ARMY TM 9-2320-365-34-2
AIR FORCE T.O. 36A12-1B-1095-12-2

TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
M1078 SERIES, 2 1/2-TON, 4 X 4,
LIGHT MEDIUM TACTICAL VEHICLES (LMTV)

VOLUME NO. 2 OF 2

MODEL	NSN	EIC
TRK, CAR., LMTV, M1078		
W/WN	2320-01-360-1898	BHH
W/O WN	2320-01-354-3385	BHD
TRK, VAN, LMTV, M1079		
W/WN	2320-01-360-1891	BHG
W/O WN	2320-01-354-3384	BHE
TRK, CHAS, LMTV, M1080		
W/O WN	2320-01-353-9098	BHC
TRK, CAR., LMTV, AIR DROP, M1081		
W/WN	2320-01-360-1899	BHJ
W/O WN	2320-01-355-3064	BHF

HOW TO USE THIS MANUAL
PAGE v

ENGINE MAINTENANCE
PAGE 3-1

FUEL SYSTEM MAINTENANCE
PAGE 4-1

TRANSMISSION MAINTENANCE
PAGE 7-1

FRONT AXLE MAINTENANCE
PAGE 9-1

REAR AXLE MAINTENANCE
PAGE 10-1

FRAME MAINTENANCE
PAGE 13-1

ENGINE MAINTENANCE
PAGE 20-1

TRANSMISSION MAINTENANCE
PAGE 21-1

POWER TRANSFER AND FINAL DRIVE ASSEMBLY MAINTENANCE
PAGE 22-1

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENTS OF THE ARMY AND THE AIR FORCE

JUNE 1998

WARNING SUMMARY

WARNING

EXHAUST GASES CAN KILL

1. **DO NOT** operate your vehicle engine in enclosed area.
2. **DO NOT** idle vehicle engine with cab windows enclosed.
3. **DO NOT** drive vehicles with inspection plates or covers removed.
4. **BE ALERT** at all times for exhaust odors.
5. **BE ALERT** for exhaust poisoning symptoms, they are:

   Headache

   Dizziness

   Sleepiness

   Loss of Muscular Control

6. **IF YOU SEE** another person with exhaust poisoning symptoms:

   Remove person from area.

   Expose to open air.

   Keep person warm.

   Do not permit person to move.

   Administer cardiopulmonary resuscitation, if necessary.*

* For cardiopulmonary resuscitation, refer to FM 21-11.

WARNING

Remove rings, bracelets, watches, necklaces, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury or short across electrical circuit and cause severe burns or electrical shock. Batteries can explode from a spark. Battery acid is harmful to skin and eyes. Always wear eye protection and rubber gloves when working with batteries.

WARNING

Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries. Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent clothing being damaged.

WARNING SUMMARY (CONT)

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 ° F (38 ° C) and for Type II is 130 ° F (50 ° C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

WARNING

Diesel fuel is flammable. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.

WARNING

After Nuclear, Biological, or Chemical (NBC) exposure of vehicle, all air filters shall be handled with extreme caution. Unprotected personnel may experience serious injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots in accordance with FM-3-4. All contaminated air filters shall be placed in double-lined plastic bags and moved swiftly to a segregation area away from the worksite. The same procedure applies for radioactive dust contamination. The Company NBC team should measure radiation prior to filter removal to determine extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP. Decontamination operation shall be in accordance with FM-3-5 and local SOP. Failure to comply may result in serious injury or death to personnel.

WARNING

Diesel fuel is flammable. Do not fill fuel tank with engine running, while smoking, or when near an open flame. Never overfill the tank or spill fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.

WARNING

Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

WARNING

Use care when removing springs. Springs are under tension and can act as projectiles when being removed. Failure to comply may result in injury to personnel.

WARNING

Use care when installing springs. Springs are under tension and can act as projectiles when being removed. Failure to comply may result in injury to personnel.

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

WARNING

Ensure exhaust system is cool before performing maintenance. Failure to comply may result in injury to personnel.

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

WARNING SUMMARY (CONT)

WARNING

Do not operate MTV vehicle with muffler removed. Toxic exhaust fumes may enter cab, resulting in serious injury or death to personnel.

WARNING

Do not work on fuel system when engine is hot; fuel can be ignited by a hot engine.

WARNING

Post signs that read "NO SMOKING WITHIN 50 FEET" when working with open fuel, fuel lines or fuel tanks. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Exhaust pipe, transmission oil lines, and transmission scavenge pump hose may be hot to the touch. Extreme care should be taken when checking exhaust pipe, transmission oil lines, and transmission scavenge pump hose for leaks. Failure to comply may result in injury to personnel.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.

WARNING

Wheel drum weighs approximately 90 lbs (41 kgs). Use the aid of an assistant to help remove wheel drum. Failure to comply may result in injury to personnel.

WARNING

Wheel drum weighs approximately 90 lbs (41 kgs). Use the aid of an assistant to help install wheel drum. Failure to comply may result in injury to personnel.

WARNING

Brake shoes may be covered with dust. Breathing this dust may be harmful to your health. Do not used compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury to personnel.

WARNING

Cage spring brake before air chamber is removed or serious injury to personnel will occur.

WARNING

Ensure air chamber is caged prior to installation. Failure to comply may result in injury to personnel.

WARNING

Ensure that tire is totally deflated before removing self-locking nuts. Failure to comply may result in serious injury or death to personnel.

WARNING

Spring brakes must be caged before attempting replacement of a rear axle wheel stud. Failure to comply may result in injury to personnel.

WARNING

Wear protective goggles to protect against possible injury from release of high pressure air. Failure to comply may result in injury to personnel.

WARNING

Prolonged contact with lubricating oil (MIL-L-2104) may cause a skin rash. Skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be well ventilated to keep fumes to a minimum. Failure to comply may result in injury to personnel.

WARNING

Hydraulic fluid (MIL-H-5606) is TOXIC. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes. Skin and clothing that come in contact with hydraulic oil should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

WARNING

Wire rope can become frayed or contain broken wires. Wear heavy leather-palmed gloves when handling wire rope. Frayed or broken wires can injure hands. Failure to comply may result in injury to personnel.

WARNING SUMMARY (CONT)

WARNING

Never let moving wire rope slide through hands, even when wearing gloves. A broken wire could cut through gloves and cut hands.

WARNING

Wear appropriate eye protection when drilling out rivets. Failure to comply may result in injury to personnel.

WARNING

Wear leather gloves at all times when handling winch cable. Do not allow cable to slide through hands even with gloves on. Broken wires may cause injury.

WARNING

Use extreme caution when working around moving cable. Failure to do so may result in serious injury to personnel.

WARNING

Do not remove radiator cap when the engine is hot; steam and hot coolant can escape and burn skin. Failure to comply may result in injury to personnel.

WARNING

Use extreme care when opening cab door with cab raised. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Ensure engine is cool before performing troubleshooting. Failure to comply may result in severe burns.

WARNING

Ensure exhaust system is cool before performing troubleshooting. Failure to comply may result in injury to personnel.

WARNING

Caution must be exercised while cab is raised. Ensure that locking mechanism is functioning properly before proceeding. Failure to comply may result in death or serious injury to personnel and damage to equipment.

WARNING

Ensure all pressure is released from engine container. Failure to comply may result in injury to personnel.

WARNING

Engine container cover weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to unpacking. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Engine assembly weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in serious injury or death to personnel or damage to equipment.

WARNING

Engine assembly weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to packing. Failure to comply may result in serious injury or death to personnel or damage to equipment.

WARNING

Storage container cover weighs approximately 130 lbs (59 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Alternator weighs approximately 50 lbs (23 kgs). The aid of an assistant is required to remove alternator. Failure to comply may result in injury to personnel.

WARNING

Alternator weighs approximately 50 lbs (23 kgs). The aid of an assistant is required to install alternator. Failure to comply may result in injury to personnel.

WARNING

Cylinder head weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (CONT)

WARNING

Cylinder head weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Wear appropriate eye protection when drilling holes. Failure to comply may result in injury to personnel.

WARNING

Flywheel housing weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Flywheel housing weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Engine compartment and components may be hot to the touch. Extreme care should be taken when adjusting idle speed. Failure to comply may result in injury to personnel.

WARNING

Engine compartment includes a partially covered fan blade. Extreme care should be taken when working in the engine compartment. Failure to comply may result in injury to personnel.

WARNING

Use care when removing retaining clips. Retaining clips are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

WARNING

Use care when installing retaining clips. Retaining clips are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

WARNING

Clutch housing is assembled under tension. Use caution during disassembly. Failure to comply may result in injury to personnel.

WARNING

Loosen C-clamps slowly and evenly to release tension. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Tighten C-clamps slowly and evenly to apply tension. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Ensure engine is cool before performing maintenance. Failure to comply may result in injury to personnel.

WARNING

Torque converter module weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel.

WARNING

Torque converter module weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Transmission weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Transmission weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (CONT)

WARNING

Use care when removing valve body parts retained by retaining pins. Valve body parts are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

WARNING

Use care when installing valve body parts retained by retaining pins. Valve body parts are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

WARNING

Control valve module weighs approximately 65 lbs (30 kgs). Position a floor jack under control module prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Control valve module weighs approximately 65 lbs (30 kgs). Position a floor jack under control module prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front axle assembly weighs approximately 1580 lbs (717 kgs). Front axle assembly must be supported on a transmission/differential lift during removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front axle assembly weighs approximately 1580 lbs (717 kgs). Front axle assembly must be supported on a transmission/ differential lift during installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Steering knuckle weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Steering knuckle weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Rear axle assembly weighs approximately 1580 lbs (717 kgs). Rear axle assembly must be supported on a transmission/ differential lift during removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Rear axle assembly weighs approximately 1580 lbs (717 kgs). Rear axle assembly must be supported on a transmission/ differential lift during installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Rear axle differential carrier weighs approximately 400 lbs (182 kgs). Rear axle differential carrier must be supported on transmission/ differential lift during removal. Failure to comply may cause serious injury to personnel or damage to equipment.

WARNING

Adhesive causes immediate bonding on contact with eyes, skin, or clothing and also gives off harmful vapors. Wear protective goggles and use in well-ventilated area. If adhesive get in eyes, try to keep eyes open, flush eyes with water for 15 minutes, and get immediate medical attention. Failure to comply may result in injury to personnel.

WARNING SUMMARY (CONT)

WARNING

Steering gear assembly weighs approximately 130 lbs (59 kgs). Support steering gear assembly on jack before dismounting from chassis. Failure to comply can cause injury to personnel or damage to equipment.

WARNING

Steering gear assembly weighs approximately 130 lbs (59 kgs). Support steering gear assembly on jack during installation. Failure to comply may cause injury to personnel or damage to equipment.

WARNING

Parachute suspension assembly weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Parachute suspension assembly weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Frame plate weighs approximately 50 lbs (23 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Frame plate weighs approximately 50 lbs (23 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Lifting beam weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front lifting bracket assembly weighs approximately 300 lbs (136 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front lifting bracket assembly weighs approximately 300 lbs (136 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Lifting beam weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Frame rail weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Frame rail weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Subframe rail weighs approximately 180 lbs (82 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Subframe rail weighs approximately 180 lbs (82 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front crossmember weighs approximately 200 lbs (91 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (CONT)

WARNING

Front crossmember weighs approximately 200 lbs (91 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Intermediate crossmember weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Intermediate crossmember weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

WARNING

Do not attempt to repair or disassemble leaf springs. Leaf springs are under extreme tension. Failure to comply may result in serious injury or death to personnel.

WARNING

Wear protective goggles to protect against possible injury from release of high pressure air. Failure to comply may result in injury to personnel.

WARNING

Brace cab prior to removal of cotter pin from cab tilt cylinder mounting bolt. Failure to comply may result in serious injury or death to personnel or damage to equipment.

WARNING

Cab must be braced on cab support tool prior to removal of cotter pin from cab tilt cylinder mounting bolt. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Standard cab weighs approximately 1400 lbs (636 kgs). M1081 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Cab may swing forward slightly when screws are removed. An assistant is required to steady cab. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Brace cab with cab support tool before installing locking arm, spacer, washer, and cotter pin on tilt cylinder mounting bolt. Failure to comply may result in serious injury or death to personnel.

WARNING

After cab is lowered on cab support tool, return cab tilt selector knob to the RAISE position for added safety. Failure to comply may result in injury to personnel.

WARNING

Goggles and gloves must be worn when working with glass. Failure to comply may result in injury to personnel.

WARNING

Cargo bed weighs approximately 2610 lbs (1185 kgs). Attach a suitable lifting device to four corner tiedown points prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Cargo bed weighs approximately 2610 lbs (1185 kgs). Attach a suitable lifting device to four corner tiedown points prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

11K Self-recovery winch (SRW) weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (CONT)

WARNING

11K Self-recovery winch (SRW) weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Use care when removing screws. Pump is under spring tension. Failure to comply may result in injury to personnel.

WARNING

Use care when installing screws, pump is under spring tension. Failure to comply may result in injury to personnel.

WARNING

Machine gun ring assembly weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Some chemical agents (detergents, solvents, alkalis, etc.) may irritate skin or be harmful to the eyes, nose, and throat. Some must be used only with adequate ventilation. When working with potentially harmful chemical substances, read and heed all warnings on the product labels and follow prescribed safety precautions. When working with any potentially harmful substance; including live steam, hot water, and compressed air; wear appropriate safety equipment and use extreme care. Failure to comply may result in injury to personnel.

WARNING

High pressure steam can blow particles or chemicals into eyes, can cause severe burns, and creates hazardous noise levels. Wear appropriate eye, skin, and hearing protection when using high pressure steam. Failure to comply may result in serious injury to personnel.

WARNING

Follow these general precautions whenever using these methods of crack detection to prevent personnel injury. Never shine the black light directly into the eyes. Do not smoke or eat while using inspection chemicals. Avoid getting chemicals on clothing. Avoid inhaling spray mist, airborne powder dust and solvent vapors. Provide adequate ventilation. Store chemicals away from open flames and sources of heat. Failure to comply may result in injury to personnel.

WARNING

Crankshaft weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Diesel fuel is flammable. Keep diesel fuel away from open fire and keep a fire extinguisher within easy reach when working with diesel fuel. Do not smoke when working with diesel fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.

WARNING

Crankshaft weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Use extreme care when handling heated gear. Failure to comply may result in injury to personnel.

WARNING

Use extreme care when handling heated camshaft gear. Failure to comply may result in injury to personnel.

WARNING

Torque converter housing weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Torque converter housing weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

C3/C4 clutch spring assemblies are under pressure. Loosen bolts evenly during disassembly. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (CONT)

WARNING

Transfer case weighs approximately 500 lbs (227 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Transfer case module weighs approximately 500 lbs (227 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Transfer case cover weighs approximately 75 lbs (34 kgs). The aid of an assistant is required to safely lift it. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Front axle differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to moving. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Rear axle differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to moving. Failure to comply may result in injury to personnel or damage to equipment.

CHANGE NO. 2

HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
Washington, D.C., 20 August 2005

TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
M1078 SERIES, 2-1/2-TON, 4x4,
LIGHT MEDIUM TACTICAL VEHICLE
(LMTV)

VOLUME NO. 2 OF 2

TM 9-2320-365-34-2, 17 June 1998, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the outer margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration.

Remove Pages	Insert Pages
A thru D	A thru D
none	Change 2 Authentication Sheet
3-23 and 3-24	3-23 and 3-24
3-45 and 3-46	3-45 and 3-46
3-87 and 3-88	3-87 and 3-88
3-111 and 3-112	3-111 and 3-112
3-133 and 3-134	3-133 and 3-134
none	3-134.1/(3-134.2 Blank)
7-1 thru 7-4	7-1 thru 7-4
7-7 and 7-8	7-7 and 7-8
7-16.1/(7-16.2 Blank)	7-16.1/(7-16.2 Blank)
7-17 and 7-18	7-17 and 7-18
7-29 and 7-30	7-29 and 7-30
7-35 and 7-36	7-35 and 7-36
7-45 and 7-46	7-45 and 7-46
7-117 thru 7-120	7-117 thru 7-120
8-1 and 8-2	8-1 and 8-2
8-5 thru 8-10	8-5 thru 8-10
none	8-10.1/(8-10.2 Blank)
none	8-11 thru 8-16
9-3 thru 9-8	9-3 thru 9-8
9-8.1/(9-8.2 Blank)	9-8.1 and 9-8.2
none	9-8.3/(9-8.4 Blank)
9-11 thru 9-16	9-11 thru 9-16
9-16.1/(9-16.2 Blank)	9-16.1 and 9-16.2
none	9-16.3/(9-16.4 Blank)
9-17 thru 9-20	9-17 thru 9-20
9-20.1/(9-20.2 Blank)	9-20.1 and 9-20.2
9-21 and 9-22	9-21 and 9-22
10-8.1/(10-8.2 Blank)	10-8.1 and 10-8.2
10-11 and 10-12	10-11 and 10-12
none	10-12.1/(10-12.2 Blank)
10-13 and 10-14	10-13 and 10-14
none	10-16.1 and 10-16.2
10-17 and 10-18	10-17 and 10-18
12-11 and 12-12	12-11 and 12-12
13-53 and 13-54	13-53 and 13-54
13-69 thru 13-72	13-69 thru 13-72
13-75 and 13-76	13-75 and 13-76
13-91 and 13-92	13-91 and 13-92
13-95/(13-96 Blank)	13-95/(13-96 Blank)
14-1 thru 14-4	14-1 thru 14-4
none	14-4.1 and 14-4.2
14-5 thru 14-8	14-5 thru 14-8
15-1 thru 15-4	15-1 thru 15-4
15-27 and 15-28	15-27 and 15-28
15-119 thru 15-122	15-119 thru 15-122
15-122.1/(15-122.2 Blank)	15-122.1.and 15-122.2
15-123 and 15-124	15-123 and 15-124
15-124.1 and 15-124.2	none
15-125 thru 15-128	15-125 thru 15-128
none	15-128.1 and 15-128.2
15-129/(15-130 Blank)	15-129/(15-130Blank)
16-28.1 and 16-28.2	16-28.1 and 16-28.2
16-40.1 thru 16-40.3/ (16-40.4 Blank)	16-40.1 thru 16-40.4
18-1 and 18-2	18-1 and 18-2
18-27/(18-28 Blank)	18-27 and 18-28
none	18-29 thru 18-58
19-1 and 19-2	19-1 and 19-2
none	19-4.1/(19-4.2 Blank)
19-5 and 19-6	19-5 and 19-6
19-15 thru 19-17/ (19-18 Blank)	19-15 thru 19-17/ (19-18 Blank)
20-5 and 20-6	20-5 and 20-6
21-9 and 21-10	21-9 and 21-10
21-11 and 21-12	none
22-1 thru 22-2	22-1 thru 22-2

Place this change sheet in the front of the publication for reference purposes.

Remove Pages	Insert Pages	Remove Pages	Insert Pages
22-3 and 22-4	none		
22-5 and 22-6	(22-5 Blank)/22-6		
23-1 and 23-2	23-1 and 23-2		
23-15 thru 23-18	23-15 thru 23-18		
24-1 and 24-2	24-1 and 24-2		
24-15 thru 24-18	24-15 thru 24-18		
C-5 thru C-8	C-5 thru C-8		
F-3 thru F-6	F-3 thru F-6		
F-9 thru F-12	F-9 thru F-12		
H-1 thru H-4	H-1 thru H-4		
INDEX-1 thru INDEX-4	INDEX-1 thru INDEX-4		
INDEX-9 and INDEX-10	INDEX-9 and INDEX-10		
FO-1 FP-3/(FP-4 Blank)	FO-1 FP-3/(FP-4 Blank)		
FO-1 FP-61/(FP-62 Blank)	FO-1 FP-61/(FP-62 Blank)		
Metric Conversion Chart	Metric Conversion Chart		
/PIN	/PIN		

Place this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

*O*fficial:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0401509

By Order of the Secretary of the Air Force:

JOHN P. JUMPER
General, United States Air Force
Chief of Staff

*O*fficial:

GREGORY S. MARTIN
General, United States Air Force
Commander, Air Force Materiel Command

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 380937, requirements for Family of Medium Tactical Vehicles (FMTVA1) TM 9-2320-365-34-2.

CHANGE NO. 1

**HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE**

Washington, D.C., 31 July 2001

TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
M1078 SERIES, 2-1/2-TON, 4x4,
LIGHT MEDIUM TACTICAL VEHICLE
(LMTV)

VOLUME NO. 2 OF 2

TM 9-2320-365-34-2, 17 June 1998, is changed as follows:
1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the outer margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration.

Remove Pages	Insert Pages
c thru f	c thru f
none	g thru r
none	A thru D
i thru vi	i thru vi
none	vii/(viii Blank)
3-15 thru 3-20	3-15 thru 3-20
3-23 thru 3-26	3-23 thru 3-26
none	3-26.1 and 3-26.2
3-27 thru 3-42	3-27 thru 3-42
none	3-42.1/(3-42.2 Blank)
3-43 and 3-44	3-43 and 3-44
none	3-44.1/(3-44.2 Blank)
3-45 thru 3-48	3-45 thru 3-48
3-51 thru 3-54	3-51 thru 3-54
none	3-54.1/(3-54.2 Blank)
3-55 thru3-58	3-55 thru 3-58
3-81 thru 3-84	3-81 thru 3-84
3-87 and 3-88	3-87 and 3-88
none	3-88.1/(3-88.2 Blank)
5-1 thru 5-4	5-1 thru 5-4
none	5-4.1 and 5-4.2
5-5 thru 5-7/(5-8 Blank)	5-5 thru 5-7/(5-8 Blank)
6-1 and 6-2	6-1 and 6-2
6-27 thru 6-30	6-27 thru 6-30
6-33 thru 6-36	6-33 thru 6-36
none	6-36.1 thru 6-36.15/(6-36.16 Blank)
6-37 and 6-38	6-37 and 6-38
7-1 thru 7-4	7-1 thru 7-4
none	7-16.1/(7-16.2 Blank)
7-17 and 7-18	7-17 and 7-18
7-21 and 7-22	7-21 and 7-22
7-25 thru 7-28	7-25 thru 7-28
none	7-28.1 thru 7-28.14
7-29 thru 7-42	7-29 thru 7-42
none	7-42.1/(7-42.2 Blank)
7-43 thru 7-46	7-43 thru 7-46
7-51 and 7-52	7-51 and 7-52
7-67 and 7-68	7-67 and 7-68
7-71 and 7-72	7-71 and 7-72
7-87 thru 7-92	7-87 thru 7-92
none	7-99 thru 7-127/(7-128 Blank)
8-1 thru 8-10	8-1 thru 8-10
9-1 thru 9-8	9-1 thru 9-8
none	9-8.1/(9-8.2 Blank)
9-9 and 9-10	9-9 and 9-10
9-15 and 9-16	9-15 and 9-16
none	9-16.1/(9-16.2 Blank)
9-17 thru 9-20	9-17 thru 9-20
none	9-20.1/(9-20.2 Blank)
9-21 and 9-22	9-21 and 9-22
10-1 thru 10-4	10-1 thru 10-4
none	10-4.1/(10-4.2 Blank)
10-5 thru 10-8	10-5 thru 10-8
none	10-8.1/(10-8.2 Blank)
10-9 thru 10-17/(10-18 Blank)	10-9 thru 10-18
11-1 and 11-2	11-1 and 11-2
11-7 thru 11-9/ (11-10 Blank)	11-7 thru 11-9/ (11-10 Blank)
12-1 and 12-2	12-1 and 12-2
12-15 and 12-16	12-15/(12-16 Blank)
12-17 and 12-18	none
13-1 and 13-2	13-1 and 13-2
13-9 thru 13-20	13-9 thru 13-20
13-25 and 13-26	13-25 and 13-26
13-41 thru 13-46	13-41 thru 13-46
13-49 thru 13-56	13-49 thru 13-56

Place this change sheet in the front of the publication for reference purposes.

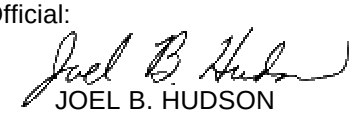
Remove Pages	Insert Pages
13-59 and 13-60	13-59 and 13-60
13-63 and 13-64	13-63 and 13-64
13-67 thru 13-78	13-67 thru 13-78
none	13-91 thru 13-95/(13-96 Blank)
14-1 thru 14-20	14-1 thru 14-20
14-25 and 14-26	14-25 and 14-26
14-31 and 14-32	14-31 and 14-32
15-1 thru 15-6	15-1 thru 15-6
15-11 and 15-12	15-11 and 15-12
none	15-12.1/(15-12.2 Blank)
15-13 thru 15-22	15-13 thru 15-22
15-25 and 15-26	15-25 and 15-26
15-29 and 15-30	15-29 and 15-30
15-33 thru 15-48	15-33 thru 15-48
none	15-48.1/(15-48.2 Blank)
15-51 and 15-52	15-51 and 15-52
none	15-52.1/(15-52.2 Blank)
15-53 thru 15-58	15-53 thru 15-58
15-63 and 15-64	15-63 and 15-64
15-67 and 15-68	15-67 and 15-68
none	15-70.1/(15-70.2 Blank)
none	15-72.1/(15-72.2 Blank)
15-73 thru 15-76	15-73 thru 15-76
15-79 and 15-80	15-79 and 15-80
none	15-80.1/(15-80.2 Blank)
15-81 thru 15-84	15-81 thru 15-84
15-101 thru 15-104	15-101 thru 15-104
15-115 and 15-116	15-115 and 15-116
none	15-116.1 thru 15-116.5/ (15-116.6 Blank)
15-117 thru 15-122	15-117 thru 15-122
none	15-122.1/(15-122.2 Blank)
15-123 and 15-124	15-123 and 15-124
none	15-124.1 and 15-124.2
15-125 thru 15-129/ (15-130 Blank)	15-125 thru 15-129/ (15-130 Blank)
16-19 thru 16-24	16-19 thru 16-24
16-27 and 16-28	16-27 and 16-28
none	16-28.1 and 16-28.2
16-29 thru 16-32	16-29 thru 16-32
none	16-32.1/(16-32.2 Blank)
16-35 and 16-36	16-35 and 16-36
none	16-36.1/(16-36.2 Blank)
16-39 and 16-40	16-39 and 16-40
none	16-40.1 thru 16-40.3/(16-40.4 Blank)
16-41 and 16-42	16-41 and 16-42
17-1 thru 17-8	17-1 thru 17-7/(17-8 Blank)
17-9 thru 17-12	none
18-1 thru 18-28	18-1 thru 18-27/(18-28 Blank)
18-29 thru 18-123/ (18-124 Blank)	none
19-1 thru 19-17/ (19-18 Blank)	19-1 thru 19-17/ (19-18 Blank)
20-1 and 20-2	20-1 and 20-2
20-5 and 20-6	20-5 and 20-6
20-11 and 20-12	20-11 and 20-12
20-39 and 20-40	20-39 and 20-40
20-49 and 20-50	20-49 and 20-50
20-57 and 20-58	20-57 and 20-58
21-9 thru 21-12	21-9 thru 21-12
22-1 thru 22-10	22-1 thru 22-10
23-1 thru 23-4	23-1 thru 23-4
23-7 and 23-8	23-7 and 23-8
23-13 thru 23-19/ (23-20 Blank)	23-13 thru 23-19/ (23-20 Blank)
24-1 thru 24-4	24-1 thru 24-4
24-7 and 24-8	24-7 and 24-8
24-13 thru 24-19/ (24-20 Blank)	24-13 thru 24-19/ (24-20 Blank)
A-1 and A-2	A-1 and A-2
C-1 thru C-8	C-1 thru C-8
D-3 thru D-6	D-3 thru D-6
D-19 thru D-24	D-19 thru D-24
D-31 thru D-40	D-31 thru D-40
D-67/(D-68 Blank)	D-67 and D-68
none	D-69 thru D-71/(D-72 Blank)
F-1 thru F-11/(F-12 Blank)	F-1 thru F-12
G-1/(G-2 Blank)	G-1/(G-2 Blank)
none	H-1 thru H-4
INDEX-1 thru INDEX-9/ (INDEX-10 Blank)	INDEX-1 thru INDEX-10
DA Form 2028-2 Sample	DA Form 2028 Sample
DA Form 2028-2	DA Form 2028
DA Form 2028-2	DA Form 2028
DA Form 2028-2	DA Form 2028
FO-1 FP-1/(FP-2 Blank)	FO-1 FP-1/(FP-2 Blank)
thru FP-19/(FP-20 Blank)	thru FP-19/(FP-20 Blank)
FO-1 FP-23/(FP-24 Blank)	FO-1 FP-23/(FP-24 Blank)
FO-1 FP-27/(FP-28 Blank)	FO-1 FP-27/(FP-28 Blank)
thru FP-61/(FP-62 Blank)	thru FP-61/(FP-62 Blank)
FO-1 FP-65/(FP-66 Blank)	FO-1 FP-65/(FP-66 Blank)
and FP-67/(FP-68 Blank)	and FP-67/(FP-68 Blank)
Back Cover	Back Cover

Place this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0110108

DISTRIBUTION: To be distributed in accordance with the initial distribution number (IDN) 380937, requirements for TM 9-2320-365-34-2

LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

NOTE: New or changed material is indicated by a vertical bar in the outer margin of the page.

Dates of issue for original and changed pages are:

Original ..... 0 .....17 June 1998
Change ..... 1 ..... 31 July 2001
Change ..... 2 .....20 August 2005

THE TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 1400, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover	1
Blank	0
a and b	0
c thru f	1
g thru r Added	1
A thru D	2
i	1
ii	0
iii thru vi	1
vii Added	1
viii Blank Added	1
3-1 thru 3-14	0
3-15 thru 3-19	1
3-20 thru 3-22	0
3-23	1
3-24	2
3-25	0
3-26	1
3-26.1 and 3-26.2 Added	1
3-27 thru 3-30	1
3-31	0
3-32 thru 3-39	1
3-40	0
3-41 and 3-42	1
3-42.1 Added	1
3-42.2 Blank Added	1
3-43 and 3-44	1
3-44.1 Added	1
3-44.2 Blank Added	1
3-45	1
3-46	2
3-47 and 3-48	1
3-49 thru 3-51	0
3-52 thru 3-54	1
3-54.1 Added	1
3-54.2 Blank Added	1
3-55 and 3-56	1
3-57	0
3-58	1
3-59 thru 3-80	0
3-81 thru 3-83	1
3-84 thru 3-86	0
3-87	2
3-88	1
3-88.1 Added	1
3-88.2 Blank Added	1
3-89 thru 3-110	0
3-111	2
3-112 thru 3-132	0
3-133 and 3-134	2
3-134.1 Added	2
3-134.2 Blank Added	2
3-135	0
3-136 Blank	0
4-1 thru 4-46	0
5-1	1
5-2	0
5-3 and 5-4	1
5-4.1 and 5-4.2 Added	1
5-5 thru 5-7	1
5-8 Blank	0
6-1	1
6-2 thru 6-26	0
6-27 and 6-28	1
6-29	0
6-30	1
6-31 and 6-32	0
6-33 thru 6-36	1
6-36.1 thru 6-36.15 Added	1
6-36.16 Blank Added	1
6-37	1
6-38 thru 6-44	0
7-1	1
7-2	2
7-3	1
7-4	2
7-5 thru 7-7	0
7-8	2
7-9 thru 7-16	0
7-16.1	2
7-16.2 Blank Added	1
7-17	1
7-18	2
7-19 and 7-20	0
7-21	1
7-22 thru 7-24	0
7-25 thru 7-28	1
7-28.1 thru 7-28.14 Added	1
7-29	1
7-30	2
7-31 thru 7-35	1
7-36	2
7-37 thru 7-42	1
7-42.1 Added	1
7-42.2 Blank Added	1
7-43 and 7-44	1
7-45	2
7-46	1
7-47 thru 7-51	0
7-52	1
7-53 thru 7-66	0
7-67	1
7-68 thru 7-70	0
7-71 and 7-72	1
7-73 thru 7-87	0
7-88 thru 7-91	1
7-92 thru 7-98	0
7-99 thru 7-116 Added	1
7-117	2
7-118 and 7-119 Added	1
7-120	2
7-121 thru 7-127 Added	1
7-128 Blank Added	1
8-1	2
8-2 and 8-3	1
8-4	0
8-5	2
8-6 and 8-7	1
8-8	2
8-9 and 8-10	2

* Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

Page No.	*Change No.
8-10.1 Added	2
8-10.2 Blank Added	2
8-11 thru 8-16 Added	2
9-1	0
9-2	1
9-3	0
9-4 and 9-5	2
9-6	0
9-7	1
9-8	2
9-8.1 and 9-8.2	2
9-8.3 Added	2
9-8.4 Blank Added	2
9-9	1
9-10	1
9-11	0
9-12 thru 9-15	2
9-16	1
9-16.1 and 9-16.2	2
9-16.3 Added	2
9-16.4 Blank Added	2
9-17	2
9-18	1
9-19	2
9-20	1
9-20.1 and 9-20.2	2
9-21	2
9-22 thru 9-30	0
10-1	0
10-2 thru 10-4	1
10-4.1 Added	1
10-4.2 Blank Added	1
10-5 thru 10-8	1
10-8.1 and 10-8.2	2
10-9 and 10-10	1
10-11 and 10-12	2
10-12.1 Added	2
10-12.2 Blank Added	2
10-13 and 10-14	2
10-15 and 10-16	1
10-16.1 and 10-16.2 Added	2
10-17	2
10-18	1
11-1	0
11-2	1
11-3 thru 11-7	0
11-8 and 11-9	1
11-10 Blank	0
12-1	1
12-2 thru 12-11	0
12-12	2
12-13 and 12-14	0
12-15	1
12-16 Blank	1
12-17 and 12-18 Deleted	1
13-1	1
13-2 thru 13-8	0
13-9 thru 13-11	1
13-12	0
13-13	1
13-14	0
13-15	1
13-16	0
13-17	1
13-18 and 13-19	0
13-20	1
13-21 thru 13-24	0
13-25	1
13-26 thru 13-41	0
13-42	1
13-43	0
13-44 and 13-45	1
13-46 thru 13-49	0
13-50	1
13-51	0
13-52	1
13-53	2
13-54 thru 13-56	1
13-57 and 13-58	0
13-59	1
13-60 thru 13-62	0
13-63 and 13-64	1
13-65 and 13-66	0
13-67	1
13-68 and 13-69	0
13-70	2
13-71	1
13-72	2
13-73 and 13-74	1
13-75	0
13-76	2
13-77 and 13-78	1
13-79 thru 13-90	0
13-91	2
13-92 thru 13-94 Added	1
13-95	2
13-96 Blank Added	1
14-1	0
14-2 thru 14-4	2
14-4.1 and 14-4.2 Added	2
14-5 thru 14-8	2
14-9 and 14-10	1
14-11	0
14-12 thru 14-20	1
14-21 thru 14-25	0
14-26	1
14-27 thru 14-31	0
14-32	1
14-33 thru 14-37	0
14-38 Blank	0
15-1	2
15-2	1
15-3	2
15-4 and 15-5	1
15-6 thru 15-11	0
15-12	1
15-12.1 Added	1
15-12.2 Blank Added	1
15-13	1
15-14	0
15-15 thru 15-19	1
15-20	0
15-21 and 15-22	1
15-23 and 15-24	0
15-25 and 15-26	1
15-27 and 15-28	2
15-29 and 15-30	1
15-31 and 15-32	0
15-33 and 15-34	1
15-35	0
15-36 thru 15-45	1
15-46	0
15-47 and 15-48	1
15-48.1 Added	1
15-48.2 Blank Added	1
15-49 and 15-50	0
15-51 and 15-52	1
15-52.1 Added	1
15-52.2 Blank Added	1
15-53	1
15-54	0
15-55	1
15-56	0
15-57	1
15-58 thru 15-62	0
15-63	1
15-64 thru 15-67	0
15-68	1
15-69 and 15-70	0
15-70.1 Added	1

* Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

Page No.	*Change No.
15-70.2 Blank Added	1
15-71 and 15-72	0
15-72.1 Added	1
15-72.2 Blank Added	1
15-73	1
15-74 and 15-75	0
15-76	1
15-77 thru 15-79	0
15-80	1
15-80.1 Added	1
15-80.2 Blank Added	1
15-81	1
15-82 and 15-83	0
15-84	1
15-85 thru 15-101	0
15-102 and 15-103	1
15-104 thru 15-115	0
15-116	1
15-116.1 thru 15-116.5 Added	1
15-116.6 Blank Added	1
15-117 thru 15-119	1
15-120 thru 15-122	2
15-122.1 and 15-122.2	2
15-123 thru 15-128	2
15-128.1 and 15-128.2 Added	2
15-129	2
15-130 Blank	0
16-1 thru 16-18	0
16-19 thru 16-21	1
16-22	0
16-23	1
16-24 thru 16-26	0
16-27 and 16-28	1
16-28.1 Added	1
16-28.2	2
16-29 and 16-30	1
16-31	0
16-32	1
16-32.1 Added	1
16-32.2 Blank Added	1
16-33 and 16-34	0
16-35 and 16-36	1
16-36.1 Added	1
16-36.2 Blank Added	1
16-37 and 16-38	0
16-39 and 16-40	1
16-40.1	2
16-40.2 Added	1
16-40.3 and 16-40.4	2
16-41 and 16-42	1
17-1 thru 17-7	1
17-8 Blank	1
17-9 thru 17-11 Deleted	1
17-12 Blank Deleted	1
18-1	2
18-2 thru 18-26	1
18-27 and 18-28	2
18-29 thru 18-58 Added	2
18-59 thru 18-123 Deleted	1
18-124 Blank Deleted	1
19-1	1
19-2	2
19-3	0
19-4	1
19-4.1 Added	2
19-4.2 Blank Added	2
19-5 and 19-6	2
19-7	0
19-8 thru 19-15	1
19-16 and 19-17	2
19-18 Blank	0
20-1 and 20-2	1
20-3 and 20-4	0
20-5	1
20-6	2
20-7 thru 20-10	0
20-11	1
20-12 thru 20-39	0
20-40	1
20-41 thru 20-49	0
20-50	1
20-51 thru 20-57	0
20-58	1
20-59 and 20-60	0
21-1 thru 21-9	0
21-10	2
21-11 and 21-12 Deleted	2
21-13 thru 21-77	0
21-78 Blank	0
22-1 and 22-2	2
22-3 and 22-4 Deleted	2
22-5 Blank	2
22-6	2
22-7 thru 22-9	1
22-10 thru 22-22	0
23-1	0
23-2	2
23-3	1
23-4 thru 23-6	0
23-7	1
23-8 thru 23-12	0
23-13 thru 23-14	1
23-15	2
23-16	0
23-17	2
23-18 and 23-19	1
23-20 Blank	0
24-1	0
24-2	2
24-3	1
24-4 thru 24-6	0
24-7	1
24-8 thru 24-12	0
24-13 and 24-14	1
24-15	2
24-16	0
24-17	2
24-18 and 24-19	1
24-20 Blank	0
A-1	0
A-2	1
A-3 and A-4	0
B-1 thru B-5	0
B-6 Blank	0
C-1 thru C-5	1
C-6 and C-7	2
C-8	1
D-1 thru D-3	0
D-4 and D-5	1
D-6 thru D-19	0
D-20 thru D-23	1
D-24 thru D-31	0
D-32	1
D-33	0
D-34 thru D-39	1
D-40 thru D-66	0
D-67 and D-68	1
D-69 thru D-71 Added	1
D-72 Blank Added	1
E-1 thru E-8	0
F-1	0
F-2 and F-3	1
F-4 and F-5	2
F-6 thru F-9	1
F-10 thru F-12	2
G-1	1
G-2 Blank	0
H-1 Added	1

* Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

Page No.	*Change No.
H-2 and H-3	2
H-4 Added	1
INDEX-1 thru INDEX-3	2
INDEX-4 thru INDEX-8	1
INDEX-9	2
INDEX-10	1
Glossary-1	0
Glossary-2 Blank	0
FO-1 FP-1	1
FO-1 FP-2 Blank	0
FO-1 FP-3	2
FO-1 FP-4 Blank	0
FO-1 FP-5	1
FO-1 FP-6 Blank	0
FO-1 FP-7	1
FO-1 FP-8 Blank	0
FO-1 FP-9	1
FO-1 FP-10 Blank	0
FO-1 FP-11	1
FO-1 FP-12 Blank	0
FO-1 FP-13	1
FO-1 FP-14 Blank	0
FO-1 FP-15	1
FO-1 FP-16 Blank	0
FO-1 FP-17	1
FO-1 FP-18 Blank	0
FO-1 FP-19	1
FO-1 FP-20 Blank	0
FO-1 FP-21	0
FO-1 FP-22 Blank	0
FO-1 FP-23	1
FO-1 FP-24 Blank	0
FO-1 FP-25	0
FO-1 FP-26 Blank	0
FO-1 FP-27	1
FO-1 FP-28 Blank	0
FO-1 FP-29	1
FO-1 FP-30 Blank	0
FO-1 FP-31	1
FO-1 FP-32 Blank	0
FO-1 FP-33	1
FO-1 FP-34 Blank	0
FO-1 FP-35	1
FO-1 FP-36 Blank	0
FO-1 FP-37	1
FO-1 FP-38 Blank	0
FO-1 FP-39	1
FO-1 FP-40 Blank	0
FO-1 FP-41	1
FO-1 FP-42 Blank	0
FO-1 FP-43	1
FO-1 FP-44 Blank	0
FO-1 FP-45	1
FO-1 FP-46 Blank	0
FO-1 FP-47	1
FO-1 FP-48 Blank	0
FO-1 FP-49	1
FO-1 FP-50 Blank	0
FO-1 FP-51	1
FO-1 FP-52 Blank	0
FO-1 FP-53	1
FO-1 FP-54 Blank	0
FO-1 FP-55	1
FO-1 FP-56 Blank	0
FO-1 FP-57	1
FO-1 FP-58 Blank	0
FO-1 FP-59	1
FO-1 FP-60 Blank	0
FO-1 FP-61	2
FO-1 FP-62 Blank	0
FO-1 FP-63	0
FO-1 FP-64 Blank	0
FO-1 FP-65	1
FO-1 FP-66 Blank	0
FO-1 FP-67	1
FO-1 FP-68 Blank	0
FO-2 FP-1	0
FO-2 FP-2 Blank	0
FO-2 FP-3	0
FO-2 FP-4 Blank	0
FO-2 FP-5	0
FO-2 FP-6 Blank	0
FO-2 FP-7	0
FO-2 FP-8 Blank	0
FO-3 FP-1	0
FO-3 FP-2 Blank	0
FO-3 FP-3	0
FO-3 FP-4 Blank	0
FO-3 FP-5	0
FO-3 FP-6 Blank	0
FO-4 FP-1	0
FO-4 FP-2 Blank	0
FO-4 FP-3	0
FO-4 FP-4 Blank	0
FO-5 FP-1	0
FO-5 FP-2 Blank	0
FO-5 FP-3	0
FO-5 FP-4 Blank	0
FO-5 FP-5	0
FO-5 FP-6 Blank	0

* Zero in this column indicates an original page.

TECHNICAL MANUAL
NO. 9-2320-365-34-2

TECHNICAL ORDER
NO. 36A12-1B-1095-12-2

HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE

Washington, D.C., 17 June 1998

Direct Support and General Support Maintenance Manual

M1078 SERIES, 2 1/2-TON, 4 x 4, LIGHT MEDIUM TACTICAL VEHICLES (LMTV)

VOLUME NO. 2 OF 2

MODEL	NSN	EIC
TRK, CAR., LMTV, M1078		
W/WN	**2320-01-360-1898**	**BHH**
W/O WN	**2320-01-354-3385**	**BHD**
TRK, VAN, LMTV, M1079		
W/WN	**2320-01-360-1891**	**BHG**
W/O WN	**2320-01-354-3384**	**BHE**
TRK, CHAS, LMTV, M1080		
W/O WN	**2320-01-353-9098**	**BHC**
TRK, CAR., LMTV, AIR DROP, M1081		
W/WN	**2320-01-360-1899**	**BHJ**
W/O WN	**2320-01-355-3064**	**BHF**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or Email your letter or DA Form 2028 direct to: AMSTA-LC-CI/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

TABLE OF CONTENTS

Page

HOW TO USE THIS MANUAL iii

CHAPTER 3 ENGINE MAINTENANCE 3-1

Section I **Introduction** 3-1
Section II **Maintenance Procedures** 3-2

TABLE OF CONTENTS (CONT)

Page

CHAPTER 4 FUEL SYSTEM MAINTENANCE 4-1
Section I Introduction 4-1
Section II Maintenance Procedures 4-2

CHAPTER 5 COOLING SYSTEM MAINTENANCE 5-1
Section I Introduction 5-1
Section II Maintenance Procedures 5-2

CHAPTER 6 ELECTRICAL SYSTEM MAINTENANCE 6-1
Section I Introduction 6-1
Section II Maintenance Procedures 6-2

CHAPTER 7 TRANSMISSION MAINTENANCE 7-1
Section I Introduction 7-1
Section II Maintenance Procedures 7-2

CHAPTER 8 POWER TRANSFER AND FINAL DRIVE ASSEMBLY MAINTENANCE 8-1
Section I Introduction 8-1
Section II Maintenance Procedures 8-2

CHAPTER 9 FRONT AXLE MAINTENANCE 9-1
Section I Introduction 9-1
Section II Maintenance Procedures 9-2

CHAPTER 10 REAR AXLE MAINTENANCE 10-1
Section I Introduction 10-1
Section II Maintenance Procedures 10-2

CHAPTER 11 BRAKE SYSTEM MAINTENANCE 11-1
Section I Introduction 11-1
Section II Maintenance Procedures 11-2

CHAPTER 12 STEERING SYSTEM MAINTENANCE 12-1
Section I Introduction 12-1
Section II Maintenance Procedures 12-2

CHAPTER 13 FRAME MAINTENANCE 13-1
Section I Introduction 13-1
Section II Maintenance Procedures 13-2

CHAPTER 14 SUSPENSION MAINTENANCE 14-1
Section I Introduction 14-1
Section II Maintenance Procedures 14-2

CHAPTER 15 BODY AND CAB MAINTENANCE 15-1
Section I Introduction 15-1
Section II Maintenance Procedures 15-2

CHAPTER 16 11K SELF-RECOVERY WINCH (SRW) MAINTENANCE 16-1
Section I Introduction 16-1
Section II Maintenance Procedures 16-2

CHAPTER 17 HYDRAULIC SYSTEM MAINTENANCE 17-1
Section I Introduction 17-1
Section II Maintenance Procedures 17-2

CHAPTER 18 KIT MAINTENANCE 18-1
Section I Introduction 18-1
Section II Maintenance Procedures 18-2

CHAPTER 19 ARMAMENT/SIGHTING AND FIRE CONTROL MATERIEL MAINTENANCE 19-1
Section I Introduction 19-1
Section II Maintenance Procedures 19-2

CHAPTER 20 ENGINE MAINTENANCE 20-1
Section I Introduction 20-1
Section II Maintenance Procedures 20-2

CHAPTER 21 TRANSMISSION MAINTENANCE 21-1
Section I Introduction 21-1
Section II Maintenance Procedures 21-2

CHAPTER 22 POWER TRANSFER AND DRIVE ASSEMBLY MAINTENANCE 22-1
Section I Introduction 22-1
Section II Maintenance Procedures 22-2

CHAPTER 23 FRONT AXLE MAINTENANCE 23-1
Section I Introduction 23-1
Section II Maintenance Procedures 23-2

CHAPTER 24 REAR AXLE MAINTENANCE 24-1
Section I Introduction 24-1
Section II Maintenance Procedures 24-2

APPENDIXES
A. REFERENCES A-1
B. TOOLS AND SPECIAL TOOLS LIST B-1
C. EXPENDABLE AND DURABLE ITEMS LIST C-1
D. ILLUSTRATED LIST OF MANUFACTURED ITEMS D-1
E. TORQUE LIMITS E-1
F. MANDATORY REPLACEMENT PARTS F-1
G. ADDITIONAL AUTHORIZATION LIST (AAL) G-1
H. TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART H-1

TABLE OF CONTENTS (CONT)

	Page
SUBJECT INDEX	Index-1
GLOSSARY	Glossary-1

LIST OF ILLUSTRATIONS

Figure	Title	Page
D-1	Brake Adjusting Tool Support	D-5
D-2	Brake Plunger Seal Driver	D-6
D-3	Cab Front Support Spanner Socket	D-7
D-4	Cab Maintenance Stand Angle Brackets and Straight Braces	D-9
D-5	Cab Maintenance Stand Base Angle Bracket Locations	D-10
D-6	Cab Maintenance Stand Base Fabrication	D-11
D-7	Cab Maintenance Stand Brace Bracket Locations	D-12
D-8	Cab Maintenance Stand Brace to Base Assembly	D-13
D-9	Cab Maintenance Stand Side Braces Side View	D-14
D-10	Cab Maintenance Stand Assembly	D-15
D-11	Cab Support Tool Strut and Cab Rest	D-16
D-12	Cab Support Tool Seat	D-17
D-13	Cab Support Tool Seat Layout	D-18
D-14	Cab Support Tool Assembly	D-19
D-15	Engine Stand Bracket Assembly	D-20
D-16	Engine Stand Bracket Front Plate	D-21
D-17	Engine Stand Bracket Rear Plate	D-22
D-18	Engine Stand Bracket Side Plates	D-23
D-19	Headlight Adjustment Screen	D-24
D-20	Machine Gun Ring Drill Stop	D-25
D-21	Main Valve Body Spring Compression Tool	D-26
D-22	Spanner Socket Tool	D-27
D-23	Spanner Wrench Tool Assembly	D-28
D-24	Spanner Wrench Jaw	D-29
D-25	Spanner Wrench Handle Piece	D-29
D-26	Spreader Bar Layout	D-30
D-27	Spreader Bar Assembly	D-31
D-28	Steering Stop Shim Gage	D-32
D-29	Transfer Case Lift Bracket Assembly	D-33
D-30	Transfer Case Lift Bracket Main Mounting Bracket	D-34
D-31	Transfer Case Bracket Bolt Mounting Bracket	D-35
D-32	Transfer Case Lift Bracket Lifting Bracket	D-36
D-33	Transfer Case Lift Bracket Center Support Plate	D-37
D-34	Transfer Case Lift Bracket Lifting Plate Braces	D-38
D-35	Transfer Case Lift Bracket Bolt Mounting Bracket Supports	D-39
D-36	Transmission Lift and Mounting Bracket Assembly	D-40
D-37	Transmission Lift and Mounting Bracket Bottom Plate	D-41
D-38	Transmission Lift and Mounting Bracket Side Plates	D-42
D-39	Transmission Lift and Mounting Bracket Top Plate	D-43
D-40	Transmission Lift and Mounting Bracket Top and Bottom Braces	D-44
D-41	Transmission Lift and Mounting Bracket Side Supports	D-45
D-42	Transmission Lift and Mounting Bracket Bolt Mounting Plates	D-46
D-43	Transmission Lift Bracket Assembly	D-47
D-44	Lower Lift Bracket	D-48
D-45	Upper Lift Bracket	D-49
D-46	Battery 12V Cable Assembly	D-51
D-47	Battery Ground Cable Assembly	D-53

LIST OF ILLUSTRATIONS (CONT)

Figure	Title	Page
D-48	Battery 24V Cable Assembly	D-54
D-49	Lanyard Assembly	D-60
D-50	Wooden Skid	D-61
D-51	CTIS Seal Driver	D-63
D-52	Front Axle Shaft Seal Driver	D-64
D-53	Wheel Hub Grease Seal Driver	D-65
D-54	Differential Pinion Seal Driver	D-66
D-55	Front and Rear Differential Yoke Seal Driver	D-67
D-56	Purge Valve Tool	D-69

LIST OF TABLES

Number	Title	Page
3-1	Crankshaft Positions for Valve Clearance Setting	3-101
3-2	Valve Clearances	3-103
3-3	Valve Clearance Ranges	3-103
4-1	Crankshaft Position	4-20
7-1	Torque Converter Shim Chart	7-14
7-2	Torque Converter End Play Shim Chart	7-16
20-1	Valve Specifications	20-12
20-2	Valve Spring Specifications	20-13
20-3	Valve Seat Insert Specifications	20-14
20-4	Cylinder Head Surface Flatness	20-15
20-5	Crankshaft Main Bearing Journal Diameter	20-33
20-6	Crankshaft Connecting Rod Journal Diameter	20-33
20-7	Piston/Piston Ring Clearances	20-45
20-8	Camshaft Minimum Lobe Lift	20-54
21-1	Selective Spacer Chart	21-12
23-1	Pinion Bearing Preload Chart	23-13
23-2	Pinion Cone Variation Chart	23-16
24-1	Pinion Bearing Preload Chart	24-13
24-2	Pinion Cone Variation Chart	24-16
D-1	Pneumatic Tube Lengths	D-56
D-2	Non-Metallic Electrical Cable Conduit Lengths	D-58
E-1	Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts	E-2
E-2	Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts	E-4
E-3	Dry Torque Limits for Metric Screws and Free Spinning Nuts	E-5
E-4	Dry Torque Limits for Metric Prevailing Torque Nuts	E-6
E-5	Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts	E-7

HOW TO USE THIS MANUAL

OVERVIEW

This Technical Manual (TM) is provided to help you maintain the LMTV at the Direct Support (DS) and General Support (GS) Maintenance levels. This volume, Volume 2, contains information which will assist you in the performance of remainder of the DS Maintenance procedures and all of the GS Maintenance procedures on the LMTV. Volume 2 contains the following major sections in order of appearance:

OVERVIEW (CONT)

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual. Read all **WARNINGS** and **CAUTIONS** before performing any troubleshooting or maintenance procedure.

- **TABLE OF CONTENTS.** Lists the chapters, sections, appendixes, and indexes with page numbers in order of appearance.

- **MAINTENANCE PROCEDURES.** DS and GS Maintenance procedures to assist you in supporting the LMTV. Chapters 13 through 19 are Direct Support Maintenance procedures. General Support Maintenance procedures are contained in chapters 20 through 24. Become familiar with the entire maintenance procedure before beginning any maintenance task.

DIRECT SUPPORT MAINTENANCE

- **CHAPTER 13, FRAME MAINTENANCE**

- **CHAPTER 14, SUSPENSION MAINTENANCE**

- **CHAPTER 15, BODY AND CAB MAINTENANCE**

- **CHAPTER 16, 11K SELF-RECOVERY WINCH (SRW) MAINTENANCE**

- **CHAPTER 17, HYDRAULIC SYSTEM MAINTENANCE**

- **CHAPTER 18, KIT MAINTENANCE**

- **CHAPTER 19, ARMAMENT/SIGHTING AND FIRE CONTROL MATERIEL MAINTENANCE**

GENERAL SUPPORT MAINTENANCE

- **CHAPTER 20, ENGINE MAINTENANCE**

- **CHAPTER 21, TRANSMISSION MAINTENANCE**

- **CHAPTER 22, POWER TRANSFER AND FINAL DRIVE ASSEMBLY MAINTENANCE**

- **CHAPTER 23, FRONT AXLE MAINTENANCE**

- **CHAPTER 24, REAR AXLE MAINTENANCE**

- **APPENDIX A, REFERENCES.** Lists publications used with the LMTV and reference publications which contain information regarding the equipment.

- **APPENDIX B, TOOLS AND SPECIAL TOOLS LIST.** Lists equipment used in the performance of maintenance.

- **APPENDIX C, EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST.** Lists expendable and durable items used in the performance of maintenance.

- **APPENDIX D, ILLUSTRATED LIST OF MANUFACTURED ITEMS.** Illustrates and describes items that must be fabricated from bulk materials for repair of the LMTV.

- **APPENDIX E, TORQUE LIMITS.** Lists the standard torque values for specific attaching hardware.

GENERAL SUPPORT MAINTENANCE (CONT)

- **APPENDIX F, MANDATORY REPLACEMENT PARTS.**
- **APPENDIX G, ADDITIONAL AUTHORIZATION LIST (AAL).** Lists additional items you are authorized for the support of the LMTV.
- **APPENDIX H, TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART.** Lists actions required to mate different transmission configurations with WTEC II or WTEC III controls.
- **SUBJECT INDEX.** Lists important subjects contained in Volume 2 in alphabetical order and gives the paragraph number where they are located.

FINDING INFORMATION

There are several ways to find the information you need in this manual. They are as follows:

- **FRONT COVER INDEX.** The front cover index contains a list of the most important topics contained in this volume. It features a black box at the right edge of the cover which corresponds with a black box on the page containing the topic. The topics listed on the front cover are highlighted in the table of contents with a box.
- **TABLE OF CONTENTS.** Lists chapters, sections, appendixes, and indexes with page numbers in order of appearance.
- **CHAPTER INDEXES.** List paragraphs contained in the individual chapters with paragraph and page numbers in order of appearance.
- **SUBJECT INDEX.** Lists all maintenance procedures contained in Volume 2 in alphabetical order and gives the paragraph number where they are located.

TROUBLESHOOTING

Troubleshooting is contained in Chapter 2 of Volume 1. When a malfunction occurs, look at the symptom index for the vehicle troubleshooting table in Chapter 2. Find the malfunction in the index. Turn to the page number listed for the malfunction in the troubleshooting table. Perform the steps required to correct the malfunction. If you can't find the malfunction, or the malfunction is not corrected, notify your supervisor.

FOLLOW THESE GUIDELINES WHEN USING THIS MANUAL:

- Become familiar with the entire maintenance procedure before beginning a maintenance task.
- Read all **WARNINGS** and **CAUTIONS** before performing any procedures.

CHAPTER 3
ENGINE MAINTENANCE

Section I. INTRODUCTION 3-1
3-1. INTRODUCTION 3-1

Section II. MAINTENANCE PROCEDURES 3-2
3-2. DRESSED ENGINE UNPACKING/PACKING 3-2
3-3. ENGINE ASSEMBLY REPLACEMENT 3-15
3-4. ENGINE FRONT RESILIENT MOUNT AND MOUNTING BRACKET REPLACEMENT 3-59
3-5. ENGINE BRACKET REPLACEMENT 3-63
3-6. CYLINDER HEAD/HEAD GASKET REPLACEMENT 3-68
3-7. PULLEY DAMPER REPLACEMENT 3-75
3-8. CRANKSHAFT FRONT SEAL REPLACEMENT 3-77
3-9. CRANKSHAFT REAR SEAL REPLACEMENT 3-81
3-10. FLEXPLATE ASSEMBLY REPLACEMENT 3-84
3-11. FLYWHEEL HOUSING REPLACEMENT 3-87
3-12. ROCKER ARM AND PUSH ROD REPLACEMENT/REPAIR 3-89
3-13. CAM ROLLER FOLLOWERS REPLACEMENT 3-95
3-14. VALVE CLEARANCE ADJUSTMENT 3-100
3-15. ENGINE FRONT COVER REPLACEMENT 3-105
3-16. OIL PAN REPLACEMENT 3-108
3-17. OIL PUMP REPLACEMENT 3-114
3-18. OIL FILTER BASE REPLACEMENT 3-116
3-19. OIL COOLER REPLACEMENT 3-119
3-20. AIR INLET ELBOW REPLACEMENT 3-122
3-21. INLET MANIFOLD COVER REPLACEMENT 3-126
3-22. INLET MANIFOLD REPLACEMENT 3-128
3-23. EXHAUST MANIFOLD REPLACEMENT 3-133

Section I. INTRODUCTION

3-1. INTRODUCTION

This chapter contains maintenance instructions for replacing or repairing Engine and Engine Components at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

3-2. DRESSED ENGINE UNPACKING/PACKING

This task covers:

a. Unpacking

b. Packing.

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Sling, Multiple Leg (TM 9-2320-365-20)
Sling, Engine and Transmission, Motor Vehicle (Item 49, Appendix B)
Stand, Engine Transport (Item 59, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Tape, Duct (Item 84, Appendix C)
Desiccant (5) (Item 26, Appendix C)
Lockwasher (41) (Item 104, Appendix F)
Gasket (Item 29, Appendix F)

Personnel Required
(2)

a. Unpacking.

WARNING

Ensure all pressure is released from engine container. Failure to comply may result in injury to personnel.

(1) Depress and hold air release button (1) on engine container breather valve (2) until all pressure is released.

WARNING

Engine container cover weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to unpacking. Failure to comply may result in injury to personnel or damage to equipment.

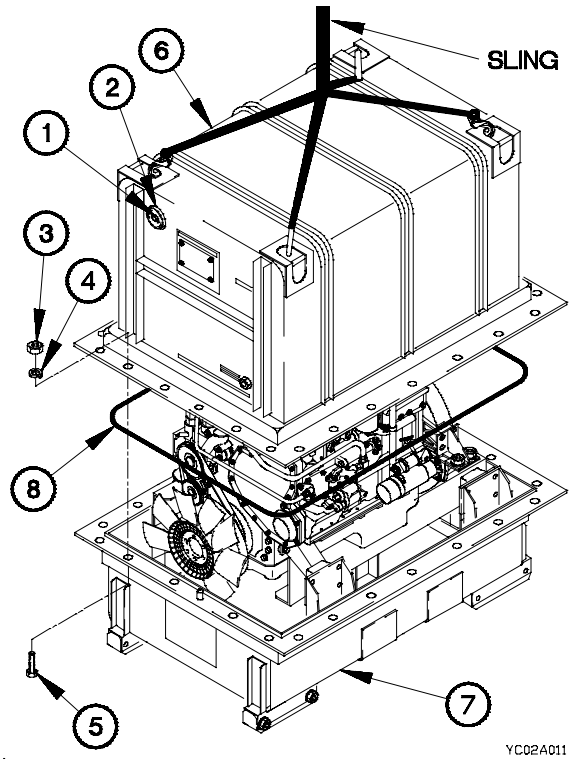
(2) Remove 24 nuts (3), lockwashers (4), and screws (5) from engine container cover (6). Discard lockwashers.

NOTE

Step (3) requires the aid of an assistant.

(3) Lift engine container cover (6) from engine container base (7).

(4) Remove gasket (8) from engine container base (7). Discard gasket.



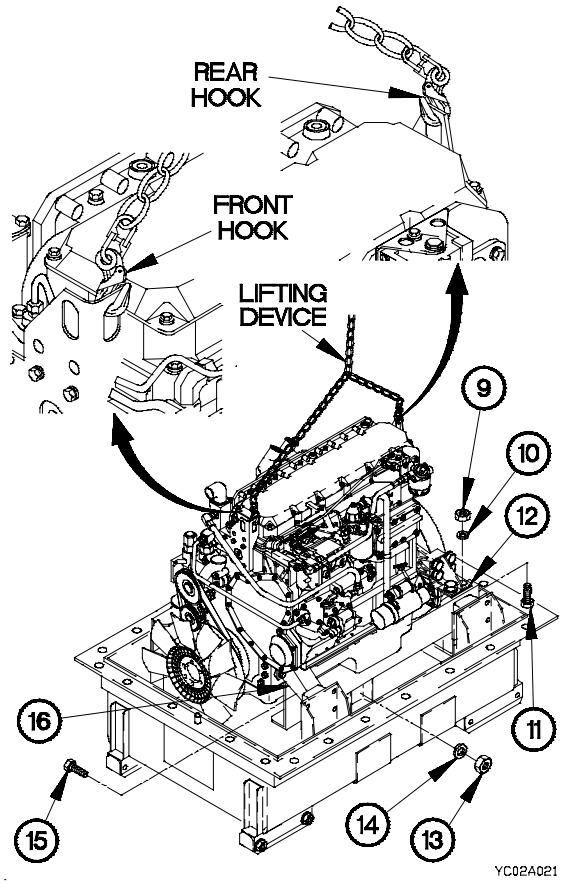
(5) Position rear hook of lifting device inward and front hook in left side lifting hole.

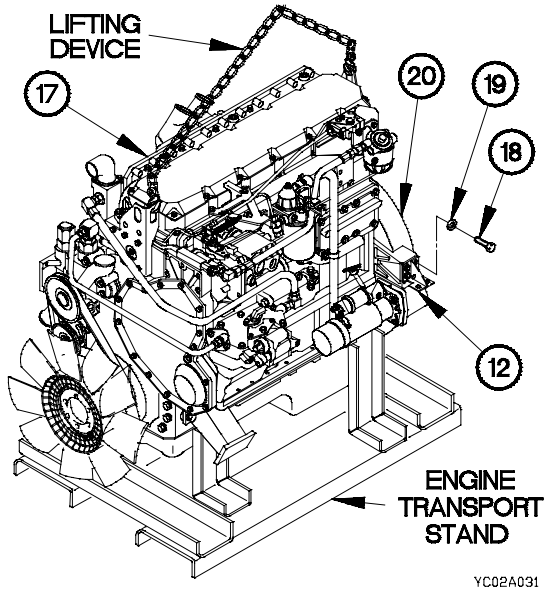
WARNING

Engine assembly weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in serious injury or death to personnel or damage to equipment.

(6) Remove seven nuts (9), lockwashers (10), and screws (11) from two rear mounting brackets (12). Discard lockwashers.

(7) Remove two nuts (13), lockwashers (14), and screws (15) from front motor mounts (16). Discard lockwashers.





NOTE

Step (8) requires the aid of an assistant.

(8) Lift engine (17) and place on engine transport stand.

(9) Remove eight screws (18), lockwashers (19), and two rear mounting brackets (12) from flywheel housing (20). Discard lockwashers.

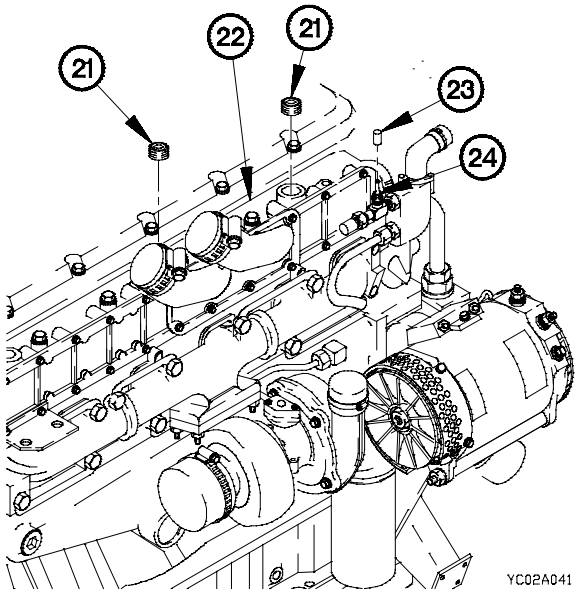
3-2. DRESSED ENGINE UNPACKING/PACKING (CONT)

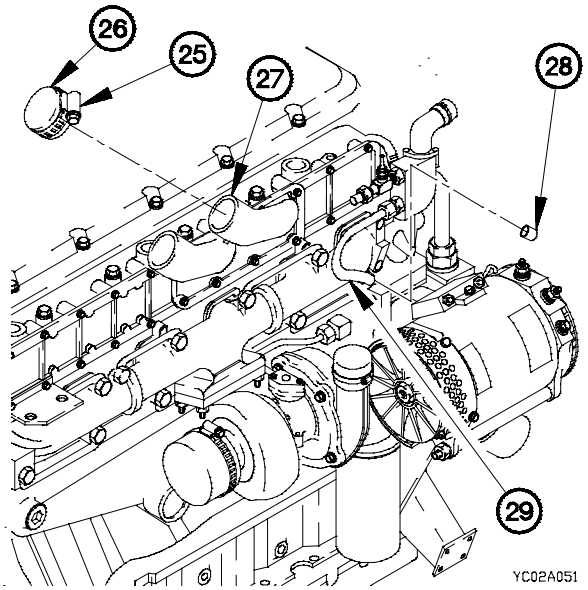
NOTE

Plugs, caps, and plastic wrappers will be installed in packing.

(10) Remove two plugs (21) from inlet manifold (22).

(11) Remove dust cap (23) from hose fitting (24).





CAUTION

Ensure both air inlet elbow openings are covered with wiping rags after removing dust caps. Failure to comply may result in damage to equipment.

(12) Loosen two clamps (25) on dust caps (26).

(13) Remove two dust caps (26) from air inlet elbows (27).

(14) Remove dust cap (28) from heater supply tube (29).

CAUTION

Ensure all turbocharger openings are covered with wiping rags after removing dust caps. Failure to comply may result in damage to equipment.

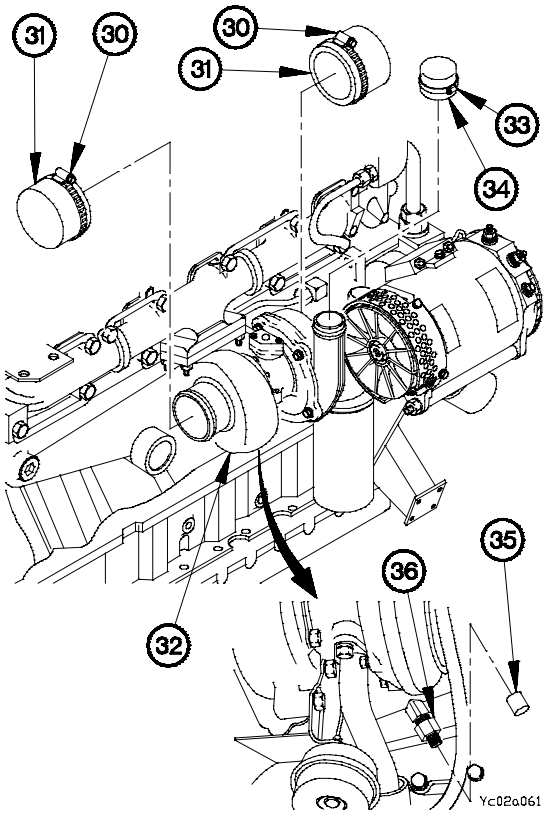
(15) Loosen two clamps (30) on dust caps (31).

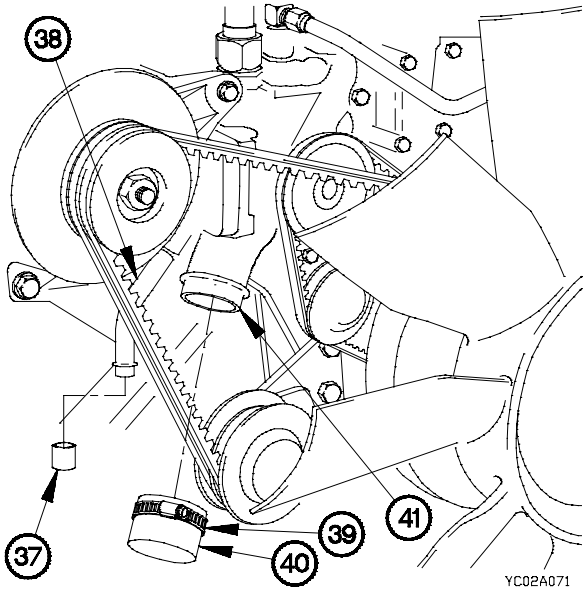
(16) Remove two dust caps (31) from turbocharger (32).

(17) Loosen clamp (33) on dust cap (34).

(18) Remove dust cap (34) from turbocharger (32).

(19) Remove dust cap (35) from oil sampling hose fitting (36).

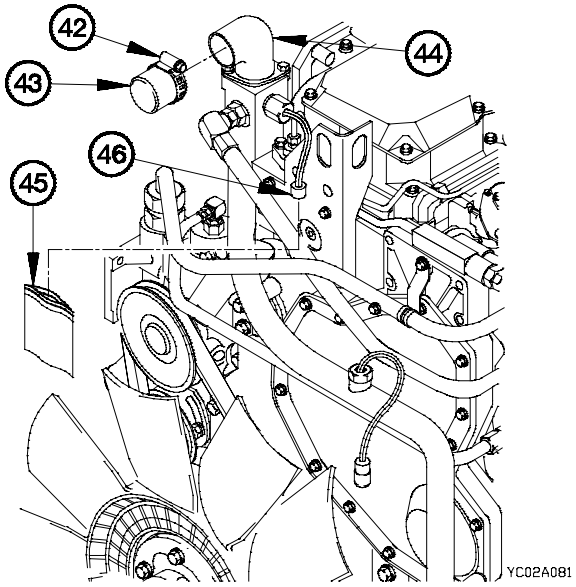




(20) Remove dust cap (37) from heater return tube (38).

(21) Loosen clamp (39) on dust cap (40).

(22) Remove dust cap (40) from water pump (41).



(23) Loosen clamp (42) on dust cap (43).

(24) Remove dust cap (43) from thermostat housing (44).

(25) Remove plastic wrapping (45) from coolant temperature light switch connector (46).

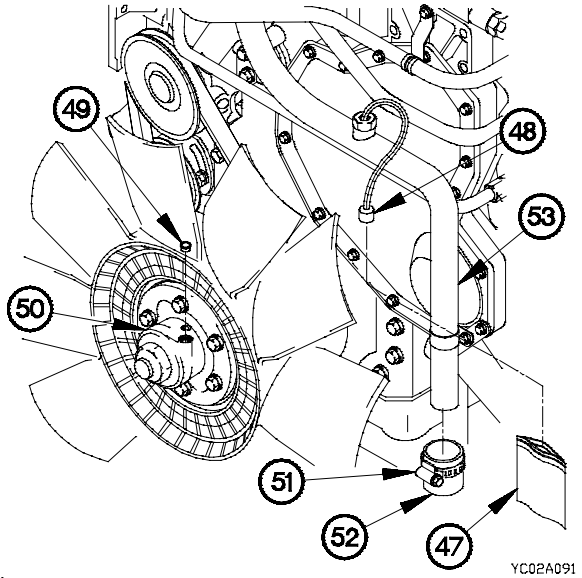
3-2. DRESSED ENGINE UNPACKING/PACKING (CONT)

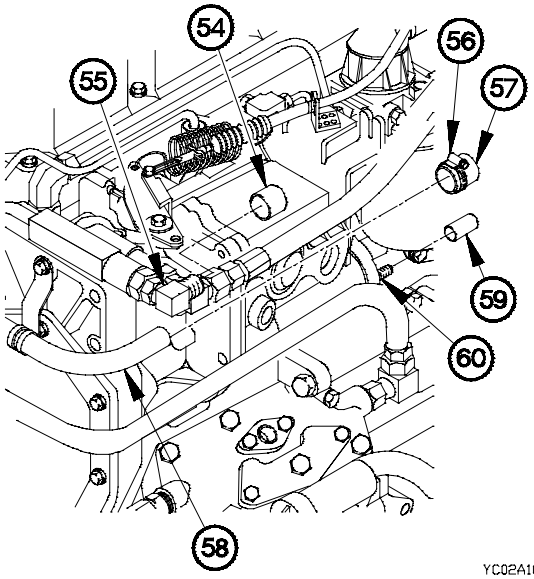
(26) Remove plastic wrapper (47) from ether sensor connector (48).

(27) Remove dust plug (49) from fan impeller clutch (50).

(28) Loosen clamp (51) on dust cap (52).

(29) Remove dust cap (52) from coolant bypass tube (53).





(30) Remove dust cap (54) from 90-degree fitting (55).

(31) Loosen clamp (56) on dust cap (57).

(32) Remove dust cap (57) from coolant overflow tube (58).

(33) Remove two dust caps (59) from fuel shutoff solenoid (60).

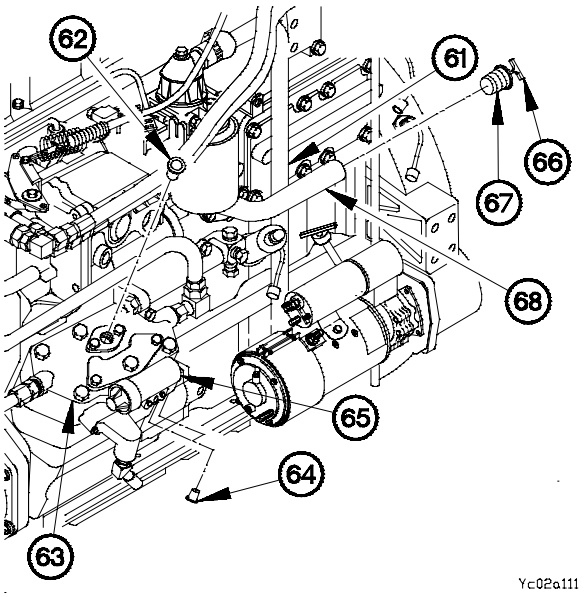
(34) Remove duct tape from crankcase breather hose (61).

(35) Remove dust plug (62) from air compressor (63).

(36) Remove two dust plugs (64) from air compressor governor (65).

(37) Loosen screw (66) in plug (67).

(38) Remove plug (67) from oil fill tube (68).

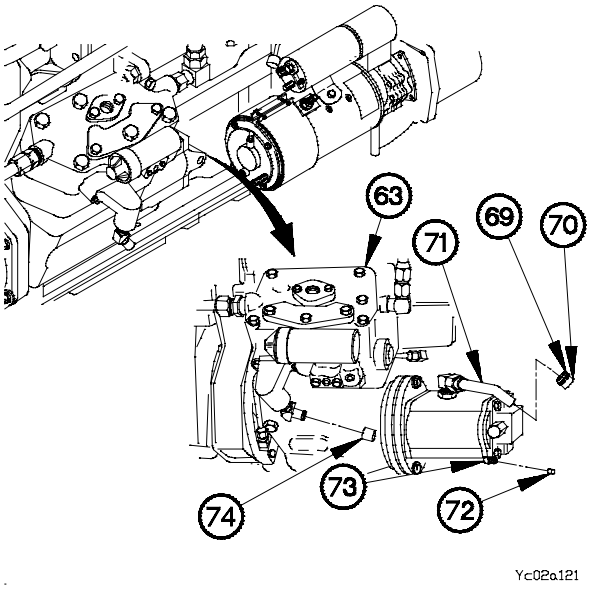


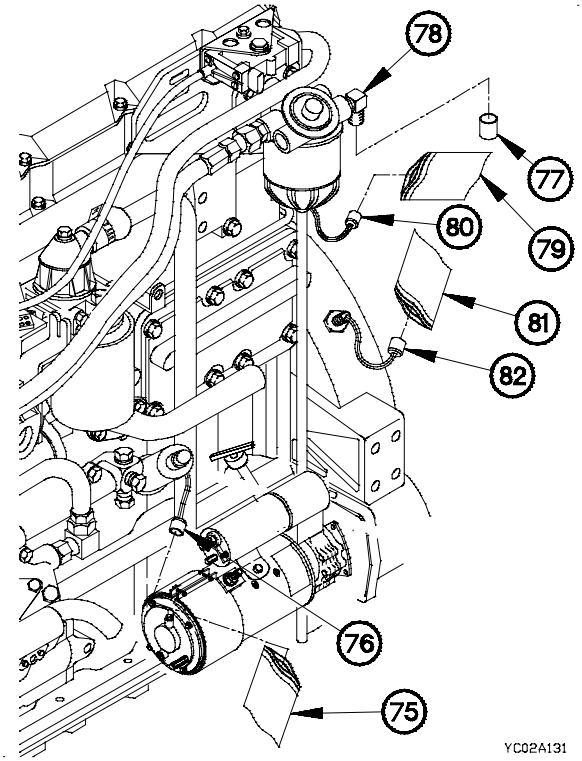
(39) Loosen clamp (69) on dust cap (70).

(40) Remove dust cap (70) from power steering pump supply tube (71).

(41) Remove dust cap (72) from 90-degree fitting (73).

(42) Remove dust cap (74) from air compressor (63).





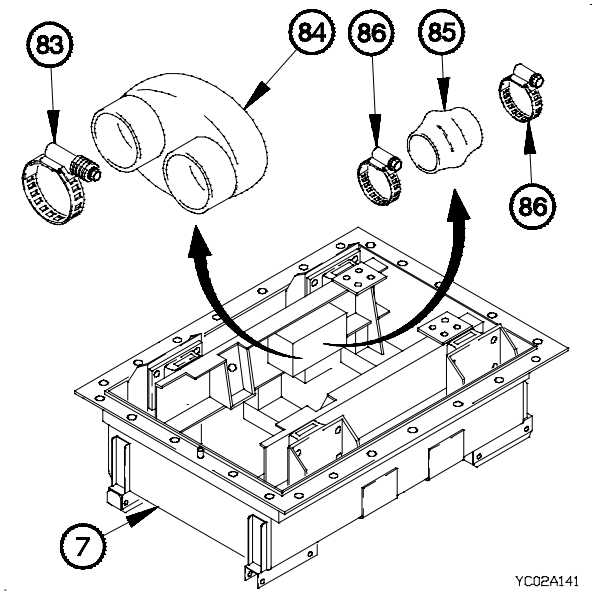
(43) Remove plastic wrapper (75) from oil pressure transducer connector (76).

(44) Remove dust cap (77) from 90-degree fitting (78).

(45) Remove plastic wrapper (79) from fuel/water separator bowl heater connector (80).

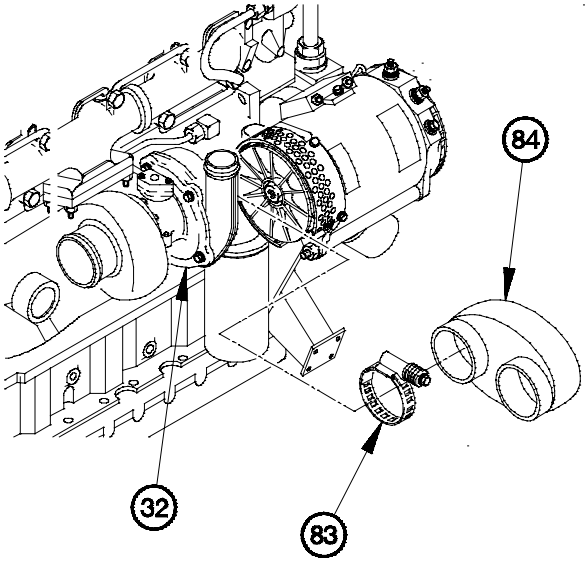
(46) Remove plastic wrapper (81) from engine speed sensor connector (82).

(47) Remove clamp (83), turbocharger inlet coupling (84), hose (85), and two clamps (86) from engine container base (7).

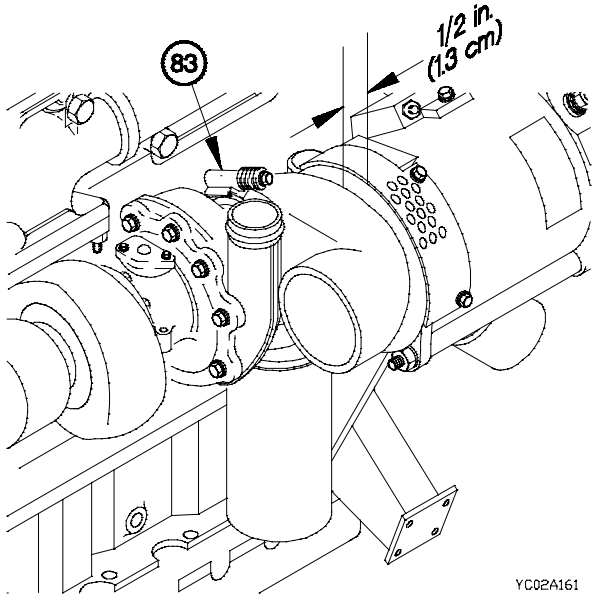


3-2. DRESSED ENGINE UNPACKING/PACKING (CONT)

(48) Position turbocharger inlet coupling (84) on turbocharger (32) with clamp (83).



YC02A151



YC02A161

CAUTION

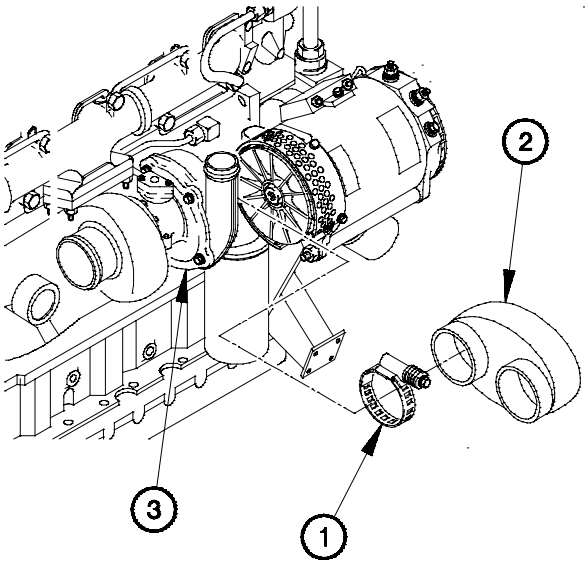
A gap of approximately 1/2 inch (1.3 cm) is required between turbocharger inlet coupling and alternator. Failure to comply may result in damage to equipment.

(49) Tighten clamp (83) to 90-100 lb-in. (10-11 N·m).

b. Packing.

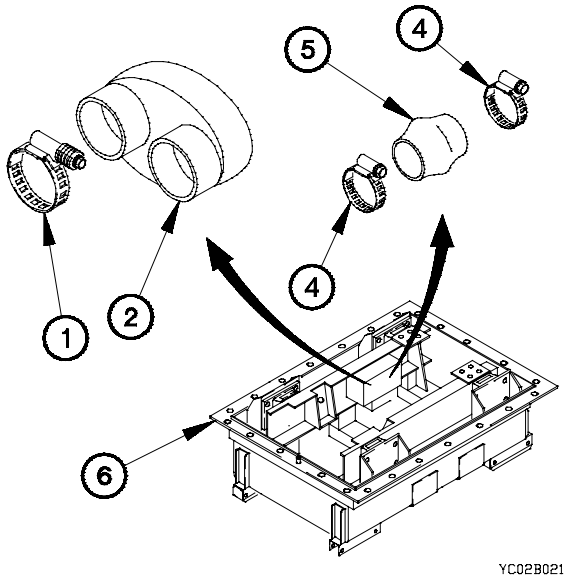
(1) Loosen clamp (1) on turbocharger inlet coupling (2).

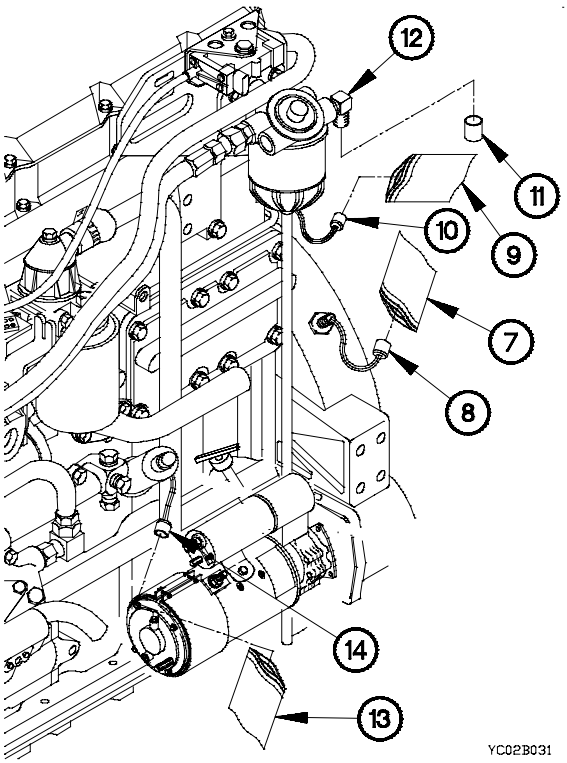
(2) Remove turbocharger inlet coupling (2) from turbocharger (3).



YC02B011

(3) Store two clamps (4), hose (5), turbocharger inlet coupling (2), and clamp (1) in engine container base (6).





(4) Install plastic wrapper (7) on engine speed sensor connector (8) with duct tape.

(5) Install plastic wrapper (9) on fuel/water separator bowl heater connector (10) with duct tape.

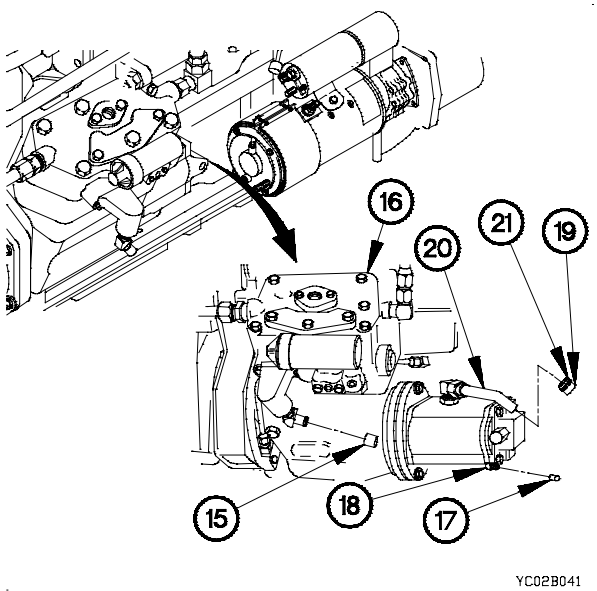
(6) Install dust cap (11) on 90-degree fitting (12).

(7) Install plastic wrapper (13) on oil pressure light switch connector (14) with duct tape.

(8) Install dust cap (15) on air compressor (16).

(9) Install dust cap (17) on 90-degree fitting (18).

(10) Install dust cap (19) on power steering pump supply tube (20) with clamp (21).



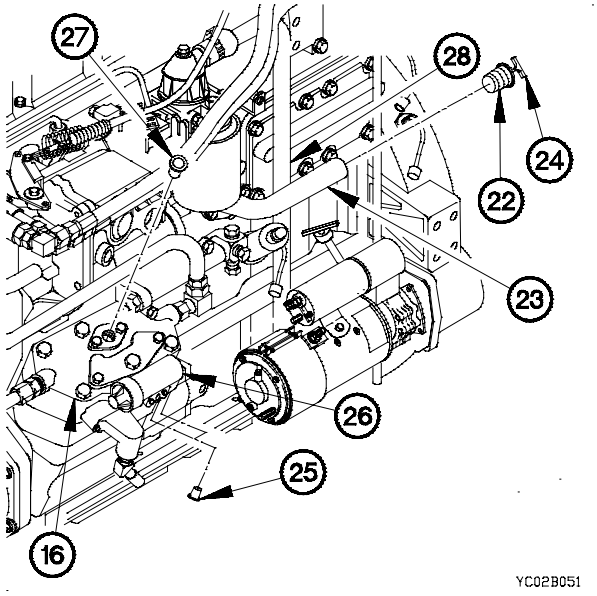
3-2. DRESSED ENGINE UNPACKING/PACKING (CONT)

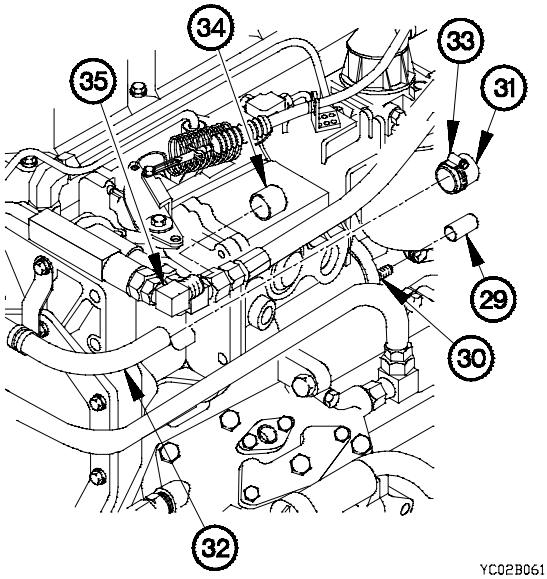
(11) Install plug (22) in oil fill tube (23) with screw (24).

(12) Install two dust plugs (25) in air compressor governor (26).

(13) Install dust plug (27) in air compressor (16).

(14) Cover bottom of crankcase breather tube (28) with duct tape.





(15) Install two dust caps (29) on fuel shutoff solenoid (30).

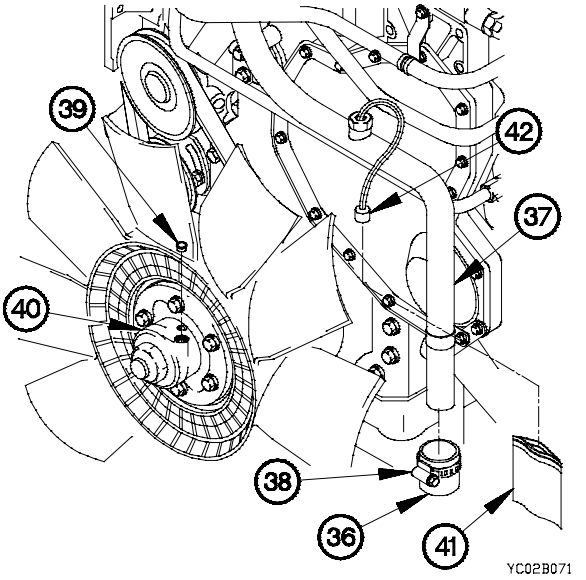
(16) Install dust cap (31) on coolant overflow tube (32) with clamp (33).

(17) Install dust cap (34) on 90-degree fitting (35).

(18) Install dust cap (36) on coolant bypass tube (37) with clamp (38).

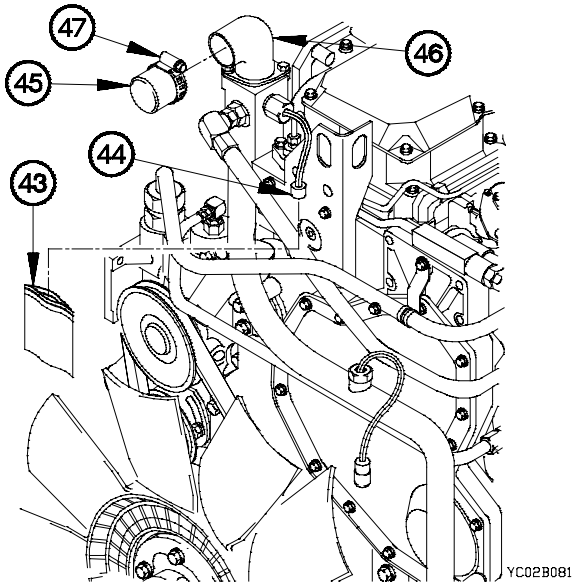
(19) Install dust plug (39) in fan impeller clutch (40).

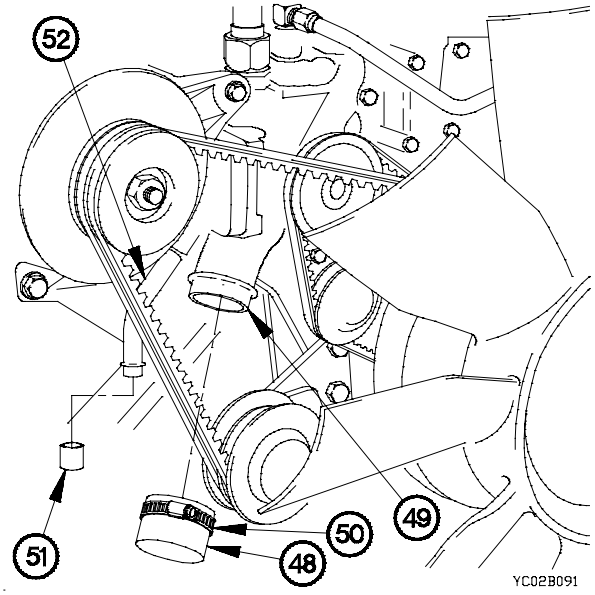
(20) Install plastic wrapper (41) on ether sensor connector (42) with duct tape.



(21) Install plastic wrapper (43) on coolant temperature light switch connector (44).

(22) Install dust cap (45) on thermostat housing (46) with clamp (47) with duct tape.





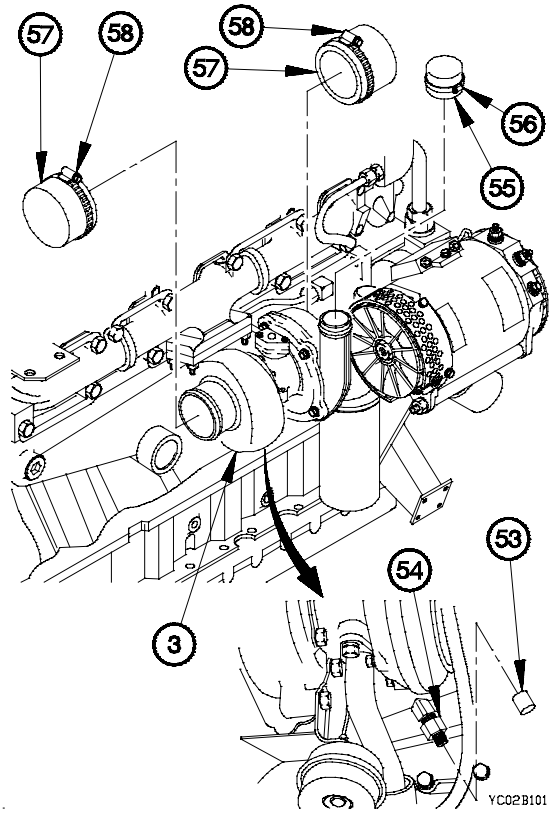
(23) Install dust cap (48) on water pump (49) with clamp (50).

(24) Install dust cap (51) on heater return tube (52).

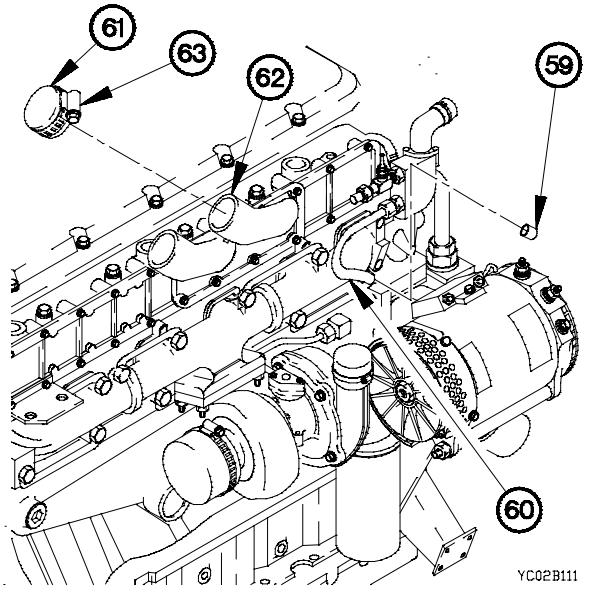
(25) Install dust cap (53) on oil sampling hose fitting (54).

(26) Install dust cap (55) on turbocharger (3) with clamp (56).

(27) Install two dust caps (57) on turbocharger (3) with two clamps (58).

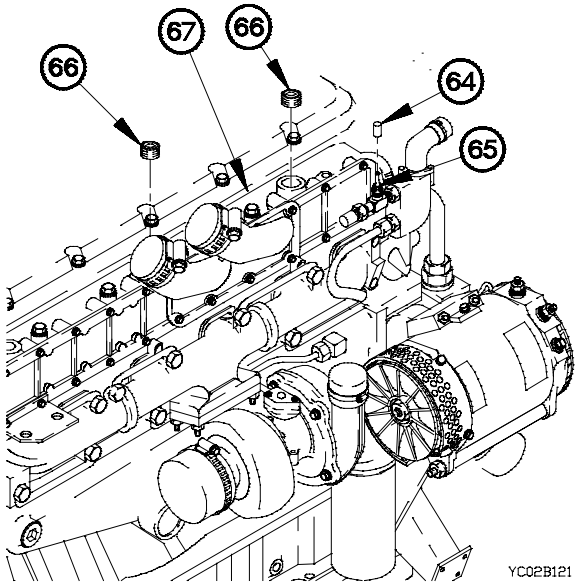


3-2. DRESSED ENGINE UNPACKING/PACKING (CONT)



(28) Install dust cap (59) on heater supply tube (60).

(29) Install two dust caps (61) on air inlet elbows (62) with clamps (63).

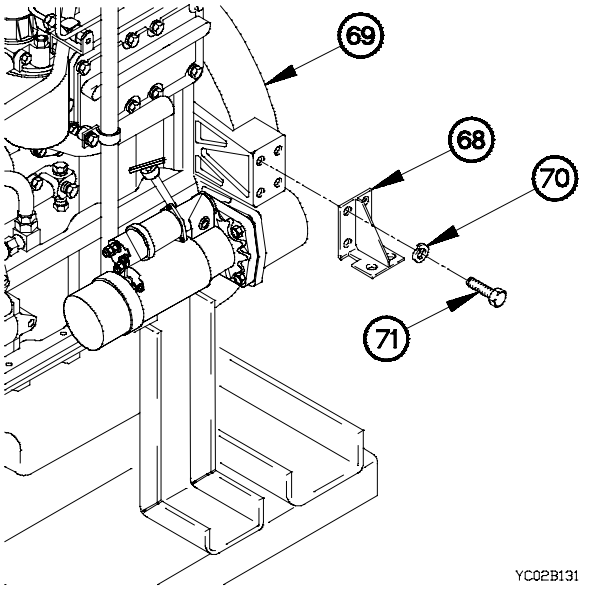


(30) Install dust cap (64) on hose fitting (65).

(31) Install two plugs (66) in inlet manifold (67).

NOTE

Steps (32) through (36) require the aid of an assistant.



(32) Position two rear mounting brackets (68) on flywheel housing (69) with eight lockwashers (70) and screws (71).

(33) Position rear hook of lifting device inward and front hook in left side lifting hole.

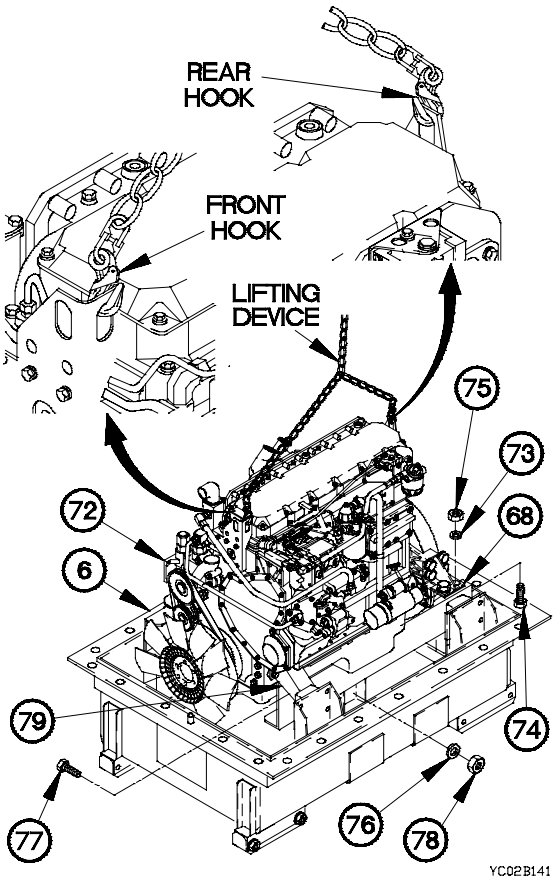
WARNING

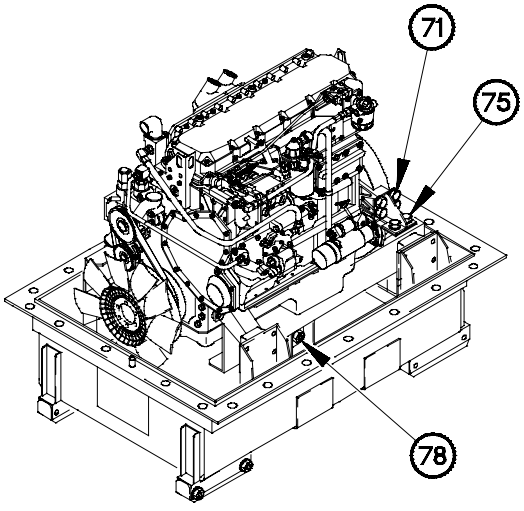
Engine assembly weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to packing. Failure to comply may result in serious injury or death to personnel or damage to equipment.

(34) Position engine (72) in engine container base (6).

(35) Position seven lockwashers (73), screws (74), and nuts (75) in rear mounting brackets (68).

(36) Position two lockwashers (76), screws (77), and nuts (78) in front motor mounts (79).





(37) Tighten seven nuts (75) to 31-37 lb-ft (42-50 N·m).

(38) Tighten two nuts (78) to 71-83 lb-ft (96-113 N·m).

(39) Tighten eight screws (71) to 31-37 lb-ft (42-50 N·m).

3-2. DRESSED ENGINE UNPACKING/PACKING (CONT)

WARNING

Storage container cover weighs approximately 130 lbs (59 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

(40) Place gasket (80) on engine container base (6).

NOTE

Step (41) requires the aid of an assistant.

(41) Position container cover (81) on container base (6).

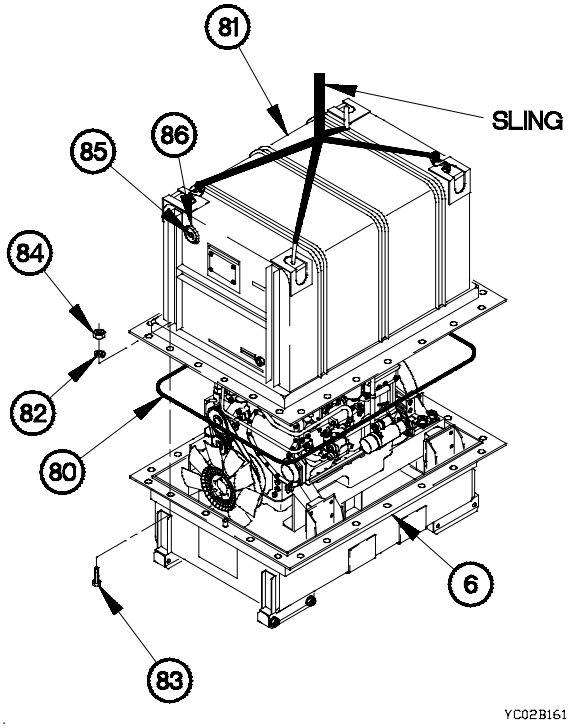
(42) Position 24 lockwashers (82), screws (83), and nuts (84) on container cover (81).

(43) Tighten 24 nuts (84) to 31-37 lb-ft (42-50 N·m).

(44) Remove breather cover (85) from breather port (86).

(45) Place 80 units of desiccant in breather port (86).

(46) Install breather cover (85) on breather port (86).



End of Task.

3-3. ENGINE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (TM 9-2320-365-20-3).
Engine oil drained (TM 9-2320-365-20).
Spare tire removed (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).
Top radiator fan shroud removed (TM 9-2320-365-20-3).
Transmission oil cooler removed (TM 9-2320-365-20-4).
200 amp alternator removed, if equipped (TM 9-2320-365-20-5).
Rear cab support assembly removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Stand, Engine Transport (Item 59, Appendix B)
Sling, Engine and Transmission, Motor, Vehicle (Item 49, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gage, Belt Tension (TM 9-2320-365-20)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Heater, Gun Type, Electric (Item 20, TM 9-2320-366-20 Appendix B)

Materials/Parts
Screw, Cab, Hex Hd (8) (Item 76.1, Appendix C)
Nut, Self-locking (2) (Item 133, Appendix F)

Materials/Parts (Cont)
Mount, Resilient (2) (Item 115, Appendix F)
Nut, Self-Locking (3) (Item 145, Appendix F)
Nut, Self-Locking (2) (Item 152, Appendix F)
Nut, Self-Locking (vehicles equipped with 200 Amp alternator) (Item 128, Appendix F)
Lockwasher (2) (Item 96, Appendix F)
Lockwasher (Item 106, Appendix F)
Gasket (Item 51, Appendix F)
Packing, Preformed (2) (Item 205, Appendix F)
Nut, Self-Locking (2) (Item 146, Appendix F)
Nut, Self-Locking (2) (Item 132, Appendix F)
Nut, Self-Locking (Item 155, Appendix F)
Nut, Self-Locking (Item 154, Appendix F)
Nut, Self-Locking (4) (Item 131, Appendix F)
Sealing Compound (Item 68, Appendix C)
Sealing Compound (Item 70, Appendix C)
Ties, Cable Plastic (Item 89, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Adhesive (Item 5, Appendix C)
Nut, Self-Locking (4) (Item 135, Appendix F)
Nut, Self-Locking (3) (Item 135.1, Appendix F)
Sealing Compound (Item 71, Appendix C)
Gasket (Item 28, Appendix F)
Splice, Conductor (Item 81.1, Appendix C)
Tape, Insulation, Electrical (Item 85, Appendix C)
Insulation Sleeving, Electrical (Item 43.1, Appendix C)

Personnel Required
(3)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

a. Removal.

(1) Remove two self-locking nuts (1), screws (2), and power steering reservoir bracket (3) from bracket (4). Discard self-locking nuts.

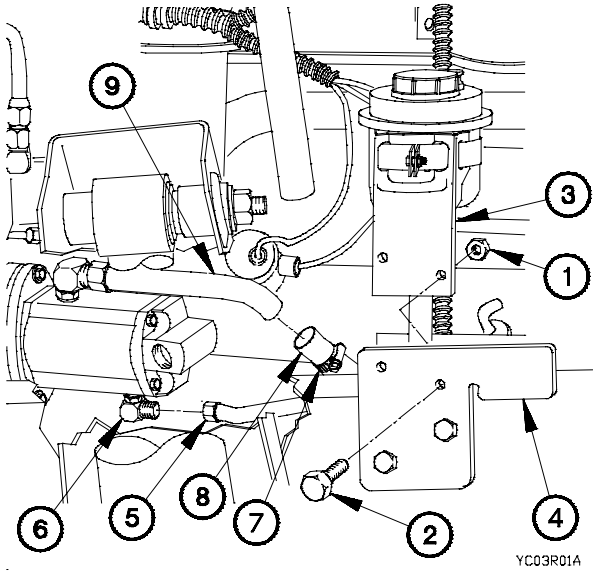
NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect power steering pressure hose (5) from 90-degree fitting (6).

(3) Loosen clamp (7) on power steering return hose (8).

(4) Disconnect power steering return hose (8) from tube (9).



(5) Deleted.

(6) Deleted.

(7) Deleted.

(8) Deleted.

(9) Deleted.

(10) Deleted.

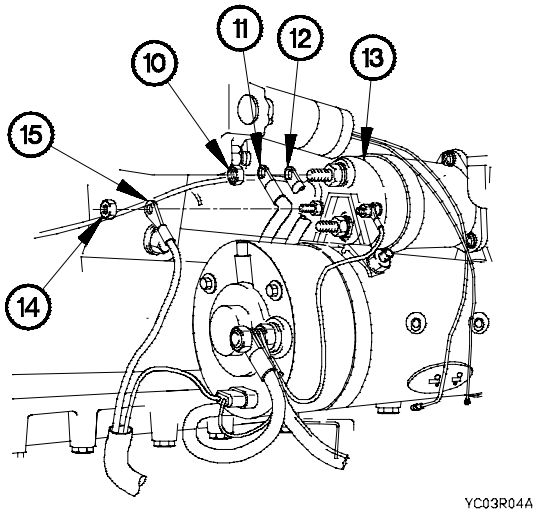
(11) Deleted.

(12) Remove adhesive, nut (10), terminal lugs TL55 (11), and TL12 (12) from starter solenoid (13).

(13) Position nut (10) on starter solenoid (13).

(14) Remove adhesive, nut (14), and terminal lug TL26 (15) from starter solenoid (13).

(15) Position nut (14) on starter solenoid (13).



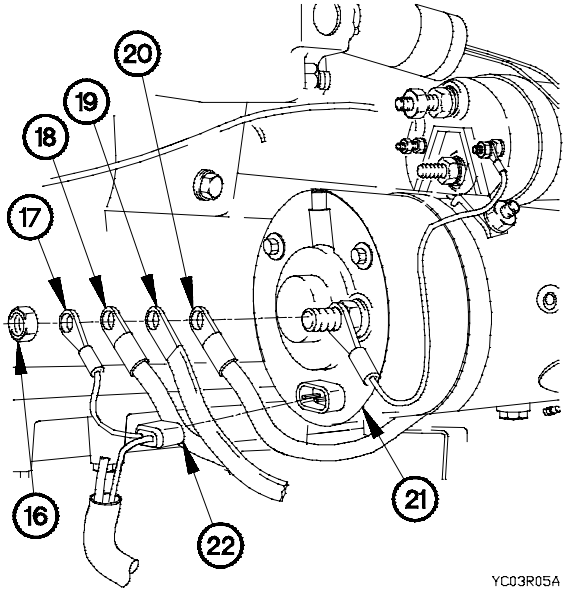
(16) Remove adhesive, nut (16), terminal lugs TL25 (17), TL46 (18), ground strap (19), and terminal lug TL53 (20) from starting motor (21).

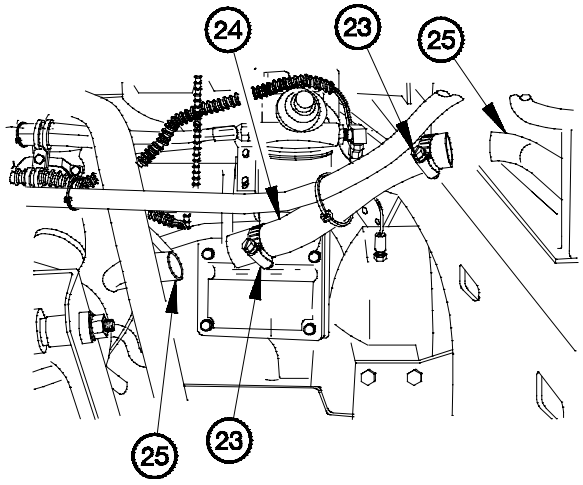
(17) Position nut (16) on starting motor (21).

NOTE

Perform step (18) on vehicles that have not had connector P81 removed.

(18) Disconnect connector P81 (22) from starting motor (21).





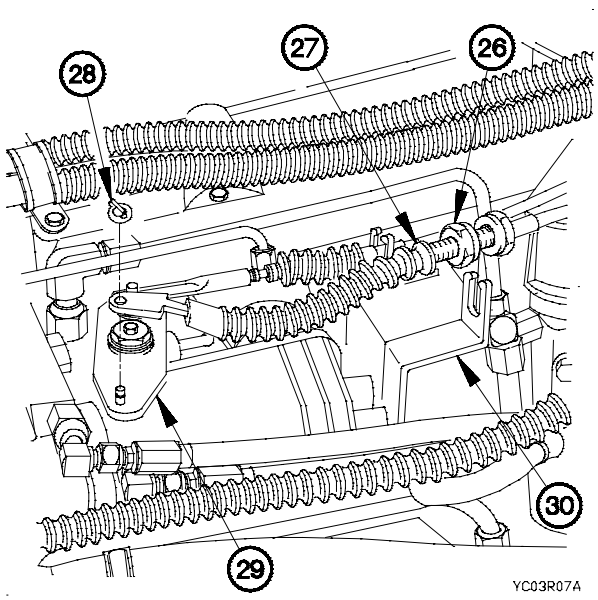
(19) Loosen two clamps (23) on engine oil fill hose (24).

(20) Remove engine oil fill hose (24) from two oil fill tubes (25).

(21) Loosen nut (26) on throttle control cable (27).

(22) Remove clip (28) from governor linkage (29).

(23) Remove throttle control cable (27) from bracket (30).



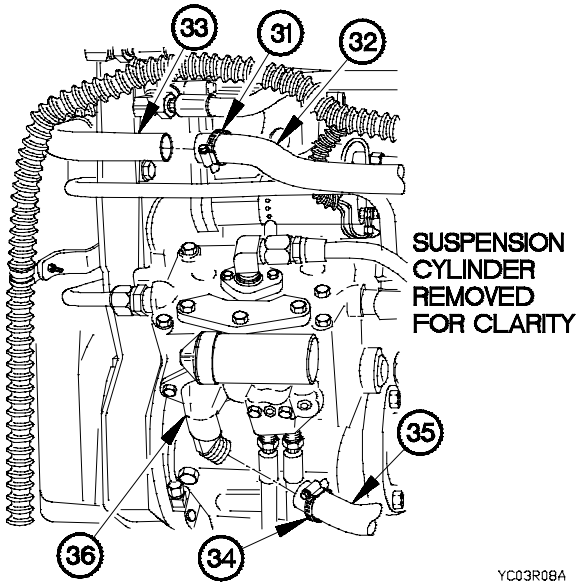
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

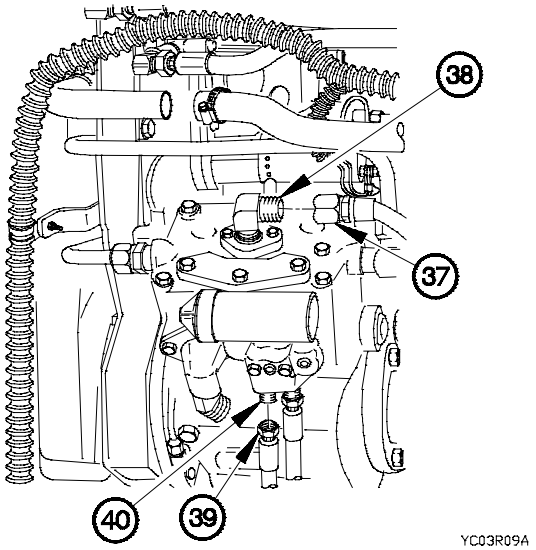
(24) Loosen clamp (31) on coolant bypass hose (32).

(25) Remove coolant bypass hose (32) from coolant tube (33).

(26) Loosen clamp (34) on air compressor intake hose (35).

(27) Remove air compressor intake hose (35) from 45-degree fitting (36).



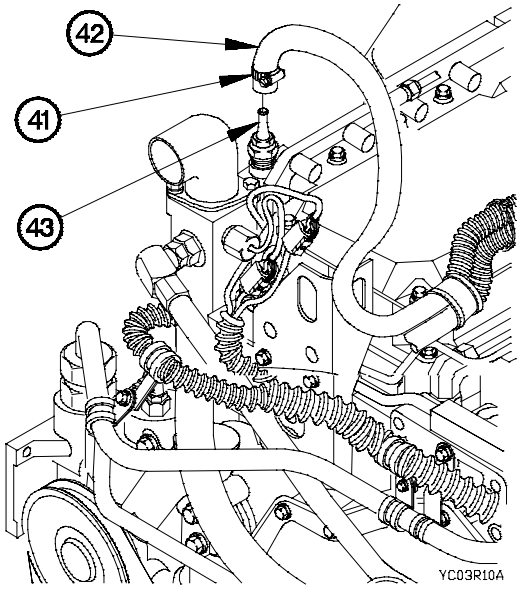


(28) Disconnect air compressor pressure hose (37) from 90-degree fitting (38).

CAUTION

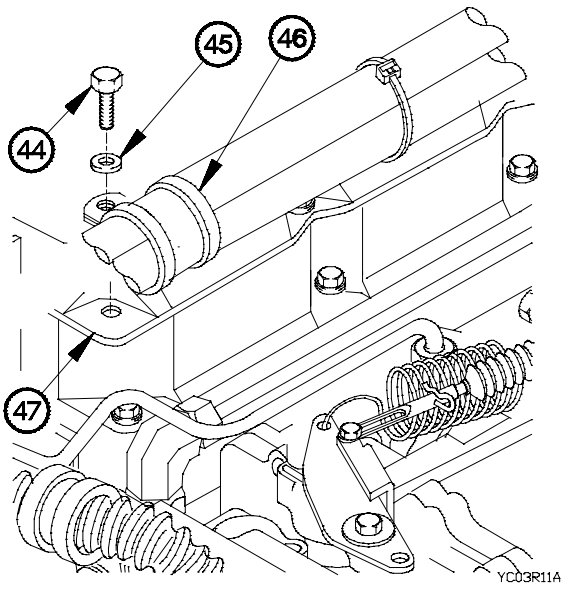
Ensure hoses and connection points are tagged correctly prior to disconnecting. Failure to comply may result in air system not being able to pressurize.

(29) Disconnect two unloader valve hoses (39) from adapters (40).



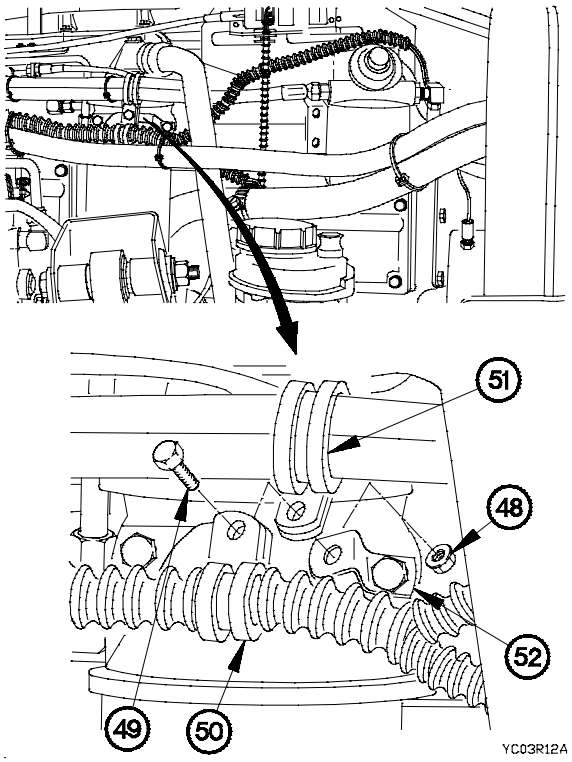
(30) Loosen clamp (41) on coolant fill hose (42).

(31) Disconnect coolant fill hose (42) from hose fitting (43).

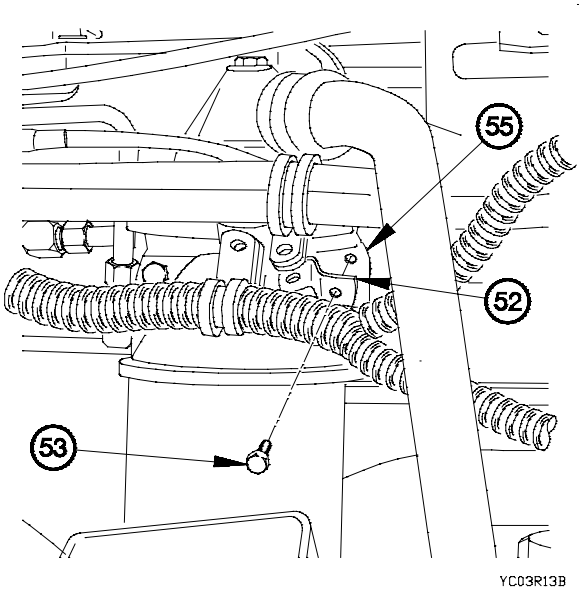


(32) Remove screw (44), washer (45), and clamp (46) from valve cover (47).

(33) Install washer (45) and screw (44) in valve cover (47).



(34) Remove self-locking nut (48), screw (49), clamp (50), and clamp (51) from bracket (52). Discard self-locking nut.

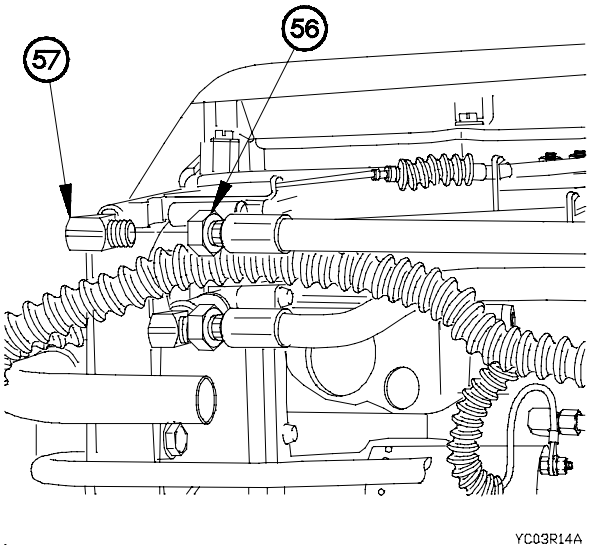


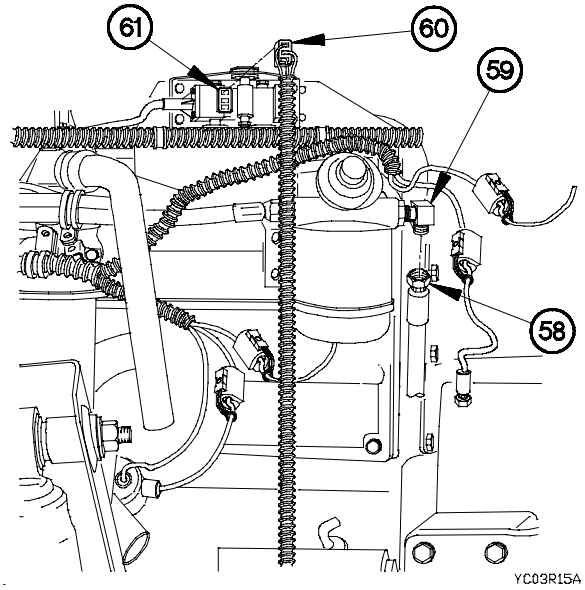
(35) Remove screw (53), and bracket (52) from fuel filter base (55).

(36) Install screw (53) in fuel filter base (55).

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(37) Disconnect fuel return hose (56) from 90-degree fitting (57).





(38) Disconnect fuel supply hose (58) from 90-degree fitting (59).

(39) Disconnect connector (60) from throttle position sensor (TPS) (61).

NOTE

Perform steps (40) and (41) on vehicles equipped with troopseats.

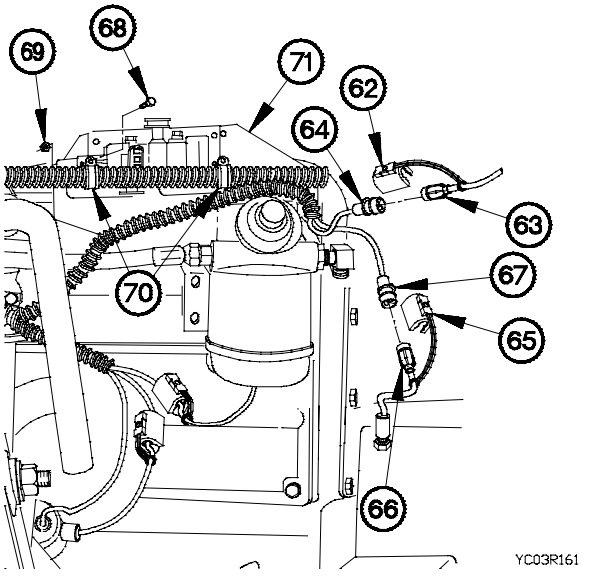
(40) Disconnect connector clamp (62) from troop transport alarm connector J39 (63).

(41) Disconnect connector P39 (64) from connector J39 (63).

(42) Disconnect connector clamp (65) from engine speed sensor connector J38 (66).

(43) Disconnect connector P38 (67) from connector J38 (66).

(44) Remove two screws (68), nuts (69), and clamps (70) from bracket (71).



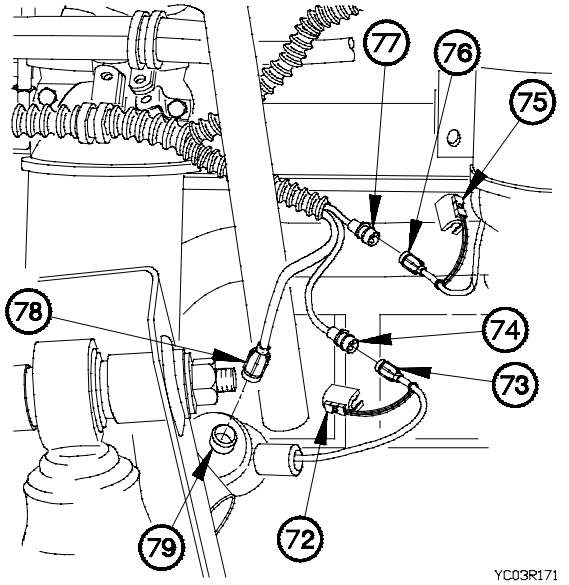
(45) Disconnect connector clamp (72) from oil pressure switch connector (73).

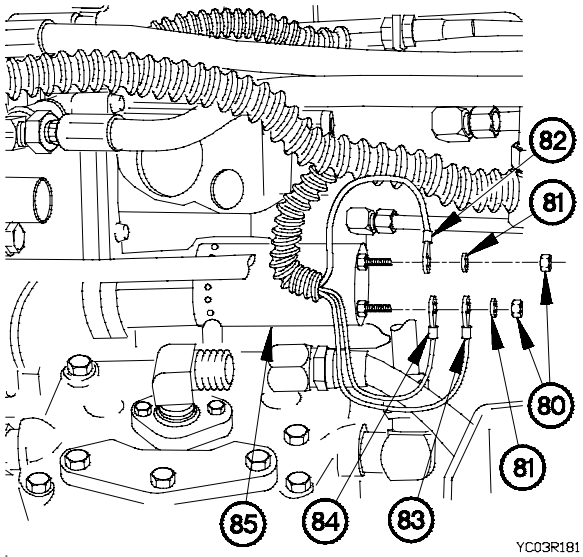
(46) Disconnect connector P34 (74) from oil pressure switch connector (73).

(47) Disconnect connector clamp (75) from fuel/water separator connector (76).

(48) Disconnect connector P33 (77) from fuel/water separator connector (76).

(49) Disconnect connector P32 (78) from oil pressure transmitter (79).



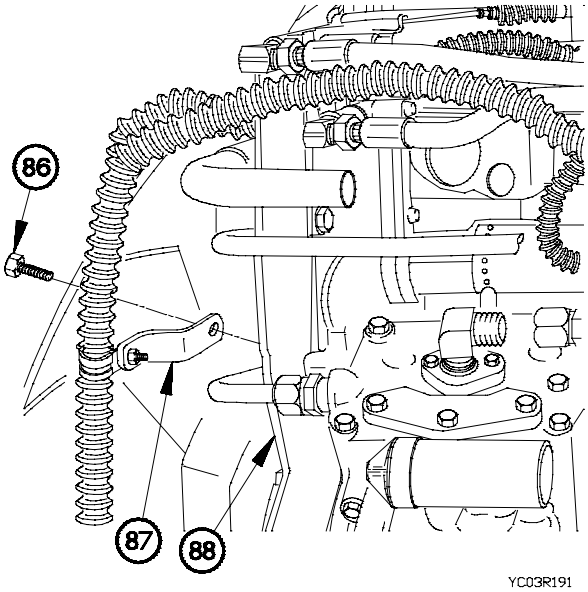


(50) Remove two nuts (80), washers (81), terminal lugs TL28 (82), TL29 (83), and TL66 (84) from fuel shutoff solenoid (85).

(51) Install two washers (81) and nuts (80) on fuel shutoff solenoid (85).

(52) Remove bolt (86) and bracket (87) from engine front cover (88).

(53) Install bolt (86) in engine front cover (88).

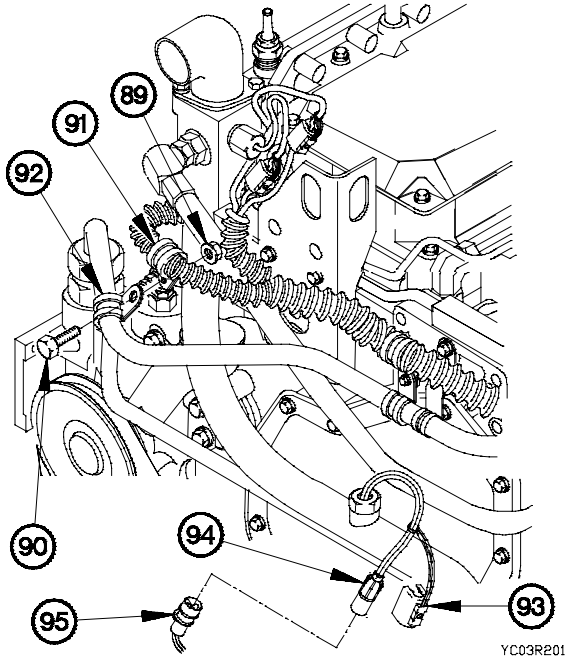


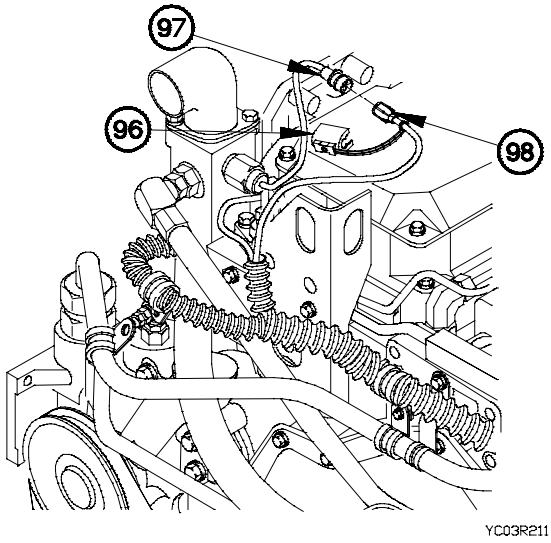
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(54) Remove self-locking nut (89), screw (90), and clamp (91) from clamp (92). Discard self-locking nut.

(55) Disconnect connector clamp (93) from ether sensor connector (94).

(56) Disconnect connector P42 (95) from ether sensor connector (94).

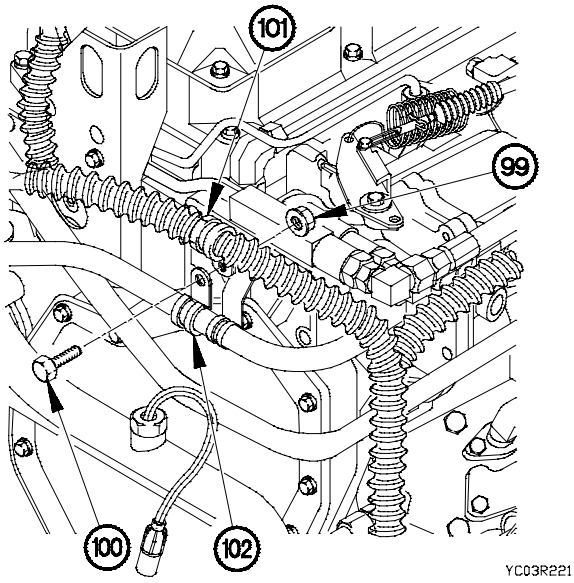




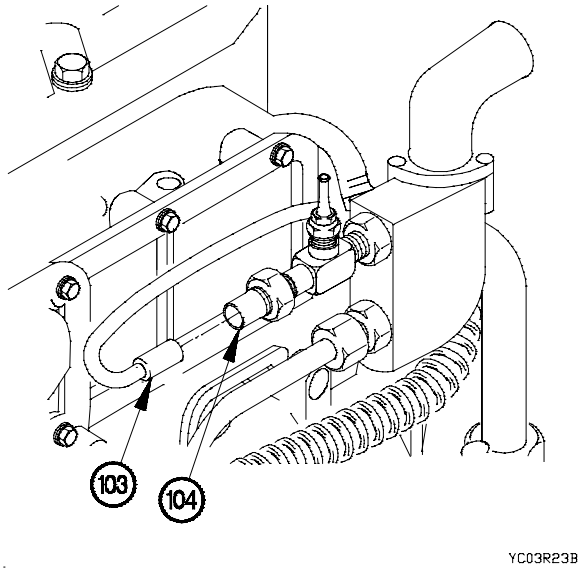
(57) Disconnect connector clamp (96) from water temperature light switch connector (97).

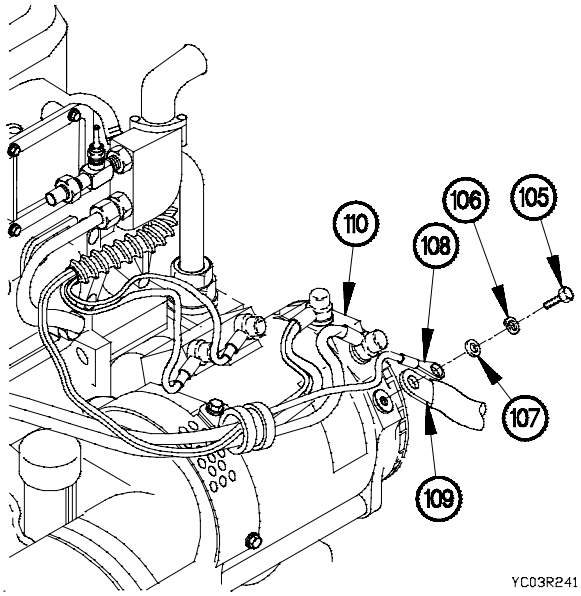
(58) Disconnect connector P37 (98) from water temperature light switch (97).

(59) Remove self-locking nut (99), screw (100), and clamp (101) from clamp (102). Discard self-locking nut.



(60) Disconnect connector P41 (103) from water temperature transducer (104).





NOTE

Perform steps (61) through (78) on vehicles equipped with 100 AMP alternator.

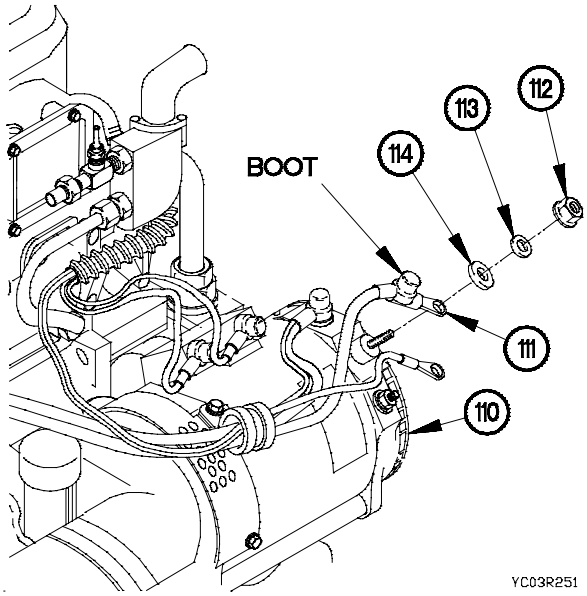
(61) Remove screw (105), lockwasher (106), washer (107), terminal lugs TL5 (108), and TL8 (109) from alternator (110). Discard lockwasher.

(62) Position washer (107), lockwasher (106), and screw (105) on alternator (110).

(63) Lift boot from terminal lug TL60 (111).

(64) Remove self-locking nut (112), washer (113), insulation washer (114), and 12v terminal lug TL60 (111) from alternator (110). Discard self-locking nut.

(65) Position insulation washer (114), washer (113), and self-locking nut (112) on alternator (110).



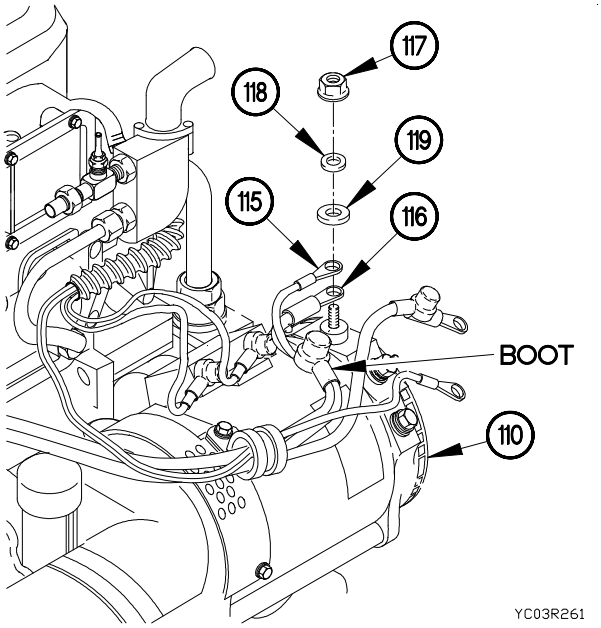
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

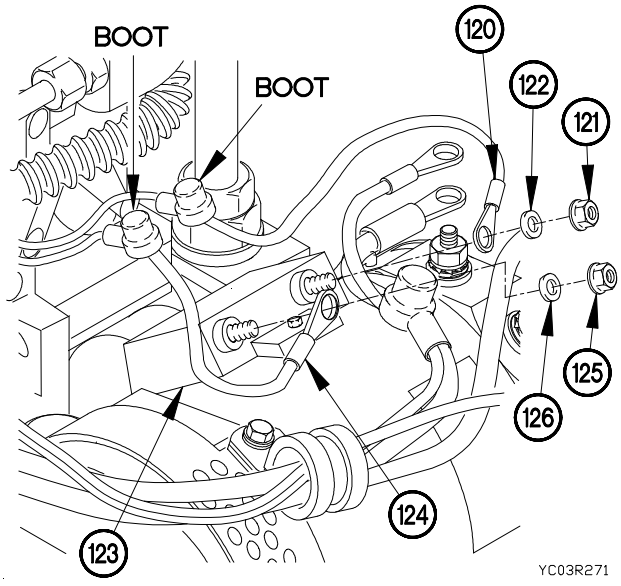
(66) Lift boot from terminal lugs TL6 (115) and TL2 (116).

(67) Remove self-locking nut (117), washer (118), insulation washer (119), 24v terminal lugs TL6 (115), and TL2 (116) from alternator (110). Discard self-locking nut.

(68) Remove terminal lug TL6 (115) from boot on TL2 (116).

(69) Position insulation washer (119), washer (118), and self-locking nut (117) on alternator (110).





(70) Lift boot from terminal lug TL35 (120).

(71) Remove self-locking nut (121), washer (122), and terminal lug TL35 (120) from voltage regulator (123). Discard self-locking nut.

(72) Position washer (122) and self-locking nut (121) on voltage regulator (123).

NOTE

Perform steps (73) through (75) on vehicles equipped with alternator N1506-1 (12420852).

(73) Lift boot from terminal lug TL110 (124).

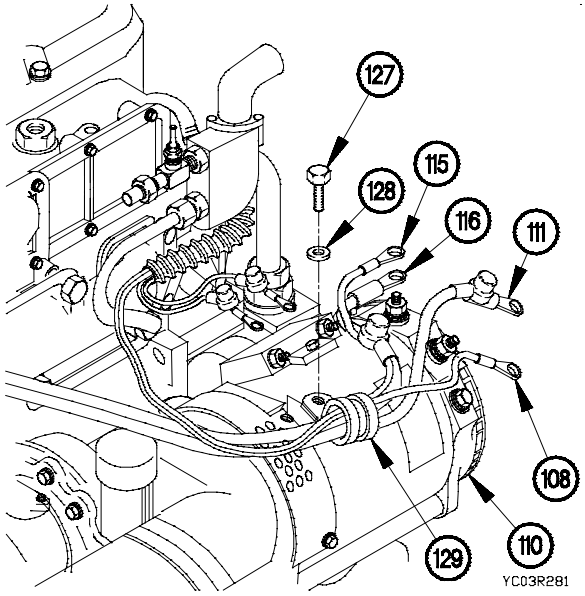
(74) Remove self-locking nut (125), washer (126), and terminal lug TL110 (124) from voltage regulator (123). Discard self-locking nut.

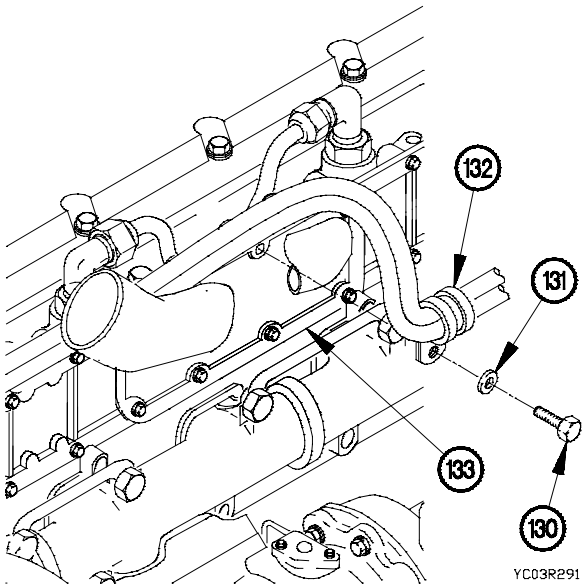
(75) Position washer (126) and self-locking nut (125) on voltage regulator (123).

(76) Remove screw (127), washer (128), and clamp (129) from alternator (110).

(77) Position washer (128) and screw (127) in alternator (110).

(78) Remove terminal lugs TL2 (116), TL60 (111), TL6 (115), and TL5 (108) from clamp (129).



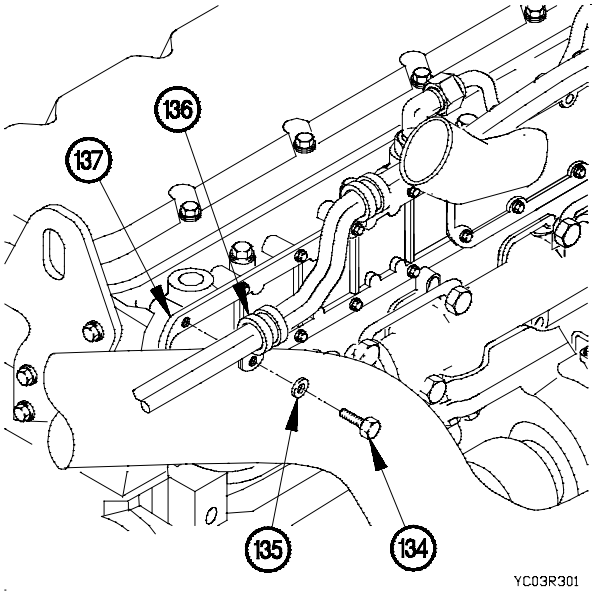


(79) Remove screw (130), washer (131), and clamp (132) from air inlet elbow (133).

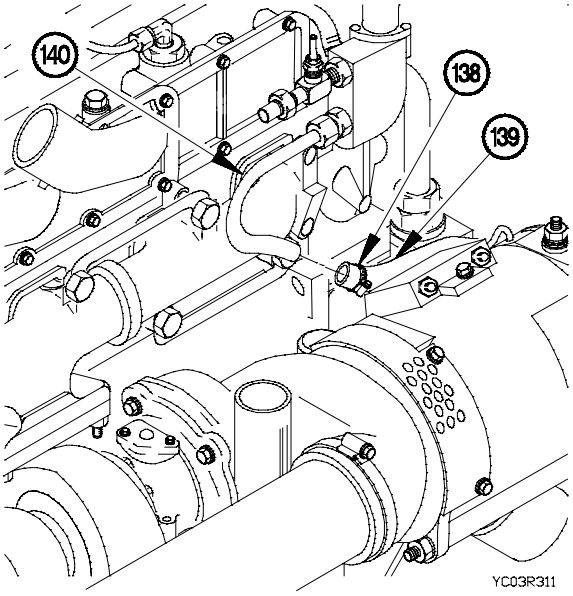
(80) Install washer (131) and screw (130) in air inlet elbow (133).

(81) Remove two screws (134), washers (135) and clamps (136) from inlet manifold (137).

(82) Install two washers (135) and screws (134) in inlet manifold (137).

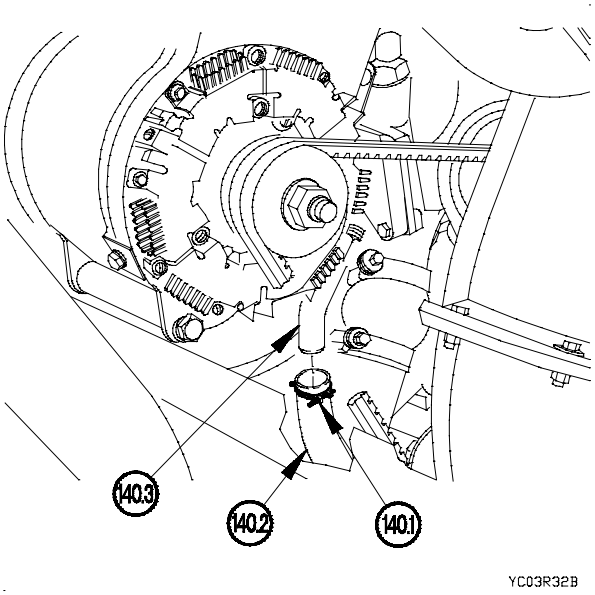


3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)



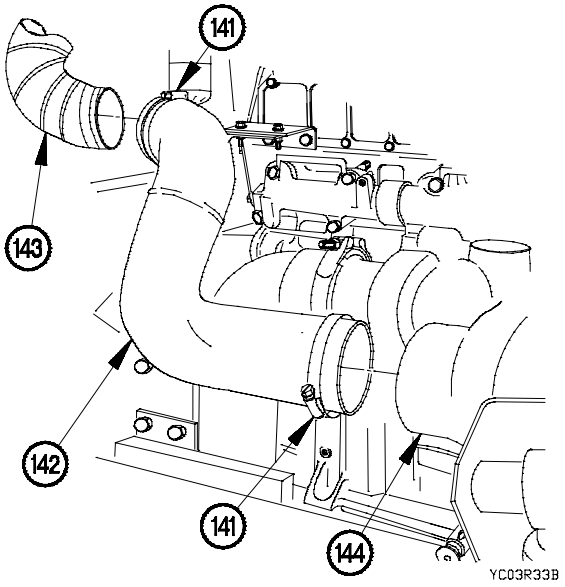
(83) Loosen clamp (138) on heater hose (139).

(84) Disconnect heater hose (139) from heater supply tube (140).



(84.1) Loosen clamp (140.1) on heater outlet hose (140.2).

(84.2) Remove heater outlet hose (140.2) from return fitting (140.3).

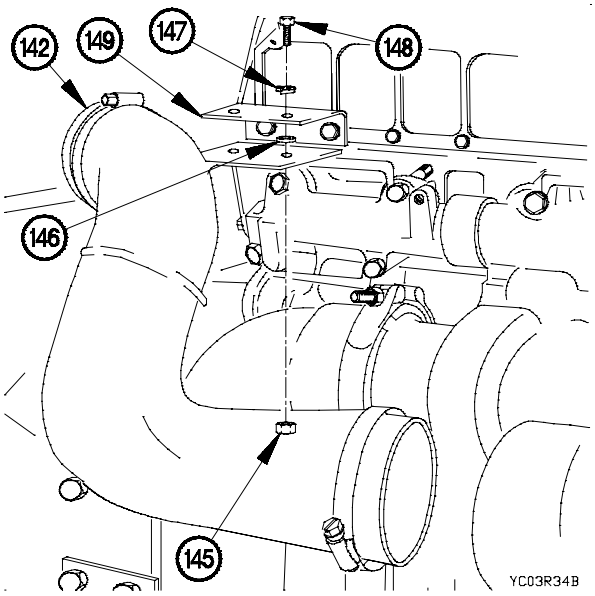


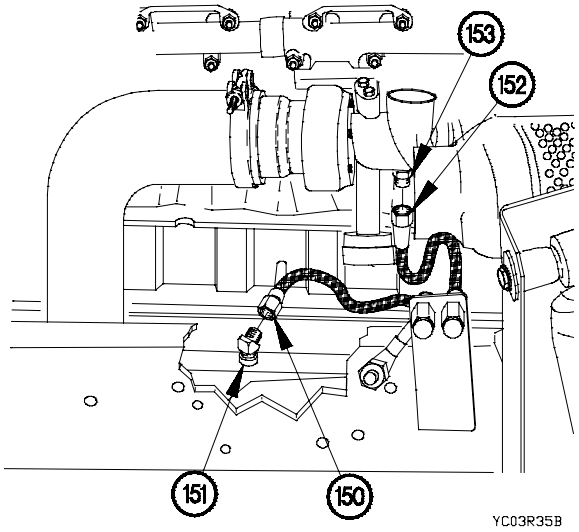
(85) Loosen two clamps (141) on intake tube (142).

(86) Disconnect turbocharger intake air hose (143) from intake tube (142).

(87) Remove intake tube (142) from turbocharger inlet coupling (144).

(88) Remove two nuts (145), washers (146), washers (147), screws (148), and intake tube (142) from bracket (149). Discard lockwashers.

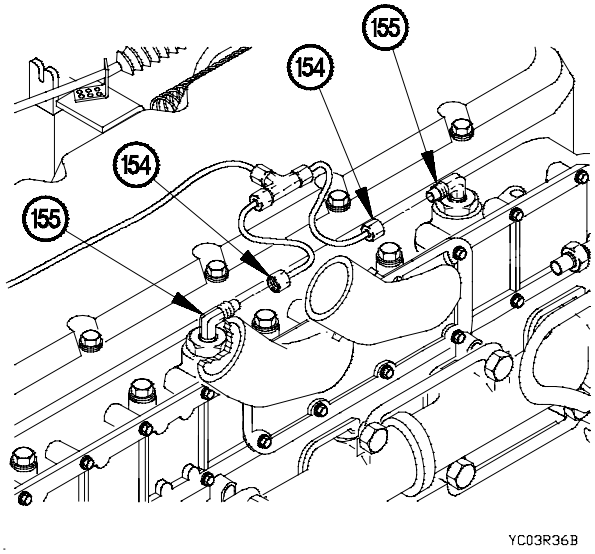




(89) Disconnect transmission oil sampling hose (150) from 45-degree fitting (151).

(90) Disconnect engine oil sampling hose (152) from fitting (153).

(91) Disconnect two ether tubes (154) from ether nozzles (155).

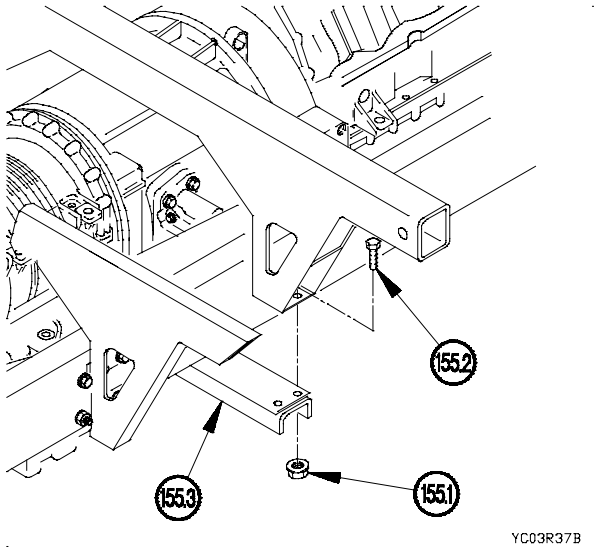


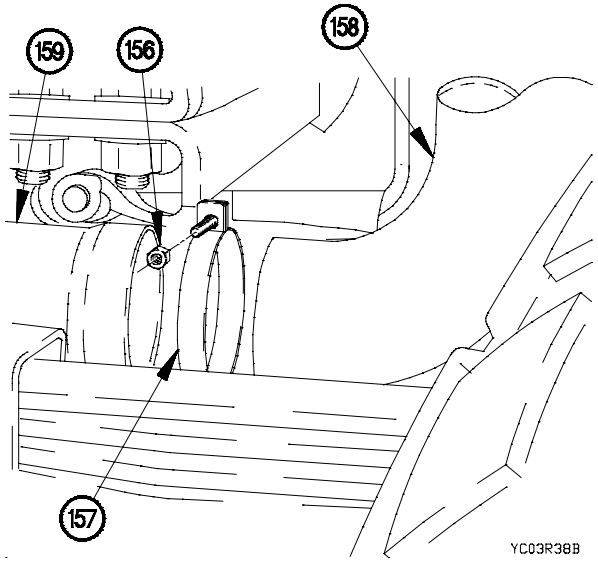
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

NOTE

Perform step (91.1) on vehicles equipped with transmission oil cooler hoses.

(91.1) Remove four self-locking nuts (155.1), bolts (155.2), and lower support crossmember (155.3) from vehicle. Discard self-locking nuts.





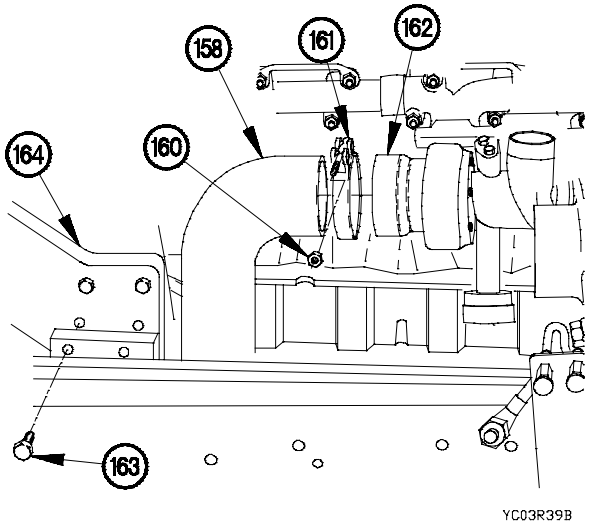
(92) Remove self-locking nut (156) and clamp (157) from upper exhaust pipe (158). Discard self-locking nut.

(93) Disconnect upper exhaust pipe (158) from lower exhaust pipe (159).

(94) Remove self-locking nut (160) and clamp (161) from upper exhaust pipe (158). Discard self-locking nut.

(95) Disconnect upper exhaust pipe (158) from turbocharger (162).

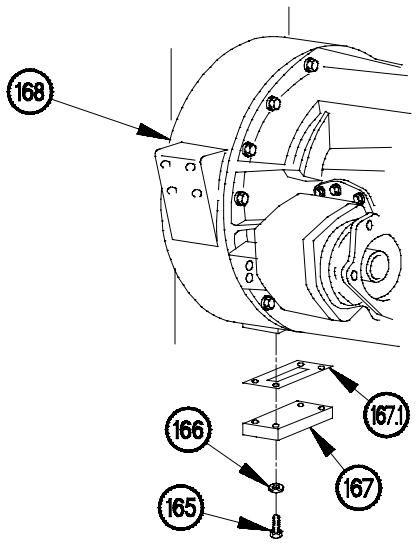
(96) Remove two bolts (163) and upper exhaust pipe (158) from bracket (164).



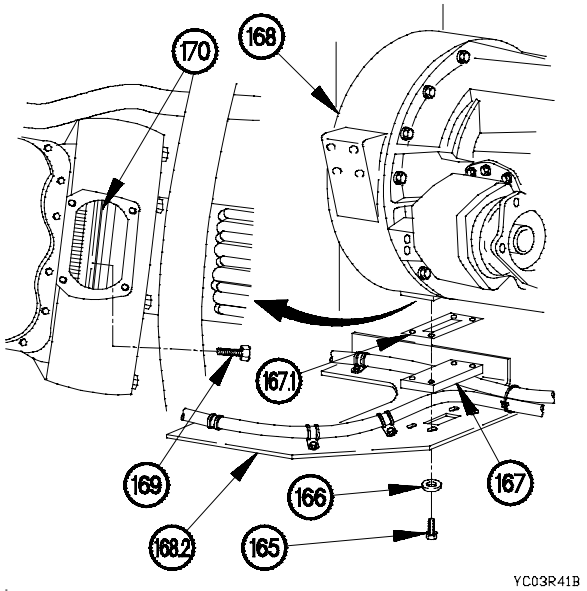
NOTE

Perform step (97) on vehicles equipped with transmission oil cooler tubes.

(97) Remove four screws (165), washers (166), flywheel cover (167) and gasket (167.1) from flywheel housing (168). Discard gasket.



YC03R40B



YC03R41B

NOTE

Perform step (97.1) on vehicles equipped with transmission oil cooler hoses.

(97.1) Remove four screws (165), washers (166), transmission oil cooler hose bracket (168.2), flywheel cover (167), and gasket (167.1) from flywheel housing (168). Discard gasket.

NOTE

- Perform step (98) on vehicle serial number 0001 through 1477.
- Step (98) requires the aid of an assistant.
- During removal of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(98) Remove 12 bolts (169) from flexplate (170).

(98.1) Install flywheel cover (167) on flywheel housing (168) with four washers (166) and screws (165).

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

NOTE

Perform steps (99) through (100.1) on vehicle serial number 1478 and higher.

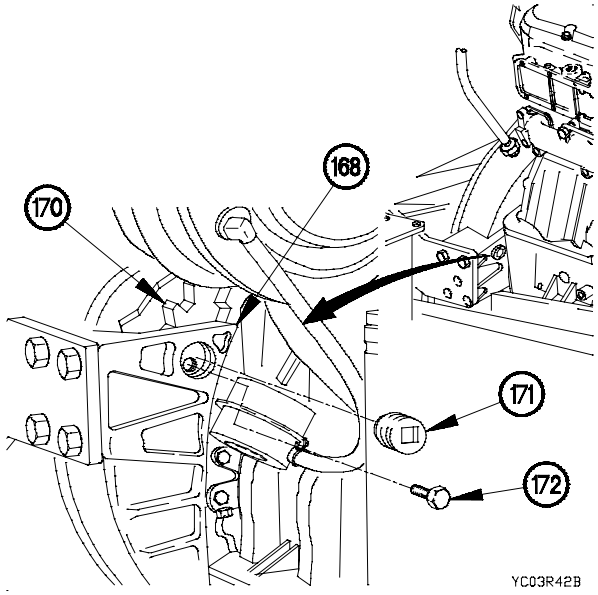
(99) Remove plug (171) from flywheel housing (168).

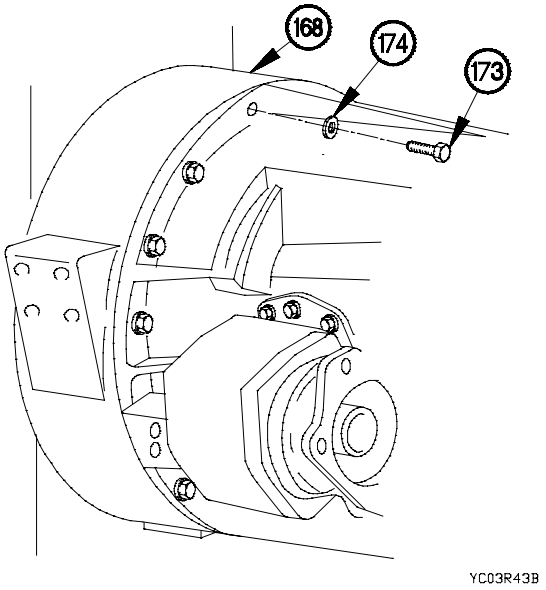
NOTE

- Step (100) requires the aid of an assistant.
- During removal of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(100) Remove six bolts (172) from flexplate (170).

(100.1) Install plug (171) in flywheel housing (168).



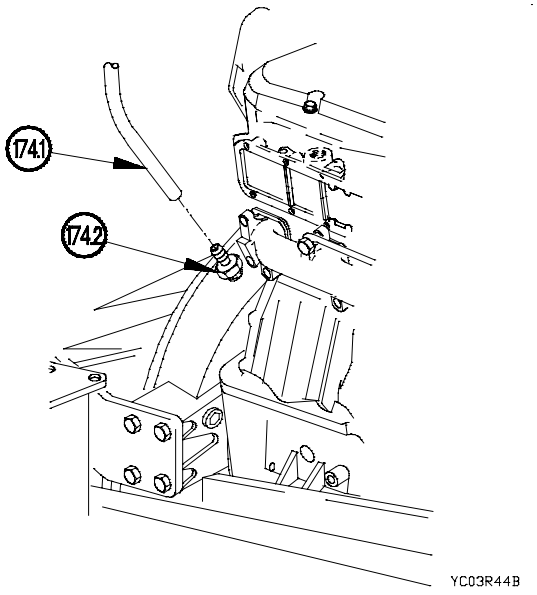


WARNING

Position floor jack under transmission control valve module for support. Failure to comply may result in injury to personnel or damage to equipment.

(101) Remove 12 bolts (173) and washers (174) from flywheel housing (168).

(101.1) Disconnect hose (174.1) from fitting (174.2).

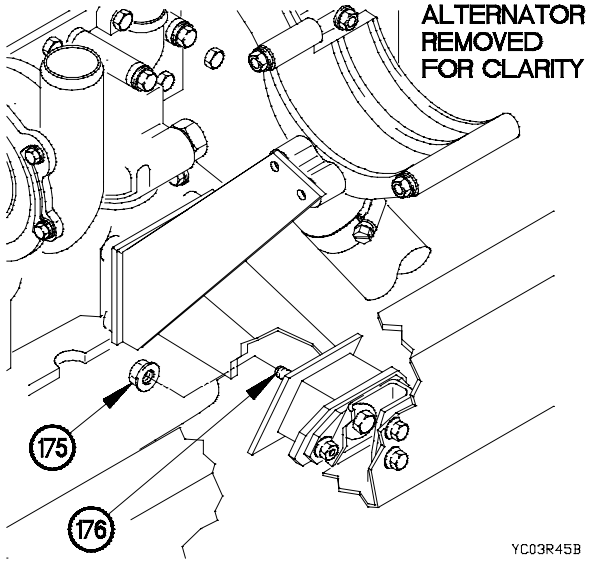


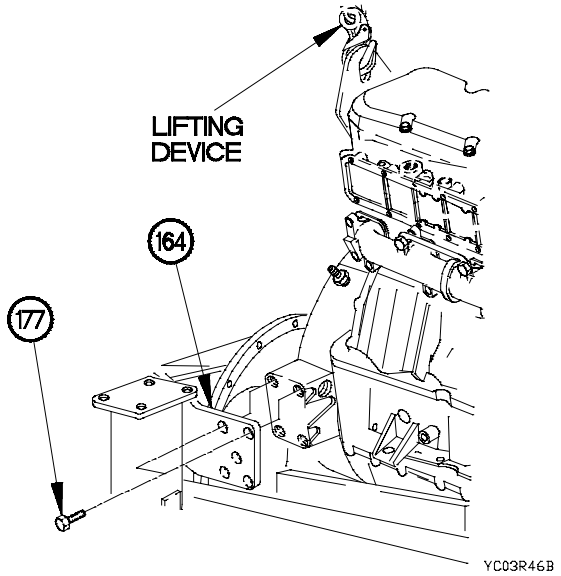
NOTE

Left and right side front engine mounts are removed the same way. Right side shown.

(102) Remove self-locking nut (175) from bolt (176). Discard self-locking nut.

(103) Perform step (102) on left side of engine.





WARNING

Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

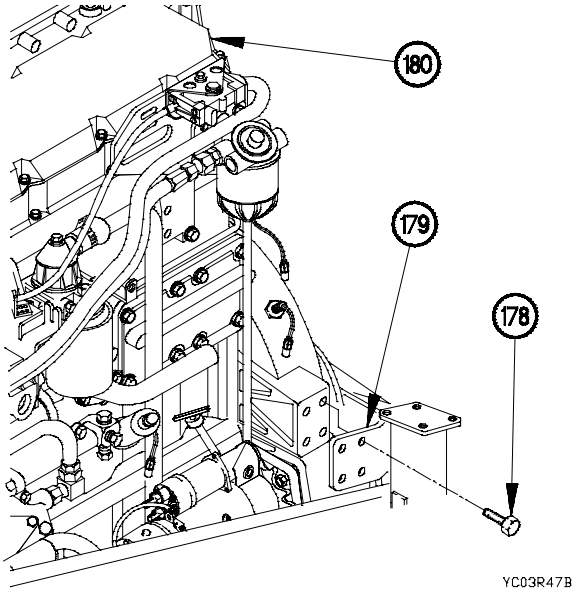
(104) Remove two bolts (177) from right rear mounting bracket (164).

(105) Remove four bolts (178) from left rear mounting bracket (179).

CAUTION

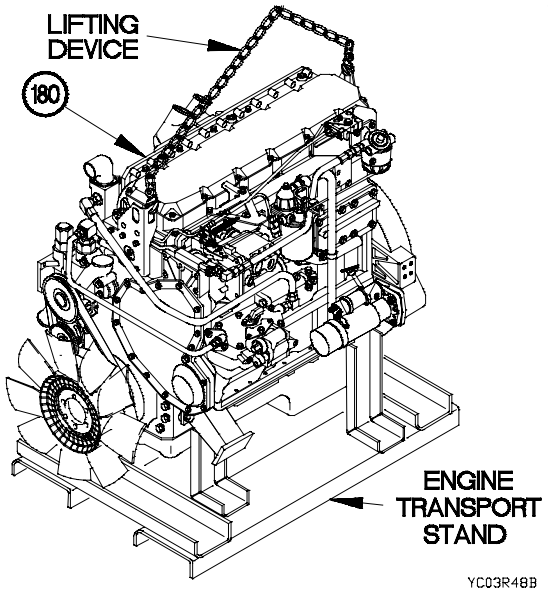
Cables, wires, hoses, tubes, and other parts removed or disconnected from engine must be positioned so that they are clear of engine removal path. Failure to comply may result in damage to equipment.

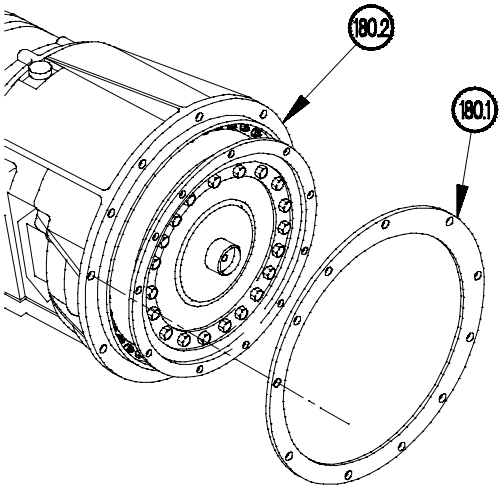
(106) Remove engine (180) from vehicle.



3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(107) Position engine (180) on engine transport stand.





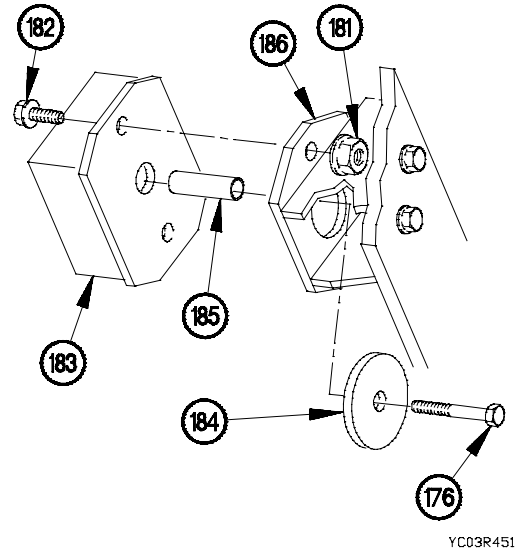
(107.1) Remove gasket (180.1) from transmission (180.2). Discard gasket.

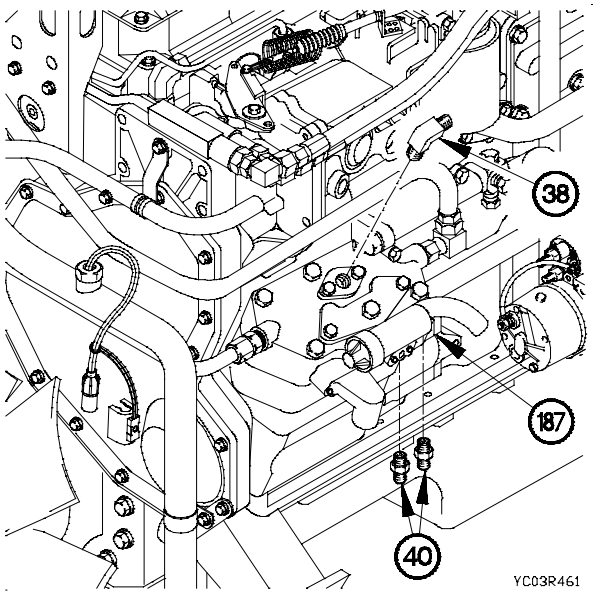
NOTE

Left and right side resilient mounts are removed the same way. Right side shown.

(108) Remove two self-locking nuts (181), screws (182), resilient mount (183), bolt (176), washer (184), and sleeve (185) from right side engine mount bracket (186). Discard self-locking nuts.

(109) Perform step (108) on left side resilient mount.



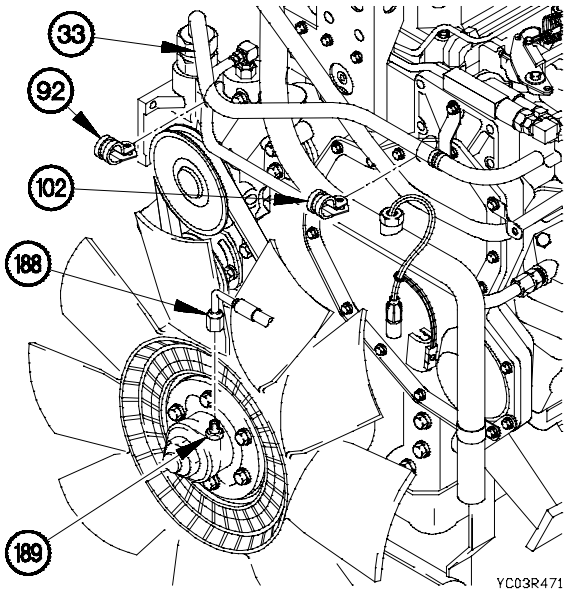


(110) Remove 90-degree fitting (38) from air compressor (187).

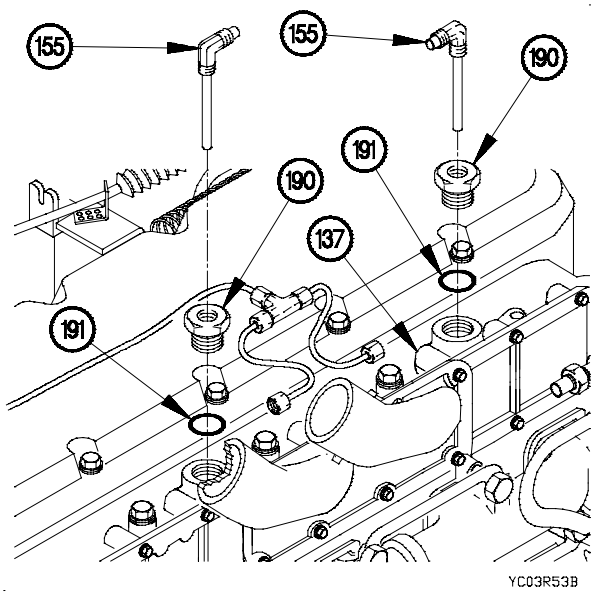
(111) Remove two adapters (40) from air compressor (187).

(112) Remove fan clutch hose (188) from adapter (189).

(113) Remove clamps (92 and 102) from coolant tube (33).



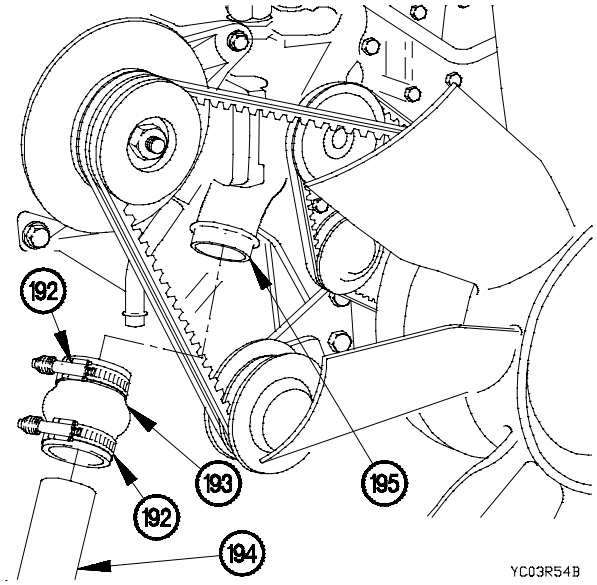
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)



(114) Remove two ether nozzles (155) from adapters (190).

(115) Remove two adapters (190) from inlet manifold (137).

(116) Remove two preformed packings (191) from adapters (190). Discard preformed packings.



(117) Loosen two clamps (192) on coolant hose (193).

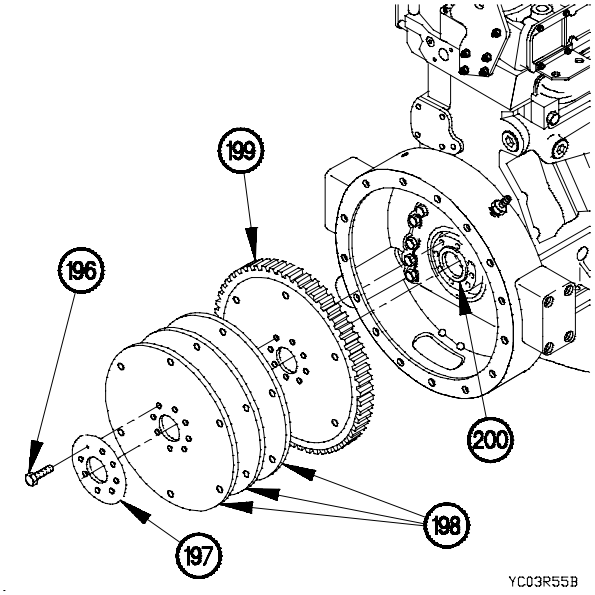
(118) Remove tube (194) from coolant hose (193).

(119) Remove coolant hose (193) from water pump (195).

NOTE

Perform step (120) on vehicles serial number 0001 through 1477.

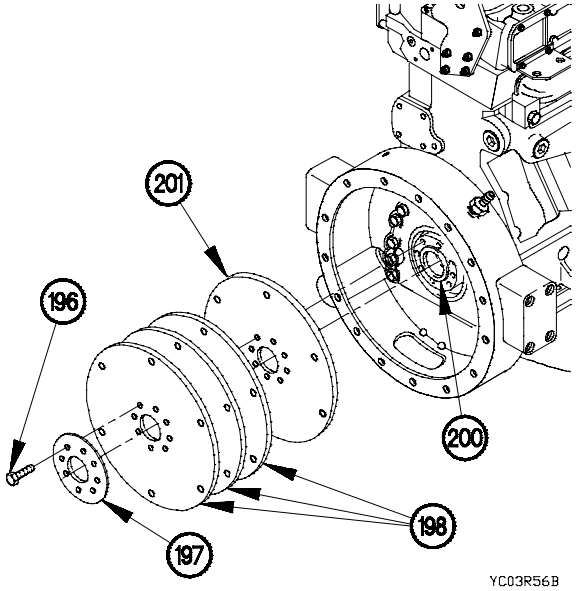
(120) Remove eight bolts (196), plate (197), three shims (198), and gear and disc assembly (199) from hub adapter (200). Discard bolts.

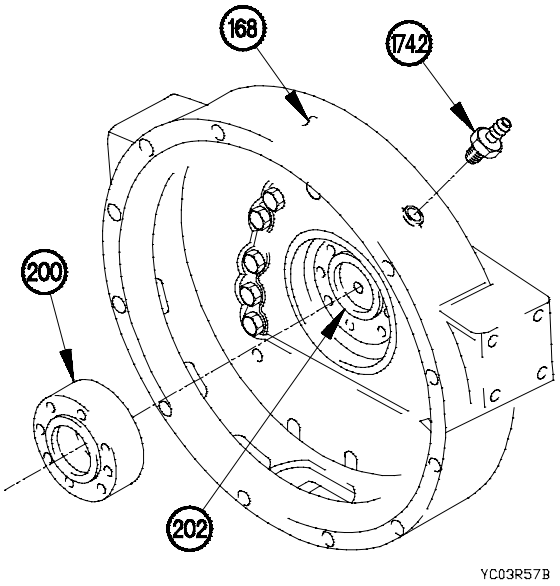


NOTE

Perform step (121) on vehicles serial number 1478 and higher.

(121) Remove eight bolts (196), plate (197), three flexplates (198), and flexplate assembly (201) from hub adapter (200).





(122) Remove hub adapter (200) from crankshaft (202).

(122.1) Remove fitting (174.2) from flywheel housing (168).

NOTE

Replacement engines are equipped with 100 amp alternators. Perform steps (123) through (125) on vehicles equipped with 200 Amp alternator.

(123) Remove self-locking nut (203), spacer (204), screw (205), and washer (206) from alternator (110). Discard self-locking nut.

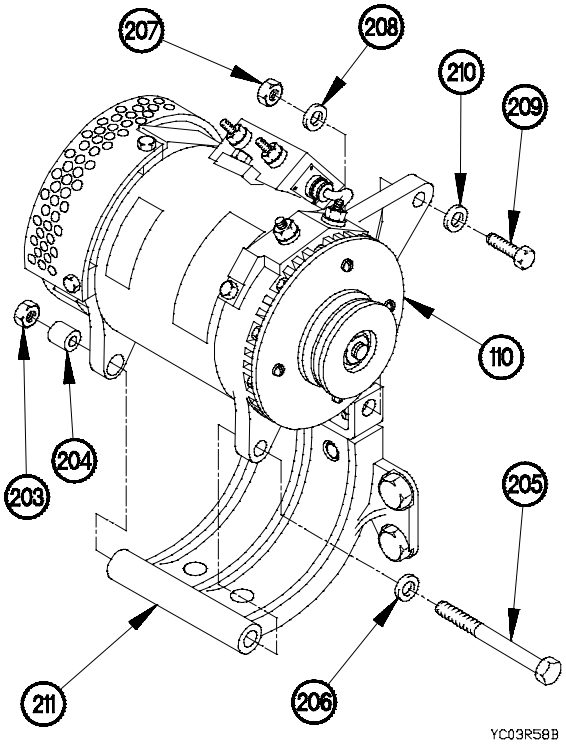
WARNING

Alternator weighs approximately 50 lbs (23 kgs). The aid of an assistant is required to remove alternator. Failure to comply may result in injury to personnel.

NOTE

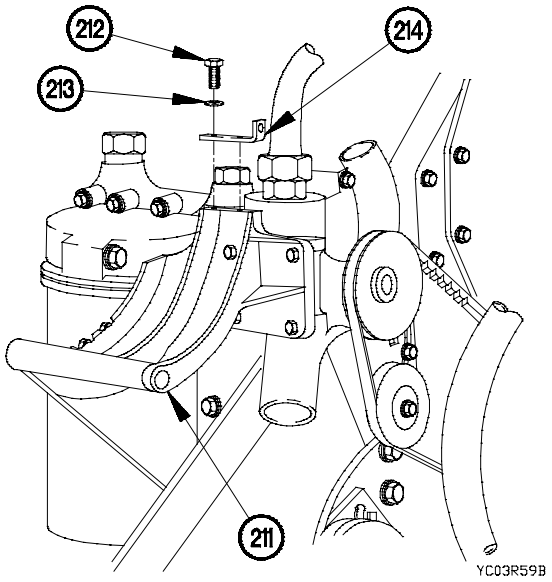
Step (124) requires the aid of an assistant.

(124) Remove nut (207), washer (208), screw (209), washer (210), and alternator (110) from support bracket (211).

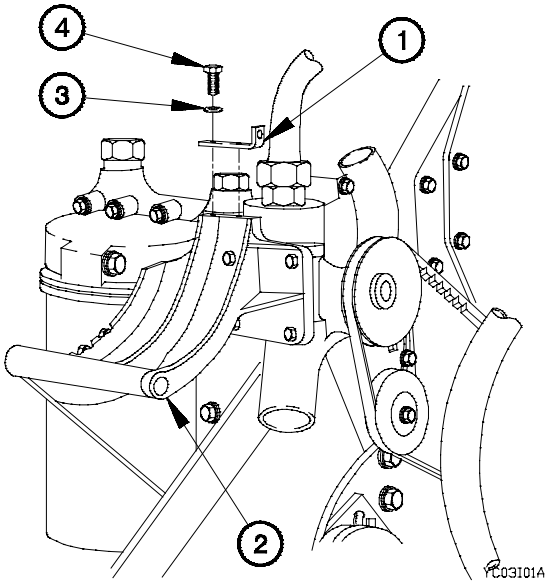


3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(125) Remove two screws (212), washers (213), and alternator bracket (214) from support bracket (211).



b. Installation.



NOTE

Perform steps (1) through (6), on removed engine, on vehicles equipped with 200 Amp alternator.

(1) Position alternator bracket (1) on support bracket (2) with two washers (3) and screws (4).

(2) Tighten two screws (4) to 18-22 lb-ft (24-30 N·m).

WARNING

Alternator weighs approximately 50 lbs (23 kgs). The aid of an assistant is required to install alternator. Failure to comply may result in injury to personnel.

NOTE

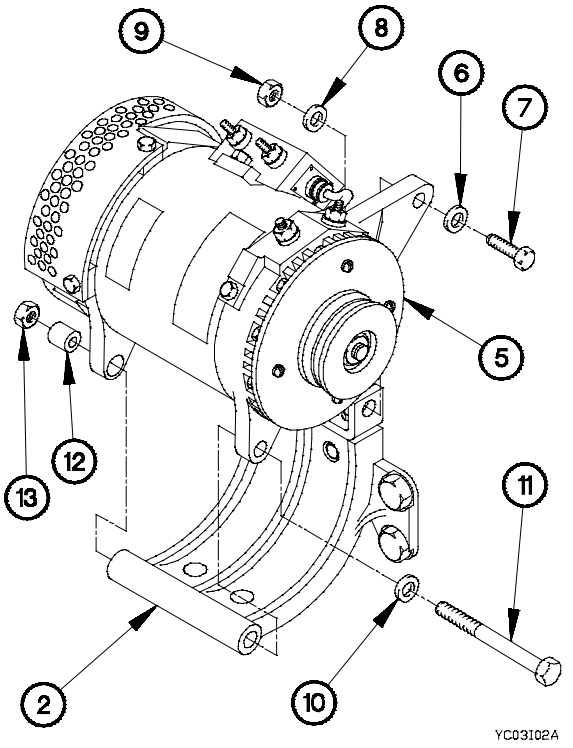
Step (3) requires the aid of an assistant.

(3) Position alternator (5) on support bracket (2) with washer (6), screw (7), washer (8), and nut (9).

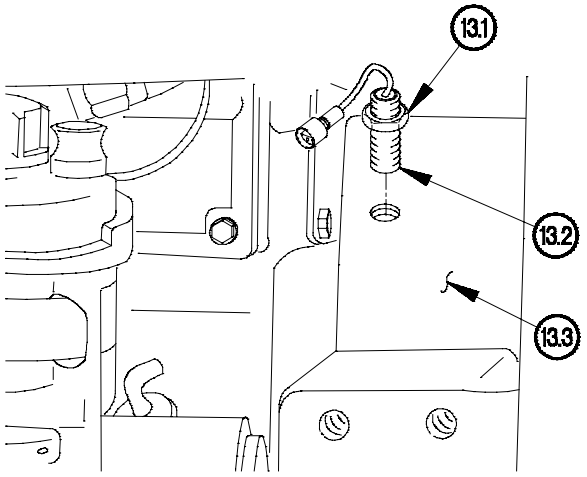
(4) Position washer (10), screw (11), spacer (12), and self-locking nut (13) in alternator (5).

(5) Tighten self-locking nut (13) to 44-55 lb-ft (60-76 N·m).

(6) Tighten nut (9) to 18-22 lb-ft (24-30 N·m).



YC03I02A



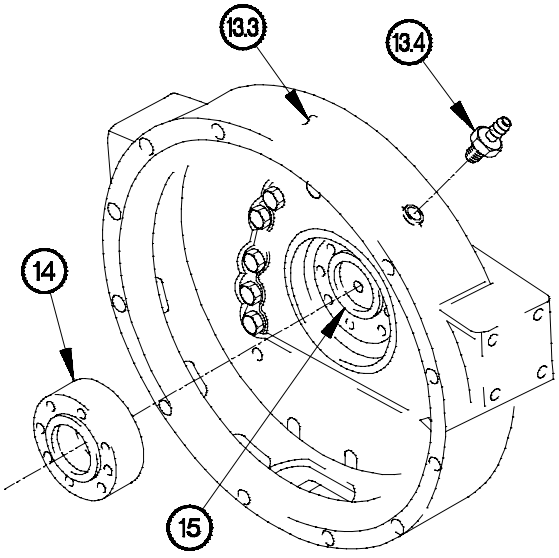
YC03I03B

(6.1) Loosen jam nut (13.1) on engine speed sensor (13.2).

(6.2) Remove engine speed sensor (13.2) from flywheel housing (13.3).

(6.3) Install fitting (13.4) in flywheel housing (13.3).

(7) Position hub adapter (14) on crankshaft (15).



YC03I04B

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

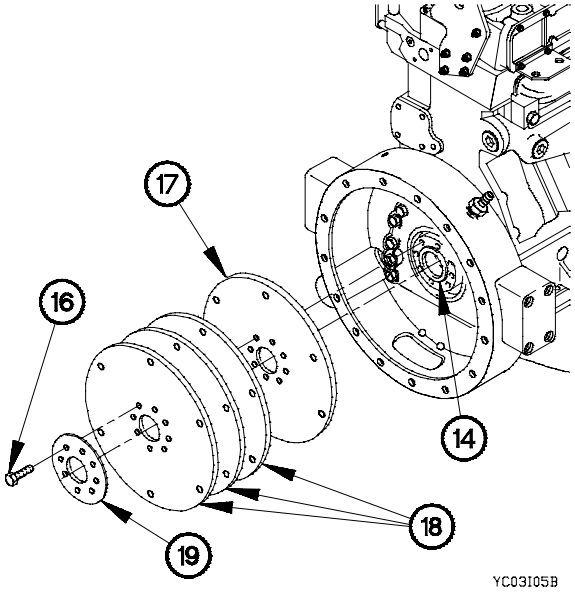
NOTE

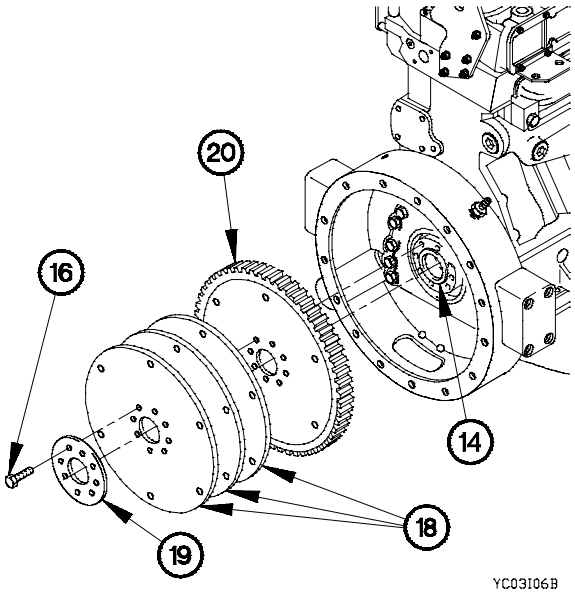
Perform steps (8) through (10) on engines with balance plate removed.

(8) Apply sealing compound to the threads of eight bolts (16).

(9) Position flexplate assembly (17) and three flexplates (18) on hub adapter (14) with plate (19) and eight bolts (16).

(10) Tighten eight bolts (16) to 76-94 ft-lb (103-125 N•m).





NOTE

Perform steps (11) through (13) on engines with ring gear removed.

(11) Apply sealing compound to the threads of eight bolts (16).

(12) Position gear and disc assembly (20) and three shims (18) on hub adapter (14) with plate (19) and eight bolts (16).

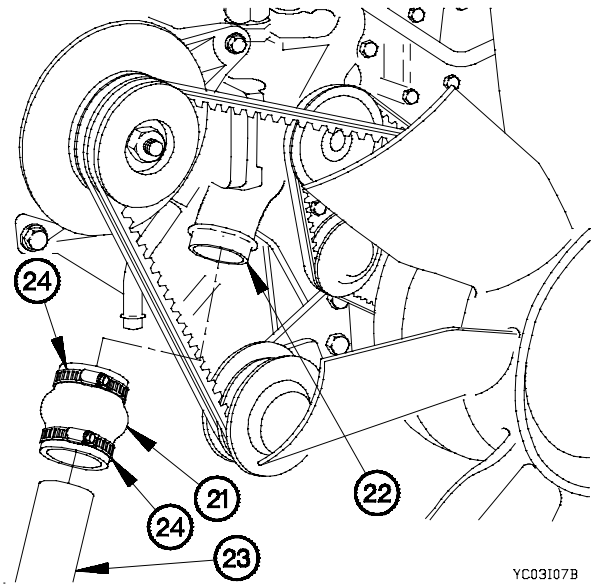
(13) Tighten eight bolts (16) to 76-94 ft-lb (103-125 N•m).

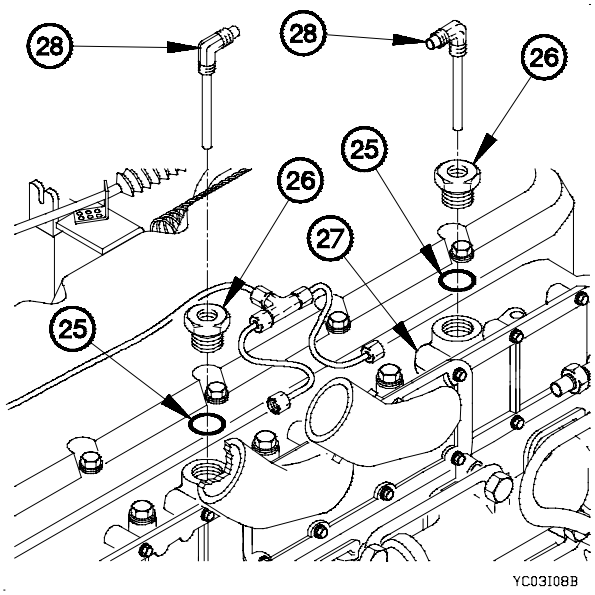
(14) Deleted.

(15) Install coolant hose (21) on water pump (22).

(16) Install tube (23) in coolant hose (21).

(17) Tighten two clamps (24) to 13-17 lb-in. (2 N·m).





(18) Install two preformed packings (25) on adapters (26).

(19) Install two adapters (26) in inlet manifold (27).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

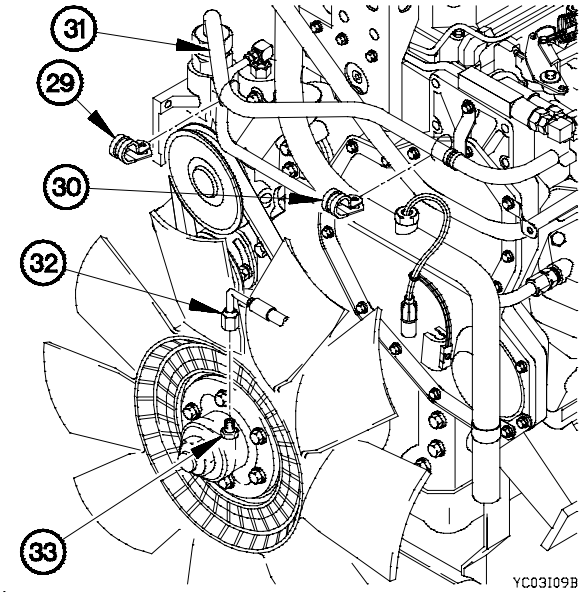
(20) Apply sealing compound to threads of two ether nozzles (28).

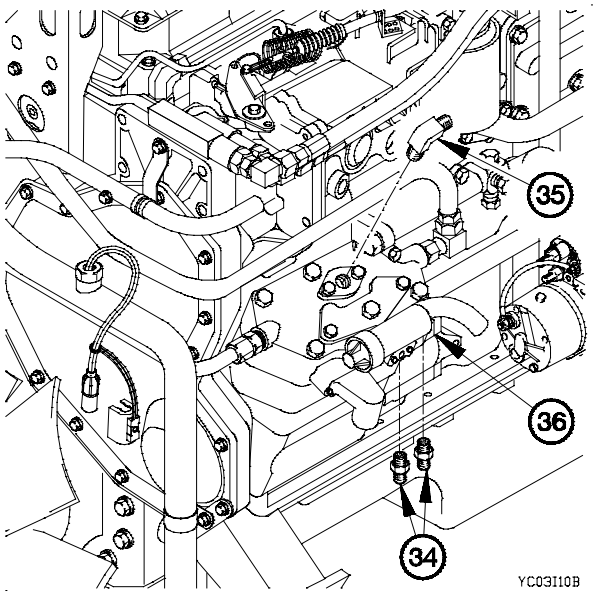
(21) Install two ether nozzles (28) in adapters (26).

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(22) Position clamps (29 and 30) on coolant tube (31).

(23) Connect fan clutch hose (32) to adapter (33).





WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(24) Apply sealing compound to threads of two adapters (34) and 90-degree fitting (35).

(25) Install two adapters (34) in air compressor (36).

(26) Install 90-degree fitting (35) in air compressor (36).

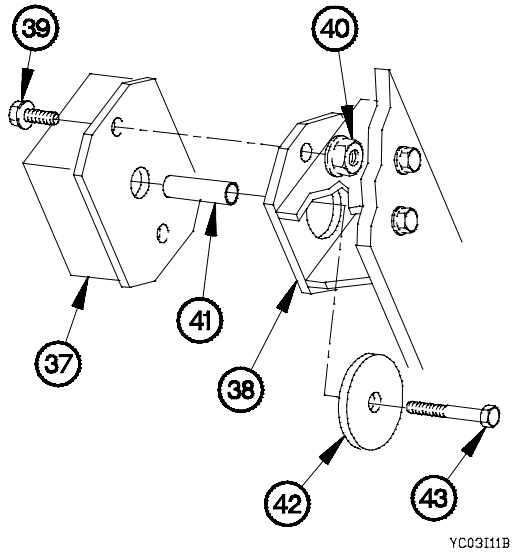
NOTE

Left and right side resilient mounts are installed the same way. Right side shown.

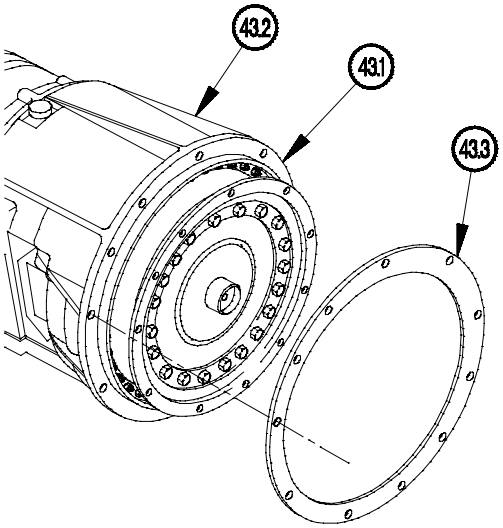
(27) Position resilient mount (37) on engine mount bracket (38) with two screws (39) and self-locking nuts (40).

(28) Position sleeve (41), washer (42), and bolt (43) in resilient mount (37).

(29) Perform steps (27) and (28) on left side resilient mount.



YC03I11B



YC03I12B

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(29.1) Apply light coat of sealing compound to seating surface (43.1) on transmission (43.2).

(29.2) Install gasket (43.3) on transmission (43.2).

WARNING

Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

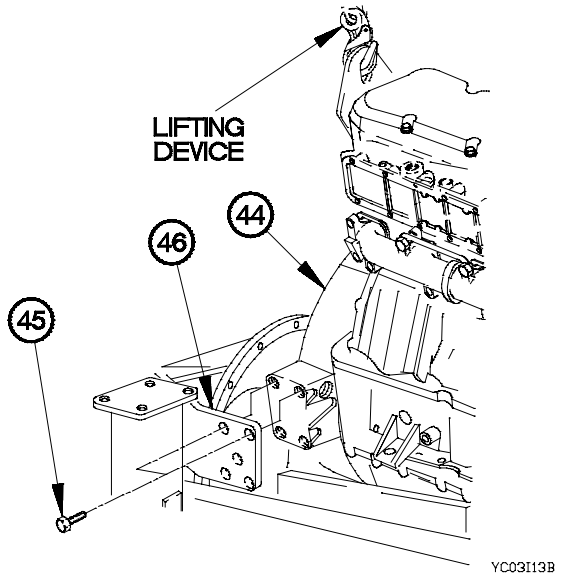
NOTE

Hoist assembly is required until front and rear mounting bolts are installed.

(30) Position engine (44) in vehicle.

(31) Apply sealing compound to threads of two bolts (45).

(32) Position two bolts (45) in right rear mounting bracket (46).



YC03I13B

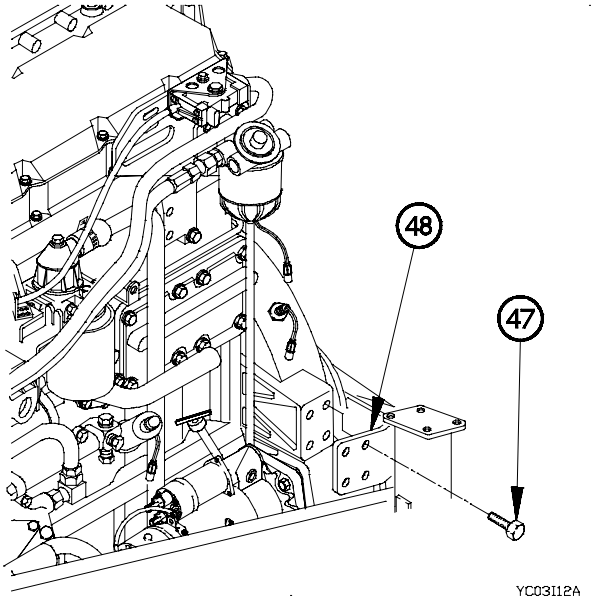
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

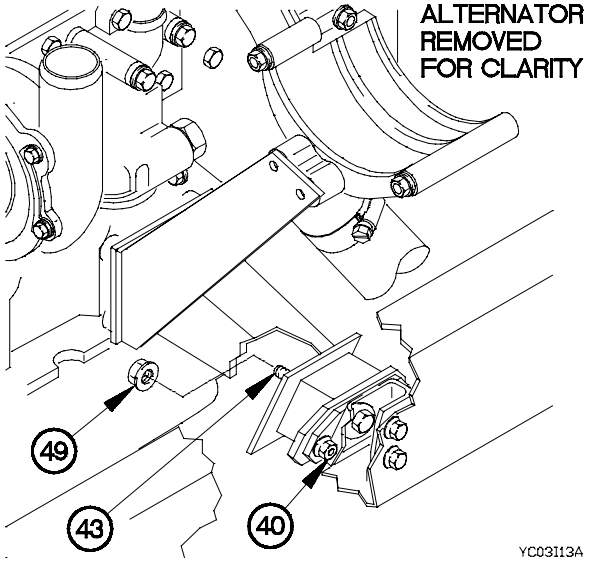
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(33) Apply sealing compound to threads of four bolts (47).

(34) Position four bolts (47) in left rear mounting bracket (48).





NOTE

Left and right side front engine mounts are installed the same way. Right side shown.

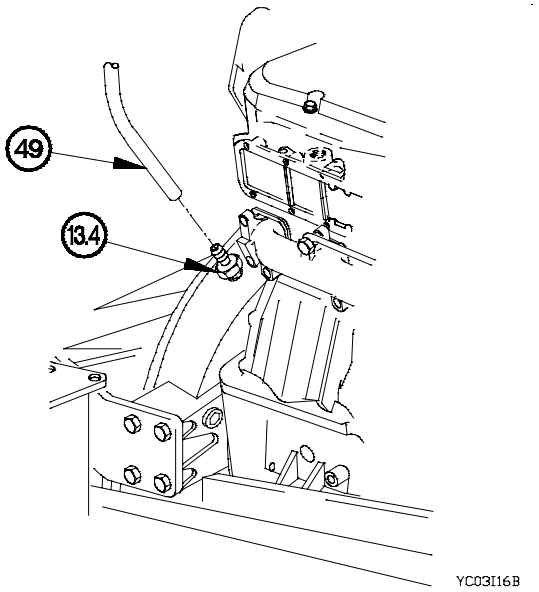
(35) Position self-locking nut (49) on bolt (43).

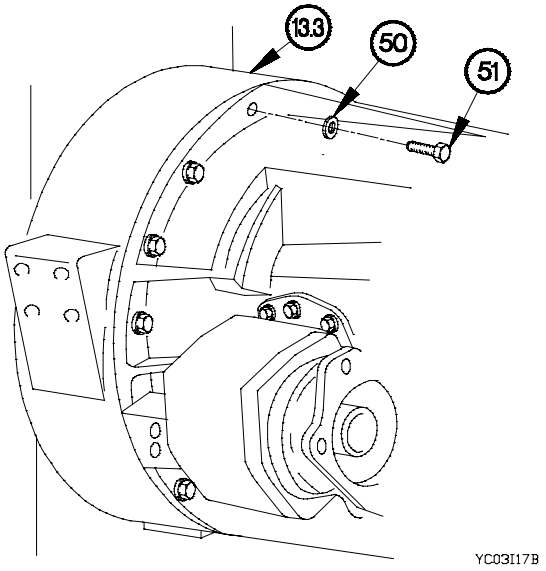
(36) Tighten self-locking nut (49) to 76-94 lb-ft (103-127 N·m).

(37) Tighten two self-locking nuts (40) to 22-26 lb-ft (30-35 N·m).

(38) Perform steps (35) through (37) on left side of engine.

(38.1) Connect hose (49.1) to fitting (13.4).





(39) Position 12 washers (50) and bolts (51) in flywheel housing (13.3).

(40) Tighten 12 bolts (51) to 33-47 lb-ft (45-64 N·m).

NOTE

Perform steps (41) through (43) on vehicles serial number 1478 and higher.

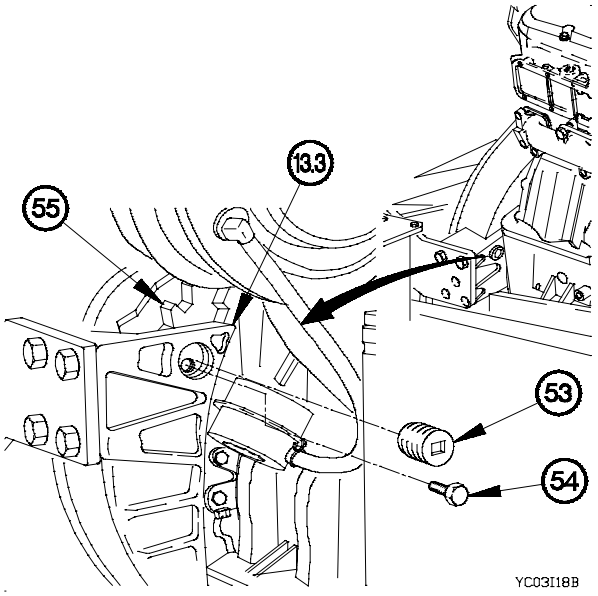
(41) Remove plug (53) from flywheel housing (13.3).

NOTE

- Steps (42) and (43) require the aid of an assistant.
- Flexplate bolts can be accessed by turning alternator pulley through a series of short arcs.

(42) Position six bolts (54) in flexplate (55).

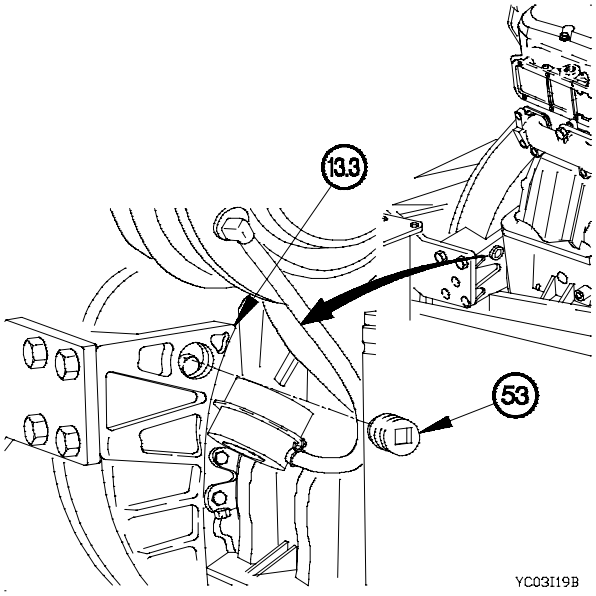
(43) Tighten six bolts (54) to 37-45 lb-ft (61-67 N·m).



3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(44) Deleted.

(45) Install plug (53) in flywheel housing (13.3).



NOTE

- Steps (46) and (47) require the aid of an assistant.
- During installation of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.
- Perform steps (46) through (49) on vehicles serial number 0001 through 1477.

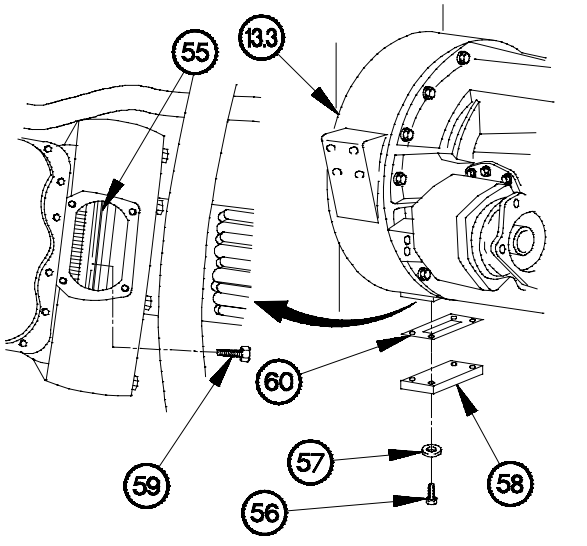
(46) Remove four screws (56), washers (57), and flywheel cover (58) from flywheel housing (13.3).

(47) Position 12 bolts (59) in flexplate (55).

(48) Tighten 12 bolts (59) to 18-22 lb-ft (24-28 N·m).

NOTE

Perform step (49) on vehicles equipped with transmission oil cooler tubes.



(49) Position gasket (60) and flywheel cover (58) on flywheel housing (13.3) with four washers (57) and screws (56).

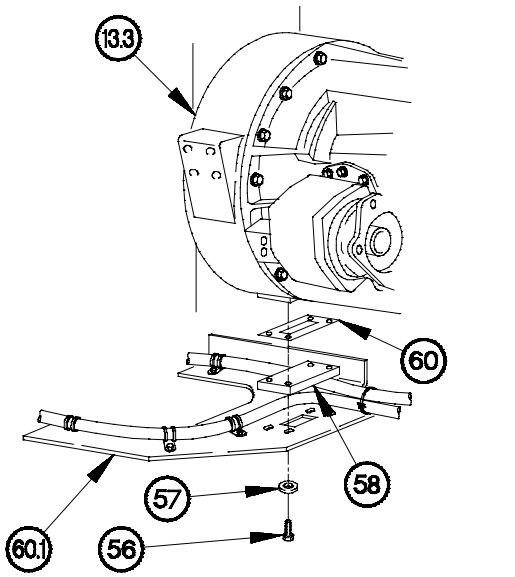
(50) Deleted.

NOTE

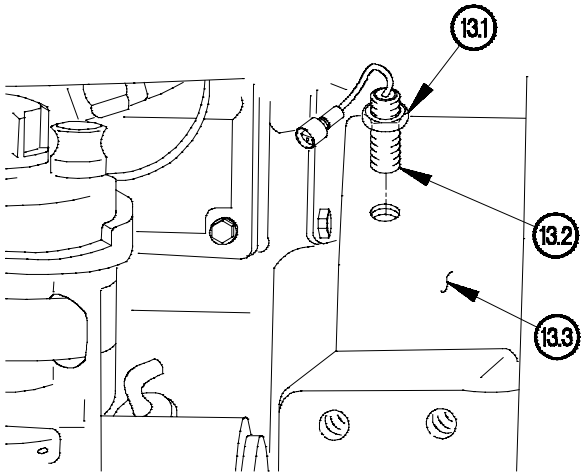
Perform step (50.1) on vehicles equipped with transmission oil cooler hoses.

(50.1) Position gasket (60), flywheel cover (58), and transmission oil cooler hose bracket (60.1) on flywheel housing (13.3) with four washers (57) and screws (56).

(50.2) Tighten four screws (56) to 16-25 lb-ft (21-35 N·m).



YC03I21B



YC03I22B

(50.3) Turn engine speed sensor (13.2) to the right in flywheel housing (13.3) until engine speed sensor contacts flywheel.

(50.4) Turn engine speed sensor (13.2) to the left out of flywheel housing (13.3) two full turns.

(50.5) Tighten jam nut (13.1) on engine speed sensor (13.2).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

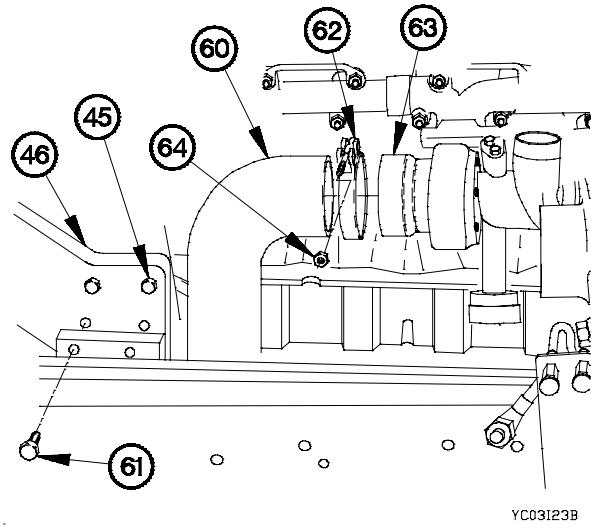
(51) Apply sealing compound to threads of two bolts (61).

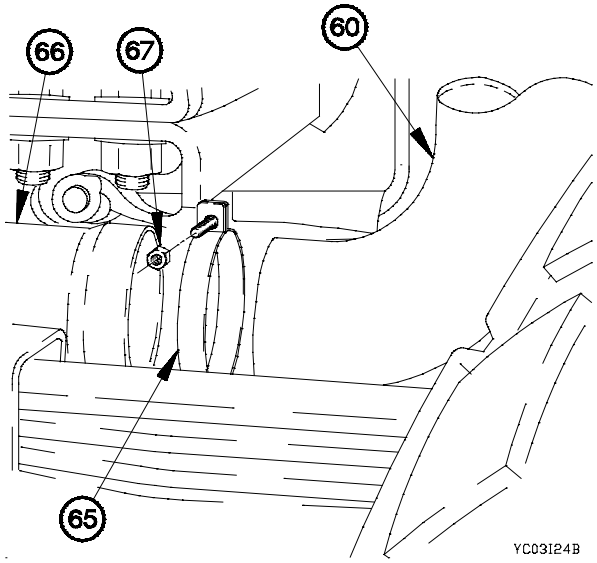
(52) Position upper exhaust pipe (60) on right rear mounting bracket (46) with two bolts (61).

(53) Position upper exhaust pipe (60) and clamp (62) on turbocharger (63) with self-locking nut (64).

(54) Tighten self-locking nut (64) to 89-109 lb-in. (10-12 N·m).

(55) Tighten two bolts (45 and 61) to 129-159 lb-ft (175-215 N·m).





(56) Position upper exhaust pipe (60) and clamp (65) on lower exhaust pipe (66) with self-locking nut (67).

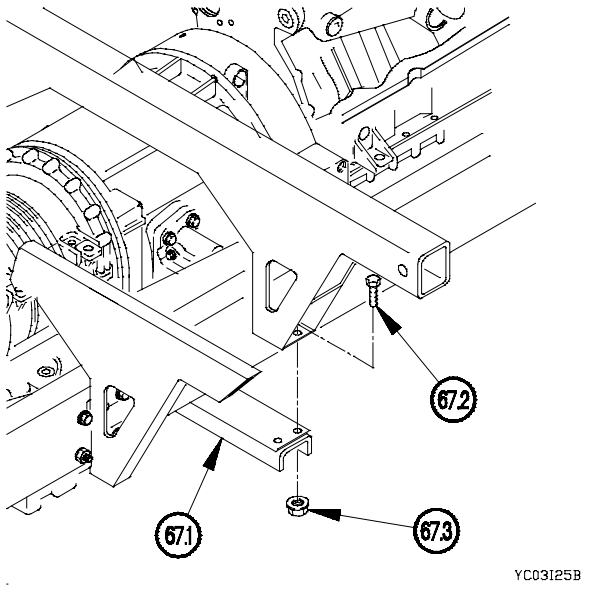
(57) Tighten self-locking nut (67) to 89-109 lb-in. (10-12 N·m).

NOTE

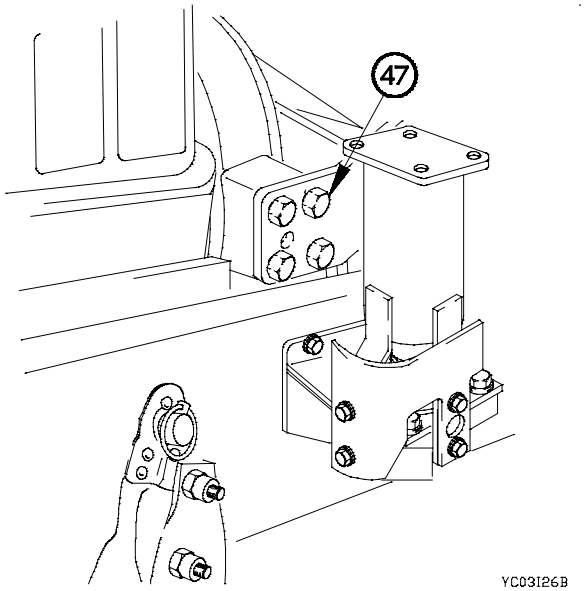
Steps (57.1) and (57.2) require the aid of an assistant.

(57.1) Position lower front support crossmember (67.1) on vehicle with four bolts (67.2) and self-locking nuts (67.3).

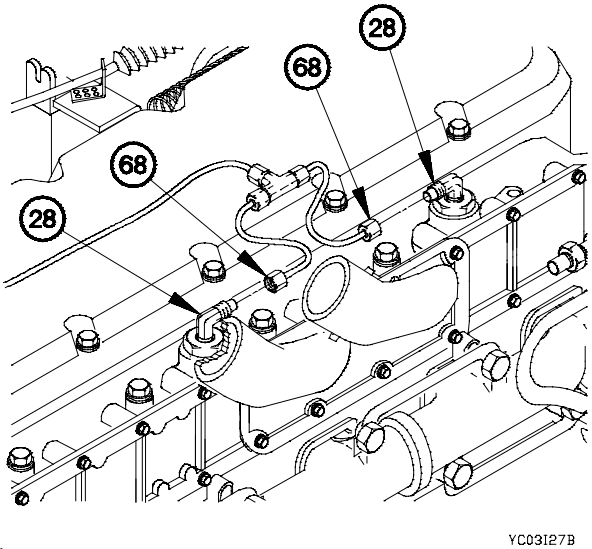
(57.2) Tighten four self-locking nuts (67.3) to 295-369 lb-ft (400-500 N·m).



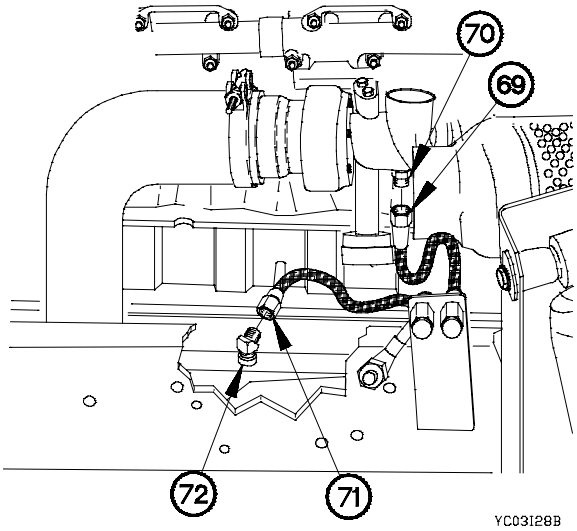
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)



(58) Tighten four bolts (47) to 129-159 lb-ft (175-215 N·m).



(59) Connect two ether tubes (68) to ether nozzles (28).

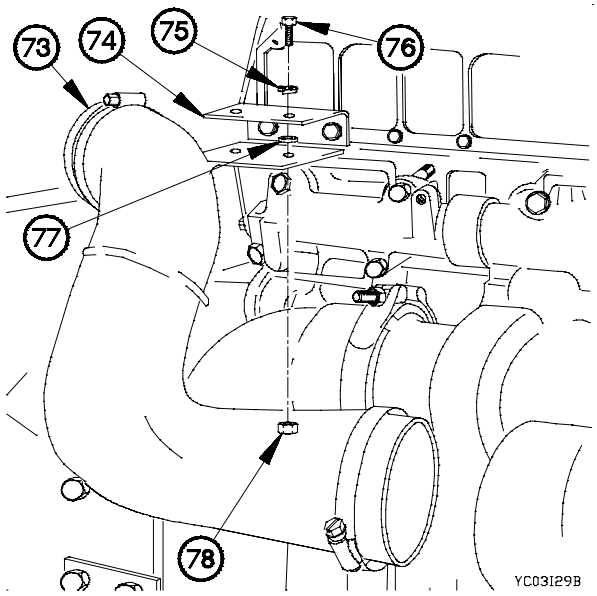


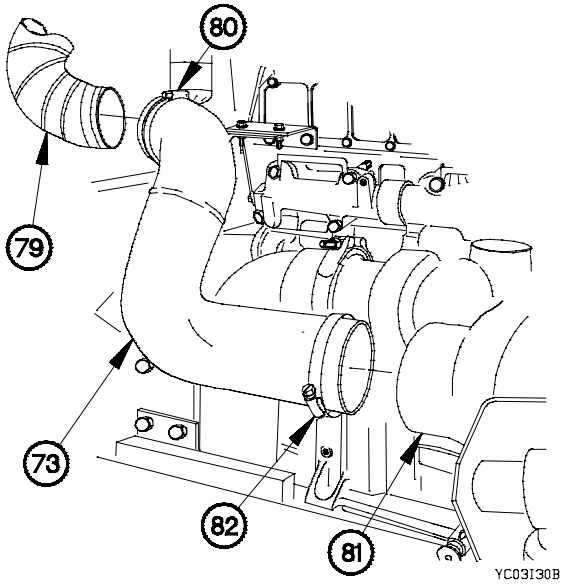
(60) Connect engine oil sampling hose (69) to fitting (70).

(61) Connect transmission oil sampling hose (71) to 45-degree fitting (72).

(62) Position intake tube (73) on bracket (74) with two washers (75), screws (76), lockwashers (77), and nuts (78).

(63) Tighten two nuts (78) to 22-26 lb-ft (29-35 N·m).





(64) Position turbocharger intake air hose (79) on intake tube (73) with clamp (80).

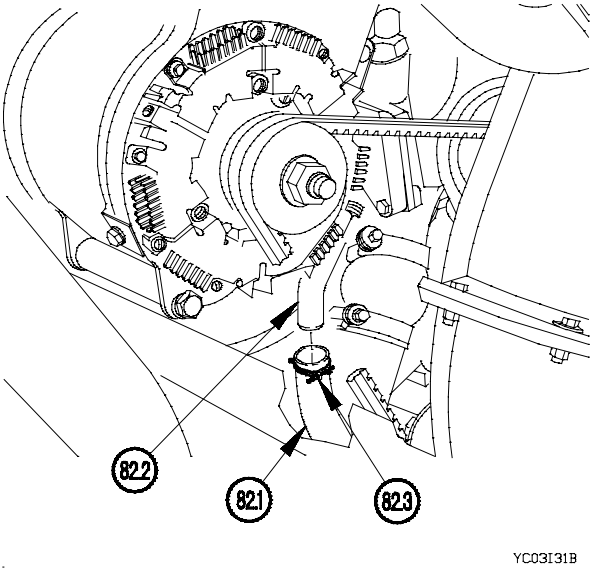
(65) Tighten clamp (80) to 36-48 lb-in. (5-6 N·m).

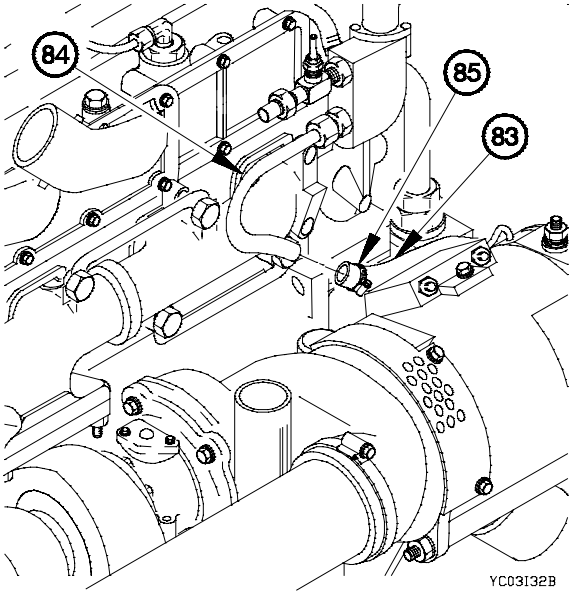
(66) Position intake tube (73) on turbocharger inlet coupling (81) with clamp (82).

(67) Tighten clamp (82) to 36-48 lb-in. (5-6 N·m).

(67.1) Position heater outlet hose (82.1) on return fitting (82.2) with clamp (82.3).

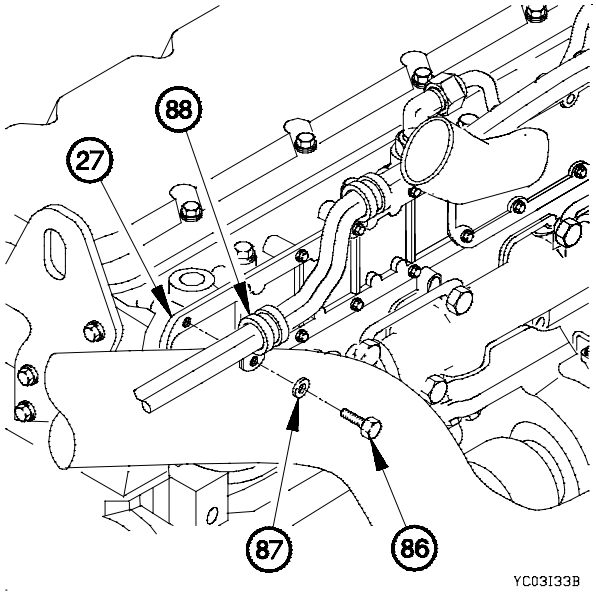
(67.2) Tighten clamp (82.3) to 12-18 lb-in. (1-2 N·m).





(68) Position heater hose (83) on tube (84) with clamp (85).

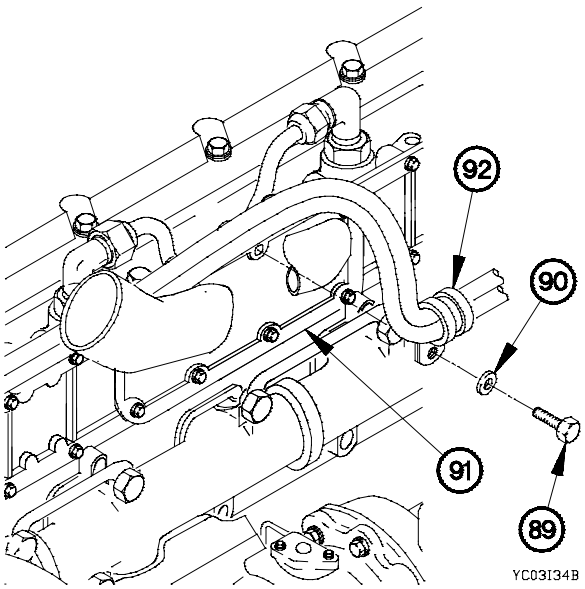
(68.1) Tighten clamp (85) to 12-18 lb-in. (1-2 N·m).



(69) Remove two screws (86) and washers (87) from inlet manifold (27).

(70) Position two clamps (88) on inlet manifold (27) with two washers (87) and screws (86).

(71) Tighten two screws (86) to 15-25 lb-ft (20-34 N·m).



(72) Remove screw (89) and washer (90) from air inlet elbow (91).

(73) Position clamp (92) on air inlet elbow (91) with washer (90) and screw (89).

(74) Tighten screw (89) to 15-25 lb-ft (20-34 N·m).

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

NOTE

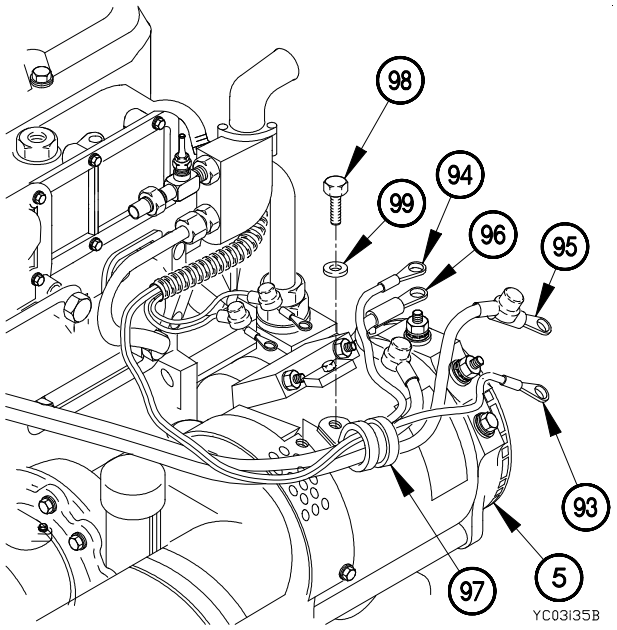
Perform steps (75) through (98) on vehicles equipped with 100 Amp alternator.

(75) Position terminal lugs TL5 (93), TL6 (94), TL60 (95), and TL2 (96) in clamp (97).

(76) Remove screw (98) and washer (99) from alternator (5).

(77) Position clamp (97) on alternator (5) with washer (99) and screw (98).

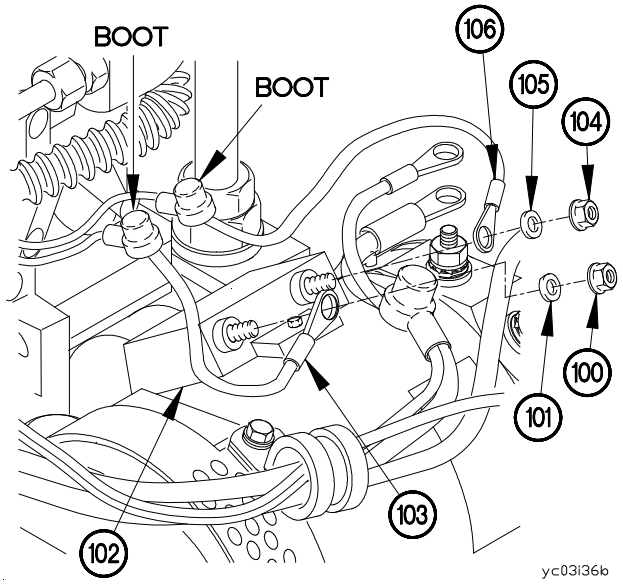
(78) Tighten screw (98) to 80 lb-in. (9 N •m).



NOTE

- Perform step (79) if replacing alternator P/N N1506-1 (12420852) with alternator N1509-1 (12422863).
- Install plastic cable ties to TL110 and tie wire awav from alternator.

(79) Apply electrical tape to terminal lug TL110 (103).



NOTE

Perform steps (79.1) through (82) on alternator N1506-1 (12420852).

(79.1) Remove self-locking nut (100) and washer (101) from voltage regulator (102).

(80) Position terminal lug TL110 (103) on voltage regulator (102) with washer (101) and self-locking nut (100).

(81) Tighten self-locking nut (100) to 20 lb-in. (2 N •m).

(82) Position boot on terminal lug TL110 (103).

(83) Remove self-locking nut (104) and washer (105) from voltage regulator (102).

(84) Position terminal lug TL35 (106) on voltage regulator (102) with washer (105) and self-locking nut (104).

(85) Tighten self-locking nut (104) to 20 lb-in. (2 N•m).

(86) Position boot on terminal lug TL35 (106).

(87) Remove self-locking nut (107), washer (108), and insulator washer (109) from alternator (5).

(88) Route terminal lug TL6 (94) through boot on TL2 (96).

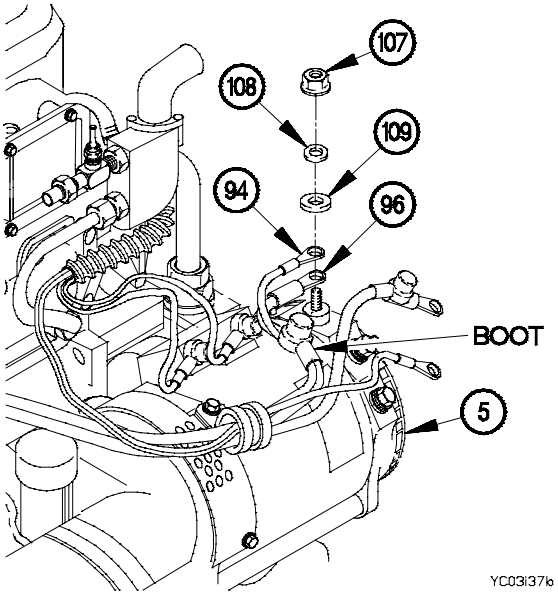
CAUTION

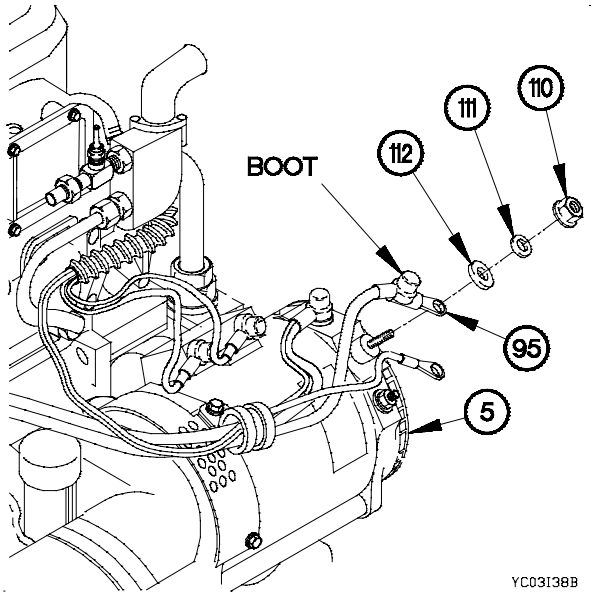
Insulator washer must be installed with flat side up. Failure to comply may result in damage to equipment.

(89) Position 24v terminal lugs TL2 (96) and TL6 (94) on alternator (5) with insulator washer (109), washer (108), and self-locking nut (107).

(90) Tighten self-locking nut (107) to 40 lb-in. (5 N·m).

(91) Position boot on terminal lugs TL6 (94) and TL2 (96).





CAUTION

Insulator washer must be installed with flat side up. Failure to comply may result in damage to equipment.

(92) Remove self-locking nut (110), washer (111), and insulator washer (112) from alternator (5).

(93) Position 12v terminal lug TL60 (95) on alternator (5) with insulator washer (112), washer (111), and self-locking nut (110).

(94) Tighten self-locking nut (110) to 40 lb-in. (5 N·m).

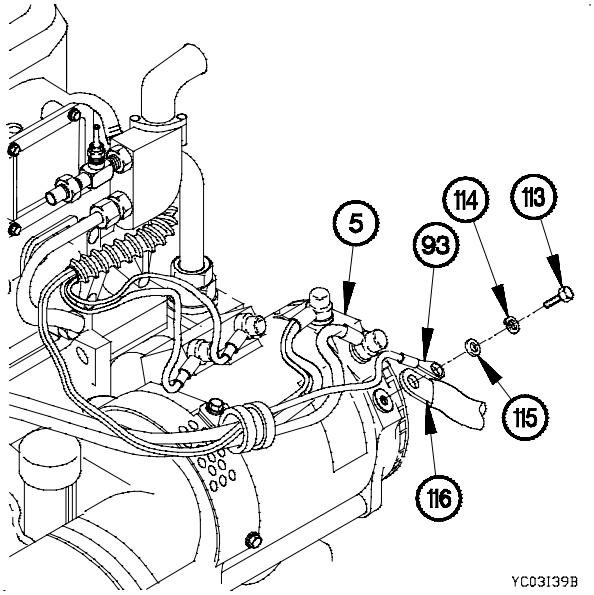
(95) Position boot on terminal lug TL60 (95).

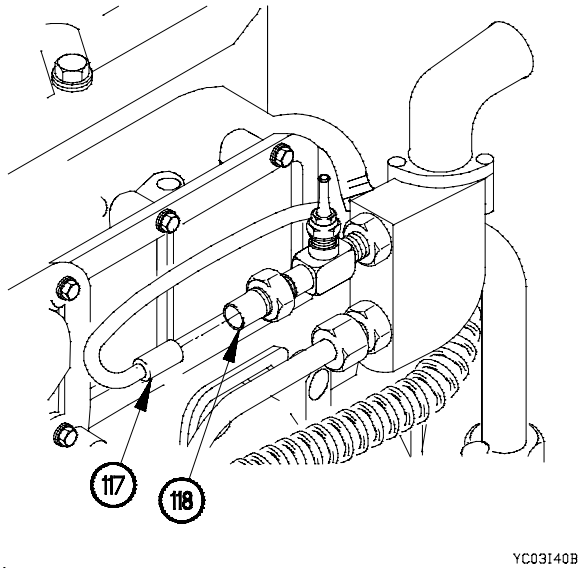
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(96) Remove screw (113), lockwasher (114), and washer (115) from alternator (5).

(97) Position terminal lugs TL8 (116) and TL5 (93) on alternator (5) with washer (115), lockwasher (114) and screw (113).

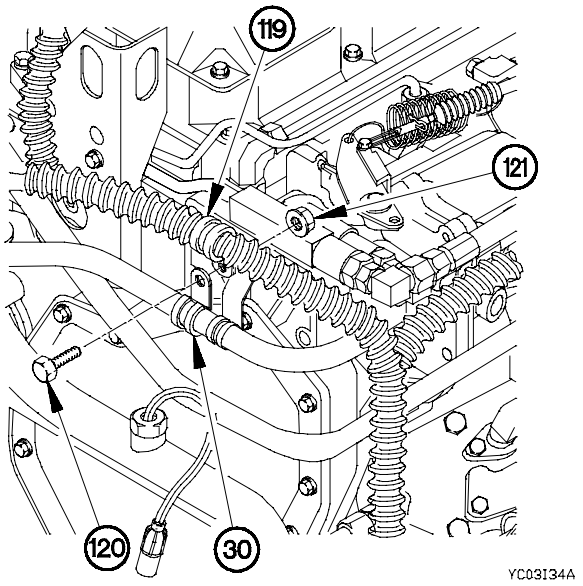
(98) Tighten screw (113) to 80 lb-in. (9 N·m).

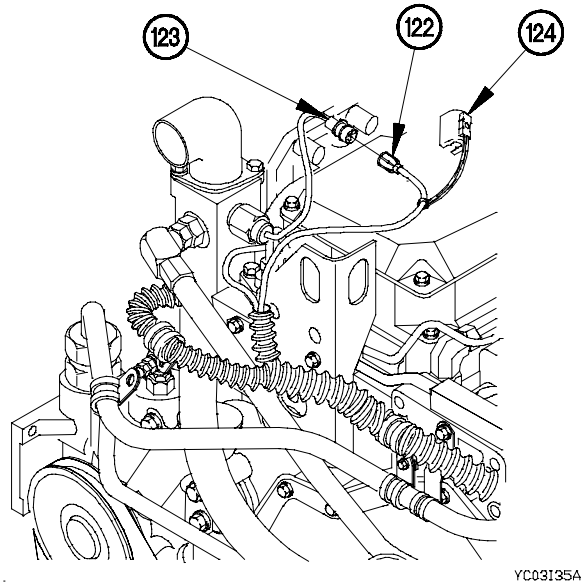




(99) Connect connector P41 (117) to water temperature transducer (118).

(100) Install clamp (119) on clamp (30) with screw (120) and self-locking nut (121).





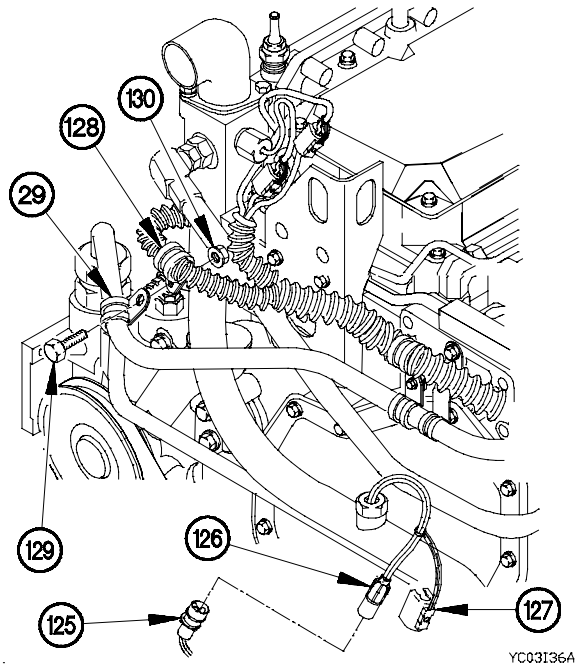
(101) Connect connector P37 (122) to water temperature light switch connector (123).

(102) Connect connector clamp (124) on water temperature light switch connector (123).

(103) Connect connector P42 (125) to ether sensor connector (126).

(104) Connect connector clamp (127) on ether sensor connector (126).

(105) Install clamp (128) on clamp (29) with screw (129) and self-locking nut (130).

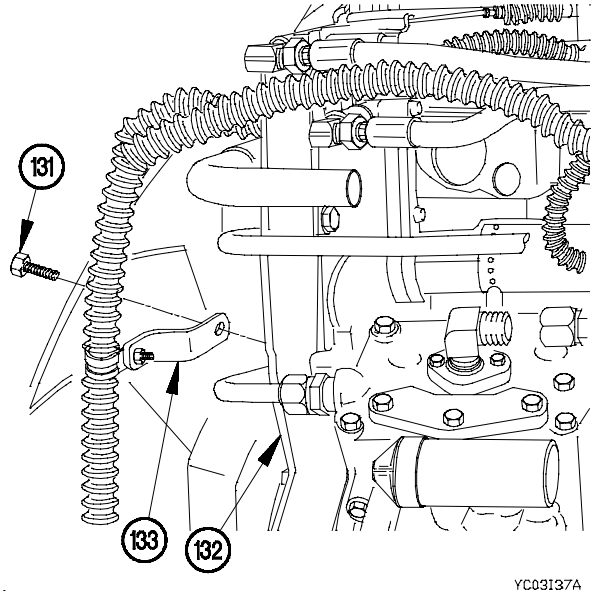


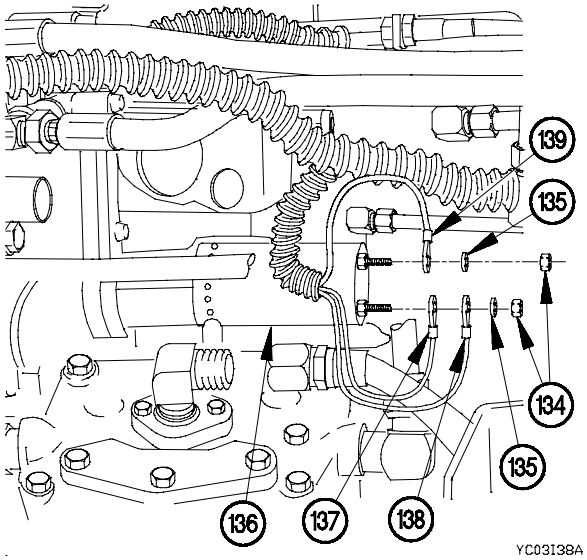
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(106) Remove bolt (131) from engine front cover (132).

(107) Position bracket (133) on engine front cover (132) with bolt (131).

(108) Tighten bolt (131) to 15-25 lb-ft (20-34 N·m).





(109) Remove two nuts (134) and washers (135) from fuel shutoff solenoid (136).

(110) Install terminal lugs TL66 (137), TL29 (138), and TL28 (139) on fuel shutoff solenoid (136) with two washers (135) and nuts (134).

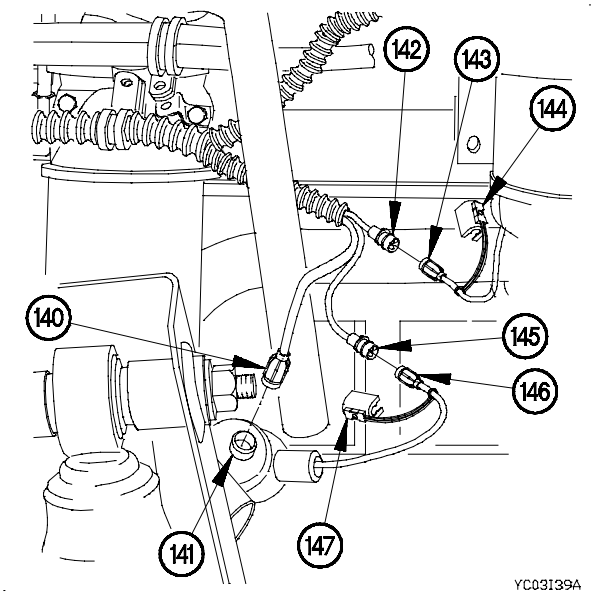
(111) Connect connector P32 (140) to oil pressure transmitter (141).

(112) Connect connector P33 (142) to fuel/water separator connector (143).

(113) Connect connector clamp (144) on fuel/water separator connector (143).

(114) Connect connector P34 (145) to oil pressure switch connector (146).

(115) Connect connector clamp (147) on oil pressure switch connector (146).



(116) Connect connector P38 (148) to engine speed sensor connector J38 (149).

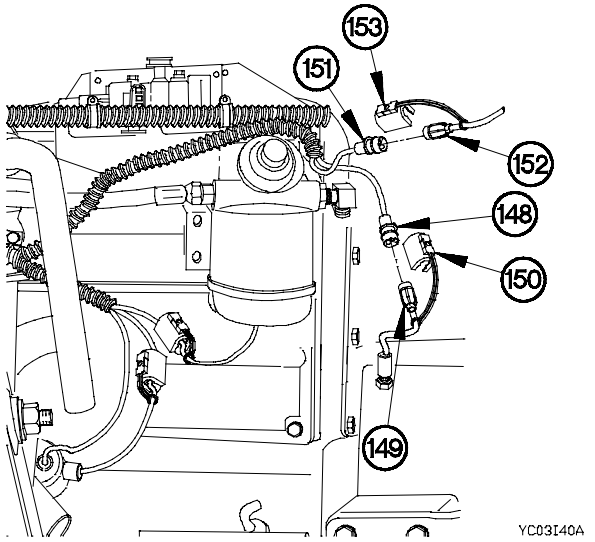
(117) Connect connector clamp (150) on connector P38 (148).

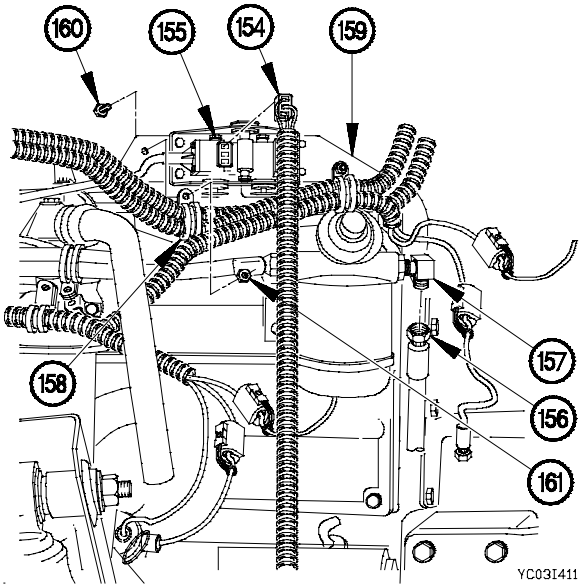
NOTE

Perform steps (118) and (119) on vehicles equipped with troopseats.

(118) Connect connector P39 (151) to troop transport alarm connector J39 (152).

(119) Connect connector clamp (153) on connector J39 (152).



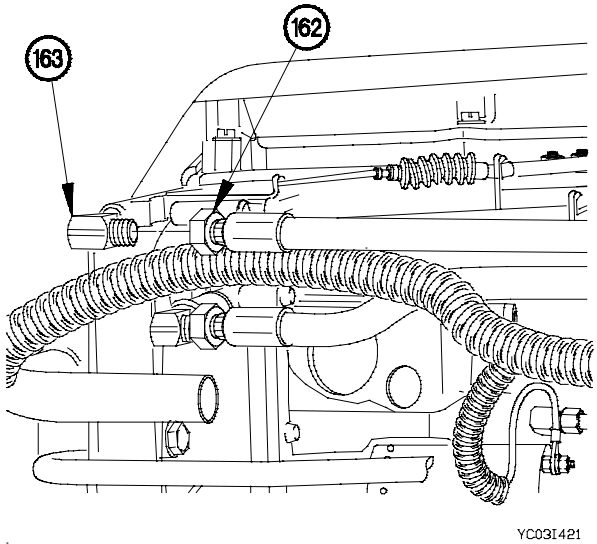


(120) Connect connector (154) to TPS (155).

(121) Connect fuel supply hose (156) to 90-degree fitting (157).

(122) Install two clamps (158) on bracket (159) with two screws (160) and nuts (161).

(123) Connect fuel return hose (162) to 90-degree fitting (163).

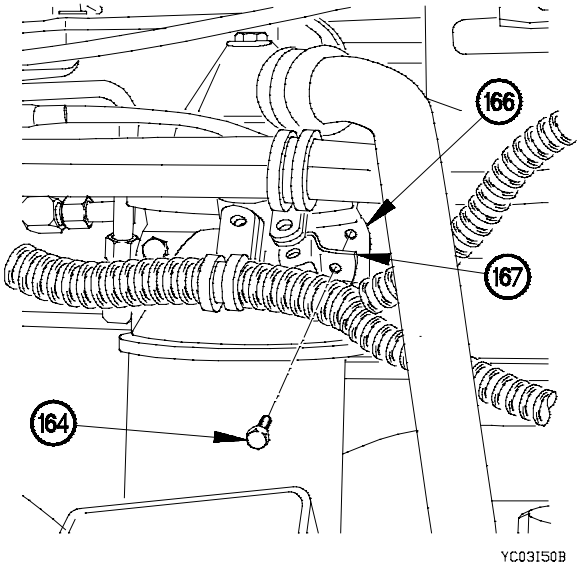


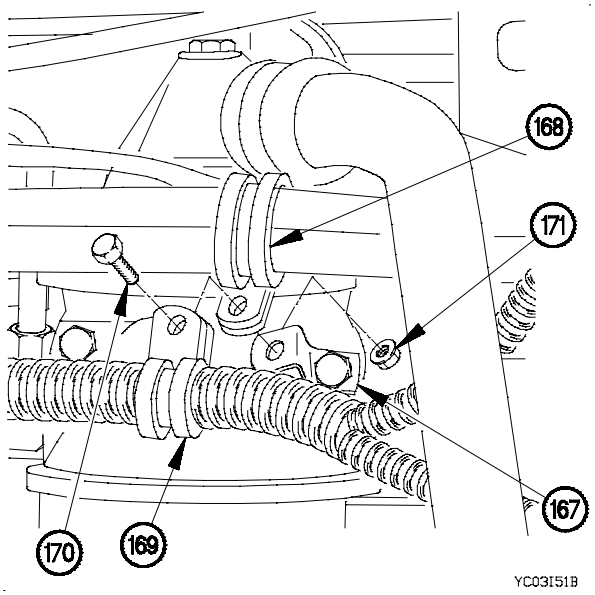
3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(124) Remove screw (164) from fuel filter base (166).

(125) Position bracket (167) on fuel filter base (166) with screw (164).

(126) Tighten screw (164) to 96-166 lb-in. (11-16 N·m).



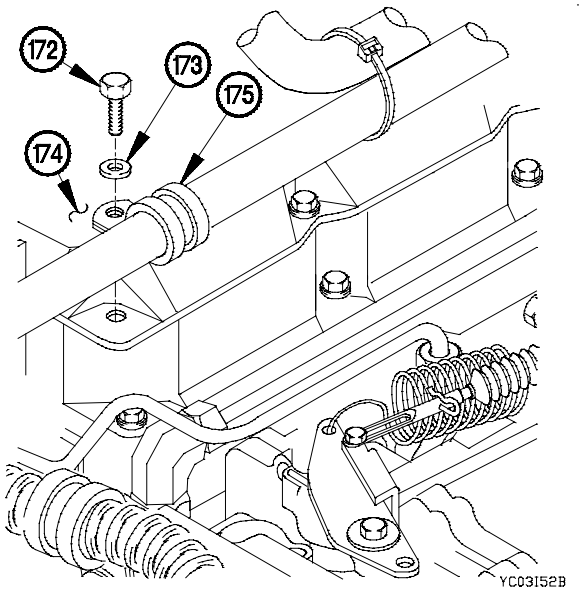


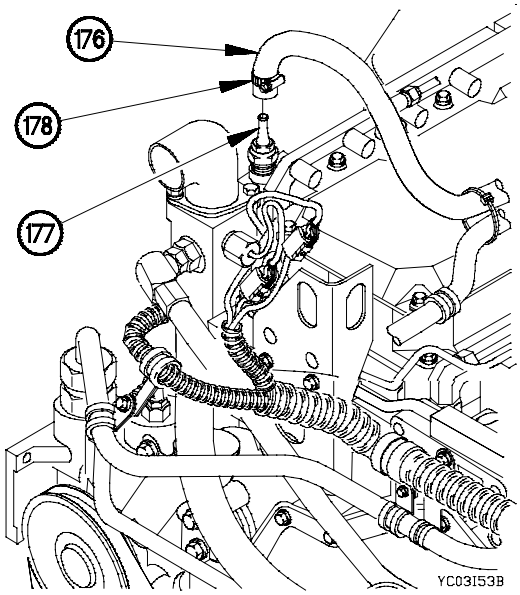
(127) Install clamp (168) and clamp (169) on bracket (167) with screw (170) and self-locking nut (171).

(128) Remove screw (172) and washer (173) from valve cover (174).

(129) Position clamp (175) on valve cover (174) with washer (173) and screw (172).

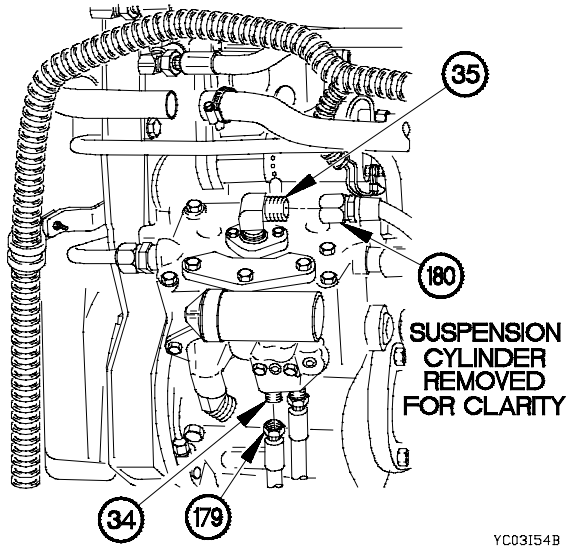
(130) Tighten screw (172) to 84-132 lb-in. (9-15 N·m).





(131) Position coolant fill hose (176) on hose fitting (177) with clamp (178).

(131.1) Tighten clamp (178) to 34-44 lb-in. (4-5 N·m).

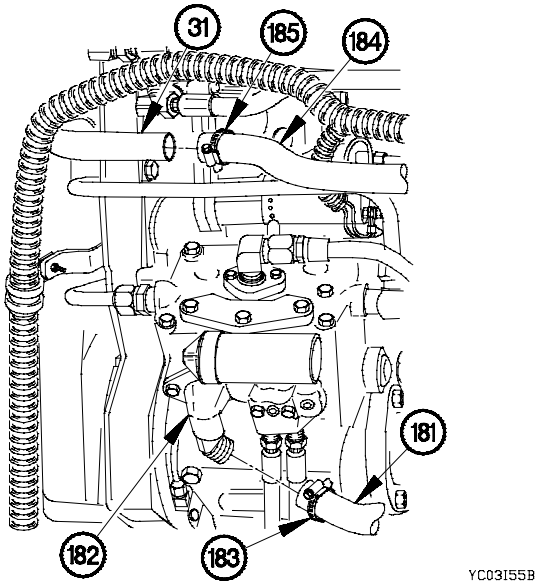


CAUTION

Ensure hoses and connection points are tagged correctly prior to disconnecting. Failure to comply may result in air system not being able to pressurize.

(132) Connect two unloader valve hoses (179) to adapters (34).

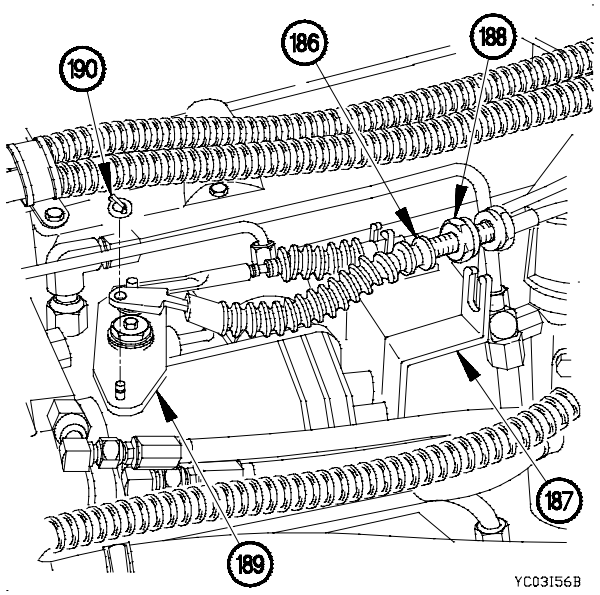
(133) Connect air compressor pressure hose (180) to 90-degree fitting (35).



(134) Install air compressor intake hose (181) on 45-degree fitting (182) with clamp (183).

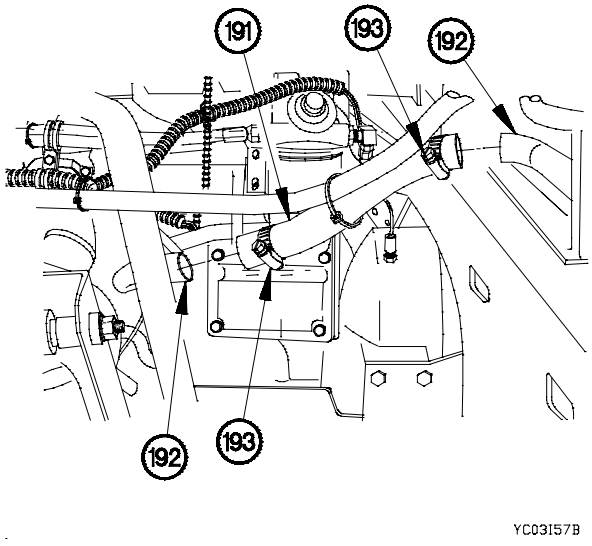
(135) Install coolant bypass hose (184) on coolant tube (31) with clamp (185).

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)



(136) Install throttle control cable (186) in bracket (187) with nut (188).

(137) Install throttle control cable (186) on governor linkage (189) with clip (190).



(138) Position engine oil fill hose (191) on two oil fill tubes (192) with clamps (193).

(138.1) Tighten two clamps (193) to 36-44 lb-in. (4-5 N·m).

(139) Deleted.

(140) Deleted.

(141) Deleted.

(142) Deleted.

(143) Deleted.

(144) Deleted.

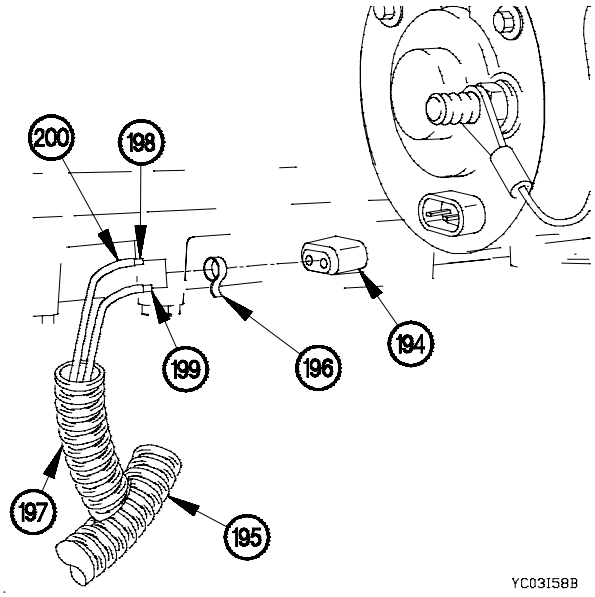
(145) Deleted.

(146) Deleted.

(147) Deleted.

(148) Deleted.

(149) Deleted.



NOTE

Perform steps (149.1) through (150) on vehicles that have not had connector P81 removed.

(149.1) Cut connector P81 (194) from start and charging cable assembly (195).

(149.2) Remove band marker (196) from start and charging cable assembly (195).

NOTE

Remove electrical tape as required.

(149.3) Remove convoluted tubing (197) from wires (198 and 199).

(149.4) Remove insulation sleeving (200) from wires (198 and 199).

NOTE

Measure wires from body of start and charging cable assembly.

(149.5) Cut wire (198) to 3 in. (76 mm) in length.

(149.6) Cut wire (199) to 4 in. (102 mm) in length.

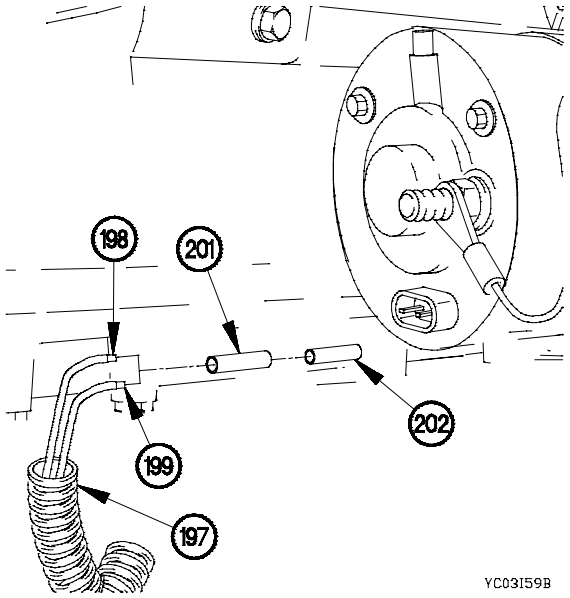
(149.7) Remove 0.38 in. (10 mm) of insulation from wires (198 and 199).

(149.8) Cut insulation sleeving (201) to 1.5 in. (38 mm).

(149.9) Position insulation sleeving (201) on wire (199).

(149.10) Install conductor splice (202) on wires (198 and 199).

(149.11) Install insulation sleeving (201) on conductor splice (202).



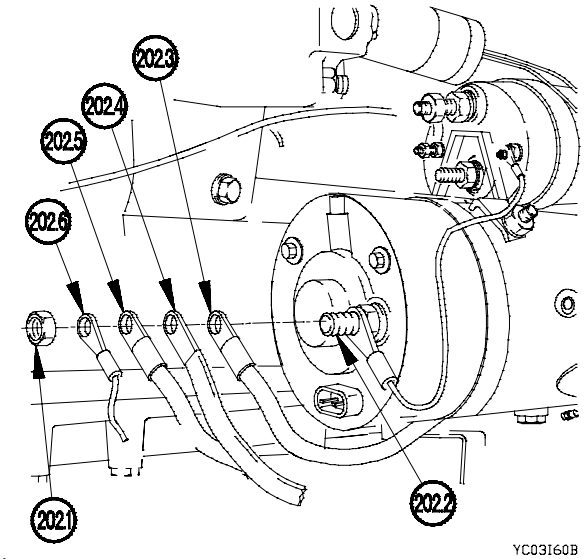
NOTE

Install electrical tape as required.

(150) Install convoluted tubing (197) on wires (198 and 199).

(151) Deleted.

(152) Remove nut (202.1) from starting motor terminal (202.2).



(153) Position terminal lug TL53 (202.3), ground strap (202.4), terminal lugs TL46 (202.5), and TL25 (202.6) on starting motor terminal (202.2) with nut (202.1).

(154) Tighten nut (202.1) to 33-37 lb-ft (45-50 N·m).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(155) Apply adhesive on terminal lug TL53 (202.3), ground strap (202.4), terminal lugs TL46 (202.5), TL25 (202.6), nut (202.1) and starting motor terminal (202.2).

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

(156) Remove nut (203.1) from starter solenoid (203.2).

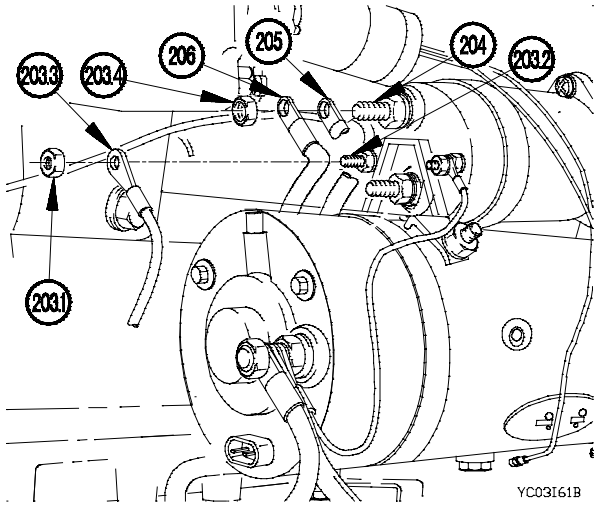
(157) Position terminal lug TL26 (203.3) on starter solenoid (203.2) with nut (203.1).

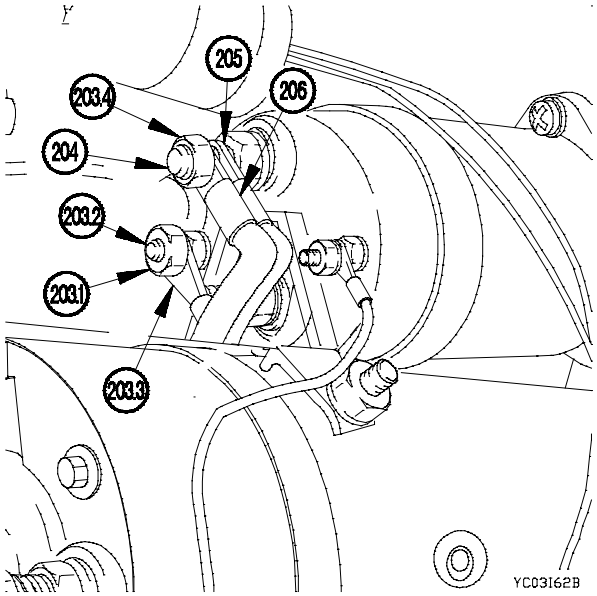
(158) Tighten nut (203.1) to 31 lb-in. (4 N·m).

(159) Remove nut (203.4) from starter solenoid (204).

(160) Position terminal lugs TL12 (205) and TL55 (206) on starter solenoid (204) with nut (203.4).

(161) Tighten nut (203.4) to 30 lb-ft (41 N·m).





WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(160.2) Apply adhesive on terminal lug TL26 (203.3), solenoid terminal (203.2), and nut (203.1).

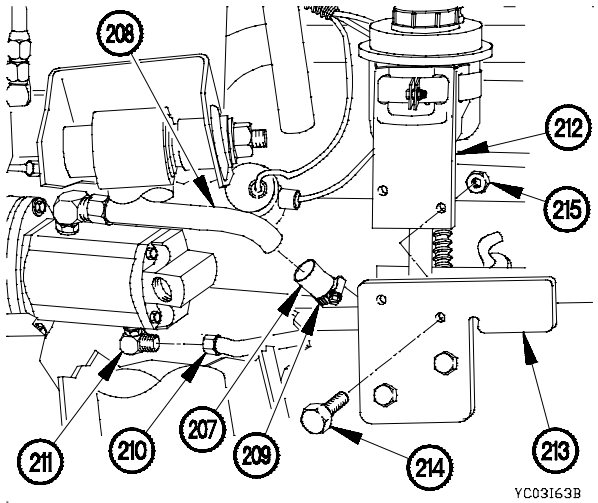
(160.3) Apply adhesive on terminal lugs TL12 (205), TL55 (206), solenoid terminal (204), and nut (203.4).

(161) Connect power steering return hose (207) to tube (208) with clamp (209).

(162) Connect power steering pressure hose (210) to 90-degree fitting (211).

(163) Position power steering reservoir bracket (212) on bracket (213) with two screws (214) and self-locking nuts (215).

(163.1) Tighten two self-locking nuts (215) to 31-39 lb-ft (43-53 N·m).

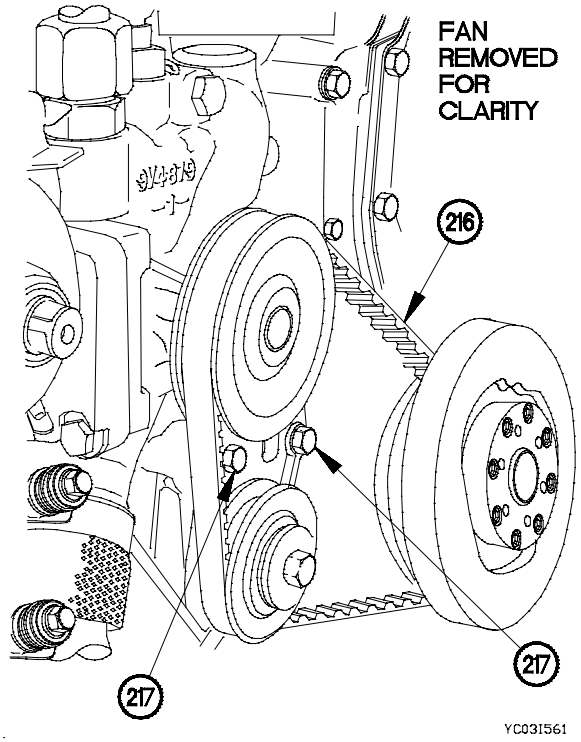


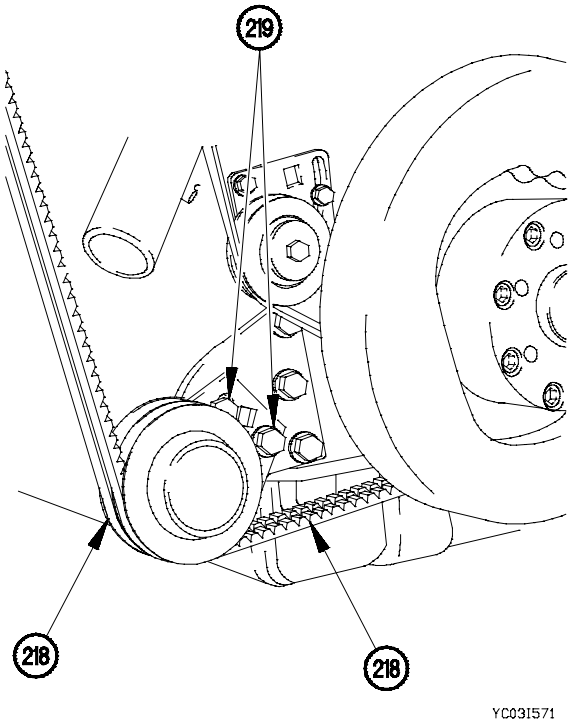
NOTE

- Steps (164) and (165) require the aid of an assistant.
- Use square hole in water pump belt pulley bracket to apply and maintain tension on water pump belt while adjusting belt tension.

(164) Adjust tension on water pump belt (216) to 115-125 lbs (512-556 N).

(165) Tighten two screws (217) to 35 lb-ft (47 N·m).





NOTE

- Steps (166) and (167) require the aid of an assistant.
- Use square hole in alternator belts pulley bracket to apply and maintain tension on alternator belts while adjusting belt tension.

(166) Adjust tension on alternator belts (218) to 115-125 lbs (512-556 N).

(167) Tighten two screws (219) to 41-50 lb-ft (56-68 N·m).

3-3. ENGINE ASSEMBLY REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Install rear cab support assembly (TM 9-2320-365-20-4).

(2) Install 200 amp alternator, if equipped (TM 9-2320-365-20-5).

(3) Install transmission oil cooler (TM 9-2320-365-20-4).

(4) Install top radiator fan shroud (TM 9-2320-365-20-3).

(5) Install spare tire (TM 9-2320-365-10).

(6) Add engine oil to engine (TM 9-2320-365-20).

(7) Add coolant to radiator overflow tank (TM 9-2320-365-20).

(8) Add fluid to power steering reservoir (TM 9-2320-365-20).

(9) Connect batteries (TM 9-2320-365-20-3).

(9.1) Perform engine speed sensor adjustment (TM 9-2320-365-20-3).

(10) Deleted.

End of Task.

3-4. ENGINE FRONT RESILIENT MOUNT AND MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Sling, Engine and Transmission, Motor Vehicle (Item 49, Appendix B)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Nut, Self-locking (2) (Item 131, Appendix F)
Nut, Self-locking (3) (Item 133, Appendix F)
Mount, Resilient (Item 115, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

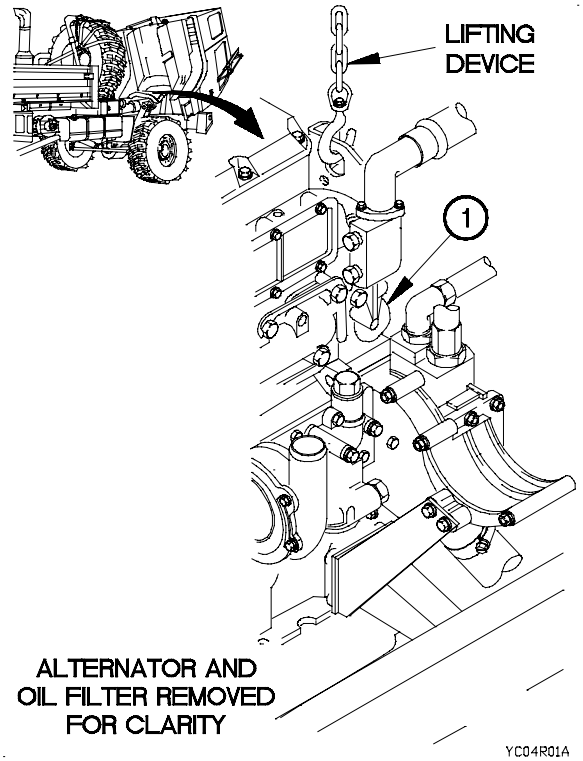
WARNING

Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in serious injury or death to personnel or damage to equipment.

CAUTION

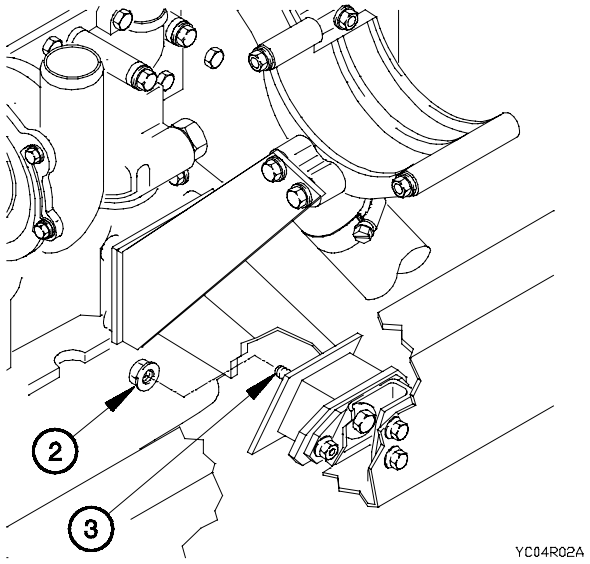
Raise engine enough to remove pressure from mounts. Failure to comply may result in damage to equipment.

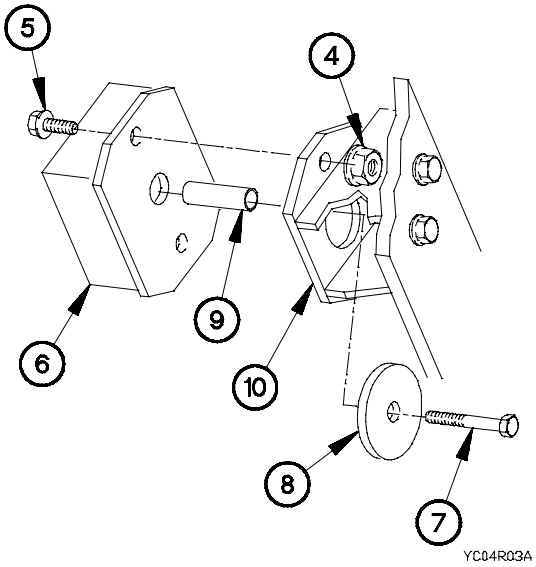
(1) Raise engine (1).



3-4. ENGINE FRONT RESILIENT MOUNT AND MOUNTING BRACKET REPLACEMENT (CONT)

(2) Remove self-locking nut (2) from bolt (3). Discard self-locking nut.



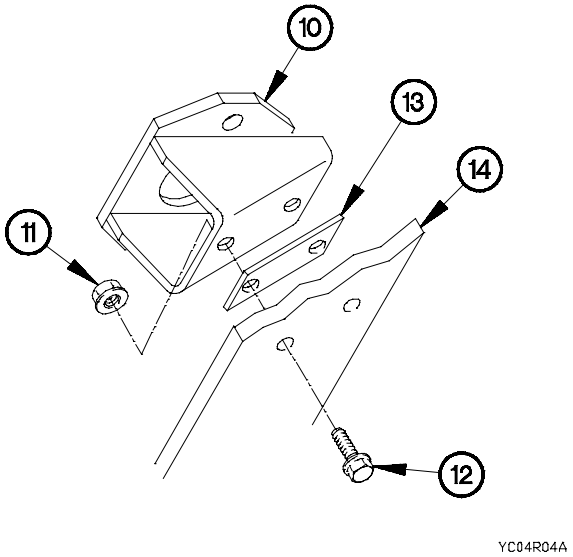


NOTE

Left and right side resilient mounts are removed the same way. Right side resilient mount shown.

(3) Remove two self-locking nuts (4), screws (5), resilient mount (6), bolt (7), washer (8), and sleeve (9) from engine mount bracket (10). Discard self-locking nuts, resilient mount, washer, and sleeve.

(4) Remove two self-locking nuts (11), bolts (12), engine mount bracket (10), and spacer (13) from frame (14). Discard self-locking nuts.

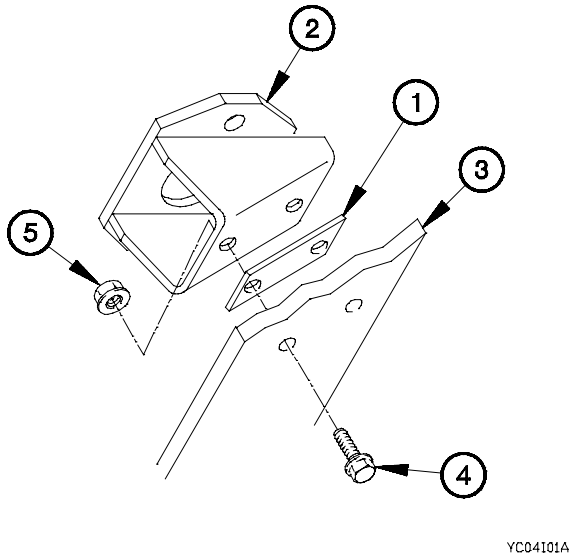


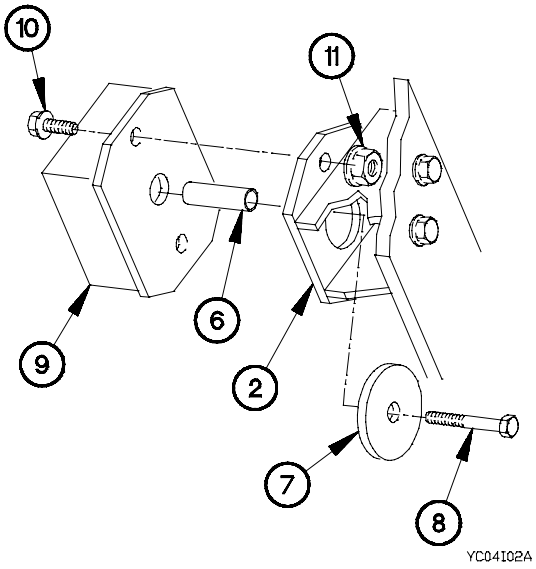
b. Installation.

NOTE

Left and right side resilient mounts are installed the same way. Right side resilient mount shown.

(1) Position spacer (1) and engine mount bracket (2) on frame (3) with two bolts (4) and self-locking nuts (5).

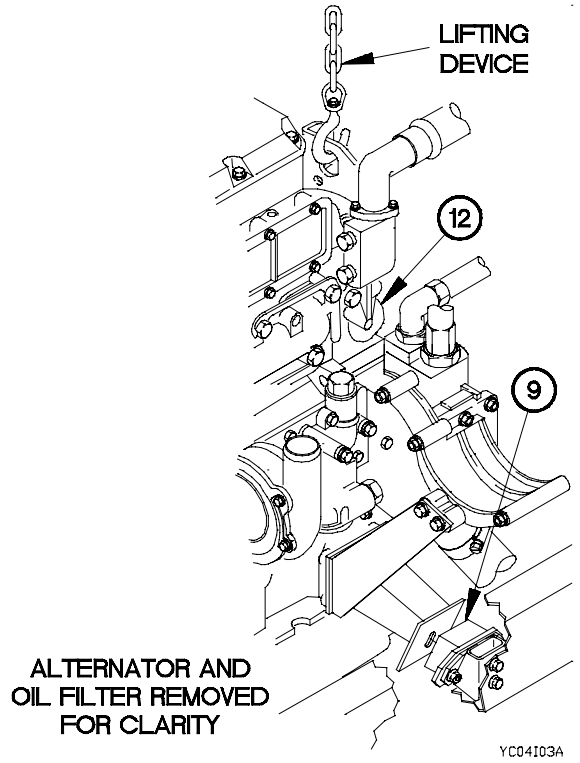




(2) Position sleeve (6), washer (7), and bolt (8) in engine mount bracket (2).

(3) Position resilient mount (9) on engine mount bracket (2) with two screws (10) and self-locking nuts (11).

(4) Lower engine (12) on resilient mount (9).



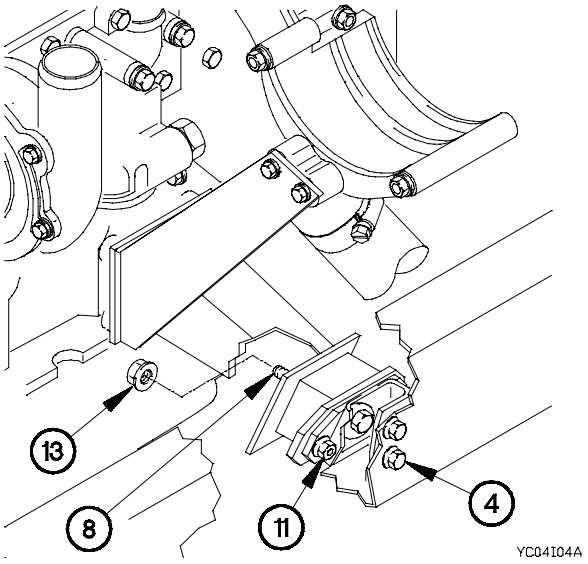
3-4. ENGINE FRONT RESILIENT MOUNT AND MOUNTING BRACKET REPLACEMENT (CONT)

(5) Position self-locking nut (13) on bolt (8).

(6) Tighten self-locking nut (13) to 76-94 lb-ft (103-127 N·m).

(7) Tighten two self-locking nuts (11) to 22-26 lb-ft (30-35 N·m).

(8) Tighten two bolts (4) to 76-94 lb-ft (103-127 N·m).



c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Raise cab (TM 9-2320-365-10).

(4) Check engine for excessive vibration.

(5) Lower cab (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.

3-5. ENGINE BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air compressor removed (para 11-2) (left mount support).
100 amp alternator removed, if equipped (TM 9-2320-365-20-3) (right mount support).
200 amp alternator removed, if equipped (TM 9-2320-365-20-5) (right mount support).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Nut, Self-locking (Item 133, Appendix F)

Personnel Required
(2)

WARNING

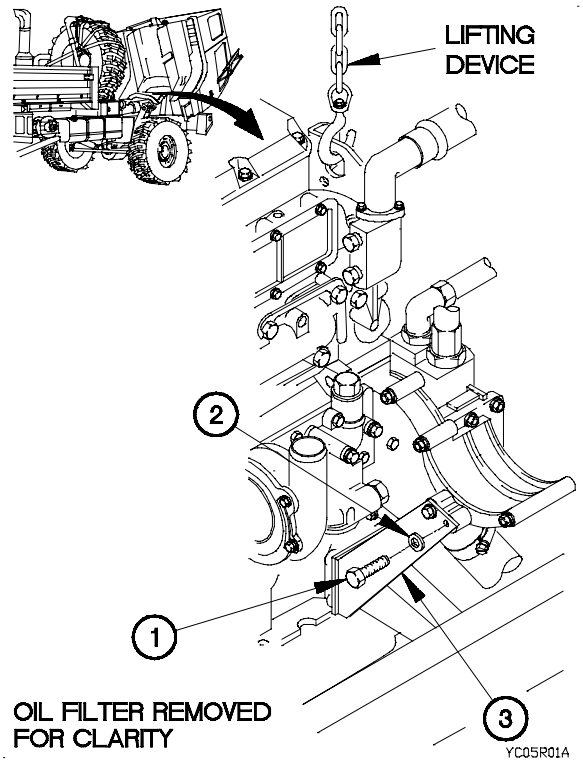
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

Perform step (1) on right engine bracket.

(1) Remove two screws (1) and washers (2) from alternator support bracket (3).



WARNING

Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in serious injury or death to personnel or damage to equipment.

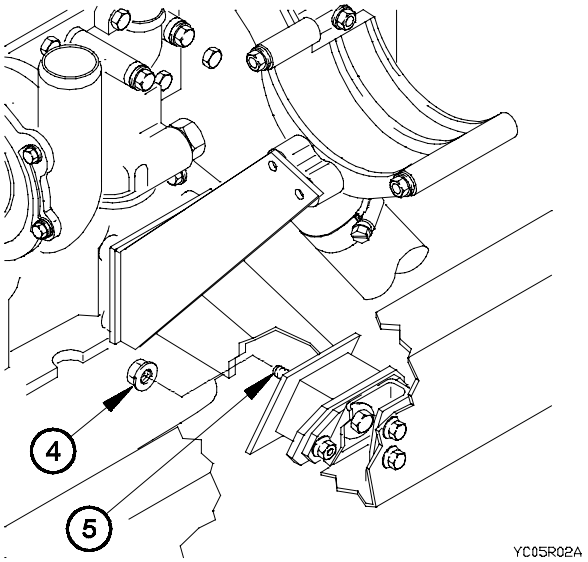
CAUTION

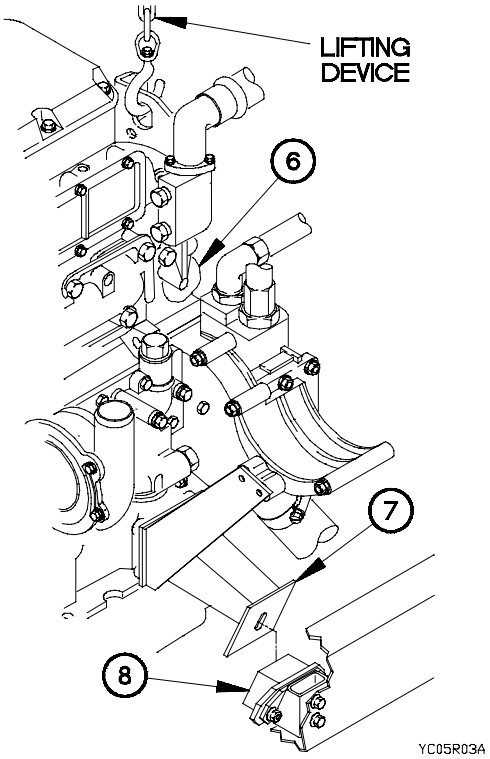
Do not lift engine at this time. Failure to comply may result in damage to equipment.

(2) Take up slack with lifting device.

3-5. ENGINE BRACKET REPLACEMENT (CONT)

(3) Remove self-locking nut (4) from bolt (5). Discard self-locking nut.





CAUTION

Lift engine enough to take weight off of resilient mount. Failure to comply may result in damage to equipment.

NOTE

Step (4) requires the aid of an assistant.

(4) Lift engine (6) and engine bracket (7) from resilient mount (8).

NOTE

Perform steps (5) and (6) on right engine bracket.

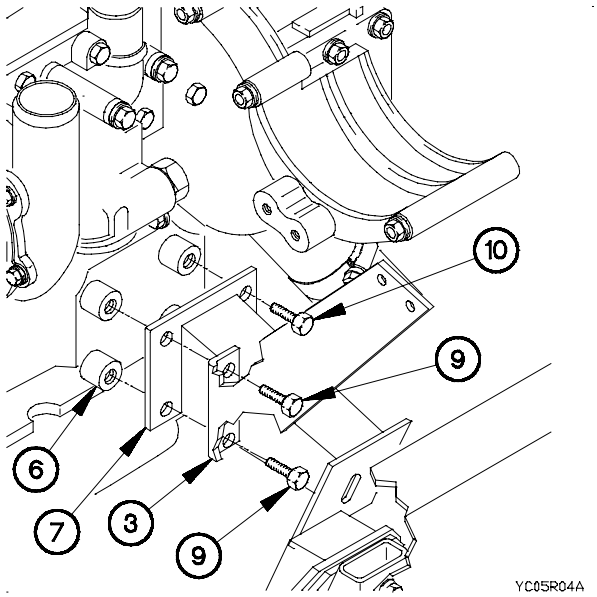
(5) Remove two screws (9) and alternator support bracket (3) from engine bracket (7).

(6) Remove two screws (10) and engine bracket (7) from engine (6).

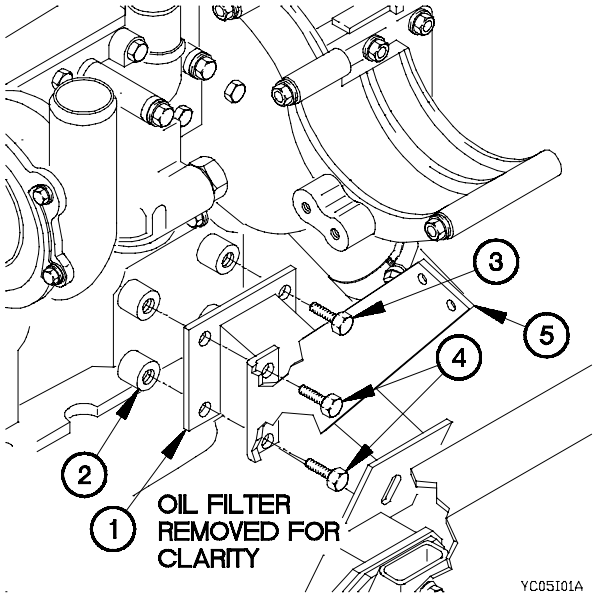
NOTE

Perform step (7) on left engine bracket.

(7) Remove two screws (9 and 10) and engine bracket (7) from engine (6).



b. Installation.



NOTE

Perform step (1) on left engine bracket.

(1) Position engine bracket (1) on engine (2) with two screws (3 and 4).

NOTE

Perform steps (2) and (3) on right engine bracket.

(2) Position alternator support bracket (5) and engine bracket (1) on engine (2) with two screws (4).

(3) Position two screws (3) in engine bracket (1).

3-5. ENGINE BRACKET REPLACEMENT (CONT)

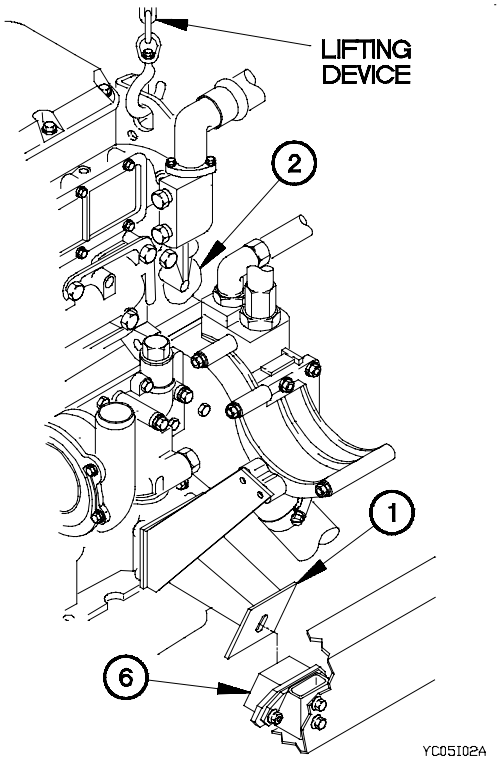
WARNING

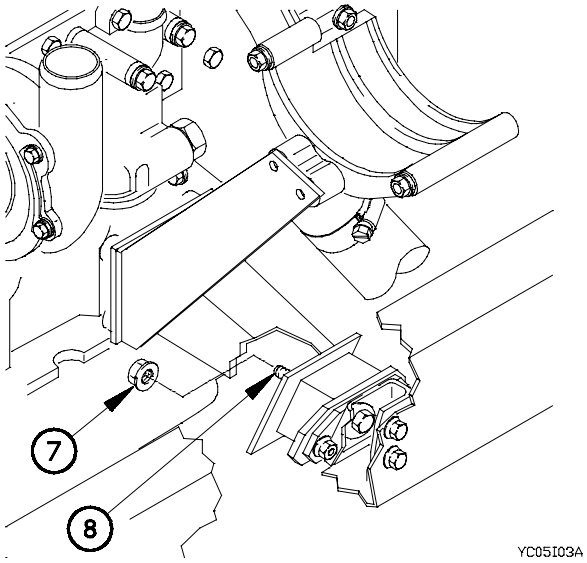
Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.

NOTE

Step (4) requires the aid of an assistant.

(4) Position engine (2) and engine bracket (1) on resilient mount (6).





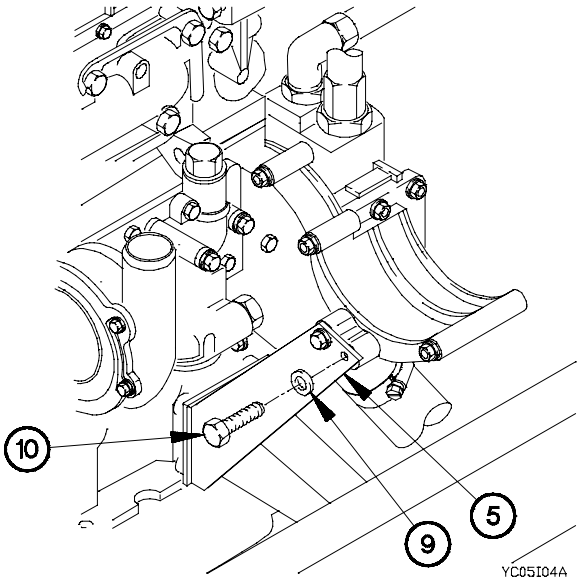
(5) Position self-locking nut (7) on bolt (8).

NOTE

Perform steps (6) and (7) on right engine bracket.

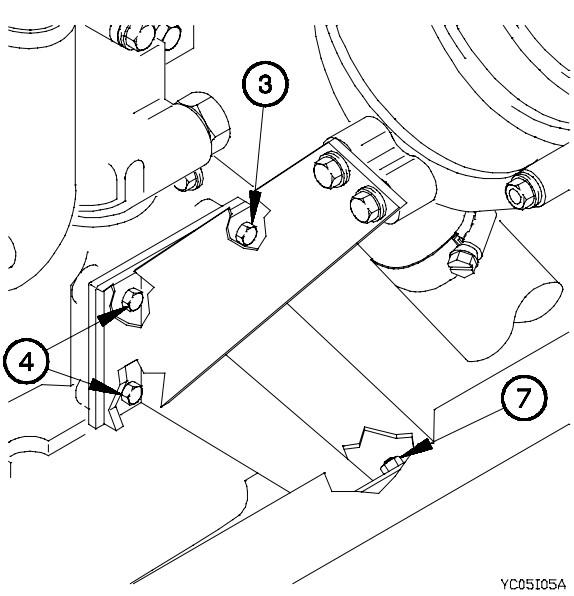
(6) Position two washers (9) and screws (10) in alternator support bracket (5).

(7) Tighten two screws (10) to 121-147 lb-ft (164-200 N·m).



(8) Tighten two screws (3 and 4) to 121-147 lb-ft (164-200 N·m).

(9) Tighten self-locking nut (7) to 76-94 lb-ft (103-127 N·m).



c. Follow-On Maintenance.

(1) Install 200 amp alternator, if equipped (TM 9-2320-365-20-5).

(2) Install 100 amp alternator, if equipped (TM 9-2320-365-20-3).

(3) Install air compressor (para 11-2).

(4) Lower cab (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Raise cab (TM 9-2320-365-10).

(7) Check engine for excessive vibration.

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.

3-6. CYLINDER HEAD/HEAD GASKET REPLACEMENT

This task covers:

a. Removal
b. Cleaning/Inspection
c. Installation
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Inlet manifold removed (para 3-22).
Fuel filter base removed (TM 9-2320-365-20-3).
Orifice tube assembly removed (TM 2320-365-20-3).
Rocker arms and push rods removed (para 3-12).
Fuel control linkage removed (para 4-7).
Fuel injectors removed (para 4-2).
Thermostat housing removed (TM 9-2320-365-20-3).
Exhaust manifold removed (para 3-23).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)

Tools and Special Tools (Cont)
Socket Wrench Attachment, Screwdriver (TM 9-2320-365-20)
Socket, Socket Wrench (Item 56, Appendix B)
Adapter, Socket (Item 1, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Materials/Parts
Packing, Preformed (Item 204, Appendix F)
Packing, Preformed (2) (Item 197, Appendix F)
Gasket (Item 53, Appendix F)
Packing, Preformed (Item 190, Appendix F)
Packing, Performed (Item 191, Appendix F)
Packing, Performed (Item 182, Appendix F)
Packing, Preformed (Item 199, Appendix F)
Rag, Wiping (Item 57, Appendix C)
Ties, Cable Plastic (Item 87, Appendix C)
Lubricating Oil, Engine (Item 43, Appendix C)
Solvent, Dry Cleaning (Item 79, Appendix C)

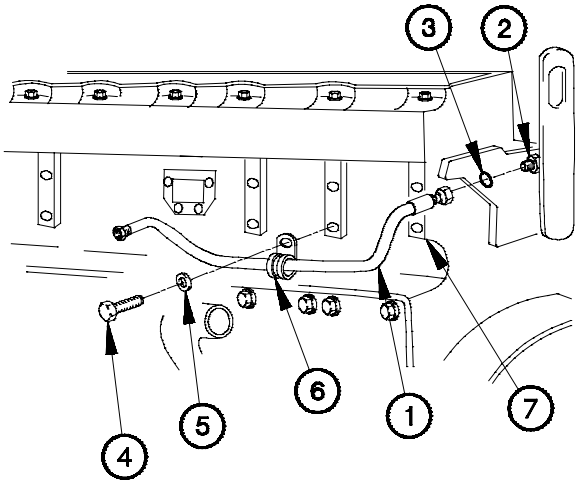
Personnel Required
(2)

a. Removal.

(1) Disconnect fuel tube (1) from 90-degree fitting (2).

(2) Remove preformed packing (3) from 90-degree fitting (2). Discard preformed packing.

(3) Remove screw (4), washer (5), clamp (6), and fuel tube (1) from cylinder head (7).

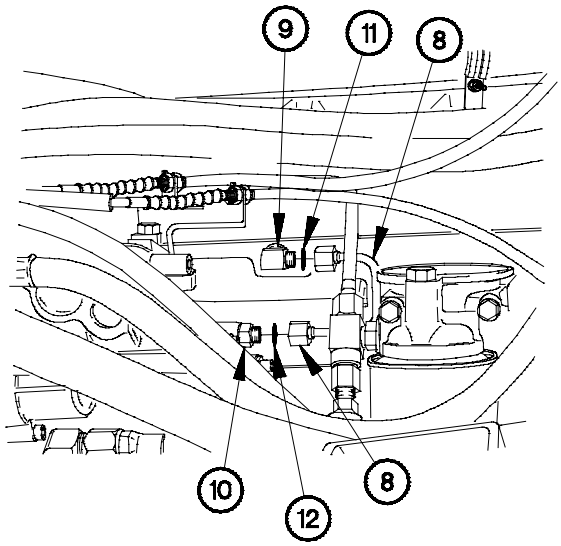


(4) Disconnect oil tube (8) from 90-degree fitting (9).

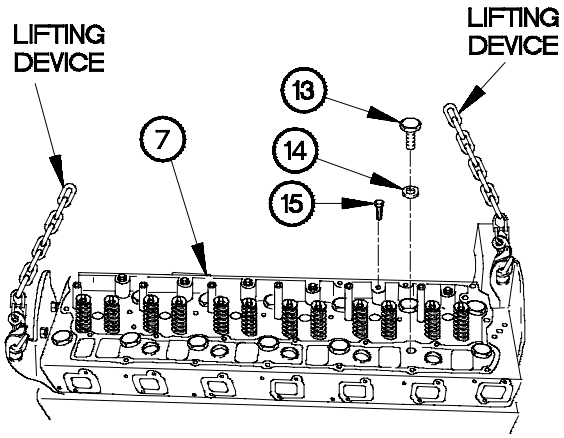
(5) Remove oil tube (8) from fitting (10).

(6) Remove preformed packing (11) from 90-degree fitting (9). Discard preformed packing.

(7) Remove preformed packing (12) from fitting (10). Discard preformed packing.



YC06A021



YC06A031

(8) Remove 14 bolts (13) and washers (14) from cylinder head (7).

(9) Remove six bolts (15) from cylinder head (7).

WARNING

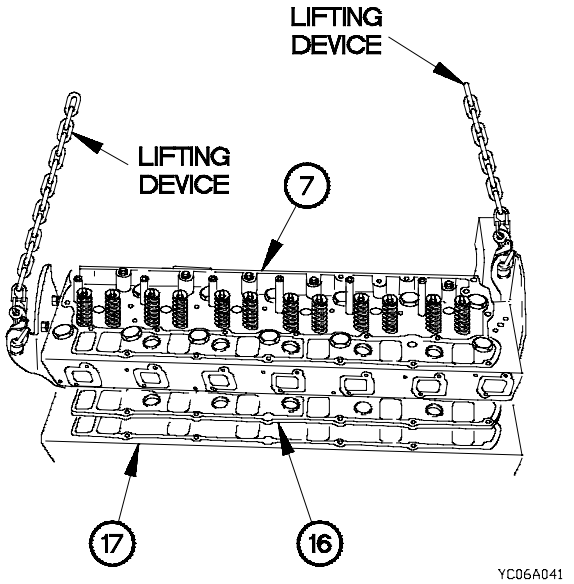
Cylinder head weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Keep cylinder head level during removal to prevent damage to dowels. Failure to comply may result in damage to equipment.

NOTE

Step (10) requires the aid of an assistant.



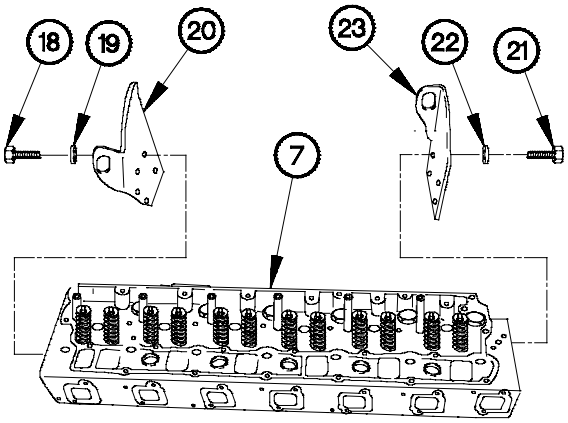
YC06A041

(10) Remove cylinder head (7) and gasket (16) from cylinder block (17). Discard gasket.

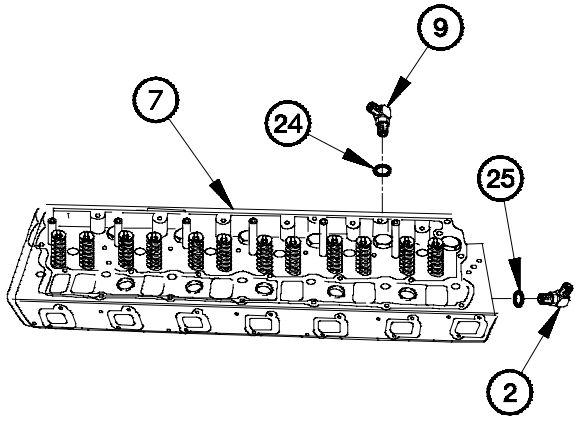
3-6. CYLINDER HEAD/HEAD GASKET REPLACEMENT (CONT)

(11) Remove five screws (18), washers (19), and rear lifting eye bracket (20) from cylinder head (7).

(12) Remove four screws (21), washers (22), and front lifting eye bracket (23) from cylinder head (7).



YC06A051



YC06A061

(13) Remove 90-degree fitting (9) from cylinder head (7).

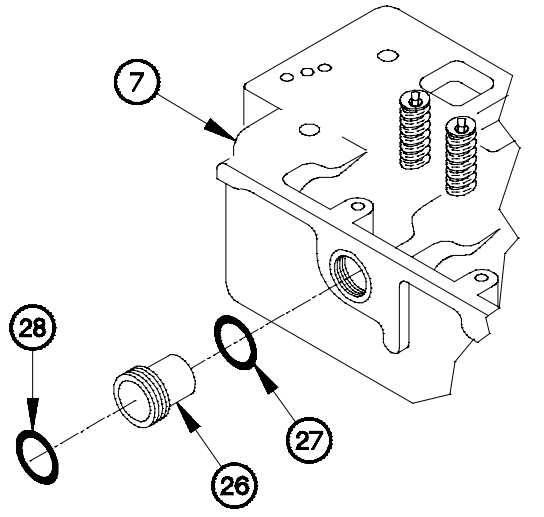
(14) Remove preformed packing (24) from 90-degree fitting (9). Discard preformed packing.

(15) Remove 90-degree fitting (2) from cylinder head (7).

(16) Remove preformed packing (25) from 90-degree fitting (2). Discard preformed packing.

(17) Remove adapter sleeve (26) and preformed packing (27) from cylinder head (7). Discard preformed packing.

(18) Remove preformed packing (28) from adapter sleeve (26). Discard preformed packing.



YC06A071

b. Cleaning/Inspection.

WARNING

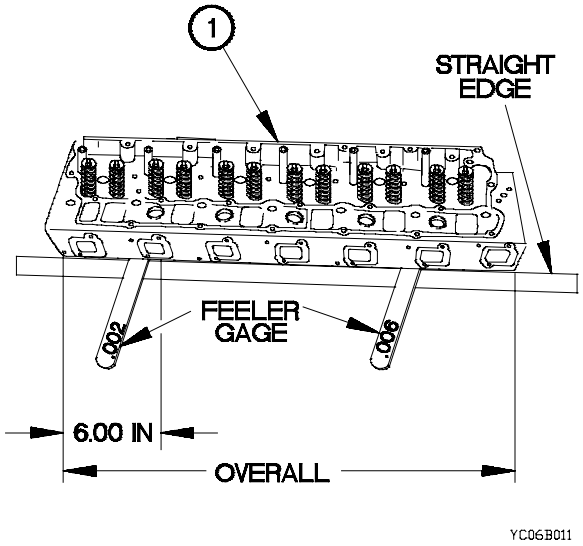
- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

NOTE

Replace any part that fails visual inspection or size measurement requirements.

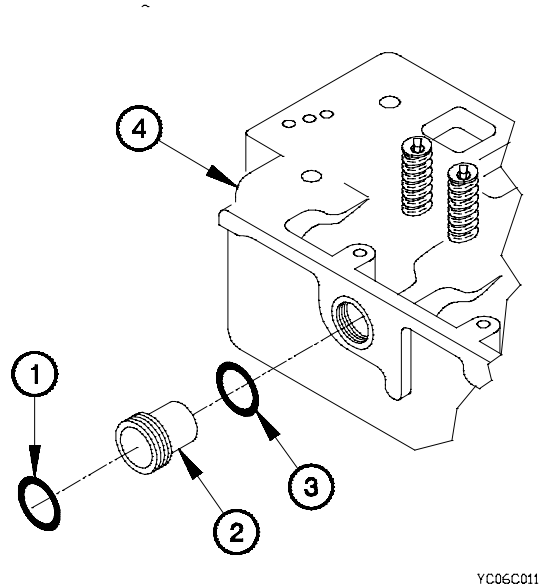
(1) Clean all parts with dry cleaning solvent.

(2) Measure mating surface of cylinder head (1) for flatness. Maximum deviation should not exceed 0.002 in. (0.01 cm) in a six inch area or 0.006 in. (0.02 cm) overall.



YC06B011

c. Installation.



YC06C011

NOTE

Apply lubricating oil to all preformed packings during installation.

(1) Install preformed packing (1) on adapter sleeve (2).

(2) Install preformed packing (3) and adapter sleeve (2) in cylinder head (4).

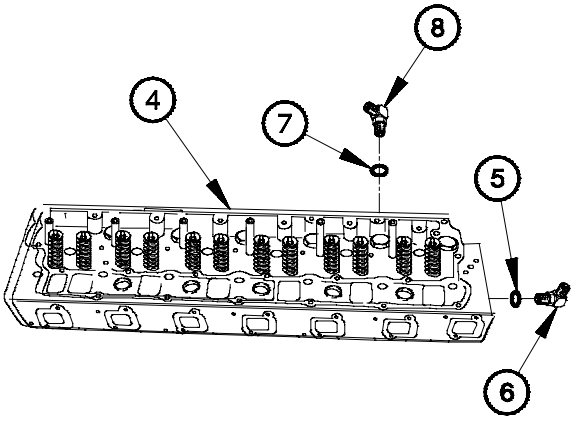
3-6. CYLINDER HEAD/HEAD GASKET REPLACEMENT (CONT)

(3) Install preformed packing (5) on 90-degree fitting (6).

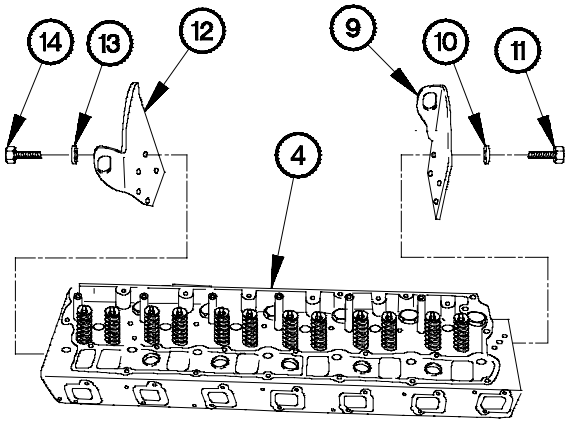
(4) Install 90-degree fitting (6) in cylinder head (4).

(5) Install preformed packing (7) on 90-degree fitting (8).

(6) Install 90-degree fitting (8) in cylinder head (4).



YC06C021



YC06C031

(7) Install front lifting eye bracket (9) on cylinder head (4) with four washers (10) and screws (11).

(8) Install rear lifting eye bracket (12) on cylinder head (4) with five washers (13) and screws (14).

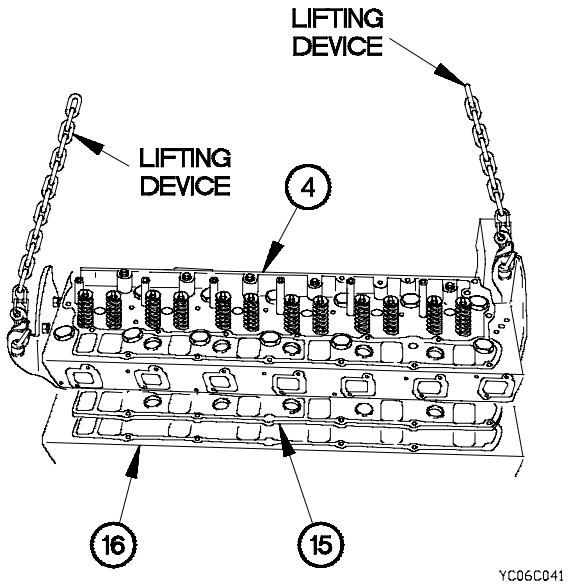
WARNING

Cylinder head weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (9) requires the aid of an assistant.

(9) Position gasket (15) and cylinder head (4) on cylinder block (16).



YC06C041

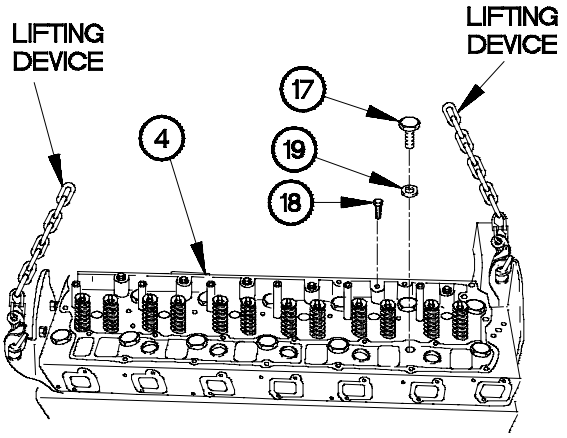
CAUTION

Keep cylinder head level during installation to prevent damage to dowels. Failure to comply may result in damage to equipment.

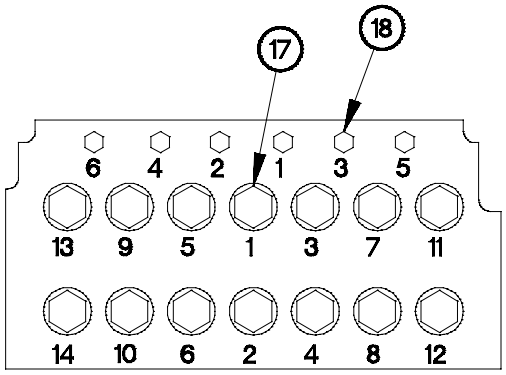
(10) Apply lubricating oil to threads of 14 bolts (17) and six bolts (18).

(11) Position six bolts (18) in cylinder head (4).

(12) Position 14 washers (19) and bolts (17) in cylinder head (4).



YC06C051



TIGHTENING SEQUENCE

YC06C061

(13) Tighten 14 bolts (17) to 99-121 lb-ft (134-164 N•m) in sequence shown.

(14) Re-tighten 14 bolts (17) to 305-335 lb-ft (414-454 N•m) in sequence shown.

(15) Re-tighten 14 bolts (17) to 305-335 lb-ft (414-454 N·m) in sequence shown.

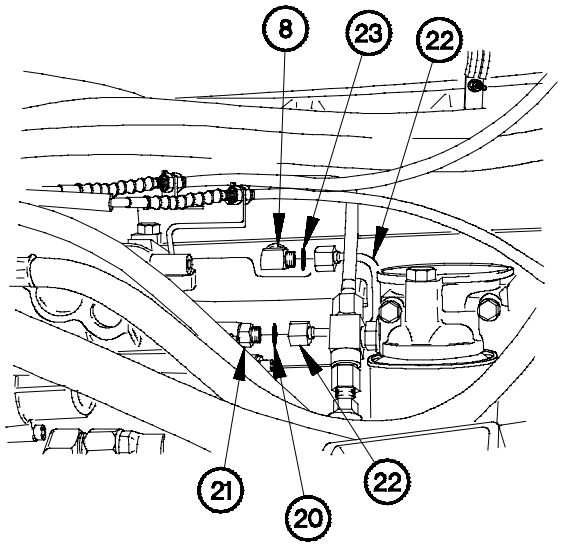
(16) Tighten six bolts (18) to 36-46 lb-ft (49-62 N•m) in sequence shown.

(17) Install preformed packing (20) on fitting (21).

(18) Install oil tube (22) on fitting (21).

(19) Install preformed packing (23) on 90-degree fitting (8)

(20) Connect oil tube (22) on 90-degree fitting (8).



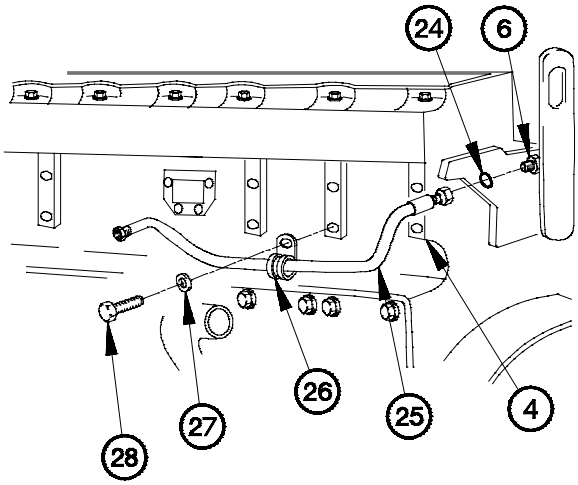
YC06C071

3-6. CYLINDER HEAD/HEAD GASKET REPLACEMENT (CONT)

(21) Install preformed packing (24) on 90-degree fitting (6).

(22) Install fuel tube (25) on 90-degree fitting (6).

(23) Install clamp (26), washer (27), and screw (28) on cylinder head (4).



d. Follow-On Maintenance.

(1) Install exhaust manifold (para 3-23).

(2) Install thermostat housing (TM 9-2320-365-20-3).

(3) Install fuel injectors (para 4-2).

(4) Install fuel control linkage (para 4-7).

(5) Install rocker arms and pushrods (para 3-12).

(6) Install orifice tube assembly (TM 9-2320-365-20-3).

(7) Install fuel filter base (TM 9-2320-365-20-3).

(8) Install inlet manifold (para 3-22).

(9) Fill radiator with coolant (TM 9-2320-365-20).

(10) Prime vehicle fuel system (TM 9-2320-365-10).

(11) Lower cab (TM 9-2320-365-10).

(12) Start engine (TM 9-2320-365-10).

(13) Check oil pressure (TM 9-2320-365-10).

(14) Check for excessive smoke from tailpipe.

(15) Ensure engine runs smoothly.

(16) Raise cab (TM 9-2320-365-10).

(17) Check for evidence of oil or coolant leakage around cylinder head.

(18) Lower cab (TM 9-2320-365-10).

(19) Shut down engine (TM 9-2320-365-10).

End of Task.

3-7. PULLEY DAMPER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance.

INITIAL SETUP

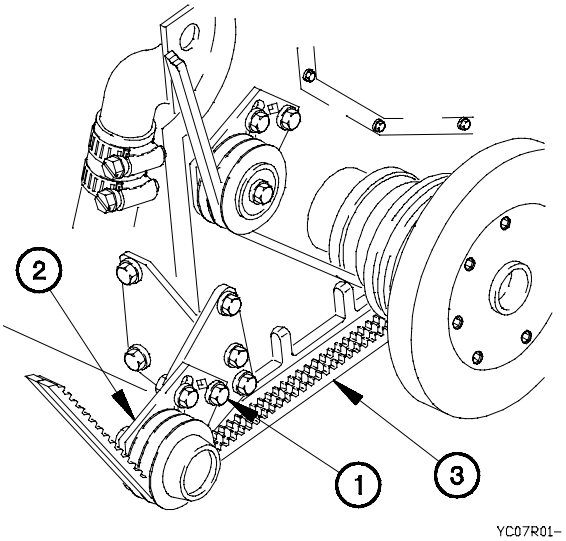
Equipment Conditions
Engine fan and fan clutch removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Tools and Special Tools (Cont)
Gage, Belt Tension (TM 9-2320-365-20)
Adapter, Socket Wrench (Item 3, Appendix B)
Socket Wrench Attachment, Screwdriver (Item 54, Appendix B)

Personnel Required
(2)

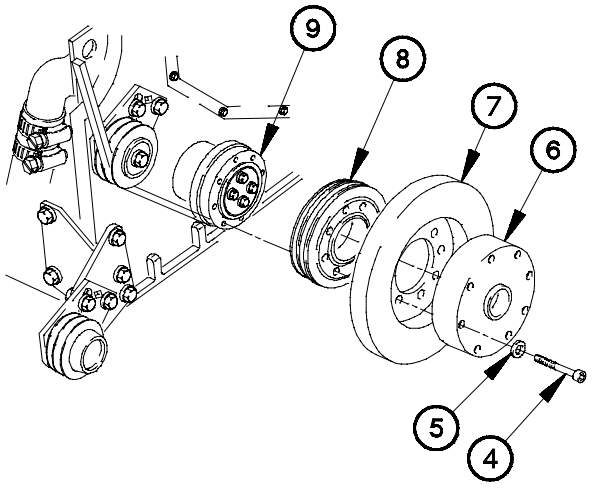
a. Removal.



YC07R01-

(1) Loosen two screws (1) on idler pulley (2).

(2) Remove two alternator belts (3) from engine.



YC07R02-

CAUTION

Damper is easily damaged and must be handled carefully. Failure to comply may result in damage to equipment.

(3) Remove eight screws (4), washers (5), adapter (6), damper (7), and pulley (8) from crankshaft pulley (9).

3-7. PULLEY DAMPER REPLACEMENT (CONT)

b. Installation.

CAUTION

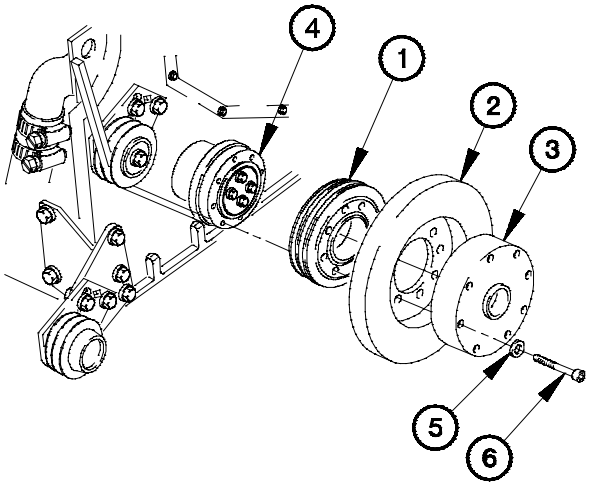
Damper is easily damaged and must be handled carefully. Failure to comply may result in damage to equipment.

NOTE

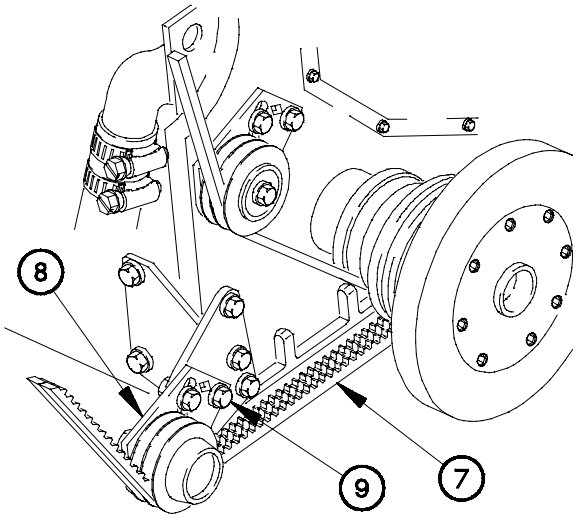
Step (1) requires the aid of an assistant.

(1) Position pulley (1), damper (2), and adapter (3) on crankshaft pulley (4) with eight washers (5) and screws (6).

(2) Tighten eight screws (6) to 33-47 lb-ft (45-65 N·m).



YC07I011



YC07I02-

(3) Install two alternator drive belts (7) on engine.

CAUTION

Steps (4) and (5) must be accomplished while maintaining belt tension. Failure to comply may result in damage to equipment.

NOTE

Tension adjustment for new belt is 115-125 lbs (52-57 N). For reinstalled belt 85-95 lbs (39-43 N).

(4) Adjust belt tension with idler pulley (8).

(5) Tighten two screws (9) to 43-51 lb-ft (58-69 N·m).

c. Follow-On Maintenance.

(1) Install engine fan and fan clutch (TM 9-2320-365-20-3).

(2) Start engine check for proper operation (TM 9-2320-365-10).

(3) Shut down engine (TM 9-2320-365-10).

End of Task.

3-8. CRANKSHAFT FRONT SEAL REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance.

INITIAL SETUP

Equipment Conditions
Pulley damper removed (para 3-7).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Inserter, Seal (TM 9-2320-365-20)
Drill, Portable Electric (Item 18, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gage, Belt Tension (TM 9-2320-365-20)
Puller Kit, Universal (Item 45, Appendix B)
Caliper, Vernier (Item 8, Appendix B)

Tools and Special Tools (Cont)
Drill Set, Twist (Item 17, Appendix B)

Materials/Parts
Lubricating Oil, Engine (Item 45, Appendix C)
Soap, Laundry (Item 79, Appendix C)
Seal, Plain Encased (Item 268, Appendix F)
Excluder (Item 24, Appendix F)

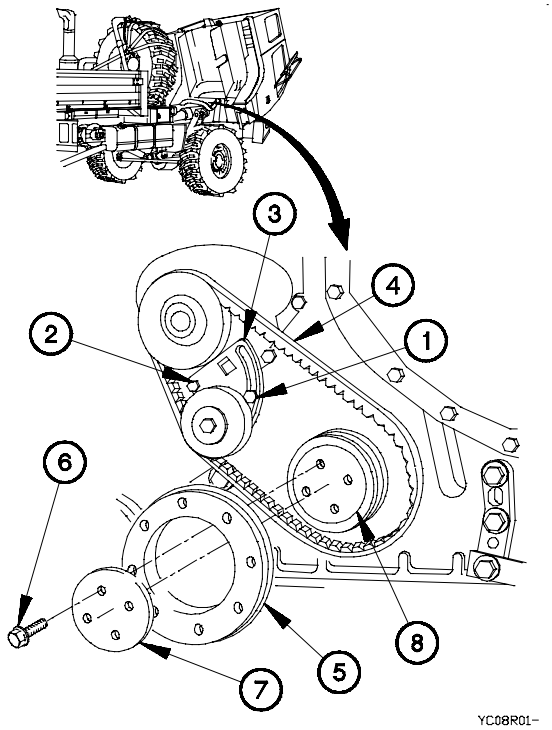
Personnel Required
(2)

a. Removal.

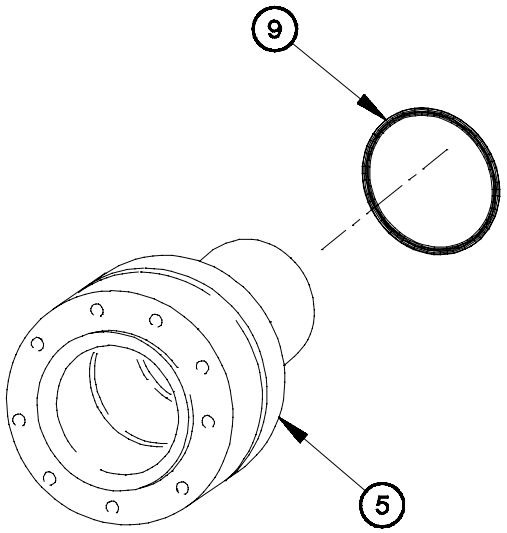
(1) Loosen screws (1 and 2) on bracket (3).

(2) Remove water pump belt (4) from pulley (5).

(3) Remove four screws (6), plate (7), and pulley (5) from crankshaft (8).



YC08R01-



YC08R02-

(4) Remove excluder (9) from pulley (5). Discard excluder.

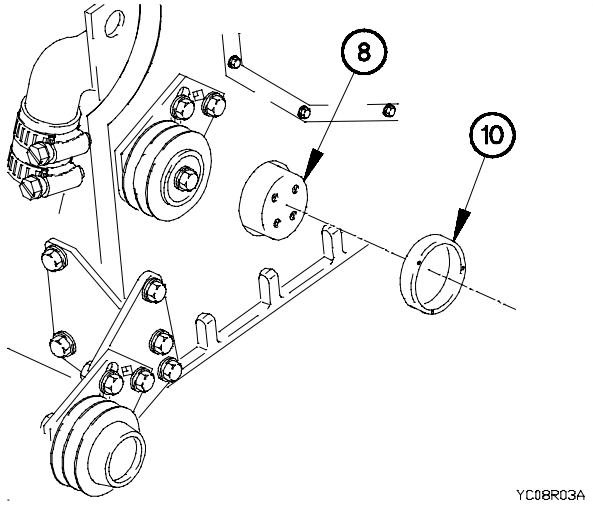
3-8. CRANKSHAFT FRONT SEAL REPLACEMENT (CONT)

WARNING

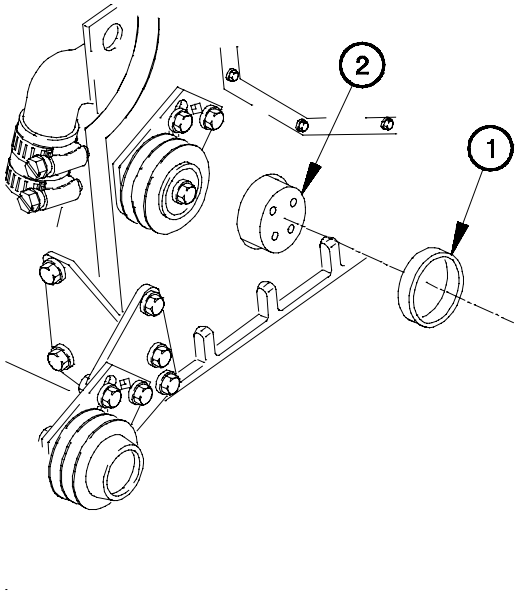
Wear appropriate eye protection when drilling holes. Failure to comply may result in injury to personnel.

(5) Drill three equally spaced holes in crankshaft front seal (10).

(6) Remove crankshaft front seal (10) from crankshaft (8). Discard crankshaft front seal.



b. Installation.



CAUTION

Crankshaft front seal must be installed with shipping sleeve in place. Failure to comply may result in damage to equipment.

(1) Install crankshaft front seal (1) on crankshaft (2).

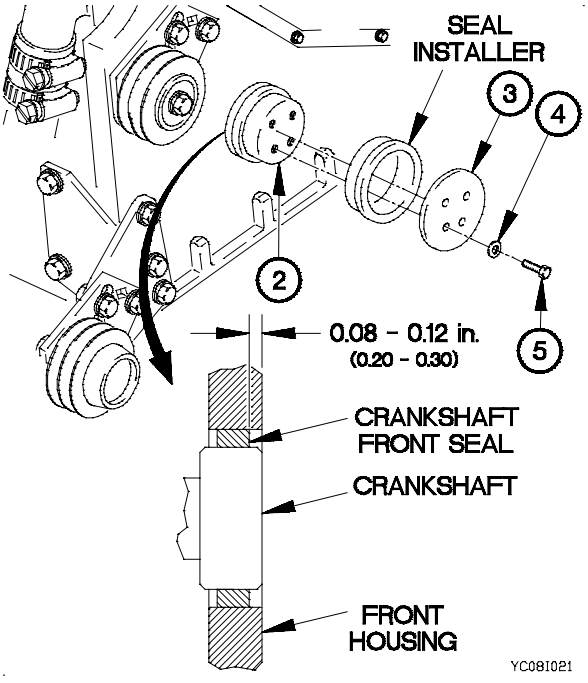
(2) Position seal installer and plate (3), on crankshaft (2) with four washers (4) and screws (5).

NOTE

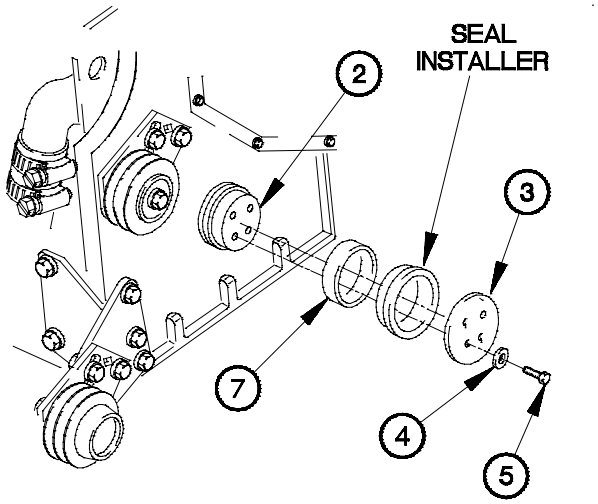
Front seal is properly seated when recessed into front housing 0.08-0.12 in. (0.20-0.30 cm).

(3) Measure distance from surface of crankshaft front seal to surface of front housing.

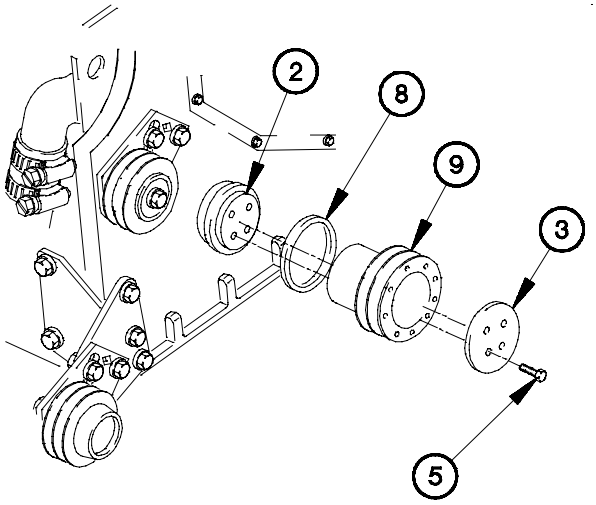
(4) Tighten four screws (5) on plate (3).



(5) Remove four screws (5), washers (4), plate (3), seal installer, and shipping sleeve (7) from crankshaft (2).



YC08I031



YC08I04-

(6) Apply a light coating of liquid soap to inside diameter of excluder (8).

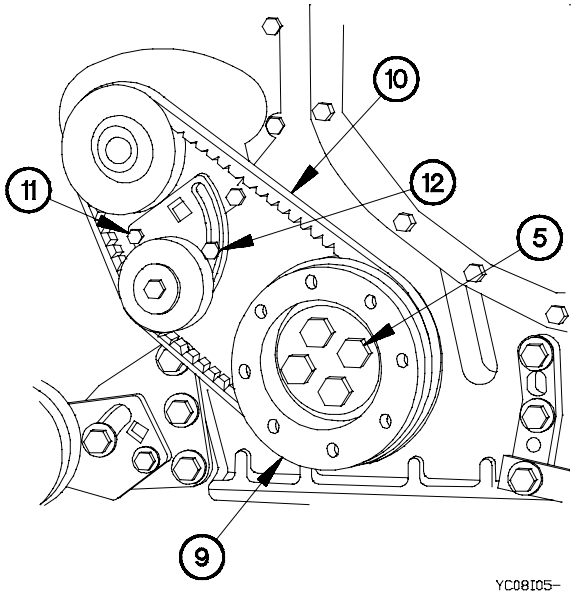
(7) Install excluder (8) on pulley (9), approximately 1/4 in. (0.6 cm).

(8) Position pulley (9) and plate (3) on crankshaft (2) with four screws (5).

3-8. CRANKSHAFT FRONT SEAL REPLACEMENT (CONT)

(9) Tighten four screws (5) to 98-142 lb-ft (133-193 N·m).

(10) Position water pump belt (10) on pulley (9).



CAUTION

Maintain correct belt tension while tightening screws. Failure to comply may result in damage to equipment.

NOTE

- Belt tension for new belt is 115-125 lbs (512-556 N). For reinstalled belt 85-95 lbs (378-442 N).
- Steps (11) and (12) require the aid of an assistant.

(11) Adjust water pump belt (10) to 115-125 lb (512-556 N).

(12) Tighten screws (11 and 12) to 15-25 lb-ft (20-34 N·m).

c. Follow-On Maintenance.

(1) Install pulley damper (para 3-7).

(2) Start engine (TM 9-2320-365-10).

(3) Raise cab (TM 9-2320-365-10).

(4) Check crankshaft front seal for oil leaks.

(5) Lower cab (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.

3-9. CRANKSHAFT REAR SEAL REPLACEMENT

This task covers:

a. Removal
b. Cleaning/Inspection
c. Installation
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine removed (para 3-3).
Flexplate removed (para 3-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Drill, Portable, Electric (Item 18, Appendix B)
Drill Set, Twist (Item 17, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Inserter, Seal (Item 32, Appendix B, TM 9-2320-365-20)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 38, Appendix B, TM 9-2320-365-20)
Wrench Set, Socket, (Item 74, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Tool, Distorter (Item 75, Appendix B, TM 9-2320-366-20)

Materials/Parts
Seal, Plain Encased (Item 266, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)
Rag, Wiping (Item 59, Appendix C)

a. Removal.

WARNING

Wear appropriate eye protection when drilling holes. Failure to comply may result in injury to personnel.

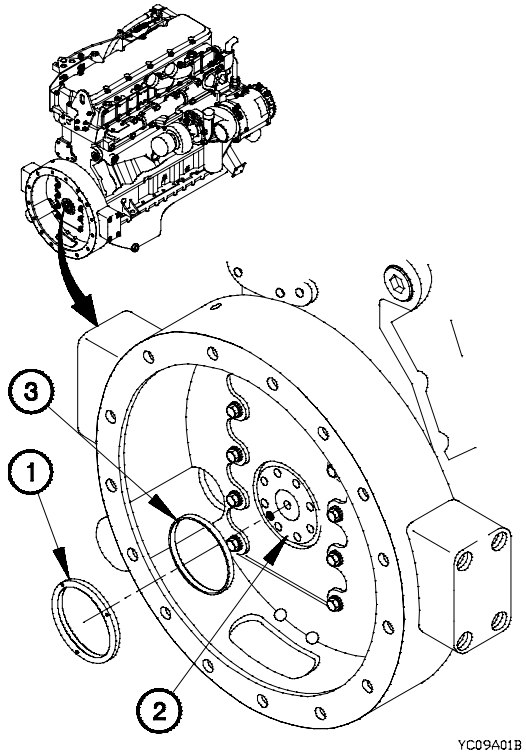
(1) Drill three evenly spaced holes in seal (1).

(2) Remove seal (1) from crankshaft (2). Discard seal.

NOTE

If crankshaft rear seal has not previously been replaced, a wear ring will not be installed.

(3) Remove wear ring (3) from crankshaft (2).



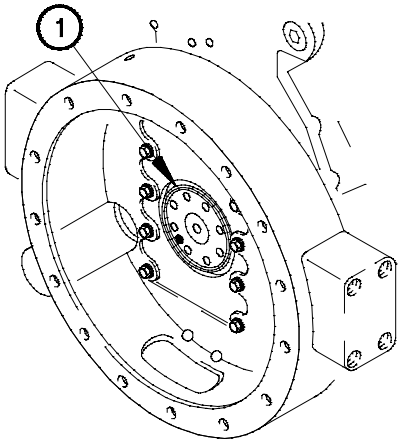
3-9. CRANKSHAFT REAR SEAL REPLACEMENT (CONT)

b. Cleaning/Inspection.

WARNING

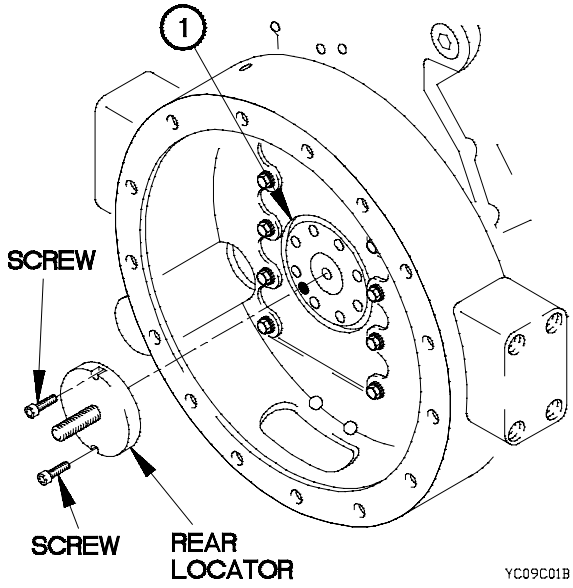
- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using Dry Cleaning Solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using Dry Cleaning Solvent, immediately get fresh air and medical help. If Dry Cleaning Solvent contacts skin or clothes, flush with cold water. If Dry Cleaning Solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

Clean seal seating surface (1) thoroughly with dry cleaning solvent.



YC09B01B

c. Installation.



YC09C01B

NOTE

Two screws are tightened finger tight.

(1) Position rear locator on crankshaft (1) with two screws.

CAUTION

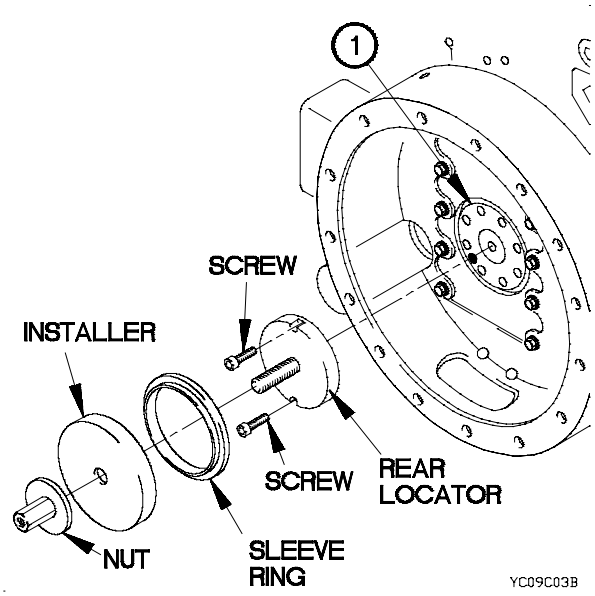
Rear crankshaft seal and sleeve ring are installed with bevel edge toward engine. Failure to comply may result in damage to equipment.

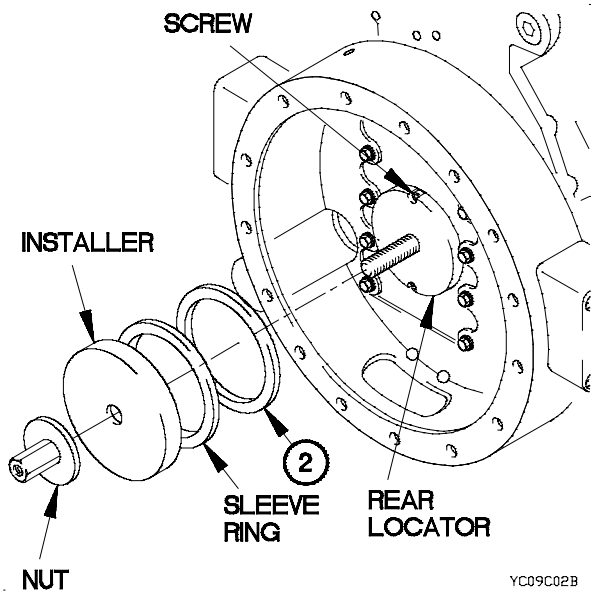
(2) Position rear seal (2) in sleeve ring.

(3) Position sleeve ring on rear locator.

(4) Position installer on rear locator with nut.

(5) Tighten nut on installer.





(6) Remove nut, installer and sleeve ring from rear locator.

(7) Rotate sleeve ring 180 degrees.

(8) Position sleeve ring on rear locator.

(9) Position installer on rear locator with nut.

(10) Tighten nut on installer.

(11) Remove nut, installer, and sleeve ring from rear locator.

CAUTION

Ensure rear seal and wear ring are flush. Failure to comply may result in damage to equipment.

(12) Remove two screws and rear locator from crankshaft (1).

d. Follow-On Maintenance.

(1) Install flexplate (para 3-10).

(2) Install engine (para 3-3).

End of Task.

3-10. FLEXPLATE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine removed (para 3-3).
Engine fan and fan clutch removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

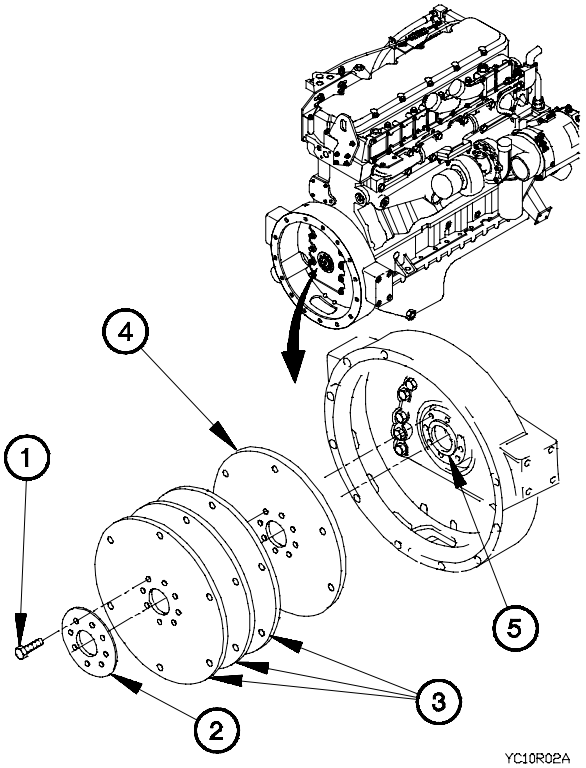
Materials/Parts
Sealing Compound (Item 74, Appendix C)

a. Removal.

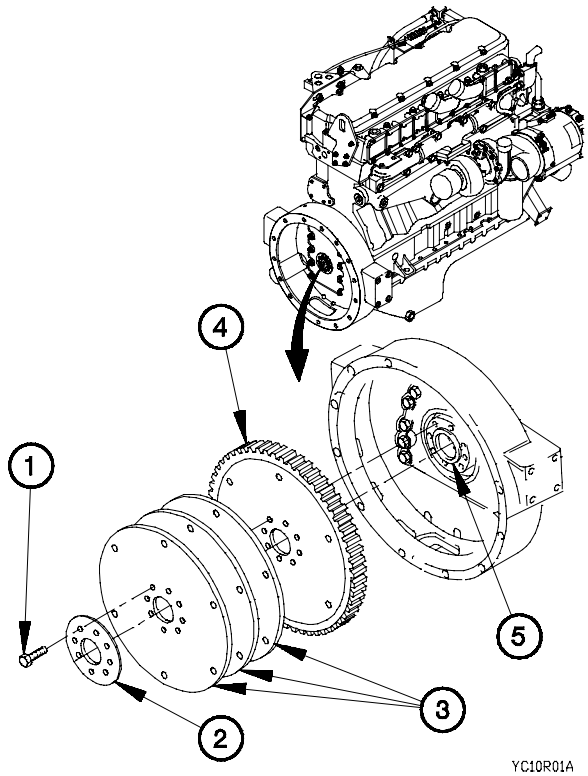
NOTE

Perform step (1) for engine with ring gear and shims installed.

(1) Remove eight bolts (1), plate (2), three shims (3), and gear and disc assembly (4) from hub adapter (5).



YC10R02A



YC10R01A

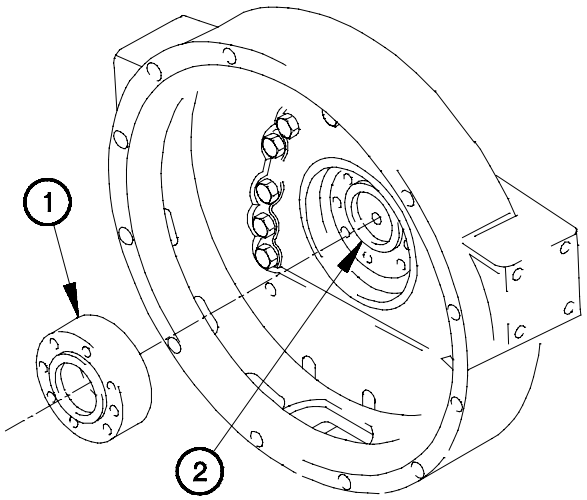
NOTE

Perform step (2) for engine with balance plate and shims installed.

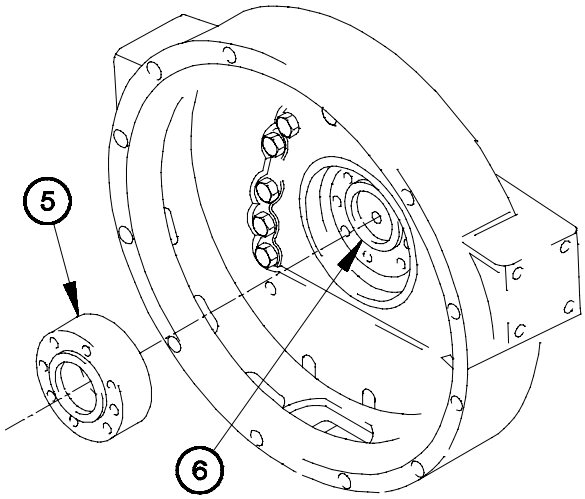
(2) Remove eight bolts (1), plate (2), three flexplates (3), and flexplate assembly (4) from hub adapter (5).

(3) Remove hub adapter (5) from crankshaft (6).

b. Installation.



YC10I01-



YC10R03-

(1) Position hub adapter (1) on crankshaft (2).

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

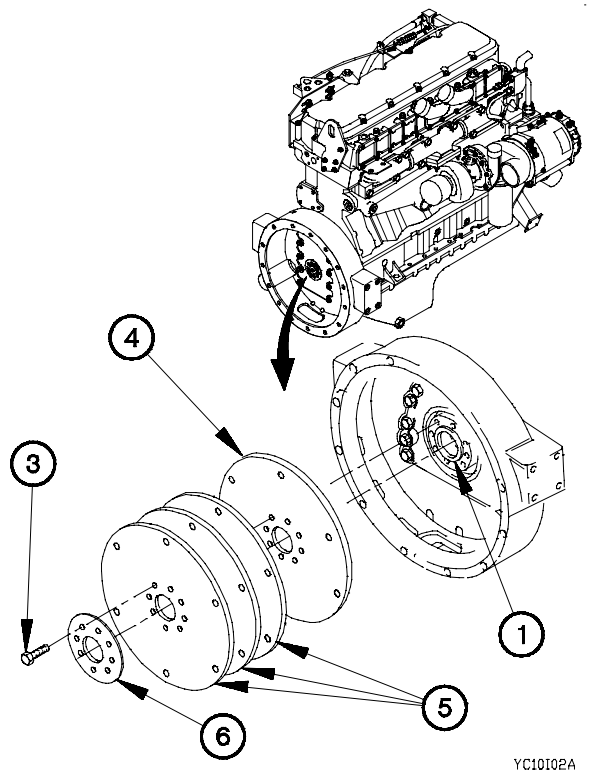
NOTE

Perform steps (2) through (4) on engines with balance plate removed.

(2) Apply sealing compound to the threads of eight bolts (3).

(3) Position flexplate assembly (4) and three flexplates (5) on hub adapter (1) with plate (6) and eight bolts (3).

(4) Tighten eight bolts (3) to 76-94 ft-lb (103-127 N•m).



YC10I02A

3-10. FLEXPLATE ASSEMBLY REPAIR (CONT)

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

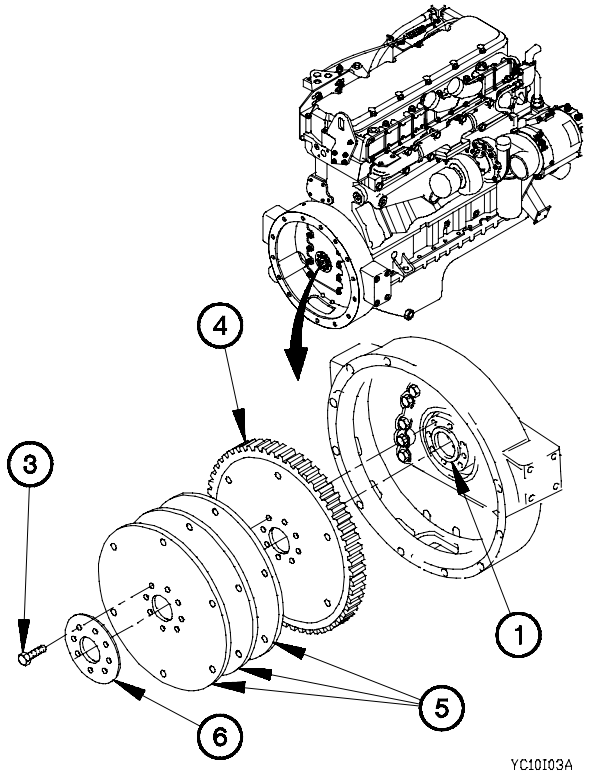
NOTE

Perform steps (5) through (7) on engines with ring gear removed.

(5) Apply sealing compound to the threads of eight bolts (3).

(6) Position gear and disc assembly (4) and three shims (5) on hub adapter (1) with plate (6) and eight bolts (3).

(7) Tighten eight bolts (3) to 76-94 ft-lb (103-127 N•m).



c. Follow-On Maintenance.

(1) Install engine fan and fan clutch (TM 9-2320-365-20-3).

(2) Install engine (para 3-3).

End of Task.

3-11. FLYWHEEL HOUSING REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Starting motor removed (TM 9-2320-365-20-3).
Engine speed sensor removed (TM 9-2320-365-20-3).
Engine removed (para 3-3).
Flexplate removed (para 3-10).
Crankshaft rear seal removed (para 3-9).
Oil pan removed (para 3-16).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Materials/Parts
Gasket Maker (Item 35.1, Appendix C)
Screw, Self-locking (10) (Item 253.1, Appendix F)

Personnel Required
(2)

a. Removal.

WARNING

Flywheel housing weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

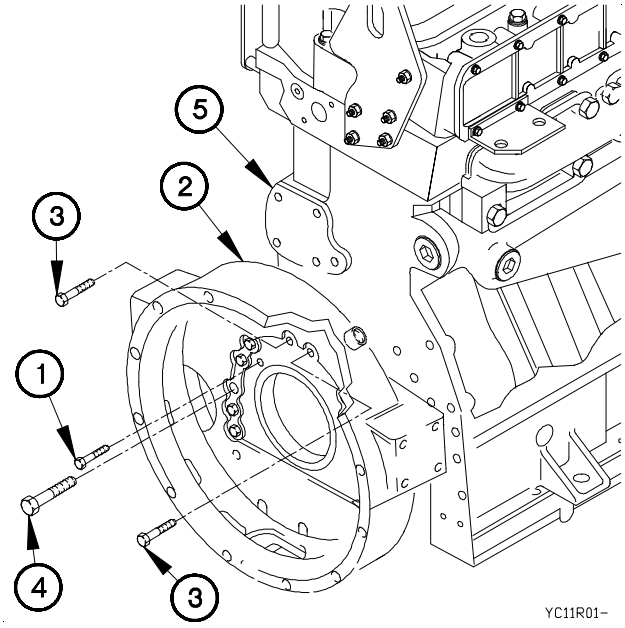
(1) Remove bolt (1) from flywheel housing (2).

(2) Remove two bolts (3) from flywheel housing (2).

NOTE

Step (3) requires the aid of an assistant.

(3) Remove 10 self-locking screws (4) and flywheel housing (2) from engine (5). Discard self-locking screws.

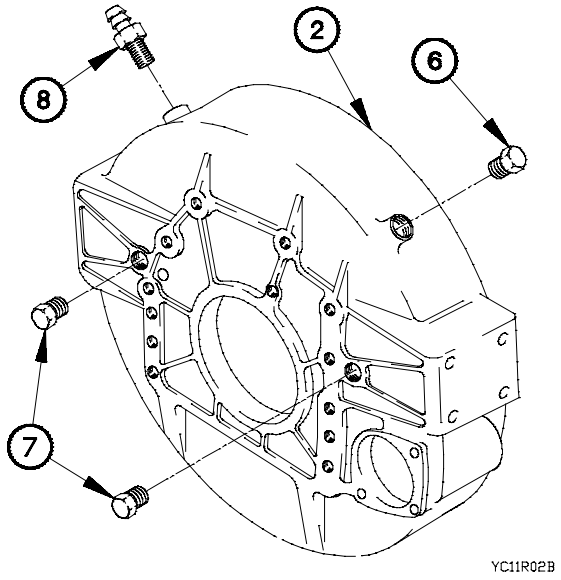


3-11. FLYWHEEL HOUSING REPLACEMENT (CONT)

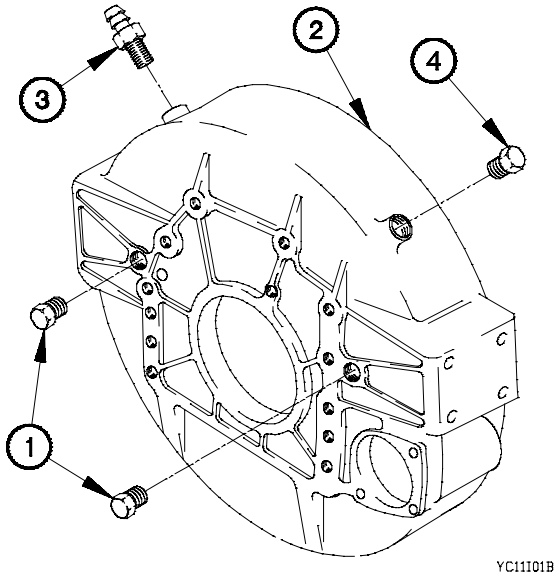
(4) Remove plug (6) from port on top of flywheel housing (2).

(5) Remove plug (7) from each side of flywheel housing (2).

(6) Remove fitting (8) from flywheel housing (2).



b. Installation.



(1) Install plug (1) on left and right side of flywheel housing (2).

(2) Install plug (3) on top of flywheel housing (2).

(3) Install fitting (4) in flywheel housing (2).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(4) Apply sealant to seating area between and around all mounting holes.

WARNING

Flywheel housing weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (5) through (8) require the aid of an assistant.

(5) Position flywheel housing (2) on engine (5).

(6) Position bolt (6) in flywheel housing (2).

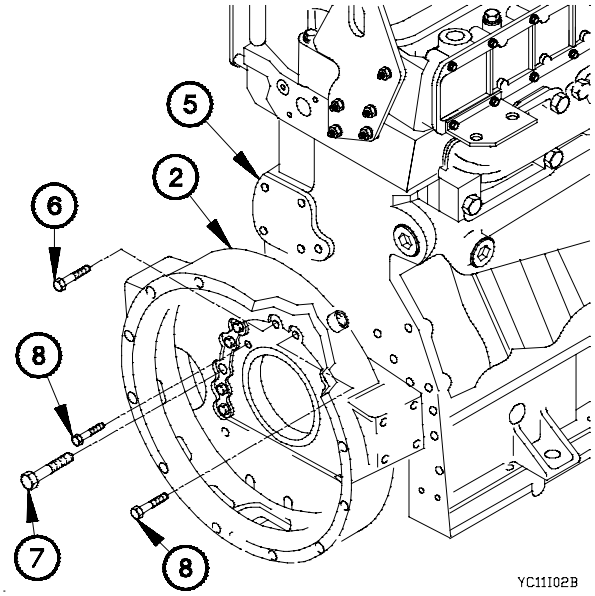
(7) Position 10 self-locking screws (7) in flywheel housing (2).

(8) Position two bolts (8) in flywheel housing (2).

(9) Tighten 10 self-locking screws (7) to 98-144 lb-ft (130-190 N·m).

(10) Tighten two bolts (8) to 33-47 lb-ft (45-65 N·m).

(11) Tighten bolt (6) to 156-276 lb-in. (18-31 N·m).



c. Follow-On Maintenance.

(1) Install oil pan (para 3-16).

(2) Install crankshaft rear seal (para 3-9).

(3) Install flexplate (para 3-10).

(4) Install engine (para 3-3).

(5) Install engine speed sensor (TM 9-2320-365-20-3).

(6) Install starting motor (TM 9-2320-365-20-3).

End of Task.

3-12. ROCKER ARM AND PUSH ROD REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Valve cover removed (TM 9-2320-365-20-2).
Fuel shutoff solenoid removed (para 6-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Socket Wrench Attachment, Screwdriver (TM 9-2320-365-20)
Adapter, Socket Wrench (Item 3, Appendix B)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

a. Removal.

NOTE

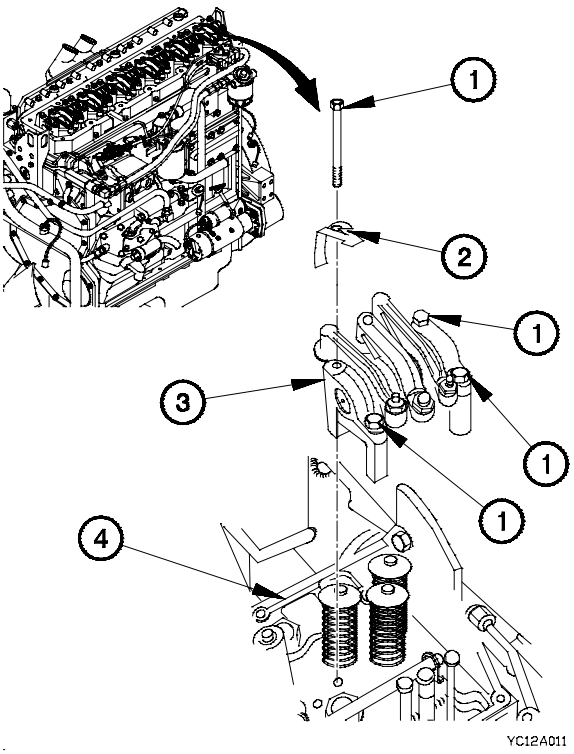
- All six rocker arm groups are removed the same way. No. 1 rocker arm group shown.
- No. 1 cylinder rocker arm group will have a deflector.

(1) Remove four bolts (1) and deflector (2) from rocker arm group (3).

CAUTION

Hold rocker arm group level when removing from engine to prevent accidental disassembly. Failure to comply may result in damage to equipment.

(2) Remove rocker arm group (3) from cylinder head (4).



3-12. ROCKER ARM AND PUSH ROD REPLACEMENT/REPAIR (CONT)

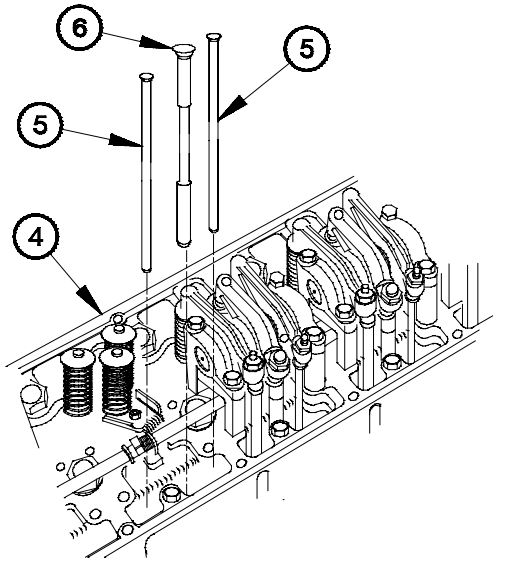
NOTE

If intake and exhaust push rods are not being replaced, install push rods on the same cylinder and valve from which they were removed. Mark and tag location of intake and exhaust push rods prior to removing.

(3) Remove intake and exhaust push rods (5) from cylinder head (4).

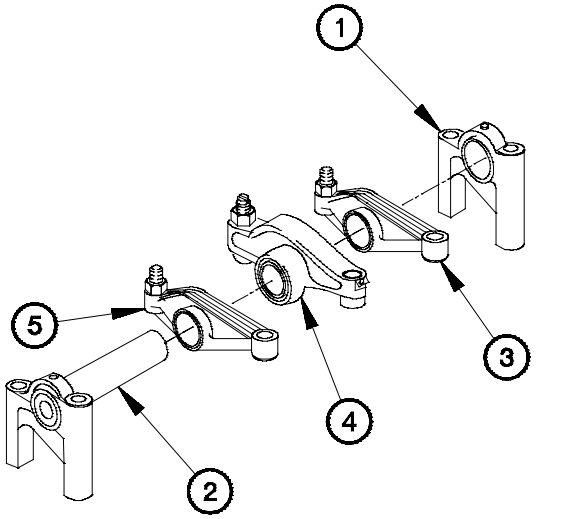
(4) Remove fuel injector push rod (6) from cylinder head (4).

(5) Perform steps (1) through (4) on remaining five rocker arm groups.



YC12A021

b. Disassembly.



YC12B011

(1) Remove shaft support (1) from shaft arm (2).

(2) Remove rocker arm (3) from shaft arm (2).

(3) Remove unit arm (4) from shaft arm (2).

(4) Remove rocker arm (5) from shaft arm (2).

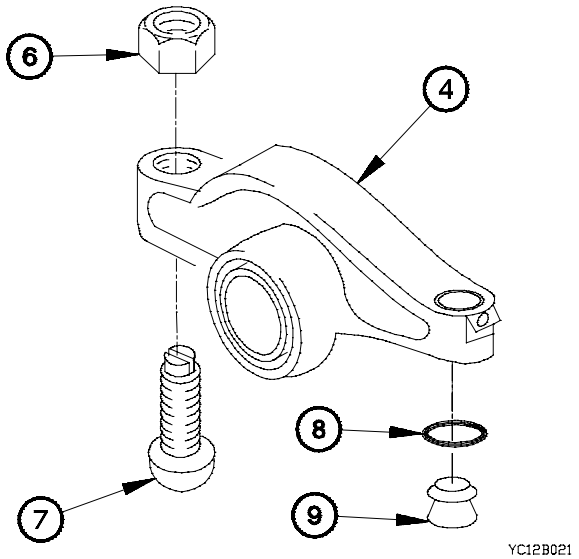
NOTE

Injector adjustment screw is removed through bottom of unit arm.

(5) Remove jam nut (6) from injector adjustment screw (7).

(6) Remove injector adjustment screw (7) from unit arm (4).

(7) Remove retaining ring (8) and arm button (9) from unit arm (4).



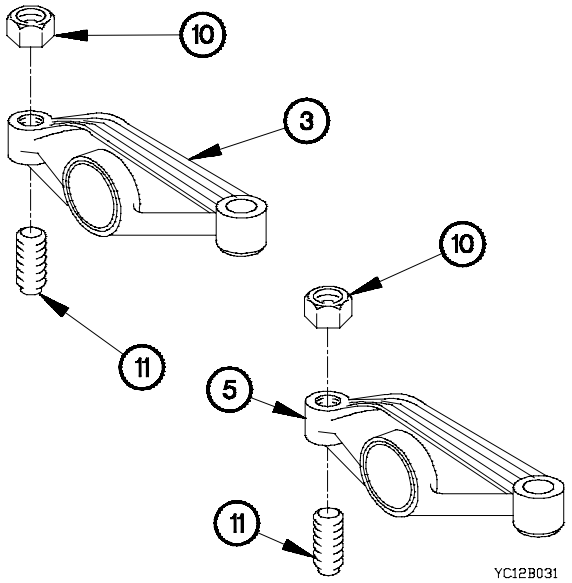
YC12B021

(8) Remove two jam nuts (10) from valve adjustment screws (11).

NOTE

Valve adjustment screws are removed through bottom of rocker arm.

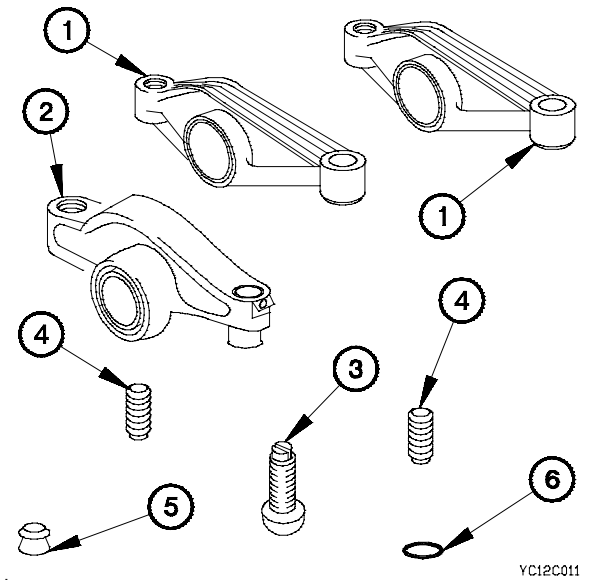
(9) Remove valve adjustment screws (11) from rocker arms (3 and 5).



c. Cleaning and Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 ° F (38 ° C) and for Type II is 130 ° F (50 ° C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**



(1) Clean all parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection.

(2) Inspect two rocker arms (1) for cracks or signs of wear.

(3) Inspect unit arm (2) for cracks or signs of wear.

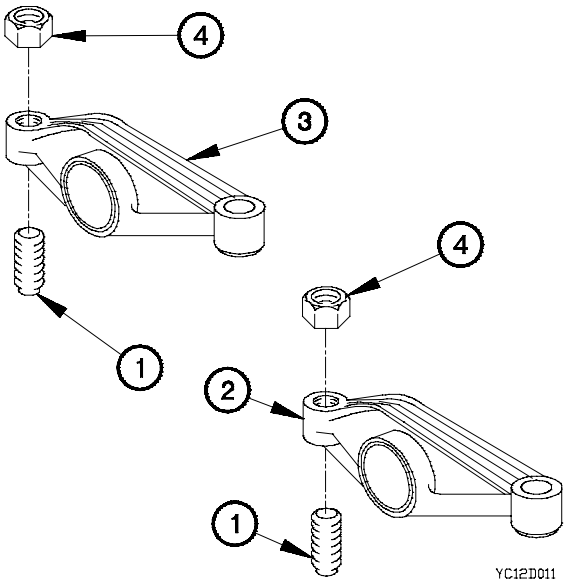
(4) Inspect injector adjustment screw (3) and two valve adjustment screws (4) for damaged threads.

(5) Inspect arm button (5) for signs of wear.

(6) Inspect retaining ring (6) for signs of wear.

3-12. ROCKER ARM AND PUSH ROD REPLACEMENT/REPAIR (CONT)

d. Assembly.

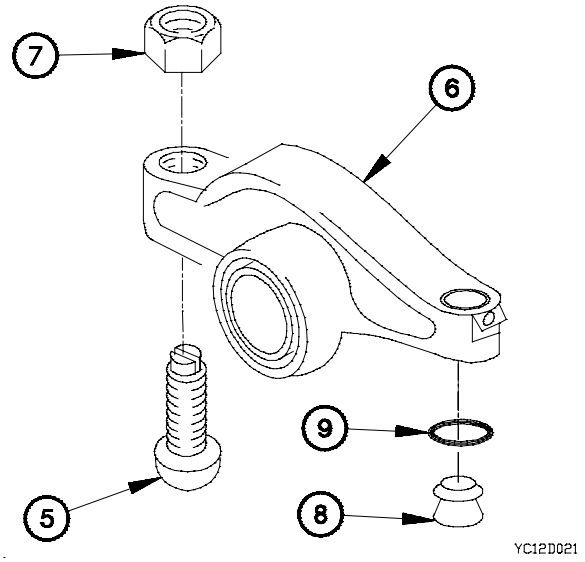


NOTE

- Lubricate with lubricating oil all parts prior to assembly.
- Valve adjustment screws are installed from bottom side of rocker arms.

(1) Position two valve adjustment screws (1) in rocker arms (2 and 3).

(2) Install two jam nuts (4) on valve adjustment screws (1).



NOTE

Injector adjustment screw is installed from bottom side of unit arm.

(3) Position injector adjustment screw (5) in unit arm (6).

(4) Position jam nut (7) on injector adjustment screw (5).

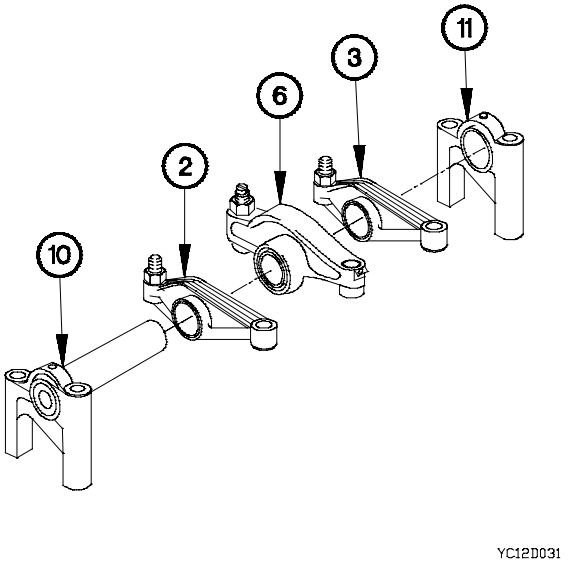
(5) Install retainer ring (9) and arm button (8) on unit arm (6).

(6) Install rocker arm (2) on shaft arm (10).

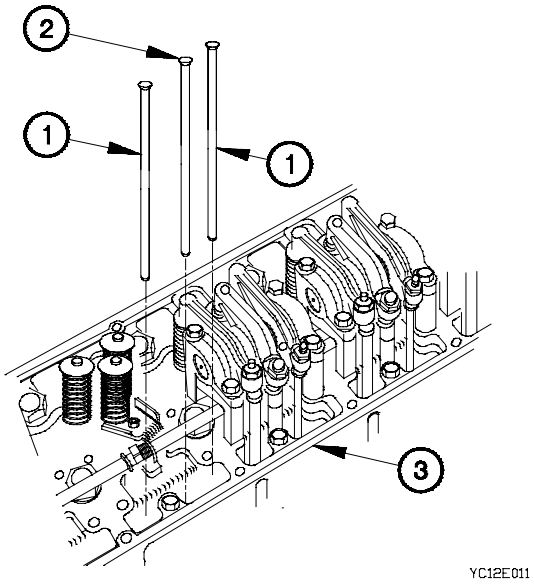
(7) Install unit arm (6) on shaft arm (10).

(8) Install rocker arm (3) on shaft arm (10).

(9) Install shaft support (11) on shaft arm (10).



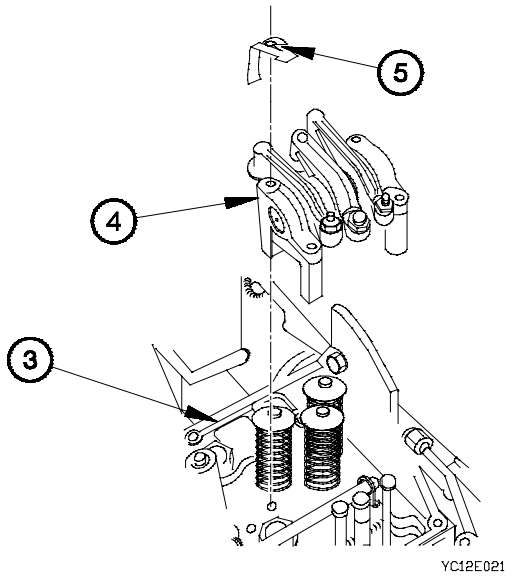
e. Installation.



NOTE

If intake and exhaust push rods are being replaced, the new intake and exhaust push rods will be of the same size diameter.

(1) Install intake and exhaust valve push rods (1) and fuel injector push rod (2) in cylinder head (3).



CAUTION

Hold rocker arm group level when installing on engine to prevent accidental disassembly. Failure to comply may result in damage to equipment.

NOTE

All six rocker arm groups are installed the same way. No. 1 rocker arm group shown.

(2) Position rocker arm group (4) on cylinder head (3).

NOTE

Perform step (3) on No. 1 cylinder rocker arm group.

(3) Position deflector (5) on rocker arm group (4).

3-12. ROCKER ARM AND PUSH ROD REPLACEMENT/REPAIR (CONT)

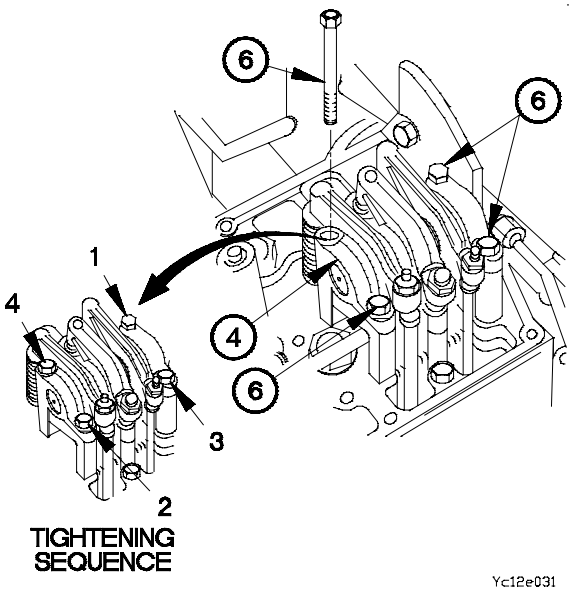
CAUTION

Ensure push rods are seated at top and bottom. Failure to comply may result in damage to equipment.

(4) Position four bolts (6) in rocker arm group (4).

(5) Tighten four bolts (6) to 156-276 lb-in. (18-31 N·m) in sequence shown.

(6) Perform steps (1), (2), (4), and (5) on remaining five rocker arm groups.



f. Follow-On Maintenance.

Perform fuel timing checks (para 4-5).

End of Task.

3-13. CAM ROLLER FOLLOWERS REPLACEMENT

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Rocker arms and push rods removed (para 3-12).
Fuel filter removed (TM 9-2320-365-20-3).
Fuel governor removed (para 4-9).
Air compressor removed (para 11-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 83, Appendix B)
Adapter, Socket Wrench (Item 3, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Socket Wrench Attachment, Screwdriver (TM 9-2320-365-20)
Wrench Set, Socket (Item 75, Appendix B)

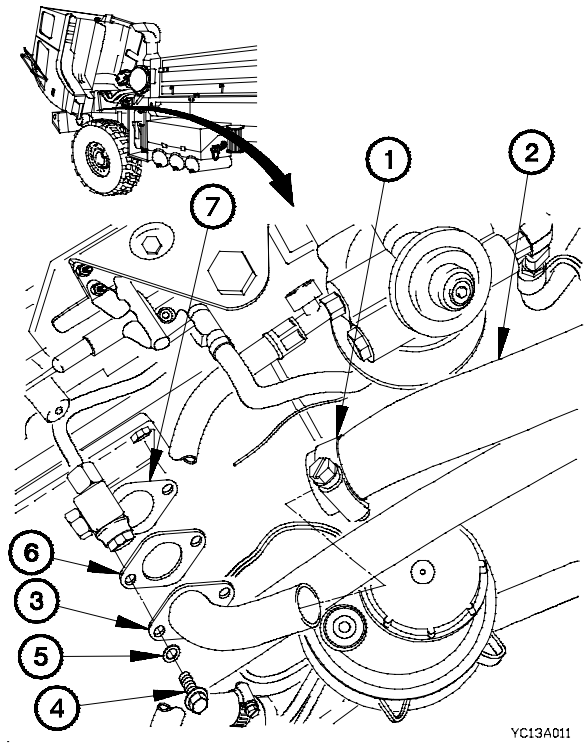
Materials/Parts
Gasket (Item 55, Appendix F)
Gasket (3) (Item 63, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Rag, Wiping (Item 59, Appendix C)

a. Removal.

(1) Loosen hose clamp (1) on oil fill hose (2).

(2) Remove oil fill hose (2) from oil fill tube (3).

(3) Remove two screws (4), washers (5), oil fill tube (3), and gasket (6) from center side cover (7). Discard gasket.



3-13. CAM ROLLER FOLLOWERS REPLACEMENT (CONT)

(4) Remove plug (8) from top of oil manifold (9).

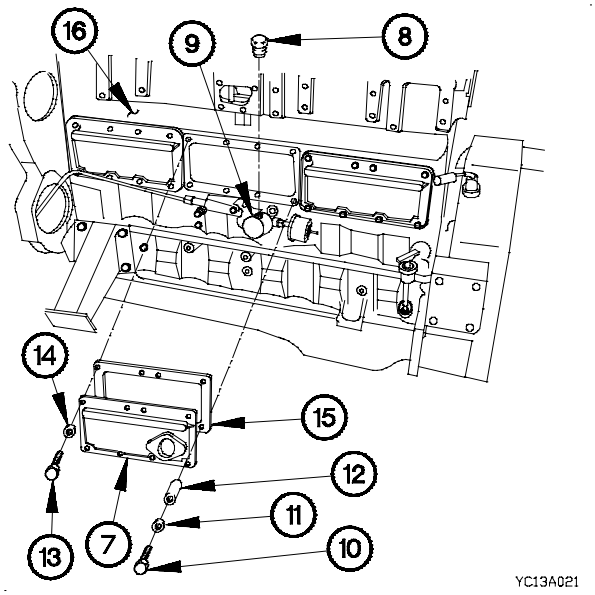
NOTE

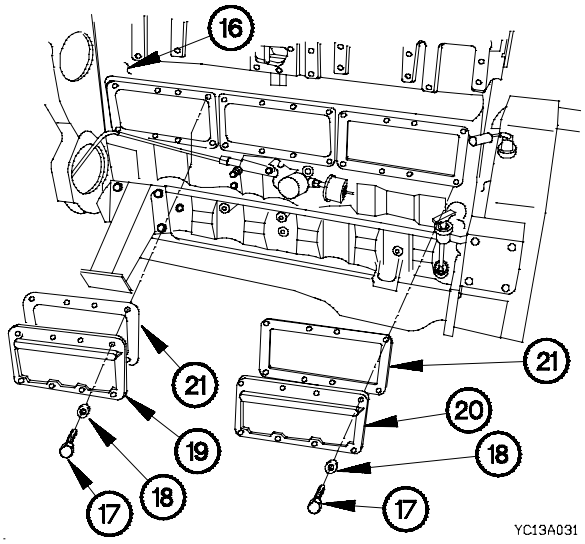
Perform steps (5) through (7) on center side cover.

(5) Remove screw (10), washer (11), and sleeve (12) from center side cover (7).

(6) Remove seven screws (13) and washers (14) from center side cover (7).

(7) Remove center side cover (7) and gasket (15) from cylinder block (16). Discard gasket.





(8) Remove eight screws (17) and washers (18) from front and rear side covers (19 and 20).

(9) Remove front and rear side covers (19 and 20) and two gaskets (21) from cylinder block (16). Discard gaskets.

b. Disassembly.

(1) Remove four screws (1), two sleeves (2), and shaft (3) from side cover (4).

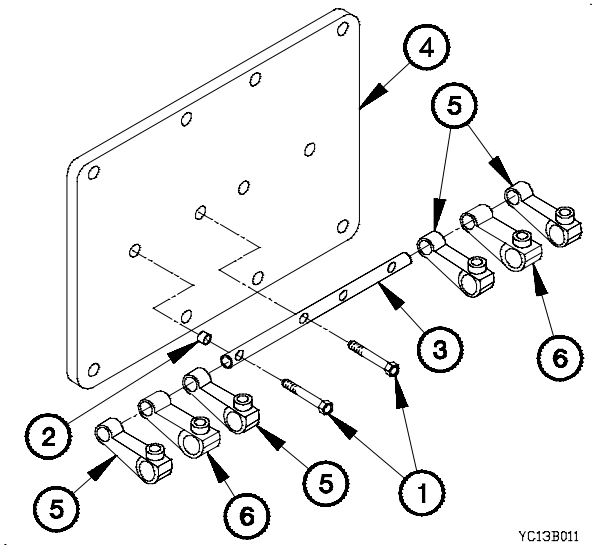
NOTE

Tag lifter roller followers and injector roller followers prior to removal.

(2) Remove two lifter roller followers (5) and injector roller follower (6) from shaft (3).

(3) Remove two lifter roller followers (5) and injector roller follower (6) from other side of shaft (3).

(4) Perform steps (1) through (3) on two remaining side covers.



c. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

NOTE

Replace any part that fails visual inspection.

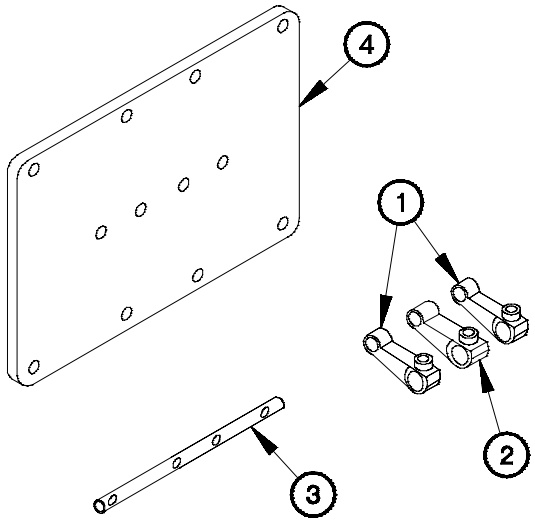
(1) Clean all metal parts with dry cleaning solvent.

(2) Inspect four lifter roller followers (1) for worn, broken, or missing parts.

(3) Inspect two injector roller followers (2) for worn, broken, or missing parts.

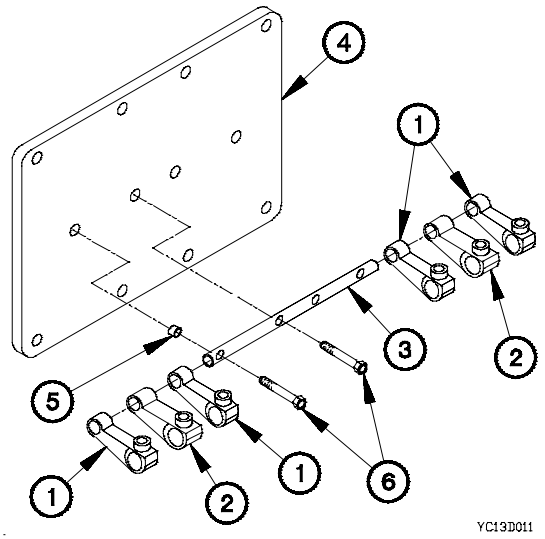
(4) Inspect shaft (3) for cracks, corrosion, or wear.

(5) Inspect side covers (4) for cracks, corrosion, or damage.



YC13C011

d. Assembly.



YC13D011

(1) Install two lifter roller followers (1) and injector roller follower (2) on shaft (3).

(2) Install two lifter roller followers (1) and injector roller follower (2) on other side of shaft (3).

(3) Position shaft (3) on side cover (4) with two sleeves (5) and four screws (6).

(4) Tighten four screws (6) to 72-144 lb-in (8-16 N·m).

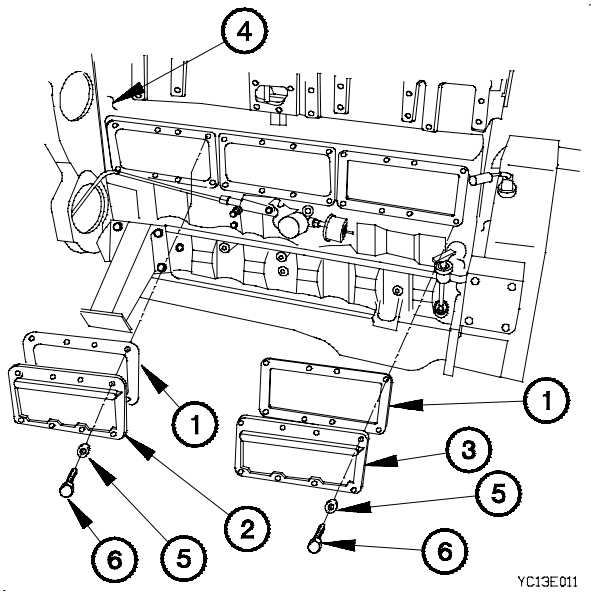
(5) Perform steps (1) through (4) on two remaining side covers (4).

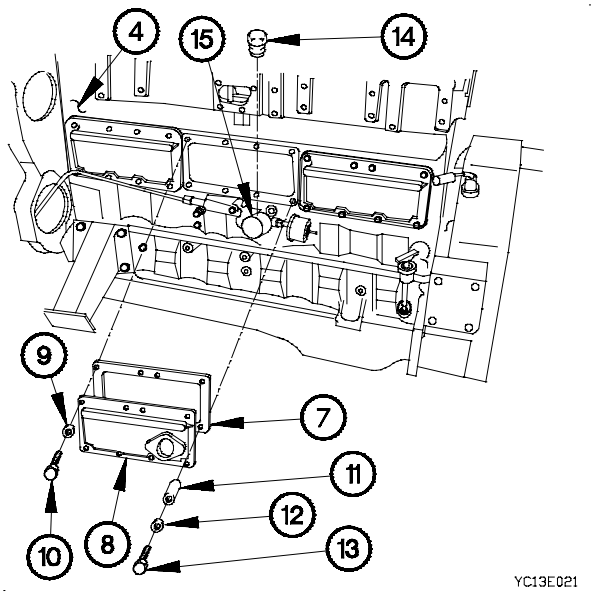
3-13. CAM ROLLER FOLLOWERS REPLACEMENT (CONT)

e. Installation.

(1) Position two gaskets (1) and front and rear side covers (2 and 3) on cylinder block (4) with eight washers (5) and screws (6).

(2) Tighten eight screws (6) to 13-23 lb-ft (18-32 N·m).





NOTE

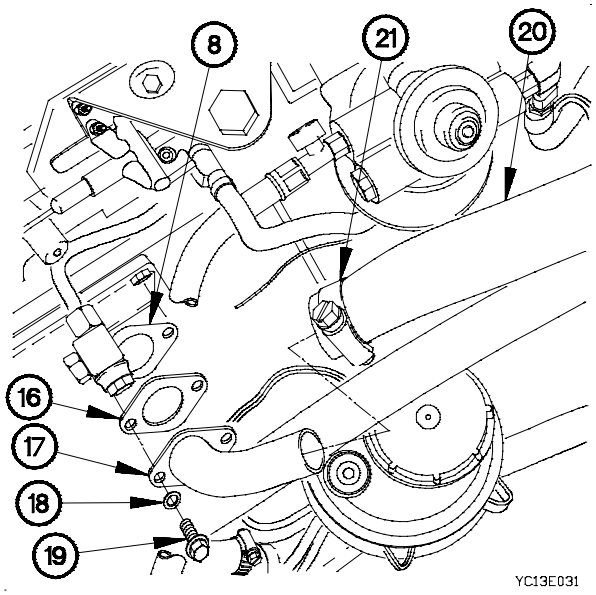
Perform steps (3) through (5) on center side cover.

(3) Position gasket (7) and center side cover (8) on cylinder block (4) with seven washers (9) and screws (10).

(4) Position spacer (11), washer (12), and screw (13) on cylinder block (4).

(5) Tighten screw (13) and seven screws (10) to 156-276 lb-in. (18-32 N·m).

(6) Install plug (14) in oil manifold (15).



(7) Install gasket (16) and oil fill tube (17) on center side cover (8) with two washers (18) and screws (19).

(8) Install oil fill hose (20) on oil fill tube (17) with hose clamp (21).

f. Follow-On Maintenance.

(1) Install air compressor (para 11-2).

(2) Install fuel governor (para 4-9).

(3) Install fuel filter (TM 9-2320-365-20-3).

(4) Install rocker arm and push rods (para 3-12).

End of Task.

3-14. VALVE CLEARANCE ADJUSTMENT

This task covers:

a. Adjustment

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Valve cover removed (TM 9-2320-365-20-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 83, Appendix B)

Tools and Special Tools (Cont)
Hammer, Hand, Soft Head (Item 28, Appendix B)
Tool Kit, Internal Combustion Engine (TM 9-2320-365-20)

Personnel Required
(2)

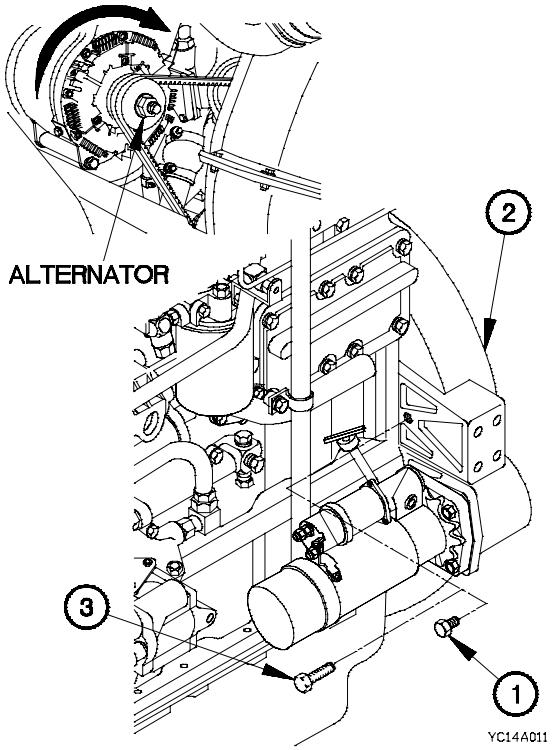
a. Adjustment.

(1) Remove plug (1) from timing hole on front of flywheel housing (2).

NOTE

- Making reference marks on engine front housing and the crankshaft pulley at top center will assist in locating top center on the next stroke.
- Access timing hole by turning alternator pulley through a series of short arcs.

(2) Install timing bolt (3) in timing bolt hole on front of flywheel housing (2).



NOTE

- Intake and exhaust valves for No. 1 cylinder are fully closed if No. 1 piston is on **COMPRESSION STROKE** and rocker arms can be moved by hand. If rocker arms can not be moved by hand and valves are slightly open, No. 1 piston is on **EXHAUST STROKE**.

- To find correct cylinder(s) to be checked/adjusted for stroke position of crankshaft, refer to **Table 3-1 Crankshaft Positions for Valve Clearance Setting.**

Table 3-1. Crankshaft Positions for Valve Clearance Setting

SAE Standard (Counterclockwise) Rotation Engines as Viewed from Flywheel End	
Check/Adjust with No. 1 Piston On	Top Center Compression Stroke
Injectors	3-5-6
Intake Valves	1-2-4
Exhaust Valves	1-3-5
Check/Adjust with No. 1 Piston On	Top Center Exhaust Stroke
Injectors	1-2-4
Intake Valves	3-5-6
Exhaust Valves	2-4-6
Firing Order	1-5-3-6-2-4

3-14. VALVE CLEARANCE ADJUSTMENT (CONT)

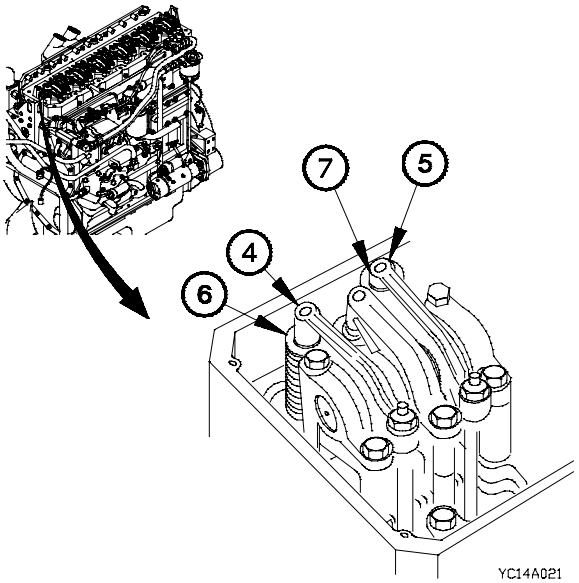
(3) Refer to **Table 3-1 Crankshaft Positions for Valve Clearance Setting** and check clearance on appropriate valves.

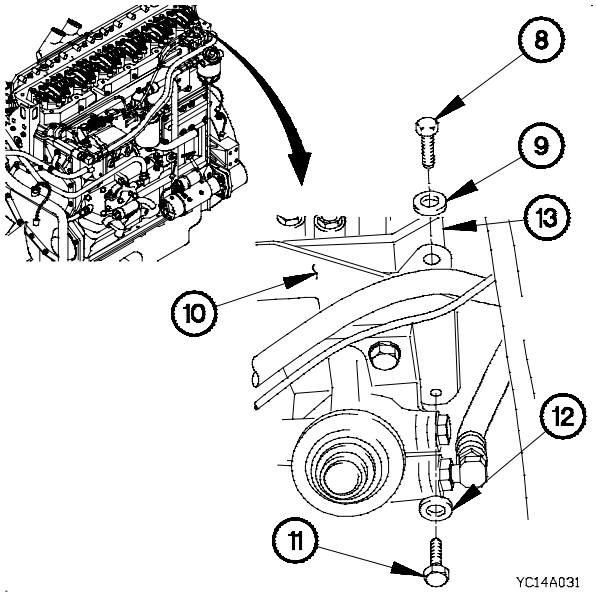
(4) Tap each intake rocker arm (4) and each exhaust rocker arm (5) with a soft face hammer.

NOTE

Valve clearance is measured between intake rocker arms or exhaust rocker arms and their respective valves. All clearance measurements and adjustments are made with the valves FULLY CLOSED.

(5) Check clearance between valves (6 or 7) and intake rocker arms (4) or exhaust rocker arms (5).





(6) Remove three bolts (8) and washers (9) from fuel/water separator bracket (10).

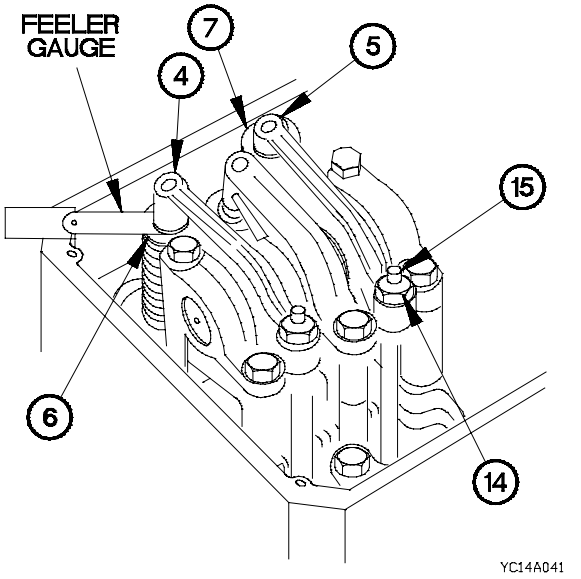
(7) Remove bolt (11), washer (12), and fuel/water separator bracket (10) from inlet manifold (13).

NOTE

Steps (8) through (12) require the aid of an assistant.

(8) Loosen jam nut (14) for pushrod adjustment screw (15).

(9) If there is not enough clearance for a feeler gauge between intake rocker arms (4) or exhaust rocker arms (5) and their respective valves (6 or 7), turn adjustment screw (15) left to increase valve clearance.



(10) Refer to **Table 3-2 Valve Clearances** and insert a feeler gauge of correct dimension between intake rocker arms (4) or exhaust rocker arms (5) and their respective valves (6 or 7).

Table 3-2. Valve Clearances

VALVES	GAUGE DIMENSIONS
Intake	0.015 in. (0.38 mm)
Exhaust	0.025 in. (0.64 mm)

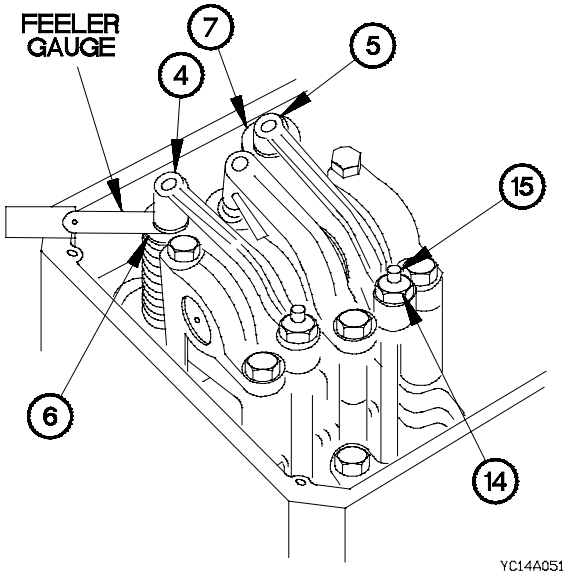
(11) Turn adjustment screw (15) clockwise until either valve (6 or 7) is set to specifications in **Table 3-3 Valve Clearance Ranges.**

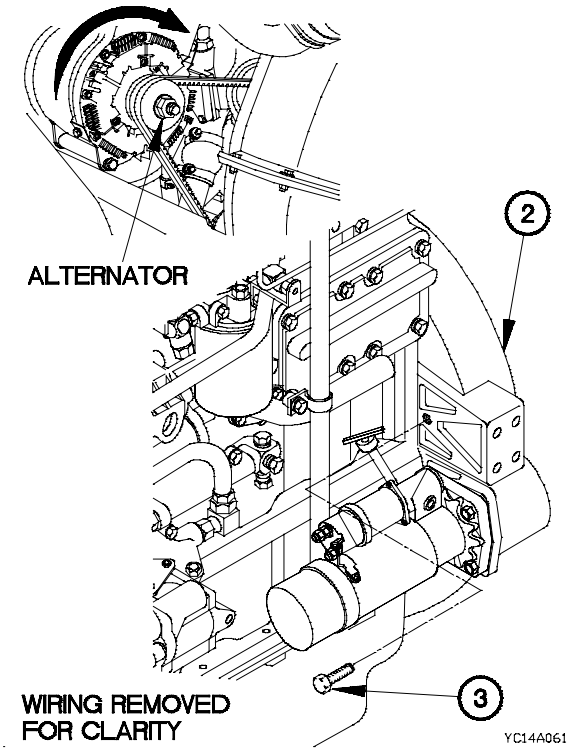
Table 3-3. Valve Clearance Ranges

VALVES	ACCEPTABLE CLEARANCE RANGE
Intake	0.012 - 0.018 in. (0.30 - 0.46 mm)
Exhaust	0.022 - 0.028 in. (0.56 - 0.72 mm)

(12) After each adjustment, tighten jam nut (14) to 156-276 lb-in. (17-31 N·m).

(13) Perform steps (5) through (12) on remaining valves on that stroke.





NOTE

- Perform step (14) after checking and adjusting clearance on all valves for a specified piston position.
- Use bolt on front of alternator to rotate flywheel for timing bolt installation

(14) Rotate flywheel right 360 degrees.

(15) Remove timing bolt (3) from timing bolt hole on front of flywheel housing (2).

(16) Rotate crankshaft 360 degrees.

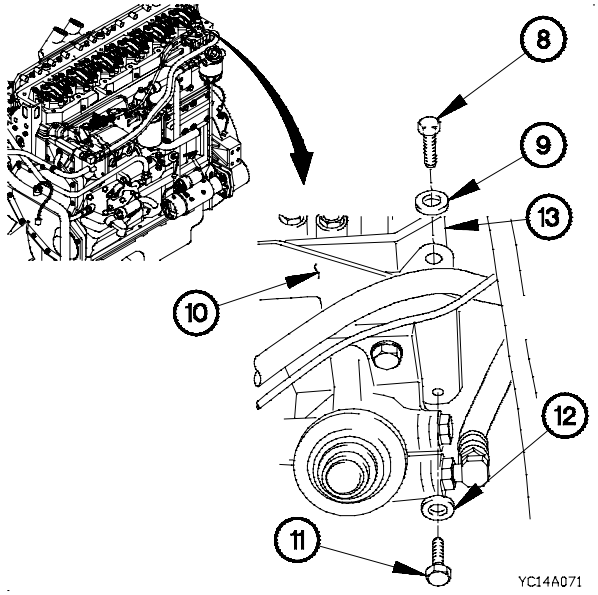
(17) Install timing bolt (3) in timing bolt hole on front of flywheel housing (2).

NOTE

This will put number 1 piston at top center (TC) position on the other stroke.

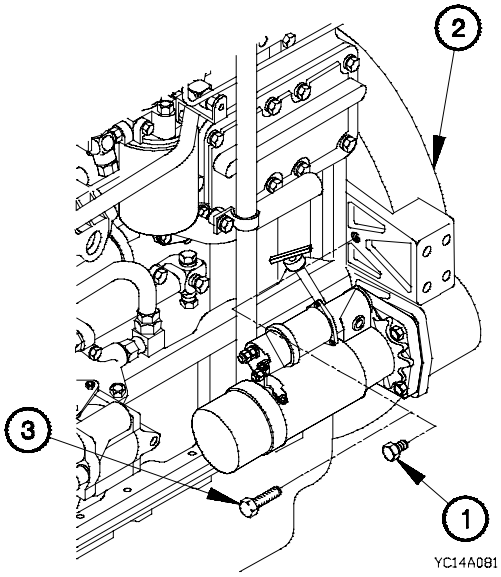
(18) Perform steps (3) through (5) on remaining valves.

3-14. VALVE CLEARANCE ADJUSTMENT (CONT)



(19) Install fuel/water separator bracket (10) on inlet manifold (13) with washer (12) and bolt (11).

(20) Install three washers (9) and bolts (8) in fuel/water separator bracket (10).



(21) Remove timing bolt (3) from timing bolt hole on front of flywheel housing (2).

(22) Install plug (1) in timing bolt hole on front of flywheel housing (2).

b. Follow-On Maintenance.

(1) Install valve cover (TM 9-2320-365-20-2).

(2) Lower cab (TM 9-2320-365-10).

(3) Connect batteries (TM 9-2320-365-20-3).

(4) Start engine and monitor for proper operation (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

End of Task.

3-15. ENGINE FRONT COVER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Radiator drained (TM 9-2320-365-10).
Transmission oil cooler tube removed (TM 9-2320-365-20-3).
Upper coolant tube removed (TM 9-2320-365-20-3).
Air compressor inlet and outlet coolant tubes removed (TM 9-2320-365-20-3).
Engine fan and fan clutch removed (TM 9-2320-365-20-3).

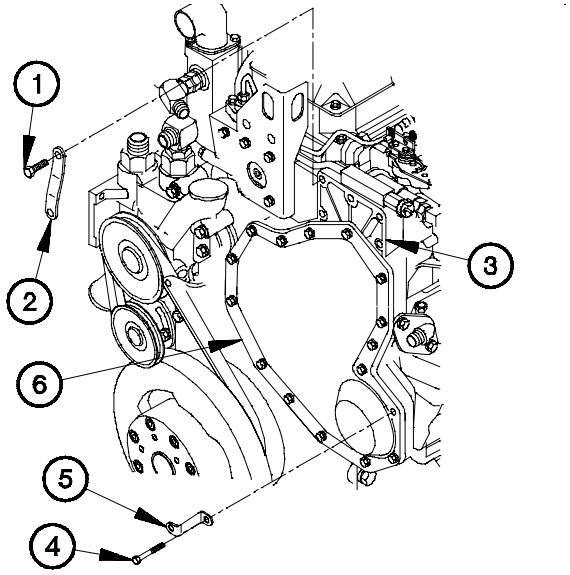
Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Materials/Parts
Gasket (Item 62, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

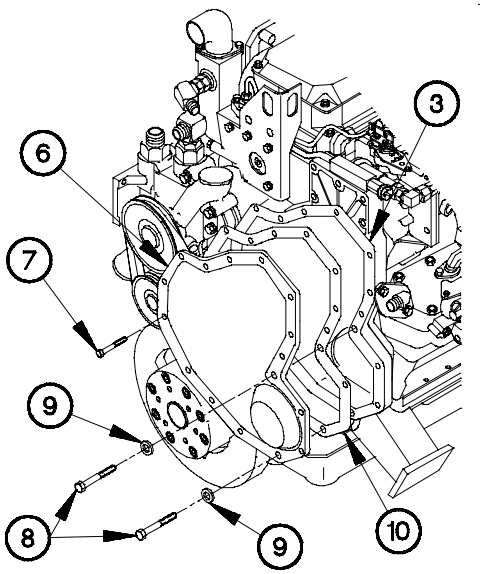
a. Removal.

(1) Remove screw (1) and bracket (2) from engine front housing (3).

(2) Remove screw (4) and bracket (5) from engine front cover (6).



YC15R01A



YC15R02A

(3) Remove 13 screws (7) from engine front cover (6).

(4) Remove two screws (8), washers (9), engine front cover (6), and gasket (10) from engine front housing (3). Discard gasket.

3-15. ENGINE FRONT COVER REPLACEMENT (CONT)

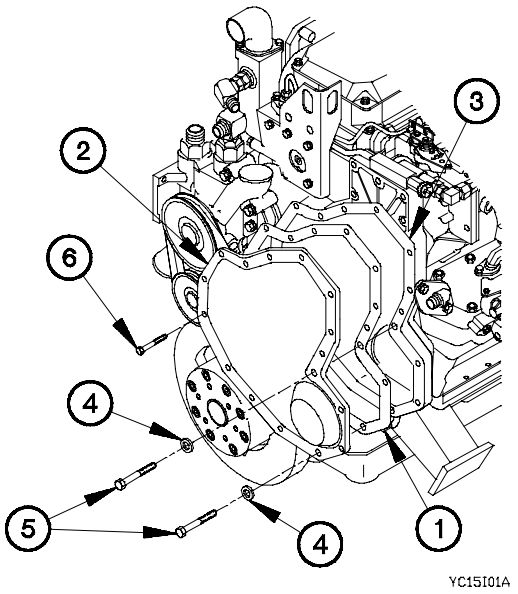
b. Installation.

(1) Position gasket (1) and engine front cover (2) on engine front housing (3) with two washers (4) and screws (5).

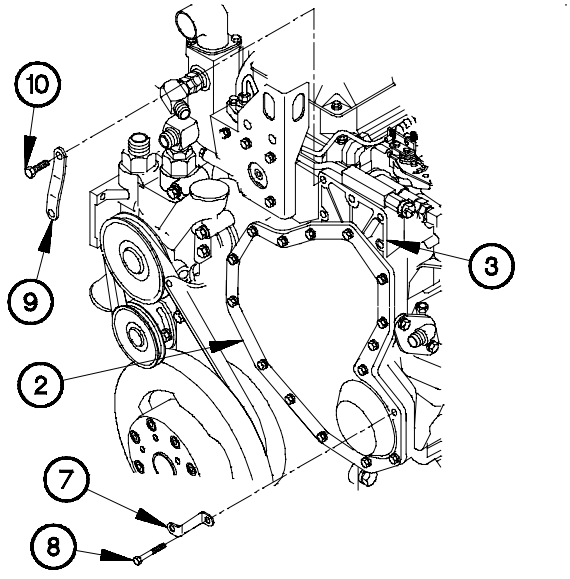
(2) Position 13 screws (6) in engine front cover (2).

(3) Tighten two screws (5) to 74-89 lb-ft (100-120 N·m).

(4) Tighten 13 screws (6) to 15-25 lb-ft (20-34 N·m).



YC15I01A



YC15I02A

(5) Position bracket (7) on engine front cover (2) with screw (8).

(6) Tighten screw (8) to 15-25 lb-ft (20-34 N·m).

(7) Position bracket (9) on engine front housing (3) with screw (10).

(8) Tighten screw (10) to 15-25 lb-ft (20-34 N·m).

c. Follow-On Maintenance.

(1) Install engine fan and fan clutch (TM 9-2320-365-20-3).

(2) Install compressor inlet and outlet coolant tubes (TM 9-2320-365-20-3).

(3) Install upper coolant tube (TM 9-2320-365-20-3).

(4) Install transmission oil cooler tube (TM 9-2320-365-20-3).

(5) Fill radiator with coolant (TM 9-2320-365-10).

(6) Lower cab (TM 9-2320-365-10).

(7) Start engine (TM 9-2320-365-10).

(8) Raise cab (TM 9-2320-365-10).

(9) Check air compressor inlet and outlet coolant tubes, upper coolant tube, and transmission oil cooler tube for coolant leaks (TM 9-2320-365-20-3).

(10) Lower cab (TM 9-2320-365-10).

(11) Shut down engine (TM 9-2320-365-10).

End of Task.

3-16. OIL PAN REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-3220-365-10).
Coolant drained (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Container (Capacity 25 qt (24 L)
Hammer, Soft Head (Item 28, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Packing, Preformed (Item 190, Appendix F)
Gasket (Item 47, Appendix F)
Packing, Preformed (Item 200, Appendix F)
Cap and Plug Set (Item 18, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Cement, Gasket (Item 35, Appendix C)
Sealing Compound (Item 73, Appendix C)

Personnel Required
(2)

WARNING

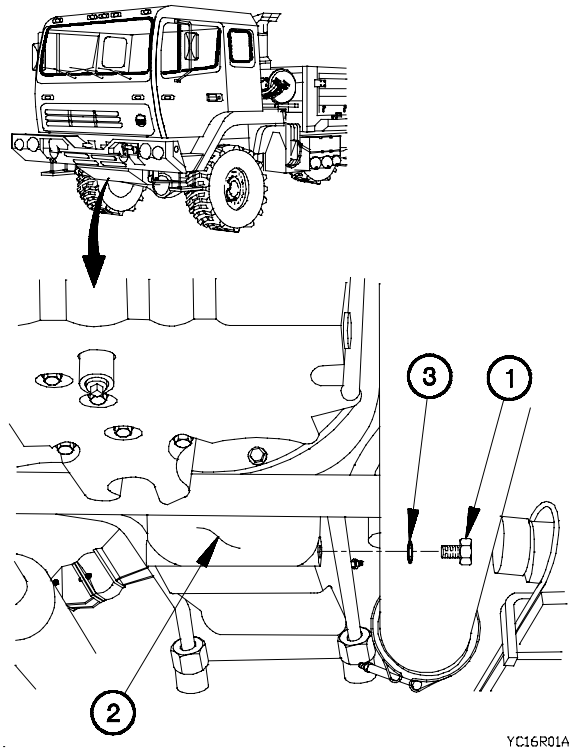
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

(1) Position container under drain plug (1).

(2) Remove drain plug (1) from oil pan (2).

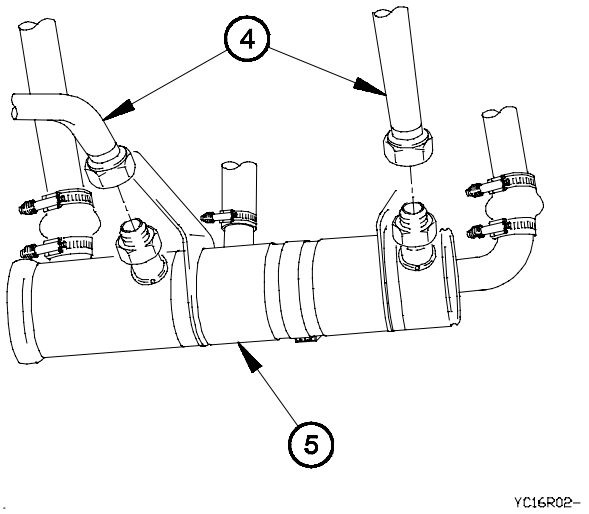
(3) Remove preformed packing (3) from drain plug (1). Discard preformed packing.

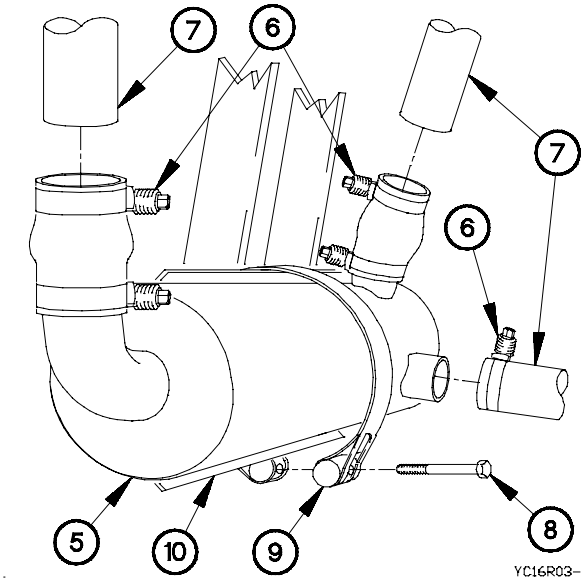


CAUTION

Cap or plug oil tubes and connection points to prevent contamination of transmission fluid. Failure to comply may result in damage to equipment.

(4) Disconnect two oil cooler tubes (4) from oil cooler (5).





(5) Loosen three clamps (6) on coolant hoses (7).

(6) Remove three coolant hoses (7) from oil cooler (5).

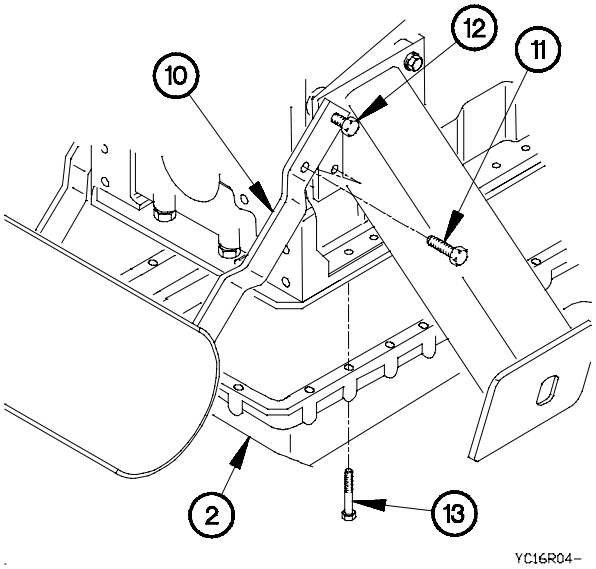
(7) Remove bolt (8), clamp (9), and oil cooler (5) from bracket (10).

(8) Remove screw (11) from each side of bracket (10).

(9) Loosen screw (12) on each side of bracket (10).

(10) Position bracket (10) towards front of vehicle to provide clearance for oil pan (2).

(11) Remove 36 bolts (13) and oil pan (2) from engine.



3-16. OIL PAN REPLACEMENT (CONT)

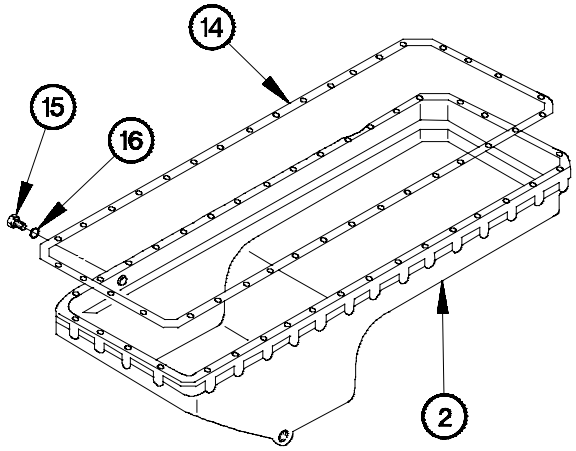
CAUTION

Use caution when removing gasket, seating surface of oil pan can be easily damaged. Failure to comply may result in damage to equipment.

(12) Remove gasket (14) from oil pan (2). Discard gasket.

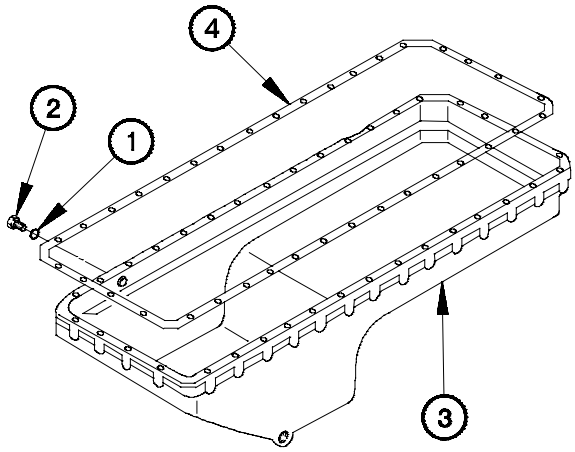
(13) Remove plug (15) from oil pan (2).

(14) Remove preformed packing (16) from plug (15). Discard preformed packing.



YC16R051

b. Installation.



YC16I011

(1) Install preformed packing (1) on plug (2).

(2) Install plug (2) in oil pan (3).

WARNING

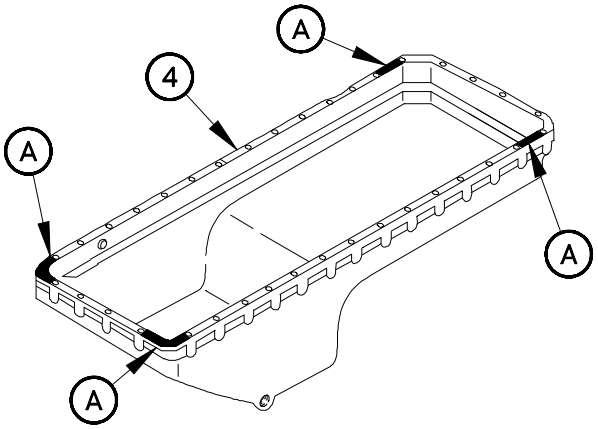
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(3) Apply gasket cement to oil pan (3).

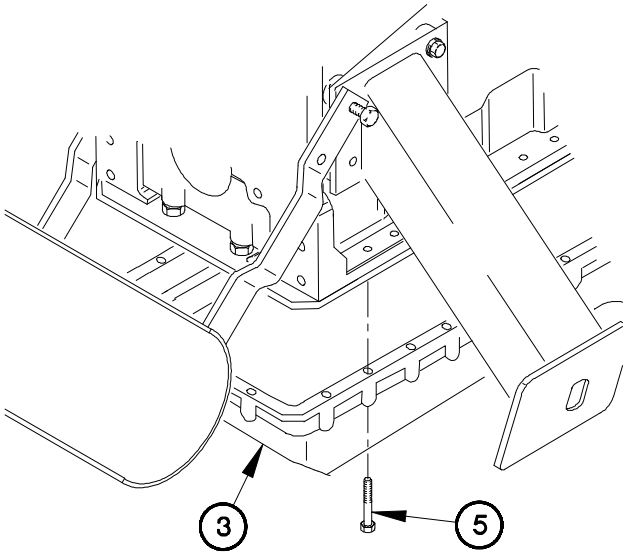
(4) Align holes in gasket (4) with holes in oil pan (3).

(5) Install gasket (4) on oil pan (3).

(6) Apply a thin coat of sealing compound between bolt holes at four areas (A) on gasket (4).



YC16I021



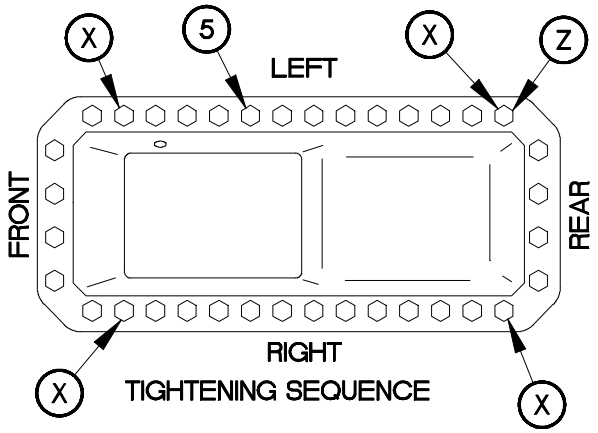
YC16I031

(7) Position oil pan (3) on engine with 36 bolts (5).

(8) Tighten four bolts (5) at locations X to 21-25 lb-ft (28-34 N•m).

(9) Starting at the left rear corner of the oil pan at location Z, tighten the remaining 32 bolts (5) in a counter clockwise direction, to 21-25 lb-ft (28-34 N•m).

(9.1) Starting at the left rear corner of the oil pan at location Z, re-tighten the 36 bolts (5) in a counter clockwise direction, to 21-25 lb-ft (28-34 N•m).



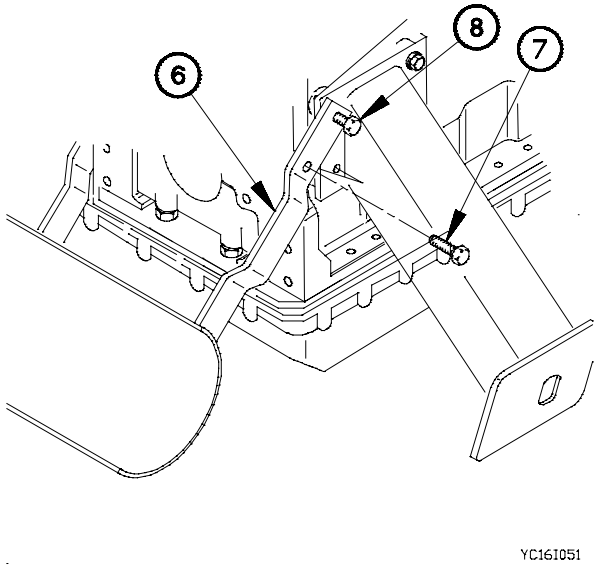
YC16I041

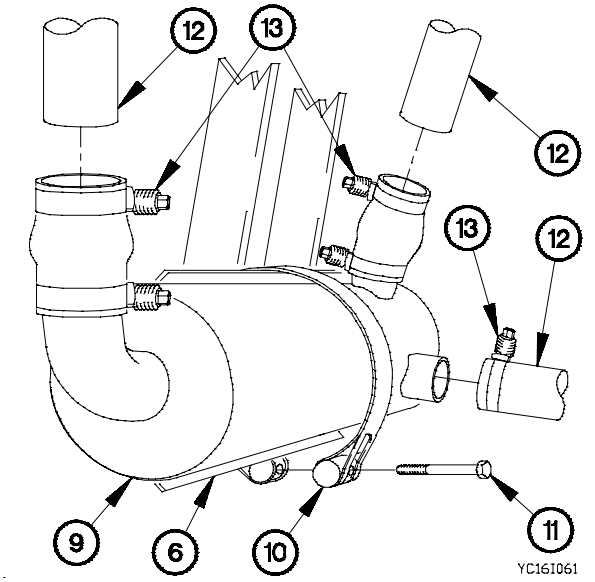
3-16. OIL PAN REPLACEMENT (CONT)

(10) Position bracket (6) toward engine.

(11) Position screw (7) in each side of bracket (6).

(12) Tighten screws (7 and 8) to 98-142 lb-ft (133-193 N·m).

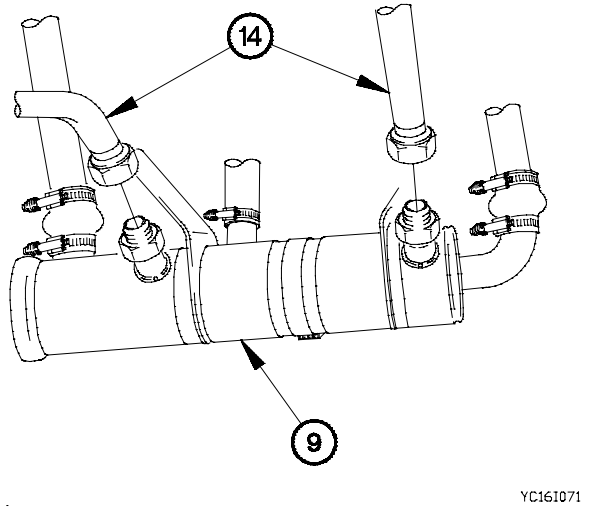




(13) Install oil cooler (9) on bracket (6) with clamp (10) and screw (11).

(14) Install three coolant hoses (12) on oil cooler (9) with three clamps (13).

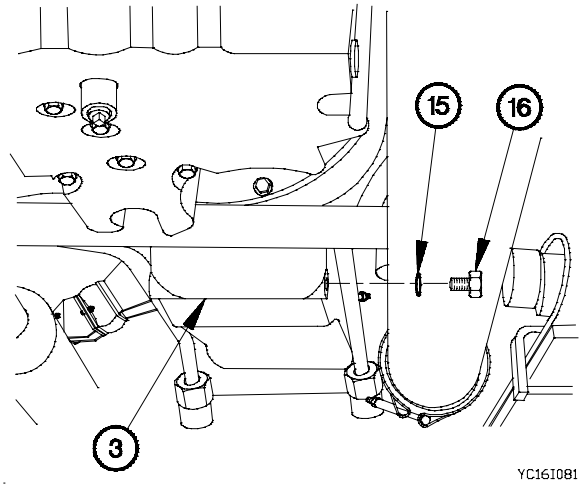
(15) Connect two oil cooler tubes (14) to oil cooler (9).



(16) Install preformed packing (15) on drain plug (16).

(17) Position drain plug (16) in oil pan (3).

(18) Tighten drain plug (16) to 14-22 lb-ft (20-30 N·m).



c. Follow-On Maintenance.

(1) Fill engine with oil (TM 9-2320-365-10).

(2) Fill radiator overflow tank (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Check oil pan for oil leaks.

(5) Check transmission oil cooler for leaks.

(6) Shut down engine (TM 9-2320-365-10).

End of Task.

3-17. OIL PUMP REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-on Maintenance

INITIAL SETUP

Equipment Conditions
Oil pan removed (para 3-16).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Tools and Special Tools (Cont)
Gloves, Rubber (Item 23, Appendix B)

Materials/Parts
Gasket (Item 61, Appendix F)
Packings, Preformed (2) (Item 193, Appendix F)
Lockwasher (Item 99, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

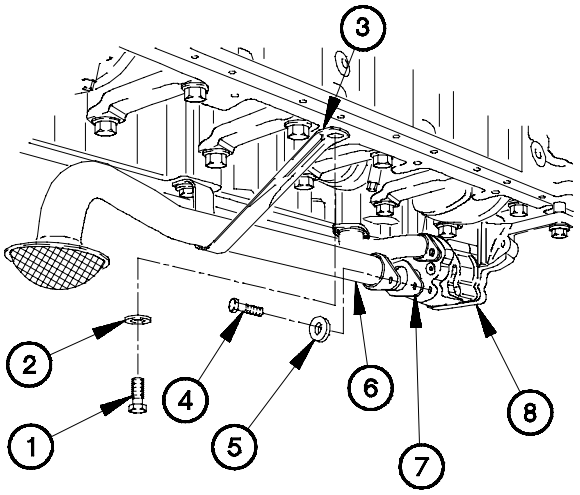
WARNING

Wear appropriate eye protection when working under vehicle. Falling debris may cause eye injury. Failure to comply may result in injury to personnel.

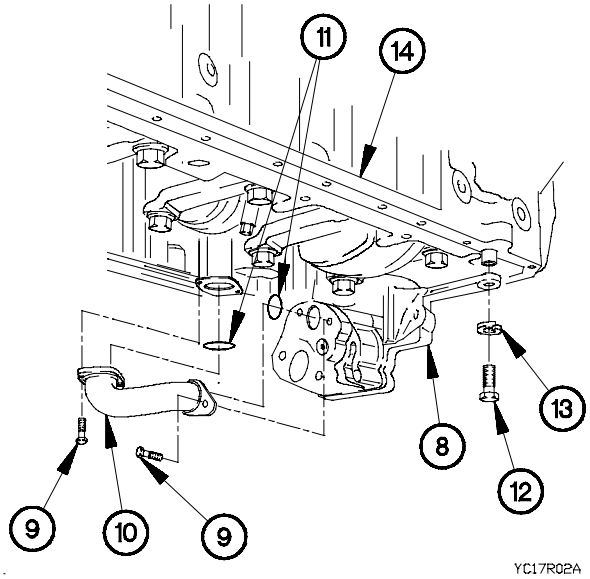
a. Removal.

(1) Remove two screws (1) and washers (2) from pick-up tube bracket (3).

(2) Remove two screws (4), washers (5), oil pick-up tube (6), and gasket (7) from oil pump (8). Discard gasket.



YC17R01A



YC17R02A

(3) Remove two screws (9), oil discharge tube (10), and two preformed packings (11) from oil pump (8). Discard preformed packings.

(4) Remove two screws (12), lockwashers (13), and oil pump (8) from engine (14). Discard lockwashers.

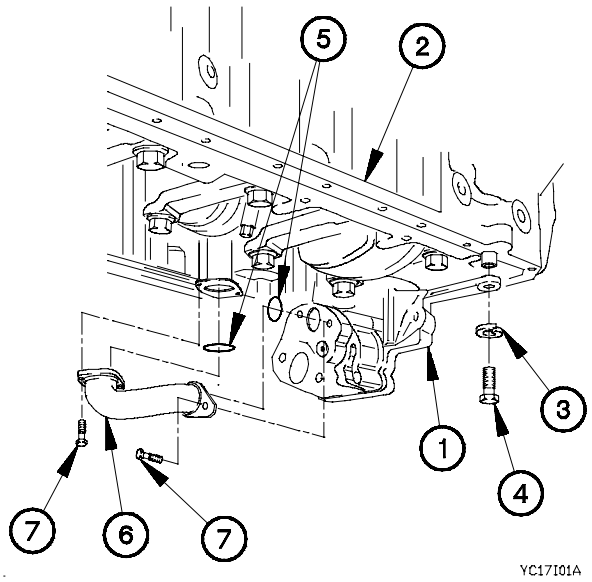
b. Installation.

(1) Position oil pump (1) on engine (2) with two lockwashers (3) and screws (4).

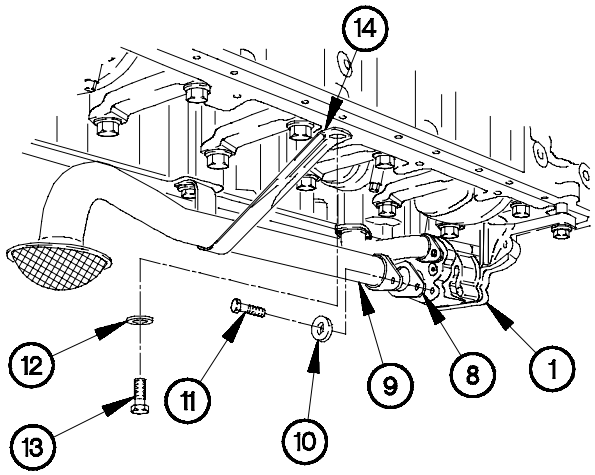
(2) Tighten two screws (4) to 33-47 lb-ft (45-64 N•m).

(3) Position two preformed packings (5) and oil discharge tube (6) on oil pump (1) with two screws (7).

(4) Tighten two screws (7) to 15-25 lb-ft (20-34 N•m).



YC17I01A



YC17I02A

(5) Position gasket (8) and oil pickup tube (9) on oil pump (1) with two washers (10) and screws (11).

(6) Tighten two screws (11) to 15-25 lb-ft (20-34 N•m).

(7) Position two washers (12) and screws (13) in oil pick-up tube bracket (14).

(8) Tighten two screws (13) to 15-25 lb-ft (20-34 N•m).

c. Follow-On Maintenance.

(1) Install oil pan (para 3-16).

(2) Fill engine with oil (TM 9-2320-365-10).

(3) Lower cab (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Check oil pressure (TM 9-2320-365-10).

(6) Check oil pan for oil leaks.

(7) Shut down engine (TM 9-2320-365-10).

End of Task.

3-18. OIL FILTER BASE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Oil filter removed (TM 9-2320-365-20-2).
Turbocharger removed (para 4-6).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-60 N·m (Item 84, Appendix B)

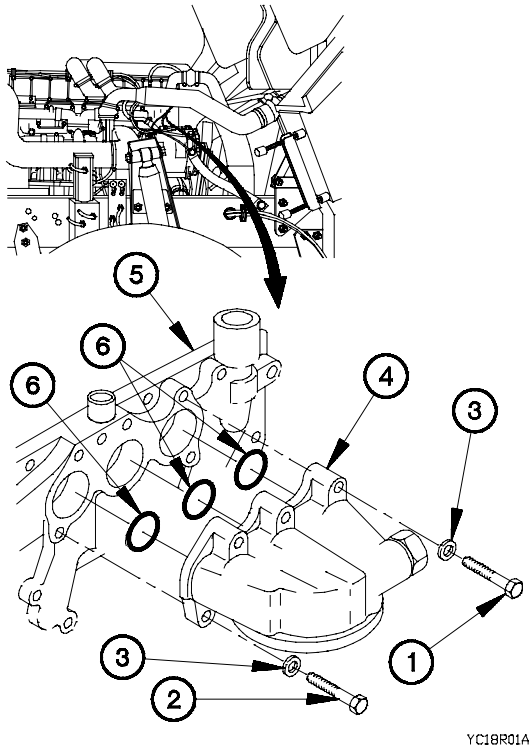
Tools and Special Tools (Cont)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Packing, Preformed (3) (Item 198, Appendix F)
Packing, Preformed (Item 188, Appendix F)
Lubricating Oil, Engine (Item 45, Appendix C)

a. Removal.

(1) Remove three screws (1), two bolts (2), five washers (3), and oil filter base (4) from engine (5).

(2) Remove three preformed packings (6) from oil filter base (4). Discard preformed packings.

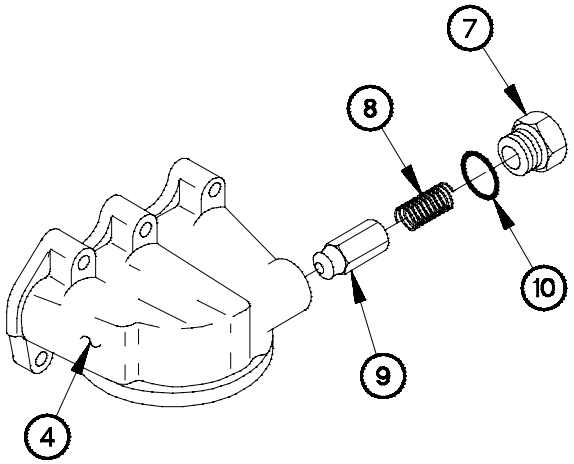


WARNING

Use care when removing springs. Springs are under tension and can act as projectiles when removed. Failure to comply may result in injury to personnel.

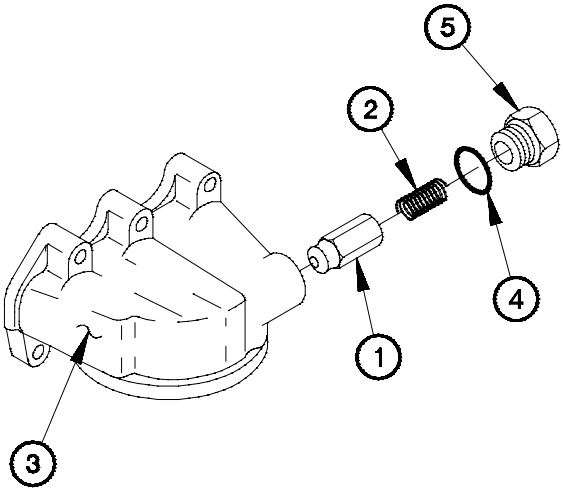
(3) Remove plug (7), spring (8), and bypass valve (9) from oil filter base (4).

(4) Remove preformed packing (10) from plug (7). Discard preformed packing.



YC18R021

b. Installation.



YC18I011

NOTE

Apply lubricating oil to all parts during assembly.

(1) Install bypass valve (1) and spring (2) in oil filter base (3).

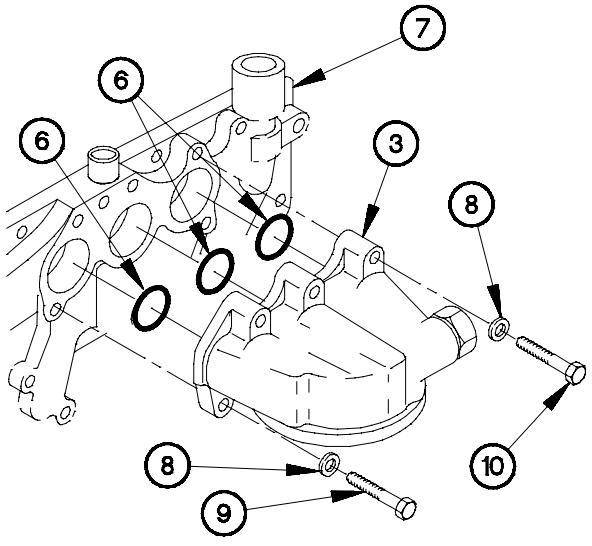
(2) Install preformed packing (4) on plug (5).

(3) Install plug (5) in oil filter base (3).

(4) Install three preformed packings (6) on oil filter base (3).

(5) Position oil filter base (3) on engine (7) with five washers (8), two bolts (9), and three screws (10).

(6) Tighten two bolts (9) and three screws (10) to 15-25 lb-ft (20-34 N·m).



YC18I02-

3-18. OIL FILTER BASE REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Install turbocharger (para 4-6).

(2) Install oil filter (TM 9-2320-365-20-2).

(3) Check engine oil level (TM 9-2320-365-10).

(4) Lower cab (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Raise cab (TM 9-2320-365-10).

(7) Check oil filter base for oil leaks.

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.

3-19. OIL COOLER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Turbocharger removed (para 4-6).
Oil filter base removed (para 3-18).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

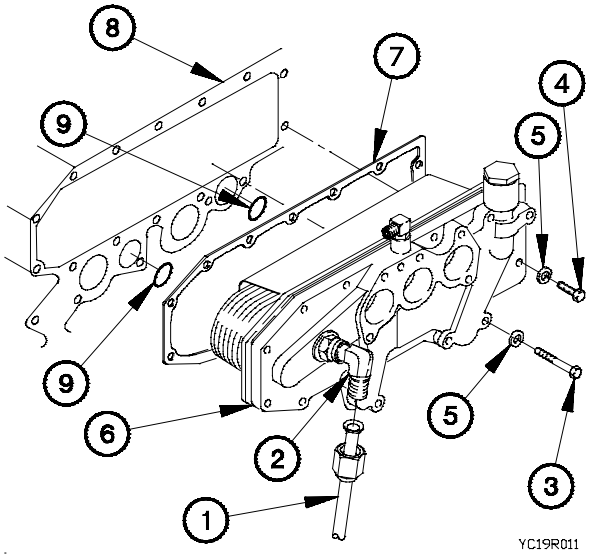
Materials/Parts
Gasket (Item 56, Appendix F)
Gasket (Item 59, Appendix F)
Spring, Helical Compression (Item 291, Appendix F)
Valve, Check (Item 293, Appendix F)
Packing, Preformed (Item 188, Appendix F)
Packing, Preformed (2) (Item 201, Appendix F)
Packing, Preformed (Item 190, Appendix F)
Packing, Preformed (Item 192, Appendix F)

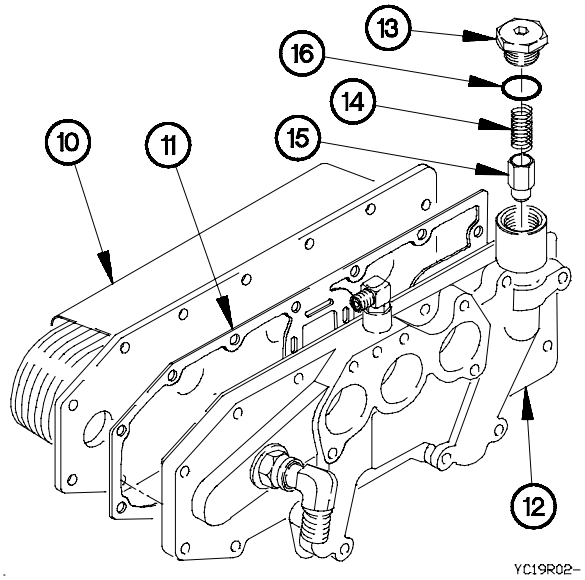
a. Removal.

(1) Disconnect oil tube (1) from 90-degree fitting (2).

(2) Remove seven screws (3 and 4), 14 washers (5), oil cooler (6), and gasket (7) from engine (8). Discard gasket.

(3) Remove two preformed packings (9) from engine (8). Discard preformed packings.





(4) Remove oil cooler core assembly (10) and gasket (11) from oil cooler base (12). Discard gasket.

(5) Remove plug (13), spring (14), and check valve (15) from oil cooler base (12). Discard spring and check valve.

(6) Remove preformed packing (16) from plug (13). Discard preformed packing.

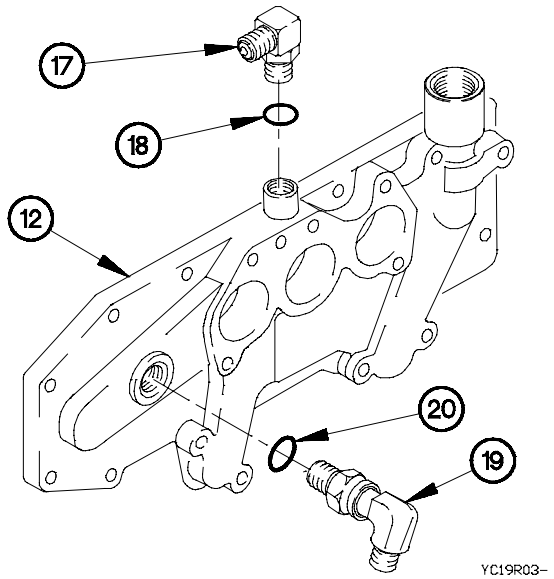
3-19. OIL COOLER REPLACEMENT/REPAIR (CONT)

(7) Remove 90-degree fitting (17) from oil cooler base (12).

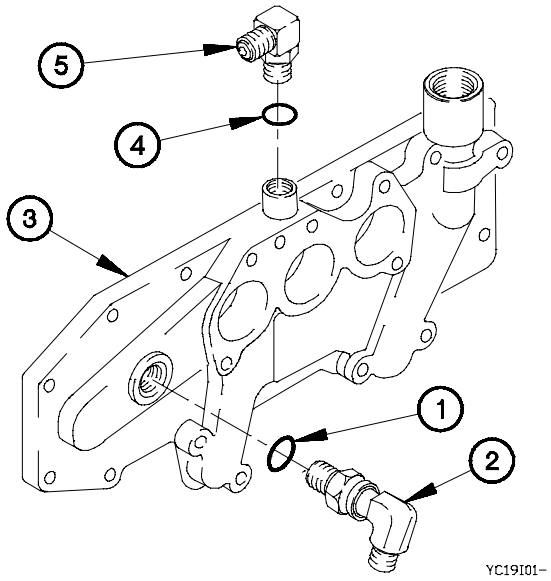
(8) Remove preformed packing (18) from 90-degree fitting (17). Discard preformed packing.

(9) Remove 90-degree fitting (19) from oil cooler base (12).

(10) Remove preformed packing (20) from 90-degree fitting (19). Discard preformed packing.



b. Installation.



(1) Install preformed packing (1) on 90-degree fitting (2).

(2) Install 90-degree fitting (2) in oil cooler base (3).

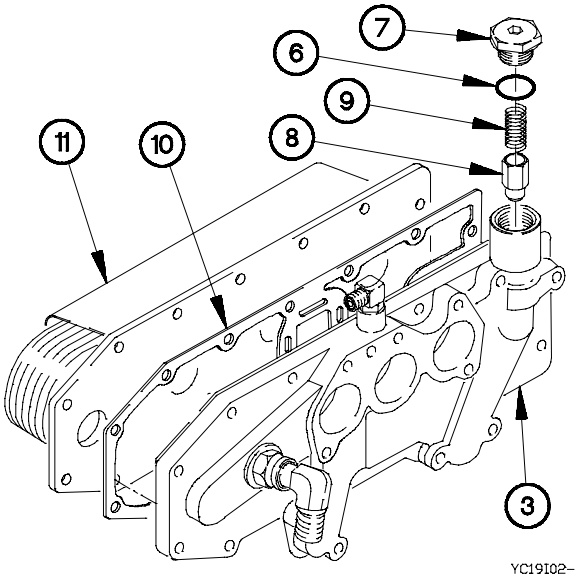
(3) Install preformed packing (4) on 90-degree fitting (5).

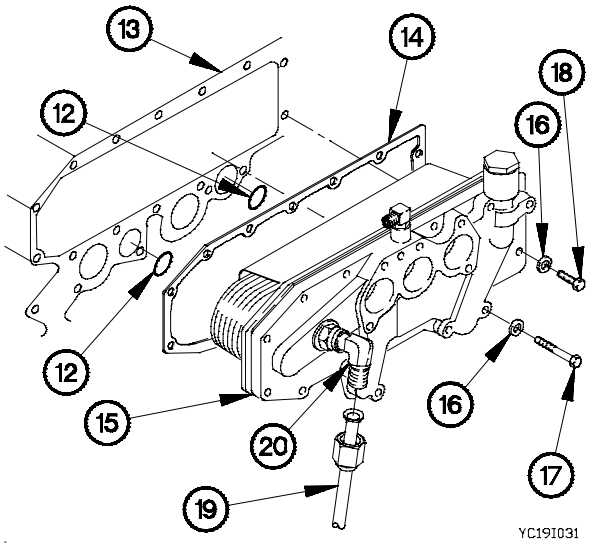
(4) Install 90-degree fitting (5) in oil cooler base (3).

(5) Install preformed packing (6) on plug (7).

(6) Install check valve (8), spring (9), and plug (7) in oil cooler base (3).

(7) Position gasket (10) and oil cooler core assembly (11) on oil cooler base (3).





(8) Install two preformed packings (12) on engine (13).

(9) Position gasket (14) and oil cooler assembly (15) on engine (13) with 14 washers (16) and seven screws (17 and 18).

(10) Tighten seven screws (17 and 18) to 15-25 lb-ft (20-34 N•m).

(11) Connect oil tube (19) to 90-degree fitting (20).

c. Follow-On Maintenance.

(1) Install oil filter base (para 3-18).

(2) Install turbocharger (para 4-6).

(3) Check engine oil level (TM 9-2302-365-10).

(4) Lower cab (TM 9-2320-365-10).

(5) Start engine (TM 9-2320-365-10).

(6) Raise cab (TM 9-2320-365-10).

(7) Check oil cooler, oil filter base, and oil filter for leaks.

(8) Lower cab (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.

3-20. AIR INLET ELBOW REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-on Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Turbocharger to charge air cooler tubes and hoses removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Pan, Drain (Item 36, Appendix B)
Wrench Set, Crowfoot Ratcheting (TM 9-2320-365-20)

Materials/Parts
Gasket (Item 52, Appendix F)

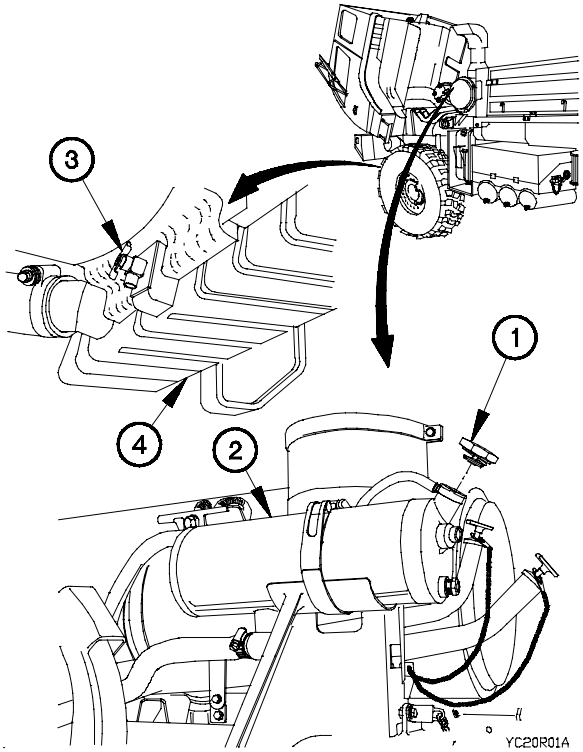
a. Removal.

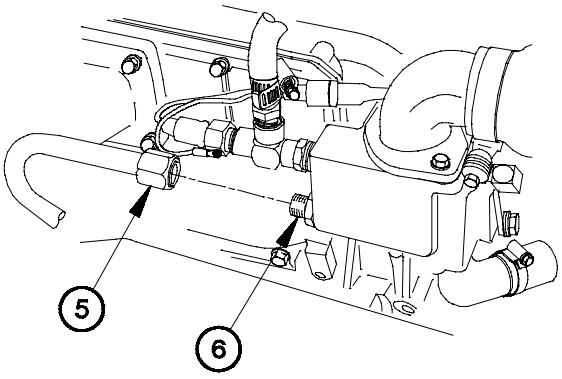
(1) Remove radiator cap (1) from radiator overflow tank (2).

(2) Place drain pan under radiator draincock (3).

(3) Open radiator draincock (3) and drain approximately one gallon (3.8 liters) of coolant from radiator (4).

(4) Close radiator draincock (3).



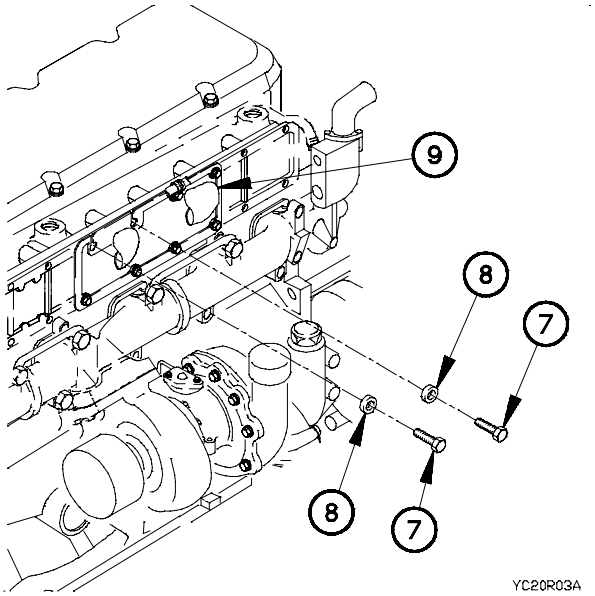


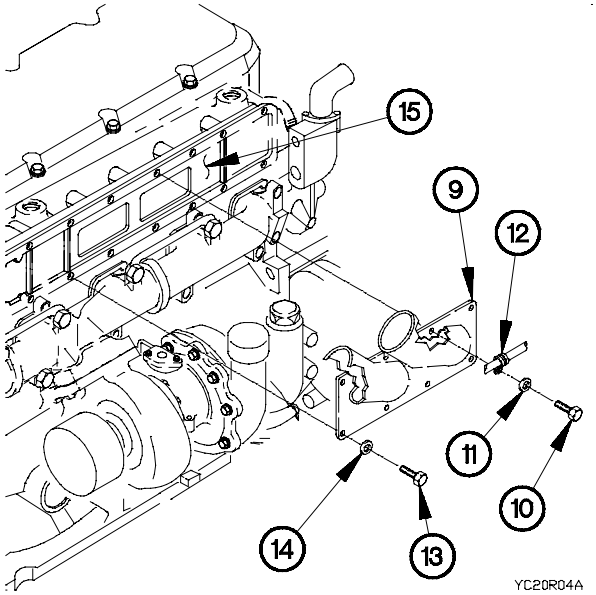
(5) Disconnect heater tube (5) from fitting (6).

NOTE

Mark location of two thick washers prior to removal.

(6) Remove two bolts (7) and washers (8) from air inlet elbow (9).





NOTE

Perform step (9) on vehicle serial numbers 3092 and higher serial numbers, and vehicle serial numbers 0001 through 3091 that have had the lower charge air tube bracket replaced.

(9) Remove four bolts (16), washers (17), and air inlet elbow (9) from inlet manifold cover (15).

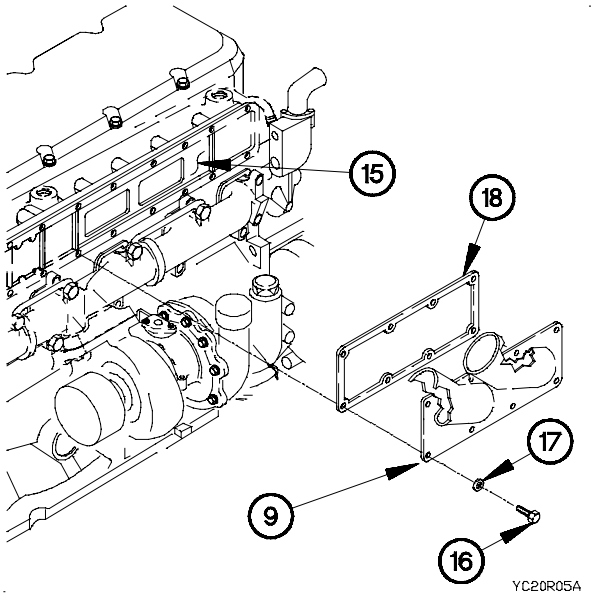
(10) Remove gasket (18) from inlet manifold cover (15). Discard gasket.

NOTE

Perform steps (7) and (8) on vehicle serial numbers 0001 through 3091 that have not had the lower charge air tube bracket replaced.

(7) Remove bolt (10), washer (11), and clamp (12) from air inlet elbow (9).

(8) Remove five bolts (13), washers (14), and air inlet elbow (9) from inlet manifold cover (15).



3-20. AIR INLET ELBOW REPLACEMENT (CONT)

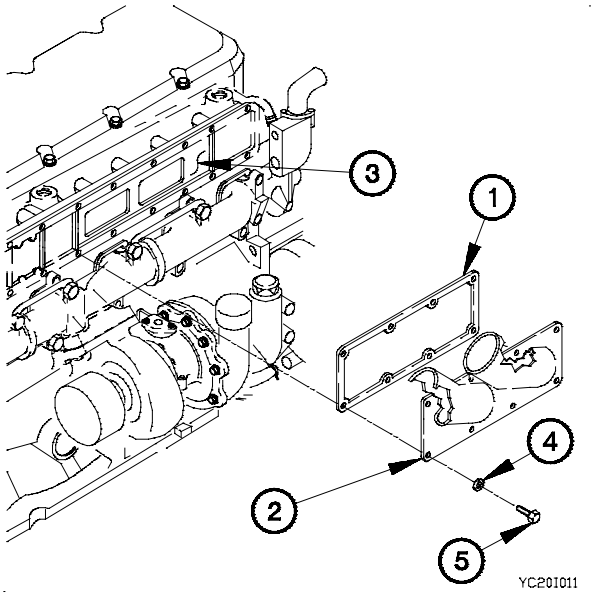
b. Installation.

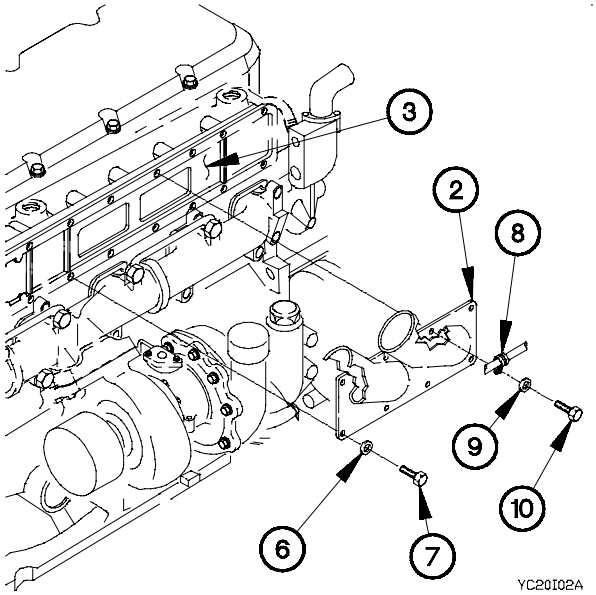
NOTE

Perform steps (1) and (2) on vehicle serial numbers 3092 and higher serial numbers, and vehicle serial numbers 0001 through 3091 that have had the lower charge air tube bracket replaced.

(1) Position gasket (1) and air inlet elbow (2) on inlet manifold cover (3) with four washers (4), and bolts (5).

(2) Tighten four bolts (5) to 15-25 lb-ft (20-34 N·m).





NOTE

Perform steps (3) and (4) on vehicle serial numbers 0001 through 3091 that have not had the lower charge air tube bracket replaced.

(3) Position air inlet elbow (2) on inlet manifold cover (3) with five washers (6) and bolts (7).

(4) Position clamp (8) on air inlet elbow (2) with washer (9) and bolt (10).

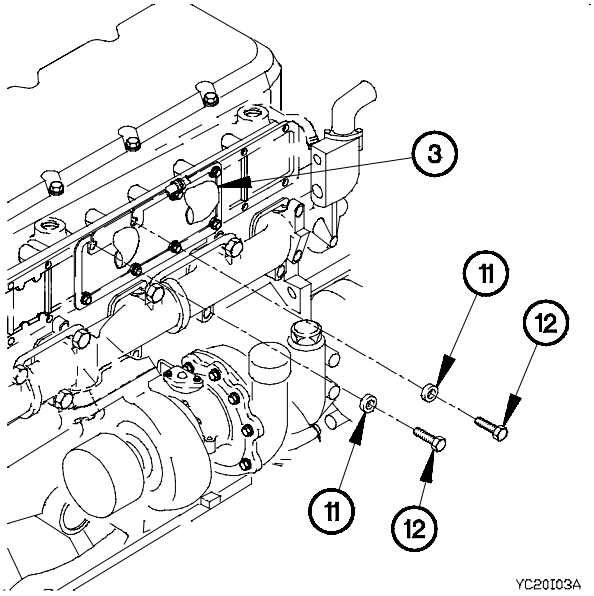
(5) Tighten five bolts (7) and bolt (10) to 15-25 lb-ft (20-34 N·m).

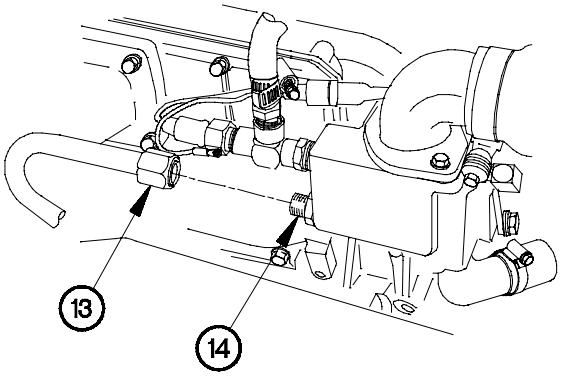
NOTE

Two thick washers must be installed in slotted holes.

(6) Position two washers (11) and bolts (12) on inlet manifold cover (3).

(7) Tighten two bolts (12) to 15-25 lb-ft (20-34 N·m).





(8) Connect heater tube (13) to fitting (14).

c. Follow-On Maintenance.

(1) Install turbocharger to charge air cooler tubes and hoses (TM 9-2320-365-20-3).

(2) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(3) Lower cab (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Check for coolant leaks under vehicle.

(6) Shut down engine (TM 9-2320-365-10).

(7) Add coolant to radiator overflow tank (TM 9-2320-365-10).

End of Task.

3-21. INLET MANIFOLD COVER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air inlet elbow removed (para 3-20).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Materials/Parts
Gasket (Item 46, Appendix F)
Tape, Antiseizing (Item 82, Appendix C)

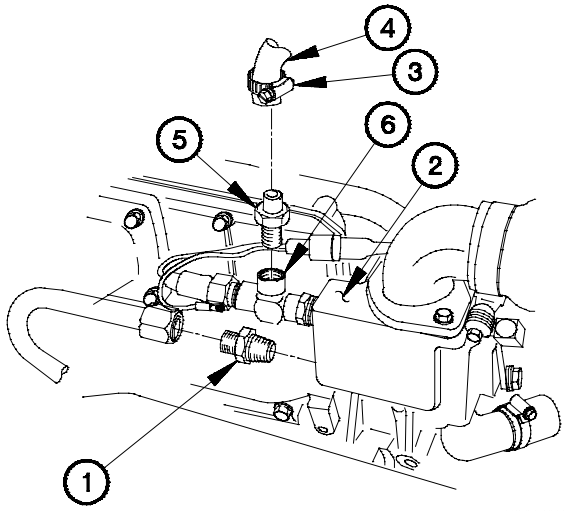
a. Removal.

(1) Remove fitting (1) from thermostat housing (2).

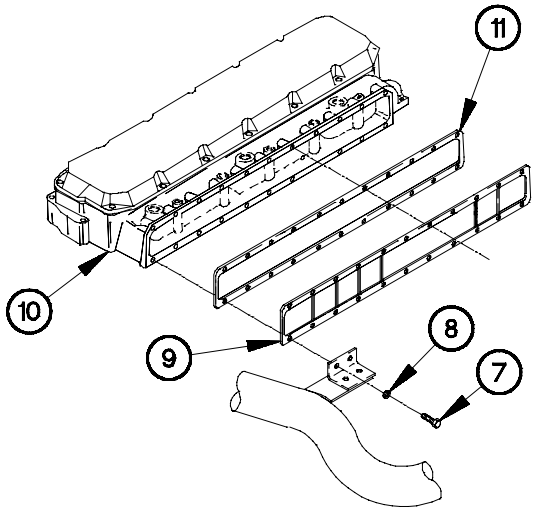
(2) Loosen hose clamp (3) on radiator fill hose (4).

(3) Remove radiator fill hose (4) from hose adapter (5).

(4) Remove hose adapter (5) from tee fitting (6).



YC21R011



YC21R02A

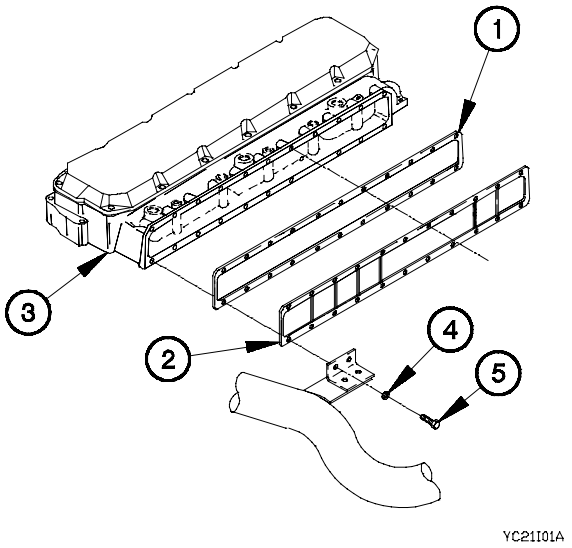
(5) Remove 14 bolts (7), washers (8), and inlet manifold cover (9) from inlet manifold (10).

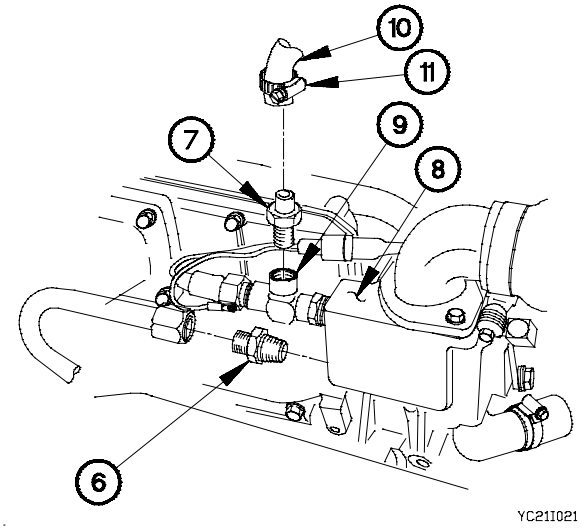
(6) Remove gasket (11) from inlet manifold cover (9). Discard gasket.

b. Installation.

(1) Position inlet manifold gasket (1) and inlet manifold cover (2) on inlet manifold (3) with 14 washers (4) and bolts (5).

(2) Tighten 14 bolts (5) to 15-25 lb-ft (20-34 N·m).





(3) Apply antiseizing tape to threads of fitting (6) and hose adapter (7).

(4) Install fitting (6) in thermostat housing (8).

(5) Install hose adapter (7) in tee fitting (9).

(6) Install radiator fill hose (10) on hose adapter (7) with hose clamp (11).

c. Follow-On Maintenance.

(1) Install air inlet elbow (para 3-20).

(2) Lower cab (TM 9-2320-365-10).

End of Task.

3-22. INLET MANIFOLD REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

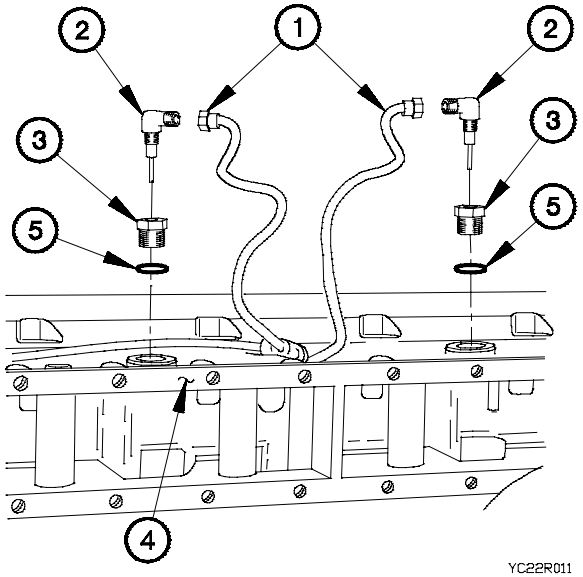
Equipment Conditions
Valve cover removed (TM 9-2320-365-20-2).
Air inlet elbow removed (para 3-20).
Inlet manifold cover removed (para 3-21).
Fuel ratio control tube removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Socket, Socket Wrench (Item 55, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Packing, Preformed (2) (Item 205, Appendix F)
Packing, Preformed (Item 191, Appendix F)
Gasket (Item 46, Appendix F)
Sealing Compound (Item 70, Appendix C)

a. Removal.

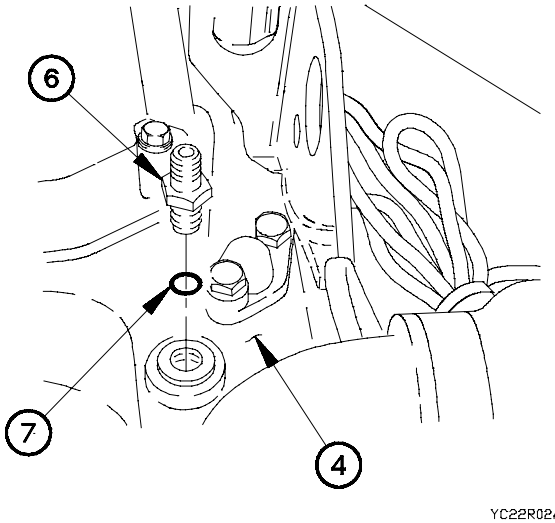


(1) Disconnect two ether start tubes (1) from ether start nozzles (2).

(2) Remove two ether start nozzles (2) from adapters (3).

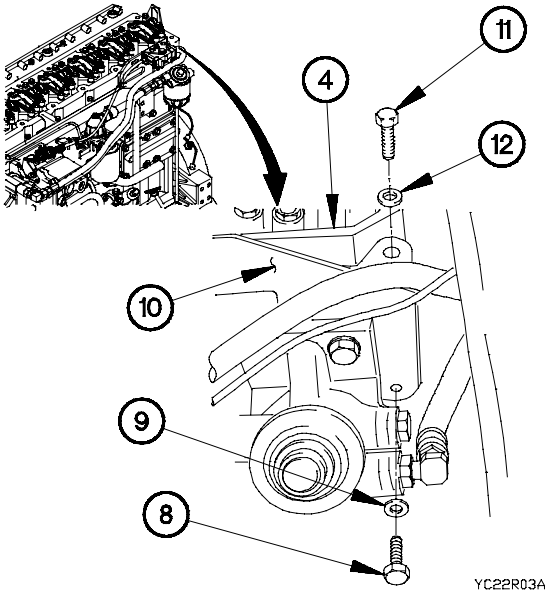
(3) Remove two adapters (3) from inlet manifold (4).

(4) Remove two preformed packings (5) from adapters (3). Discard preformed packings.



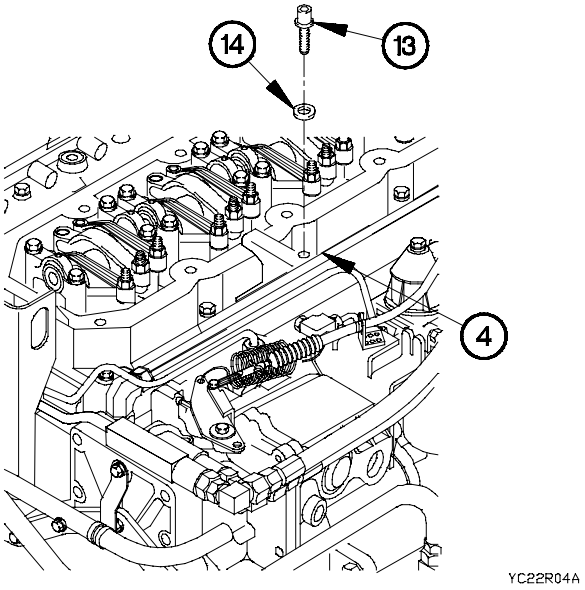
(5) Remove fitting (6) from inlet manifold (4).

(6) Remove preformed packing (7) from fitting (6). Discard preformed packing.

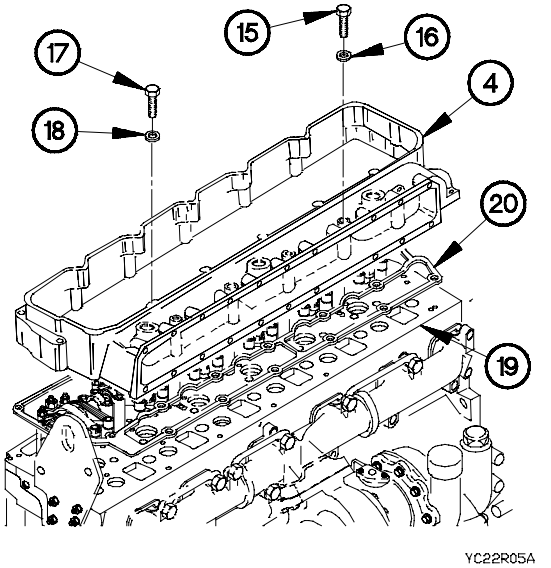


(7) Remove bolt (8) and washer (9) from fuel/water separator bracket (10).

(8) Remove three bolts (11), washers (12), and fuel/water separator bracket (10) from inlet manifold (4).



(9) Remove bolt (13) and washer (14) from inlet manifold (4).



(10) Remove 10 bolts (15) and washers (16) from inlet manifold (4).

(11) Remove six bolts (17) and washers (18) from inlet manifold (4).

(12) Remove inlet manifold (4) from cylinder head (19).

(13) Remove gasket (20) from cylinder head (19). Discard gasket.

3-22. INLET MANIFOLD REPLACEMENT (CONT)

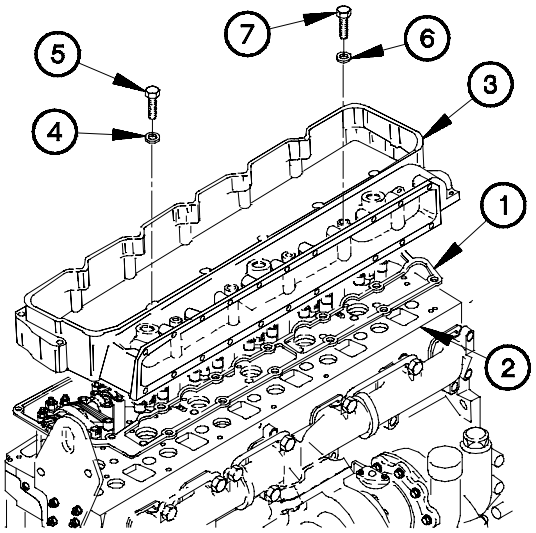
b. Installation.

(1) Position gasket (1) on cylinder head (2).

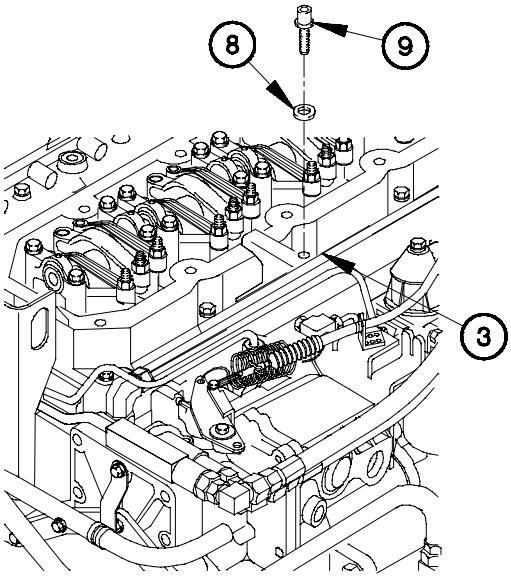
(2) Position inlet manifold (3) on cylinder head (2).

(3) Position six washers (4) and bolts (5) on inlet manifold (3).

(4) Position 10 washers (6) and bolts (7) on inlet manifold (3).



YC22I01A



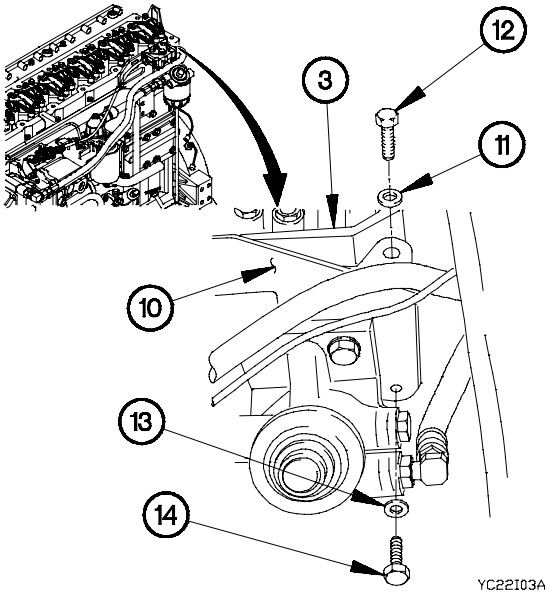
YC22I02A

(5) Position washer (8) and bolt (9) in inlet manifold (3).

(6) Position fuel/water separator bracket (10) on inlet manifold (3) with three washers (11) and bolts (12).

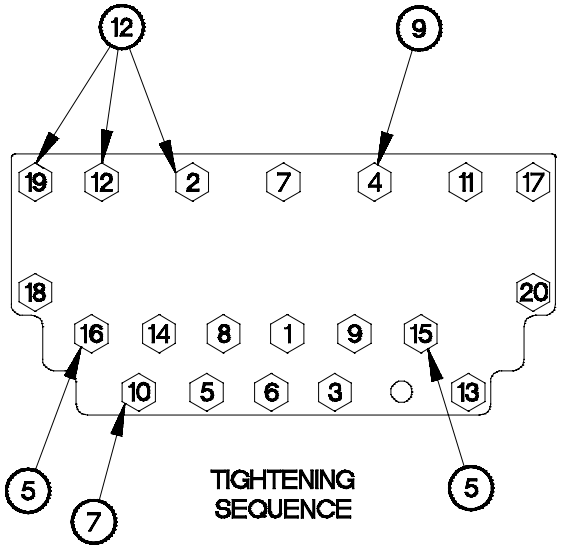
(7) Position washer (13) and bolt (14) in fuel/water separator bracket (10).

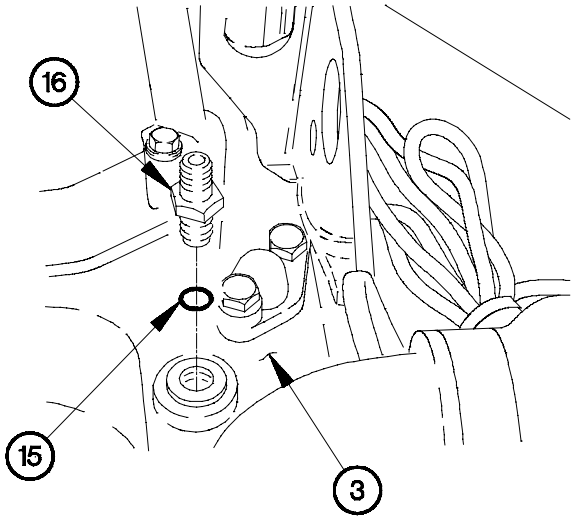
(8) Tighten bolt (14) to 37-51 lb-ft (50-69 N·m).



YC22I03A

(9) Tighten six bolts (5), 10 bolts (7), bolt (9), and three bolts (12) to 15-25 lb-ft (20-34 N·m) in sequence shown.

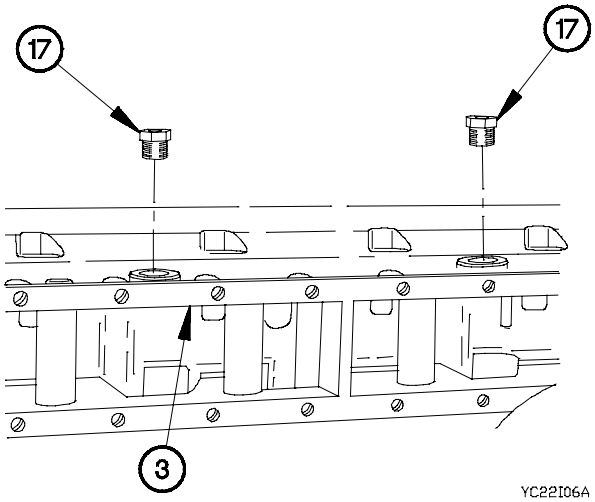




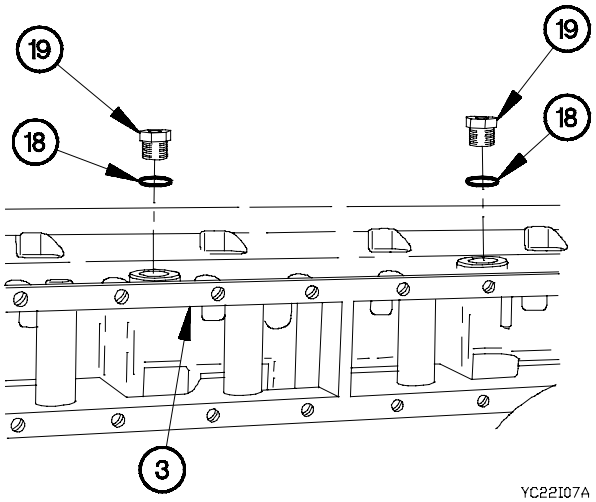
(10) Install preformed packing (15) on fitting (16).

(11) Install fitting (16) in inlet manifold (3).

(12) Remove two plugs (17) from inlet manifold (3). Discard plugs.

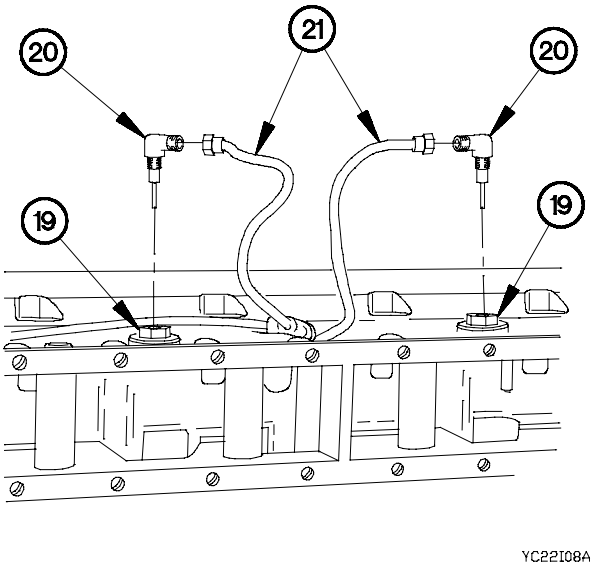


3-22. INLET MANIFOLD REPLACEMENT (CONT)



(13) Install two preformed packings (18) on adapters (19).

(14) Install two adapters (19) in inlet manifold (3).



WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(15) Apply sealing compound to threads of two ether nozzles (20).

(16) Install two ether nozzles (20) in adapters (19).

(17) Connect two ether start tubes (21) to ether start nozzles (20).

c. Follow-On Maintenance.

(1) Install fuel ratio control tube (TM 9-2320-365-20-3).

(2) Install inlet manifold cover (para 3-21).

(3) Install air inlet elbow (para 3-20).

(4) Install valve cover (TM 9-2320-365-20-2).

End of Task.

3-23. EXHAUST MANIFOLD REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Turbocharger removed (para 4-6).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)

Tools and Special Tools (Cont)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Ring, Retaining (Item 245, Appendix F)
Ring, Retaining (5) (Item 246, Appendix F)
Gasket (3) (Item 45, Appendix F)
Compound, Antiseize (Item 13, Appendix C)

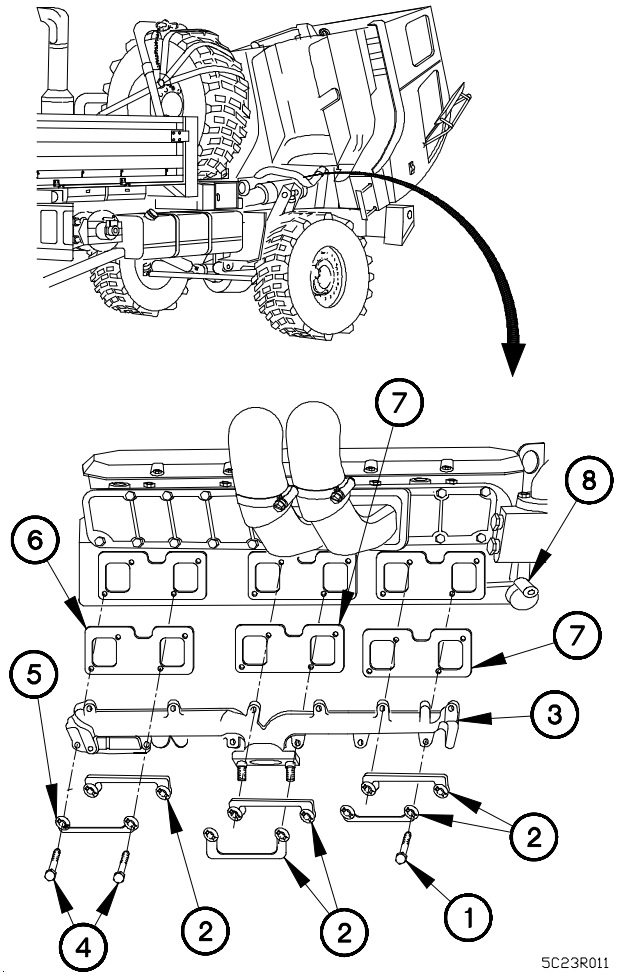
NOTE

- Vehicles are equipped with two different exhaust manifolds. Exhaust manifolds are equipped with retaining rings or shims. Both exhaust manifolds fit all engines. Mounting hardware is not interchangeable.
- Perform steps (1) and (2) on exhaust manifolds equipped with retaining rings.

a. Removal.

(1) Remove 10 screws (1) and five retaining rings (2) from manifold (3). Discard retaining rings.

(2) Remove two screws (4), retaining ring (5), gasket (6), two gaskets (7), and manifold (3) from cylinder head (8). Discard gaskets.



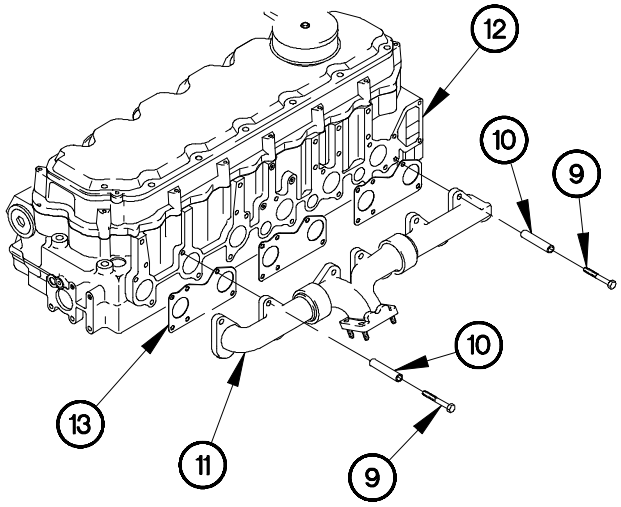
3-23. EXHAUST MANIFOLD REPLACEMENT (CONT)

NOTE

Perform steps (3) and (4) on exhaust manifolds equipped with shims.

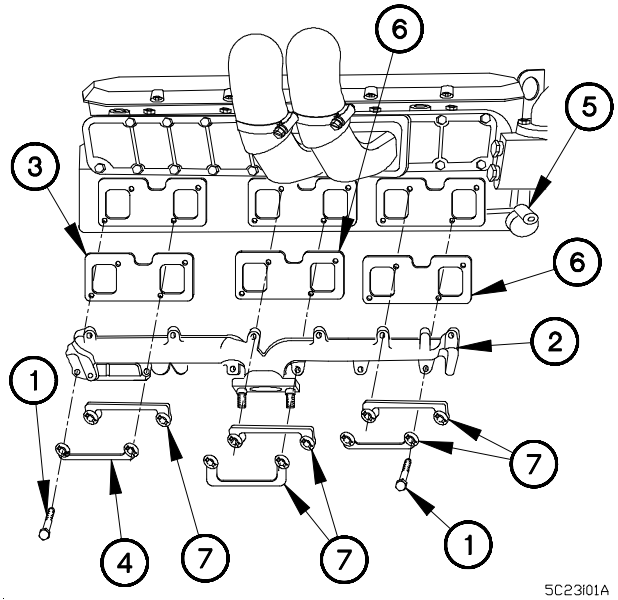
(3) Remove 12 screws (9), shims (10), and exhaust manifold (11) from cylinder head (12).

(4) Remove three gaskets (13) from cylinder head (12). Discard gaskets.



5C23R02

b. Installation.



5C23I01A

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(1) Apply antiseize compound to threads of 12 screws (1).

NOTE

Perform steps (2) and (3) on exhaust manifold equipped with retaining rings.

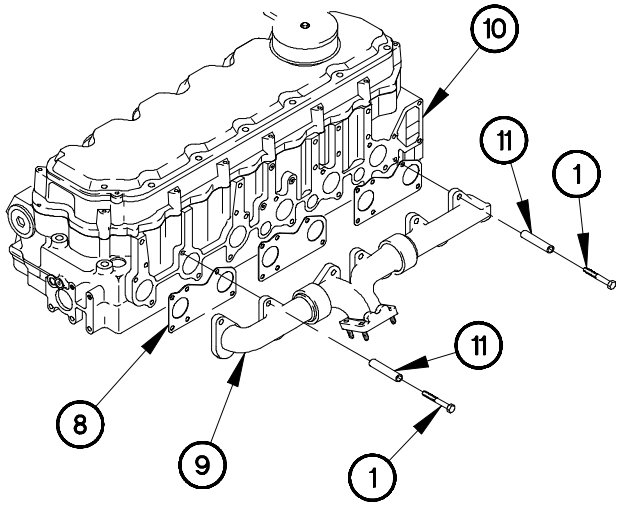
(2) Position exhaust manifold (2), gasket (3), and retaining ring (4) on cylinder head (5) with two screws (1).

(3) Position two gaskets (6), five retaining rings (7), and 10 screws (1) on exhaust manifold (2).

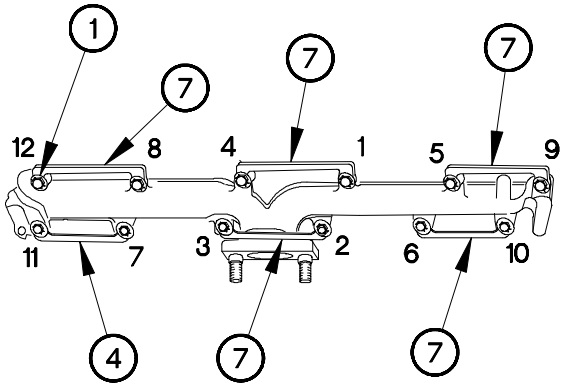
NOTE

Perform step (3.1) on exhaust manifolds equipped with shims.

(3.1) Position three gaskets (8) and exhaust manifold (9) on cylinder head (10) with 12 shims (11) and screws (1).



5C23I03



TIGHTENING SEQUENCE

5C23I02A

(4) Tighten 12 screws (1) to 24-48 lb-in. (3-5 N m) in sequence shown.

(5) Re-tighten 12 screws (1) to 29-37 lb-ft (39-50 N m) in sequence shown.

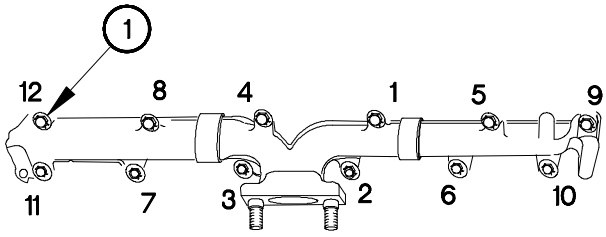
NOTE

Perform step (6) on exhaust manifolds equipped with retaining rings.

(6) Bend tabs on five retaining rings (7) and retaining ring (4).

(7) Tighten 12 screws (1) to 24-48 lb-in (3-5 N•m) in sequence shown.

(8) Re-tighten 12 screws (1) to 29-37 l-ft (39-50 N•m) in sequence shown.



TIGHTENING SEQUENCE

5C23I04

c. Follow-On Maintenance.

(1) Install turbocharger (para 4-6).

(2) Lower cab (TM 9-2320-365-10).

(3) Start engine (TM 9-2320-365-10).

(4) Raise cab (TM 9-2320-365-10).

(5) Check for exhaust leaks (TM 9-2320-365-10).

(6) Lower cab (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

End of Task.

CHAPTER 4
FUEL SYSTEM MAINTENANCE

Section I. INTRODUCTION 4-1
4-1. INTRODUCTION 4-1

Section II. MAINTENANCE PROCEDURES 4-2
4-2. FUEL INJECTOR REPLACEMENT 4-2
4-3. FUEL INJECTOR SYNCHRONIZATION 4-5
4-4. FUEL SETTING CHECK 4-12
4-5. FUEL TIMING CHECKS 4-18
4-6. TURBOCHARGER REPLACEMENT 4-24
4-7. FUEL CONTROL LINKAGE REPLACEMENT 4-32
4-8. IDLE SPEED ADJUSTMENT 4-35
4-9. FUEL GOVERNOR REPLACEMENT/REPAIR 4-37

Section I. INTRODUCTION

4-1. INTRODUCTION

This Chapter contains maintenance instructions for replacing, adjusting, and repairing of Fuel System Components authorized by the Maintenance Allocation Chart (MAC) at Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

4-2. FUEL INJECTOR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Valve cover removed (TM 9-2320-365-20-2).
Rocker arm assembly removed (para 3-12).
Fuel setting checks performed (para 4-4) (No.1 fuel injector).

Tools/Special Tools
Tool Kit, Intl. Comb. Eng. (TM 9-2320-365-20)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)

Tools/Special Tools (Cont)
Socket Wrench Attachment, Screwdriver (TM 9-2320-365-20)
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Lubricating Oil, Engine (Item 48, Appendix C)
Packing, Preformed (Item 179, Appendix F)
Packing, Preformed (Item 180, Appendix F)

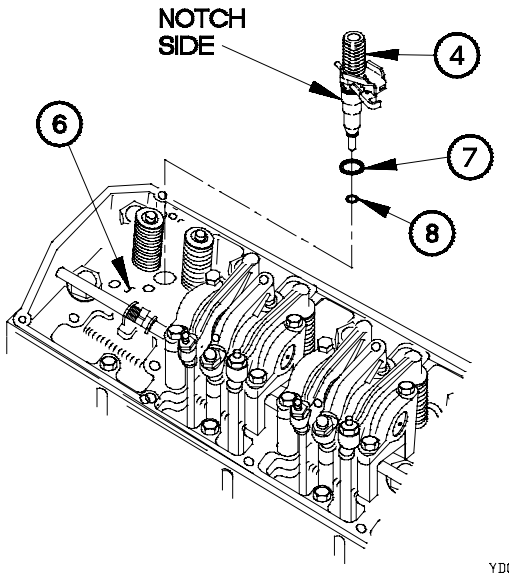
a. Removal.

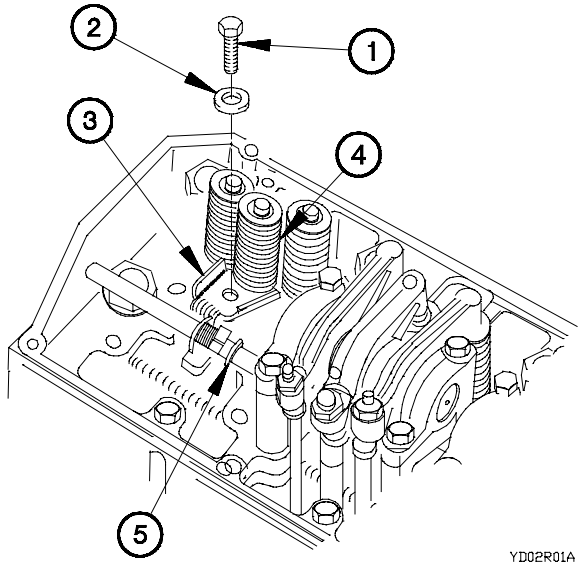
NOTE

All six fuel injectors are removed the same way. One fuel injector shown.

(1) Remove fuel injector hold down bolt (1) and washer (2) from fuel injector hold down bracket (3).

(2) Press down on fuel injector (4) and rotate fuel injector to disengage from rack control linkage (5).





CAUTION

Do not pry on injector hold down bracket. Damage to injector could occur. Injector has a notch on the side opposite the rack for prying injector loose. Failure to comply may result in damage to equipment.

(3) Remove fuel injector (4) from cylinder head (6).

(4) Remove preformed packings (7 and 8) from fuel injector (4). Discard preformed packings.

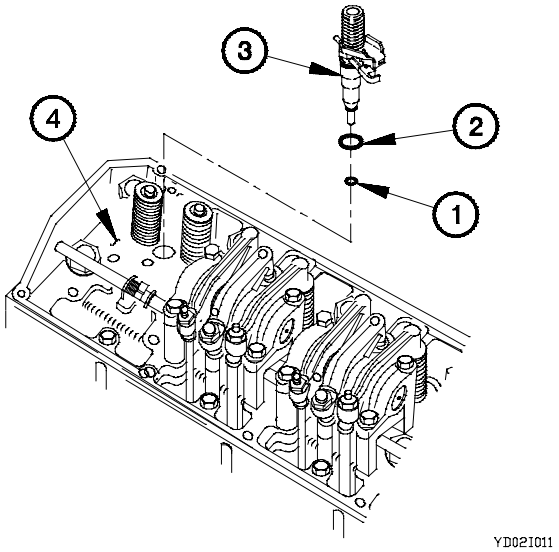
b. Installation.

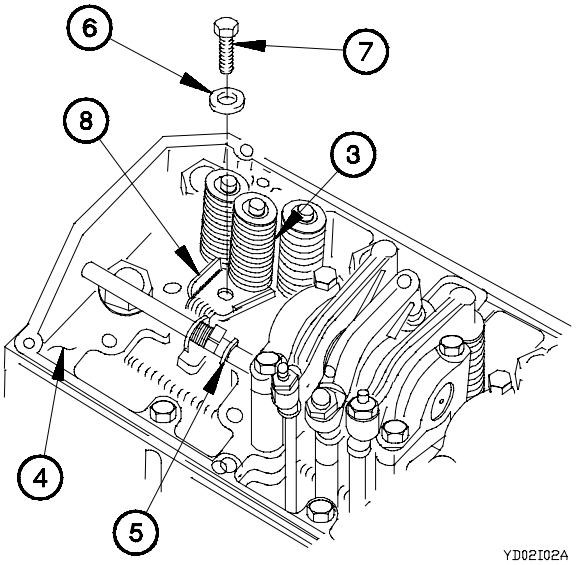
NOTE

All six fuel injectors are installed the same way. One fuel injector shown.

(1) Install preformed packings (1 and 2) on fuel injector (3).

(2) Position fuel injector (3) in cylinder head (4).





(3) Rotate fuel injector (3) to engage with rack control linkage (5).

(4) Push down on fuel injector (3) to seat into bore of cylinder head (4).

CAUTION

Do not use bolt to push the fuel injector down into cylinder head. Failure to comply may result in damage to equipment.

(5) Position washer (6) and fuel injector hold down bolt (7) in fuel injector hold down bracket (8).

(6) Tighten bolt (7) to 72-144 lb-in. (8-16 N•m).

4-2. FUEL INJECTOR REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Perform fuel injector synchronization (para 4-3).

(2) Install rocker arm assembly (para 3-12).

(3) For those cylinders that had rocker arm assemblies removed, perform valve clearance checks (para 3-14).

(4) Perform fuel timing checks (para 4-5).

(5) Reset fuel setting to measurement recorded prior to removal (para 4-4) (No. 1 fuel injector).

(6) Install valve cover (TM 9-2320-365-20-2).

(7) Bleed fuel system (TM 9-2320-365-20-3).

(8) Lower cab (TM 9-2320-365-10).

(9) Start engine (TM 9-2320-365-10).

(10) Operate vehicle and check for proper engine operation (TM 9-2320-365-10).

(11) Shut down engine (TM 9-2320-365-10).

End of Task.

4-3. FUEL INJECTOR SYNCHRONIZATION

This task covers:

a. Fuel Injector Synchronization

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Valve cover removed (TM 9-2320-365-20-2).
Fuel shutoff solenoid removed (para 6-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Tool Kit, Intl. Comb. Eng. (TM 9-2320-365-20)

Tools and Special Tools (Cont)
Wrench, Torque, 0-60 N·m (Item 84, Appendix B)
Hammer, Hand Soft Head (Item 28, Appendix B)

Materials/Parts
Lubricating Oil, Engine (Item 48, Appendix C)

Personnel Required
(2)

a. Fuel Injector Synchronization.

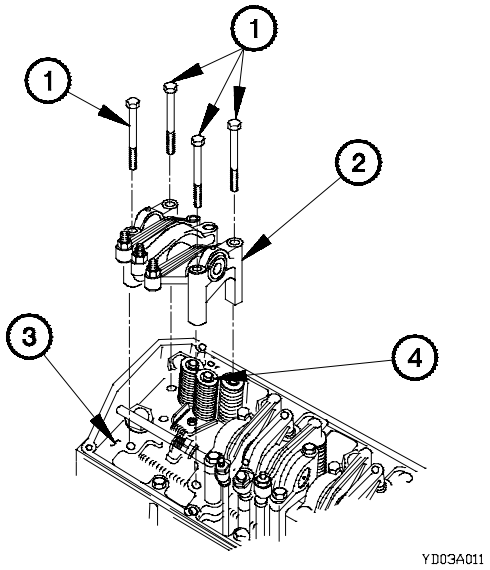
CAUTION

- This task must be performed when any fuel injector is replaced. If No. 1 fuel injector is replaced, all injectors must be synchronized. Failure to comply may result in damage to equipment.
- Hold rocker arm assembly level when removing from engine to prevent disassembly. Failure to comply may result in damage to equipment.

(1) Remove four bolts (1) from rocker arm assembly (2).

(2) Remove rocker arm assembly (2) from cylinder head (3).

(3) Apply a small amount of clean lubricating oil to top of No. 1 fuel injector (4).



4-3. FUEL INJECTOR SYNCHRONIZATION (CONT)

(4) Remove three push rods (5) from cylinder head (3).

CAUTION

Injector spring compressor must be installed on all fuel injectors that have rocker arms removed. Failure to comply may result in internal damage to fuel injector.

(5) Install injector spring compressor on No. 1 fuel injector (4).

(6) Lightly tap injector spring compressor with a soft face hammer.

NOTE

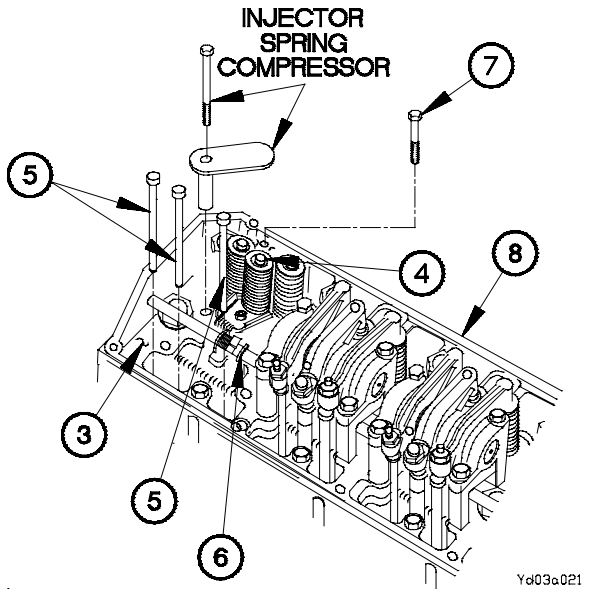
If injector rack does not move freely, repeat steps (5) and (6).

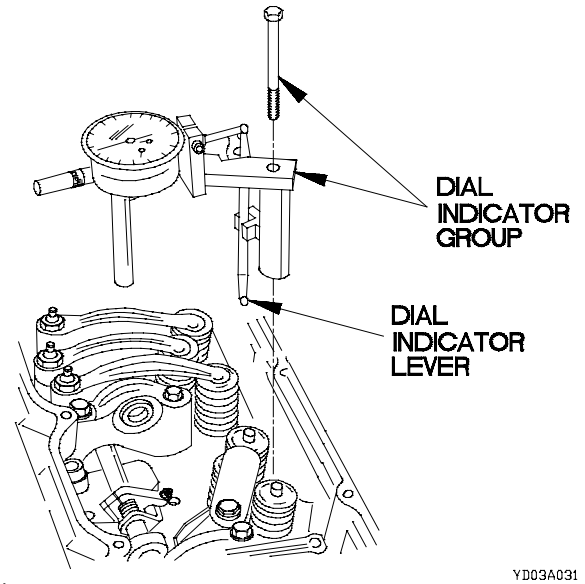
(7) Check for free movement of injector rack bar (6).

NOTE

Perform steps (3) through (7) on all fuel injector(s) to be synchronized.

(8) Remove bolt (7) from inlet manifold (8), nearest to fuel injector to be synchronized.





CAUTION

Ensure end face of injector rack bar is clean. Failure to comply may result in faulty reading.

(9) Install the shortest (0.442 in.) (1.122 cm) dial indicator contact point on dial indicator group.

(10) Install dial indicator group on injector to be synchronized.

CAUTION

Ensure dial indicator lever is in contact with end face of rack bar. Failure to comply may result in faulty reading.

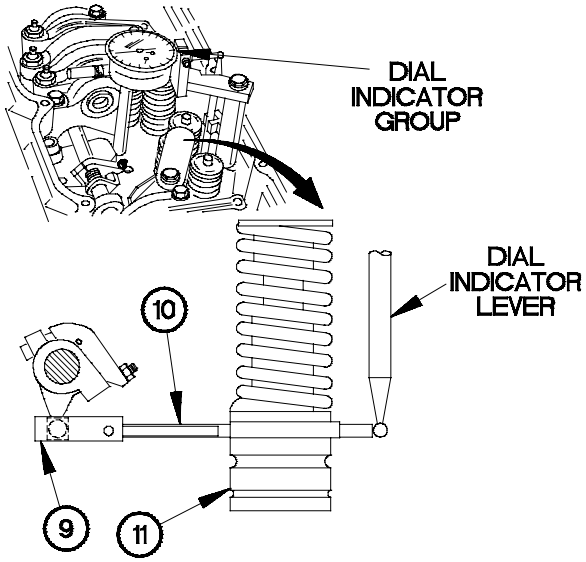
(11) Firmly push rack head (9) of fuel injector to be synchronized, toward fuel injector until rack stop (10) contacts fuel injector base (11).

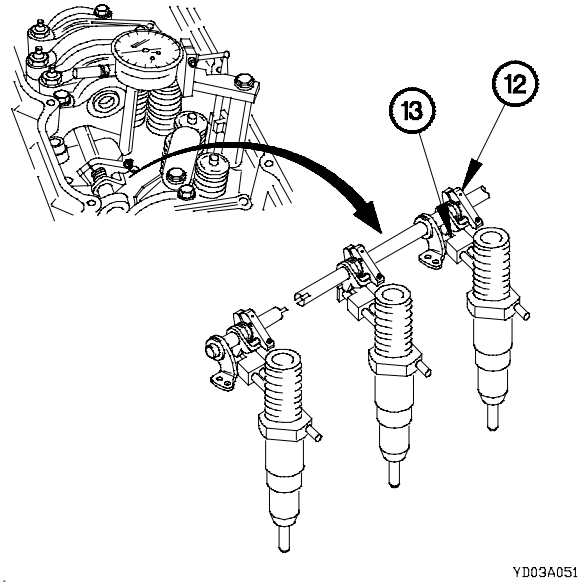
NOTE

Steps (12) through (30) require the aid of an assistant.

(12) Hold rack head (9) in shutoff position and adjust dial indicator until all dials read zero.

(13) Tighten dial indicator and release rack head (9).



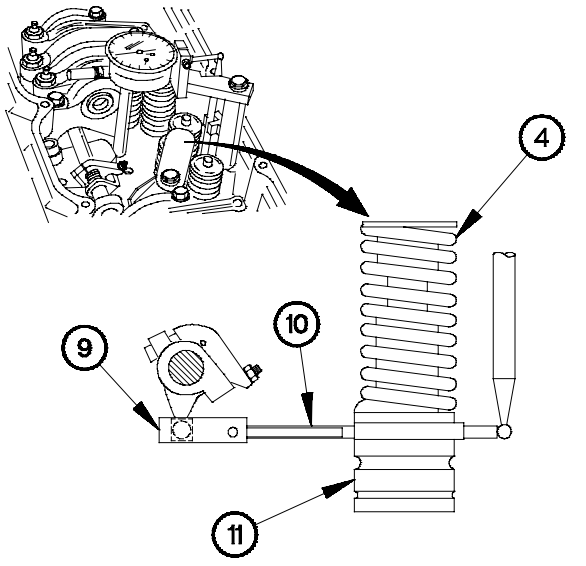


(14) Push down on clamp assembly (12) to rotate rack control linkage (13) in FUEL ON direction.

(15) Quickly release clamp assembly (12) to ensure springs and bearings of rack control linkage (13) are in their normal positions.

(16) Firmly push rack head (9) of No. 1 fuel injector (4) toward injector until rack stop (10) contacts injector base (11).

(17) Hold rack head (9) in this position for steps (18) and (19).

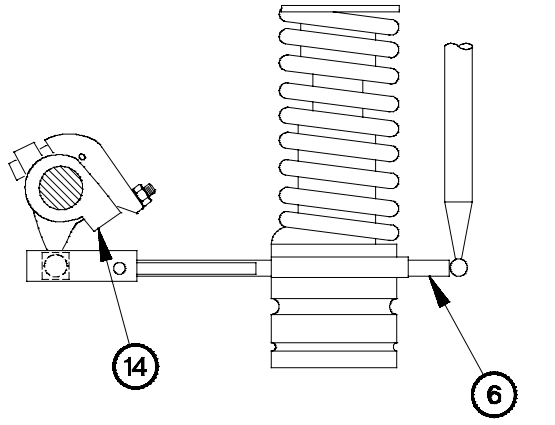


4-3. FUEL INJECTOR SYNCHRONIZATION (CONT)

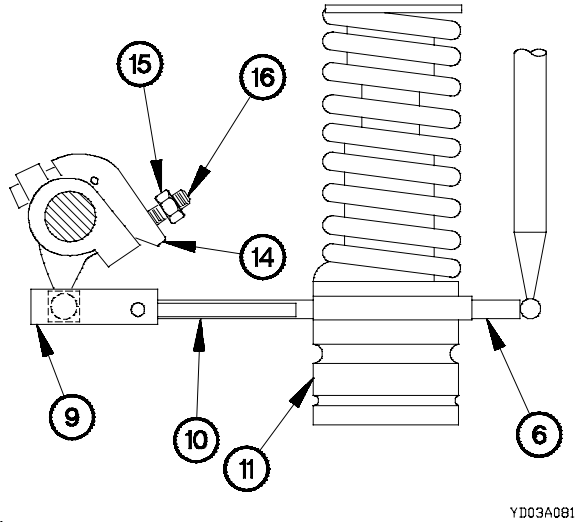
(18) Push down and quickly release fuel injector lever (14) to ensure smooth movement of injector rack bar (6) on fuel injector being synchronized.

(19) Verify dial indicator reads +0.01 to +0.05 mm.

(20) Perform steps (14) through (19) two or three times to confirm reading.



YD03A071



YD03A081

NOTE

- If reading is correct, go to step (29).
- If reading is not correct, continue with step (21).

(21) Loosen locking nut (15) and fuel setting screw (16) out to the left.

(22) Firmly push No.1 injector rack head (9) of No.1 injector until rack stop (10) contacts injector base (11).

(23) Hold No.1 injector rack head (9) in this position for steps (24) and (25).

(24) Push down and quickly release fuel injector lever (14) to ensure smooth movement of injector rack bar (6) on fuel injector being synchronized.

(25) Turn fuel setting screw (16) right until dial indicator reads +0.01 to +0.05 mm.

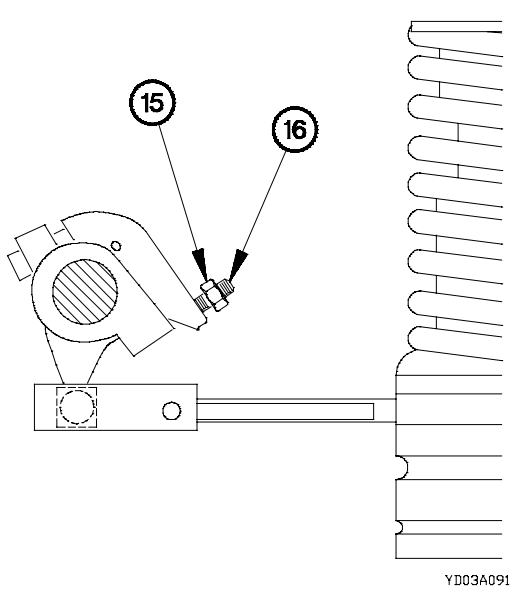
CAUTION

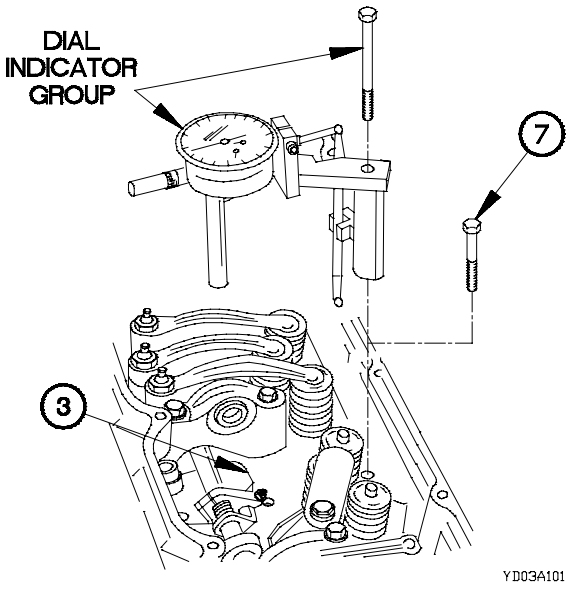
Do not overtighten locking nuts. Failure to comply may result in damage to threads.

(26) Tighten locking nut (15) while holding fuel setting screw (16).

(27) Check adjustment by repeating steps (14) through (16).

(28) If indicator does not indicate +0.01 to +0.05 mm, repeat steps (21) through (26).





(29) Remove dial indicator group from cylinder head (3).

(30) Install bolt (7) where dial indicator group was installed.

NOTE

When synchronizing more than one fuel injector, apply consistent pressure on rack assembly from one fuel injector to the next to ensure accurate dial indicator readings.

(31) Perform steps (1) through (30) on all injectors being synchronized.

NOTE

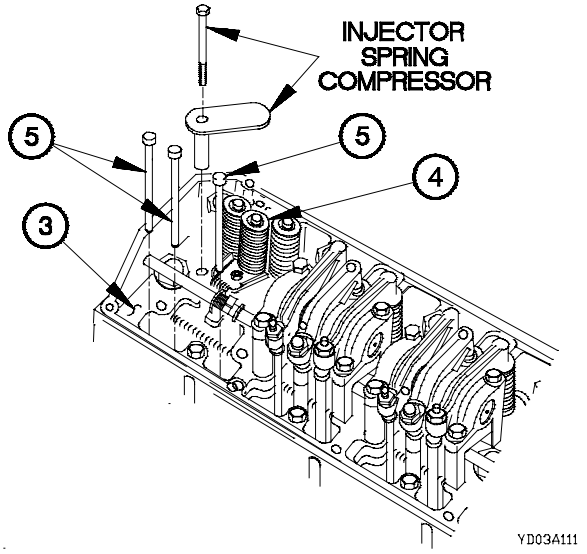
Perform step (32) if fuel setting is known to be incorrect.

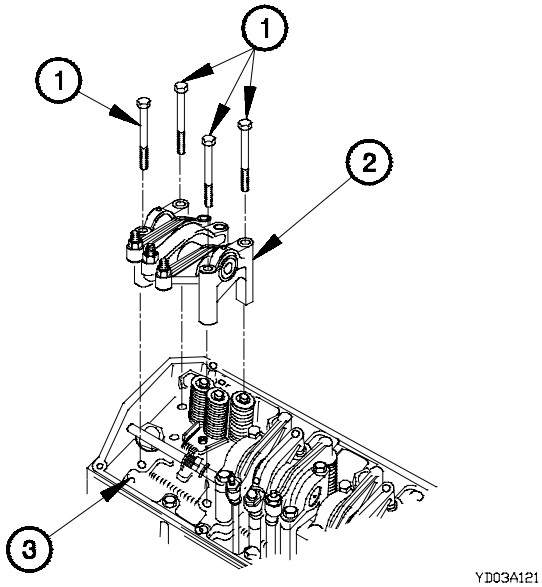
(32) Perform fuel setting check (para 4-4).

4-3. FUEL INJECTOR SYNCHRONIZATION (CONT)

(33) Remove injector spring compressor from No. 1 fuel injector (4) and injector being synchronized.

(34) Install three pushrods (5) in cylinder head (3).





CAUTION

Hold rocker arm assembly level when installing on engine to prevent disassembly. Failure to comply may result in damage to equipment.

(35) Install rocker arm assembly (2) on cylinder head (3).

(36) Position four bolts (1) in rocker arm assembly (2).

(37) Tighten four bolts (1) to 180-300 lb-in. (20-34 N·m).

(38) Perform steps (33) through (37) on all injectors synchronized.

b. Follow-On Maintenance.

(1) Install fuel shutoff solenoid (para 6-4).

(2) Perform fuel timing check (para 4-5).

(3) Perform valve clearance check for rocker arms removed (3-14).

(4) Install valve cover (TM 9-2320-365-20-2).

(5) Lower cab (TM 9-2320-365-10).

(6) Start engine (TM 9-2320-365-10).

(7) Operate vehicle and check for proper engine operation (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.

4-4. FUEL SETTING CHECK

This task covers:

a. Fuel Setting Check

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Valve cover removed (TM 9-2320-365-20-2).
Fuel shutoff solenoid removed (para 6-4).
Fuel injectors synchronized (para 4-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Tool Kit, Intl. Comb. Eng. (TM 9-2320-365-20)
Wrench, Torque, 0-60 N·m (Item 84, Appendix B)

a. Fuel Setting Check.

CAUTION

Injector spring compressor must be installed on all fuel injectors that have the rocker arms removed. Failure to comply may result in internal damage to fuel injectors.

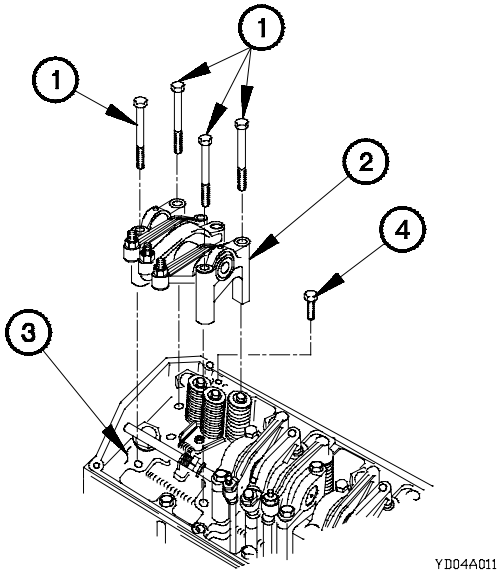
NOTE

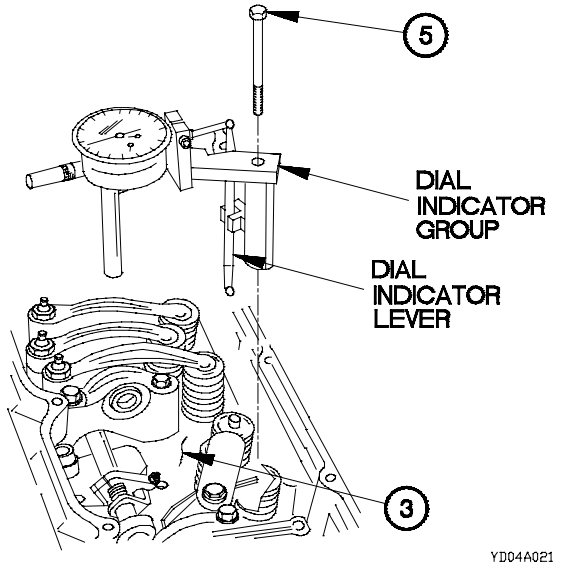
Hold rocker arm assembly level when removing from engine to prevent disassembly.

(1) Remove four bolts (1) from No. 1 cylinder rocker arm (2).

(2) Remove No. 1 cylinder rocker arm (2) from cylinder head (3).

(3) Remove bolt (4) from cylinder head (3).





CAUTION

Ensure end of injector rack bar is clean. Failure to comply may result in faulty reading.

(4) Install the shortest (0.442 in.) dial indicator contact point on dial indicator group.

(5) Install dial indicator group with bolt (5) on cylinder head (3).

CAUTION

Ensure dial indicator lever is in contact with end face of rack bar. Failure to comply may result in faulty reading.

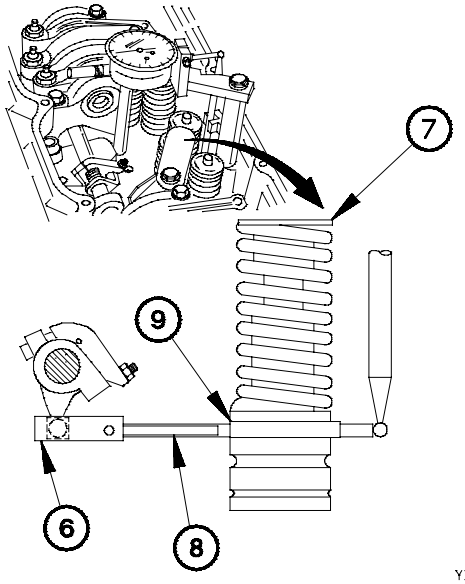
(6) Firmly push rack head (6) of fuel injector (7) toward fuel injector until rack stop (8) contacts fuel injector base (9).

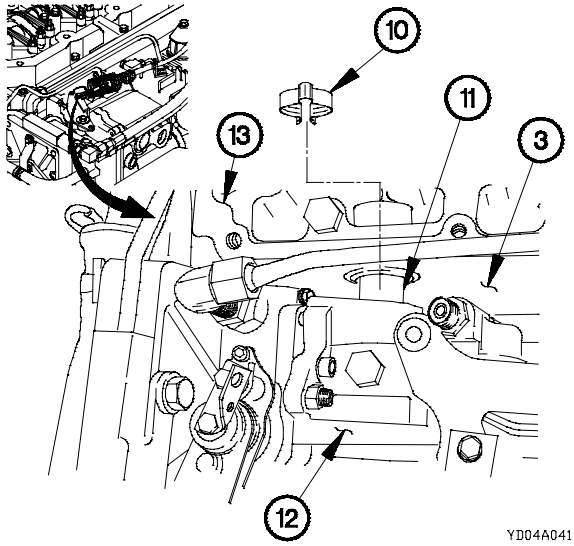
NOTE

No. 1 fuel injector is now in fuel shutoff position.

(7) Hold rack head (6) in shutoff position and adjust dial indicator group until all dials read zero.

(8) Tighten dial indicator group and release rack head (6).





(9) Remove clip (10) from adapter sleeve (11) between fuel governor (12) and inlet manifold (13).

(10) Slide sleeve (11) from fuel governor (12) toward cylinder head (3).

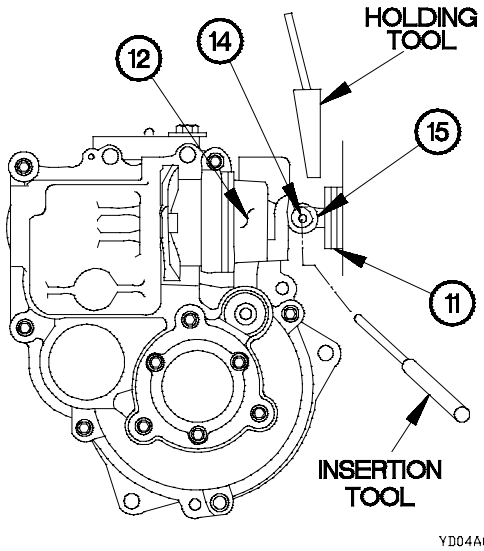
(11) Install insertion tool into link pin (14) of output shaft (15).

NOTE

When properly installed, equal lengths of small diameter of insertion tool will extend from both ends of link pin.

(12) Install holding tool between adapter sleeve (11) and small diameter of insertion tool.

(13) Push holding tool down until small diameter of insertion tool contacts face of fuel governor (12). This is fuel setting measurement position.



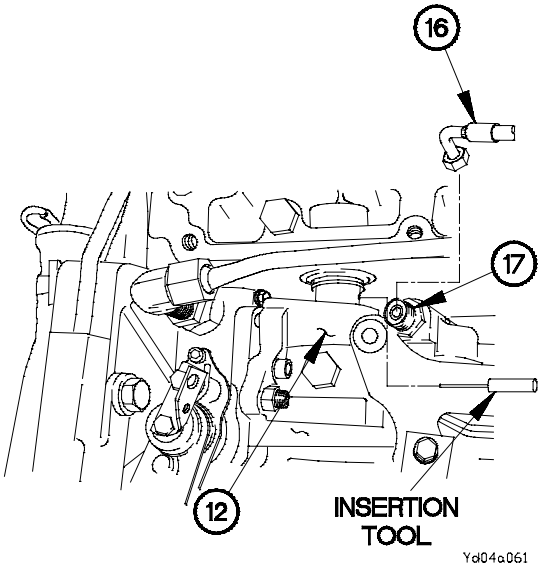
4-4. FUEL SETTING CHECK (CONT)

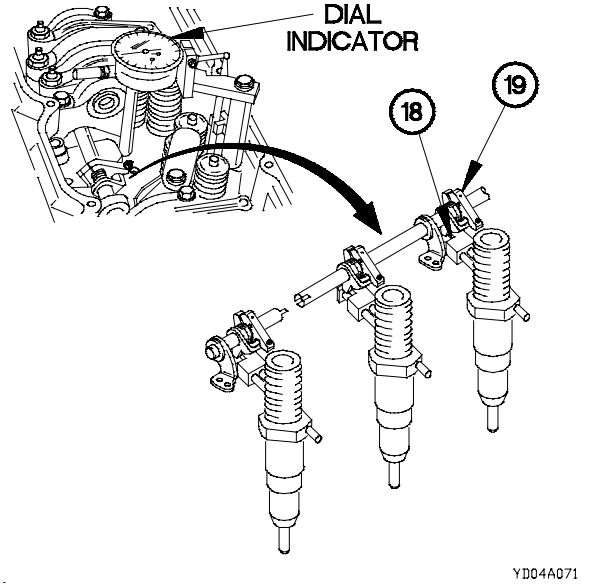
NOTE

Perform steps (14) and (15) if small diameter of insertion tool does not contact face of fuel governor.

(14) Remove fuel ratio control air tube (16) from fuel governor (12).

(15) Apply 15 psi (105 kPa) of air to fuel ratio control port (17) on fuel governor (12).





(16) Push down on rack lever (18) and quickly release it.

(17) Perform step (16) until smooth movement of fuel injector rack (19) is attained.

NOTE

Refer to engine information plate on valve cover for correct fuel setting (Full Load Static Fuel).

(18) Verify reading on dial indicator is within +/- 0.25 mm of specified fuel setting.

NOTE

Perform steps (19) through (22) if dial indicator reading indicates adjustment of fuel setting is required.

(19) Loosen locking nut (20) on fuel setting screw (21).

(20) Adjust fuel setting screw (21) to obtain specified fuel setting.

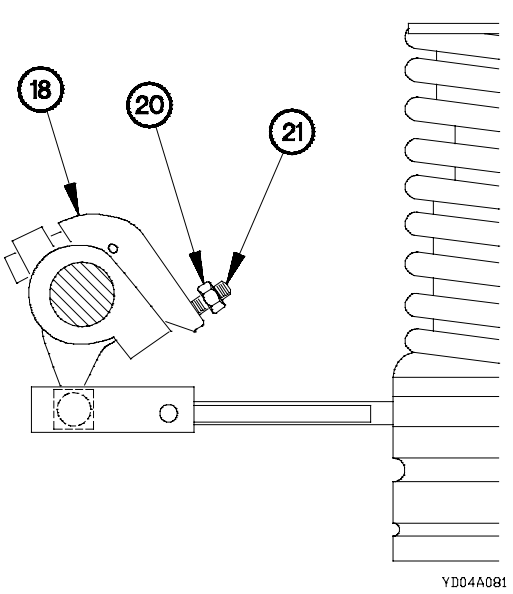
CAUTION

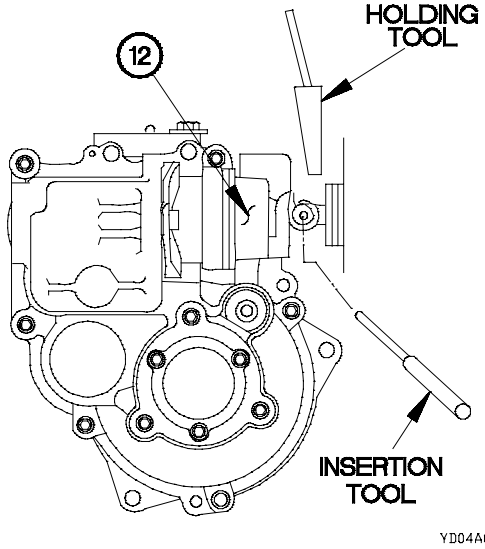
Do not loosen screw which holds clamp assembly to control shaft. Failure to comply may result in damage to equipment.

(21) Hold fuel setting screw (21) in position while tightening locking nut (20).

(22) Check fuel setting by pushing down on rack lever (18) and quickly releasing.

(23) Verify correct fuel setting. If fuel setting is not correct, repeat steps (19) through (22).





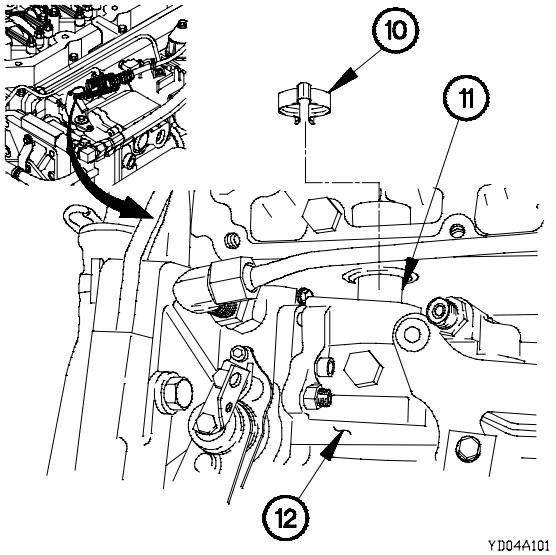
(24) Remove holding tool and insertion tool from fuel governor (12).

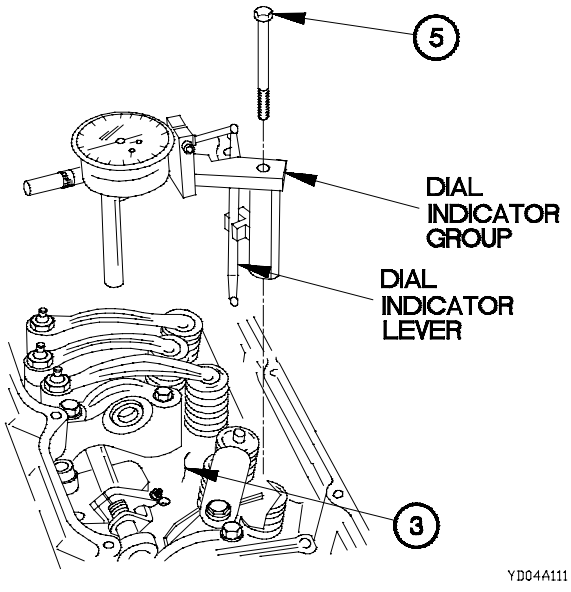
4-4. FUEL SETTING CHECK (CONT)

NOTE

Lubricate sleeve with engine oil if required.

(25) Slide adapter sleeve (11) into fuel governor (12) and install clip (10).



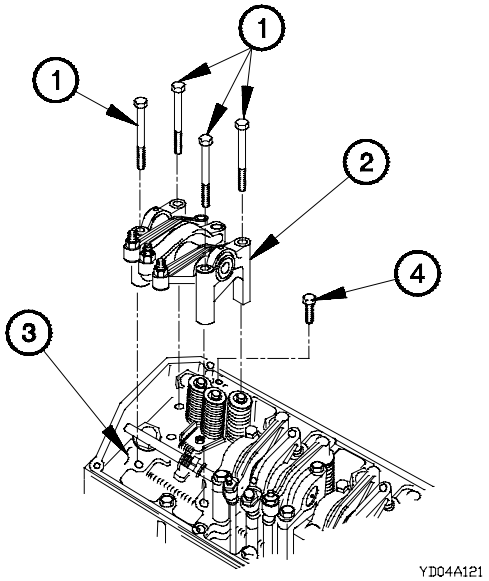


(26) Remove bolt (5) and dial indicator group from cylinder head (3).

(27) Install bolt (4) in cylinder head (3).

CAUTION

Hold rocker arm assembly level when installing on engine to prevent disassembly. Failure to comply may result in damage to equipment.



(28) Install No. 1 cylinder rocker arm (2) on cylinder head (3).

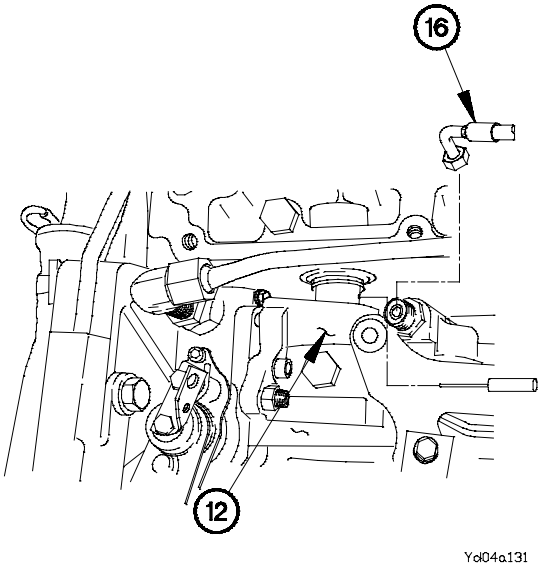
(29) Position four bolts (1) in No. 1 cylinder rocker arm (2).

(30) Tighten four bolts (1) to 180-300 lb-in. (20-34 N·m).

NOTE

Perform step (31) if fuel ratio control air tube was removed.

(31) Install fuel ratio control air tube (16) on fuel governor (12).



b. Follow-On Maintenance.

(1) Perform fuel timing check (para 4-5).

(2) Install fuel shutoff solenoid (para 6-4).

(3) Install valve cover (TM 9-2320-365-20-2).

(4) Start engine (TM 9-2320-365-10).

(5) Operate vehicle and check for proper engine operation (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.

4-5. FUEL TIMING CHECKS

This task covers:

a. Fuel Timing Checks
b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Valve cover removed (TM 9-2320-365-20-2).
Fuel setting check completed (para 4-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)

Tools and Special Tools (Cont)
Tool Kit, Intl. Comb. Eng. (TM 9-2320-365-20)
Wrench, Torque, 0-60 N·m (Item 84, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Personnel Required
(2)

a. Fuel Timing Checks.

CAUTION

Crankshaft must always be rotated to right to align timing bolt with flywheel. Failure to comply may result in damage to equipment.

NOTE

Use bolt on front of alternator to rotate crankshaft for timing bolt installation.

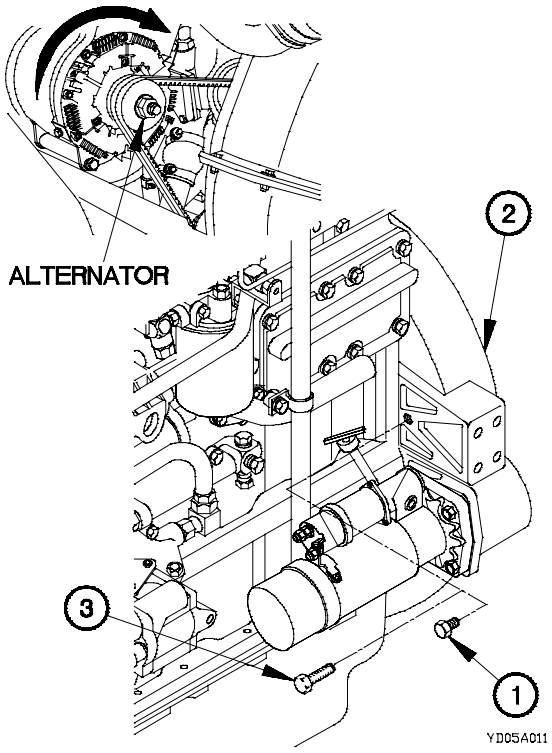
(1) Rotate crankshaft to the right two complete revolutions.

(2) Remove plug (1) from timing hole on front of flywheel housing (2).

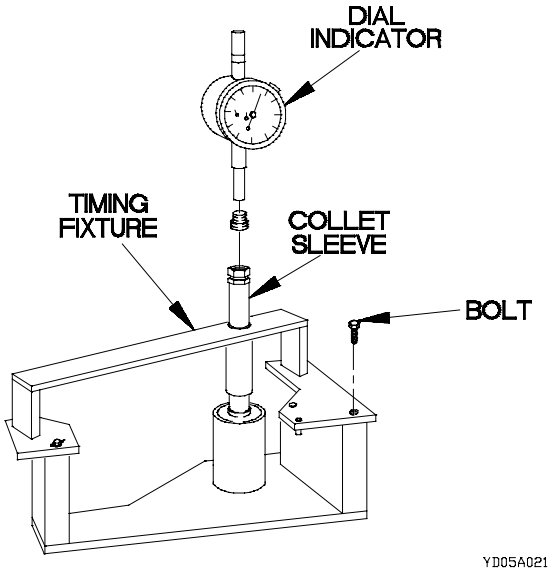
NOTE

- Steps (3) through (8) requires the aid of an assistant.
- Mark damper to engine front cover when timing bolt engages with flywheel.

(3) Install timing bolt (3) in timing hole on front of flywheel housing (2).



(4) Calibrate fuel timing fixture as follows:



(a) Install contact point 0.50 in. (12.7 mm) excluding threads, on dial indicator stem.

NOTE

Make sure locating pin (A) in left side of timing fixture engages hole in calibration fixture.

(b) Install dial indicator in collet sleeve of timing fixture.

(c) Put dial indicator and timing fixture on injector timing block and calibration fixture.

(d) Install bolt on the right side to secure timing fixture to calibration fixture.

(e) Obtain fuel timing dimension from engine information plate located on valve cover.

(f) Subtract injector timing block length (62.00 mm) from specified fuel timing dimension. Record the results.

NOTE

In the following calculation the answer recorded in step f. must be converted to a negative number to obtain correct offset reading on the dial indicator.

(g) Convert the answer to a negative number.

NOTE

This is ONLY an example. Be sure to use correct fuel timing dimension for engine being checked.

Fuel Timing Dimension . . . . . 64.01 mm

Length of Injector
Timing block . . . . . 62.00 mm

Correct Offset (Converted) . . . . . -2.01 mm

The difference is 2.01 mm. Put a minus (-) sign in front of the result (-2.01 mm). The dial indicator will be moved in the collet so that the pointers indicate this value on the red minus (-) or negative scale on the dial indicator while timing fixture is mounted securely on calibration fixture.

4-5. FUEL TIMING CHECKS (CONT)

(h) Loosen collet sleeve and move dial indicator in collet until pointer indicates correct offset, minus scale (red numbers).

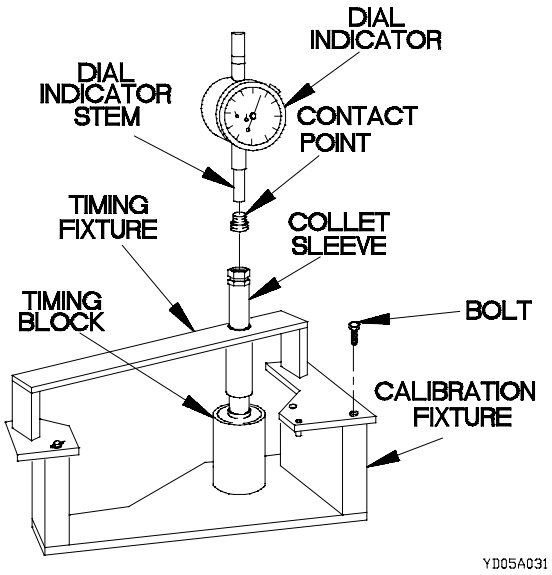
(i) Tighten collet sleeve and check reading on red scale.

(j) Wipe clean the top of all fuel injector tappets and shoulder surfaces.

CAUTION

After timing fixture has been installed, **DO NOT** rotate engine. Failure to comply may result in damage to equipment.

(k) Remove bolt from timing fixture.



NOTE

Intake and exhaust valves for No. 1 cylinder are fully closed if No. 1 piston is on **COMPRESSION STROKE** and rocker arms can be moved by hand. If rocker arms can not be moved and valves are slightly open, No. 1 piston is on **EXHAUST STROKE**. Refer to **Table 4-1 Crankshaft Position** to determine which injectors are to be checked/adjusted for stroke position of crankshaft when timing bolt has been installed in flywheel.

Table 4-1. Crankshaft Position

CRANKSHAFT POSITIONS FOR FUEL TIMING SETTING	
SAE Standard (Counterclockwise) Rotation Engines As Viewed From The Flywheel End	
Check/Adjust With No. 1 Piston on TC Compression Stroke	Injectors 3-5-6
Check/Adjust With No. 1 Piston On TC Exhaust Stroke	Injectors 1-2-4

(l) Hold collet sleeve up and gently install dial indicator and timing fixture in position on inlet manifold (4) over injector to be checked.

NOTE

- When properly positioned, locating pin and bolt will engage holes in top face of inlet manifold.
- The sliding locating pin and two hole positions are provided in the timing fixture because of a different valve cover bolt hole position on the rear cylinder.

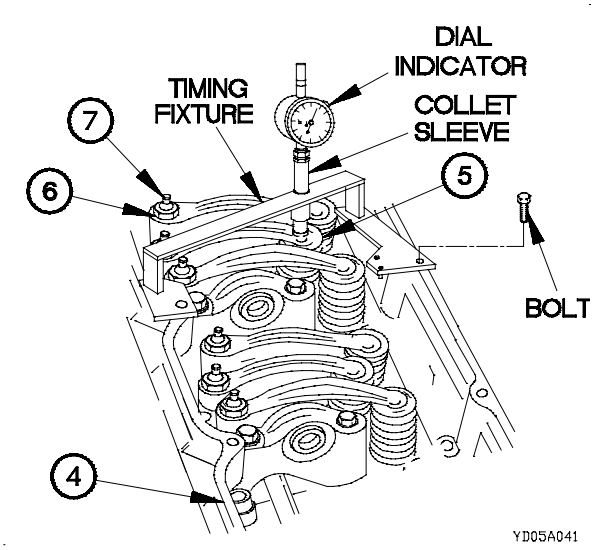
(m) Install bolt to secure timing fixture to inlet manifold (4).

(n) Slide collet sleeve until long pin of timing fixture contacts shoulder of injector (5).

(o) Verify dial indicator reads 0.00 mm ± 0.20 mm.

NOTE

- If dial indicator reading is within limits proceed to step (7).
- If dial indicator reading is **NOT** within limits, perform steps (4p through 4s).
- The limits are a checking tolerance. If adjustment is necessary, adjust each injector to the specified fuel timing dimension.



(p) Loosen locking nut (6) on push rod adjustment screw (7) for injector (5) to be adjusted.

(q) Turn adjustment screw (7) until dial indicator reads 0.00 mm.

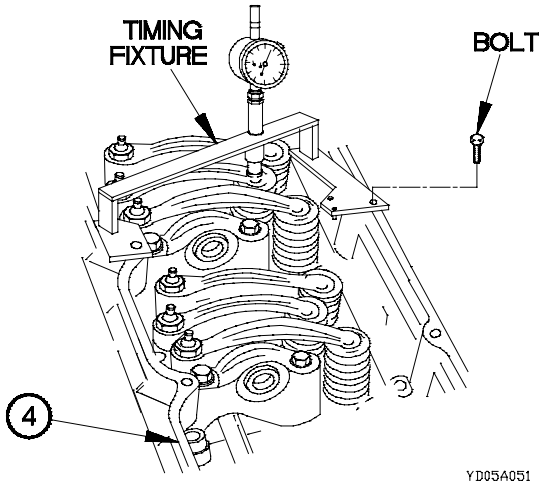
(r) Tighten self-locking nut (6) on adjustment screw (7) to 13-23 lb-ft (18-32 N•m).

(s) Check adjustment again.

(t) Perform steps (4o through 4s) until adjustment is correct.

4-5. FUEL TIMING CHECKS (CONT)

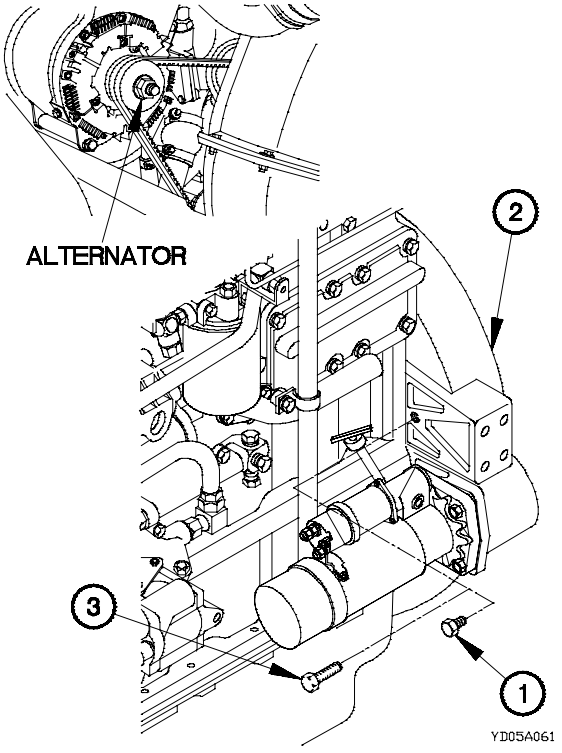
(5) Remove bolt and timing fixture from inlet manifold (4).



(6) Remove timing bolt (3) from timing hole on front of flywheel housing (2).

NOTE

Use bolt on front of alternator to rotate crankshaft and timing bolt installation.



(7) Rotate crankshaft to the right one complete revolution.

CAUTION

Crankshaft must always be rotated to right to align timing bolt with flywheel. Do not rotate crankshaft to left for alignment. Failure to comply may result in damage to equipment.

NOTE

If timing bolt alignment is not obtained on first revolution, crankshaft must be rotated two complete revolutions before installing timing bolt.

(8) Install timing bolt (3) in timing hole on front of flywheel housing (2).

(9) Perform steps (4) through (8) on remaining injectors on this stroke.

(10) Remove timing bolt (3) from timing hole on front of flywheel housing (2).

(11) Install plug (1) in timing hole on front of flywheel housing (2).

b. Follow-On Maintenance.

(1) Perform valve clearance adjustment (para 3-14).

(2) Install valve cover (TM 9-2320-365-20-2).

(3) Lower cab (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Operate vehicle and check for proper engine operation (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

End of Task.

4-6. TURBOCHARGER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Compound, Antiseize (Item 13, Appendix C)

Materials/Parts (Cont)
Nut, Self-Locking (2) (Item 146, Appendix F)
Lockwasher (2) (Item 96, Appendix F)
Gasket (Item 48, Appendix F)
Packing, Preformed (Item 204, Appendix F)
Gasket (Item 60, Appendix F)
Ring, Seal (Item 249, Appendix F)
Packing, Preformed (Item 194, Appendix F)
Locknut, Tube Fitting (4) (Item 87, Appendix F)
Gasket (Item 57, Appendix F)
Rag, Wiping (Item 59, Appendix C)

a. Removal.

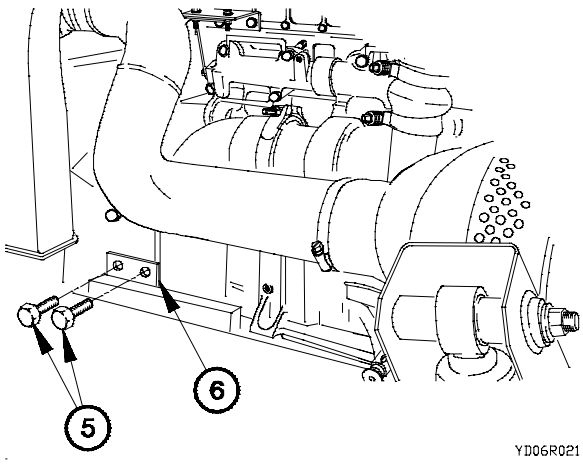
CAUTION

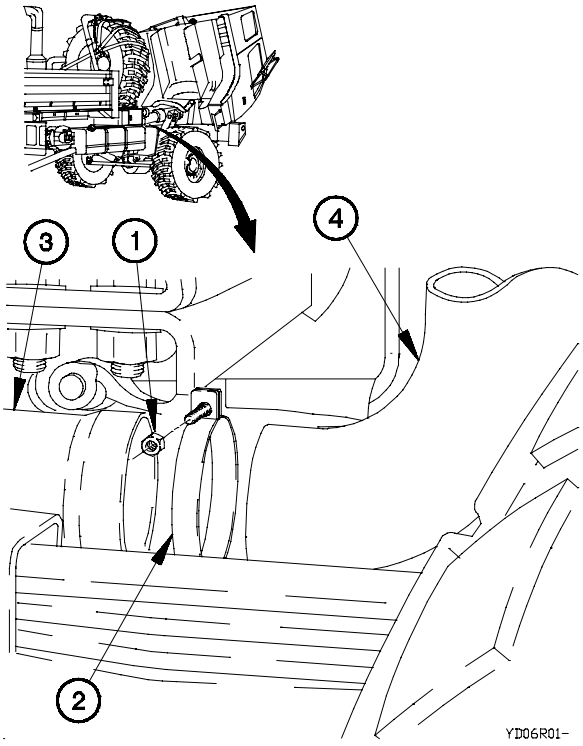
Ensure all openings of turbocharger are covered with wiping rags during removal. Failure to comply may result in damage to equipment.

(1) Remove self-locking nut (1) from clamp (2). Discard self-locking nut.

(2) Remove lower exhaust pipe (3) from upper exhaust pipe (4).

(3) Remove clamp (2) from lower exhaust pipe (3).

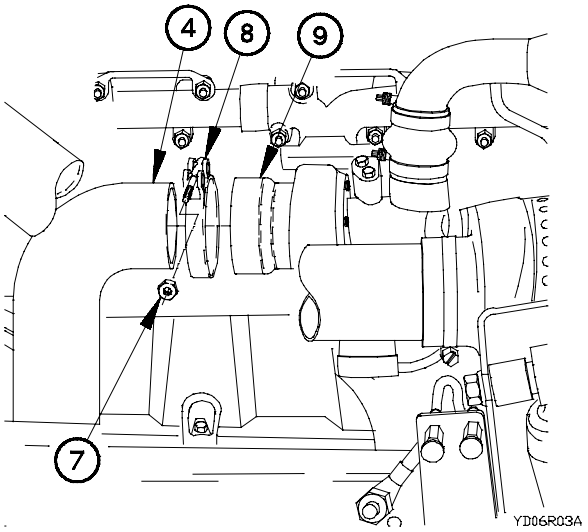


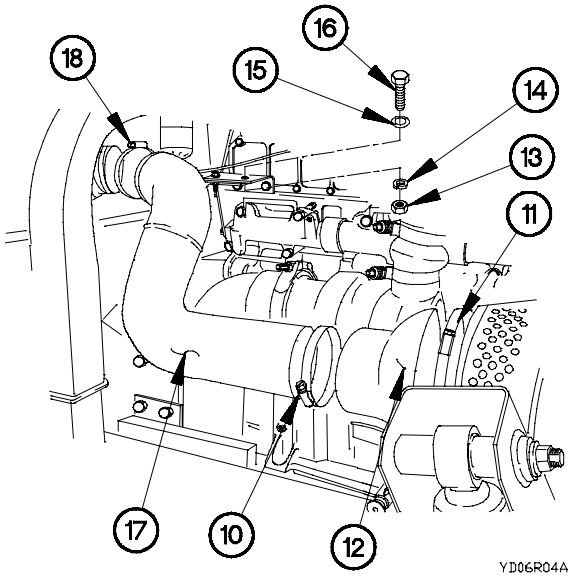


(4) Remove two bolts (5) from exhaust pipe bracket (6).

(5) Remove self-locking nut (7) from clamp (8). Discard self-locking nut.

(6) Remove upper exhaust pipe (4) and clamp (8) from turbocharger (9).





(7) Loosen clamps (10 and 11) on intake boot (12).

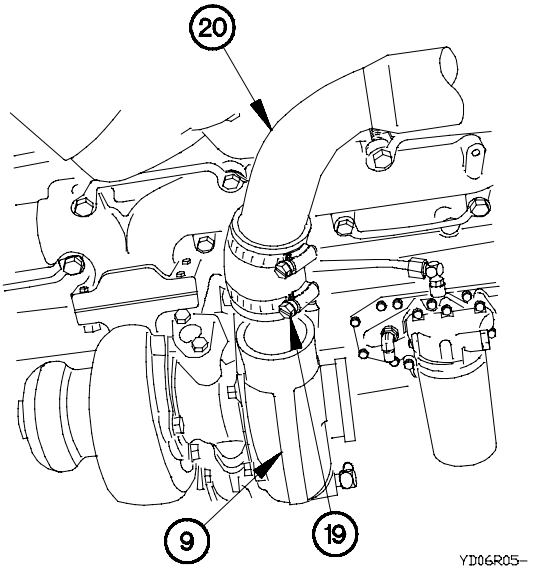
(8) Remove two nuts (13), lockwashers (14), washers (15), and bolts (16) from intake tube (17). Discard lockwashers.

(9) Loosen clamp (18) on intake tube (17).

(10) Remove intake tube (17) and intake boot (12) from vehicle.

(11) Loosen clamp (19) on charge air tube (20).

(12) Remove charge air tube (20) from turbocharger (9).



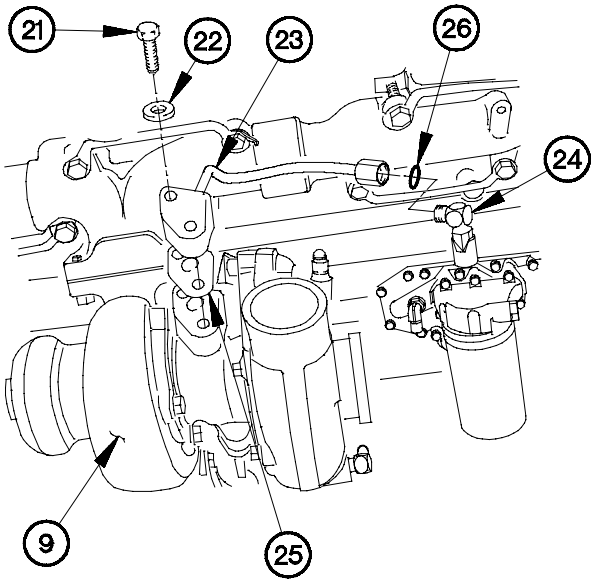
4-6. TURBOCHARGER REPLACEMENT (CONT)

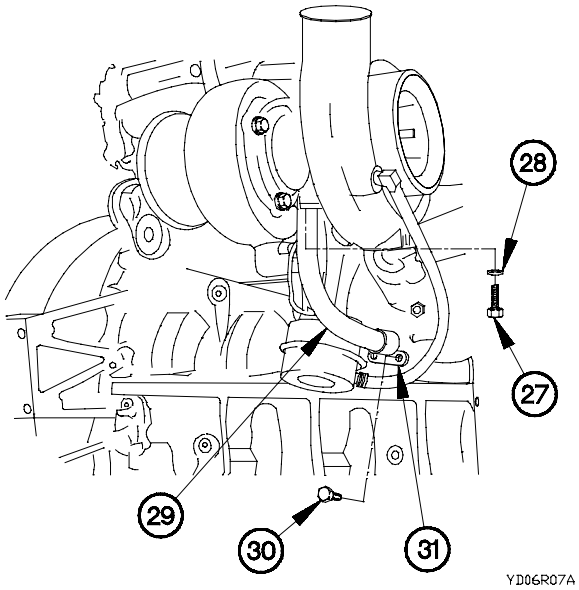
(13) Remove two bolts (21) and washers (22) from oil supply tube (23).

(14) Disconnect oil supply tube (23) from 90-degree fitting (24).

(15) Remove oil supply tube (23) and gasket (25) from turbocharger (9). Discard gasket.

(16) Remove preformed packing (26) from 90-degree fitting (24). Discard preformed packing.

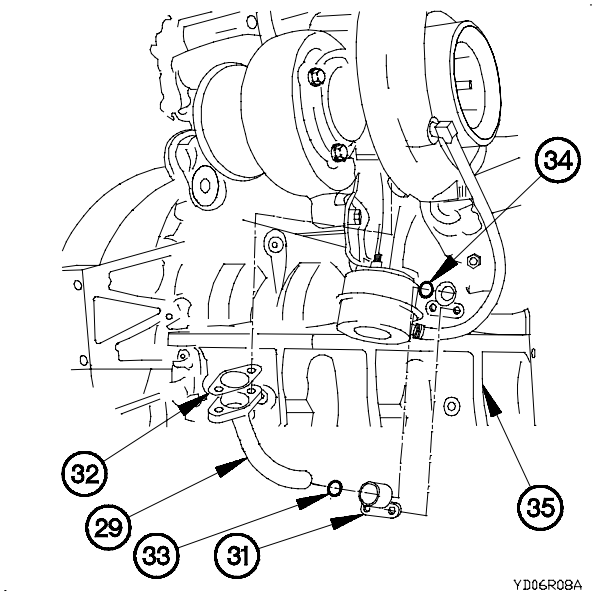




(17) Remove two bolts (27) and washers (28) from oil drain tube (29).

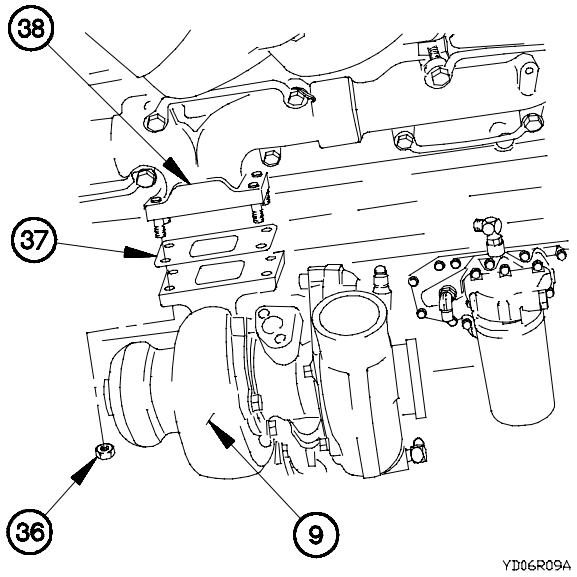
(18) Remove two bolts (30) from adapter (31).

(19) Remove oil drain tube (29), gasket (32), adapter (31), seal ring (33), and preformed packing (34) from engine (35). Discard gasket, seal ring, and preformed packing.

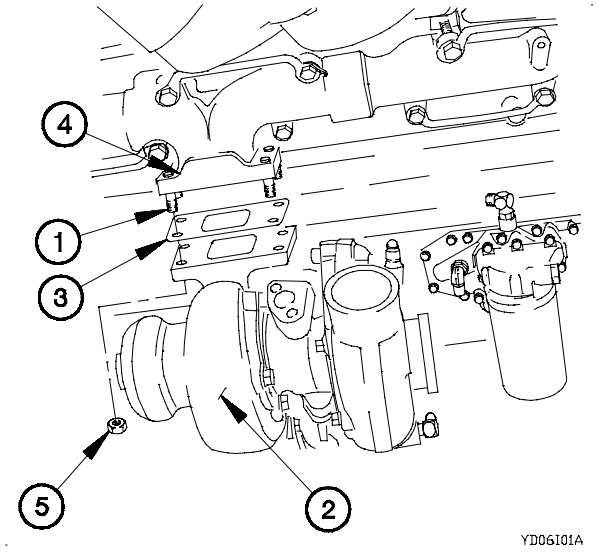


(20) Remove four locknuts (36) from turbocharger (9). Discard locknuts.

(21) Remove turbocharger (9) and gasket (37) from exhaust manifold (38). Discard gasket.



b. Installation.



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

CAUTION

Ensure all openings of replacement turbocharger are covered with wiping rags. Remove coverings as connections are made. Failure to comply may result in damage to equipment.

(1) Apply antiseize compound to threads of exhaust manifold studs (1).

(2) Position turbocharger (2) and gasket (3) on exhaust manifold (4) with four locknuts (5).

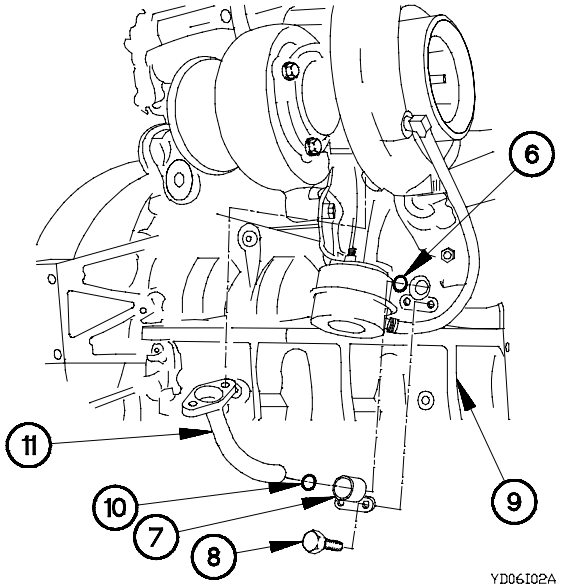
(3) Tighten four locknuts (5) to 36-44 lb-ft (49-60 N•m).

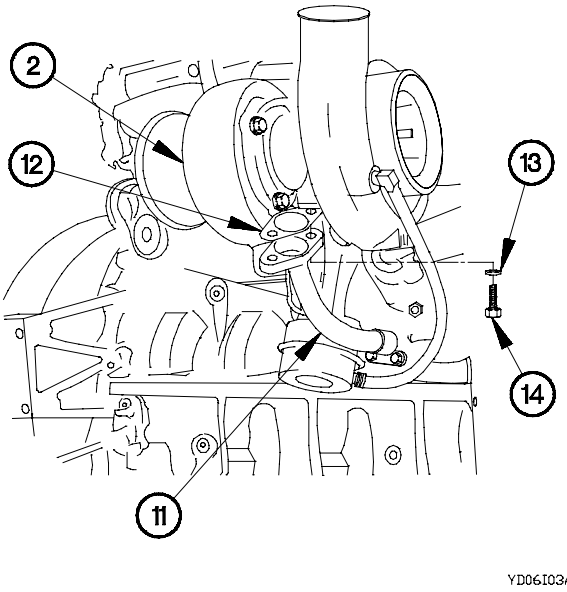
4-6. TURBOCHARGER REPLACEMENT (CONT)

(4) Position preformed packing (6), adapter (7), and two bolts (8) on engine (9).

(5) Tighten two bolts (8) to 15-25 lb-ft (20-34 N•m).

(6) Position seal ring (10) and oil drain tube (11) on adapter (7).





(7) Position gasket (12), two washers (13), bolts (14), and oil drain tube (11) on turbocharger (2).

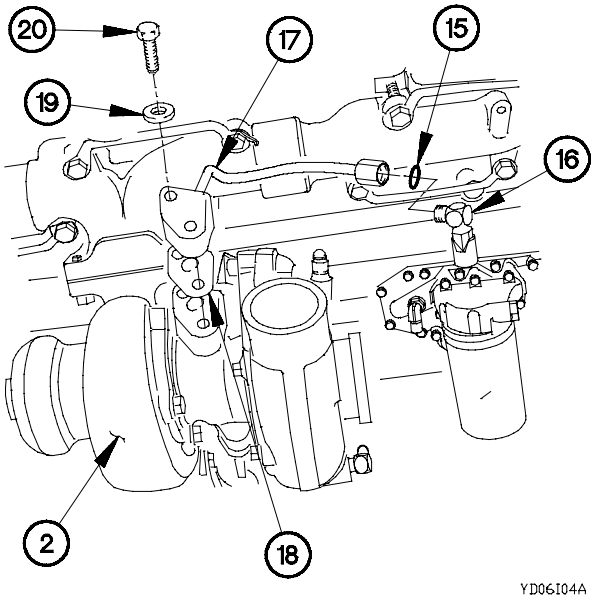
(8) Tighten two bolts (14) to 15-25 lb-ft (20-34 N•m).

(9) Install preformed packing (15) on 90-degree fitting (16).

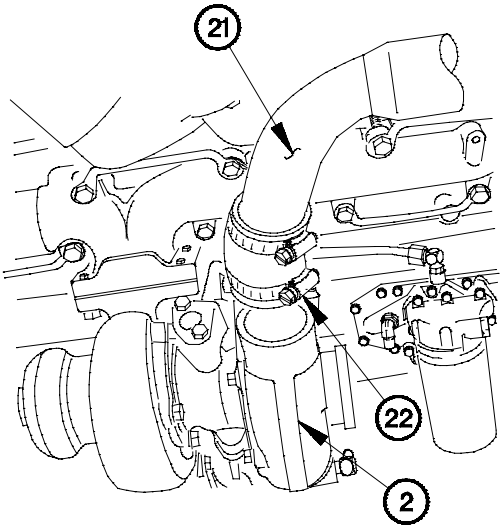
(10) Connect oil supply tube (17) to 90-degree fitting (16).

(11) Position gasket (18) and oil supply tube (17) on turbocharger (2) with two washers (19) and bolts (20).

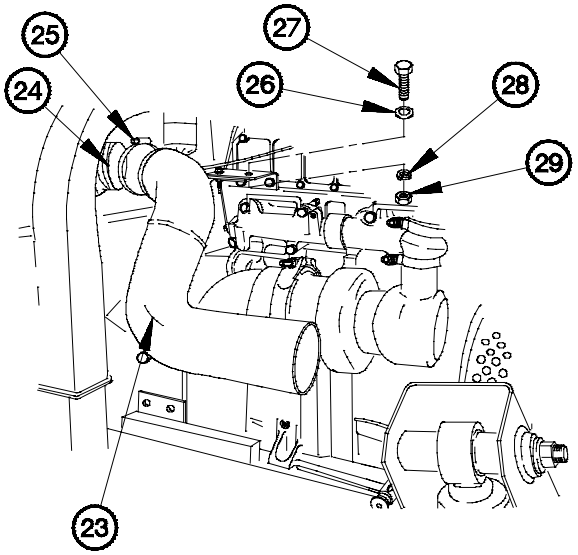
(12) Tighten two bolts (20) to 15-25 lb-ft (20-34 N•m).



(13) Install charge air tube (21) on turbocharger (2) with clamp (22).



YD06I051



YD06I061

(14) Position intake tube (23) on hose (24) with clamp (25).

(15) Tighten clamp (25) to 36-48 lb-in. (4-5 N·m).

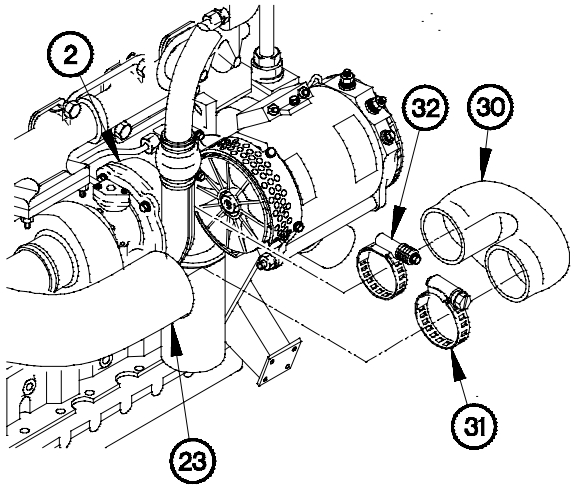
(16) Position two washers (26), bolts (27), lockwashers (28), and nuts (29) in intake tube (23).

(17) Tighten two nuts (29) to 22-26 ft-lb (30-35 N•m).

(18) Position intake boot (30) on intake tube (23) and turbocharger (2) with clamps (31 and 32).

(19) Tighten clamp (31) to 36-48 lb-in. (4-5 N·m).

(20) Tighten clamp (32) to 21-25 lb-in. (2-3 N·m).



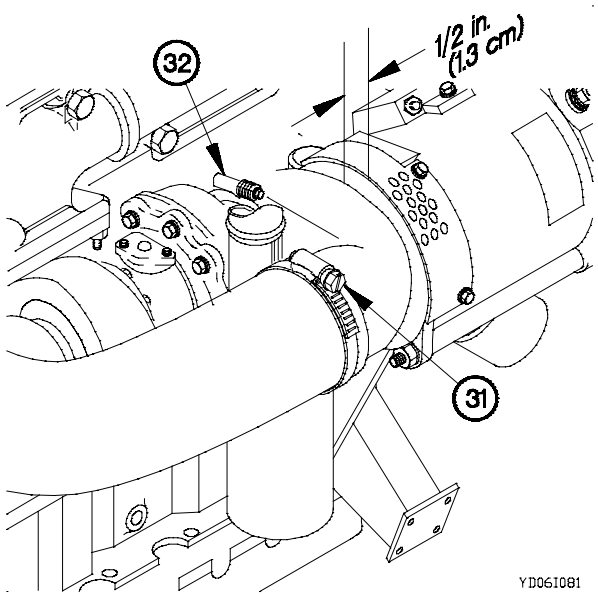
YD06I071

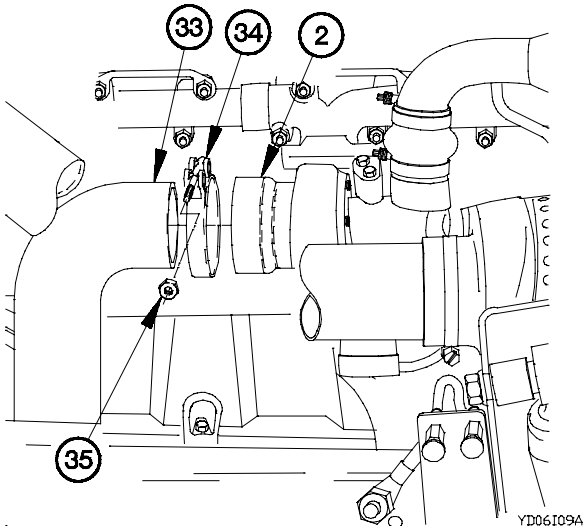
4-6. TURBOCHARGER REPLACEMENT (CONT)

CAUTION

A gap of approximately 1/2 in. (1.3 cm) between intake boot and alternator is required. Failure to comply may result in damage to equipment.

(21) Tighten clamps (31 and 32) to 36-48 lb-in (4-5 N·m).



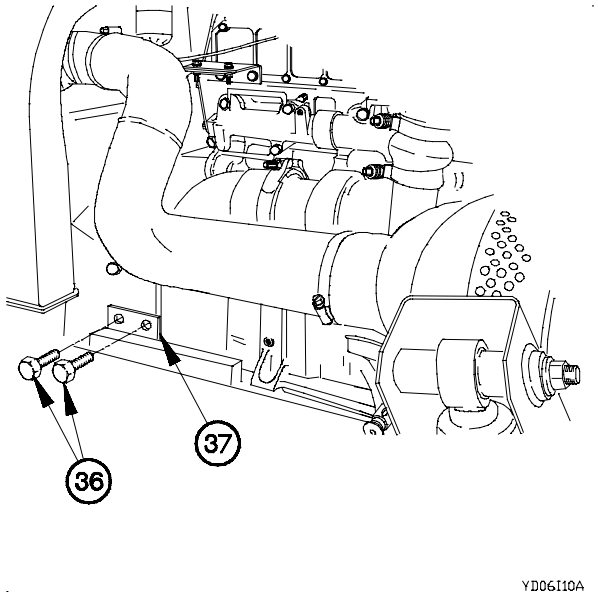


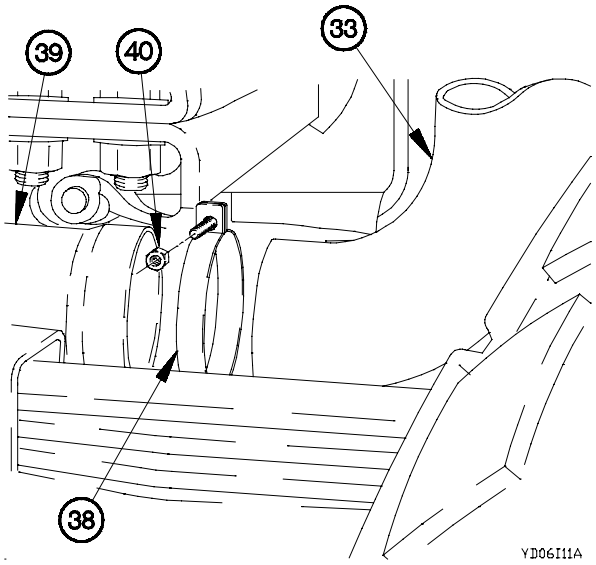
(22) Position upper exhaust pipe (33) and clamp (34) on turbocharger (2) with self-locking nut (35).

(23) Tighten self-locking nut (35) to 89-109 lb-in. (10-12 N·m).

(24) Position two bolts (36) in exhaust pipe bracket (37).

(25) Tighten two bolts (36) to 106-130 lb-ft (144-176 N·m).





(26) Position clamp (38) and upper exhaust pipe (33) on lower exhaust pipe (39) with self-locking nut (40).

(27) Tighten self-locking nut (40) to 89-109 lb-in. (10-12 N·m).

c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Start engine (TM 9-2320-365-10).

(3) Check for oil leaks on turbocharger and under vehicle.

(4) Operate vehicle and check for proper engine operation (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10)

End of Task.

4-7. FUEL CONTROL LINKAGE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Rocker arm assemblies removed (para 3-12).

Tools and Special Tools
Tool Kit, Intl. Comb. Eng. (TM 9-2320-365-20)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)

Tools and Special Tools (Cont)
Adapter, Socket Wrench, (Item 1, Appendix B)
Socket Wrench Attachment, Screwdriver (TM 9-2320-365-20)
Hammer, Hand Soft Head (Item 28, Appendix B)
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Lubricating Oil, Engine (Item 46, Appendix C)

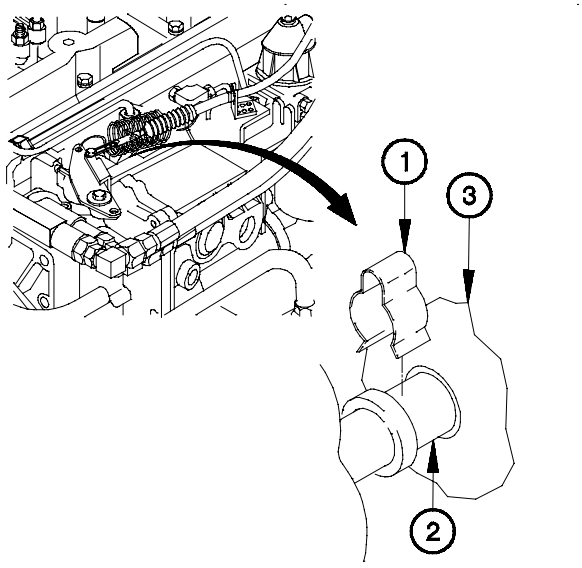
a. Removal.

(1) Remove clip (1) from adapter sleeve (2).

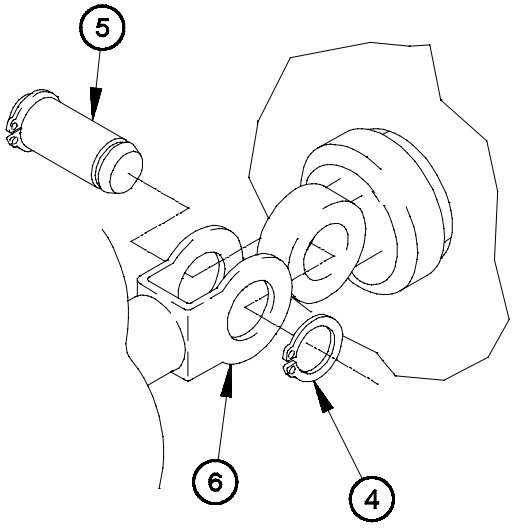
CAUTION

Do not use hard-jawed pliers or screwdriver to move sleeve. Failure to comply may result in damage to equipment.

(2) Slide adapter sleeve (2) in cylinder head (3).



YD07R01A



YD07R02

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(3) Remove retaining ring (4) and clevis pin (5) from governor linkage (6).

NOTE

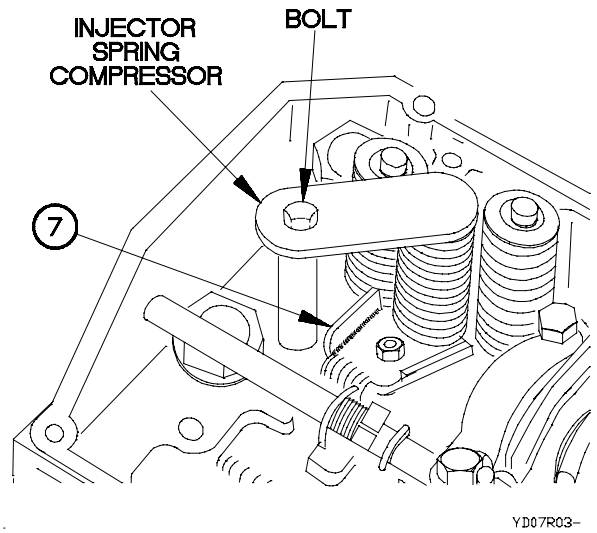
If cylinder head is to be replaced proceed to step (8).

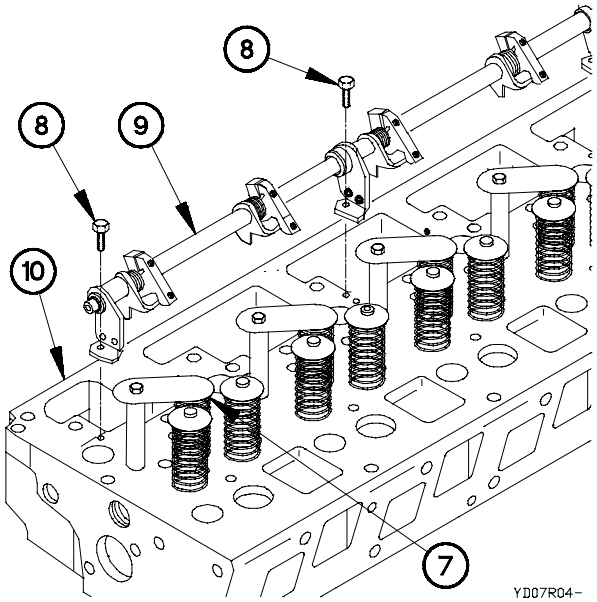
(4) Install injector spring compressor on No. 1 fuel injector (7).

(5) Tighten bolt to compress injector spring compressor .

(6) Tap injector spring compressor lightly with soft hammer.

(7) Perform steps (4) through (6) on remaining five fuel injectors (7).





(8) Remove four bolts (8) from fuel control linkage (9).

(9) Disconnect fuel control linkage (9) from each fuel injector (7).

(10) Remove fuel control linkage (9) from cylinder head (10).

b. Installation.

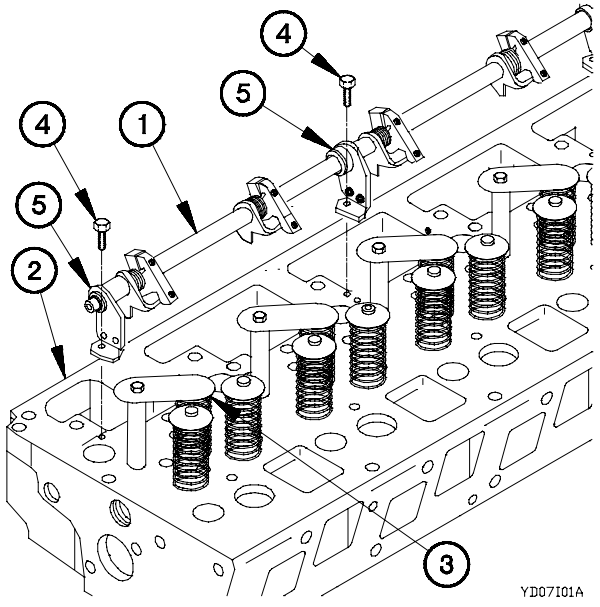
(1) Position fuel control linkage (1) on cylinder head (2).

(2) Engage all six fuel injectors (3).

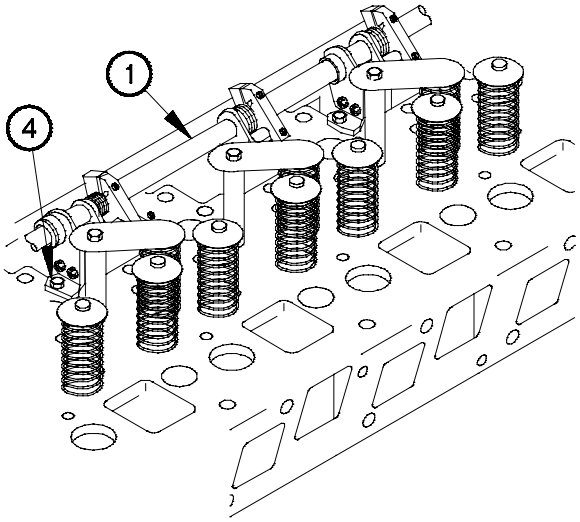
CAUTION

Ensure dowel on each mounting bracket is properly positioned and mounting bracket is flush against cylinder head. Failure to comply may result in damage to equipment.

(3) Position four screws (4) in mounting brackets (5).



4-7. FUEL CONTROL LINKAGE REPLACEMENT (CONT)

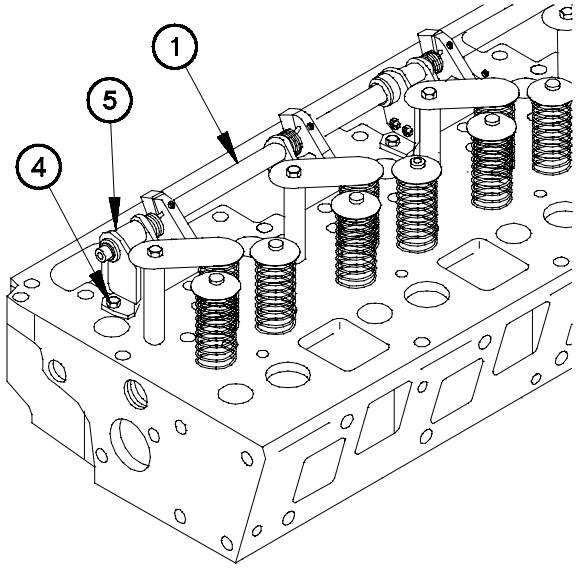


YD07I021

(4) Verify fuel control linkage (1) rotates freely.

(5) Hold fuel control linkage (1) in place.

(6) Tighten four screws (4) to 24-36 lb-in. (3-4 N·m).



YD07I03A

NOTE

If free movement of fuel control linkage is not obtained, perform steps (7) through (9).

(7) Loosen four screws (4) on mounting brackets (5).

(8) Verify that fuel control linkage (1) will rotate freely.

(9) Tighten four screws (1) to 24-36 lb-in. (3-4 N·m).

c. Follow-On Maintenance.

Perform fuel injector synchronization (para 4-3).

End of Task.

4-8. IDLE SPEED ADJUSTMENT

This task covers:

a. Adjustment

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Engine within operational temperature (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
STE-ICE-R (Item 60, Appendix B)

References
TM 9-4910-571-12&P

WARNING

Engine compartment and components may be hot to the touch. Extreme care should be taken when adjusting idle speed. Failure to comply may result in injury to personnel.

a. Adjustment.

NOTE

Route STE-ICE-R cable through left door window.

(1) Connect STE-ICE-R to DCA connector (1).

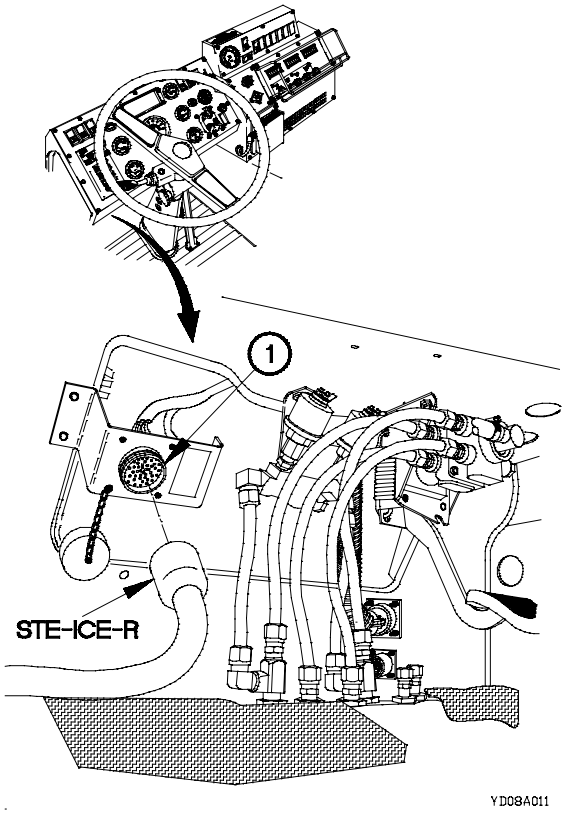
(2) Turn on power to STE-ICE-R (TM 9-4910-571-12&P).

(3) Perform confidence test (TM 9-4910-571-12&P).

(4) Start engine (TM 9-2320-365-10).

(5) Raise cab (TM 9-2320-365-10).

(6) Perform Test 10 (TM 9-4910-571-12&P).



4-8. IDLE SPEED ADJUSTMENT (CONT)

WARNING

Engine compartment includes a partially covered fan blade. Extreme care should be taken when working in the engine compartment. Failure to comply may result in injury to personnel.

(7) Loosen self-locking nut (2) on governor idle screw (3).

NOTE

Governor idle screw turns right to increase RPM and turns left to decrease RPM.

(8) While monitoring engine RPM, adjust governor idle screw (3) until 730-770 RPMS are obtained.

(9) Tighten self-locking nut (2) on governor idle screw (3).

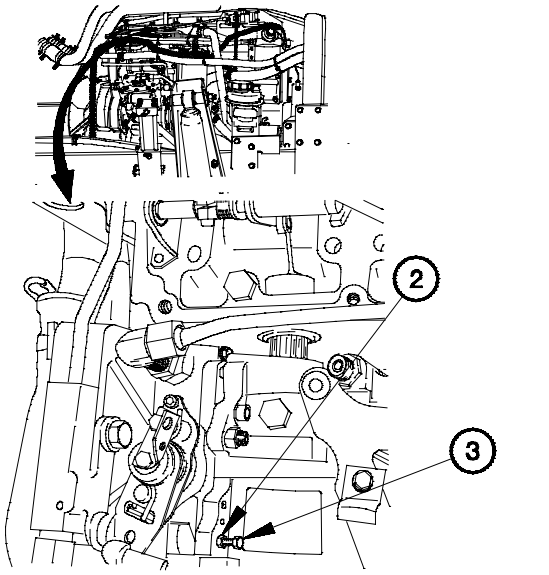
(10) Lower cab (TM 9-2320-365-10).

(11) Shut down engine (TM 9-2320-365-10).

(12) Turn power off to STE-ICE-R (TM 9-4910-571-12&P).

(13) Remove STE-ICE-R (TM 9-4910-571-12&P).

End of Task.



4-9. FUEL GOVERNOR REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Fuel shutoff solenoid removed (para 6-4).
Fuel ratio control tube removed (TM 9-2320-365-20-3).
Governor linkage removed (TM 9-2320-365-20-3).
Fuel setting checks performed (para 4-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Tool Kit, Auto Fuel and Electrical System Repair (Item 65, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Tools and Special Tools (Cont)
Pliers, Slip Joint (Item 40, Appendix B)
Pan, Drain (Item 36, Appendix B)

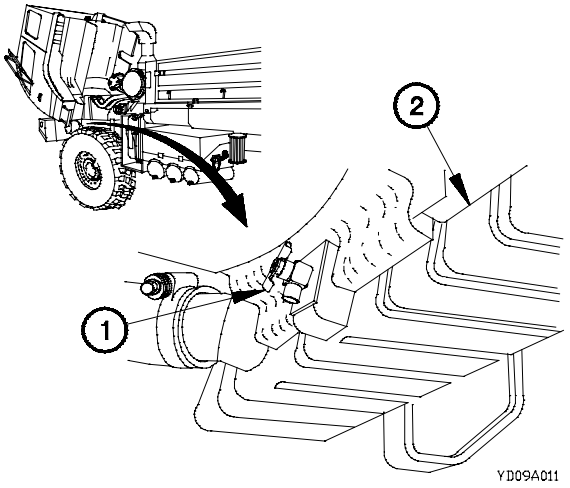
Materials/Parts
Packing, Preformed (2) (Item 197, Appendix F)
Packing, Preformed (2) (Item 204, Appendix F)
Parts Kit, Engine Fuel Pump (Item 220, Appendix F)
Packing, Preformed (2) (Item 190, Appendix F)
Packing, Preformed (Item 199, Appendix F)
Gasket (Item 58, Appendix F)
Packing, Preformed (Item 189, Appendix F)
Packing, Preformed (2) (Item 191, Appendix F)

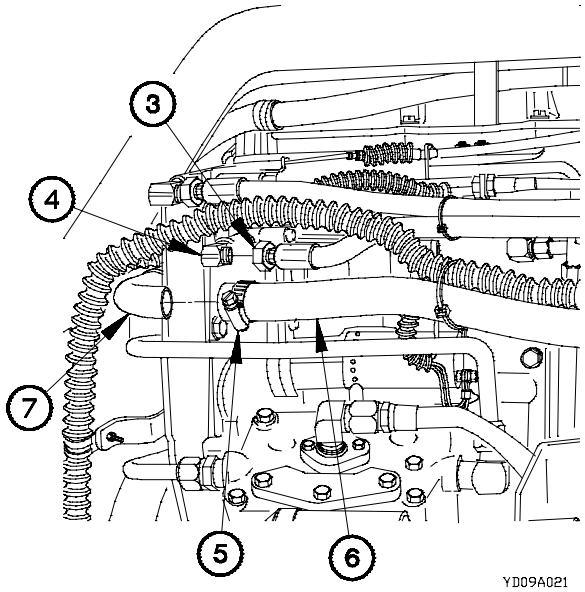
Personnel Required
(2)

a. Removal.

(1) Position drain pan under radiator draincock (1).

(2) Drain radiator (2) about halfway [approximately 15-20 qt (14-19 L)].



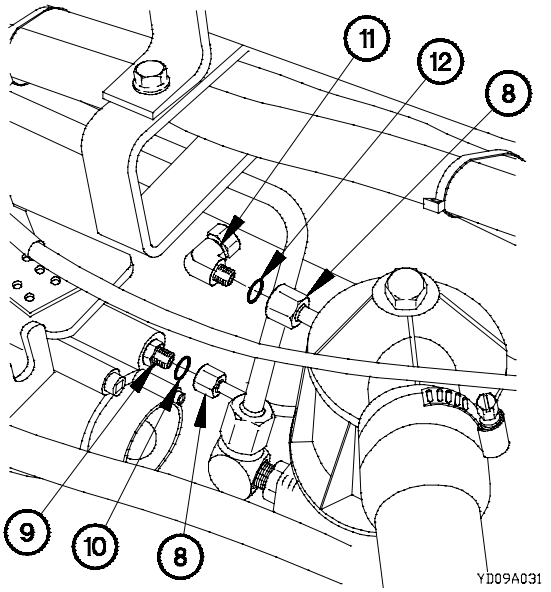


(3) Disconnect fuel hose (3) from 90-degree fitting (4).

(4) Loosen hose clamp (5) on coolant hose (6).

(5) Disconnect coolant hose (6) from coolant tube (7).

4-9. FUEL GOVERNOR REPLACEMENT/REPAIR (CONT)

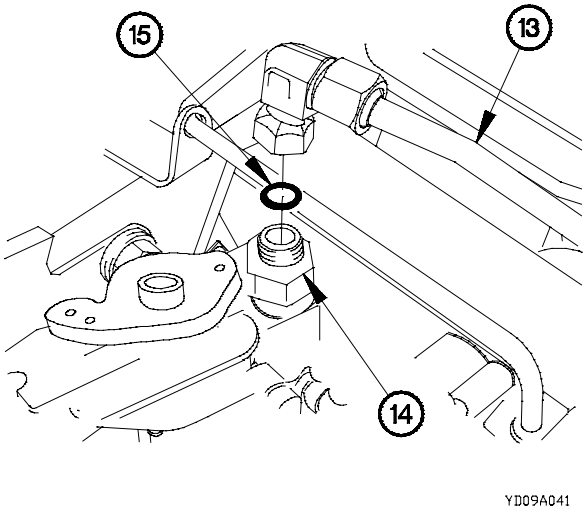


(6) Disconnect oil tube (8) from fitting (9).

(7) Remove preformed packing (10) from fitting (9). Discard preformed packing.

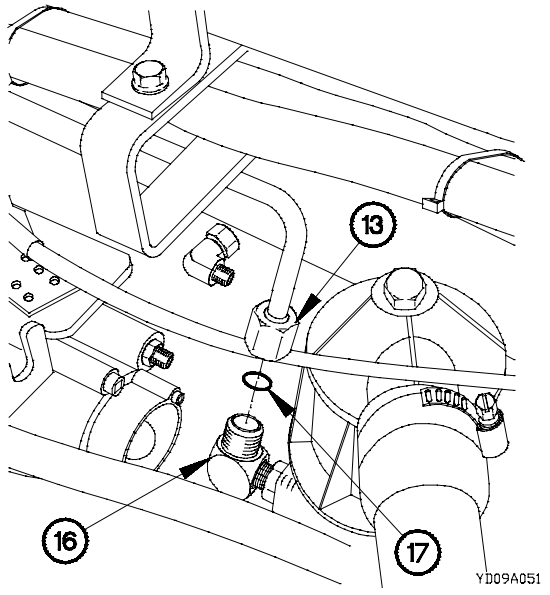
(8) Disconnect oil tube (8) from 90-degree fitting (11).

(9) Remove preformed packing (12) from 90-degree fitting (11). Discard preformed packing.



(10) Disconnect fuel tube (13) from fitting (14).

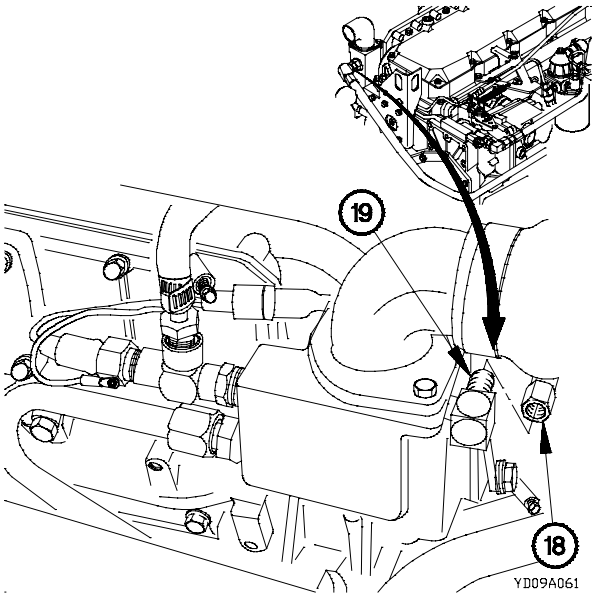
(11) Remove preformed packing (15) from fitting (14). Discard preformed packing.

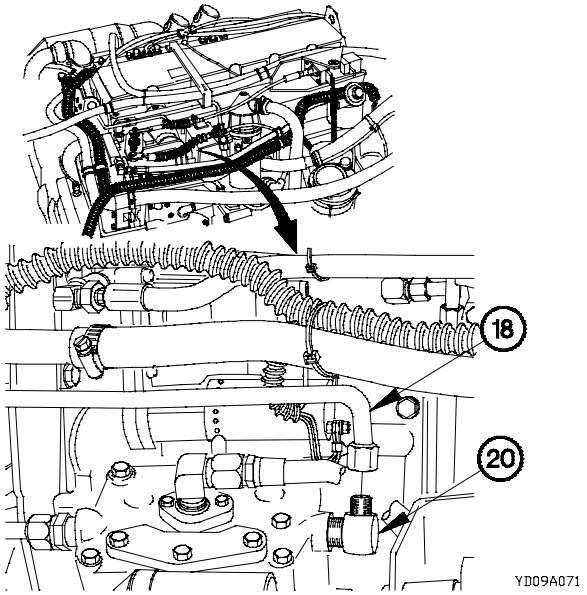


(12) Disconnect fuel tube (13) from tee fitting (16).

(13) Remove preformed packing (17) from tee fitting (16). Discard preformed packing.

(14) Disconnect air compressor inlet coolant tube (18) from 90-degree fitting (19).





(15) Remove air compressor inlet coolant tube (18) from 90-degree fitting (20).

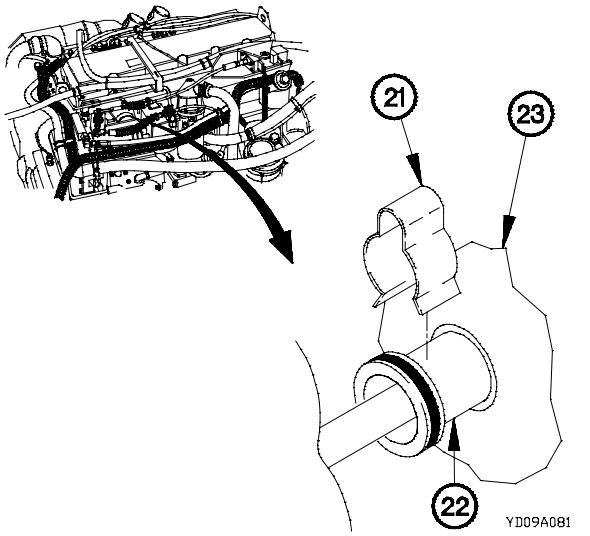
(16) Remove spring clip (21) from adapter sleeve (22).

CAUTION

Ensure dowel on each mounting bracket is properly positioned and mounting bracket is flush against cylinder head. Failure to comply may result in damage to equipment.

(17) Loosen adapter sleeve (22) on cylinder head (23).

(18) Slide adapter sleeve (22) into cylinder head (23).



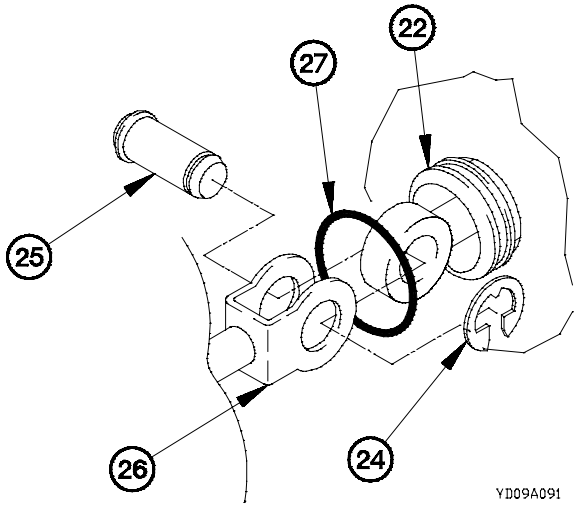
4-9. FUEL GOVERNOR REPLACEMENT/REPAIR (CONT)

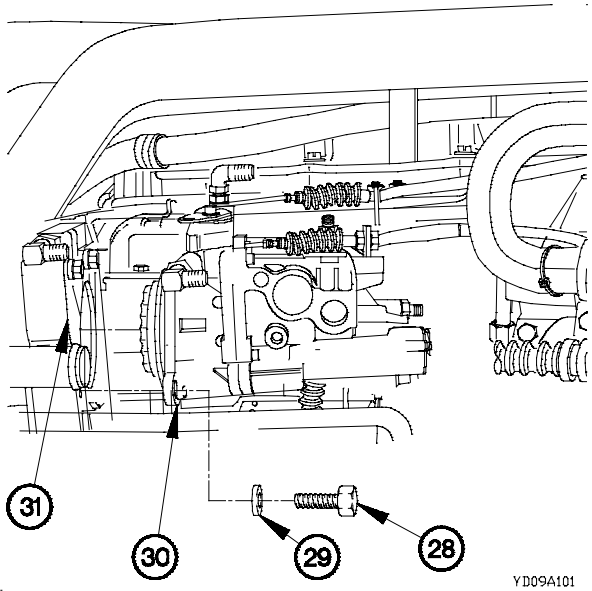
WARNING

Use care when removing retaining clips. Retaining clips are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(19) Remove retaining clip (24) and clevis pin (25) from fuel governor clevis (26).

(20) Remove preformed packing (27) from adapter sleeve (22). Discard preformed packing.





(21) Remove three screws (28), washers (29), and fuel governor (30) from engine (31).

b. Disassembly.

(1) Remove gasket (1) from fuel governor (2). Discard gasket.

(2) Remove 90-degree fitting (3) from adapter (4).

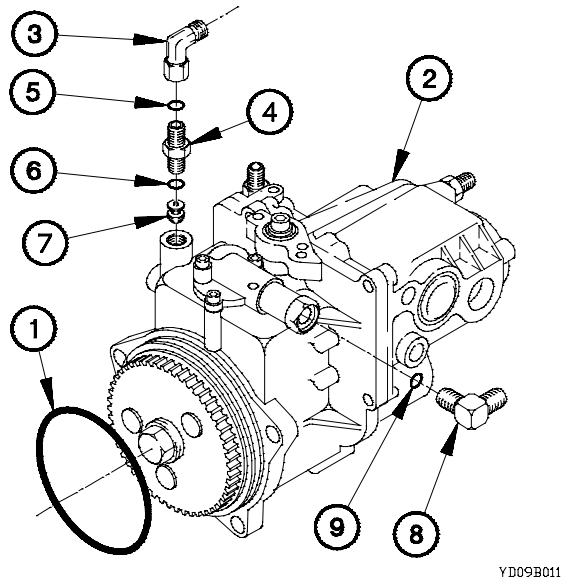
(3) Remove adapter (4) from fuel governor (2).

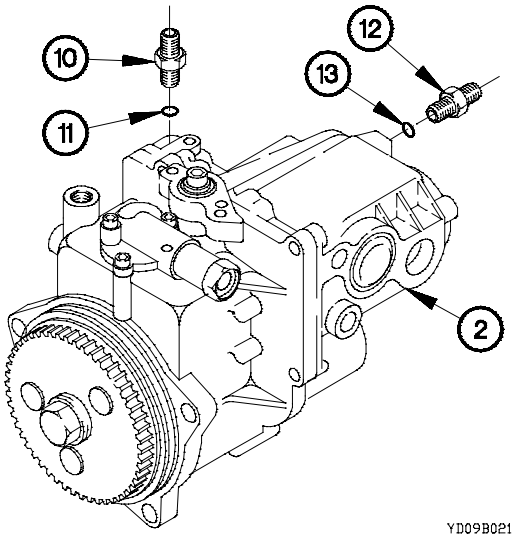
(4) Remove preformed packings (5 and 6) from adapter (4). Discard preformed packings.

(5) Remove check valve (7) from fuel governor (2). Discard check valve.

(6) Remove 90-degree fitting (8) from fuel governor (2).

(7) Remove preformed packing (9) from 90-degree fitting (8). Discard preformed packing.



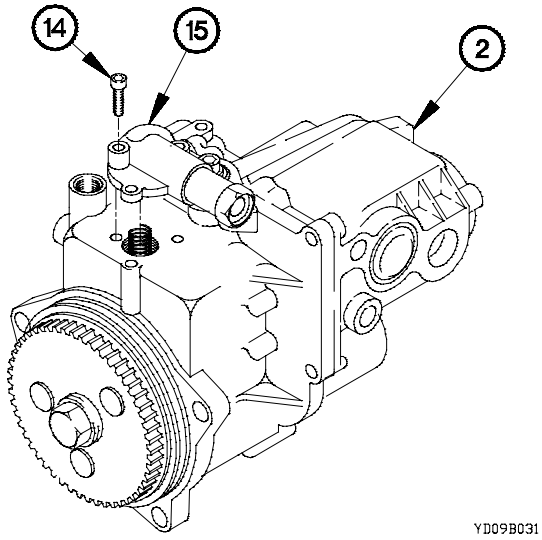


(8) Remove fitting (10) from fuel governor (2).

(9) Remove preformed packing (11) from fitting (10). Discard preformed packing.

(10) Remove fitting (12) from fuel governor (2).

(11) Remove preformed packing (13) from fitting (12). Discard preformed packing.

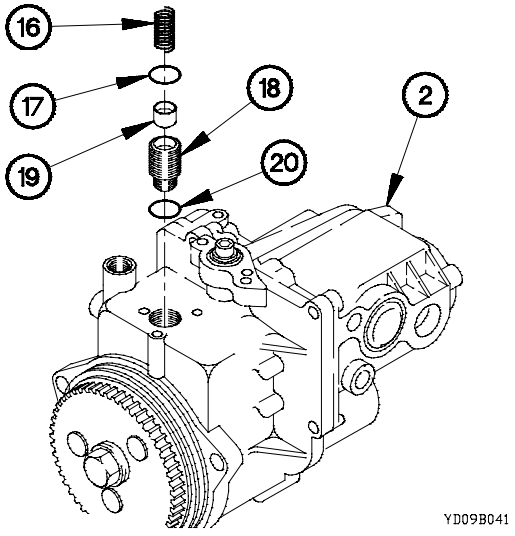


CAUTION

Transfer pump cover is under spring pressure. Pressure must be maintained on cover and screws loosened evenly. Failure to comply may result in damage to equipment.

(12) Remove three screws (14) from transfer pump cover (15).

(13) Remove transfer pump cover (15) from fuel governor (2).

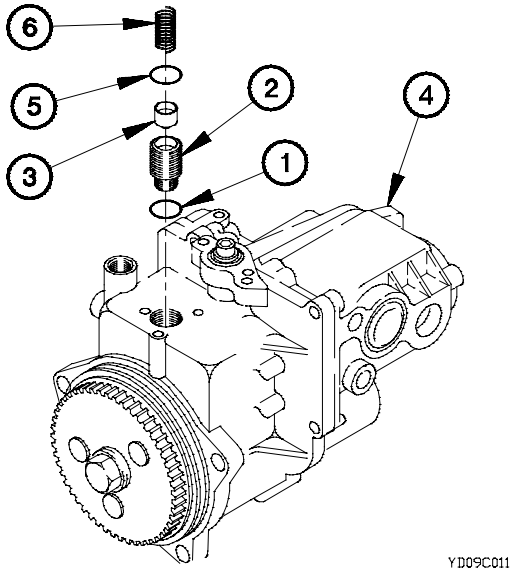


(14) Remove spring (16) and seal (17) from pump piston (18). Discard spring and seal.

(15) Remove sleeve (19), pump piston (18), and seal (20) from fuel governor (2). Discard sleeve, pump piston, and seal.

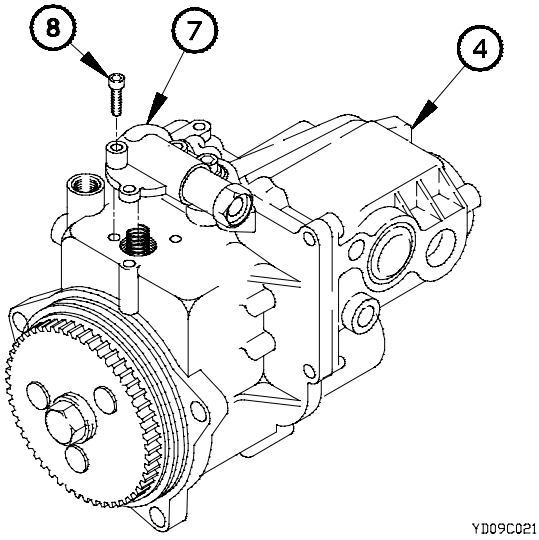
4-9. FUEL GOVERNOR REPLACEMENT/REPAIR (CONT)

c. Assembly.



(1) Install seal (1), pump piston (2), and sleeve (3) in fuel governor (4).

(2) Install seal (5) and spring (6) in pump piston (2).



CAUTION

Transfer pump cover is under spring pressure. Pressure must be maintained on cover and screws tightened evenly. Failure to comply may result in damage to equipment.

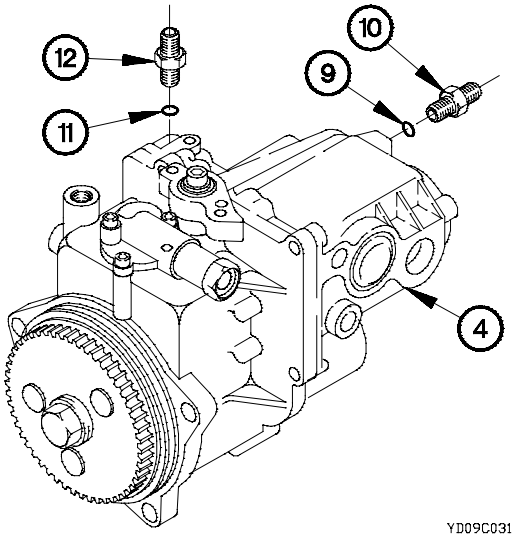
(3) Install transfer pump cover (7) on fuel governor (4) with three screws (8).

(4) Install preformed packing (9) on fitting (10).

(5) Install fitting (10) in fuel governor (4).

(6) Install preformed packing (11) on fitting (12).

(7) Install fitting (12) in fuel governor (4).



(8) Install preformed packing (13) on 90-degree fitting (14).

(9) Install 90-degree fitting (14) on fuel governor (4).

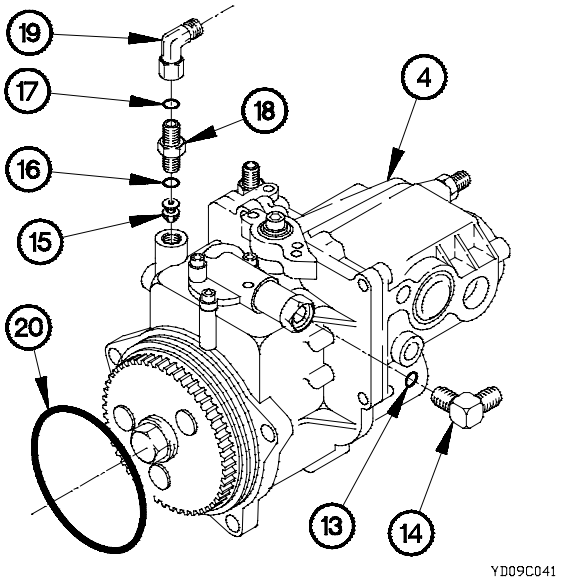
(10) Install check valve (15) in fuel governor (4).

(11) Install preformed packings (16 and 17) on adapter (18).

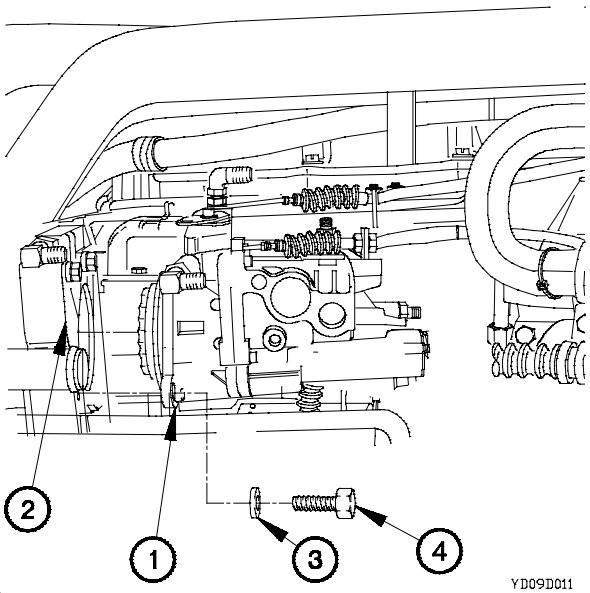
(12) Install adapter (18) in fuel governor (4).

(13) Install 90-degree fitting (19) on adapter (18).

(14) Install gasket (20) on fuel governor (4).



d. Installation.



(1) Position fuel governor (1) on engine (2) with three washers (3) and bolts (4).

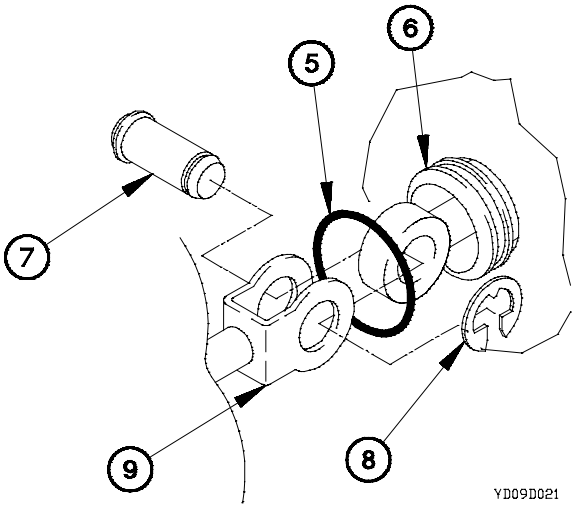
(2) Tighten three bolts (4) to 15-25 lb-ft (20-34 N·m).

(3) Install preformed packing (5) on adapter sleeve (6).

WARNING

Use care when installing retaining clips. Retaining clips are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(4) Install clevis pin (7) and retaining clip (8) in fuel governor clevis (9).



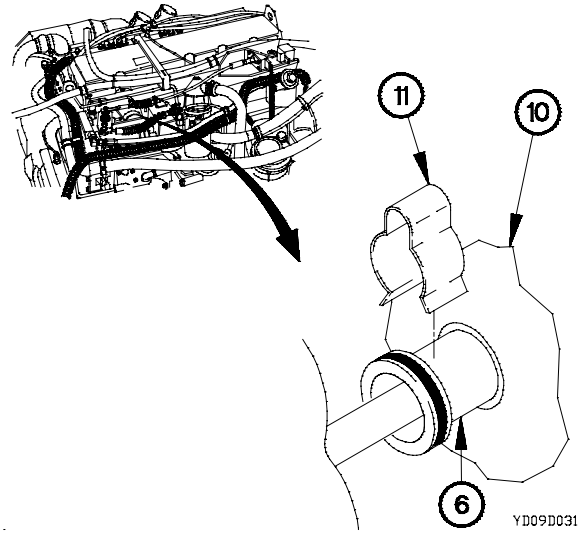
4-9. FUEL GOVERNOR REPLACEMENT/REPAIR (CONT)

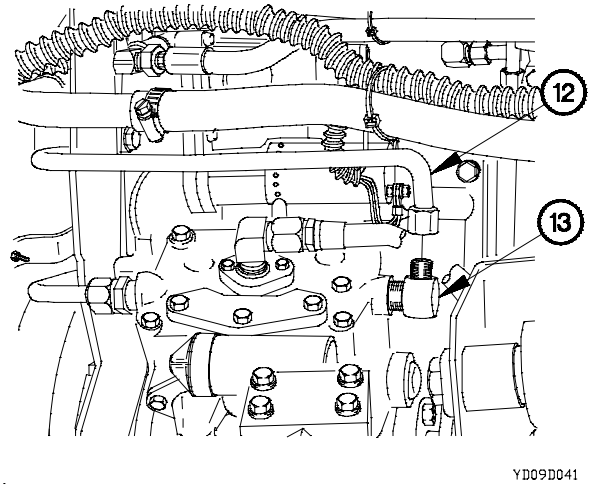
CAUTION

Ensure dowel on each mounting bracket is properly positioned and mounting bracket is flush against cylinder head. Failure to comply may result in damage to equipment.

(5) Slide adapter sleeve (6) out of cylinder head (10).

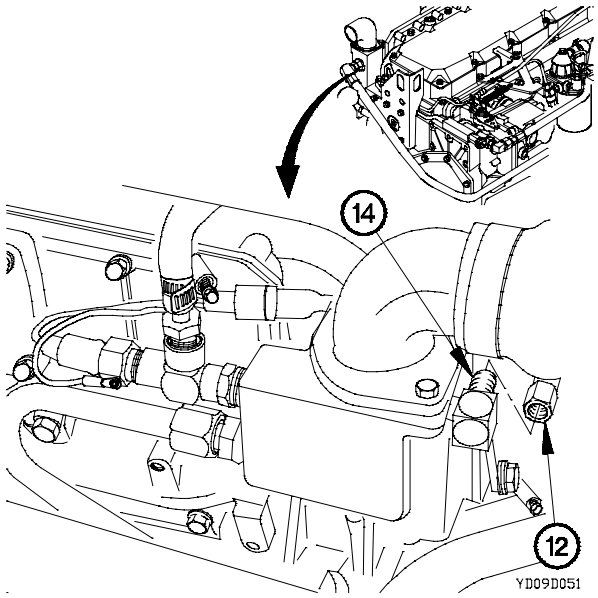
(6) Install spring clip (11) on adapter sleeve (6).





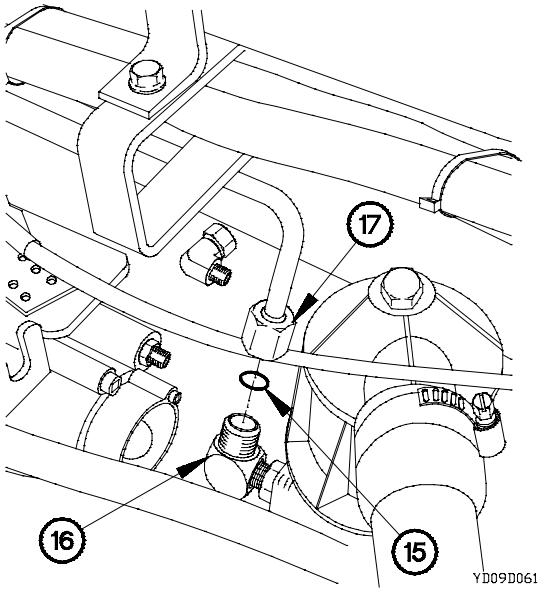
(7) Connect compressor inlet coolant tube (12) to 90-degree fitting (13).

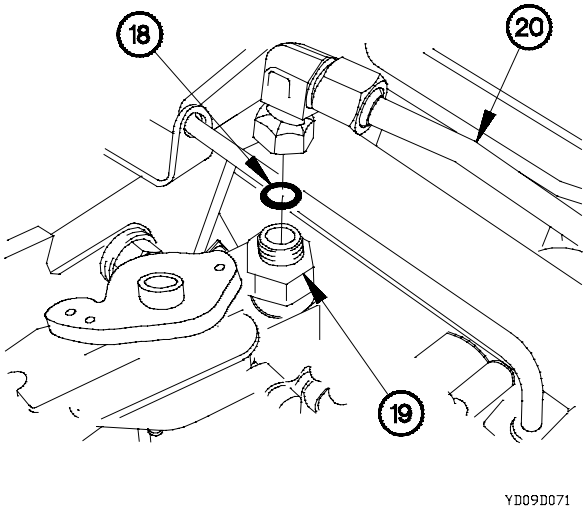
(8) Connect compressor inlet coolant tube (12) to 90-degree fitting (14).



(9) Install preformed packing (15) on tee fitting (16).

(10) Connect fuel tube (17) to tee fitting (16).





(11) Install preformed packing (18) on fitting (19).

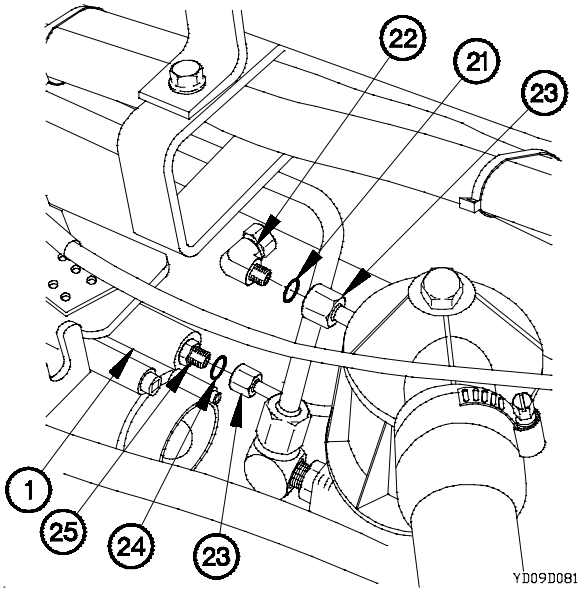
(12) Connect fuel tube (20) to fitting (19).

(13) Install preformed packing (21) on 90-degree fitting (22).

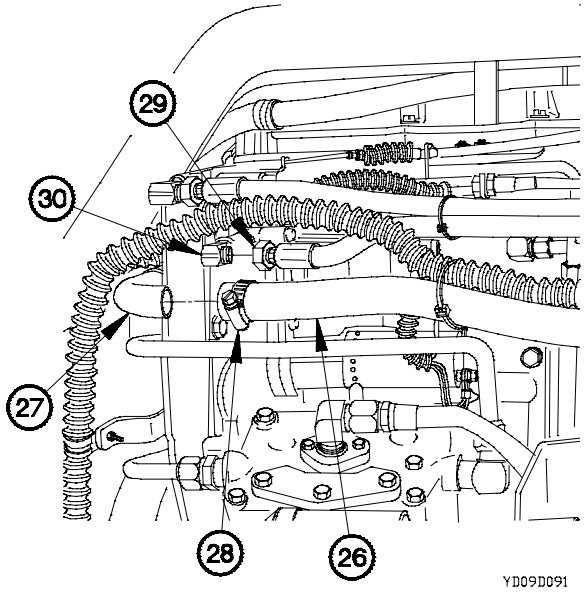
(14) Connect oil tube (23) to 90-degree fitting (22).

(15) Install preformed packing (24) on fitting (25).

(16) Connect oil tube (23) to fitting (25) on fuel governor (1).



4-9. FUEL GOVERNOR REPLACEMENT/REPAIR (CONT)



(17) Connect coolant hose (26) to coolant tube (27).

(18) Tighten hose clamp (28).

(19) Connect fuel hose (29) to 90-degree fitting (30).

e. Follow-on Maintenance.

(1) Install governor linkage (TM 9-2320-365-20-2).

(2) Install fuel ratio control tube (TM 9-2320-365-20-2).

(3) Install fuel shutoff solenoid (para 6-4).

(4) Perform fuel setting check (para 4-4).

(5) Fill radiator with coolant (TM 9-2320-365-10).

(6) Lower cab (TM 9-2320-365-10).

(7) Start engine (TM 9-2320-365-10).

(8) Operate vehicle and check for fuel and oil leaks and proper engine operation (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.

CHAPTER 5
COOLING SYSTEM MAINTENANCE

Section I. INTRODUCTION 5-1
5-1. INTRODUCTION 5-1

Section II. MAINTENANCE PROCEDURES 5-2
5-2. RADIATOR REPAIR 5-2
5-3. ENGINE FAN CLUTCH REPAIR (P/N 1090-08000-01) 5-3

Section I. INTRODUCTION

5-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Cooling System Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

5-2. RADIATOR REPAIR

This task covers:

a. Repair

INITIAL SETUP

Equipment Conditions
Radiator placed on Radiator Test and Repair Stand.

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Stand, Radiator Test and Repair (Item 58, Appendix B)

References
TM 750-254 Cooling System: Tactical Vehicle

a. Repair.

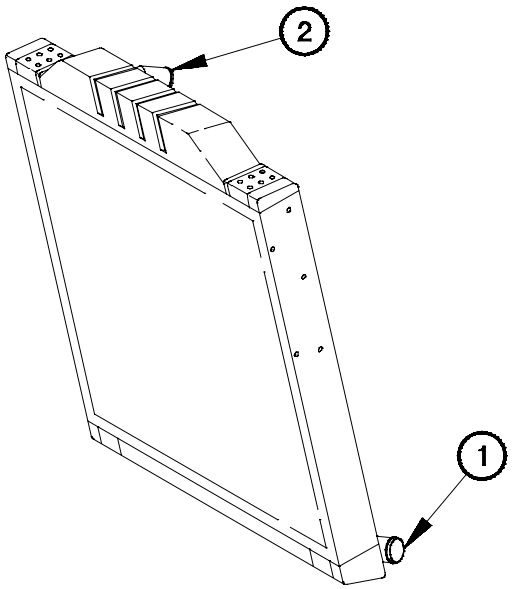
(1) Test radiator for leaks.

a. Plug radiator outlet (1) and attach low pressure air source (10-15 psi) (69-103 kPa) in inlet (2).

b. Submerge radiator in tank of water and apply air pressure.

c. Observe for leaks indicated by air bubbles.

(2) To repair leaks, refer to TM 750-254.



End of Task.

5-3. ENGINE FAN CLUTCH REPAIR (P/N 1090-08000-01)

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Deleted

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque 0-150 lb-in. (Item 79, Appendix B)
C-Clamp (2) (Item 10, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Pliers, Retaining Ring (Item 37, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Paper, Abrasive (Item 53.1, Appendix C)
Kit, Repair (Item 85.1, Appendix F)
Sealing Compound (Item 67.2, Appendix C)
Nut, Self-Locking (Item 143, Appendix F)
Rag, Wiping (Item 59, Appendix C)
Grease, General Purpose (Item 37, Appendix C)

a. Disassembly.

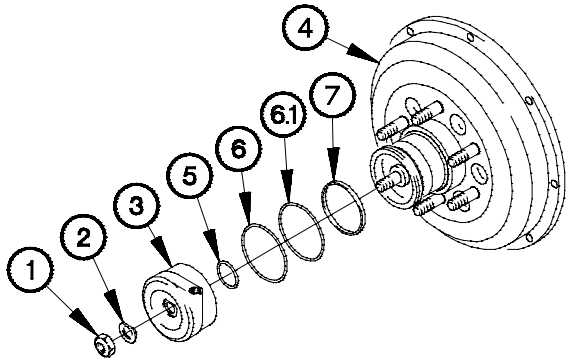
(1) Remove self-locking nut (1), tab washer (2), and cylinder (3) from clutch housing (4). Discard self-locking nut and tab washer.

(2) Remove preformed packing (5) from cylinder (3). Discard preformed packing.

(3) Remove preformed packing (6) from clutch housing (4). Discard preformed packing.

(3.1) Remove preformed packing (6.1) from clutch housing (4). Discard preformed packing.

(4) Remove seal (7) from clutch housing (4). Discard seal.



YE03A01B

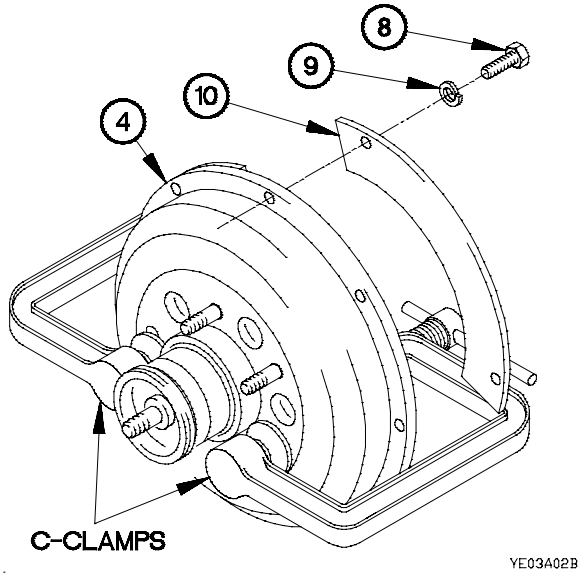
5-3. ENGINE FAN CLUTCH REPAIR (P/N 1090-08000-01) (CONT)

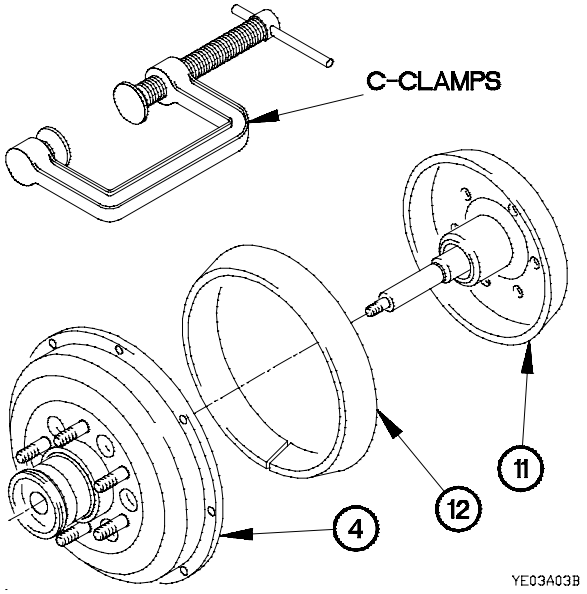
WARNING

Clutch housing is assembled under tension. Use caution during disassembly. Failure to comply may result in injury to personnel.

(5) Attach two C-clamps to clutch housing (4).

(6) Remove six screws (8), lockwashers (9), and three retaining plates (10) from clutch housing (4). Discard screws and lockwashers.





WARNING

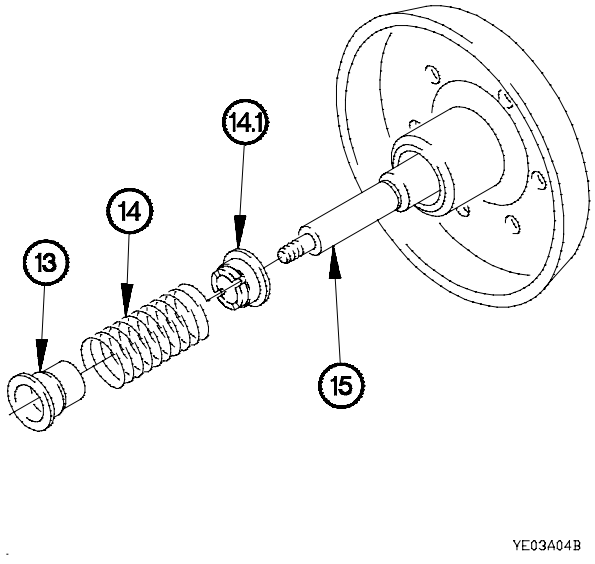
Loosen C-clamps slowly and evenly to release tension. Failure to comply may result in injury to personnel or damage to equipment.

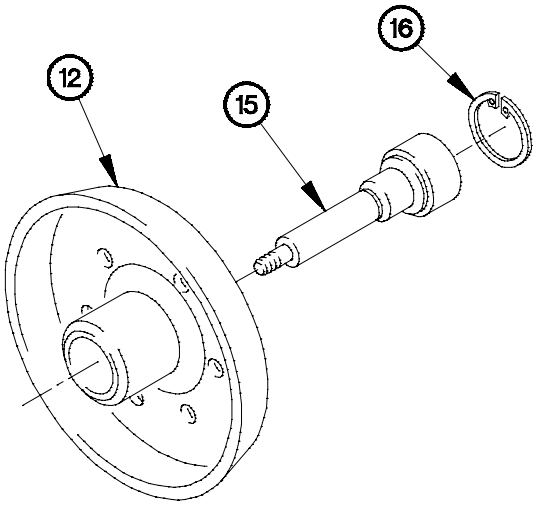
(7) Remove C-clamps from clutch housing (4) and shaft mount (11).

(8) Remove shaft mount (11) from clutch housing (4).

(9) Remove lining (12) from clutch housing (4). Discard lining.

(10) Remove front spring cap (13), spring (14), and rear spring cap (14.1) from shaft (15). Discard spring and rear spring cap.





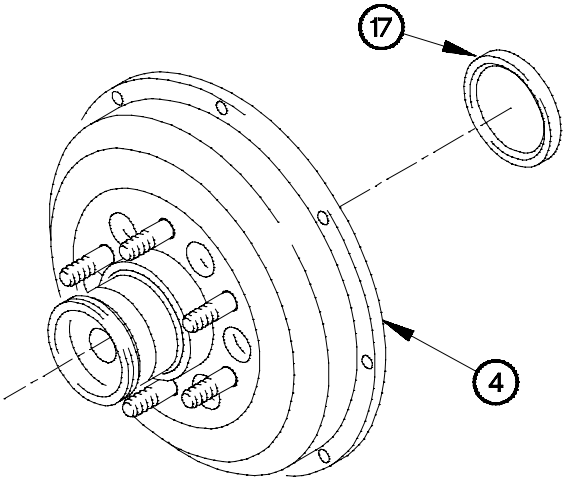
YE03A05B

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(11) Remove retaining ring (16) from shaft mount (12).

(12) Remove shaft (15) from shaft mount (12).



YE03A06B

(13) Remove grease seal (17) from clutch housing (4). Discard grease seal.

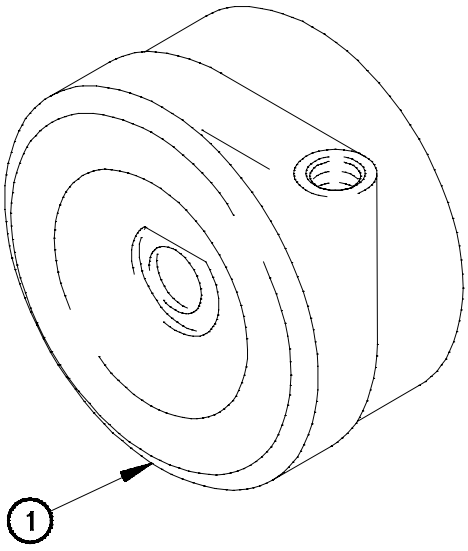
b. Cleaning/Inspection.

NOTE

Replace any part that fails visual inspection.

(1) Wipe clean all metal parts.

(2) Inspect cylinder (1) for cracks or scoring.



YE03B011

5-3. ENGINE FAN CLUTCH REPAIR (P/N 1090-08000-01) (CONT)

NOTE

Replace fan clutch if any part in steps (3) through (10) fail inspection.

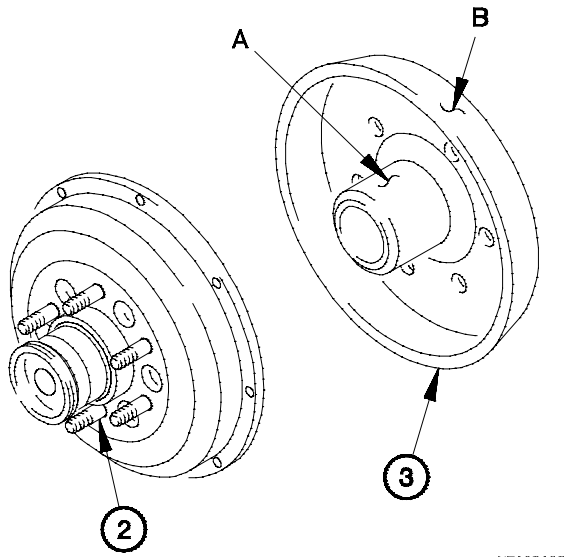
(3) Inspect clutch housing studs (2) for damage or looseness.

(4) Sand surface A on shaft mount (3).

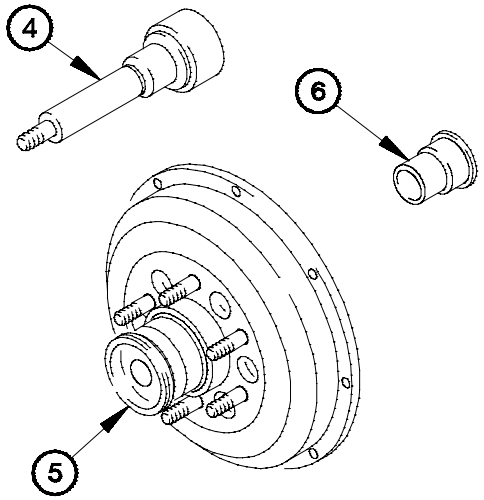
(5) Inspect surface A of shaft mount (3) for any signs of scoring, knicks, cracking, or wear.

(6) Sand surface B of shaft mount (3) to remove any glazing.

(7) Inspect surface B of shaft mount (3) for any signs of scoring, burning, or cracking.



YE03B02B



YE03B03B

(8) Inspect shaft (4) for pitting, corrosion, and signs of burning.

(9) Inspect piston bearing (5) for free spinning or rough turning.

(10) Inspect front spring cap (6) for wear which indicates rubbing.

c. Assembly.

NOTE

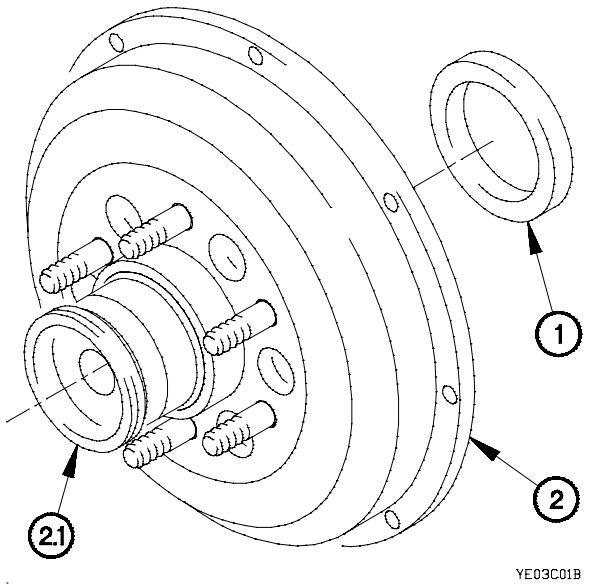
Lubricate all grease seals, front and rear spring caps, seals, and preformed packings prior to installation.

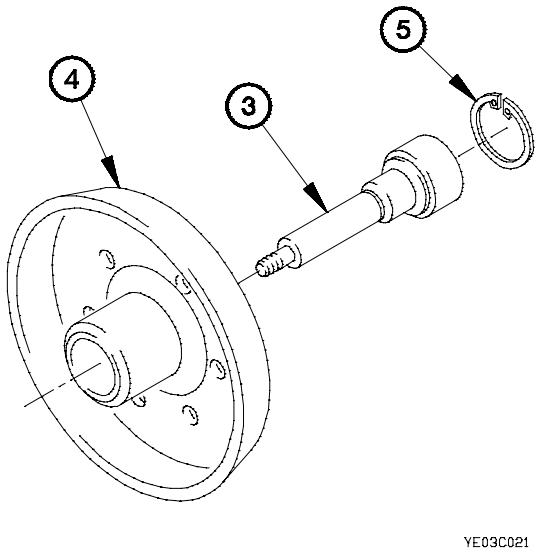
(1) Install grease seal (1) in clutch housing (2).

CAUTION

Ensure piston bearing is packed thoroughly with grease. Failure to comply may result in damage to equipment.

(1.1) Pack piston bearing (2.1) thoroughly with grease.





WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(1.2) Apply sealing compound to bearing surface of shaft (3).

(2) Install shaft (3) in shaft mount (4).

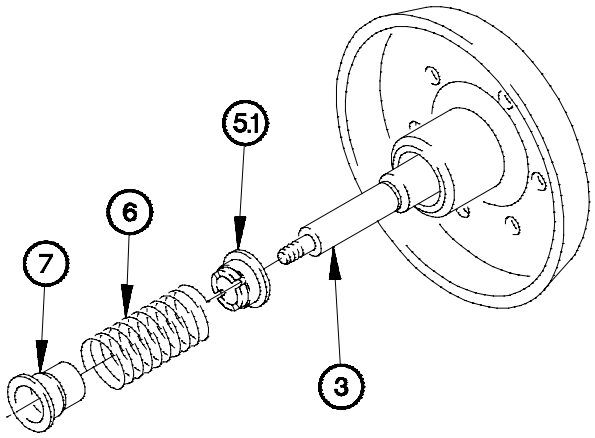
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

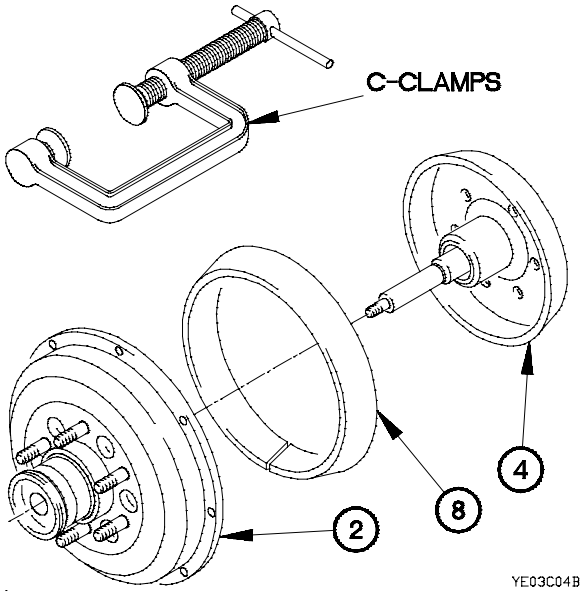
(3) Install retaining ring (5) in shaft mount (4).

5-3. ENGINE FAN CLUTCH REPAIR (P/N 1090-08000-01) (CONT)

(4) Install rear spring cap (5.1), spring (6), and front spring cap (7) on shaft (3).



YE03C03B



YE03C04B

(5) Install lining (8) in clutch housing (2).

(6) Position shaft mount (4) in clutch housing (2) with holes aligned.

(7) Attach two C-clamps on clutch housing (2).

WARNING

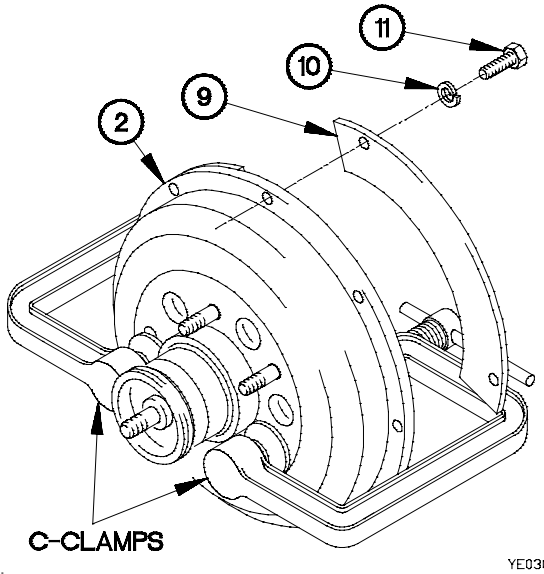
Tighten C-clamps slowly and evenly to apply tension. Failure to comply may result in injury to personnel or damage to equipment.

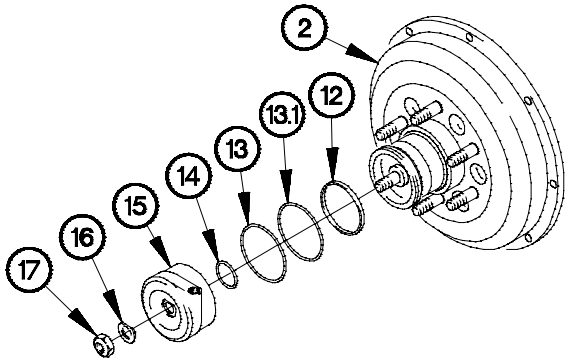
(8) Compress clutch housing (2) and shaft mount (4).

(9) Position three retaining plates (9) on clutch housing (2) with six lockwashers (10) and screws (11).

(10) Tighten six screws (11) to 30 lb-in. (3 N•m).

(11) Remove two C-clamps from clutch housing (2).





(12) Install seal (12) and preformed packing (13) on clutch housing (2).

(12.1) Install preformed packing (13.1) on clutch housing (2).

(13) Install preformed packing (14) on cylinder (15).

(14) Install cylinder (15) on shaft (3).

(15) Position tab washer (16) and self-locking nut (17) on shaft (3).

(16) Tighten self-locking nut (17) to 84 lb-in. (9 N•m).

End of Task.

CHAPTER 6
ELECTRICAL SYSTEM MAINTENANCE

Section I. INTRODUCTION 6-1
6-1. INTRODUCTION 6-1

Section II. MAINTENANCE PROCEDURES 6-2
6-2. 100 AMP ALTERNATOR REPAIR 6-2
6-3. STARTING MOTOR REPAIR (P/N M0017730MD) 6-11
6-4. FUEL SHUTOFF SOLENOID REPLACEMENT 6-28
6-5. TRANSMISSION TURBINE SPEED SENSOR REPLACEMENT 6-32
6-6. STARTING MOTOR REPAIR (P/N M0017730ME) 6-33
6-7. TRANSMISSION EXTERNAL WIRING HARNESS REPLACEMENT 6-38
6-8. TRANSMISSION ADAPTER CABLE ASSEMBLY REPLACEMENT 6-43

Section I. INTRODUCTION

6-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repairing of Electrical System Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

6-2. 100 AMP ALTERNATOR REPAIR

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque 0-175 lb-ft (Item 80, Appendix B)
Puller Kit, Universal (Item 44, Appendix B)
Wrench, Torque 0-200 lb-in. (Item 81, Appendix B)
Hammer, Soft Head (Item 28, Appendix B)
Press, Arbor Hand Operated (Item 41, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Grease, Molybdenum Disulfide (Item 38, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

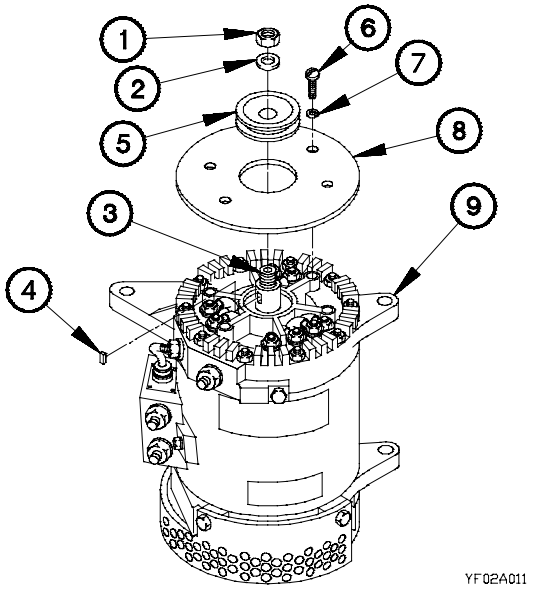
Materials/Parts (Cont)
Sealing Compound (Item 75, Appendix C)
Nut, Self-locking (Item 153, Appendix F)
Lockwasher (4) (Item 108, Appendix F)
Nut, Self-Locking (Item 122, Appendix F)
Lockwasher (2) (Item 109, Appendix F)
Nut, Self-Locking (18) (Item 150, Appendix F)
Lockwasher (6) (Item 107, Appendix F)
Screw, Cap (3) (Item 252, Appendix F)

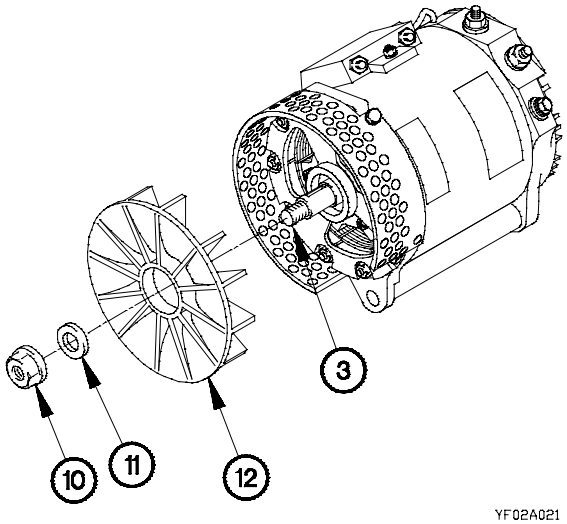
a. Disassembly

(1) Remove self-locking nut (1) and washer (2) from shaft (3). Discard self-locking nut.

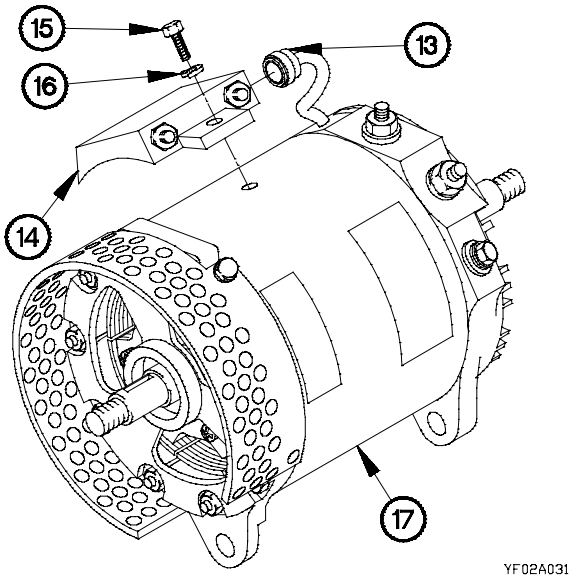
(2) Remove key (4), and pulley bushing (5) from shaft (3).

(3) Remove four screws (6), lockwashers (7), and cover plate (8) from front housing (9). Discard lockwashers.





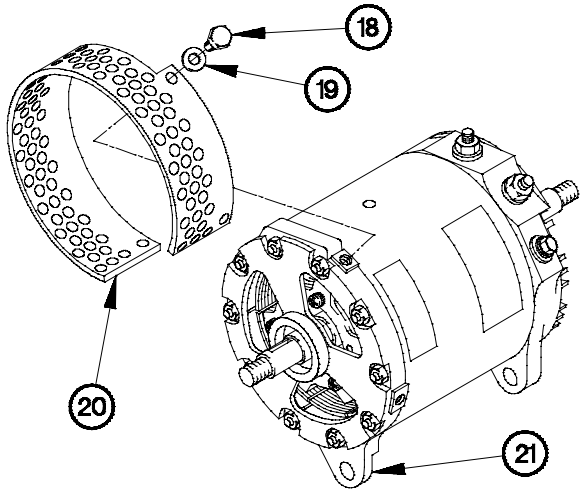
(4) Remove self-locking nut (10), washer (11), and fan (12) from shaft (3). Discard self-locking nut.



YF02A031

(5) Disconnect connector (13) from voltage regulator (14).

(6) Remove two screws (15), lockwashers (16), and voltage regulator (14) from stator (17). Discard lockwashers.



YF02A041

(7) Remove four screws (18), washers (19), and fan guard (20) from end housing (21).

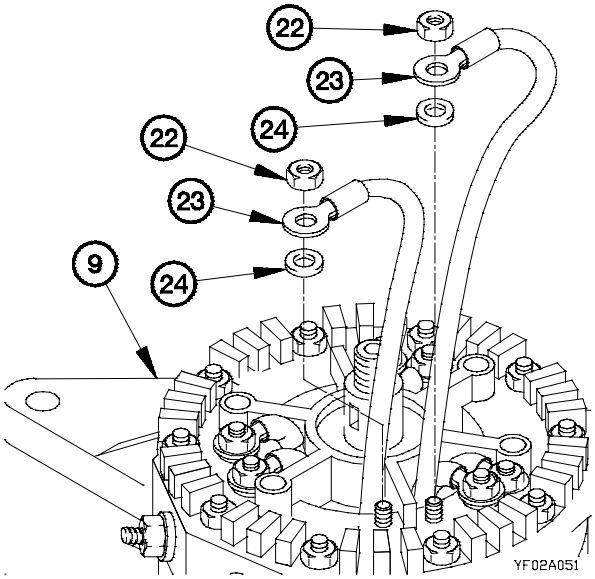
CAUTION

Nuts securing field leads and coil leads are not interchangeable. Tag field lead nuts during removal. Failure to comply may result in damage to equipment.

NOTE

Tag field leads and connection points prior to disconnecting.

(8) Remove two nuts (22), field leads (23), and washers (24) from front housing (9).



YF02A051

6-2. 100 AMP ALTERNATOR REPAIR (CONT)

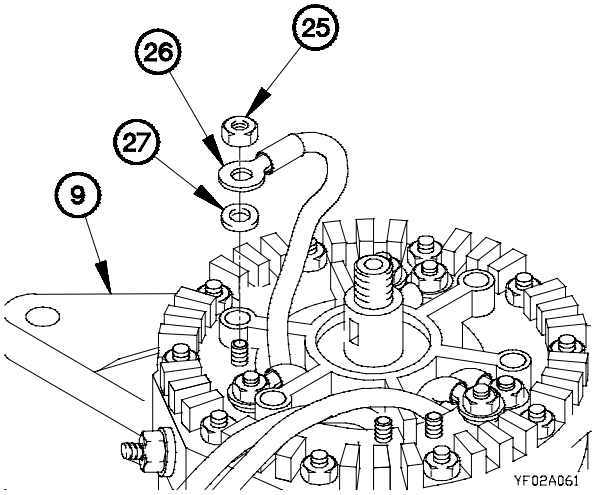
CAUTION

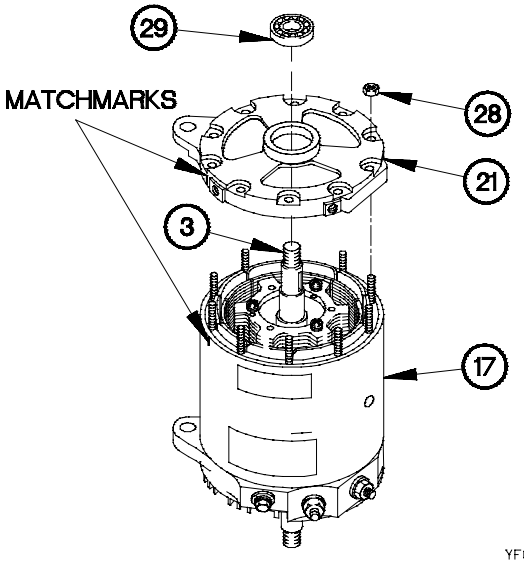
Nuts securing field leads and coil leads are not interchangeable. Tag field lead nuts during removal. Failure to comply may result in damage to equipment.

NOTE

Tag coil leads and connection points prior to disconnecting.

(9) Remove six nuts (25), coil leads (26), and washers (27) from front housing (9).





(10) Match mark end housing (21) to stator (17).

(11) Remove nine self-locking nuts (28) and end housing (21) from stator (17). Discard self-locking nuts.

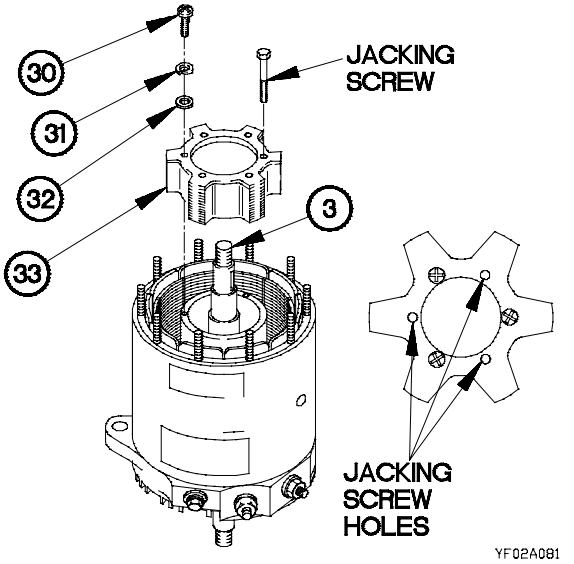
(12) Remove bearing (29) from shaft (3).

(13) Remove three screws (30), lockwashers (31), and washers (32) from rotor (33). Discard lockwashers.

(14) Install three jacking screws in small threaded holes on rotor (33).

(15) Remove rotor (33) from shaft (3) by alternately turning three jacking screws two full turns.

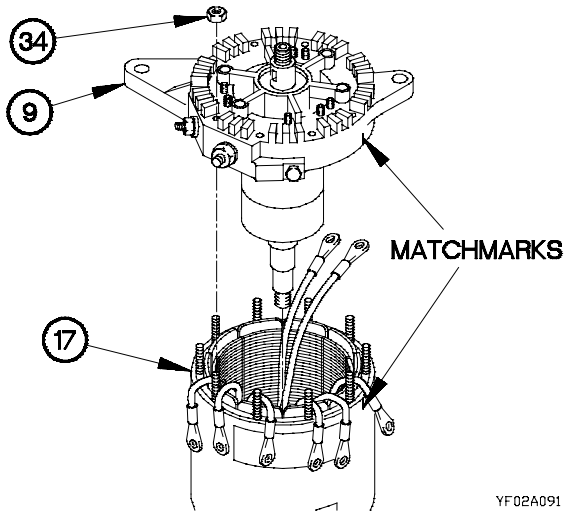
(16) Remove three jacking screws from rotor (33).

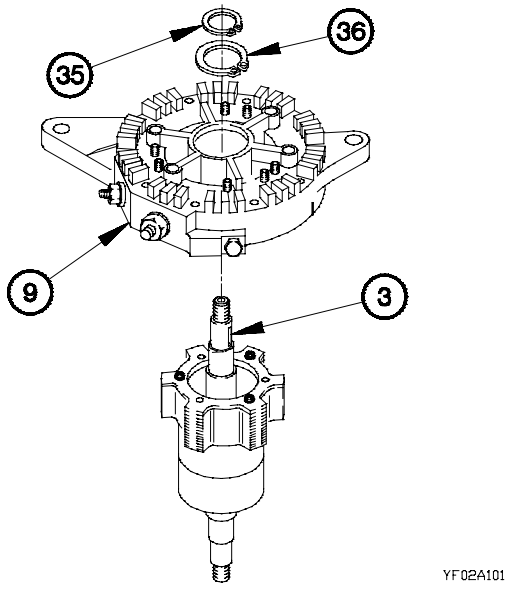


(17) Match mark front housing (9) to stator (17).

(18) Remove nine self-locking nuts (34) from front housing (9). Discard self-locking nuts.

(19) Remove front housing (9) from stator (17).





WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(20) Remove retaining ring (35) from shaft (3).

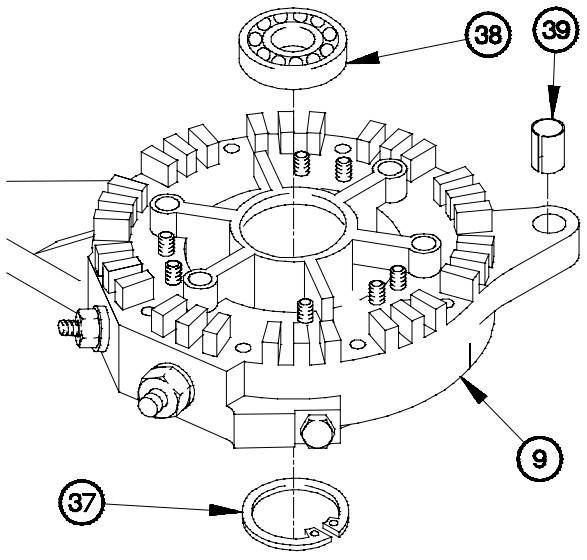
(21) Remove retaining ring (36) from front housing (9).

(22) Remove shaft (3) from front housing (9).

(23) Remove retaining ring (37) from front housing (9).

(24) Remove bearing (38) from front housing (9).

(25) Remove bushing (39) from front housing (9).



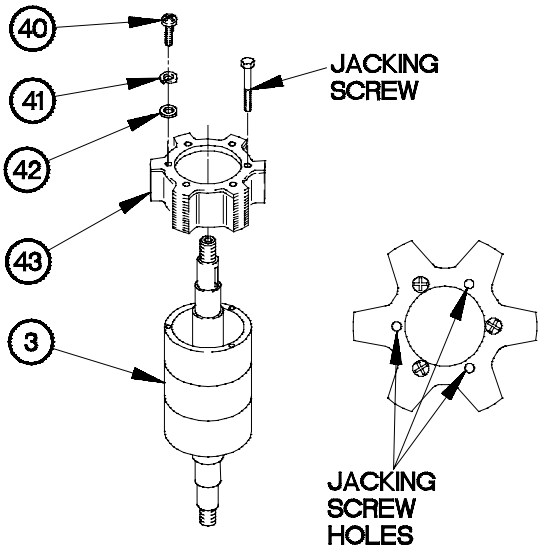
6-2. 100 AMP ALTERNATOR REPAIR (CONT)

(26) Remove three screws (40), lockwashers (41), and washers (42) from rotor (43). Discard lockwashers.

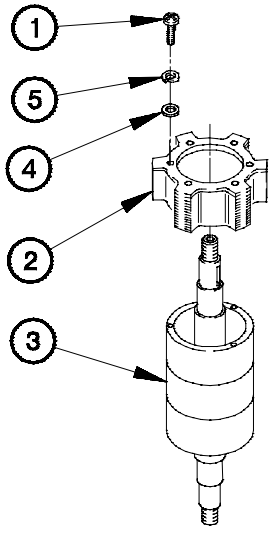
(27) Install three jacking screws in small threaded holes in rotor (43).

(28) Remove rotor (43) from shaft (3) by alternately turning jacking screws two full turns.

(29) Remove three jacking screws from rotor (43).



b. Assembly.



WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(1) Apply sealing compound to threads of three screws (1).

(2) Position rotor (2) on shaft (3) with three washers (4), lockwashers (5) and screws (1).

(3) Tighten three screws (1) to 45 lb-in. (5 N•m).

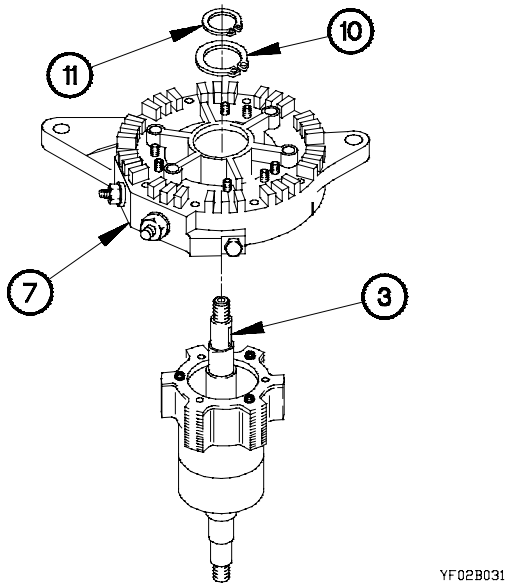
(4) Install bushing (6) in front housing (7).

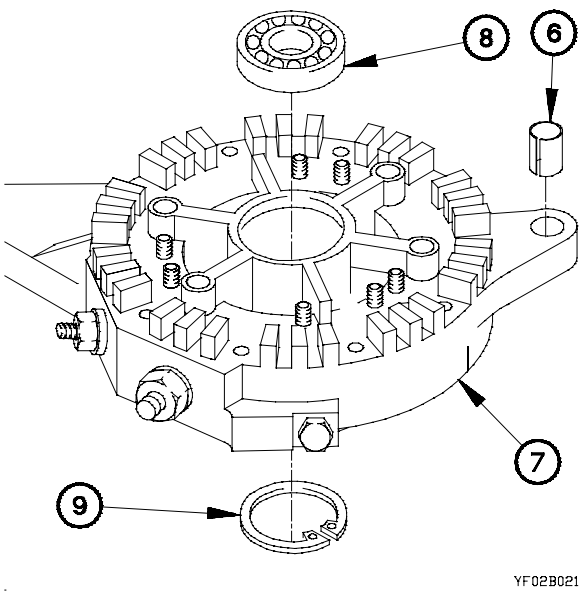
(5) Install bearing (8) in front housing (7).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(6) Install retaining ring (9) in front housing (7).





(7) Install shaft (3) in front housing (7).

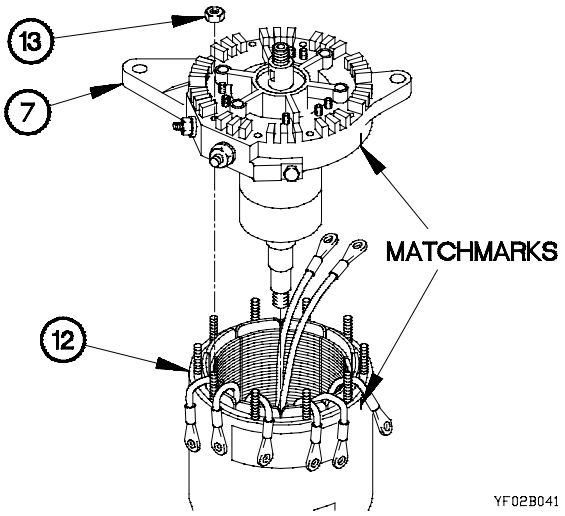
(8) Install retaining ring (10) in front housing (7).

(9) Install retaining ring (11) on shaft (3).

(10) Position front housing (7) on stator (12) with matchmarks aligned.

(11) Position nine self-locking nuts (13) on stator (12).

(12) Tighten nine self-locking nuts (13) to 18 lb-in. (2 N•m).



6-2. 100 AMP ALTERNATOR REPAIR (CONT)

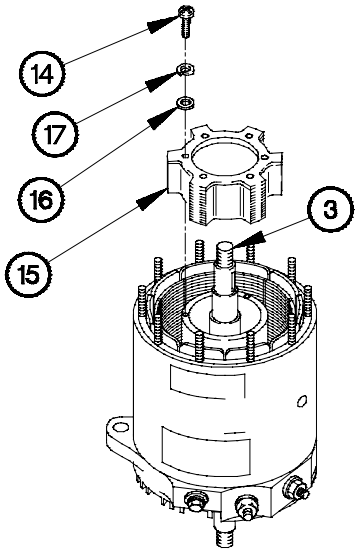
WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush with water and get immediate medical attention. Failure to comply may result in injury to personnel.

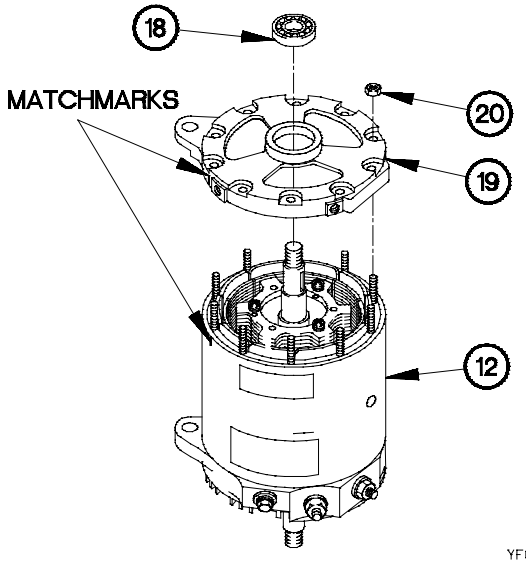
(13) Apply sealing compound to threads of three screws (14).

(14) Position rotor (15) on shaft (3) with three washers (16), lockwashers (17), and screws (14).

(15) Tighten three screws (14) to 45 lb-in. (5 N•m).



YF02B051



YF02B061

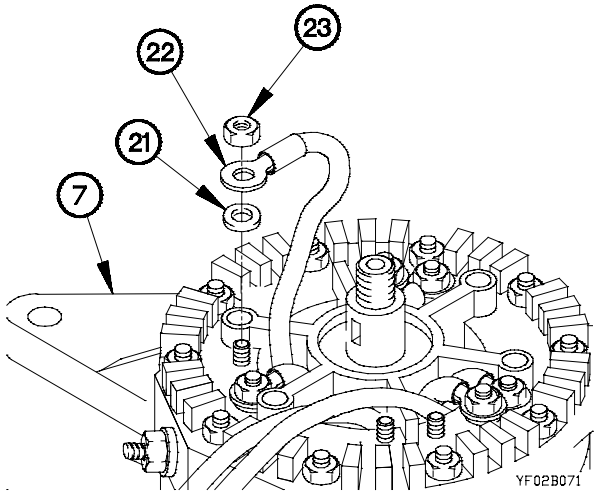
(16) Install bearing (18) in end housing (19).

(17) Position end housing (19) on stator (12) with matchmarks aligned.

(18) Position nine self-locking nuts (20) on stator (12).

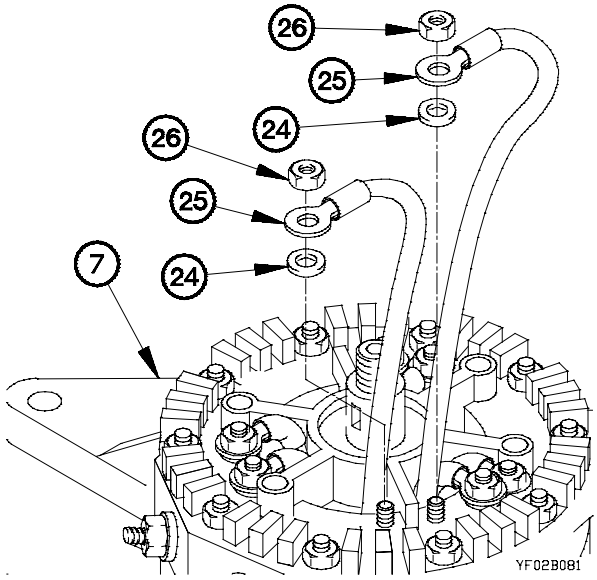
(19) Tighten nine self-locking nuts (20) to 45 lb-in. (5 N•m).

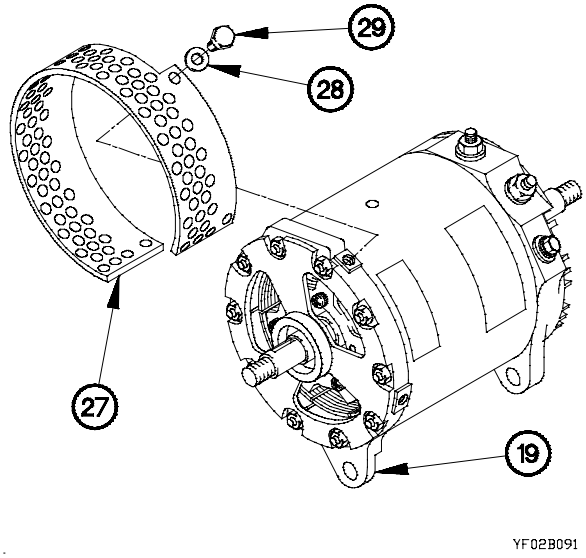
(20) Install six washers (21) and coil leads (22) on front housing (7) with six nuts (23).



YF02B071

(21) Install two washers (24) and field leads (25) on front housing (7) with two nuts (26).





(22) Position fan guard (27) on end housing (19) with four washers (28) and screws (29).

(23) Tighten four screws (29) to 65 lb-in. (7 N•m).

WARNING

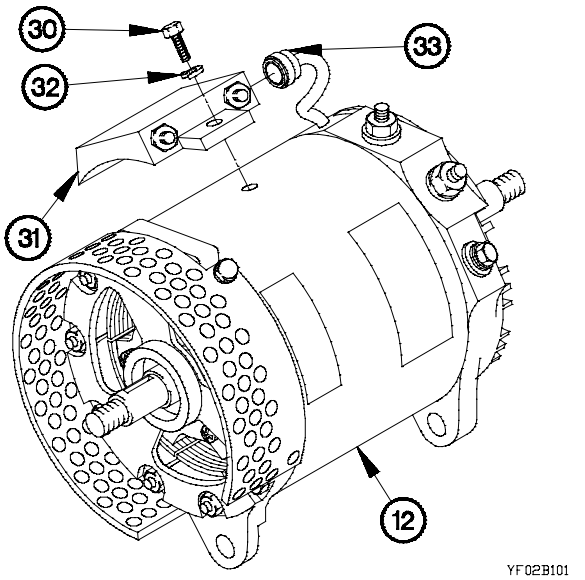
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(24) Apply sealing compound to threads of two screws (30).

(25) Position voltage regulator (31) on stator (12) with two lockwashers (32) and screws (30).

(26) Tighten two screws (30) to 65 lb-in. (7 N•m).

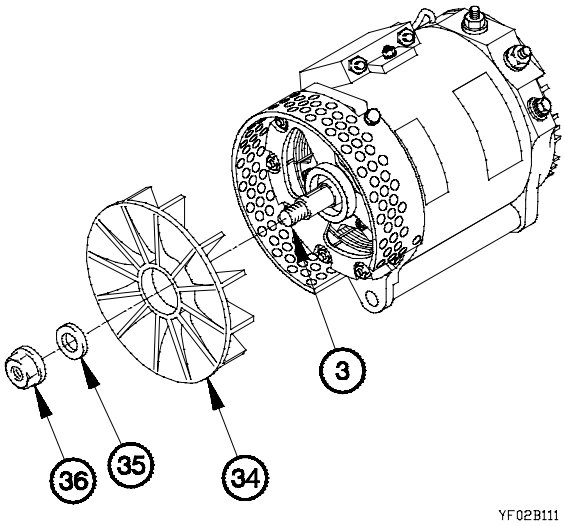
(27) Connect connector (33) to voltage regulator (31).



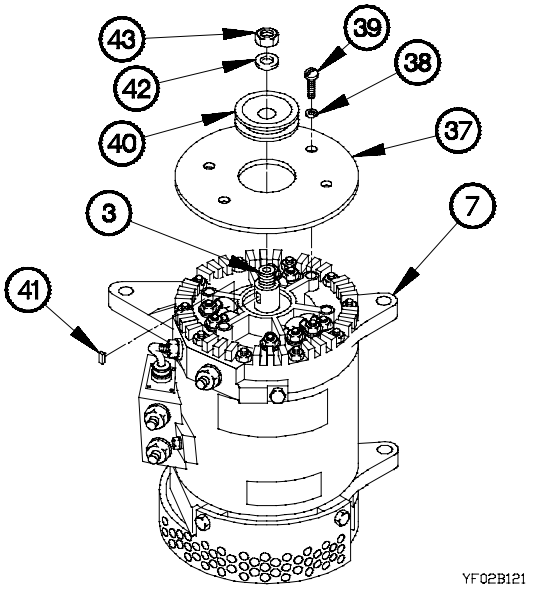
6-2. 100 AMP ALTERNATOR REPAIR (CONT)

(28) Position fan (34) on shaft (3) with washer (35) and self-locking nut (36).

(29) Tighten self-locking nut (36) to 50 lb-ft (68 N•m).



YF02B111



YF02B121

(30) Install cover (37) on front housing (7) with four lockwashers (38) and screws (39).

(31) Install pulley bushing (40) and key (41) on shaft (3).

(32) Install washer (42) and self-locking nut (43) on shaft (3).

End of Task.

6-3. STARTING MOTOR REPAIR (P/N M0017730MD)

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Tool Kit, Automotive Fuel and Electrical System Repair (Item 65, Appendix B)
Wrench, Torque 0-300 lb-in. (Item 83, Appendix B)
Socket Wrench, Attachment Screwdriver (TM 9-2320-365-20)
Gloves, Rubber (Item 23, Appendix B)
Test Stand, Automotive Generator and Starter (Item 62, Appendix B)
Multimeter, Digital (Item 34, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

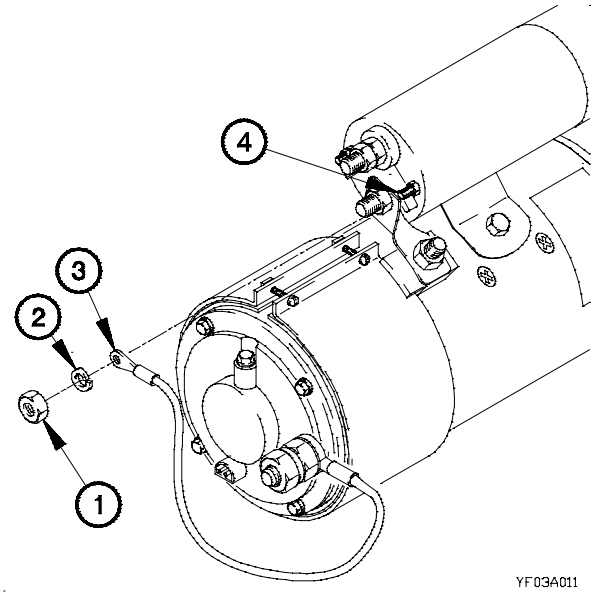
Materials/Parts
Lockwasher (Item 94, Appendix F)
Lockwasher (Item 114, Appendix F)
Lockwasher (9) (Item 110, Appendix F)
Packing, Preformed (2) (Item 162, Appendix F)
Packing, Preformed (Item 206, Appendix F)
Packing, Preformed (2) (Item 215, Appendix F)
Washer, Flat (Item 299, Appendix F)

Materials/Parts (Cont)
Seal, Plain Encased (Item 270, Appendix F)
Brush Set (Item 17, Appendix F)
Brush Set, Electrical Contract (Item 18, Appendix F)
Washer, Flat (2) (Item 298, Appendix F)
Washer, Fiber (Item 297, Appendix F)
Rag, Wiping (Item 59, Appendix C)
Compound, Sealing (Item 71, Appendix C)
Grease, Automotive and Artillery (Item 36, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Cloth, Abrasive (Item 23, Appendix C)

References
TM 9-2920-242-35, TM 9-4910-485-12, TM 9-4910-663-12

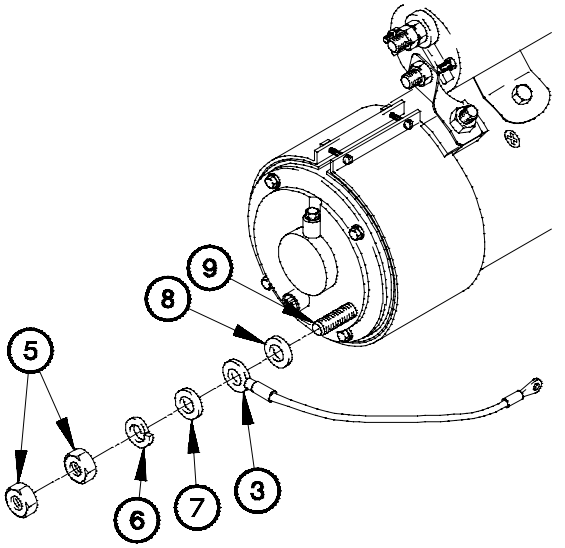
a. Disassembly.

(1) Remove nut (1), lockwasher (2), and electrical lead (3) from starting motor solenoid terminal (4). Discard lockwasher.

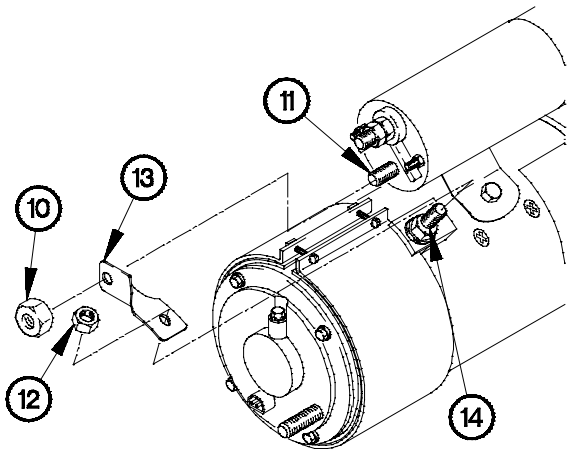


6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

(2) Remove two nuts (5), lockwasher (6), washer (7), electrical lead (3), and washer (8) from starting motor terminal (9). Discard lockwasher.



YF03A021



YF03A031

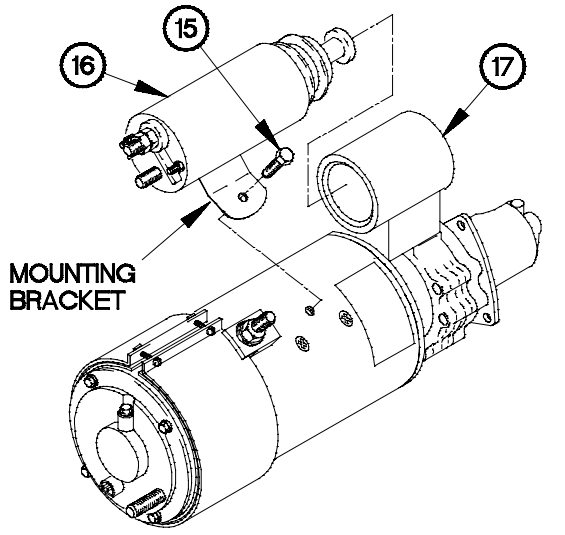
(3) Remove nut (10) from starting motor solenoid terminal (11).

(4) Remove nut (12) and strap (13) from starting motor terminal (14).

(5) Remove two screws (15) from starting motor solenoid (16).

(6) Rotate starting motor solenoid (16) so mounting bracket is turned up.

(7) Remove starting motor solenoid (16) from shift housing (17).



YF03A041

(8) Position boot (18) on link spool (19) to allow access to plunger (20).

CAUTION

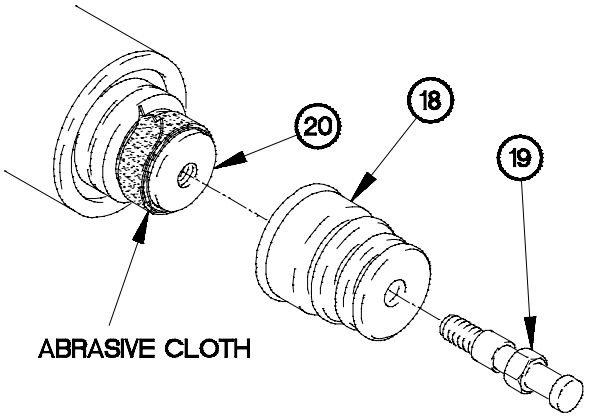
Use care not to damage link spool during removal. Failure to comply will result in damage to equipment.

(9) Wrap three layers of abrasive cloth around plunger (20).

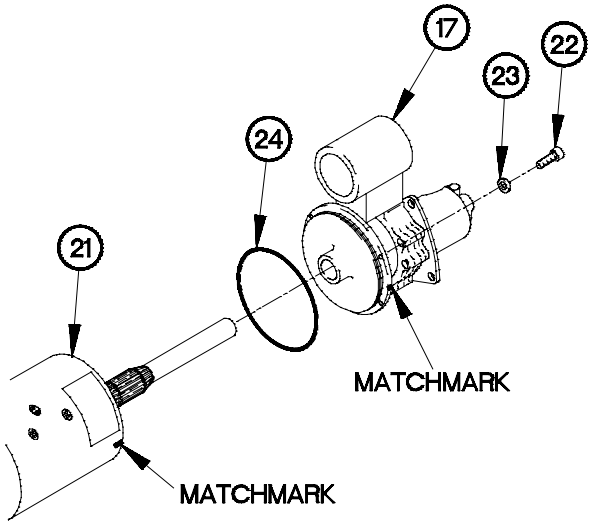
(10) Hold plunger (20) in a fixed position.

(11) Remove link spool (19) from plunger (20).

(12) Remove boot (18) from link spool (19).



YF03A051



YF03A061

(13) Match mark shift housing (17) to drive housing (21).

(14) Remove five screws (22), lockwashers (23), and shift housing (17) from drive housing (21). Discard lockwashers.

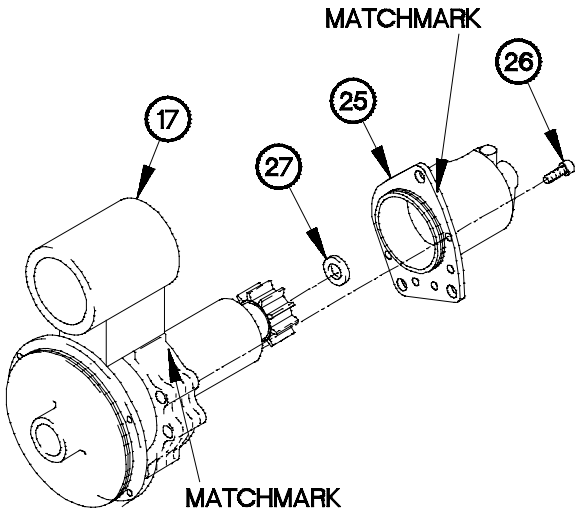
(15) Remove preformed packing (24) from shift housing (17). Discard preformed packing.

6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

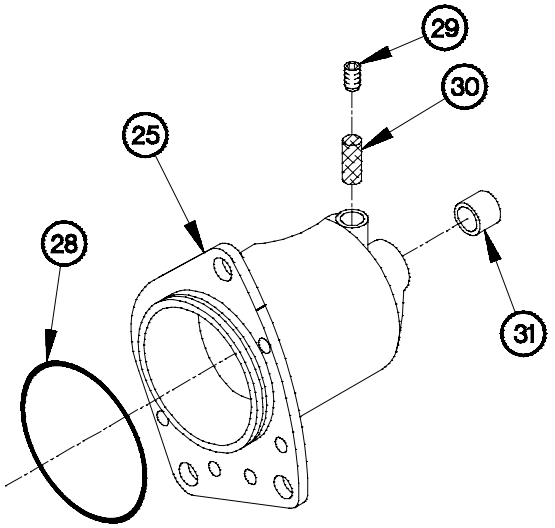
(16) Match mark shift housing (17) to nose housing (25).

(17) Remove five screws (26) and nose housing (25) from shift housing (17).

(18) Remove washer (27) from shift housing (17).



Yf03a071



YF03A081

(19) Remove preformed packing (28) from nose housing (25). Discard preformed packing.

(20) Remove plug (29) and oil wick (30) from nose housing (25).

NOTE

Oil wick should soak in lubricating oil for a minimum of four hours.

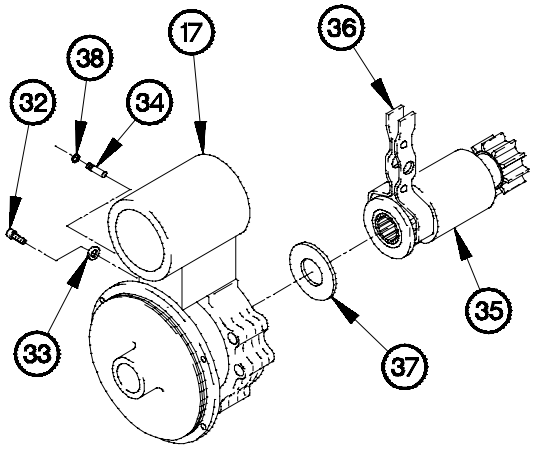
(21) Place oil wick (30) in container of oil.

(22) Remove bushing (31) from nose housing (25). Discard bushing.

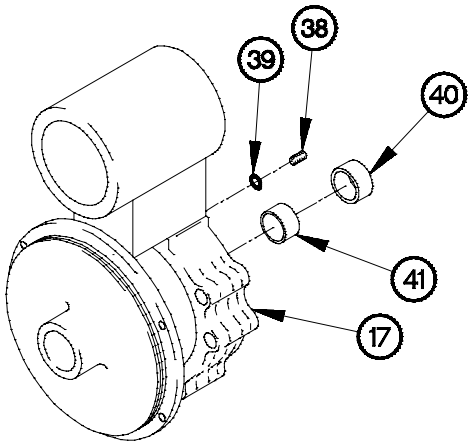
(23) Remove screw (32), washer (33), pin (34), drive (35), and lever (36) from shift housing (17).

(24) Remove washer (37) from shift housing (17). Discard washer.

(25) Remove preformed packing (38) from pin (34). Discard preformed packing.



YF03A091

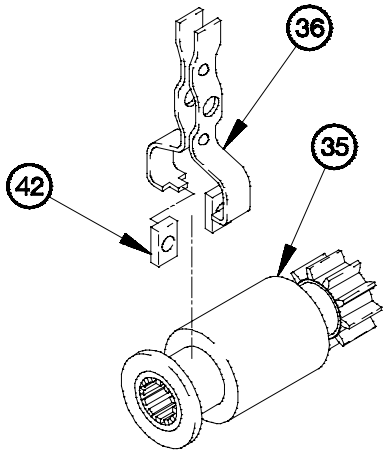


YF03A101

(26) Remove plug (38) and preformed packing (39) from shift housing (17). Discard preformed packing.

(27) Remove seal (40) and bushing (41) from shift housing (17). Discard seal and bushing.

(28) Remove drive (35) and two cams (42) from lever (36).



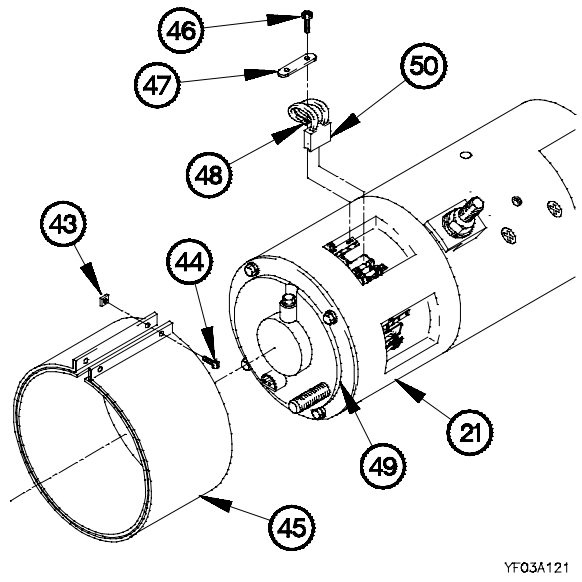
YF03A111

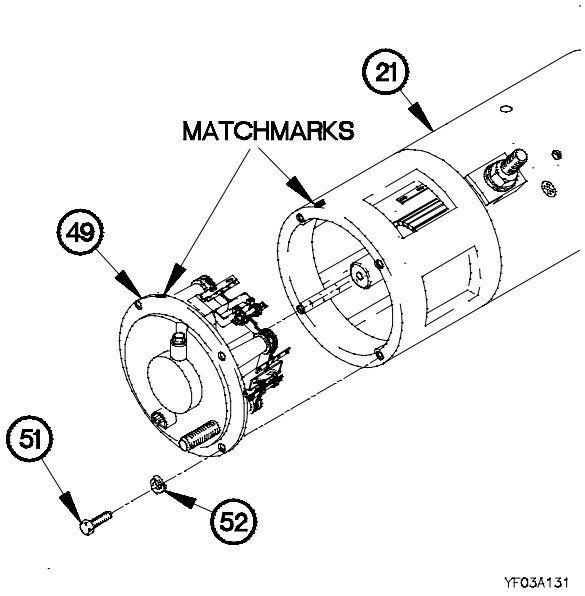
6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

(29) Remove two nuts (43), screws (44), and cover (45) from drive housing (21).

(30) Remove eight screws (46), four lock plates (47), and eight brush terminal lugs (48) from brush housing (49).

(31) Remove eight brushes (50) from brush housing (49).

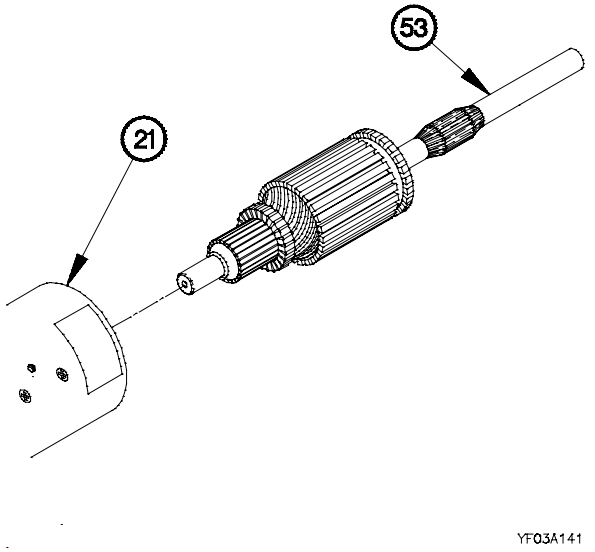




(32) Match mark brush housing (49) to drive housing (21).

(33) Remove four screws (51), lockwashers (52), and brush holder (49) from drive housing (21). Discard lockwashers.

(34) Remove armature (53) from drive housing (21).



(35) Remove plug (54) and oil wick (55) from brush housing (49).

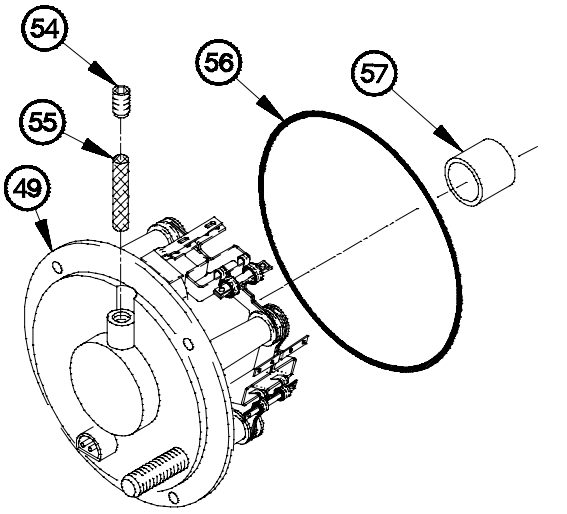
NOTE

Oil wick should soak in lubricating oil for a minimum of four hours.

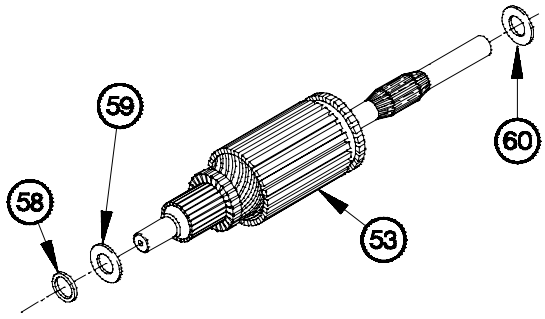
(36) Place oil wick (55) in container of oil.

(37) Remove preformed packing (56) from brush housing (49). Discard preformed packing.

(38) Remove bushing (57) from brush housing (49).



YF03A151



YF03A161

(39) Remove fiber washer (58), washer (59), and washer (60) from armature (53). Discard fiber washer and two washers.

6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

b. Cleaning/Inspection.

WARNING

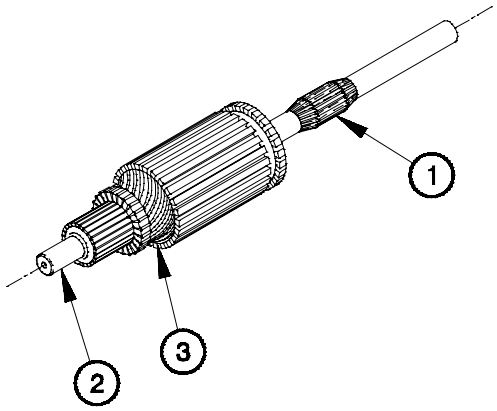
- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 ° F (38 ° C) and for Type II is 130 ° F (50 ° C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**
- **Compressed air used for cleaning purposes will not exceed 30 psi (207 Kpa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent and dry using compressed air prior to inspection.

NOTE

- Replace any part that fails visual inspection or size measurement requirements.
- Replace armature if continuity is present between splined end of armature and commutator contacts.

(2) Test for shorts between splined end (1) of armature (2) and all commutator contacts (3).



YF03B011

NOTE

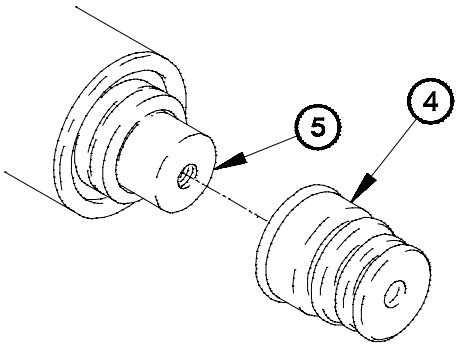
Replace starting motor solenoid if boot is damaged.

(3) Inspect boot (4) for tears or cracks.

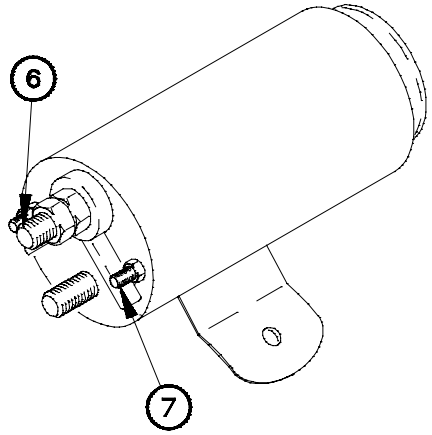
CAUTION

Replace link spool if surface is nicked. Failure to comply will result in damage to equipment.

(4) Inspect plunger (5) for nicks and scratches.



YF03B021



YF03B031

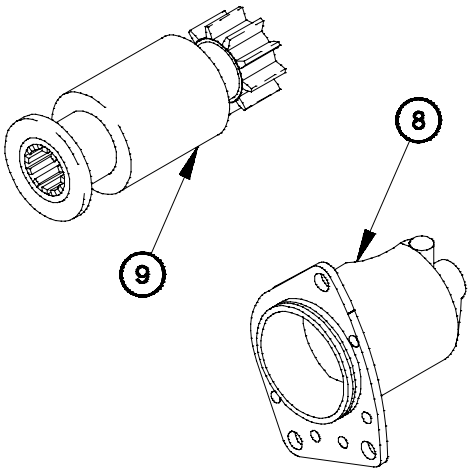
NOTE

Replace starting motor solenoid if continuity is present between starting motor solenoid positive terminal and starting motor solenoid ground terminal.

(5) Check for continuity between starting motor solenoid positive terminal (6) and starting motor solenoid ground terminal (7).

(6) Inspect nose housing (8) for cracks, pitting, or corrosion.

(7) Inspect starting motor solenoid drive (9) for broken, chipped, or worn teeth.



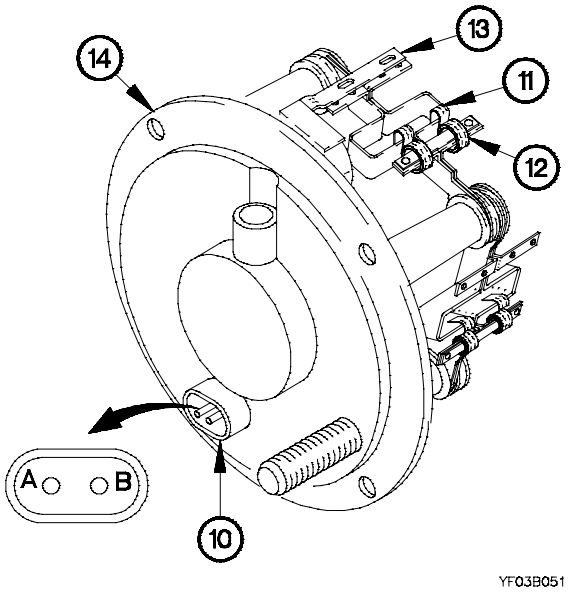
YF03B041

6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

NOTE

Replace brush housing frame if continuity is not present between pin A and B of thermostat switch.

(8) Check continuity between pin A and pin B of thermostat switch connector (10).



NOTE

Replace brush housing if brush holder or brush springs fail visual inspection.

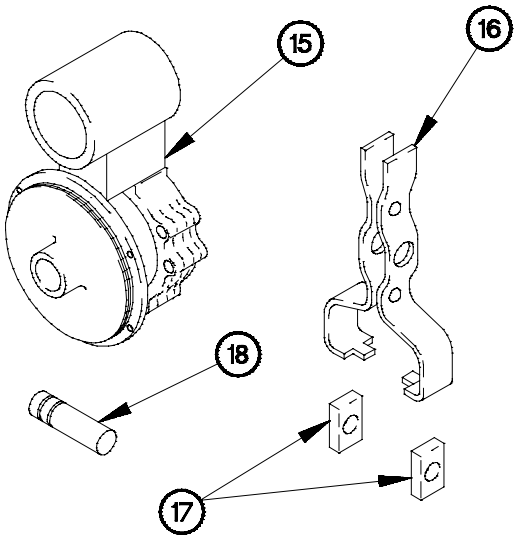
(9) Check brush holder (11) for cracks, pitting, or corrosion.

(10) Check brush springs (12) for cracks, nicks, breaks, or distortion.

NOTE

Replace brush housing if continuity is present between brush housing terminal and brush housing frame.

(11) Check continuity between brush housing terminal (13) and brush housing frame (14).



NOTE

Replace starting motor if shift housing, lever, cams, or pin fail visual inspection.

(12) Inspect shift housing (15) for cracks, pitting, or corrosion.

(13) Inspect lever (16) for cracks, pitting, or corrosion.

(14) Inspect two cams (17) and pin (18) for cracks, pitting, or corrosion.

NOTE

Replace starting motor if drive housing fails visual inspection or resistance checks.

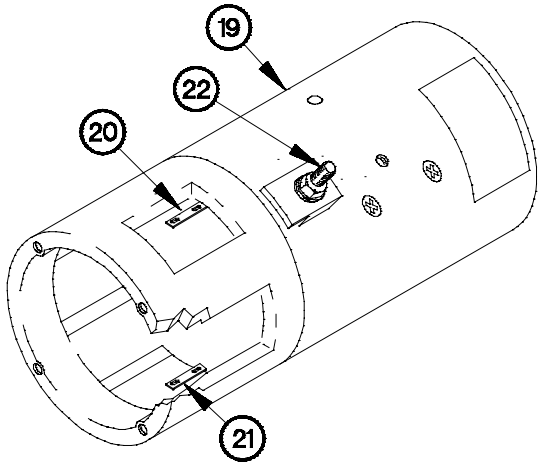
(15) Inspect starting drive housing (19) for cracks, pitting, or corrosion.

NOTE

Replace drive housing if continuity is not present between field coil terminals and drive housing.

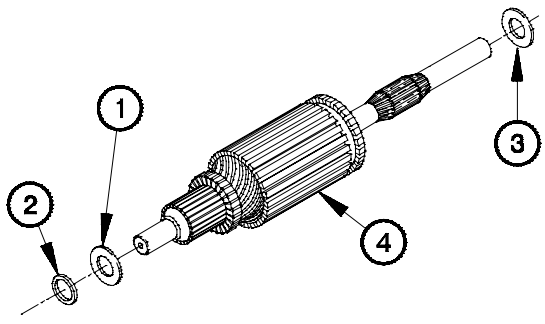
(16) Measure resistance between field coil terminals (20 and 21).

(17) Measure resistance between field coil terminals (20 and 21) and ground terminal (22).



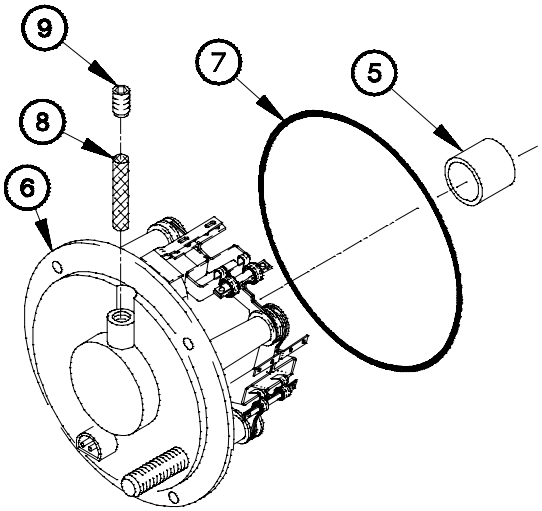
YF03B071

c. Assembly.



YF03C011

(1) Position washer (1), fiber washer (2), and washer (3) on armature (4).



YF03C021

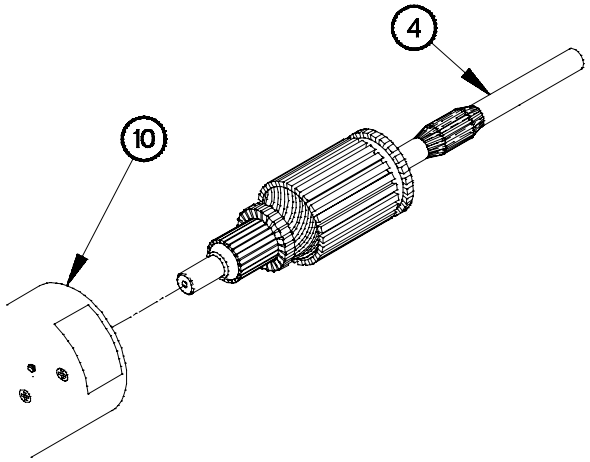
(2) Install bushing (5) in brush housing (6).

(3) Install preformed packing (7) on brush housing (6).

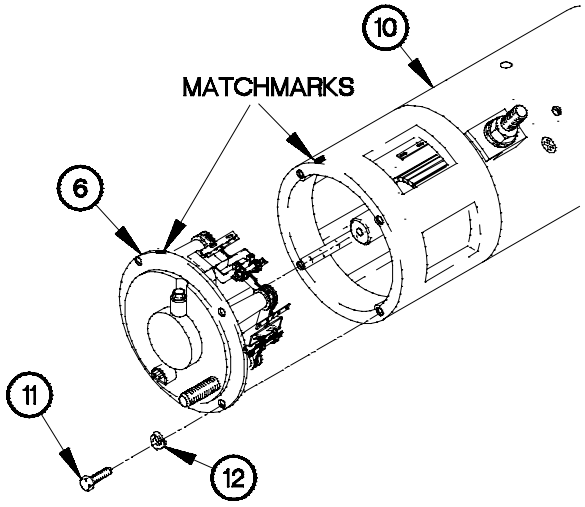
(4) Install oil wick (8) and plug (9) in brush housing (6).

6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

(5) Position armature (4) in drive housing (10).



YF03C031



YF03C041

(6) Position brush housing (6) on drive housing (10) with matchmarks aligned.

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(7) Apply sealing compound to threads for four screws (11).

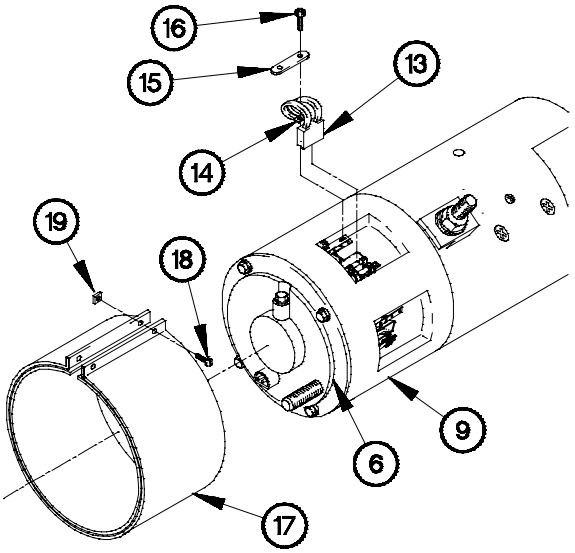
(8) Position four lockwashers (12) and screws (11) in brush housing (6).

(9) Tighten four screws (11) to 62-66 lb-in. (7 N·m).

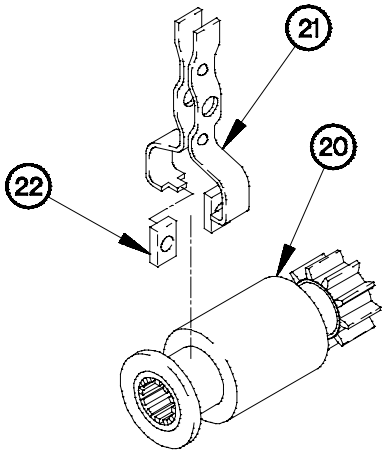
(10) Position eight brushes (13) in brush housing (6).

(11) Install eight brush terminal lugs (14) on brush housing (6) with four lock plates (15) and eight screws (16).

(12) Install cover (17) on drive housing (9) with two screws (18) and nuts (19).



YF03C051

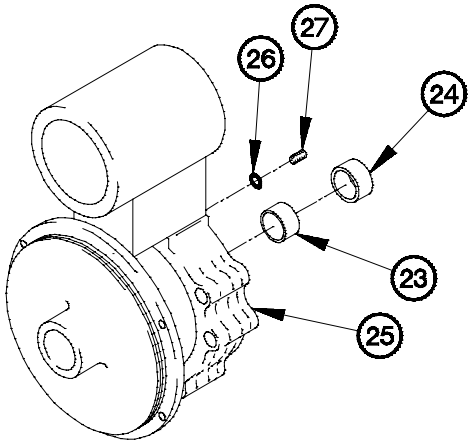


YF03C061

(13) Position drive (20) on lever (21) with two cams (22).

(14) Install bushing (23) and seal (24) in shift housing (25).

(15) Install preformed packing (26) and plug (27) in shift housing (25).



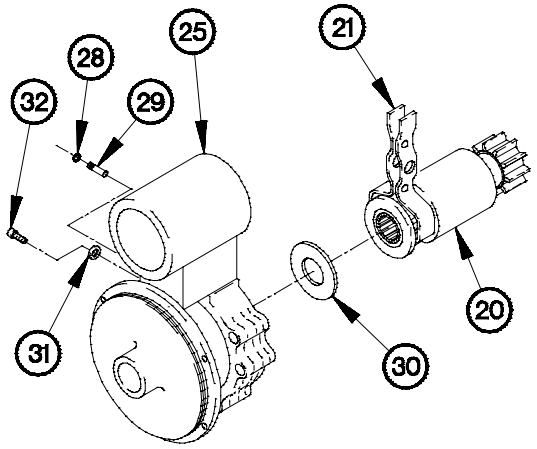
YF03C071

6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

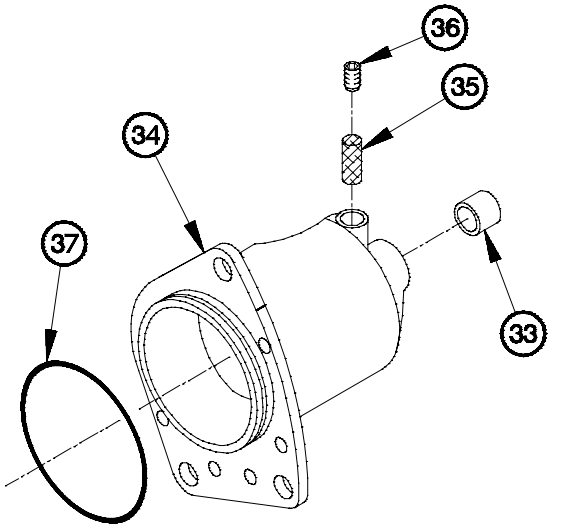
(16) Install preformed packing (28) on pin (29).

(17) Position washer (30) in shift housing (25).

(18) Install lever (21) and drive (20) in shift housing (25) with pin (29), washer (31), and screw (32).



YF03C081



YF03C091

(19) Install bushing (33) in nose housing (34).

(20) Install oil wick (35) and plug (36) in nose housing (34).

(21) Install preformed packing (37) on nose housing (34).

(22) Position washer (38) on shift housing (25).

(23) Position nose housing (34) on shift housing (25) with matchmarks aligned.

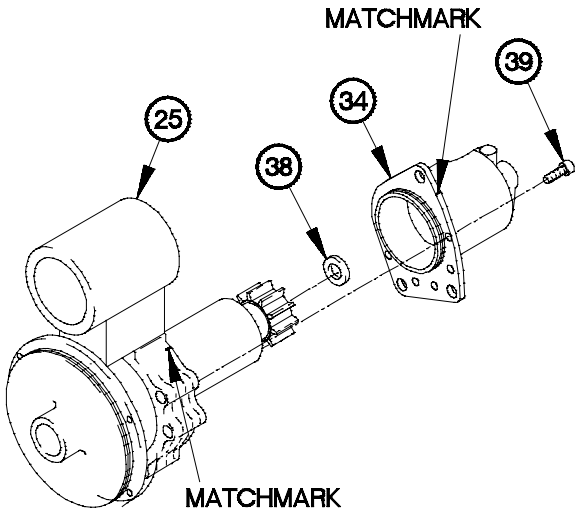
WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(24) Apply sealing compound to threads for five screws (39).

(25) Position five screws (39) in nose housing (34).

(26) Tighten five screws (39) to 13-17 lb-ft (18-23 N·m).



Yf03c101

(27) Install preformed packing (40) on shift housing (25).

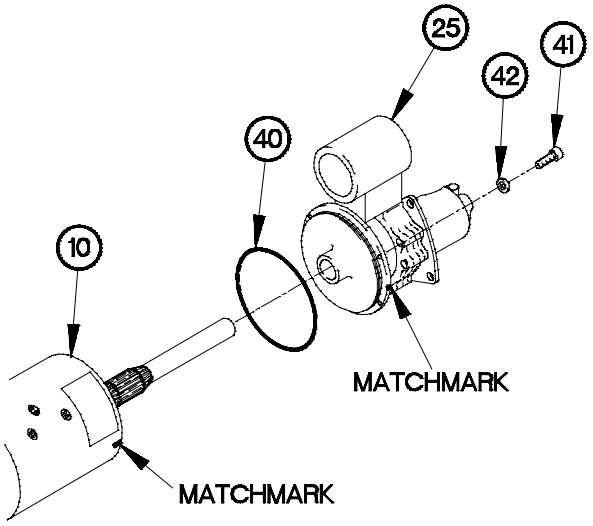
CAUTION

Drive and two washers must be aligned with armature shaft during assembly of shift and drive housings. Failure to comply may result in damage to equipment.

(28) Position shift housing (25) on drive housing (10) with matchmarks aligned.

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

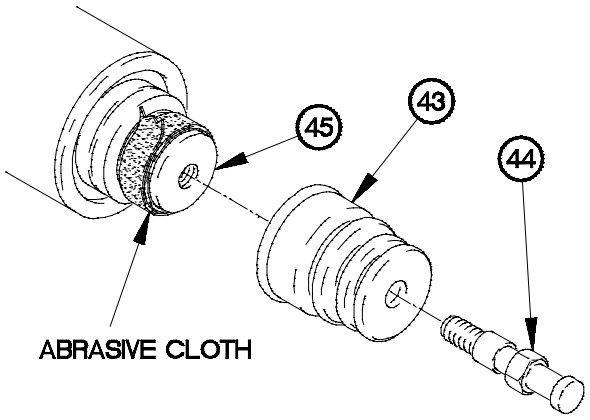


YF03C111

(29) Apply sealing compound to threads of five screws (41).

(30) Position five lockwashers (42) and screws (41) in shift housing (25).

(31) Tighten five screws (41) to 108-132 lb-in. (12-15 N·m).



YF03C121

(32) Install boot (43) on link spool (44).

CAUTION

Use care not to damage link spool during installation. Failure to comply will result in damage to equipment.

(33) Wrap three layers of abrasive cloth around plunger (45) and link spool (44).

(34) Position boot (43) and link spool (44) in plunger (45).

(35) Hold plunger (45) in a fixed position.

(36) Tighten link spool (44) to 27-33 lb-in. (3-4 N·m).

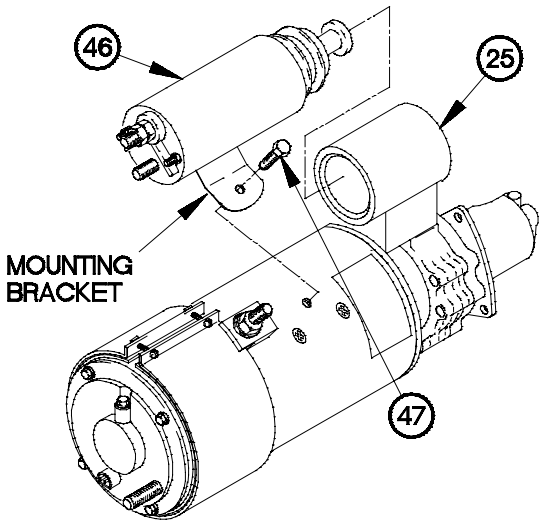
6-3. STARTING MOTOR REPAIR (P/N M0017730MD) (CONT)

NOTE

Hold the shift housing end up for installation of solenoid.

(37) Position starting motor solenoid (46) in shift housing (25).

(38) Rotate starting motor solenoid (46) so mounting bracket is facing down.



YF03C131

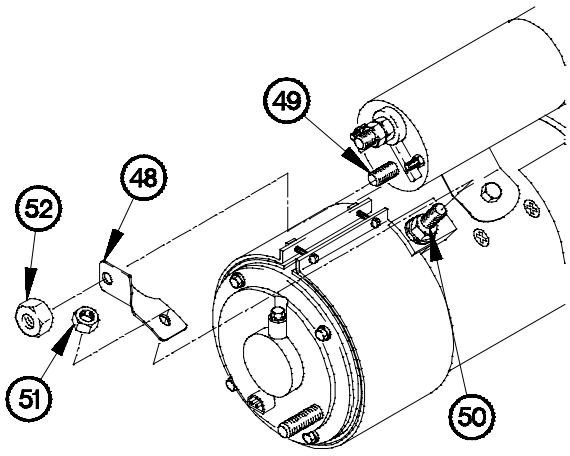
WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(39) Apply sealing compound to threads of two screws (47).

(40) Position two screws (47) in starting motor solenoid (46).

(41) Tighten two screws (47) to 20-24 lb-ft (27-32 N·m).



YF03C141

(42) Position strap (48) on starting motor solenoid terminal (49) and starting motor terminal (50).

(43) Apply sealing compound to threads of starting motor solenoid terminal (49) and starting motor terminal (50).

(44) Position nut (51) on starting motor terminal (50).

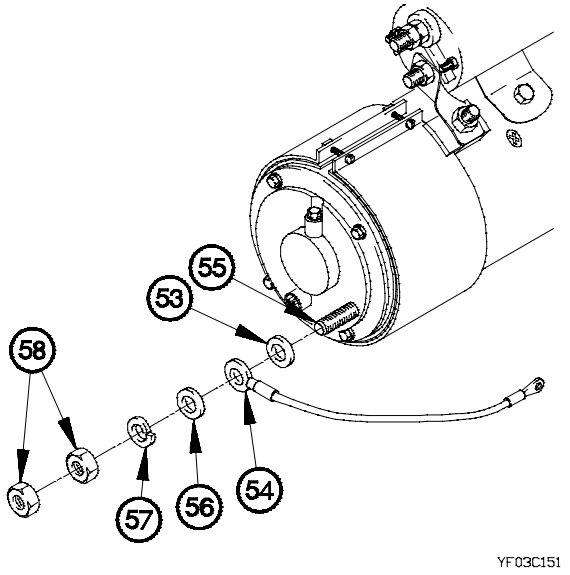
(45) Tighten nut (51) to 18-22 lb-ft (24-30 N·m).

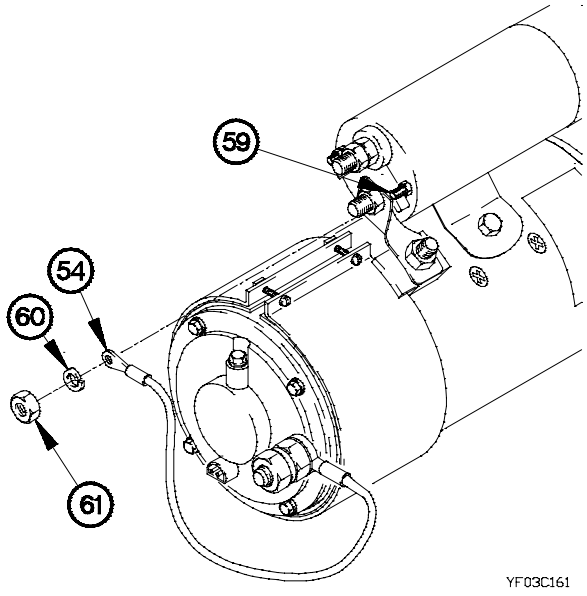
(46) Position nut (52) on starting motor solenoid terminal (49).

(47) Tighten nut (52) to 21-29 lb-ft (28-39 N·m).

(48) Position washer (53) and electrical lead (54) on starting motor terminal (55) with washer (56), lockwasher (57), and two nuts (58).

(49) Tighten two nuts (58) to 33-37 lb-ft (45-50 N·m).





(50) Position electrical lead (54) on starting motor solenoid terminal (59) with lockwasher (60) and nut (61).

(51) Tighten nut (61) to 43-47 lb-in. (5 N·m).

d. Follow-on Maintenance

Perform starter adjustments and test (TM 9-2920-242-35).

End of Task.

6-4. FUEL SHUTOFF SOLENOID REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (TM 9-2320-365-20-3).
Cab raised (TM 9-2320-365-10).

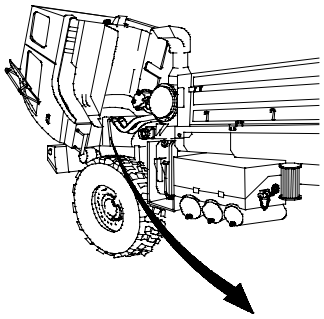
Tools and Special Tools
Tool Kit, Gen Mech (Item 68, Appendix B)
Tool Kit, Intl. Comb. Eng. (TM 9-2320-365-20)
Pan, Drain (Item 36, Appendix B)
Wrench, Torque, 0-75 lb-in. (Item 98, Appendix B)

Materials/Parts
Lockwasher (2) (Item 100, Appendix F)
Seal, Connector Tube (Item 256, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Antifreeze (Item 12, Appendix C)

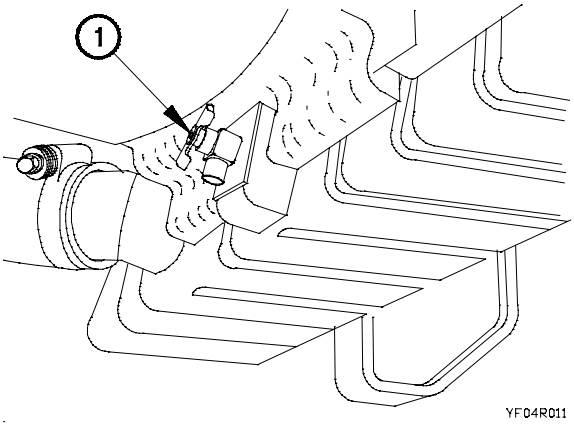
WARNING

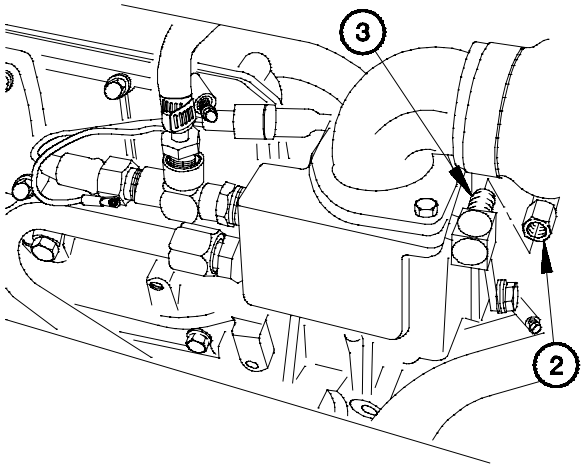
Ensure engine is cool before performing maintenance. Failure to comply may result in injury to personnel.

a. Removal.



(1) Open radiator drain cock (1) and drain [approximately 15 to 20 qt (14 to 19 L)].

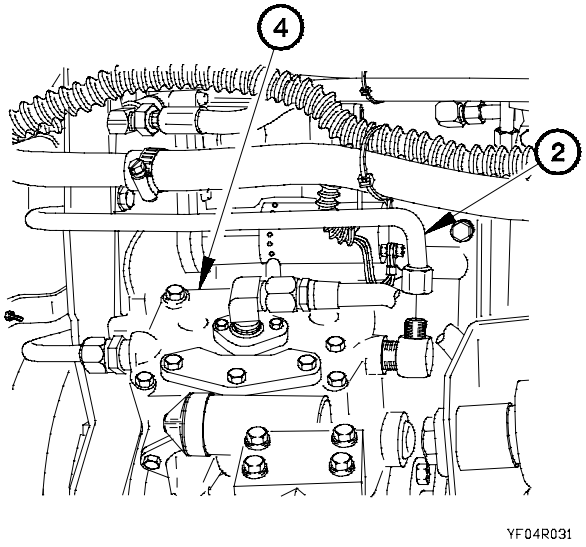


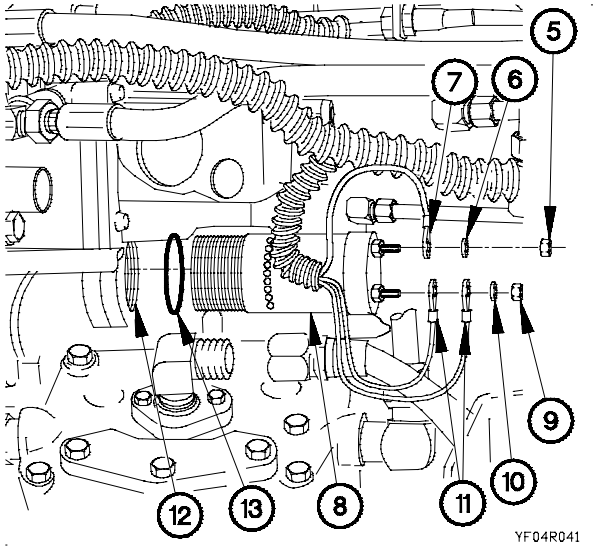


(2) Disconnect compressor inlet coolant tube (2) from thermostat housing (3).

(3) Disconnect compressor inlet coolant tube (2) from air compressor (4).

(4) Remove compressor inlet coolant tube (2) from vehicle.





NOTE

Tag and mark all electrical leads and solenoid terminals prior to removal for ease of installation.

(5) Remove nut (5), lockwasher (6), and electrical lead (7) from fuel shutoff solenoid (8). Discard lockwasher.

(6) Remove nut (9), lockwasher (10), and two electrical leads (11) from fuel shut-off solenoid (8). Discard lockwasher.

(7) Remove fuel shut-off solenoid (8) from governor (12).

(8) Remove connector seal (13) from fuel shut-off solenoid (8). Discard connector seal.

6-4. FUEL SHUTOFF SOLENOID REPLACEMENT (CONT)

b. Installation.

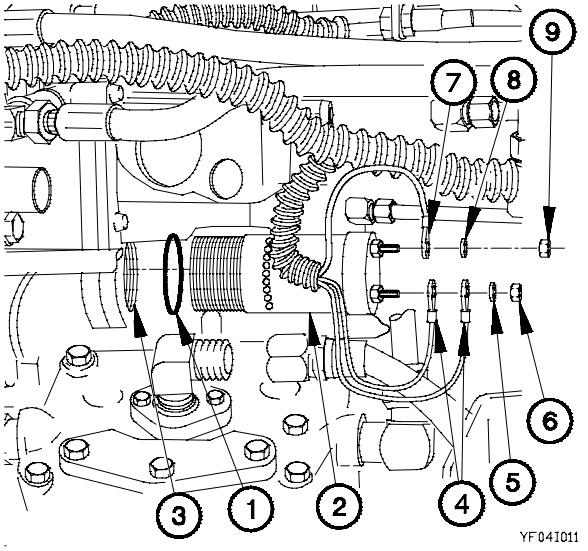
(1) Install connector seal (1) on fuel shut-off solenoid (2).

(2) Install fuel shut-off solenoid (2) on governor (3).

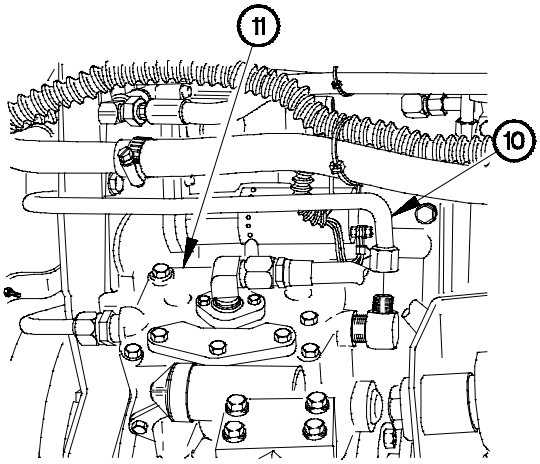
(3) Position two electrical leads (4), lockwasher (5), and nut (6) on fuel shut-off solenoid (2).

(4) Position electrical lead (7), lockwasher (8), and nut (9) on fuel shut-off solenoid (2).

(5) Tighten nuts (6 and 9) to 23-27 lb-in. (3 N·m).



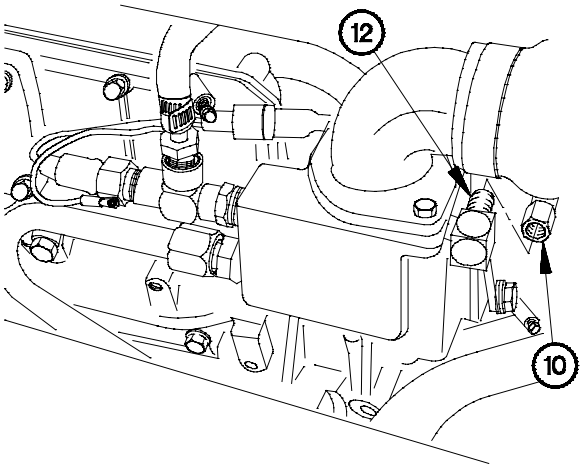
YF04I011



YF04I021

(6) Connect compressor inlet coolant tube (10) to air compressor (11).

(7) Connect compressor inlet coolant tube (10) to thermostat housing (12).



YF04I031

c. Follow-On Maintenance.

(1) Remove radiator cap from radiator overflow tank.

(2) Add coolant to radiator overflow tank (TM 9-2320-365-10).

(3) Lower cab (TM 9-2320-365-10).

(4) Connect batteries (TM 9-2320-365-20-3).

(5) Start engine (TM 9-2320-365-10).

(6) Check for coolant leaks.

(7) Operate vehicle and check for proper engine operation (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.

6-5. TRANSMISSION TURBINE SPEED SENSOR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

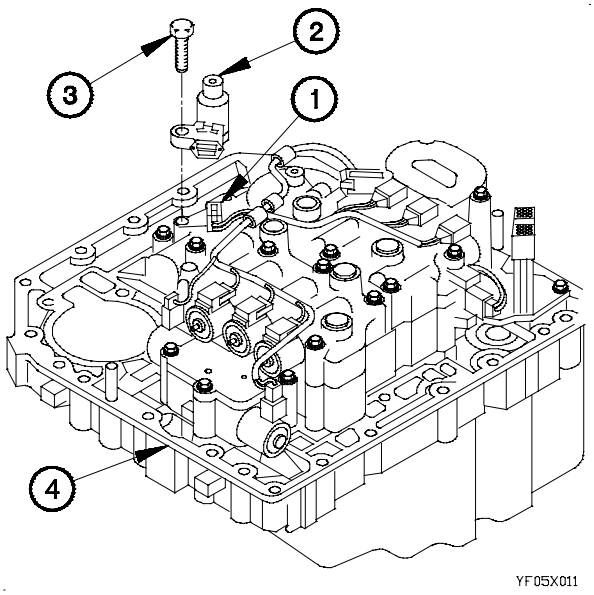
Equipment Conditions
Control valve module removed (para 7-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Tools and Special Tools (Cont)
Multimeter, Digital (Item 34, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)

a. Removal.



(1) Disconnect wiring harness connector (1) from turbine speed sensor (2).

(2) Remove two screws (3) and turbine speed sensor (2) from control valve module (4).

b. Installation.

NOTE

Handle parts carefully to prevent damage.

(1) Position turbine speed sensor (2) on control valve module (4) with two screws (3).

(2) Tighten two screws (3) to 108-120 lb-in. (12-14 N·m).

(3) Connect wiring harness connector (1) to turbine speed sensor (2).

c. Follow-On Maintenance.

Install control valve module (para 7-10).

End of Task.

6-6. STARTING MOTOR REPAIR (P/N M0017703ME)

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Tool Kit, Automotive Fuel and Electrical System (Item 65, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 83, Appendix B)
Wrench, Torque, 0-150 lb-ft (Item 78, Appendix B)
Screwdriver Attachment, Socket Wrench (Item 53.1, Appendix B, TM 9-2320-364-20)
Gloves, Rubber (Item 23, Appendix B)
Test Stand, Automotive Generator and Starter (Item 62, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

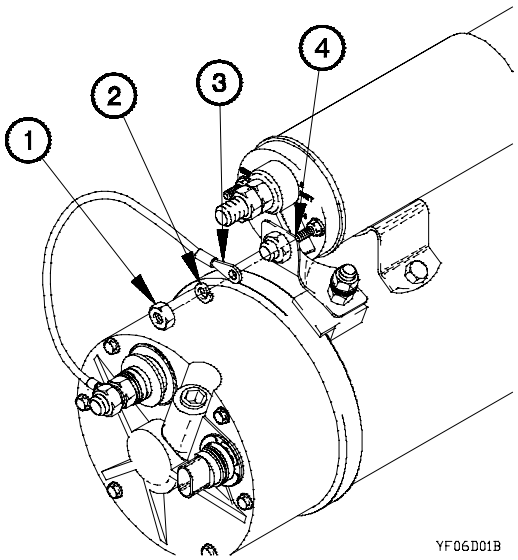
Materials/Parts
Lockwasher (Item 109.1, Appendix F)
Washer, Spring (4) (Item 306, Appendix F)
Packing, Preformed (2) (Item 215.1, Appendix F)
Boot (Item 15.2, Appendix F)
Lockwasher (5) (Item 110, Appendix F)
Packing, Preformed (Item 162, Appendix F)
Packing, Preformed (Item 161, Appendix F)
Wick (Item 308, Appendix F)
Bushing, Sleeve (Item 22.1, Appendix F)
Packing, Preformed (Item 204, Appendix F)
Washer, Flat (Item 299, Appendix F)

Materials/Parts (Cont)
Seal, Plain Encased (Item 270, Appendix F)
Bushing, Sleeve (Item 22.2, Appendix F)
Washer, Seal (6) (Item 299.2, Appendix F)
Packing, Preformed (Item 160.1, Appendix F)
Washer, Thrust (Item 306.1, Appendix F)
Ring, Seal (Item 248.1, Appendix F)
Packing, Preformed (Item 215.1, Appendix F)
Washer, Insulation (Item 299.1, Appendix F)
Wick (Item 307, Appendix F)
Packing, Preformed (Item 155.3, Appendix F)
Bushing, Sleeve (Item 20.1, Appendix F)
Rag, Wiping (Item 59, Appendix C)
Compound, Sealing (Item 71, Appendix C)
Grease, Automotive and Artillery (Item 36, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Lubricating Oil, Engine (Item 48, Appendix C)
Cloth, Abrasive (Item 23, Appendix C)

Reference
TM 9-2920-242-35
TM 9-4910-485-12
TM 9-4910-663-12

a. Disassembly.

(1) Remove nut (1), lockwasher (2), and electrical lead (3) from starting motor solenoid terminal (4). Discard lockwasher.

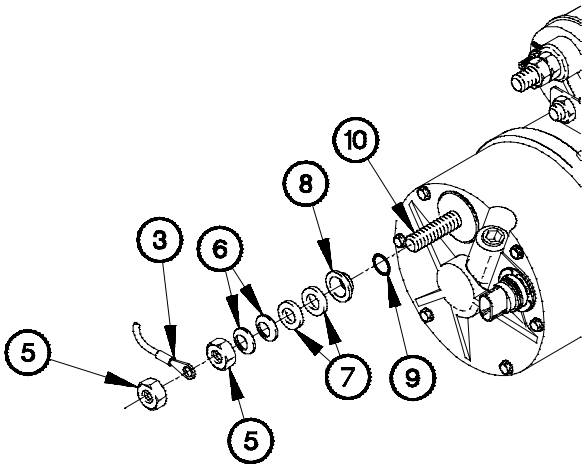


6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

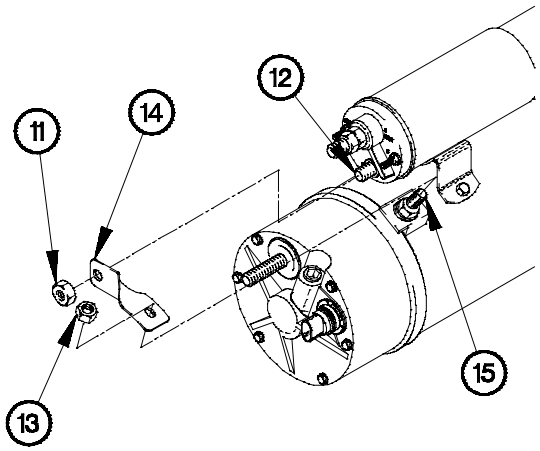
NOTE

Note position of spring washers prior to removal.

(2) Remove nut (5), electrical lead (3), nut (5), two spring washers (6), washers (7), isolator (8), and preformed packing (9) from contact screw (10). Discard spring washers and preformed packing.



YF06D02B



YF06D03B

(3) Remove nut (11) from starting motor solenoid terminal (12).

(4) Remove nut (13) and strap (14) from field coil screw (15).

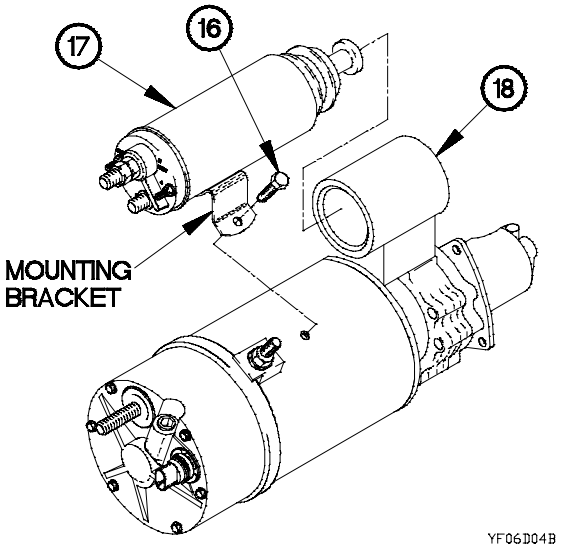
(5) Remove two screws (16) from starting motor solenoid (17).

CAUTION

Bendix must be moved to the engagement position before the starting motor solenoid can be rotated. Failure to comply may result in damage to equipment.

(6) Rotate starting motor solenoid (17) so mounting bracket is turned up.

(7) Remove starting motor solenoid (17) from shift housing (18).



YF06D04B

(8) Position boot (19) on link spool (20) to allow access to plunger (21).

CAUTION

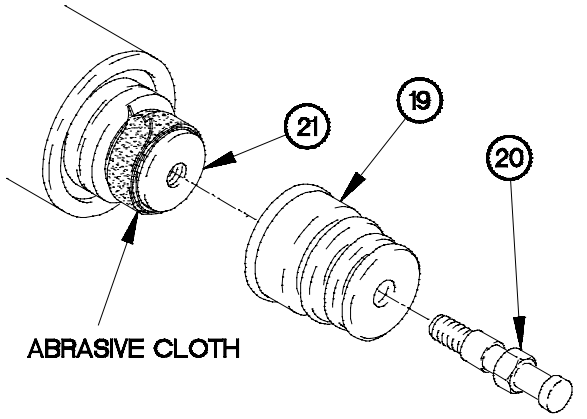
Use care not to damage link spool during removal. Failure to comply may result in damage to equipment.

(9) Wrap three layers of abrasive cloth around plunger (21).

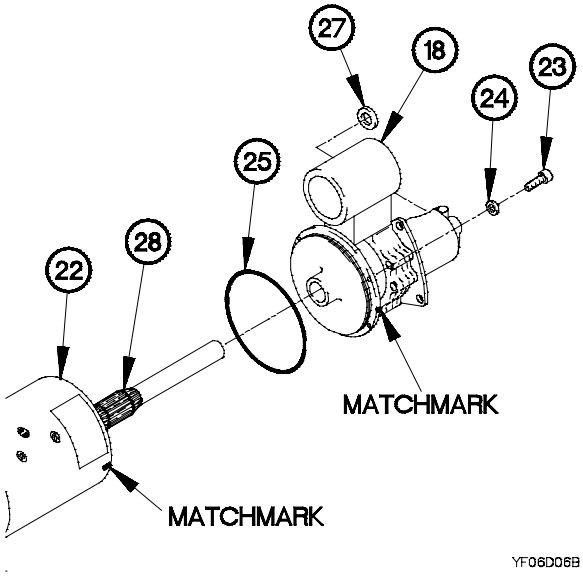
(10) Hold plunger (21) in a fixed position.

(11) Remove link spool (20) from plunger (21).

(12) Remove boot (19) from link spool (20). Discard boot.



YF06D05B



YF06D06B

(13) Match mark shift housing (18) to field ring (22).

(14) Remove five screws (23), lockwashers (24), and shift housing (18) from field ring (22). Discard lockwashers.

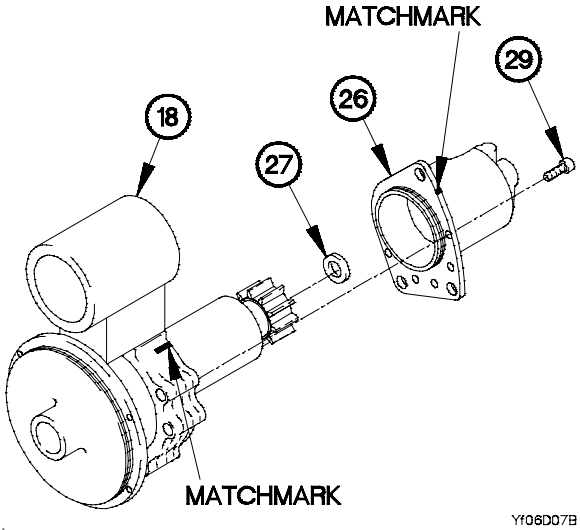
(15) Remove preformed packing (25) from shift housing (18). Discard preformed packing.

(16) Remove washer (27) and armature (28) from field ring (22).

(17) Match mark shift housing (18) to nose housing (26).

(18) Remove washer (27) from nose housing (26).

(19) Remove five screws (29) and nose housing (26) from shift housing (18).



Yf06D07B

6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

(20) Remove preformed packing (30) from nose housing (26). Discard preformed packing.

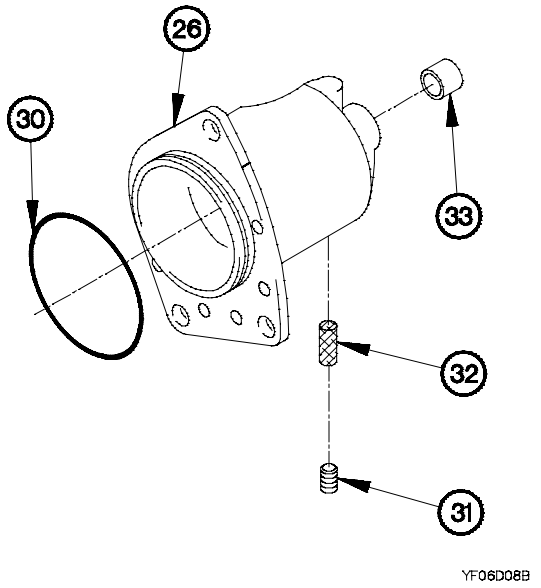
(21) Remove plug (31) and oil wick (32) from nose housing (26). Discard oil wick.

CAUTION

Oil wick should soak in lubricating oil for a minimum of four hours.

(22) Place replacement oil wick (32) in container of oil.

(23) Remove bushing (33) from nose housing (26). Discard bushing.



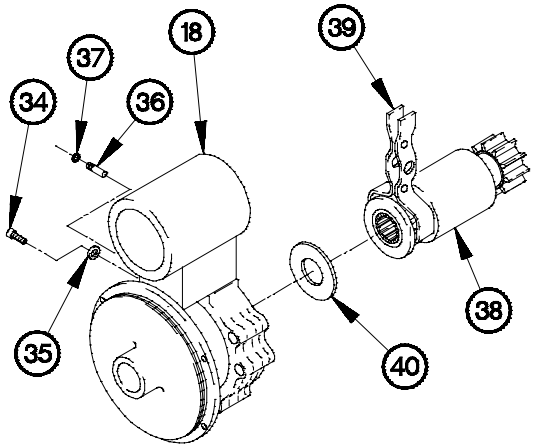
YF06D08B

(24) Remove screw (34), and washer (35) from shift housing (18).

(25) Remove pin (36) from shift housing (18).

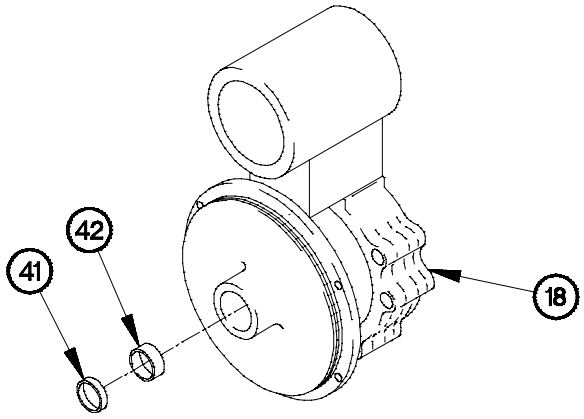
(26) Remove preformed packing (37) from pin (36). Discard preformed packing.

(27) Remove drive (38), lever (39), and washer (40) from shift housing (18). Discard washer.



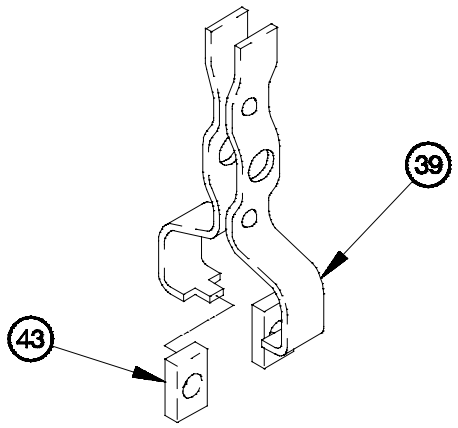
YF06D09B

(28) Remove oil seal (41) and bushing (42) from shift housing (18). Discard oil seal and bushing.

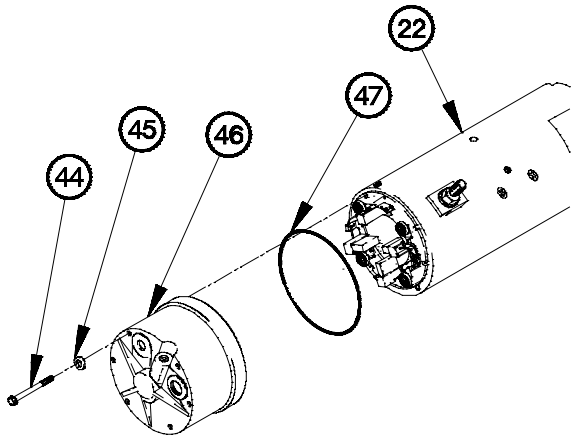


YF06D10B

(29) Remove two cams (43) from lever (39).



YF06D11B

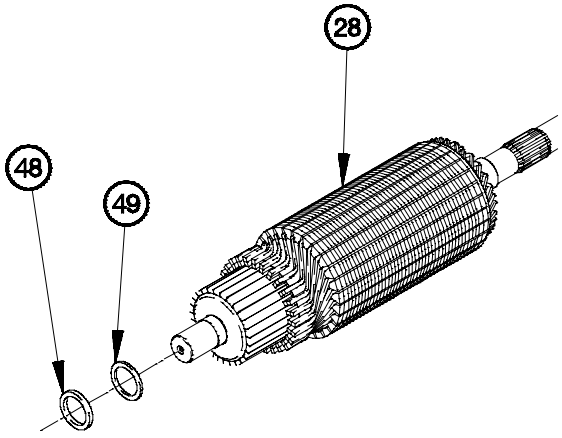


YF06D12B

(30) Remove six screws (44), seal washers (45), and commutator end housing (46) from field ring (22). Discard seal washers.

(31) Remove preformed packing (47) from field ring (22). Discard preformed packing.

(32) Remove fiber thrust washer (48) and steel thrust washer (49) from armature (28). Discard fiber thrust washer.

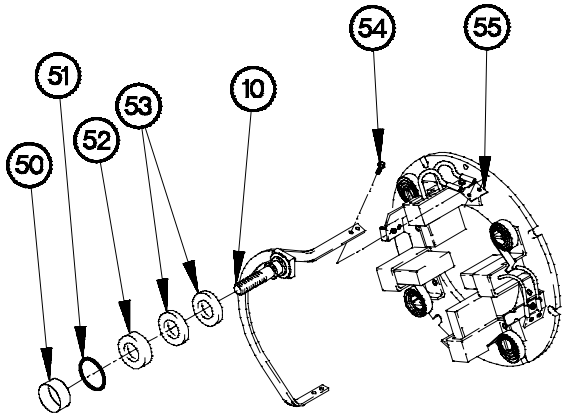


YF06D13B

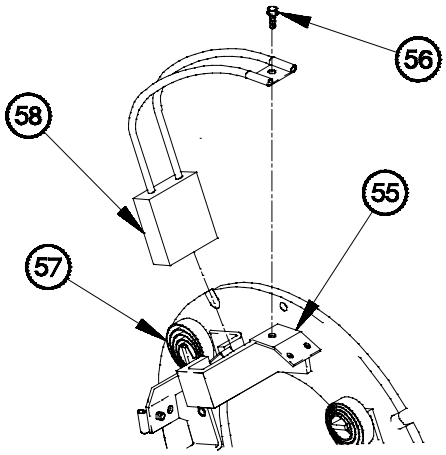
6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

(33) Remove sealing ring (50), preformed packing (51), insulation washer (52), and two washers (53) from contact screw (10). Discard sealing ring, preformed packing, and insulation washer.

(34) Remove four screws (54) and contact screw (10) from brush plate (55).



YF06D14B



YF06D15B

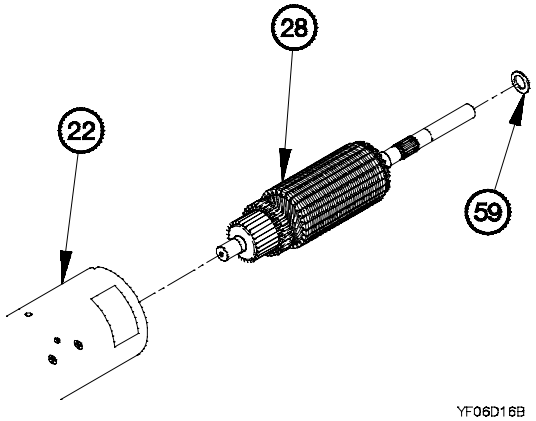
(35) Remove screw (56) from brush plate (55).

(36) Lift spring (57) and remove brush (58) from brush plate (55).

(37) Perform steps (35) and (36) on three remaining brushes.

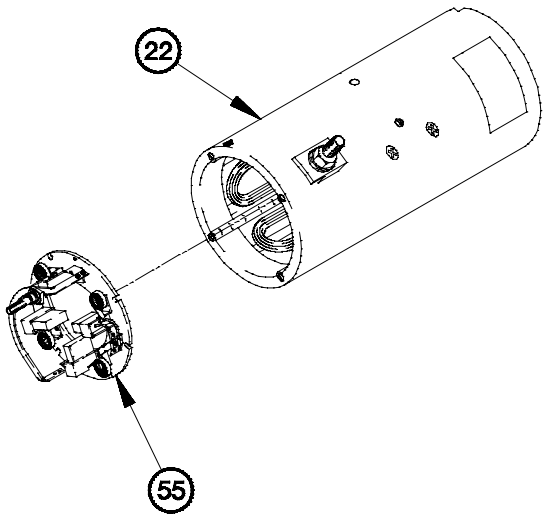
(38) Remove armature (28) from field ring (22).

(39) Remove washer (59) from armature (28).

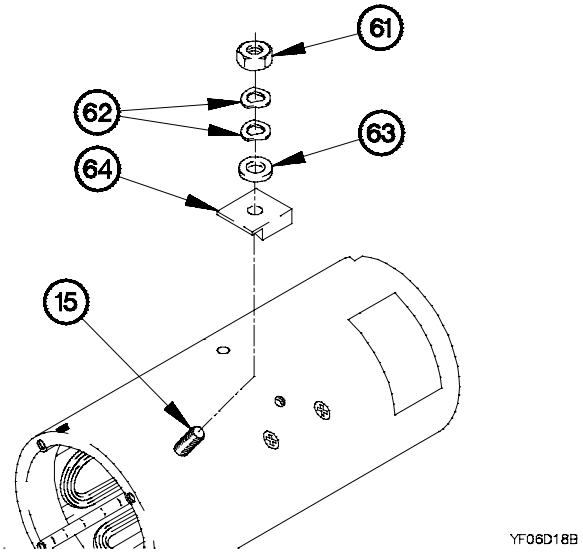


YF06D16B

(40) Remove brush plate (55) from field ring (22).



YF06D17B



YF06D18B

NOTE

Note orientation of spring washers prior to removal.

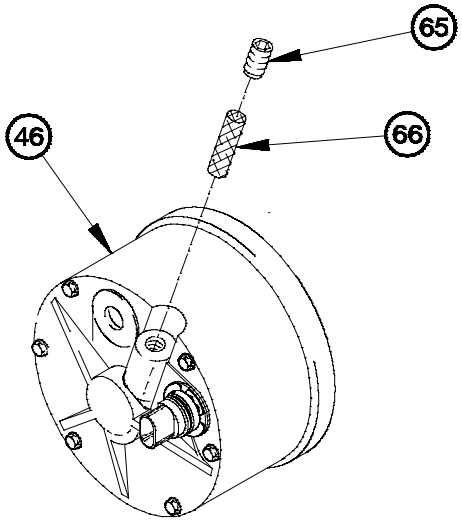
(41) Remove nut (61), two spring washers (62), washer (63), and insulation (64) from field coil screw (15). Discard spring washers.

(42) Remove plug (65) and oil wick (66) from commutator end housing (46). Discard oil wick.

NOTE

Oil wick should soak in lubricating oil for a minimum of four hours.

(43) Place replacement oil wick (66) in container of oil.

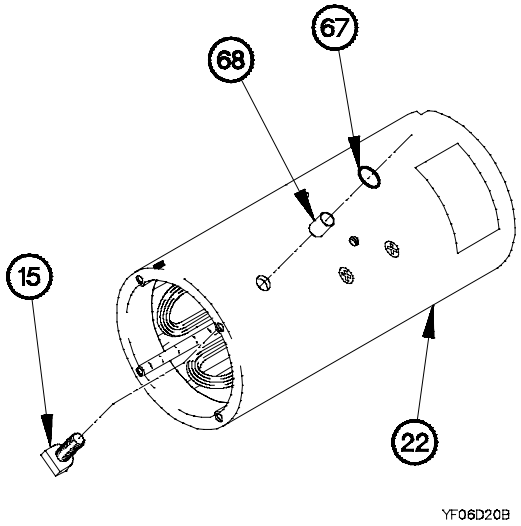


YF06D19B

6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

(44) Remove field coil screw (15) from field ring (22).

(45) Remove preformed packing (67) and insulation bushing (68) from field ring (22). Discard preformed packing and insulation bushing.



b. Cleaning/Inspection.

WARNING

- **Dry cleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I dry cleaning solvent is 100 ° F (38 ° C) and for Type II is 130 ° F (50 ° C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

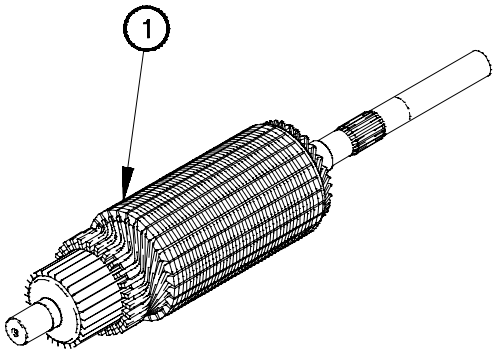
(1) Clean all metal parts with Dry Cleaning Solvent and dry using compressed air prior to inspection.

NOTE

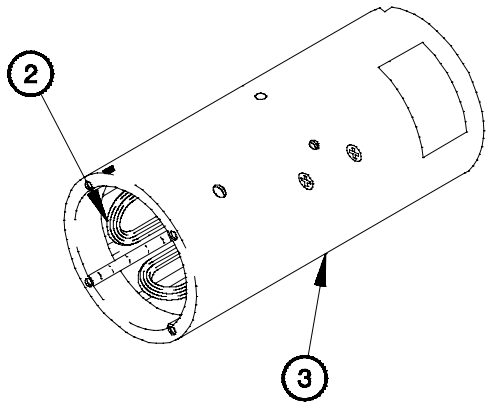
- Replace any part that fails visual inspection or size measurement requirements.
- Replace armarture if continuity is present between splined end of armature and commutator contacts.

(2) Check for continuity between splined end of armature (1) and all commutator contacts.

(3) Check armature (1) for wear or damaged shaft splines.



YF06C01B



YF06C02B

NOTE

Replace starting motor if continuity is present from field coil to field ring or if field ring fails visual inspection.

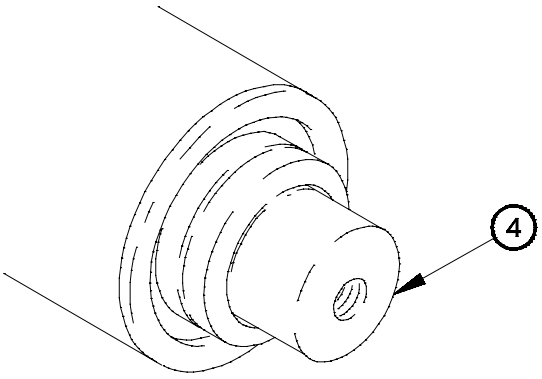
(4) Check for continuity from field coil (2) to field ring (3).

(5) Inspect field ring (3) for cracks, pitting, or corrosion.

CAUTION

Replace link spool if surface is nicked. Failure to comply may result in damage to equipment.

(6) Inspect plunger (4) for nicks and scratches.



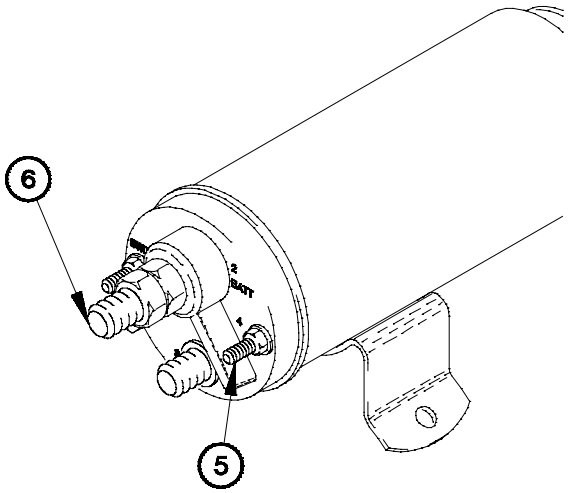
YF06C03B

6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

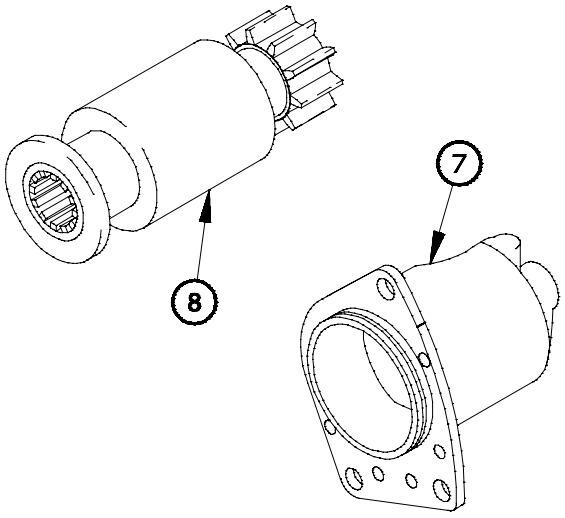
NOTE

Replace starting motor solenoid if continuity is present between starting motor solenoid positive terminal and starting motor solenoid ground terminal.

(7) Check for continuity between starting motor solenoid positive terminal (5) and starting motor solenoid ground terminal (6).



YF06C04B



YF06C05B

(8) Inspect nose housing (7) for cracks, pitting, or corrosion.

(9) Inspect drive (8) for broken, chipped, or worn teeth.

NOTE

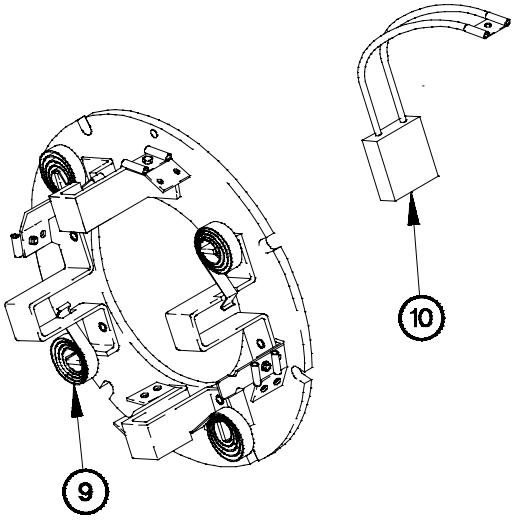
Replace brush plate if brush springs fail visual inspection.

(10) Check brush springs (9) for cracks, nicks, breaks, or distortion.

NOTE

Replace all four brushes if any brush measures less than 0.625 in. (15.875 mm).

(11) Measure four brushes (10) for serviceability.

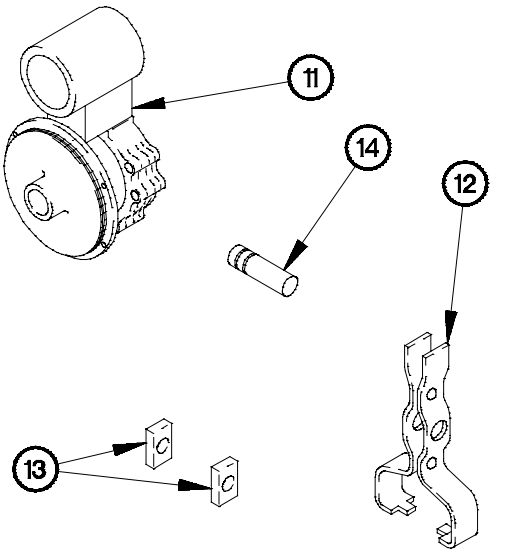


YF06C06B

(12) Inspect shift housing (11) for cracks, pitting, or corrosion.

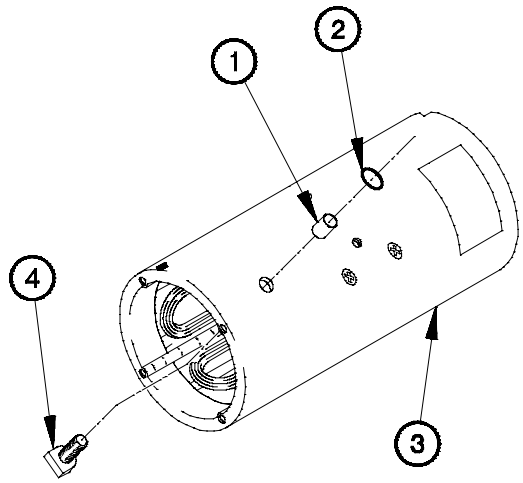
(13) Inspect lever (12) for cracks, pitting, or corrosion.

(14) Inspect two cams (13) and pin (14) for cracks, pitting, or corrosion.



YF06C07B

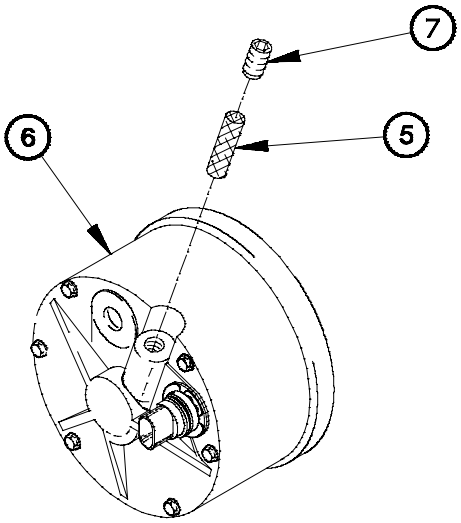
c. Assembly.



YF06A01B

(1) Install insulation bushing (1) and preformed packing (2) in field ring (3).

(2) Install field coil screw (4) in field ring (3).



YF06a02b

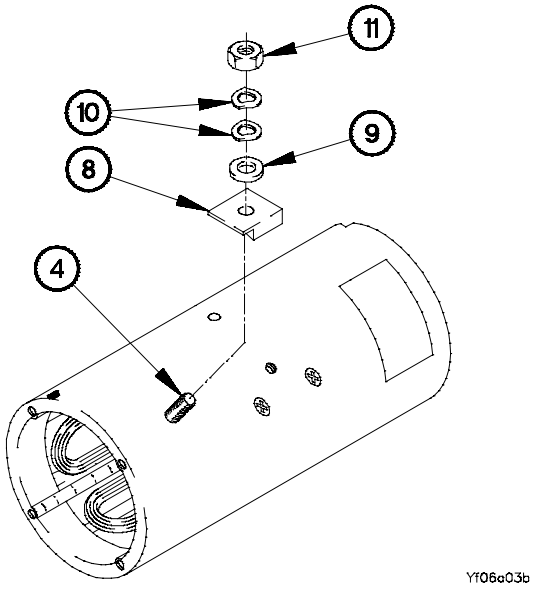
(3) Install oil wick (5) in commutator end housing (6).

(4) Install plug (7) in commutator end housing (6).

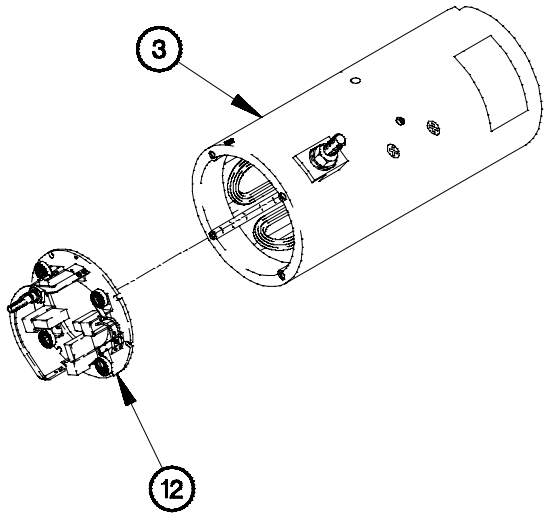
6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

(5) Position insulator (8), washer (9), two spring washers (10), and nut (11) on field coil screw (4).

(6) Tighten nut (11) to 18-22 lb-ft (24-32 N·m).



YF06A03B

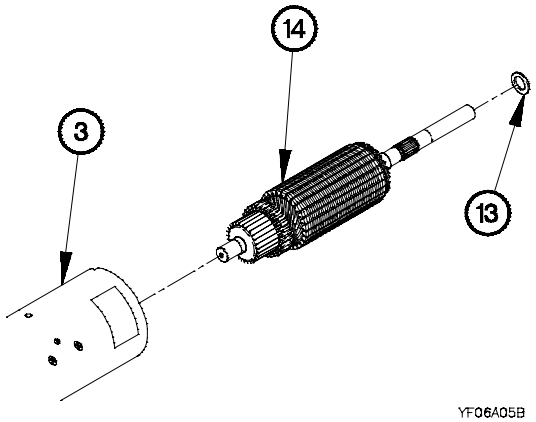


YF06A04B

(7) Install brush plate (12) on field ring (3).

(8) Install washer (13) on armature (14).

(9) Install armature (14) in field ring (3).

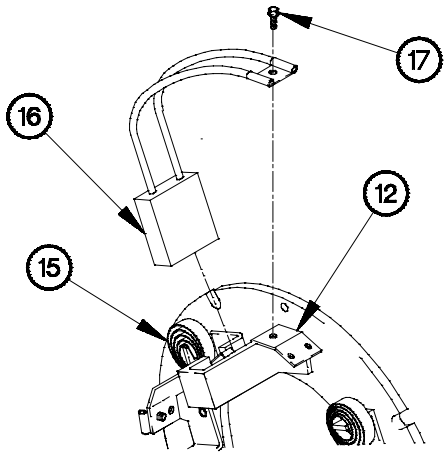


YF06A05B

(10) Lift spring (15) and install brush (16) in brush plate (12).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

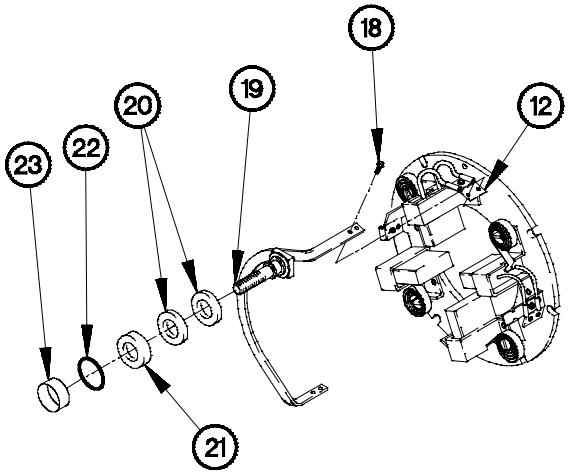


YF06A06B

(11) Apply sealing compound to threads of screws (17).

(12) Install screw (17) in brush plate (12).

(13) Perform steps (10) through (12) on remaining brushes.



YF06A07B

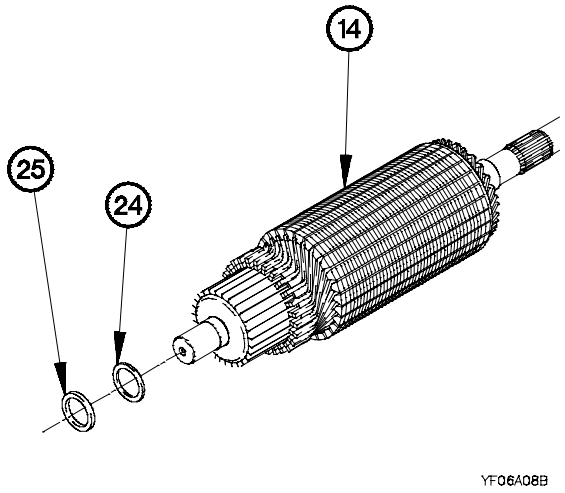
(14) Apply sealing compound to threads of four screws (18).

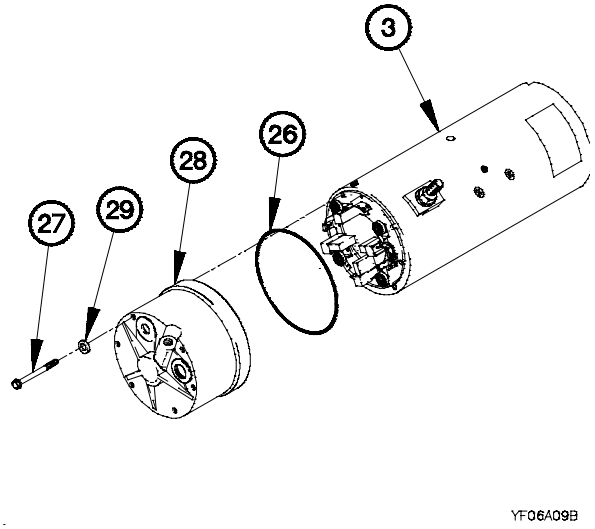
(15) Install contact screw (19) on brush plate (12) with four screws (18).

(16) Install two washers (20), insulation washer (21), preformed packing (22), and sealing ring (23) on contact screw (19).

6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

(17) Install steel thrust washer (24) and fiber thrust washer (25) on armature (14).





(18) Install preformed packing (26) on field ring (3).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

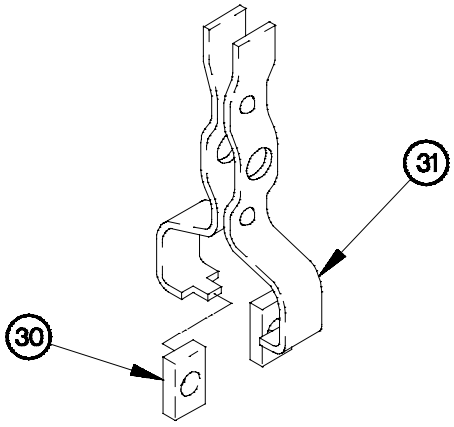
(19) Apply sealing compound to threads of six screws (27).

(20) Install commutator end housing (28) on field ring (3) with six sealing washers (29) and screws (27).

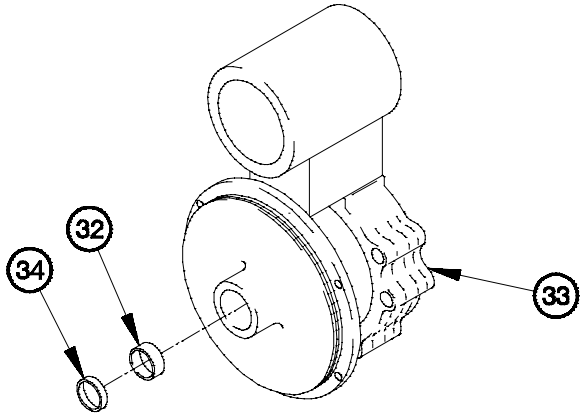
NOTE

Apply a drop or two of oil on cams prior to installing.

(21) Install two cams (30) on lever (31).



YF06A10B



YF06A11B

(22) Install bushing (32) in shift housing (33).

(23) Install oil seal (34) in shift housing (33).

6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

(24) Install washer (35) in shift housing (33).

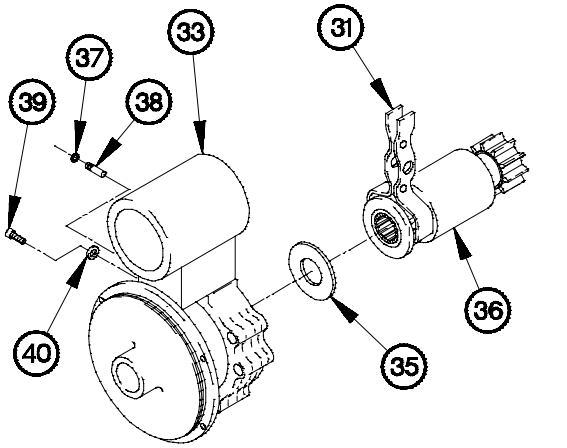
(25) Position lever (31) and drive (36) in shift housing (33).

(26) Install preformed packing (37) on pin (38).

(27) Install pin (38) in shift housing (33).

WARNING

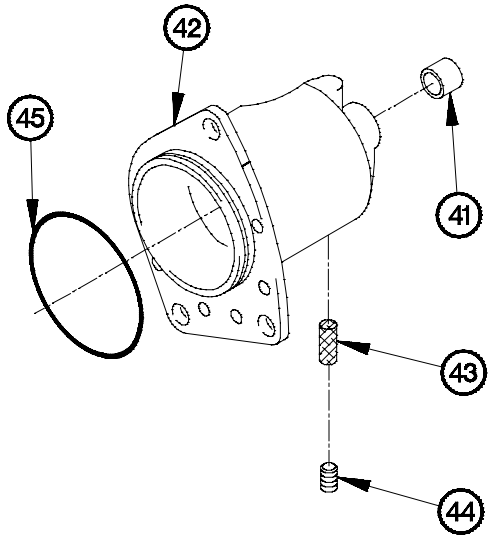
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.



YF06A12B

(28) Apply sealing compound to threads of screw (39).

(29) Install washer (40) and screw (39) in shift housing (33).



YF06A13B

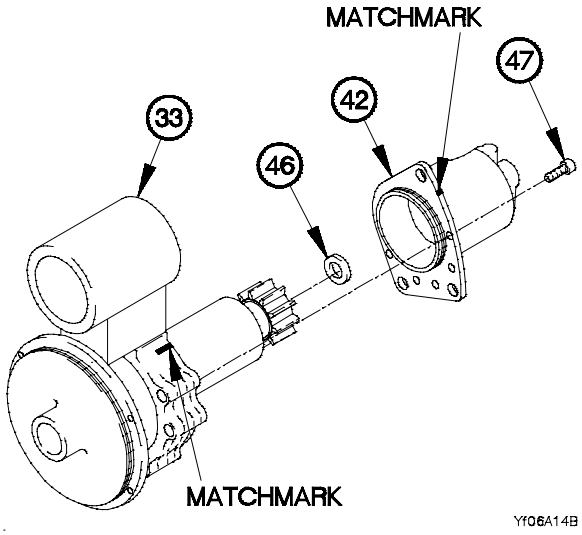
(30) Install bushing (41) in nose bushing (42).

(31) Install oil wick (43) in nose housing (42).

(32) Install plug (44) in nose housing (42).

(33) Install preformed packing (45) on nose housing (42).

(34) Position washer (46) and nose housing (42) on shift housing (33) with matchmarks aligned.



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

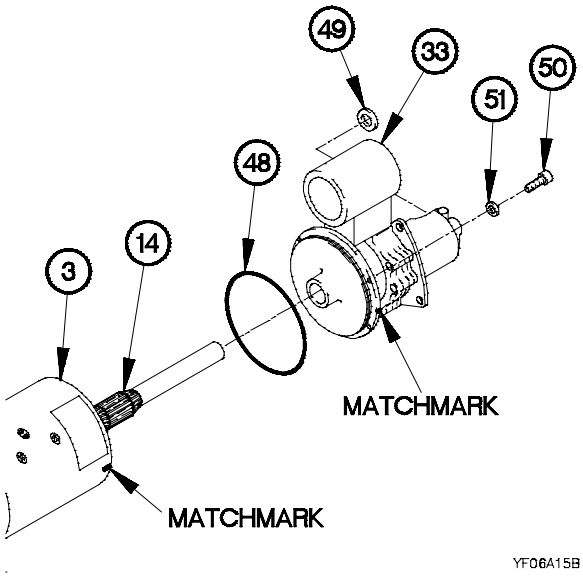
(35) Apply sealing compound to threads of five screws (47).

(36) Position five screws (47) in nose housing (42).

NOTE

Step (37) requires the aid of an assistant.

(37) Tighten five screws (47) to 13-17 lb-ft (18-23 N·m).



(38) Install preformed packing (48) on shift housing (33).

NOTE

Apply a drop or two of oil on cams prior to installing.

(39) Position shift housing (33) on field ring (3) with matchmarks aligned.

(40) Install washer (49) on armature (14).

(41) Apply sealing compound to threads of five screws (50).

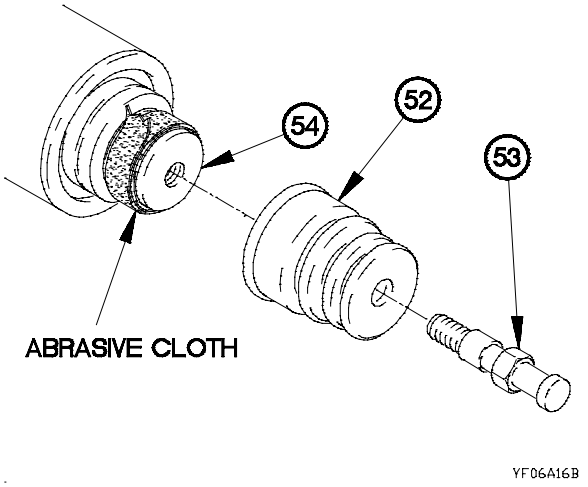
(42) Install five lockwashers (51) and screws (50) in shift housing (33).

6-6. STARTING MOTOR REPAIR (P/N M0017703ME) (CONT)

(43) Install boot (52) on link spool (53).

CAUTION

Use care not to damage link spool during installation. Failure to comply may result in damage to equipment.



(44) Wrap three layers of abrasive cloth around plunger (54).

(45) Position boot (52) and link spool (53) in plunger (54).

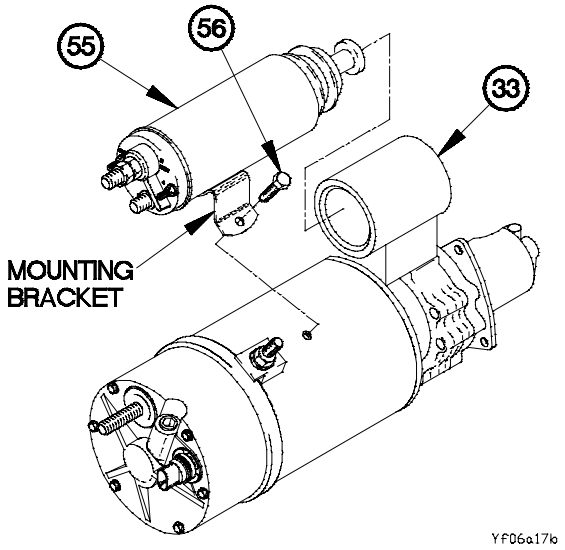
(46) Hold plunger (54) in a fixed position.

(47) Tighten link spool (53) to 27-33 lb-in. (3-4 N·m).

NOTE

Hold the shift housing end up for installation of solenoid.

(48) Position starting motor solenoid (55) in shift housing (33).



(49) Rotate starting motor solenoid (55) so mounting bracket is facing down.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(50) Apply sealing compound to threads of two screws (56).

NOTE

Steps (51) and (52) require the aid of an assistant.

(51) Position two screws (56) in starting motor solenoid (55).

(52) Tighten two screws (56) to 20-24 lb-ft (27-32 N·m).

(53) Position strap (57) on starting motor solenoid terminal (58) and field coil screw (4).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

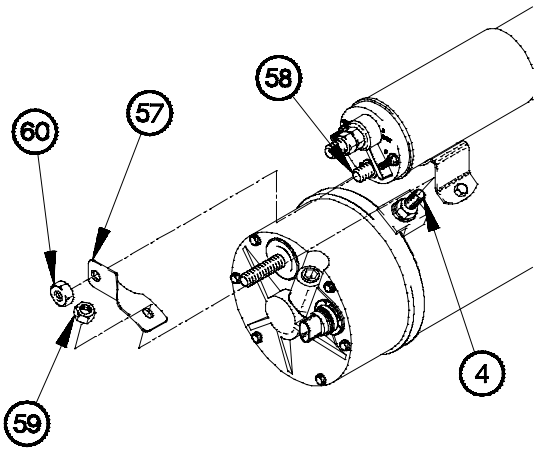
(54) Apply sealing compound to threads of starting motor solenoid terminal (58) and field coil screw (4).

(55) Position nut (59) on field coil screw (4).

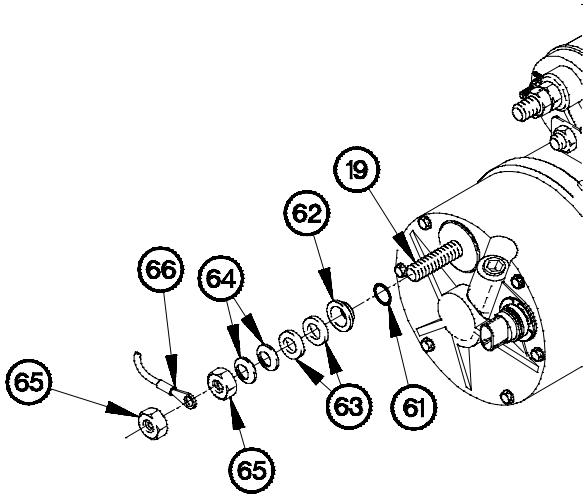
(56) Tighten nut (59) to 18-22 lb-ft (24-30 N·m).

(57) Position nut (60) on starting motor solenoid terminal (58).

(58) Tighten nut (60) to 21-29 lb-ft (28-39 N·m).



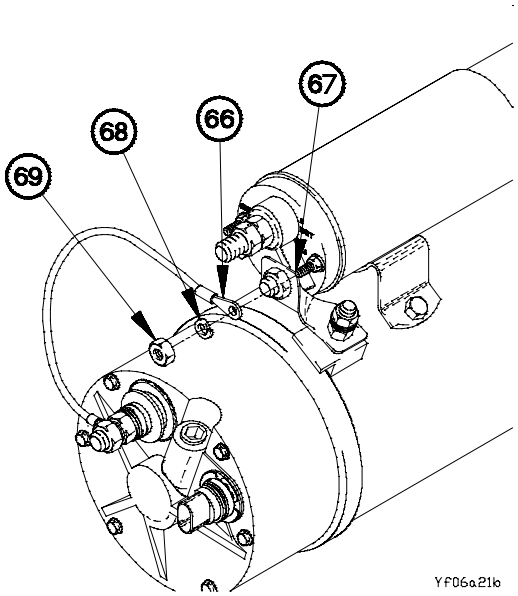
YF06a18b



YF06a20b

(59) Position preformed packing (61), isolator (62), two washers (63), spring washers (64), nut (65), electrical lead (66), and nut (65) on contact screw (19).

(60) Tighten two nuts (65) to 33-37 lb-ft (45-50 N·m).



(61) Position electrical lead (66) on starting motor solenoid terminal (67) with lockwasher (68) and nut (69).

(62) Tighten nut (69) to 43-47 lb-in. (5 N·m).

d. Follow-On Maintenance.

Perform starter adjustments and test.

End of Task.

6-7. TRANSMISSION EXTERNAL WIRING HARNESS REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (TM 9-2320-365-20-3).
Cab raised (TM 9-2320-365-10).

Tools and Special Tools
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 25, Appendix B)
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

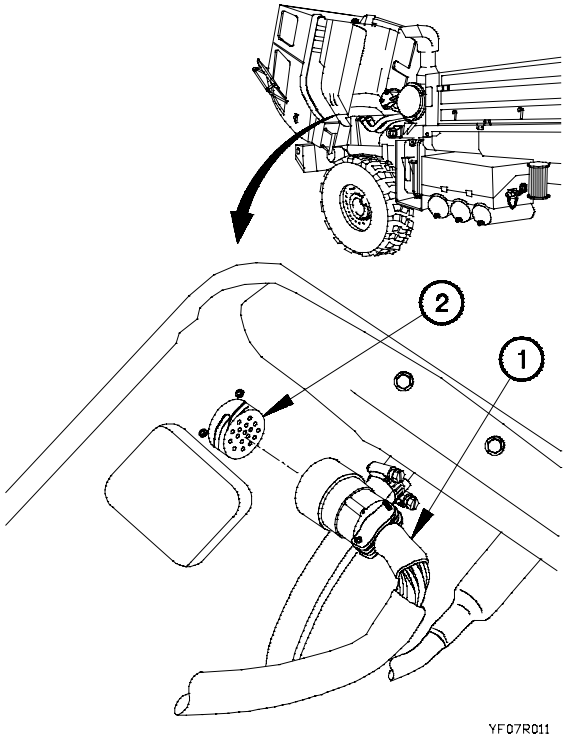
Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 29, Appendix C)
Ties, Cable Plastic (Item 87, Appendix C)
Nut, Self-Locking (Item 130, Appendix F)

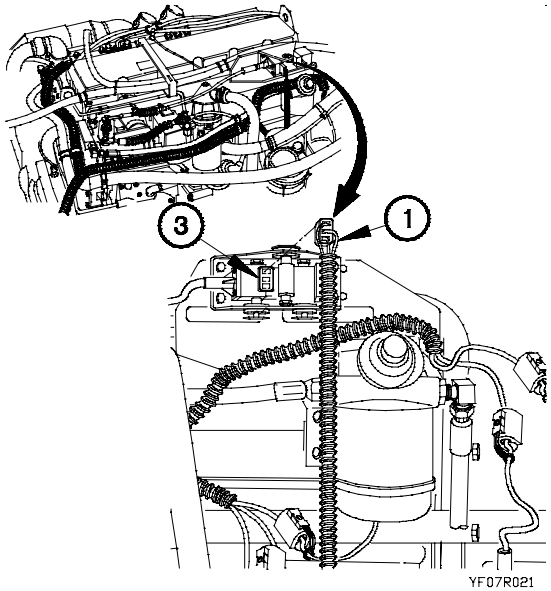
a. Removal.

NOTE

- Tag connectors and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(1) Disconnect transmission external harness (1) from bulkhead receptacle J119 (2).





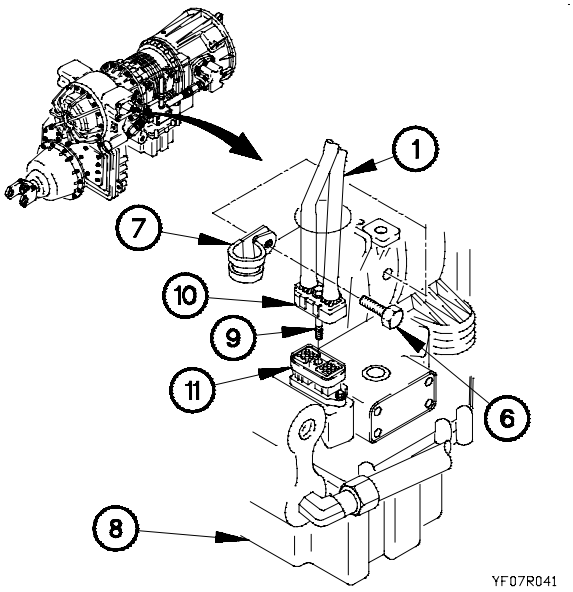
(2) Disconnect transmission external harness (1) from throttle position sensor (3).

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

(3) Disconnect transmission external harness (1) from speed sensor (4).

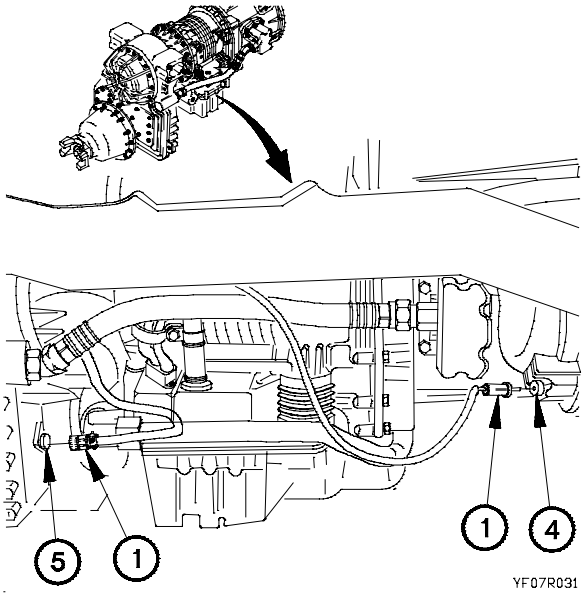
(4) Disconnect transmission external harness (1) from transfer case module (5).



NOTE

Perform step (9) on serial number 6510032369 and higher.

(9) Disconnect transmission external harness (1) from transmission internal harness connector (12).



NOTE

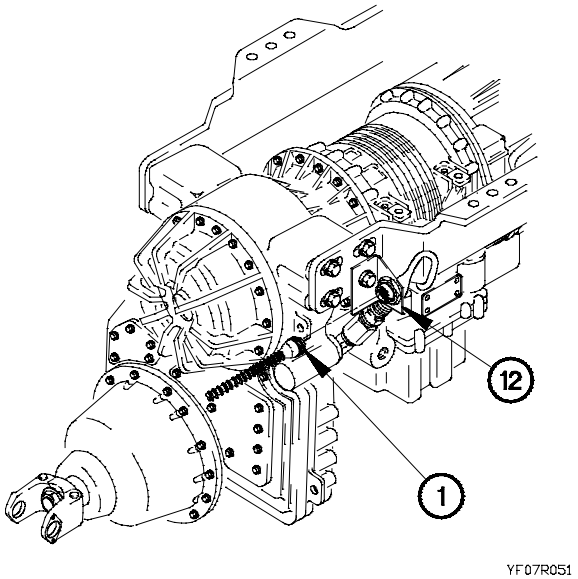
Perform steps (5) through (8) on serial numbers prior to 6510032369.

(5) Remove screw (6) and clamp (7) from transmission (8).

(6) Loosen screw (9) on connector (10).

(7) Disconnect transmission external harness (1) from receptacle (11).

(8) Remove clamp (7) from transmission external harness (1).

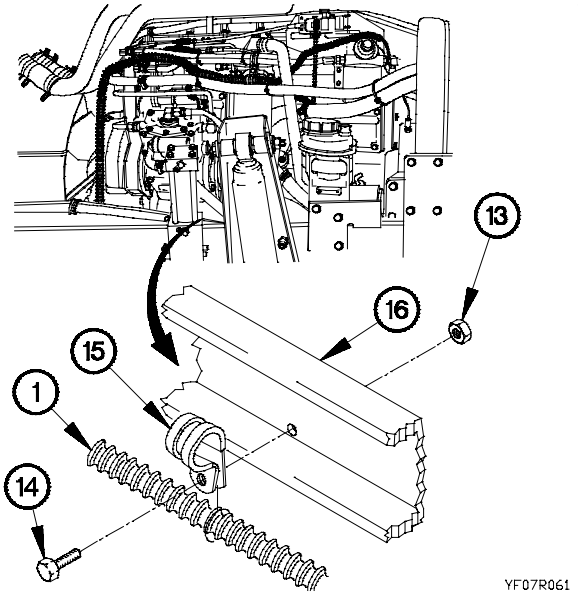


6-7. TRANSMISSION EXTERNAL WIRING HARNESS REPLACEMENT (CONT)

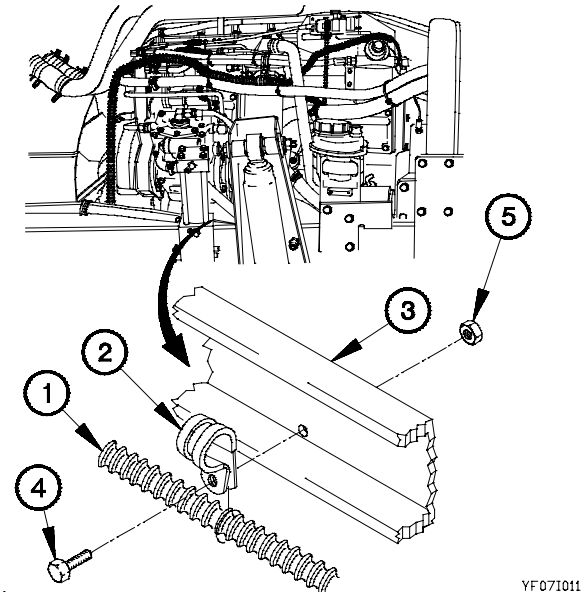
(10) Remove self-locking nut (13), screw (14), clamp (15) and transmission external harness (1) from frame (16). Discard self-locking nut.

(11) Remove clamp (15) from transmission external harness (1).

(12) Remove transmission external harness (1) from vehicle.



b. Installation.



(1) Position transmission external harness (1) in clamp (2).

(2) Install clamp (2) on frame (3) with screw (4) and self-locking nut (5).

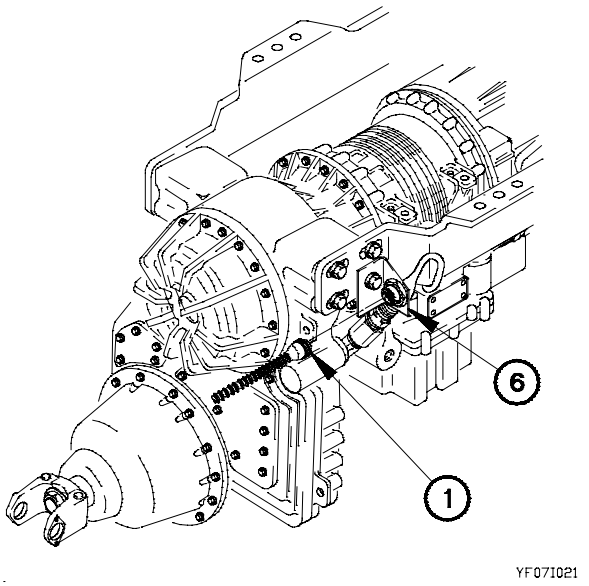
WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE

Perform step (3) on serial number 6510032369 and higher.

(3) Connect transmission external harness (1) to internal transmission harness connector (6).



CAUTION

Connector pins can be damaged during connection. Use care when connecting transmission external harness connector. Failure to comply may result in damage to equipment.

NOTE

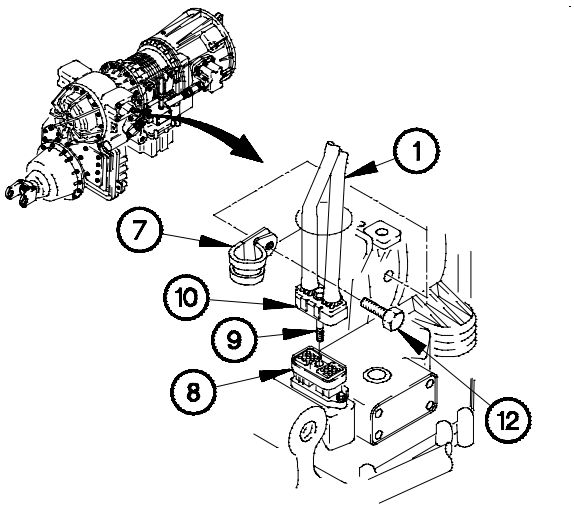
Perform steps (4) through (7) on serial numbers prior to 6510032369.

(4) Install clamp (7) on transmission adapter harness (1).

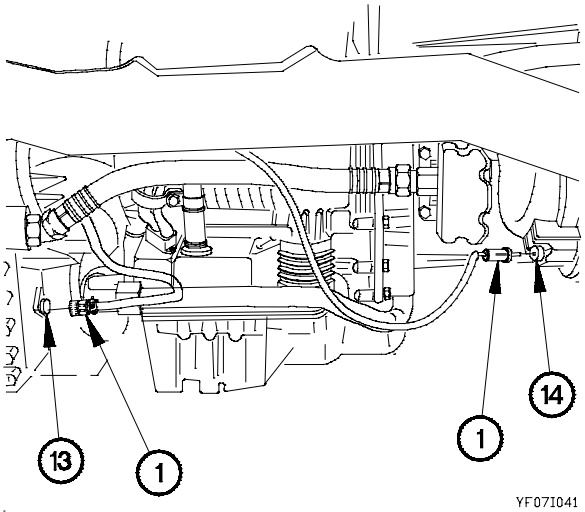
(5) Connect transmission adapter harness (1) to receptacle on transmission (8).

(6) Tighten screw (9) on connector (10) to 12-24 lb-in. (1-3 N·m).

(7) Install clamp (7) on transmission (11) with screw (12).



YF07I031

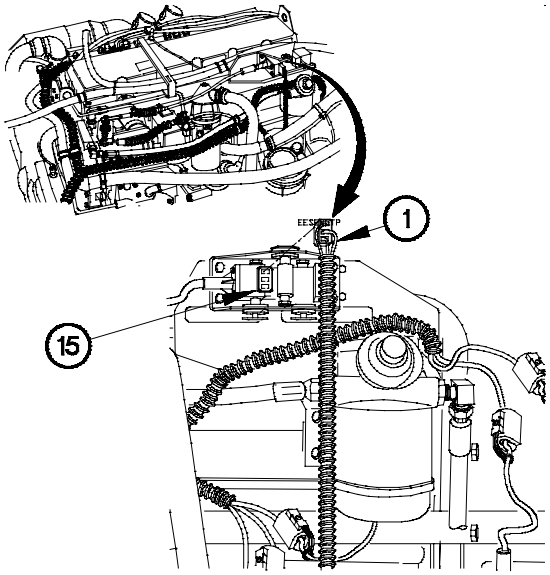


YF07I041

(8) Connect transmission external harness (1) to transfer case module (13).

(9) Connect transmission external harness (1) to speed sensor (14).

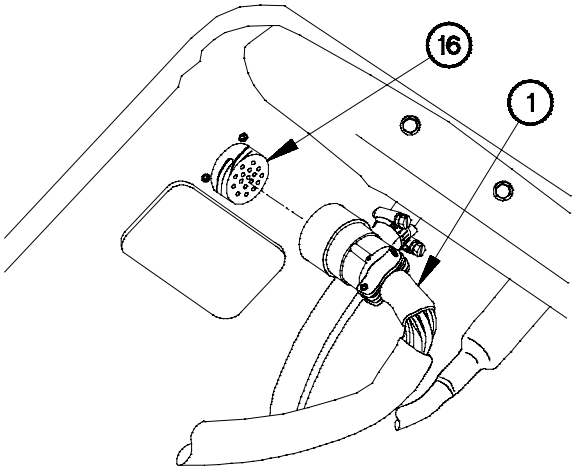
(10) Connect transmission external harness (1) to throttle position sensor (15).



YF07I051

6-7. TRANSMISSION EXTERNAL WIRING HARNESS REPLACEMENT (CONT)

(11) Connect transmission external harness (1) to bulkhead receptacle J119 (16).



c. Follow-On Maintenance.

(1) Lower cab (TM 9-2320-365-10).

(2) Connect batteries (TM 9-2320-365-20-3).

(3) Operate vehicle and check for proper operation of transmission (TM 9-2320-365-10).

End of Task.

6-8. TRANSMISSION ADAPTER CABLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).

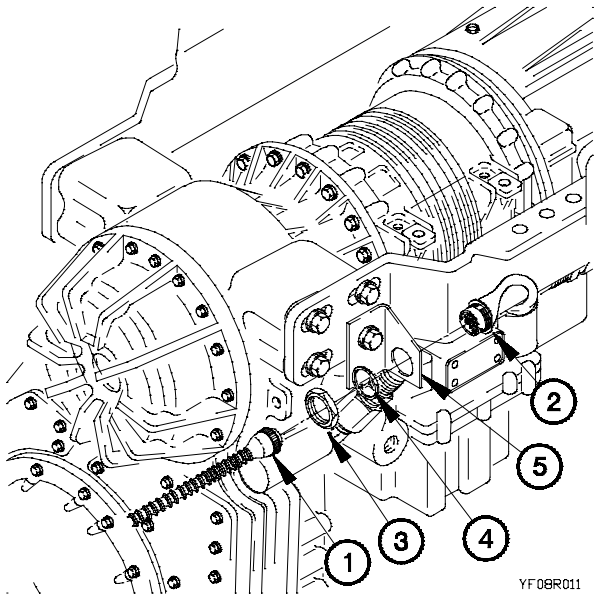
Tools/Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque 0-150 lb-in. (Item 79, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

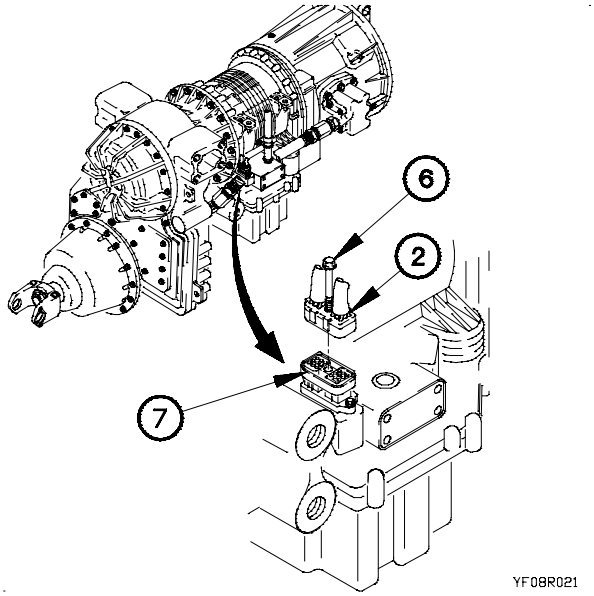
a. Removal.

(1) Disconnect transmission external wiring harness connector (1) from transmission adapter cable assembly (2).

(2) Remove nut (3), washer (4), and transmission adapter cable assembly (2) from bracket (5).

(3) Install washer (4) and nut (3) on transmission adapter cable assembly (2).





(4) Loosen bolt (6) on transmission adapter cable assembly (2).

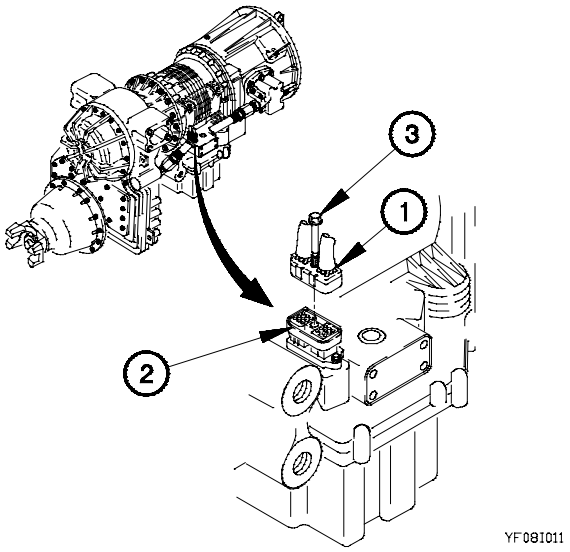
(5) Remove transmission adapter cable assembly (2) from main housing module receptacle (7).

6-8. TRANSMISSION EXTERNAL WIRING HARNESS REPLACEMENT (CONT)

b. Installation

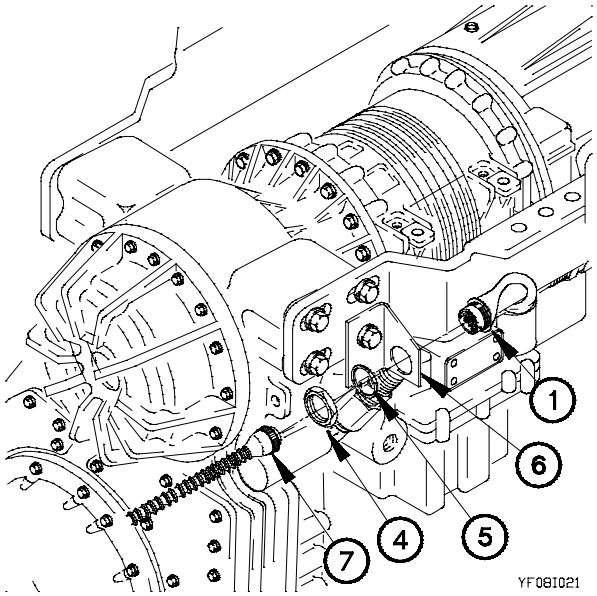
CAUTION

Due to position of main housing module connector, extreme care must be taken when installing transmission adapter cable assembly connector. Failure to comply may result in damage to equipment.



(1) Position transmission adapter cable assembly (1) in main housing module receptacle (2) with bolt (3).

(2) Tighten bolt (3) to 12-24 lb-in. (1-3 N·m).



(3) Remove nut (4) and washer (5) from transmission adapter cable assembly (1).

(4) Install transmission adapter cable assembly (1) on bracket (6) with washer (5) and nut (4).

(5) Connect transmission external wiring harness connector (7) to transmission adapter cable assembly (1).

c. Follow-on Maintenance

Operate vehicle and verify proper transmission operation (TM 9-2320-365-10).

End of Task.

CHAPTER 7
TRANSMISSION MAINTENANCE

Section I. INTRODUCTION 7-1
7-1. INTRODUCTION 7-1

Section II. MAINTENANCE PROCEDURES 7-2
7-2. TORQUE CONVERTER REPLACEMENT/REPAIR 7-2
7-3. TRANSMISSION UNPACKING/PACKING 7-19
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) 7-25
7-5. TRANSMISSION TO MAINTENANCE STAND 7-45
7-6. TRANSMISSION RESILIENT MOUNT AND BRACKET REPLACEMENT 7-46
7-7. STATIONARY CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR 7-53
7-8. ROTATING CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR 7-57
7-9. C6 CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR 7-62
7-10. CONTROL VALVE MODULE REPLACEMENT 7-67
7-11. CONTROL VALVE MODULE REPAIR 7-77
7-12. MAIN VALVE BODY ASSEMBLY REPAIR 7-81
7-13. TRANSMISSION INTERNAL WIRING HARNESS REPLACEMENT 7-88
7-14. CONTROL VALVE MODULE STRAINER REPLACEMENT 7-92
7-15. TRANSMISSION OIL COOLER MOUNTING BRACKET REPLACEMENT 7-94
7-16. SCAVENGE PUMP ASSEMBLY REPLACEMENT 7-97
7-17. ENGINE AND TRANSMISSION MOUNT BRACKET REPLACEMENT 7-99
7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) 7-107

Section I. INTRODUCTION

7-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repairing of Electrical System Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

7-2. TORQUE CONVERTER REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission mounted on maintenance stand (para 7-5).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft. (Item 80, Appendix B)
Gage, Profile (TM 9-2320-365-20)
Caliper, Vernier (Item 8, Appendix B)
Caliper, Micrometer (Item 7, Appendix B)
Straight Edge (Item 61, Appendix B)
Gage Set, Telescoping (Item 21, Appendix B)
Gage, Depth, Micrometer (Item 22, Appendix B)
Pan, Drain (Item 36, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Socket Wrench Attachment, Screwdriver (Item 53, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Chain, Welded (TM 9-2320-365-10)
Adapter (3/8 to 1/2") (NSN 5120-01-335-0701)

Tools and Special Tools (Cont)
Socket Wrench Attachment, Screwdriver (3/4 Hex, 1/2 Drive) (NSN 5120-01-367-3468)

Materials/Parts
Packing, Retainer (Item 217, Appendix F)
Washer, Seal (Item 300, Appendix F)
Sealring (Item 281, Appendix F)
Spring, Flat (13) (Item 290, Appendix F)
Packing, Retainer (Item 216, Appendix F)
Bolt, Machine (2) (Item 15, Appendix C)
Washer, Flat (2) (Item 92, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Lubricating Oil, Engine (Item 48, Appendix C)

Personnel Required
(2)

a. Removal.

(1) Rotate transmission on maintenance stand so that torque converter module (1) is in up position.

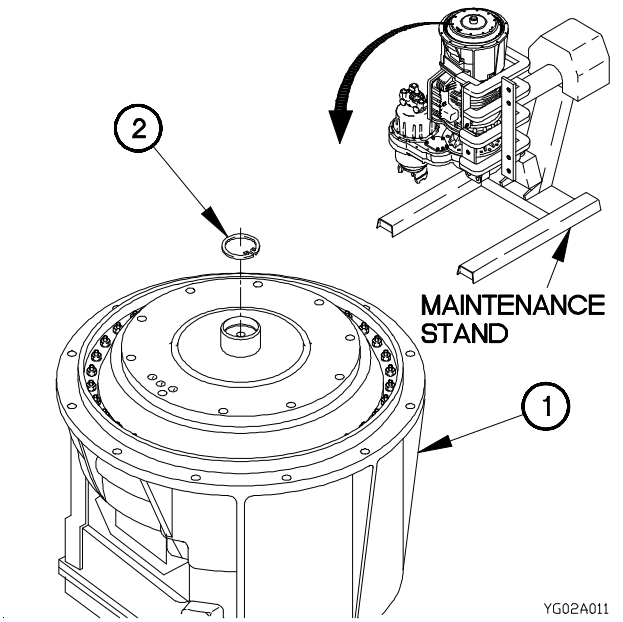
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

NOTE

Perform steps (2) through (6) on transmissions prior to serial number 6510165560.

(2) Remove retaining ring (2) from torque converter module (1).

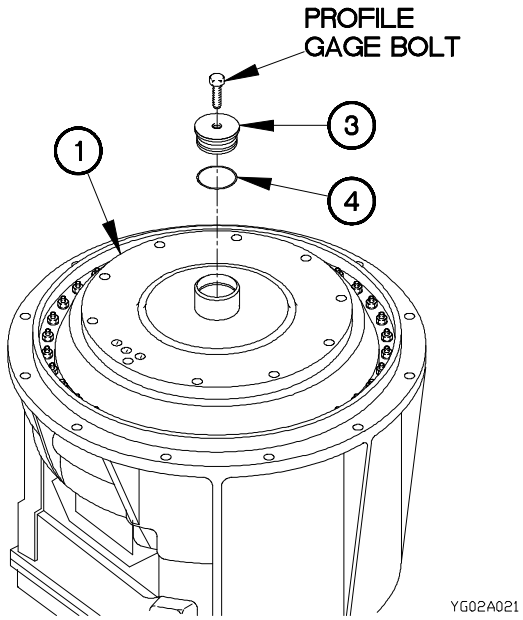


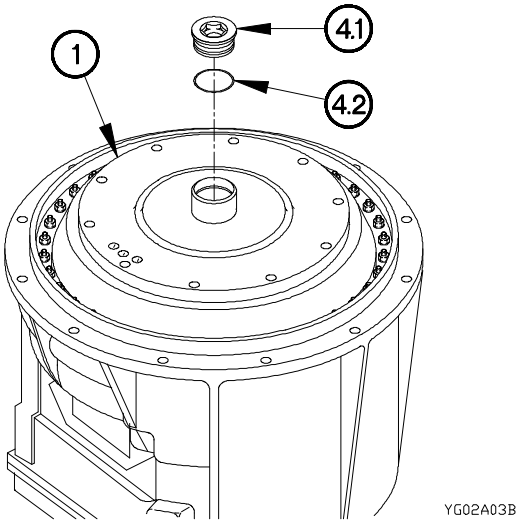
(3) Install profile gage bolt in torque converter end plug (3).

(4) Remove torque converter end plug (3) from torque converter module (1).

(5) Remove profile gage bolt from torque converter end plug (3).

(6) Remove retainer packing (4) from torque converter end plug (3). Discard retainer packing.





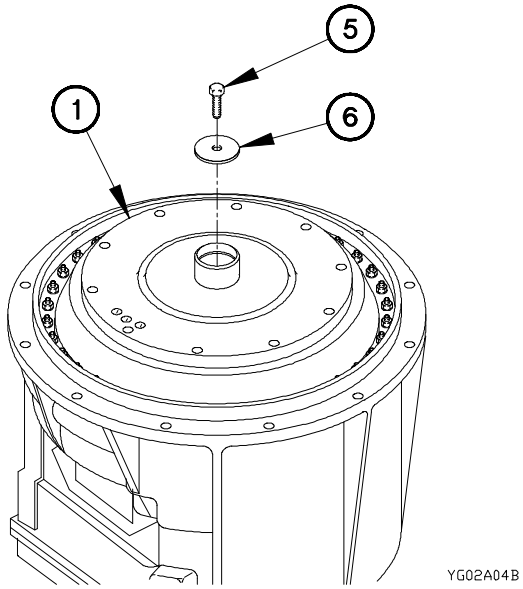
NOTE

Perform steps (7) and (8) on transmission serial numbers 6510165560 and higher.

(7) Remove torque converter end plug (4.1) from torque converter module (1).

(8) Remove retainer packing (4.2) from torque converter end plug (4.1). Discard retainer packing.

(9) Remove screw (5) and shim (6) from torque converter module (1).



7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)

(10) Secure chain to opposite sides of torque converter module (1) with two washers and bolts.

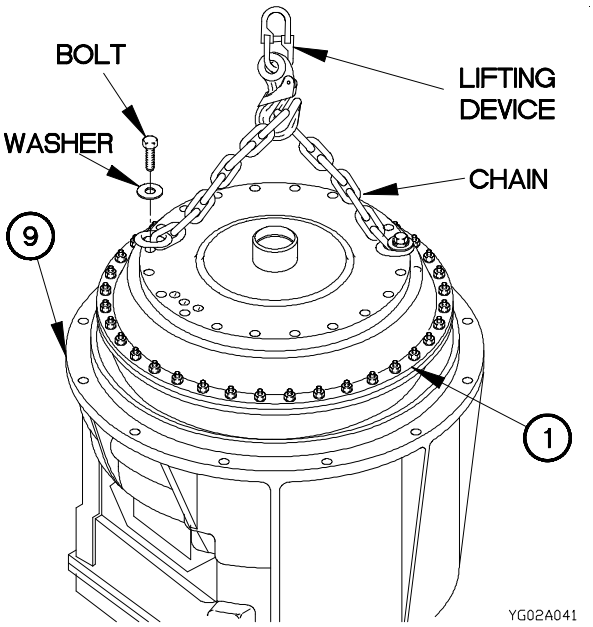
WARNING

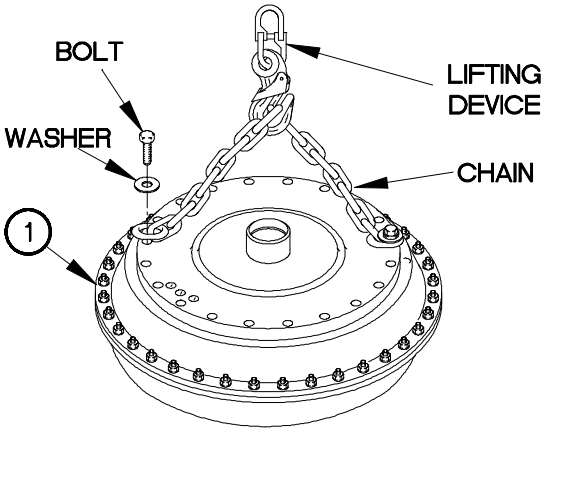
Torque converter module weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel.

NOTE

Step (11) requires the aid of an assistant.

(11) Remove torque converter module (1) from torque converter housing module (9).





(12) Remove two bolts, washers, and chain from torque converter module (1).

b. Disassembly.

(1) Remove 36 nuts (1) from converter cover (2).

NOTE

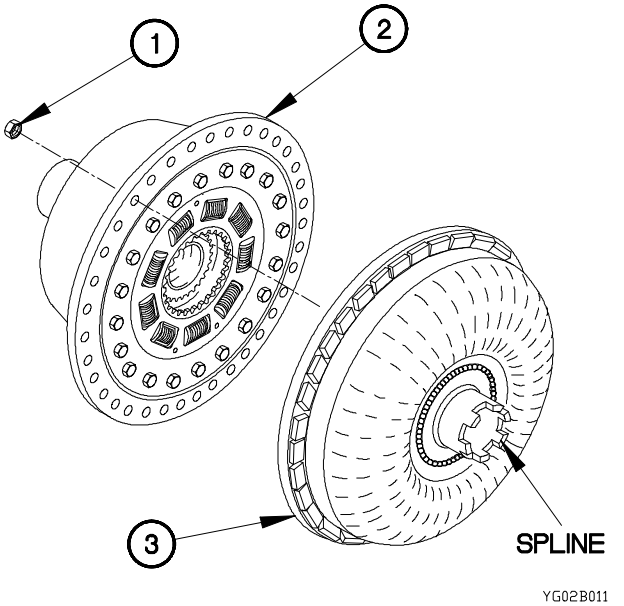
Perform step (2) on converter pumps with six splines.

(2) Remove converter cover (2) from converter pump (3). Discard converter pump.

NOTE

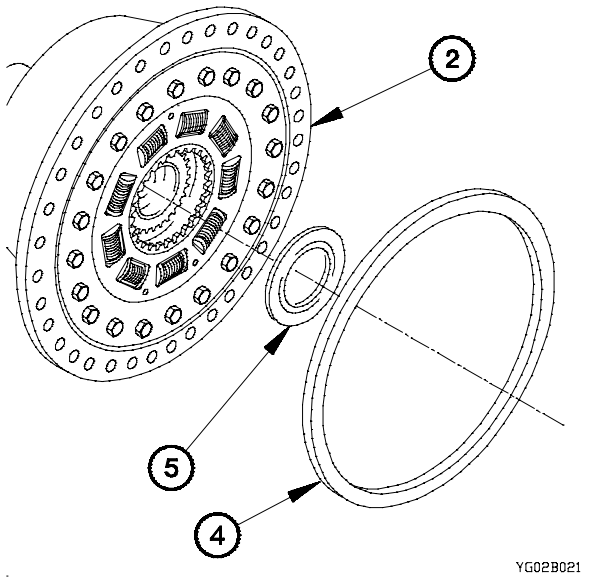
Perform step (3) on converter pumps with two splines.

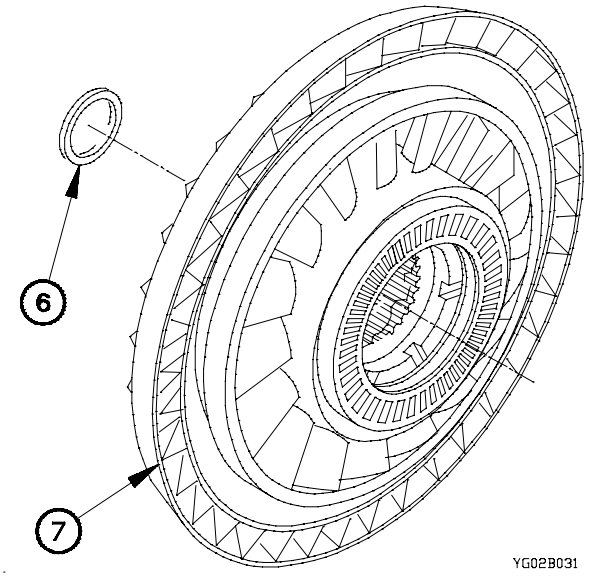
(3) Remove converter cover (2) from converter pump (3).



(4) Remove retainer packing (4) from converter cover (2). Discard retainer packing.

(5) Remove thrust bearing (5) from converter cover (2).





(6) Remove seal washer (6) from turbine (7). Discard seal washer.

(7) Remove 20 screws (8) from lockup clutch backing plate (9).

(8) Remove lockup clutch backing plate (9) from damper (10).

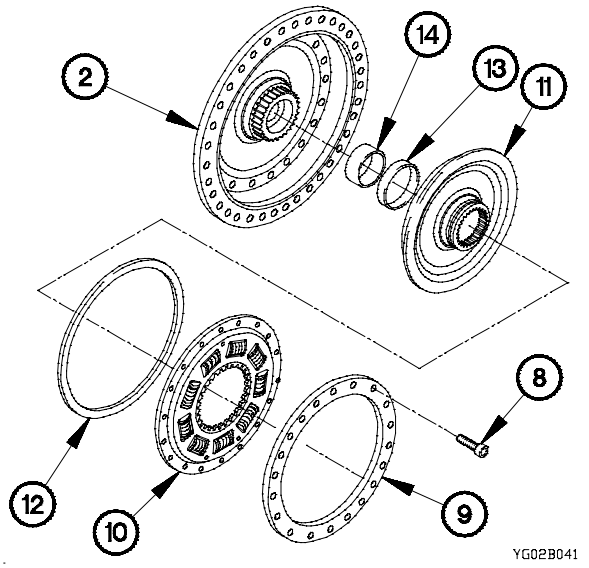
(9) Remove damper (10) from converter cover (2).

(10) Remove lockup piston (11) from converter cover (2).

(11) Remove lockup piston sealring (12) from lockup piston (11). Discard sealring.

(12) Remove lockup piston seal (13) from converter cover (2).

(13) Remove bushing (14) from converter cover (2).



7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)

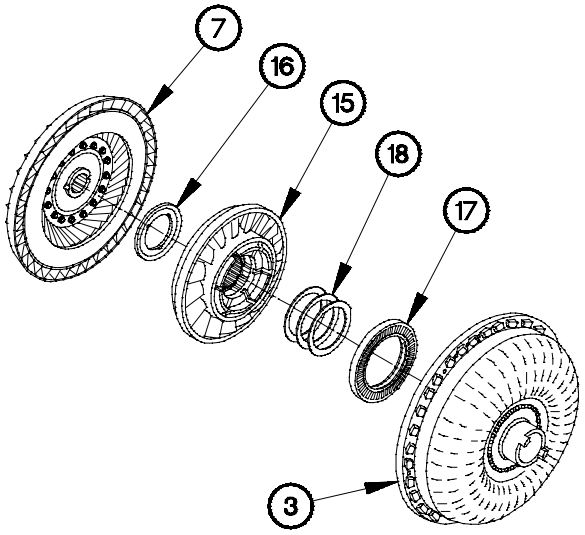
(14) Remove turbine (7) from converter pump (3).

(15) Remove stator/cam (15) from turbine (7).

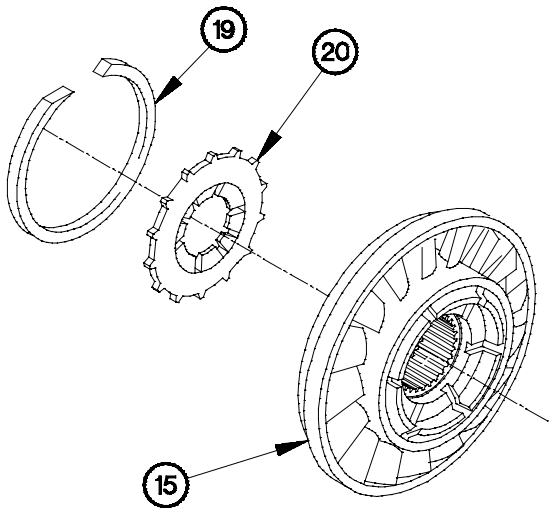
(16) Remove stator thrust bearing (16) from stator/cam (15).

(17) Remove thrust pump bearing (17) from stator/cam (15).

(18) Remove converter shim(s) (18) from stator/cam (15).



YG02B051



YG02B061

WARNING

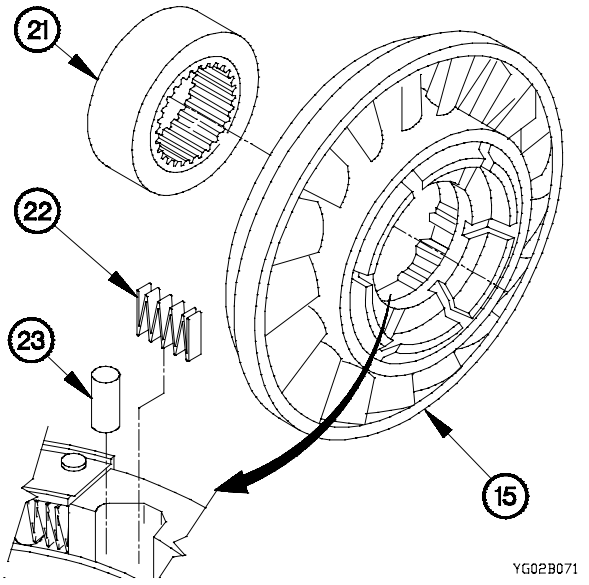
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(19) Remove retaining ring (19) from stator/cam (15).

(20) Remove stator thrust plate (20) from stator/cam (15).

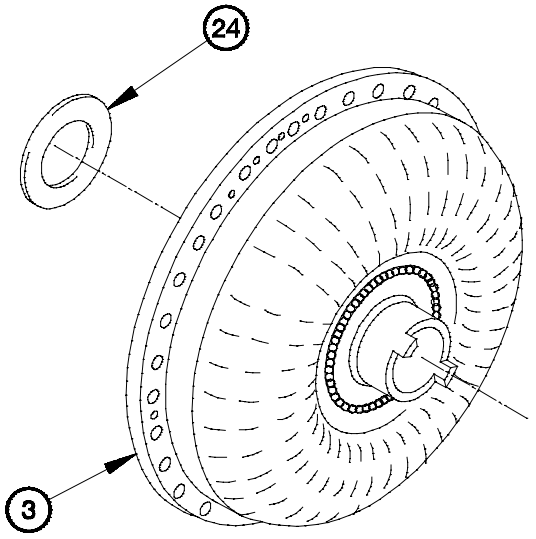
(21) Remove stator race (21) from stator/cam (15).

(22) Remove 13 flat springs (22) and stator rollers (23) from stator/cam (15). Discard flat springs.



YG02B071

(23) Remove thrust pump washer (24) from converter pump (3).

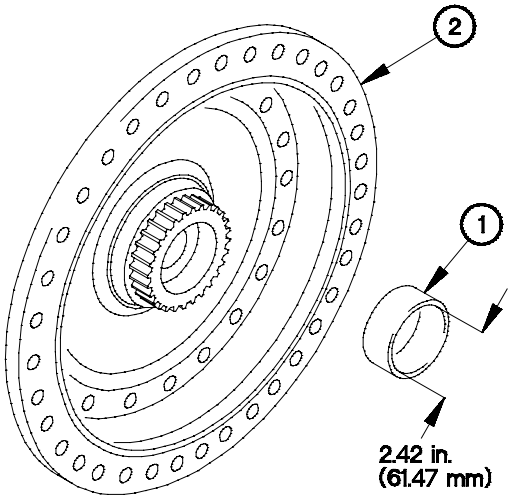


YG02B081

c. Cleaning/Inspection

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**



YG02C011

(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect bushing (1) for scoring, pitting, or corrosion.

(3) Measure inside diameter of cover bushing (1), maximum inside diameter 2.42 in. (61.47 mm).

(4) Inspect converter cover (2) for cracks or damaged threads.

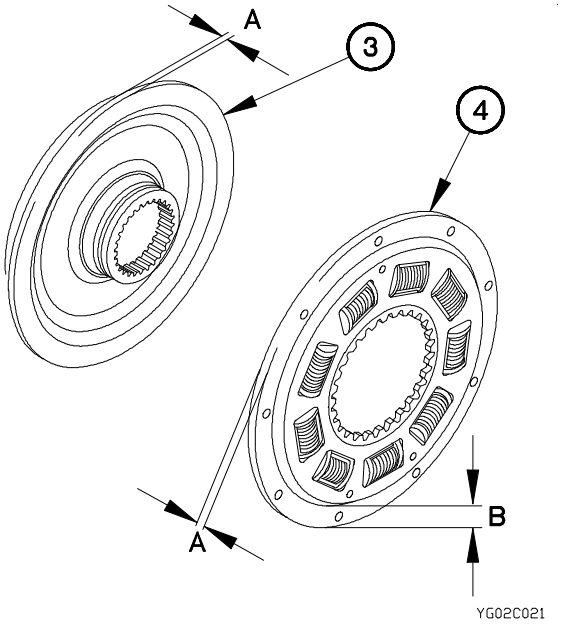
7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)

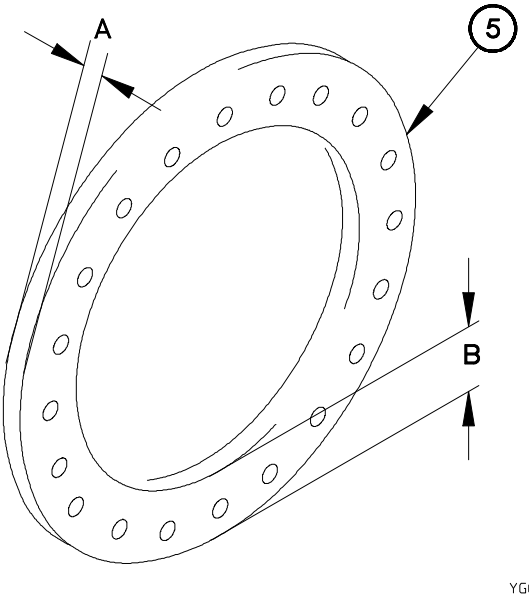
(5) Inspect lockup piston (3) for cracks, distortion, scoring, or burrs.

(6) Measure lockup piston (3) for wear. Minimum thickness (A) 0.225 in. (5.72 mm).

(7) Inspect damper (4) for cracks, distortion or missing parts.

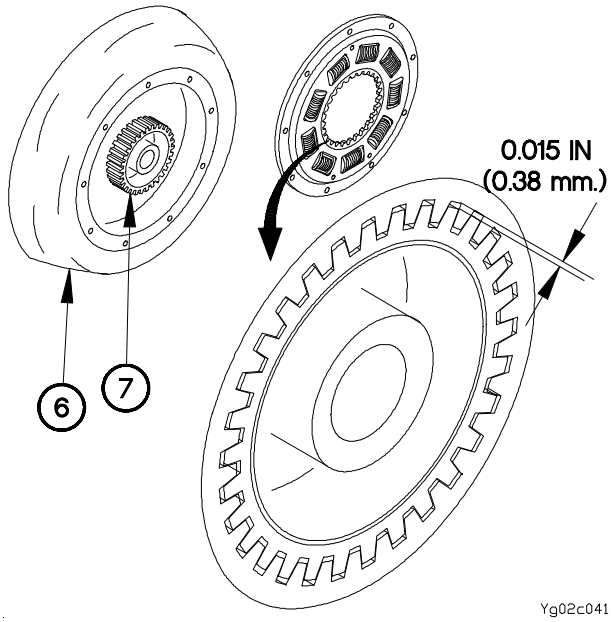
(8) Measure damper (4) for plate thickness (A) and flatness (B). Minimum thickness 0.317 in. (8.05 mm). Maximum flatness variation 0.020 in. (0.51 mm).





(9) Inspect lockup clutch backing plate (5) for cracks, distortion, or scoring.

(10) Measure lockup clutch backing plate (5) for minimum dimension (A) 0.33 in. (8.38 mm) from back face to wear step and maximum flatness variation (B) 0.006 in. (0.15 mm).



(11) Inspect turbine (6) for cracks, loose rivets or excessive spline wear.

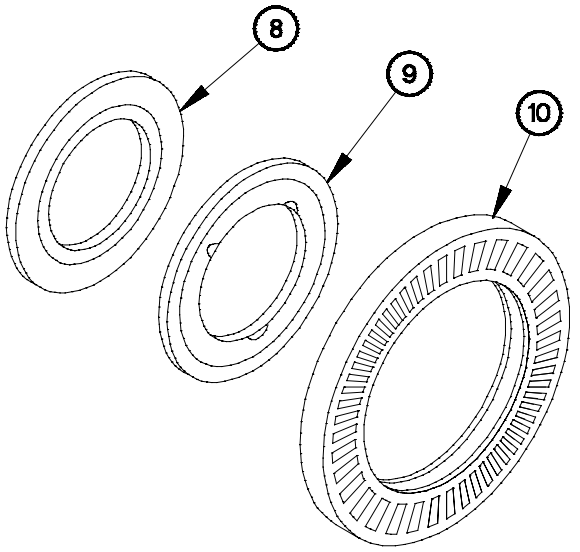
(12) Measure turbine (6) to damper (4) for maximum spline wear 0.015 in. (0.38 mm).

(13) Measure hub (7) of turbine (6) for minimum outside diameter 2.42 in. (61.47 mm).

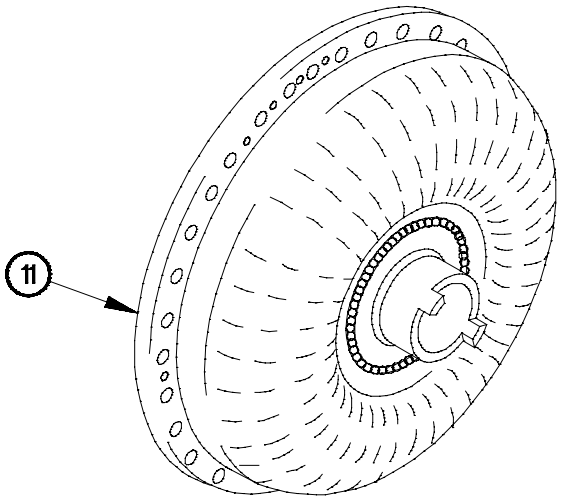
(14) Inspect thrust bearing (8) for heat and wear spots and pitting.

(15) Inspect stator thrust bearing (9) for rough movement, pitting or wear.

(16) Inspect thrust pump bearing (10) for rough movement, pitting or wear.



YG02C051

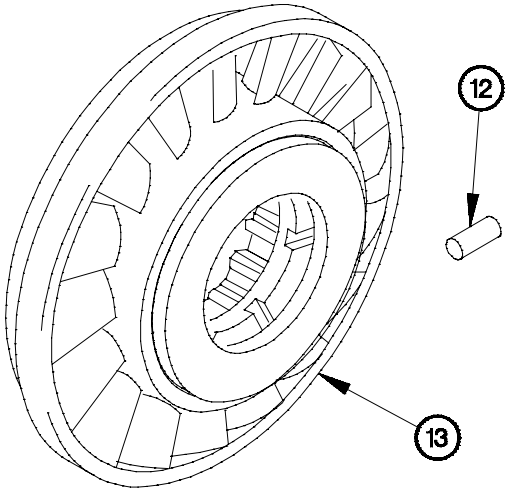


YG02C061

(17) Inspect converter pump (11) for cracks, missing vanes, or loose internal parts.

(18) Inspect 13 stator rollers (12) for pitting or wear.

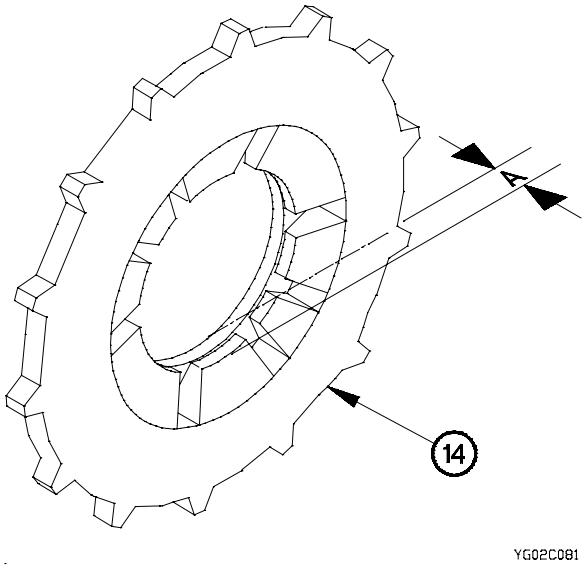
(19) Inspect stator/cam (13) for cracks, damage to vanes, scoring of cam or thrust plate.



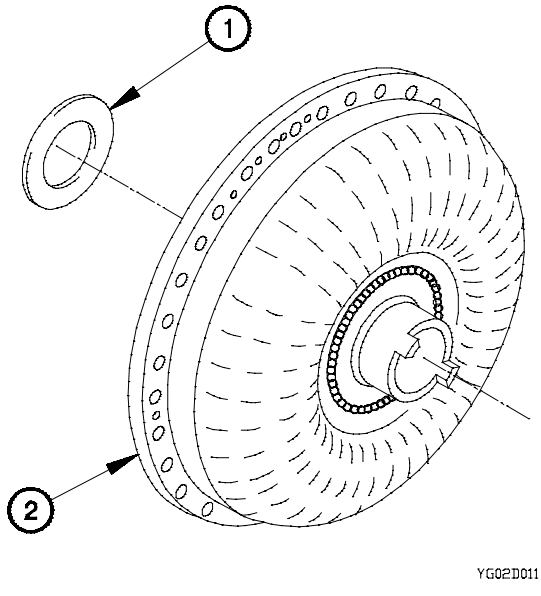
YG02C071

7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)

(20) Measure thickness (A) of stator thrust plate (14), minimum thickness 0.505 in. (12.83 mm).



d. Assembly.



NOTE

Perform steps (1) through (3) if replacing a six splined converter pump with a two splined converter pump.

(1) Replace cycloidal gear PN 23049376 and gear bushing PN 6881926 with cycloidal gear PN 29514537 and gear bushing PN 29514538 (para 21-3).

(2) Replace pump housing PN 29502322 with pump housing PN 29514801, ball PN 145651, spring PN 29507709, and pin PN 29516030 (para 21-3).

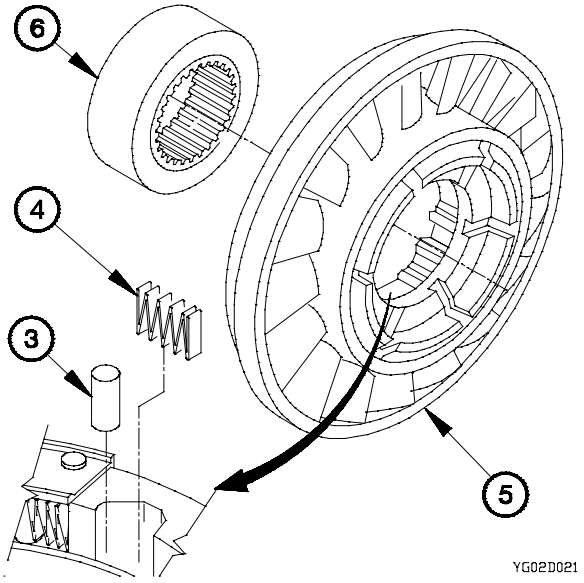
(3) Replace drive hub PN 29503970 and gear PN 29511395 with drive hub PN 29514799 and gear PN 29511395 (para 21-5).

(4) Install thrust pump washer (1) in converter pump (2).

NOTE

Stator rollers and flat springs are installed together. One roller and one spring per cam pocket.

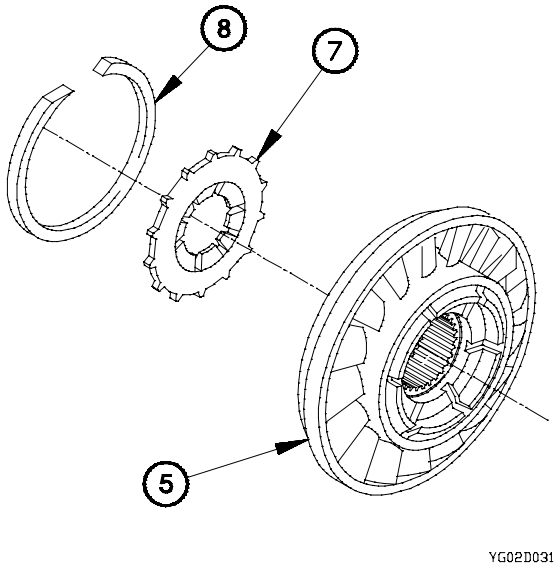
(5) Install 13 stator rollers (3) and flat springs (4) in stator/cam (5).



CAUTION

Stator race must be installed with bevel side down. Failure to comply may result in damage to equipment.

(6) Install stator race (6) in stator/cam (5).



(7) Install stator thrust plate (7) in stator/cam (5).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(8) Install retaining ring (8) in stator/cam (5).

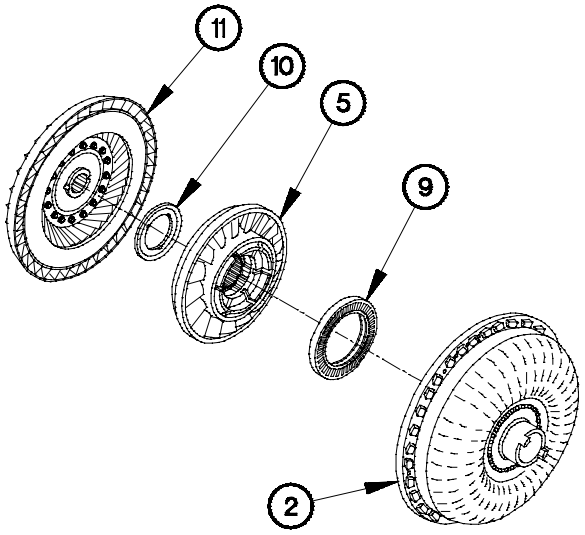
7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)

(9) Install thrust pump bearing (9) in stator/cam (5).

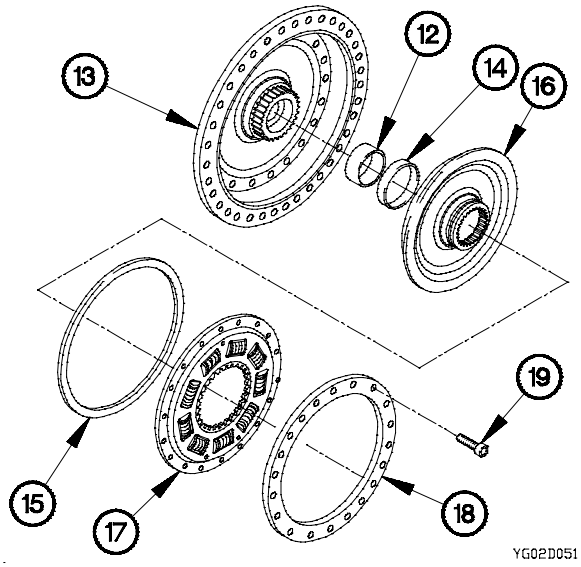
(10) Install stator thrust bearing (10) in stator/cam (5).

(11) Install stator/cam (5) in turbine (11).

(12) Install turbine (11) in converter pump (2).



YG02D041



YG02D051

(13) Install bushing (12) in converter cover (13).

(14) Install lockup piston seal (14) in converter cover (13).

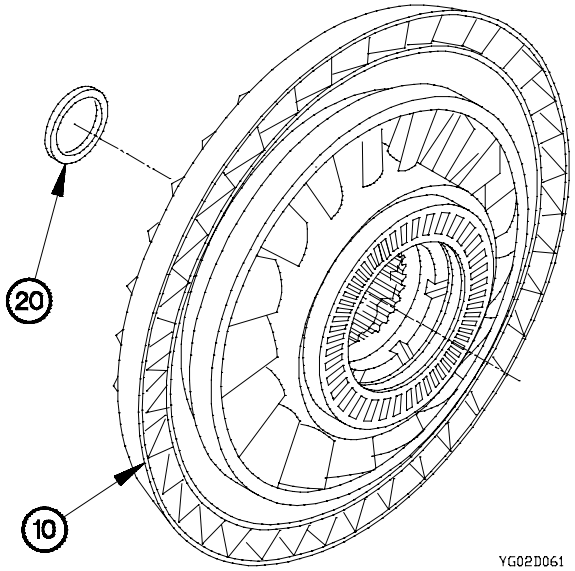
(15) Install lockup piston seal ring (15) in lockup piston (16).

(16) Install lockup piston (16) in converter cover (13).

(17) Install damper (17) in converter cover (13).

(18) Install lockup clutch backing plate (18) on damper (17) with 20 screws (19).

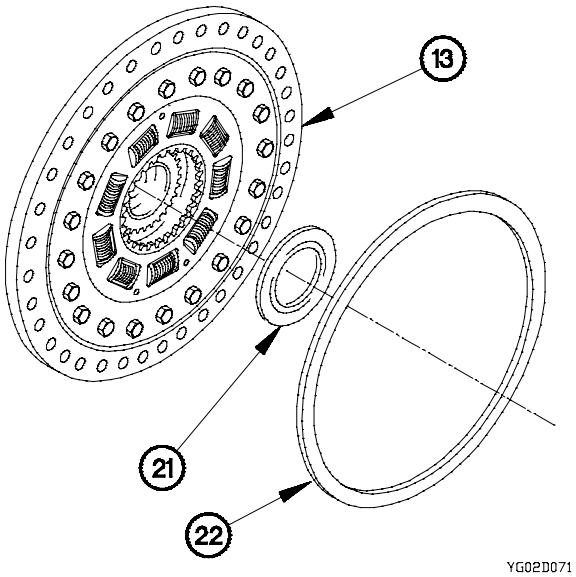
(19) Install seal ring (20) in turbine (10).



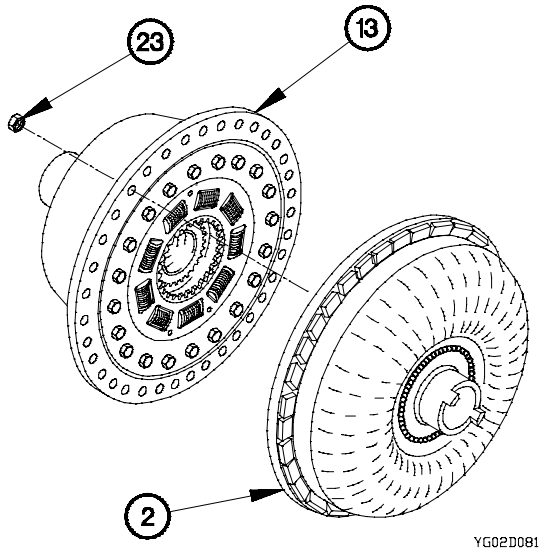
YG02D061

(20) Install thrust bearing (21) in converter cover (13).

(21) Install retainer packing (22) in converter cover (13).



YG02D071

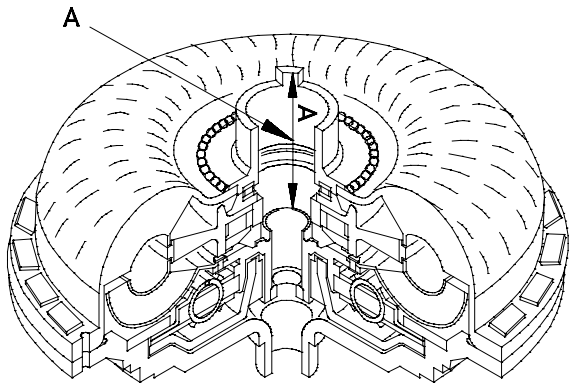


YG02D081

(22) Install converter pump (2) on converter cover (13).

(23) Install four nuts (23) on converter cover (13), 90-degrees apart.

(24) Measure and record Dimension A.



YG02D091

7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)

(25) Install profile gage in shaft opening (24).

(26) Measure and record Dimension B.

NOTE

Refer to **Table 7-1 Torque Converter Shim Chart** Dimension C for correct shim selection.

(27) Subtract Dimension B from Dimension A to determine Dimension C (A-B=C).

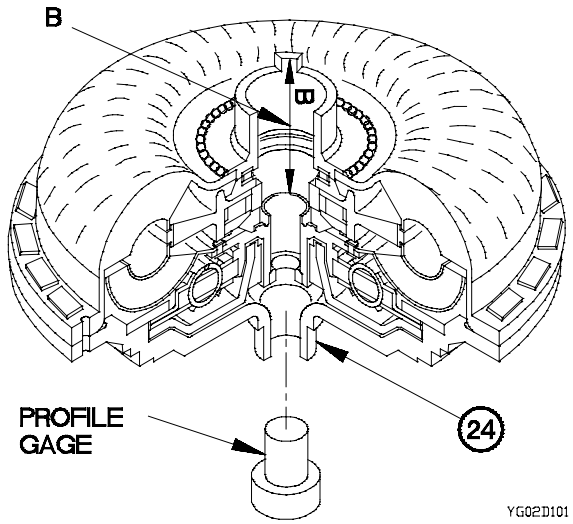


Table 7-1
Torque Converter Shim Chart

DIMENSION C	USE P/N	SHIM THICKNESS
0.155-0.319 mm 0.006-0.012 in.	-	0.000 NO SHIM
0.320-0.589 mm 0.013-0.023 in.	29502277	0.229-0.279 mm 0.009-0.011 in.
0.590-0.859 mm 0.024-0.033 in.	29502276	0.457-0.508 mm 0.018-0.020 in.
0.860-0.982 mm 80.034-0.038 in.	29502275	0.686-0.737 mm 0.027-0.029 in.

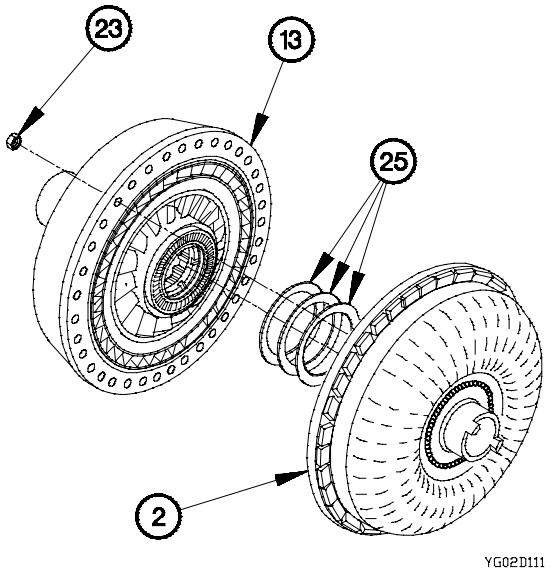
(28) Remove four nuts (23) from converter cover (13).

(29) Remove converter pump (2) from converter cover (13).

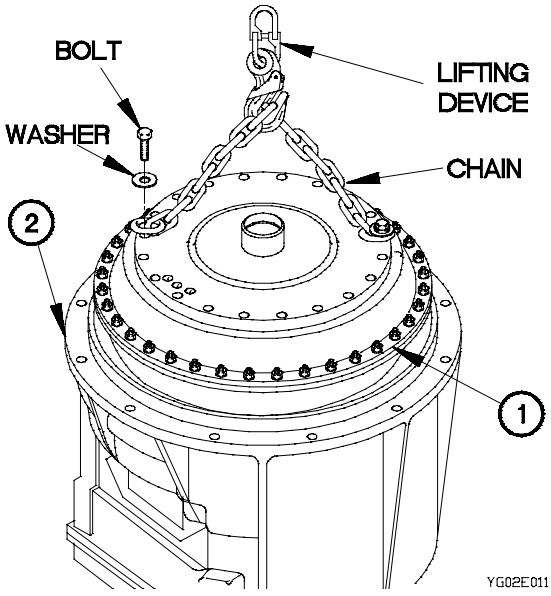
(30) Install converter shim(s) (25) in converter pump (2).

(31) Position converter cover (13) on converter pump (2) with 36 nuts (23).

(32) Tighten 36 nuts (23) to 22-26 lb-ft (30-35 N·m).



e. Installation.



(1) Secure chain to opposite sides of torque converter module (1) with two washers and bolts.

WARNING

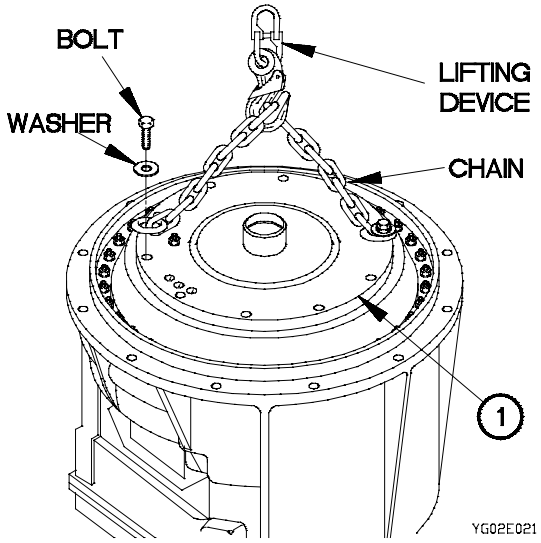
Torque converter module weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to installing. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Rotation of torque converter may be required to obtain correct mating. Failure to comply may result in damage to equipment.

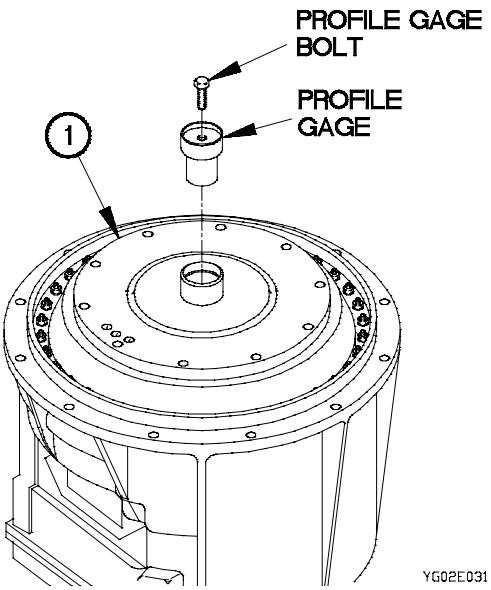
(2) Position torque converter module (1) in torque converter housing module (2).

7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)



(3) Remove lifting device from chain.

(4) Remove two bolts, washers, and chain from torque converter module (1).

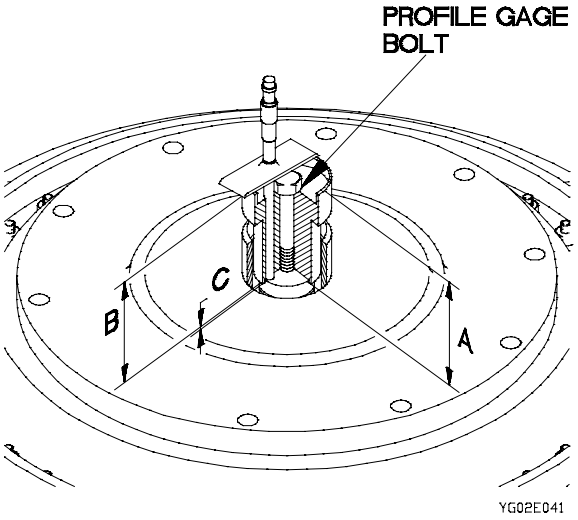


(5) Position profile gage in torque converter module (1) with profile gage bolt.

(6) Tighten profile gage bolt to 18-22 lb-ft (24-30 N•m).

NOTE

Refer to **Table 7-2 Torque Converter End Play Shim Chart** for correct shim thickness.



(7) Measure dimension "A", constant tool height should be 3.937 in. (10 cm). Record measurement.

(8) Measure dimension "B". Record measurement.

(9) Subtract dimension "B" from dimension "A" (constant tool height) to determine dimension "C" (A - B = C).

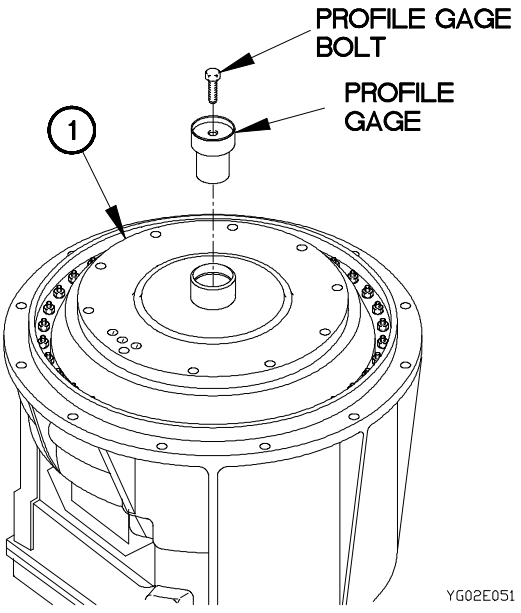
NOTE

Based on dimension "C", select proper shim from **Table 7-2 Torque Converter End Play Shim Chart.**

Table 7-2
Torque Converter End Play Shim Chart

DIMENSION C	USE P/N	SHIM THICKNESS
0.4093-0.6597 mm 0.016-0.026 in.	29505688	0.000 NO STEP
0.6598-0.8377 mm 0.026-0.033 in.	29505681	0.178-0.288 mm 0.007-0.009 in.
0.8378-1.0157 mm 0.033-0.040 in.	29505682	0.356-0.406 mm 0.014-0.016 in.
1.0156-1.1937 mm 0.040-0.047 in.	29505683	0.534-0.584 mm 0.021-0.023 in.
1.1938-1.3707 mm 0.047-0.054 in.	29505684	0.711-0.761 mm 0.028-0.030 in.
1.3708-1.5487 mm 0.054-0.061 in.	29505685	0.889-0.939 mm 0.035-0.037 in.
1.5486-1.6823 mm 0.061-0.066 in.	29505686	1.067-1.117 mm 0.042-0.044 in.

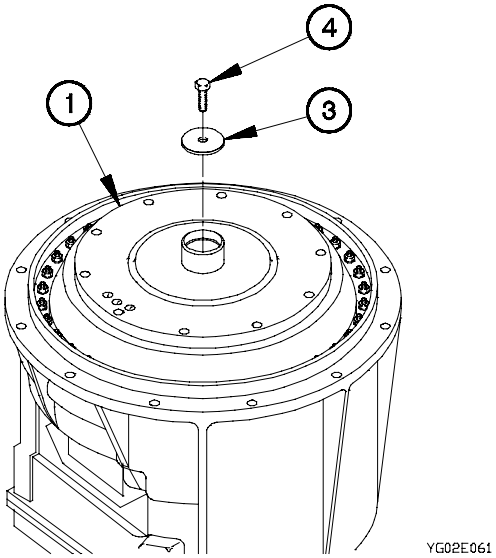
(10) Remove profile gage bolt and profile gage from torque converter module (1).

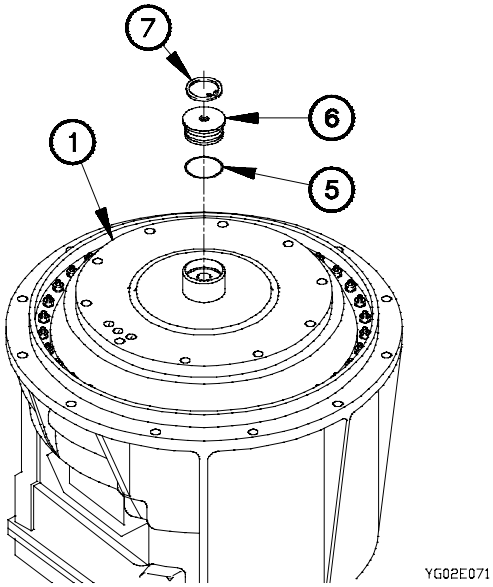


7-2. TORQUE CONVERTER REPLACEMENT/REPAIR (CONT)

(11) Position shim (3), recessed side down, in torque converter module (1) with bolt (4).

(12) Tighten bolt (4) to 66-81 lb-ft (89-110 N•m).





WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

NOTE

Perform steps (13) and (14) on transmissions prior to serial number 6510165560.

(13) Install retainer packing (5) on converter end plug (6).

(14) Install converter end plug (6), flat side up, in torque converter module (1) with retaining ring (7).

NOTE

Perform steps (15) through (17) on transmissions S/N 6510165560 or higher.

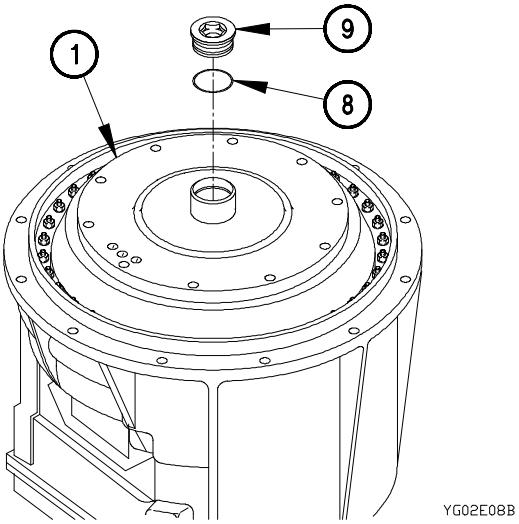
(15) Lubricate and install retainer packing (8) on torque converter end plug (9).

(16) Position torque converter end plug (9) in torque converter module (1).

CAUTION

Use care when tightening converter end plug. Do not over tighten. Failure to comply may result in damage to equipment.

(17) Tighten torque converter end plug (9) to 37-44 lb-ft (50-60 N•m).



f. Follow-On Maintenance.

Install transmission assembly (para 7-4).

End of Task.

7-3. TRANSMISSION UNPACKING/PACKING

This task covers:

a. Unpacking

b. Packing

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Sling, Multiple Leg (TM 9-2320-365-20)
Transmission, Lifting Bracket (Item 21, Appendix D)
Sling, Engine and Transmission, Motor Vehicle (Item 49, Appendix B)

Materials/Parts
Desiccant (5) (Item 26, Appendix C)
Gasket (Item 30, Appendix F)
Lockwasher (28) (Item 104, Appendix F)

Personnel
(2)

a. Unpacking.

WARNING

Ensure all pressure is released from container. Failure to comply may result in injury to personnel.

(1) Depress and hold air release button (1) on transmission shipping and storage container breather valve (2) until all pressure is released.

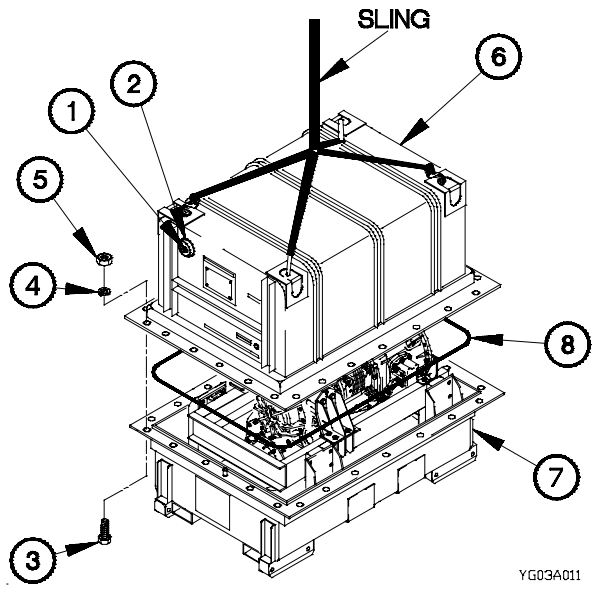
WARNING

Storage container cover weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(2) Remove 28 screws (3), washers (4), and nuts (5) from stowage container cover (6).

(3) Lift stowage container cover (6) from stowage container base (7).

(4) Remove gasket (8) from stowage container base (7). Discard gasket.



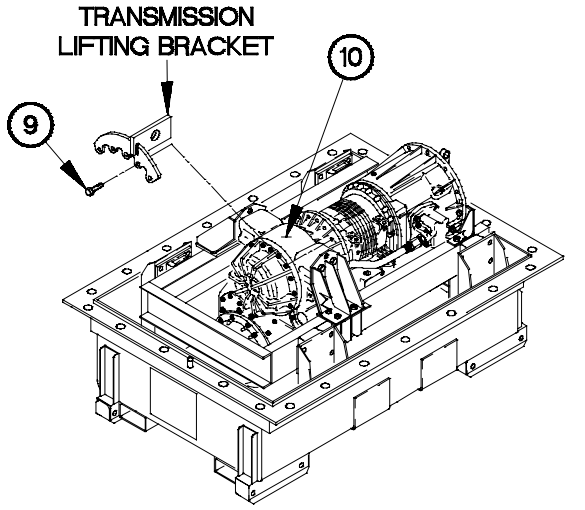
7-3. TRANSMISSION UNPACKING/PACKING (CONT)

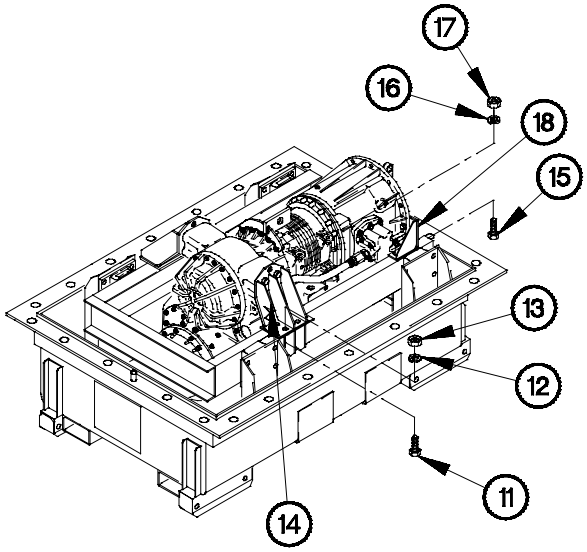
(5) Remove five bolts (9) from adapter housing module (10).

NOTE

Transmission lifting bracket is installed with lift eye top-dead-center facing forward.

(6) Position transmission lifting bracket on adapter housing module (10) with five bolts (9).





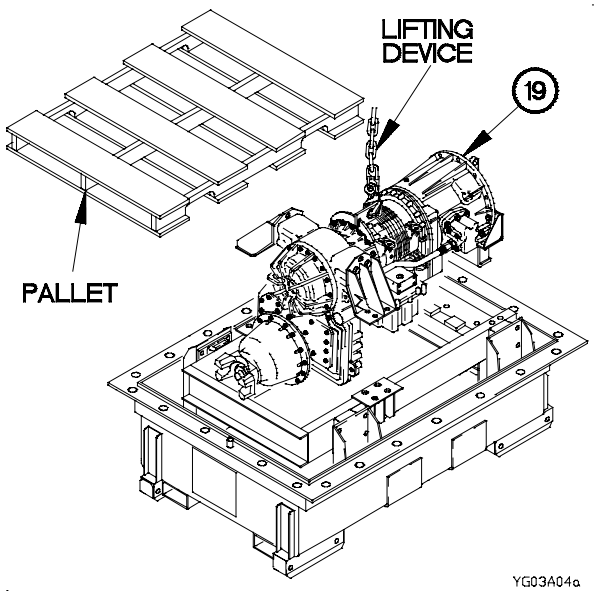
(7) Remove eight screws (11), lockwashers (12), and nuts (13) from two rear mounting brackets (14). Discard lockwashers.

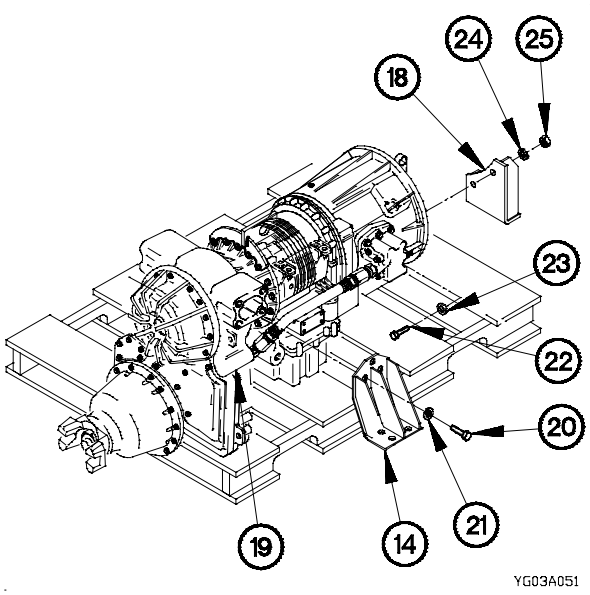
(8) Remove six screws (15), lockwashers (16), and nuts (17) from three front mounting brackets (18). Discard lockwashers.

WARNING

Transmission weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(9) Lift transmission (19) and place on pallet.

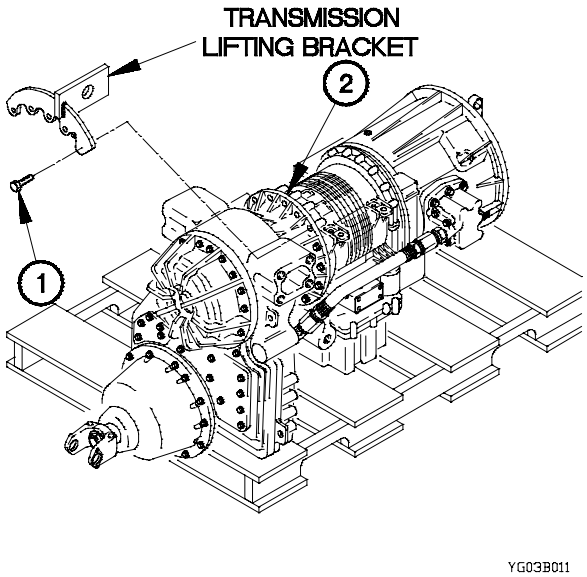




(10) Remove eight screws (20), lockwashers (21), and two rear mounting brackets (14) from transmission (19). Discard lockwashers.

(11) Remove six screws (22), washers (23), lockwashers (24), nuts (25), and three front mounting brackets (18) from transmission (19). Discard lockwashers.

b. Packing.



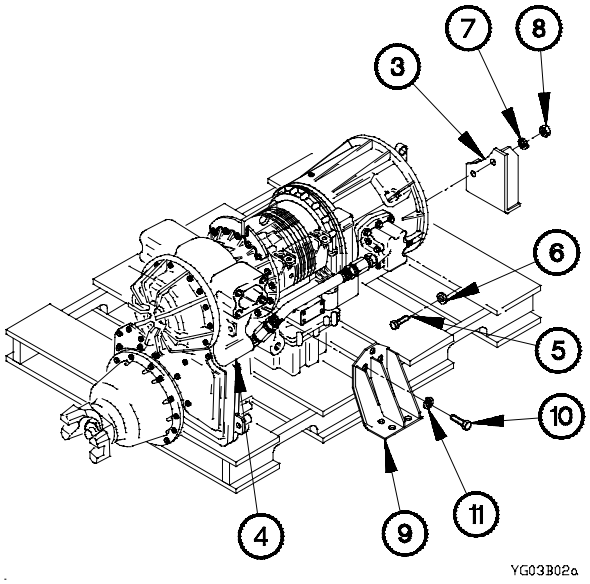
(1) Remove five bolts (1) from adapter housing module (2).

NOTE

Transmission lifting bracket is installed with lift eye top-dead-center facing forward.

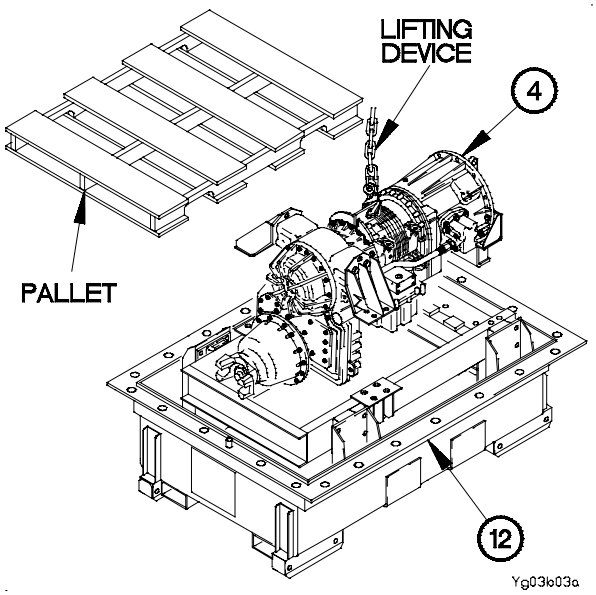
(2) Position transmission lifting bracket on adapter housing module (2) with five bolts (1).

7-3. TRANSMISSION UNPACKING/PACKING (CONT)



(3) Position three front mounting brackets (3) on transmission (4) with six screws (5), washers (6), lockwashers (7), and nuts (8).

(4) Position two rear mounting brackets (9) on transmission (4) with eight screws (10) and lockwashers (11).

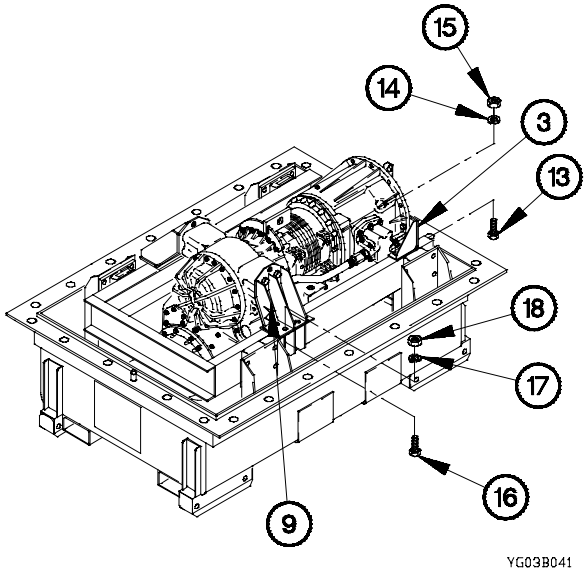


WARNING

Transmission weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

(5) Lift transmission (4) from pallet.

(6) Place transmission (4) on stowage container base (12).



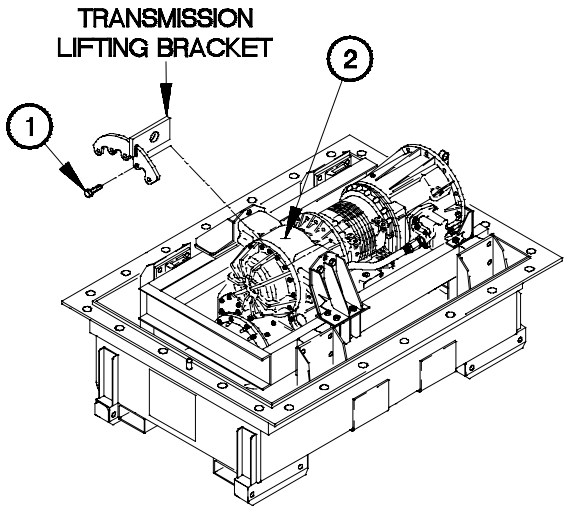
(7) Position six screws (13), lockwashers (14), and nuts (15) in three front mounting brackets (3).

(8) Position eight screws (16), lockwashers (17), and nuts (18) in two rear mounting brackets (9).

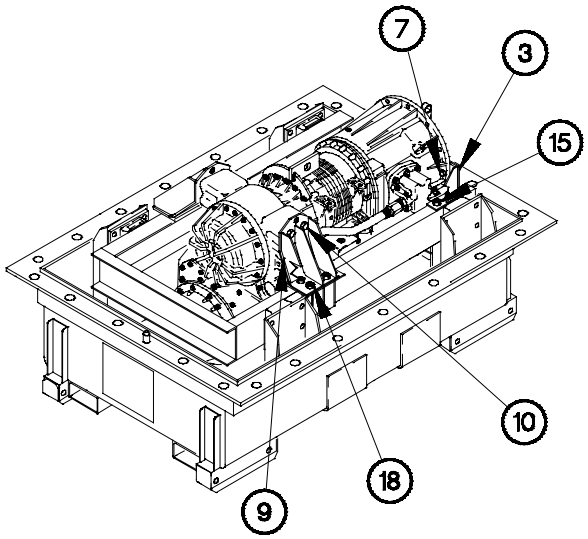
(9) Tighten six nuts (7 and 15) on front brackets (3) to 31-37 lb-ft (42-50 N·m).

(10) Tighten eight screws (10) on rear mounting brackets (9) to 31-37 lb-ft (42-50 N·m).

(11) Tighten eight nuts (18) on rear mounting brackets (9) to 31-37 lb-ft (42-50 N·m).



YG03B061



YG03B051

(12) Remove five bolts (1) and transmission lifting bracket from adapter housing module (2).

(13) Position five bolts (1) in adapter housing module (2).

(14) Tighten five bolts (1) to 42-50 lb-ft (57-68 N·m).

WARNING

Storage container cover weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

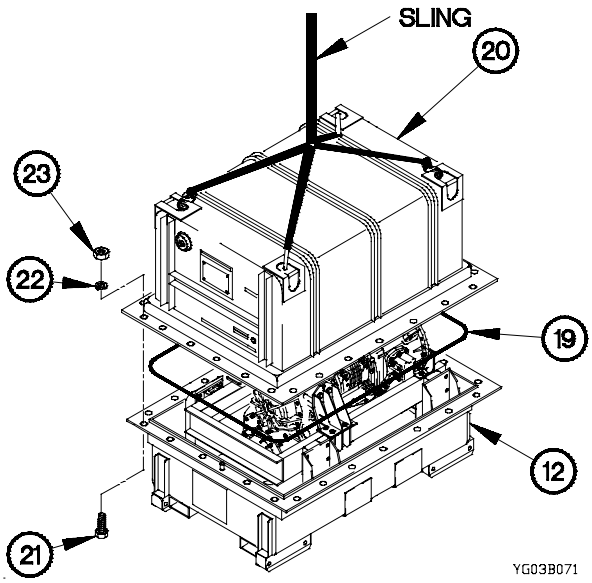
(15) Place gasket (19) on stowage container base (12).

(16) Position stowage container cover (20) on stowage container base (12).

(17) Position 28 screws (21), washers (22), and nuts (23) on stowage container cover (20).

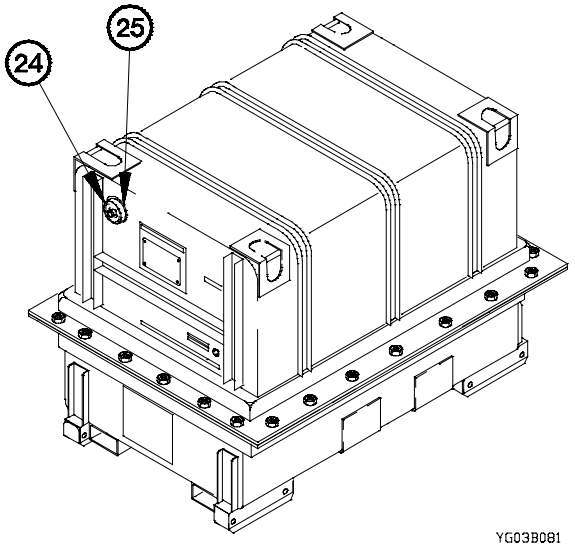
(18) Tighten 28 nuts (23) to 31-37 lb-ft (42-50 N·m).

(19) Remove lifting device from stowage container cover (20).



YG03B071

7-3. TRANSMISSION UNPACKING/PACKING (CONT)



(20) Remove breather cover (24) from breather port (25).

(21) Place 80 units of desiccant in breather port (25).

(22) Install breather cover (24) on breather port (25).

End of Task.

7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS)

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Spare tire removed (TM 9-2320-365-10).
Batteries disconnected (TM 9-2320-365-20-3).
Front drive shaft removed (TM 9-2320-365-20-3).
Rear drive shaft removed (TM 9-2320-365-20-3).
Transmission oil drained (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-365-20)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Lift,Transmission/Differential (Item 21, Appendix D)
Wrench Set, Socket (Item 74, Appendix B)
Adapter, Socket Wrench, (Item 2, Appendix B)
Pan, Drain (Item 36, Appendix B)

Materials/Parts
Cap and Plug Set (Item 18, Appendix C)
Nut, Self-locking (2) (Item 146, Appendix F)
Nut, Self-Locking (4) (Item 135, Appendix F)
Packing, Preformed (2) (Item 210, Appendix F)
Seal, Non Metallic (2) (Item 260, Appendix F)
Nut, Self-locking (Item 128, Appendix F)
Gasket (Item 51, Appendix F)
Gasket (Item 28, Appendix F)
Sealing, Compound (Item 71, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Bolt (Item 16.1, Appendix C)
Screw, Cap, Hex Hd (Item 78.1, Appendix C)
Ties, Cable, Plastic (Item 89, Appendix C)
Packing, Preformed (2) (Item 155.2, Appendix F)
Packing, Preformed (2) (Item 155.1, Appendix F)
Gasket (Item 50, Appendix F)

Personnel Required
(3)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE

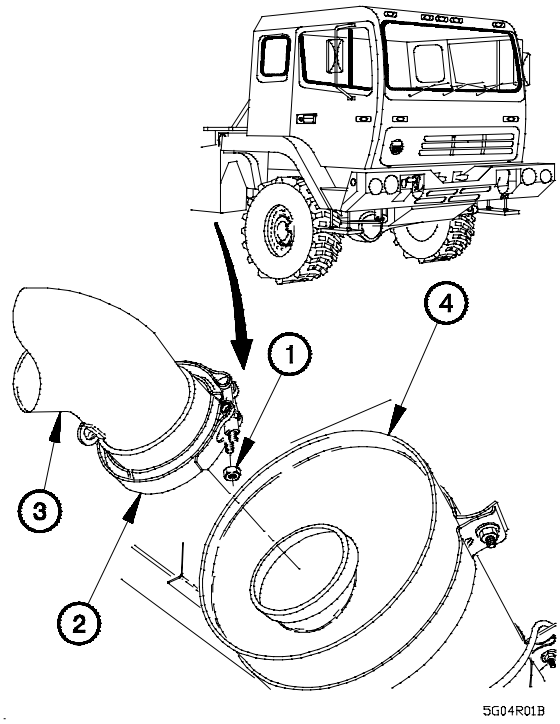
- Vehicle serial numbers 0001 through 7161 may have transmission oil cooler tubes installed. Vehicle serial number 7162 and higher will have transmission oil cooler hoses installed.
- Refer to Appendix H for Transmission/Transmission Controls Compatibility

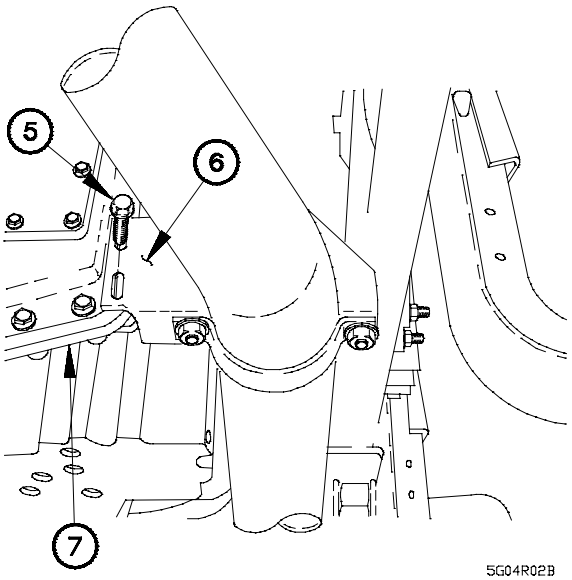
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

a. Removal.

(1) Remove self-locking nut (1) from clamp (2). Discard self-locking nut.

(2) Disconnect lower exhaust pipe (3) from muffler (4).

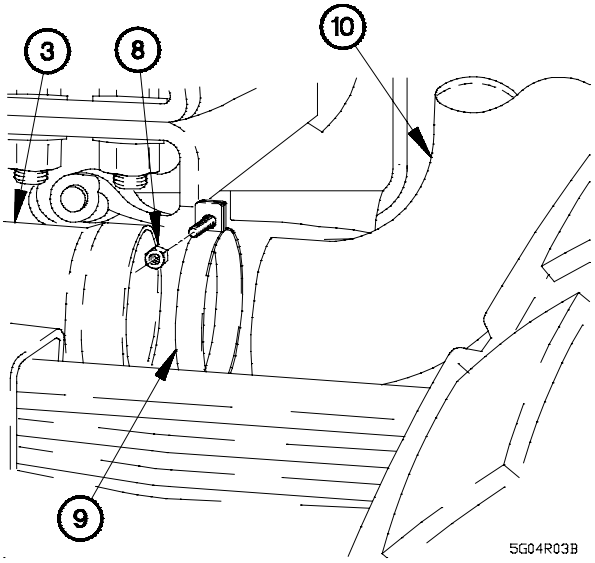




(3) Remove two bolts (5) and exhaust bracket (6) from transmission (7).

(4) Remove self-locking nut (8) from clamp (9). Discard self-locking nut.

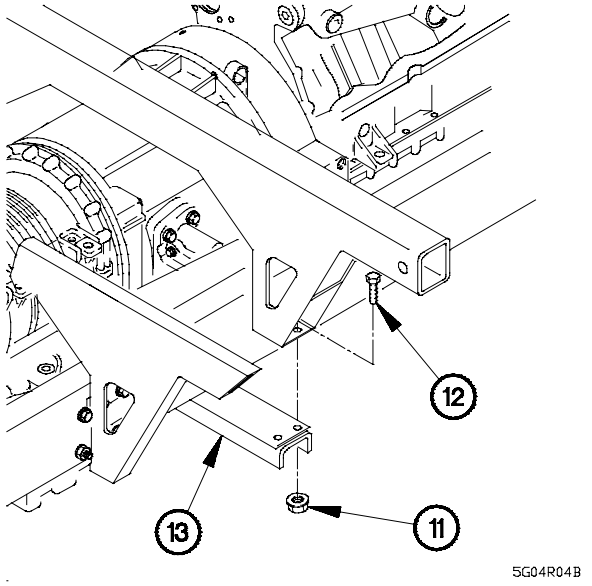
(5) Remove lower exhaust pipe (3) from upper exhaust pipe (10).



NOTE

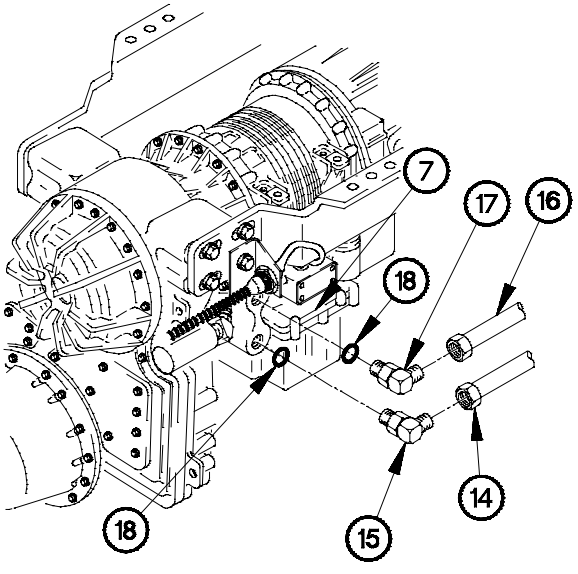
- Step (6) requires the aid of an assistant.
- Perform step (6) on vehicles equipped with transmission oil cooler hoses.

(6) Remove four self-locking nuts (11), bolts (12), and lower front support crossmember (13) from vehicle. Discard self-locking nuts.



CAUTION

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.



NOTE

- Perform steps (7) through (11) on vehicles equipped with transmission oil cooler tubes.
- Tag tubes and connection points prior to disconnecting.

(7) Disconnect transmission oil cooler tube (14) from 90-degree fitting (15).

(8) Disconnect oil cooler tube (16) from 90-degree fitting (17).

(9) Loosen two jam nuts (18) on 90-degree fittings (15 and 17).

NOTE

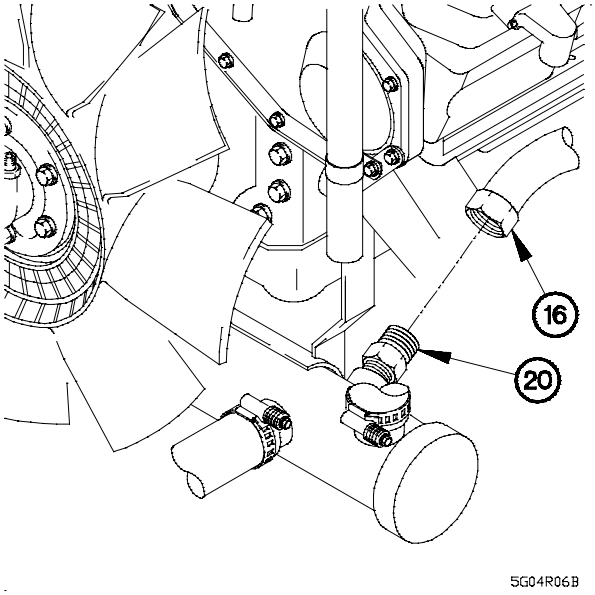
Note position of fittings prior to removal.

(10) Remove 90-degree fittings (15 and 17) from transmission (7).

(11) Remove two preformed packings (19) from 90-degree fittings (15 and 17). Discard preformed packings.

7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

(12) Remove transmission oil cooler tube (16) from fitting (20).



NOTE

- Perform steps (13) through (17) on vehicles equipped with transmission oil cooler hoses.
- Tag hoses and connection points prior to disconnecting.

(13) Disconnect transmission oil cooler hose (21) from 90-degree fitting (15).

(14) Disconnect transmission oil cooler hose (22) from 90-degree fitting (17).

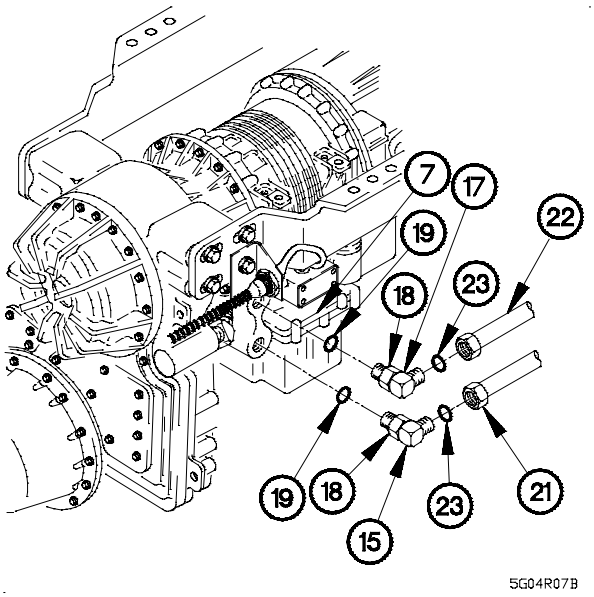
(15) Loosen two jam nuts (18) on 90-degree fittings (15 and 17).

NOTE

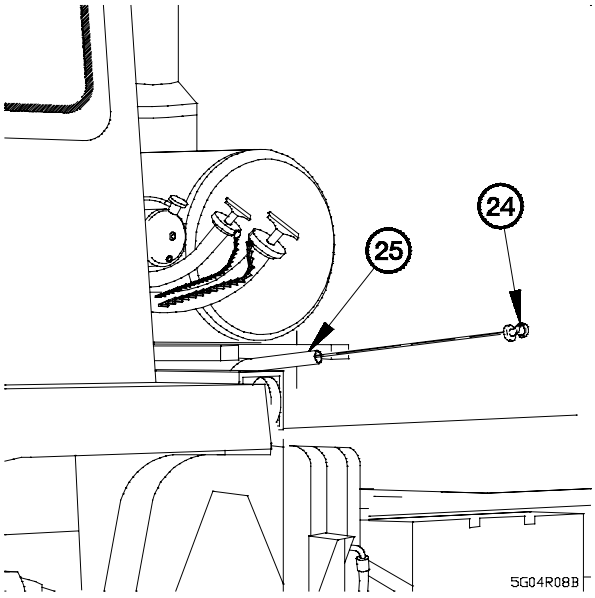
Note orientation of 90-degree fittings prior to removal.

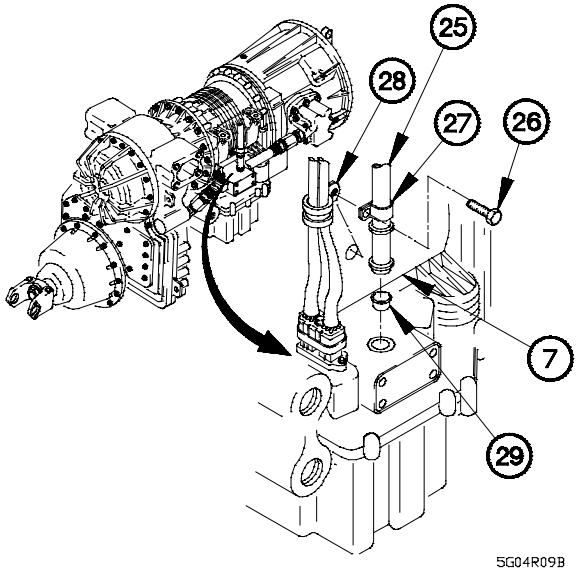
(16) Remove 90-degree fittings (15 and 17) from transmission (7).

(17) Remove two preformed packings (19 and 23) from 90-degree fittings (15 and 17). Discard preformed packings.



(18) Remove dipstick (24) from oil dipstick tube (25).





NOTE

Perform step (19) on transmission serial numbers prior to 6510032369.

(19) Remove bolt (26), clamp (27), and wiring harness clamp (28) from transmission (7).

NOTE

Perform step (20) on transmission serial number 6510032369 and higher.

(20) Remove bolt (26) from clamp (27).

(21) Remove oil dipstick tube (25) from transmission (7).

(22) Remove seal (29) from oil dipstick tube (25). Discard seal.

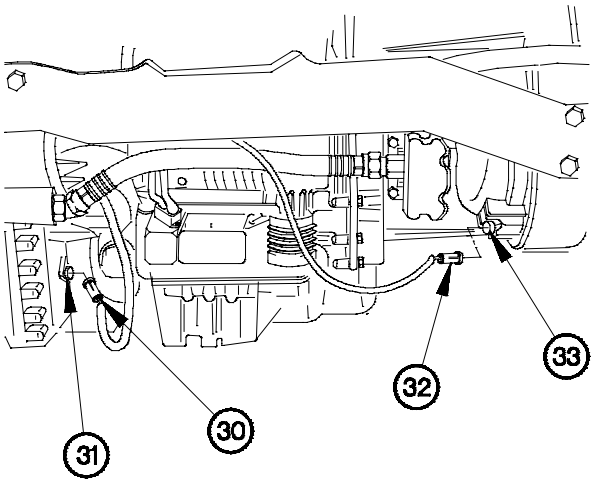
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

NOTE

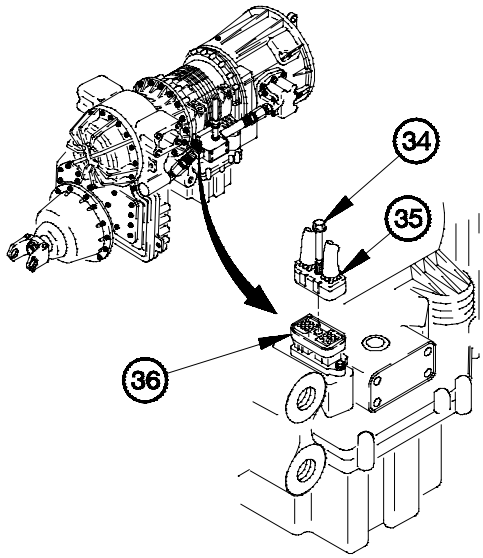
- Tag electrical connections and connection points prior to disconnecting.
- Remove plastic cable ties as required

(23) Disconnect engine speed sensor connector (30) from engine speed sensor (31).

(24) Disconnect output speed sensor connector (32) from transfer case module (33).



5G04R10B



5G04R11B

CAUTION

Due to position of main housing module connector, extreme care must be taken when removing main transmission external connector. Failure to comply may result in damage to equipment.

NOTE

Perform steps (25) and (26) on transmission serial numbers prior to 6510032369.

(25) Loosen connector bolt (34) on main transmission external connector (35).

(26) Remove main transmission external connector (35) from main housing module receptacle (36).

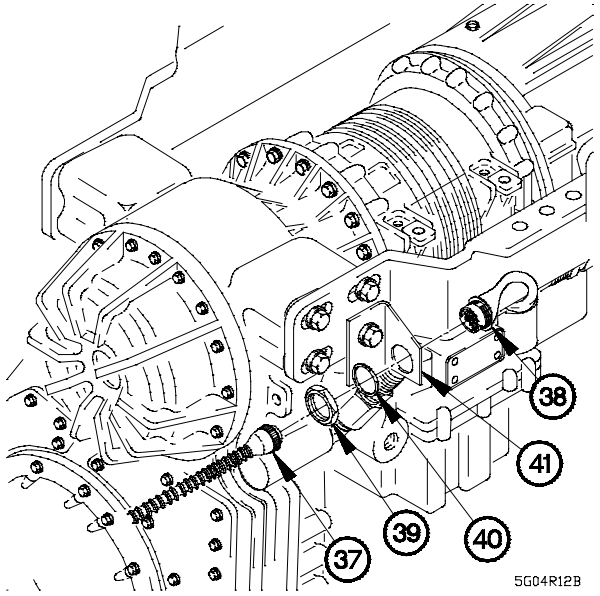
NOTE

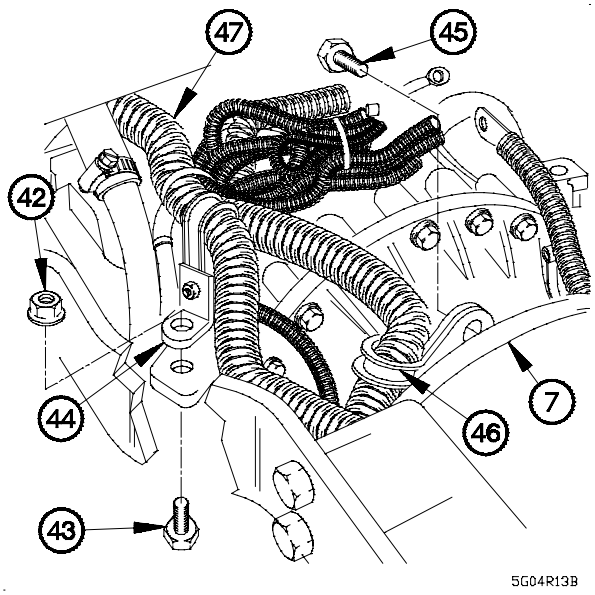
Perform steps (27) through (28) on transmission serial number 6510032369 and higher.

(27) Disconnect transmission external wiring harness connector (37) from transmission adapter harness (38).

(28) Remove nut (39), washer (40), and transmission adapter harness (38) from bracket (41).

(29) Install washer (40) and nut (39) on transmission adapter harness (38).





(30) Remove self-locking nut (42), bolt (43), and clamp (44) from transmission (7). Discard self-locking nut.

NOTE

Perform steps (30) and (31) on transmission serial numbers prior to 6510032369.

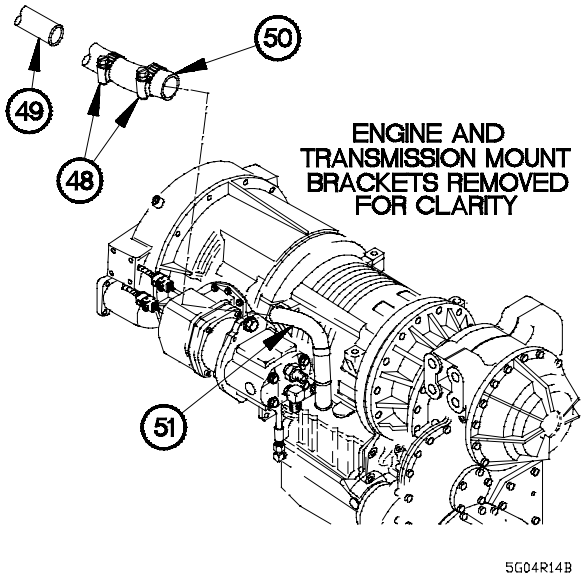
(31) Remove bolt (45) and clamp (46) from transmission (7).

(32) Install bolt (45) in transmission (7).

(33) Position wiring harness (47) for access to transmission (7).

(34) Loosen two clamps (48) on tube (49) and oil fill hose (50).

(35) Remove oil fill hose (50) from oil fill tube (51) and tube (49).



7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

NOTE

Perform step (36) on vehicles equipped with transmission oil cooler tubes.

(36) Remove four screws (52), washers (53), flywheel cover (54), and gasket (55) from flywheel housing (56). Discard gasket.

NOTE

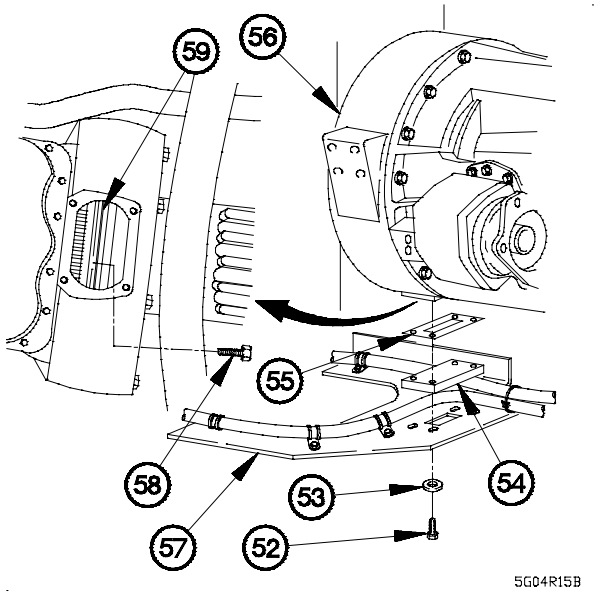
Perform step (37) on vehicles equipped with transmission oil cooler hoses.

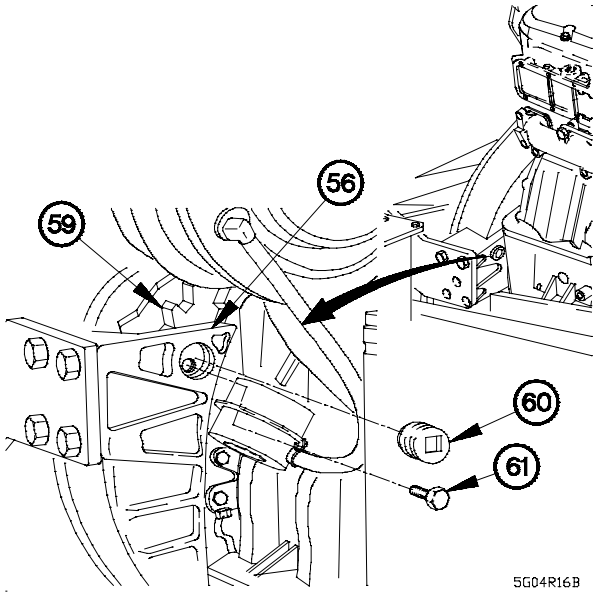
(37) Remove four screws (52), washers (53), transmission oil cooler hose bracket (57), flywheel cover (54), and gasket (55) from flywheel housing (56). Discard gasket.

NOTE

- Perform step (38) on vehicle serial number 0001 through 1477.
- Step (38) requires the aid of an assistant.
- During removal of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(38) Remove 12 bolts (58) from flexplate (59).





NOTE

Perform steps (39) and (40) on vehicle serial number 1478 and higher.

(39) Remove plug (60) from flywheel housing (56).

NOTE

- Step (40) requires the aid of an assistant.
- During removal of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(40) Remove six bolts (61) from flexplate (59).

NOTE

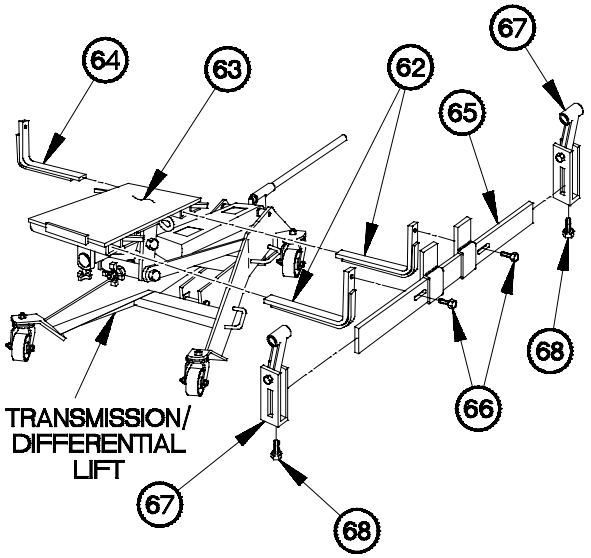
The rear of transmission/differential lift has release knob and pump handle. Rear of transmission/differential lift will go to front of vehicle.

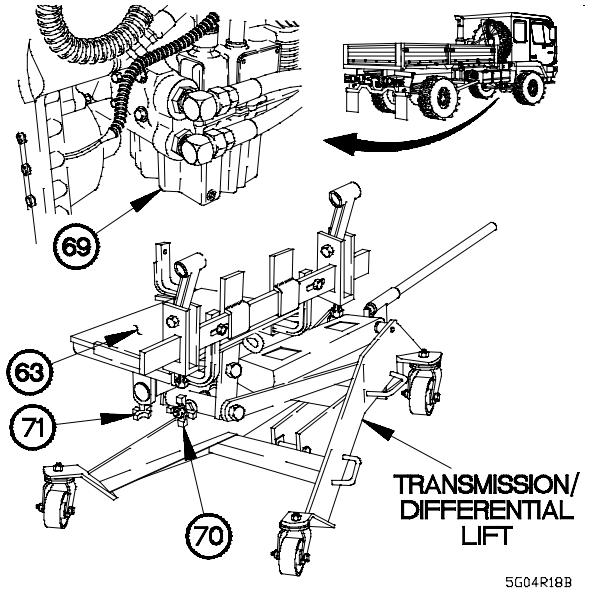
(41) Install two 90-degree brackets (62) on left side of headplate (63).

(42) Install 90-degree bracket (64) on right side of headplate (63).

(43) Position long adapter support bar (65) on two 90-degree brackets (62) with bolts (66).

(44) Position two bolt circle adapters (67) on long adapter support bar (65) with two bolts (68).

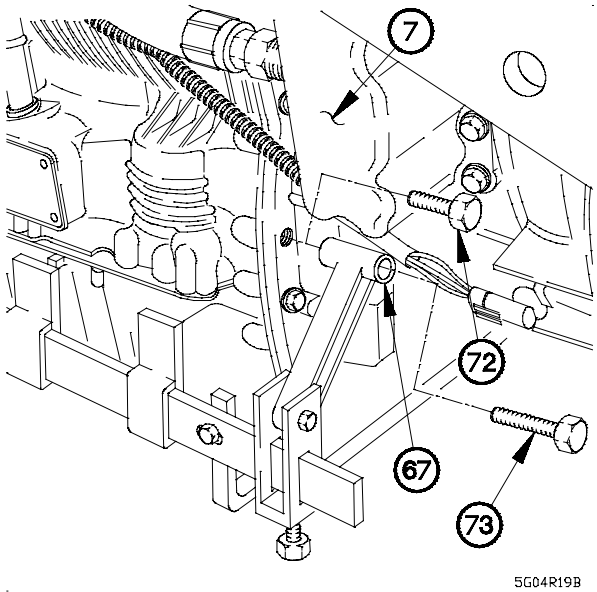




(45) Position transmission/differential lift under transmission control valve module (69).

(46) Align headplate (63) front to rear by adjusting knob (70).

(47) Align headplate (63) side to side by adjusting knob (71).



(48) Remove bolt (72) from front of transmission (7).

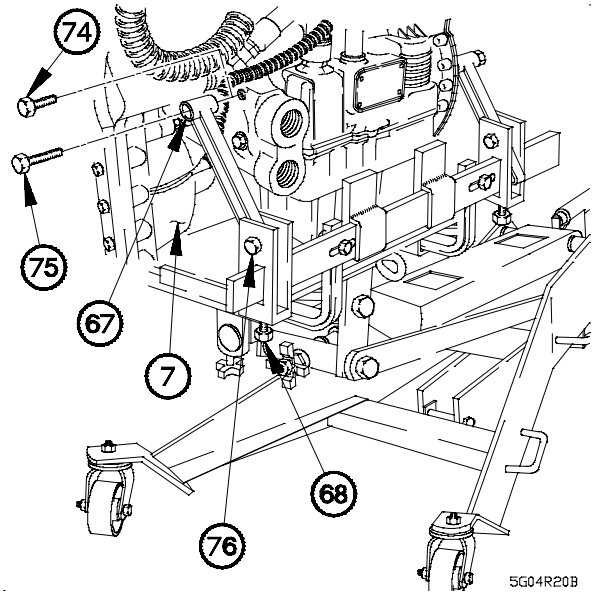
(49) Position bolt circle adapter (67) on front of transmission (7) with bolt (73).

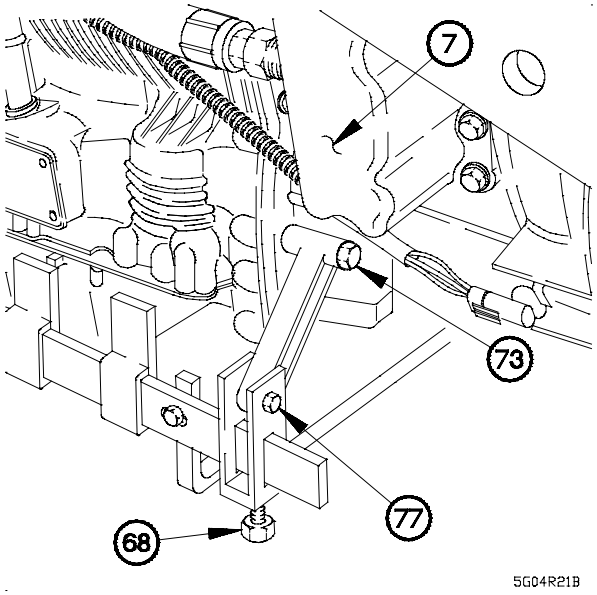
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

(50) Remove bolt (74) from rear of transmission (7).

(51) Position bolt circle adapter (67) on rear of transmission (7) with bolt (75).

(52) Tighten bolts (68, 75, and 76).





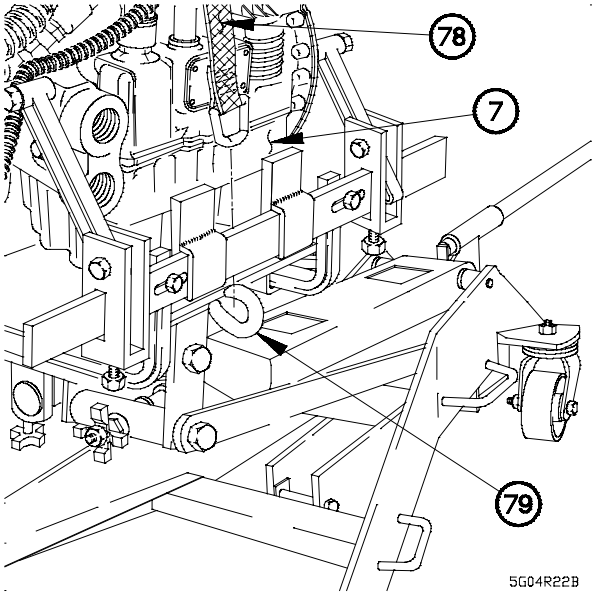
(53) Tighten bolts (68, 73, and 77) on front of transmission (7).

NOTE

Position strap under long adapter support bar.

(54) Attach strap (78) to hook (79).

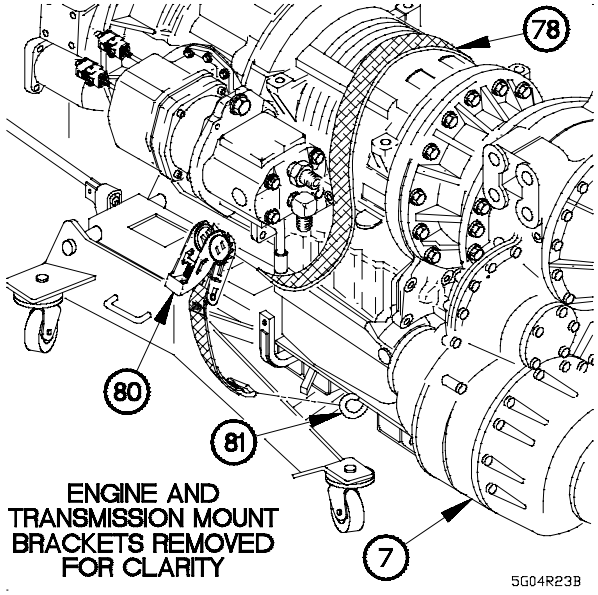
(55) Position strap (78) over transmission (7).

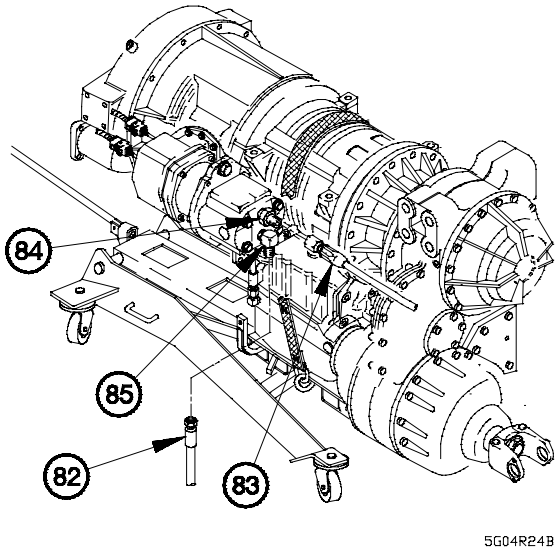


(56) Position ratchet (80) on left side of transmission (7) and attach to hook (81).

(57) Position strap (78) through ratchet (80).

(58) Tighten ratchet (80) until strap (78) is tight.





NOTE

Position hoses so that they will not interfere with lowering of transmission.

(60) Disconnect air hose (86) from 90-degree fitting (87).

(61) Remove 90-degree fitting (87) from secondary air tank (88).

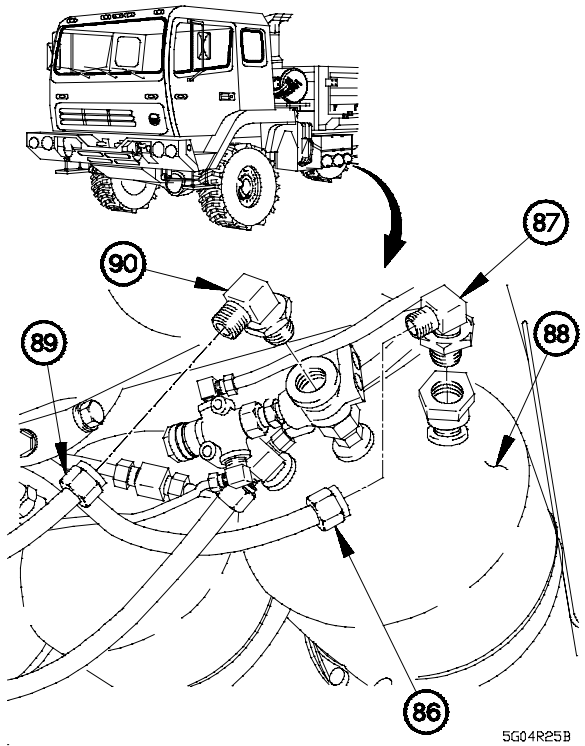
(62) Disconnect air hose (89) from 90-degree fitting (90).

(63) Remove 90-degree fitting (90) from secondary air tank (88).

NOTE

Perform step (59) on vehicles equipped with hydraulic rotary pump.

(59) Disconnect hydraulic hoses (82 and 83) from fitting (84) and 90-degree fitting (85).



7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

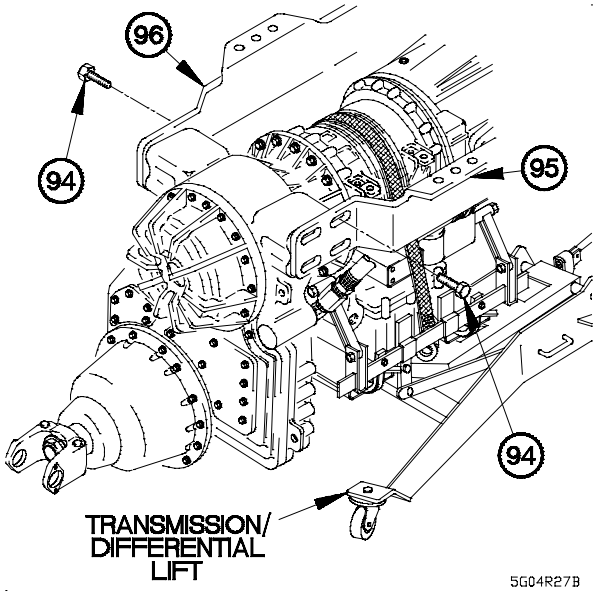
WARNING

Transmission weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (64) through (70) require the aid of an assistant.

(64) Remove 12 bolts (91) and washers (92) from transmission torque converter housing (93).



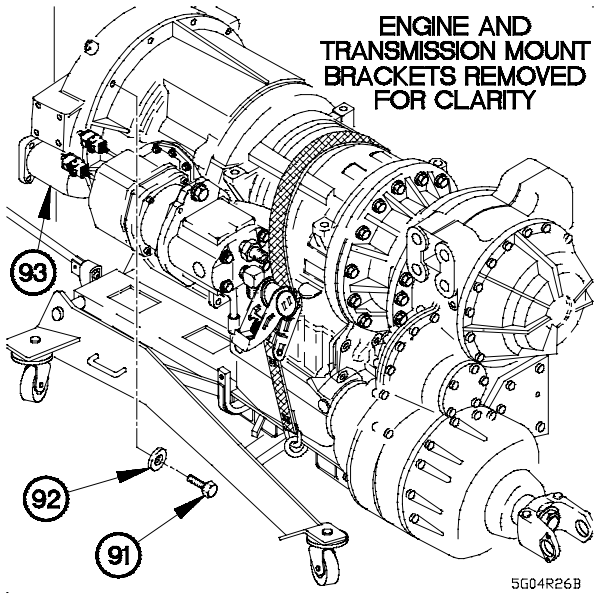
NOTE

Perform steps (68) through (70) on transmission serial number 6510032369 and higher.

(68) Remove four bolts (94) and bracket (41) from RH engine and transmission mount bracket (95).

(69) Remove four bolts (94) from LH engine and transmission mount bracket (96).

(70) Lower transmission/differential lift under vehicle.



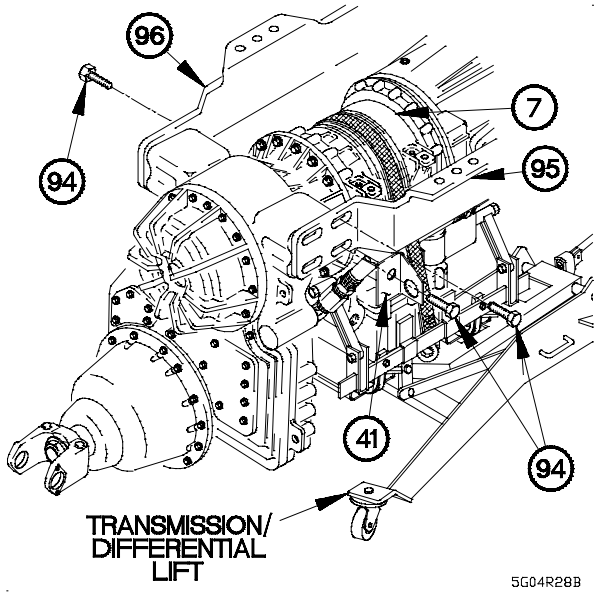
NOTE

Perform steps (65) through (67) on transmission serial numbers prior to 6510032369.

(65) Remove four bolts (94) from RH engine and transmission mount bracket (95).

(66) Remove four bolts (94) from LH engine and transmission mount brackets (96).

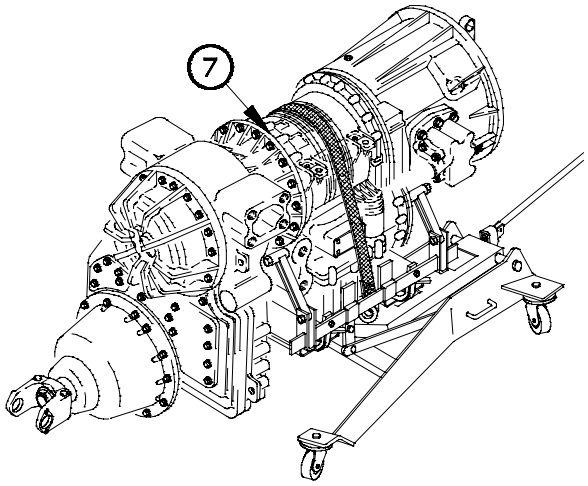
(67) Lower transmission/differential lift under vehicle.



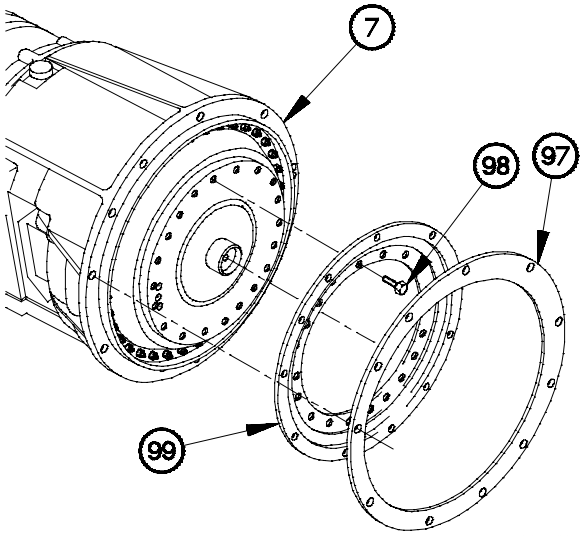
NOTE

Step (71) requires the aid of an assistant.

(71) Remove transmission/differential lift and transmission (7) from under vehicle.



5G04R29B



5G04R30B

(72) Remove gasket (97) from transmission (7). Discard gasket.

NOTE

Perform step (73) on transmission serial numbers prior to 6510032369.

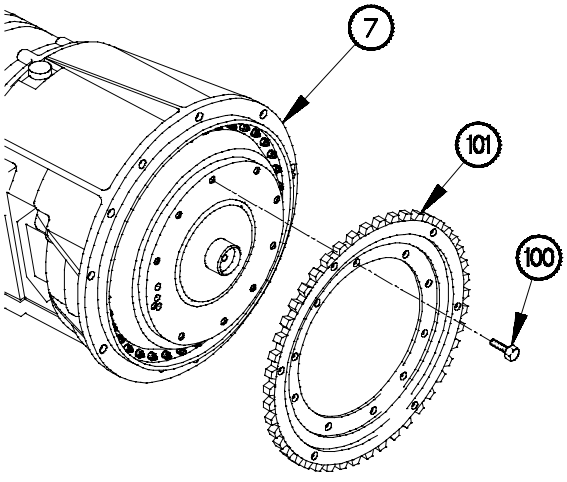
(73) Remove 20 bolts (95) and pressure plate assembly (99) from transmission (7).

NOTE

Perform step (74) on transmission serial number 6510032369 and higher.

(74) Remove 10 bolts (100) and spur gear (101) from transmission (7).

(75) If replacing transmission with serial number prior to 6510032369 with serial number 6510032369 or higher, remove transmission external wiring harness (para 6-7) and replace with new wiring harness part number 12420826.

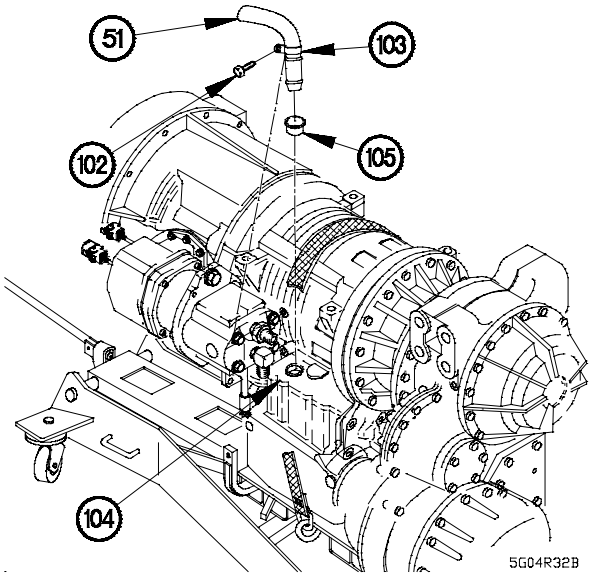


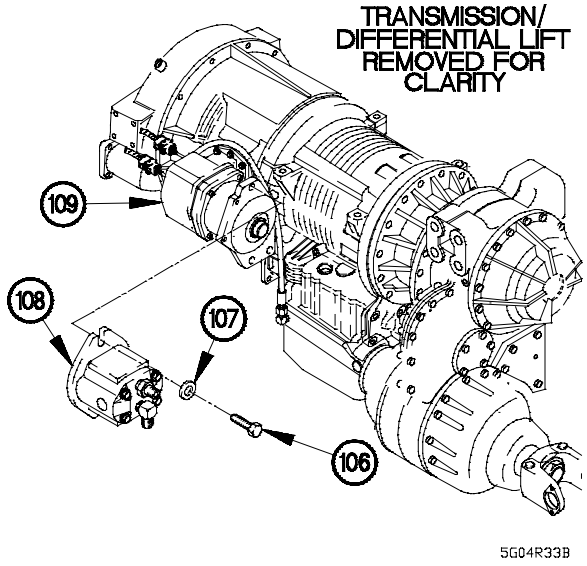
5G04R31B

7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

(76) Remove screw (102), oil fill tube clamp (103) and oil fill tube (51) from main housing module (104).

(77) Remove seal (105) from oil fill tube (51). Discard seal.





NOTE

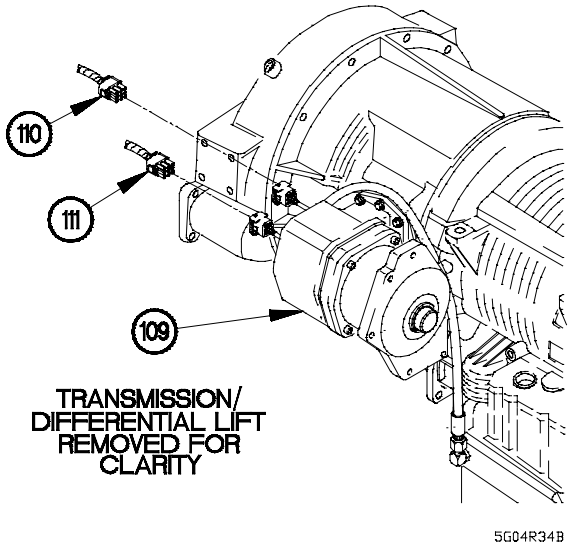
- Perform steps (79) through (82) on vehicles equipped with PTO.
- Remove plastic cable ties as required.
- Tag electric connectors and connection points prior to disconnecting.

(79) Disconnect electrical connectors P216 (110) and P217 (111) from PTO (109).

NOTE

- Perform step (78) on vehicles equipped with hydraulic rotary pump.
- Step (78) requires the aid of an assistant.

(78) Remove two screws (106), washers (107), and hydraulic rotary pump (108) from PTO (109).



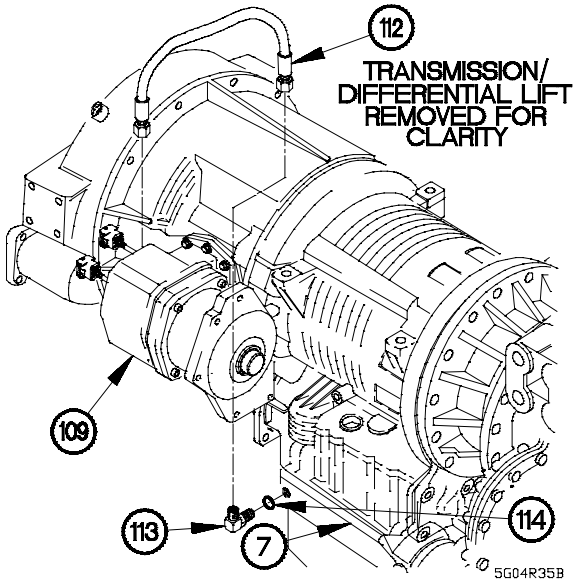
(80) Disconnect oil hose (112) from PTO (109).

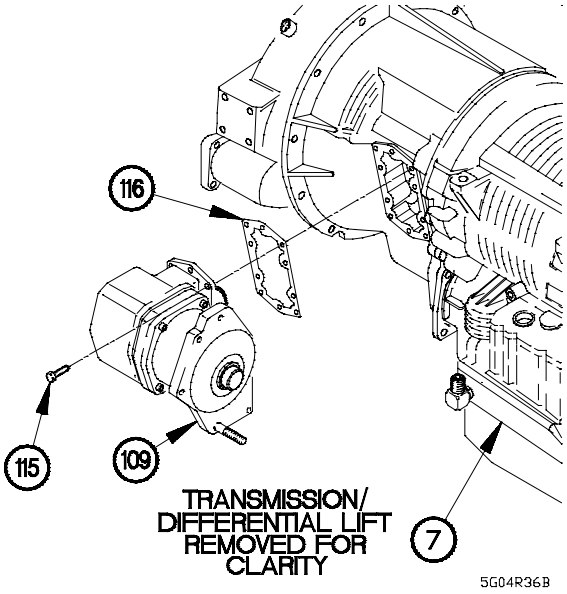
NOTE

Note orientation of 90-degree fitting prior to removal.

(81) Remove 90-degree fitting (113) from transmission (7).

(82) Remove preformed packing (114) from 90-degree fitting (113). Discard preformed packing.





NOTE

Step (83) requires the aid of an assistant.

(83) Remove eight screws (115), PTO (109), and gasket (116) from transmission (7). Discard gasket.

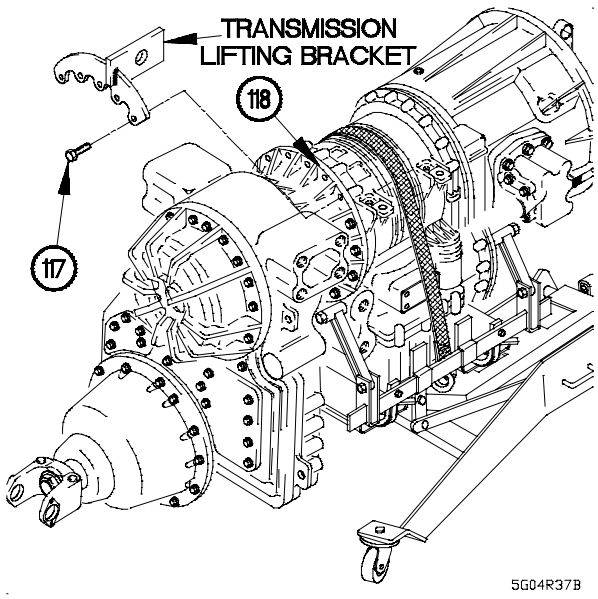
(84) Remove five bolts (117) from adapter housing module (118).

NOTE

Transmission lifting bracket is installed with lift eye top-dead center facing forward.

(85) Position transmission lifting bracket on adapter housing module (118) with five bolts (117).

(86) Tighten five bolts (117) to 42-50 lb-ft (57-68 N·m).



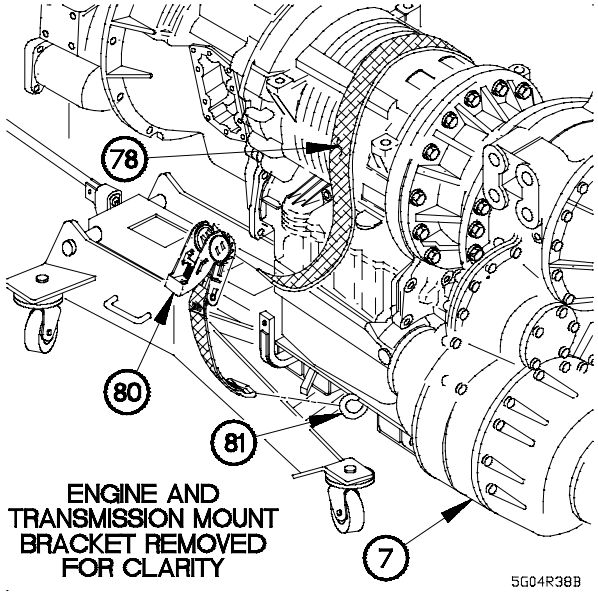
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

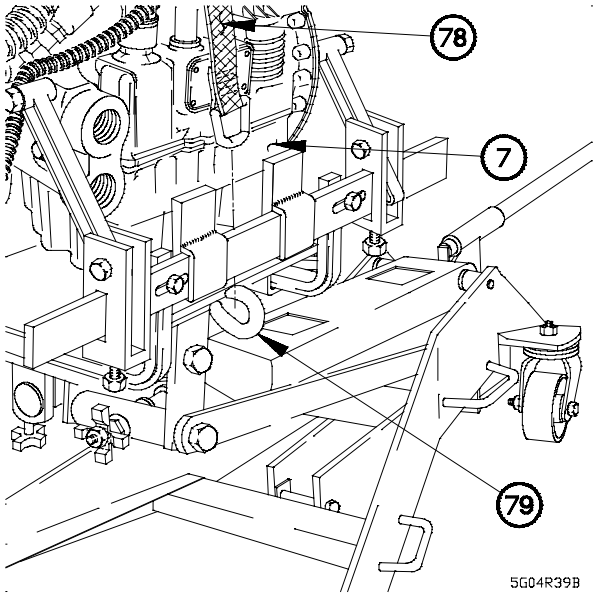
(87) Loosen ratchet (80).

(88) Remove strap (78) from ratchet (80).

(89) Remove ratchet (80) from hook (81).

(90) Remove strap (78) from over transmission (7).





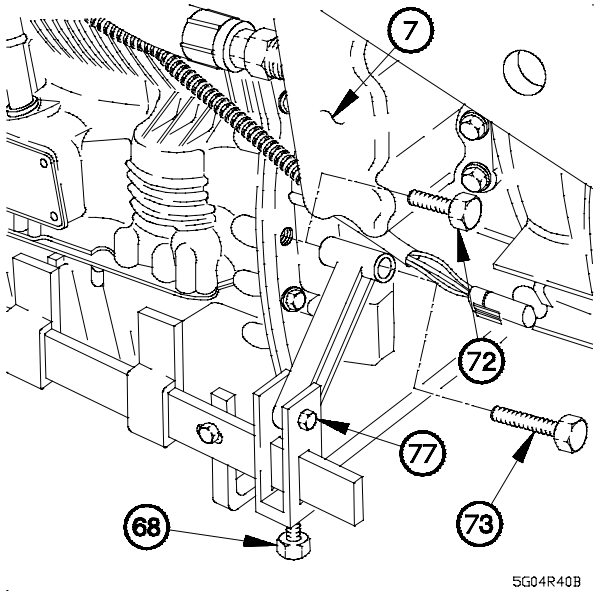
(91) Remove strap (78) from hook (79).

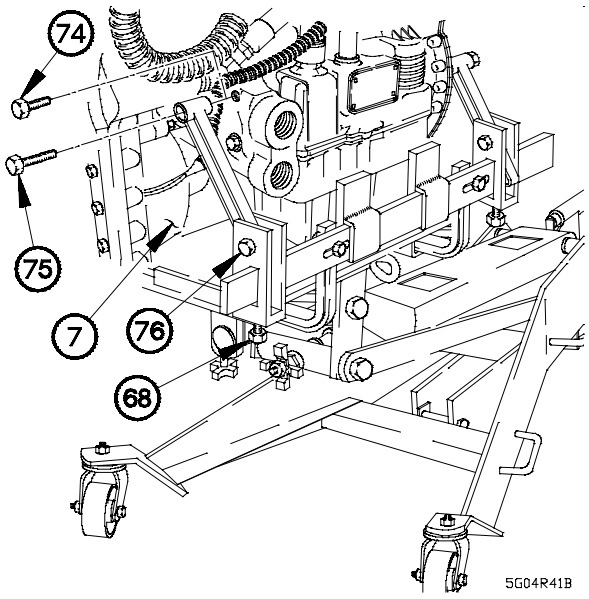
(92) Loosen bolts (68 and 77).

(93) Remove bolt (73) from front of transmission (7).

(94) Position bolt (72) in transmission (7).

(95) Tighten bolt (72) to 42-50 lb-ft (57-68 N·m).



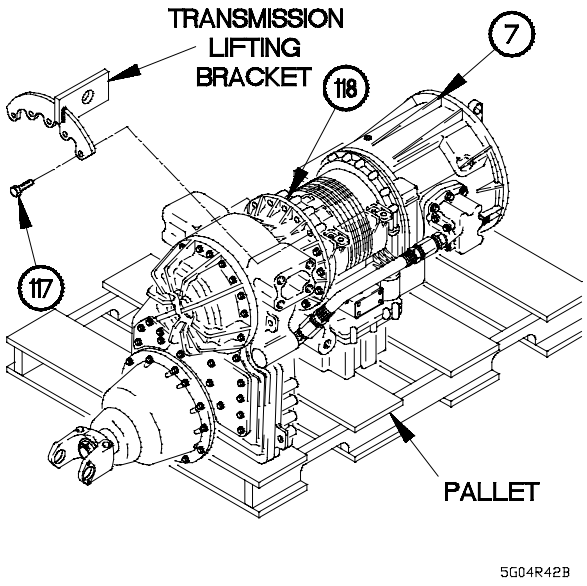


(96) Loosen bolts (68 and 76).

(97) Remove bolt (75) from rear of transmission (7).

(98) Position bolt (74) in transmission (7).

(99) Tighten bolt (74) to 42-50 lb-ft (57-68 N·m).



WARNING

Transmission weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(100) Lift transmission (7) and place on pallet.

(101) Remove five bolts (117) and transmission lifting bracket from adapter housing module (118).

(102) Position five bolts (117) in adapter housing module (118).

(103) Tighten five bolts (117) to 42-50 lb-ft (57-68 N·m).

7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

b. Installation.

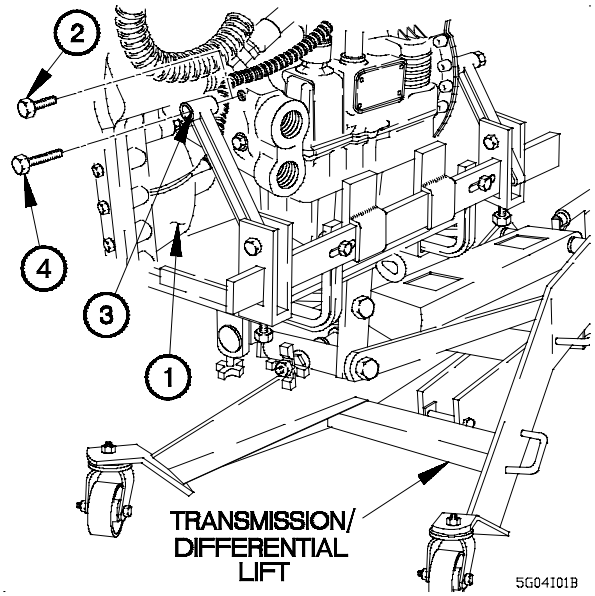
WARNING

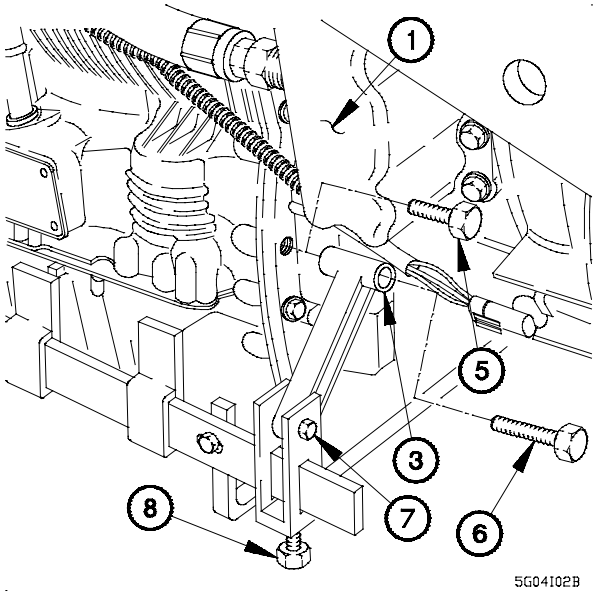
Transmission assembly weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

(1) Place transmission (1) on transmission/differential lift.

(2) Remove bolt (2) from rear of transmission (1).

(3) Position bolt circle adapter (3) on rear of transmission (1) with bolt (4).

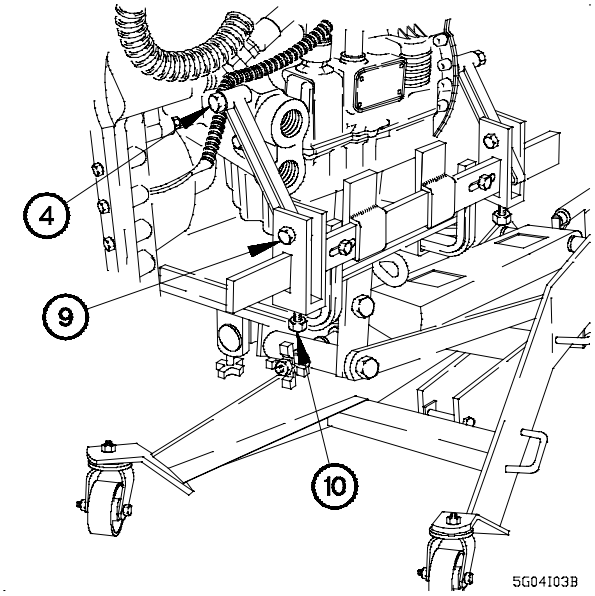




(4) Remove bolt (5) from front of transmission (1).

(5) Position bolt circle adapter (3) on front of transmission (1) with bolt (6).

(6) Tighten bolts (6, 7, and 8).



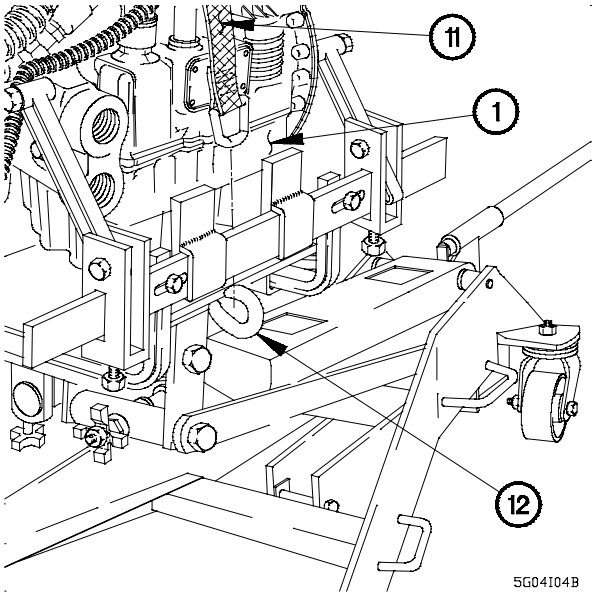
(7) Tighten bolts (4, 7, and 8) on rear of transmission (1).

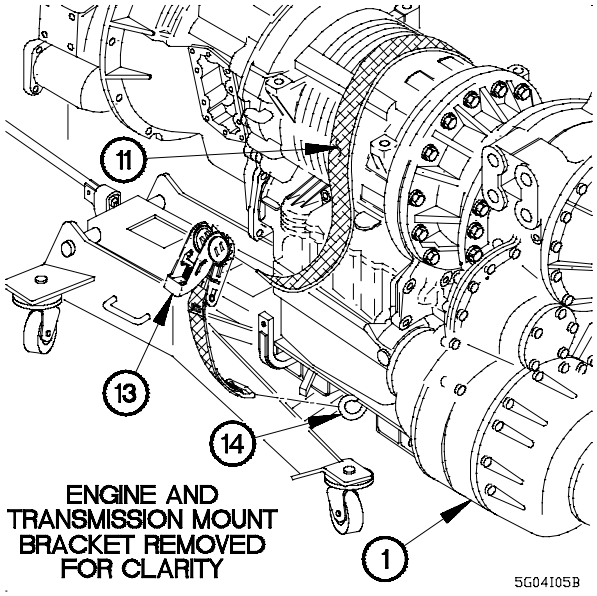
NOTE

Ensure strap is under long adapter support bar.

(8) Attach strap (11) to hook (12).

(9) Position strap (11) over transmission (1).





(10) Position ratchet (13) on left side of transmission (1) and attach to hook (14).

(11) Position strap (11) through ratchet (13).

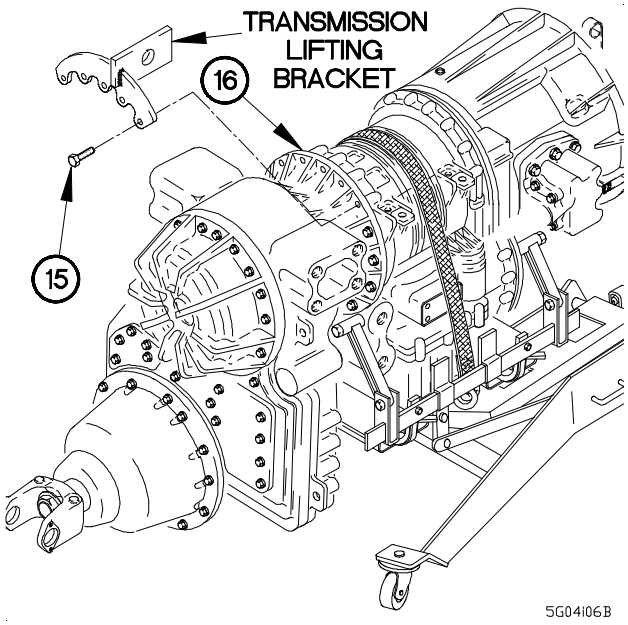
(12) Tighten ratchet (13) until strap (11) is tight.

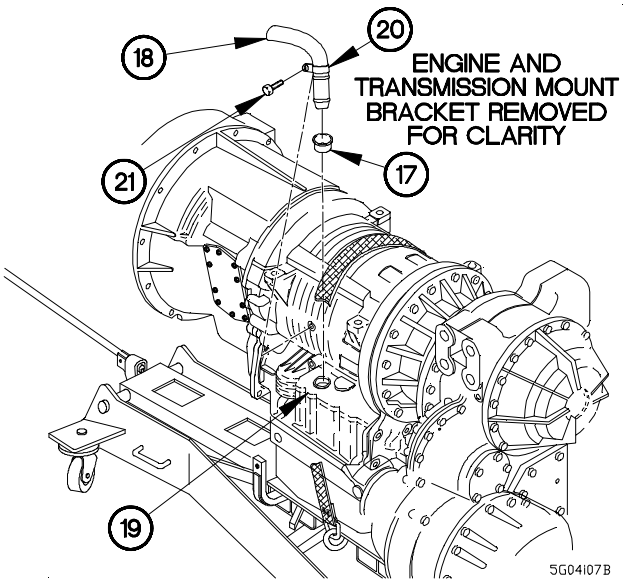
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

(13) Remove five bolts (15) and transmission lifting bracket from adapter housing module (16).

(14) Position five bolts (15) in adapter housing module (16).

(15) Tighten five bolts (15) to 42-50 lb-ft (57-68 N•m).





(16) Install seal (17) on oil fill tube (18).

(17) Install oil fill tube (18) in main housing module (19).

(18) Position oil fill tube clamp (20) on transmission (1) with screw (21).

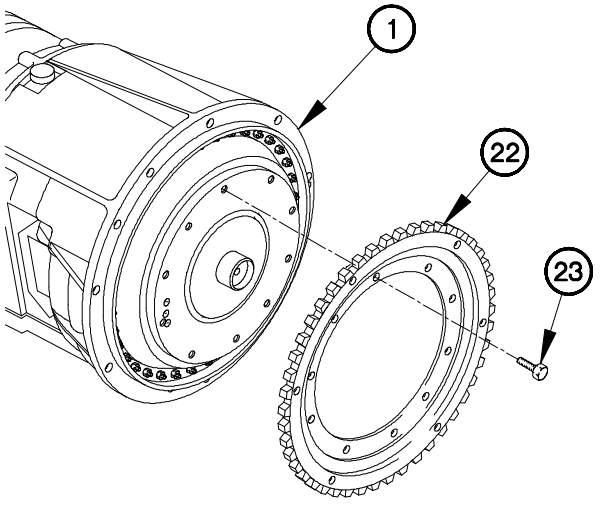
(19) Tighten screw (21) to 37-45 lb-ft (50-61 N•m).

NOTE

Perform steps (20) and (21) if spur gear was removed from transmission serial number 6510032369 or higher.

(20) Position spur gear (22) on transmission (1) with 10 bolts (23).

(21) Tighten 10 bolts (23) to 25-29 lb-ft (34-39 N•m).



NOTE

Perform steps (22) and (23) if pressure plate assembly was removed from transmission serial numbers prior to 6510032369.

(22) Position pressure plate assembly (24) on transmission (1) with 20 bolts (25).

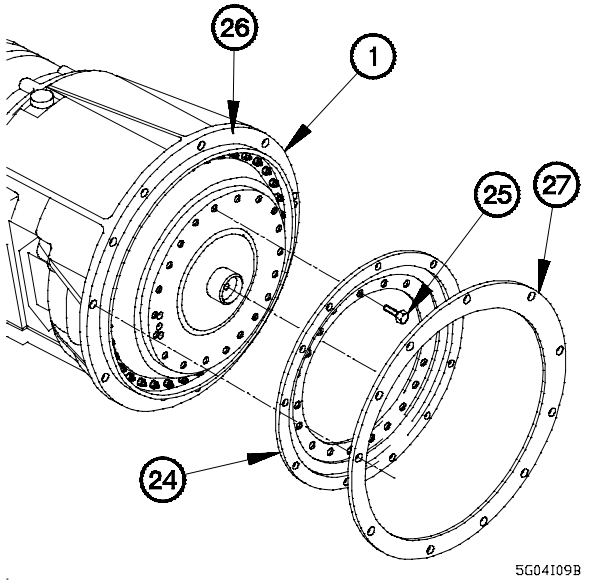
(23) Tighten 20 bolts (25) to 18-22 lb-ft (24-30 N·m).

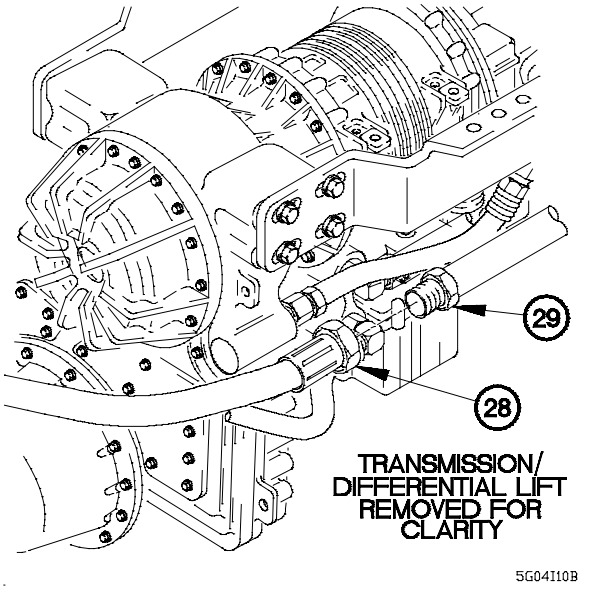
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(24) Apply light coat of sealing compound to seating surface (26) on transmission (1).

(25) Install gasket (27) on transmission (1).





NOTE

Perform step (28) on vehicles equipped with transmission oil cooler tubes.

(26) Connect transmission oil cooler hose (28) to fitting (29).

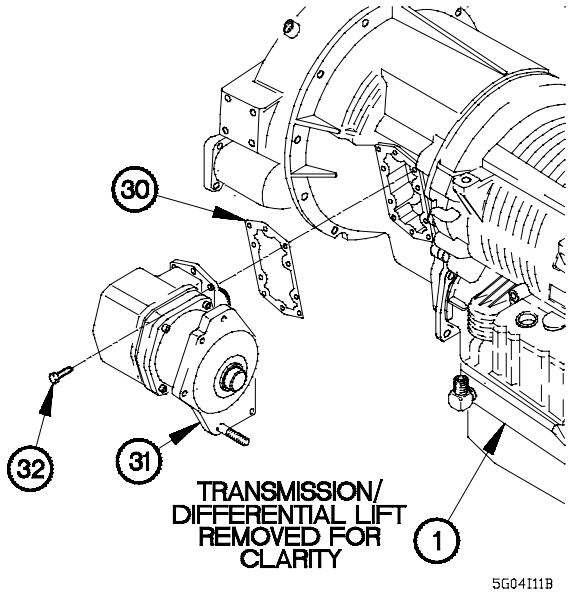
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

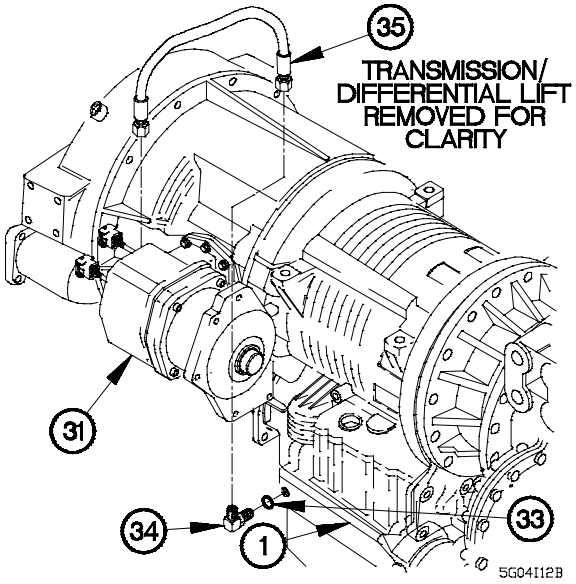
NOTE

- Perform steps (27) through (32) on vehicles with PTO.
- Step (27) requires the aid of an assistant.

(27) Position gasket (30) and PTO (31) on transmission (1) with eight screws (32).

(28) Tighten eight screws (32) to 42-50 lb-ft (57-68 N·m).





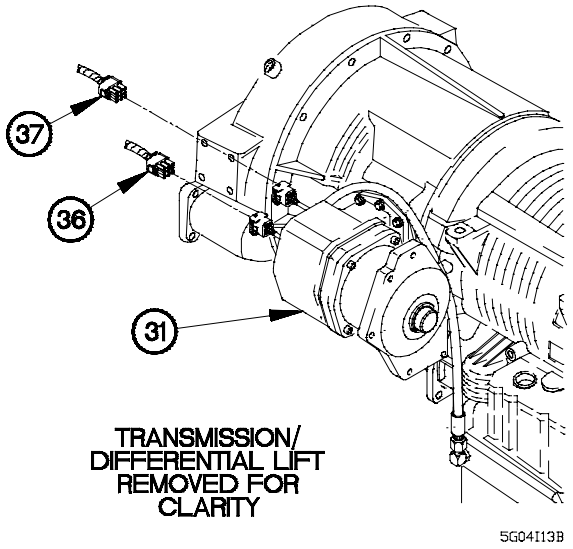
(29) Position preformed packing (33) on 90-degree fitting (34).

(30) Install 90-degree fitting (34) on transmission (1).

(31) Connect oil hose (35) to 90-degree fitting (34).

(32) Install oil hose (35) to PTO (31).

(33) Connect electrical connectors P217 (36) and P216 (37) to PTO (31).

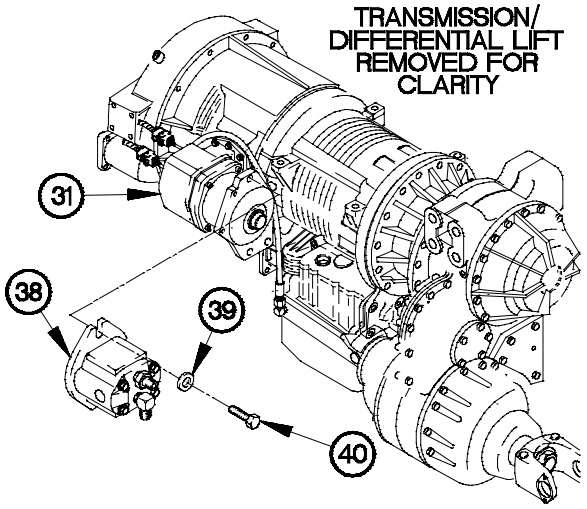


NOTE

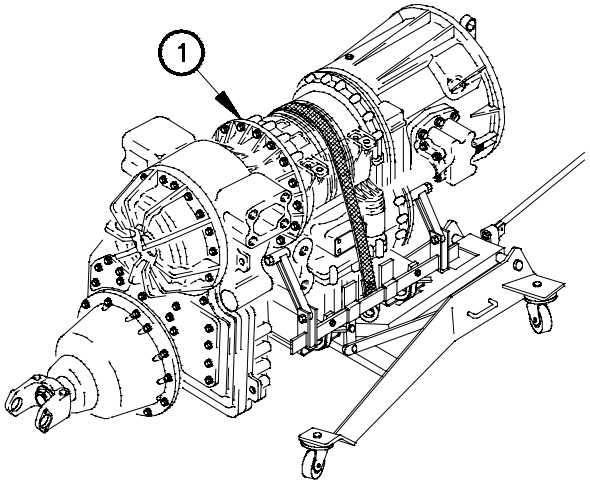
- Perform steps (34) and (35) on vehicles equipped with hydraulic rotary pump.
- Step (34) requires the aid of an assistant.

(34) Position hydraulic rotary pump (38) on PTO (31) with two washers (39) and screws (40).

(35) Tighten two screws (40) to 60-90 lb-ft (81-122 N·m).



5G04I14B



5G04I15B

NOTE

Step (36) requires the aid of an assistant.

(36) Position transmission (1) under vehicle.

7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

WARNING

Extreme caution must be used when raising transmission under vehicle. Transmission/ differential lift must be tilted back towards rear of vehicle and raised at the same time. Failure to comply may result in serious injury or death to personnel or damage to equipment.

NOTE

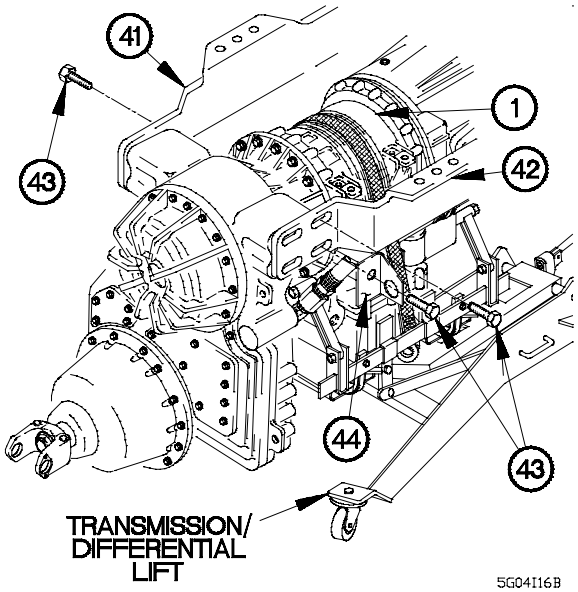
- Perform steps (37) through (40) on transmission serial number 6510032369 and higher.
- Steps (37) and (38) require the aid of two assistants.

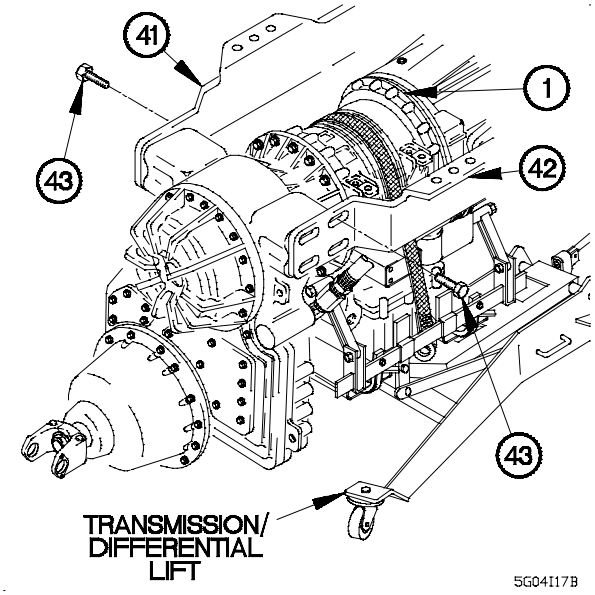
(37) Raise transmission (1) in position between LH and RH engine and transmission mount brackets (41 and 42).

(38) Position four bolts (43) in LH engine and transmission mount bracket (41).

(39) Position four bolts (43) and bracket (44) in RH engine and transmission mount bracket (42).

(40) Tighten eight bolts (43) to 330-378 lb-ft (448-513 N·m).





NOTE

- Perform steps (41) through (43) on transmission serial numbers prior to 6510032369.
- Steps (41) and (42) require the aid of two assistants.

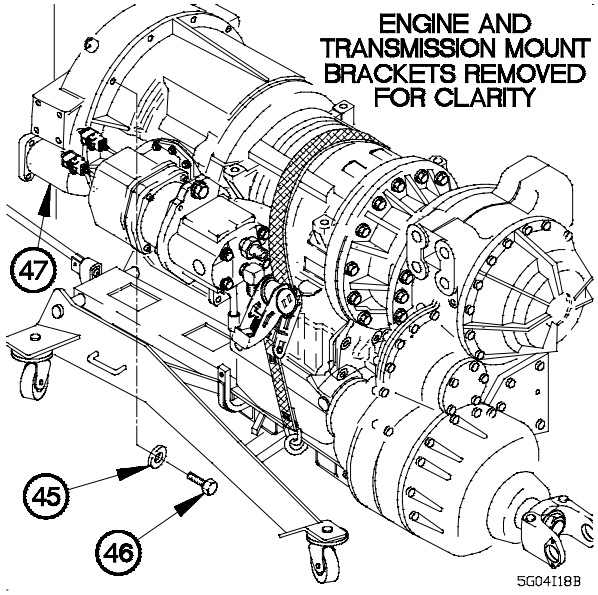
(41) Raise transmission (1) in position between LH and RH engine and transmission mount brackets (41 and 42).

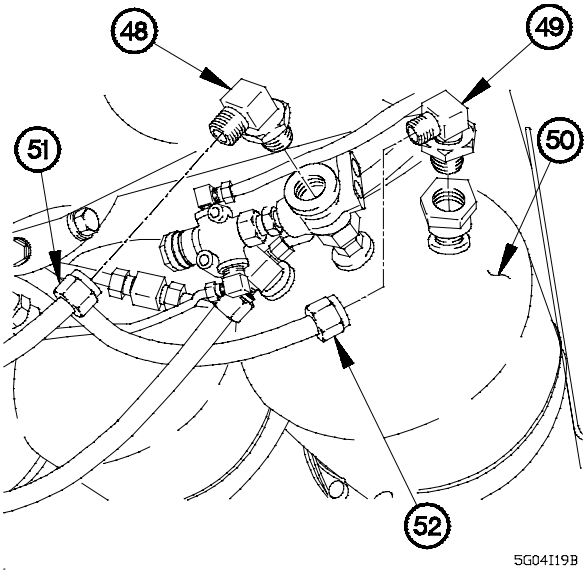
(42) Position four bolts (43) in LH and RH engine and transmission mount brackets (41 and 42).

(43) Tighten eight bolts (43) to 330-378 lb-ft (448-513 N·m).

(44) Position 12 washers (45) and bolts (46) in torque converter housing module (47).

(45) Tighten 12 bolts (46) to 37-45 lb-ft (50-61 N·m).





(46) Install 90-degree fittings (48 and 49) in secondary air tank (50).

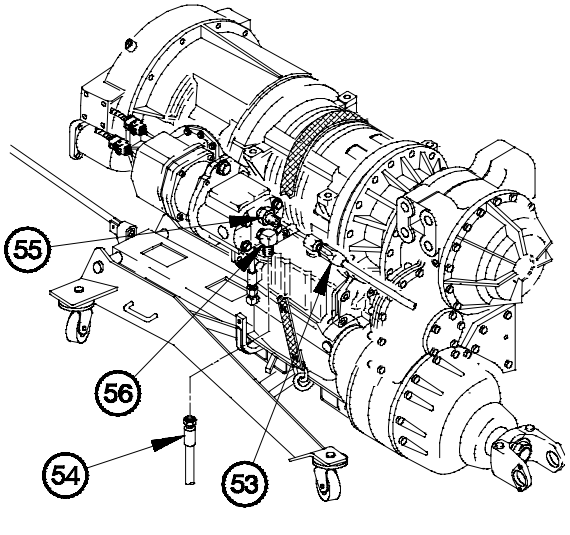
(47) Connect air hose (51) to 90-degree fitting (48).

(48) Connect air hose (52) to 90-degree fitting (49).

NOTE

Perform step (49) on vehicles equipped with hydraulic rotary pump.

(49) Connect hydraulic hoses (53 and 54) to fitting (55) and 90-degree fitting (56).



7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

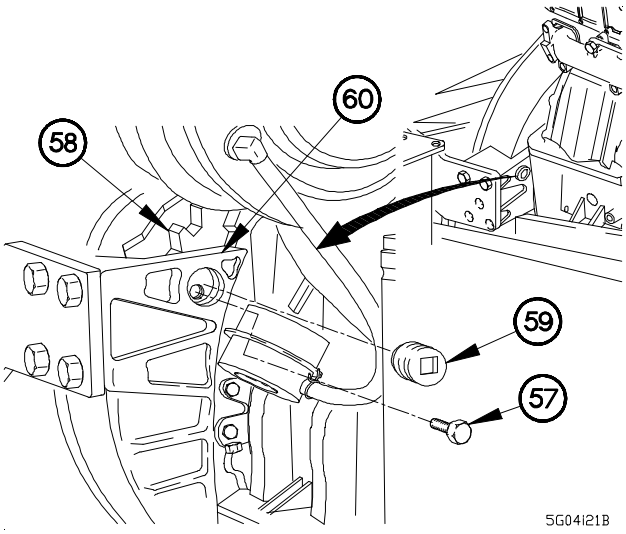
NOTE

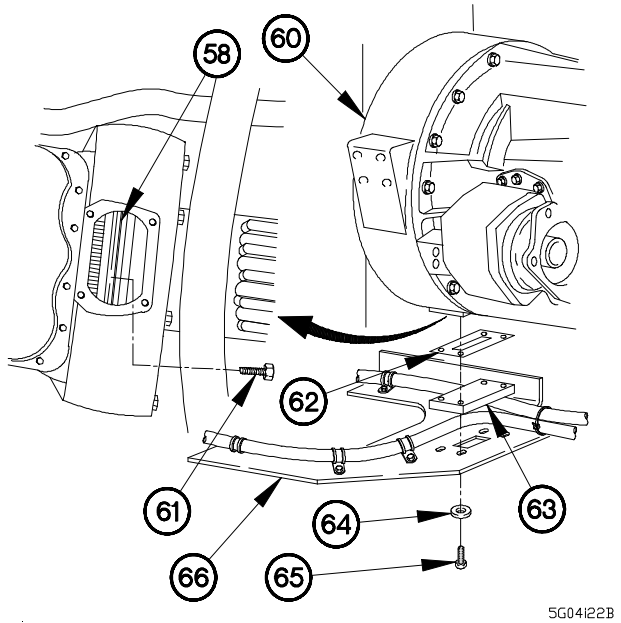
- Perform steps (50) through (52) on vehicle serial number 1478 and higher.
- Steps (50) and (51) require the aid of an assistant.
- During installation of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short

(50) Position six bolts (57) in flexplate (58).

(51) Tighten six bolts (57) to 25-29 lb-ft (34-39 N•m).

(52) Install plug (59) in flywheel housing (60).





NOTE

- Perform steps (53) and (54) on vehicle serial number 0001 through 1477.
- Steps (53) and (54) require the aid of an assistant.
- During installation of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(53) Position 12 bolts (61) in flexplate (58).

(54) Tighten 12 bolts (61) to 18-22 lb-ft (24-30 N•m).

NOTE

Perform steps (55) and (56) on vehicles equipped with transmission oil cooler tubes.

(55) Position gasket (62) and flywheel cover (63) on flywheel housing (60) with four washers (64) and screws (65).

NOTE

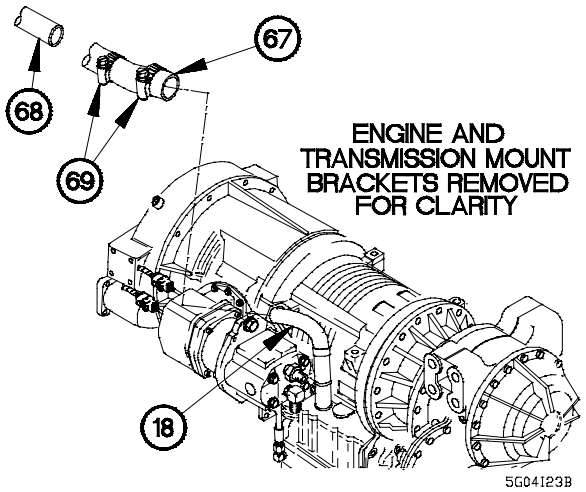
Perform step (56) on vehicles equipped with transmission oil cooler hoses.

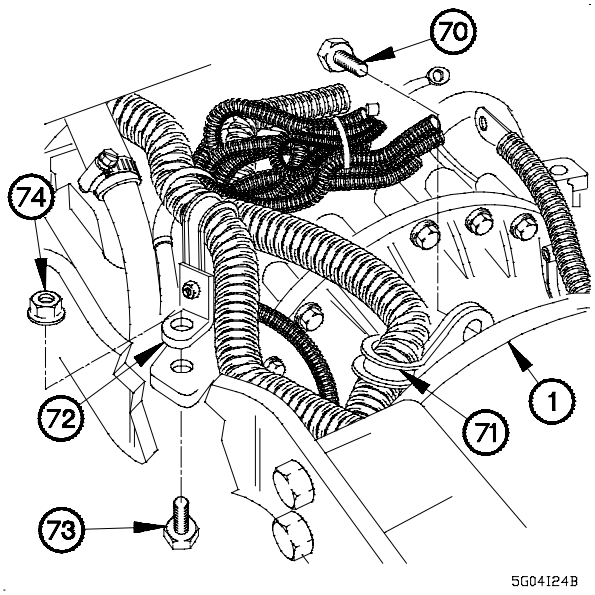
(56) Install gasket (62), flywheel cover (63), and transmission oil cooler hose bracket (66) on flywheel housing (60) with four washers (64) and screws (65).

(57) Tighten four screws (65) to 22-26 lb-ft (30-35 N•m).

(58) Position oil fill hose (67) on oil fill tube (18) and tube (68) with two clamps (69).

(59) Tighten two clamps (69) to 24-48 lb-in. (3-5 N·m).





NOTE

Perform steps (60) through (63) on transmission serial numbers prior to 6510032369.

(60) Remove bolt (70) from transmission (1).

(61) Position clamp (71) on transmission (1) with bolt (70).

(62) Tighten bolt (70) to 42-50 lb-ft (57-68 N·m).

(63) Install clamp (72) on transmission (1) with bolt (73) and self-locking nut (74).

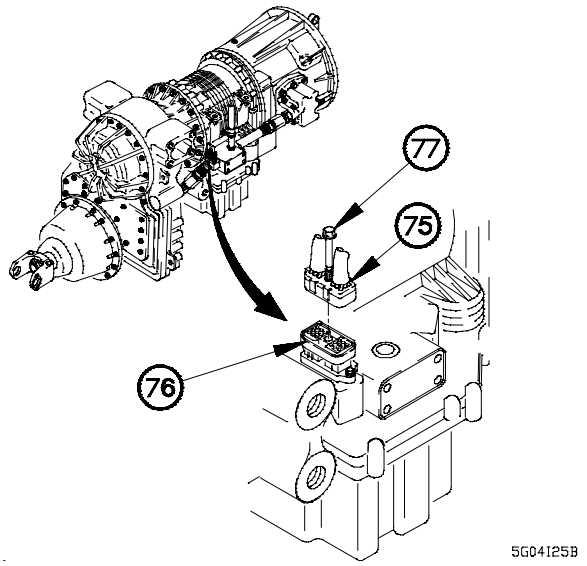
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

CAUTION

Due to position of main housing module connector, extreme care must be taken when installing pigtail adapter connector. Failure to comply may result in damage to equipment.

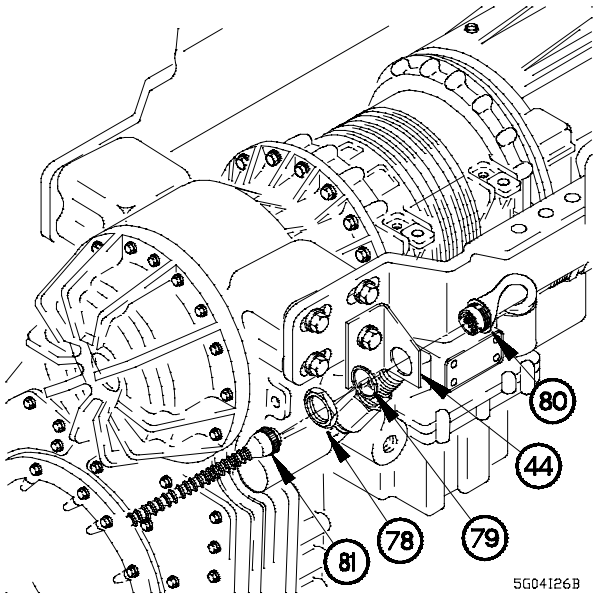
NOTE

- Transmissions with serial numbers lower than 6510032369 require the use of a transmission adapter harness (part number 29519210) to adapt to the transmission external wiring harness. Transmissions with serial numbers higher than 6510032369 do not require the use of a transmission adapter harness.
- Install plastic cable ties as required.



(64) Position transmission adapter harness (75) in main housing module receptacle (76) with connector bolt (77).

(65) Tighten connector bolt (77) to 12-24 lb-in. (1-3 N·m).



NOTE

Perform steps (66) through (68) on transmission serial number 6510032369 and higher.

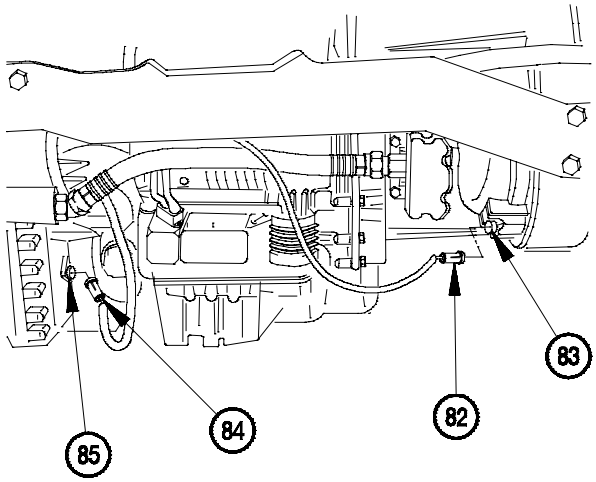
(66) Remove nut (78) and washer (79) from transmission adapter harness (80).

(67) Install transmission adapter harness (80) in bracket (44) with washer (79) and nut (78).

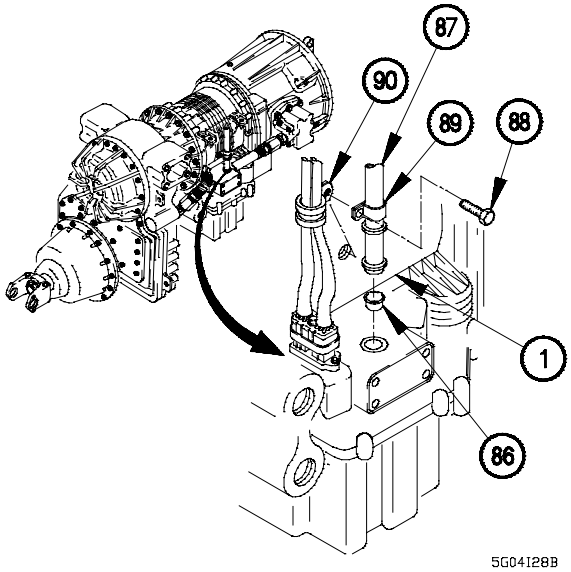
(68) Connect transmission external wiring harness connector (81) to transmission adapter harness (80).

(69) Connect engine speed sensor connector (82) to engine speed sensor (83).

(70) Connect output speed sensor connector (84) to transfer case module (85).



5G04I27B



5G04I28B

(71) Install seal (86) on oil dipstick tube (87).

(72) Install oil dipstick tube (87) in transmission (1).

NOTE

Perform step (73) on transmission serial number 6510032369 and higher.

(73) Install bolt (88) in clamp (89) on transmission (1).

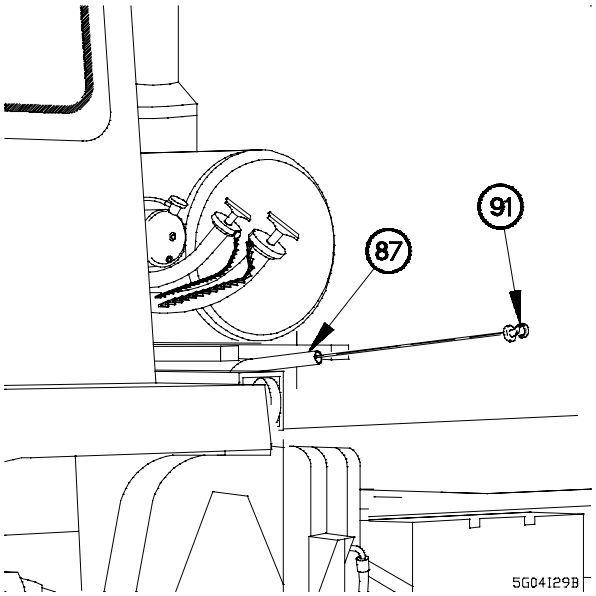
NOTE

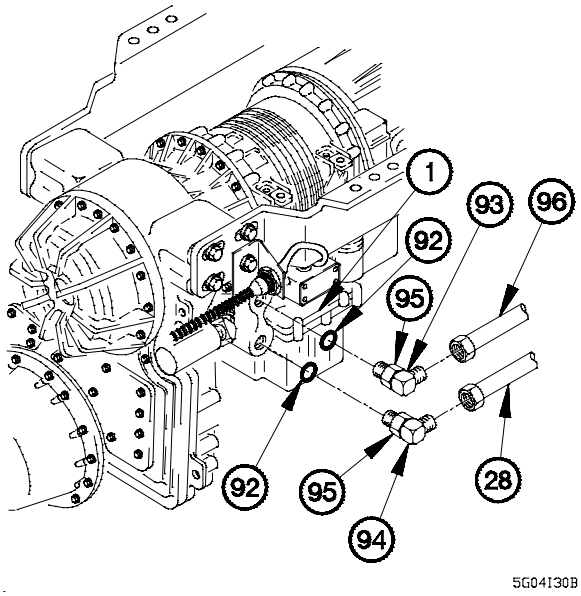
Perform step (74) on transmission serial numbers prior to 6510032369.

(74) Install bolt (88) in clamp (89) and wiring harness clamp (90) on transmission (1).

7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

(75) Install dipstick (91) in oil dipstick tube (87).





NOTE

Perform steps (76) through (81) on vehicles equipped with transmission oil cooler tubes.

(76) Install two preformed packings (92) on 90-degree fittings (93 and 94).

(77) Position 90-degree fittings (93 and 94) in transmission (1).

(78) Tighten jam nuts (95) on fittings (93 and 94).

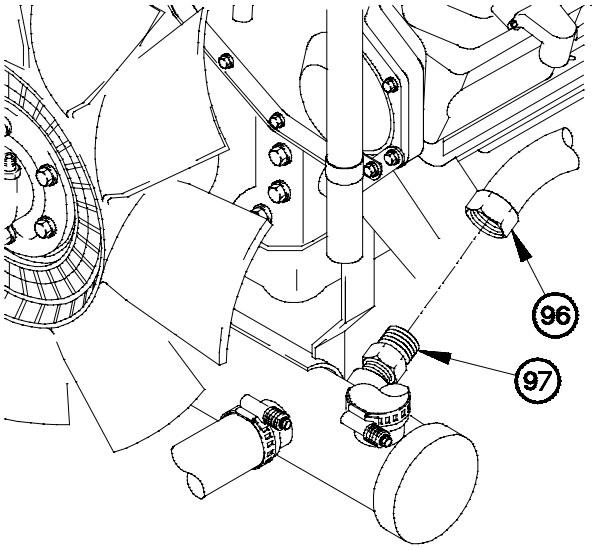
(79) Connect transmission oil cooler tube (96) to 90-degree fittings (93).

(80) Connect transmission oil cooler tube (28) to 90-degree fittings (94).

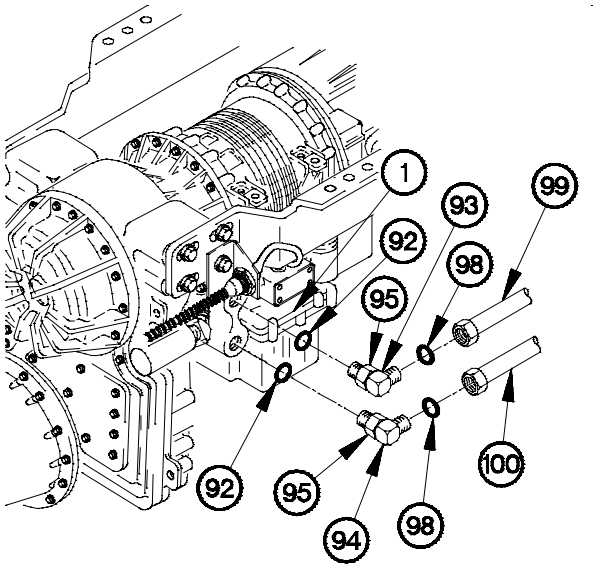
(81) Tighten transmission oil cooler tube (96) and transmission oil cooler hose (28) to 94-104 lb-ft (127-141 N·m).

(82) Position transmission oil cooler tube (96) on fitting (97).

(83) Tighten transmission oil cooler tube (96) to 94-104 lb-ft (127-141 N·m).



5G04I31B



5G04I32B

NOTE

Perform steps (84) through (89) on vehicles equipped with transmission oil cooler hoses.

(84) Install two preformed packings (92 and 98) on 90-degree fittings (93 and 94).

(85) Position 90-degree fittings (93 and 94) on transmission (1).

(86) Tighten jam nuts (95) on fittings (93 and 94).

(87) Position transmission oil cooler hose (99) on 90-degree fitting (93).

(88) Position transmission oil cooler hose (100) on 90-degree fitting (94).

(89) Tighten transmission oil cooler hose (99) and transmission oil cooler hose (100) to 94-104 lb-ft (127-141 N·m).

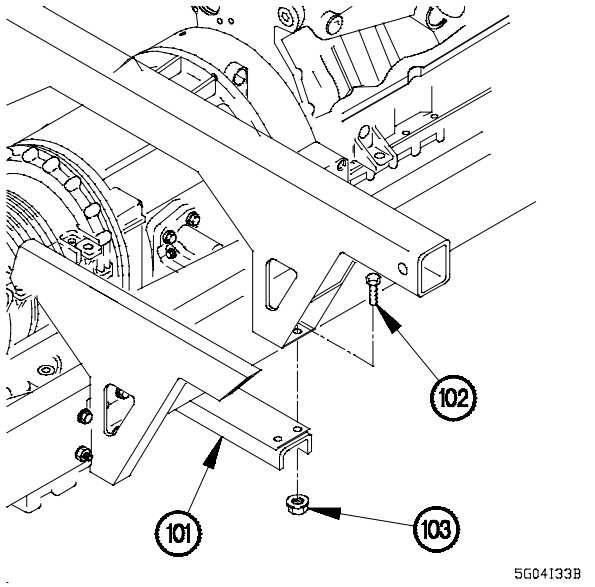
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

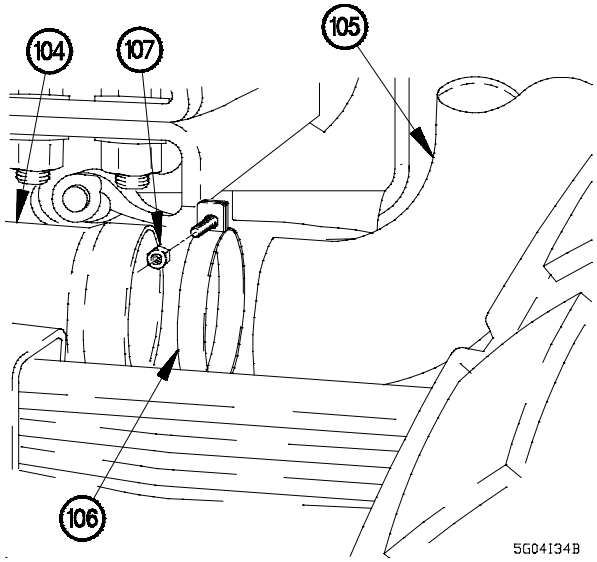
NOTE

Steps (90) and (91) require the aid of an assistant.

(90) Position lower front support crossmember (101) on vehicle with four bolts (102) and self-locking nuts (103).

(91) Tighten four self-locking nuts (103) to 295-369 lb-ft (400-500 N·m).



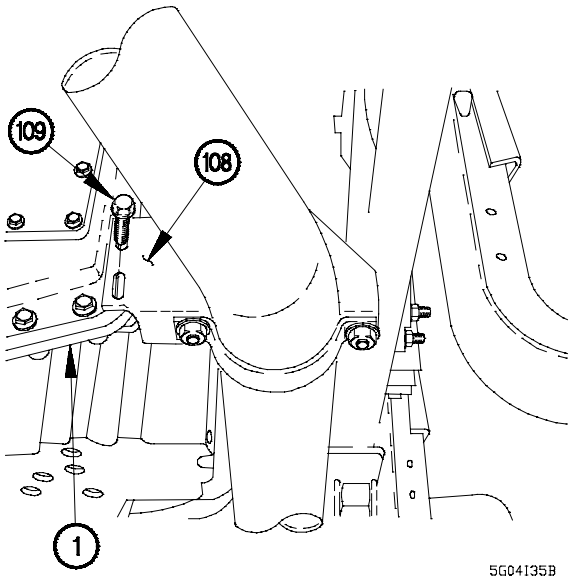


(92) Position lower exhaust pipe (104) on upper exhaust pipe (105) with clamp (106) and self-locking nut (107).

(93) Tighten self-locking nut (107) to 72-120 lb-in. (8-14 N·m).

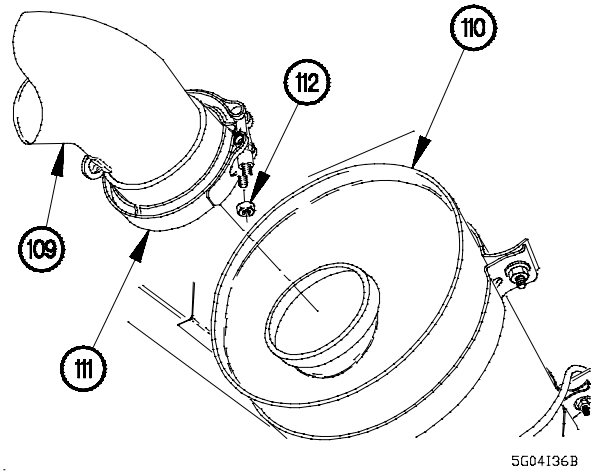
(94) Position exhaust bracket (108) on transmission (1) with two bolts (109).

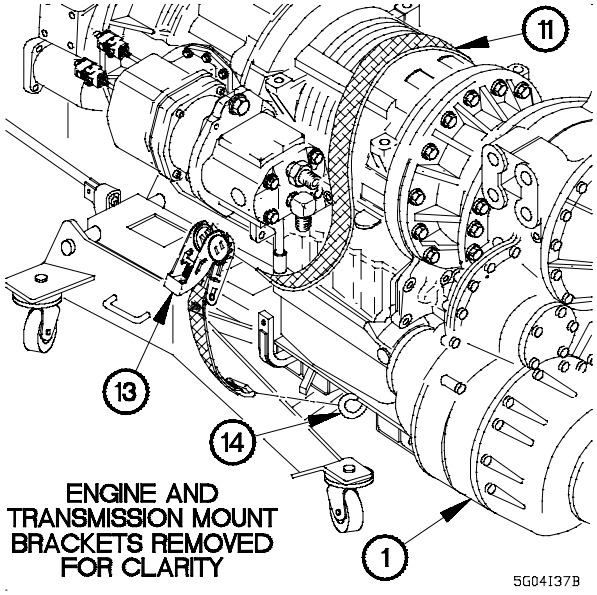
(95) Tighten two bolts (109) to 44-55 lb-ft (60-75 N·m).



(96) Install lower exhaust pipe (109) on muffler (110) with clamp (111) and self-locking nut (112).

(97) Tighten self-locking nut (112) to 72-120 lb-in. (8-14 N·m).



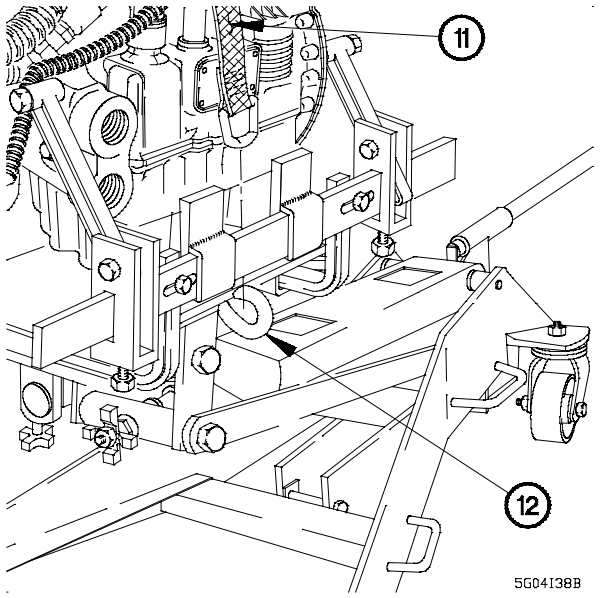


(98) Loosen ratchet (13).

(99) Remove strap (11) from ratchet (13).

(100) Remove ratchet (13) from hook (14).

(101) Remove strap (11) from over transmission (1).



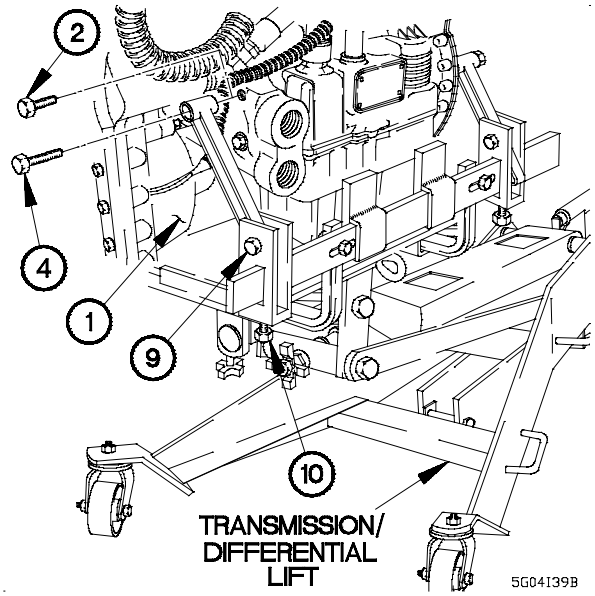
(102) Remove strap (11) from hook (12).

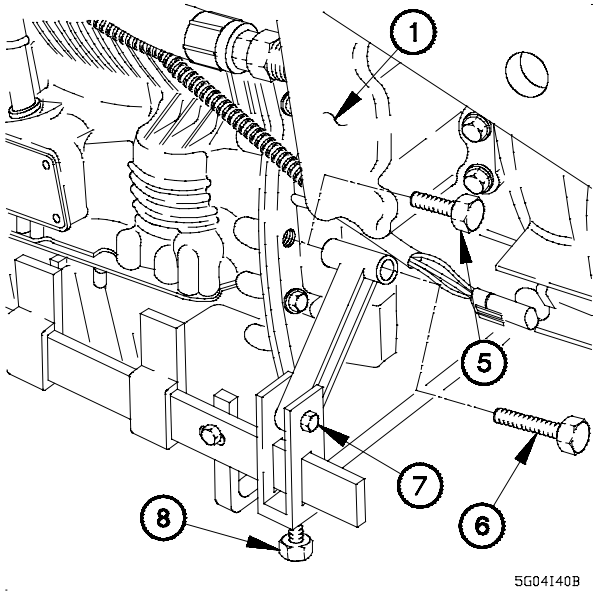
(103) Loosen bolts (9 and 10) on rear of transmission (1).

(104) Remove bolt (4) from transmission (1).

(105) Position bolt (2) in transmission (1).

(106) Tighten bolt (2) to 42-50 lb-ft (57-68 N·m).





(107) Loosen bolts (7 and 8) on front of transmission (1).

(108) Remove bolt (6) from transmission (1).

(109) Position bolt (5) in transmission (1).

(110) Tighten bolt (5) to 42-50 lb-ft (57-68 N·m).

(111) Lower and remove transmission/differential lift from under vehicle.

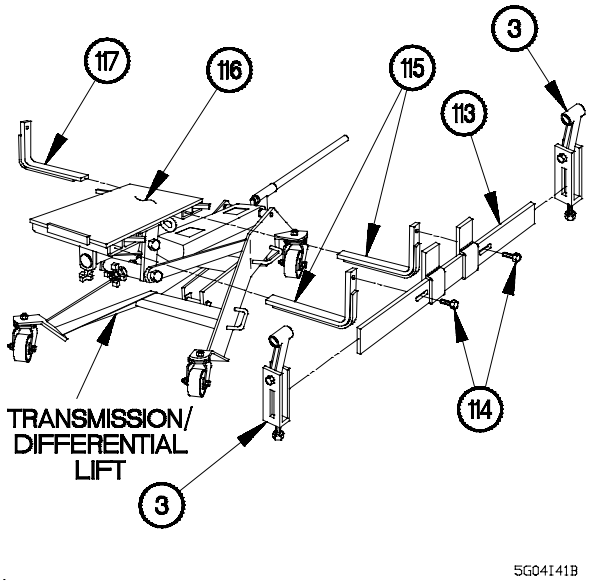
7-4. TRANSMISSION ASSEMBLY REPLACEMENT (USUAL CONDITIONS) (CONT)

(112) Remove two bolt circle adapters (3) from long adapter support bar (113).

(113) Remove two bolts (114) and long adapter support bar (113) from two 90-degree brackets (115).

(114) Remove two 90-degree brackets (115) from curb side of headplate (116).

(115) Remove 90-degree bracket (117) from road side of headplate (116).



c. Follow-On Maintenance.

(1) Install rear drive shaft (TM 9-2320-365-20-3).

(2) Install front drive shaft (TM 9-2320-365-20-3).

(3) Service transmission (TM 9-2320-365-20-3).

(4) Connect batteries (TM 9-2320-365-20-3).

(5) Install spare tire (TM 9-2320-365-10).

(6) Operate vehicle and check transmission for oil leaks.

(7) Check exhaust pipe for exhaust leaks, excessive noise, and vibration.

(8) Operate 11K Self-Recovery Winch (SRW) (if equipped) and check for hydraulic leaks (TM 9-2320-365-10-2).

End of Task.

7-5. TRANSMISSION TO MAINTENANCE STAND

This task covers:

a. Installation

b. Removal

INITIAL SETUP

Equipment Condition
Transmission assembly removed (para 7-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Stand, Maintenance, Automotive Engine (Item 74, Appendix B, TM 9-2320-365-20)
Transmission Lift/Mounting Bracket Assembly (Item 20, Appendix D)

Materials /Parts
Bolt, Machine (4) (Item 16, Appendix C)
Nut, Self-locking (4) (Item 52, Appendix C)

Personnel Required
(2)

WARNING

Transmission weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to lifting. Failure to comply may result in injury to personnel or damage to equipment.

a. Installation.

(1) Install transmission stand bracket (1) on transmission (2) with four bolts (3) and self-locking nuts (4).

NOTE

Step (2) requires the aid of an assistant.

(2) Install transmission (2) on maintenance stand with four bolts (5) and nuts (6).

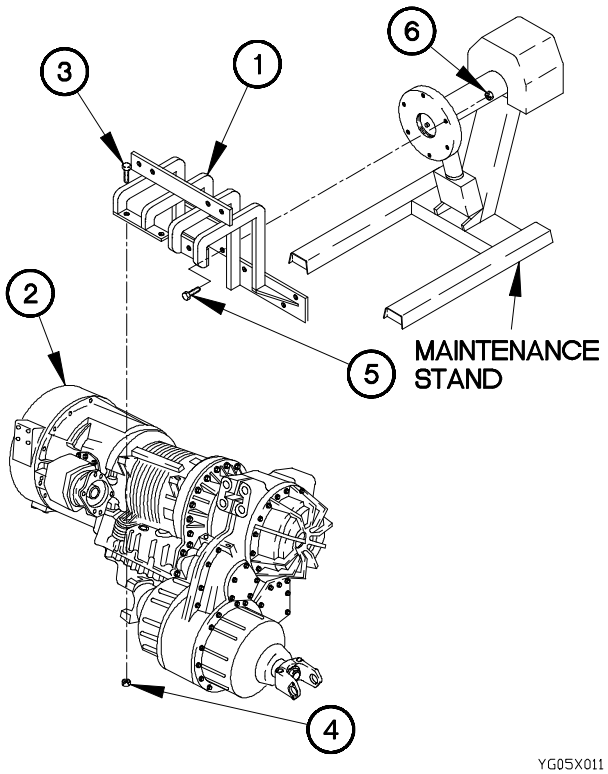
b. Removal.

NOTE

Step (1) requires the aid of an assistant.

(1) Remove four nuts (6), bolts (5), and transmission (2) from maintenance stand.

(2) Remove four self-locking nuts (4), bolts (3), and transmission stand bracket (1) from transmission (2). Discard self-locking nuts.



End of Task.

7-6. TRANSMISSION RESILIENT MOUNT AND BRACKET REPLACEMENT

This task covers:

a. LH Removal
b. LH Installation
c. RH Removal
d. RH Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
D% Transmission assembly removed (para 7-4).
Hydraulic reservoir removed, if equipped (LH side) (TM 9-2320-365-20-4).
Battery box removed (LH side) (TM 9-2320-365-20-3).
Fuel tank removed (RH side) (TM 9-2320-365-20-3).
Spare tire retainer removed (TM 9-2320-365-20-4).
Intake air cleaner removed (TM 9-2320-365-20-3).
RH or LH engine and transmission mount bracket removed (para 7-17).

Tools and Special Tools
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Tools and Special Tools (Cont)
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Bolt (4) (Item 11, Appendix F)
Nut, Self-locking (8) (Item 129, Appendix F)
Bolt (4) (Item 6, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of failing debris. Failure to comply may result in injury to personnel.

a. LH Removal.

CAUTION

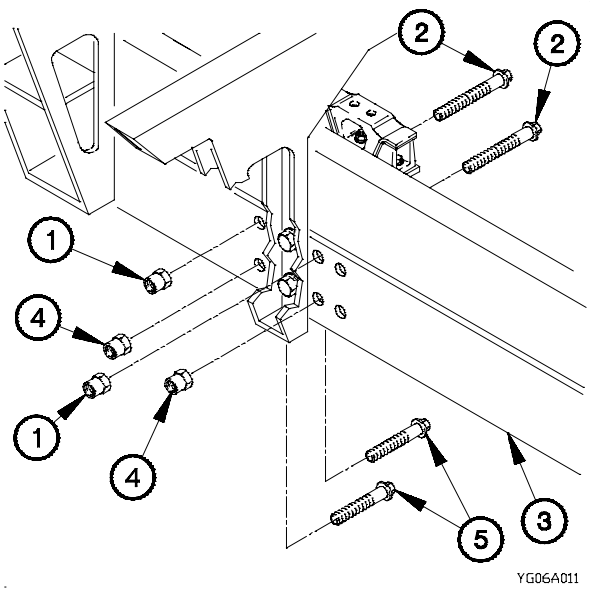
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

- Steps (1) through (8) require the aid of an assistant.
- Perform steps (1) and (2) on all vehicles not equipped with hydraulic reservoir.

(1) Remove two collars (1) and bolts (2) from frame rail (3). Discard collars and bolts.

(2) Remove two collars (4) and bolts (5) from frame rail (3). Discard collars and bolts.



NOTE

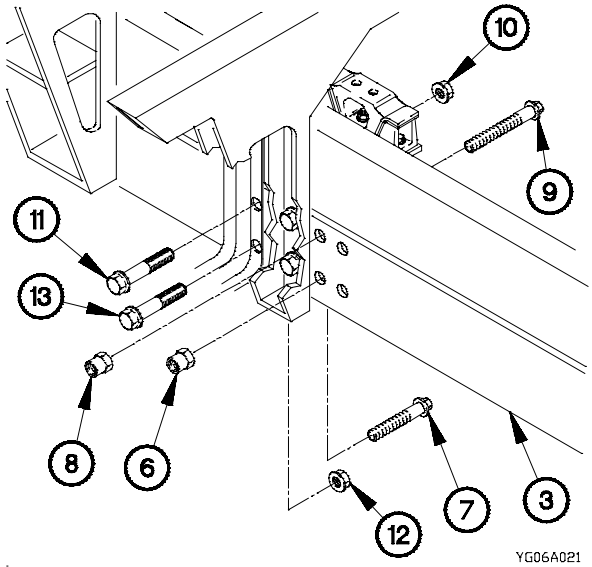
Perform steps (3) through (6) on all vehicles equipped with hydraulic reservoir.

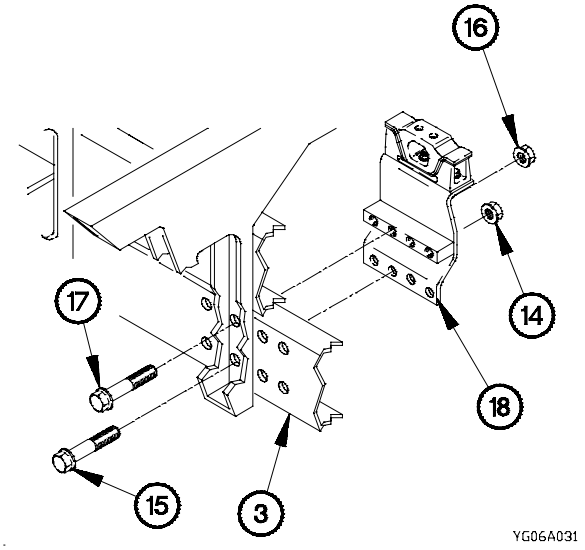
(3) Remove collar (6) and bolt (7) from frame rail (3). Discard collar and bolt.

(4) Remove collar (8) and bolt (9) from frame rail (3). Discard collar and bolt.

(5) Remove self-locking nut (10) and bolt (11) from frame rail (3). Discard self-locking nut.

(6) Remove self-locking nut (12) and bolt (13) from frame rail (3). Discard self-locking nut.



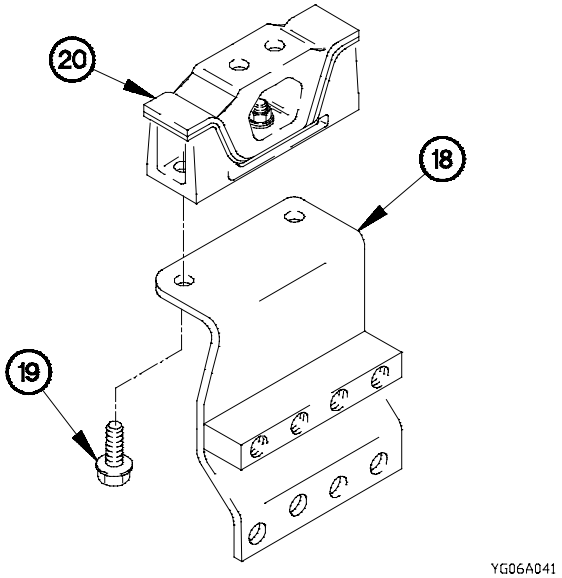


(7) Remove self-locking nut (14) and bolt (15) from frame rail (3). Discard self-locking nut.

(8) Remove self-locking nut (16), bolt (17), and bracket (18) from frame rail (3). Discard self-locking nut.

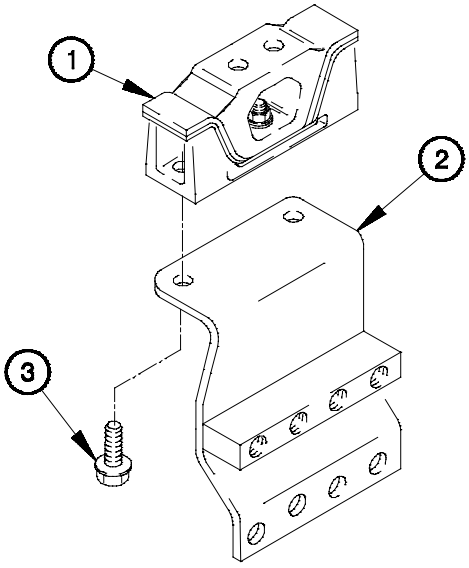
7-6. TRANSMISSION RESILIENT MOUNT AND BRACKET REPLACEMENT (CONT)

(9) Remove two bolts (19) and resilient mount (20) from bracket (18).



YG06A041

b. LH Installation.



YG06B011

(1) Position resilient mount (1) on bracket (2) with two bolts (3).

(2) Tighten two bolts (3) to 76-94 lb-ft (103-127 N·m).

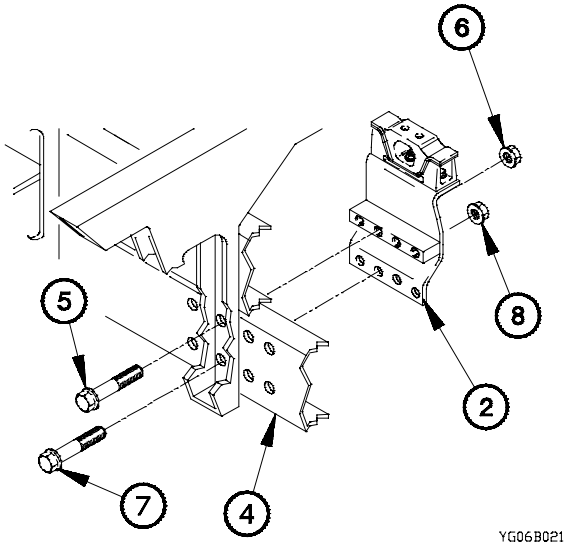
NOTE

Steps (3) through (8) require the aid of an assistant.

(3) Position bracket (2) on frame rail (4) with bolt (5) and self-locking nut (6).

(4) Position bolt (7) and self-locking nut (8) in frame rail (4).

(5) Tighten self-locking nuts (6 and 8) to 210-225 lb-ft (285-305 N·m).



YG06B021

NOTE

Perform steps (6) through (10) on all vehicles equipped with hydraulic reservoir.

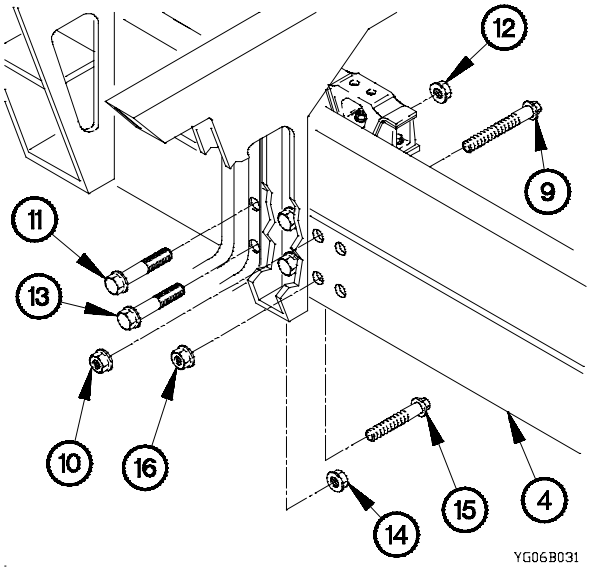
(6) Position bolt (9) and self-locking nut (10) in frame rail (4).

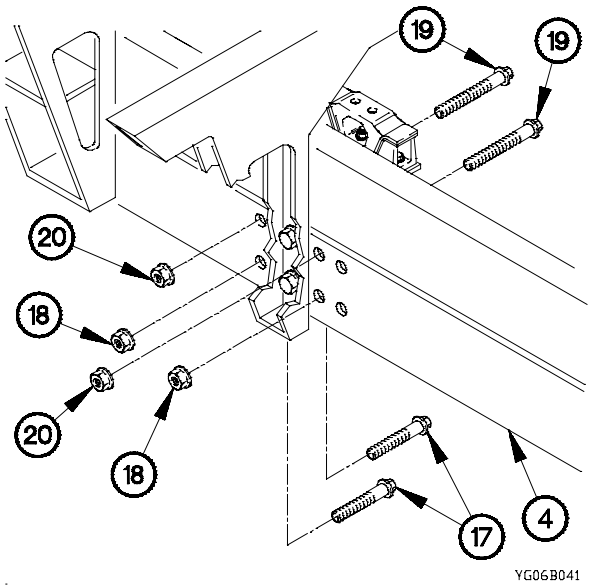
(7) Position bolt (11) and self-locking nut (12) in frame rail (4).

(8) Position bolt (13) and self-locking nut (14) in frame rail (4).

(9) Position bolt (15) and self-locking nut (16) in frame rail (4).

(10) Tighten self-locking nuts (10, 12, 14, 16) to 210-225 lb-ft (285-305 N·m).





NOTE

Perform steps (11) through (13) on all vehicles not equipped with hydraulic reservoir.

(11) Position two bolts (17) in frame rail (4) with two self-locking nuts (18).

(12) Position two bolts (19) in frame rail (4) with two self-locking nuts (20).

(13) Tighten two self-locking nuts (18 and 20) to 210-225 lb-ft (285-305 N·m).

7-6. TRANSMISSION RESILIENT MOUNT AND BRACKET REPLACEMENT (CONT)

c. RH Removal.

CAUTION

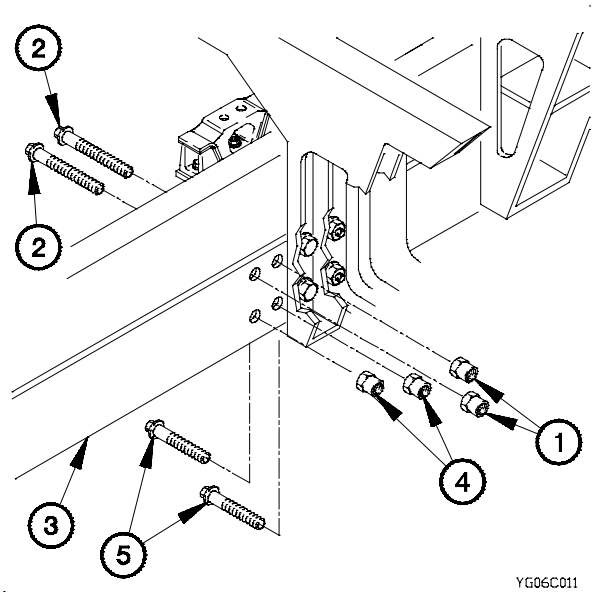
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collars to bolts.

NOTE

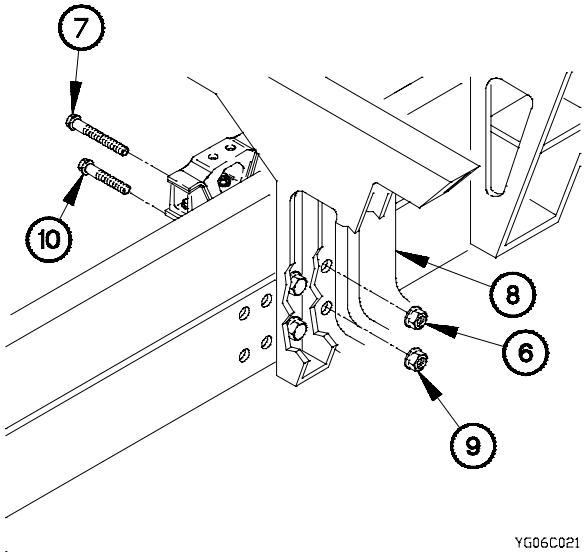
Steps (1) through (4) require the aid of an assistant.

(1) Remove two collars (1) and bolts (2) from frame rail (3). Discard collars and bolts.

(2) Remove two collars (4) and bolts (5) from frame rail (3). Discard collars and bolts.



YG06C011



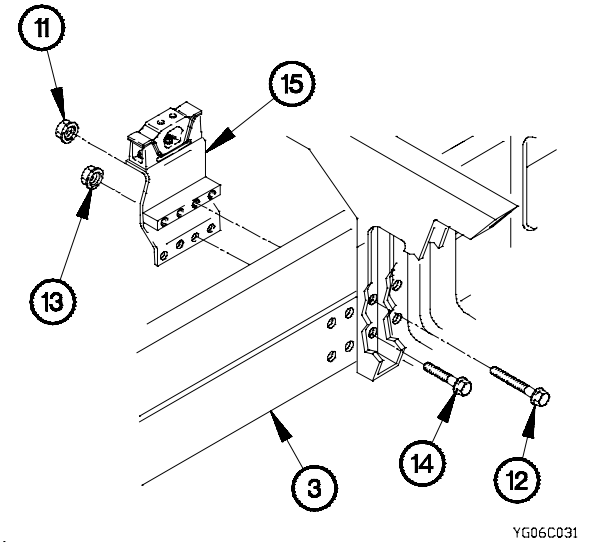
YG06C021

(3) Remove self-locking nut (6) and bolt (7) from fuel tank bracket (8). Discard self-locking nut.

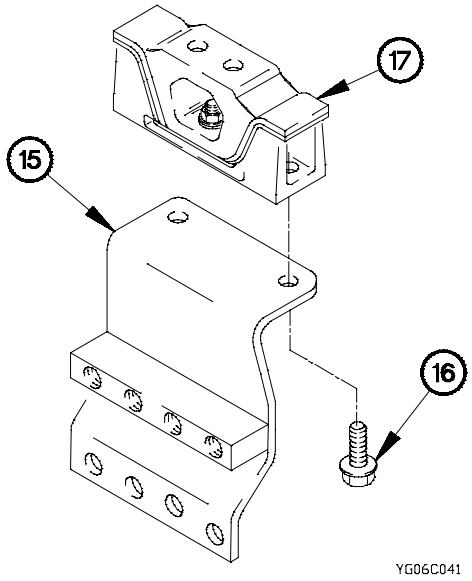
(4) Remove self-locking nut (9) and bolt (10) from fuel tank bracket (8). Discard self-locking nut.

(5) Remove self-locking (11) and bolt (12) from frame rail (3). Discard self-locking nut.

(6) Remove self-locking nut (13), bolt (14), and bracket (15) from frame rail (3).

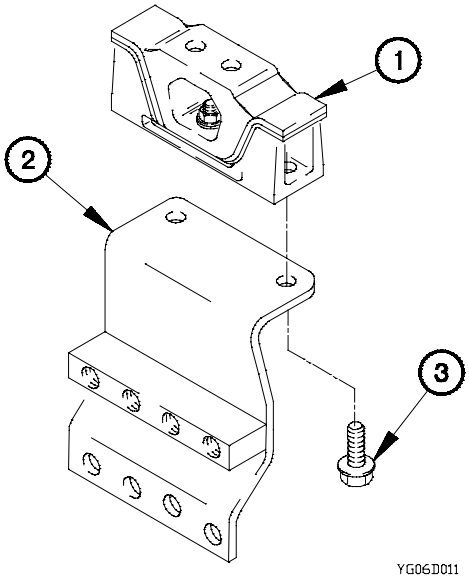


YG06C031



(7) Remove two bolts (16) and resilient mount (17) from bracket (15).

d. RH Installation.

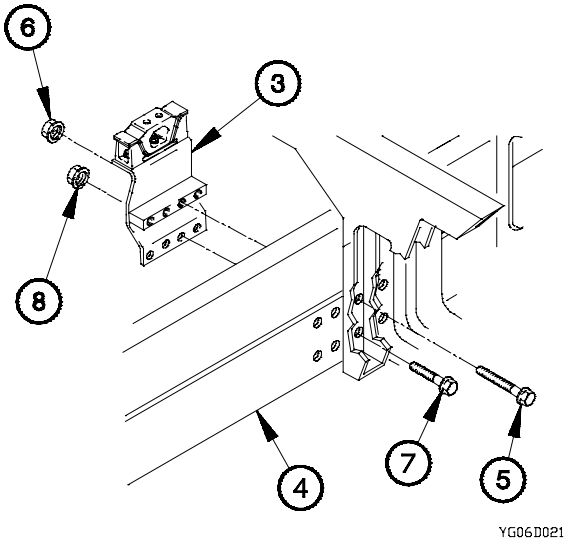


(1) Position resilient mount (1) on bracket (2) with two bolts (3).

(2) Tighten two bolts (3) to 76-94 lb-ft (103-127 N·m).

NOTE

Steps (3) through (11) require the aid of an assistant.



(3) Position bracket (3) on frame rail (4) with bolt (5) and self-locking nut (6).

(4) Position bolt (7) in frame rail (4) with self-locking nut (8).

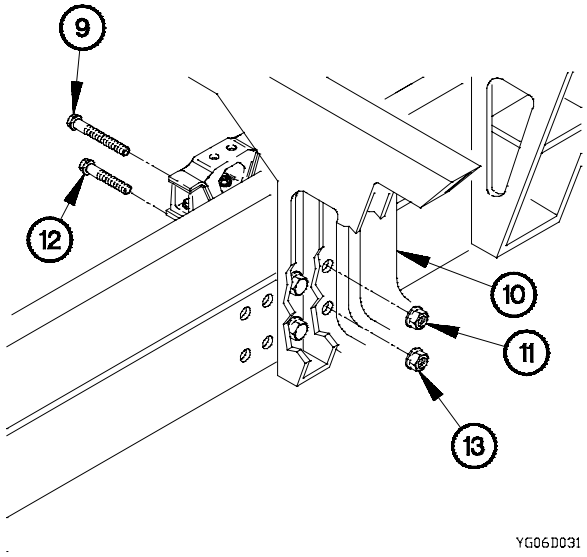
(5) Tighten self-locking nuts (6 and 8) to 210-225 lb-ft (285-305 N·m).

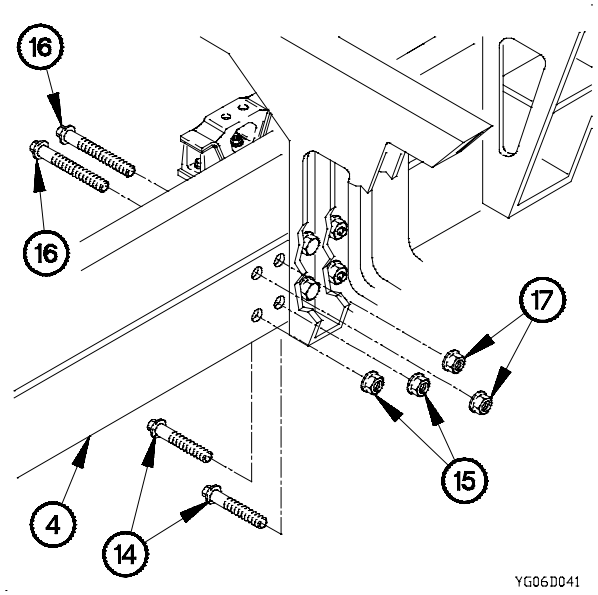
7-6. TRANSMISSION RESILIENT MOUNT AND BRACKET REPLACEMENT (CONT)

(6) Position bolt (9) in fuel tank bracket (10) with self-locking nut (11).

(7) Position bolt (12) in fuel tank bracket (10) with self-locking nut (13).

(8) Tighten self-locking nuts (11 and 13) to 210-225 lb-ft (285-305 N·m).





(9) Position two bolts (14) in frame rail (4) with self-locking nuts (15).

(10) Position two bolts (16) in frame rail (4) with two self-locking nuts (17).

(11) Tighten two self-locking nuts (15 and 17) to 210-225 lb-ft (285-305 N·m).

e. Follow-On Maintenance.

(1) Install RH or LH engine and transmission mount bracket (para 7-17).

(2) Install intake air cleaner (TM 9-2320-365-20-3).

(3) Install spare tire retainer (TM 9-2320-365-20-4).

(4) Install fuel tank (RH side) (TM 9-2320-365-20-3).

(5) Install battery box (TM 9-2320-365-20-3).

(6) Install hydraulic reservoir if equipped (LH side) (TM 9-2320-365-20-4).

(7) Install transmission assembly (para 7-4).

End of Task.

7-7. STATIONARY CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

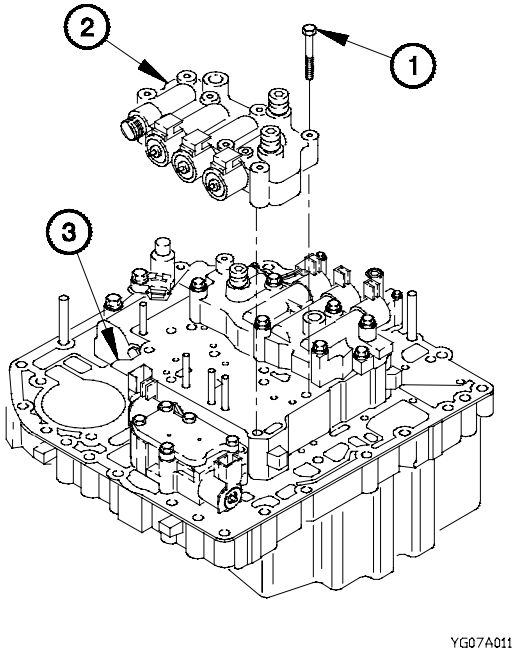
Equipment Conditions
Transmission internal wiring harness removed (para 7-13)

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Multimeter, Digital (Item 34, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Filter Element (3) (Item 25, Appendix F)
Seal, Non-Metallic (2) (Item 259, Appendix F)
Packing, Preformed (3) (Item 174, Appendix F)
Packing, Preformed (3) (Item 176, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

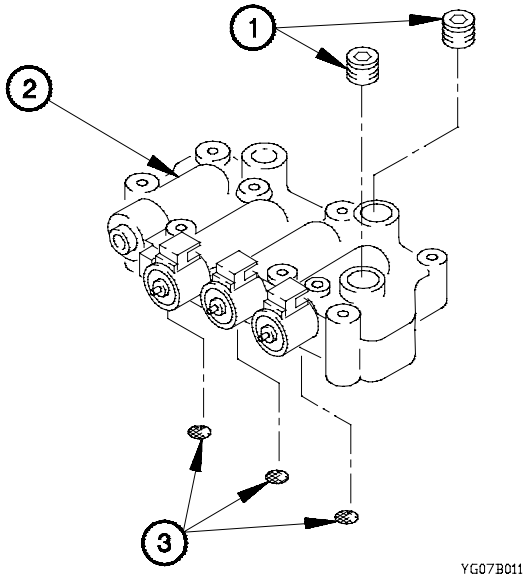
a. Removal.

Remove eight screws (1) and clutch valve body (2) from main valve body (3).



YG07A011

b. Disassembly.



YG07B011

NOTE

Stationary clutch solenoid contains parts which cannot be interchanged. Tag all parts prior to removal.

(1) Remove two face seals (1) from clutch valve body (2). Discard face seals.

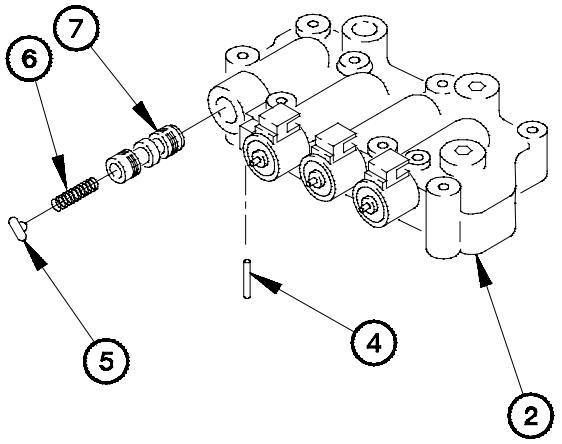
(2) Remove three filter screens (3) from clutch valve body (2). Discard filter screens.

7-7. STATIONARY CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR (CONT)

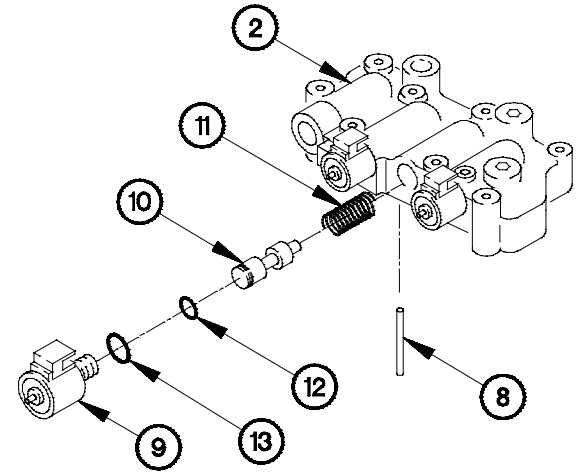
WARNING

Use care when removing valve body parts retained by retaining pins. Valve body parts are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(3) Remove retaining pin (4), stop (5), spring (6), and valve (7) from clutch valve body (2).



YG07B021



YG07B031

CAUTION

Retaining pins must be removed from bottom of solenoid body. Failure to comply may result in damage to equipment.

(4) Remove three retaining pins (8), solenoids (9), regulating valves (10), and springs (11) from clutch valve body (2).

(5) Remove three preformed packings (12 and 13) from solenoids (9). Discard preform packings.

c. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100° F (38° C) and for Type II is 130° F (50° C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**

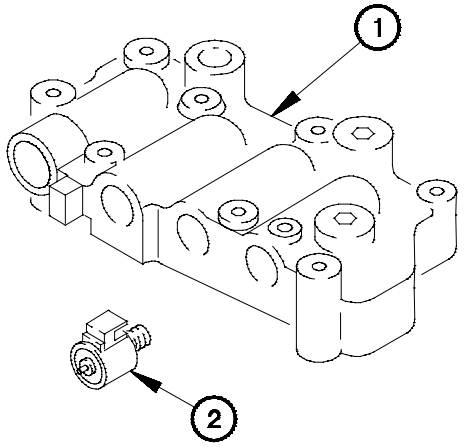
(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection, size measurements requirements, or resistance checks.

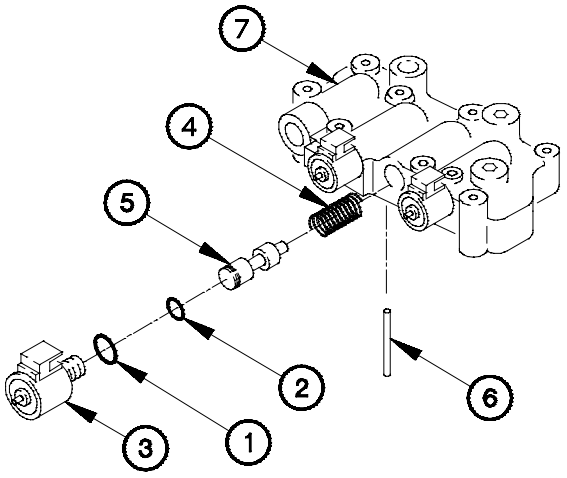
(2) Inspect clutch valve body (1) for cracks, burrs, grooves, distortion, scoring, excessive wear, or varnish buildup.

(3) Measure resistance of three solenoids (2), resistance should be between 2.0 - 5.0 ohms.



YG07C011

d. Assembly.



YG07D011

WARNING

Use care when installing valve body parts retained by retaining pins. Valve body parts are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

CAUTION

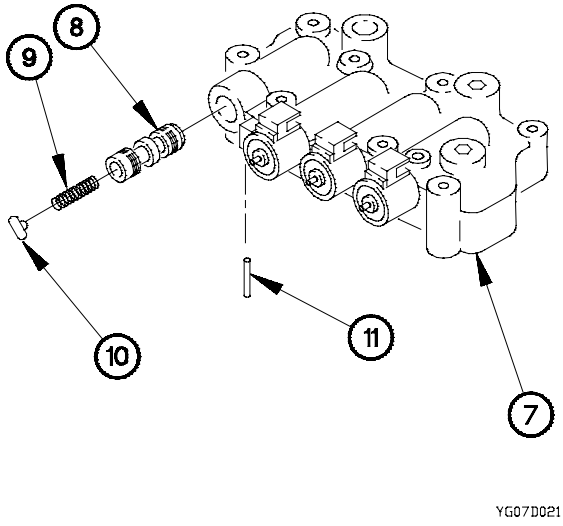
Retaining pins must be installed from bottom of solenoid body. Failure to comply may result in damage to equipment.

(1) Install three preformed packings (1 and 2) on solenoids (3).

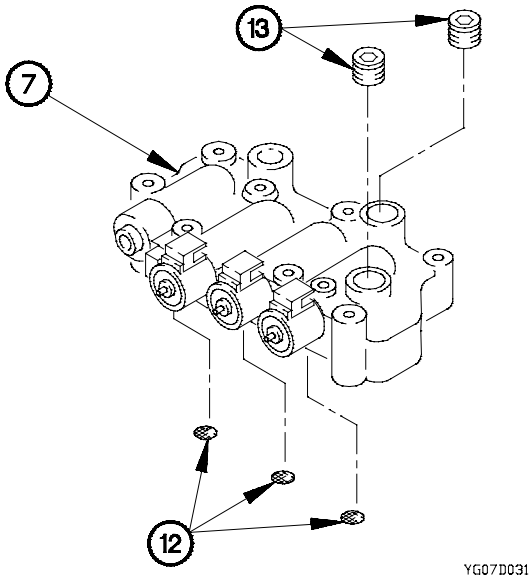
(2) Install three springs (4), regulating valves (5), solenoids (3), and retaining pins (6) in clutch valve body (7).

7-7. STATIONARY CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR (CONT)

(3) Install valve (8), spring (9), stop (10), and retaining pin (11) in clutch valve body (7).



YG07D021



YG07D031

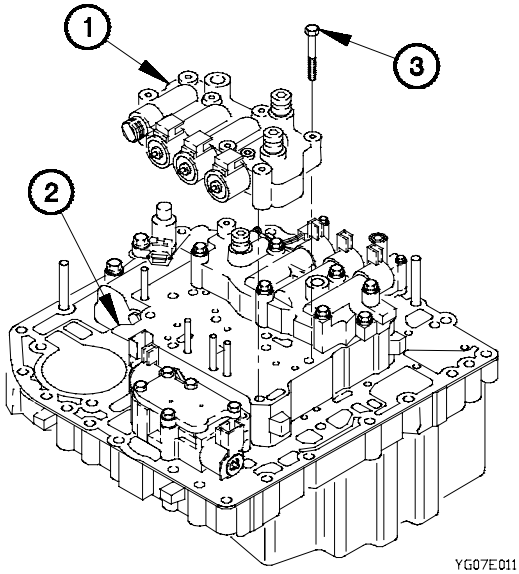
(4) Install three filter screens (12) in clutch valve body (7).

(5) Install two face seals (13) in clutch valve body (7).

e. Installation.

(1) Position clutch valve body (1) on main valve body (2) with eight screws (3).

(2) Tighten eight screws (3) to 108-120 lb-in. (12-14 N·m).



YG07E011

f. Follow-On Maintenance.

Install transmission internal wiring harness (para 7-13).

End of Task.

7-8. ROTATING CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission internal wiring harness removed (para 7-13).

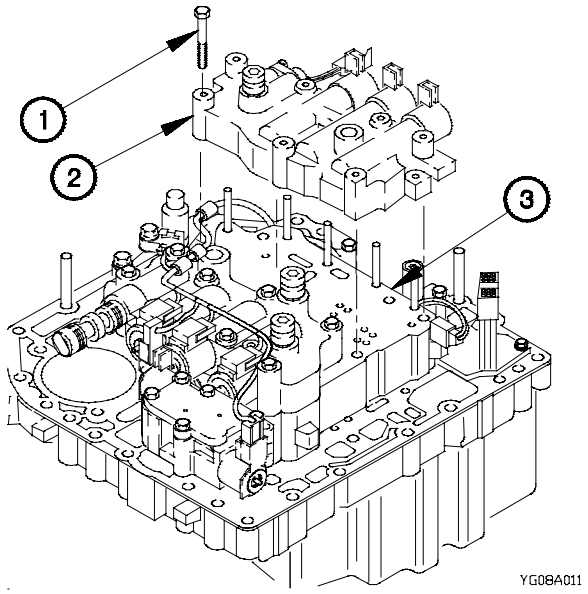
Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Multimeter, Digital (Item 34, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Seal, Non-Metallic (Item 259, Appendix F)
Filter Element (3) (Item 25, Appendix F)
Packing, Preformed (Item 173, Appendix F)
Packing, Preformed (2) (Item 174, Appendix F)
Packing, Preformed (2) (Item 176, Appendix F)
Packing, Preformed (Item 175, Appendix F)
Packing, Preformed (Item 168, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

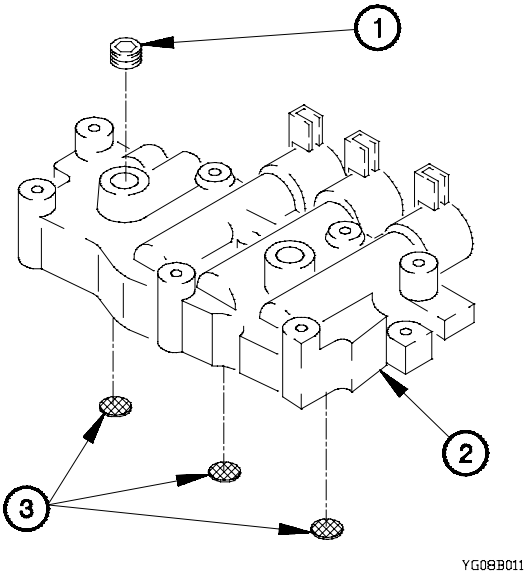
a. Removal.

(1) Remove three bolts (1) from rotating clutch valve body (2).

(2) Remove rotating clutch valve body (2) from main valve body (3).



b. Disassembly.



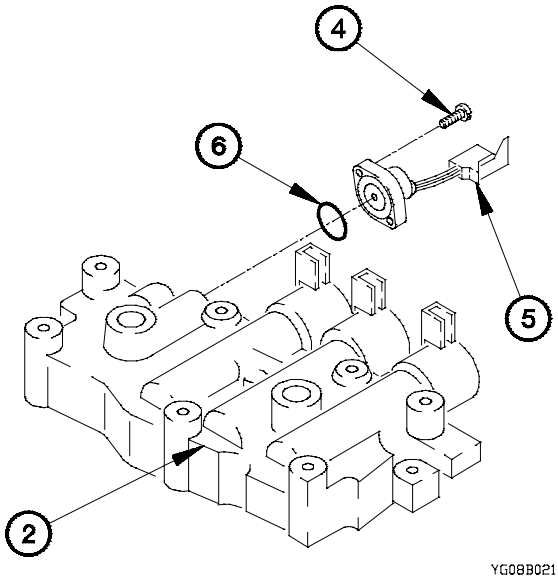
NOTE

Rotating clutch solenoid assembly contains parts which cannot be interchanged. Tag all parts prior to removal.

(1) Remove seal (1) from rotating clutch valve body (2). Discard seal.

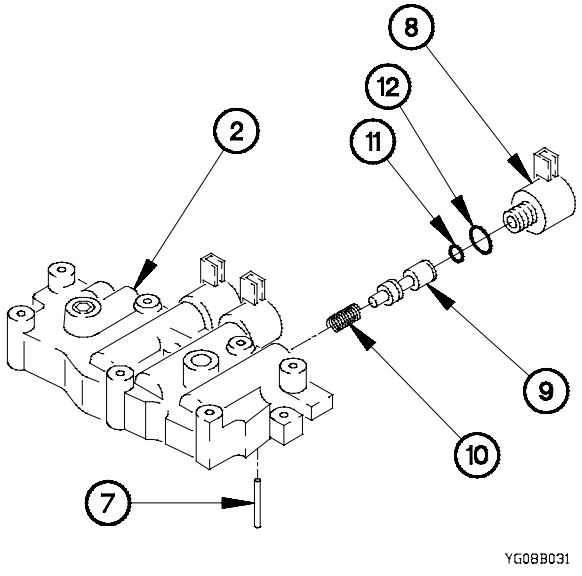
(2) Remove three solenoid filter screens (3) from rotating clutch valve body (2). Discard solenoid filter screens.

7-8. ROTATING CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR (CONT)



(3) Remove two screws (4) and pressure switch (5) from rotating clutch valve body (2).

(4) Remove preformed packing (6) from pressure switch (5). Discard preformed packing.



WARNING

Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

CAUTION

Retaining pins are removed from the bottom of solenoid body. Failure to comply may result in damage to equipment.

(5) Remove retaining pin (7), solenoid (8), regulator valve (9), and spring (10) from rotating clutch valve body (2).

(6) Remove preformed packings (11 and 12) from solenoid (8). Discard preformed packings.

(7) Perform steps (5) and (6) on remaining two solenoids (8).

c. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If Dry Cleaning Solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection, size measurements requirements, or resistance checks.

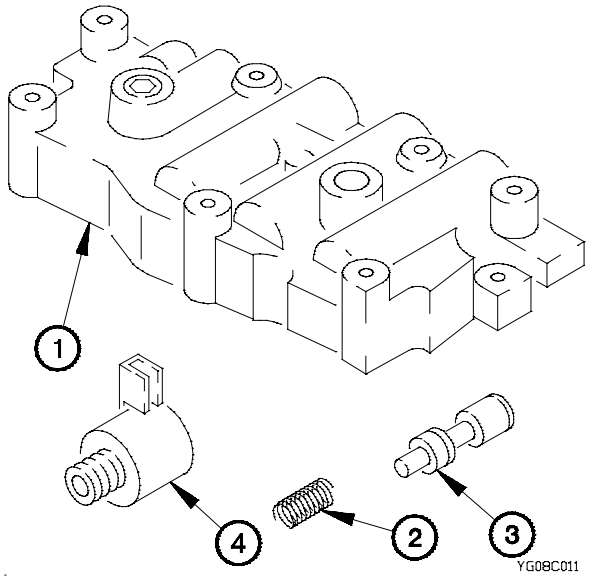
(2) Inspect rotating clutch valve body (1) for cracks, burrs, grooves, distortion, scoring, excessive wear, or varnish buildup.

(3) Inspect spring (2) for cracks, burrs, grooves, distortion, scoring, excessive wear, or varnish buildup.

(4) Inspect regulator valve (3) for cracks, burrs, grooves, distortion, scoring, excessive wear, or varnish buildup.

(5) Inspect solenoid (4) for cracks, burrs, grooves, distortion, scoring, excessive wear, or varnish buildup.

(6) Perform resistance check on solenoid (4). Minimum resistance should be between 2.0 - 5.0 ohms on a 10 ohm scale.



7-8. ROTATING CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR (CONT)

d. Assembly.

(1) Install preformed packings (1 and 2) on solenoid (3).

WARNING

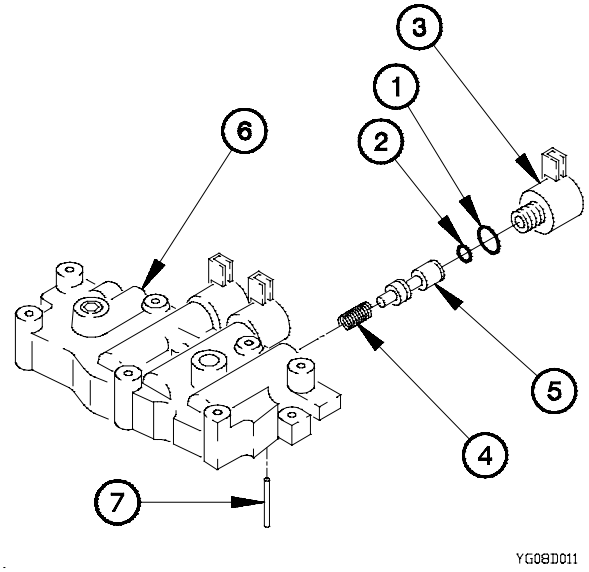
Use care when installing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

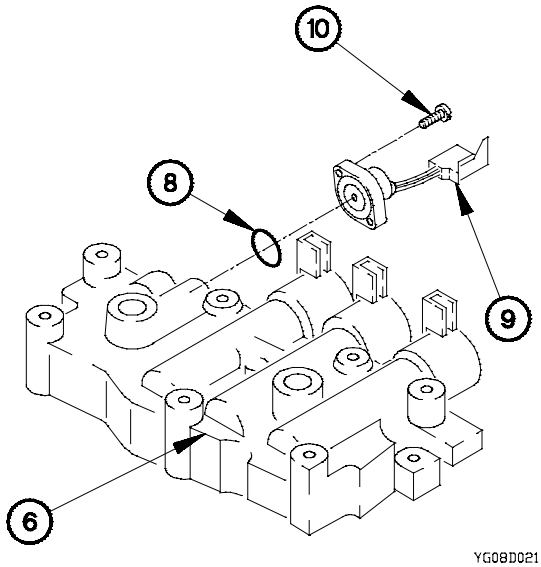
CAUTION

Retaining pins are installed from bottom of solenoid body. Failure to comply may result in damage to equipment.

(2) Install spring (4), regulator valve (5), and solenoid (3) in rotating clutch valve body (6) with retaining pin (7).

(3) Perform steps (1) and (2) on remaining two solenoids (3).





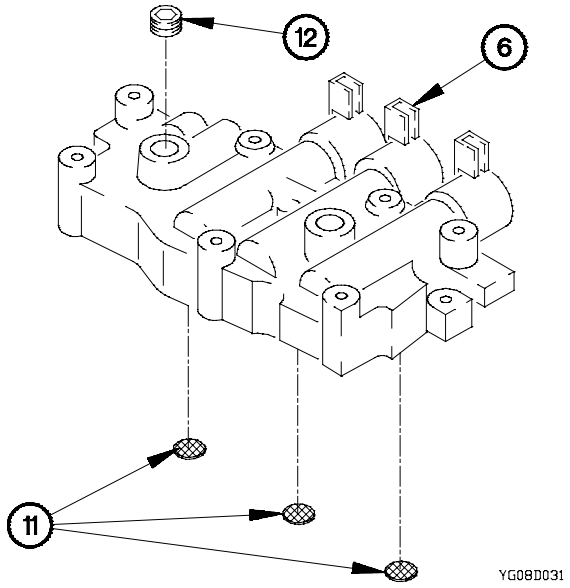
(4) Install preformed packing (8) on pressure switch (9).

(5) Position pressure switch (9) on rotating clutch valve body (6) with two screws (10).

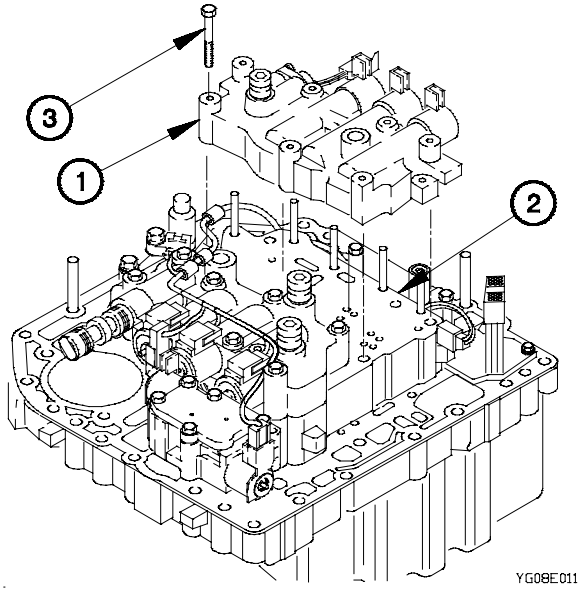
(6) Tighten two screws (10) to 48-72 lb-in. (5-8 N·m).

(7) Install three filter screens (11) in rotating clutch valve body (6).

(8) Install face seal (12) in rotating clutch valve body (6).



e. Installation.



(1) Position rotating clutch valve body (1) on main valve body (2) with three bolts (3).

(2) Tighten three bolts (3) to 108-120 lb-in. (12-14 N·m).

f. Follow-On Maintenance.

Install transmission internal wiring harness (para 7-13).

End of Task.

7-9. C6 CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission internal wiring harness removed (para 7-13).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Multimeter, Digital (Item 34, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

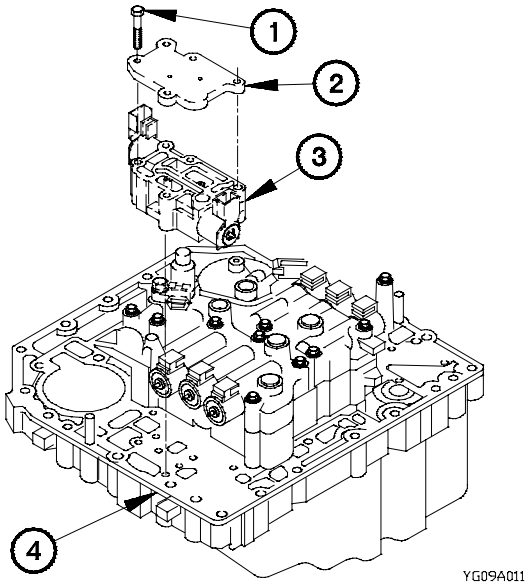
Tools and Special Tools (Cont)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Filter Element (2) (Item 25, Appendix F)
Packing, Preformed (Item 174, Appendix F)
Packing, Preformed (Item 176, Appendix F)
Packing, Preformed (Item 175, Appendix F)
Packing, Preformed (Item 177, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

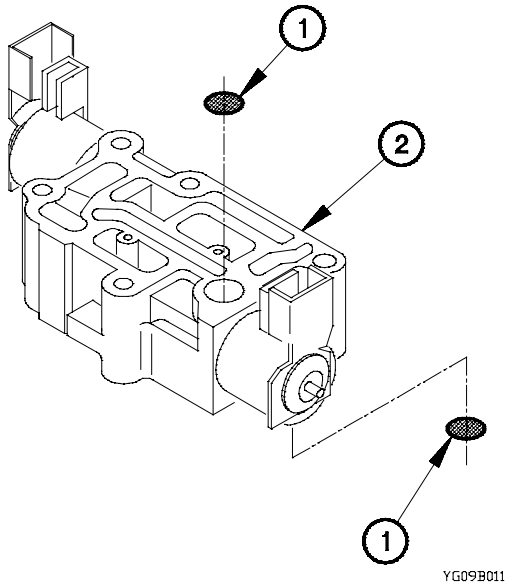
a. Removal.

(1) Remove five screws (1) and cover plate (2) from C6 clutch valve body (3).

(2) Remove C6 clutch valve body (3) from channel plate assembly (4).



b. Disassembly.



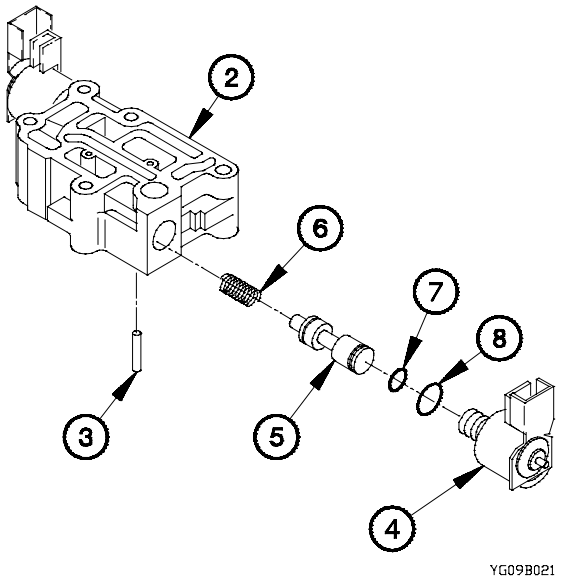
(1) Remove two filter elements (1) from C6 clutch valve body (2). Discard filter elements.

WARNING

Use care when removing valve body parts retained by retaining pins. Valve body parts are under tension and can act as projectiles when released causing severe eye injury. Failure to comply may result in injury to personnel.

CAUTION

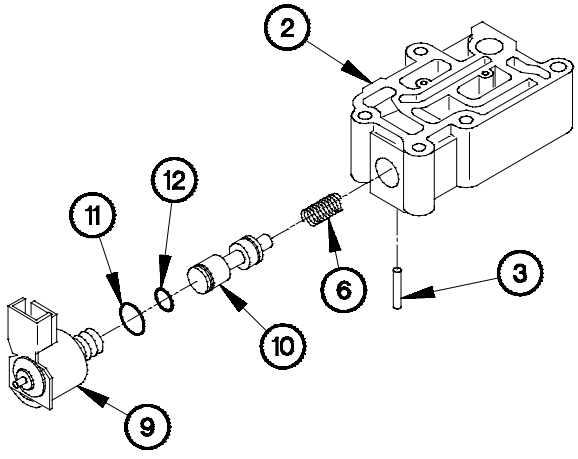
- Retaining pins must be removed from bottom of solenoid body. Failure to comply may result in damage to equipment.
- C6 clutch solenoid assemblies contain parts which cannot be interchanged. Tag parts during disassembly. Failure to comply may result in damage to equipment.



YG09B021

(2) Remove retaining pin (3), regulator valve solenoid (4), regulator valve (5), and spring (6) from C6 clutch valve body (2).

(3) Remove preformed packings (7 and 8) from regulator valve solenoid (4). Discard preformed packings.



YG09B031

(4) Remove retaining pin (3), C6 interlock valve solenoid (9), C6 interlock valve (10), and spring (6) from C6 clutch valve body (2).

(5) Remove preformed packings (11 and 12) from C6 interlock valve solenoid (9). Discard preformed packings.

7-9. C6 CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR (CONT)

c. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

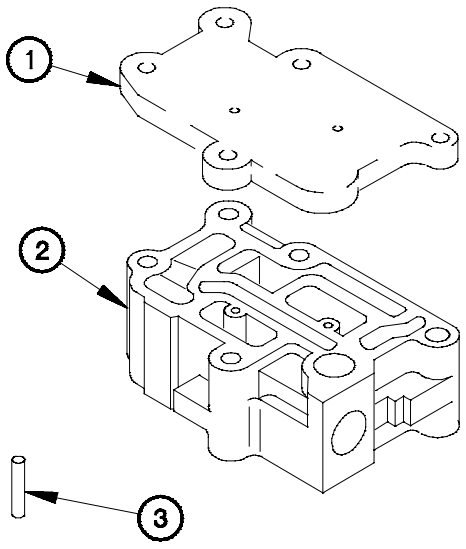
NOTE

Replace any part that fails visual inspection, size measurements requirements, or resistance checks.

(2) Inspect cover (1) for cracks, burrs, grooves, distortion, scoring, excessive wear or varnish buildup.

(3) Inspect C6 clutch valve body (2) for cracks, burrs, grooves, distortion, scoring, excessive wear or varnish buildup.

(4) Inspect retaining pin (3) for cracks, burrs, grooves, distortion, scoring, excessive wear or varnish buildup.



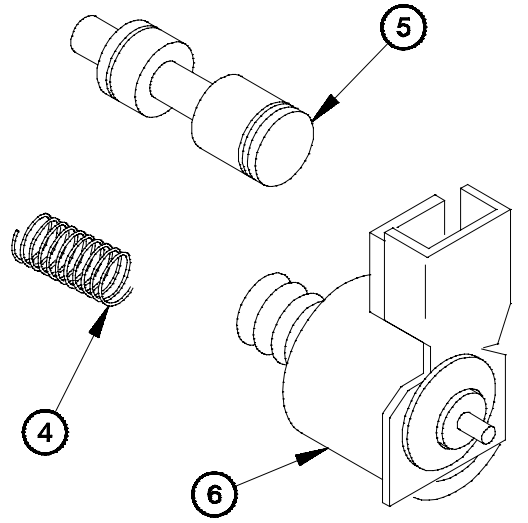
YG09C011

(5) Inspect spring (4) for cracks, burrs, grooves, distortion, scoring, excessive wear or varnish buildup.

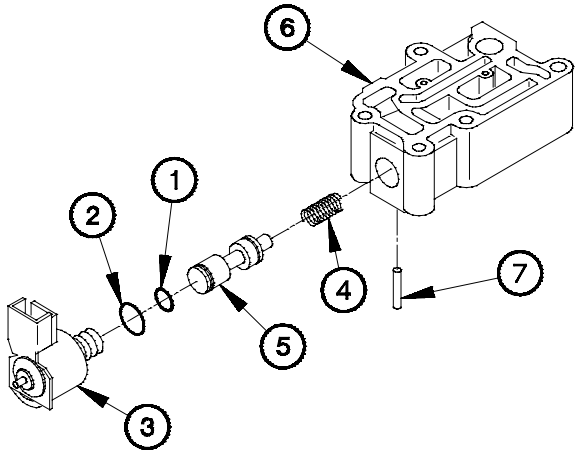
(6) Inspect regulator valve (5) for cracks, burrs, grooves, distortion, scoring, excessive wear or varnish buildup.

(7) Inspect two solenoids (6) for cracks, burrs, grooves, distortion, scoring, excessive wear or varnish buildup.

(8) Measure resistance of two solenoids (6), resistance should be between 2.0 - 5.0 ohms.



d. Assembly



WARNING

Use care when installing valve body parts retained by retaining pins. Valve body parts are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

CAUTION

Retaining pins must be installed from the bottom. Failure to comply may result in damage to equipment.

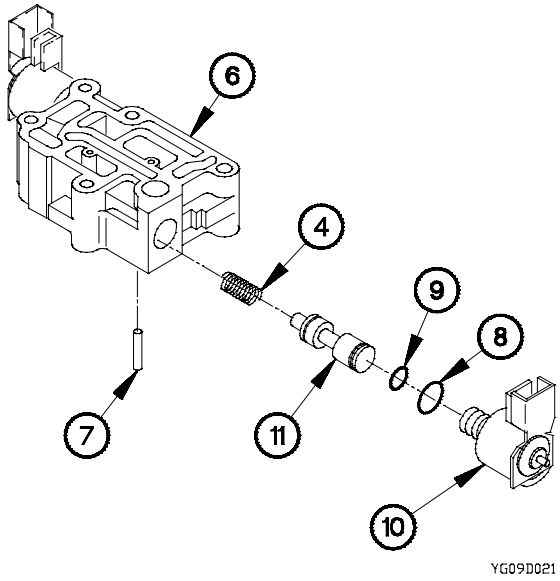
(1) Install preformed packings (1 and 2) on C6 interlock valve solenoid (3).

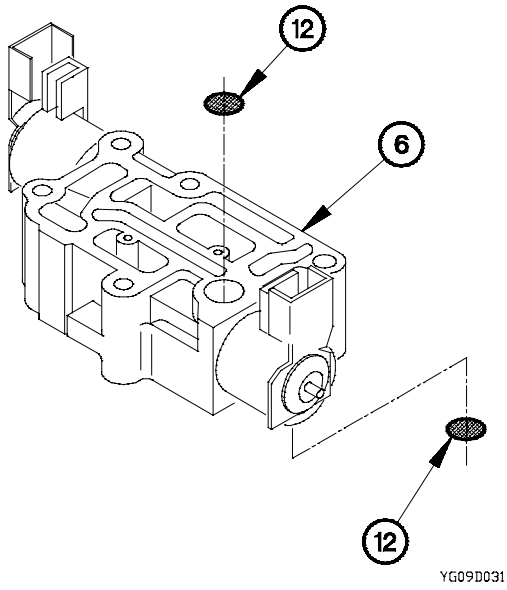
(2) Install spring (4), C6 interlock valve (5) and C6 interlock valve solenoid (3) in C6 clutch valve body (6) with retaining pin (7).

7-9. C6 CLUTCH SOLENOID ASSEMBLY REPLACEMENT/REPAIR (CONT)

(3) Install preformed packings (8 and 9) on regulator valve solenoid (10).

(4) Install spring (4), regulator valve (11), and regulator valve solenoid (10) in C6 clutch valve body (6) with retaining pin (7).





(5) Install two filter elements (12) in C6 clutch valve body (6).

e. Installation.

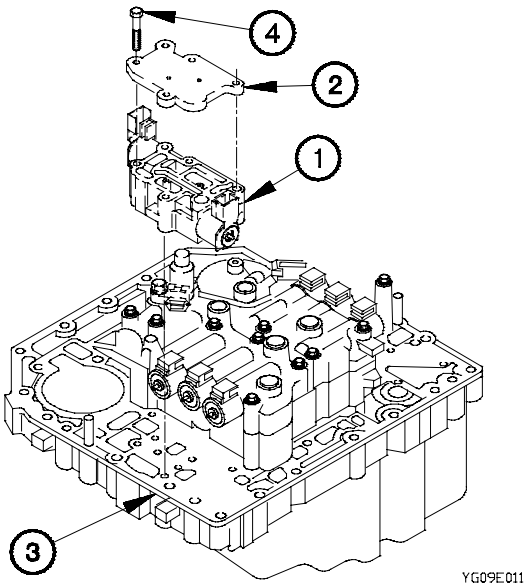
(1) Position C6 clutch valve body (1) and cover (2) on channel plate (3) with five screws (4).

(2) Tighten five screws (4) to 108-120 lb-in. (12-14 N·m).

f. Follow-On Maintenance.

Install transmission internal wiring harness (para 7-13).

End of Task.



7-10. CONTROL VALVE MODULE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Front drive shaft removed (TM 9-2320-365-20-3).
Transmission oil filters removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Tools/Special Tools (Cont)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Screw, Cap, Hex Head (3) (M10x1.5x55) (Item 77, Appendix C)
Nut, Self-Locking (2) (Item 146, Appendix F)
Seal (Item 260, Appendix F)
Gasket (Item 36, Appendix F)
Lubricating Oil, Gear (Item 49, Appendix C)

Personnel Required
(2)

WARNING

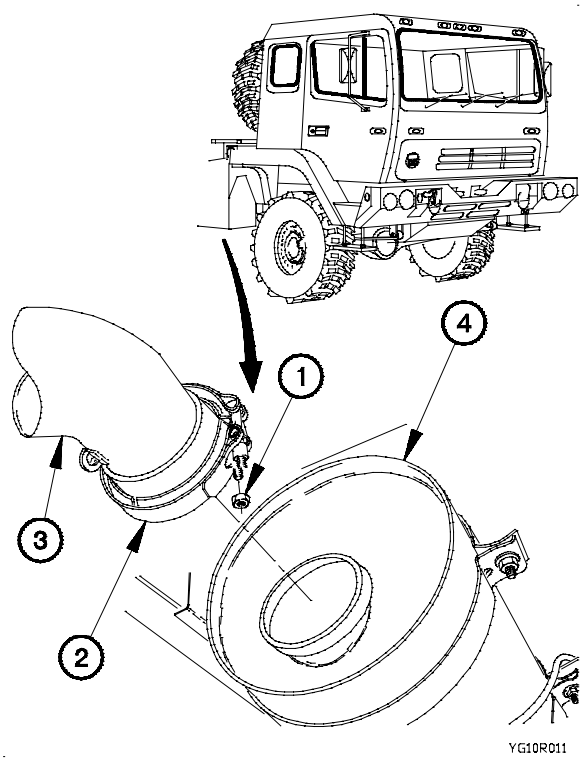
- **Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**
- **Ensure exhaust system is cool before performing maintenance. Failure to comply may result in injury to personnel.**

a. Removal.

(1) Remove self-locking nut (1) from clamp (2). Discard self-locking nut.

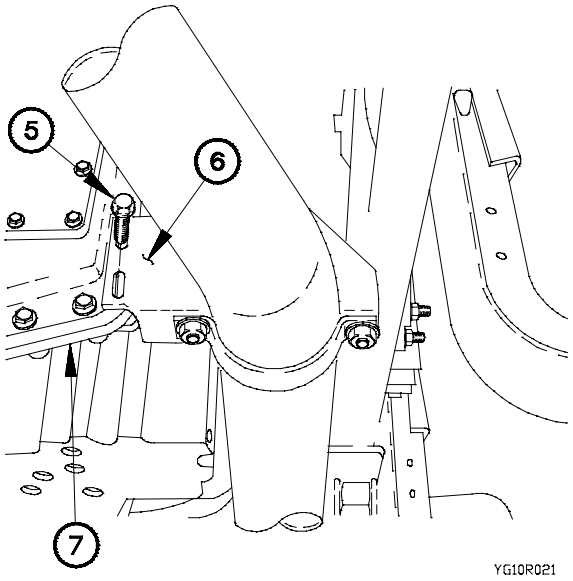
(2) Disconnect lower exhaust pipe (3) from muffler (4).

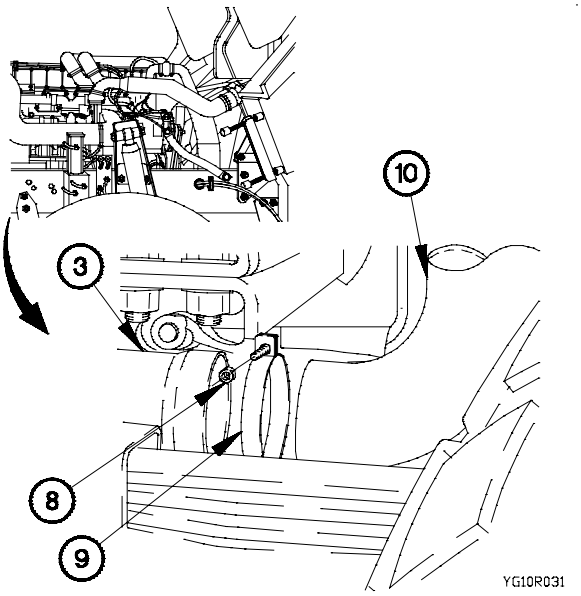
(3) Remove clamp (2) from lower exhaust pipe (3).



7-10. CONTROL VALVE MODULE REPLACEMENT (CONT)

(4) Remove two bolts (5) and exhaust bracket (6) from transmission (7).





(5) Remove self-locking nut (8) from clamp (9). Discard self-locking nut.

(6) Remove lower exhaust pipe (3) from upper exhaust pipe (10).

(7) Remove clamp (9) from lower exhaust pipe (3).

NOTE

Perform step (8) on transmissions prior to serial number 6510032369.

(8) Remove bolt (11), clamp (12) and wiring harness clamp (13) from transmission (7).

NOTE

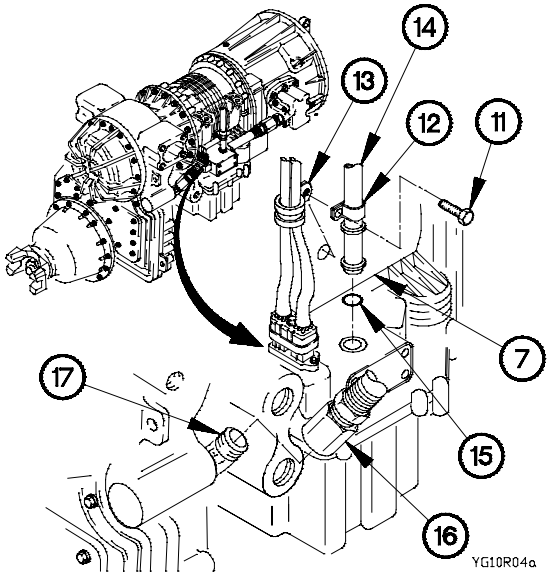
Perform step (9) on transmissions serial number 6510032369 and higher.

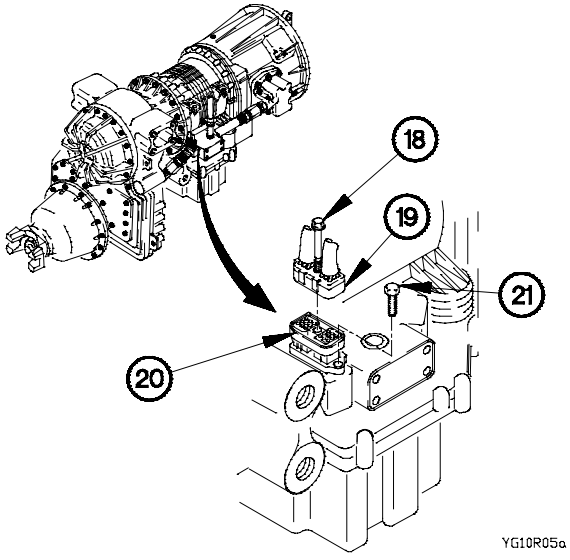
(9) Remove bolt (11) from clamp (12).

(10) Remove oil dipstick tube (14) from transmission (7).

(11) Remove seal (15) from oil dipstick tube (14). Discard seal.

(12) Disconnect scavenge pump hydraulic return hose (16) from 45-degree fitting (17).





CAUTION

Due to position of main housing module connector, extreme care must be taken when removing main transmission external connector. Failure to comply may result in damage to equipment.

NOTE

Perform steps (13) through (15) on transmissions prior to serial number 6510032369.

(13) Loosen connector bolt (18) on connector (19).

(14) Remove connector (19) from main housing module (20).

(15) Remove two screws (21) from main housing module (20).

7-10. CONTROL VALVE MODULE REPLACEMENT (CONT)

NOTE

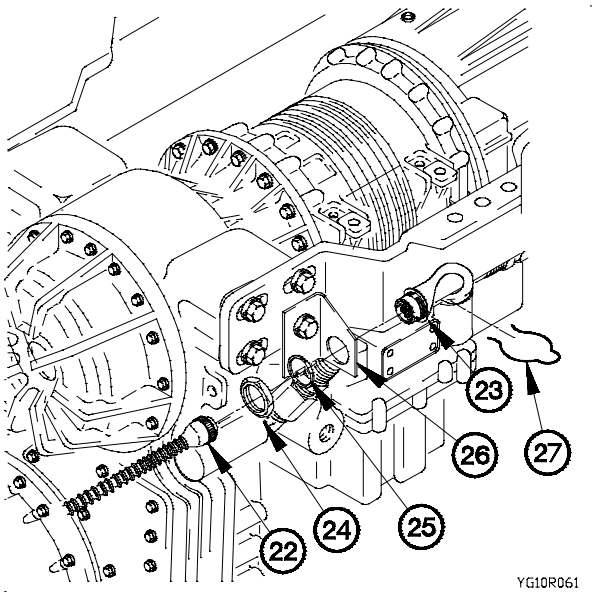
Perform steps (16) through (19) on transmissions serial number 6510032369 and higher.

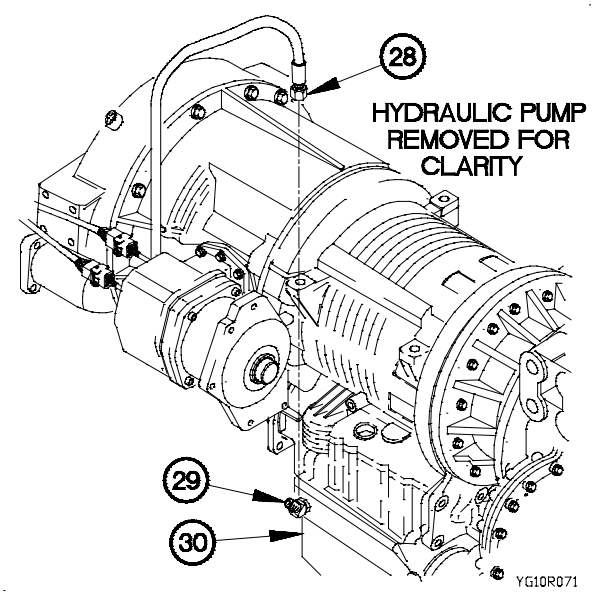
(16) Disconnect transmission external wiring harness connector (22) from transmission adapter harness (23).

(17) Remove nut (24), washer (25), and transmission adapter harness (23) from bracket (26).

(18) Install washer (25) and nut (24) on transmission adapter harness (23).

(19) Remove clip (27) from transmission adapter harness (23).



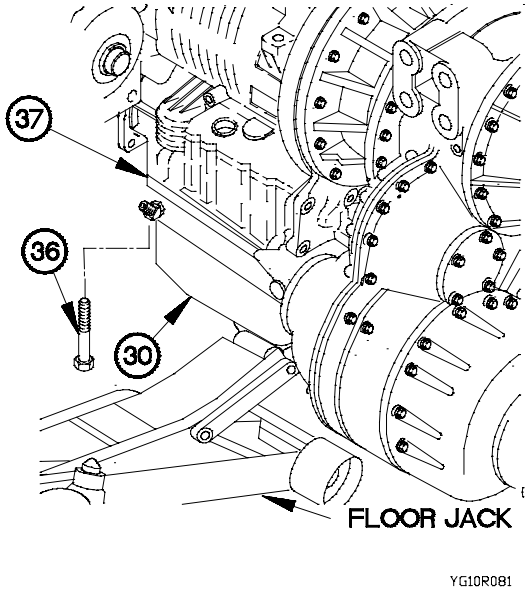


(20) Disconnect oil hose (28) from 45-degree fitting (29) on control valve module (30).

WARNING

Control valve module weighs approximately 65 lbs (30 kgs). Position a floor jack under control module prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(21) Remove 20 screws (36) from control valve module (30) and main housing module (37).



(22) Position three jacking bolts in control valve module (30).

CAUTION

Tighten three jacking bolts evenly to break control valve module free from vehicle. Failure to comply may result in damage to equipment.

(23) Tighten three jacking bolts on control valve module (30).

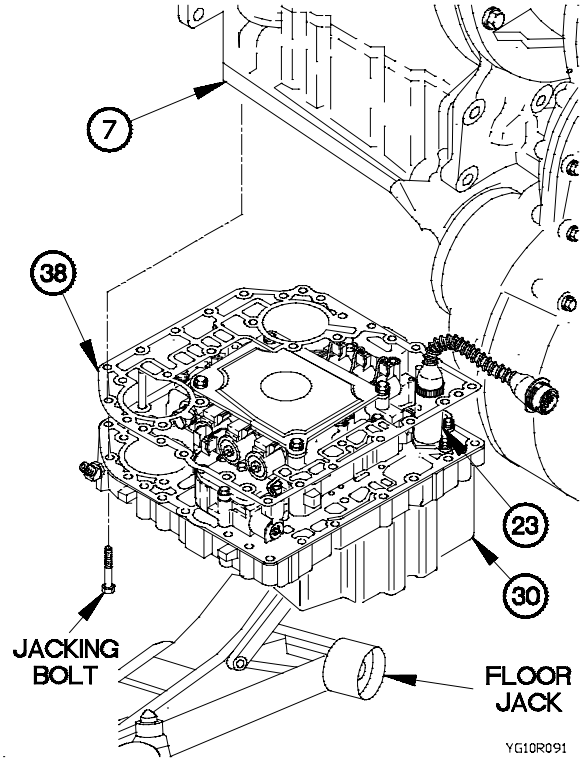
(24) Remove control valve module (30) and gasket (38) from vehicle. Discard gasket.

NOTE

Perform step (25) on transmissions serial number 6510032369 and higher.

(25) Remove control valve module (30), gasket (38) and transmission adapter harness (23) from transmission (7). Discard gasket.

(26) Remove three jacking bolts from control valve module (30).



7-10. CONTROL VALVE MODULE REPLACEMENT (CONT)

b. Installation.

(1) Install gasket (1) on control valve module (2).

WARNING

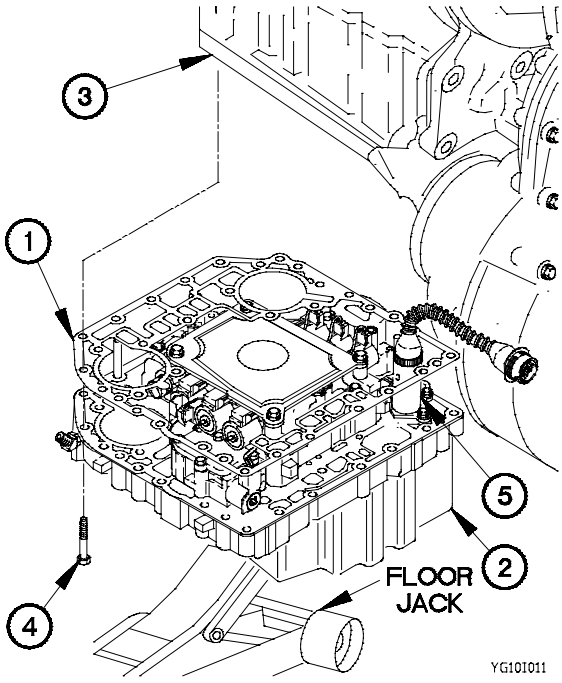
Control valve module weighs approximately 65 lbs (30 kgs). Position a floor jack under control module prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

(2) Position control valve module (2) on main housing module (3) with 18 screws (4).

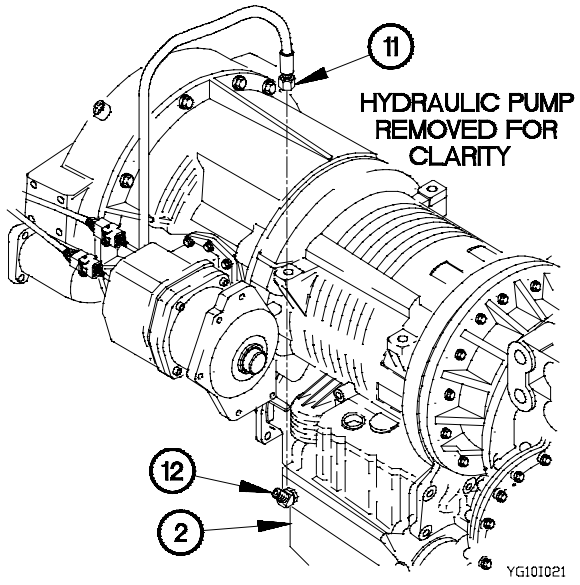
NOTE

Perform step (3) on transmissions serial number 6510032369 and higher.

(3) Position transmission adapter harness (5) and control valve module (2) on main housing module (3) with 20 screws (4).



(3.1) Tighten screws (4) to 38-45 lb-ft (51-61 N·m).



(4) Connect oil hose (11) to 45-degree fitting (12) on control valve module (2).

NOTE

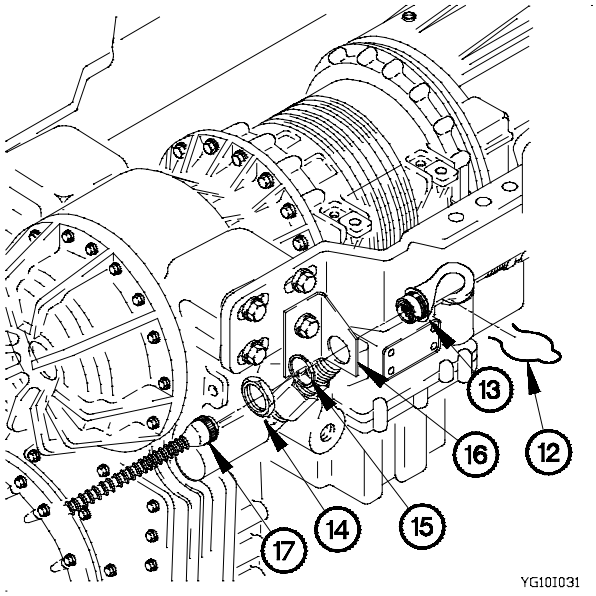
Perform steps (5) through (8) on serial number 6510032369 and higher.

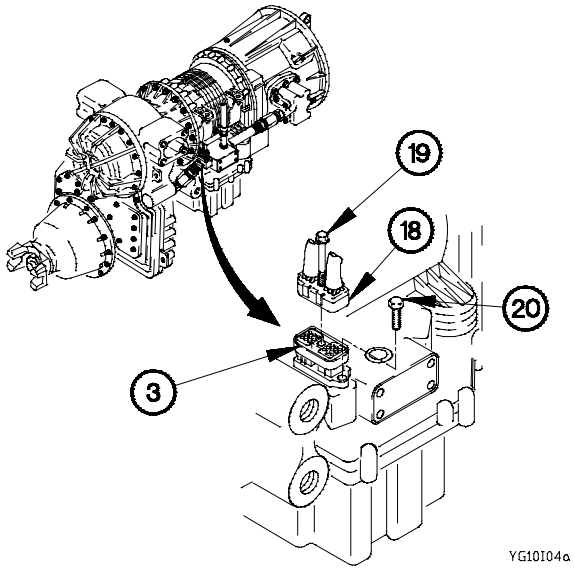
(5) Install clip (12) on transmission adapter harness (13).

(6) Remove nut (14) and washer (15) from transmission adapter harness (13).

(7) Install transmission adapter harness (13) in bracket (16) with washer (15) and nut (14).

(8) Connect transmission external wiring harness connector (17) to transmission adapter harness (13).





CAUTION

Due to position of main housing module connector, extreme care must be taken when installing main transmission external connector. Failure to comply may result in damage to equipment.

NOTE

Perform steps (9) through (11) on transmissions prior to serial number 6510032369.

(9) Position connector (18) in main housing module (3) with connector bolt (19).

(10) Tighten connector bolt (19) to 12-24 lb-in. (1-3 N·m).

(11) Install two screws (20) in main housing module (3).

7-10. CONTROL VALVE MODULE REPLACEMENT (CONT)

(12) Connect scavenge pump hydraulic return hose (21) to 45-degree fitting (22).

(13) Install seal (23) on oil dipstick tube (24).

(14) Install oil dipstick tube (24) in transmission (25).

NOTE

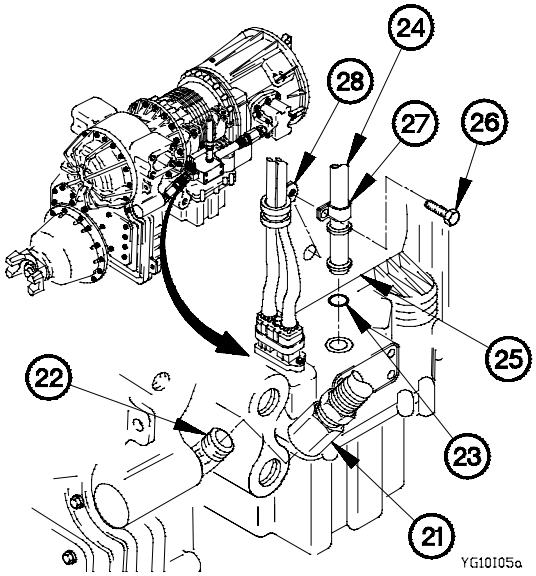
Perform step (15) on serial number 6510032369 and higher.

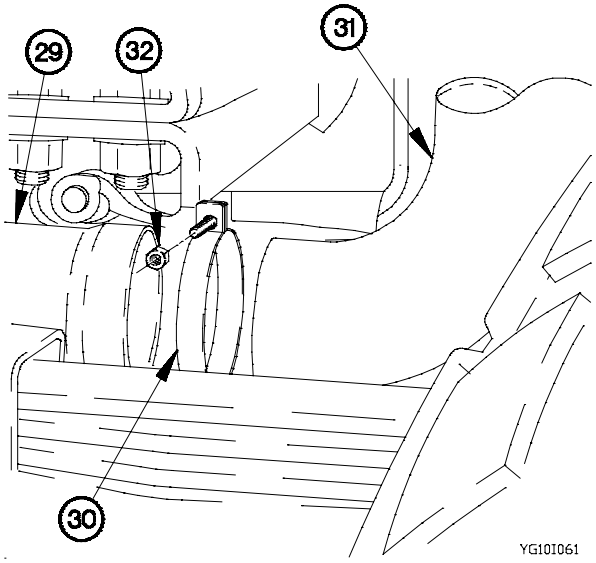
(15) Install bolt (26) in clamp (27).

NOTE

Perform step (16) on serial numbers prior to 6510032369.

(16) Install bolt (26) in clamp (27) and wiring harness clamp (28) on transmission (25).





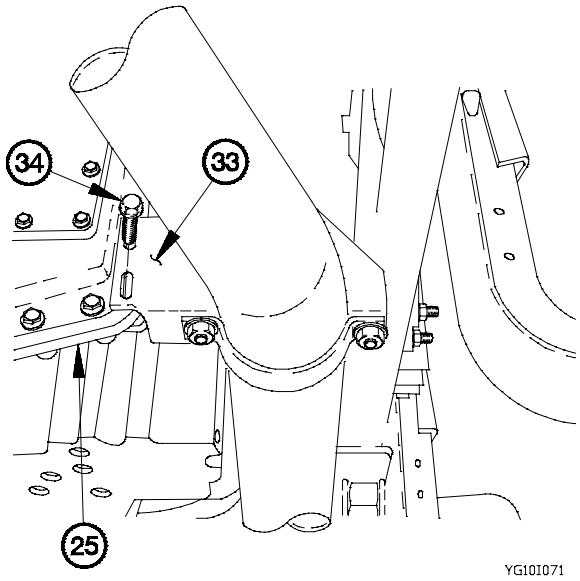
(17) Install lower exhaust pipe (29) and clamp (30) on upper exhaust pipe (31).

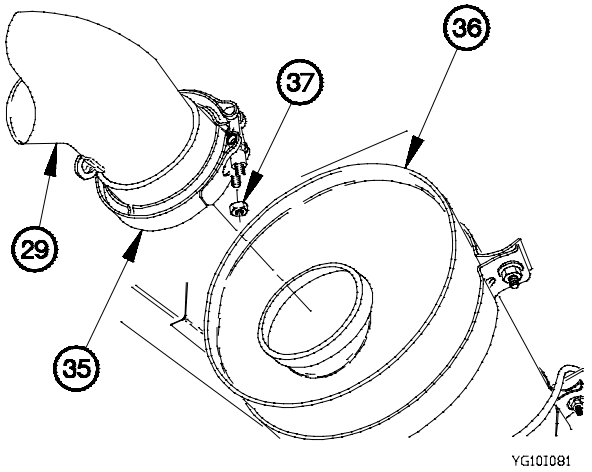
(18) Position self-locking nut (32) on clamp (30).

(19) Tighten self-locking nut (32) to 89-109 lb-in. (10-12 N·m).

(20) Position exhaust bracket (33) on transmission (25) with two bolts (34).

(21) Tighten two bolts (34) to 44-55 lb-ft (60-75 N·m).





(22) Install lower exhaust pipe (29) and clamp (35) on muffler (36).

(23) Position self-locking nut (37) on clamp (35).

(24) Tighten self-locking nut (37) to 89-109 lb-in. (10-12 N·m).

7-10. CONTROL VALVE MODULE REPLACEMENT (CONT)

d. Follow-On Maintenance.

(1) Install transmission oil filters (TM 9-2320-365-20-3).

(2) Install front drive shaft (TM 9-2320-365-20-3).

(3) Add lubricating oil to transmission/transfer case (TM 9-2320-365-20-3).

(4) Start engine (TM 9-2320-365-10).

(5) Check transmission for oil leaks.

(6) Check exhaust pipe for exhaust leaks, excessive noise, and vibration.

(7) Operate vehicle and check vehicle for proper operation of transmission (TM 9-2320-365-10).

(8) Shut down engine (TM 9-2320-365-10).

End of Task.

7-11. CONTROL VALVE MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Condition
Transmission internal wiring harness removed (para 7-13).

Tools/Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Tools and Special Tools (Cont)
Gloves, Rubber (Item 23, Appendix B)

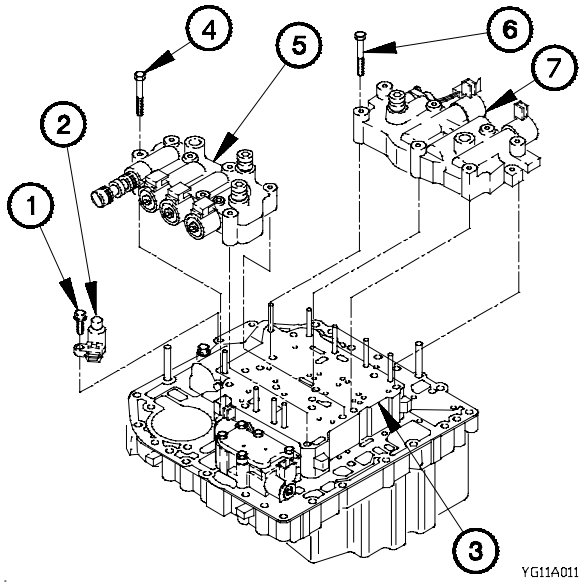
Materials/Parts
Solvent, Dry Cleaning (Item 81, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Honing Stone Assembly (Item 40, Appendix C)
Cloth, Abrasive (Item 23, Appendix C)
Gasket (Item 36, Appendix F)

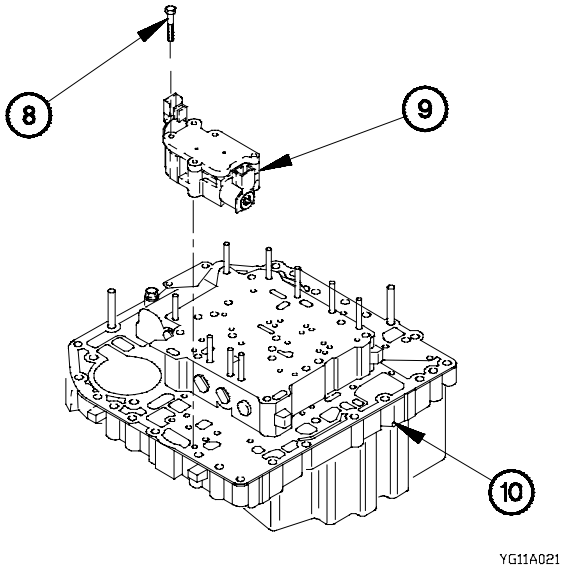
a. Disassembly.

(1) Remove two bolts (1) and turbine speed sensor (2) from main valve body (3).

(2) Remove eight bolts (4) and stationary clutch valve body (5) from main valve body (3).

(3) Remove three bolts (6) and rotating clutch valve body (7) from main valve body (3).





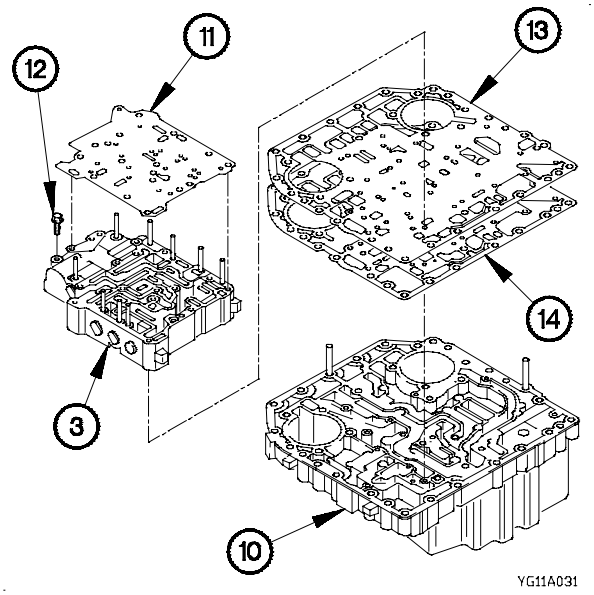
(4) Remove five bolts (8) and C6 clutch valve body (9) from channel plate (10).

7-11. CONTROL VALVE MODULE REPAIR (CONT)

(5) Remove spacer plate (11) from main valve body (3).

(6) Remove two bolts (12) and main valve body (3) from channel plate (10).

(7) Remove separator plate (13) and gasket (14) from channel plate (10). Discard gasket.



b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 ° F (38 ° C) and for Type II is 130 ° F (50 ° C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

(2) Inspect all parts for visible cracks or damage.

c. Assembly.

NOTE

Perform steps (1) and (2) on separator plates PN 29507446.

(1) Replace separator plate PN 29507446 and gasket 29507436 with separator plate PN 29524397 and gasket 29524394.

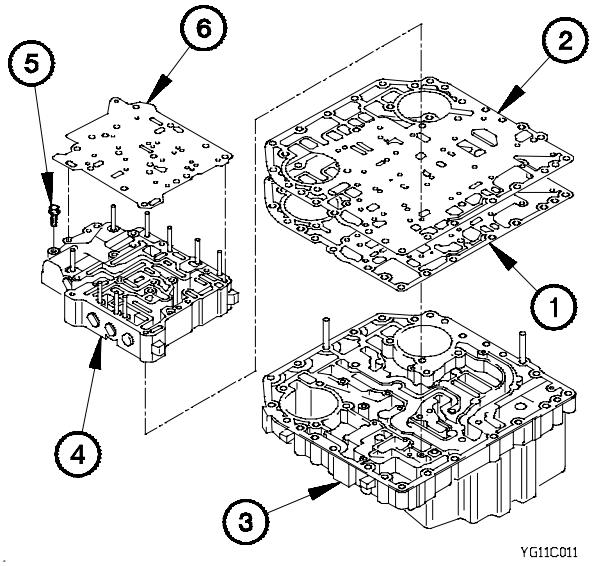
(2) Replace converter regulator valve retaining pin (Main Valve Body Assembly Repair para 7-12).

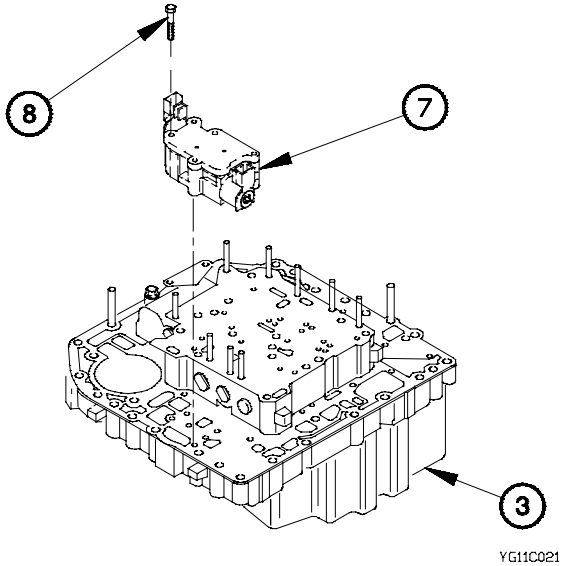
(3) Install gasket (1) and separator plate (2) on channel plate (3).

(4) Position main valve body (4) on channel plate (3) with two bolts (5).

(5) Tighten two bolts (5) to 108-120 lb-in. (12-14 N·m).

(6) Install spacer plate (6) on main valve body (4).

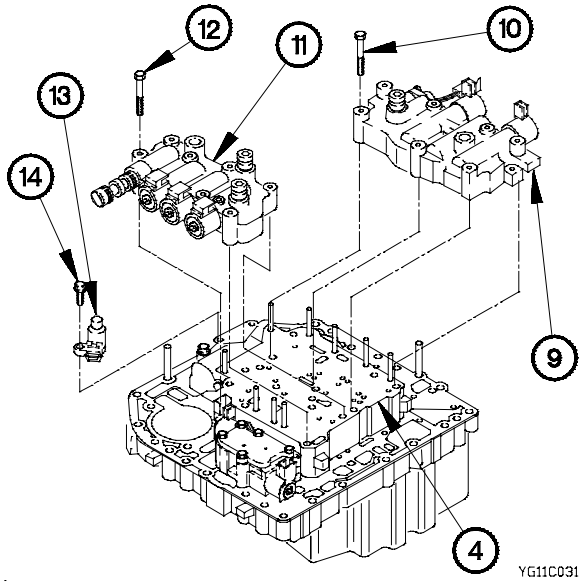




(7) Position C6 clutch valve body (7) on channel plate (3) with five bolts (8).

(8) Tighten five bolts (8) to 108-120 lb-in. (12-14 N·m).

7-11. CONTROL VALVE MODULE REPAIR (CONT)



(9) Position rotating clutch valve body (9) on main valve body (4) with three bolts (10).

(10) Tighten three bolts (10) to 108-120 lb-in. (12-14 N·m).

(11) Position stationary clutch valve body (11) on main valve body (4) with eight bolts (12).

(12) Tighten eight bolts (12) to 108-120 lb-in. (12-14 N·m).

(13) Position turbine speed sensor (13) on main valve body (4) with two bolts (14).

(14) Tighten two bolts (14) to 108-120 lb-in. (12-14 N·m).

d. Follow-On Maintenance.

Install transmission internal wiring harness (para 7-13).

End of Task.

7-12. MAIN VALVE BODY ASSEMBLY REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Control valve module disassembled (para 7-11).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Multimeter, Digital (Item 34, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Wrench, Torque, 0-60 N·m (Item 84, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Spring Compression Tool, Main Valve Body (Item 11, Appendix D)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Packing, Preformed (Item 177, Appendix F)
Packing, Preformed (Item 175, Appendix F)
Filter Element (Item 25, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

a. Disassembly.

CAUTION

The main valve body contains parts which cannot be interchanged. Tag all parts prior to removal. Failure to comply may result in damage to equipment.

(1) Remove retaining pin (1) from main valve body (2).

(2) Remove solenoid (3) from main valve body (2).

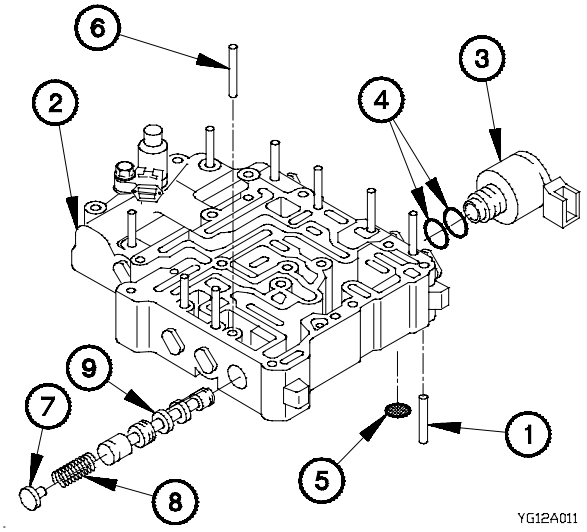
(3) Remove two preformed packings (4) from solenoid (3). Discard preformed packings.

(4) Remove solenoid filter screen (5) from main valve body (2). Discard solenoid filter screen.

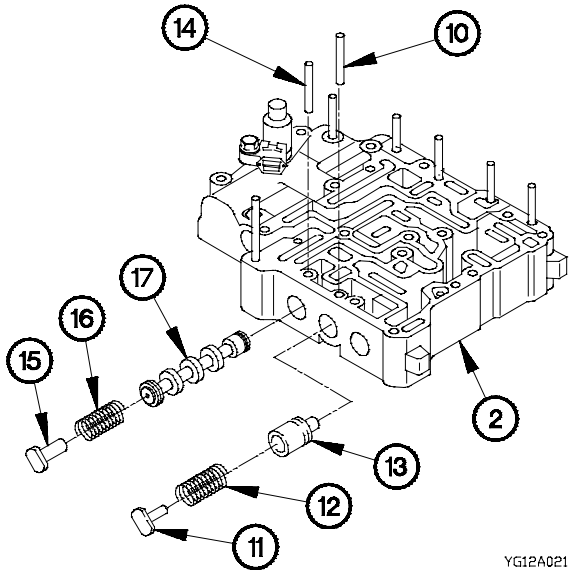
WARNING

Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(5) Remove retaining pin (6), stop (7), spring (8), and C2 latch valve (9) from main valve body (2).

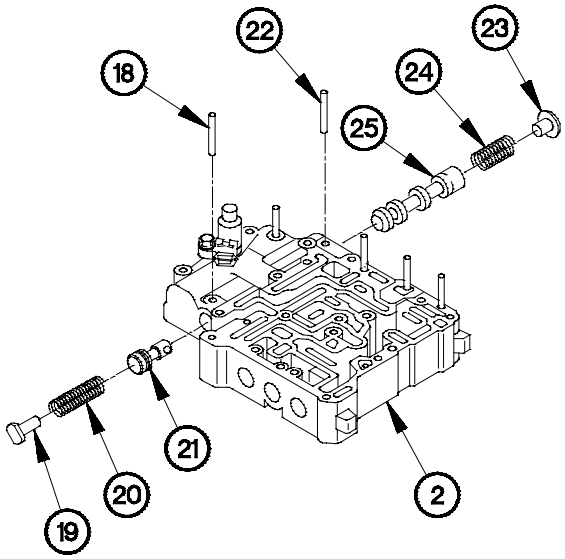


7-12. MAIN VALVE BODY ASSEMBLY REPAIR (CONT)



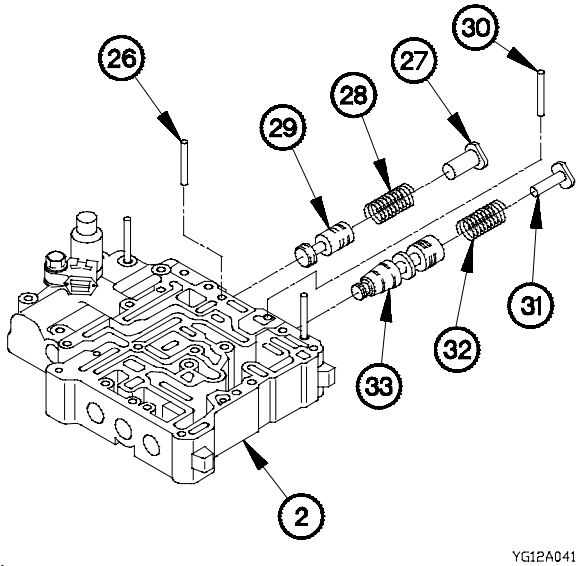
(6) Remove retaining pin (10), stop (11), spring (12), and exhaust back valve (13) from main valve body (2).

(7) Remove retaining pin (14), stop (15), spring (16), and C1 latch valve (17) from main valve body (2).



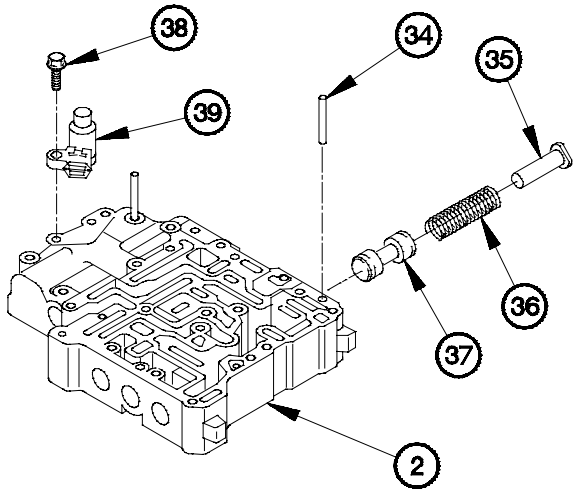
(8) Remove retaining pin (18), stop (19), spring (20), and converter regulator valve (21) from main valve body (2).

(9) Remove retaining pin (22), stop (23), spring (24), and lockup valve (25) from main valve body (2).



(10) Remove retaining pin (26), stop (27), spring (28), and lube regulator valve (29) from main valve body (2).

(11) Remove retaining pin (30), stop (31), spring (32), and main regulator valve (33) from main valve body (2).



YG12A051

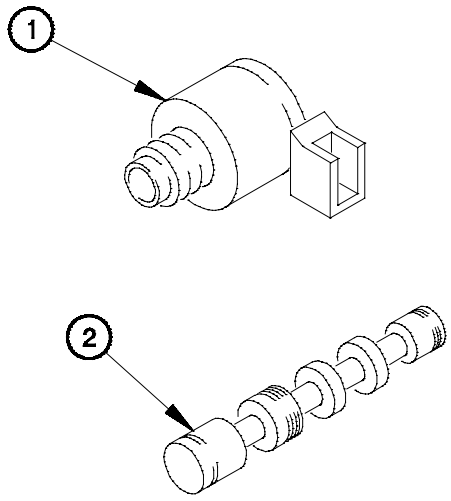
(12) Remove retaining pin (34), stop (35), spring (36), and control main valve (37) from main valve body (2).

(13) Remove two bolts (38) and turbine speed sensor (39) from main valve body (2).

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**



YG12B011

(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails to pass visual inspection or size measurement requirements.

(2) Inspect solenoid (1) for cracks or varnish buildup.

(3) Perform solenoid (1) resistance check; resistance should read between 2.0-5.0 ohm on a 10 ohm scale.

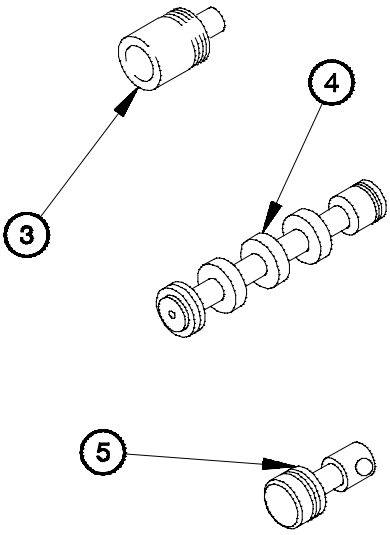
(4) Inspect C2 latch valve (2) for nicks, scratches, varnish buildup, and free movement in the bore.

7-12. MAIN VALVE BODY ASSEMBLY REPAIR (CONT)

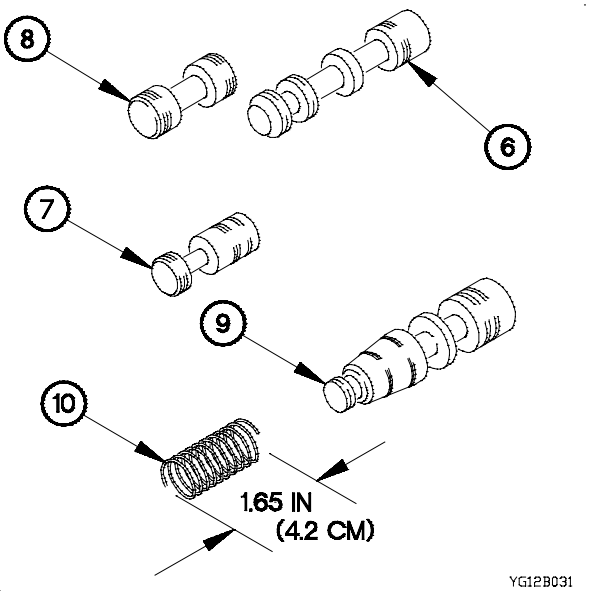
(5) Inspect exhaust back valve (3) for nicks, scratches, varnish buildup, and free movement in the bore.

(6) Inspect C1 latch valve (4) for nicks, scratches, varnish buildup, and free movement in the bore.

(7) Inspect converter regulator valve (5) for nicks, scratches, varnish buildup, and free movement in the bore.



YG12B021



YG12B031

(8) Inspect lockup valve (6) for nicks, scratches, varnish buildup, and free movement in the bore.

(9) Inspect lube regulator valve (7) for nicks, scratches, varnish buildup, and free movement in the bore.

(10) Inspect control main valve (8) for nicks, scratches, varnish buildup, and free movement in the bore.

(11) Inspect main regulator valve (9) for nicks, scratches, varnish buildup, and free movement in the bore.

(12) Measure lockup valve spring (10) for minimum free length of 1.65 in. (4.2 cm).

(13) Measure lube regulator valve spring (11) for minimum free length of 1.77 in. (4.5 cm).

(14) Measure main regulator valve spring (12) for minimum free length of 3.88 in. (9.9 cm).

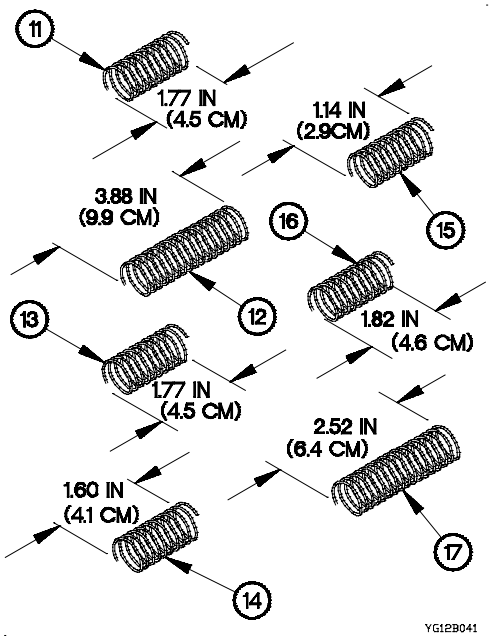
(15) Measure main control valve spring (13) for minimum free length of 1.77 in. (4.5 cm).

(16) Measure C2 latch valve spring (14) for minimum free length of 1.60 in. (4.1 cm).

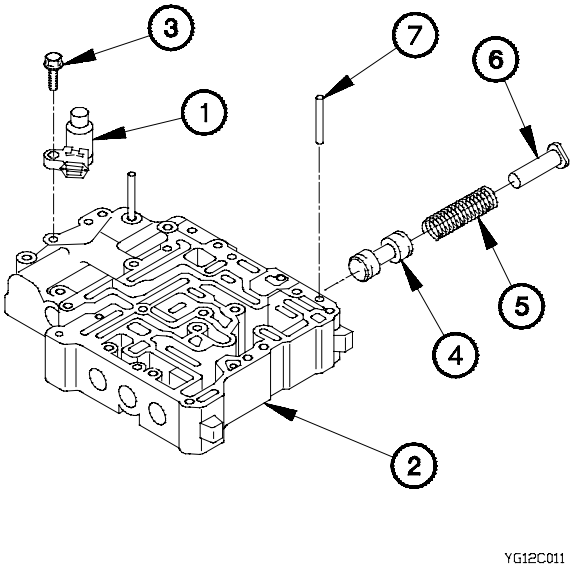
(17) Measure exhaust back valve spring (15) for minimum free length of 1.14 in. (2.9 cm).

(18) Measure C1 latch valve spring (16) for minimum free length of 1.82 in. (4.6 cm).

(19) Measure converter regulator valve spring (17) for minimum free length of 2.52 in. (6.4 cm).



c. Assembly.



WARNING

Use care when installing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Position turbine speed sensor (1) on main valve body (2) with two screws (3).

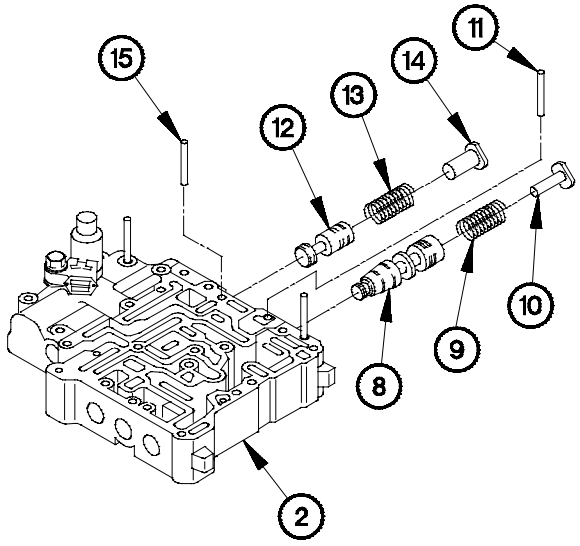
(2) Tighten two screws (3) to 9-10 lb-ft (12-14 N·m).

(3) Install control main valve (4), spring (5), stop (6), and retaining pin (7) in main valve body (2).

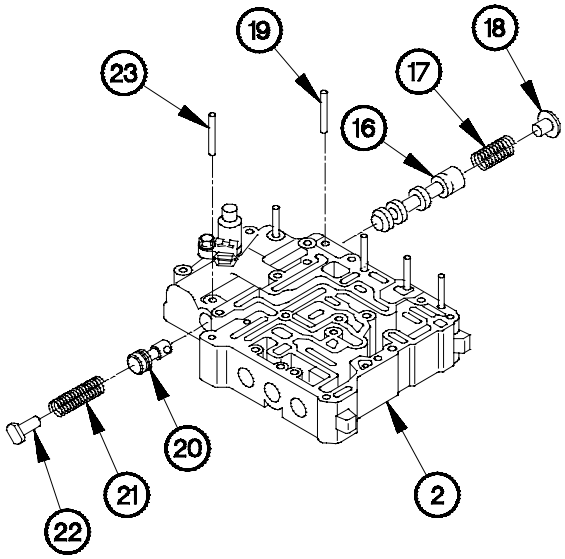
7-12. MAIN VALVE BODY ASSEMBLY REPAIR (CONT)

(4) Install control regulator valve (8), spring (9), stop (10), and retaining pin (11) in main valve body (2).

(5) Install lube regulator valve (12), spring (13), stop (14), and retaining pin (15) in main valve body (2).



YG12C021



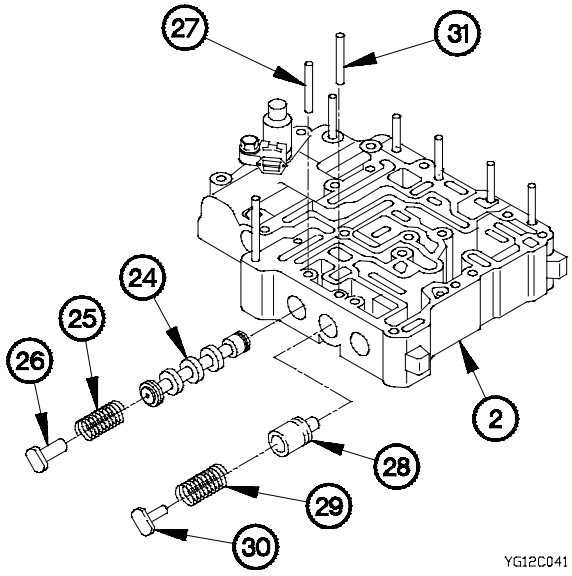
YG12C031

(6) Install lockup valve (16), spring (17), stop (18), and retaining pin (19) in main valve body (2).

(7) Install converter regulator valve (20), spring (21), stop (22), and retaining pin (23) in main valve body (2).

(8) Install C1 latch valve (24), spring (25), stop (26), and retaining pin (27) in main valve body (2).

(9) Install exhaust back valve (28), spring (29), stop (30), and retaining pin (31) in main valve body (2).



YG12C041

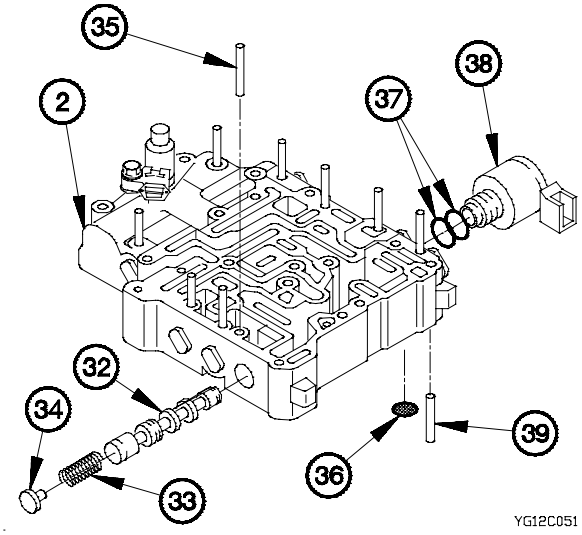
(10) Install C2 latch valve (32), spring (33), stop (34), and retaining ring (35) in main valve body (2).

(11) Install solenoid filter element (36) in main valve body (2).

(12) Install two preformed packings (37) on solenoid (38).

(13) Install solenoid (38) in main valve body (2).

(14) Install retaining pin (39) in main valve body (2).



d. Follow-On Maintenance.

Assemble control valve module (para 7-11).

End of Task.

7-13. TRANSMISSION INTERNAL WIRING HARNESS REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Condition
Control valve module removed (para 7-10).
Control valve module strainer removed (para 7-14).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

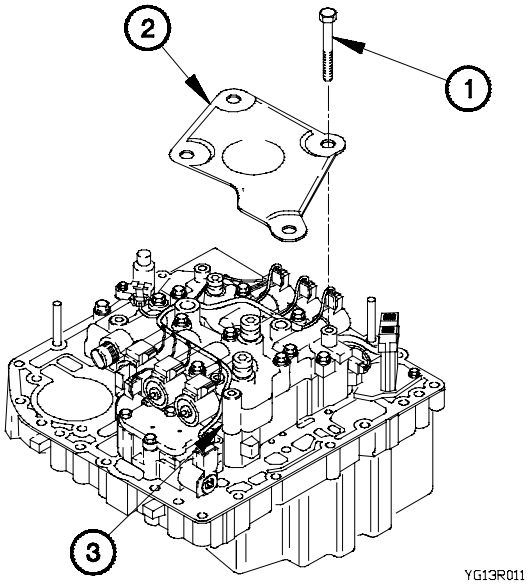
Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

a. Removal.

NOTE

Cover will not be installed on transmission serial number 6510088864 and higher or if internal wiring harness P/N 29529474 is installed.

(1) Remove four bolts (1) and cover plate (2) from stationary clutch valve body (3).



CAUTION

Use care when disconnecting harness connectors. Failure to comply may result in damage to equipment.

NOTE

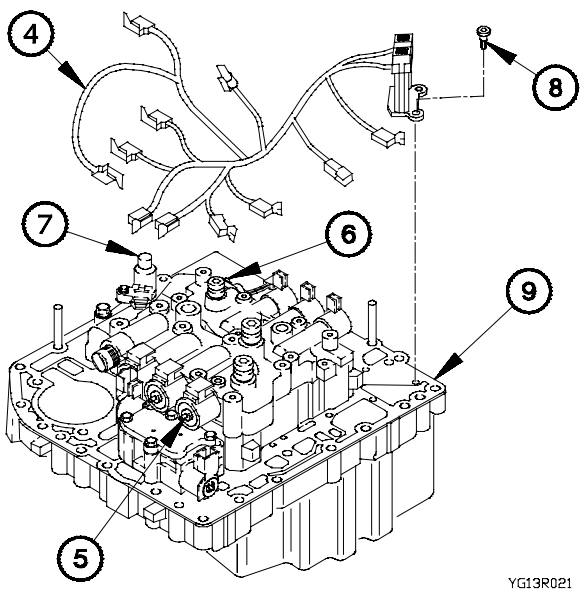
- Tag wires and connection points prior to disconnecting.
- Perform steps (2) through (5) on serial numbers prior to 6510032369.

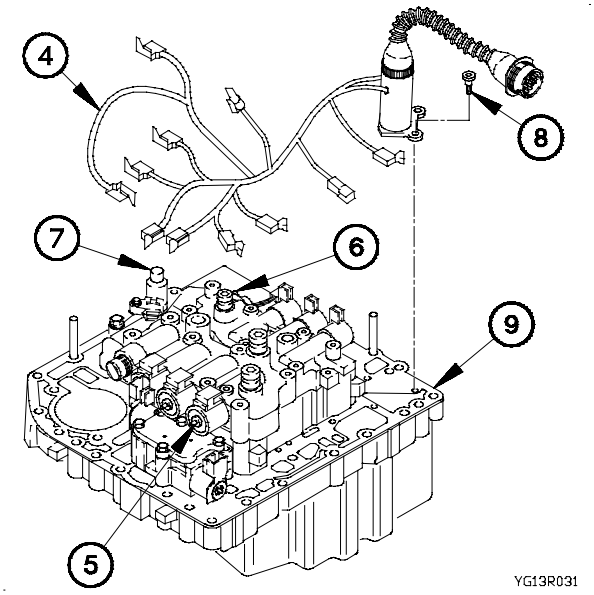
(2) Disconnect harness (4) from nine solenoids (5).

(3) Disconnect harness (4) from pressure switch (6).

(4) Disconnect harness (4) from turbine speed sensor (7).

(5) Remove two bolts (8) and harness (4) from channel plate (9).





NOTE

Perform steps (6) through (9) on serial number 6510032369 and higher.

(6) Disconnect harness (4) from nine solenoids (5).

(7) Disconnect harness (4) from pressure switch (6).

(8) Disconnect harness (4) from turbine speed sensor (7).

(9) Remove two bolts (8) and harness (4) from channel plate (9).

7-13. TRANSMISSION INTERNAL WIRING HARNESS REPLACEMENT (CONT)

b. Installation.

NOTE

Perform steps (1) through (5) on serial number 6510032369 and higher.

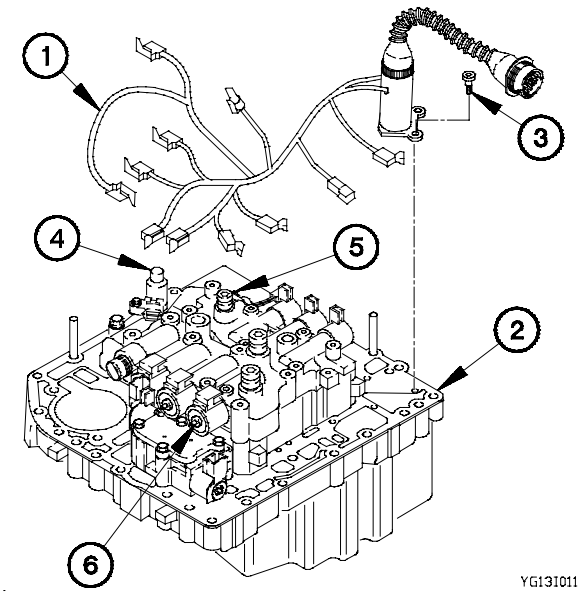
(1) Position harness (1) on channel plate (2) with two bolts (3).

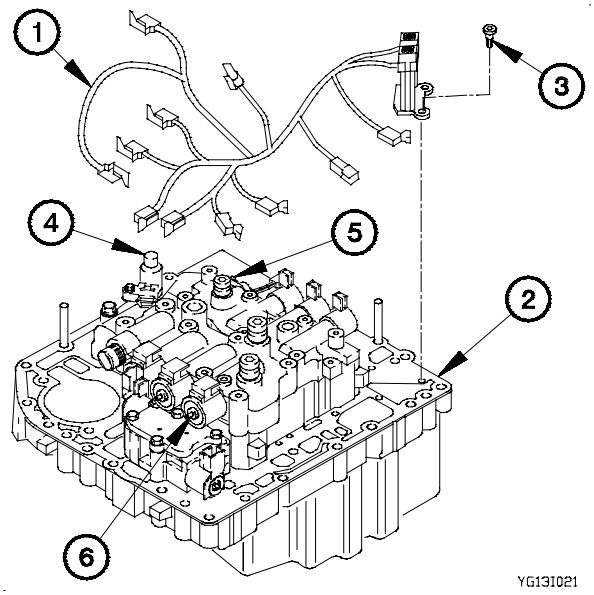
(2) Tighten two bolts (3) to 108-120 lb-in. (12-14 N·m).

(3) Connect harness (1) to turbine speed sensor (4).

(4) Connect harness (1) to pressure switch (5).

(5) Connect harness (1) to nine solenoids (6).





NOTE

Perform steps (6) through (10) on serial numbers prior to 6510032369.

(6) Position harness (1) on channel plate (2) with two bolts (3).

(7) Tighten two bolts (3) to 108-120 lb-in. (12-14 N·m).

(8) Connect harness (1) to turbine speed sensor (4).

(9) Connect harness (1) to pressure switch (5).

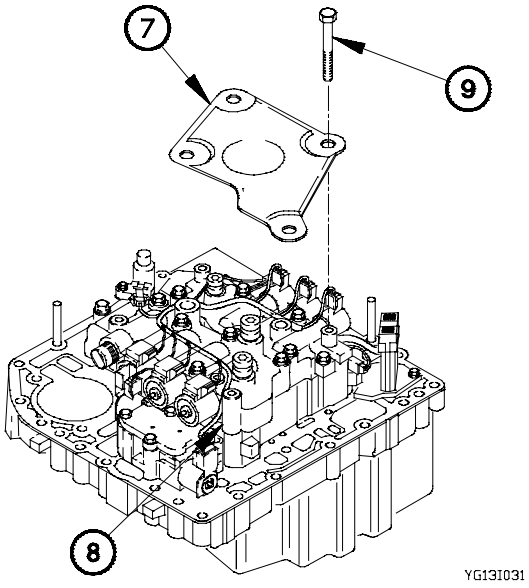
(10) Connect harness (1) to nine solenoids (6).

NOTE

Cover is not used on transmission serial number 6510088864 and higher or with internal wiring harness P/N 29529474.

(11) Position cover plate (7) on stationary clutch valve body (8) with four bolts (9).

(12) Tighten four bolts (9) to 108-120 lb-in. (12-14 N·m).



c. Follow-On Maintenance.

(1) Install control valve module strainer (para 7-14).

(2) Install control valve module (para 7-10).

End of Task.

7-14. CONTROL VALVE MODULE STRAINER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Condition
Control valve module removed (para 7-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)

Tools and Special Tools (Cont)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Seal (Item 259, Appendix F)
Gasket (Item 35, Appendix F)
Strainer, Suction (Item 292, Appendix F)

a. Removal.

NOTE

Perform step (1) on serial numbers prior to 6510032369.

(1) Remove four bolts (1) from housing (2).

NOTE

Perform step (2) on serial number 6510032369 and higher.

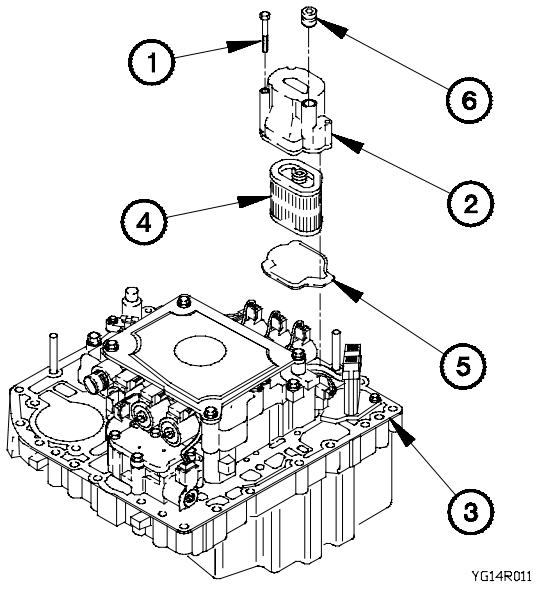
(2) Remove three bolts (1) from housing (2).

(3) Remove housing (2) from channel plate (3).

(4) Remove strainer (4) from channel plate (3). Discard strainer.

(5) Remove gasket (5) from channel plate (3). Discard gasket.

(6) Remove seal (6) from housing (2). Discard seal.



b. Installation.

(1) Install seal (1) in housing (2).

(2) Install gasket (3) on channel plate (4).

(3) Install strainer (5) on channel plate (4).

NOTE

Perform steps (4) and (5) on serial number 6510032369 and higher.

(4) Position housing (2) on channel plate (4) with three bolts (6).

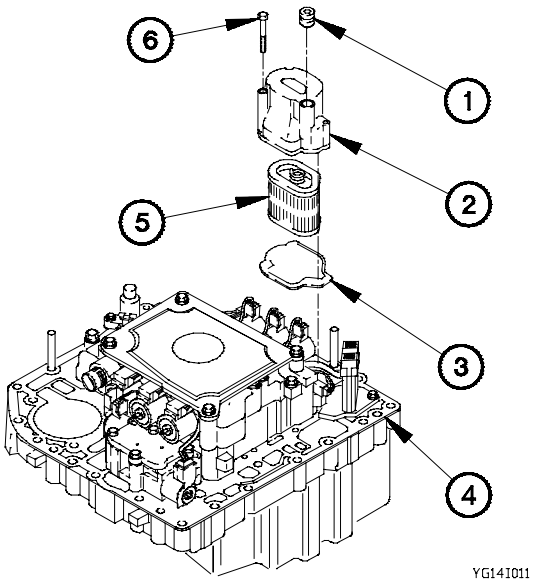
(5) Tighten three bolts (6) to 108-120 lb-in. (12-14 N·m).

NOTE

Perform steps (6) and (7) on serial numbers prior to 6510032369.

(6) Position housing (2) on channel plate (4) with four bolts (6).

(7) Tighten four bolts (6) to 108-120 lb-in. (12-14 N·m).



c. Follow-On Maintenance.

Install control valve module (para 7-10).

End of Task.

7-15. TRANSMISSION OIL COOLER MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Condition
Transmission oil cooler removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

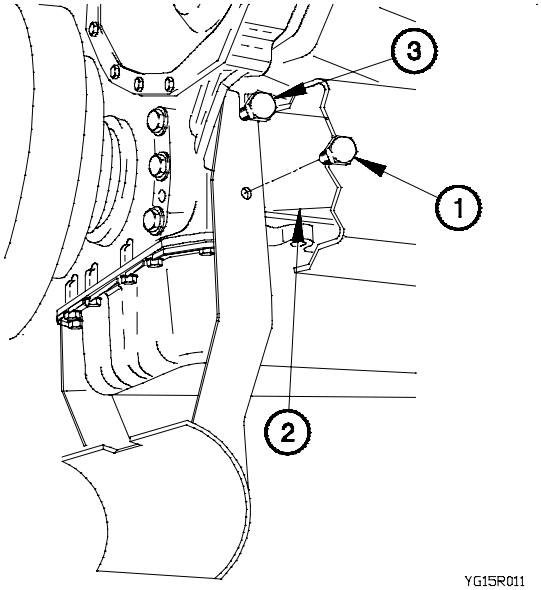
WARNING

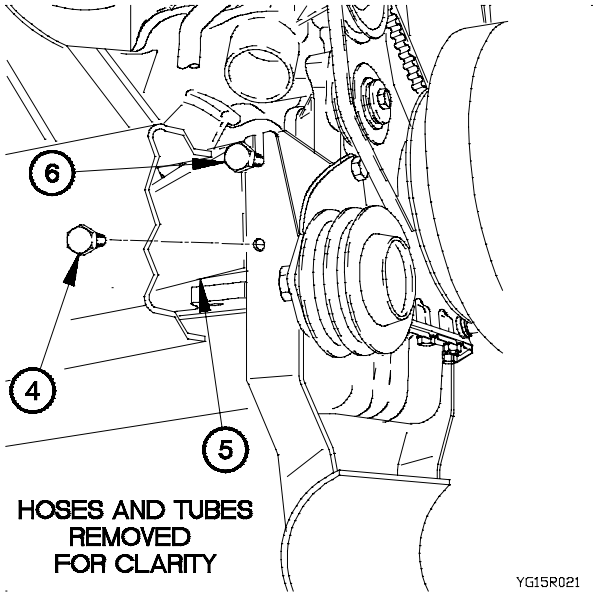
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

(1) Remove bolt (1) from engine left front mounting bracket (2).

(2) Loosen bolt (3) on engine left front mounting bracket (2).

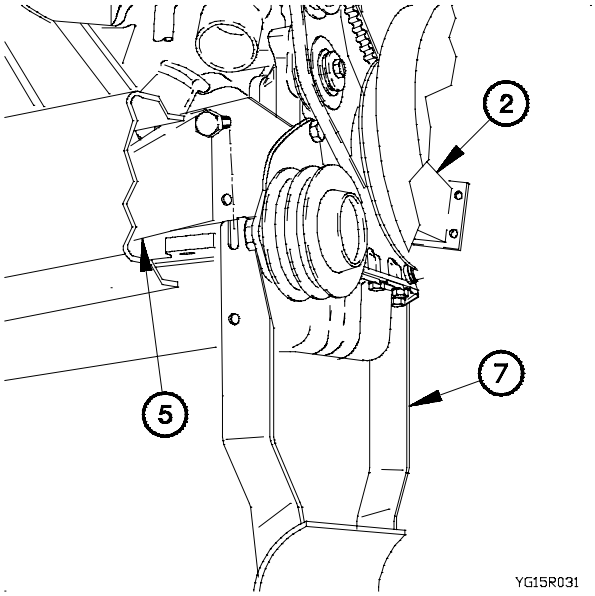




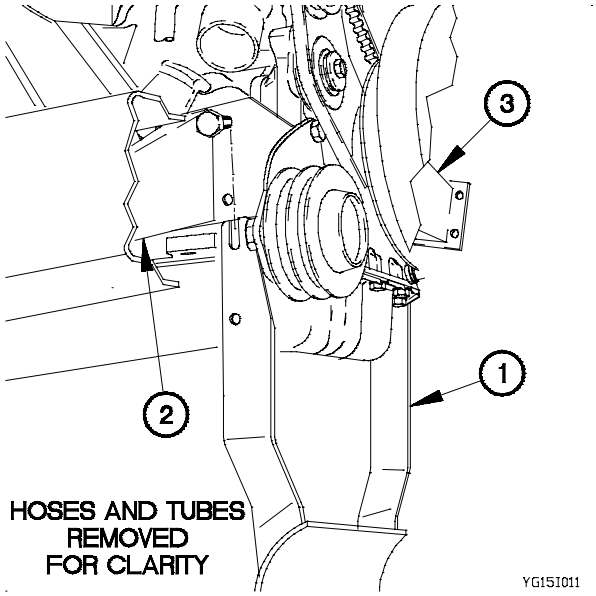
(3) Remove bolt (4) from engine right front mounting bracket (5).

(4) Loosen bolt (6) on engine right front mounting bracket (5).

(5) Remove transmission oil cooler mounting bracket (7) from engine left and right front mounting brackets (2 and 5).



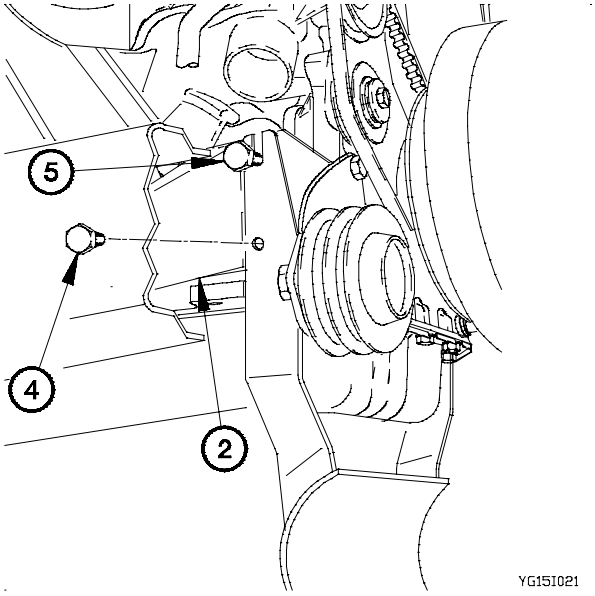
b. Installation.



(1) Position transmission oil cooler mounting bracket (1) between engine right and left front mounting brackets (2 and 3).

(2) Position bolt (4) in engine right front mounting bracket (2).

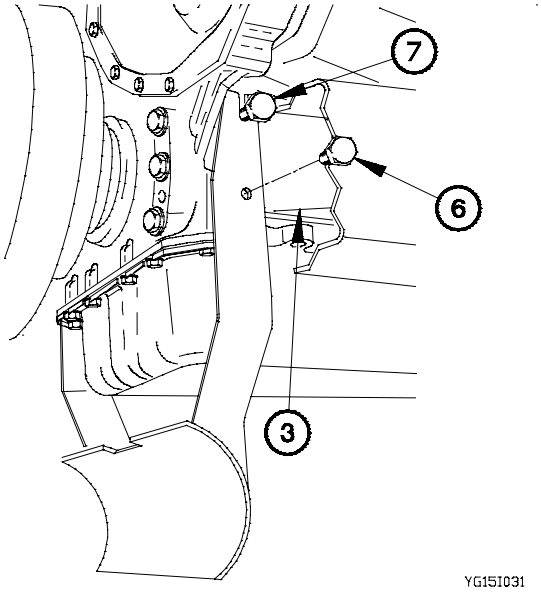
(3) Tighten bolts (4 and 5) to 121-147 lb-ft (164-200 N·m).



7-15. TRANSMISSION OIL COOLER MOUNTING BRACKET REPLACEMENT (CONT)

(4) Position bolt (6) in engine left front mounting bracket (3).

(5) Tighten bolts (6 and 7) to 121-147 lb-ft (164-200 N·m).



c. Follow-On Maintenance.

Install transmission oil cooler (TM 9-2320-365-20-3).

End of Task.

7-16. SCAVENGE PUMP ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

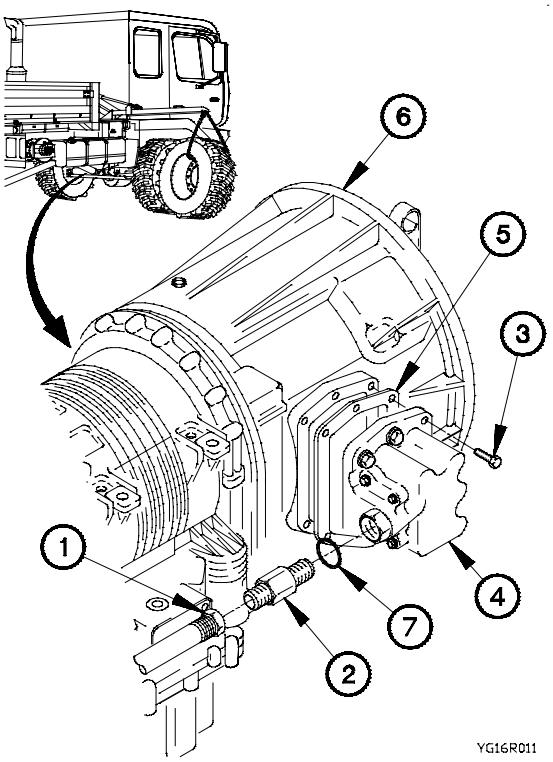
Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Spare tire lowered (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Gasket, (Item 33, Appendix F)
Packing, Preformed (Item 172, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.



a. Removal.

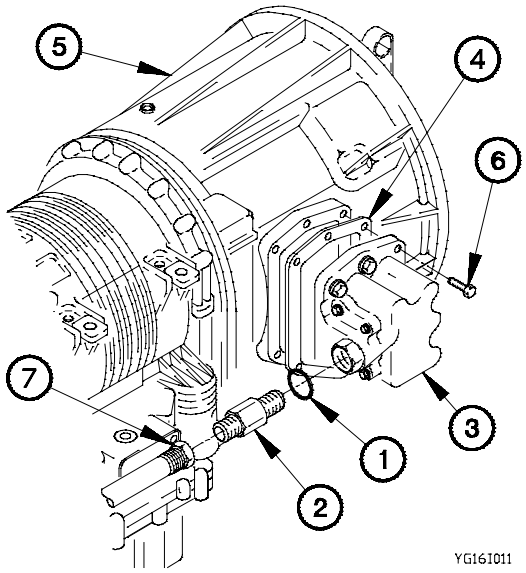
(1) Disconnect oil return hose (1) from fitting (2).

(2) Remove nine bolts (3), scavenge pump (4), and gasket (5) from transmission main housing module (6). Discard gasket.

(3) Remove fitting (2) from scavenge pump (4).

(4) Remove preformed packing (7) from fitting (2). Discard preformed packing.

7-16. SCAVENGE PUMP ASSEMBLY REPLACEMENT (CONT)



b. Installation.

(1) Install preformed packing (1) on fitting (2).

(2) Install fitting (2) on scavenge pump (3).

(3) Position gasket (4) and scavenge pump (3) on transmission main housing module (5) with nine bolts (6).

(4) Tighten nine bolts (6) to 42-50 lb-ft (57-68 N·m).

(5) Connect oil return hose (7) to fitting (2).

c. Follow-On Maintenance.

(1) Stow spare tire (TM 9-2320-365-10).

(2) Start engine and check transmission for oil leaks (TM 9-2320-365-10).

(3) Operate vehicle and check for proper operation (TM 9-2320-365-10).

(4) Shut down engine (TM 9-2320-365-10).

End of Task.

7-17. ENGINE AND TRANSMISSION MOUNT BRACKET REPLACEMENT

This task covers:

a. LH Removal
b. LH Installation
c. RH Removal
d. RH Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
M1079 van body removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Tools and Special Tools (Cont)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
4x4x8 in. (20 cm) wooden piece

Materials/Parts
Nut, Self-locking (2) (Item 146, Appendix F)
Sealant, Pipe (Item 67.1, Appendix C)

Personnel
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

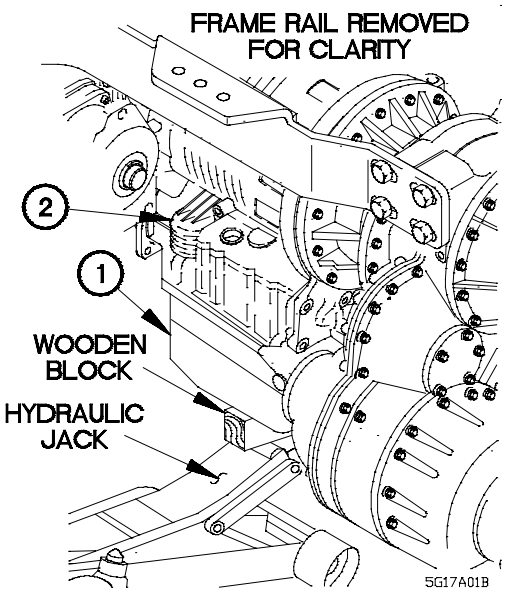
a. LH Removal.

NOTE

Hydraulic jack is used to support engine and transmission while LH engine and transmission mount bracket is being replaced.

(1) Position hydraulic jack with 8 in. (20 cm) wooden block under transmission control valve module (1).

(2) Raise hydraulic jack to apply pressure to transmission (2).

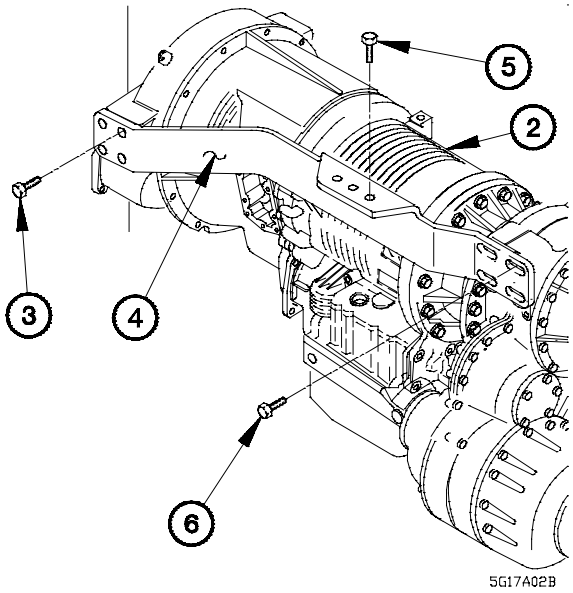


7-17. ENGINE AND TRANSMISSION MOUNT BRACKET REPLACEMENT (CONT)

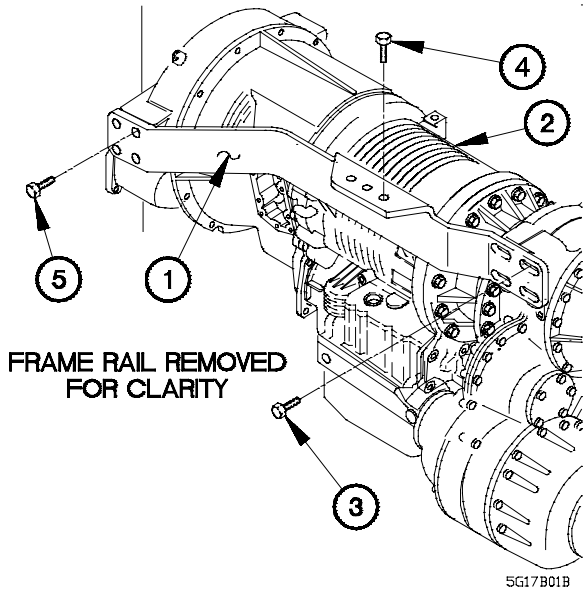
(3) Remove four bolts (3) from front of LH engine and transmission mount bracket (4).

(4) Remove two bolts (5) from top of LH engine and transmission mount bracket (4).

(5) Remove four bolts (6) and LH engine and transmission mount bracket (4) from transmission (2).



b. LH Installation.



(1) Position LH engine and transmission mount bracket (1) on transmission (2) with four bolts (3).

(2) Position two bolts (4) in top of LH engine and transmission mount bracket (1).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

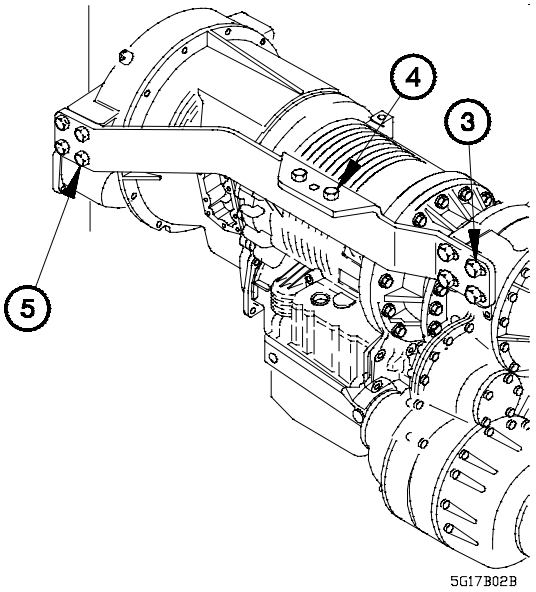
(3) Apply sealing compound to threads of four bolts (5).

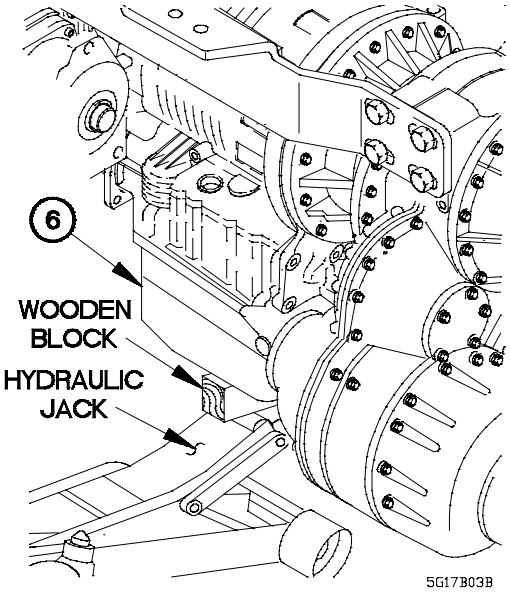
(4) Position four bolts (5) on front of LH engine and transmission mount bracket (1).

(5) Tighten four bolts (5) to 330-378 lb-ft (447-513 N·m).

(6) Tighten two bolts (4) to 76-94 lb-ft (103-127 N·m).

(7) Tighten four bolts (3) to 129-159 lb-ft (175-215 N·m).





(8) Remove hydraulic jack and wooden block from under transmission control valve module (6).

c. RH Removal.

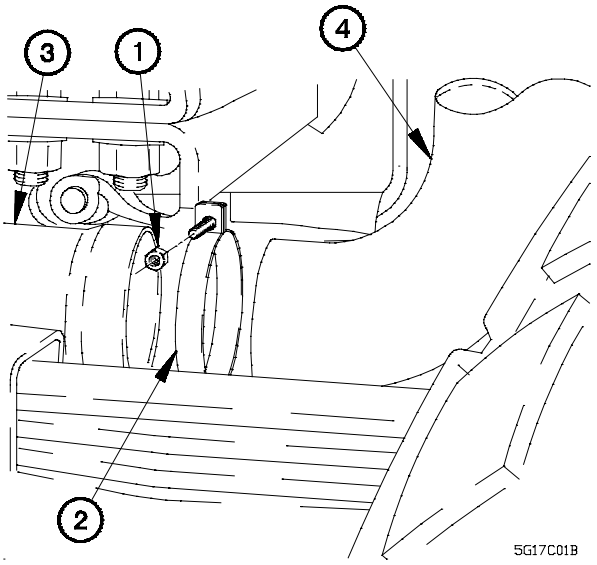
WARNING

Ensure exhaust system is cool before performing maintenance. Failure to comply may result in injury to personnel.

(1) Remove self-locking nut (1) from clamp (2). Discard self-locking nut.

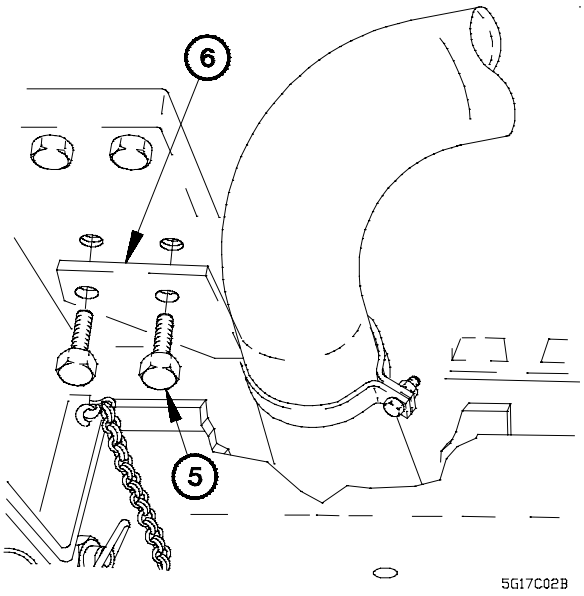
(2) Remove exhaust pipe (3) from exhaust pipe (4).

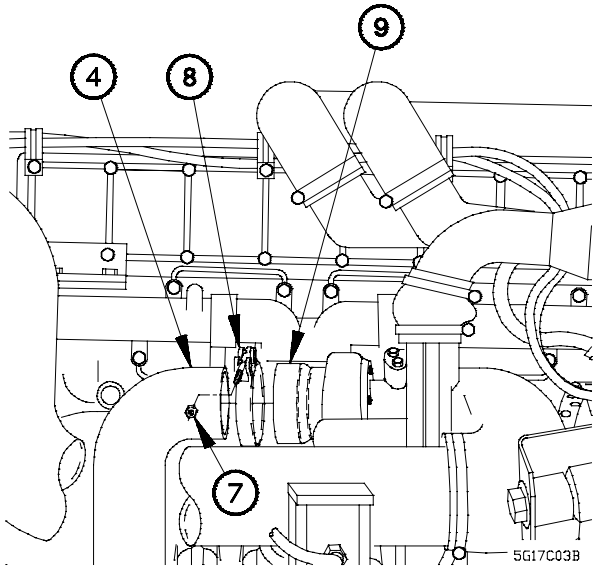
(3) Remove clamp (2) from exhaust pipe (3).



7-17. ENGINE AND TRANSMISSION MOUNT BRACKET REPLACEMENT (CONT)

(4) Remove two bolts (5) from exhaust bracket (6).





(5) Remove self-locking nut (7) from clamp (8). Discard self-locking nut.

(6) Remove exhaust pipe (4) from rear of turbocharger (9).

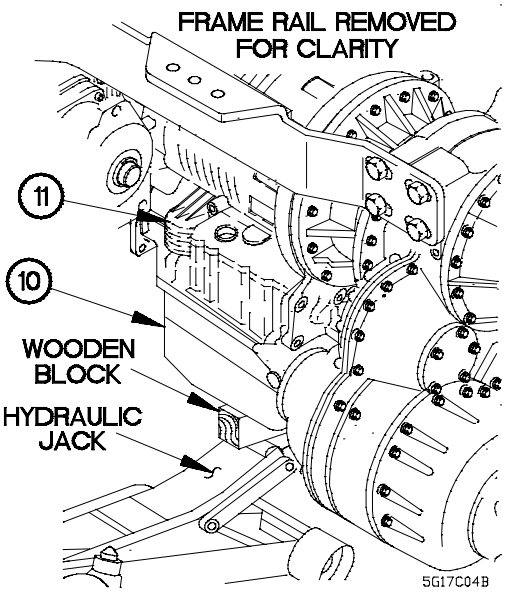
(7) Remove clamp (8) from exhaust pipe (4).

NOTE

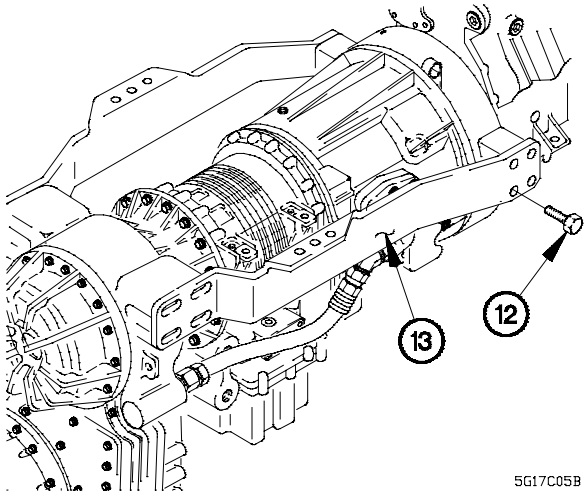
Hydraulic jack is used to support engine and transmission while RH engine mount and transmission bracket is being replaced.

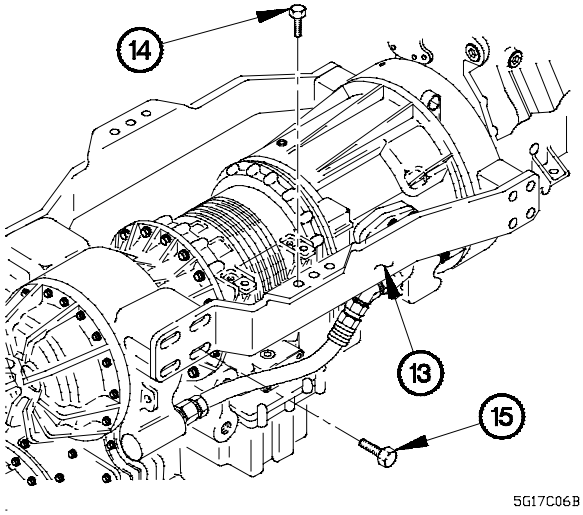
(8) Position hydraulic jack with 8 in. (20 cm) wooden block under transmission control valve module (10).

(9) Raise hydraulic jack to apply pressure to transmission (11).



(10) Remove two bolts (12) from front of RH engine and transmission mount bracket (13).





(11) Remove two bolts (14) from top of RH engine and transmission mount bracket (13).

NOTE

Perform step (12) on serial numbers prior to 6510032369.

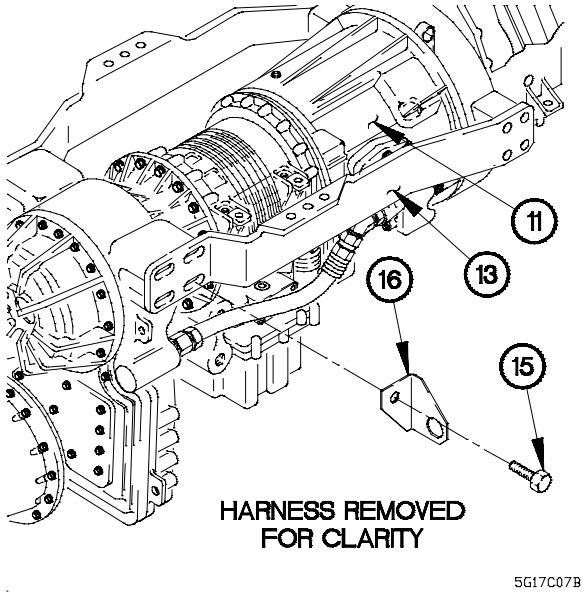
(12) Remove four bolts (15) from rear of RH engine and transmission mount bracket (13).

NOTE

Perform step (13) on serial numbers 6510032369 and higher.

(13) Remove four bolts (15) and bracket (16) from rear of RH engine and transmission mount bracket (13).

(14) Remove RH engine and transmission mount bracket (13) from transmission (11).



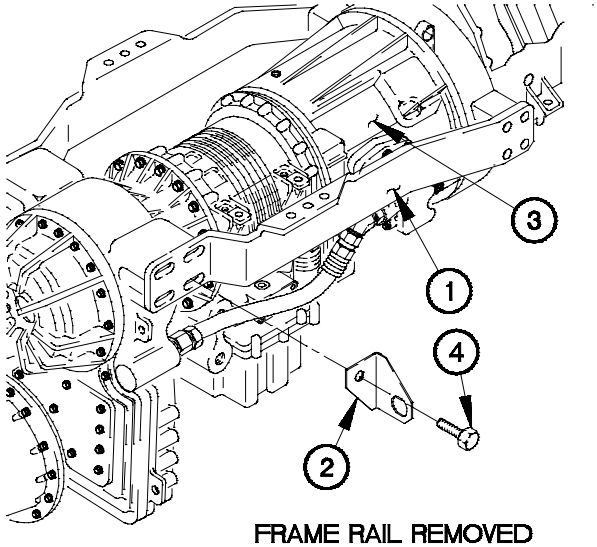
7-17. ENGINE AND TRANSMISSION MOUNT BRACKET REPLACEMENT (CONT)

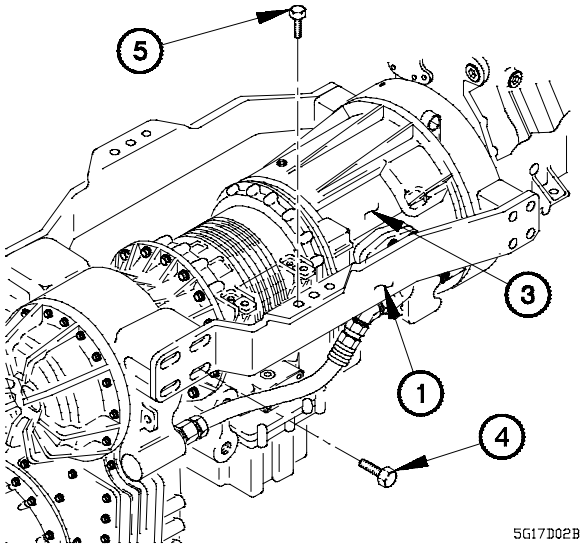
d. RH Installation.

NOTE

Perform step (1) on serial numbers 6510032369 and higher.

(1) Position RH engine and transmission mount bracket (1) and bracket (2) on transmission (3) with four bolts (4).





NOTE

Perform step (2) on serial numbers prior to 6510032369.

(2) Position RH engine and transmission bracket (1) on transmission (3) with four bolts (4).

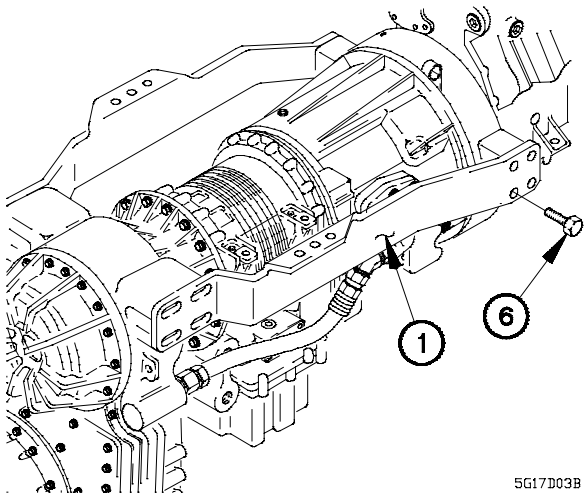
(3) Position two bolts (5) on top of RH engine and transmission mount bracket (1).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(4) Apply light coat of sealing compound to threads of two bolts (6).

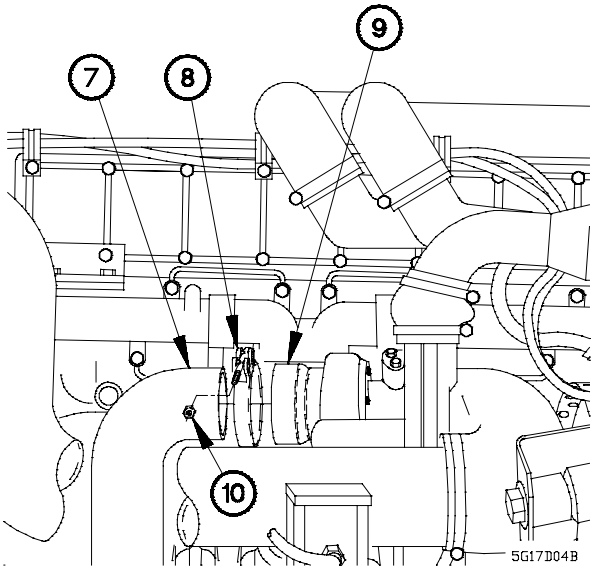
(5) Position two bolts (6) on front of RH engine and transmission mount bracket (1).

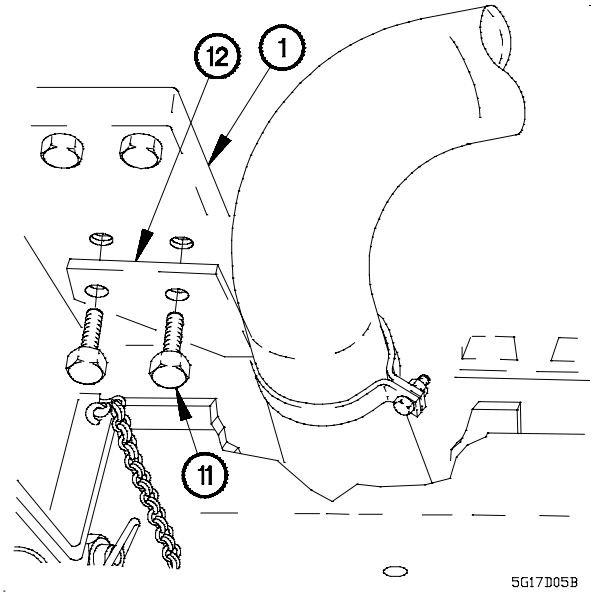


(6) Install exhaust pipe (7) and clamp (8) to rear of turbocharger (9).

(7) Position self-locking nut (10) on clamp (8).

(8) Tighten self-locking nut (10) to 89-109 lb-in. (10-12 N·m).





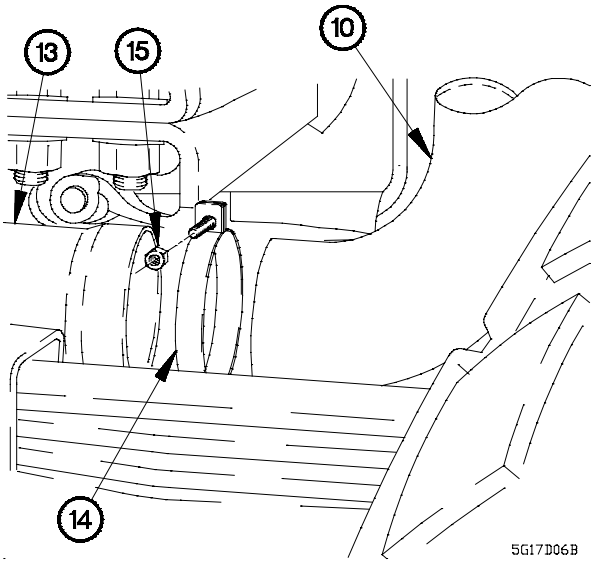
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(9) Apply light coat of sealing compound to threads of two bolts (11).

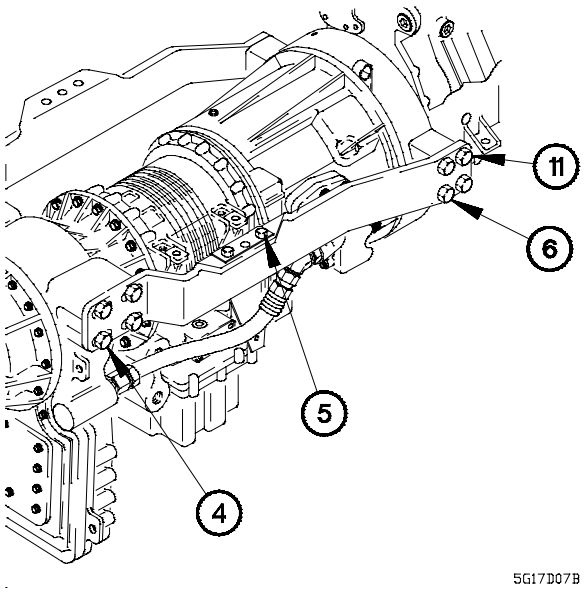
(10) Position exhaust pipe bracket (12) on RH engine and transmission mount bracket (1) with two bolts (11).

7-17. ENGINE AND TRANSMISSION MOUNT BRACKET REPLACEMENT (CONT)



(11) Position lower exhaust pipe (13) on upper exhaust pipe (10) with clamp (14) and self-locking nut (15).

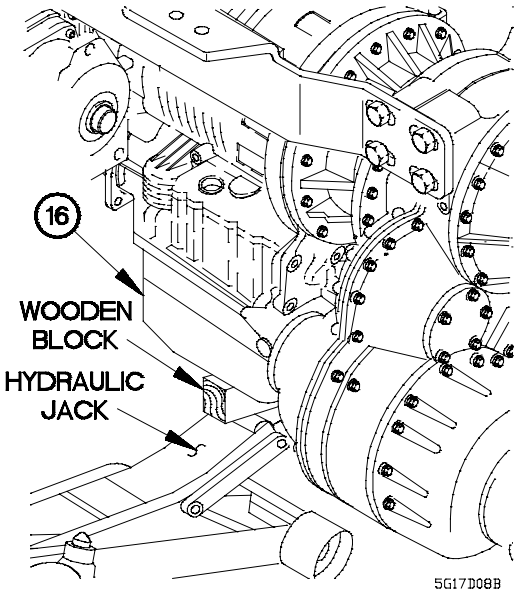
(12) Tighten self-locking nut (15) to 72-120 lb-in. (8-14 N·m).



(13) Tighten two bolts (6 and 11) to 129-159 lb-ft (175-215 N·m).

(14) Tighten two bolts (5) to 76-94 lb-ft (103-127 N·m).

(15) Tighten four bolts (4) to 330-378 lb-ft (447-513 N·m).



(16) Remove hydraulic jack and wooden block from under transmission control valve module (16).

c. Follow-On Maintenance.

(1) Start engine (TM 9-2320-366-20-3).

(2) Check exhaust pipe for exhaust leaks, excessive noise, and vibration.

(3) Shut down engine (TM 9-2320-365-10).

End of Task.

7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS)

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Spare tire removed (TM 9-2320-365-10).
Batteries disconnected (TM 9-2320-365-20-3).
Front drive shaft removed (TM 9-2320-365-20-3).
Rear drive shaft removed (TM 9-2320-365-20-3).
Transmission oil drained (TM 9-2320-365-20-3).
PTO removed, if equipped (para 16-6).
Hydraulic pump removed, if equipped (para 16-5).
Cargo bed removed, if equipped (para 15-8).
M1079 Van body removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-365-20)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Transmission Lifting Bracket (Item 21, Appendix D)
Wrench Set, Socket (Item 74, Appendix B)

Tools and Special Tools (Cont)
Adapter, Socket Wrench, (Item 2, Appendix B)

Materials/Parts
Rope, Fibrous (Item 61, Appendix C)
Cap and Plug Set (Item 18, Appendix C)
Nut, Self-locking (2) (Item 146, Appendix F)
Nut, Self-Locking (4) (Item 135, Appendix F)
Packing, Preformed (2) (Item 210, Appendix F)
Seal, Non Metallic (2) (Item 260, Appendix F)
Nut, Self-locking (Item 128, Appendix F)
Gasket (Item 51, Appendix F)
Gasket (Item 28, Appendix F)
Sealing, Compound (Item 71, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Packing, Preformed (2) (Item 155.1, Appendix F)
Packing, Preformed (2) (Item 155.2, Appendix F)

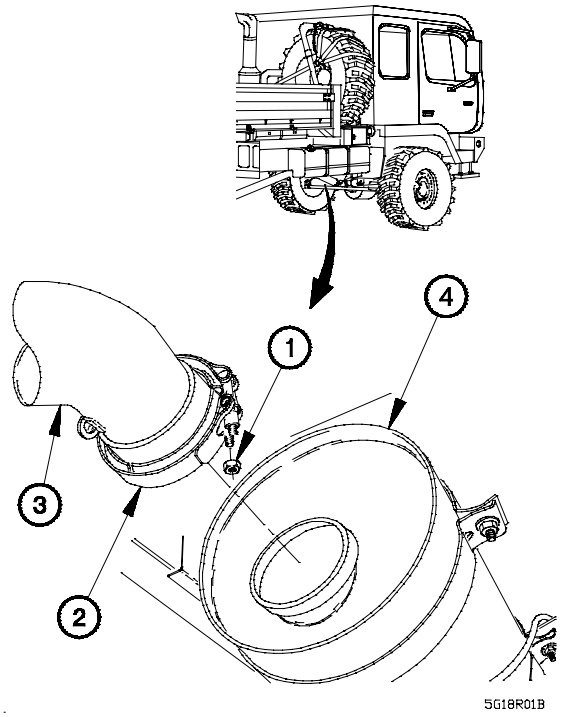
Personnel Required
(3)

WARNING

- **Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**
- **Ensure exhaust system is cool before performing maintenance. Failure to comply may result in injury to personnel.**

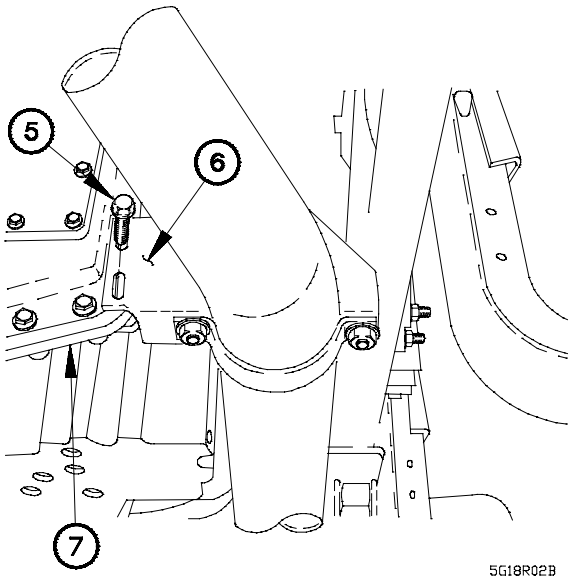
(1) Remove self-locking nut (1) from clamp (2). Discard self-locking nut.

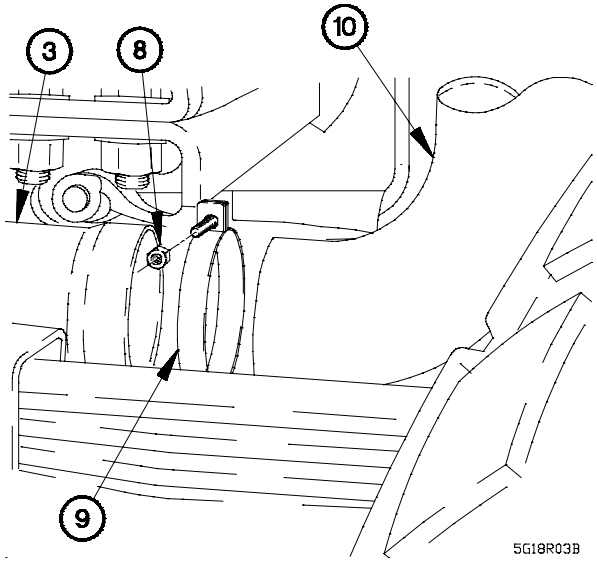
(2) Disconnect lower exhaust pipe (3) from muffler (4).



7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

(3) Remove two bolts (5) and exhaust bracket (6) from transmission (7).





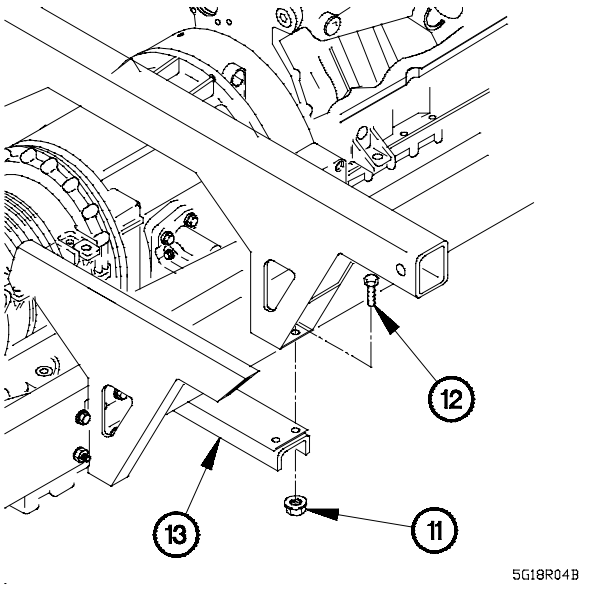
(4) Remove self-locking nut (8) from clamp (9). Discard self-locking nut.

(5) Remove lower exhaust pipe (3) from upper exhaust pipe (10).

NOTE

- Perform step (6) on vehicles equipped with transmission oil cooler hoses.
- Step (6) requires the aid of an assistant.

(6) Remove four self-locking nuts (11), bolts (12), and lower front support crossmember (13) from vehicle. Discard self-locking nuts.



CAUTION

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

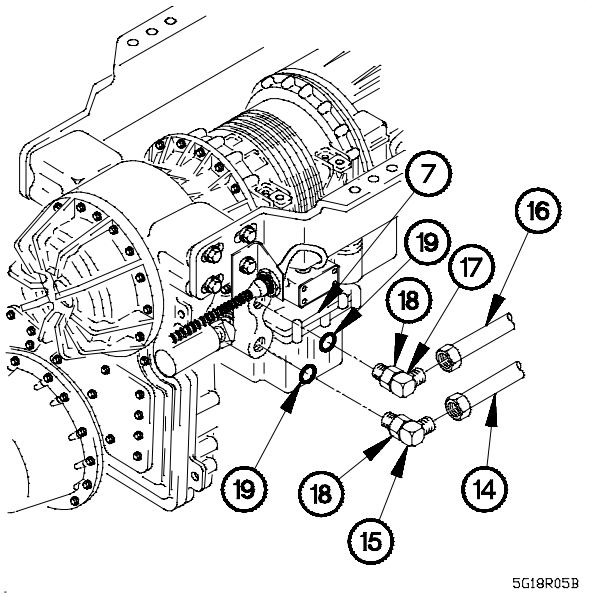
NOTE

- Vehicle serial numbers 0001 through 7211 may have transmission oil cooler tubes installed. Vehicle serial numbers 7212 and higher will have transmission oil cooler hoses installed.
- Perform steps (7) through (12) on vehicles equipped with transmission oil cooler tubes.
- Tag tubes and connection points prior to disconnecting.

(7) Disconnect transmission oil cooler tube (14) from 90-degree fitting (15).

(8) Disconnect transmission oil cooler tube (16) from 90-degree fitting (17).

(9) Loosen jam nuts (18) on 90-degree fittings (15 and 17).



NOTE

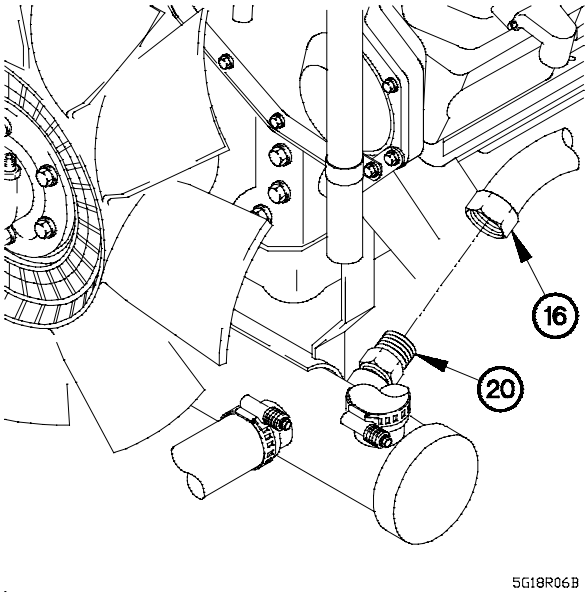
Note orientation of 90-degree fittings prior to removal.

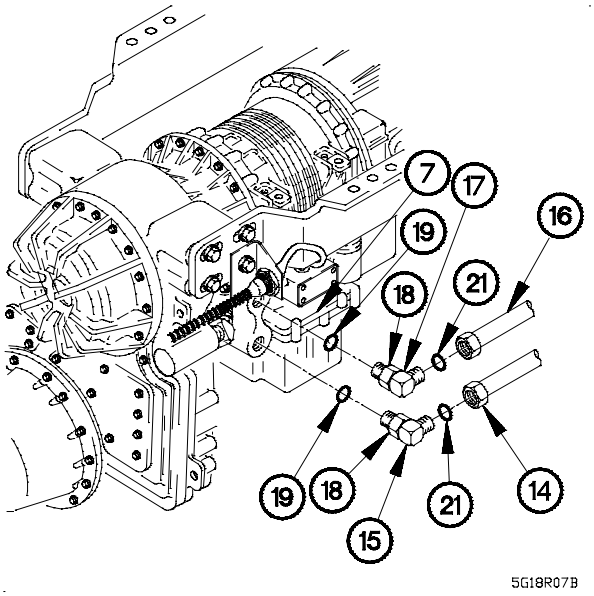
(10) Remove 90-degree fittings (15 and 17) from transmission (7).

(11) Remove preformed packings (19) from 90-degree fittings (15 and 17). Discard preformed packings.

7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

(12) Remove transmission oil cooler tube (16) from fitting (20).





NOTE

- Perform steps (13) through (17) on vehicles equipped with transmission cooler hoses.
- Tag hoses and connection points prior to removal.

(13) Disconnect transmission oil cooler hose (14) from 90-degree fitting (15).

(14) Disconnect transmission oil cooler hose (16) from 90-degree fitting (17).

(15) Loosen jam nuts (18) on 90-degree fittings (15 and 17).

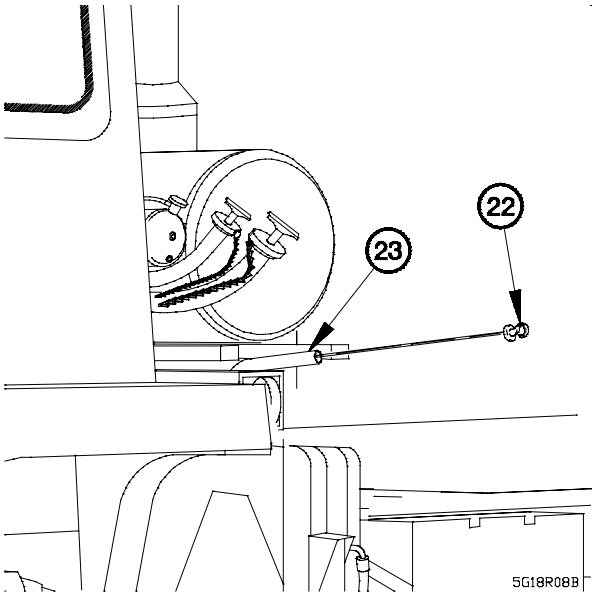
NOTE

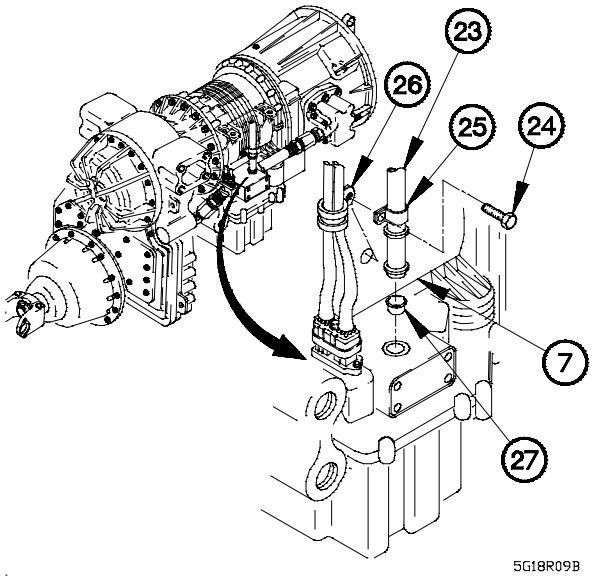
Note orientation of 90-degree fittings prior to removal.

(16) Remove 90-degree fittings (15 and 17) from transmission (7).

(17) Remove two preformed packings (19 and 21) from 90-degree fittings (15 and 17). Discard preformed packings.

(18) Remove dipstick (22) from oil dipstick tube (23).





NOTE

Perform step (19) on transmission serial numbers prior to 6510032369.

(19) Remove bolt (24), clamp (25), and wiring harness clamp (26) from transmission (7).

NOTE

Perform step (20) on transmission serial number 6510032369 and higher.

(20) Remove bolt (24) from clamp (25).

(21) Remove oil dipstick tube (23) from transmission (7).

(22) Remove seal (27) from oil dipstick (23). Discard seal.

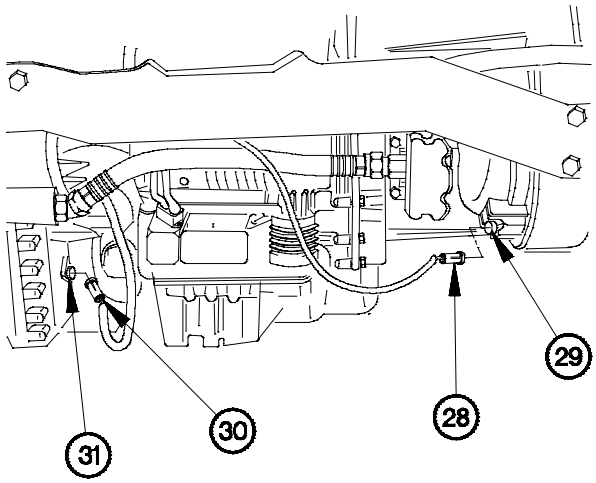
7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

NOTE

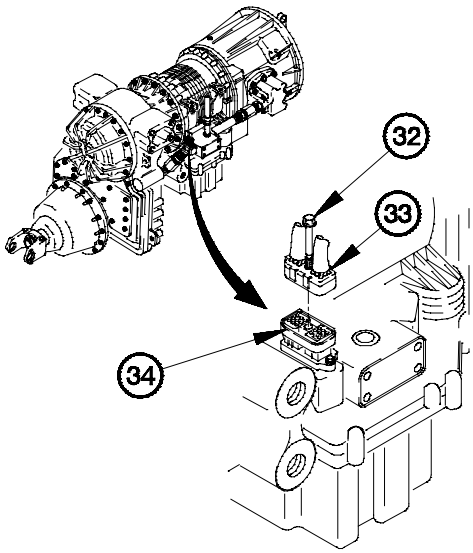
- Tag electrical connections and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(23) Disconnect engine speed sensor connector (28) from engine speed sensor (29).

(24) Disconnect output speed sensor connector (30) from transfer case module (31).



5G18R10B



5G18R11B

CAUTION

Due to position of main housing module connector, extreme care must be taken when removing main transmission external connector. Failure to comply may result in damage to equipment.

NOTE

Perform steps (25) and (26) on transmission serial numbers prior to 6510032369.

(25) Loosen bolt (32) on main transmission external connector (33).

(26) Remove main transmission external connector (33) from main housing module receptacle (34).

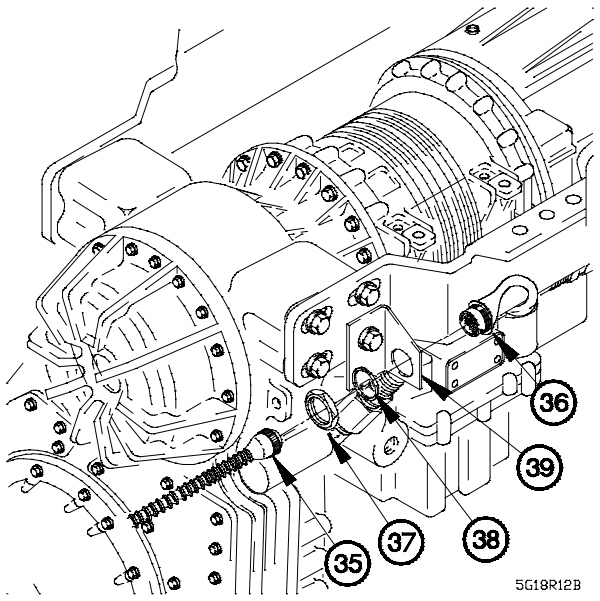
NOTE

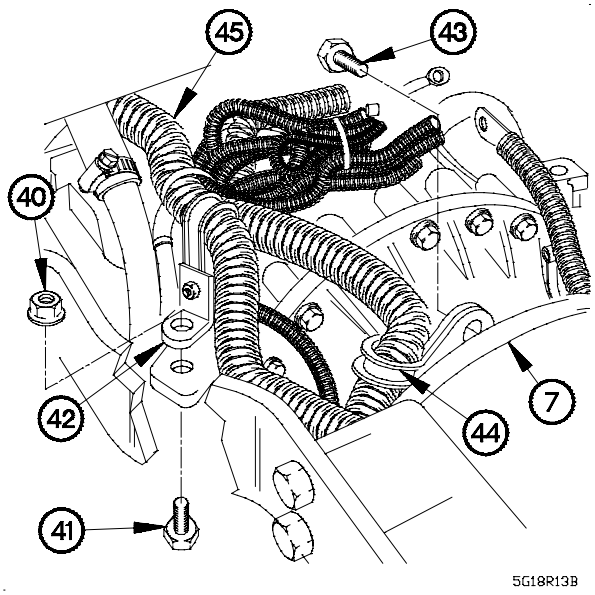
Perform steps (27) through (29) on transmission serial number 6510032369 and higher.

(27) Disconnect transmission external wiring harness connector (35) from transmission adapter harness (36).

(28) Remove nut (37), washer (38), and transmission adapter harness (36) from bracket (39).

(29) Install washer (38) and nut (37) on transmission adapter harness (36).





(30) Remove self-locking nut (40), bolt (41), and clamp (42) from transmission (7). Discard self-locking nut.

NOTE

Perform steps (31) and (32) on transmission serial numbers prior to 6510032369.

(31) Remove bolt (43) and clamp (44) from transmission (7).

(32) Install bolt (43) in transmission (7).

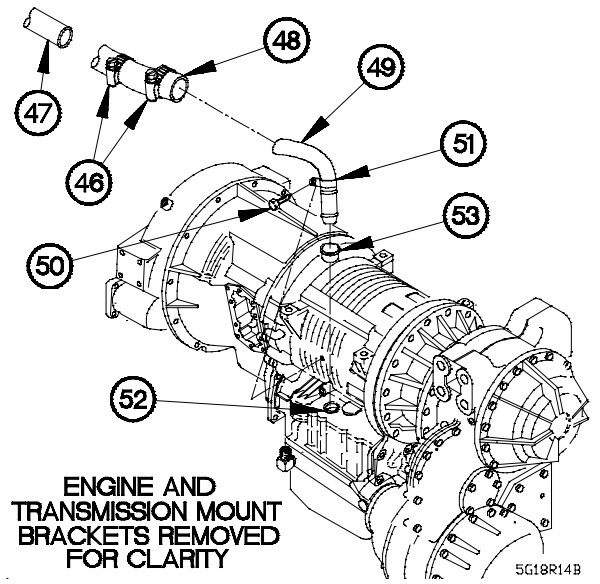
(33) Position wiring harness (45) for access to transmission (7).

(34) Loosen two clamps (46) on tube (47) and oil fill hose (48).

(35) Remove oil fill hose (48) from oil fill tube (49).

(36) Remove screw (50), oil fill tube clamp (51) and oil fill tube (49) from main housing module (52).

(37) Remove seal (53) from oil fill tube (49). Discard seal.



7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

NOTE

Perform step (38) on vehicles equipped with transmission oil cooler tubes.

(38) Remove four screws (54), washers (55), flywheel cover (56), and gasket (57) from flywheel housing (58). Discard gasket.

NOTE

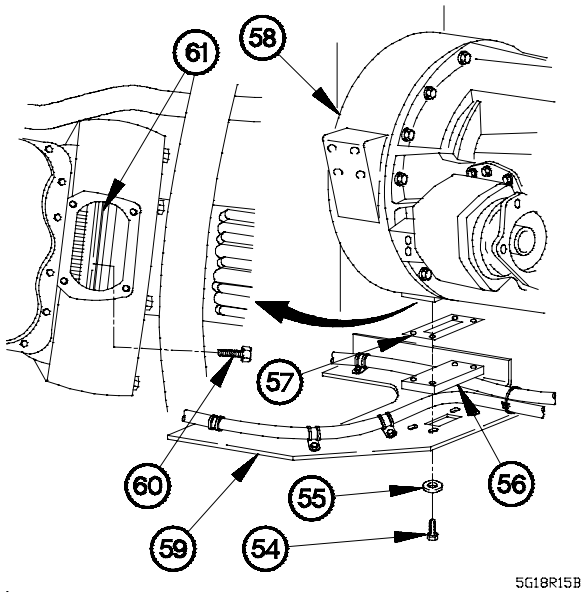
Perform step (39) on vehicles equipped with transmission oil cooler hoses.

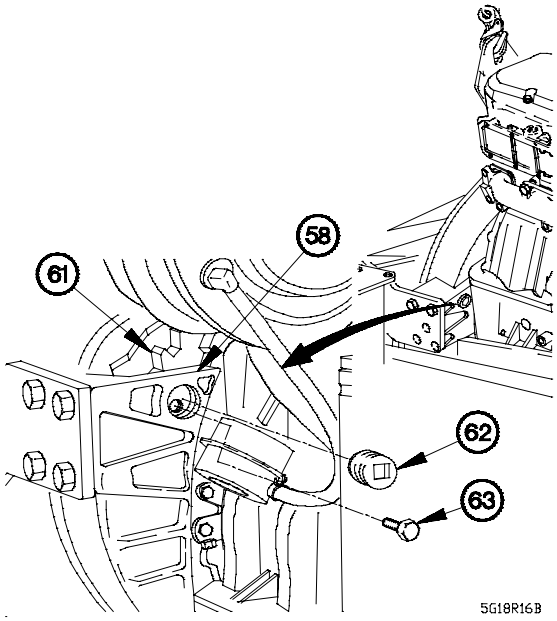
(39) Remove four screws (54), washers (55), transmission oil cooler hose bracket (59), flywheel cover (56), and gasket (57) from flywheel housing (58). Discard gasket.

NOTE

- Perform step (40) on vehicle serial numbers 0001 through 7211.
- Step (40) requires the aid of an assistant.
- During removal of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(40) Remove 12 bolts (60) from flexplate (61).





NOTE

Perform steps (41) and (42) on vehicle serial numbers 1478 and higher.

(41) Remove plug (62) from flywheel housing (58).

NOTE

- Step (42) requires the aid of an assistant.
- During removal of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(42) Remove six bolts (63) from flexplate (61).

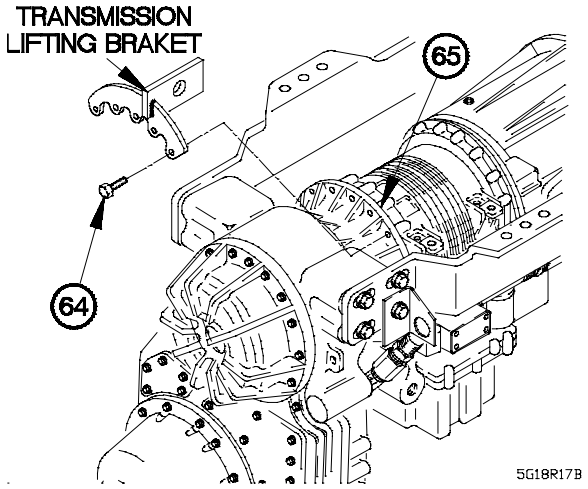
(43) Remove five bolts (64) from adapter housing module (65).

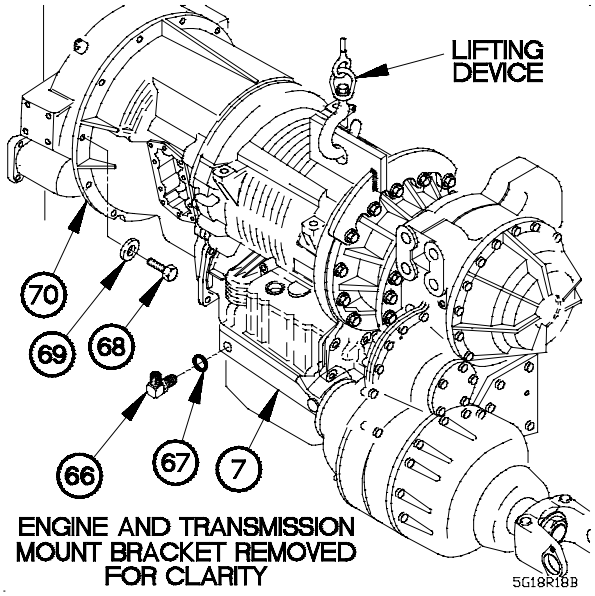
NOTE

Transmission lifting bracket is installed with lift eye top-dead-center facing forward.

(44) Position transmission lifting bracket on adapter housing module (65) with five bolts (64).

(45) Tighten five bolts (64) to 42-50 lb-ft (57-68 N·m).





WARNING

Transmission assembly weighs approximately 1300 lbs (590 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

- Perform steps (46) and (47) on vehicles equipped with PTO.
- Note orientation of 90-degree fitting prior to removal.

(46) Remove 90-degree fitting (66) from transmission (7).

(47) Remove preformed packing (67) from 90-degree fitting (66). Discard preformed packing.

NOTE

Steps (48) through (54) require the aid of an assistant.

(48) Remove 12 bolts (68) and washers (69) from transmission torque converter housing (70).

7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

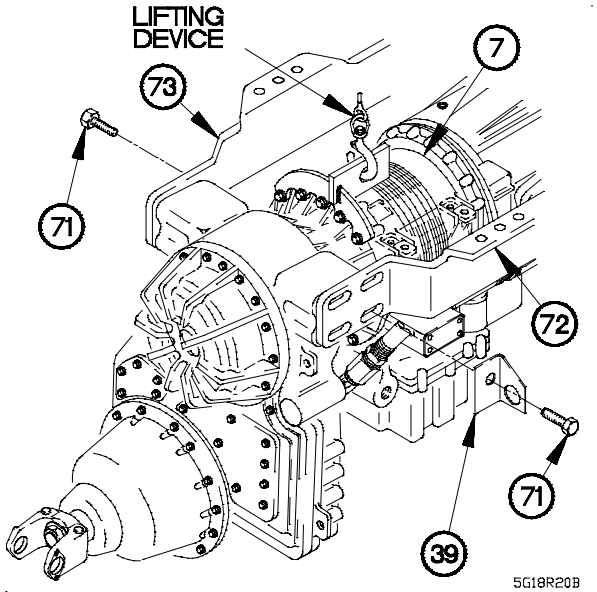
NOTE

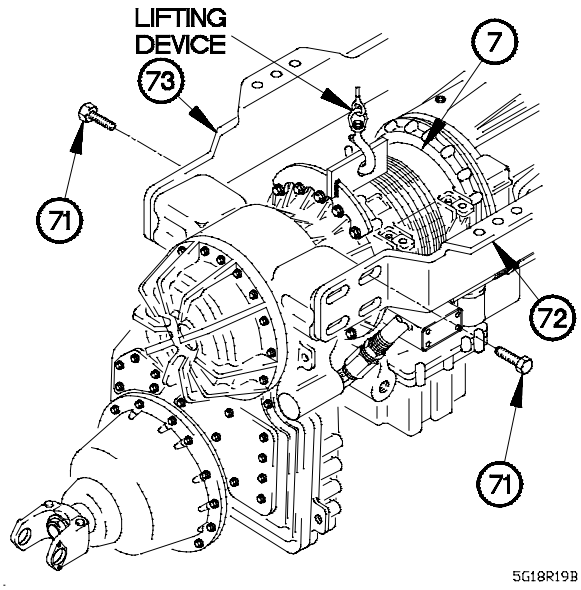
Perform steps (49) through (51) on transmission serial numbers prior to 6510032369.

(49) Remove four bolts (71) from RH engine and transmission mount bracket (72).

(50) Remove four bolts (71) from LH engine and transmission mount brackets (73).

(51) Remove transmission (7) from vehicle.





NOTE

Perform steps (52) through (54) on transmission serial number 6510032369 and higher.

(52) Remove four bolts (71) and bracket (39) from RH engine and transmission mount bracket (72).

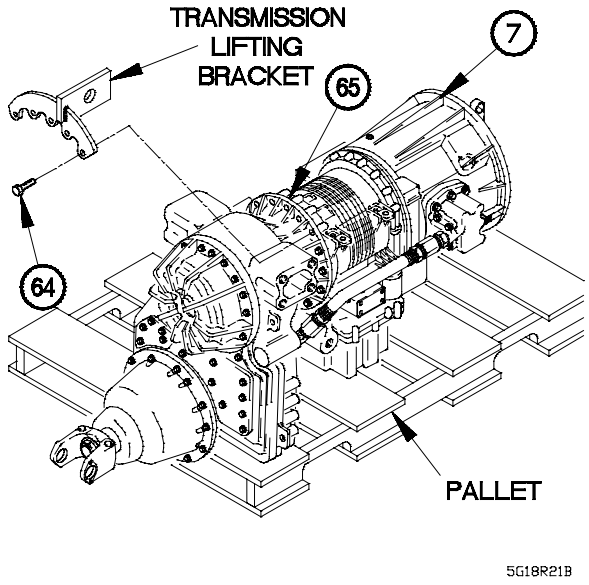
(53) Remove four bolts (71) from LH engine and transmission mount bracket (73).

(54) Remove transmission (7) from vehicle.

(55) Lift transmission (7) and place on pallet.

(56) Remove five bolts (64) and transmission lifting bracket from adapter housing module (65).

(57) Install five bolts (64) in adapter housing module (60).

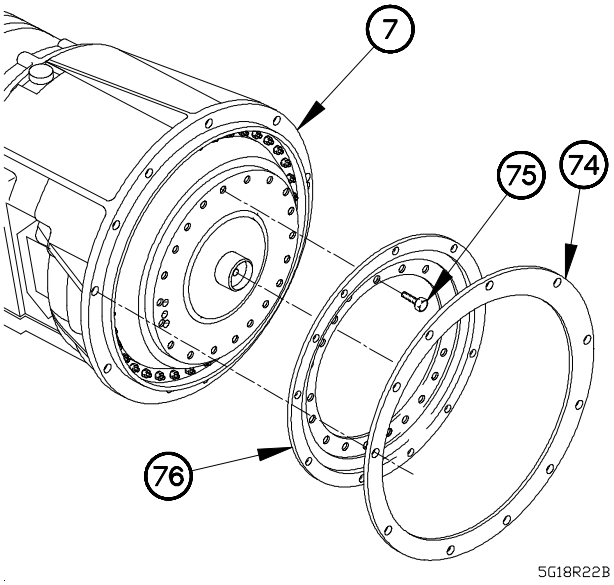


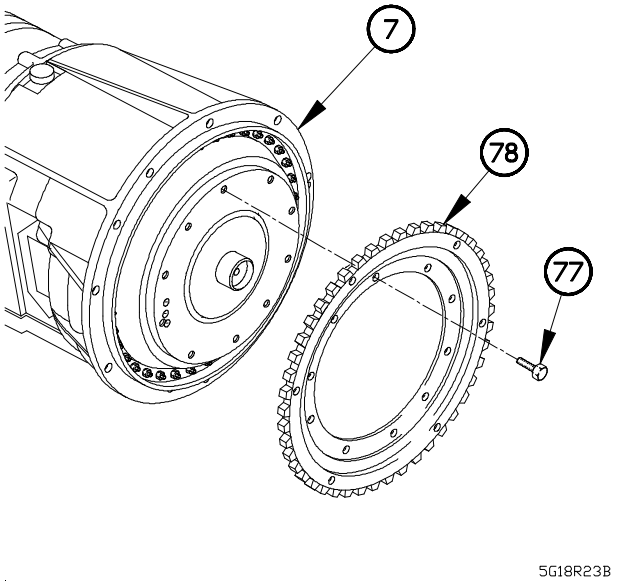
(58) Remove gasket (74) from transmission (7). Discard gasket.

NOTE

Perform step (59) on transmission serial numbers prior to 6510032369.

(59) Remove 20 bolts (75) and pressure plate assembly (76) from transmission (7).





NOTE

Perform step (60) on serial number 6510032369 and higher.

(60) Remove 10 bolts (77) and spur gear (78) from transmission (7).

(61) If replacing transmission with serial number prior to 6510032369 with serial number 6510032369 or higher, remove transmission external wiring harness (para 6-7) and replace with new wiring harness part number 12420826.

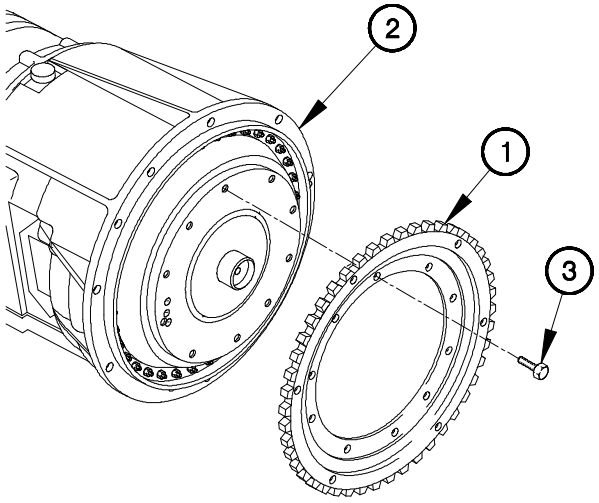
b. Installation.

NOTE

Perform step (1) and (2) if spur gear was removed from transmission serial number 6510032369 and higher.

(1) Position spur gear (1) on transmission (2) with 10 bolts (3).

(2) Tighten 10 bolts (3) to 25-29 lb-ft (34-39 N•m).



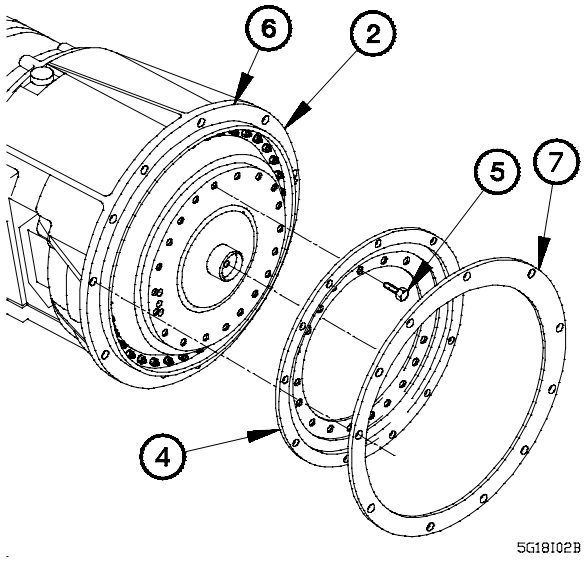
7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

NOTE

Perform steps (3) and (4) if pressure plate assembly was removed from transmission serial numbers prior to 6510032369.

(3) Position pressure plate assembly (4) on transmission (2) with 20 bolts (5).

(4) Tighten 20 bolts (5) to 18-22 lb-ft (24-30 N·m).

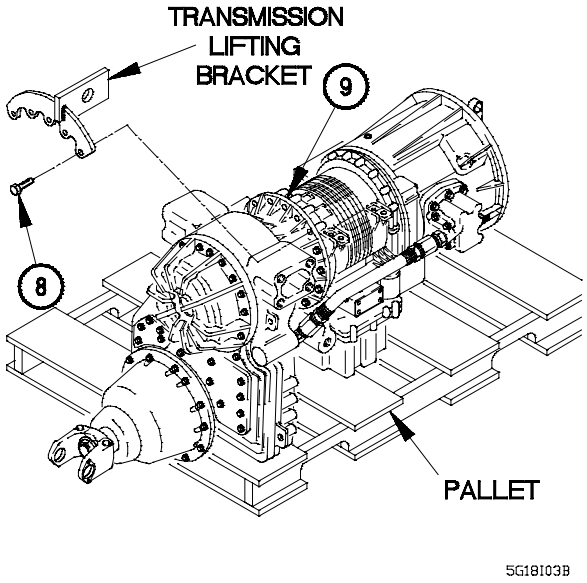


WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(5) Apply light coat of sealing compound to seating surface (6) on transmission (2).

(6) Install gasket (7) on transmission (2).



(7) Remove five bolts (8) from adapter housing module (9).

NOTE

Transmission lifting bracket is installed with lift top-dead center facing forward.

(8) Position transmission lifting bracket on adapter housing module (9) with five bolts (8).

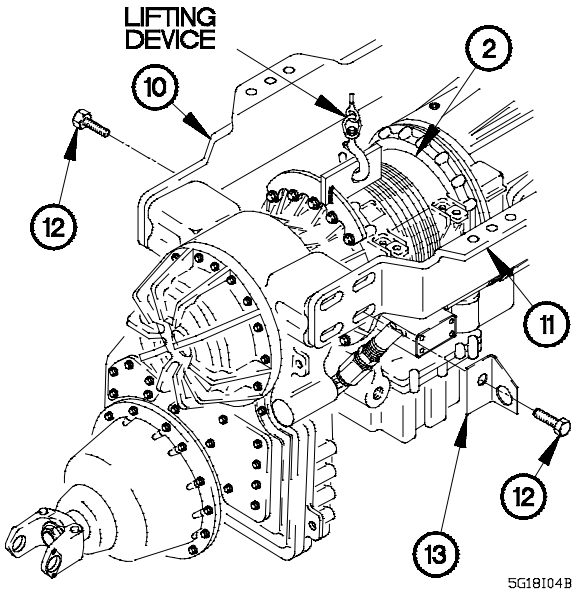
(9) Tighten five bolts (8) to 42-50 lb-ft (57-68 N·m).

WARNING

- **Transmission assembly weighs approximately 1300 lbs (590 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**
- **Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**

NOTE

- Perform steps (10) through (13) on transmission serial number 6510032369 and higher.
- Steps (10) and (11) require the aid of two assistants.

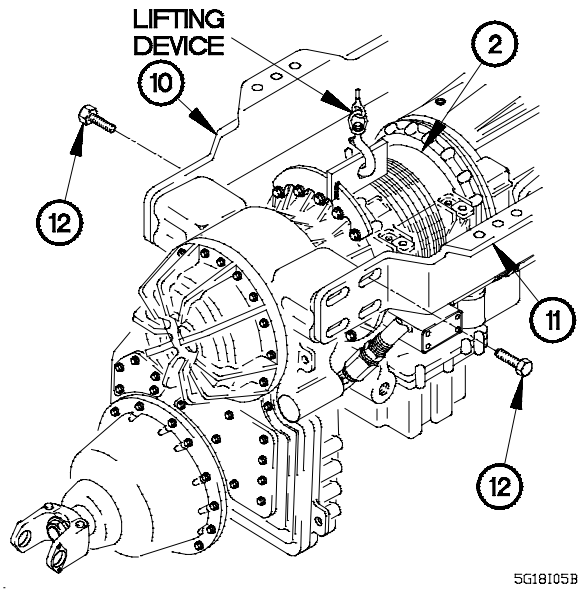


(10) Raise transmission (2) in position between LH and RH engine and transmission mount brackets (10 and 11).

(11) Position four bolts (12) in LH engine and transmission mount bracket (10).

(12) Position four bolts (12) and bracket (13) in right cradle mount bracket (11).

(13) Tighten eight bolts (12) to 400-488 lb-ft (542-662 N·m).



NOTE

- Perform steps (14) through (16) on transmission serial numbers prior to 6510032369.
- Steps (14) and (15) require the aid of two assistants.

(14) Raise transmission (2) in position between LH and RH engine and transmission mount brackets (10 and 11).

(15) Position four bolts (12) in LH and RH engine and transmission mount brackets (10 and 11).

(16) Tighten eight bolts (12) to 400-488 lb-ft (542-662 N·m).

7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

(17) Position 12 washers (14) and bolts (15) in torque converter housing module (16).

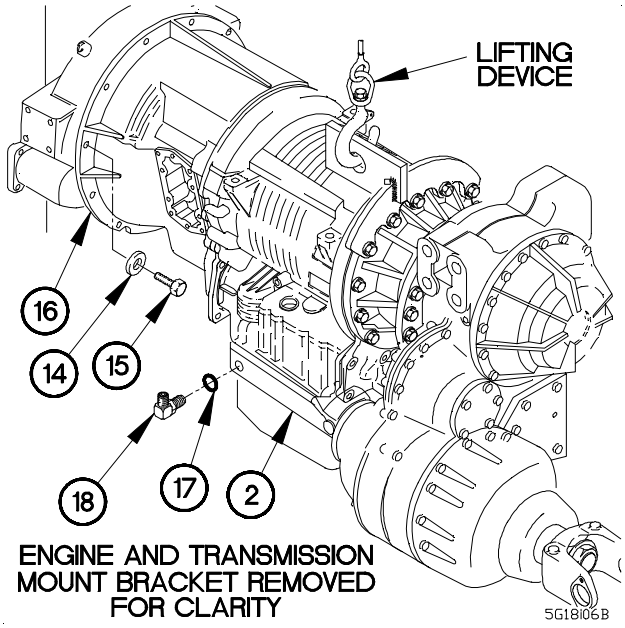
(18) Tighten 12 bolts (15) to 37-45 lb-ft (50-61 N•m).

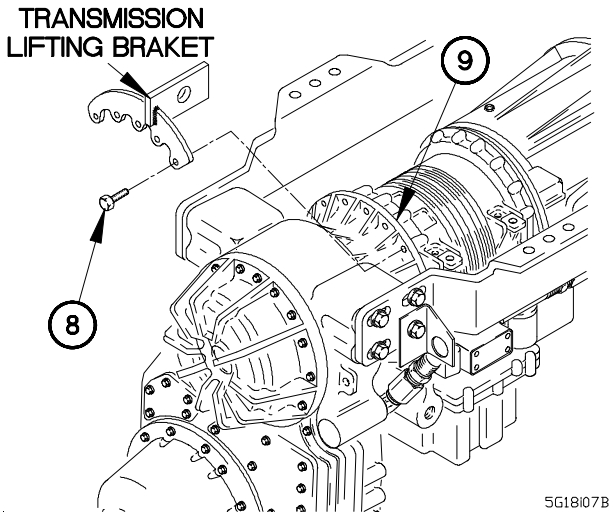
NOTE

Perform steps (19) and (20) on vehicles equipped with PTO.

(19) Position preformed packing (17) on 90-degree fitting (17).

(20) Install 90-degree fitting (18) on transmission (2).





(21) Remove five bolts (8) and transmission lifting bracket from adapter housing module (9).

(22) Position five bolts (8) in adapter housing module (9).

(23) Tighten five bolts (8) to 42-50 lb-ft (57-68 N•m).

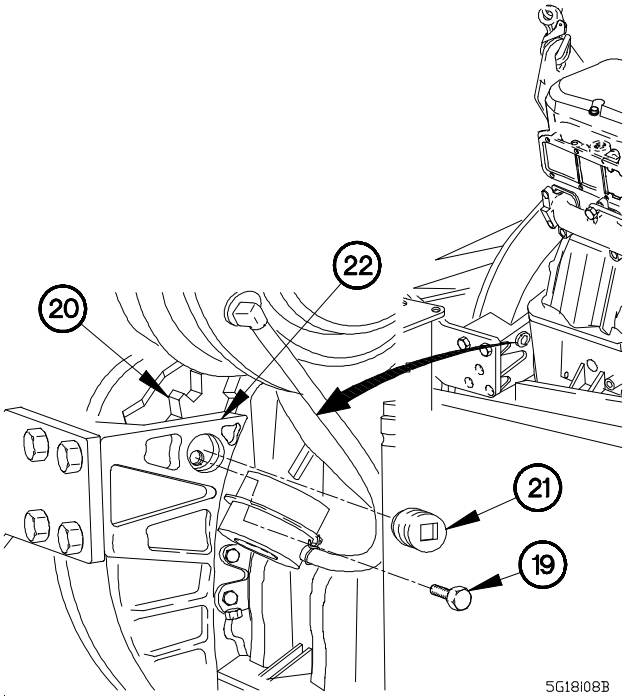
NOTE

- Perform steps (24) through (26) on vehicle serial numbers and higher.
- Steps (24) and (25) require the aid of an assistant.
- During installation of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(24) Position six bolts (19) in flexplate (20).

(25) Tighten six bolts (19) to 25-29 lb-ft (34-39 N•m).

(26) Install plug (21) in flywheel housing (22).



NOTE

- Steps (27) and (28) require the aid of an assistant.
- During installation of flexplate bolts, access each flexplate bolt by turning alternator pulley through a series of short arcs.

(27) Position 12 bolts (23) in flexplate (20).

NOTE

Perform step (28) on vehicles equipped with transmission oil cooler tubes.

(28) Tighten 12 bolts (23) to 18-22 lb-ft (24-30 N·m).

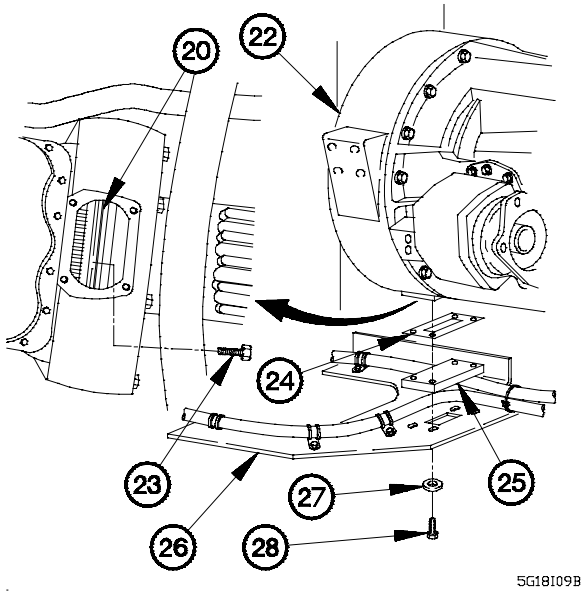
NOTE

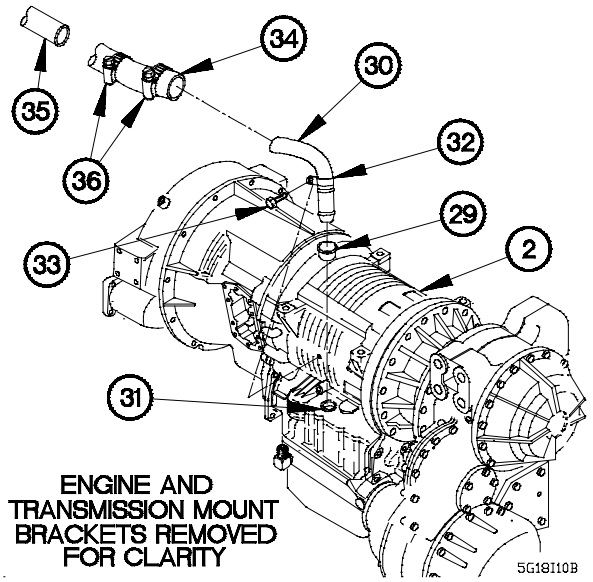
Perform step (29) on vehicles equipped with transmission oil cooler hoses.

(29) Install gasket (24), flywheel cover (25), and transmission oil cooler hose bracket (26) on flywheel housing (22) with four washers (27) and screws (28).

(30) Position gasket (24), flywheel cover (25) on flywheel housing (22) with four washers (28).

(31) Tighten four screws (26) to 21-25 lb-ft (30-35 N·m).





(32) Install seal (29) on oil fill tube (30).

(33) Install oil fill tube (30) in main housing module (31).

(34) Position oil fill tube clamp (32) on transmission (2) with screw (33).

(35) Tighten screw (33) to 32-45 lb-ft (50-61 N·m).

(36) Position oil fill hose (34) on oil fill tube (30) and tube (35) with two clamps (36).

(37) Tighten two clamps (36) to 24-48 lb-ft (3-5 N·m).

7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

NOTE

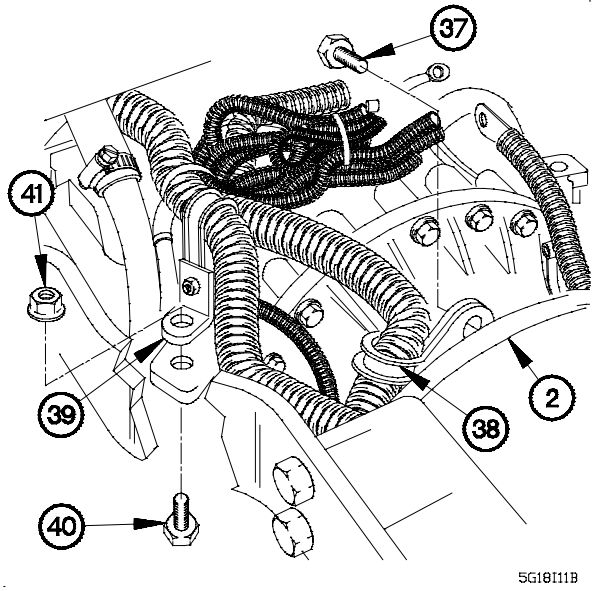
Perform steps (38) through (40) on transmission serial numbers prior to 6510032369.

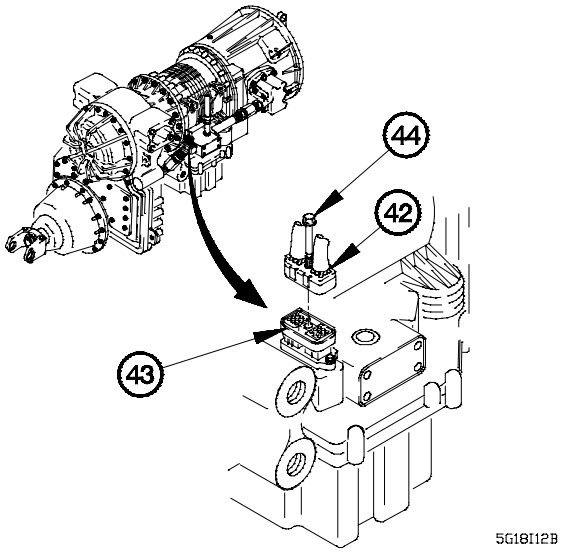
(38) Remove bolt (37) from transmission (2).

(39) Position clamp (38) on transmission (2) with bolt (37).

(40) Tighten bolt (37) to 42-50 lb-ft (57-68 N·m).

(41) Install clamp (39) on transmission (2) with bolt (40) and self-locking nut (41).





CAUTION

Due to position of main housing module connector, extreme care must be taken when installing pigtail adapter connector. Failure to comply may result in damage to equipment.

NOTE

- If transmission with serial number prior to 6510032369 was removed and replaced with serial number 6510032369 and higher, a transmission adapter harness (part number 29519210) will be used to adapt transmission to transmission external wiring harness.

- Install plastic cable ties as required.

(42) Position transmission adapter harness (42) in main housing module receptacle (43) with bolt (44).

(43) Tighten bolt (44) to 12-24 lb-ft (1-3 N·m).

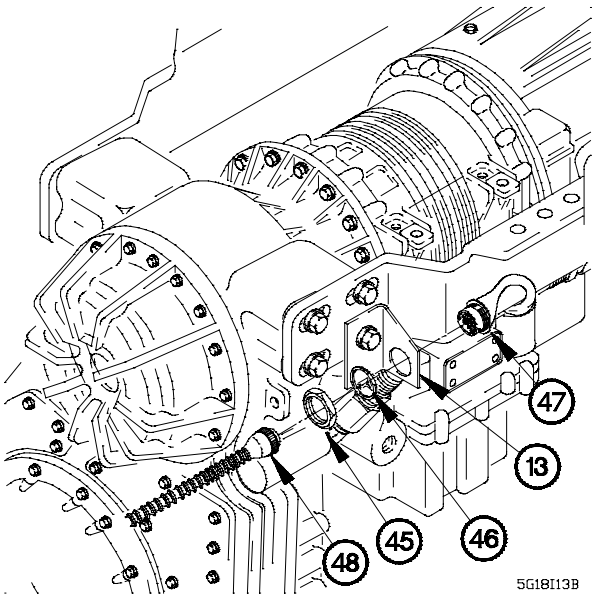
NOTE

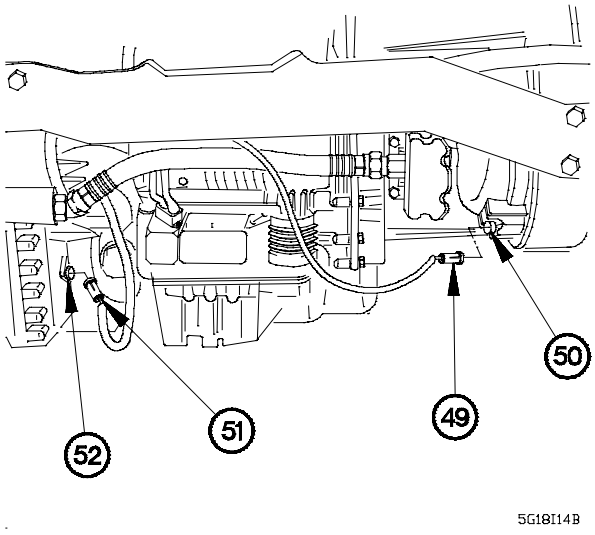
Perform steps (44) through (46) on transmission serial number 6510032369 and higher.

(44) Remove nut (45) and washer (46) from transmission adapter harness (47).

(45) Install transmission adapter harness (47) in bracket (13) with washer (46) and nut (45).

(46) Connect transmission external wiring harness connector (48) to transmission adapter harness (47).





(47) Connect engine speed sensor connector (49) to engine speed sensor (50).

(48) Connect output speed sensor connector (51) to transfer case module (52).

(49) Install seal (53) on oil dipstick tube (54).

(50) Install oil dipstick tube (54) in transmission (2).

NOTE

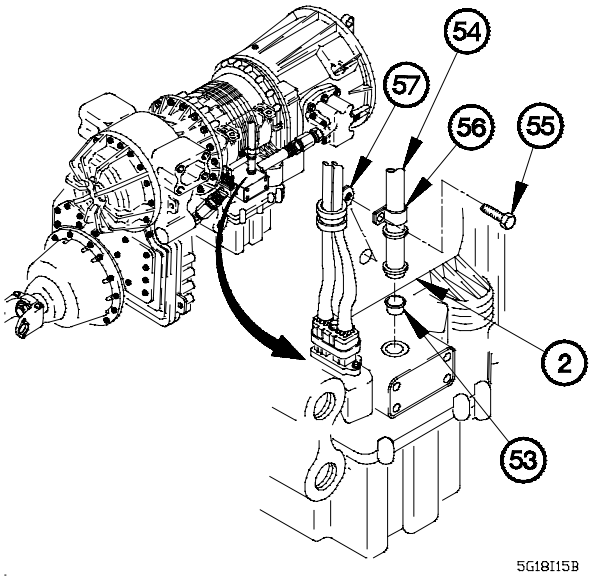
Perform step (51) on transmission serial number 6510032369 and higher.

(51) Install bolt (55) in clamp (56).

NOTE

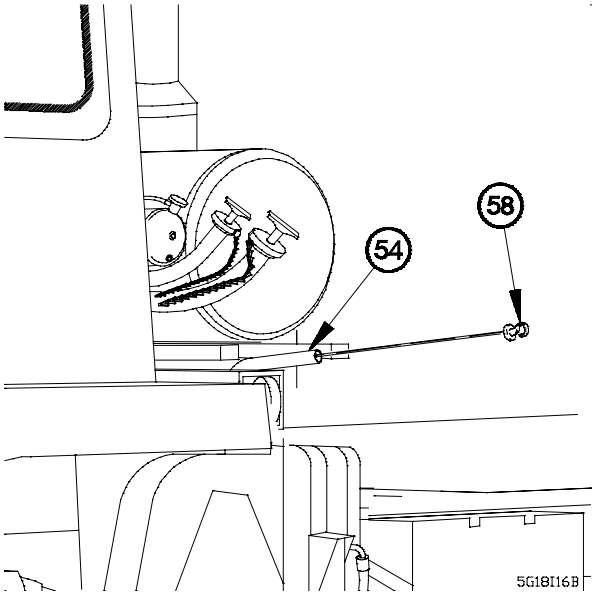
Perform step (52) on transmission serial numbers prior to 6510032369.

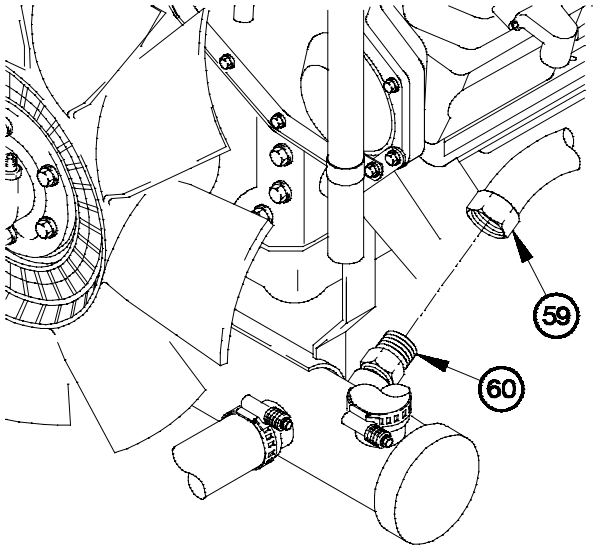
(52) Install bolt (55) in clamp (56) and wiring harness clamp (57) on transmission (2).



7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)

(53) Install dipstick (58) in oil dipstick tube (54).





NOTE

- Perform steps (54) through (61) with transmission oil cooler tubes.
- Step (54) requires the aid of an assistant.

(54) Install transmission oil cooler tube (59) on fitting (60).

(55) Tighten transmission oil cooler tube (59) to 94-104 lb-ft (127-141 N·m).

(56) Install preformed packing (61) on 90-degree fittings (62 and 63).

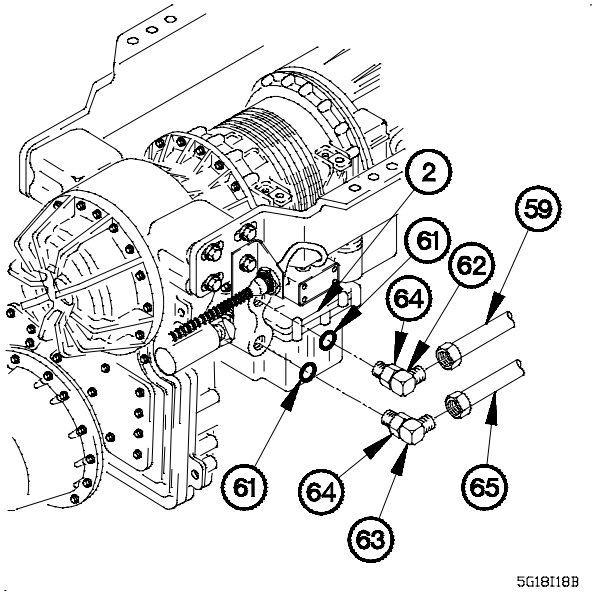
(57) Position 90-degree fittings (62 and 63) on transmission (2).

(58) Tighten jam nuts (64) on 90-degree fittings (62 and 63).

(59) Connect transmission oil cooler tube (59) to 90-degree fitting (62).

(60) Connect transmission oil cooler tube (65) to 90-degree fitting (63).

(61) Tighten transmission oil cooler tube (59 and 65) to 94-104 lb-ft (127-141 N·m).



NOTE

Perform steps (62) through (67) on vehicles equipped with transmission oil cooler hoses.

(62) Install preformed packings (61 and 66) on 90-degree fittings (62 and 63).

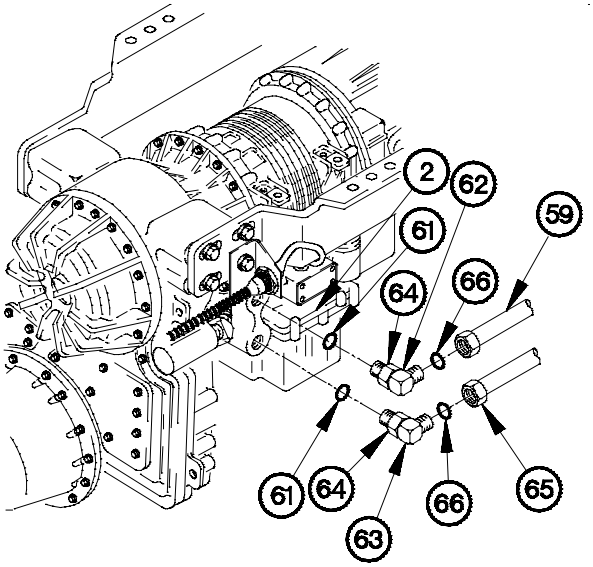
(63) Position 90-degree fittings (62 and 63) on transmission (2).

(64) Tighten jam nuts (64) on 90-degree fittings (62 and 63).

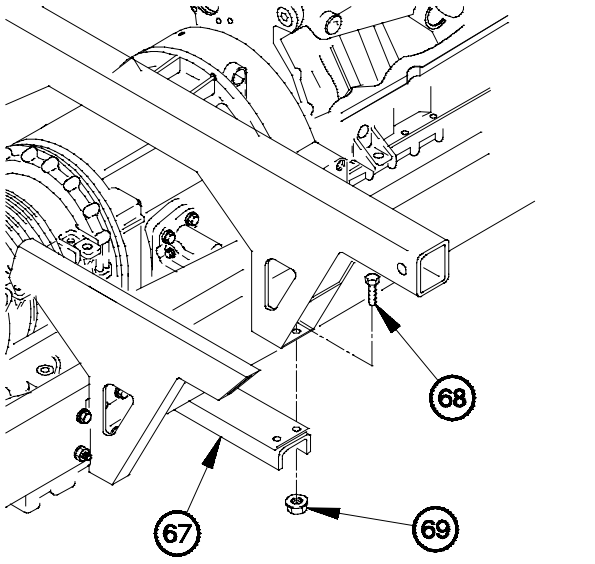
(65) Position transmission oil cooler hose (65) on 90-degree fitting (62).

(66) Position transmission oil cooler hose (65) on 90-degree fitting (63).

(67) Tighten transmission oil cooler hoses (59 and 65) to 94-104 lb-ft (127-141 N·m).



5G18I19B



5G18I20B

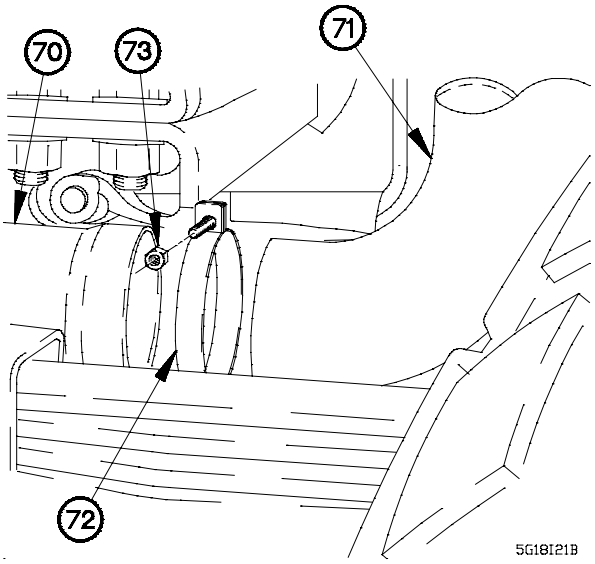
NOTE

- Perform steps (68) and (69) on vehicles equipped with transmission oil cooler hoses.
- Steps (68) and (69) require the aid of an assistant.

(68) Position lower front support crossmember (67) on vehicle with four bolts (68) and self-locking nuts (69).

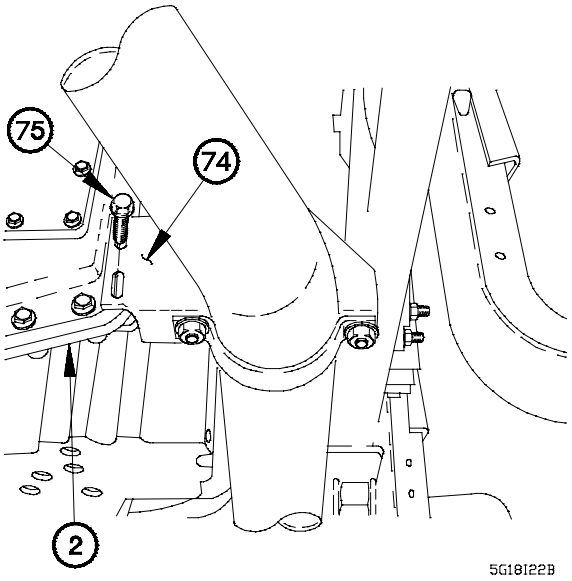
(69) Tighten four self-locking nuts (69) to 117-131 lb-ft (159-178 N·m).

7-18. TRANSMISSION ASSEMBLY REPLACEMENT (UNUSUAL CONDITIONS) (CONT)



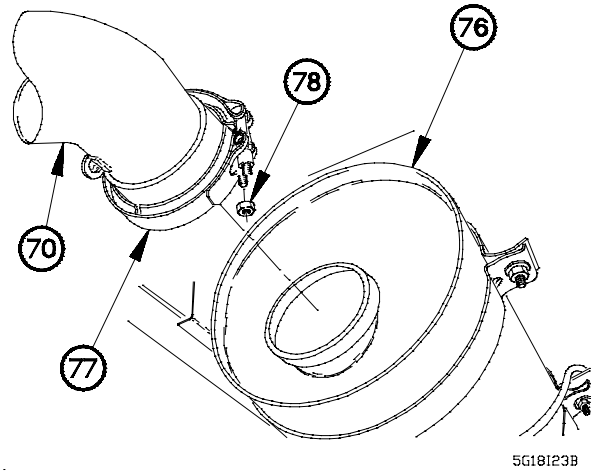
(70) Position lower exhaust pipe (70) on upper exhaust pipe (71) with clamp (72) and self-locking nut (73).

(71) Tighten self-locking nut (72) to 89-109 lb-in. (10-12 N·m).



(72) Position exhaust bracket (74) on transmission (2) with two bolts (75).

(73) Tighten two bolts (75) to 44-55 lb-ft (60-75 N·m).



(74) Position lower exhaust pipe (70) on muffler (76) with clamp (77) and self-locking nut (78).

(75) Tighten self-locking nut (78) to 89-109 lb-in. (10-12 N·m).

c. Follow-On Maintenance.

(1) Install cargo bed, if equipped (para 15-8).

(2) Install hydraulic pump, if equipped (para 16-5).

(3) Install PTO, if equipped (para 16-6).

(4) Install rear drive shaft (TM 9-2320-365-20-3).

(5) Install front drive shaft (TM 9-2320-365-20-3).

(6) Service transmission (TM 9-2320-365-20-3).

(7) Service transfer case (TM 9-2320-365-20-3).

(8) Connect batteries (TM 9-2320-365-20-3).

(9) Install spare tire (TM 9-2320-365-10).

(10) Operate vehicle and check transmission for oil leaks.

(11) Check exhaust pipe for exhaust leaks, excessive noise, and vibration.

End of Task.

CHAPTER 8
POWER TRANSFER AND FINAL DRIVE ASSEMBLY MAINTENANCE

Section I. INTRODUCTION 8-1
8-1. INTRODUCTION 8-1

Section II. MAINTENANCE PROCEDURE 8-2
8-2. TRANSFER CASE CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR 8-2
8-3. TRANSFER CASE MODULE SEAL AND DRIVE YOKE REPLACEMENT 8-8
8-4. TRANSFER CASE MODULE REPLACEMENT 8-11

Section I. INTRODUCTION

8-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repairing of Power Transfer and Final Drive Assembly Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURE

8-2. TRANSFER CASE CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-150 lb-in (Item 79, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Multimeter, Digital (Item 34, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

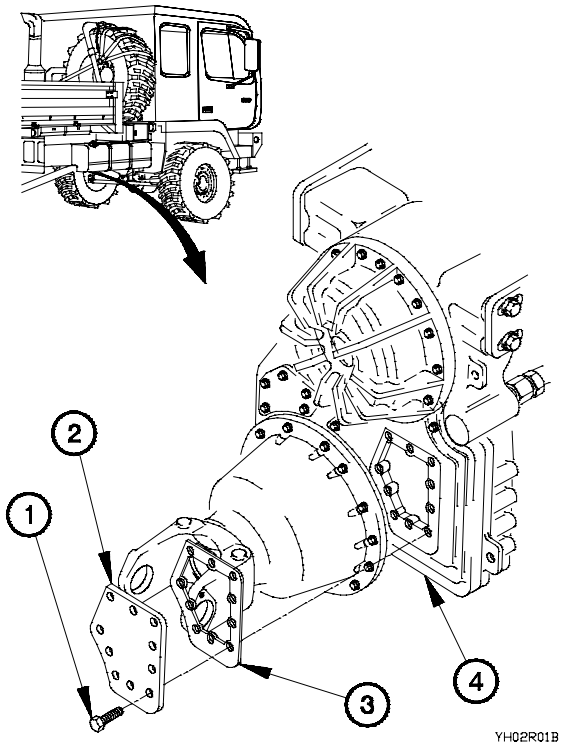
Materials/Parts
Gasket (Item 41, Appendix F)
Gasket (Item 44, Appendix F)
Filter Element (Item 25, Appendix F)
Packing Preformed (Item 174, Appendix F)
Packing Preformed (Item 176, Appendix F)
Rag, Wiping (Item 59, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

(1) Remove 10 bolts (1), valve body cover (2), and gasket (3) from transfer case module (4). Discard gasket.



NOTE

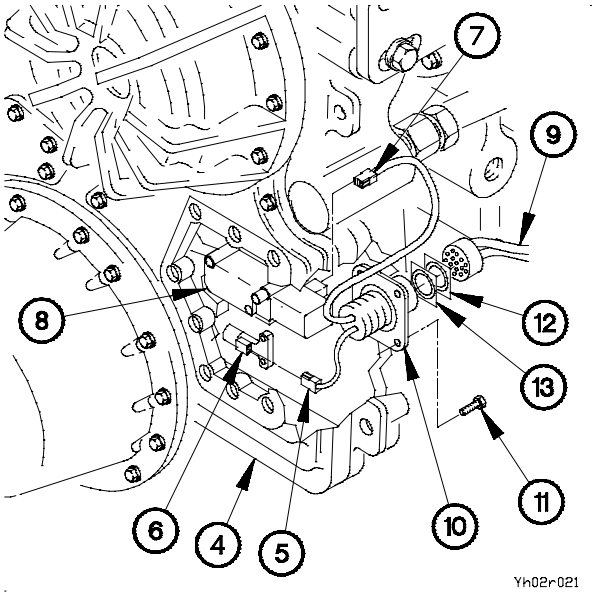
Tag wires and connection points prior to disconnecting.

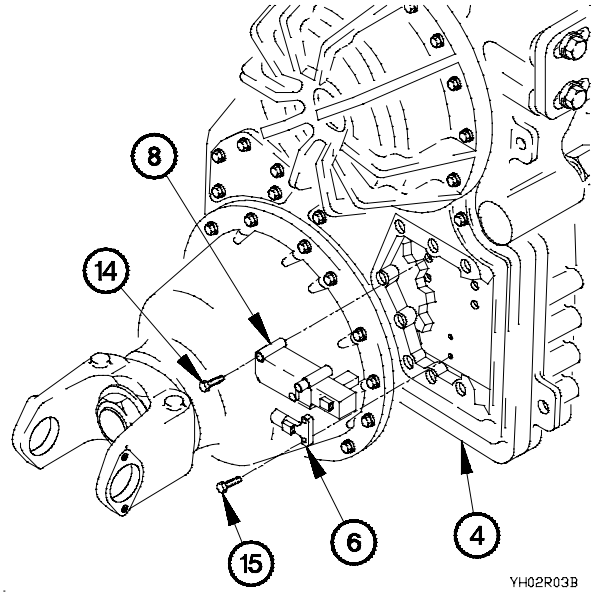
(2) Disconnect connector (5) from output speed sensor (6).

(3) Disconnect connector (7) from control valve assembly (8).

(4) Disconnect connector (9) from connector (10).

(5) Remove four bolts (11), connector (10), plate (12), and gasket (13) from transfer case module (4). Discard gasket.





(6) Remove six screws (14) and control valve solenoid (8) from transfer case module (4).

(7) Remove two screws (15) and output speed sensor (6) from transfer case module (4).

8-2. TRANSFER CASE CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

b. Disassembly.

(1) Remove filter element (1) from control valve body (2). Discard filter element.

WARNING

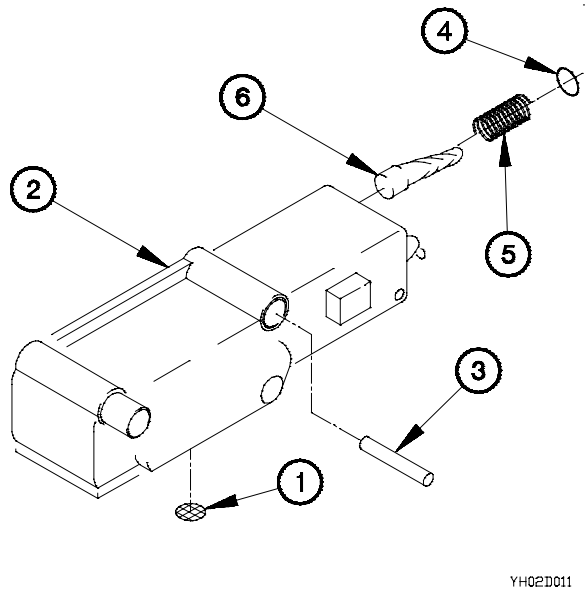
Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

NOTE

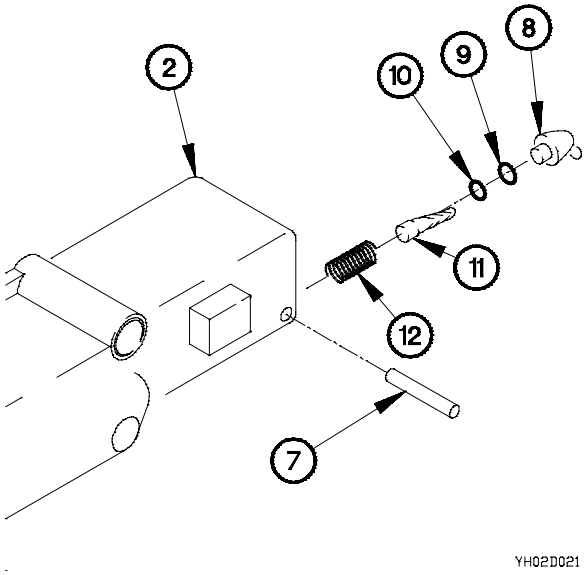
Retaining pin is punched out from top.

(2) Remove retaining pin (3) from control valve body (2).

(3) Remove stop (4), spring (5), and valve (6) from control valve body (2).



YH02D011



YH02D021

(4) Remove retaining pin (7) from control valve body (2).

(5) Remove solenoid (8) from control valve body (2).

(6) Remove preformed packings (9 and 10) from solenoid (8). Discard preformed packings.

(7) Remove valve (11) and spring (12) from control valve body (2).

c. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100° F (38° C) and for Type II is 130° F (50° C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection or resistance checks.

(2) Inspect connector (1) for continuity, damage, broken or missing pins, or excessive wear.

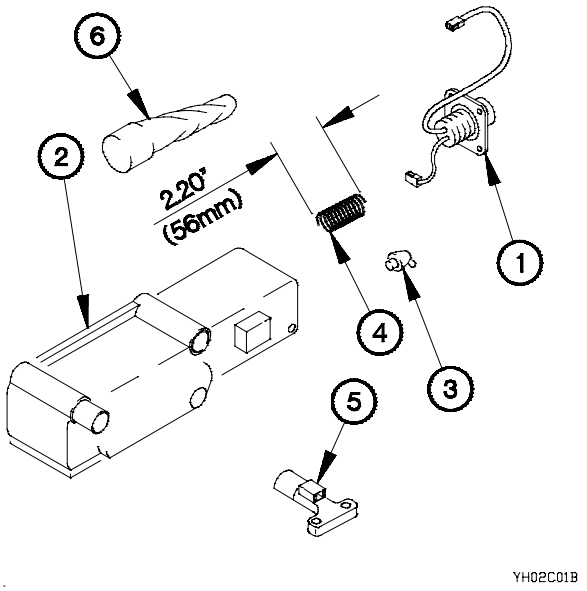
(3) Inspect control valve body (2) for cracks, pitting, or corrosion.

(4) Inspect solenoid (3) for continuity and resistance; resistance should read 3-5 ohms.

(5) Inspect two springs (4) for maximum length of 2.20 in. (56 mm).

(6) Inspect speed sensor (5) for continuity and resistance; resistance should read 200-400 ohms.

(7) Inspect two valves (6) for cracks, pitting, or corrosion.



8-2. TRANSFER CASE CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

d. Assembly.

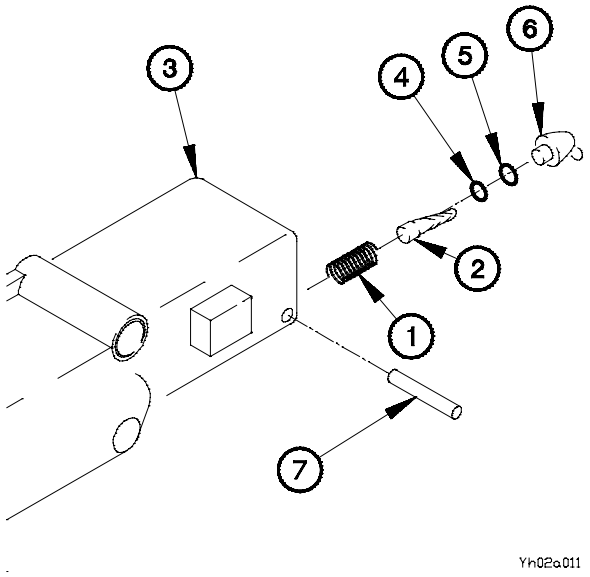
WARNING

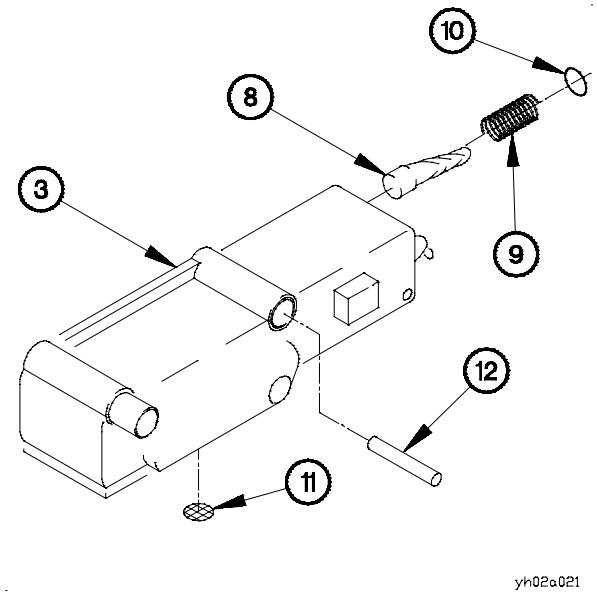
Use care when installing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Install spring (1) and valve (2) in control valve body (3).

(2) Install preformed packings (4 and 5) on solenoid (6).

(3) Install solenoid (6) in control valve body (3) with retaining pin (7).





(4) Install valve (8), spring (9), and stop (10) in control valve body (3).

(5) Install filter element (11) in control valve body (3).

(6) Install retaining pin (12) in control valve body (3).

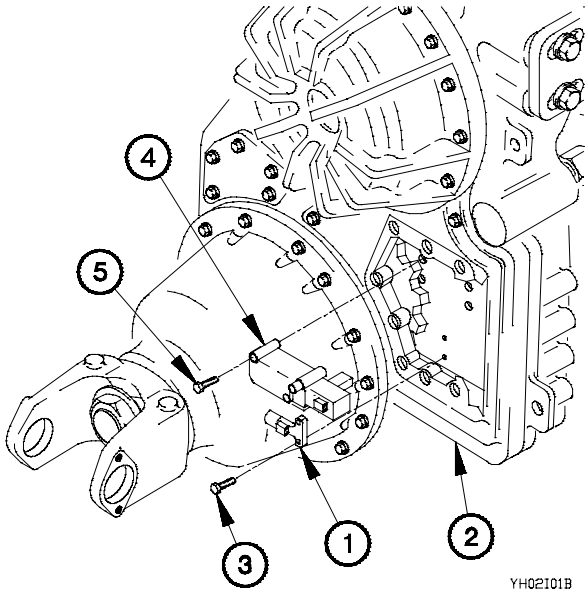
e. Installation.

(1) Position speed sensor (1) in transfer case module (2) with two bolts (3).

(2) Tighten two bolts (3) to 84-120 lb-in. (9-14 N•m).

(3) Position control valve assembly (4) in transfer case module (2) with six bolts (5).

(4) Tighten six bolts (5) to 22-30 lb-ft (30-41 N•m).



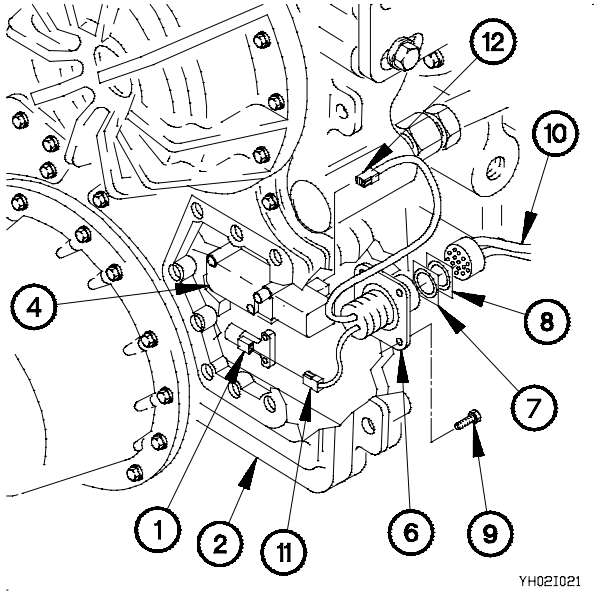
(5) Position connector (6), gasket (7), and plate (8) in transfer case module (2) with four bolts (9).

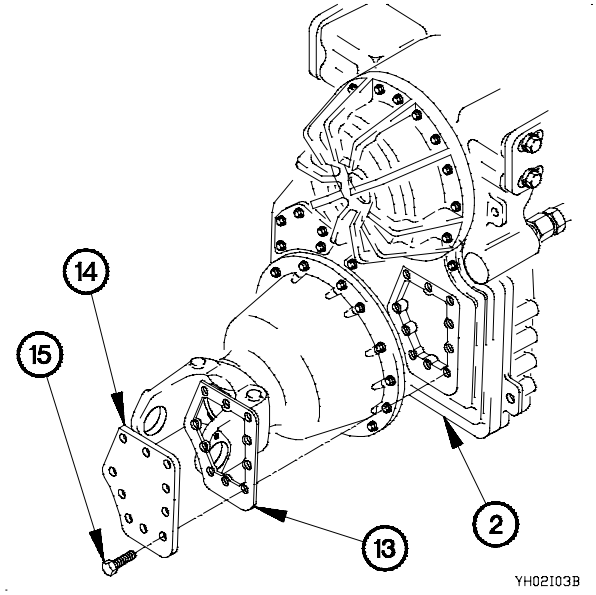
(6) Tighten four bolts (9) to 48-60 lb-in. (5-7 N•m).

(7) Connect connector (10) to connector (6).

(8) Connect connector (11) to speed sensor (1).

(9) Connect connector (12) to control valve solenoid (4).





(10) Position gasket (13) and valve body cover (14) on transfer case module (2) with 10 bolts (15).

(11) Tighten 10 bolts (15) to 18-21 lb-ft (24-28 N•m).

f. Follow-On Maintenance.

(1) Connect batteries (TM 9-2320-365-20-3).

(2) Start engine and check transfer case for leaks (TM 9-2320-365-10).

End of Task.

8-3. TRANSFER CASE MODULE SEAL AND DRIVE YOKE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket, Socket Wrench (Item 67, Appendix B)
Holding Bar, Pinion (TM 9-2320-365-20)
Installer, Seal (TM 9-2320-365-20)
Hammer, Hand, Soft Head (Item 28, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Sling, Cargo (Item 48, Appendix B)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 44, Appendix B)
Puller, Mechanical (Item 45, Appendix B)
Multiplier, Torque Wrench (Item 35, Appendix B)

Materials/Parts
Sealing Compound (Item 75.2, Appendix C)
Seal, Plain Encased (Item 265, Appendix F)
Nut, Self-Locking (Item 125, Appendix F)
Screw, Self-Locking (4) (Item 251.1, Appendix F)
Sealant (Item 64.1, Appendix C)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle. Falling debris may cause eye injury. Failure to comply may result in injury to personnel.

NOTE

Forward and rear seals and yokes are replaced the same way. Rear seal and yoke shown.

a. Removal.

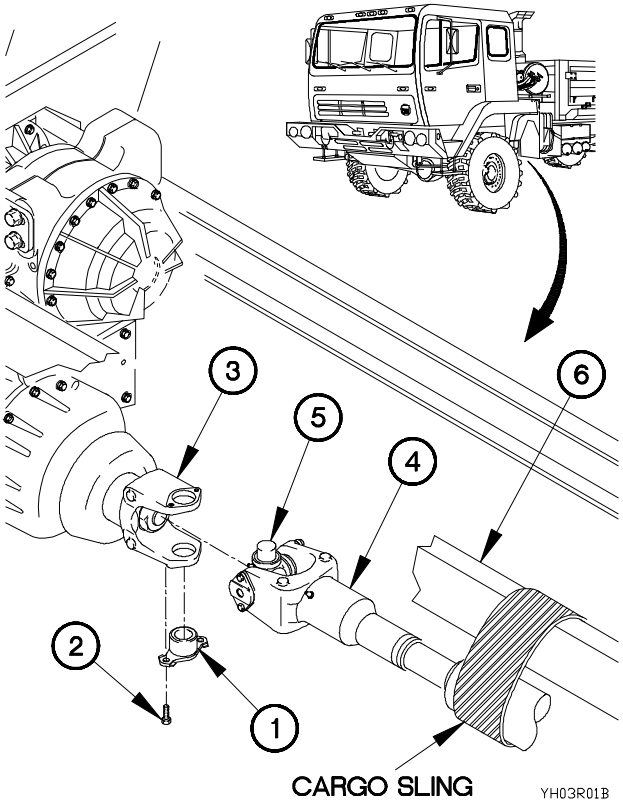
NOTE

There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups with tabs

(1) Lift tabs from two bearing cups (1).

(1.1) Remove four screws (2) and two bearing cups (1) from drive yoke (3). Discard screws.

(2) Slide drive shaft (4) from side to side and separate universal joint (5) from drive yoke (3).



NOTE

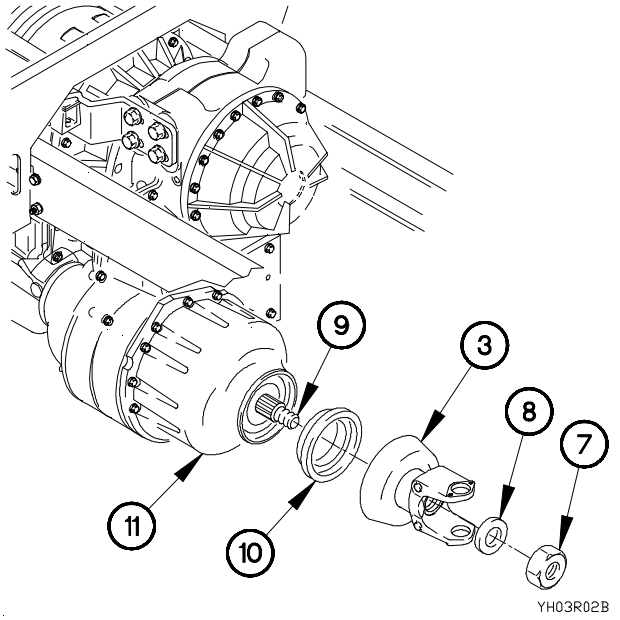
Step (3) requires the aid of an assistant.

(3) Attach drive shaft (4) to frame (6).

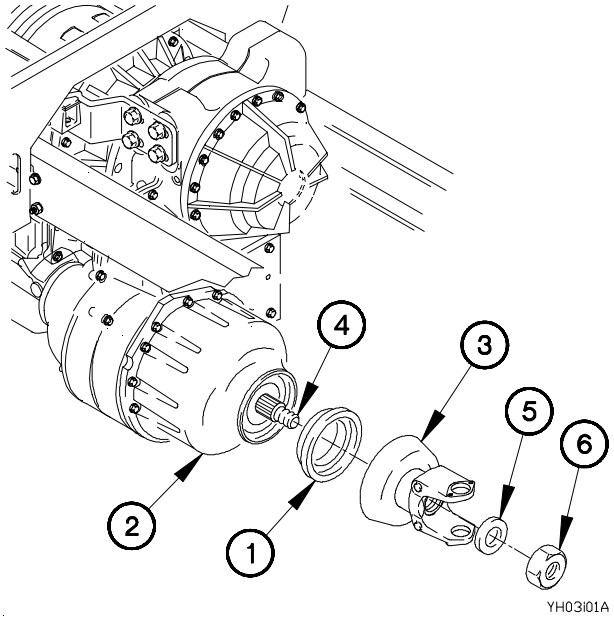
(4) Remove self-locking nut (7) and washer (8) from shaft (9). Discard self-locking nut.

(5) Remove drive yoke (3) from shaft (9).

(6) Remove seal (10) from housing (11). Discard seal.



b. Installation.



(1) Apply a small amount of grease to outside edge and spring cavity of seal (1).

(2) Install seal (1) in housing (2).

(3) Visually verify seal (1) is properly seated.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(3.1) Apply sealant to both sides of washer (5).

(4) Position drive yoke (3) on shaft (4) with washer (5) and self-locking nut (6).

(5) Tighten self-locking nut (6) to 450-600 lb-ft (610-815 N•m).

8-3. TRANSFER CASE MODULE SEAL AND DRIVE YOKE REPLACEMENT (CONT)

(6) Remove drive shaft (7) from frame (8).

WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

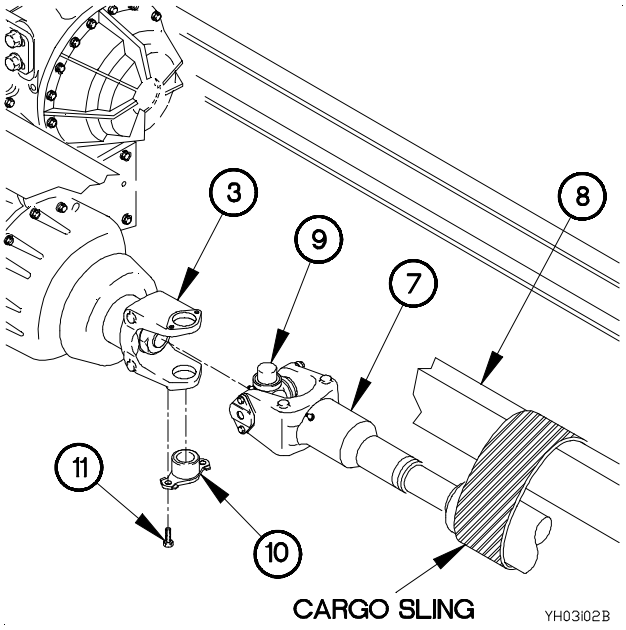
Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

- Wipe end of yoke bearing bores prior to installation.
- There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups not equipped with tabs.

(7) Position universal joint (9) on drive yoke (3) with two bearing cups (10) and four screws (11).

(7.1) Tighten four screws (11) to 26-35 lb-ft (35-47 N•m).



NOTE

- Perform the following step on kits equipped with screws P/N C5H5-24-39.
- Perform the following step on kits equipped with shear head screws.
- When correct torque is reached, bearing cap screw small hex head will break off.

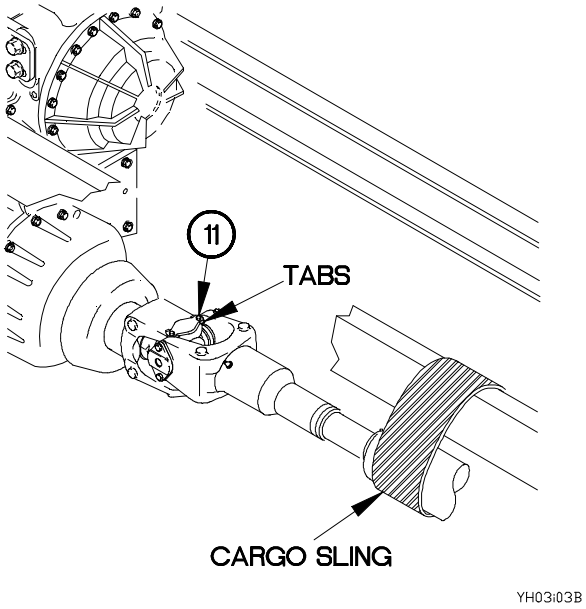
(8) Tighten four screws (11).

NOTE

Perform the following two steps on bearing cups equipped with tabs.

(8.1) Tighten four screws (11) to 26-35 lb-ft (35-47 N•m).

(8.2) Fold tabs on four screws (11).



c. Follow-On Maintenance.

(1) Check transfer case oil level (TM 9-2320-365-20).

(1.1) Lubricate drive shaft universal joint and slip yoke (TM 9-2320-365-20-1).

(2) Operate vehicle and check for proper operation of drive
train (TM 9-2320-365-10).

(3) Check seal for oil leaks.

End of Task.

8-4 TRANSFER CASE MODULE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions
Transmission mounted on maintenance stand (para 7-5).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Stand, Maintenance, Automotive Engine (TM 9-2320-365-20)
Bracket Assembly, Lift, Transfer Case (Item 18, Appendix D)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Multiplier, Torque Wrench (Item 35, Appendix B)

Materials/Parts
Screw, Hex Head (8) (Item 78, Appendix C)
Packing, Preformed (Item 172, Appendix F)
Gasket (Item 43, Appendix F)

Personnel Required
(2)

a. Removal.

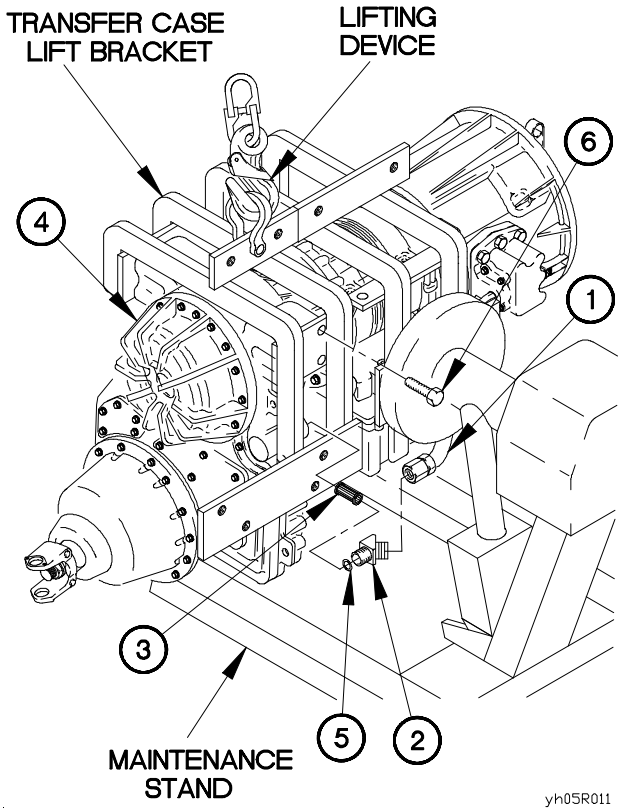
(1) Disconnect hose (1) from 45-degree fitting (2).

(2) Remove 45-degree fitting (2) and screen (3) from transfer case module (4).

(3) Remove preformed packing (5) from 45-degree fitting (2). Discard preformed packing.

(4) Position transfer case lift bracket on transfer case module (4) with eight screws (6).

(5) Tighten eight screws (6) to 42-50 lb-ft (57-68 N•m).



8-4. TRANSFER CASE MODULE REPLACEMENT (CONT)

WARNING

Transfer case weighs approximately 500 lbs (227 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(6) Take up slack on transfer case lift bracket to support transfer case module (4).

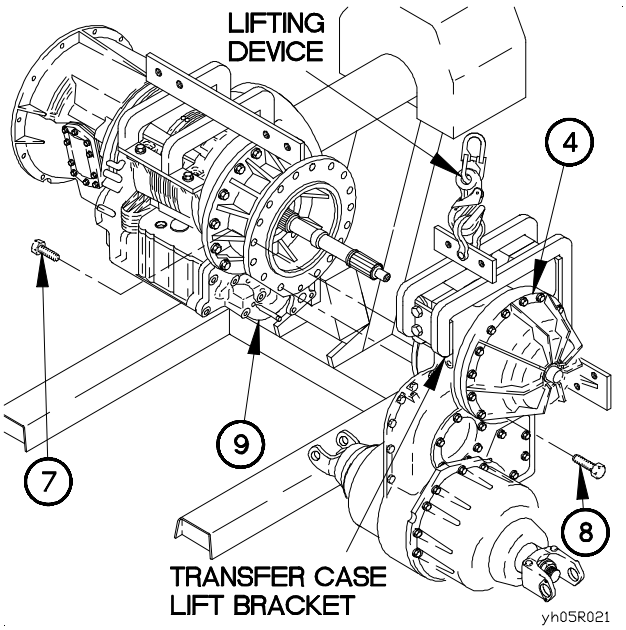
(7) Remove 19 bolts (7) from transfer case module (4).

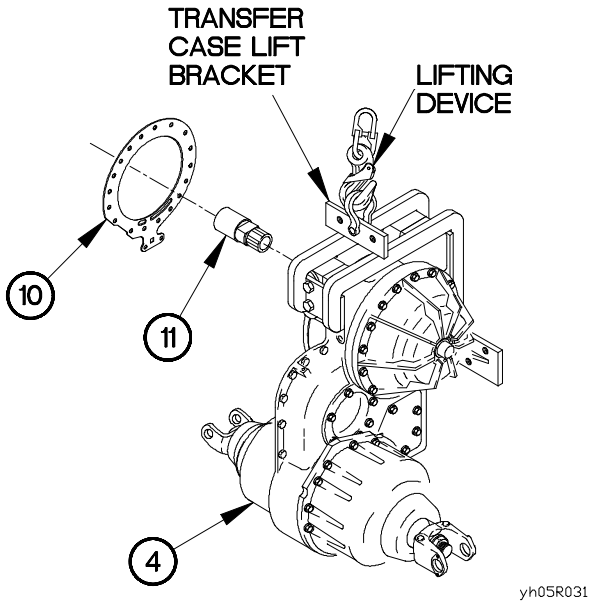
(8) Remove bolt (8) from front side of transfer case module (4).

NOTE

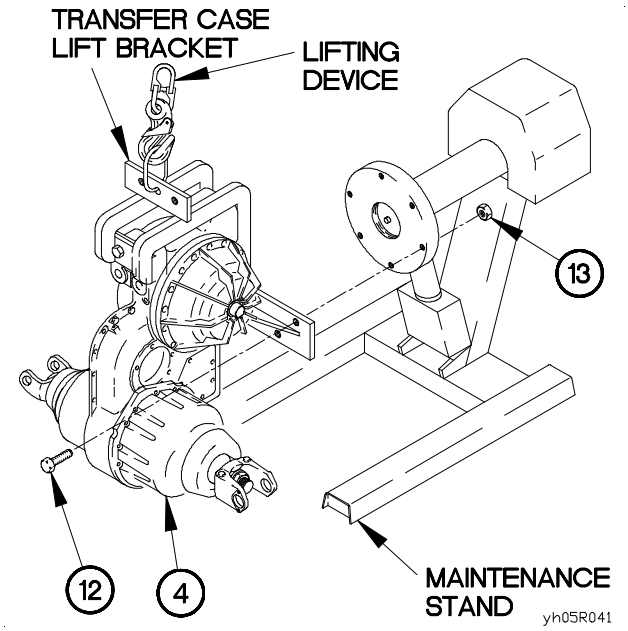
Step (9) requires the aid of an assistant.

(9) Remove transfer case module (4) from adapter housing module (9).





(10) Remove gasket (10) and transmission shift adapter (11) from transfer case module (4). Discard gasket.



NOTE

Step (11) requires the aid of an assistant.

(11) Install transfer case lift bracket and transfer case module (4) on maintenance stand with four bolts (12) and nuts (13).

b. Installation.

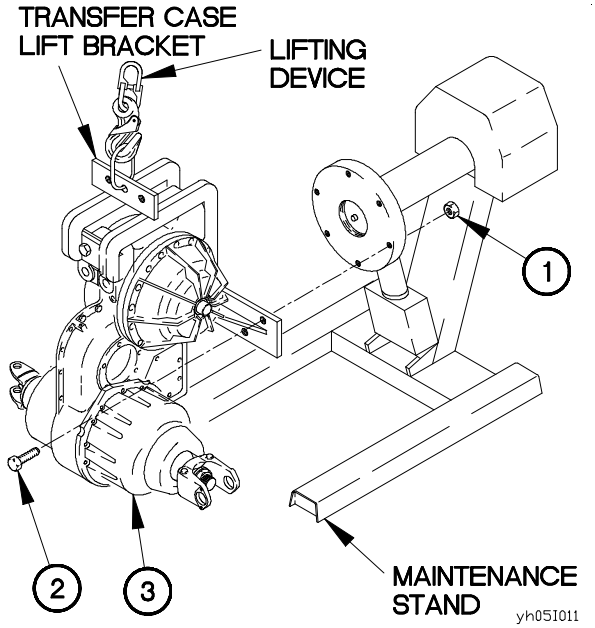
WARNING

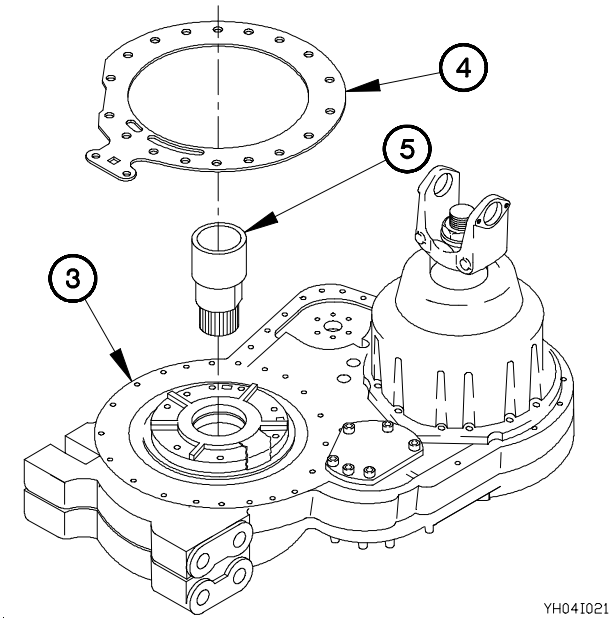
Transfer case module weighs approximately 500 lbs (227 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (1) requires the aid of an assistant.

(1) Remove four nuts (1), bolts (2), and transfer case module (3) from maintenance stand.





(2) Install transmission shaft adapter (5) in transfer case housing (3).

(3) Install gasket (4) on transfer case housing (3).

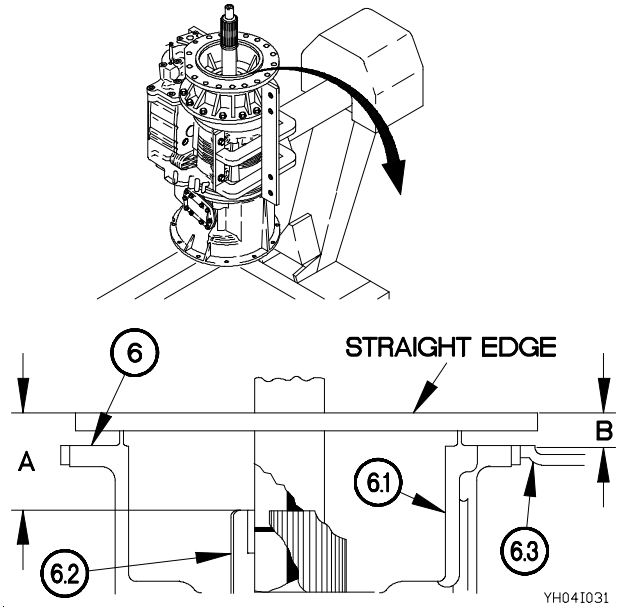
8-4. TRANSFER CASE MODULE REPLACEMENT (CONT)

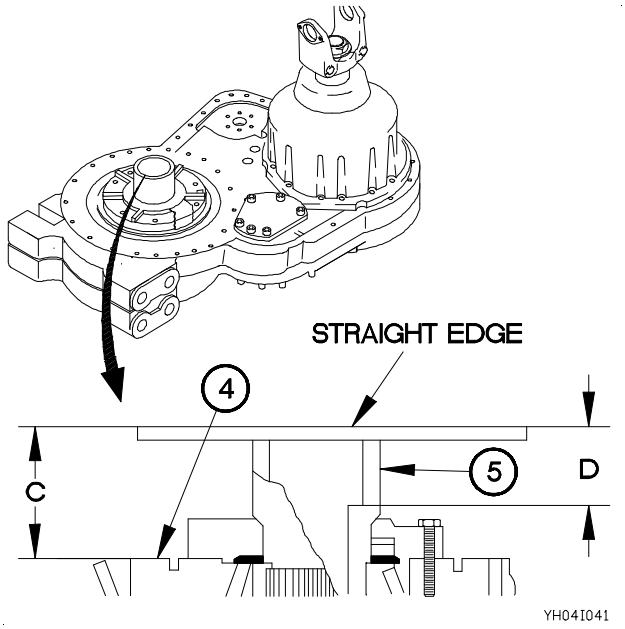
(3.1) Position main housing (6.1) with adapter housing (6) facing up.

(3.2) Place straight edge across raised ridge of transmission adapter housing (6).

(3.3) Measure dimension “A” between straight edge and top of P3 planetary module (6.2) Record measurement.

(3.4) Measure dimension “B” between straight edge and adapter housing flage (6.3). Record measurement.





(3.5) Place straight edge across top of transmission shaft adapter (5).

(3.6) Measure dimension “C” between straight edge and gasket (4). Record measurement.

(3.7) Measure dimension “D” from inside of transmission shaft adapter (5) to straight edge. Record measurement.

(3.8) Subtract dimension “B” from dimension “A”. Subtract dimension “D” from dimension “C”. Subtract total from (A-B) and total from (C-D) = dimension “E”. Record measurement.

NOTE

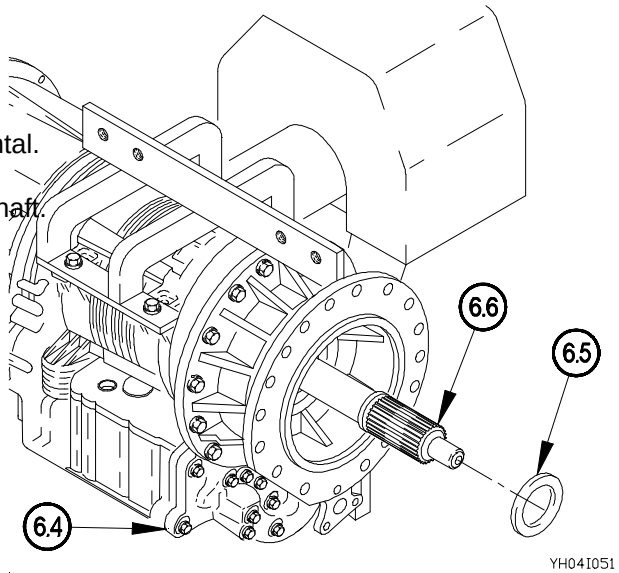
Based on dimension "E", select proper selective spacer from **Table 8-1. Selective Spacer Chart**.

TABLE 8-1.
SELECTIVE SPACER CHART

DIMENSION "E"	USE P/N	SPACER INSIDE DIAMETER
0.180-0.190 in. 4.572-4.826 mm	29503226	1 NOTCH
0.192-0.201 in. 4.877-5.105 mm	29503227	2 NOTCHES
0.202-0.212 in. 5.131-5.385 mm	29503228	3 NOTCHES
0.213-0.223 in. 5.410-5.664 mm	29503229	4 NOTCHES
0.224-0.233 in. 5.690-5.918 mm	29503230	5 NOTCHES
0.234-0.244 in. 5.944-6.198 mm	29503231	6 NOTCHES
0.245-0.254 in. 6.223-6.452 mm	29503232	7 NOTCHES

(3.9) Position transmission with main housing (6.4) horizontal.

(3.10) Install selective spacer (6.5) on P3 planetary (6.6) shaft.



8-4. TRANSFER CASE MODULE REPLACEMENT (CONT)

NOTE

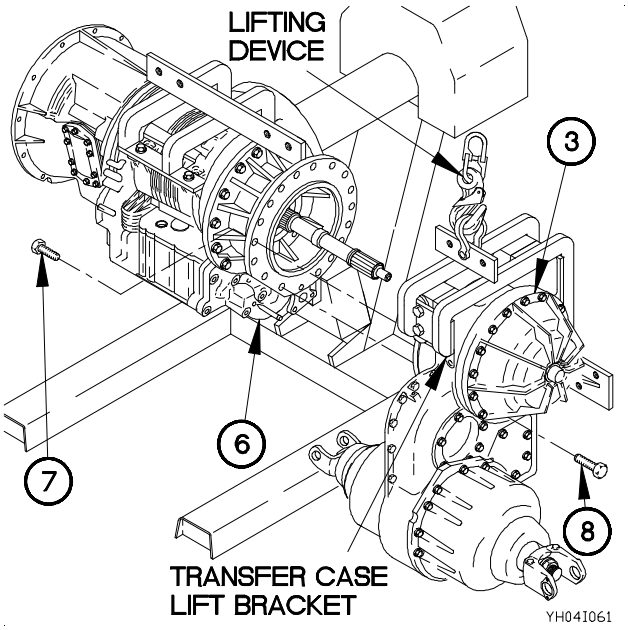
- Transmission should be in horizontal position on maintenance stand.
- Step (4) requires the aid of an assistant.

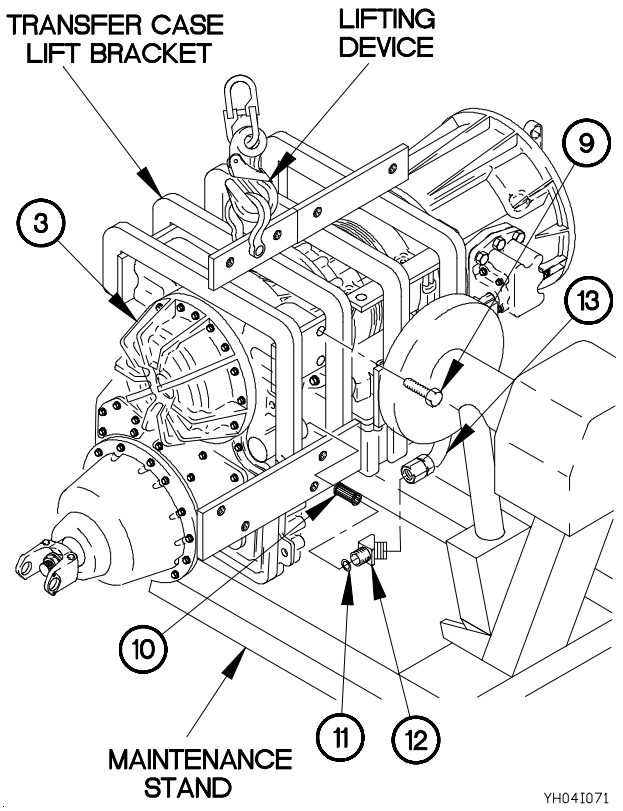
(4) Position transfer case module (3) on transmission adapter housing module (6).

(5) Position 19 bolts (7) in transmission adapter housing module (6).

(6) Position bolt (8) in opposite side of transmission adapter housing module (6).

(7) Tighten 19 bolts (7) and bolt (8) to 42-50 lb-ft (57-68 N•m).





(8) Remove eight screws (9) and transfer case lift bracket from transfer case module (3).

(9) Install screen (10) in transfer case module (3).

(10) Install preformed packing (11) and 45-degree fitting (12) on transfer case module (3).

(11) Install hose (13) on 45-degree fitting (12).

End of Task.

CHAPTER 9
FRONT AXLE MAINTENANCE

Section I. INTRODUCTION 9-1
9-1. INTRODUCTION 9-1

Section II. MAINTENANCE PROCEDURES 9-2
9-2. FRONT AXLE ASSEMBLY REPLACEMENT 9-2
9-3. FRONT AXLE SHAFT AND SEALS REPLACEMENT 9-11
9-4. FRONT AXLE DIFFERENTIAL CARRIER REPLACEMENT 9-15
9-5. FRONT AXLE DIFFERENTIAL PINION SEAL, YOKE SEAL AND DRIVE YOKE REPLACEMENT . . . 9-19
9-6. STEERING KNUCKLE MECHANISM REPLACEMENT 9-22

Section I. INTRODUCTION

9-1. INTRODUCTION

This chapter contains maintenance instructions for replacement of Front Axle and Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

9-2. FRONT AXLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).
Gravel deflector and gravel deflector extensions removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Multiplier, Torque Wrench (Item 35, Appendix B)
Trestle, Motor Vehicle Maintenance (2) (Item 71, Appendix B)
Lift, Transmission/Differential (Item 32, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
Socket, Left Front Leaf Spring U-Bolt (Item 8, Appendix D)
Puller Kit, Universal (Item 44, Appendix B)
Hammer, Hand, Soft Head (Item 28, Appendix B)

Tools and Special Tools (Cont)
Puller, Mechanical (Item 45, Appendix B)
Sling, Cargo (Item 48, Appendix B)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Nut, Self-Locking (2) (Item 126, Appendix F)
Pin, Cotter (2) (Item 227, Appendix F)
Nut, Self-Locking (8) (Item 124, Appendix F)
Washer (2) (Item 294, Appendix F)
Bracket (2, if required) (Item 16, Appendix F)
Washer, Brake Housing (2, if required) (Item 296, Appendix F)
Screw, Self-locking (4) (Item 251.1, Appendix F)
U-bolt (4) (Item 15.1, Appendix F)

Personnel Required
(3)

WARNING

Wear appropriate eye protection when working under vehicle due to possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

(1) Deleted

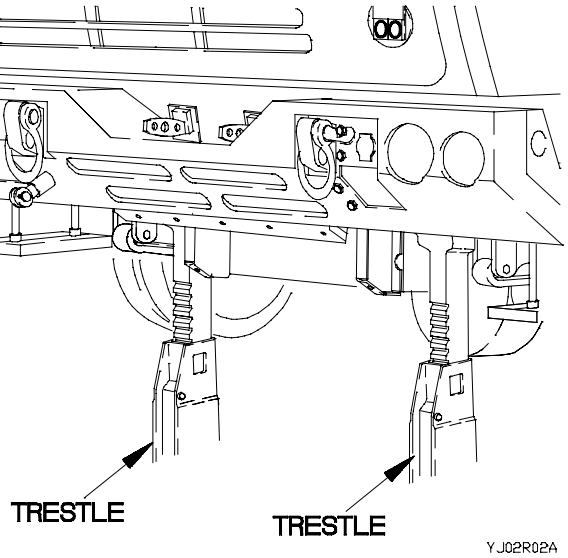
(2) Deleted

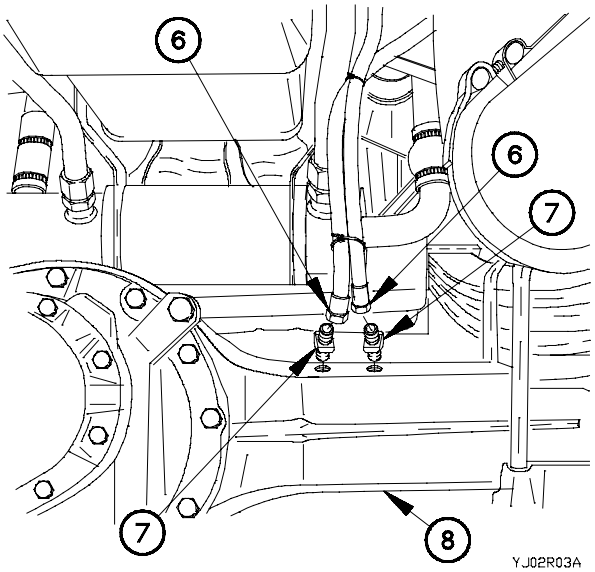
CAUTION

Use caution not to pinch left side air tubes when positioning trestles. Failure to comply may result in damage to equipment.

(3) Place front of vehicle on two trestles so wheels are off ground.

(4) Remove front wheels from vehicle (TM 9-2320-365-10).





(5) Disconnect two front axle breather tubes (6) from 45-degree fittings (7).

(6) Remove two 45-degree fittings (7) from front axle assembly (8).

NOTE

- Left and right side of front axle assembly is removed the same way. Right side shown.
- Tag hoses and connection points prior to disconnecting.

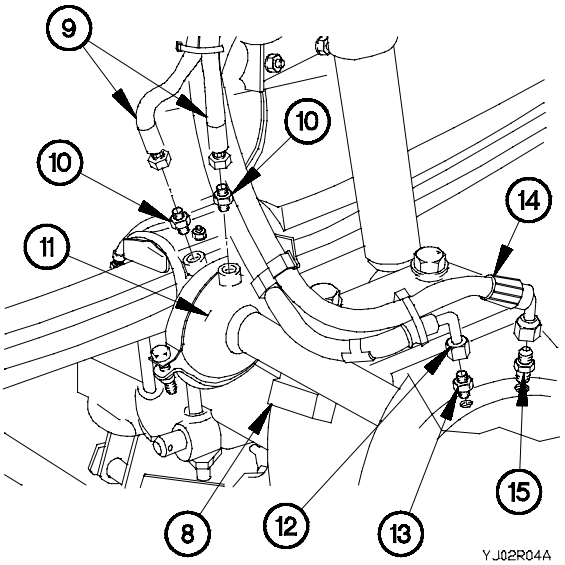
(7) Disconnect two brake hoses (9) from fittings (10).

(8) Remove two fittings (10) from front brake air chamber (11).

(9) Disconnect CTIS supply hose (12) from fitting (13).

(10) Disconnect CTIS vent hose (14) from fitting (15).

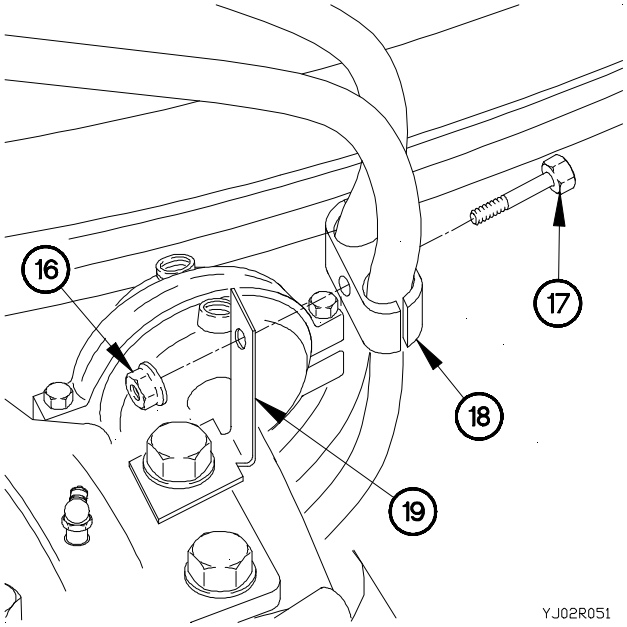
(11) Remove fittings (13 and 15) from front axle assembly (8).

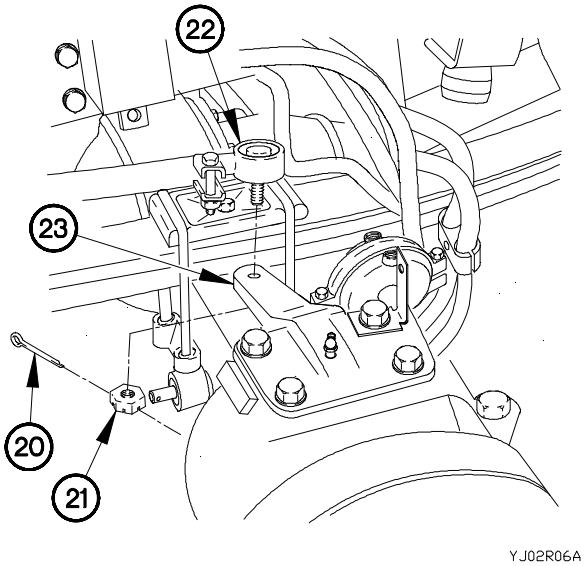


9-2. FRONT AXLE ASSEMBLY REPLACEMENT (CONT)

(12) Remove self-locking nut (16), screw (17), and clamp (18) from bracket (19). Discard self-locking nut.

(13) Perform steps (7) through (12) on left side of front axle assembly.





(14) Remove cotter pin (20), nut (21), and draglink (22) from pivoting arm (23). Discard cotter pin.

NOTE

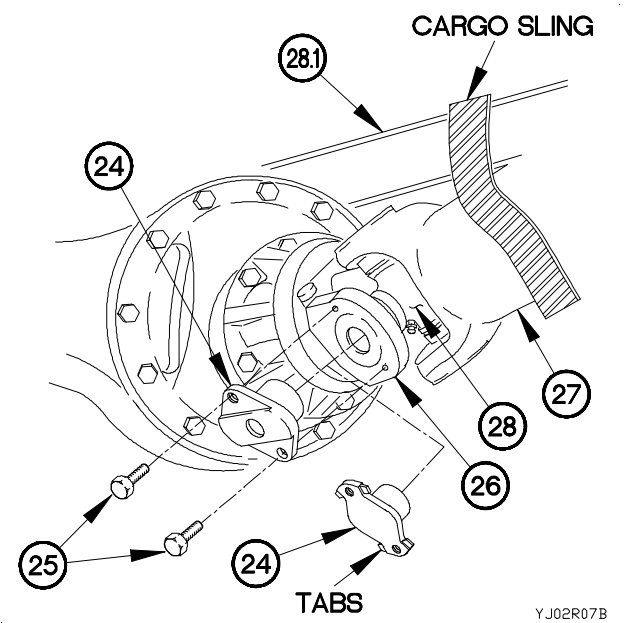
There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups with tabs.

(15) Lift tabs from two bearing cups (24).

(15.1) Remove four screws (25) and two bearing cups (24) from drive yoke (26). Discard screws.

(16) Slide drive shaft (27) from side to side and separate universal joint (28) from drive yoke (26).

(16.1) Attach drive shaft (27) to crossmember (28.1).



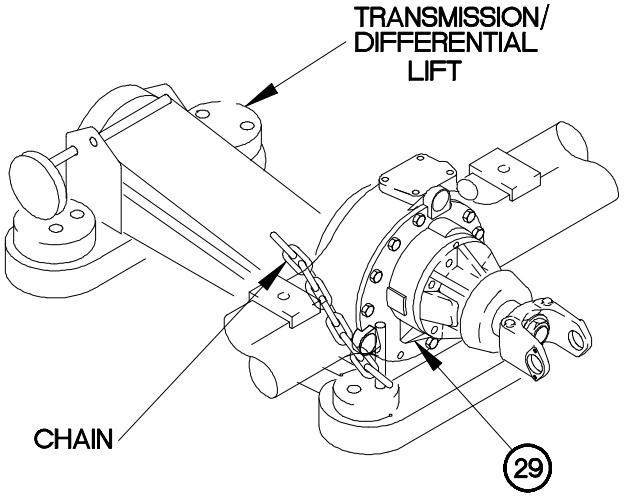
WARNING

Front axle assembly weighs approximately 1580 lbs (717 kgs). Front axle assembly must be supported on a transmission/differential lift during removal. Failure to comply may result in injury to personnel or damage to equipment.

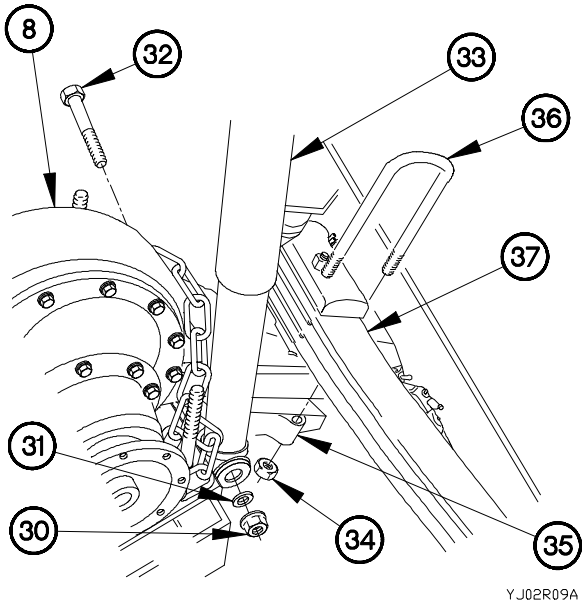
(17) Position transmission/differential lift under front differential (29).

(18) Secure front differential (29) to transmission/differential lift with chain.

(19) Raise transmission/differential lift to apply pressure to front differential (29).



YJ02R08B



YJ02R09A

NOTE

Left and right sides of front axle assembly are removed the same way. Right side shown.

(20) Remove nut (30), washer (31), and bolt (32) from front shock absorber (33).

(21) Remove four self-locking nuts (34) and mounting pad (35) from two U-bolts (36). Discard self-locking nuts.

(22) Remove two U-bolts (36) from leaf spring (37). Discard U-bolts.

(23) Perform steps (20) through (22) on left side of front axle assembly.

NOTE

Step (24) requires the aid of two assistants.

(24) Remove front axle assembly (8) from vehicle.

9-2. FRONT AXLE ASSEMBLY REPLACEMENT (CONT)

NOTE

Perform steps (25) and (26) on replacement front axle assembly.

(25) Remove 10 protective covers (38) from front axle assembly (8).

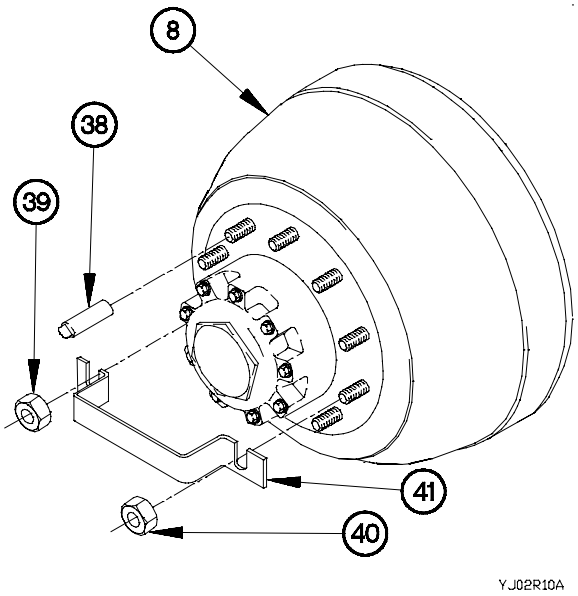
(26) Remove nuts (39 and 40) and bracket (41) from front axle assembly (8).

NOTE

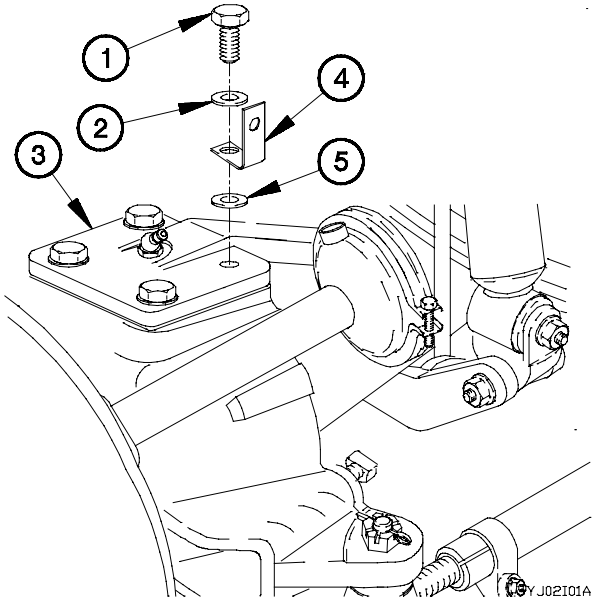
Perform steps (27) and (28) on old front axle assembly.

(27) Install bracket (41) on front axle assembly (8) with nuts (39 and 40).

(28) Install 10 protective covers (38) on front axle assembly (8).



b. Installation.



NOTE

Perform steps (1) through (3) on left and right sides of front axle assembly if replacement front axle assembly is not equipped with brackets on steering knuckles.

(1) Remove screw (1) and washer (2) from steering knuckle (3).

(2) Position bracket (4) on steering knuckle (3) with washer (5), washer (2), and screw (1).

(3) Tighten screw (1) to 500-650 lb-ft (678-881 N·m).

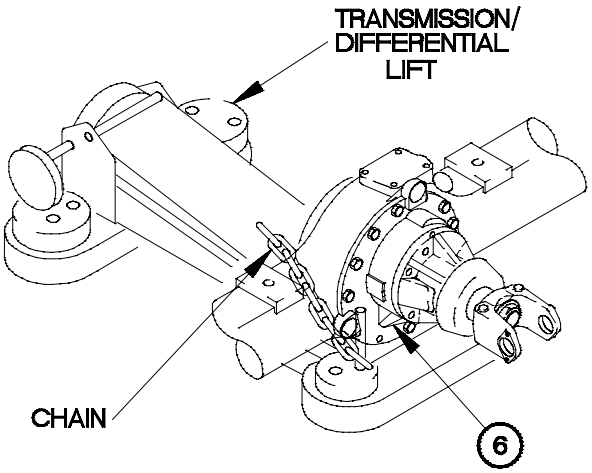
WARNING

Front axle assembly weighs approximately 1580 lbs (717 kgs). Front axle assembly must be supported on a transmission/ differential lift during installation. Failure to comply may result in injury to personnel or damage to equipment.

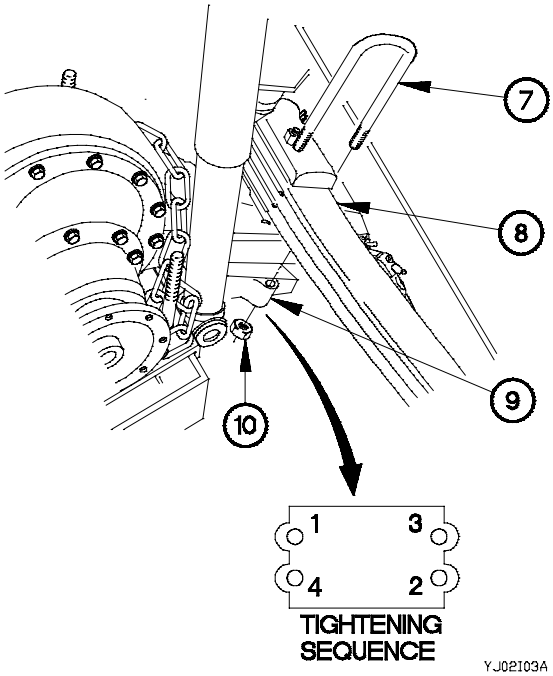
NOTE

Step (4) requires the aid of two assistants.

(4) Position front axle assembly (6) under vehicle.



YJ02I02B



YJ02I03A

NOTE

Left and right sides of front axle assembly is installed the same way. Right side shown.

(5) Install two U-bolts (7) on leaf spring (8).

(6) Align hole on mounting pad (9) with stud protruding from bottom of leaf spring.

(7) Position mounting pad (9) on U-bolts (7) with four self-locking nuts (10).

(8) Tighten four self-locking nuts (10) to 200 lb-ft (271 N·m) in sequence shown.

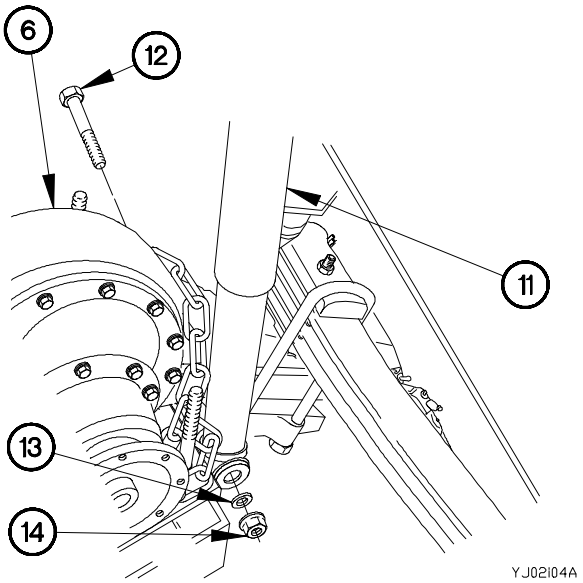
(9) Re-tighten four self-locking nuts (10), in 50 lb-ft (68 N·m) increments, to 390-510 lb-ft (529-692 N·m) in sequence shown.

9-2. FRONT AXLE ASSEMBLY REPLACEMENT (CONT)

(10) Position shock absorber (11) on front axle assembly (6) with bolt (12), washer (13), and nut (14).

(11) Tighten nut (14) to 284-343 lb-ft (385-465 N•m).

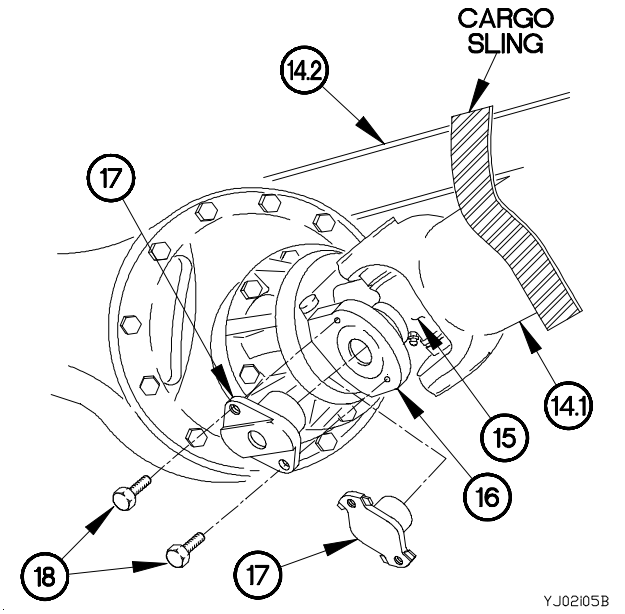
(12) Perform steps (5) through (11) on left side of front axle assembly.



NOTE

Step (12.1) requires the aid of an assistant.

(12.1) Remove drive shaft (14.1) from crossmember (14.2).



WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

- Wipe end of yoke bearing bores prior to installation.
- There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups not equipped with tabs.

(13) Position universal joint (15) on drive yoke (16) with two bearing cups (17) and four screws (18).

NOTE

Perform the following step on kits equipped with screws P/N C5H5-24-39.

(13.1) Tighten four screws (18) to 26-35 lb-ft (35-47 N•m).

9-2. FRONT AXLE ASSEMBLY REPLACEMENT (CONT)

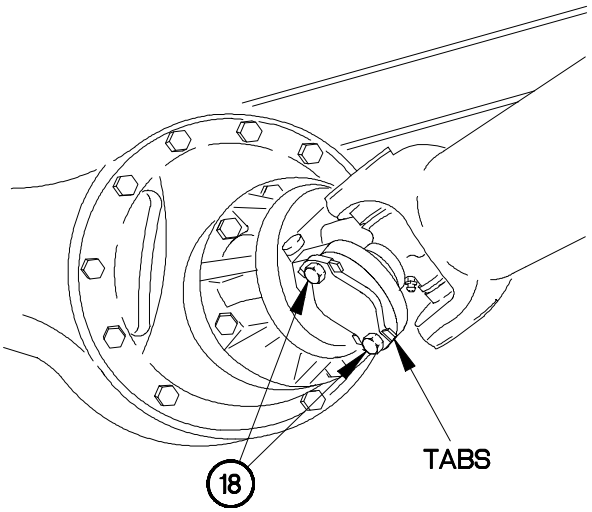
NOTE

- Perform the following step on kits equipped with shearhead screws.
- Alternately tighten screws.
- When correct torque is reached, bearing cup small screw hex head will break off.

(14) Tighten four screws (18).

NOTE

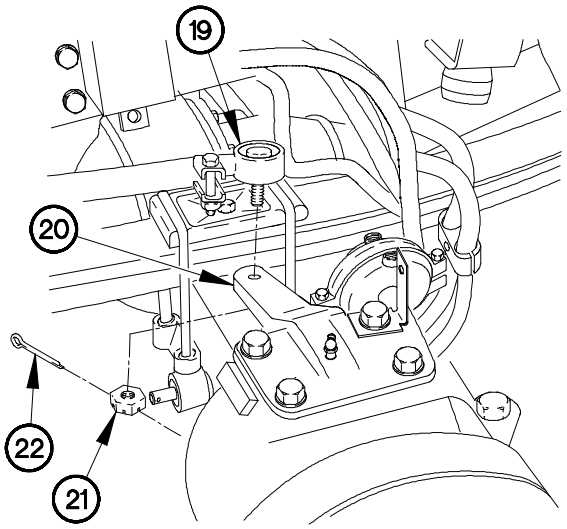
Perform the following two steps on bearing cups equipped with tabs.



YJ02I06B

(14.1) Tighten four screws (18) to 26-35 lb-ft (35-47 N•m).

(14.2) Fold tabs on four screws (18).



YJ02I07B

(15) Connect drag link end (19) to pivoting arm (20).

(16) Position nut (21) on drag link end (19).

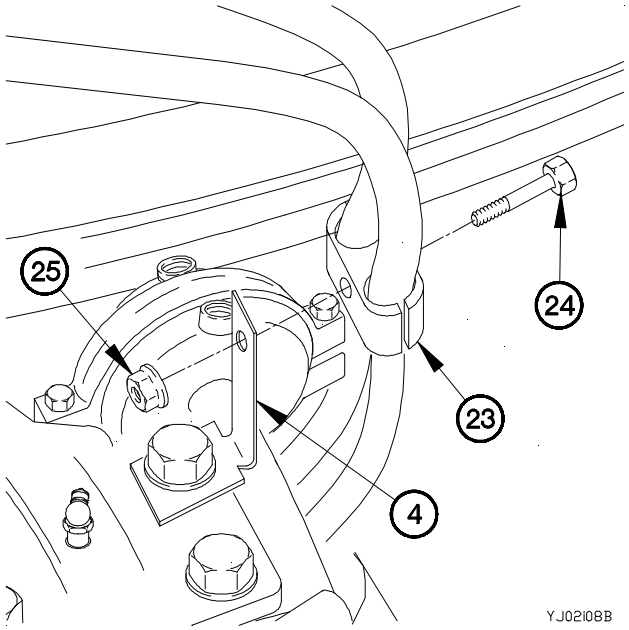
(17) Tighten nut (21) to 140-170 lb-ft (190-230 N•m).

(18) Install cotter pin (22) in nut (21).

NOTE

Left and right sides of front axle assembly are installed the same way. Right side shown.

(19) Install clamp (23) on bracket (4) with screw (24) and self-locking nut (25).



9-2. FRONT AXLE ASSEMBLY REPLACEMENT (CONT)

(20) Install two fittings (26) in front brake air chamber (27).

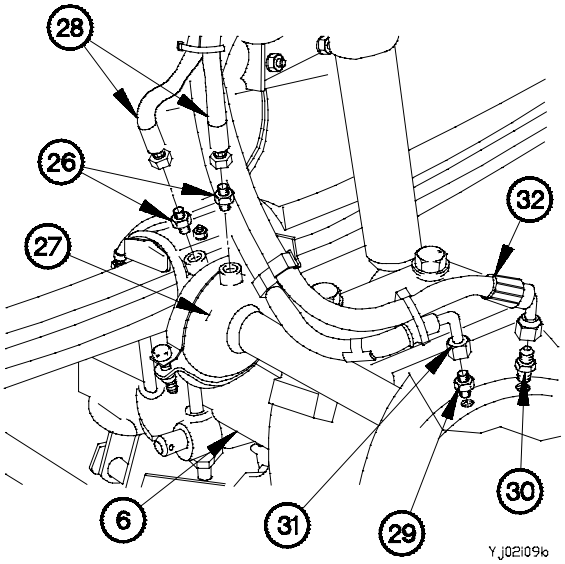
(21) Connect two brake hoses (28) to fittings (26).

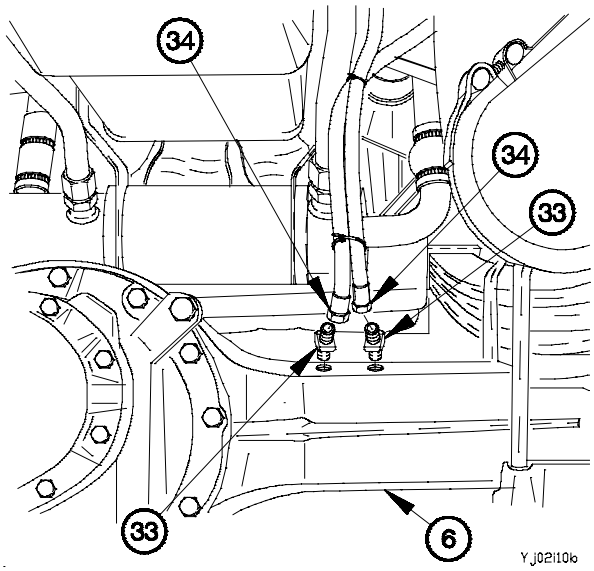
(22) Install fittings (29 and 30) in front axle assembly (6).

(23) Connect CTIS supply hose (31) to fitting (29).

(24) Connect CTIS vent hose (32) to fitting (30).

(25) Perform steps (19) through (24) on left side of front axle assembly.



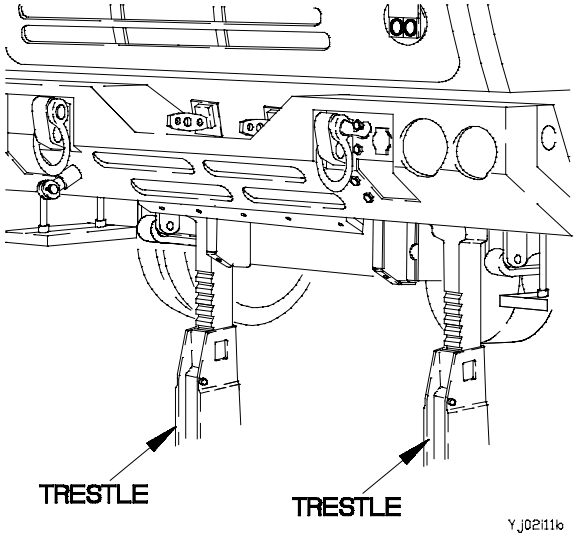


(26) Install two 45-degree fittings (33) in front axle assembly (6).

(27) Connect two front axle breather tubes (34) to 45-degree fittings (33).

(28) Install front wheels on vehicle (TM 9-2320-365-10).

(29) Remove trestles from front of vehicle.



(30) Deleted.

(31) Deleted.

(32) Deleted.

(33) Deleted.

c. Follow-On Maintenance.

(1) Fill front differential carrier with oil (TM 9-2320-365-20).

(1.1) Lubricate drive shaft universal joint and slip yoke (TM 9-2320-365-20-1).

(1.2) Install gravel deflector and gravel deflector expansion (TM 9-2330-365-20-3).

(2) Operate vehicle, checking for proper steering, braking, and listening for unusual noises (TM 9-2320-365-10).

(3) Shut down engine (TM 9-2320-365-10).

(4) Check front axle assembly and differential carrier for oil leaks.

(5) After first 1000 miles of vehicle operation, tighten self-locking nuts on U-bolts, in 50 lb-ft (68 N·m) increments, to 390-510 lb-ft (529-692 N·m) in sequence.

End of Task.

9-3. FRONT AXLE SHAFT AND SEALS REPLACEMENT

This task covers:

a. Removal
b. Cleaning/Inspection
c. Installation
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Wheel bearing/CTIS seal removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Puller, Mechanical (Item 45, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Respirator, Air Filtering (Item 46, Appendix B)
Driver, Front Axle Shaft Seal (Item 42, Appendix D)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Seal, Plain Encased (2) (Item 269, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Grease, Automotive and Artillery (Item 36, Appendix C)

Personnel Required
(2)

WARNING

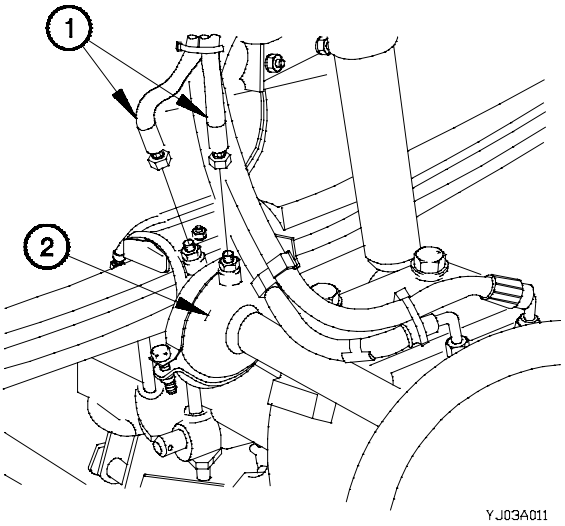
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

Tag brake hoses and connection points prior to disconnecting.

(1) Disconnect two brake hoses (1) from front brake air chamber (2).



9-3. FRONT AXLE SHAFT AND SEALS REPLACEMENT (CONT)

WARNING

Brake shoes may be covered with dust. Breathing this dust may be harmful to your health. Do not used compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury to personnel.

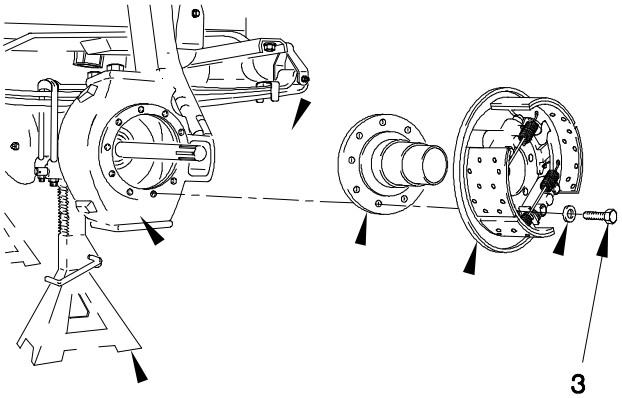
NOTE

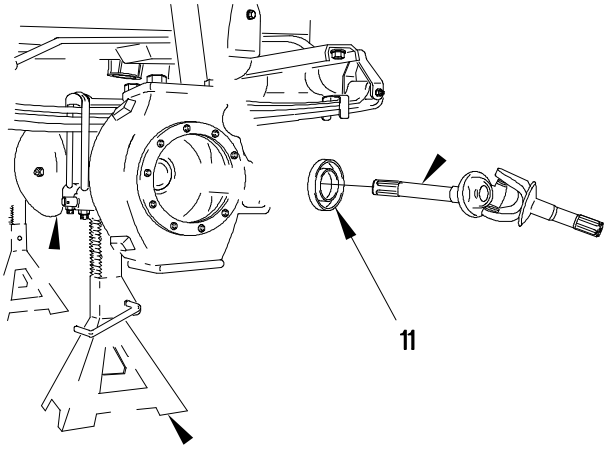
Step (2) requires the aid of an assistant.

(2) Remove 10 screws (3), washers (4), and brake assembly (5) from steering knuckle (6).

(3) Remove spindle assembly (7) from steering knuckle (6).

(4) Remove outer seal (8) from spindle assembly (7). Discard seal.





(5) Remove front axle shaft (9) from front axle housing (10).

(6) Remove inner seal (11) from front axle housing (10). Discard inner seal.

b. Cleaning/Inspection.

WARNING

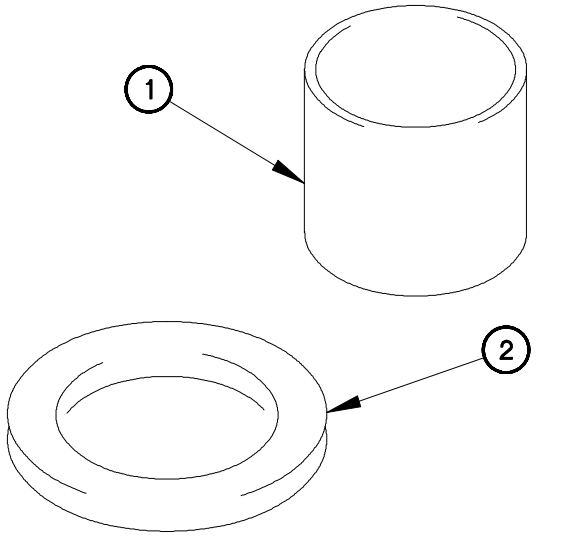
- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 ° F (38° C) and for Type II is 130° F (50° C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**
- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in serious injury or death to personnel.**

(1) Clean all metal parts with dry cleaning solvent and dry using compressed air prior to inspection.

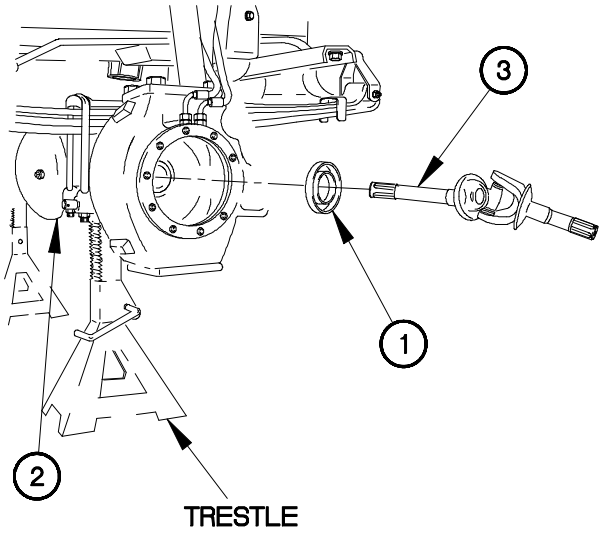
NOTE

Replace any parts that fails visual inspection.

(2) Inspect two bushings (1) and thrust washers (2) in spindle assembly for cracks, pitting, and corrosion.



c. Installation.



(1) Apply a small amount of grease to outside edges of inner seal (1).

(2) Install inner seal (1) on front axle housing (2).

CAUTION

Ensure front axle shaft does not damage inner seal. Failure to comply may result in damage to equipment.

(3) Install front axle shaft (3) in front axle housing (2).

9-3. FRONT AXLE SHAFT AND SEALS REPLACEMENT (CONT)

(4) Install outer seal (4) in spindle assembly (5).

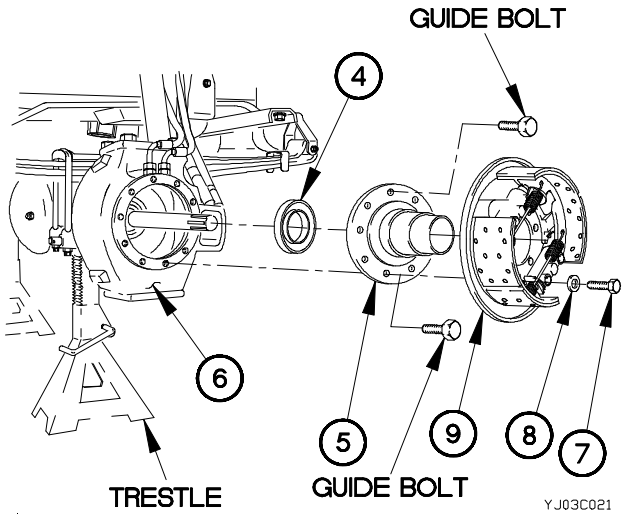
(5) Install spindle assembly (5) in steering knuckle (6).with two guide bolts.

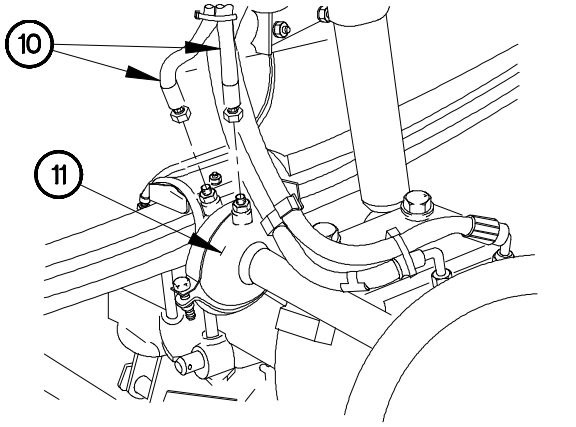
NOTE

Use the aid of an assistant to hold front axle shaft prior to installation of spindle assembly.

(6) Position 10 screws (7), washers (8), and brake assembly (9) on steering knuckle (6).

(7) Tighten 10 screws (7) to 110-145 lb-ft (149-197 N• m).





(8) Connect two brake hoses (10) to front brake air chambers (11).

d. Follow-On Maintenance.

(1) Install wheel bearing/CTIS seal (TM 9-2320-365-20-3).

(2) Check oil level of front differential carrier (TM 9-2320-365-20).

(3) Check oil level of hub assembly (TM 9-2320-365-20).

(4) Perform wheel toe-in adjustment (TM 9-2320-365-20-3).

(5) Start engine (TM 9-2320-365-10).

(6) Operate vehicle, checking for proper steering operation and excessive vibration (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

(8) Check for oil leaks around wheel end assembly.

End of Task.

9-4. FRONT AXLE DIFFERENTIAL CARRIER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Tie-rod assembly removed (TM 9-2320-365-20-3).
Front axle shafts removed (para 9-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

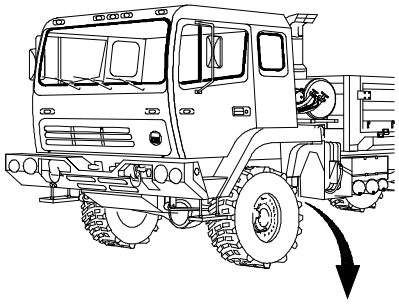
Tools and Special Tools
Lift, Transmission/Differential (Item 32, Appendix B)
Sling, Cargo (Item 48, Appendix B)

Materials/Parts
Sealant, Adhesive (Item 67, Appendix C)
Screw (4) (Item 251.1, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.



a. Removal.

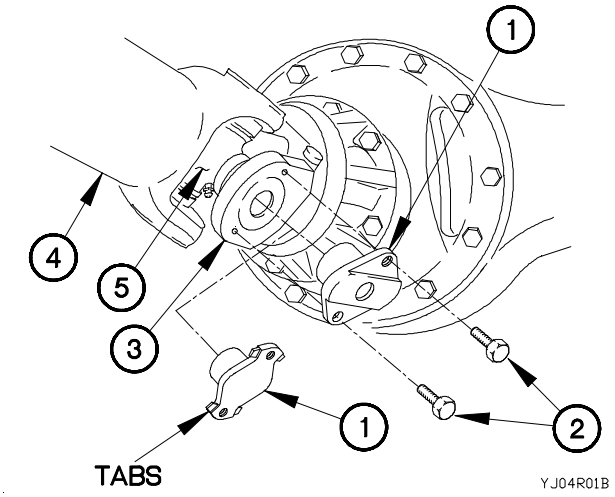
NOTE

There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups with tabs.

(1) Lift tabs from two bearing cups (1).

(1.1) Remove four screws (2) and two bearing cups (1) from drive yoke (3). Discard screws.

(2) Slide drive shaft (4) from side to side and separate universal joint (5) from drive yoke (3).

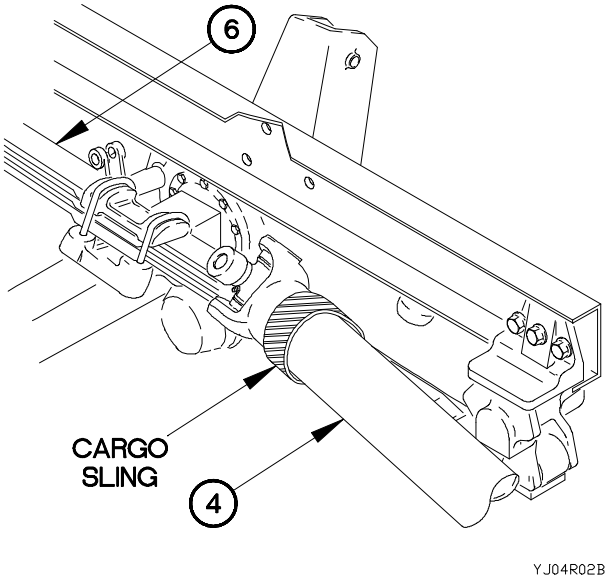


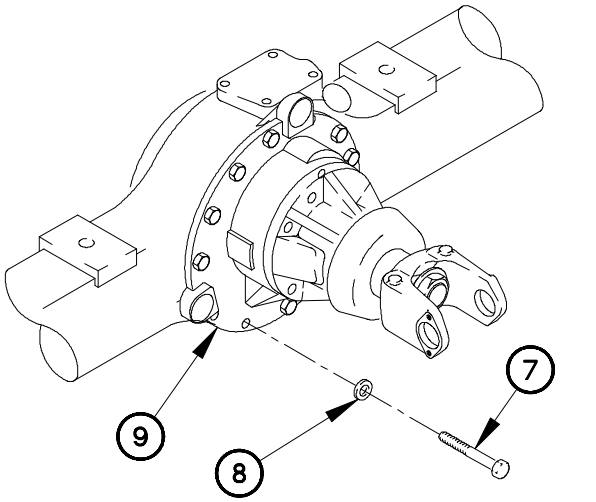
9-4. FRONT AXLE DIFFERENTIAL CARRIER REPLACEMENT (CONT)

NOTE

Step (3) requires the aid of an assistant.

(3) Tie drive shaft (4) to leaf spring (6).





(4) Remove six screws (7) and washers (8) from bottom half of differential carrier (9).

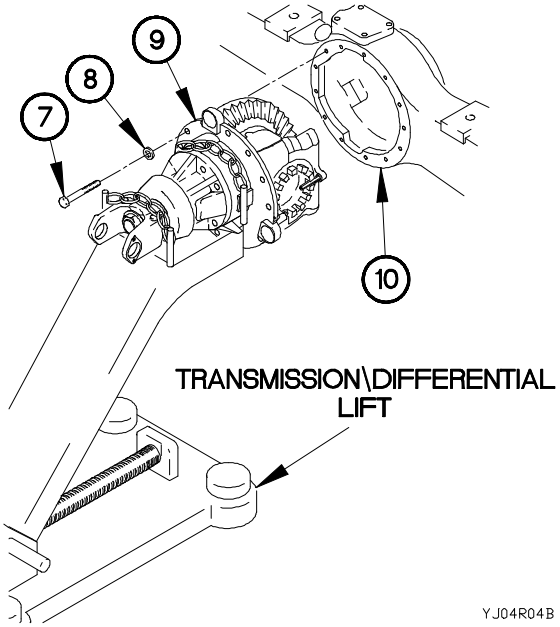
(5) Position transmission/differential lift under differential carrier (9).

WARNING

Front differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (6) and (7) require the aid of an assistant.



(6) Remove six screws (7) and washers (8) from top half of differential carrier (9).

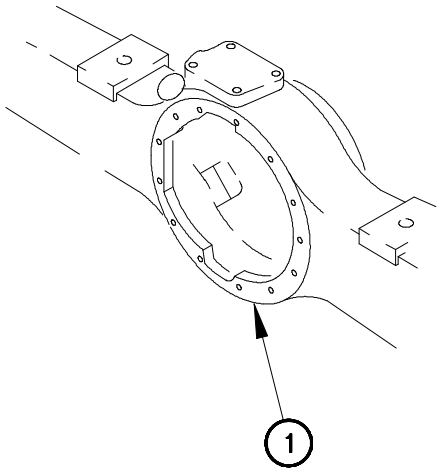
(7) Remove differential carrier (9) from axle assembly (10).

b. Installation.

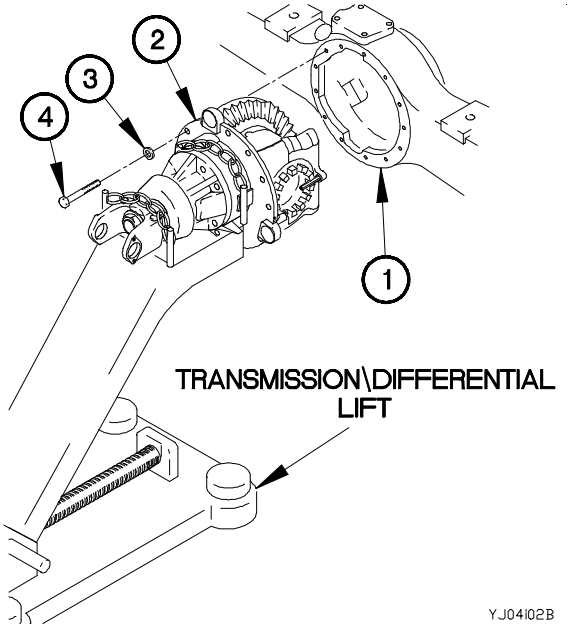
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(1) Apply adhesive sealant to mounting flange of axle assembly (1).



YJ04I01B



YJ04I02B

WARNING

Front differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (2) and (3) require the aid of an assistant.

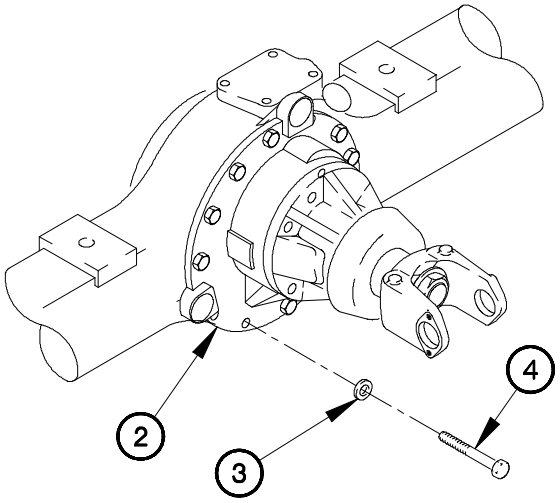
(2) Position differential carrier (2) on axle assembly (1) with six washers (3) and screws (4).

(3) Remove transmission/differential lift from differential carrier (2).

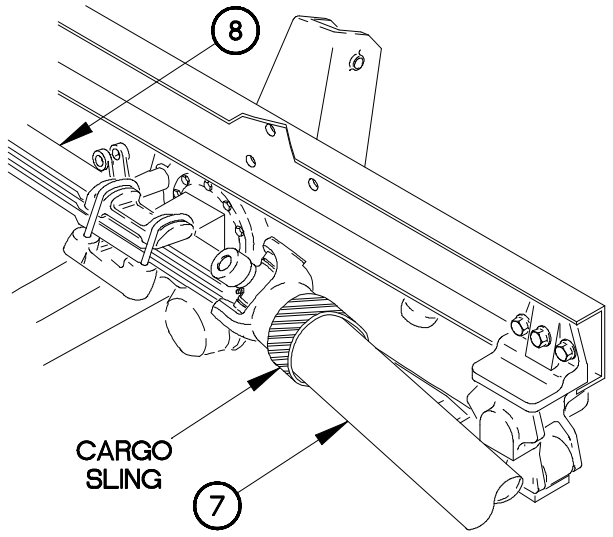
9-4. FRONT AXLE DIFFERENTIAL CARRIER REPLACEMENT (CONT)

(4) Position six washers (3) and screws (4) on bottom half of differential carrier (2).

(5) Tighten 12 screws (4) to 74-96 lb-ft (100-130 N•m).



YJ04I03B



YJ04I04B

NOTE

Step (6) requires the aid of an assistant.

(6) Remove drive shaft (7) from leaf spring (8).

WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

- Wipe end of yoke bearing bores prior to installation.
- There are two types of bearing cups, those with tabs, and those without. Perform the following step on bearing cups not equipped with tabs.

(7) Position universal joint (9) on drive yoke (10) with two bearing cups (11) and four screws (12).

NOTE

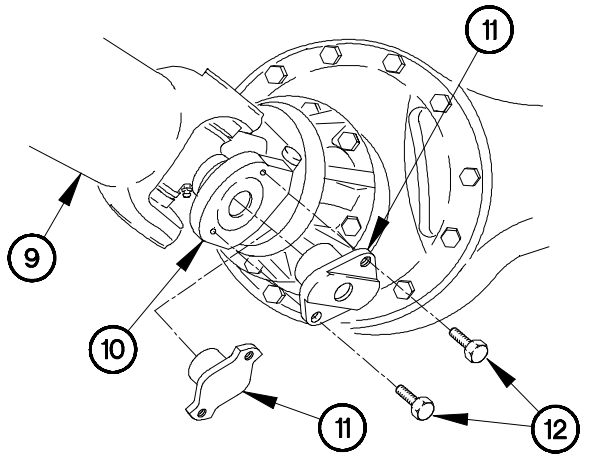
Perform the following step on kits equipped with screws P/N C5H5-24-39.

(7.1) Tighten four screws (12) to 26-35 lb-ft (35-47 N•m).

NOTE

- Perform the following step on kits equipped with shear head screws.
- Alternately tighten screws.
- When correct torque is reached, bearing cap screw small hex head will break off.

(8) Tighten four screws (12).



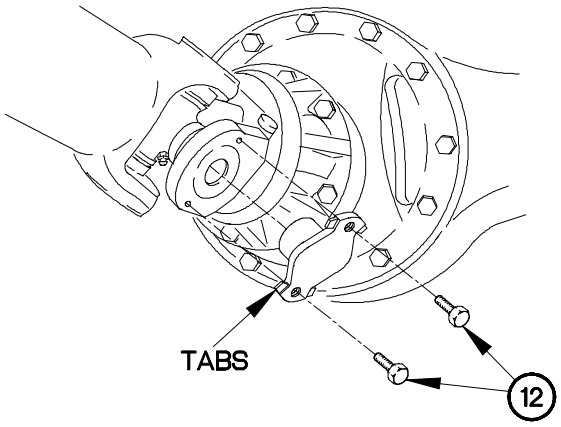
YJ04i05B

NOTE

Perform the following two steps on bearing cups equipped with tabs.

(8.1) Tighten four screws (12) to 26-35 lb-ft (35-47 N•m).

(8.2) Fold tabs on four screws (12).



YJ04i06B

9-4. FRONT AXLE DIFFERENTIAL CARRIER REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Install front axle shaft (para 9-3).

(1.1) Lubricate drive shaft universal joint and slip yoke (TM 9-2320-365-10-1).

(2) Refill front axle differential carrier oil (TM 9-2320-365-20).

(3) Install tie-rod assembly (TM 9-2320-365-20-3).

(4) Start engine (TM 9-2320-365-10).

(5) Operate vehicle and check for proper operation of front axle differential carrier (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

(7) Check front axle differential carrier for oil leaks.

End of Task.

9-5. FRONT AXLE DIFFERENTIAL PINION SEAL, YOKE SEAL AND DRIVE YOKE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Puller Kit, Universal (Item 44, Appendix B)
Wrench Set, Socket, (Item 74, Appendix B)
Multiplier, Torque Wrench (Item 35, Appendix B)
Driver, Differential Pinion Seal (Item 44, Appendix D)
Driver, Front and Rear Differential Yoke Seal (Item 45, Appendix D)
Goggles, Industrial (Item 25, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Tools and Special Tools (Cont)
Hammer, Hand, Soft Head (Item 28, Appendix B)
Sling, Cargo (Item 48, Appendix B)
Holding Bar, Pinion (TM 9-2320-365-20)

Materials/Parts
Sealing Compound (Item 75.2, Appendix C)
Kit, Seal (Item 263.1, Appendix F)
Nut, Self-Locking (Item 144, Appendix F)
Screw, Self-Locking (4) (Item 251.1, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

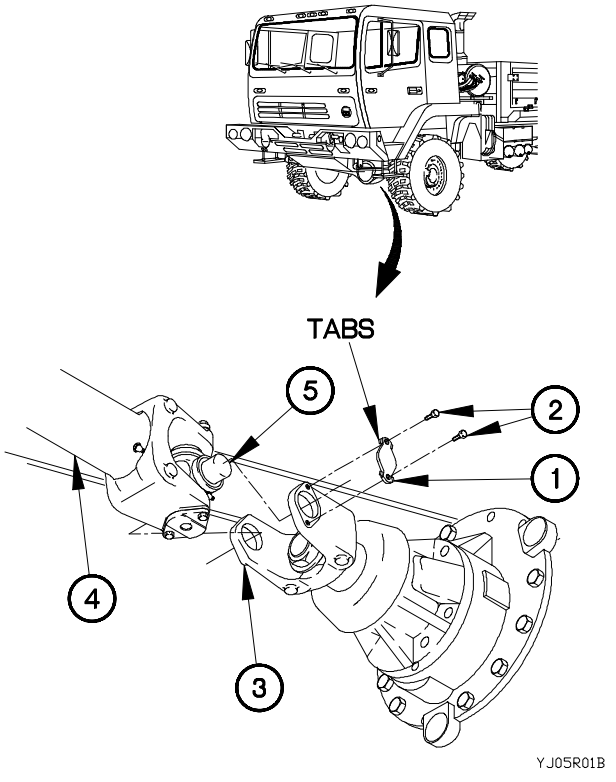
NOTE

There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups with tabs.

(1) Lift tabs from two bearing cups (1).

(1.1) Remove four screws (2) and two bearing cups (1) from drive yoke (3). Discard screws.

(2) Slide drive shaft (4) from side to side and separate universal joint (5) from drive yoke (3).

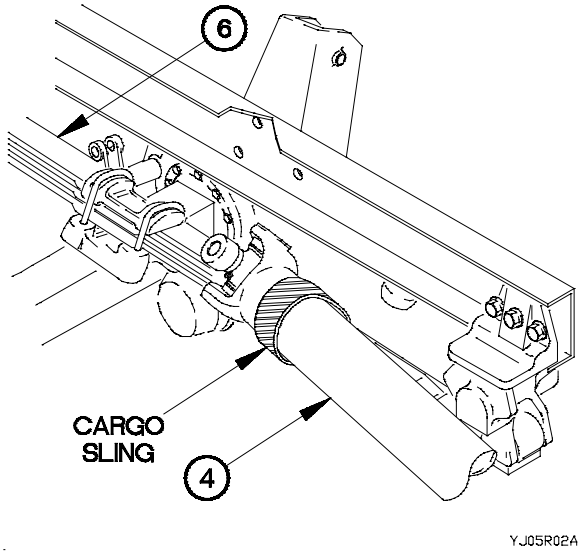


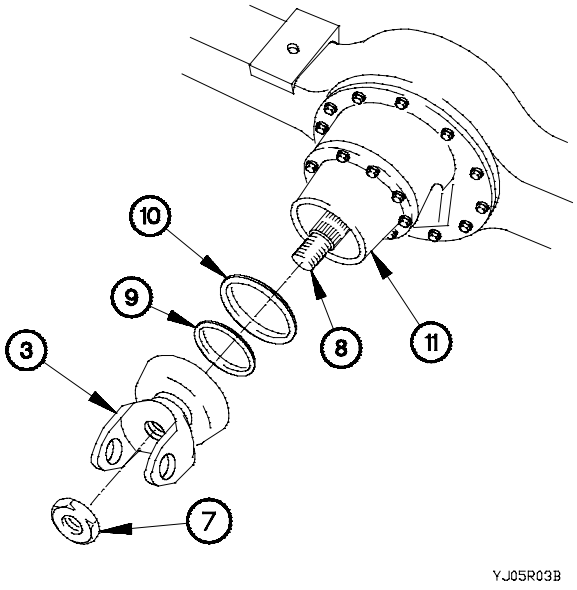
9-5. FRONT AXLE DIFFERENTIAL PINION SEAL, YOKE SEAL AND DRIVE YOKE REPLACEMENT (CONT)

NOTE

Step (3) requires the aid of an assistant.

(3) Attach drive shaft (4) to leaf spring (6).





(4) Remove drive yoke nut (7) from pinion shaft (8). Discard drive yoke nut.

(5) Remove drive yoke (3) from pinion shaft (8).

NOTE

Vehicles serial number 0001 through 3133, were not originally equipped with yoke seals. Yoke seals may not be present if maintenance has not been previously performed on drive yoke.

(6) Remove yoke seal (9) from drive yoke (3). Discard yoke seal.

(7) Remove pinion seal (10) from front differential carrier (11). Discard pinion seal.

b. Installation.

(1) Apply a small amount of sealing compound to outside edge and spring cavity of pinion seal (1).

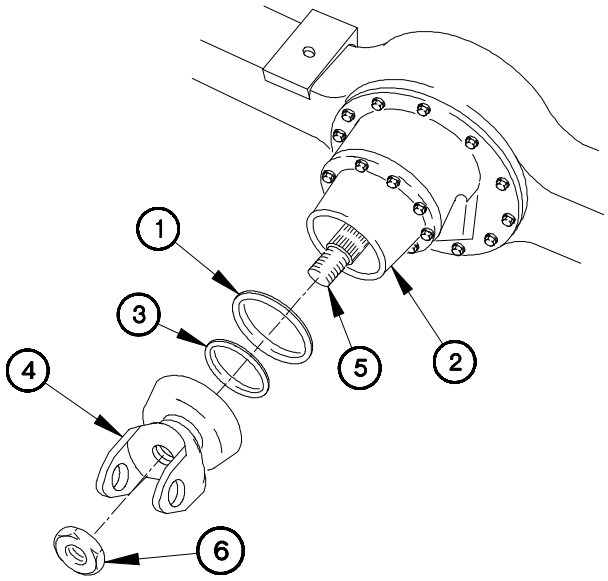
(2) Install pinion seal (1) in front differential carrier (2).

(3) Visually verify pinion seal (1) is properly seated.

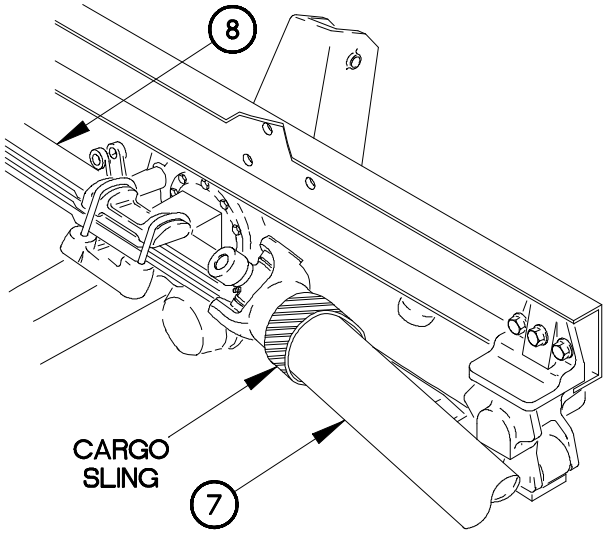
(4) Install yoke seal (3) on drive yoke (4).

(5) Install drive yoke (4) on pinion shaft (5) with drive yoke nut (6).

(6) Tighten drive yoke nut (6) to 920-1130 lb-ft (1248-1532 N•m).



YJ05i01B



YJ05i02B

NOTE

Step (7) requires the aid of an assistant.

(7) Remove drive shaft (7) from leaf spring (8).

9-5. FRONT AXLE DIFFERENTIAL PINION SEAL, YOKE SEAL AND DRIVE YOKE REPLACEMENT (CONT)

WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

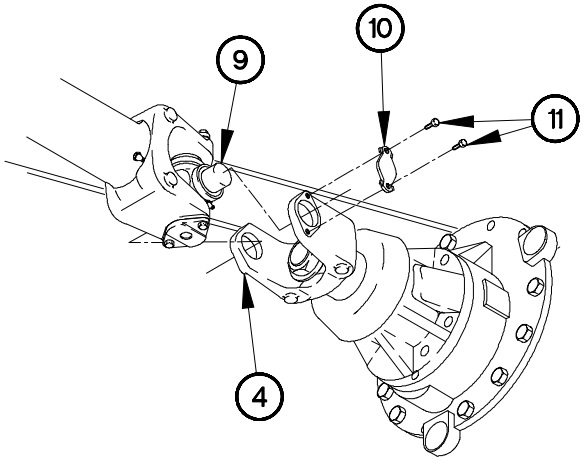
- There are two types of bearing cups, those with tabs and those without. Perform the following step in bearing cups not equipped with tabs.
- Wipe end of yoke bearing bores prior to installation

(8) Position universal joint (9) on drive yoke (4) with two bearing cups (10) and four screws (11).

NOTE

Perform the following step on kits equipped with screws P/N C5H5-24-39.

(8.1) Tighten four screws (11) to 26-35 lb-ft (35-47 N•m).



YJ05I03B

NOTE

- Perform the following step on kits equipped with shear head screws.
- Alternately tighten screws
- When correct torque is reached, bearing cap small screw hex head will break off.

(9) Tighten four screws (11).

NOTE

Perform the following two steps on bearing cups equipped with tabs

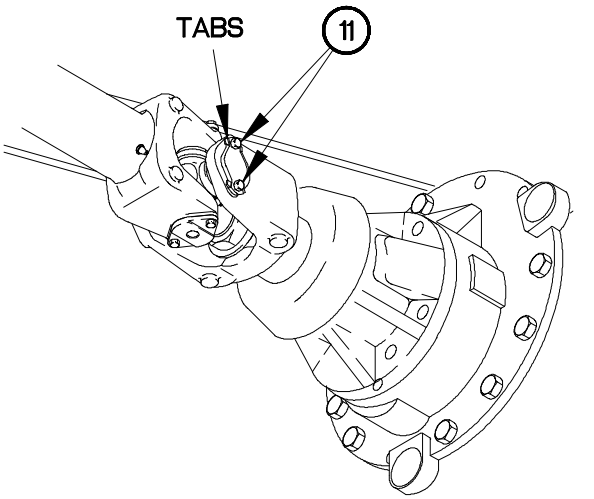
(9.1) Tighten four screws (11) to 26-35 lb-ft (35-47 N•m).

(9.2) Fold tabs on four screws (11).

CAUTION

Grease must flow from all four seals. Failure to comply may result in damage to equipment.

(10) Apply lubrication to grease fittings (TM 9-2320-366-20).



c. Follow-On Maintenance.

(1) Check differential oil level (TM 9-2320-365-20).

(1.1) Lubricate drive shaft universal joint and slip yoke (TM 9-2320-365-20-1).

(2) Operate vehicle and check differential for proper operation (TM 9-2320-365-10).

(3) Shut down engine (TM 9-2320-365-10).

(4) Check pinion seal for oil leaks.

End of Task.

9-6. STEERING KNUCKLE MECHANISM REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Front axle shaft removed (para 9-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Indicator, Dial (Item 30, Appendix B)
Multiplier, Torque Wrench (Item 35, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Sling, Cargo (Item 48, Appendix B)

Tools and Special Tools (Cont)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
Tie Down, Cargo Aircraft (Item 64, Appendix B)

Materials/Parts
Pin, Cotter (Item 226, Appendix F) (left side)
Pin, Cotter (Item 227, Appendix F) (right side)
Nut, Self-Locking (Item 126, Appendix F)
Seal, Non-metallic (2) (Item 261, Appendix F)
Bearing, Washer, Thrust (Item 1, Appendix F)
Rag, Wiping (Item 59, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

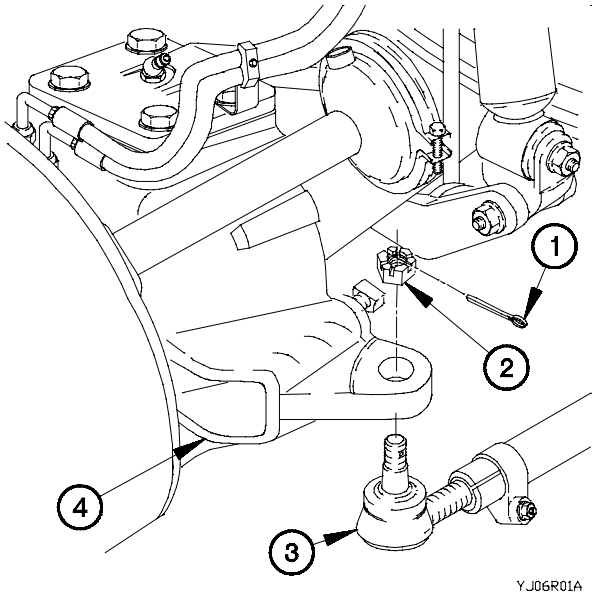
Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

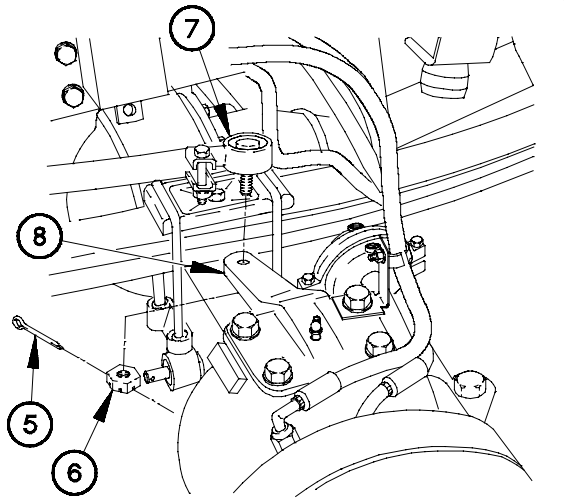
(1) Remove cotter pin (1), nut (2), and tie rod (3) from steering knuckle (4). Discard cotter pin.



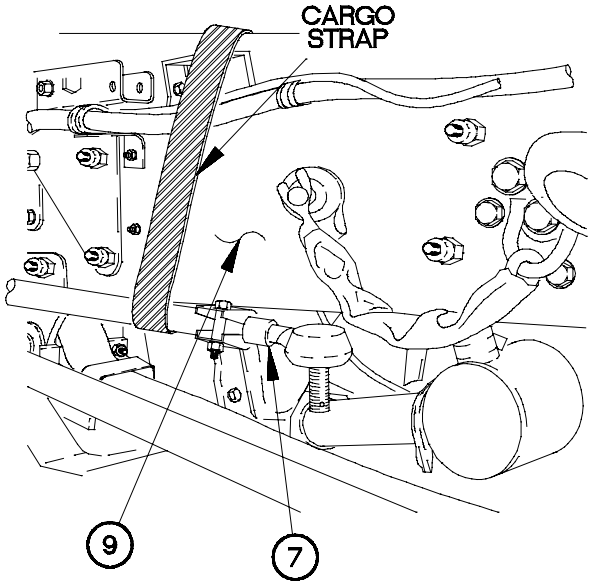
NOTE

Steps (2) and (3) apply to left side steering knuckle.

(2) Remove cotter pin (5), nut (6), and drag link (7) from pivoting arm (8). Discard cotter pin.



YJ06R02A



YJ06R03A

(3) Attach drag link (7) to frame rail (9).

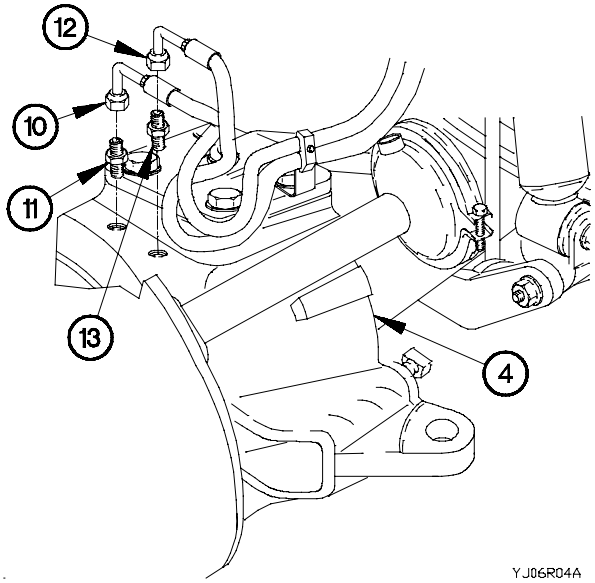
NOTE

Tag hoses and connection points prior to disconnecting.

(4) Disconnect CTIS supply hose (10) from fitting (11).

(5) Disconnect CTIS vent hose (12) from fitting (13).

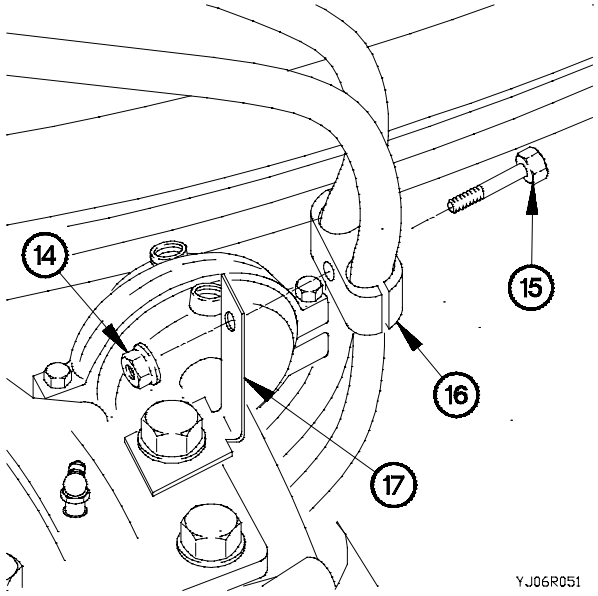
(6) Remove fittings (11 and 13) from steering knuckle (4).

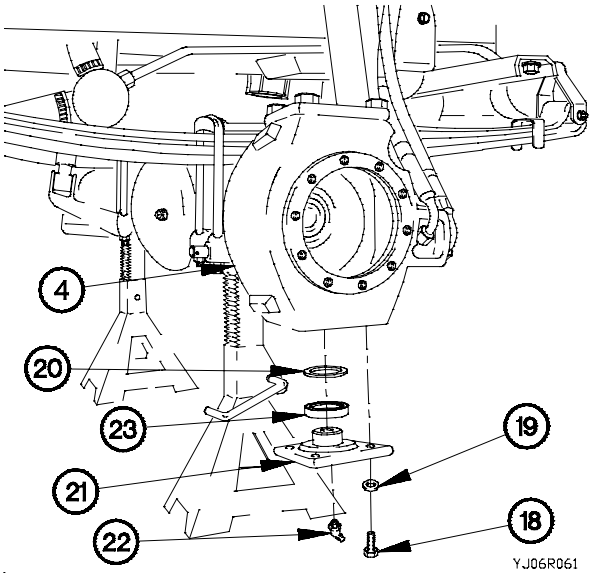


YJ06R04A

9-6. STEERING KNUCKLE MECHANISM REPLACEMENT (CONT)

(7) Remove self-locking nut (14), screw (15), and clamp (16) from bracket (17). Discard self-locking nut.





(8) Remove four screws (18), washers (19), washer bearing (20), and access cover (21) from steering knuckle (4).

(9) Remove grease fitting (22) from access cover (21).

(10) Remove seal (23) from access cover (21). Discard seal.

(11) Support steering knuckle (4) with floor jack.

(12) Use floor jack to raise steering knuckle (4) and remove pressure from pivoting arm (8).

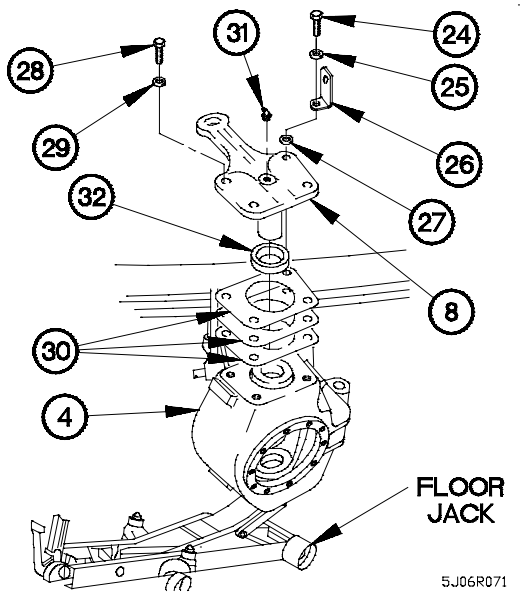
(13) Remove screw (24), washer (25), bracket (26), and washer (27) from pivoting arm (8).

(14) Remove three screws (28), washers (29), pivoting arm (8), and shim(s) (30) from steering knuckle (4).

(15) Remove grease fitting (31) from pivoting arm (8).

(16) Remove seal (32) from pivoting arm (8). Discard seal.

(17) Remove floor jack from steering knuckle (4).



WARNING

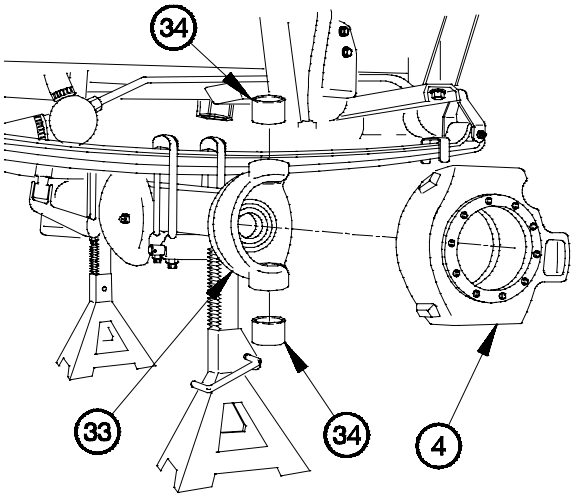
Steering knuckle weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (18) and (19) require the aid of an assistant.

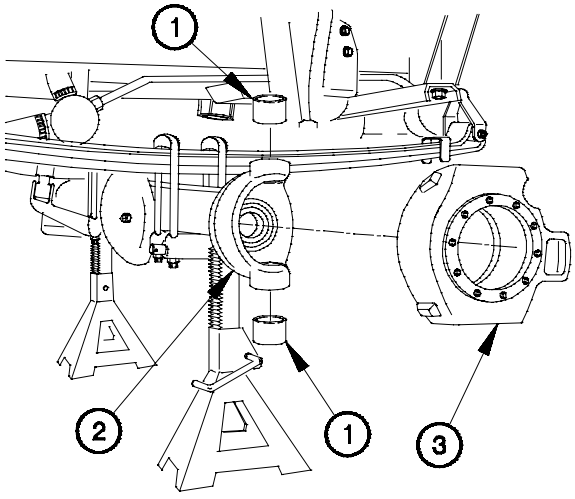
(18) Remove steering knuckle (4) from front axle (33).

(19) Remove two thrust washer bearings (34) from front axle (33). Discard thrust washer bearings.



5J06R081

b. Installation.



YJ06I01A

NOTE

Steps (1) and (2) require the aid of an assistant.

(1) Install two thrust washer bearings (1) in front axle (2).

WARNING

Steering knuckle weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

(2) Install steering knuckle (3) on front axle (2).

9-6. STEERING KNUCKLE MECHANISM REPLACEMENT (CONT)

(3) Support steering knuckle (3) with floor jack.

(4) Use floor jack to raise steering knuckle (3) and remove pressure from pivoting arm (4).

(5) Install seal (5) on pivoting arm (4).

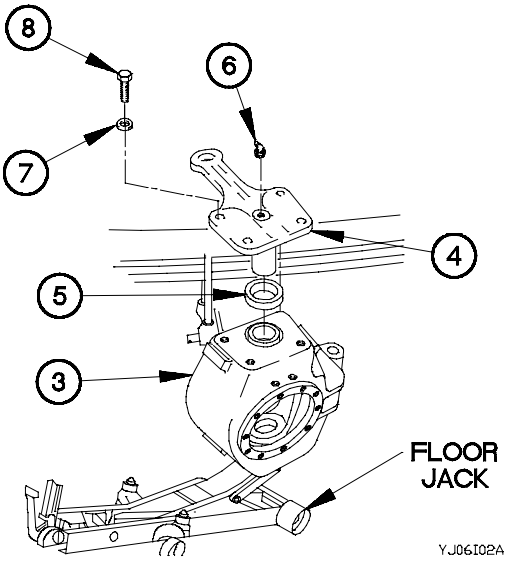
(6) Install grease fitting (6) on pivoting arm (4).

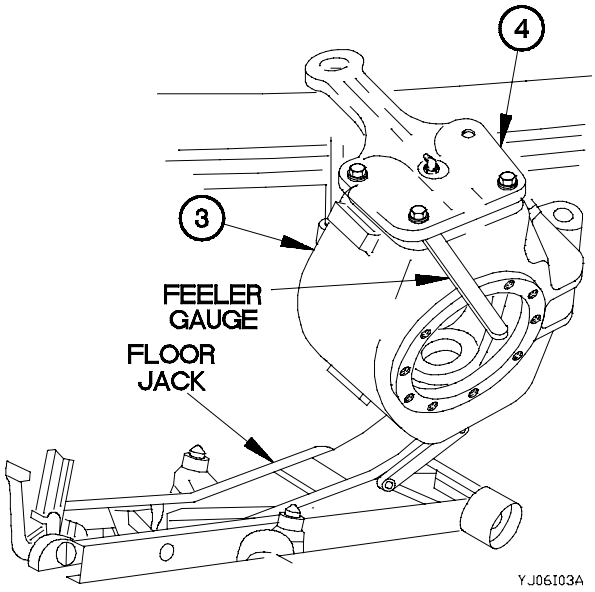
(7) Support steering knuckle (3) with floor jack.

NOTE

Screws used to position the pivoting arm are tightened finger tight until pivoting arm binds.

(8) Position pivoting arm (4) on steering knuckle (3) with three washers (7) and screws (8).

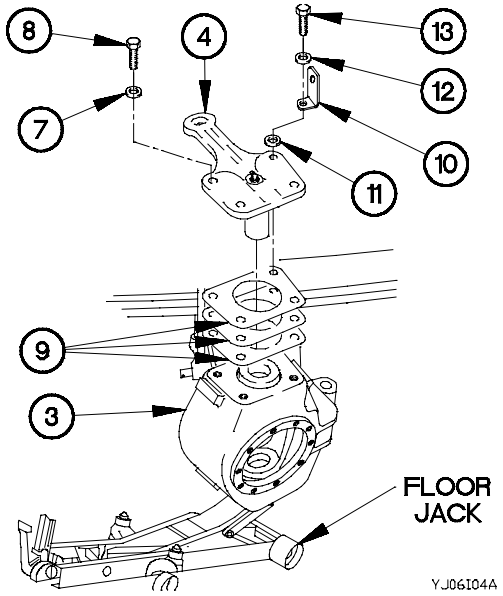




NOTE

The gap measured in step (9) is the required thickness of the shim pack to be installed.

(9) Measure and record the gap between the pivoting arm (4) and steering knuckle (3).



(10) Remove three screws (8), washers (7), and pivoting arm (4) from steering knuckle (3).

(11) Position shim(s) (9) and pivoting arm (4) on steering knuckle (3) with three washers (7) and screws (8).

(12) Position bracket (10) on pivoting arm (4) with washer (11), washer (12), and screw (13).

(13) Tighten three screws (8) and screw (13) to 500-650 lb-ft (678-881 N·m).

(14) Lower floor jack from steering knuckle (3).

(15) Install seal (14) on access cover (15).

CAUTION

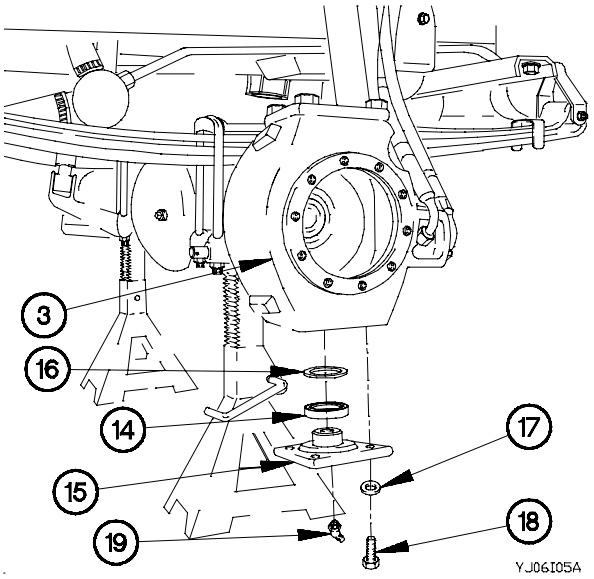
Washer bearing must be positioned with grooves facing up and hole aligned with pin in steering knuckle.

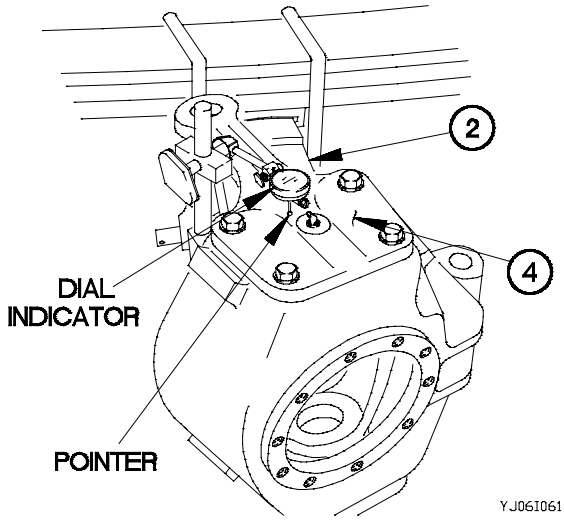
(16) Install washer bearing (16) on access cover (15).

(17) Position access cover (15) on steering knuckle (3) with four washers (17) and screws (18).

(18) Tighten four screws (18) to 500-650 lb-ft (678-881 N·m).

(19) Install grease fitting (19) on access cover (15).





(20) Install dial indicator on front axle (2) so pointer contacts surface of pivoting arm (4).

(21) Use floor jack and raise steering knuckle (3) to apply pressure to access cover (15).

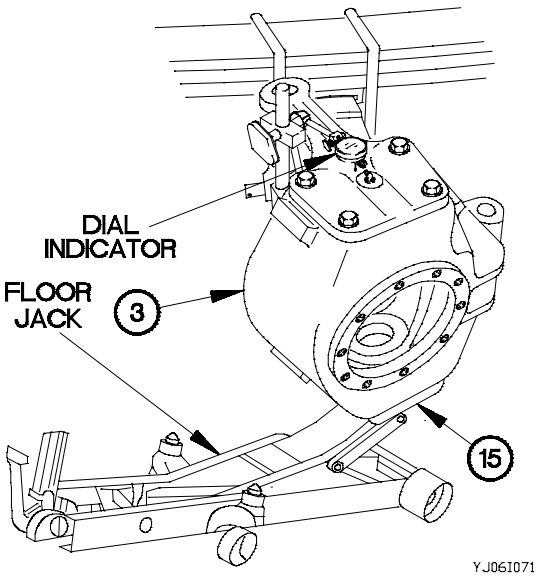
(22) Set dial indicator to zero.

(23) Lower floor jack from steering knuckle (3).

NOTE

End play should read between 0.005-0.015 in. (0.0127-0.0381 cm).

(24) Read end play on dial indicator.



9-6. STEERING KNUCKLE MECHANISM REPLACEMENT (CONT)

NOTE

Perform steps (25) through (31) if end play is not between 0.005-0.015 in. (0.0127-0.0381 cm).

(25) Use floor jack and raise steering knuckle (3) to apply pressure to access cover (15).

(26) Remove screw (13), washer (12), bracket (10), and washer (11) from pivoting arm (4).

(27) Remove three screws (8), washers (7), pivoting arm (4), and shim(s) (9) from steering knuckle (3).

NOTE

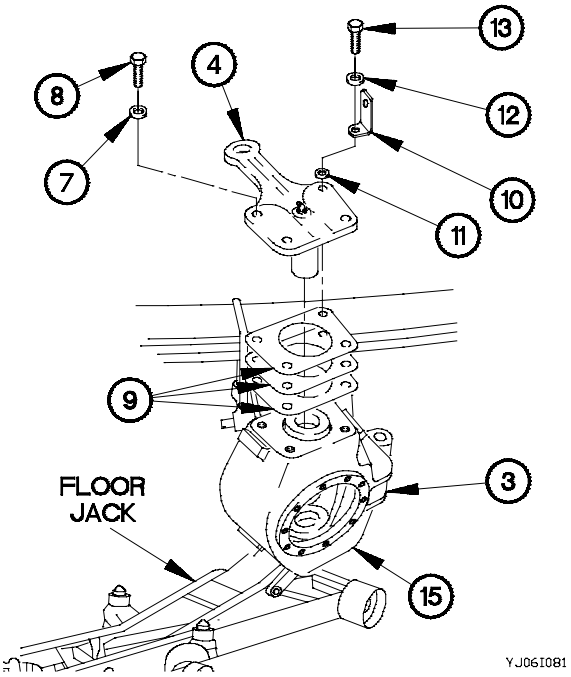
Shim(s) are added to decrease end play or removed to increase end play.

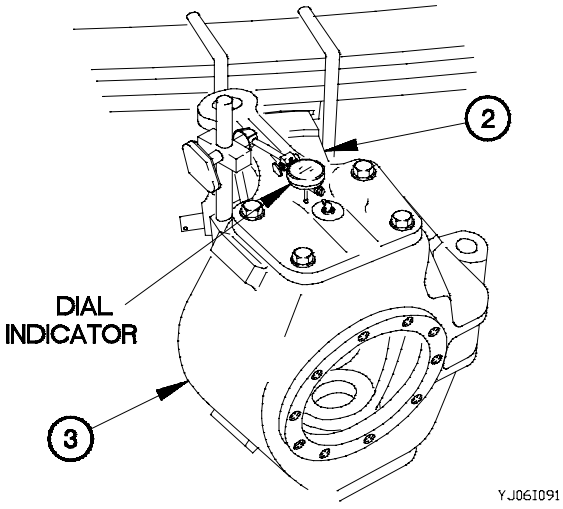
(28) Remove or add shim(s) (9) to obtain correct end play.

(29) Position shim(s) (9) and pivoting arm (4) on steering knuckle (3) with three washers (7), and screws (8).

(30) Position bracket (10) on pivoting arm (4) with washer (11), washer (12) and screw (13).

(31) Tighten three screws (8) and screw (13) to 500-650 lb-ft (678-881 N·m).



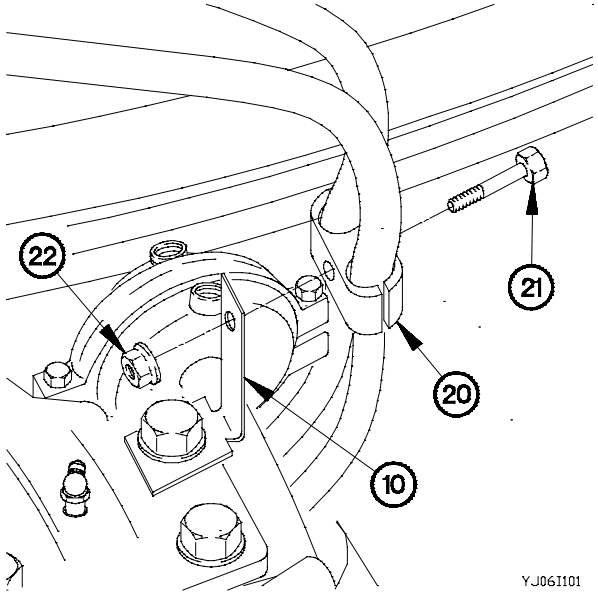


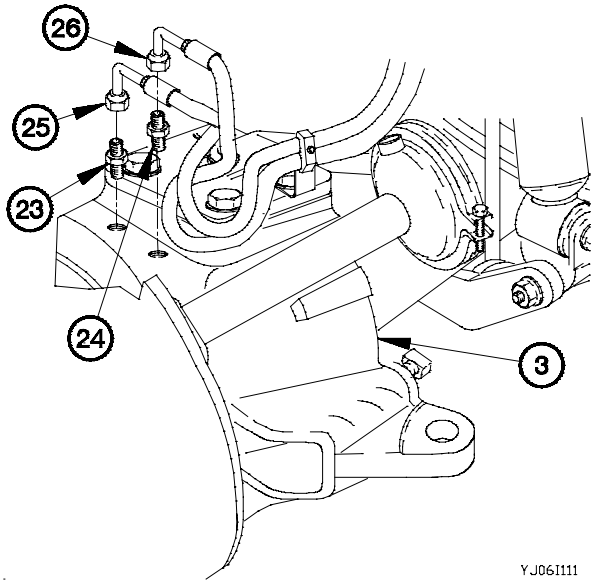
(32) Perform steps (20) through (31) to determine if end play is correct.

(33) Remove dial indicator from front axle (2).

(34) Remove floor jack from steering knuckle (3).

(35) Install clamp (20) on bracket (10) with screw (21) and self-locking nut (22).





(36) Install fittings (23 and 24) in steering knuckle (3).

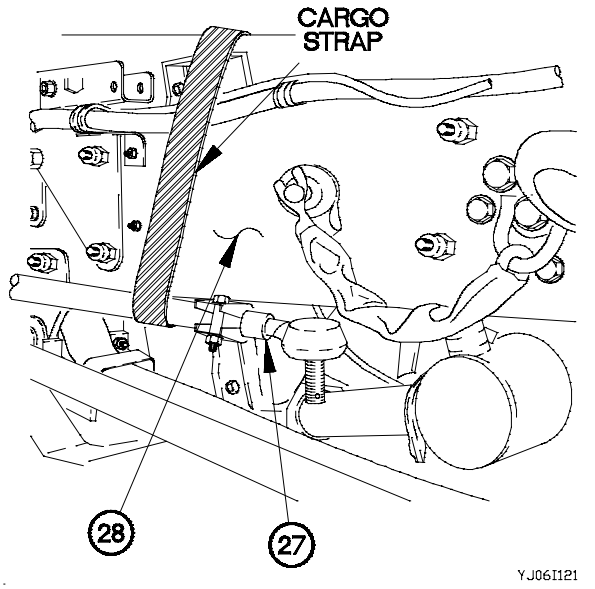
(37) Connect CTIS supply hose (25) to fitting (23).

(38) Connect CTIS vent hose (26) to fitting (24).

NOTE

Steps (39) through (42) apply to left side steering knuckle.

(39) Remove drag link (27) from frame rail (28).

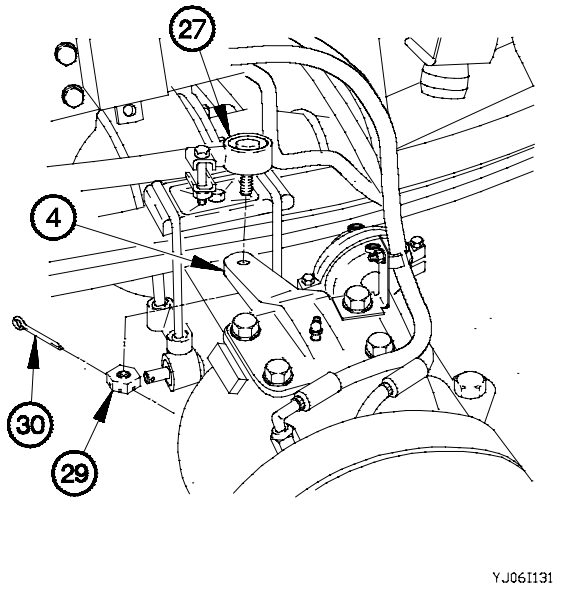


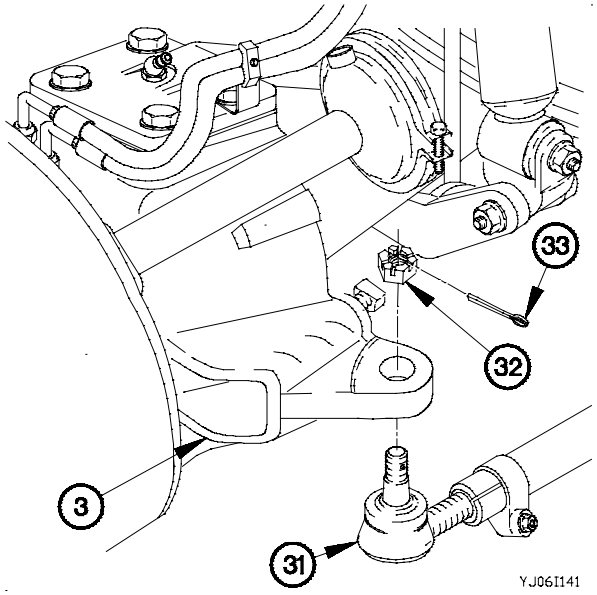
9-6. STEERING KNUCKLE MECHANISM REPLACEMENT (CONT)

(40) Position drag link (27) on pivoting arm (4) with nut (29).

(41) Tighten nut (29) to 138-178 lb-ft (187-241 N·m).

(42) Install cotter pin (30) in nut (29).





(43) Position tie-rod (31) on steering knuckle (3) with nut (32).

(44) Tighten nut (32) to 140-180 lb-ft (190-244 N·m).

(45) Install cotter pin (33) in nut (32).

c. Follow-On Maintenance.

(1) Install front axle shaft (para 9-3).

(2) Operate vehicle and check steering knuckle for proper operation (TM 9-2320-365-10).

End of Task.

CHAPTER 10
REAR AXLE MAINTENANCE

Section I. INTRODUCTION 10-1
10-1. INTRODUCTION 10-1

Section II. MAINTENANCE PROCEDURES
10-2. REAR AXLE ASSEMBLY REPLACEMENT 10-2
10-3. REAR AXLE DIFFERENTIAL PINION SEAL, YOKE SEAL AND DRIVE YOKE REPLACEMENT 10-11
10-4. REAR AXLE DIFFERENTIAL CARRIER REPLACEMENT 10-14

Section I. INTRODUCTION

10-1. INTRODUCTION

This chapter contains maintenance instructions for replacing and repairing Rear Drive Axle Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

10-2. REAR AXLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Rear stabilizer bar removed (TM 9-2320-365-20-3).
Rear wheels removed (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Lift, Transmission/Differential (Item 32, Appendix B)
Hammer, Hand, Soft Head (Item 28, Appendix B)
Jack, Leveling Support, Vehicle (TM 9-2320-365-20)

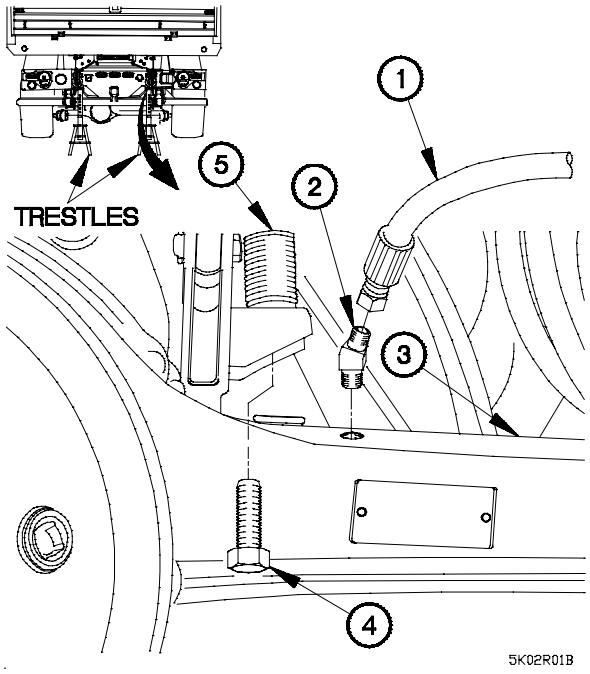
Tools and Special Tools (Cont)
Sling, Cargo (Item 48, Appendix B)

Materials/Parts
Dispenser, Pressure Sensitive Tape (Item 31, Appendix C)
Nut, Self-locking (4) (Item 136, Appendix F)
Nut, Self-locking (8) (Item 124, Appendix F)
Screw, Self-locking (8) (Item 251.1, Appendix F)
U-bolt (4) (Item 15.1, Appendix F)

Personnel Required
(3)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.



a. Removal.

(1) Place trestles under rear of vehicle.

(2) Disconnect axle breather tube (1) from 45-degree fitting (2).

(3) Remove 45-degree fitting (2) from rear axle assembly (3).

(4) Remove screw (4) from load spring (5). Discard lockwasher.

(5) Disconnect load spring (5) from rear axle assembly (3).

NOTE

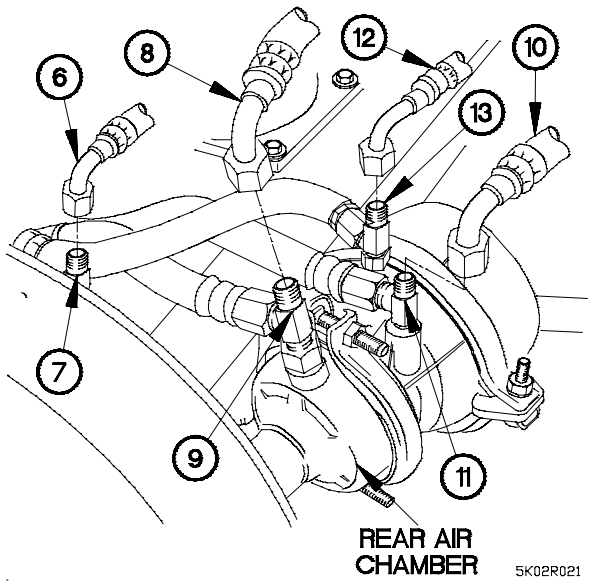
- Left and right sides of rear axle assembly are removed the same way. Left side shown.
- Tag hoses and connection points prior to disconnecting.

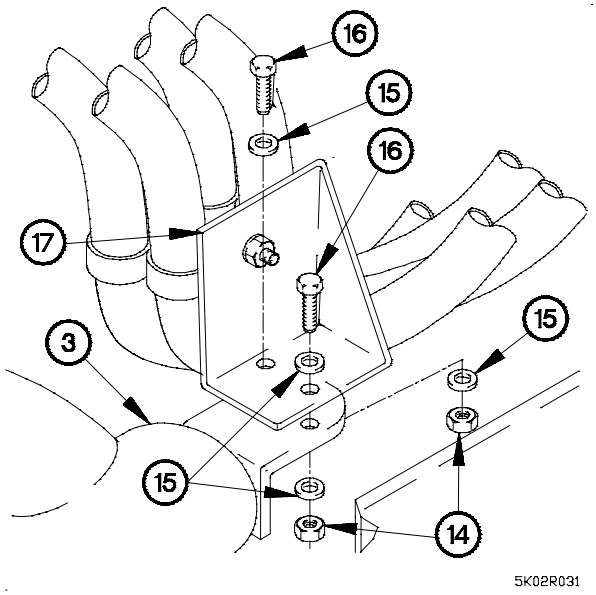
(6) Remove hose (6) from 45-degree fitting (7).

(7) Remove hose (8) from tee fitting (9).

(8) Remove hose (10) from tee fitting (11).

(9) Remove hose (12) from tee fitting (13).





(10) Remove two self-locking nuts (14), four washers (15), and two screws (16) from bracket (17). Discard self-locking nuts.

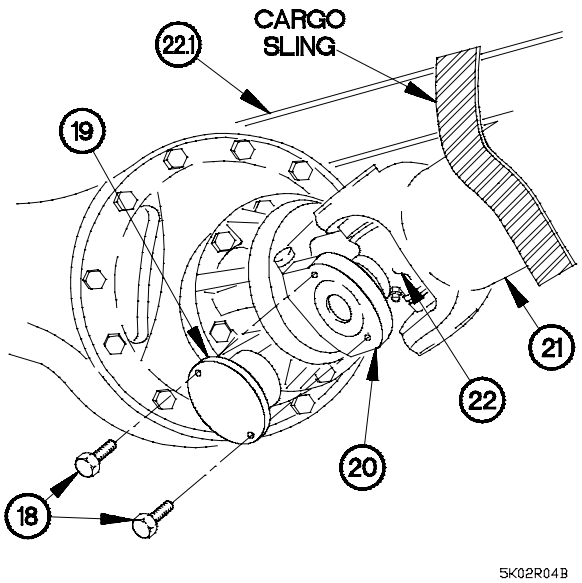
(11) Separate bracket (17) from rear axle assembly (3).

(11.1) Perform steps (6) through (11) on right side of rear axle assembly.

(12) Remove four screws (18) and two bearing cups (19) from drive yoke (20). Discard screws.

(13) Slide drive shaft (21) from side to side and separate universal joint (22) from drive yoke (20).

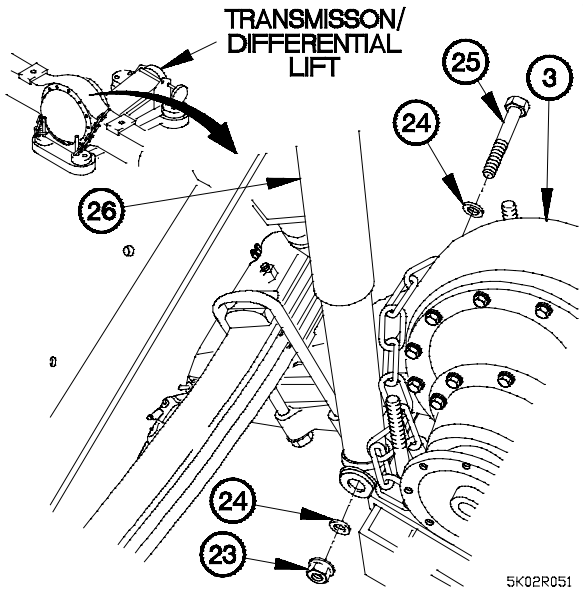
(13.1) Attach drive shaft (21) to frame (22.1).



10-2. REAR AXLE ASSEMBLY REPLACEMENT (CONT)

WARNING

Rear axle assembly weighs approximately 1580 lbs (717 kgs). Rear axle assembly must be supported on a transmission/ differential lift during removal. Failure to comply may result in injury to personnel or damage to equipment.

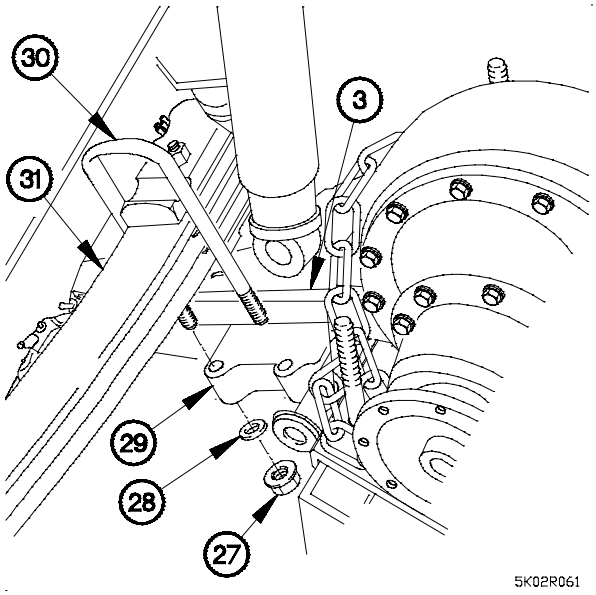


NOTE

- Steps (14) through (18) require the aid of an assistant.
- Left and right side shock absorbers are removed the same way. Right side shown.

(14) Position transmission/differential lift under rear axle assembly (3) and secure with chain.

(15) Remove nut (23), two washers (24), and bolt (25) from shock absorber (26).



NOTE

Left and right side U-bolts and mounting pads are removed the same way. Right side shown.

(16) Remove four self-locking nuts (27), washers (28), and mounting pad (29) from two U-bolts (30). Discard self-locking nuts.

(17) Remove two U-bolts (30) from rear left spring (31). Discard U-bolts.

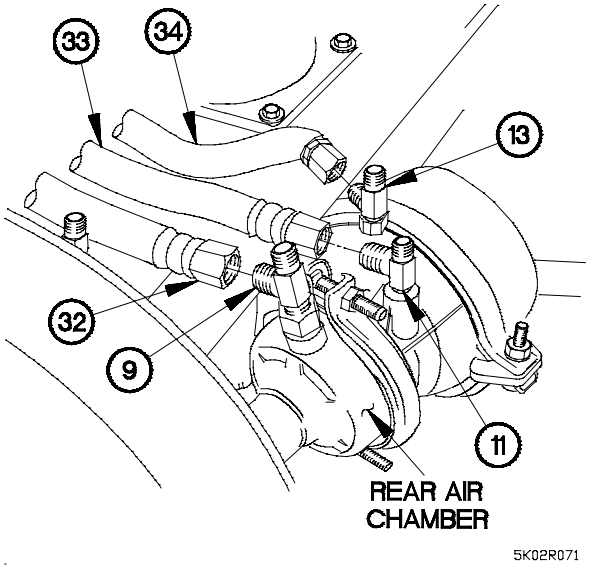
(18) Remove rear axle assembly (3) from vehicle.

(18.1) Perform steps (14) through (18) on left side of rear axle assembly.

(19) Disconnect hose (32) from tee fitting (9).

(20) Disconnect hose (33) from tee fitting (11).

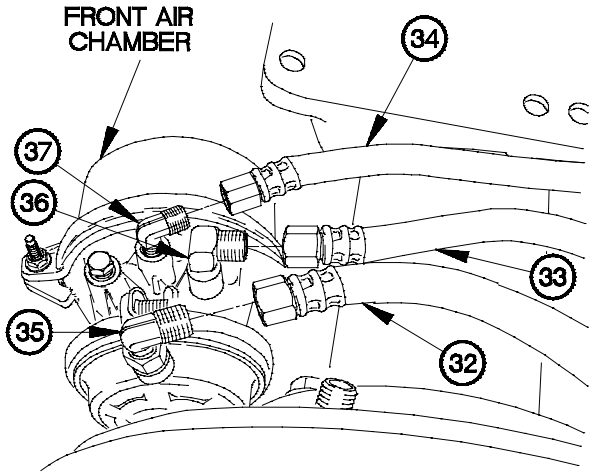
(21) Disconnect hose (34) from tee fitting (13).



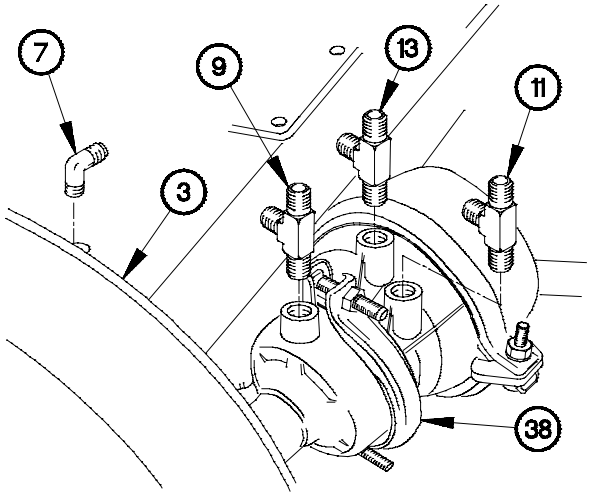
(22) Remove hose (32) from 90-degree fitting (35).

(23) Remove hose (33) from 90-degree fitting (36).

(24) Remove hose (34) from 90-degree fitting (37).



5K02R081



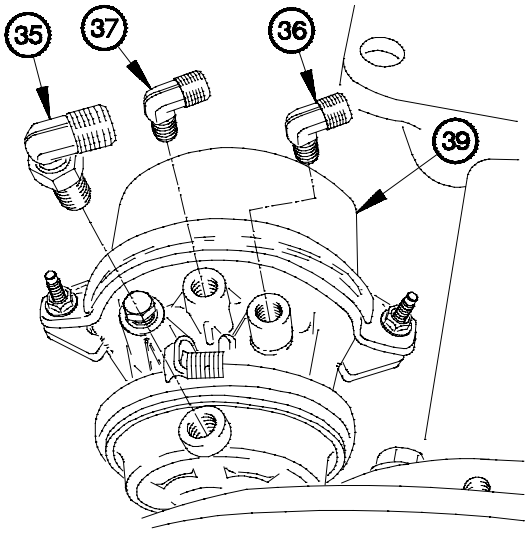
5K02R091

(25) Remove tee fittings (9, 11, and 13) from rear air chamber (38).

(26) Remove 45-degree fitting (7) from rear axle assembly (3).

(27) Remove 90-degree fittings (35, 36, and 37) from front air chamber (39).

(27.1) Perform steps (19) through (27) on right side of rear axle assembly.



5K02R101

10-2. REAR AXLE ASSEMBLY REPLACEMENT (CONT)

NOTE

Perform steps (28) and (29) on replacement rear axle assembly.

(28) Remove 10 protective covers (40) from rear axle assembly (3).

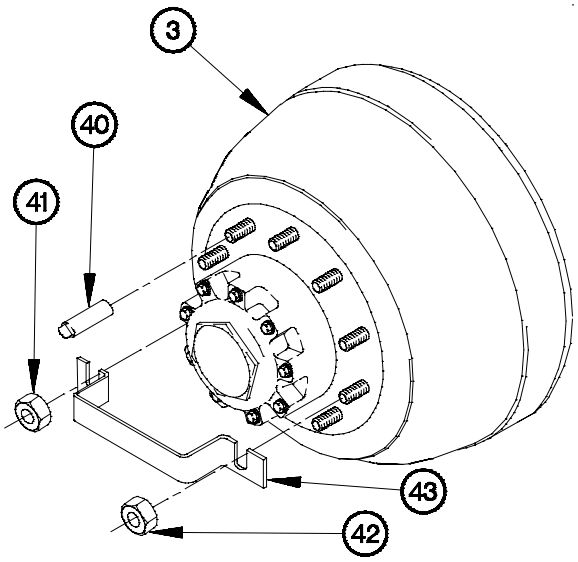
(29) Remove nuts (41 and 42) and bracket (43) from rear axle assembly (3).

NOTE

Perform steps (30) and (31) on old rear axle assembly.

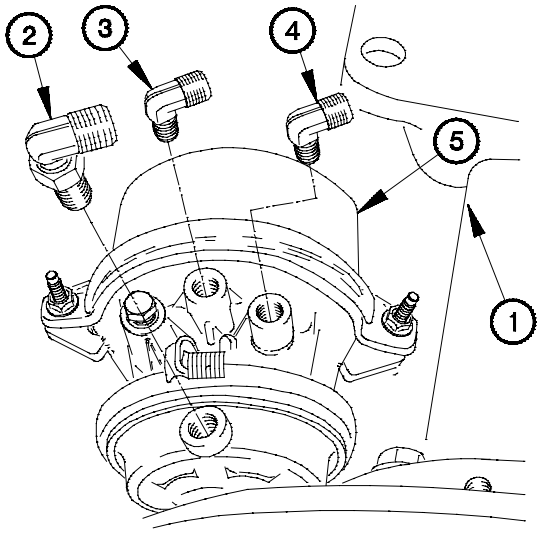
(30) Install bracket (43) on rear axle assembly (3) with nuts (41 and 42).

(31) Install 10 protective covers (40) on rear axle assembly (3).



5K02R111

b. Installation.



5K02I01-

WARNING

Rear axle assembly weighs approximately 1580 lbs (717 kgs). Rear axle assembly must be supported on a transmission/ differential lift during installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

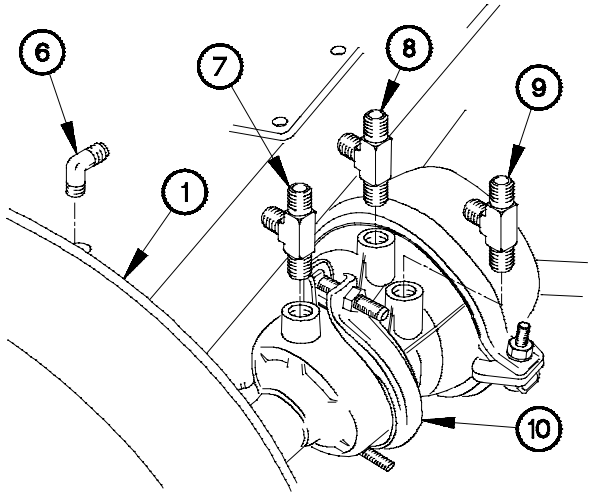
Left and right sides of rear axle assembly are installed the same way. Left side shown.

(1) Position rear axle assembly (1) on transmission/ differential lift and secure with chain.

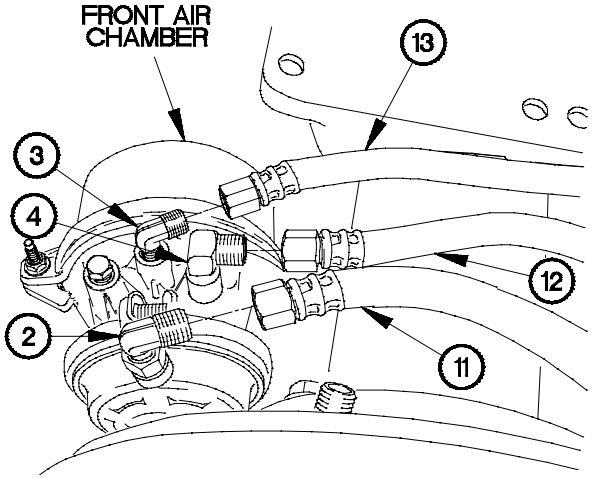
(2) Install 90-degree fittings (2, 3, and 4) on front air chamber (5).

(3) Install 45-degree fitting (6) on rear axle assembly (1).

(4) Install tee fittings (7, 8, and 9) on rear air chamber (10).



5K02I021



5K02I03-

(5) Connect hose (11) to 90-degree fitting (2).

(6) Connect hose (12) to 90-degree fitting (4).

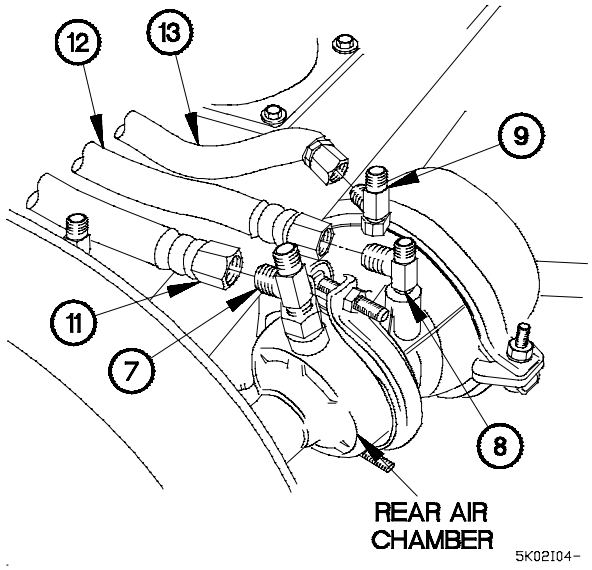
(7) Connect hose (13) to 90-degree fitting (3).

(8) Connect hose (11) to tee fitting (7).

(9) Connect hose (12) to tee fitting (8).

(10) Connect hose (13) to tee fitting (9).

(10.1) Perform steps (2) through (10) on right side of rear side assembly.



5K02I04-

10-2. REAR AXLE ASSEMBLY REPLACEMENT (CONT)

NOTE

Left and right side of U-bolts and mounting pads are installed the same way. Left side shown.

(11) Position rear axle assembly (1) under vehicle.

(12) Install two U-bolts (14) on rear leaf spring (15).

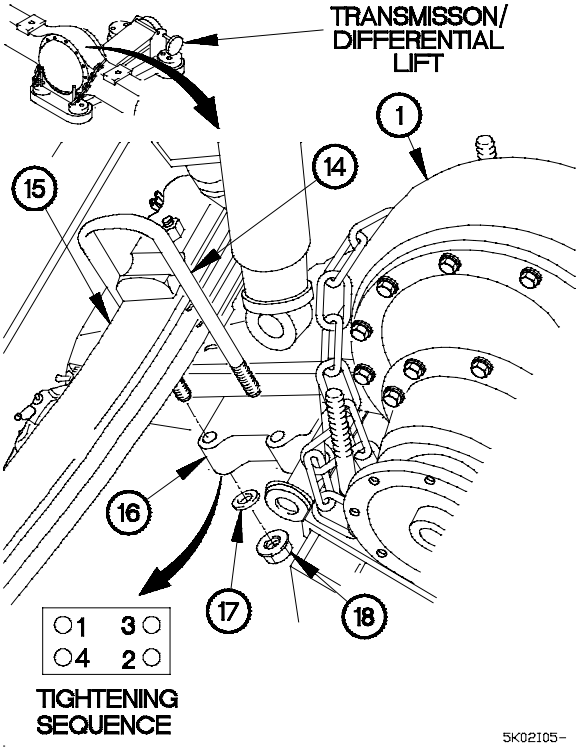
NOTE

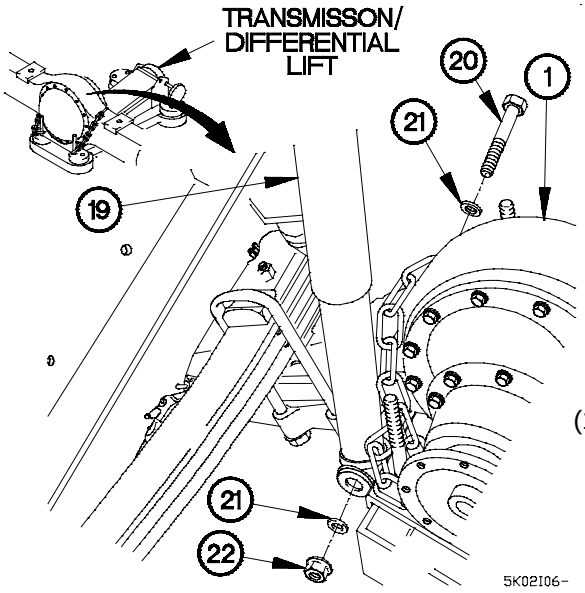
Align hose on mounting pad with stud protruding from bottom of leaf spring.

(13) Position mounting pad (16) on two U-bolts (14) with four washers (17) and self-locking nuts (18).

(14) Tighten four self-locking nuts (18) to 200 lb-ft (271 N·m).

(15) Re-tighten four self-locking nuts (18) in increments of 50 lb-ft (271 N·m) to 390-510 lb-ft (529-692 N·m) in sequence shown.





NOTE

Left and right side shock absorbers are installed the same way. Right side shown.

(16) Position shock absorber (19) on rear axle assembly (1) with bolt (20), two washers (21), and nut (22).

(17) Tighten nut (22) to 398-487 lb-ft (540-660 N·m).

(18) Remove transmission/differential lift from under vehicle.

(18.1) Perform steps (12) through (18) on left side of rear axle assembly.

(18.2) Remove drive shaft (22.1) from frame (22.2).

WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups in ensure all needle bearings are in place prior to installation. replace bearing cups if needle are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

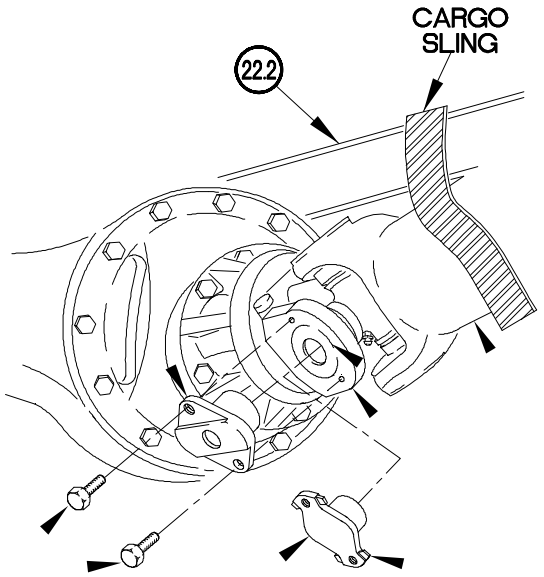
- Wipe end of yoke bearing bores prior to installation.
- There are two types of bearing cups, those with tabs and those without. Perform step (19) on bearing cups not equipped with tabs.

(19) Position universal joint (23) on drive yoke (24) with two bearing cups (25) and four screws (26).

NOTE

Perform step (19.1) on kits equipped with screws P/N C5 H5-24-39.

(19.1) Tighten four screws (26) to 26-35 lb-ft (35-47 N•m).



10-2. REAR AXLE ASSEMBLY REPLACEMENT (CONT)

NOTE

- Perform step (20) on kits equipped with shearhead screws.
- Alternately tighten screws.
- When correct torque is reached, bearing cap screw small hex head will break off.

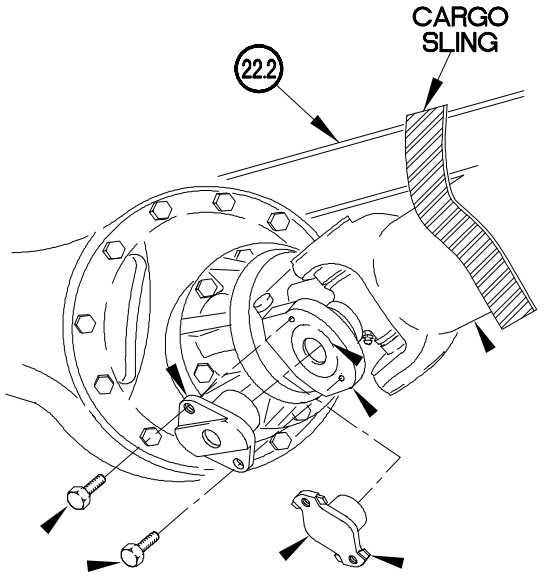
(20) Tighten four screws (26).

NOTE

Perform steps (20.1) and (20.2) on bearing cups equipped with tabs.

(20.1) Tighten four screws (26) to 26-35 lb-ft (35-47 N•m)

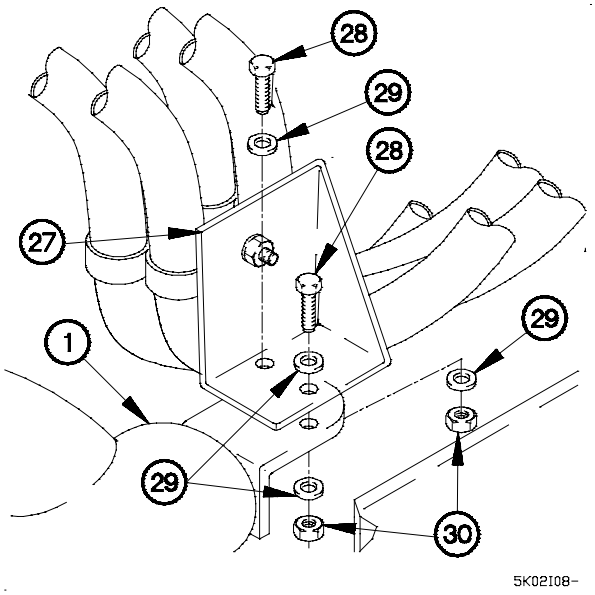
(20.2) Fold tabs on four screws (26).

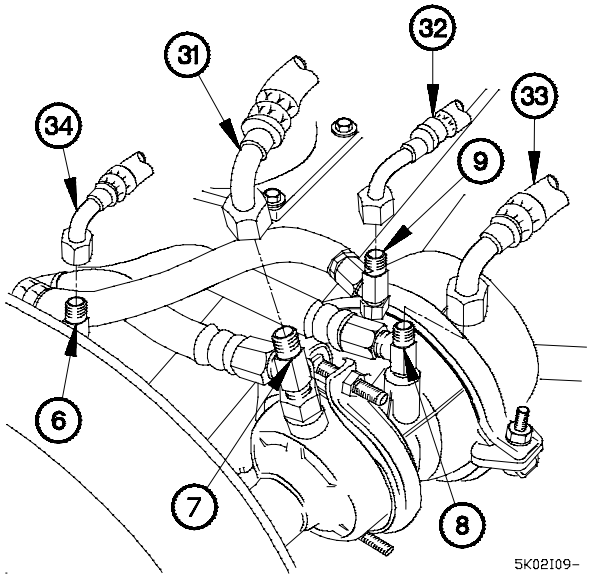


NOTE

Left and right sides of rear axle assembly are installed the same way. Left side shown.

(21) Install bracket (27) on rear axle assembly (1) with two screws (28), four washers (29), and two self-locking nuts (30).





(22) Install hose (31) on tee fitting (7).

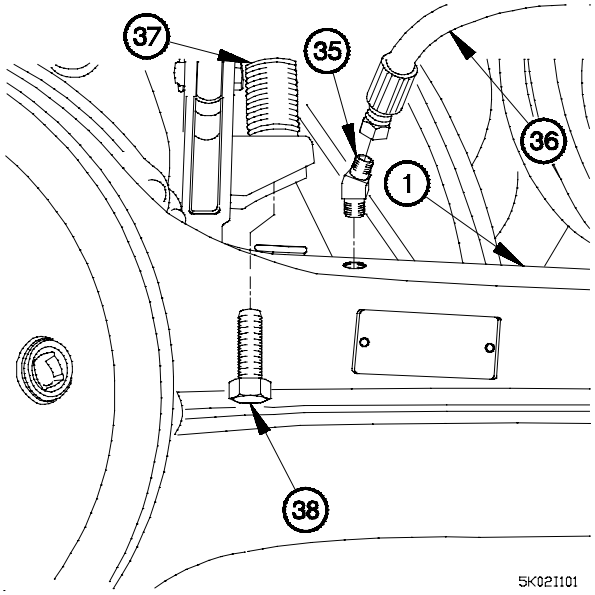
(23) Install hose (32) on tee fitting (9).

(24) Install hose (33) on tee fitting (8).

(25) Install hose (34) on 45-degree fitting (6).

(25.1) Perform steps (21) through (25) on right side of rear axle assembly.

10-2. REAR AXLE ASSEMBLY REPLACEMENT (CONT)



(26) Install 45-degree fitting (35) on rear axle assembly (1).

(27) Install axle breather tube (36) on 45-degree fitting (35).

(28) Connect load spring (37) on rear axle assembly (1) with screw (38).

c. Follow-On Maintenance.

(1) Service differential carrier (TM 9-2320-365-10).

(1.1) Lubricate drive shaft universal joint and slip yoke (TM 9-2320-365-20-1).

(2) Install rear stabilizer bar (TM 9-2320-365-20-3).

(3) Install rear wheels (TM 9-2320-365-10).

(4) Start engine (TM 9-2320-365-10).

(5) Operate vehicle and check for proper steering and drive operation. Listen for unusual noises and vibration (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

(7) Check rear axle assembly and rear axle differential carrier for air leaks.

(8) After 1000 miles of vehicle operation, tighten four self-locking nuts on U-bolts in increments of 50 lb-ft (271 N·m) to 390-510 lb-ft (529-692 N·m) in sequence.

End of Task.

10-3. REAR AXLE DIFFERENTIAL PINION SEAL, YOKE SEAL AND DRIVE YOKE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Puller Kit, Mechanical (Item 44, Appendix B)
Wrench Set, Socket, (Item 74, Appendix B)
Multiplier, Torque Wrench (Item 35, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Hammer, Soft Head (Item 28, Appendix B)
Socket, socket wrench (Item 67, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Tools and Special Tools (Cont)
Sling, Cargo (Item 48, Appendix B)
Driver, Front and Rear Differential Yoke Seal (Item 45, Appendix D)
Driver, Differential Pinion Seal (Item 44, Appendix D)
Holding Bar, Pinion (TM 9-2320-365-20)

Materials/Parts
Sealing compound (Item 75.2 Appendix C)
Kit, Seal (Item 263.1, Appendix F)
Nut, Self-Locking (Item 144, Appendix F)
Screw (4) (Item 251.1, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

There are two types of bearing cups. Those with tabs and those without. Perform the following step on bearing cups with tabs.

(1) Lift tabs from two bearing cups (1).

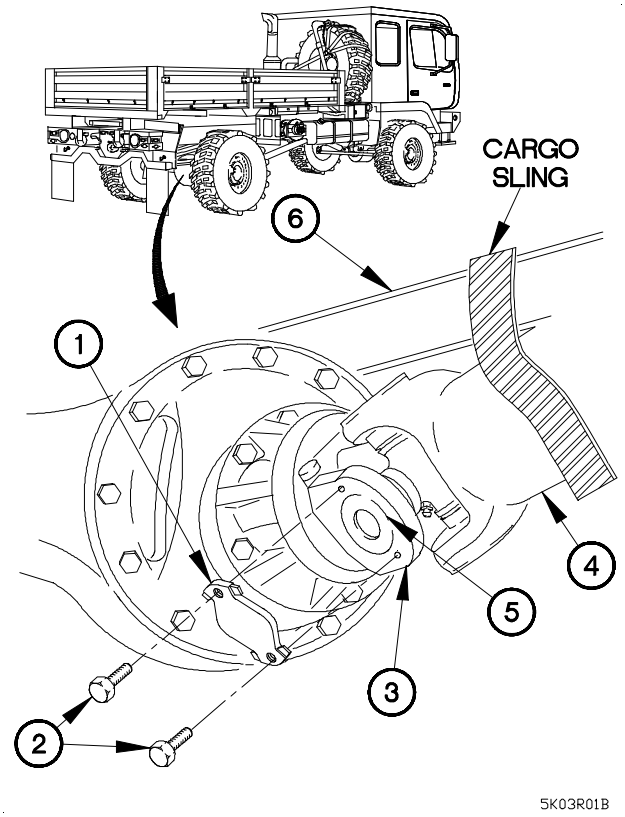
(1.1) Remove four screws (2) and two bearing cups (1) from drive yoke (3). Discard screws.

(2) Slide drive shaft (4) from side to side and separate universal joint (5) from drive yoke (3).

NOTE

Step (3) requires the aid of an assistant.

(3) Attach drive shaft (4) to frame (6).



10-3. REAR AXLE DIFFERENTIAL PINION SEAL, YOKE SEAL AND DRIVE YOKE REPLACEMENT (CONT)

(4) Remove drive yoke nut (7) from pinion shaft (8). Discard drive yoke nut.

(5) Place drain pan under pinion shaft (8).

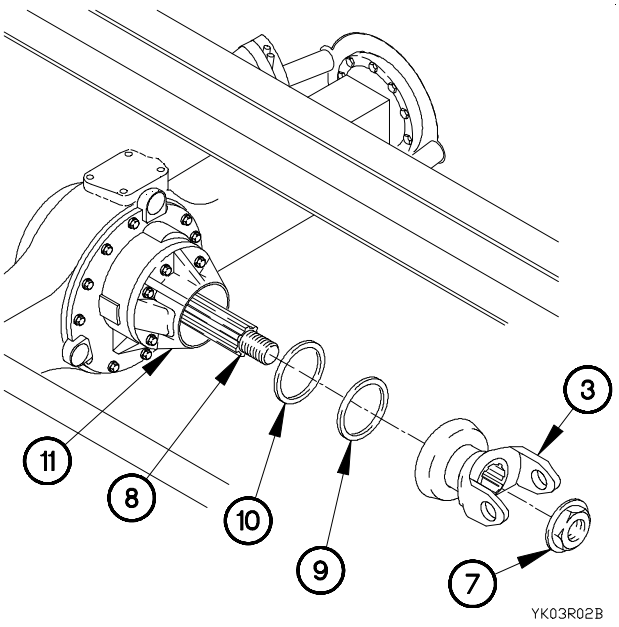
(6) Remove drive yoke (3) from pinion shaft (8).

NOTE

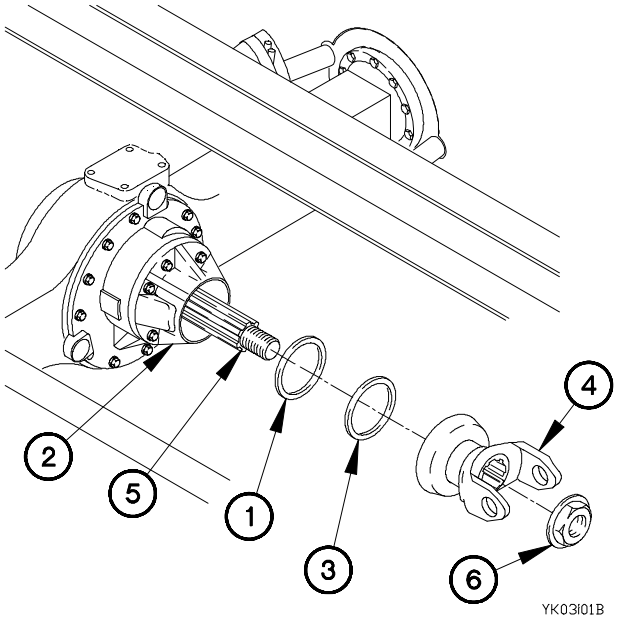
Vehicles serial number 0001 through 3133 were not originally equipped with yoke seals. Yoke seals may not be present if maintenance has not been previously performed on drive yoke.

(7) Remove yoke seal (9) from drive yoke (3) Discard yoke seal.

(8) Remove pinion seal (10) from rear differential carrier (11). Discard pinion seal.



b. Installation.



(1) Apply a small amount of sealing compound to outside edge and spring cavity of pinion seal (1).

(2) Install pinion seal (1) in rear differential carrier (2).

(3) Visually verify pinion seal (1) is properly seated.

(4) Install yoke seal (3) on drive yoke (4).

(5) Install drive yoke (4) on pinion shaft (5) with drive yoke nut (6).

(6) Tighten drive yoke nut (6) to 920-1130 lb-ft (1248-1532 N•m).

WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment

CAUTION

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needed bearing are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

- Wipe end of yoke bearing bores prior to installation.
- Step (7) requires the aid of an assistant.

(7) Remove propeller shaft (7) from frame (8).

NOTE

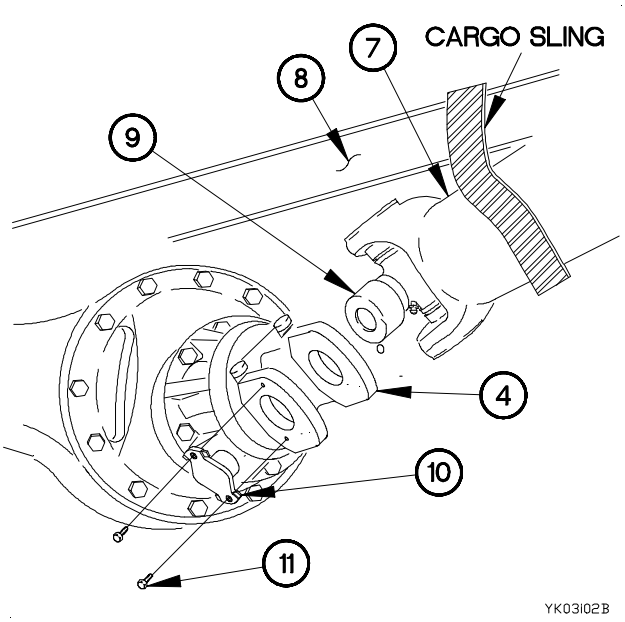
There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups not equipped with tabs.

(8) Position universal joint (9) on drive yoke (4) with two bearing cups (10) and four screws (11).

NOTE

Perform the following step on kits equipped with screws P/N C5 H5-24-39.

(8.1) Tighten four screws (11) to 26-35 lb-ft. (35-47 N•m).



NOTE

- When correct torque is reached, bearing cap screw small hex head will break off.
- Alternately tighten screws.
- Perform the following step on kits equipped with shearhead screws.

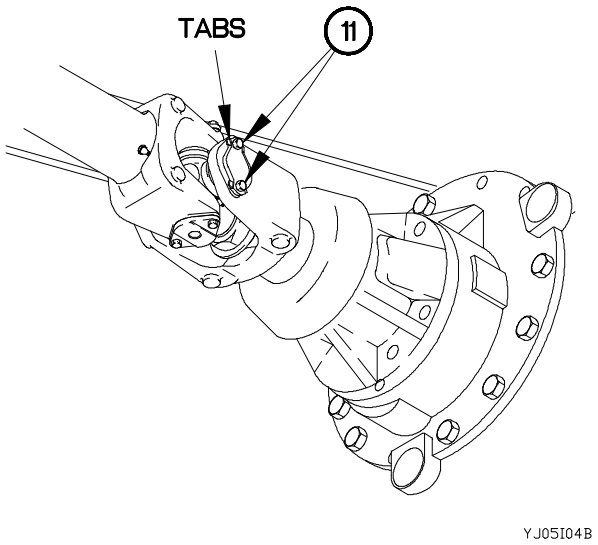
(9) Tighten four screws (11).

NOTE

Perform the following two steps on bearing cups equipped with tabs.

(9.1) Tighten four screws (11) to 26-35 lb-ft (35-47 N•m).

(9.2) Fold tabs on four screws (11).



CAUTION

Grease must flow from all four seals. Failure to comply may result in damage to equipment.

(10) Apply lubrication to grease Fittings (TM9-2320-366-20).

c. Follow-On Maintenance.

(1) Check differential oil level (TM 9-2320-365-20).

(1.1) Lubricate drive shaft universal joint and slip yoke (TM 9-2320-365-20-1).

(1) Operate vehicle and check for proper operation (TM 9-2320-365-10).

(3) Shut down engine (TM 9-2320-365-10).

(4) Check pinion seal for oil leaks.

End of Task.

10-4. REAR AXLE DIFFERENTIAL CARRIER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Rear axle shaft removed (TM 9-2320-365-20-3).
Rear axle differential carrier drained (TM 9-2320-365-20).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Lift, Transmission/Differential (Item 32, Appendix B)
Wrench Set, Socket (TM 9-2320-365-20)
Pan, Drain (Item 36, Appendix B)

Tools and Special Tools (Cont)
Sling, Cargo (Item 48, Appendix B)

Materials/Parts
Sealant, Adhesive (Item 67, Appendix C)
Screw (4) (Item 251.1, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

There are two types of bearing cups, those with tabs and those without. Perform step (1) on bearing cups with tabs.

(1) Lift tabs from two bearing cups (1).

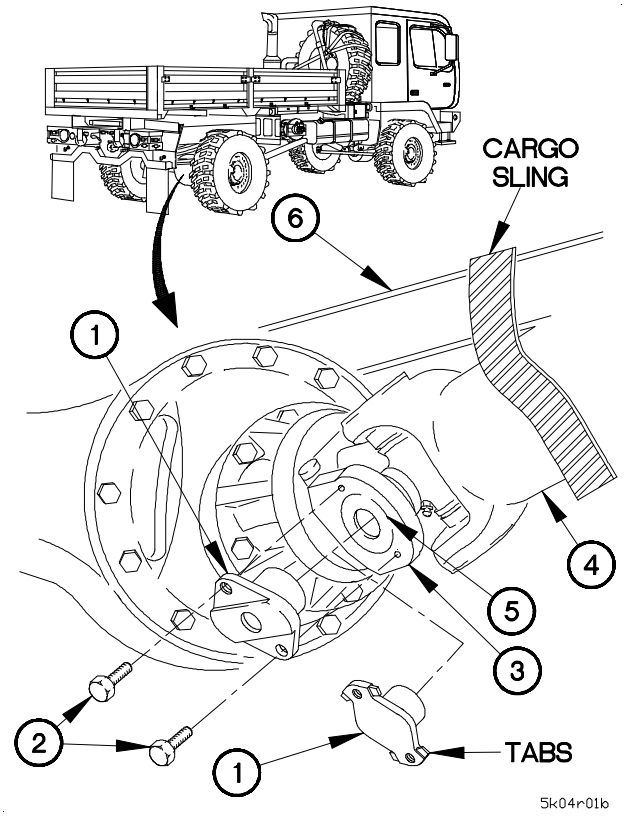
(1.1) Remove four screws (2) and two bearing cups (1) from drive yoke (3). Discard screws.

(2) Slide drive shaft from side to side (4) and separate universal joint (5) from drive yoke (3).

NOTE

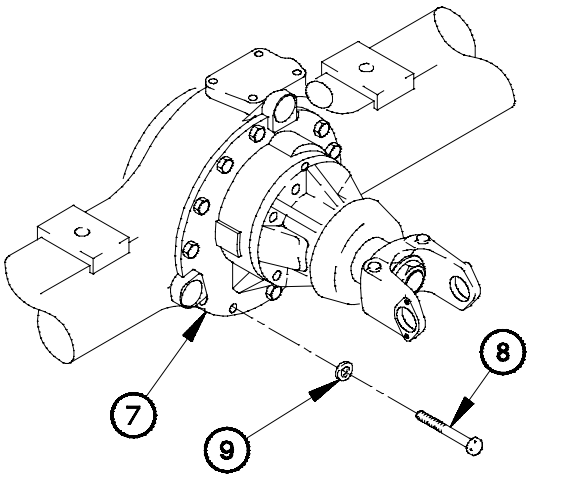
Step (3) requires the aid of an assistant.

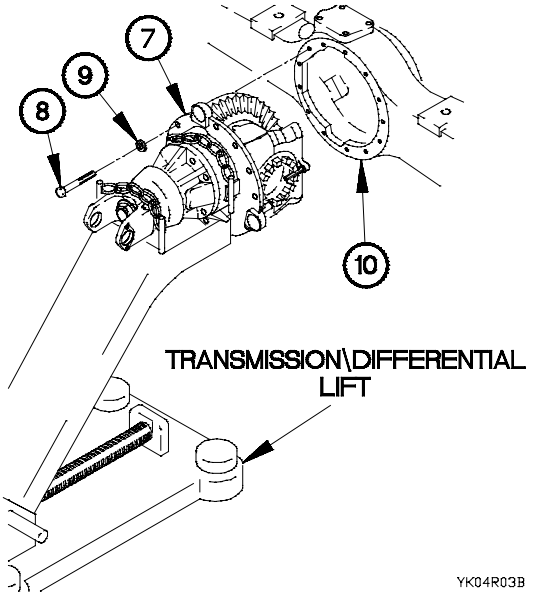
(3) Attach drive shaft (4) to frame (6).



(4) Place drain pan under rear axle differential carrier (7).

(5) Remove five bolts (8) and washers (9) from bottom of rear axle differential carrier (7).





WARNING

Rear axle differential carrier weighs approximately 400 lbs (182 kgs). Rear axle differential carrier must be supported on transmission/ differential lift during removal. Failure to comply may cause serious injury to personnel or damage to equipment.

(6) Support rear axle differential carrier (7) with transmission/differential lift.

(7) Remove seven bolts (8) and washers (9) from rear axle differential carrier (7).

NOTE

Step (8) requires the aid of assistant.

(8) Remove rear axle differential carrier (7) from axle (10).

10-4. REAR AXLE DIFFERENTIAL CARRIER REPLACEMENT (CONT)

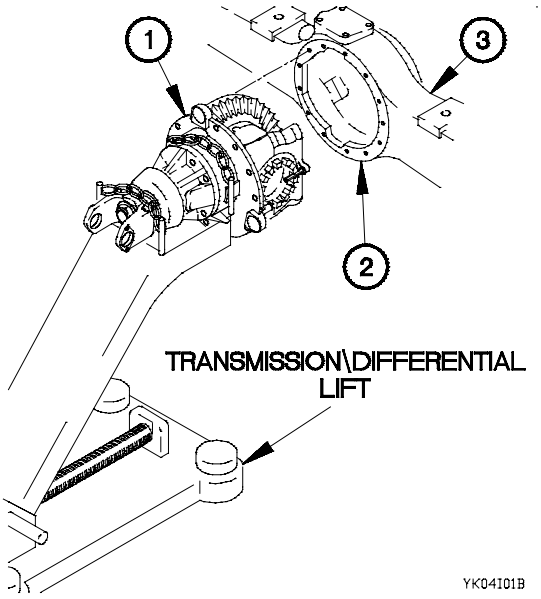
b. Installation.

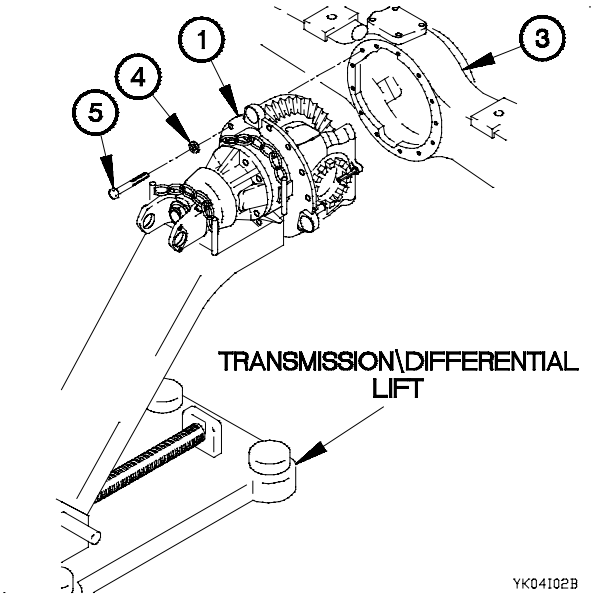
(1) Place rear axle differential carrier (1) on transmission/ differential lift.

WARNING

Adhesive causes immediate bonding on contact with eyes, skin, or clothing and also gives off harmful vapors. Wear protective goggles and use in well-ventilated area. If adhesive get in eyes, try to keep eyes open, flush eyes with water for 15 minutes, and get immediate medical attention. Failure to comply may result in injury to personnel.

(2) Apply adhesive to differential flange (2) on axle (3).





NOTE

Step (3) requires the aid of assistant.

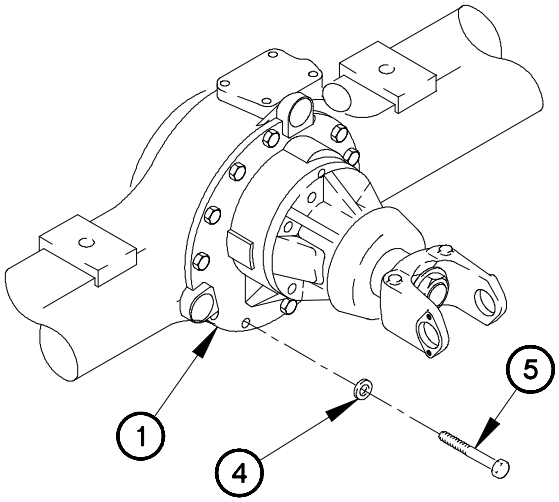
(3) Align rear axle differential carrier (1) with axle (3).

(4) Position seven washers (4) and bolts (5) in rear axle differential carrier (1).

(5) Remove transmission/differential lift from under vehicle.

(6) Position five washers (4) and bolts (5) in rear axle differential carrier (1).

(7) Tighten 12 bolts (5) to 74-96 lb-ft (100-130 N•m).



YK04I03B

10-4. REAR AXLE DIFFERENTIAL CARRIER REPLACEMENT (CONT)

WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needed bearings are missing or cut out of place. Failure to compy may result in damage to equipment.

NOTE

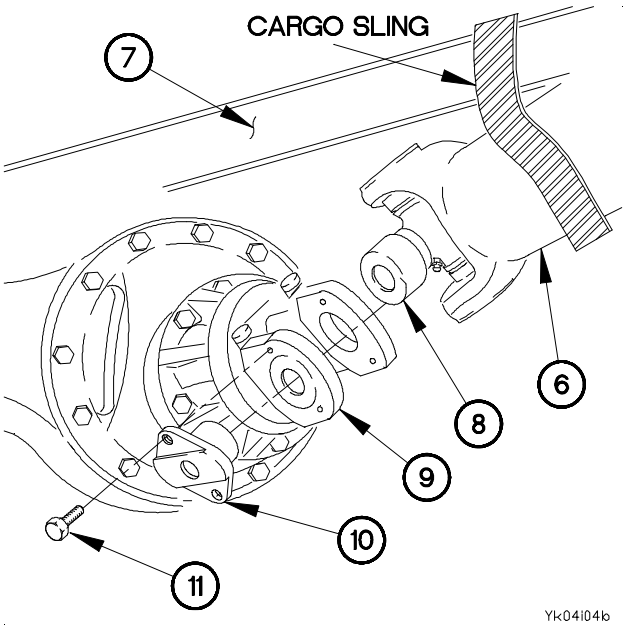
- Wipe end of yoke bearing bores prior to installation,
- Step (8) requires the aid of an assistant.

(8) Remove drive shaft (6) from frame (7).

NOTE

There are two types of bearing cups, those with tabs and those without. Perform the following step on bearing cups not equipped with tabs.

(9) Position universal joint (8) on drive yoke (9) with two bearing cups (10) and four screws (11).



NOTE

- Alternately tighten screws.
- When correct torque is reached, bearing cap screw small hex head will break off.
- Perform step (10) on kits equipped with screws P/N C5 H5-24-39.

(10) Tighten four screws (11) to 26-35 lb ft (35-47 N•m)

NOTE

Perform step (11) on kits equipped with shearhead screws.

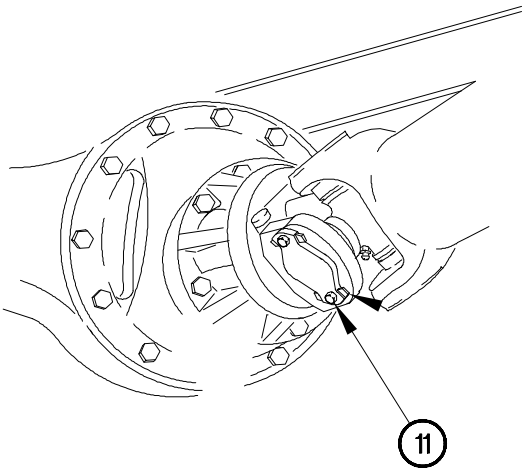
(11) Tighten four screws (11).

NOTE

Perform steps (12) and (13) on bearing cups equipped with tabs.

(12) Tighten four screws (11) to 26-35 lb ft (35-47 N•m).

(13) Fold tabs on four screws (11).



CAUTION

Grease must flow from all four seals. Failure to comply may result in damage to equipment.

(14) Apply lubrication to grease fittings (TM 9-2320-366-20)

10-4. REAR AXLE DIFFERENTIAL CARRIER REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Refill rear axle differential carrier (TM 9-2320-365-20).

(1.1) Lubricate drive shaft universal joint and slip yoke (TM 9-2320-365-20-1).

(2) Install rear axle shaft (TM 9-2320-365-20-3).

(3) Start engine (TM 9-2320-365-10).

(4) Operate vehicle and check for proper operation of rear axle differential carrier (TM 9-2320-365-10).

(5) Shut down engine (TM 9-2320-365-10).

(6) Check rear axle differential carrier for oil leaks.

End of Task.

CHAPTER 11
BRAKE SYSTEM MAINTENANCE

Section I. INTRODUCTION 11-1
11-1. INTRODUCTION 11-1

Section II. MAINTENANCE PROCEDURES 11-2
11-2. AIR COMPRESSOR REPLACEMENT 11-2

Section I. INTRODUCTION

11-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repairing Brake System Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

11-2. AIR COMPRESSOR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Power steering pump removed (TM 9-2320-365-20-3).
Air tanks drained (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Pan, Drain (Item 36, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Vise, Machinist (Item 72, Appendix B)
Caps, Vise Jaw (Item 9, Appendix B)

Materials/Parts
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Antifreeze (Item 12, Appendix C)
Sealing, Compound (Item 41, Appendix C)
Nut, Self-Locking (Item 145, Appendix F)
Gasket (Item 64, Appendix F)
Sealant (Item 75, Appendix C)

Personnel Required
(2)

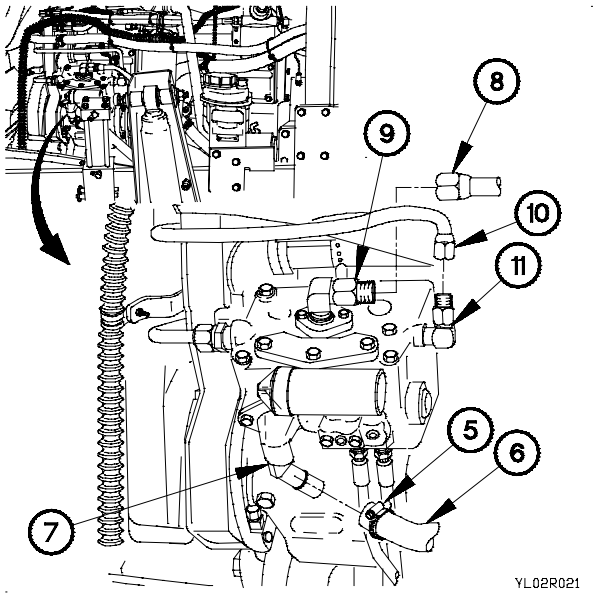
a. Removal.

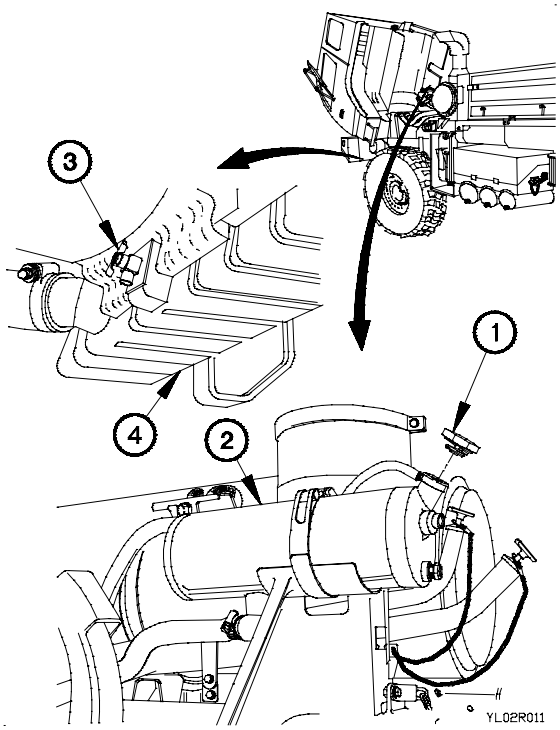
(1) Remove radiator cap (1) from radiator overflow tank (2).

(2) Position drain pan under radiator draincock (3).

(3) Drain approximately 15-20 qt (14-19 L) of coolant from radiator (4).

(4) Close radiator draincock (3) on radiator (4).





(5) Loosen hose clamp (5) on air hose (6).

(6) Disconnect air hose (6) from 45-degree fitting (7).

(7) Disconnect air hose (8) from 90-degree fitting (9).

(8) Disconnect coolant hose (10) from 90-degree fitting (11).

(9) Disconnect coolant tube (12) from adapter (13).

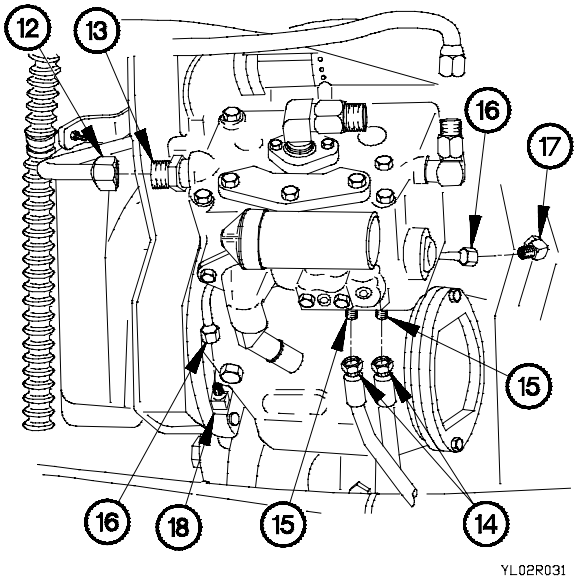
NOTE

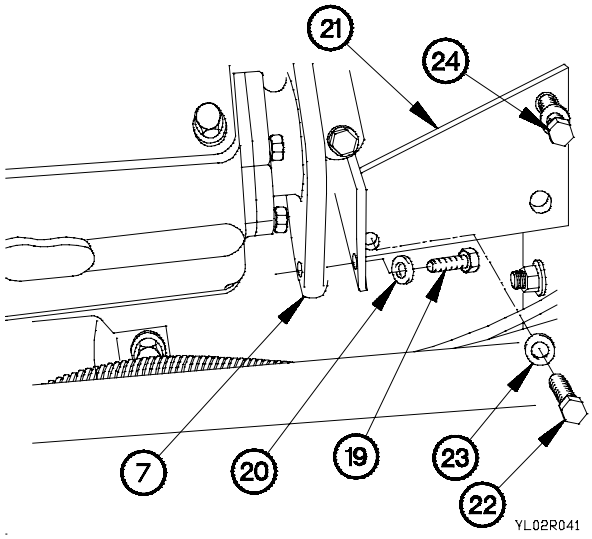
Tag air hoses, tubes, and connection points prior to disconnecting.

(10) Disconnect two governor air hoses (14) from fittings (15).

(11) Disconnect oil tube (16) from 90-degree fitting (17).

(12) Remove oil tube (16) from 90-degree fitting (18).





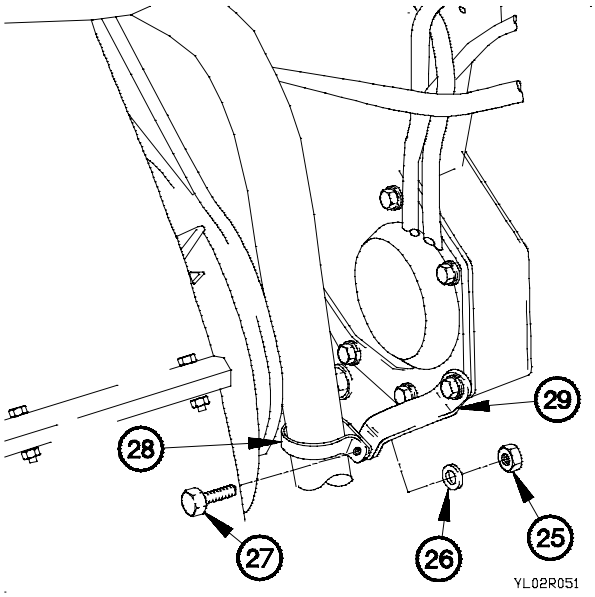
(13) Remove bolt (19) and washer (20) from support bracket (21).

(14) Remove two lower bracket bolts (22) and washers (23) from support bracket (21).

(15) Loosen upper bracket bolt (24) on support bracket (21).

(16) Position support bracket (21) clear of air compressor (7).

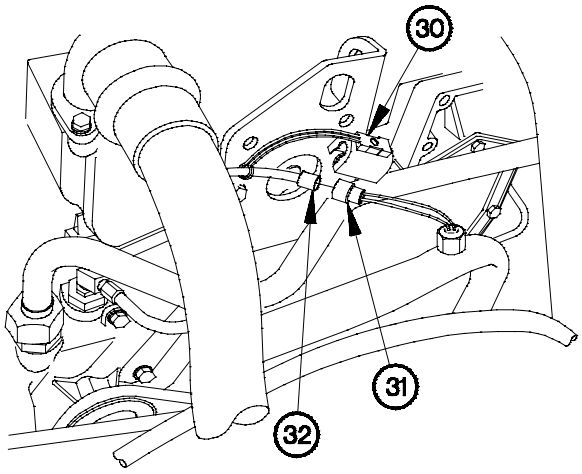
(17) Remove self-locking nut (25), washer (26), screw (27), and clamp (28) from bracket (29). Discard self-locking nut.



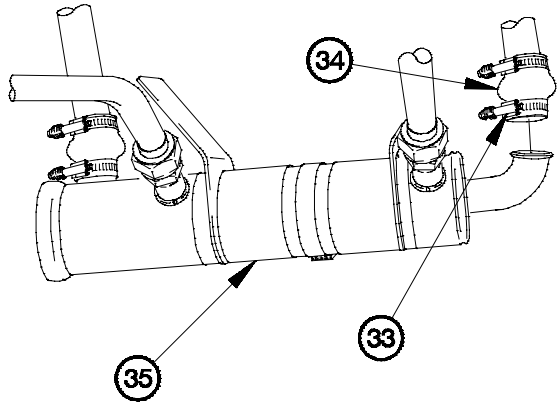
11-2. AIR COMPRESSOR REPLACEMENT (CONT)

(18) Disconnect connector clamp (30) from either sensor switch connector (31).

(19) Disconnect ether sensor switch connector (31) from electrical connector P42 (32).



YL02R061



YL02R071

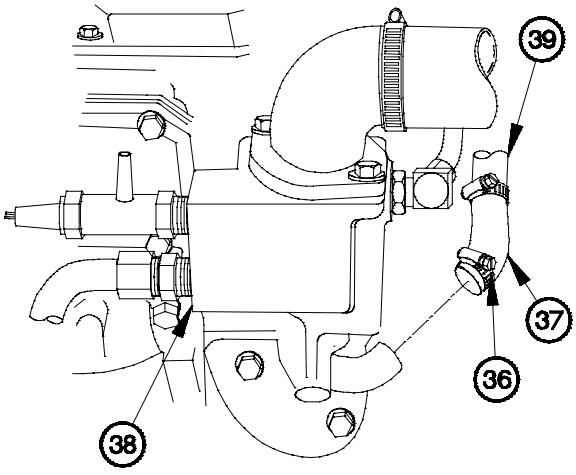
(20) Loosen hose clamp (33) on bottom coolant hose (34).

(21) Disconnect bottom coolant hose (34) from oil cooler (35).

(22) Loosen hose clamp (36) on upper coolant hose (37).

(23) Remove upper coolant hose (37) from thermostat housing (38).

(24) Remove transmission oil cooler tube (39) from vehicle.

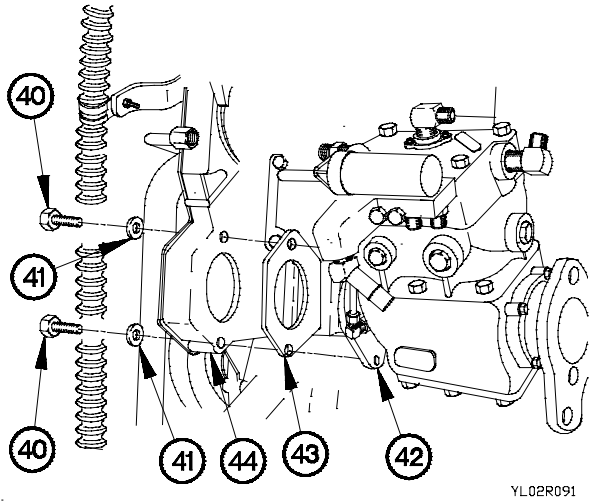


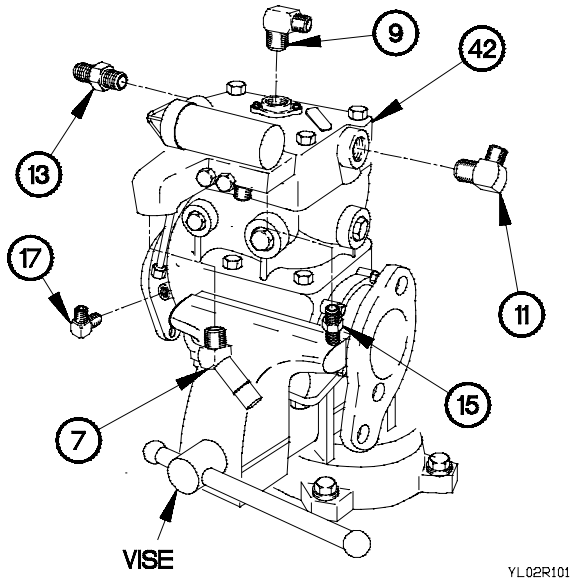
YL02R081

NOTE

Step (25) requires the aid of an assistant.

(25) Remove two bolts (40), washers (41), air compressor (42), and gasket (43) from engine front cover (44). Discard gasket.





(26) Place air compressor in (42) in vise.

(27) Remove adapter (13) from air compressor (42).

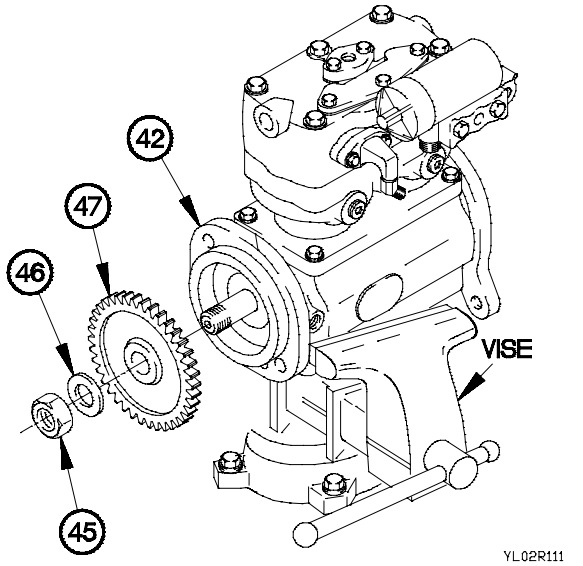
(28) Remove 90-degree fittings (9, 11, and 17) from air compressor (42).

(29) Remove two fittings (15) from air compressor (42).

(30) Remove 45-degree fitting (7) from air compressor (42).

(31) Remove nut (45), washer (46), and spur gear (47) from air compressor (42).

(32) Remove air compressor (42) from vise.



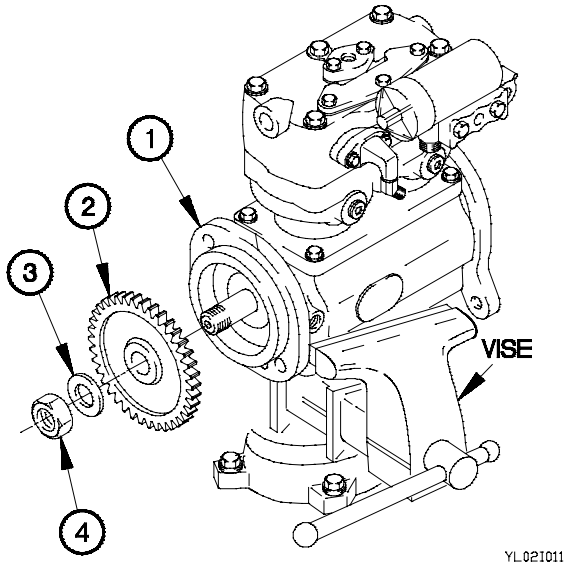
11-2. AIR COMPRESSOR REPLACEMENT (CONT)

b. Installation.

(1) Place air compressor (1) in vise.

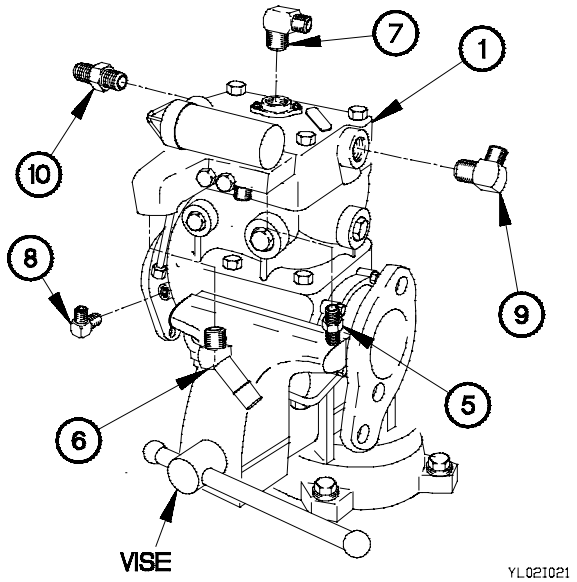
(2) Position spur gear (2) on air compressor (1) with washer (3) and nut (4).

(3) Tighten nut (4) to 107-129 lb-ft (145-175 N·m).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.



(4) Apply sealing compound to threads of two fittings (5) and 45-degree fitting (6).

(5) Install two fittings (5) in air compressor (1).

(6) Install 45-degree fitting (6) in air compressor (1).

(7) Apply sealing compound to threads of 90-degree fittings (7, 8, and 9).

(8) Install 90-degree fittings (7, 8, and 9) in air compressor (1).

(9) Apply sealing compound to threads of adapter (10).

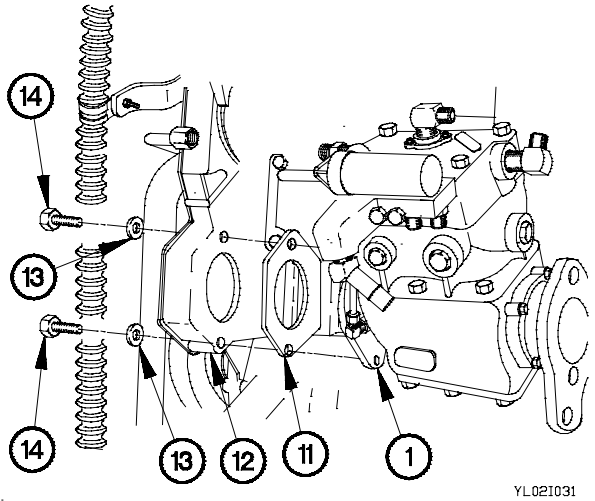
(10) Install adapter (10) in air compressor (1).

NOTE

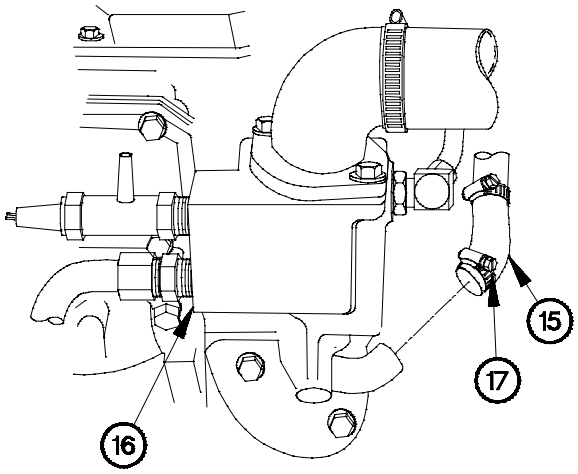
Step (11) requires the aid of an assistant.

(11) Position gasket (11) and air compressor (1) on engine front cover (12) with two washers (13) and bolts (14).

(12) Tighten two bolts (14) to 74-89 lb-ft (100-121 N·m).



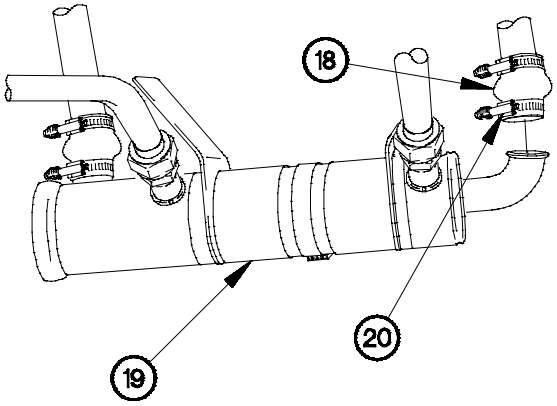
YL02I031



YL02I041

(13) Install upper coolant hose (15) on thermostat (16) with clamp (17).

(14) Install bottom coolant hose (18) on transmission oil cooler (19) with clamp (20).

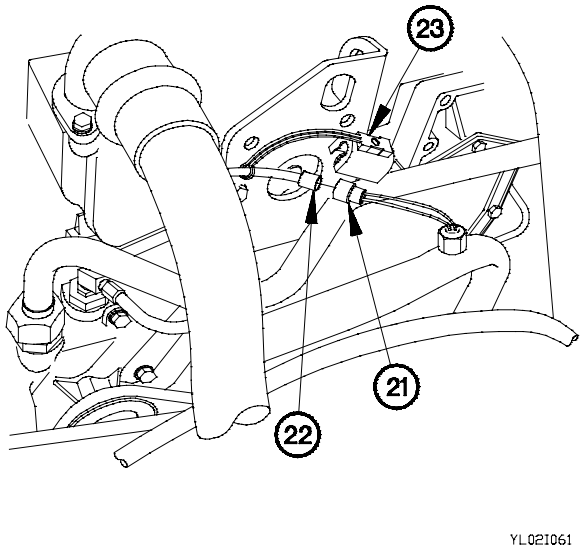


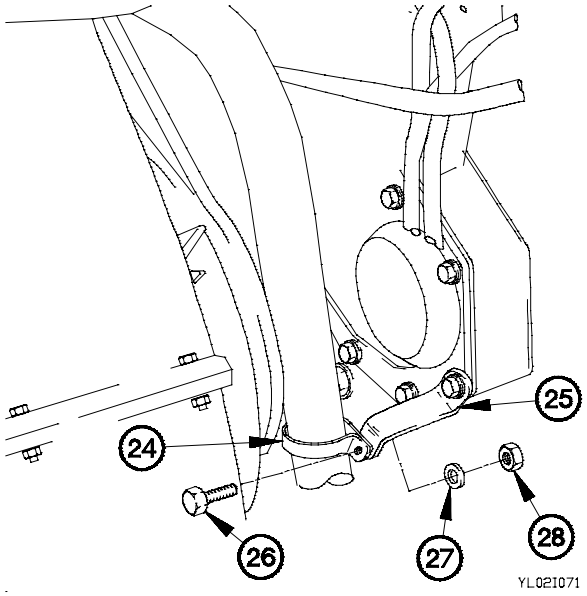
YL02I051

11-2. AIR COMPRESSOR REPLACEMENT (CONT)

(15) Connect ether sensor switch connector (21) to electrical connector P-42 (22).

(16) Connect connector clamp (23) on either sensor switch connector (21).





(17) Install clamp (24) on bracket (25) with screw (26), washer (27), and self-locking nut (28).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(17.1) Apply sealant to threads of bolt (31).

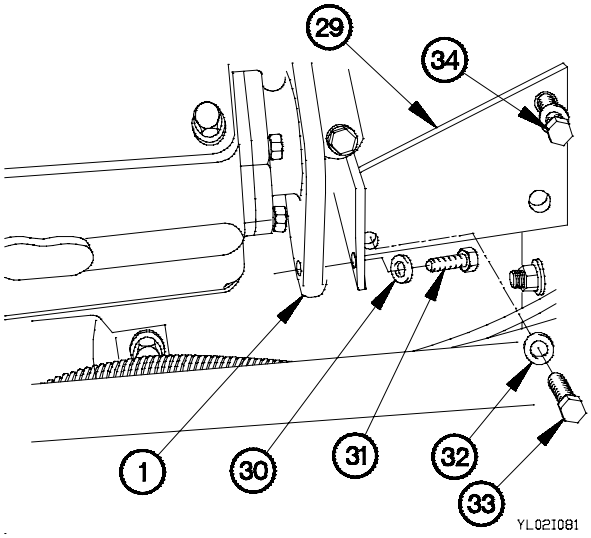
(18) Position support bracket (29) on air compressor (1) with washer (30) and bolt (31).

(19) Position two washers (32) and bolts (33) in bracket (29).

(20) Tighten bolt (31) to 28-38 lb-ft (38-52 N·m).

(21) Tighten two bolts (33) to 25-31 lb-ft (35-43 N·m).

(21.1) Tighten bolt (34) to 18-22 lb-ft (24-30 N·m).

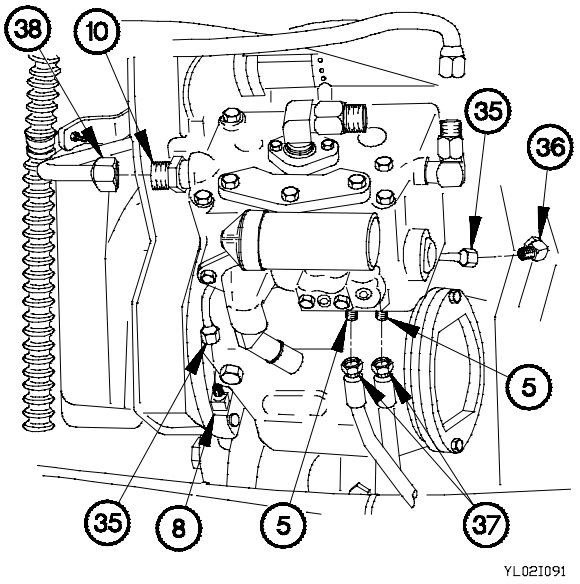


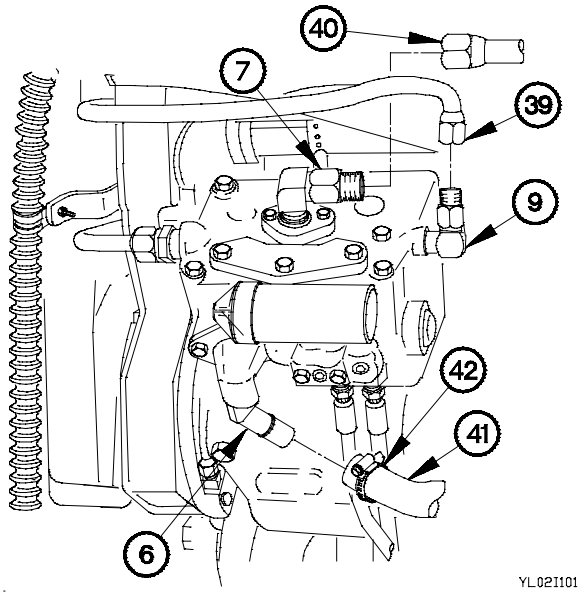
(22) Install oil tube (35) to 90-degree fitting (36).

(23) Connect oil tube (35) to 90-degree fitting (8).

(24) Connect two governor air hoses (37) to fittings (5).

(25) Connect coolant tube (38) to adapter (10).





(26) Connect coolant hose (39) to adapter (9).

(27) Connect air hose (40) to 90-degree fitting (7).

(28) Position air hose (41) on 45-degree fitting (6) with clamp (42).

(29) Tighten clamp (42) to 35-45 lb-in. (4-5 N·m).

c. Follow-On Maintenance

(1) Install power steering pump (TM 9-2320-365-20-3).

(2) Fill radiator overflow tank (TM 9-2320-365-10).

(3) Start engine and check for coolant and oil leaks under vehicle (TM 9-2320-365-10).

(4) Raise cab (TM 9-2320-365-10).

(5) Check air compressor for air leaks.

(6) Lower Cab (TM 9-2320-365-10).

(7) Shut down engine (TM 9-2320-365-10).

(8) Fill radiator overflow tank (TM 9-2320-365-10).

End of Task.

CHAPTER 12
STEERING SYSTEM MAINTENANCE

Section I. INTRODUCTION 12-1
12-1. INTRODUCTION 12-1

Section II. MAINTENANCE PROCEDURES 12-2
12-2. STEERING GEAR REPLACEMENT 12-2
12-3. STEERING GEAR ASSEMBLY ADJUSTMENT 12-9

Section I. INTRODUCTION

12-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and adjustment of Steering System Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

12-2. STEERING GEAR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Radiator removed (TM 9-2320-365-20-3)

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Vise, Machinists (Item 72, Appendix B)
Pan, Drain (Item 36, Appendix B)
Adapter, Socket Wrench (Item 2, Appendix B)
Puller, Mechanical (Item 45, Appendix B)

Tools and Special Tools (Cont)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)

Materials/Parts
Cap and Plug Set (Item 18, Appendix C)
Nut, Plain, Hex (Item 121, Appendix F)
Nut, Self-Locking (6) (Item 134, Appendix F)
Pin, Cotter (Item 227, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

Personnel Required
(2)

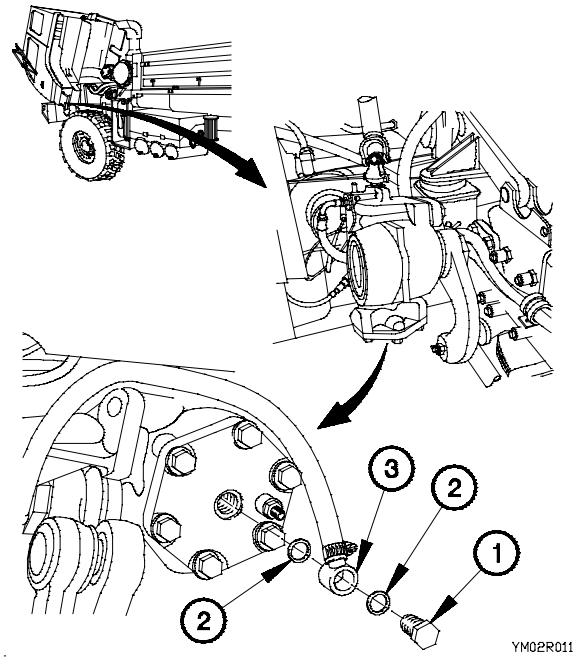
WARNING

Ensure engine is cool before performing maintenance. Failure to comply may result in injury to personnel.

a. Removal.

CAUTION

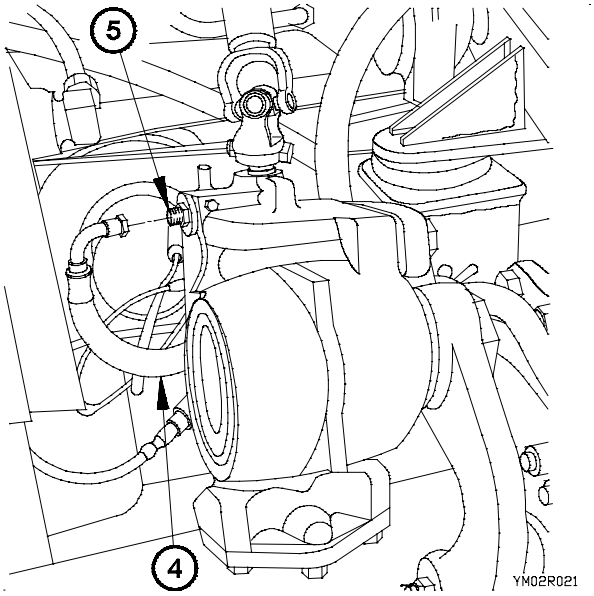
- Ensure steering axle wheels are pointed straight ahead. Failure to comply may result in damage to equipment.
- Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

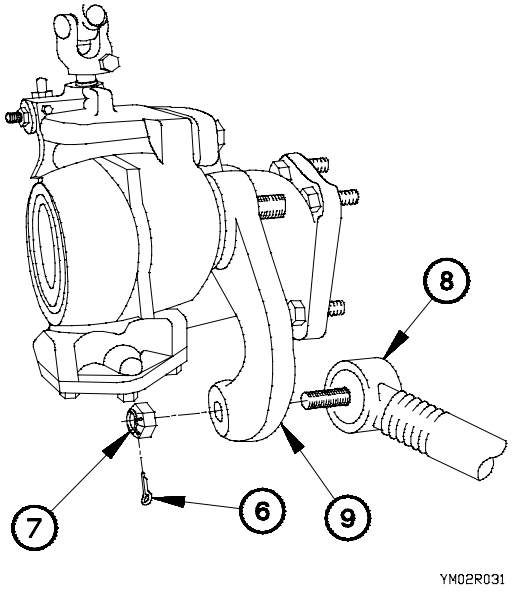


(1) Place drain pan under vehicle.

(2) Remove plug (1) and two metal ring seals (2) from power steering return hose (3).

(3) Disconnect power steering supply hose (4) from supply port adapter (5).





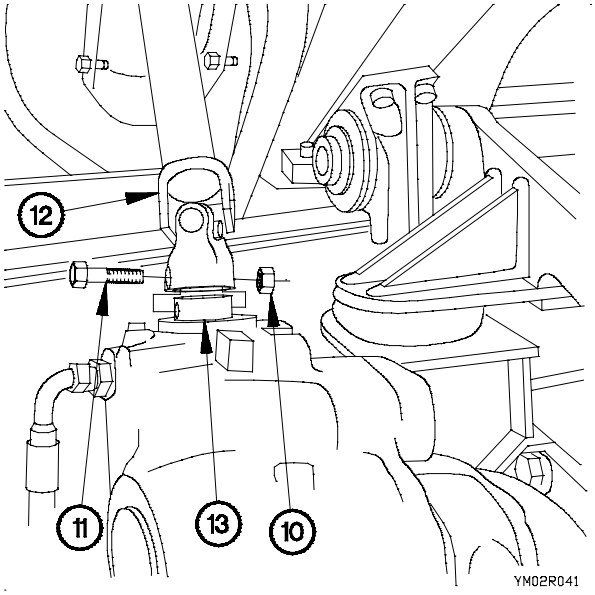
(4) Remove cotter pin (6) from nut (7). Discard cotter pin.

(5) Remove nut (7) from drag link end (8).

(6) Disconnect drag link end (8) from steering pitman arm (9).

(7) Remove self-locking nut (10) and bolt (11) from steering gear arm universal joint (12). Discard self-locking nut.

(8) Disconnect steering gear arm universal joint (12) from steering gear input shaft (13).



12-2. STEERING GEAR REPLACEMENT (CONT)

WARNING

Steering gear assembly weighs approximately 130 lbs (59 kgs). Support steering gear assembly on jack before dismounting from chassis. Failure to comply can cause injury to personnel or damage to equipment.

NOTE

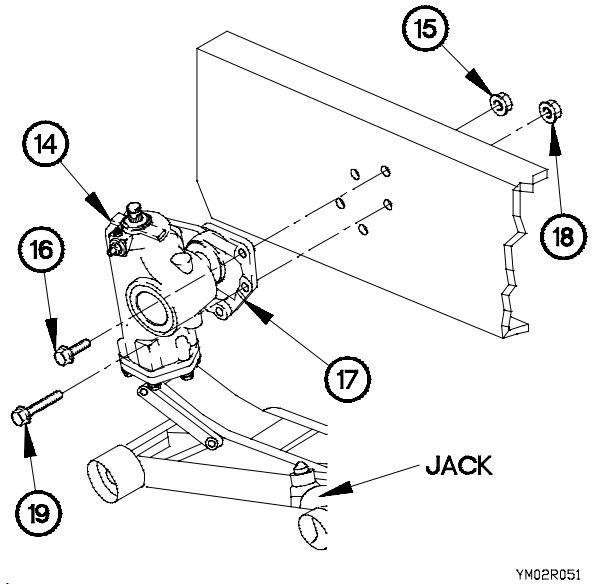
- Bolts removed in steps (10) and (11) are different lengths. Tag bolts and mark locations for ease during installation.
- Steps (9) through (12) require the aid of an assistant.

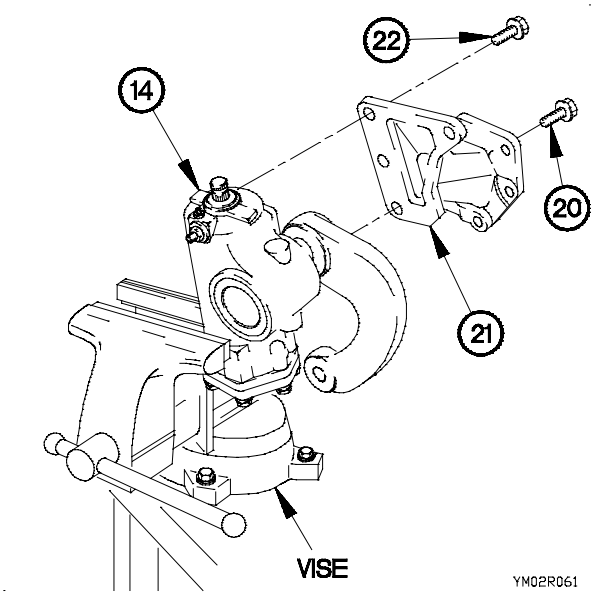
(9) Place jack under steering gear assembly (14).

(10) Remove self-locking nut (15) and bolt (16) from bracket (17). Discard self-locking nut.

(11) Remove five self-locking nuts (18) and bolts (19) from bracket (17). Discard self-locking nuts.

(12) Remove steering gear assembly (14) from vehicle.





(13) Place steering gear assembly (14) in vise.

NOTE

Bolts removed in steps (14) and (15) are different lengths. Tag bolts and mark locations for ease during installation.

(14) Remove bolt (20) from bracket (21).

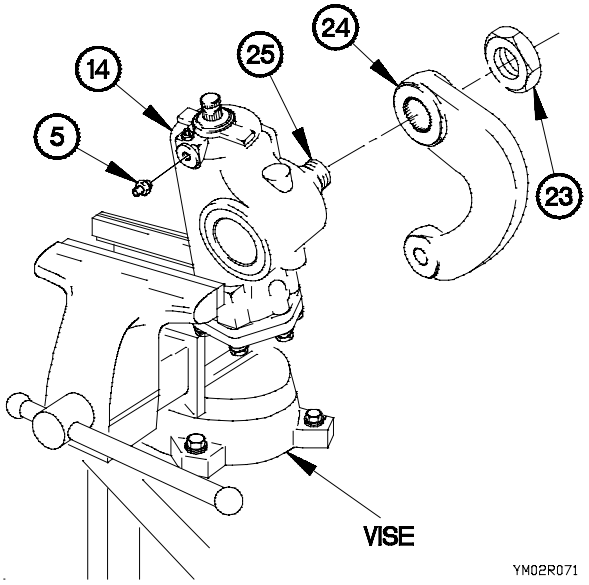
(15) Remove three bolts (22) from bracket (21).

(16) Remove bracket (21) from steering gear assembly (14).

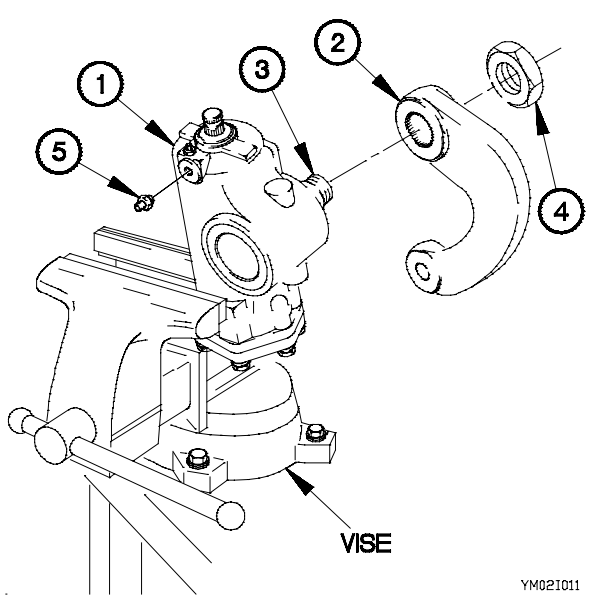
(17) Remove supply port adapter (5) from steering gear assembly (14).

(18) Remove nut (23) and steering pitman arm (24) from output shaft (25).

(19) Remove steering gear assembly (14) from vise.



b. Installation.



(1) Position steering gear assembly (1) in vise.

CAUTION

Ensure marks on steering gear output shaft and pitman arm are aligned. Failure to comply may result in damage to equipment.

(2) Install steering pitman arm (2) on output shaft (3).

(3) Position nut (4) on output shaft (3).

(4) Tighten nut (4) to 365-446 lb-ft (495-605 N•m).

(5) Stake nut (4) to output shaft (3) at a minimum depth of 0.1 in. (2.5 mm).

(6) Install supply port adapter (5) in steering gear assembly (1).

12-2. STEERING GEAR REPLACEMENT (CONT)

(7) Place bracket (6) on steering gear assembly (1).

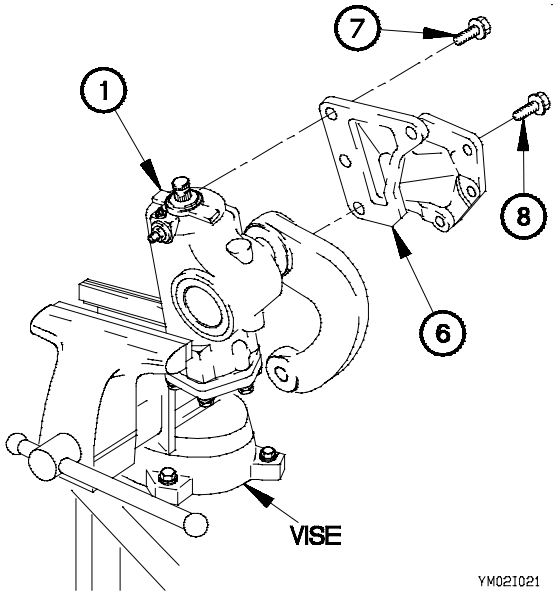
NOTE

Bolts installed in steps (8) and (9) are different lengths. Position bolts in tagged locations.

(8) Position three bolts (7) in bracket (6).

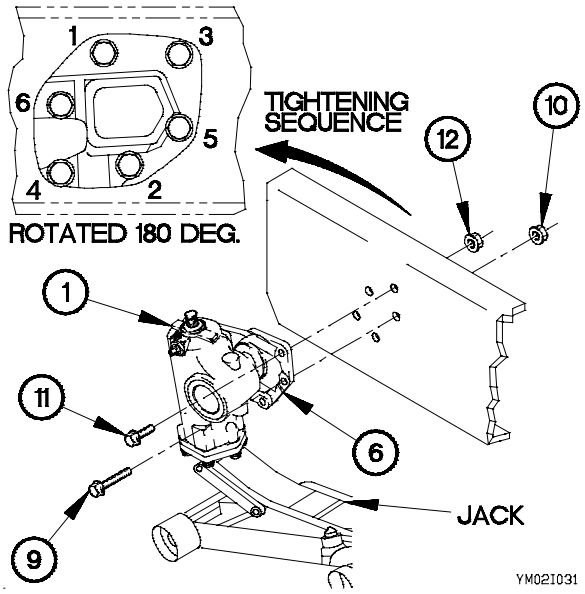
(9) Position bolt (8) in bracket (6).

(10) Tighten three bolts (7) and bolt (8) to 372-454 lb-ft (504-616 N•m).



WARNING

Steering gear assembly weighs approximately 130 lbs (59 kgs). Support steering gear assembly on jack during installation. Failure to comply may cause injury to personnel or damage to equipment.



NOTE

Steps (11) through (15) require the aid of an assistant.

(11) Remove steering gear assembly (1) from vise and place on jack.

(12) Raise steering gear assembly (1) to mounting location.

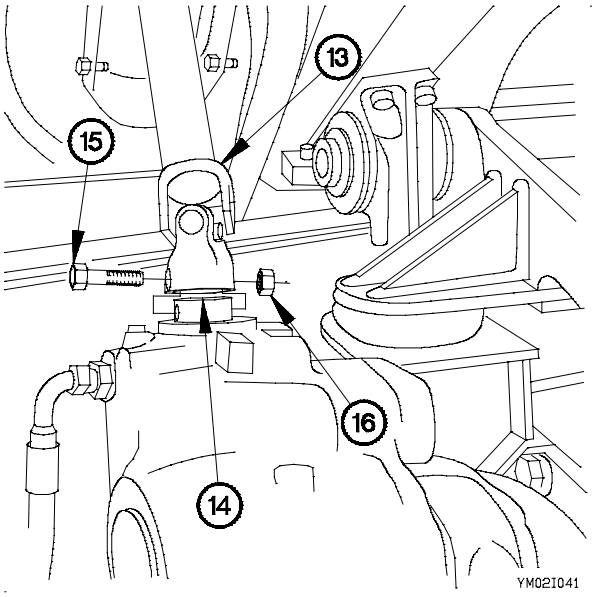
NOTE

Bolts in steps (13) and (14) are different lengths. Install bolts in holes marked during removal.

(13) Position five bolts (9) and self-locking nuts (10) in bracket (6).

(14) Position bolt (11) and self-locking nut (12) in bracket (6).

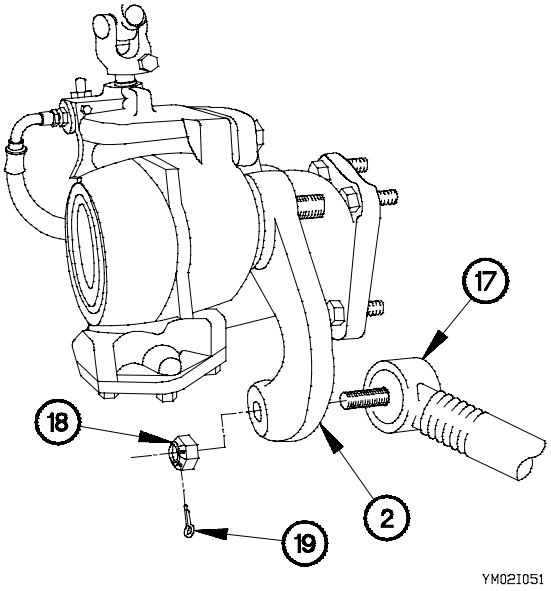
(15) Tighten five self-locking nuts (10) and self-locking nut (12) to 232-284 lb-ft (315-385 N•m) in sequence shown.



(16) Install steering gear arm universal joint (13) on steering gear input shaft (14).

(17) Position bolt (15) and self-locking nut (16) on universal joint (13).

(18) Tighten self-locking nut (16) to 32-39 lb-ft (43-53 N•m).



(19) Install drag link end (17) in steering pitman arm (2).

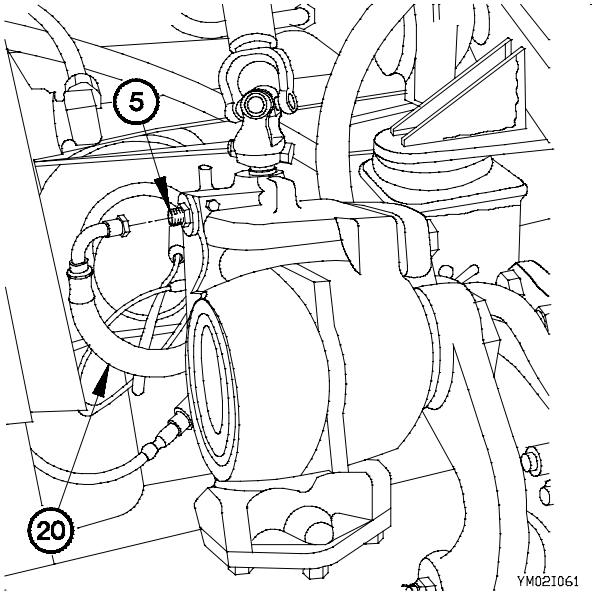
(20) Position nut (18) on drag link end (17).

(21) Tighten nut (18) to 232-284 lb-ft (315-385 N•m).

NOTE

After tightening nut to correct torque, tighten again until hole in drag link end is aligned with slots in nut.

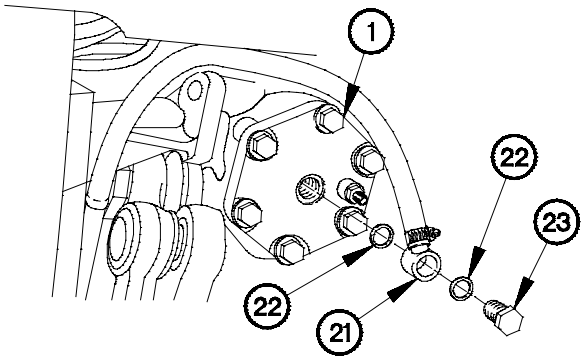
(22) Install cotter pin (19) in nut (18).



(23) Install power steering supply hose (20) on supply port adapter (5).

12-2. STEERING GEAR REPLACEMENT (CONT)

(24) Install power steering return hose (21), two metal ring seals (22), and plug (23) on steering gear assembly (1).



YM021071

c. Follow-On Maintenance.

(1) Fill power steering pump reservoir to correct level (TM 9-2320-365-10).

(2) Install radiator (TM 9-2320-365-20-3).

(3) Start engine (TM 9-2320-365-10).

(4) Turn steering wheel fully left and fully right several times to remove air from steering gear assembly.

(5) Fill power steering pump reservoir to correct level (TM 9-2320-365-10).

(6) Shut down engine (TM 9-2320-365-10).

(7) Lower cab (TM 9-2320-365-10).

(8) Perform steering gear assembly adjustment (para 12-3).

End of Task.

12-3. STEERING GEAR ASSEMBLY ADJUSTMENT

This task covers:

a. Adjustment

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Trestle, Motor Vehicle Maintenance (2) (Item 71, Appendix B)
Pan, Drain (Item 36, Appendix B)
STE/ICE-R (Item 60, Appendix B)
Crowfoot, Attachment (Item 14, Appendix B)
Gage, Steering Stop Shim (2) (Item 17, Appendix D)
Jack, Dolly Type Hydraulic (2) (Item 31, Appendix B)

Materials/Parts
Coupling, Pipe (Item 25, Appendix C)
Tee, Pipe to Tube (Item 86, Appendix C)
Lubricating Oil, Engine (Item 44, Appendix C)
Ties, Cable, Plastic (Item 89, Appendix C)

Personnel Required
(2)

References:
TM 9-4910-571-12 & P

a. Adjustment.

(1) Remove two screws (1) and washers (2) from front grille (3).

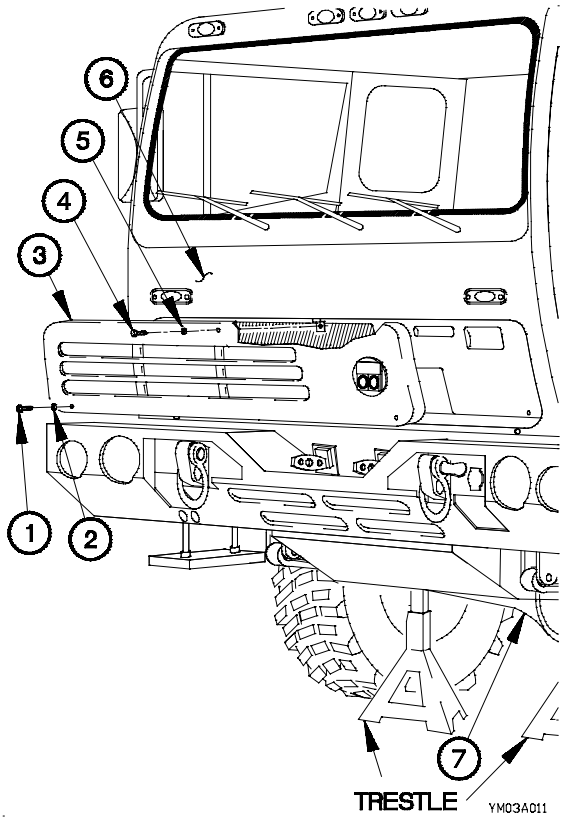
(2) Remove screw (4), washer (5), and front grille (3) from cab (6).

NOTE

Step (3) and (4) require the aid of an assistant.

(3) Raise front axle (7) until wheels are off ground.

(4) Place two trestles under front axle (7).



12-3. STEERING GEAR ASSEMBLY ADJUSTMENT (CONT)

(5) Raise cab (TM 9-2320-365-10).

(6) Disconnect supply hose (8) from adapter (9).

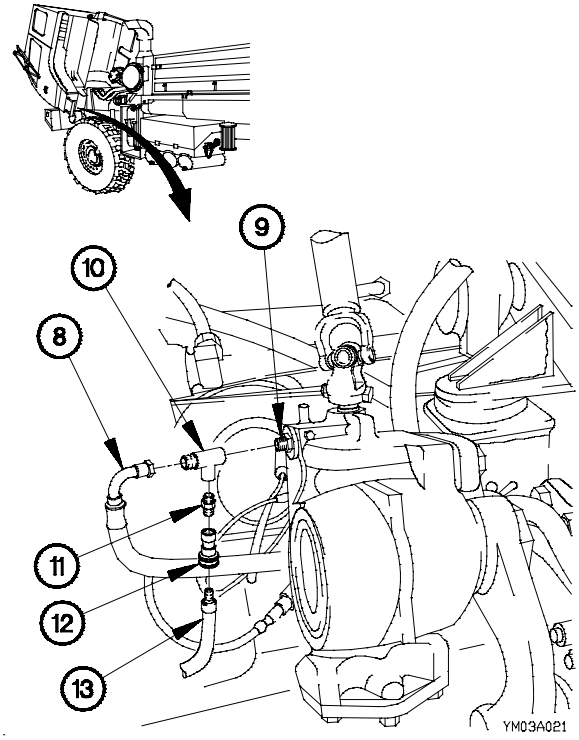
(7) Install tee fitting (10) on adapter (9).

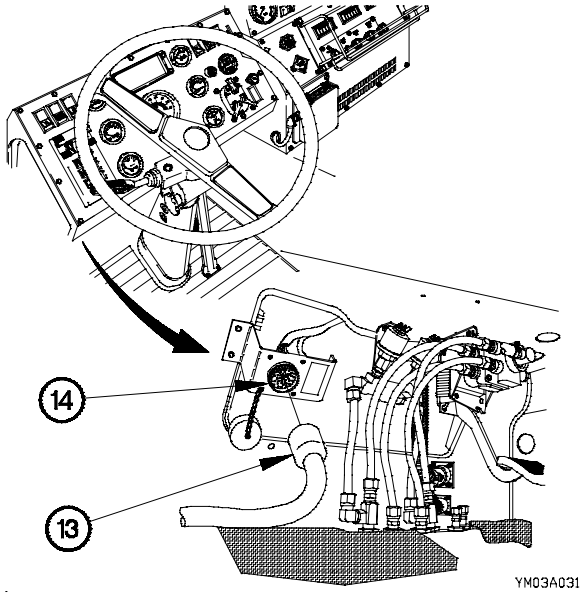
(8) Install snubber (11) in tee fitting (10).

(9) Install pressure transducer (12) in snubber (11).

(10) Connect supply hose (8) to tee fitting (10).

(11) Connect test cable (13) to pressure transducer (12).





(12) Check power steering reservoir fluid level (TM 9-2320-365-10).

CAUTION

Ensure cab does not damage tee fitting or pinch hoses when lowered. Failure to comply may result in damage to equipment.

NOTE

Step (13) requires the aid of assistant.

(13) Lower cab (TM 9-2320-365-10).

(14) Connect test cable (13) to DCA connector (14).

(15) Perform STE/ICE-R Test 50 (TM 9-4910-571-12&P).

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE

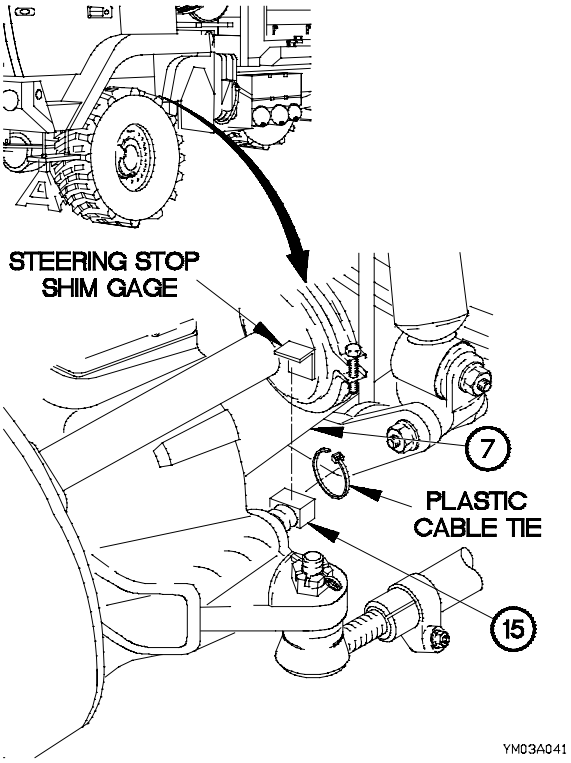
Left and right side steering bolt stops are installed the same way. Left side shown.

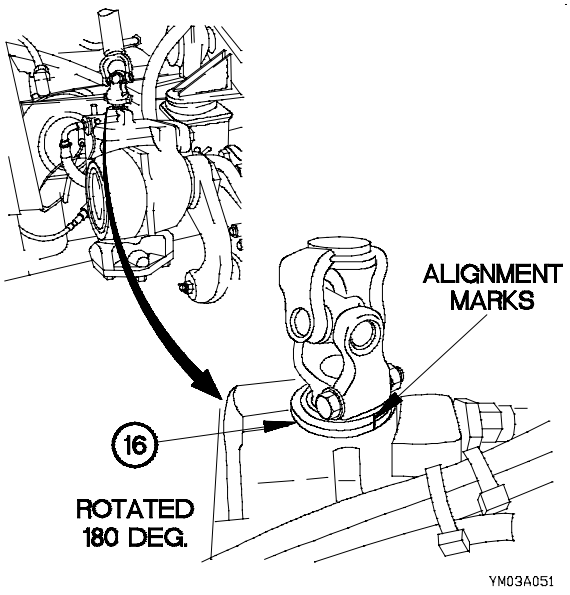
(16) Position steering stop shim gage on steering stop bolt (15) and secure with plastic cable ties.

(17) Start engine (TM 9-2320-365-10).

(18) Turn steering wheel fully left and right two times, then point wheels straight ahead.

(19) Shut down engine (TM 9-2320-365-10).





(20) Lift mud flap to access power steering reservoir.

(21) Check power steering reservoir fluid level (TM 9-2320-365-10).

(22) Verify that alignment marks on steering gear box (16) are aligned.

(23) Check that wheels point straight ahead.

12-3. STEERING GEAR ASSEMBLY ADJUSTMENT (CONT)

NOTE

Step (24) is required if wheels do not point straight ahead.

(24) Perform drag link adjustment (TM 9-2320-365-20-3).

(25) Start engine (TM 9-2320-365-10).

NOTE

If initial pressure is less than 5 psi replace power steering pump (para 12-4)

(26) Turn steering wheel to left until stops are reached and hold for ten seconds. Check pressure reading on STE/ICE-R. Pressure reading should be between 500-1000 psi (3448-6895 kPa).

(27) Turn wheels straight ahead.

NOTE

If pressure reading is not within range, turn adjustment screw right to decrease pressure or left to increase pressure.

(28) Loosen locknut (17) on top adjustment screw (18).

(29) Adjust top adjustment screw (18) to right or left.

(30) Turn steering wheel to left until stops are reached and verify pressure is 650-750 psi (4482-5171 kPa).

(31) Turn wheels straight ahead.

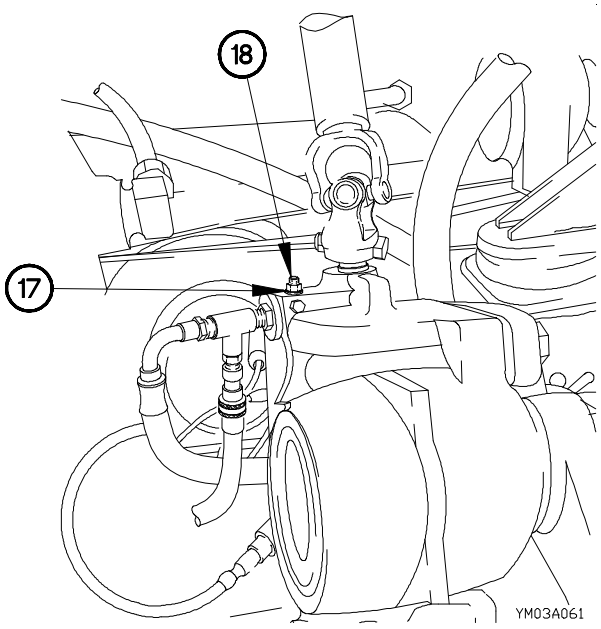
CAUTION

Ensure adjustment screw does not turn when tightening locknut. Failure to comply may result in damage to equipment.

NOTE

Repeat steps (29) through (31) until pressure reading of 650-750 psi (4482-5171 kPa) is obtained.

(32) Tighten locknut (17) on top adjustment screw (18) to 22 lb-ft (30 N m).



NOTE

Steps (33) and (34) must be performed together.

(33) Turn steering wheel to right until stops are reached and hold for ten seconds.

(34) Check pressure reading on STE/ICE-R. Pressure reading should be between 500-1000 psi (3448-6895 kPa).

(35) Turn wheels straight ahead.

NOTE

If pressure reading is not within range, bottom adjustment screw is turned to right to increase pressure or turned to left to decreases pressure.

(36) Loosen locknut (16) on bottom adjustment screw (19).

(37) Adjust bottom adjustment screw (19) to left or right.

(38) Turn steering wheel to right until stops are reached and verify pressure is 650-750 psi (4482-5171 kPa).

(39) Turn wheels straight ahead.

CAUTION

Ensure adjustment screw does not turn when tightening locknut. Failure to comply may result in damage to equipment.

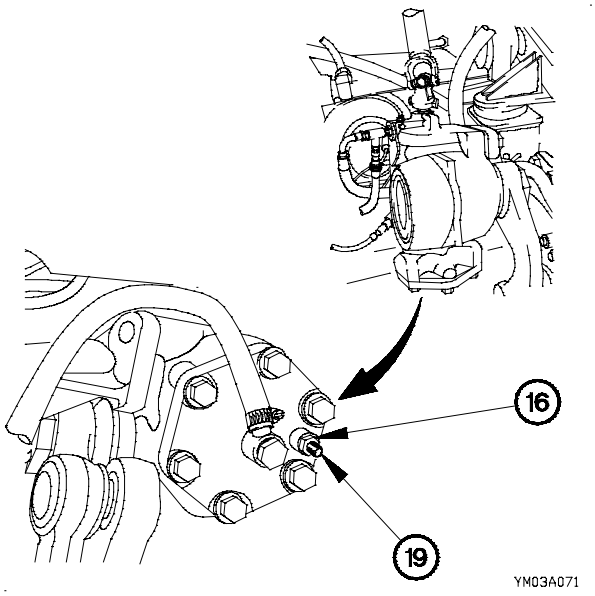
NOTE

Repeat steps (37) through (38) until pressure reading of 650-750 psi (4482-5171 kPa) is obtained.

(40) Tighten locknut (16) on bottom adjustment screw (19) to 22 lb-ft (30 N·m).

(41) Turn steering wheel to left until stops are reached and hold for ten seconds.

(42) Check pressure reading on STE/ICE-R. Pressure reading should be between 500-1000 psi (3448-6895 kPa).



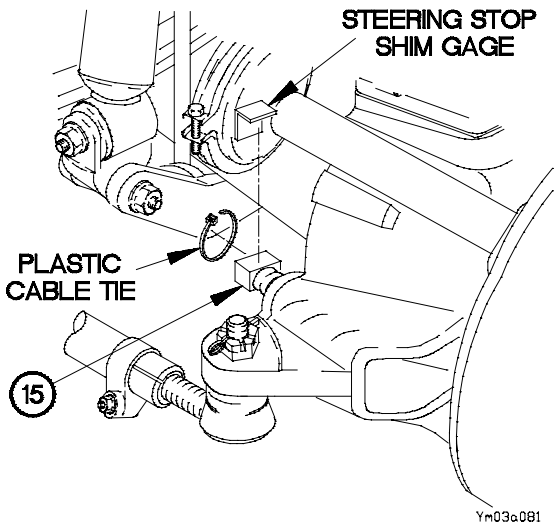
12-3. STEERING GEAR ASSEMBLY ADJUSTMENT (CONT)

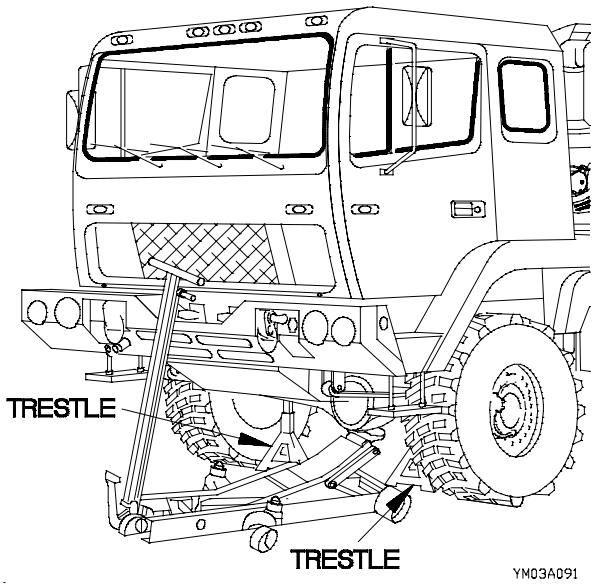
(43) Turn steering wheel to right until stops are reached.

(44) Check pressure reading on STE/ICE-R. Pressure reading should be between 500-1000 psi (3448-6895 kPa).

(45) Shut down engine (TM 9-2320-365-10).

(46) Remove plastic cable ties and two steering stop shim gages from steering stop bolt (15).





(47) Raise vehicle off trestles.

(48) Remove two trestles from vehicle.

(49) Lower vehicle to ground.

(50) Start engine (TM 9-2320-365-10).

(51) Turn steering wheel left until stops are reached and verify pressure increases and then decreases to a range between 500-1000 psi (3448-6895 kPa).

(52) Turn steering wheel right until stops are reached and verify pressure increases and then decreases to a range between 500-1000 psi (3448-6895 kPa).

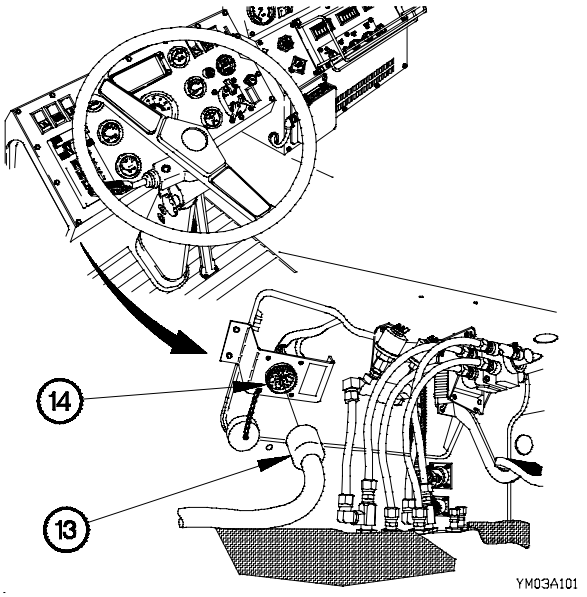
NOTE

If pressure readings obtained in steps (51) and (52) are not within range, repeat steps (24) through (49).

(53) Shut down engine (TM 9-2320-365-10).

(54) Disconnect test cable (13) from DCA connector (14).

(55) Raise cab (TM 9-2320-365-10).



(56) Disconnect test cable (13) from pressure transducer (12).

(57) Remove pressure transducer (12) from snubber (11).

(58) Remove snubber (11) from tee fitting (10).

(59) Disconnect supply hose (8) from tee fitting (10).

(60) Remove tee fitting (10) from adapter (9).

(61) Connect supply hose (8) to adapter (9).

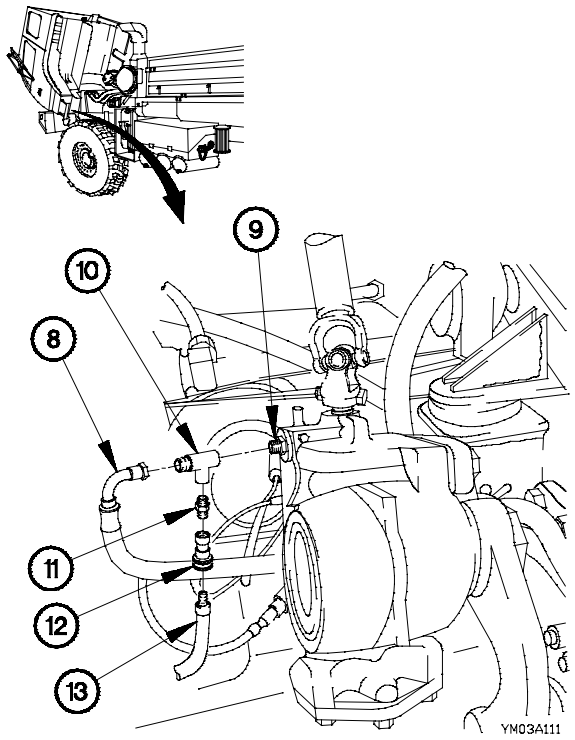
(62) Check power steering reservoir fluid level (TM 9-2320-365-10).

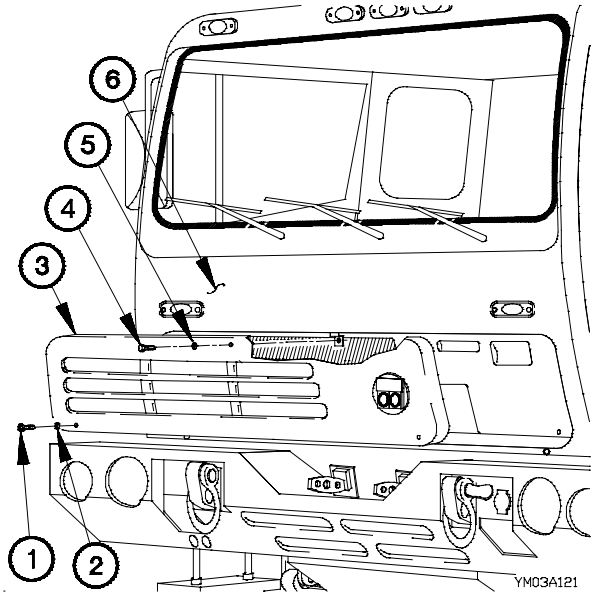
(63) Lower cab (TM 9-2320-365-10).

(64) Start engine (TM 9-2320-365-10).

(65) Turn steering wheel full left and right two times.

(66) Check under vehicle for steering fluid leaks from supply hose (8).





(67) Shut down engine (TM 9-2320-365-10).

(68) Position front grille (3) on cab (6) with washer (5) and screw (4).

(69) Position two washers (2) and screws (1) in front grille (3).

(70) Tighten screw (4) to 48-60 lb-in (5-7 N·m).

(71) Tighten two screws (1) to 24 lb-in (3 N·m).

End of Task.

All data on pages 12-16 through 12-18, including pages12-17 and 12-18, deleted.

CHAPTER 13
FRAME MAINTENANCE

Section I. INTRODUCTION 13-1
13-1. INTRODUCTION 13-1

Section II. MAINTENANCE PROCEDURES 13-2
13-2. M1081 SIDELOAD BRACKET REPLACEMENT 13-2
13-3. FRONT ANGLE BRACKET REPLACEMENT 13-5
13-4. M1081 PARACHUTE SUSPENSION ASSEMBLY REPLACEMENT 13-7
13-5. REAR TENSION BEAM AND TAILLIGHT MOUNTING BRACKET REPLACEMENT 13-9
13-6. REAR CROSSMEMBER REPLACEMENT 13-13
13-7. SHOCK MOUNT CROSSMEMBER REPLACEMENT 13-17
13-8. REAR BUMPER REPLACEMENT 13-26
13-9. REAR SPRING BRACKETS REPLACEMENT 13-28
13-10. M1081 ANGLE BRACKET REPLACEMENT 13-32
13-11. M1081 FRAME PLATE REPLACEMENT 13-35
13-12. FRONT LIFTING BRACKET REPLACEMENT 13-42
13-13. FRAME RAIL REPLACEMENT 13-53
13-14. M1078 SUBFRAME RAIL REPLACEMENT 13-72
13-15. M1081 SUBFRAME RAIL REPLACEMENT 13-76
13-16. FRONT CROSSMEMBER REPLACEMENT 13-80
13-17. INTERMEDIATE CROSSMEMBER REPLACEMENT 13-85
13-18. FRAME MUFFLER SUPPORT BRACKET REPLACEMENT 13-87
13-19. RADIATOR BRACKET REPLACEMENT 13-89
13-20. M1079 SUBFRAME RAIL REPLACEMENT 13-91

Section I. INTRODUCTION

13-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repairing Frame Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

13-2. M1081 SIDELOAD BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Wrench, Torque, 0-150 lb-ft (Item 78, Appendix B)
Crowfoot Attachment, Socket Wrench (TM 9-2320-365-20)

Tools and Special Tools (Cont)
Socket Set, Impact (Item 50, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)

Materials/Parts
Nut, Self-locking (6) (Item 134, Appendix F)
Bolt (Item 4, Appendix F)
Bolt (5) (Item 5, Appendix F)
Nut, Self-locking (Item 148, Appendix F)

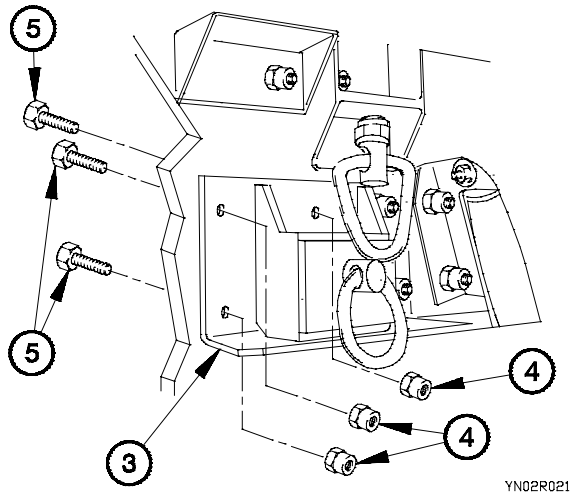
Personnel Required
(2)

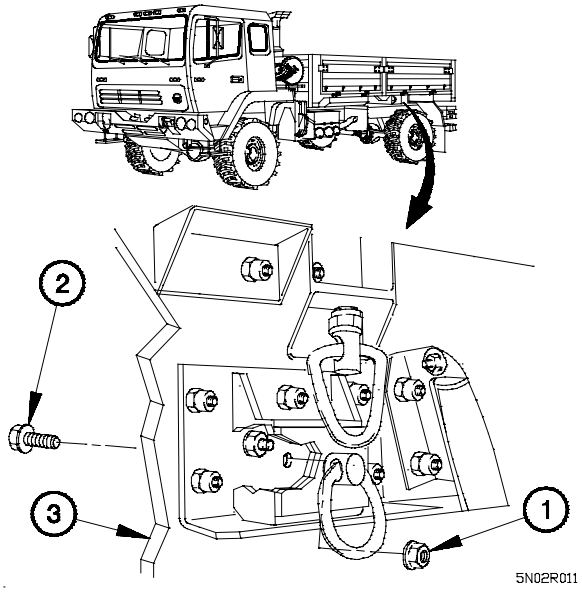
a. Removal.

NOTE

- Left and right side sideload brackets are removed the same way. Left side shown.
- Steps (1) through (4) require the aid of an assistant.

(1) Remove self-locking nut (1) and bolt (2) from sideload bracket (3). Discard self-locking nut.



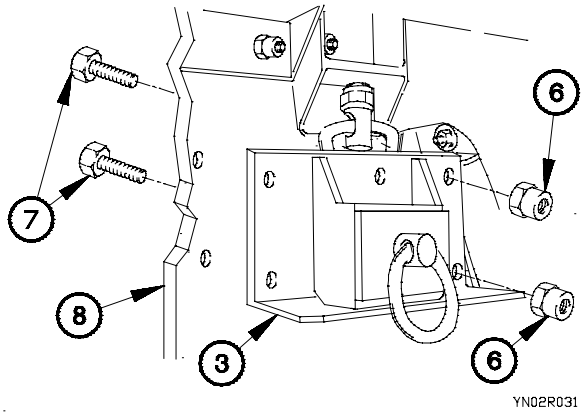


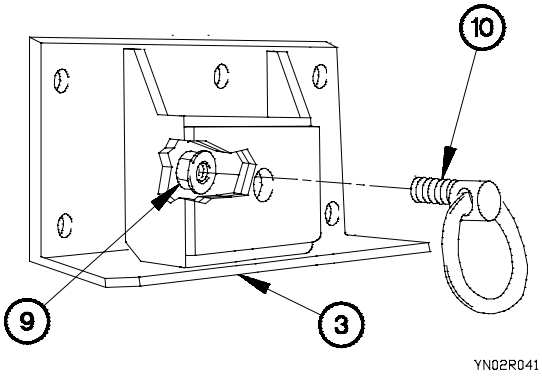
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(2) Remove three collars (4) and bolts (5) from sideload bracket (3). Discard collars and bolts.

(3) Remove two collars (6), bolts (7), and sideload bracket (3) from frame (8). Discard collars and bolts.





(4) Remove self-locking nut (9) and tiedown ring (10) from sideload bracket (3). Discard self-locking nut.

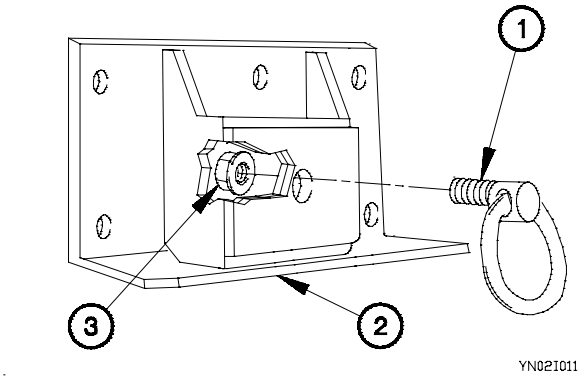
b. Installation

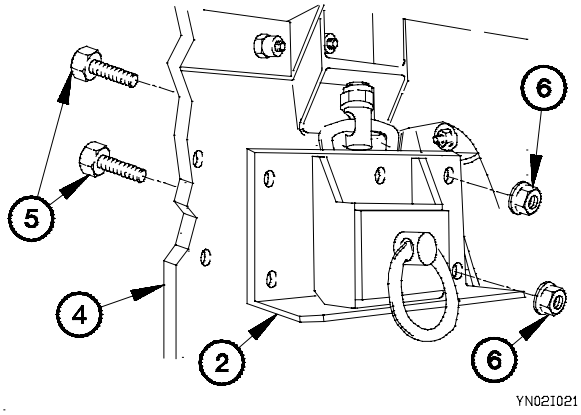
NOTE

- Steps (1) through (7) require the aid of an assistant.
- Left and right side sideload brackets are installed the same way. Left side shown.

(1) Position tiedown ring (1) in sideload bracket (2) with self-locking nut (3).

(2) Tighten self-locking nut (3) to 111-135 lb-ft (150-184 N·m).



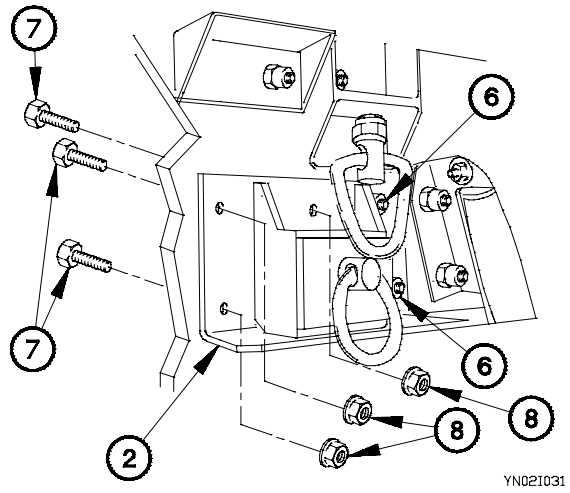


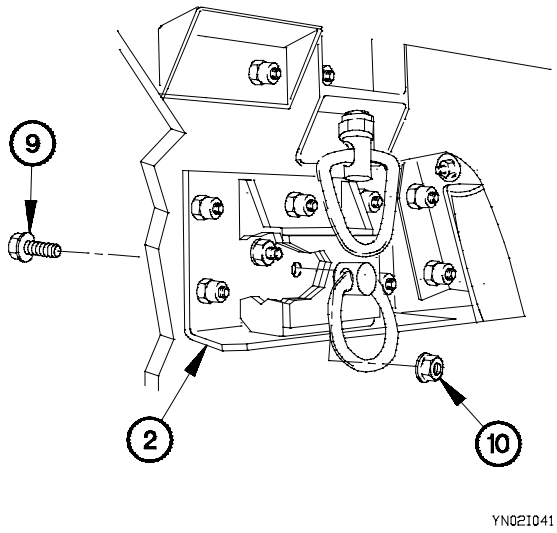
(3) Position sideload bracket (2) on frame (4) with two bolts (5) and self-locking nuts (6).

13-2. M1081 SIDELOAD BRACKET REPLACEMENT (CONT)

(4) Position three bolts (7) and self-locking nuts (8) in sideload bracket (2).

(5) Tighten three self-locking nuts (8) and two self-locking nuts (6) to 210-225 lb-ft (285-305 N·m).





(6) Position bolt (9) and self-locking nut (10) in sideload bracket (2).

(7) Tighten self-locking nut (10) to 210-225 lb-ft (285-305 N·m).

End of Task.

13-3. FRONT ANGLE BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Resilient mount removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Adapter, Socket Wrench (Item 1, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)

Materials/Parts
Nut, Self-Locking (2) (Item 128, Appendix F)
Bolt (2) (Item 2, Appendix F)

WARNING

Wear appropriate eye protection when working under vehicle. Falling debris may cause eye injury. Failure to comply may result in injury to personnel.

a. Removal.

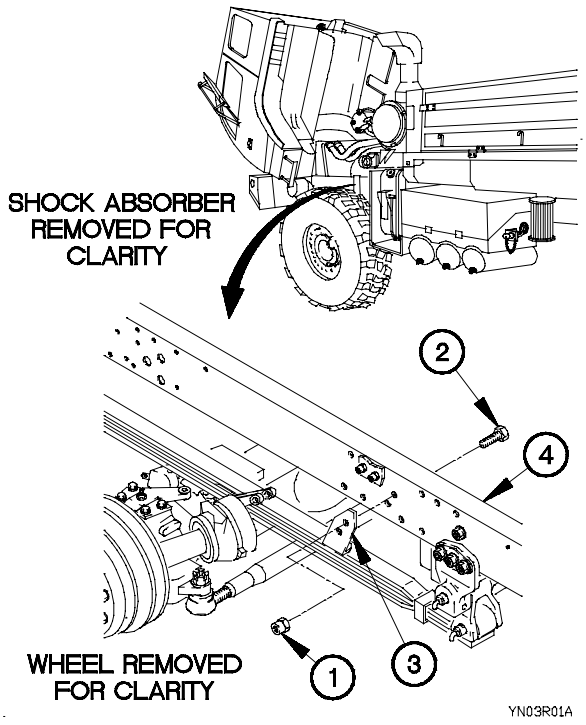
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

Left and right side front angle brackets are removed the same way. Left side shown.

Remove two collars (1), bolts (2), and front angle bracket (3) from frame (4). Discard bolts and collars.



13-3. FRAME ANGLE BRACKET REPLACEMENT (CONT)

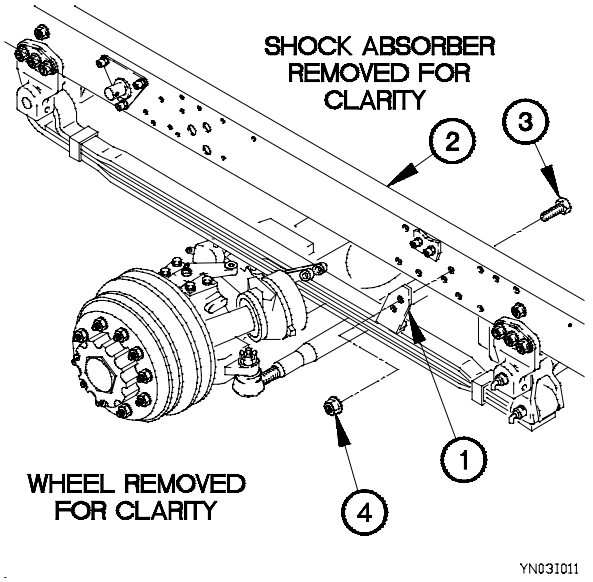
b. Installation.

NOTE

Left and right side front angle brackets are installed the same way. Right side shown.

(1) Position front angle bracket (1) on frame (2) with two bolts (3) and self-locking nuts (4).

(2) Tighten two self-locking nuts (4) to 77-92 lb-ft (104-124 N·m).



c. Follow-On Maintenance.

Install resilient mount (TM 9-2320-365-20-3).

End of Task.

13-4. M1081 PARACHUTE SUSPENSION ASSEMBLY REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance.

INITIAL SETUP

Equipment Conditions
Parachute slide assemblies removed (TM 9-2320-365-20-3).
Cargo bed removed (para 15-8).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)

Tools and Special Tools (Cont)
Sling, Cargo (Item 48, Appendix B)

Materials/Parts
Nut, Self-locking (32) (Item 135, Appendix F)

Personnel Required
(2)

a. Removal.

NOTE

Steps (1) through (4) require the aid of an assistant.

(1) Remove 16 self-locking nuts (1) and bolts (2) from parachute suspension assembly (3). Discard self-locking nuts.

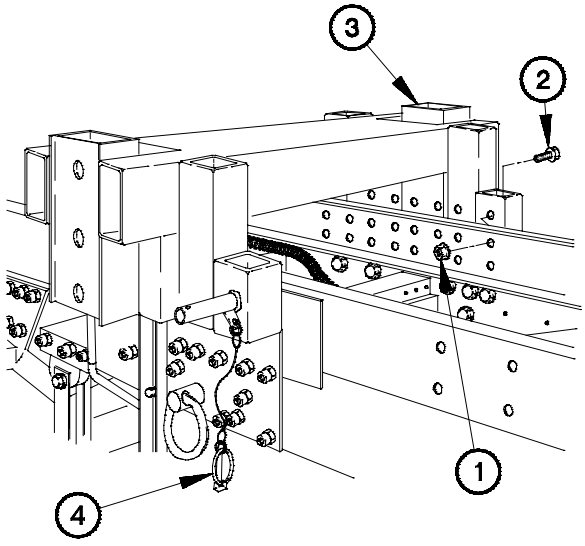
(2) Perform step (1) on left side of parachute suspension assembly.

WARNING

Parachute suspension assembly weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

(3) Remove lanyard (4) from parachute suspension assembly (3).

(4) Remove parachute suspension assembly (3) from vehicle.



5N04R011

13-4. M1081 PARACHUTE SUSPENSION ASSEMBLY REPLACEMENT (CONT)

b. Installation.

WARNING

Parachute suspension assembly weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

(1) Position parachute suspension assembly (1) on vehicle.

(2) Install lanyard (2) on parachute suspension assembly (1).

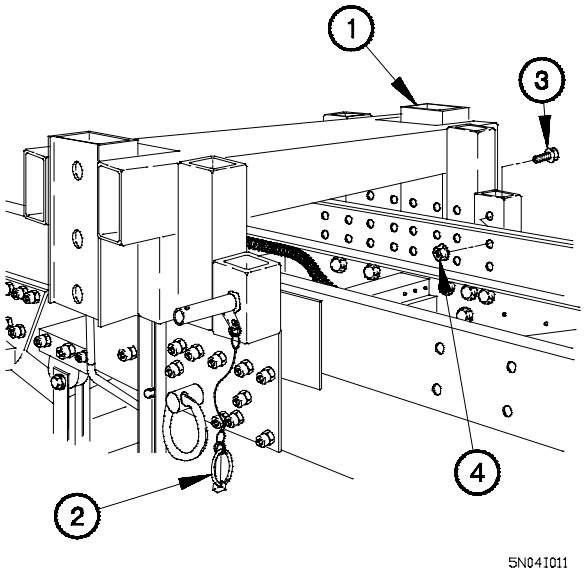
NOTE

Steps (3) through (5) require the aid of an assistant.

(3) Position 16 screws (3) and self-locking nuts (4) in parachute suspension assembly (1).

(4) Perform step (3) on left side of parachute suspension assembly.

(5) Tighten 32 self-locking nuts (4) to 240-293 lb-ft (325-397 N·m).



c. Follow-On Maintenance.

(1) Install cargo bed (para 15-8).

(2) Install parachute slide assemblies (TM 9-2320-365-20-3).

End of Task.

13-5. REAR TENSION BEAM AND TAILLIGHT MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Taillight carriers removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Bolt (14) (Item 10, Appendix F) (M1078/M1079)
Nut, Self-locking (14) (Item 134, Appendix F)
Bolt (10) (Item 10, Appendix F) (M1081)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

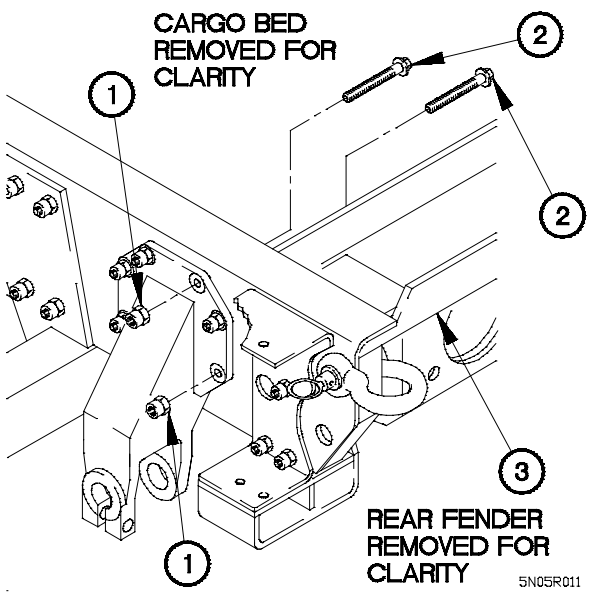
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

- Left and right side of rear tension beam is removed the same way. Left side shown.
- Steps (1) through (5) require the aid of an assistant.

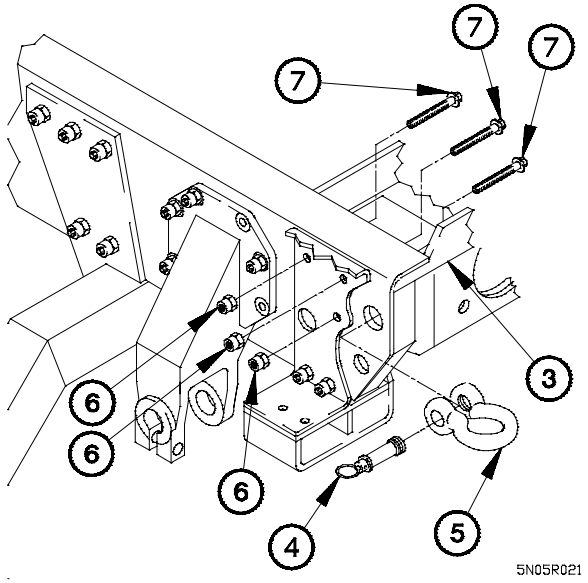
(1) Remove two collars (1) and bolts (2) from rear tension beam (3). Discard collars and bolts.

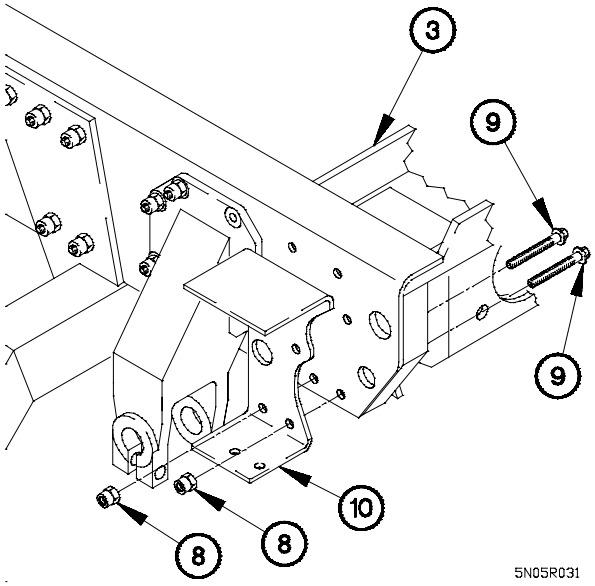


13-5. REAR TENSION BEAM AND TAILLIGHT MOUNTING BRACKET REPLACEMENT (CONT)

(2) Remove pin (4) and shackle (5) from rear tension beam (3).

(3) Remove three collars (6) and bolts (7) from rear tension beam (3). Discard collars and bolts.





NOTE

Perform step (5) on model M1081.

(5) Remove two self-locking nuts (11), bolts (12), taillight mounting bracket (10), and load spreader bracket (13) from rear tension beam (3). Discard self-locking nuts and bolts.

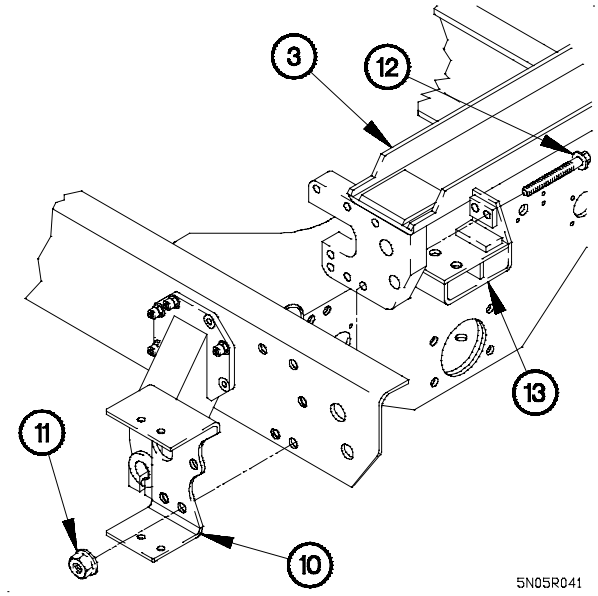
(6) Perform steps (1) through (5) on right side of rear tension beam (3).

(7) Remove rear tension beam (3) from vehicle.

NOTE

Perform step (4) on model M1078/M1079.

(4) Remove two collars (8), bolts (9), and taillight mounting bracket (10) from rear tension beam (3). Discard collars and bolts.



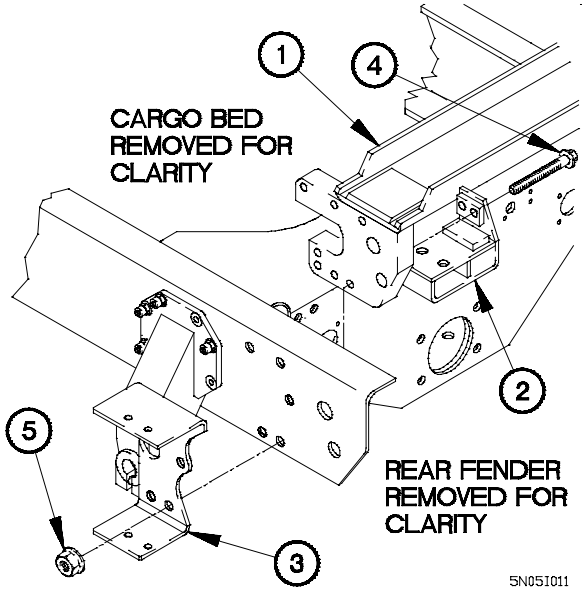
b. Installation.

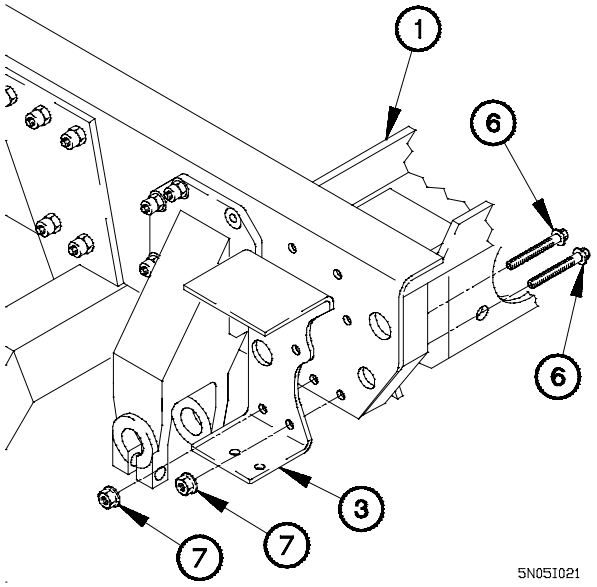
NOTE

- Steps (1) through (9) require the aid of an assistant.
- Left and right side of rear tension beam is installed the same way. Left side shown.
- Perform steps (1) and (2) on model M1081.

(1) Position rear tension beam (1), load spreader bracket (2), and taillight mounting bracket (3) on vehicle with two bolts (4) and self-locking nuts (5).

(2) Tighten two self-locking nuts (5) to 210-225 lb-ft (285-305 N·m).





NOTE

Perform steps (3) and (4) on model M1078/M1079.

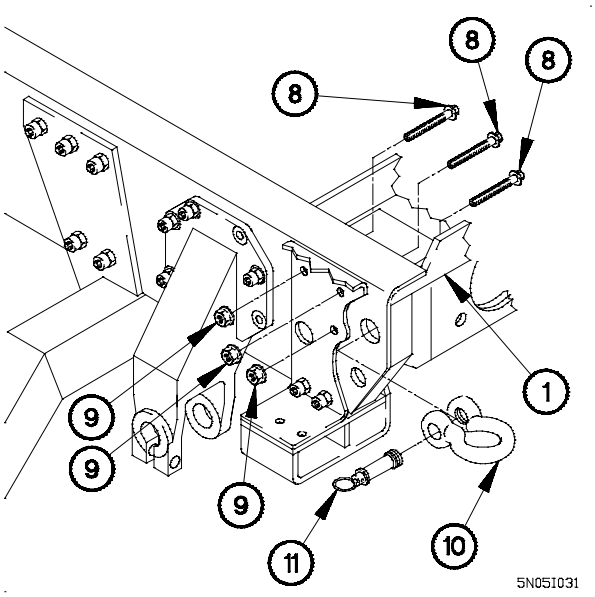
(3) Position taillight mounting bracket (3) on rear tension beam (1) with two bolts (6) and self-locking nuts (7).

(4) Tighten two self-locking nuts (7) to 210-225 lb-ft (285-305 N·m).

(5) Position three bolts (8) and self-locking nuts (9) in rear tension beam (1).

(6) Tighten three self-locking nuts (9) to 210-225 lb-ft (285-305 N·m).

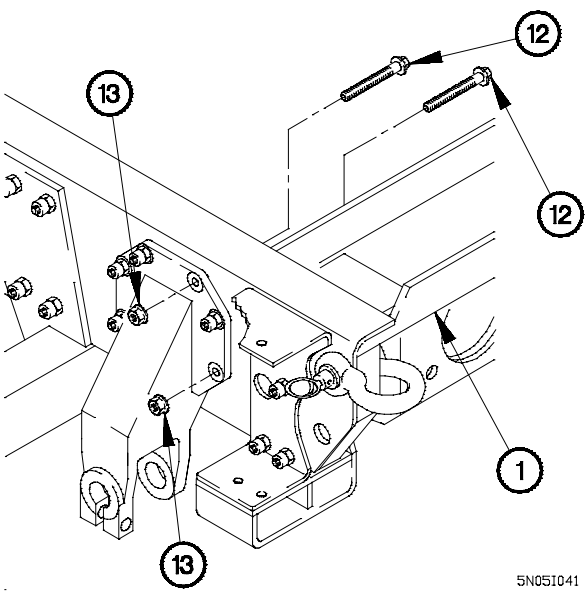
(7) Install shackle (10) on rear tension beam (1) with pin (11).



13-5. REAR TENSION BEAM AND TAILLIGHT MOUNTING BRACKET REPLACEMENT (CONT)

(8) Position two bolts (12) and self-locking nuts (13) in rear tension beam (1).

(9) Tighten two self-locking nuts (13) to 210-225 lb-ft (285-305 N·m).



c. Follow-On Maintenance.

Install taillight carriers (TM 9-2320-365-20-3).

End of Task.

13-6. REAR CROSSMEMBER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Rear tension beam removed (para 13-5).
Rear bumper removed (para 13-8).
Rear spring rear bracket removed (para 13-9).
Rear marker lights removed (TM 9-2320-365-20-3).
Rear gladhands removed (TM 9-2320-365-20-3).
Rear intervehicular 12 VDC (7 Pin) cable removed (TM 9-2320-365-20-3).
Rear intervehicular 24 VDC (12 Pin) cable removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Socket, Socket Wrench (TM 9-2320-365-20)

Materials/Parts
Pin, Cotter (Item 230, Appendix F)
Nut, Self-locking (16) (Item 134, Appendix F)
Bolt (2) (Item 6, Appendix F)
Bolt (10) (Item 10, Appendix F)
Grease, Automotive and Artillery (GAA) (Item 36, Appendix C)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

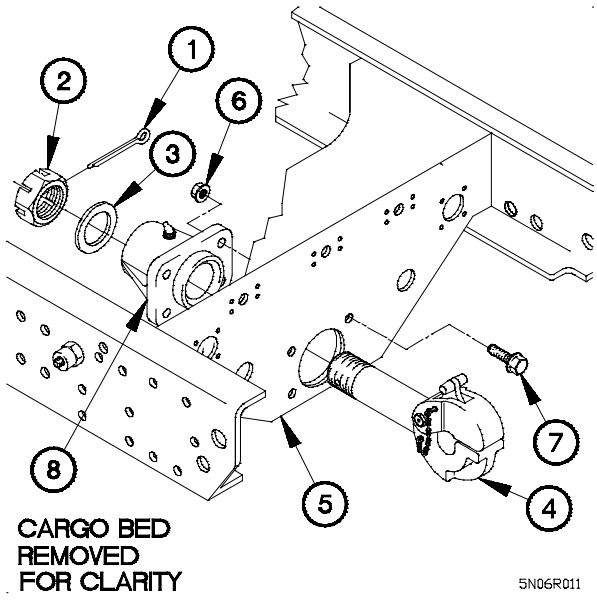
a. Removal.

(1) Remove cotter pin (1) from nut (2). Discard cotter pin.

(2) Remove nut (2) and washer (3) from pintle hook (4).

(3) Remove pintle hook (4) from rear crossmember (5).

(4) Remove four self-locking nuts (6), screws (7), and support (8) from rear crossmember (5). Discard self-locking nuts.



13-6. REAR CROSSMEMBER REPLACEMENT (CONT)

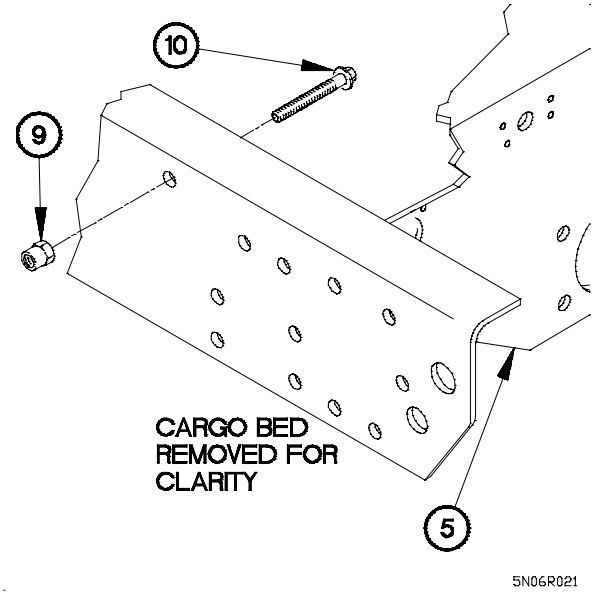
CAUTION

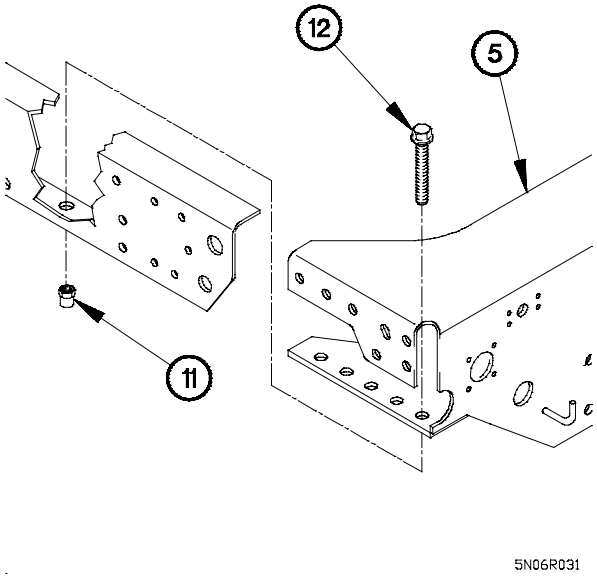
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

- Left and right side of rear crossmember is removed the same way. Left side shown.
- Steps (5) through (8) require the aid of an assistant.

(5) Remove collar (9) and bolt (10) from rear crossmember (5). Discard collar and bolt.





(6) Remove five collars (11) and bolts (12) from rear crossmember (5). Discard collars and bolts.

(7) Perform steps (5) and (6) on right side of rear crossmember (5).

(8) Remove rear crossmember (5) from vehicle.

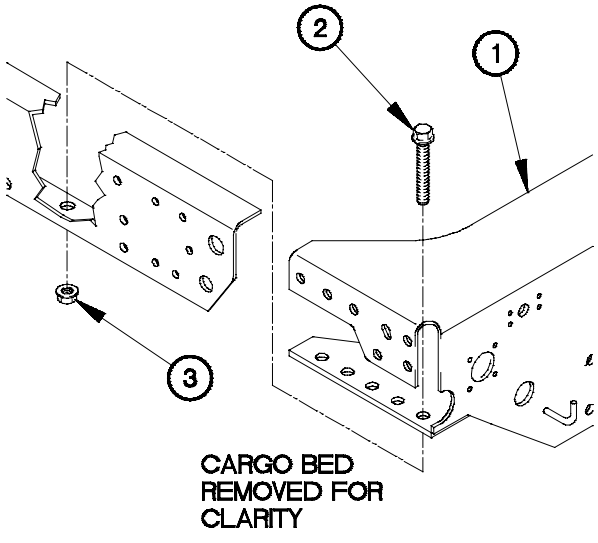
b. Installation.

NOTE

- Left and right side of rear crossmember is installed the same way. Left side shown.
- Steps (1) through (4) require the aid of an assistant.

(1) Position rear crossmember (1) on vehicle with five bolts (2) and self-locking nuts (3).

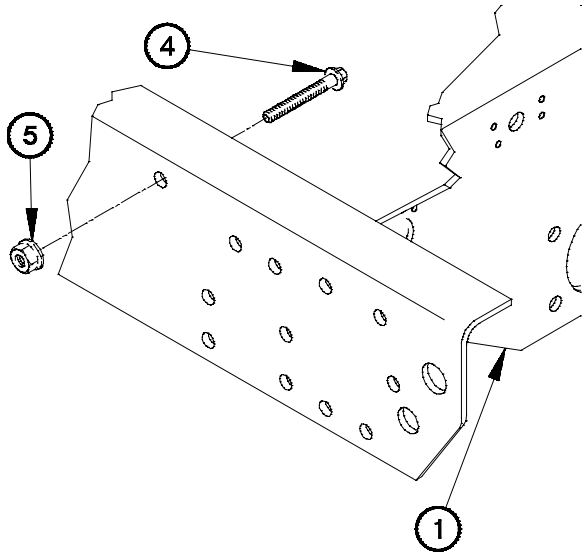
(2) Tighten five self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).

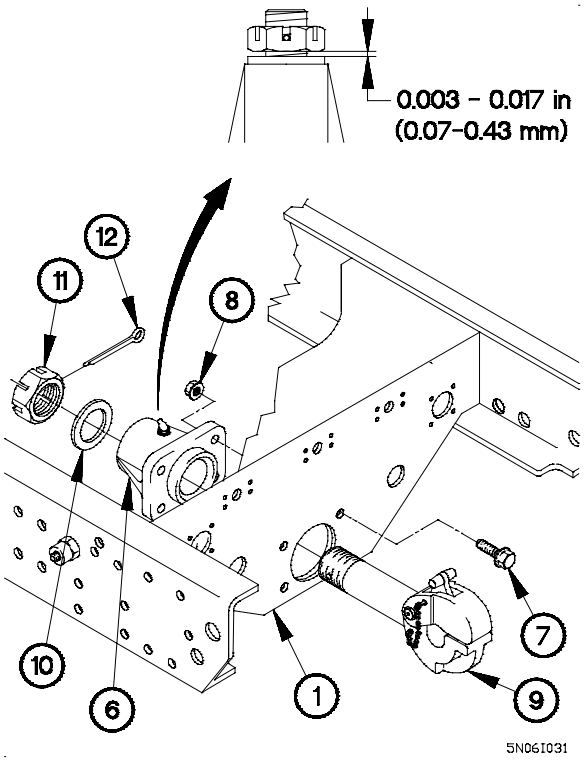


(3) Position bolt (4) and self-locking nut (5) in rear crossmember (1).

(4) Tighten self-locking nut (5) to 210-225 lb-ft (285-305 N·m).

(5) Perform steps (1) through (4) on right side of rear crossmember.





(6) Position support (6) on rear crossmember (1) with four screws (7) and self-locking nuts (8).

(7) Tighten four self-locking nuts (8) to 195-239 lb-ft (265-325 N·m).

(7.1) Apply coat of grease to shaft of pintle hook (9). ■

(8) Install pintle hook (9) in rear crossmember (1) with washer (10) and nut (11).

CAUTION

Clearance between washer and support must be 0.003-0.017 in. (0.07-0.43 mm). Failure to comply may result in damage to equipment.

(9) Adjust nut (11) until clearance is 0.003-0.017 in. (0.07-0.43 mm) with alignment holes lined up between nut and pintle hook (9).

(10) Install cotter pin (12) in nut (11).

13-6. REAR CROSSMEMBER REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Lubricate pintle hook (TM 9-2320-365-20).

(2) Install rear intervehicular 24 VDC (7 pin) cable (TM 9-2320-365-20-3).

(3) Install rear intervehicular 12 VDC (12 pin) cable (TM 9-2320-365-20-3).

(4) Install rear gladhands (TM 9-2320-365-20-3).

(5) Install rear marker lights (TM 9-2320-365-20-3).

(6) Install rear spring bracket (para 13-9).

(7) Install rear bumper (para 13-8).

(8) Install rear tension beam (para 13-5).

End of Task.

13-7. SHOCK MOUNT CROSSMEMBER REPLACEMENT

This task covers:

a. M1078/M1079 Removal
b. M1078/M1079 Installation
c. M1081 Removal
d. M1081 Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cargo bed removed (para 15-8).
Van body removed (TM 9-2320-365-20-4).
Stabilizer mounting bracket removed (para 14-7).
Rear bumper removed (para 13-8).
Resilient mount and mechanical stops removed (M1078/M1079) (TM 9-2320-365-20-3).
Rear crossmember removed (para 13-6).
Load sensing valve and bracket removed (TM 9-2320-365-20-3).
Rear spring bracket removed (para 13-9).
Frame plates removed (M1081) (para 13-11).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-150 lb-ft (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)

Tools and Special Tools (Cont)
Socket Set, Impact (Item 50, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Nut, Self-locking (4) (Item 126, Appendix F)
Nut, Self-locking (2) (Item 127, Appendix F)
Nut, Self-locking (16) (Item 134, Appendix F) (M1078/M1079)
Nut, Self-locking (2) (Item 134, Appendix F) (M1081)
Nut, Self-locking (2) (Item 142, Appendix F) (M1078/M1079)
Nut, Self-locking (2) (Item 142, Appendix F) (M1081)
Nut, Self-locking (6) (Item 136, Appendix F)
Nut, Self-locking (2) (Item 148, Appendix F)
Bolt (14) (Item 5, Appendix F) (M1078/M1079)
Ties, Plastic, Cable (Item 89, Appendix C)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

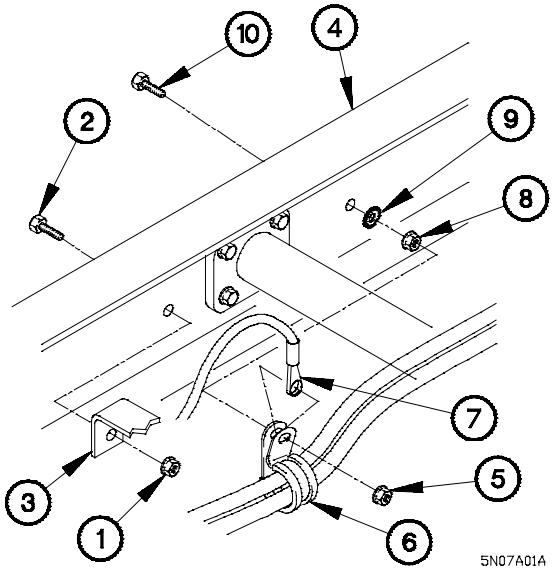
a. M1078/M1079 Removal.

NOTE

Perform steps (1) and (2) on LH side.

(1) Remove self-locking nut (1), screw (2), and bracket (3) from frame rail (4). Discard self-locking nut.

(2) Remove self-locking nut (5), clamp (6), terminal lug TL93 (7), self-locking nut (8), lockwasher (9), and screw (10) from frame rail (4). Discard self-locking nuts and lockwasher.

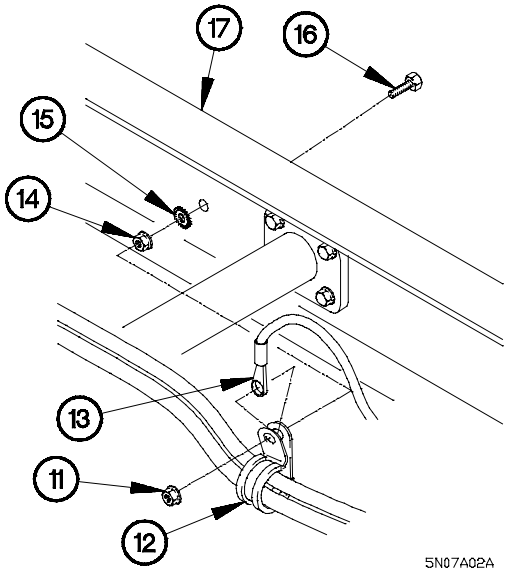


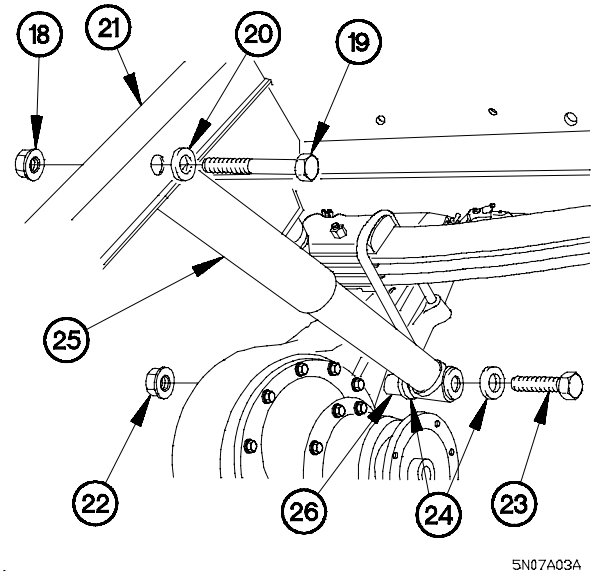
13-7. SHOCK MOUNT CROSSMEMBER REPLACEMENT (CONT)

NOTE

Perform step (3) on RH side.

(3) Remove self-locking nut (11), clamp (12), terminal lug TL92 (13), self-locking nut (14), lockwasher (15), and screw (16) from frame rail (17). Discard self-locking nut and lockwasher.





NOTE

Left and right side of shock mount crossmember is removed the same way. Left side shown.

(4) Remove self-locking nut (18), bolt (19), and washer (20) from shock mount crossmember (21). Discard self-locking nut.

(5) Remove self-locking nut (22), bolt (23), two washers (24), and shock absorber (25) from lower bracket (26). Discard self-locking nut.

CAUTION

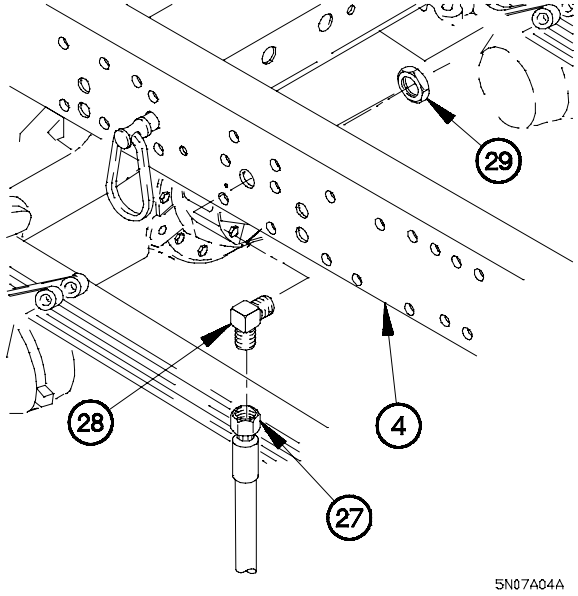
Cap or plug hoses and disconnection points to prevent contamination of pneumatic system. Failure to comply may result in damage to equipment.

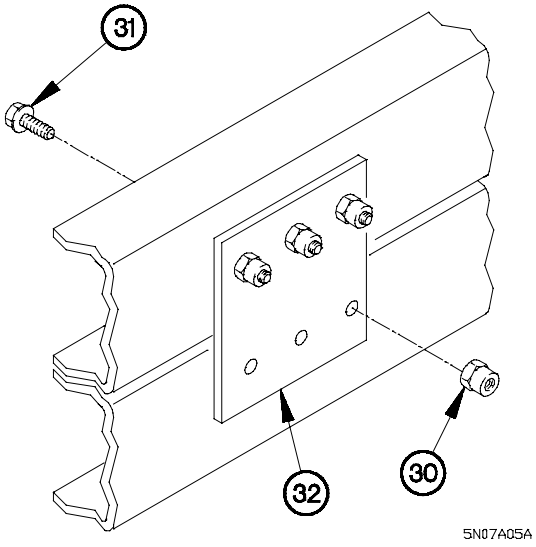
NOTE

- Tag hoses and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(6) Disconnect hose (27) from 90-degree fitting (28).

(7) Remove nut (29) and 90-degree fitting (28) from frame rail (4).



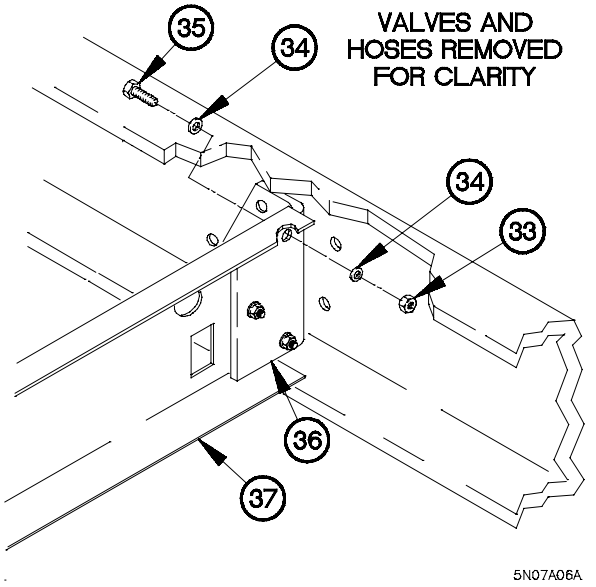


CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(8) Remove three collars (30) and bolts (31) from bracket (32). Discard collars and bolts.

(9) Remove three self-locking nuts (33), six washers (34), three screws (35), and bracket (36) from valve panel (37). Discard self-locking nuts.



13-7. SHOCK MOUNT CROSSMEMBER REPLACEMENT (CONT)

(10) Remove self-locking nut (38) and ring (39) from shock mount crossmember (21). Discard self-locking nut.

CAUTION

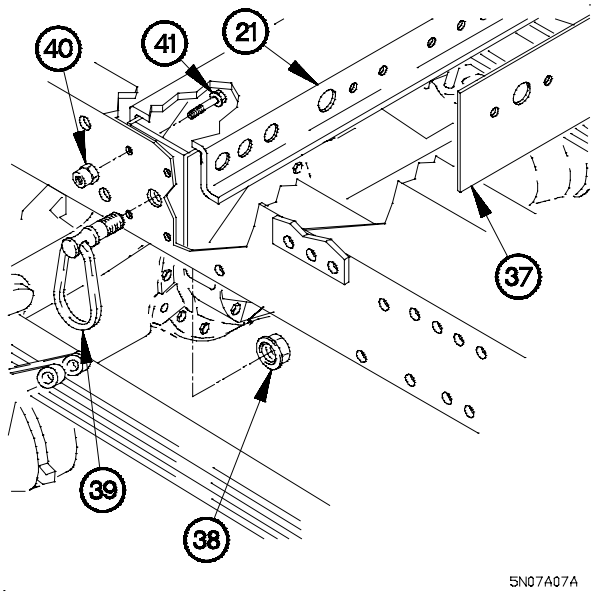
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(11) Remove four collars (40) and bolts (41) from shock mount crossmember (21). Discard collars and bolts.

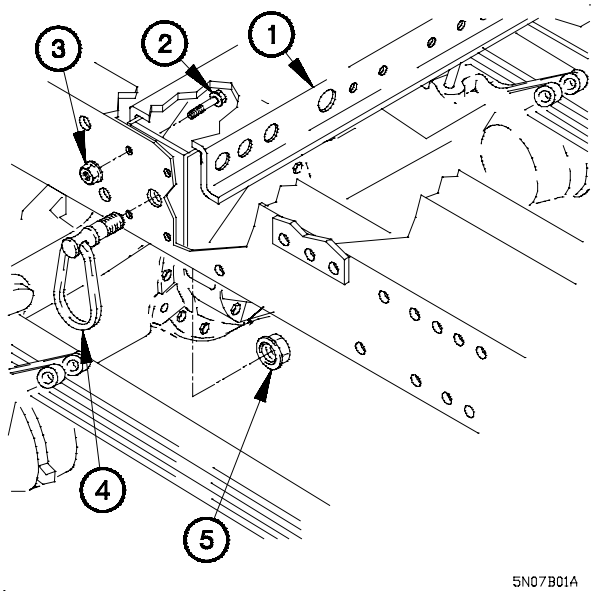
(12) Perform steps (4) through (11) on right side of shock mount crossmember.

(13) Position valve panel (37) to gain access to shock mount crossmember (21).

(14) Remove shock mount crossmember (21) from vehicle.



b. M1078/M1079 Installation.



NOTE

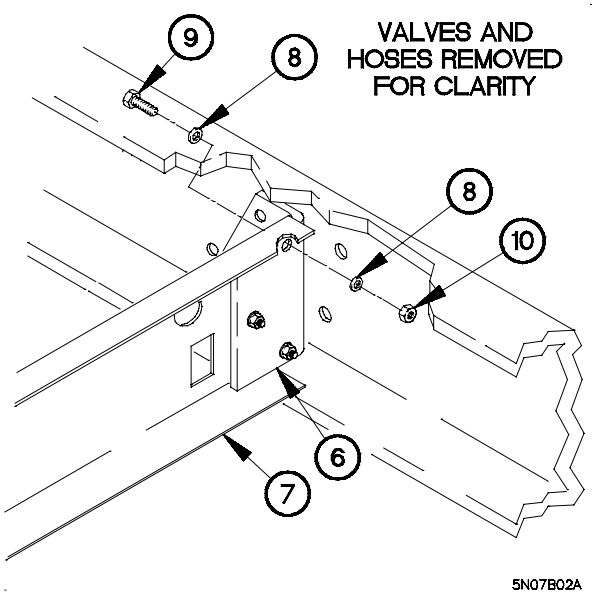
- Left and right side of shock mount crossmember is installed the same way. Left side shown.
- Steps (1) through (24) require the aid of an assistant.
- Install plastic cable ties as required.

(1) Position shock mount crossmember (1) on vehicle with four bolts (2) and self-locking nuts (3).

(2) Tighten four self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).

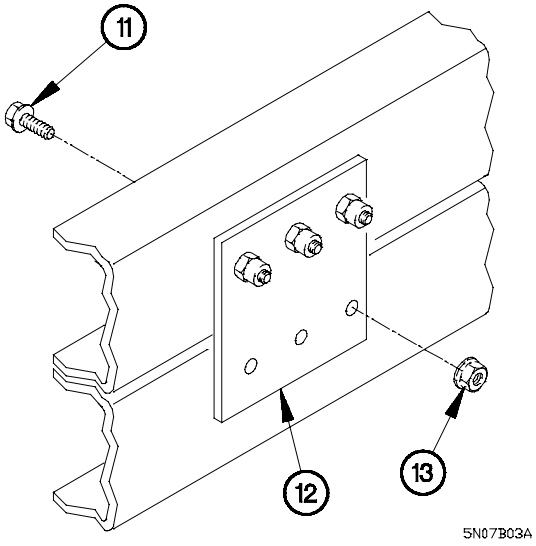
(3) Position ring (4) in shock mount crossmember (1) with self-locking nut (5).

(4) Tighten self-locking nut (5) to 113-138 lb-ft (153-187 N·m).



(5) Position bracket (6) on valve panel (7) with six washers (8), three screws (9), and self-locking nuts (10).

(6) Tighten three self-locking nuts (10) to 14-18 lb-ft (20-24 N·m).



(7) Position three bolts (11) in bracket (12) with three self-locking nuts (13).

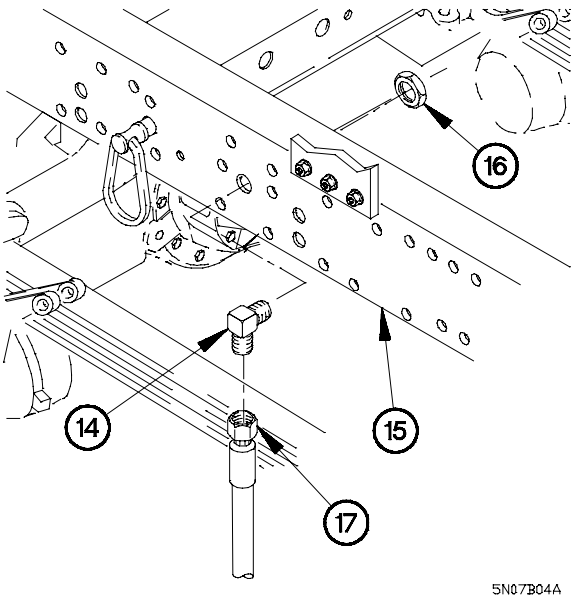
(8) Tighten three self-locking nuts (13) to 210-225 lb-ft (285-305 N·m).

NOTE

Install plastic cable ties as required.

(9) Install 90-degree fitting (14) in frame rail (15) with nut (16).

(10) Connect hose (17) to 90-degree fitting (14).



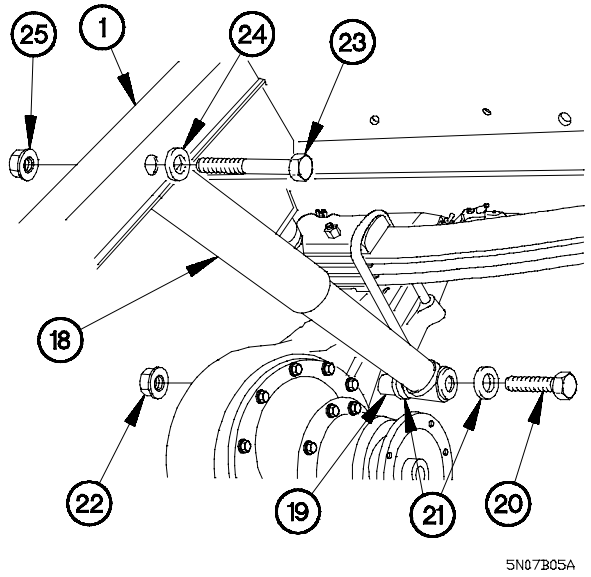
13-7. SHOCK MOUNT CROSSMEMBER REPLACEMENT (CONT)

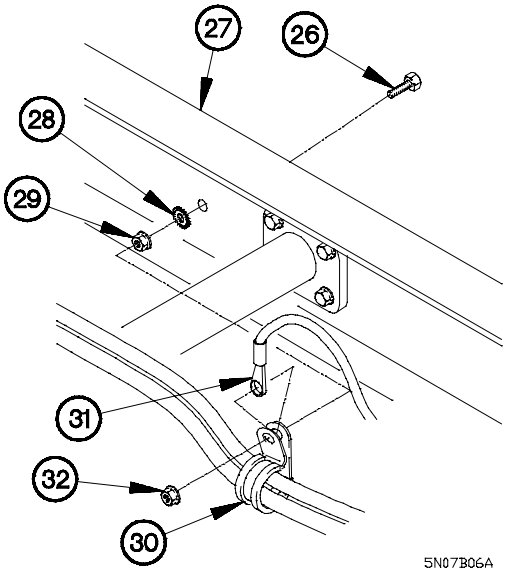
(11) Position shock absorber (18) on lower bracket (19) with bolt (20), two washers (21), and self-locking nut (22).

(12) Position bolt (23) and shock absorber (18) in shock mount crossmember (1) with washer (24) and self-locking nut (25).

(13) Tighten nuts (22 and 25) to 195-239 lb-ft (264-324 N·m).

(14) Perform steps (1) through (13) on right side of shock mount crossmember.





NOTE

Perform steps (15) through (18) on RH side.

(15) Position screw (26) in frame rail (27) with lockwasher (28) and self-locking nut (29).

(16) Tighten self-locking nut (29) to 84-108 lb-in (10-12 N·m).

(17) Position clamp (30) and lug terminal TL92 (31) on screw (26) with self-locking nut (32).

(18) Tighten self-locking nut (32) to 84-108 lb-in. (10-12 N·m).

NOTE

Perform steps (19) through (23) on LH side.

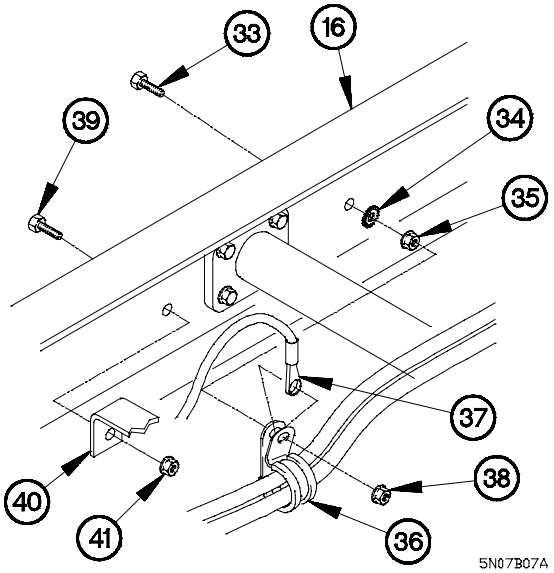
(19) Position screw (33) in frame rail (16) with lockwasher (34) and self-locking nut (35).

(20) Tighten self-locking nut (35) to 84-108 lb-in. (10-12 N·m).

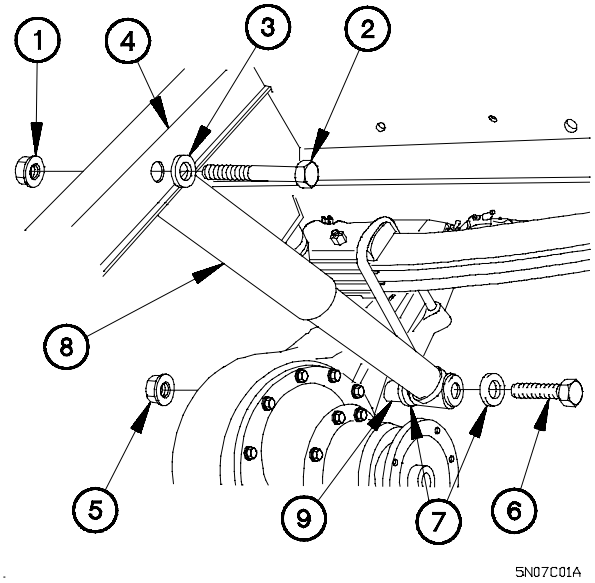
(21) Position clamp (36) and lug terminal TL93 (37) on screw (33) with self-locking nut (38).

(22) Positions screw (39) and bracket (40) on frame rail (16) with self-locking nut (41).

(23) Tighten self-locking nuts (38 and 41) to 84-108 lb-in. (10-12 N·m).



c. M1081 Removal.



NOTE

Left and right side of shock mount crossmember is removed the same way. Left side shown.

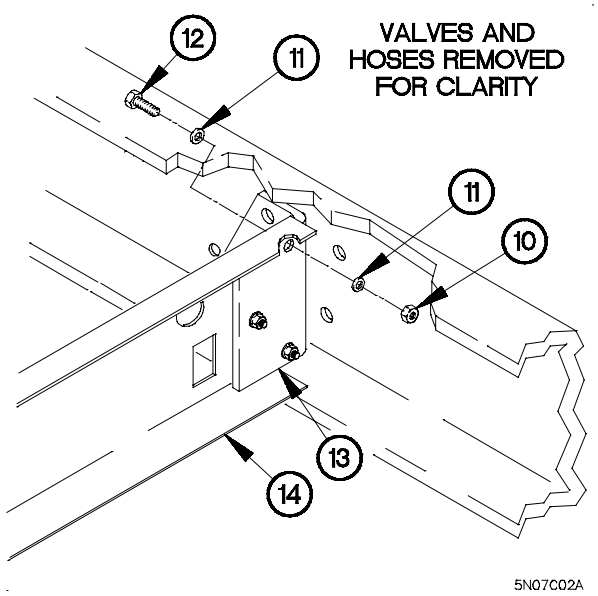
(1) Remove self-locking nut (1), bolt (2), and washer (3) from shock mount crossmember (4). Discard self-locking nut.

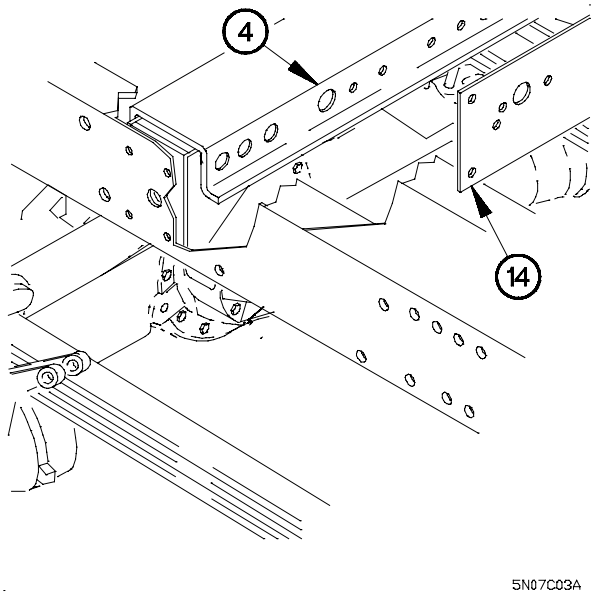
(2) Remove self-locking nut (5), bolt (6), two washers (7), and shock absorber (8) from lower bracket (9). Discard self-locking nut.

13-7. SHOCK MOUNT CROSSMEMBER REPLACEMENT (CONT)

(3) Remove three self-locking nuts (10), six washers (11), three screws (12), and bracket (13) from valve panel (14). Discard self-locking nuts.

(4) Perform steps (1) through (3) on right side of shock mount crossmember.





(5) Position valve panel (14) to gain access to shock mount crossmember (4).

NOTE

Step (6) requires the aid of an assistant.

(6) Remove shock mount crossmember (4) from vehicle.

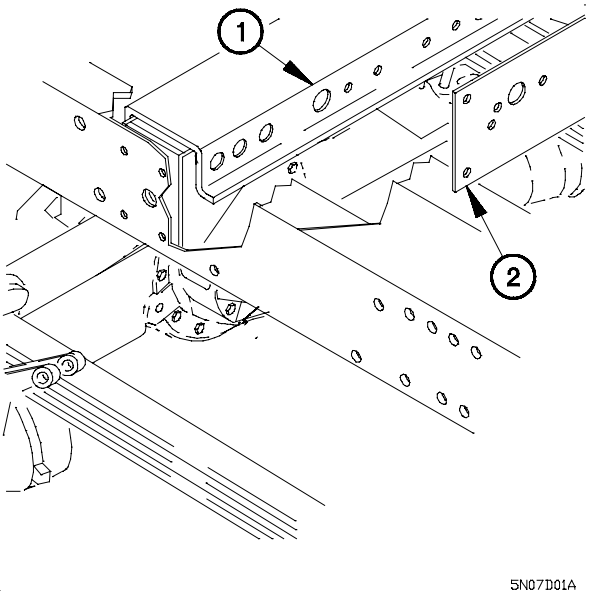
d. M1081 Installation.

NOTE

Step (1) requires the aid of an assistant.

(1) Position shock mount crossmember (1) on vehicle.

(2) Position valve panel (2) in mounting position.

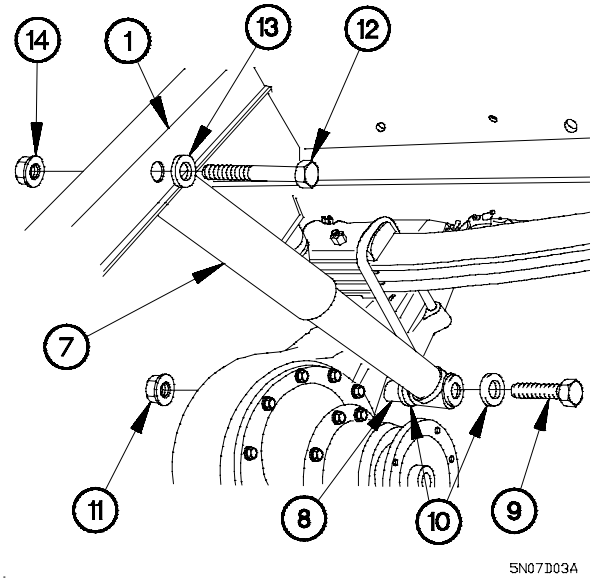


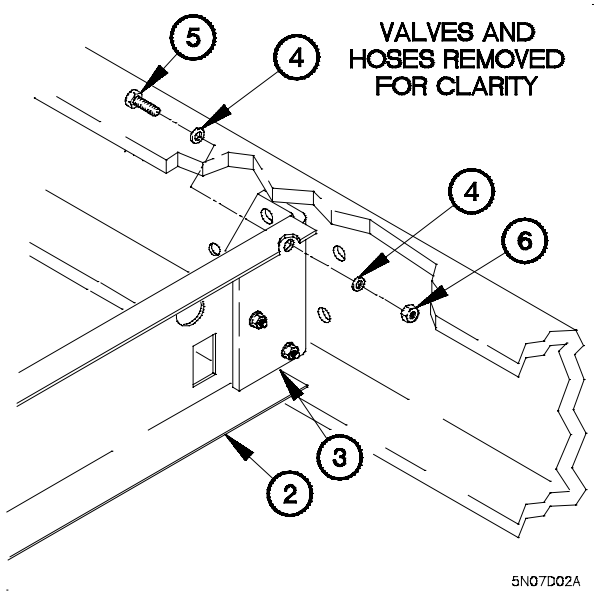
NOTE

Left and right side of shock mount crossmember is installed the same way. Left side shown.

(3) Position bracket (3) on valve panel (2) with six washers (4), three screws (5), and self-locking nuts (6).

(4) Tighten three self-locking nuts (6) to 14-18 lb-ft (20-24 N·m).





(5) Position shock absorber (7) on lower bracket (8) with bolt (9), two washers (10) and self-locking nut (11).

(6) Position bolt (12) and shock absorber (7) in shock mount crossmember (1) with washer (13) and self-locking nut (14).

(7) Tighten self-locking nuts (11 and 14) to 195-239 lb-ft (264-324 N·m).

(8) Perform steps (3) through (7) on right side of shock mount crossmember.

e. Follow-On Maintenance.

(1) Install frame plates (M1081) (para 13-11).

(2) Install rear spring bracket (para 13-9).

(3) Install load sensing valve and bracket (TM 9-2320-365-20-3).

(4) Install rear crossmember (para 13-6).

(5) Install resilient mount and mechanical stops (M1078) (TM 9-2320-365-20-3).

(6) Install rear bumper (para 13-8).

(7) Install stabilizer mounting bracket (para 14-7).

(7.1) Install van body (TM 9-2320-365-20-4).ss

(8) Install cargo bed (para 15-8).

13-8. REAR BUMPER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Rear fenders removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)

Materials/Parts
Bolt (12) (Item 3, Appendix F)
Nut, Self-locking (12) (Item 134, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

CAUTION

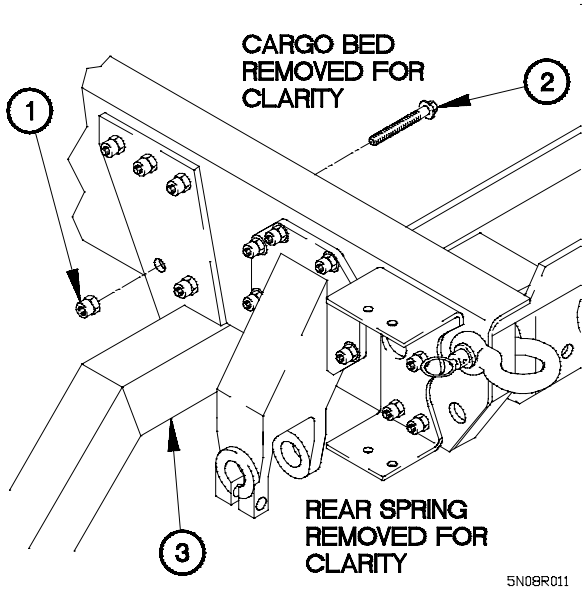
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

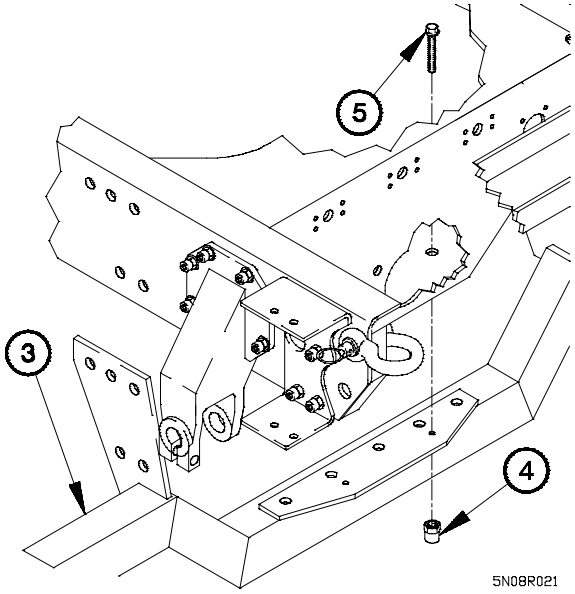
- Step (1) requires the aid of an assistant.
- Left and right side or rear bumper is removed the same way. Left side shown.

(1) Remove five collars (1) and bolts (2) from rear bumper (3). Discard collars and bolts.

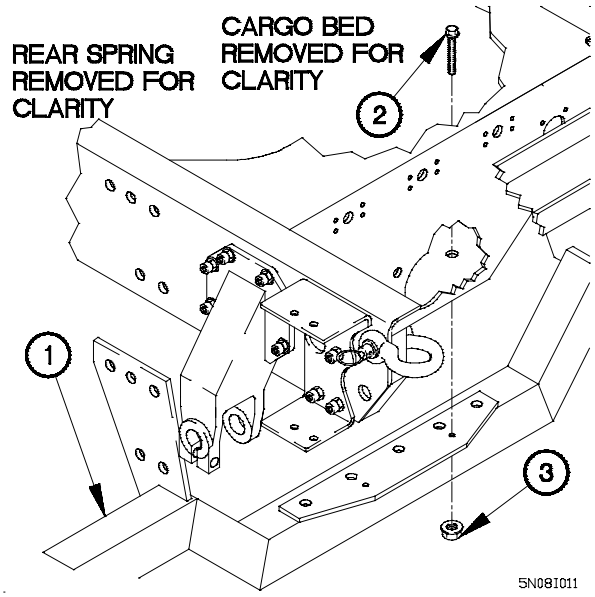
(2) Perform step (1) on right side of rear bumper.



(3) Remove two collars (4), bolts (5), and rear bumper (3) from vehicle. Discard collars and bolts.



b. Installation.



NOTE

- Steps (1) through (4) require the aid of an assistant.
- Left and right side or rear bumper is installed the same way. Left side shown.

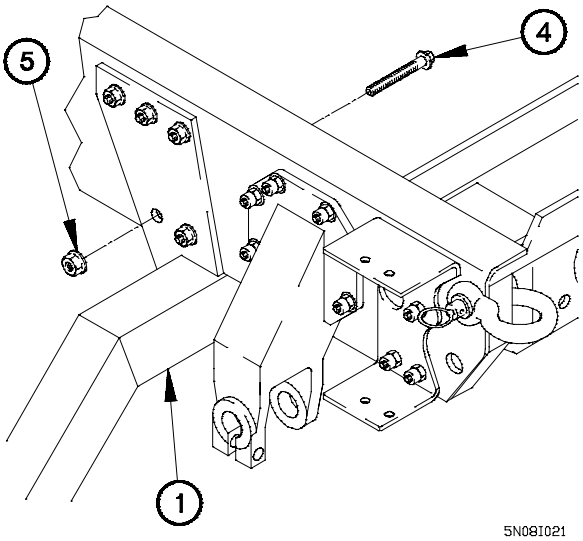
(1) Position rear bumper (1) on vehicle with two bolts (2) and self-locking nuts (3).

(2) Tighten two self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).

(3) Position five bolts (4) and self-locking nuts (5) in rear bumper (1).

(4) Tighten five self-locking nuts (5) to 210-225 lb-ft (285-305 N·m).

(5) Perform steps (3) and (4) on right side of rear bumper.



c. Follow-On Maintenance.

Install rear fenders (TM 9-2320-365-20-4).

End of Task.

13-9. REAR SPRING BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions
Rear wheel removed (from side being replaced) (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
Trestles, Motor Vehicle Maintenance (2) (Item 71, Appendix B)

Materials/Parts
Bolt (2) (Item 5, Appendix F)
Bolt (1) (Item 8, Appendix F)
Bolt (3) (Item 10, Appendix F)
Nut, Self-locking (6) (Item 134, Appendix F)
Nut, Self-locking (2) (Item 138, Appendix F)
Grease, Automotive and Artillery (GAA) (Item 36, Appendix C)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

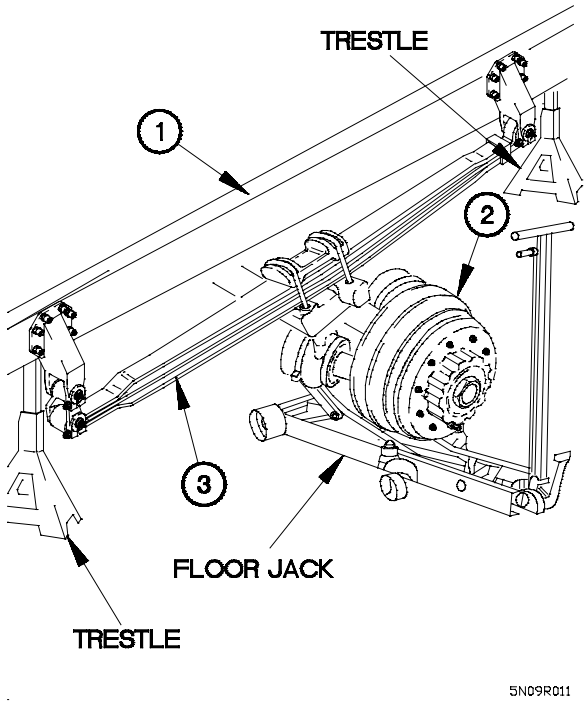
a. Removal.

NOTE

- Left and right side rear spring brackets are removed the same way. Right side shown.
- Steps (1) through (8) require the aid of an assistant.

(1) Place two trestles under frame (1).

(2) Position floor jack under rear axle (2) and lift enough to take weight off leaf spring (3).



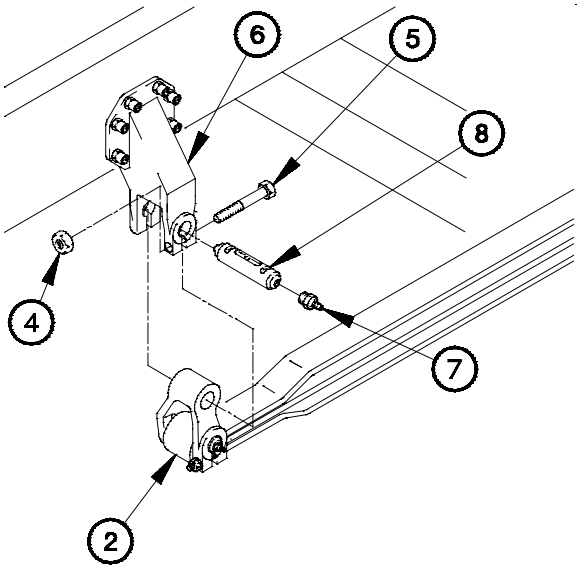
(3) Remove nut (4) and screw (5) from rear spring bracket (6).

(4) Remove lubrication fitting (7) from spring pin (8).

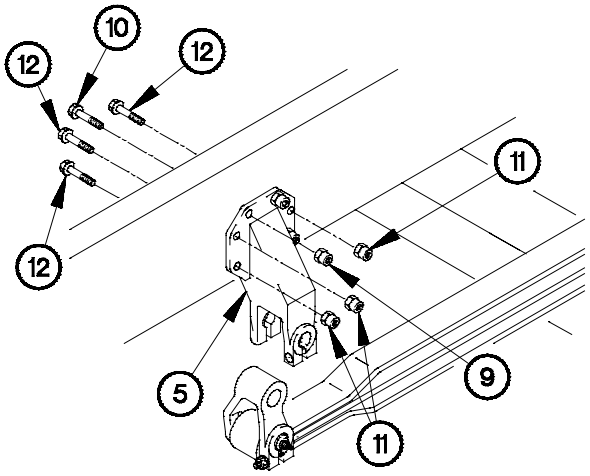
CAUTION

Use care when removing spring pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(5) Remove spring pin (8) and leaf spring (2) from rear spring bracket (6).



5N09R021



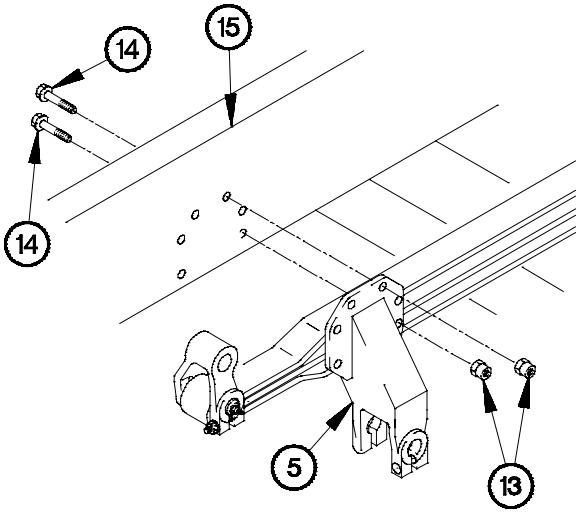
5N09R031

CAUTION

When removing bolts, continuous removal of collar is mandatory. Failure to comply will result in seizing of collar to bolt.

(6) Remove collar (9) and bolt (10) from rear spring bracket (5). Discard collar and bolt.

(7) Remove three collars (11) and bolts (12) from rear spring bracket (5). Discard collars and bolts.



5N09R041

(8) Remove two collars (13), bolts (14), and rear spring bracket (5) from frame rail (15). Discard collars and bolts.

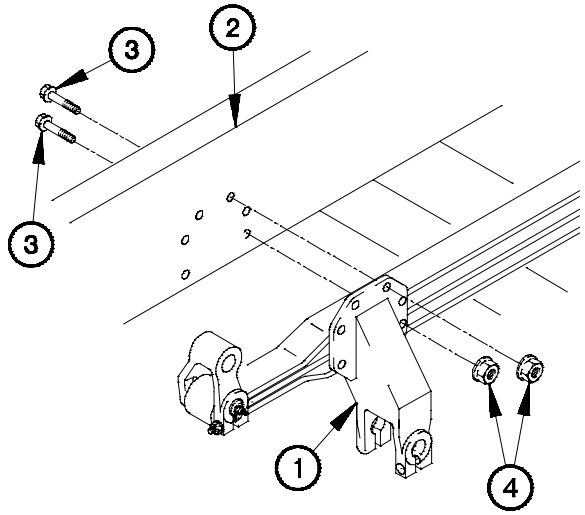
13-9. REAR SPRING BRACKETS REPLACEMENT (CONT)

b. Installation.

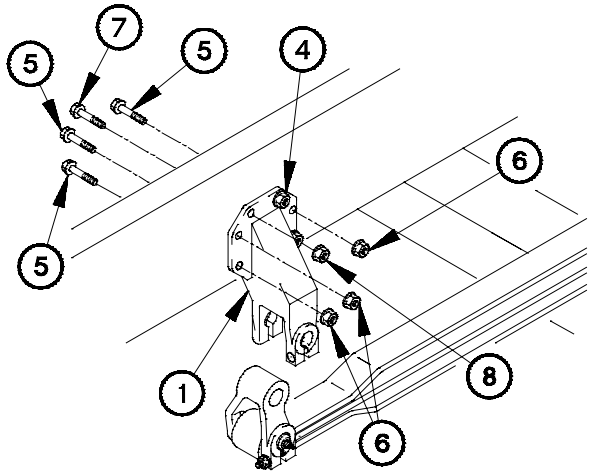
NOTE

- Left and right side rear spring brackets are installed the same way. Right side shown.
- Steps (1) through (10) require the aid of an assistant.

(1) Position rear spring bracket (1) on frame rail (2) with two bolts (3) and self-locking nuts (4).



5N09I011



5N09I021

(2) Position three bolts (5) and self-locking nuts (6) in rear spring bracket (1).

(3) Position bolt (7) and self-locking nut (8) in rear spring bracket (1).

(4) Tighten two self-locking nuts (4), three self-locking nuts (6) and self-locking nut (8) to 210-225 lb-ft (285-305 N·m).

NOTE

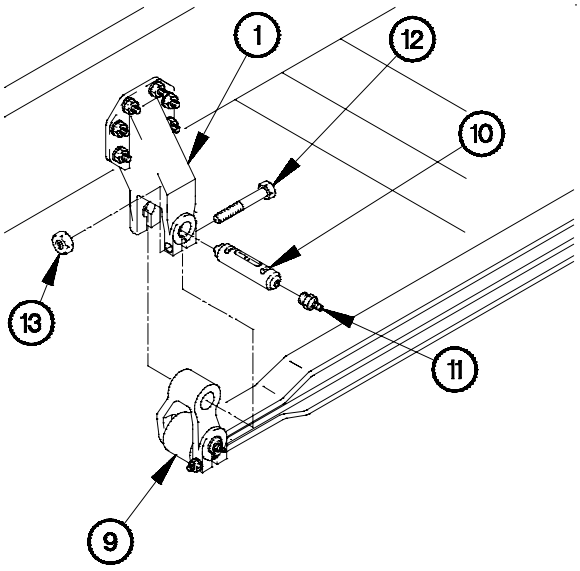
Lubricate pin before installation.

(5) Install leaf spring (9) in rear spring bracket (1) with spring pin (10).

(6) Install lubrication fitting (11) in spring pin (10).

(7) Position screw (12) and nut (13) in rear spring bracket (1).

(8) Tighten nut (13) to 76-94 lb-ft (103-127 N·m).



5N09I031

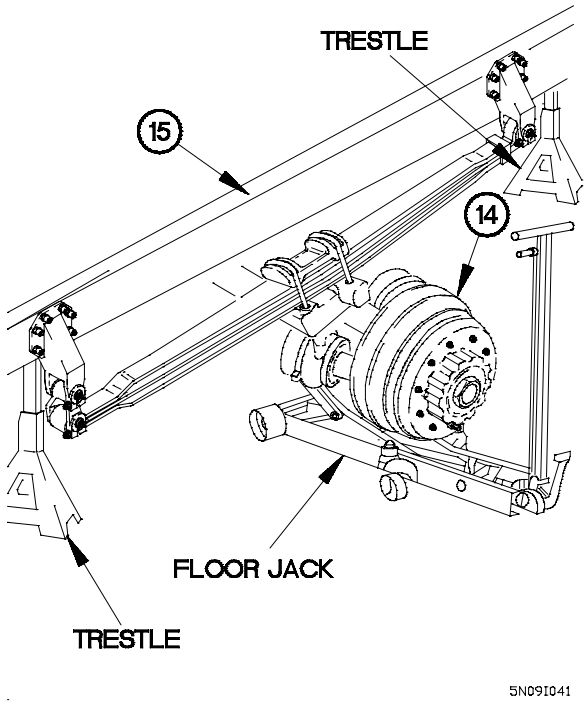
(9) Remove floor jack from rear axle (14).

(10) Remove trestles from frame rail (15).

c. Follow-On Maintenance.

Install rear wheel (TM 9-2320-365-10).

End of Task.



13-10. M1081 ANGLE BRACKET REPLACEMENT

This task covers:

a. LH Removal
b. LH Installation
c. RH Removal
d. RH Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air dryer removed (LH side) (TM 9-2320-365-20-5).
Muffler and heat shield removed (RH side) (TM 9 2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Nut, Self-locking (6) (Item 134, Appendix F) (LH side)
Bolt (6) (Item 5, Appendix F) (LH side)
Nut, Self-locking (4) (Item 134, Appendix F) (RH side)
Bolt (4) (Item 5, Appendix F) (RH side)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. LH Removal.

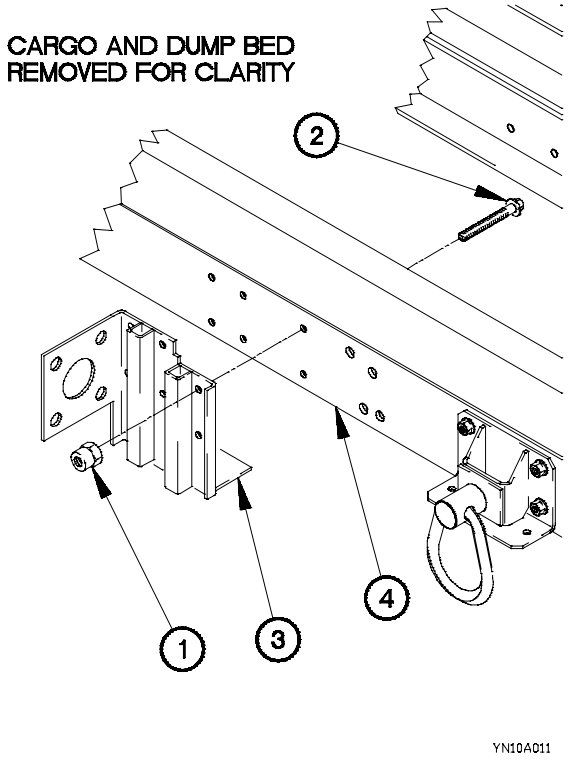
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

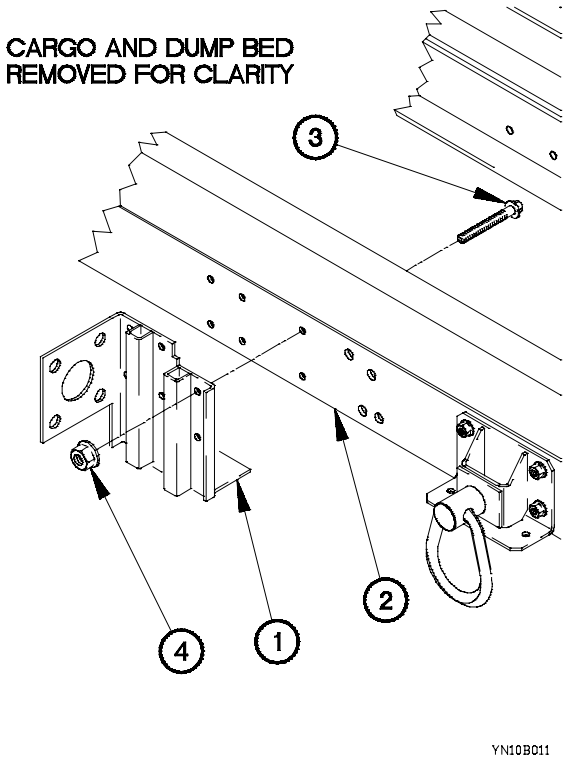
NOTE

Step (1) requires the aid of an assistant.

Remove six collars (1), bolts (2), and angle bracket (3) from frame rail (4). Discard collars and bolts.



b. LH Installation.



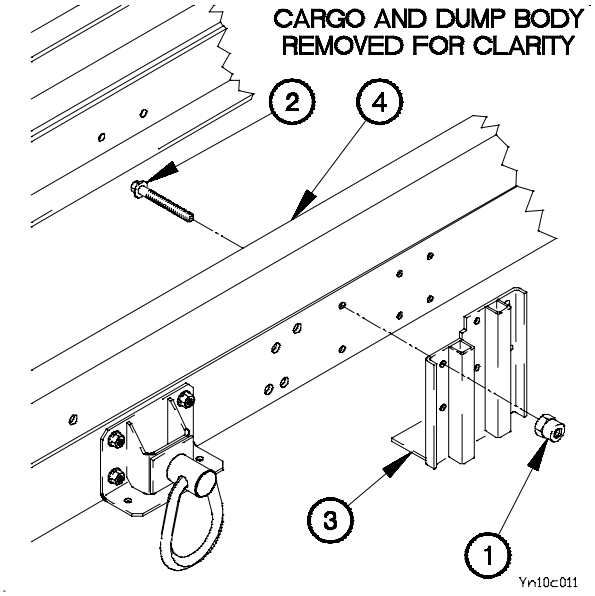
NOTE

Steps (1) and (2) require the aid of an assistant.

(1) Position angle bracket (1) on frame rail (2) with six bolts (3) and self-locking nuts (4).

(2) Tighten six self-locking nuts (4) to 210-225 lb-ft (285-305 N·m).

c. RH Removal.



CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply may result in seizing of collar to bolt.

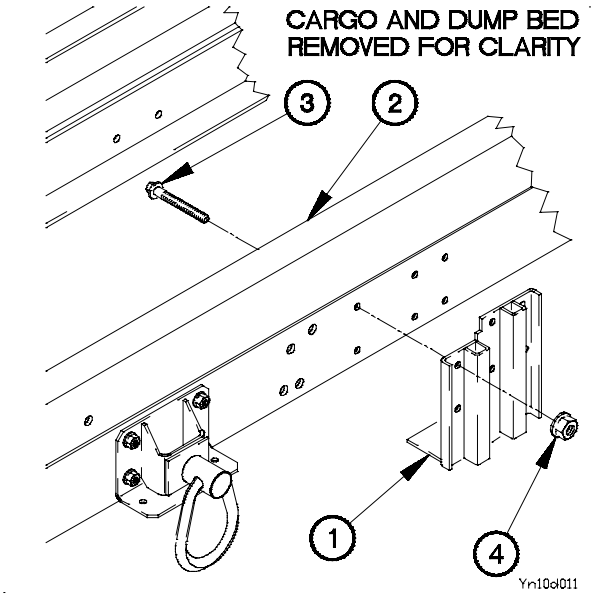
NOTE

Steps (1) requires the aid of an assistant.

Remove four collars (1), bolts (2), and angle bracket (3) from frame rail (4). Discard collars and bolts.

13-10. M1081 ANGLE BRACKET REPLACEMENT (CONT)

d. RH Installation.



NOTE

Steps (1) and (2) require the aid of an assistant.

(1) Position angle bracket (1) on frame rail (2) with four bolts (3) and self-locking nuts (4).

(2) Tighten four self-locking nuts (4) to 210-225 lb-ft (285-305 N·m).

e. Follow-On Maintenance.

(1) Install muffler and heat shield (RH side) (TM 9-2320-365-20-3).

(2) Install air dryer (LH side) (TM 9-2320-365-20-5).

End of Task.

13-11. M1081 FRAME PLATE REPLACEMENT

This task covers:

a. LH Removal
b. LH Installation
c. RH Removal
d. RH Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Resilient mount and mechanical stops removed (TM 9-2320-365-20-3).
Parachute suspension assembly removed (para 13-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Sling, Cargo (Item 48, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Cap and Plug Set (Item 18, Appendix C)
Nut, Self-locking (2) (Item 126, Appendix F)
Nut, Self-locking (Item 148, Appendix F)
Nut, Self-locking (17) (Item 134, Appendix F) (LH side)
Nut, Self-locing (16) (Item 134, Appendix F) (RH side)
Bolt (13) (Item 5, Appendix F) (LH side)
Bolt (12) (Item 5, Appendix F) (RH side)

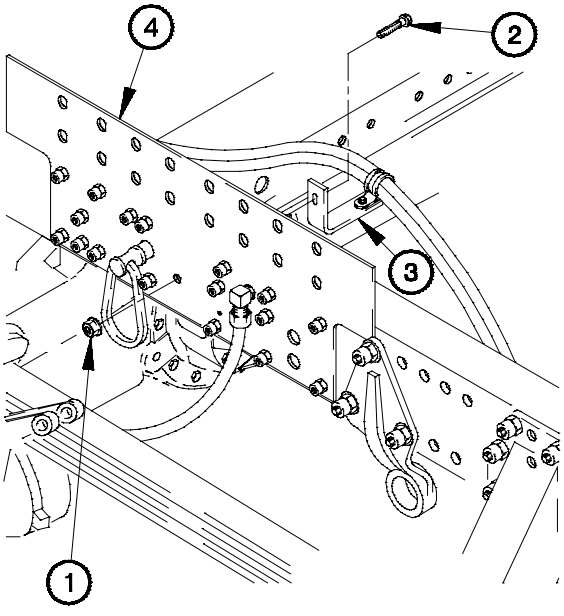
Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. LH Removal.

(1) Remove two self-locking nuts (1), bolts (2), and brackets (3) from frame plate (4). Discard self-locking nuts.



5N11A011

13-11. M1081 FRAME PLATE REPLACEMENT (CONT)

NOTE

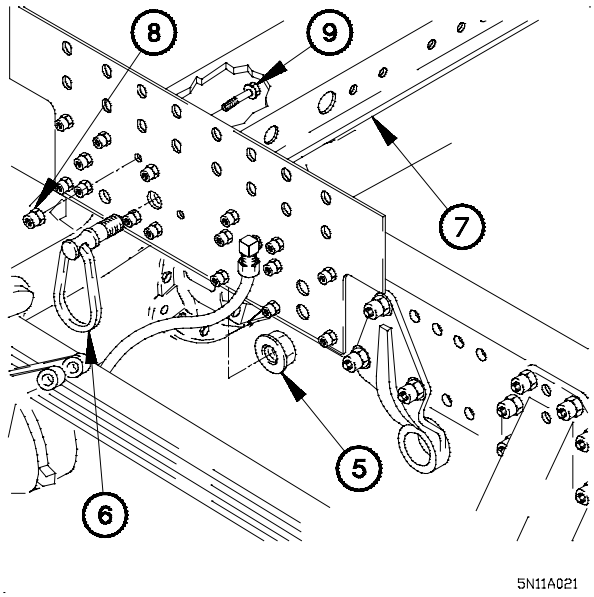
Steps (2) through (5) require the aid of an assistant.

(2) Remove self-locking nut (5) and ring (6) from rear channel (7). Discard self-locking nut.

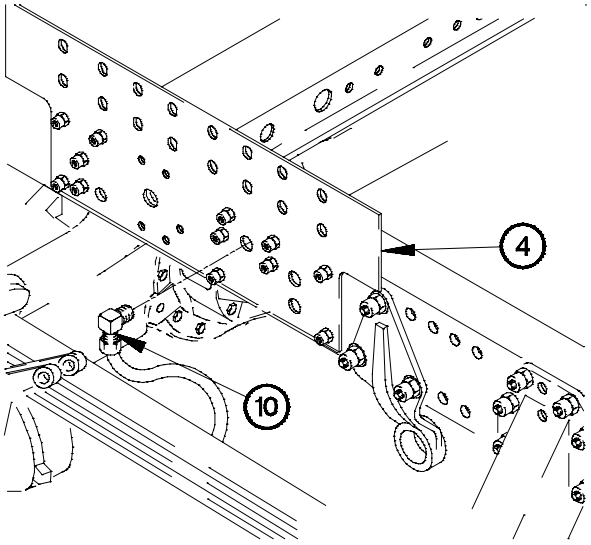
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(3) Remove four collars (8) and bolts (9) from rear channel (7). Discard collars and bolts.



5N11A021



5N11A031

WARNING

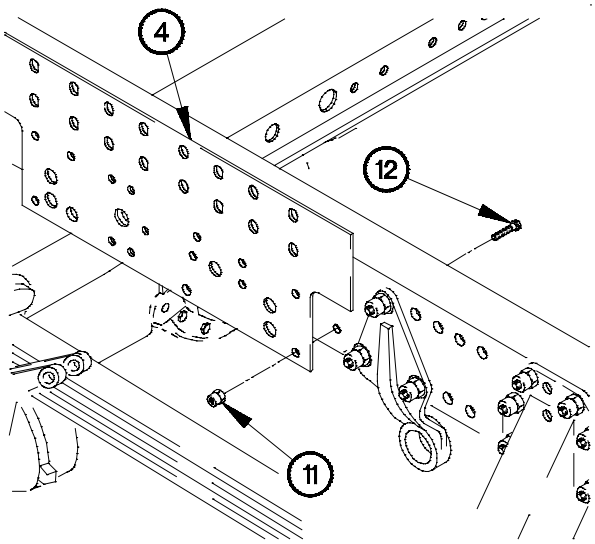
Frame plate weighs approximately 50 lbs (23 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

(5) Remove 13 collars (11), bolts (12), and frame plate (4) from vehicle. Discard collars and bolts.

CAUTION

Cap or plug pneumatic hoses and connection points to prevent contamination of pneumatic system. Failure to comply may result in damage to equipment.

(4) Remove 90-degree fitting (10) from frame plate (4).



5N11A041

b. LH Installation.

WARNING

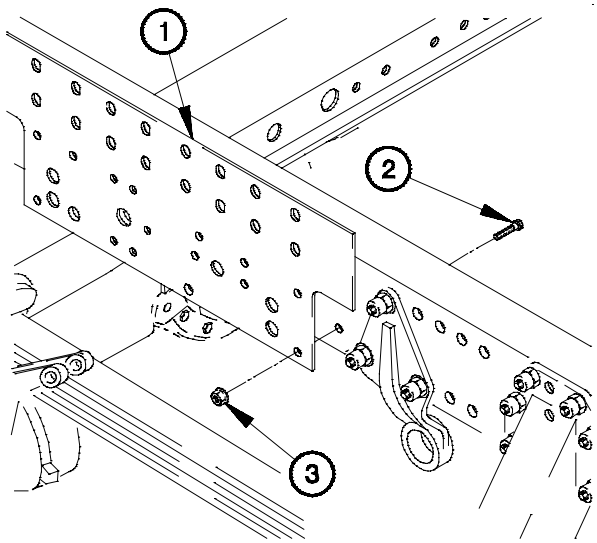
Frame plate weighs approximately 50 lbs (23 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

NOTE

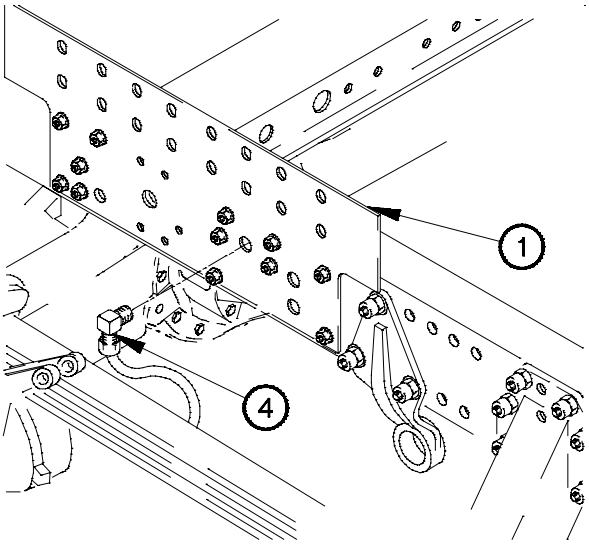
Steps (1) through (6) require the aid of an assistant.

(1) Position frame plate (1) on vehicle with 13 bolts (2) and self-locking nuts (3).

(2) Tighten 13 self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).



5N11B011



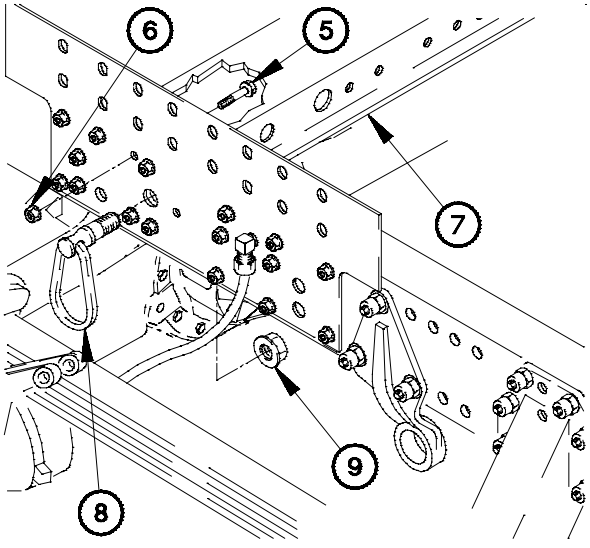
5N11B021

(3) Install 90-degree fitting (4) in frame plate (1).

(4) Position four bolts (5) and self-locking nuts (6) in rear channel (7).

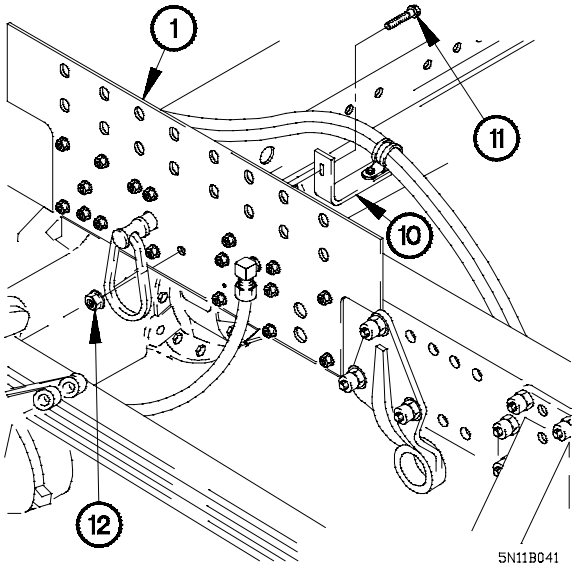
(5) Tighten four self-locking nuts (6) to 210-225 lb-ft (285-305 N·m).

(6) Install ring (8) in rear channel (7) with self-locking nut (9).



5N11B031

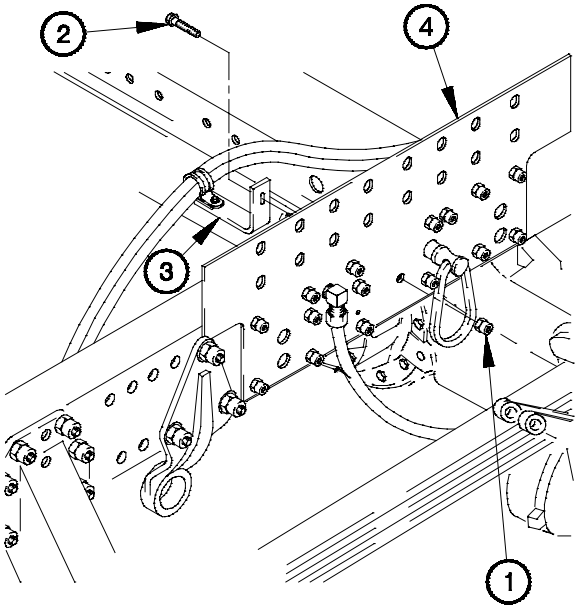
13-11. M1081 FRAME PLATE REPLACEMENT (CONT)



(7) Position two brackets (10) in frame plate (1) with two bolts (11) and self-locking nuts (12).

(8) Tighten two self-locking nuts (12) to 84-108 lb-in. (10-12 N·m).

c. RH Removal.



CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

Steps (1) through (5) require the aid of an assistant.

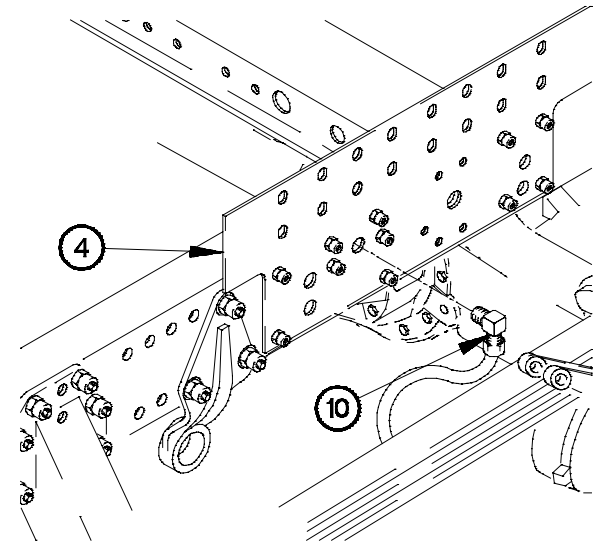
(1) Remove collar (1), bolt (2), and bracket (3) from frame plate (4). Discard collar and bolt.

(2) Remove self-locking nut (5) and ring (6) from rear channel (7). Discard self-locking nut.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(3) Remove four collars (8) and bolts (9) from rear channel (7). Discard collars and bolts.

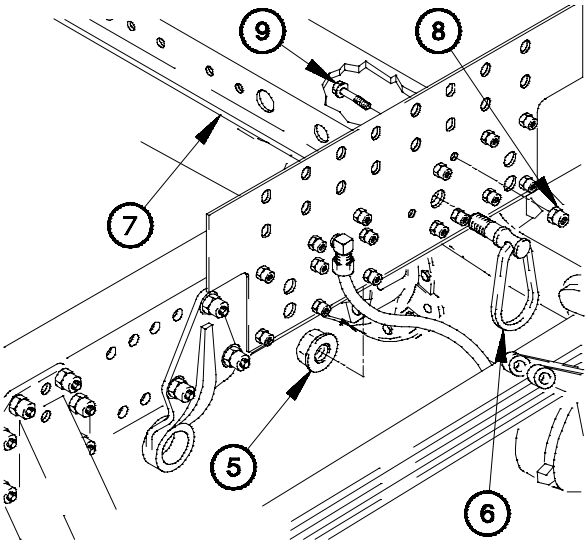


5N11C031

WARNING

Frame plate weighs approximately 50 lbs (23 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

(5) Remove 12 collars (11), bolts (12), and frame plate (4) from vehicle. Discard collars and bolts.

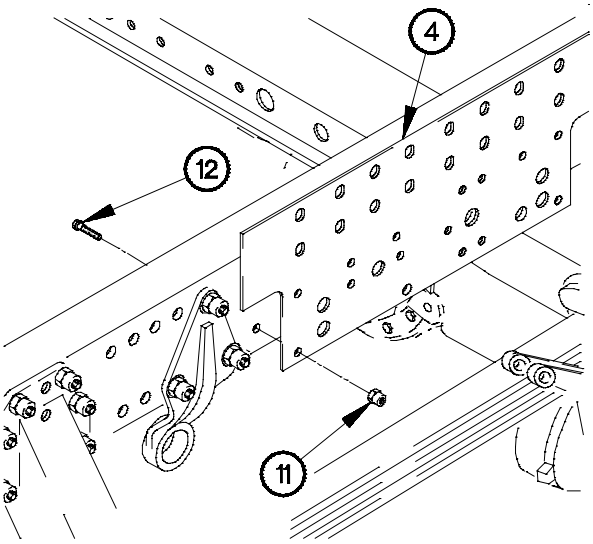


5N11C021

CAUTION

Cap or plug pneumatic hoses and connection points to prevent contamination of pneumatic system. Failure to comply may result in damage to equipment.

(4) Remove 90-degree fitting (10) from frame plate (4).



5N11C041

13-11. M1081 FRAME PLATE REPLACEMENT (CONT)

d. RH Installation.

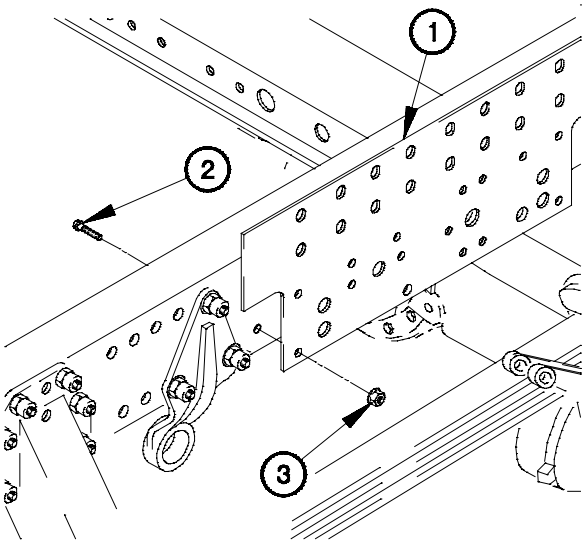
WARNING

Frame plate weighs approximately 50 lbs (23 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

NOTE

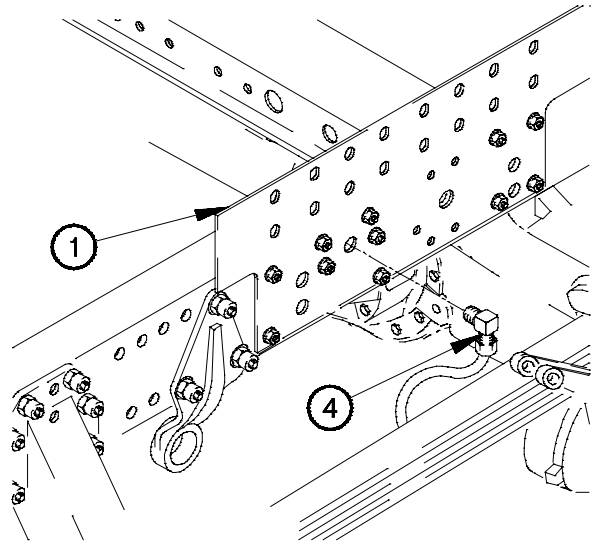
Steps (1) through (8) require the aid of an assistant.

(1) Position frame plate (1) on vehicle with 12 bolts (2) and self-locking nuts (3).



5N11D011

(2) Tighten 12 self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).



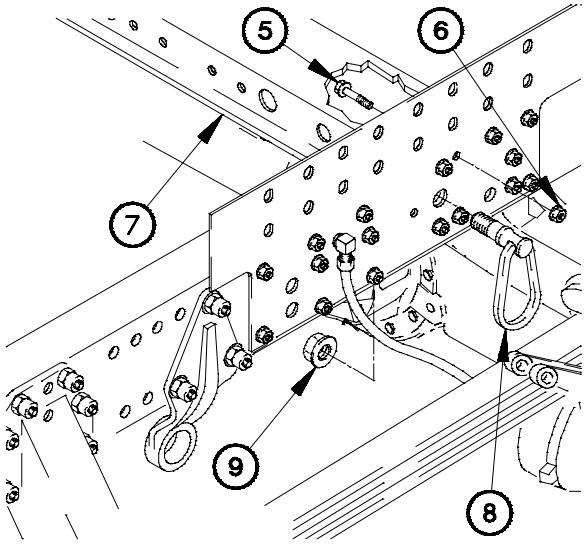
5N11D021

(3) Install 90-degree fitting (4) in frame plate (1).

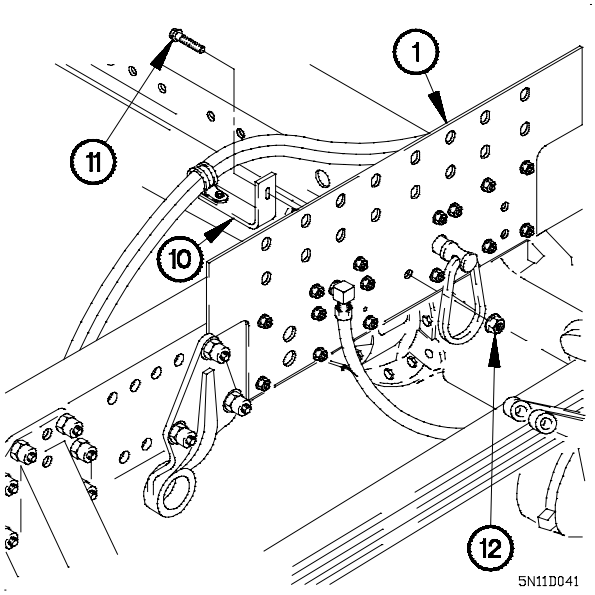
(4) Position four bolts (5) and self-locking nuts (6) in rear channel (7).

(5) Tighten four self-locking nuts (6) to 210-225 lb-ft (285-305 N·m).

(6) Install ring (8) in rear channel (7) with self-locking nut (9).



5n11d031



(7) Position bracket (10) in frame plate (1) with bolt (11) and self-locking nut (12).

(8) Tighten self-locking nut (12) to 210-225 lb-ft (285-305 N·m).

e. Follow-On Maintenance.

(1) Install parachute suspension assembly (para 13-4).

(2) Install resilient mount and mechanical stops (TM 9-2320-365-20-3).

End of Task.

13-12. FRONT LIFTING BRACKET REPLACEMENT

This task covers:

a. M1078/M1079 Removal
b. M1078/M0179 Installation
c. M1081 Removal
d. M1081 Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Intake air cleaner removed (TM 9-2320-365-20-3).
Spare tire retainer removed (TM 9-2320-365-20-3).
Radiator overflow tank removed (TM 9-2320-365-20-3).
Hydraulic reservoir removed, if equipped (TM 9-2320-365-20-4).
Fuel tank removed (TM 9-2320-365-20-3).
Engine oil fill tube removed (TM 9-2320-365-20-2).
Transmission oil fill tube removed (M1078/M1079) (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Sling, Cargo (2) (Item 48, Appendix B)
Socket Set, Impact (Item 50, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)

Materials/Parts
Nut, Self-locking (4) (Item 135, Appendix F)
Nut, Self-locking (16) (Item 134, Appendix F) (M1078/M1079)
Nut, Self-locking (20) (Item 134, Appendix F) (M1081)
Bolt (16) (Item 12, Appendix F) (M1078/M1079)
Bolt (20) (Item 12, Appendix F) (M1081)
Washer, Spring Tension (8) (Item 304, Appendix F)

Personnel Required
(3)

a. M1078/M1079 Removal.

WARNING

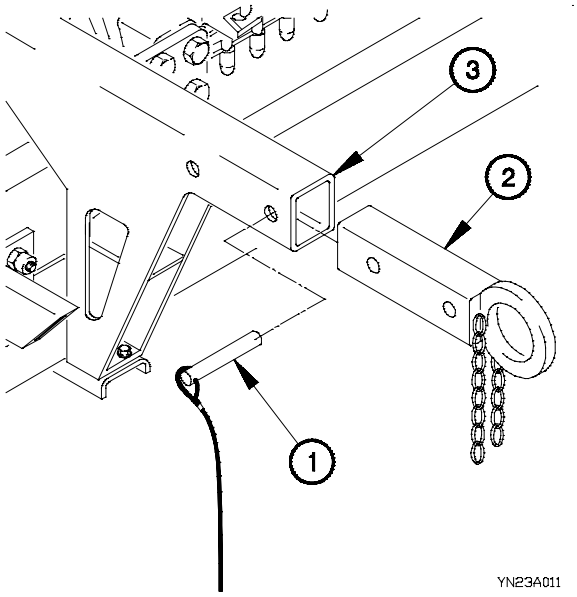
Lifting beam weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

- Left and right side lifting beams are removed the same way. Right side shown.
- Step (3) requires the aid of an assistant.

(1) Remove two pins (1) and lifting beam (2) from front lifting bracket (3).

(2) Perform step (1) on left side lifting beam.



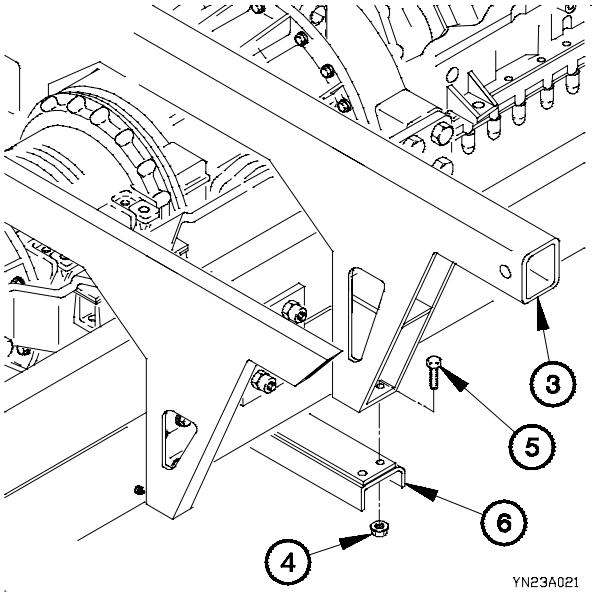
WARNING

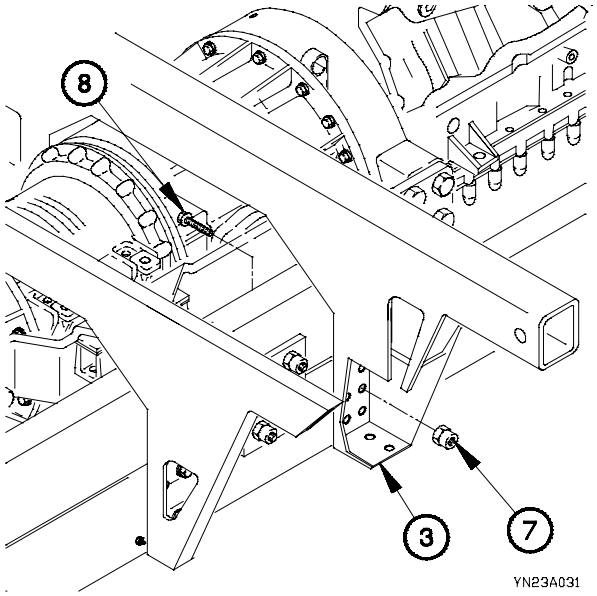
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE

Steps (3) through (6) require the aid of an assistant.

(3) Remove four self-locking nuts (4), bolts (5), and lower front lifting bracket support crossmember (6) from front lifting bracket (3). Discard self-locking nuts.





CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

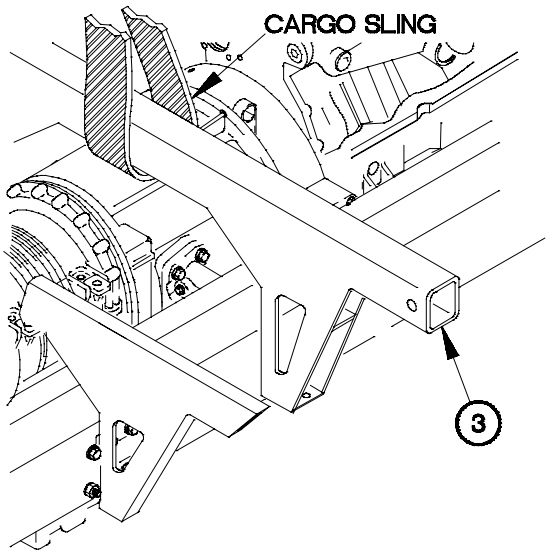
Left and right side of front lifting bracket assembly is removed the same way. Right side shown.

(4) Remove six collars (7) and bolts (8) from front lifting bracket (3). Discard collars and bolts.

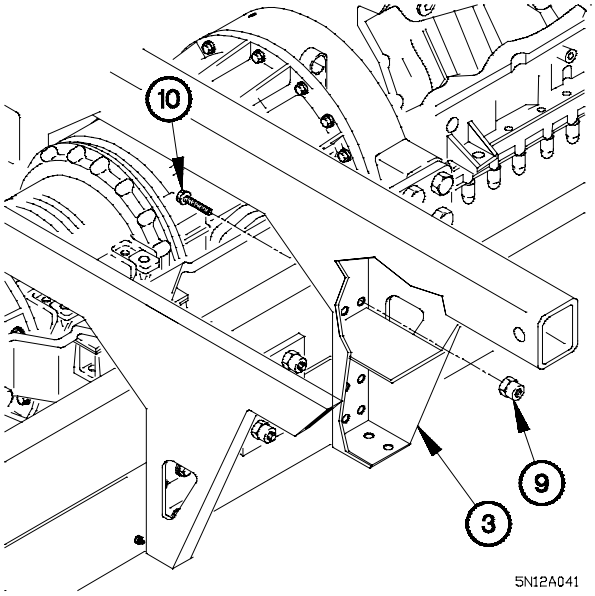
13-12. FRONT LIFTING BRACKET REPLACEMENT (CONT)

(5) Remove two collars (9) and bolts (10) from front lifting bracket (3). Discard collars and bolts.

(6) Perform steps (4) and (5) on left side of front lifting bracket.



YN23A051



5N12A041

WARNING

Front lifting bracket assembly weighs approximately 300 lbs (136 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (7) requires the aid of two assistants.

(7) Remove front lifting bracket (3) from vehicle.

b. M1078/M1079 Installation

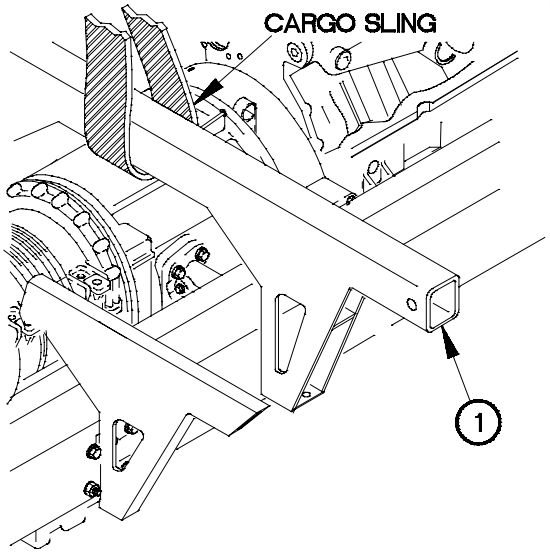
WARNING

Front lifting bracket assembly weighs approximately 300 lbs (136 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of two assistants.

(1) Position front lifting bracket (1) on vehicle.

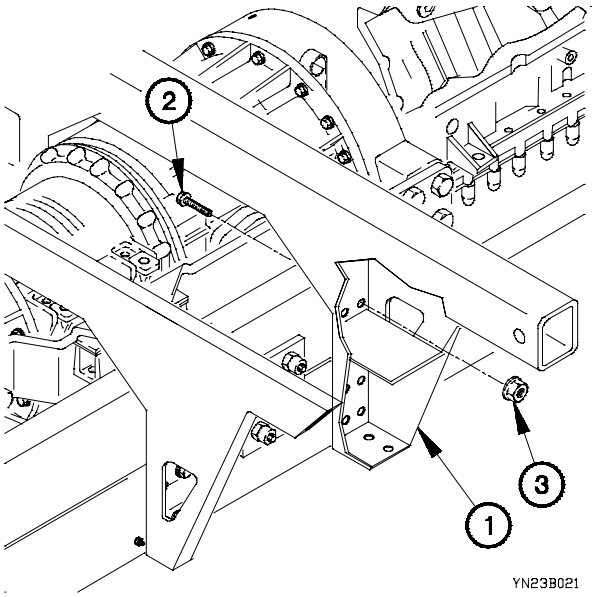


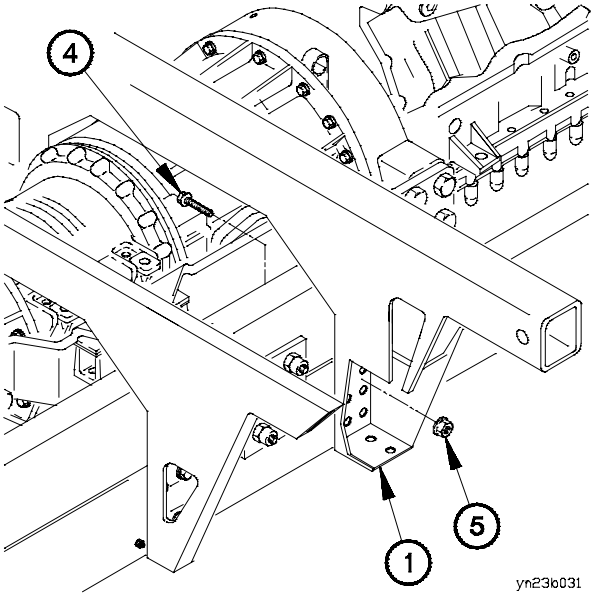
YN23B011

NOTE

- Steps (2) through (9) require the aid of an assistant.
- Left and right side of front lifting bracket assembly is installed the same way. Right side shown.

(2) Position two bolts (2) in front lifting bracket (1) with two self-locking nuts (3).





(3) Position six bolts (4) in front lifting bracket (1) with six self-locking nuts (5).

(4) Tighten six self-locking nuts (5) to 210-225 lb-ft (285-305 N·m).

(5) Tighten two self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).

(6) Perform steps (2) through (5) on left side of front lifting bracket.

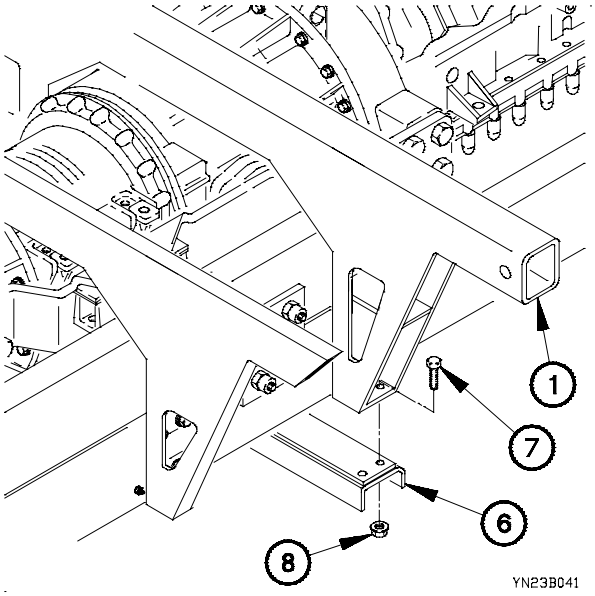
13-12. FRONT LIFTING BRACKET REPLACEMENT (CONT)

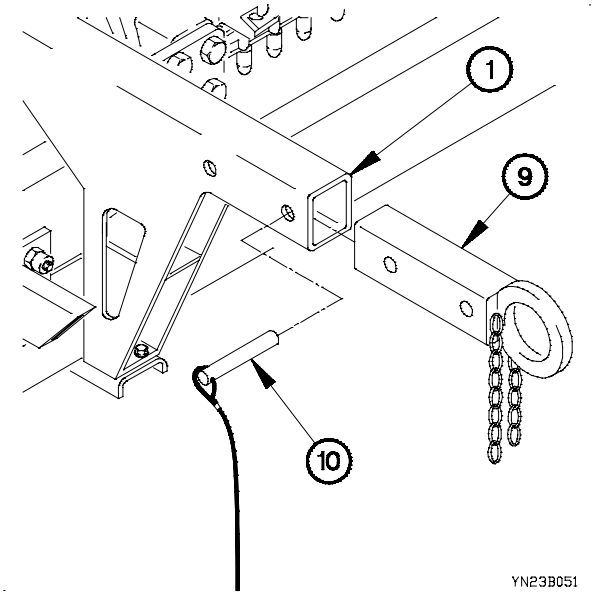
WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

(7) Position lower front lifting bracket support crossmember (6) on front lifting bracket (1) with four bolts (7) and self-locking nuts (8).

(8) Tighten four self-locking nuts (8) to 117-131 lb-ft (159-178 N·m).





WARNING

Lifting beam weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Left and right side lifting beams are installed the same way. Right side shown.

(9) Position lifting beam (9) in front lifting bracket (1) with two pins (10).

(10) Perform step (9) on left side lifting beam.

c. M1081 Removal.

WARNING

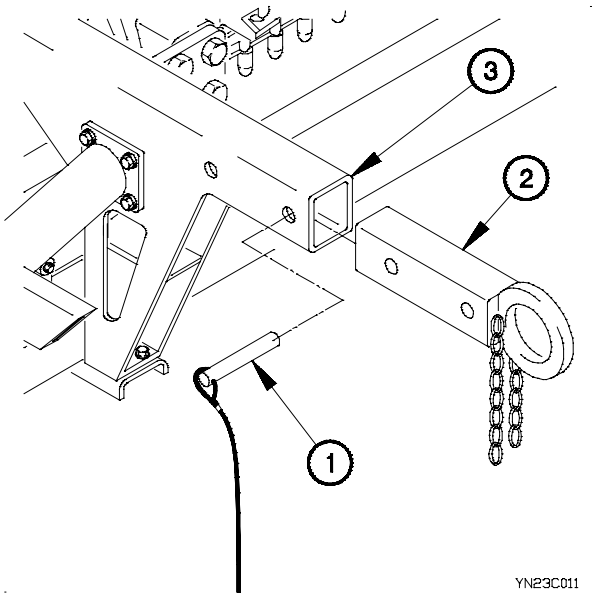
Lifting beam weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

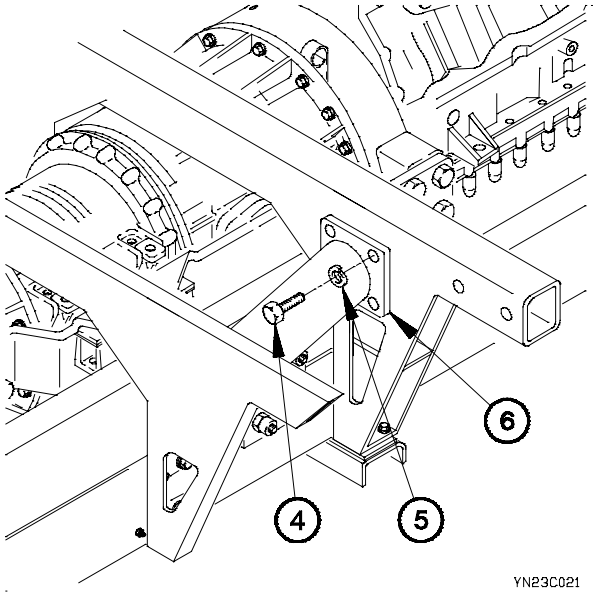
NOTE

- Left and right lifting beams are removed the same way. Right side shown.
- Step (1) requires the aid of an assistant.

(1) Remove two pins (1) and lifting beam (2) from front lifting bracket (3).

(2) Perform step (1) on left side lifting beam.





NOTE

Left and right side crossmembers are removed from front lifting bracket the same way. Right side shown.

(3) Remove four screws (4) and lockwashers (5) from crossmember (6). Discard lockwashers.

(4) Perform step (3) on left side crossmember.

13-12. FRONT LIFTING BRACKET REPLACEMENT (CONT)

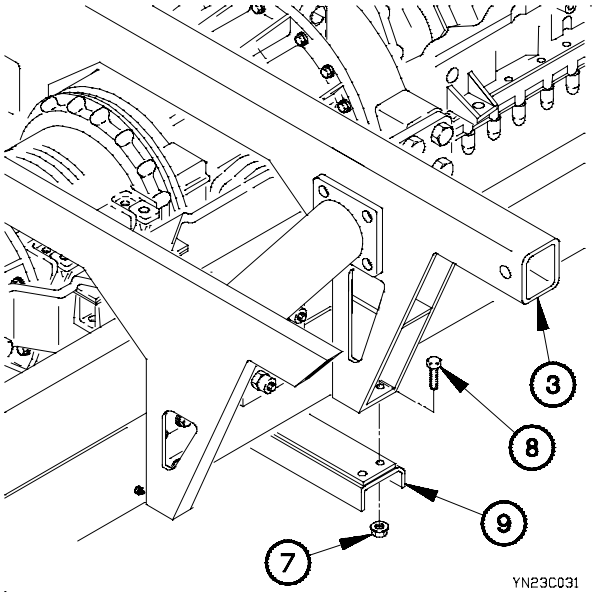
WARNING

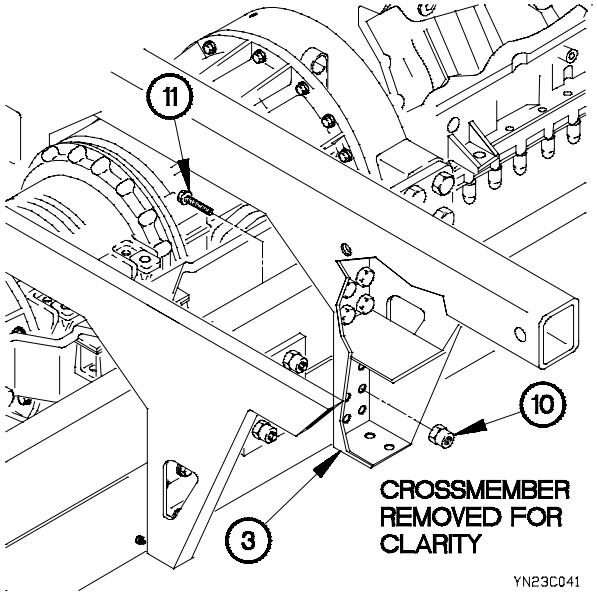
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE

Steps (5) through (8) require the aid of an assistant.

(5) Remove four self-locking nuts (7), bolts (8), and lower front lifting bracket support crossmember (9) from front lifting bracket (3). Discard self-locking nuts.





CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

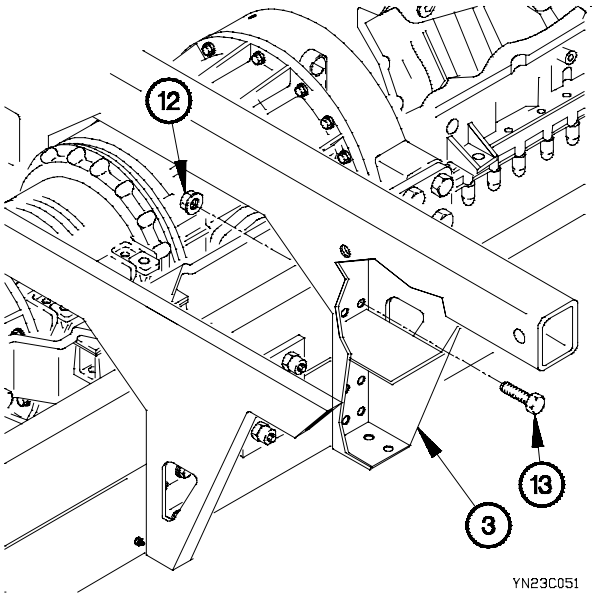
NOTE

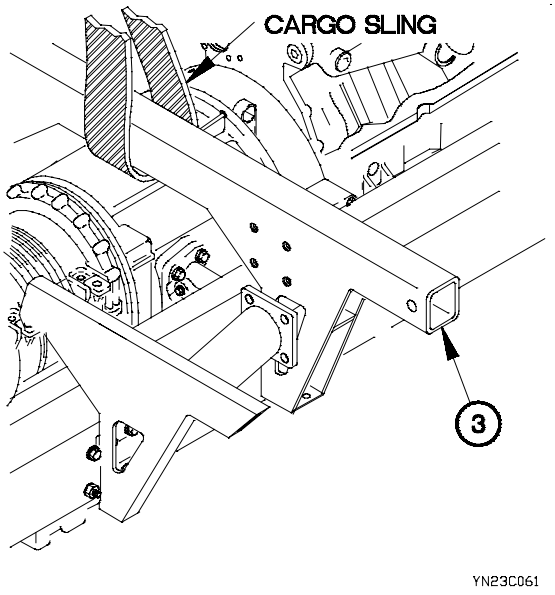
Left and right sides of front lifting bracket are removed the same way. Right side shown.

(6) Remove six collars (10) and bolts (11) from front lifting bracket (3). Discard collars and bolts.

(7) Remove four collars (12) and bolts (13) from front lifting bracket (3). Discard collars and bolts.

(8) Perform steps (6) and (7) on left side of front lifting bracket.





WARNING

Front lifting bracket assembly weighs approximately 300 lbs (136 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (9) requires the aid of two assistants.

(9) Remove front lifting bracket (3) from vehicle.

13-12. FRONT LIFTING BRACKET REPLACEMENT (CONT)

d. M1081 Installation.

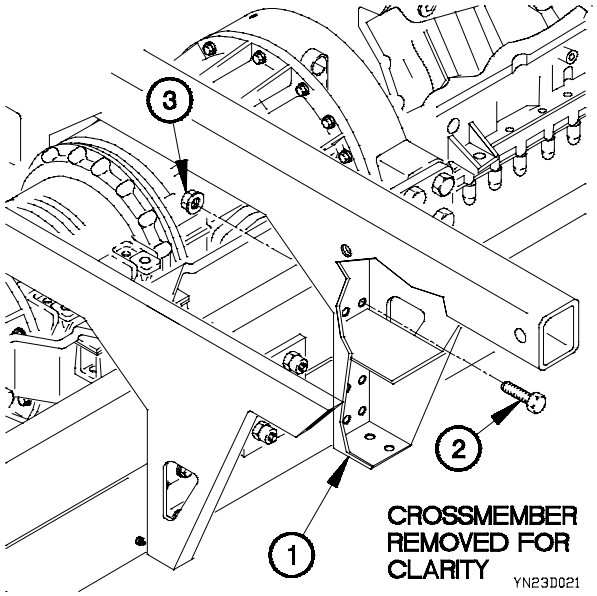
WARNING

Front lifting bracket weighs approximately 300 lbs (136 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of two assistants.

(1) Position front lifting bracket (1) on vehicle.

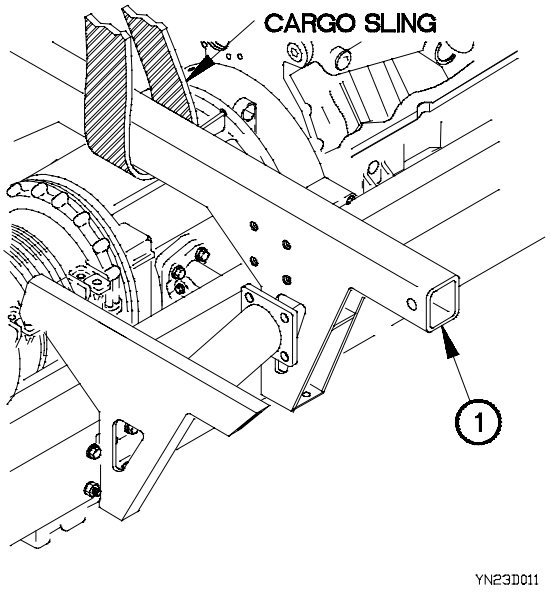


(3) Position six bolts (4) in front lifting bracket (1) with six self-locking nuts (5).

(4) Tighten six self-locking nuts (5) to 210-225 lb-ft (285-305 N·m).

(5) Tighten four self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).

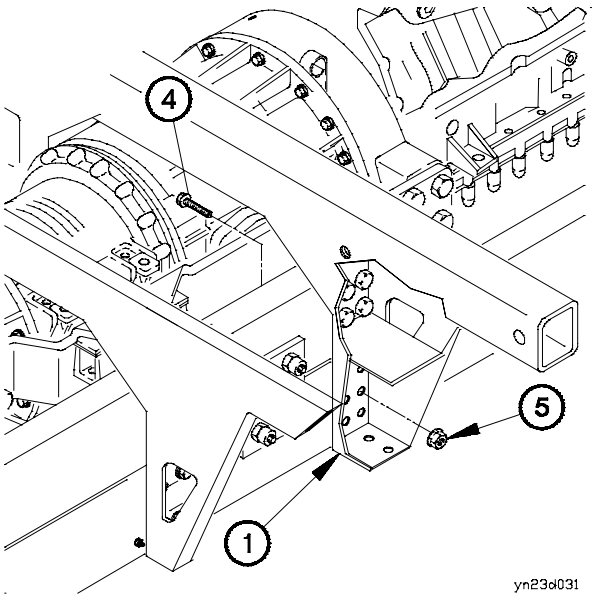
(6) Perform steps (2) through (5) on left side of front lifting bracket.



NOTE

- Left and right sides of front lifting bracket are installed the same way. Right side shown.
- Steps (2) through (11) requires the aid of an assistant.

(2) Position four bolts (2) in front lifting bracket (1) with four self-locking nuts (3).

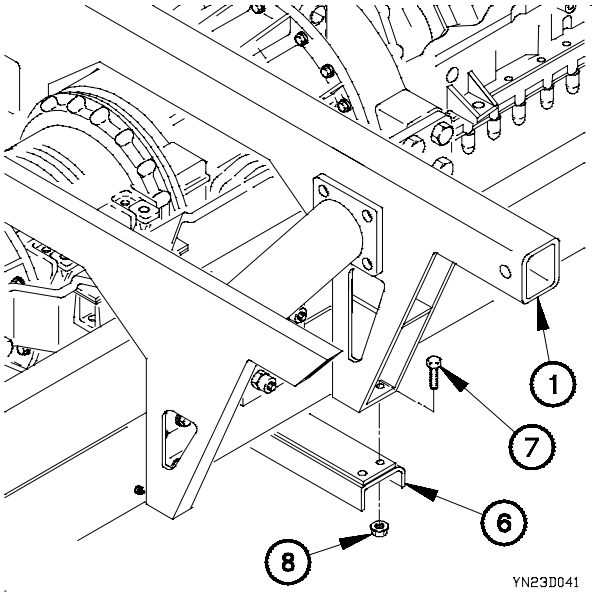


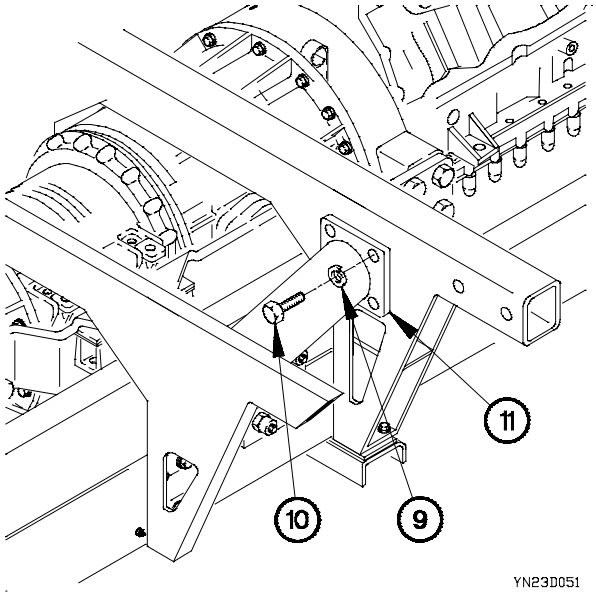
WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

(7) Position lower front lifting bracket support crossmember (6) on front lifting bracket (1) with four screws (7) and self-locking nut (8).

(8) Tighten four self-locking nuts (8) to 117-131 lb-ft (259-178 N·m).





NOTE

Left and right side crossmembers are installed on front lifting bracket the same way. Right side shown.

(9) Position four lockwashers (9) and screws (10) in crossmember (11).

(10) Tighten four screws (10) to 48-58 lb-ft (65-79 N·m).

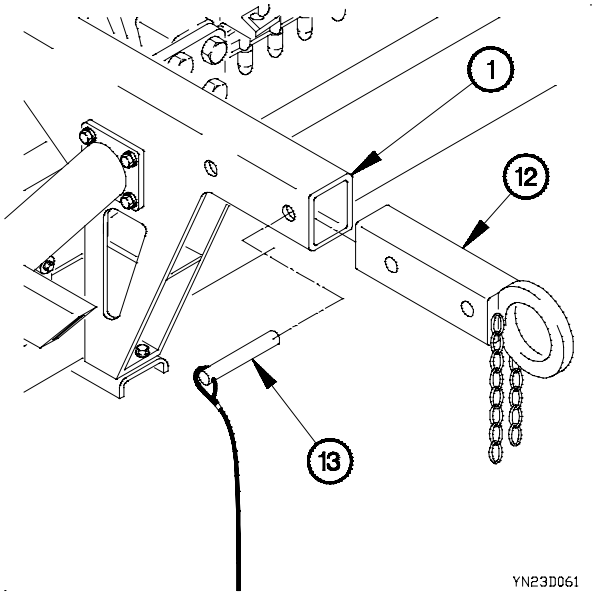
13-12. FRONT LIFTING BRACKET REPLACEMENT (CONT)

WARNING

Lifting beam weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Left and right side lifting beams are installed the same way. Right side shown.



(11) Position lifting beam (12) in front lifting bracket (1) with two pins (13).

(12) Perform step (11) on left side lifting beam.

e. Follow-On Maintenance.

(1) Install transmission oil fill tube (M1078/M1079) (TM 9-2320-365-20-3).

(2) Install engine oil fill tube (TM 9-2320-365-20-2).

(3) Install fuel tank (TM 9-2320-365-20-3).

(4) Install hydraulic reservoir, if equipped (TM 9-2320-365-20-4).

(5) Install radiator overflow tank (TM 9-2320-365-20-3).

(6) Install spare tire retainer (TM 9-2320-365-20-3).

(7) Install intake air cleaner (TM 9-2320-365-20-3).

End of Task.

13-13. FRAME RAIL REPLACEMENT

This task covers:

a. LH Removal
b. LH Installation
c. RH Removal
d. RH Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Gravel deflector and gravel deflector extension removed (TM 9-2320-365-20-3).
Headlight and headlight housing removed (TM 9-2320-365-20-3).
Start and charging cable assembly removed (TM 9-2320-365-20-3).
Power Takeoff (PTO) cable assembly removed, if equipped (TM 9-2320-365-20-3).
Cab front support removed (para 15-3).
Transmission assembly removed (para 7-4).
Engine assembly removed (para 3-3).
Subframe removed (para 13-14 or 13-15).
Front angle brackets removed (para 13-3).
Front spring brackets removed (para 14-5).
Front shock absorber brackets removed (para 14-6).
Shock mount crossmember removed (para 13-7).
M1081 Frame plate removed (para 13-11).
Fuel tank and brackets removed (TM 9-2320-365-20-3).
Cab to chassis ground strap removed (TM 9-2320-365-20-3).
Battery box removed (TM 9-2320-365-20-3).
Air dryer removed (TM 9-2320-365-20-5).
Transmission resilient mount and bracket removed (para 7-6).
Engine front resilient mount and mounting bracket removed (para 3-4).
Radiator/charge air cooler removed (TM 9-2320-365-20-3).
Air spring and bracket removed (TM 9-2320-365-20-4).
Suspension cylinder removed (para 17-2).
Alternator ground strap removed (TM 9-2320-365-20-3).
M1081 angle brackets removed (para 13-10).
11K Self-Recovery Winch (SRW) rear cable pulleys removed, if equipped (TM 9-2320-365-20-4).
Power steering pump reservoir and bracket removed (TM 9-2320-365-20-3).

Equipment Conditions (Cont)

11K Self-Recovery Winch (SRW) hoses removed, if equipped (TM 9-2320-365-20-4).
Central Tire Inflation System (CTIS) hoses and fittings removed (TM 9-2320-365-20-3).
Power steering hoses and tubes removed (TM 9-2320-365-20-3).
Steering gear removed (para 12-2).
11K Self-Recovery Winch (SRW) control valve assembly and brackets removed, if equipped (TM 9-2320-365-20-4).
Rear cab support assembly removed (TM 9-2320-365-20-4).
Frame muffler support bracket removed (para 13-18).
Radiator overflow tank removed (TM 9-2320-365-20-3).
Spare tire retainer removed (TM 9-2320-365-20-3).
Air cleaner removed (TM 9-2320-365-20-3).
Radiator brackets removed (para 13-19).
Engine and transmission oil sampling valves removed (TM 9-2320-365-20-2).
Rear lights cable assembly removed (TM 9-2320-365-20-3).
Tailpipe removed (TM 9-2320-365-20-3).

Tools and Special Tools

Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Sling, Cargo (2) (Item 48, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Socket Set, Socket Wrench (Item 51, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

13-13. FRAME RAIL REPLACEMENT

INITIAL SETUP (CONT)

Materials/Parts
- Nut, Self-locking (2) (Item 132, Appendix F) (LH side)
- Nut, Self-locking (11) (Item 145, Appendix F) (LH side)
- Nut, Self-locking (8) (Item 145, Appendix F) (RH side)
- Nut, Self-locking (2) (Item 126, Appendix F)
- Bolt (4) (Item 5, Appendix F) (M1081)
- Bolt (7) (Item 5, Appendix F) (M1078/M1079)
- Bolt (10) (Item 14, Appendix F) (M1081)
- Bolt (16) (Item 14, Appendix F) (M1078/M1079)

Materials/Parts (Cont)
- Bolt (2) (Item 15, Appendix F)
- Bolt (2) (Item 13, Appendix F)
- Nut, Self-locking (24) (Item 134, Appendix F) (M1081)
- Nut, Self-locking (33) (Item 134, Appendix F) (M1078/M1079)
- Bolt (6) (Item 12, Appendix F)

Personnel Required
(2)

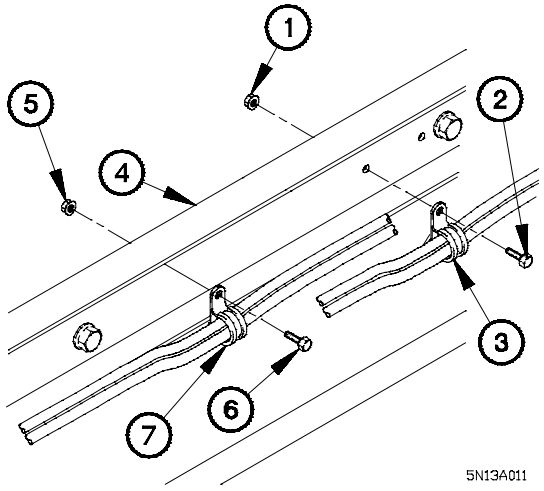
WARNING

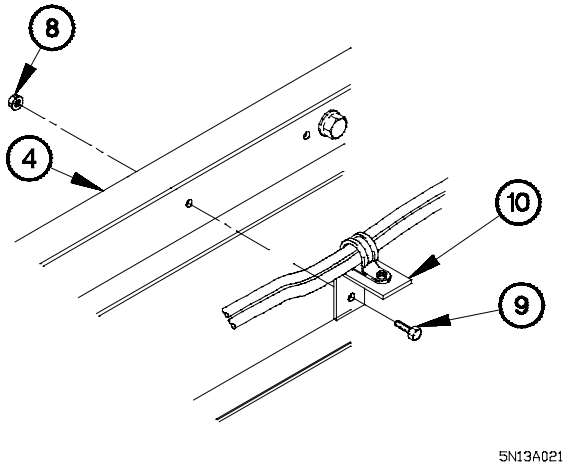
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. LH Removal.

(1) Remove eight self-locking nuts (1), bolts (2), and clamps (3) from frame rail (4). Discard self-locking nuts.

(2) Remove self-locking nut (5), bolt (6), and clamp (7) from frame rail (4). Discard self-locking nut.



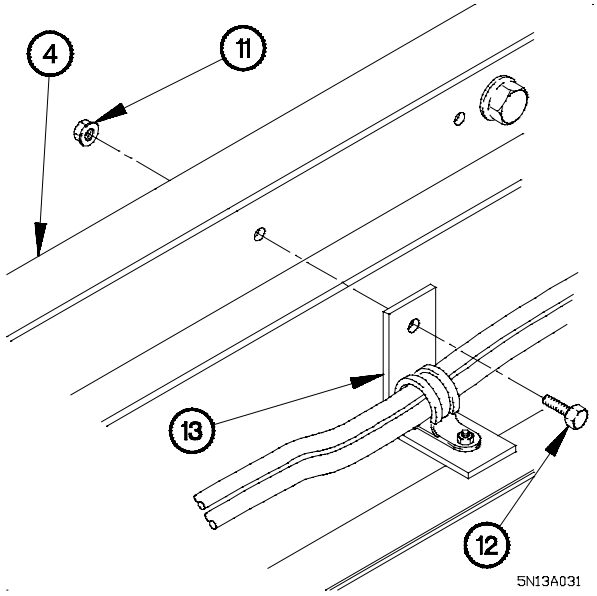


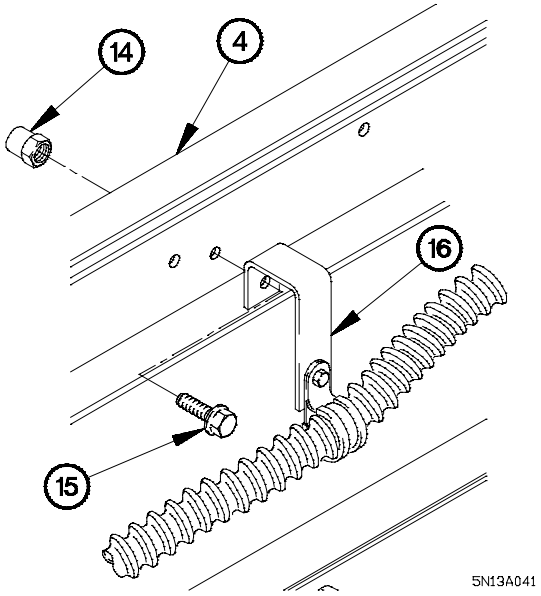
(3) Remove two self-locking nuts (8), bolts (9), and brackets (10) from frame rail (4). Discard self-locking nuts.

NOTE

Perform step (4) on M1078/M1079.

(4) Remove two self-locking nuts (11), bolts (12), and brackets (13) from frame rail (4). Discard self-locking nuts.





CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

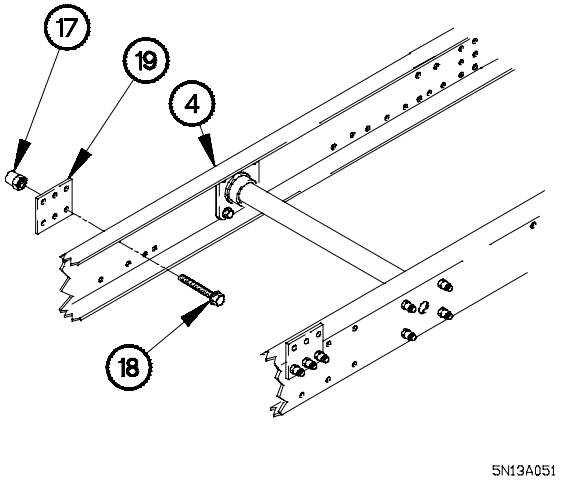
Steps (5) through (13) require the aid of an assistant.

(5) Remove two collars (14), bolts (15), and brackets (16) from frame rail (4). Discard collar and bolt.

NOTE

Perform step (6) on M1078/M1079.

(6) Remove six collars (17), bolts (18), and two frame plates (19) from frame rail (4). Discard collars and bolts.



13-13. FRAME RAIL REPLACEMENT (CONT)

CAUTION

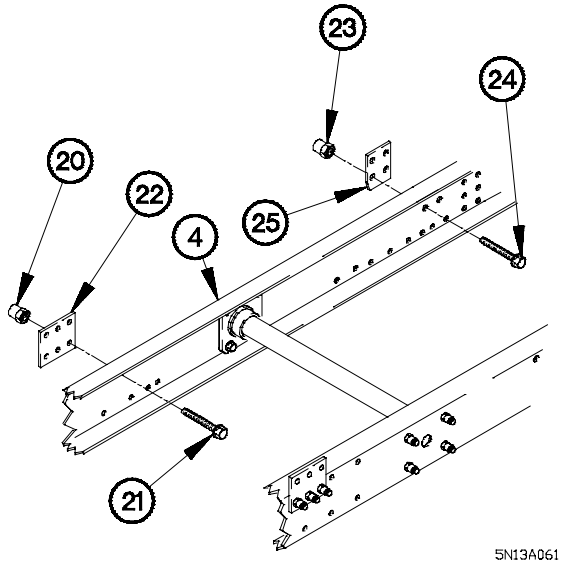
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

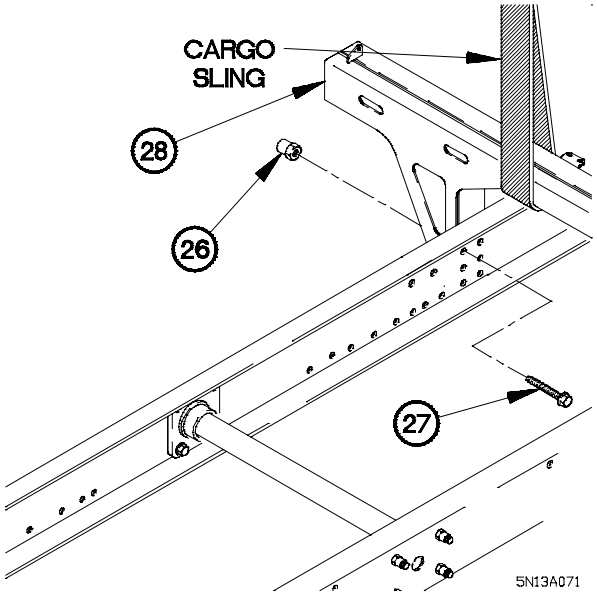
NOTE

Perform step (7) on M1081.

(7) Remove three collars (20), bolts (21), and frame plate (22) from frame rail (4). Discard collars and bolts.

(8) Remove collar (23), bolt (24), and frame plate (25) from frame rail (4). Discard collar and bolt.





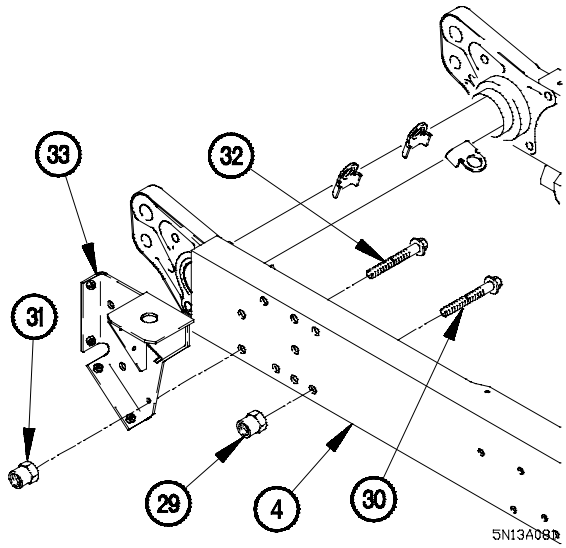
CAUTION

Attach sling prior to removal of bolts and collars. Failure to comply may result in damage to equipment.

(9) Remove six collars (26) and bolts (27) from front lifting bracket (28). Discard collars and bolts.

(10) Remove four collars (29) and bolts (30) from frame rail (4). Discard collars and bolts.

(11) Remove two collars (31), bolts (32), and front bracket (33) from frame rail (4). Discard collars and bolts.



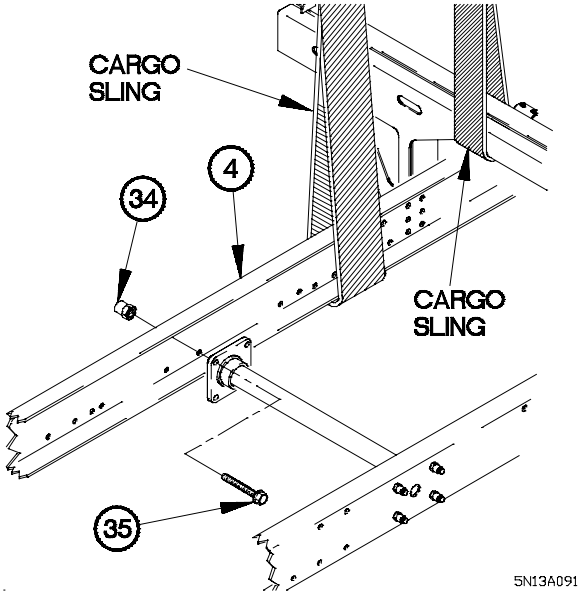
WARNING

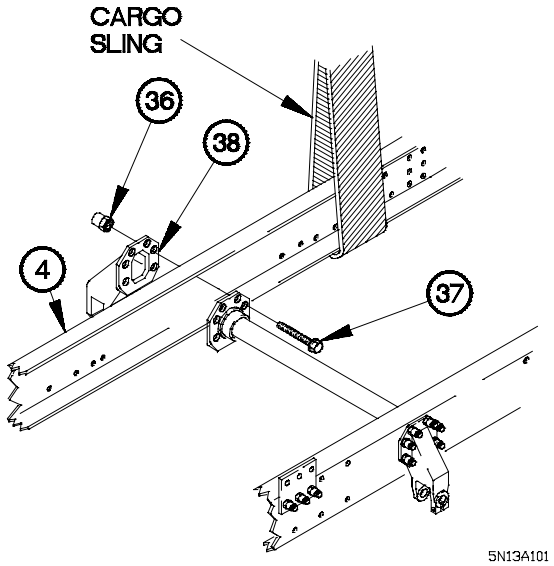
Frame rail weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(12) Remove two collars (34) and bolts (35) from frame rail (4). Discard collars and bolts.





(13) Remove six collars (36), bolts (37), spring support (38), and frame rail (4) from vehicle. Discard collars and bolts.

13-13. FRAME RAIL REPLACEMENT (CONT)

b. LH Installation.

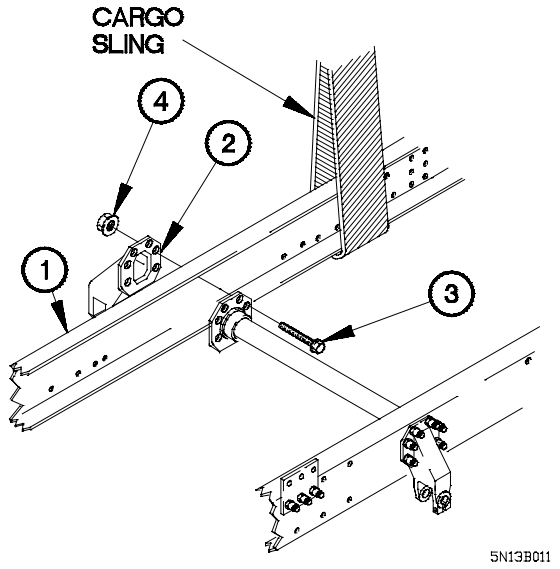
WARNING

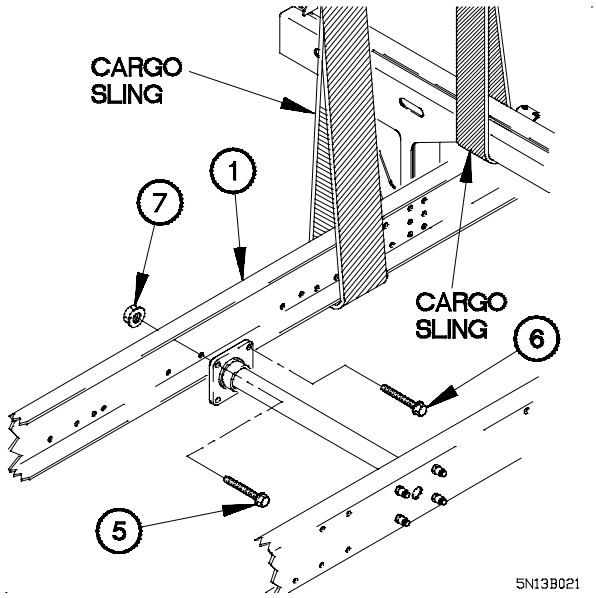
Frame rail weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

NOTE

Steps (1) through (14) require the aid of an assistant.

(1) Position frame rail (1) and spring support (2) on vehicle with six bolts (3) and self-locking nuts (4).



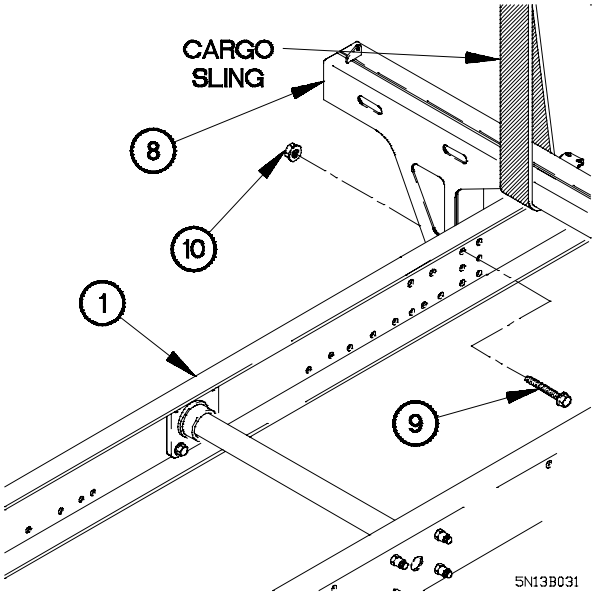


(2) Position two bolts (5 and 6) in frame rail (1).

(3) Position two self-locking nuts (7) on bolts (5).

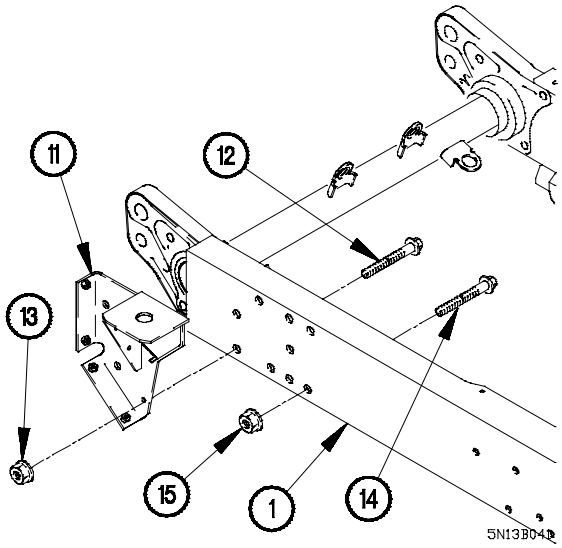
(4) Remove two bolts (6) from frame rail (1).

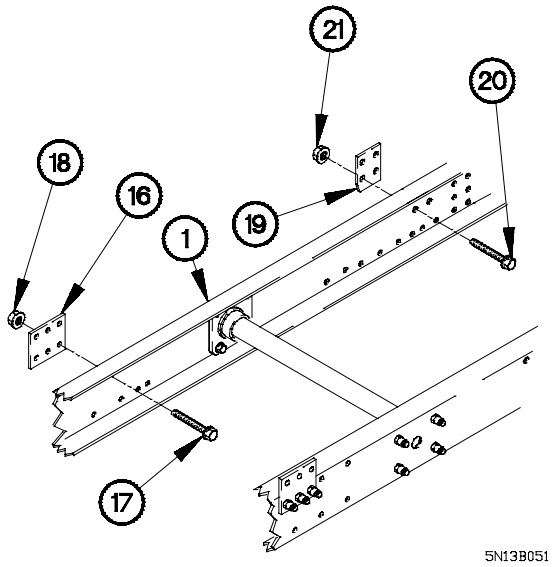
(5) Position front lifting bracket (8) on frame rail (1) with six bolts (9) and self-locking nuts (10).



(6) Position front bracket (11) on frame rail (1) with two bolts (12) and self-locking nuts (13).

(7) Position four bolts (14) and self-locking nuts (15) in frame rail (1).





NOTE

Perform steps (8) and (9) on M1081.

(8) Position frame plate (16) on frame rail (1) with three bolts (17) and self-locking nuts (18).

(9) Tighten three self-locking nuts (18) to 210-225 lb-ft (285-305 N·m).

(10) Position frame plate (19) on frame rail (1) with bolt (20) and self-locking nut (21).

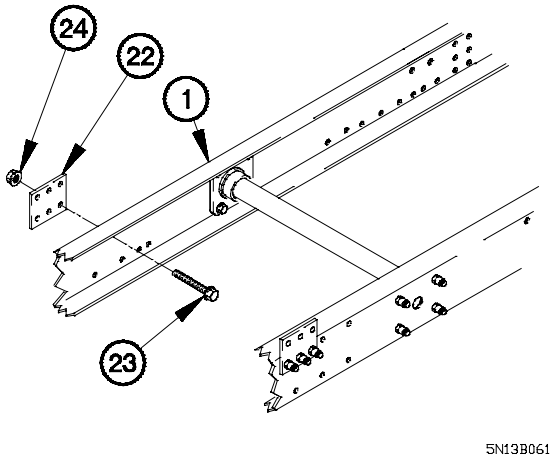
(11) Tighten self-locking nut (21) to 210-225 lb-ft (285-305 N·m).

NOTE

Perform steps (12) and (13) on M1078/M1079.

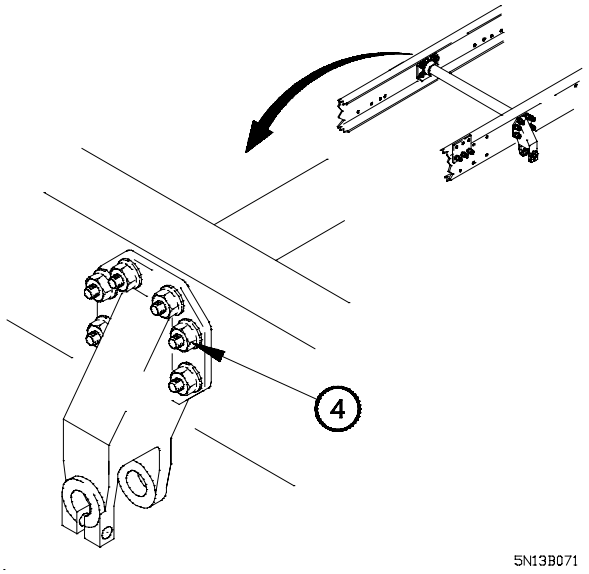
(12) Position two frame plates (22) on frame rail (1) with six bolts (23) and self-locking nuts (24).

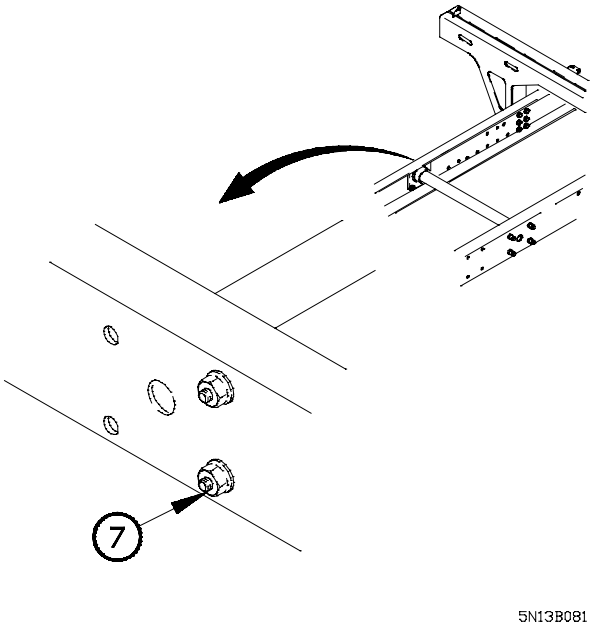
(13) Tighten six self-locking nuts (24) to 210-225 lb-ft (285-305 N·m).



13-13. FRAME RAIL REPLACEMENT (CONT)

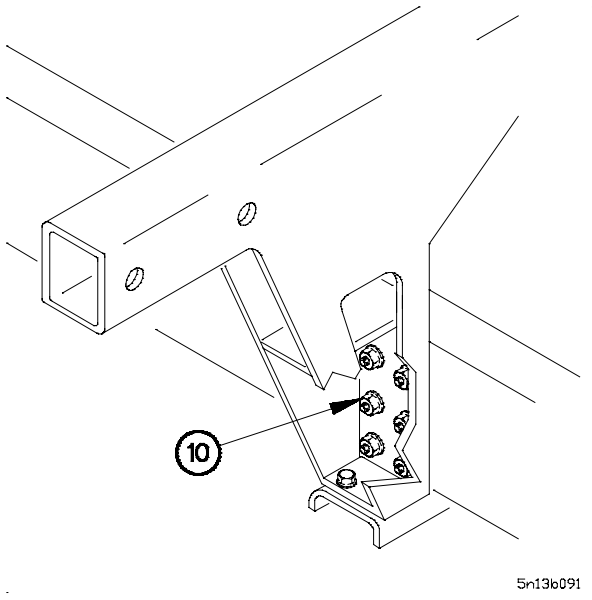
(14) Tighten six self-locking nuts (4) to 210-225 lb-ft (285-305 N·m).



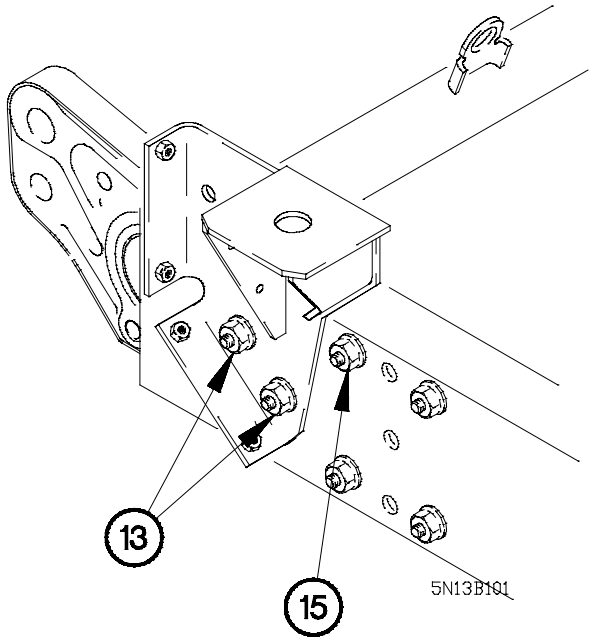


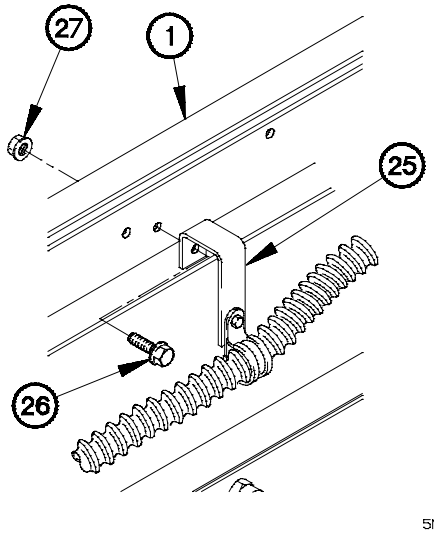
(15) Tighten two self-locking nuts (7) to 210-225 lb-ft (285-305 N·m).

(16) Tighten six self-locking nuts (10) to 210-225 lb-ft (285-305 N·m).



(17) Tighten two self-locking nuts (13) and four self-locking nuts (15) to 210-225 lb-ft (285-305 N·m).



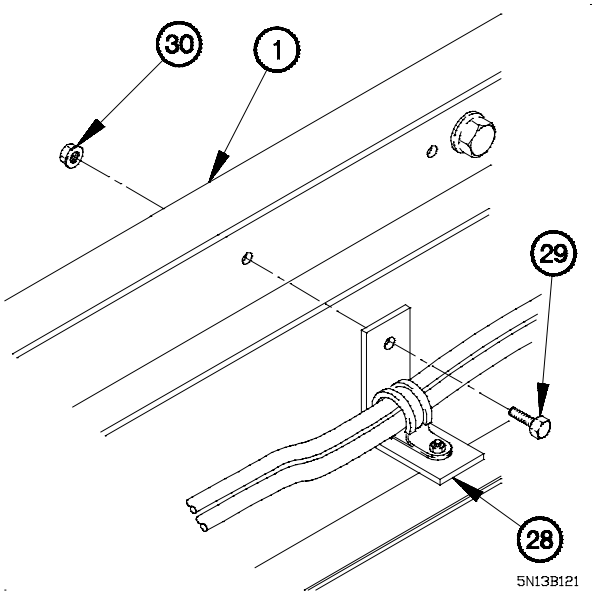


(18) Position bracket (25) on frame rail (1) with bolt (26) and self-locking nut (27).

(19) Tighten self-locking nut (27) to 77-92 lb-ft (105-125 N·m).

(20) Position two brackets (28) on frame rail (1) with two bolts (29) and self-locking nuts (30).

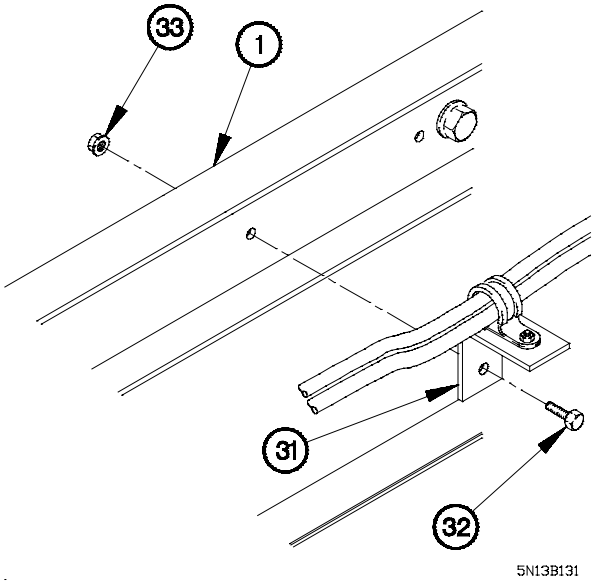
(21) Tighten two self-locking nuts (30) to 210-225 lb-ft (285-305 N·m).

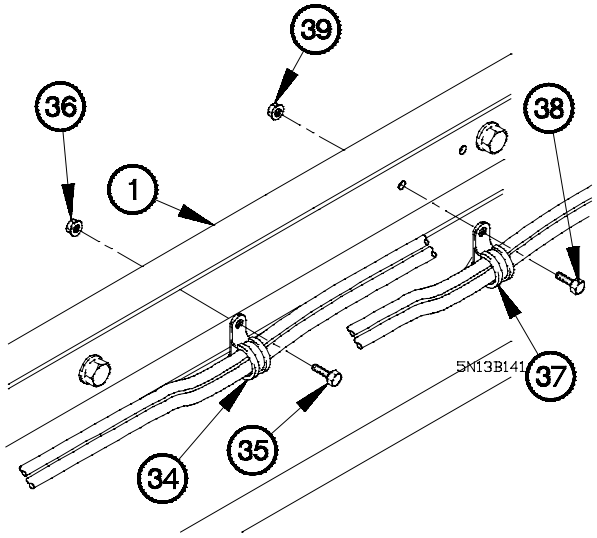


13-13. FRAME RAIL REPLACEMENT (CONT)

(22) Position two brackets (31) on frame rail (1) with two bolts (32) and self-locking nuts (33).

(23) Tighten two self-locking nuts (33) to 210-225 lb-ft (285-305 N·m).





(24) Position clamp (34) on frame rail (1) with bolt (35) and self-locking nut (36).

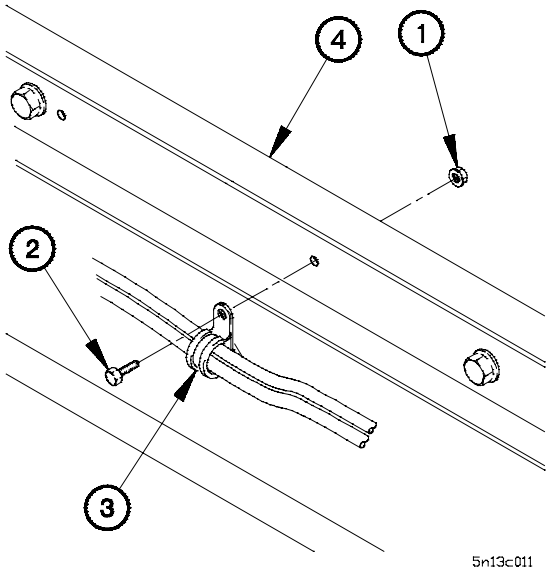
(25) Tighten self-locking nut (36) to 84-108 lb-in. (10-12 N·m).

(26) Position seven clamps (37) on frame rail (1) with seven bolts (38) and self-locking nuts (39).

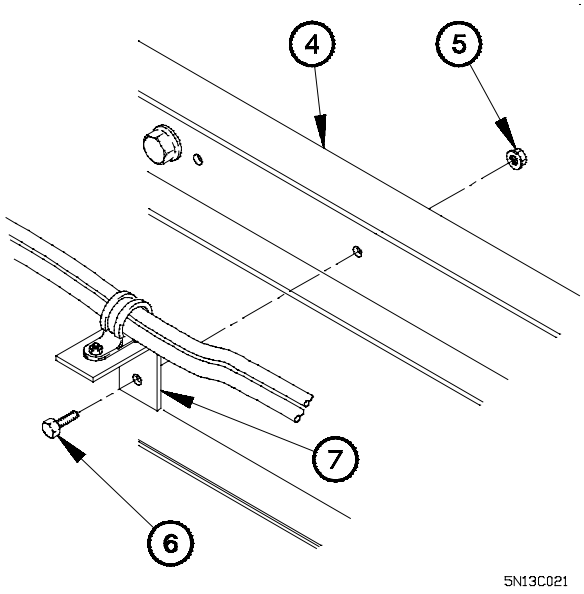
(27) Tighten seven self-locking nuts (39) to 84-108 lb-in. (10-12 N·m).

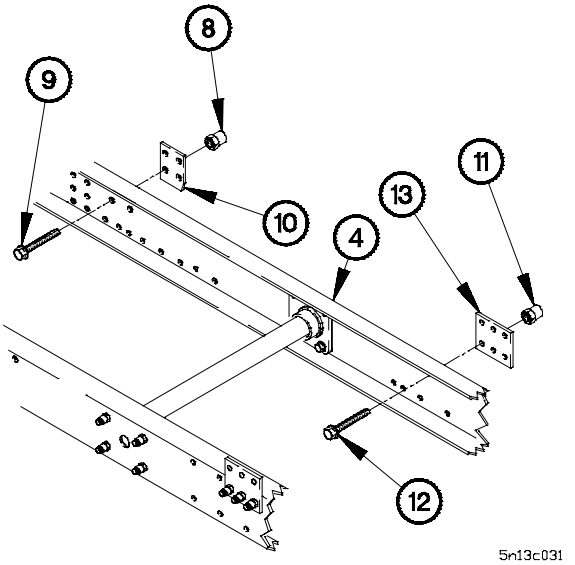
c. RH Removal.

(1) Remove five self-locking nuts (1), bolts (2), and clamps (3) from frame rail (4). Discard self-locking nuts.



(2) Remove self-locking nut (5), bolt (6), and bracket (7) from frame rail (4). Discard self-locking nut.





CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

Steps (3) through (10) require the aid of an assistant.

(3) Remove collar (8), bolt (9), and frame plate (10) from frame rail (4). Discard collar and bolt.

NOTE

Perform step (5) on M1078/M1079.

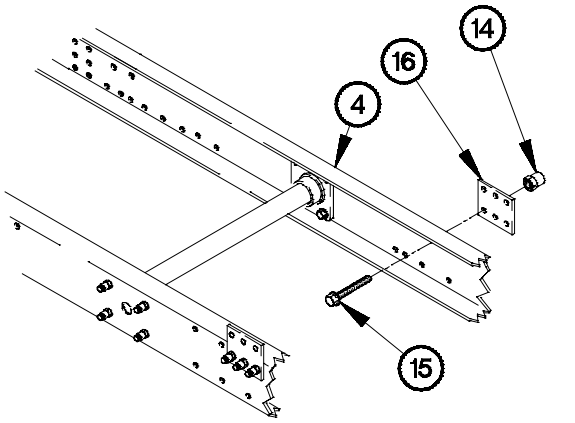
(4) Remove six collars (11), bolts (12), and two frame plates (13) from frame rail (4). Discard collars and bolts.

13-13. FRAME RAIL REPLACEMENT (CONT)

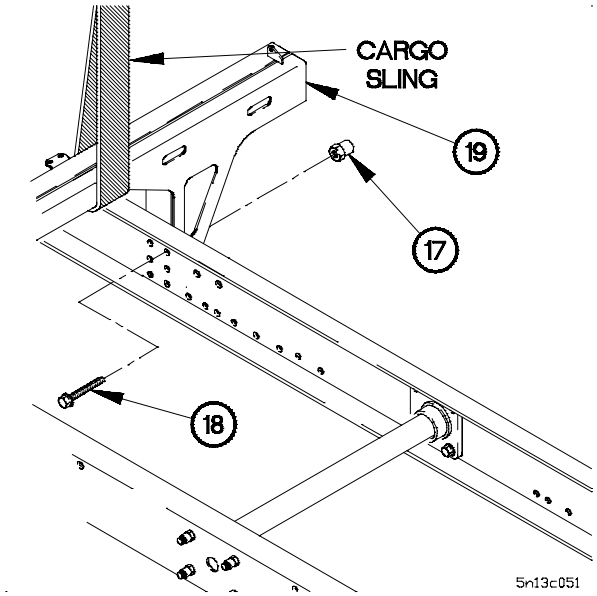
NOTE

Perform step (5) on M1081.

(5) Remove three collars (14), bolts (15), and frame plate (16) from frame rail (4). Discard collars and bolts.



5n13c041



5n13c051

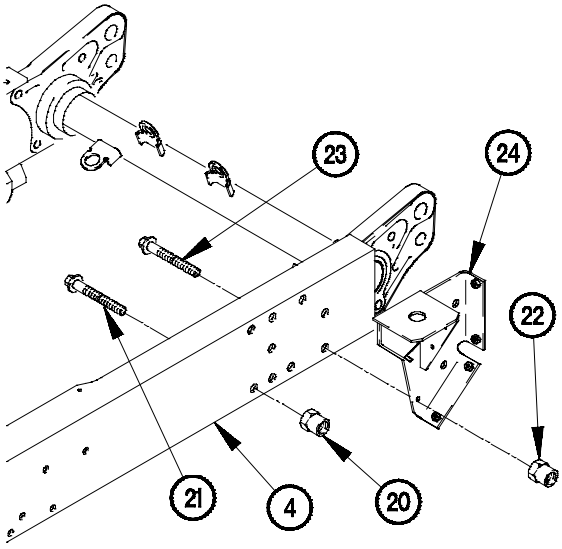
CAUTION

Attach sling prior to removal of bolts and collars. Failure to comply may result in damage to equipment.

(6) Remove six collars (17) and bolts (18) from front lifting bracket (19). Discard collars and bolts.

(7) Remove four collars (20) and bolts (21) from frame rail (4). Discard collars and bolts.

(8) Remove two collars (22), bolts (23), and front bracket (24) from frame rail (4). Discard collars and bolts.



5n13c061

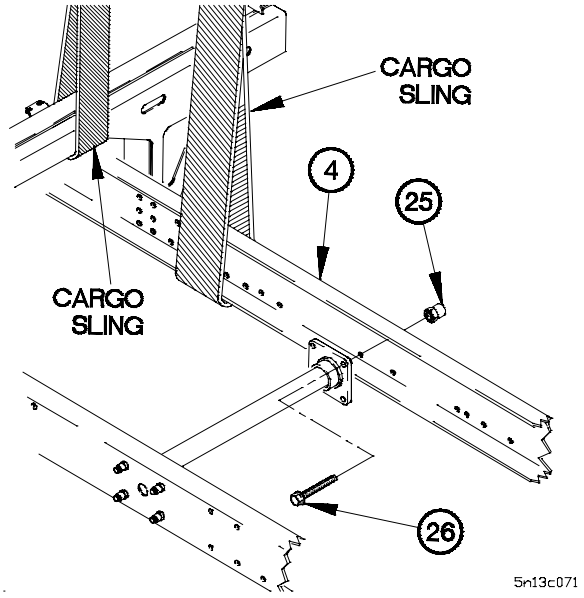
WARNING

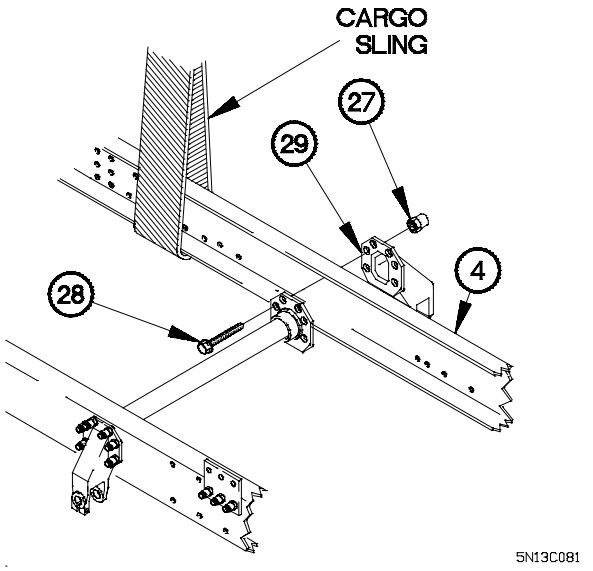
Frame rail weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(9) Remove four collars (25) and bolts (26) from frame rail (4). Discard collars and bolts.





(10) Remove six collars (27), bolts (28), spring support (29), and frame rail (4) from vehicle. Discard collars and bolts.

13-13. FRAME RAIL REPLACEMENT (CONT)

d. RH Installation.

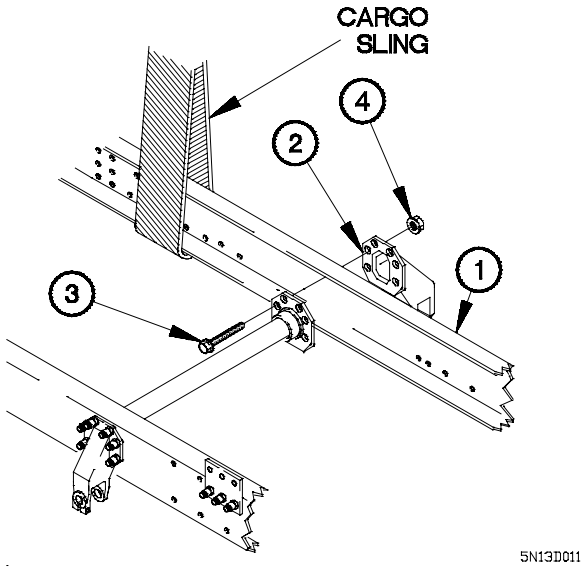
WARNING

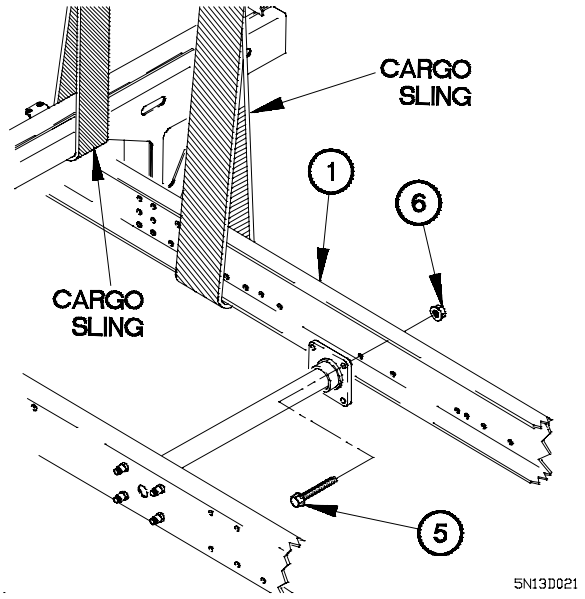
Frame rail weighs approximately 250 lbs (113 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in damage to equipment or injury to personnel.

NOTE

Steps (1) through (17) require the aid of an assistant.

(1) Position frame rail (1) and spring support (2) on vehicle with six bolts (3) and self-locking nuts (4).

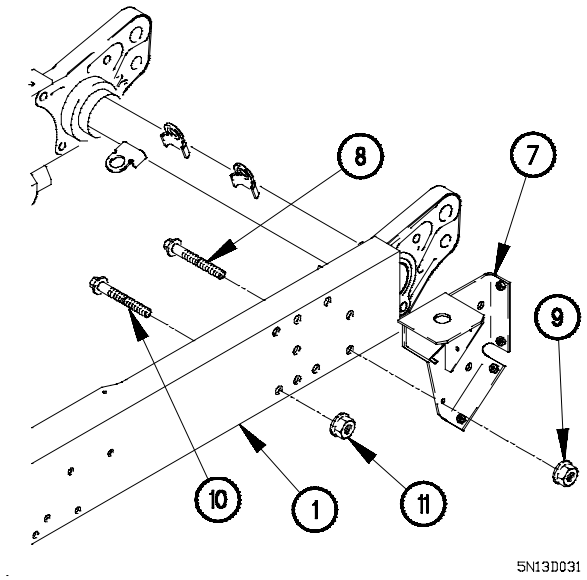




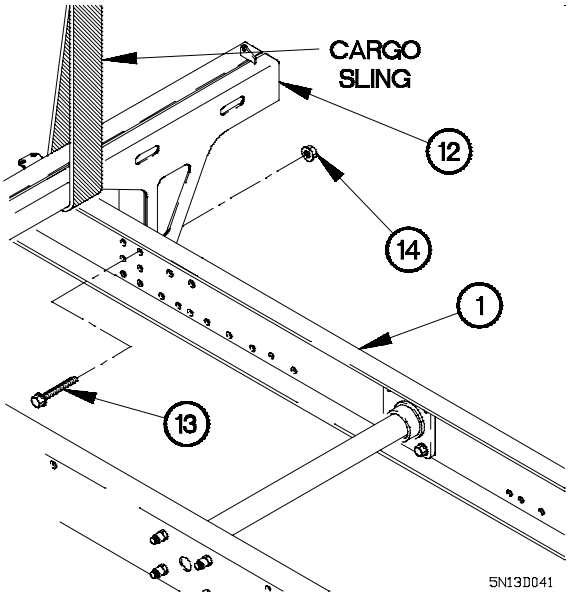
(2) Position four bolts (5) and self-locking nuts (6) in frame rail (1).

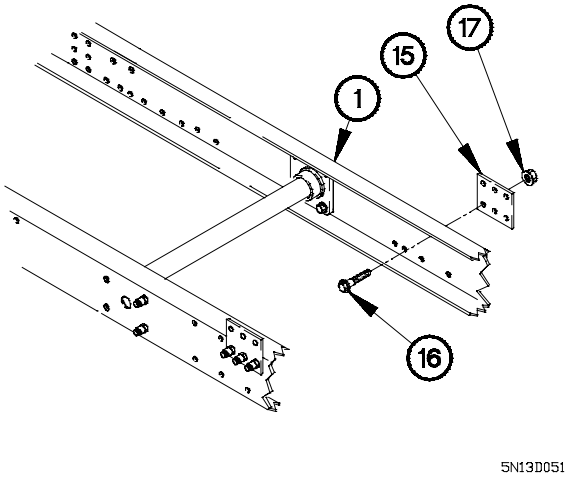
(3) Position front bracket (7) on frame rail (1) with two bolts (8) and self-locking nuts (9).

(4) Position four bolts (10) and self-locking nuts (11) in frame rail (1).



(5) Position front lifting bracket (12) on frame rail (1) with six bolts (13) and self-locking nuts (14).





NOTE

Perform steps (6) and (7) on M1081.

(6) Position frame plate (15) on frame rail (1) with three bolts (16) and self-locking nuts (17).

(7) Tighten three self-locking nuts (17) to 210-225 lb-ft (285-305 N·m).

NOTE

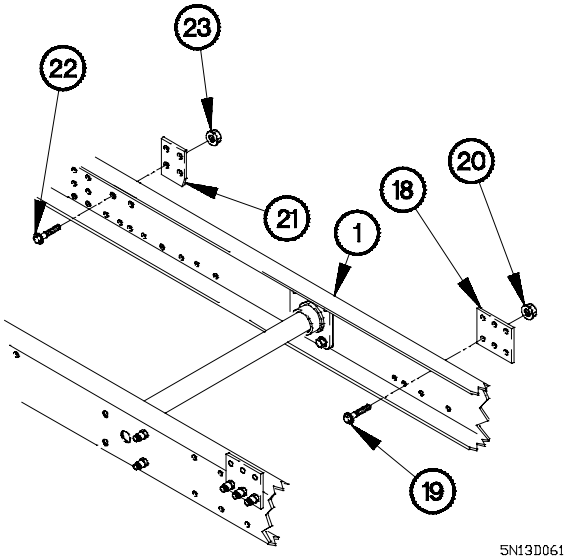
Steps (8) and (9) apply to M1078/M1079.

(8) Position two frame plates (18) on frame rail (1) with six bolts (19) and self-locking nuts (20).

(9) Tighten six self-locking nuts (20) to 210-225 lb-ft (285-305 N·m).

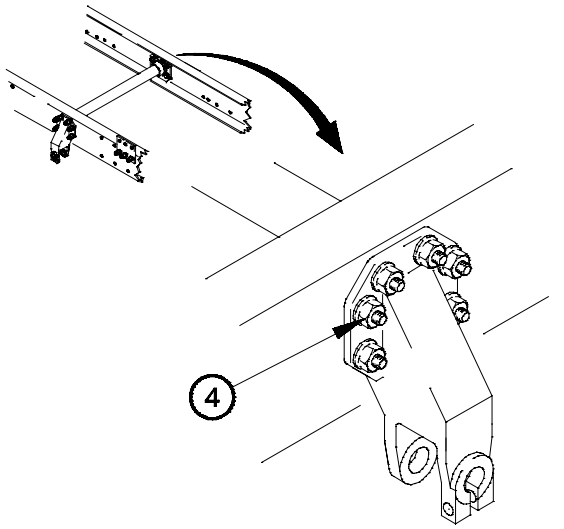
(10) Position frame plate (21) on frame rail (1) with bolt (22) and self-locking nut (23).

(11) Tighten self-locking nut (23) to 210-225 lb-ft (285-305 N·m).

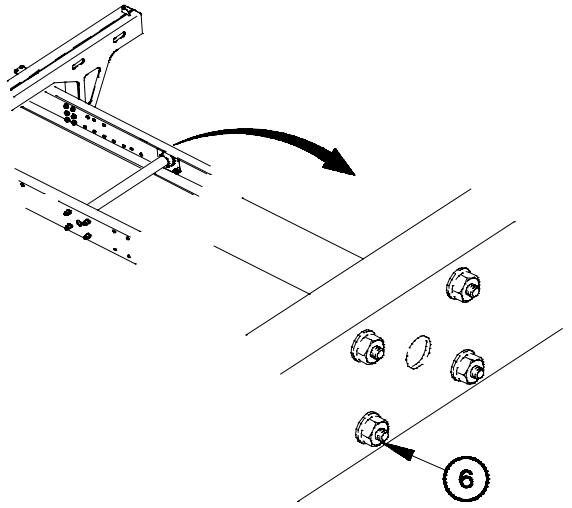


13-13. FRAME RAIL REPLACEMENT (CONT)

(12) Tighten six self-locking nuts (4) to 210-225 lb-ft (285-305 N·m).



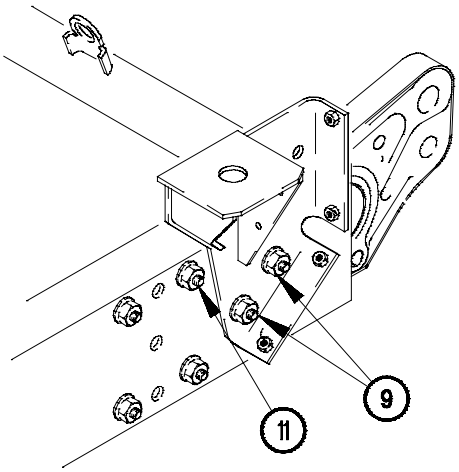
5N13D071



5N13D081

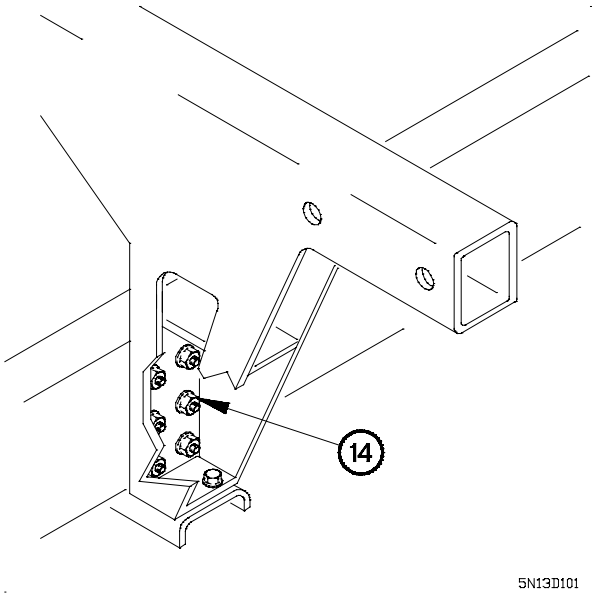
(13) Tighten four self-locking nuts (6) to 210-225 lb-ft (285-305 N·m).

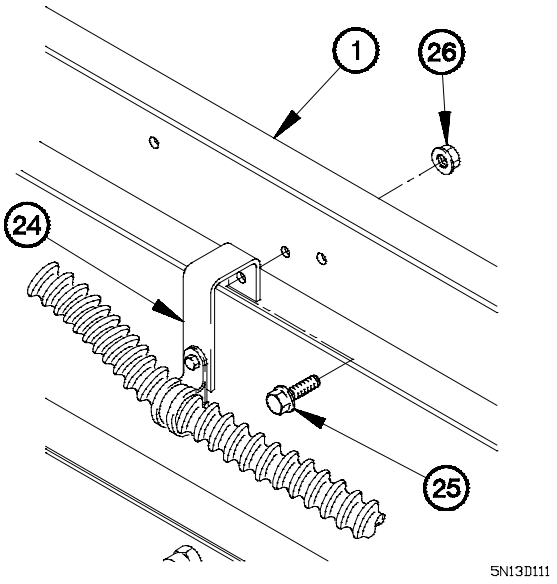
(14) Tighten two self-locking nuts (9) and four self-locking nuts (11) to 210-225 lb-ft (285-305 N·m).



5n13d091

(15) Tighten six self-locking nuts (14) to 210-225 lb-ft (285-305 N·m).



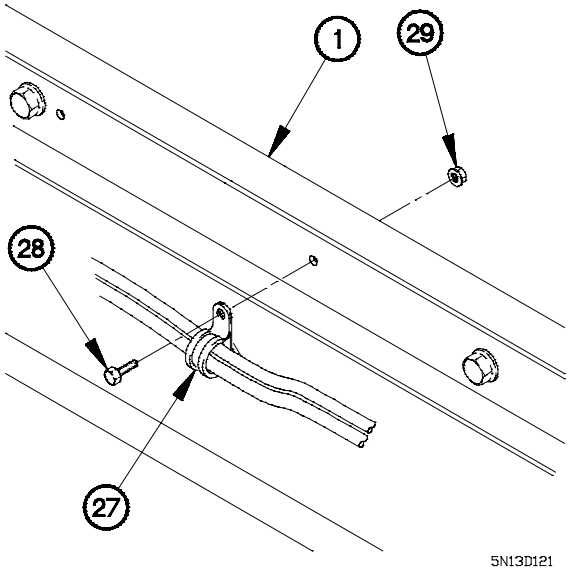


(16) Position two brackets (24) on frame rail (1) with two bolts (25) and self-locking nuts (26).

(17) Tighten two self-locking nuts (26) to 210-225 lb-ft (285-305 N·m).

(18) Position five clamps (27) on frame rail (1) with five bolts (28) and self-locking nuts (29).

(19) Tighten five self-locking nuts (29) to 84-108 lb-in. (10-12 N·m).



e. Follow-On Maintenance.

(1) Install tailpipe (TM 9-2320-365-20-3).

(2) Install rear lights cable assembly (TM 9-2320-365-20-3).

13-13. FRAME RAIL REPLACEMENT (CONT)

(3) Install engine and transmission oil sampling valves (TM 9-2320-365-20-2).

(4) Install radiator brackets (para 13-19).

(5) Install air cleaner (TM 9-2320-365-20-3).

(6) Install spare tire retainer (TM 9-2320-365-20-3).

(7) Install radiator overflow tank (TM 9-2320-365-20-3).

(8) Install frame muffler support bracket (para 13-18).

(9) Install rear cab support assembly (TM 9-2320-365-20-4).

(10) Install 11K Self-Recovery Winch (SRW) control valve assembly and brackets, if equipped (TM 9-2320-365-20-4).

(11) Install steering gear (para 12-2).

(12) Install power steering hoses and tubes (TM 9-2320-365-20-3).

(13) Install Central Tire Inflation System (CTIS) hoses and fittings (TM 9-2320-365-20-3).

(14) Install 11K Self-Recovery Winch (SRW) hoses, if equipped (TM 9-2320-365-20-4).

(15.1) Deleted.

(16) Install power steering pump reservoir and bracket (TM 9-2320-365-20-3).

(17) Install 11K Self-Recovery Winch (SRW) rear cable pulleys, if equipped (TM 9-2320-365-20-4).

(18) Install M1081 angle brackets (para 13-10).

(19) Install alternator ground strap (TM 9-2320-365-20-3).

(20) Install suspension cylinder (para 17-2).

(21) Install air spring and bracket (TM 9-2320-365-20-4).

(22) Install radiator/charge air cooler (TM 9-2320-365-20-3).

(23) Install engine front resilient mount and mounting bracket (para 3-4).

(24) Install transmission resilient mount and bracket (para 7-6).

(25) Install air dryer (TM 9-2320-365-20-5).

(26) Install battery box (TM 9-2320-365-20-3).

(27) Install cab to chassis ground strap (TM 9-2320-365-20-3).

(28) Install fuel tank and brackets (TM 9-2320-365-20-3).

(29) Install M1081 frame plate (para 13-11).

(30) Install shock mount crossmember (para 13-7).

(31) Install front shock absorber brackets (para 14-6).

(32) Install front spring brackets (para 14-5).

(33) Install front angle brackets (para 13-3).

(34) Install subframe (para 13-14 or 13-15).

(35) Install engine assembly (para 3-3).

(36) Install transmission assembly (para 7-4).

(37) Install cab front support (para 15-3).

(38) Install arctic kit w/Power Takeoff (PTO) cable assembly, if equipped (TM 9-2320-365-20-3).

(39) Install Power Takeoff (PTO) cable assembly, if equipped (TM 9-2320-365-20-3).

(40) Install start and charging cable assembly (TM 9-2320-365-20-3).

(41) Install headlight and headlight housing (TM 9-2320-365-20-3).

(42) Install gravel deflector and gravel deflector extension (TM 9-2320-365-20-3).

(43) Perform front wheel toe-in alignment/adjustment (TM 9-2320-366-20-4).

End of Task.

13-14. M1078 SUBFRAME RAIL REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cargo bed removed (para 15-8).
Tool box removed (TM 9-2320-365-20-4).
Hydraulic manifold removed (TM 9-2320-365-20-4).
Fuel tank removed (TM 9-2320-365-20-3).
Hydraulic reservoir removed, if equipped (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Gen Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
rench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)

Materials/Parts
Nut, Self-Locking (10) (Item 134, Appendix F)
Bolt (10) (Item 5, Appendix F)

Personnel
(3)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

CAUTION

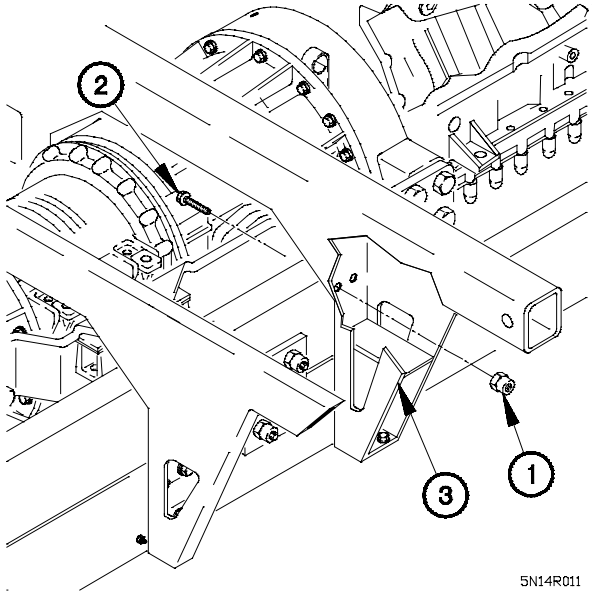
When removing bolts, continuous removal of collars is mandatory. Failure to comply may result in seizing of collar to bolt.

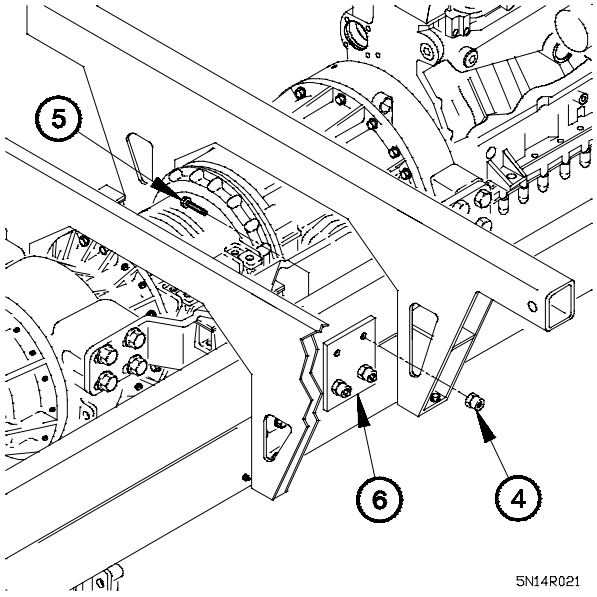
a. Removal.

NOTE

- Left and right side subframe rails are removed the same way. Right side shown.
- Steps (1) through (3) require the aid of an assistant.

(1) Remove two collars (1) and bolts (2) from front lifting bracket (3). Discard collars and bolts.





(2) Remove two collars (4) and bolts (5) from bracket (6).

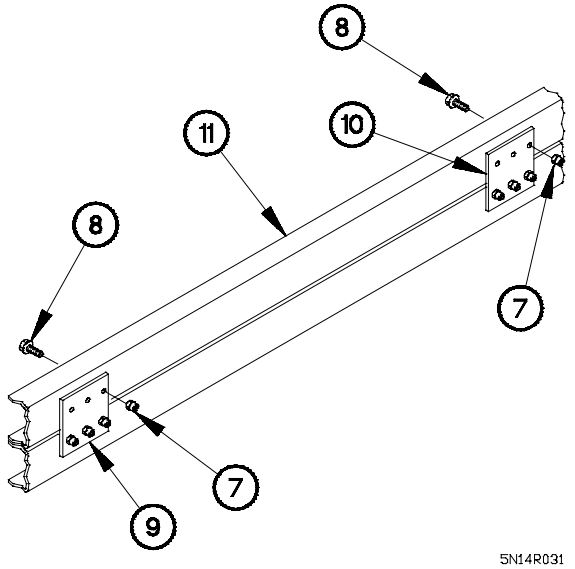
(3) Remove six collars (7) and bolts (8) from brackets (9 and 10). Discard collars and bolts.

WARNING

Subframe rail weighs approximately 180 lbs (82 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (4) requires the aid of two assistants.



(4) Remove subframe rail (11) from vehicle.

13-14. M1078 SUBFRAME RAIL REPLACEMENT (CONT)

b. Installation.

WARNING

Subframe rail weighs approximately 180 lbs (82 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

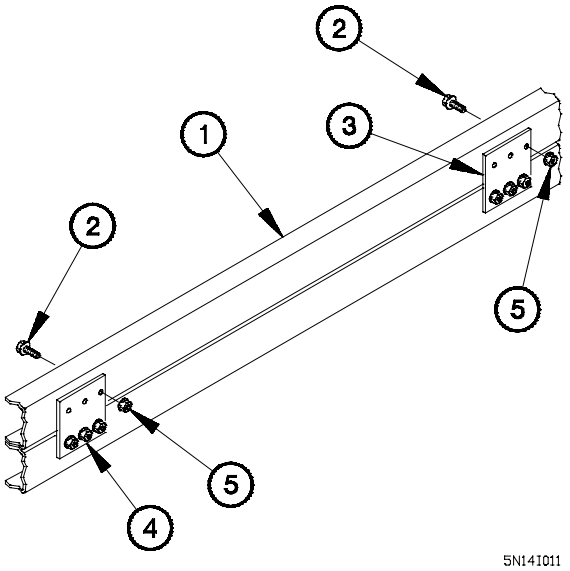
NOTE

- Left and right side subframe rails are installed the same way. Right side shown.
- Step (1) requires the aid of two assistants.

(1) Position subframe rail (1) on vehicle.

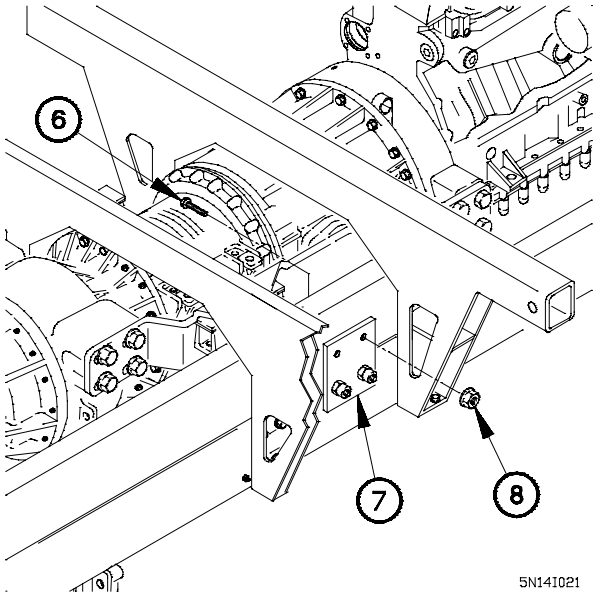
NOTE

Steps (2) through (7) require the aid of an assistant.



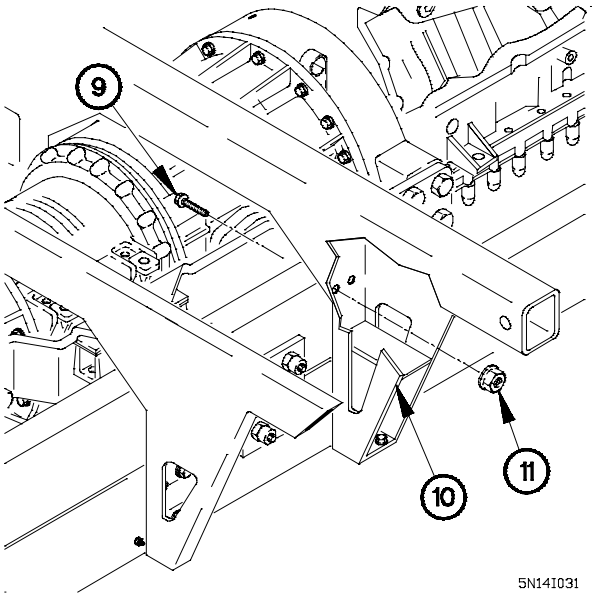
(2) Position six bolts (2) in brackets (3 and 4) with six self-locking nuts (5).

(3) Tighten six self-locking nuts (5) to 210-225 lb-ft (285-305 N·m).



(4) Position two bolts (6) in bracket (7) with two self-locking nuts (8).

(5) Tighten two self-locking nuts (8) to 210-225 lb-ft (285-305 N·m).



(6) Position two bolts (9) in front lifting bracket (10) with two self-locking nuts (11).

(7) Tighten two self-locking nuts (11) to 210-225 lb-ft (285-305 N·m).

c. Follow-On Maintenance.

(1) Install arctic exhaust restrictor kit, if equipped (TM 9-2320-365-20-5).

(2) Install swingfire kit, if equipped (TM 9-2320-365-20-5).

(3) Install cab arctic kit, if equipped (para 18-2).

(4) Install hydraulic reservoir, if equipped (TM 9-2320-365-20-4).

(5) Install fuel tank (TM 9-2320-365-20-3).

(6) Install hydraulic manifold (TM 9-2320-365-20-4).

(7) Install tool box (TM 9-2320-365-20-4).

(8) Install cargo bed (para 15-8).

End of Task.

13-15. M1081 SUBFRAME RAIL REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
M1081 Parachute suspension assembly removed (para 13-4).
Particle extraction tube removed (TM 9-2320-365-20-3).
Tool box removed (TM 9-2320-365-20-4).
Hydraulic manifold removed (TM 9-2320-365-20-4).
Fuel tank removed (TM 9-2320-365-20-3).
Hydraulic reservoir removed, if equipped (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Gen Mech (Item 68, Appendix B)
Wrench, Torque 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)

Materials/Parts
Nut, Self-locking (11) (Item 134, Appendix F)
Bolt (5) (Item 5, Appendix F)

Personnel
(3)

WARNING

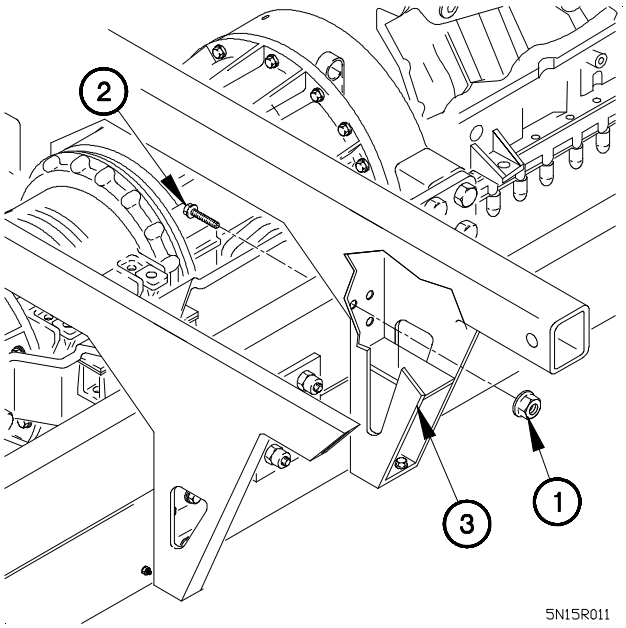
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

- Left and right side subframe rails are removed the same way. Right side shown.
- Steps (1) through (4) require the aid of an assistant.

(1) Remove four self-locking nuts (1) and bolts (2) from front lifting bracket (3). Discard self-locking nuts.

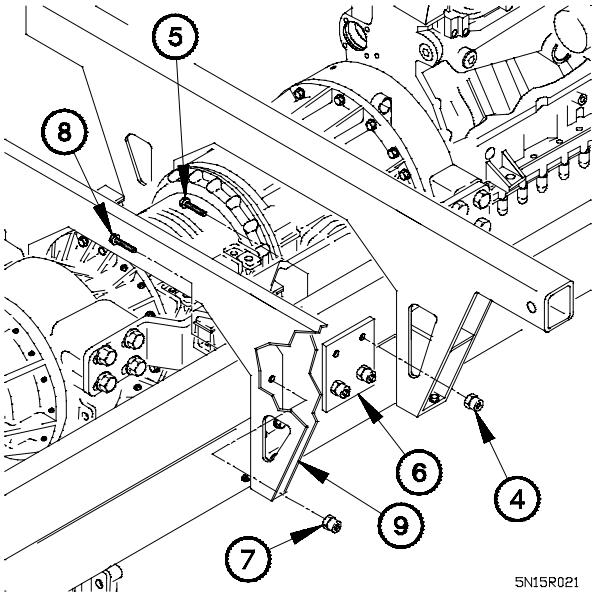


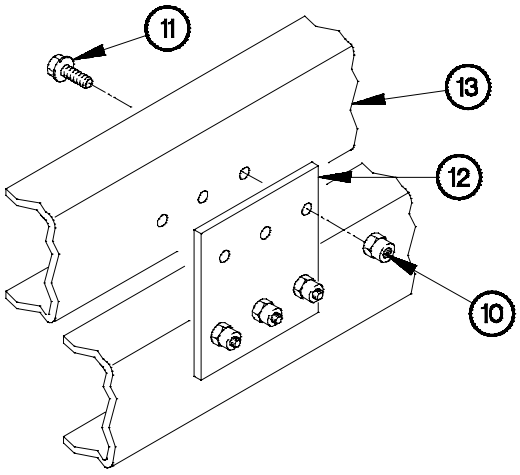
(2) Remove two self-locking nuts (4) and bolts (5) from rear support brace (6). Discard self-locking nuts.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(3) Remove two collars (7) and bolts (8) from bracket (9). Discard collars and bolts.





(4) Remove three collars (10) and bolts (11) from bracket (12). Discard collars and bolts.

NOTE

Step (5) requires the aid of two assistants.

(5) Remove subframe rail (13) from rear of vehicle.

13-15. M1081 SUBFRAME RAIL REPLACEMENT (CONT)

b. Installation.

NOTE

- Left and right side subframe rails are installed the same way. Right side shown.
- Install subframe rails from rear of vehicle.
- Step (1) requires the aid of two assistants.

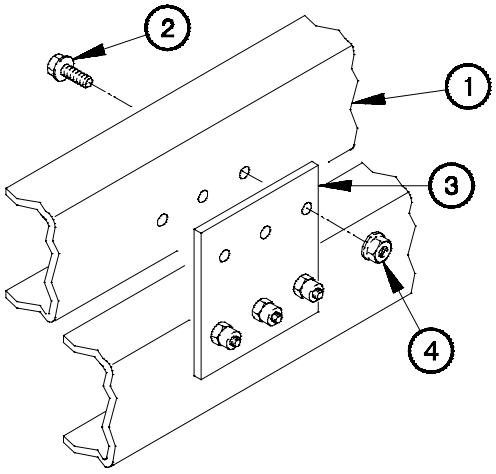
(1) Position subframe rail (1) on vehicle.

CAUTION

Ensure subframe rail flange is in contact with main frame rail flange. Failure to comply may result in damage to equipment.

NOTE

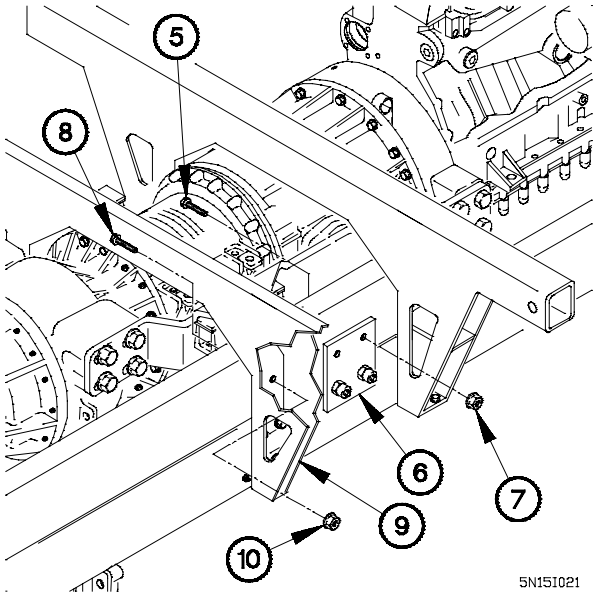
Steps (2) through (9) require the aid of an assistant.



5N15I011

(2) Position three bolts (2) in bracket (3) with three self-locking nuts (4).

(3) Tighten three self-locking nuts (4) to 210-225 lb-ft (285-305 N·m).



5N15I021

(4) Position two bolts (5) in bracket (6) with two self-locking nuts (7).

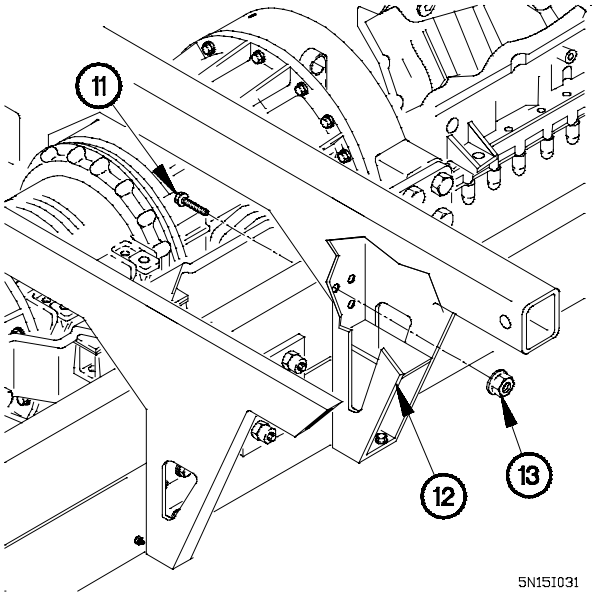
(5) Tighten two self-locking nuts (7) to 210-225 lb-ft (285-305 N·m).

(6) Position two bolts (8) in rear support brace (9) with two self-locking nuts (10).

(7) Tighten two self-locking nuts (10) to 210-225 lb-ft (285-305 N·m).

(8) Position four bolts (11) in front lifting bracket (12) with four self-locking nuts (13).

(9) Tighten four self-locking nuts (13) to 210-225 lb-ft (285-305 N·m).



c. Follow-On Maintenance.

(1) Install arctic exhaust restrictor kit, if equipped (TM 9-2320-365-20-5).

(2) Install swingfire kit, if equipped (TM 9-2320-365-20-5).

(3) Install cab arctic kit, if equipped (para 18-2).

(4) Install hydraulic reservoir, if equipped (TM 9-2320-365-20-4).

(5) Install fuel tank (TM 9-2320-365-20-3).

(6) Install hydraulic manifold (TM 9-2320-365-20-4).

(7) Install tool box (TM 9-2320-365-20-4).

(8) Install particle extraction tube (TM 9-2320-365-20-3).

(9) Install M1081 parachute suspension assembly (para 13-4).

End of Task.

13-16. FRONT CROSSMEMBER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Front bumper and gravel deflector removed (TM 9-2320-365-20-3).
Headlight and headlight housing removed (TM 9-2320-365-20-3).
Radiator brackets removed (para 13-19).
Front spring brackets removed (Front) (para 14-5).
Check valve removed (TM 9-2320-365-20-3).
Front axle quick release valve removed (TM 9-2320-365-20-3).
Front gladhands removed (TM 9-2320-365-20-3).
Cab to chassis ground strap removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Sling, Cargo (2) (Item 48, Appendix B)

Materials/Parts
Bolt (10) (Item 15, Appendix F)
Nut, Self-locking (12) (Item 134, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

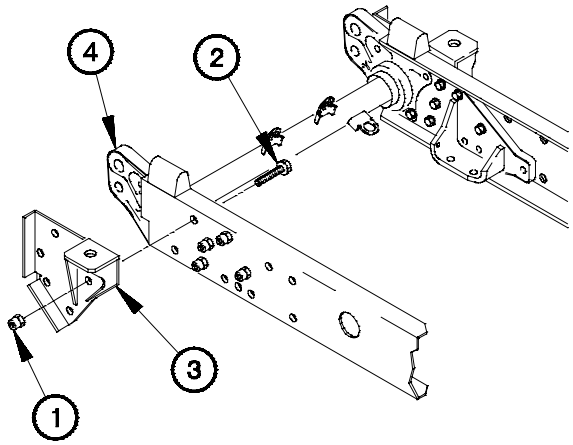
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

- Steps (1) through (5) require the aid of an assistant.
- Perform step (1) on left side of front crossmember.

(1) Remove two collars (1), bolts (2), and bracket (3) from front crossmember (4). Discard collars and bolts.

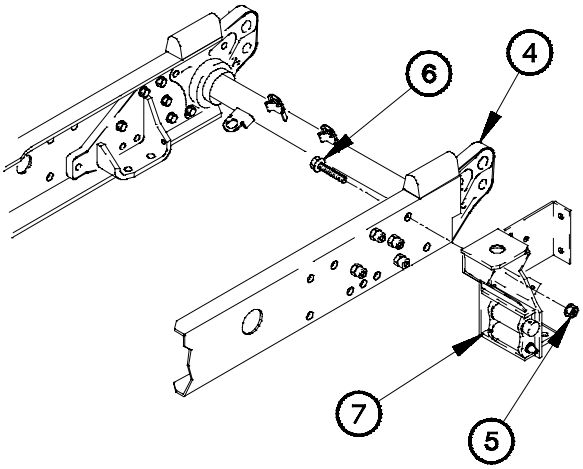


YN42R011

NOTE

Perform step (2) on right side of front crossmember.

(2) Remove two self-locking nuts (5), bolts (6), and bracket (7) from front crossmember (4). Discard self-locking nuts.



YN42R021

CAUTION

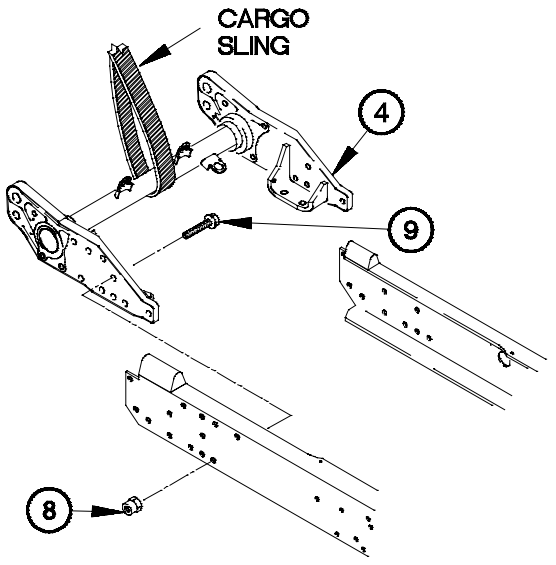
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

Left and right side of front crossmember is removed the same way. Left side shown.

(3) Remove four collars (8) and bolts (9) from front crossmember (4). Discard collars and bolts.

(4) Perform step (3) on right side of front crossmember.



YN42R031

WARNING

Front crossmember weighs approximately 200 lbs (91 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(5) Remove front crossmember (4) from vehicle.

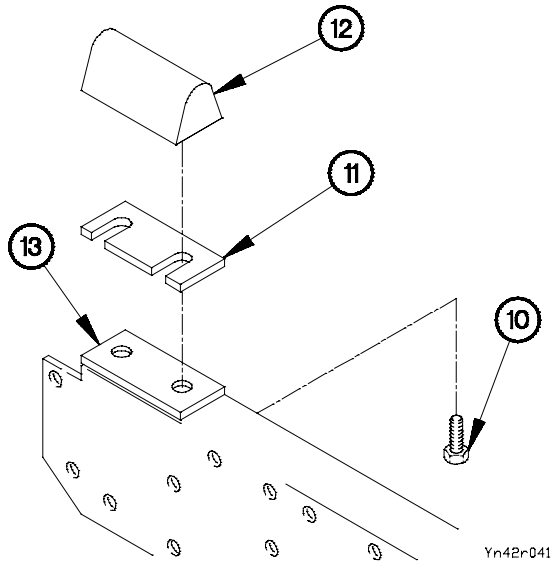
13-16. FRONT CROSSMEMBER REPLACEMENT (CONT)

NOTE

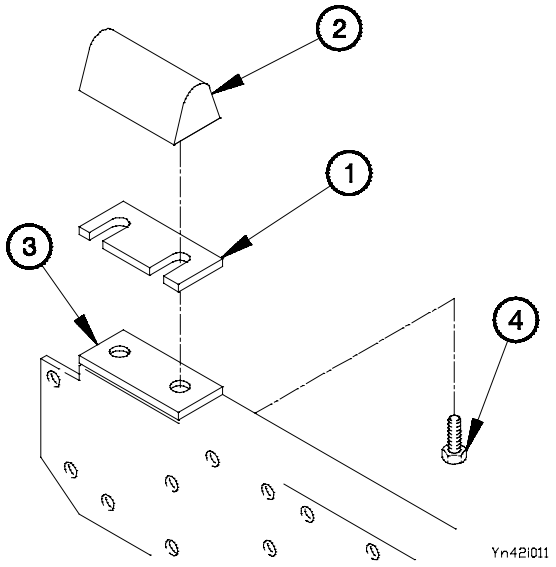
Left and right side rubber bumpers are removed the same way. Left side shown.

(6) Remove two screws (10), spacer (11), and rubber bumper (12) from frame rail (13).

(7) Perform step (6) on right side rubber bumper.



b. Installation.



NOTE

Left and right side rubber bumpers are installed the same way. Left side shown.

(1) Position spacer (1) and rubber bumper (2) on frame rail (3) with two screws (4).

(2) Tighten two screws (4) to 34-42 lb-ft (48-57 N·m).

(3) Perform steps (1) and (2) right side rubber bumper.

WARNING

Front crossmember weighs approximately 200 lbs (91 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (4) through (11) require the aid of an assistant.

(4) Position front crossmember (5) on vehicle.

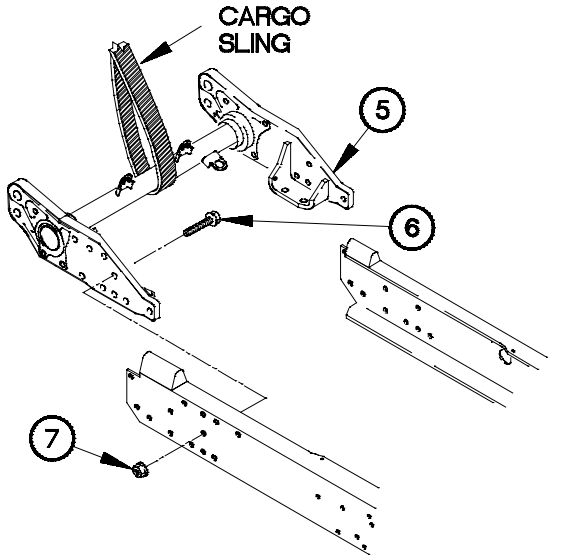
NOTE

Left and right side of front crossmember is installed the same way. Left side shown.

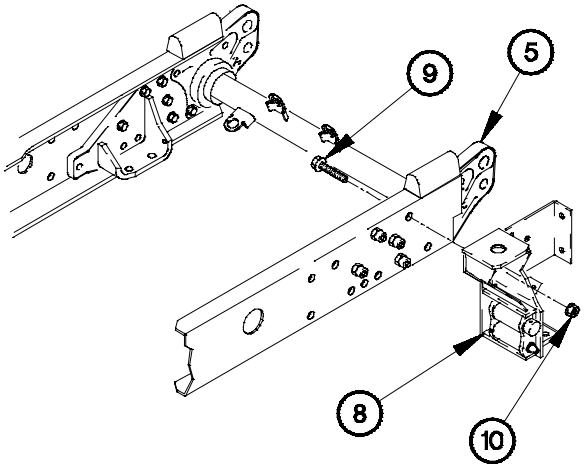
(5) Position four bolts (6) and self-locking nuts (7) in front crossmember (5).

(6) Tighten four self-locking nuts (7) to 210-225 lb-ft (285-305 N·m).

(7) Perform steps (5) and (6) on right side of front crossmember.



YN42I021



YN42I031

NOTE

Perform steps (8) and (9) on right side of front crossmember.

(8) Position bracket (8) on front crossmember (5) with two bolts (9) and self-locking nuts (10).

(9) Tighten two self-locking nuts (10) to 210-225 lb-ft (285-305 N·m).

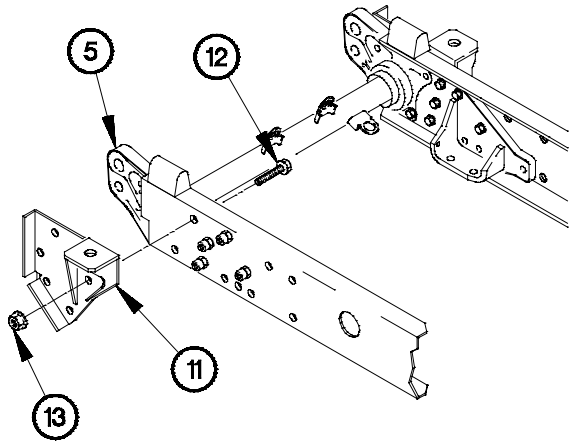
13-16. FRONT CROSSMEMBER REPLACEMENT (CONT)

NOTE

Perform steps (10) and (11) on left side of front crossmember.

(10) Position bracket (11) on front crossmember (5) with two bolts (12) and self-locking nuts (13).

(11) Tighten two self-locking nuts (13) to 210-225 lb-ft (285-305 N·m).



YN42I041

c. Follow-On Maintenance.

(1) Install cab to chassis ground strap (TM 9-2320-365-20-3).

(2) Install front gladhands (TM 9-2320-365-20-3).

(3) Install front axle quick release valve (TM 9-2320-365-20-3).

(4) Install check valve (TM 9-2320-365-20-3).

(5) Install front spring brackets (Front) (para 14-5).

(6) Install radiator brackets (para 13-19).

(7) Install headlight and headlight housing (TM 9-2320-365-20-3).

(8) Install front bumper and gravel deflector (TM 9-2320-365-20-3).

End of Task.

13-17. INTERMEDIATE CROSSMEMBER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
One frame rail removed (para 13-13).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 25, Appendix B)
Sling, Cargo (2) (Item 48, Appendix B)

Materials/Parts
Bolt (4) (Item 13, Appendix F)
Nut, Self-locking (4) (Item 134, Appendix F)

Personnel Required
(2)

a. Removal.

WARNING

Intermediate crossmember weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

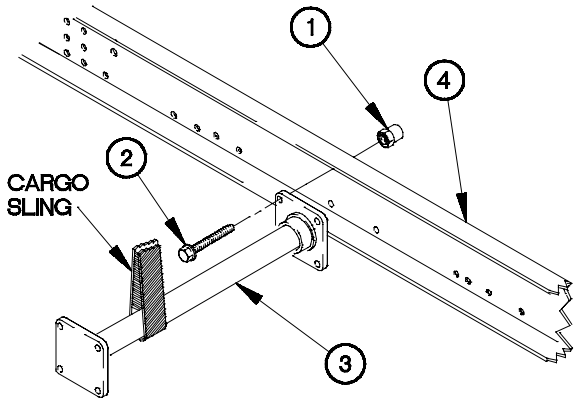
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

- Step (1) requires the aid of an assistant.
- Both intermediate crossmembers are removed the same way. Front intermediate crossmember shown.

Remove four collars (1), bolts (2), and intermediate crossmember (3) from frame rail (4). Discard collars and bolts.



5NI7R01A

13-17. INTERMEDIATE CROSSMEMBER REPLACEMENT (CONT)

b. Installation.

WARNING

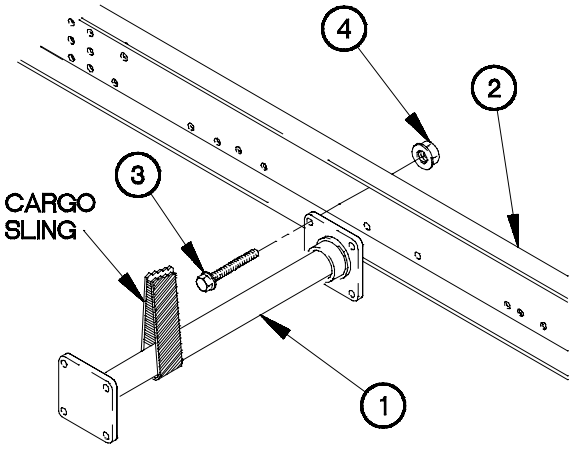
Intermediate crossmember weighs approximately 75 lbs (34 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in damage to equipment or injury to personnel.

NOTE

- Steps (1) and (2) require the aid of an assistant.
- Both intermediate crossmembers are installed the same way. Front intermediate crossmember shown.

(1) Position intermediate crossmember (1) on frame rail (2) with four bolts (3) and self-locking nuts (4).

(2) Tighten four self-locking nuts (4) to 210-225 lb-ft (285-305 N·m).



5N17I01A

c. Follow-On Maintenance.

Install one frame rail (para 13-13).

End of Task.

13-18. FRAME MUFFLER SUPPORT BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Muffler and heatshield removed (TM 9-2320-365-20-3).
11K self-recovery winch (SRW) removed, if equipped (para 16-2).
Angle bracket removed (RH side) (M1081) (para 13-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)

Tools and Special Tools (Cont)
Socket Set, Socket Wrench (Item 51, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Nut, Self-locking (Item 126, Appendix F)
Nut, Self-locking (2) (Item 139, Appendix F)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

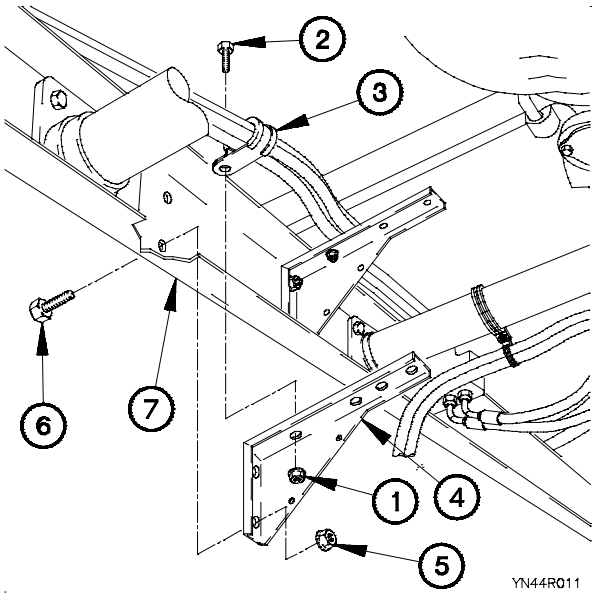
a. Removal.

NOTE

Front and rear frame muffler support brackets are removed the same way. Front frame muffler support bracket shown.

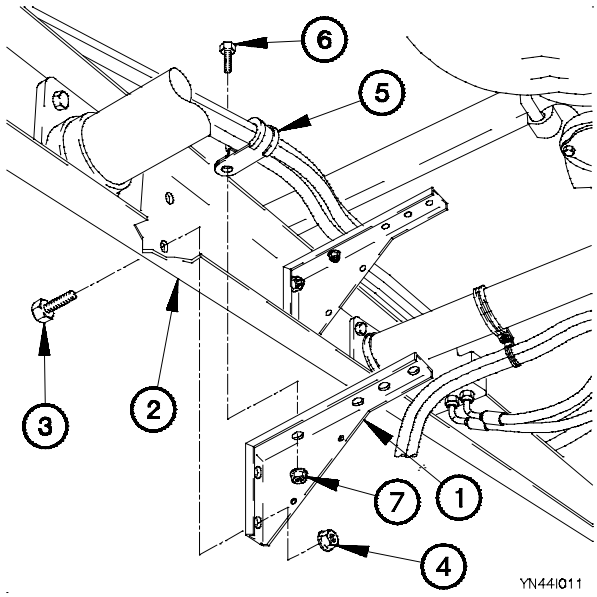
(1) Remove self-locking nut (1), screw (2), and clamp (3) from frame muffler support bracket (4). Discard self-locking nut.

(2) Remove two self-locking nuts (5), screws (6), and frame muffler support bracket (4) from frame rail (7). Discard self-locking nuts.



13-18. FRAME MUFFLER SUPPORT BRACKET REPLACEMENT (CONT)

b. Installation.



NOTE

Front and rear frame muffler support brackets are installed the same way. Front frame muffler support bracket shown.

(1) Position frame muffler support bracket (1) on frame rail (2) with two screws (3) and self-locking nuts (4).

(2) Tighten two self-locking nuts (4) to 62-76 lb-ft (84-103 N·m).

(3) Position clamp (5) on frame muffler support bracket (1) with screw (6) and self-locking nut (7).

(4) Tighten self-locking nut (7) to 88-106 lb-in. (10-12 N·m).

c. Follow-On Maintenance.

(1) Install M1081 angle bracket (RH side) (para 13-10).

(2) Install 11K self-recovery winch (SRW), if equipped (para 16-2).

(3) Install heatshield and muffler (TM 9-2320-365-20-3).

End of Task.

13-19. RADIATOR BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Cab front support removed (para 15-3).
Steering gear removed (para 12-2).
Radiator/charger air cooler removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)

Tools and Special Tools (Cont)
Socket Set, Impact (Item 50, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Nut, Self-locking (3) (Item 134, Appendix F)
Bolt (2) (Item 14, Appendix F)
Bolt (Item 5, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

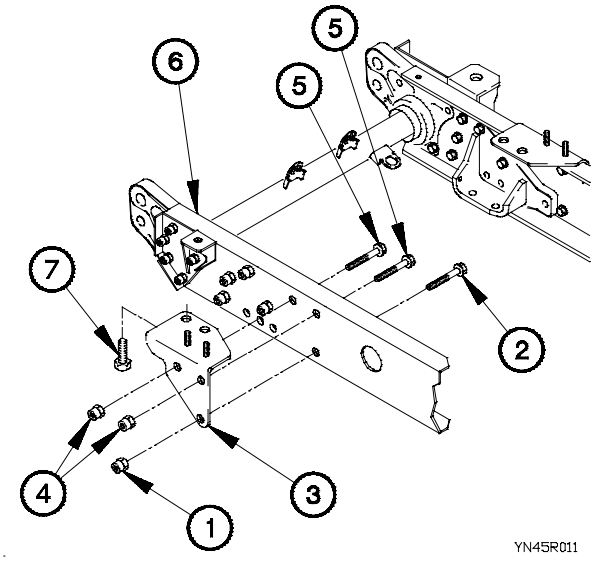
a. Removal.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

- Left and right side radiator brackets are removed the same way. Left side shown.
- Steps (1) and (2) require the aid of an assistant.



(1) Remove collar (1) and bolt (2) from radiator bracket (3). Discard collar and bolt.

(2) Remove two collars (4), bolts (5), and radiator bracket (3) from frame rail (6). Discard collars and bolts.

(3) Remove two bolts (7) from radiator bracket (3).

13-19. RADIATOR BRACKET REPLACEMENT (CONT)

b. Installation.

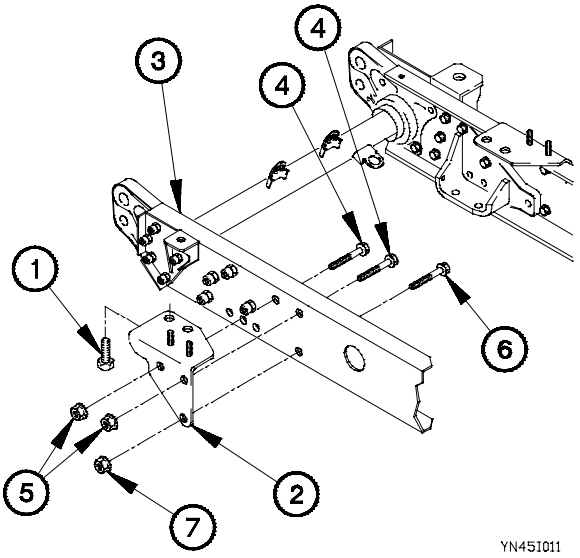
NOTE

- Left and right side radiator brackets are installed the same way. Left side shown.
- Steps (1) through (3) require the aid of an assistant.

(1) Position two bolts (1) and radiator bracket (2) on frame rail (3) with two bolts (4) and self-locking nuts (5).

(2) Position bolt (6) in radiator bracket (2) with self-locking nut (7).

(3) Tighten two self-locking nuts (5) and self-locking nut (7) to 210-225 lb-ft (285-305 N·m).



c. Follow-on Maintenance.

(1) Install radiator/charge air cooler (TM 9-2320-365-20-3).

(2) Install steering gear (para 12-2).

(3) Install cab front support (para 15-3).

End of Task

13-20. M1079 SUBFRAME RAIL REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Van body removed (TM 9-2320-365-20-4).
Tool box removed (TM 9-2320-365-20-4).
Hydraulic manifold removed (TM 9-2320-365-20-4).
Fuel tank removed (TM 9-2320-365-20-3).
Hydraulic reservoir removed, if equipped (TM 9-2320-365-20-4).
Lower spreader bars removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Gen Mech (Item 68, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)

Materials/Parts
Nut, Self-Locking (24) (Item 134, Appendix F)
Bolt (20) (Item 5, Appendix F)
Bolt (4) (Item 6, Appendix F)

Personnel
(3)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply may result in seizing of collar to bolt.

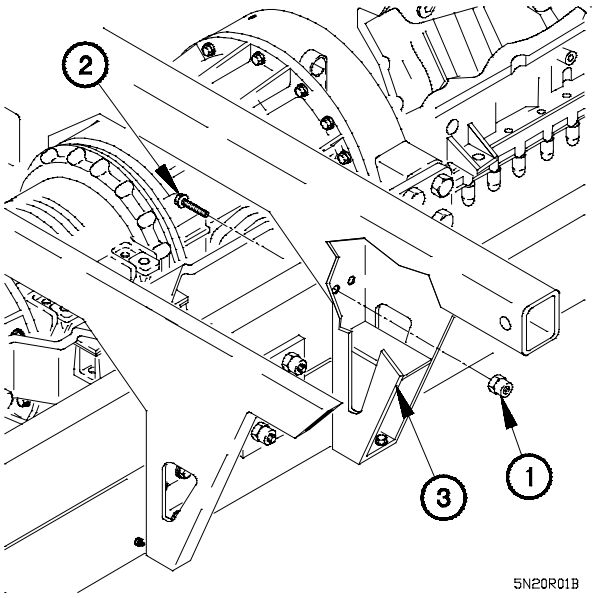
13-20. M1079 SUBFRAME RAIL REPLACEMENT (CONT)

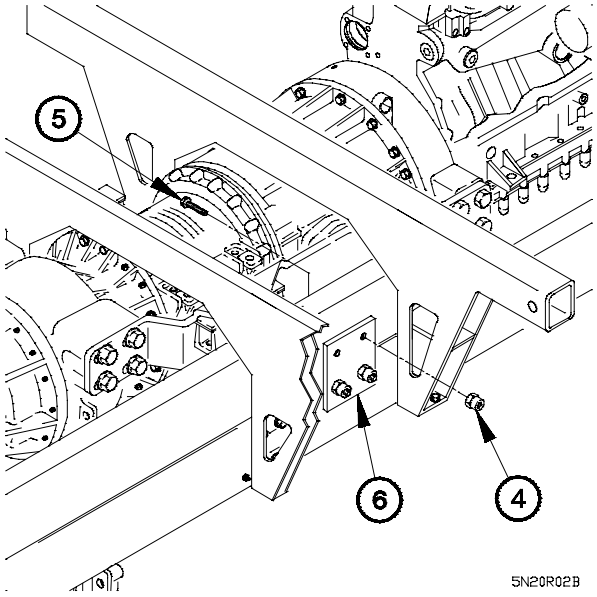
a. Removal.

NOTE

- Left and right subframe rails are removed the same way. Right side shown.
- Steps (1) through (4) require the aid of an assistant.

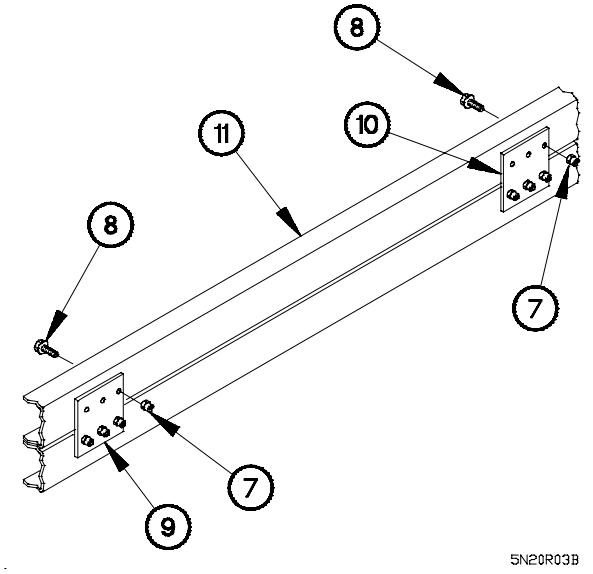
(1) Remove two collars (1) and bolts (2) from front lifting bracket (3). Discard collars and bolts.



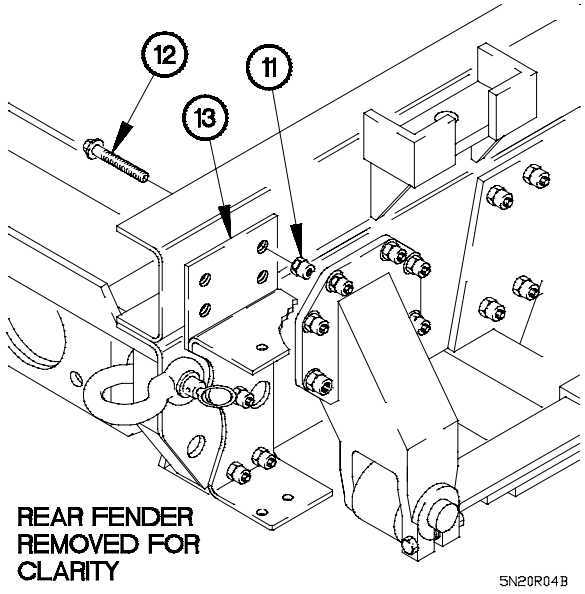


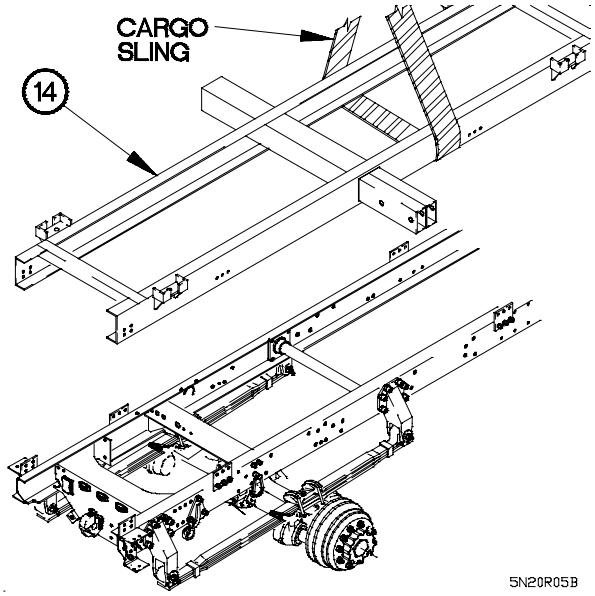
(2) Remove two collars (4) and bolts (5) from bracket (6).

(3) Remove six collars (7) and bolts (8) from brackets (9 and 10). Discard collars and bolts.



(4) Remove four collars (11) and bolts (12) from bracket (13). Discard collars and bolts.





WARNING

Subframe rail assembly weighs approximately 670 lbs (304 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (5) requires the aid of an assistant.

(5) Remove subframe rail assembly (14) from vehicle.

b. Installation.

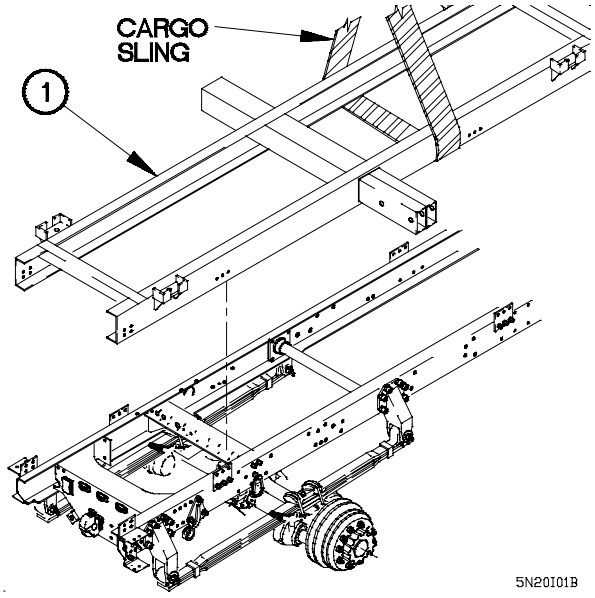
WARNING

Subframe rail assembly weighs approximately 670 lbs (304 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

- Left and right subframe rails are installed the same way. Right side shown.
- Step (1) requires the aid of two assistants.

(1) Position subframe rail (1) on vehicle.



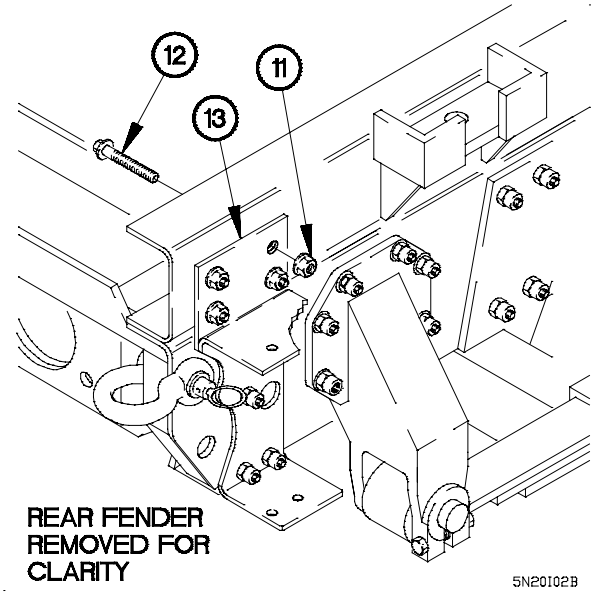
13-20. M1079 SUBFRAME RAIL REPLACEMENT (CONT)

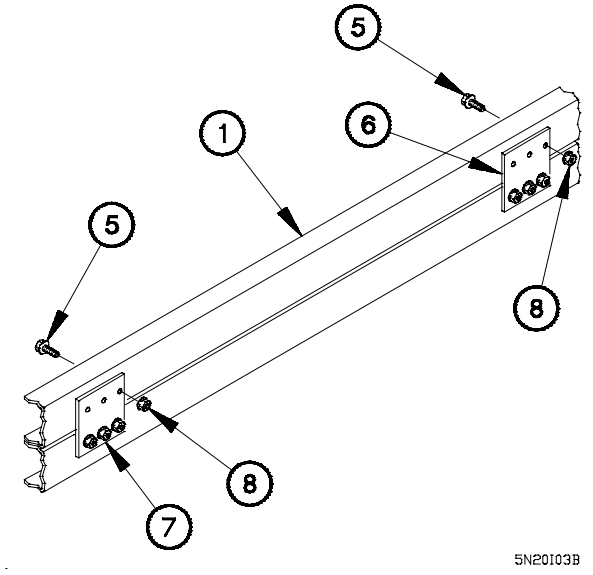
NOTE

Steps (2) through (9) require the aid of an assistant.

(2) Position four bolts (2) in bracket (3) with four self-locking nuts (4).

(3) Tighten four self-locking nuts (4) to 210-225 lb-ft (285-305 N·m).



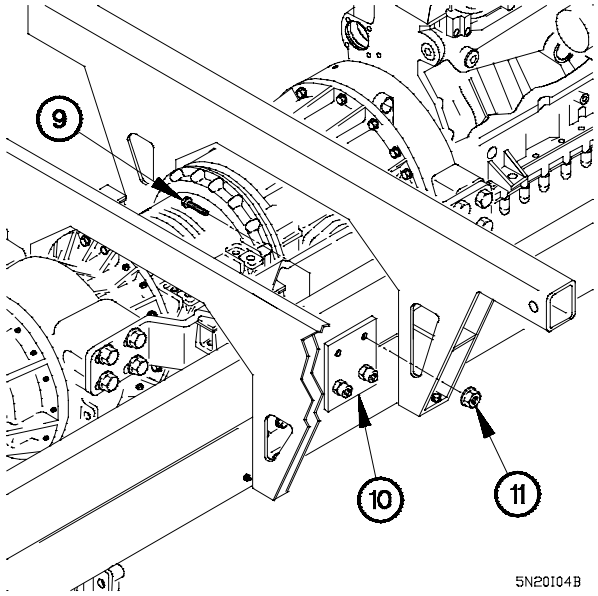


(4) Position six bolts (5) in brackets (6 and 7) with six self-locking nuts (8).

(5) Tighten six self-locking nuts (8) to 210-225 lb-ft (285-305 N·m).

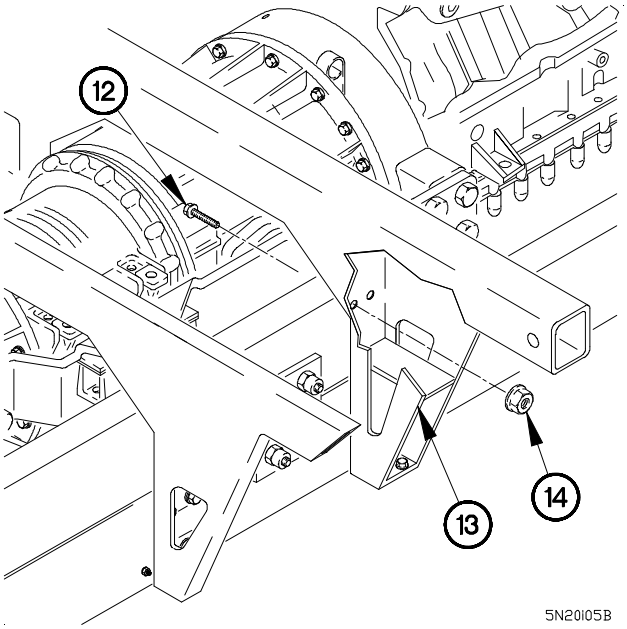
(6) Position two bolts (9) in bracket (10) with two self-locking nuts (11).

(7) Tighten two self-locking nuts (11) to 210-225 lb-ft (285-305 N·m).



(8) Position two bolts (12) in front lifting bracket (13) with two self-locking nuts (14).

(9) Tighten two self-locking nuts (14) to 210-225 lb-ft (285-305 N•m).



c. Follow-On Maintenance.

(1) Install lower spreader bars (TM 9-2320-365-20-4).

(2) Deleted.

(3) Deleted.

(4) Deleted.

(5) Install hydraulic reservoir, if equipped (TM 9-2320-365-20-4).

(6) Install fuel tank (TM 9-2320-365-20-3).

(7) Install hydraulic manifold (TM 9-2320-365-20-4).

(8) Install tool box (TM 9-2320-365-20-4).

(9) Install van body (TM 9-2320-365-20-4).

End of Task.

CHAPTER 14
SUSPENSION MAINTENANCE

Section I. INTRODUCTION 14-1
14-1. INTRODUCTION 14-1

Section II. MAINTENANCE PROCEDURES 14-2
14-2. FRONT LEAF SPRING REPLACEMENT 14-2
14-3. FRONT LEAF SPRING SHACKLE AND PIN REPLACEMENT 14-10
14-4. REAR LEAF SPRING REPLACEMENT 14-16
14-5. FRONT SPRING BRACKETS REPLACEMENT 14-20
14-6. FRONT SHOCK ABSORBER BRACKET REPLACEMENT 14-33
14-7. STABILIZER MOUNTING BRACKET REPLACEMENT 14-36

Section I. INTRODUCTION

14-1. INTRODUCTION

This chapter contains maintenance instructions for replacement of Suspension Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

14-2. FRONT LEAF SPRING REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Front drive shaft removed (left side) (TM 9-2320-365-20-3).
Gravel deflector and gravel deflector extension removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)

Tools and Special Tools (Cont)
Trestles, Motor Vehicle Maintenance (2) (Item 71, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Socket, Left Front Leaf Spring U-Bolt (Item 8, Appendix D)

Materials/Parts
Nut, Self-Locking (4) (Item 124, Appendix F)
Pin, Cotter (Item 229, Appendix F)
Nut, Self-Locking (2) (Item 138, Appendix F)
Grease, Automotive and Artillery (Item 36, Appendix C)
U-bolt (Item 15.1, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

Vehicles S/N 11,438 through 13,302 were originally equipped with three leaf springs. When replacing a three leaf spring with a four leaf spring, both sides must be replaced.

(1) Deleted

(2) Deleted

(3) Remove wheel on side that leaf spring is being removed (TM 9-2320-365-10).

CAUTION

Use care not to pinch left side air hoses when positioning trestles. Failure to comply may result in damage to equipment.

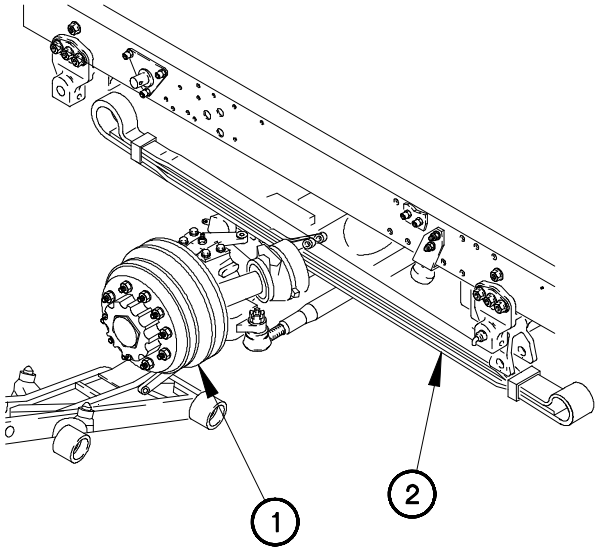
(4) Place front of vehicle on two trestles so front wheels are off ground.

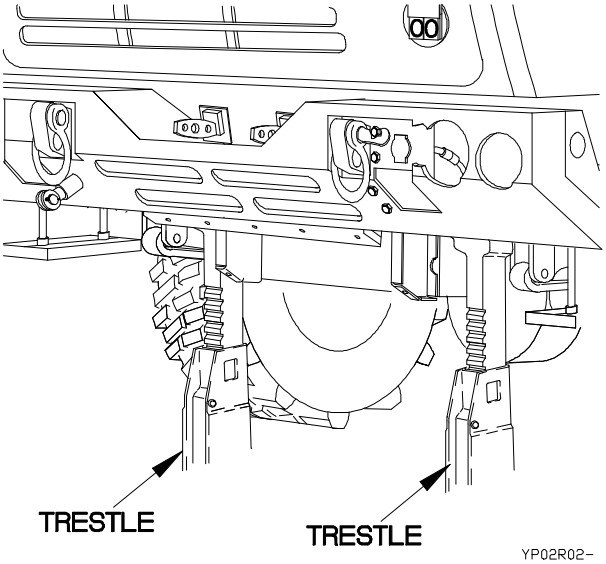
NOTE

Perform step (5) on LH side of vehicle.

(5) Turn steering wheel fully to right.

(6) Raise cab (TM 9-2320-365-10).





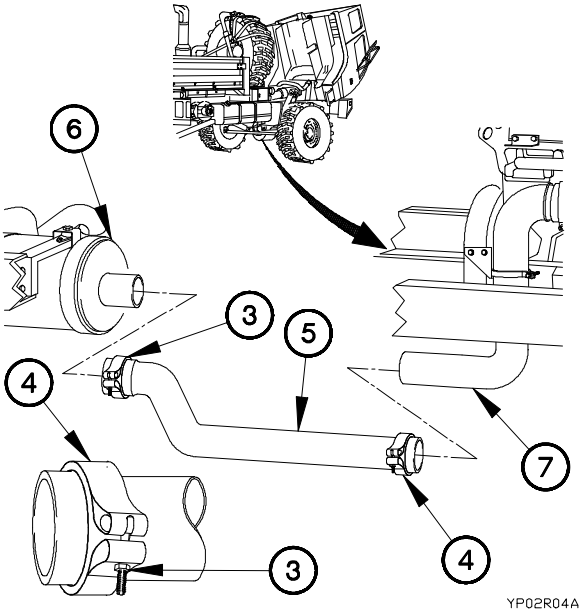
(7) Place floor jack under front axle (1) and raise jack until there is a gap between front axle and leaf spring (2).

NOTE

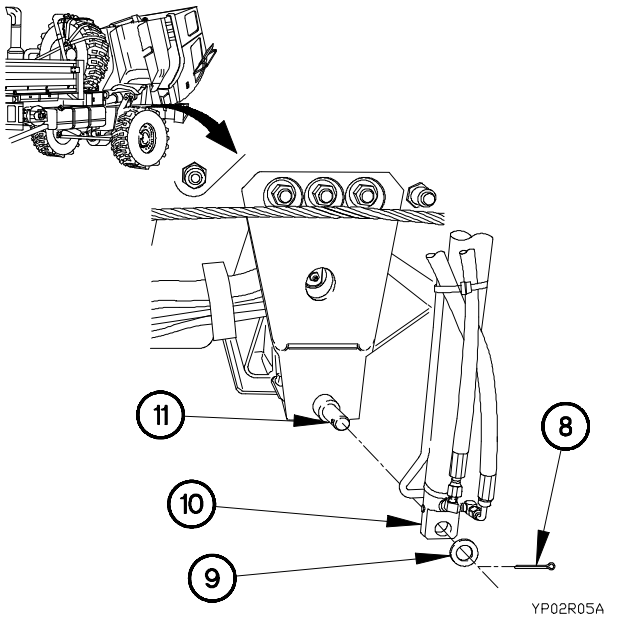
Perform steps (8) through (15) on RH side of vehicle.

(8) Loosen two nuts (3) on exhaust pipe clamps (4).

(9) Remove exhaust pipe (5) from muffler (6) and engine exhaust extension (7).

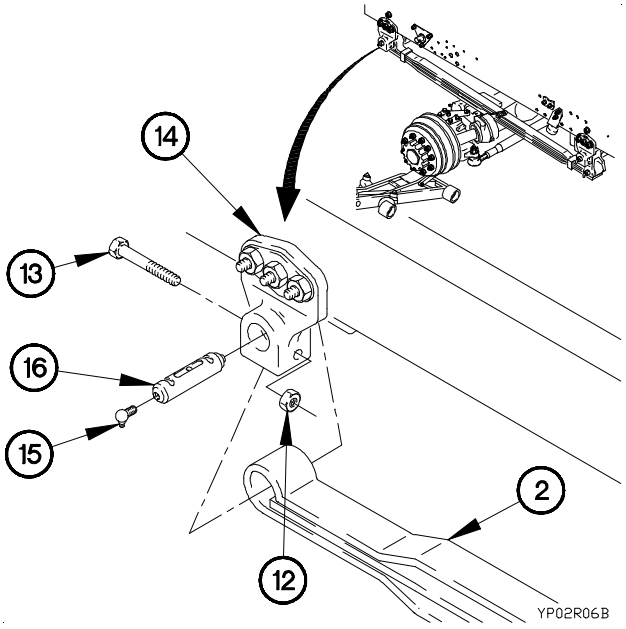


14-2. FRONT LEAF SPRING REPLACEMENT (CONT)



(10) Remove cotter pin (8) and washer (9) from lower end of cab tilt cylinder (10). Discard cotter pin.

(11) Swing cab tilt cylinder (10) away from bracket (11).



(12) Remove self-locking nut (12) and screw (13) from front bracket (14). Discard self-locking nut.

(13) Remove lubrication fitting (15) from spring pin (16).

CAUTION

Use care when removing spring pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(14) Remove spring pin (16) and leaf spring (2) from front bracket (14).

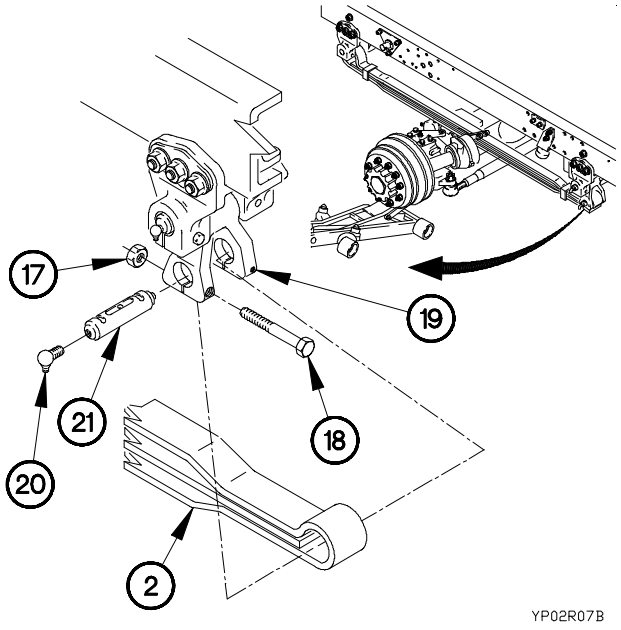
(15) Remove self-locking nut (17) and screw (18) from shackle (19). Discard self-locking nut.

(16) Remove lubrication fitting (20) from spring pin (21).

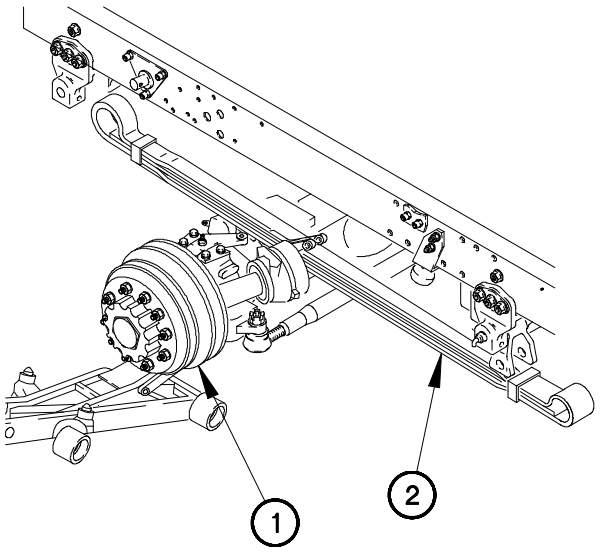
CAUTION

Use care when removing spring pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(17) Remove spring pin (21) and leaf spring (2) from shackle (19).



YP02R07B



YP02R08A

WARNING

Do not attempt to repair or disassemble leaf springs. Leaf springs are under extreme tension. Failure to comply may result in serious injury or death to personnel.

NOTE

(18) Remove leaf spring (2) from front axle (1). Step (18) requires the aid of an assistant.

14-2. FRONT LEAF SPRING REPLACEMENT (CONT)

(19) Install C-clamp on leaf spring (2).

NOTE

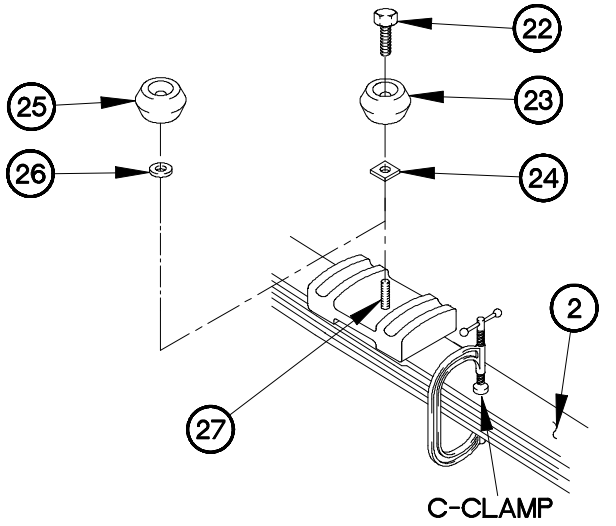
Perform step (20) on vehicles not equipped with enhanced resilient mounts.

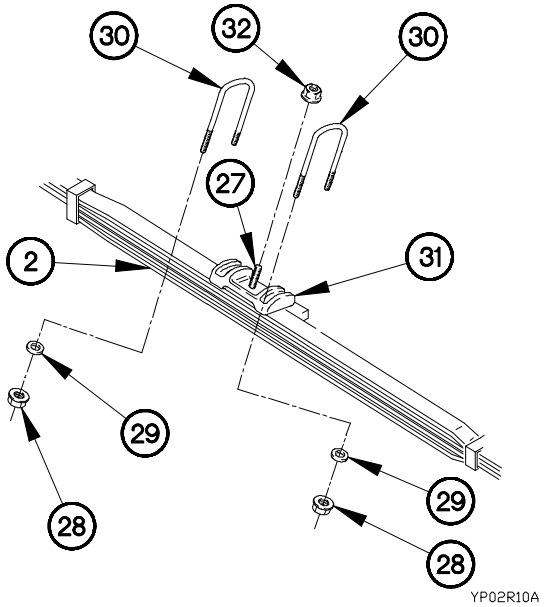
(20) Remove screw (22), resilient mount (23), and spacer (24) from adapter. Discard mount, spacer, and screw.

NOTE

Perform step (21) on vehicles equipped with enhanced resilient mounts.

(21) Remove enhanced resilient mount (25) and spacer (26) from bolt (27).





(22) Remove four self-locking nuts (28) and washers (29) from two U-bolts (30). Discard self –locking nuts.

(23) Remove two U-bolts (30) from leaf spring (2). Discard U-bolts.

(24) Remove plate (31) from leaf spring (2).

(25) Remove self-locking nut (32) from bolt (27).

(26) Remove bolt (27) from leaf spring (2).

b. Installation

NOTE

- Vehicles S/N 11,438 through 13,302 were originally equipped with three leaf springs. When replacing a three leaf spring with a four leaf spring, both sides must be replaced.
- Vehicles S/N 13,303 through 16,156 were originally equipped with standard resilient mounts attached with bolts and washers. If leaf spring has this configuration, perform Enhanced Resilient Mount Initial Install action (M18-12 linked) and upgrade all six resilient mount to kit P.N 57K2003.

(1) Install C-Clamp on leaf spring (1).

(2) Position bolt (2) on leaf spring (1) with self-locking nut (3).

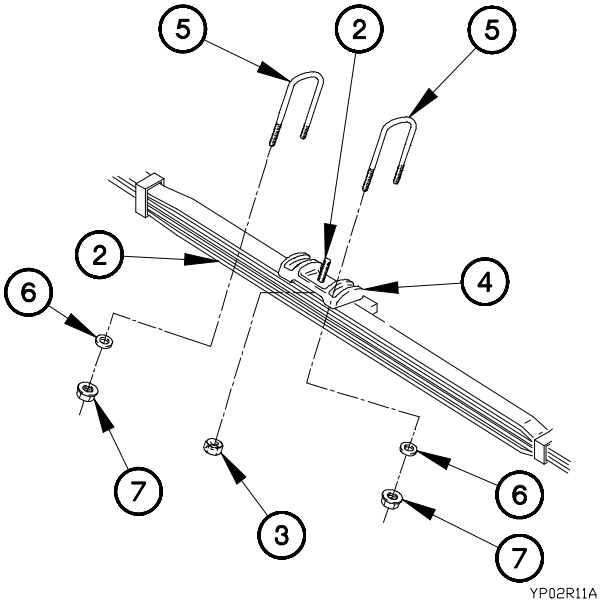
(3) Tighten bolt to 69-79 lb-ft (90-110 N•m).

(4) Position plate (4) on bolt (2).

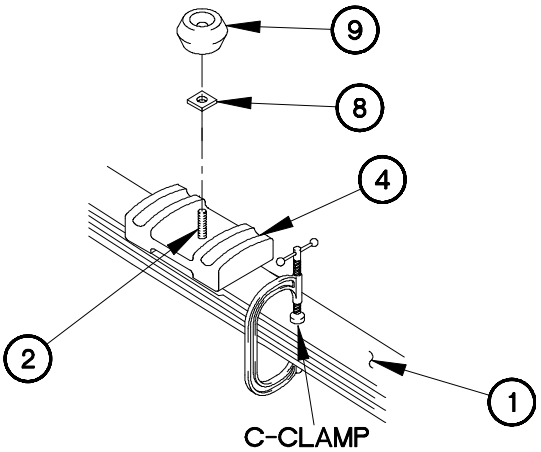
(5) Position two U-bolts (5), four washers (6), and self-locking nuts (7) on plate (4).

(6) Tighten four self-locking nuts (7) to 200 lb-ft (271 N•m) to 390-510 lb-ft (529-692 N•m), in sequence shown.

(7) Re tighten four self-locking nuts (7) in increments of 50 lb-ft (68 N•m) to 390-510 lb-ft (529-692 N•m), in sequence shown.



YP02R11A



YP02R12A

(8) Apply sealant to threads of bolt (2).

(9) Position spacer (8) and enhanced resilient mount (9) on bolt (2).

(10) Tighten enhanced resilient mount (9) 1 1/2 turns after contact with plate (4).

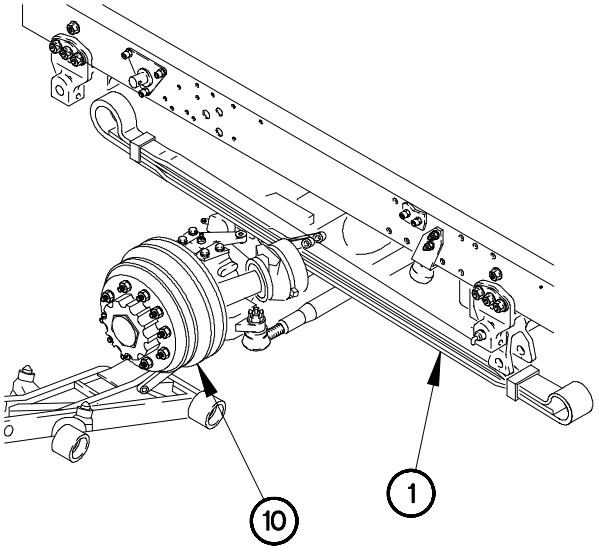
(11) Remove C-Clamp.

14-2. FRONT LEAF SPRING REPLACEMENT (CONT)

NOTE

Step (12) requires the aid of an assistant.

(12) Position leaf spring (1) on front axle (10).



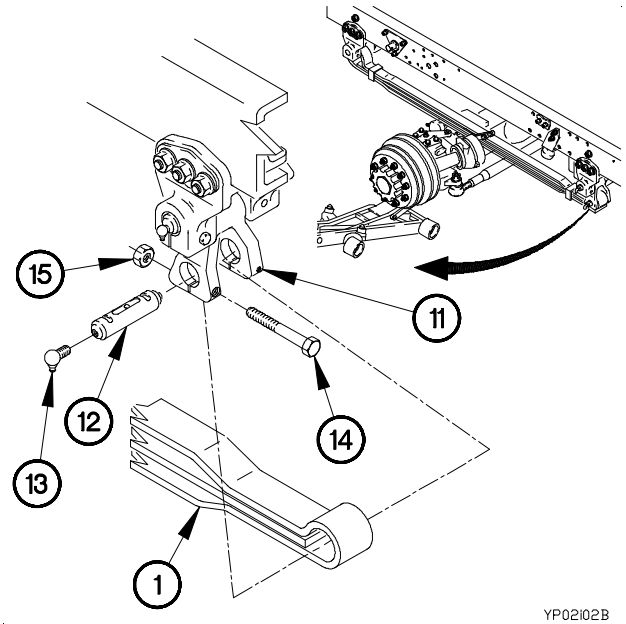
YP02I01-

CAUTION

Use care when installing spring pins to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

NOTE

- Position spring pin so grove faces slot in shackle.
- Lubricate spring pin before installation.
- Step (13) requires the aid of an assistant.



YP02I02B

(13) Install leaf spring (1) in shackle (11) with spring pin (5).

(14) Install lubrication fitting (13) in pin (12).

(15) Position screw (14) and self-locking nut (15) in shackle (4).

(16) Tighten nut (15) to 76-94 lb-ft (103-127 N•m).

NOTE

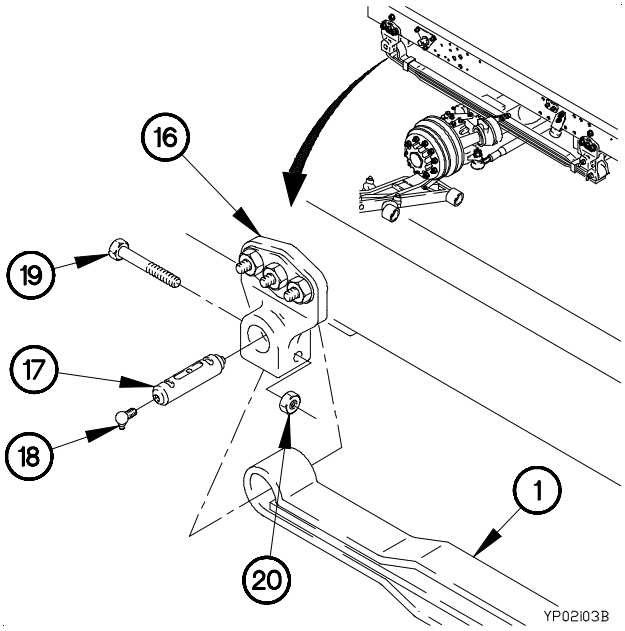
- Position spring pin so groove faces slot in bracket.
- Lubricate spring pin before installation.
- Step (17) requires the aid of an assistant.

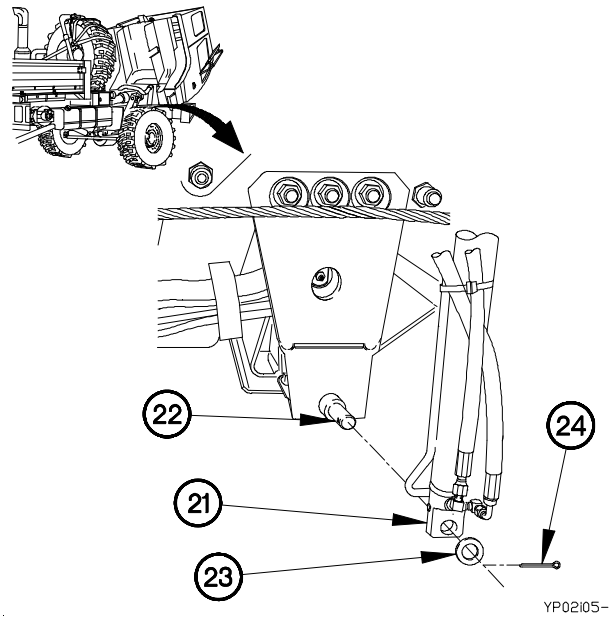
(17) Install leaf spring (1) in front bracket (16) with spring pin (17).

(18) Install lubrication fitting (18) in spring pin (17).

(19) Position bolt (19) and nut (20) in front bracket (16).

(20) Tighten self-locking nut (20) to 76-94 lb-ft (103-127 N•m).





NOTE

Perform steps (21) through (24) on RH side of vehicle.

(21) Position cab tilt cylinder (21) on bracket (22).

(22) Install washer (23) and cotter pin (24) in cab tilt cylinder (21).

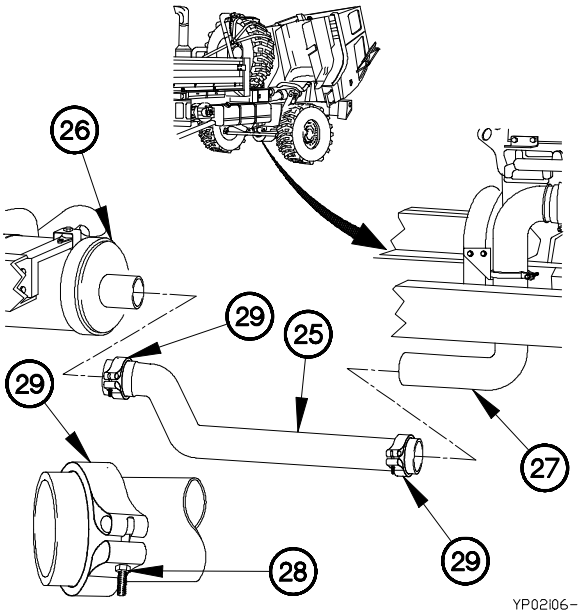
14-2. FRONT LEAF SPRING REPLACEMENT (CONT)

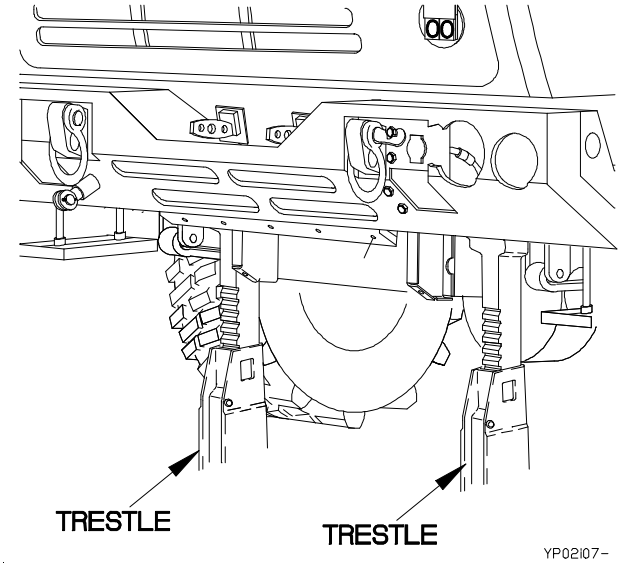
NOTE

Steps (23) and (24) requires the aid of an assistant.

(23) Position exhaust pipe (25) on muffler (26) and engine exhaust extension (27).

(24) Tighten two nuts (28) on clamps (29) to 73-126 lb-in (8-14 N•m).





(25) Lower cab (TM 9-2320-365-10).

(26) Position wheel and lug nuts on side leaf spring was installed (TM 9-2320-365-10).

(27) Remove trestles and floor jack from front of vehicle.

(28) Tighten lug nuts to 425-475 lb-ft (576-644 N•m).

(29) Deleted.

(30) Deleted.

(31) Deleted.

(32) Deleted.

c. Follow-On Maintenance.

(1) Install front drive shaft (left side) (TM 9-2320-365-20-3).

(1.1) Install gravel deflector and gravel deflector extension (TM 9-2320-365-20-3).

(2) After first 1000 miles of vehicle operation, tighten self-locking nuts on U-bolts, in increments of 50 lb-ft (68 N·m), to 390-510 lb-ft (529-692 N·m) in crisscross pattern.

End of Task.

14-3. FRONT LEAF SPRING SHACKLE AND PIN REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Hydraulic reservoir removed, if equipped (left side) (TM 9-2320-365-20-4).
Gravel deflector and gravel deflector extension removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)

Tools and Special Tools (Cont)
Trestles, Motor Vehicle Maintenance (2) (Item 71, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Nut, Self-locking (3) (Item 138, Appendix F)
Grease, Automotive and Artillery (Item 36, Appendix C)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

(1) Deleted.

(2) Deleted.

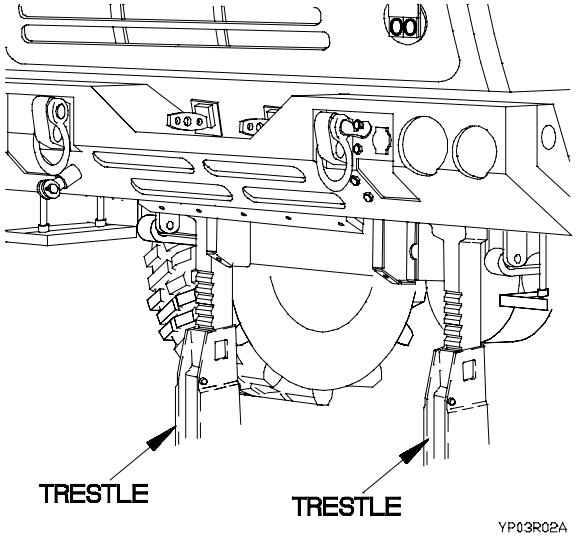
(3) Remove wheel on side that spring is being removed (TM 9-2320-365-10).

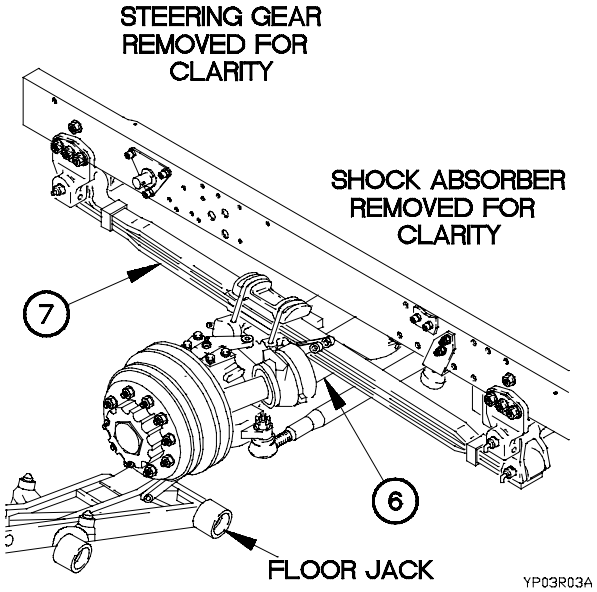
CAUTION

Use care not to pinch left side air hoses when positioning trestles. Failure to comply may result in damage to equipment.

(4) Place front of vehicle on trestles so front wheels are off ground.

(5) Raise cab (TM 9-2320-365-10).





(6) Place floor jack under front axle (6).

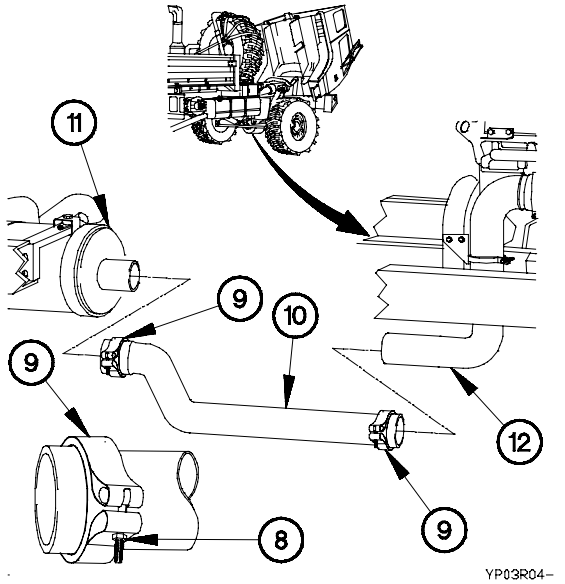
(7) Raise floor jack enough to take front axle weight off leaf spring (7).

NOTE

Perform steps (8) and (9) on right side.

(8) Loosen two nuts (8) on exhaust pipe clamps (9).

(9) Remove exhaust pipe (10) from muffler (11) and engine exhaust extension (12).



14-3. FRONT LEAF SPRING SHACKLE AND PIN REPLACEMENT (CONT)

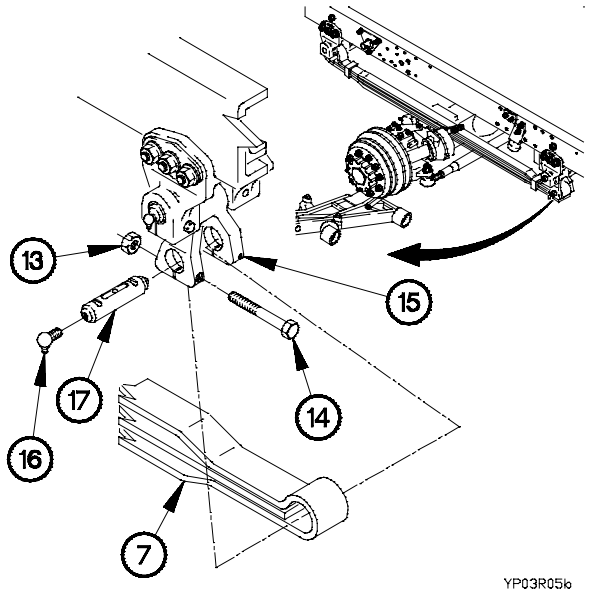
(10) Remove self-locking nut (13) and screw (14) from shackle (15). Discard self-locking nut.

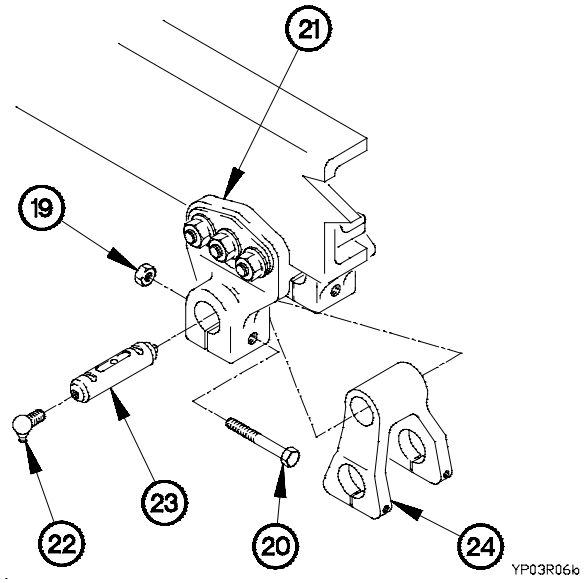
(11) Remove lubrication fitting (16) from spring pin (17).

CAUTION

Use care when removing spring pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(12) Remove spring pin (17) and leaf spring (7) from shackle (15).





(13) Remove self-locking nut (19) and screw (20) from rear bracket (21). Discard self-locking nut.

(14) Remove lubrication fitting (22) from spring pin (23).

CAUTION

Use care when removing pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(15) Remove spring pin (23) and shackle (24) from rear bracket (21).

b. Installation.

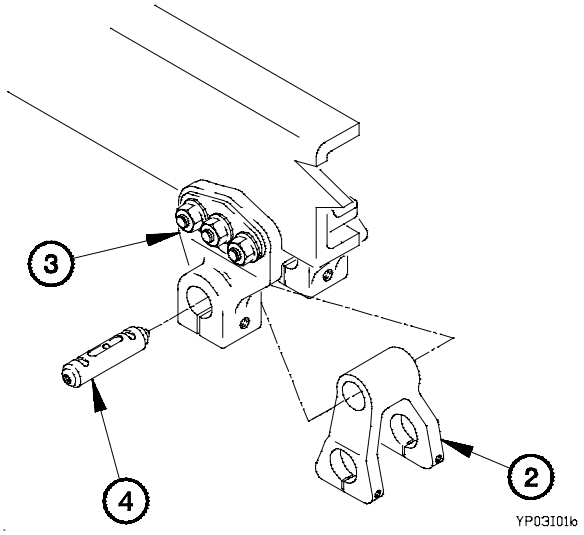
CAUTION

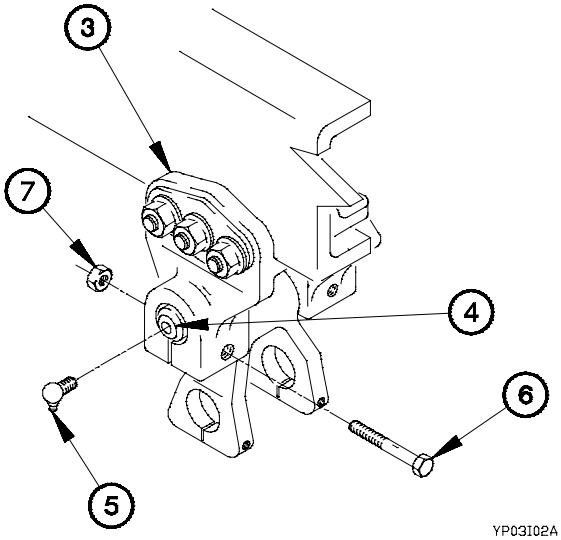
Ensure spring pin is positioned so groove faces slot in rear shackle. Failure to comply may result in damage to equipment.

NOTE

Lubricate spring pin prior to installation.

(1) Install shackle (2) in rear bracket (3) with spring pin (4).





CAUTION

Use care when installing pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(2) Install lubrication fitting (5) in spring pin (4).

(3) Position screw (6) and nut (7) in rear bracket (3).

(4) Tighten self-locking nut (7) to 76-94 lb-ft (103-127 N·m).

14-3. FRONT LEAF SPRING SHACKLE AND PIN REPLACEMENT (CONT)

CAUTION

- Use care when installing pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.
- Ensure spring pin is positioned so grove faces slot in rear shackle. Failure to comply may result in damage to equipment.

NOTE

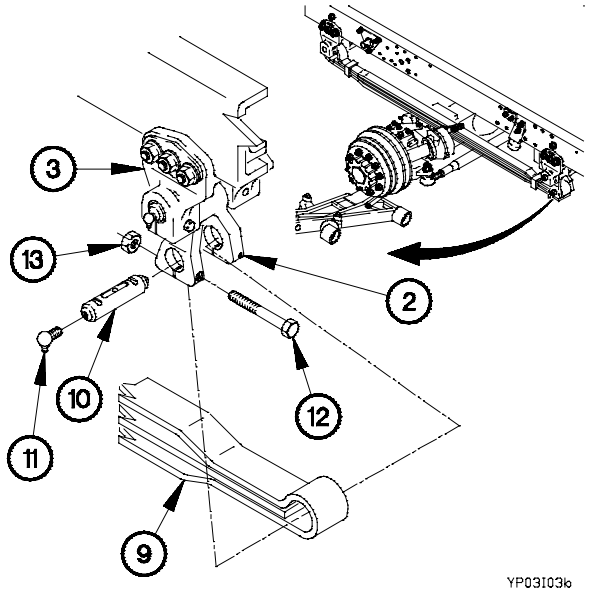
- Step (5) requires the aid of an assistant.
- Lubricate spring pin prior to installation.

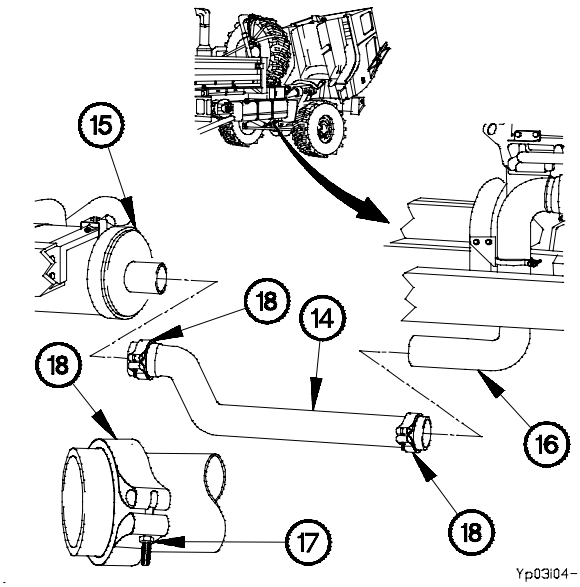
(5) Install leaf spring (9) on shackle (2) with spring pin (10).

(6) Install lubrication fitting (11) in spring pin (10).

(7) Position screw (12) and self-locking nut (13) in rear bracket (3).

(8) Tighten self-locking nut (13) to 76-94 lb-ft (103-127 N·m).





NOTE

- Perform steps (9) and (10) on RH side of vehicle.
- Steps (9) and (10) require the aid of an assistant.

(9) Position exhaust pipe (14) on muffler (15) and engine exhaust extension (16).

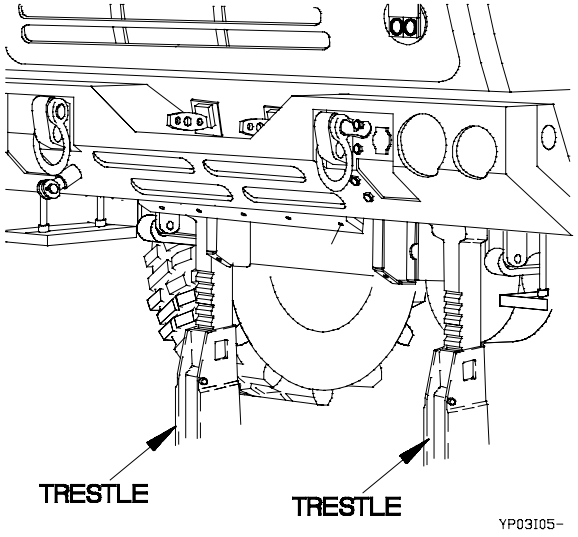
(10) Tighten two nuts (17) on clamps (18) to 73-126 lb-in (8-14 N·m).

(11) Lower cab (TM 9-2320-365-10).

(12) Position wheel and lug nuts on side leaf spring was installed (TM-9-2320-365-10).

(13) Remove two trestles and floor jack from under vehicle.

(14) Tighten lug nuts to 425-475 lb-ft (576-644 N·m).



(15) Deleted.

(16) Deleted.

(17) Deleted.

(18) Deleted.

c. Follow-On Maintenance.

(1) Install hydraulic reservoir, if removed (TM 9-2320-365-20-4).
(2) Install gravel deflector and gravel deflector extension (TM 9-2320-365-20-3).

End of Task.

14-4. REAR LEAF SPRING REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Rear wheel removed (from side being replaced) (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)

Tools and Special Tools (Cont)
Trestles, Motor Vehicle Maintenance (2) (Item 71, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Nut, Self-locking (4) (Item 124, Appendix F)
Nut, Self-locking (2) (Item 138, Appendix F)
U-bolt (2) (Item 15.1, Appendix F)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

Left and right side rear leaf springs are removed the same way. Right side leaf spring shown.

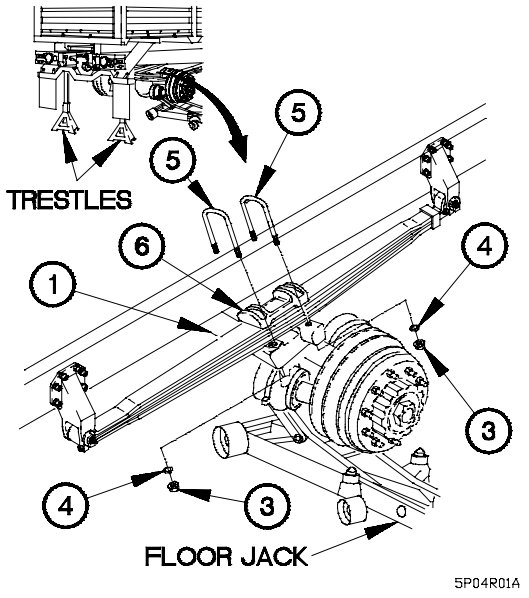
(1) Place trestles under rear of vehicle.

(2) Raise floor jack enough to take rear axle (1) weight off leaf spring (2).

(3) Remove four self-locking nuts (3), washers (4), and two U-bolts (5) from leaf spring (2). Discard self-locking nuts and U-bolts.

(4) Remove plate (6) from leaf spring (2).

(5) Lower rear axle (1) until there is a gap between rear axle and leaf spring (2).



(6) Remove self-locking nut (7) and screw (8) from rear bracket (9). Discard self-locking nut.

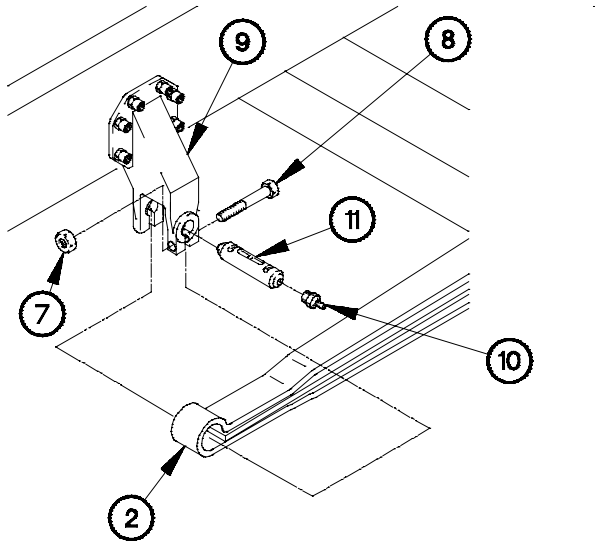
(7) Remove lubrication fitting (10) from spring pin (11).

CAUTION

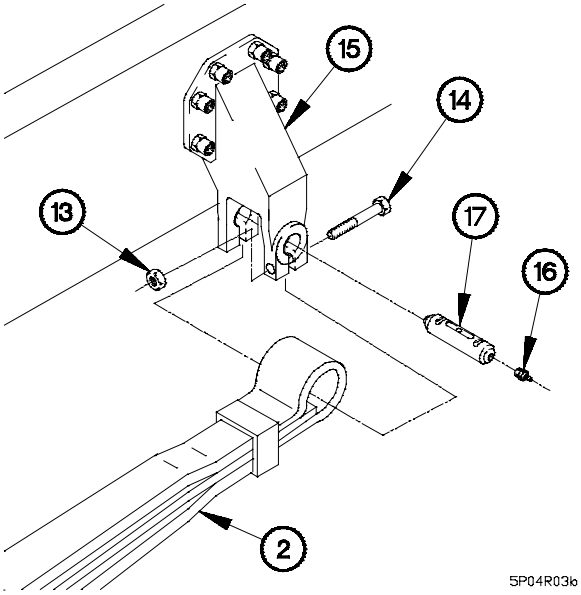
Use care when removing spring pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(8) Remove spring pin (11) from rear bracket (9).

(9) Remove leaf spring (2) from rear bracket (9).



5P04R02lo



5P04R03lo

(10) Remove self-locking nut (13) and screw (14) from front bracket (15). Discard self-locking nut.

(11) Remove lubrication fitting (16) from spring pin (17).

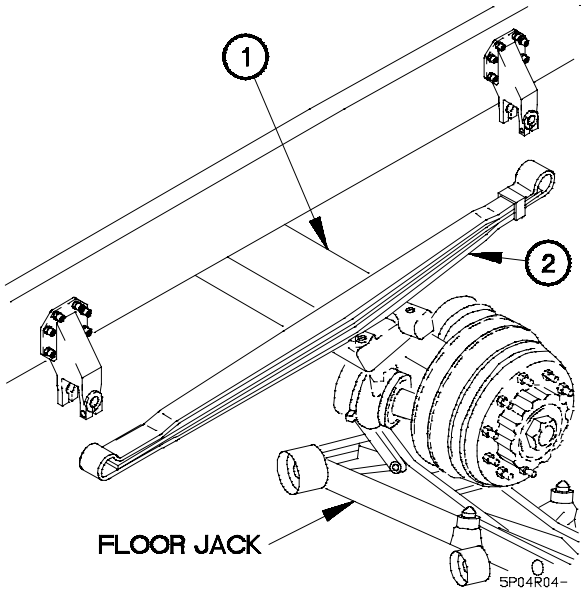
(12) Remove spring pin (17) from front bracket (15).

(13) Remove leaf spring (2) from front bracket (15).

WARNING

Do not attempt to repair or disassemble leaf springs. Leaf springs are under extreme tension. Failure to comply may result in serious injury or death to personnel.

(14) Remove leaf spring (2) from rear axle (1).



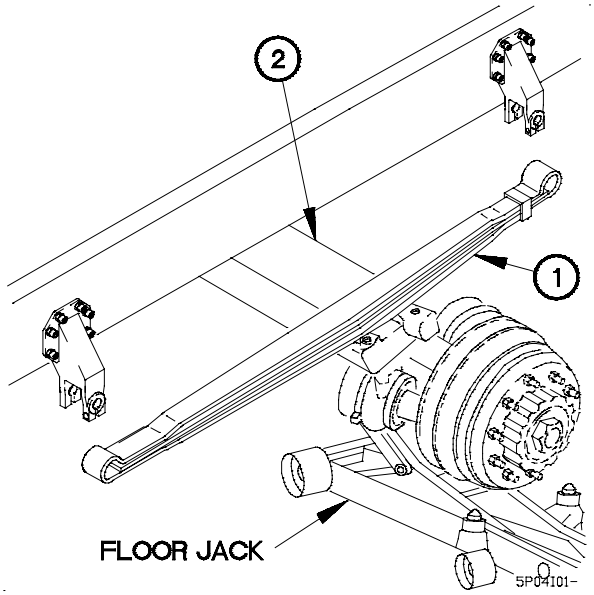
14-4. REAR LEAF SPRING REPLACEMENT (CONT)

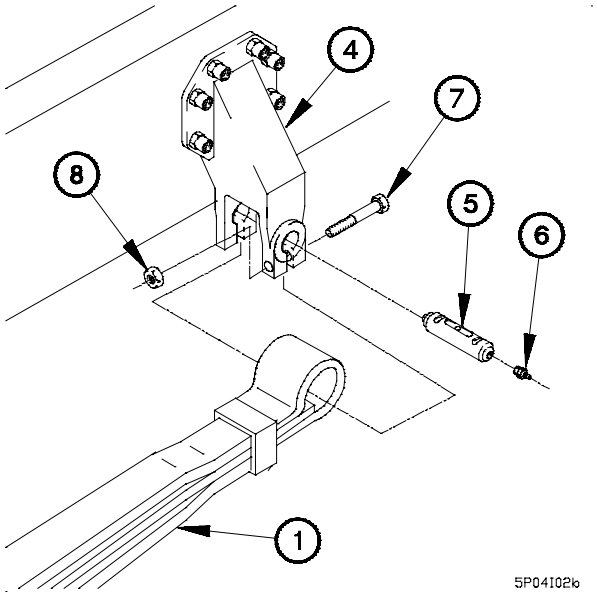
b. Installation.

NOTE

- Left and right side rear leaf springs are installed the same way. Right side leaf spring shown.
- Step (1) requires the aid of assistant.

(1) Position leaf spring (1) on rear axle (2).





CAUTION

Ensure spring pin is positioned so groove faces slot in bracket. Failure to comply may result in damage to equipment.

NOTE

Lubricate pin before installation.

(2) Install leaf spring (1) in front bracket (4) with spring pin (5).

(3) Install lubrication fitting (6) in spring pin (5).

(4) Position screw (7) and nut (8) in front bracket (4).

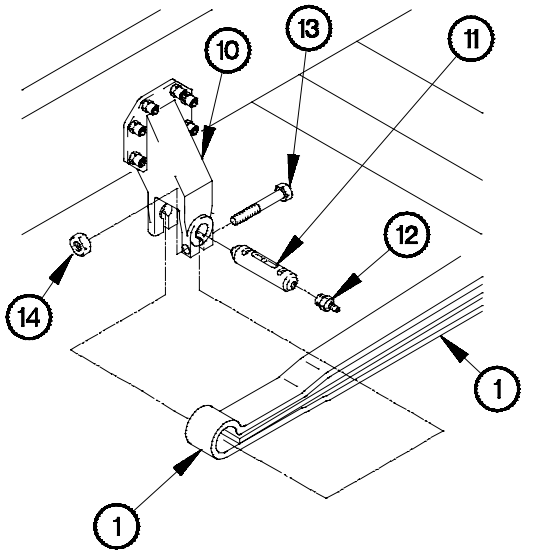
(5) Tighten nut (8) to 76-94 lb-ft (103-127 N·m)..

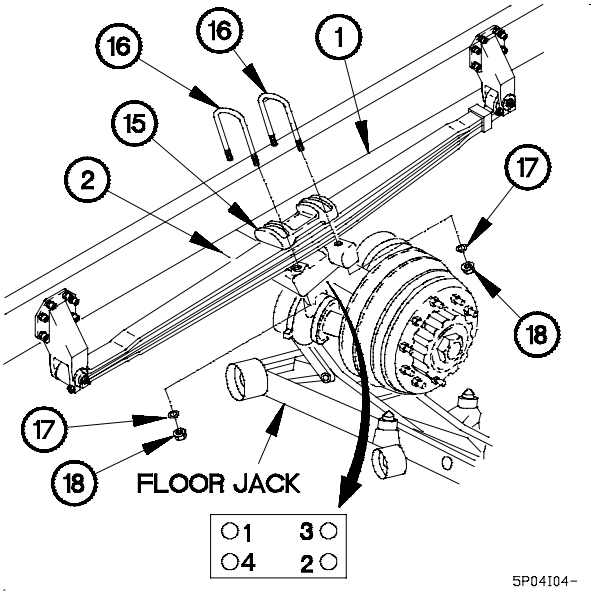
(6) Install leaf spring (1) in rear bracket (10) with spring pin (11).

(7) Install lubrication fitting (12) in spring pin (11).

(8) Position screw (13) and nut (14) in rear bracket (10).

(9) Tighten nut (14) to 76-94 lb-ft (103-127 N·m).





(10) Place floor jack under rear axle (2).

(11) Raise rear axle (2) until leaf spring (1) is in mounting position.

(12) Install plate (15) on leaf spring (1).

(13) Install two U-bolts (16) on leaf spring (1) with four washers (17) and nuts (18).

(14) Tighten four nuts (18) to 390-510 lb-ft (529-692 N·m).

(15) Remove floor jack from rear axle (2).

c. Follow-On Maintenance.

(1) Install rear wheels (TM 9-2320-365-10).

(2) After 1000 miles of vehicle operation, torque four nuts on U-bolts in increments of 50 lb-ft (68 N·m) to 390-510 lb-ft (529-692 N·m) in crisscross pattern.

End of Task.

14-5. FRONT SPRING BRACKETS REPLACEMENT

This task covers:

a. Front Spring Front Bracket Removal
b. Front Spring Front Bracket Installation
c. Front Spring Rear Bracket Removal
d. Front Spring Rear Bracket Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Fuel tank removed (right front spring rear bracket) (TM 9-2320-365-20-3).
Hydraulic reservoir removed, if equipped (left front spring rear bracket) (TM 9-2320-365-20-4).
Gravel deflector and gravel deflector extension removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
Jack, Leveling Support, Vehicle (2) (TM 9-2320-365-20)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Nut, Self-locking (Item 138, Appendix F)

Materials/Parts (Cont)
Bolt (2) (Item 9, Appendix F)
Nut, Self-locking (3) (Item 134, Appendix F) (front spring front brackets)
Nut, Self-locking (4) (Item 134, Appendix F) (front spring rear brackets)
Pin, Cotter (Item 229, Appendix F) (front spring front brackets)
Nut, Self-locking (2) (Item 126, Appendix F) (front spring rear brackets)
Nut, Self-locking (2) (Item 132, Appendix F) (front spring rear brackets)
Bolt (Item 8, Appendix F) (front spring rear brackets)
Bolt (Item 11, Appendix F) (front spring rear brackets)
Sealing Compound (Item 75, Appendix C)
Grease, Automotive and Artillery (GAA) (Item 36, Appendix C)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Front Spring Front Bracket Removal.

(1) Deleted

(2) Deleted

NOTE

- Turn steering wheel all the way to the right.
- Left and right side front spring front brackets are removed the same way. Left side shown.

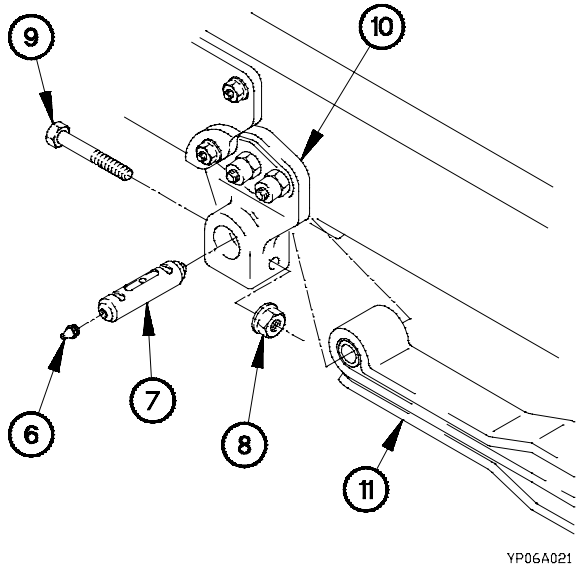
(3) Remove lubrication fitting (6) from spring pin (7).

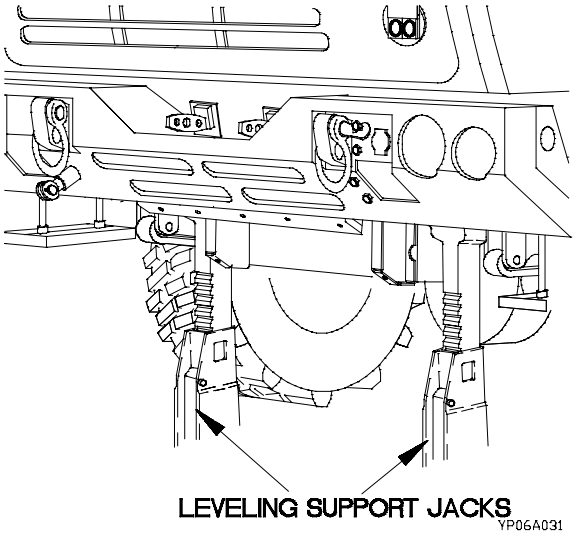
(4) Remove self-locking nut (8) and screw (9) from left front spring front bracket (10). Discard self-locking nut.

CAUTION

Use care when removing spring pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(5) Remove spring pin (7) and front spring (11) from left front spring front bracket (10).





CAUTION

Use care not to pinch left side air hoses when positioning leveling support jacks. Failure to comply may result in damage to equipment.

(6) Place front of vehicle on two leveling support jacks so front wheels are barely touching ground.

14-5. FRONT SPRING BRACKETS REPLACEMENT (CONT)

NOTE

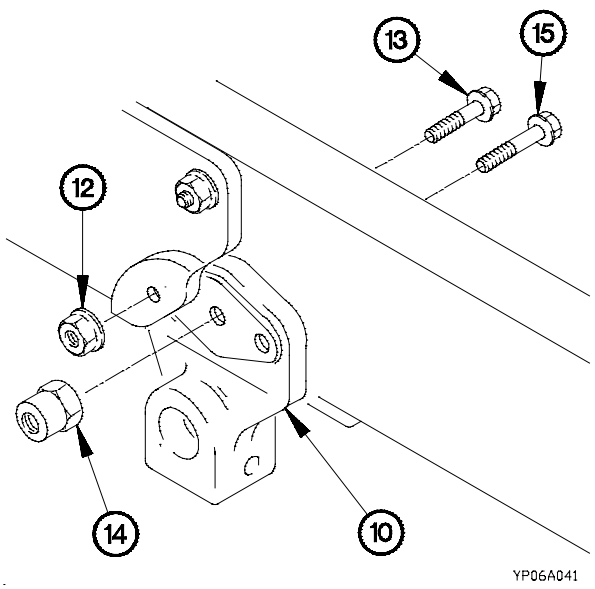
Perform steps (7) through (9) on left side front spring front bracket.

(7) Remove self-locking nut (12) and bolt (13) from left front spring front bracket (10). Discard self-locking nut.

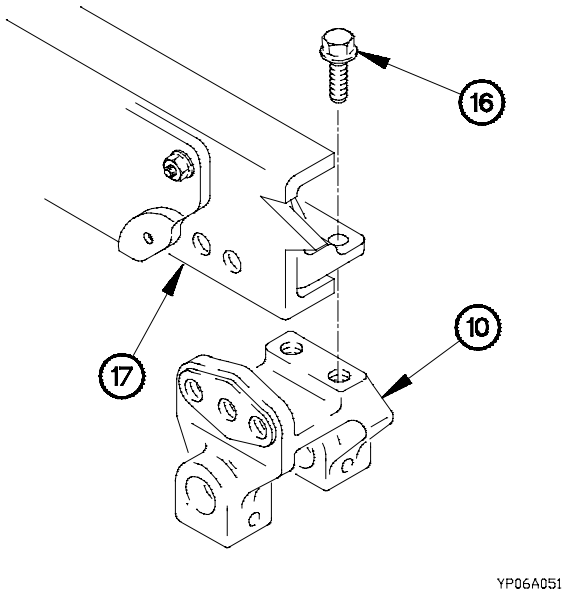
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(8) Remove two collars (14) and bolts (15) from left front spring front bracket (10). Discard collars and bolts.



YP06A041



YP06A051

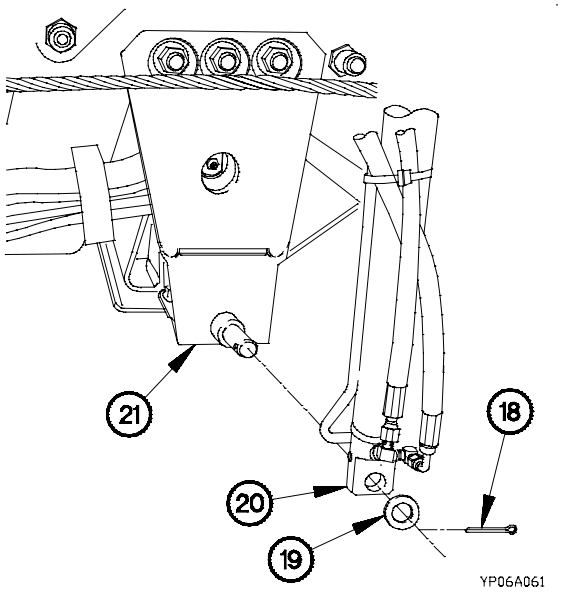
(9) Remove two bolts (16) and left front spring front bracket (10) from left frame rail (17).

NOTE

Perform steps (10) through (13) on right side front spring front bracket.

(10) Remove cotter pin (18) and washer (19) from lower end of cab tilt cylinder (20). Discard cotter pin.

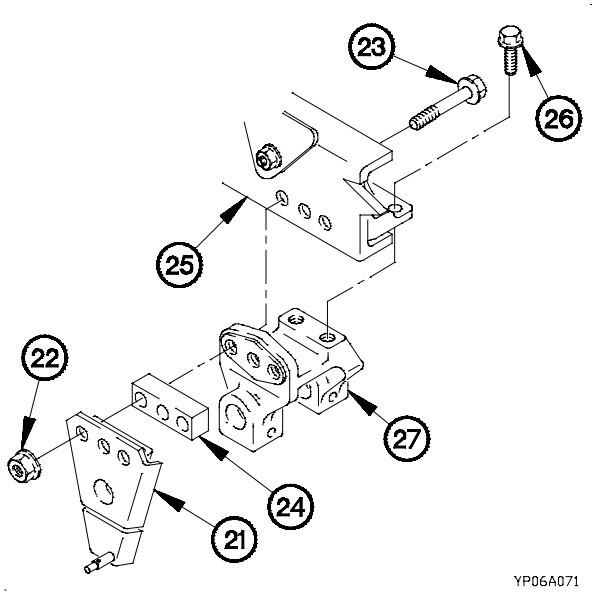
(11) Remove cab tilt cylinder (20) from cab tilt cylinder bracket (21).



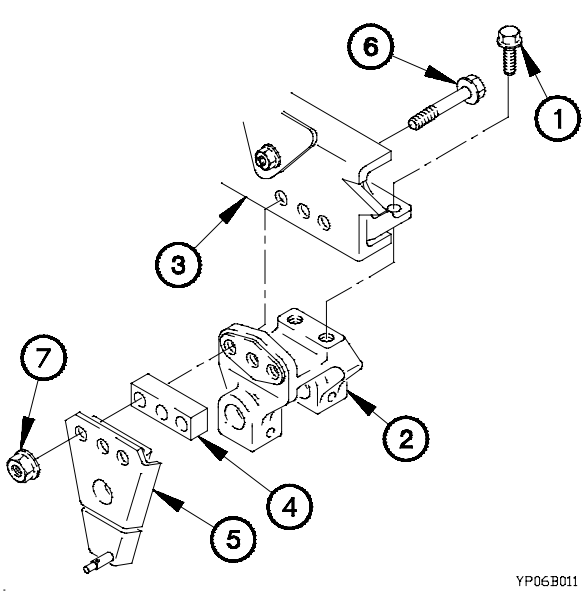
YP06A061

(12) Remove three self-locking nuts (22), bolts (23), cab tilt cylinder bracket (21), and plate (24) from right frame rail (25). Discard self-locking nuts.

(13) Remove two bolts (26) and right front spring front bracket (27) from right frame rail (25).



b. Front Spring Front Bracket Installation.



WARNING

Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

NOTE

Perform steps (1) through (6) on right side front spring front bracket.

(1) Apply sealing compound to threads of two bolts (1).

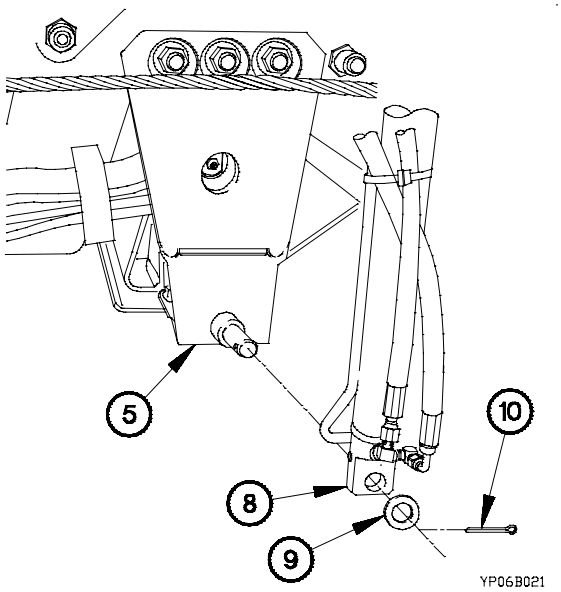
(2) Position right front spring front bracket (2) on right frame rail (3) with two bolts (1).

(3) Tighten two bolts (1) to 195-240 lb-ft (265-325 N·m).

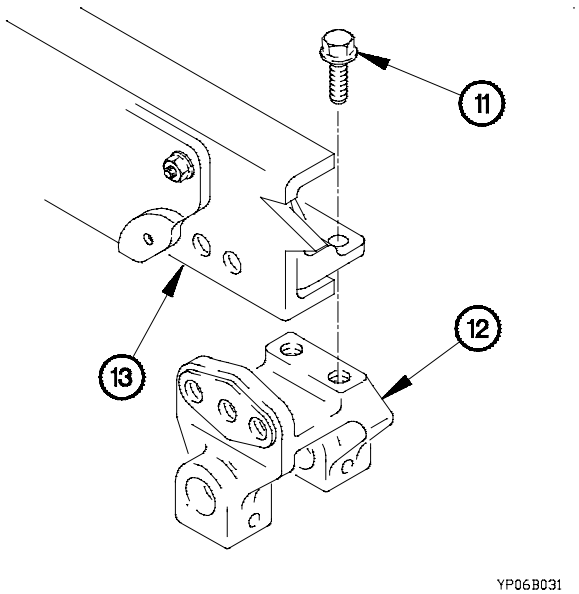
(4) Position plate (4) and cab tilt cylinder bracket (5) on right frame rail (3) with three bolts (6) and self-locking nuts (7).

(5) Tighten three self-locking nuts (7) to 210-225 lb-ft (285-305 N·m).

14-5. FRONT SPRING BRACKETS REPLACEMENT (CONT)



(6) Install cab tilt cylinder (8) on cab tilt cylinder bracket (5) with washer (9) and cotter pin (10).



WARNING

Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

NOTE

Steps (7) through (13) apply to left side front spring front bracket.

(7) Apply sealing compound to threads of two bolts (11).

(8) Position left front spring front bracket (12) on left frame rail (13) with two bolts (11).

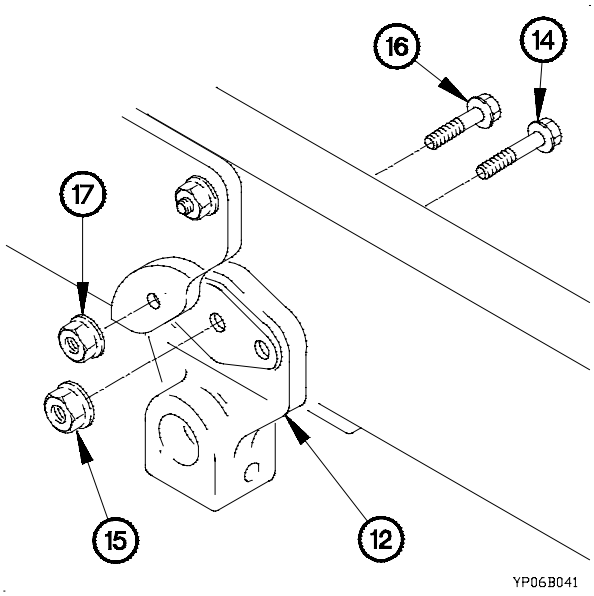
(9) Tighten two bolts (11) to 195-240 lb-ft (265-325 N·m).

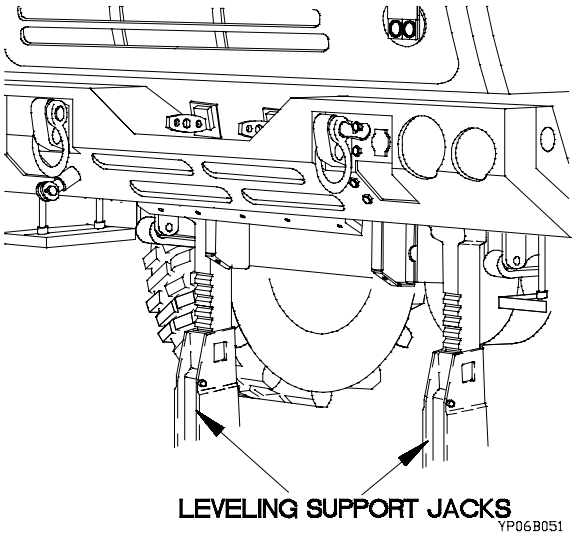
(10) Position two bolts (14) and self-locking nuts (15) in left front spring front bracket (12).

(11) Tighten two self-locking nuts (15) to 210-225 lb-ft (285-305 N·m).

(12) Position bolt (16) and self-locking nut (17) in left front spring front bracket (12).

(13) Tighten self-locking nut (17) to 232-284 lb-ft (315-385 N·m).





(14) Remove two leveling support jacks from front of vehicle.

NOTE

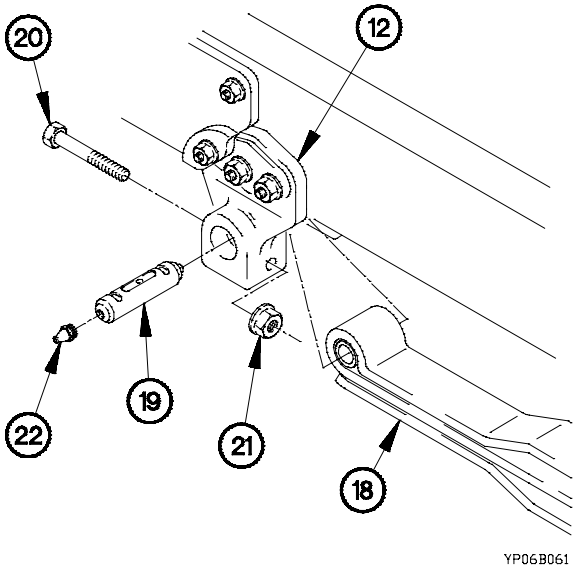
Left and right side front spring front brackets are installed the same way. Left side shown.

(15) Install front spring (18) in left front spring front bracket (12) with spring pin (19).

(16) Position screw (20) and self-locking nut (21) in left front spring front bracket (12).

(17) Tighten self-locking nut (21) to 74-96 lb-ft (100-130 N·m).

(18) Install lubrication fitting (22) in spring pin (19).



14-5. FRONT SPRING BRACKETS REPLACEMENT (CONT)

(19) Deleted.

(20) Deleted.

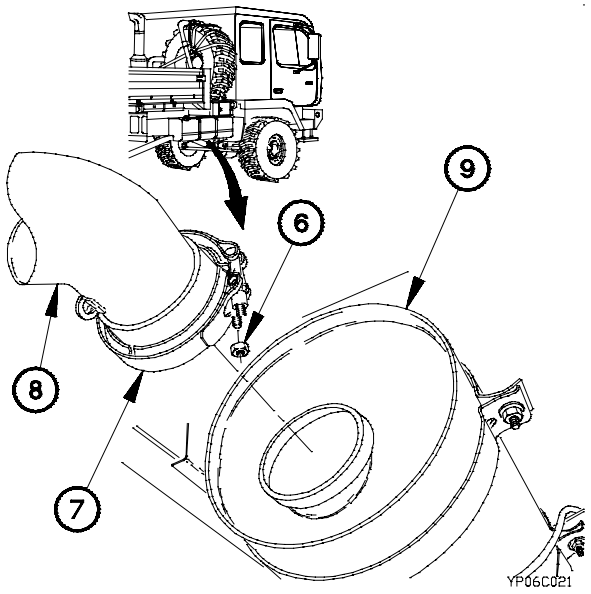
(21) Deleted.

(22) Deleted.

c. Front Spring Rear Bracket Removal.

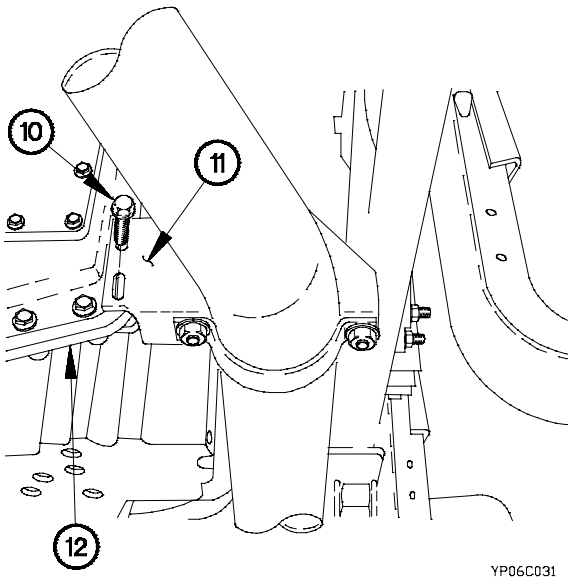
(1) Deleted.

(2) Deleted.

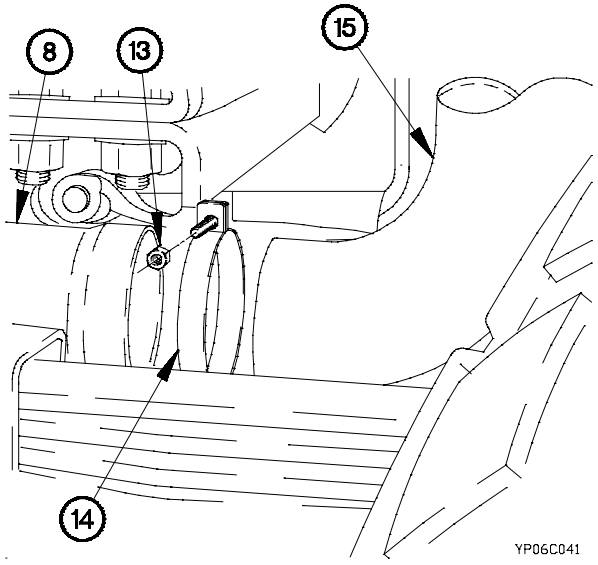


(3) Remove self-locking nut (6) from clamp (7). Discard self-locking nut.

(4) Disconnect lower exhaust pipe (8) from muffler (9).



(5) Remove two bolts (10) and exhaust bracket (11) from transmission (12).

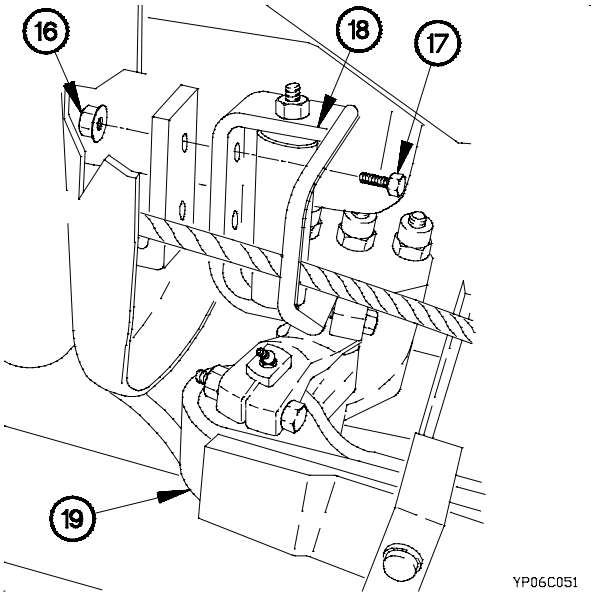


(6) Remove self-locking nut (13) from clamp (14). Discard self-locking nut.

(7) Remove lower exhaust pipe (8) from upper exhaust pipe (15).

NOTE

Perform steps (8) and (9) on vehicles with 11K SRW.



(8) Remove two self-locking nuts (16) and bolts (17) from cable guide (18).

(9) Position cable guide (18) for access to front spring rear bracket (19).

14-5. FRONT SPRING BRACKETS REPLACEMENT (CONT)

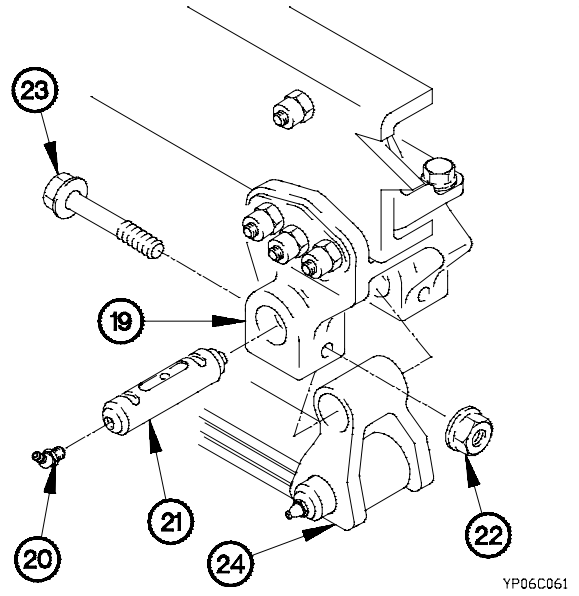
(10) Remove lubrication fitting (20) from spring pin (21).

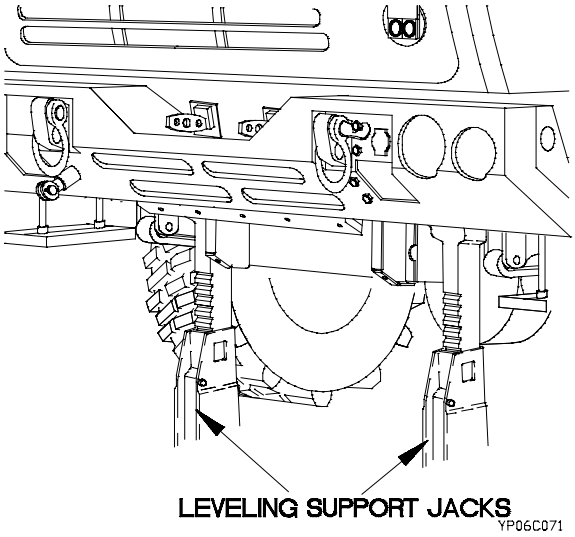
CAUTION

Use care when removing spring pin to prevent damage to lubrication fitting hole threads. Failure to comply may result in damage to equipment.

(11) Remove self-locking nut (22) and screw (23) from front spring rear bracket (19). Discard self-locking nut.

(12) Remove spring pin (21) and front spring (24) from front spring rear bracket (19).





CAUTION

Use care not to pinch left side air lines when positioning leveling support jacks. Failure to comply may result in damage to equipment.

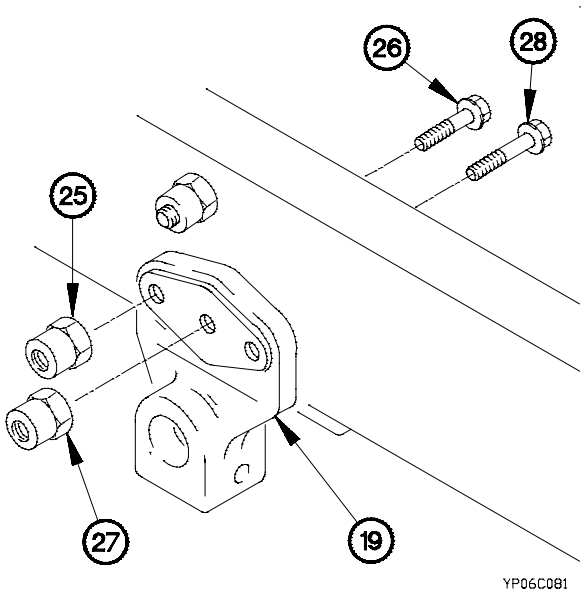
(13) Place front of vehicle on two leveling support jacks so front wheels are barely touching ground.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(14) Remove two collars (25) and bolts (26) from front spring rear bracket (19). Discard collars and bolts.

(15) Remove collar (27), and bolt (28) from front spring rear bracket (19). Discard collar and bolt.

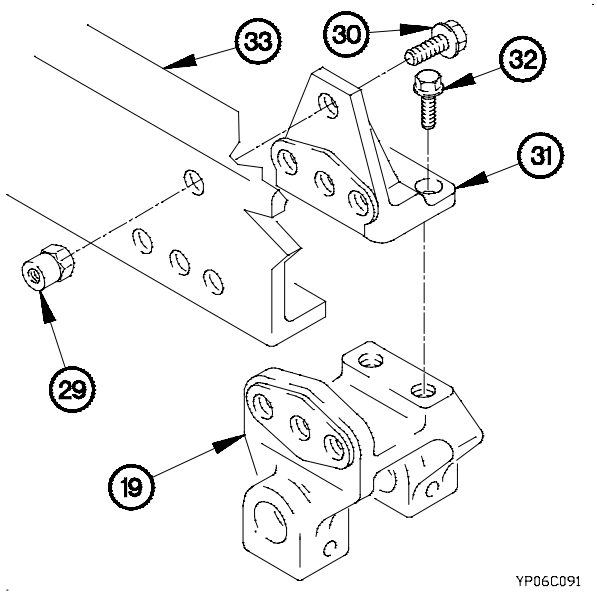


CAUTION

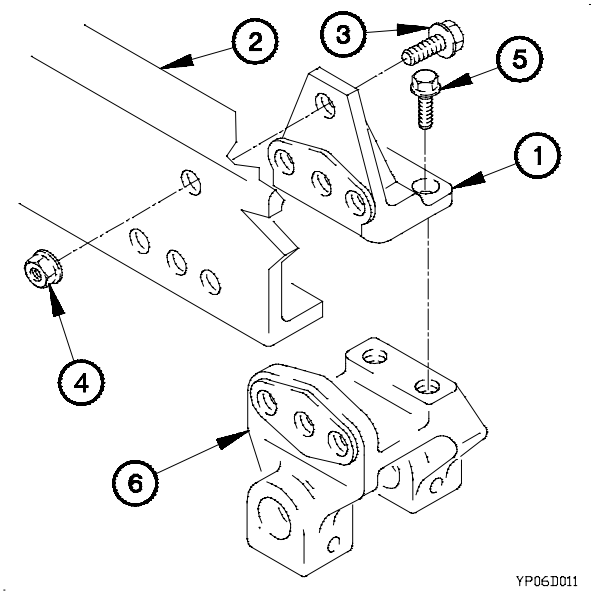
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(16) Remove collar (29) and bolt (30) from angle bracket (31). Discard collar and bolt.

(17) Remove two bolts (32), angle bracket (31) and front spring rear bracket (19) from frame rail (33).



d. Front Spring Rear Bracket Installation.



(1) Position angle bracket (1) on frame rail (2) with bolt (3) and self-locking nut (4).

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(2) Apply sealing compound to threads of two bolts (5).

(3) Position front spring rear bracket (6) on angle bracket (1) with two bolts (5).

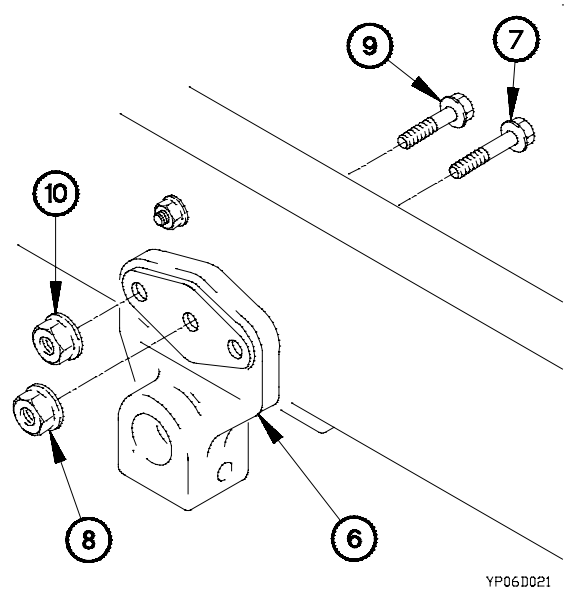
(4) Tighten two bolts (5) to 195-240 lb-ft (265-325 N·m).
(5) Tighten self-locking nut (4) to 210-225 lb-ft (285-305 N·m).

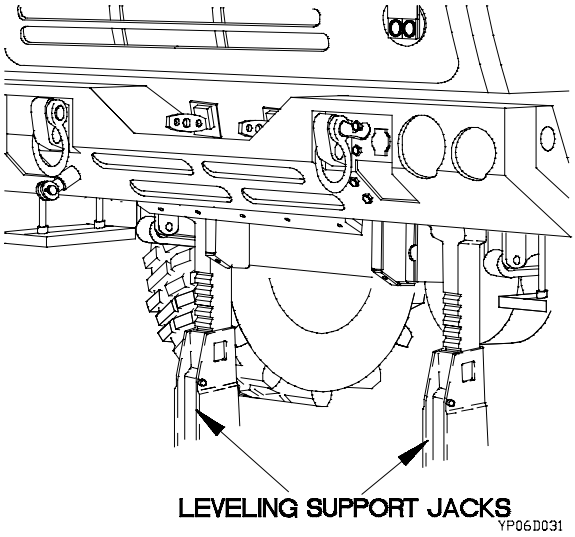
14-5. FRONT SPRING BRACKETS REPLACEMENT (CONT)

(6) Position bolt (7) and self-locking nut (8) in front spring rear bracket (6).

(7) Position two bolts (9) and self-locking nuts (10) in front spring rear bracket (6).

(8) Tighten self-locking nut (8) and two self-locking nuts (10) to 210-225 lb-ft (285-305 N·m).





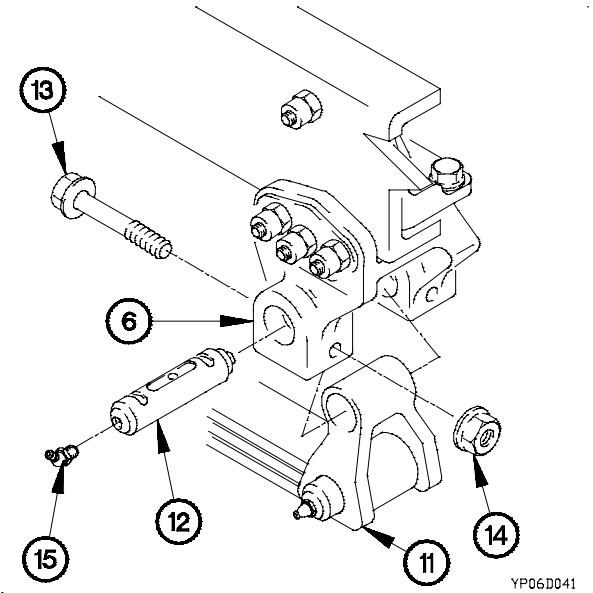
(9) Remove two leveling support jacks from front of vehicle.

(10) Install front spring (11) in front spring rear bracket (6) with spring pin (12)

(11) Position bolt (13) and self-locking nut (14) in front spring rear bracket (6).

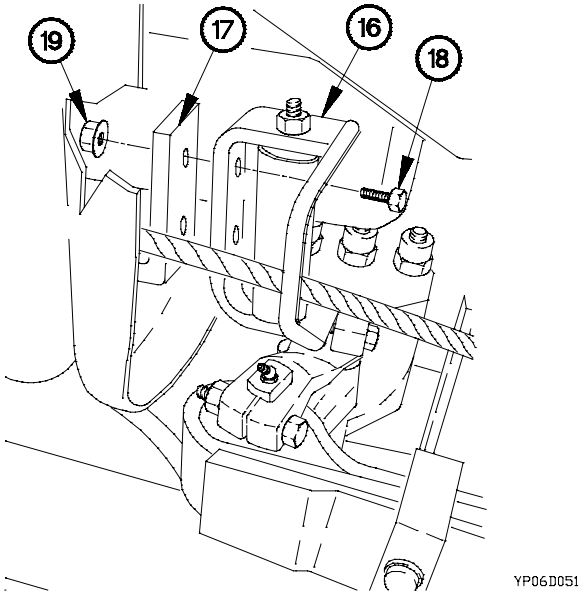
(12) Tighten self-locking nut (14) to 74-96 lb-ft (100-130 N·m).

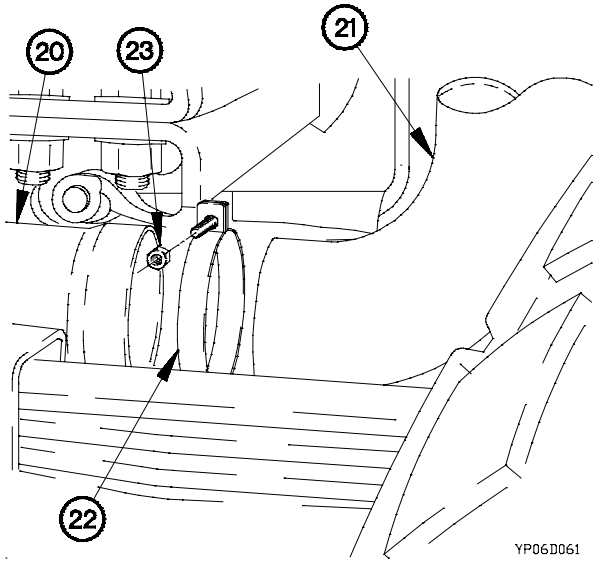
(13) Install lubrication fitting (15) in spring pin (12).



(14) Position cable guide (16) on bracket (17) with two bolts (18) and self-locking nuts (19).

(15) Tighten two self-locking nuts (19) to 34-42 lb-ft (47-57 N·m).



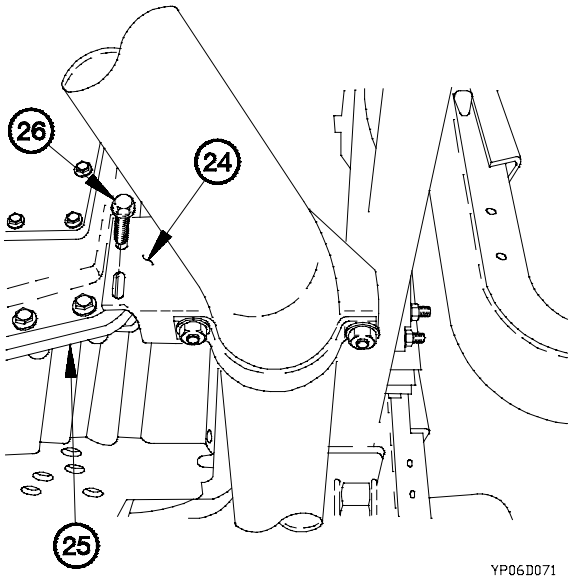


(16) Position lower exhaust pipe (20) on upper exhaust pipe (21) with clamp (22) and self-locking nut (23).

(17) Tighten self-locking nut (23) to 72-120 lb-in. (8-14 N·m).

(18) Position exhaust bracket (24) on transmission (25) with two bolts (26).

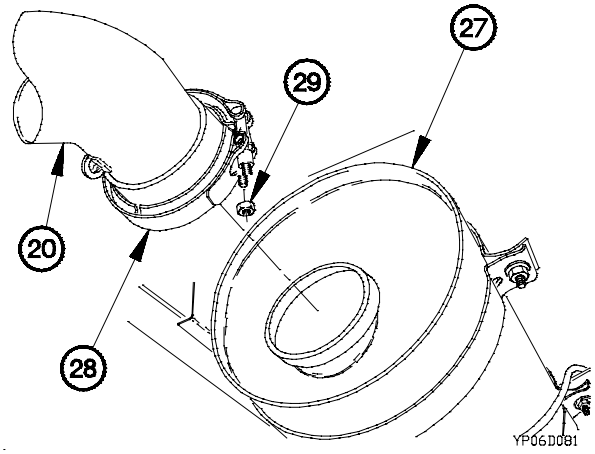
(19) Tighten two bolts (26) to 44-55 lb-ft (60-75 N·m).



14-5. FRONT SPRING BRACKETS REPLACEMENT (CONT)

(20) Position lower exhaust pipe (20) on muffler (27) with clamp (28) and self-locking nut (29).

(21) Tighten self-locking nut (29) to 89-109 lb-in. (8-14 N·m).



(22) Deleted.

(23) Deleted.

(24) Deleted.

(25) Deleted.

e. Follow-On Maintenance.

(1) Install hydraulic reservoir, if equipped (left front spring rear bracket) (TM 9-2320-365-20-4).

(2) Install fuel tank (right front spring rear bracket) (TM 9-2320-365-20-3).

(3) Apply grease to lubrication fittings (TM 9-2320-365- 10).

(4) Install gravel deflector and gravel deflector extension (TM 9-2320-365-20-3).

End of Task.

14-6. FRONT SHOCK ABSORBER BRACKET REPLACEMENT

This task covers:

a. Left Front Shock Absorber Bracket Removal
b. Left Front Shock Absorber Bracket Installation
c. Right Front Shock Absorber Bracket Removal
d. Right Front Shock Absorber Bracket Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Front axle shock absorber removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Tools and Special Tools (Cont)
Socket Set, Socket Wrench (Item 51, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)

Materials/Parts
Bolt (2) (Item 2, Appendix F)
Bolt (2) (Item 3, Appendix F)
Nut, Self-locking (4) (Item 128, Appendix F) (LH side)
Nut, Self-locking (Item 133, Appendix F) (LH side)
Nut, Self-locking (Item 145, Appendix F) (RH side)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Left Front Shock Absorber Bracket Removal.

(1) Remove self-locking nut (1), screw (2), and clamp (3) from left front shock absorber bracket (4). Discard self-locking nut.

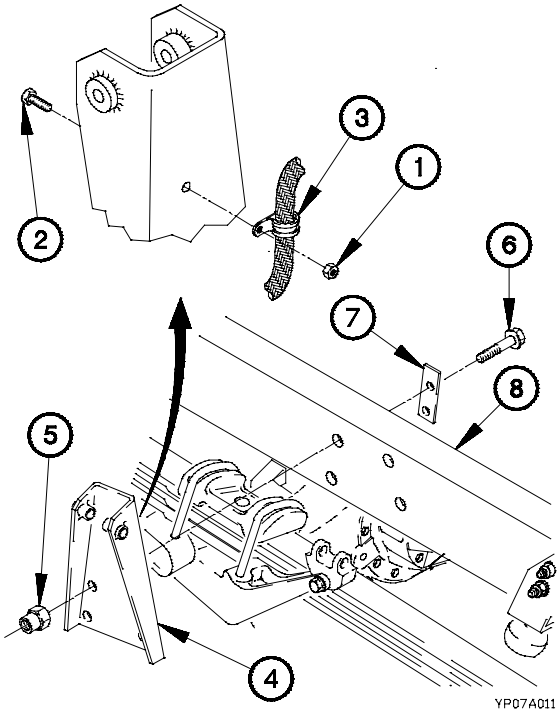
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

Step (2) requires the aid of an assistant.

(2) Remove four collars (5), bolts (6), left front shock absorber bracket (4), and two plates (7) from frame rail (8). Discard collars and bolts.



14-6. FRONT SHOCK ABSORBER BRACKET REPLACEMENT (CONT)

b. Left Front Shock Absorber Bracket Installation.

NOTE

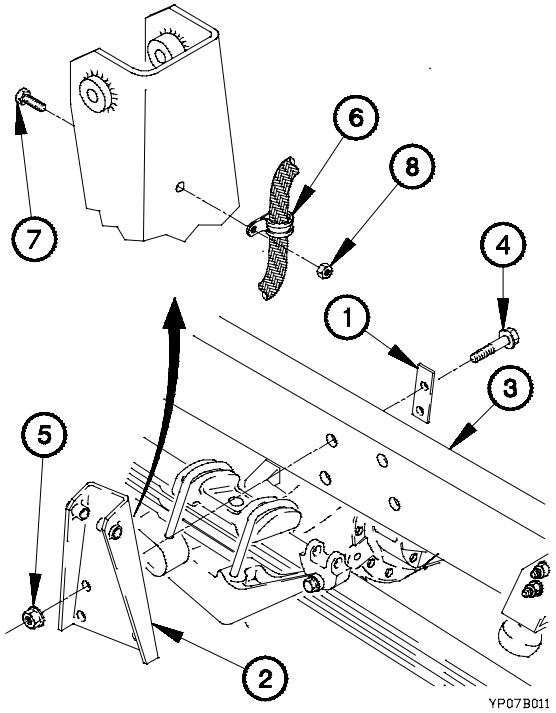
Steps (1) and (2) require the aid of an assistant.

(1) Position two plates (1) and left front shock absorber bracket (2) on frame rail (3) with four bolts (4) and self-locking nuts (5).

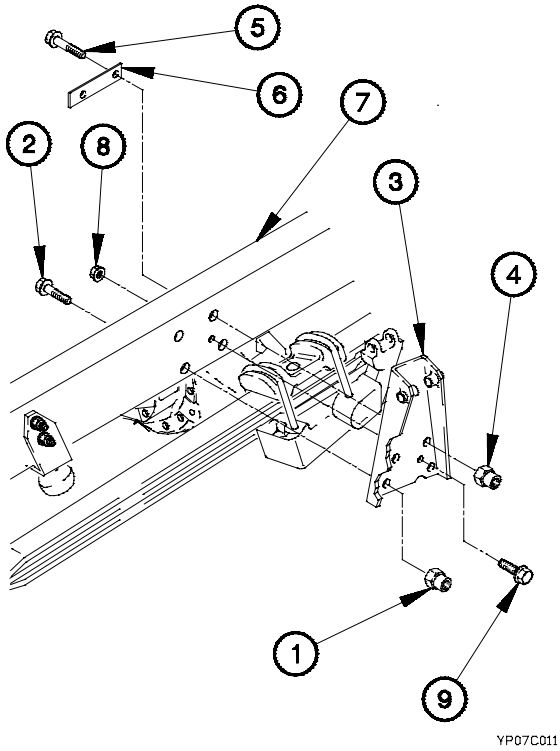
(2) Tighten four self-locking nuts (5) to 77-92 lb-ft (105-125 N·m).

(3) Position clamp (6) on left front shock absorber bracket (2) with screw (7) and self-locking nut (8).

(4) Tighten self-locking nut (8) to 84-108 lb-in. (10-12 N·m).



c. Right Front Shock Absorber Bracket Removal.



CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

Steps (1) through (3) require the aid of an assistant.

(1) Remove two collars (1) and bolts (2) from front right shock absorber bracket (3). Discard collars and bolts.

(2) Remove two collars (4), bolts (5), and plate (6) from frame rail (7). Discard collars and bolts.

(3) Remove self-locking nut (8), bolt (9), and right front shock absorber bracket (3) from frame rail (7). Discard self-locking nut.

d. Right Front Shock Absorber Bracket Installation.

NOTE

Steps (1) through (5) require the aid of an assistant.

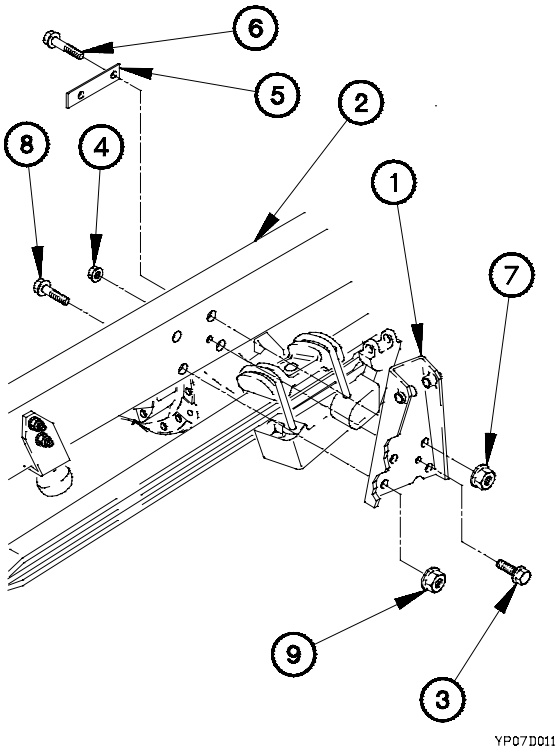
(1) Position right front shock absorber bracket (1) on frame rail (2) with bolt (3) and self-locking nut (4).

(2) Position plate (5) on frame rail (2) with two bolts (6) and self-locking nuts (7).

(3) Position two bolts (8) and self-locking nuts (9) in right front shock absorber bracket (1).

(4) Tighten two self-locking nuts (7 and 9) to 77-92 lb-ft (105-125 N·m).

(5) Tighten bolt (3) to 76-94 lb-ft (103-127 N·m).



e. Follow-On Maintenance.

Install front axle shock absorber (TM 9-2320-365-20-3).

End of Task.

14-7. STABILIZER MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Rear stabilizer bar removed (TM 9-2320-365-20-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)

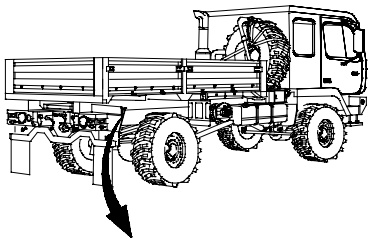
Tools and Special Tools (Cont)
Wrench Set, Socket (Item 74, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Bolt (6) (Item 6, Appendix F)
Nut, Self-Locking (6) (Item 134, Appendix F)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.



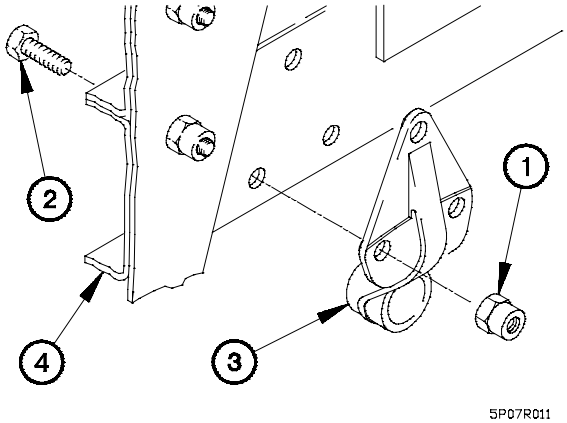
CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

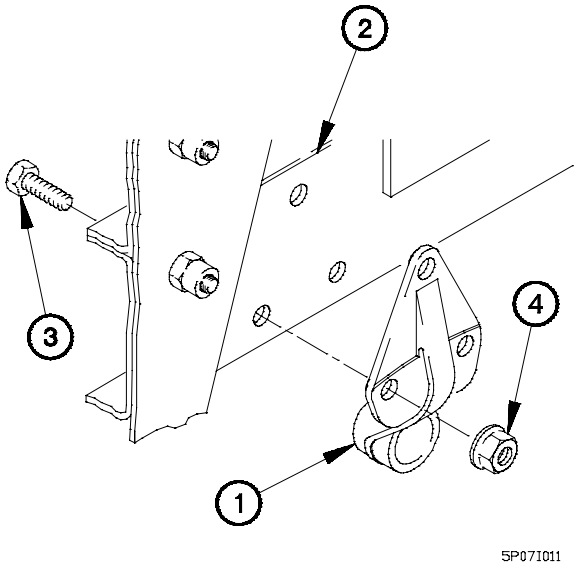
NOTE

Left and right side stabilizer mounting brackets are removed the same way. Right side shown.

Remove three collars (1), bolts (2), and mounting bracket (3) from frame (4). Discard collars and bolts.



b. Installation.



NOTE

Left and right side stabilizer mounting brackets are installed the same way. Right side shown.

(1) Position mounting bracket (1) on frame (2) with three bolts (3) and self-locking nuts (4).

(2) Tighten three self-locking nuts (4) to 285-305 lb-ft (386-414 N·m).

c. Follow-On Maintenance.

Install rear stabilizer bar (TM 9-2320-365-20-3).

End of Task.

CHAPTER 15
BODY AND CAB MAINTENANCE

Section I. INTRODUCTION 15-1
15-1. INTRODUCTION 15-1

Section II. MAINTENANCE PROCEDURES 15-2
15-2. CAB REPLACEMENT 15-2
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR 15-57
15-4. M1081 CAB SIDE WALL REPLACEMENT/REPAIR 15-87
15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR 15-95
15-6. M1081 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR 15-107
15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT 15-116
15-8. CARGO BED REPLACEMENT/REPAIR 15-120

Section I. INTRODUCTION

15-1. INTRODUCTION

This chapter contains maintenance instructions for replacing and repairing Body and Cab components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

15-2. CAB REPLACEMENT

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Air tanks drained (TM 9-2320-365-10).
Radiator drained (TM 9-2320-365-10).
WTEC II dashboard cable assembly removed (TM 9-2320-365-20-3).
WTEC III dashboard cable assembly removed (TM 9-2320-365-20-3).
Auxiliary panel cable assembly removed, if equipped (TM 9-2320-365-20-3).
Steering column removed (TM 9-2320-365-20-3).
Foot control valve and brake foot pedal removed (TM 9-2320-365-20-3).
Park control two-way check valve removed (TM 9-2320-365-20-3).
Throttle control cable removed (TM 9-2320-365-20-3).
Throttle control cable threaded rod removed (TM 9-2320-365-20-3).
Accelerator pedal removed (TM 9-2320-365-20-3).
Fan and differential lock solenoids removed (TM 9-2320-365-20-2).
STE-ICE/R cable assembly removed (TM 9-2320-365-20-3).
Manifold valve assembly removed (TM 9-2320-365-20-3).
Clearance light cable assemblies removed (TM 9-2320-365-20-3).
Mirrors removed (TM 9-2320-365-20-4).
Air drop cab liners removed (M1081) (TM 9-2320-365-20-4).
Cab liners, removed (TM 9-2320-365-20-4).
Cab floor covering removed (TM 9-2320-365-20-4).
Warning light cable removed (TM 9-2320-365-20-3).
Warning light kit removed, if equipped (TM 9-2320-365-10).
Chemical kit alarm cable removed, if equipped (TM 9-2320-365-20-3).
Roof hatch removed (TM 9-2320-365-20-4).

Equipment Conditions (Cont)
Machine gun ring kit removed, if equipped (para 19-2).
Windshield wipers and linkage removed (TM 9-2320-365-20-4).
Cab windshield and side windows removed (para 15-7).
Horn removed (TM 9-2320-365-20-3).
Fenders and mud flaps removed (TM 9-2320-365-20-4).
Placards removed, as required (TM 9-2320-365-20-1).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Puller, Mechanical (Item 45, Appendix B)
Tool Kit, Blind Rivet (Item 66, Appendix B)
Bar, Spreader (Item 16, Appendix D)
Sling, Cargo (Item 48, Appendix B)
Stand, Cab Maintenance (Item 4, Appendix D)
Tool, Cab Support (Item 5, Appendix D)
Wrench Set, Socket (Item 74, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Dispenser, Sealant (Item 13.1, TM 9-2320-366-20 Appendix B)

Materials/Parts
Rubber Strip 150 in. (382 cm) (Item 251, Appendix F)
Adhesive (Item 10.1, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

15-2. CAB REPLACEMENT (CONT)

INITIAL SETUP (CONT)

Materials/Parts
Ties, Cable Plastic (Item 89, Appendix C)
Compound, Sealing (Item 70, Appendix C)
Rubber Sheet, Solid (Item 63, Appendix C)
Lockwasher (2) (Item 101, Appendix F)
Nut, Self-locking (Item 133, Appendix F)
Lockwasher (2) (Item 102, Appendix F)
Pin, Cotter (Item 229, Appendix F)
Nut, Self-locking (Item 140, Appendix F)
Washer, Spring Tension (Item 303, Appendix F)
Nut, Self-locking (3) (Item 137, Appendix F)
Washer, Spring Tension (Item 302, Appendix F)
Nut, Plain, Hex. (Item 120, Appendix F)
Nut, Self-locking (Item 136, Appendix F)
Plug, Rubber (13) (Item 240, Appendix F)
Lockwasher (Item 105, Appendix F)
Plug, Rubber (2) (Item 241, Appendix F)
Plug, Rubber (4) (Item 241, Appendix F)

Materials/Parts (Cont)
Seal, Door (2) (Item 257, Appendix F)
Plug, Rubber (2) (Item 238, Appendix F)
Plug, Rubber (10) (Item 238, Appendix F)
Plug, Plastic (10) (Item 235, Appendix F)
Plug, Plastic (2) (Item 234, Appendix F)
Rivet, Compression (4) (Item 250, Appendix F)
Plug, Rubber (2) (Item 236, Appendix F)
Nut, Clinch (61) (Item 116, Appendix F)
Nut, Clinch (4) (Item 117, Appendix F)
Plug, Rubber (10) (Item 237, Appendix F)
Plug, Rubber (6) (Item 239, Appendix F)
Adhesive (Item 10, Appendix C)
Nut, Self-Locking (4) (Item 135.1, Appendix F)
Washer, Seal (4) (Item 301.1, Appendix F

Personnel Required
(2)

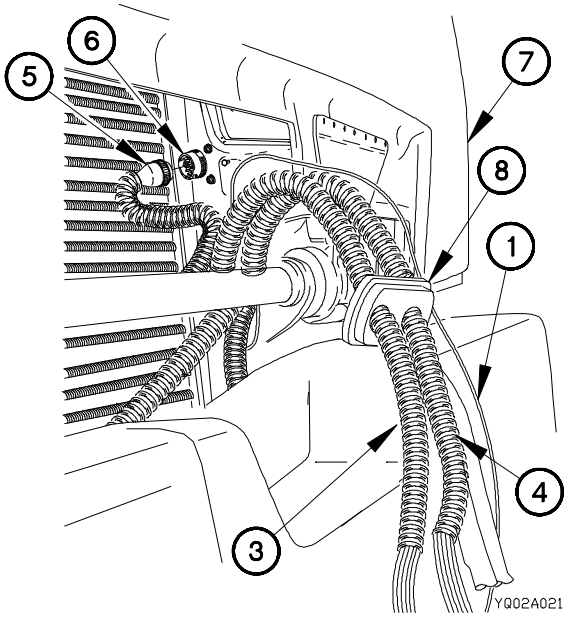
a. Removal.

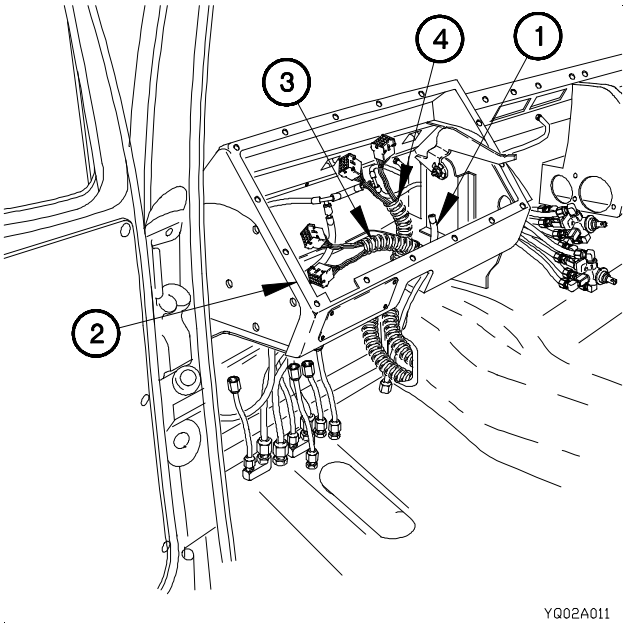
NOTE

Remove plastic cable ties as required.

(1) Remove vacuum hose (1) from dashboard (2).

(2) Remove engine control cable assembly (3) and start and charging cable assembly (4) from dashboard (2).





(3) Disconnect connector P119 (5) from connector J119 (6).

NOTE

Steps (4) and (5) require the aid of an assistant.

(4) Remove vacuum hose (1) from cab (7).

(5) Remove engine control cable assembly (3), start and charging cable assembly (4), and grommet (8) from cab (7).

15-2. CAB REPLACEMENT (CONT)

(6) Remove front lights cable assembly (9), rear lights cable assembly (10), power distribution panel 12 vdc cable (11), and power distribution panel 24 vdc cable (12) from dashboard (2).

NOTE

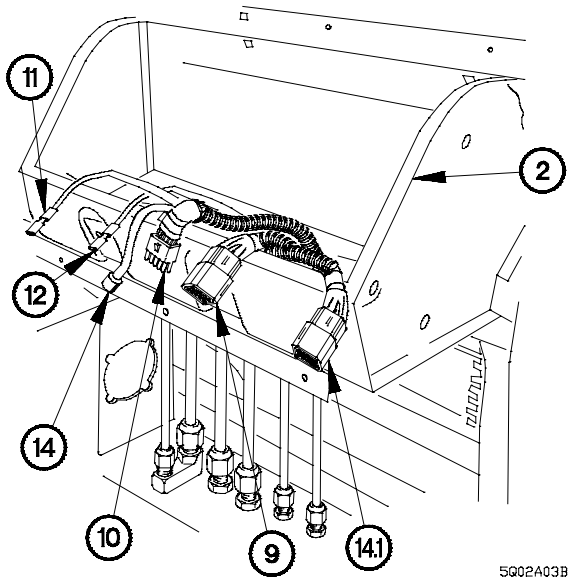
Perform step (7) on vehicles equipped with PTO.

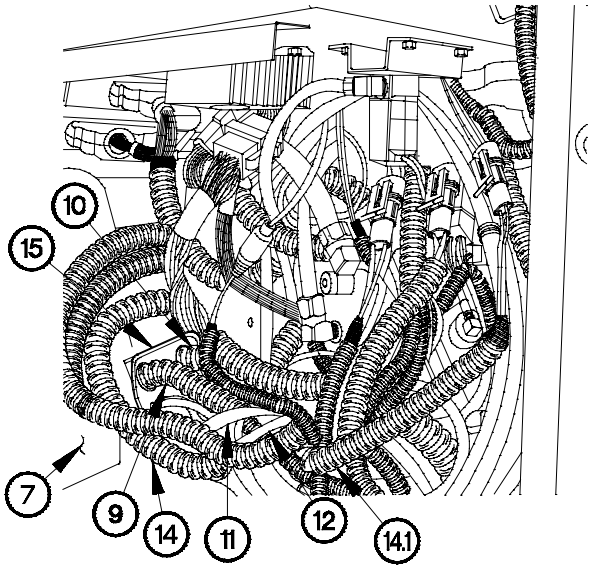
(7) Remove PTO cable assembly (14) from dashboard (2).

NOTE

Perform step (7.1) on M1079 vehicles.

(7.1) Remove 12/24 vdc power cable (14.1) from dashboard (2).





NOTE

Steps (8) and (9) require the aid of an assistant.

(8) Remove front lights cable assembly (9), rear lights cable assembly (10), power distribution panel 12 vdc cable (11), power distribution panel 24 vdc cable (12), and grommet (15) from cab (7).

NOTE

Perform step (9) on vehicles equipped with PTO.

(9) Remove PTO cable assembly (16) from cab (7).

NOTE

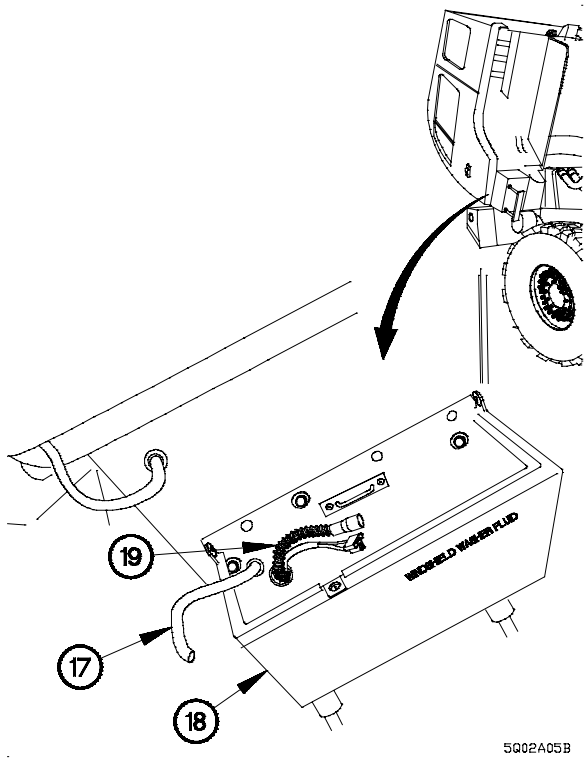
Performs step (9.1) on M1079.

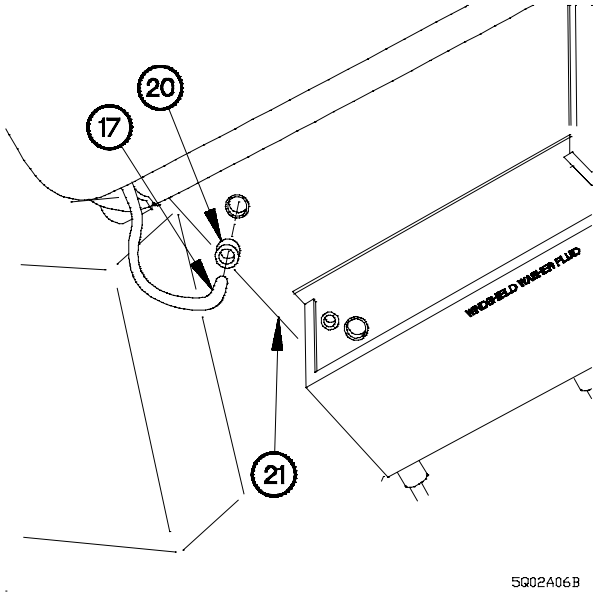
(9.1) Remove 12/24 vdc power cable (14.1) from cab (7).

(10) Raise cab (TM 9-2320-365-10).

(11) Remove hose (17) from step (18).

(12) Remove windshield washer pump/EMI cable assembly (19) from step (18).





(13) Remove hose (17) and grommet (20) from step mount (21).

NOTE

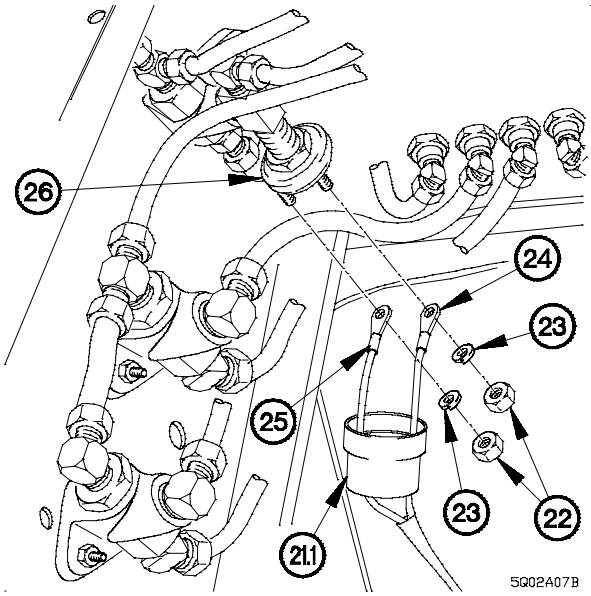
Perform step (13.1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(13.1) Remove adhesive and boot (21.1) from lower pressure transmitter (22).

NOTE

Tag wires and connection points prior to disconnecting.

(14) Remove two nuts (22), lockwashers (23), and terminal lugs TL201 (24) and TL202 (25) from air pressure transmitter (26). Discard lockwashers.



15-2. CAB REPLACEMENT (CONT)

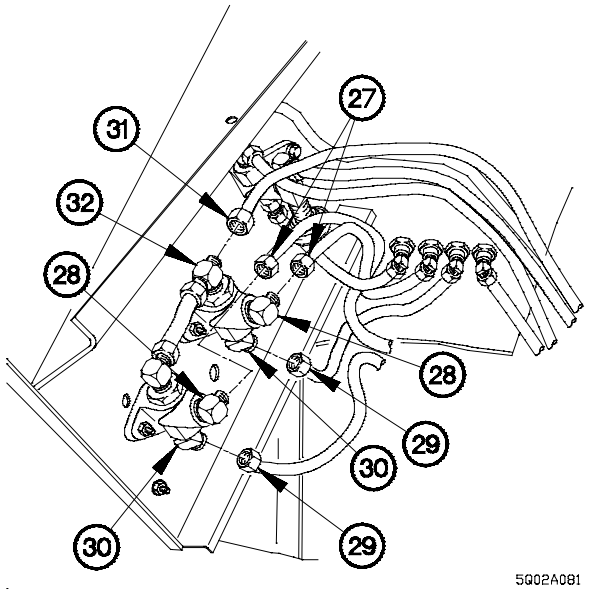
NOTE

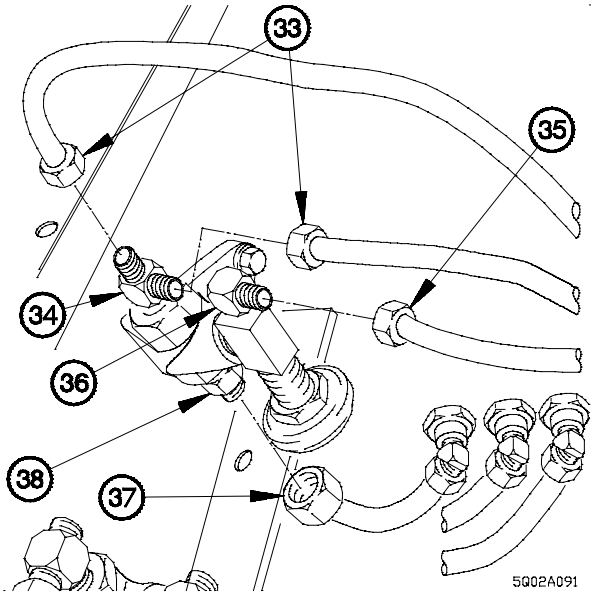
Tag hoses and connection points prior to disconnecting.

(15) Disconnect two hoses (27) from 90-degree fittings (28).

(16) Disconnect two hoses (29) from 45-degree fittings (30).

(17) Disconnect hose (31) from tee fitting (32).



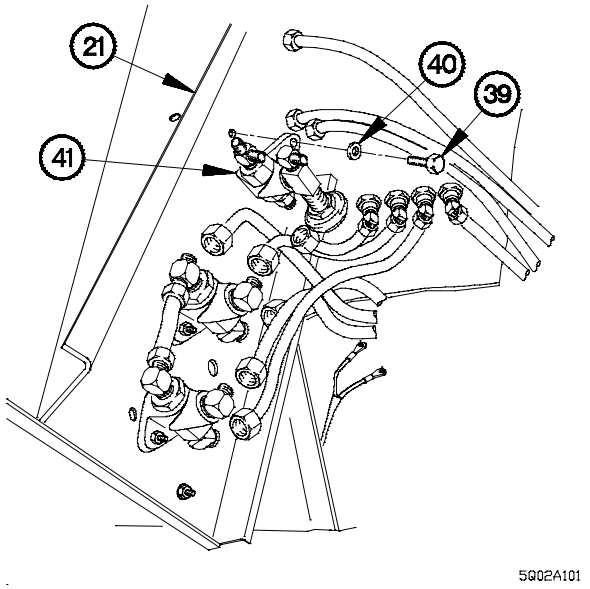


(18) Disconnect two hoses (33) from tee fitting (34).

(19) Disconnect hose (35) from 90-degree fitting (36).

(20) Disconnect hose (37) from fitting (38).

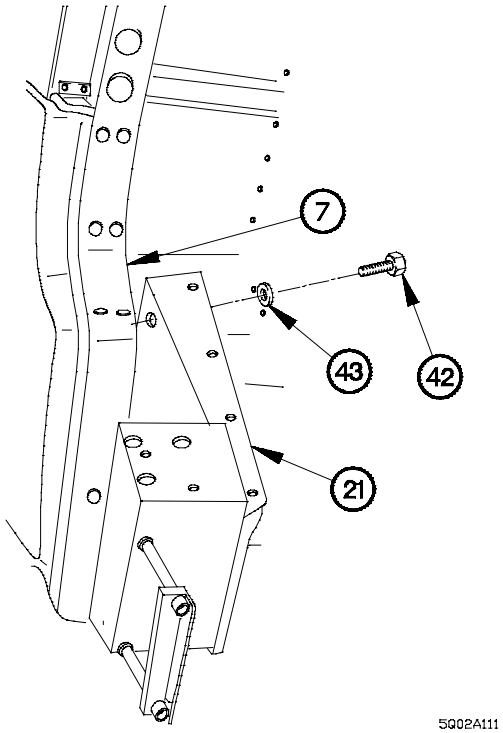
(21) Remove screw (39), washer (40), and valve (41) from step mount (21).

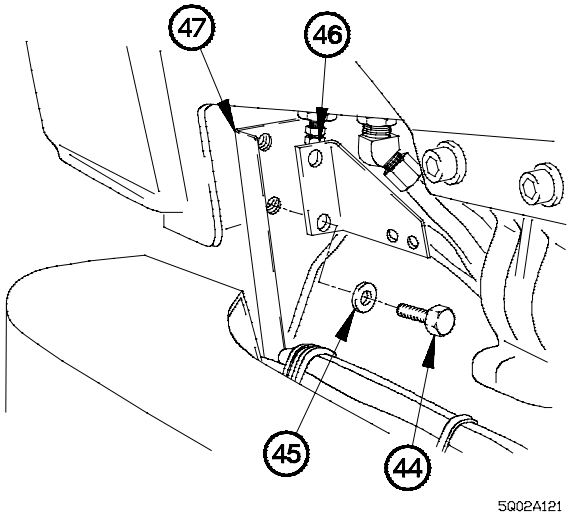


NOTE

Step (22) requires the aid of an assistant.

(22) Remove seven screws (42), washers (43), and step mount (21) from cab (7).



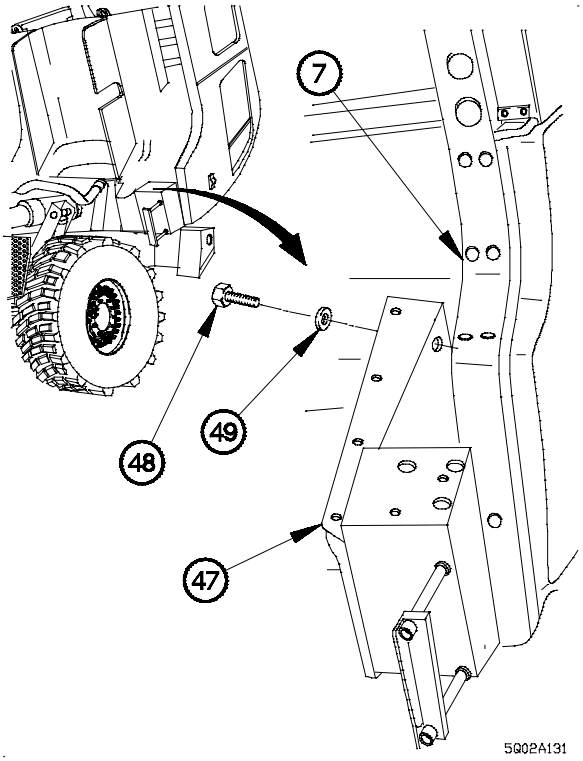


(23) Remove two screws (44), washers (45), and bracket (46) from step mount (47).

NOTE

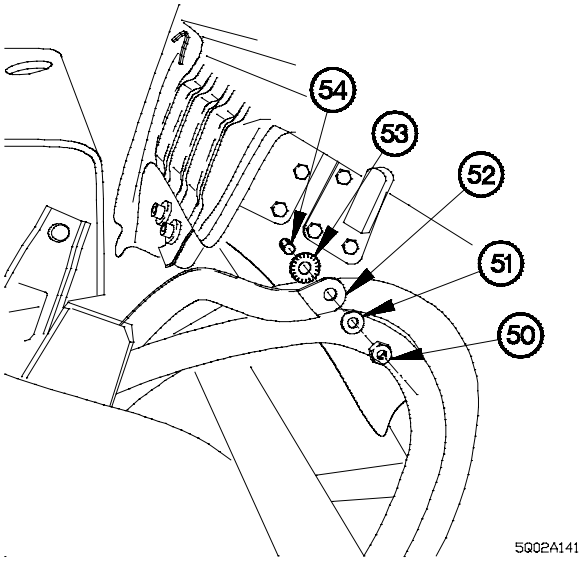
Step (24) requires the aid of an assistant.

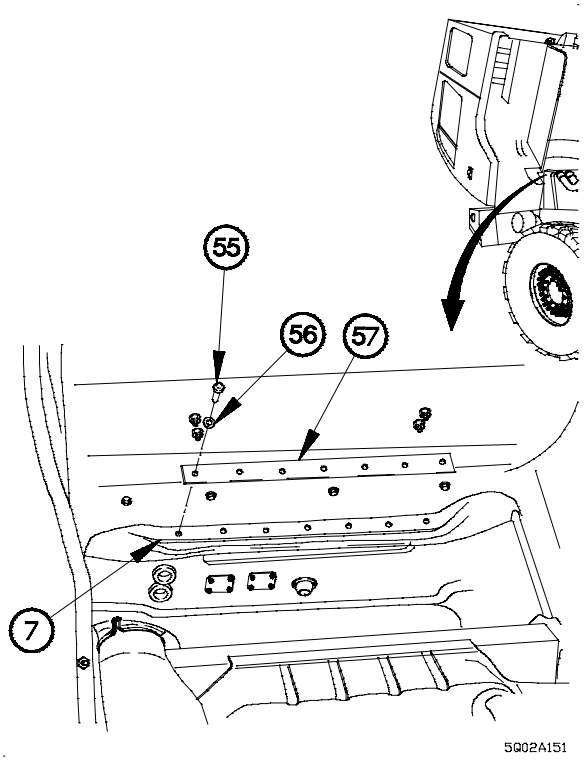
(24) Remove six screws (48), washers (49), and step mount (47) from cab (7).



15-2. CAB REPLACEMENT (CONT)

(25) Remove self-locking nut (50), washer (51), ground strap (52), and lockwasher (53) from ground stud (54). Discard self-locking nut and lockwasher.



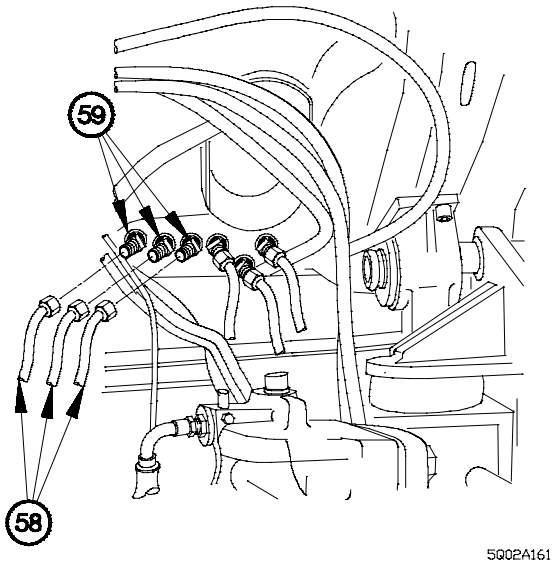


WARNING

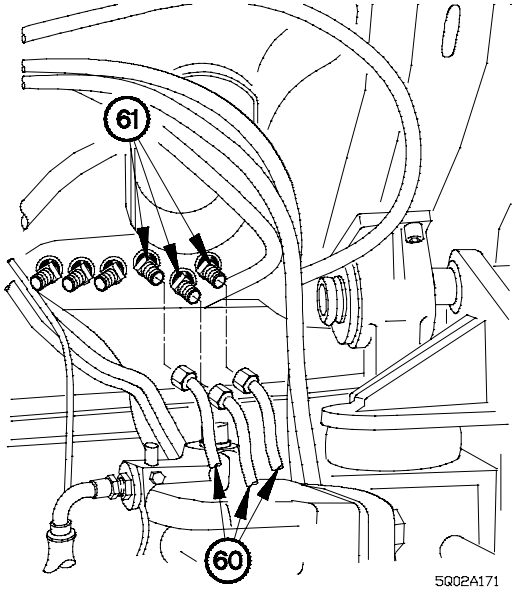
Wear appropriate eye protection when drilling out rivets. Failure to comply may result in injury to personnel.

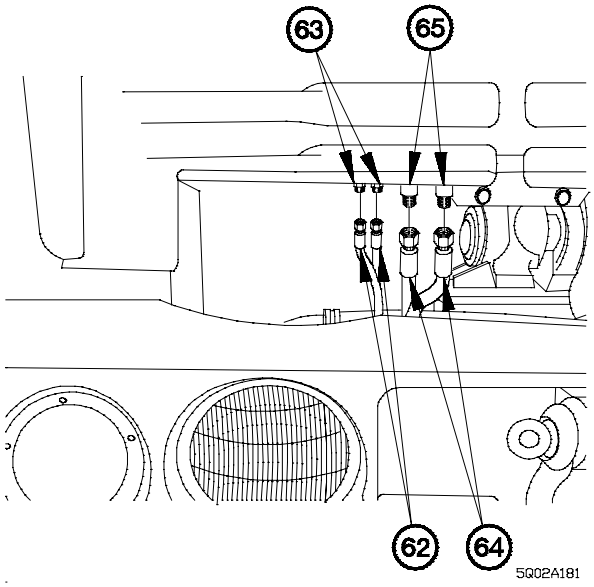
(26) Remove seven rivets (55), washers (56), and baffle (57) from cab (7).

(27) Disconnect three hoses (58) from 45-degree fittings (59).



(28) Disconnect three hoses (60) from 45-degree fittings (61).





WARNING

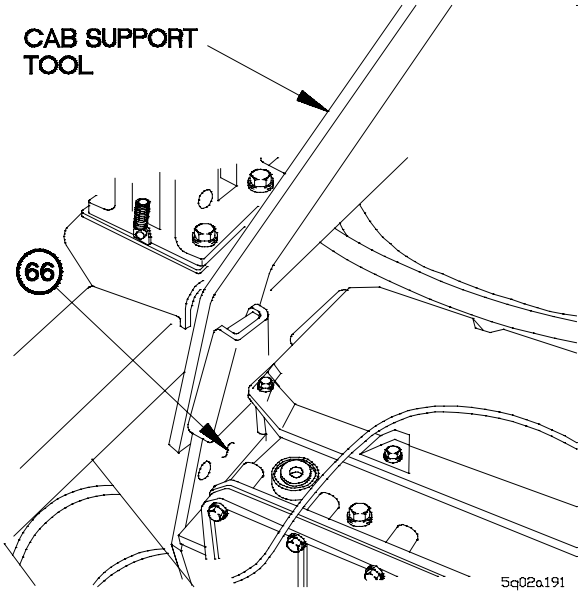
Wear protective goggles to protect against possible injury from release of high pressure air. Failure to comply may result in injury to personnel.

(29) Disconnect two pneumatic hoses (62) from 45-degree fittings (63).

(30) Disconnect two pneumatic hoses (64) from fittings (65).

WARNING

Brace cab prior to removal of cotter pin from cab tilt cylinder mounting bolt. Failure to comply may result in serious injury or death to personnel or damage to equipment.



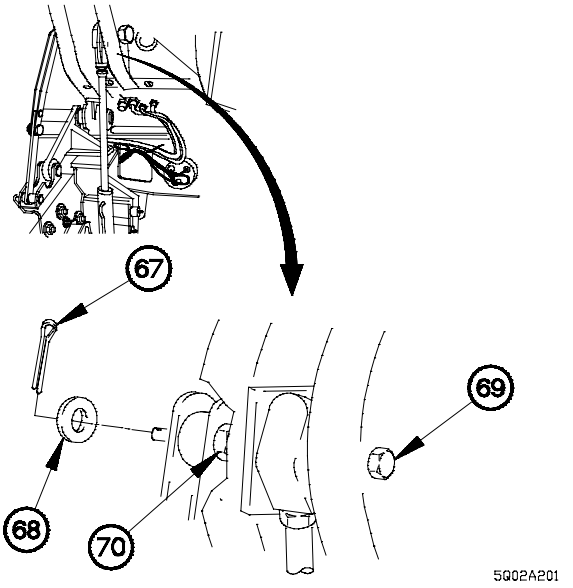
(31) Install cab support tool on engine rear lifting eye (66).

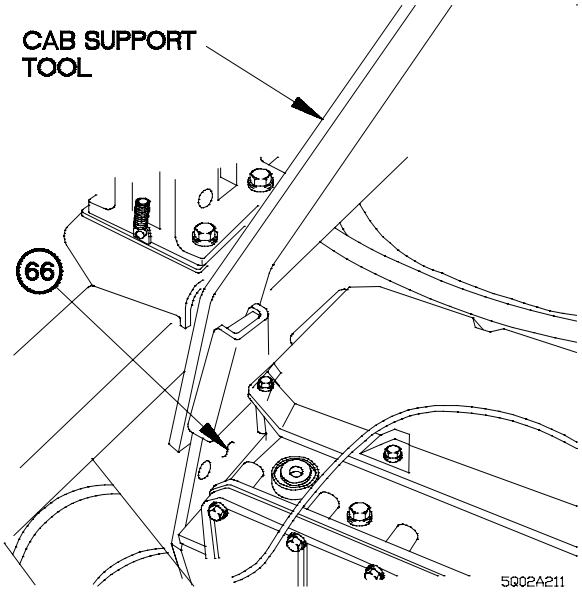
(32) Lower cab until cab rests on cab support tool (TM 9-2320-365-10).

15-2. CAB REPLACEMENT (CONT)

(33) Remove cotter pin (67) and washer (68) from cab tilt cylinder mounting bolt (69). Discard cotter pin.

(34) Loosen self-locking nut (70) on cab tilt cylinder mounting bolt (69).



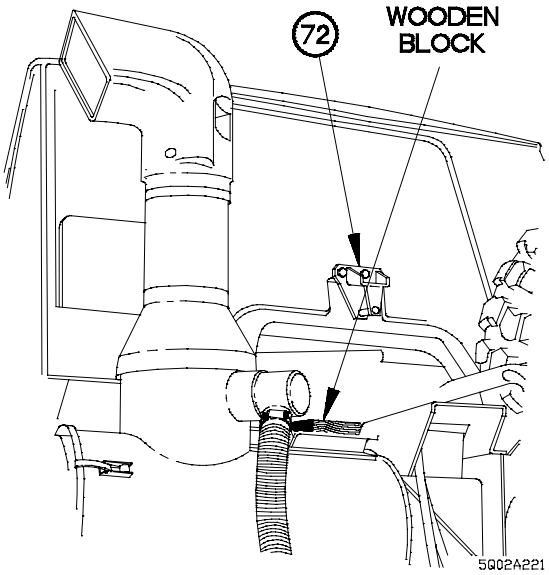


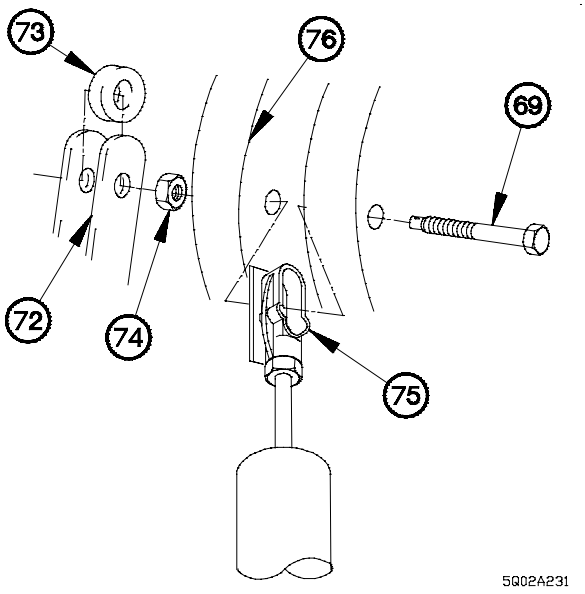
(35) Raise cab slightly and remove cab support tool from engine rear lifting eye (66) (TM 9-2320-365-10).

NOTE

Use wooden block on top of cab hydraulic latch to prevent cab from latching when cab is lowered.

(36) Lower cab until cab latch (71) rests on wooden block (TM 9-2320-365-10).



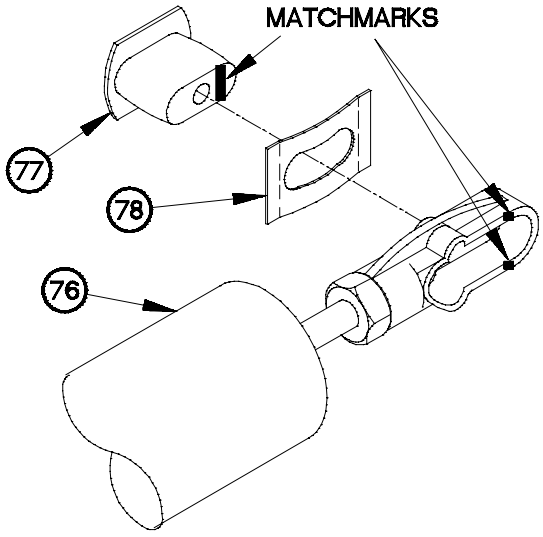


NOTE

Steps (37) and (38) require the aid of an assistant.

(37) Disengage locking arm (72) and spacer (73) from cab tilt cylinder mounting bolt (69).

(38) Remove self-locking nut (74), cab tilt cylinder mounting bolt (69) and cab tilt cylinder (75) from bracket (76). Discard self-locking nut.



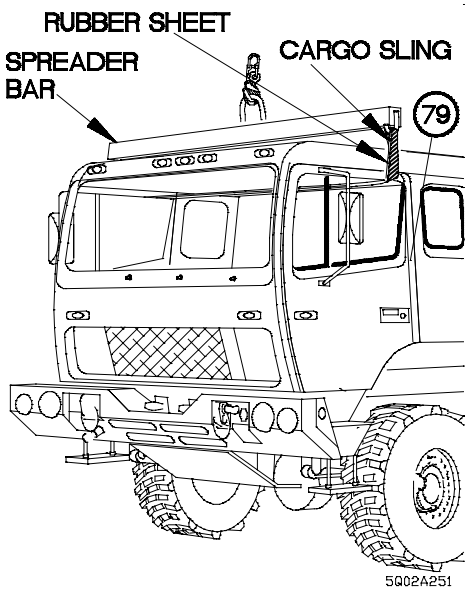
(39) Match mark remote control cam (77) to cab tilt cylinder (76) prior to removal.

(40) Swing cab tilt cylinder (76) back out of way and remove control cam (77) and spring washer (78) from cab tilt cylinder (76). Discard spring washer.

CAUTION

Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

(41) Lower cab door windows and install cargo sling through rear section of cab doors (79).



15-2. CAB REPLACEMENT (CONT)

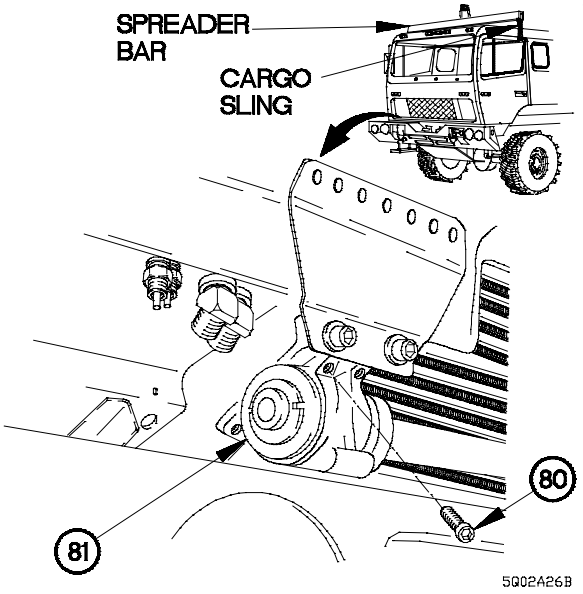
WARNING

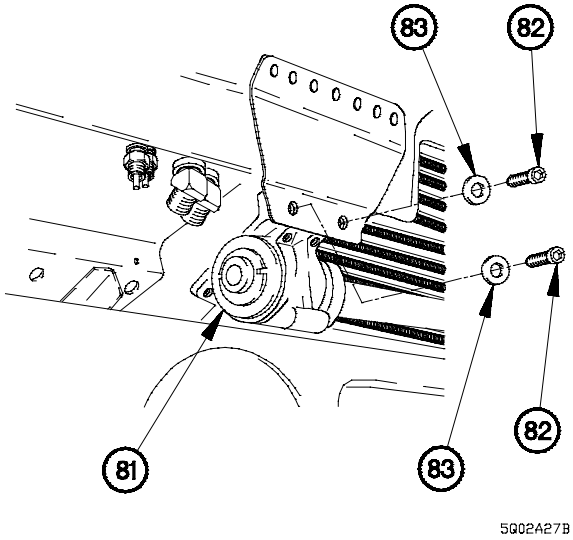
- **Standard cab weighs approximately 1400 lbs (636 kgs). M1081 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**
- **Cab may swing forward slightly when screws are removed. An assistant is required to steady cab. Failure to comply may result in injury to personnel or damage to equipment.**

NOTE

Left and right side cab front support mounts are disconnected the same way. Right side shown.

(42) Remove four screws (80) from cab front support mount (81).





(43) Remove two screws (82) and washers (83) from cab front support mount (81).

(44) Perform steps (42) and (43) on left side cab front support mount.

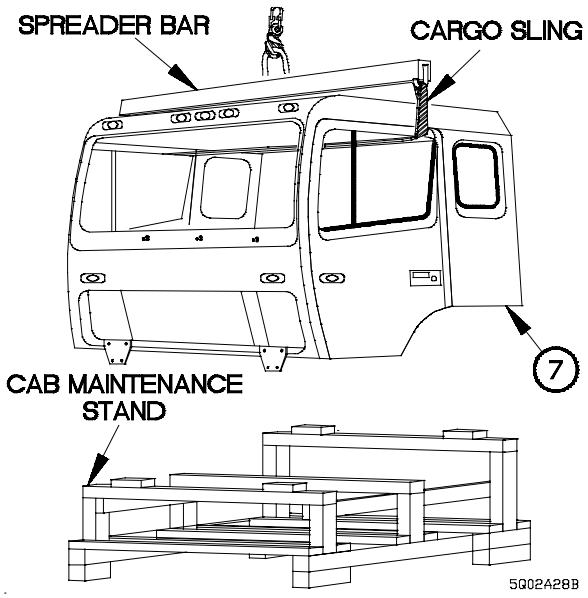
CAUTION

Raise cab straight up to clear radiator. Failure to comply may result in damage to equipment.

(45) Remove cab (7) from vehicle.

(46) Position cab (7) on cab maintenance stand.

(47) Remove spreader bar, cargo sling, and rubber sheet from cab (7).

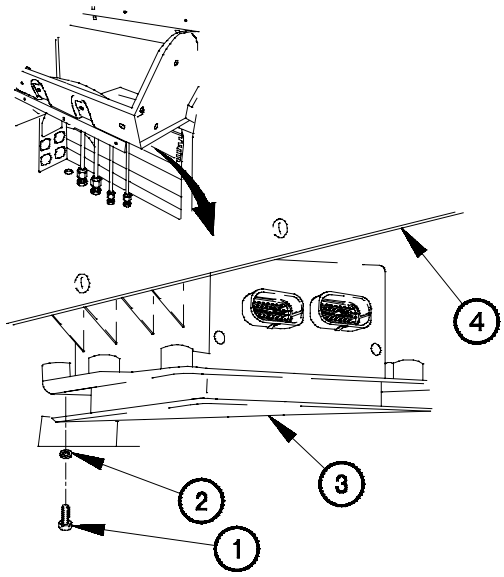


b. Disassembly.

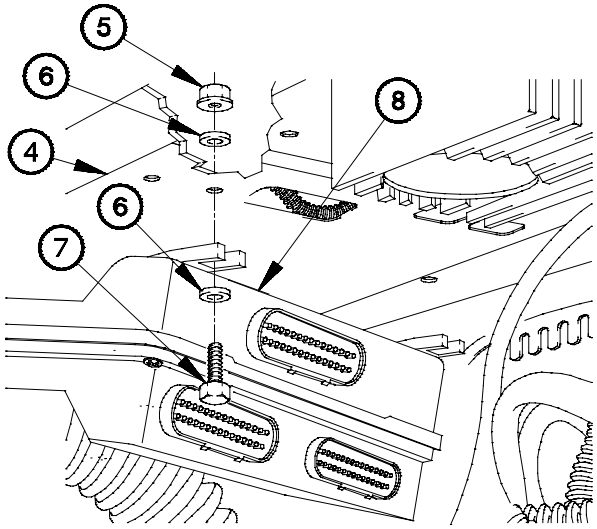
NOTE

Perform step (1) on WTEC II vehicles.

(1) Remove three screws (1), washers (2), and vehicle Interface Module (VIM) (3) from dashboard (4).



YQ02B011



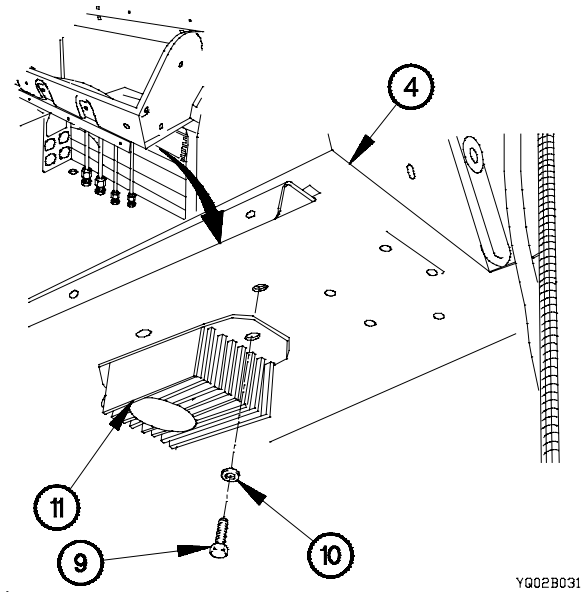
YQ02B021

NOTE

Perform step (2) on WTEC III vehicles.

(2) Remove three nuts (5), six washers (6), three screws (7), and WTEC III transmission ECU (8) from dashboard (4).

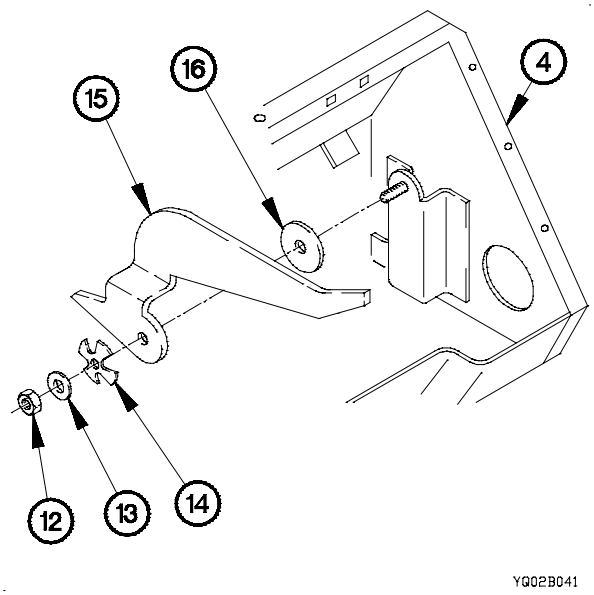
(3) Remove two screws (9), washers (10), and flasher (11) from dashboard (4).

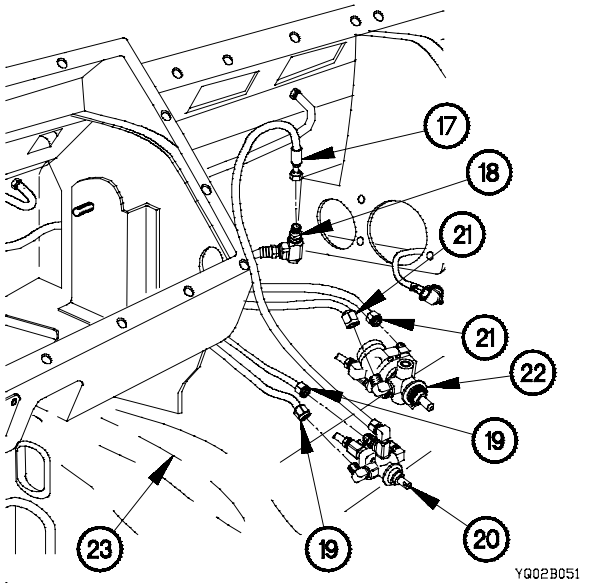


YQ02B031

15-2. CAB REPLACEMENT (CONT)

(4) Remove self-locking nut (12), washer (13), spring washer (14), manual throttle lever (15), and friction disk (16) from dashboard (4). Discard spring washer and self-locking nut.





NOTE

Tag hoses and connection points prior to disconnecting.

(5) Remove air hose (17) from tee fitting (18).

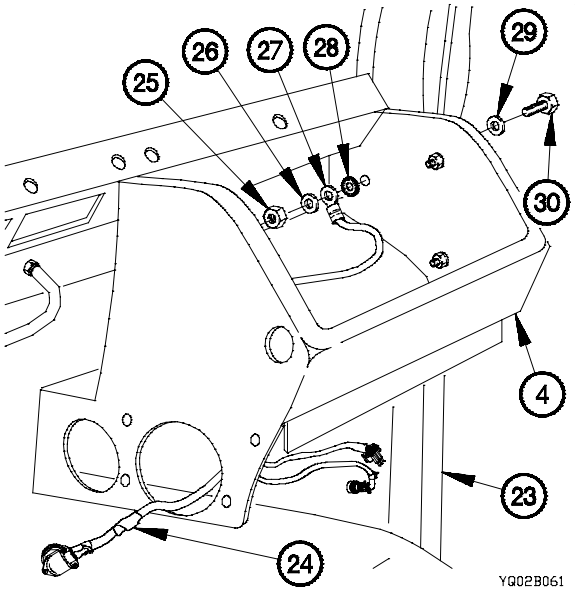
(6) Disconnect two hoses (19) from trailer air supply valve (20).

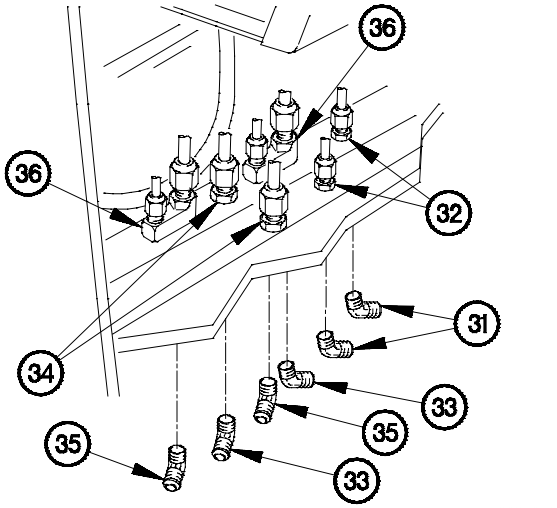
(7) Disconnect two hoses (21) from system park valve (22).

(8) Remove trailer air supply valve (20) and system park valve (22) from cab (23).

(9) Remove CTIS electrical harness (24) from cab (23).

(10) Remove nut (25), washer (26), electrical cable TL56 (27), lockwasher (28), washer (29), and screw (30) from dashboard (4). Discard lockwasher.





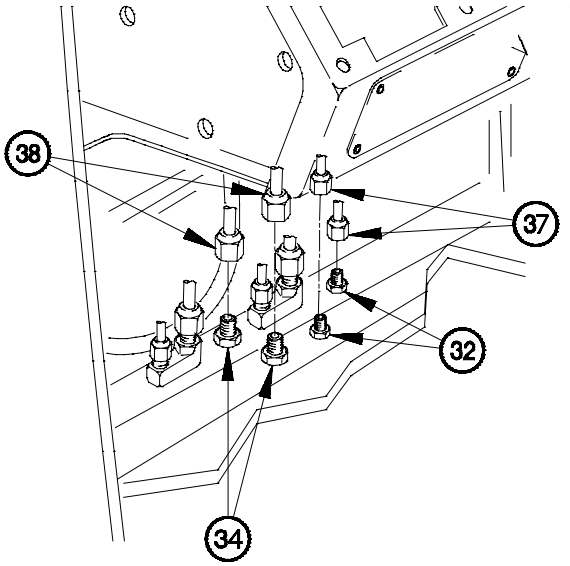
NOTE

Record position and location of fittings prior to removal.

(11) Remove two 45-degree fittings (31) from fittings (32).

(12) Remove two 45-degree fittings (33) from fittings (34).

(13) Remove two 45-degree fittings (35) from fittings (36).

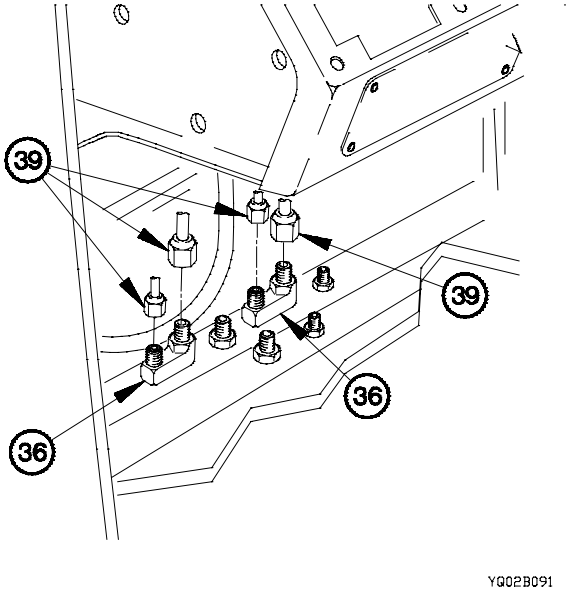


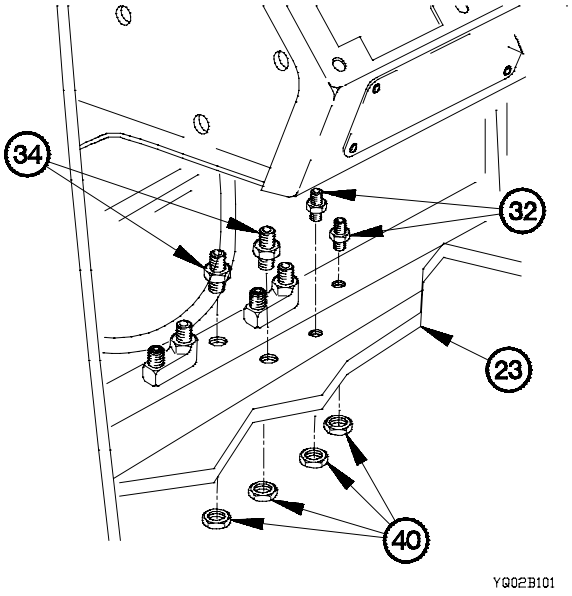
(14) Remove two hoses (37) from fittings (32).

(15) Remove two hoses (38) from fittings (34).

15-2. CAB REPLACEMENT (CONT)

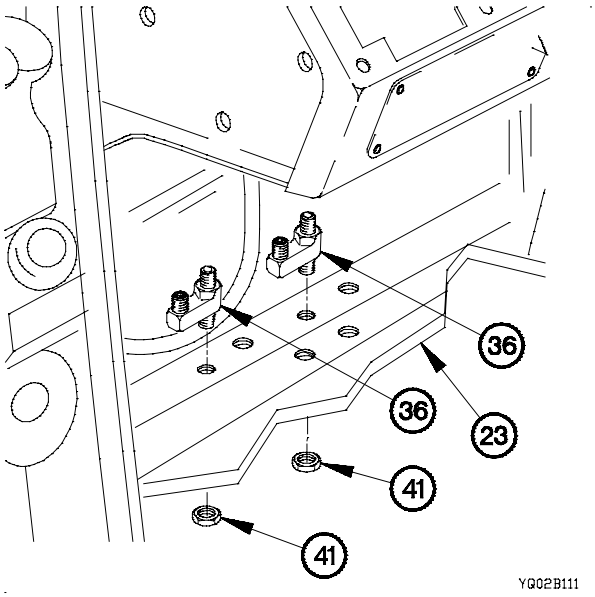
(16) Remove four hoses (39) from two fittings (36).





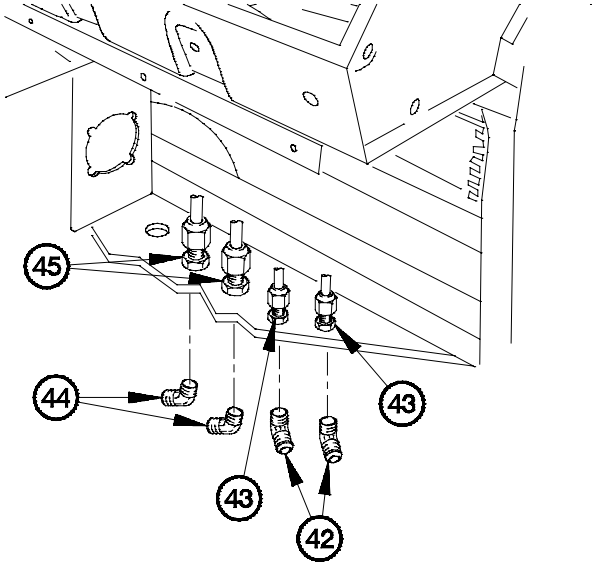
(17) Remove four nuts (40), two fittings (32), and fittings (34) from cab (23).

(18) Remove two nuts (41) and fittings (36) from cab (23).

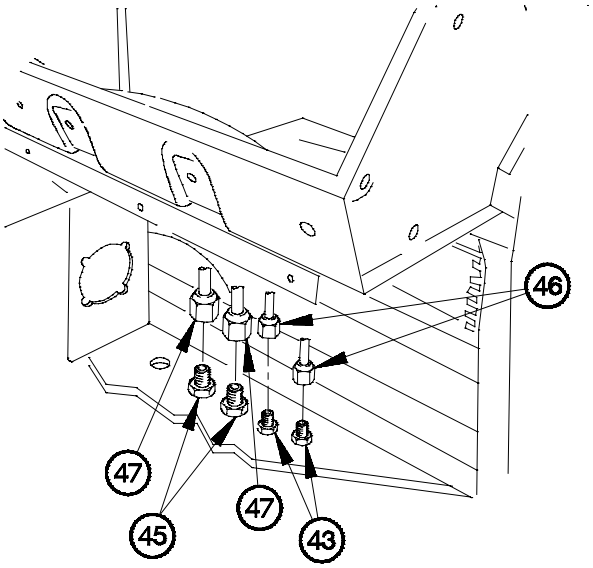


(19) Remove two 45-degree fittings (42) from fittings (43).

(20) Remove two 45-degree fittings (44) from fittings (45).



YQ02B121

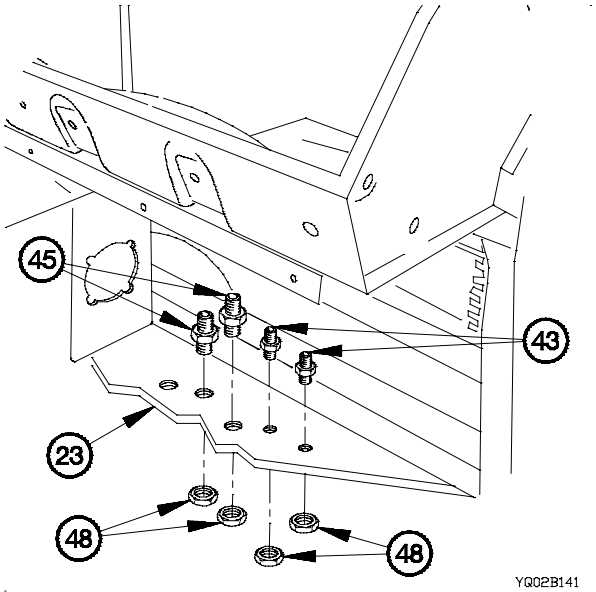


YQ02B131

(21) Remove two hoses (46) from fittings (43).

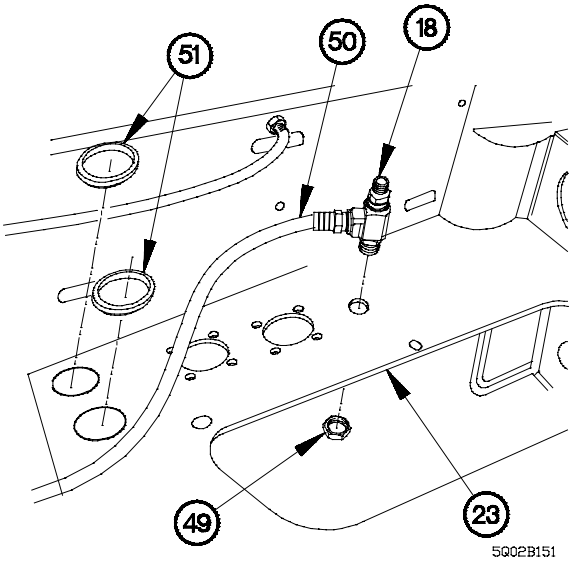
(22) Remove two hoses (47) from fittings (45).

(23) Remove four nuts (48), two fittings (43), and fittings (45) from cab (23).



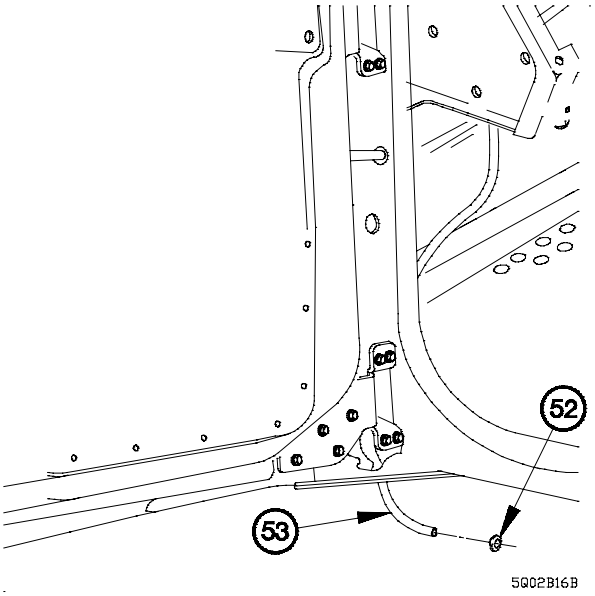
YQ02B141

15-2. CAB REPLACEMENT (CONT)

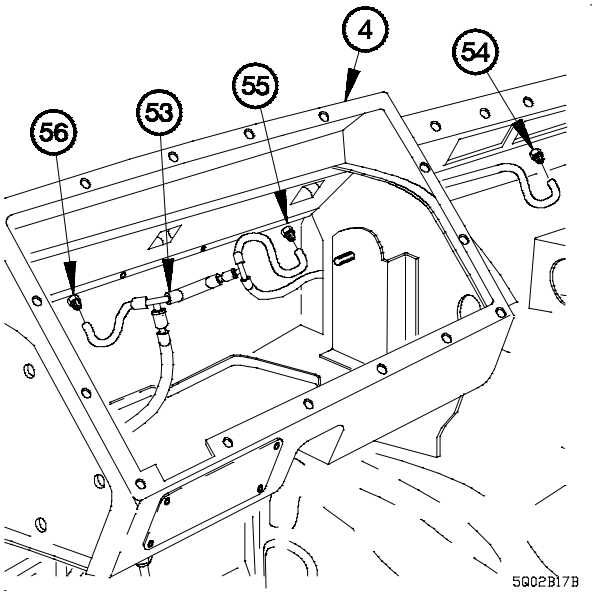


(24) Remove nut (49), tee fitting (18), and hose (50) from cab (23).

(25) Remove two grommets (51) from cab (23).



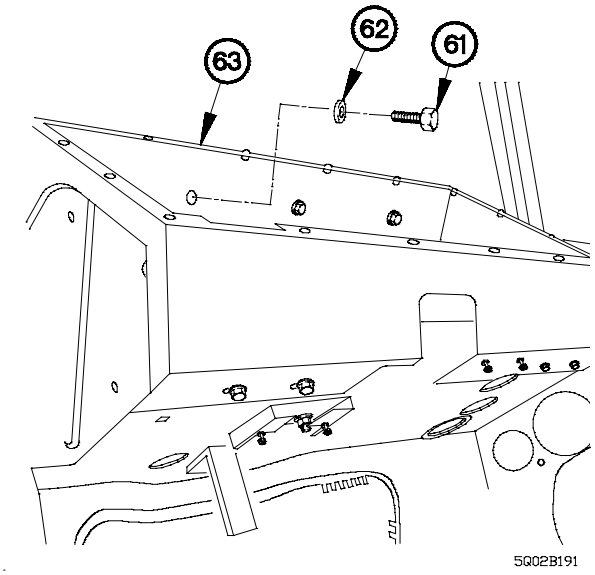
(26) Remove grommet (52) from window washer hose (53).



(27) Disconnect window washer hose (53) from fittings (54, 55, and 56).

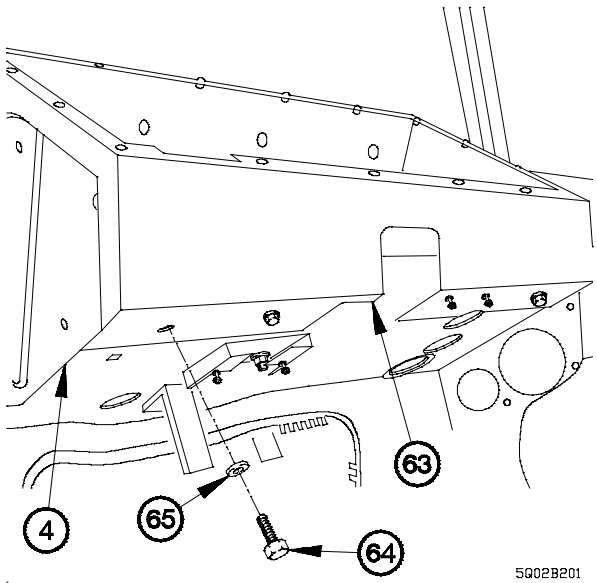
(28) Remove window washer hose (53) from dashboard (4).

(29) Deleted.

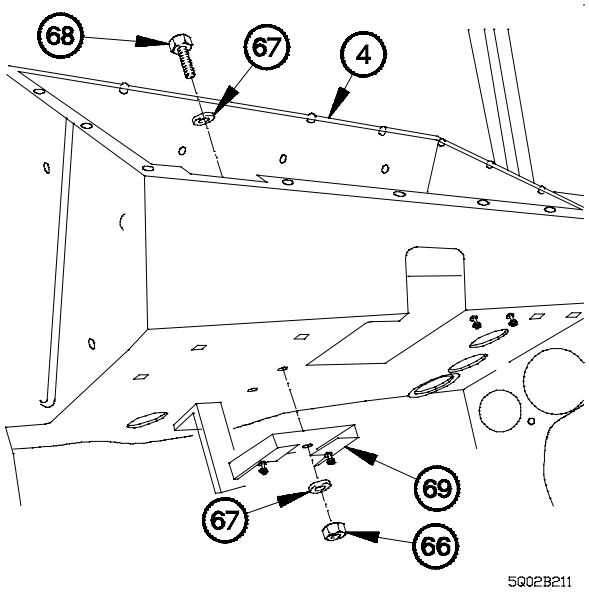


(30) Remove three screws (61) and washers (62) from dashboard bezel (63).

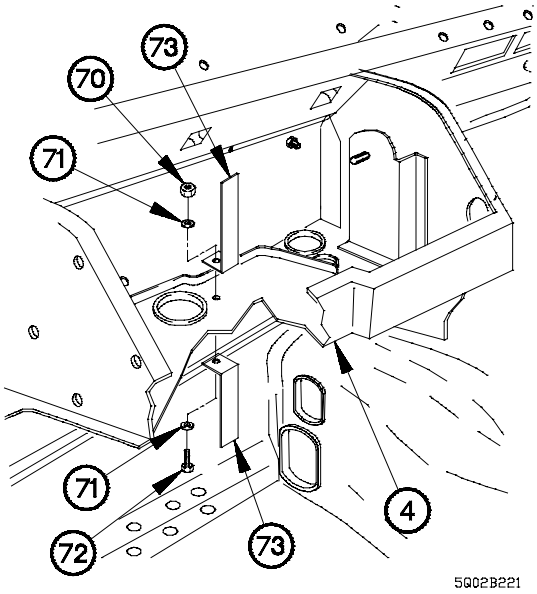
(31) Remove three screws (64), washers (65), and dashboard bezel (63) from dashboard (4).



15-2. CAB REPLACEMENT (CONT)



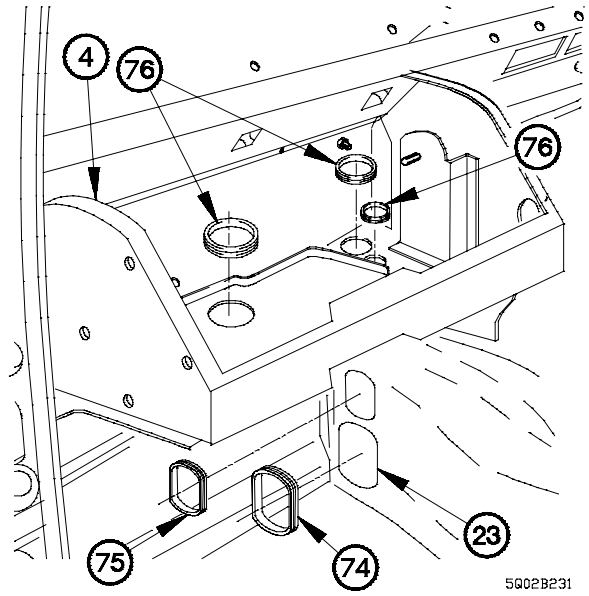
(32) Remove two nuts (66), four washers (67), two screws (68), and bracket (69) from dashboard (4).



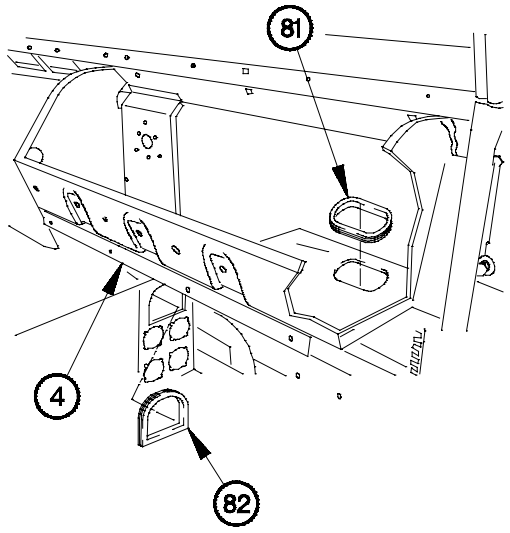
(33) Remove self-locking nut (70), two washers (71), screw (72), and two brackets (73) from dashboard (4). Discard self-locking nut.

(34) Remove rubber edgings (74 and 75) from cab (23).

(35) Remove three grommets (76) from dashboard (4).

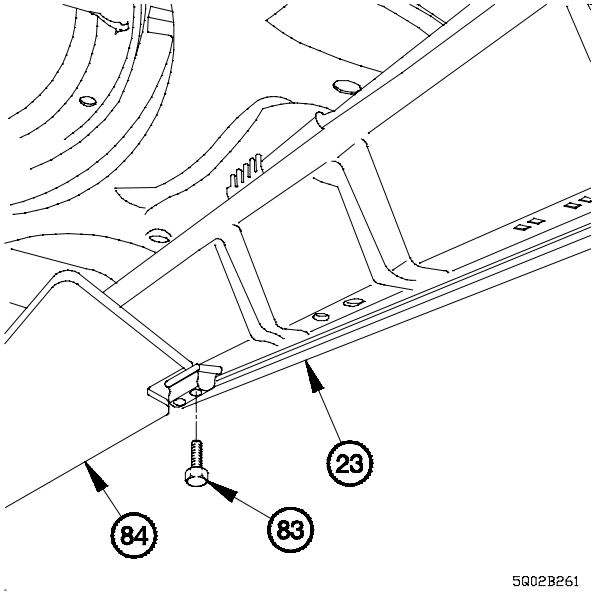


(36) Deleted.



(37) Remove rubber edgings (81 and 82) from dashboard (4).

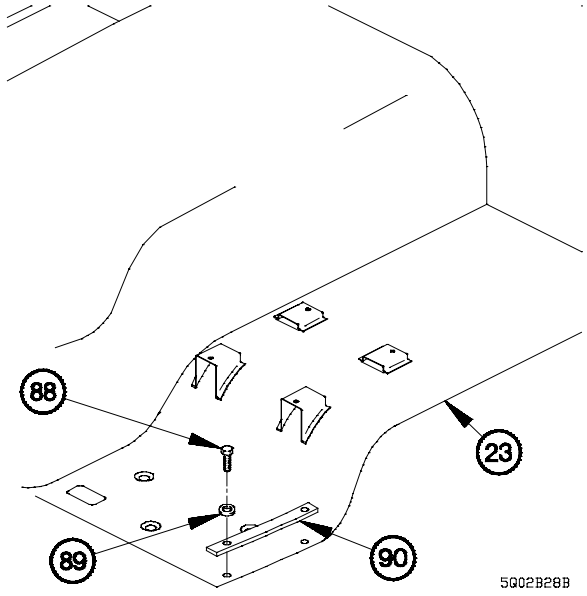
(38) Remove four screws (83) and sunvisor (84) from cab (23).



15-2. CAB REPLACEMENT (CONT)

(39) Deleted.

(40) Deleted.

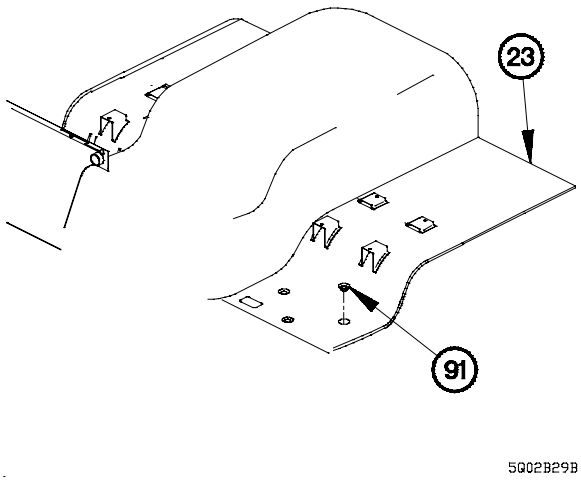


(41) Remove eight screws (88), washers (89), and two floor moldings (90) from cab (23).

NOTE

Perform step (42) on all models except M1081.

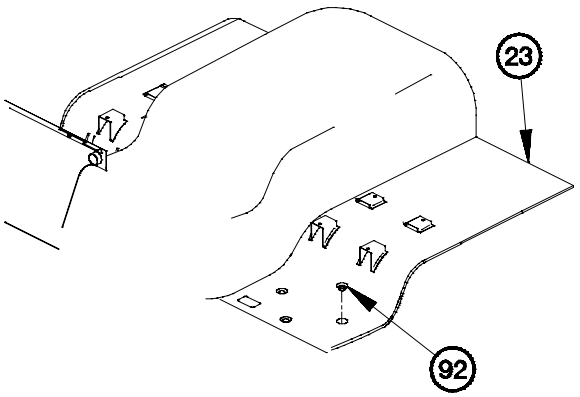
(42) Remove 12 rubber plugs (91) from cab (23). Discard rubber plugs.



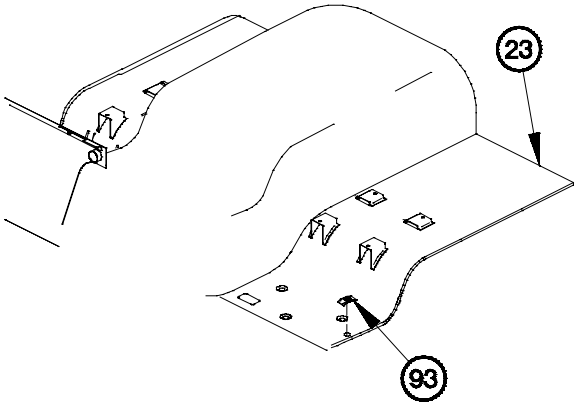
NOTE

Perform step (43) on M1081.

(43) Remove 10 rubber plugs (92) from cab (23). Discard rubber plugs.



5Q02B301



5Q02B311

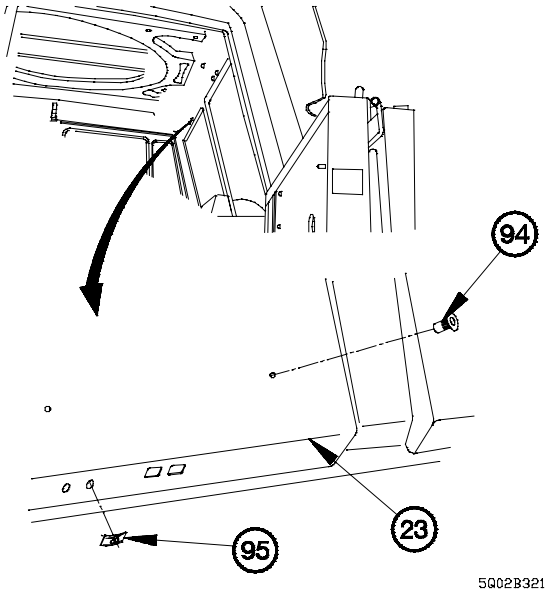
(44) Remove eight expansion nuts (93) from cab (23).

NOTE

Perform steps (45) and (46) on all models except M1081.

(45) Remove four expansion nuts (94) from cab (23).

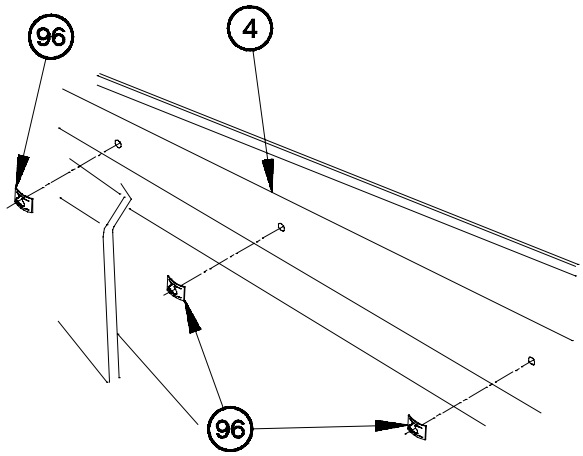
(46) Remove five clinch nuts (95) from cab (23).



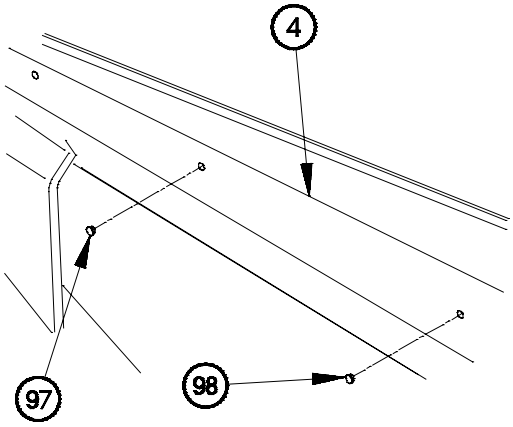
5Q02B321

15-2. CAB REPLACEMENT (CONT)

(47) Remove 12 expansion nuts (96) from dashboard (4).



5Q02D331



5Q02B341

NOTE

Left and right door seals, check valve boots, and door strike catch plates are removed the same way. Left side shown.

(50) Remove door seal (99) from cab (23). Discard door seals.

(51) Remove ventilation check valve boot (100) from door posts (101).

(52) Remove three screws (102), door catch strike plate (103), shim (104), and threaded plate (105) from door post (99).

(53) Perform steps (50) through (52) on right side.

NOTE

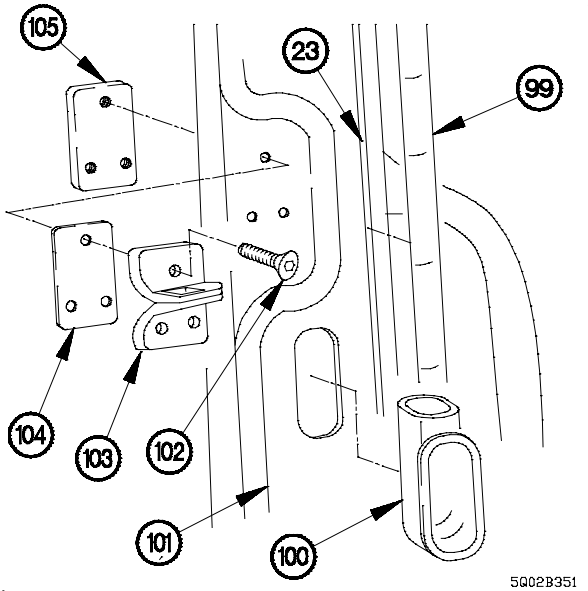
Perform step (48) on all models except M1081.

(48) Remove 13 rubber plugs (97) and two rubber plugs (98) from dashboard (4). Discard rubber plugs.

NOTE

Perform step (49) on M1081.

(49) Remove 13 rubber plugs (97) and four rubber plugs (98) from dashboard (4). Discard rubber plugs.

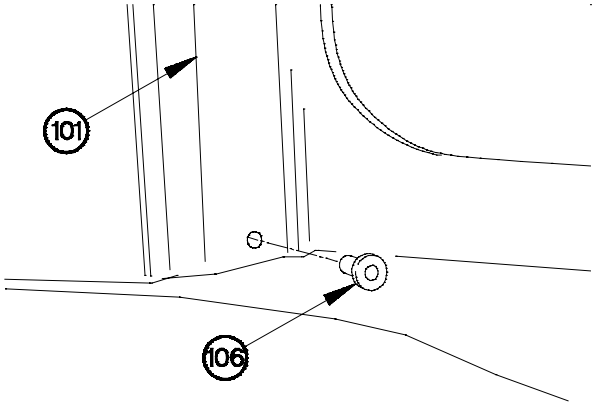


5Q02B351

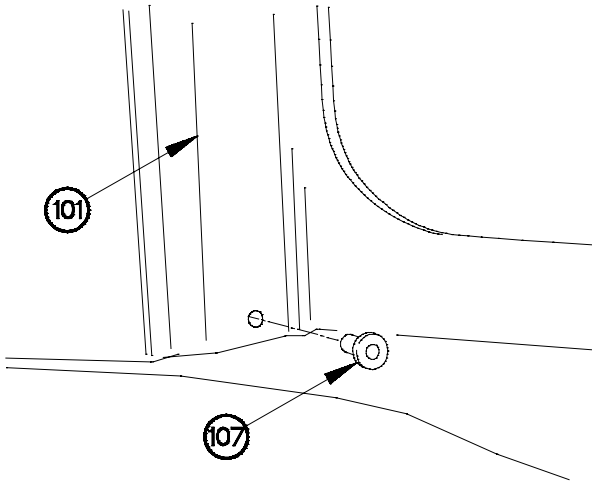
NOTE

Perform step (54) on all models except M1081.

(54) Remove two button plugs (106) from door posts (101). Discard button plugs.



5Q02B36B



5Q02B37B

NOTE

Perform step (55) on M1081.

(55) Remove six button plugs (107) from two door posts (101). Discard button plugs.

(56) Remove three bolts (108) and washers (109) from cab latch bracket (110).

NOTE

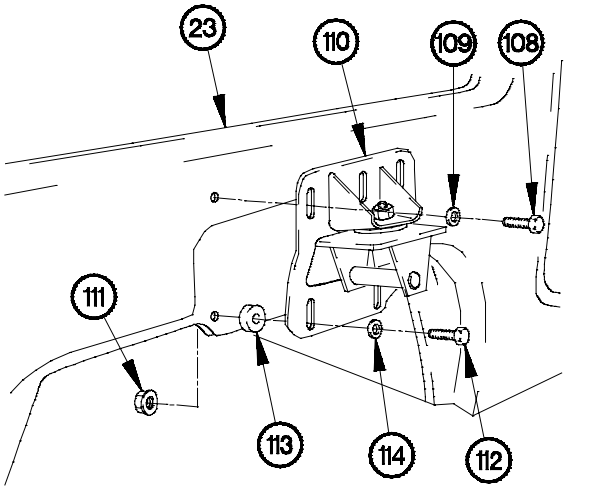
Perform step (57) on vehicles 0001 through 7167.

(57) Remove two self-locking nuts (111), screws (112), spacers (113), washers (114), and latch bracket (110) from cab (23). Discard self-locking nuts.

NOTE

Perform step (57.1) on vehicles 7168 and higher.

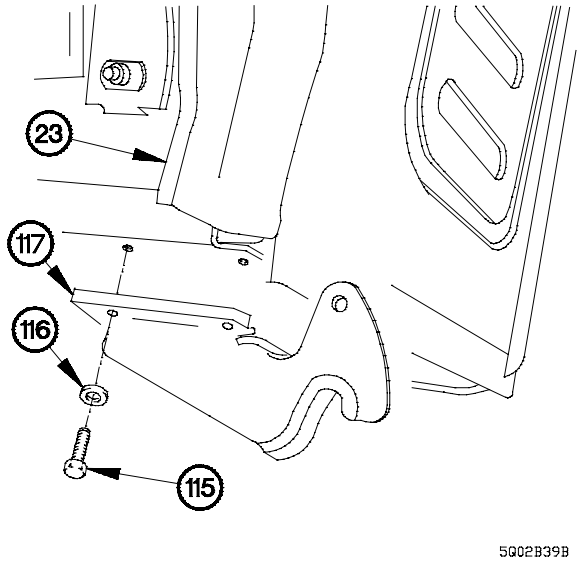
(57.1) Remove two self-locking nuts (111), screws (112), washers (114), and latch bracket (110) from cab (23). Discard self-locking nuts.

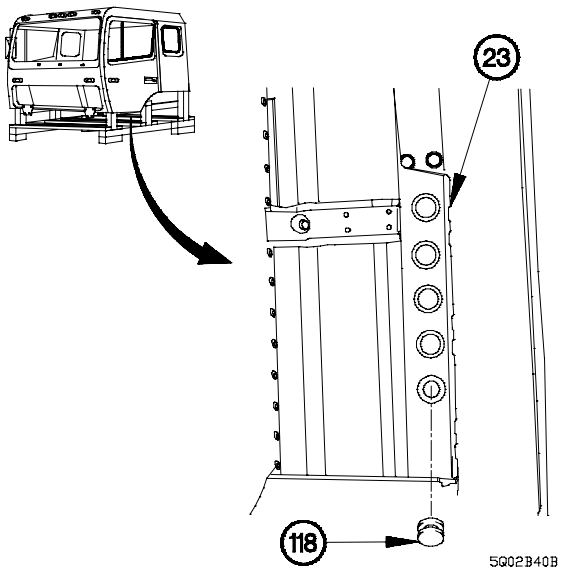


5Q02B38B

15-2. CAB REPLACEMENT (CONT)

(58) Remove four screws (115), washers (116), and two cab latches (117) from cab (23).





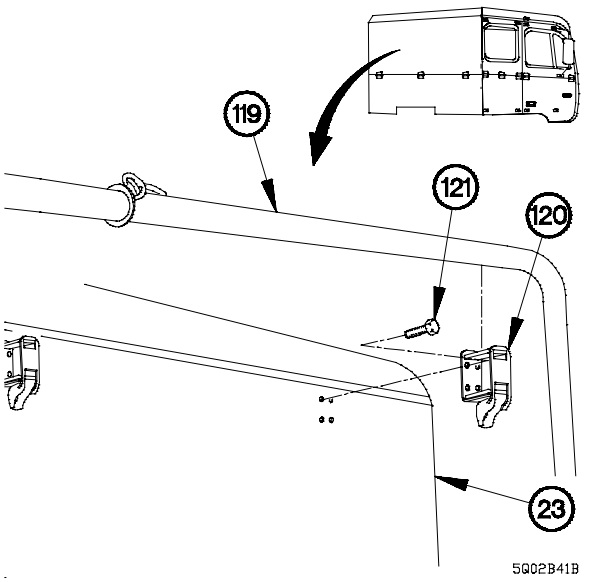
(59) Remove 10 plastic plugs (118) from bottom of cab (23). Discard plastic plugs.

NOTE

Perform steps (60) and (61) on M1081.

(60) Remove davit (119) from three mounting brackets (120).

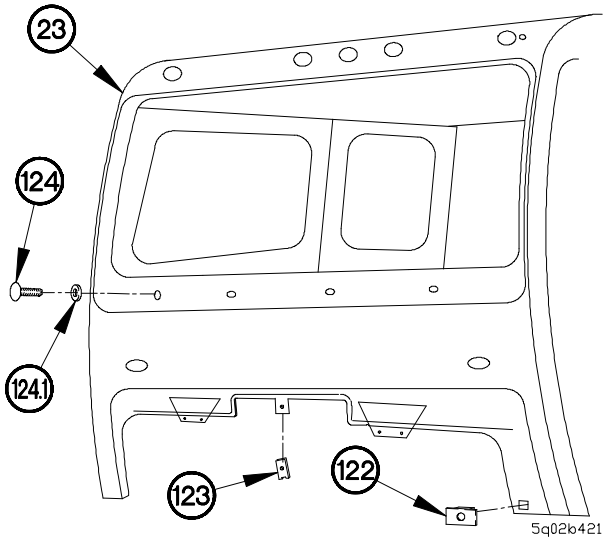
(61) Remove 12 screws (121) and three mounting brackets (120) from cab (23).

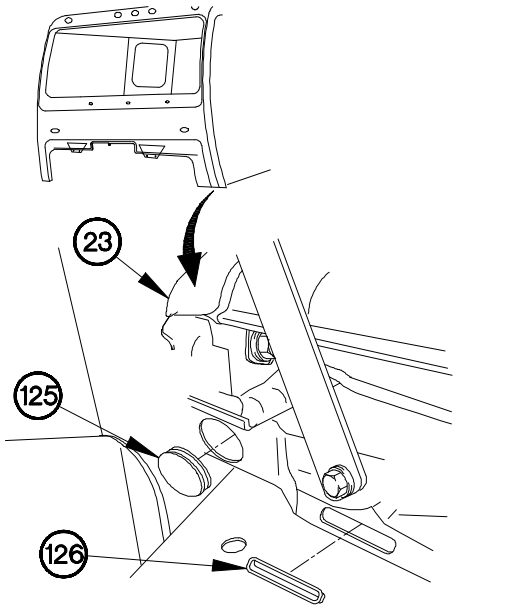


(62) Remove two-grille expansion nuts (122) from cab (23).

(63) Remove grille clip-on nut (123) from cab (23).

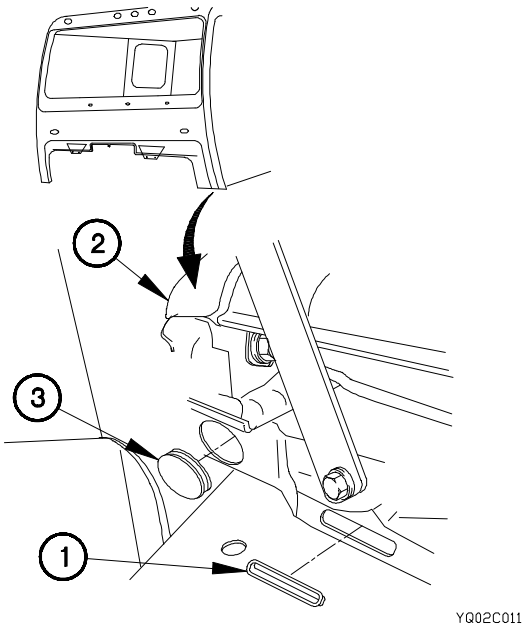
(64) Remove four plastic plugs (124) and washers (124.1) from cab (23). Discard plastic plugs.





(65) Remove two plastic plugs (125) from cab (23). Discard plastic plugs.

(66) Remove two rubber plugs (126) from cab (23). Discard rubber plugs.



c. Assembly.

(1) Install two rubber plugs (1) in cab (2).

(2) Install two plastic plugs (3) in cab (2).

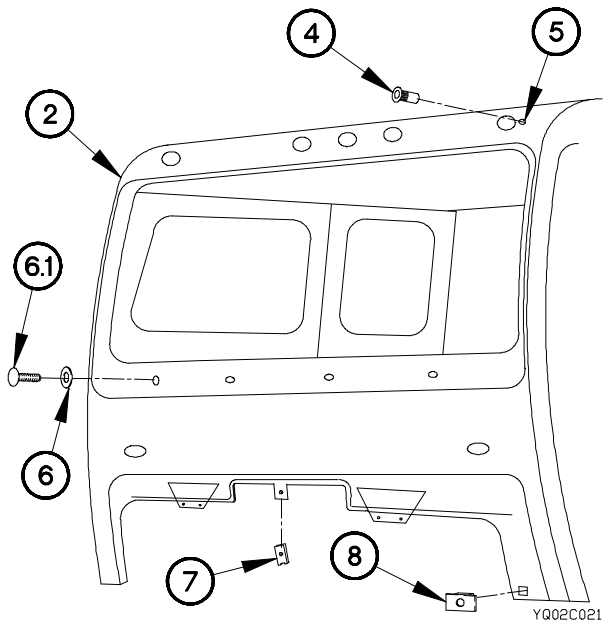
15-2. CAB REPLACEMENT (CONT)

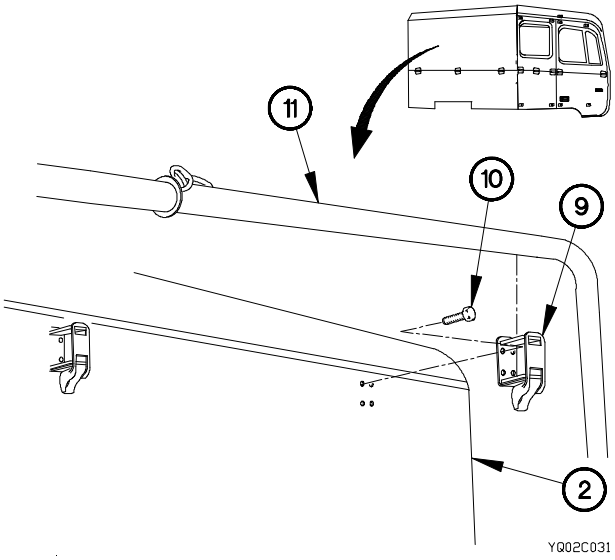
(3) Install 36-clinch nuts (4) in cab clearance and marker light (5) mounting holes.

(4) Install four washers (6) and plastic plugs (6.1) in cab (2).

(5) Install grille clip-on nut (7) on cab (2).

(6) Install two-grille expansion nuts (8) on cab (2).





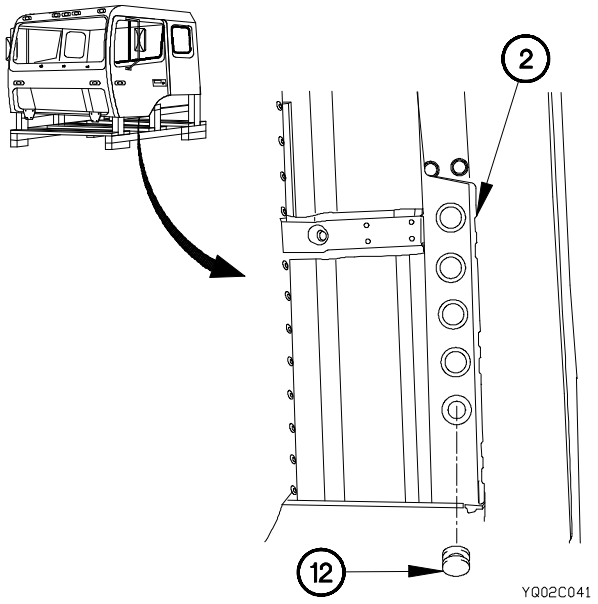
NOTE

Perform steps (7) through (9) on M1081.

(7) Position three mounting brackets (9) on cab (2) with 12 screws (10).

(8) Tighten 12 screws (10) to 36-44 lb-in. (4-5 N•m).

(9) Install davit (11) in mounting brackets (9).



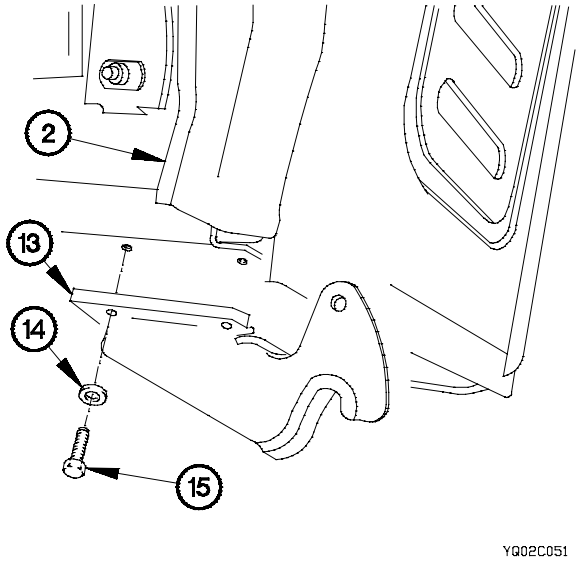
(10) Install 10 plastic plugs (12) in cab (2).

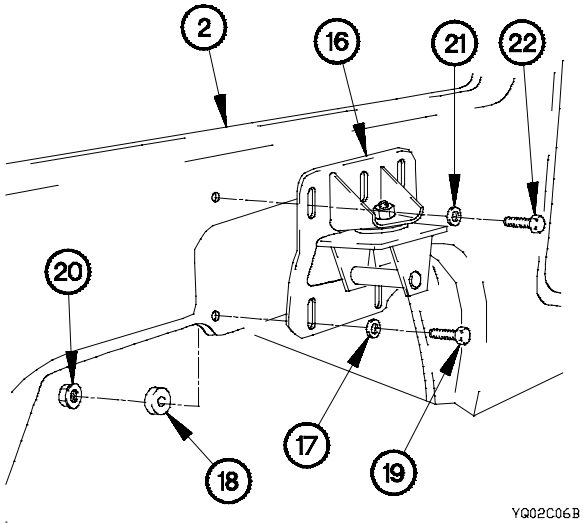
NOTE

Tighten screws so cab latch can be moved with some resistance.

(11) Position two cab latches (13) on cab (2) with four washers (14) and screws (15).

(12) Deleted.





NOTE

Perform step (12.1) on vehicles 7168 and higher.

(12.1) Position latch bracket (16) on cab (2) with two washers (17), screws (19), and self-locking nuts (20).

NOTE

Perform step (13) on vehicles 0001 through 7167.

(13) Position latch bracket (16) on cab (2) with two washers (17), spacers (18), screws (19), and self-locking nuts (20).

(14) Position three washers (21) and screws (22) in cab latch bracket (16).

(15) Tighten three screws (22) and two self-locking nuts (20) to 34-44 lb-ft (44-60 N·m).

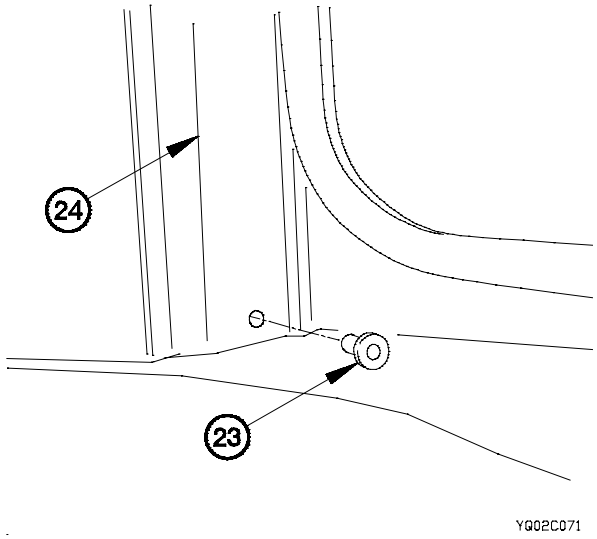
(16) Deleted.

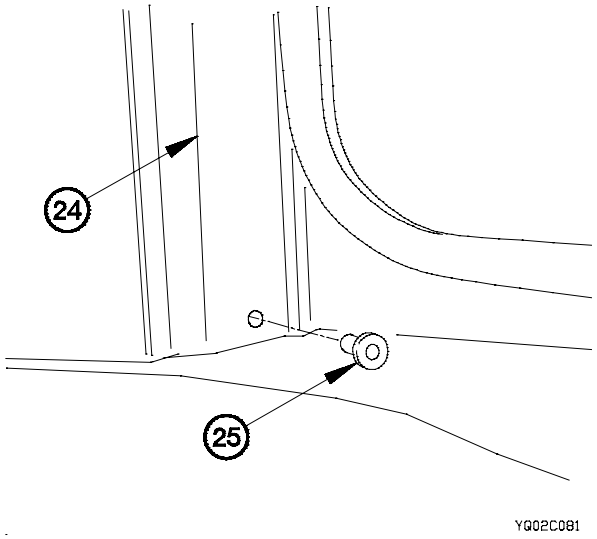
15-2. CAB REPLACEMENT (CONT)

NOTE

Perform step (17) on M1081.

(17) Install six button plugs (23) in two door posts (24).





NOTE

Perform step (18) on all models except M1081.

(18) Install two button plugs (25) in door posts (24).

NOTE

Left and right side door catch strike plates, check valve boots, and door seals are installed the same way. Left side shown.

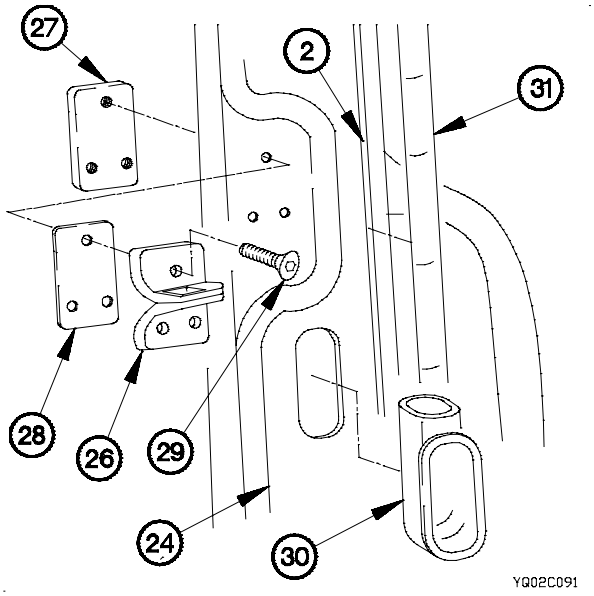
(19) Position door catch strike plate (26) on door post (24) with threaded plate (27), shim (28), and three screws (29).

(20) Tighten three screws (29) to 70-85 lb-in. (8-10 N·m).

(21) Install ventilation check valve boot (30) in door post (24).

(22) Install two door seal (31) on cab (2).

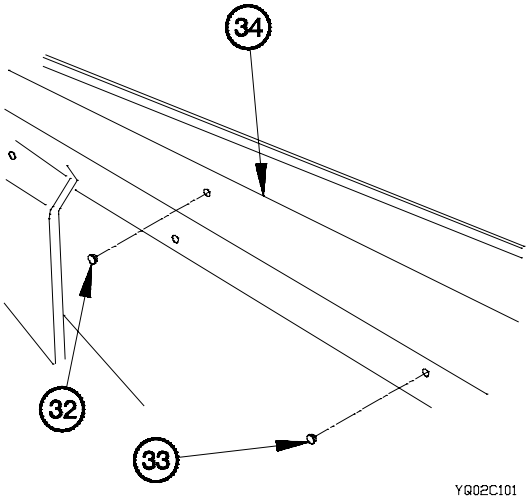
(23) Perform steps (19) through (22) on right side door catch strike plates, check valve boots, and door seals.



NOTE

Perform step (24) on M1081.

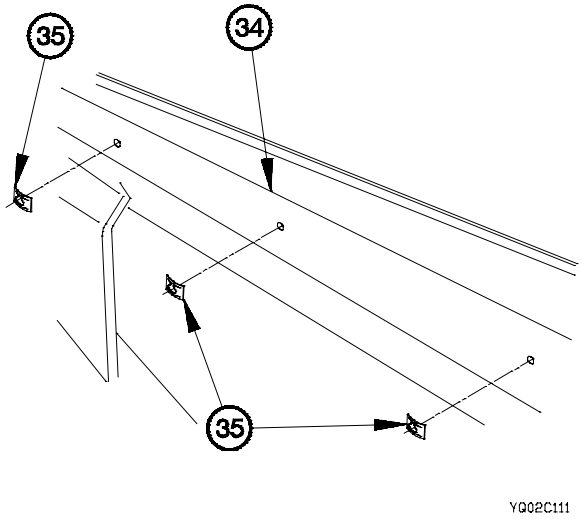
(24) Install 13 plugs (32) and four plugs (33) in dashboard (34).



NOTE

Perform step (25) on all models except M1081.

(25) Install 13 plugs (32) and two plugs (33) in dashboard (34).



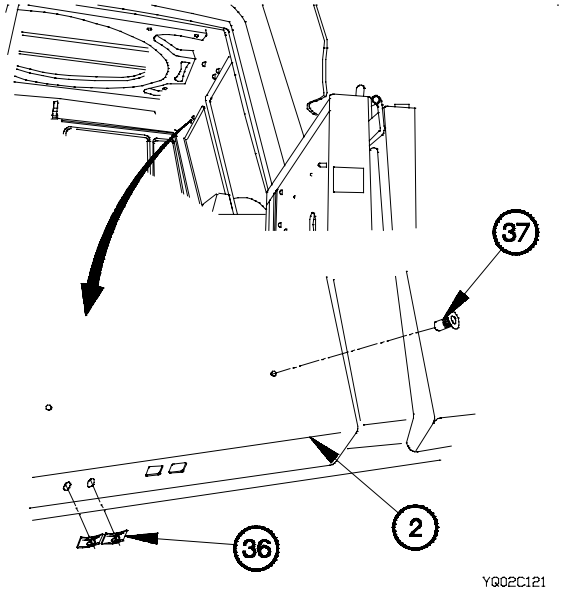
(26) Install 12 expansion nuts (35) in dashboard (34).

NOTE

Perform steps (27) and (28) on all models except M1081.

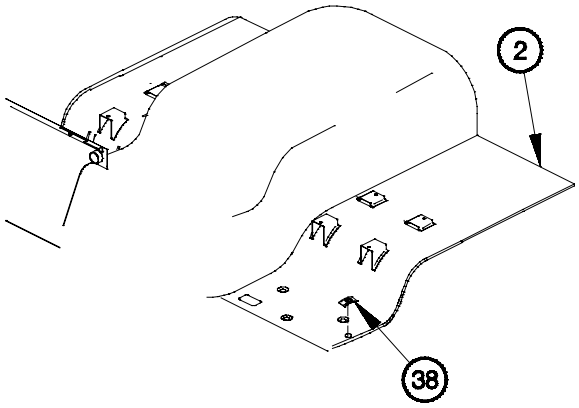
(27) Install four expansion nuts (36) in cab (2).

(28) Install five clinch nuts (37) in cab (2).

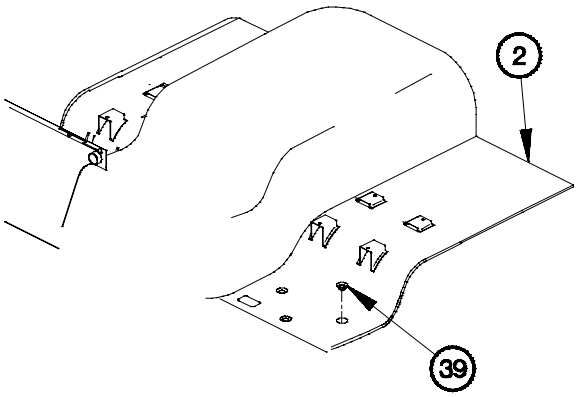


15-2. CAB REPLACEMENT (CONT)

(29) Install eight expansion nuts (38) in cab (2).



YQ02C131



YQ02C141

NOTE

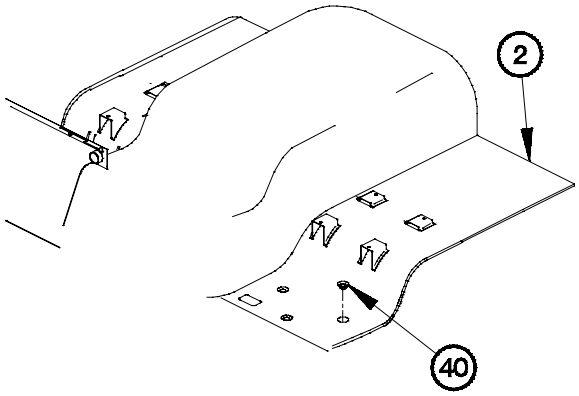
Perform step (30) on M1081.

(30) Install 10 rubber plugs (39) in cab (2).

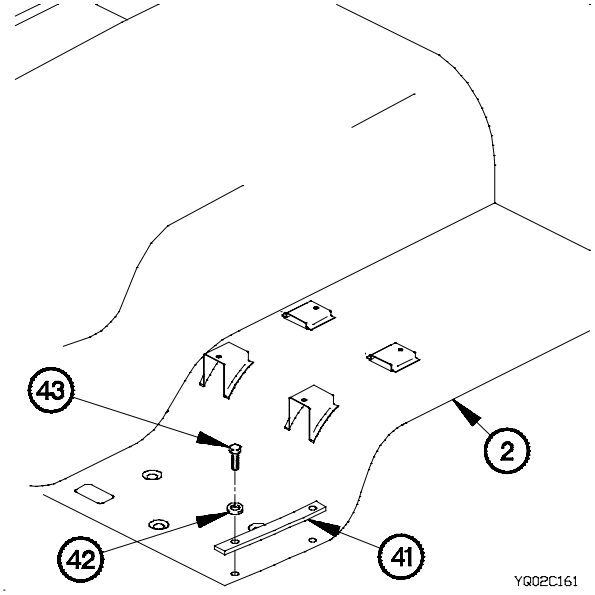
NOTE

Perform step (31) on all models except M1081.

(31) Install 12 rubber plugs (40) in cab (2).



YQ02C151



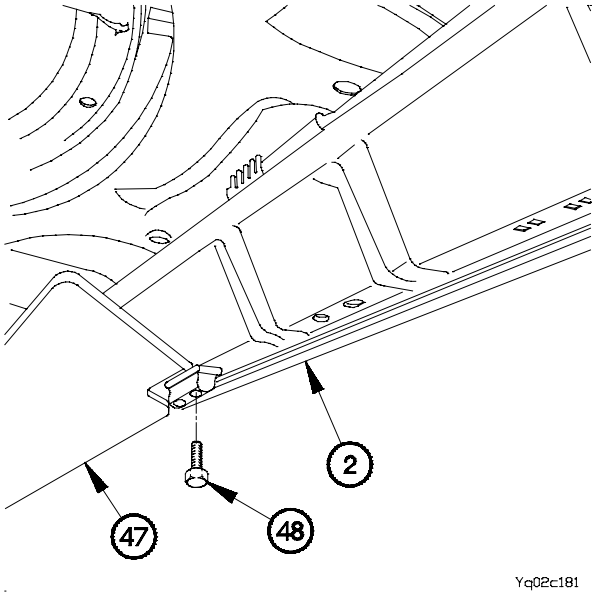
(32) Position two floor moldings (41) on cab (2) with eight washers (42), and screws (43).

(33) Tighten eight screws (43) to 22-27 lb-in. (2-3 N·m).

(34) Deleted.

(35) Deleted.

(36) Deleted.

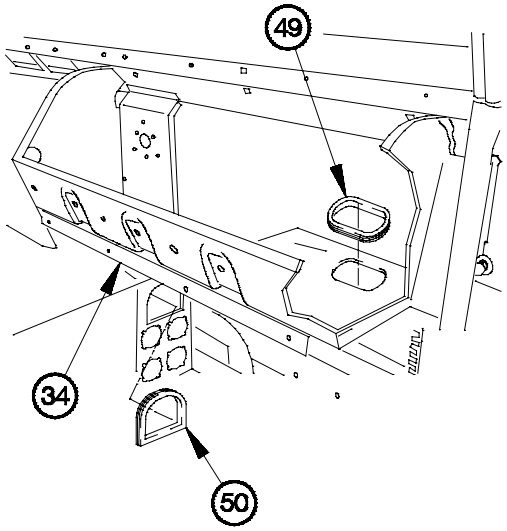


(37) Position sunvisor (47) on cab (2) with four screws (48).

(38) Tighten four screws (48) to 22-27 lb-in. (2-3 N·m).

15-2. CAB REPLACEMENT (CONT)

(39) Install rubber edgings (49 and 50) on dashboard (34).



(40) Deleted.

(41) Deleted.

(42) Deleted.

WARNING

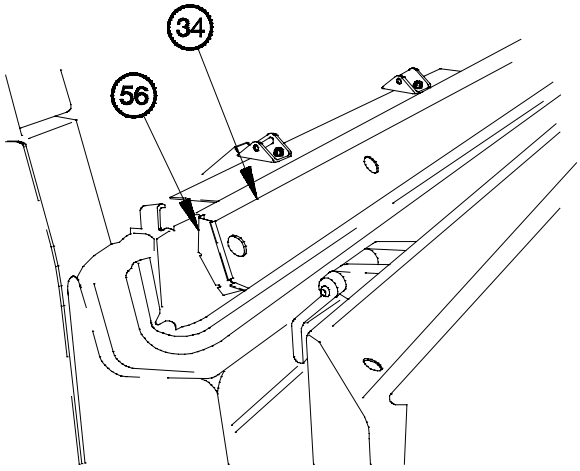
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

NOTE

Perform steps (43) and (44) on M1081.

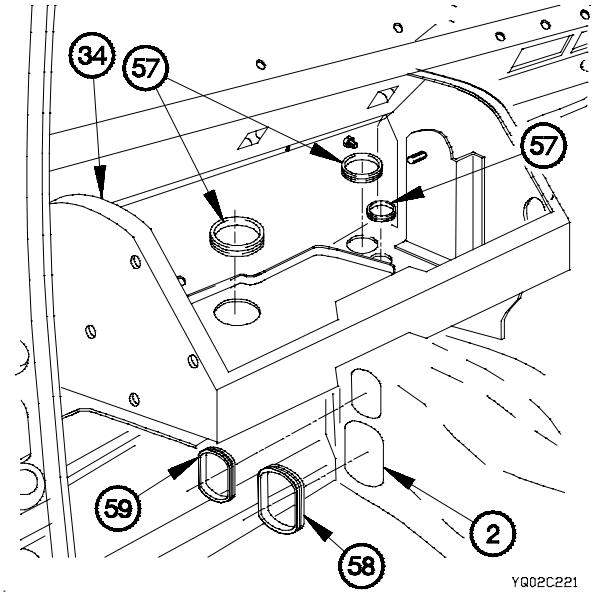
(43) Apply adhesive to two diverters (56).

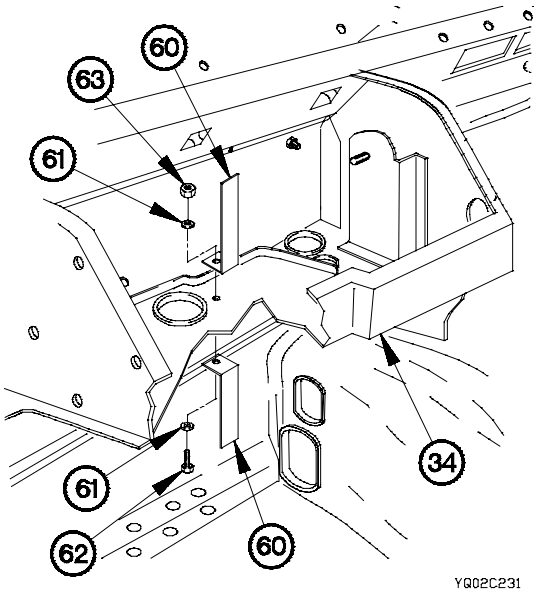
(44) Install two diverters (56) in dashboard (34).



(45) Install three grommets (57) in dashboard (34).

(46) Install rubber edgings (58 and 59) in cab (2).



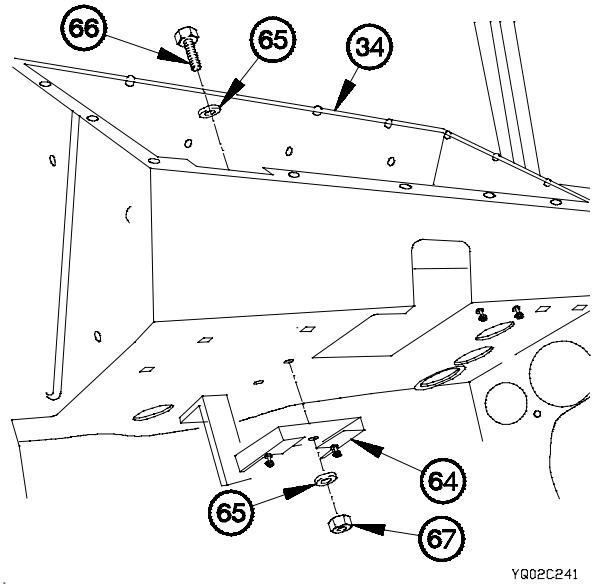


(47) Position two brackets (60) on dashboard (34) with two washers (61), screw (62), and nut (63).

(48) Tighten nut (63) to 62-75 lb-in. (7-8 N·m).

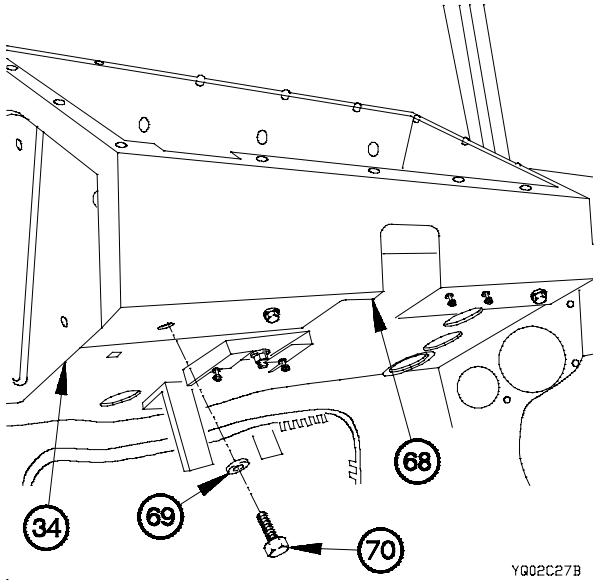
(49) Position bracket (64) on dashboard (34) with four washers (65), two screws (66), and nuts (67).

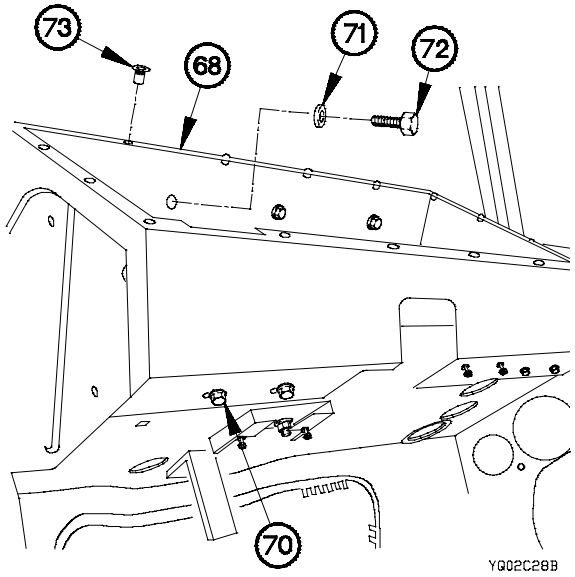
(50) Tighten two nuts (67) to 16-20 lb-in. (2 N·m).



15-2. CAB REPLACEMENT (CONT)

(51) Position dashboard bezel (68) on dashboard (34) with three washers (69) and screws (70).





(52) Position three washers (71) and screws (72) in dashboard bezel (68).

(53) Tighten three screws (72) to 16-20 lb-in. (2 N·m).

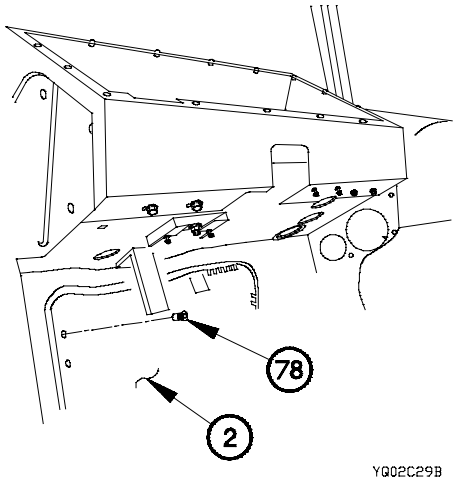
(54) Tighten three screws (70) to 48-60 lb-in. (5-7 N·m).

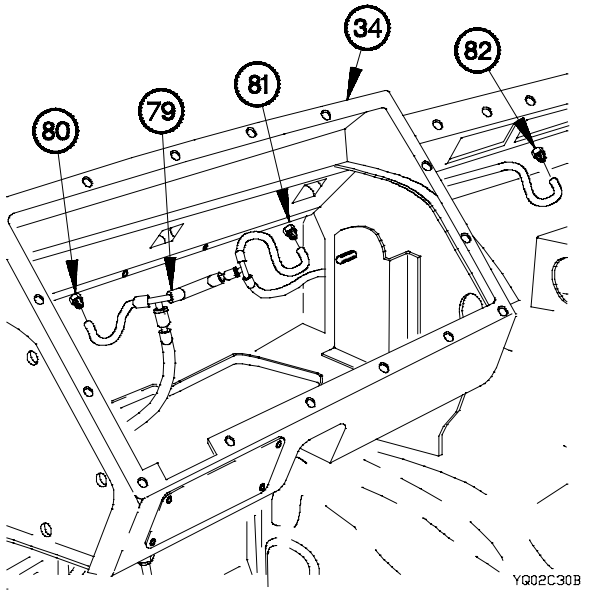
(55) Install 16 clinch nuts (73) in dashboard bezel (68).

(56) Deleted.

(57) Deleted.

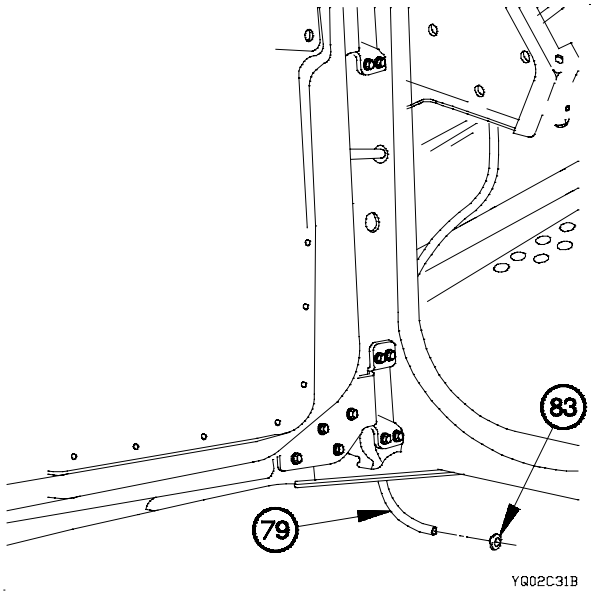
(58) Install two clinch nuts (78) in STE-ICE mounting bracket holes on cab (2).



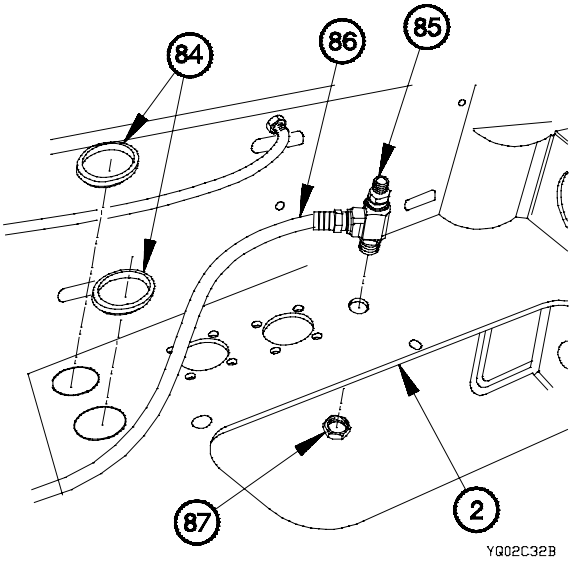


(59) Position window washer hose (79) in dashboard (34).

(60) Connect window washer hose (79) to fittings (80, 81, and 82).



(61) Position grommet (83) on window washer hose (79).



(62) Install two grommets (84) in cab (2).

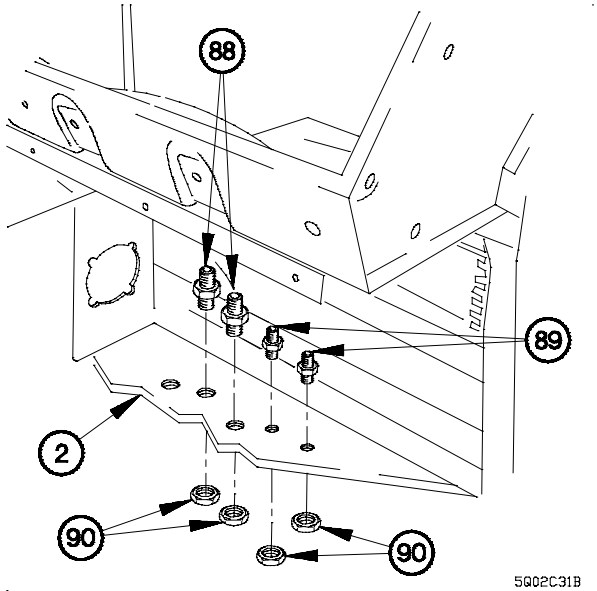
(63) Install tee fitting (85) and hose (86) in cab (2) with nut (87).

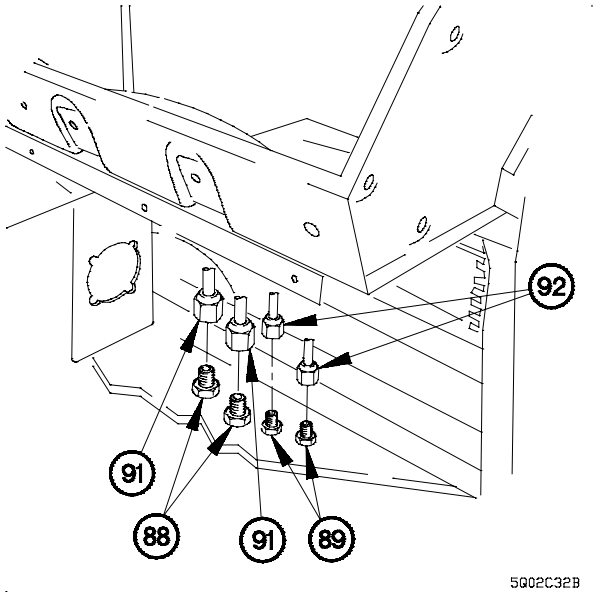
15-2. CAB REPLACEMENT (CONT)

NOTE

Locate and position fittings as noted during disassembly.

(64) Install two fittings (88) and fittings (89) in cab (2) with four nuts (90).



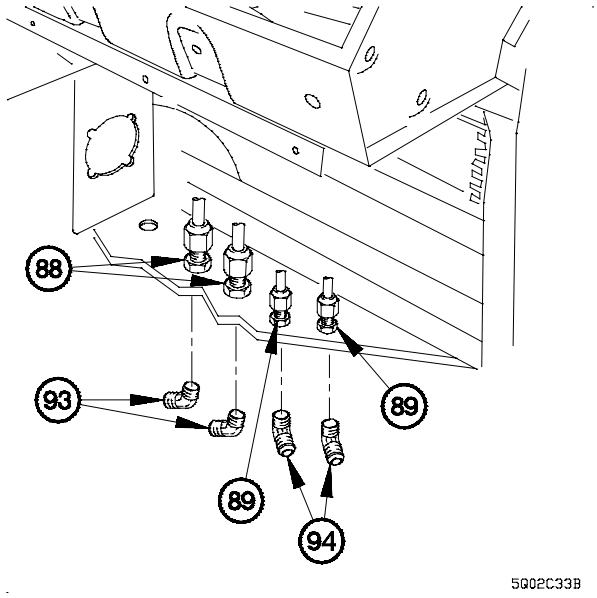


(65) Install two hoses (91) on fittings (88).

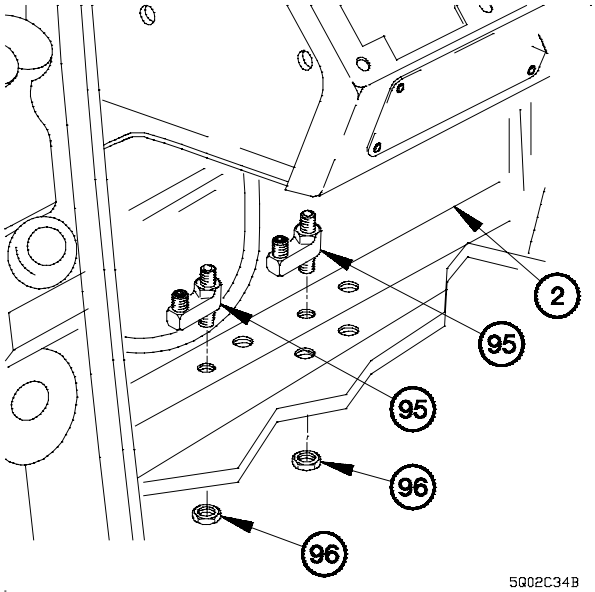
(66) Install two hoses (92) on fittings (89).

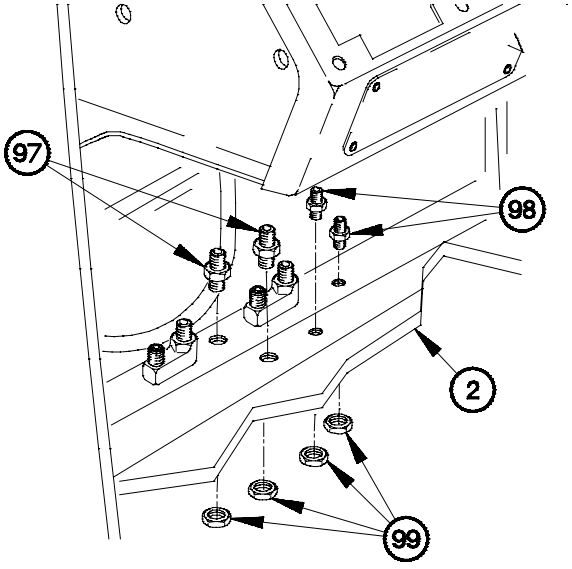
(67) Install two 45-degree fittings (93) in fittings (88).

(68) Install two 45-degree fittings (94) in fittings (89).



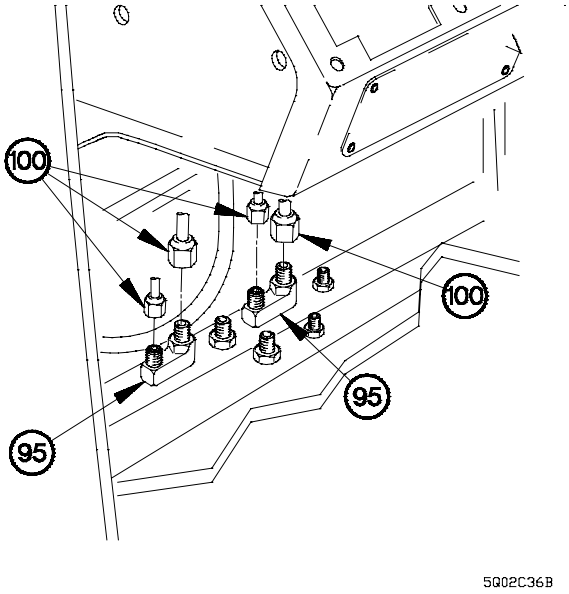
(69) Install two fittings (95) in cab (2) with two nuts (96).



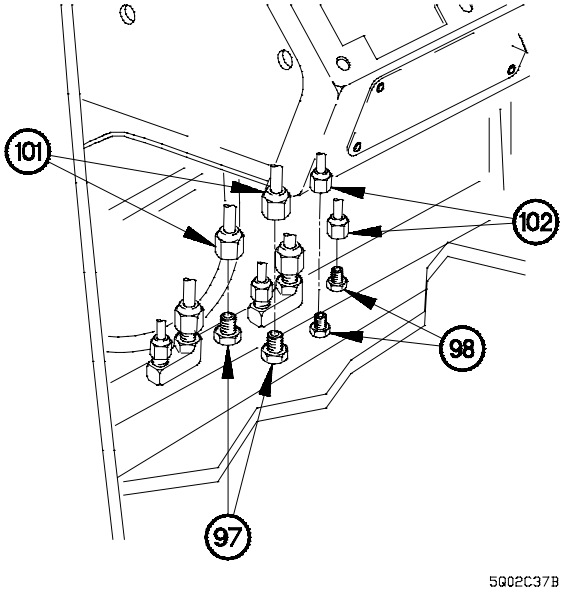


(70) Install two fittings (97) and fittings (98) in cab (2) with four nuts (99).

(71) Install four hoses (100) on two fittings (95).

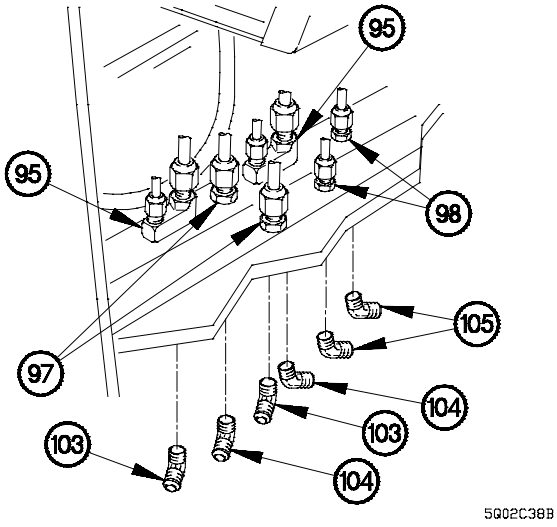


15-2. CAB REPLACEMENT (CONT)



(72) Install two hoses (101) on fittings (97).

(73) Install two hoses (102) on fittings (98).



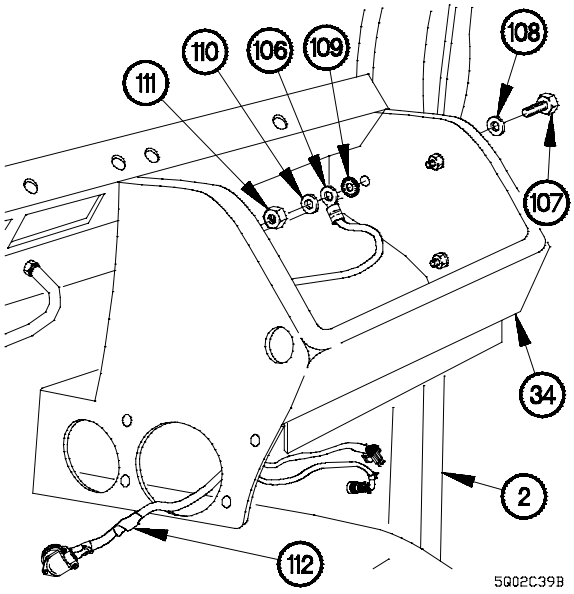
(74) Install two 45-degree fittings (103) in fittings (95).

(75) Install two 45-degree fittings (104) in fittings (97).

(76) Install two 45-degree fittings (105) in fittings (98).

(77) Install electrical cable TL56 (106) on dashboard (34) with screw (107), washer (108), lockwasher (109), washer (110), and nut (111).

(78) Route CTIS electrical harness (112) in cab (2).



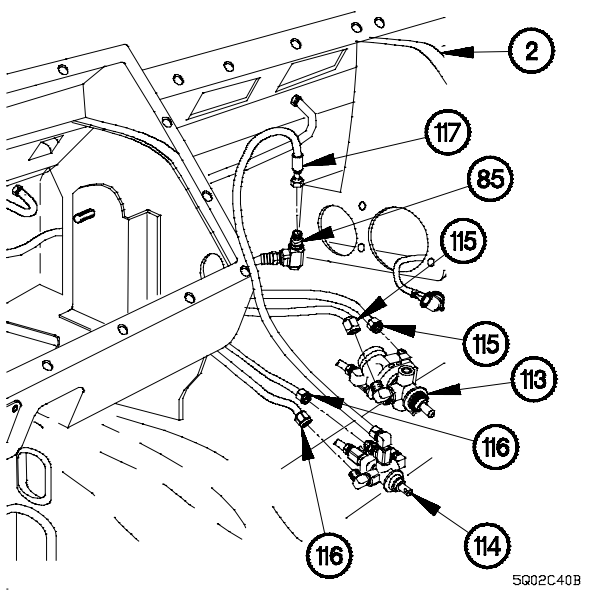
(79) Position trailer air supply valve (113) and system park valve (114) in cab (2).

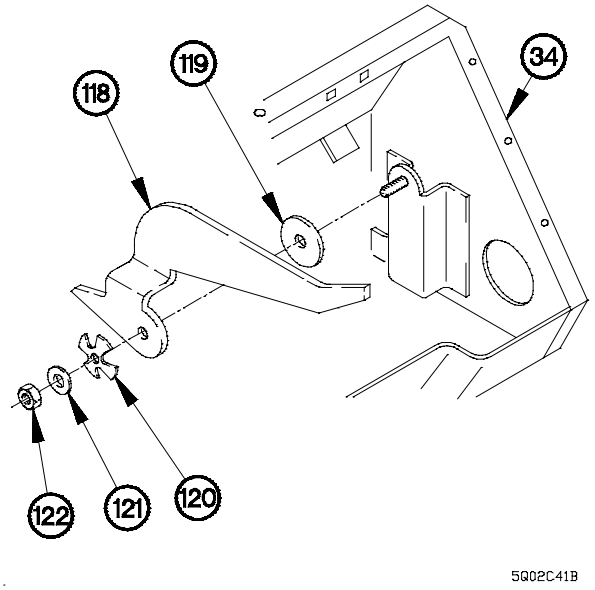
(80) Connect two air hoses (115) to trailer air supply valve (113).

(81) Deleted.

(82) Connect two hoses (116) to system park valve (114).

(83) Connect air hose (117) to tee fitting (85).



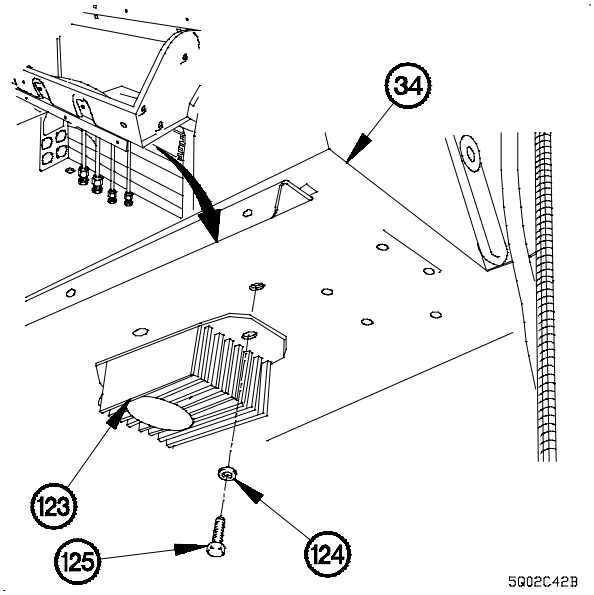


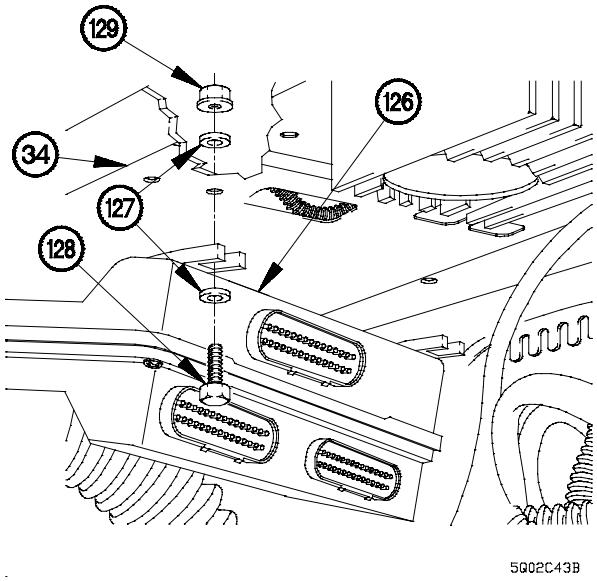
(84) Position manual throttle lever (118) on dashboard (34) with friction disk (119), spring washer (120), washer (121), and self-locking nut (122).

(85) Tighten self-locking nut (122) to 48-50 lb-in. (5-6 N·m).

15-2. CAB REPLACEMENT (CONT)

(86) Install flasher (123) on dashboard (34) with two washers (124) and screws (125).





NOTE

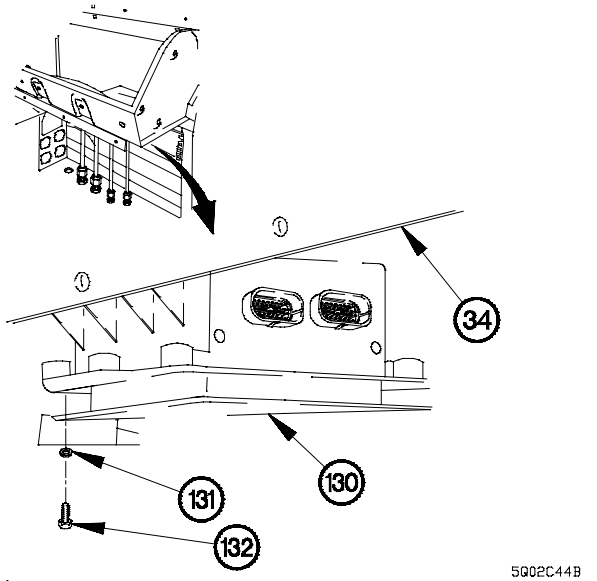
Perform step (87) on vehicles equipped with WTEC III.

(87) Install WTEC III transmission ECU (126) on dashboard (34) with three screws (127), six washers (128), and three nuts (129).

NOTE

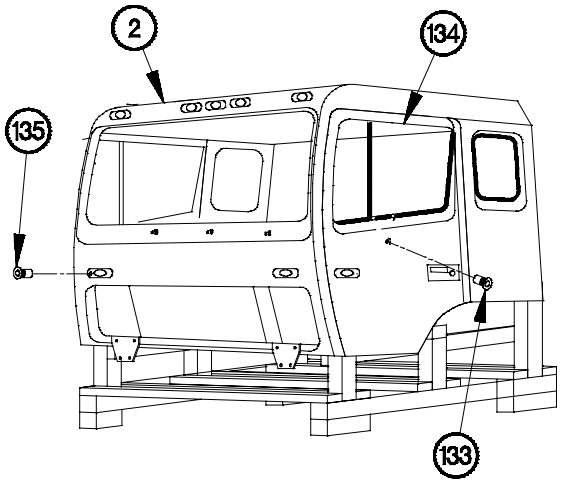
Perform step (88) on vehicles equipped with WTEC II.

(88) Install VIM (130) on dashboard (34) with three washers (131) and screws (132).

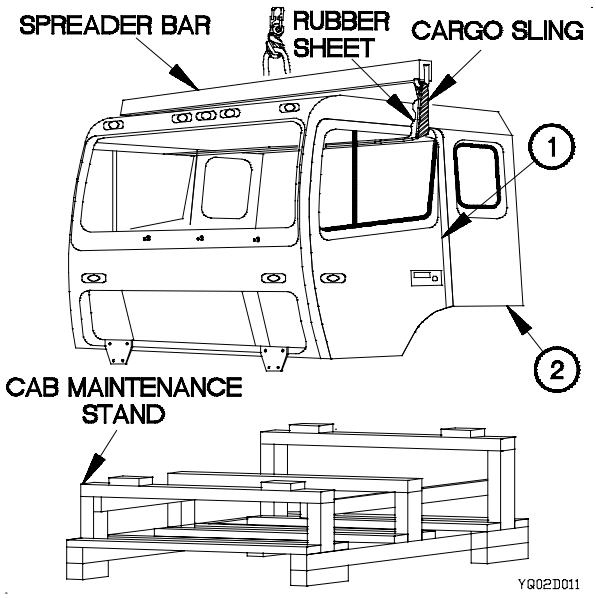


(89) Install four clinch nuts (133) in two cab doors (134).

(90) Install 36 cinch nuts (135) in cab (2).



d. Installation.



WARNING

Standard cab weighs approximately 1400 lbs (636 kgs). M1081 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

NOTE

Steps (1) through (5) require the aid of an assistant.

(1) Lower cab door windows and install cargo sling through rear section of cab doors (1).

(2) Remove cab (2) from cab maintenance stand.

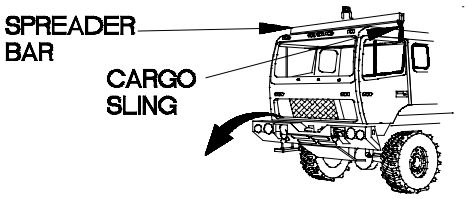
15-2. CAB REPLACEMENT (CONT)

CAUTION

Lower cab straight down to clear radiator. Failure to comply may result in damage to equipment.

NOTE

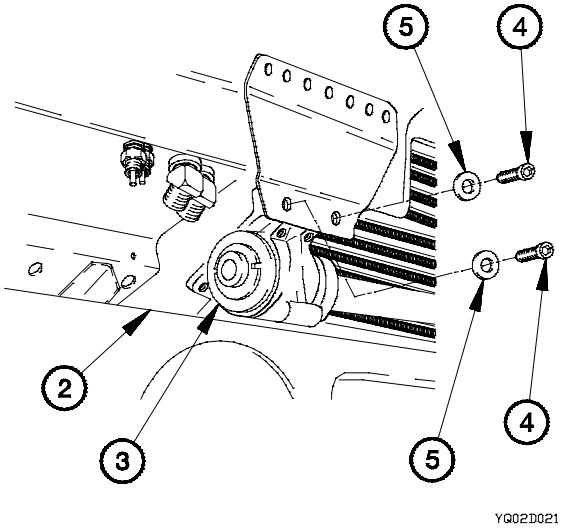
Right and left side cab front support mounts are connected the same way. Right side shown.



(3) Position cab (2) on two cab front support mounts (3).

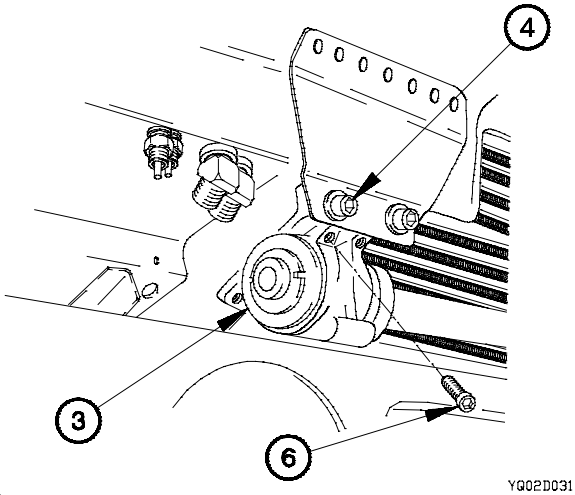
WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.



(4) Apply sealing compound to threads of two screws (4).

(5) Position two washers (5) and screws (4) in right side cab front support mount (3).



(6) Apply sealing compound to threads of four screws (6).

(7) Position four screws (6) in right side cab front support mount (3).

(8) Tighten four screws (6) and two screws (4) to 32-42 lb-ft (45-57 N·m).

(9) Perform steps (3) through (8) on left side cab front support mount.

NOTE

Perform steps (10) through (16) if rear weld nuts are damaged.

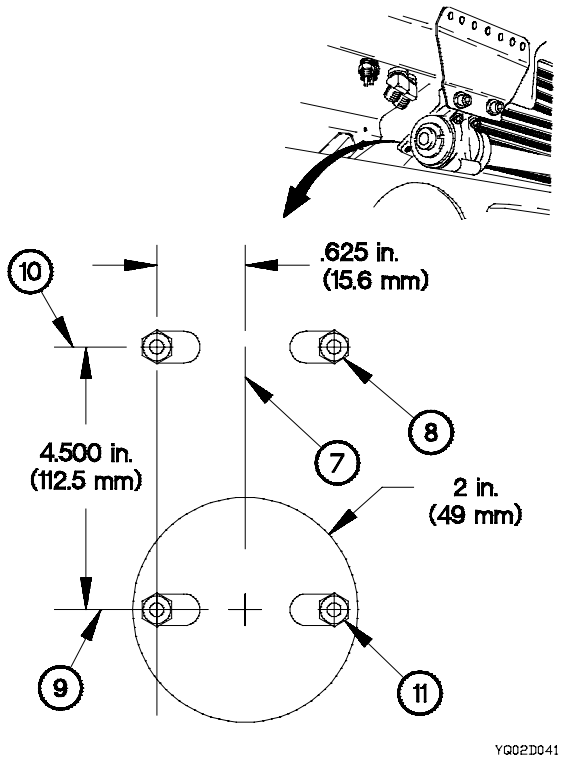
(10) Measure and mark a line (7) half way 0.625 in. (15.6 mm) between two forward weld nuts (8).

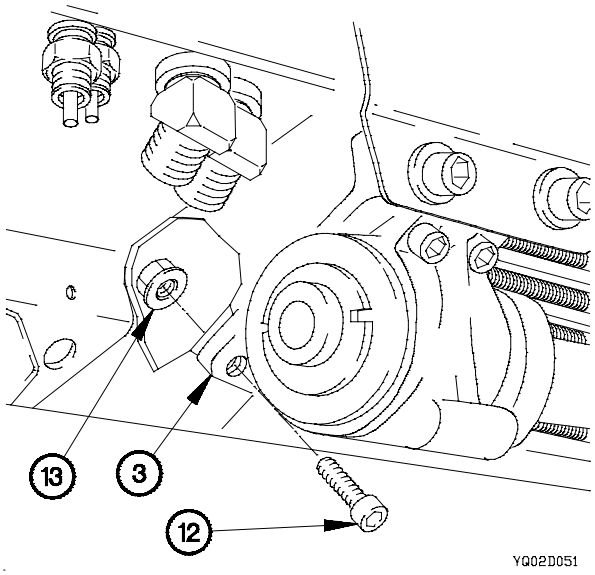
(11) Measure and mark a line (9) 4.500 in. (112.5 mm) in back from front weld nuts (8) on line (10).

(12) Drill a pilot hole at intersection of lines (9 and 10).

(13) Drill a 2 in. (49 mm) hole at pilot hole.

(14) Remove damaged weld nut (11).





NOTE

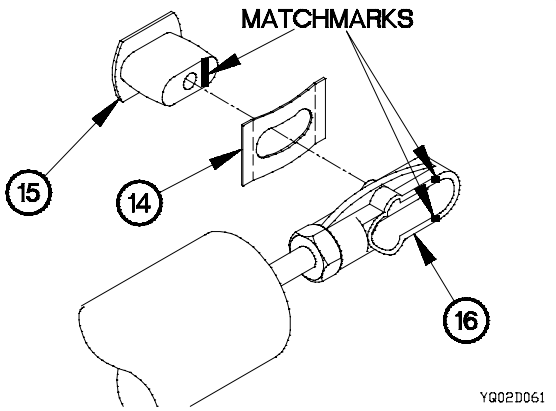
Steps (15) and (16) require the aid of an assistant.

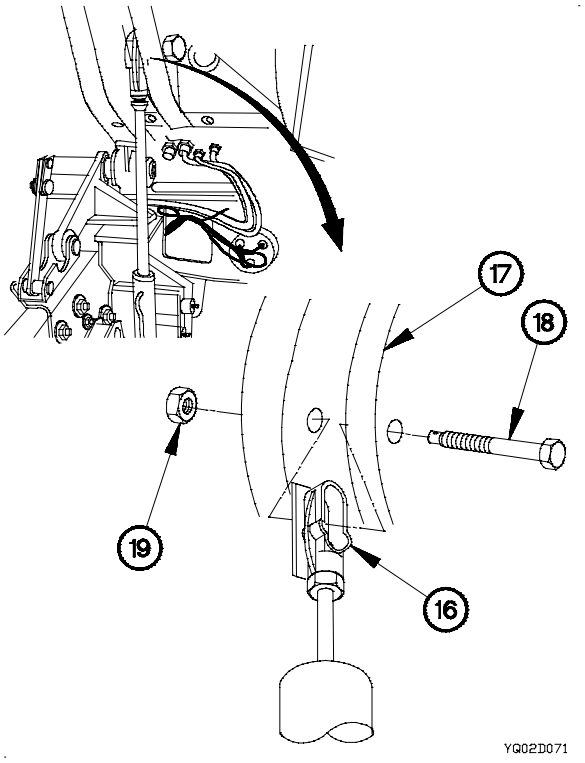
(15) Position screw (12) and self-locking nut (13) in cab support (3).

(16) Tighten screw (12) to 42-52 lb-ft (57-71 N·m).

15-2. CAB REPLACEMENT (CONT)

(17) Install spring washer (14) and control cam (15) in cab tilt cylinder (16) with matchmarks aligned.





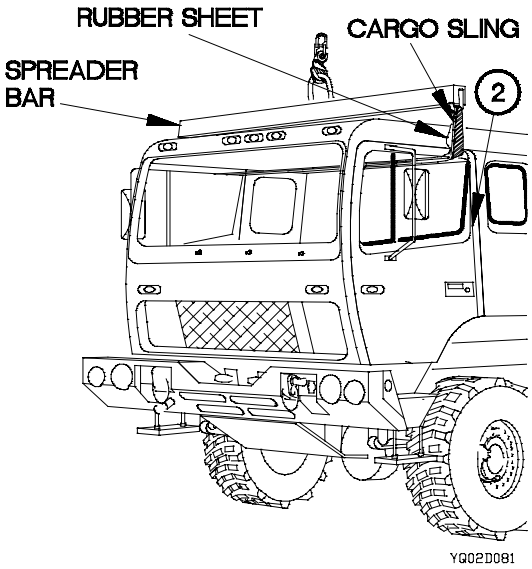
CAUTION

Align arrow on top of tilt cylinder to point toward front of cab. Failure to comply may result in damage to equipment.

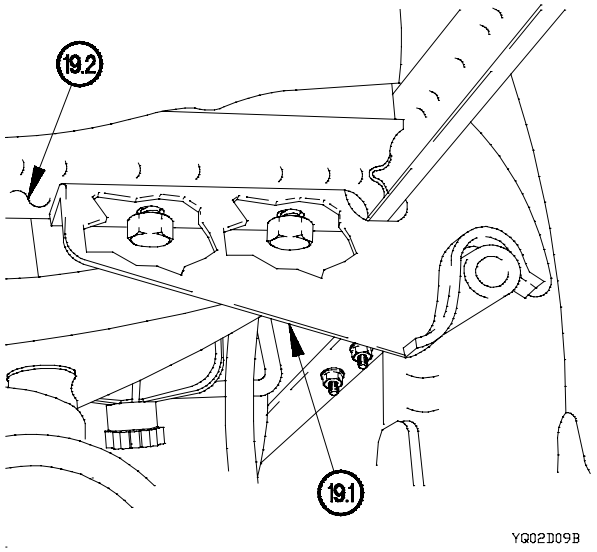
(18) Position cab tilt cylinder (16) in tilt cylinder mounting bracket (17).

(19) Position cab tilt cylinder mounting bolt (18) in tilt cylinder mounting bracket (17) and tilt cylinder (16) with self-locking nut (19).

(20) Tighten self-locking nut (19) to 180-232 lb-ft (244-315 N·m).



(21) Remove spreader bar, cargo sling and rubber sheet from cab (2).



CAUTION

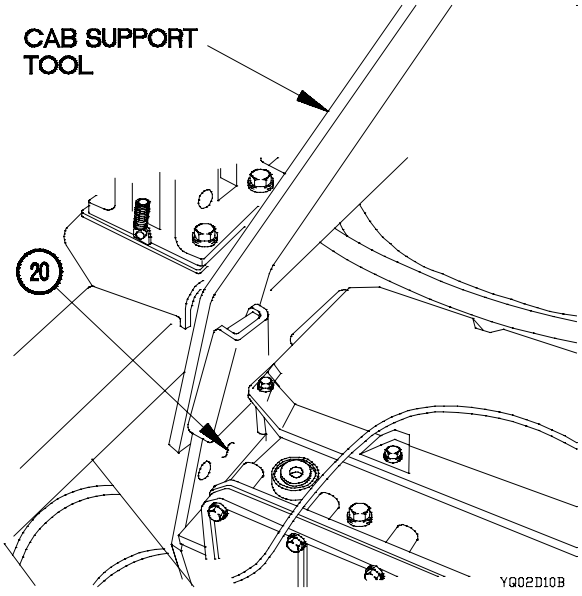
Cab latch must be adjusted so that it rides squarely on the latch support and does not contact the welded area of the latch support. Failure to comply may result in damage to equipment.

(21.1) Adjust cab latch (19.1) on latch supports (19.2).

WARNING

Brace cab with cab support tool before installing locking arm, spacer, washer, and cotter pin on tilt cylinder mounting bolt. Failure to comply may result in serious injury or death to personnel.

(22) Raise cab enough to install cab support tool on engine rear lifting eye (20) (TM 9-2320-365-10).



WARNING

After cab is lowered on cab support tool, return cab tilt selector knob to the RAISE position for added safety. Failure to comply may result in injury to personnel.

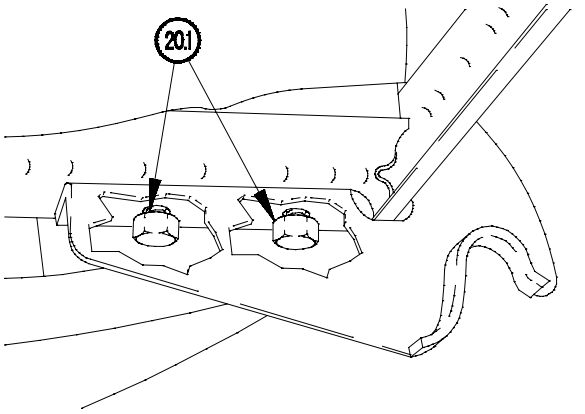
(23) Lower cab on cab support tool (TM 9-2320-365-10).

15-2. CAB REPLACEMENT (CONT)

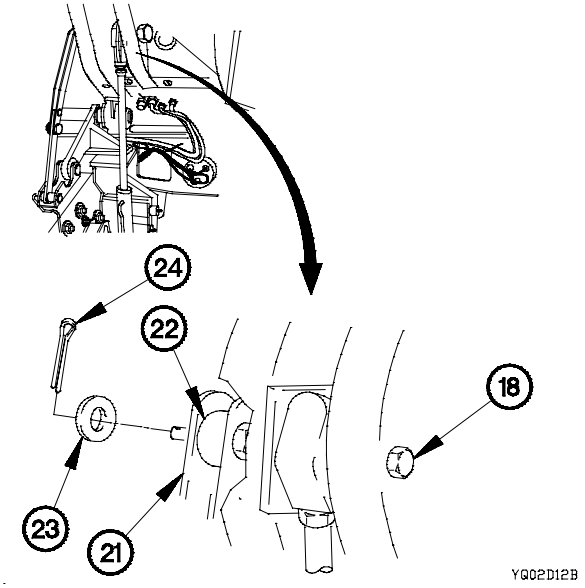
CAUTION

Do not allow cab latch to change position while tightening screws. Failure to comply may result in damage to equipment.

(23.1) Tighten two screws (20.1) to 34-44 lb-ft (44-60 N·m).



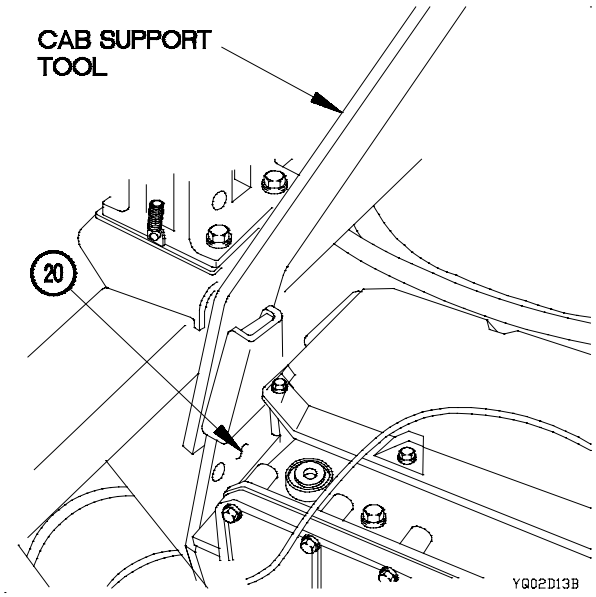
Yq02d11b



(24) Install locking arms (21), spacer (22), washer (23), and cotter pin (24) on cab tilt cylinder mounting bolt (18).

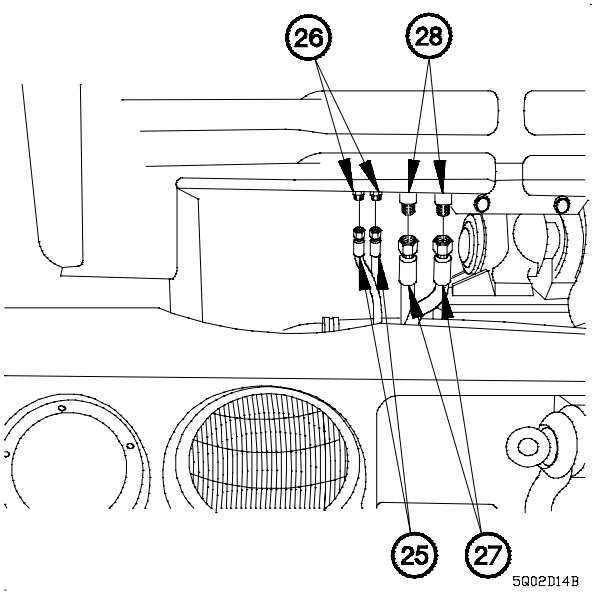
(25) Raise cab (TM 9-2320-365-10).

(26) Remove cab support tool from engine rear lifting eye (20).

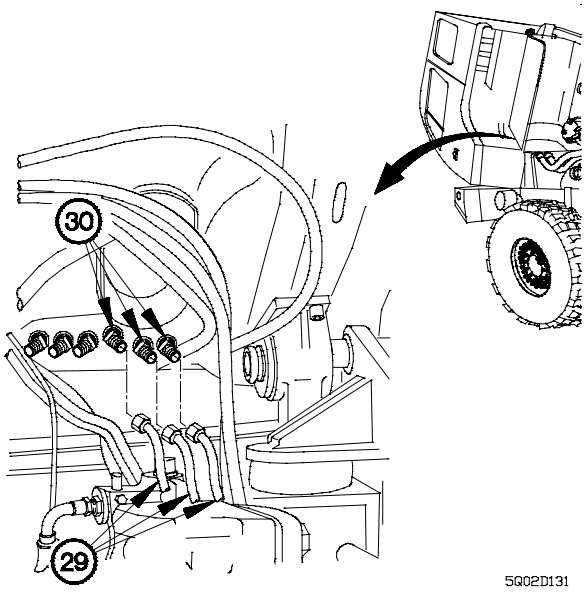


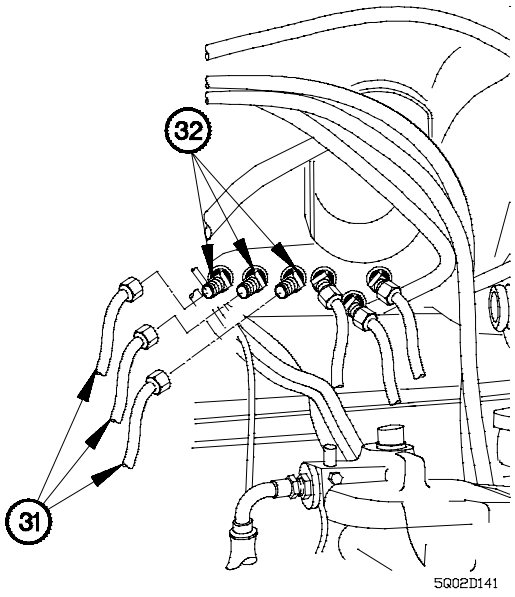
(27) Connect two pneumatic hoses (25) to fittings (26).

(28) Connect two pneumatic hoses (27) to 45-degree fittings (28).



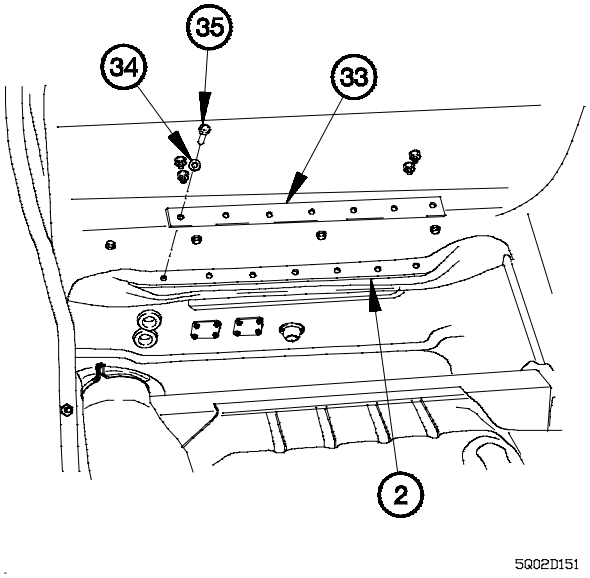
(29) Connect three pneumatic hoses (29) to 45-degree fittings (30).





(30) Connect three pneumatic hoses (31) to 45-degree fittings (32).

(31) Install baffle (33) on cab (2) with seven washers (34) and rivets (35).

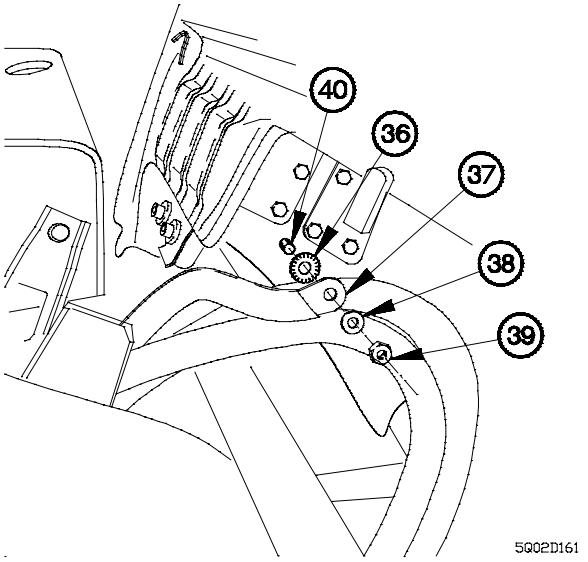


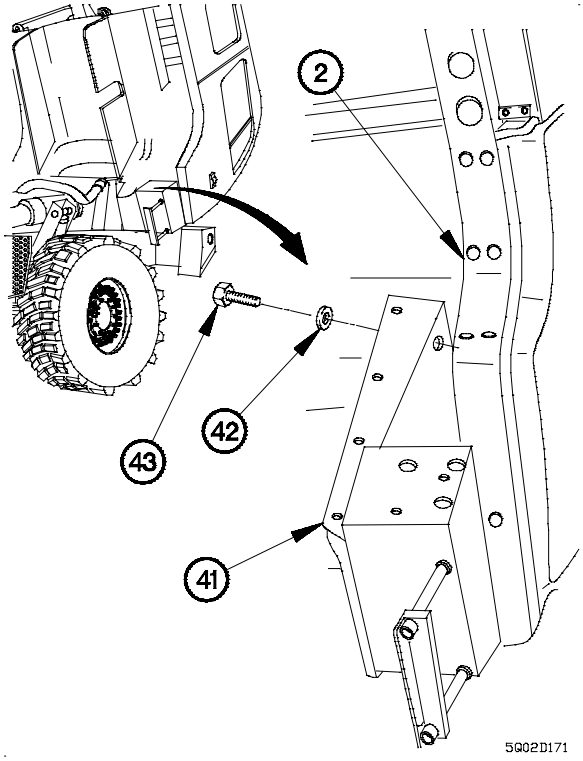
15-2. CAB REPLACEMENT (CONT)

NOTE

Vehicle serial numbers 0001 through 1477 have a smaller diameter ground stud than vehicle serial numbers 1478 and higher serial numbers. Vehicle serial number will determine which self-locking nut to use.

(32) Install lockwasher (36), ground strap (37), washer (38) and self-locking nut (39) on ground stud (40).



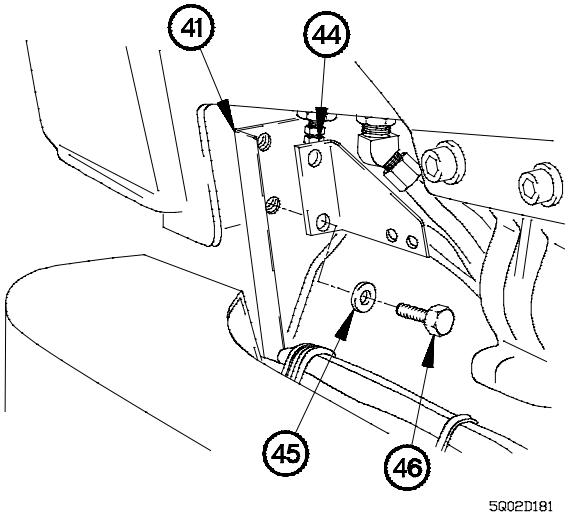


NOTE

Step (33) requires the aid of an assistant.

(33) Install step mount (41) on cab (2) with six washers (42) and screws (43).

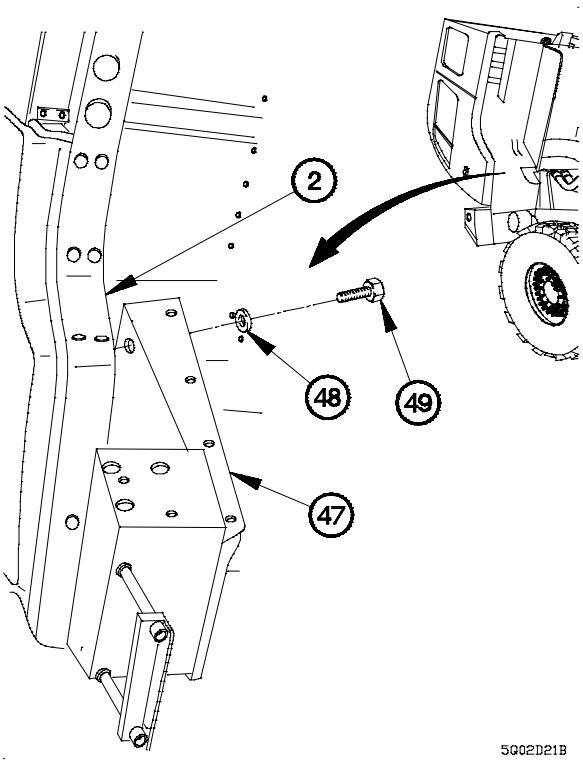
(34) Install bracket (44) on step mount (41) with two washers (45) and screws (46).

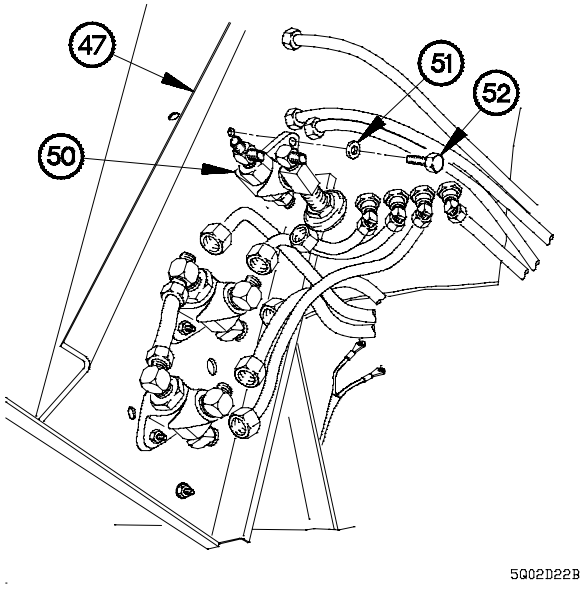


NOTE

Step (35) requires the aid of an assistant.

(35) Install step mount (47) on cab (2) with seven washers (48) and screws (49).



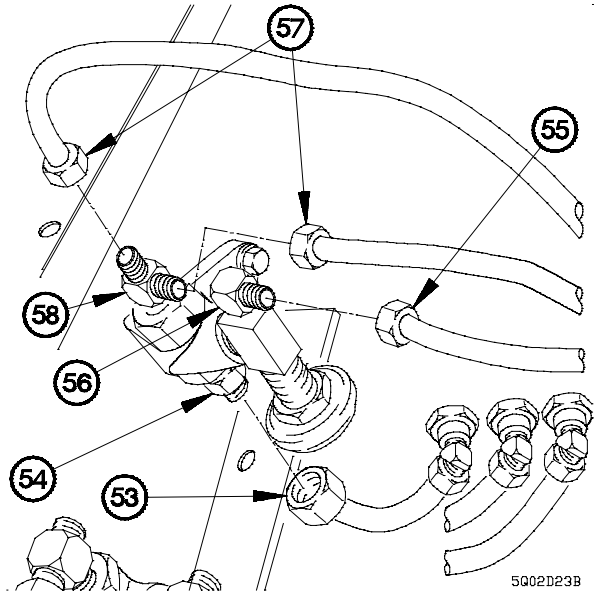


(36) Install valve (50) on step mount (47) with washer (51) and screw (52).

(37) Connect hose (53) to fitting (54).

(38) Connect hose (55) to 90-degree fitting (56).

(39) Connect two hoses (57) to tee fitting (58).

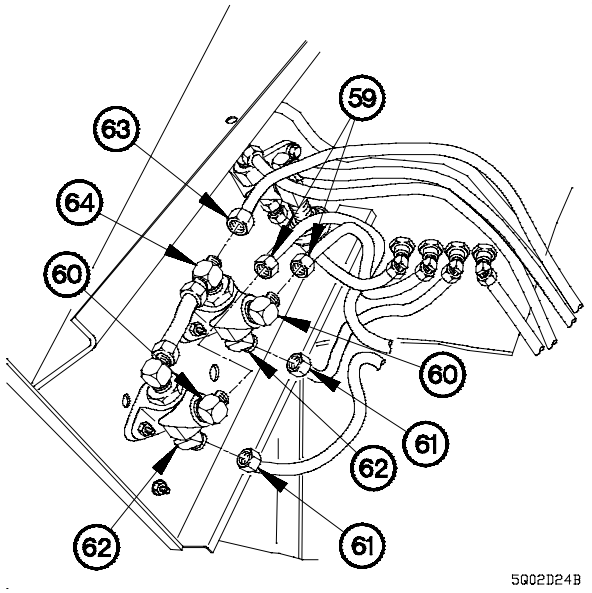


15-2. CAB REPLACEMENT (CONT)

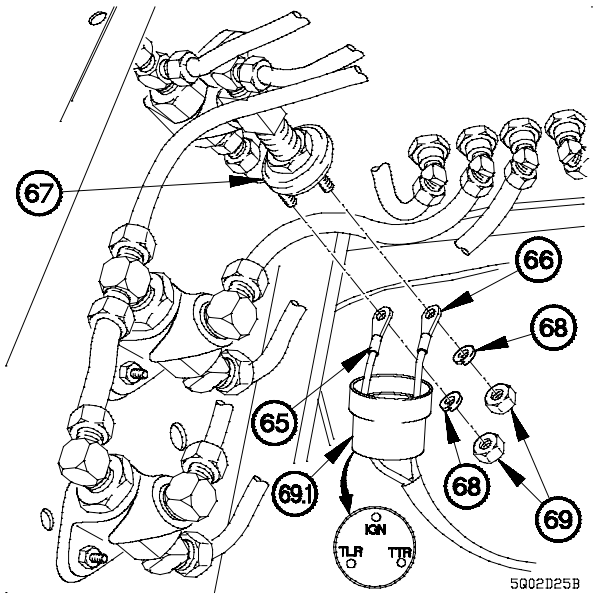
(40) Connect two hoses (59) to 90-degree fittings (60).

(41) Connect two hoses (61) to 45-degree fittings (62).

(42) Connect hose (63) to tee fittings (64).



(43) Install terminal lugs TL201 (65) and TL202 (66) on air pressure transmitter (67) with two lockwashers (68) and nuts (69).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(43.1) Apply sealing compound to nuts (69), lockwashers (68), and terminal lugs TL201 (65) and TL202 (66).

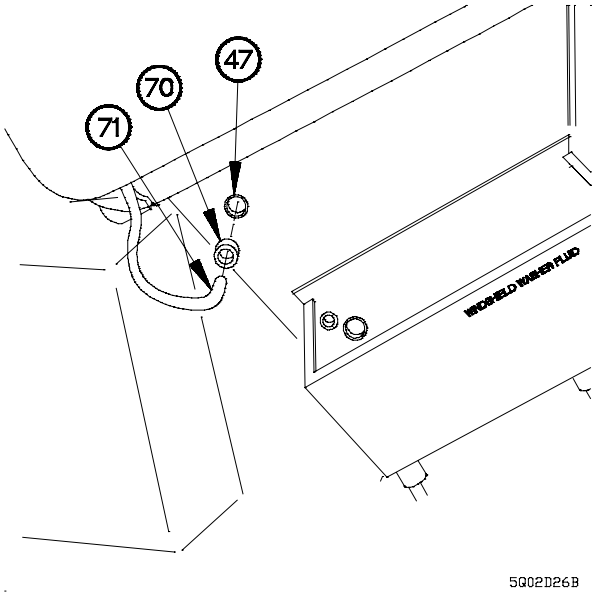
NOTE

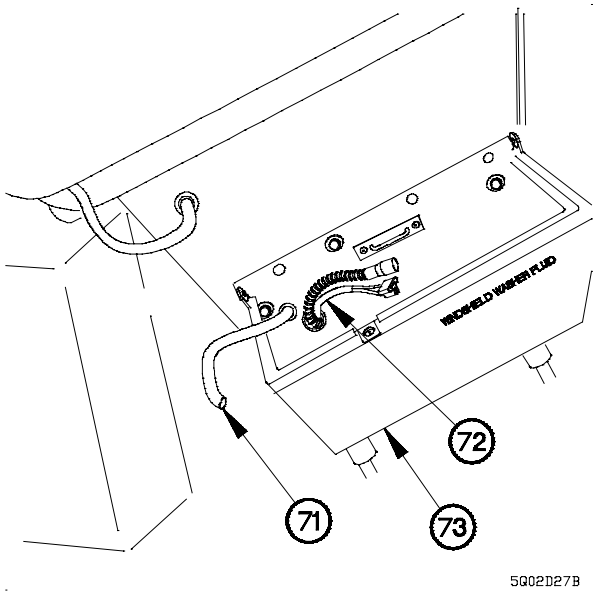
Perform steps (47) and (48) on vehicle serial number 7748 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(43.2) Install boot (69.1) on lower pressure transmitter (69).

(43.3) Apply antiseize to holes TLR and TTR and around edges of boot (69.1).

(44) Position grommet (70) and hose (71) in step mount (47).





(45) Position windshield washer pump/EMI cable assembly (72) in step (73).

(46) Position hose (71) in step (73).

(47) Lower cab (TM 9-2320-365-10).

NOTE

Perform step (47.1) on M1079.

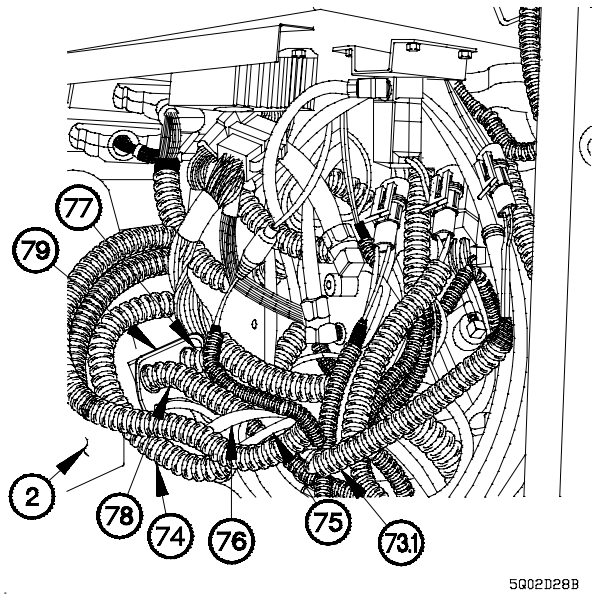
(47.1) Route 12/24 vdc power cable (73.1) in cab (2).

NOTE

Perform step (48) on vehicles equipped with PTO.

(48) Route PTO cable assembly (74) inside cab (2).

(49) Route power distribution panel 24 vdc cable (75), power distribution panel 12 vdc cable (76), rear lights cable assembly (77), front lights cable assembly (78), and grommet (79) inside cab (2).



NOTE

Perform step (49.1) on M1079.

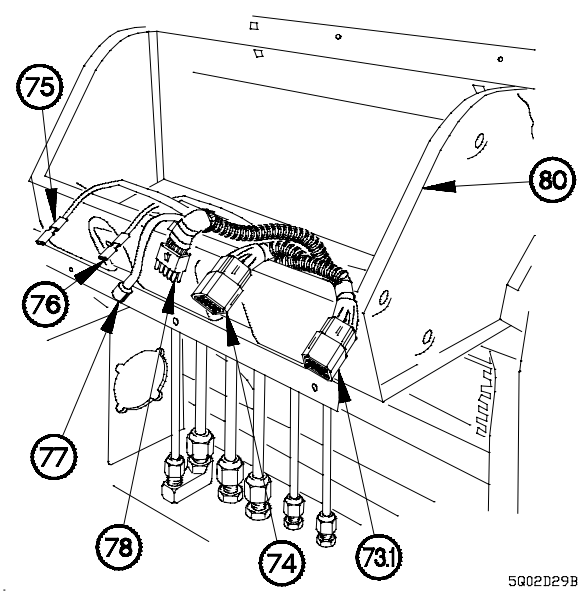
(49.1) Route 12/24 vdc power cable (73.1) inside dashboard (80).

NOTE

Perform step (50) on vehicles equipped with PTO.

(50) Route PTO cable assembly (74) inside dashboard (80).

(51) Route power distribution panel 24 vdc cable (75), power distribution panel 12 vdc cable (76), rear lights cable assembly (77), and front lights cable assembly (78) inside dashboard (80).



15-2. CAB REPLACEMENT (CONT)

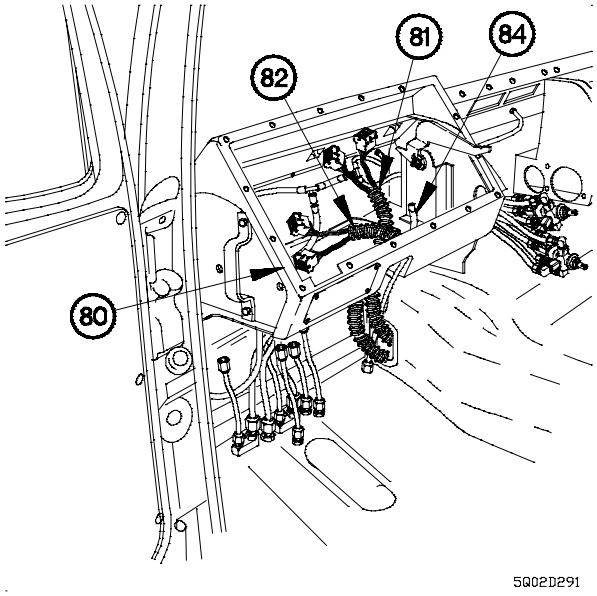
NOTE

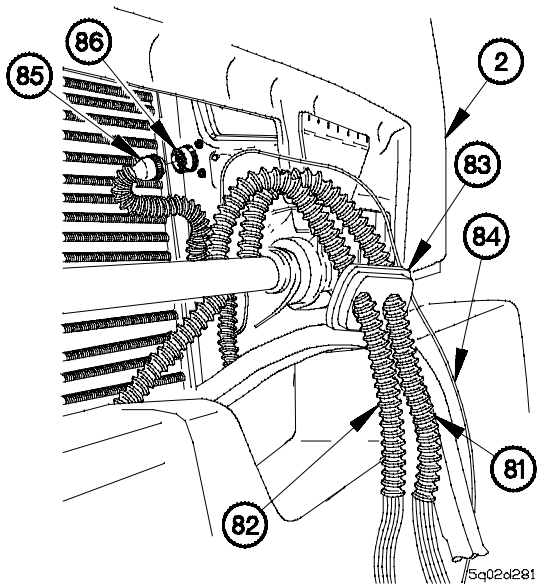
Steps (52) and (53) require the aid of an assistant.

(52) Route start and charging cable assembly (81), engine control cable assembly (82), and grommet (83) inside cab (2).

(53) Route vacuum hose (84) inside cab (2).

(54) Connect connector P119 (85) to connector J119 (86).





NOTE

Install plastic cable ties as required.

(55) Route start and charging cable assembly (81) and engine control cable assembly (82) inside dashboard (80).

(56) Route vacuum hose (84) inside dashboard (80).

e. Follow-On Maintenance.

(1) Install placard, as required (TM 9-2320-365-20-1).

(2) Install fenders and mud flaps (TM 9-2320-365-20-4).

(3) Install horn (TM 9-2320-365-20-3).

(4) Install cab windshield and side windows (para 15-7).

(5) Install windshield wipers and linkage (TM 9-2320-365-20-4).

(6) Install machine gun ring kit, if equipped (para 19-2).

(6.1) Install roof hatch (TM 9-2320-365-20-4).

(7) Install chemical kit alarm cable, if equipped (TM 9-2320-365-20-3).

(8) Install warning light kit, if equipped (TM 9-2320-365-10).

(9) Install warning light cable (TM 9-2320-365-20-3).

(10) Install cab floor covering (TM 9-2320-365-20-4).

(11) Install cab liners (TM 9-2320-365-20-4).

(12) Install air drop cab liners (M1081) (TM 9-2320-365-20-4).

(13) Adjust doors (TM 9-2320-365-20-4).

(14) Install mirrors (TM 9-2320-365-20-4).

(15) Install clearance light cable assemblies (TM 9-2320-365-20-3).

(16) Install manifold valve assembly (TM 9-2320-365-20-3).

(17) Install STE-ICE/R cable assembly (TM 9-2320-365-20-3).

(18) Install fan and differential lock solenoids (TM 9-2320-365-20-2).

(19) Install accelerator pedal (TM 9-2320-365-20-2).

(20) Install throttle control cable threaded rod (TM 9-2320-365-20-3).

(21) Install throttle control cable (TM 9-2320-365-20-3).

(22) Install park control two-way check valve (TM 9-2320-365-20-3).

(23) Install foot control valve and brake foot pedal (TM 9-2320-365-20-3).

(24) Install steering column (TM 9-2320-365-20-3).

(25) Install auxiliary panel cable assembly (TM 9-2320-365-20-3).

15-2. CAB REPLACEMENT (CONT)

(26) Install WTEC III dashboard cable assembly (TM 9-2320-365-20-3).

(27) Install WTEC II dashboard cable assembly (TM 9-2320-365-20-3).

(28) Fill radiator (TM 9-2320-365-10).

(29) Connect batteries (TM 9-2320-365-20-3).

(30) Start engine and check air system and heater hoses for leaks (TM 9-2320-365-10).

(31) Operate vehicle and check electrical system for proper operation (TM 9-2320-365-10).

(32) Shut down engine (TM 9-2320-365-10).

End of Task.

15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Batteries disconnected (TM 9-2320-365-20-3).
Air tanks drained (TM 9-2320-365-10).
Steering wheel removed (TM 9-2320-365-20-3).
Instrument panel removed for access (TM 9-2320-365-20-3).
Kick panel removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Pan, Drain (Item 36, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Sling, Cargo (Item 48, Appendix B)
Tool, Cab Support (Item 5, Appendix D)
Bar, Spreader (Item 16, Appendix D)
Stand, Cab Maintenance (Item 4, Appendix D)
Cab Front Support Spanner Socket (Item 3, Appendix D)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Socket Set, Socket Wrench (Item 51, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Crowfoot Attachment, Socket Wrench (TM 9-2320-365-20)
Crowfoot Attachment, Socket Wrench (TM 9-2320-365-20)
Socket Wrench Attachment, Screwdriver (Item 54, Appendix 4)

Materials/Parts
Sealing Compound (Item 75, Appendix C)
Oil, Paraffin and Mineral (Item 54, Appendix C)
Tape, Antiseizing (Item 83, Appendix C)
Rubber Sheeting (Item 63, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Ties, Cable, Plastic (Item 89, Appendix C)
Lockwasher (2) (Item 103, Appendix F)
Lockwasher (Item 102, Appendix F)
Lockwasher (2) (Item 101, Appendix F)
Nut, Plain, Hex (Item 121, Appendix F)
Pin, Cotter (Item 229, Appendix F)
Nut, Self-Locking (Item 140, Appendix F)
Nut, Self-Locking (Item 141, Appendix F)
Washer, Spring Tension (Item 305, Appendix F)
Pin, Cotter (Item 228, Appendix F)
Packing, Preformed (Item 214, Appendix F)
Nut, Plain, Hex. (2) (Item 119, Appendix F)
Bushing, Sleeve (Item 21, Appendix F)
Bushing, Sleeve (Item 22, Appendix F)
Bushing, Non-metallic (Item 20, Appendix F)
Nut, Self-locking (Item 136/145, Appendix F)
Washer, Flat (Item 297.1, Appendix F)
Pin, Straight Headed (Item 231.1, Appendix F)
Pin, Cotter (Item 226.1, Appendix F)

Personnel Required
(3)

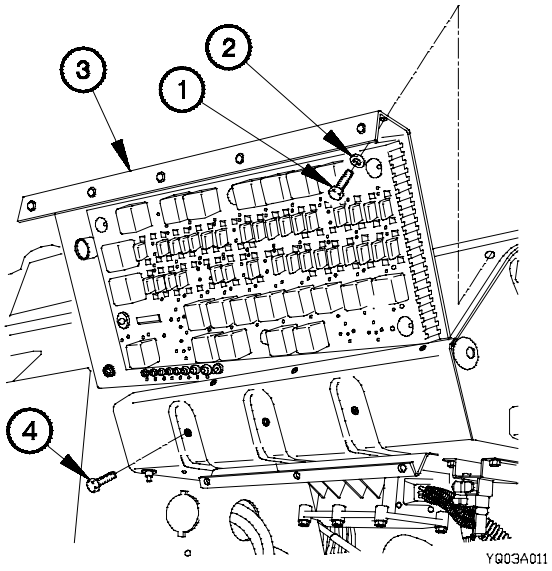
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

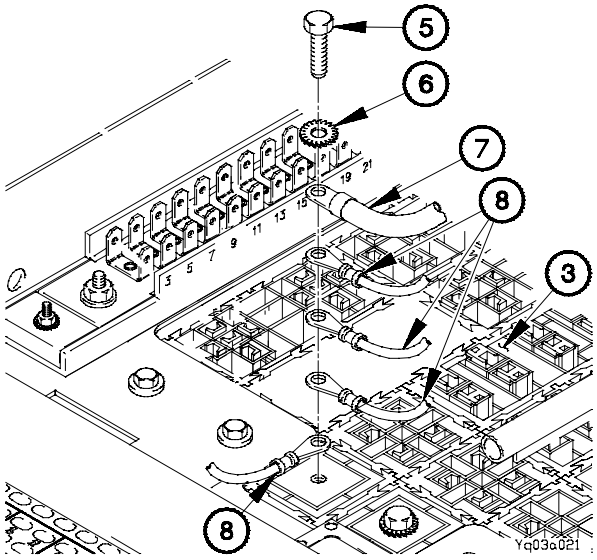
a. Removal.

(1) Remove three screws (1) and washers (2) from power distribution panel (3).

(2) Remove three screws (4) from power distribution panel (3).

(3) Lift power distribution panel (3) outward to gain access.





NOTE

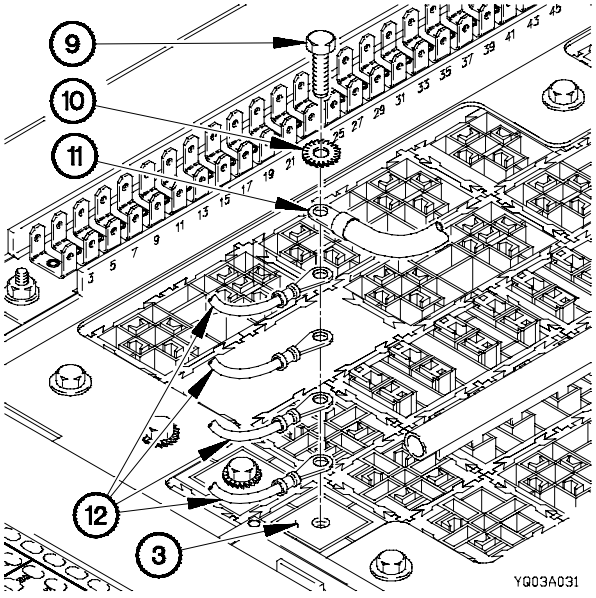
Tag connectors and connection points prior to disconnecting.

(4) Remove screw (5), lockwasher (6), terminal lug TL41 (7), and four terminal lugs (8) from power distribution panel (3). Discard lockwasher.

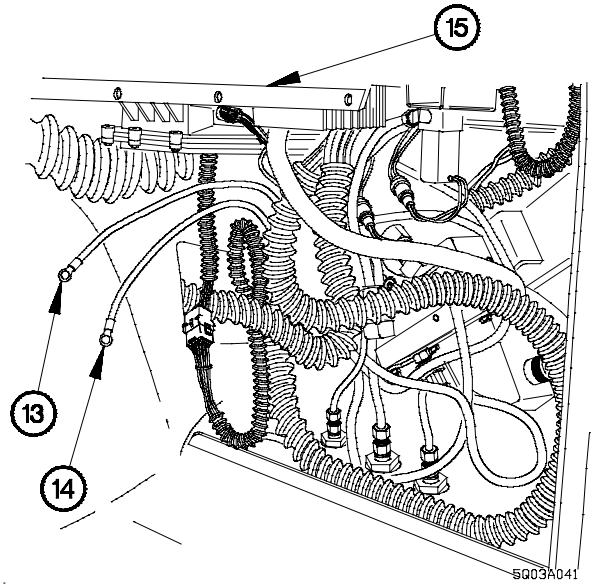
(5) Position four terminal lug (8) and screw (5) on power distribution panel (3).

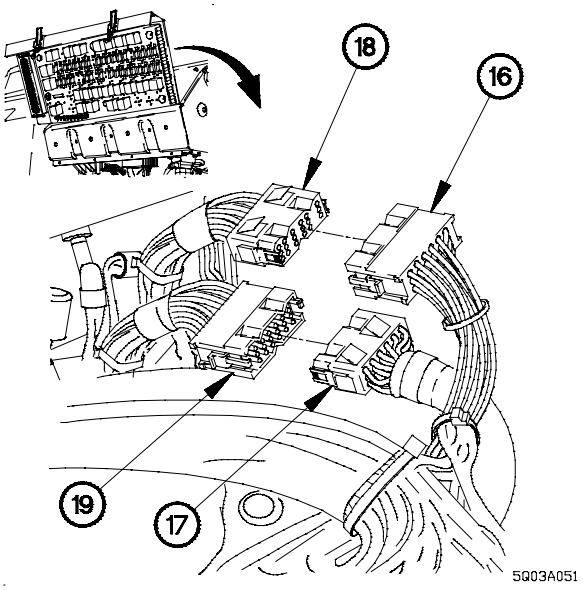
(6) Remove screw (9), lockwasher (10), terminal lug TL42 (11), and four terminal lugs (12) from power distribution panel (3). Discard lockwasher.

(7) Position four terminal lugs (12) and screw (9) on power distribution panel (3).



(8) Remove power distribution panel 12 vdc cable (13) and power distribution panel 24 vdc cable (14) from dashboard (15).

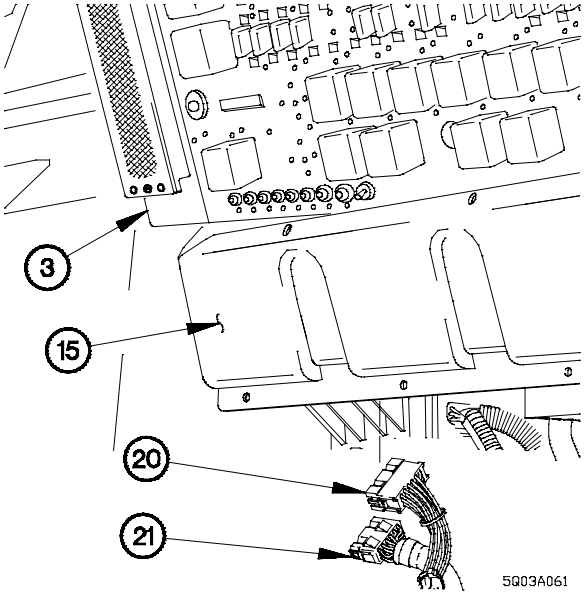




(9) Disconnect connectors J27 (16) and J51 (17) from connectors P27 (18) and P51 (19).

(10) Remove front lights cable assembly (20) and rear lights cable assembly (21) from dashboard (15).

(11) Position power distribution panel (3) in dashboard (15).

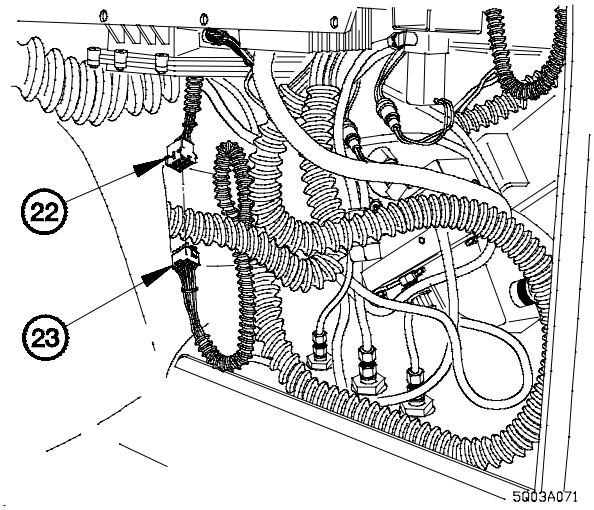


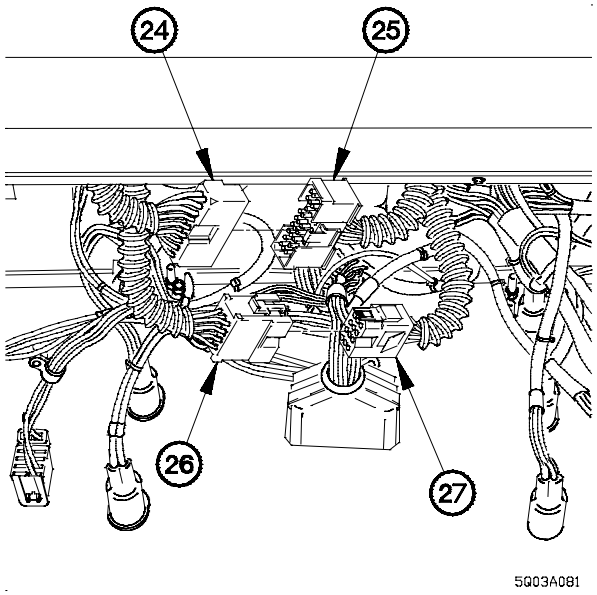
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

NOTE

Perform step (12) on vehicles equipped with PTO.

(12) Disconnect connector P210 (22) from connector J210 (23).





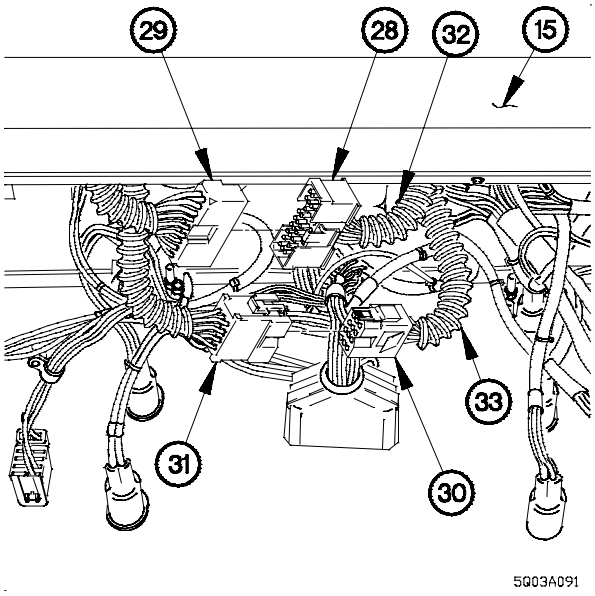
(13) Disconnect connector J31X (24) from connector P31X (25).

(14) Disconnect connector J43X (26) from connector P43X (27).

(15) Disconnect connector P31 (28) from connector J31 (29).

(16) Disconnect P43 (30) from connector J43 (31).

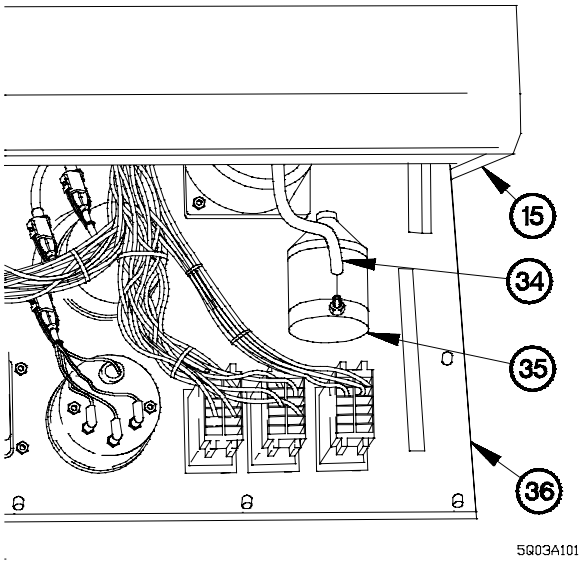
(17) Remove engine control cable assembly (32) and start and charging cable assembly (33) from dashboard (15).

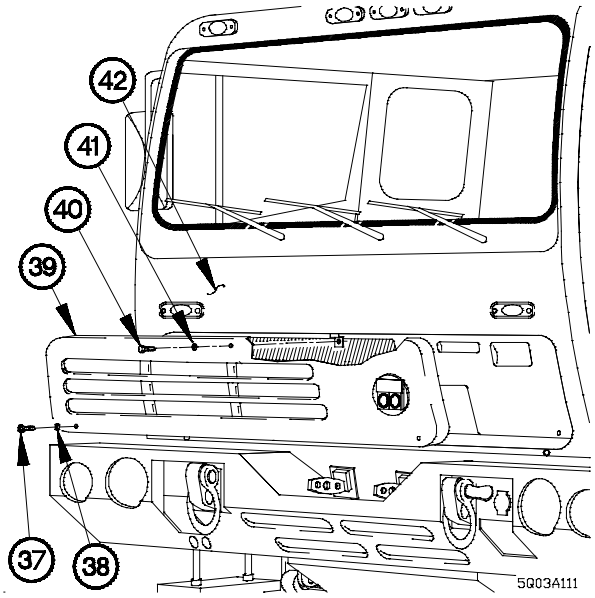


(18) Disconnect vacuum hose (34) from air filter restriction gauge (35).

(19) Remove vacuum hose (34) from dashboard (15).

(20) Position instrument panel assembly (36) in dashboard (15).





(21) Remove two screws (37) and washers (38) from front grille (39).

(22) Remove screw (40), washer (41), and front grille (39) from cab (42).

(23) Place drain pan under two heater hoses (43).

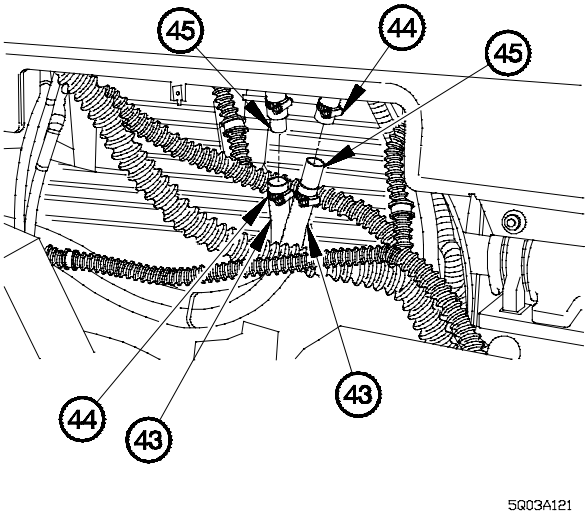
NOTE

Tag hoses and connection points prior to disconnecting.

(24) Loosen two hose clamps (44) on heater hoses (43).

(25) Disconnect two heater hoses (43) from tubes (45).

(26) Connect two heater hoses (43) together.

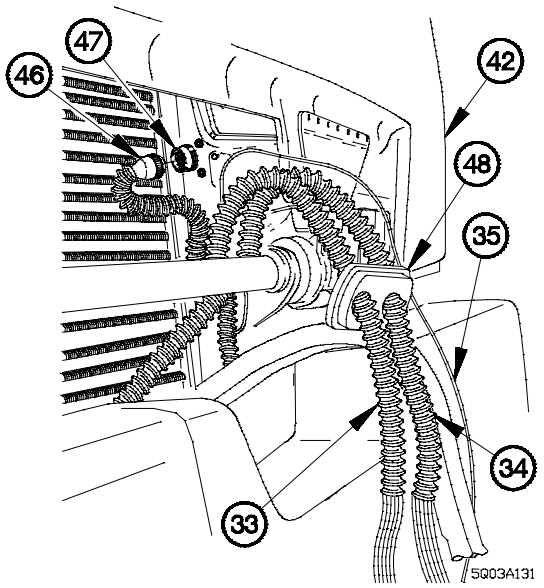


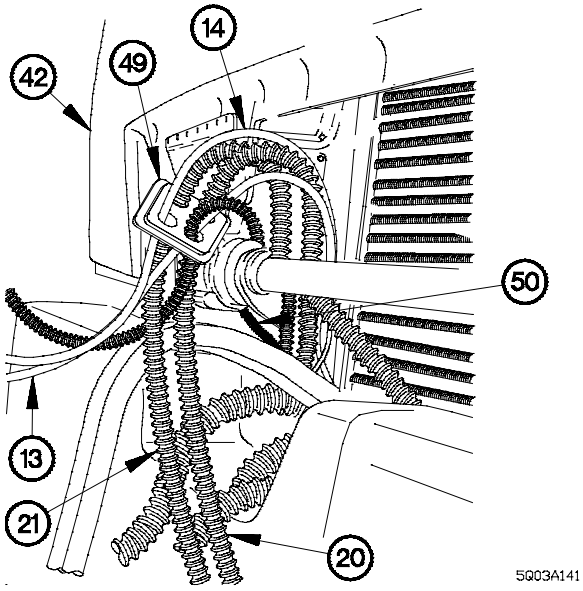
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

(27) Disconnect connector P119 (46) from connector J119 (47).

(28) Remove vacuum hose (35) from cab (42).

(29) Remove engine control cable assembly (33), start and charging cable assembly (34), and grommet (48) from cab (42).





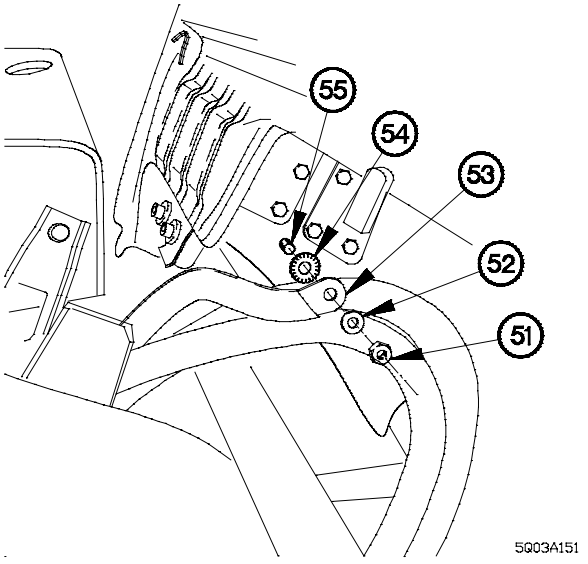
(30) Remove front lights cable assembly (20), rear lights cable assembly (21), power distribution panel 12 vdc cable (13), power distribution panel 24 vdc cable (14) and grommet (49) from cab (42).

NOTE

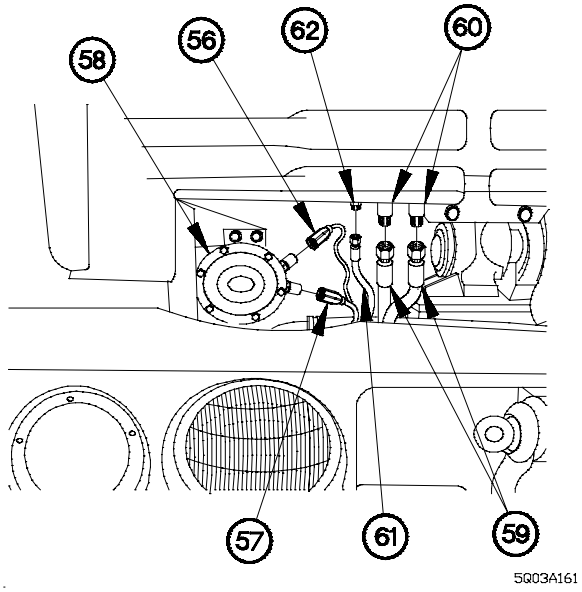
Perform step (31) on vehicles equipped with PTO.

(31) Remove PTO cable assembly (50) from cab (42).

(32) Remove self-locking nut (51), washer (52), ground strap (53) and lockwasher (54) from ground stud (55). Discard self-locking nut and lockwasher.



(33) Disconnect connectors P5 (56) and P6 (57) from horn (58).



WARNING

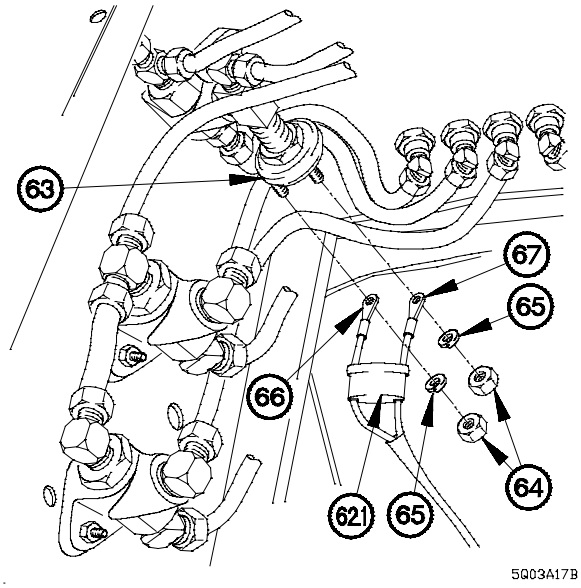
Wear protective goggles to protect against possible injury from release of high pressure air. Failure to comply may result in injury to personnel.

NOTE

Tag pneumatic hoses and connection points prior to disconnecting.

(34) Disconnect two pneumatic hoses (59) from 45-degree fittings (60).

(35) Disconnect pneumatic hose (61) from fitting (62).



(36) Raise cab (TM 9-2320-365-10).

NOTE

Perform step (36.1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(36.1) Remove adhesive and boot (62.1) from low pressure transmitter (63).

(37) Remove adhesive, two nuts (64), lockwashers (65), and terminal lugs TL201 (66) and TL202 (67) from low pressure transmitter (63). Discard lockwashers.

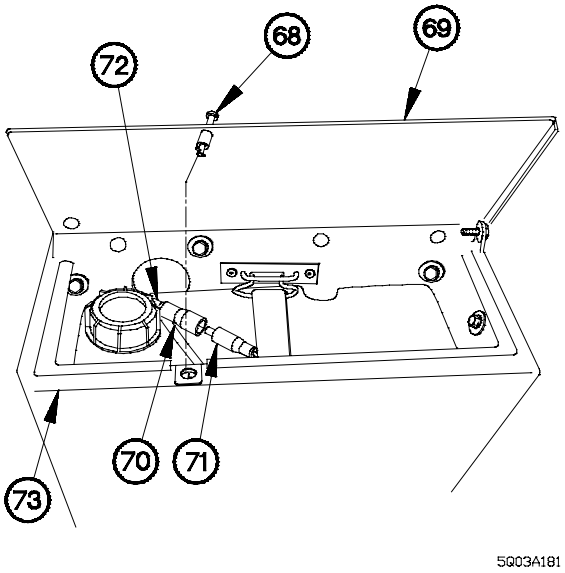
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

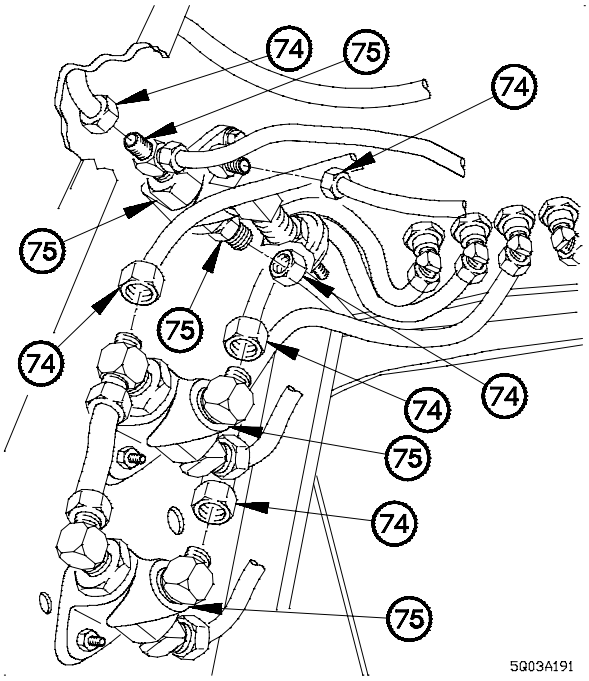
(38) Turn screw (68) to the left to unlock step plate (69).

(39) Open step plate (69).

(40) Disconnect connector P25 (70) from connector J25 (71).

(41) Remove windshield washer cable assembly (72) from step (73).





NOTE

- Note positions of pneumatic hoses prior to disconnecting.
- Remove plastic cable ties as required.

(42) Disconnect six pneumatic hoses (74) from three two-way check valves (75).

(43) Remove clip (76) and throttle control cable (77) from stud (78).

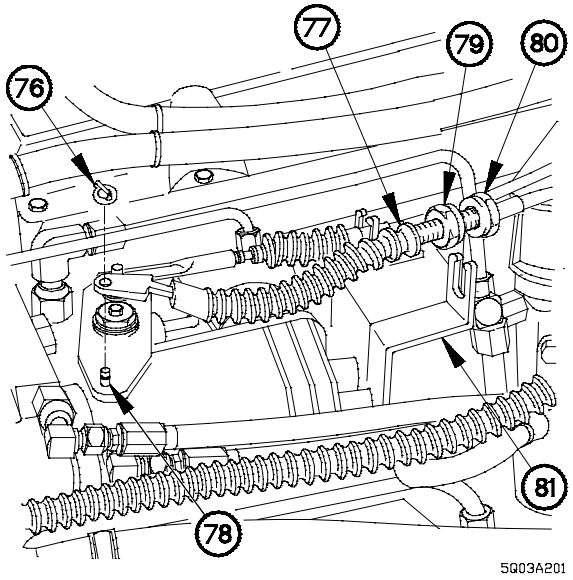
NOTE

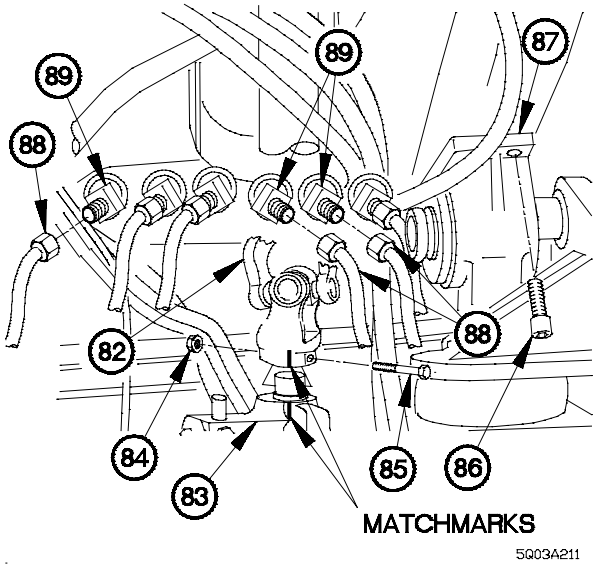
Count the number of threads showing on throttle cable ferrule and record this number prior to removal.

(44) Loosen nut (79) on throttle control cable ferrule (80).

(45) Remove throttle control cable (77) from bracket (81).

(46) Position throttle control cable (77) clear of any interference.





(47) Match mark universal joint (82) to steering gear (83).

(48) Remove self-locking nut (84) and screw (85) from universal joint (82). Discard self-locking nut.

(49) Remove two screws (86) from left side bearing housing (87).

(50) Perform step (49) on right side bearing housing.

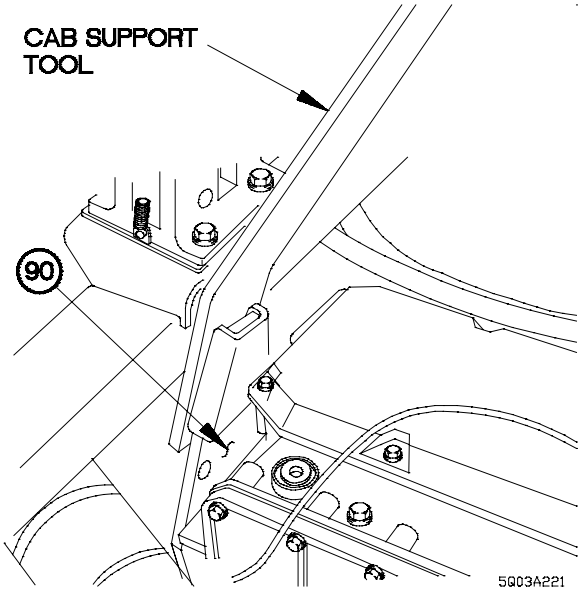
(51) Disconnect three pneumatic hoses (88) from 45-degree fittings (89).

15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

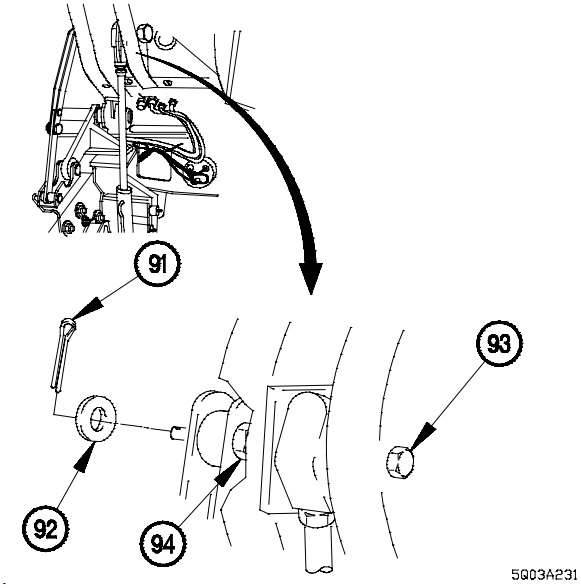
WARNING

Cab must be braced on cab support tool prior to removal of cotter pin from cab tilt cylinder mounting bolt. Failure to comply may result in injury to personnel or damage to equipment.

(52) Install cab support tool on engine rear lifting eye (90).

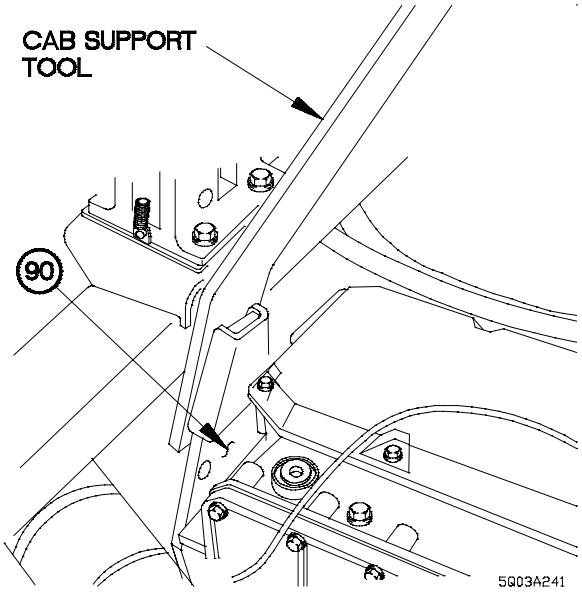


(53) Lower cab until cab rests on cab support tool (TM 9-2320-365-10).



(54) Remove cotter pin (91) and washer (92) from cab tilt cylinder mounting bolt (93). Discard cotter pin.

(55) Loosen self-locking nut (94) on cab tilt cylinder mounting bolt (93).

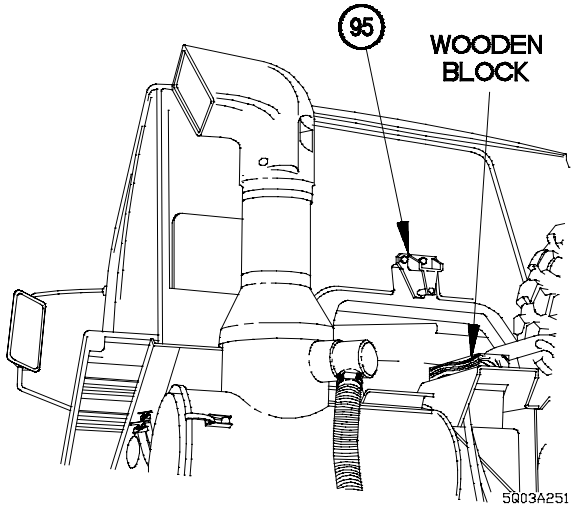


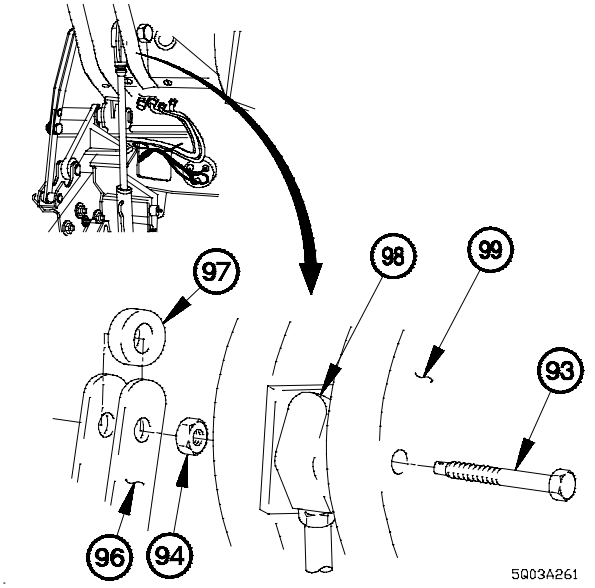
(56) Raise cab slightly and remove cab support tool from engine rear lifting eye (90) (TM 9-2320-365-10).

NOTE

Use wooden block on top of cab hydraulic latch to prevent cab from latching when cab is lowered.

(57) Lower cab until cab latch (95) rests on wooden block (TM 9-2320-365-10).





NOTE

Steps (58) and (59) require the aid of an assistant.

(58) Disengage pivot arm (96) and spacer (97) from cab tilt cylinder mounting bolt (93).

(59) Remove self-locking nut (94), cab tilt cylinder mounting bolt (93) and cab tilt cylinder (98) from bracket (99).

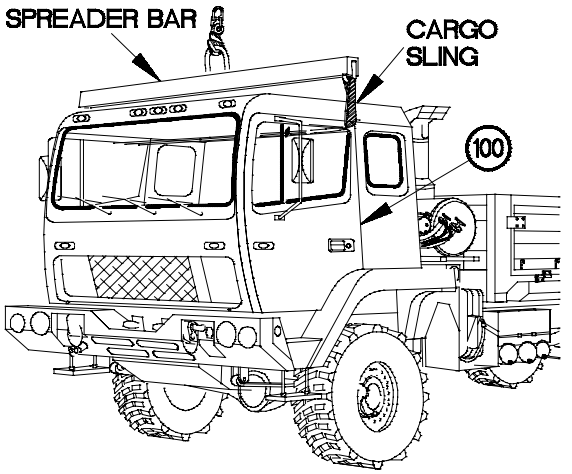
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

WARNING

Standard cab weighs approximately 1400 lbs (636 kgs). M1081 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

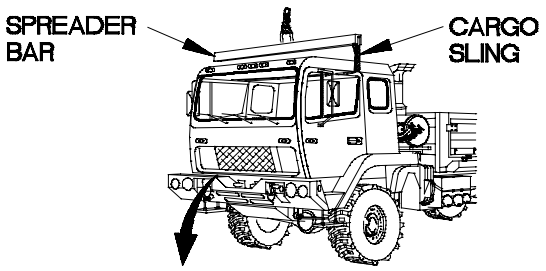


5Q03A271

NOTE

Steps (60) through (66) require the aid of two assistants.

(60) Lower cab door windows and install cargo sling through rear section of cab doors (100).



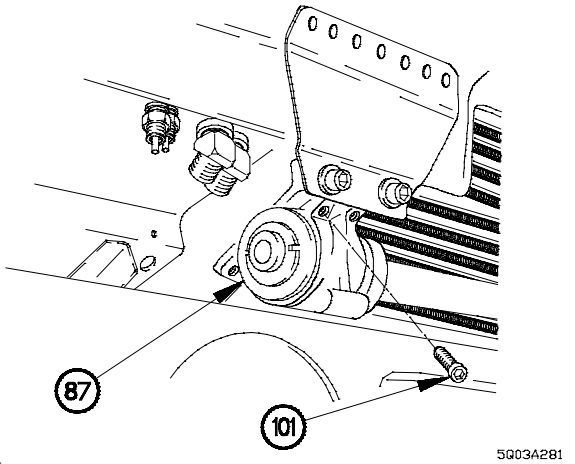
WARNING

Cab may swing forward slightly when screws are removed. An assistant is required to steady cab. Failure to comply may result in injury to personnel or damage to equipment.

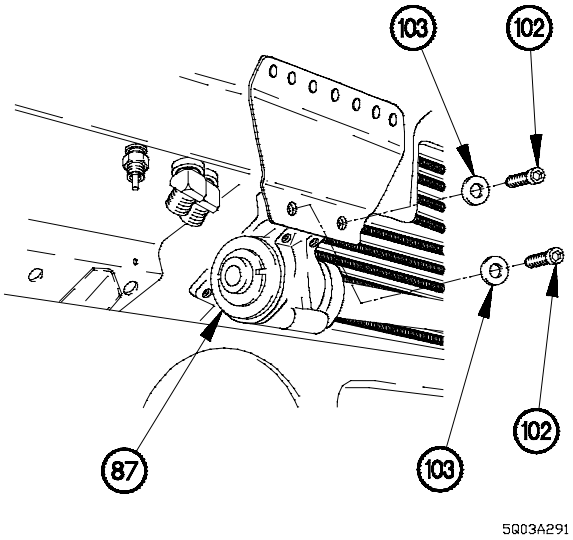
NOTE

Left and right side bearings are disassembled the same way. Right side shown.

(61) Remove four screws (101) from right side bearing housing (87).

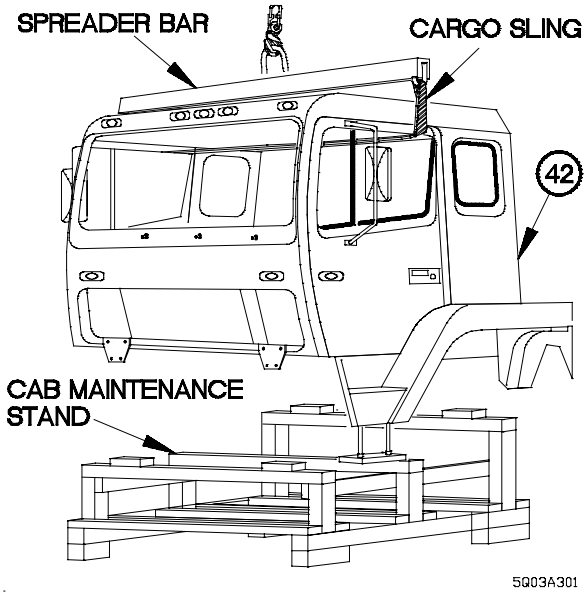


5Q03A281



(62) Remove two screws (102) and washers (103) from right side bearing housing (87).

(63) Perform steps (61) and (62) on left side bearing housing.



CAUTION

Raise cab straight up to clear radiator. Failure to comply may result in damage to equipment.

(64) Remove cab (42) from vehicle.

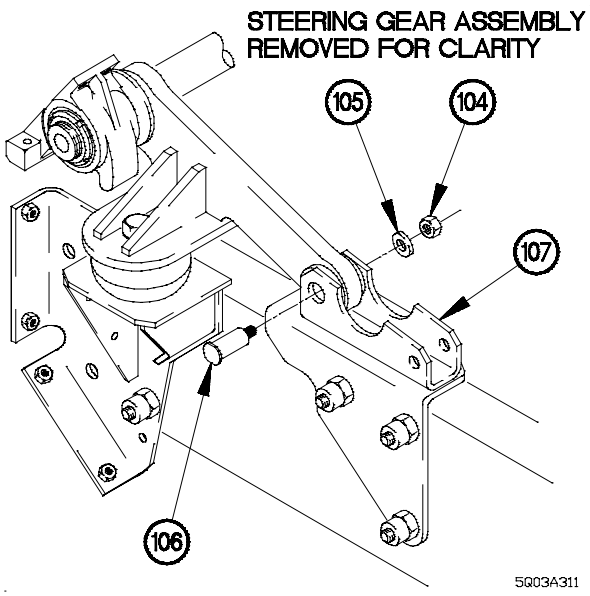
(65) Position cab (42) on cab maintenance stand.

(66) Remove cargo sling from cab (42).

NOTE

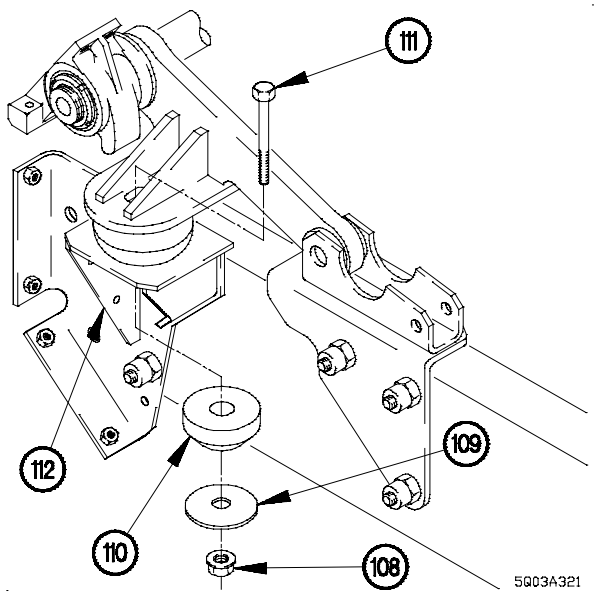
Left and right side of cab front support assembly is removed the same way. Left side shown.

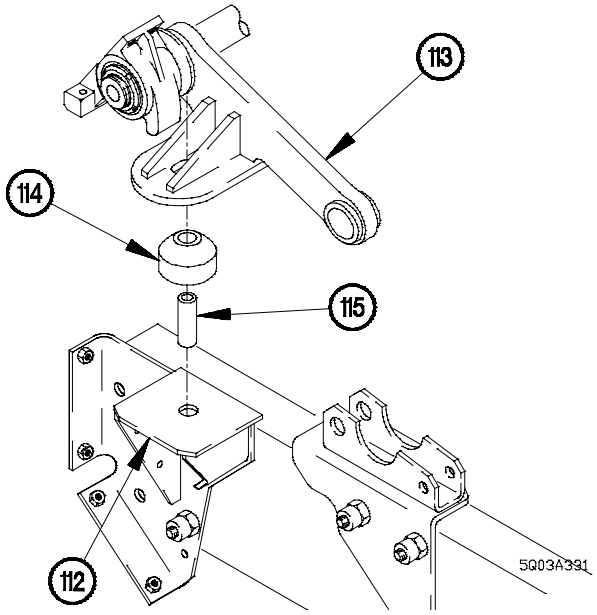
(67) Remove nut (104), washer (105), and shoulder bolt (106) from left side cab mounting bracket (107).



15-3.CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

(68) Remove self-locking nut (108), washer (109), lower resilient mount (110), and bolt (111) from left side front bumper mounting bracket (112). Discard self-locking nut.





NOTE

Perform step (71) on right side cab mounting bracket.

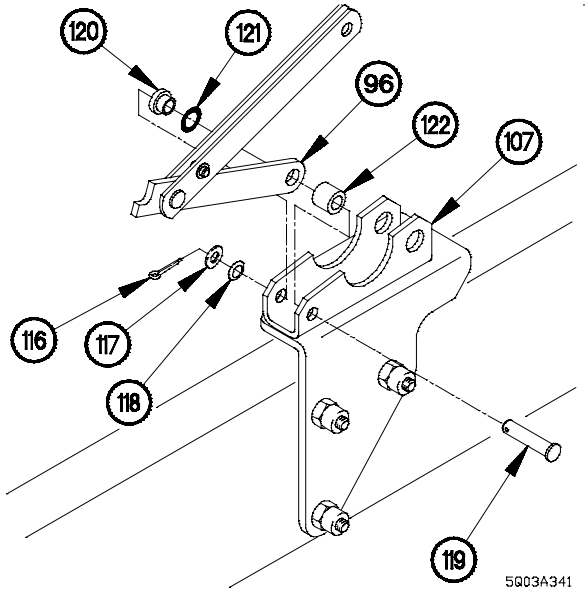
(71) Remove cotter pin (116), washer (117), spring tension washer (118), pin (119), bushing (120), preformed packing (121), pivot arm (96), and spacer (122) from cab mounting bracket (107). Discard preformed packing, spring tension washer, and cotter pin.

NOTE

Step (69) requires the aid of an assistant.

(69) Remove cab front support assembly (113), two upper resilient mounts (114), and sleeve spacers (115) from front bumper mounting brackets (112).

(70) Perform steps (67) through (69) on right side cab front support assembly.



NOTE

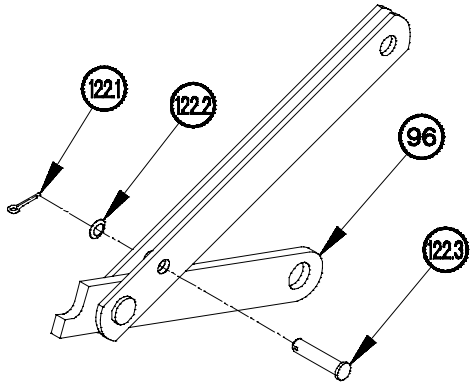
Perform step (71.1) on vehicle serial number 0001 through 7599 that have not previously had pin and spring tension washer replaced.

(71.1) Remove cotter pin (122.1), spring tension washer (122.2) and pin (122.3) from pivot arm (96). Discard pin, spring tension washer and cotter pin.

NOTE

Perform step (71.2) on vehicle serial number 7600 through 9099 that have not previously had pin and washer replaced.

(71.2) Remove cotter pin (122.1), washer (122.2) and pin (122.3) from pivot arm (96). Discard pin, washer and cotter pin.

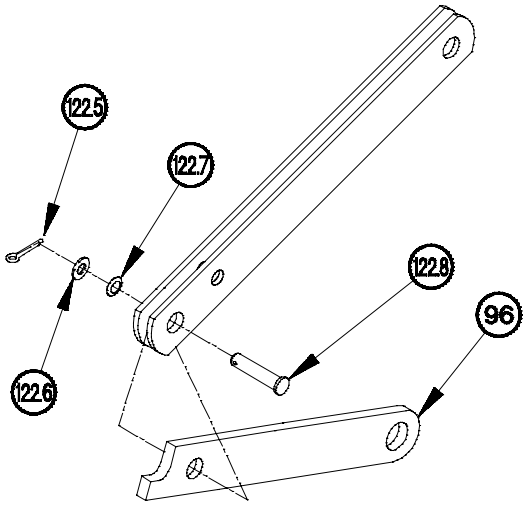


5Q03A35B

NOTE

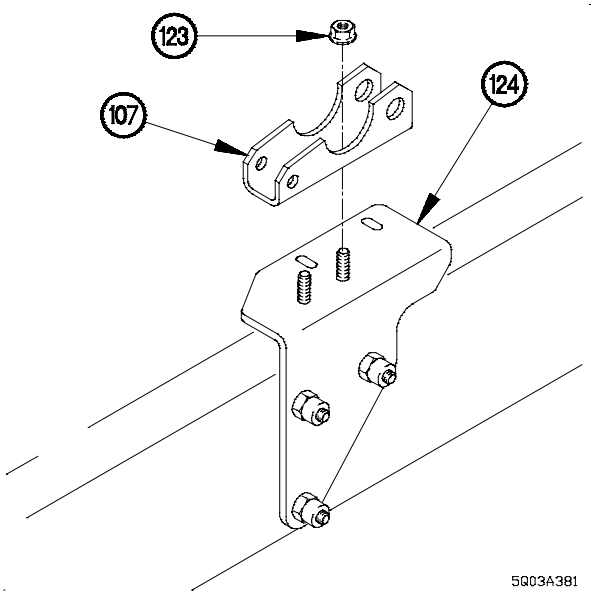
Perform step (71.3) on vehicle serial number 9100 and higher.

(71.3) Remove cotter pin (122.1), washer (122.2) and pin (122.3) from pivot arm (96). Discard cotter pin.



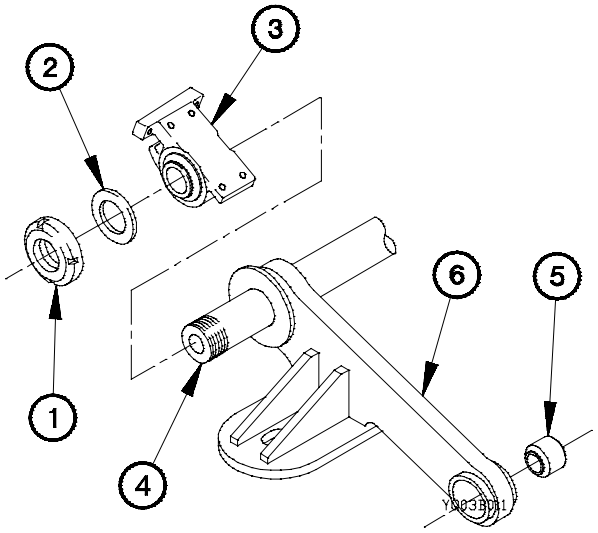
5Q03A36B

(71.4) Remove cotter pin (122.5), washer (122.6), spring tension washer (122.7) and pin (122.8) from pivot arm (96). Discard spring tension washer and cotter pin.



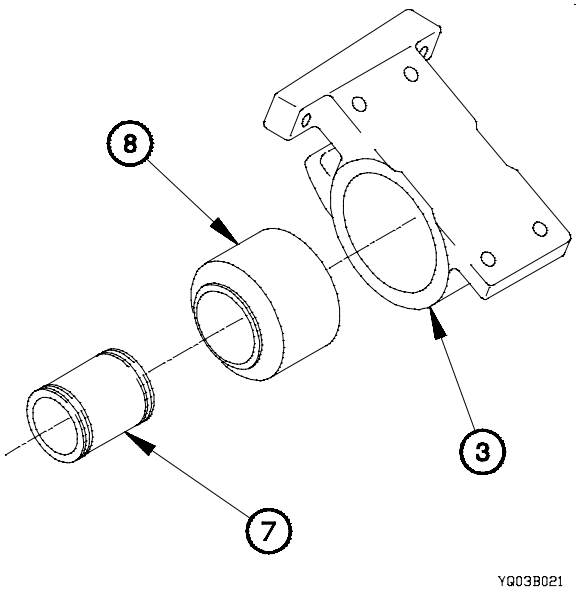
(72) Remove two self-locking nuts (123) and cab mounting bracket (107) from radiator mounting bracket (124). Discard self-locking nuts.

b. Disassembly.



(1) Remove spanner nut (1), washer (2), and left side bearing housing (3) from cab front support (4).

(2) Remove sleeve bushing (5) from left side cab tilt arm (6). Discard sleeve bushing.



(3) Remove sleeve bushing (7) from bushing (8).

(4) Remove bushing (8) from left side bearing housing (3). Discard bushing.

(5) Perform steps (1) through (4) on right side of cab front support assembly.

15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

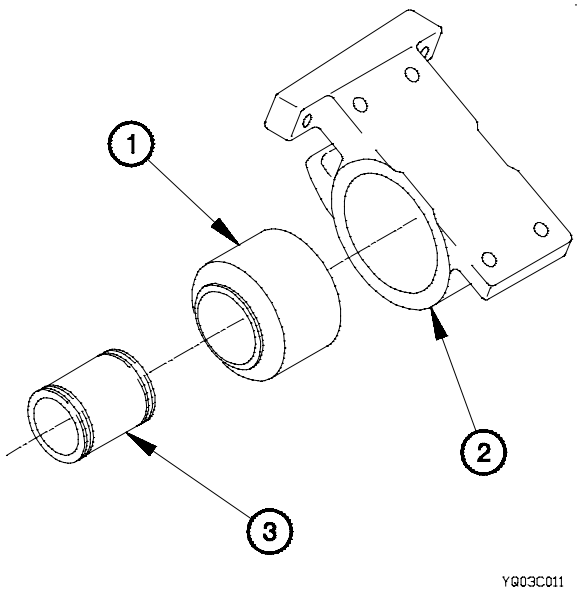
c. Assembly.

NOTE

Lubricate bushings with paraffin and mineral oil prior to installation.

(1) Install bushing (1) in left side bearing housing (2).

(2) Install sleeve bushing (3) in bushing (1).



YQ03C011

NOTE

Lubricate sleeve bushings with paraffin and mineral oil prior to installation.

(3) Install sleeve bushing (4) in left side cab tilt arm (5).

WARNING

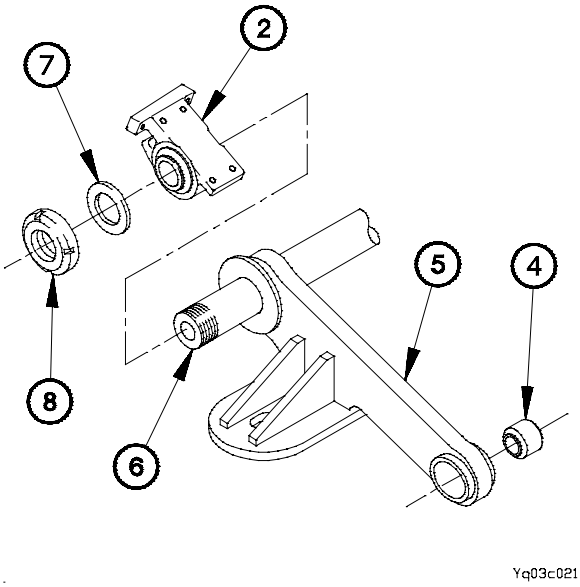
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(4) Apply adhesive sealant to threads on left side of cab front support (6).

(5) Position left side bearing housing (2), washer (7), and spanner nut (8) on cab front support (6).

(6) Tighten spanner nut (8) to 138-163 lb-ft (180-220 N·m).

(7) Perform steps (1) through (6) on right side of cab front support assembly.

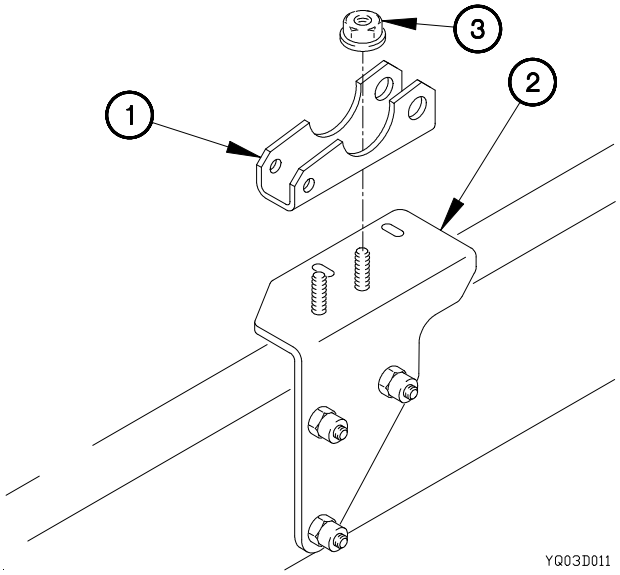


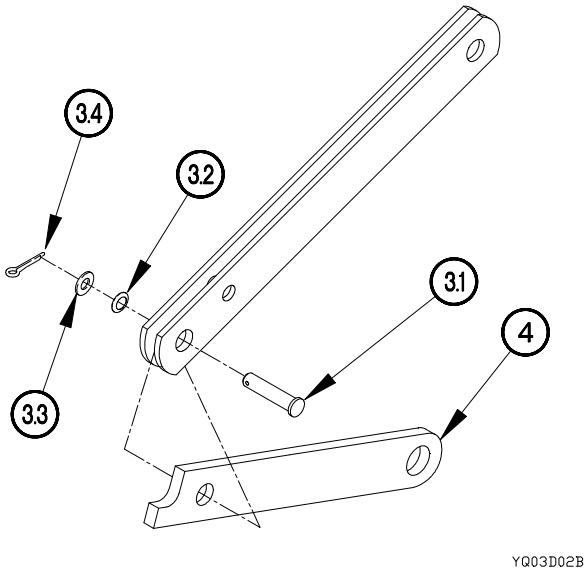
Yq03c021

d. Installation.

(1) Position cab mounting bracket (1) on radiator mounting bracket (2) with two self-locking nuts (3).

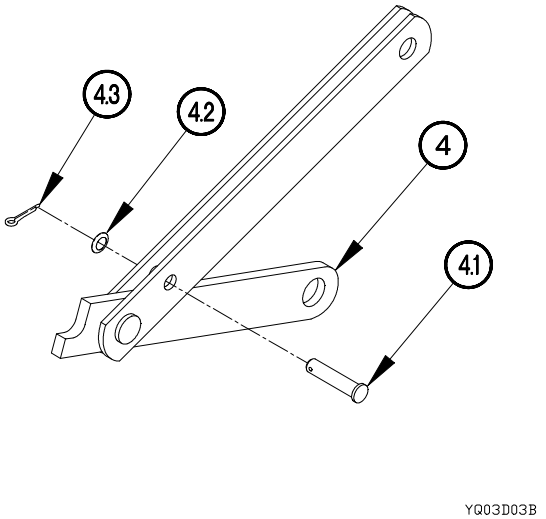
(2) Tighten two self-locking nuts (3) to 76-94 lb-ft (103-127 N m).





(2.1) Install pin (3.1), spring tension washer (3.2), washer (3.3), and cotter pin (3.4) in pivot arm (4).

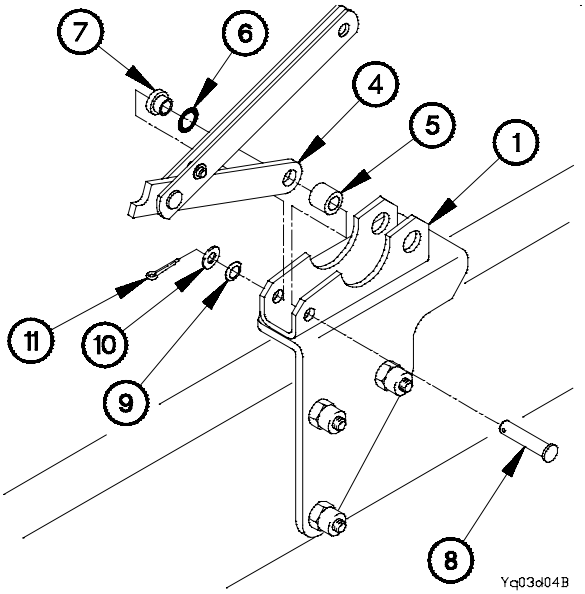
(2.2) Install pin (4.1), washer (4.4), and cotter pin (4.3) in pivot arm (4).

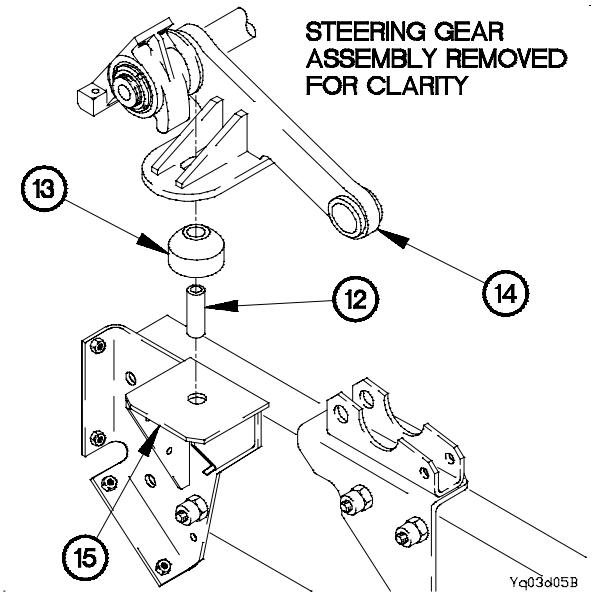


NOTE

Perform step (3) on right side cab mounting bracket.

(3) Install pivot arm (4) in cab mounting bracket (1) with spacer (5), preformed packing (6), bushing (7), pin (8), spring tension washer (9), washer (10), and cotter pin (11).





NOTE

- Steps (4) and (5) require the aid of an assistant.
- Left and right side of cab front support assembly is installed the same way. Left side shown.

(4) Position two sleeve spacers (12), upper resilient mounts (13), and cab front support assembly (14) on two front bumper mounting brackets (15).

15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

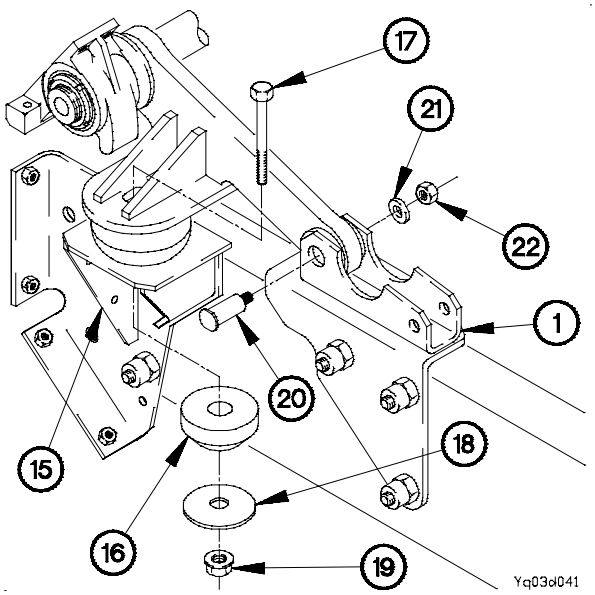
(5) Position two lower resilient mounts (16) on front bumper mounting brackets (15) with two bolts (17), washers (18), and self-locking nuts (19).

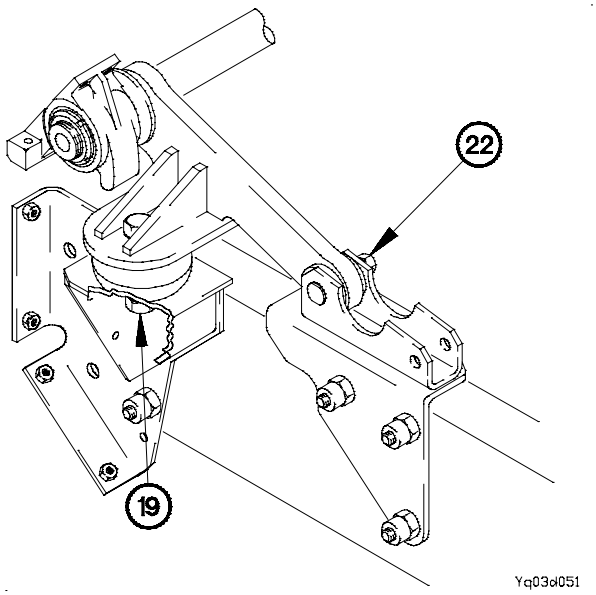
WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(6) Apply sealing compound to threads of shoulder bolt (20).

(7) Position shoulder bolt (20), washer (21), and nut (22) in cab mounting bracket (1).





(8) Tighten two self-locking nuts (19) to 199-243 lb-ft (270-330 N·m).

(9) Tighten nut (22) to 40-48 lb-ft (54-66 N·m).

(10) Perform steps (7) through (9) on right side cab mounting bracket.

WARNING

Standard cab weighs approximately 1400 lbs (636 kgs). M1081 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.

CAUTION

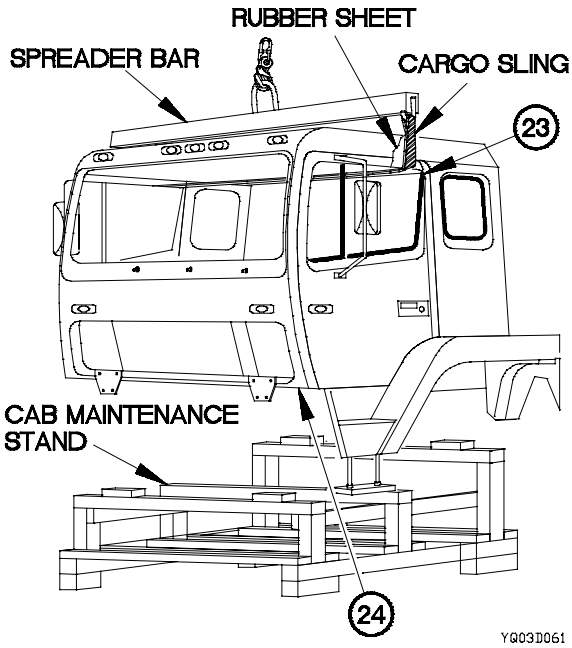
Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

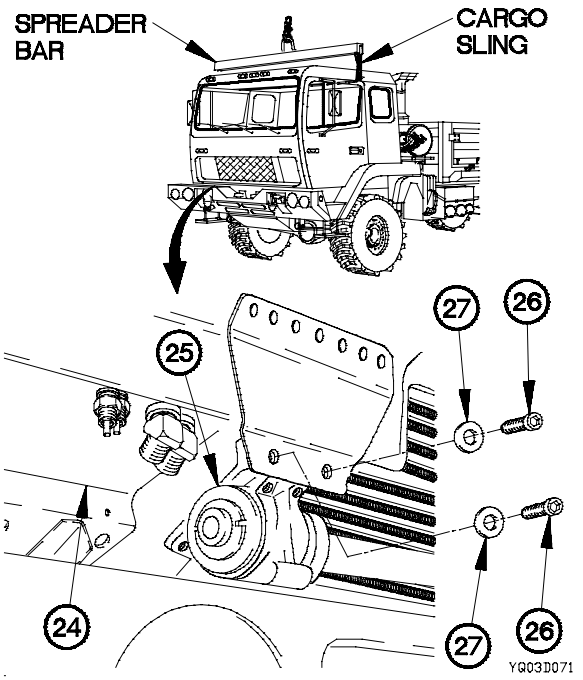
NOTE

Steps (11) through (23) require the aid of an two assistants.

(11) Lower cab door windows and install cargo sling through rear section of cab doors (23).

(12) Remove cab (24) from cab maintenance stand.





CAUTION

Lower cab straight down to clear radiator. Failure to comply may result in damage to equipment.

(13) Position cab (24) on two bearing housings (25).

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(14) Apply sealing compound to threads of two screws (26).

NOTE

Left and right side bearing housings are installed the same way. Right side shown.

(15) Position two washers (27) and screws (26) in right side bearing housing (25).

15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

WARNING

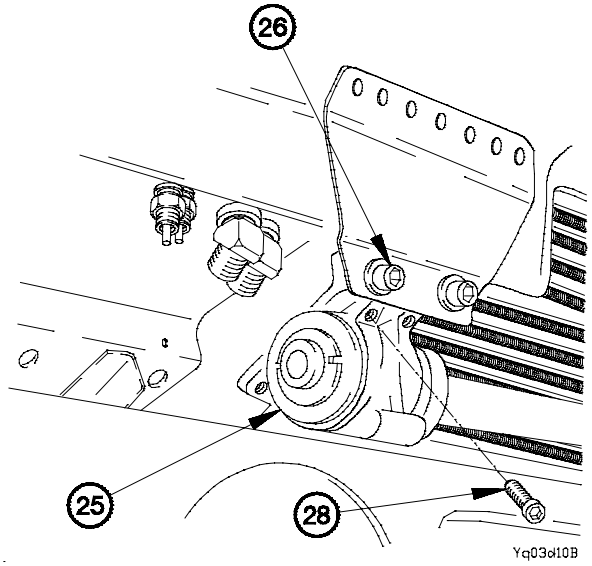
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

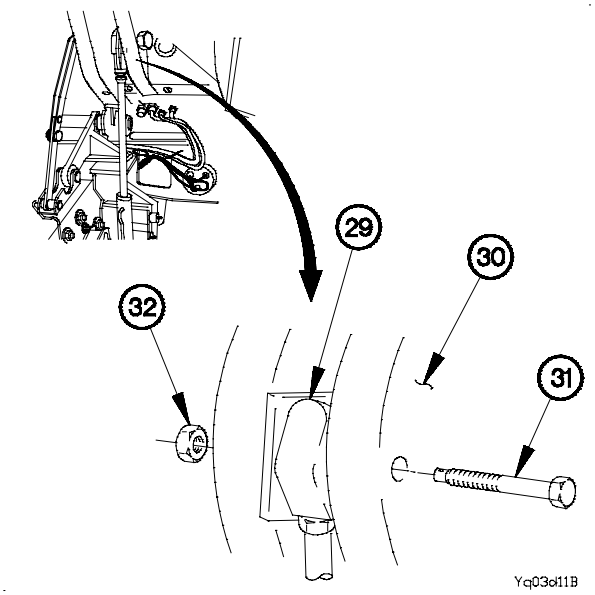
(16) Apply sealing compound to threads of four screws (28).

(17) Position four screws (28) in right side bearing housing (25).

(18) Tighten four screws (28) and two screws (26) to 34-42 lb-ft (47-57 N·m).

(19) Perform steps (14) through (18) on left side bearing housing.





CAUTION

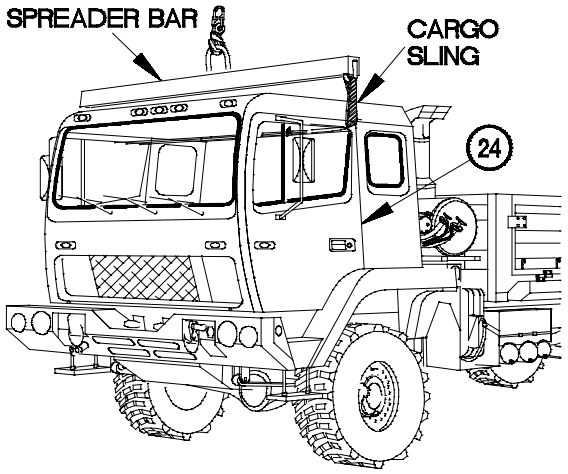
Align arrow on top of tilt cylinder mounting eye to point toward front of cab. Failure to comply may result in damage to equipment.

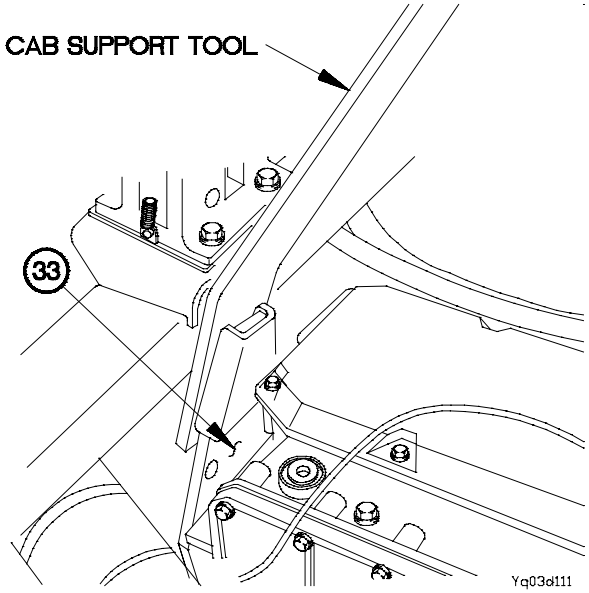
(20) Position cab tilt cylinder mounting eye (29) in cab tilt cylinder mounting bracket (30).

(21) Position cab tilt cylinder mounting bolt (31) in cab tilt cylinder mounting bracket (30) and cab tilt cylinder mounting eye (29) with self-locking nut (32).

(22) Tighten self-locking nut (32) to 180-232 lb-ft (244-314 N·m).

(23) Remove cargo sling from cab (24).





WARNING

Brace cab with cab support tool before installing pivot arm, spacer, washer, and cotter pin on tilt cylinder mounting bolt. Failure to comply may result in serious injury or death to personnel.

(24) Raise cab enough to install cab support tool on engine rear lifting eye (33) (TM 9-2320-365-10).

WARNING

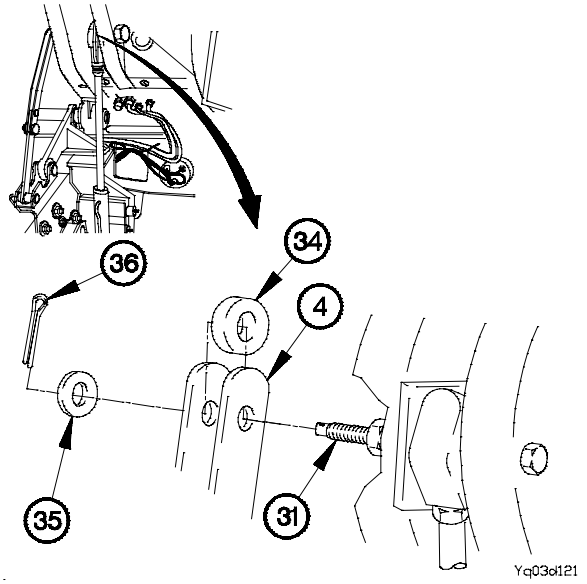
After cab is lowered on cab support tool, return cab tilt selector knob to the RAISE position for added safety. Failure to comply may result in injury to personnel.

(25) Lower cab on cab support tool (TM 9-2320-365-10).

15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

(26) Install pivot arm (4), spacer (34), washer (35), and cotter pin (36) on cab tilt cylinder mounting bolt (31).

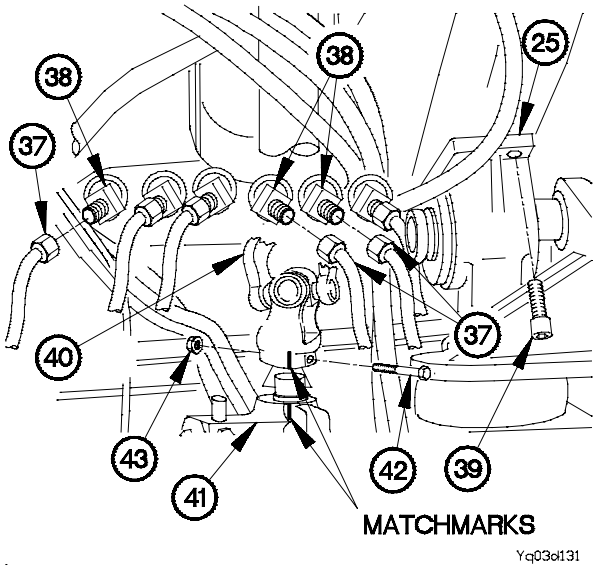
(27) Raise cab (TM 9-2320-365-10).



(28) Connect three pneumatic hoses (37) to 45-degree fittings (38).

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.



(29) Apply sealing compound to threads of two screws (39).

(30) Position two screws (39) in left side bearing housing (25).

(31) Tighten two screws (39) to 34-42 lb-ft (47-57 N·m).

(32) Perform steps (29) through (31) on right side bearing housing.

(33) Position steering column universal joint (40) on steering gear (41) with matchmarks aligned.

(34) Position screw (42) and self-locking nut (43) in steering column universal joint (40).

(35) Tighten self-locking nut (43) to 31-39 lb-ft (43-53 N·m).

NOTE

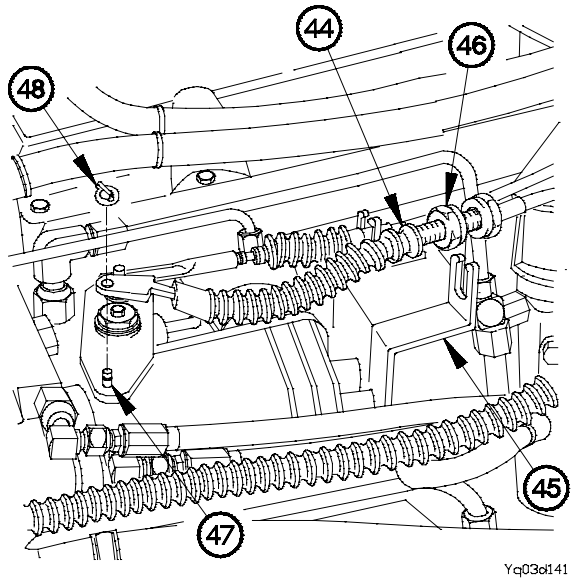
Install plastic cable ties as required.

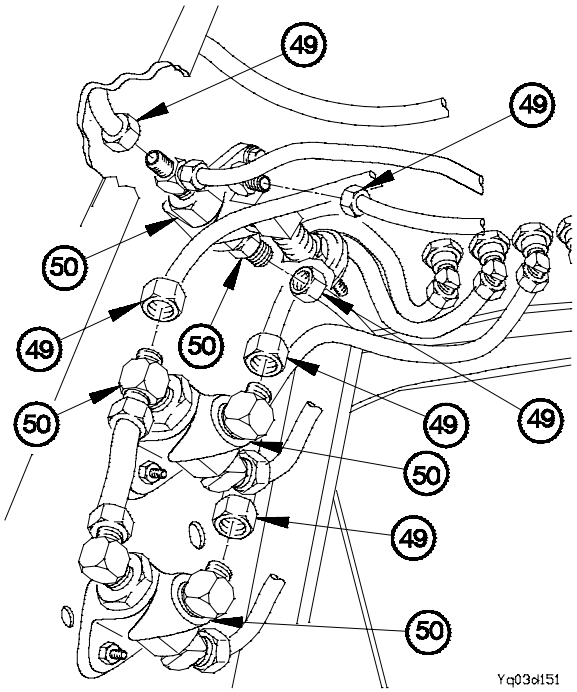
(36) Route throttle control cable (44) to bracket (45).

(37) Position throttle control cable (44) in bracket (45) with two nuts (46).

(38) Adjust and tighten nuts (46) to position marked during removal.

(39) Install throttle control cable (44) on stud (47) with clip (48).

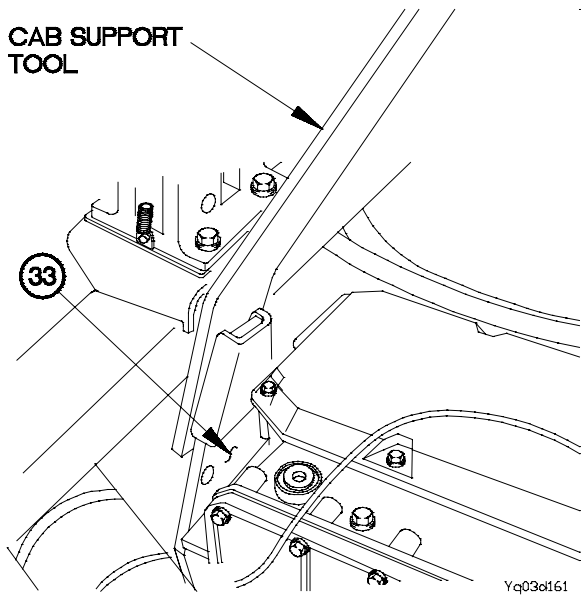




(40) Connect six pneumatic hoses (49) to three two-way check valves (50).

(41) Remove cab support tool from engine rear lifting eye (33).

(42) Lower cab (TM 9-2320-365-10).



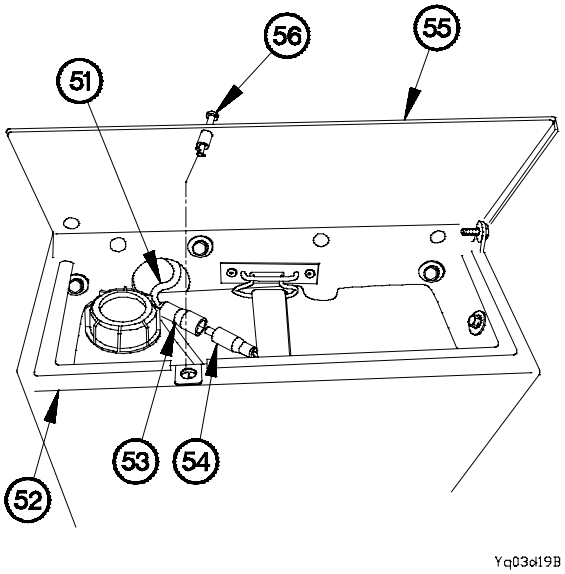
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

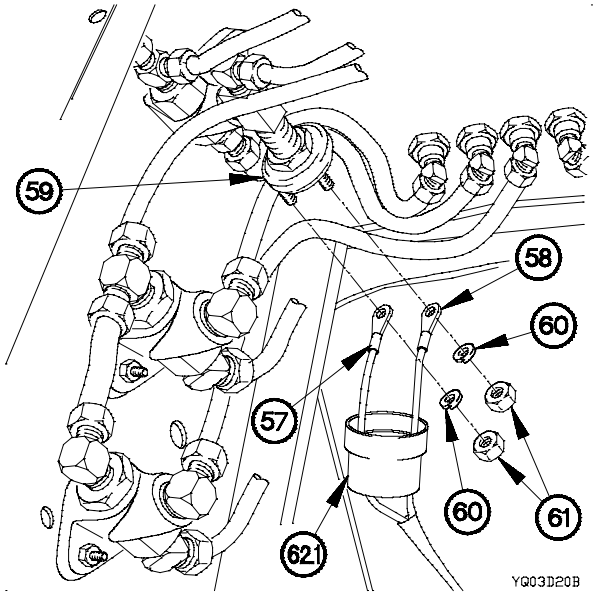
(43) Position windshield washer cable assembly (51) in step (52).

(44) Connect connector P25 (53) to connector J25 (54).

(45) Close step plate (55).

(46) Tighten screw (56) on step plate (55).





(47) Install terminal lug TL201 (57) and TL202 (58) on air pressure transmitter (59) with two lockwashers (60) and nuts (61).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

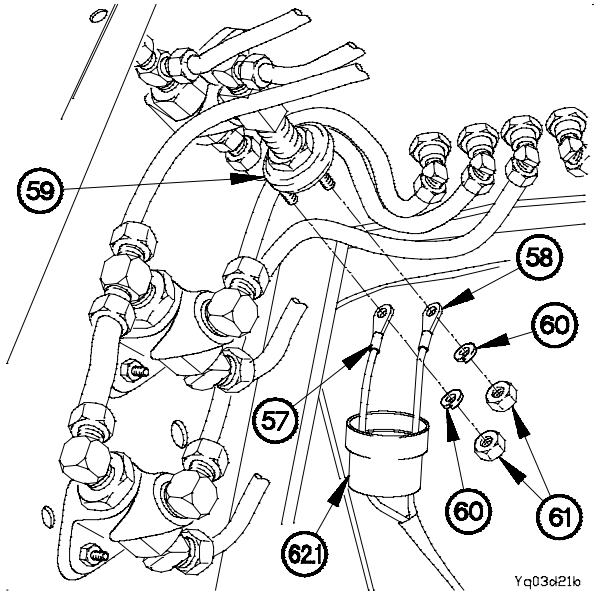
(48) Apply sealing compound to nuts (61), lockwashers (60), and terminal lugs TL201 (57) and TL202 (58).

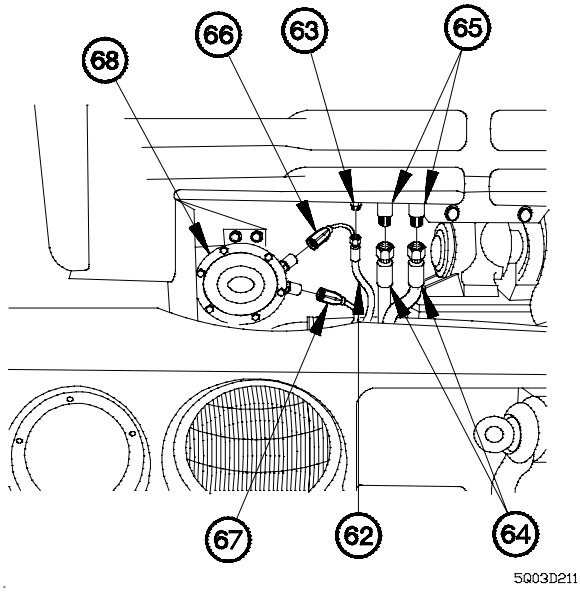
NOTE

Perform steps (48.2) and (48.3) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(48.2) Install boot (62.1) on low pressure transmitter (59).

(48.3) Apply antiseize to holes TLR and TTR and around edges of boot (62.1).





(49) Connect pneumatic hose (62) to fitting (63).

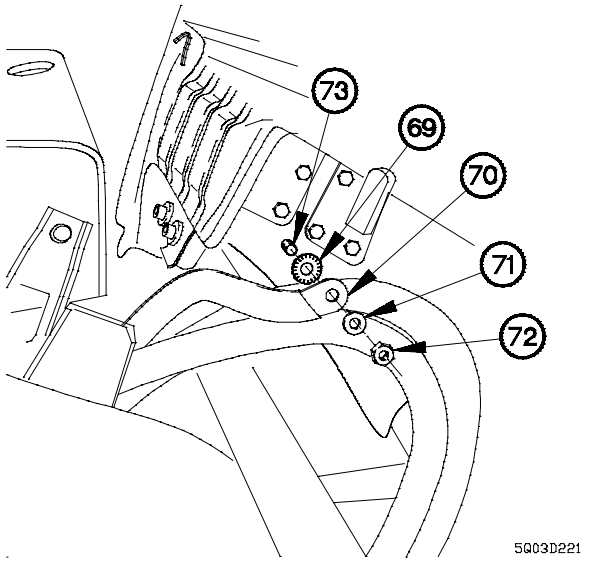
(50) Connect two pneumatic hoses (64) to 45-degree fittings (65).

(51) Connect connectors P5 (66) and P6 (67) to horn (68).

NOTE

Vehicle serial numbers 0001 through 1477 have a smaller diameter ground stud than vehicle serial numbers 1478 and higher. Vehicle serial number will determine which self-locking nut to use.

(52) Install lockwasher (69), ground strap (70), washer (71), and self-locking nut (72) on ground stud (73).

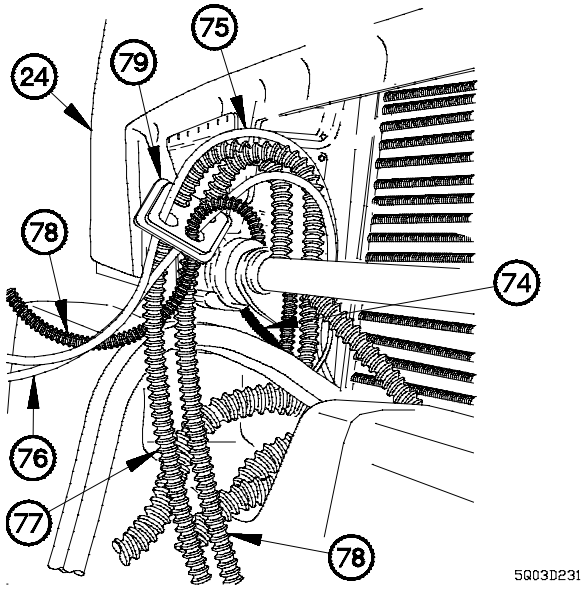


NOTE

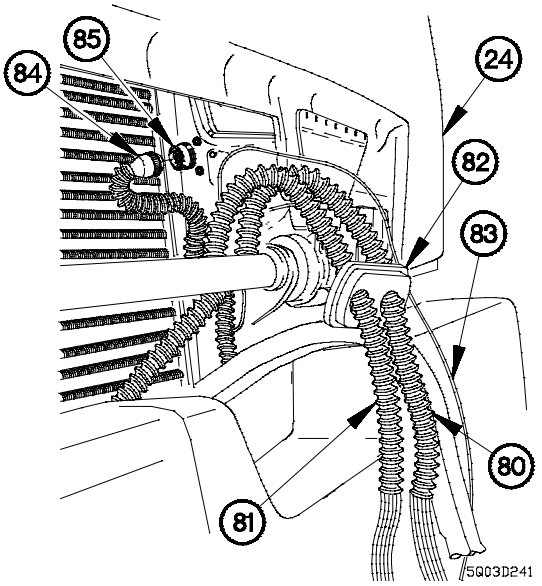
Perform step (53) on vehicles equipped with PTO.

(53) Route PTO cable assembly (74) inside cab (24).

(54) Route power distribution panel 24 vdc cable (75), power distribution panel 12 vdc cable (76), rear lights cable assembly (77), front lights cable assembly (78) and grommet (79) inside cab (24).



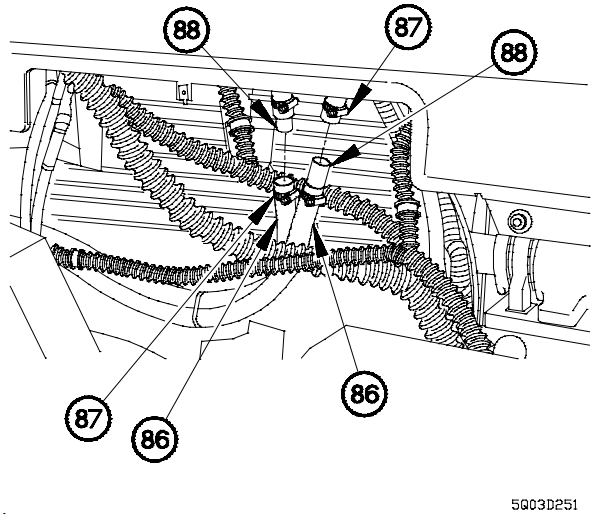
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)



(55) Route start and charging cable assembly (80), engine control cable assembly (81) and grommet (82) inside cab (24).

(56) Route vacuum hose (83) inside cab (24).

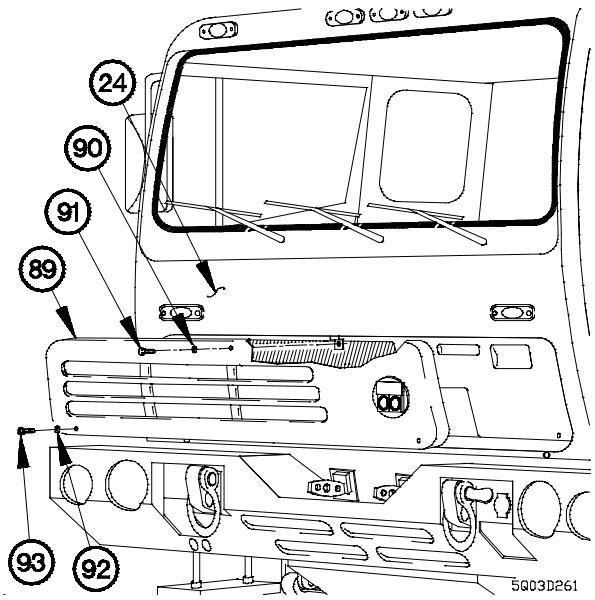
(57) Connect connector P119 (84) to connector J119 (85).



(58) Disconnect two heater hoses (86).

(59) Position two clamps (87) and heater hoses (86) on tubes (88).

(60) Tighten two clamps (87) to 60-72 lb-in. (7-8 N·m).



(61) Position front grille (89) on cab (24) with washer (90) and screw (91).

(62) Position two washers (92) and screws (93) in front grille (89).

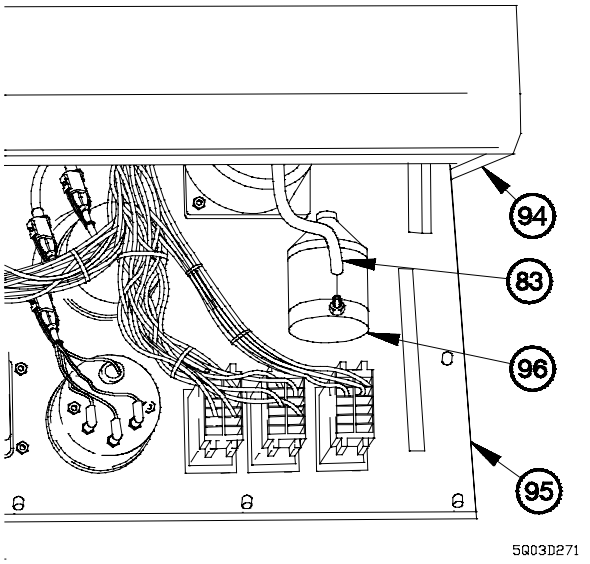
(63) Tighten screw (91) to 48-60 lb-in. (5-7 N·m).

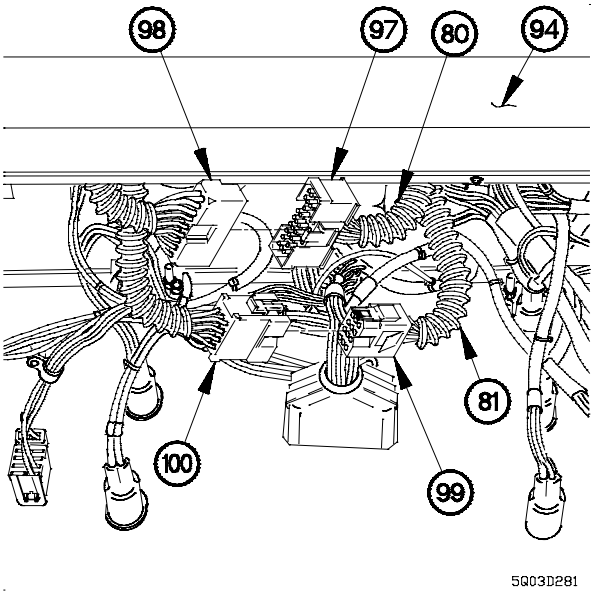
(64) Tighten two screws (93) to 24 lb-in. (3 N·m).

(65) Route vacuum hose (83) inside dashboard (94).

(66) Lift instrument panel assembly (95) outward to gain access.

(67) Connect vacuum hose (83) to air filter restriction gauge (96).





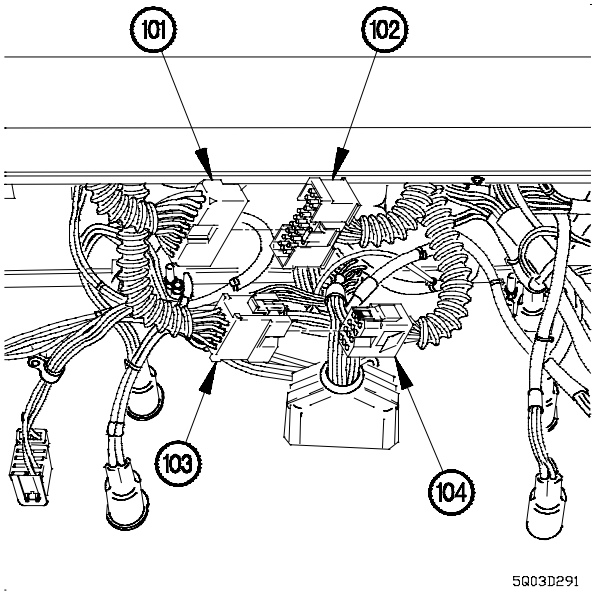
(68) Route start and charging cable assembly (80) and engine control cable assembly (81) inside dashboard (94).

(69) Connect connector P43 (97) to connector J43 (98).

(70) Connect connector P31 (99) to connector J31 (100).

(71) Connect connector J43X (101) to connector P43X (102).

(72) Connect connector J31X (103) to connector P31X (104).

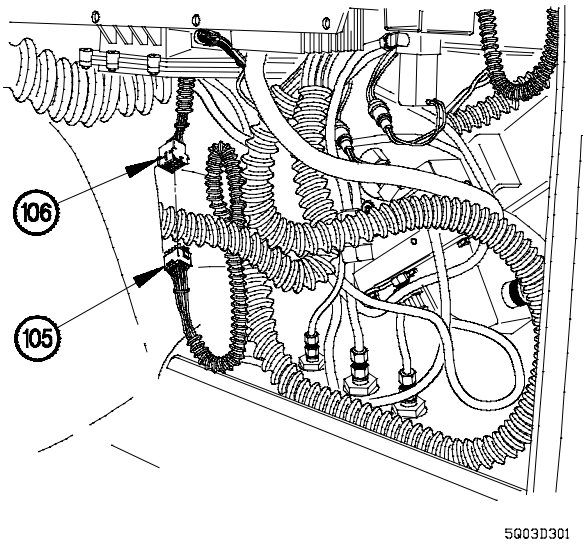


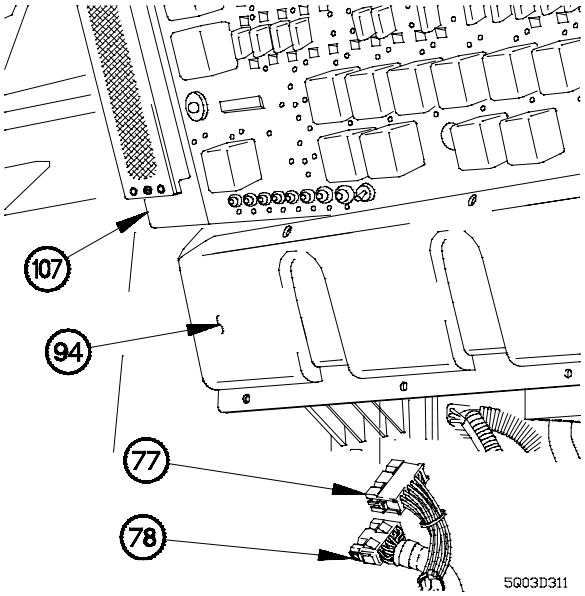
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

NOTE

Perform step (73) on vehicles equipped with PTO.

(73) Connect connector P210 (105) to connector J210 (106).



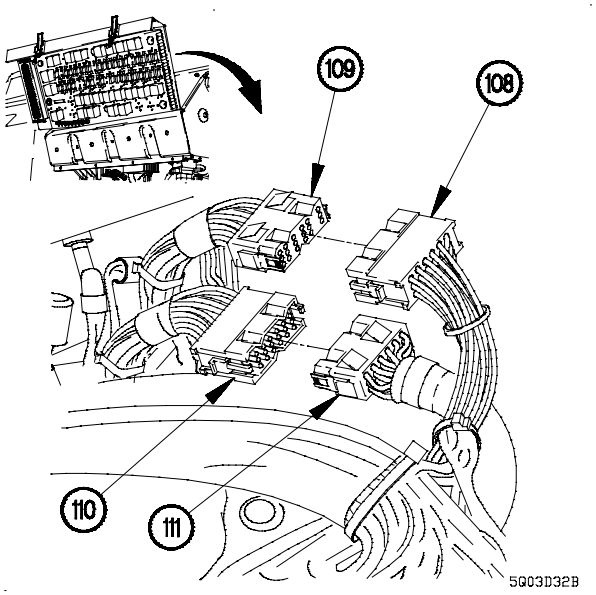


(74) Lift power distribution panel (107) outward to gain access.

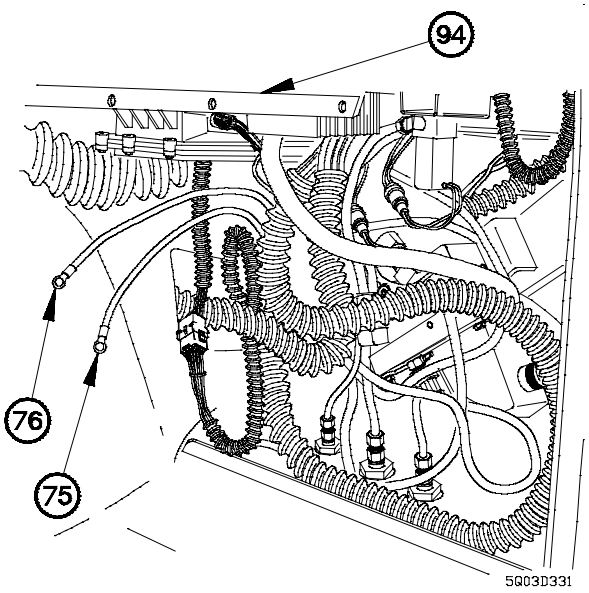
(75) Route rear lights cable assembly (77) and front lights cable assembly (78) inside dashboard (94).

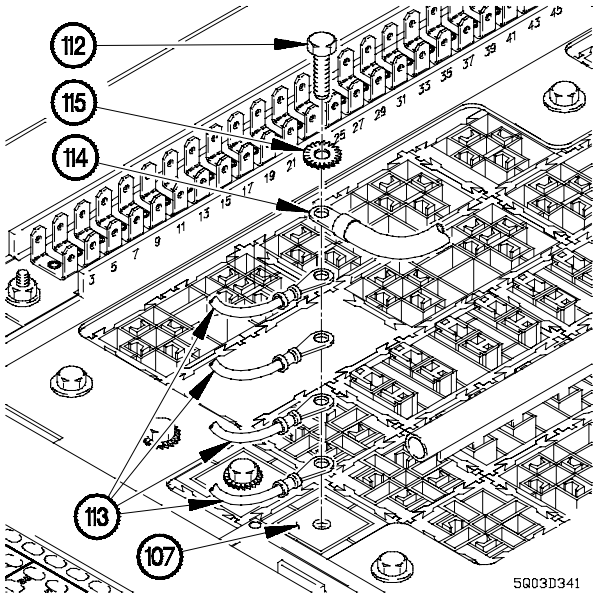
(76) Connect connector J27 (108) to connector P27 (109).

(77) Connect connector J51 (110) to connector P51 (111).



(78) Route power distribution panel 24 vdc cable (75) and power distribution panel 12 vdc cable (76) inside dashboard (94).





(79) Remove screw (112) from power distribution panel (107).

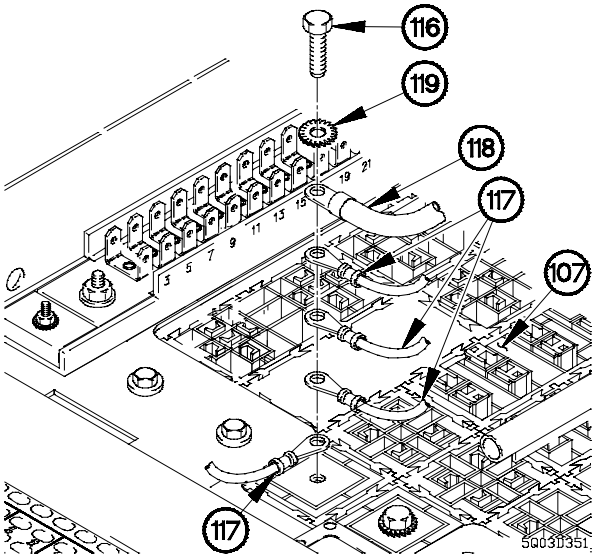
(80) Position four terminal lugs (113), terminal lug TL42 (114), lockwasher (115), and screw (112) on power distribution panel (107).

(81) Tighten screw (112) to 35-45 lb-in. (4-5 N·m).

(82) Remove screw (116) from power distribution panel (107).

(83) Position four terminal lugs (117), terminal lugs TL41 (118), lockwasher (119), and screw (116) on power distribution panel (107).

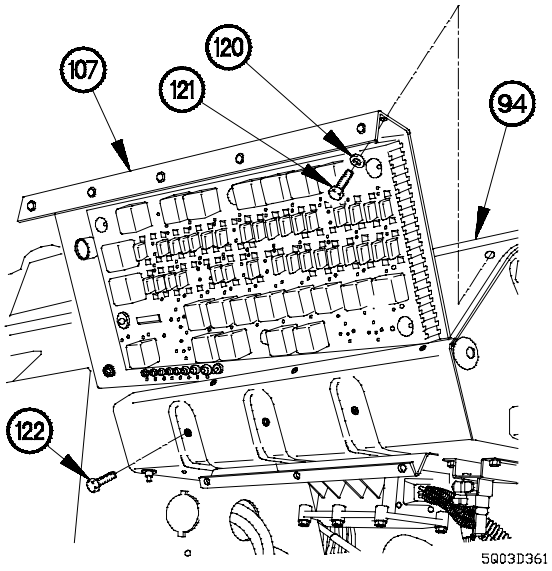
(84) Tighten screw (116) to 35-45 lb-in. (4-5 N·m).



15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

(85) Install power distribution panel (107) in dashboard (94) with three washers (120) and screws (121).

(86) Install three screws (122) in power distribution panel (107).



e. Follow-On Maintenance.

(1) Install kick panel (TM 9-2320-365-20-4).

(2) Install instrument panel (TM 9-2320-365-20-3).

(3) Install steering wheel (TM 9-2320-365-20-3).

(4) Fill radiator with anti-freeze (TM 9-2320-365-10).

(5) Connect batteries (TM 9-2320-365-20-3).

(6) Start engine (TM 9-2320-365-10).

(7) Check air system and heater hoses for leaks (TM 9-2320-365-10).

(8) Operate vehicle and electrical system and check for proper operation (TM 9-2320-365-10).

(9) Shut down engine (TM 9-2320-365-10).

End of Task.

15-4. M1081 CAB SIDE WALL REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
M1081 cab roof removed (TM 9-2320-365-20-4).
Side window removed (para 15-7).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Socket Set, Socket Wrench (Item 51, Appendix B)

Tools and Special Tools (Cont)
Wrench Set, Socket (TM 9-2320-365-20)

Material/Parts
Washer, Flat (Item 91, Appendix C)
Nut, Self-locking (Item 52, Appendix C)
Screw, Captive (4) (Item 253, Appendix F)
Seal (30 in. (750mm)) (Item 254, Appendix F)
Lubricating Oil, Engine (Item 48, Appendix C)

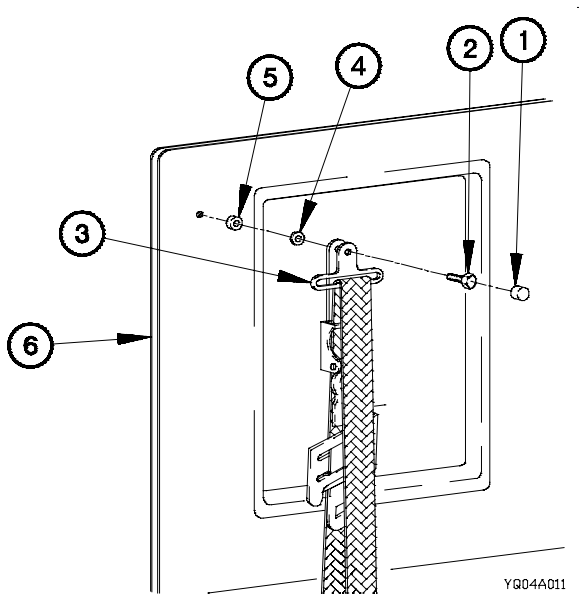
a. Removal.

NOTE

Left and right side cab side walls are removed the same way. Right side shown.

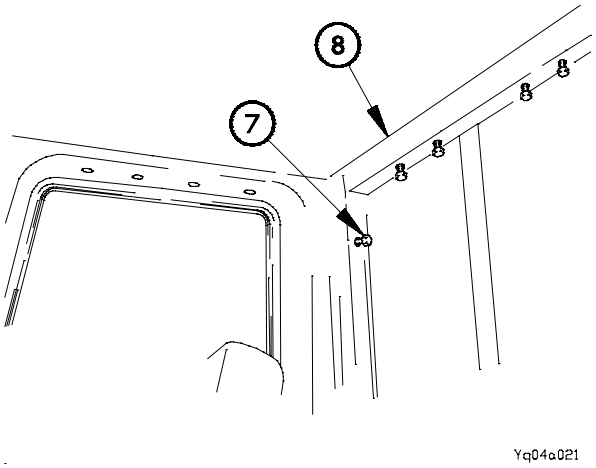
(1) Remove plastic cover (1) from screw (2).

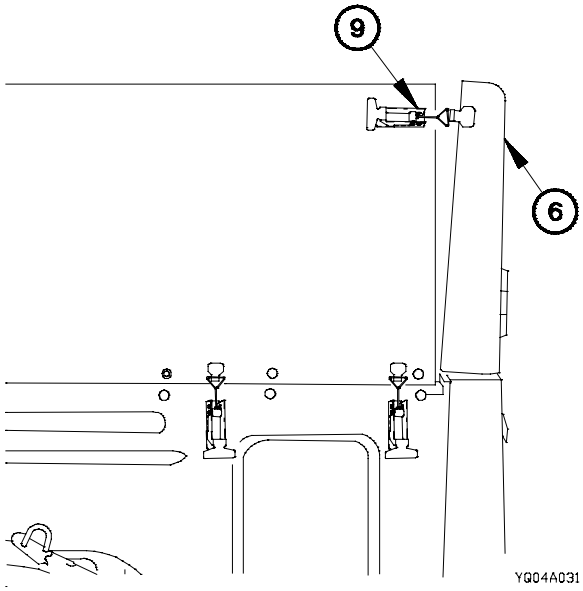
(2) Remove screw (2), seat belt mounting bracket (3), washer (4), and spacer (5) from cab side wall (6).



15-4. M1081 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

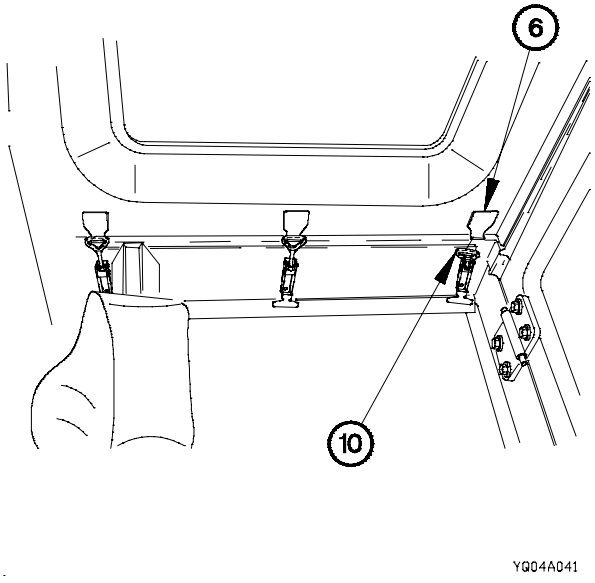
(3) Loosen captive screw (7) in cab rear wall (8).



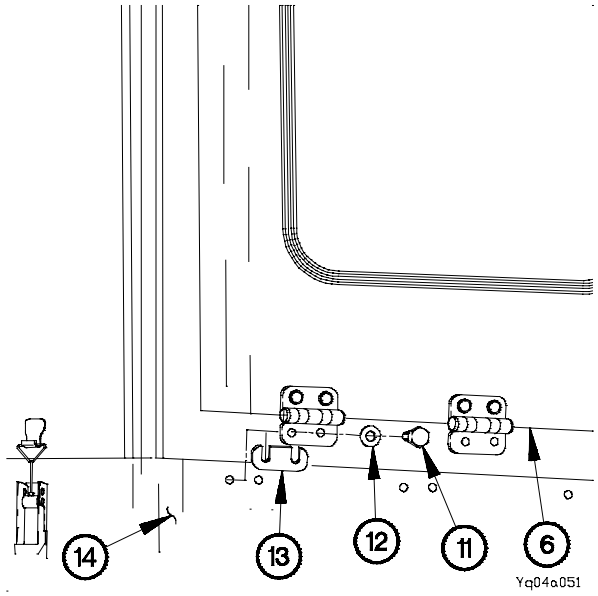


(4) Release latch (9) from cab side wall (6).

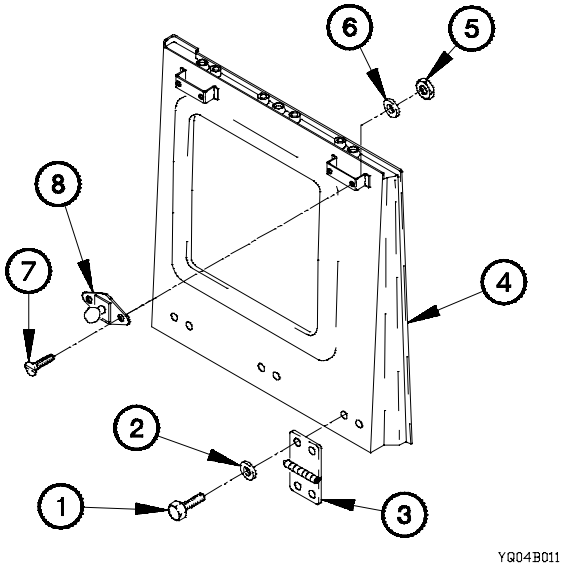
(5) Release three latches (10) from cab side wall (6).



(6) Remove six screws (11), washers (12), three spacers (13), and cab side wall (6) from cab (14).



b. Disassembly.

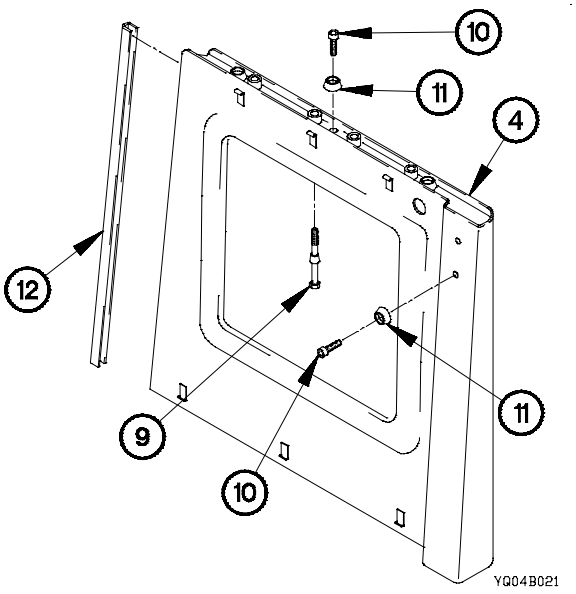


NOTE

Left and right side cab side walls are disassembled the same way. Right side shown.

(1) Remove six screws (1), washers (2), and three hinges (3) from cab side wall (4).

(2) Remove four nuts (5), washers (6), screws (7), and two friction catch studs (8) from cab side wall (4).

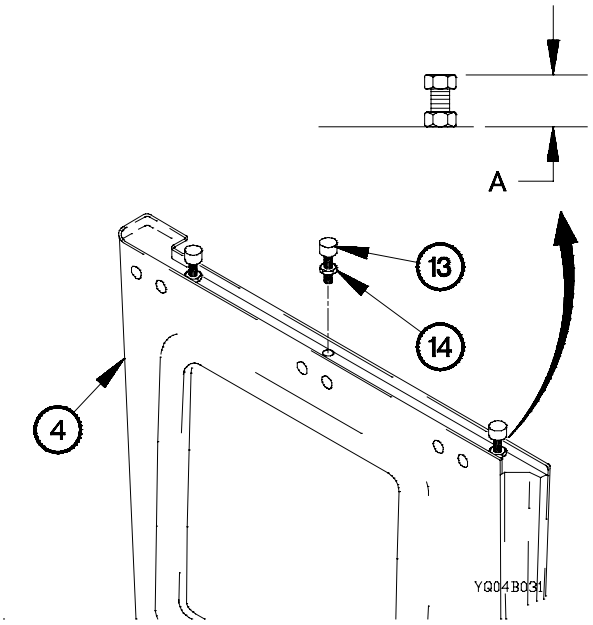


(3) Remove four captive screws (9) from cab side wall (4). Discard captive screws.

(4) Remove four screws (10) and centering cones (11) from cab side wall (4).

(5) Remove seal (12) from cab side wall (4). Discard seal.

15-4. M1081 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

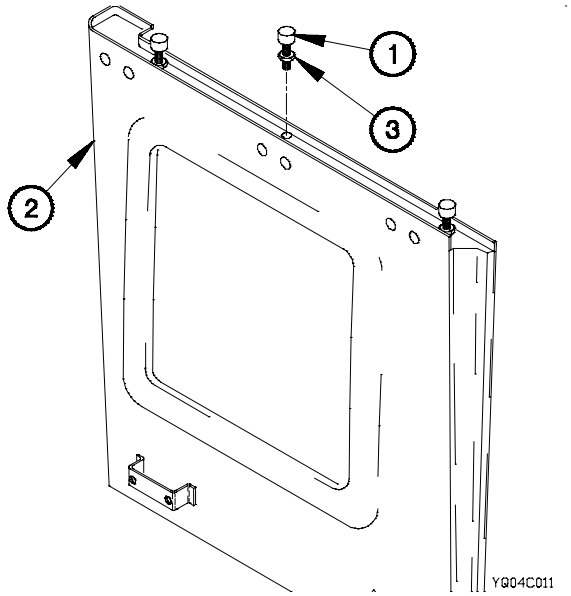


(6) Record distance A on three rubber stoppers (13).

(7) Loosen three nuts (14) on rubber stoppers (13).

(8) Remove three rubber stoppers (13) from cab side wall (4).

c. Assembly.



NOTE

Install rubber stoppers using measurement A from disassembly.

(1) Install three rubber stoppers (1) in cab side wall (2).

(2) Tighten three nuts (3) on rubber stoppers (1).

(3) Install seal (4) on cab side wall (2).

(4) Position four centering cones (5) on cab side wall (2) with four screws (6).

(5) Tighten four screws (6) to 62-124 lb-in. (7-14 N·m).

CAUTION

Use care when installing captive screws. Failure to comply may result in damage to equipment.

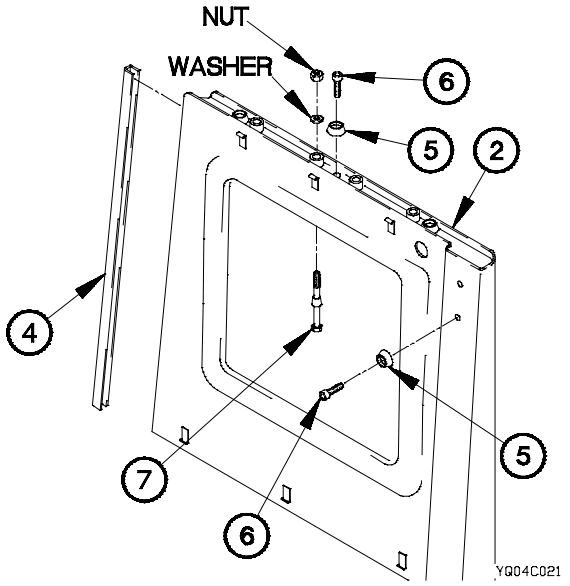
NOTE

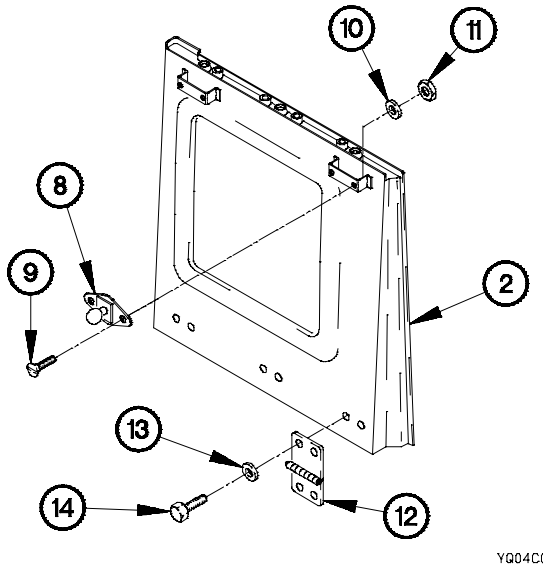
- Lubricate captive screws prior to installation.
- All captive screws are installed the same way. One shown.
- Tighten nut until captive screw is seated.

(6) Install captive screw (7) in cab side wall (2) with washer and nut.

(7) Remove nut and washer from captive screw (7).

(8) Perform steps (6) and (7) on remaining captive screws.





(9) Position two friction catch studs (8) on cab side wall (2) with four screws (9), washers (10) and nuts (11).

(10) Position three hinges (12) on cab side wall (2) with six washers (13) and screws (14).

(11) Tighten six screws (14) to 22-28 lb-ft (30-38 N·m).

15-4. M1081 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

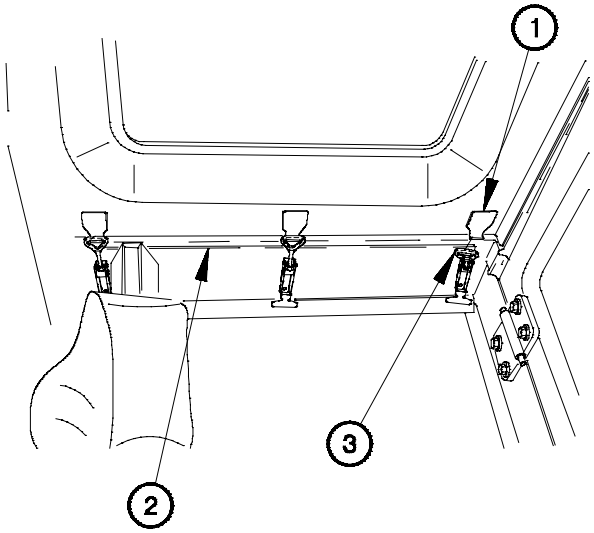
d. Installation.

NOTE

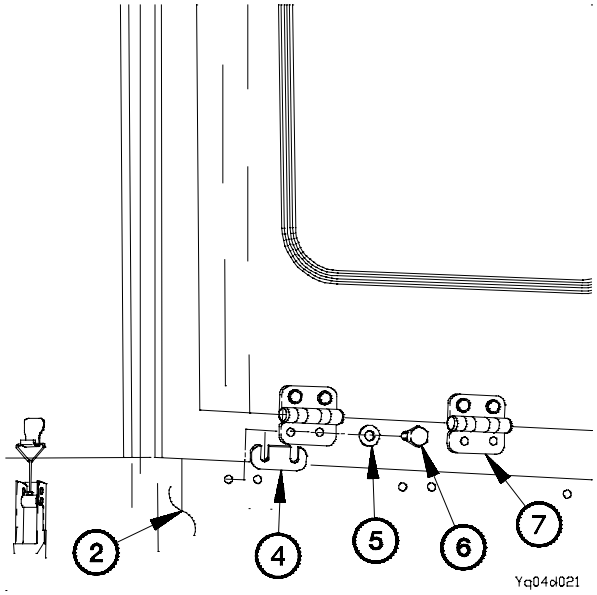
Steps (1) through (7) require the aid of an assistant.

(1) Position cab side wall (1) on cab (2).

(2) Fasten three latches (3) to cab side wall (1).



YG04D011



Yq04d021

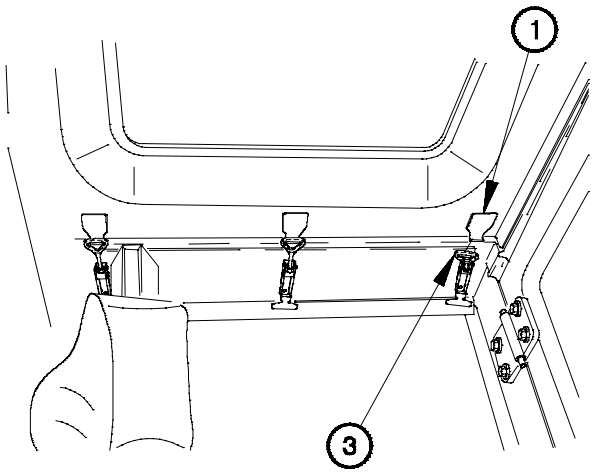
(3) Position three spacers (4), six washers (5), screws (6), and three hinges (7) on cab (2).

(4) Tighten six screws (6) to 22-28 lb-ft (30-38 N·m).

NOTE

All friction catch studs are adjusted the same way. One shown.

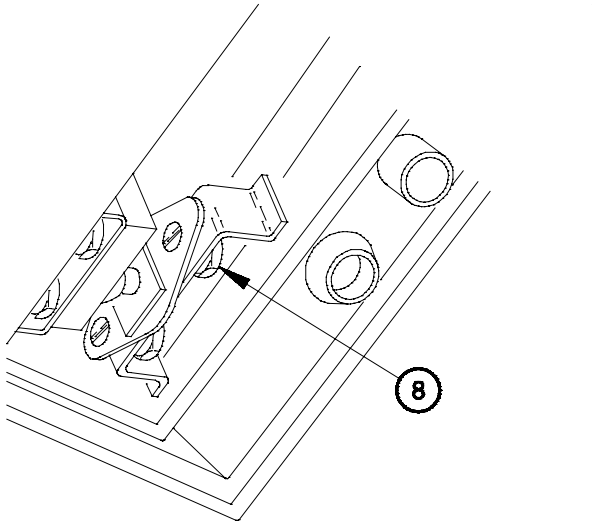
(5) Release three latches (3) and fold down cab side wall (1).



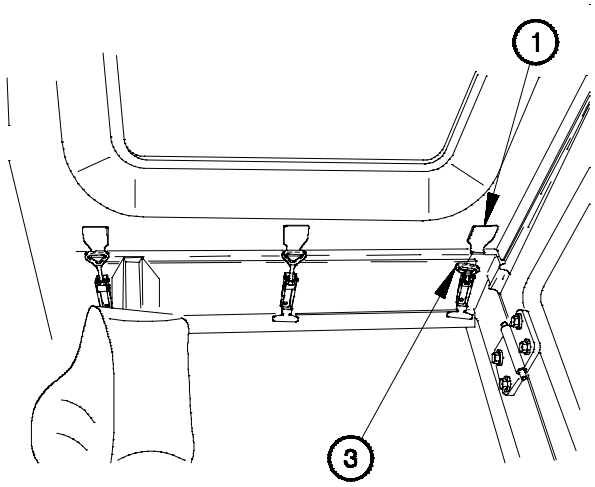
YG04D031

(6) Tighten two nuts (8) to 62-124 lb-in. (7-14 N·m).

(7) Perform step (6) on remaining friction catch stud (9).



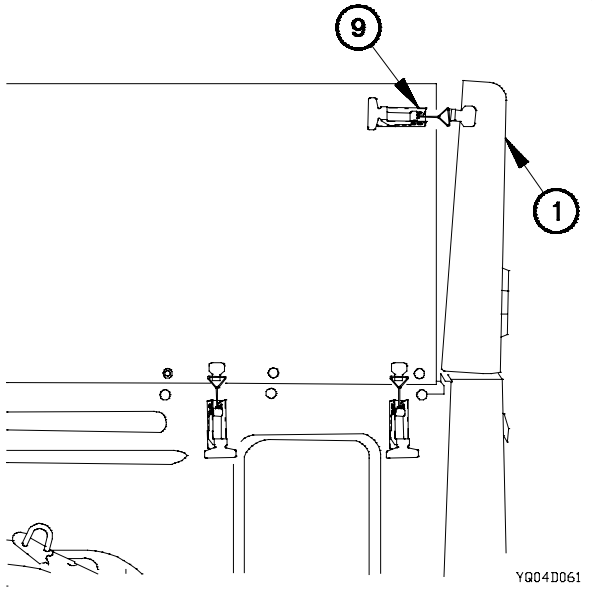
Yq04d041



YQ04D051

(8) Fold up cab side wall (1) and fasten three latches (3).

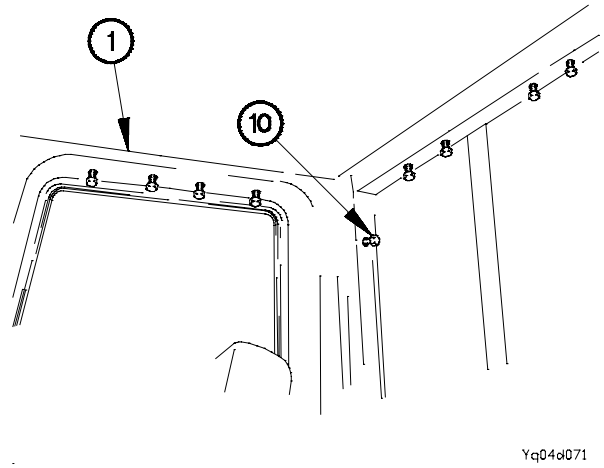
(9) Fasten latch (9) on cab side wall (1).

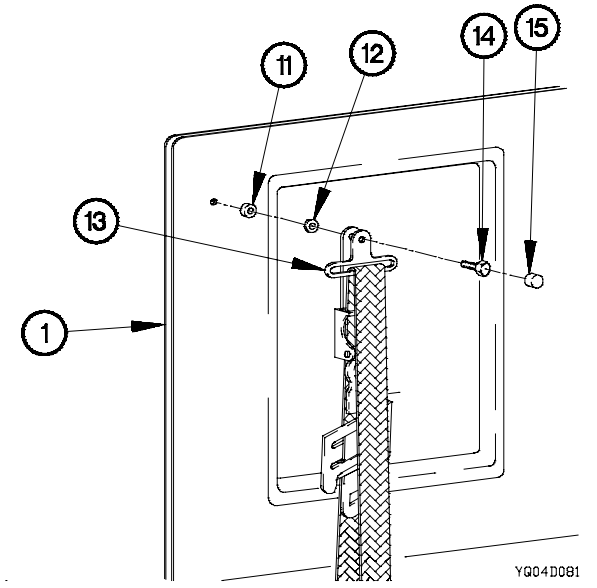


YQ04D061

15-4. M1081 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

(10) Install captive screw (10) in cab side wall (1)





(11) Position spacer (11), washer (12), and seat belt mounting bracket (13) on cab side wall (1) with screw (14).

(12) Tighten screw (14) to 30-35 lb-ft (41-47 N·m).

(13) Install plastic cover (15) on screw (14).

e. Follow-On Maintenance.

(1) Install side window (para 15-7).

(2) Install M1081 cab roof (TM 9-2320-365-20-4).

End of Task.

15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
M1081 cab roof removed (TM 9-2320-365-20-4).
M42 Alarm removed, if equipped (TM 9-2320-365-10).
Spare tire lowered (TM 9-2320-365-10).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Socket Set, Socket Wrench (Item 51, Appendix B)
Wrench Set, Socket (TM 9-2320-365-20)
Socket Wrench Attachment, Screwdriver (TM 9-2320-365-20)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-75 lb-in. (Item 86, Appendix B)
Tool Kit, Blind Rivet (Item 66, Appendix B)

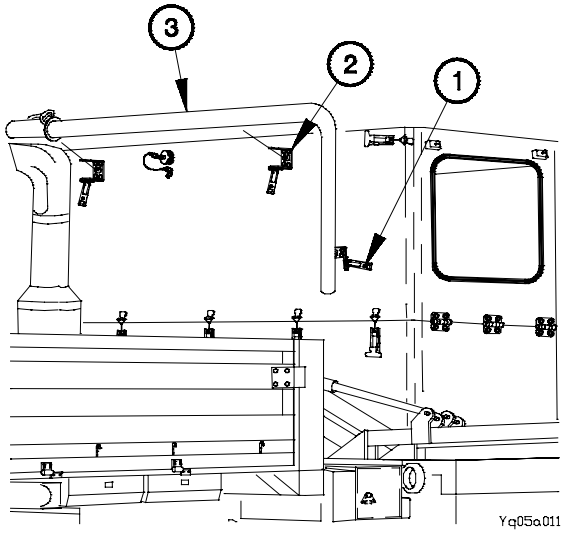
Materials/Parts
Washer, Flat (Item 91, Appendix C)
Nut, Self-locking (Item 52, Appendix C)
Seal (2) (30 in. (750mm)) (Item 254, Appendix F)
Screw, Captive (12) (Item 253, Appendix F)
Insulation Panel (Item 65, Appendix F)
Insulation Panel (Item 66, Appendix F)
Insulation Panel (Item 67, Appendix F)
Insulation Panel (Item 68, Appendix F)
Insulation Panel (Item 69, Appendix F)
Insulation Panel (Item 70, Appendix F)
Lubricating Oil, Engine (Item 48, Appendix C)

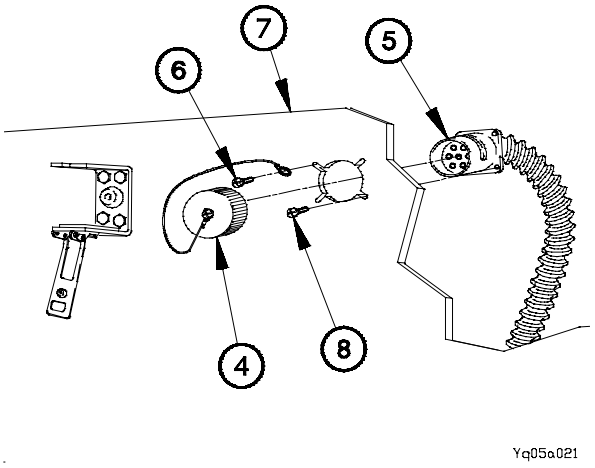
Personnel Required
(2)

a. Removal.

(1) Release three latches (1) on clamps (2).

(2) Remove davit (3) from three clamps (2).





(3) Remove dustcap (4) from connector J62 (5).

(4) Remove screw (6) and dustcap (4) from cab rear wall (7).

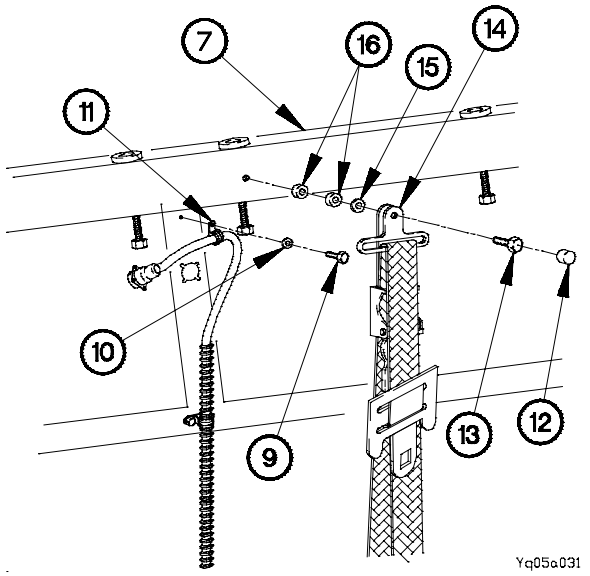
(5) Remove three screws (8) and connector J62 (5) from cab rear wall (7).

15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

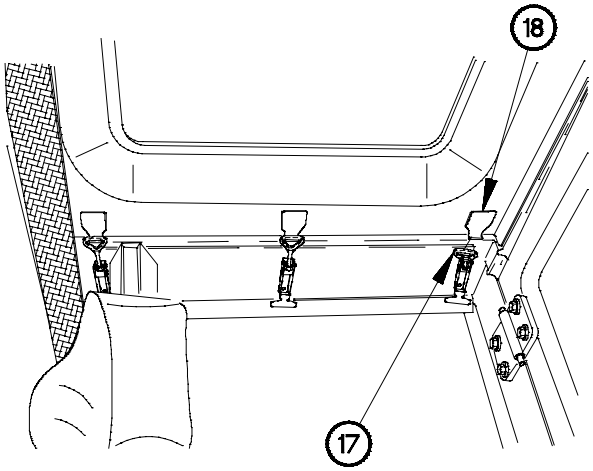
(6) Remove three screws (9), washers (10), and clamps (11) from cab rear wall (7).

(7) Remove cover (12) from screw (13).

(8) Remove screw (13), washer (14), center seatbelt mounting bracket (15), and two spacers (16) from cab rear wall (7).



Yq05a031



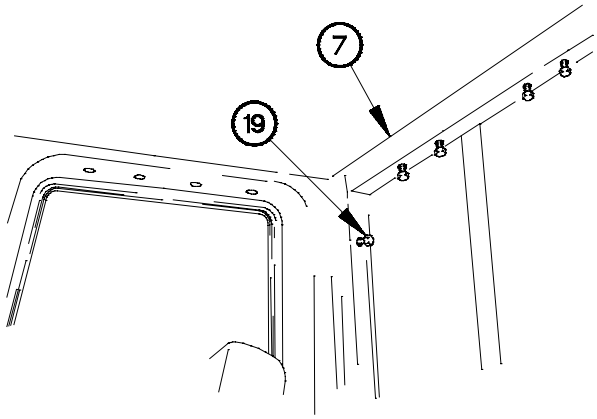
Yq05a041

NOTE

Perform steps (9) and (11) on left and right cab side walls, and step (10) on left and right sides of cab rear wall. Right side shown.

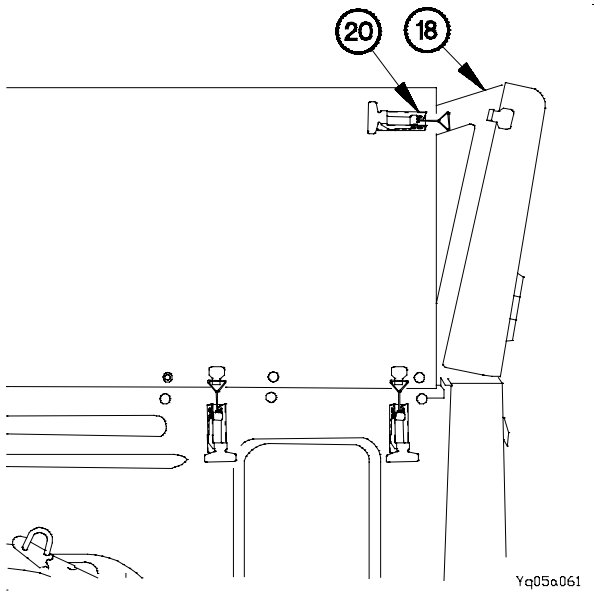
(9) Release three latches (17) on cab side wall (18).

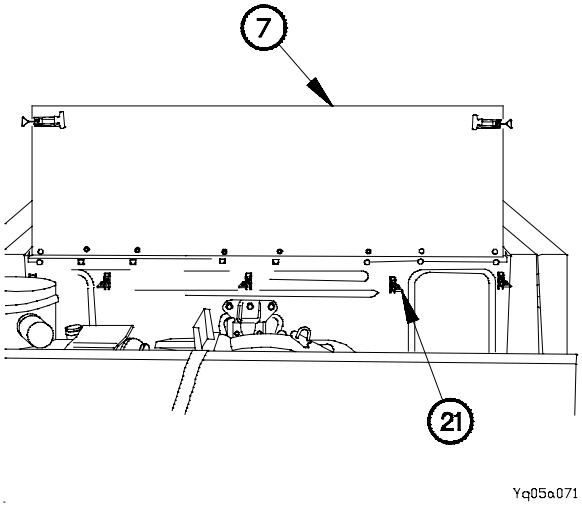
(10) Loosen captive screw (19) in cab rear wall (7).



Yq05a051

(11) Release latch (20) and fold down cab side wall (18).



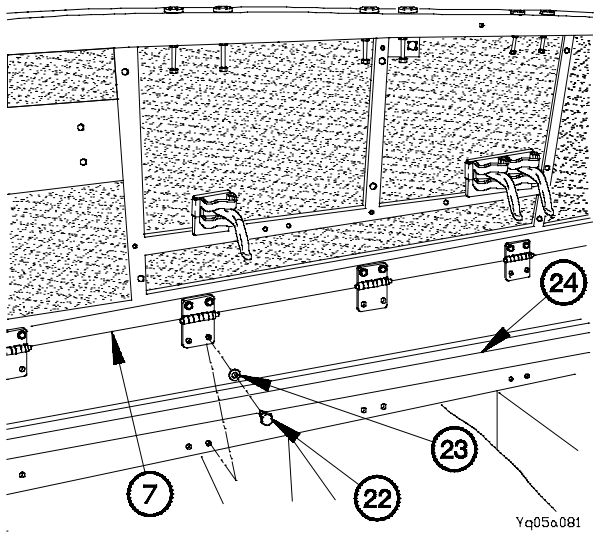


NOTE

Steps (12) and (13) require the aid of an assistant.

(12) Release five latches (21) on cab rear wall (7).

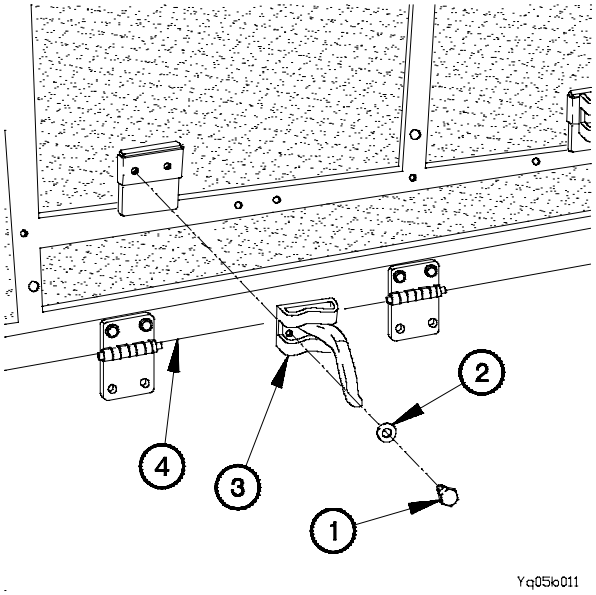
(13) Remove 10 screws (22), washers (23), and cab rear wall (7) from cab (24).

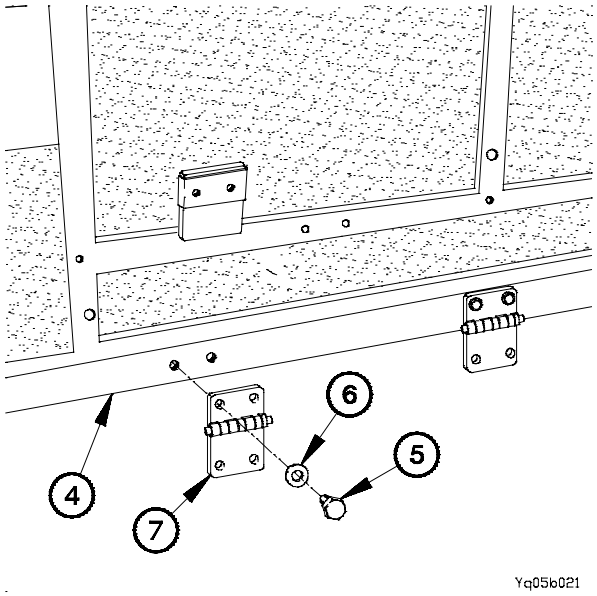


15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

b. Disassembly.

(1) Remove six screws (1), washers (2), and three rifle clamps (3) from cab rear wall (4).





(2) Remove 10 screws (5), washers (6), and five hinges (7) from cab rear wall (4).

NOTE

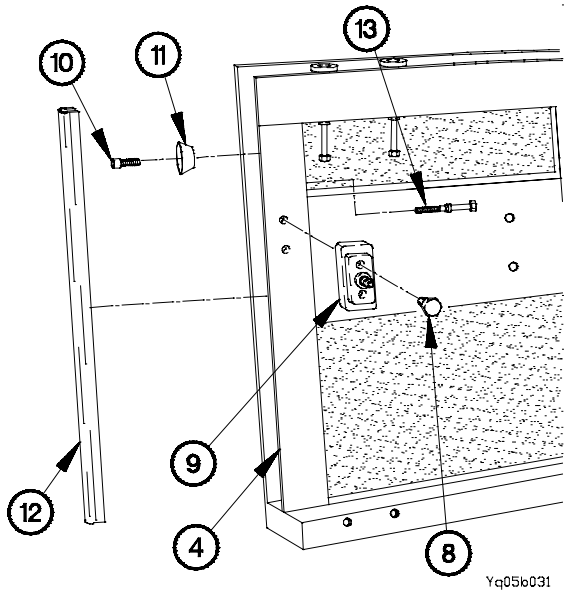
Perform steps (3) through (6) on left and right sides of cab rear wall. Right side shown.

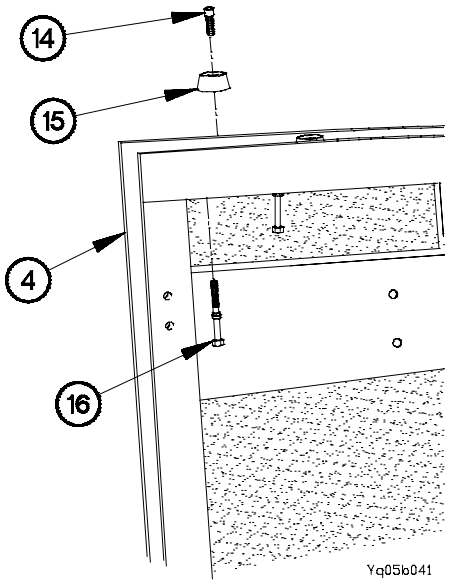
(3) Remove two screws (8) and friction catch stud (9) from cab rear wall (4).

(4) Remove screw (10) and centering cup (11) from cab rear wall (4).

(5) Remove seal (12) from cab rear wall (4). Discard seal.

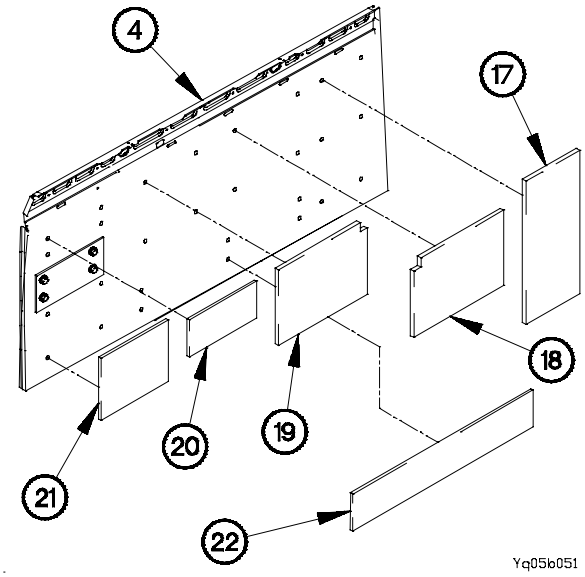
(6) Remove captive screw (13) from cab rear wall (4). Discard captive screw.



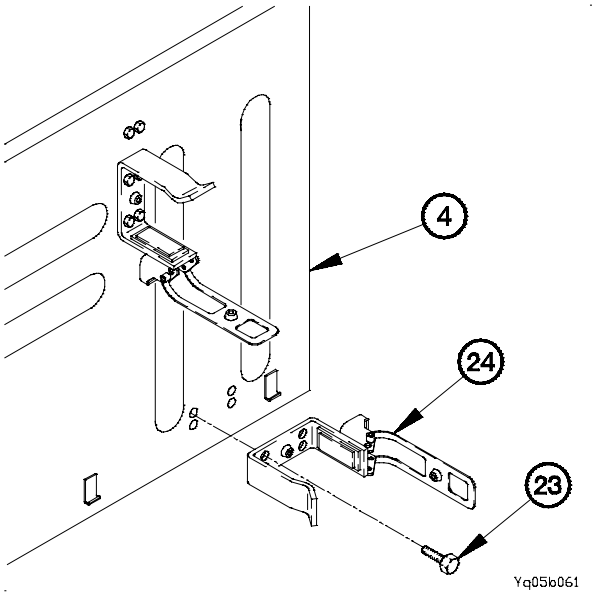


(7) Remove five screws (14) and centering cones (15) from cab rear wall (4).

(8) Remove 10 captive screws (16) from cab rear wall (4). Discard captive screws.



(9) Remove insulation panel (17 through 22) from cab rear wall (4). Discard insulation panels.

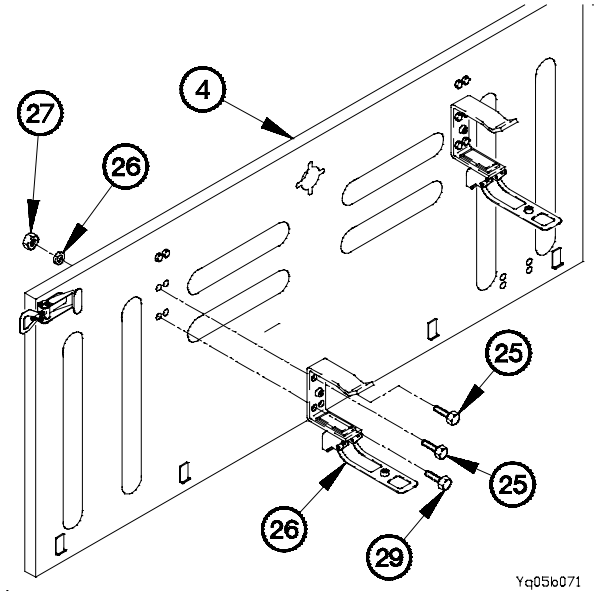


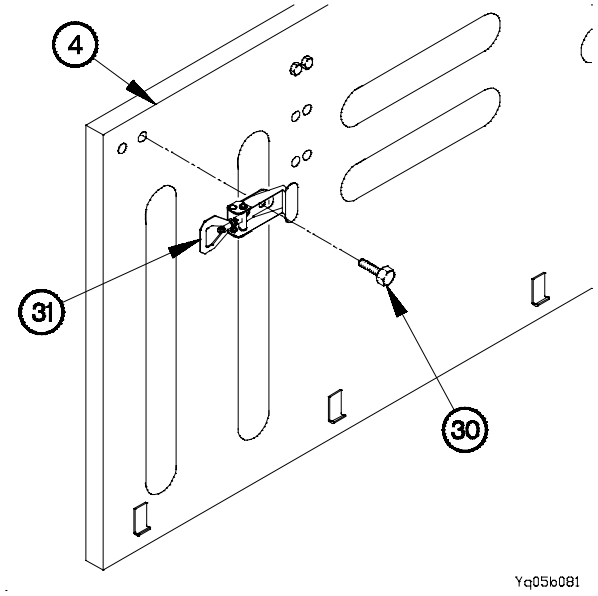
(10) Remove four screws (23) and clamp (24) from cab rear wall (4).

15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

(11) Remove four screws (25) from two clamps (26).

(12) Remove four nuts (27), washers (28), screws (29), and two clamps (26) from cab rear wall (4).





NOTE

Perform step (13) on left and right sides of cab rear wall. Left side shown.

(13) Remove two screws (30) and latch (31) from cab rear wall (4).

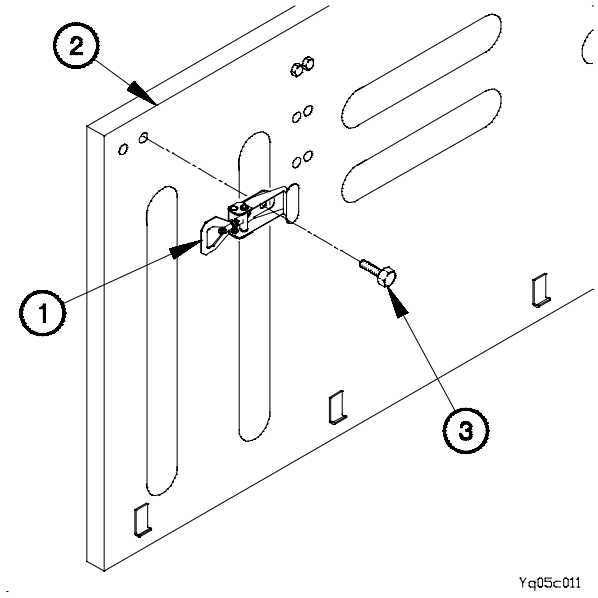
c. Assembly.

NOTE

Perform steps (1) and (2) on left and right sides of cab rear wall. Left side shown.

(1) Position latch (1) on car rear wall (2) with two screws (3).

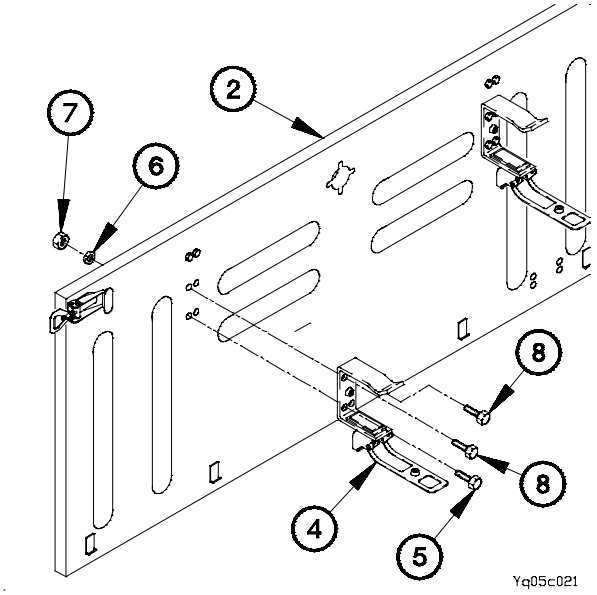
(2) Tighten two screws (3) to 62-124 lb-in. (7-14 N·m).

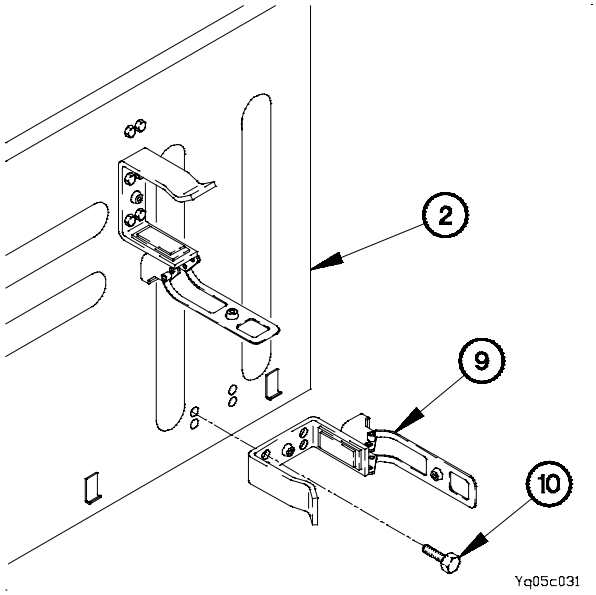


(3) Position two clamps (4) on cab rear wall (2) with four screws (5), washers (6), and nuts (7).

(4) Position four screws (8) in two clamps (4).

(5) Tighten four screws (8) and nuts (7) to 35-44 lb-in. (4-5 N·m).

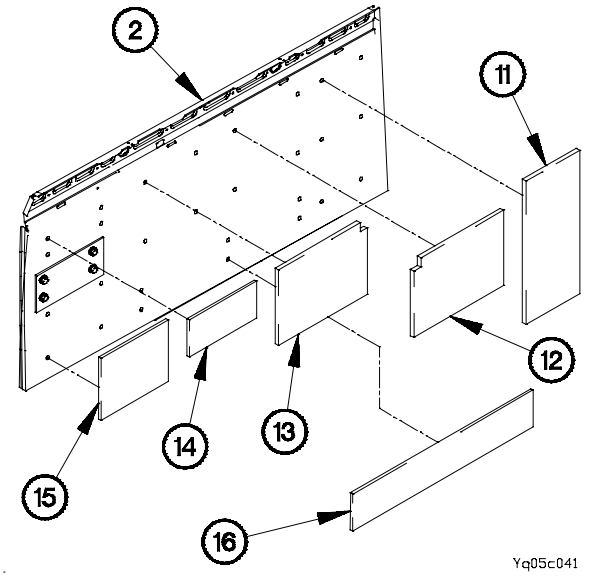




(6) Position clamp (9) on cab rear wall (2) with four screws (10).

(7) Tighten four screws (10) to 35-44 lb-in. (4-5 N·m).

(9) Install insulation panels (11 through 16) on cab rear wall (2).



15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

CAUTION

Use care when installing captive screws. Failure to comply may result in damage to equipment.

NOTE

- Lubricate all captive screws prior to installation.
- All captive screws are installed the same way. One captive screw shown.
- Tighten nut until captive screw is seated.

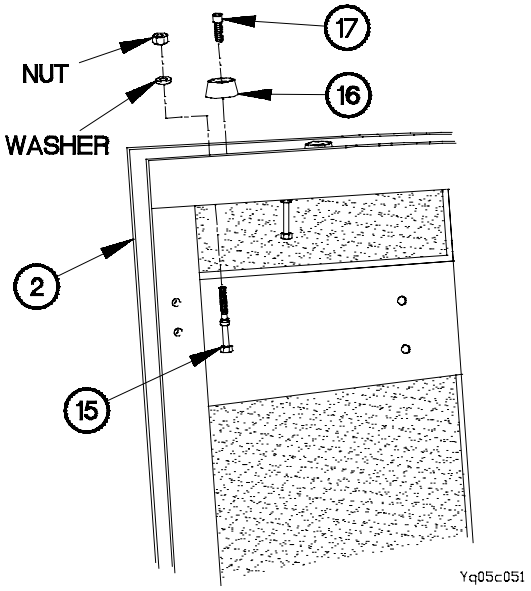
(9) Install captive screw (15) in cab rear wall (2) with washer and nut.

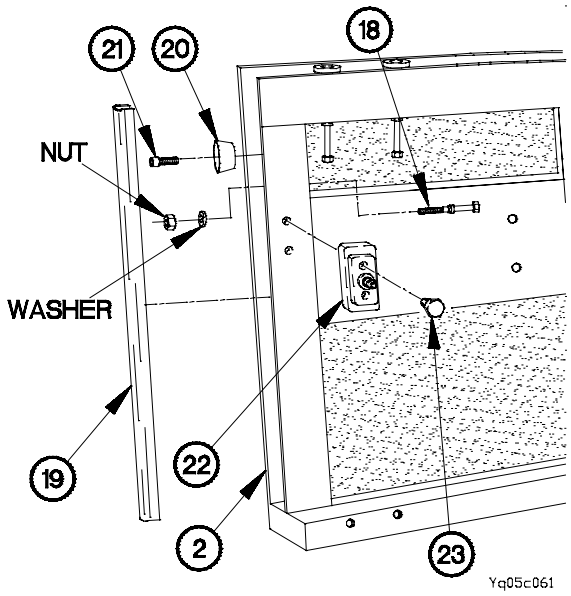
(10) Remove nut and washer from captive screw (15).

(11) Perform steps (9) and (10) on remaining nine captive screws.

(12) Position five centering cups (16) on cab rear wall (2) with five screws (17).

(13) Tighten five screws (17) to 62-124 lb-in. (7-14 N·m).





NOTE

- Perform steps (14) through (20) on left and right sides of cab rear wall. Right side shown.
- Tighten nut until captive screw is seated.

(14) Install captive screw (18) in cab rear wall (2) with washer and nut.

(15) Remove nut and washer from captive screw (18).

(16) Install seal (19) on cab rear wall (2).

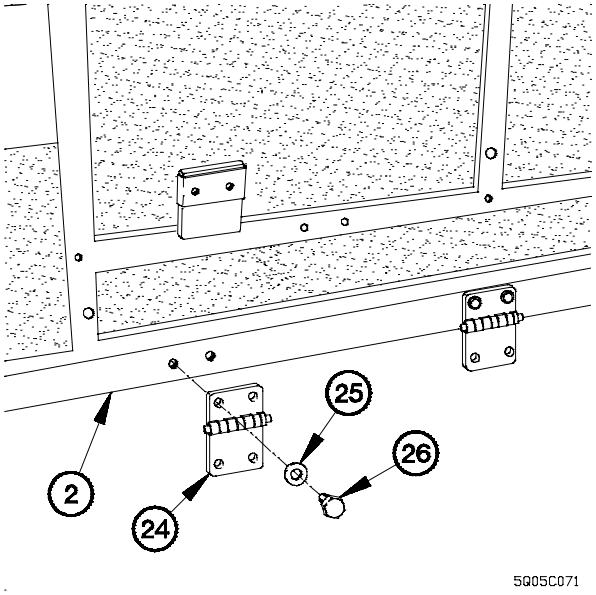
(17) Position centering cup (20) on cab rear wall (2) with screw (21).

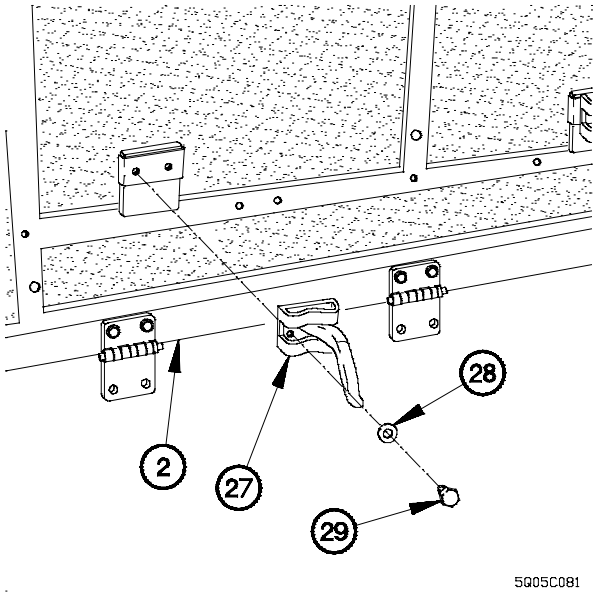
(18) Tighten screw (21) to 62-124 lb-in. (7-14 N·m).

(19) Position friction catch (22) on cab rear wall (2) with two screws (23).

(20) Tighten two screws (23) to 62-124 lb-in. (7-14 N·m).

(21) Position five hinges (24) on cab rear wall (2) with 10 washers (25) and screws (26).





(22) Position three rifle clamps (27) on cab rear wall (2) with six washers (28) and screws (29).

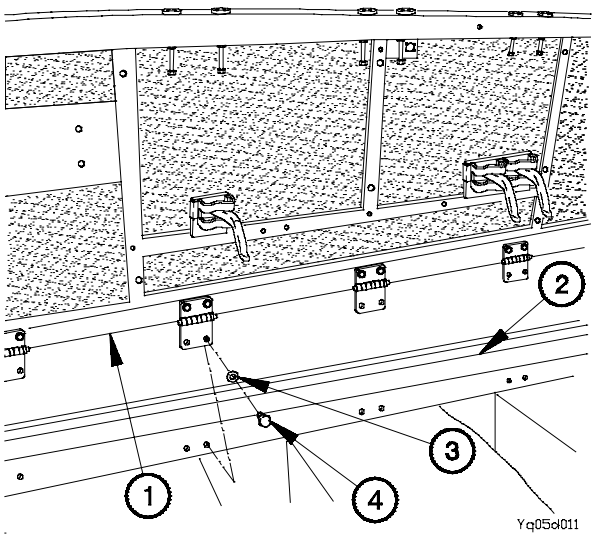
(23) Tighten six screws (29) to 35-44 lb-in. (4-5 N·m).

d. Installation.

NOTE

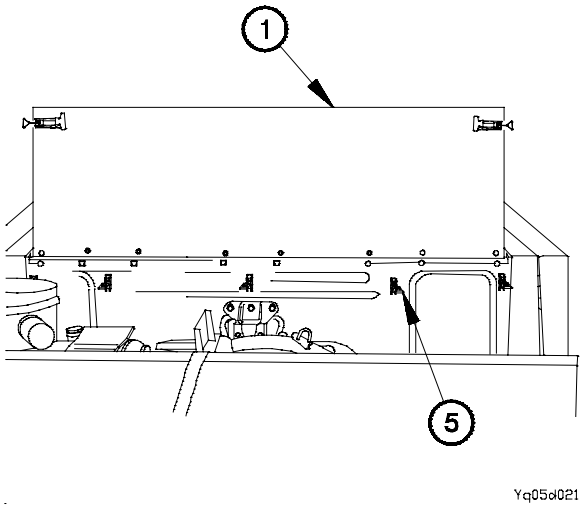
Steps (1) and (2) require the aid of an assistant.

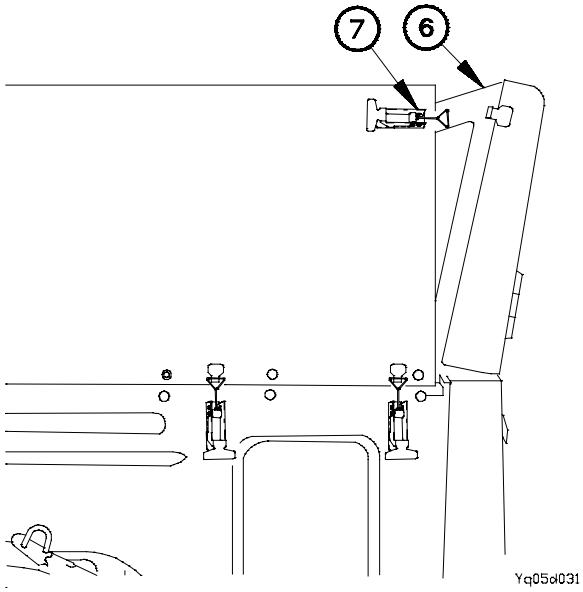
(1) Position cab rear wall (1) on cab (2) with 10 washers (3) and screws (4).



15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

(2) Fasten five latches (5) on cab rear wall (1).



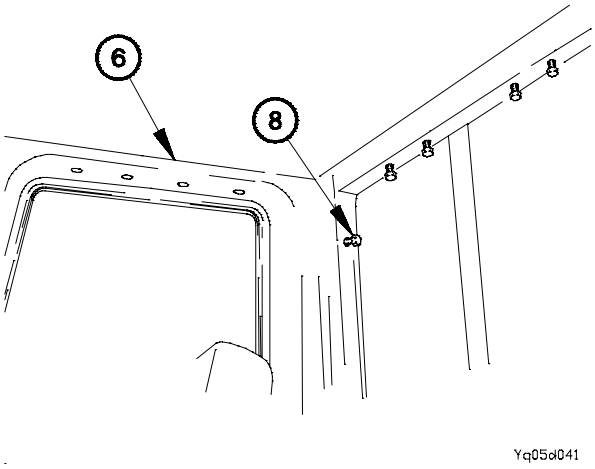


NOTE

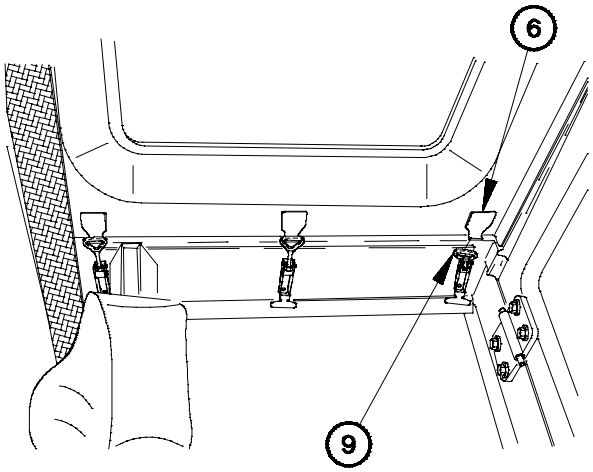
Perform steps (3) and (5) on left and right cab side walls and step (4) on left and right sides of cab rear wall. Right side shown.

(3) Raise cab side wall (6) and fasten latch (7).

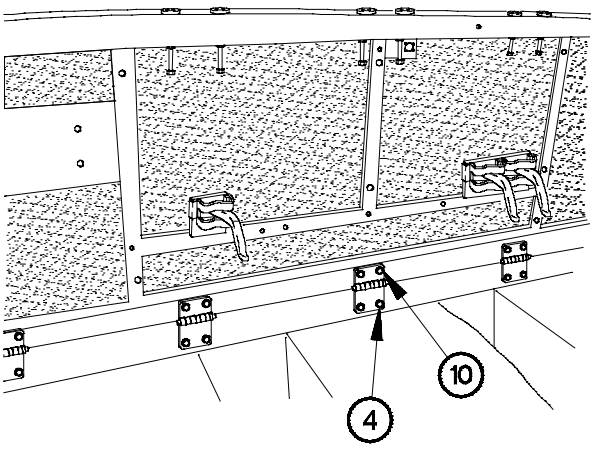
(4) Install captive screw (8) in cab side wall (6).



(5) Fasten three latches (9) on cab side wall (6).



Yq05a051



Yq05a061

(6) Tighten 10 screws (4) to 22-28 lb-ft (30-38 N·m).

(7) Tighten 10 screws (10) to 22-28 lb-ft (30-38 N·m).

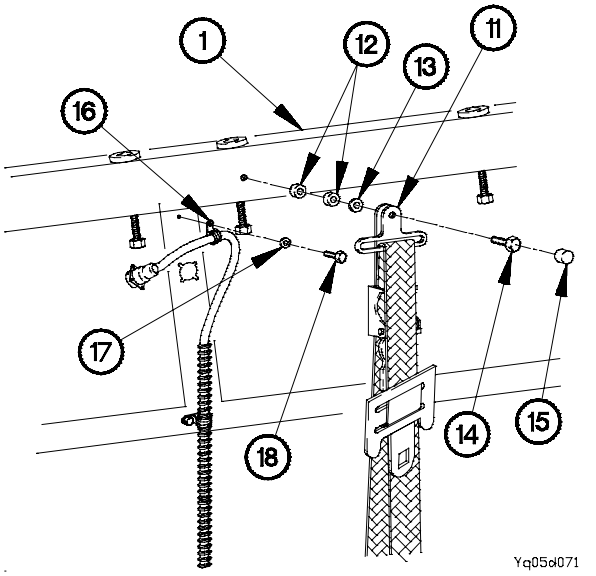
(8) Position center seatbelt mounting bracket (11) on cab rear wall (1) with two spacers (12), washer (13), and screw (14).

(9) Tighten screw (14) to 30-35 lb-ft (41-47 N·m).

(10) Install cover (15) on screw (14).

(11) Position three clamps (16) on cab rear wall (1) with three washers (17) and screws (18).

(12) Tighten three screws (18) to 27-35 lb-in. (3-4 N·m).



Yq05a071

15-5. M1081 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

NOTE

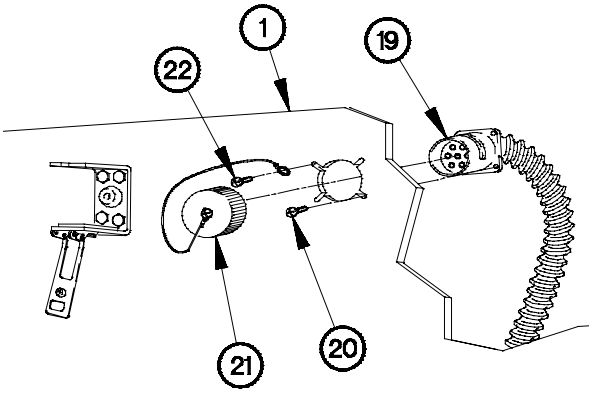
Steps (13) requires the aid of an assistant.

(13) Position connector J62 (19) in cab rear wall (1) with three screws (20).

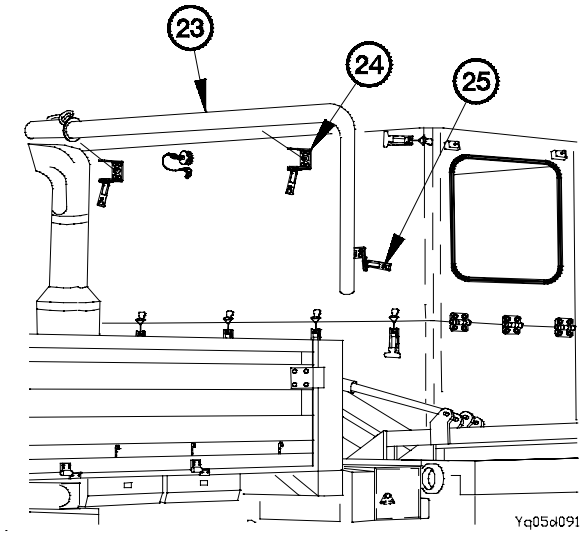
(14) Tighten three screws (20) to 27-35 lb-in. (3-4 N·m).

(15) Position dustcap (21) on cab rear wall (1) with screw (22).

(16) Tighten screw (22) to 27-35 lb-in. (3-4 N·m).



Yq05a081



Yq05a091

(17) Install davit (23) in three clamps (24).

(18) Fasten three latches (25) on clamps (24).

e. Follow-On Maintenance.

(1) Raise spare tire (TM 9-2320-365-10).

(2) Install M42 Alarm, if equipped.

(3) Install M1081 cab roof (TM 9-2320-365-20-4).

End of Task.

15-6. M1081 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
M1081 cab roof removed (TM 9-2320-365-20-4).
Cab windshield removed (para 15-7).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench Set, Socket (TM 9-2320-365-20)
Socket Set, Socket Wrench (Item 51, Appendix B)

Materials/Parts
Washer, Flat (Item 91, Appendix C)
Nut, Self-locking (Item 52, Appendix C)
Lockwasher (Item 97, Appendix F)
Screw, Captive (10) (Item 253, Appendix F)
Seal (79 in. (2000 mm)) (Item 254, Appendix F)
Lubricating Oil, Engine (Item 48, Appendix C)
Seal (2) (87 in. (2200 mm)) (Item 254, Appendix F)

Personnel Required
(3)

a. Removal.

NOTE

Left and right side wiper arms are removed the same way. Left side shown.

(1) Disconnect windshield washer hose (1) from fitting (2).

(2) Lift cover (3) at base of wiper arm (4).

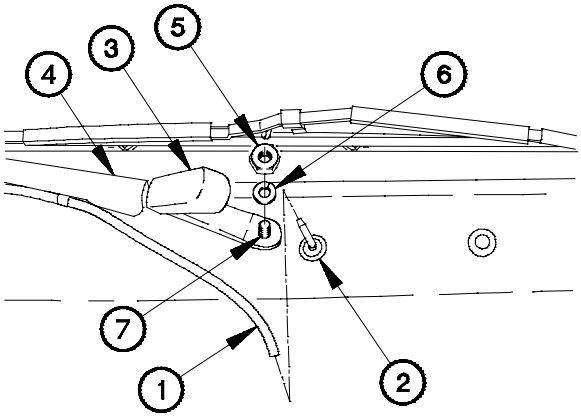
(3) Remove nut (5) and lockwasher (6) from wiper arm shaft (7). Discard lockwasher.

NOTE

Mark position of wiper arm prior to removal.

(4) Remove wiper arm (4) from wiper arm shaft (7).

(5) Perform steps (1) through (4) on right side wiper arm.

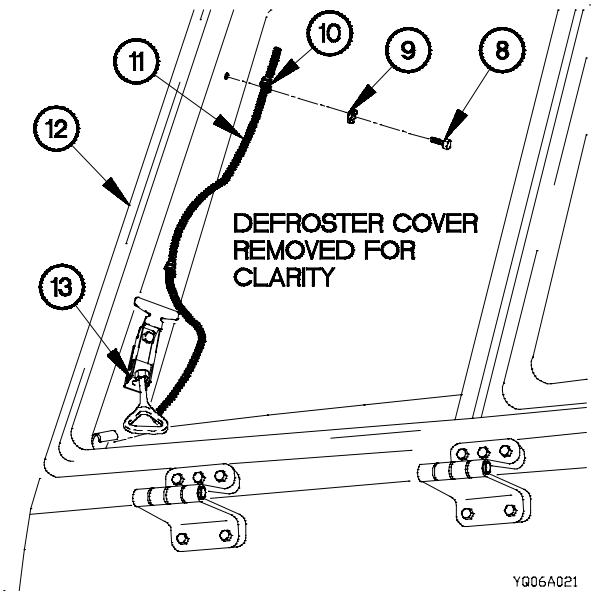


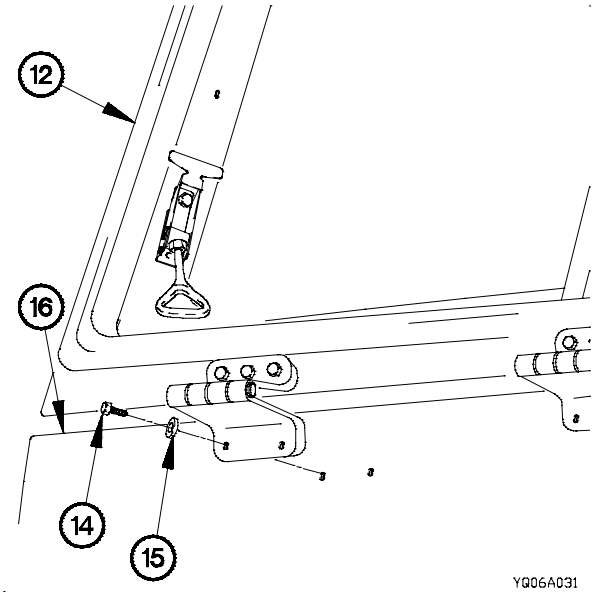
YQ06A011

15-6. M1081 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

(6) Remove two screws (8), washers (9), clamps (10), and cable assembly (11) from windshield frame (12).

(7) Release two latches (13) on windshield frame (12).





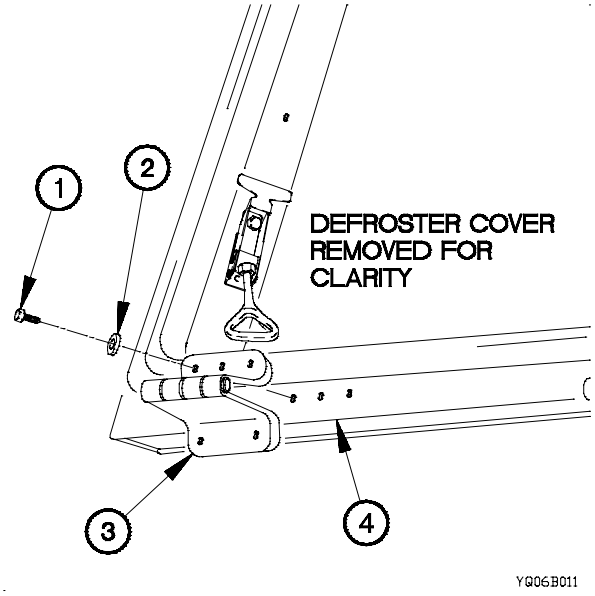
NOTE

Step (8) requires the aid of two assistants.

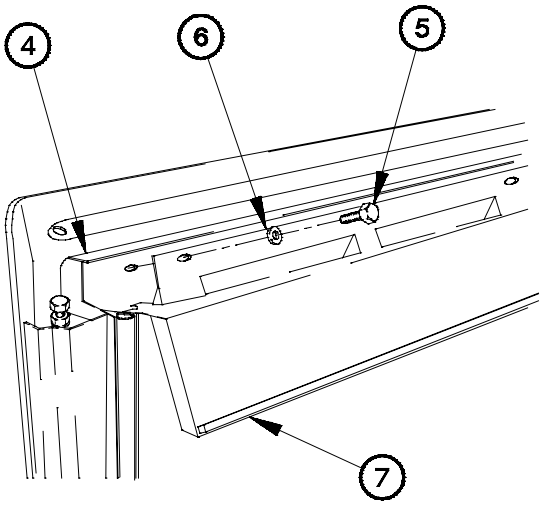
(8) Remove six bolts (14), washers (15), and windshield frame (12) from cab (16).

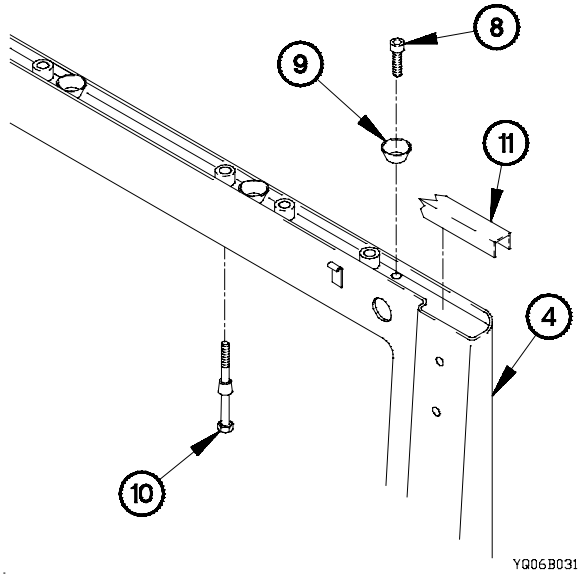
b. Disassembly.

(1) Remove nine screws (1), washers (2), and three hinges (3) from windshield frame (4).



(2) Remove six screws (5), washers (6), and two defroster covers (7) from windshield frame (4).



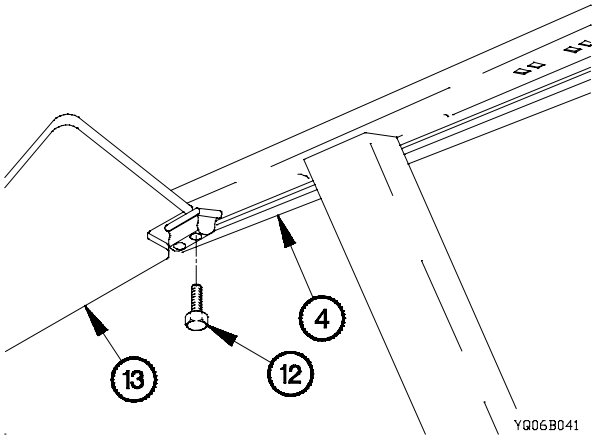


(3) Remove five screws (8) and centering cups (9) from windshield frame (4).

(4) Remove 10 captive screws (10) from windshield frame (4). Discard captive screws.

(5) Remove seal (11) from windshield frame (4). Discard seal.

(6) Remove four screws (12) and sunvisor (13) from windshield frame (4).



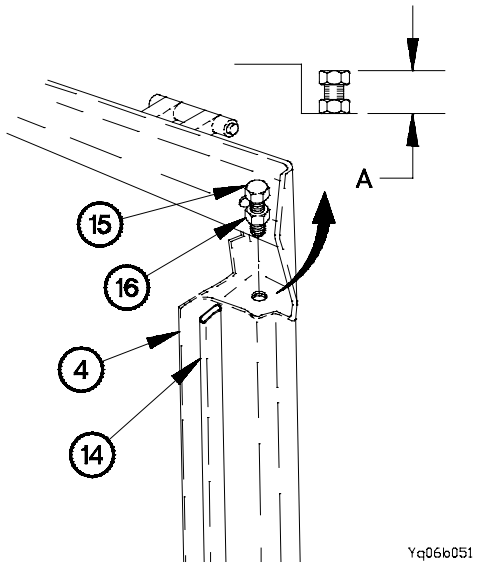
15-6. M1081 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

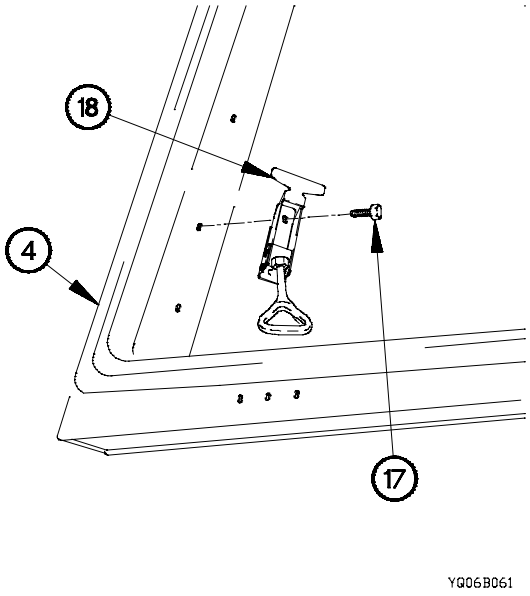
(7) Remove two seals (14) from windshield frame (4). Discard seals

(8) Record distance A on two stoppers (15).

(9) Loosen two nuts (16) on stoppers (15).

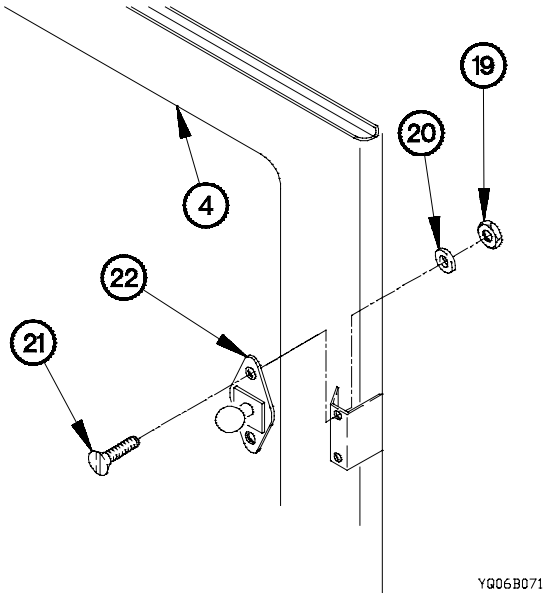
(10) Remove two stoppers (15) from windshield frame (4).





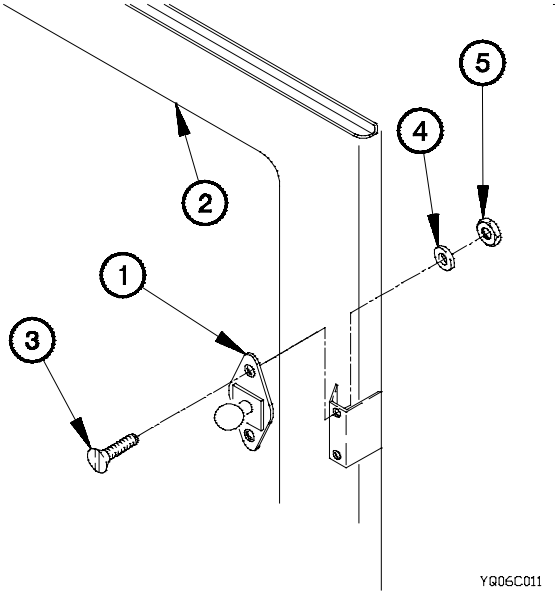
(11) Remove four screws (17) and two latches (18) from windshield frame (4).

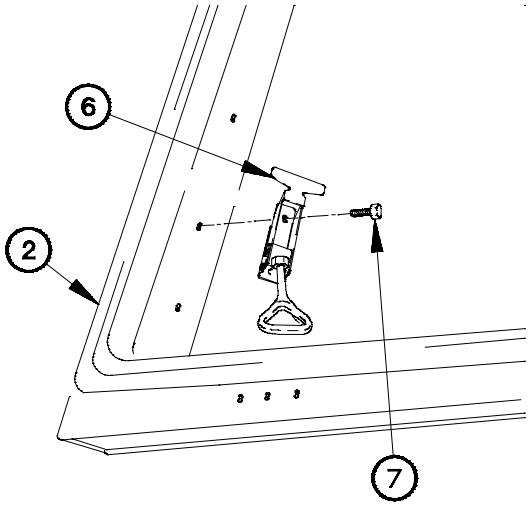
(12) Remove four nuts (19), washers (20), screws (21), and two friction catch studs (22) from windshield frame (4).



c. Assembly.

(1) Position two friction catch studs (1) on windshield frame (2) with four screws (3), washers (4), and nuts (5).





(2) Position two latches (6) on windshield frame (2) with four screws (7).

(3) Tighten four screws (7) to 62-124 lb-in. (7-14 N·m).

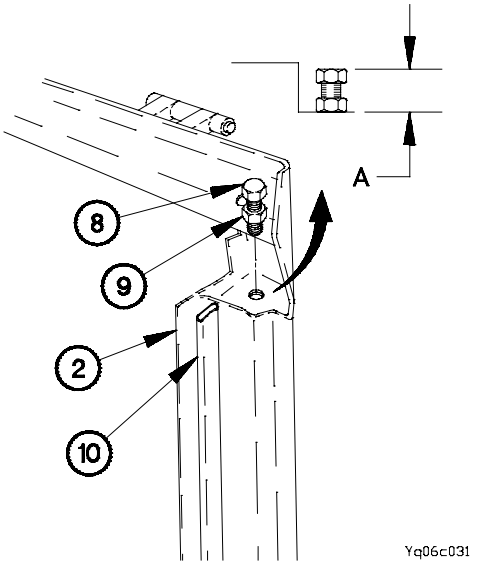
NOTE

Install stoppers using measurement A from disassembly.

(4) Install two stoppers (8) in windshield frame (2).

(5) Tighten two nuts (9) on stoppers (8).

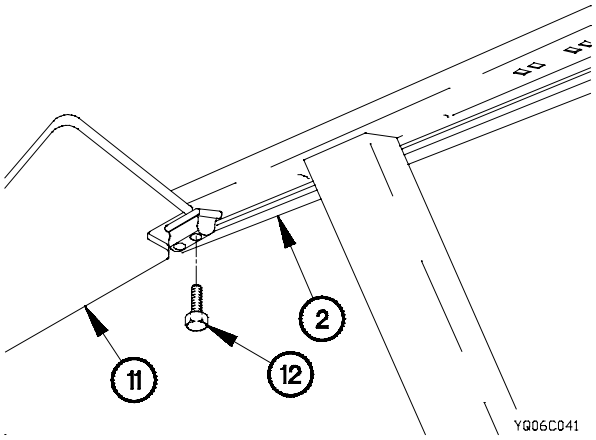
(6) Install two seals (10) on windshield frame (2).



15-6. M1081 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

(7) Position sunvisor (11) on windshield frame (2) with four screws (12).

(8) Tighten four screws (12) to 22-27 lb-in. (2-3 N·m).



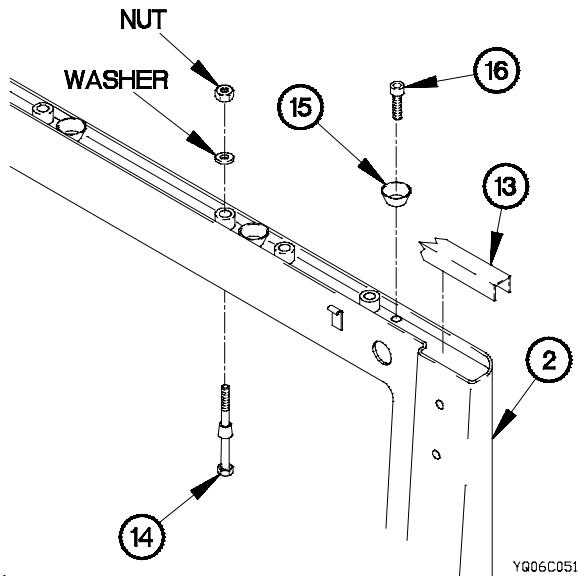
(9) Install seal (13) on windshield frame (2).

CAUTION

Use care when installing captive screws. Failure to comply may result in damage to equipment.

NOTE

- Lubricate captive screws prior to installation.
- All captive screws are installed the same way. One shown.
- Tighten nut until captive screw is seated.



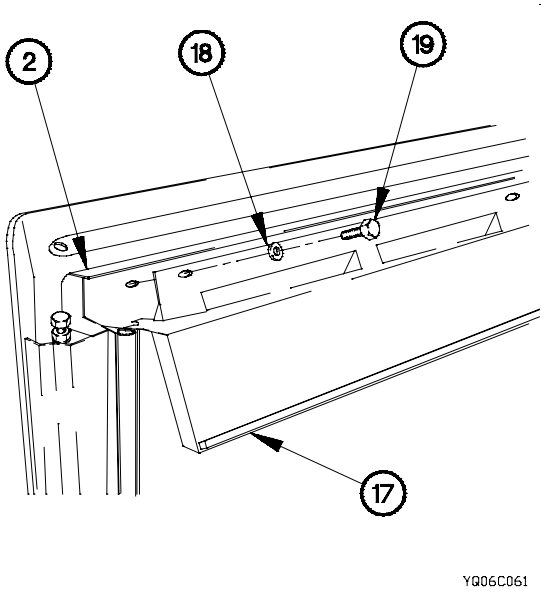
(10) Install captive screw (14) in windshield frame (2) with washer and nut.

(11) Remove nut and washer from captive screw (14).

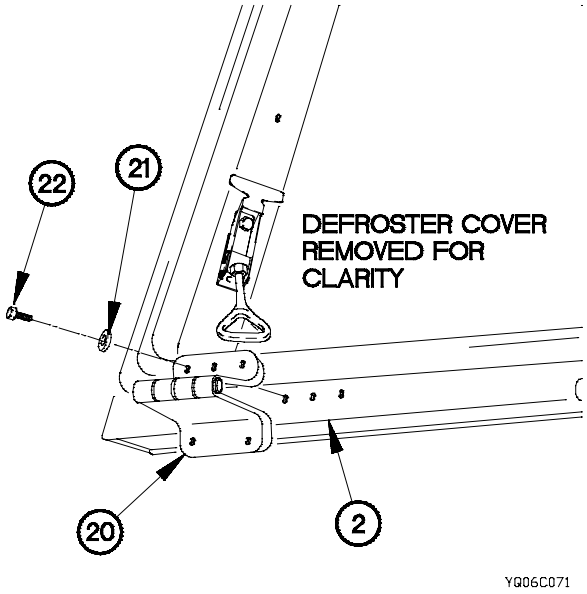
(12) Perform steps (10) and (11) on remaining nine captive screws.

(13) Position five centering cups (15) on windshield frame (2) with five screws (16).

(14) Tighten five screws (16) to 62-124 lb-in. (7-14 N·m).



(15) Install two defrost covers (17) on windshield frame (2) with six washers (18) and screws (19).



(16) Position three hinges (20) on windshield frame (2) with nine washers (21) and screws (22).

(17) Tighten nine screws (22) to 22-28 lb-ft (30-38 N·m).

d. Installation.

NOTE

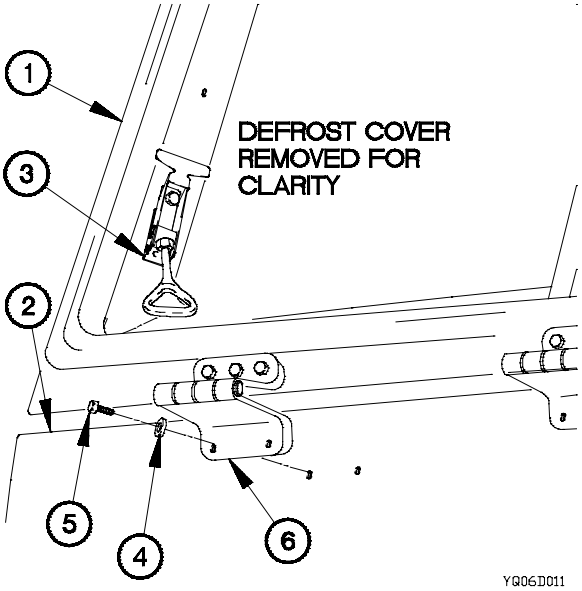
Steps (1) through (7) requires the aid of two assistants.

(1) Position windshield frame (1) on cab (2).

(2) Fasten two latches (3) to cab (2).

(3) Position six washers (4) and bolts (5) in three hinges (6).

(4) Tighten six bolts (5) to 22-28 lb-ft (30-38 N·m).

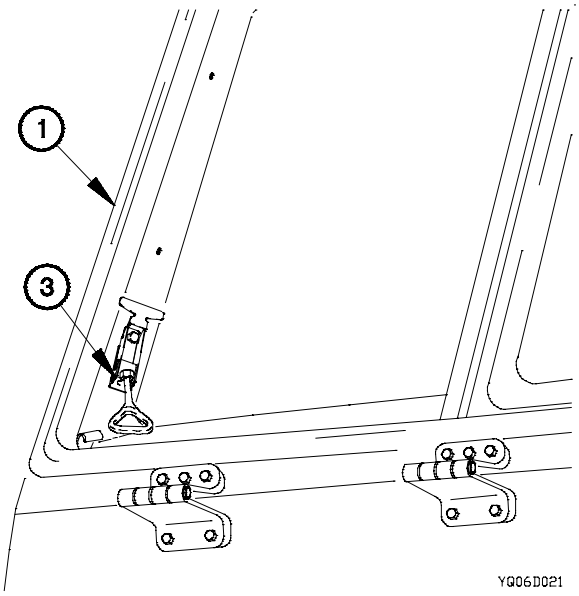


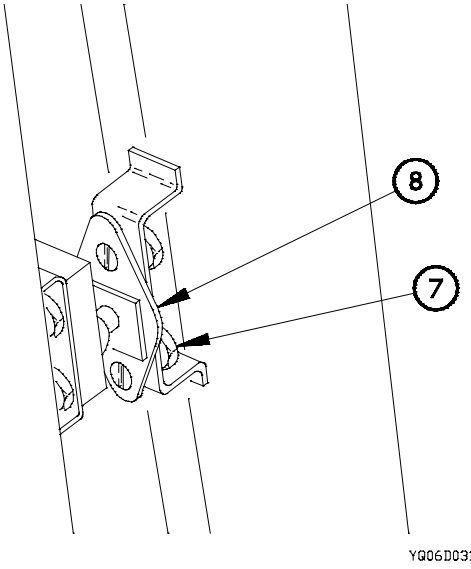
15-6. M1081 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

NOTE

Both friction catch studs are adjusted the same way. One shown.

(5) Release two latches (3) and fold down windshield frame (1).

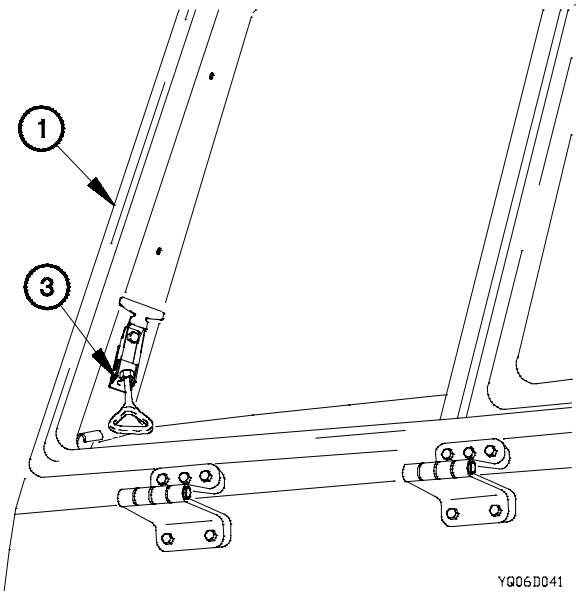




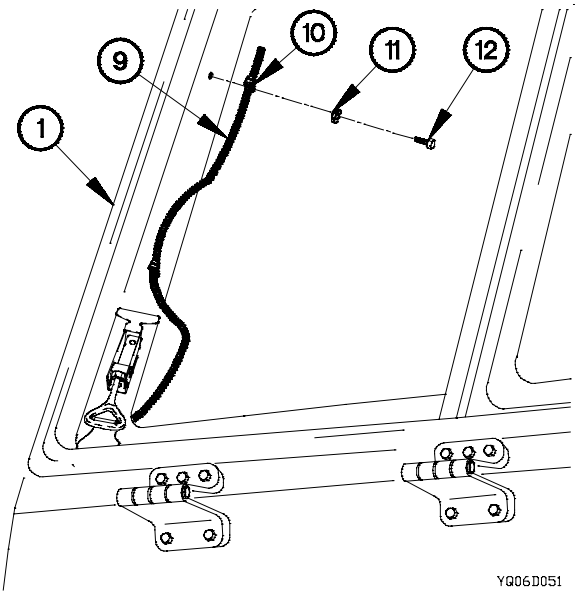
(6) Tighten two nuts (7) to 62-124 lb-in. (7-14 N·m).

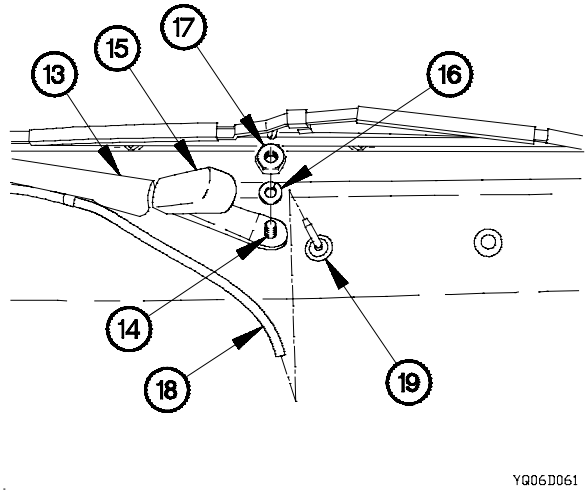
(7) Perform step (6) on remaining friction catch stud (8).

(8) Fold up windshield frame (1) and fasten two latches (3).



(9) Install cable assembly (9) on windshield frame (1) with two clamps (10), washers (11), and screws (12).





NOTE

Left and right side wiper arms are installed the same way. Left side shown.

(10) Position wiper arm (13) on wiper arm shaft (14).

(11) Lift cover (15) and install lockwasher (16) and nut (17) on wiper arm shaft (14).

(12) Snap cover (15) in place on wiper arm (13).

(13) Connect windshield washer hose (18) to fitting (19).

e. Follow-On Maintenance.

(1) Install cab windshield (para 15-7).

(2) Install M1081 cab roof (TM 9-2320-365-20-4).

End of Task.

15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT

This task covers:

a. Windshield Removal
b. Cab Side Window Removal
c. Door Side Window Removal
d. Windshield Installation
e. Cab Side Window Installation
f. Door Side Window Installation
g. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Windshield wipers removed (windshield replacement only) (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Setting Tool, Windshield (TM 9-2320-365-20)
Gloves, Rubber (Item 23, Appendix B)
Hammer, Hand, Soft Head (Item 28, Appendix B)

Materials/Parts
Bucket, Mop (Item 17, Appendix C)
Rubber Lubricant Emulsion (Item 51.1, Appendix C)
Twine, Fibrous (Item 90, Appendix C)
Cleaning Compound, Windshield (Item 21, Appendix C)

Personnel Required
(2)

WARNING

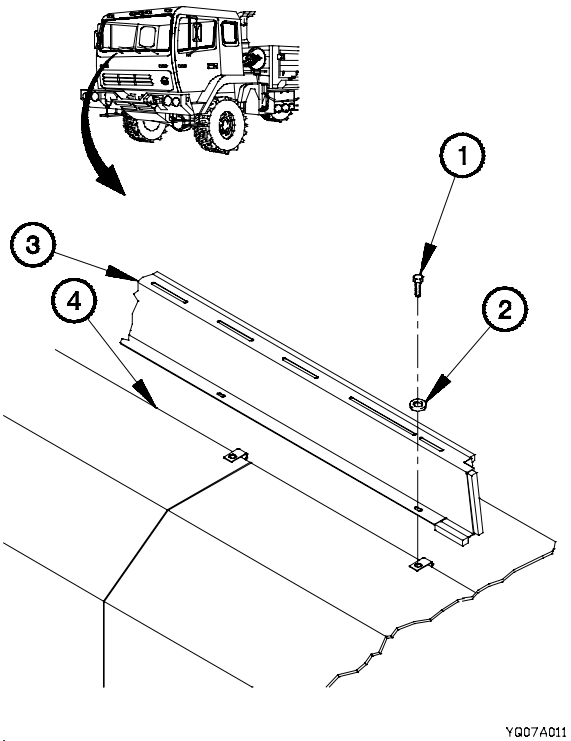
Goggles and gloves must be worn when working with glass. Failure to comply may result in injury to personnel.

a. Windshield Removal.

NOTE

Perform step (1) on all vehicles except M1081.

(1) Remove six screws (1), washers (2), and defrost cover (3) from dashboard (4).

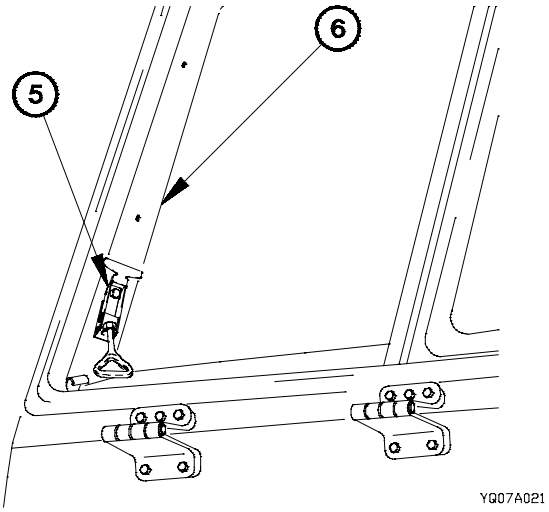


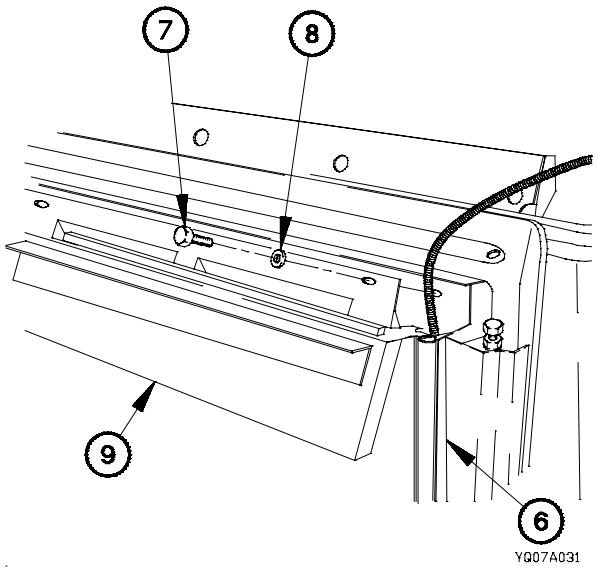
YG07A011

NOTE

Perform steps (2) through (4) on M1081.

(2) Release two latches (5) and fold down windshield frame (6).





NOTE

Left and right defrost covers are removed the same way. Left defrost cover shown.

(3) Remove four screws (7), washers (8), and defrost cover (9) from windshield frame (6).

(4) Perform steps (2) and (3) on right defrost cover.

15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

NOTE

- All model windshields are removed the same way. M1078 shown.
- Steps (5) through (9) require the aid of an assistant.

(5) Insert windshield setting tool under inside upper left lip of seal (10).

NOTE

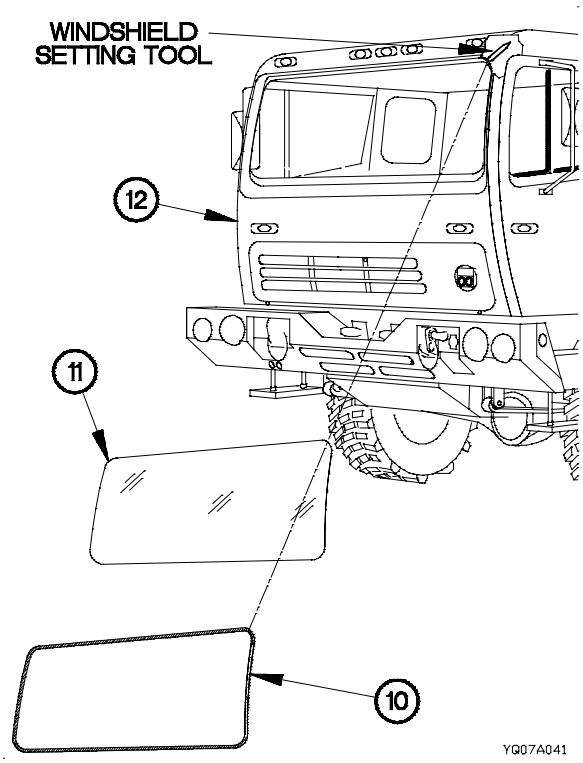
Move windshield setting tool around edge of seal as windshield is removed.

(6) Lift lip of seal (10) around windshield (11).

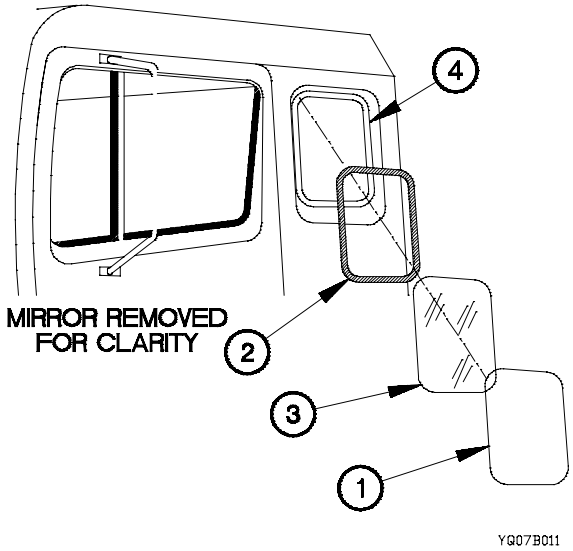
(7) Apply outward pressure to windshield (11).

(8) Remove windshield (11) from cab (12).

(9) Remove seal (10) from windshield (11).



b. Cab Side Window Removal.



(1) Remove rubber locking strip (1) from seal (2).

(2) Remove glass (3) from seal (2).

(3) Remove seal (2) from frame (4).

c. Door Side Window Removal.

(1) Position windshield setting tool under upper corner of door side window seal (1).

CAUTION

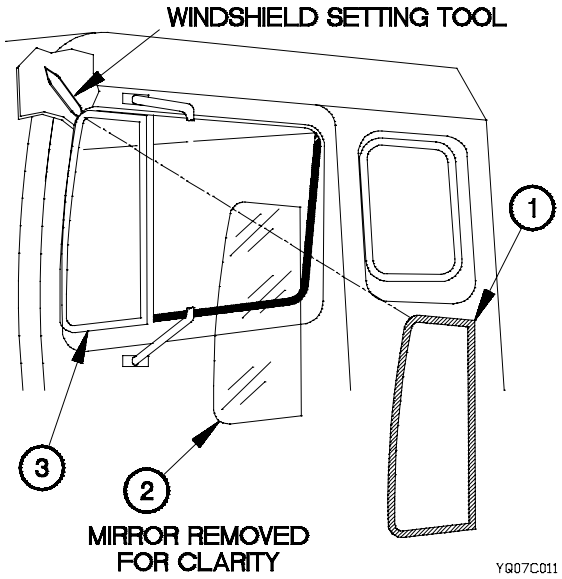
Windshield setting tool must be moved around edge of window as window is removed. Failure to comply may result in damage to equipment.

(2) Lift seal (1) around window (2).

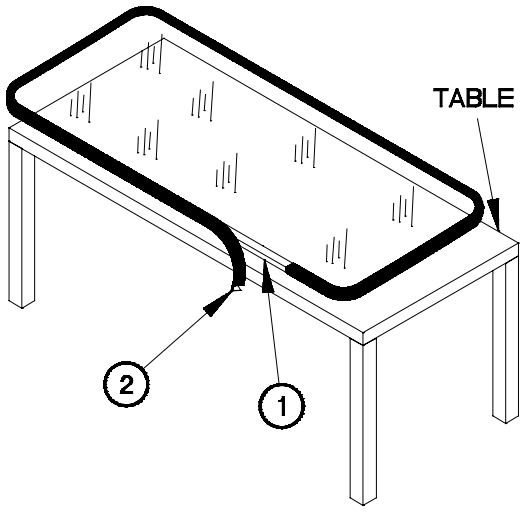
(3) Apply outward pressure to window (2).

(4) Remove window (2) from door (3).

(5) Remove seal (1) from window (2).



d. Windshield Installation.



WARNING

Use caution when working with windshield on the table or in the cab frame. Failure to comply may result in injury to personnel or damage to equipment.

(1) Position windshield (1) on table with cab interior side of windshield facing up.

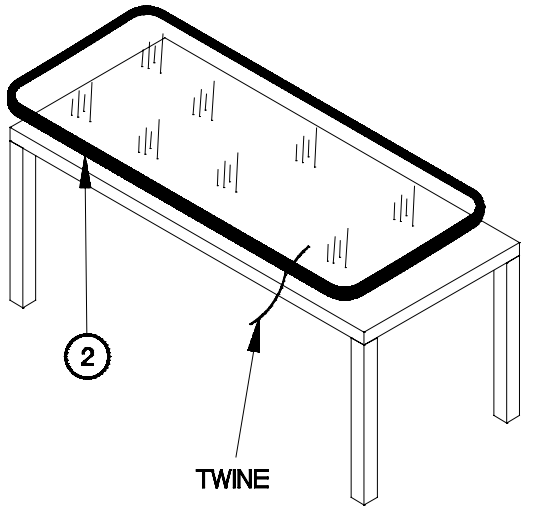
(2) Install seal (2) on windshield (1).

15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

NOTE

Position twine where both ends start and finish at the bottom LH corner of seal.

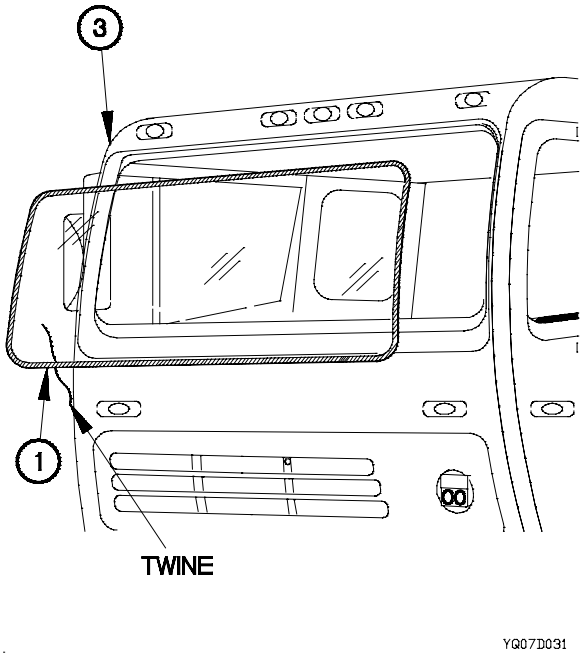
(3) Position twine on seal (2) as shown.



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(4) Apply lubrication compound to seal (2).



NOTE

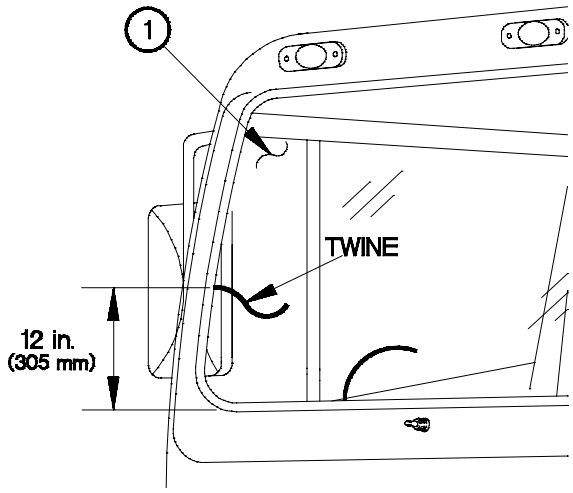
Steps (5) through (13) require the aid of an assistant.

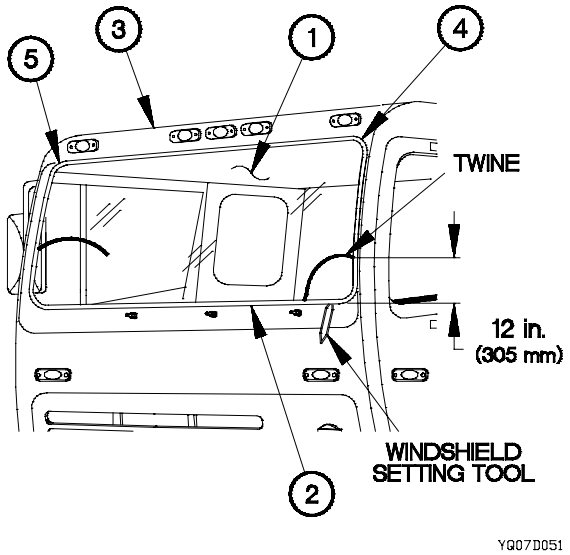
(5) Position windshield (1) in cab (3).

CAUTION

While twine is being removed from inside of cab, always tap behind the twine (with soft head hammer) on outside of cab to seat seal. Always start from RH lower part of windshield and work to the LH side of vehicle. DO NOT start tapping at the middle of the windshield. Failure to comply may result in damage to equipment.

(6) Remove RH side of twine until twine is 12 in. (305 mm) up RH side on windshield (1) as shown.





(7) Remove LH side of twine until twine is 12 in. (305 mm) up LH side of windshield (1) as shown.

CAUTION

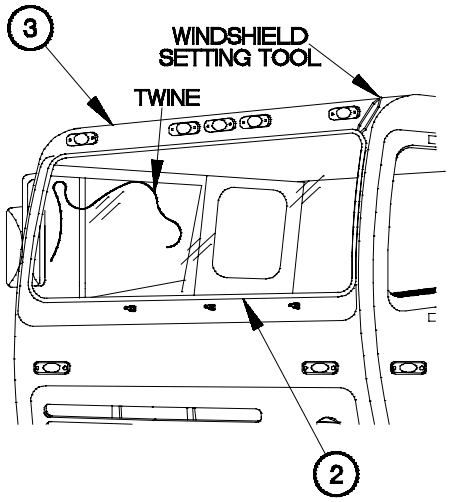
After using windshield setting tool, tap bottom section of seal lightly with soft head hammer to ensure proper fit with cab. Use caution not to hit glass. Failure to comply may result in damage to equipment.

(8) Insert bottom of seal (2) evenly with cab (3) using windshield setting tool and soft head hammer.

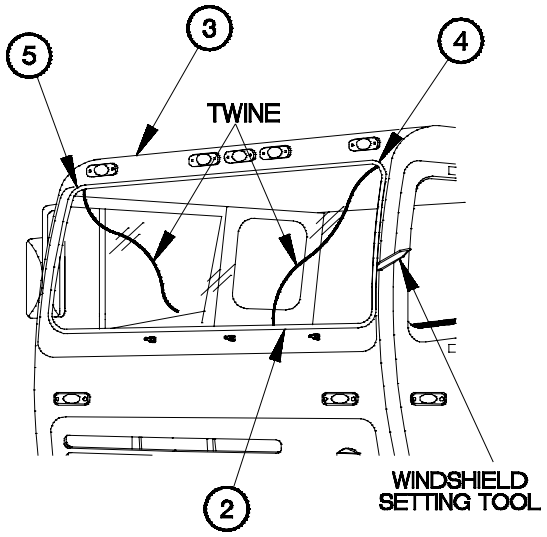
(9) Pull down on LH and RH top corners (4 and 5) of windshield (1).

(10) Pull LH and RH ends of twine up to top corners (4 and 5) of windshield (1) as shown.

(11) Insert sides of seal (2) evenly with cab (3) using windshield setting tool and soft head hammer.



YQ07D071



YQ07D061

(12) Pull LH side of twine over to RH side of cab (3) until completely removed from seal (2).

(13) Insert top of seal (2) evenly with cab (3) using windshield setting tool and rubber hammer.

NOTE

Start at lower RH side of windshield

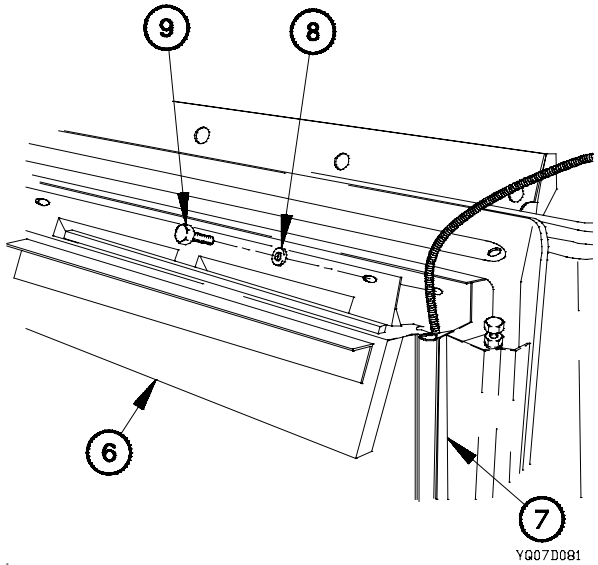
(14) Check seal (2) for proper installation, adjust as required with windshield setting tool and soft head hammer.

NOTE

- Perform steps (15) through (17) on M1081.
- Left and right defrost covers are installed the same way. Left defrost cover shown.

(15) Install defrost cover (6) on windshield frame (7) with four washers (8) and screws (9).

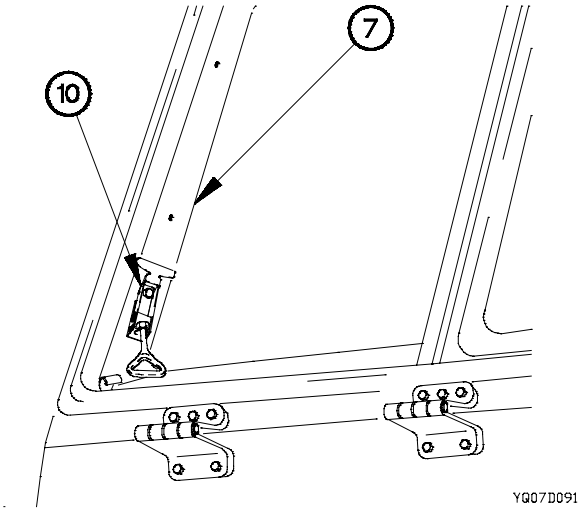
(16) Perform step (15) on right defrost cover.

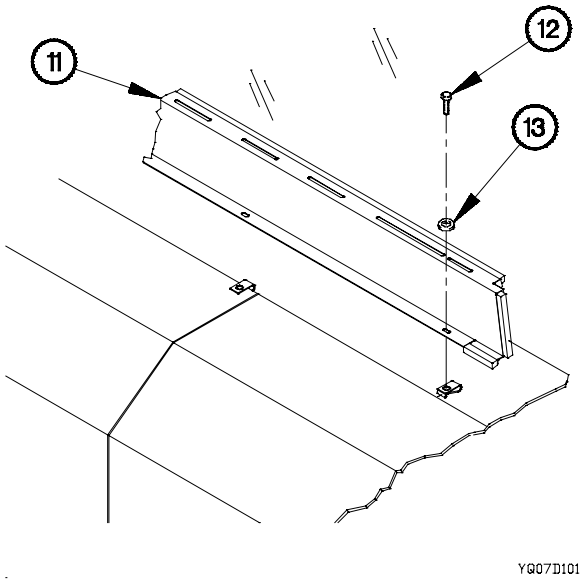


YQ07D081

15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

(17) Fold up windshield frame (7) and fasten two latches (10).





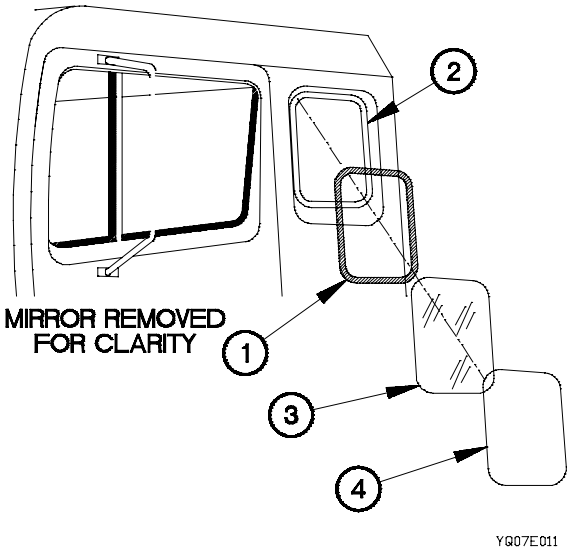
NOTE

Perform steps (18) and (19) on all vehicles except M1081.

(18) Position defrost cover (11) on vehicle with six washers (12) and screws (13).

(19) Tighten four screws (13) to 22-27 lb-in. (2-3 N·m).

e. Cab Side Window Installation.



(1) Position seal (1) in side window frame (2).

(2) Position glass (3) in seal (1).

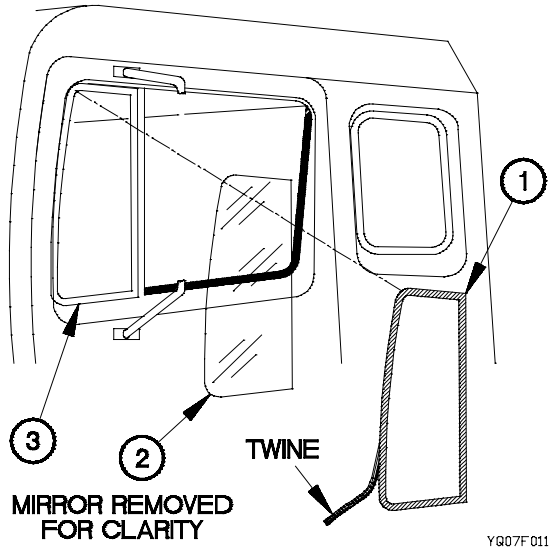
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(3) Apply lubrication to locking groove in seal (1).

(4) Insert rubber locking strip (4) in seal (1).

f. Door Side Window Installation.



(1) Apply lubrication to seal (1).

(2) Install seal (1) around window (2).

(3) Install twine around inside lip of seal (1).

(4) Apply lubrication to inside of seal (1).

(5) Position seal (1) and window (2) in frame (3).

(6) Smooth outer lip of seal (1) around outer frame (3).

(7) Pull twine from inside of frame (3) until seal (1) is evenly positioned.

g. Follow-On Maintenance.

Install windshield wipers (windshield replacement only) (TM 9-2320-365-20-4).

End of Task.

15-8. CARGO BED REPLACEMENT/REPAIR

This task covers:

a. M1078 Removal
b. M1078 Installation
c. M1081 Removal
d. M1081 Installation
e. Hinge Removal
f. Hinge Installation
g. Tie Down Removal
h. Tie Down Installation
i. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Ladder removed (TM 9-2320-365-10).
Light material handling crane (LMHC) removed, if equipped (TM 9-2320-365-20-5)
Troop seats removed, if equipped (TM 9-2320-365-10).
Cargo cover kit removed, if equipped (TM 9-2320-365-10).
Cargo bed side panels removed, if equipped (TM 9-2320-365-10).
Rear fenders and splash guards removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque 0-600 lb-ft (Item 85, Appendix B)
Sling, Cargo (2) (Item 48, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)

Tools and Special Tools (Cont)
Vise, Machinist (Item 72, Appendix B)
Nose Assembly (Item 36.1, Appendix B) (TM 9-2320-365-20)
Riveter, Blind Pneumatic (Item 40.1, Appendix B) (TM 9-2320-365-20)
Drill Set, Twist (Item 17, Appendix B)

Materials/Parts
Nut, Self-locking (16) (Item 128, Appendix F) (M1078)
Nut, Self-locking (14) (Item 134, Appendix F) (M1081)
Bolt (16) (Item 2, Appendix F) (M1078)
Bolt (14) (Item 5, Appendix F) (M1081)
Lockwasher (24) (Item 111, Appendix F) (M1081)
Nut, Self-locking (4) (Item 148, Appendix F) (M1081)
Nut, Self-locking (4) (Item 132, Appendix F)
Rivet, Blind (20) (Item 249.1, Appendix F)

Personnel Required
(4)

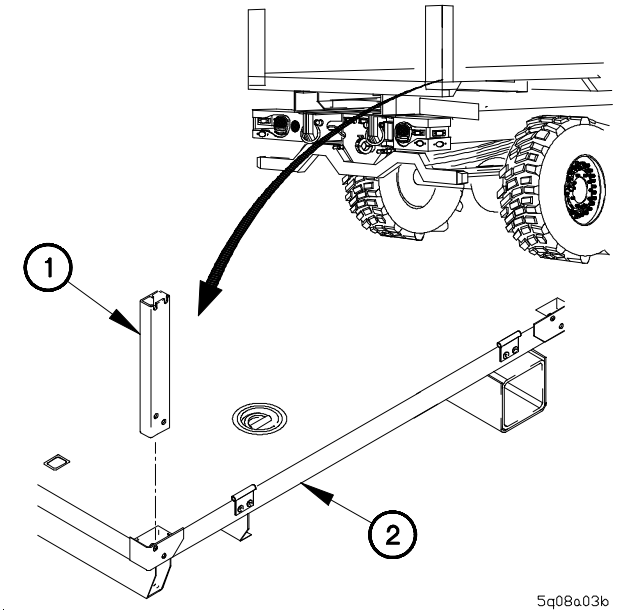
References
TM 43-0139

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. M1078 Removal.

(1) Remove four stakes (1) from cargo bed (2).

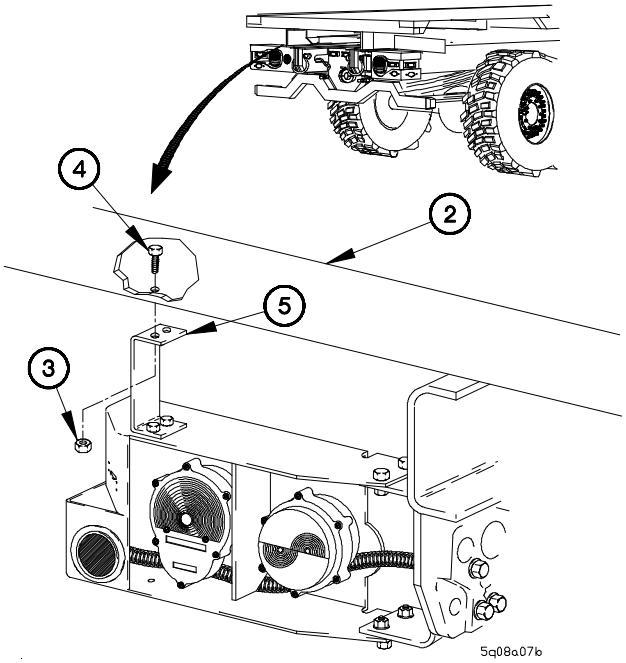


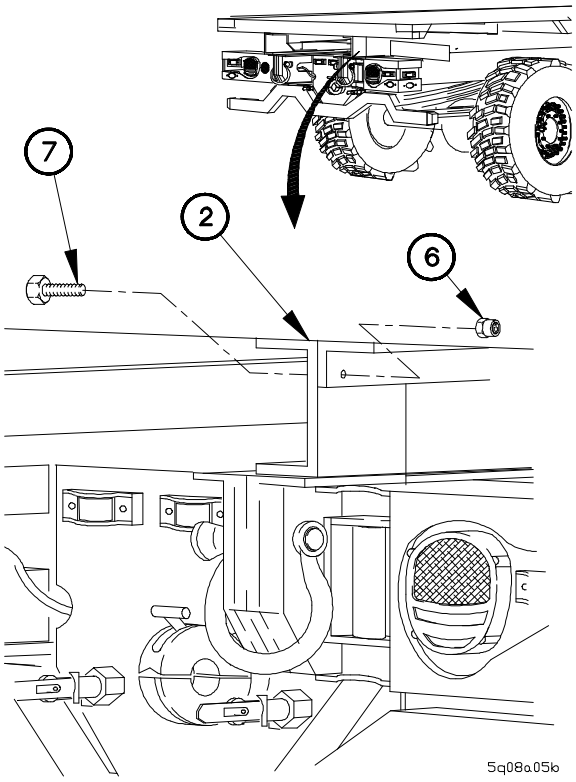
NOTE

Left and right braces are removed the same way. Left side brace shown.

(2) Remove self-locking nut (3) and screw (4) from brace (5) and cargo bed (2). Discard self-locking nut.

(3) Perform step (2) on right side brace.





CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

- Left and right side of cargo bed is removed the same way. Right side shown.
- Step (4) requires the aid of an assistant.

(4) Remove eight collars (6) and bolts (7) from cargo bed (2). Discard collars and bolts.

(5) Perform step (4) on left side of cargo bed.

15-8. CARGO BED REPLACEMENT/REPAIR (CONT)

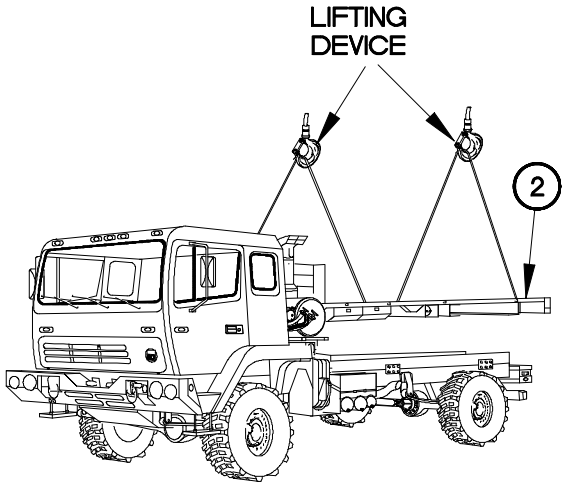
WARNING

Cargo bed weighs approximately 2610 lbs (1185 kgs). Attach a suitable lifting device to four corner tiedown points prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (6) requires the aid of three assistants.

(6) Remove cargo bed (2) from vehicle.



5q08a06b

b. M1078 Installation.

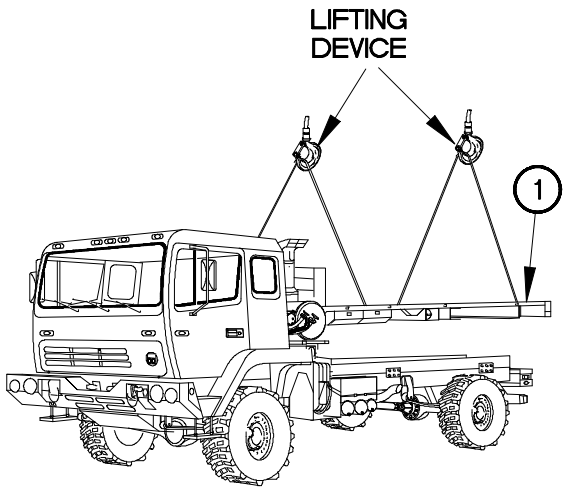
WARNING

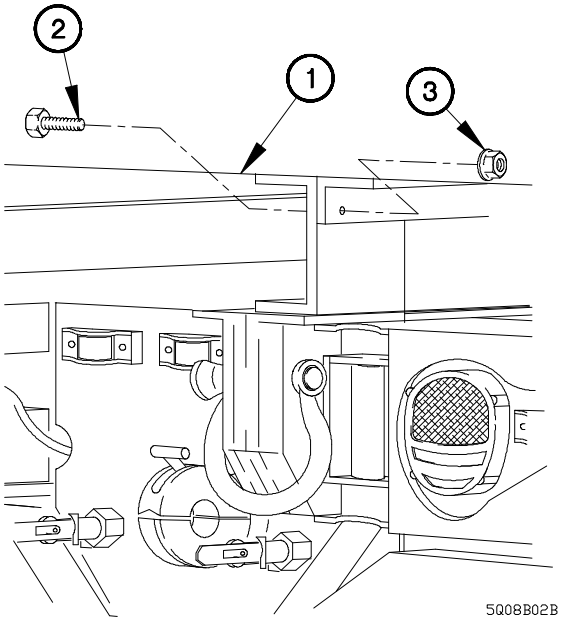
Cargo bed weighs approximately 2610 lbs (1185 kgs). Attach a suitable lifting device to four corner tiedown points prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of three assistants.

(1) Position cargo bed (1) on vehicle.





NOTE

- Left and right side of cargo bed is installed the same way. Right side shown.
- Step (2) requires the aid of an assistant.

(2) Position eight bolts (2) and self-locking nuts (3) in cargo bed (1).

(3) Tighten eight self-locking nuts (3) to 77-92 lb-ft (105-25 N•m).

(4) Perform steps (2) and (3) on left side of cargo bed.

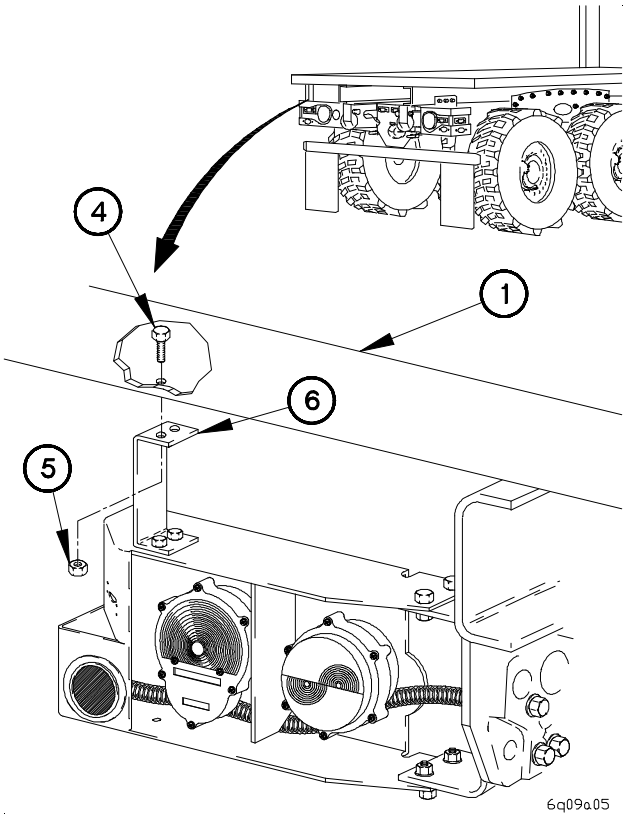
15-8. CARGO BED REPLACEMENT /REPAIR (CONT)

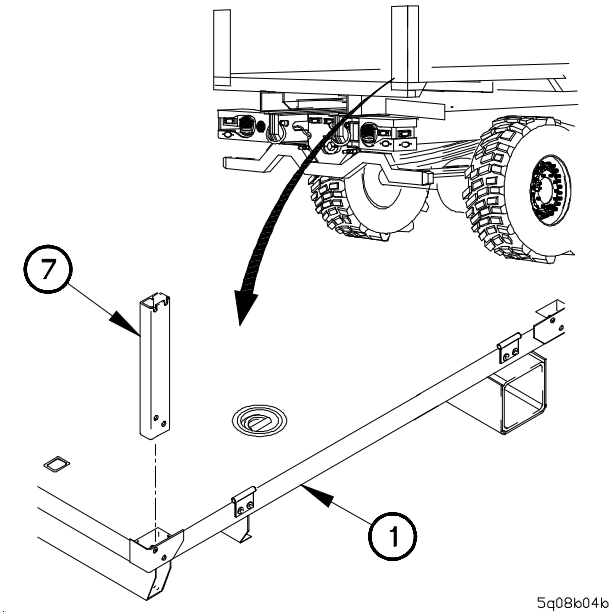
NOTE

Left and right braces are installed the same way. Left side brace shown.

(5) Position screw (4) and self-locking nut (5) on brace (6) and cargo bed (1).

(6) Tighten self-locking nut (5) to 47 lb-ft (64 N•m).

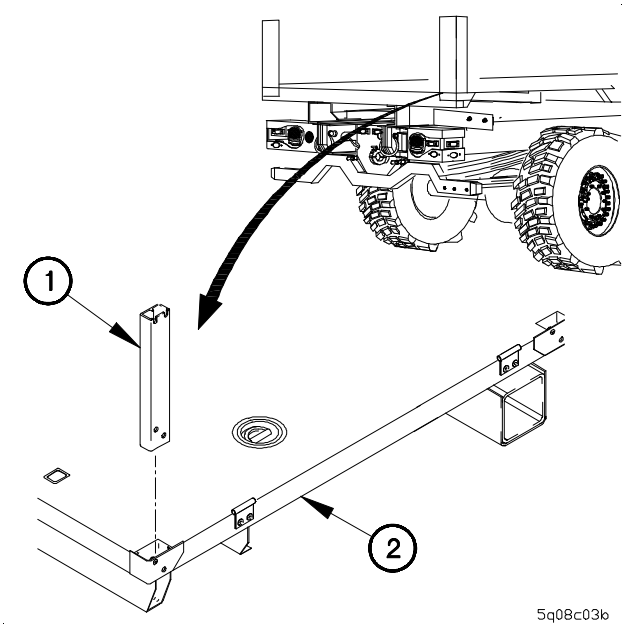


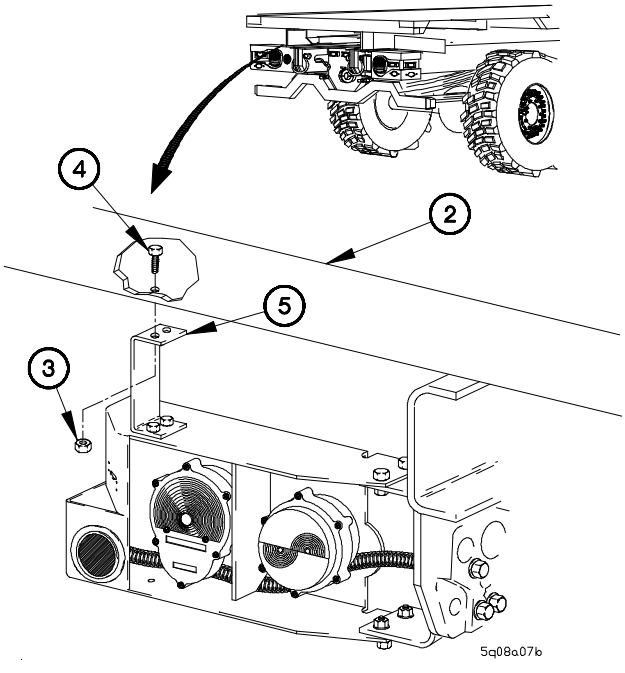


(7) Install four stakes (7) in cargo bed (1).

c. M1081 Removal.

(1) Remove four stakes (1) from cargo bed (2).





NOTE

Left and right braces are removed the same way. Left side brace shown.

(2) Remove self-locking nut (3) and screw (4) from brace (5) and cargo bed (2). Discard self-locking nut.

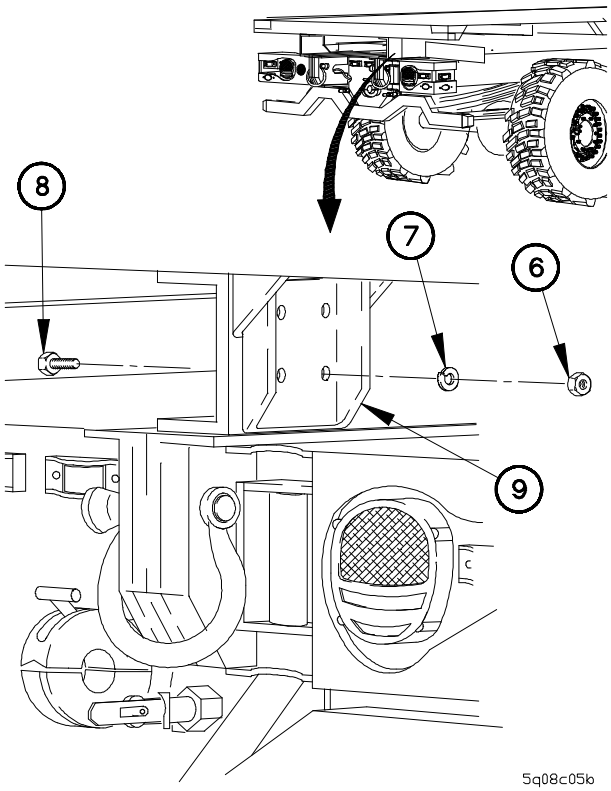
(3) Perform step (2) on right side brace.

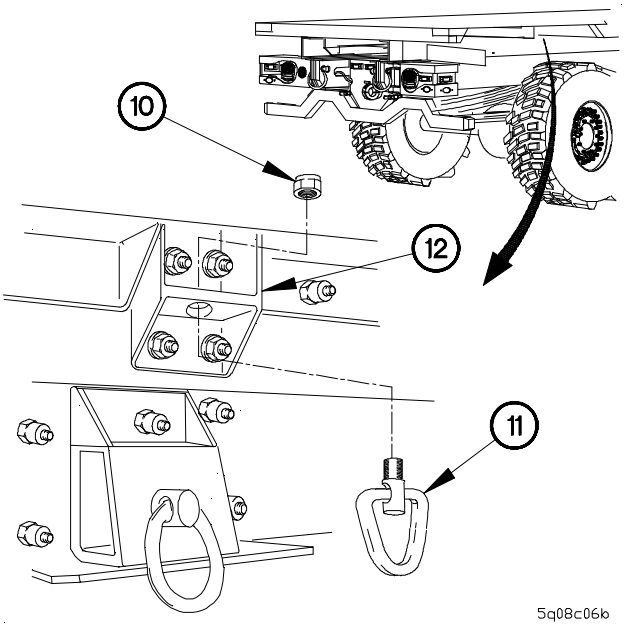
15-8. CARGO BED REPLACEMENT/REPAIR (CONT)

NOTE

- Left and right side of cargo bed is removed the same way. Right side shown.
- Steps (4) through (7) require the aid of an assistant.

(4) Remove four nuts (6), lockwashers (7), and bolts (8) from bracket (9). Discard lockwashers.



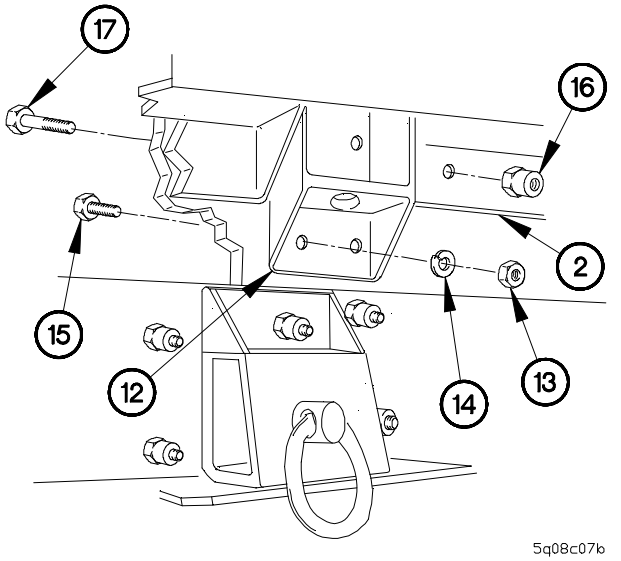


(5) Remove two self-locking nuts (10) and tiedown rings (11) from brackets (12). Discard self-locking nuts.

(6) Remove eight nuts (13), lockwashers (14), and bolts (15) from two brackets (12). Discard lockwashers.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

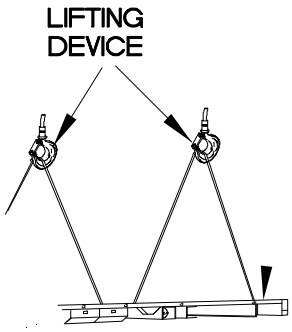


(7) Remove seven collars (16) and bolts (17) from cargo bed (2). Discard collars and bolts.

(8) Perform steps (4) through (7) on left side of cargo bed.

WARNING

Cargo bed weighs approximately 2610 lbs (1185 kgs). Attach a suitable lifting device to four corner tiedown points prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

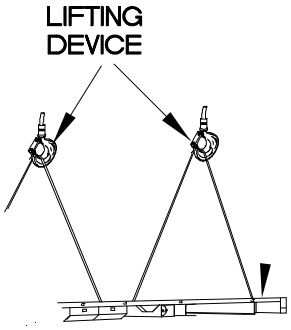


NOTE

Step (9) requires the aid of three assistants.

(9) Remove cargo bed (2) from vehicle.

d. M1081 Installation.



WARNING

Cargo bed weighs approximately 2610 lbs (1185 kgs). Attach a suitable lifting device to four corner tiedown points prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of three assistants.

(1) Position cargo bed (1) on vehicle.

15-8. CARGO BED REPLACEMENT/REPAIR (CONT)

NOTE

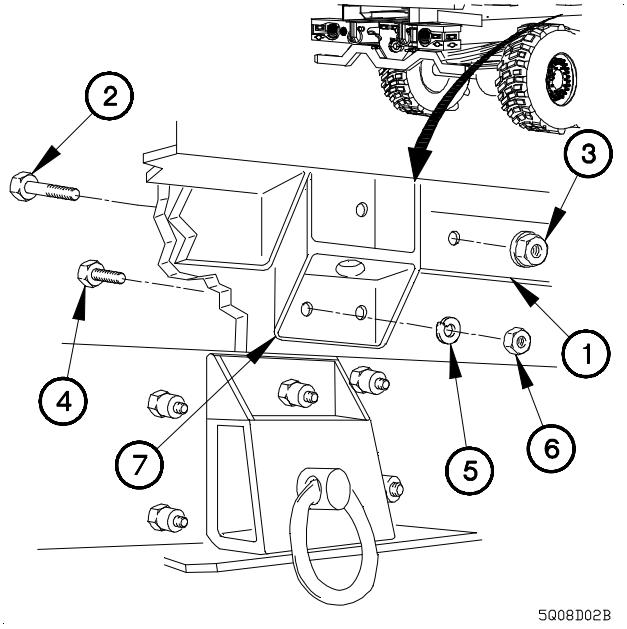
- Left and right side of cargo bed is installed the same way. Right side shown.
- Steps (2) through (9) require the aid of an assistant.

(2) Position seven bolts (2) and self-locking nuts (3) in cargo bed (1).

(3) Tighten seven self-locking nuts (3) to 210-225 lb-ft (285-305 N•m).

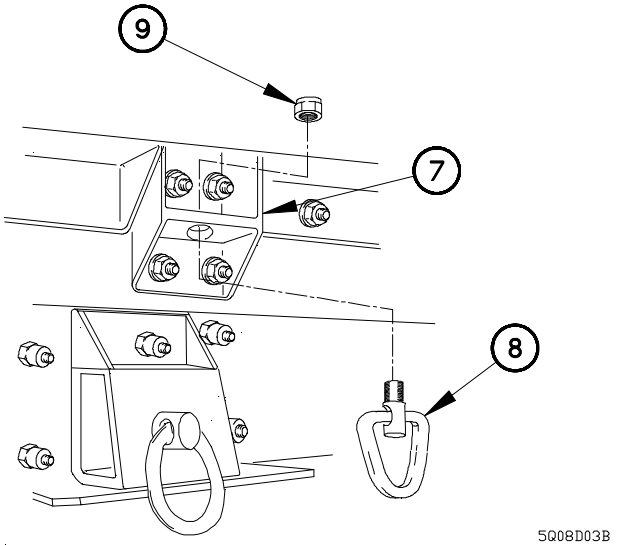
(4) Position eight bolts (4), lockwashers (5), and nuts (6) in two brackets (7).

(5) Tighten eight nuts (6) to 179-219 lb-ft (243-297 N•m).



(6) Position two tiedown rings (8) in brackets (7) with self-locking nuts (9).

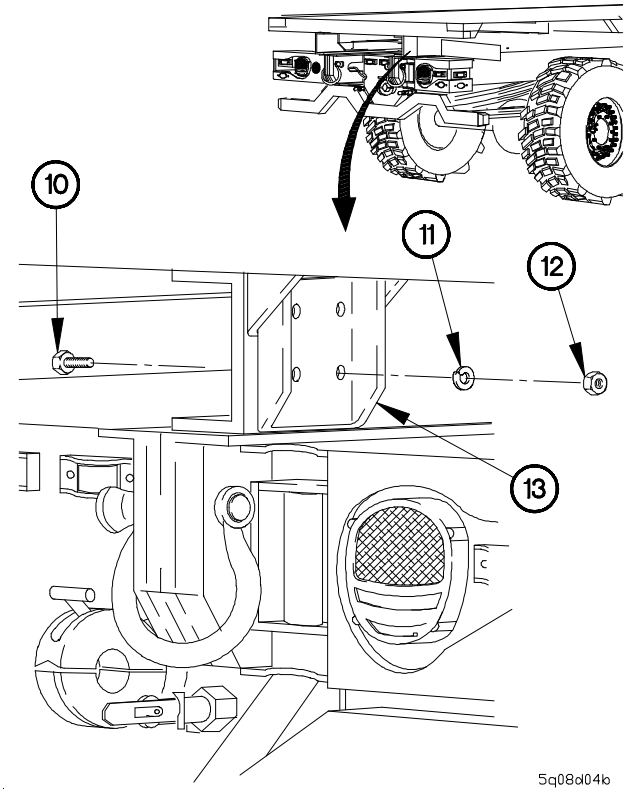
(7) Tighten two self-locking nuts (9) to 113-138 lb-ft (153-187 N•m).



(8) Position four bolts (10), lockwashers (11), and nuts (12) in bracket (13).

(9) Tighten four nuts (12) to 179-219 lb-ft (243-297 N•m).

(10) Perform steps (2) through (9) on right side of cargo bed.



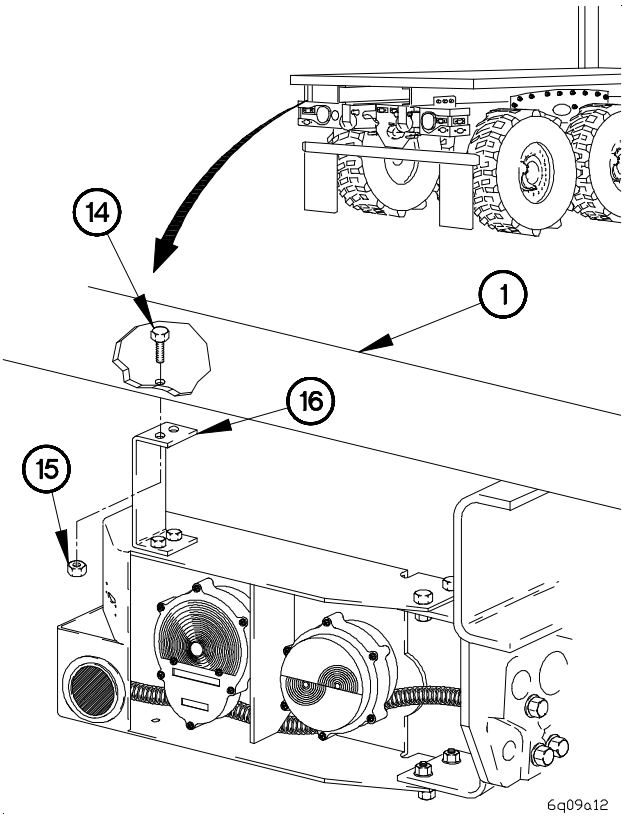
NOTE

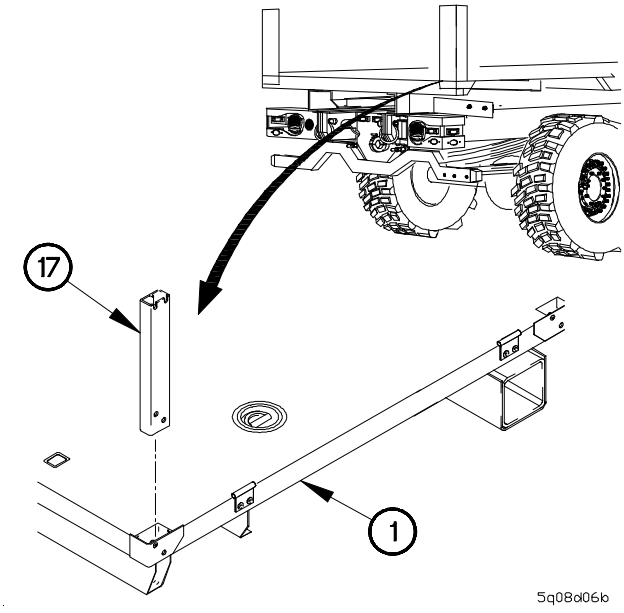
Left and right braces are installed the same way. Left side brace shown.

(11) Position screw (14) and self-locking nut (15) on brace (16) and cargo bed (1).

(12) Tighten self-locking nut (15) to 47 lb-ft (5 N•m).

(13) Perform steps (11) and (12) on right side brace.





(14) Install four stakes (17) in cargo bed (1).

15-8. CARGO BED REPLACEMENT/REPAIR (CONT)

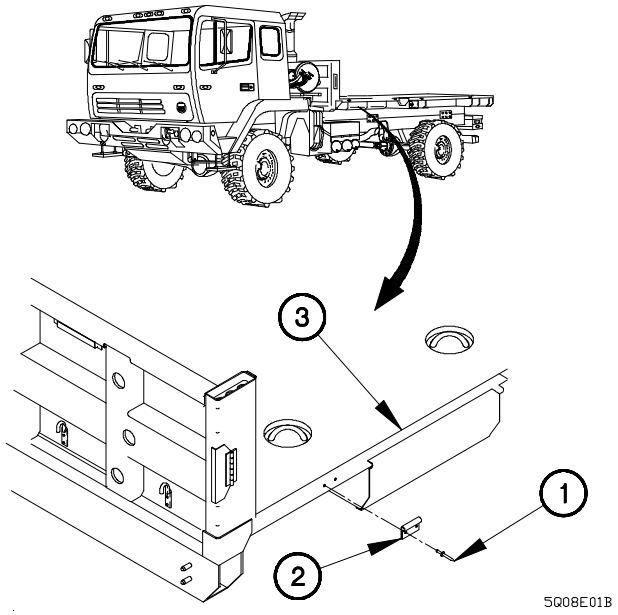
e. Hinge Removal.

NOTE

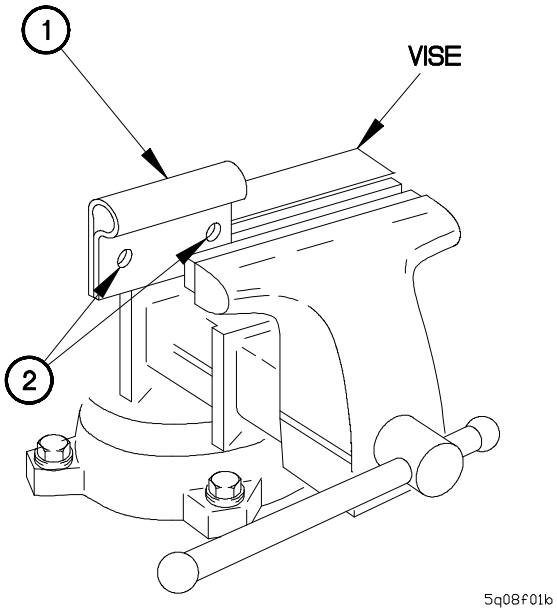
Left, right, and rear hinges are removed the same way. Left side shown.

(1) Remove two rivets (1) from hinge (2).

(2) Remove hinge (2) from cargo bed (3).



f. Hinge Installation.

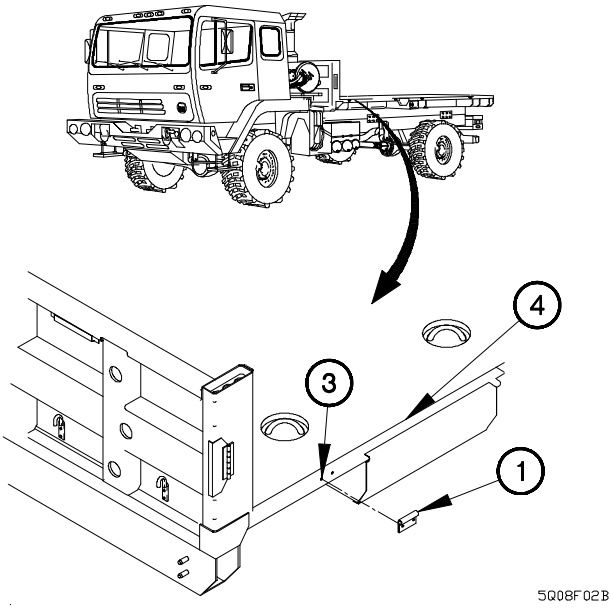


(1) Position hinge (1) in vise.

(2) Enlarge two holes (2) on hinge (1) to 0.327-0.340 in. (8.318-8.636 mm).

(3) Align hinge (1) with two holes (3) on cargo bed (4).

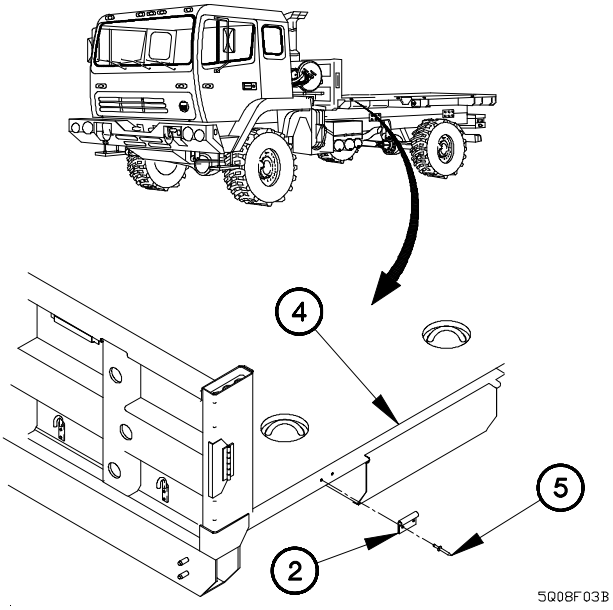
(4) Match drill and enlarge two holes (3) on cargo bed (4) to 0.327-0.340 in. (8.318-8.636 mm).



NOTE

Left, right, and rear hinges are installed the same way. Left side shown.

(5) Install hinge (2) on cargo bed (4) with two blind rivets (5).

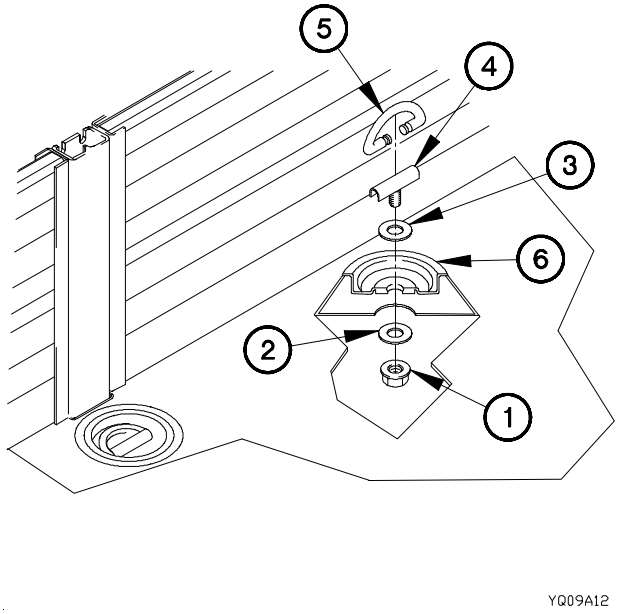


g. Tie Down Removal.

NOTE

- There are two types of tie down cups installed on cargo beds. On the underside, stamped cups have raised center sections and cast cups have flat center sections.
- Steps (1) and (2) require the aid of an assistant.
- Perform step (1) on tie downs with stamped cups.

(1) Remove nut (1), washer (2), teflon washer (3), D-ring retainer (4), and D-ring (5) from stamped tie down cup (6)

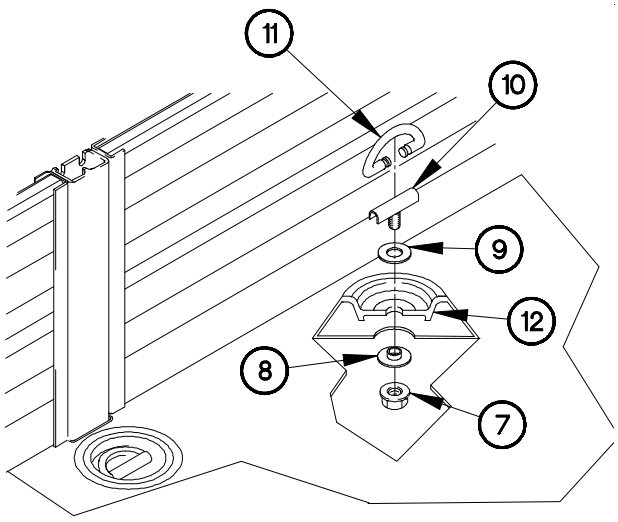


15-8. CARGO BED REPLACEMENT/REPAIR (CONT)

NOTE

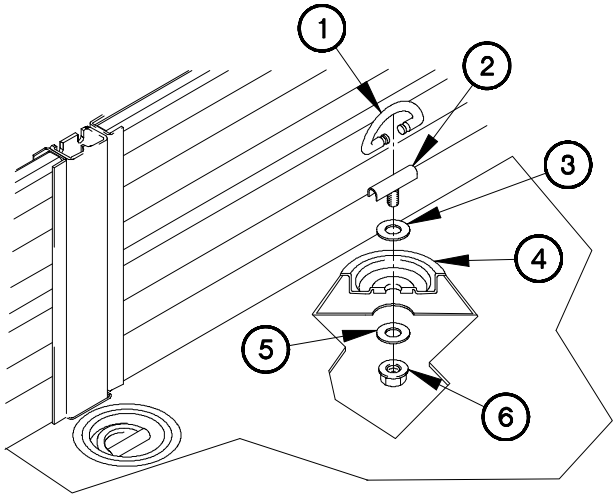
Perform step (2) on tie down with cast cups.

(2) Remove nut (7), spacer (8), teflon washer (9), D-ring retainer (10), and D-ring (11) from cast tie down cup (12).



YQ06Ar05

g. Tie Down Installation.



YQ09A10

NOTE

- There are two types of tie down cups installed on cargo beds. On the underside, stamped cups have raised center sections and cast cups have flat center sections.
- Steps (1) through (10) require the aid of an assistant.
- Perform steps (1) through (5) on tie downs with stamped cups.

(1) Position D-ring (1) in D-ring retainer (2).

(2) Position teflon washer (3) on D-ring retainer (2).

(3) Position D-ring retainer (2) in stamped tie down cup (4)

(4) Position washer (5) and nut (6) on D-ring retainer (2).

(5) Tighten nut (6) to 76-94 lb-ft (103-128 N•m).

NOTE

Perform steps (6) through (10) on tie downs with cast cups.

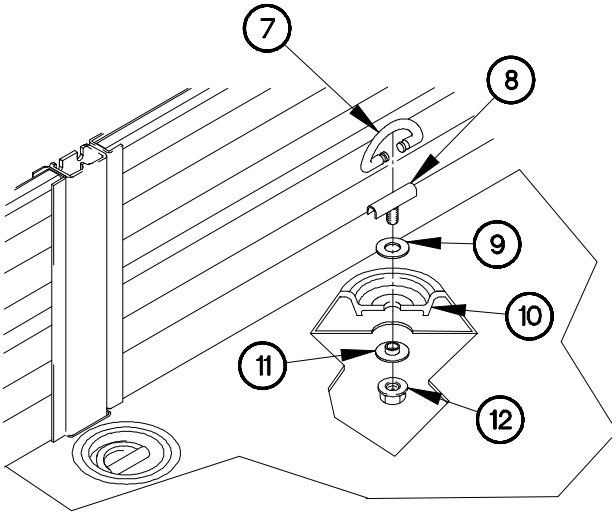
(6) Position D-ring (7) in D-ring retainer (8).

(7) Position teflon washer (9) on D-ring retainer (8)

(8) Position D-ring retainer (8) in cast tie down cup (10).

(9) Position spacer (11) and nut (12) on D-retainer (8).

(10) Tighten nut (12) to 76-94 lb-ft (103-128 N •m).



i. Follow-On Maintenance.

(1) Install rear fenders and splash guards (TM 9-2320-365-20-4).

(2) Install cargo bed side panels, if equipped (TM 9-2320-365-10).

(3) Install cargo cover kit, if equipped (TM 9-2320-365-10).

(4) Install troop seats, if equipped (TM 9-2320-365-10).

(5) Install light material handling crane (LMHC), if equipped (TM 9-2320-365-20-5).

(6) Install ladder (TM 9-2320-365-10).

End of Task.

CHAPTER 16
11K SELF-RECOVERY WINCH (SRW) MAINTENANCE

Section I. INTRODUCTION 16-1
16-1. INTRODUCTION 16-1

Section II. MAINTENANCE PROCEDURES 16-2
16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR 16-2
16-3. 11K SELF-RECOVERY WINCH (SRW) CARTRIDGE/COUNTERBALANCE VALVE REPLACEMENT 16-19
16-4. 11K SELF-RECOVERY WINCH (SRW) HYDRAULIC MOTOR REPLACEMENT 16-23
16-5. HYDRAULIC ROTARY PUMP REPLACEMENT 16-24
16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR 16-27

Section I. INTRODUCTION

16-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repairing 11K Self-Recovery Winch (SRW) System Components authorized by the Maintenance Allocation Chart (MAC) at Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
11K Self-recovery winch (SRW) cable removed (TM 9-2320-365-20-4).
Muffler and heat shields removed (TM 9-2320-365-20-3).
11K Self-recovery winch (SRW) cartridge/ counterbalance valve removed (para 16-3).
11K Self-recovery winch (SRW) hydraulic motor removed (para 16-4).
Cargo bed removed (para 15-8).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Pan, Drain (Item 36, Appendix B)
Wrench, Torque, 0-250 N·m (Item 82, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Tools and Special Tools (Cont)
Sling, Cargo (2) (Item 48, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Oil, Lubricating (Item 44, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Nut, Self-locking (8) (Item 134, Appendix F)
Lockwasher (12) (Item 93, Appendix F)
Parts Kit, Seal (Item 221, Appendix F)
Parts Kit, Disc and Spring (Item 219, Appendix F)
Parts Kit, Winch (Item 224, Appendix F)
Spring, Compression (Item 289, Appendix F)
Lockwasher (40) (Item 92, Appendix F)
Pin, Spring (4) (Item 231, Appendix F)
Lockwasher (6) (Item 91, Appendix F)

Personnel Required
(2)

a. Removal.

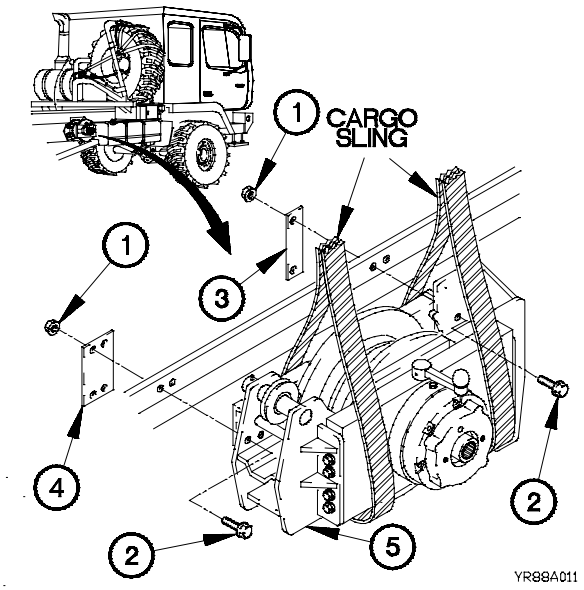
WARNING

11K Self-recovery winch (SRW) weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of an assistant.

Remove eight self-locking nuts (1), bolts (2), mounting plates (3 and 4), and 11K SRW (5) from vehicle. Discard self-locking nuts.

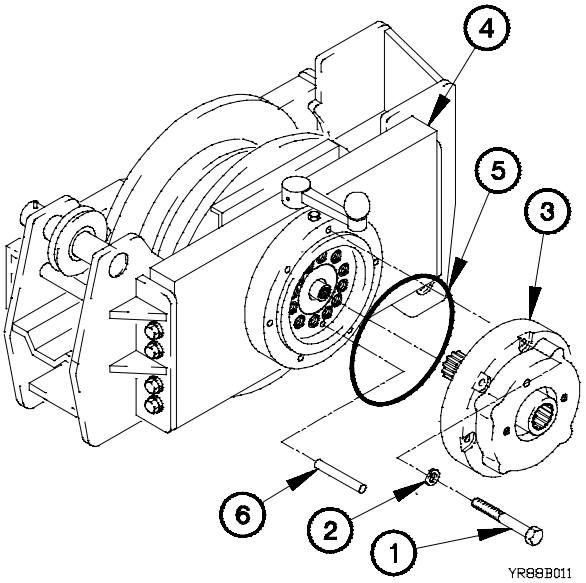


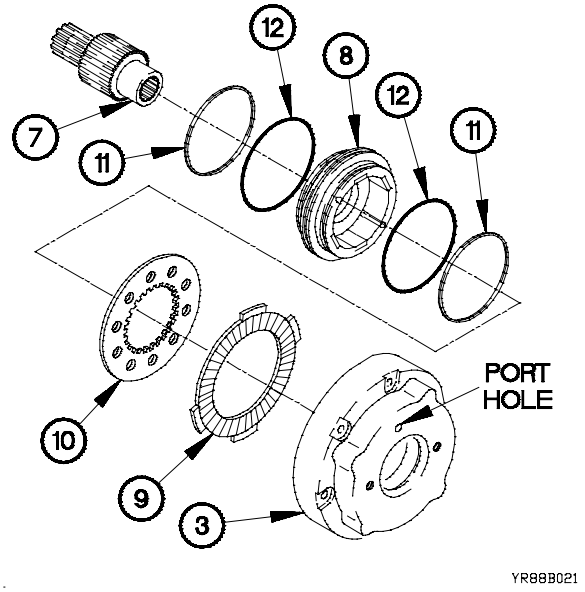
b. Disassembly.

(1) Remove six screws (1), lockwashers (2), and outer brake housing (3) from motor end support (4). Discard lockwashers.

(2) Remove preformed packing (5) from motor end support (4). Discard preformed packing.

(3) Remove two dowel pins (6) from motor end support (4).





(4) Remove brake shaft (7) from outer brake housing (3).

(5) Apply low pressure air to port hole on face of outer brake housing (3).

(6) Remove brake piston (8) from outer brake housing (3).

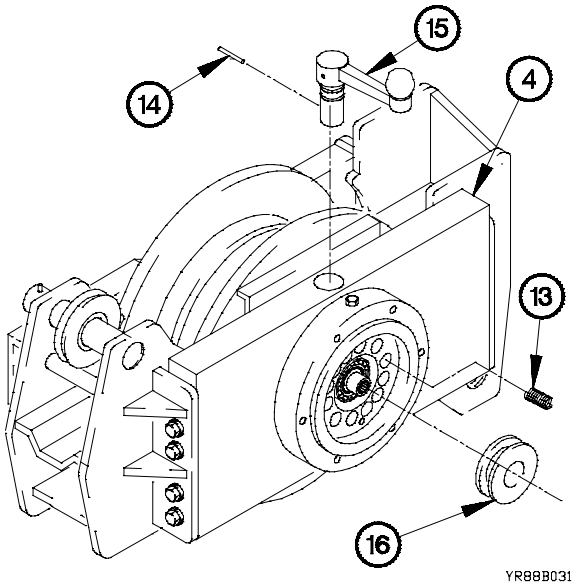
(7) Remove 10 friction disc plates (9) and nine brake drive plates (10) from outer brake housing (3).

(8) Remove two back-up rings (11) and preformed packings (12) from brake piston (8). Discard back-up rings and preformed packings.

(9) Remove twelve compression springs (13) from motor end support (4). Discard compression springs.

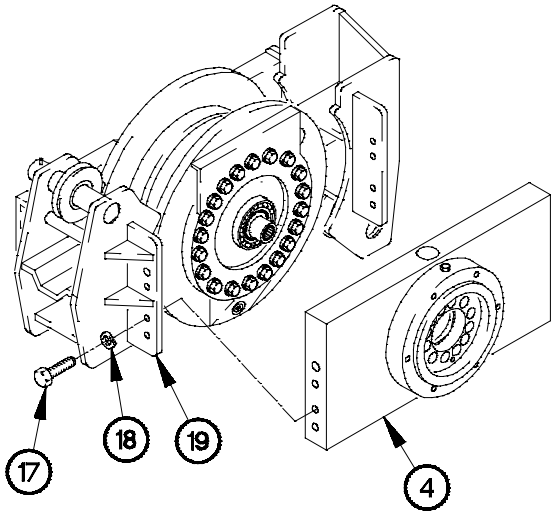
(10) Remove spring pin (14) and arm shifter (15) from motor support end (4). Discard spring pin.

(11) Remove shifter drive gear (16) from motor end support (4).

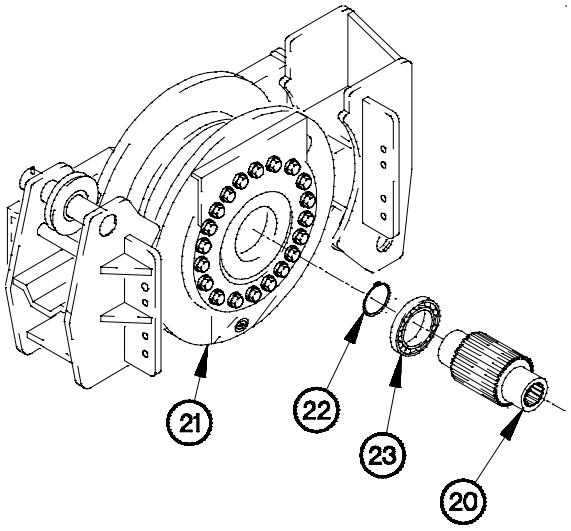


16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(12) Remove eight bolts (17), lockwashers (18), and motor end support (4) from two base mounts (19). Discard lockwashers.



YR88B041



YR88B051

(13) Remove primary sun gear (20) from motor end flange (21).

WARNING

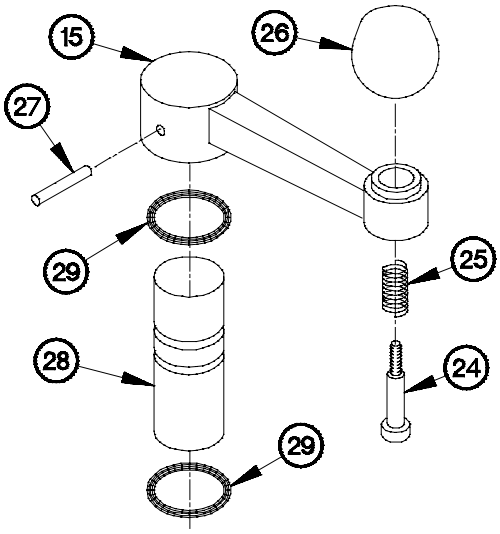
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(14) Remove retaining ring (22) and ball bearing (23) from primary sun gear (20).

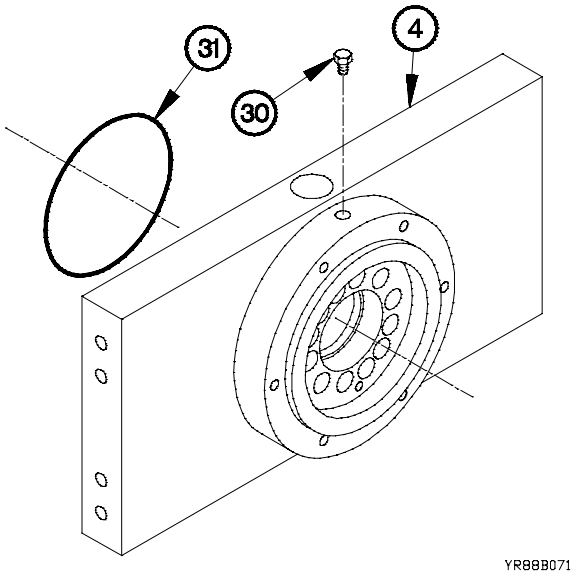
(15) Remove locator pin (24), compression spring (25), and shifter round knob (26) from arm shifter (15). Discard compression spring.

(16) Remove spring pin (27) and arm shifter (15) from shouldered shaft (28). Discard spring pin.

(17) Remove two preformed packings (29) from shouldered shaft (28). Discard preformed packings.

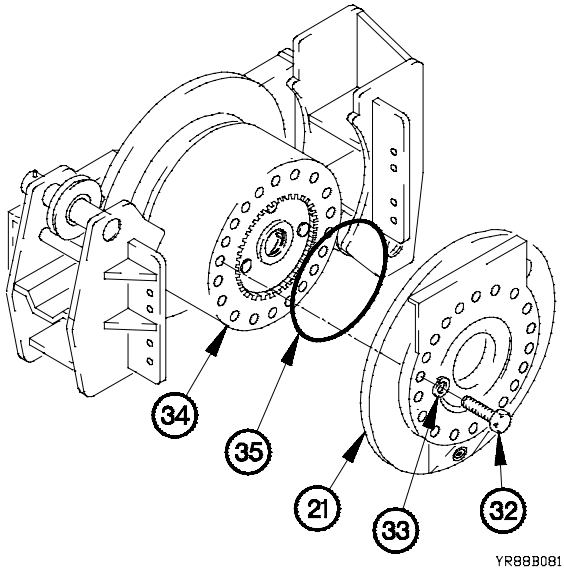


YR88B061



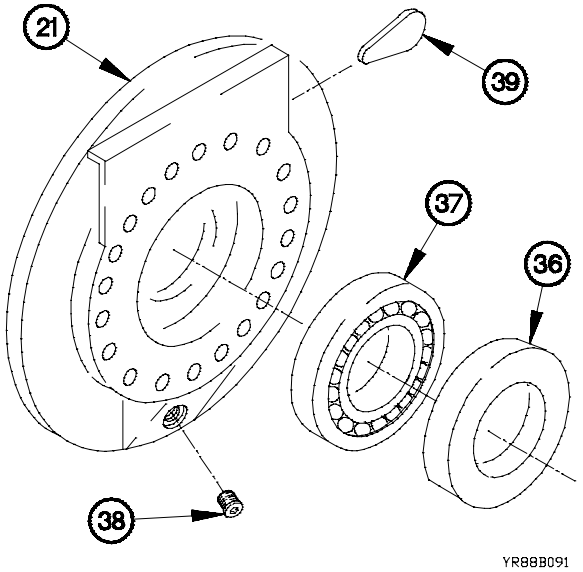
(18) Remove relief vent (30) from motor end support (4).

(19) Remove preformed packing (31) from motor end support (4). Discard preformed packing.



(20) Remove 20 screws (32), lockwashers (33), and motor end flange (21) from ring gear (34). Discard lockwashers.

(21) Remove preformed packing (35) from motor end flange (21). Discard preformed packing.



(22) Remove shaft seal (36) and ball bearing (37) from motor end flange (21). Discard shaft seal.

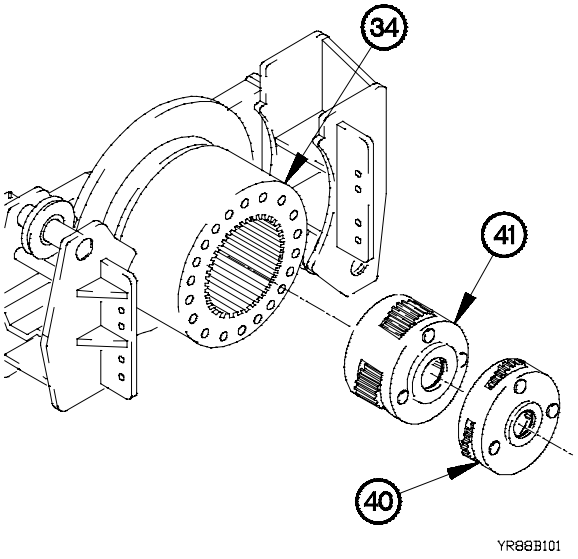
(23) Remove two magnetic plugs (38) from motor end flange (21).

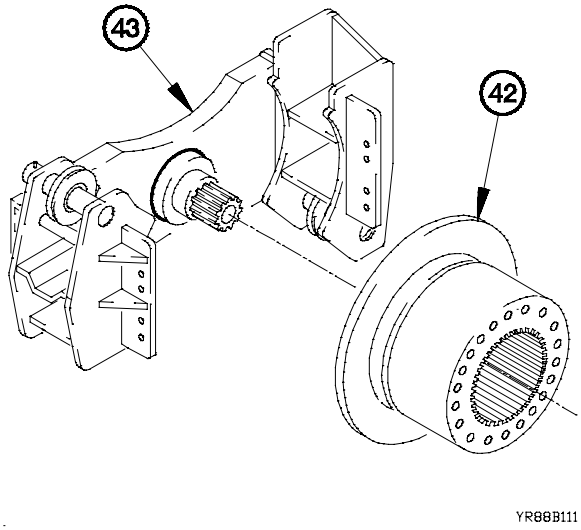
(24) Remove cable wedge (39) from motor end flange (21).

16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(25) Remove primary carrier (40) from ring gear (34).

(26) Remove secondary carrier (41) from ring gear (34).



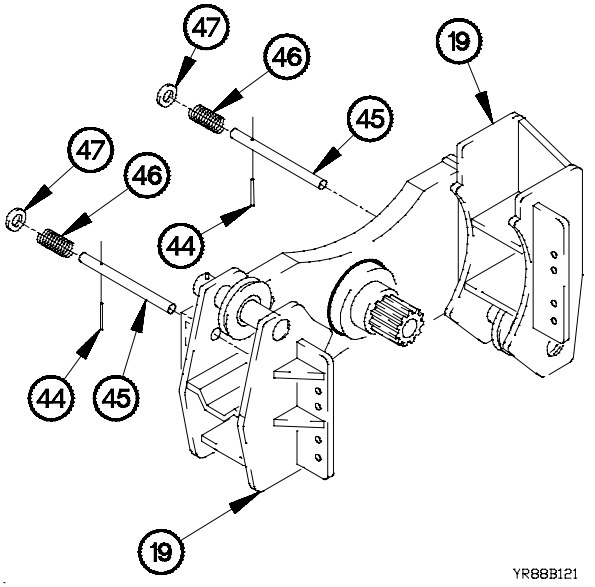


(27) Remove gear end flange (42) from gear end support (43).

WARNING

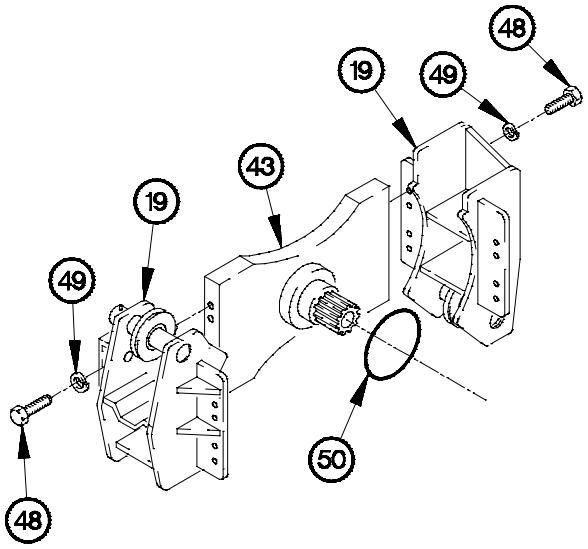
Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(28) Remove two spring pins (44), cable retainer pins (45), springs (46), and washers (47) from base mounts (19). Discard spring pins.

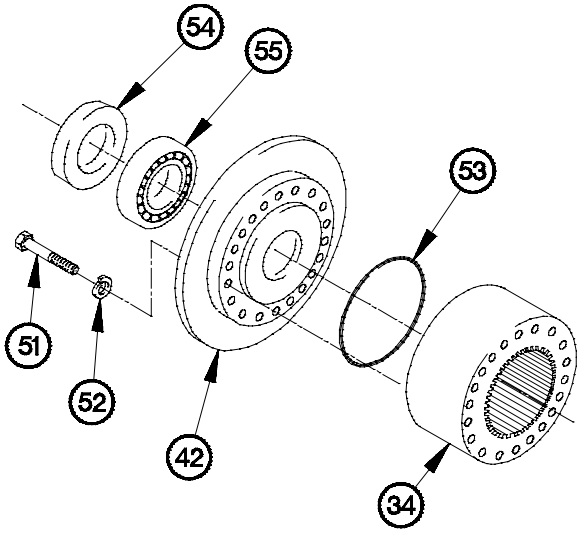


(29) Remove eight screws (48), lockwashers (49), and gear end support (43) from two base mounts (19). Discard lockwashers.

(30) Remove preformed packing (50) from gear end support (43). Discard preformed packing.



YR88B131



YR88B141

(31) Remove 20 screws (51), lockwashers (52), and gear end flange (42) from ring gear (34). Discard lockwashers.

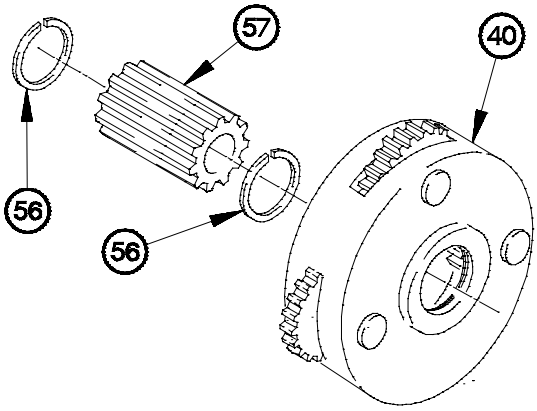
(32) Remove preformed packing (53) from gear end flange (42). Discard preformed packing.

(33) Remove shaft seal (54) and ball bearing (55) from gear end flange (42). Discard shaft seal.

WARNING

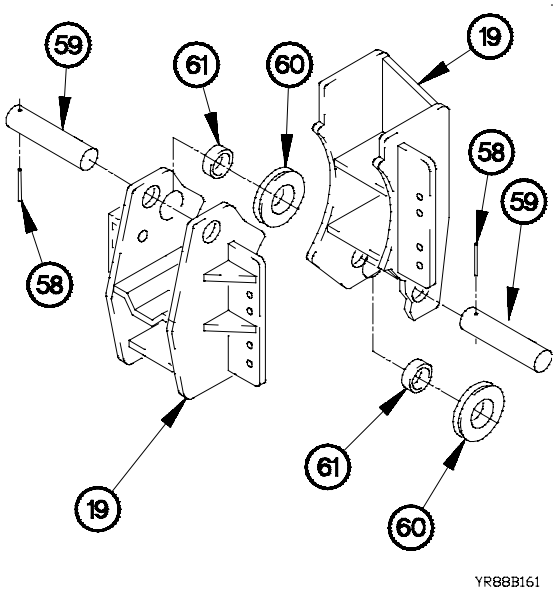
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(34) Remove two retaining rings (56) and secondary sun gear (57) from primary carrier assembly (40).



YR88B151

16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)



(35) Remove two spring pins (58), roller shafts (59), and cable guide sheaves (60) from base mounts (19). Discard spring pins.

(36) Remove two bushings (61) from cable guide sheaves (60).

c. Cleaning/ Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**
- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

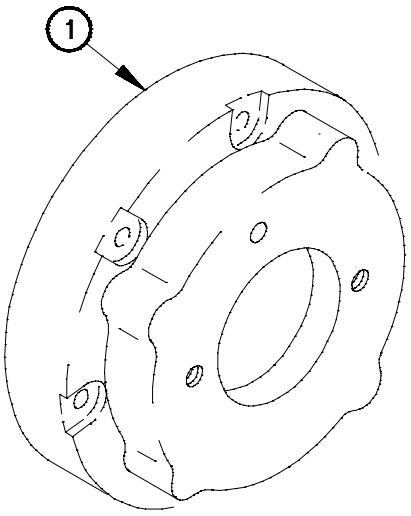
NOTE

Replace any part that fails to pass visual inspection or size measurement requirements.

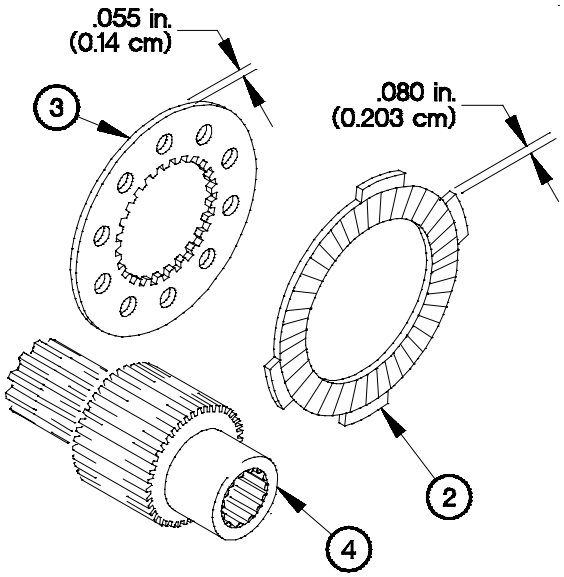
(1) Clean all metal parts with dry cleaning solvent.

(2) Dry metal parts with compressed air.

(3) Inspect outer brake housing (1) for nicks or deep scratches.



YR88C011



YR88C021

(4) Measure thickness of ten friction disc plates (2). Minimum thickness is 0.080 in. (.203 cm).

(5) Inspect 10 friction disc plates (2) for wear marks, pitting, warping, and corrosion.

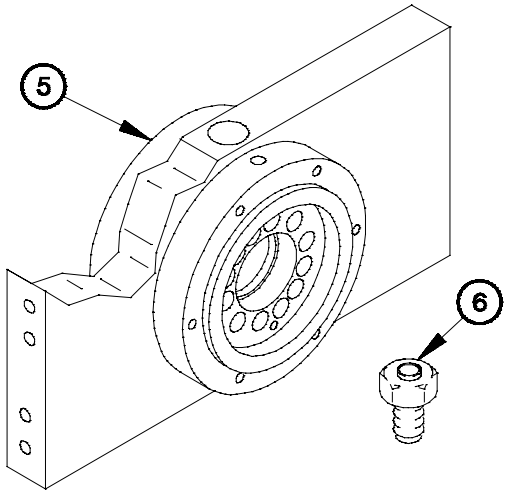
(6) Measure thickness of nine brake drive plates (3). Minimum thickness is 0.055 in. (0.14 cm).

(7) Inspect nine brake drive plates (3) for wear marks, pitting, warping, and corrosion.

(8) Inspect gear teeth on brake shaft (4) wear pitting or broken teeth.

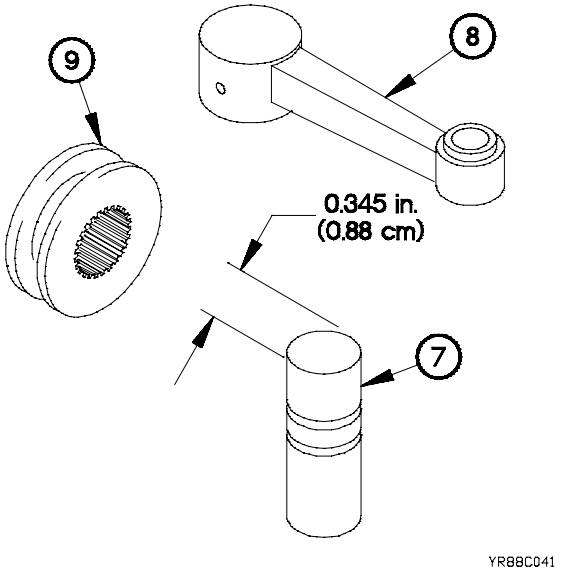
(9) Inspect rotary seal surface on motor end support (5) for scratches and pits.

(10) Check that spring loaded poppet on relief vent (6) operates freely.



YR88C031

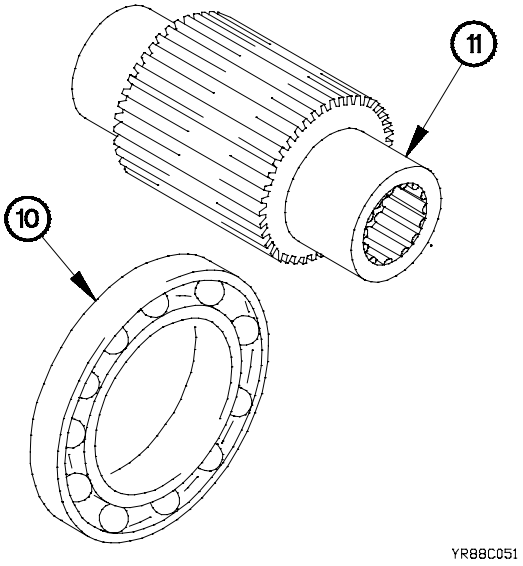
16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)



(11) Check diameter of shoulder on shoulder shifter shaft (7). Minimum diameter is 0.345 in. (0.88 cm).

(12) Check that shifter arm (8) is not broken or bent.

(13) Inspect shifter drive gear (9) for wear, pitting, or broken teeth.



(14) Check ball bearing (10) for free rotation of inner race to outer race.

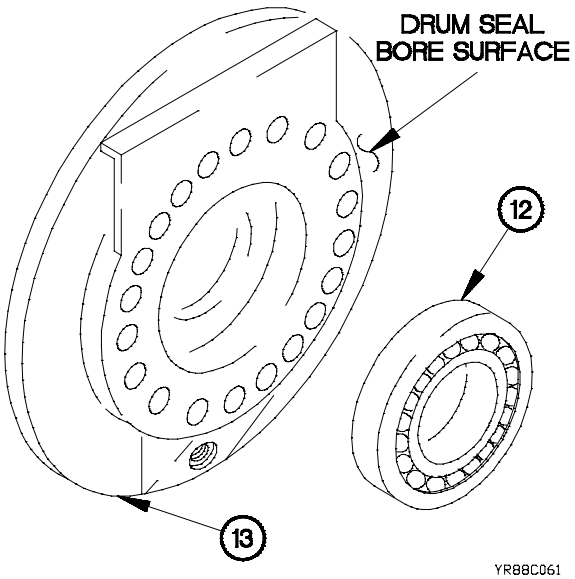
(15) Check ball bearing (10) for pitting and corrosion.

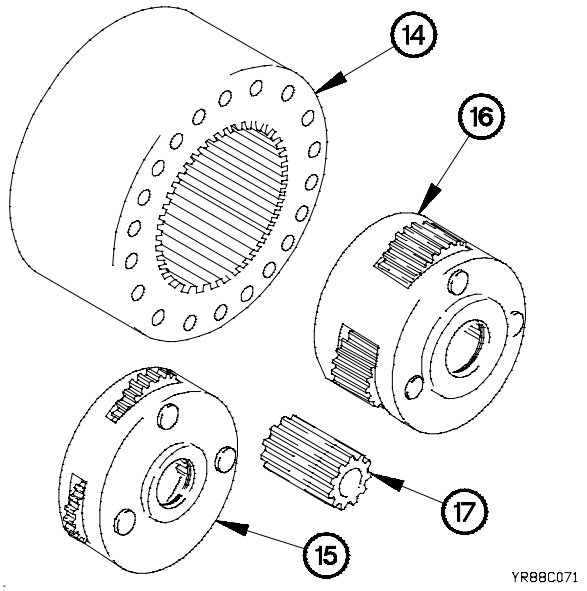
(16) Inspect primary sun gear (11) for wear, pitting, or broken teeth.

(17) Check bearing (12) for free rotation of inner race to outer race.

(18) Check bearing (12) for pitting and corrosion.

(19) Inspect drum seal bore surface on motor end flange (13) for scratches or pits.



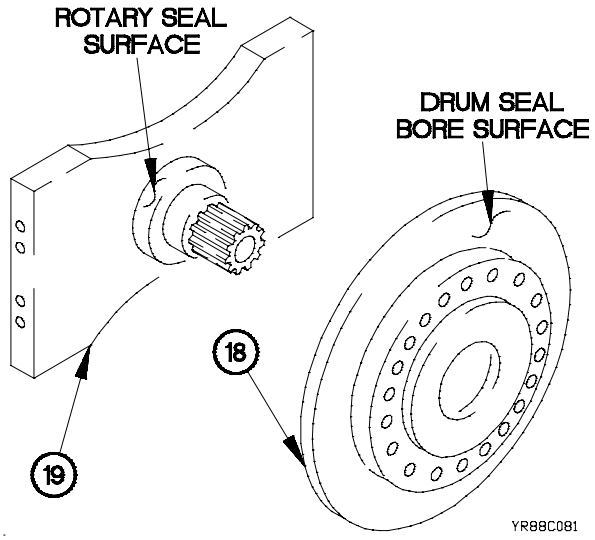


(20) Inspect ring gear (14) for worn or broken teeth.

(21) Inspect gears of primary carrier (15) for free rotation, pits, or broken teeth.

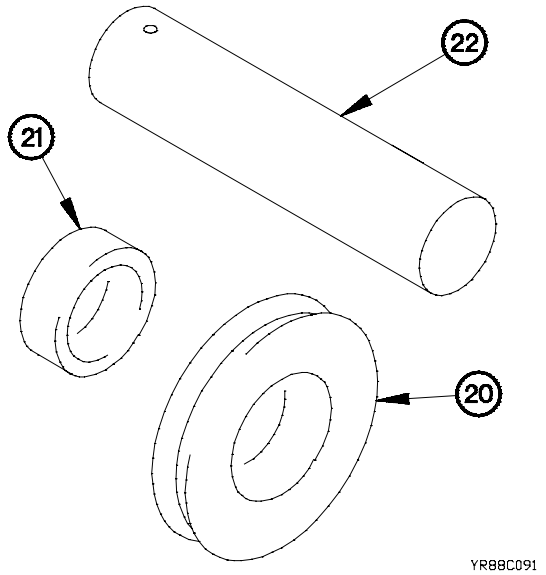
(22) Inspect gears of secondary carrier (16) for free rotation, pits, or broken teeth.

(23) Inspect on secondary sun gear (17) for worn or broken teeth.



(24) Inspect drum seal bore surface on gear end flange (18) for scratches or pits.

(25) Inspect rotary seal surface on gear end support (19) for scratches and pits.

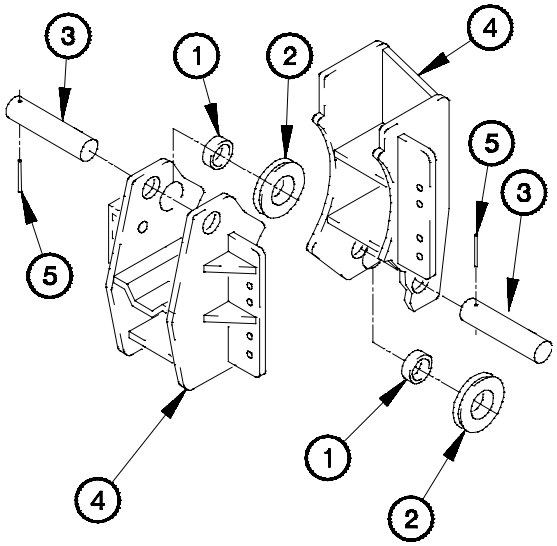


(26) Inspect cable guide sheave (20) and bushing (21) for pitting or corrosion.

(27) Inspect roller shaft (22) for scratches or pits.

16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

d. Assembly.



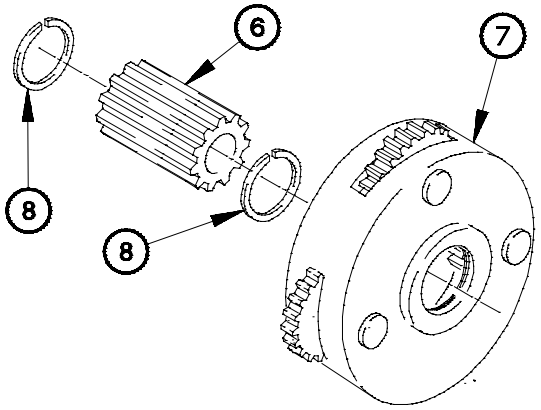
YR88D011

NOTE

Apply lubricating oil to parts during assembly.

(1) Install two bushings (1) in cable guide sheaves (2).

(2) Install two cable guide sheaves (2) and roller shafts (3) on base mounts (4) with spring pins (5).



YR88D021

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

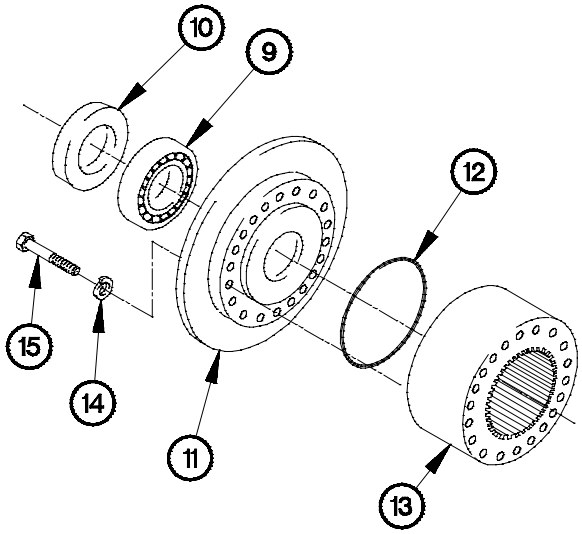
(3) Install secondary sun gear (6) in primary carrier assembly (7) with two retaining rings (8).

(4) Install ball bearing (9) and shaft seal (10) in gear end flange (11).

(5) Install preformed packing (12) on gear end flange (11).

(6) Position gear end flange (11) on ring gear (13) with 20 lockwashers (14) and screws (15).

(7) Tighten 20 screws (15) to 38-45 lb-ft (52-61 N·m).

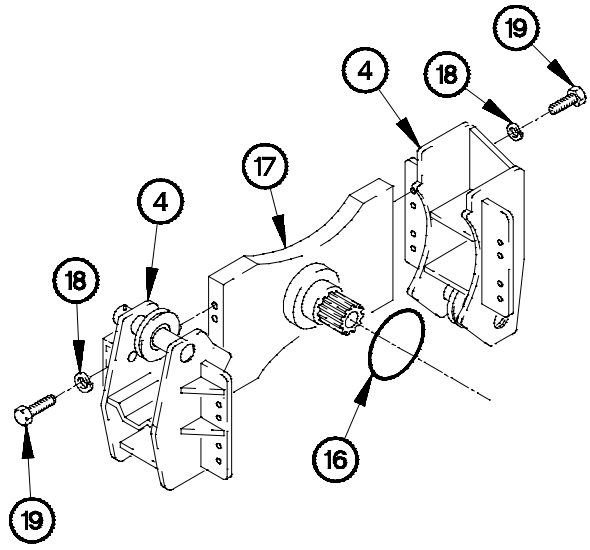


YR88D031

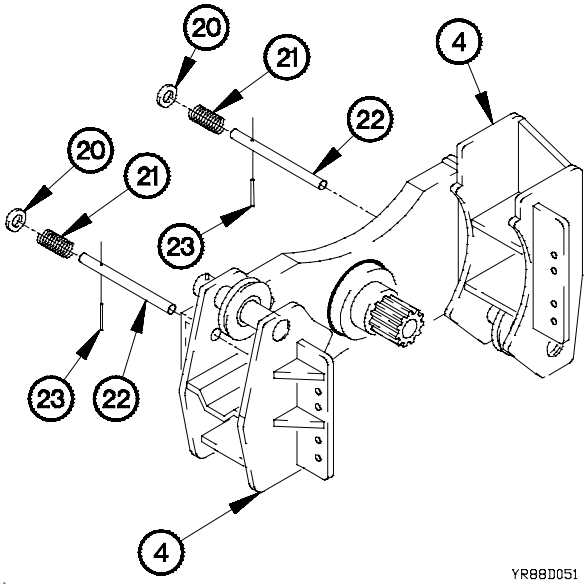
(8) Install preformed packing (16) on gear end support (17).

(9) Position gear end support (17) on two base mounts (4) with eight lockwashers (18) and screws (19).

(10) Tighten eight screws (19) to 70-95 lb-ft (95-129 N·m).



YR88D041



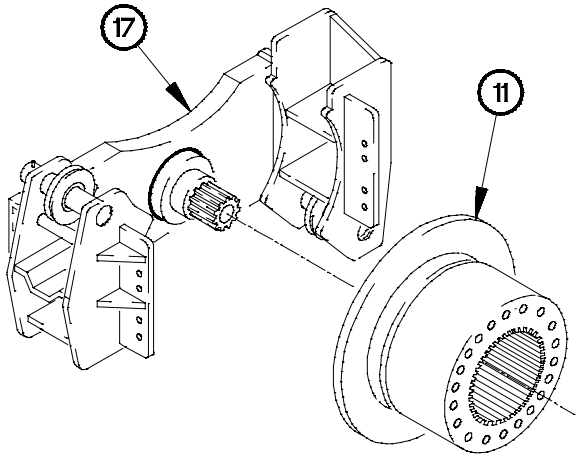
YR88D051

WARNING

Use care when installing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(11) Install two washers (20), springs (21), and cable retainer pins (22) on base mounts (4) with spring pins (23).

(12) Install gear end flange (11) on gear end support (17).



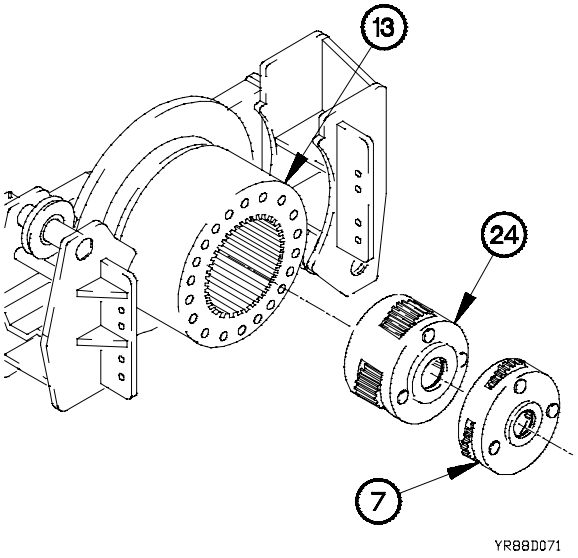
YR88D061

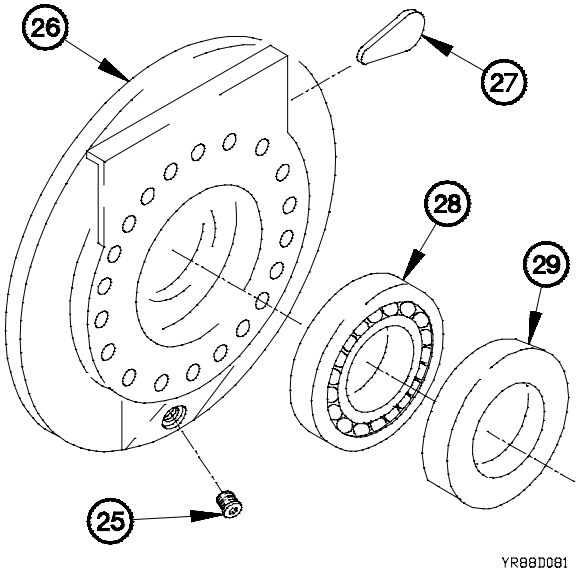
16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(13) Lubricate secondary carrier (24) and primary carrier (7).

(14) Install secondary carrier (24) in ring gear (13).

(15) Install primary carrier (7) in ring gear (13).





(16) Install two magnetic plugs (25) in motor end flange (26).

(17) Install cable wedge (27) in motor end flange (26).

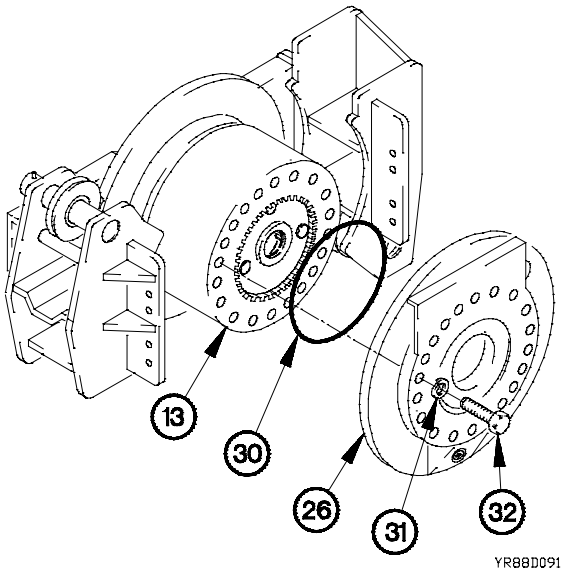
(18) Install ball bearing (28) in motor end flange (26).

(19) Install shaft seal (29) in motor end flange (26).

(20) Install preformed packing (30) on motor end flange (26).

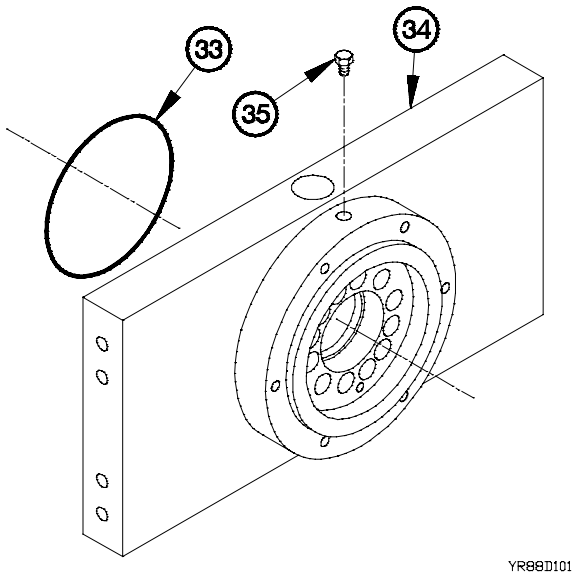
(21) Position motor end flange (26) on ring gear (13) with 20 lockwashers (31) and screws (32).

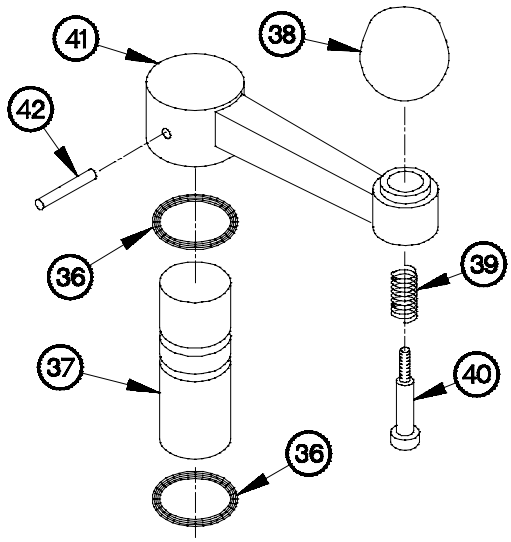
(22) Tighten 20 screws (32) to 38-45 lb-ft (52-61 N·m).



(23) Install preformed packing (33) on motor end support (34).

(24) Install relief vent (35) in motor end support (34).





(25) Install two preformed packings (36) on shifter shoulder shaft (37).

WARNING

Use care when installing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(26) Install round knob (38), compression spring (39), and locator pin (40) on arm shifter (41).

(27) Install arm shifter (41) on shoulder shaft (37) with spring pin (42).

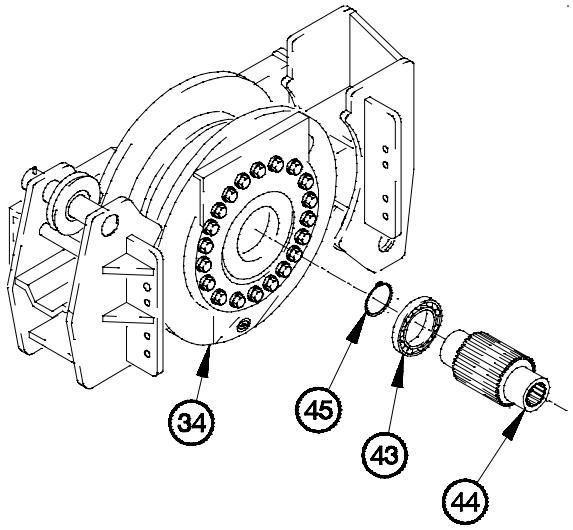
16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

WARNING

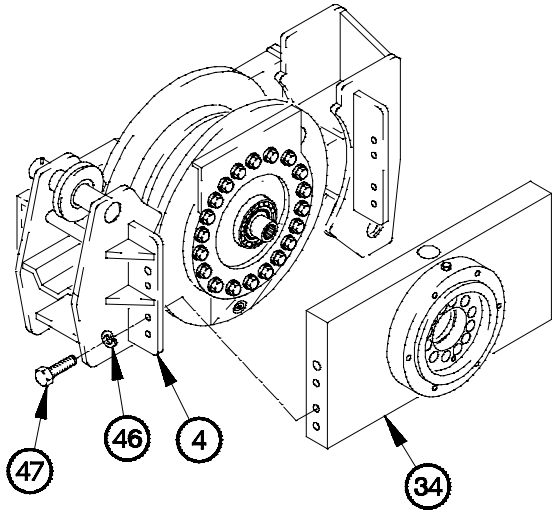
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(28) Install ball bearing (43) on primary sun gear (44) with retaining ring (45).

(29) Install primary sun gear (44) in motor end support (34).



YR88D121



YR88D131

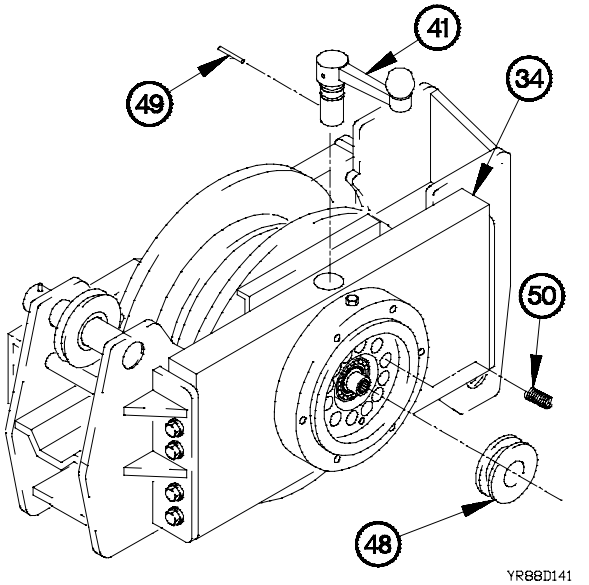
(30) Position motor end support (34) on two base mounts (4) with eight lockwashers (46) and bolts (47).

(31) Tighten eight bolts (47) to 70-95 lb-ft (95-129 N·m).

(32) Install shifter drive gear (48) in motor end support (34).

(33) Install arm shifter (41) in motor end support (34) with spring pin (49).

(34) Install 12 compression springs (50) in motor end support (34).



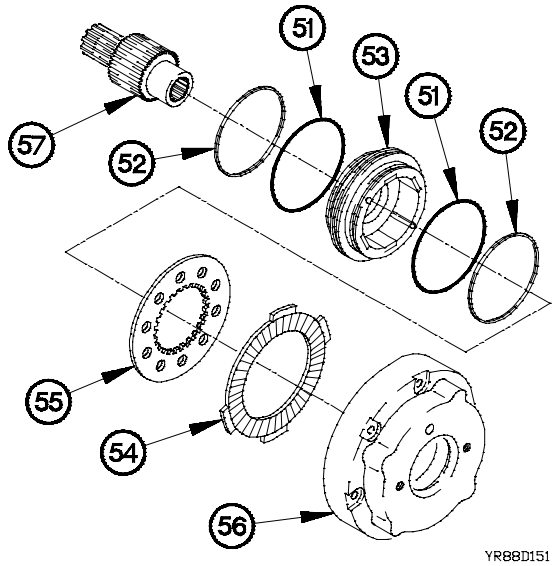
YR88D141

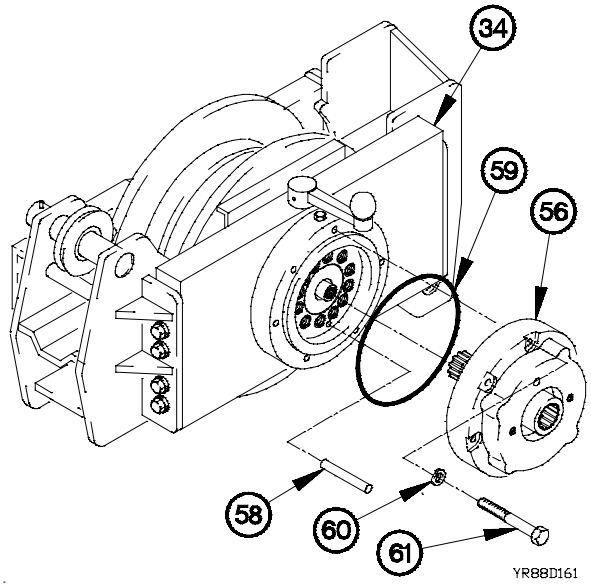
(35) Install two preformed packings (51) and back-up rings (52) on brake piston (53).

(36) Alternately install 10 friction disc plates (54) and nine brake drive plates (55) in outer brake housing (56).

(37) Install brake piston (53) in outer brake housing (56).

(38) Install brake shaft (57) in outer brake housing (56).





(39) Install two dowel pins (58) in motor end support (34).

(40) Install preformed packing (59) on motor end support (34).

(41) Position outer brake housing (56) in motor end support (34) with six lockwashers (60) and screws (61).

(42) Tighten six screws (61) to 45-55 lb-ft (61-75 N·m).

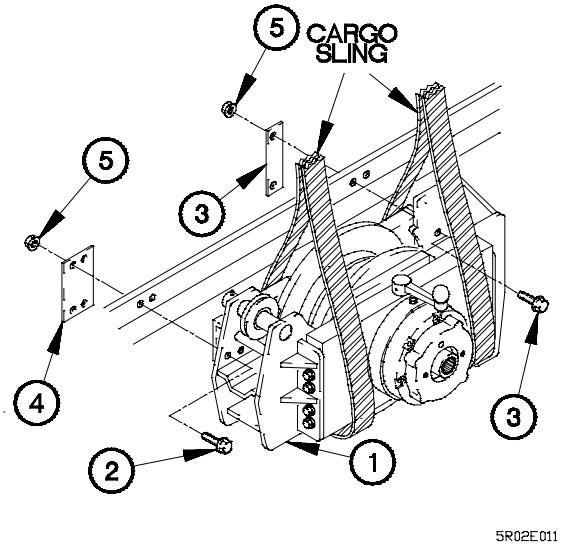
e. Installation.

WARNING

11K Self-recovery winch (SRW) weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

(1) Position 11K SRW (1) on vehicle with eight bolts (2), plates (3 and 4), and self-locking nuts (5).

(2) Tighten eight self-locking nuts (2) to 150-180 lb-ft (203-244 N·m).



16-2. 11K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

f. Follow-On Maintenance.

(1) Install cargo bed (para 15-8).

(2) Install 11K self-recovery winch (SRW) hydraulic motor (para 16-4).

(3) Install 11K self-recovery winch (SRW) counterbalance/ cartridge valve (para 16-3).

(4) Install muffler and heat shields (TM 9-2320-365-20-3).

(5) Fill 11K self-recovery winch (SRW) with gear oil (TM 9-2320-365-20).

(6) Install 11K self-recovery winch (SRW) cable (TM 9-2320-365-20-4).

(7) Operate 11K self-recovery winch (SRW) and check for proper operation (TM 9-2320-365-10).

End of Task.

16-3. 11K SELF-RECOVERY WINCH (SRW) CARTRIDGE/COUNTERBALANCE VALVE REPLACEMENT

This task covers:

a. Cartridge Valve Removal
b. Cartridge Valve Installation
c. Counterbalance Valve Removal
d. Counterbalance Valve Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
11K Self-recovery winch (SRW) cable removed (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 83, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Pan, Drain (Item 36, Appendix B)

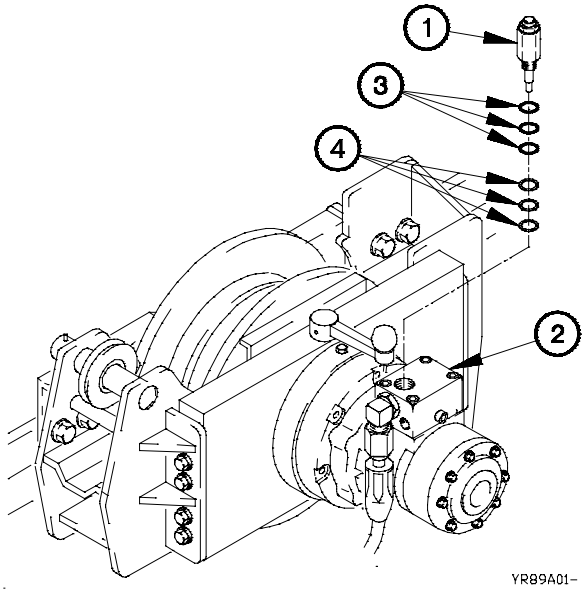
Materials/Parts
Cap and Plug Set (Item 18, Appendix C)
Kit, Seal (Item 86, Appendix F)
Packing, Preformed (Item 156, Appendix F)
Packing, Preformed (2) (Item 157, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Packing, Preformed (2) (Item 203.1, Appendix F)

Personnel Required
(2)

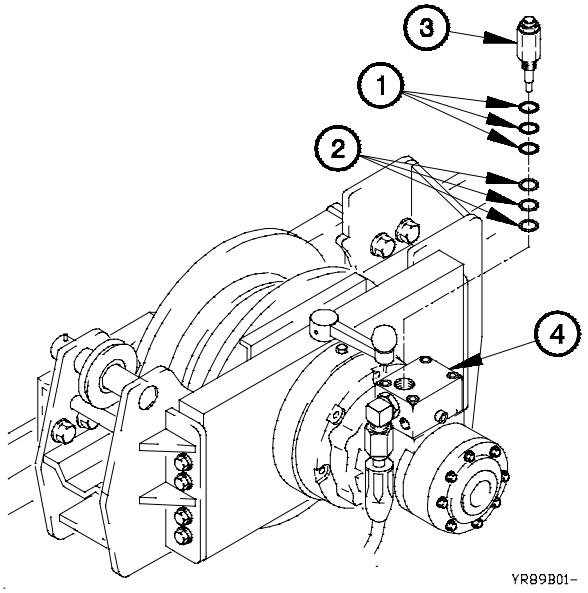
a. Cartridge Valve Removal.

(1) Remove cartridge valve (1) from counterbalance valve (2).

(2) Remove three preformed packings (3) and back-up rings (4) from cartridge valve (1). Discard preformed packings and back-up rings.



b. Cartridge Valve Installation.



(1) Install three back-up rings (1) and preformed packings (2) on cartridge valve (3).

(2) Position cartridge valve (3) in counterbalance valve (4).

(3) Tighten cartridge valve (3) to 40-45 lb-ft (54-61 N·m).

16-3. 11K SELF-RECOVERY WINCH (SRW) CARTRIDGE/COUNTERBALANCE VALVE REPLACEMENT (CONT)

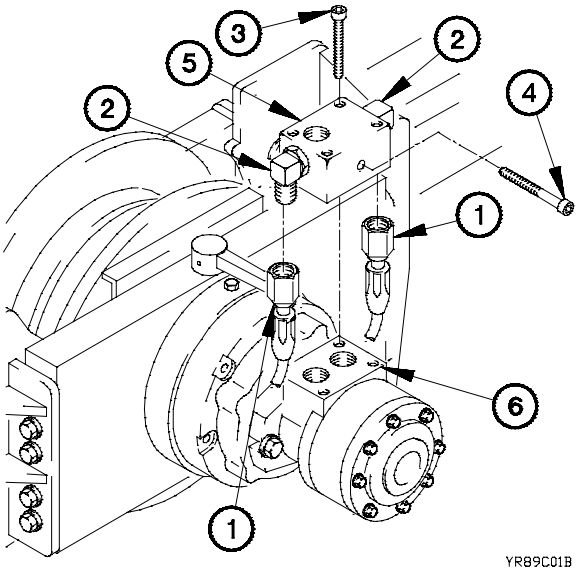
c. Counterbalance Valve Removal.

CAUTION

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

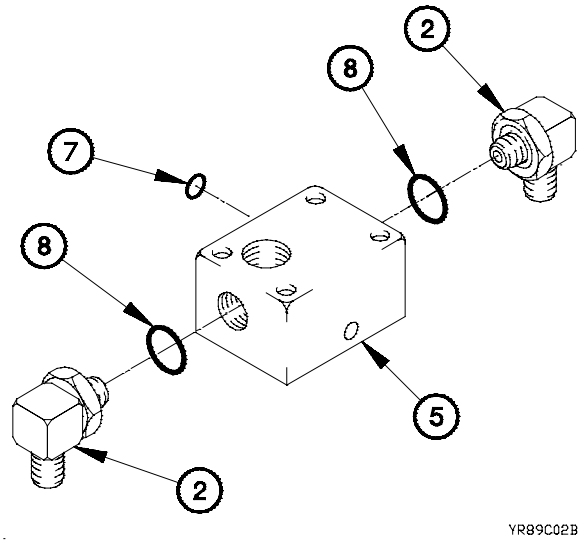
Tag hydraulic hoses and connection points prior to disconnecting.



(1) Disconnect two hydraulic hoses (1) from 90-degree fittings (2).

(2) Remove four screws (3) and screw (4) from counterbalance valve (5).

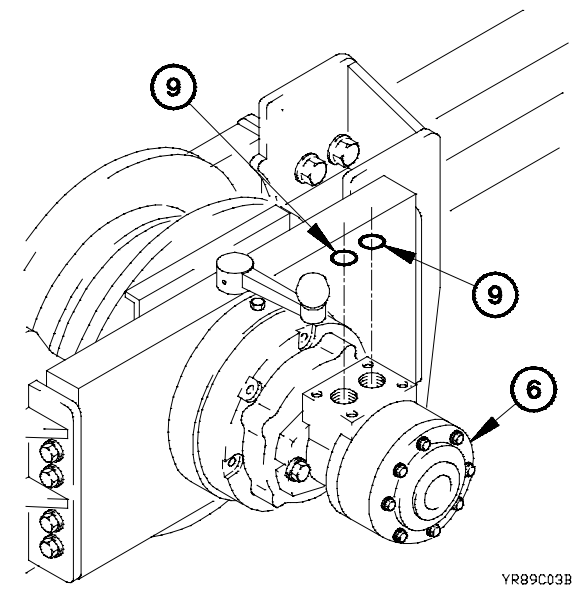
(3) Remove counterbalance valve (5) from hydraulic motor (6).



(4) Remove preformed packing (7) from counterbalance valve (5). Discard preformed packing.

(5) Remove two 90-degree fittings (2) from counterbalance valve (5).

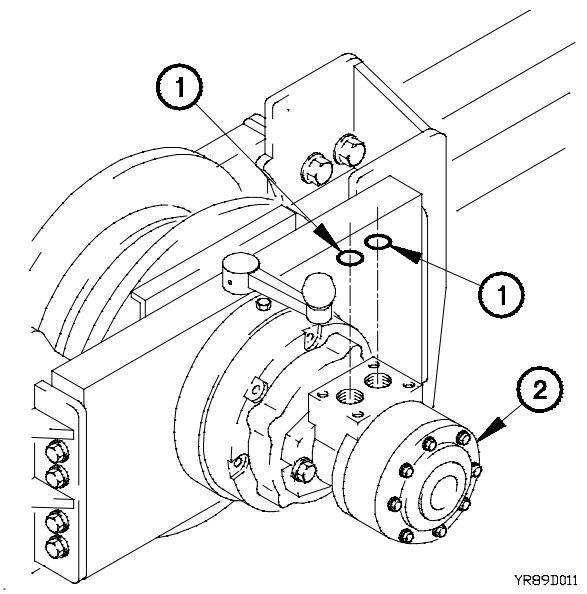
(6) Remove two preformed packings (8) from 90-degree fittings (2). Discard preformed packings.

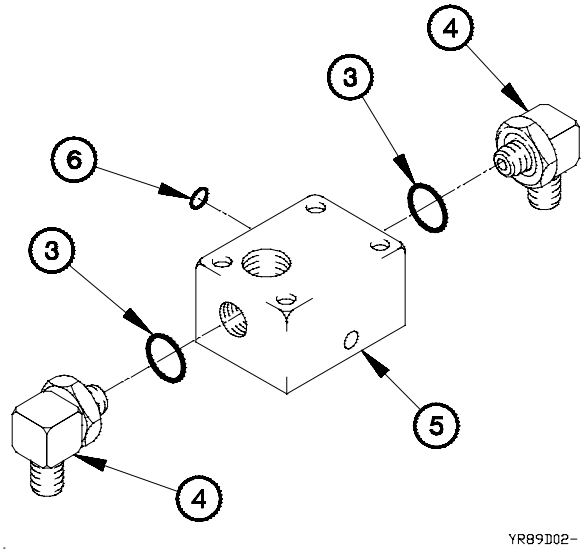


(7) Remove two preformed packings (9) from hydraulic motor (6). Discard preformed packings.

d. Counterbalance Valve Installation.

(1) Install two preformed packings (1) in hydraulic motor (2).





(2) Install two preformed packings (3) on 90-degree fittings (4).

(3) Install two 90-degree fittings (4) in counterbalance valve (5).

(4) Install preformed packing (6) in counterbalance valve (5).

(5) Install counterbalance valve (5) on hydraulic motor (2).

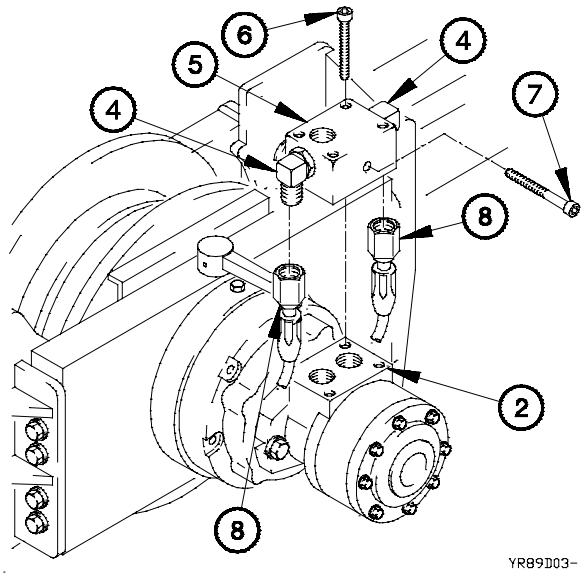
(6) Position four screws (6) in counterbalance valve (5).

(7) Position screw (7) in counterbalance valve (5).

(8) Tighten four screws (6) to 25 lb-ft (34 N·m).

(9) Tighten screw (7) to 8 lb-ft (11 N·m).

(10) Connect two hydraulic hoses (8) to 90-degree fittings (4).



16-3. 11K SELF-RECOVERY WINCH (SRW) CARTRIDGE/COUNTERBALANCE VALVE REPLACEMENT (CONT)

e. Follow-On Maintenance.

(1) Install 11K self-recovery winch (SRW) cable (TM 9-2320-365-20-4).

(2) Operate 11K self-recovery winch (SRW) and check for proper operation (TM 9-2320-365-10).

End of Task.

16-4. 11K SELF-RECOVERY WINCH (SRW) HYDRAULIC MOTOR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
11K Self-Recovery Winch (SRW) counterbalance valve removed (para 16-3).

Tools and Special Tools
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Tools and Special Tools (Cont)
Tool Kit, Genl Mech (Item 68, Appendix B)

Materials/Parts
Lockwasher (2) (Item 93, Appendix F)
Parts Kit, Winch (Item 224, Appendix F)

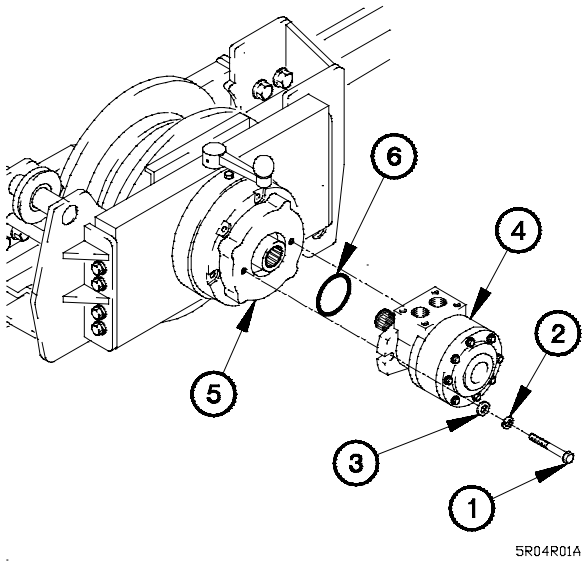
NOTE

When replacing 11K SRW hydraulic motor PN 73169 with PN 73228, replace counterbalance valve PN 12543 with PN 53080.

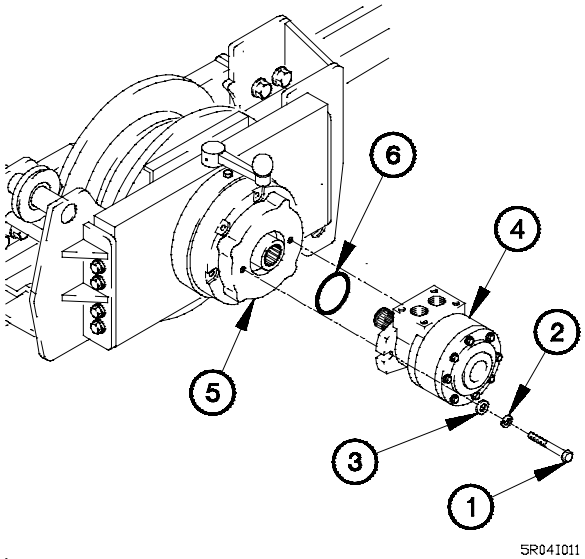
a. Removal.

(1) Remove two screws (1), lockwashers (2), washers (3), and hydraulic motor (4) from 11K SRW (5). Discard lockwashers.

(2) Remove preformed packing (6) from hydraulic motor (4). Discard preformed packing.



b. Installation.



(1) Install preformed packing (6) on hydraulic motor (4).

(2) Position hydraulic motor (4) on 11K SRW (5) with two washers (3), lockwashers (2), and screws (1).

(3) Tighten two screws (1) to 50 lb-ft (68 N·m).

c. Follow-On Maintenance.

(1) Install 11K Self-Recovery Winch (SRW) counterbalance valve (para 16-3).

(2) Operate 11K Self-Recovery Winch (SRW) and check for hydraulic leaks (TM 9-2320-365-10).

End of Task.

16-5. HYDRAULIC ROTARY PUMP REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-on Maintenance

INITIAL SETUP

Equipment Conditions
Splash guard removed (TM 9-2320-365-20-4).
Air cleaner removed (TM 9-2320-365-20-3)

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Cap and Plug Set (Item 18 Appendix C)
Packing, Preformed (Item 211, Appendix F)
Packing, Preformed (Item 209, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

Personnel Required
(2)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

CAUTION

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

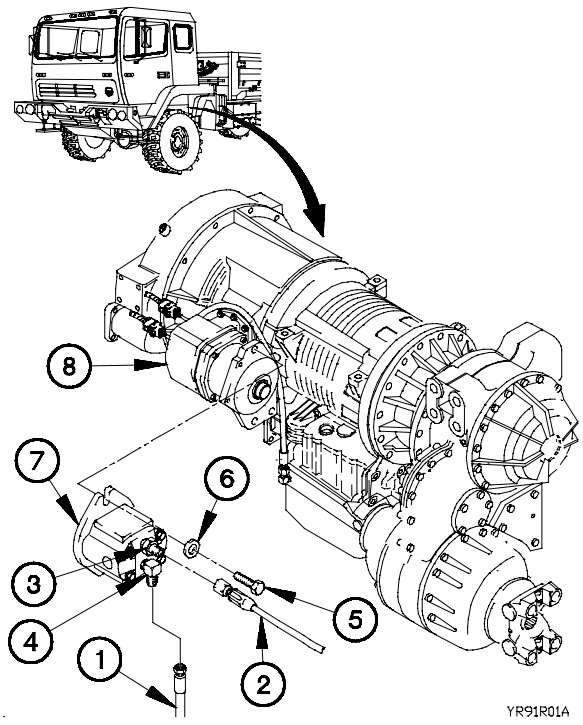
Tag hydraulic hoses and connection points prior to disconnecting.

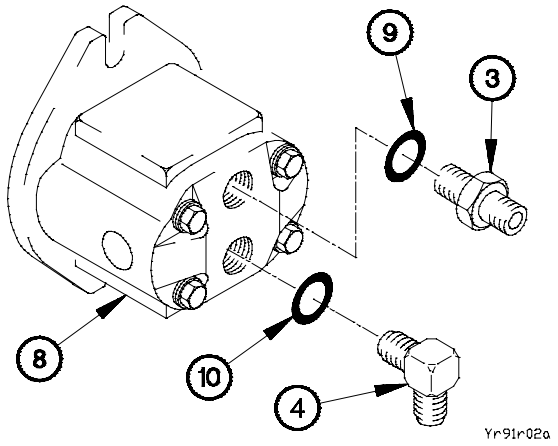
(1) Disconnect hydraulic hoses (1 and 2) from fitting (3) and 90 degree fitting (4).

NOTE

Step (2) requires the aid of an assistant.

(2) Remove two screws (5), washers (6), and hydraulic rotary pump (7) from PTO (8).

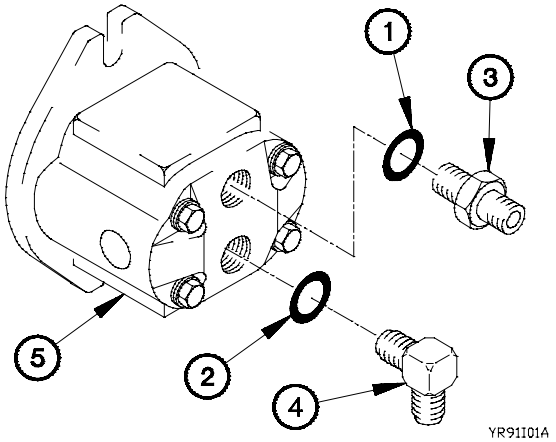




(3) Remove fitting (3) and 90 degree fitting (4) from hydraulic rotary pump (8).

(4) Remove preformed packings (9 and 10) from fitting (3) and 90 degree fitting (4).

b. Installation.



(1) Install preformed packings (1 and 2) on fittings (3) and 90 degree fitting (4).

(2) Install fitting (3) and 90 degree fitting (4) in hydraulic rotary pump (5).

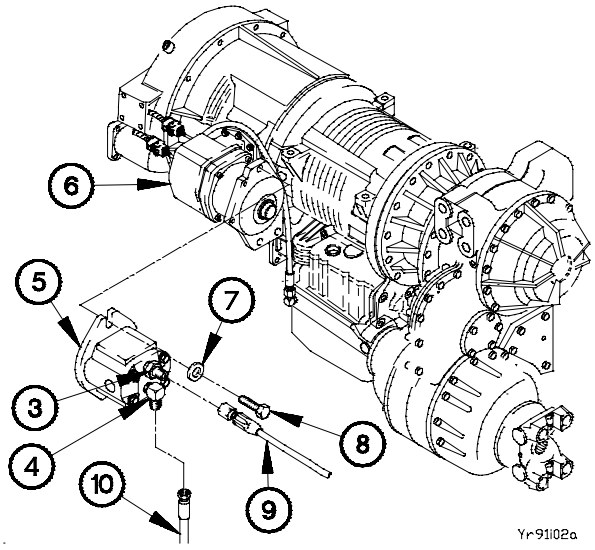
NOTE

Step (3) requires the aid of an assistant.

(3) Position hydraulic rotary pump (5) on PTO (6) with two washers (7) and screws (8).

(4) Tighten two screws (8) to 58-78 lb-ft (79-105 N•m).

(5) Connect hydraulic hoses (9 and 10) to fitting (3) and 90 degree fitting (4).



16-5. HYDRAULIC ROTARY PUMP REPLACEMENT (CONT)

c. Follow-On Maintenance.

(1) Install air cleaner (TM 9-2320-365-20-3).

(2) Install splash guard (TM 9-2320-365-20-4).

(3) Operate 11K self-recovery winch (SRW) and check for hydraulic leaks (TM 9-2320-365-10).

End of Task.

16-6. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (TM 9-2320-365-20-3).
Hydraulic rotary pump removed (para 16-5).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Pliers, Retaining Ring (Item 38, Appendix B)
Pliers, Retaining Ring (Item 39, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Crowfoot Attachment, Socket Wrench (Item 12.1, TM 9-2320-366-20 Appendix B)
Sling, Cargo (Item 48, Appendix B)

Materials/Parts
Cap and Plug Set (Item 18, Appendix C)
Gasket (Item 54, Appendix F)

Materials/Parts
Ties, Cable Plastic (Item 89, Appendix C)
Sealing Compound (Item 75, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Packing, Preformed (2) (Item 193, Appendix F)
Gasket (Item 50, Appendix F)
Seal, Encased (2) (Item 267, Appendix F)
Gasket (Item 49, Appendix F)
Seal, Plain Encased (Item 271, Appendix F)
Packing, Preformed (Item 187, Appendix F)
Packing, Preformed (Item 186, Appendix F)
Packing, Preformed (Item 185, Appendix F)
Packing, Preformed (Item 184, Appendix F)
Packing, Preformed (Item 183, Appendix F)
Packing, Preformed (Item 213, Appendix F)
Packing, Preformed (2) (Item 155.1, Appendix F)
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Screw, Self-Locking (4) (Item 251.1, Appendix F)

Personnel Required
(2)

WARNING

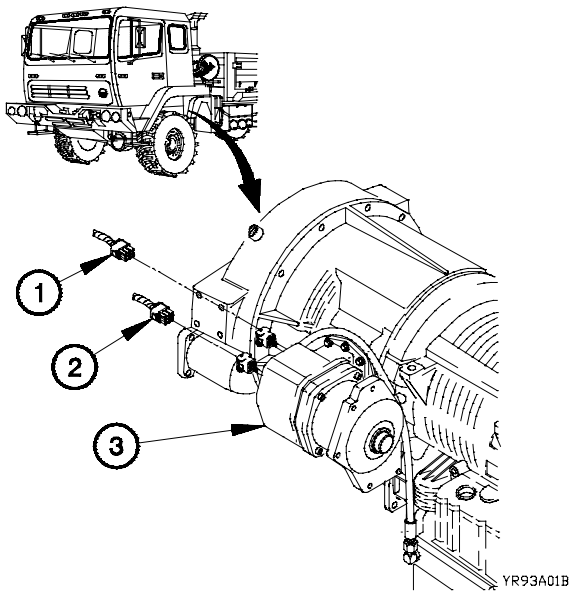
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

- Remove plastic cable ties as required.
- Tag electrical connectors and connection points prior to disconnecting.

(1) Disconnect electrical connectors P216 (1) and P217 (2) from PTO (3).



16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

CAUTION

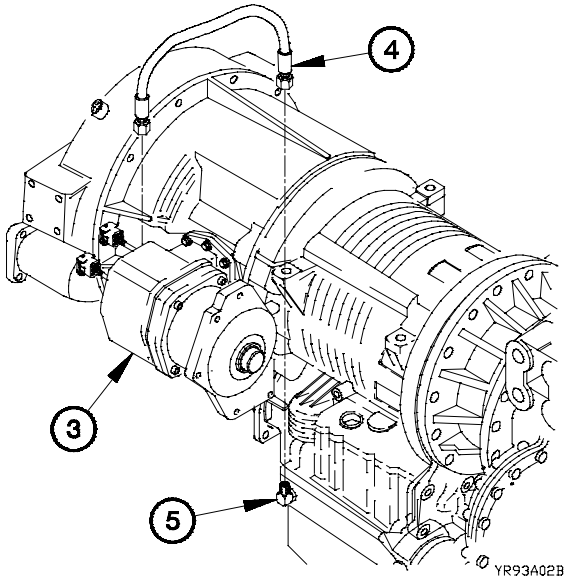
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

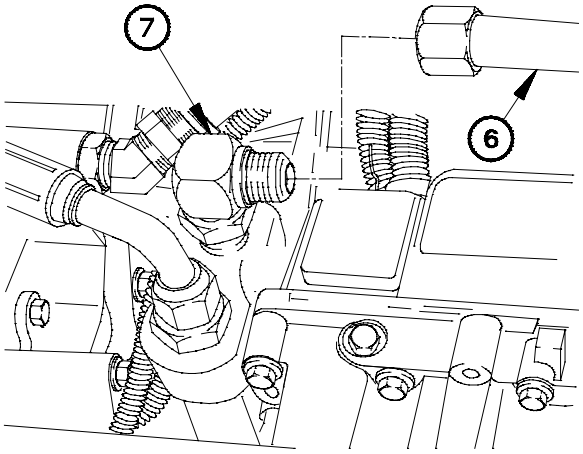
NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect oil hose (4) from PTO (3).

(3) Remove oil hose (4) from 90-degree fitting (5).





NOTE

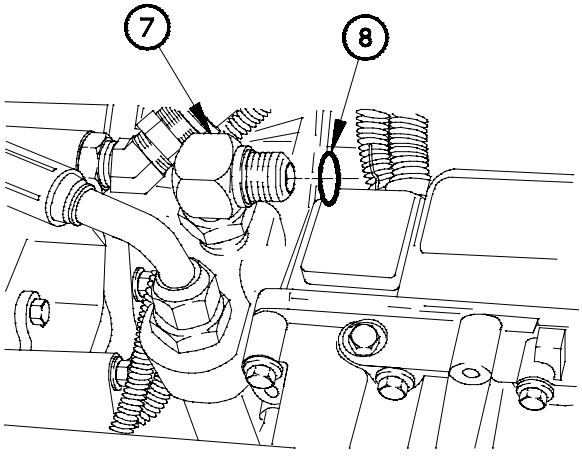
Perform steps (4) through (5.6) on vehicles equipped with transmission oil cooler tubes.

(4) Disconnect transmission oil cooler return tube (6) from 90-degree fitting (7).

NOTE

- Vehicles equipped with either non-corrosive enhanced fittings with one preformed packing or corrosive enhanced fittings with two preformed packings. When removing a non-corrosive enhanced fitting replace it with corrosive enhanced fitting.
- Perform step (5) on vehicles equipped with corrosive enhanced fittings.

(5) Remove preformed packing (8) from 90-degree fitting (7). Discard preformed packing.

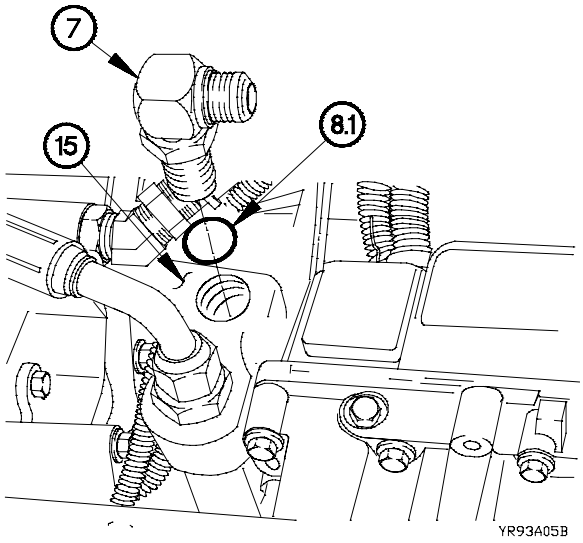


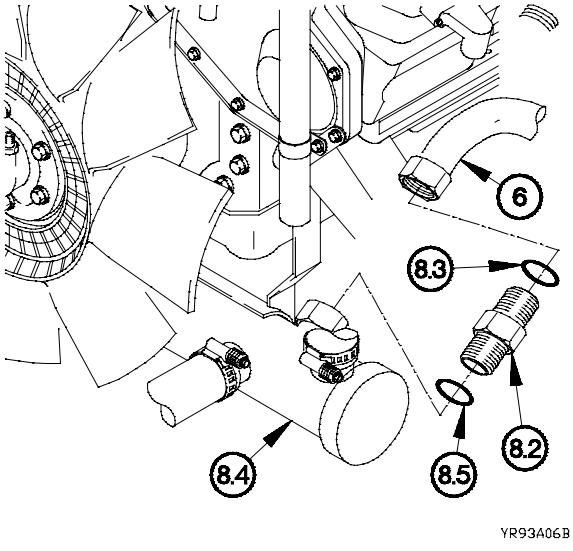
NOTE

- Perform steps (5.1) and (5.2) on vehicles not equipped with corrosive enhanced fittings.
- Note orientation of 90-degree fitting prior to removal.

(5.1) Remove 90-degree fitting (7) from transmission (15).

(5.2) Remove preformed packing (8.1) from 90-degree fitting (7). Discard preformed packing.





(5.3) Remove transmission oil cooler return tube (6) from fitting (8.2)

NOTE

Perform step (5.4) on vehicles equipped with corrosive enhanced fitting.

(5.4) Remove preformed packing (8.3) from fitting (8.2). Discard preformed packing.

NOTE

Perform steps (5.5) and (5.6) on vehicles not equipped with corrosive enhanced fittings.

(5.5) Remove fitting (8.2) from transmission oil cooler (8.4).

(5.6) Remove preformed packing (8.5) from fitting (8.2). Discard preformed packing.

16-6. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

NOTE

There are two types of bearing cups those with tabs and those without. Perform the following step on bearing ups with tabs.

(6) Lift tabs from two bearing cups (9).

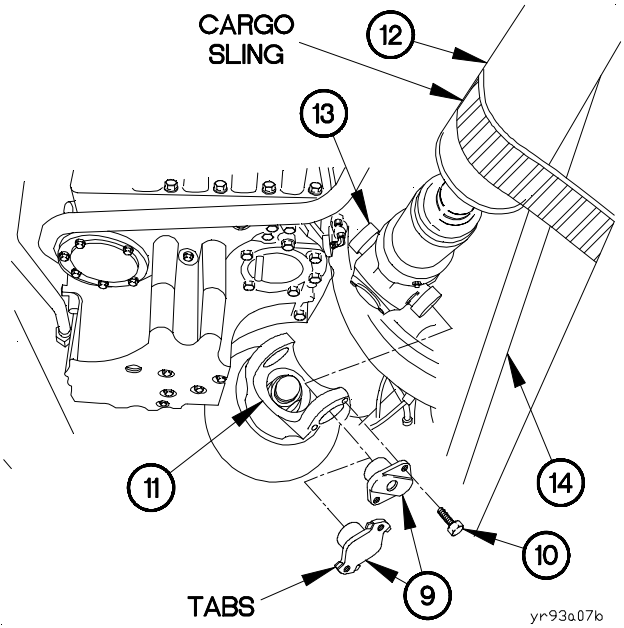
(6.1) Remove four screws (10) and two bearing cups (9) from yoke (11). Discard screws.

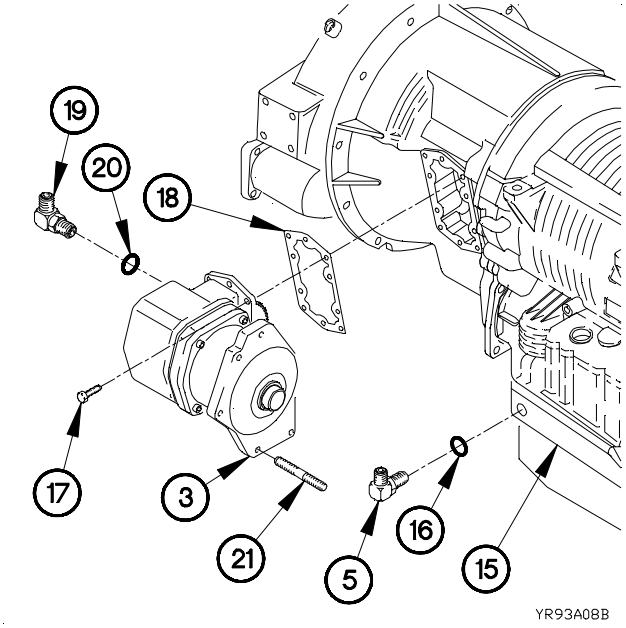
(7) Slide drive shaft (12) from side to side and separate universal joint (13) from yoke (11).

NOTE

Step (8) requires the aid of an assistant.

(8) Attach drive shaft (12) to frame (14).





(9) Remove 90-degree fitting (5) from transmission (15).

(10) Remove preformed packing (16) from fitting (5). Discard preformed packing.

NOTE

Step (11) requires the aid of an assistant.

(11) Remove eight screws (17), PTO (3), and gasket (18) from transmission (15). Discard gasket.

NOTE

Perform steps (12) and (13) on PTO Assembly (P/N 276XMF-JX-D5XK).

(12) Remove 90-degree fitting (19) from PTO (3).

(13) Remove preformed packing (20) from fitting (19). Discard preformed packing.

(14) Remove four threaded studs (21) from PTO (3).

NOTE

Perform steps (14.1) and (14.5) on PTO Assembly (P/N 12378814-001).

(14.1) Disconnect tube (21.1) from tee fitting (21.2).

(14.2) Remove tube (21.1) from 90-degree fitting (21.3).

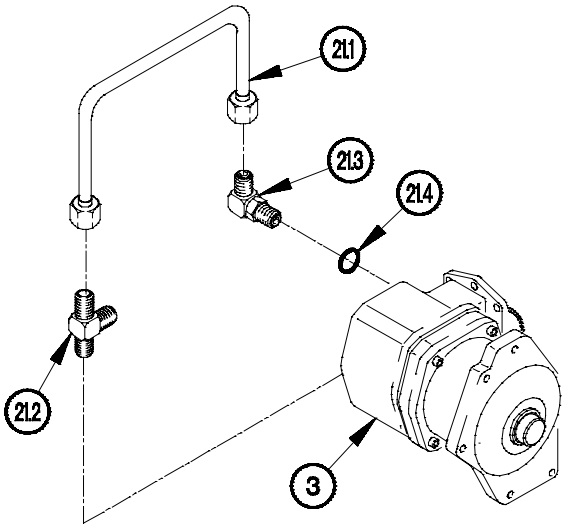
NOTE

Note orientation of tee fitting and 90-degree fitting.

(14.3) Remove tee fitting (21.2) from PTO (3).

(14.4) Remove 90-degree fitting (21.3) from PTO (3).

(14.5) Remove preformed packing (21.4) from 90-degree fitting (21.3).



YR93A09B

(14) Deleted.

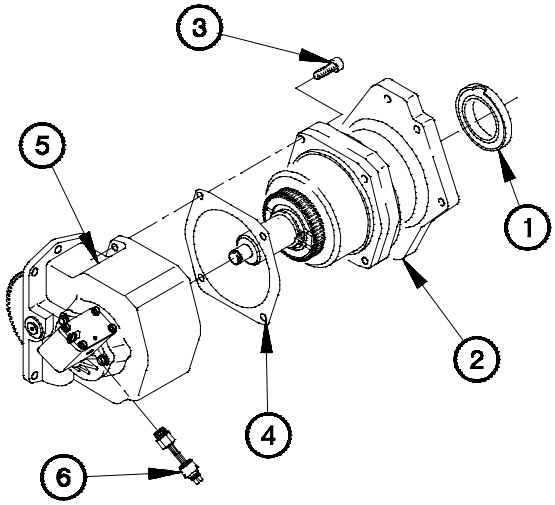
b. Disassembly.

(1) Remove oil seal (1) from bearing cap (2). Discard oil seal.

(2) Remove four screws (3) from bearing cap (2).

(3) Remove bearing cap (2) and gasket (4) from housing (5). Discard gasket.

(4) Remove solenoid electrical connector (6) from housing (5).



YR93B01B

16-6. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

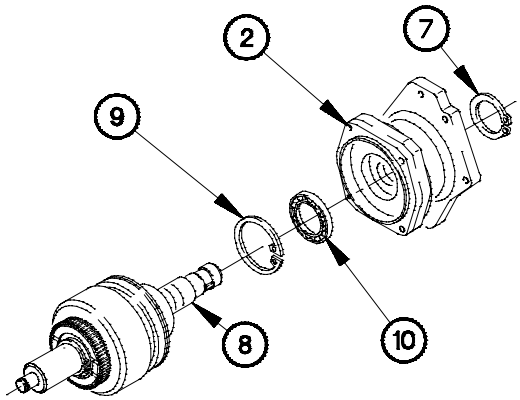
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

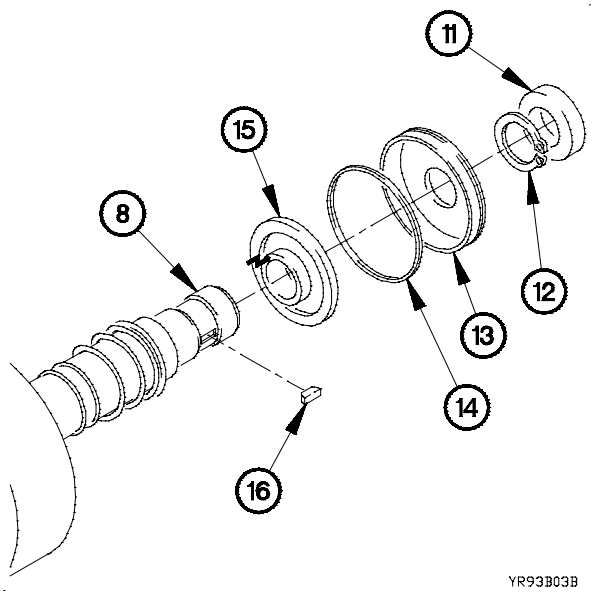
(5) Remove retaining ring (7) from bearing cap (2).

(6) Remove output shaft (8) from bearing cap (2).

(7) Remove retaining ring (9) and bearing (10) from bearing cap (2).



YR93B02B



YR93B03B

(8) Remove spacer (11) from output shaft (8).

(9) Remove retaining ring (12) from output shaft (8).

(10) Remove clutch back-up cylinder (13), vee ring (14), and piston (15) from output shaft (8).

NOTE

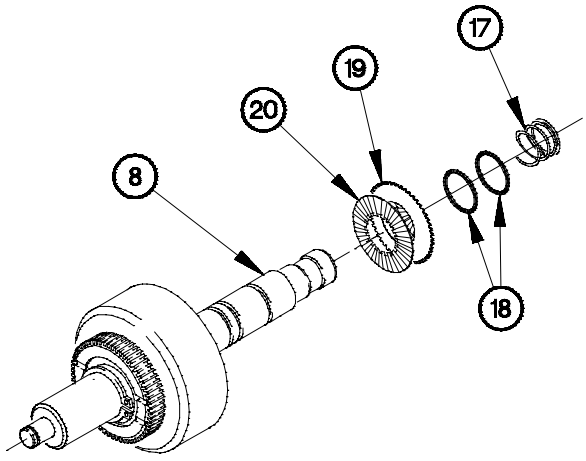
Perform step (11) on PTO Assembly (P/N 276XMF-JX-D5XK).

(11) Remove key (16) from output shaft (8).

(12) Remove spring (17) from output shaft (8).

(13) Remove two preformed packings (18) from output shaft (8). Discard preformed packings.

(14) Remove seven clutch plates (19) and eight friction plates (20) from output shaft (8).



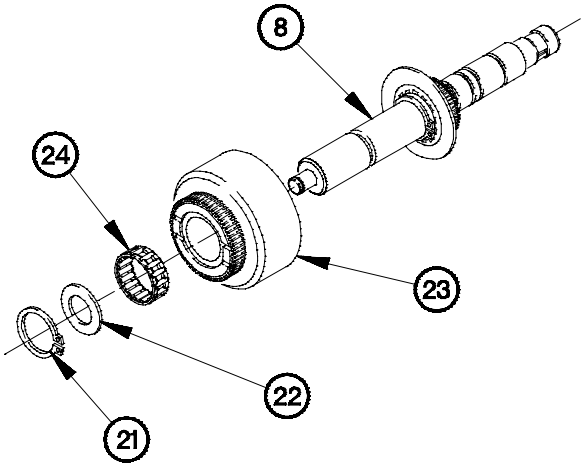
YR93B04B

WARNING

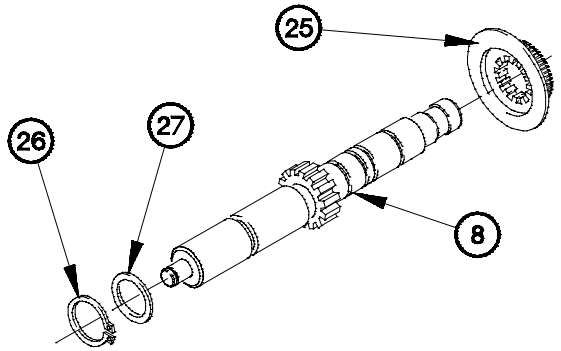
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(15) Remove retaining ring (21), thrust washer (22), and outer clutch gear (23) from output shaft (8).

(16) Remove needle bearing (24) from outer clutch gear (23).



Yr93b05b



YR93B06B

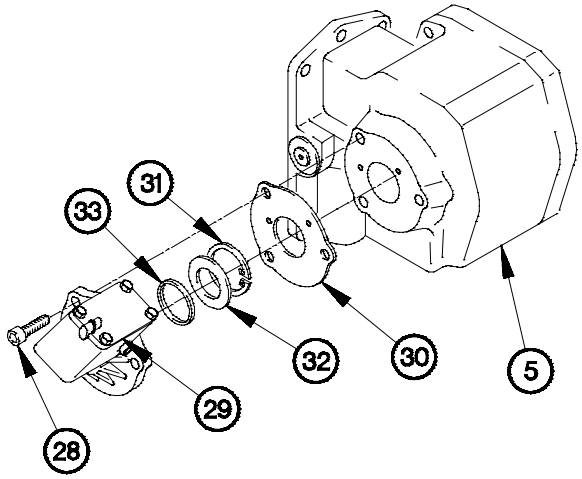
(17) Remove inner clutch gear (25) from output shaft (8).

(18) Remove retaining ring (26) and back-up ring (27) from output shaft (8).

(19) Remove three screws (28), valve body (29), and gasket (30) from housing (5). Discard gasket.

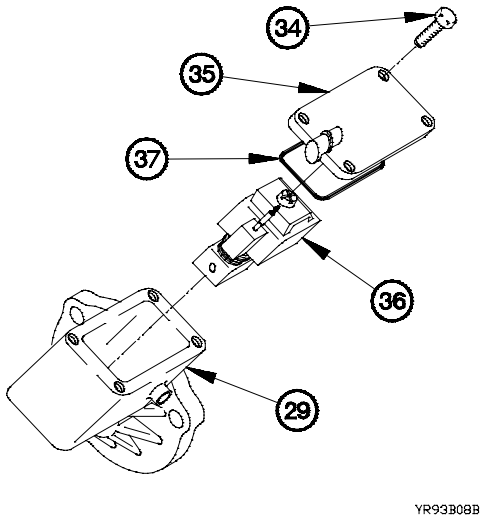
(20) Remove retaining ring (31) and washer (32) from valve body (29).

(21) Remove oil seal (33) from valve body (29). Discard oil seal.



YR93B07B

16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

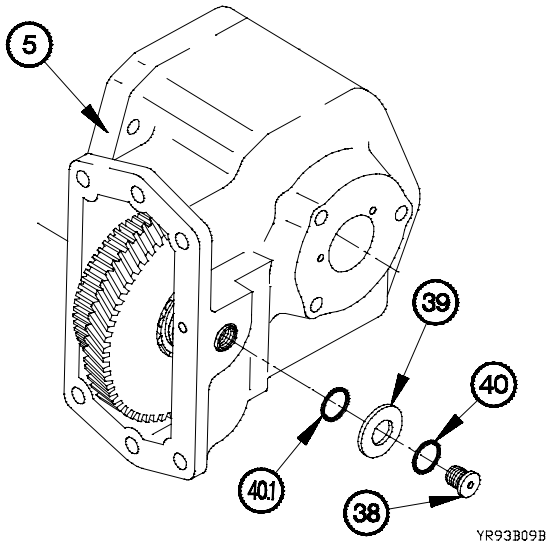


(22) Remove four screws (34) from valve cap (35).

(23) Remove valve cap (35) from valve body (29).

(24) Remove solenoid valve (36) from valve body (29).

(25) Remove block ring (37) from valve cap (35). Discard block ring.



NOTE

Perform step (26) on PTO Assembly (P/N 276MS-JX-D5XK).

(26) Remove plug (38), washer (39), preformed packing (40) and preformed packing (40.1) from housing (5). Discard preformed packings .

NOTE

Perform step (26.1) on PTO Assembly (P/N 12378814-001).

(26.1) Remove plug (38) and preformed packing (40) from housing (5). Discard preformed packing.

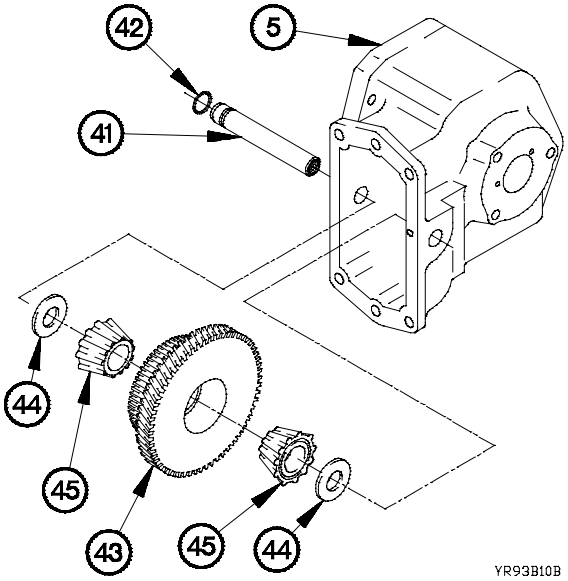
NOTE

Perform steps (27) through (29) on PTO Assembly (P/N 276XMF-JX-D5XK).

(27) Remove idler shaft (41) from housing (5).

(28) Remove preformed packing (42) from idler shaft (41). Discard preformed packing.

(29) Remove input gear (43), two thrust washers (44), and bearings (45) from housing (5).



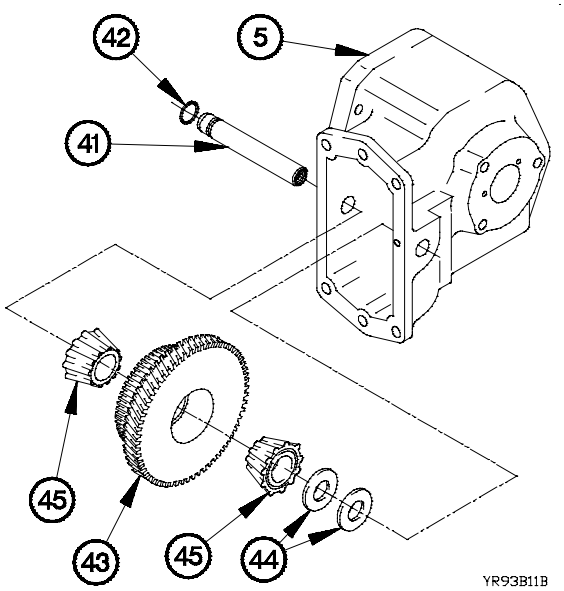
NOTE

Perform steps (29.1) through (29.3) on PTO Assembly (P/N 12378814-001).

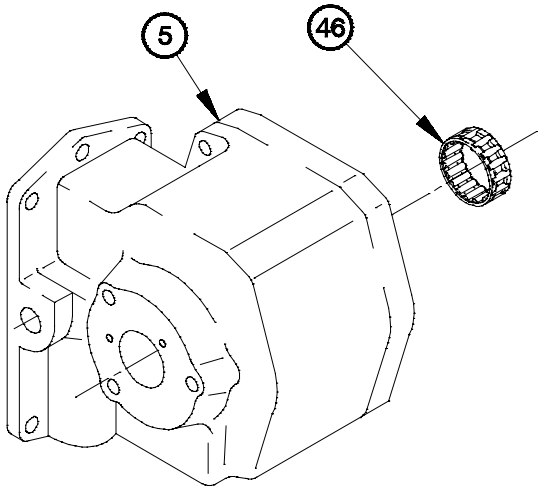
(29.1) Remove idler shaft (41) from housing (5).

(29.2) Remove preformed packing (42) from idler shaft (41). Discard preformed packing.

(29.3) Remove input gear (43), two thrust washers (44), and bearings (45) from housing (5).



(30) Remove needle bearing (46) from housing (5).

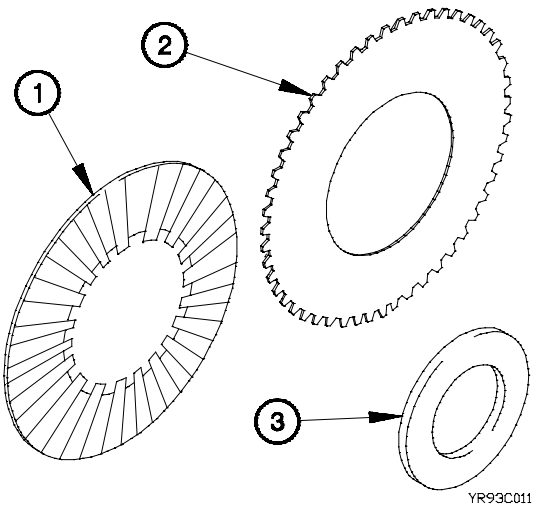


YR93B111

c. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**



YR93C011

(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection.

(2) Inspect seven clutch plates (1) for damage or heat damage.

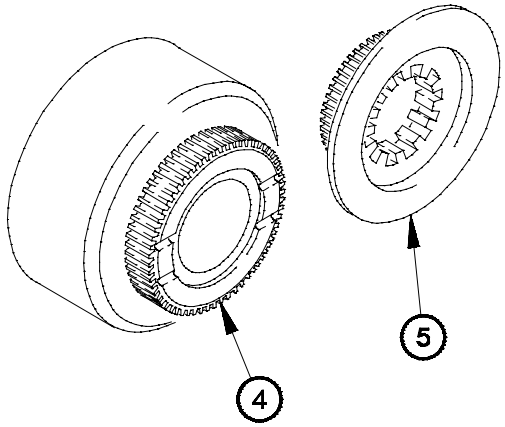
(3) Inspect eight friction plates (2) for damage or heat damage.

(4) Inspect thrust washer (3) for heat damage.

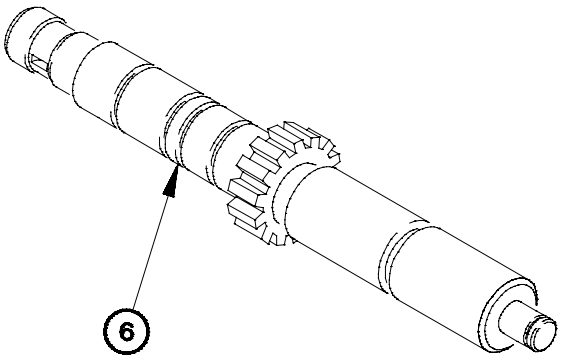
16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

(5) Inspect outer clutch gear (4) for cracks, pitting, or missing gear teeth.

(6) Inspect inner clutch gear (5) for wear or damaged and missing teeth.



YR93C021



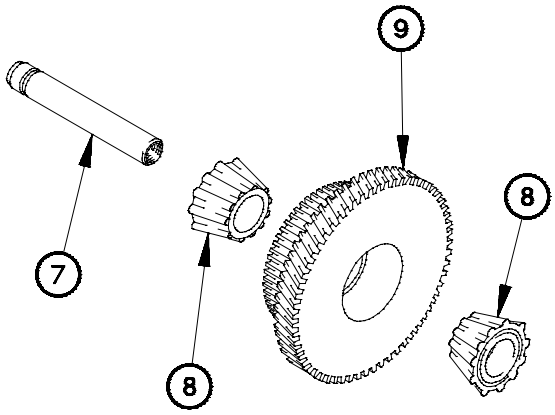
YR93C031

(7) Inspect output shaft (6) for nicks, scratches, or other damage.

(8) Inspect idler shaft (7) for pitting, corrosion, or binding.

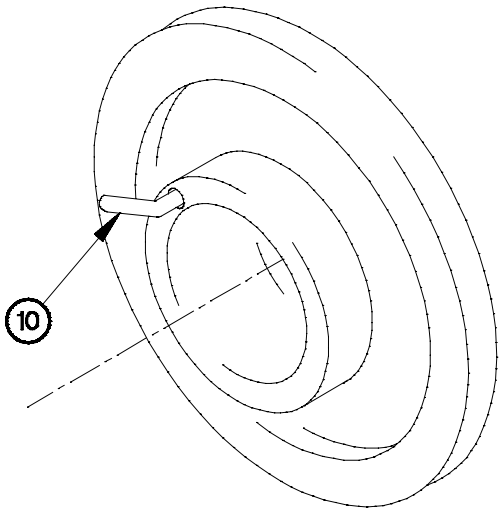
(9) Inspect two bearings (8) for pitting, corrosion, or binding.

(10) Inspect input gear (9) races and teeth for cracks, nicks, heat damage, or missing gear teeth.



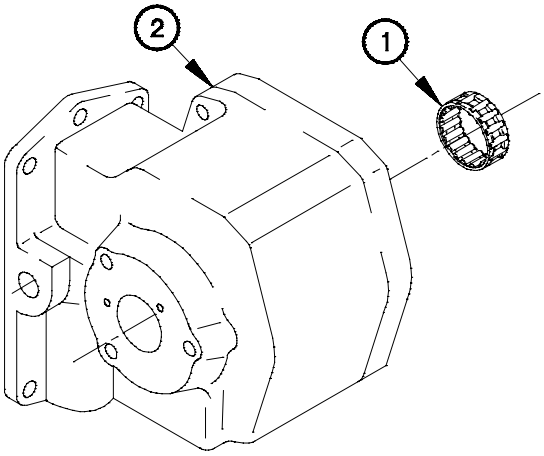
YR93C041

(11) Verify wire (10) is not bent or broken.



YR93C05B

d. Assembly.



YR93D01B

NOTE

Apply lubricating oil to all parts during assembly.

(1) Install needle bearing (1) in housing (2).

NOTE

Perform steps (1.1) through (1.4) on PTO Assembly (P/N 12378814-001).

(1.1) Install two bearings (3) in input gear (4).

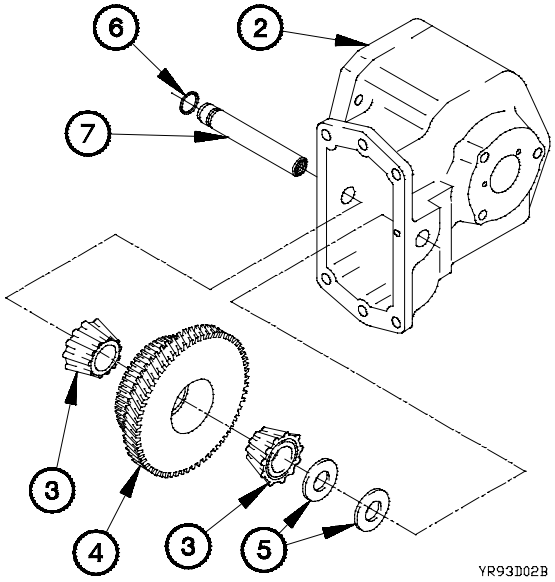
(1.2) Install two thrust washers (5) and input gear (4) in housing (2).

(1.3) Install preformed packing (6) on idler shaft (7).

CAUTION

Ensure flat side of shaft is lined up to make proper contact. Failure to comply may result in damage to equipment.

(1.4) Install idler shaft (7) in housing (2).



YR93D02B

16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

(2) Install two bearings (3) in input gear (4).

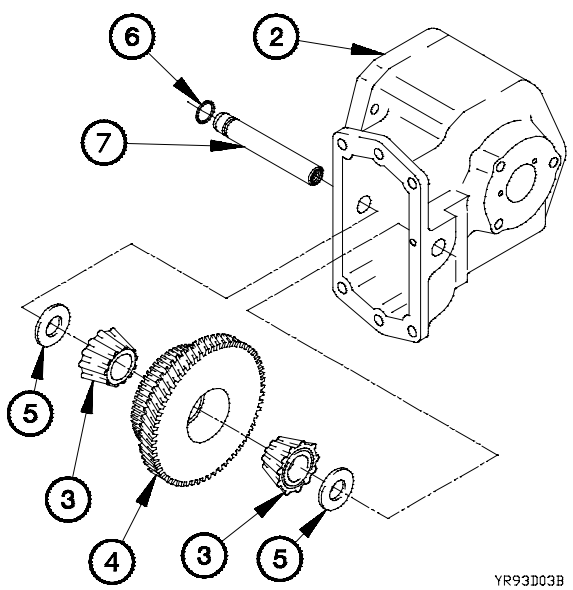
(3) Install two thrust washers (5) and input gear (4) in housing (2).

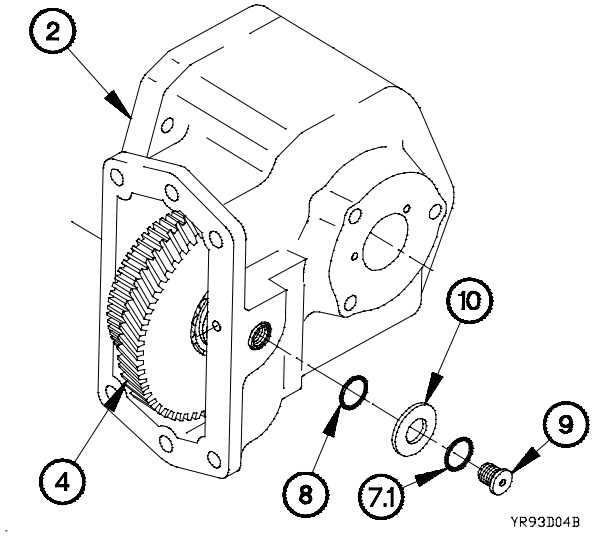
(4) Install preformed packing (6) on idler shaft (7).

CAUTION

Ensure flat side of shaft is lined up to make proper contact. Failure to comply may result in damage to equipment.

(5) Install idler shaft (7) in housing (2).





NOTE

Perform steps (5.1) and (5.2) on PTO Assembly (P/N 12378814-001).

(5.1) Install preformed packing (7.1) on plug (9).

(5.2) Position plug (9) in housing (2).

NOTE

Perform steps (6) and (7) on PTO Assembly (P/N 276XMF-JX-D5XK).

(6) Install two preformed packings (8) on plug (9).

(7) Position washer (10) and plug (9) in housing (2).

(8) Tighten plug (9) to 97-106 lb-in. (11-16 N•m).

CAUTION

Input gear should turn freely and have no side-to-side movement. Failure to comply may result in damage to equipment.

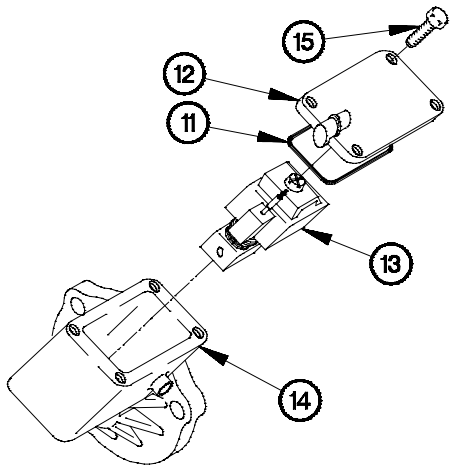
(9) Turn input gear (4) in housing (2).

(10) Install block ring (11) on valve cap (12).

(11) Install solenoid valve (13) in valve body (14).

(12) Position valve cap (12) on valve body (14) with four screws (15).

(13) Tighten four screws (15) to 48-72 lb-in. (5-8 N•m).



(14) Install oil seal (16) in valve body (14).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(15) Install washer (17) and retaining ring (18) in valve body (14).

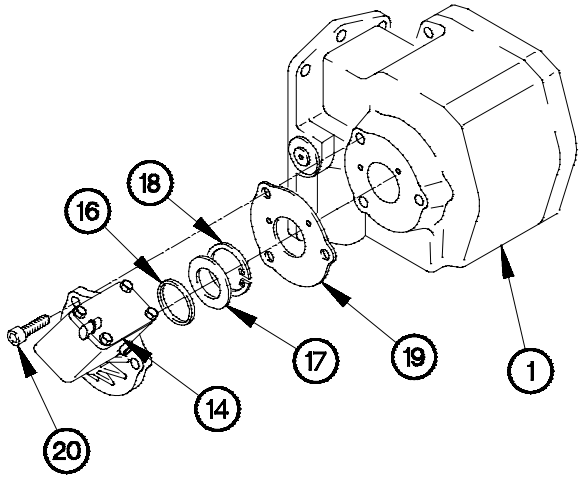
CAUTION

Ensure oil ports on valve body and housing are aligned. Failure to comply may result in damage to equipment.

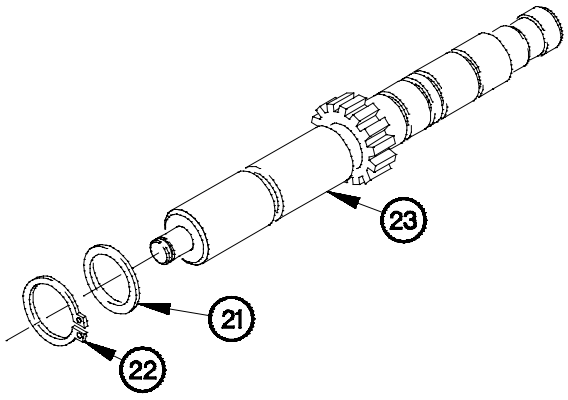
(16) Install gasket (19) and valve body (14) on housing (2).

(17) Position three screws (20) in valve body (14).

(18) Tighten three screws (20) to 16-20 lb-ft (22-27 N•m).

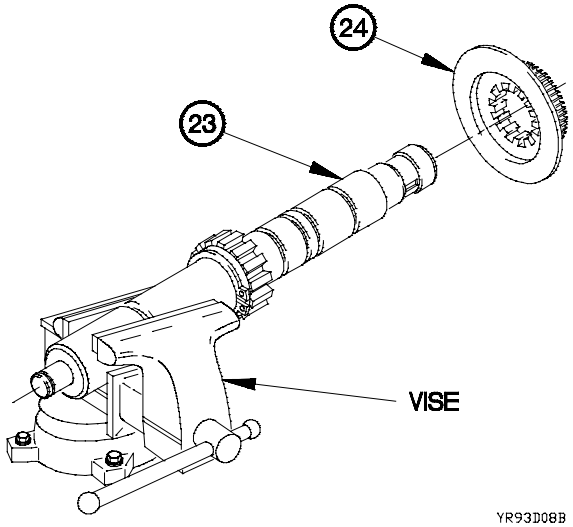


Yr93d051



YR93D07B

(19) Install back-up ring (21) and retaining ring (22) on output shaft (23).



YR93D08B

(20) Position output shaft (23) in vise.

(21) Install inner clutch gear (24) on output shaft (23).

16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

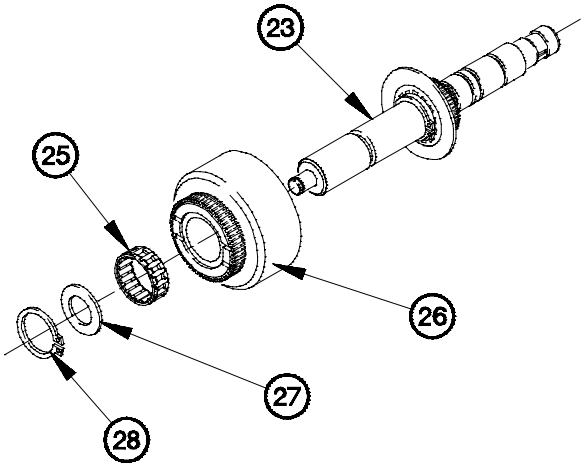
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

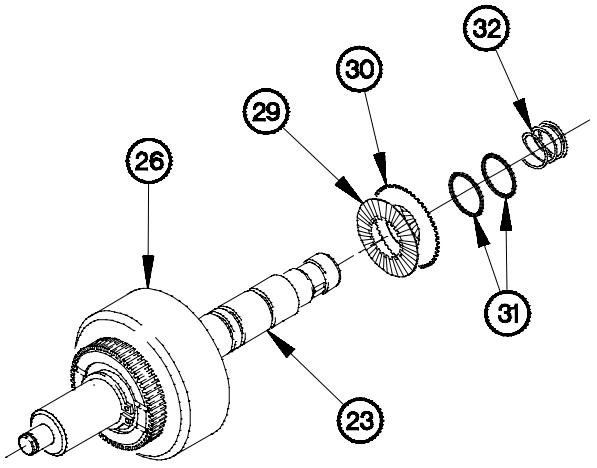
(22) Install needle bearing (25) in outer clutch gear (26).

(23) Install outer clutch gear (26) on output shaft (23).

(24) Install washer (27) and retaining ring (28) on output shaft (23).



YR93D081



YR93D091

CAUTION

Alternately stack friction plates and clutch parts. Failure to comply may result in damage to equipment.

NOTE

Apply lubricating oil to friction plates and clutch plates during assembly.

(25) Install eight friction plates (29) and seven clutch plates (30) in outer clutch gear (26).

(26) Install two preformed packings (31) on output shaft (23).

(27) Install spring (32) on output shaft (23).

NOTE

Perform step (28) on PTO Assembly (P/N 276XMF-JX-D5XK).

(28) Install key (33) in output shaft (23).

CAUTION

Verify ring installed with open face toward back-up cylinder. Failure to comply may result in damage to equipment.

(29) Install vee ring (34) on piston (35).

(30) Install piston (35) on output shaft (23).

(31) Install back-up cylinder (36) on output shaft (23).

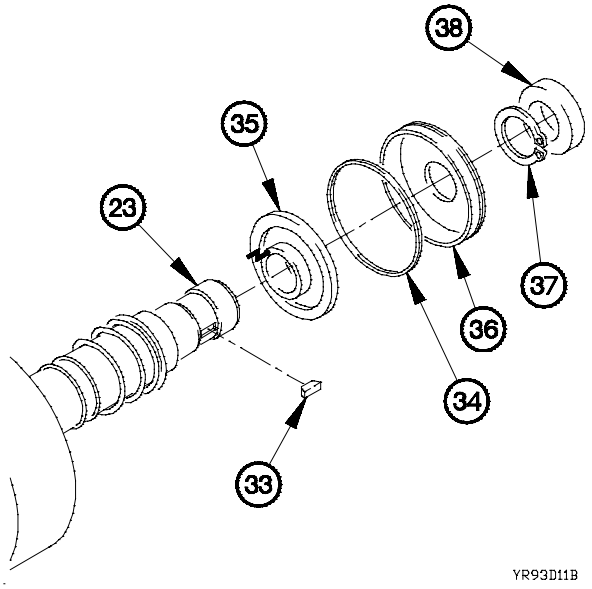
(32) Press down back-up cylinder (36).

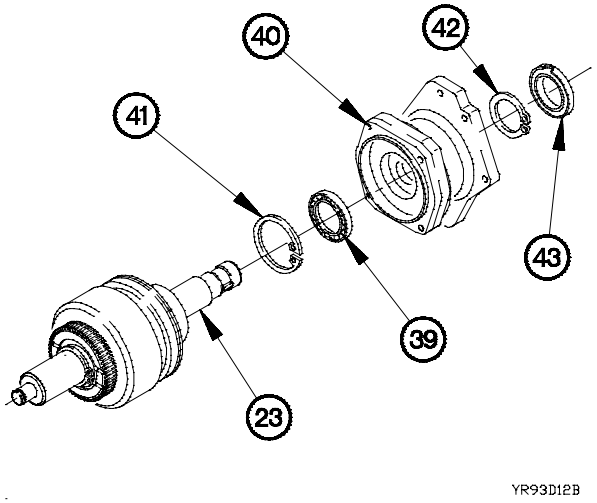
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(33) Install retaining ring (37) on output shaft (23).

(34) Install spacer (38) on output shaft (23).





(35) Install bearing (39) in bearing cap (40).

(36) Install retaining ring (41) in bearing cap (40).

(37) Install bearing cap (40) on output shaft (23).

(38) Install retainer ring (42) on output shaft (23).

(39) Press oil seal (43) in bearing cap (40).

16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

(40) Position gasket (44) and bearing cap (40) on housing (2) with four screws (45).

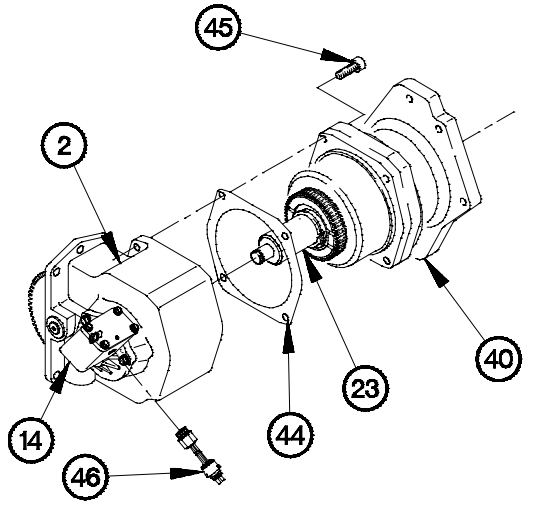
(41) Tighten four screws (45) to 16-20 lb-ft (22-27 N•m).

CAUTION

Output shaft should turn freely in bearing cap and have no side-to-side movement. Failure to comply may result in damage to equipment.

(42) Turn output shaft (23) in bearing cap (40).

(43) Install solenoid electrical connector (46) in valve body (14).



e. Installation.

NOTE

Perform steps (1) through (1.11) on PTO Assembly (P/N 12378814-001).

(1) Install four threaded studs (1) in PTO (2).

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(1.1) Apply sealing compound to threads of 90-degree fittings (3 and 4) and tee fitting (4.1).

(1.2) Install preformed packing (5) on 90-degree fitting (3).

(1.3) Position 90-degree fitting (3) in PTO (2).

(1.4) Install the fitting (4.1) in PTO (2).

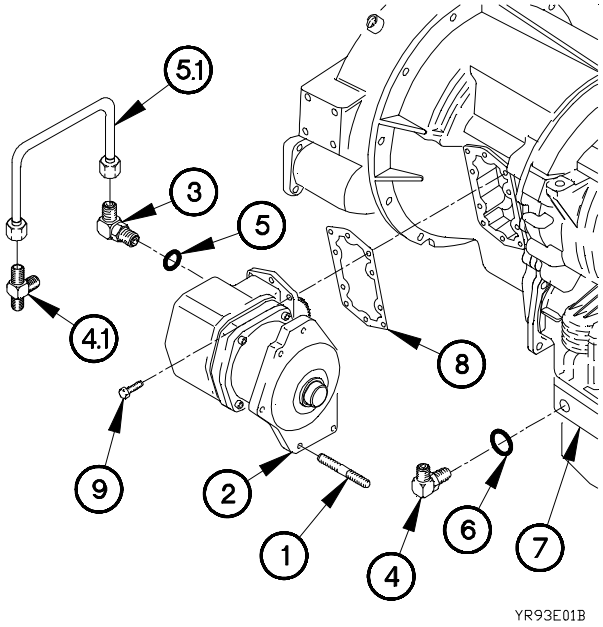
(1.5) Install tube (5.1) on 90-degree fitting (3).

(1.6) Install tube (5.1) on tee fitting (4.1).

(1.7) Install preformed packing (6) on 90-degree fitting (4).

(1.8) Position 90-degree fitting (4) in transmission (7).

(1.9) Tighten 90-degree fittings (3 and 4) to 10-13 lb-ft (14-18 N•m).



NOTE

- Step (1.10) requires the aid of an assistant.
- Apply spindle compound to input gear prior to installation.

(1.10) Position gasket (8) and PTO (2) on transmission (7) with eight screws (9).

(1.11) Tighten eight screws (9) to 42-50 lb-ft (57-68 N•m).

WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush with water and get immediate medical attention. Failure to comply may result in injury to personnel.

NOTE

Perform steps (1.12) through (9) on PTO Assembly (P/N 276XMF-JX-D5XK).

(1.12) Install four threaded studs (1) in PTO (2).

(2) Apply sealing compound to 90-degree fittings (3 and 4).

(3) Install preformed packing (5) on 90-degree fitting (3).

(4) Position 90-degree fitting (3) in PTO (2).

(5) Install preformed packing (6) on 90-degree fitting (4).

(6) Position 90-degree fitting (4) in transmission (7).

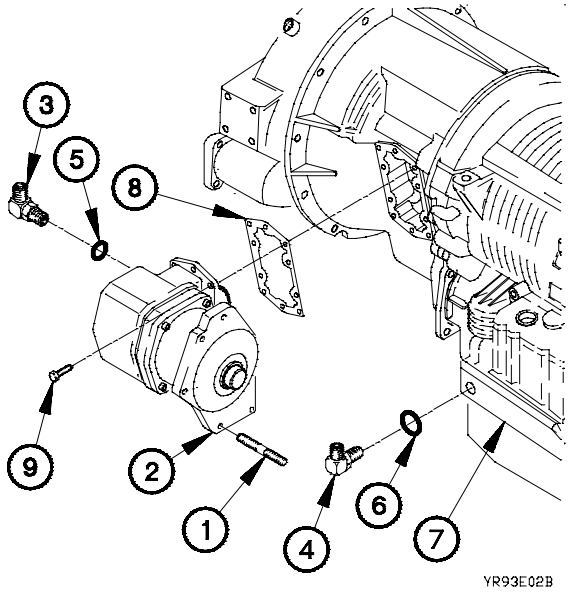
(7) Tighten 90-degree fittings (3 and 4) to 10-13 lb-ft (14-18 N·m).

NOTE

Step (8) requires the aid of an assistant.

(8) Position gasket (8) and PTO (2) on transmission (7) with eight screws (9).

(9) Tighten eight screws (9) to 42-50 lb-ft (57-68 N·m).



NOTE

Step (10) requires the aid of an assistant.

(10) Remove drive shaft (10) from frame (11).

WARNING

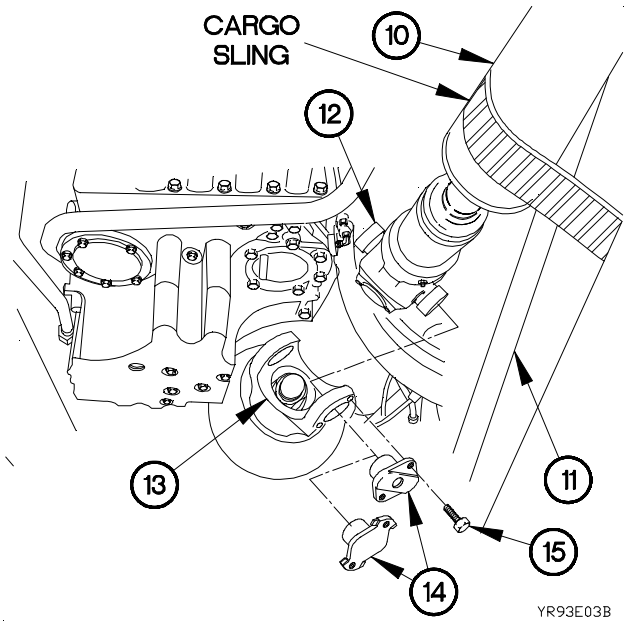
Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups to ensure all needle bearings are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

- Wipe end of yoke bearing cores prior to installation.
- There are two types of bearing cup, those with tabs and those without. Perform the following step on bearing cups not equipped with tabs.



(11) Position universal joint (12) on yoke (13) with two bearing cups (14) and four screws (15).

NOTE

- When correct torque is reached, bearing cap screw small hex head will brake off.
- Perform the following step on kits equipped with screws P/N C5 H5 24-39.

(12) Tighten four screws (15).

16-6. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

NOTE

- Perform the following step on kits equipped with shearhead screws.
- Alternately tighten screws.
- When correct torque is reached, bearing cup small screw hex head will break off.

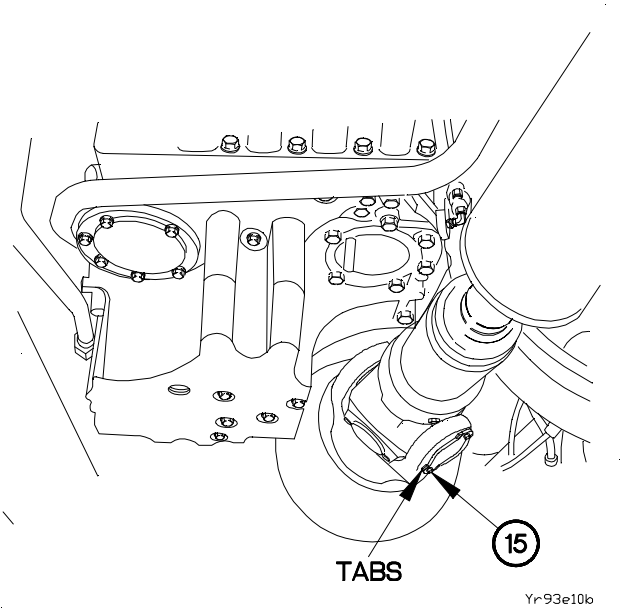
(12.1) Tighten four screws (15).

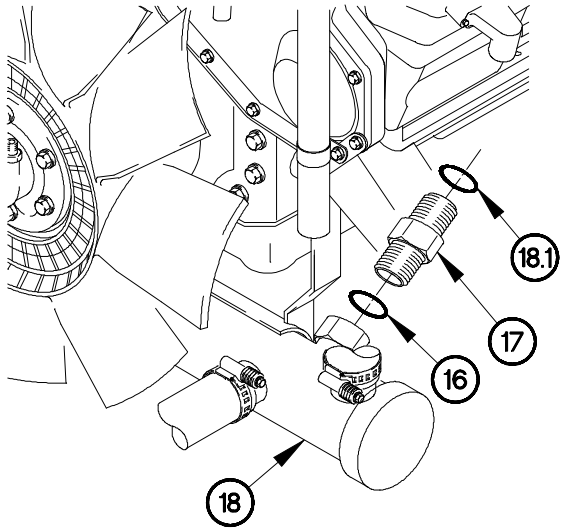
NOTE

Perform the following two steps on bearing cups equipped with tabs.

(12.2) Tighten four screws (15) to 26-35 lb-ft (35-47 N•m).

(12.3) Fold tabs on four screws (15).





NOTE

- Perform steps (13) through (14.9) on vehicles equipped with transmission oil cooler tubes.
- Perform steps (13) and (14) on vehicles not previously equipped with corrosive enhanced fittings.

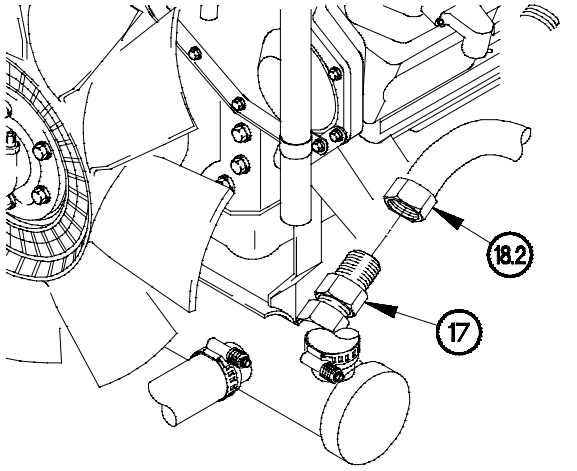
(13) Install preformed packing (16) on fitting (17).

(14) Install fitting (17) on transmission oil cooler (18).

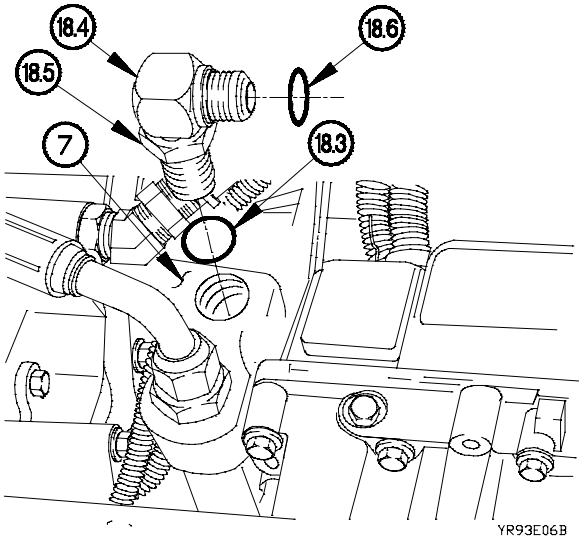
(14.1) Install preformed packing (18.1) on fitting (17).

(14.2) Position transmission oil cooler return tube (18.2) on fitting (17).

(14.3) Tighten transmission oil cooler return tube (18.2) to 94-104 lb-ft (127-141 N·m).



YR93E05B



YR93E06B

NOTE

Perform steps (14.4) through (14.7) on vehicles not previously equipped with corrosive enhanced fittings.

(14.4) Install preformed packing (18.3) on 90-degree fitting (18.4).

(14.5) Position 90-degree fitting (18.4) on transmission (7).

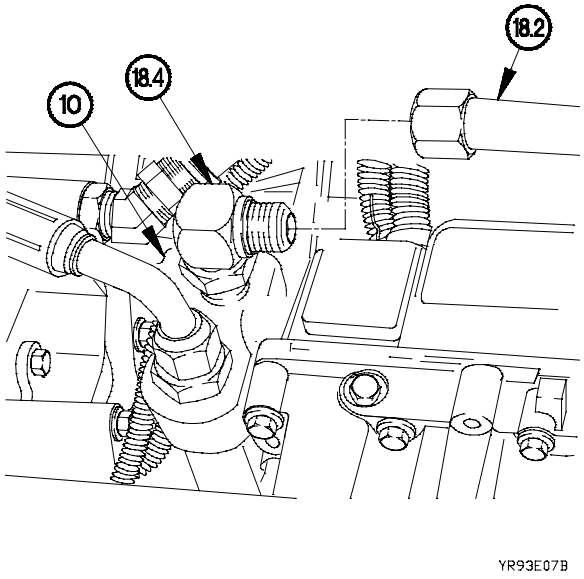
(14.6) Tighten jamb nut (18.5) on 90-degree fitting (18.4).

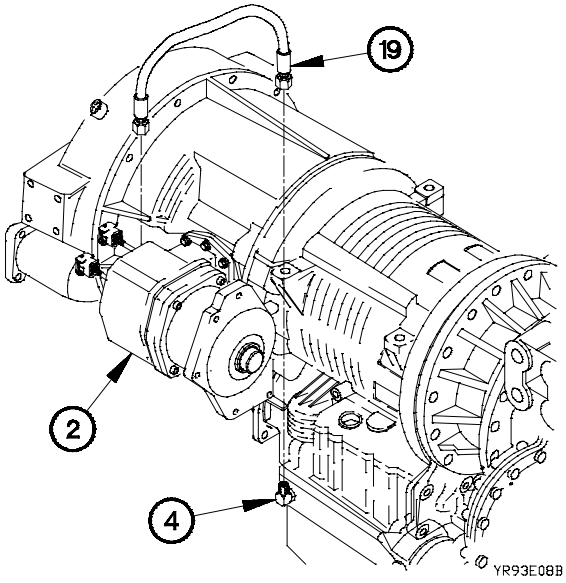
(14.7) Install preformed packing (18.6) on 90-degree fitting (18.4).

16-6. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

(14.8) Position transmission oil cooler return tube (18.2) on 90-degree fitting (18.4).

(14.9) Tighten transmission oil cooler return tube (18.2) to 94-104 lb-ft (127-141 N·m).

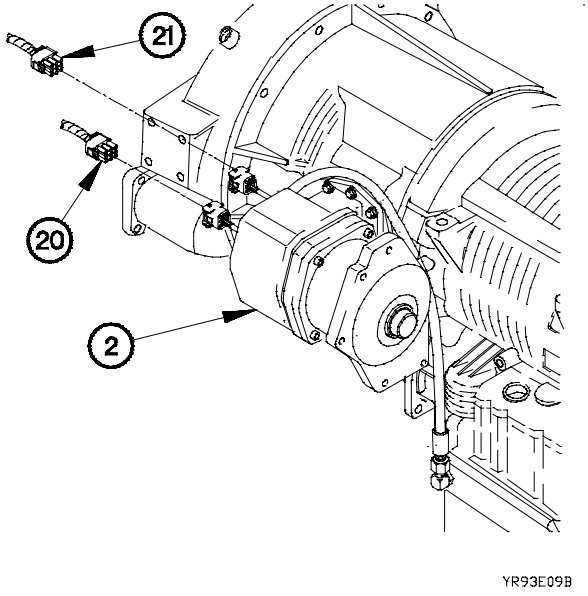




(15) Connect oil hose (19) to 90-degree fitting (4).

(16) Install oil hose (19) to PTO (2).

(17) Connect electrical connectors P217 (20) and P216 (21) to PTO (2).



f. Follow-On Maintenance.

(1) Install hydraulic rotary pump (para 16-5).

(2) Connect batteries (TM 9-2320-365-20-3).

(3) Operate 11K self-recovery winch (SRW) and check for proper operation (TM 9-2320-365-10).

End of Task.

CHAPTER 17
HYDRAULIC SYSTEM MAINTENANCE

Section I. INTRODUCTION 17-1
17-1. INTRODUCTION 17-1

Section II. MAINTENANCE PROCEDURES 17-2
17-2. SUSPENSION CYLINDER REPLACEMENT 17-2

Section I. INTRODUCTION

17-1. INTRODUCTION

This chapter contains maintenance instructions for replacing Hydraulic System Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

17-2. SUSPENSION CYLINDER REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Top radiator fan shroud removed (TM 9-2320-365-20-3). (LH side only).
Engine front resilient mounts removed (para 3-4). (LH side only).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 81, Appendix B)

Tools and Special Tools (Cont)
Socket Set, Socket Wrench (Item 34, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)

Materials/Parts
Cap and Plug Set (Item 18, Appendix C)
Packing, Preformed (2) (Item 212, Appendix F)
Nut, Self-Locking (Item 145, Appendix F)
Pin, Cotter (Item 226.1, Appendix F)
Hydraulic Fluid A (Item 41.2, Appendix C)

Personnel Required
(2)

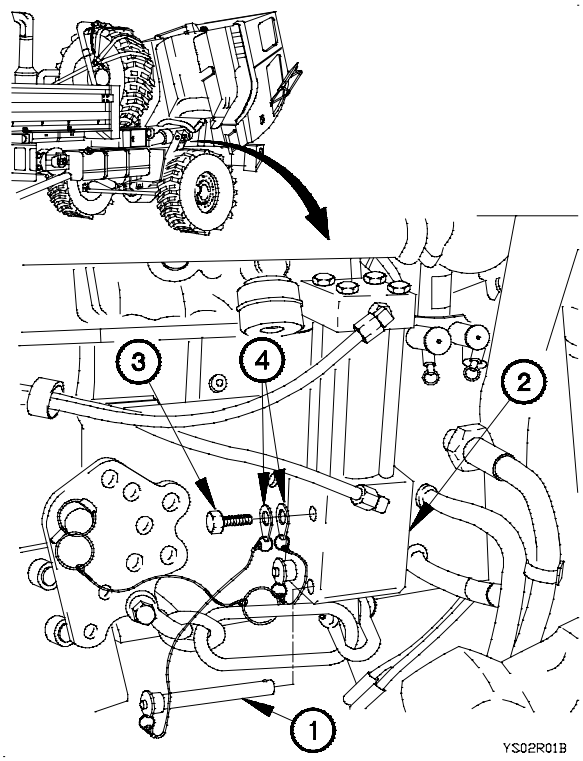
a. Removal.

NOTE

Left and right suspension cylinders are removed the same way. Right side shown.

(1) Remove two quick release pins (1) from suspension cylinder (2).

(2) Remove screw (3) and two lanyards (4) from suspension cylinder (2).



WARNING

Hydraulic fluid (MIL-H-5606A) is TOXIC. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes. Skin and clothing that comes in contact with hydraulic oil should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.

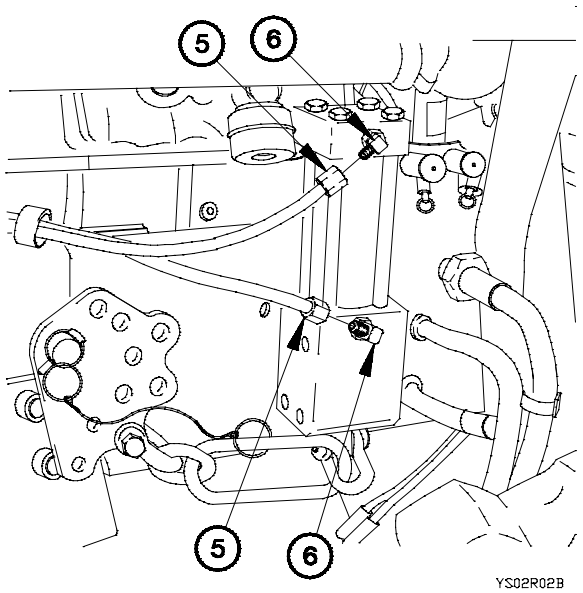
CAUTION

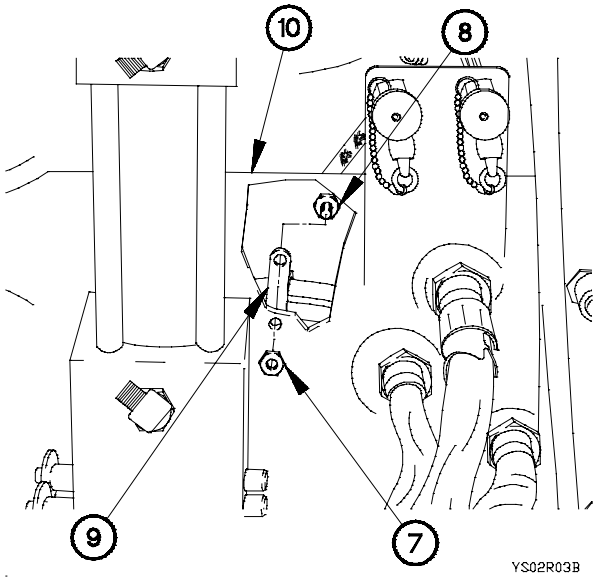
Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

(3) Disconnect two hydraulic hoses (5) from 90-degree fittings (6).





WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE

Step (4) requires the aid of an assistant.

(4) Remove self-locking nut (7), screw (8), and clamp (9) from frame rail (10). Discard self-locking nut.

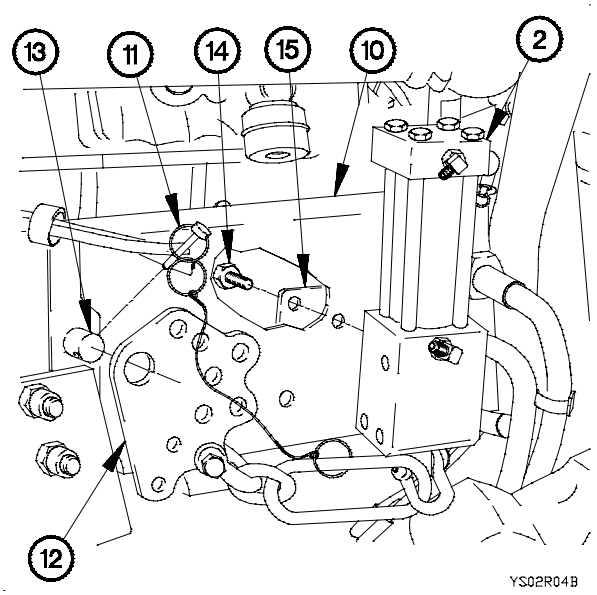
17-2. SUSPENSION CYLINDER REPLACEMENT (CONT)

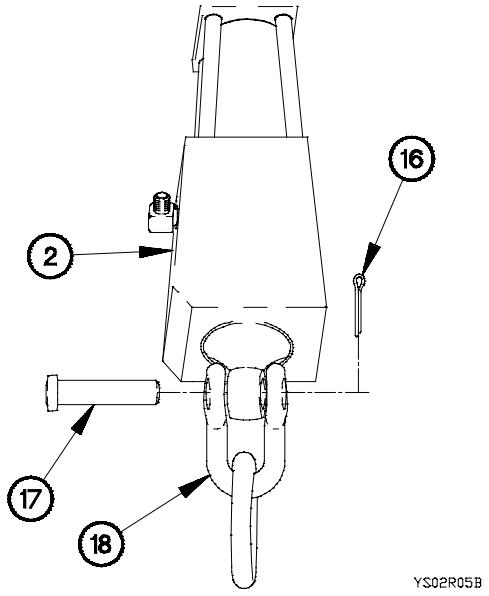
(5) Remove spring pin (11) and suspension compression plate (12) from suspension compression plate stud (13).

NOTE

Step (6) requires the aid of an assistant.

(6) Remove three screws (14), plate (15), and suspension cylinder (2) from frame rail (10).





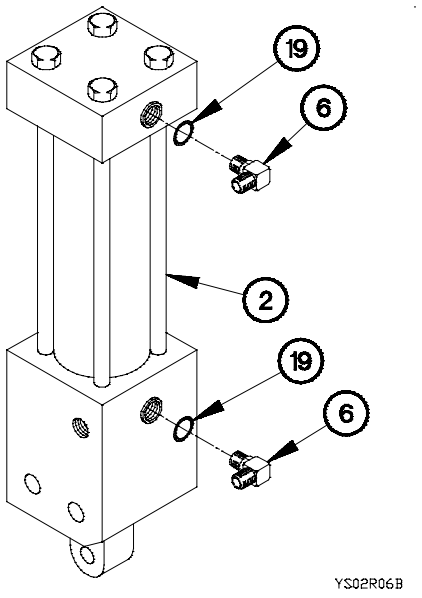
(7) Remove cotter pin (16), pin (17), and shackle (18) from suspension cylinder (2). Discard cotter pin.

NOTE

Note orientation of fittings prior to removal.

(8) Remove two 90-degree fittings (6) from suspension cylinder (2).

(9) Remove two preformed packings (19) from 90-degree fittings (6). Discard preformed packings.



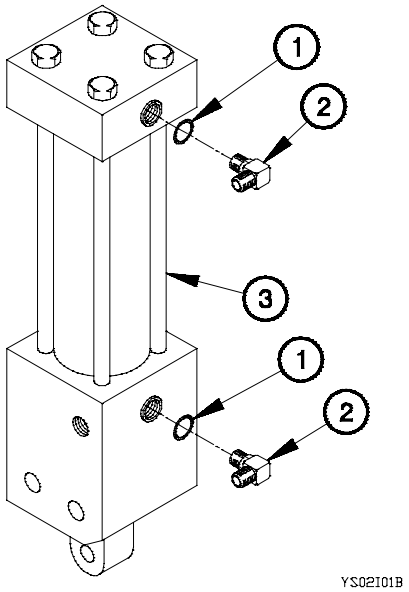
b. Installation.

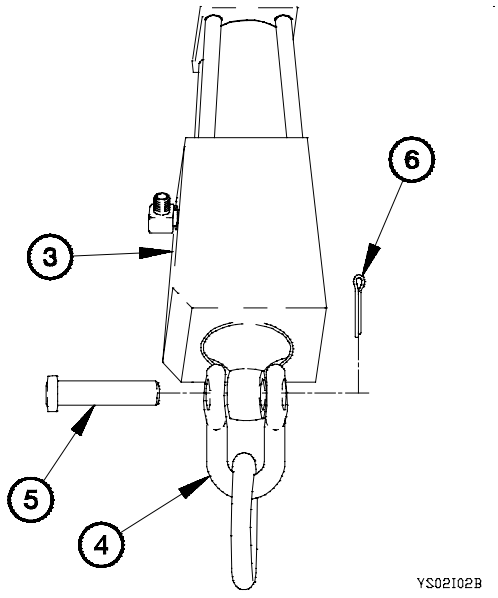
NOTE

Left and right side suspension cylinders are installed the same way. Right side shown.

(1) Install two preformed packings (1) on 90-degree fittings (2).

(2) Install two 90-degree fittings (2) in suspension cylinder (3).

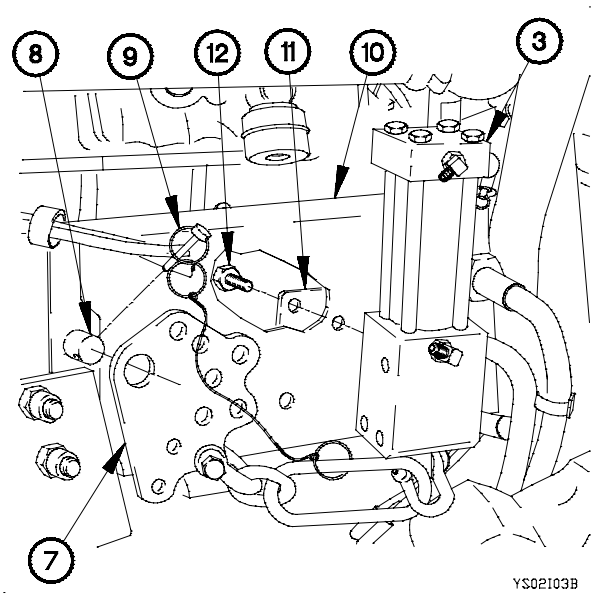




(3) Install shackle (4) on suspension cylinder (3) with pin (5) and cotter pin (6).

17-2. SUSPENSION CYLINDER REPLACEMENT (CONT)

(4) Install suspension compression plate (7) on suspension compression plate stud (8) with spring pin (9).



WARNING

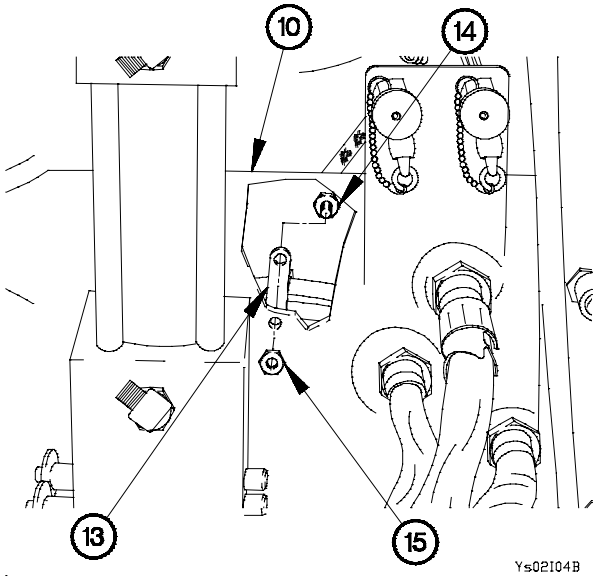
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

NOTE

Steps (5) through (8) require the aid of an assistant.

(5) Position suspension cylinder (3) on frame rail (10) with plate (11) and three screws (12).

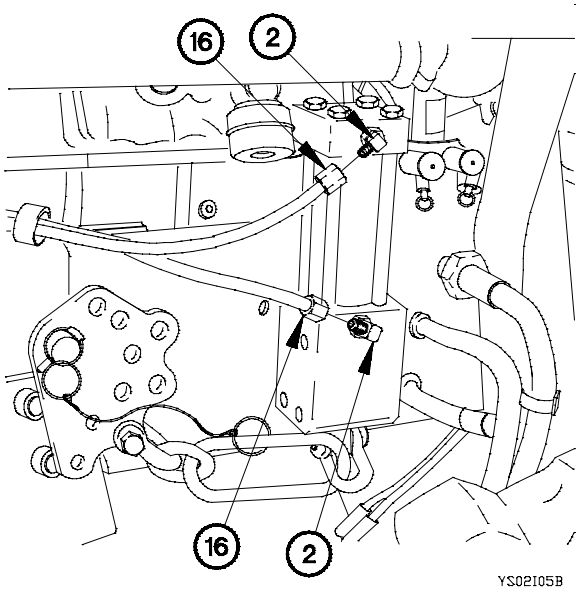
(6) Tighten three screws (12) to 149-183 lb-ft (202-248 N·m).

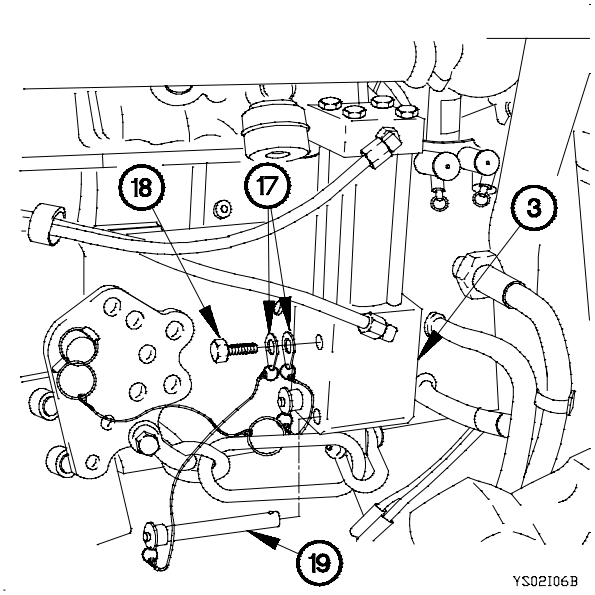


(7) Position clamp (13) on frame rail (10) with screw (14), and self-locking nut (15).

(8) Tighten self-locking nut (15) to 84-108 lb-in. (9-12 N·m).

(9) Connect two hydraulic hoses (16) to 90-degree fittings (2).





(10) Position two lanyards (17) on suspension cylinder (3) with screw (18).

(11) Tighten screw (18) to 18-22 lb-ft (24-30 N·m).

(12) Install two quick release pins (19) in suspension cylinder (3).

c. Follow-On Maintenance.

(1) Fill air transportability hydraulic system (TM 9-2320-365-20).

(2) Lower cab (TM 9-2320-365-10).

End of Task.

All data on pages 17-8 through 17-12, including pages 17-9 through 17-12, deleted.

CHAPTER 18
SPECIAL PURPOSE KITS MAINTENANCE

Section I. INTRODUCTION 18-1
18-1. INTRODUCTION 18-1
18-2. M1078/M1079 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION 18-2
18-3. 200 AMP ALTERNATOR REPAIR 18-12
18-4. DIGITIZATION KIT, INITIAL INSTALLATION 18-29
18-5. ENHANCED RESILIENT MOUNT INITIAL INSTALLATION 18-57

Section I. INTRODUCTION

18-1. INTRODUCTION

This chapter contains maintenance instructions for installation and repair of Special Purpose Kits authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

18-2. M1078/M1079 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION

This task covers:

a. Installation

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Air tanks drained (TM 9-2320-365-10).
Cargo bed removed, if equipped (para 15-8).
Van body removed, if equipped (TM 9-2320-365-20-4).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Socket, Socket Wrench (TM 9-2320-365-20)
Vise, Machinist (Item 72, Appendix B)
Drill, Electric, Portable (Item 18, Appendix B)

Tools and Special Tools (Cont)
Drill Set, Twist (Item 17, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)
Sling, Cargo (Item 48, Appendix B)
Shop Equipment, Automotive Vehicle (Item 56, TM 9-2320-366-20 Appendix B)

Materials/Parts
Ties, Cable, Plastic (Item 89, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)

Personnel Required
(3)

WARNING

Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

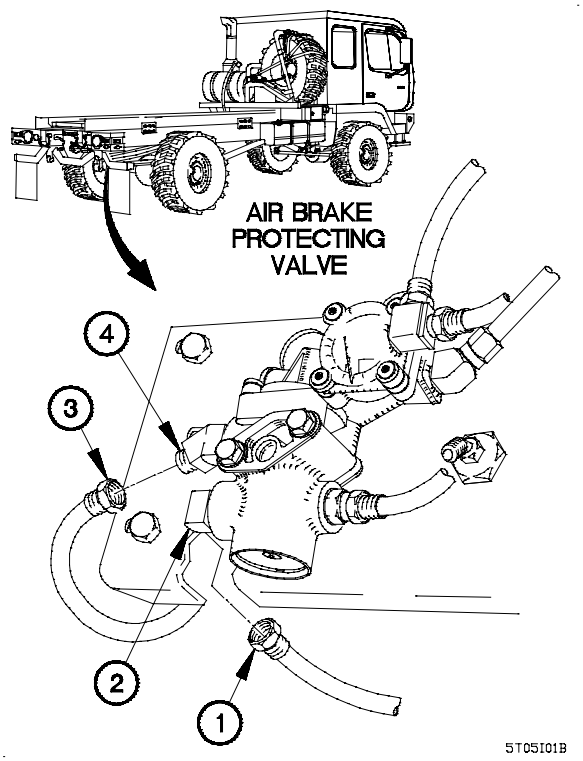
a. Installation.

NOTE

- Remove plastic cable ties as required.
- Tag air hoses and connection points prior to disconnecting.

(1) Disconnect air hose (1) from 90-degree fitting (2).

(2) Disconnect air hose (3) from 45-degree fitting (4).



(3) Remove cotter pin (5) from nut (6). Discard cotter pin.

(4) Remove nut (6) and washer (7) from pintle hook (8).

WARNING

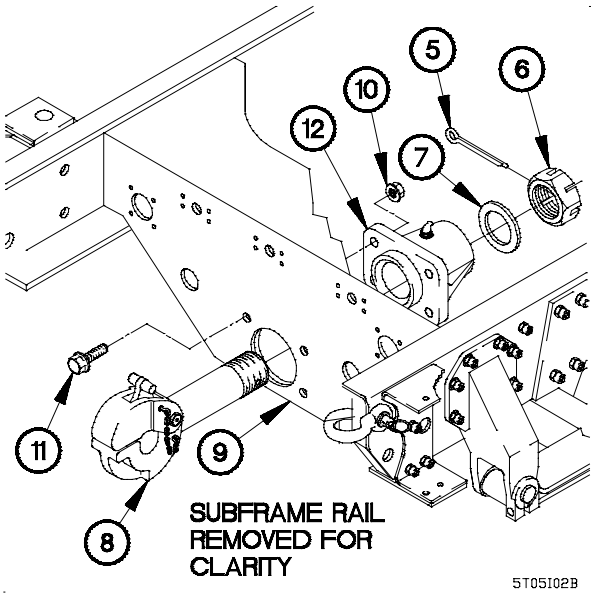
Pintle hook weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

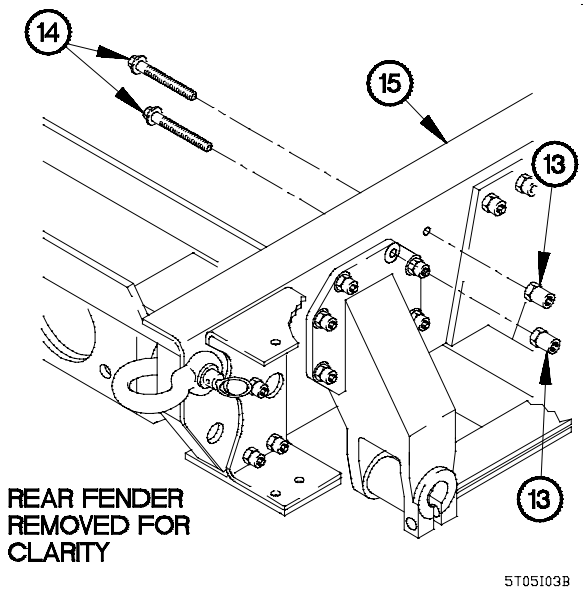
NOTE

Steps (5) through (9) require the aid of an assistant.

(5) Remove pintle hook (8) from rear crossmember (9).

(6) Remove four self-locking nuts (10), bolts (11), and support (12) from rear crossmember (9). Discard self-locking nuts.





CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

NOTE

Left and right side bolts and collars are removed the same way. Right side shown.

(7) Remove two collars (13) and bolts (14) from RH frame rail (15). Discard collars and bolts.

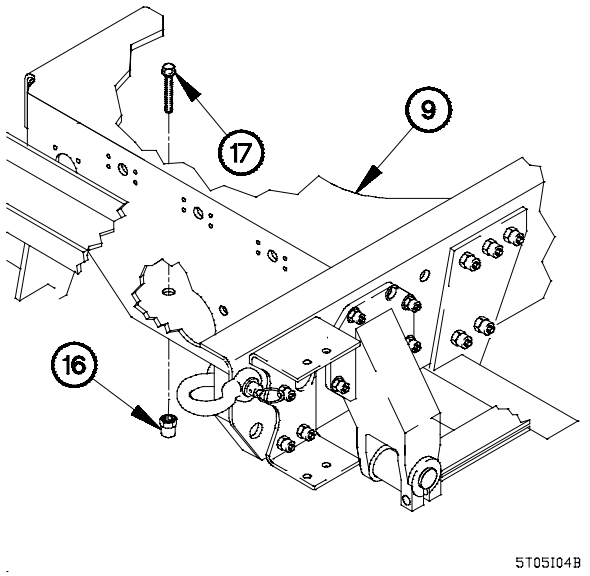
(8) Perform step (7) on left side bolts and collars.

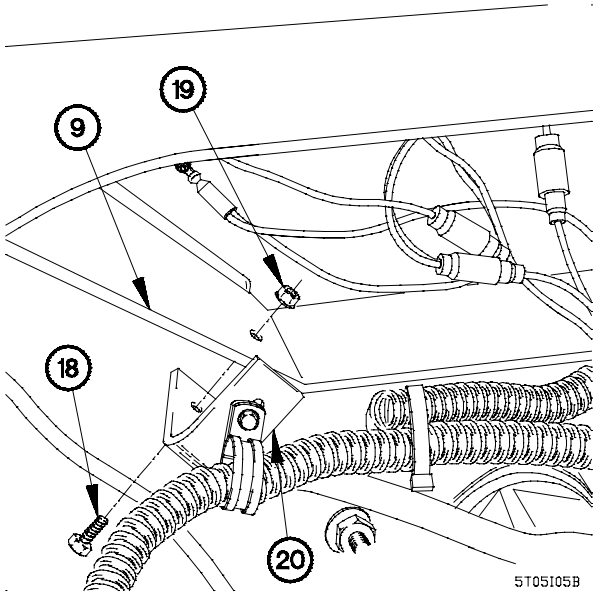
18-2. M1078/M1079 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

(9) Remove two collars (16) and bolts (17) from rear crossmember (9). Discard collars and bolts.





NOTE

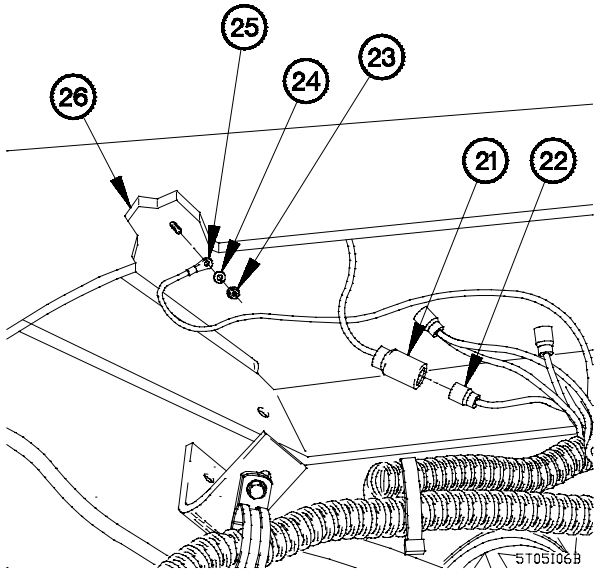
Left and right side L-brackets are removed the same way. Right side shown.

(10) Remove screw (18), self-locking nut (19), and L-bracket (20) from rear crossmember (9).

(11) Perform step (10) on left side L-bracket.

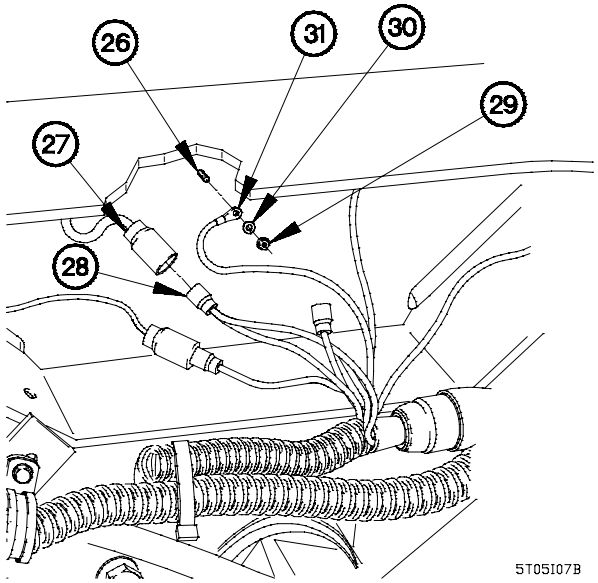
(12) Disconnect connector (21) from connector P58 (22).

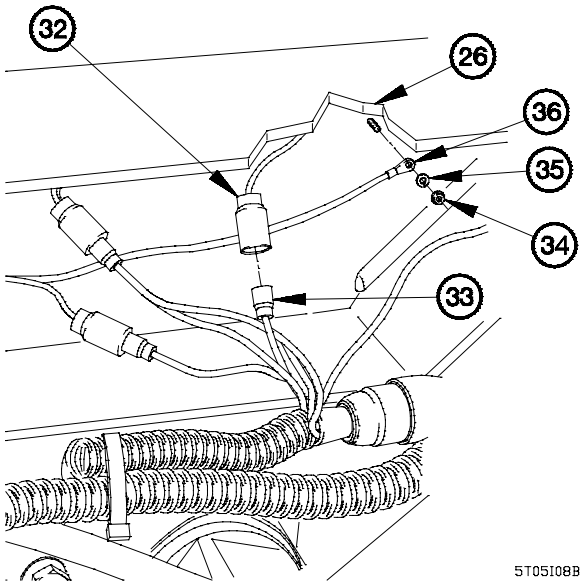
(13) Remove nut (23), lockwasher (24), and terminal lug TL32 (25) from base (26).



(14) Disconnect connector (27) from connector P56 (28).

(15) Remove nut (29), lockwasher (30), and terminal lug TL31 (31) from base (26).





(16) Disconnect connector (32) from connector P54 (33).

(17) Remove nut (34), lockwasher (35), and terminal lug TL30 (36) from base (26).

NOTE

- Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (18).
- Step (18) requires the aid of an assistant.

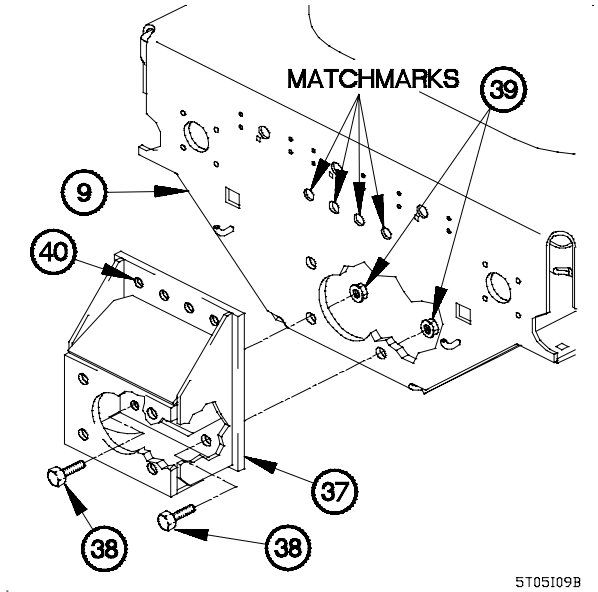
(18) Install pintle hook extension (37) on rear crossmember (9) with two bolts (38) and self-locking nuts (39).

(19) Match mark four top holes (40) on rear crossmember (9).

(20) Remove two self-locking nuts (39), bolts (38), and pintle hook extension (37) from rear crossmember (9).

(21) Drill four 0.375 in. (9.5 mm) pilot holes in rear crossmember (9) at matchmarks.

(22) Drill four 0.75 in. (19 mm) holes in rear crossmember (9).

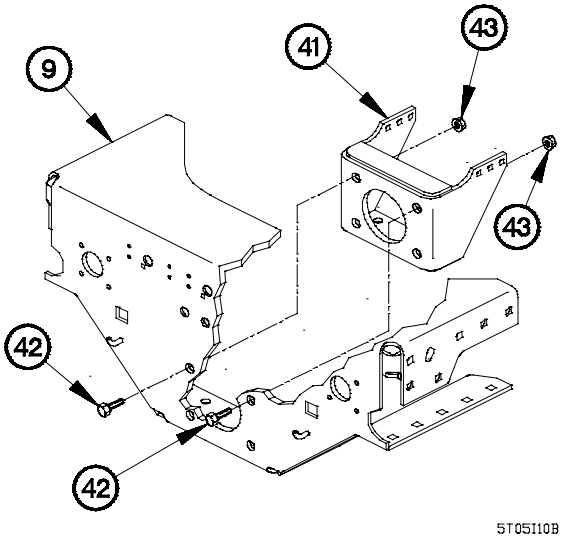


18-2. M1078/M1079 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

Use bolts P/N 12414307-140 and self-locking nuts P/N 12414308-025 on step (23).

(23) Position rear lower crossmember support (41) on rear crossmember (9) with two bolts (42) and self-locking nuts (43).



NOTE

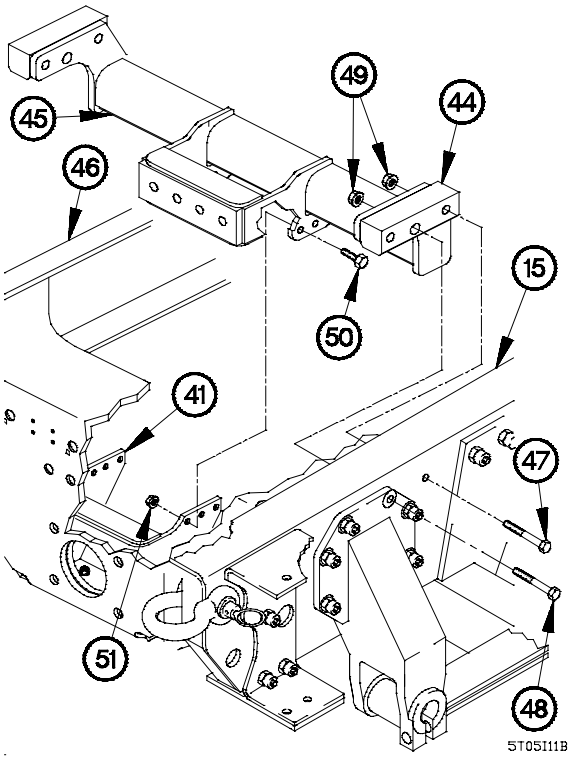
- Position two spacers on frame rails with beveled edges facing down.
- Use bolts P/N 12414307-149 and P/N 12414307-148 and self-locking nuts P/N 12414308-025 on step (24).
- Left and right side of rear main crossmember support is installed the same way. Right side shown.
- Route connectors and terminal lugs under rear main crossmember.

(24) Position two spacers (44) and rear main crossmember support (45) on LH and RH frame rails (46 and 15) with two bolts (47 and 48) and four self-locking nuts (49).

NOTE

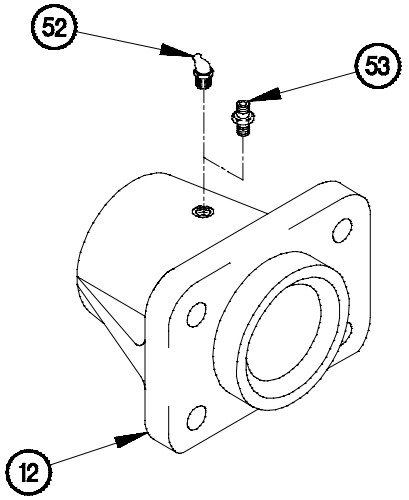
Use bolts P/N 12414307-079 and self-locking nuts P/N 12414308-021 on step (25).

(25) Position six bolts (50) and self-locking nuts (51) on rear lower crossmember support (41).

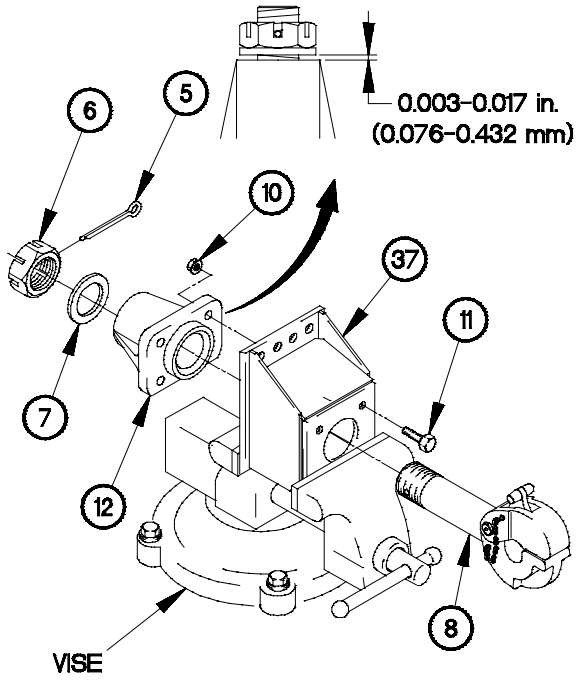


(26) Remove 45-degree grease fitting (52) from support (12).

(27) Install grease fitting (53) in support (12).



5T05I12B



5T05I13B

NOTE

- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (28).
- Support will be installed with fitting facing down.

(28) Position support (12) on pintle hook extension (37) with four bolts (11) and self-locking nuts (10).

(29) Position pintle hook extension (37) in vise.

(30) Tighten four self-locking nuts (10) to 196-240 lb-ft (265-325 N·m).

(31) Position pintle hook (8) in pintle hook extension (37) with washer (7) and nut (6).

CAUTION

Clearance between washer and support must be 0.003-0.017 in. (0.076-0.432 mm). Failure to comply may result in damage to equipment.

(32) Adjust nut (6) until clearance is 0.003-0.017 in. (0.076-0.432 mm) with alignment holes lined up between nut (6) and pintle hook (8).

(33) Install cotter pin (5) in nut (6).

18-2. M1078/M1079 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

WARNING

Pintle hook extension weighs approximately 90 lbs (41 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

- Step (34) requires the aid of two assistants.
- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (34).

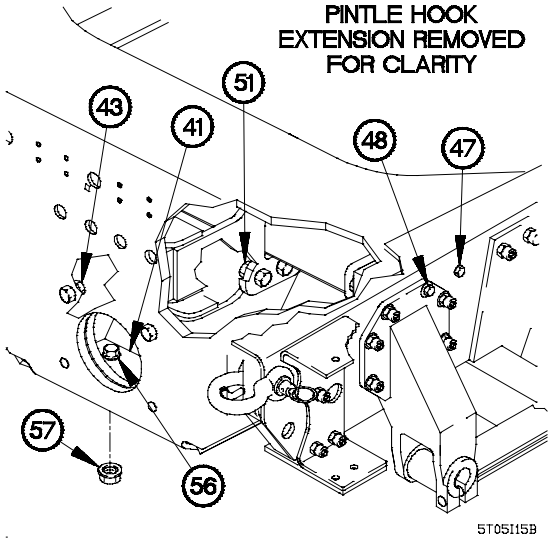
(34) Position pintle hook extension (37) on rear crossmember (9) with four bolts (54) and self-locking nuts (55).

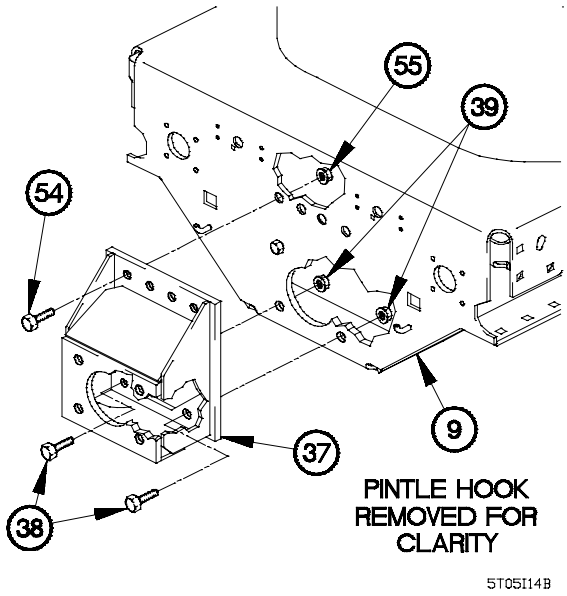
NOTE

- Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (35).
- Steps (35) through (40) require the aid of an assistant.

(35) Position two bolts (38) and self-locking nuts (39) in pintle hook extension (37).

(36) Tighten four self-locking nuts (55) and two self-locking nuts (39) to 196-240 lb-ft (265-325 N·m).





NOTE

Use bolts P/N 12414307-141 and self-locking nuts P/N 12414308-025 on step (37).

(37) Position two bolts (56) and self-locking nuts (57) in rear lower crossmember support (41).

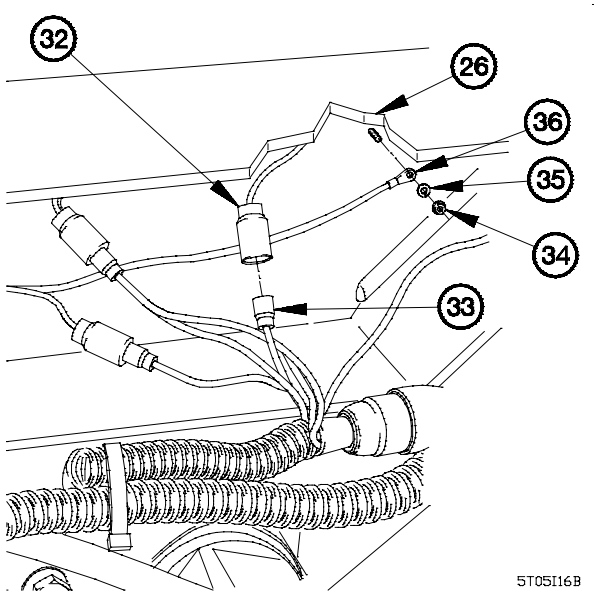
(38) Tighten two self-locking nuts (43 and 57) to 196-240 lb-ft (265-325 N·m).

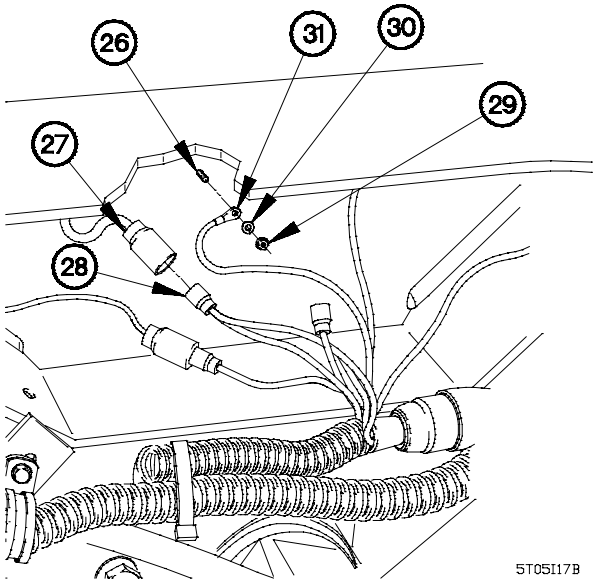
(39) Tighten six self-locking nuts (51) to 76-94 lb-ft (103-125 N·m).

(40) Tighten two bolts (47 and 48) to 236-288 lb-ft (319-389 N·m).

(41) Install terminal lug TL30 (36) on base (26) with lockwasher (35) and nut (34).

(42) Connect connector (32) to connector P54 (33).



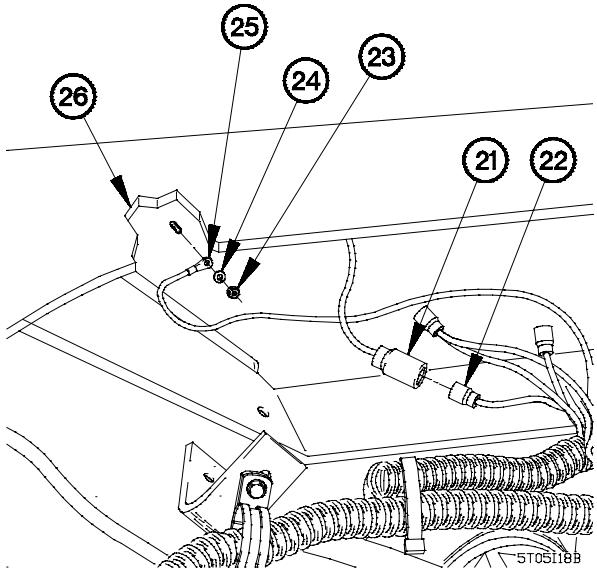


(43) Install terminal lug TL31 (31) on base (26) with lockwasher (30) and nut (29).

(44) Connect connector (27) to connector P56 (28).

(45) Install terminal lug TL32 (25) on base (26) with lockwasher (24) and nut (23).

(46) Connect connector (21) to connector P58 (22).

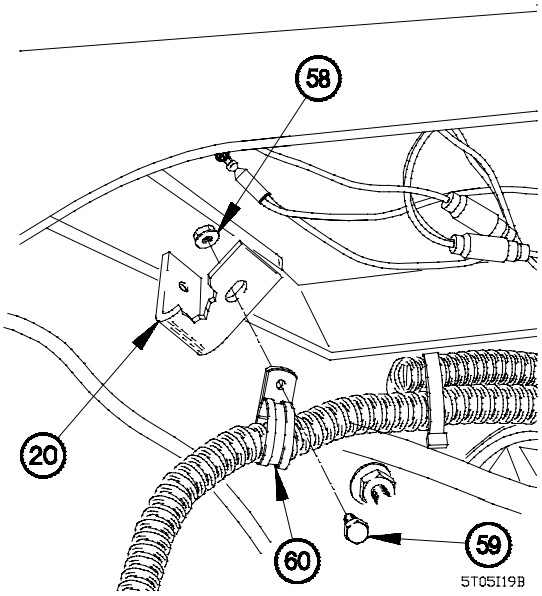


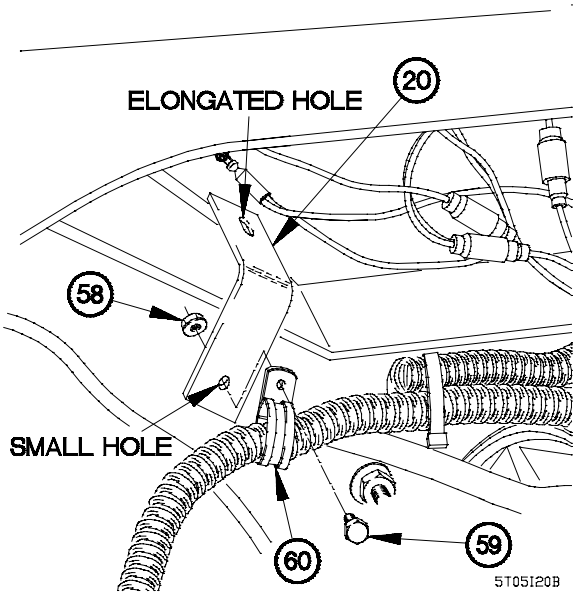
18-2. M1078/M1079 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

Left and right side L-brackets are removed and installed the same way. Right side shown.

(47) Remove self-locking nut (58), screw (59), and clamp (60) from L-bracket (20).





NOTE

Position L-bracket on rear crossmember with long side of bracket facing down.

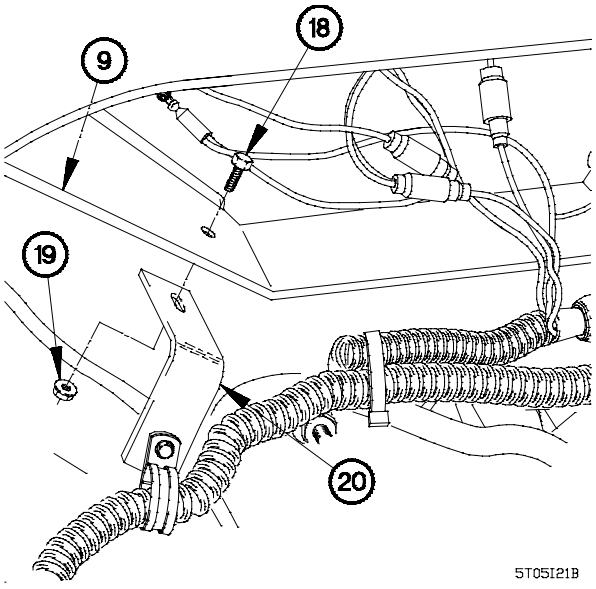
(49) Install L-bracket (20) on rear crossmember (9) with screw (18) and self-locking nut (19).

(50) Perform steps (47) through (49) on left side L-bracket.

NOTE

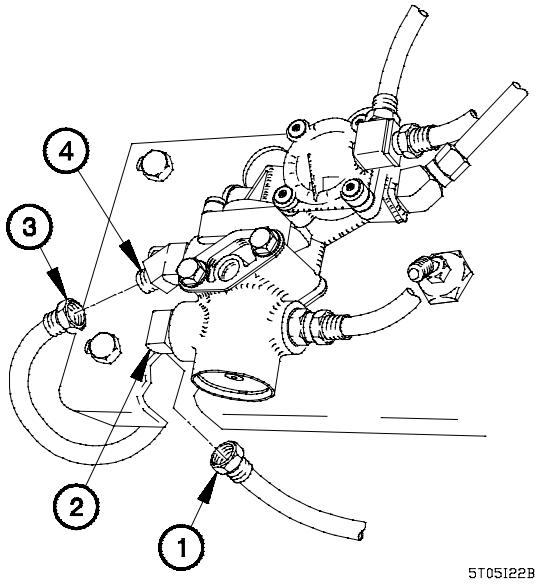
The L-bracket will be mounted with elongated hole against the rear crossmember and long end of L-bracket pointing down.

(48) Install clamp (60) in small hole on L-bracket (20) with screw (59) and self-locking nut (58).



(51) Connect air hose (3) to 45-degree fitting (4).

(52) Connect air hose (1) to 90-degree fitting (2).



b. Follow-On Maintenance.

(1) Install van body, if equipped (TM 9-2320-365-20-4).

(2) Install cargo bed, if equipped (para 15-8).

(3) Lubricate pintle hook (TM 9-2320-365-20).

End of Task.

18-3. 200 AMP ALTERNATOR REPAIR

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque 0-175 lb-ft (Item 80, Appendix B)
Puller Kit, Universal (TM 9-2320-365-20)
Wrench, Torque 0-200 lb-in. (Item 81, Appendix B)
Hammer, Soft Head (Item 28, Appendix B)
Press, Arbor Hand Operated (Item 41, Appendix B)
Vise, Machinist (Item 72, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Screw, Cap, Hex (Item 76, Appendix C)
Nut, Self-locking (Item 53, Appendix C)
Pulley, Groove (Item 58, Appendix C)
Grease, Molybdenum Disulfide (Item 38, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Sealing Compound (Item 70, Appendix C)
Sealing Compound (Item 75, Appendix C)

Materials/Parts (Cont)
Nut, Self-locking (Item 151, Appendix F)
Key, Woodruff (Item 85, Appendix F)
Nut, Self-locking (Item 122, Appendix F)
Lockwasher (8) (Item 107, Appendix F)
Nut, Self-locking (Item 152, Appendix F)
Nut, Self-locking (Item 154, Appendix F)
Lockwasher (13) (Item 108, Appendix F)
Lockwasher (2) (Item 113, Appendix F)
Lockwasher (Item 106, Appendix F)
Nut, Self-locking (18) (Item 150, Appendix F)
Nut, Self-locking (12) (item 149, Appendix F)
Bushing, Sleeve (Item 23, Appendix F)
Ring, Retaining (Item 248, Appendix F)
Ring, Retaining (Item 247, Appendix F)
Lockwasher (2) (Item 112, Appendix F)

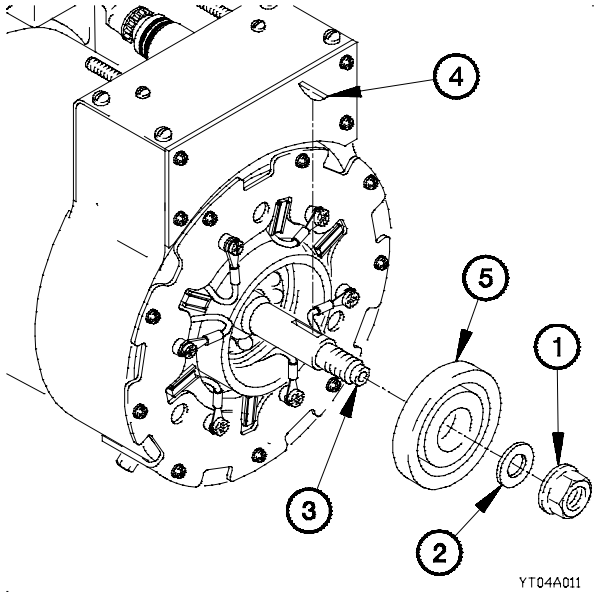
Personnel Required
(2)

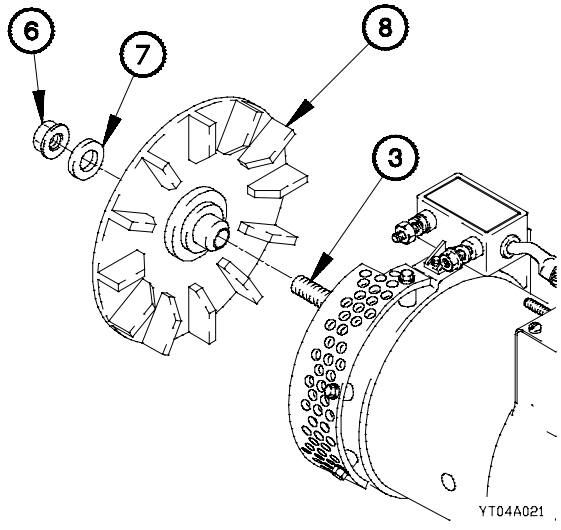
a. Disassembly

(1) Remove self-locking nut (1) and washer (2) from shaft (3). Discard self-locking nut.

(2) Remove key (4) from shaft (3). Discard key.

(3) Remove pulley bushing (5) from shaft (3).

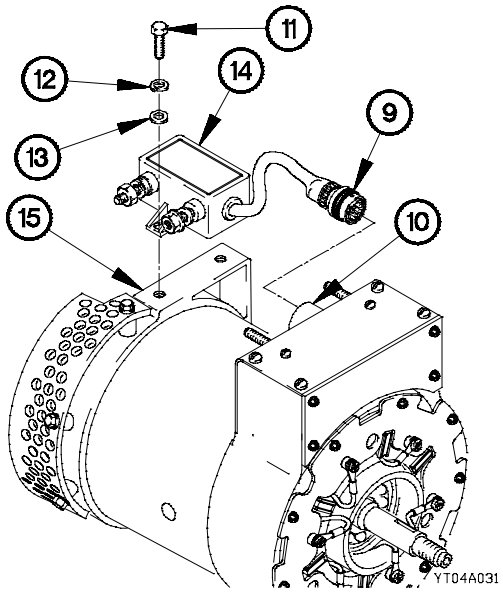


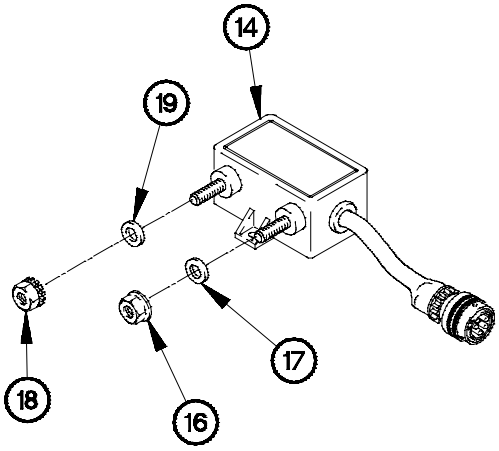


(4) Remove self-locking nut (6), washer (7), and fan (8) from shaft (3). Discard self-locking nut.

(5) Disconnect connector (9) from receptacle (10).

(6) Remove two screws (11), lockwashers (12), washers (13), and voltage regulator (14) from end housing (15). Discard lockwashers.

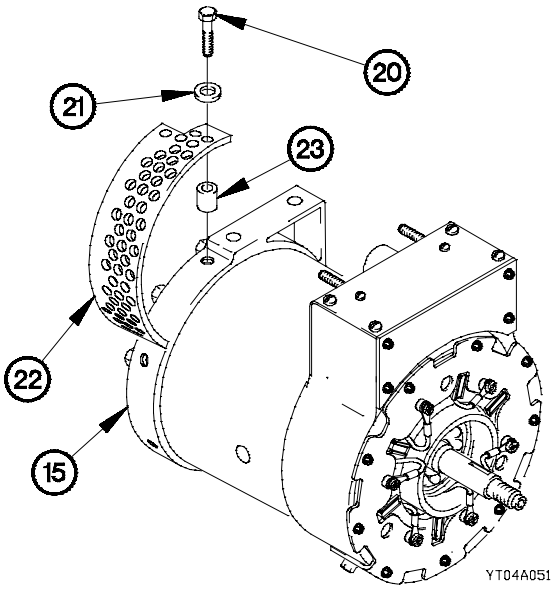




(7) Remove self-locking nut (16) and washer (17) from voltage regulator (14). Discard self-locking nut.

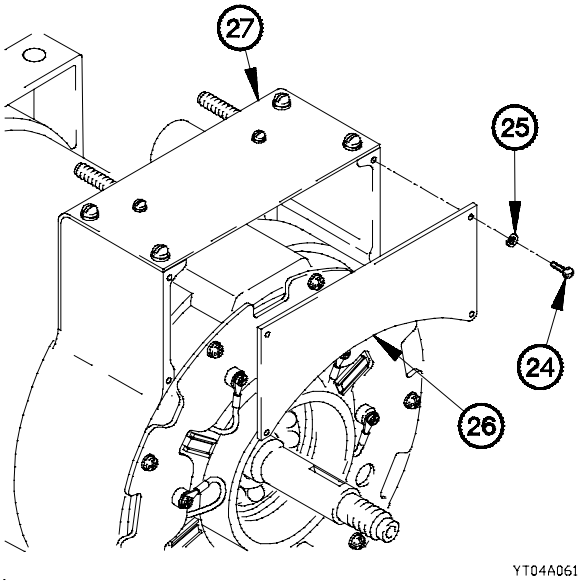
(8) Remove self-locking nut (18), and washer (19) from voltage regulator (14). Discard self-locking nut.

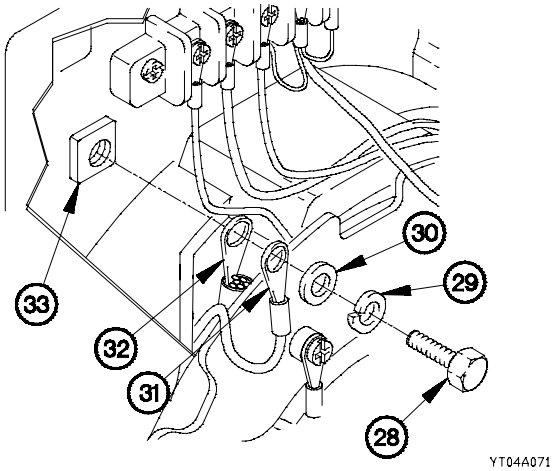
(9) Remove three screws (20), washers (21), fan guard (22), and three spacers (23) from end housing (15).



18-3. 200 AMP ALTERNATOR REPAIR (CONT)

(10) Remove four screws (24), lockwashers (25), and cover (26) from front housing (27). Discard lockwashers.



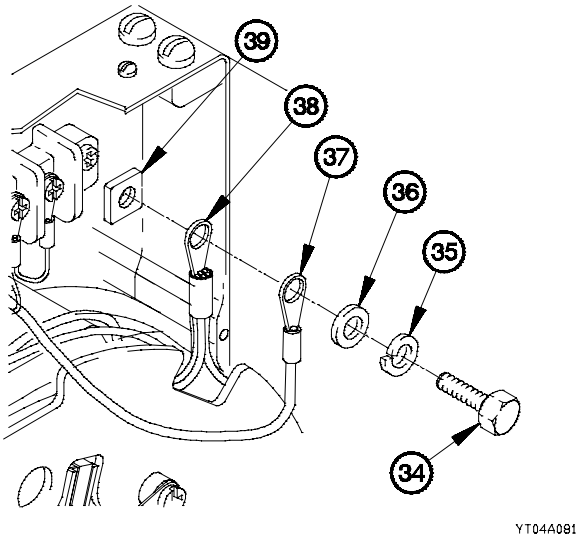


NOTE

Tag terminal lugs and connection points prior to disconnecting.

(11) Remove adhesive, screw (28), lockwasher (29), washer (30), terminal lugs (31 and 32) from 24 vdc post (33). Discard lockwasher.

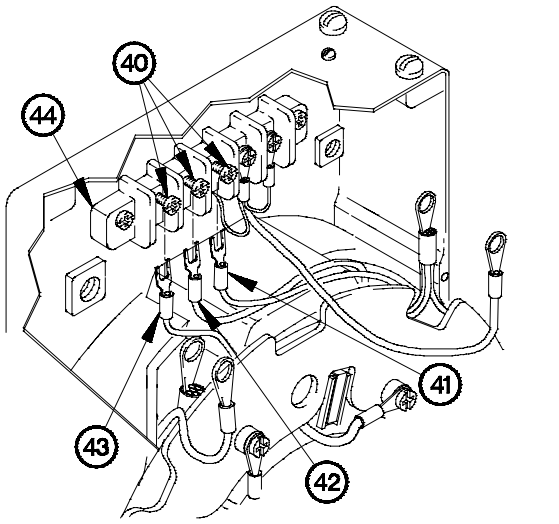
(12) Remove adhesive, screw (34), lockwasher (35), washer (36), terminal lugs (37 and 38) from 12 vdc post (39). Discard lockwasher.



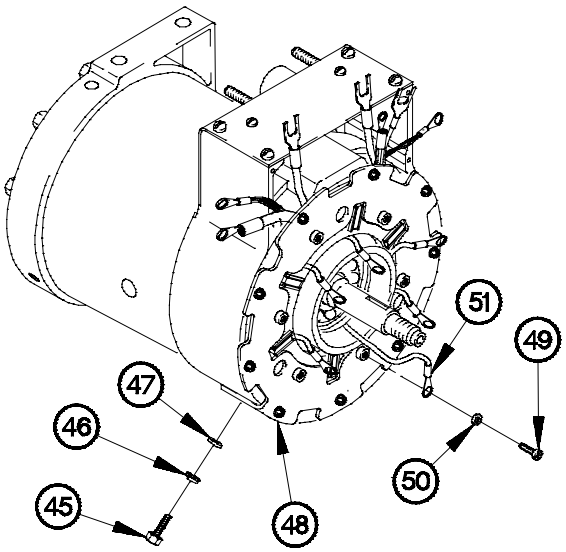
(13) Remove adhesive from three screws (40).

(14) Loosen three screws (40).

(15) Remove terminal lugs (41, 42, and 43) from terminal block (44).



YT04A091

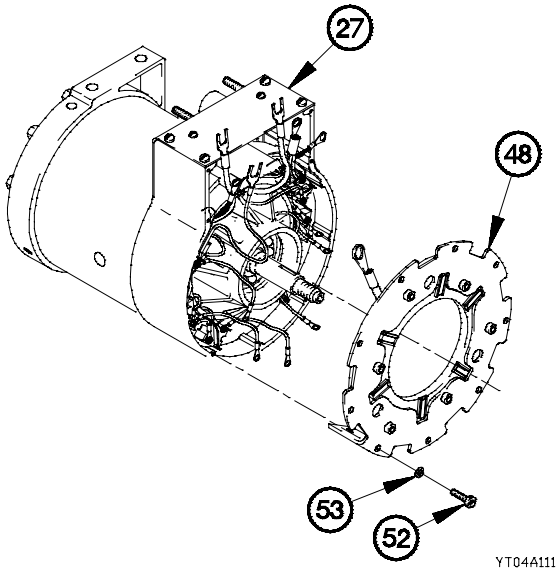


YT04A101

(16) Remove screw (45), lockwasher (46), and washer (47) from diode plate (48). Discard lockwasher.

(17) Remove adhesive, six screws (49), lockwashers (50), and terminal lugs (51) from diode plate (48). Discard lockwashers.

(18) Remove nine screws (52), lockwashers (53), and diode plate (48) from front housing (27). Discard lockwashers.

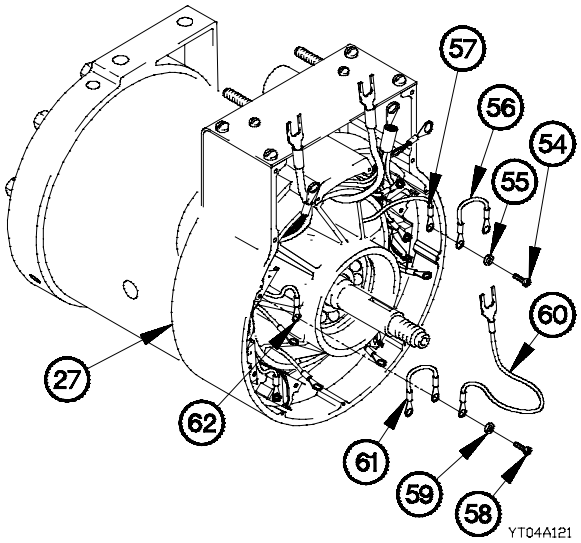


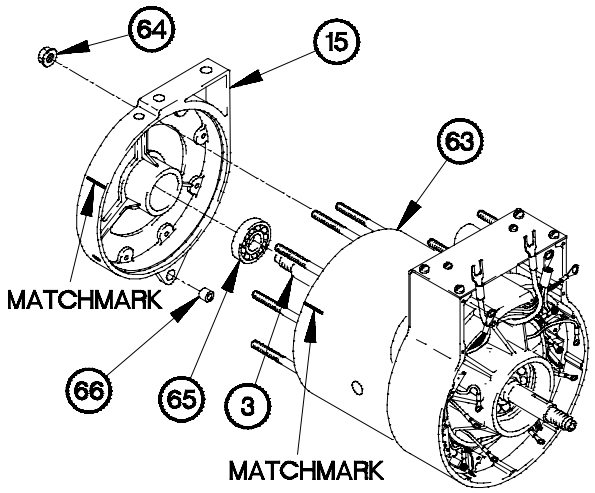
YT04A111

18-3. 200 AMP ALTERNATOR REPAIR (CONT)

(19) Remove adhesive, five screws (54), washers (55), jumpers (56), and terminal lugs (57) from front housing (27).

(20) Remove adhesive, screw (58), washer (59), jumpers (60 and 61), and terminal lug (62) from front housing (27).





(21) Match mark end housing (15) to stator (63).

(22) Remove nine self-locking nuts (64) and end housing (15) from stator (63). Discard self-locking nuts.

(23) Remove bearing (65) from shaft (3).

(24) Remove bushing (66) from end housing (15). Discard bushing.

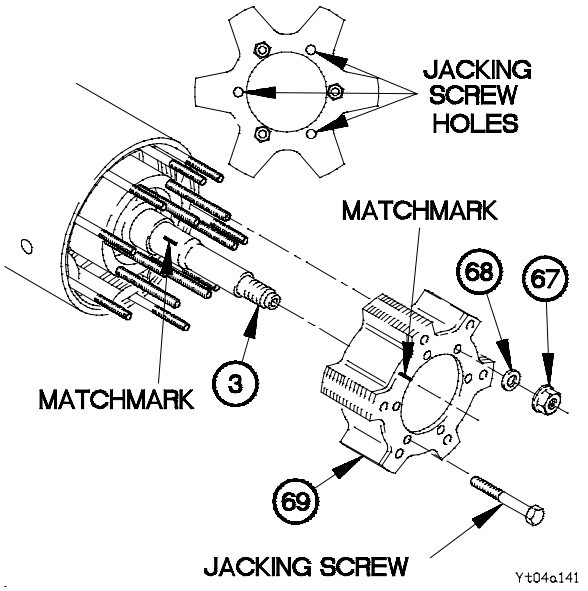
(25) Remove six self-locking nuts (67) and washers (68) from rotor (69). Discard self-locking nuts.

(26) Match mark rotor (69) to shaft (3).

(27) Install three jacking screws in small threaded holes in rotor (69).

(28) Remove rotor (69) from shaft (3) by alternately turning three jacking screws two full turns.

(29) Remove three jacking screws from rotor (69).



(30) Match mark front housing (27) to stator (63).

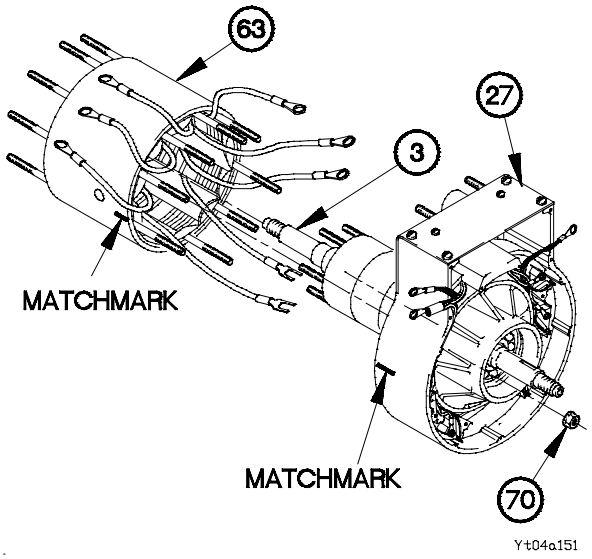
CAUTION

Use care when removing front housing and shaft from stator. Failure to comply may result in damage to equipment.

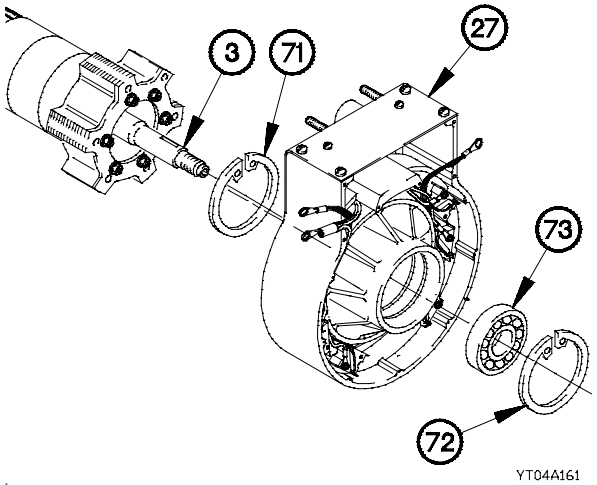
NOTE

Step (31) requires the aid of an assistant.

(31) Remove nine self-locking nuts (70), front housing (27), and shaft (3) from stator (63). Discard self-locking nuts.



(32) Remove shaft (3) from front housing (27).



WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

NOTE

Note position of retaining rings prior to removal.

(33) Remove retaining rings (71 and 72) from front housing (27). Discard retaining rings.

(34) Press bearing (73) from front housing (27).

18-3. 200 AMP ALTERNATOR REPAIR (CONT)

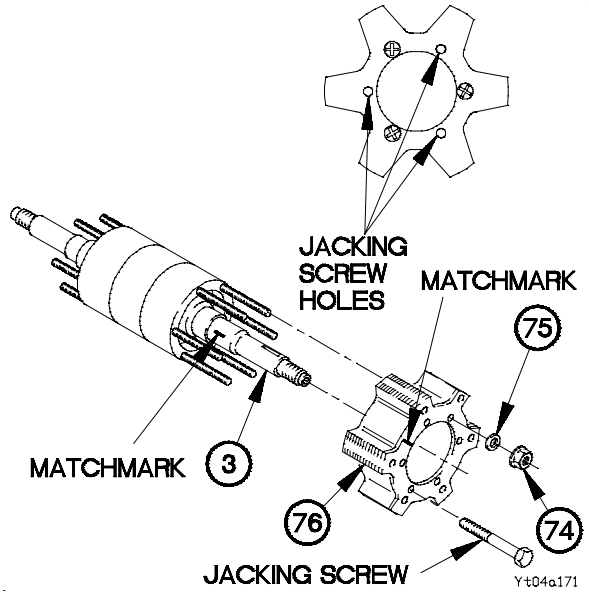
(35) Remove six self-locking nuts (74) and washers (75) from rotor (76). Discard self-locking nuts.

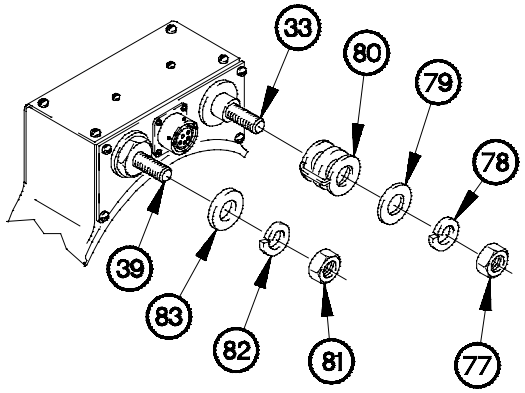
(36) Match mark rotor (76) to shaft (3).

(37) Install three jacking screws in small threaded holes in rotor (76).

(38) Remove rotor (76) from shaft (3) by alternately turning three jacking screws two full turns.

(39) Remove three jacking screws from rotor (76).





YT04A181

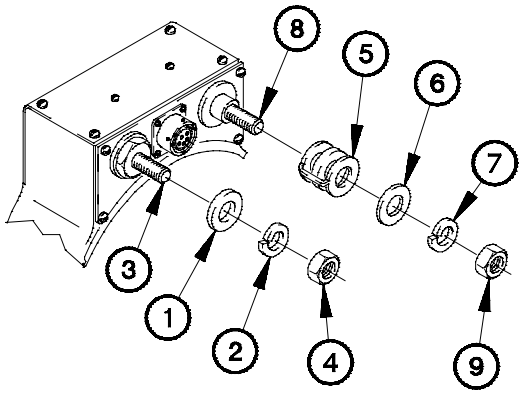
(40) Remove nut (77), lockwasher (78), washer (79), and fuse (80) from 24 vdc post (33). Discard lockwasher.

(41) Remove nut (81), lockwasher (82), and washer (83) from 12 vdc post (39). Discard lockwasher.

b. Assembly.

(1) Position washer (1) and lockwasher (2) on 12 vdc post (3) with nut (4).

(2) Position fuse (5), washer (6), and lockwasher (7) on 24 vdc post (8) with nut (9).



YT04B011

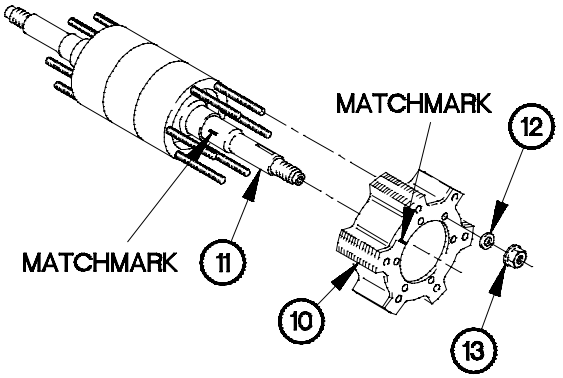
NOTE

Transfer matchmarks to replacement parts prior to installation.

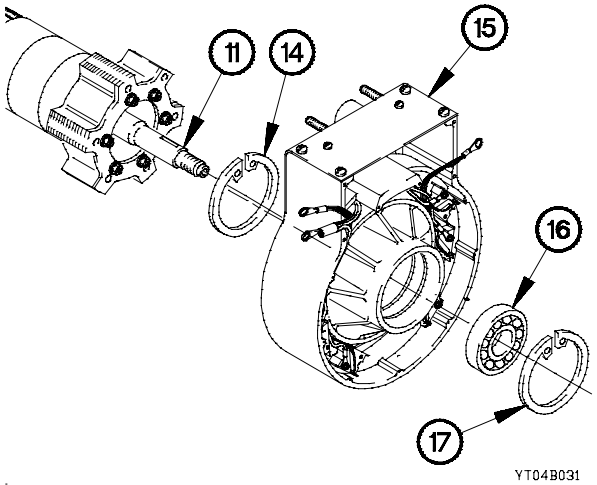
(3) Position rotor (10) on shaft (11) with matchmarks aligned.

(4) Position six washers (12) and self-locking nuts (13) on shaft (11).

(5) Tighten six self-locking nuts (13) to 45 lb-in. (5 N·m).



Yt04b021



YT04B031

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

NOTE

Install retaining rings in positions noted during removal.

(6) Install retaining ring (14) in front housing (15).

(7) Press bearing (16) in front housing (15).

(8) Install retaining ring (17) in front housing (15).

(9) Install shaft (11) in front housing (15).

18-3. 200 AMP ALTERNATOR REPAIR (CONT)

CAUTION

Use care when installing front housing and shaft on stator. Failure to comply may result in damage to equipment.

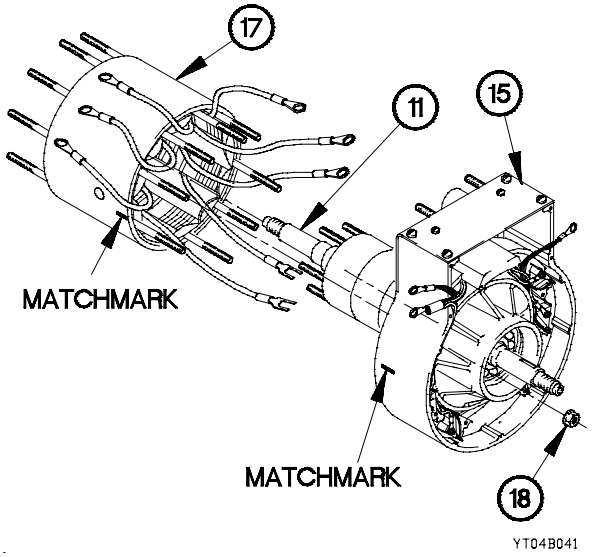
NOTE

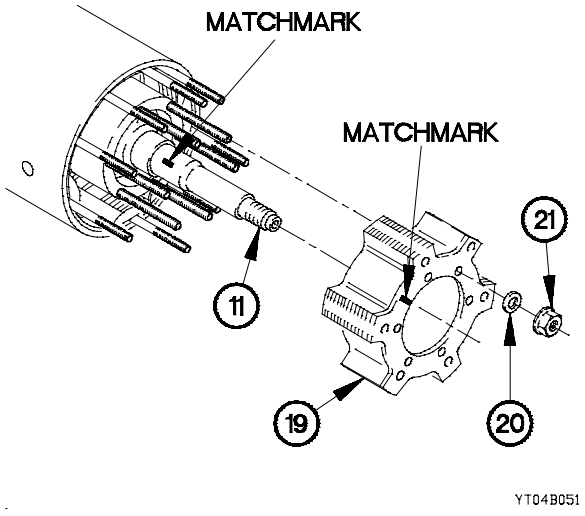
- Transfer matchmarks to replacement parts prior to installation.
- Step (10) requires the aid of an assistant.

(10) Position front housing (15) and shaft (11) on stator (17) with matchmarks aligned.

(11) Position nine self-locking nuts (18) on stator (17).

(12) Tighten nine self-locking nuts (18) to 45 lb-in. (5 N·m).





NOTE

Transfer matchmarks to replacement parts prior to installation.

(13) Position rotor (19) on shaft (11) with matchmarks aligned.

(14) Position six washers (20) and self-locking nuts (21) on shaft (11).

(15) Tighten six self-locking nuts (21) to 45 lb-in (5 N·m).

(16) Install bushing (22) in end housing (23).

(17) Install bearing (24) in end housing (23).

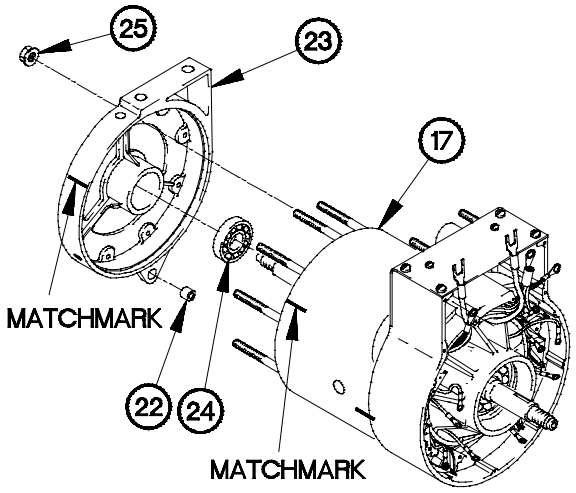
NOTE

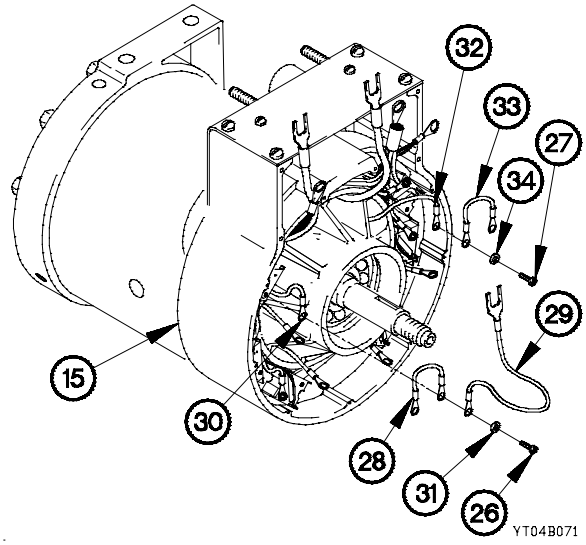
Transfer matchmarks to replacement parts prior to installation.

(18) Position end housing (23) on stator (17) with matchmarks aligned.

(19) Position nine self-locking nuts (25) on stator (17).

(20) Tighten nine self-locking nuts (25) to 45 lb-in. (5 N·m).





WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(21) Apply sealing compound to threads of screw (26) and five screws (27).

(22) Position jumpers (28 and 29) and terminal lug (30) on front housing (15) with washer (31) and screw (26).

(23) Position five terminal lugs (32) and jumpers (33) on front housing (15) with five washers (34) and screws (27).

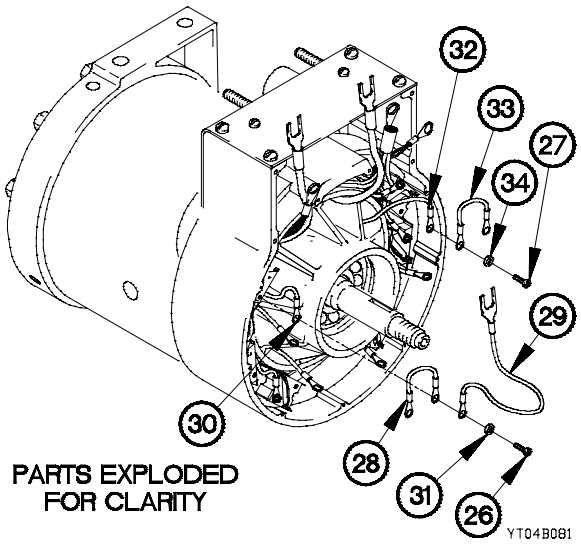
(24) Tighten screw (26) and five screws (27) to 30 lb-in. (3 N·m).

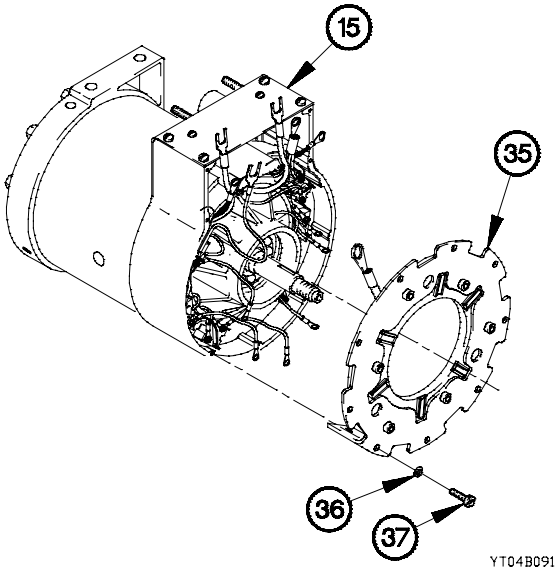
18-3. 200 AMP ALTERNATOR REPAIR (CONT)

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(25) Apply sealing compound to head of screw (26), terminal lug (30), jumpers (28 and 29), five screws (27), terminal lugs (32), and jumpers (33).





CAUTION

Use care when installing diode plate on stator. Failure to comply may result in damage to equipment.

(26) Position diode plate (35) on front housing (15) with nine lockwashers (36) and screws (37).

(27) Tighten nine screws (37) to 30 lb-in. (3 N·m).

(28) Position six terminal lugs (38) on diode plate (35) with six lockwashers (39) and screws (40).

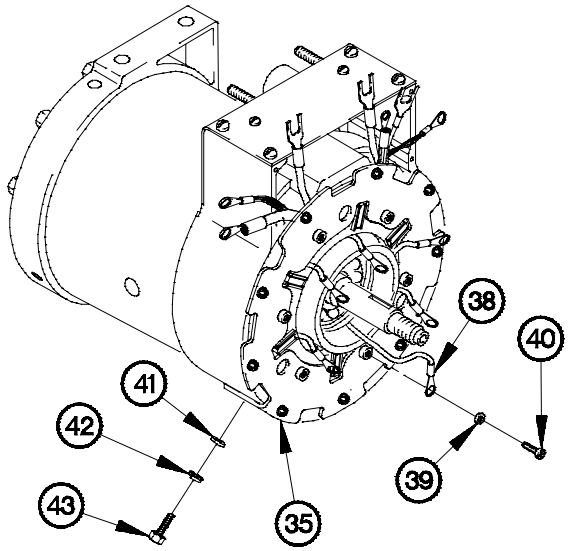
(29) Tighten six screws (40) to 30 lb-in. (3 N·m).

WARNING

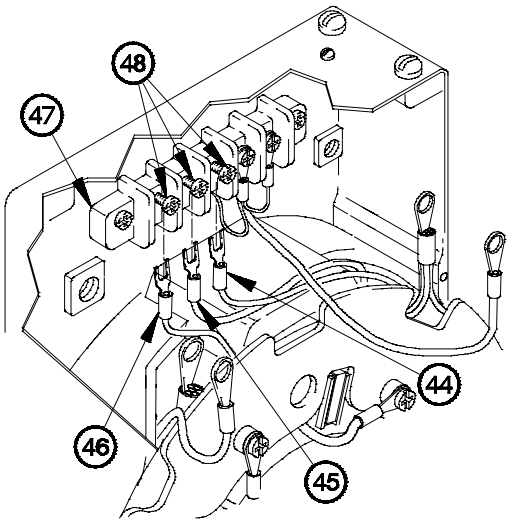
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(30) Apply sealing compound to six screws (40) and terminal lugs (38).

(31) Position washer (41), lockwasher (42), and screw (43) in diode plate (35).



YT04B101



YT04B111

(32) Position terminal lugs (44, 45 and 46) on terminal block (47).

(33) Tighten three screws (48) on terminal block (47) to 30 lb-in. (3 N·m).

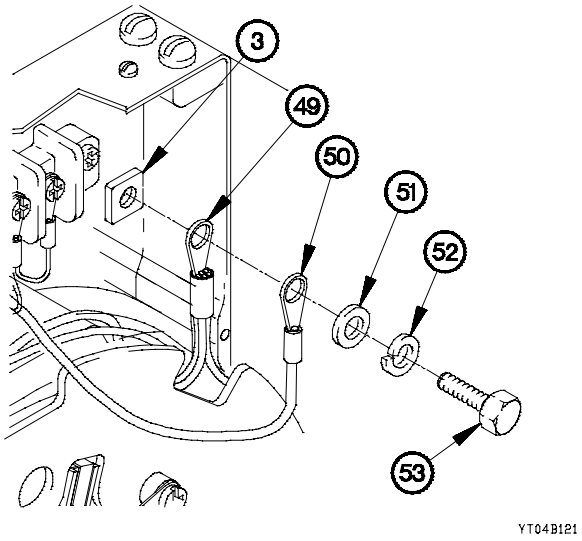
(34) Apply sealing compound to three screws (48) and terminal lugs (44, 45, and 46).

18-3. 200 AMP ALTERNATOR REPAIR (CONT)

(35) Position terminal lugs (49 and 50), washer (51), and lockwasher (52) on 12 vdc post (3) with screw (53).

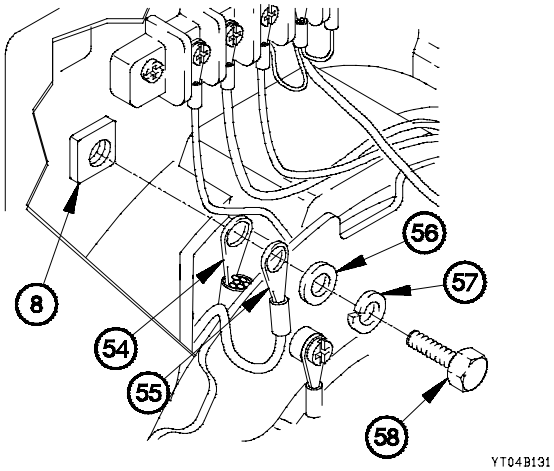
(36) Tighten screw (53) to 80 lb-in. (9 N·m).

(37) Apply sealing compound to screw (53), lockwasher (52), washer (51), and terminal lugs (49 and 50).



(38) Position terminal lugs (54 and 55), washer (56), and lockwasher (57) on 24 vdc post (8) with screw (58).

(39) Tighten screw (58) to 80 lb-in. (9 N·m).



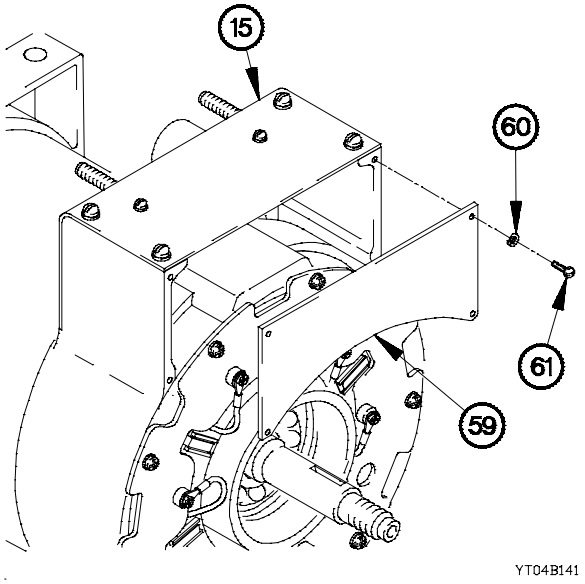
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

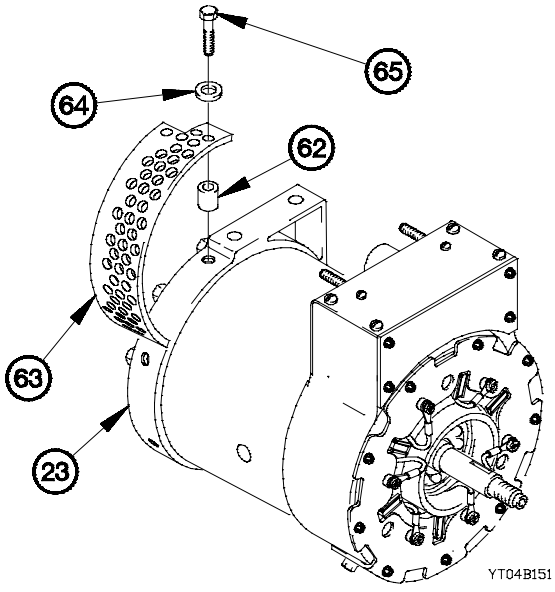
(40) Apply sealing compound to screw (58), lockwasher (57), washer (56), and terminal lugs (55 and 54).

(41) Position cover (59) on front housing (15) with four lockwashers (60) and screws (61).

(42) Tighten four screws (61) to 20 lb-in. (2 N·m).



YT04B141



YT04B151

(43) Position three spacers (62) and fan guard (63) on end housing (23) with three washers (64) and screws (65).

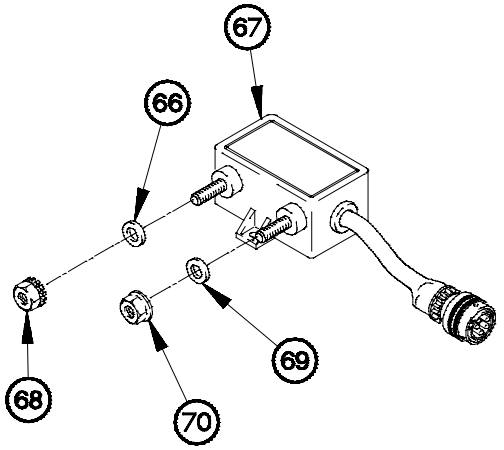
(44) Tighten three screws (65) to 75 lb-in. (9 N·m).

(45) Position washer (66) on voltage regulator (67) with self-locking nut (68).

CAUTION

Use care when positioning self-locking nut on regulator not to engage self-locking portion of nut. Failure to comply will result in damage to equipment.

(46) Position washer (69) on voltage regulator (67) with self-locking nut (70).



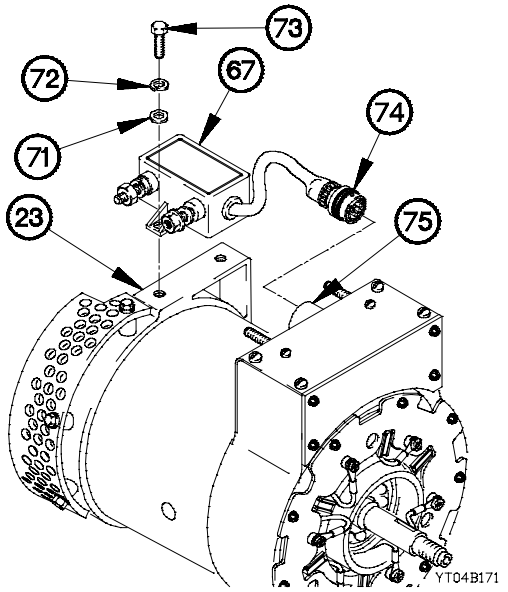
YT04B161

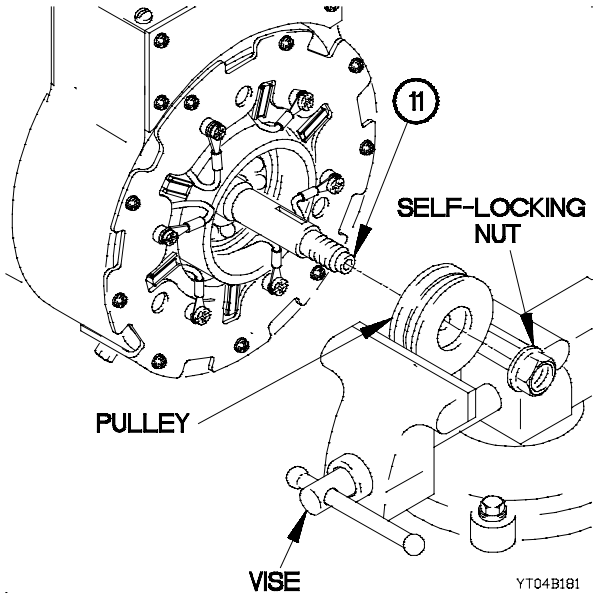
18-3. 200 AMP ALTERNATOR REPAIR (CONT)

(47) Position voltage regulator (67) on end housing (23) with two washers (71), lockwashers (72), and screws (73).

(48) Tighten two screws (73) to 65 lb-in (7 N·m).

(49) Connect connector (74) to receptacle (75).



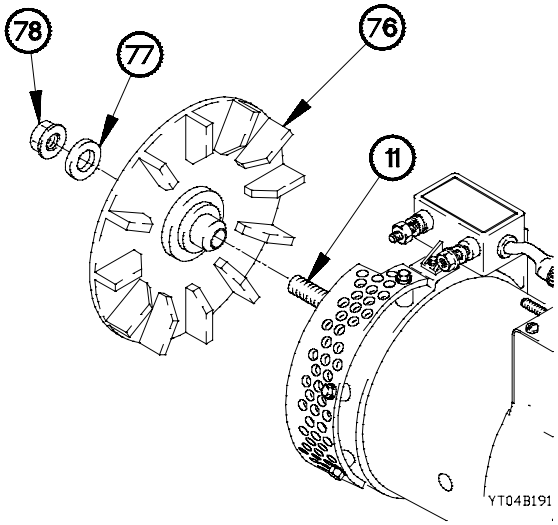


(50) Position pulley on shaft (11) with self-locking nut.

(51) Position pulley in vise.

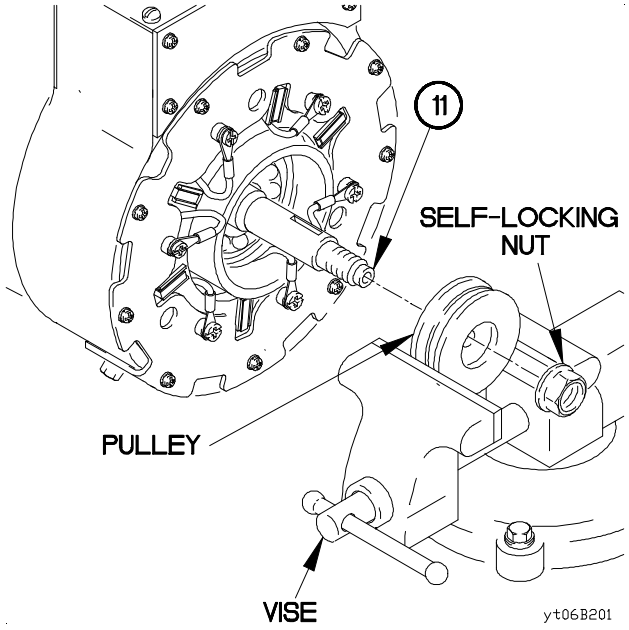
(52) Position fan (76) on shaft (11) with washer (77) and self-locking nut (78).

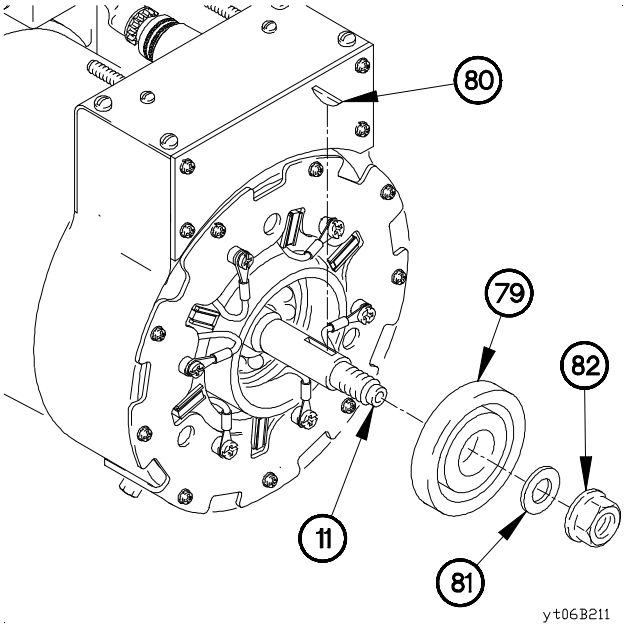
(53) Tighten self-locking nut (78) to 50 lb-ft (68 N·m).



(54) Remove pulley from vise.

(55) Remove self-locking nut and pulley from shaft (11). Discard self-locking nut.





(56) Position pulley bushing (79) on shaft (11).

(57) Install key (80) in shaft (11).

CAUTION

Use care when positioning self-locking nut on shaft not to engage self-locking part of nut. Failure to comply will result in damage to equipment.

(58) Position washer (81) and self-locking nut (82) on shaft (11).

End of Task.

18-4. DIGITIZATION KIT INITIAL INSTALLATION

This task covers:

a. Installation

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Batteries disconnected (TM 9-2320-365-20-3).
Cab storage boxes removed (TM 9-2320-365-20-4).
Seat belts removed (TM 9-2320-365-20-4)
Small arms mounts removed (TM 9-2320-365-20-4)
Rear boarding handles removed (TM 9-2320-365-20-4)
RH seat removed (TM 9-2320-365-20-4)
Power distribution panel removed for access (TM 9-2320-365-20-4)
Kick panel removed (TM 9-2320-365-20-4)

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B).
Drill Electric, Portable (Item 18, Appendix B)
Drill Set, Twist (Item 17, Appendix B)
Machine Gun Ring Drill Stop (Item 9, Appendix D)

Tools and Special Tools (Cont.)
Clamp (2) (Item 10, Appendix B)
Wrench, Torque (0-200 lb-in) (Item 81, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Drill Stop Collar Set (Item 20.1, Appendix B)

Materials/Parts
Ties, Cable Plastic (Item 89, Appendix C)
Rivet, Compression (4) (Item 250.1, Appendix F)
Sealant (Item 64.1, Appendix C)
Antiseize (Item 13.1, Appendix C)

Personnel Required
(2)

Reference Material
TB43-0242

a. Installation

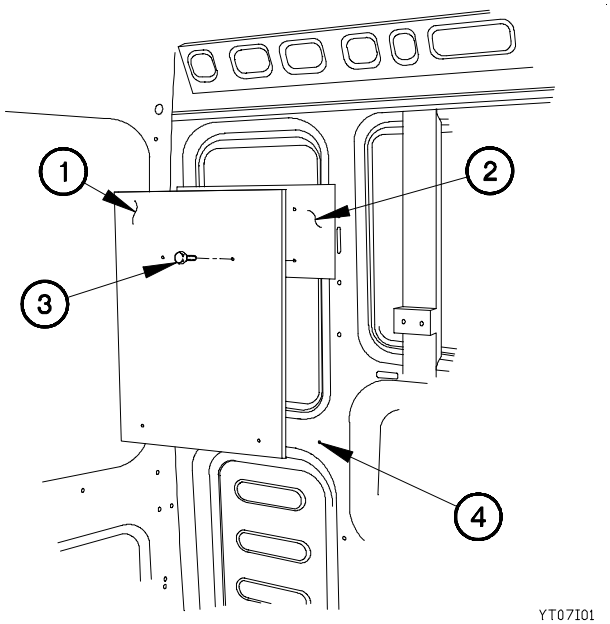
(1) Position RH template (1) on rear cab wall (2) with two screws (3).

WARNING

Wear appropriate eye protection when drilling holes. Failure to comply may result in injury to personnel.

CAUTION

Drill bit stop must be used to limit the depth of drill bit travel. Failure to comply may result in damage to cab.



(2) Drill two 3/16” (5 mm) pilot holes at locations (4).

(3) Remove two screws (3) and template (1) from rear cab wall (2).

(4) Enlarge holes at location (4) to 17/32” (13 mm).

CAUTION

Enlarge holes only in plastic wall covering. Pull plastic away from rear cab wall if necessary. Failure to comply may result in damage to equipment.

(5) Enlarge two holes in plastic cab liner (5) at location (4) to 1/2” (13 mm).

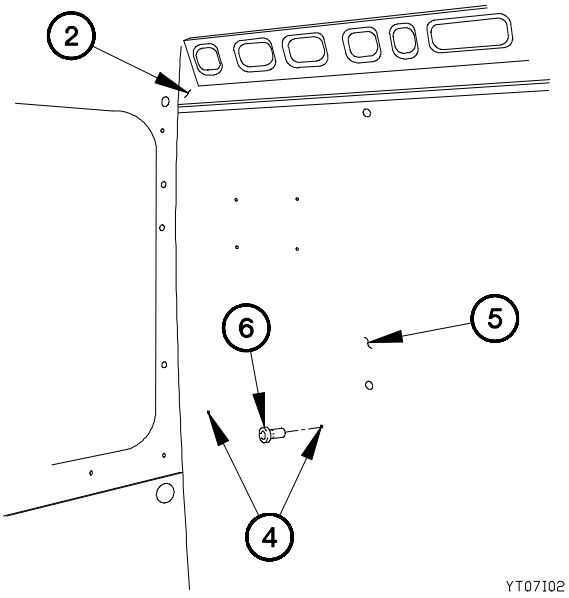
NOTE

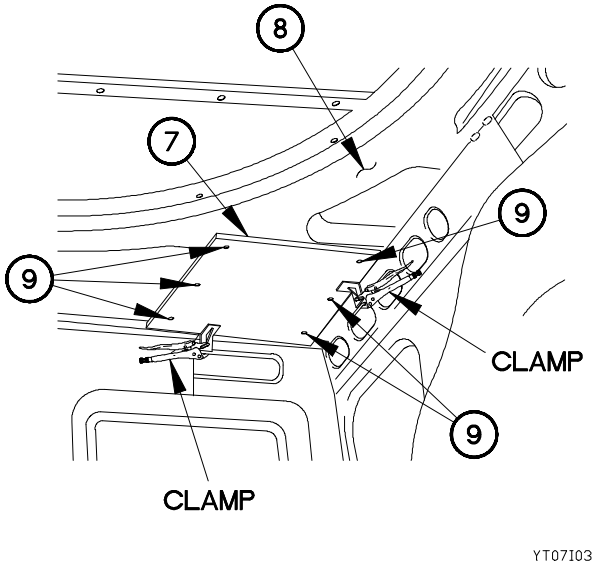
Use primer and paint as indicated in TM Paint TB43-0242.

(6) Apply primer and paint to rear cab wall (2) holes at locations (4).

(7) Apply primer and paint to two rivnuts (6).

(8) Install rivnuts (6) in rear cab wall (2) holes at location (4).





(9) Position RH roof template (7) on cab roof (8) with two clamps.

(10) Drill six 3/16” (5 mm) pilot holes at locations (9).

(11) Remove two clamps and RH roof template (7) from cab roof (8).

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(12) Enlarge holes at location (9) to 17/32” (13 mm).

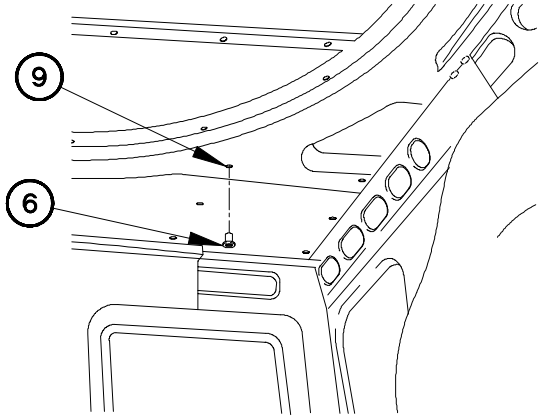
NOTE

Use primer and paint as indicated in TM Paint, TB43-0242.

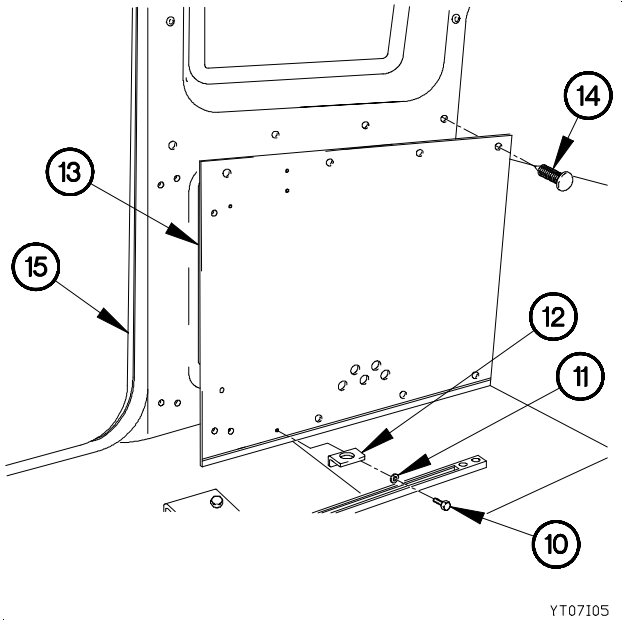
(13) Apply primer and paint to RH roof holes at location (9).

(14) Apply primer and paint to six rivnuts (6).

(15) Install rivnuts (6) to RH roof holes at location (9).



YT07I04



YT07I05

(16) Remove screw (10), washer (11), and bracket (12) from right side panel (13).

(17) Remove seven fasteners (14) and right side panel (13) from RH cab side wall (15). Discard fasteners.

(18) Enlarge three holes in RH cab side wall (15) to 17/32” (13 mm) at location (16).

NOTE

Use primer and paint as indicated in TM Paint TB43-0242.

(19) Apply primer and paint to RH cab side wall holes at location (16).

(20) Apply primer and paint to three rivnuts (6).

(21) Install three rivnuts (6) in RH cab side wall at location (16).

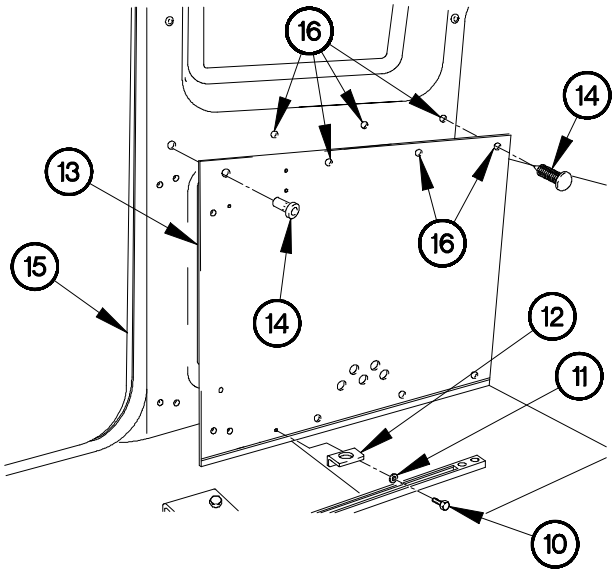
NOTE

Steps (22) through (24) require the aid of an assistant.

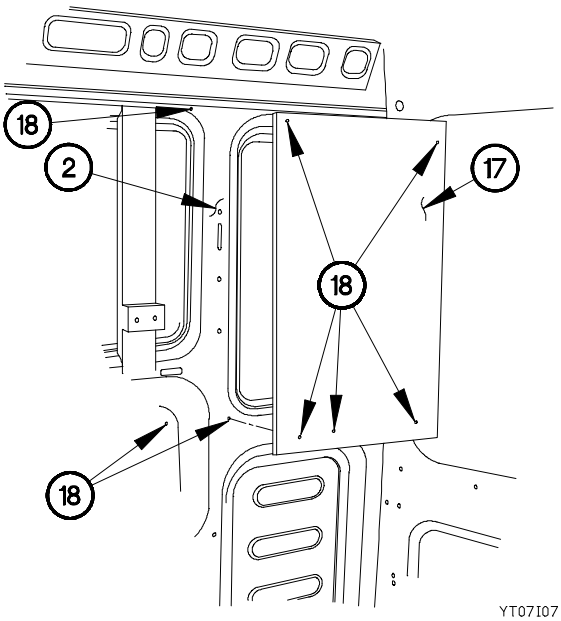
(22) Enlarge three holes in right side panel (13) at location (16) to 1/2” (13 mm).

(23) Install right side panel (13) on RH cab side wall (15) with four fasteners (14).

(24) Install bracket (12) on right side panel (13) with washer (11) and screw (10).



YT07I06



YT07I07

NOTE

Align LH rear cab wall template with LH cab side wall and roof.

(25) Position LH template (17) on rear cab wall (2).

(26) Drill five 3/16” (5 mm) pilot holes at locations (18).

(27) Remove LH template (17) from rear cab wall (2).

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(28) Enlarge five holes at location (18) to 17/32” (13 mm).

CAUTION

Enlarge holes only in plastic wall covering, pull plastic away from rear cab wall if necessary. Failure to comply may result in damage to equipment.

(29) Enlarge five holes in plastic cab liner (5) at locations (18) to 1/2” (13 mm).

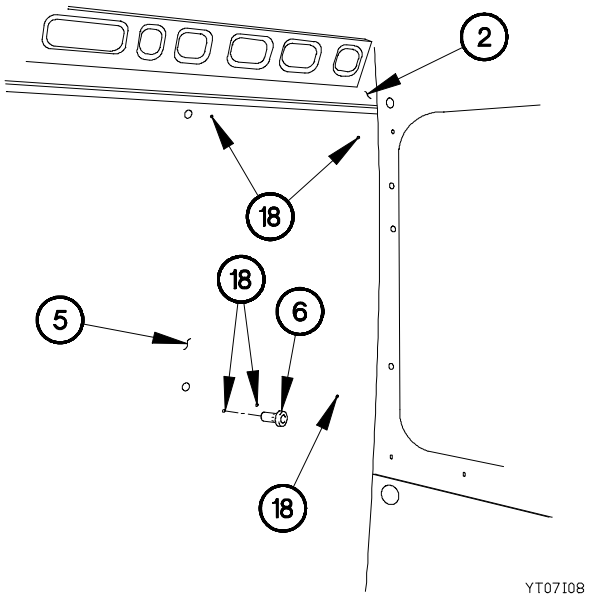
NOTE

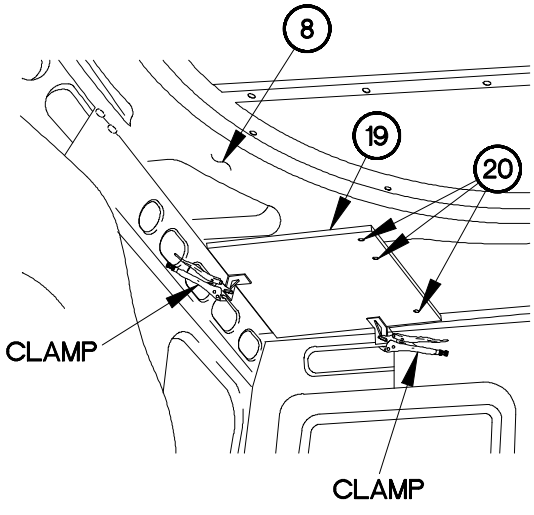
Use primer and paint as indicated in TM Paint TB43-0242

(30) Apply primer and paint to rear cab wall holes at locations (18).

(31) Apply primer and paint to five rivnuts (6).

(32) Install five rivnuts (6) in rear cab wall (2) at locations (18).





(33) Position LH roof template (19) on cab roof (8) with two clamps.

(34) Drill three 3/16” (5 mm) pilot holes at locations (20).

(35) Remove two clamps and LH roof template (19) from cab roof (8).

(36) Enlarge three holes at locations (20) to 25/64” (10 mm).

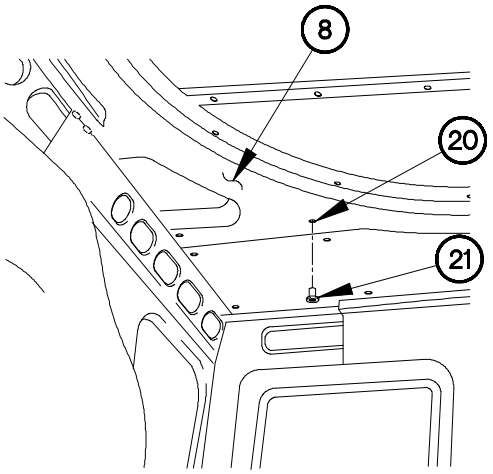
NOTE

Use primer and paint as indicated in TM Paint TB43-0242.

(37) Apply primer and paint to three holes in cab roof (8) at locations (20).

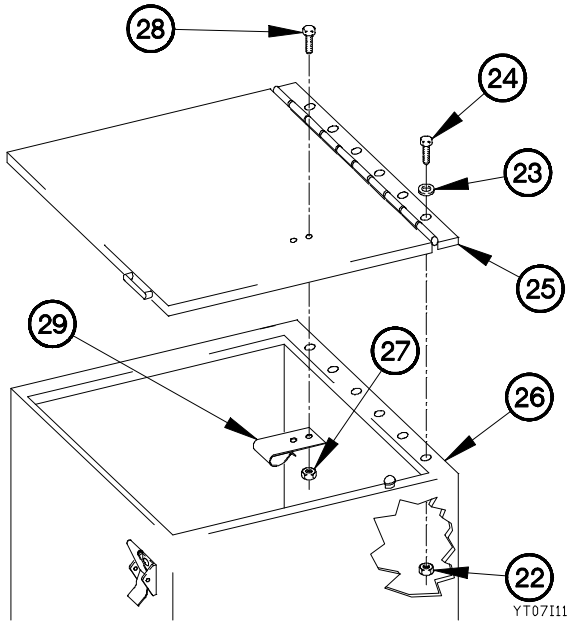
(38) Apply primer and paint to three rivuts (21).

(39) Install three rivnuts (21) in cab roof (8) at locations (20).



YT07I10

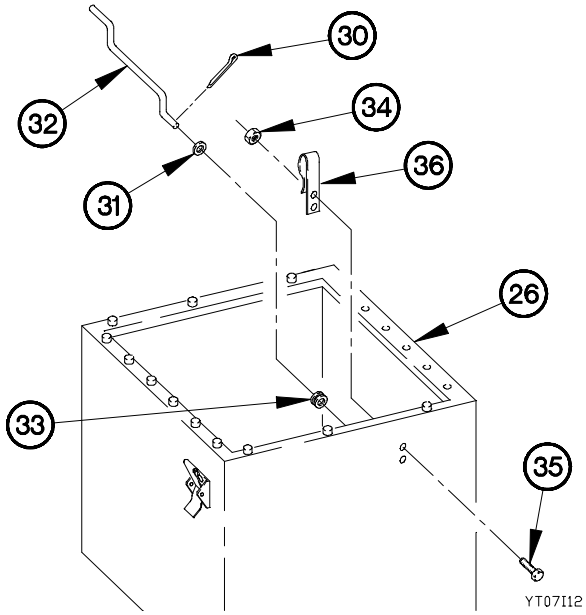
b. LH Stowage Box Assembly.



YT07I11

(40) Remove six nuts (22), washers (23), screws (24), and storage box cover (25) from storage box (26).

(41) Remove two nuts (27), screws (28), and clamp (29) from storage box cover (26).



YT07I12

(42) Remove cotter pin (30), washer (31), and cover support arm (32) from storage box (26). Discard cotter pin.

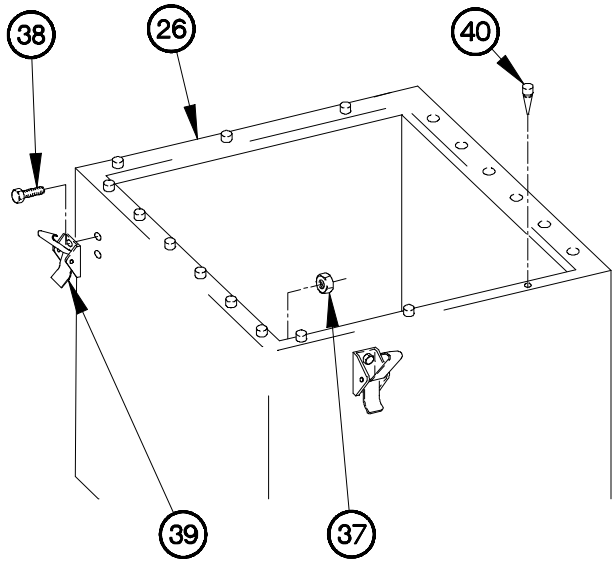
(43) Remove rubber grommet (33) from storage box (26). Discard rubber grommet.

(44) Remove two nuts (34), screws (35), and clamp (36) from storage box (26).

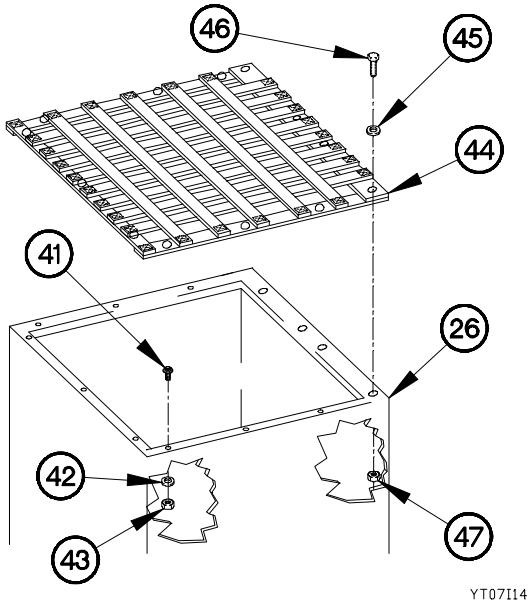
18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(45) Remove four nuts (37), screws (38), and two latches (39) from storage box (26).

(46) Remove 12 rubber bumpers (40) from storage box (26). Discard rubber bumpers.



YT07I13



YT07I14

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

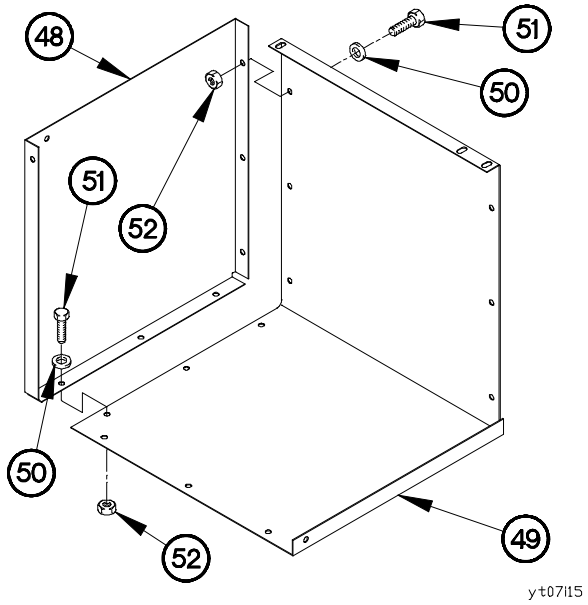
(47) Apply sealant to threads of nine snap screws (41).

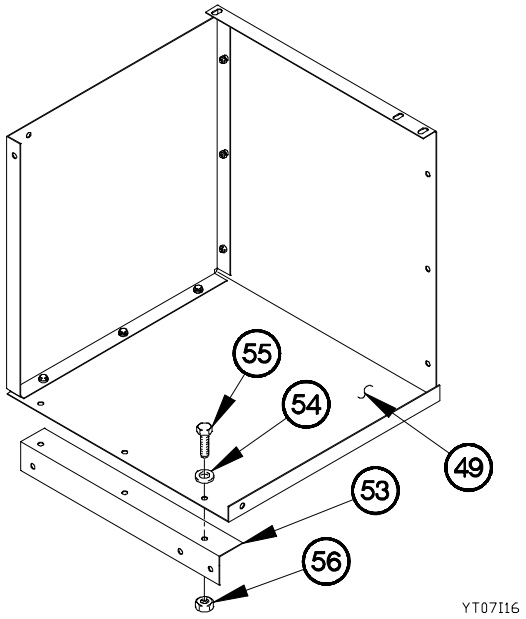
(48) Install nine snap screws (41) on Driver's Storage Box (26) with nine lockwashers (42) and nuts (43).

(49) Install webbing (44) on Driver's Storage Box (26) with four washers (45), screws (46), and nuts (47).

(50) Position back cover (48) on AFT Storage Compartment (49) with six washers (50), screws (51), and self-locking nuts (52).

(51) Tighten six self-locking nuts (52) to 106 lb-in (12 N•m).



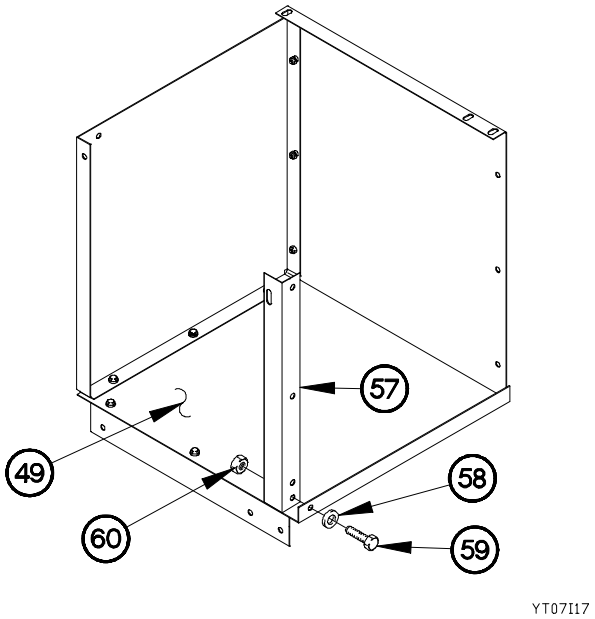


(52) Position support (53) on AFT Storage Compartment (49) with three washers (54), screws (55), and self-locking nuts (56).

(53) Tighten three self-locking nuts (56) to 106 lb-in (12 N•M).

(54) Position bracket (57) on AFT Storage Compartment (49) with washer (58), screw (59), and self-locking nut (60).

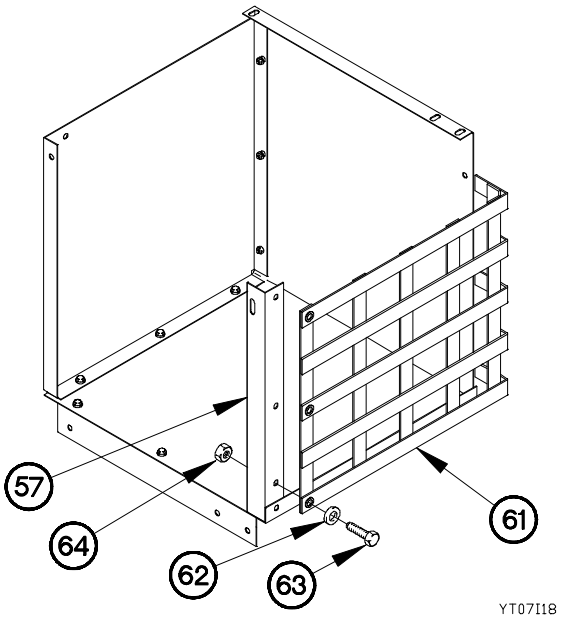
(55) Tighten self-locking nut (60) to 106 lb-in (12 N•m).



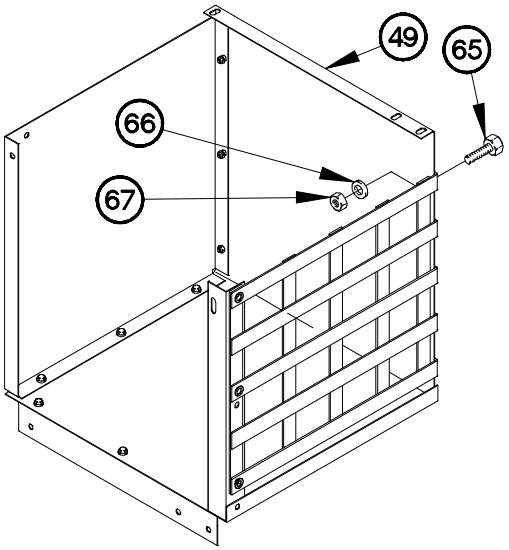
18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(56) Position webbing (61) on bracket (57) with three washers (62), screws (63), and self-locking nuts (64).

(57) Tighten three self-locking nuts (64) to 106 lb-in (12 N•m).



YT07I18



YT07I19

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(58) Apply sealant to threads of three snap screws (65).

(59) Install three snap screws (65) in AFT Storage Compartment (49) with three washers (66) and nuts (67).

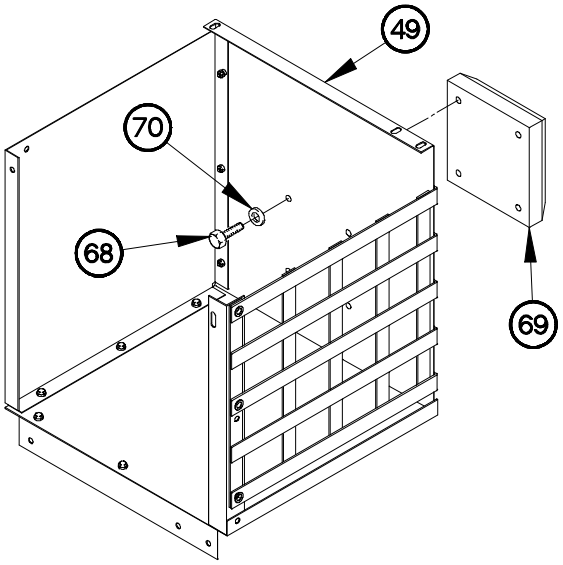
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

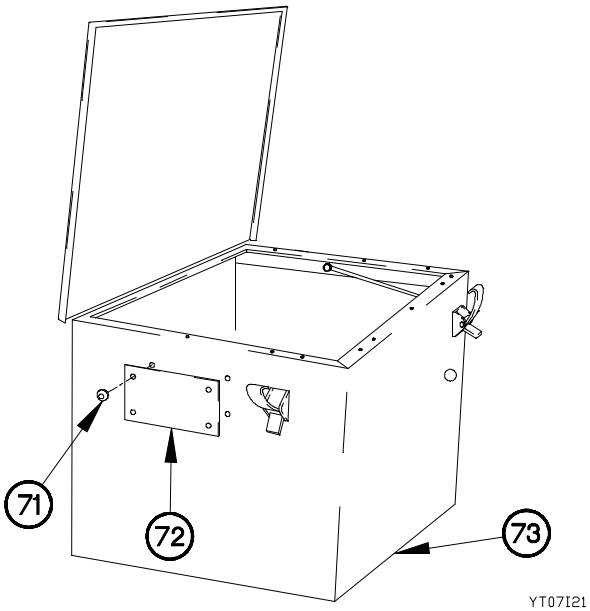
(60) Apply sealant to threads of four screws (68).

(61) Position headrest pad (69) on AFT Storage Compartment (49) with four washers (70) and screws (68).

(62) Tighten four screws (68) to 77 lb-in (9 N•m).



YT07I20

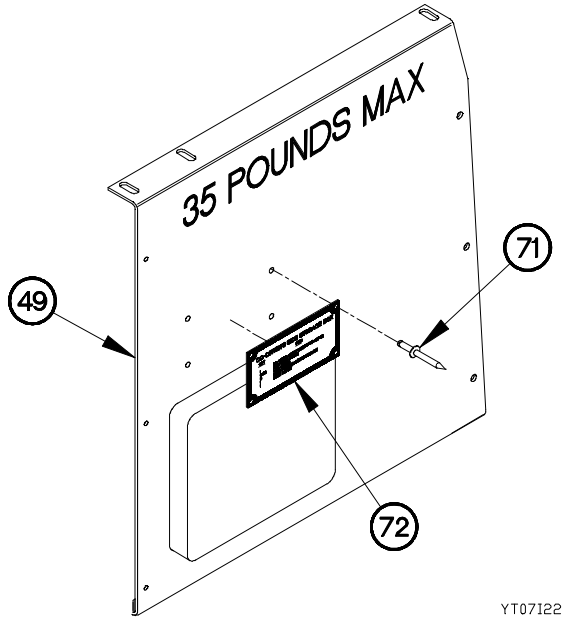


YT07I21

WARNING

Wear appropriate eye protection when removing rivets. Failure to comply may result in injury to personnel.

(63) Remove four rivets (71) and Data Plate (72) from co-drivers storage box (73).



YT07I22

(64) Install Data Plate (72) on AFT Storage Compartment (49) with four rivets (71).

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

c. Radio Rack Assembly.

CAUTION

If radio rack is assembled outside of cab, do not install top and bottom support plates until rack is in cab. Failure to comply may result in damage to equipment.

(65) Place four support legs (73) in alignment,

NOTE

All holes are the same. No. 6 hole shown

(66) Count and mark holes in support legs (73) used to mount shelves. Refer to **Table 18-1** for locations.

(67) Remove paint from support legs (73) at shelf hole locations and top-bottom hole locations.

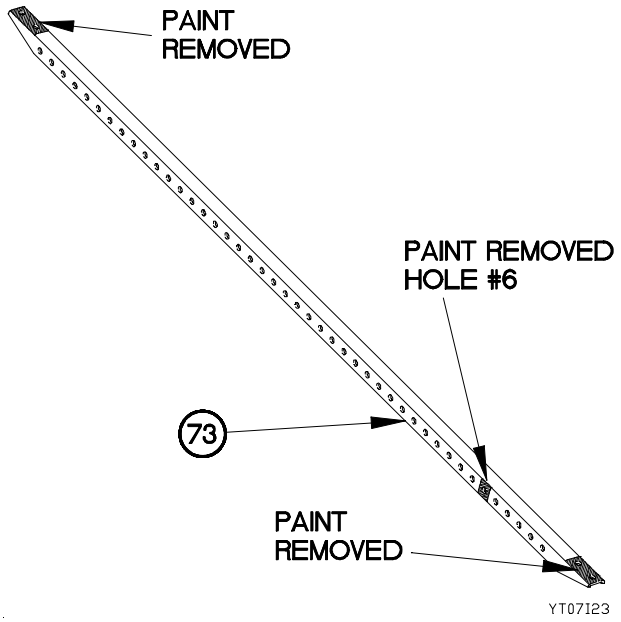


Table 18-1 Support Leg Hole Locations

Shelf	Hole Location
FBCB2 Shelf	6
EPLRS Shelf	17
Power Distribution Shelf	26
Lower Head Rest Support	33
Singars Shelf	36

WARNING

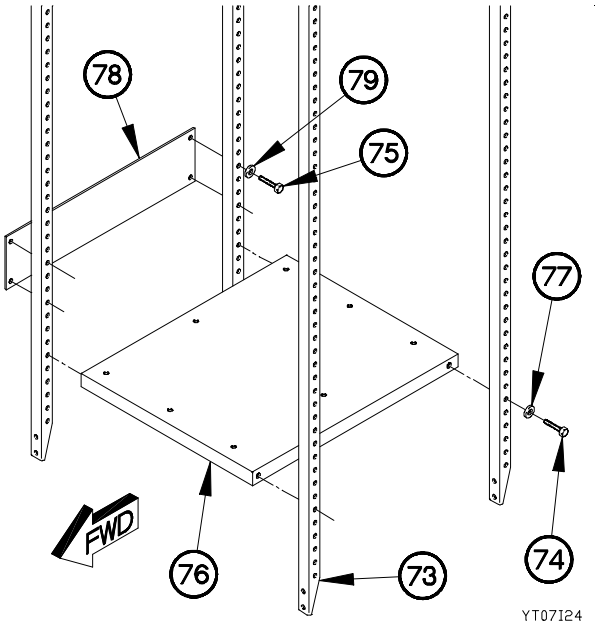
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

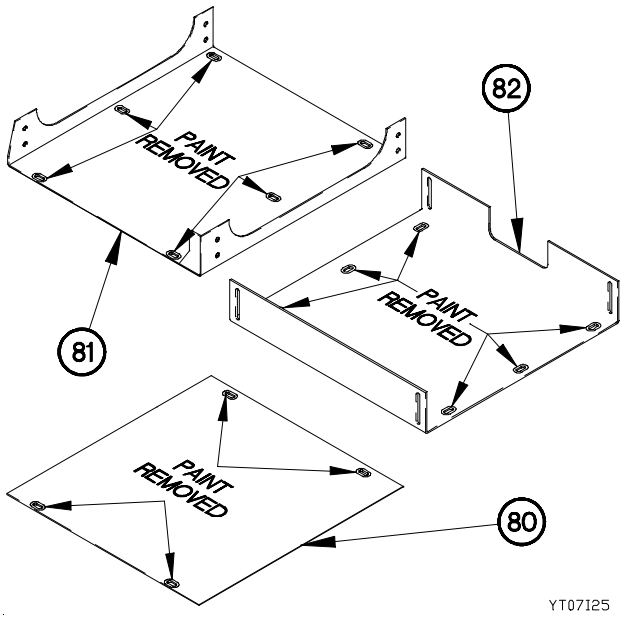
(68) Apply sealant to support legs (73) at locations paint was removed.

(69) Apply sealant to threads of four screws (74 and 75).

(70) Install FBCB2 shelf (75) on four support legs (73) with washers (77) and screws (74). Refer to **Table 18-1** for hole location.

(71) Install stiffening plate (78) at support legs (73), location holes seven and 10 with four washers (79) and screws (75).





(72) Remove paint from top support (80), bottom support (81), and MTS plate (82).

(73) Apply sealant to top support (80), bottom support (81), and MTS plate (82) where paint was removed.

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

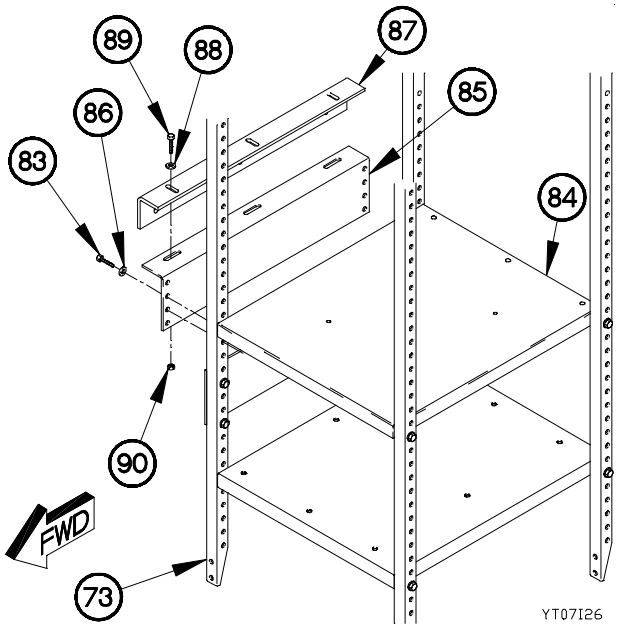
WARNING

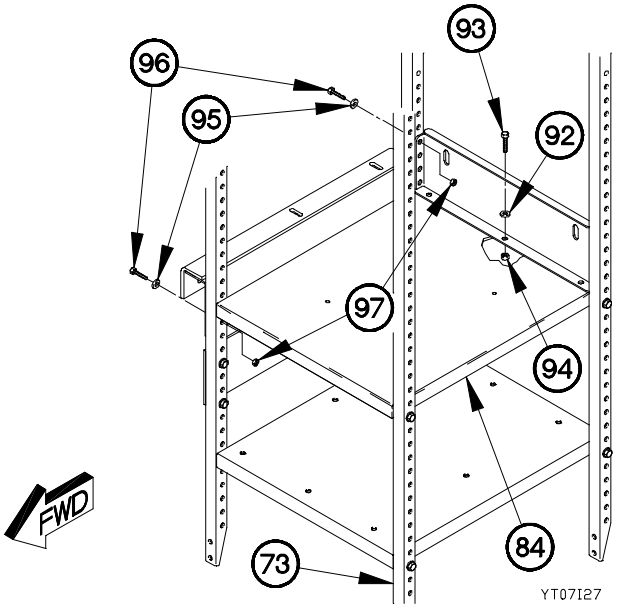
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(74) Apply sealant to three of four screws (83).

(75) Install EPLRS shelf (84) and inside support (85) on support legs (73) with four washers (86) and screws (83). Refer to **Table 18-1** for hole locations.

(76) Position outer side support (87) on inner side support (85) with three washers (88), screws (89), and self-locking nuts (90).





(77) Position rear and mid support (91) on EPLRS shelf (84) with three washers (92), screws (93), and self-locking nuts (94).

(78) Position six washers (95), screws (96), and self-locking nuts (97) in support legs (73).

(79) Tighten three self-locking nuts (94 and 97) to 110-120 lb-in (12-14 N•m).

WARNING

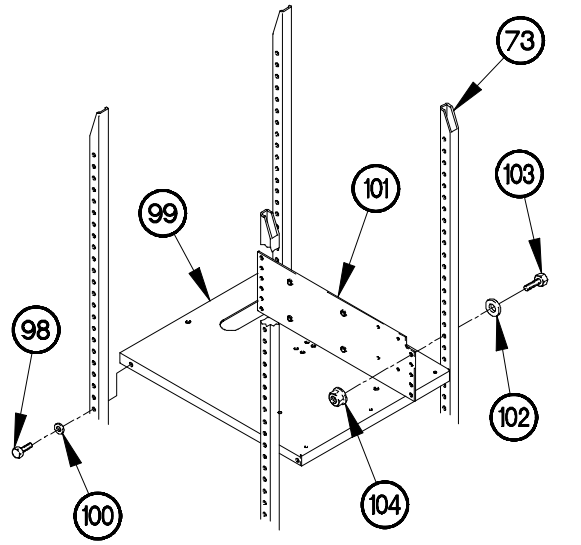
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

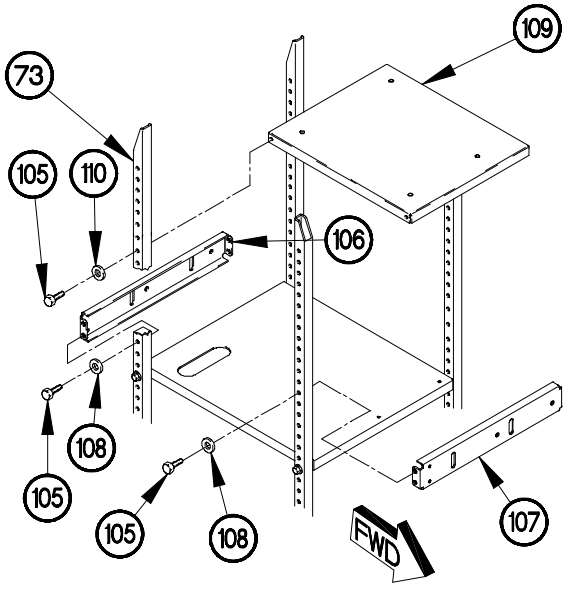
(80) Apply sealant to threads of four screws (98).

(81) Install Power Distribution Panel (99) on support legs (73) with four washers (100) and screws (98). Refer to Table 18-1 for hole locations.

(82) Position PLGR/M42 Alarm Plate (101) on support legs (73) with four washers (102), screws (103), and self-locking nuts (104).

(83) Tighten four self-locking nuts (104) to 110-112 lb-in (12-14 N•m).

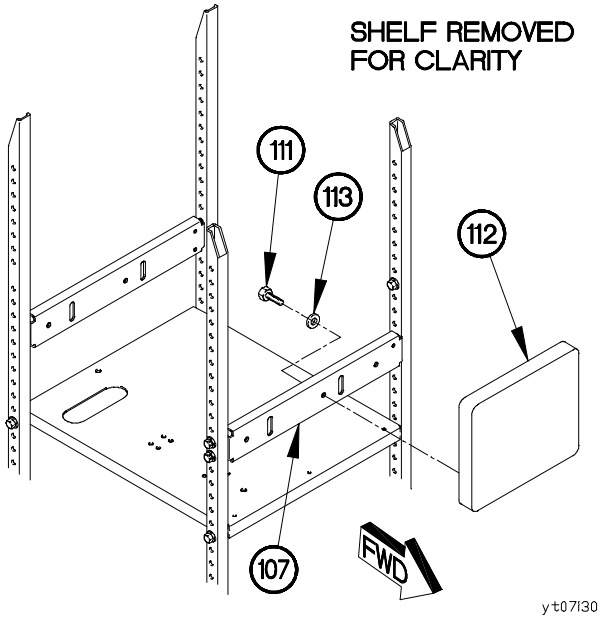




(84) Apply sealant to threads of 12 screws (105).

(85) Install top rear wall (106) and front head pad brace (107) on support legs (73) with four washers (108) and screws (105). Refer to **Table 18-1** for hole locations.

(86) Install Sincgars Shelf (109) on support legs (73) with four washers (110) and screws (105). Refer to **Table 18-1** for hole locations.



(87) Apply sealant to threads of two screws (111).

(88) Install head pad (112) on front head pad brace (107) with two washers (113) and screws (111).

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

NOTE

- Position radio rack in cab with out top or bottom support or MTS plate. Forward of RH seat mounting location. Slide radio rack towards rear of cab.
- Steps (89) and (90) require the aid of an assistant.

(89) Position radio rack in cab.

(90) Position radio rack on bottom support (81).

WARNING

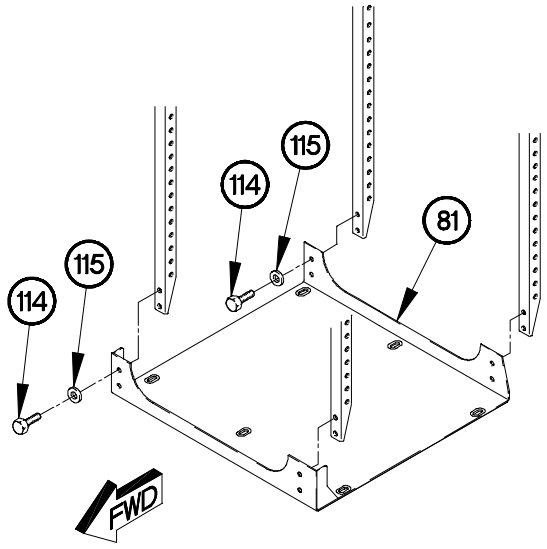
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(91) Apply sealant to threads of eight screws (114).

(92) Position eight washers (115) and screws (114) in bottom support (81).

(93) Tighten eight screws (114) to 110-120 lb-in (12-14 N•m).

RADIO RACK ASSEMBLY



YT07I31

(94) Apply sealant to threads of six screws (116).

NOTE

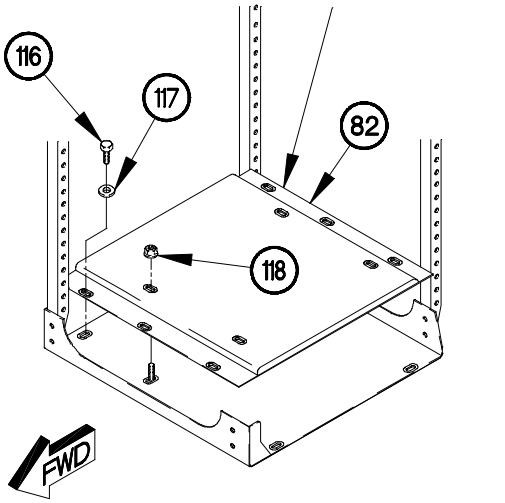
Position MTS plate with slotted holes towards rear of cab.

(95) Position MTS plate (82) on bottom support (81) with six washers (117) and screws (116).

(96) Tighten six screws (116) to 70-80 lb-in (8-9 N•m).

(97) Position four self-locking nuts (118) on MTS plate (82).

SLOTTED EDGE REAR



YT07I32

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(98) Apply sealant to threads of six screws (119) and eight screws (120).

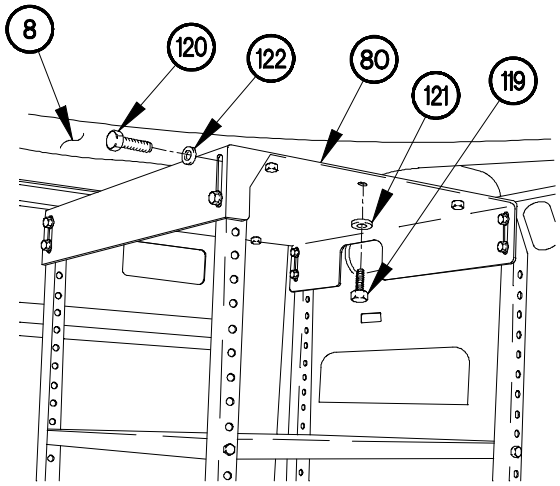
(99) Position top support (80) on top of radio rack.

(100) Position six washers (121) and screws (119) in cab roof (8).

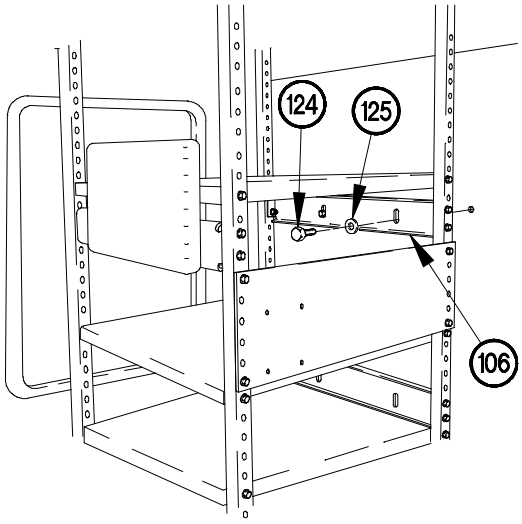
(101) Tighten six screws (119) to 70-80 lb-in (8-9 N•m).

(102) Position eight washers (122) and screws (120) in top support (80).

(103) Tighten eight screws (120) to 110-120 lb-in (12-14 N•m).



YT07I33



YT07I34

CAUTION

Add spacers behind supports on vehicles equipped with rear panels. Failure to comply may result in damage to equipment.

(104) Position washers (123) between top rear wall brace (106) and weld nut as required.

(105) Apply sealant to threads of two screws (124).

(106) Position two washers (125) and screws (124) in top rear wall brace (106.

(107) Tighten two screws (124) to 70-80 lb-in (8-9 N•m).

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

CAUTION

Add spacers behind supports on vehicles equipped with rear panels. Failure to comply may result in damage to equipment.

(108) Position washers (126) between bottom rear wall brace (91) and rivnuts as required.

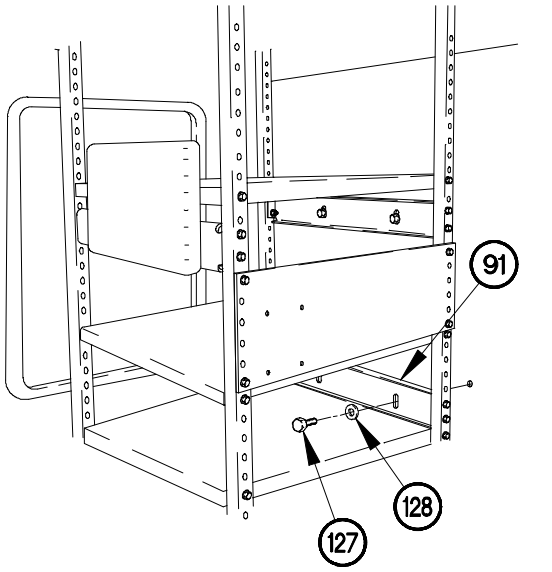
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(109) Apply sealant to threads of two screws (127).

(110) Position two washers (128) and screws (127) in bottom rear wall brace (91).

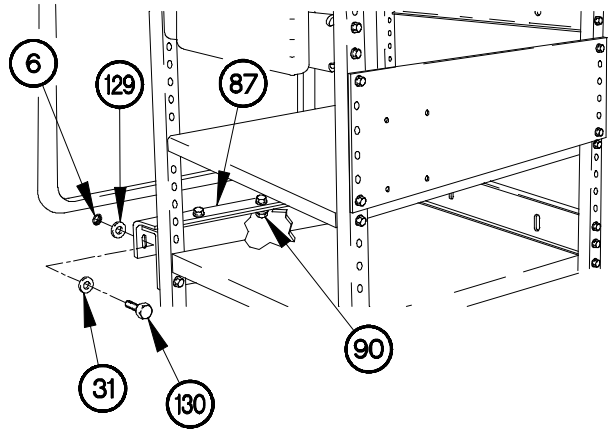
(111) Tighten two screws (127) to 70-80 lb-in (8-9 N•m).



YT07I35

CAUTION

Add spacers behind supports on vehicle side panel. Failure to comply may result in damage to equipment.



YT07I36

(112) Position washers (129) between outer side support (87) and rivnuts (6) as required.

(113) Apply sealant to threads of three screws (130).

(114) Position three washers (131) and screws (130) in outer side support (87).

(115) Tighten three screws (130) to 70-80 lb-in (8-9 N•m).

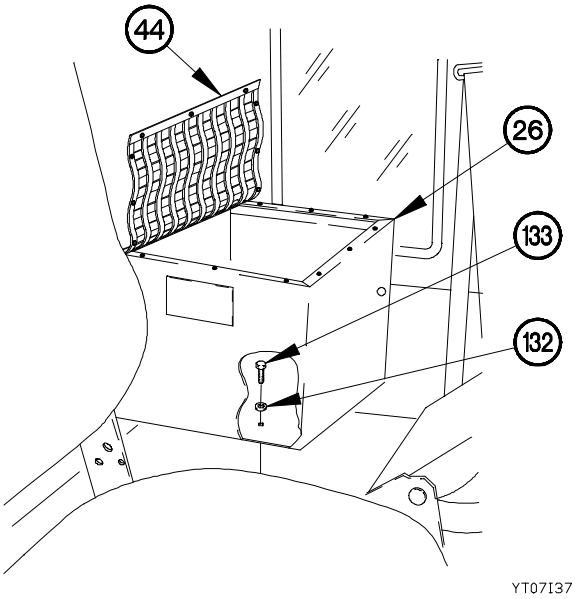
(116) Tighten three self-locking nuts (90) to 110-120 lb-in (12-14 N•m).

(117) Position Driver's Storage Box (26) in mounting location on cab floor.

(118) Position six washers (132) and screws (133) in Driver's Storage Box (26).

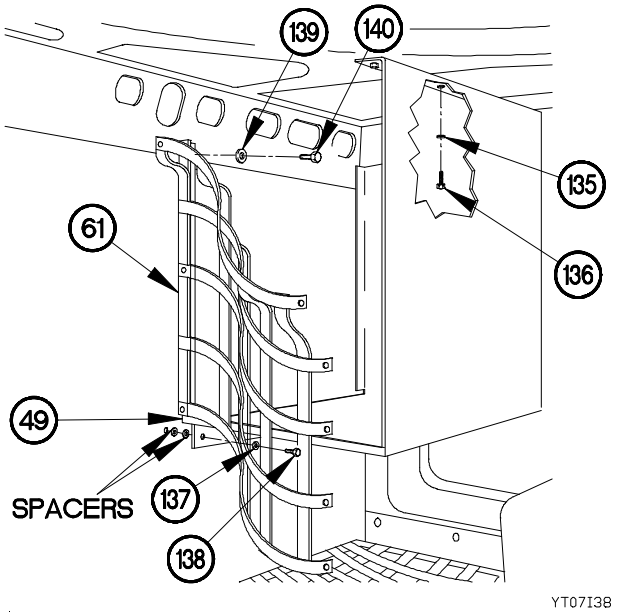
(119) Tighten six screws (133) to 70-85 lb-in (8-10 N•m).

(120) Snap webbing (44).



CAUTION

Add spacers behind supports on vehicle equipped with rear panels. Failure to comply may result in damage to equipment.



(121) Position washers (134) on plastic cab liner (5) as required.

(122) Position AFT Storage Compartment (49) in vehicle with three washers (135) and screws (136).

(123) Position three washers (137) and screws (138) in AFT Storage Compartment (49).

(124) Tighten three screws (136 and 138) to 70-80 lb-in (8-9 N•m).

(125) Position two washers (139) and screws (140) in AFT Storage Compartment (49).

(126) Tighten two screws (140) to 70-80 lb-in (8-9 N•m).

(127) Snap webbing (61) in place.

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

NOTE

Install plastic cable ties as required.

(128) Position digitization power cable (141) in vehicle.

(129) Install distribution panel PD2 (142) on power distribution panel (99) with two screws (143), lockwashers (144), and nuts (145).

(130) Install distribution panel PD1 (146) on power distribution panel (99) with four screws (147), lockwashers (148), and nuts (149).

(131) Install circuit breakers in distribution panels PD2 and PD1 (142) and (146). Refer to **Table 18-2** and **Figure 18-1 Power Distribution** for Circuit Breaker Location.

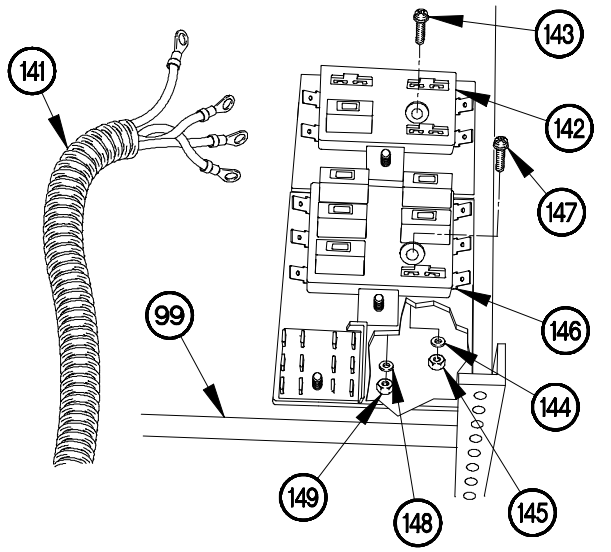


Figure 18-1. Power Distribution Circuit Breaker Locations.

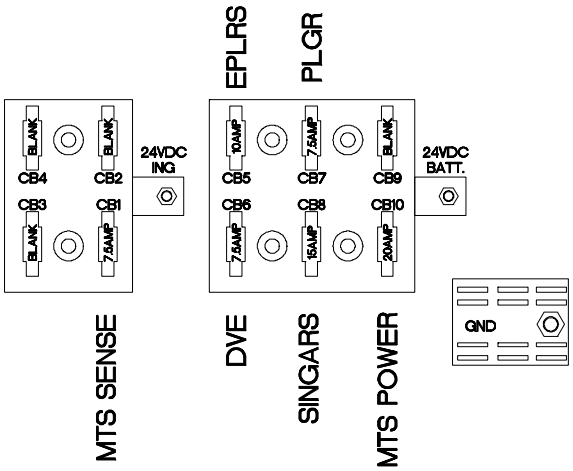


Table 18-2. Power Distribution Panel Circuit Breakers.

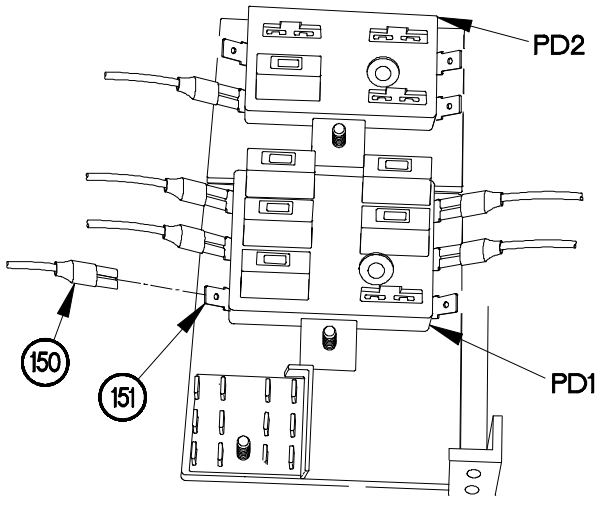
CB	Amp	Function	Reset	P/N
CB1	7.5 AMP	MTS SENSE	Manual	223-7.5-400
CB2		Blank		
CB3		Blank		
CB4		Blank		
CB5	10 AMP	EPLARS	Manual	223-10-400
CB6	7.5 AMP	DVE	Manual	223-7.5-400
CB7	7.5 AMP	PLGR	Manual	223-7.5-400
CB8	15 AMP	SINCGARS/FBCB2	Manual	223-15-400
CB9		Blank		
CB10	20 AMP	MTS POWER	Manual	223-20-400

NOTE

- Terminal lugs are connected the same way. One terminal lug shown.
- Refer to **Table 18-3 Lug Locations and Connectors** for details.

(132) Connect terminal TL1 (150) to distribution panel PD1 CB10 (151).

(133) Perform step (132) on remaining terminal lugs.



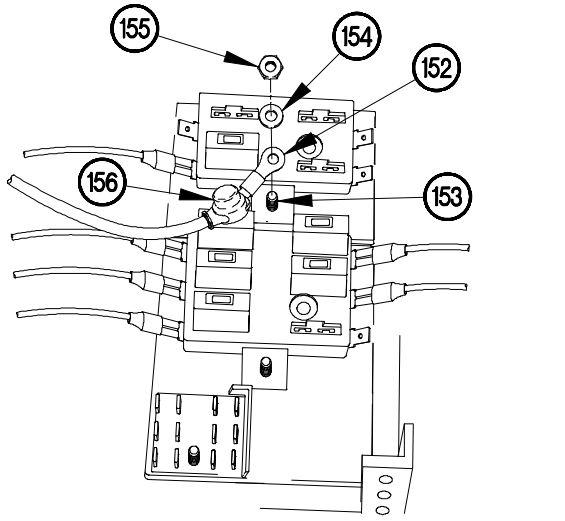
18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

Table 18-3-Terminal Lug Locations and Connector

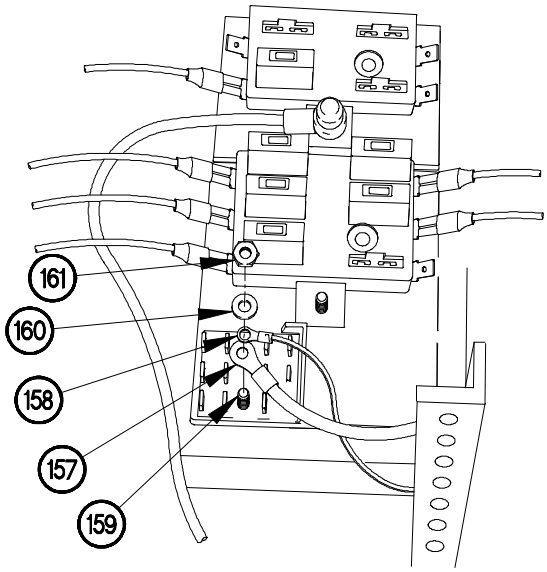
LOCATION	FUNCTION	PD	CONNECTOR	AMP
CB1	MTS SENSE	PD2	TL6	7.5 A
CB2	Spare	PD2		spare
CB3	Spare	PD2		spare
CB4	spare	PD2		spare
CB5	EPLRS	PD1	TL8	10 A
CB6	DVE	PD1	TL3	7.5 A
CB7	PLGR	PD1	TL9	7.5 A
CB8	SINCGAR/FBCB2	PD1	TL2	15 A
CB9	Spare	PD1		spare
CB10	MTS PWR	PD1	TL1	20 A

(134) Install terminal lug TL15 (152) on stud (153) with washer (154) and nut (155).

(135) Install dust boot (156) on stud (153).



YT07I42

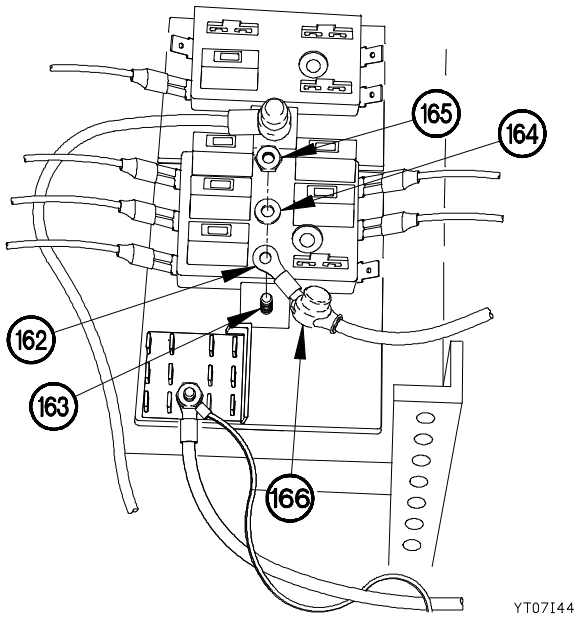


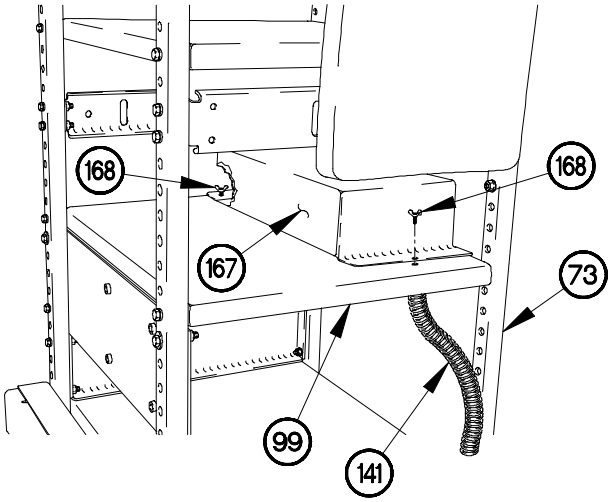
YT07I43

(136) Install terminal lug TL18 (157) and terminal lug TL17 (158) on stud (159) with washer (160) and nut (161).

(137) Install terminal lug TL16 (162) on stud (163) with washer (164) and nut (165).

(138) Install Dust boot (166) on stud (163).





(139) Install Electrical Distribution Block Cover (167) on Power Distribution panel (99) with two wing screws (168).

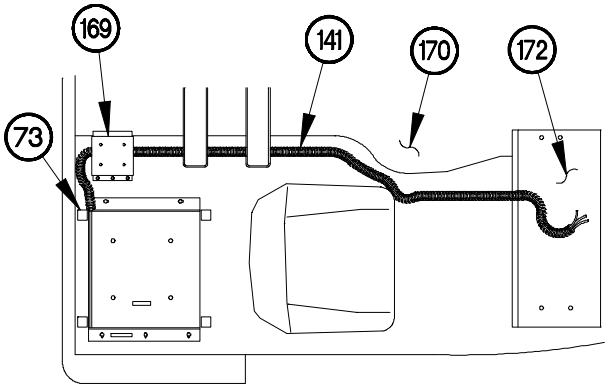
(140) Route Digitization Power cable (141) down support leg (73).

(141) Route Digitization Power cable (141) from support leg (73).

(142) Route Digitization Power cable (141) under small arms mounting bracket (169).

(143) Route Digitization Power cable (141) along RH center floor (170).

(144) Route Digitization Power cable (141) to Power Distribution panel (172).



18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(145) Position circuit breaker CB11 (173) on dashboard (174).

(146) Match mark position of mounting hole locations (175) in dashboard (174).

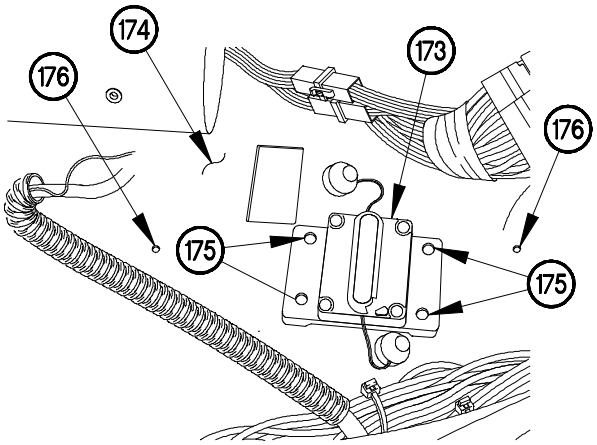
(147) Remove circuit breaker CB11 (173) from dashboard (174).

WARNING

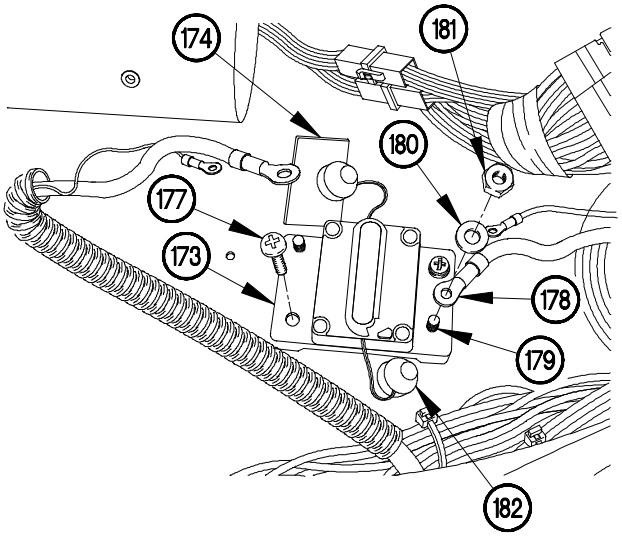
Wear appropriate eye protection when drilling holes. Failure to comply may result in injury to personnel.

(148) Drill four holes in dashboard (174) at hole locations (175).

(149) Drill two holes, one inch to left and right of hole locations (175) at locations (176).



YT07I47

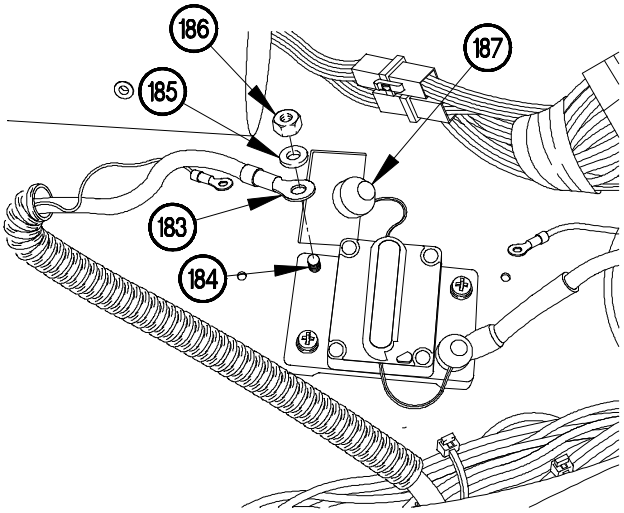


YT07I48

(150) Install circuit breaker CB11 (173) on dashboard (174) with two screws (177).

(151) Install terminal lug TL24 (178) on stud (179) with washer (180) and nut (181).

(152) Install dust boot (182) on stud (179).



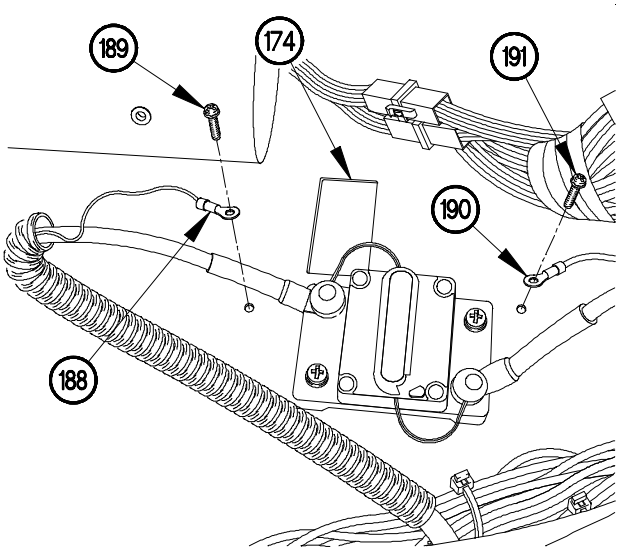
YT07I49

(153) Install terminal lug TL23 (183) on stud (184) with washer (185) and nut (186).

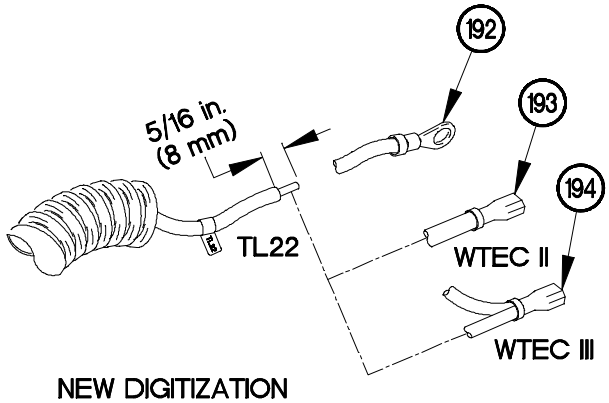
(154) Install dust boot (187) on stud (184).

(155) Install terminal lug TL25 (188) on dashboard (174) with screw (189).

(156) Install terminal lug TL19 (190) on dashboard (174) with screw (191).



YT07I50



NEW DIGITIZATION POWER CABLE

YT07I51

NOTE

Perform steps (157) and (158) if replacing the digitization power cable on vehicle serial numbers 00001 through 11347 equipped with WTEC II controller.

(157) Remove terminal lug TL22 ring terminal (192) from NEW digitization power cable and strip insulation 5/16 in. (8 mm).

(158) Install terminal lug TL22 spade terminal (193) on New digitization power cable.

NOTE

Perform steps (159) and (160) if replacing the digitization power cable on vehicle serial numbers 00001 through 11347 equipped with WTEC III controller.

(159) Remove terminal lug TL22, ring terminal (192) from NEW digitization power cable and strip insulation 5/16 in. (8 mm).

(160) Install terminal lug TL22, spade terminal (194) on NEW digitization power cable and existing wire J117.

18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(161) Remove two nuts (195), lockwashers (196), washers (197), and cover (198) from terminal block TB1 (199). Discard lockwashers.

NOTE

- Perform steps (162) through (164) on vehicle serial numbers 00001 through 11437.
- Perform step (162) on vehicles equipped with WTEC II transmission controllers.

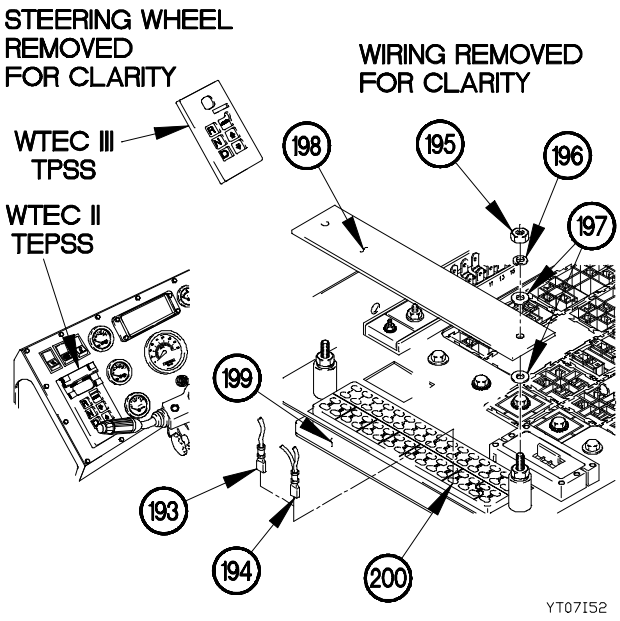
(162) Install terminal lug TL22 (193) on terminal block TB1 connector 58 (200).

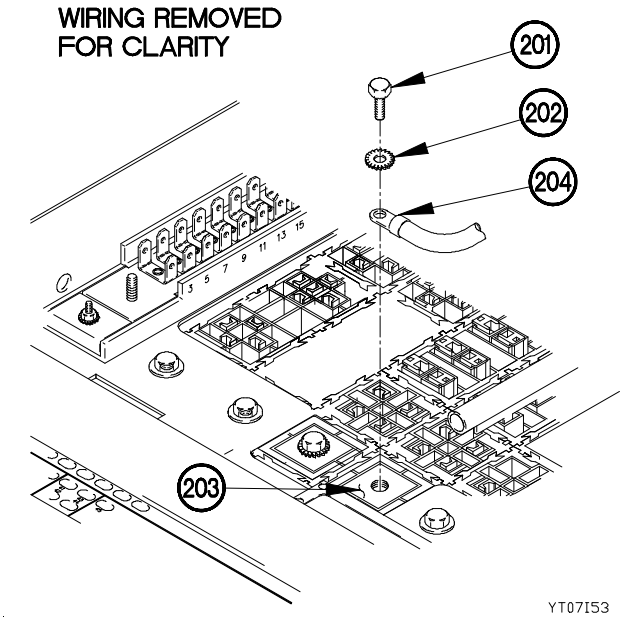
NOTE

Perform step (163) on vehicles equipped with WTEC III transmission controllers.

(163) Install terminal lug TL22 (194) on terminal block TB1 connector 58 (200).

(164) Install two washers (197) and cover (198) on terminal block TB1 (199) with two washers (197), lockwashers (196), and nuts (195).





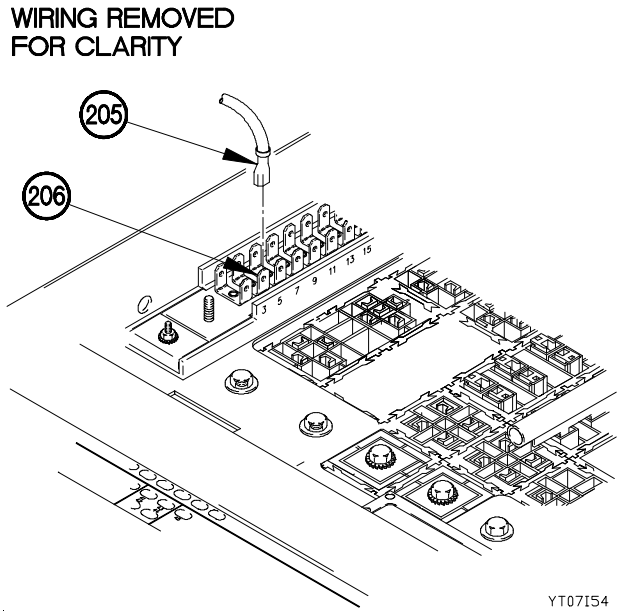
NOTE

Other terminal lugs are present at this location.

(165) Remove screw (201) and lockwasher (202) from 24 VDC connector X1 (203). Discard lockwasher.

(166) Install terminal lug TL20 (204) on 24 VDC connector X1 (203) with lockwasher (202) and screw (201).

(167) Connect terminal lug TL14 (205) to terminal block TB2 connector 43 (206).

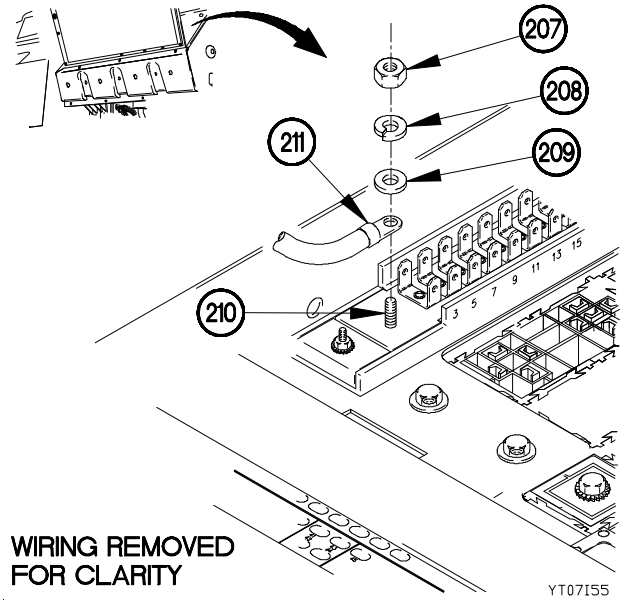


NOTE

Other terminal lugs are present at this location

(168) Remove nut (207), lockwasher (208), and washer (209) from ground stud (210). Discard lockwasher.

(169) Install terminal lug TL21 (211) on ground stud (210) with washer (209), lockwasher (208), and nut (207).

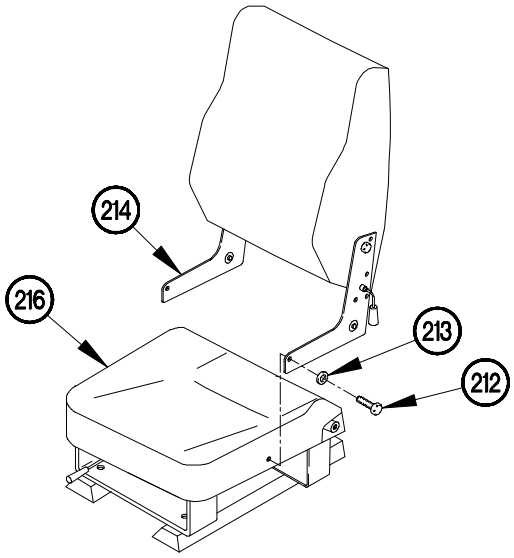


18-4. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

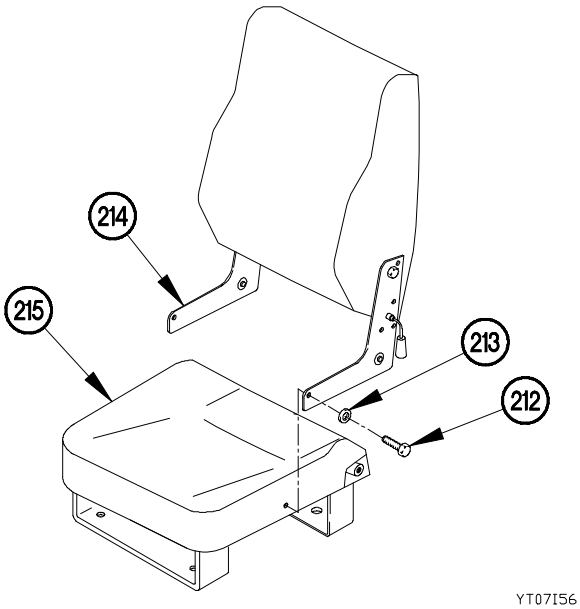
NOTE

Retain seat bottom for future use.

(170) Remove four screws (212), washers (213), and seat back (214) from seat bottom (215).



YT07I57



YT07I56

(171) Install seat back (214) on seat bottom (216) with four washers (213) and screws (212).

b. Follow-on Maintenance

(1) Kick panel installed (TM 9-2320-365-20-4)

(2) Power distribution panel installed (TM 9-2320-365-20-4)

(3) RH seat installed (TM 9-2320-365-20-4)

(4) Rear boarding handles installed (TM 9-2320-365-20-4)

(5) Small arms mounts installed (TM 9-2320-365-20-4)

(6) Seat belts installed (TM 9-2320-365-20-4)

(7) Cab storage boxes installed (TM 9-2320-365-20-4).

(8) Batteries connected (TM 9-2320-365-20-3).

End of Task.

18-5. ENHANCED RESILIENT MOUNT INITIAL INSTALLATION

This task covers:

a. Mechanical Stop Resilient Mount Removal
b. Mechanical Stop Resilient Mount Installation
c. Front Leaf Spring Resilient Mount Removal
d. Front Leaf Spring Resilient Mount Installation
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Gravel deflector removed (TM 9-2320-365-10).
Cab raised (TM 9-2320-365-10).
Front leaf spring removed (front leaf spring resilient mount only) (TM 9-2320-365-34)

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Drill Set, Twist (Item 17, Appendix B)
Drill, Portable Electric (Item 18, Appendix B)
Wrench, Torque 0-200 lb-in (Item 81, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 90, Appendix B)
Wrench, Torque 0-600 lb-ft (Item 85, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
C-Clamp (Item 10, Appendix B)
Jack, Dolly Type, Hydraulic (Item 31, Appendix B)
Trestles, Motor Vehicle Maintenance (2) (Item 71, Appendix B)

Tools and Special Tools (Cont)
Crowfoot Attachment, Socket Wrench (Item 14, Appendix B)
Vise, Machinist (Item 72, Appendix B)
Socket, Left Front Spring, U-Bolt (Item 8, Appendix D)

Materials/Parts
Bolt, U (2) (Item 15.1, Appendix F)
Nut, Self-locking (5) (Item 133, Appendix F)
Nut, Self-locking (4) (Item 124, Appendix F)
Nut, Self-locking (2) (Item 138, Appendix F)
Nut, Self-locking (2) (Item 134, Appendix F)
Pin, Cotter (Item 230, Appendix F)
Sealing Compound (Item 75, Appendix C)
Grease, Automotive and Artillery (Item 36, Appendix C)

WARNING

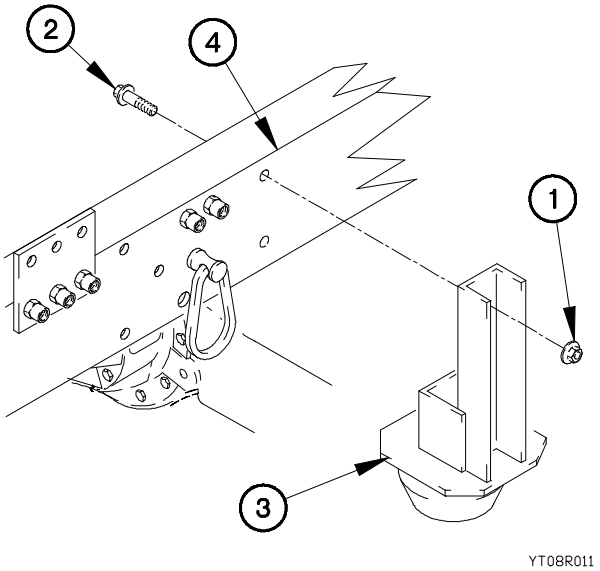
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Mechanical Stop Resilient Mount Removal.

NOTE

Both mechanical stops are removed the same way. Right rear side shown.

(1) Remove two self-locking nuts (1), bolts (2), and mechanical stop (3) from frame (4). Discard self-locking nuts.



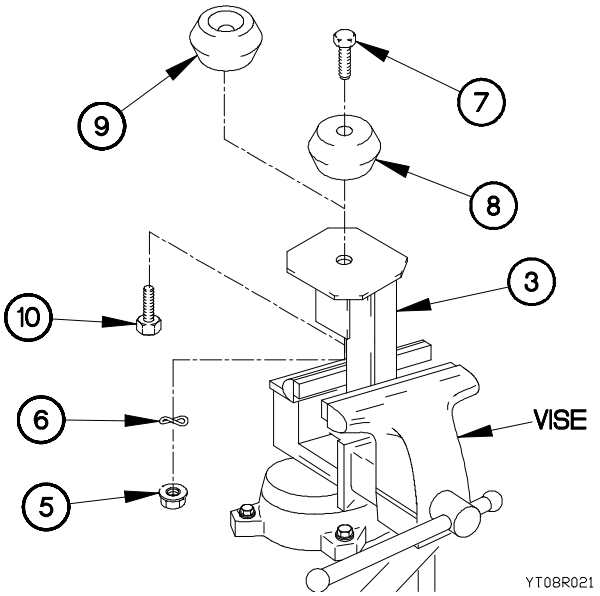
18-5. ENHANCED RESILIENT MOUNT INITIAL INSTALLATION (CONT)

(2) Position mechanical stop (3) in vise.

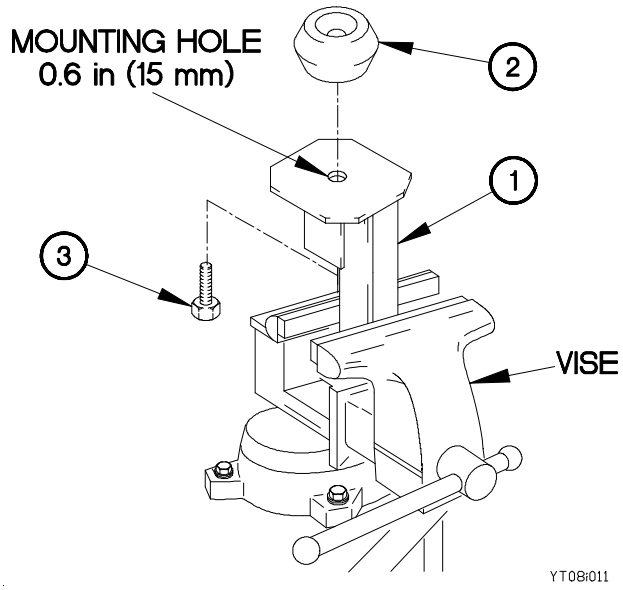
NOTE

Perform step (3) on vehicles not equipped with enhanced resilient mounts.

(3) Remove self-locking nut (5), spring washer (6), screw (7), and resilient mount (8). Discard nut, washer, screw, and mount.



b. Mechanical Stop Resilient Mount Installation.



(1) Enlarge mounting hole on mechanical stop (1) to 0.6 in. (15 mm).

(2) Position enhanced resilient mount (2) on mechanical stop (1) with bolt (3).

(3) Tighten bolt (3) to 69-79 lb-ft (90-110 N•m).

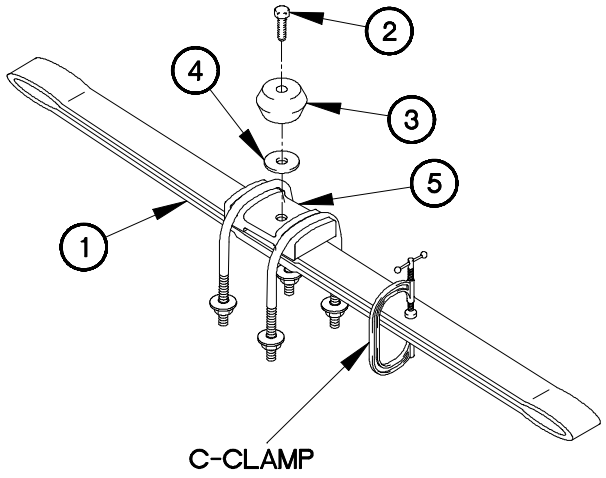
c. Front Leaf Spring Resilient Mount Removal.

WARNING

Frame rails approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

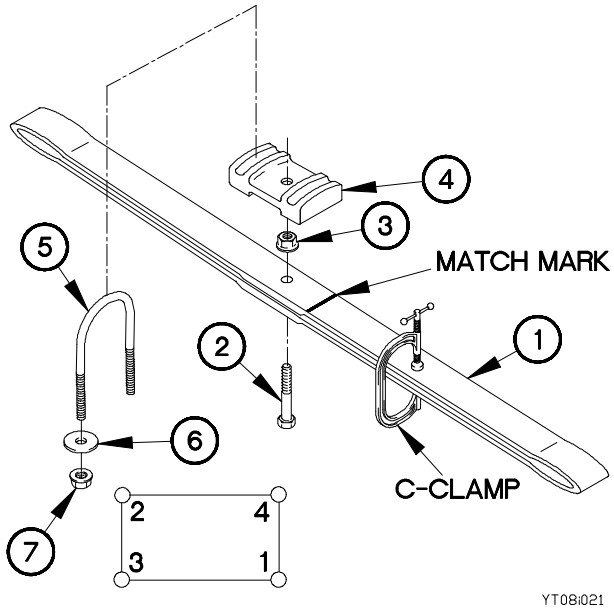
(1) Install c-clamp on leaf spring (1).

(2) Remove bolt (2), resilient mount (3), and spacer (4) from plate (5). Discard bolt, mount, and spacer.



YT08R031

d. Front Leaf Spring Resilient Mount Installation.



YT08i021

(1) Install C-clamp on leaf spring (1).

NOTE

Use bolt P/N 12422628-002 on vehicles equipped with three leaf springs. Use bolt P/N 12422628-001 on vehicles equipped

(2) Install bolt (2) on leaf spring (1) with self-locking nut (3).

(3) Tighten self-locking nut (3) to 69-79 lb-ft (90-110 N•m).

(4) Position plate (4) on leaf spring (1) with plate aligned with matchmarks.

(5) Position two U-bolts (5) on plate (4) with four washers (6) and self-locking nuts (7).

(6) Tighten four self-locking nuts (7) to 200 lb-ft (271 N•m) in sequence shown.

18-5. ENHANCED RESILIENT MOUNT INITIAL INSTALLATION (CONT)

WARNING

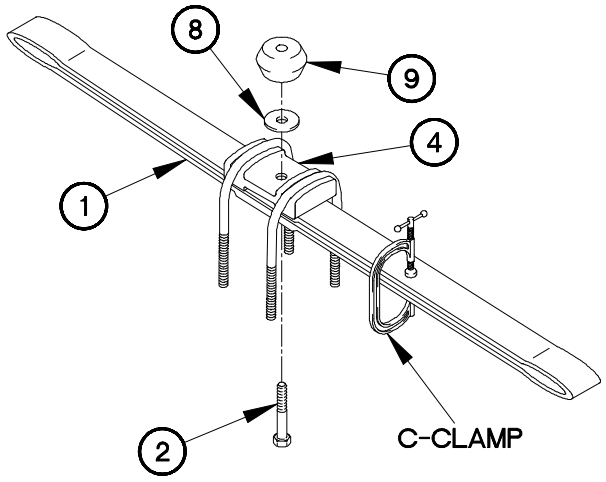
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(7) Apply sealing compound to threads of bolt (2).

(8) Position spacer (8) and enhanced resilient mount (9) on bolt (2).

(9) Tighten resilient mount (9) 1½turns after contact with plate (4).

(10) Remove C-clamp from leaf spring (1).



YT08i031

e. Follow-On Maintenance.

(1) Install gravel deflector (TM 9-2320-365-10).

(2) Install front leaf spring (TM 9-2320-365-34).

(3) Lower cab (TM 9-2320-365-10).

End of Task.

All data on pages 18-59 thru 18-124, including page 18-59 through 18-124 deleted.

CHAPTER 19
ARMAMENT/SIGHTING AND FIRE CONTROL MATERIEL MAINTENANCE

Section I. INTRODUCTION 19-1
19-1. INTRODUCTION 19-1

Section II. MAINTENANCE PROCEDURES 19-2
19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL 19-2

Section I. INTRODUCTION

19-1. INTRODUCTION

This chapter contains maintenance instructions for installing and removing Armament/Sighting and Fire Control Materiel Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL

This task covers:

a. Installation
b. Removal
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-365-10).
Roof hatch, removed (All models except M1081) (TM 9-2320-365-20-4)
Roof hatch, removed (M1081) (TM 9-2320-365-20-4)

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Drill, Electric, Portable (Item 18, Appendix B)
Drill Set, Twist (Item 17, Appendix B)
Blade, Hand, Hacksaw, (Item 4, Appendix B)
Frame, Hand, Hacksaw, (Item 20, Appendix B)
Wrench, Torque, 0-175 lb ft (Item 80, Appendix B)
Tap and Die Set, (Item 47, Appendix B)
Square Combination (Item 57, Appendix B)
Wrench Set, Crowfoot Ratcheting, (TM 9-2320-365-20)
Tool Kit, Blind Rivet, (Item 66, Appendix B)
Wrench, Torque 0-200 lb-in. (Item 81, Appendix B)
Machine Gun Ring Drill Stop (Item 9, Appendix D)
Machine Gun Ring Wooden Support (3) (Item 10, Appendix D)

Tools and Special Tools (Cont)
Screwdriver Attachment, Socket Wrench (Item 47.1, TM 9-2320-365-20 Appendix B)
Dispenser, Sealant (Item 13.1, TM 9-2320-366-20 Appendix B)

Materials/Parts
Sealing Compound (Item 70, Appendix C)
Sealant, Adhesive (Item 66, Appendix C)
Seal (Item 255, Appendix F)
Panel, Defroster (Item 218, Appendix F)
Seal, Urethane Foam (102.25 in. 259.7 cm) (Item 273, Appendix F)
Seal, Urethane Foam (86.75 in. 220.3 cm) (Item 272, Appendix F)
Rubber Strip (Item 251, Appendix F)
Black Polysufide Sealant (Item 75.1, Appendix C)
Spacer (4) (Item 287.1 Appendix F)

Personnel Required
(2)

a. Installation.

(1) Remove four screws (1) and washers (2) from center seat side brackets (3).

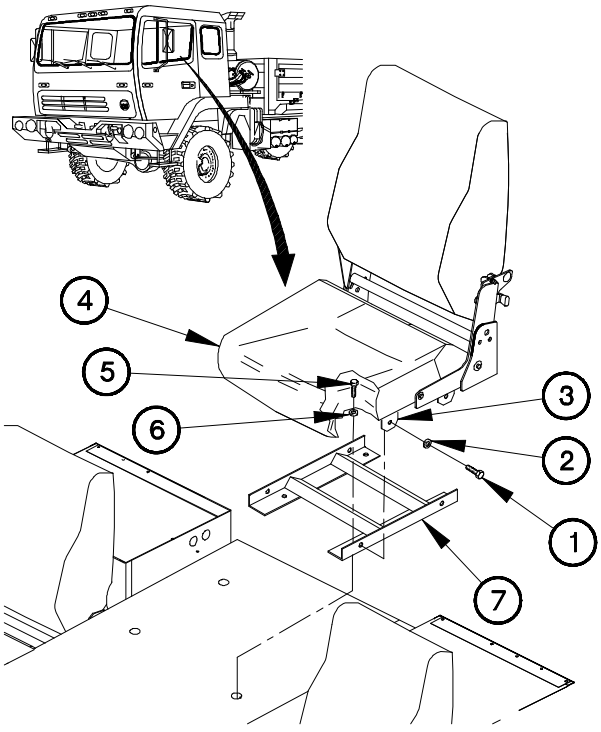
NOTE

Store center seat, mount, screws, and washers for future installation.

(2) Remove center seat (4) from vehicle.

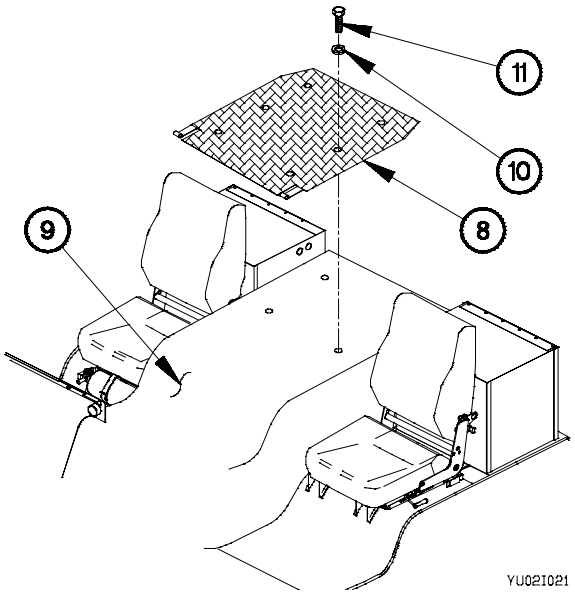
(3) Remove four screws (5) and washers (6) from center seat mount (7).

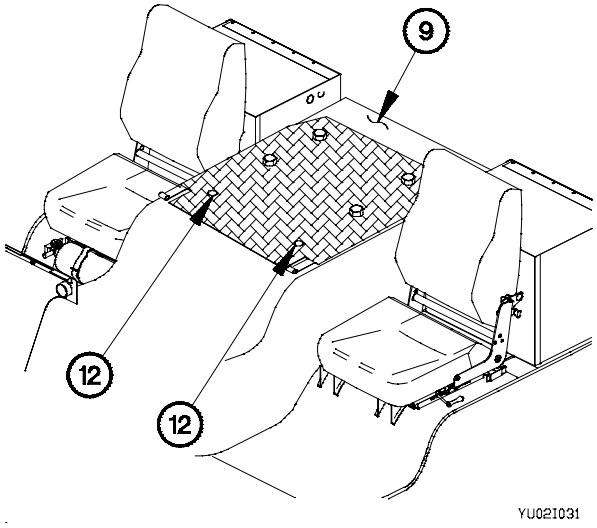
(4) Remove center seat mount (7) from vehicle.



YU02I011

(5) Install top platform (8) on cab floor (9) with four washers (10) and screws (11).





CAUTION

Drill bit stop must be used to limit the depth of drill bit travel. Failure to comply may result in damage to engine components.

(6) Drill two 10 mm holes (12) in cab floor (9).

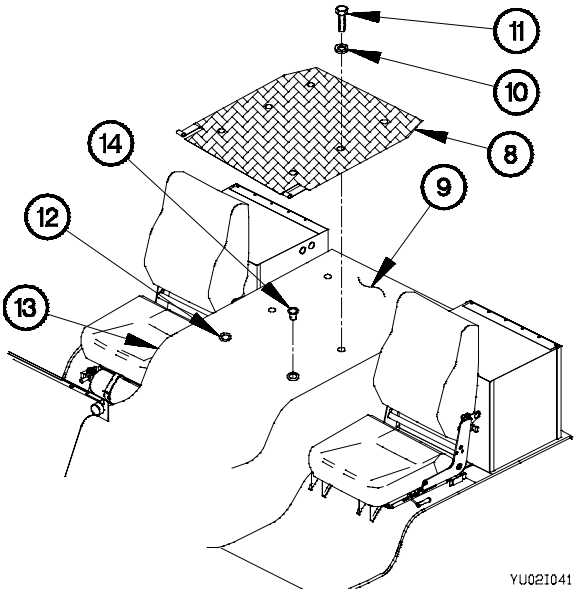
(7) Remove four screws (11), washers (10), and top platform (8) from cab floor (9).

NOTE

Remove all rubber material around holes to ensure metal to metal contact between clinch nuts and cab floor.

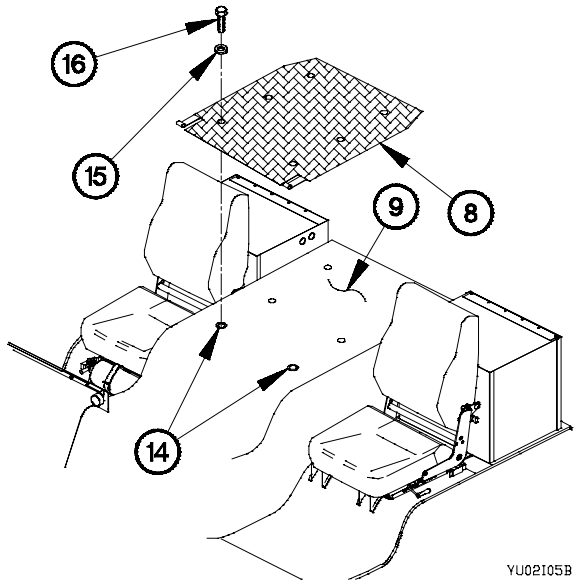
(8) Cut rubber material from around two holes (12) in floor mat (13) to approximately 3/4 inch.

(9) Install two clinch nuts (14) in holes (12).



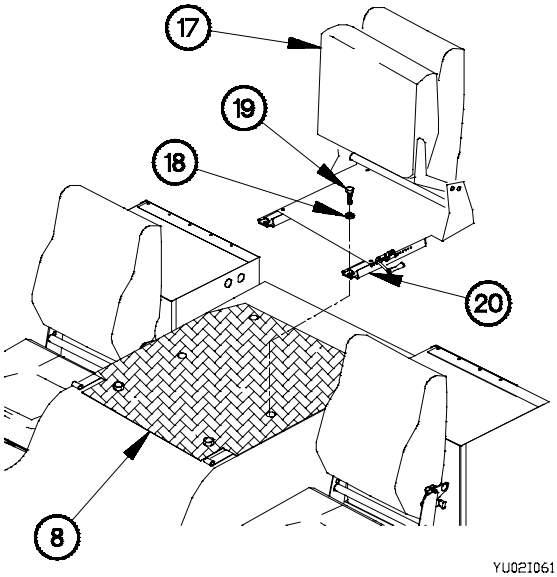
19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(10) Position top platform (8) in cab floor (9) with two washers (15) and screws (16) in clinch nuts (14).



WARNING

Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.



NOTE

Install center seat in folded and raised position with seat rails in forward position.

(11) Apply sealing compound to threads of two screws (19).

(12) Position center seat (17) on top platform (8).

NOTE

Flat sides of screw will be in line with seat tracks.

(13) Position two washers (18) and screws (19) in seat mount (20).

(14) Slide center seat (17) fully forward.

(15) Fold center seat (17) down.

NOTE

Perform step (13.1) on vehicles with cab S/N 12076G or higher. Cab S/N located on B Pillar.

(13.1) Position two spacer (20.1), washer (18) and screws (19) in seat mount (20).

(14) Slide center seat (17) fully forward.

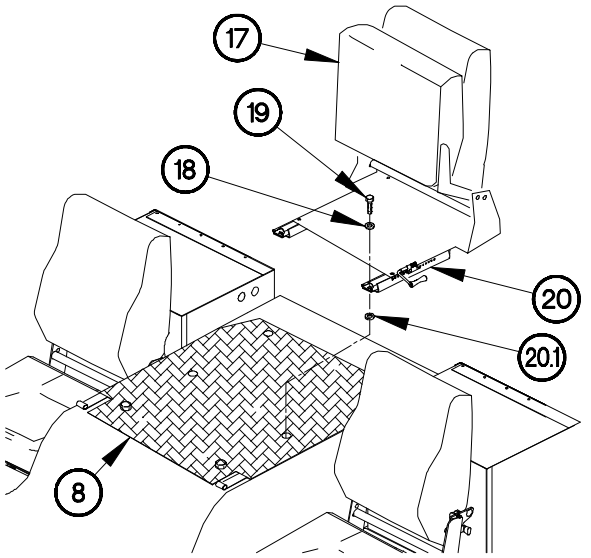
(15) Fold center seat (17) down.

WARNING

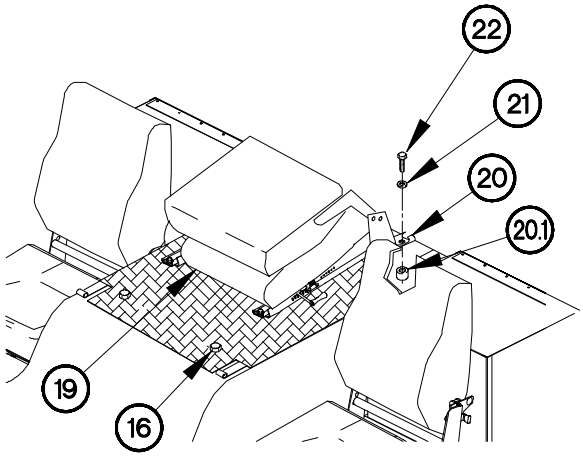
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(16) Apply sealing compound to threads of two screws (22).

(17) Position two washers (21) and screws (22) in seat mount (20).



yu021171



YU02I072

NOTE

- Perform step (17.1) on vehicles with cab S/N 12076G or higher.
- When tightening screws, flat sides of screws are to be in line with track sides.

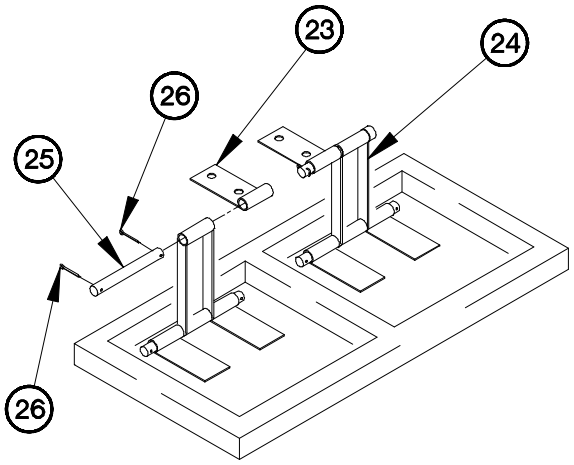
(17.1) Position two spacers (20.1), washer (21) and screws (22) in seat mount (20).

(18) Tighten two screws (16) to 71-89 lb-in. (8-10 N•m).

(18.1) Tighten two screws (19 and 22) to 14-18 lb-ft (19-25 N•m).

(19) Install two support brackets (23) on lower platform legs (24) with straight pins (25).

(20) Install four cotter pins (26) in two straight pins (25).



YU02I081

19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(21) Position lower platform (27) on top platform (8) with two quick-release pins (28).

(22) Place lower platform (27) in raised position with legs (24) fully forward and support brackets (23) flush with cab floor (9).

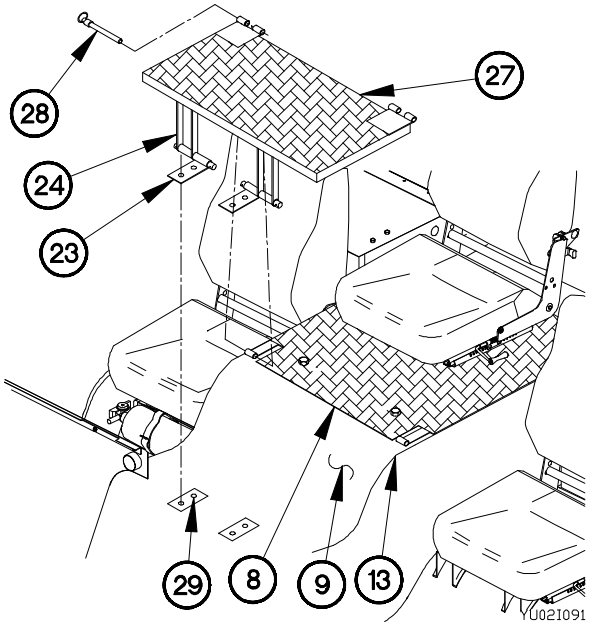
(23) Mark outline of support bracket (23).

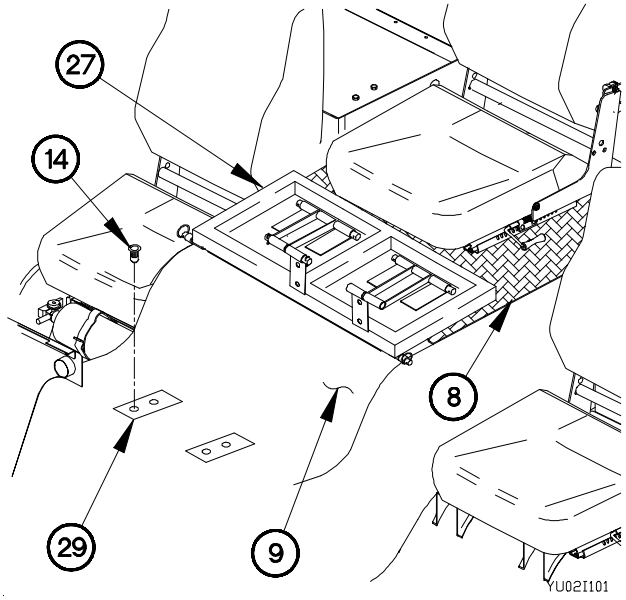
(24) Cut floor mat (13) around outline of support bracket (23).

NOTE

Remove all rubber material under floor mat to have metal to metal contact between clinch nuts and cab floor.

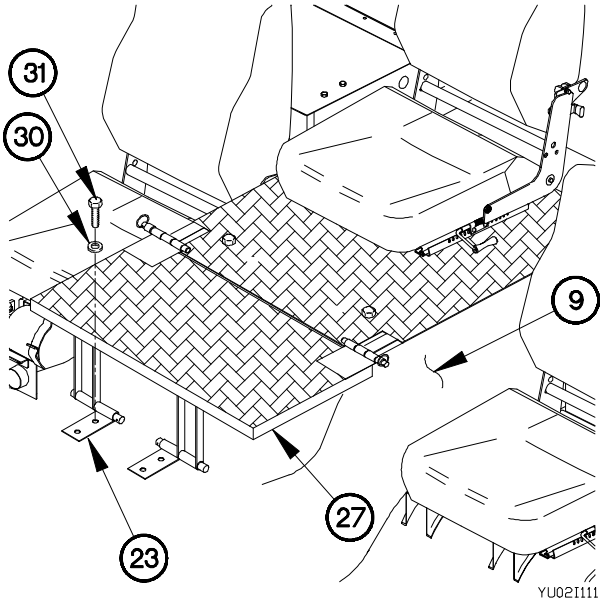
(25) Mark and center punch location of four support bracket holes (29) on cab floor (9).





(26) Fold lower platform (27) back to rest on top platform (8).

(27) Drill four 10 mm holes (29) in cab floor (9).



(28) Install four clinch nuts (14) in holes (29).

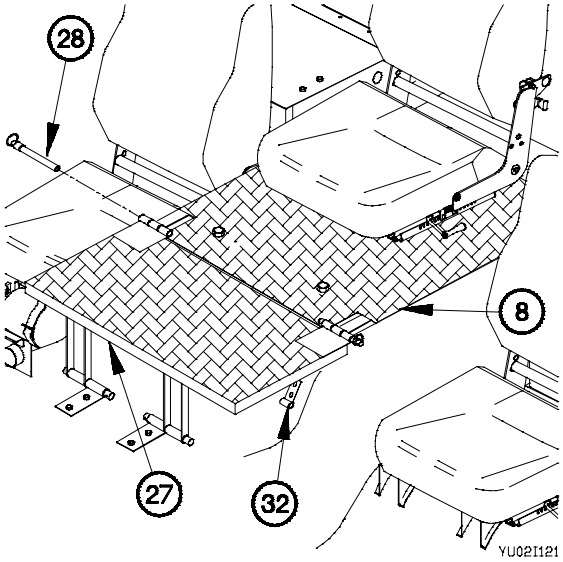
(29) Rotate lower platform (27) back in raised position.

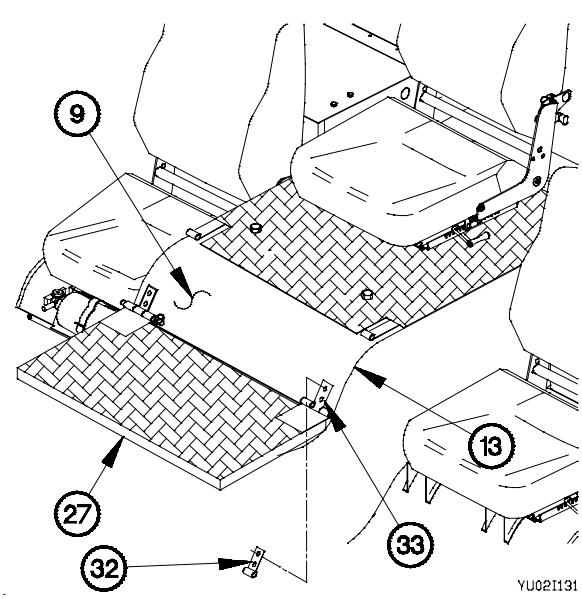
(30) Position two brackets (23) on cab floor (9) with four washers (30) and screws (31).

(30.1) Tighten four screws (31) to 71-89 lb-in. (8-10 N•m).

(31) Remove two quick-release pins (28) from lower platform (27) and top platform (8).

(32) Connect storage brackets (32) to lower platform (27) with quick-release pins (28).





(33) Place lower platform (27) in lowered position with storage brackets (32) resting on cab floor (9).

(34) Mark outline of storage brackets (32) on cab floor (9).

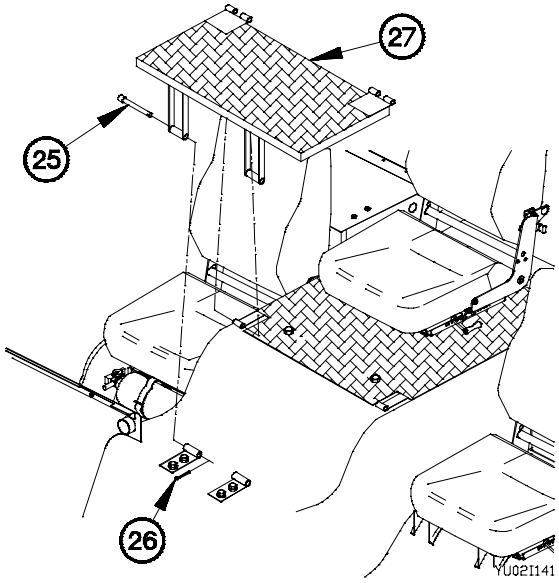
(35) Cut floor mat (13) around outline of storage bracket (32).

NOTE

Remove all rubber material from cutout of storage bracket to have metal to metal contact between clinch nuts and cab floor.

(36) Center punch location of four storage bracket holes (33) on cab floor (9).

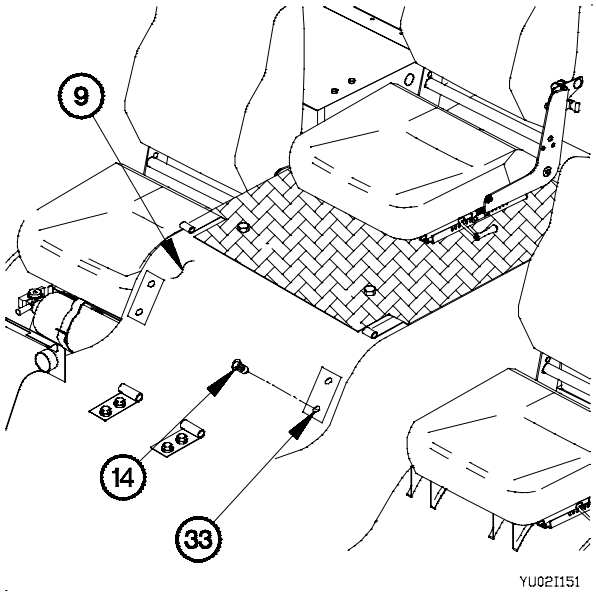
19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)



(37) Raise lower platform (27).

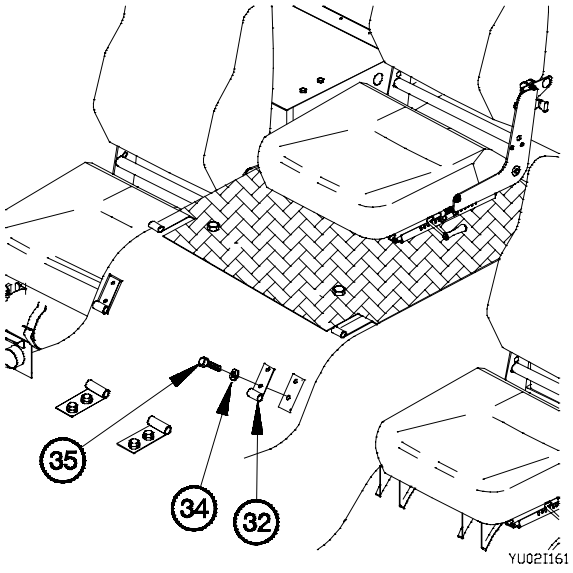
(38) Remove two cotter pins (26) and straight pins (25) from lower platform legs (27).

(39) Remove lower platform (27) from vehicle.



(40) Drill four 10 mm holes (33) in cab floor (9).

(41) Install four clinch nuts (14) in holes (33).



■ (42) Position two washers (34) and screws (35) in bottom holes of storage brackets (32).

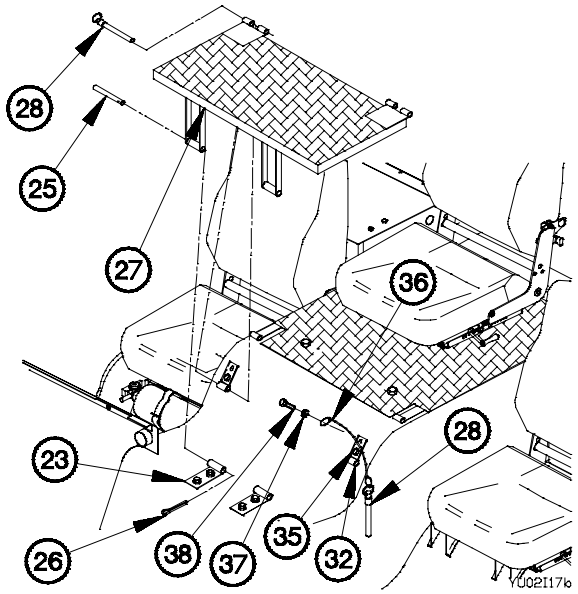
(43) Position two lanyards (36), washers (37), and screws (38) to top holes of storage brackets (32).

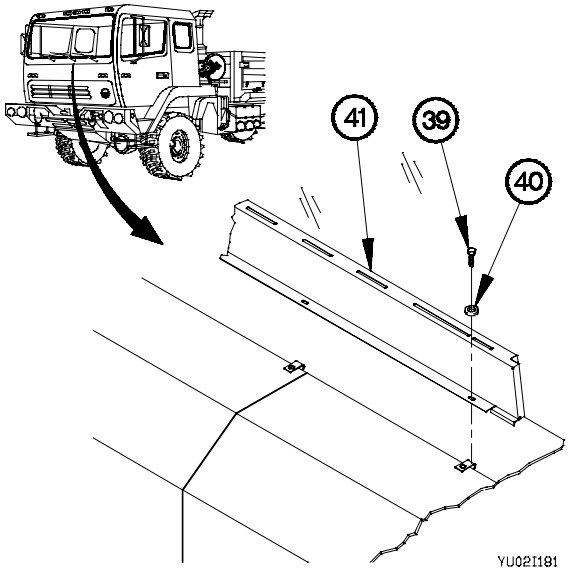
(43.1) Tighten two screws (35 and 38) to 71-89 lb-in. (8-10 N·m).

(44) Connect two lanyards (36) to quick-release pins (28).

(45) Attach lower platform (27) to two brackets (23) with straight pins (25) and cotter pins (26).

(46) Attach lower platform (27) to storage brackets (32) with two quick-release pins (28).





NOTE

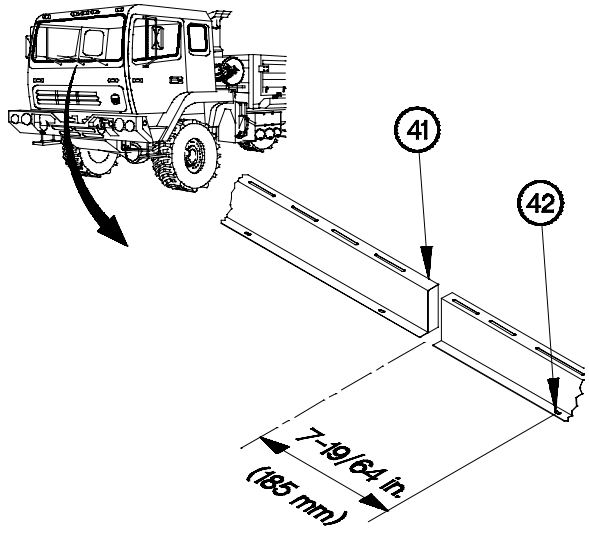
Perform steps (47) through (60) on all vehicles except M1081.

(47) Remove six screws (39) and washers (40) from defrost cover (41).

(48) Remove defrost cover (41) from vehicle.

(49) Measure and mark center line of defrost cover (41) at 7 19/64 in. (185 mm) from either of the center defrost cover mounting holes (42).

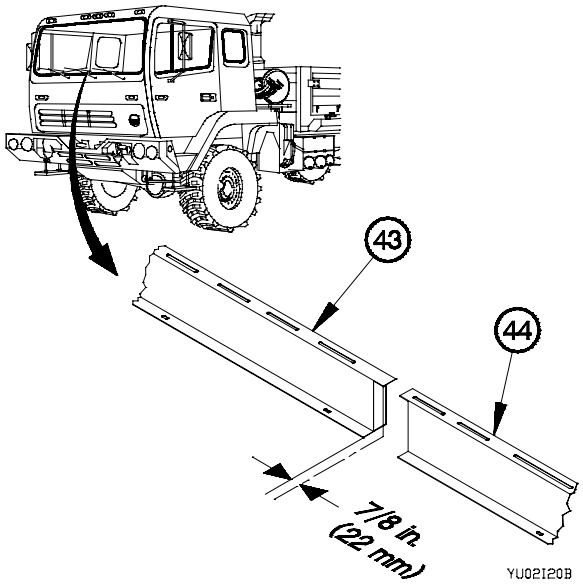
(50) Cut out marked 7 19/64 in. (185 mm) center line on defrost cover (41).

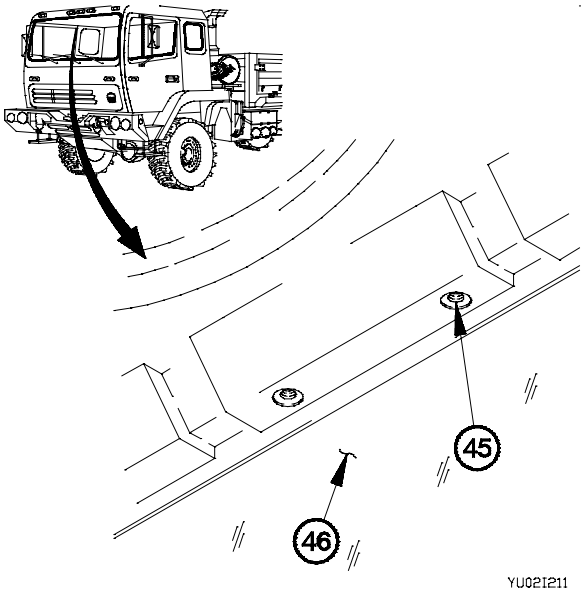


19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(51) Measure and mark 7/8 in. (22 mm) in from flat edges of LH defrost cover (43) and RH defrost cover (44).

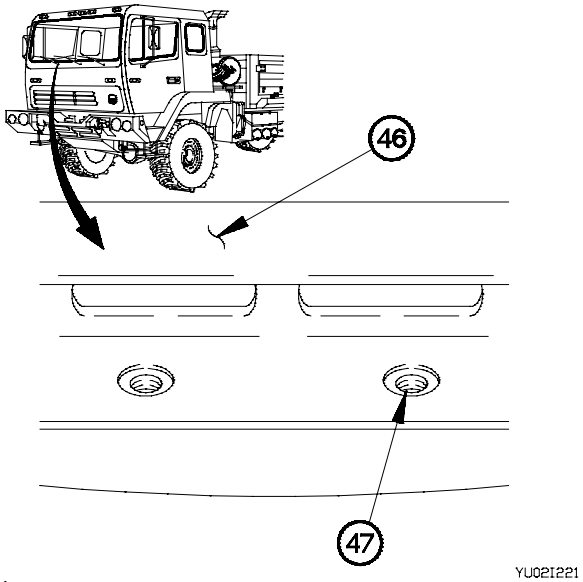
(52) Cut out marked 7/8 in. (22 mm) from bottom and center flat edges of LH defrost cover (43) and RH defrost cover (44).





(53) Clean threads of two clinch nuts (45) at top of windshield (46).

(54) Clean threads of two clinch nuts (47) at bottom of windshield (46).



WARNING

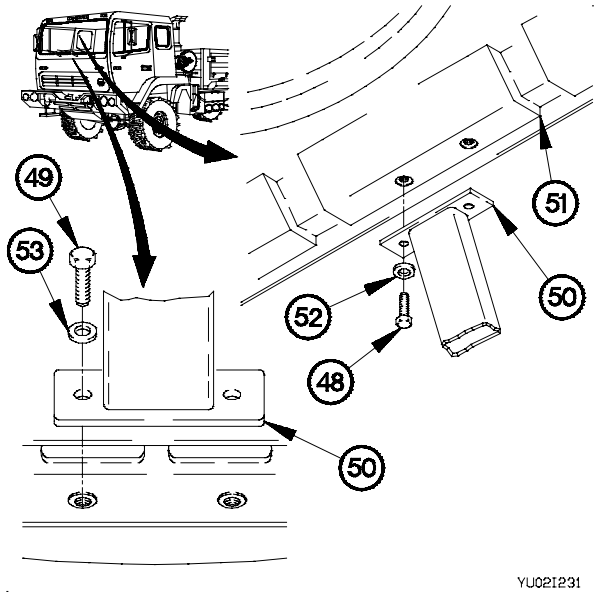
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

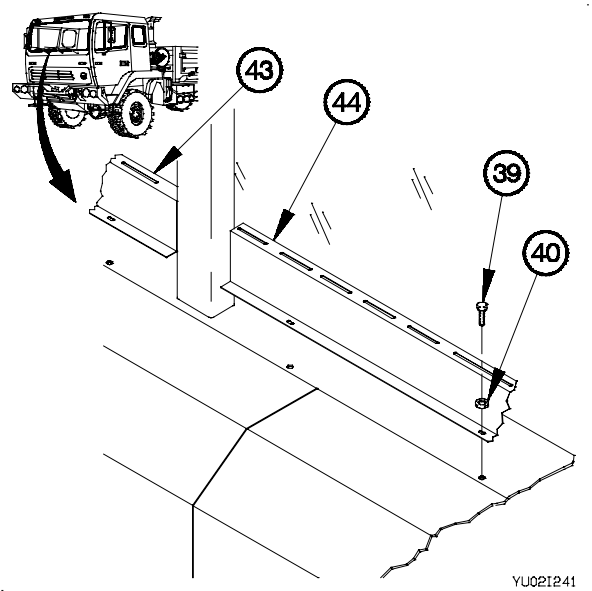
(55) Apply adhesive sealant to two screws (48 and 49).

(56) Position roof support post (50) on cab roof (51) with two washers (52) and screws (48).

(57) Position two washers (53) and screws (49) in roof support post (50).

(58) Tighten two screws (48 and 49) to 21-27 lb-ft (29-37 N·m).





(59) Position LH defrost cover (43) and RH defrost cover (44) in vehicle with six washers (40) and screws (39).

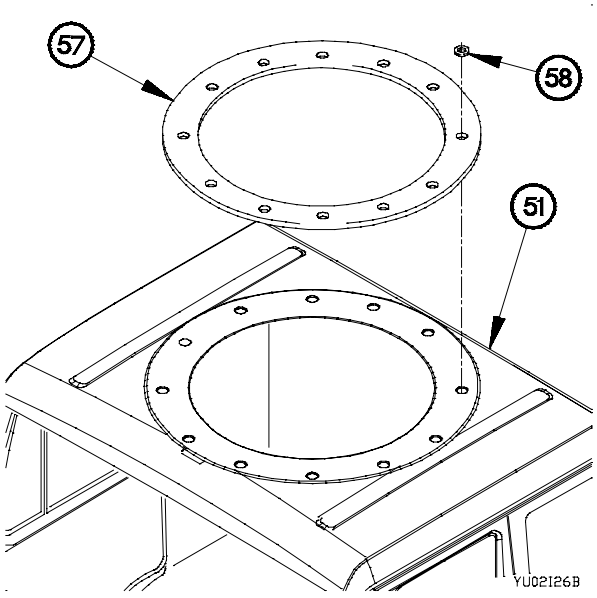
(60) Tighten six screws (39) to 22-27 lb-in. (2-3 N·m).

19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(61) Deleted.

(62) Deleted.

(63) Deleted.



NOTE

- Align ring spacer and washers with threaded holes in cab roof.
- Ring spacer should have 1/4 in. clearance from inner lip of cab roof to allow free rotation of machine gun ring.

(64) Position ring spacer (57) and 12 washers (58) on cab roof (51).

WARNING

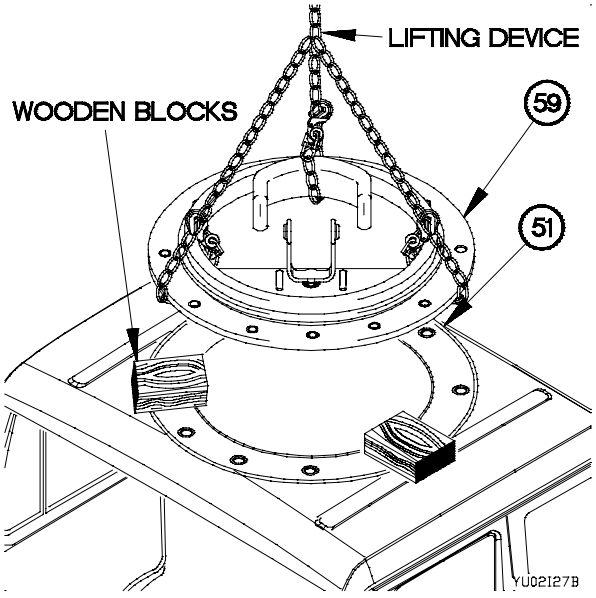
Machine gun ring assembly weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (65) through (69) require the aid of an assistant.

(65) Position three wooden blocks on cab roof (51).

(66) Position machine gun ring (59) on three wooden blocks.



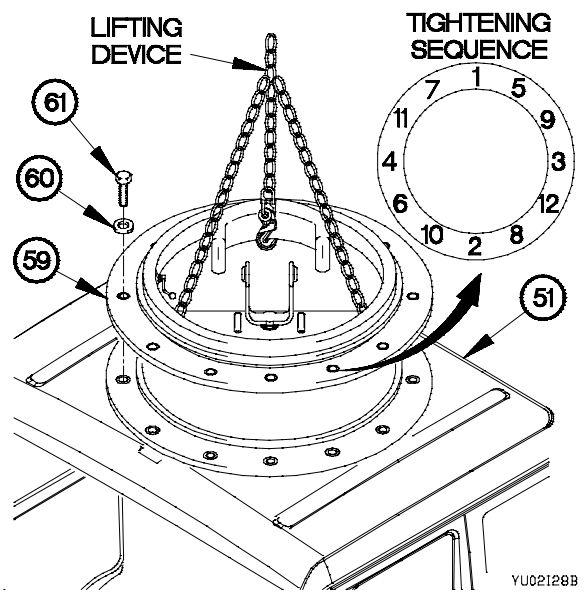
(67) Re-position lifting device on machine gun ring (59).

(68) Remove three wooden blocks from cab roof (51).

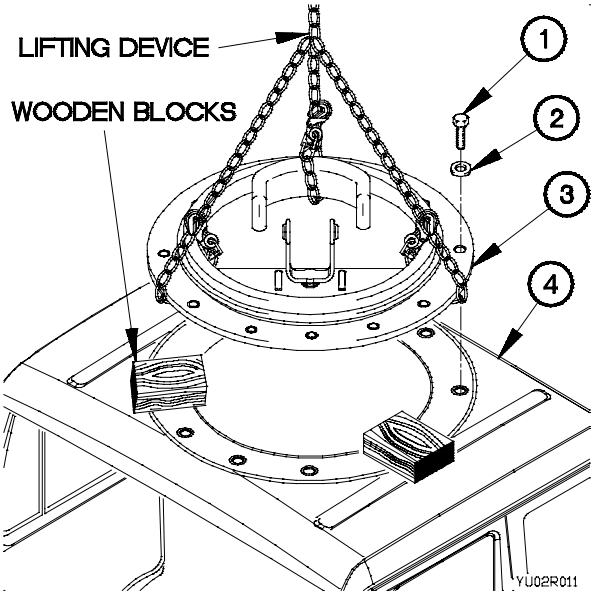
(69) Position machine gun ring (59) on cab roof (51).

(70) Position 12 washers (60) and screws (61) in machine gun ring (59).

(71) Tighten 12 screws (61) 23 sequence to 49-61 lb-ft (66-82 N·m).



b. Removal.



(1) Remove 12 screws (1) and washers (2) from machine gun ring (3).

(2) Position three wooden blocks on cab roof (4).

WARNING

Machine gun ring assembly weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

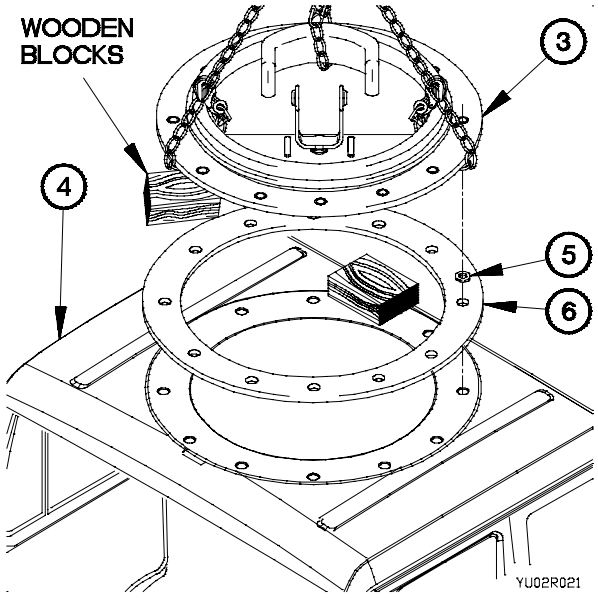
NOTE

Steps (3) through (7) require the aid of an assistant.

(3) Position machine gun ring (3) on three wooden blocks.

(4) Re-position lifting device on machine gun ring (3).

19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)



(5) Remove machine gun ring (3) from cab roof (4).

(6) Remove three wooden blocks from cab roof (4).

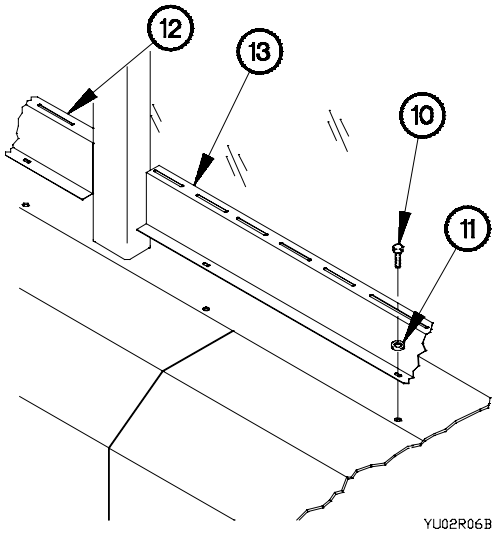
(7) Remove 12 washers (5) and ring spacer (6) from cab roof (4).

(8) Deleted.

(9) Deleted.

(10) Deleted.

(11) Deleted.



NOTE

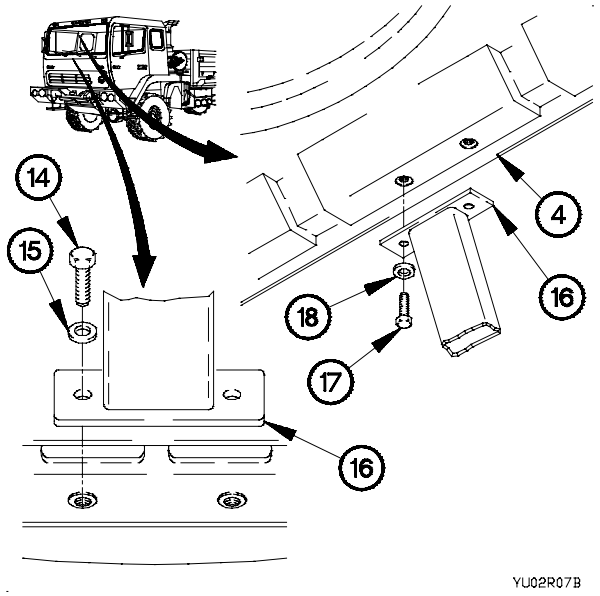
- Perform steps (12) through (16) on all vehicles except M1081.
- Store defrost covers for future installation.

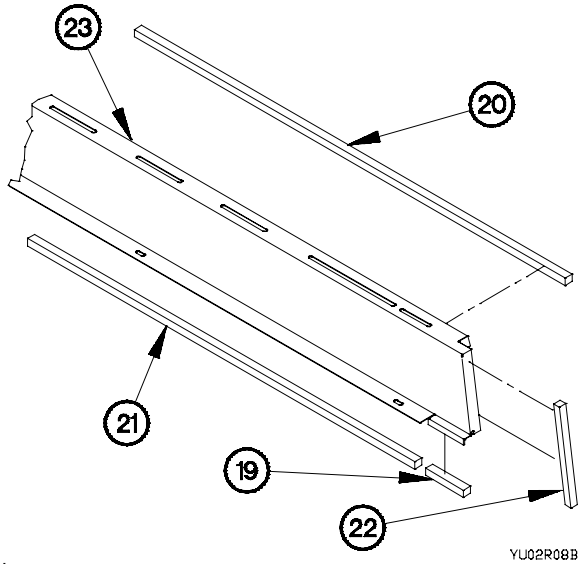
(12) Remove six screws (10), washers (11), LH defrost cover (12) and RH defrost cover (13) from vehicle.

(13) Remove two screws (14) and washers (15) from roof support (16).

(14) Remove two screws (17) and washers (18) from roof support (16).

(15) Remove roof support (16) from cab roof (4).





(16) Cut two seals (19) to 2 1/2 in. (63.5 mm).

(17) Cut seal (20) to 86 3/4 in. (2203 mm).

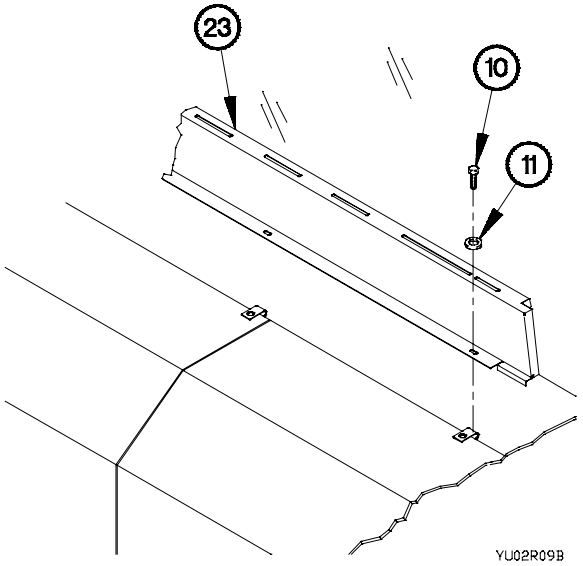
(18) Cut seal (21) to 86 3/4 in. (2203 mm).

(19) Cut two seals (22) to 7 in. (179 mm).

(20) Install seals (20 and 21) and two seals (19 and 22) on defroster cover (23).

(21) Position defrost cover (23) in vehicle with six washers (11) and screws (10).

(22) Tighten six screws (10) to 22-27 lb-in. (2-3 N·m).



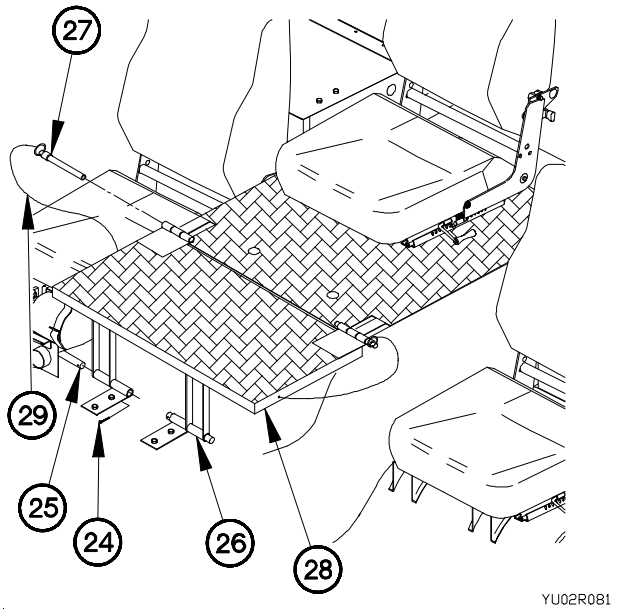
19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

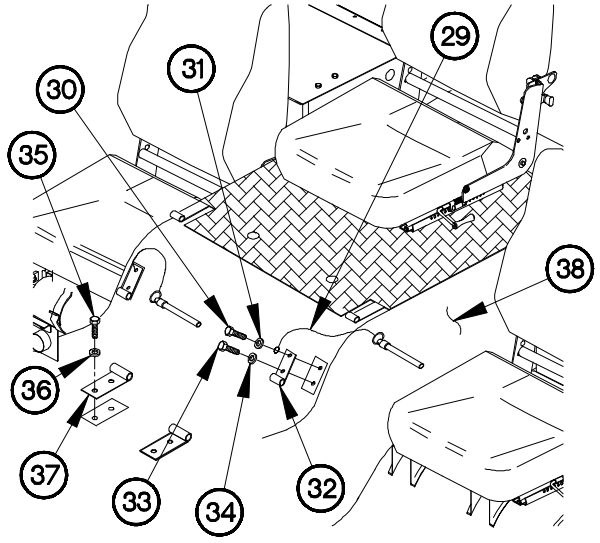
(23) Remove two cotter pins (24) and straight pins (25) from lower platform legs (26).

(24) Remove two quick-release pins (27) from lower platform (28).

(25) Remove lower platform (28) from vehicle.

(26) Remove two lanyards (29) from quick-release pins (27).





(27) Remove two screws (30), lanyards (29), and washers (31) from storage brackets (32).

(28) Remove two screws (33), washers (34), and storage brackets (32) from vehicle.

(29) Remove four screws (35), washers (36), and two support brackets (37) from cab floor (38).

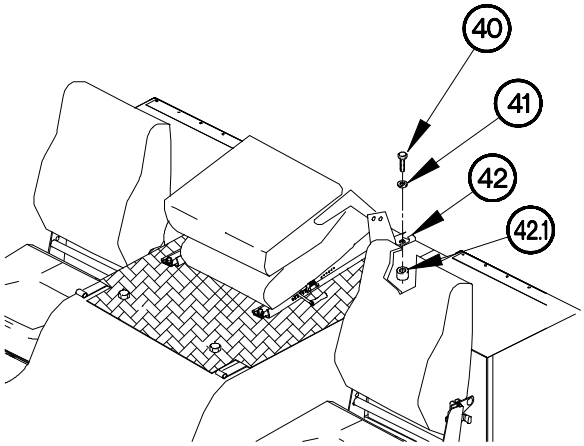
(30) Fold back of center seat (39) down and slide fully forward.

(31) Remove two screws (40) and washers (41) from seat mount (42).

NOTE

Perform step (31.1) on vehicles with cab S/N 12076G or higher.

(31.1) Remove two screws (40), washers (41) and spacers (42.1) from mount (42). Discard spacers.



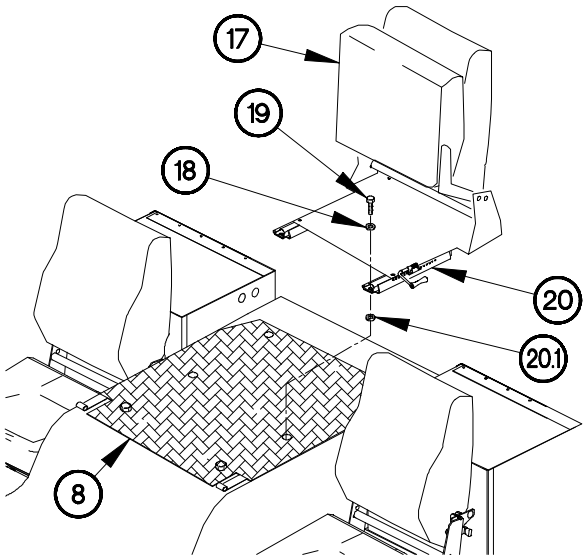
(32) Slide center seat (39) fully rearward.

(35) Remove two screws (43), washers (44), and center seat (39) from vehicle.

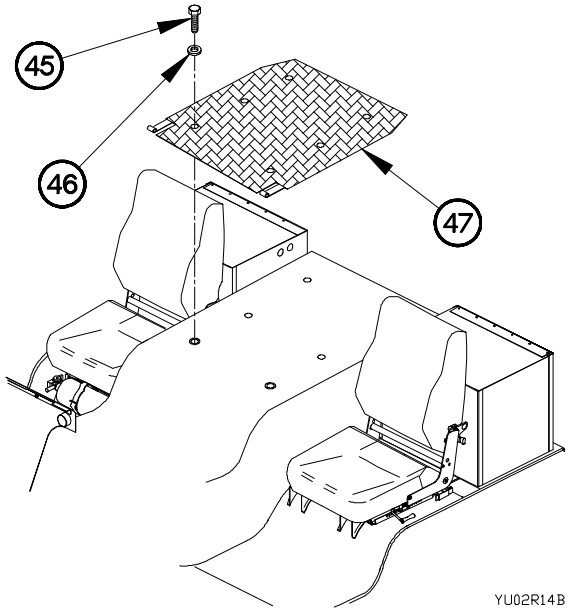
NOTE

Perform step (33.1) on vehicles with cab S/N 12076G or higher. Cab S/N located on B Pillar.

(33.1) Remove two screws (43), washers (44), spacers (44.1) and center seat (39) from vehicles. Discard spacers.



yu02l171



YU02R14B

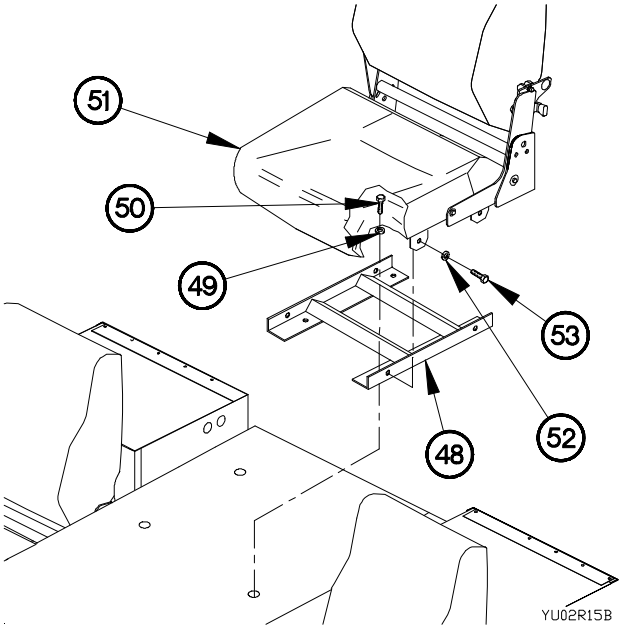
(34) Remove two screws (45) and washers (46) from top platform (47).

(35) Remove top platform (47) from vehicle.

(36) Position center seat mount (48) in vehicle with four washers (49) and screws (50).

(36.1) Tighten four screws (50) to 16-18 lb-ft (22-26 N•m).

(37) Install center seat (51) on center seat mount (48) with four washers (52) and screws (53).



YU02R15B

c. Follow-On Maintenance.

(1) Install roof hatch (all models except M1081) (TM 9-2320-365-4).

(2) Install roof hatch (M1081) (TM 9-2320-365-20-4).

End of Task.

CHAPTER 20
ENGINE MAINTENANCE

Section I. INTRODUCTION 20-1
20-1. INTRODUCTION 20-1

Section II. MAINTENANCE PROCEDURES 20-2
20-2. ENGINE TO MAINTENANCE STAND MOUNTING 20-2
20-3. CYLINDER HEAD REPAIR 20-6
20-4. CYLINDER BLOCK REPAIR 20-25
20-5. CRANKSHAFT AND MAIN BEARINGS REPLACEMENT/REPAIR 20-30
20-6. PISTON AND CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR 20-40
20-7. CAMSHAFT AND BEARING REPLACEMENT/REPAIR 20-50
20-8. FRONT GEAR HOUSING AND IDLER GEAR REPLACEMENT 20-58

Section I. INTRODUCTION

20-1. INTRODUCTION

This chapter contains maintenance instructions for repairing and replacing Engine Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

20-2. ENGINE TO MAINTENANCE STAND MOUNTING

This task covers:

a. Mounting
b. Demounting
c. Follow-On Maintenance

INITIAL SETUP

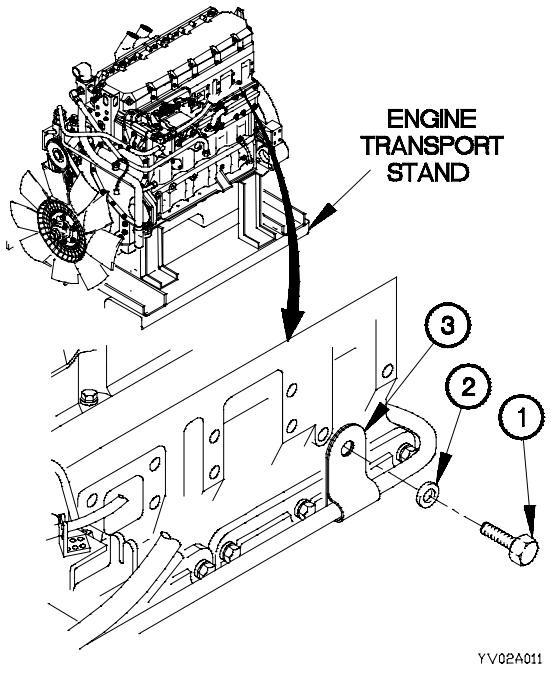
Equipment Conditions
Engine assembly removed (para 3-3).
Starter removed (TM 9-2320-365-20-3).
Throttle position sensor cable assembly removed (TM 9-2320-365-20-3).
Fuel/water separator removed (TM 9-2320-365-20-3).
Fuel filter base removed (TM 9-2320-365-20-3).
Air compressor removed (para 11-2).
Engine bracket removed (para 3-5).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Engine Stand Bracket (Item 6, Appendix D)
Stand, Maintenance, Engine (TM 9-2320-365-20)

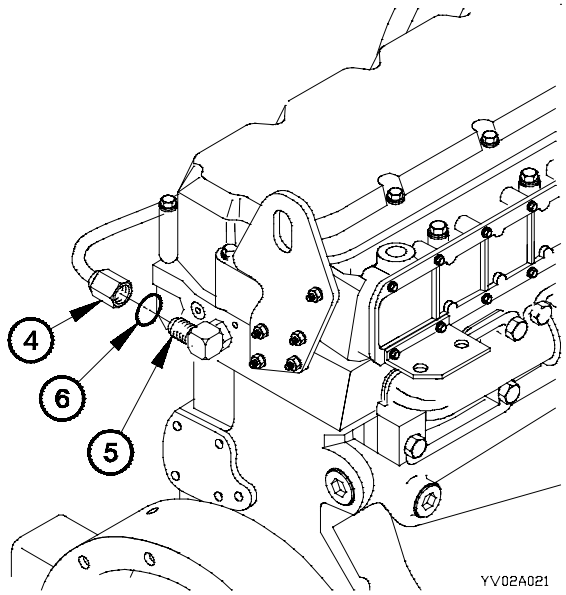
Materials/Parts
Packing, Preformed (Item 204, Appendix F)
Gasket (Item 55, Appendix F)
Packing, Preformed (Item 195, Appendix F)

Personnel Required
(2)

a. Mounting.



(1) Remove bolt (1) and washer (2) from fuel tube clip (3).

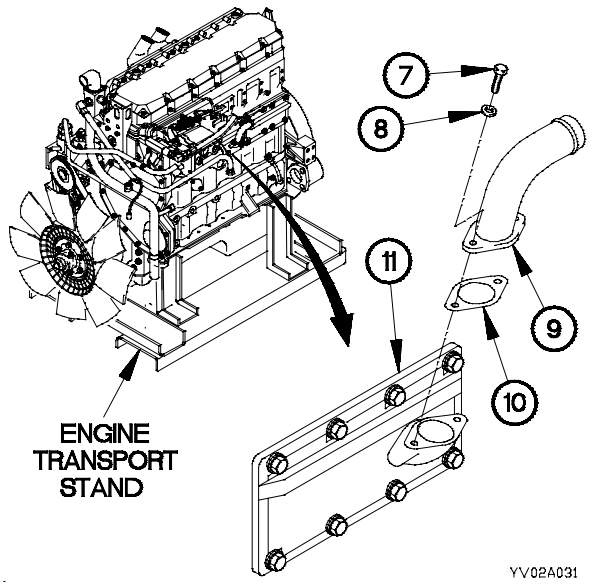


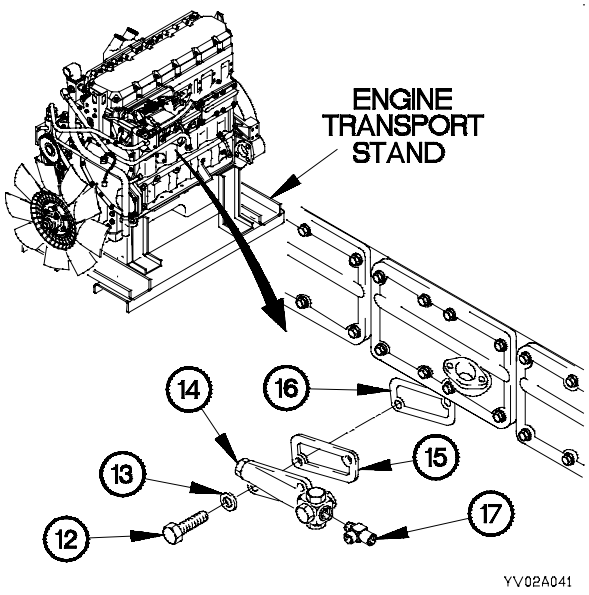
(2) Disconnect fuel tube (4) from 90-degree fitting (5).

(3) Remove preformed packing (6) from 90-degree fitting (5). Discard preformed packing.

(4) Remove two bolts (7) and washers (8) from oil tube (9).

(5) Remove oil tube (9) and gasket (10) from center side cover (11). Discard gasket.





(6) Remove two bolts (12) and washers (13) from oil manifold (14).

(7) Remove oil manifold (14) and preformed packing (15) from engine (16). Discard preformed packing.

(8) Remove tee fitting (17) from oil manifold (14).

(9) Install engine stand bracket on engine (16) with six bolts (18).

WARNING

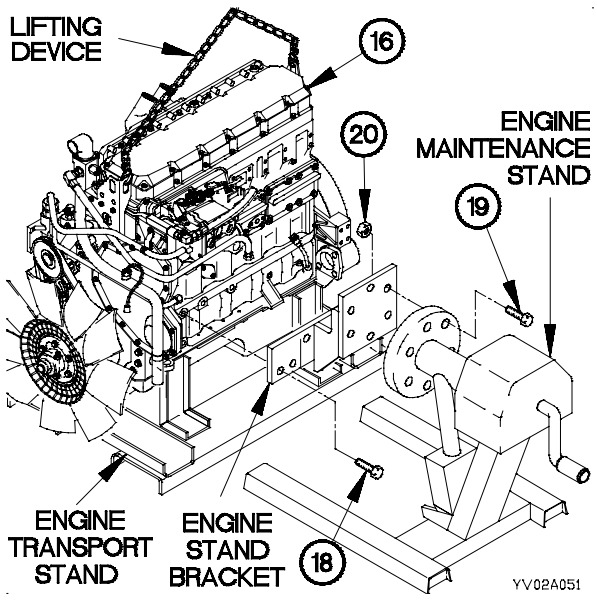
Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to mounting on maintenance stand. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Steps (10) and (11) require the aid of an assistant.

(10) Remove engine (16) from engine transport stand.

(11) Install engine (16) on engine maintenance stand with four bolts (19) and nuts (20).



20-2. ENGINE TO MAINTENANCE STAND MOUNTING (CONT)

b. Demounting.

WARNING

Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to demounting from maintenance stand. Failure to comply may result in injury to personnel or damage to equipment.

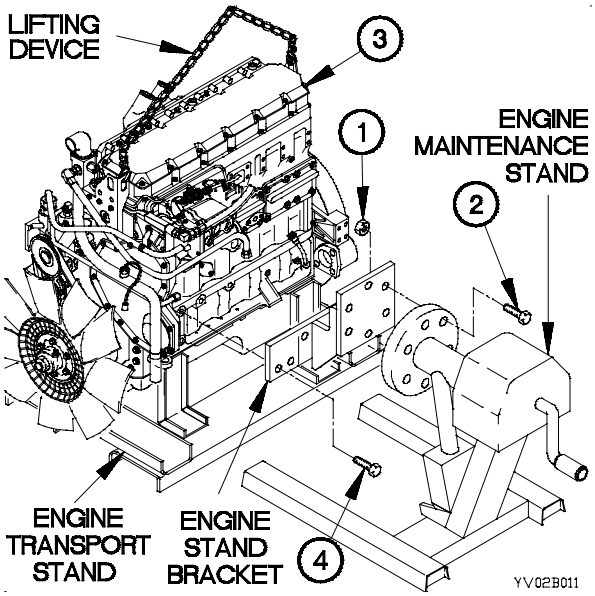
NOTE

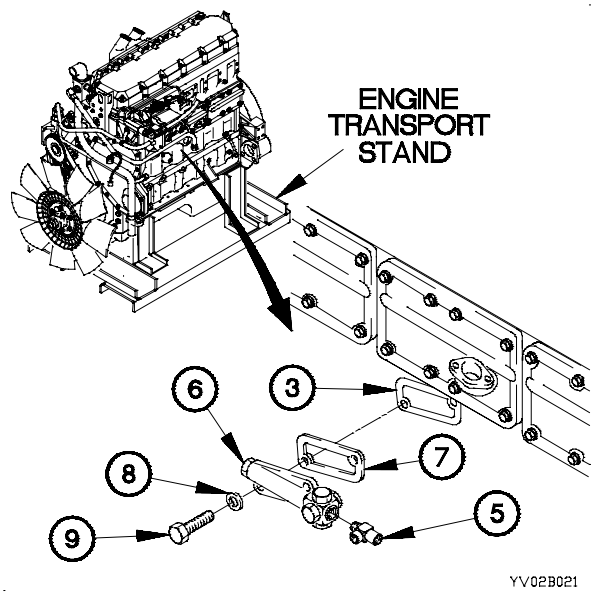
Steps (1) and (2) require the aid of an assistant.

(1) Remove four nuts (1), bolts (2), and engine (3) from engine maintenance stand.

(2) Position engine (3) on engine transport stand.

(3) Remove six bolts (4) and engine stand bracket from engine (3).





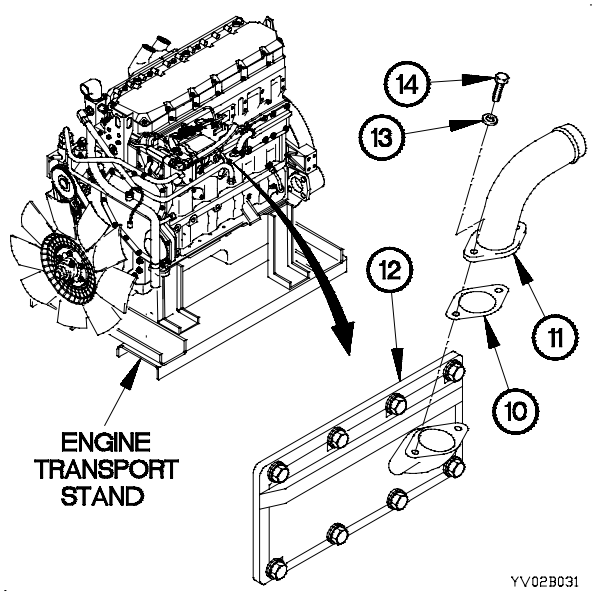
(4) Install tee fitting (5) on oil manifold (6).

(5) Position preformed packing (7) and oil manifold (6) on engine (3).

(6) Install two washers (8) and bolts (9) in oil manifold (6).

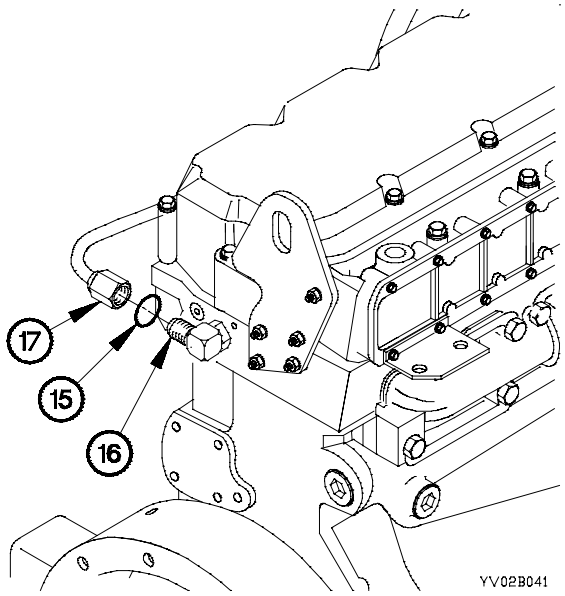
(7) Position gasket (10) and oil tube (11) on center side cover (12).

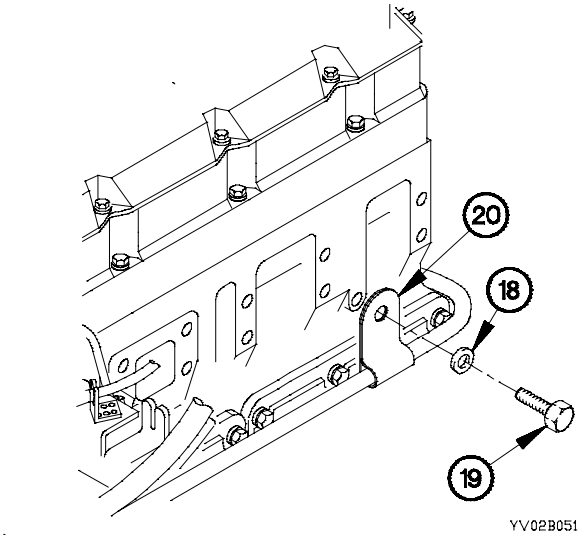
(8) Install two washers (13) and bolts (14) in oil tube (11).



(9) Install preformed packing (15) on 90-degree fitting (16).

(10) Connect fuel tube (17) to 90-degree fitting (16).





(11) Install washer (18) and bolt (19) in fuel tube clip (20).

c. Follow-On Maintenance.

(1) Install engine bracket (para 3-5).

(2) Deleted

(3) Install air compressor (para 11-2).

(4) Install fuel filter base (TM 9-2320-365-20-3).

(5) Install fuel/water separator assembly (TM 9-2320-365-20-3).

(6) Install throttle position sensor cable (TM 9-2320-365-20-3).

(7) Install starter (TM 9-2320-365-20-3).

(8) Install engine assembly (para 3-3).

End of Task.

20-3. CYLINDER HEAD REPAIR

This task covers:

a. Disassembly
c. Cleaning
c. Inspection (General)
d. Inspection (Combustion Surface and Top Deck)
e. Assembly
f. Follow-On Maintenance
g. Shipping and Storage of Reconditioned Cylinder Heads

INITIAL SETUP

Equipment Conditions
Cylinder head removed (para 3-6).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Lifter, Valve Spring (Item 33, Appendix B)
Tool Kit, Valve Seat Ring Inserter (Item 69, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Drill, Electric Portable (Item 18, Appendix B)
Tool Kit, Diesel Injector (TM 9-2320-365-20, Appendix B, Item 81)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Compressor Unit, Reciprocating (Item 12, Appendix B)
Gun, Air Blow (Item 27, Appendix B)
Hose Assembly, Nonmetallic (Item 29, Appendix B)
Cleaner, Steam, Pressure Jet (Item 11, Appendix B)

Tools and Special Tools
Degreaser, Portable Liquid Type (Item 15, Appendix B)
Caliper Set, Micrometer, Inside (Item 6, Appendix B)
Straight Edge (Item 61, Appendix B)
Grinding Kit, Valve Seat (Item 26, Appendix B)

Materials/Parts
Solvent, Dry Cleaning (Item 81, Appendix C)
Carbon Removing Compound (Item 19, Appendix C)
Protector, Hearing (Item 56, Appendix C)
Grease, Molybdenum (Item 38, Appendix C)
Lubricating Oil, Engine (Item 44, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Sealing Compound (Item 75, Appendix C)
Packing, Preformed (3) (Item 181, Appendix F)
Plug, Expansion (2) (Item 233, Appendix F)
Primer, Sealing Compound (Item 55, Appendix C)

a. Disassembly.

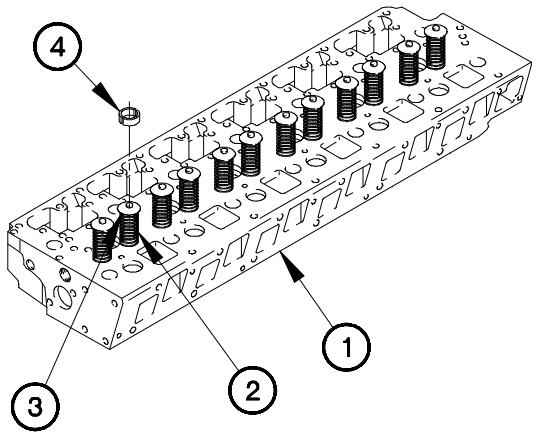
(1) Place cylinder head (1) on flat surface with valve faces down.

CAUTION

Keep each valve, valve spring, keepers, spring retainer, valve seal, valve guide, and valve seat insert together for assembly. Failure to comply may result in damage to equipment.

(2) Compress valve spring (2) on No. 1 intake valve (3).

(3) Remove two keepers (4) from valve spring (2).



YV03A011

(4) Release pressure on valve spring (2).

(5) Remove spring retainer (5) from valve spring (2).

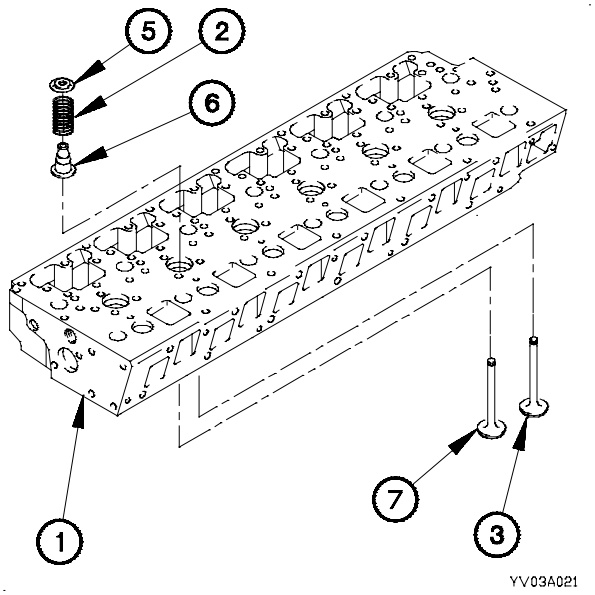
(6) Remove valve spring (2) from cylinder head (1).

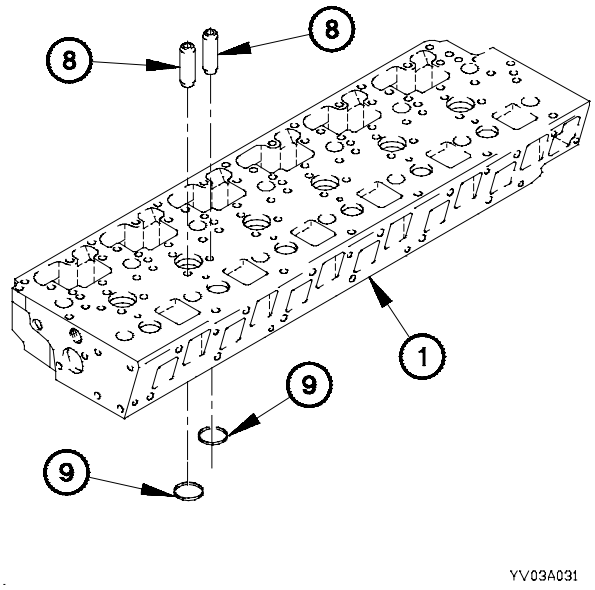
(7) Remove valve seal (6) from cylinder head (1).

(8) Remove No. 1 intake valve (3) from bottom side of cylinder head (1).

(9) Perform steps (2) through (8) for No. 1 exhaust valve (7).

(10) Perform steps (2) through (9) for remaining intake and exhaust valves.





(11) Remove 12 valve guides (8) from cylinder head (1).

(12) Remove 12 valve seat inserts (9) from cylinder head (1).

20-3. CYLINDER HEAD REPAIR (CONT)

(13) Insert lower pilot (10) into injector sleeve (11).

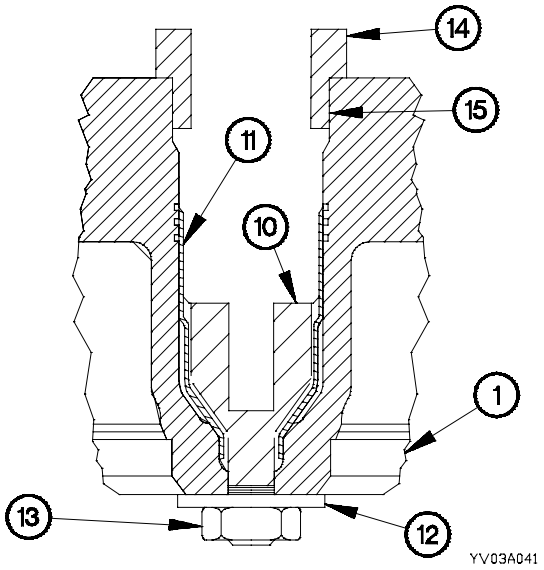
(14) Install washer (12) and nut (13), loosely, at bottom side of cylinder head (1).

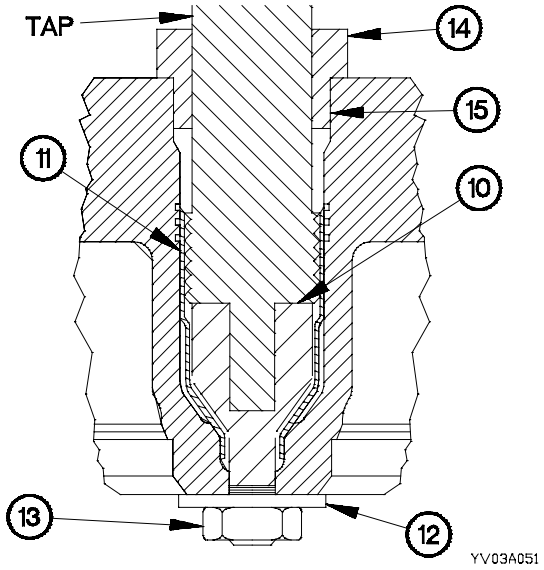
NOTE

Use large bushing (identified by an "L" or by a coarse knurl) if it will slip into bore with hand force. If large bushing can not be installed as stated, select smaller bushing (identified by an "S" or a fine knurl).

(15) Select a guide bushing (14) that best fits into cylinder head injector bore (15), above the sleeve that is to be removed.

(16) Remove guide bushing (14) from cylinder head (1).





(17) Install tap in injector sleeve (11).

(18) Install pilot end of tap in pilot bore of lower pilot (10).

(19) Lubricate injector sleeve (11) and cutting threads of tap.

(20) Install bushing guide (14) over shank of tap and into cylinder head injector bore (15).

(21) Tighten nut (13) on lower pilot (10).

(22) Install 1/2-in. drive socket on tap.

(23) Turn tap right until tap comes in contact with top surface of lower pilot (10).

(24) Remove tap and guide bushing (14).

(25) Remove any debris from newly cut threads.

(26) Remove nut (13) and washer (12) from lower pilot (10).

NOTE

Approximate depth of thread engagement is 0.375 in. (9.525 mm). If puller assembly will not engage to this depth, continue to cut threads until this depth is achieved.

(27) Apply sealing compound on threaded stem of puller assembly (16).

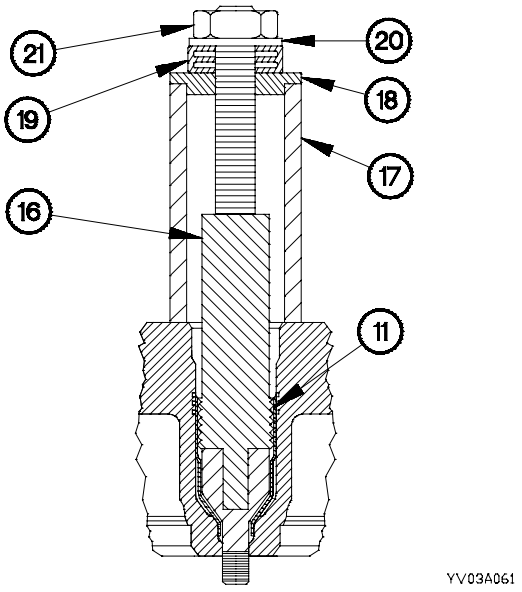
(28) Install puller assembly (16) into injector sleeve (11).

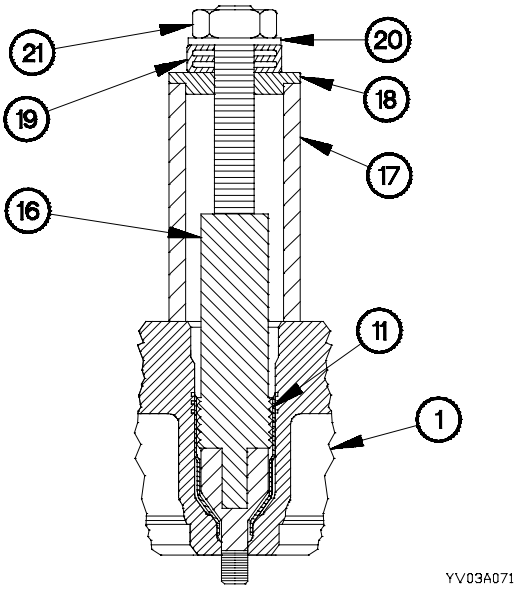
(29) Install reaction sleeve (17) and plate (18) over threaded stem of puller assembly (16).

(30) Position thrust bearing (19) on plate (18).

(31) Position washer (20) on thrust bearing (19).

(32) Install nut (21) on threaded stem of puller assembly (16).





CAUTION

Stop pulling on injector sleeve when it pulls free from lower bore. Manually lift puller assembly enough to center injector sleeve in upper bore before using wrench to pull injector sleeve through upper bore. Failure to center injector sleeve in upper bore may result in damage to cylinder head or tool.

NOTE

Upper bore in cylinder head is small enough that injector sleeve must be pulled through that bore also.

(33) Remove injector sleeve (11) from cylinder head (1).

(34) Remove nut (21), washer (20), thrust bearing (19), plate (18), and reaction sleeve (17) from puller assembly (16).

(35) Remove injector sleeve (11) from puller assembly (16).

20-3. CYLINDER HEAD REPAIR (CONT)

NOTE

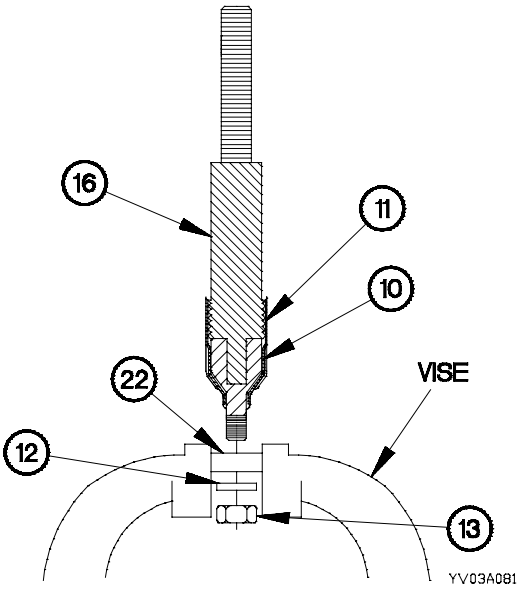
If injector sleeve can not be removed by hand, perform steps (36) through (39), using release block.

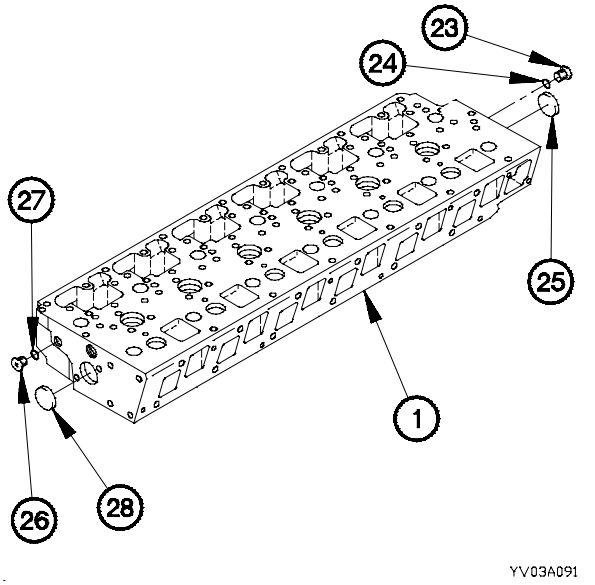
(36) Position release block (22) in vise. Tighten vise only enough to secure release block.

(37) Position threaded (stem) end of lower pilot (10) in release block (22).

(38) Install washer (12) and nut (13) on puller assembly (16).

(39) Turn puller assembly (16) and separate tools from injector sleeve (11).





(40) Remove two plugs (23), preformed packings (24), and freeze plug (25) from front end of cylinder head (1). Discard preformed packings and freeze plug.

(41) Remove plug (26), preformed packing (27), and freeze plug (28) from rear end of cylinder head (1). Discard preformed packing and freeze plug.

b. Cleaning.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

(2) Dry all metal parts with compressed air.

WARNING

Some chemical agents (detergents, solvents, alkalis, etc.) may irritate skin or be harmful to the eyes, nose, and throat. Some must be used only with adequate ventilation. When working with potentially harmful chemical substances, read and heed all warnings on the product labels and follow prescribed safety precautions. When working with any potentially harmful substance; including live steam, hot water, and compressed air; wear appropriate safety equipment and use extreme care. Failure to comply may result in injury to personnel.

(3) Soak all metal parts in degreaser unit with carbon removing compound for at least one hour.

WARNING

High pressure steam can blow particles or chemicals into eyes, can cause severe burns, and creates hazardous noise levels. Wear appropriate eye, skin, and hearing protection when using high pressure steam. Failure to comply may result in serious injury or death to personnel.

(4) Remove all metal parts from degreaser unit and rinse with high pressure steam to remove residue left from degreaser unit.

(5) Dry all metal parts with compressed air.

20-3. CYLINDER HEAD REPAIR (CONT)

c. Inspection (General).

NOTE

Replace any part that fails visual inspection or size measurement requirements.

(1) Inspect 12 intake and exhaust valves (1) for signs of cracking, wear, and overheating.

(2) Measure 12 intake and exhaust valves (1) for reuse. Refer to **Table 20-1 Valve Specifications.**

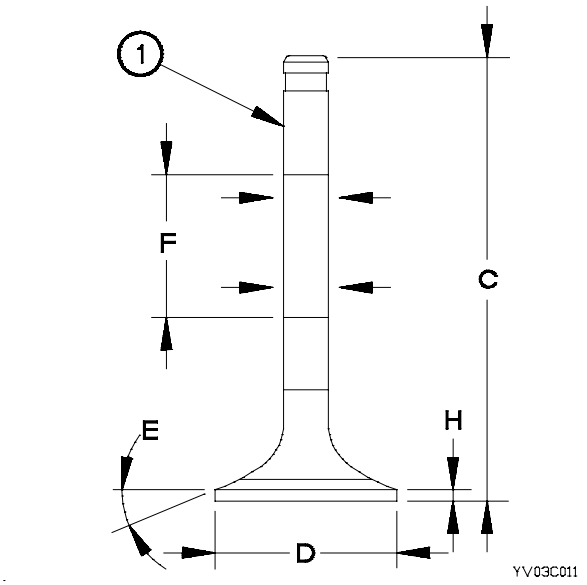


Table 20-1. Valve Specifications

Description	Intake 7W8064	Exhaust 7W2699
Overall length (C)	6.958-6.994 in. (17.67-17.76 cm)	6.943-6.979 in. (17.63-17.72 cm)
Valve head diameter (D)	1.845-1.856 in. (4.68-4.71 cm)	1.570-1.580 in. (3.98-4.01 cm)
Valve face angle (E)	29.5°-30°	44.75°-45.25°
New stem diameter (F)	0.3147-0.3153 in. (0.799-0.800 cm)	0.3147-0.3153 in. (0.799-0.800 cm)
Minimum stem diameter within area (F)	0.3136 in. (0.796 cm)	0.3136 in. (0.796 cm)
New lip thickness (H)	0.118-0.134 in. (0.30-0.34 cm)	0.103-0.119 in. (0.26-0.30 cm)
Minimum lip thickness (H)	0.071 in. (0.18 cm)	0.060 in. (0.15 cm)

(3) Inspect 12 valve springs (2) for signs of cracking, wear, and overheating.

(4) Measure 12 valve springs (2) for reuse. Refer to **Table 20-2 Valve Spring Specifications.**

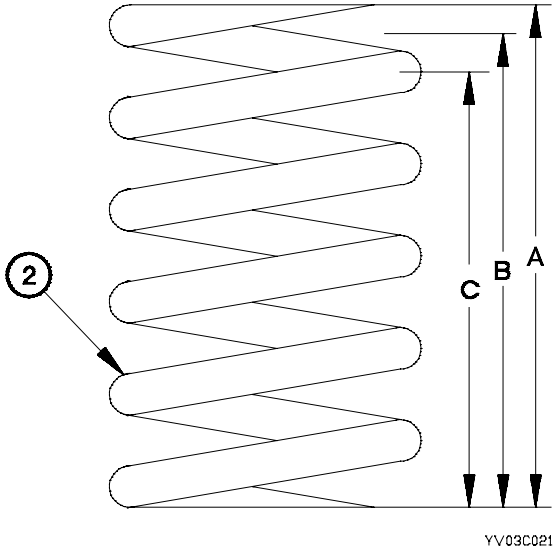
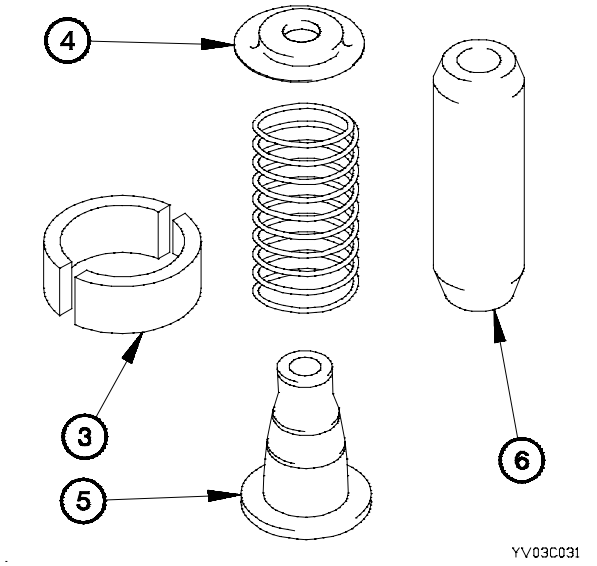


Table 20-2. Valve Spring Specifications

Free length (A)	2.80 in. (7.1 cm)
Assembled length (B)	2.593 in. (6.58 cm)
Load at assembled length	44-54 lb (195-239 N)
Minimum operating length (C)	2.00 in. (5.08 cm)
Load at minimum operating length	184-202 lb (818-898 N)



(5) Inspect 12 keepers (3) for signs of cracking, wear, and overheating.

(6) Inspect 12 valve spring retainers (4) for signs of cracking, wear, and overheating.

(7) Inspect 12 valve seals (5) for signs of cracking, wear, and overheating.

(8) Inspect 12 valve guides (6) for signs of cracking, wear, and overheating.

20-3. CYLINDER HEAD REPAIR (CONT)

(9) Inspect 12 valve seat inserts (7) for damage and wear. Refer to **Table 20-3 Valve Seat Insert Specifications.**

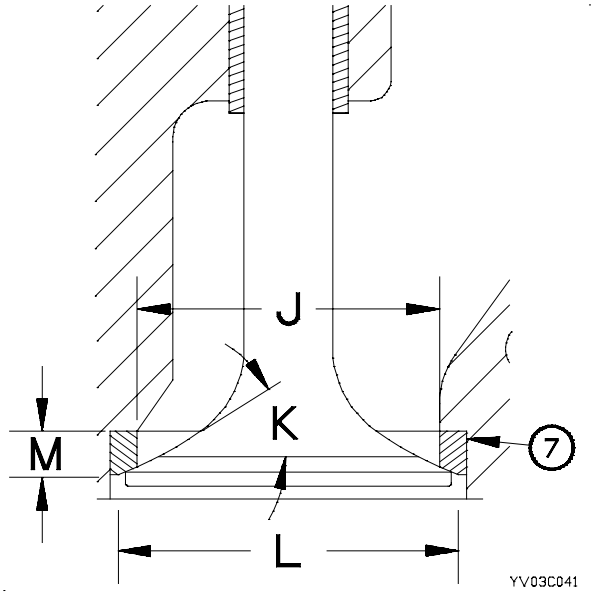


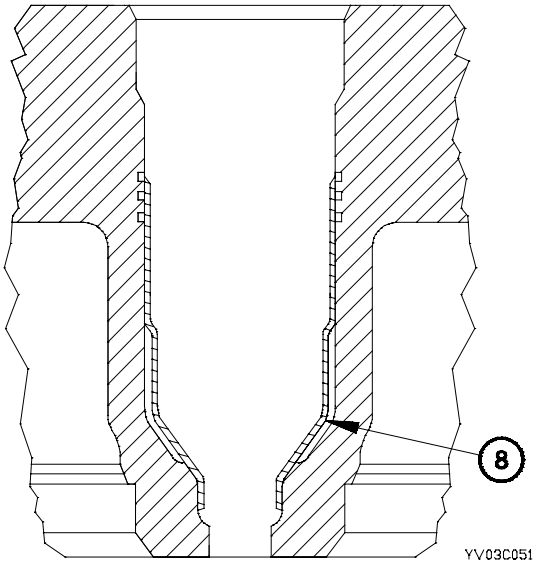
Table 20-3. Valve Seat Insert Specifications

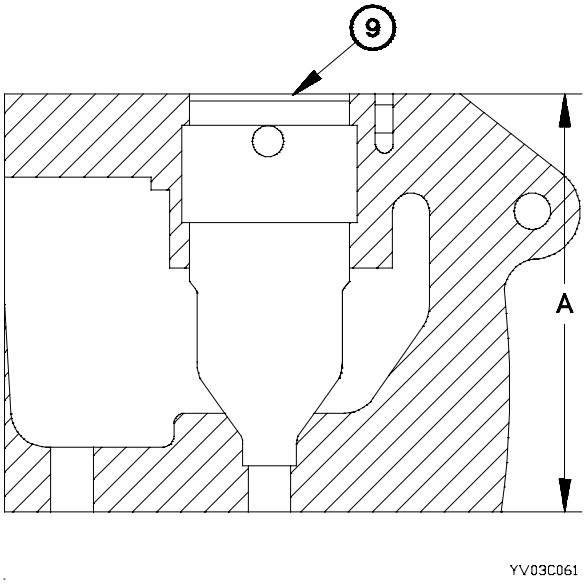
Intake valve seat insert bore diameter	(J)	1.9608-1.9708 in. (4.998-5.005 cm)
Exhaust valve seat insert bore diameter	(J)	1.6853-1.6953 in. (4.280-4.306 cm)
Intake valve seat insert face angle	(K)	29.75-30.75 degrees 0.52-0.536 (rad)
Exhaust valve seat insert face angle	(K)	45-46 degrees 0.785-0.803 (rad)
Seating face outside diameter, intake	(L)	1.89 in. (4.8 cm)
Seating face outside diameter, exhaust	(L)	1.59 in. (4.03 cm)
Valve seat bore depth, intake	(M)	0.389-0.399 in. (0.98-1.01 cm)
Valve seat bore depth, exhaust	(M)	0.389-0.399 in. (0.98-1.01 cm)

NOTE

Injector sleeves should be replaced when repairing cylinder heads with high hours.

(10) Inspect six injector sleeves (8) for damage, corrosion, cracks, or pitting.





(11) Measure cylinder head flatness, using a straight edge and feeler gage. Refer to **Table 20-4 Cylinder Head Surface Flatness.**

NOTE

Always check the thickness of a cylinder head before resurfacing. Cylinder head may have been previously resurfaced and may not have enough stock to be resurfaced again.

(12 Measure the cylinder head (9) for thickness dimension (A), and compare the dimensions to **Table 20-3 (Valve Seat Insert Specifications).** A maximum stock removal of 0.010 in. (0.025 cm) is permissible when resurfacing the head or a minimum head thickness of 4.037 in. (10.25 cm).

Table 20-4. Cylinder Head Surface Flatness.

Overall	0.006 in. (0.015 cm)
For Any Span	0.002 in. (0.005 cm) 5.91 in. (15.01 cm)

20-3. CYLINDER HEAD REPAIR (CONT)

d. Inspection (Combustion Surface and Top Deck).

WARNING

Follow these general precautions whenever using these methods of crack detection to prevent personnel injury. Never shine the black light directly into the eyes. Do not smoke or eat while using inspection chemicals. Avoid getting chemicals on clothing. Avoid inhaling spray mist, airborne powder dust and solvent vapors. Provide adequate ventilation. Store chemicals away from open flames and sources of heat. Failure to comply may result in injury to personnel.

NOTE

- Fluorescent penetrant inspection, using a black light, is the most desirable procedure for inspecting components for indications of cracks. The high intensity black light and fluorescent chemicals will identify cracks not normally found with other methods.
- Use one of the following three methods to check for cracks on the combustion chamber surface.
- Metal spray process can be used to restore (build up) gasket contact surfaces to original dimensions.

(1) Liquid Fluorescent Inspection.

NOTE

Black light and test kit shall be in accordance with overhaul contract requirements.

(a) Thoroughly clean surface to be inspected.

(b) Spray cleaner/remover fluid on cylinder head to remove any contaminants from surface to be checked.

(c) Spray penetrant on surface to be inspected. Allow penetrant to remain on surface for five to 30 minutes. This will allow penetrant to enter the smallest cracks.

(d) Remove excess penetrant from surface.

NOTE

Penetrant can be removed by washing with water or by using moist and dry paper towels to wipe surface clean. Care should be taken not to overwash surface. Surface must be dry and free of penetrant. Check surface with black light to see if chemical has been removed.

(e) Spray developer on dry surface. Coat entire surface with developer. Low pressure air can be used to improve drying time. Once developer has been applied and is dry, a minimum developing time of ten minutes is required. During this time developer will draw penetrant out of cracks and to the surface.

(f) Check surface with black light to highlight location of any damage. Black light should be measured to assure correct output of 800 micro watts per sq mm at the part surface, 15.0 in. (38.1 cm) away from 125 watt bulb.

(2) Dry Magnetic Particle Method

NOTE

Magnetic yoke, magnetic particle powders, and cleaner/remover fluid shall be in accordance with overhaul contract requirements.

(a) Thoroughly clean surface to be inspected.

(b) Apply cleaner/remover fluid to the cylinder head to remove any contaminants from surface to be checked.

(c) Place magnetic yoke on surface to be inspected at a right angle to the area to be checked.

(d) Apply magnetic powder on surface to be inspected when yoke is energized (turned on).

NOTE

If there is a crack in the surface between the yoke arms, the magnetic powder will go into the crack. The crack will appear as a straight line of magnetic particles.

(e) Check surface being inspected for signs of cracks.

(3) Dye Penetrant Method (Liquid Non-Fluorescent).

NOTE

- Cleaner/remover fluid, dye penetrant, and developer shall be in accordance with overhaul contract requirements.
- This method will not always find shallow cracks with a depth of up to 0.002 in. (0.005 cm).

(a) Thoroughly clean and dry surface to be inspected.

(b) Spray cleaner/remover on cylinder head to remove any contaminants from surface to be checked.

(c) Apply dye penetrant chemical on surface. Allow the dye penetrant approximately three to five minutes to enter any cracks.

(d) Wipe penetrant from surface, using clean paper towel.

(e) Spray a light coat of developer solution onto surface to be inspected. A crack will appear as a colored line in developer.

20-3. CYLINDER HEAD REPAIR (CONT)

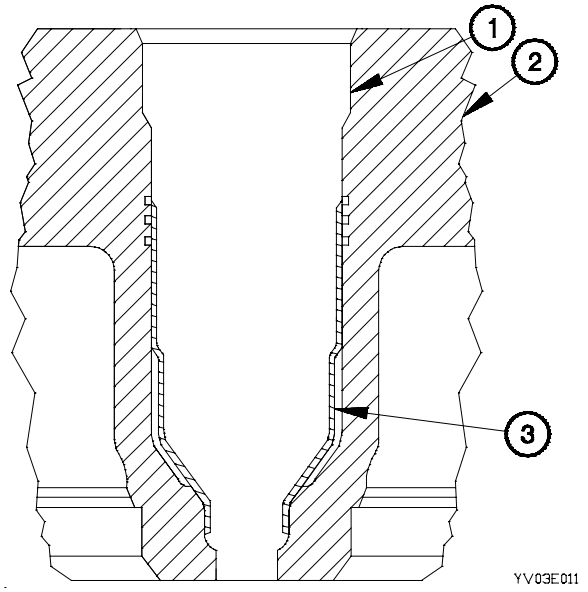
e. Assembly.

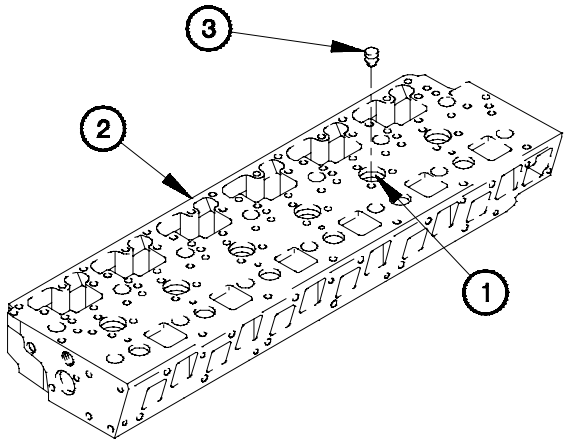
NOTE

Remove all cutting chips and debris from cylinder head fuel galley. Use a cotton swab, lightly coated with grease, to aid in removal of any particles.

(1) Clean injector sleeve bores (1) in cylinder head (2).

(2) Clean injector sleeves (3).



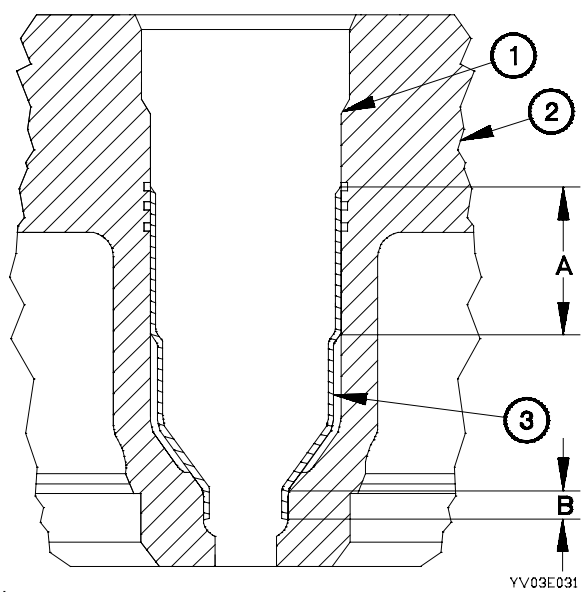


WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

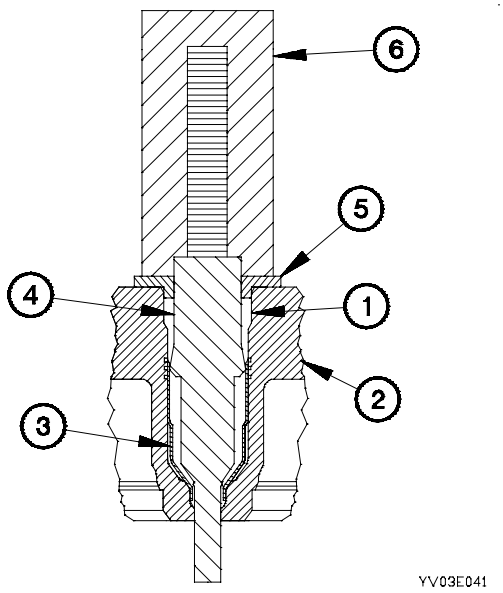
(3) Spray dry cleaning solvent inside of each injector sleeve bore (1) in cylinder head (2) and outside of each injector sleeve (3).

(4) Spray primer inside of each injector sleeve bore (1) in cylinder head (2) and outside of each injector sleeve (3).



(5) Apply sealing compound to injector sleeve bore (1) in cylinder head (2) and outside of injector sleeve (3) at locations (A and B).

(6) Install injector sleeve (3) in injector sleeve bore (1) in cylinder head (2). Wipe away any excess sealing compound that is either in or above injector sleeve.



(7) Apply grease to lubricate swage assembly (4) and upper inside injector sleeve bore (1).

(8) Install swage assembly (4) in injector sleeve (3). Push injector sleeve all the way to the bottom of injector sleeve bore (1) in cylinder head (2).

NOTE

Use large bushing (identified by an "L" or by a coarse knurl) if it will slip into bore with hand force. If large bushing can not be installed as stated, select smaller bushing (identified by an "S" or a fine knurl).

(9) Install guide bushing (5) over swage assembly (4) and into injector sleeve bore (1).

(10) Position driver (6) over swage assembly (4).

20-3. CYLINDER HEAD REPAIR (CONT)

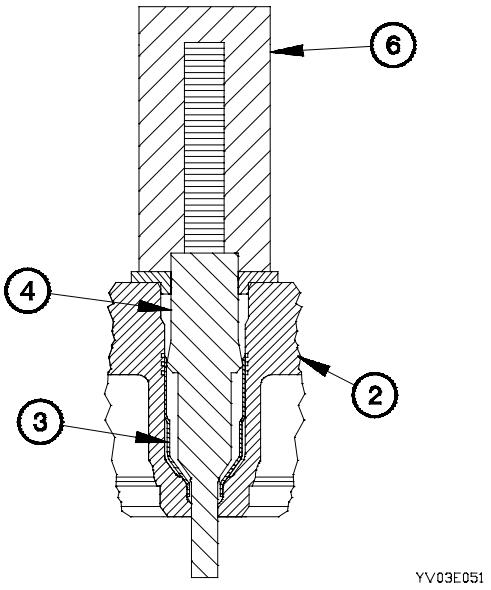
NOTE

The centerline of the injector sleeve bore in the cylinder head must be parallel to the centerline of the arbor press ram.

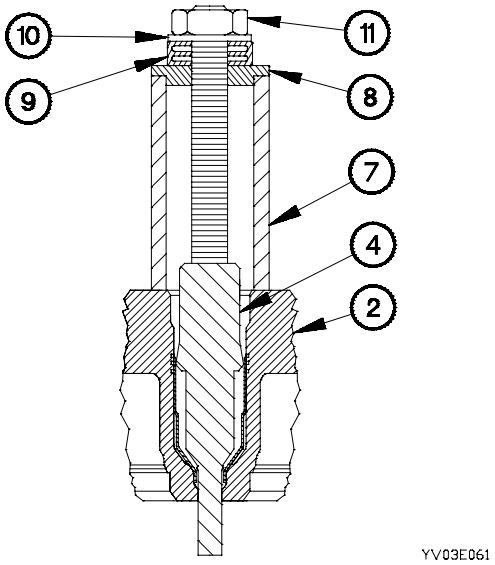
(11) Position cylinder head (2) on arbor press so driver (6) is centered under arbor press arm.

(12) Press swage assembly (4) in injector sleeve (3) until the bottom of driver (6) contacts top of guide.

(13) Remove driver (6) from swage assembly (4).



(14) Install reaction sleeve (7) and plate (8) over threaded stem of swage assembly (4).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(15) Apply sealing compound to threaded stem of swage assembly (4).

(16) Install thrust bearing (9) on plate (8).

(17) Install washer (10) on thrust bearing (9).

(18) Install nut (11) on threaded stem of swage assembly (4).

(19) Pull swage assembly (4) from cylinder head (2), using deep socket.

(20) Wipe away any excess lubricant or sealing compound that may be in either injector sleeve bore (1) or in injector sleeve (3).

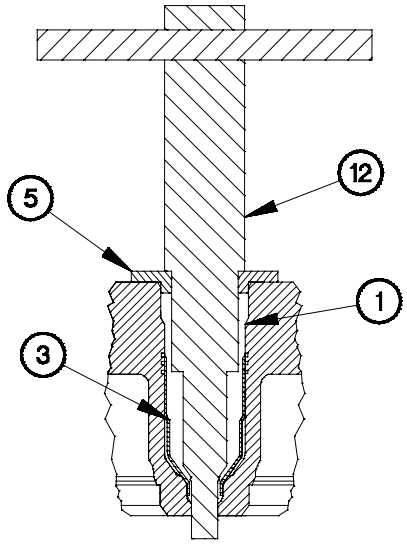
NOTE

Use large bushing (identified by an "L" or by a coarse knurl) if it will slip into bore with hand force. If large bushing can not be installed as stated, select smaller bushing (identified by an "S" or a fine knurl).

(21) Install guide bushing (5) in injector sleeve bore (1).

(22) Apply a generous amount of engine oil to lubricate the cutting area of the reamer assembly (12).

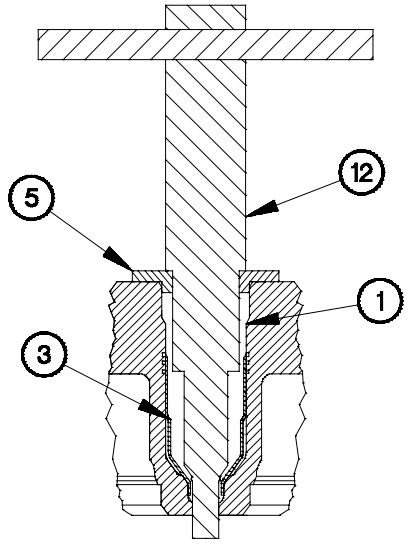
(23) Install reamer assembly (12) in guide bushing (5).



YV03E071

NOTE

- Reamer assembly will cut aggressively.
- Check cutting progress often. Stop cutting when injector seat is full faced or when shoulder of reamer assembly comes in contact with guide bushing.
- If injector seat does not match to 360° full face, injector sleeve must be removed. Install new injector sleeve and do reaming procedure again.
- Stop cutting immediately when seat is full face, so minimum amount of material is removed. This way, as much material as possible will be retained, in the event that reaming is necessary in the future.
- For correct sealing of combustion gas, injector seat must be free of machining chatter and scratches.



YV03E081

(24) With light but even pressure, turn reamer assembly (12) to right.

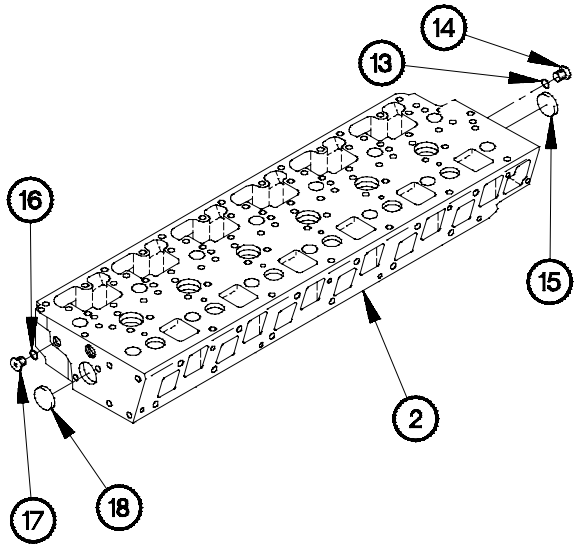
(25) Remove reamer assembly (12) and guide bushing (5) from injector sleeve bore (1).

(26) Remove any evidence of lubricants or copper particles that may be in, or on, injector sleeve (3). Be sure to thoroughly clean cylinder head fuel galleys.

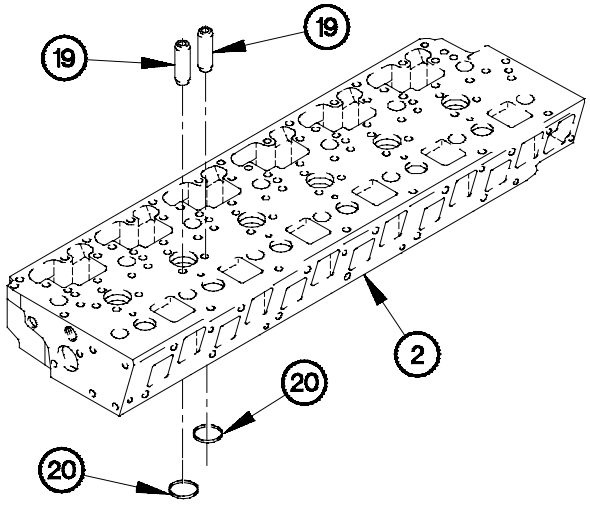
20-3. CYLINDER HEAD REPAIR (CONT)

(27) Install preformed packing (13), plug (14), and freeze plug (15) in front end of cylinder head (2).

(28) Install two preformed packings (16), plugs (17), and freeze plug (18) in rear end of cylinder head (2).



YV03E091



YV03E101

(29) Install 12 valve guides (19) in cylinder head (2) with larger end upward.

NOTE

Valve seat inserts should be placed in a freezer for at least one hour prior to installation.

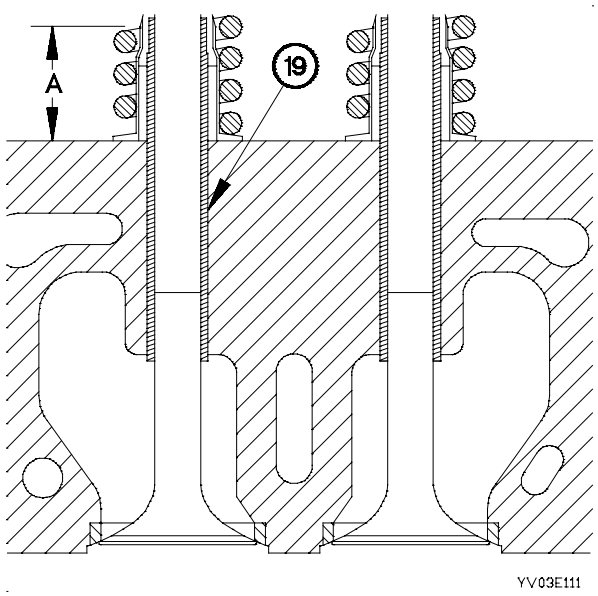
(30) Install 12 valve seat inserts (20) in cylinder head (2).

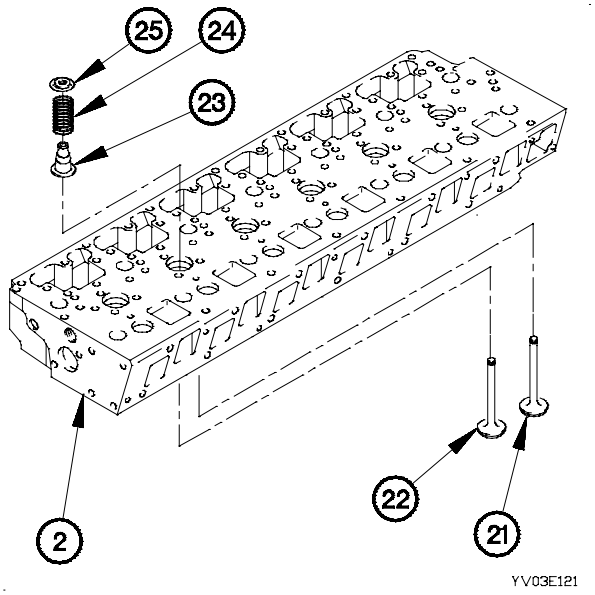
NOTE

- Do not use a valve and guide combination that has a difference of 0.004 in. (0.01 cm) or larger.
- Measure valve guide bore at both ends, 0.75 in. (1.90 cm) from end of bore. If plug gage is used and end of plug gage goes into valve guide bore more than 0.75 in. (1.90 cm), valve guide bore is worn out. Replace valve guide.

(31) Measure valve guide bore of 12 valve guides (19). Maximum valve guide bore is 0.3201 in. (0.813 cm) for intake and exhaust.

(32) Measure valve guide height of 12 valve guides (19). Maximum valve guide height dimension (A) is 0.886-0.926 in. (2.25-2.35 cm).





NOTE

Lubricate all parts during assembly.

(33) Install six intake valves (21) in cylinder head (2).

(34) Install six exhaust valves (22) in cylinder head (2).

(35) Install 12 valve seals (23) on valve springs (24).

(36) Install 12 valve springs (24) on valve stems (21 and 22).

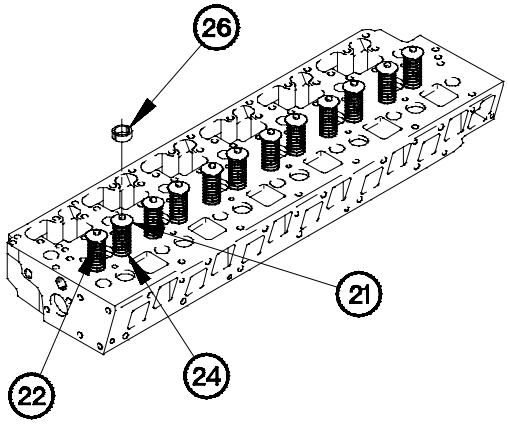
(37) Install 12 valve spring retainers (25) on valve stems (21 and 22).

20-3. CYLINDER HEAD REPAIR (CONT)

(38) Apply a small amount of grease to 12 keepers (26)

(39) Compress valve spring (24) and install two keepers (26).

(40) Perform step (39) for remaining intake and exhaust valves (21 and 22).



YV03E131

f. Follow-On Maintenance.

Install cylinder head (para 3-6).

g. Shipping and Storage of Reconditioned Cylinder Head.

CAUTION

Holes in top of cylinder head for injectors and internal fuel passage must be kept clean. Any dust, dirt, or debris in these fuel passages after reconditioning may result in premature wear or damage to injectors. This could cause poor performance, low power, hard starting, injector seizure, etc. Failure to comply may result in damage to equipment.

(1) Coat cylinder head with rust preventive.

(2) Cover cylinder head with a shrink type plastic wrap.

CAUTION

Bottom combustion surface must be well protected. Failure to comply may result in damage to equipment.

(3) Place cylinder head on wooden pallet and band in place.

(4) Place pallet in stowage area.

End of Task.

20-4. CYLINDER BLOCK REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine mounted on maintenance stand (para 20-2).
Water pump removed (TM 9-2320-365-20-3).
Alternator brackets/bracket assembly removed (TM 9-2320-365-20-3).
Cylinder head removed (para 3-6).
Flywheel housing removed (para 3-11).
Cam roller followers removed (para 3-13).
Crankshaft front seal removed (para 3-8).
Crankshaft rear seal removed (para 3-9).
Crankshaft and main bearings removed (para 20-5).
Piston and connecting rod assembly removed (para 20-6).
Camshaft and bearings removed (para 20-7).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Cleaner, Steam, Pressure Jet (Item 11, Appendix B)

Tools and Special Tools (cont)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Compressor Unit, Reciprocating (Item 12, Appendix B)
Gun, Air Blow (Item 27, Appendix B)
Hose Assembly, Nonmetallic (Item 29, Appendix B)
Caliper, Micrometer, Inside (Item 6, Appendix B)

Materials/Parts
Protector, Hearing (Item 56, Appendix C)
Packing, Preformed (2) (Item 190, Appendix F)
Plug (Item 232, Appendix F)
Plug (2) (Item 233, Appendix F)
Gasket (Item 54, Appendix F)
Packing, Preformed (Item 196, Appendix F)

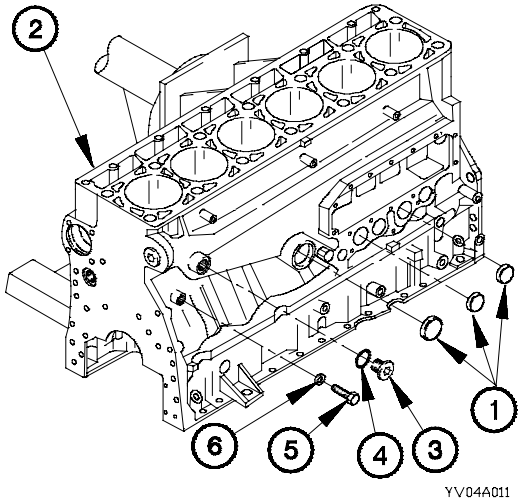
a. Disassembly.

(1) Remove three expansion plugs (1) from cylinder block (2). Discard expansion plugs.

(2) Remove plug (3) from cylinder block (2).

(3) Remove preformed packing (4) from plug (3). Discard preformed packing.

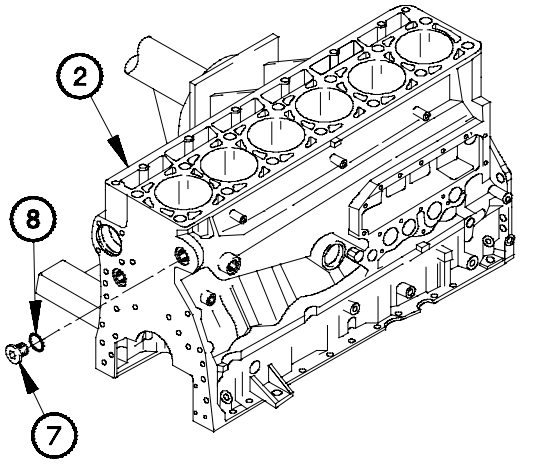
(4) Remove bolt (5) and washer (6) from cylinder block (2).



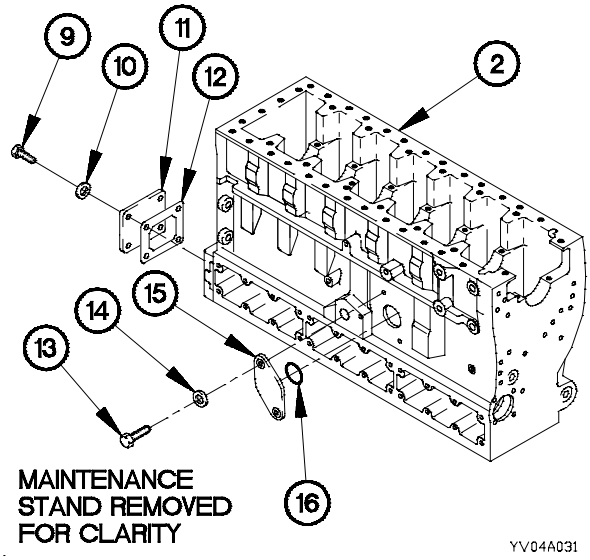
20-4. CYLINDER BLOCK REPAIR (CONT)

(5) Remove plug (7) from cylinder block (2).

(6) Remove preformed packing (8) from plug (7). Discard preformed packing.



YV04A021



YV04A031

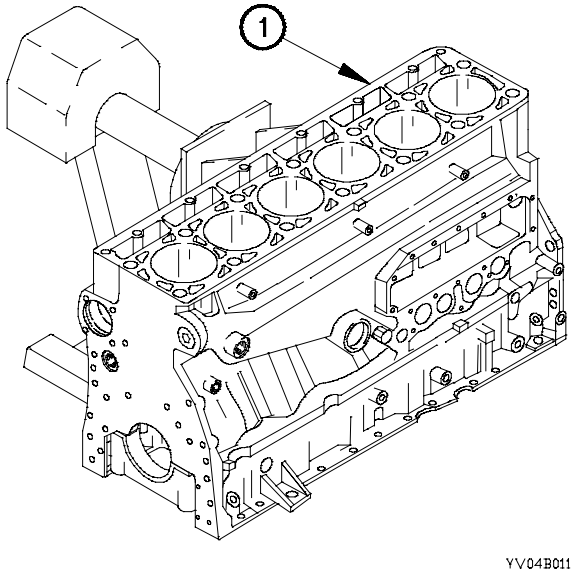
(7) Remove four bolts (9), washers (10), cover plate (11), and gasket (12) from cylinder block (2). Discard gasket.

(8) Remove two bolts (13), washers (14), and cover plate (15) from cylinder block (2).

(9) Remove preformed packing (16) from cover plate (15). Discard preformed packing.

b. Cleaning/Inspection.

(1) Remove gasket material and sealant from cylinder block (1) surface.



WARNING

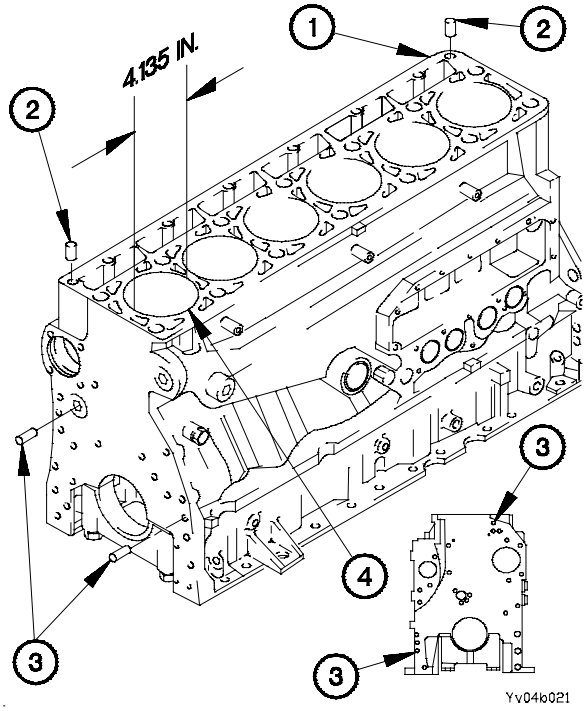
High pressure steam may blow particles into eyes, may cause severe burns, and creates hazardous noise levels. Eye, skin, and hearing protection is required. Failure to comply may result in injury to personnel.

(2) Steam clean cylinder block (1).

WARNING

Compressed air for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles, shield, gloves, etc.). Failure to comply may result in injury to personnel.

(3) Dry cylinder block (1) thoroughly with compressed air.



NOTE

Replace any part that fails visual inspection or size measurement requirements.

(4) Inspect cylinder block (1) for cracks, evidence of overheating, and other damage.

(5) Inspect two sleeves (2) for damage and corrosion.

(6) Inspect four alignment dowels (3) for damage and corrosion.

NOTE

If any cylinder bore exceeds maximum allowable diameter, replace cylinder block.

(7) Measure cylinder bore (4) of each cylinder. Maximum cylinder bore diameter is 4.1358 in. (10.504 cm).

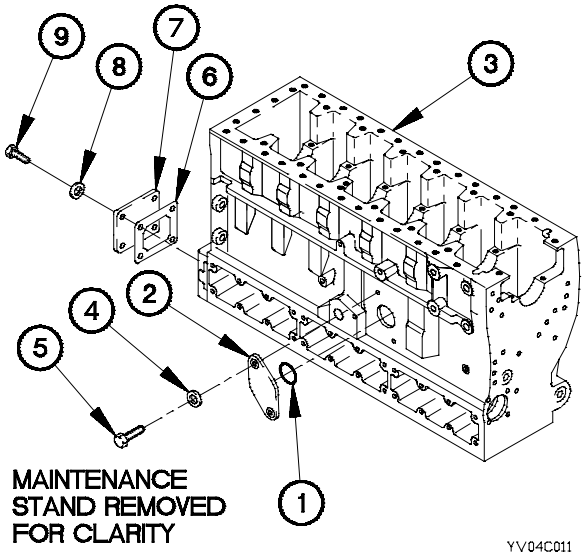
20-4. CYLINDER BLOCK REPAIR (CONT)

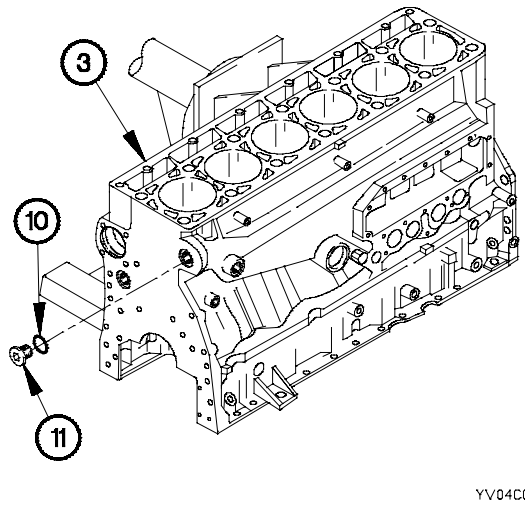
c. Assembly.

(1) Install preformed packing (1) on cover plate (2).

(2) Install cover plate (2) on cylinder block (3) with two washers (4) and bolts (5).

(3) Install gasket (6)and cover plate (7) on cylinder block (3) with four washers (8) and bolts (9).





(4) Install preformed packing (10) on plug (11).

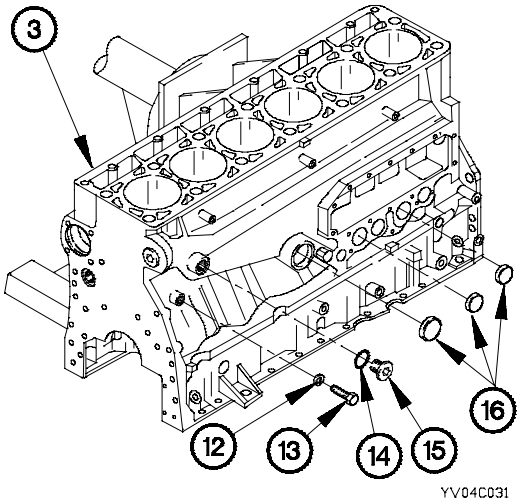
(5) Install plug (11) in cylinder block (3).

(6) Install washer (12) and bolt (13) in cylinder block (3).

(7) Install preformed packing (14) on plug (15).

(8) Install plug (15) in cylinder block (3).

(9) Install three expansion plugs (16) in cylinder block (3).



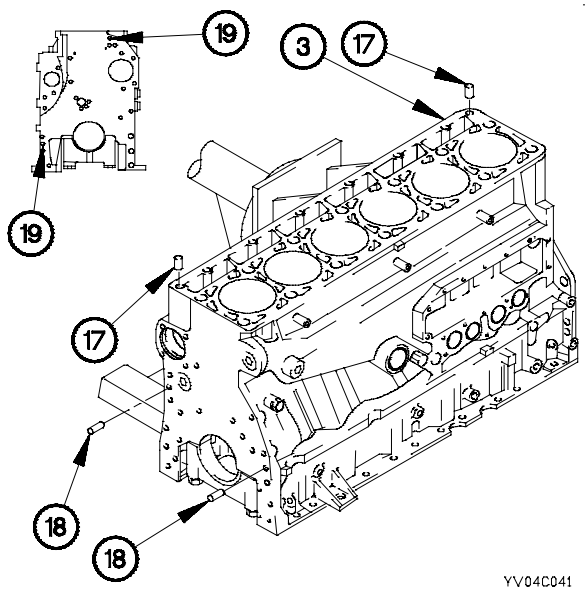
NOTE

Perform steps (10) through (12) only if sleeves and dowels failed visual inspection.

(10) Install two sleeves (17) in cylinder block (3).

(11) Install two alignment dowels (18) in cylinder block (3).

(12) Install two alignment dowels (19) in cylinder block (3).



d. Follow-On Maintenance.

(1) Install camshaft and bearings (para 20-7).

(2) Install piston and connecting rod assembly (para 20-6).

(3) Install crankshaft and main bearings (para 20-5).

(4) Install crankshaft rear seal (para 3-9).

(5) Install crankshaft front seal (para 3-8).

(6) Install cam roller followers (para 3-13).

(7) Install flywheel housing (para 3-11).

(8) Install cylinder head (para 3-6).

(9) Install alternator brackets/bracket assembly (TM 9-2320-365-20-3).

(10) Install water pump (TM 9-2320-365-20-3).

(11) Demount engine from maintenance stand (para 20-2).

End of Task.

20-5. CRANKSHAFT AND MAIN BEARINGS REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Cleaning/Inspection
c. Disassembly

INITIAL SETUP

Equipment Conditions
Engine mounted on maintenance stand (para 20-2).
Cylinder head removed (para 3-6).
Camshaft and bearings removed (para 20-6).
Front gear housing and idler gear removed (para 20-8).
Crankshaft front seal removed (para 3-7).
Oil pump removed (para 3-17).
Flexplate assembly removed (para 3-10).
Flywheel housing removed (para 3-11).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Indicator, Dial (Item 30, Appendix B)
Caliper Set, Micrometer, Outside (Item 7, Appendix B)

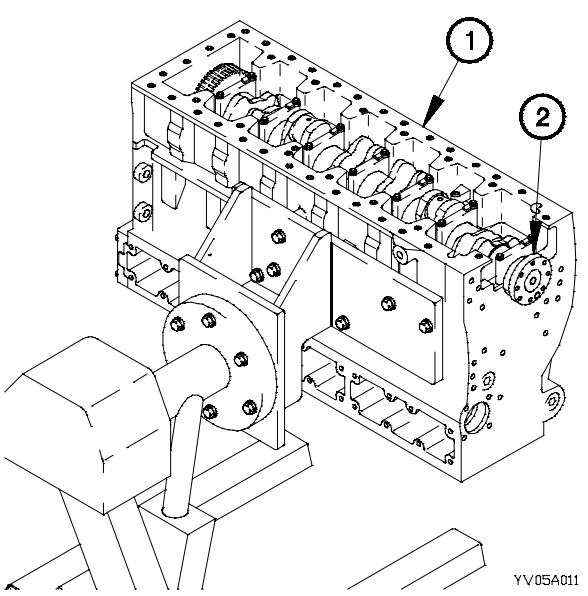
Tools and Special Tools
Puller Kit, Universal (TM 9-2320-365-20)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Sling, Cargo (Item 48, Appendix B)

Materials/Parts
Diesel Fuel (Item 29, Appendix C)
Gage, Bearing Clear (Item 34, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 31, Appendix C)
Lubricating Oil, Gear (Item 45, Appendix C)

Personnel Required
(2)

a. Removal.

(1) Rotate cylinder block (1) for access to crankshaft (2).

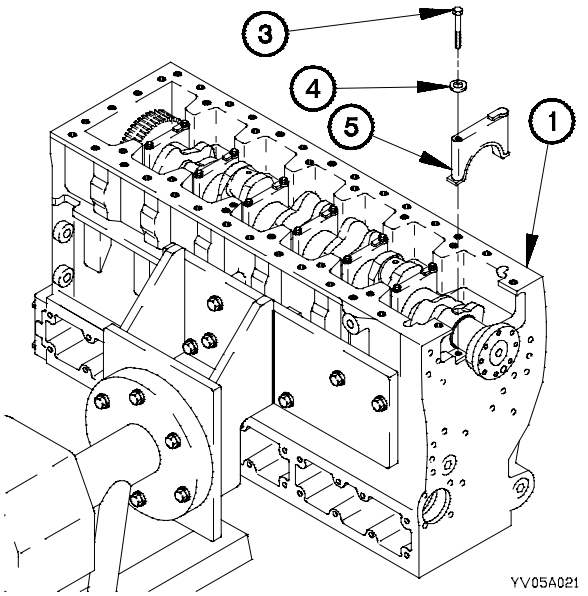


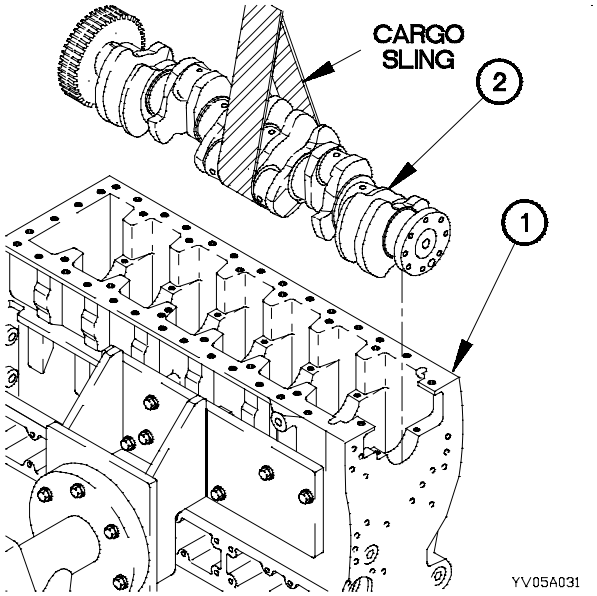
(2) Remove 14 bolts (3) and washers (4) from seven crankshaft main bearing caps (5).

NOTE

- Retain main bearing half in each crankshaft bearing cap until inspection is completed.
- Tag main bearing caps prior to removal.

(3) Remove seven crankshaft main bearing caps (5) from cylinder block (1).





WARNING

Crankshaft weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (4) requires the aid of an assistant.

(4) Remove crankshaft (2) from cylinder block (1).

20-5. CRANKSHAFT AND MAIN BEARINGS REPLACEMENT/REPAIR (CONT)

b. Cleaning/Inspection.

WARNING

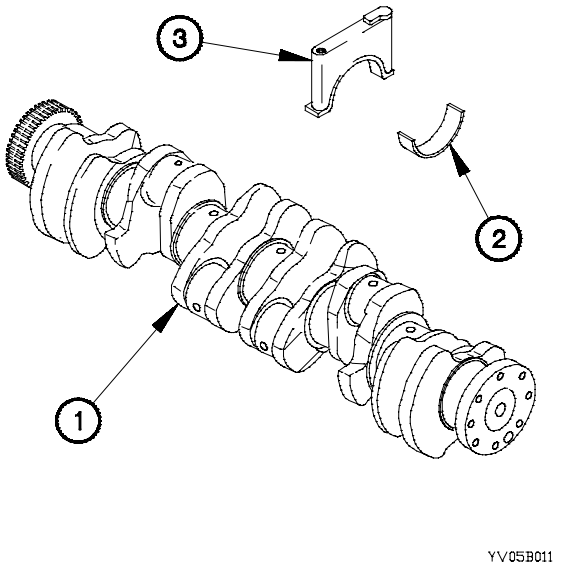
Diesel fuel is flammable. Keep diesel fuel away from open fire and keep a fire extinguisher within easy reach when working with diesel fuel. Do not smoke when working with diesel fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.

CAUTION

If crankshaft main or connecting rod bearing journals are found to be out of tolerance, crankshaft must be replaced and new main bearings installed. Failure to comply may result in damage to equipment.

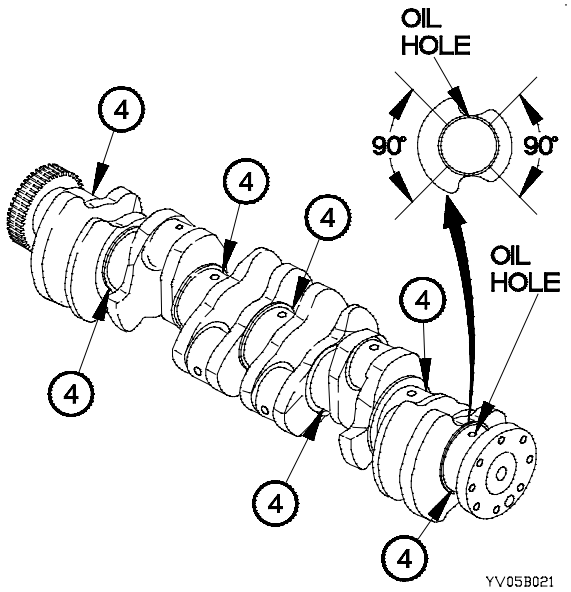
NOTE

Replace any part that fails visual inspection or size measurement requirements.



YV05B011

(1) Clean crankshaft (1), main bearings (2), and main bearing caps (3) thoroughly with diesel fuel.



YV05B021

(2) Inspect seven crankshaft main bearing journals (4) for cracks and evidence of overheating.

CAUTION

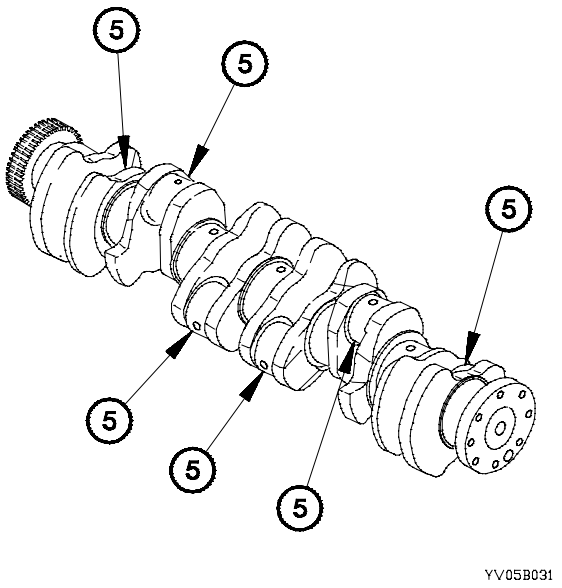
Check crankshaft main bearing journals in two places, 90 degrees apart, on each main bearing journal. Do not use area immediately around oil hole where journal surface is lower. Failure to comply may result in inaccurate readings and damage to equipment.

(3) Check dimensions of seven crankshaft main bearing journals (4). Refer to **Table 20-5. Crankshaft Main Bearing Journal Diameters.**

Table 20-5. Crankshaft Main Bearing Journal Diameters

Original crankshaft main bearing journal diameter	3.5425-3.5441 in. (8.997-9.002 cm)

(4) Inspect six crankshaft connecting rod bearing journals (5) for cracks and evidence of overheating.



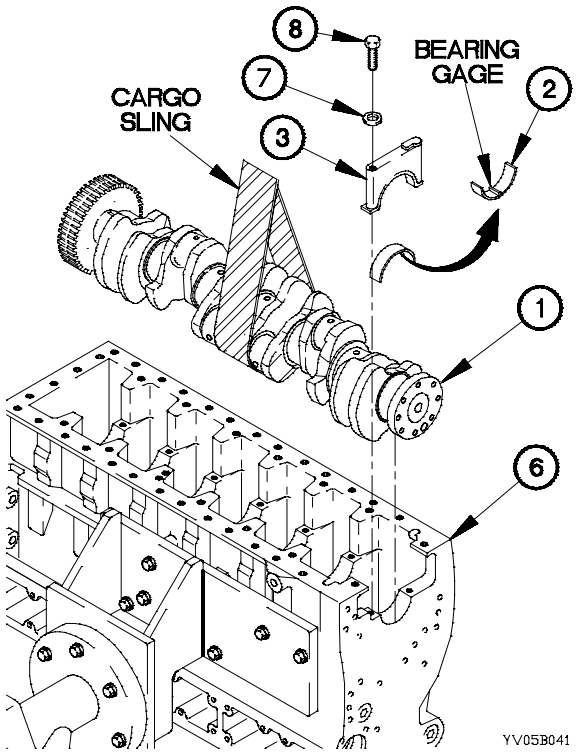
CAUTION

Check crankshaft connecting rod bearing journals first at Top Dead Center (TDC), then at 90 degrees away from TDC, on each connecting rod bearing journal. Do not use area immediately around oil hole where journal surface is lower. Failure to comply may result in inaccurate readings and damage to equipment.

(5) Check dimensions of six crankshaft connecting rod bearing journals (5). Refer to **Table 20-6. Crankshaft Connecting Rod Journal Diameters.**

Table 20-6. Crankshaft Connecting Rod Journal Diameters

Original crankshaft connecting rod bearing journal diameter	2.7551-2.7567 in. (6.997-7.002 cm)



WARNING

Crankshaft weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

- Step (6) requires the aid of an assistant.
- Note position of tabs on main bearings in cylinder block.

(6) Install crankshaft (1) in cylinder block (6).

(7) Position bearing gage on seven main bearings (2).

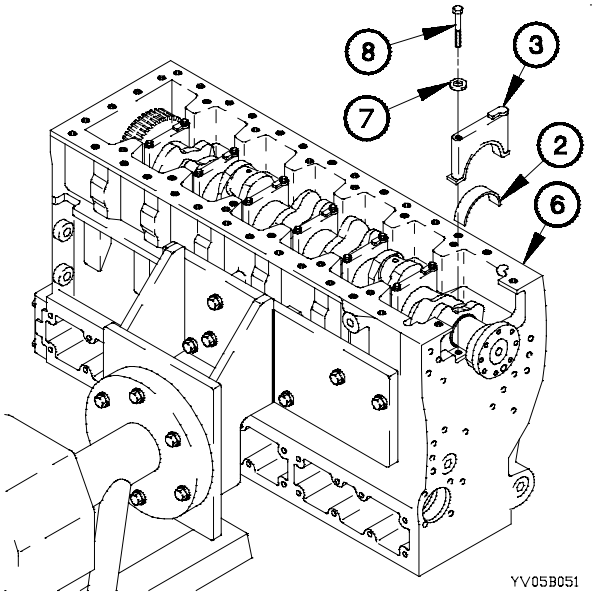
(8) Position seven main bearings (2) and crankshaft main bearing caps (3) on cylinder block (6) with 14 washers (7) and bolts (8).

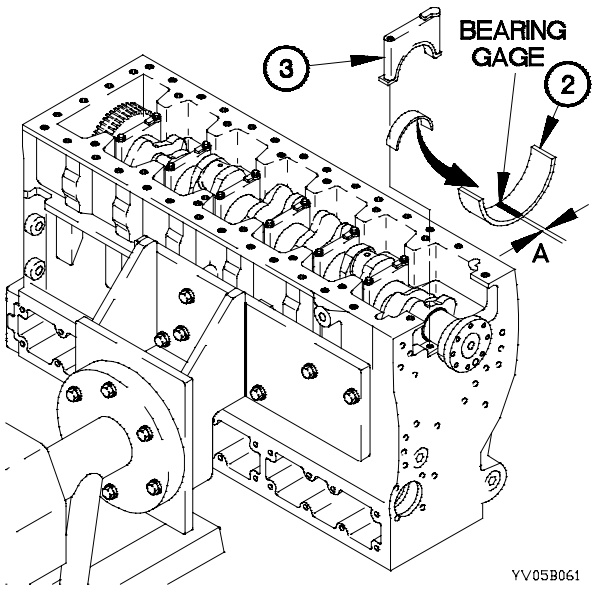
(9) Tighten 14 bolts (8) to 35-45 lb-ft (47-61 N·m).

20-5. CRANKSHAFT AND MAIN BEARINGS REPLACEMENT/REPAIR (CONT)

(10) Tighten 14 bolts (8) an additional 1/4 turn.

(11) Remove 14 bolts (8), washers (7), seven crankshaft main bearing caps (3) and main bearings (2) from cylinder block (6).





(12) Measure largest width (A) of each bearing gage with chart contained with gage package. Clearance should be 0.003-0.006 in. (0.007-0.015 cm).

(13) Discard bearing gage from seven main bearings (2) after recording clearance.

(14) Perform steps (8) through (10) to install seven crankshaft main bearings caps (3).

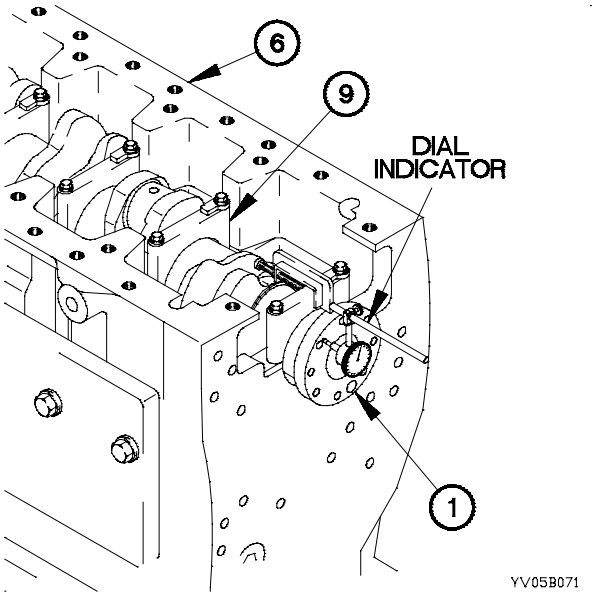
(15) Mount dial indicator on cylinder block (6).

(16) Align dial indicator with crankshaft (1) and adjust indicator to read zero.

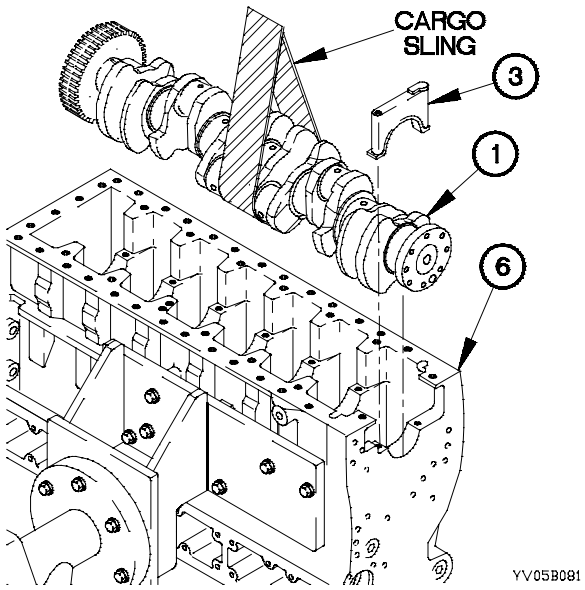
(17) Rotate crankshaft (1) and observe end play reading.

(18) End play must be 0.003-0.009 in. (0.007-0.023 cm). If end play exceeds tolerance replace thrust bearing in No. 6 main bearing journal (9).

(19) Remove dial indicator from cylinder block (6).



(20) Perform step (11) to remove seven crankshaft main bearing caps (3).



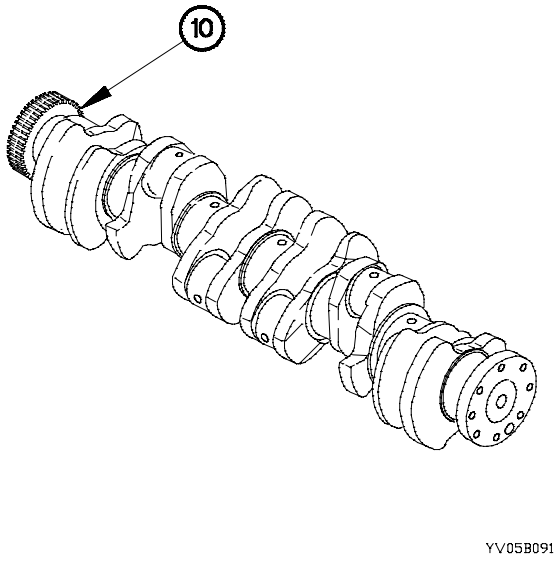
WARNING

Crankshaft weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

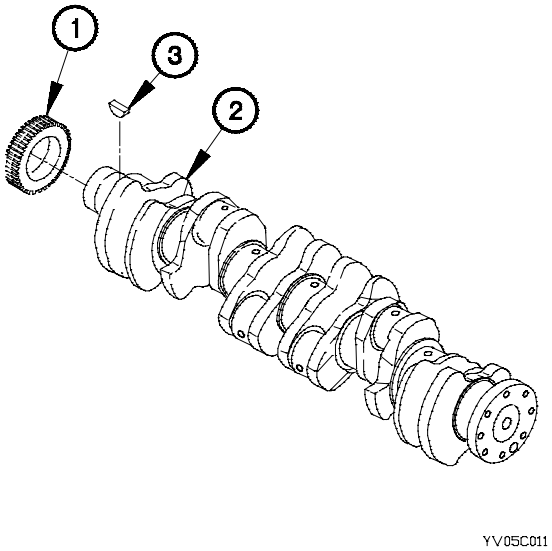
NOTE

Step (21) requires the aid of an assistant.

(21) Remove crankshaft (1) from cylinder block (6).



(22) Inspect crankshaft gear (10) for cracks, missing or broken teeth, and evidence of overheating.



c. Disassembly.

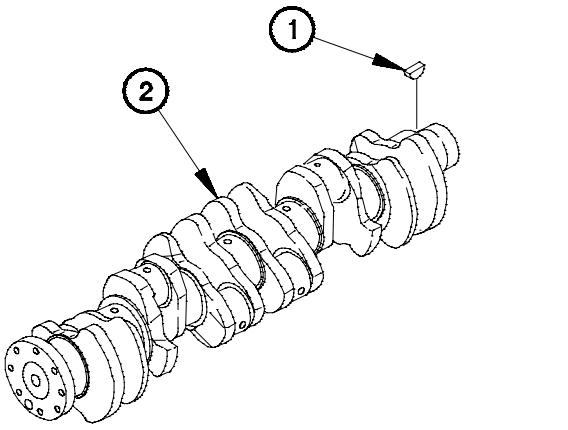
(1) Remove gear (1) from crankshaft (2).

(2) Remove key (3) from crankshaft (2).

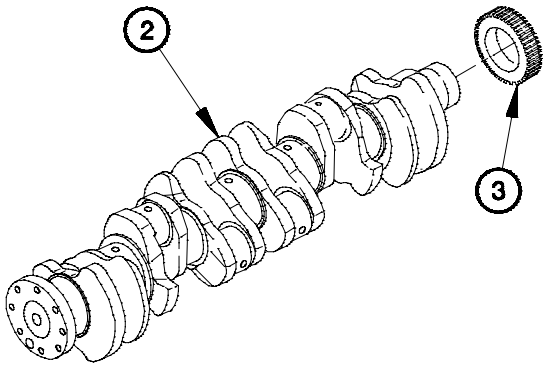
20-5. CRANKSHAFT AND MAIN BEARINGS REPLACEMENT/REPAIR (CONT)

d. Assembly.

(1) Install key (1) on forward end of crankshaft (2).



YV05D011



YV05D021

WARNING

Use extreme care when handling heated gear. Failure to comply may result in injury to personnel.

(2) Heat gear (3) to approximately 600°F (315°C).

(3) Install gear (3) on forward end of crankshaft (2).

e. Installation.

CAUTION

- Ensure main bearing tabs engage grooves in block and cap. Permanent damage to engine could occur if bearings are not properly installed. Failure to comply may result in damage to equipment.
- Ensure new bearings are installed as a matched set to each corresponding journal and cap. Permanent damage could occur if bearings are not from same set. Failure to comply may result in damage to equipment.

NOTE

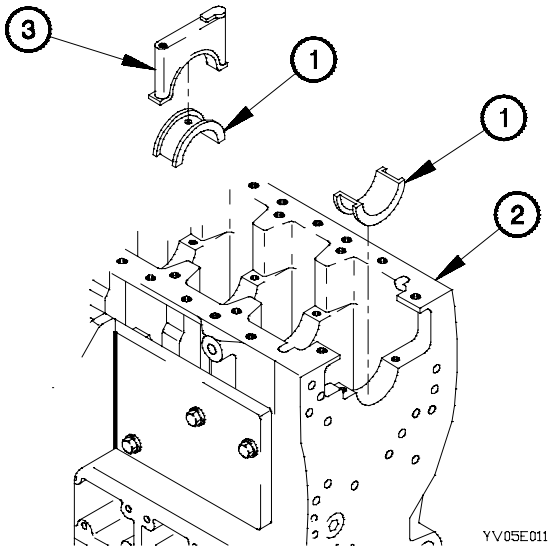
Number six bearing is crankshaft thrust bearing. Upper (or block) half of main bearings two, three, five, and six are slotted for oil flow to connecting rod bearings. Ensure no oil is allowed on back of bearings.

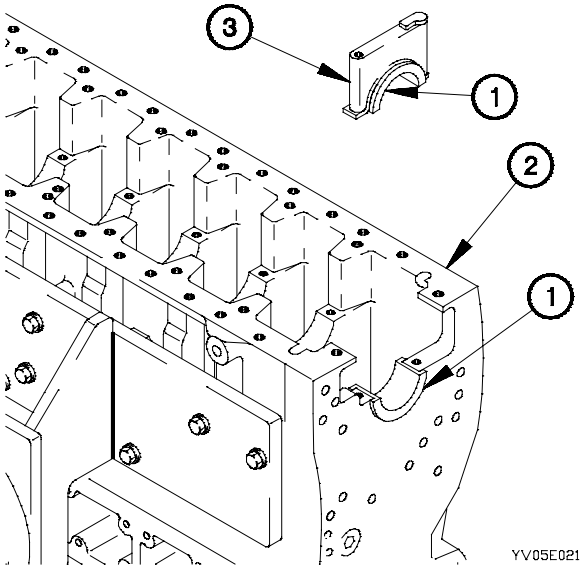
(1) Install thrust bearing (1) in No. 6 journal of cylinder block (2).

(2) Install other half of thrust bearing (1) in No. 6 crankshaft main bearing cap (3).

(3) Perform step (1) for six remaining main bearing halves in journals of cylinder block (2).

(4) Perform step (2) for six remaining main bearing halves in corresponding crankshaft main bearing caps (3).





CAUTION

Do not get oil on backs of main bearing halves. Failure to comply may result in damage to equipment.

(5) Lubricate face of all main bearing halves (1) in cylinder block (2).

(6) Lubricate face of main bearings (1) in crankshaft main bearing caps (3).

20-5. CRANKSHAFT AND MAIN BEARINGS REPLACEMENT/REPAIR (CONT)

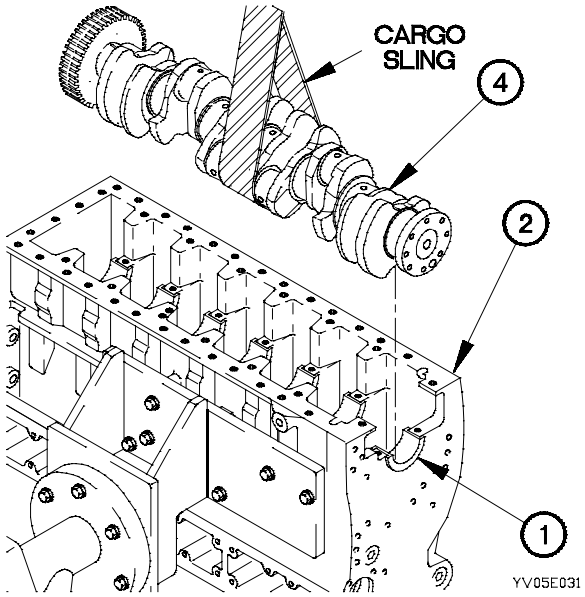
WARNING

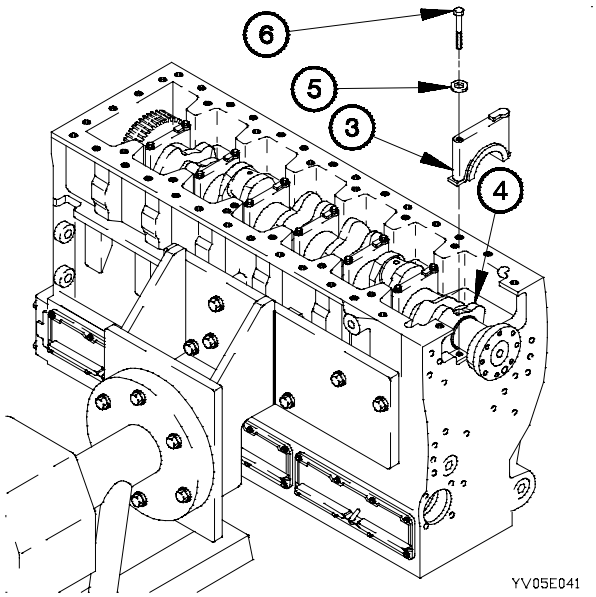
Crankshaft weighs 130 lbs (59 kgs). Use appropriate lifting device to lift crankshaft. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (7) requires the aid of an assistant.

(7) Position crankshaft (4) on seven main bearings (1) in cylinder block (2).





NOTE

Note position of tabs on main bearings.

(8) Install No. 6 crankshaft main bearing cap (3) on corresponding journal of crankshaft (4).

(9) Repeat Step (8) for remaining main bearing caps on corresponding journals of crankshaft (4).

(10) Position 14 washers (5) and bolts (6) in seven crankshaft main bearing caps (3).

NOTE

When tightening bolts for rear main bearing, slide cap as far forward as it will go (towards front of engine) against its bolts to prevent interference between crankshaft main bearing cap and engine rear seal.

(11) Tighten seven bolts (6), on side with tabs, to 35-45 lb-ft (47-61 N·m).

(12) Tighten seven bolts (6), on side without tabs, to 35-45 lb-ft (47-61 N·m).

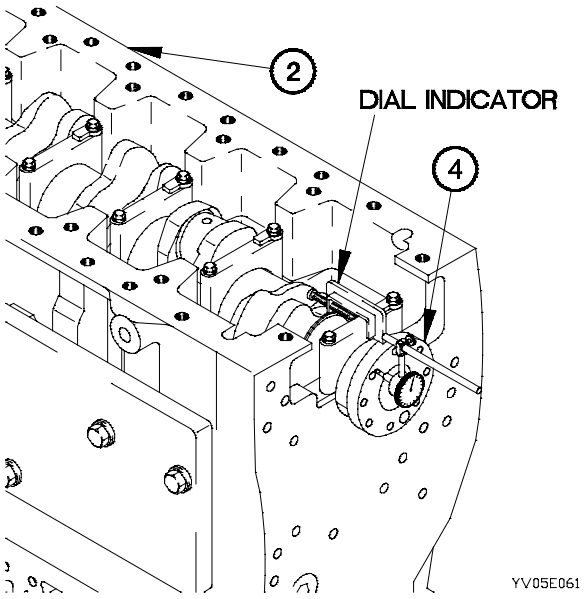
(13) Match mark each bolt (6) and crankshaft main bearing cap (3).

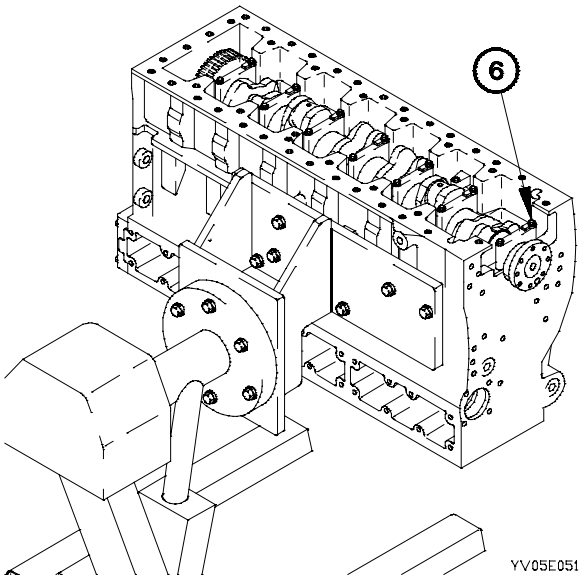
NOTE

Use match marks as reference.

(14) Tighten seven bolts (6), on side with tabs, an additional 1/4 turn.

(15) Tighten seven bolts (6), on side without tabs, an additional 1/4 turn.





(16) Mount magnetic base and dial indicator to rear of cylinder block (2).

(17) Align dial indicator with crankshaft (4) and adjust for zero reading on dial.

(18) Rotate crankshaft (4) slowly.

(19) Indicated end play must be 0.003-0.009 in. (0.08-0.23 mm).

(20) Remove magnetic base and dial indicator.

f. Follow-On Maintenance.

(1) Install flywheel housing (para 3-11).

(2) Install flexplate assembly (para 3-10).

(3) Install oil pump (para 3-17).

(4) Install crankshaft front seal (para 3-7).

(5) Install front gear housing and idler gear (para 20-8).

(6) Install camshaft and bearings (para 20-7).

(7) Demount engine from maintenance stand (para 20-2).

End of Task.

20-6. PISTON AND CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine mounted on maintenance stand (para 20-2).
Cylinder head removed (para 3-6).
Oil pump removed (para 3-17).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Extractor, Screw (Item 19, Appendix B)
Caliper, Micrometer, Inside (Item 6, Appendix B)
Pliers, Retaining Ring (Item 38, Appendix B)
Degreaser, Portable Liquid Type (Item 15, Appendix B)
Compressor, Ring, Piston (Item 13, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)

Tools and Special Tools
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Materials/Parts
Gage, Bearing Clearance (Item 34, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Lubricating Oil, Engine (Item 47, Appendix C)
Carbon Removing Compound (Item 19, Appendix C)

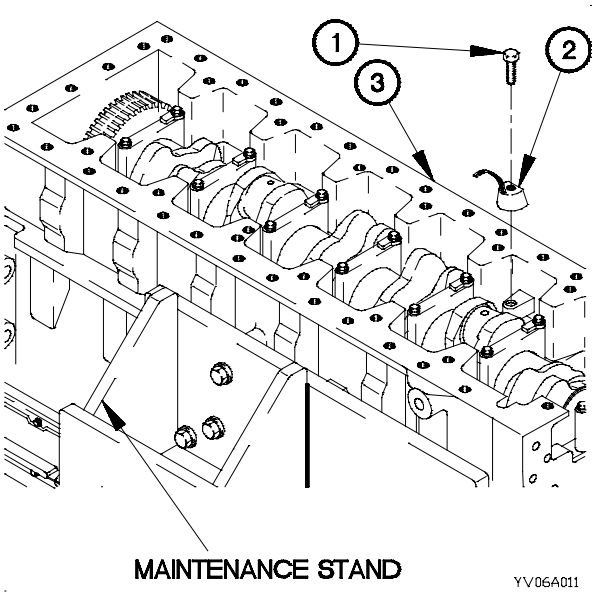
Personnel Required
(2)

a. Removal.

NOTE

All piston and connecting rod assemblies are removed the same way. One piston and connecting rod assembly shown.

(1) Remove bolt (1) and cooling jet (2) from cylinder block (3).



NOTE

Tag pistons, connecting rods, and rod caps by cylinder number during removal.

(2) Remove two rod cap nuts (4) and rod cap (5) from connecting rod (6).

(3) Remove rod bearing half (7) from rod cap (5).

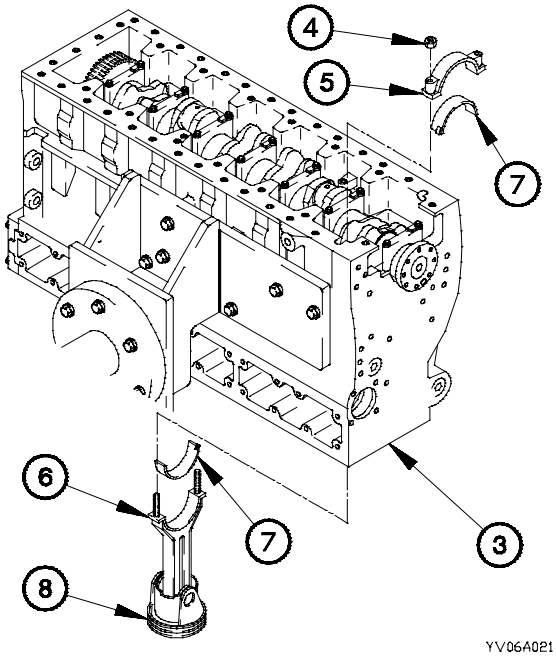
CAUTION

Use care when removing piston and connecting rod to prevent damage to connecting rod bolt threads and crankshaft journals. Failure to comply may result in damage to equipment.

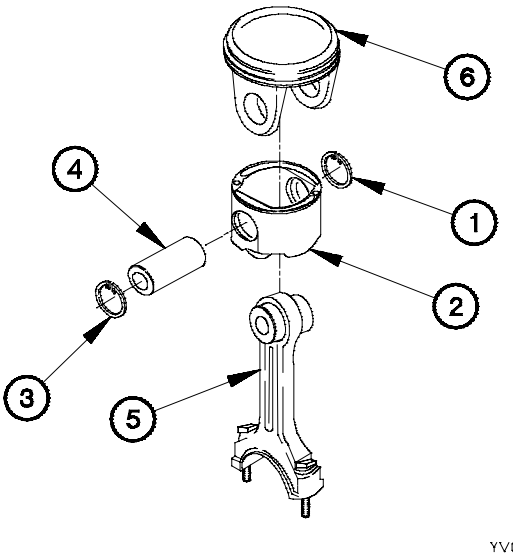
(4) Remove piston and connecting rod assembly (8) from cylinder block (3).

(5) Remove rod bearing half (7) from connecting rod (6).

(6) Perform steps (1) through (5) on remaining pistons and connecting rod assemblies.



b. Disassembly.



WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

NOTE

All pistons are disassembled the same way. One piston shown.

(1) Remove retaining ring (1) from piston skirt (2).

(2) Remove retaining ring (3) from piston skirt (2).

(3) Remove piston pin (4) and piston skirt (2) from connecting rod (5).

(4) Separate piston crown (6) from piston skirt (2).

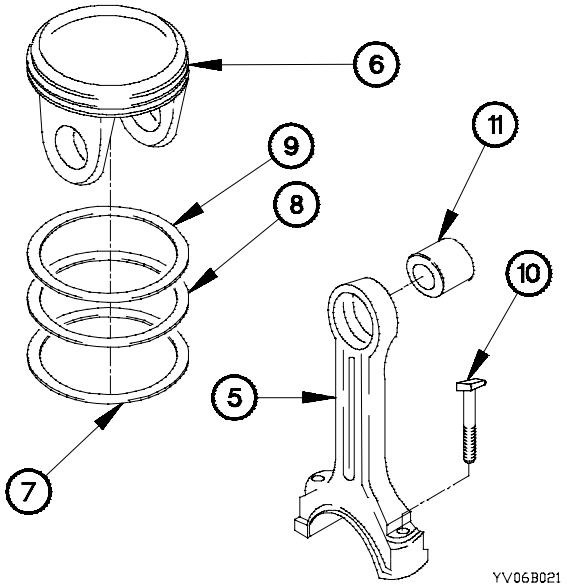
20-6. PISTON AND CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR (CONT)

(5) Remove No. 1 piston ring (7), No. 2 piston ring (8) and oil control ring (9) from piston crown (6).

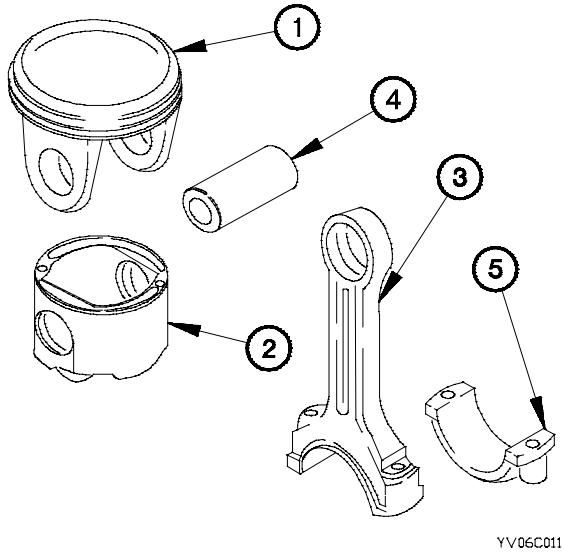
(6) Remove two connecting rod bolts (10) from connecting rod (5).

(7) Remove piston pin bearing (11) from connecting rod (5).

(8) Perform steps (1) through (7) on remaining pistons.



c. Cleaning/Inspection.



WARNING

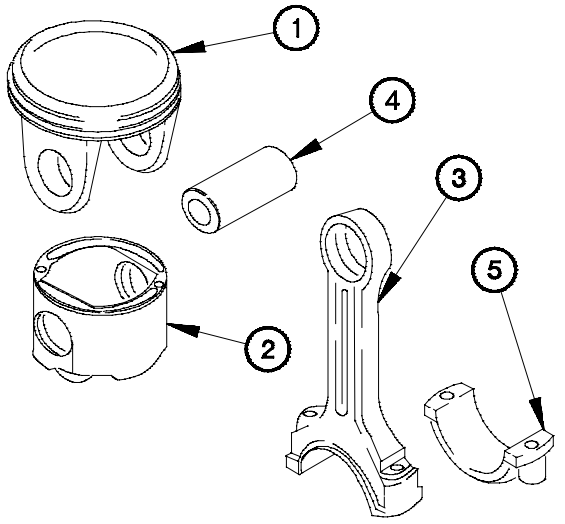
Some chemical agents (detergents, solvents, alkalis, etc.) may irritate skin or be harmful to the eyes, nose, and throat. Some must be used only with adequate ventilation. When working with potentially harmful chemical substances, read and heed all warnings on the product labels and follow prescribed safety precautions. When working with any potentially harmful substance; including live steam, hot water, and compressed air; wear appropriate safety equipment and use extreme care. Failure to comply may result in injury to personnel.

(1) Soak six piston crowns (1), piston skirts (2), connecting rods (3), piston pins (4), and rod caps (5) in degreaser unit with carbon removing compound for at least one hour.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flash point for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(2) Remove six piston crowns (1), piston skirts (2), connecting rods (3), piston pins (4), and rod caps (5) from degreaser unit and clean with dry cleaning solvent.



20-6. PISTON AND CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR (CONT)

NOTE

Replace any part that fails visual inspection or size measurement requirements.

(3) Inspect six piston crowns (1) for cracks, wear, and corrosion.

(4) Inspect six piston skirts (2) for cracks, wear, and corrosion.

(5) Inspect six connecting rods (3) for cracks, wear and corrosion.

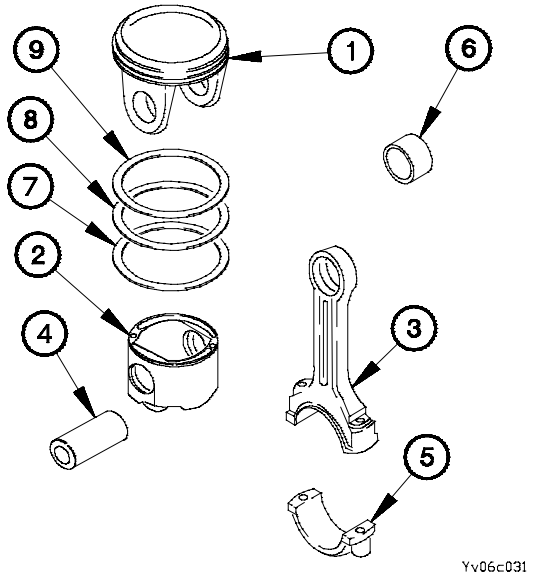
(6) Measure inside diameter of six piston pin bearings (6). Minimum inside diameter is 1.5756 in. (4.002 cm).

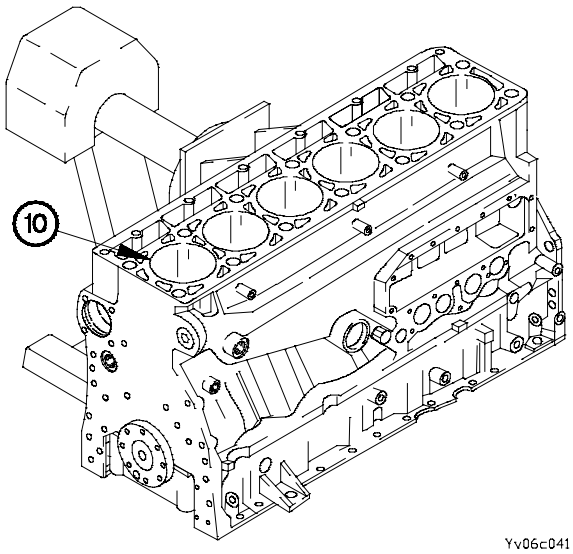
(7) Inspect six rod caps (5) for cracks, wear and corrosion.

(8) Inspect six No. 1 piston rings (7), No. 2 piston rings (8), and oil control rings (9) for cracks and corrosion.

(9) Inspect six piston pins (4) for damage, wear, and corrosion.

(10) Measure diameter of six piston pins (4). Minimum diameter is 1.5746 in. (3.999 cm).





NOTE

If any cylinder bore exceeds maximum allowable diameter, replace cylinder block.

(11) Measure inside diameter of six cylinder bores (10). Maximum allowable bore diameter is 4.1358 in. (10.505 cm).

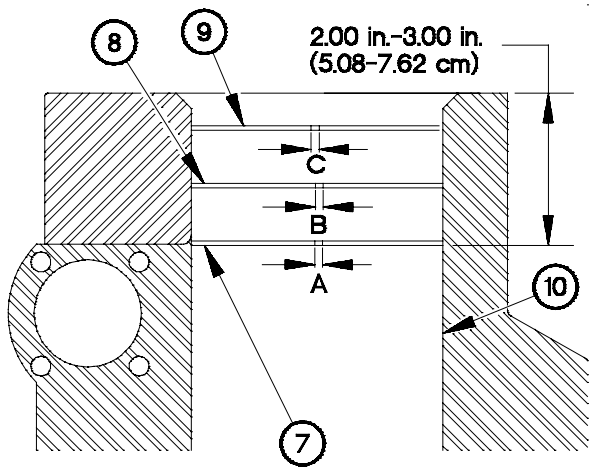
(12) Insert No. 1 piston ring (7) inside No. 1 cylinder bore (10) far enough to be within area of ring travel, 2.00-3.00 in. (5.08-7.62 cm) deep.

CAUTION

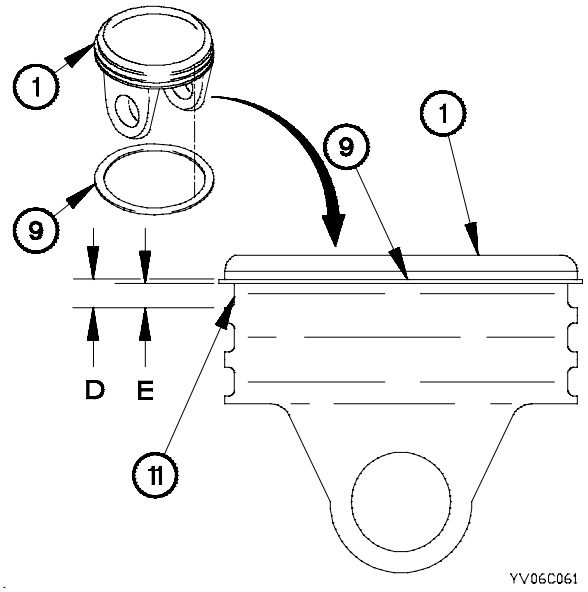
Ends of ring must be filed if gap is not within limits. File from outer surface of ring toward inner surface. Failure to comply may result in damage to equipment.

(13) Measure end gap of No. 1 piston ring (7). Refer to **Table 20-7. Piston/Piston Ring Clearances.**

(14) Perform steps (12) and (13) for remaining No. 1 piston rings (7), No. 2 piston rings (8), and oil control rings (9).



YV06C051



YV06C061

(15) Measure piston oil control ring groove (11). Refer to **Table 20-7. Piston/Piston Ring Clearances.**

(16) Install oil control ring (9) on piston crown (1).

(17) Measure clearance between oil control ring (9) and oil ring groove (11). Refer to **Table 20-7. Piston/Piston Ring Clearances.**

(18) Perform steps (15) through (17) for remaining piston crowns (1).

Table 20-7. Piston/Piston Ring Clearances

Item to be measured	Clearance
End gap of No. 1 piston ring installed in cylinder bore size of 4.134 in. (10.50 cm) (A)	0.016-0.026 in. (0.04-0.06 cm)
End gap of No. 2 piston ring installed in cylinder bore size of 4.1348 in. (10.50 cm) (B)	0.028-0.038 in. (0.07-0.09 cm)
End gap of oil control ring installed in cylinder bore size 4.1348 in. (10.50 cm) (C)	0.012-0.024 in. (0.03-0.06 cm)
Groove width in piston crown for oil control ring (D)	0.1586-0.1596 in. (0.402-0.405 cm)
Clearance between groove and oil control ring (E)	0.0015-0.0031 in. (0.003-0.007 cm)

20-6. PISTON AND CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR (CONT)

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(19) Clean and dry two connecting rod bearing halves (12) and crankshaft connecting rod journal (13).

(20) Install connecting rod bearing half (12) in rod cap (5).

CAUTION

Do not allow any bearing gage material to overhang edge of connecting rod bearing half. Failure to comply may result in inaccurate bearing clearance reading.

(21) Place bearing gage at crown of connecting rod bearing half (12).

(22) Install connecting rod bearing half (12) in connecting rod (3).

(23) Position connecting rod (3) in cylinder bore (10) against connecting rod journal (13).

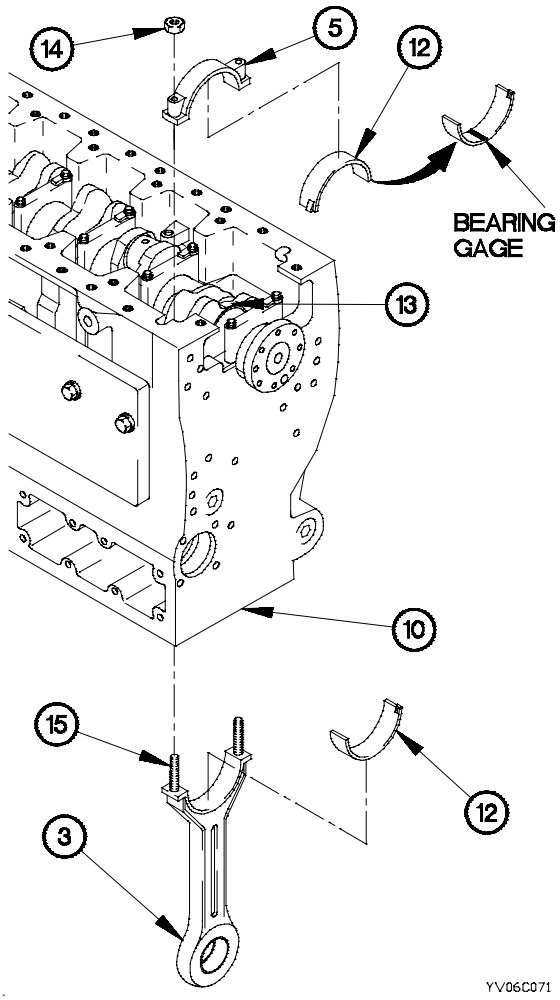
(24) Position rod cap (5) on connecting rod (3).

(25) Position two connecting rod cap nuts (14) on two connecting rod bolts (15).

(26) Tighten two connecting rod cap nuts (14) to 35-45 lb-ft (47-61 N·m).

(27) Match mark rod cap (5) and connecting rod cap nut (14).

(28) Tighten two connecting rod cap nuts (14) an additional 1/6 turn.



CAUTION

Do not turn crankshaft while bearing gage is on connecting rod bearing. Failure to comply will result in inaccurate clearance reading and possible damage to equipment.

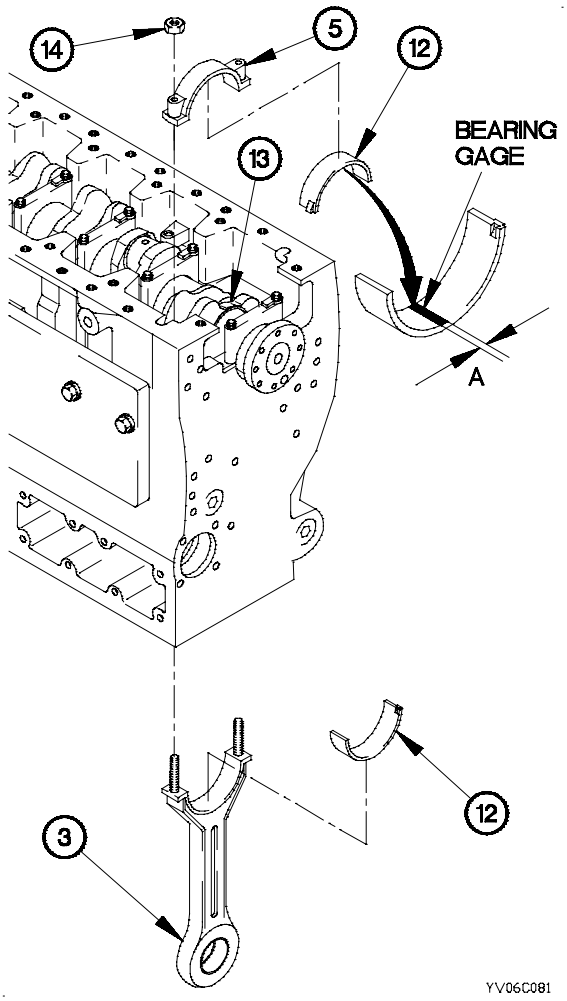
(29) Remove two connecting rod cap nuts (14) and connecting rod (3) from rod cap (5).

(30) Remove rod cap (5) from connecting rod journal (13).

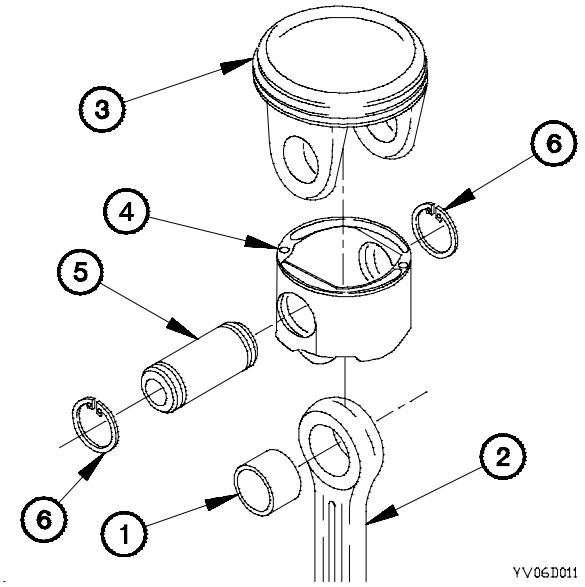
(31) Measure greatest width (A) of bearing gage in connecting rod bearing half (12) against chart contained in gage package. Maximum clearance is 0.0061 in. (0.015 cm). Record clearance reading.

(32) Clean bearing gage from connecting rod half (12) and connecting rod journal (13).

(33) Perform steps (19) through (32) for remaining five connecting rods and rod caps.



d. Assembly.



(1) Install piston rod bearing (1) in connecting rod (2).

(2) Install piston crown (3) on piston skirt (4).

(3) Install piston crown (3) on connecting rod (2) with piston pin (5).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(4) Install two retaining rings (6) on piston pin (5).

20-6. PISTON AND CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR (CONT)

NOTE

Oil control ring is to be installed over the spring with the end gap joint 180-degrees from oil ring spring.

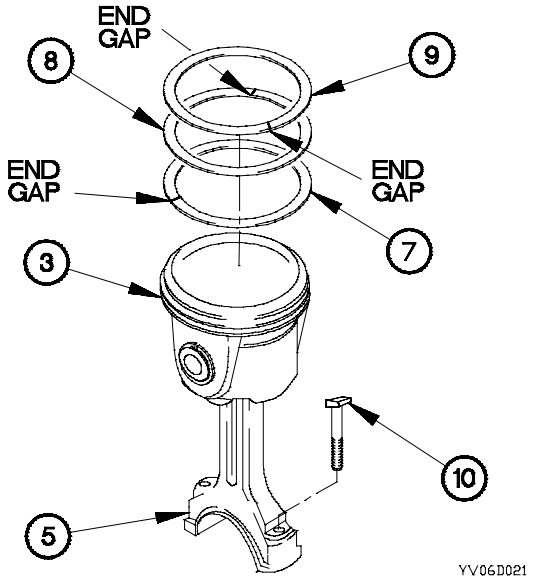
(5) Install oil control ring (7) in bottom groove of piston crown (3).

(6) Install No. 2 ring (8) in middle groove of piston crown (3) with marking "UP-2" toward top of piston.

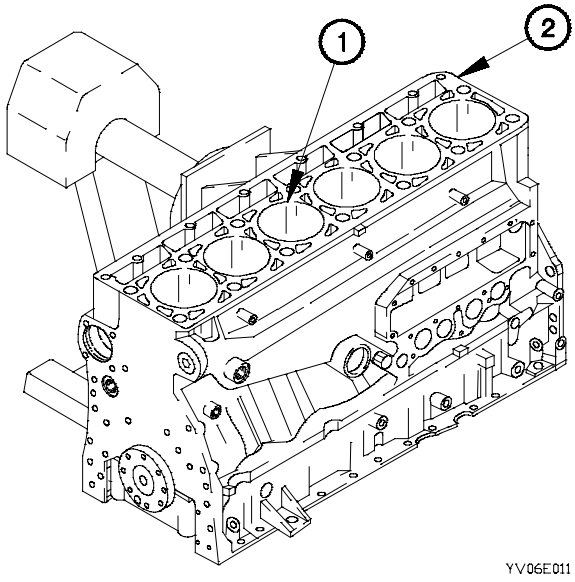
(7) Install No. 1 ring (9) in top groove of piston crown (3) with marking "UP-1" toward top of piston.

(8) Rotate three piston rings (7, 8, and 9) until end gaps are 120-degrees apart.

(9) Install two connecting rod cap bolts (10) in connecting rod (5).



e. Installation.



CAUTION

Do not lubricate back side of connecting rod bearings. Failure to comply may result in damage to equipment.

NOTE

Lubricate all parts with engine oil prior to installation.

(1) Lubricate each cylinder bore (1) of cylinder block (2).

CAUTION

Cover threaded portions of rod bolts to protect crankshaft/journals. Failure to comply may result in damage to equipment.

(2) Position piston (3) and connecting rod (4) in cylinder block (2).

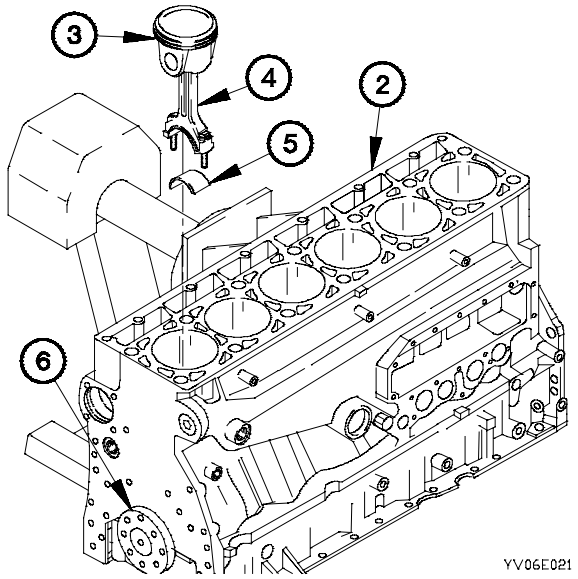
NOTE

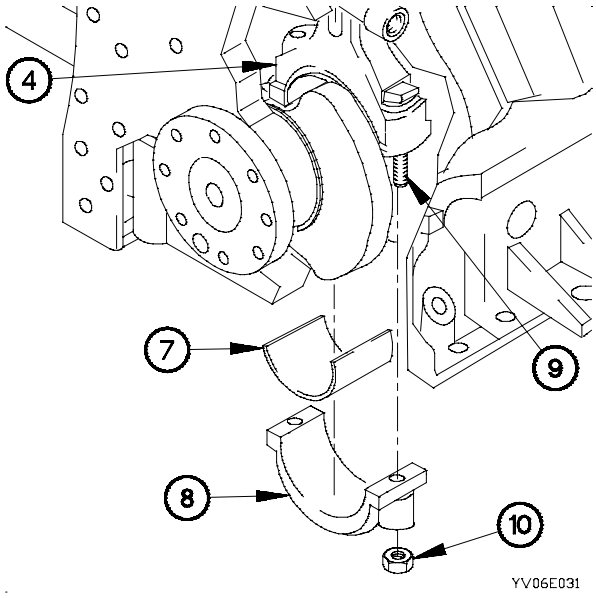
Bearing tab must engage groove in connecting rod.

(3) Install upper half of rod bearing (5) on connecting rod (4).

(4) Apply engine oil to upper half rod bearing (5).

(5) Position connecting rod (4) on crank shaft (6).





(6) Position lower half rod bearing (7) in rod cap (8).

NOTE

Bearing tab must engage the groove in rod cap.

(7) Apply engine oil to lower half rod bearing (7) surface and threads of rod bolt (9).

(8) Position rod cap (8) with two rod cap nuts (10) on connecting rod (4).

(9) Tighten two rod cap nuts (10) to 35-45 lb-ft (47-61 N·m).

(10) Position alignment mark on rod cap (8) and rod cap nuts (10).

(11) Tighten two rod cap nuts (10) a 1/6 of a turn.

f. Follow-On Maintenance.

(1) Install oil pump (para 3-17).

(2) Install cylinder head (para 3-6).

End of Task.

20-7. CAMSHAFT AND BEARING REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Cleaning/Inspection
c. Disassembly
d. Assembly
e. Installation
f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine mounted on maintenance stand (para 20-2).
Cam roller followers removed (para 3-13).
Pulley damper removed (para 3-7).
Engine front cover group removed (para 3-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Degreaser, Portable Liquid Type (Item 15, Appendix B)
Caliper Set, Micrometer, Inside (Item 6, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Driver Kit, Bearing (TM 9-2320-365-20)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 44, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Gloves, Welders (Item 24, Appendix B)

Materials/Parts
Carbon Removing Compound (Item 19, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Grease, Molybdenum Disulfide (Item 38, Appendix C)

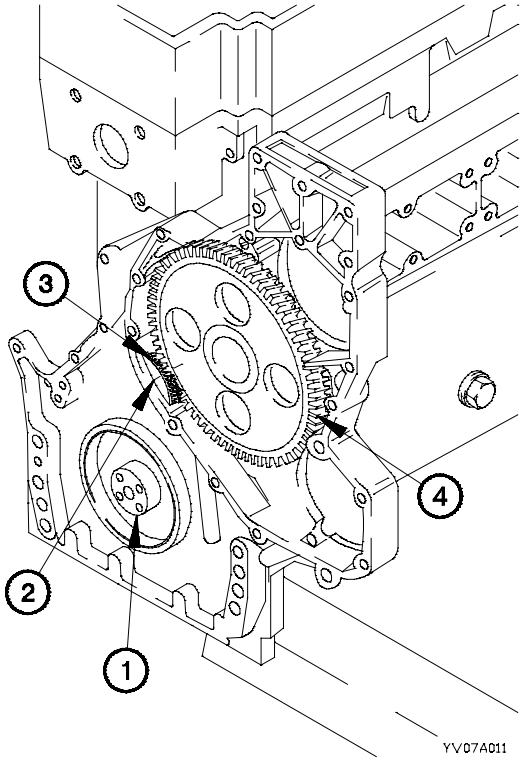
Personnel Required
(2)

a. Removal.

CAUTION

Do not alter position of crankshaft after timing marks have been aligned. Failure to comply may result in damage to equipment.

(1) Turn crankshaft (1) until timing marks (2) are aligned on idler gear (3) and camshaft gear (4).

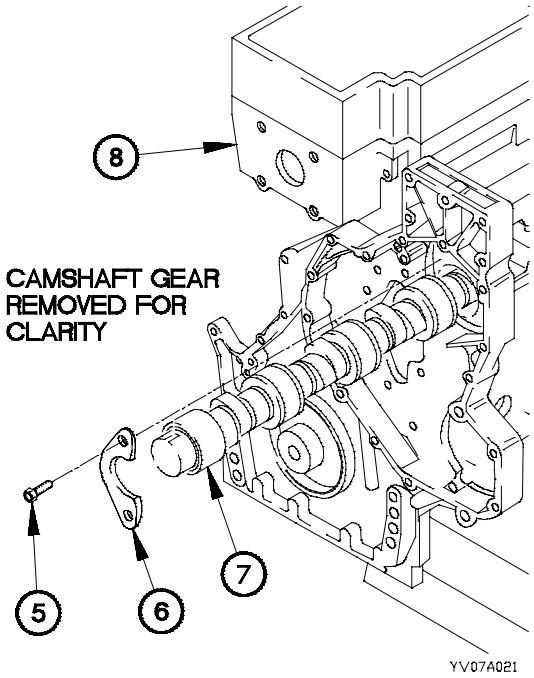


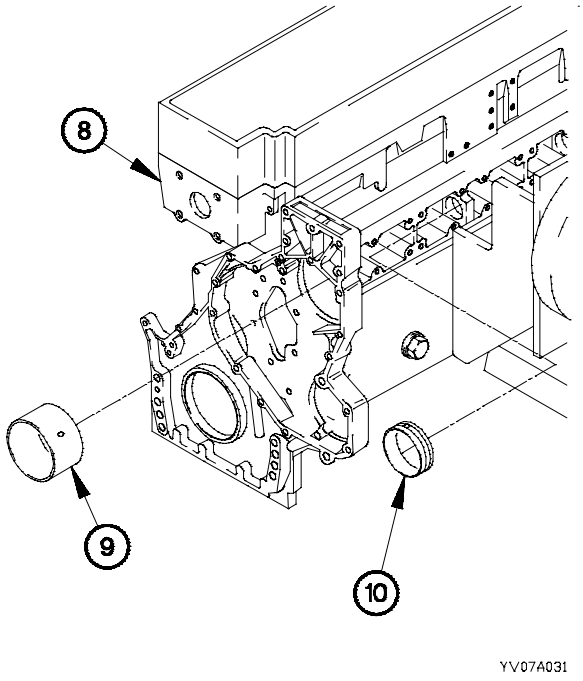
(2) Remove two screws (5) from thrust plate (6).

CAUTION

Use extreme care when removing camshaft to prevent damage to camshaft journals and lobes. Failure to comply may result in damage to equipment.

(3) Remove thrust plate (6) and camshaft (7) from cylinder block (8).





NOTE

- Perform steps (4) and (5) if camshaft bearings fail inspection or if camshaft is being replaced.
- Note location of camshaft bearing joints and bearing oil holes during removal.

(4) Remove No. 1 camshaft bearing (9) from cylinder block (8).

(5) Remove six camshaft bearings (10) from cylinder block (8).

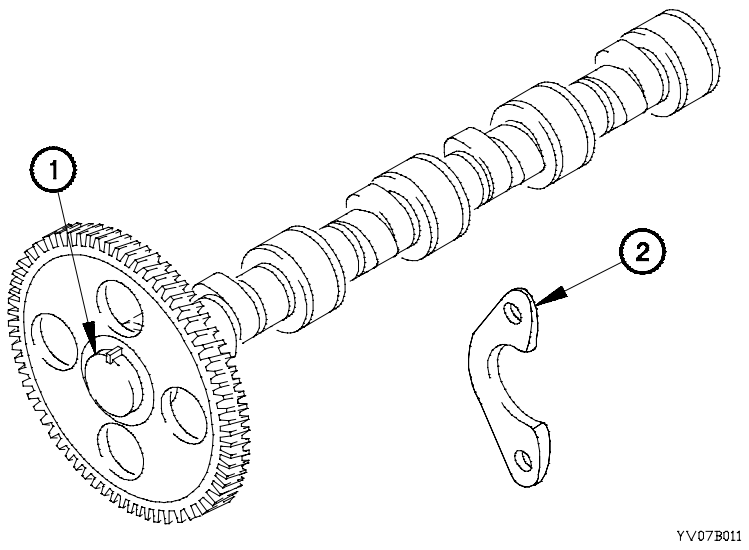
20-7. CAMSHAFT AND BEARING REPLACEMENT/REPAIR (CONT)

b. Cleaning/Inspection.

WARNING

Some chemical agents (detergents, solvents, alkalis, etc.) may irritate skin or be harmful to the eyes, nose, and throat. Some must be used only with adequate ventilation. When working with potentially harmful chemical substances, read and heed all warnings on the product labels and follow prescribed safety precautions. When working with any potentially harmful substance; including live steam, hot water, and compressed air; wear appropriate safety equipment and use extreme care. Failure to comply may result in injury to personnel.

(1) Soak camshaft (1) and thrust plate (2) in degreaser unit with carbon removing compound for at least one hour.



WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

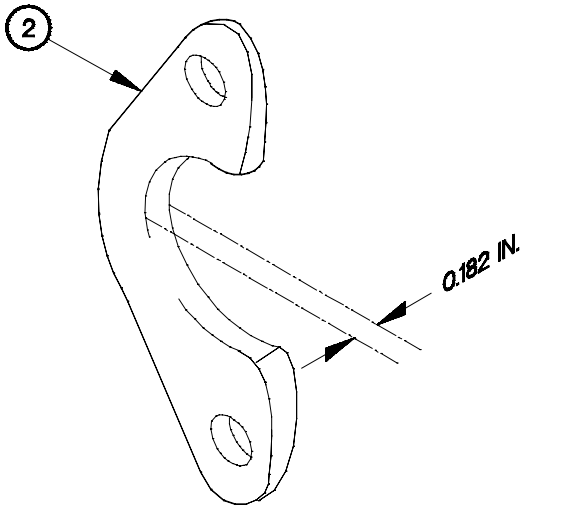
- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(2) Remove thrust plate (2) and camshaft (1) from degreaser unit, rinse with dry cleaning solvent and allow parts to air dry.

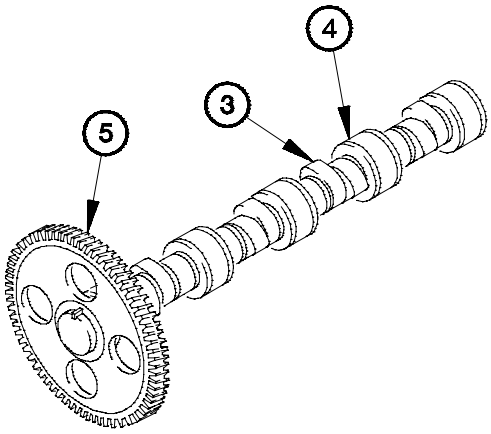
NOTE

Replace any part that fails visual inspection or size measurement requirements.

(3) Measure thickness of thrust plate (2). Minimum thickness is 0.182 in. (4.62 mm).



Yv07b021



YV07B031

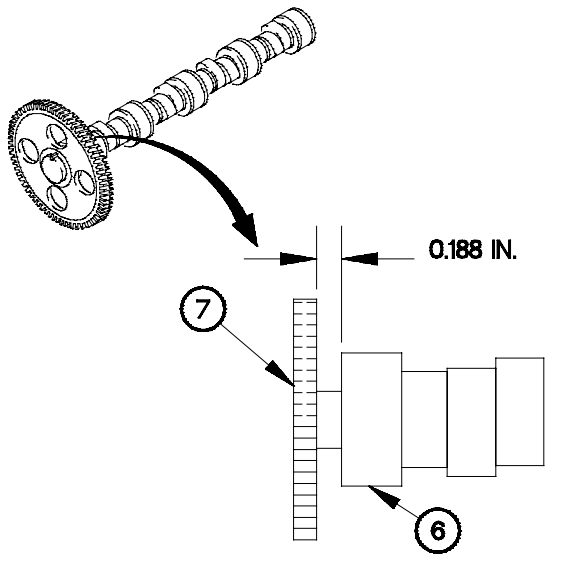
NOTE

If camshaft fails inspection, camshaft bearings and cam roller followers must also be replaced.

(4) Inspect camshaft lobes (3) and journals (4) for pitting, cracks, corrosion, and evidence of overheating.

(5) Inspect camshaft gear (5) for cracks and damaged or broken teeth.

(6) Measure distance between camshaft shoulder (6) and camshaft gear (7). Minimum distance is 0.188 in. (4.78 mm).



Yv07b041

20-7. CAMSHAFT AND BEARING REPLACEMENT/REPAIR (CONT)

(7) Measure diameter of camshaft journals (4). Minimum diameter is 2.5635 in. (65.113 mm).

(8) Measure height (A) of all camshaft lobes (3). Record measurement.

(9) Measure base circle (B) of all camshaft lobes (3). Record measurement.

(10) Subtract measurement (B) from measurement (A). Difference in measurement is lobe lift (C). Refer to **Table 20-8. Camshaft Minimum Lobe Lift.**

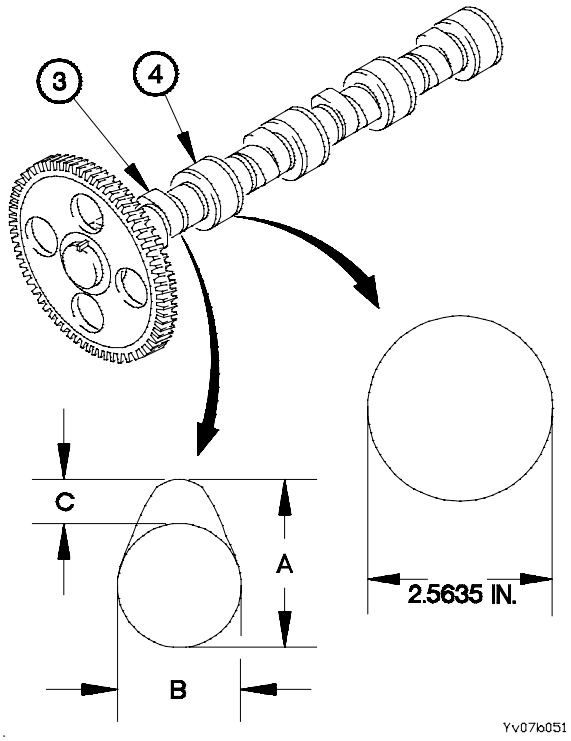
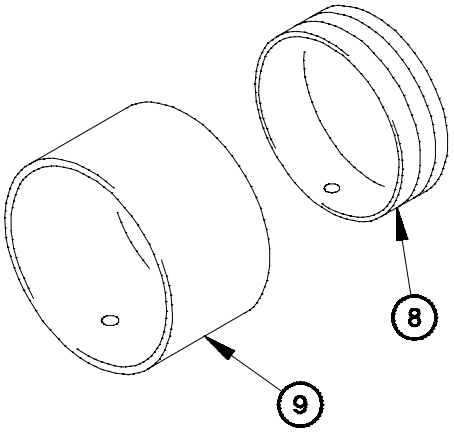


Table 20-8 Camshaft Minimum Lobe Lift

Exhaust lobe lift	0.3655 in. (9.284 mm)
Intake lobe lift	0.3655 in. (9.284 mm)
Injector lobe lift	0.3832 in. (9.733 mm)



(11) Measure inside diameter of six camshaft bearings (8). Maximum inside diameter is 2.575 in. (65.40 mm).

(12) Measure inside diameter of No. 1 camshaft bearing (9). Maximum inside diameter is 2.575 in. (65.40 mm).

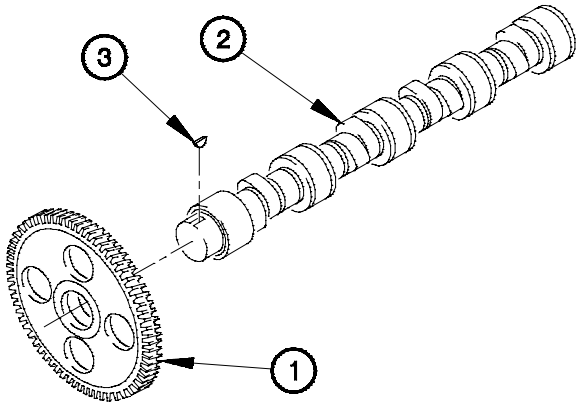
c. Disassembly.

NOTE

Perform Steps (1) and (2) if camshaft or camshaft gear fails inspection.

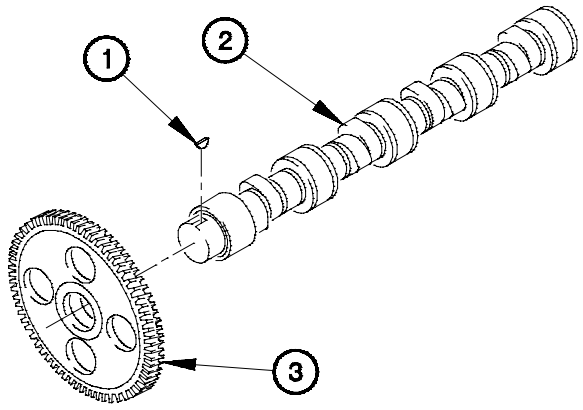
(1) Remove camshaft gear (1) from camshaft (2).

(2) Remove woodruff key (3) from camshaft (2).



YV07C011

d. Assembly.



YV07D011

(1) Install woodruff key (1) on camshaft (2).

WARNING

Use extreme care when handling heated camshaft gear. Failure to comply may result in injury to personnel.

(2) Heat camshaft gear (3) to approximately 600°F (316°C).

(3) Install camshaft gear (3) on camshaft (2).

20-7. CAMSHAFT AND BEARING REPLACEMENT/REPAIR (CONT)

e. Installation.

CAUTION

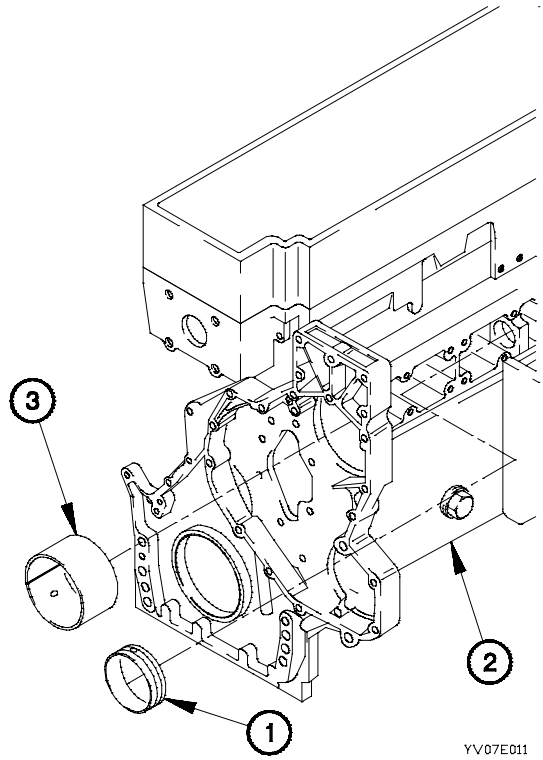
Camshaft bearing joints and oil holes must be properly aligned. Failure to comply will result in damage to equipment.

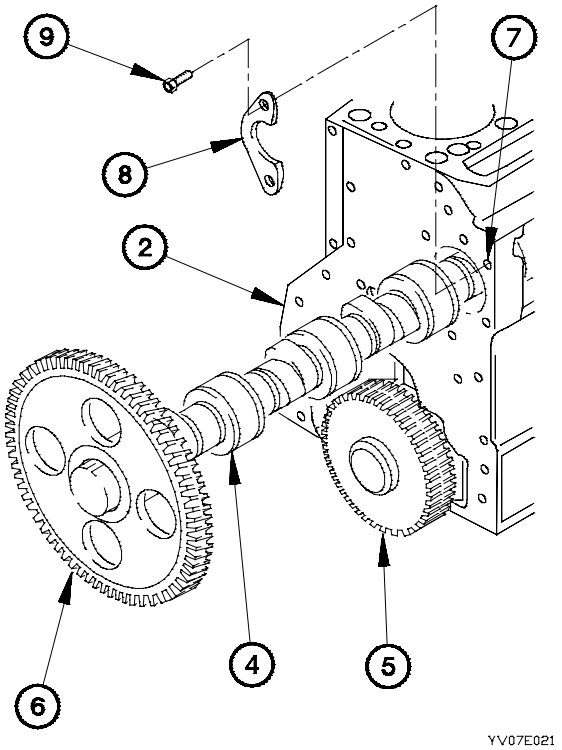
NOTE

All camshaft bearings, except No. 1 camshaft bearing, are installed with oil hole at top of bearing bore with bearing joint toward centerline of cylinder block.

(1) Install six camshaft bearings (1) in cylinder block (2).

(2) Install No. 1 camshaft bearing (3) in cylinder block (2) with bearing oil hole aligned with oil hole in cylinder block (7 o'clock position) and bearing joint toward centerline of cylinder block.





CAUTION

Timing mark on camshaft gear must line up with timing mark on idler gear at installation. Failure to comply will result in damage to equipment.

(3) Lubricate journals and lobes of camshaft (4) with grease.

(4) Insert camshaft (4) into cylinder block (2).

(5) Turn crankshaft (5) until holes in camshaft gear (6) are aligned with camshaft thrust plate holes (7) in cylinder block (2).

(6) Position camshaft thrust plate (8) on cylinder block (2) with two bolts (9).

(7) Tighten two bolts (9) to 15-25 lb-ft (20-34 N·m).

f. Follow-On Maintenance.

(1) Install engine front cover (para 3-15).

(2) Install pulley damper (para 3-7).

(3) Install cam roller followers (para 3-13).

(4) Perform fuel timing checks (para 4-5).

(5) Demount engine from maintenance stand (para 20-2).

End of Task

20-8. FRONT GEAR HOUSING AND IDLER GEAR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Camshaft removed (para 20-7).
Oil pan removed (para 3-16).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)

Materials/Parts
Sealing Compound (Item 75, Appendix C)

Personnel Required
(2)

a. Removal.

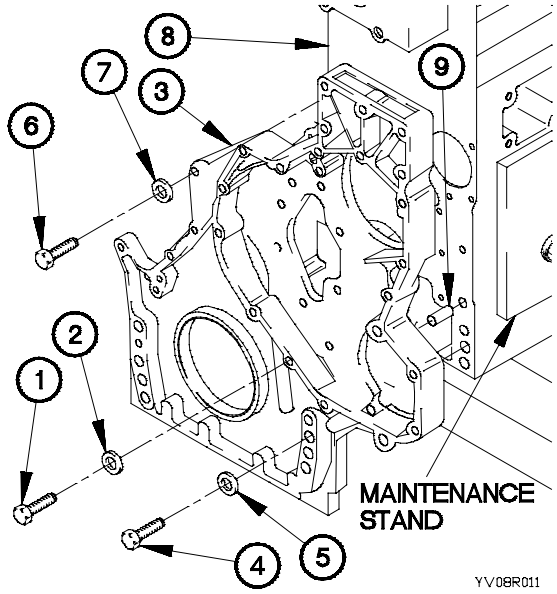
(1) Remove eight bolts (1) and washers (2) from front gear housing (3).

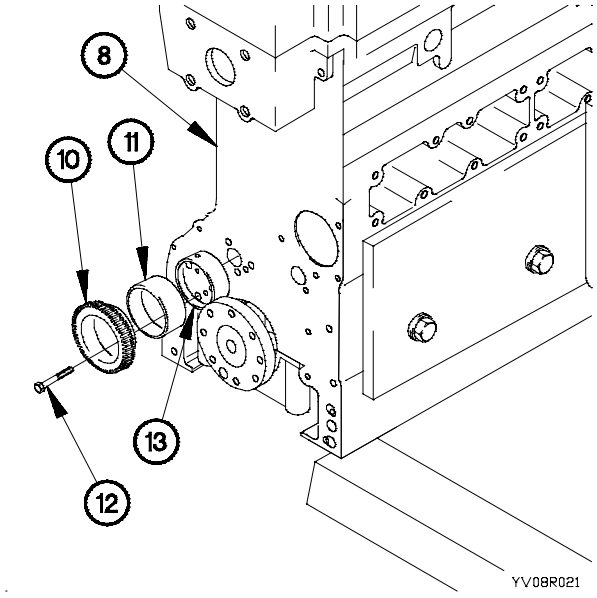
(2) Remove five bolts (4) and washers (5) from front gear housing (3).

(3) Remove three bolts (6), washers (7), and front gear housing (3) from cylinder block (8).

(4) Remove sealing compound from back of front gear housing (3).

(5) Remove expansion shield (9) from front gear housing (3).





(6) Remove idler gear (10) and bearing sleeve (11) from cylinder block (8).

(7) Remove three bolts (12) and stub shaft (13) from cylinder block (8).

b. Installation.

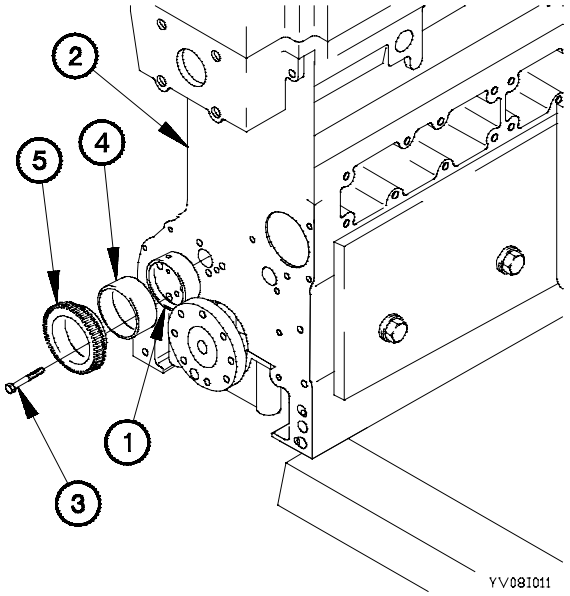
(1) Position stub shaft (1) on cylinder block (2) with three bolts (3).

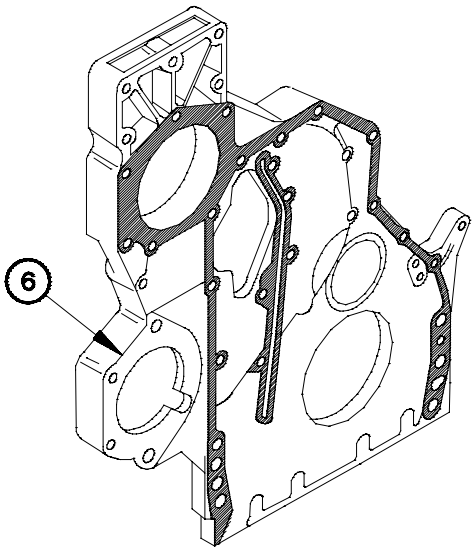
(2) Tighten three bolts (3) to 33-47 lb-ft (45-65 N·m).

CAUTION

Ensure timing marks are aligned as noted during removal. Failure to comply may result in damage to equipment.

(3) Install bearing sleeve (4) and idler gear (5) with timing mark outward.





WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(4) Place a bead of sealant on front gear housing (6) seating surface (shaded area).

20-8. FRONT GEAR HOUSING AND IDLER GEAR REPLACEMENT (CONT)

(5) Install expansion shield (7) in front gear housing (6).

NOTE

Step (6) requires the aid of an assistant.

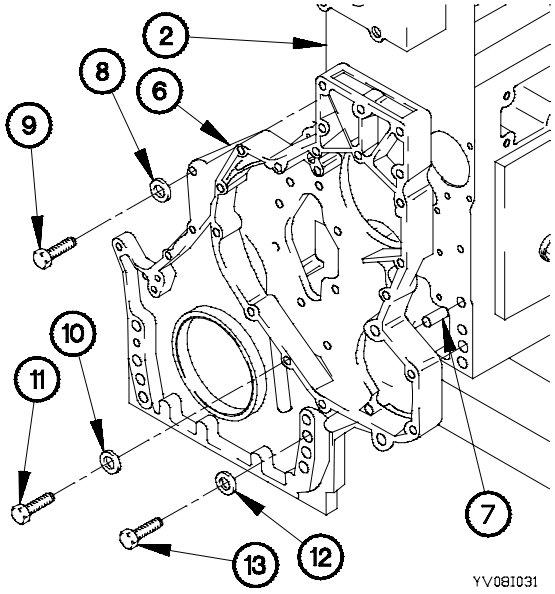
(6) Position front gear housing (6) on cylinder block (2) with two washers (8) and bolts (9).

(7) Position four washers (10) and bolts (11) in front gear housing (6).

(8) Position eight washers (12) and bolts (13) in front gear housing (6).

(9) Tighten two bolts (9) and four bolts (11) to 15-25 lb-ft (20-34 N·m).

(10) Tighten eight bolts (13) to 60-90 lb-ft (81-122 N·m).



c. Follow-On Maintenance

(1) Install oil pan (para 3-16).

(2) Install camshaft (para 20-7).

End of Task.

CHAPTER 21
TRANSMISSION MAINTENANCE

Section I. INTRODUCTION 21-1
21-1. INTRODUCTION 21-1

Section II. MAINTENANCE PROCEDURES 21-2
21-2. TRANSMISSION REPAIR 21-2
21-3. FRONT SUPPORT/CHARGING PUMP MODULE REPAIR 21-14
21-4. ROTATING CLUTCH MODULE REPAIR 21-20
21-5. CONVERTER HOUSING MODULE REPAIR 21-30
21-6. ADAPTER HOUSING MODULE REPAIR 21-36
21-7. P3 PLANETARY CARRIER MODULE REPAIR 21-40
21-8. MAIN SHAFT MODULE REPAIR 21-43
21-9. P2 PLANETARY CARRIER MODULE REPAIR 21-46
21-10. P1 PLANETARY CARRIER MODULE REPAIR 21-50
21-11. REAR OUTPUT HOUSING REPAIR 21-54
21-12. P4 PLANETARY CARRIER ASSEMBLY REPAIR 21-59
21-13. C3/C4 CLUTCH MODULE REPAIR 21-61
21-14. C6 CLUTCH HOUSING ASSEMBLY REPAIR 21-66
21-15. C7 CLUTCH HOUSING AND FRONT OUTPUT HOUSING ASSEMBLY REPAIR 21-70

Section I. INTRODUCTION

21-1. INTRODUCTION

This chapter contains maintenance instructions for repairing and replacing Transmission Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

21-2. TRANSMISSION REPAIR

This task covers:

a. Disassembly
b. Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission mounted on maintenance stand (para 7-5).
Transfer case module removed (para 22-2).
Scavenge pump assembly removed (para 7-16).
Control valve module removed (para 7-10).
Torque converter removed (para 7-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Pliers, Retaining Ring (Item 37, Appendix B)
Suitable container [33 qt (31 L) capacity]
Caliper, Vernier (Item 8, Appendix B)
Straight Edge (Item 61, Appendix B)
Caliper Set, Micrometer, Outside (Item 7, Appendix B)
Indicator, Dial (Item 30, Appendix B)

Tools and Special Tools (Cont)
Caliper, Micrometer, Inside (Item 6, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Gage, Profile (TM 9-2320-365-20)

Materials/Parts
Gasket (Item 32, Appendix F)
Gasket (Item 37, Appendix F)
Gasket (Item 38, Appendix F)
Lubricating Oil, Engine (Item 44, Appendix C)
Cloth, Abrasive (Item 23, Appendix C)

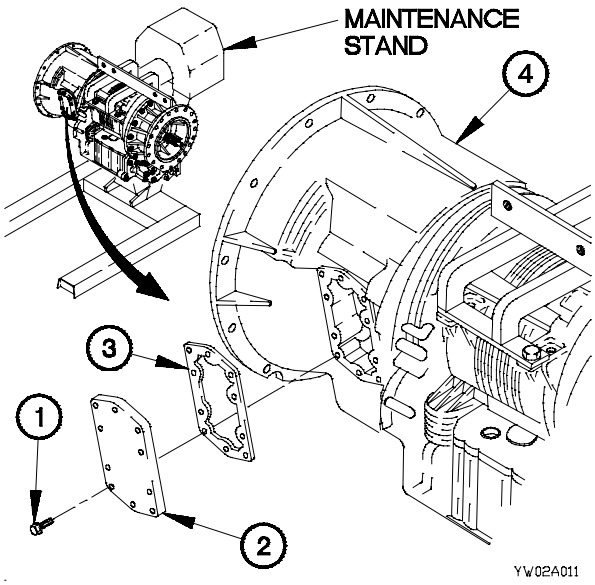
Personnel Required
(2)

a. Disassembly

NOTE

Perform step (1) if transmission is equipped with PTO cover.

(1) Remove 10 bolts (1), PTO cover (2) and gasket (3) from torque converter housing (4). Discard gasket.



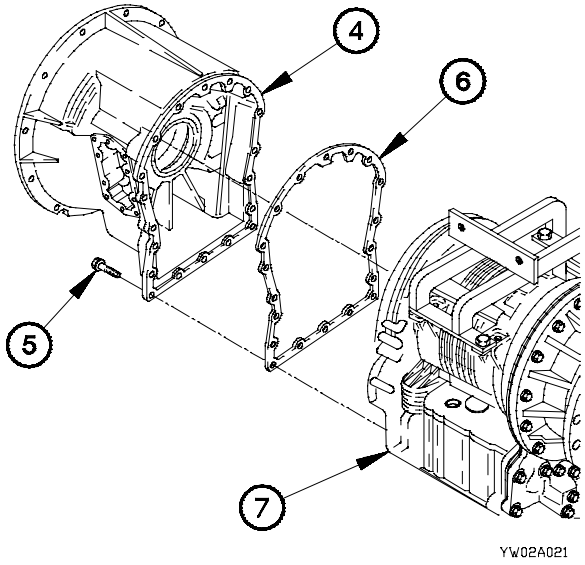
WARNING

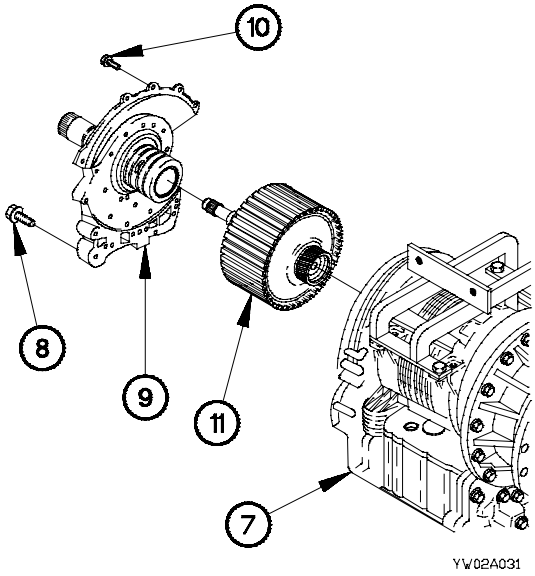
Torque converter housing weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (2) requires the aid of an assistant.

(2) Remove 20 bolts (5), torque converter housing (4), and gasket (6) from main housing (7). Discard gasket.





(3) Remove six bolts (8) from front support charging pump (9).

(4) Remove five bolts (10) from front support charging pump (9).

(5) Remove front support charging pump (9) and rotating clutch (11) from main housing (7).

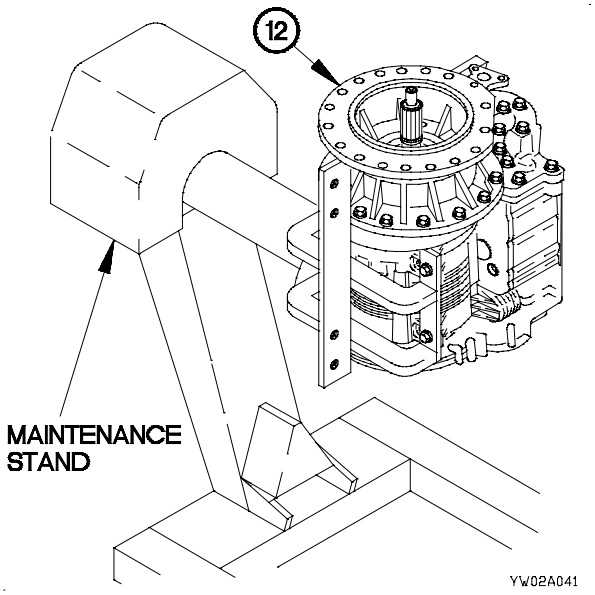
CAUTION

Hold main shaft in place while removing adapter housing. Failure to comply may result in damage to equipment.

NOTE

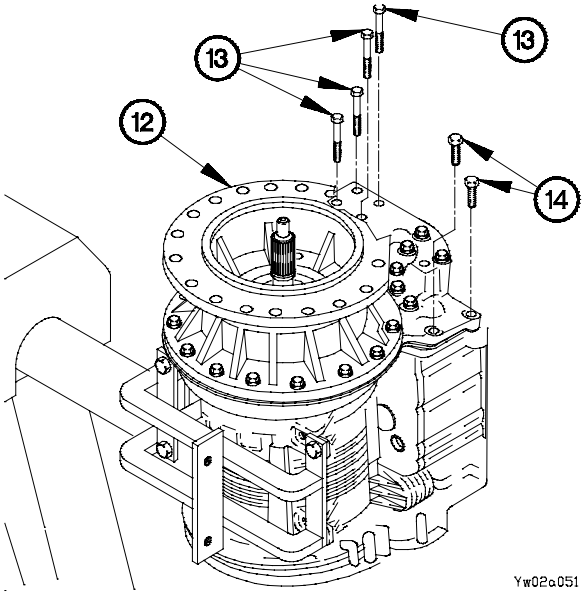
Steps (6) through (9) requires the aid fo an assistant.

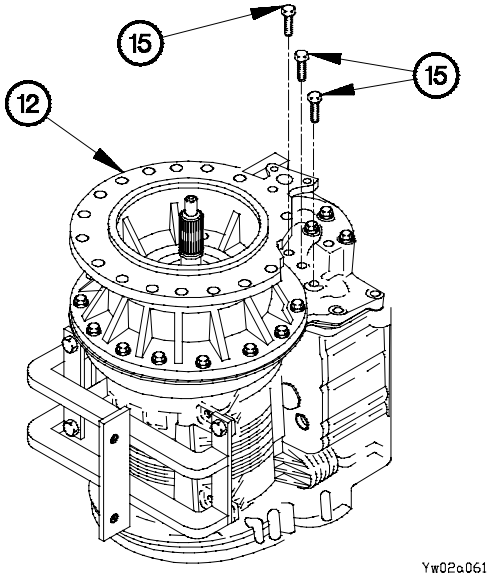
(6) Position transmission with adapter housing (12) facing up.



21-2. TRANSMISSION REPAIR (CONT)

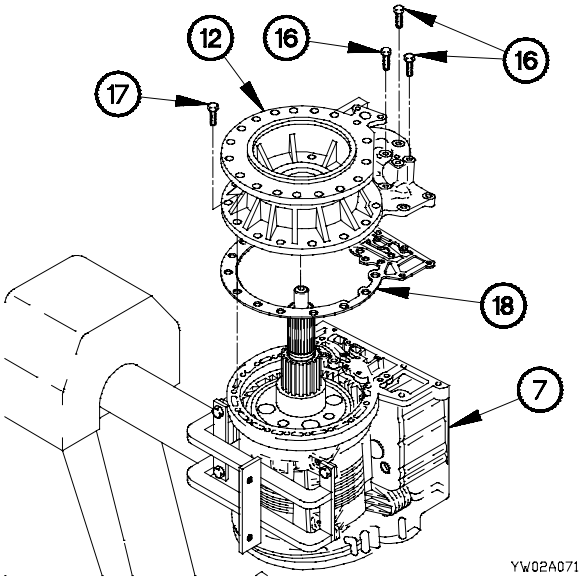
(7) Remove four bolts (13) and two bolts (14) from adapter housing (12).





(8) Remove three bolts (15) from adapter housing (12).

(9) Remove three bolts (16), 15 bolts (17), adapter housing (12), and gasket (18) from main housing (7). Discard gasket.



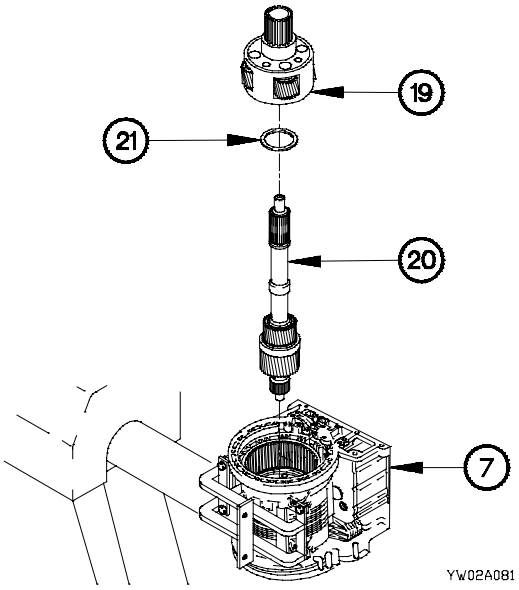
(10) Remove P3 planetary (19) from main housing (7).

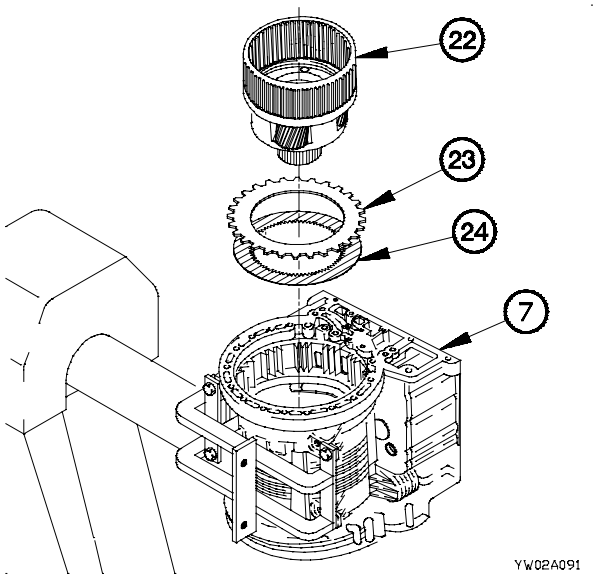
(11) Remove main shaft (20) from main housing (7).

NOTE

Perform step (12) if shim is installed on main shaft.

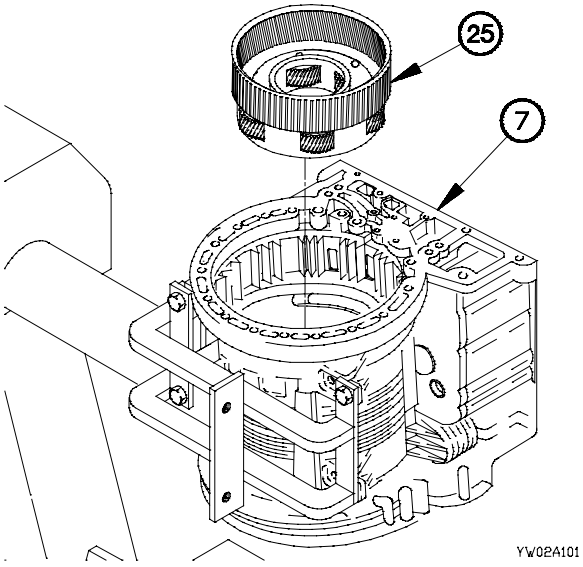
(12) Remove shim (21) from main shaft (20).





(13) Remove P2 planetary (22) from main housing (7).

(14) Remove eight C5 clutch reaction plates (23) and seven C5 clutch friction plates (24) from main housing (7).



(15) Remove P1 planetary (25) from main housing (7).

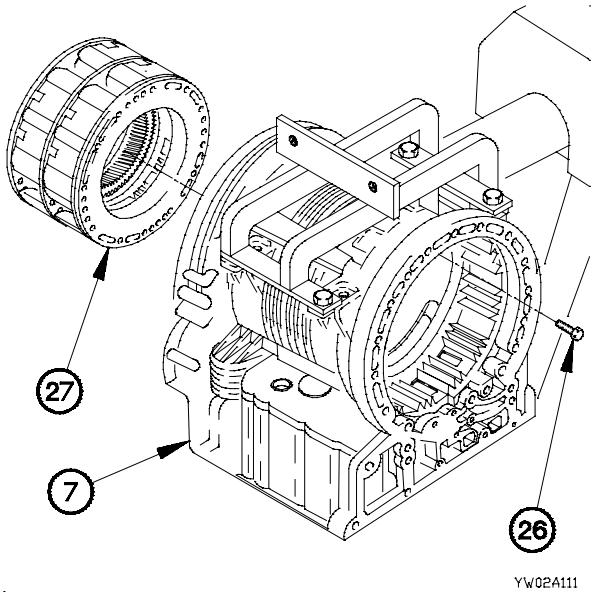
21-2. TRANSMISSION REPAIR (CONT)

CAUTION

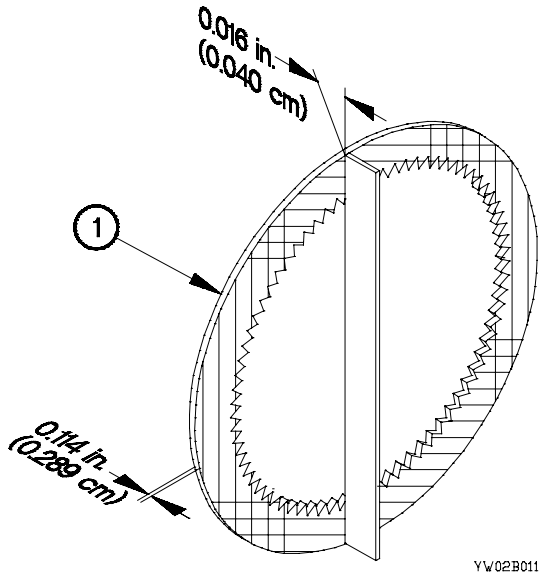
The main housing module must be horizontal before removing C3 and C4 clutch module. Failure to comply may result in damage to equipment.

(16) Position transmission with main housing (7) in horizontal position.

(17) Remove 12 bolts (26), and C3 and C4 clutch (27) from main housing (7).



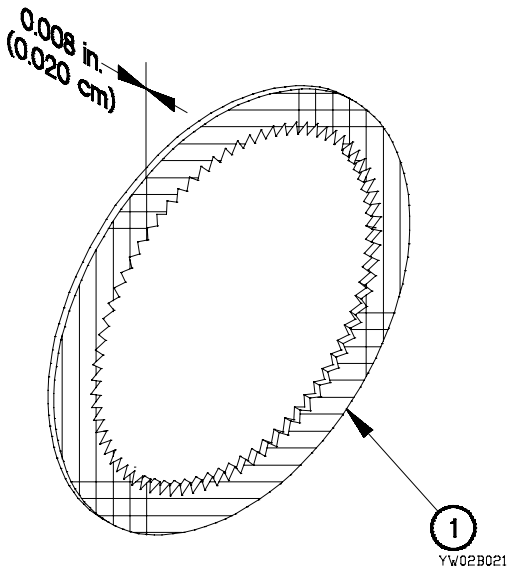
b. Inspection



(1) Measure thickness of seven C5 friction plates (1), minimum thickness 0.114 in. (0.289 cm).

(2) Lay a straight edge across each C5 friction plate (1), maximum bend in friction plate 0.016 in. (0.040 cm).

(3) Measure oil groove depth in each C5 friction plate (1), minimum oil groove depth 0.008 in. (0.020 cm).



c. Assembly.

CAUTION

Main housing must be horizontal with ground before installing C3 and C4 clutch. Failure to comply may result in damage to equipment.

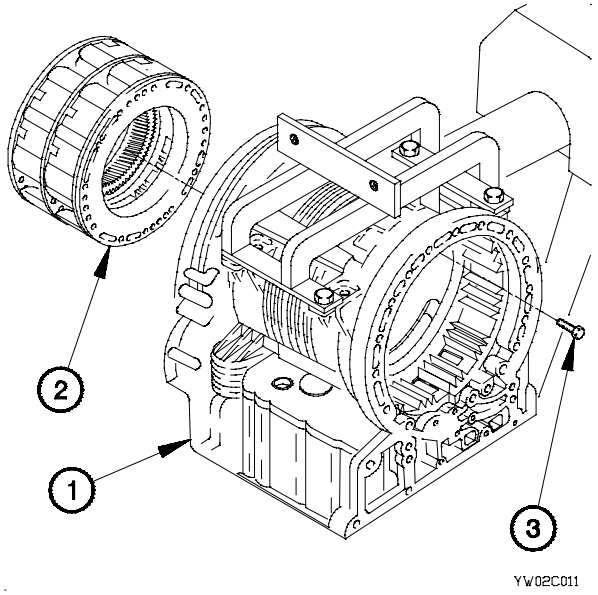
NOTE

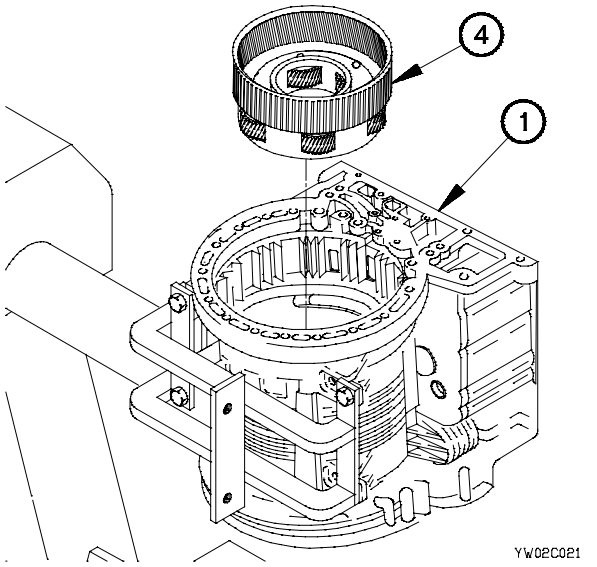
Apply lubricating oil to all parts during assembly.

(1) Position main housing (1) horizontal with ground.

(2) Position C3 and C4 clutch (2) in main housing (1) with 12 bolts (3).

(3) Tighten 12 bolts (3) to 42-50 lb-ft (57-68 N·m).

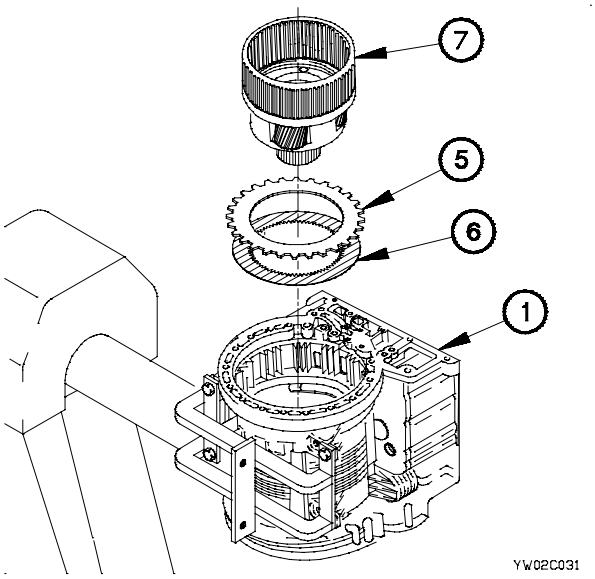




(4) Position rear of main housing (1) facing up.

(5) Install P1 planetary (4) in main housing (1).

21-2. TRANSMISSION REPAIR (CONT)

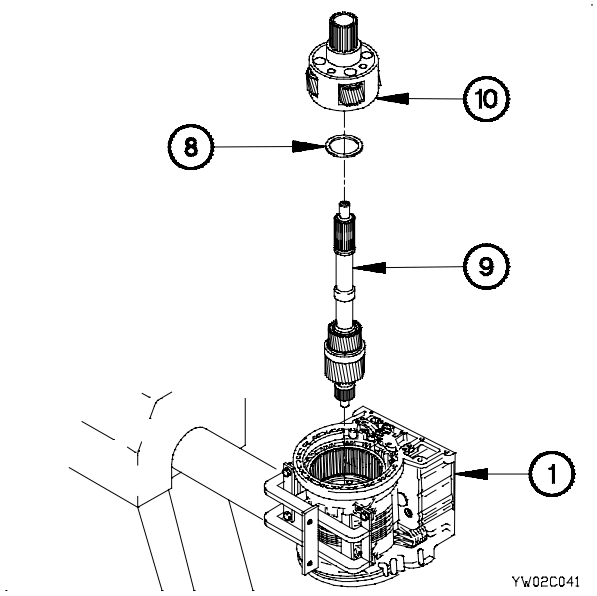


NOTE

Alternately stack eight C5 reaction plates and seven C5 friction plates.

(6) Install eight C5 reaction plates (5) and seven C5 friction plates (6) in main housing (1).

(7) Install P2 planetary (7) in main housing (1).



CAUTION

Hold main shaft during installation of adapter housing. Failure to comply may result in damage to equipment.

NOTE

- Perform step (8) if shim was removed from main shaft.
- Steps (8) through (17) require the aid of an assistant.

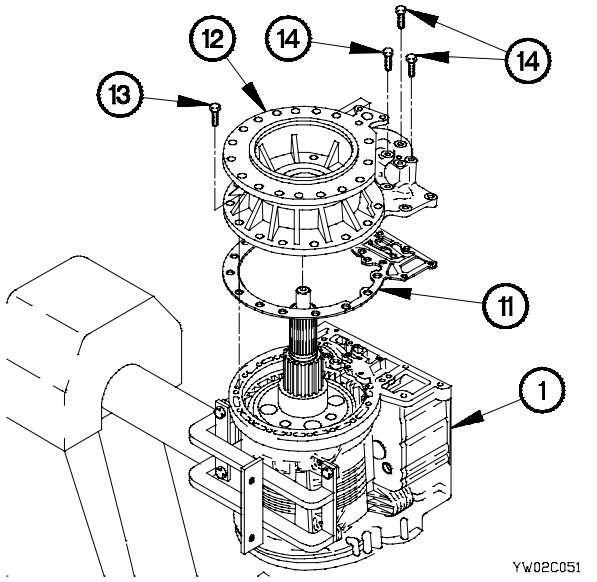
(8) Install shim (8) on main shaft (9).

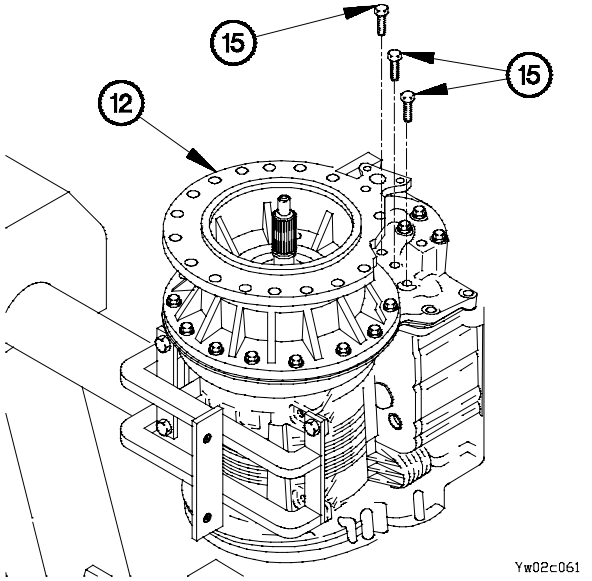
(9) Install main shaft (9) in main housing (1).

(10) Install P3 planetary (10) in main housing (1).

(11) Position gasket (11) and adapter housing (12) on main housing (1) with 15 bolts (13).

(12) Position three bolts (14) in adapter housing (12).

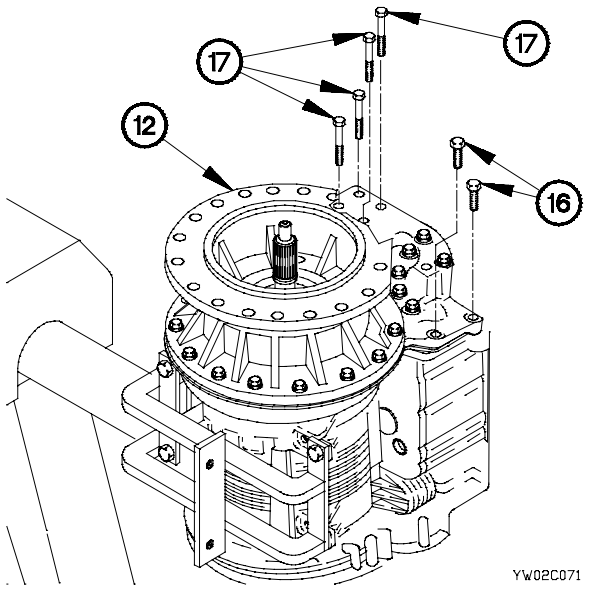




(13) Position three bolts (15) in adapter housing (12).

(14) Position two bolts (16) and four bolts (17) in adapter housing (12).

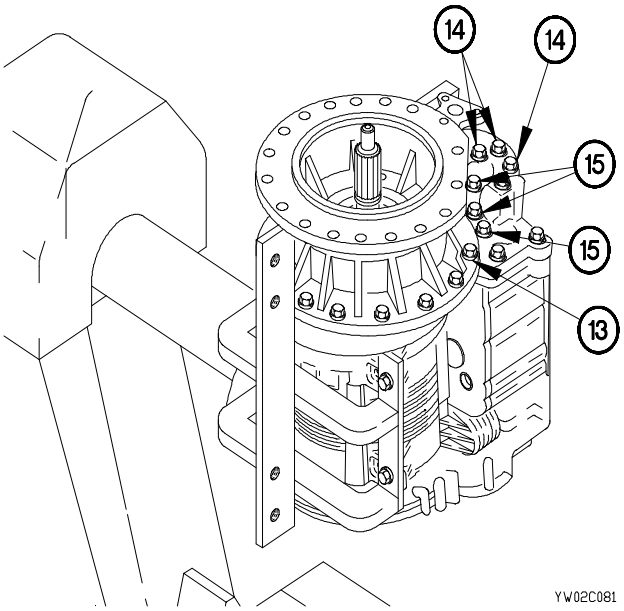
(15) Tighten four bolts (17) and two bolts (16) to 66-81 lb-ft (90-110 N·m).

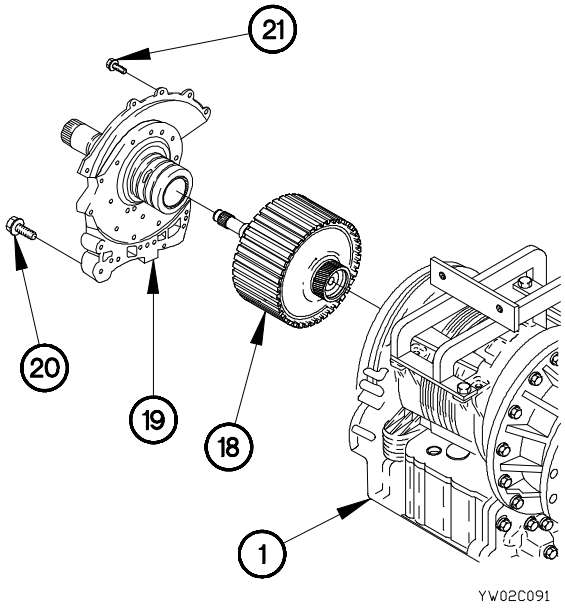


21-2. TRANSMISSION REPAIR (CONT)

(16) Tighten three bolts (14 and 15) to 66-81 lb-ft (90-110 N•m).

(17) Tighten 15 bolts (13) to 40-42 lb-ft (54-57 N•m).





(18) Position main housing (1) horizontal with ground.

NOTE

Step (19) requires the aid of an assistant.

(19) Install rotating clutch (18) in main housing (1).

(20) Position front support pump (19) on main housing (1) with five bolts (20) and six bolts (21).

(21) Tighten five bolts (20) and six bolts (21) to 42-50 lb-ft (57-68 N•m).

WARNING

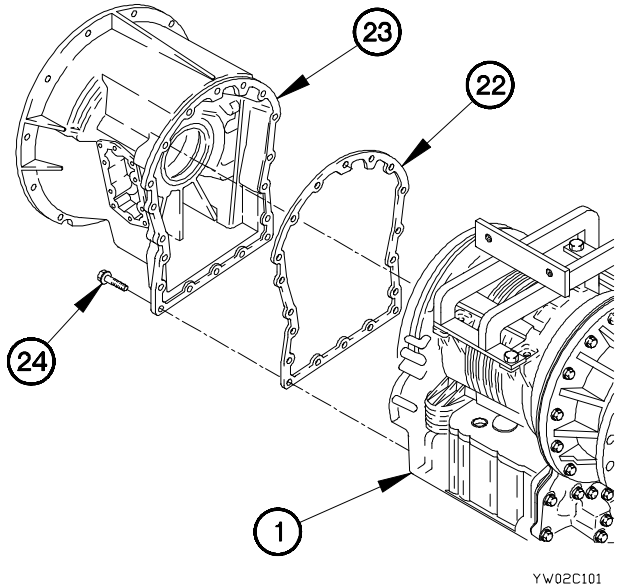
Torque converter housing weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

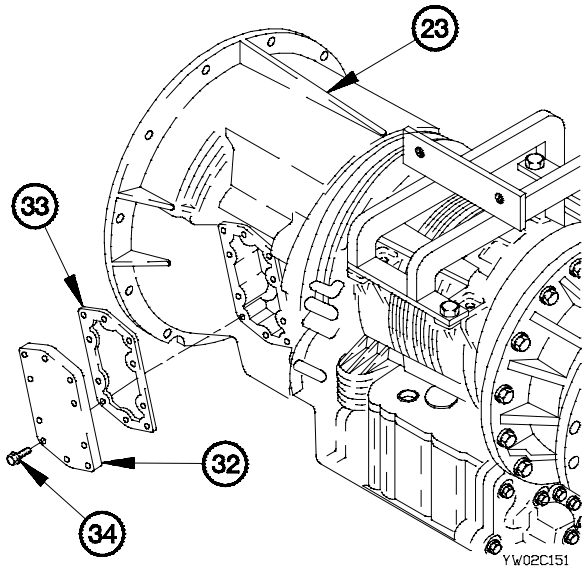
Step (22) requires the aid of an assistant.

(22) Position gasket (22) and torque converter housing (23) on main housing (1) with 20 bolts (24).

(23) Tighten 20 bolts (24) to 42-50 lb-ft (57-68 N•m).



All data on pages 21-11 and 21-12, including pages 21-11 and 21-12 deleted.



NOTE

Perform steps (36) through (38) if PTO cover was removed.

(36) Position PTO cover (32) and gasket (33) on torque converter housing (23).

(37) Position 10 bolts (34) in PTO cover (32).

(38) Tighten 10 bolts (34) to 42-50 lb-ft (57-68 N·m).

d. Follow-On Maintenance.

(1) Install torque converter (para 7-7).

(2) Install control valve module (para 7-10).

(3) Install scavenge assembly pump (7-16).

(4) Install transfer case module (para 22-2).

(5) Remove transmission from maintenance stand (para 7-5).

End of Task.

21-3. FRONT SUPPORT/CHARGING PUMP MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Puller Kit, Universal (Item 43, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

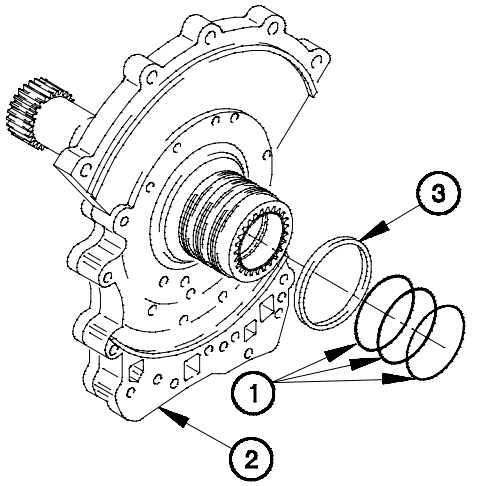
Tools and Special Tools (Cont)
Gloves, Rubber (Item 23, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-365-20)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Gasket (3) (Item 31, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

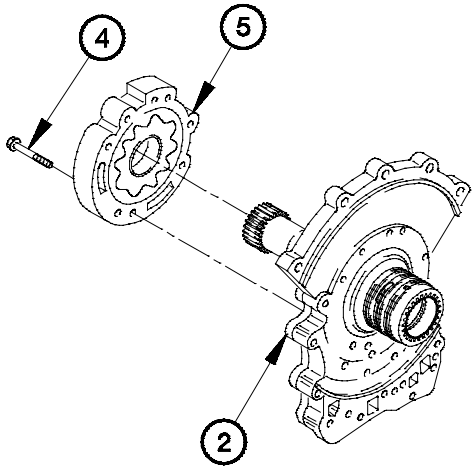
a. Disassembly.

(1) Remove three gaskets (1) from front support (2). Discard gaskets

(2) Remove bearing (3) from front support (2).



YW03A011



YW03A021

NOTE

Perform step (3) on pump housings not equipped with a main relief valve.

(3) Remove eight screws (4) and pump housing (5) from front support (2). Discard pump housing.

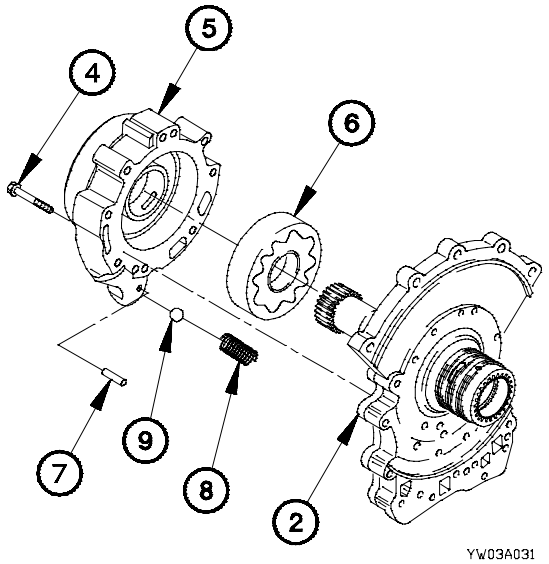
NOTE

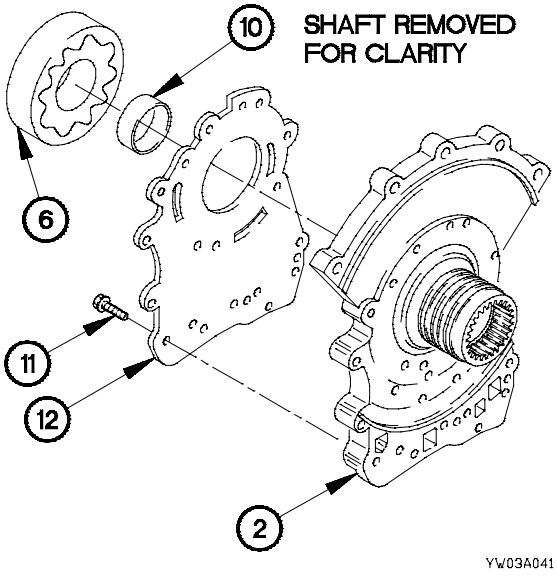
Perform step (4) through (6) on pump housings equipped with a main relief valve.

(4) Remove eight screws (4) and pump housing (5) from front support (2).

(5) Remove gear (6) from pump housing (5).

(6) Remove pin (7), spring (8), and ball (9) from pump housing (5).





(7) Remove bushing (10) from gear (6).

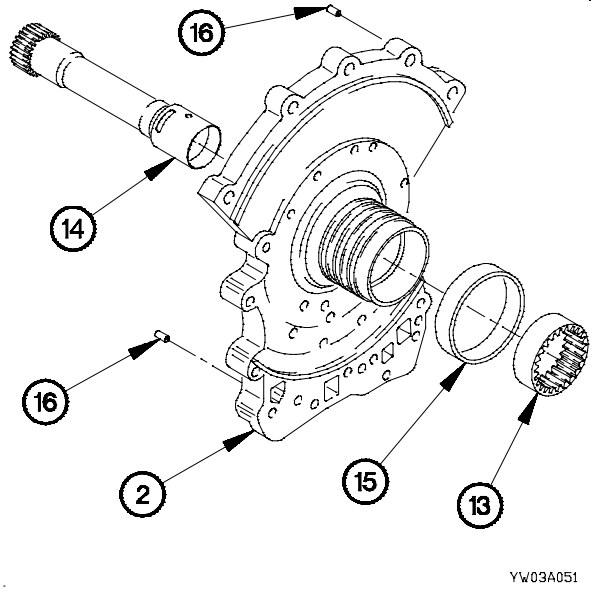
(8) Remove 10 bolts (11) and wear plate (12) from front support (2).

(9) Remove roller bearing (13) from front support (2).

(10) Remove ground sleeve (14) from front support (2).

(11) Remove spacer (15) from front support (2).

(12) Remove two dowel pins (16) from front support (2).



21-3. FRONT SUPPORT/CHARGING PUMP MODULE REPAIR (CONT)

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

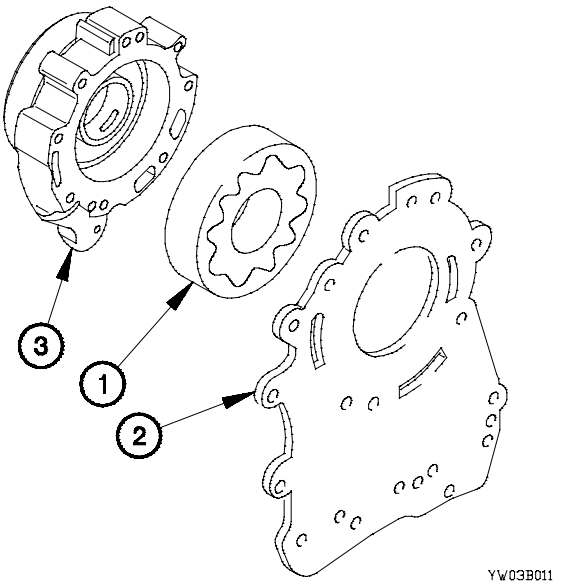
NOTE

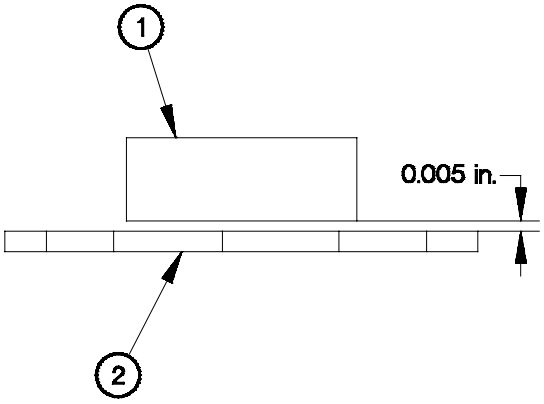
Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect gear (1) for broken teeth, pitting, and worn drive tang.

(3) Inspect wear plate (2) for scoring, nicks, and grooving.

(4) Inspect pump housing (3) for scoring, nicks, and grooving.





(5) Measure gear (1) end clearance to wear plate (2), maximum wear 0.005 in. (0.127 mm).

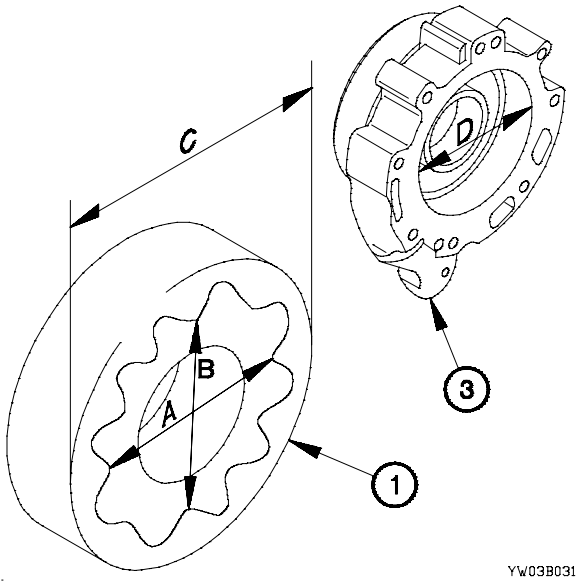
(6) Measure tooth tip clearances of gear (1) at dimension (A and B); record measurements.

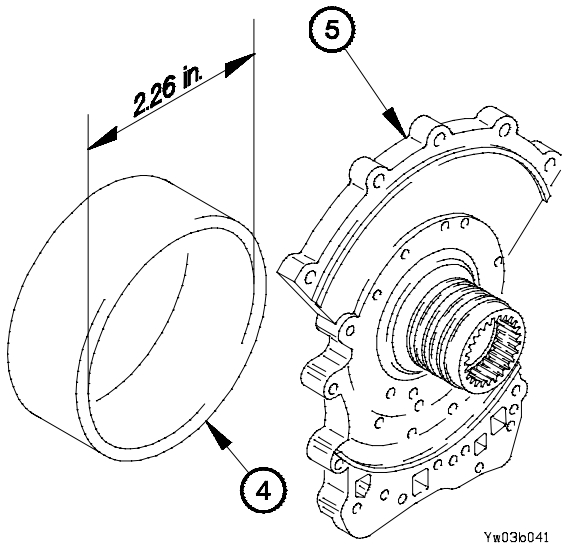
(7) Subtract dimension (B) from dimension (A), maximum difference 0.005 in. (0.127 mm).

(8) Measure outside diameter of gear (1) at dimension (C), maximum outside diameter 4.998 in. (126.95 mm); record measurement.

(9) Measure inside diameter of pump housing (3) at dimension (D); record measurement.

(10) Subtract dimension (C) from dimension (D), maximum difference 0.014 in. (0.356 mm).





(11) Measure inside diameter of bushing (4), maximum inside diameter 2.26 in. (57.4 mm).

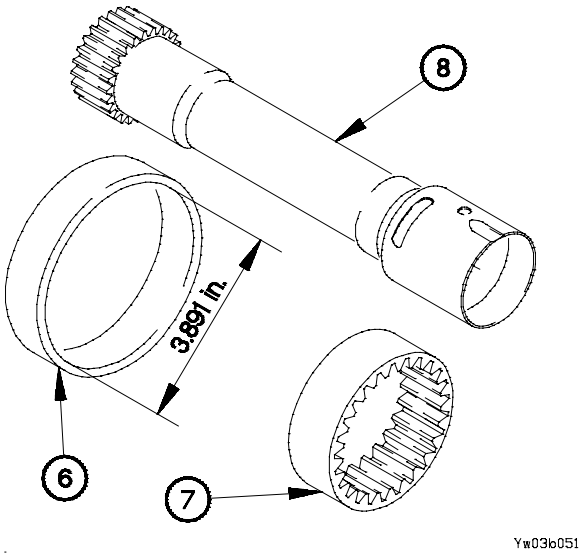
(12) Inspect front support (5) for cracks, nicks, and seal ring groove damage.

(13) Inspect spacer (6) for scoring and cracks.

(14) Measure outside diameter of spacer (6), minimum outside diameter 3.891 in. (98.83 mm).

(15) Inspect roller bearing (7) for scoring, pitting, and broken cage.

(16) Inspect ground sleeve (8) for cracks, scoring, and over heating.



21-3. FRONT SUPPORT/CHARGING PUMP MODULE REPAIR (CONT)

c. Assembly.

NOTE

Perform steps (1) and (2) if replacing pump housing not equipped with a main relief valve and cycloidal gear to pump housing equipped with main relief valve and cycloidal gear.

(1) Replace drive hub PN 29503970 and gear PN 29511395 with drive hub PN 29514799 and gear PN 29511395 (para 21-5).

(2) Replace converter pump PN 29503570 or 29511380 with converter pump PN 29514788 (para 7-2).

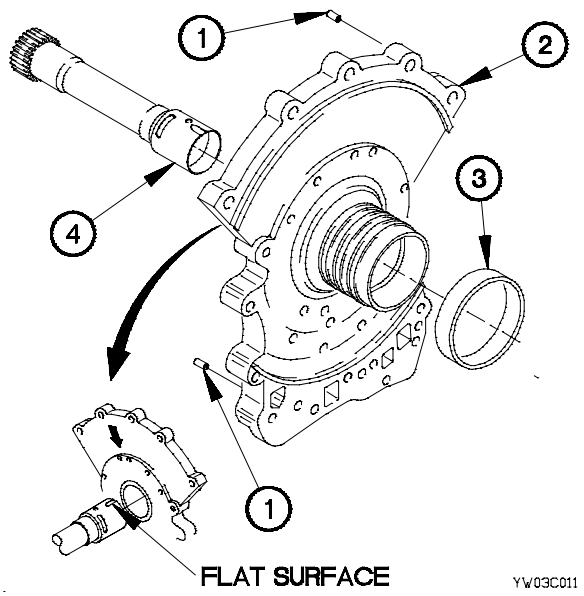
(3) Install two dowel pins (1) in front support (2).

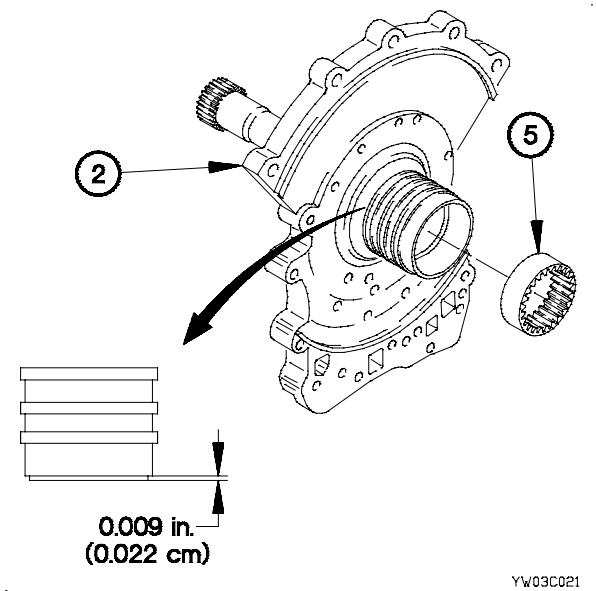
(4) Install spacer (3) on front support (2).

CAUTION

Ensure flat surface on ground sleeve is aligned with index arrow on front support. Failure to comply may result in damage to equipment.

(5) Install ground sleeve (4) in front support (2).



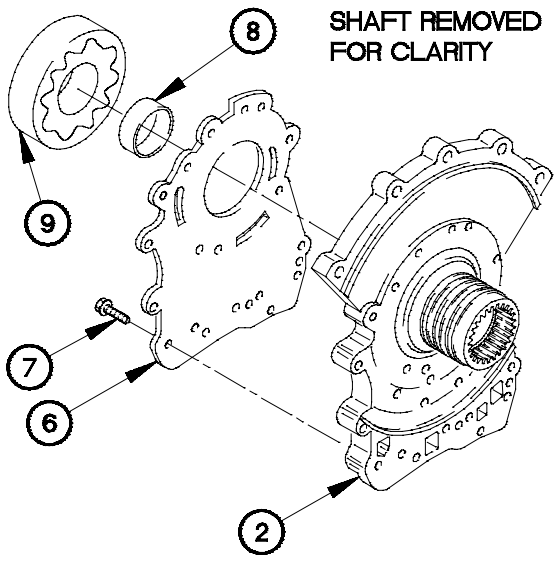


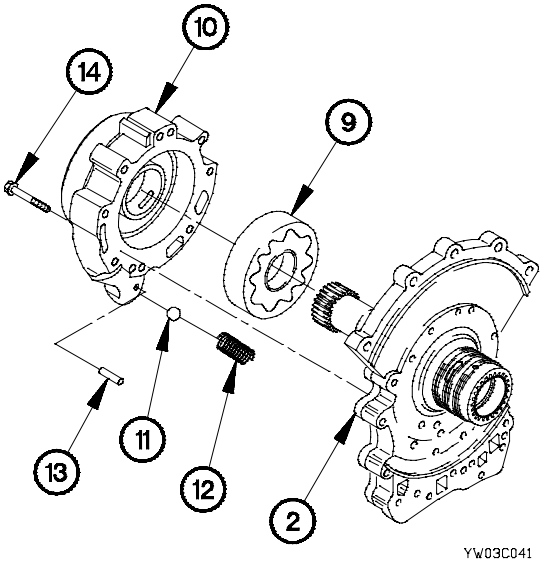
(6) Install roller bearing (5) on front support (2) flush to within 0.009 in. (0.022 cm) of top edge of front support (2).

(7) Position wear plate (6) on front support (2) with 10 bolts (7).

(8) Tighten 10 bolts (7) to 42-50 lb-ft (57-68 N·m).

(9) Install bushing (8) in gear (9).





(10) Install gear (9) in pump housing (10).

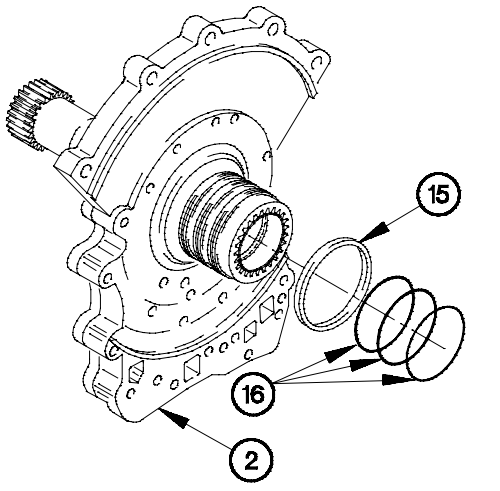
(11) Install ball (11) in pump housing (10) with spring (12) and pin (13).

(12) Position pump housing (10) on front support (2) with eight screws (14).

(13) Tighten eight screws (14) to 42-50 lb-ft (57-68 N·m).

(14) Install bearing (15) on front support (2).

(15) Install three gaskets (16) on front support (2).



d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-4. ROTATING CLUTCH MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Inserter and Remover, Spring (TM 9-2320-365-20)
Bushing Driver Set (TM 9-2320-365-20)
Handle, Drive (TM 9-2320-365-20)
Caliper, Vernier (Item 8, Appendix B)
Straight Edge (Item 61, Appendix B)
Pliers, Retaining Ring (Item 38, Appendix B)
Pliers, Retaining Ring (Item 37, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

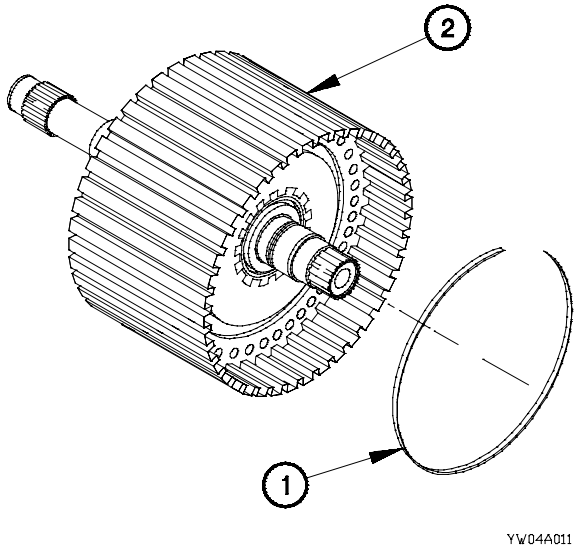
Materials/Parts
Packing, Preformed (Item 171, Appendix F)
Parts Kit, Seal Replacement (Item 222, Appendix F)
Sealring (Item 278, Appendix F)
Sealring (Item 277, Appendix F)
Sealring (Item 276, Appendix F)
Sealring (Item 274, Appendix F)
Sealring (Item 275, Appendix F)
Rag, Wiping (Item 59, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Cloth, Abrasive (Item 23, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)

a. Disassembly.

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Remove retaining ring (1) from clutch assembly (2).



(2) Remove spur gear (3) from clutch assembly (2).

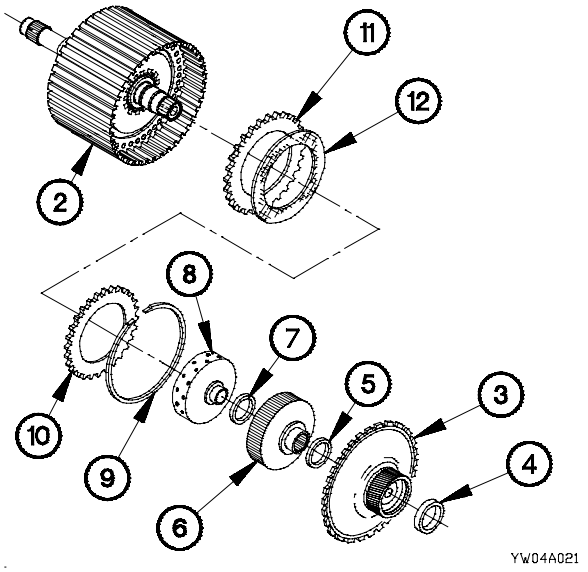
(3) Remove bushing (4) from spur gear (3).

(4) Remove thrust bearing (5) from clutch assembly (2).

(5) Remove C2 drive hub (6) from clutch assembly (2).

(6) Remove thrust bearing (7) from C2 drive hub (6).

(7) Remove C1 drive hub (8) from clutch assembly (2).



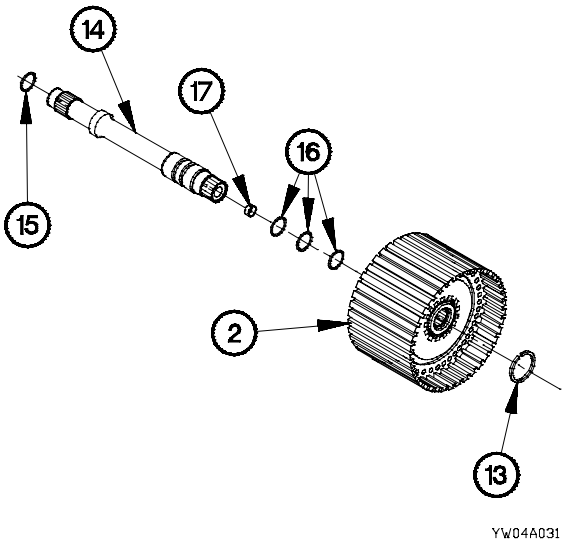
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(8) Remove retaining ring (9) from clutch assembly (2).

(9) Remove clutch disk (10) from clutch assembly (2).

(10) Remove six clutch disk (11) and intermediate plates (12) from clutch assembly (2).



(11) Remove retaining ring (13) from shaft (14).

(12) Remove shaft (14) from clutch assembly (2).

(13) Remove preformed packing (15), three sealrings (16), and bushing sleeve (17) from shaft (14). Discard sealrings and preformed packing.

21-4. ROTATING CLUTCH MODULE REPAIR (CONT)

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

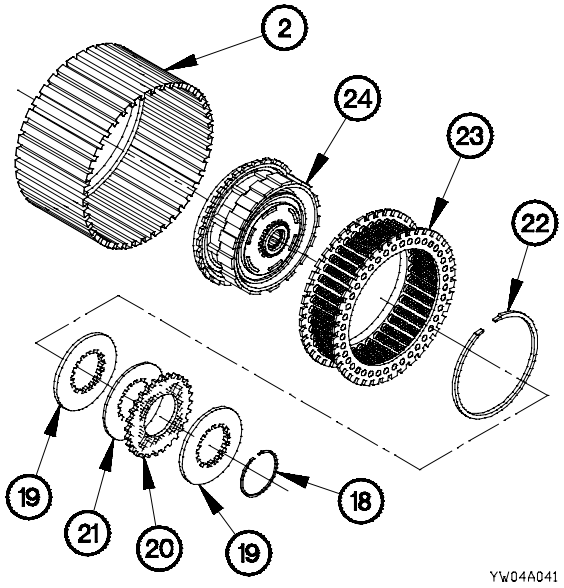
(14) Remove retaining ring (18) from clutch assembly (2).

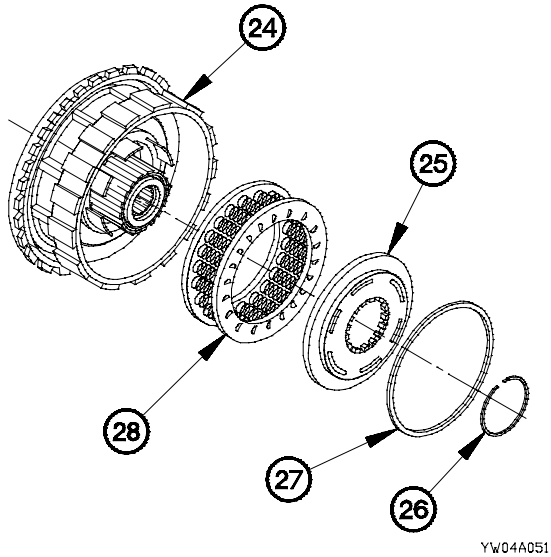
(15) Remove two C1 pressure plates (19), six friction plates (20), and five reaction plates (21) from clutch assembly (2).

(16) Remove retaining ring (22) from clutch assembly (2).

(17) Remove C2 spring (23) from clutch assembly (2).

(18) Remove C2 piston (24) from clutch assembly (2).





(19) Compress balance piston (25) to access retaining ring (26).

(20) Remove retaining ring (26) from C2 piston (24).

(21) Remove sealring (27) and C1 balance piston (25) from C2 piston (24). Discard sealring.

(22) Remove C1 spring (28) from C2 piston (24).

(23) Remove thrust bearing (29) from clutch hub (30).

(24) Remove C2 piston (24) from clutch hub (30).

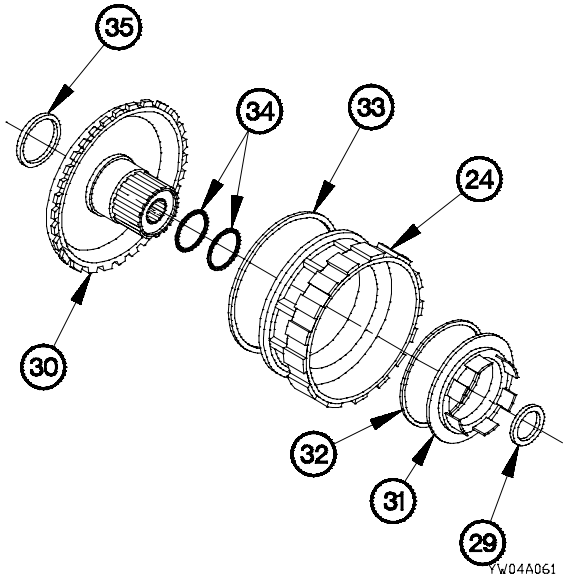
(25) Remove C1 piston (31) from C2 piston (24).

(26) Remove sealring (32) from C1 piston (31). Discard sealring.

(27) Remove sealring (33) from C2 piston (24). Discard sealring.

(28) Remove two sealrings (34) from gear (30). Discard sealrings.

(29) Remove bushing (35) from gear (30).

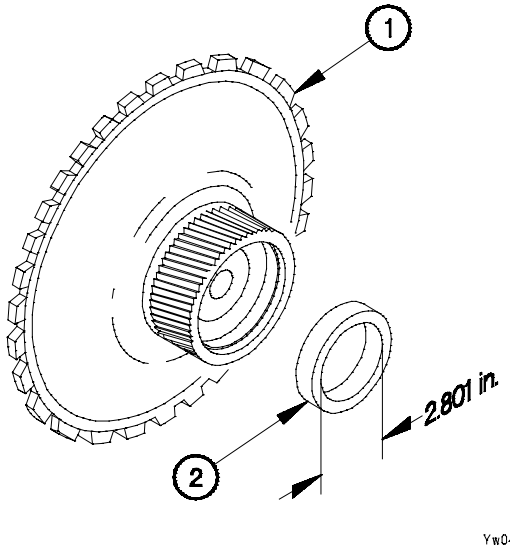


b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**



(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect spur gear (1) for broken teeth, pitting, and weld cracks.

(3) Inspect bushing (2) for scoring and burrs.

(4) Measure inside diameter of bushing (2), maximum inside diameter 2.801 in. (71.14 mm).

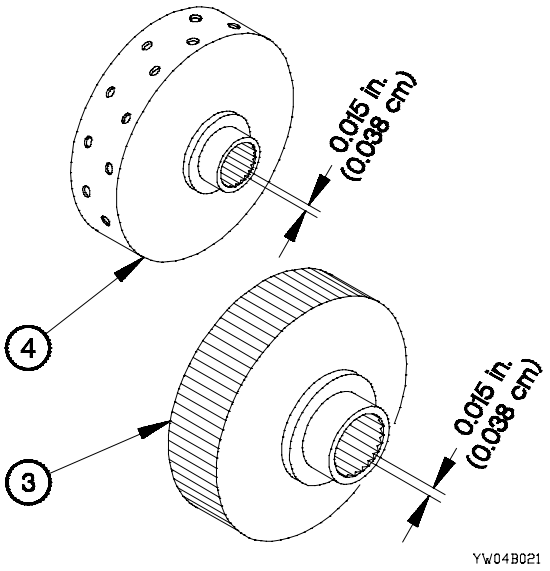
21-4. ROTATING CLUTCH MODULE REPAIR (CONT)

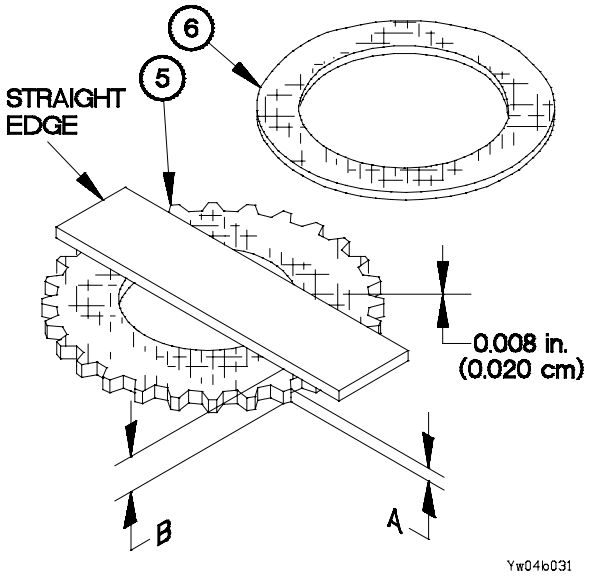
(5) Inspect spline of C2 drive hub (3) for cracks and burrs.

(6) Inspect spline of C1 drive hub (4) for cracks and burrs.

(7) Measure spline wear on C2 drive hub (3), maximum distance between splines is 0.015 in. (0.038 cm).

(8) Measure spline wear on C1 drive hub (4), maximum distance between splines is 0.015 in. (0.038 cm).





(9) Measure thickness (A) of each C1 friction plate (5), minimum thickness 0.087 in. (0.220 cm).

(10) Lay straight edge across each C1 friction plate (5), subtract measurement (B) from (A), maximum bend in friction plate 0.016 in. (0.040 cm).

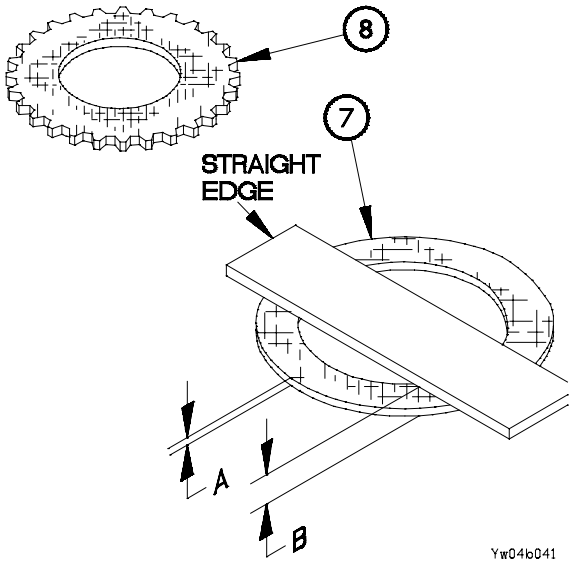
(11) Perform steps (9) and (10) on six intermediate plates (6).

(12) Measure oil groove depth of each C1 friction plate (5), minimum depth 0.008 in. (0.020 cm).

(13) Measure thickness (A) of each C1 reaction plate (7) (steel plate), minimum thickness 0.095 in. (0.241 cm).

(14) Lay straight edge across each C1 reaction plate (7), subtract measurement (B) from (A), maximum bend in reaction plate 0.016 in. (0.040 cm).

(15) Perform steps (13) and (14) on six clutch disks (8).



(16) Inspect two C1 pressure plates (9) for scoring.

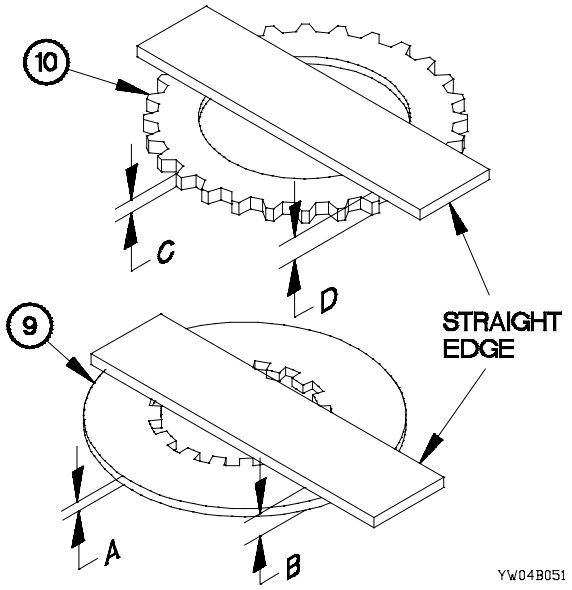
(17) Measure thickness (A) of each C1 pressure plate (9), minimum thickness at wear surface 0.246 in. (6.248 mm).

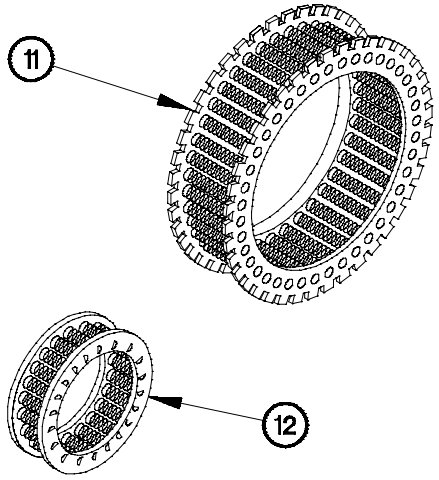
(18) Lay straight edge across each C1 pressure plate (9), subtract measurement (B) from (A), maximum bend in pressure plate 0.006 in. (0.152 mm).

(19) Inspect C2 pressure plate (10) for scoring.

(20) Measure thickness (C) of C2 pressure plate (10), minimum thickness at wear surface 0.246 in. (6.248 mm).

(21) Lay straight edge across C2 pressure plate (10), subtract measurement (D) from (C), maximum bend in pressure plate 0.018 in. (0.457 mm).





(22) Inspect C2 spring (11) for broken or missing springs.

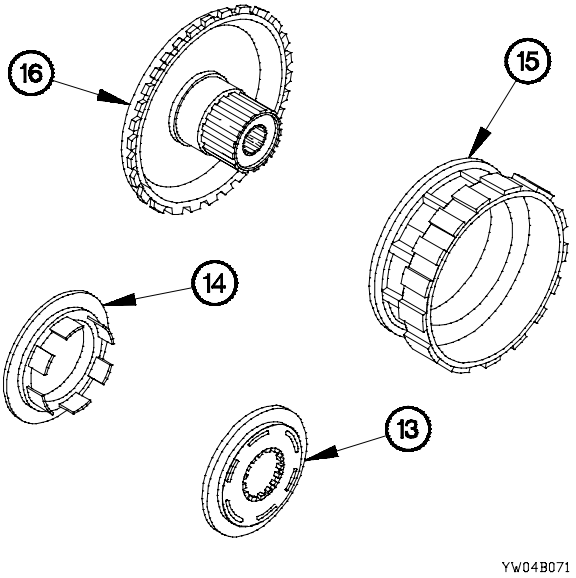
(23) Inspect C1 spring (12) for broken or missing springs.

(24) Inspect balance piston (13) for scuffing, nicks, and burrs.

(25) Inspect C1 piston (14) for scuffing, nicks, and burrs.

(26) Inspect C2 piston (15) for scuffing, nicks, and burrs.

(27) Inspect clutch hub (16) for scuffing, nicks, and burrs.

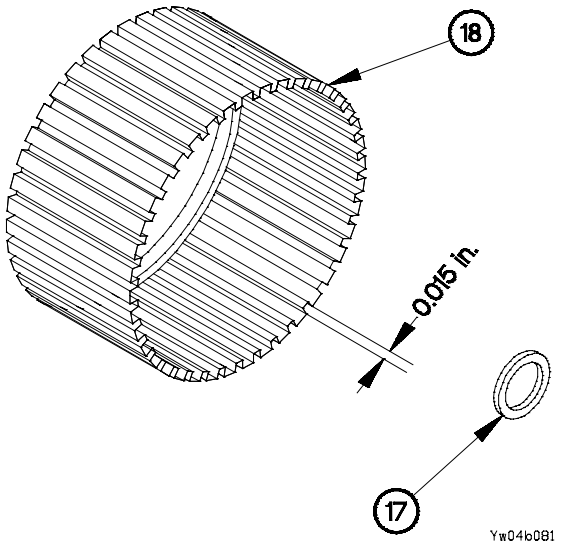


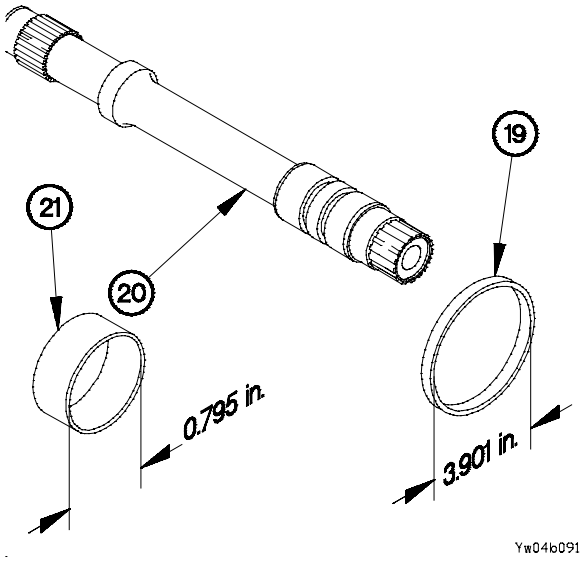
21-4. ROTATING CLUTCH MODULE REPAIR (CONT)

(28) Inspect thrust bearing (17) for scoring and damage.

(29) Inspect clutch assembly (18) for scuffing, nicks, and burrs.

(30) Measure spline wear on clutch assembly (18), maximum distance between splines 0.015 in. (0.381 mm).





(31) Measure bushing (19), maximum inside diameter of bushing is 3.901 in. (9.909 cm).

(32) Inspect shaft (20) for cracks, nicks, and scuffing.

(33) Measure inside diameter of bushing (21), maximum diameter 0.795 in. (20.193 mm).

c. Assembly.

NOTE

Apply lubricating oil to all parts during assembly.

(1) Install bushing (1) in gear (2).

(2) Install two seals (3) on gear (2).

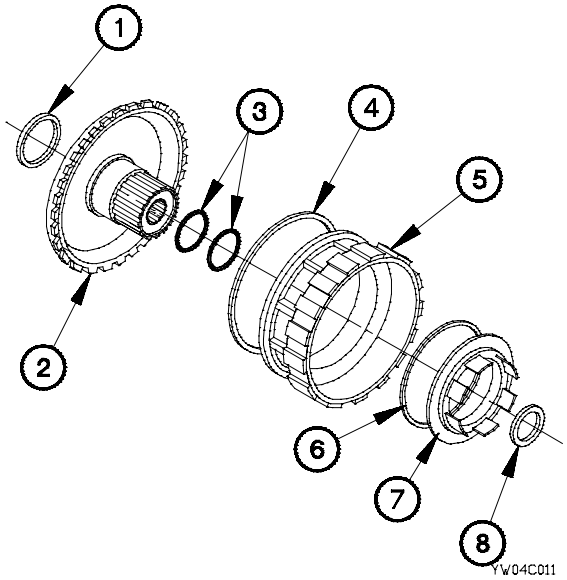
(3) Install sealring (4) on C2 piston (5).

(4) Install sealring (6) on C1 piston (7).

(5) Install C1 piston (7) in C2 piston (5).

(6) Install C2 piston (5) on gear (2).

(7) Install thrust bearing (8) in gear (2).



(8) Install C1 spring (9) in C2 piston (5).

(9) Install sealring (10) on C1 balance piston (11).

CAUTION

Ensure slots in C1 balance piston are aligned with C1 piston. Failure to comply may result in damage to equipment.

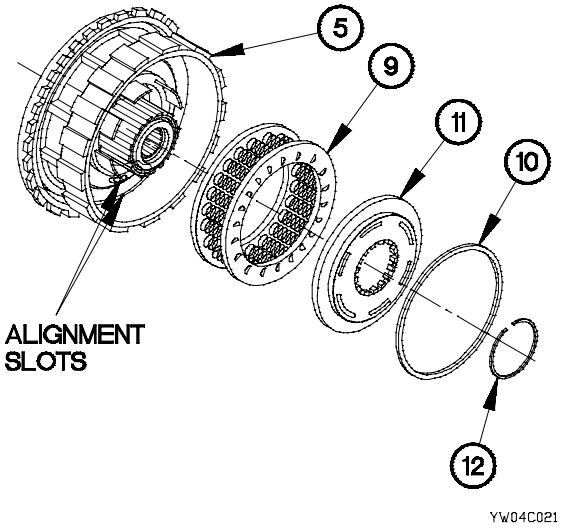
(10) Install C1 balance piston (11) in C2 piston (5).

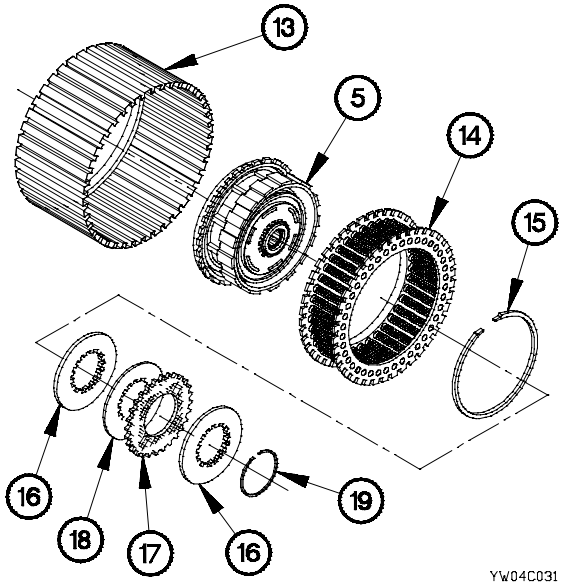
(11) Compress C1 balance piston (11) for installation of retaining ring (12).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(12) Install retaining ring (12) on C2 piston (5).





(13) Install C2 piston (5) in clutch assembly (13).

(14) Install C2 spring (14) in clutch assembly (13).

(15) Install retaining ring (15) in clutch assembly (13).

NOTE

Alternately stack friction plates and reaction plates.

(16) Install two C1 pressure plates (16), six friction plates (17), and five reaction plates (18) in clutch assembly (13).

(17) Install retaining ring (19) in clutch assembly (13).

21-4. ROTATING CLUTCH MODULE REPAIR (CONT)

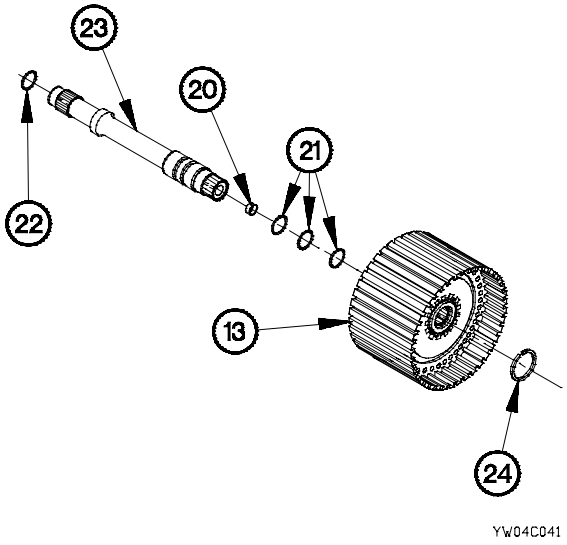
(18) Install bushing sleeve (20), three sealrings (21), and preformed packing (22) on shaft (23).

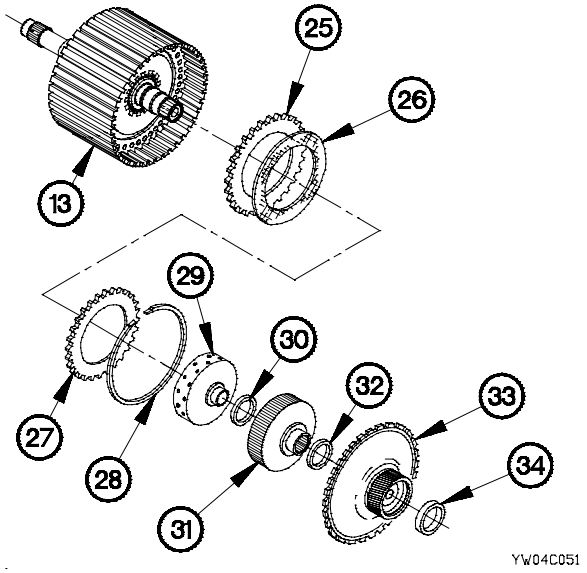
(19) Install shaft (23) in clutch assembly (13).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(20) Install retaining ring (24) on shaft (23).





NOTE

Alternately stack clutch disk and intermediate plates.

(21) Install six clutch disk (25) and intermediate plates (26) in clutch assembly (13).

(22) Install clutch disk (27) in clutch assembly (13).

(23) Install retaining ring (28) in clutch assembly (13).

(24) Install C1 drive hub (29) in clutch assembly (13).

(25) Install thrust bearing (30) in C2 drive hub (31).

(26) Install C2 drive hub (31) in clutch assembly (13).

(27) Install bushing (32) in spur gear (33).

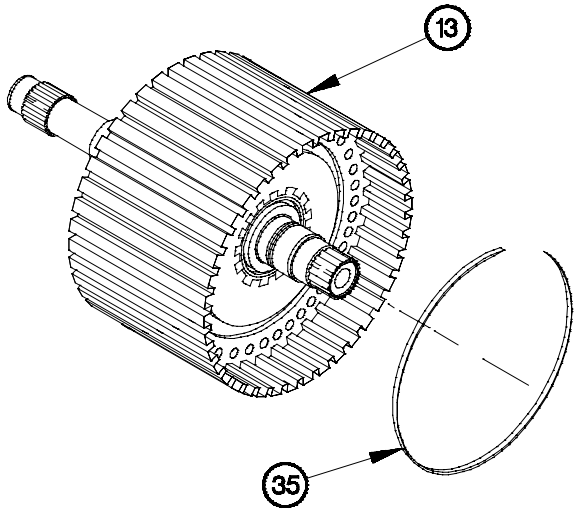
(28) Install spur gear (33) in clutch assembly (13).

(29) Install bushing (34) in spur gear (33).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(30) Install retaining ring (35) in clutch assembly (13).



d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-5. CONVERTER HOUSING MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Puller Set, Universal (Item 44, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Bushing Driver Set (TM 9-2320-365-20)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Handle, Drive (TM 9-2320-365-20)

Tools and Special Tools (Cont)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Pliers, Retaining Ring (Item 37, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Seal, Plain Encased (Item 264, Appendix F)
Sealring (Item 277, Appendix F)
Packing, Preformed (Item 177, Appendix F)
Gasket (2) (Item 31, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

a. Disassembly.

(1) Remove 10 bolts (1) from bearing retainer (2).

(2) Position two bolts (1) in threaded holes of bearing retainer (2).

CAUTION

Tighten bolts evenly to remove bearing retainer. Failure to comply may result in damage to equipment.

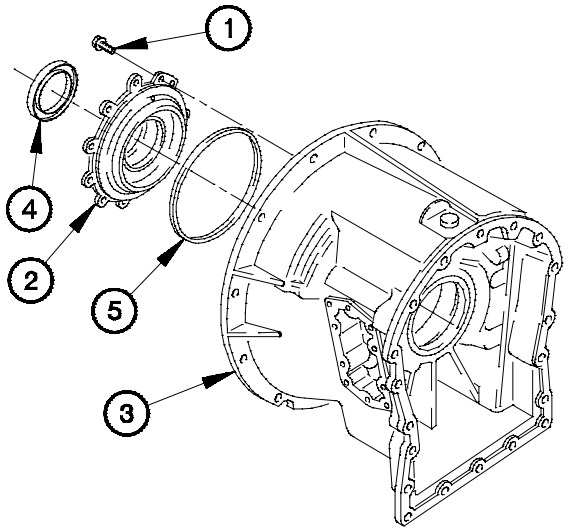
(3) Tighten two bolts (1) on bearing retainer (2).

(4) Remove bearing retainer (2) from converter housing (3).

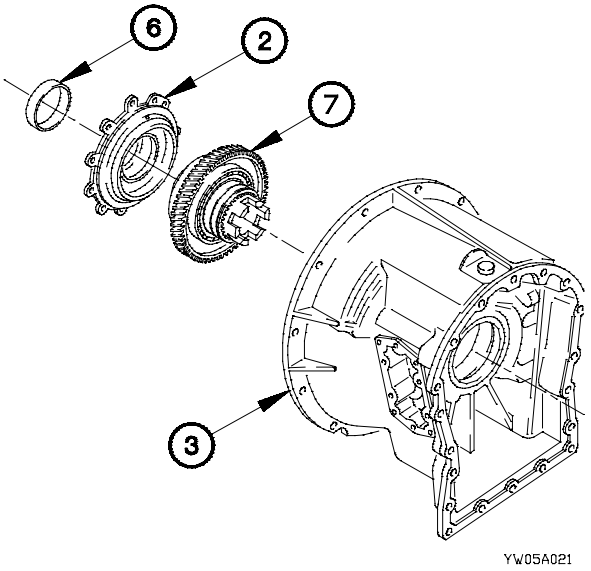
(5) Remove two bolts (1) from bearing retainer (2).

(6) Remove seal (4) from bearing retainer (2). Discard seal.

(7) Remove sealring (5) from bearing retainer (2). Discard sealring.

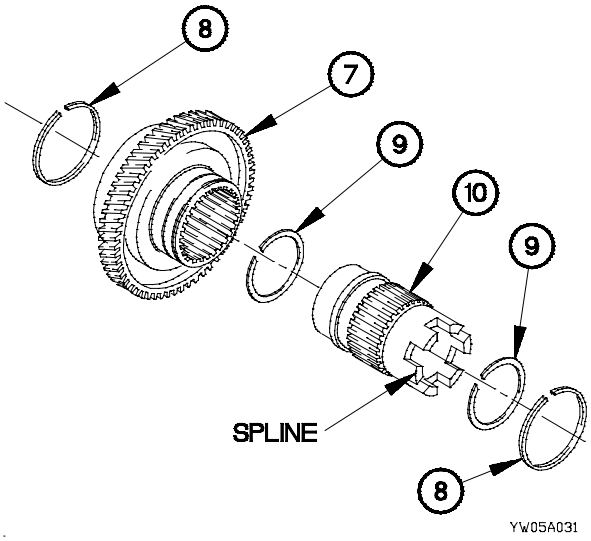


YW05A011



(8) Remove bushing (6) from bearing retainer (2).

(9) Remove gear (7) from converter housing (3).



(10) Remove two gaskets (8) from gear (7). Discard gaskets.

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

NOTE

Perform steps (11) and (12) on drive hubs with six splines.

(11) Remove two retaining rings (9) from drive hub (10).

(12) Remove drive hub (10) from gear (7). Discard drive hub and gear.

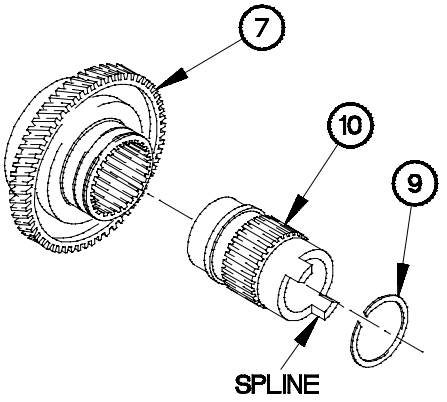
21-5. CONVERTER HOUSING MODULE REPAIR (CONT)

NOTE

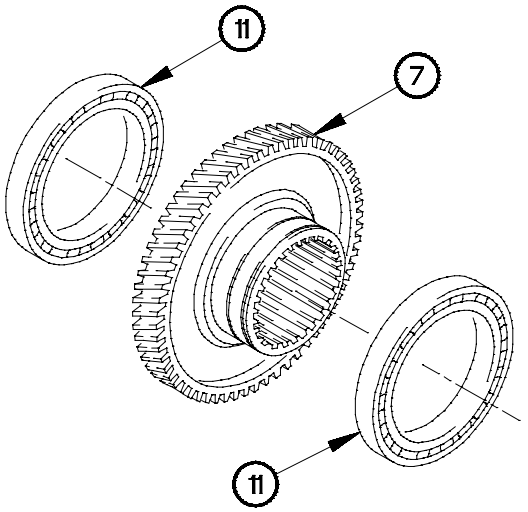
Perform steps (13) and (14) on drive hubs with two splines.

(13) Remove retaining ring (9) from drive hub (10).

(14) Remove drive hub (10) from gear (7).



YW05A041



YW05A051

(15) Remove two bearings (11) from gear (7).

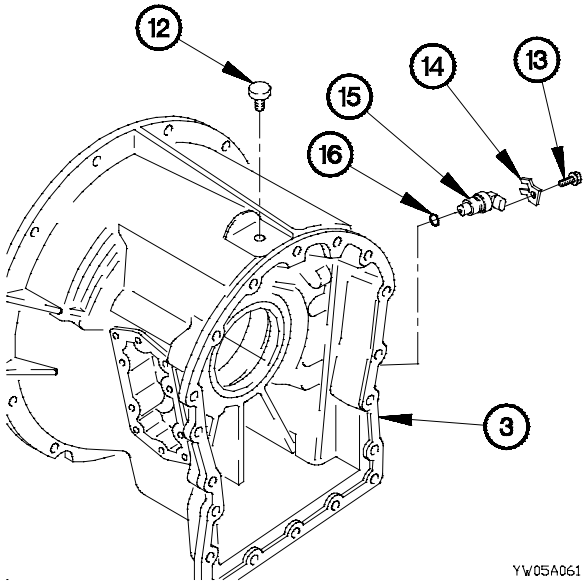
(16) Remove vent plug (12) from converter housing (3).

NOTE

If transmission is SN 6510003100 or lower and engine speed sensor PN 29503523 has never been replaced, discard engine speed sensor and replace with PN 29509637 and preformed packing PN 29503383.

(17) Remove screw (13), clip (14), and engine speed sensor (15) from converter housing (3).

(18) Remove preformed packing (16) from engine speed sensor (15). Discard preformed packing.



YW05A061

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

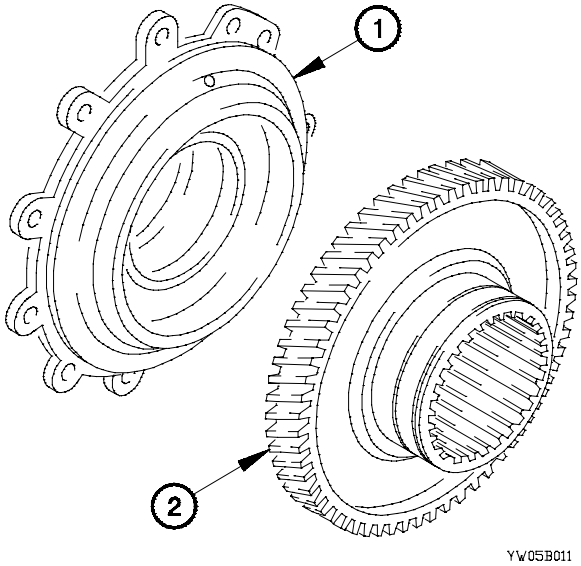
(1) Clean all metal parts with dry cleaning solvent.

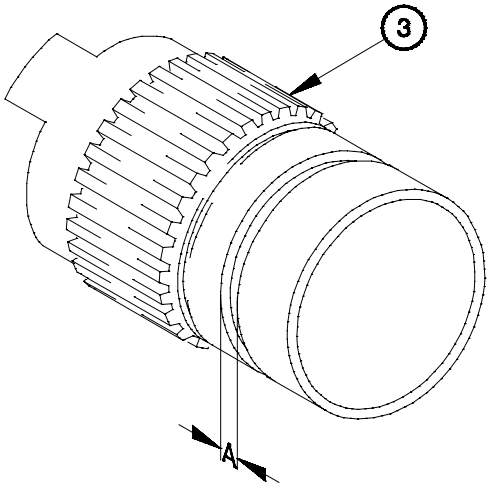
NOTE

Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect bearing retainer (1) for cracks, burrs, scoring, and grooves.

(3) Inspect gear (2) for cracks, missing or broken teeth, pitting, and any damage to sealring groove.





(4) Inspect drive hub (3) for excessive wear on drive tangs and splines.

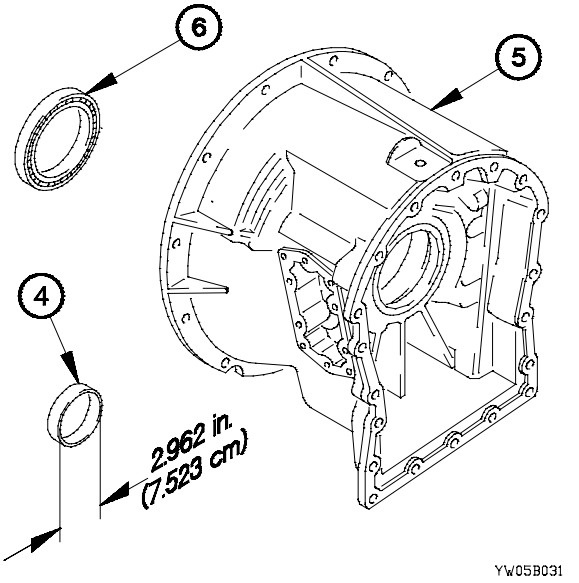
(5) Measure drive hub (3) sealring end gap (A) for maximum depth of 0.045 in. (1.143 mm).

21-5. CONVERTER HOUSING MODULE REPAIR (CONT)

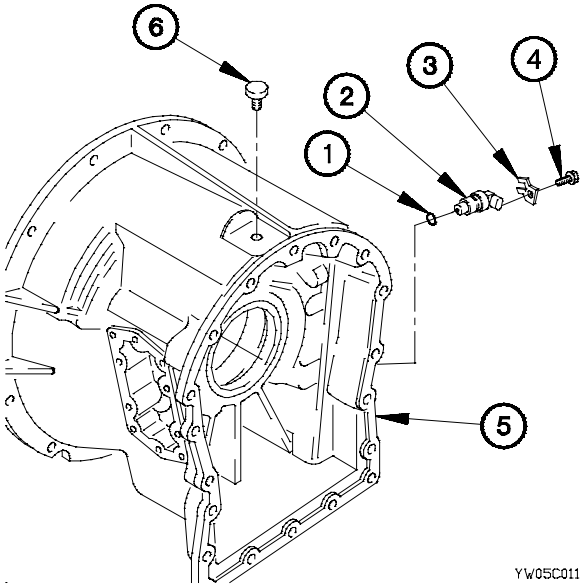
(6) Measure inside diameter of bushing (4), maximum inside diameter 2.962 in. (7.523 cm).

(7) Inspect converter housing (5) for cracks, burrs, scoring, and grooves.

(8) Inspect two bearings (6) for flat spots, scoring, grooves, nicks, burrs, and discoloration.



c. Assembly.



(1) Install preformed packing (1) on engine speed sensor (2).

(2) Install engine speed sensor (2), retainer clip (3), and screw (4) in converter housing (5).

(3) Install vent plug (6) in converter housing (5).

NOTE

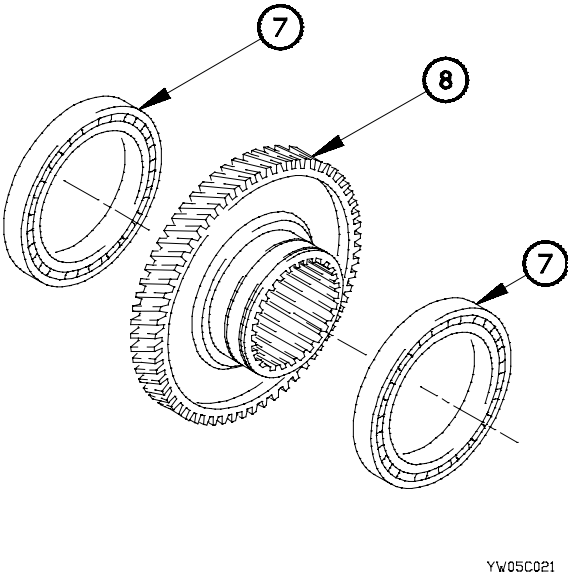
Perform steps (4) through (6) if replacing a six splined drive hub and gear with a two splined drive hub and gear.

(4) Replace cycloidal gear PN 23049376 and gear bushing PN 6881926 with cycloidal gear PN 29514537 and gear bushing PN 29514538 (para 21-3).

(5) Replace pump housing PN 29502322 with pump housing PN 29514801, ball PN 145651, spring PN 29507709, and pin PN 29516030 (para 21-3).

(6) Replace converter pump PN 29503570 or 29511380 with converter pump PN 29514788 (para 7-2).

(7) Install two bearings (7) on gear (8).



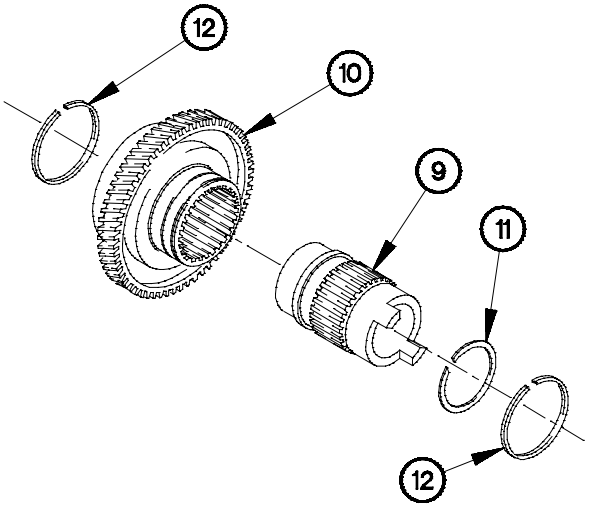
(8) Install drive hub (9) in gear (10).

WARNING

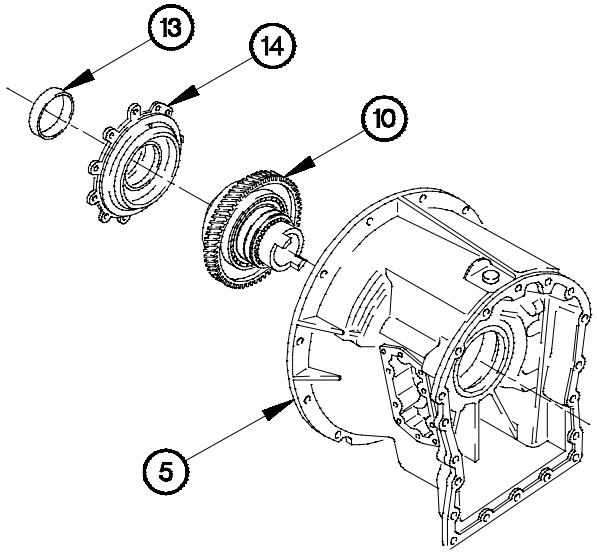
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(9) Install retaining ring (11) on drive hub (9).

(10) Install two gaskets (12) on gear (10).



YW05C031



YW05C041

(11) Install gear (10) in converter housing (5).

(12) Install bushing (13) in bearing retainer (14).

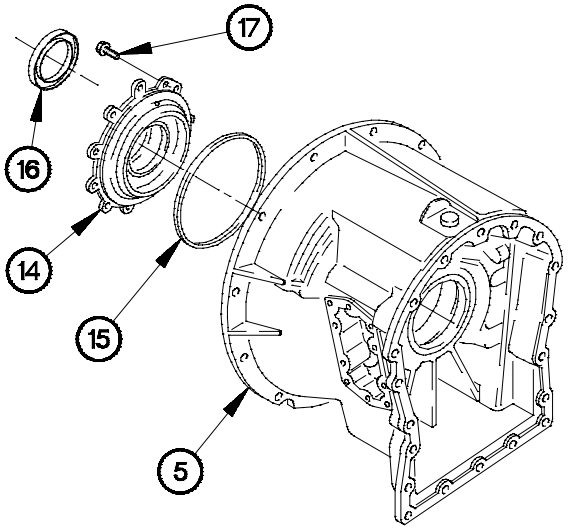
(13) Install sealring (15) on bearing retainer (14).

(14) Install seal (16) on bearing retainer (14).

(15) Install bearing retainer (14) in converter housing (5).

(16) Position 10 bolts (17) in bearing retainer (14).

(17) Tighten 10 bolts (17) to 42-50 lb-ft (57-68 N·m).



YW05C051

d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-6. ADAPTER HOUSING MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Pliers, Retaining Ring (Item 38, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Inserter and Remover, Spring (TM 9-2320-365-20)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Sealring (Item 279, Appendix F)
Sealring (Item 280, Appendix F)
Packing, Preformed (Item 178, Appendix F)
Cloth Abrasive Crocus Cloth (Item 20, Appendix C)

Personnel Required
(2)

a. Disassembly.

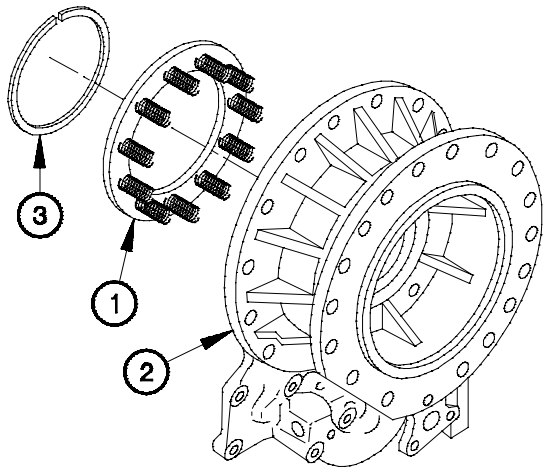
(1) Apply pressure to spring retainer (1) in adapter housing (2).

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(2) Remove retaining ring (3) from adapter housing (2).

(3) Remove spring retainer (1) from adapter housing (2).



YW06A011

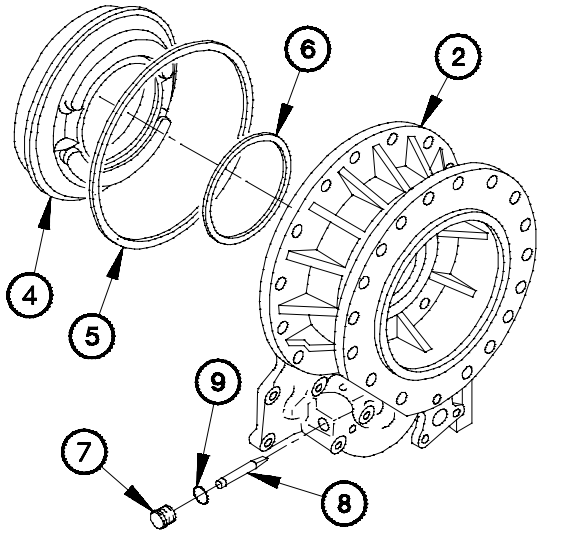
NOTE

Step (4) requires the aid of an assistant.

(4) Remove clutch piston (4), outer sealring (5), and inner sealring (6) from adapter housing (2). Discard sealrings.

(5) Remove plug (7) and strainer (8) from adapter housing (2).

(6) Remove preformed packing (9) from plug (7). Discard preformed packing.

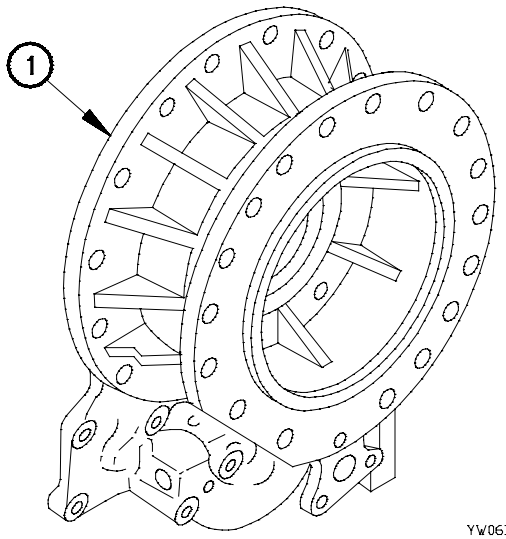


YW06A021

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**



YW06B011

(1) Clean all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection. Crocus cloth may be used to remove nicks, burrs, or scratches.

(2) Inspect adapter housing (1) for cracks, nicks, scoring, and burring.

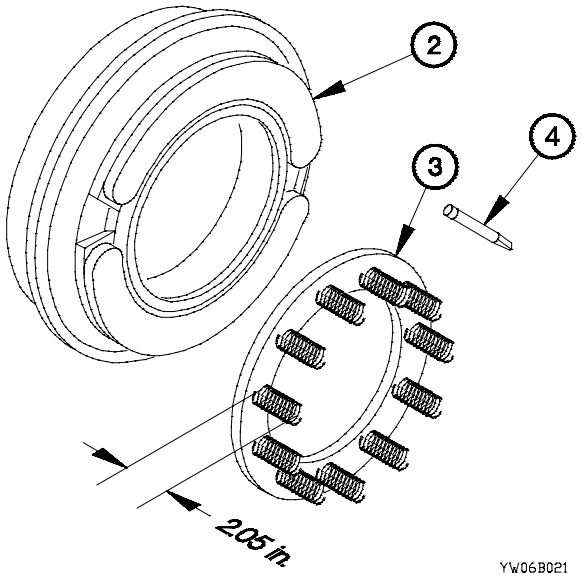
21-6. ADAPTER HOUSING MODULE REPAIR (CONT)

(3) Inspect clutch piston (2) for cracks, nicks, scoring, and burring.

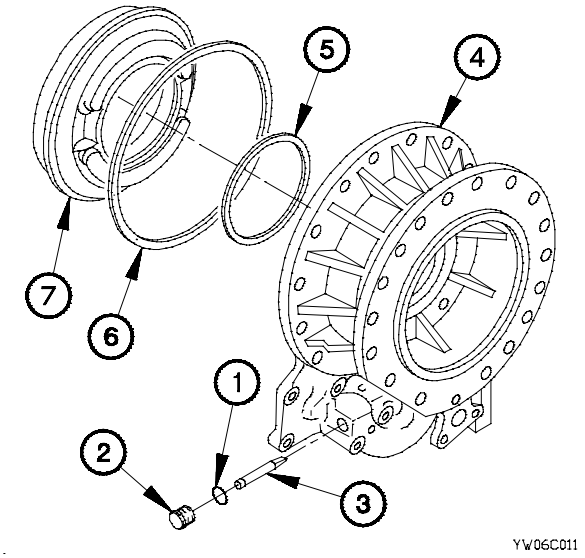
(4) Inspect spring retainer (3) for cracks, nicks, scoring, burring, and missing and broken springs.

(5) Measure length of 11 springs on spring retainer (3), minimum length is 2.05 in. (5.20 cm).

(6) Inspect strainer (4) for evidence of metallic particles and clogging.



c. Assembly.



(1) Install preformed packing (1) on plug (2).

(2) Install strainer (3) and plug (2) in adapter housing (4).

NOTE

Steps (3) through (6) require the aid of an assistant.

(3) Install inner sealring (5), outer sealring (6), and clutch piston (7) on adapter housing (4).

(4) Install spring retainer (8) in adapter housing (4).

CAUTION

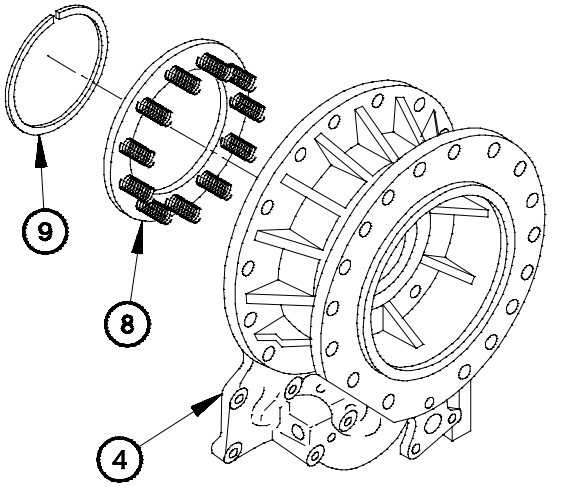
Apply pressure on at least three places on spring retainer to prevent damage to spring retainer assembly.

(5) Apply enough pressure on spring retainer (8) to allow installation of retaining ring (9).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(6) Install retaining ring (9) in adapter housing (4).



d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-7. P3 PLANETARY CARRIER MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Handle, Drive (TM 9-2320-365-20)
Press, Arbor, Hand Operated (Item 41, Appendix B)

Tools and Special Tools (Cont)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Pliers, Retaining Ring (Item 37, Appendix B)

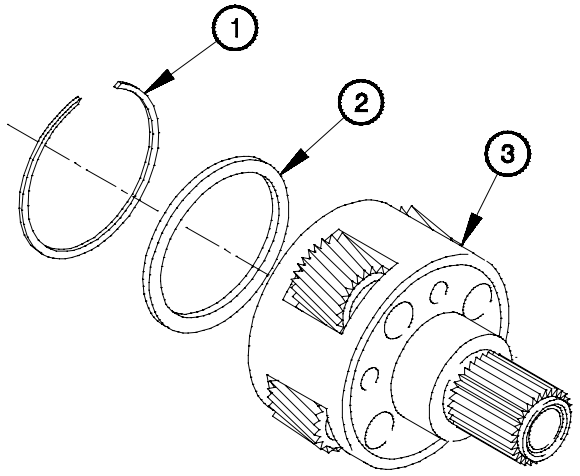
Materials/Parts
Rag, Wiping (Item 59, Appendix C)

a. Disassembly.

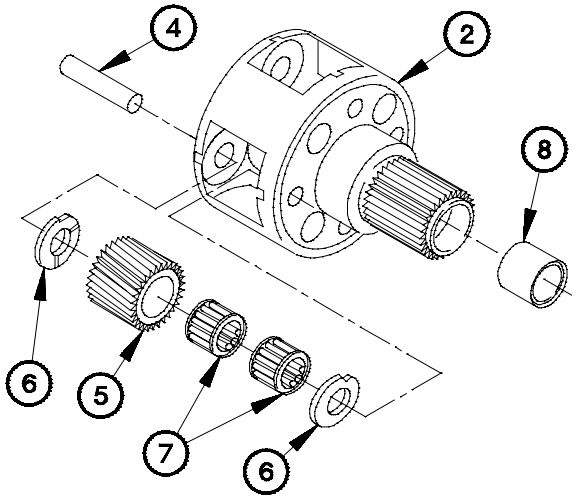
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Remove retaining ring (1) and indexing ring (2) from planetary carrier (3).



YW07A011



YW07A021

(2) Remove four spindles (4), pinion gears (5), and eight thrust washers (6) from planetary carrier (2).

(3) Remove eight roller bearings (7) from four pinion gears (5).

(4) Remove bushing (8) from planetary carrier (2).

b. Cleaning/Inspection.

(1) Wipe clean all metal parts.

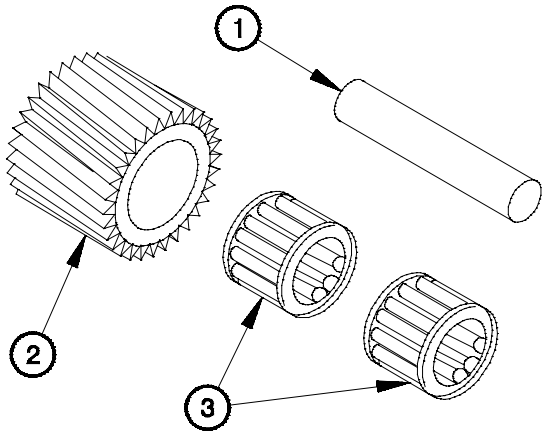
NOTE

Replace any part that fails visual inspection or size measurement requirements.

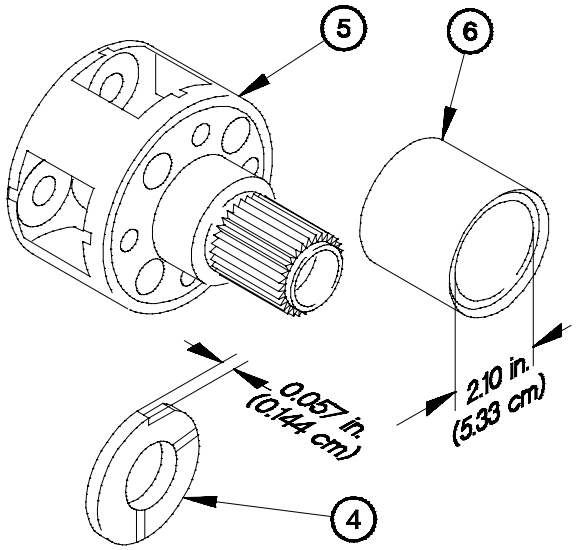
(2) Inspect four spindles (1) for cracks, pitting, burring, and evidence of excessive wear.

(3) Inspect four pinion gears (2) for burring, cracks, pitting, and broken or excessively worn teeth.

(4) Inspect eight bearings (3) for cracks, burring, pitting, and broken or excessively worn rollers.



YW07B011



YW07B021

(5) Inspect two thrust washers (4) for excessive wear.

(6) Measure thickness of two thrust washers (4), minimum thickness 0.057 in. (0.144 cm).

(7) Inspect planetary carrier housing (5) for cracks, scoring, pitting, and excessive wear.

(8) Inspect bushing (6) for cracks, scoring, burring, pitting, and excessive wear.

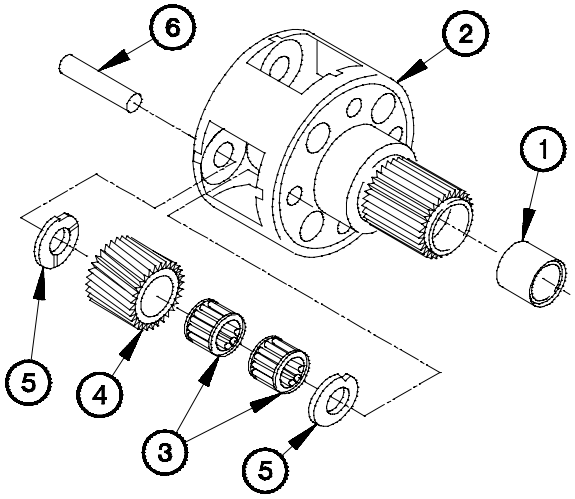
(9) Measure inside diameter of bushing (6), minimum inside diameter 2.10 in. (5.33 cm).

c. Assembly.

(1) Install bushing (1) in planetary carrier (2).

(2) Install eight roller bearings (3) on four pinion gears (4).

(3) Install four pinion gears (4) and eight thrust washers (5) in planetary carrier (2) with four spindles (6).



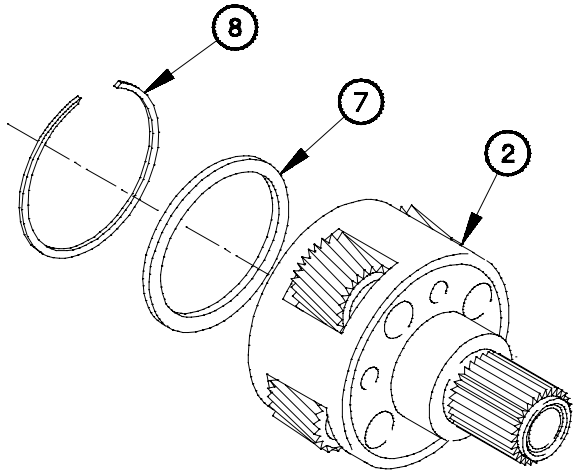
YW07C011

21-7. P3 PLANETARY CARRIER MODULE REPAIR (CONT)

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(4) Install indexing ring (7) and retaining ring (8) in planetary carrier (2).



YW07C021

d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-8. MAIN SHAFT MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 25, Appendix B)
Caliper, Vernier (Item 8, Appendix B)

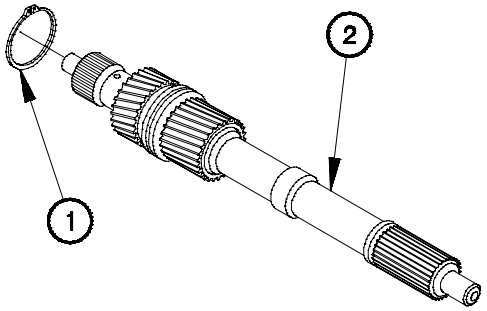
Materials/Parts
Rag, Wiping (Item 59, Appendix C)

a. Disassembly.

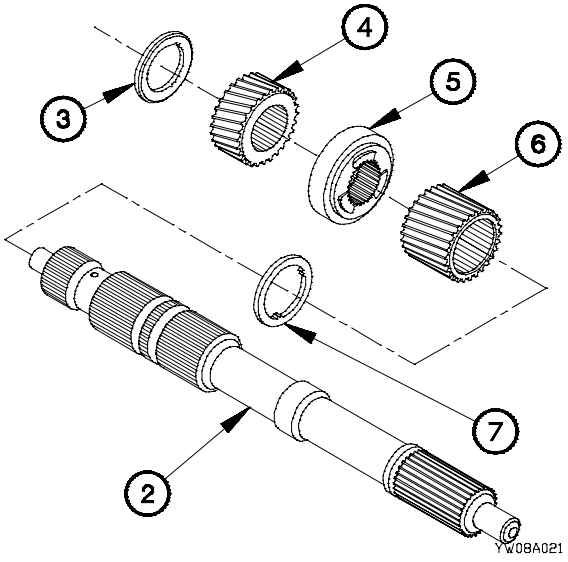
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Remove retaining ring (1) from main shaft (2).



YW08A011



(2) Remove thrust bearing (3), gear (4), spacer (5), gear (6), and thrust bearing (7) from main shaft (2).

21-8. MAIN SHAFT MODULE REPAIR (CONT)

b. Cleaning/Inspection.

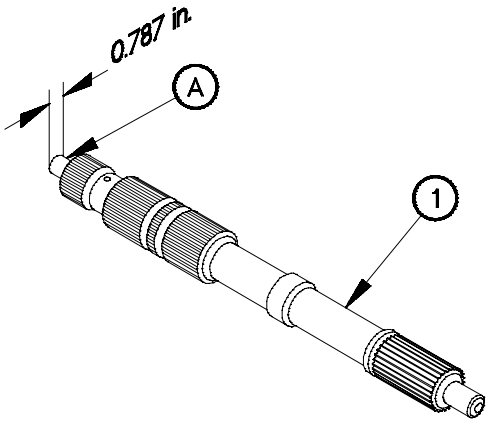
(1) Wipe clean all metal parts.

NOTE

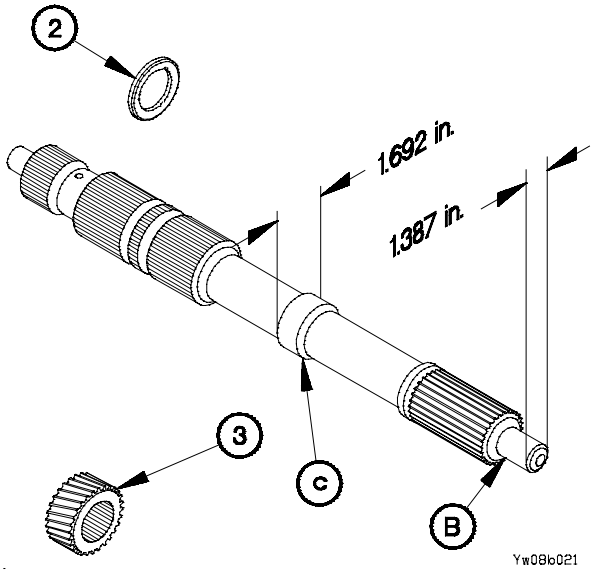
Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect main shaft (1) for cracks, nicks, burrs, pitting, and damaged teeth.

(3) Measure diameter of main shaft pilot (A), minimum diameter 0.787 in. (19.990 mm).



Yw08b011



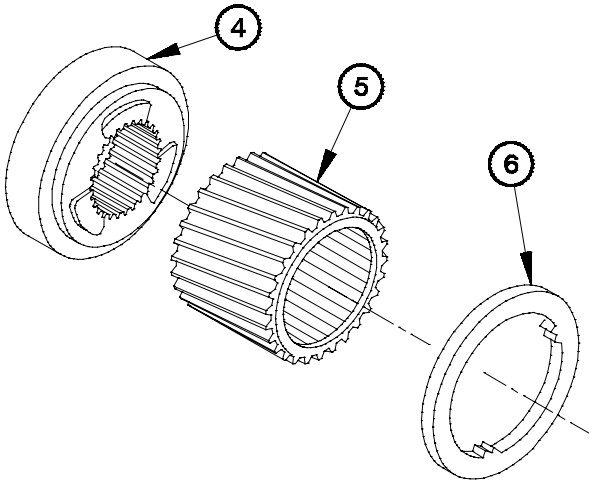
Yw08b021

(4) Measure diameter of main shaft pilot (B), minimum diameter 1.387 in. (35.23 cm).

(5) Measure outside diameter of main shaft journal area (C) with P2 planetary bushing, minimum outside diameter 1.692 in. (42.98 mm).

(6) Inspect thrust bearing (2) for nicks, burrs, cracks, and evidence of excessive wear.

(7) Inspect gear (3) for nicks, burrs, cracks, damaged or missing teeth, and corrosion.



YW08B031

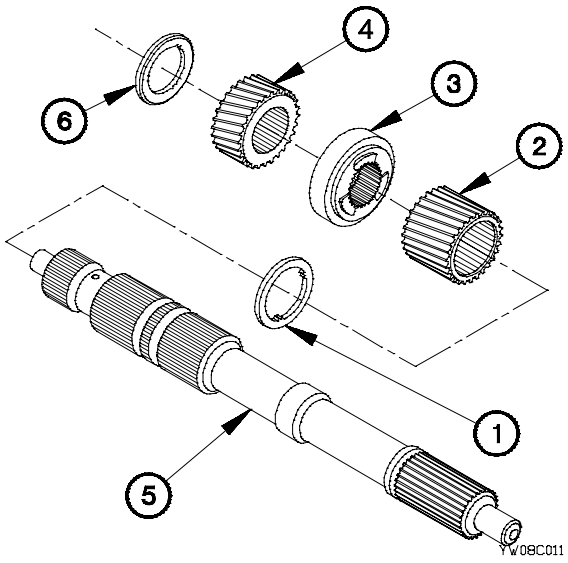
(8) Inspect spacer (4) for nicks, cracks, burrs, and evidence of excessive wear.

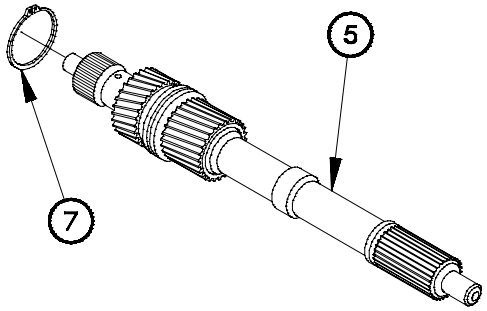
(9) Inspect gear (5) for nicks, burrs, cracks, damaged or missing teeth, and corrosion.

(10) Inspect thrust bearing (6) for nicks, burrs, cracks, and evidence of excessive wear.

c. Assembly.

(1) Install thrust bearing (1), gear (2), spacer (3), and gear (4) on main shaft (5) with thrust bearing (6).





WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(2) Install retaining ring (7) on main shaft (5).

d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-9. P2 PLANETARY CARRIER MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Caliper, Micrometer, Inside (Item 6, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Bushing Driver Set (TM 9-2320-365-20)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 43, Appendix B)
Handle, Drive (TM 9-2320-365-20)
Indicator, Dial (Item 30, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Parts Kit, Seal Replacement (Item 223, Appendix F)

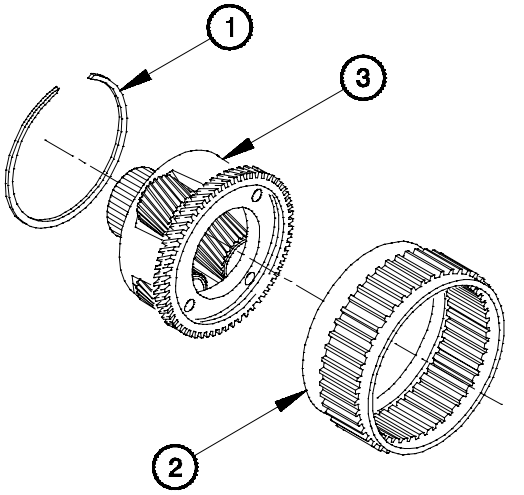
a. Disassembly.

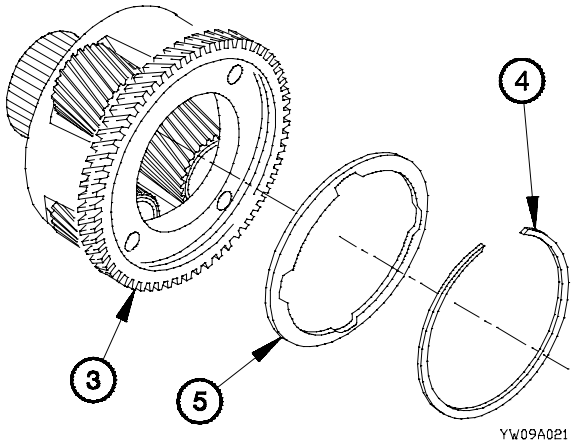
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Remove retaining ring (1) from P3 planetary ring gear (2).

(2) Remove P2 planetary carrier (3) from P3 planetary ring gear (2).



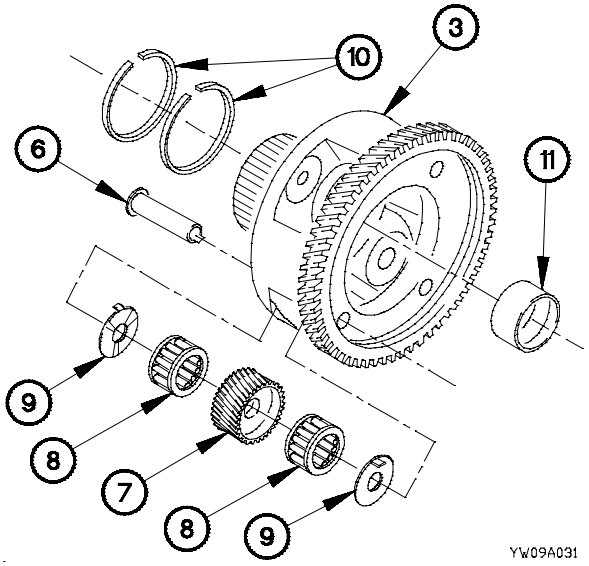


(3) Remove retaining ring (4) and P2 indexing ring (5) from P2 planetary carrier (3).

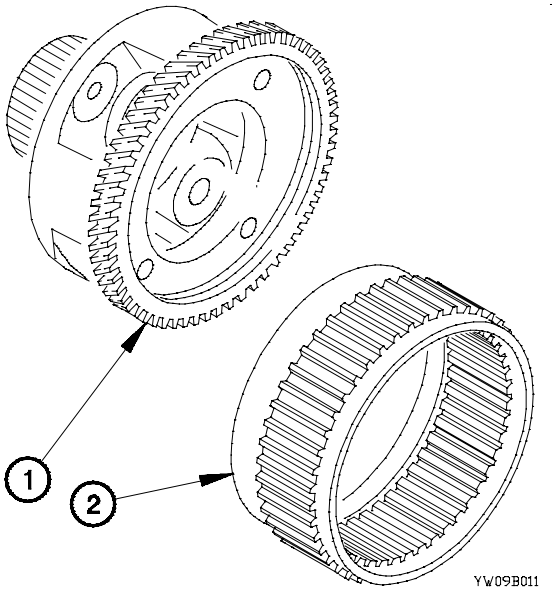
(4) Remove four spindles (6), P2 pinion gears (7), eight roller bearings (8), and thrust washers (9) from P2 planetary carrier (3).

(5) Remove two sealrings (10) from P2 planetary carrier (3). Discard sealrings.

(6) Remove bushing (11) from P2 planetary carrier (3).



b. Cleaning/Inspection.



(1) Wipe clean all metal parts.

NOTE

Replace any part that fails visual inspection or size measurements.

(2) Inspect P2 planetary carrier (1) for cracks, nicks, scoring, burring, chipped, rounded, broken, or missing gear teeth, and corrosion.

(3) Inspect P3 planetary ring gear (2) for cracks, nicks, scoring, burring, chipped, rounded, broken, or missing gear teeth, and corrosion.

21-9. P2 PLANETARY CARRIER MODULE REPAIR (CONT)

(4) Inspect four spindles (3) for scoring, nicks, cracks, burring, and corrosion.

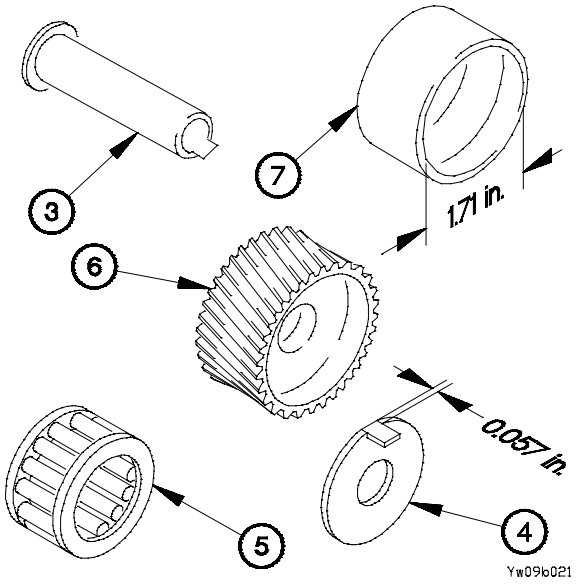
(5) Inspect eight thrust washers (4) for scoring, nicks, cracks, and burring.

(6) Measure thickness of eight thrust washers (4), minimum thickness 0.057 in. (1.448 mm).

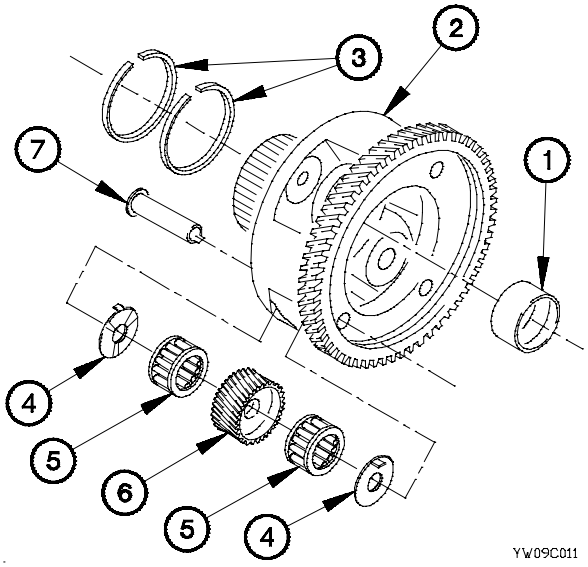
(7) Inspect eight roller bearings (5) for cracked or broken cages, and pitting.

(8) Inspect four P2 pinion gears (6) for scoring, pitting, nicks, burring, and missing teeth.

(9) Measure inside diameter of bushing (7), maximum inside diameter 1.71 in. (43.43 mm).



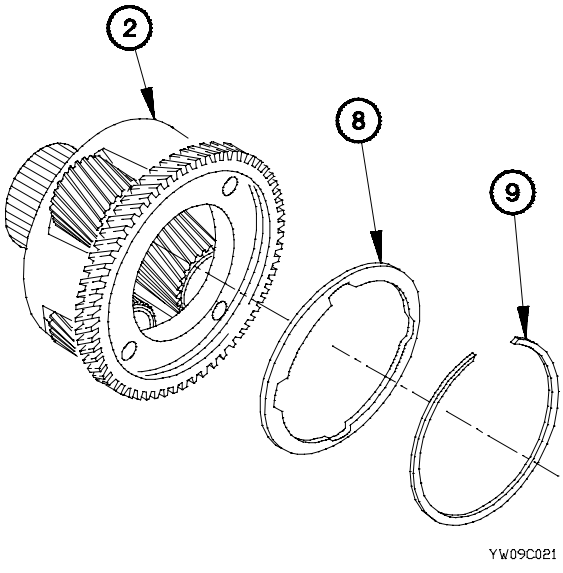
c. Assembly.



(1) Install bushing (1) in P2 planetary carrier (2).

(2) Install two sealrings (3) on P2 planetary carrier (2).

(3) Install eight thrust washers (4), four roller bearings (5), and pinion gears (6) in P2 planetary carrier (2) with four spindles (7).



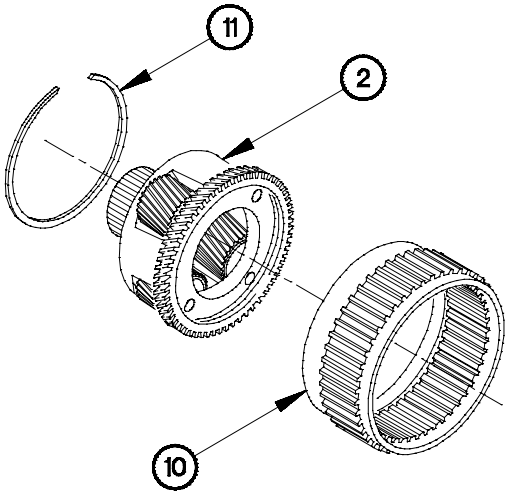
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(4) Install indexing ring (8) and retaining ring (9) in P2 planetary carrier (2).

(5) Install P2 planetary carrier (2) in P3 planetary ring gear (10).

(6) Install retaining ring (11) in P3 planetary ring gear (10).



YW09C031

d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-10. P1 PLANETARY CARRIER MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Indicator, Dial (Item 30, Appendix B)

Tools and Special Tools (Cont)
Caliper, Vernier (Item 8, Appendix B)
Pliers, Retaining Ring (Item 37, Appendix B)
Goggles, Industrial (Item 25, Appendix B)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)

a. Disassembly.

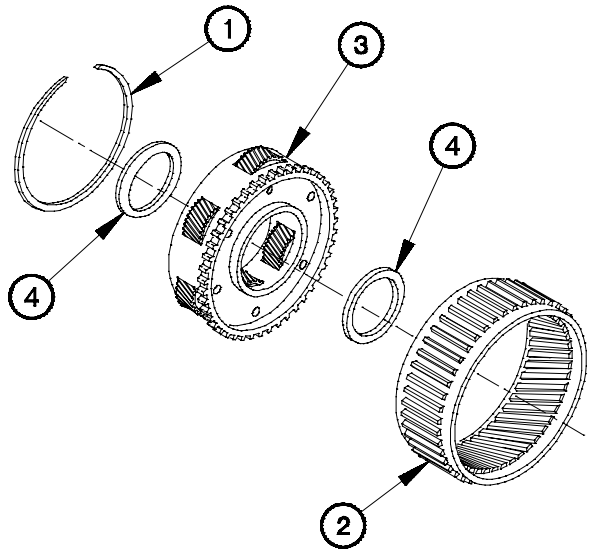
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

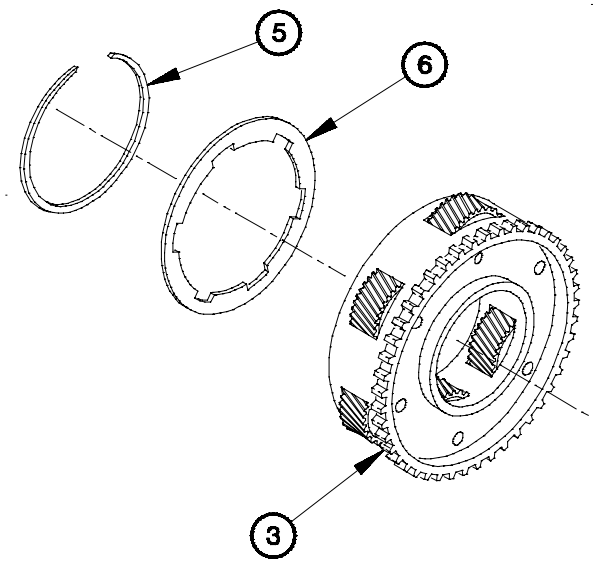
(1) Remove retaining ring (1) from ring gear (2).

(2) Remove planetary housing (3) from ring gear (2).

(3) Remove two thrust bearings (4) from planetary housing (3).



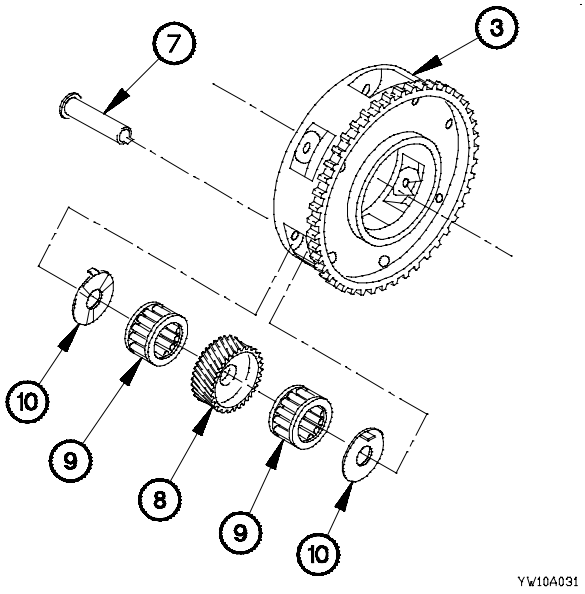
YW10A011



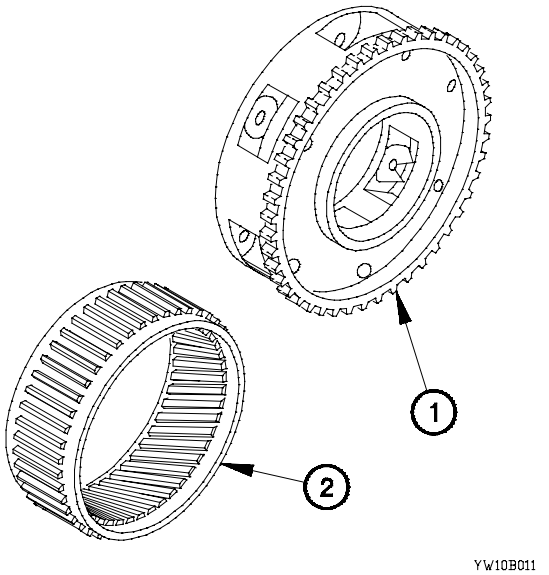
YW10A021

(4) Remove retaining ring (5) and ring (6) from planetary housing (3).

(5) Remove six spindles (7), pinion gears (8), 12 roller bearings (9), and thrust washers (10) from planetary housing (3).



b. Cleaning/Inspection.



(1) Wipe clean all metal parts.

NOTE

Replace any part that fails visual inspection or size measurement requirements.

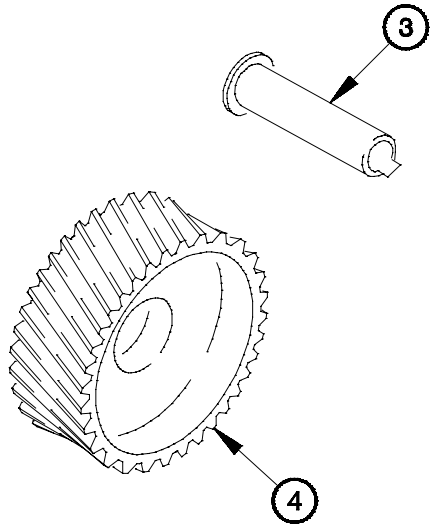
(2) Inspect planetary housing (1) for cracks, scoring, nicks, burring, and corrosion.

(3) Inspect ring gear (2) for cracks, nicks, scoring, burring, broken or missing teeth, excessive wear, and corrosion.

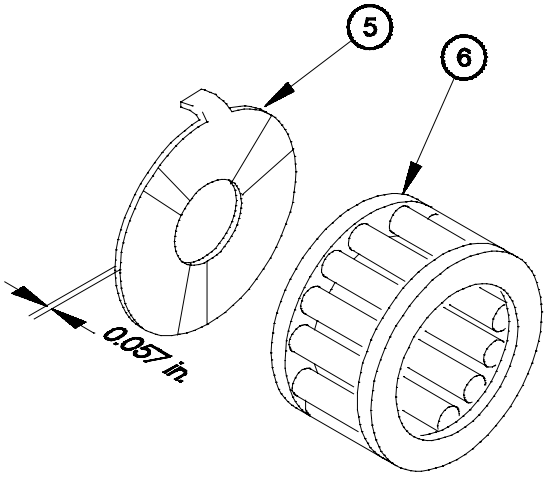
21-10. P1 PLANETARY CARRIER MODULE REPAIR (CONT)

(4) Inspect six spindles (3) for cracks, scoring, nicks, burring, and corrosion.

(5) Inspect six pinion gears (4) for scoring, nicks, cracks, broken or missing teeth, burring, pitting, and corrosion.



YW10B021



Yw10b031

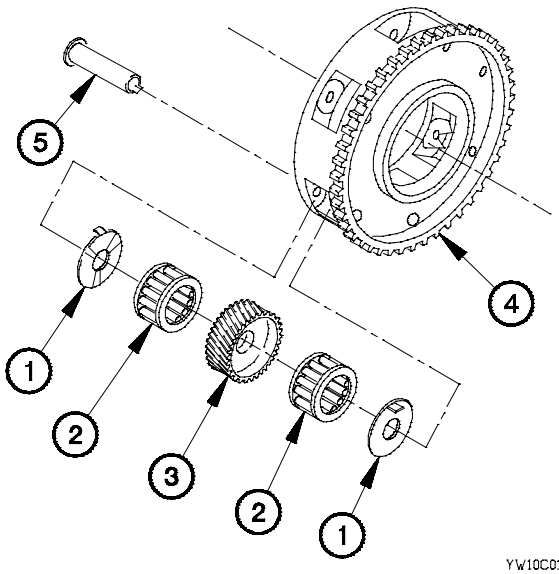
(6) Inspect 12 thrust washers (5) for scoring, nicks, burring, and excessive wear.

(7) Measure thickness of 12 thrust washers (5), minimum thickness 0.057 in. (1.448 mm).

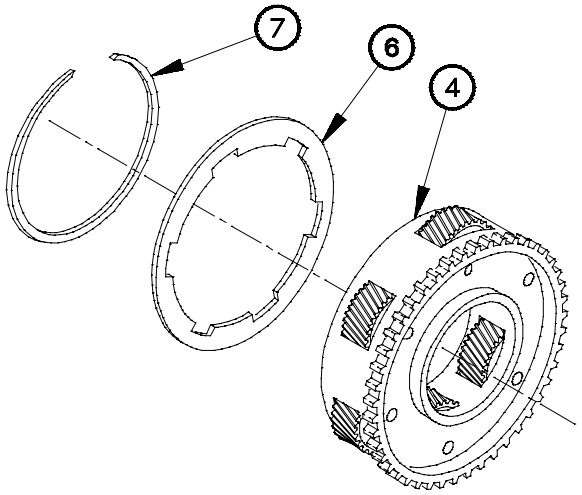
(8) Inspect 12 roller bearings (6) for broken cages, scoring, nicks, and pitting.

c. Assembly.

(1) Install 12 thrust washers (1), roller bearings (2), and six pinion gears (3) in planetary carrier (4) with six spindles (5).



YW10C011

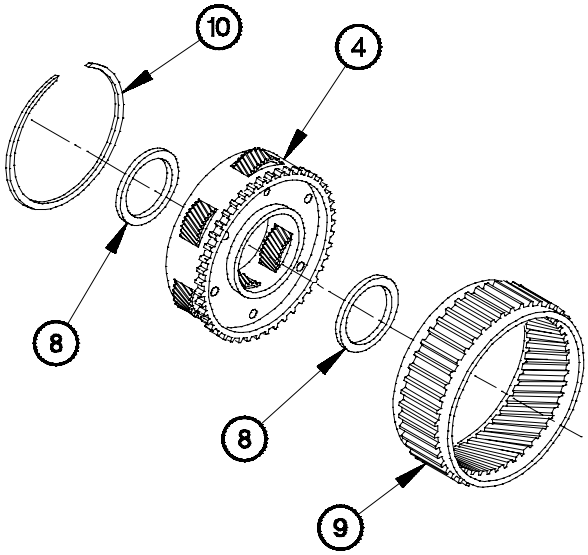


YW10C021

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(2) Install ring (6) and retaining ring (7) on planetary housing (4).



YW10C031

(3) Install two thrust bearings (8) in planetary housing (4).

(4) Install planetary housing (4) in ring gear (9).

(5) Install retaining ring (10) on planetary housing (4).

d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-11. REAR OUTPUT HOUSING REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Bearing Preload Adjustment
e. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transfer case module disassembled (para 22-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Puller Kit, Universal (Item 44, Appendix B)
Indicator, Dial (Item 30, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Gloves, Rubber (Item 23, Appendix B)
Handle, Drive (TM 9-2320-365-20)
Caliper, Vernier (Item 8, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)

Tools and Special Tools (Cont)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Pliers, Retaining Ring (Item 37, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Inserter, Bearing and Bushing (TM 9-2320-365-20)

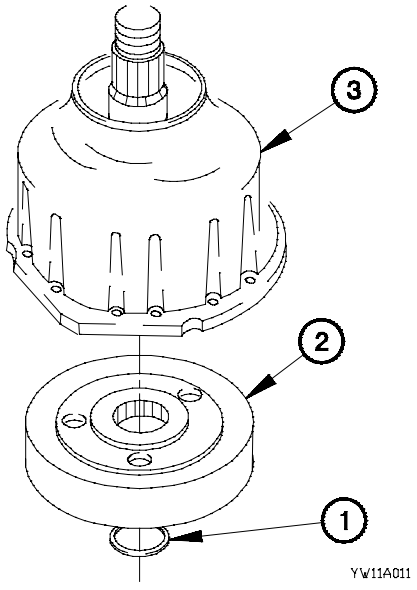
Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Oil, Lubricating (Item 44, Appendix C)
Seal, Plain Encased (Item 265, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

a. Disassembly.

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Remove retaining ring (1) and ring gear (2) from output housing (3).



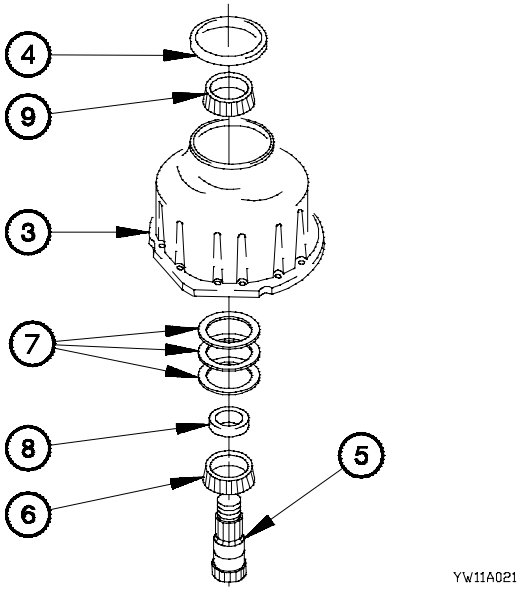
(2) Remove oil seal (4) from output housing (3). Discard oil seal.

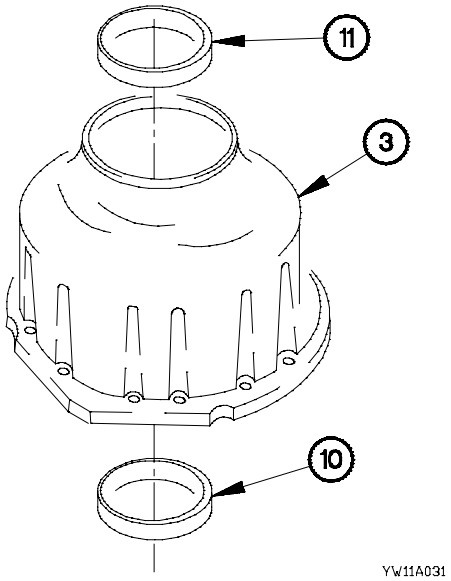
NOTE

Step (3) requires the aid of an assistant.

(3) Remove output shaft (5), roller bearing cone (6), shim(s) (7), and spacer (8) from output housing (3).

(4) Remove roller bearing cone (9) from output housing (3).





(5) Remove roller bearing cups (10 and 11) from output housing (3).

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

21-11. REAR OUTPUT HOUSING REPAIR (CONT)

NOTE

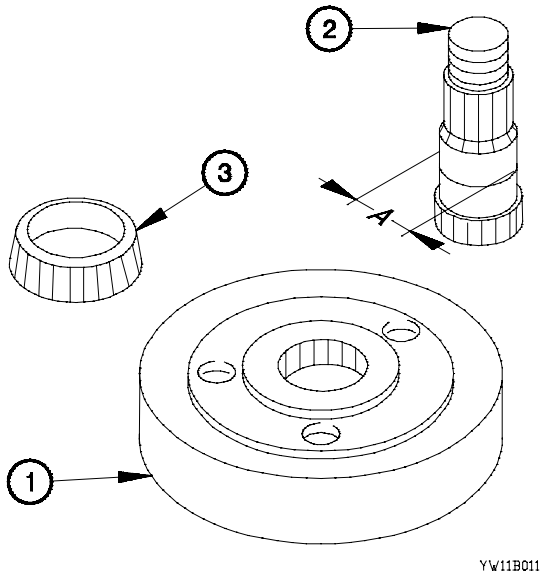
Replace any part that fails visual inspection or size measurement requirements.

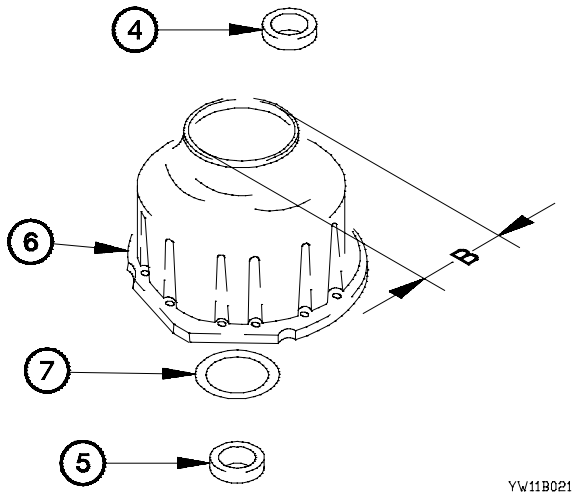
(2) Inspect ring gear (1) for scoring, burring, cracks, missing teeth, and excessive wear.

(3) Inspect output shaft (2) for scoring, burring, cracks, deformed splines, and excessive wear.

(4) Measure output shaft (2) journal (A), minimum outside diameter is 1.85 in. (4.70 cm).

(5) Inspect two roller bearing cones (3) for pitting, cage damage, and excessive wear.





(6) Inspect roller bearing cups (4) for pitting, cage damage, and excessive wear.

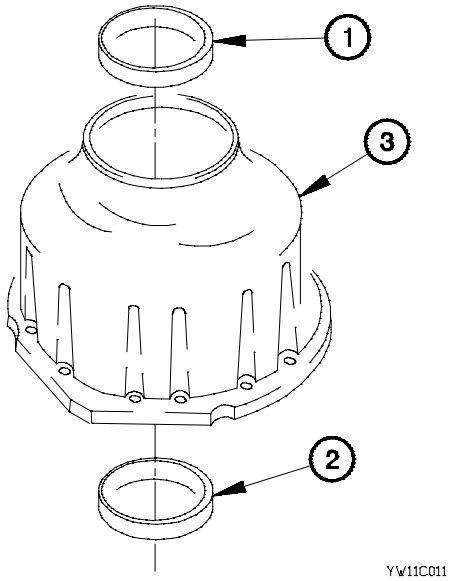
(7) Inspect spacer (5) for damage, cracks, and excessive wear.

(8) Inspect output housing (6) for cracks, scoring, burring, and excessive wear.

(9) Measure seal surface (B) of output housing (6), minimum inside diameter is 3.0 in. (7.6 cm).

(10) Inspect shim(s) (7) for cracks and burring.

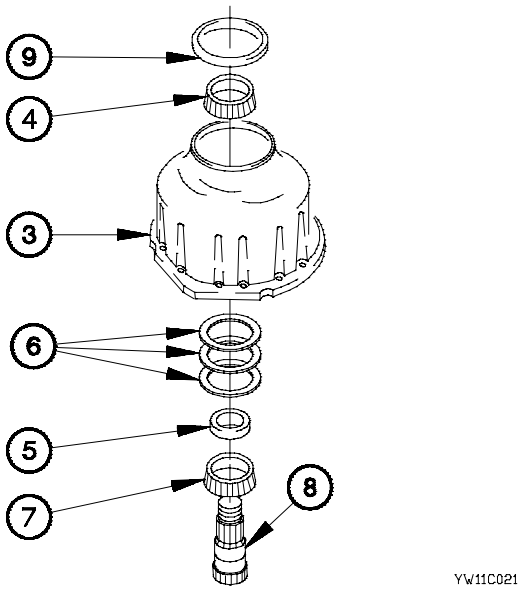
c. Assembly.



NOTE

Apply lubricating oil to all parts during assembly.

(1) Install roller bearing cups (1 and 2) in rear output housing (3).



(2) Install roller bearing cone (4) in output housing (3).

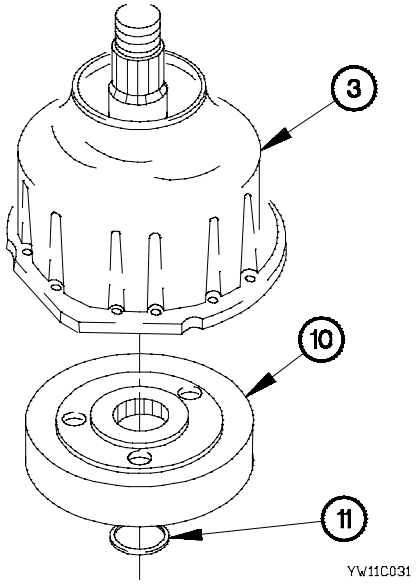
(3) Install spacer (5), shim(s) (6), roller bearing cone (7), and output shaft (8) in output housing (3).

(4) Install oil seal (9) in output housing (3).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(5) Install ring gear (10) on output housing (3) with retaining ring (11).



21-11. REAR OUTPUT HOUSING REPAIR (CONT)

d. Bearing Preload Adjustment.

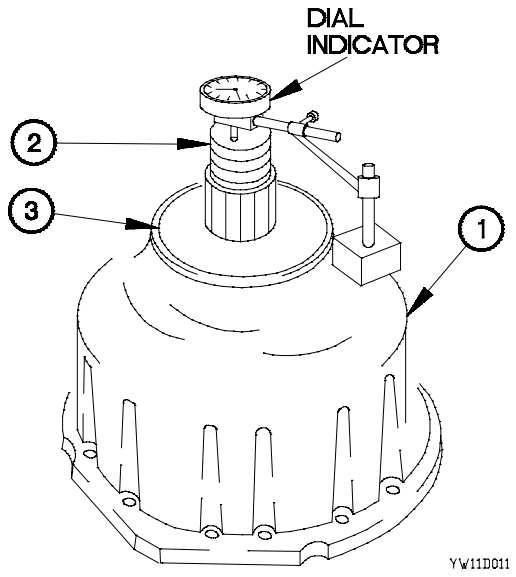
NOTE

Correct bearing preload is attained by removing increments of shim pack. If bearing cup bears on rollers, allowing no movement, disassemble all bearing retention parts.

(1) Install dial indicator on output housing (1) with stylus on output shaft (2).

(2) Adjust dial indicator to read zero.

(3) Apply upward lift sufficient to fully seat upper bearing (3).



NOTE

- Dial indicator reading at this point is preliminary end play which exists with initial shim pack thickness of 0.064 in. (1.626 mm).
- If reading is not within tolerance, disassemble rear output housing. Replace shims to achieve correct end play and assemble rear output housing.

(4) Measure end play of output shaft (2). Reading should be 0.001-0.005 in. (0.025-0.127 mm). Record reading.

e. Follow-On-Maintenance.

Assemble transfer case module (para 22-3).

End of Task

21-12. P4 PLANETARY CARRIER ASSEMBLY REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

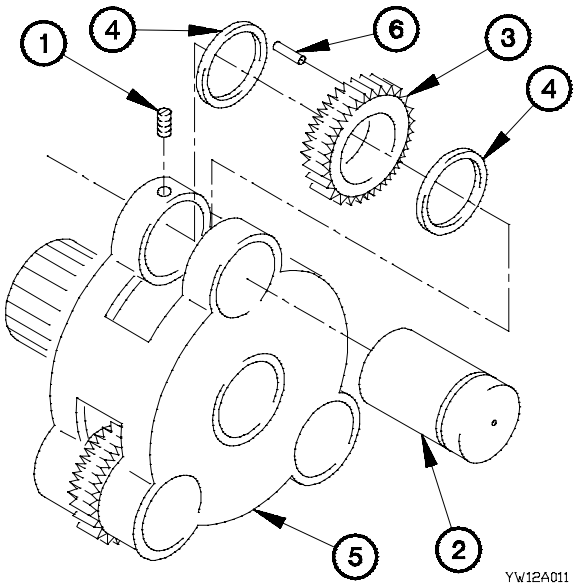
Equipment Conditions
Transfer case module disassembled (para 22-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 83, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Adapter, Socket Wrench, (Item 3, Appendix B)

Tools and Special Tools (Cont)
Socket Wrench Attachment, Screwdriver (TM 9-2320-365-20)

Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Grease, Automotive and Artillery (Item 36, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)
Setscrew (3) (Item 287, Appendix F)

a. Disassembly.



(1) Remove setscrew (1), spindle (2), pinion gear (3), and two thrust washers (4) from planetary carrier (5). Discard setscrew.

(2) Remove 18 roller bearings (6) from pinion gear (3).

(3) Perform steps (1) and (2) on remaining two pinion gears.

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

21-12. P4 PLANETARY CARRIER ASSEMBLY REPLACEMENT (CONT)

NOTE

Replace any part that fails visual inspection or size measurement requirements.

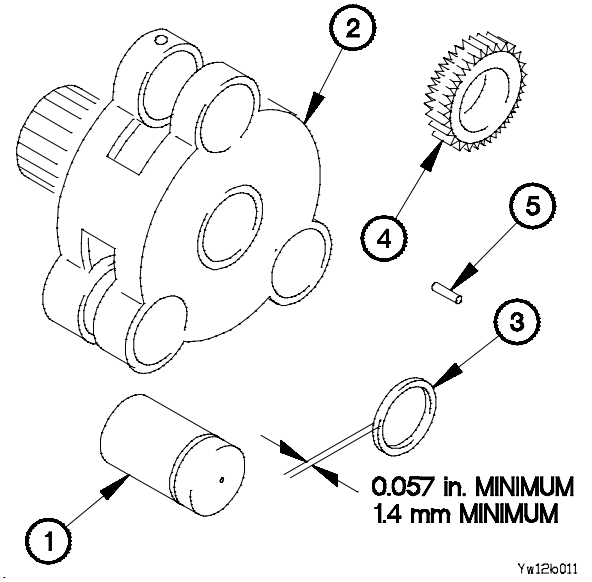
(2) Inspect three spindles (1) for scoring, pitting, and wear.

(3) Inspect planetary carrier (2) for scoring, pitting, cracks, and wear.

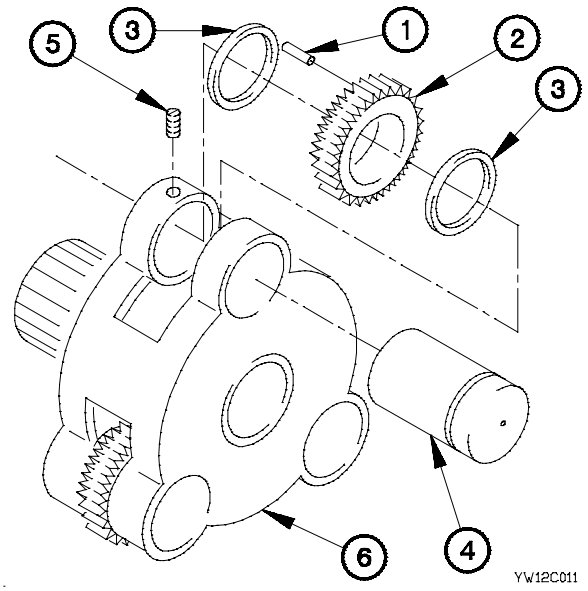
(4) Inspect three thrust washers (3) for scoring, pitting, cracks, wear, and minimum thickness of 0.057 in. (1.44 mm).

(5) Inspect three pinion gears (4) for pitting, corrosion, and broken gear teeth.

(6) Inspect 54 roller bearings (5) for pitting, corrosion, and wear.



c. Assembly.



NOTE

Apply a light coat of grease to inside of pinion gears to hold roller bearings in place.

(1) Install 18 roller bearings (1) in pinion gear (2).

(2) Position two thrust washers (3), pinion gear (2), spindle (4), and setscrew (5) in planetary carrier (6).

(3) Tighten setscrew (5) to 180 lb-in. (20 N·m).

(4) Perform steps (1) through (3) on remaining two pinion gears.

(5) Stake three setscrews (5) to planetary carrier (6).

CAUTION

Ensure adequate material has been moved during staking to prevent loss of setscrew. Failure to comply may result in damage to equipment.

(6) Inspect staking of three setscrews (5).

d. Follow-On Maintenance.

Assemble transfer case (para 22-3).

End of Task.

21-13. C3/C4 CLUTCH MODULE REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-on Maintenance

INITIAL SETUP

Equipment Conditions
Transmission disassembled (para 21-2).

Tools and Special Tools
Tool Kit, Genl Mech, (Item 68, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Straight Edge (Item 61, Appendix B)
Riveter, Yoke, Hand (TM 9-2320-365-20)
Caliper, Vernier (Item 8, Appendix B)

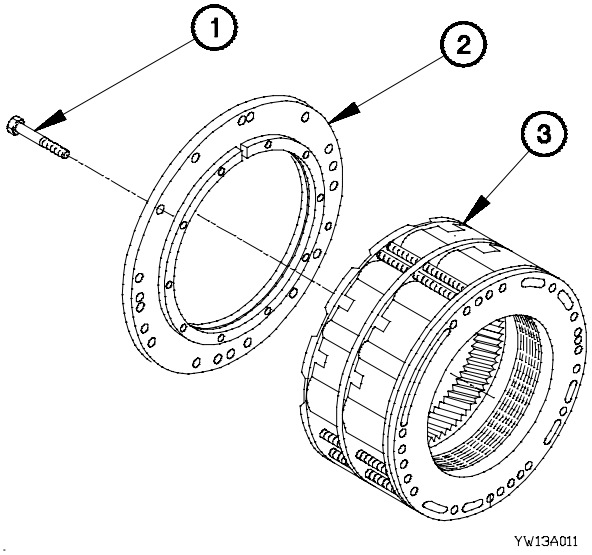
Materials/Parts
Rag, Wiping (Item 59, Appendix C)
Cloth, Abrasive (Item 23, Appendix C)

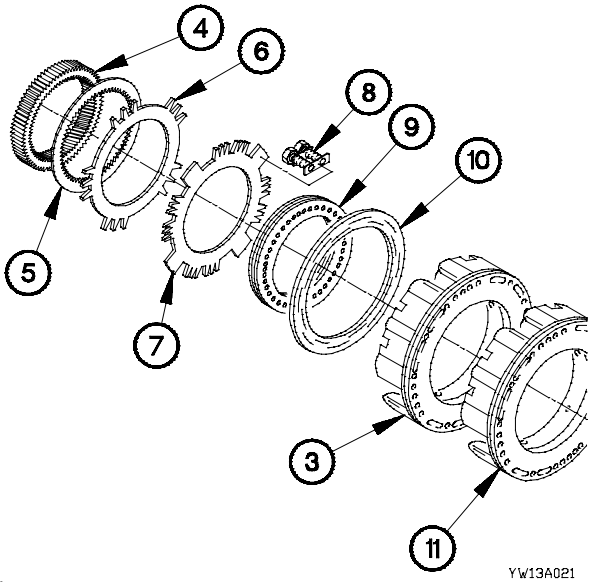
a. Disassembly.

WARNING

C3/C4 clutch spring assemblies are under pressure. Loosen bolts evenly during disassembly. Failure to comply may result in injury to personnel or damage to equipment.

(1) Remove 12 bolts (1) and backing plate (2) from C3 clutch housing (3).





(2) Remove ring gear (4), five C3 friction plates (5), four reaction plates (6), and piston return plate (7) from C3 clutch housing (3).

(3) Remove four piston return springs (8) from piston return plate (7).

(4) Remove spring retainer (9) and clutch piston (10) from C3 clutch housing (3).

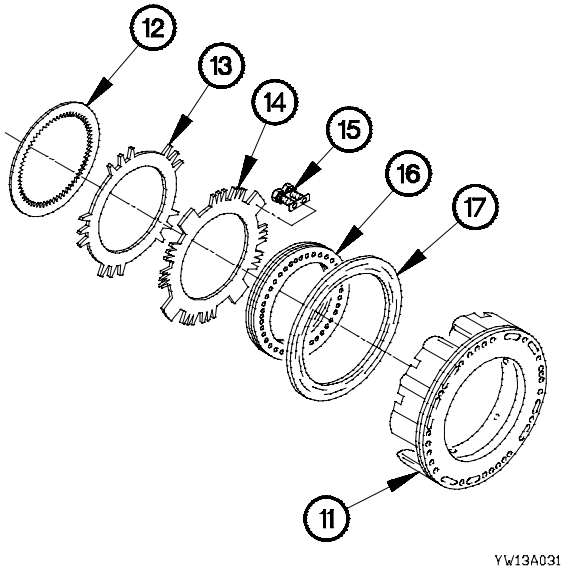
(5) Remove C3 clutch housing (3) from C4 clutch housing (11).

21-13. C3/C4 CLUTCH MODULE REPAIR (CONT)

(6) Remove five C4 reaction plates (12), friction plates (13), and return plate (14) from C4 clutch housing (11).

(7) Remove four return springs (15) from return plate (14).

(8) Remove spring retainer (16) and clutch piston (17) from C4 clutch housing (11).



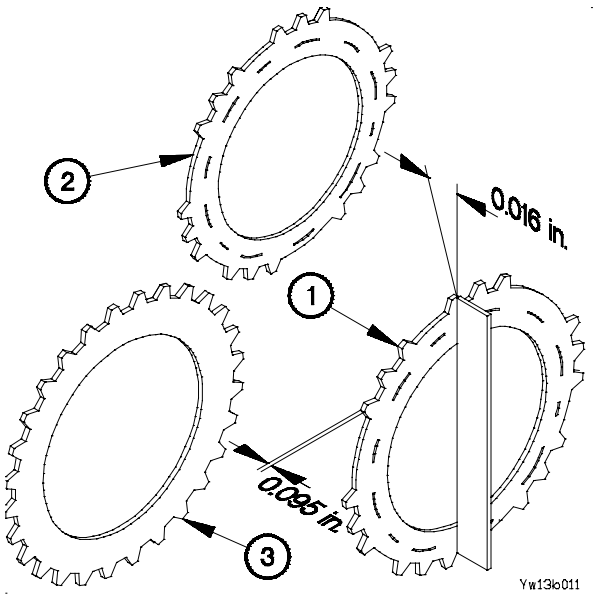
b. Cleaning/Inspection.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.

NOTE

- Clean all parts with a non-alkaline wash solution, dry with low pressure air, and wipe clean with lint free cloth.
- Replace any part that fails visual inspection or size measurements, as indicated.



(1) Measure thickness of four C3 reaction plates (1), minimum thickness 0.095 in. (2.413 mm).

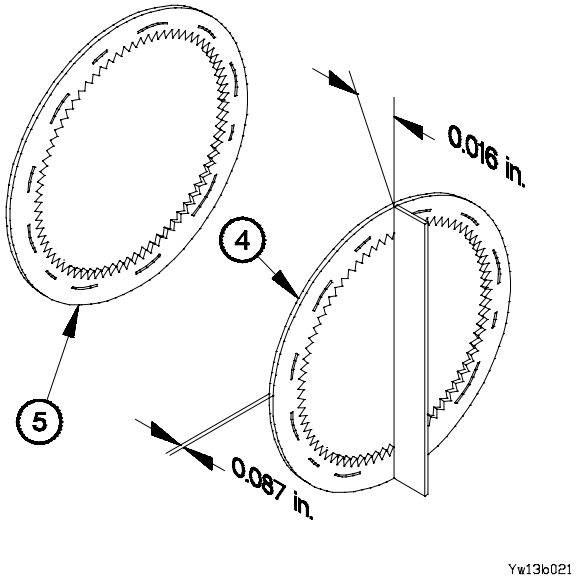
(2) Lay a straight edge across each C3 reaction plate (1), maximum bend in reaction plate 0.016 in. (0.406 mm).

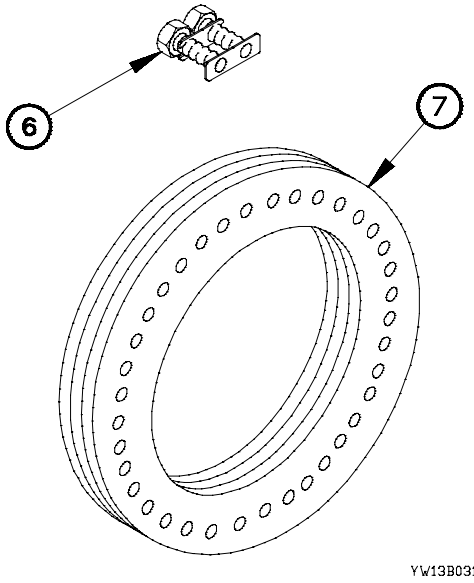
(3) Perform steps (1) and (2) for five C4 reaction plates (2) and eight C5 reaction plates (3).

(4) Measure thickness of five C3 friction plates (4), minimum thickness 0.087 in. (2.210 mm).

(5) Lay a straight edge across each C3 friction plate (4), maximum bend in friction plate 0.016 in. (0.406 mm).

(6) Perform steps (5) and (6) for five C4 friction plates (5).





(7) Inspect eight return springs (6) for broken or missing springs.

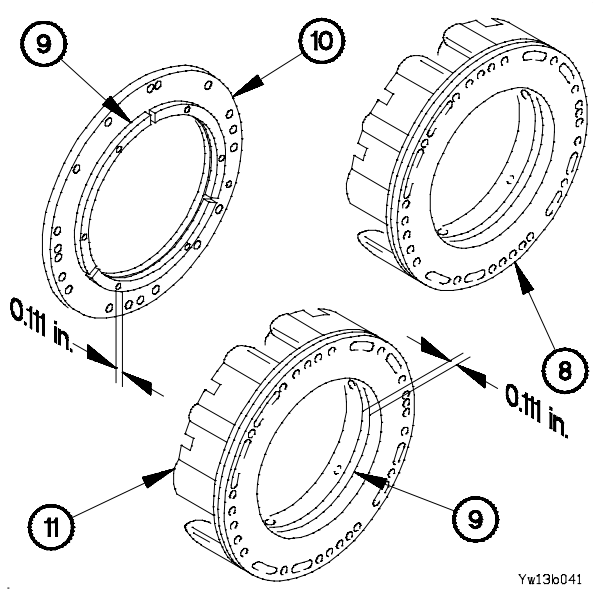
(8) Inspect two spring retainers (7) for broken or missing springs.

NOTE

- Remove scratches, nicks, or burrs with abrasive cloth.
- If any wear plates are replaced, file rivets flush with face of wear plate.

(9) Inspect C3 clutch housing (8) for scratches, nicks, and burrs.

(10) Measure thickness of wear plates (9) on backing plate (10) and C4 clutch housing (11), minimum thickness 0.111 in. (2.819 mm).



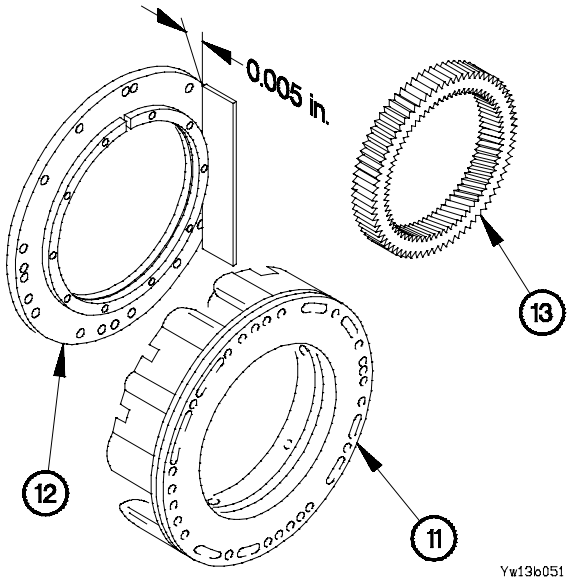
21-13. C3/C4 CLUTCH MODULE REPAIR (CONT)

(11) Inspect C4 clutch housing (11) for scratches, nicks, and burrs.

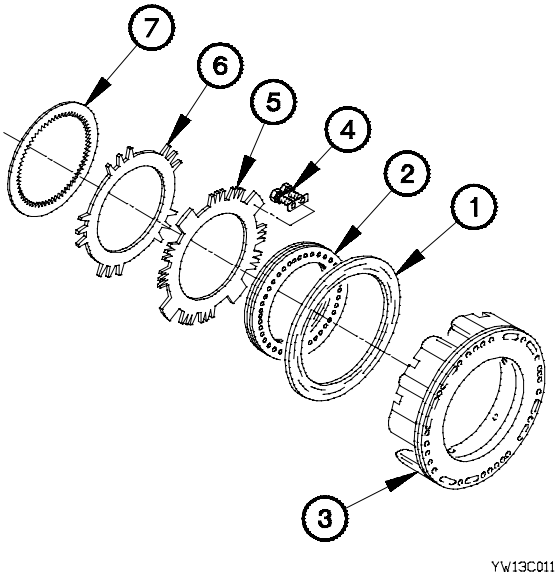
(12) Inspect C3 backing plate (12) for scratches, nicks, and burrs.

(13) Lay a straight edge on seating surfaces of C3 backing plate (12) and verify flatness within 0.005 in. (0.127 mm).

(14) Inspect ring gear (13) for cracks, scoring, nicks, and burrs.



c. Assembly.



(1) Install clutch piston (1) and spring retainer (2) in C4 clutch housing (3).

(2) Install four return springs (4) on return plate (5).

NOTE

Alternately stack five C4 friction plates and five C4 clutch reaction plates for assembly.

(3) Install return plate (5), five C4 friction plates (6), and C4 clutch reaction plates (7) in C4 clutch housing (3).

(4) Install clutch piston (8), with beveled edge down, in C3 clutch housing (9).

NOTE

Align external tabs on C3 clutch housing with tabs on C4 clutch housing.

(5) Install C3 clutch housing (9) on C4 clutch housing (10).

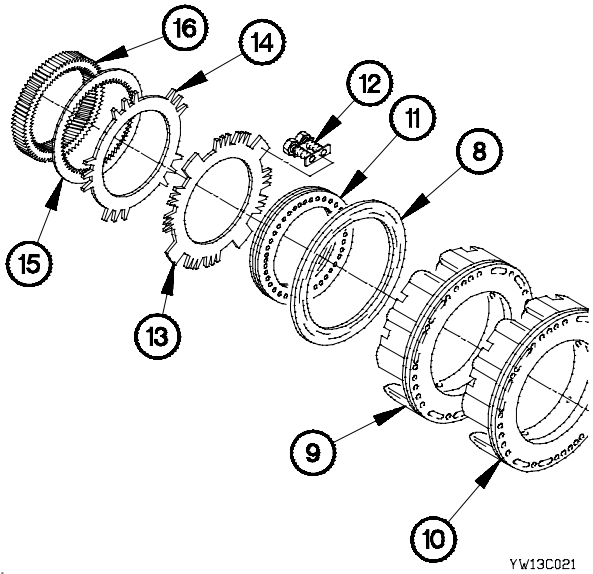
(6) Install spring retainer (11) in C3 clutch housing (9).

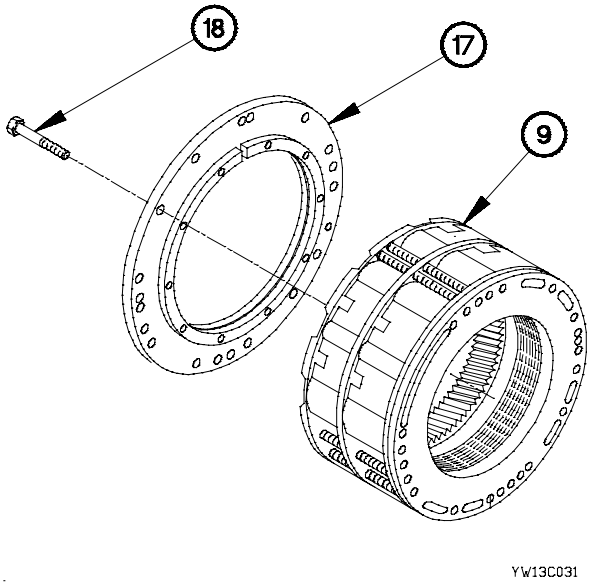
(7) Install four return springs (12) on return plate (13).

NOTE

Alternately stack five C3 friction plates and four C3 clutch reaction plates for assembly.

(8) Install return plate (13), five C3 friction plates (14), four C3 clutch reaction plates (15), and ring gear (16) in C3 clutch housing (9).





NOTE

Align indexing tab on backing plate in C3 clutch housing with external tabs on C3 and C4 clutch housings.

(9) Position backing plate (17) on C3 clutch housing (9) with 12 bolts (18).

(10) Tighten 12 bolts (18) to 42-50 lb-ft (57-68 N·m).

d. Follow-On Maintenance.

Assemble transmission (para 21-2).

End of Task.

21-14. C6 CLUTCH HOUSING ASSEMBLY REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transfer case module disassembled (para 22-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Handle, Drive (TM 9-2320-365-20)
Inserter and Remover, Spring (TM 9-2320-365-20)
Press, Arbor, Hand Operated (Item 41, Appendix B)

Tools and Special Tools (Cont)
Puller Kit, Mechanical (Item 43, Appendix B)
Pliers, Retaining Ring (Item 37, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

Materials/Parts
Oil, Engine Lubricating (Item 43, Appendix C)
Rag, Wiping (Item 57, Appendix C)
Solvent, Dry Cleaning (Item 79, Appendix C)
Sealring (Item 282, Appendix F)
Sealring (Item 283, Appendix F)

a. Disassembly.

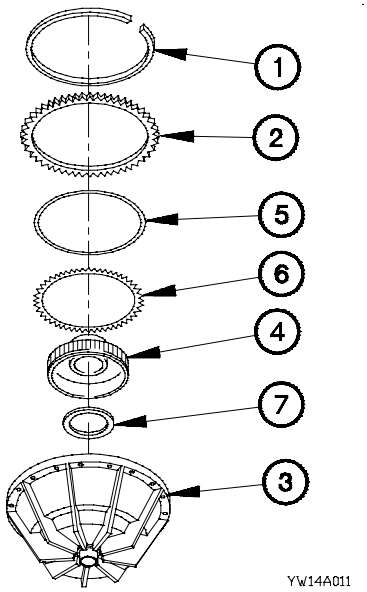
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Remove retaining ring (1) and C6 backing plate (2) from clutch housing (3).

(2) Remove C6 drive hub (4) from clutch housing (3).

(3) Remove five C6 friction plates (5) and C6 reaction plates (6) from C6 drive hub (4).



CAUTION

If transmission is prior to S/N 6510072173, C6 thrust bearing must be replaced. Failure to comply may result in damage to equipment.

(4) Remove thrust bearing (7) from clutch housing (3).

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(5) Apply pressure on spring retainer (8) in C6 clutch housing (3).

(6) Remove retaining ring (9) from C6 clutch housing (3).

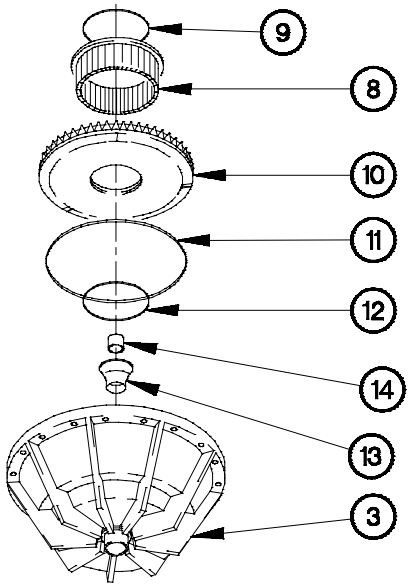
(7) Release pressure on spring retainer (8) in C6 clutch housing (3).

(8) Remove spring retainer (8) from C6 clutch housing (3).

(9) Remove piston (10) and seal rings (11 and 12) from C6 clutch housing (3). Discard seal rings.

(10) Remove sleeve (13) from C6 clutch housing (3).

(11) Remove bushing (14) from sleeve (13).



YW14A021

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

21-14. C6 CLUTCH HOUSING ASSEMBLY REPAIR (CONT)

NOTE

Replace any part that fails visual inspection or size measurements requirements.

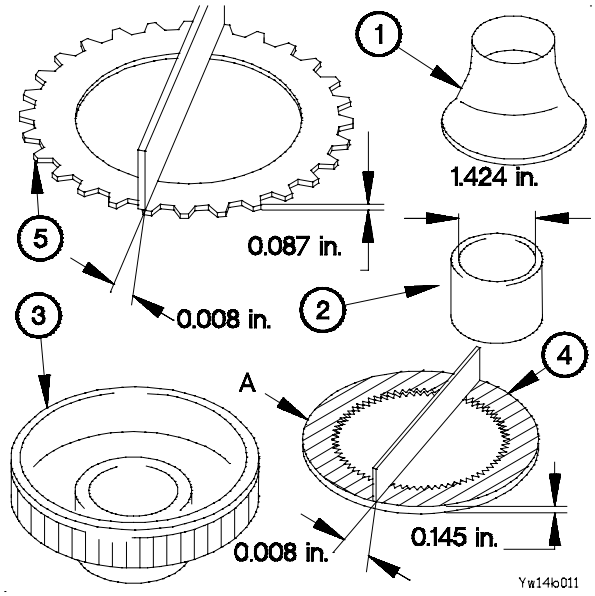
(2) Inspect sleeve (1) for excessive wear.

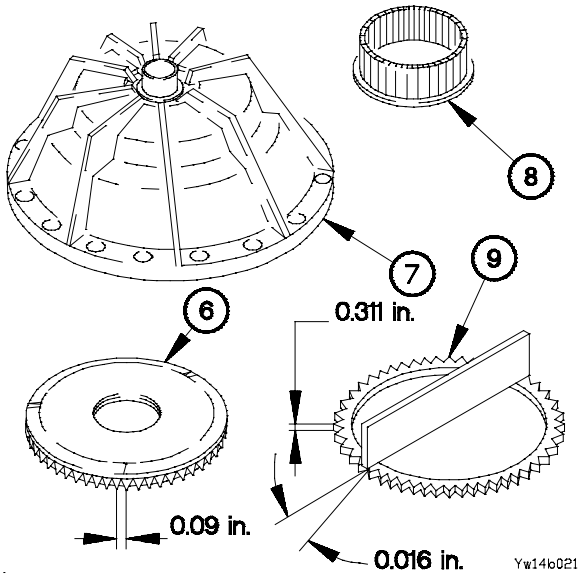
(3) Inspect bushing (2) for excessive wear. Maximum inside diameter is 1.424 in. (3.617 cm).

(4) Inspect C6 drive hub (3) for pitting, damage, and indication of wear on splines.

(5) Inspect C6 friction plates (4) for wear. Minimum thickness is 0.145 in. (3.638 mm). Maximum bend 0.016 in. (0.406 mm), and measure oil groove depth (A), minimum oil groove depth is 0.008 in. (0.203 mm).

(6) Inspect C6 reaction plates (5) for wear. Minimum thickness is 0.087 in. (2.210 mm). Maximum bend is 0.016 in. (0.406 mm).





(7) Inspect C6 piston (6) to C6 clutch housing (7) tang groove wear. Maximum tang groove wear is 0.09 in. (0.22 cm).

(8) Inspect C6 piston (6) for seal ring groove wear, burring, and broken tangs.

(9) Inspect spring retainer (8) for missing and broken springs.

(10) Inspect C6 backing plate (9) for scoring and burring. Minimum thickness is 0.311 in. (0.789 cm). Maximum bend is 0.016 in. (0.040 cm).

c. Assembly.

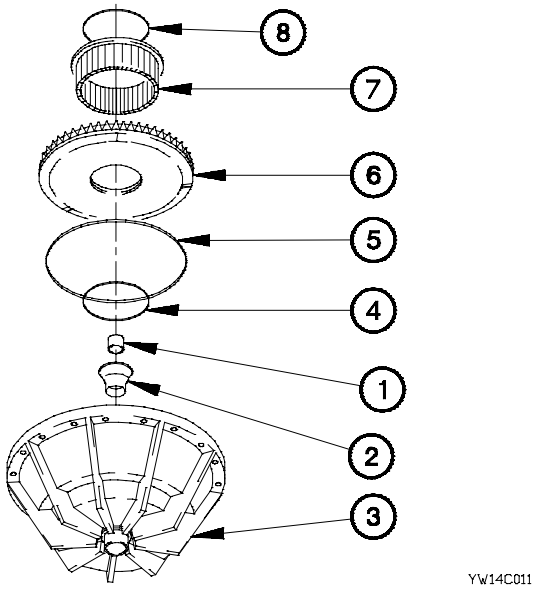
NOTE

Apply lubricating oil to all parts during assembly.

(1) Install bushing (1) in sleeve (2).

(2) Install sleeve (2) in C6 clutch housing (3).

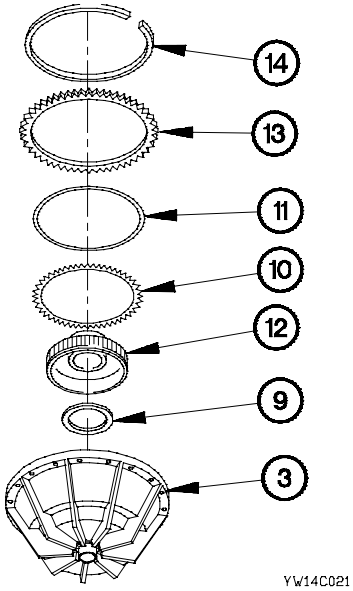
(3) Install seal rings (4 and 5) and C6 piston (6) in C6 clutch housing (3).



WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(4) Install spring retainer (7) in C6 clutch housing (3) with retaining ring (8).



(5) Install thrust bearing (9) in C6 clutch housing (3).

(6) Install five C6 reaction plates (10) and C6 friction plates (11), alternately, starting with C6 reaction plate on drive hub (12).

(7) Position C6 drive hub (12) in C6 clutch housing (3).

(8) Install C6 backing plate (13) in C6 clutch housing (3).

CAUTION

If transmission is prior to S/N 6510072173, C6 thrust bearing must be replaced. Failure to comply may result in damage to equipment.

(9) Install retaining ring (14) in C6 clutch housing (3).

d. Follow-On Maintenance.

Assemble transfer case module (para 22-3).

End of Task.

21-15. C7 CLUTCH HOUSING AND FRONT OUTPUT HOUSING ASSEMBLY REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transfer case module disassembled (para 22-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Puller Kit, Universal (Item 44, Appendix B)
Indicator, Dial (Item 30, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Handle, Drive (TM 9-2320-365-20)
Caliper, Vernier (Item 8, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)

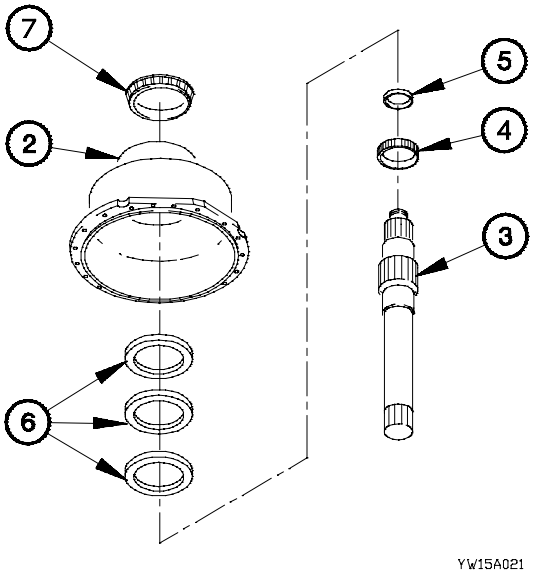
Tools and Special Tools (Cont)
Puller Kit, Universal (Item 43, Appendix B)
Gage Set, Telescoping (Item 21, Appendix B)
Pliers, Retaining Ring (Item 37, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)

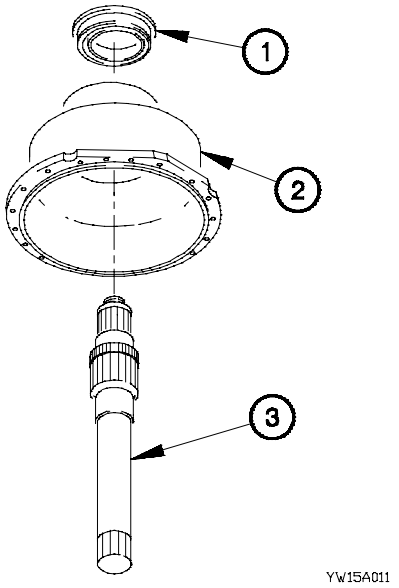
Materials/Parts
Sealring (Item 284, Appendix F)
Sealring (Item 285, Appendix F)
Seal, Plain Encased (Item 265, Appendix F)
Sealring (3) (Item 286, Appendix F)
Lubricating Oil, Engine (Item 45, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)

a. Disassembly.

(1) Remove oil seal (1) from front output housing (2). Discard oil seal.

(2) Remove front output shaft (3) from front output housing (2).



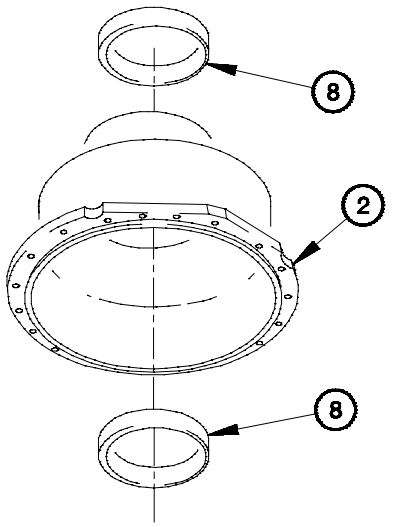


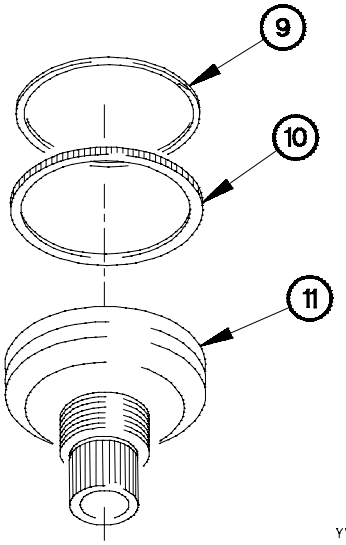
(3) Remove roller bearing cone (4) from front output shaft (3).

(4) Remove spacer (5) and shim(s) (6) from front output shaft (3).

(5) Remove roller bearing cone (7) from front output housing (2).

(6) Remove two roller bearing cups (8) from front output housing (2).





WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

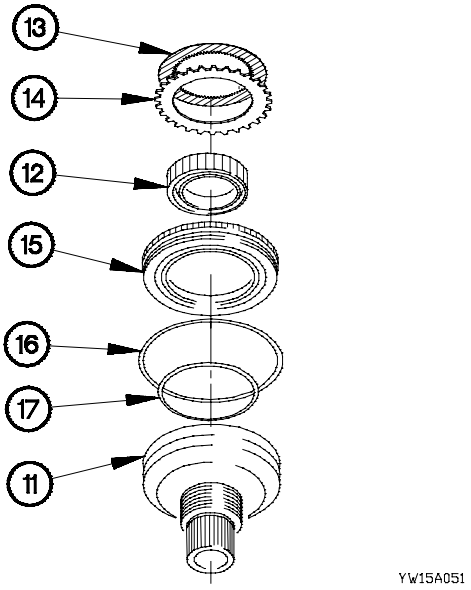
(7) Remove internal retaining ring (9) and backing plate (10) from C7 clutch housing (11).

(8) Remove C7 clutch hub (12) from C7 clutch housing (11).

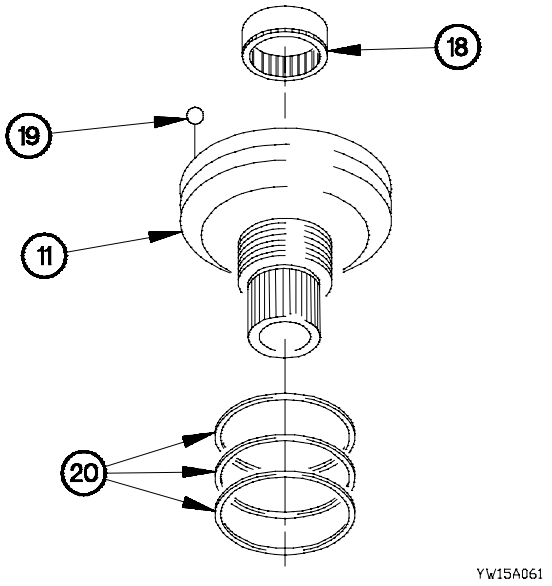
(9) Remove five C7 friction plates (13) and C7 reaction plates (14) from C7 clutch hub (12).

(10) Remove C7 piston (15) from C7 clutch housing (11).

(11) Remove external sealring (16) and internal sealring (17) from C7 piston (15). Discard sealrings.



21-15. C7 CLUTCH HOUSING AND FRONT OUTPUT HOUSING ASSEMBLY REPAIR (CONT)



(12) Remove bushing (18) and check ball (19) from C7 clutch housing (11).

(13) Remove three manifold sealrings (20) from C7 clutch housing (11). Discard sealrings.

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

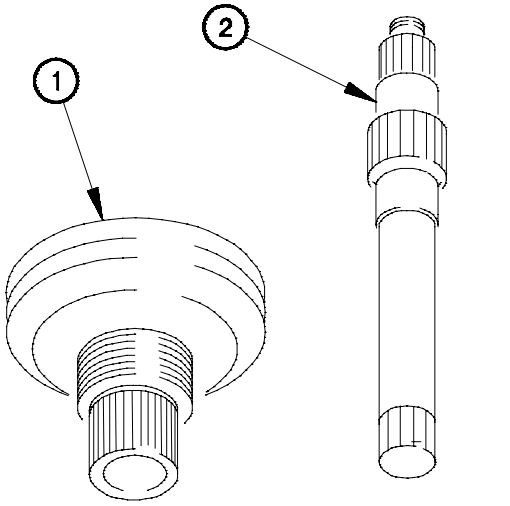
(1) Clean all metal parts with dry cleaning solvent.

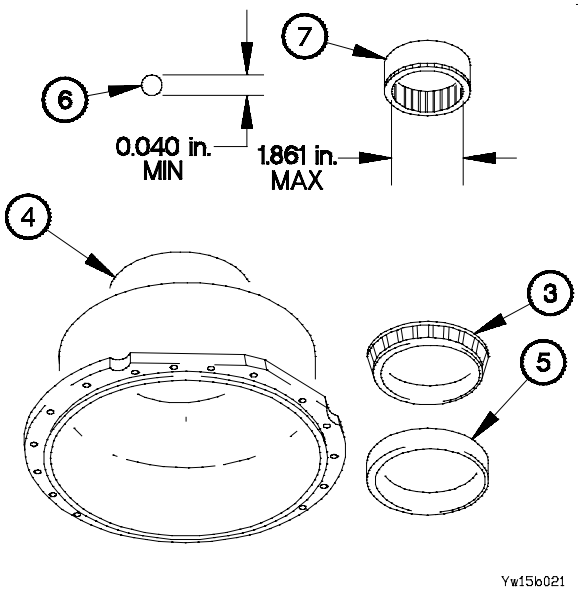
NOTE

Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect C7 clutch housing (1) for scoring, burring, cracks, damage to seal ring grooves, and excessive wear.

(3) Inspect front output shaft (2) for scoring, burring, cracks, deformed splines, and excessive wear.





(4) Inspect two roller bearings (3) for pitting, cage damage, and excessive wear.

(5) Inspect front output housing (4) for cracks, scoring, burring, and excessive wear.

(6) Inspect two roller bearing cups (5) for cracks, scoring, pitting, and excessive wear.

(7) Inspect check ball (6) for damage, excessive wear, and free movement. Minimum free movement 0.040 in. (1.016 mm).

(8) Inspect bushing (7) for excessive wear. Maximum inside diameter 1.861 in. (4.727 cm).

21-15. C7 CLUTCH HOUSING AND FRONT OUTPUT HOUSING ASSEMBLY REPAIR (CONT)

(9) Inspect five C7 friction plates (8) for wear.

(10) Measure thickness (A) of each C7 friction plate (8). Minimum thickness is 0.087 in. (2.210 mm).

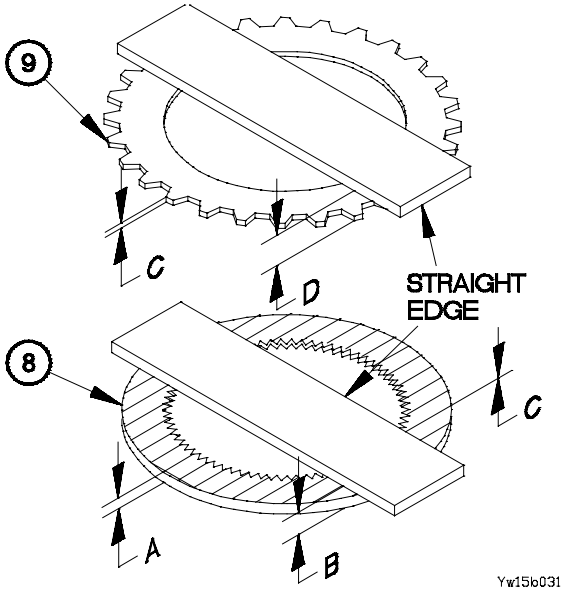
(11) Lay straight edge across each C7 friction plate (8), subtract measurement (B) from (A), maximum bend 0.010 in. (0.254 mm).

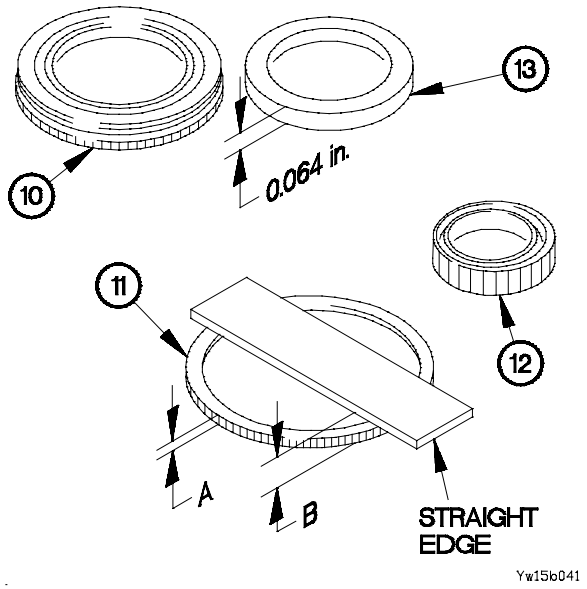
(12) Measure oil groove depth (A) of each C7 friction plate (8), minimum oil groove depth is 0.008 in. (0.203 mm).

(13) Inspect C7 five reaction plates (9) for wear.

(14) Measure thickness (C) of each C7 reaction plate (9). Minimum thickness is 0.083 in. (2.108 mm).

(15) Lay straight edge across each C7 reaction plate (9), subtract measurement (D) from (C), maximum bend is 0.010 in. (0.254 mm).





(16) Inspect C7 piston (10) for excessive seal ring groove wear and burring.

(17) Inspect C7 backing plate (11) for wear.

(18) Measure thickness (A) of each C7 backing plate. Minimum thickness is 0.34 in. (8.64 mm).

(19) Lay straight edge across each C7 backing plate (11), subtract measurement (B) from (A), maximum bend is 0.010 in. (0.254 mm).

(20) Inspect C7 clutch hub (12) for scoring and burring.

(21) Inspect shim(s) (13) for cracks and burring. Measure shims for total thickness of 0.064 in. (1.626 mm). Add or subtract shims to achieve proper dimension.

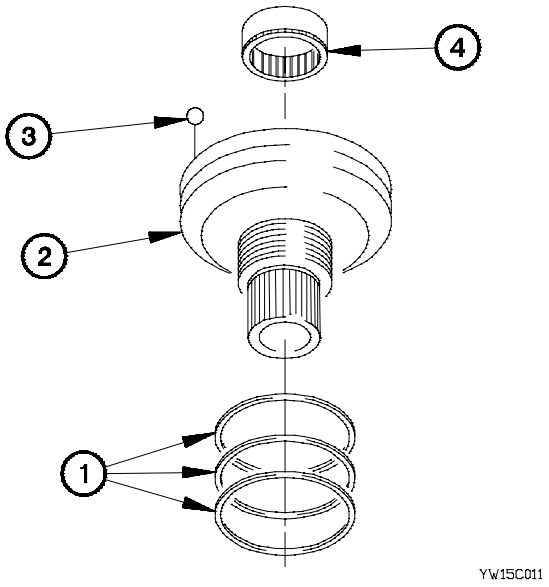
c. Assembly.

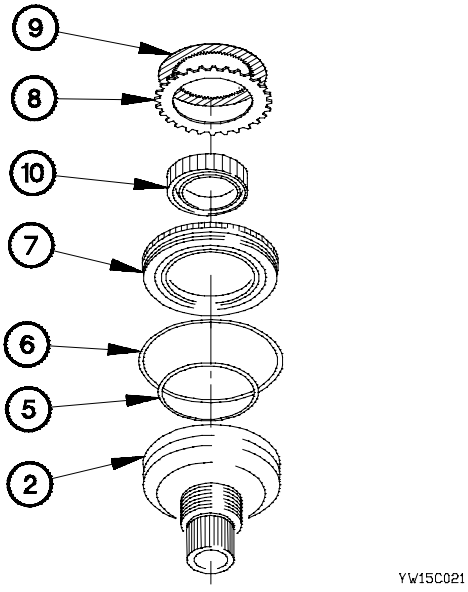
NOTE

Apply lubricating oil to all parts during assembly.

(1) Install three manifold sealrings (1) in grooves at rear of C7 clutch housing (2).

(2) Install check ball (3) and bushing (4) in C7 clutch housing (2).





CAUTION

Sealrings must be installed with bevel down. Failure to comply may result in damage to equipment.

(3) Install internal sealring (5) and external sealring (6) in C7 piston (7).

(4) Install piston (7) in C7 clutch housing (2).

CAUTION

Alternately stack C7 reaction plates and C7 friction plates. Failure to comply may result in damage to equipment.

(5) Install five C7 reaction plates (8) and C7 friction plates (9) on C7 clutch hub (10).

(6) Position clutch hub (10) in clutch housing (2).

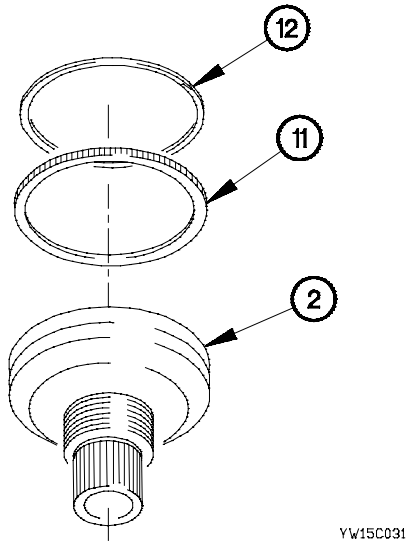
21-15. C7 CLUTCH HOUSING AND FRONT OUTPUT HOUSING ASSEMBLY REPAIR (CONT)

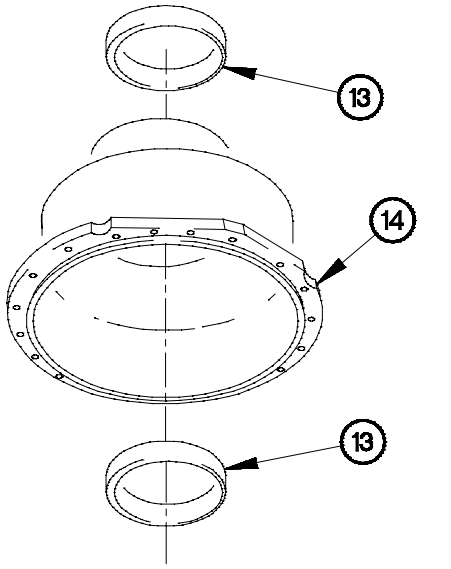
(7) Install C7 backing plate (11) in C7 clutch housing (2).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(8) Install retaining ring (12) in C7 clutch housing (2).



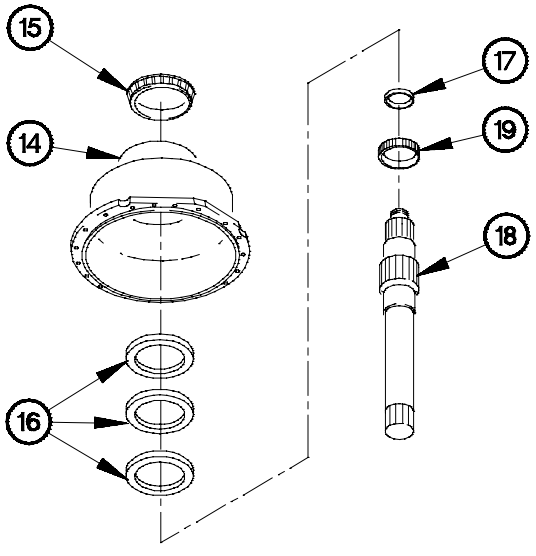


(9) Install two roller bearing cups (13) in front output housing (14).

(10) Install roller bearing cone (15) on front output housing (14).

(11) Install shim(s) (16) and spacer (17) on front output shaft (18).

(12) Install roller bearing cone (19) on front output shaft (18).

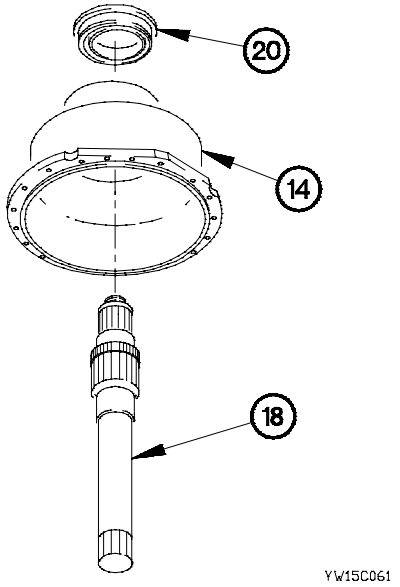


NOTE

Step (13) requires the aid of an assistant.

(13) Install front output shaft (18) in front output housing (14).

(14) Install oil seal (20) in front output housing (14).



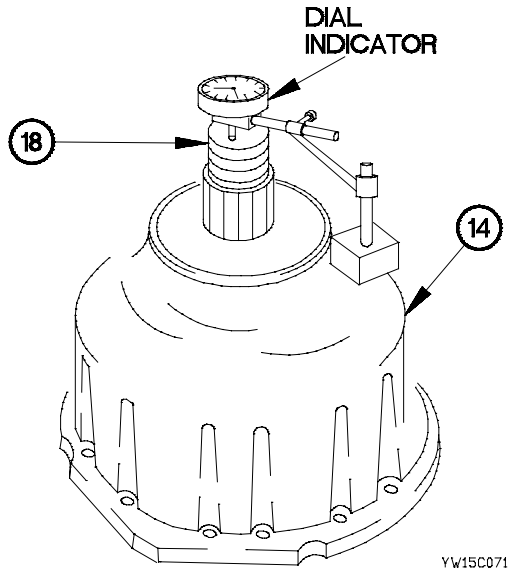
NOTE

Correct bearing preload is attained by removing increments of shim(s). If bearing cup bears on rollers, allowing no movement, disassemble all bearing retention parts.

(15) Install dial indicator on front output housing (14) with stylus on front output shaft (18).

(16) Adjust dial indicator to read zero.

(17) Apply upward lift sufficient to fully seat front output shaft (18).



NOTE

- Dial indicator reading at this point is preliminary end play which exists with initial shim pack thickness of 0.064 in. (1.626 mm).
- If reading is not within tolerance, disassemble front output housing. Replace shim(s) to achieve correct end play and perform steps (9) through (18).

(18) Measure end play of front output shaft (18). Reading should be 0.001-0.005 in. (0.025-0.127 mm). Record reading.

d. Follow-On Maintenance.

Assemble transfer case module (22-3).

End of Task.

CHAPTER 22
POWER TRANSFER AND FINAL DRIVE ASSEMBLY MAINTENANCE

Section I. INTRODUCTION 22-1
22-1. INTRODUCTION 22-1

Section II. MAINTENANCE PROCEDURES 22-2
22-2. DELETED 22-2
22-3. TRANSFER CASE MODULE REPAIR 22-6
22-4. TRANSFER CASE HOUSING REPAIR 22-10

Section I. INTRODUCTION

22-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Transfer Case Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance Level.

Section II. MAINTENANCE PROCEDURES

22-2 DELETED

All data on pages 22-2 through 22-5, including pages 22-3 and 22-4 deleted.

22-3. TRANSFER CASE MODULE REPAIR

This task covers:

a. Disassembly
b. Assembly
c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Transfer case module removed (para 22-2).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Holding Bar, Pinion (TM 9-2320-365-20)
Wrench, Impact, Electric (Item 77, Appendix B)
Multiplier, Torque (Item 35, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Adapter, Socket Wrench (Item 2, Appendix B)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 44, Appendix B)
Socket, Socket Wrench (Item 67, Appendix B)

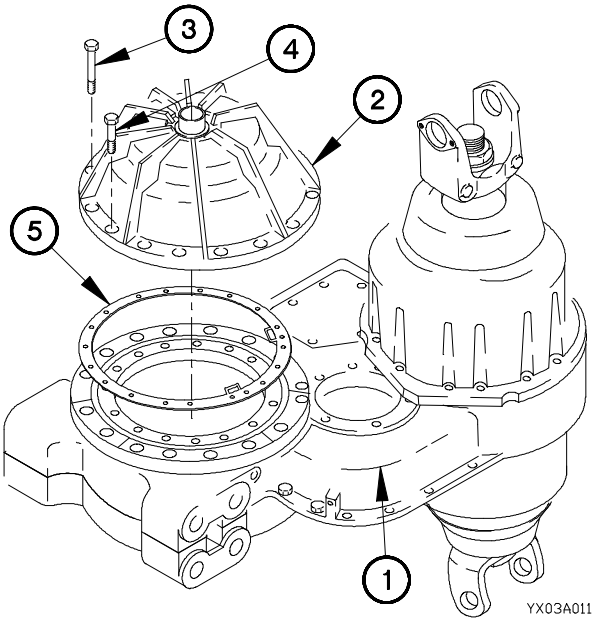
Materials/Parts
Gasket (Item 34, Appendix F)
Gasket (2) (Item 42, Appendix F)
Oil, Lubricating (Item 44, Appendix C)

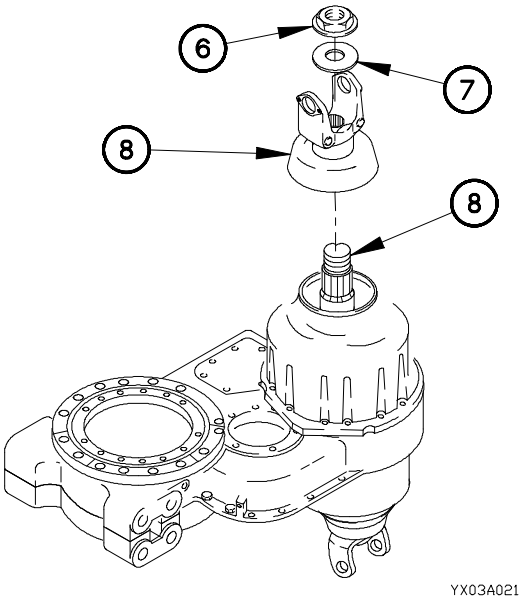
Personnel Required
(2)

a. Disassembly.

(1) Position transfer case module (1) with C6 clutch housing (2) facing up.

(2) Remove 15 screws (3), two screws (4), C6 clutch housing (2), and gasket (5) from transfer case module (1). Discard gasket.





(3) Remove nut (6), washer (7), and yoke (8) from rear output shaft (9).

(4) Remove nine screws (10) and six screws (11) from rear output housing (12).

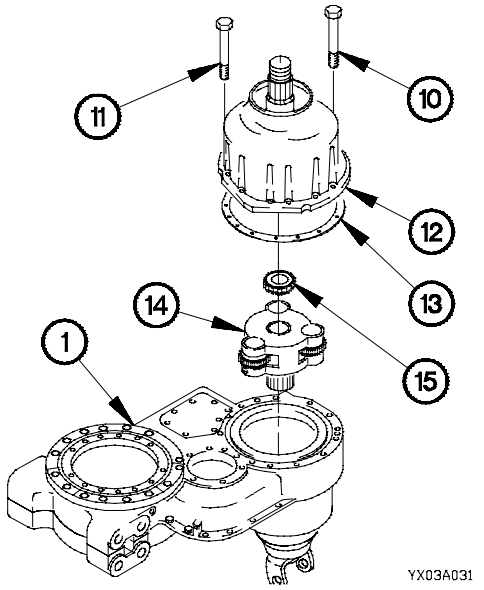
NOTE

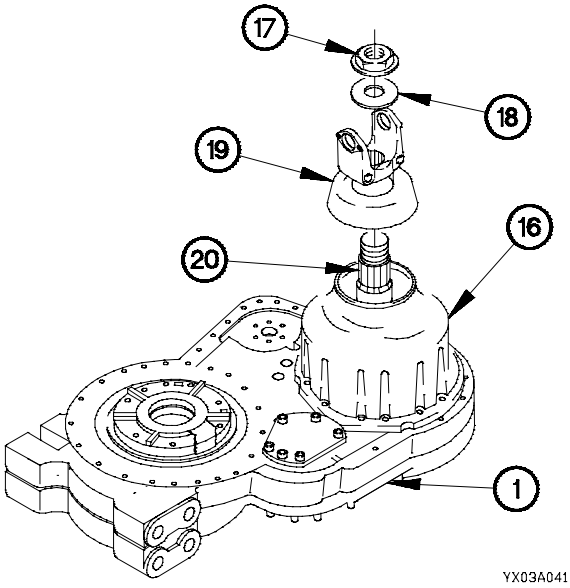
Step (5) requires the aid of an assistant.

(5) Remove rear output housing (12) and gasket (13) from transfer case module (1). Discard gasket.

(6) Remove P4 planetary carrier (14) from transfer case module (1).

(7) Remove sun gear (15) from P4 planetary carrier (14).





(8) Position transfer case module (1) with front output housing (16) facing up.

(9) Remove nut (17), washer (18), and yoke (19) from output shaft (20).

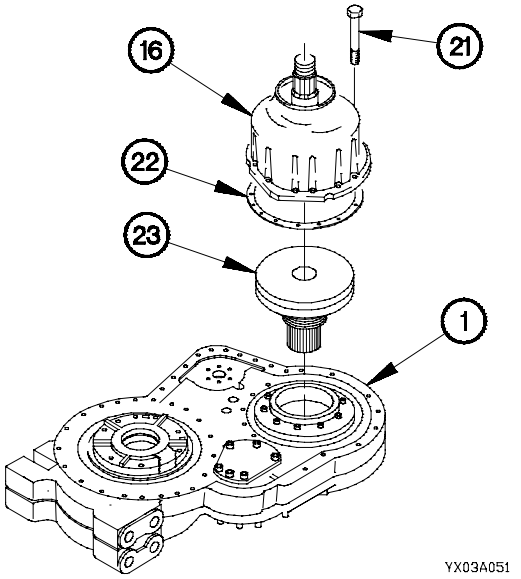
(10) Remove 15 screws (21) from front output housing (16).

NOTE

Step (11) requires the aid of an assistant.

(11) Remove front output housing (16) and gasket (22) from transfer case module (1). Discard gasket.

(12) Remove C7 clutch housing (23) from transfer case module (1).



22-3. TRANSFER CASE MODULE REPAIR (CONT)

b. Assembly.

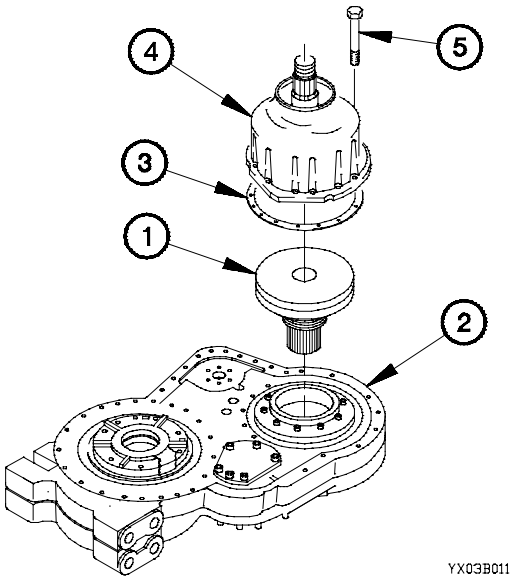
NOTE

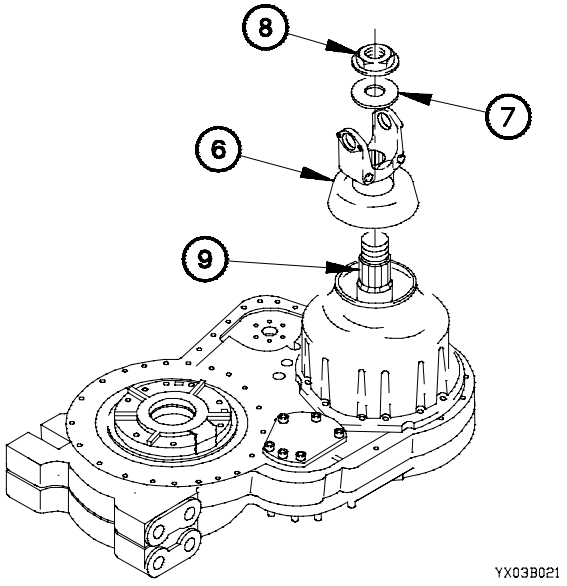
Apply lubricating oil to all parts during assembly.

(1) Install C7 clutch housing (1) in transfer case module (2).

(2) Position gasket (3) and front output housing (4) on transfer case module (2) with 15 screws (5).

(3) Tighten 15 screws (5) to 44-55 lb-ft (60-75 N·m).





(4) Install yoke (6), washer (7), and nut (8) on front output shaft (9).

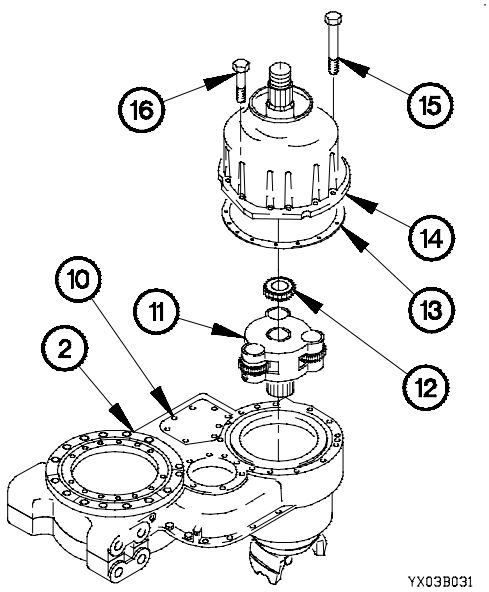
(5) Tighten nut (8) to 450-600 lb-ft (610-814 N·m).

(6) Rotate transfer case module (2) until transfer case cover (10) is facing up.

(7) Install P4 planetary carrier (11) and sun gear (12) in transfer case module (2).

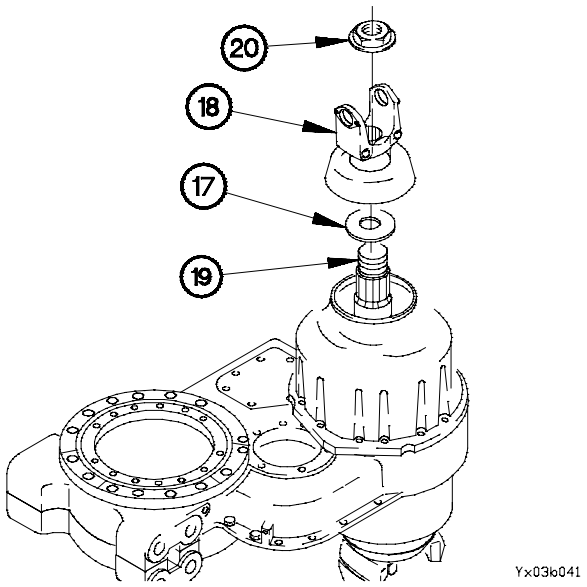
(8) Position gasket (13) and rear output housing (14) on transfer case module (2) with nine screws (15) and six screws (16).

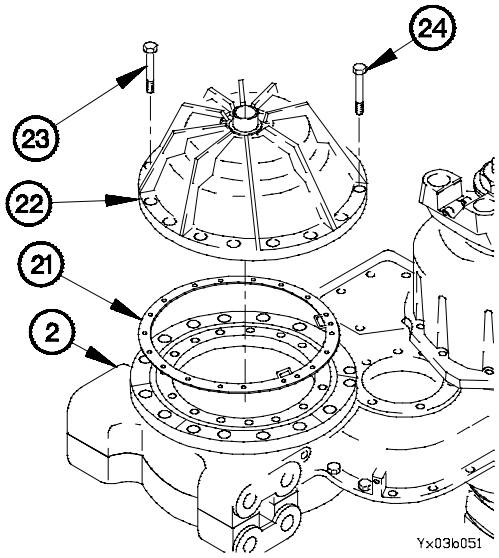
(9) Tighten nine screws (15) and six screws (16) to 44-55 lb-ft (60-75 N·m).



(10) Install washer (17) and yoke (18) on rear output shaft (19) with nut (20).

(11) Tighten nut (20) to 450-600 lb-ft (610-814 N·m).





(12) Position gasket (21) and C6 clutch housing (22) on transfer case module (2) with 15 screws (23) and two screws (24).

(13) Tighten 15 screws (23) and two screws (24) to 44-55 lb-ft (60-75 N·m).

End of Task.

22-4. TRANSFER CASE HOUSING REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Bearing Preload Adjustment
e. Follow-On Maintenance

INITIAL SETUP

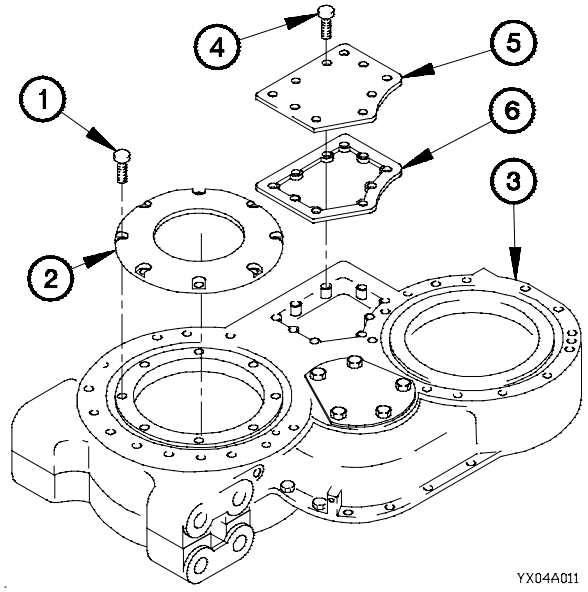
Equipment Conditions
Transfer case module disassembled (para 22-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 79, Appendix B)
Caliper, Vernier (Item 8, Appendix B)
Indicator, Dial (Item 30, Appendix B)
Hammer, Soft Head (Item 28, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-365-20)
Inserter and Remover, Spring (TM 9-2320-365-20)
Puller Kit, Universal (Item 44, Appendix B)
Puller Kit, Universal (Item 43, Appendix B)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Wrench Set, Socket (Item 75, Appendix B)

Materials/Parts
Gasket (Item 41, Appendix F)
Gasket (2) (Item 40, Appendix F)
Seal, Washer (2) (Item 301, Appendix F)
Gasket (Item 44, Appendix F)
Gasket (Item 39, Appendix F)
Packing, Preformed (Item 169, Appendix F)
Packing, Preformed (3) (Item 170, Appendix F)
Oil, Lubricating (Item 36, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Solvent, Dry Cleaning (Item 81, Appendix C)

Personnel Required
(2)

a. Disassembly.



(1) Remove eight screws (1) from C6 bearing retainer (2).

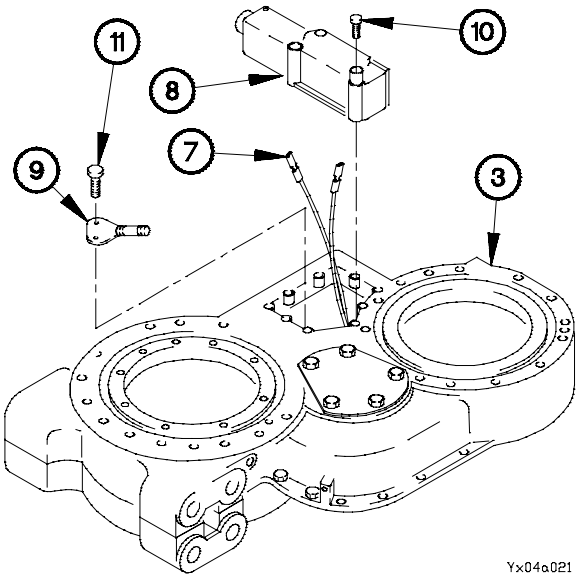
(2) Remove C6 bearing retainer (2) from transfer case cover (3).

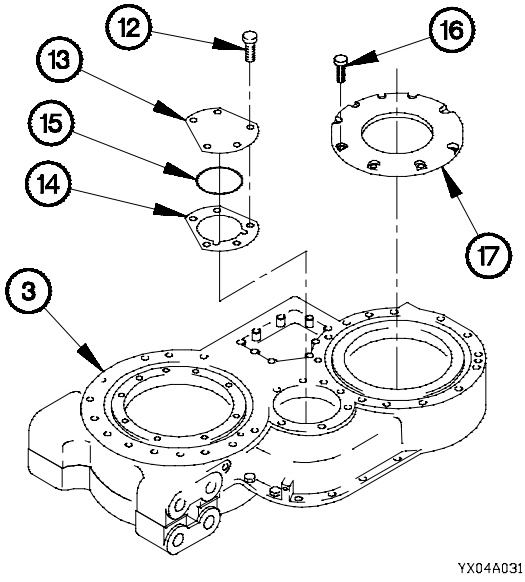
(3) Remove 10 screws (4), access cover (5), and gasket (6) from transfer case cover (3). Discard gasket.

(4) Disconnect wiring harness (7) from control valve (8) and output speed sensor (9).

(5) Remove six screws (10) and control valve (8) from transfer case cover (3).

(6) Remove two screws (11) and output speed sensor (9) from transfer case cover (3).

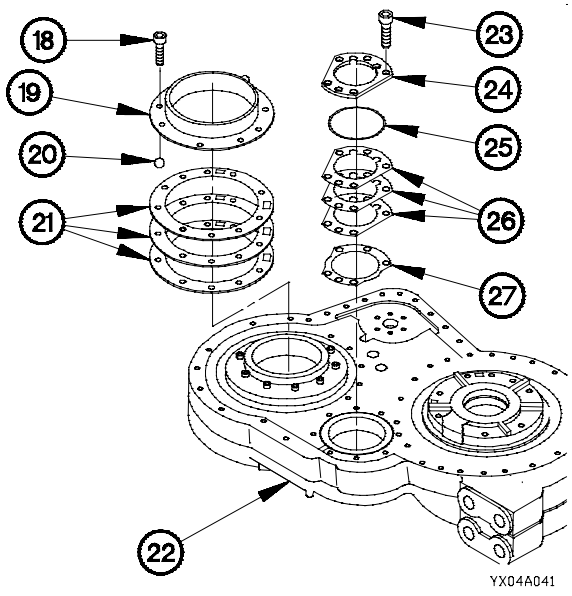




(7) Remove five screws (12), idler gear cover (13), and gasket (14) from transfer case cover (3). Discard gasket.

(8) Remove seal washer (15) from idler gear cover (13). Discard seal washer.

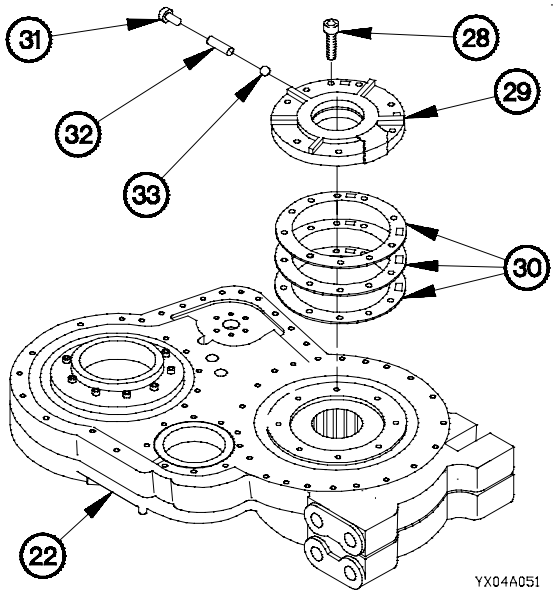
(9) Remove eight bolts (16) and rear output bearing retainer (17) from transfer case cover (3).



(10) Remove eight bolts (18), manifold (19), pressure relief ball (20), and shim(s) (21) from transfer case housing (22).

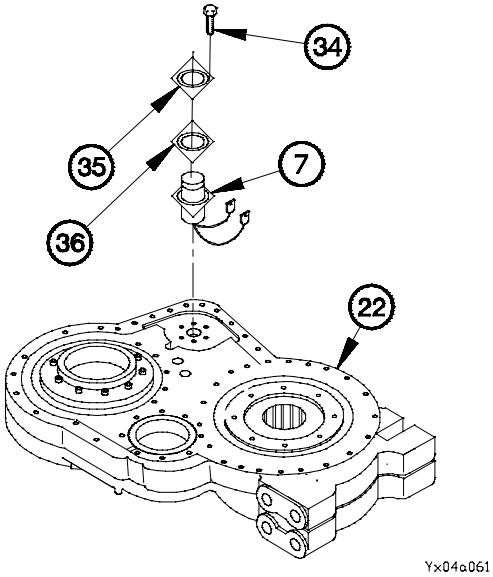
(11) Remove five bolts (23), idler gear cover (24), seal washer (25), shim(s) (26), and gasket (27) from transfer case housing (22). Discard gasket and seal washer.

22-4. TRANSFER CASE HOUSING REPAIR (CONT)



(12) Remove eight bolts (28), oil pump (29), and shim(s) (30) from transfer case housing (22).

(13) Remove plug (31), spring (32), and pressure relief valve (33) from oil pump (29).



(14) Remove four screws (34), cover plate (35), gasket (36), and wiring harness (7) from transfer case housing (22). Discard gasket.

(15) Rotate transfer case housing (22) until transfer case cover (3) is facing up.

(16) Remove 15 bolts (37) from transfer case cover (3).

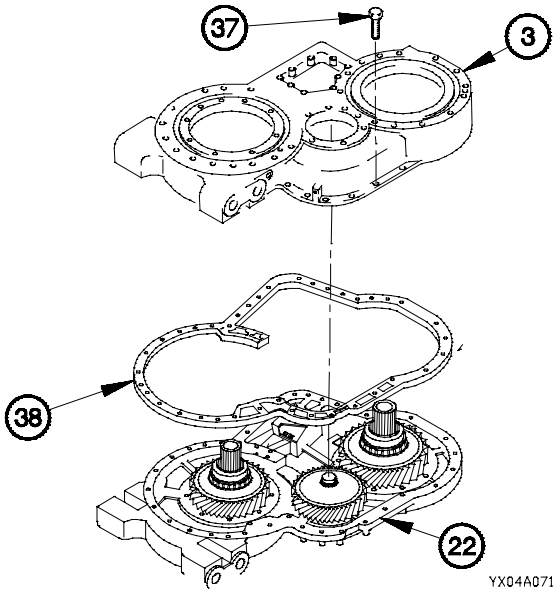
WARNING

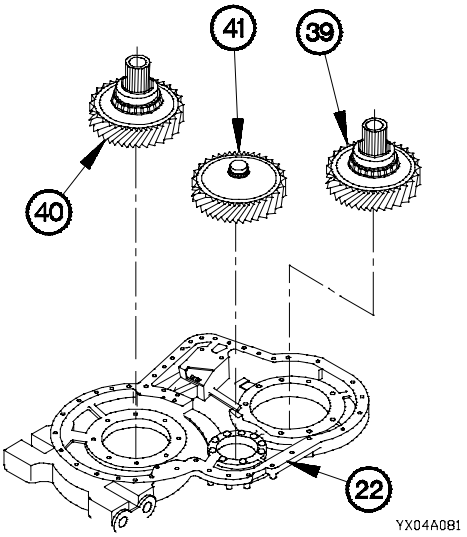
Transfer case cover weighs approximately 75 lbs (34 kgs). The aid of an assistant is required to safely lift it. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (17) requires the aid of an assistant.

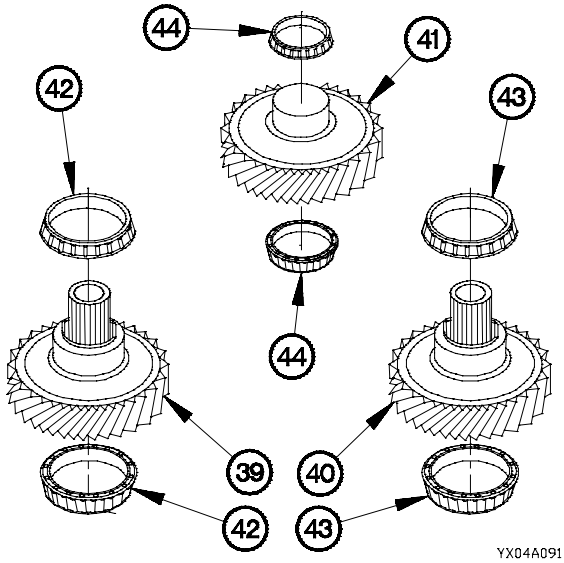
(17) Remove transfer case cover (3), and gasket (38) from transfer case housing (22). Discard gasket.





(18) Remove lower driven gear (39) from transfer case housing (22).

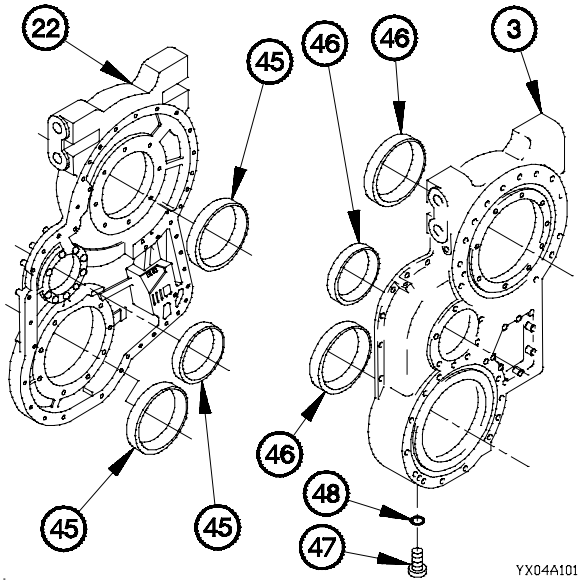
(19) Remove upper drive gear (40) and center idler gear (41) from transfer case housing (22).



(20) Remove two bearing cones (42) from lower driven gear (39).

(21) Remove two bearing cones (43) from upper drive gear (40).

(22) Remove two bearing cones (44) from center idler gear (41).



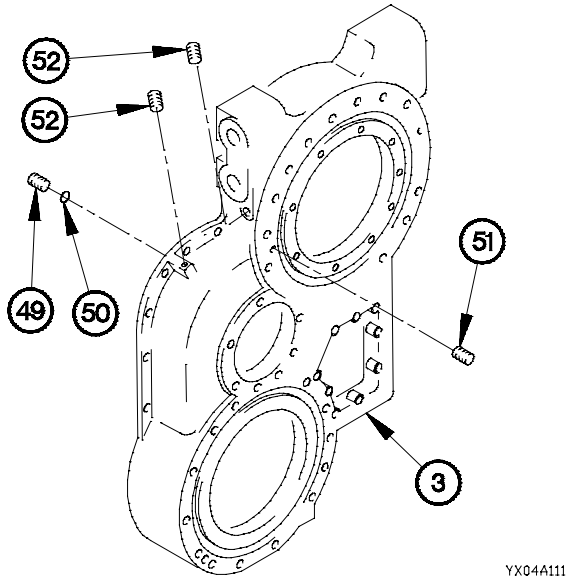
(23) Remove three bearing cups (45) from transfer case housing (22).

(24) Remove three bearing cups (46) from transfer case cover (3).

(25) Remove plug (47) from transfer case cover (3).

(26) Remove preformed packing (48) from plug (47). Discard preformed packing.

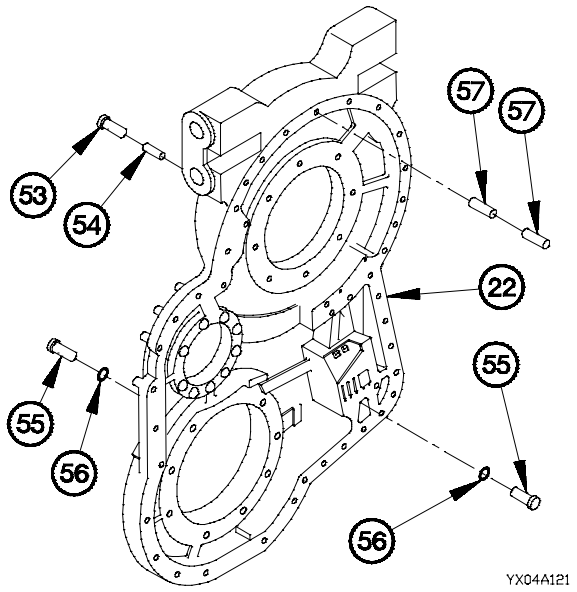
22-4. TRANSFER CASE HOUSING REPAIR (CONT)



(27) Remove plug (49) from transfer case cover (3).

(28) Remove preformed packing (50) from plug (49). Discard preformed packing.

(29) Remove plug (51) and two orifice plugs (52) from transfer case cover (3).



(30) Remove plug (53) and orifice plug (54) from transfer case housing (22).

(31) Remove two plugs (55) from transfer case housing (22).

(32) Remove two preformed packings (56) from plugs (55). Discard preformed packings.

(33) Remove two dowels (57) from transfer case housing (22).

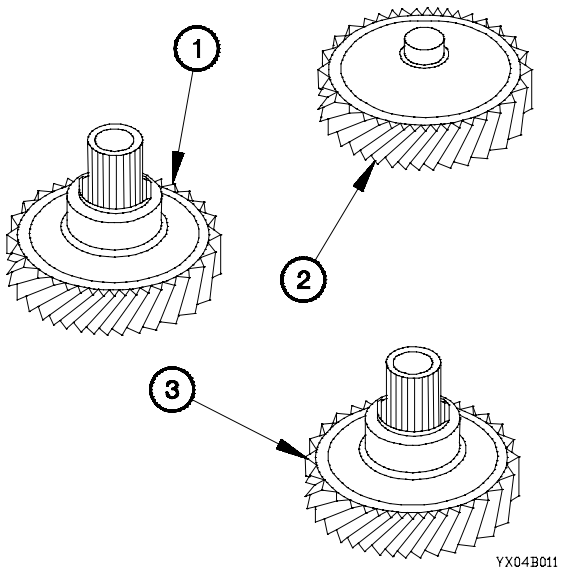
b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.



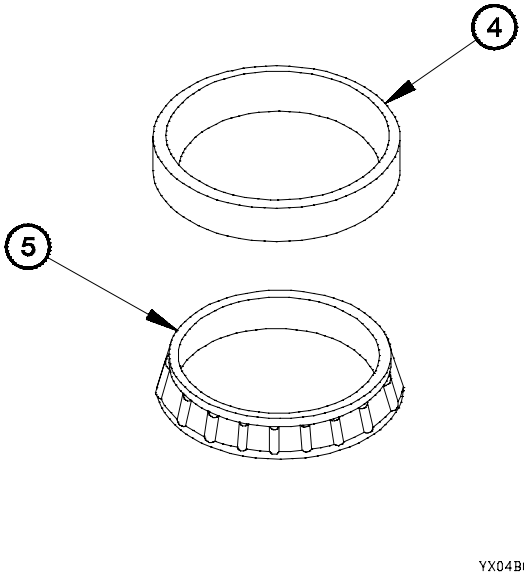
NOTE

Replace any part that fails visual inspection.

(2) Inspect upper drive gear (1) for cracks, pitting, scoring, burring, and broken gear teeth.

(3) Inspect center idler gear (2) for cracks, pitting, scoring, burring, and broken gear teeth.

(4) Inspect lower driven gear (3) for cracks, pitting, scoring, burring, and broken gear teeth.

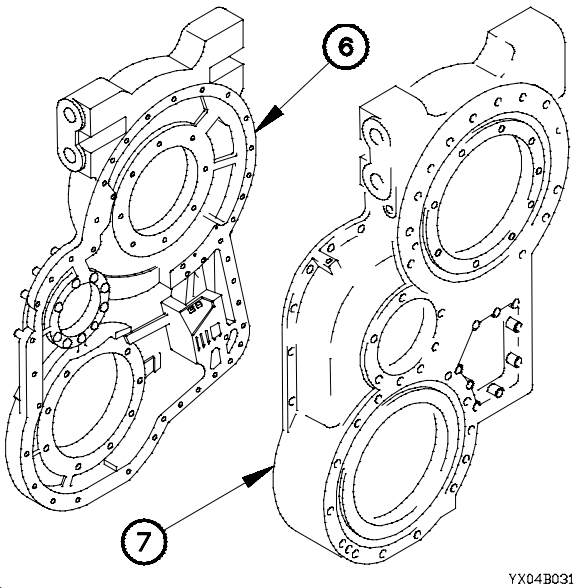


CAUTION

Bearing cones and cups must be replaced as a set. Never use an old bearing cone or cup with a new bearing cone or cup. Failure to comply may result in damage to equipment.

(5) Inspect six bearing cups (4) for pitting and excessive wear.

(6) Inspect six bearing cones (5) for pitting and excessive wear.



(7) Inspect transfer case housing (6) for cracks, scoring, and burring.

(8) Inspect transfer case cover (7) for cracks, scoring, and burring.

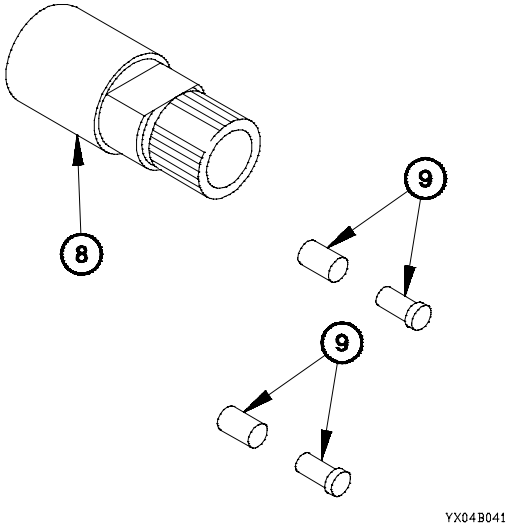
22-4. TRANSFER CASE HOUSING REPAIR (CONT)

NOTE

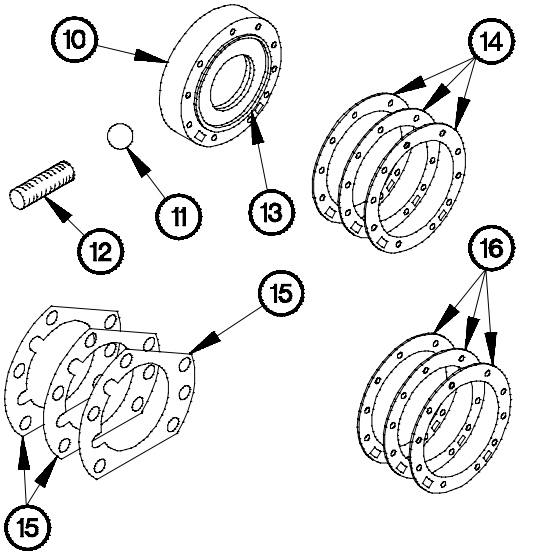
Transmission shaft adapter may have stayed with transmission.

(9) Inspect transmission shaft adapter (8) for cracks, spline wear, and burring.

(10) Inspect four plugs (9) for corrosion, pitting, and stripped threads.



YX04B041



YX04B051

(11) Inspect oil pump (10) for cracks, burring, nicks, and scratches.

(12) Inspect pressure relief valve (11) for damage, scratches, and wear.

(13) Inspect spring (12) for worn or broken coils.

(14) Inspect gear (13) for burring, nicks, scratches, and broken gear teeth.

(15) Inspect shims (14, 15 and 16) for cracks, nicks, and burring.

c. Assembly.

NOTE

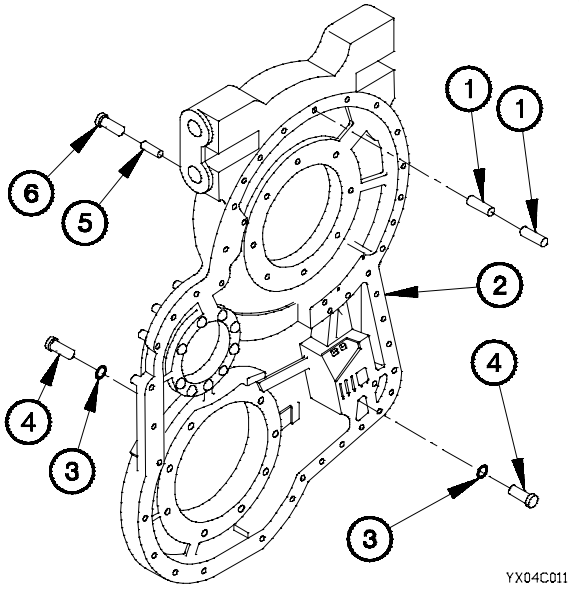
Lubricate all parts with lubricating oil during assembly.

(1) Install two dowels (1) in transfer case housing (2).

(2) Install two preformed packings (3) on plugs (4).

(3) Install two plugs (4) in transfer case housing (2).

(4) Install orifice plug (5) and plug (6) in transfer case housing (2).

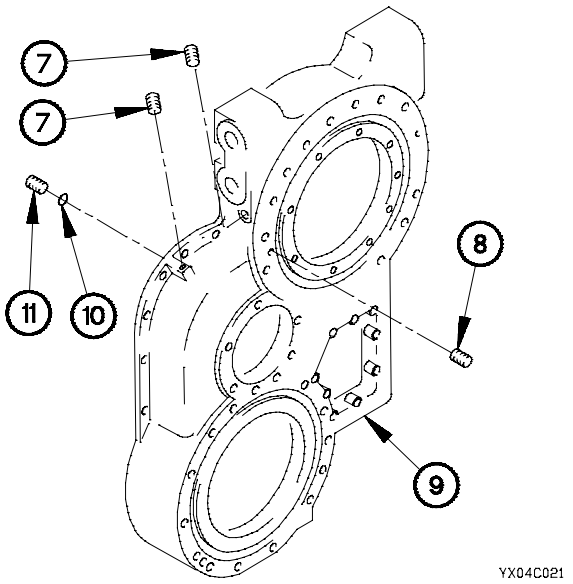


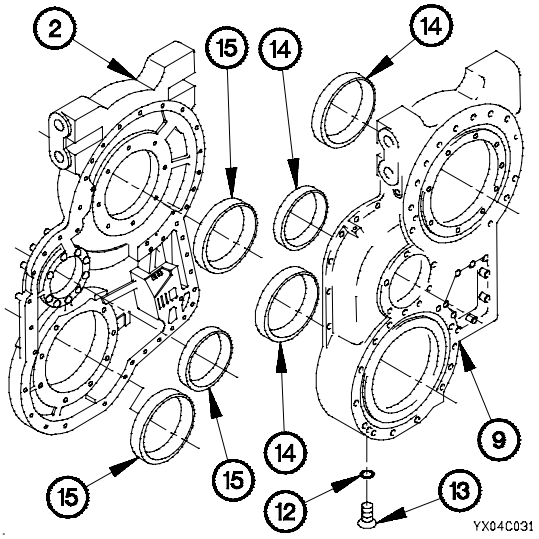
YX04C011

(5) Install two orifice plugs (7) and plug (8) in transfer case cover (9).

(6) Install preformed packing (10) on plug (11).

(7) Install plug (11) in transfer case cover (9).





(8) Install preformed packing (12) on plug (13).

(9) Install plug (13) in transfer case cover (9).

NOTE

Place all bearing cups in a freezer for a minimum of one hour prior to installation.

(10) Install three bearing cups (14) in transfer case cover (9).

(11) Install three bearing cups (15) in transfer case housing (2).

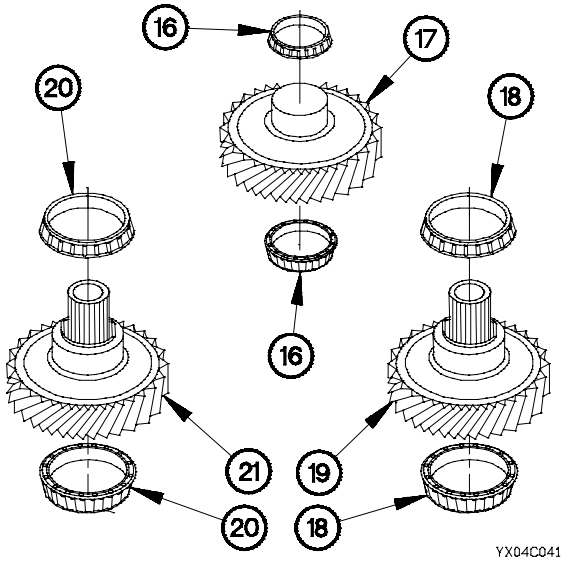
CAUTION

Bearing cones must be seated against shoulder of gears. Failure to comply may result in damage to equipment.

(12) Install two bearing cones (16) on center idler gear (17).

(13) Install two bearing cones (18) on upper drive gear (19).

(14) Install two bearing cones (20) on lower driven gear (21).



22-4. TRANSFER CASE HOUSING REPAIR (CONT)

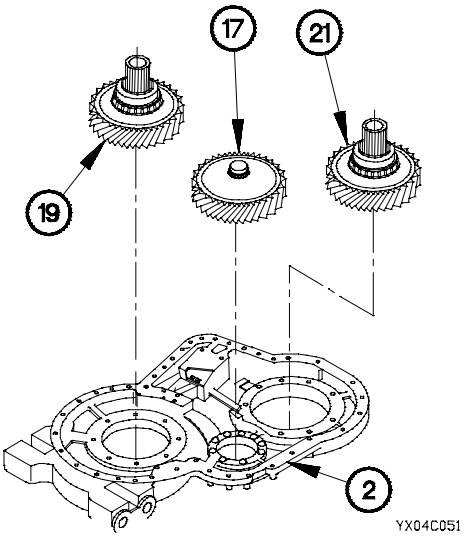
(15) Rotate transfer case housing (2) until open end is facing up.

CAUTION

Ensure center idler, upper drive, and lower driven gears with bearing cones are seated in transfer case housing. Failure to comply may result in damage to equipment.

NOTE

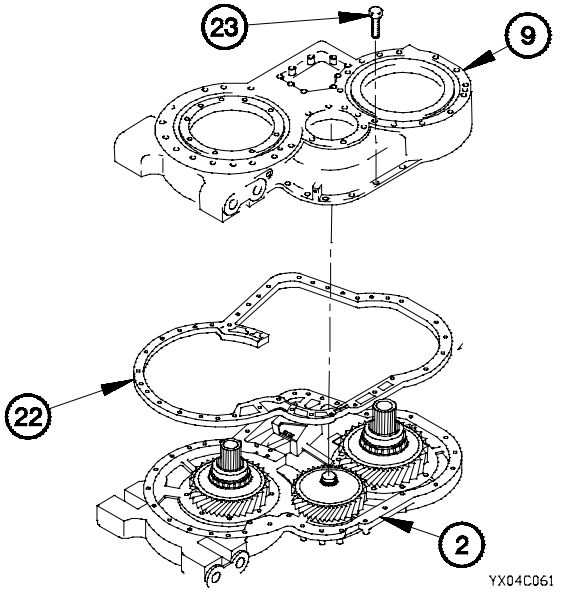
Install idler gear with threaded hole toward transfer case housing.



(16) Install center idler gear (17) in transfer case housing (2).

(17) Install upper drive gear (19) in transfer case housing (2).

(18) Install lower driven gear (21) in transfer case housing (2).



WARNING

Transfer case cover weighs approximately 75 lbs (34 kgs). The aid of an assistant is required to safely lift it. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (19) requires the aid of an assistant.

(19) Install gasket (22) and transfer case cover (9) on transfer case housing (2).

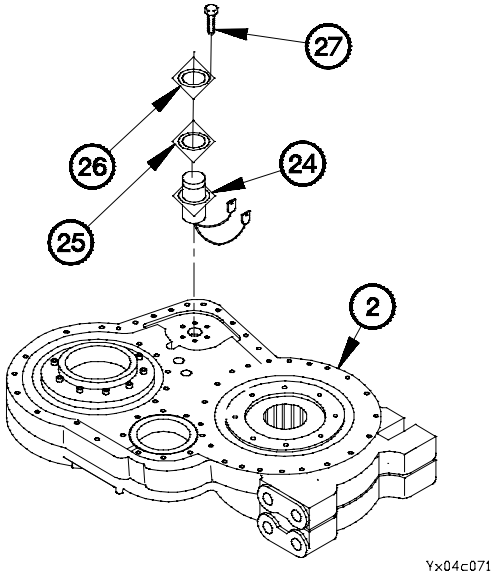
(20) Position 15 bolts (23) in transfer case housing (2).

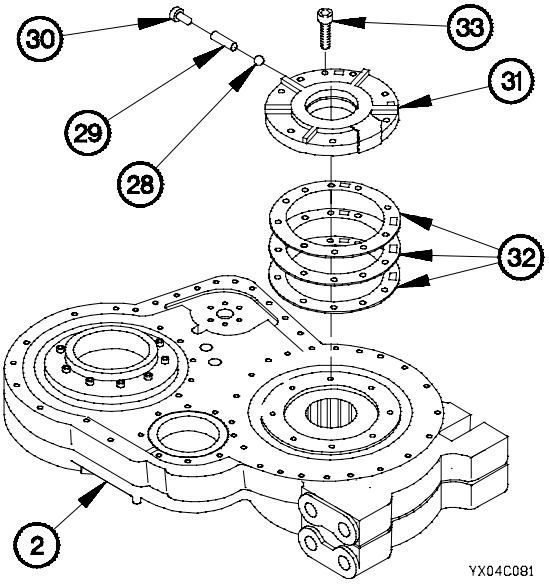
(21) Tighten 15 bolts (23) to 44-55 lb-ft (60-75 N·m).

(22) Rotate transfer case cover (9) until transfer case housing (2) is facing up.

(23) Position wiring harness (24), gasket (25), and cover plate (26) on transfer case housing (2) with four screws (27).

(24) Tighten four screws (27) to 4-6 lb-ft (5-8 N·m).





(25) Position pressure relief valve (28), spring (29), and plug (30) in oil pump (31).

(26) Tighten plug (30) to 18 lb-ft (24 N·m).

(27) Position shim(s) (32) and oil pump (31) on transfer case housing (2) with eight bolts (33).

(28) Tighten eight bolts (33) to 44-55 lb-ft (60-75 N·m).

NOTE

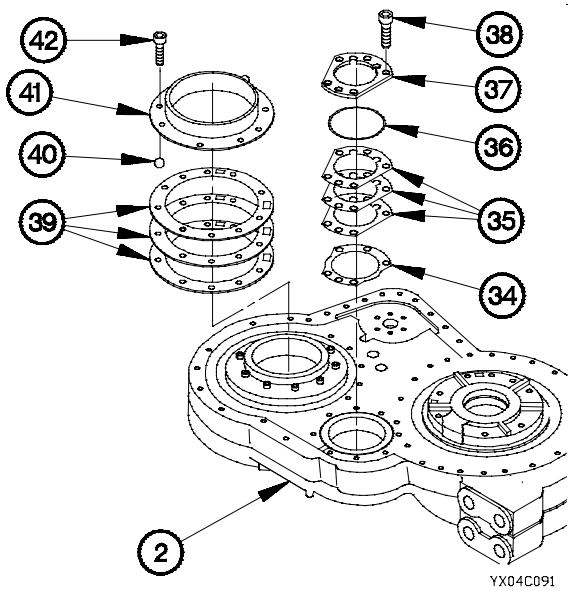
Shim(s) are selected during bearing preload adjustment (para. 22-4.d) to compensate for differences in drive gear end play. The initial shim(s) should have a minimum thickness of 0.076 in. (1.930 mm).

(29) Position gasket (34), shim(s) (35), seal washer (36), and idler gear cover (37) on transfer case housing (2) with five bolts (38).

(30) Tighten five bolts (38) to 44-55 lb-ft (60-75 N·m).

(31) Position shim(s) (39), pressure relief ball (40), and manifold (41) on transfer case housing (2) with eight bolts (42).

(32) Tighten eight bolts (42) to 44-55 lb-ft (60-75 N·m)

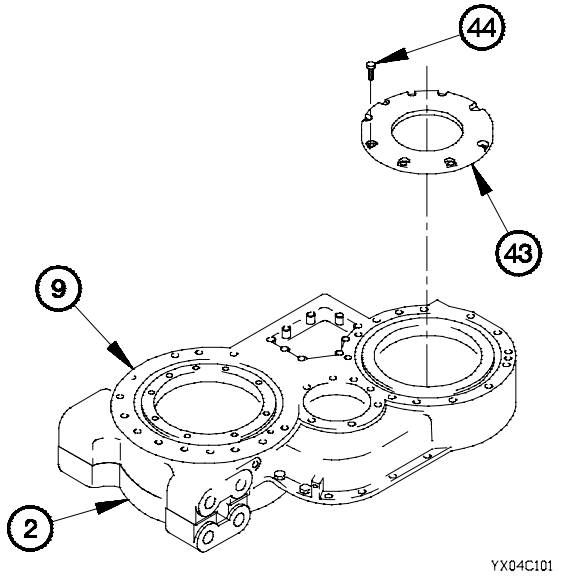


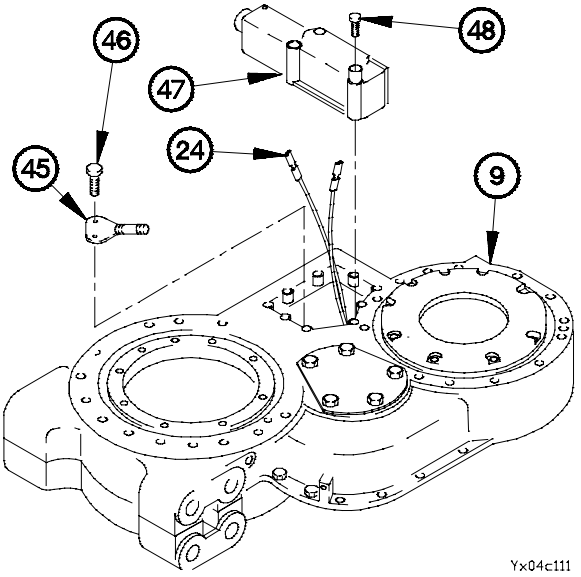
22-4. TRANSFER CASE HOUSING REPAIR (CONT)

(33) Rotate transfer case housing (2) until transfer case cover (9) is facing up.

(34) Position rear output bearing retainer (43) on transfer case cover (9) with eight bolts (44).

(35) Tighten eight bolts (44) to 44-55 lb-ft (60-75 N·m)





(36) Position output speed sensor (45) in transfer case cover (9) with two screws (46).

(37) Tighten two screws (46) to 7-10 lb-ft (9-14 N·m).

(38) Position control valve (47) in transfer case cover (9) with six screws (48).

(39) Tighten six screws (48) to 7-10 lb-ft (9-14 N·m).

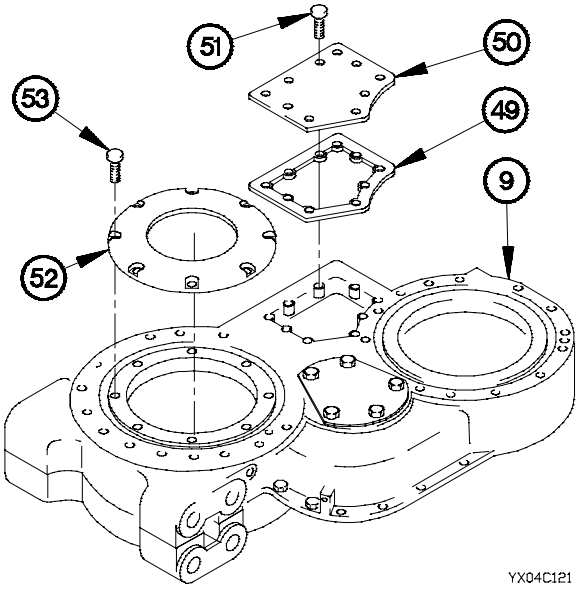
(40) Connect wiring harness (24) to output speed sensor (45) and control valve (47).

(41) Position gasket (49) and access cover (50) on transfer case cover (9) with 10 bolts (51).

(42) Tighten 10 bolts (51) to 18-21 lb-ft (24-29 N·m)

(43) Position C6 bearing retainer (52) on transfer case cover (9) with eight bolts (53).

(44) Tighten eight bolts (53) to 44-55 lb-ft (60-75 N·m)



d. Bearing Preload Adjustment.

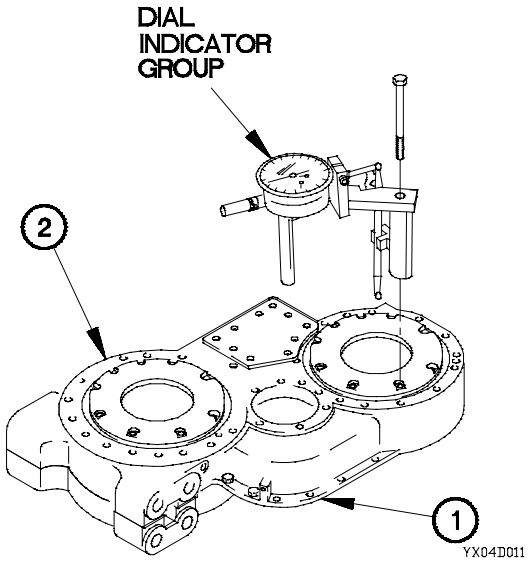
(1) Rotate transfer case housing (1) until transfer case cover (2) is facing up.

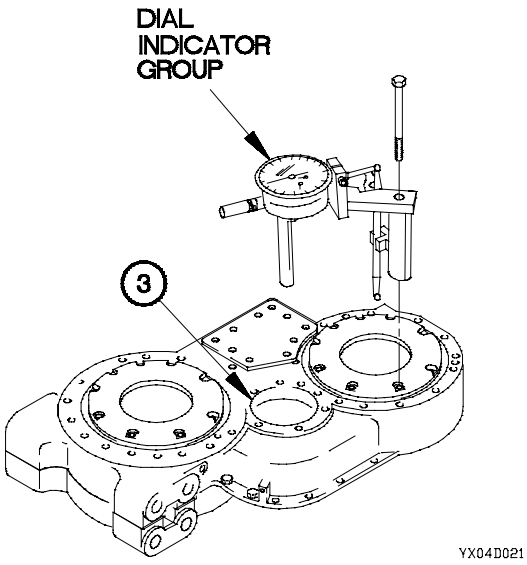
NOTE

Center idler gear, lower drive gear, and upper drive gear end play readings are measured the same way. Perform the following steps to measure end play for all three gears.

(2) Install dial indicator on transfer case cover (2).

(3) Adjust dial indicator to read zero.





NOTE

Upward force on bearing collar is required to obtain end play reading. For lower and upper drive gear bearings, apply upward force from the bottom side. For idler gear bearing, a bolt and large washer are installed in threaded end of idler gear shaft. Upward force is applied by lifting up on the washer.

(4) Apply upward force sufficient to fully seat bearing (3).

(5) The dial reading at this point is the preliminary end play which exists with the shim(s) of 0.076 in. (1.930 mm).

(6) Measure end play of bearing (3). Reading should be 0.001-0.005 in. (0.0254-0.127 mm).

22-4. TRANSFER CASE HOUSING REPAIR (CONT)

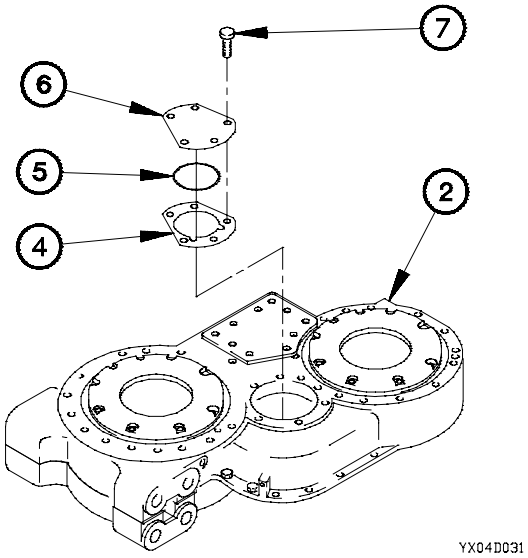
NOTE

If reading is not within tolerance, disassemble bearing retainer or idler gear cover on transfer case cover side. Replace shim(s) with proper thickness to get correct end play. Repeat steps (28) through (33) and steps (1) through (6) above.

(7) Install gasket (4) and seal washer (5) on idler gear cover (6).

(8) Position idler gear cover (6) on transfer case cover (2) with five bolts (7).

(9) Tighten five bolts (7) to 44-55 lb-ft (60-75 N·m).



e. Follow-On Maintenance.

Assemble transfer case module (para 22-3).

End of Task.

CHAPTER 23
FRONT AXLE MAINTENANCE

Section I. INTRODUCTION 23-1
23-1. INTRODUCTION 23-1

Section II. MAINTENANCE PROCEDURE 23-2
23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR 23-2

Section I. INTRODUCTION

23-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Front Axle Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

Section II. MAINTENANCE PROCEDURE

23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Adjustment

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Stand, Differential Carrier, Repair (TM 9-2320-365-20)
Puller Kit, Universal (Item 44, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Indicator Dial (Item 30, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Multiplier, Torque (Item 35, Appendix B)
Holding Bar, Pinion (TM 9-2320-365-20)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Puller Kit, Universal (TM 9-2320-365-20)
Caliper Set, Micrometer, Outside (Item 7, Appendix B)
Socket Set, Impact (Item 50, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)

Materials/Parts
Sealant, Adhesive (Item 65, Appendix C)
Sealant, Adhesive (Item 66, Appendix C)
Sealant, Adhesive (Item 67, Appendix C)
Adhesive (Item 6, Appendix C)
Compound, Sealing (Item 70, Appendix C)
Compound, Sealing (Item 75.2, Appendix C)
Lubricating Oil Gear (Item 51, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Nut, Self-Locking (Item 144, Appendix F)
Kit, Seal (Item 263.1, Appendix F)
Pin, Cotter (2) (Item 225, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

Personnel Required
(2)

a. Disassembly.

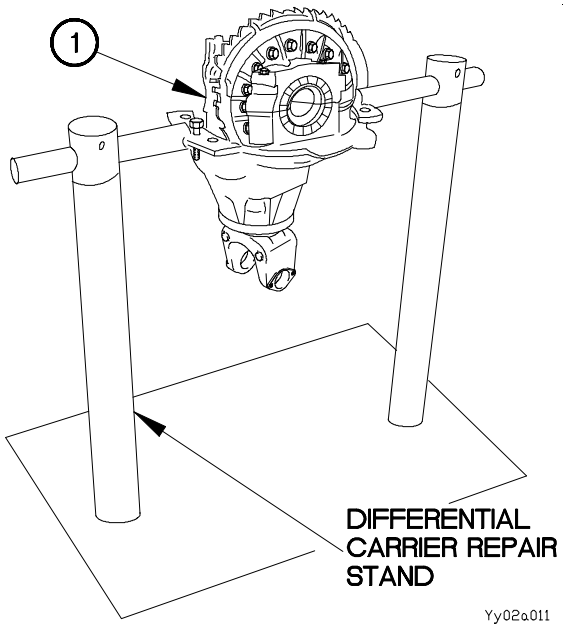
WARNING

Front axle differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to moving. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of an assistant.

(1) Install differential carrier (1) on differential carrier repair stand.



(2) Remove self-locking nut (2) from pinion drive (3). Discard self-locking nut.

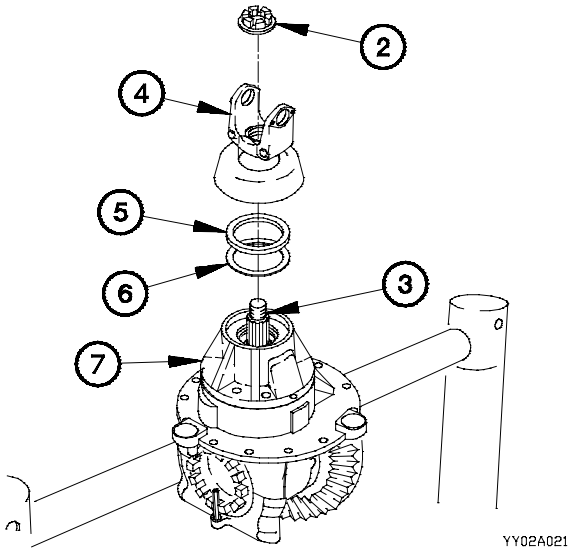
(3) Remove input yoke (4) from pinion drive (3).

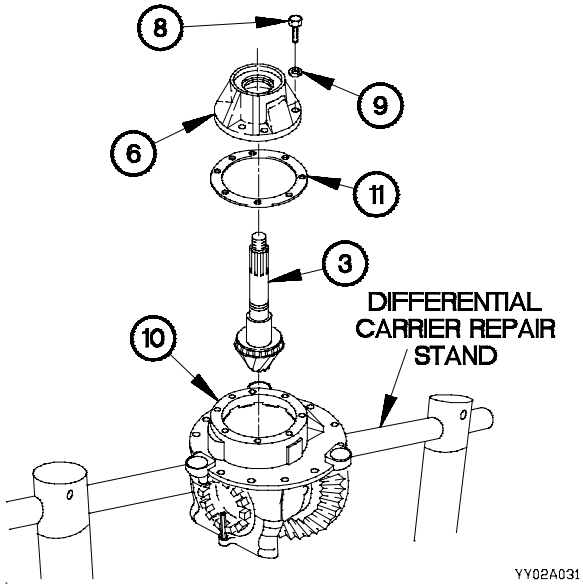
NOTE

Vehicles serial number 0001 through 3133 were not originally equipped with yoke seals. Yoke seals may not be present if maintenance has not been performed previously on input yoke.

(4) Remove yoke seal (5) from input yoke (4). Discard yoke seal.

(5) Remove pinion seal (6) from bearing cage (7). Discard seal.





(6) Remove eight screws (8) and washers (9) from bearing cage (6).

(7) Remove bearing cage (6) from differential carrier housing (10).

(8) Remove pinion drive (3) from bearing cage (6).

NOTE

Number of shims may vary.

(9) Remove shims (11) from differential carrier housing (10).

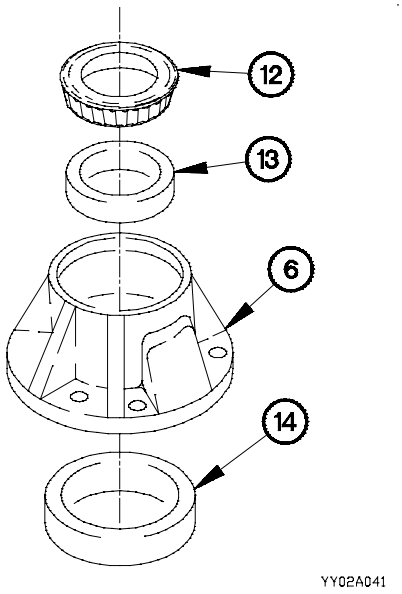
(10) Measure and record the thickness of shims (11).

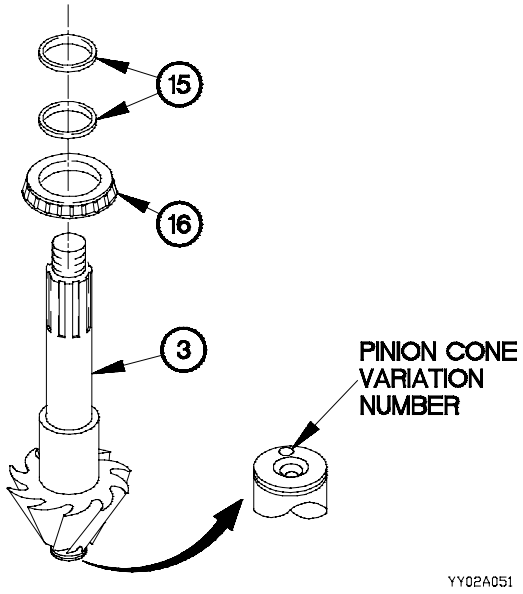
23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(11) Remove outer bearing cone (12) from bearing cage (6).

(12) Remove outer bearing cup (13) from bearing cage (6).

(13) Remove inner bearing cup (14) from bearing cage (6).



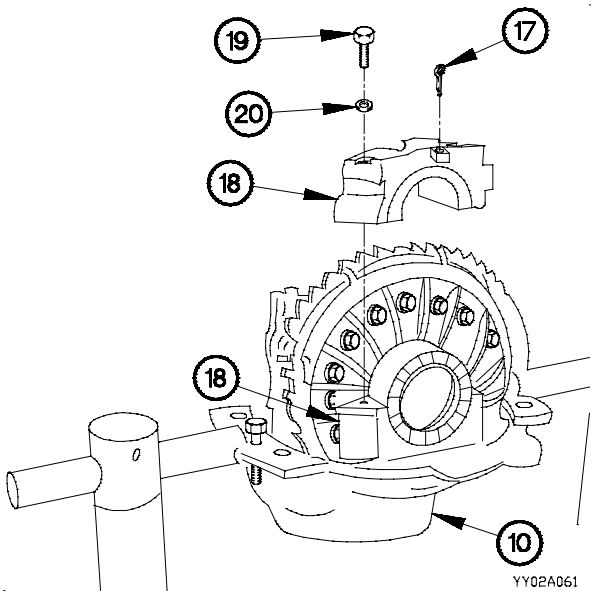


(14) Remove two bearing spacers (15) and inner bearing cone (16) from pinion drive (3).

(15) Record pinion cone variation number located on gear end of pinion drive (3).

(16) Remove two cotter pins (17) from differential bearing caps (18). Discard cotter pins.

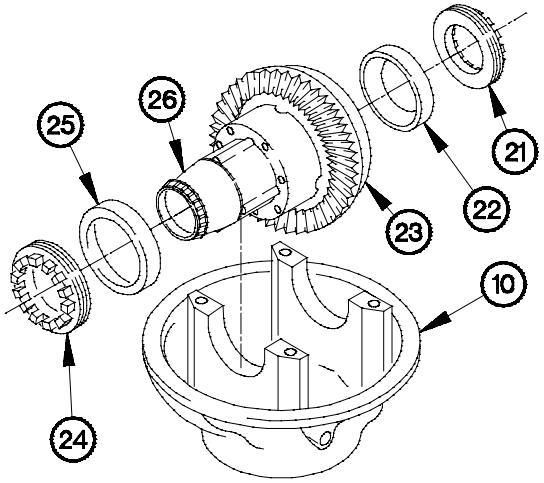
(17) Remove four screws (19), washers (20), and two differential bearing caps (18) from differential carrier housing (10).



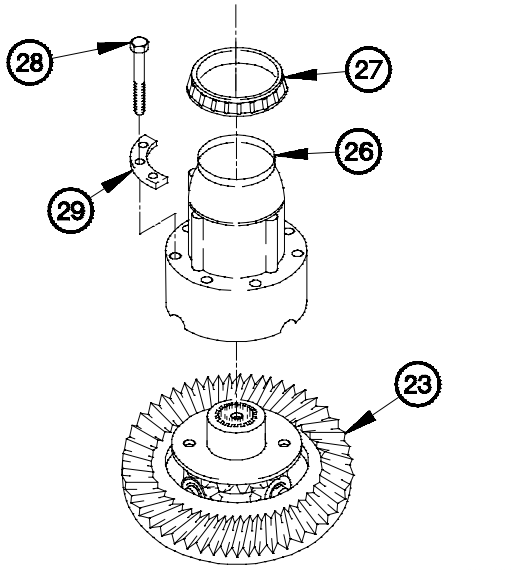
(18) Remove adjusting ring (21) and bearing cup (22) from ring gear (23).

(19) Remove adjusting ring (24) and bearing cup (25) from differential case (26).

(20) Remove ring gear (23) and differential case (26) from differential carrier housing (10).



YY02A071



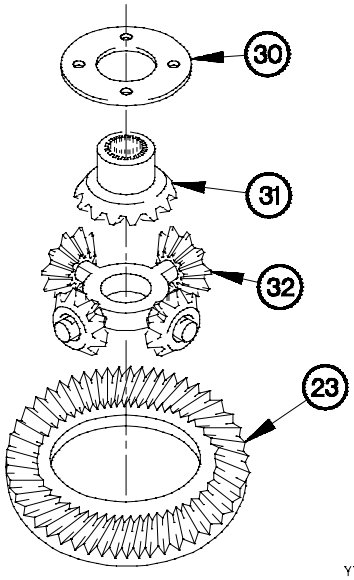
YY02A081

(21) Remove bearing cone (27) from differential case (26).

(22) Remove 12 screws (28) and four plate spacers (29) from differential case (26).

(23) Remove differential case (26) from ring gear (23).

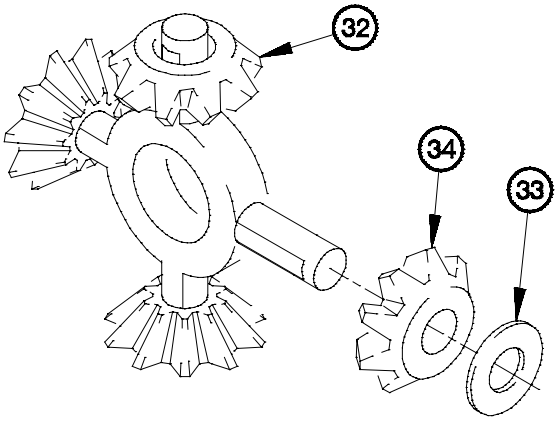
(24) Remove thrust washer (30), side gear (31), and differential spider (32) from ring gear (23).



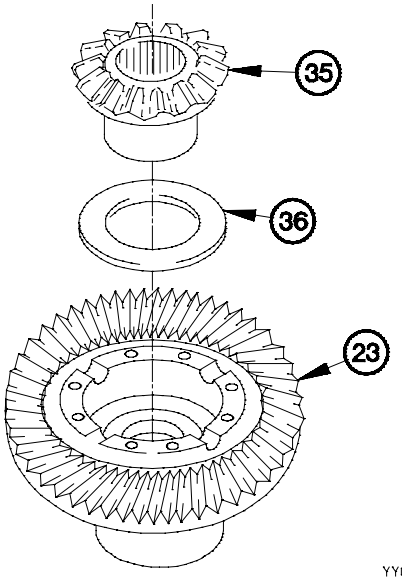
YY02A091

23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(25) Remove four thrust washers (33) and differential pinion gears (34) from differential spider (32).



YY02A101

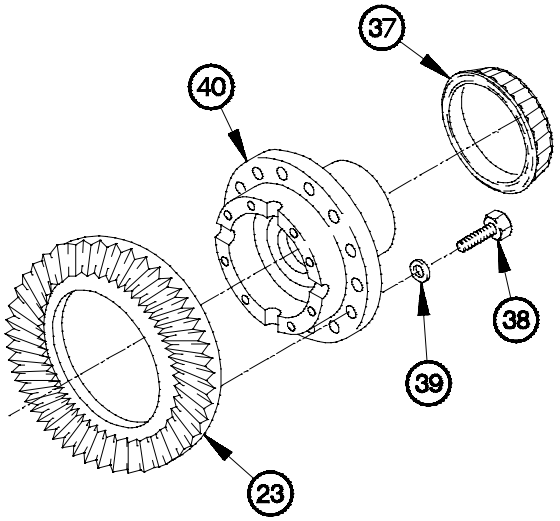


YY02A111

(26) Remove side gear (35) and thrust washer (36) from ring gear (23).

(27) Remove bearing cone (37), 16 screws (38), and washers (39) from hub body (40).

(28) Separate hub body (40) from ring gear (23).



YY02A121

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**

(1) Clean sealant residue from threaded holes with dry cleaning solvent.

CAUTION

Clean machined parts separately to avoid damage from parts bumping together. Failure to comply may result in damage to equipment.

(2) Clean all metal parts in dry cleaning solvent.

WARNING

Compressed air for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.). Failure to comply may result in injury to personnel or damage to equipment.

(3) Dry all metal parts except bearing cones (1) with compressed air. Allow bearing cones to air dry.

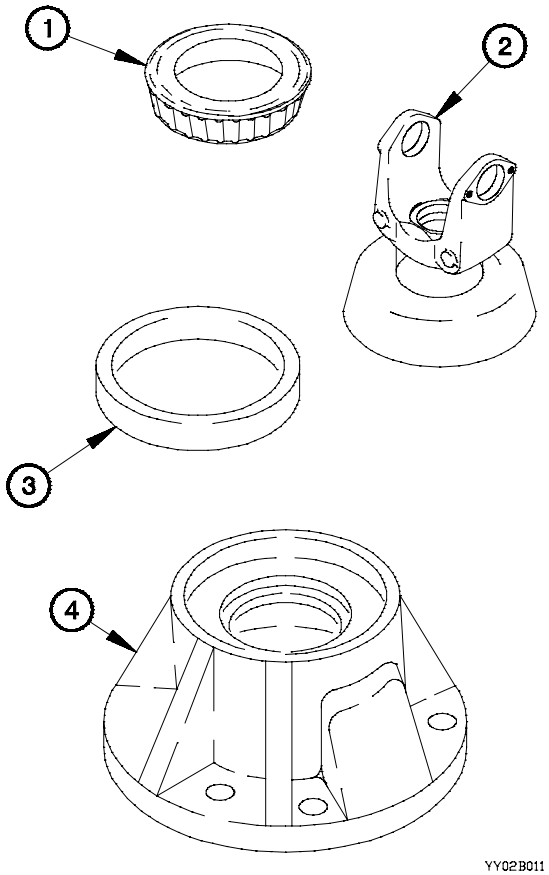
NOTE

Replace any part that fails visual inspection.

(4) Inspect input yoke (2) for visible cracks, wear, or damage.

(5) Inspect four bearing cones (1) and bearing cups (3) for visible cracks, wear, or damage.

(6) Inspect bearing cage (4) for visible cracks, wear, or damage.



23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

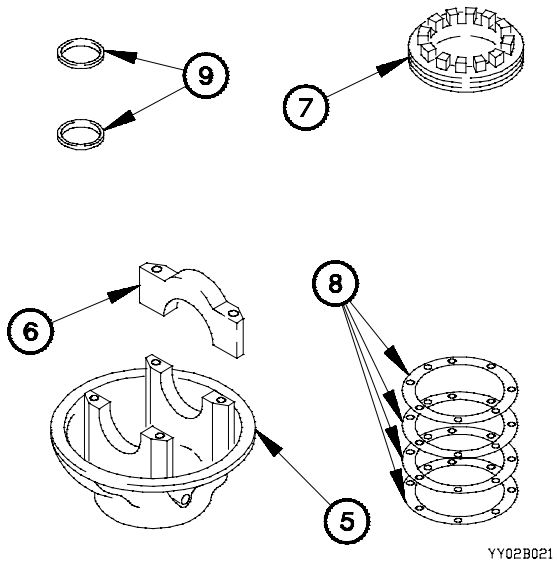
(7) Inspect differential carrier housing (6) for visible cracks, wear, or damage.

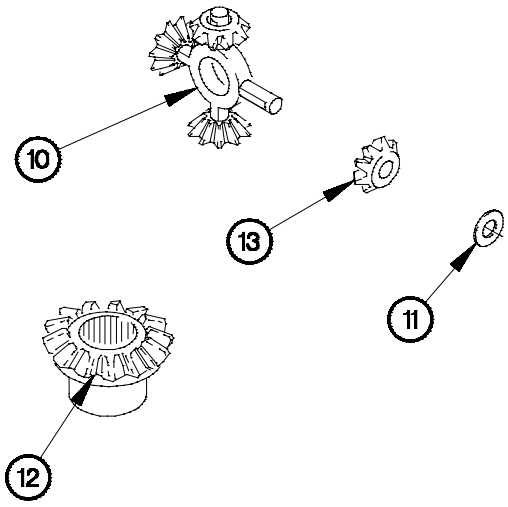
(8) Inspect differential bearing caps (7) for visible cracks, wear, or damage.

(9) Inspect two adjusting rings (8) for visible cracks, wear, or damage.

(10) Inspect shims (9) for visible cracks, wear, or damage.

(11) Inspect two bearing spacers (10) for visible cracks, wear, or damage.





CAUTION

Always replace differential spider, thrust washers, side gears, and differential pinion gears in sets. High stress on parts and early failure of assembly will occur if new parts are used with parts that are old or worn. Failure to comply may in result damage to equipment.

(12) Inspect differential spider (11) for visible cracks, wear, or damage.

(13) Inspect six thrust washers (12) for visible cracks, wear, or damage.

(14) Inspect two side gears (13) for visible cracks, wear, or damage.

(15) Inspect four differential pinion gears (14) for visible cracks, wear, or damage.

CAUTION

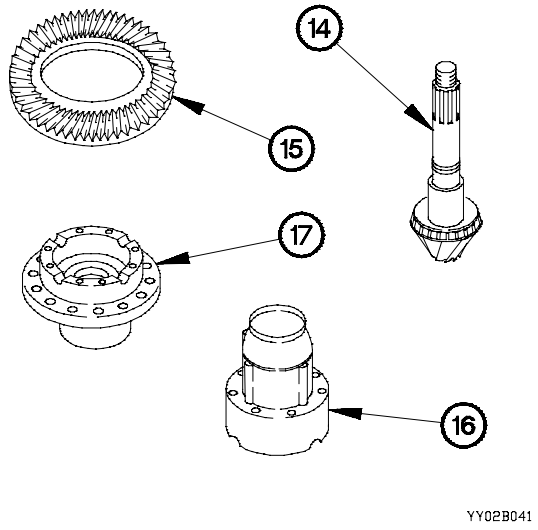
Pinion drive and ring gear are machined in matched sets and must be replaced at the same time. Failure to comply may result in damage to equipment.

(16) Inspect pinion drive (15) for visible cracks, wear, or damage.

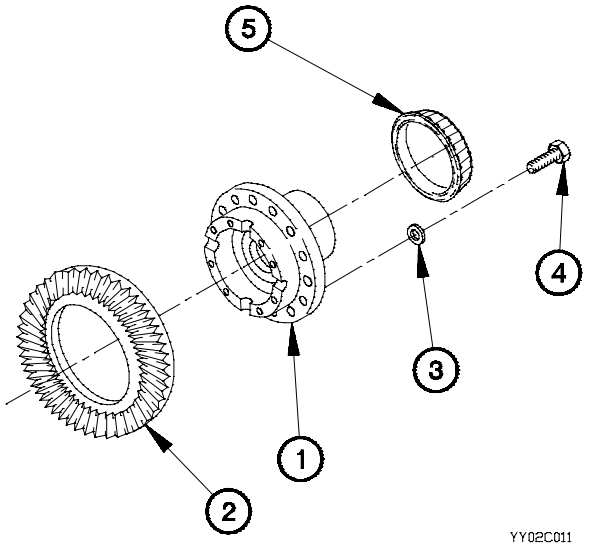
(17) Inspect ring gear (16) for visible cracks, wear, or damage.

(18) Inspect differential case (17) for visible cracks, wear, or damage.

(19) Inspect hub body (18) for visible cracks, wear, or damage.



c. Assembly.



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(1) Apply four or five drops of adhesive sealant in 16 threaded holes on hub body (1).

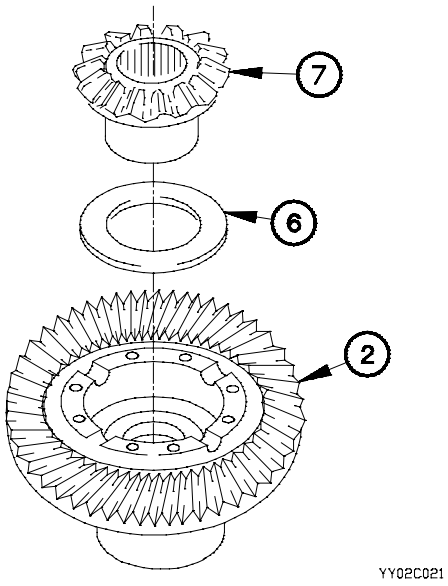
(2) Apply sealing compound to mounting surface of hub body (1).

(3) Position ring gear (2) on hub body (1) with 16 washers (3) and screws (4).

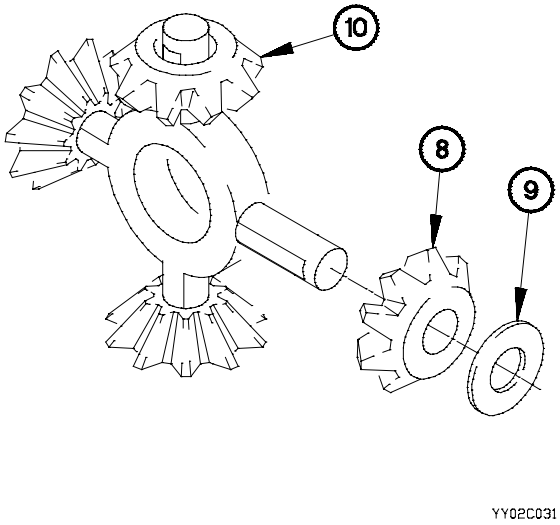
(4) Tighten 16 screws (4) to 85-115 lb-ft (115-156 N·m).

(5) Install bearing cone (5) on hub body (1).

23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)



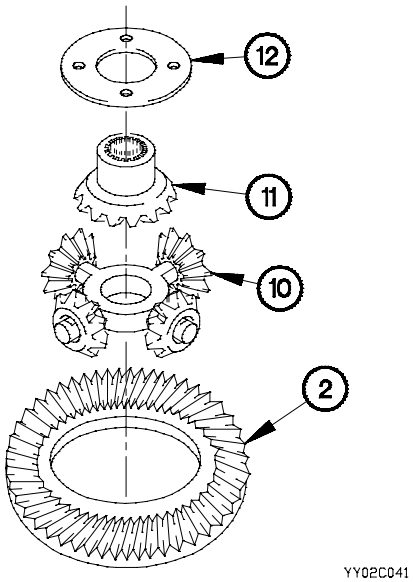
(6) Install thrust washer (6) and side gear (7) on ring gear (2).



(7) Install four differential pinion gears (8) and thrust washers (9) on differential spider (10).

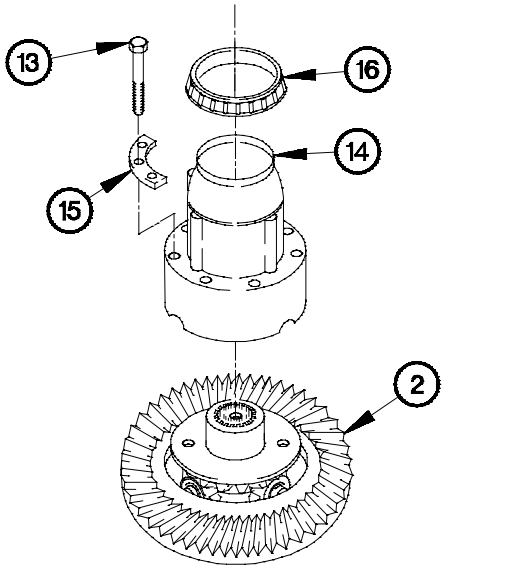
(8) Install differential spider (10) on ring gear (2).

(9) Install side gear (11) and thrust washer (12) on ring gear (2).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.



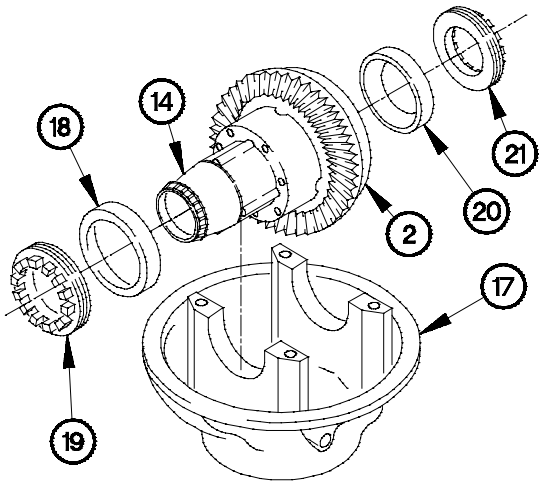
YY02C051

(10) Apply adhesive sealant to threads of 12 screws (13).

(11) Position differential case (14) on ring gear (2) with four plate spacers (15) and 12 screws (13).

(12) Tighten 12 screws (13) to 74-96 lb-ft (100-130 N·m).

(13) Install bearing cone (16) on differential case (14).



YY02C061

(14) Install ring gear (2) with differential case (14) in differential carrier housing (17).

(15) Install bearing cup (18) with adjusting ring (19) on differential case (14).

(16) Install bearing cup (20) with adjusting ring (21) on ring gear (2).

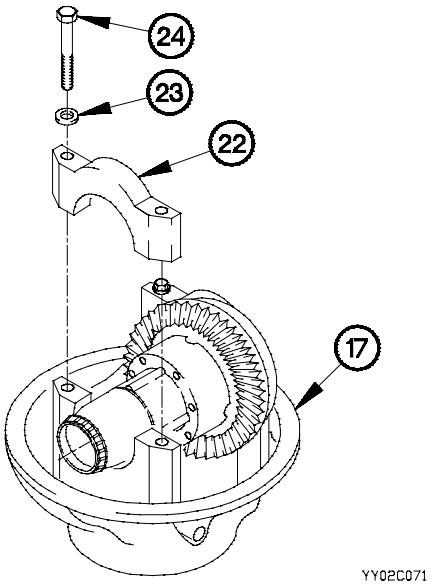
23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

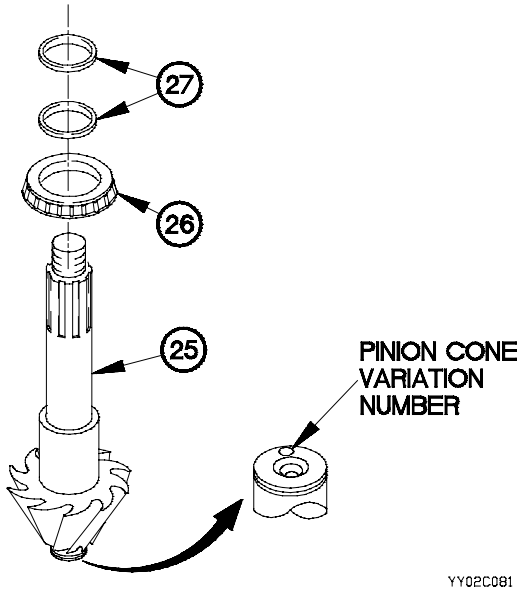
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(17) Apply four or five drops of adhesive sealant in four threaded holes on two differential bearing caps (22).

(18) Position two differential bearing caps (22) on differential carrier housing (17) with four screws (23) and washers (24).





NOTE

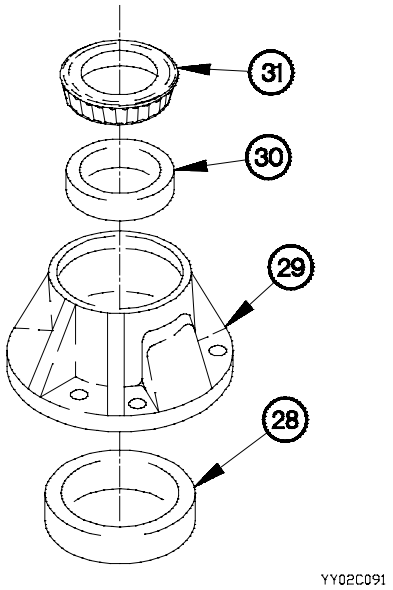
Perform step (19) only if a new pinion drive and ring gear set is being installed.

(19) Record pinion cone variation number located on gear end of pinion drive (25).

(20) Install inner bearing cone (26) and two bearing spacers (27) on pinion drive (25).

(21) Install inner bearing cup (28) in bearing cage (29).

(22) Install outer bearing cup (30) and outer bearing cone (31) in bearing cage (29).

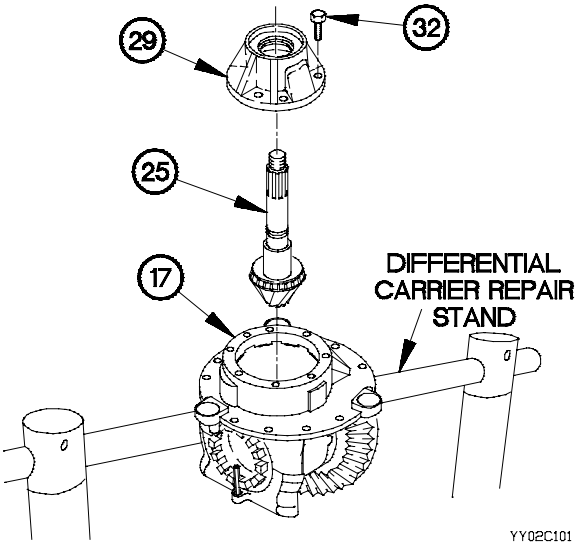


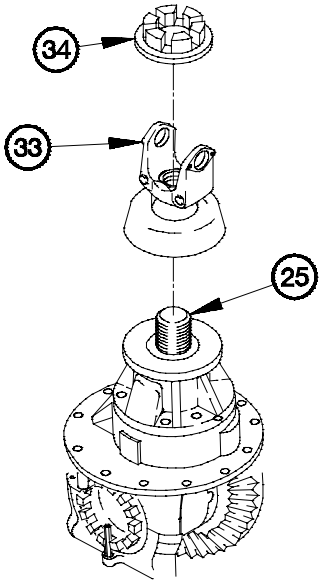
NOTE

- Washers do not need to be installed when applying the preload to the bearing cones.
- Shims are not installed in differential carrier housing until a preload is first applied to inner and outer bearing cones.

(23) Install pinion drive (25) in differential carrier housing (17).

(24) Position bearing cage (29) on differential carrier housing (17) with eight screws (32).





(25) Install input yoke (33) on pinion drive (25), with self-locking nut (34).

(26) Tighten self-locking nut (34) to 920-1130 lb-ft (1248-1532 N·m).

(27) Verify that pinion drive (25) will turn within torque limits indicated in **Table 23-1 Pinion Bearing Preload Chart.**

Table 23-1. Pinion Bearing Preload Chart

SPECIFICATIONS	PRELOAD TORQUE VALUE
New pinion bearing	10-30 lb-in. (1-3 N·m)
Used pinion bearing	10-20 lb-in. (1-2 N·m)

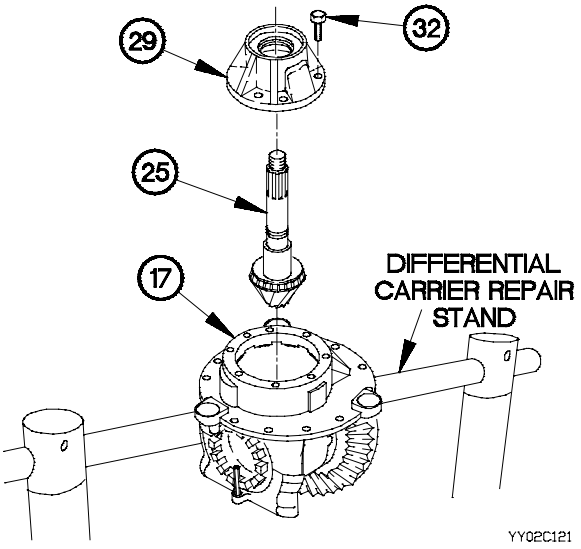
NOTE

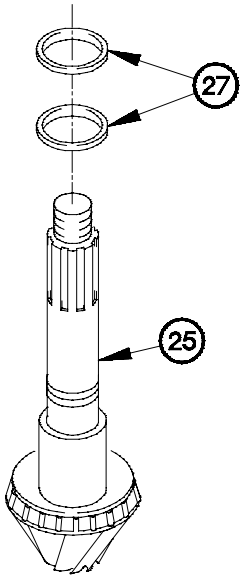
Perform steps (28) through (33) only if torque value is not within specifications. If torque value is within specifications go to step (34).

(28) Remove self-locking nut (34) and input yoke (33) from pinion drive (25).

23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(29) Remove eight screws (32), pinion drive (25), and bearing cage (29) from differential carrier housing (17).





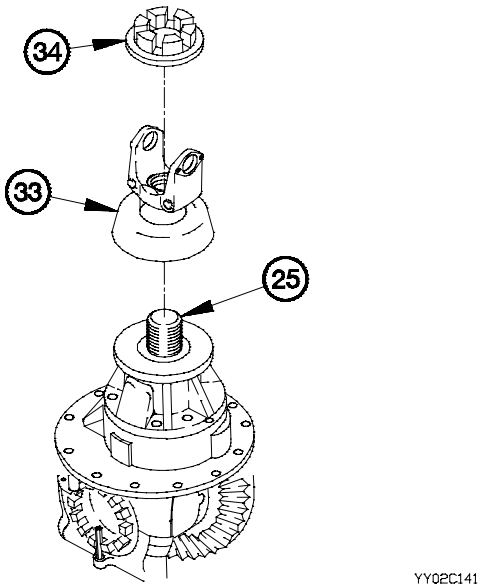
(30) Remove two bearing spacers (27) from pinion drive (25).

(31) Install thinner pinion spacers (27) to increase preload.

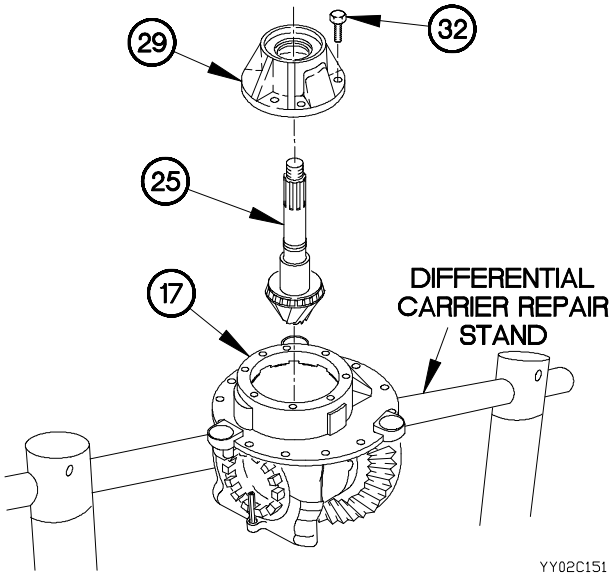
(32) Install thicker pinion spacers (27) to decrease preload.

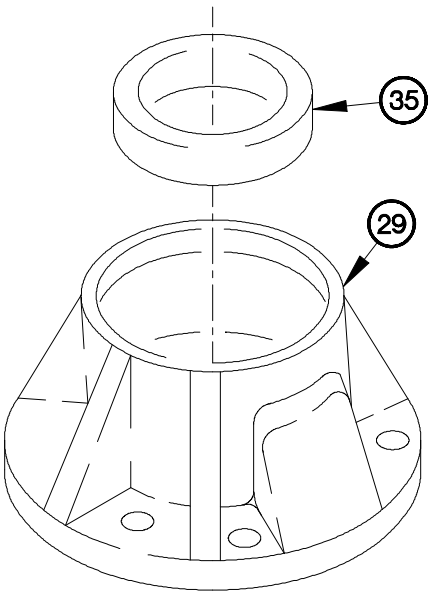
(33) Repeat steps (23) through (27) to determine if preload on inner and outer bearing cones is within specifications.

(34) Remove self-locking nut (34) and input yoke (33) from pinion drive (25). Discard self-locking nut.



(35) Remove eight screws (32), bearing cage (29), and pinion drive (25) from differential carrier housing (17).





(36) Apply a small amount of sealing compound to outside edge and spring cavity of pinion seal (35).

CAUTION

Ensure that seal lips are clean and free from dirt. Failure to comply may cause differential carrier to leak.

(37) Install pinion seal (35) in bearing cage (29).

23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

NOTE

- Perform steps (38) and (39) only if a new pinion drive and drive gear set were installed. If old pinion drive and ring gear set is installed, go to step (40).
- The pinion cone variation number can be either 0.001 in. or 0.01 mm. For example, PC +4 equals +0.004 in., PC -.05 mm equals -0.05 mm.

(38) If pinion cone variation number recorded in step (15) of disassembly is negative, subtract it from the thickness of the shims. If number is positive, add it to the thickness of the shims. Refer to **Table 23-2 Pinion Cone Variation Chart.**

NOTE

The value obtained from step (38) is the thickness of the new shims to be installed. Use as many shims as required to obtain the value from step (38).

(39) If pinion cone variation number recorded in step (19) of assembly is negative, subtract it from value of the thickness of the shims. If number is positive, add it to the thickness of the shims. Refer to **Table 23-2 Pinion Cone Variation Chart.**

Table 23-2. Pinion Cone Variation Chart

PINION CONE VARIATION NUMBER	EQUIVALENT MEASUREMENT
PC +1 through PC +9	+0.001 in. through +0.009 in.
+1 through +9	
PC -1 through PC -9	-0.001 in. through -0.009 in.
-1 through -9	
PC +.01 mm through +.09 mm	+0.01 mm through +0.09 mm
+.01 mm through +.09 mm	
PC -.01 mm through PC -.09 mm	-0.01 mm through -0.09 mm
-.01 mm through -.09 mm	

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

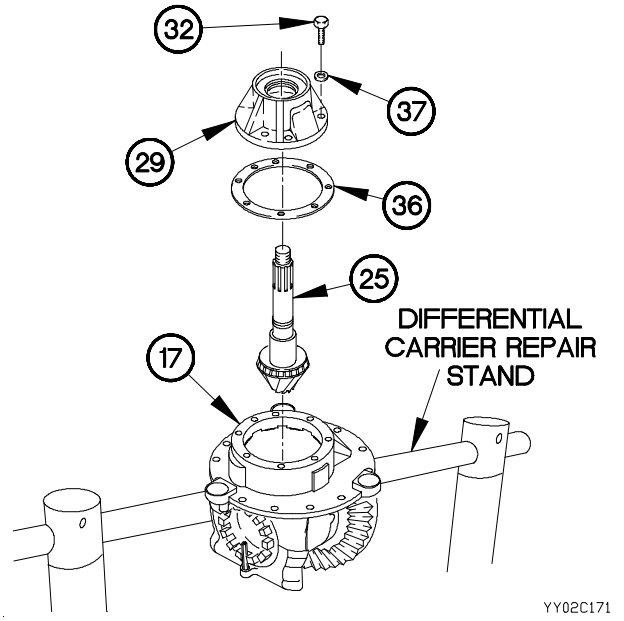
(40) Apply adhesive sealant to shims (36) and mounting flange of differential carrier housing (17).

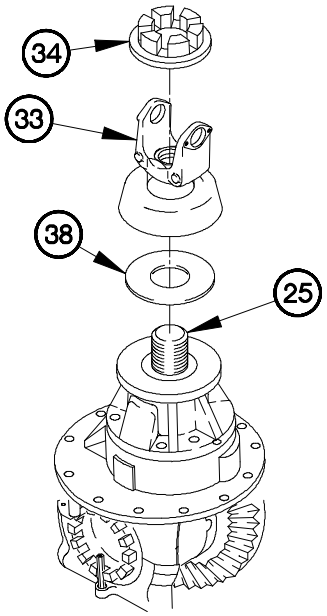
(41) Position shims (36), bearing cage (29), and pinion drive (25) on differential carrier housing (17) with eight washers (37) and screws (32).

NOTE

A minimum of three shims must be installed.

(42) Tighten eight screws (32) to 44-55 lb-ft (60-75 N•m).





(43) Apply a small amount of sealing compound to outside edge of yoke seal (38).

(44) Install yoke seal (38) on input yoke (33).

(44) Apply adhesive sealant to threads of self-locking nut (34).

(45) Install input yoke (33) on pinion drive (25) with self-locking nut (34).

(46) Tighten self-locking nut (34) to 920-1130 lb-ft (1248-1532 N•m).

23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

d. Adjustment.

A. Ring Gear Runout:

(1) Attach dial indicator on mounting flange of differential carrier (1).

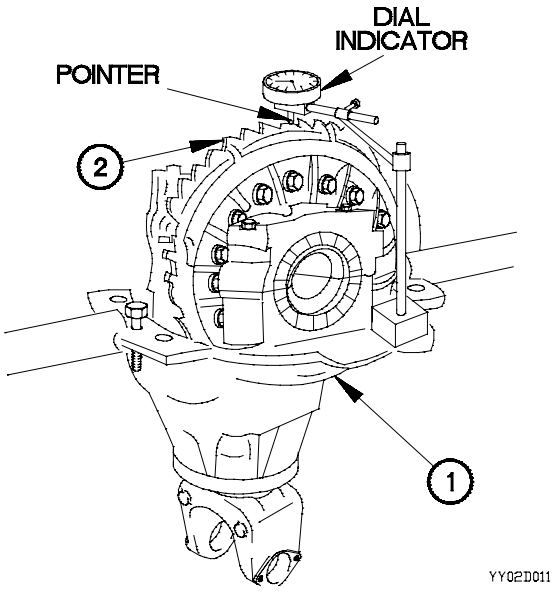
(2) Adjust dial indicator so pointer is against back surface of ring gear (2).

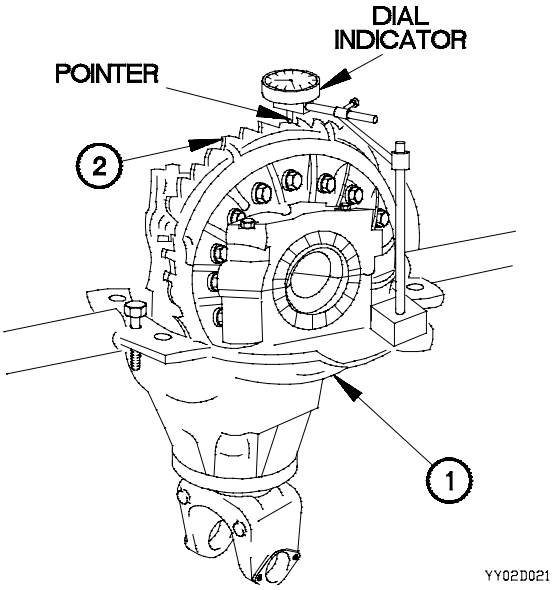
(3) Adjust dial indicator to zero.

NOTE

If dial indicator reading is greater than .008 in. (0.203 mm) repair or replace parts as required.

(4) Rotate ring gear (2); dial indicator should not exceed .008 in. (0.203 mm).





B. Ring Gear Backlash:

(1) Attach dial indicator on the mounting flange on differential carrier housing (1).

(2) Adjust the dial indicator so that pointer is against tooth surface of ring gear (2).

(3) Adjust the dial indicator to zero.

(4) Rotate ring gear (2) a small amount in both directions. Dial indicator should read between 0.008-0.018 in. (0.203-0.457 mm).

NOTE

Perform step (5) if backlash reading is less than 0.008 in. (0.203 mm).

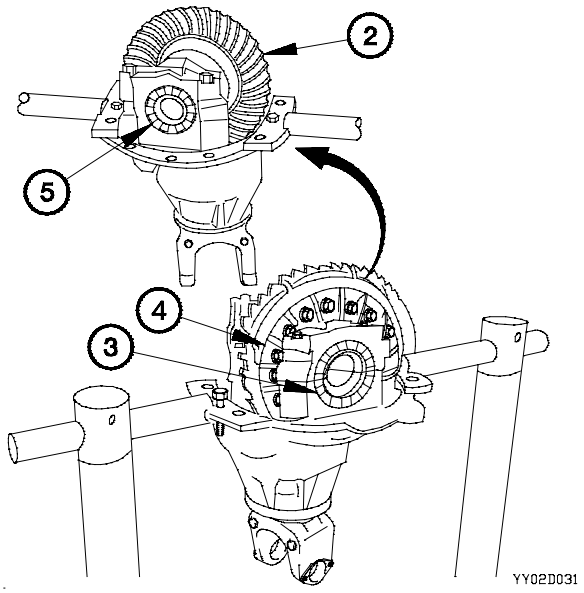
(5) Loosen adjusting ring (3) on back side of hub body (4) and tighten adjusting ring (5) facing the ring gear (2) to increase backlash.

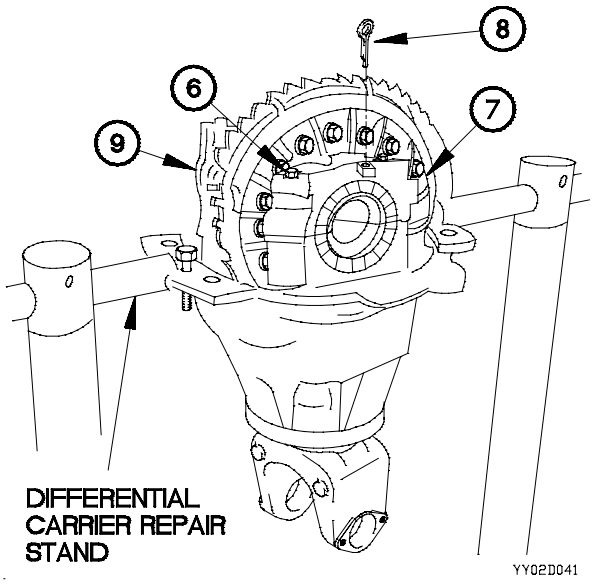
NOTE

Perform step (6) if backlash reading is greater than 0.018 in. (0.457 mm).

(6) Tighten adjusting ring (3) on back side of hub body (4) and loosen adjusting ring (5) facing the ring gear (2) to decrease backlash.

(7) Repeat steps (2) through (6) until backlash is between 0.008-0.018 in. (0.203-0.457 mm).





(8) Tighten four screws (6) on differential bearing caps (7) to 132-169 lb-ft (179-229 N·m).

(9) Install two cotter pins (8) in bearing caps (7).

WARNING

Front axle differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to moving. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (10) requires the aid of an assistant.

(10) Remove differential carrier (9) from differential carrier repair stand.

End of Task.

CHAPTER 24
REAR AXLE MAINTENANCE

Section I. INTRODUCTION 24-1
24-1. INTRODUCTION 24-1

Section II. MAINTENANCE PROCEDURE 24-2
24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR 24-2

Section I. INTRODUCTION

24-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Rear Axle Components authorized by the Maintenance Allocation Chart (MAC) at the General Support Maintenance Level.

Section II. MAINTENANCE PROCEDURE

24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Adjustment

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 68, Appendix B)
Stand, Differential Carrier, Repair (TM 9-2320-365-20)
Puller Kit, Universal (Item 44, Appendix B)
Goggles, Industrial (Item 25, Appendix B)
Gloves, Rubber (Item 23, Appendix B)
Indicator Dial (Item 30, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 80, Appendix B)
Multiplier, Torque (Item 35, Appendix B)
Holding Bar, Pinion (TM 9-2320-365-20)
Press, Arbor, Hand Operated (Item 41, Appendix B)
Wrench Set, Socket (Item 74, Appendix B)
Puller Kit, Universal (TM 9-2320-365-20)
Caliper Set, Micrometer, Outside (Item 7, Appendix B)
Socket, Set, Impact (Item 50, Appendix B)
Socket, Socket Wrench (TM 9-2320-365-20) (Item 67, Appendix B)
Wrench, Impact, Electric (Item 77, Appendix B)

Materials/Parts
Sealant, Adhesive (Item 65, Appendix C)
Sealant, Adhesive (Item 66, Appendix C)
Sealant, Adhesive (Item 67, Appendix C)
Adhesive (Item 6, Appendix C)
Sealing Compound (Item 70, Appendix C)
Sealing Compound (Item 75.2, Appendix C)
Oil Lubricating Gear (Item 51, Appendix C)
Rag, Wiping (Item 59, Appendix C)
Nut, Self-Locking (Item 144, Appendix F)
Kit, Seal (Item 263.1, Appendix F)
Pin, Cotter (2) (Item 225, Appendix F)
Solvent, Dry Cleaning (Item 81, Appendix C)

Personnel Required
(2)

a. Disassembly.

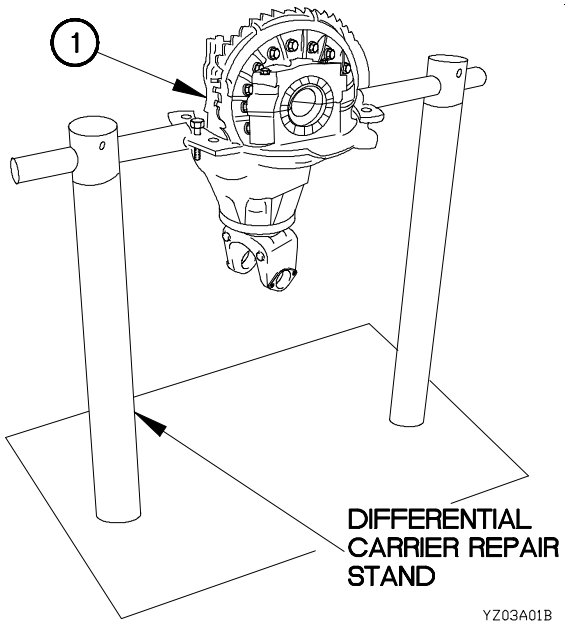
WARNING

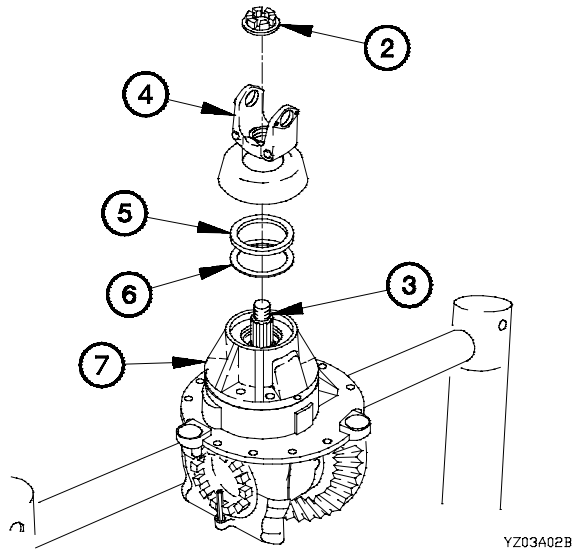
Rear differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to moving. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of an assistant.

(1) Install differential carrier (1) on differential carrier repair stand.





(2) Remove self-locking nut (2) from pinion drive (3). Discard self-locking nut.

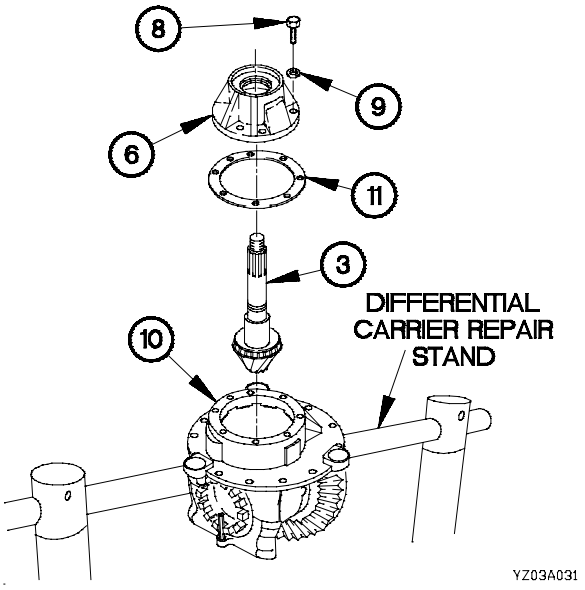
(3) Remove input yoke (4) from pinion drive (3).

NOTE

Vehicles serial number 0001 through 3133 were not originally equipped with yoke seals. Yoke seals may not be present if maintenance has not been performed previously on input yoke.

(4) Remove yoke seal (5) from input yoke (4). Discard yoke seal.

(5) Remove seal (6) from bearing cage (7). Discard pinion seal.



(6) Remove eight screws (8) and washers (9) from bearing cage (6).

(7) Remove bearing cage (6) from differential carrier housing (10).

(8) Remove pinion drive (3) from bearing cage (6).

NOTE

Number of shims may vary.

(9) Remove shims (11) from differential carrier housing (10).

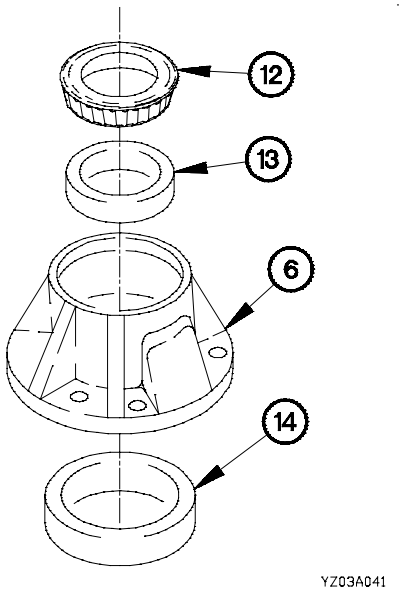
(10) Measure and record thickness of shims (11).

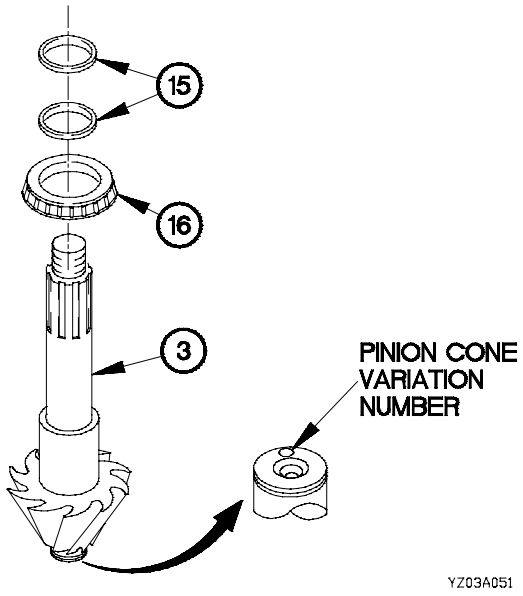
24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(11) Remove outer bearing cone (12) from bearing cage (6).

(12) Remove outer bearing cup (13) from bearing cage (6).

(13) Remove inner bearing cup (14) from bearing cage (6).



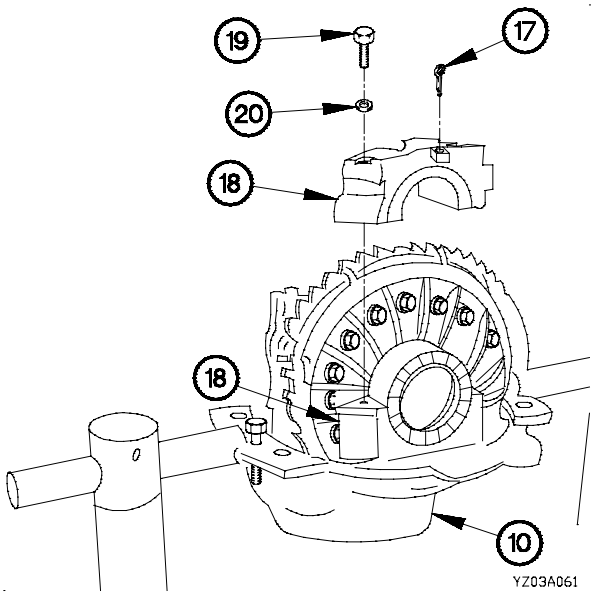


(14) Remove two bearing spacers (15) and inner bearing cone (16) from pinion drive (3).

(15) Record pinion cone variation number located on gear end of pinion drive (3).

(16) Remove two cotter pins (17) from differential bearing caps (18). Discard cotter pins.

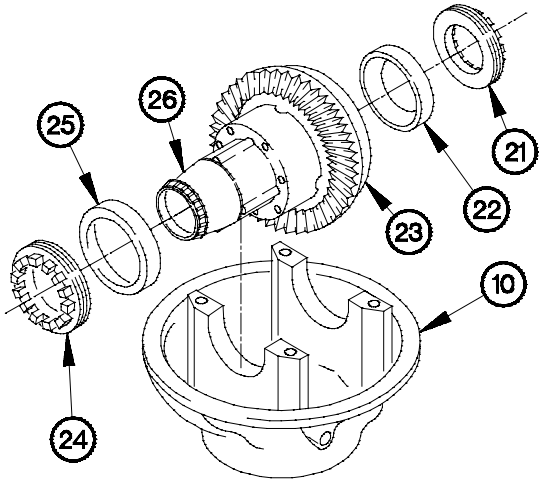
(17) Remove four screws (19), washers (20), and two differential bearing caps (18) from differential carrier housing (10).



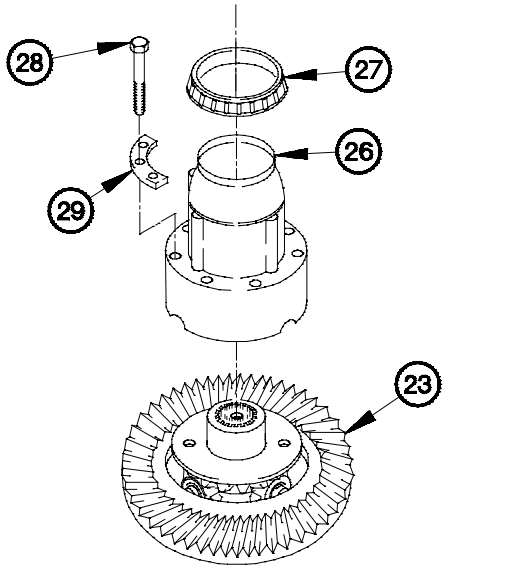
(18) Remove adjusting ring (21) and bearing cup (22) from ring gear (23).

(19) Remove adjusting ring (24) and bearing cup (25) from differential case (26).

(20) Remove ring gear (23) and differential case (26) from differential carrier housing (10).



YZ03A071

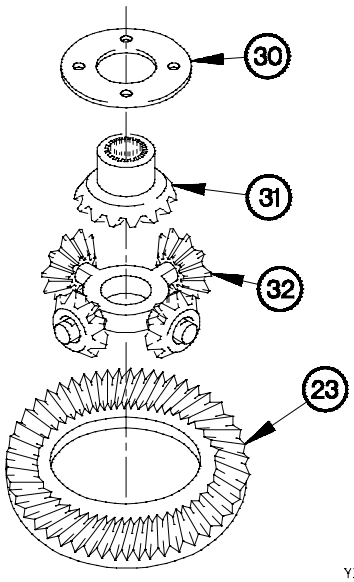


YZ03A081

(21) Remove bearing cone (27) from differential case (26).

(22) Remove 12 screws (28) and four plate spacers (29) from differential case (26).

(23) Remove differential case (26) from ring gear (23).

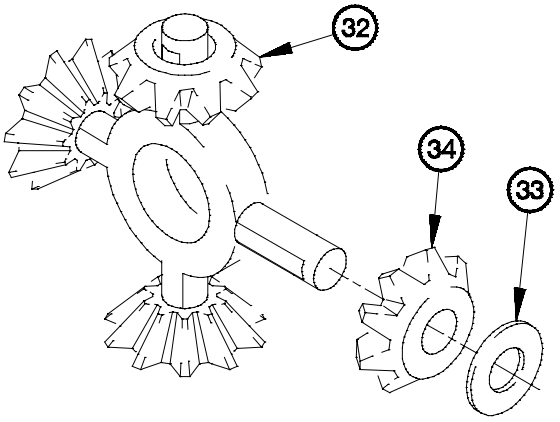


YZ03A091

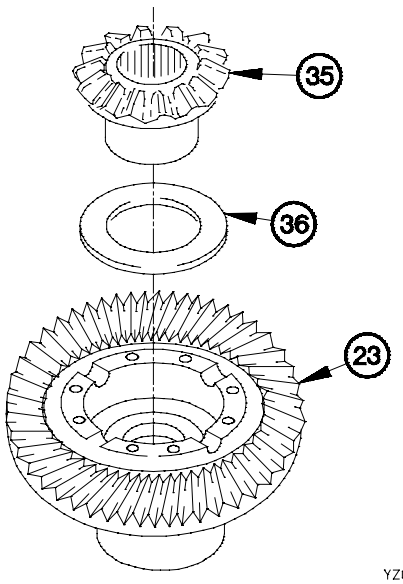
(24) Remove thrust washer (30), side gear (31), and differential spider (32) from ring gear (23).

24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(25) Remove four thrust washers (33) and differential pinion gears (34) from differential spider (32).



YZ03A101

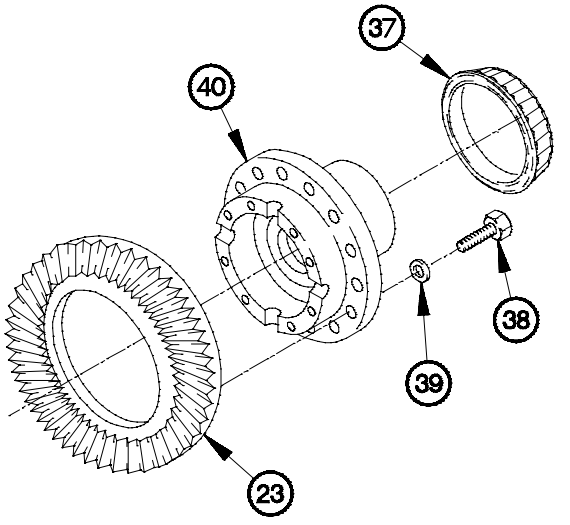


YZ03A111

(26) Remove side gear (35) and thrust washer (36) from ring gear (23).

(27) Remove bearing cone (37), 16 screws (38), and washers (39) from hub body (40).

(28) Remove hub body (40) from ring gear (23).



YZ03A121

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**

- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean sealant residue from threaded holes with dry cleaning solvent.

(2) Clean all metal parts with dry cleaning solvent.

WARNING

Compressed air for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.). Failure to comply may result in injury to personnel.

(3) Dry metal parts except bearing cones (1) with compressed air. Allow bearing cones to air dry.

NOTE

Replace any part that fails visual inspection.

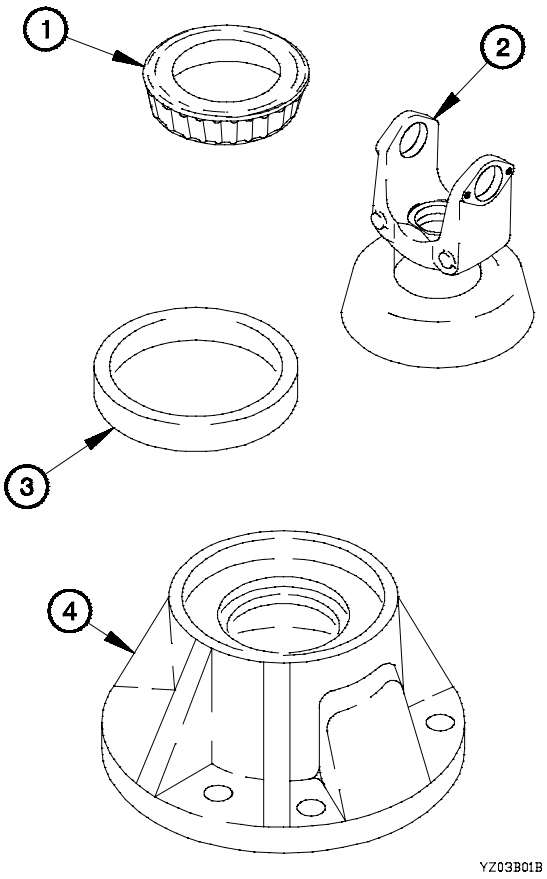
(4) Inspect input yoke (2) for visible cracks, wear, or damage.

(5) Deleted.

(6) Inspect four bearing cones (1) for visible cracks, wear, or damage.

(7) Inspect four bearing cups (3) for visible cracks, wear, or damage.

(8) Inspect bearing cage (4) for visible cracks, wear, or damage.



24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

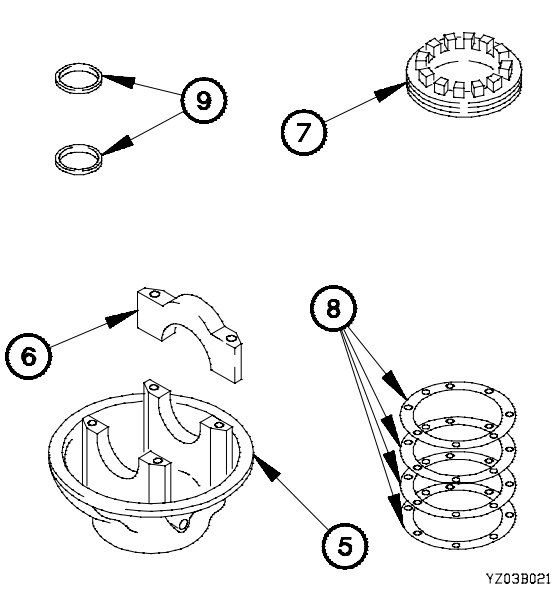
(9) Inspect differential carrier housing (6) for visible cracks, wear, or damage.

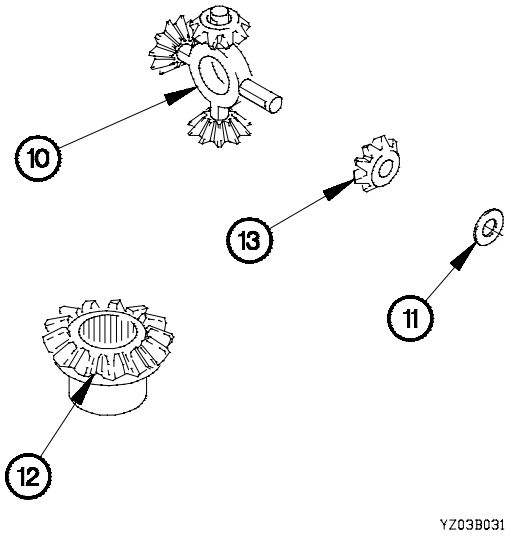
(10) Inspect differential bearing caps (7) for visible cracks, wear, or damage.

(11) Inspect two adjusting rings (8) for visible cracks, wear, or damage.

(12) Inspect shims (9) for visible cracks, wear, or damage.

(13) Inspect two bearing spacers (10) for visible cracks, wear, or damage.





CAUTION

Always replace differential spider, thrust washers, side gears, and differential pinion gears in sets. High stress on parts and early failure of assembly will occur if new parts are used with parts that are old or worn. Failure to comply may result in damage to equipment.

(14) Inspect differential spider (11) for visible cracks, wear, or damage.

(15) Inspect six thrust washers (12) for visible cracks, wear, or damage.

(16) Inspect two side gears (13) for visible cracks, wear, or damage.

(17) Inspect four differential pinion gears (14) for visible cracks, wear, or damage.

CAUTION

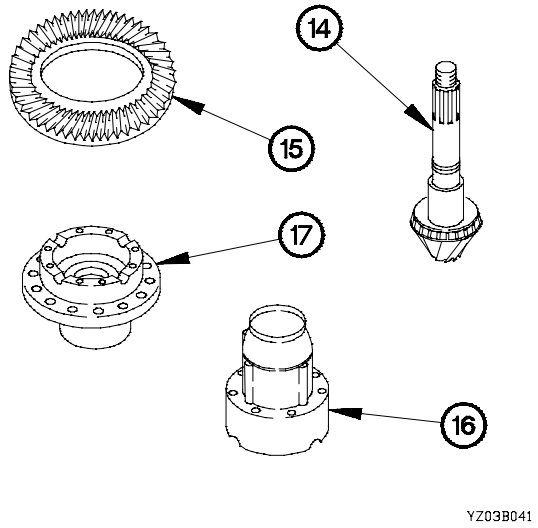
Pinion drive and ring gear are machined in matched sets and must be replaced at the same time. Failure to comply may result in damage to equipment.

(18) Inspect pinion drive (15) for visible cracks, wear, or damage.

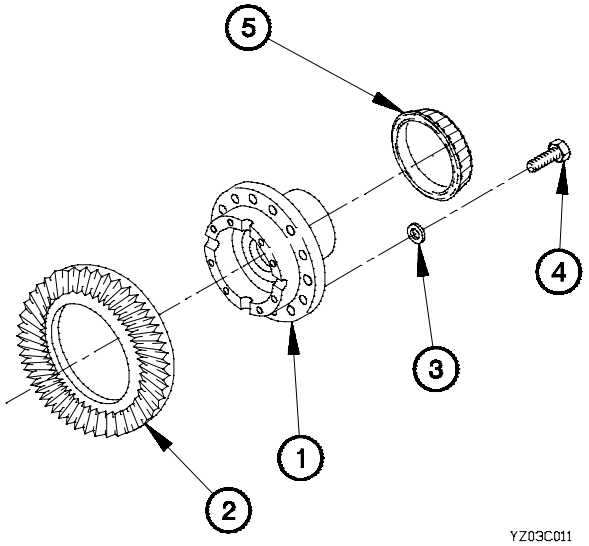
(19) Inspect ring gear (16) for visible cracks, wear, or damage.

(20) Inspect differential case (17) for visible cracks, wear, or damage.

(21) Inspect hub body (18) for visible cracks, wear, or damage.



c. Assembly.



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(1) Apply four or five drops of adhesive sealant in 16 threaded holes on hub body (1).

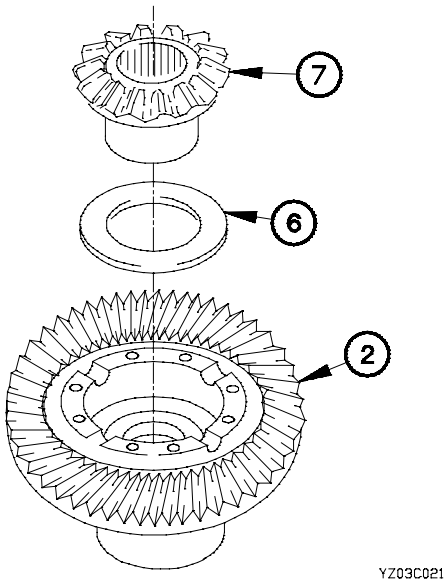
(2) Apply sealing compound to mounting surface of hub body (1).

(3) Position ring gear (2) on hub body (1) with 16 washers (3) and screws (4).

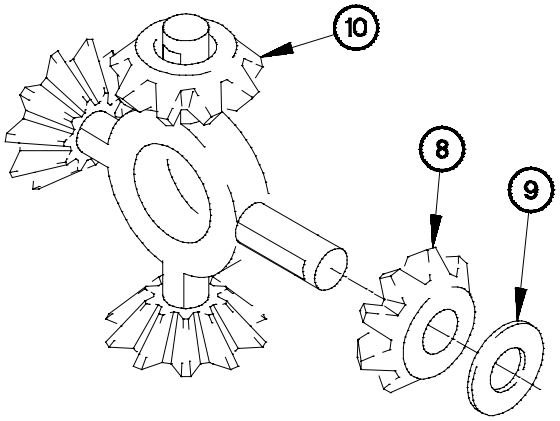
(4) Tighten 16 screws (4) to 85-115 lb-ft (115-156 N·m).

(5) Install bearing cone (5) on hub body (1).

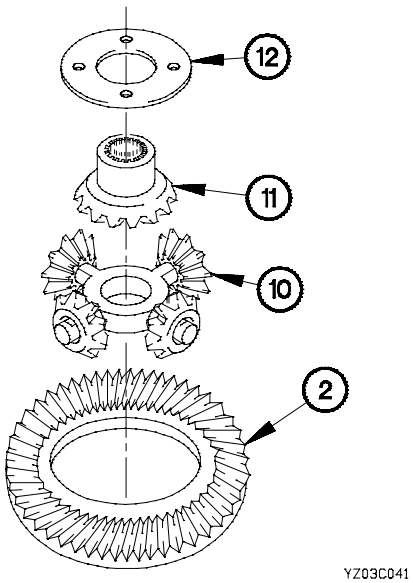
24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)



(6) Install thrust washer (6) and side gear (7) in ring gear (2).



(7) Install four differential pinion gears (8) and thrust washers (9) on differential spider (10).

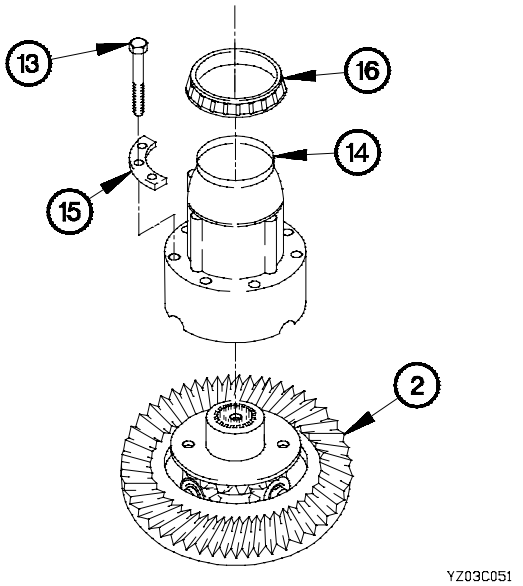


(8) Install differential spider (10) in ring gear (2).

(9) Install side gear (11) and thrust washer (12) in ring gear (2).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

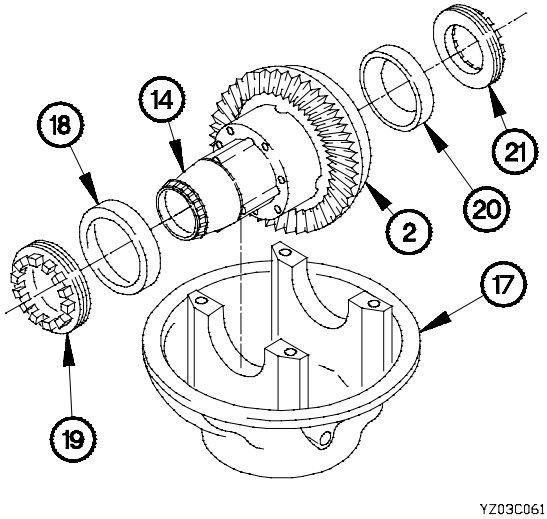


(10) Apply adhesive sealant to threads of 12 screws (13).

(11) Position differential case (14) on ring gear (2) with four plate spacers (15) and 12 screws (13).

(12) Tighten 12 screws (13) to 74-96 lb-ft (100-130 N·m).

(13) Install bearing cone (16) on differential case (14).



(14) Install ring gear (2) with differential case (14) in differential carrier housing (17).

(15) Install bearing cup (18) and adjusting ring (19) on differential case (14).

(16) Install bearing cup (20) and adjusting ring (21) on ring gear (2).

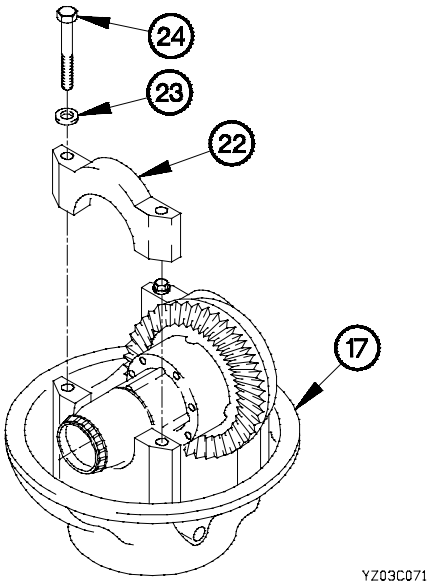
24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

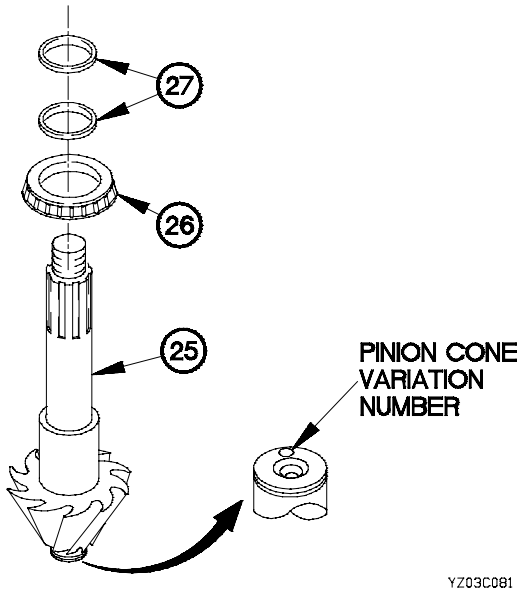
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

(17) Apply four or five drops of adhesive sealant in four threaded holes on two differential bearing caps (22).

(18) Position two differential bearing caps (22) on differential carrier housing (17) with four washers (23) and screws (24).





NOTE

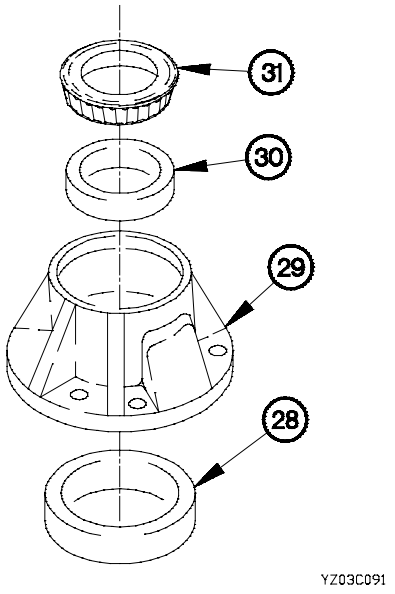
Perform step (19) only if a new pinion drive and ring gear set is being installed.

(19) Record pinion cone variation number located on gear end of pinion drive (25).

(20) Install inner bearing cone (26) and two bearing spacers (27) on pinion drive (25).

(21) Install inner bearing cup (28) in bearing cage (29).

(22) Install outer bearing cup (30) and outer bearing cone (31) in bearing cage (29).

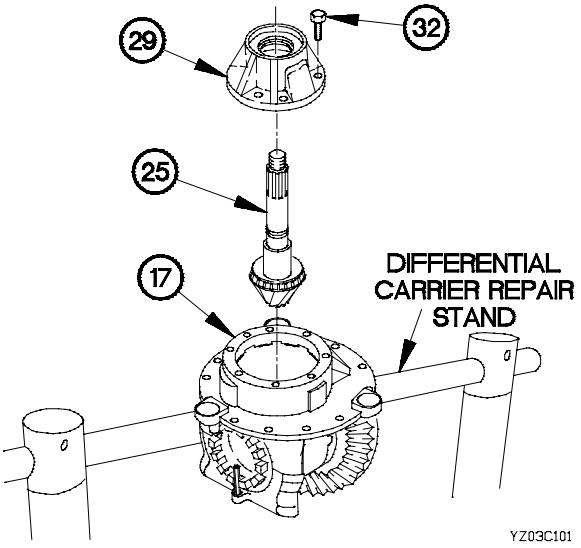


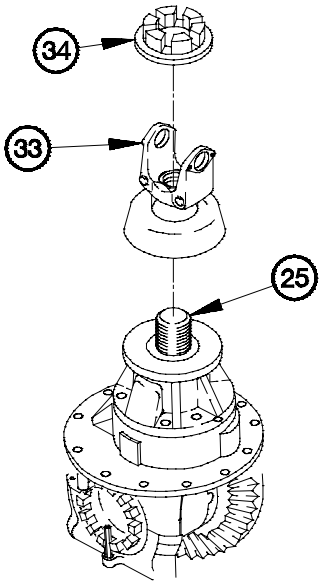
NOTE

- Washers do not need to be installed when applying the preload to the bearing cones.
- Shims are not installed in differential carrier housing until a preload is first applied to inner and outer bearing cones.

(23) Install pinion drive (25) in differential carrier housing (17).

(24) Position bearing cage (29) on differential carrier housing (17) with eight screws (32).





(25) Install input yoke (33) on pinion drive (25) with self-locking nut (33).

(26) Tighten self-locking nut (35) to 920-1130 lb-ft (1248-1532 N·m).

(27) Verify that pinion drive (25) will turn within torque limits indicated in **Table 24-1 Pinion Bearing Preload Chart.**

NOTE

Perform steps (28) through (33) only if torque value is not within specifications. If torque value is within specifications go to step (34).

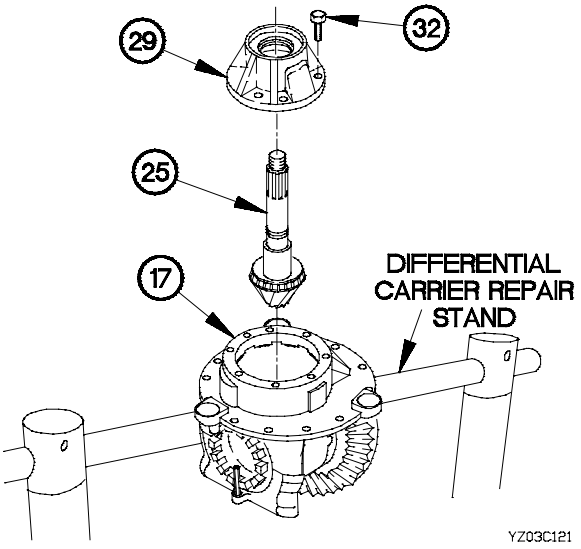
(28) Remove self-locking nut (34) and input yoke (33) from pinion drive (25).

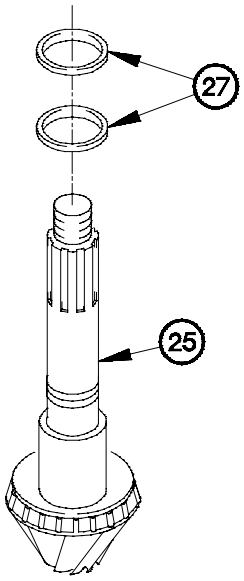
Table 24-1. Pinion Bearing Preload Chart

SPECIFICATIONS	PRELOAD TORQUE VALUE
New pinion bearing	10-30 lb-in. (1-3 N·m)
Used pinion bearing	10-20 lb-in. (1-2 N·m)

24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(29) Remove eight screws (32), pinion drive (25), and bearing cage (29) from differential carrier housing (17).





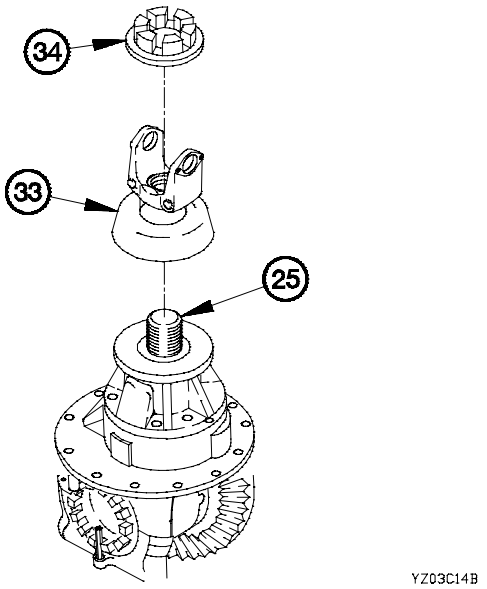
(30) Remove two bearing spacers (27) from pinion drive (25).

(31) Install thinner pinion spacers (27) to increase preload.

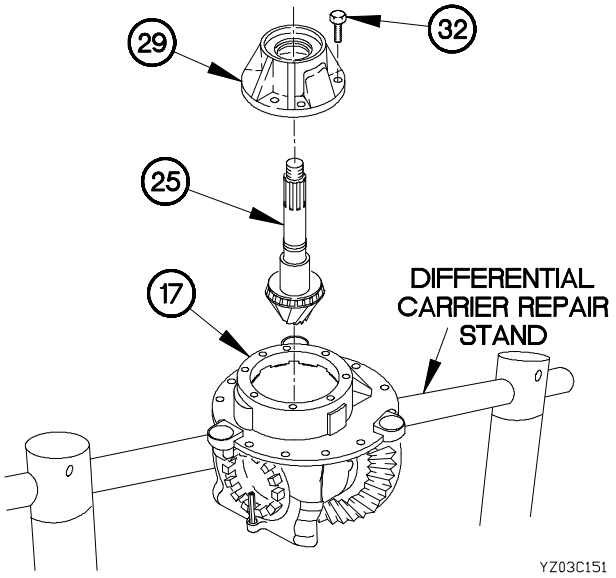
(32) Install thicker pinion spacers (27) to decrease preload.

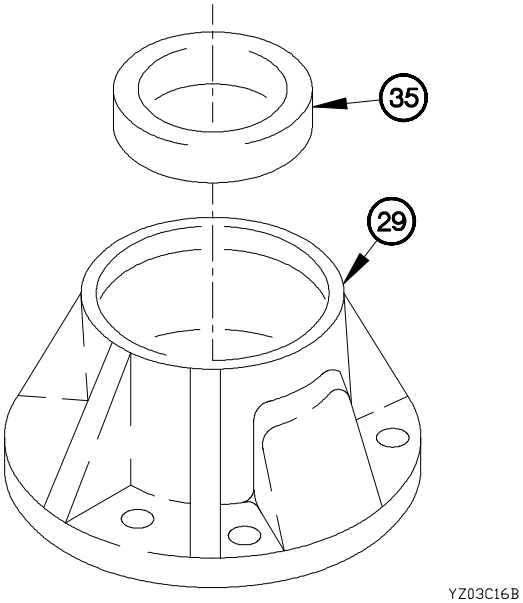
(33) Perform steps (23) through (27) to determine if preload on inner and outer bearing cones are within specifications.

(34) Remove self-locking nut (34) and input yoke (33) from pinion drive (25). Discard self-locking nut.



(35) Remove eight screws (32), bearing cage (29), and pinion drive (25) from differential carrier housing (17).





(36) Apply a small amount of sealing compound to outside edge and spring cavity of pinion seal (35).

CAUTION

Ensure that seal lips are clean and free from dirt. Failure to comply may cause differential carrier to leak.

(37) Install pinion seal (35) in bearing cage (29).

24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

NOTE

- Perform steps (38) and (39) only if a new pinion drive and drive gear set were installed. If old pinion drive and ring gear set is installed, go to step (40).
- The pinion cone variation number can be either 0.001 in. or 0.01 mm. For example, PC +4 equals +0.004 in., PC -.05 mm equals -0.05 mm.

(38) If pinion cone variation number recorded in step (15) of disassembly is negative, subtract it from the thickness of the shims. If number is positive, add it to the thickness of the shims. Refer to **Table 24-2 Pinion Cone Variation Chart.**

NOTE

The value obtained from step (38) is the thickness of the new shims to be installed. Use as many shims as required to equal the value obtained from step (38).

(39) If pinion cone variation number recorded in step (19) of assembly is negative, subtract it from value the thickness of the shims. If number is positive, add it to the thickness of the shims. Refer to **Table 24-2 Pinion Cone Variation Chart.**

Table 24-2. Pinion Cone Variation Chart

PINION CONE VARIATION NUMBER	EQUIVALENT MEASUREMENT
PC +1 through PC +9	+0.001 in. through +0.009 in.
+1 through +9	
PC -1 through PC -9	-0.001 in. through -0.009 in.
-1 through -9	
PC +.01 mm through +.09 mm	+0.01 mm through +0.09 mm
+.01 mm through +.09 mm	
PC -.01 mm through PC -.09 mm	-0.01 mm through -0.09 mm
-.01 mm through -.09 mm	

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.

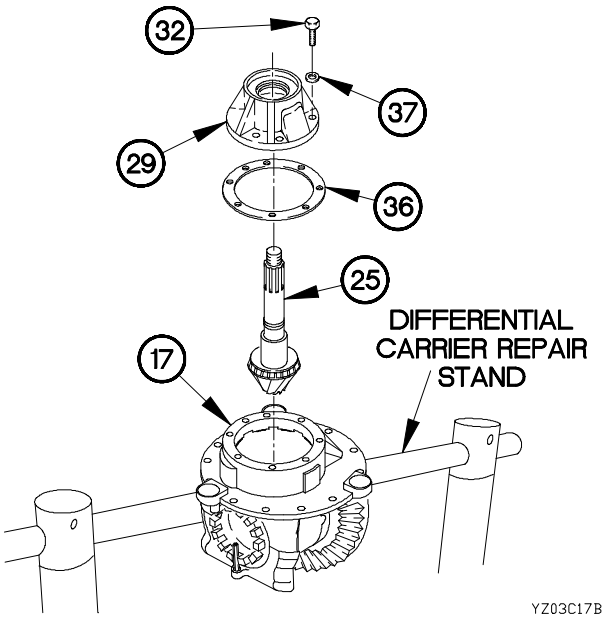
(40) Apply adhesive sealant to shims (36) and mounting flange of differential carrier housing (17).

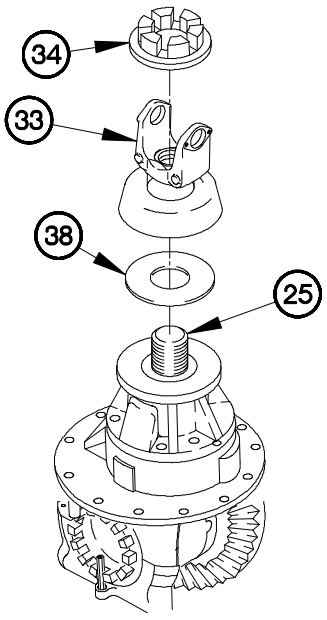
NOTE

A minimum of three shims must be installed.

(41) Position shims (36), bearing cage (29), and pinion drive (25) on differential carrier housing (17) with eight washers (37) and screws (32).

(42) Tighten eight screws (32) to 44-55 lb-ft (60-75 N•m).





(43) Apply a small amount of sealing compound to outside edge and spring cavity of yoke seal (38).

(44) Install yoke seal (38) on input yoke (33).

(44) Apply adhesive sealant to threads of self-locking nut (34).

(45) Install input yoke (33) on pinion drive (25) with self-locking nut (34).

(46) Tighten self-locking nut (34) to 920-1130 lb-ft (1248-1532 N•m).

(47) Tighten self-lockig nut (34) to 920-1130 lb-ft (1248-1532 N•m).

24-2. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

d. Adjustment.

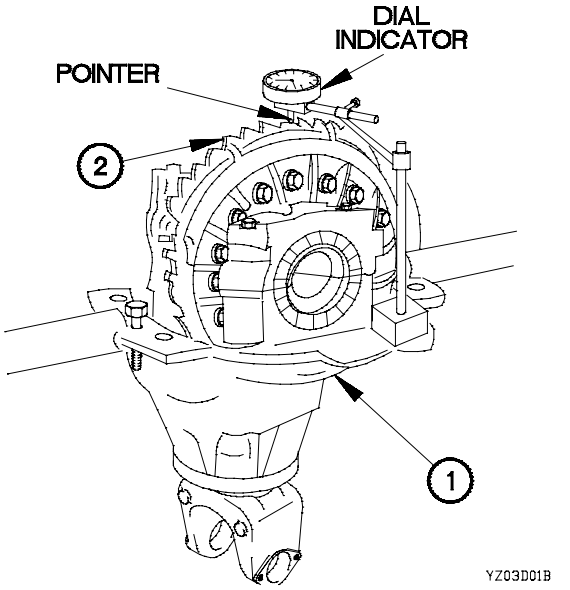
A. Ring Gear Runout:

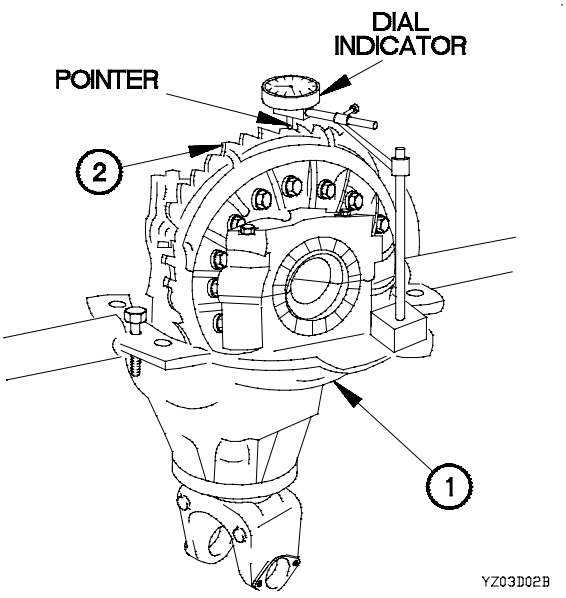
(1) Attach dial indicator on mounting flange of differential carrier (1).

(2) Adjust dial indicator so pointer is against back surface of ring gear (2).

(3) Adjust dial indicator to zero.

(4) Rotate ring gear (2); dial indicator should not exceed 0.008 in. (0.203 mm).





B. Ring Gear Backlash:

(1) Attach dial indicator on the mounting flange on differential carrier housing (1).

(2) Adjust the dial indicator so that pointer is against tooth surface of ring gear (2).

(3) Adjust the dial indicator to zero.

(4) Rotate ring gear (2) a small amount in both directions. Dial indicator should read between 0.008-0.018 in. (0.203-0.457 mm).

NOTE

Perform step (5) if backlash reading is less than 0.008 in. (0.203 mm).

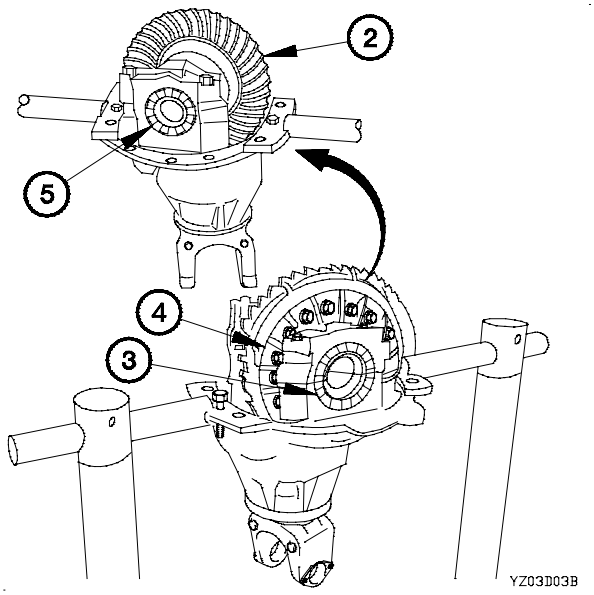
(5) Loosen adjusting ring (3) on back side of hub body (4) and tighten adjusting ring (5) facing the ring gear (2) to increase backlash.

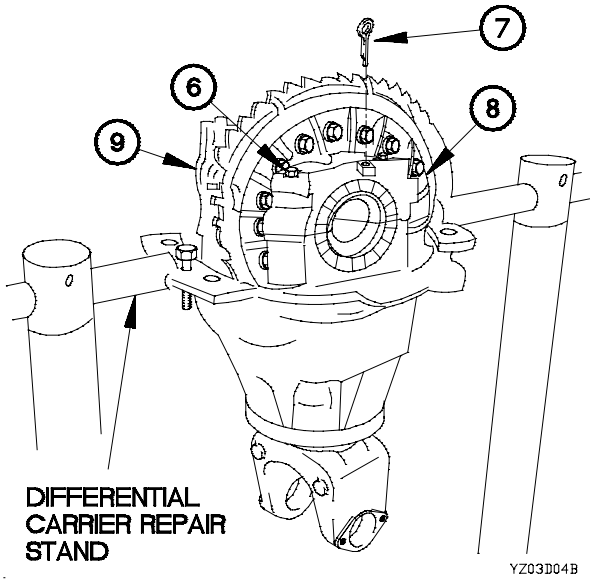
NOTE

Perform step (6) if backlash reading is greater than 0.018 in. (0.457 mm).

(6) Tighten adjusting ring (3) on back side of hub body (4) and loosen adjusting ring (5) facing the ring gear (2) to decrease backlash.

(7) Repeat steps (2) through (6) until backlash is between 0.008-0.018 in. (0.203-0.457 mm).





(8) Tighten four screws (6) to 132-169 lb-ft (179-229 N·m).

(9) Install two cotter pins (7) in bearing caps (6).

WARNING

Front differential carrier weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to moving. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (10) requires the aid of an assistant.

(10) Remove differential carrier (8) from differential carrier repair stand.

End of Task.

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals, and other publications referenced in this manual. Those publications that should be consulted for additional information about vehicle operations are also listed.

A-2. PUBLICATIONS INDEX

The following index should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Consolidated Index of Army Publications and Blank Forms . . . . . DA Pam 25-30

A-3. FORMS

The following forms pertain to this manual. See DA Pam 25-30 for index of blank forms. See DA Pam 738-750, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms pertaining to this material.

Recommended Changes to DA Publications and Blank Forms . . . . . DA Form 2028-2
Equipment Inspection and Maintenance Worksheet . . . . . DA Form 2404
Maintenance Request . . . . . DA Form 2407
Equipment Control Record . . . . . DA Form 2408-9
Processing and Deprocessing Record of Shipping, Storage, and Issue of Vehicles and Spare Engines . . . . . DD Form 1397
Packaging Improvement Report . . . . . DD Form 6
Report of Item Discrepancy (ROID) . . . . . SF 364
Product Quality Deficiency Report . . . . . SF 368

A-4. OTHER PUBLICATIONS

The following publications contain information pertinent to the LMTV and associated equipment.

a. Safety.

First Aid for Soldiers . . . . . FM 21-11
Security of Tactical Wheeled Vehicles . . . . . TB 9-2300-422-20
Safety Inspection and Testing of Lifting Devices . . . . . TB 43-0142

b. LMTV.

Hand Receipt Covering Contents of Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL), for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicles (LMTV) . . . . . TM 9-2320-365-10-HR

A-4. OTHER PUBLICATIONS (CONT)

b. LMTV (cont)

Warranty Program for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TB 9-2300-365-15
Operator's Manual for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TM 9-2320-365-10
Organizational Maintenance Repair Parts and Special Tools List for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TM 9-2320-365-24P
Organizational Maintenance Manual for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TM 9-2320-365-20
Direct Support and General Support Repair Parts and Special Tools List for M1078 Series, 2 1/2-Ton, 4x4, Light Medium Tactical Vehicle (LMTV) . . . . . TM 9-2320-365-24P

c. General Vehicle Operation.

Petroleum Tank Vehicle Operations . . . . . FM 10-71
Vehicle Recovery Operations . . . . . FM 20-22
Manual for the Wheeled Vehicle Driver . . . . . FM 21-305
Army Motor Transport Units and Operations . . . . . FM 55-30
Deleted
Safety Prevention of Motor Vehicle Accidents . . . . . AR 385-55

d. General Maintenance and Repair.

Rigging Techniques, Procedures, and Applications . . . . . FM 5-125
Use and Care of Hand Tools and Measuring Tools . . . . . TM 9-243
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Material and Related Materials Including Chemicals . . . . . TM 9-247
Operator's, Unit, Direct Support, and Intermediate General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14
Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List Simplified Test Equipment for Internal Combustion Engines Reprogrammable (STE/ICE-R) (NSN 4910-01-222-6589) . . . . . TM 9-6140-200-14
Operator's and Organizational Maintenance Manual for Radio Sets . . . . . TM 11-5820-498-12
Operator's Manual, Radio Set, AN/VRC-46 . . . . . TM 11-5820-401-10-1
Operator's Manual, Radio Set, AN/VRC-90A . . . . . TM 11-5820-890-10-1
Operator's Manual, Sun Test Stand . . . . . TM 9-4910-485-12
Operator's Manual, GASR Test Stand . . . . . TM 9-4910-663-12
Direct Support, General Support, and Depot Maintenance of Starter and Electrical Assemblies . . . . . TM 9-2920-242-35
Cooling Systems: Tactical Vehicles . . . . . TM 750-254
Army Oil Analysis Program . . . . . TB 43-0211
Charging System Troubleshooting . . . . . DA Pam 750-33
Camouflage Pattern Painting . . . . . FM 5-20
Repair of Tents, Canvas, and Webbing . . . . . FM 10-16
Metal Body Repair and Related Operations . . . . . FM 43-2
Ordnance Tracked and Wheeled Vehicle Hull and Chassis Wiring, Repair of . . . . . TB ORD 650
Description, Use, Bonding Techniques, and Properties of Adhesives . . . . . TB ORD 1032

d. General Maintenance and Repair. (Cont)

Equipment Improvement Report and Maintenance Digest: TACOM Equipment . . . . . TB 43-0001-39-1
Color, Marking, and Camouflage Painting of Military Vehicles . . . . . TB 43-0209
Purging, Cleaning, and Coating Interior Ferrous and Terne Sheet Vehicle Fuel Tanks . . . . . TB 43-0212
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems . . . . . TB 750-651
Painting Instructions for Field Use . . . . . TM 43-0139
Equipment Improvement Report and Maintenance Summary . . . . . TM 43-0143
Cooling Systems: Tactical Vehicles . . . . . TM 750-254
Welding Theory and Application . . . . . TM 9-237
Organizational Care, Maintenance, and Repair of Pneumatic Tires and Inner Tubes . . . . . TM 9-2610-200-14

e. Cold Weather Operation.

Operation and Maintenance of Ordnance Material in Cold Weather (0 to -65 °F) . . . . . FM 9-207
Basic Cold Weather Manual . . . . . FM 31-70
Northern Operations . . . . . FM 31-71

f. Decontamination.

Decontamination Operations Facilities & Equipment . . . . . TB 700-4
NBC Protection . . . . . FM 3-4
NBC Decontamination . . . . . FM 3-5

g. Maintenance of Special Purpose Kits.

Operator and Organizational Maintenance Manual for Chemical Alarm . . . . . TM 3-6665-225-12
Operator's and Unit Maintenance Manual Including Repair Parts and Special Tools List for Decontaminating Apparatus: M13 . . . . . TM 3-4230-214-12&P
Operator, Organizational, Direct Support, and General Support Maintenance Manual Including Repair Parts and Special Tools List for Various Machine Gun Mounts . . . . . TM 9-1005-245-14

h. General.

Principles of Automotive Vehicles . . . . . TM 9-8000
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use (US Army Tank-Automotive Command) . . . . . TM 750-244-6
Repair and Utilities: Concrete and masonry . . . . . TM 5-615
Soldier's Manual MOS 88M Motor Transport Operator, Skill Levels 1/2 . . . . . STP 55-88-M12-SM
Operator's Manual (M998 Series) . . . . . TM 9-2320-280-10
Operator's Manual (M1008 Series) . . . . . TM 9-2320-289-10
Operator's Manual (M35 Series) . . . . . TM 9-2320-361-10
Operator's Manual (M939 Series) . . . . . TM 9-2320-272-10
Route Reconnaissance and Classification . . . . . FM 5-36

A-4. OTHER PUBLICATIONS (CONT)

i. Land, Sea, and Air Shipment.

Airdrop of Supplies and Equipment: Rigging 5-Ton Trucks . . . . . FM 10-526
Marine Terminal Lifting Guidance . . . . . MTMCTEA Pam 56-1
Multiservice Helicopter External Air Transport: Basic
Operations and Equipment . . . . . FM 55-450-3
Multiservice Helicopter External Air Transport: Dual-Point
Load Rigging Procedures . . . . . FM 55-450-5
Multiservice Helicopter External Air Transport: Single-Point
Load Rigging Procedures . . . . . FM 55-450-4
Standard Characteristics (Dimensions, Weight, and Cube) for
Transportability of Military Vehicles and Other
Outsize/Overweight Equipment (in TOE Line Sequence) . . . . . TB 55-46-1
Tiedown Handbook for Rail Movements . . . . . MTMCTEA Pam 55-19
Tiedown Handbook for Truck Movements . . . . . MTMCTEA Ref 92-55-20
Lifting and Tiedown of U.S. Helicopters . . . . . MTMCTEA Ref 95-55-21
Marine Lifting and Lashing Handbook . . . . . MTMCTEA Ref 95-55-22
Containerization of Military Vehicles . . . . . MTMCTEA Ref 95-55-23

APPENDIX B
TOOLS IDENTIFICATION LIST

Section I. INTRODUCTION

B-1. INTRODUCTION

This appendix lists common tools, supplements, and special tools/fixtures that are suggested for maintenance tasks performed at the direct support/general support maintenance level.

B-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item, e.g., "Bar, Pry (Item 1, Appendix B)."

b. Column (2) - Item Name. This column contains the nomenclature for the item.

c. Column (3) - National Stock Number. This is the national stock number assigned to the item which you can use to requisition it.

d. Column (4) - Part Number. This provides the Government, manufacturer, or vendor part number for the item.

e. Column (5) - Reference. This column contains the shop catalog (SC), technical manual, or other publication which provides an illustration and description of the item, or lists whether the item is fabricated.

Section II. TOOLS IDENTIFICATION LIST

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
1	ADAPTER, SOCKET WRENCH	5120-00-144-5207	11655788-3	SC 4910-95-A31
2	ADAPTER, SOCKET WRENCH	5120-00-227-8103	A-A-2172	SC 4910-95-A31
3	ADAPTER, SOCKET WRENCH	5120-00-240-8702	GAX-1	SC 4910-95-A31
4	BLADE, HAND, HACKSAW	5110-00-277-4587	RS1018	SC 5180-90-CL-N05
5	BRUSH, WIRE	7920-00-291-5815	D-1416	SC 4910-95-A31
6	CALIPER SET, MICROMETER,	5120-01-117-0468	6181	SC 4910-95-A31
7	CALIPER, MICROMETER,	5120-00-221-1921	124B	SC 4910-95-A02
8	CALIPER, VERNIER	5120-01-113-1548	6420	SC 4910-95-A31

TOOLS IDENTIFICATION LIST (CONT)

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
9	CAPS, VISE JAW	5120-00-221-1506	404-4	SC 4910-95-A31
10	CLAMP	5120-00-203-6431	A-A-431	SC 4910-95-A02
11	CLEANER, STEAM, PRESSURE JET	4940-00-186-0027	200-A0	SC 4910-95-A31
12	COMPRESSOR UNIT, RECIPROCATING	4310-00-542-4566	MIL-C-52980	SC 4910-95-A62
13	COMPRESSOR, PISTON RING	5120-00-250-6055	GGG-C-555	SC 4910-95-A63
14	CROWFOOT ATTACHMENT,	5120-00-222-7975	GGG-W-646	SC 4910-95-A31
15	DEGREASER, PORTABLE LIQUID	4940-00-449-6689	MILD12491	SC 4910-95-A31
16	DISPENSING PUMP, HAND DRIVEN	4930-00-263-9886	BR2-10	SC 4910-95-A74
17	DRILL SET, TWIST	5130-00-293-0983	58	SC 4910-95-A62
18	DRILL, ELECTRIC, PORTABLE	5130-00-293-1849	W-D-661	SC 4910-95-A62
19	EXTRACTOR, SCREW	5120-00-610-1888	A-A-283SZ1-9	SC 5180-90-CL-N05
20	FRAME, HAND HACKSAW	5110-00-289-9657	163-20	SC 4910-95-A02
21	GAGE SET, TELESCOPING	5210-00-473-9350	GGG-G-17	SC 4910-95-A63
22	GAGE, DEPTH MICROMETER	5210-00-619-4045	445B-Z-6RL	CTA 50-909
23	GLOVES, RUBBER	8415-00-641-4601	ZZ-G-381	SC 4910-95-A74
24	GLOVES, WELDER'S	8415-00-268-7859	A-A-50022	SC 4910-95-A02
25	GOGGLES, INDUSTRIAL	4240-00-052-3776	A-A-1110	SC 4910-95-A74
26	GRINDING KIT, VALVE SEAT	4910-00-473-6437	1750	SC 4910-95-A02
27	GUN, AIR BLOW	4940-00-333-5541	GGGG770	SC 4910-95-A31
28	HAMMER, HAND, SOFT HEAD	5120-01-065-9037	57-533	SC 5180-90-CL-N05

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
29	HOSE ASSEMBLY, NONMETALLIC	4720-00-356-8557	ZZ-4-461	SC 4910-95-A31
30	INDICATOR, DIAL	5210-00-277-8840	196A	SC 4940-95-CL-B20
31	JACK, DOLLY TYPE, HYDRAULIC	4910-00-289-7233	93660	SC 4910-95-A31
32	LIFT, TRANSMISSION AND DIFFERENTIAL	4910-00-585-3622	49	SC 4910-95-A62
33	LIFTER, VALVE SPRING	5120-00-239-8686	T286A	SC 4910-95-A63
34	MULTIMETER, DIGITAL	6625-01-139-2512	T00377	SC 4910-95-CL-A74
35	MULTIPLIER, TORQUE WRENCH	5120-00-574-9318	292	SC 4910-95-CL-A72
36	PAN, DRAIN	4910-00-387-9592	450	SC 4910-95-A31
37	PLIERS, RETAINING RING	5120-00-293-0045	0300	SC 4910-95-A31
38	PLIERS, RETAINING RING	5120-00-293-0048	0409	SC 4910-95-A31
39	PLIERS, RETAINING RING	5120-00-293-0186	0900	SC 4910-95-CL-A74
40	PLIERS, SLIP JOINT	5120-00-624-8065	529-10	SC 4910-95-A31
41	PRESS, ARBOR, HAND OPERATED	3444-00-449-7295	A-A-51194	SC 4910-95-A02
42	PRESSURE TESTER, RADIATOR	4910-00-728-8227	J24460-01	SC 4910-95-CL-A74
43	PULLER KIT, UNIVERSAL	5180-00-313-9496	1178	SC 4910-95-A62
44	PULLER KIT, UNIVERSAL	5180-00-423-1596	PE12	SC 4910-95-A31
45	PULLER, MECHANICAL	5120-00-595-9305	GGGP781	SC 4910-95-A31
46	RESPIRATOR, AIR FILTERING	4240-00-022-2524	GGG-M-125/6	SC 4910-95-A62
47	SET, TAP AND DIE	5136-01-119-0005	TDM99117	SC 4910-95-A31
48	SLING, CARGO	1670-00-823-5043	63J4261-13	CTA 50-970

TOOLS IDENTIFICATION LIST (CONT)

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
49	SLING, ENGINE AND TRANSMISSION	4910-01-243-5556	DFP-188	SC 4910-95-A02
50	SOCKET SET, IMPACT	5130-01-117-0466	415IMMY	SC 4910-95-A31
51	SOCKET SET, SOCKET WRENCH	5120-01-117-3876	B107.5	SC 4910-95-A31
52	SOCKET WRENCH ATTACHMENT,	5120-00-596-8508	GGG-W-641	SC 4910-95-A31
53	SOCKET WRENCH ATTACHMENT,	5120-01-079-8033	SAM14A	SC 4910-95-A31
54	SOCKET WRENCH ATTACHMENT,	5120-01-101-1943	J35174-A	SC 4910-95-A31
55	SOCKET, SOCKET WRENCH	5120-00-236-2263	4707	SC 4910-95-A31
56	SOCKET, SOCKET WRENCH	5130-01-116-1643	IMM 300	SC 4910-95-A02
57	SQUARE, COMBINATION	5210-00-078-8948	GGG-S-656	SC 4910-95-A02
58	STAND, RADIATOR TEST AND REPAIR	4910-00-505-4786	60A	SC 4910-95-A02
59	STAND, TRANSPORT,	4910-00-338-6673	8708857	SC 4910-95-A62
60	STE/ICE-R	4910-222-6589	12259266	TM 9-4910-571-12&P
61	STRAIGHT EDGE	6675-00-224-8807	564000-36	SC 4910-95-A02
62	TEST STAND, AUTOMOTIVE	4910-00-767-0218	MILT4544	SC 4910-95-A02
63	TESTER, HYDRAULIC	4940-01-136-4830	13222E4767	SC 4940-95-CL-B07
64	TIE DOWN, CARGO AIRCRAFT	1670-00-725-1437	SP4067	CTA 50-970
65	TOOL KIT, AUTO FUEL & ELECTRICAL	5180-00-754-0655	SC 4910-95-CLA50	SC 4910-95-CL-A50
66	TOOL KIT, BLIND RIVET	5180-01-201-4978	D-100-MIL-1	SC 4910-95-CL-A72
67	TOOL KIT, ELECTRICAL	5180-00-876-9336	7550526	SC 4910-95-CL-A72
68	TOOL KIT, GENERAL MECHANIC'S	5180-00-177-7033	SC 5180-90-CL-N26	SC 5180-90-CL-N26

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
69	TOOL KIT, VALVE SEAT RING	5120-00-698-7979	MILT13918	SC 4910-95-A63
70	TORCH SET, CUTTING AND	3433-00-294-6743	MIL-T-13880	SC 4910-95-A02
71	TRESTLE, MOTOR VEHICLE	4910-00-251-8013	306	SC 4910-95-A31
72	VISE, MACHINIST	5120-00-293-1439	504M2	SC 4910-95-A62
73	WRENCH SET, SOCKET	5120-00-081-2309	GGG-W-641	SC 5180-90-CL-N05
74	WRENCH SET, SOCKET	5120-00-204-1999	GGG-W-641	SC 4910-95-A02
75	WRENCH SET, SOCKET	5120-00-322-6231	GGG-W-641	SC 5180-90-CL-N05
76	WRENCH, ADJUSTABLE	5120-00-423-6728	6187328	SC 4910-95-A31
77	WRENCH, IMPACT, ELECTRIC	5130-00-221-0607	WW650	SC 4910-95-A31
78	WRENCH, TORQUE, 0-150 LB-FT	5120-00-247-2540	1503BFP	SC 4910-95-A31
79	WRENCH, TORQUE, 0-150 LB-IN.	5120-00-230-6380	TQ12B	SC 4910-95-A62
80	WRENCH, TORQUE, 0-175 LB-FT	5120-00-640-6364	1753LDF	SC 4910-95-A02
81	WRENCH, TORQUE, 0-200 LB-IN.	5120-00-853-4538	F200I	SC 4910-95-CL-A72
82	WRENCH, TORQUE, 0-250 N•M	5120-01-115-1723	1753DFE	SC 4910-95-A31
83	WRENCH, TORQUE, 0-300 LB-IN.	5120-00-247-2536	F3001	SC 4910-95-A31
84	WRENCH, TORQUE, 0-60 N•M	5120-01-112-9531	TESI60	SC 4910-95-A31
85	WRENCH, TORQUE, 0-600 LB-FT	5120-00-221-7983	SW130-301	SC 4910-95-A31
86	WRENCH, TORQUE, 0-75 LB-IN.	5120-01-112-9532	B107.14MTY1CLCST 1	SC 4910-95-A31

APPENDIX C
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

C-1. SCOPE

This appendix lists expendable and durable items that you will need to operate and maintain the LMTV Truck. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except medical, class V repair parts, and heraldic items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

Section I. INTRODUCTION

C-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item, e.g., "Lubricating Oil (Item 19, Appendix D)."

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the item.

c. Column (3) - National Stock Number. This is the national stock number assigned to the item which you can use to requisition it.

d. Column (4) - Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number. This provides the other information you need to identify the item.

e. Column (5) - Unit of Measure. This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Section. II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	F/H	4730-01-270-9594	Adapter, Pipe (81343) 2022-8-12S	ea
2	F/H	4730-01-286-4614	Adapter, Pipe (81343) 2022-8-12S	ea
2.1	F	4730-01-457-4025	Adapter, Straight, Pipe to Tube (96906) MS51503B4-4	ea
2.2	F	4730-00-760-3525	Adapter, Straight, Tube to Boss (81361) C116-3-71	ea
3	F/H		Adapter, Swivel (81343) 2018-8-8S	ea
4	F/H	4730-01-113-9251	Adapter, Union	ea
5	O/F/H	8040-00-118-2695	Adhesive (72799) RTV162	kt
6	F/H	8040-00-728-3088	Adhesive (78500) 1199-T-3842 6 oz kit	oz

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
7	O/F/H	8040-01-250-3969	Adhesive (05972) 242	ea
8	F/H	8040-01-331-7470	Adhesive (81349) MIL-A-46106 5 oz tube	oz
9	F/H	8040-01-126-1422	Adhesive (52152) 1099	qt
10	H		Adhesive (04963) DP-100 1.7 oz tube	oz
10.1	O/F	8040-01-446-7842	Adhesive (01139) RTV123 10 oz	ca
11	O/F/H	6850-00-174-1806	Antifreeze (81349) MIL-A-11755 55 gl drum	gl
12	O/F/H		Antifreeze (81349) MIL-A-46153	
		6850-00-181-7929	1 gl can	gl
		6850-00-181-7940	55 gl drum	gl
13	F/H	8030-00-597-5367	Antiseize Compound (81349) MIL-A-907 2-1/2 lb can	lb
14	F/H	8415-00-222-8074	Apron, Plastic, Disposable (32075) E2-2845 Box of 100	ea
15	F/H	5306-00-174-4150	Bolt, Machine (11083) 3B4772	ea
16	F/H	5306-00-381-9928	Bolt, Machine (19207) 12414307-080	ea
16.1	F/H		Bolt, Machine (19207) 12414307-075	ea
17	F/H	7920-00-926-5243	Bucket, Mop (88001) C1122F	ea
18	F/H	5340-00-450-5718	Cap and Plug Set (19207) 10935405	ea
19	H		Carbon Removing Compound (81349) MIL-C-19853 TY II	
		6850-00-543-7801	5 gl can	gl
		6850-00-550-7453	55 gl drum	gl
20	F/H	7510-00-162-2910	Chalk Line, Marking Powder 09-304147	ea
21	O/F/H	6850-01-347-0073	Cleaning Compound, Windshield (81349) O-C-1901	cl
22	F/H	5350-00-221-0872	Cloth Abrasive Crocus Cloth (81348) P-C-458 50 sheet package	sh
23	F/H	5350-00-174-0985	Cloth, Abrasive, 600 Grit (81348) GGG-C-520 Box of 100	sh

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
24	F/H		Corrosive Preventive Compound (81349) MIL-C-16173	
		8030-00-062-6950	Grade 1 - 1 quart can	qt
			Grade 2 - 1 quart can	qt
		8030-01-149-1731	Grade 3 - 1 pint can	pt
			Grade 4 - 1 pint can	pt
25	F/H	4730-00-881-1161	Coupling, Pipe 207P-6	ea
26	F/H	6850-00-856-7955	Desiccant, Activated (81349) MIL-D-3464	
			18, 5 gl bags	bg
27		DELETED		
28	C/O/F/H		Diesel Fuel (Arctic) (81348) VVF800FRADEDDFA	
		9140-00-286-5282	5 gl cn	cn
		9140-00-286-5283	Bulk	gl
		9140-00-286-5284	55 gl drum	gl
		9140-00-286-5285	55 gl drum	gl
29	C/O/F/H		Diesel Fuel (81348) VVF800GRADEDF1WI	
		9140-00-286-5286	Bulk	gl
		9140-00-286-5287	5 gl can	gl
		9140-00-286-5288	55 gl drum	gl
		9140-00-286-5289	55 gl drum	gl
30	C/O/F/H		Diesel Fuel (81348) VVF800GRADEDF2RE	
		9140-00-286-5294	Bulk	gl
		9140-00-286-5295	5 gl can	gl
		9140-00-286-5296	55 gl drum	gl
		9140-00-286-5297	55 gl drum	gl
31	C/O/F/H	7520-01-209-1152	Dispenser, Pressure Sensitive Adhesive Tape (55203) 5006-0-9	ea
32	F/H		Fitting 190923-02S	ea
33	F/H		Fitting 2027-8-4S	ea
34	F/H	5210-00-640-6176	Gage, Bearing Clearance (77220) PLASTIGAGEPB1	
			Box of 12	ea
35	F/H	8040-01-038-5043	Gasket Cement (11083) 5H2471	
			8 oz can	oz
35.1	F	8040-01-437-6864	Gasket Cement (11083) 1U-8846	

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
36	F/H		Grease, Automotive and Artillery (GAA) (81349) MIL-G-10924	
		9150-00-065-0029	2-1/4 oz tube	oz
		9150-00-190-0904	1-3/4 lb can	lb
		9150-00-190-0905	6-1/2 lb can	lb
		9150-00-190-0907	35 lb can	lb
37	F/H	9150-00-180-6382	Grease, General Purpose (81349) MIL-T-24139	
			6-1/2 lb can	lb
38	F/H	9150-00-223-4004	Grease, Molybdenum Disulfide (81349) MIL-G-21164	
			6-1/2 lb can	lb
39	F/H	9150-00-664-0050	Grease, Ordnance, Extreme Pressure (12474) Molylube 80	
			1 pt can	pt
40	F/H	5345-01-356-8913	Honing Stone Assembly (10133) R150761-SA	ea
41	F/H		Hose (81343) FC 324-12	ea
41.1	O/F	4720-00-988-3842	Hose Assembly, Nonmetallic (50599) R25679-1	ea
41.2	O/F		Hydraulic Fluid (81349) MIL-H-5606	
		9150-00-252-6383	1 qt can	qt
		9150-00-223-4134	1 gl can	gl
42	O/F/H	5970-01-100-4464	Insulating Compound, Electrical (08800) RTV-102 White	
			2.8 oz tube	ea
43	O/F/H	5970-00-767-0524	Insulation, Sleeving, Electrical (81349) MIL-I-23053/5	
			4 in.	ea
43.1	O/F	5970-01-378-3018	Insulation, Sleeving, Electrical (06090) ATUM-1/4-0-4FT	lg
44	C/O/F/H		Lubricating Oil, Engine (81349) MIL-L-2104 OE/HDO-10	
		9150-00-183-7807	Bulk	gl
		9150-00-189-6727	1 qt can	qt
		9150-00-186-6668	5 gl can	gl
		9150-00-191-2772	55 gl drum	gl
45	F/H		Lubricating Oil, Engine (81349) MIL-L-2104 0E/HDO-30	
		9150-00-186-6681	1 qt can	qt
		9150-00-188-9858	5 gl can	gl
		9150-00-189-6729	55 gl drum	gl

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
46	F/H		Lubricating Oil, Engine (81349) MIL-L-46167	
		9150-00-402-4478	1 qt can	qt
		9150-00-402-2372	5 gl can	gl
		9150-00-491-7197	55 gl drum	gl
47	F/H		Lubricating Oil, Engine (81349) MIL-L-2104 OE/HDO-40	
		9150-00-405-2987	Bulk	gl
		9150-00-189-6730	1 qt can	qt
		9150-00-188-9862	55 gl drum	gl
48	O/F/H	9150-01-152-4117	Lubricating Oil, Engine (81349) MIL-L-2104 OE/HDO 15W-40	
			1 qt can	qt
49	O/F/H		Lubricating Oil, Gear (81349) MIL-L-2105 60-75W	
		9150-01-035-5390	1 qt can	qt
		9150-01-035-5391	5 gl can	gl
50	O/F/H		Lubricating Oil, Gear (81349) MIL-L-2105 80W-90	
		9150-01-035-5392	1 qt can	qt
		9150-01-035-5393	5 gl can	gl
		9150-01-035-5394	55 gl drum	gl
51	O/F/H	9150-01-035-5395	Lubricating Oil, Gear (81349) MIL-L-2105 85W-140	
			5 gl can	gl
51.1	F		Lubrication, Rubber Emulsion 5391-06	
			1 pt bottle	bt
52	F/H	5310-01-369-6073	Nut, Self-Locking (19207) 12414308-007	ea
53	F/H	5310-01-362-6171	Nut, Self-Locking N9406	ea
53.1	F/H		Paper, Abrasive 2347	ea
54	O/F/H	6530-01-283-6227	Paraffin and Mineral Oil (25973) 76-1026	
			7 lb can	lb
55	F/H	8030-00-043-1688	Primer, Sealing Compound (81349) MIL-S-224373	
			1 gl can	gl
56	F/H	4204-00-759-3290	Protector, Hearing 19A	ea

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
57	F/H	8010-00-652-3626	Prussian Blue, Paste, Bearing Surface (81349) MIL-P-30501 1 oz tube	oz
58	F/H		Pulley, Groove (19207) 12421165	ea
59	C/O/F/H	7920-00-205-1711	Rag, Wiping (58536) A-A-531 50 lb bale	ea
60	F/H	4730-01-113-9251	Reducer, Tube (81343) 2027-8-12S	ea
61	F/H	4020-00-593-9584	Rope, Fibrous 9868-165X4PC50	ea
62	F/H	5210-00-293-3393	Rule, Multiple, Folding (81348) GGG-R-791	ea
63	F/H	5330-00-003-5427	Rubber Sheet, Solid (81349) MIL-R-3065	sh
64	F/H		Sealant (11083) 2P2333	ea
64.1	F	8030-00-728-9665	Sealant (62377) 80017 1 pt can	pt
64.2	F	8030-01-225-4144	Sealant (P/N 12297953)	ea
65	F/H	8030-00-981-7005	Sealant, Adhesive (05972) AA15-1	ea
66	F/H		Sealant, Adhesive (78500) 1199-E-3931	ea
67	F/H		Sealant, Adhesive (78500) 2297-B-5436	ea
67.1	F	1015-01-255-4144	Sealant, Pipe (19207) 12297953 50 ml tube	tu
67.2	F/H	8030-00-111-6404	Sealing Compound (05972) 640-31 50 cc bottle	bt
68	O/F/H	8030-00-204-9149	Sealing Compound (05972) 592-41 250 cc tube	tu
69	F/H	8030-00-656-1426	Sealing Compound (81349) MIL-S-45180 1 pt can	pt
70	O/F/H	 8030-01-104-5392 8030-01-025-1692	Sealing Compound (05972) 242 10 cc bottle (box contains 10 bottles) 250 cc bottle	 bx bt
71	O/F/H	8030-01-155-3238	Sealing Compound (11083) 6V6640 50 ml tube (box contains 6 tubes)	bx
72	F/H	8030-00-220-6973	Sealing Compound (81349) MIL-S-45180 4 oz can	cn

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
73	F/H		Sealing Compound IN 8846	
74	F/H	8030-01-171-7628	Sealing Compound (05972) 272-40 50 cc bottle	bt
75	O/F/H	8030-00-148-9833	Sealing Compound (05972) 271 10 cc bottle (box contains 10 bottles)	bx
75.1	O/F	8030-01-371-8405	Sealing Compound (83574) PR-1422 B-1/2 6 oz cartridge (case contains 36 cartridges)	ca
75.2	F/H	8030-01-374-3504	Sealing Compound (51831) 50 cc tube	tu
76	F/H	5305-00-152-0533	Screw, Cap, Hex Head 2-0B113	ea
76.1	F/H	5305-01-157-1391	Screw, Cap, Hex Head 10501611	ea
77	F/H	5305-01-359-8004	Screw, Cap, Hex Head 29505612	ea
78	F/H	5305-01-374-1087	Screw, Cap, Hex Head 12414307-194	ea
78.1	F/H	5305-01-377-0696	Screw, Cap, Hex Head 12414419-128	ea
79	C/O/F/H	7930-00-082-0584	Soap, Laundry (81348) P-S-1792 2 lb box	bx
80	F/H	3439-01-164-0593	Solder (61404) 14675 5 lb spool	sl
81	C/OF/H		Solvent, Dry Cleaning (81348) P-D-680	
		6850-00-664-5685	1 qt can	qt
		6850-00-281-1985	1 gl can	gl
81.1	O/F	5940-01-456-1319	Splice, Conductor (0FW39) 12420927-001	ea
81.2	F/H		Spindle Compound #279 (ODUGZ)	ea
82	F/H	8030-00-060-3167	Tape, Antiseizing (73165) FEL-PRO 51520 520 in. roll	ro
83	O/F/H	8030-00-889-3534	Tape, Antiseizing (81349) MIL-T-27730	ea
84	O/F/H	5640-00-103-2254	Tape, Duct (39428) 1791K70 60 yd roll	ro
85	O/F/H	5970-00-644-3167	Tape, Insulation, Electrical (80063) TL83 85 ft roll	ro
86	F/H	4730-01-146-4113	Tee, Pipe to Tube (96906) MS5154A6	ea
87	F/H		Tee, Swivel (81343) R6X/063T12R6X	ea
88	F/H	8010-00-242-2089	Thinner, Paint Products (81348) TT-T-291TY1 1 gl can	gl

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
89	O/F/H	5935-01-379-4997	Ties, Cable, Plastic box of 100	 bx
89.1	C		Turbine Fuel, Aviation, Kerosene Type (MIL-T-83133), Grade JP-8	
89.2	C		Turbine Fuel, (MIL-F-16884), (NATO Code No. F75 or F-72)	
		9140-00-255-7764	5 gl can	cn
		9140-00-273-2378	55 gl drum	dr
		9140-00-273-2377	1 gl can	cn
89.3	C		Turbine Fuel, (MIL-F-5624), Grade JP-4 (NATO Code No. F40)	
		9130-00-273-2380	Drum, 16 gage	dr
89.4	C		Turbine Fuel, (MIL-T-5624), Grade JP-5 (NATO Code No. F-44)	
		9130-01-305-5596	Bulk	gl
		9130-01-250-6353	Drum, 16 gage	dr
90	F/H	4020-00-241-8893	Twine, Fibrous (80063) 6Z8827 860 ft ball	 ea
91	F/H	5310-00-110-8978	Washer, Flat 133B6663-6	ea
92	F/H	5310-01-267-1686	Washer, Flat (96906) MS51412-3	ea
93	F/H	5130-00-289-9586	Wheel, Abrasive (81348) GGG-W-290	ea
94	F/H	6145-01-148-2263	Wire, Electrical (80009) 175-0825-00 50 ft	 ft
95	F/H	9505-00-221-2650	Wire, Non-electrical (96906) MS20995C20 1 lb roll	 lb

APPENDIX D
ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

D-1. INTRODUCTION

This appendix includes complete instructions for manufacturing or fabricating authorized items locally. All bulk materials needed to manufacture an item are listed by part number or specification number. Figures are provided as needed. See standards and specifications DoD-Std-00100D(AR) and ANSI Y14.5M1982 for required details.

Section II. MANUFACTURED ITEMS INDEX

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
Brake Adjusting Tool Support		D-1
Brake Plunger Seal Driver		D-2
Cab Front Support Spanner Socket		D-3
Cab Maintenance Stand		D-4
Cab Support Tool		D-5
Engine Stand Bracket Assembly		D-6
Headlight Adjustment Screen		D-7
Left Front Leaf Spring U-Bolt Socket		D-8
Machine Gun Ring Drill Stop		D-9
Machine Gun Ring Wooden Support		D-10
Main Valve Body Spring Compression TooL		D-11
Marking Sleeve		D-12
Relay Test Wire		D-13
Spanner Socket Tool		D-14
Spanner Wrench Tool		D-15
Spreader Bar		D-16
Steering Stop Shim Gage		D-17
Transfer Case Lift Bracket Assembly		D-18
Transmission Auxillary Oil Cooler Rubber Seal		D-19
Transmission Lift and Mounting Bracket Assembly		D-20
Transmission Lifting Bracket		D-21
Wheel Bearing Shim Tool Rest		D-22
12378512	Battery 12V Cable Assembly	D-23
12378575	Battery Ground Cable Assembly	D-24
12378576	Battery 24V Cable Assembly	D-25
12420265	Double-Sided Tape	D-26
12420489	Block Seal	D-27
12412332-003	Air Duct Hose	D-28
12412332-012	Air Duct Hose	D-28
12412332-040	Air Duct Hose	D-28
12412332-048	Air Duct Hose	D-28
12412332-066	Air Duct Hose	D-28
12412332-096	Air Duct Hose	D-28

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12412332-180	Air Duct Hose	D-28
12412367-038	Non-Metallic Flex Conduit	D-29
12412367-046	Non-Metallic Flex Conduit	D-29
12412367-064	Non-Metallic Flex Conduit	D-29
12412367-094	Non-Metallic Flex Conduit	D-29
12412367-178	Non-Metallic Flex Conduit	D-29
12414690-001	Pneumatic Tube	D-30
12414690-002	Pneumatic Tube	D-30
12414690-004	Pneumatic Tube	D-30
12414690-005	Pneumatic Tube	D-30
12414690-010	Pneumatic Tube	D-30
12414690-101	Pneumatic Tube	D-30
12414690-102	Pneumatic Tube	D-30
12414690-103	Pneumatic Tube	D-30
12414690-104	Pneumatic Tube	D-30
12414690-105	Pneumatic Tube	D-30
12414690-106	Pneumatic Tube	D-30
12414690-107	Pneumatic Tube	D-30
12414690-108	Pneumatic Tube	D-30
12414690-109	Pneumatic Tube	D-30
12414690-112	Pneumatic Tube	D-30
12414690-113	Pneumatic Tube	D-30
12414690-115	Pneumatic Tube	D-30
12414690-118	Pneumatic Tube	D-30
12414690-119	Pneumatic Tube	D-30
12414690-120	Pneumatic Tube	D-30
12414690-121	Pneumatic Tube	D-30
12414690-122	Pneumatic Tube	D-30
12414690-123	Pneumatic Tube	D-30
12414690-124	Pneumatic Tube	D-30
12414690-125	Pneumatic Tube	D-30
12414690-126	Pneumatic Tube	D-30
12414690-127	Pneumatic Tube	D-30
12414690-201	Pneumatic Tube	D-30
12414690-202	Pneumatic Tube	D-30
12414690-203	Pneumatic Tube	D-30
12414690-205	Pneumatic Tube	D-30
12414690-206	Pneumatic Tube	D-30
12414690-207	Pneumatic Tube	D-30
12414690-208	Pneumatic Tube	D-30
12414690-209	Pneumatic Tube	D-30
12414690-210	Pneumatic Tube	D-30
12414690-211	Pneumatic Tube	D-30
12414690-212	Pneumatic Tube	D-30
12414690-213	Pneumatic Tube	D-30
12414690-214	Pneumatic Tube	D-30
12414690-215	Pneumatic Tube	D-30
12414690-216	Pneumatic Tube	D-30
12414690-217	Pneumatic Tube	D-30
12414690-218	Pneumatic Tube	D-30
12414690-219	Pneumatic Tube	D-30
12414690-220	Pneumatic Tube	D-30
12414690-221	Pneumatic Tube	D-30

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12414690-222	Pneumatic Tube	D-30
12414690-223	Pneumatic Tube	D-30
12414690-224	Pneumatic Tube	D-30
12414690-225	Pneumatic Tube	D-30
12414690-226	Pneumatic Tube	D-30
12414690-227	Pneumatic Tube	D-30
12414690-228	Pneumatic Tube	D-30
12414690-229	Pneumatic Tube	D-30
12414690-230	Pneumatic Tube	D-30
12414690-231	Pneumatic Tube	D-30
12414690-301	Pneumatic Tube	D-30
12414690-302	Pneumatic Tube	D-30
12414690-303	Pneumatic Tube	D-30
12414694-X508	Pneumatic Hose Assembly	D-31
12414694-X558	Pneumatic Hose Assembly	D-31
12416381P1	Non-Metallic Electrical Cable Conduit	D-32
12416381P10	Non-Metallic Electrical Cable Conduit	D-32
12416381P11	Non-Metallic Electrical Cable Conduit	D-32
12416381P12	Non-Metallic Electrical Cable Conduit	D-32
12416381P13	Non-Metallic Electrical Cable Conduit	D-32
12416381P14	Non-Metallic Electrical Cable Conduit	D-32
12416381P15	Non-Metallic Electrical Cable Conduit	D-32
12416381P16	Non-Metallic Electrical Cable Conduit	D-32
12416381P17	Non-Metallic Electrical Cable Conduit	D-32
12416381P2	Non-Metallic Electrical Cable Conduit	D-32
12416381P20	Non-Metallic Electrical Cable Conduit	D-32
12416381P21	Non-Metallic Electrical Cable Conduit	D-32
12416381P22	Non-Metallic Electrical Cable Conduit	D-32
12416381P23	Non-Metallic Electrical Cable Conduit	D-32
12416381P26	Non-Metallic Electrical Cable Conduit	D-32
12416381P3	Non-Metallic Electrical Cable Conduit	D-32
12416381P30	Non-Metallic Electrical Cable Conduit	D-32
12416381P32	Non-Metallic Electrical Cable Conduit	D-32
12416381P34	Non-Metallic Electrical Cable Conduit	D-32
12416381P35	Non-Metallic Electrical Cable Conduit	D-32
12416381P36	Non-Metallic Electrical Cable Conduit	D-32
12416381P37	Non-Metallic Electrical Cable Conduit	D-32
12416381P38	Non-Metallic Electrical Cable Conduit	D-32
12416381P4	Non-Metallic Electrical Cable Conduit	D-32
12416381P5	Non-Metallic Electrical Cable Conduit	D-32
12416381P6	Non-Metallic Electrical Cable Conduit	D-32
12416381P8	Non-Metallic Electrical Cable Conduit	D-32
12416381P9	Non-Metallic Electrical Cable Conduit	D-32
12417926-001	Compressor Hose	D-33
12417926-002	Compressor Hose	D-33
12417926-004	Compressor Hose	D-33
12418037	Steering Gear Return Hose	D-34
12418460-001	Transmission Oil Cooler Hose	D-34
12418460-002	Transmission Oil Cooler Hose	D-34
12418763	Lanyard Assembly	D-35
12420036	Wooden Skid	D-36
12420062-002	Pneumatic Hose Assembly	D-31
12420062-003	Pneumatic Hose Assembly	D-31

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12420062-004	Pneumatic Hose Assembly	D-31
12420062-005	Pneumatic Hose Assembly	D-31
12420063-002	Pneumatic Hose Assembly	D-31
12420064-001	Pneumatic Hose Assembly	D-31
12420064-002	Pneumatic Hose Assembly	D-31
12420064-006	Pneumatic Hose Assembly	D-31
12420064-009	Pneumatic Hose Assembly	D-31
12420196	Lanyard Assembly	D-35
12420197-001	Non-Metallic Vent Air Hose	D-37
12420197-002	Non-Metallic Vent Air Hose	D-37
12420197-003	Non-Metallic Vent Air Hose	D-37
12420197-004	Non-Metallic Vent Air Hose	D-37
12420197-005	Non-Metallic Vent Air Hose	D-37
12420197-006	Non-Metallic Vent Air Hose	D-37
12420198-001	Non-Metallic Vent Air Hose	D-37
12420198-002	Non-Metallic Vent Air Hose	D-37
12420308-457	Personnel Heater Air Duct Hose	D-38
12420308-760	Personnel Heater Air Duct Hose	D-38
12420398	CTIS Quick Release Valve Spacer	D-39
12420419-001	CTIS Vent Hose	D-40
12420419-002	CTIS Vent Hose	D-40
3256-H-1048	CTIS Seal Driver	D-41
3256-J-1050	Front Axle Shaft Seal Driver	D-42
3256-K-1051	Wheel Hub Grease Seal Driver	D-43
3256-M-1053	Differential Pinion Seal Driver	D-44
3256-S-1059	Front and Rear Differential Yoke Seal Driver	D-45
Dimmer Switch Test Wire		D-46
Purge Valve Tool		D-47
M1079 Blackout Shield Seals		D-48
M1079 Door Gaskets		D-59
M1079 Window Sash Glazing Seals		D-50
Block Seal 12420489 Fabrication		D-51

Section III. MANUFACTURED ITEMS

D-1. BRAKE ADJUSTING TOOL SUPPORT

Make the brake adjusting tool support from 0.134 in. (3.4 mm) flat steel stock according to the following instructions. Refer to the parts list and **Figure D-1. Brake Adjusting Tool Support** for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, ASTM A569 Sheet, Hot Rolled	6.0 in. (152.4 mm) X 6.0 in. X (152.4 mm) X 0.134 in. (3.4 mm)	2

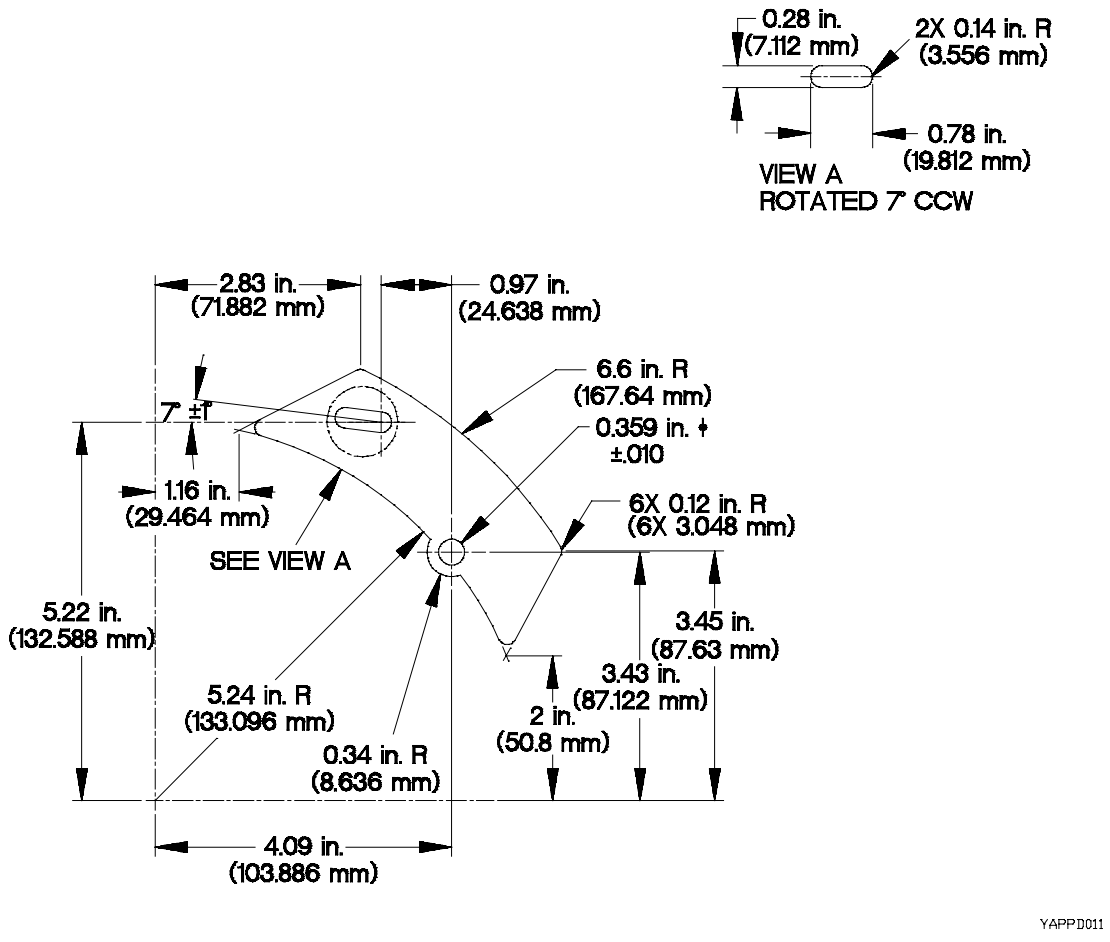


Figure D-1. Brake Adjusting Tool Support

a. All dimensions are in inches (millimeters).
b. Cut steel sheet as shown by dimensions in **Figure D-1. Brake Adjusting Tool Support**.
c. De-burr and remove sharp edges.

D-2. BRAKE PLUNGER SEAL DRIVER

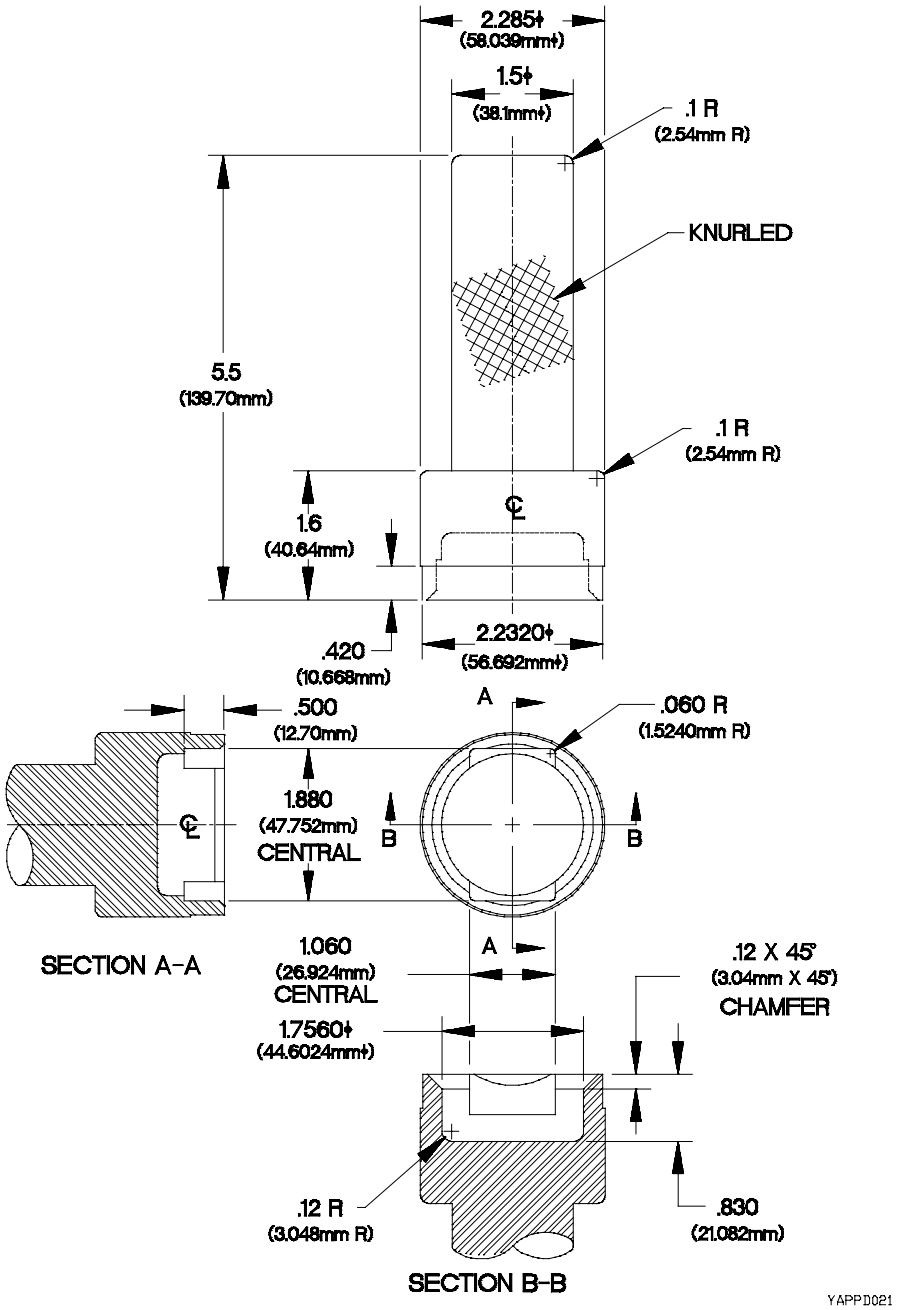


Figure D-2. Brake Plunger Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.

D-3. CAB FRONT SUPPORT SPANNER SOCKET

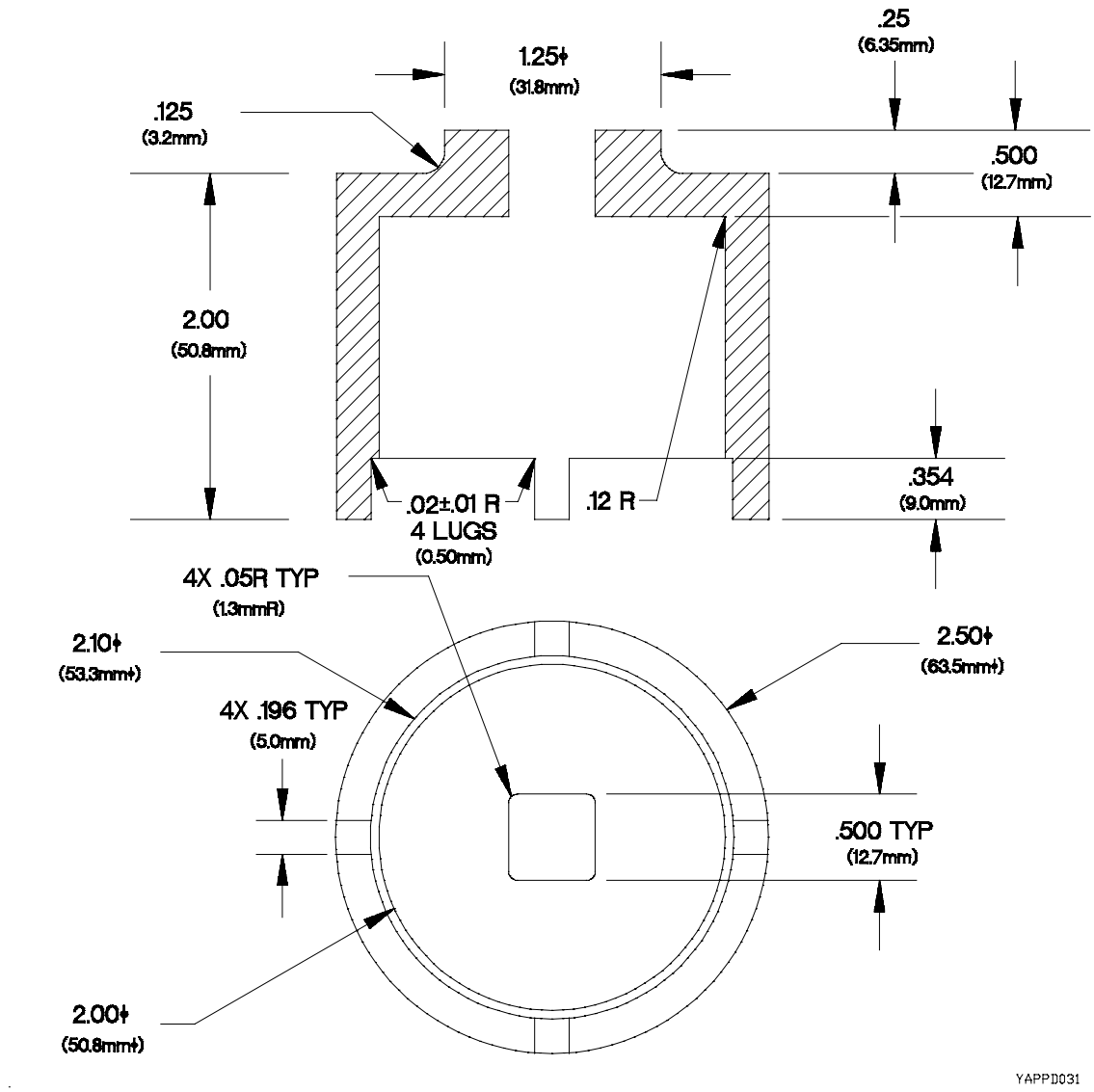


Figure D-3. Cab Front Support Spanner Socket

a. All dimensions are in inches (millimeters).
b. Fabricate from 2-1/2 inch diameter SAE 4130 bar stock conforming to MIL-T-6736 Type I Condition N (NSN 4710-00-278-0478 or equivalent).
c. Tolerance:
   1 place +/- .06
   2 place +/- .03
   3 place +/- .005
   angles +/- 2° unless otherwise specified.
d. Surface texture: 125 $\sqrt{.}$ unless otherwise specified.

D-4. CAB MAINTENANCE STAND

Make the cab maintenance stand from steel plate, 2 inch by 4 inch and 4 inch by 4 inch lumber, and bolts, nuts and washers according to the following instructions. Refer to the parts list tables and figures **Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets**, **Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations**, **Figure D-6. Cab Maintenance Stand Base Fabrication, Figure D-7. Cab Maintenance Stand Brace Bracket Locations**, **Figure D-8. Cab Maintenance Stand Brace to Base Assembly**, **Figure D-9. Cab Maintenance Stand Brace to Base Assembly**, and **Figure D-10. Cab Maintenance Stand Assembly** for details.

Item No.	Item Description	Size or Dimension	Material Description	Qty
1	Base, LH, RH	51½ x 3½ x 3½	4X4 in. Lumber (MIL-STD-731)	2
2	Base Feet	10½ x 3½ x 3½	4x4 in. Lumber	4
3	Base Spreaders	41 x 3½ x 1½	2x4 in. Lumber	6
4	Brace, Mid, and Front Supports	15½ x 3½ x 3½	4x4 in. Lumber	4
5	Brace, Rear Support	25 x 3½ x 3½	4x4 in. Lumber	2
6	Support, Rear, Front, Middle	41 x 3½ x 3½	4x4 in. Lumber	3
7	Brace Spreaders	44½ x 3½ x 1½	2x4 in. Lumber	2
8	Pads	6 x 3½ x 1½	2x4 in. Lumber	4
9	Bracket, Angle	3½ x 3½ x 1/8	1/8 in. Steel Angle Stock	6
10	Bracket, Straight	5½ x 3½ x 1/8	1/8 in. Steel Plate Stock	6
11	Bolt, 3/8 X 4 in. Carriage, NC			24
12	Bolt, 3/8 X 10 in. Carriage, NC			24
13	Washer, Flat, 3/8 in.			48
14	Lockwasher, 3/8 in.			48
15	Nut, Hex, 3/8 in.			48

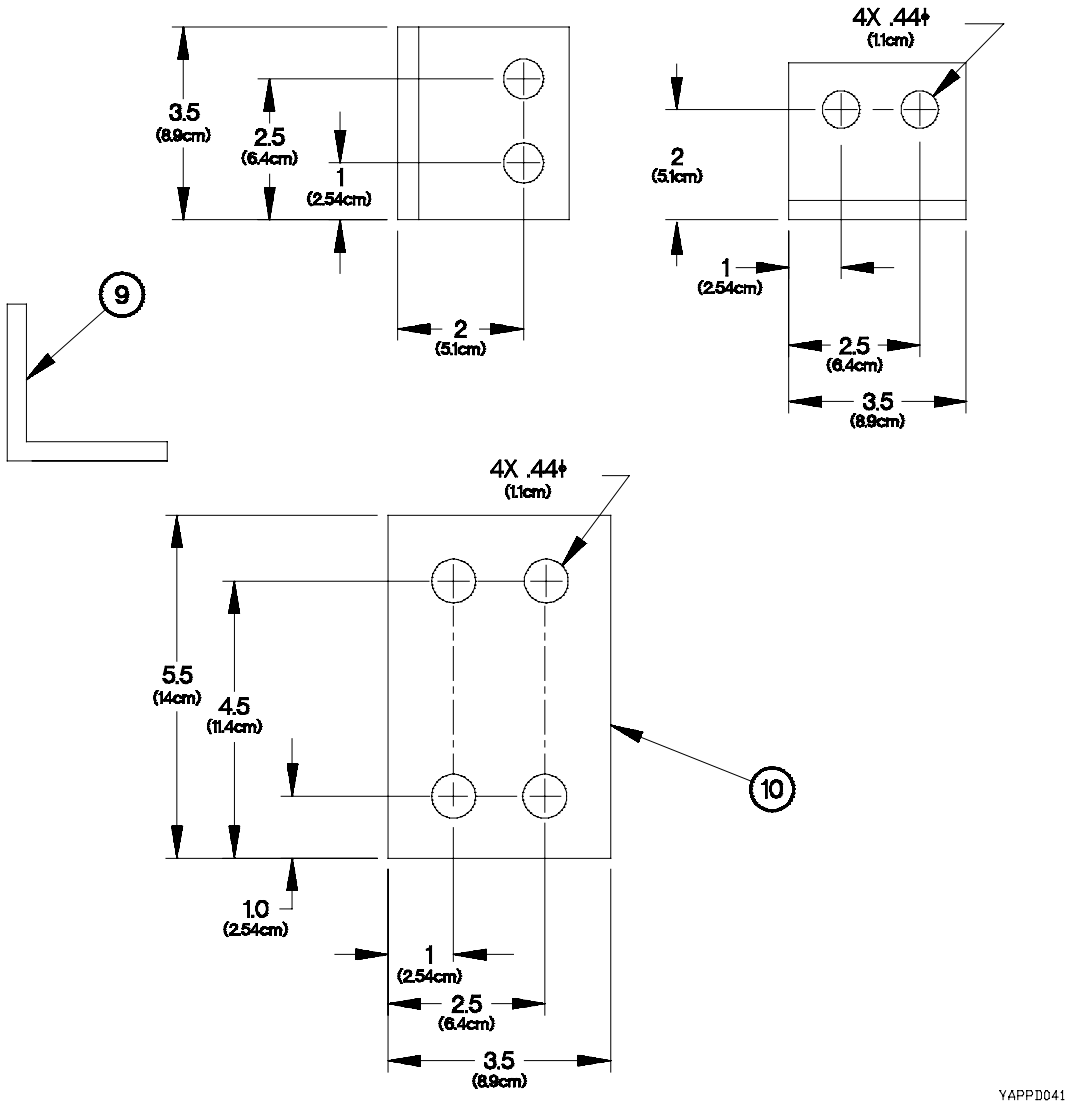


Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets

a. All dimensions are in inches (millimeters).
b. Cut 6 pieces of angle steel stock for angle brackets (9) and 6 pieces of steel plate stock for straight brackets (10).
c. Drill 0.44 in. (11.1 mm) diameter hole through 4 places in each angle bracket (9) and straight bracket (10) as shown in **Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets**.
d. De-burr and remove sharp edges.

D-4. CAB MAINTENANCE STAND (CONT)

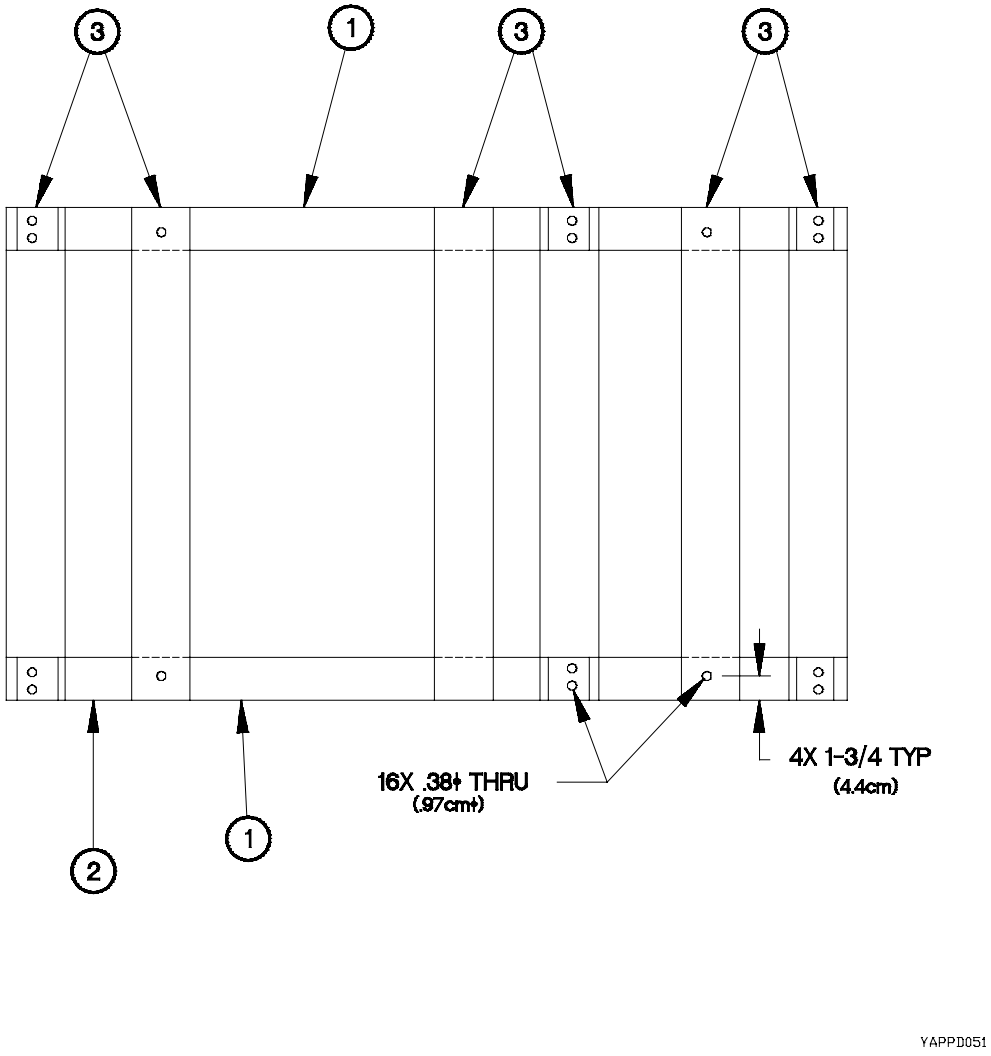


Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations

e. Using angle bracket (9) as a template, mark holes and match drill 0.38 in (9.6 mm) holes through left side base (1), left side base feet (2), and base spreaders (3) as shown in **Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations**.

f. Repeat step e. marking holes using bracket (9) for match drilling holes through right side base (1) RH, right side base feet and the base spreaders.

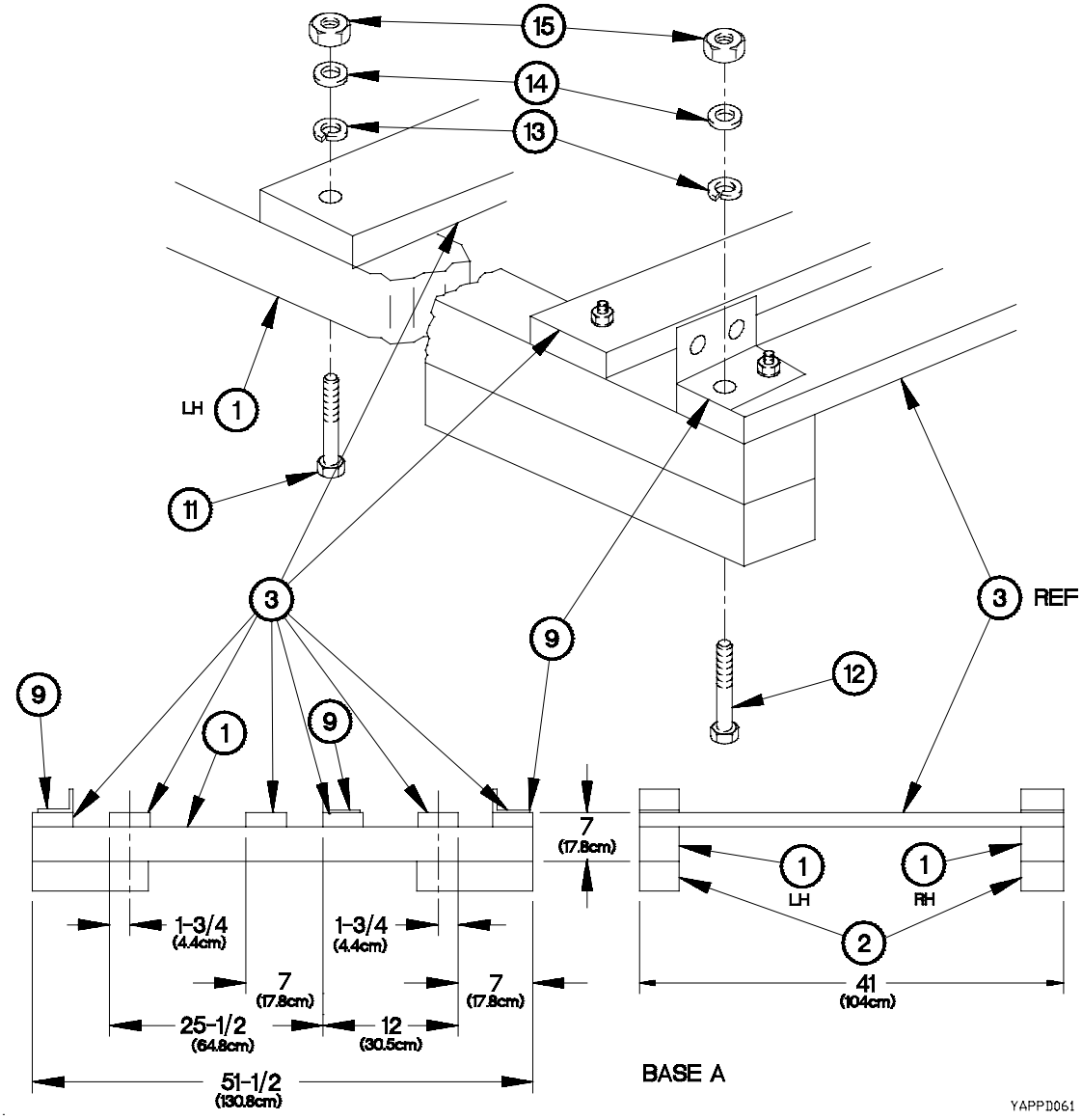


Figure D-6. Cab Maintenance Stand Base Fabrication

g. Make base of cab maintenance stand by securing to the left and to the right base (1); 2 base feet (2), 6 base spreaders (3) and 6 angle brackets (9) using 12 bolts (12), 6 bolts (11), 18 flat washers (13), lockwashers (14) and hex nuts (15) as shown in **Figure D-6. Cab Maintenance Stand Base Fabrication**.

D-4. CAB MAINTENANCE STAND (CONT)

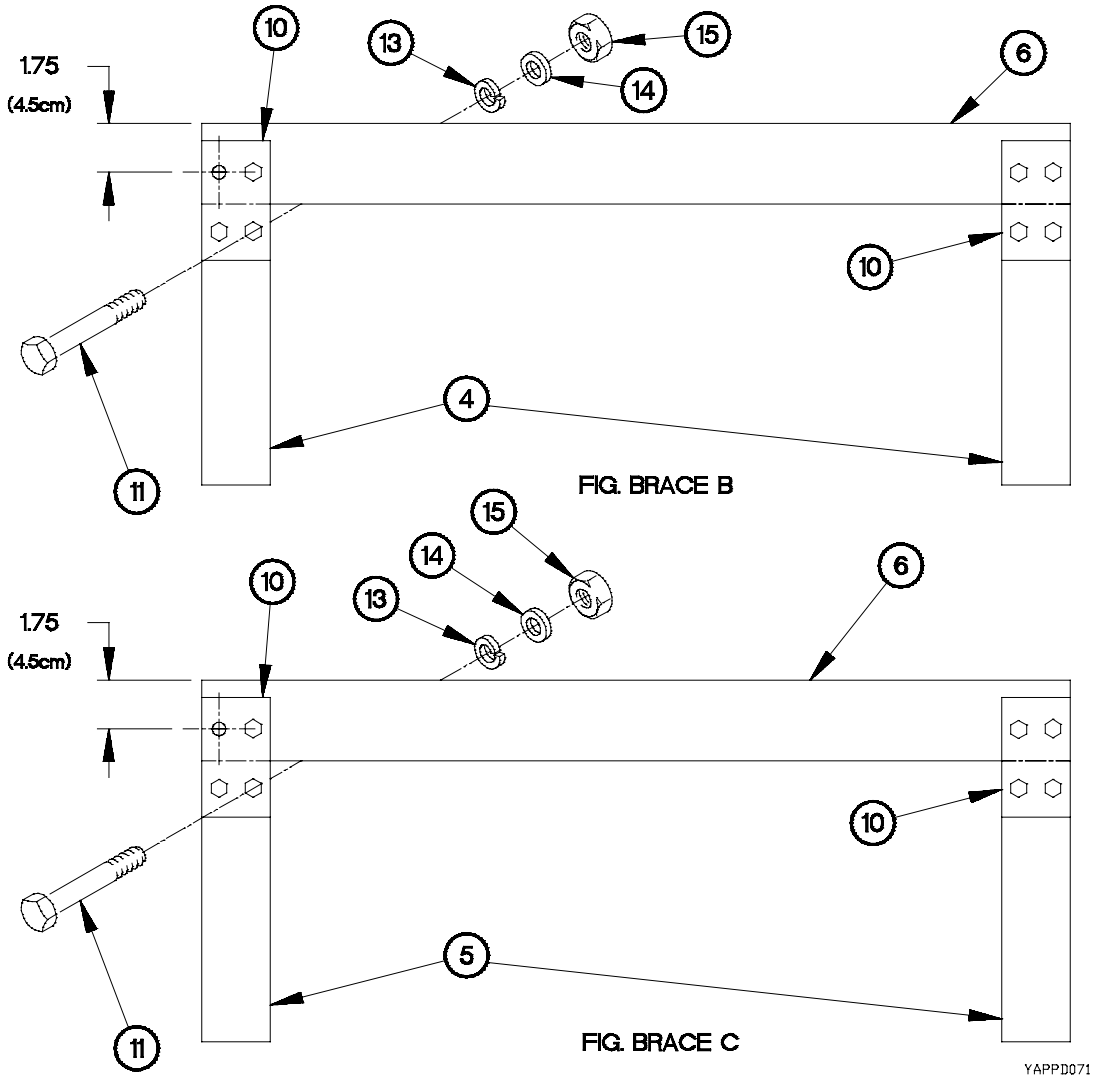


Figure D-7. Cab Maintenance Stand Brace Bracket Locations

h. Using straight bracket (10) as a template, mark holes and match drill 0.38 in. (9.6 mm) holes through 4 support braces (4) and through 2 supports (6) as shown in **Figure D-7. Cab Maintenance Stand Brace Bracket Locations**.

i. Make 2 B braces by securing to each end of support (6), braces (4) and straight brackets (10) using 16 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15).

j. Using straight bracket (10) as a template, mark holes and match drill 0.38 in. (9.6 mm) holes through 2 support braces (5) and through 1 support (6) as shown in **Figure D-7. Cab Maintenance Stand Brace Bracket Locations**.

k. Make C brace by securing to each end of support (6), brace (5) and straight brackets (10) using 8 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15).

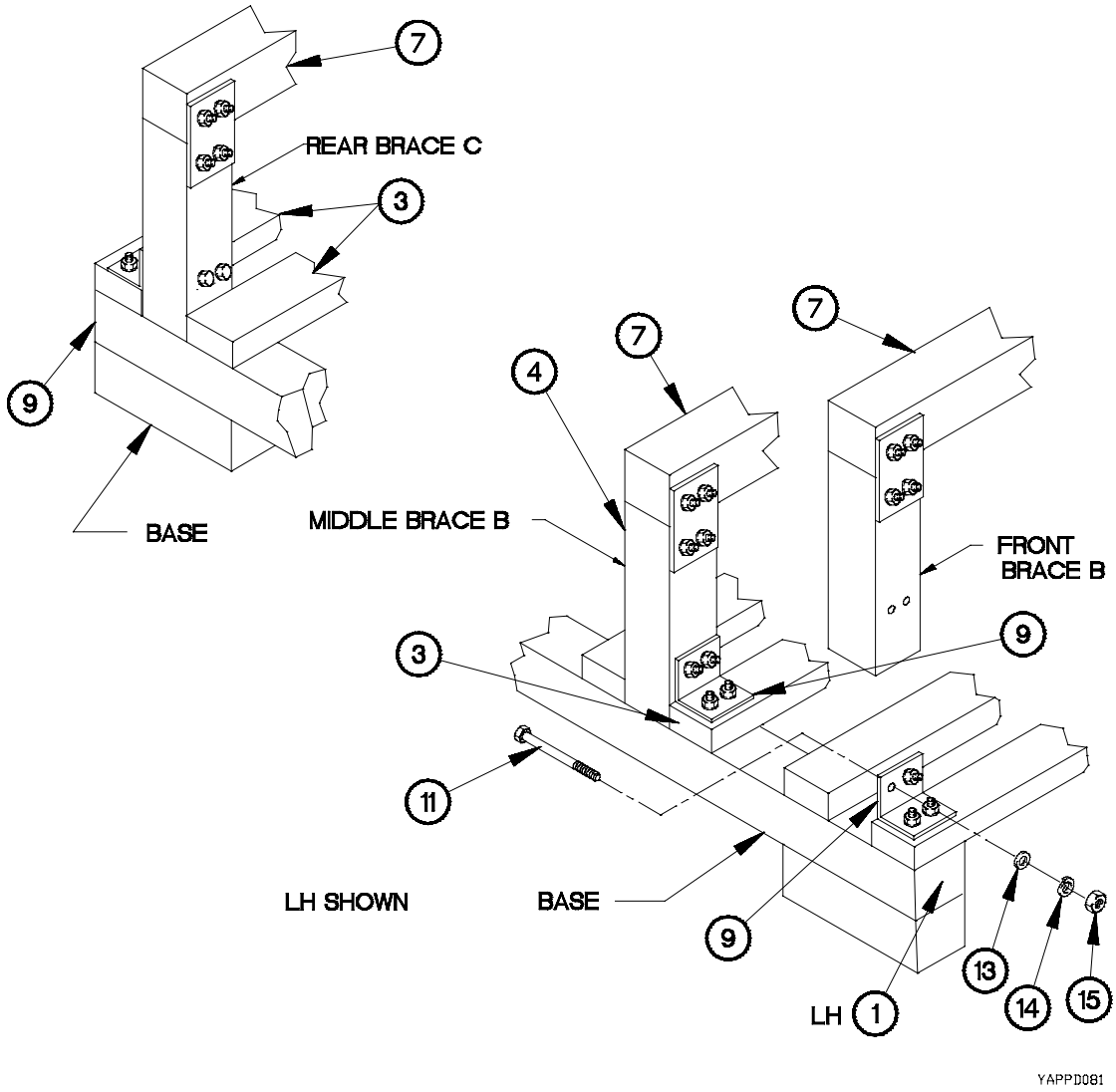


Figure D-8. Cab Maintenance Stand Brace to Base Assembly

l. At left side of base (1) LH, place middle Brace B on the base as shown in **Figure D-8. Cab Maintenance Stand Brace to Base Assembly**.
m. Using angle bracket (9) on base as a template, mark holes on Brace B and match drill 0.38 in. (9.6 mm) hole through Brace B brace (4) as shown in **Figure D-8. Cab Maintenance Stand Brace to Base Assembly**.
n. Secure Brace B to base spreader (3) using 2 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15).
o. Repeat steps m-n for front Brace B.

D-4. CAB MAINTENANCE STAND (CONT)

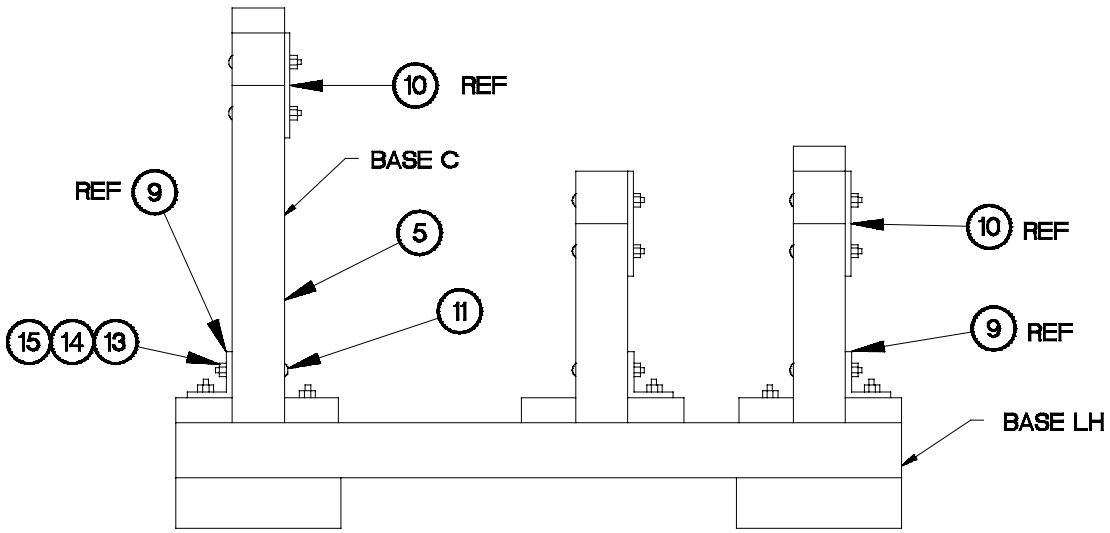


Figure D-9. Cab Maintenance Stand Side Braces Side View

p. Place Brace C on the base as shown in **Figure D-9. Cab Maintenance Stand Side Braces Side View**.
q. Using angle bracket (9) on base as a template, mark holes on Brace C and match drill 0.38 in. (9.6 mm) holes through Brace C brace (5).
r. Secure Brace C to base spreader (3) using 2 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15) as shown in **Figure D-9. Cab Maintenance Stand Brace to Base Assembly**.
s. Repeat steps m-r at right side base (1) RH.

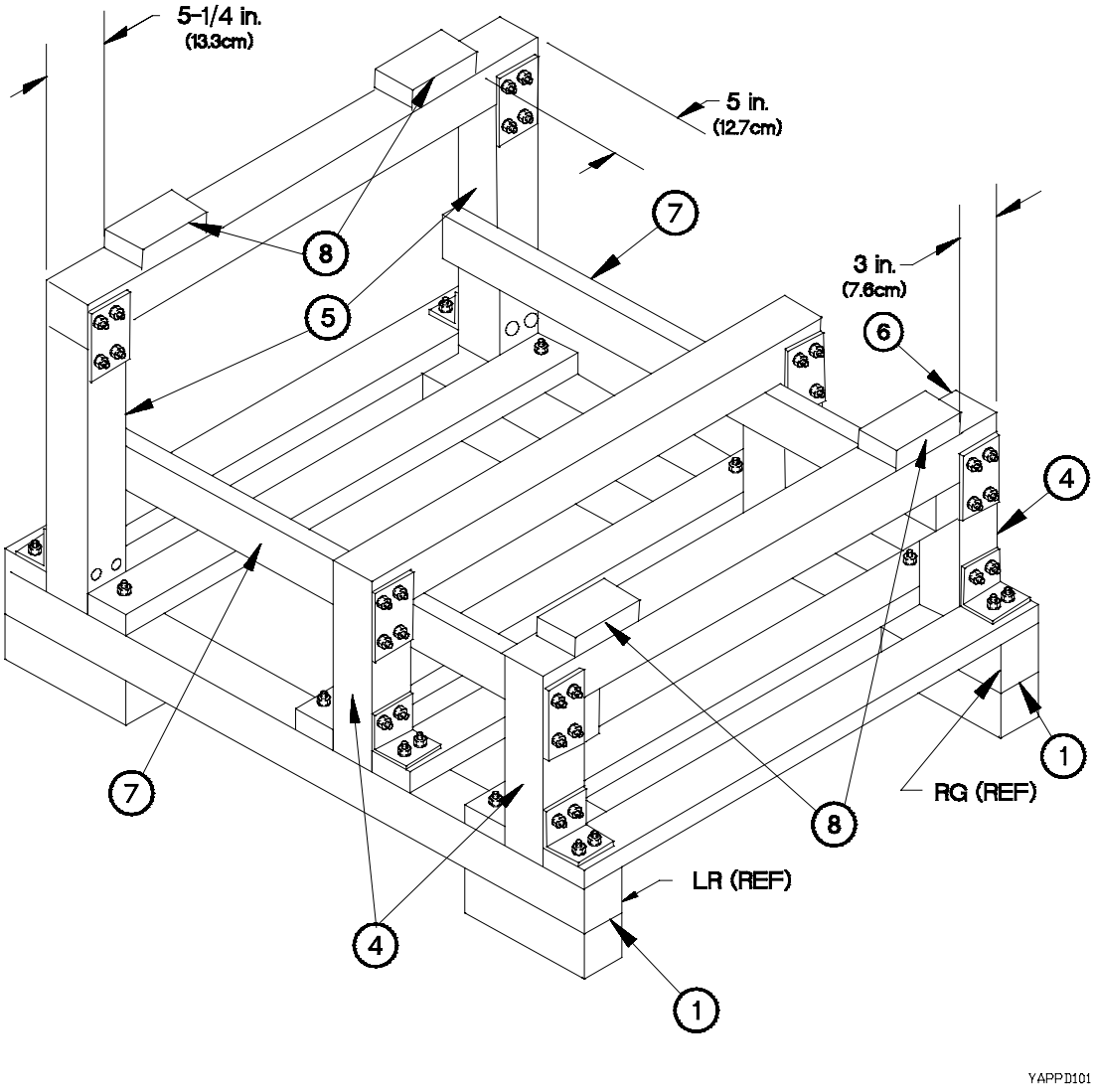


Figure D-10. Cab Maintenance Stand Assembly

t. Nail 1 pad (8) to support (6) at rear of stand 5-1/4 in. (133 mm) from left hand rear brace (5). Nail 1 pad (8) to support (6) at rear of stand 5 in. (127 mm) from right hand rear brace (5) using number 16 nails.
u. Nail 2 pads (8) to support (6) at front of stand 3 in. (76 mm) from each end of front brace (4) using number 16 nails.
v. Nail a left side brace spreader (7) to rear brace support (5) and middle and front brace supports (4) at position shown in **Figure D-10. Cab Maintenance Stand Assembly** using number 16 nails.
w. Nail a right side brace spreader (7) to rear brace (5) and middle and front brace supports (4) at positions shown in **Figure D-10. Cab Maintenance Stand Assembly** using number 16 nails.

D-5. CAB SUPPORT TOOL

Make the cab support tool from 0.38 in. (9.6 mm) flat steel stock and angle iron stock according to the following instructions. Refer to the parts list and **Figure D-11. Cab Support Tool Strut and Cab Rest** for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, Flat Bar	4.0 in. (102 mm) X 33.38 in. X (84.8 cm) X 0.38 in. (9.6 mm)	1
2	N/A	Steel, Flat Bar	4.0 in. (102 mm) X 12.0 in. (305 mm) X 0.38 in. (9.6 mm)	1
3	N/A	Angle Iron	2.0 in. (51 mm) X 2.0 in. (51 mm) X 3.5 in. (89 mm)	2
4	H.S.105VW-1	Omsi;gro[. CSA 105 C		
5	IC 551	Coating, Compound, Plastisol	NA	1

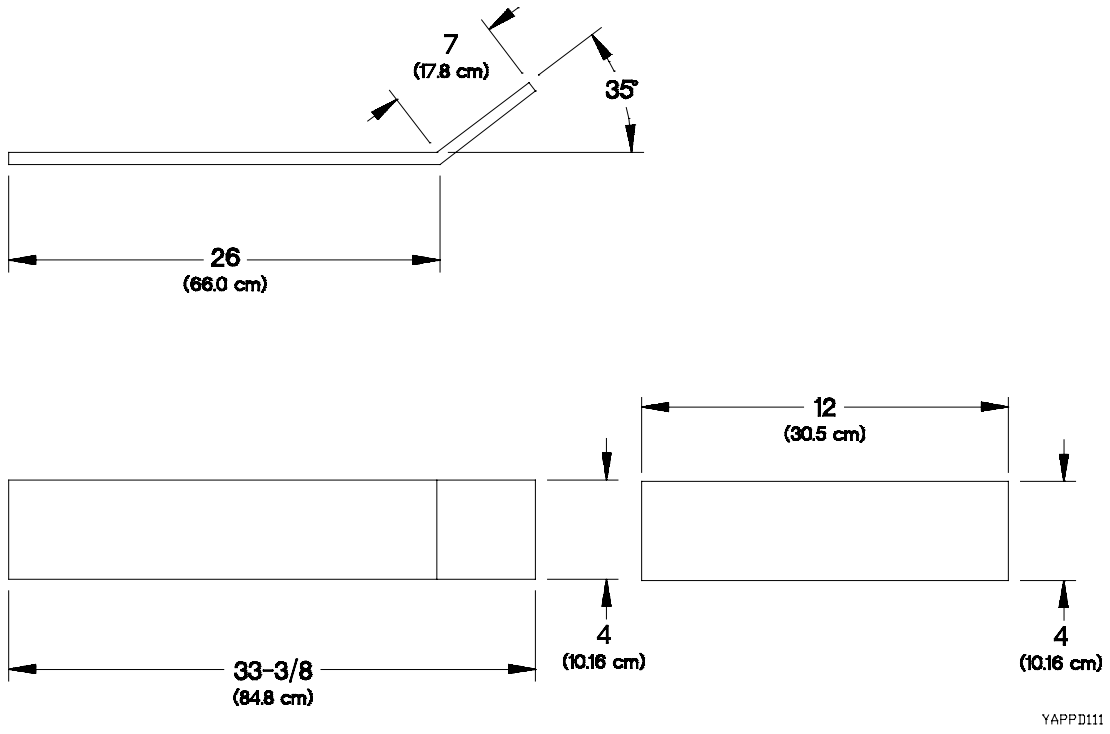


Figure D-11. Cab Support Tool Strut and Cab Rest

a. All dimensions are in inches (millimeters).
b. Cut cab support tool strut (1) from steel flat bar and bend to shape as shown in **Figure D-11. Cab Support Tool Strut and Cab Rest**.
c. Cut cab support tool cab rest (2) from steel flat bar.
d. De-burr and remove sharp edges.

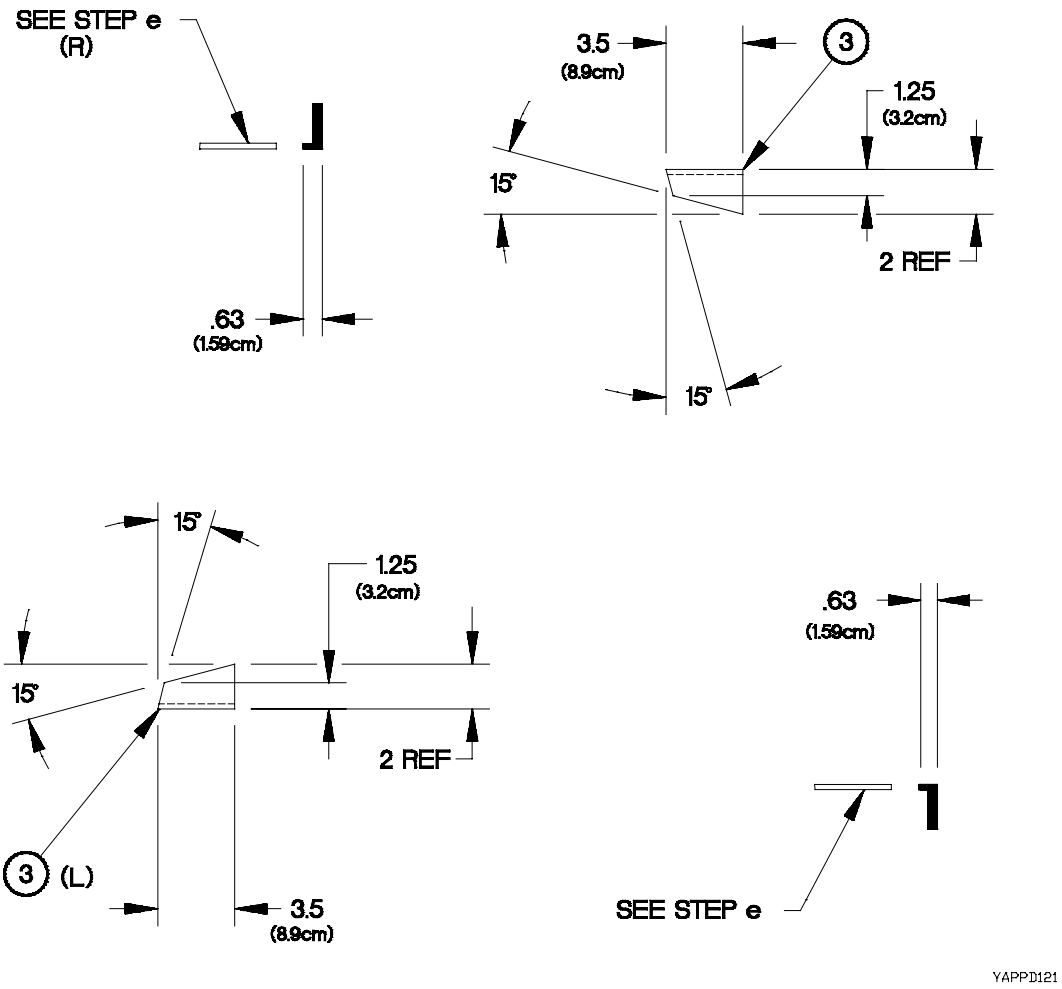


Figure D-12. Cab Support Tool Seat

e. Remove flange side of cab support tool seats (3) as shown in **Figure D-12. Cab Support Tool Seat**.
f. Cut cab support tool seats (3) L and (3) R according to dimensions and left\right orientation shown in **Figure D-12. Cab Support Tool Seat**.
g. De-burr and remove sharp edges.

D-5. CAB SUPPORT TOOL (CONT)

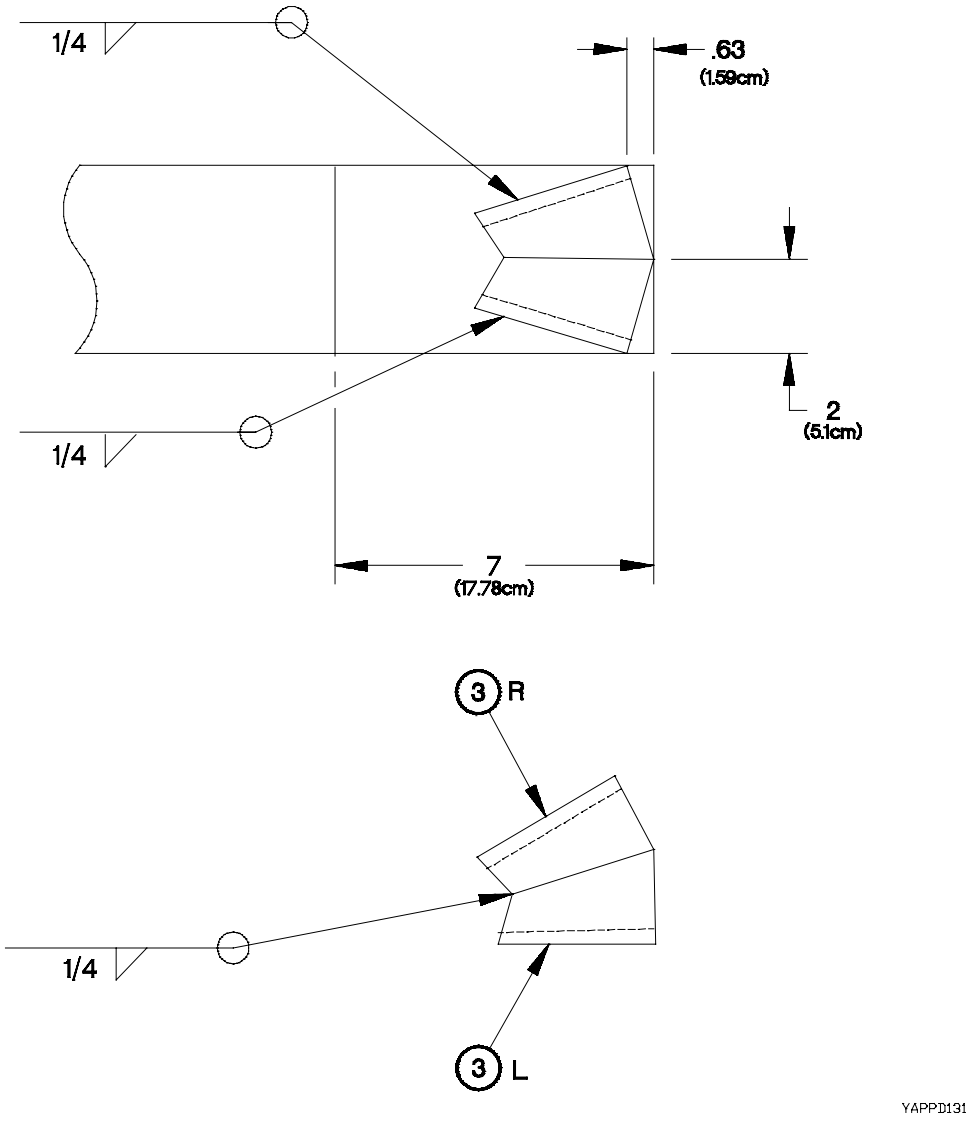


Figure D-13. Cab Support Tool Seat Layout

h. Position and clamp cab support tool seats (3) L and (3) R together as shown by dimensions in **Figure D-13. Cab Support Tool Seat Layout**.
i. Weld cab support tool seat (3) L to cab support tool seat (3) R as identified in assembly table and **Figure D-13. Cab Support Tool Seat Layout**.
j. Position and clamp cab support tool seats (3) L and (3) R to cab support tool strut (1) as shown by dimensions in **Figure D-4. Cab Support Tool Seat Layout**.
k. Weld items clamped in step (j) as shown in **Figure D-4. Cab Support Tool Seat Layout**.
l. De-burr and remove sharp edges.

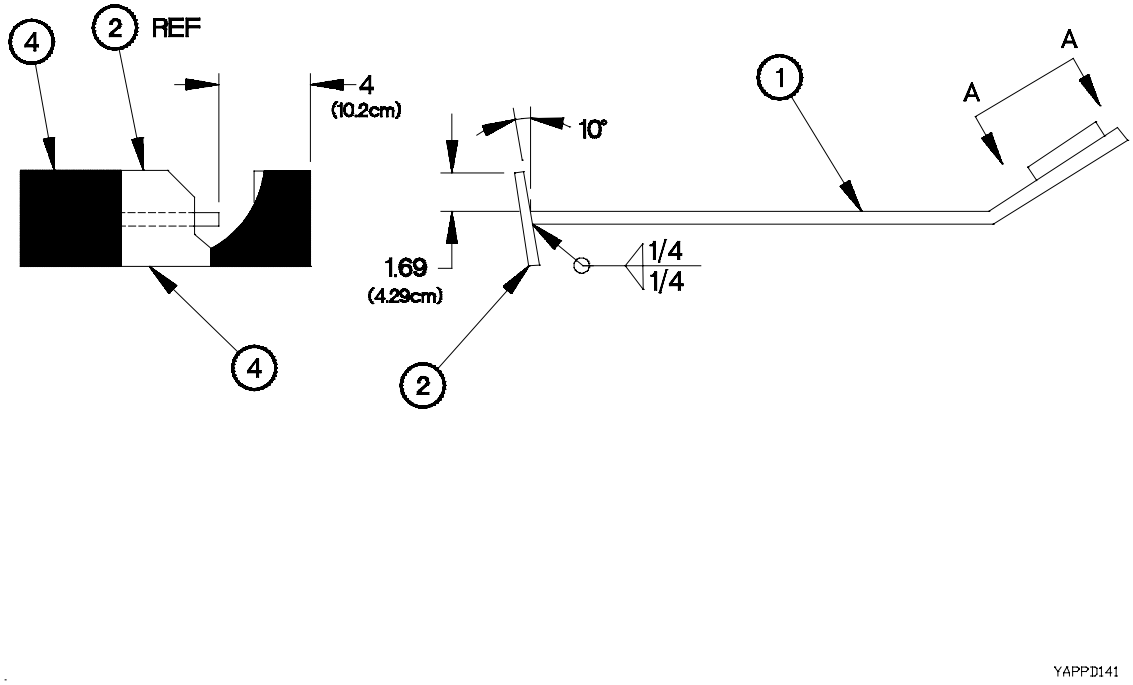


Figure D-14. Cab Support Tool Assembly

m. Position and clamp cab support tool strut (1) to cab support tool cab rest (2) as shown by dimensions in **Figure D-14. Cab Support Tool Assembly**, before insulgrip (4) is applied.
n. Weld cab support tool strut (1) to cab support tool cab rest (2).
o. Apply Insulgrip (4) to cab support tool cab rest (2) as described on material container.

D-6. ENGINE STAND BRACKET ASSEMBLY

Make the engine stand bracket assembly from the front, rear, and side plates according to the following instructions. Refer to the parts list tables and accompanying figures for details.

Item	Part Number	Name/Description	Qty
1	12419144-001	Plate, Front	1
2	12419144-002	Plate, Rear	1
3	12419144-003	Plate, Side	2

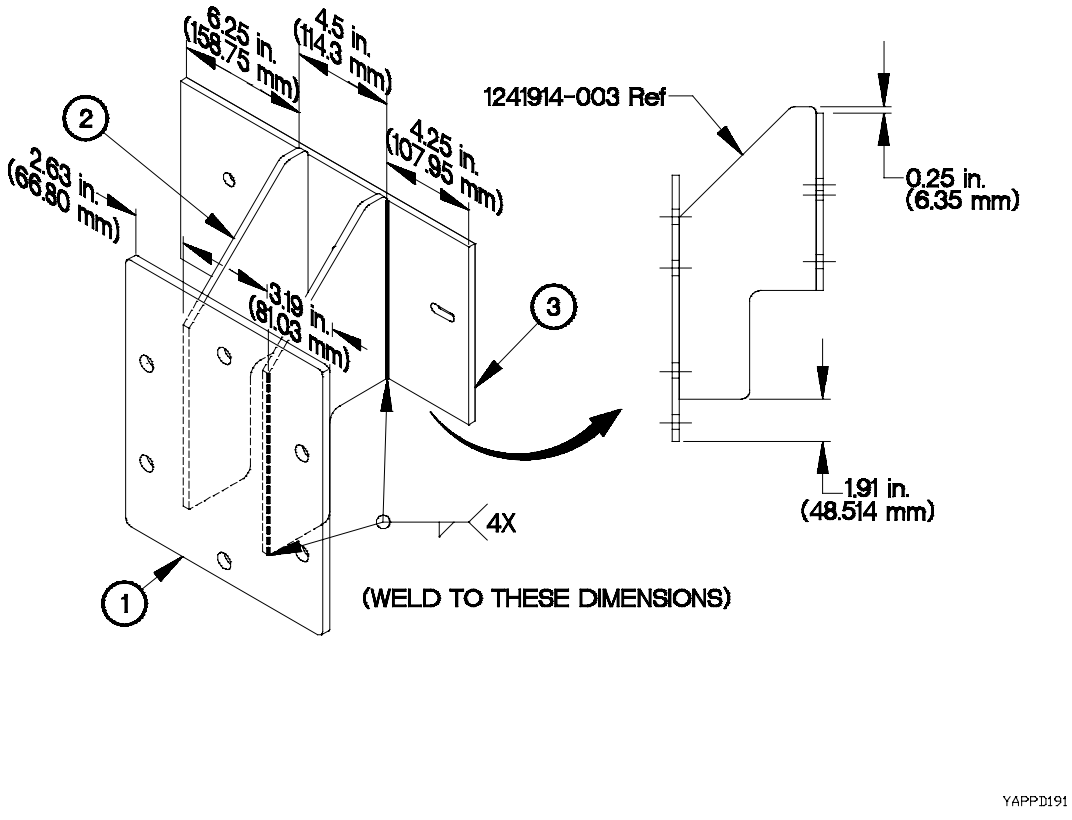


Figure D-15. Engine Stand Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Weld (1), (2) and (3) together as shown by dimensions in **Figure D-15. Engine Stand Bracket Assembly**.

Item	Part Number	Material Description	Size	Qty
1	12419142-001	Plate, Steel, ASTM A-36	12.0 in. (304.8 mm) x 10.25 in. (260.3 mm) x 0.312 in. (7.9 mm) thick	1

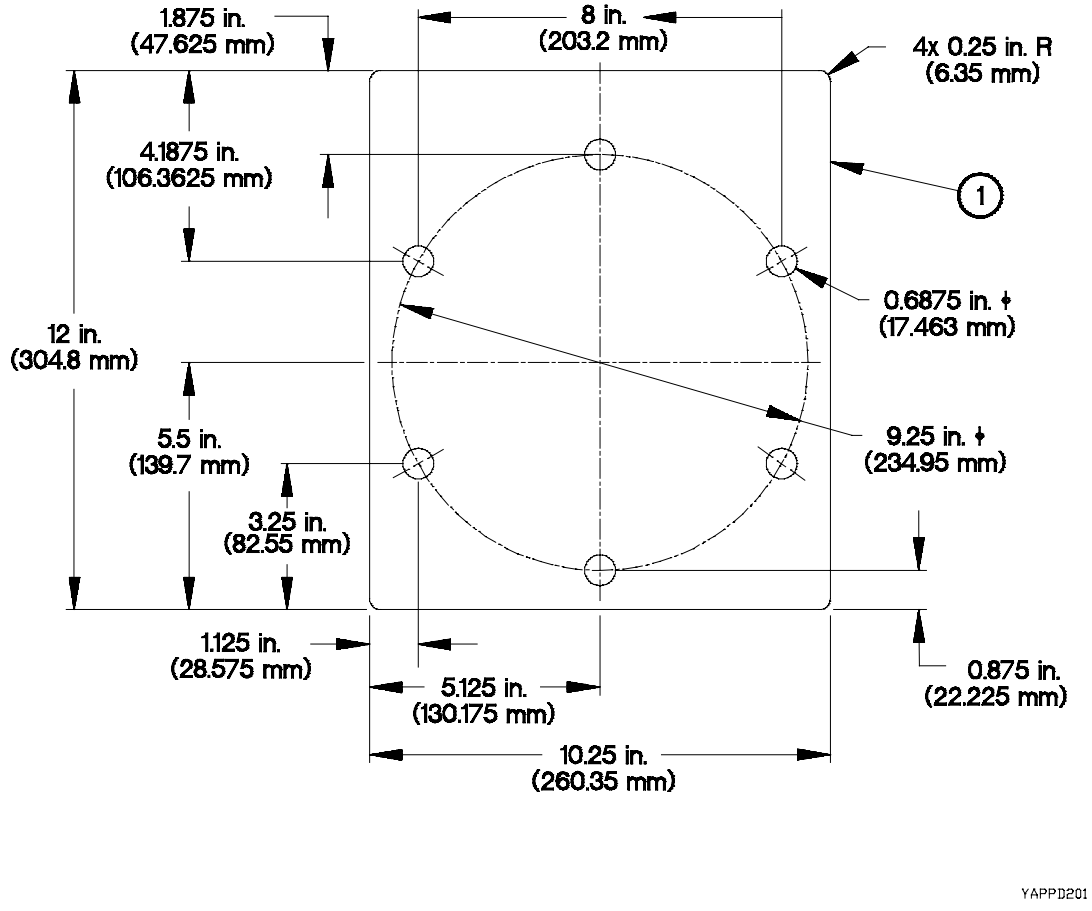


Figure D-16. Engine Stand Bracket Front Plate

a. All dimensions are in inches (millimeters).
b. Fabricate (1) from ASTM A-36 steel plate.
c. Drill 0.6875 in. (17.5 mm) diameter hole through 6 places on a 9.25 in. (234.9 mm) radius equally spaced at 60° as shown in **Figure D-16. Engine Stand Bracket Front Plate**.
d. Round four corners to 0.25 in. (6.35 mm) radius as shown in **Figure D-16. Engine Stand Bracket Front Plate**.

D-6. ENGINE STAND BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
2	12419144-002	Plate, Steel, ASTM A-36	20.62 in. (523.7 mm) x 7.25 in. (184.1 mm) x 0.312 in. (7.9 mm) thick	1

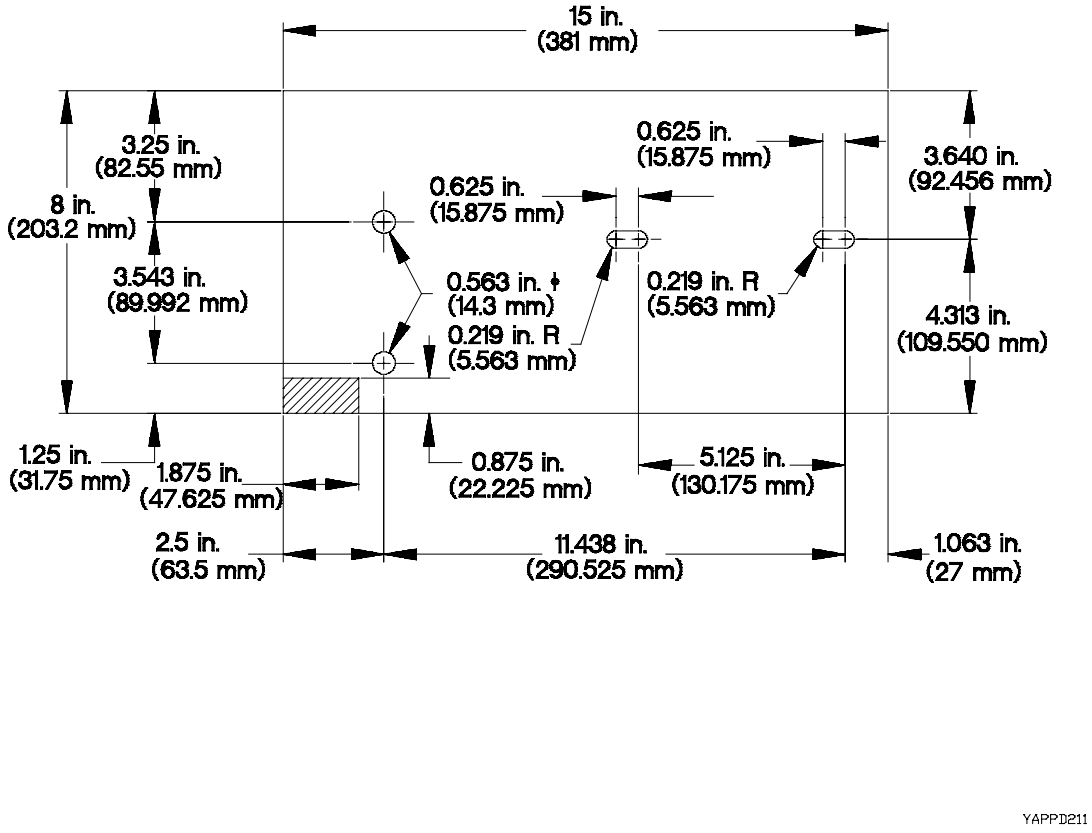


Figure D-17. Engine Stand Bracket Rear Plate

a. All dimensions are in inches (millimeters).
b. Fabricate (2) from ASTM A-36 steel plate.
c. Drill 0.563 in. (14.3 mm) diameter hole through 2 places in rear plate as shown in **Figure D-17. Engine Stand Bracket Rear Plate**.
d. Drill 0.438 in. (11.1 mm) diameter hole through 4 places in rear plate as shown in **Figure D-17. Engine Stand Bracket Rear Plate**.
e. Cut or mill between 0.438 in. (11.1 mm) diameter holes as shown in **Figure D-17. Engine Stand Bracket Rear Plate**.
f. De-burr and remove all sharp edges.

Item	Part Number	Material Description	Size	Qty
3	124191442-003	Plate, Steel, ASTM A-36	6.18 in. (157 mm) x 13.18 in. (334.8 mm) x 0.312 in. (7.9 mm) thick	2

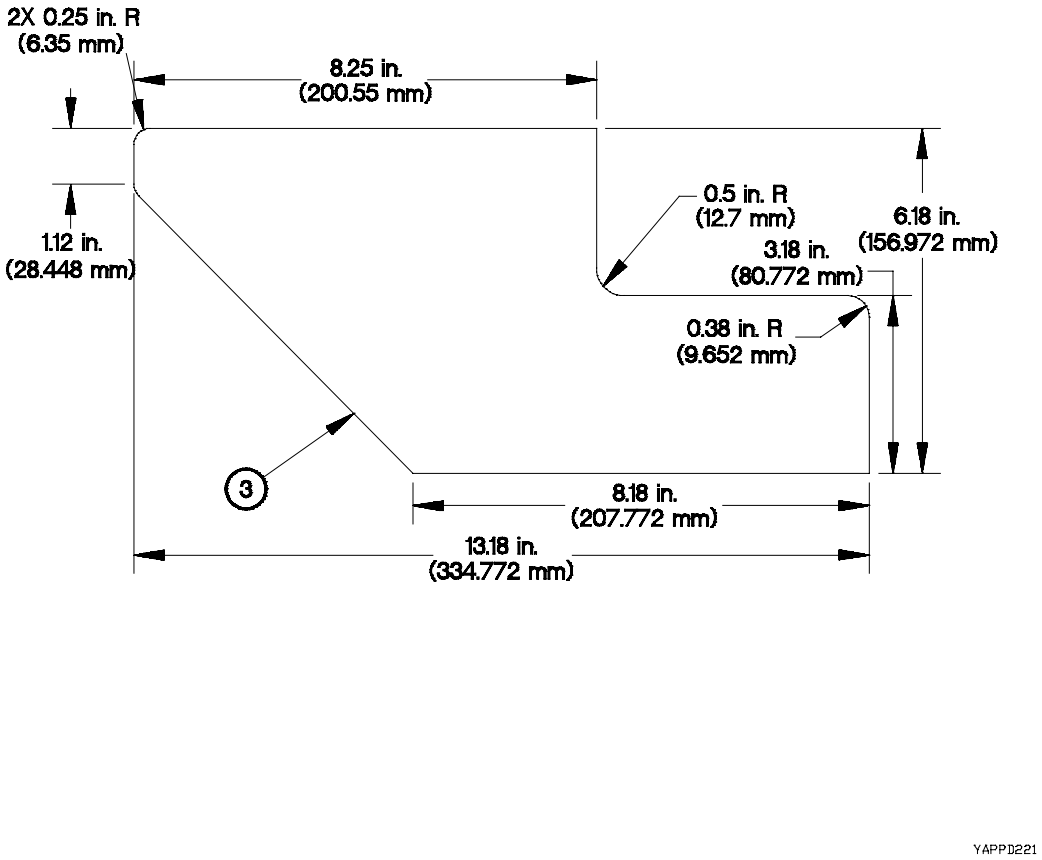


Figure D-18. Engine Stand Bracket Side Plates

a. All dimensions are in inches (millimeters).
b. Fabricate (3) from ASTM A-36 steel plate.
c. Deleted.
d. Round two corners to 0.25 in. (6.35 mm) radius as shown in **Figure D-18. Engine Stand Bracket Side Plates**.
e. Round corner to 0.38 in. (9.65 mm) radius as shown in **Figure D-18. Engine Stand Bracket Side Plates**.
f. De-burr and remove all sharp edges.

D-7. HEADLIGHT ADJUSTMENT SCREEN

The headlight adjustment screen may be drawn on any vertical surface at least 50 in. (1270 mm) high and 100 in. (2540 mm) wide.

a. Draw two vertical lines (1) 50 in. (1270 mm) high and 90.6 in. (2300 mm) apart (centered on headlight adjustment screen).

b. Locate two points 40 in. (1016 mm) from floor and 15.3 in. (389 mm) toward the center from each vertical line (1).

c. Draw vertical line (2) about 3-5 in. (76-127 mm) centered on each of the two points.

d. Draw horizontal line (3) about 3-5 in. (76-127 mm) centered on each of the two points.

e. Measure out 4 in. (102 mm) along each vertical line (2) and horizontal line (3) from each of the two points to make 8 in. (203 mm) squares (4).

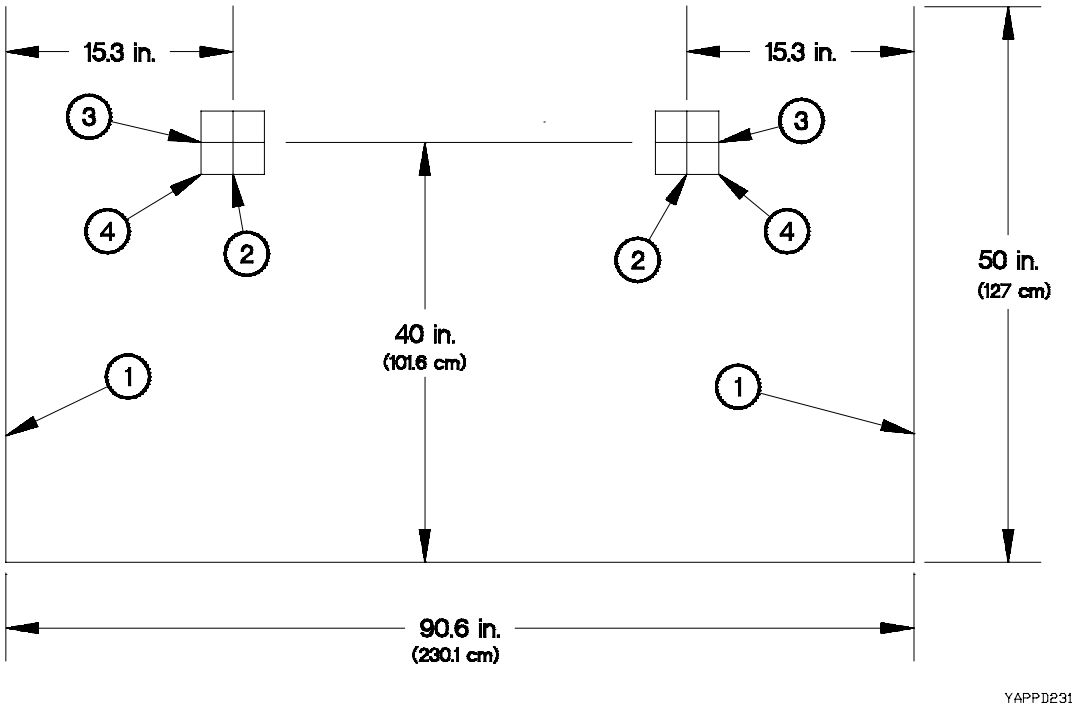


Figure D-19. Headlight Adjustment Screen

D-8. LEFT FRONT LEAF SPRING U-BOLT SOCKET

Use a 6-point 1-1/16 in. or 27 mm 3/4 in. drive impact socket. Grind down wrenching end to a maximum OD of 15 in. (38.3 mm) to fit rear inboard U-bolt nut on left front leaf spring. No modification is required if a 6-point, thin wall, deep 27mm impact socket can be obtained.

D-9. MACHINE GUN RING DRILL STOP

Make the Machine Gun Ring Drill Stop from round aluminum stock and setscrew according to the following instructions. Refer to the parts list and figure for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Rod, aluminum	0.75 in. OD (19 mm) X 0.25 in. (6.3 mm) long	1
2	5305-00-404-8272	Setscrew	0.164 in. OD (4.1 mm) x 0.125 in. length (3.2 mm) 32 UNC	1

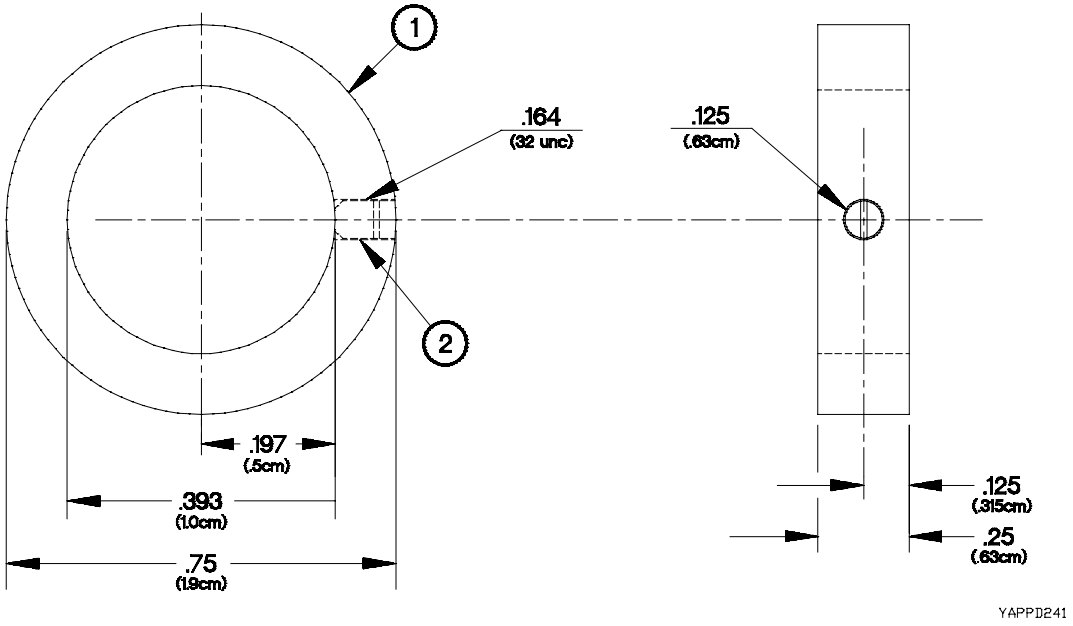


Figure D-20. Machine Gun Ring Drill Stop

a. All dimensions are in in. (millimeters).
b. Drill 0.393 in. (9.9 mm) diameter hole through as shown in **Figure D-20. Machine Gun Ring Drill Stop**.
c. Drill 0.125 in (3.2 mm) diameter hole through for setscrew as shown in **Figure D-20. Machine Gun Ring Drill Stop**.
d. Thread setscrew hole 0.164-32 UNC.
e. De-burr and remove sharp edges.
f. Insert setscrew (2) into Machine Gun Ring Drill Stop (1).

D-10 MACHINE GUN RING WOODEN SUPPORT

Cut from bulk wood stock according to the following information.

a. Fabricate from MIL-STD 736 Group IV untreated bulk wood stock.
b. Cut three (3) lengths of 2 X 4 inch stock 8 inches (203 mm) long.
c. Sand and remove sharp edges.

D-11. MAIN VALVE BODY SPRING COMPRESSION TOOL

Make the main valve body spring compression tool from steel pipe according to the following instructions. Refer to the parts list and figure for details.

Material Description	Size	Qty
Pipe, Steel, 1/2 inch ID	1/2 in. (12.7 mm) ID X 1.50 in. (38 mm)	1

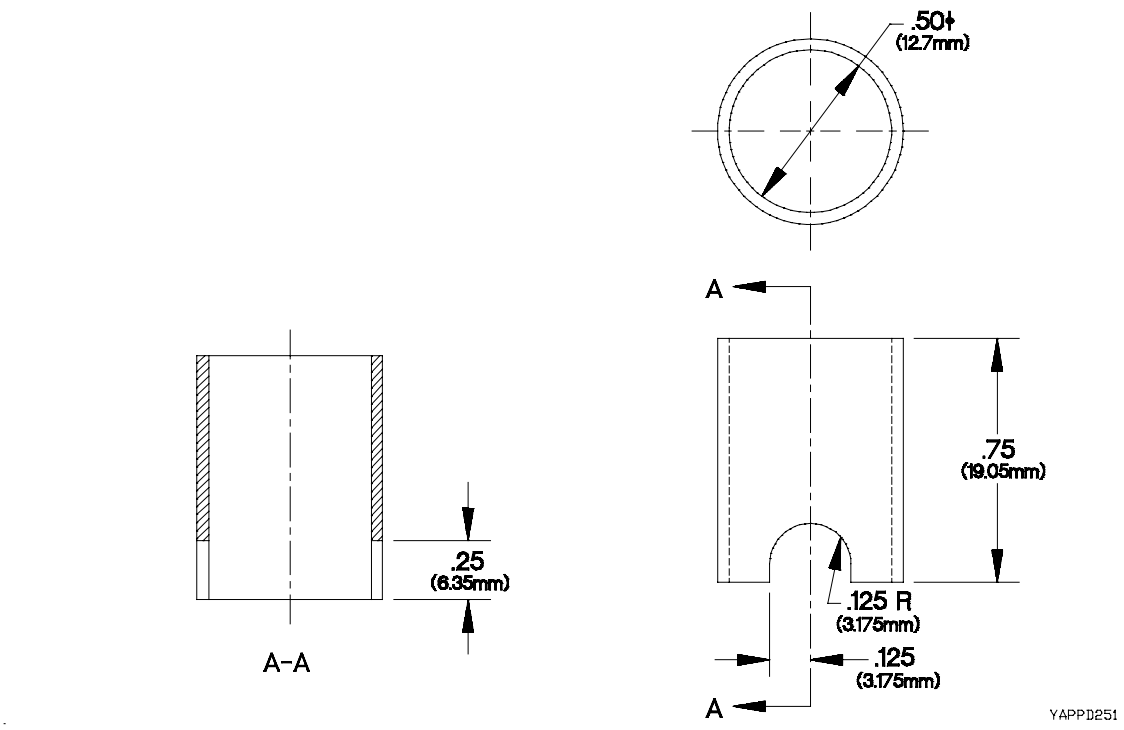


Figure D-21. Main Valve Body Spring Compression Tool

a. All dimensions are in inches (millimeters).
b. De-burr and remove sharp edges inside and outside compression tool surface.
c. Tolerance:
   1 place +/- .06
   2 place +/- .03
   3 place +/- .005
   angles +/- 2° unless otherwise specified.
d. Surface texture: 125 $\sqrt{.}$ unless otherwise specified.

D-12. MARKING SLEEVE FABRICATION

Fabricate marking sleeves according to the following information.

a. Cut from bulk sleeve material 12414663 FP-301-12.7, 2 in. (51 mm).
b. All dimensions are in inches (millimeters).
c. Identify by applying the following applicable numbers to the sleeve according to MIL-STD 130.

CAGE CODE PART NUMBER

D-13. RELAY TEST WIRE

Fabricate relay test wire according to the following information.

Material Description	National Stock Number	Size	Qty
Wire, Electrical	6145-00-330-3318	6 in. (152.4 mm), 20 AWG	1

a. All dimensions are in inches (millimeters).
b. Remove 3/4 in. (19.05 mm) insulation from each end of wire.

D-14. SPANNER SOCKET TOOL

Make the spanner socket tool from any 1/2 inch drive socket that is 2 1/2 inch OD and from 3/16 inch tool steel keystock according to the following instructions. Refer to the parts list and figure for details.

Item	Material Description	Size	Qty
1	Keystock, Tool Steel	3/16 in. X 1/8 in. X 2 in. long	4
2	Socket Wrench Socket	1/2 in. drive X 2 1/2 in. OD	1

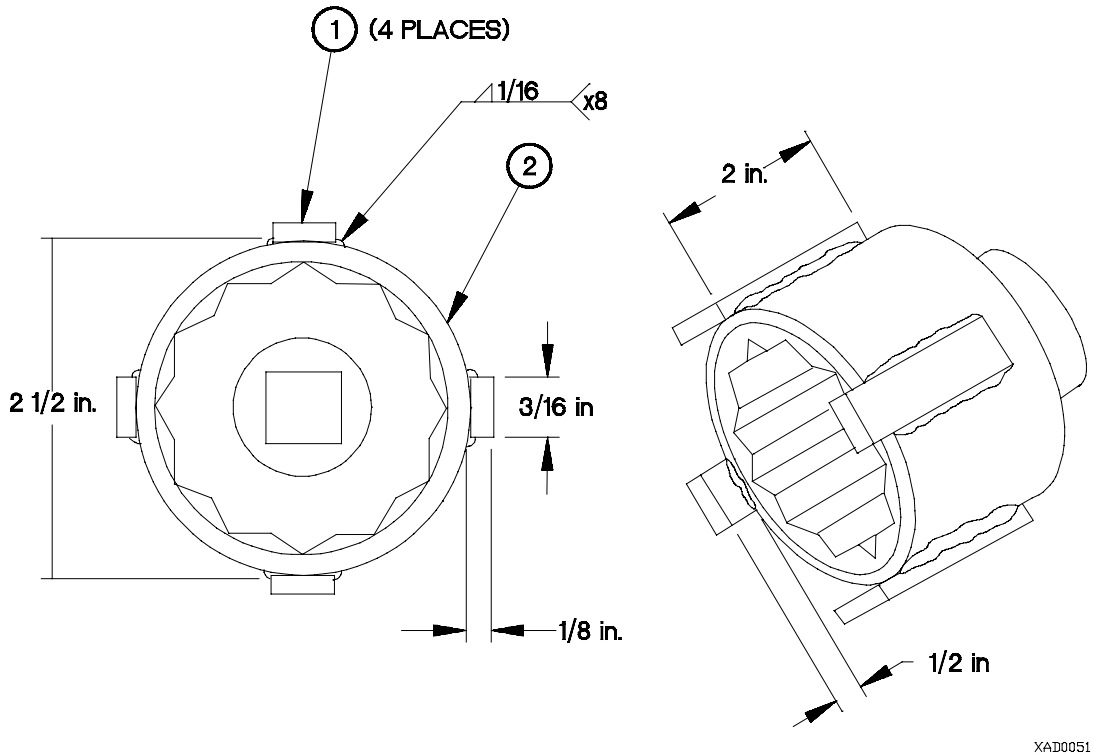


Figure D-22. Spanner Socket Tool

a. All dimensions are in inches.
b. To surface of socket (2), weld 2 inch steel keystock (1) in 4 places as shown in **Figure D-22. Spanner Socket Tool**. Ensure keystock extends 1/2 inch beyond socket face.
c. Remove sharp edges.

D-15. SPANNER WRENCH TOOL

Make the spanner wrench tool from 0.38 in. (9.6 mm) steel stock and hardware according to the following instructions. Refer to the parts list and figure for details.

Item	Part Name/Number	Material Description	Size	Qty
1	Spanner Handle	Steel, 3/8 flat plate	6.64 in. (168.6 mm) x 11.98 in. (304.3 mm) x 0.38 in. (9.6 mm)	1
2	Spanner Jaw	Steel, 3/8 flat plate	3.05 in. (77.5 mm) x 9.08 in. (230.6 mm) x 0.38 in. (9.6 mm)	1
3	Spanner Pin	Steel, Rod	0.25 in. OD (6.35 mm) x 0.75 in. (19.0 mm) long	2
4	Handle	Steel, pipe	1.25 in. OD (31.75 mm) x 1.00 in. ID (25.4 mm) x 21.00 in. (533.4 mm) long	1
5	Nut	Nut, 3/8 Hex		2
6	Bolt	Bolt, 3/8 X 1.25	0.38 in. (9.6 mm) OD x 1.25 in. (31.75 mm) long	1

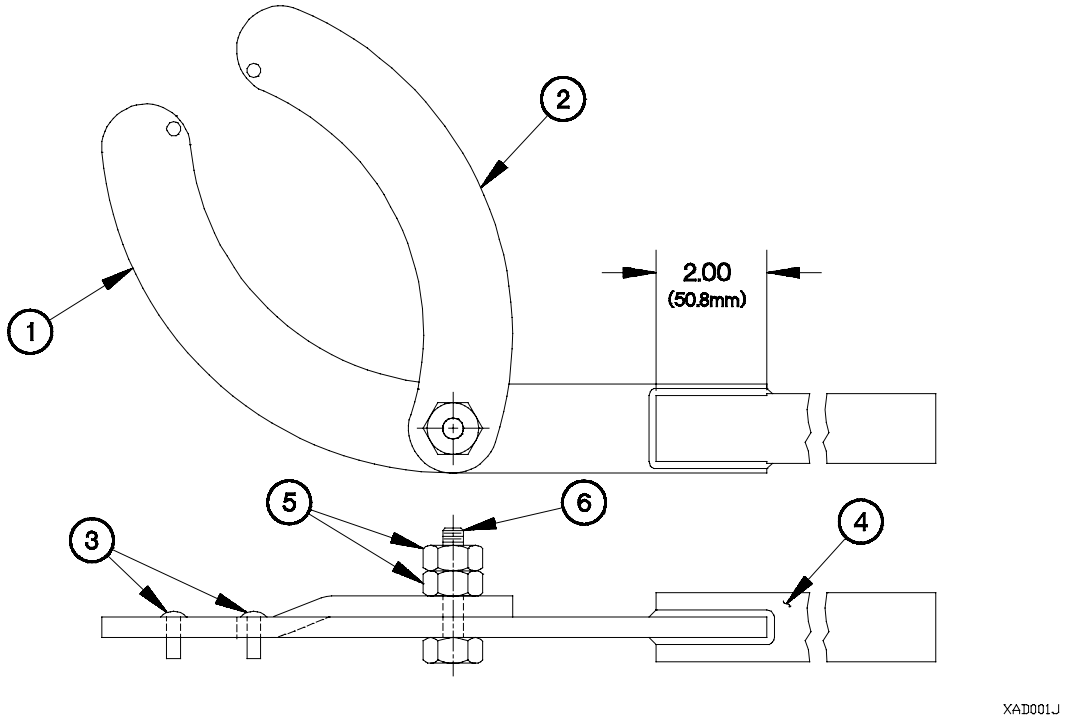


Figure D-23. Spanner Wrench Tool Assembly

a. Weld pins (3) in spanner handle (1) and spanner jaw (2) as shown in **Figure D-23. Spanner Wrench Tool Assembly**.
b. Position and clamp handle (4) to spanner handle piece (1) as shown in **Figure D-23. Spanner Wrench Tool Assembly**.
c. Weld handle to spanner handle on both sides of spanner handle.
d. Assemble spanner jaw (2) and spanner handle using bolt (6) and 2 hex nuts (5).

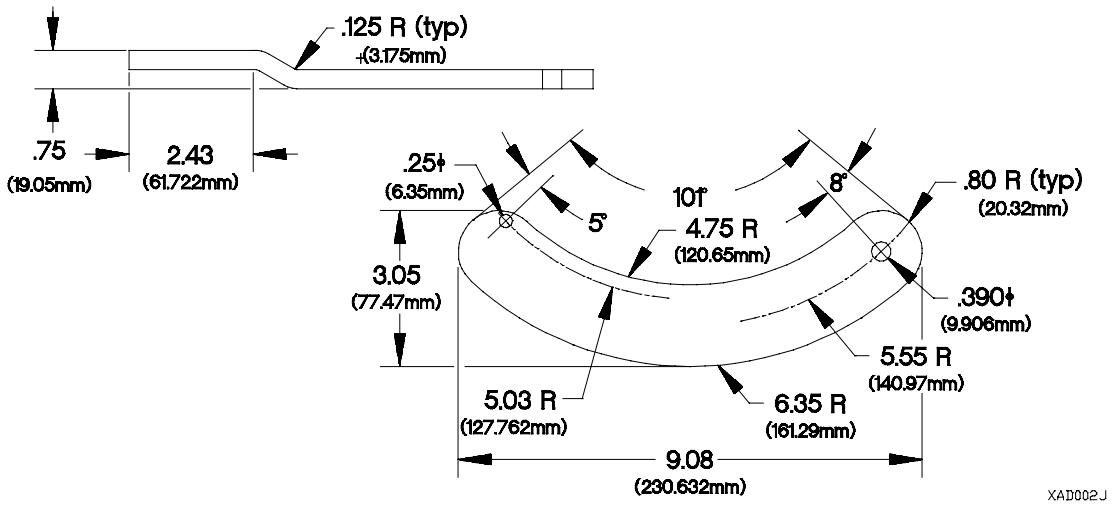


Figure D-24. Spanner Wrench Jaw

a. Shape spanner jaw (2) as shown in **Figure D-24. Spanner Wrench Jaw**.
b. Drill 0.25 in. (6.35 mm) and 0.39 in. (10.0 mm) diameter holes through as shown in **Figure D-29. Spanner Wrench Jaw**.
c. De-burr and remove sharp edges.

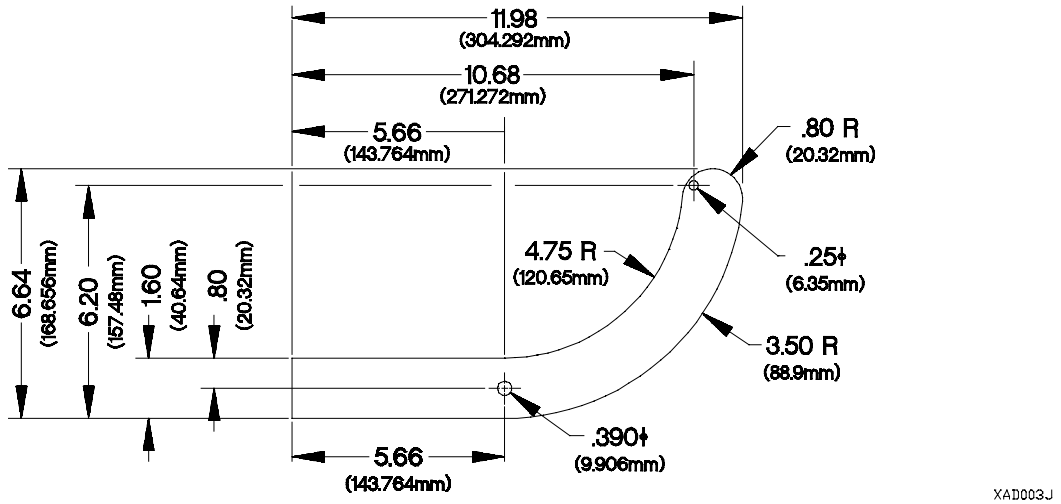


Figure D-25. Spanner Wrench Handle Piece

a. Shape spanner handle piece (1) the same as (2) except as shown in **Figure D-25. Spanner Wrench Handle Piece**.
b. Drill 0.25 in. (6.35 mm) and 0.39 in. (10.0 mm) diameter holes through as shown in **Figure D-25. Spanner Wrench Handle Piece**.
c. Cut slot in handle (4) as shown in **Figure D-25 Spanner Wrench Handle Piece**.
d. De-burr and remove sharp edges.

D-16. SPREADER BAR

Make the Spreader Bar for cab removal from steel channel stock and round rod stock according to the following steps. Refer to the parts list table and figure for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	5 inch Channel, steel, ASTM A-36	78.0 in. (1981 mm) X 5.00 in. (127 mm) X 1.75 in. (44 mm) X 0.38 in. (9.6 mm) thick	1
2	N/A	Rod, steel, ASTM A-36	29.0 in. (736 mm) X 1.00 in. OD (25.4 mm)	1
3	N/A	Rod, steel, ASTM A-36	13.0 in. (330 mm) X 1.00 in. OD (25.4 mm)	2

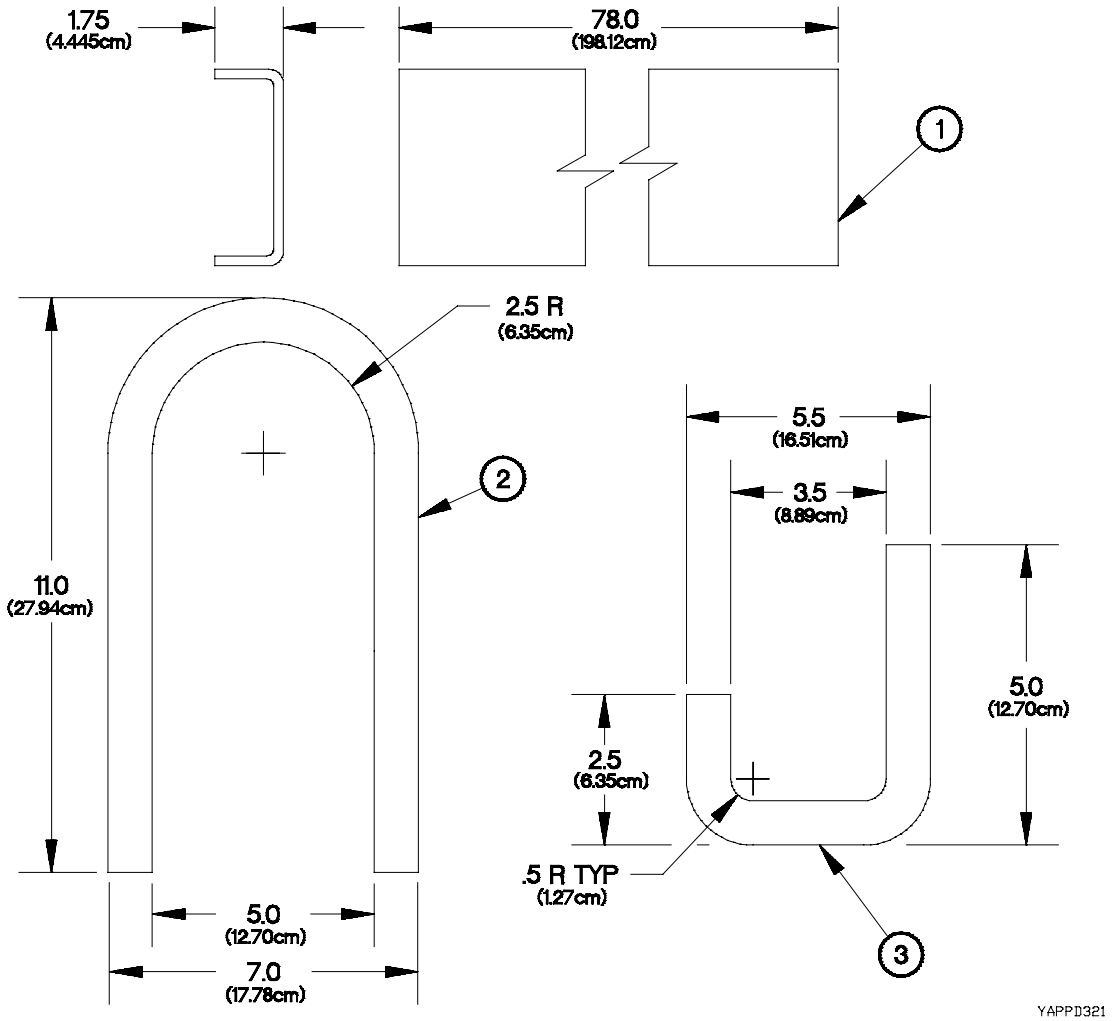


Figure D-26. Spreader Bar Layout

a. All dimensions are in inches (millimeters).
b. Heat and bend lift rod (2) to dimensions shown in **Figure D-26. Spreader Bar Layout**.
c. Heat and bend two guide rods (3) to dimensions shown in **Figure D-26. Spreader Bar Layout**.
d. Cut lift rod (2) and guide rods (3) to final dimensions shown in **Figure D-26 Spreader Bar Layout**.
e. De-burr and remove sharp edges.

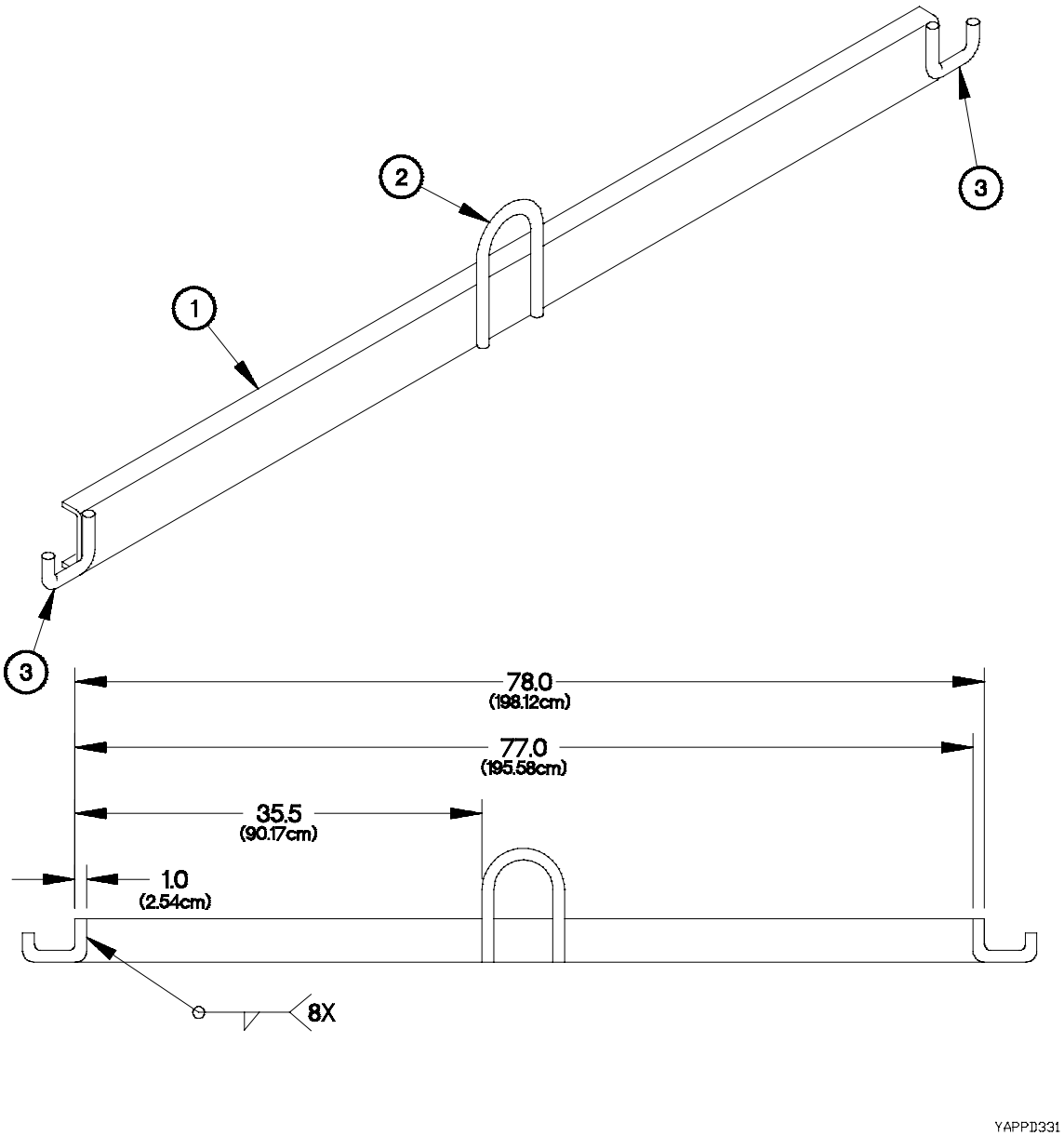


Figure D-27. Spreader Bar Assembly

f. Position and clamp lift rod (2) and guide rods (3) to steel channel (1) as shown in **Figure D-27. Spreader Bar Assembly**.
g. Weld lift rod (2) and guide rods (3) to steel channel (1) as shown in **Figure D-27. Spreader Bar Assembly**.
h. Maximum lifting capacity of the spreader bar is 2040 lbs (926 kgs).

D-17. STEERING STOP SHIM GAGE

Make the steering stop shim gage from steel sheet stock according to the following instructions. Refer to the parts list and figures for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, sheet 0.118 in. (0.3 cm) thick	2.361 in. (5.9 cm) X 0.625 in. (1.587 cm) X 0.118 in. (0.3 cm)	1

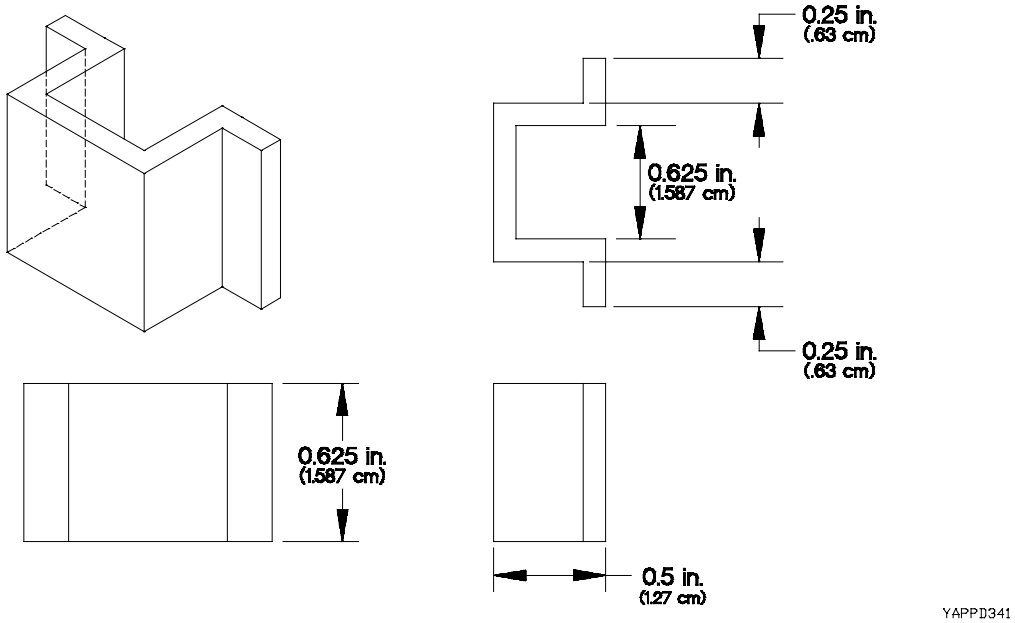


Figure D-28. Steering Stop Shim Gage

a. All dimensions are in inches (millimeters).
b. Form and bend steel stock to contours and dimensions shown in **Figure D-28. Steering Stop Shim Gage**.
c. De-burr and remove sharp edges and corners.

D-18. TRANSFER CASE LIFT BRACKET ASSEMBLY

Make the transfer case lift bracket assembly from the main mounting bracket, bolt mounting bracket, lifting and support plates and support brackets according to the following instructions. Refer to the parts list tables and accompanying figures for details.

Item	Part Number	Name/Description	Qty
1	12419141-001	Bracket, Main Mounting	1
2	12419141-002	Bracket, Bolt Mounting	1
3	12419141-003	Plate, Lifting	1
4	12419141-004	Plate, Center Support	1
5	12419141-005	Brace, Lifting Plate	2
6	12319141-006	Support, Bolt Mounting Bracket	2

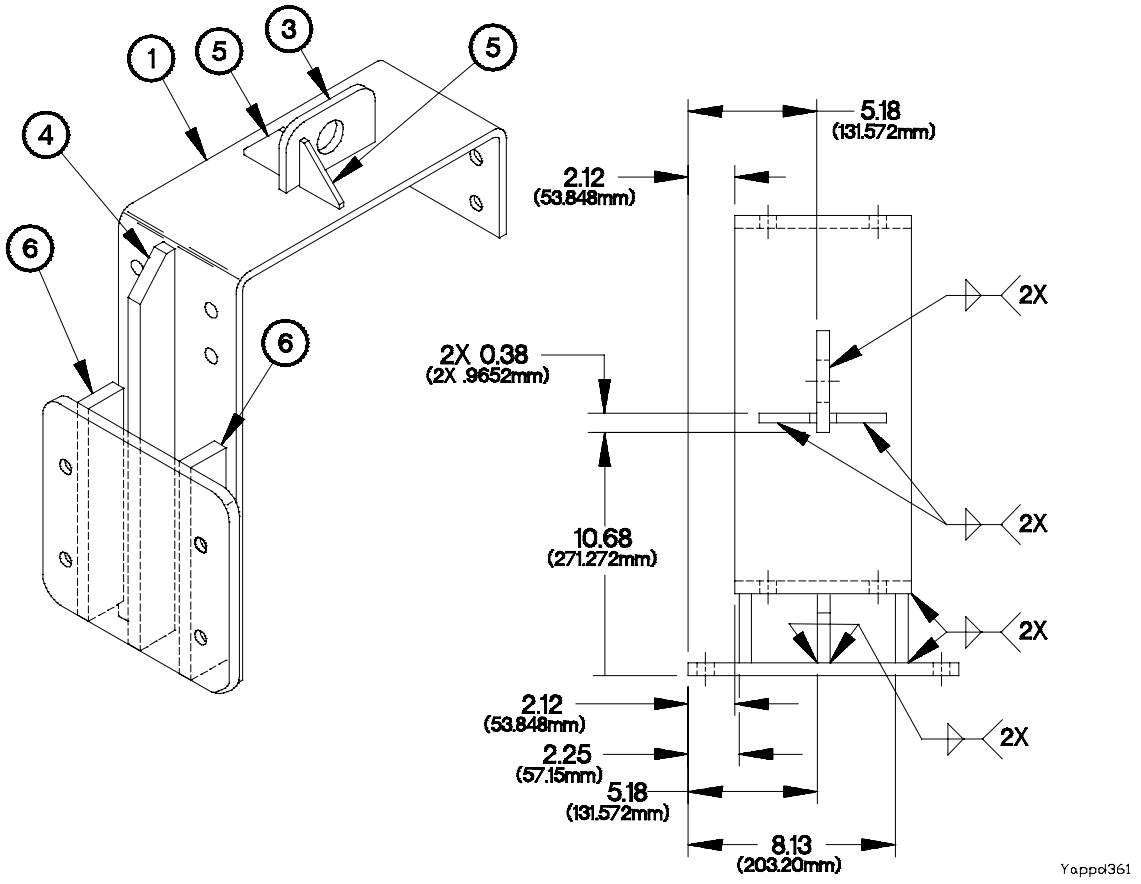


Figure D-29. Transfer Case Lift Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Position items (1 through 6) together as shown by dimensions in **Figure D-29. Transfer Case Lift Bracket Assembly**.
c. Weld items (1 through 6) together as shown in **Figure D-29. Transfer Case Lift Bracket Assembly**.

D-18. TRANSFER CASE LIFT BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
1	12419141-001	Plate, Steel, ASTM A-36	41.33 in. (1050 mm) x 6.50 in. (165.1 mm) x 0.375 in. (9.6 mm) thick	1

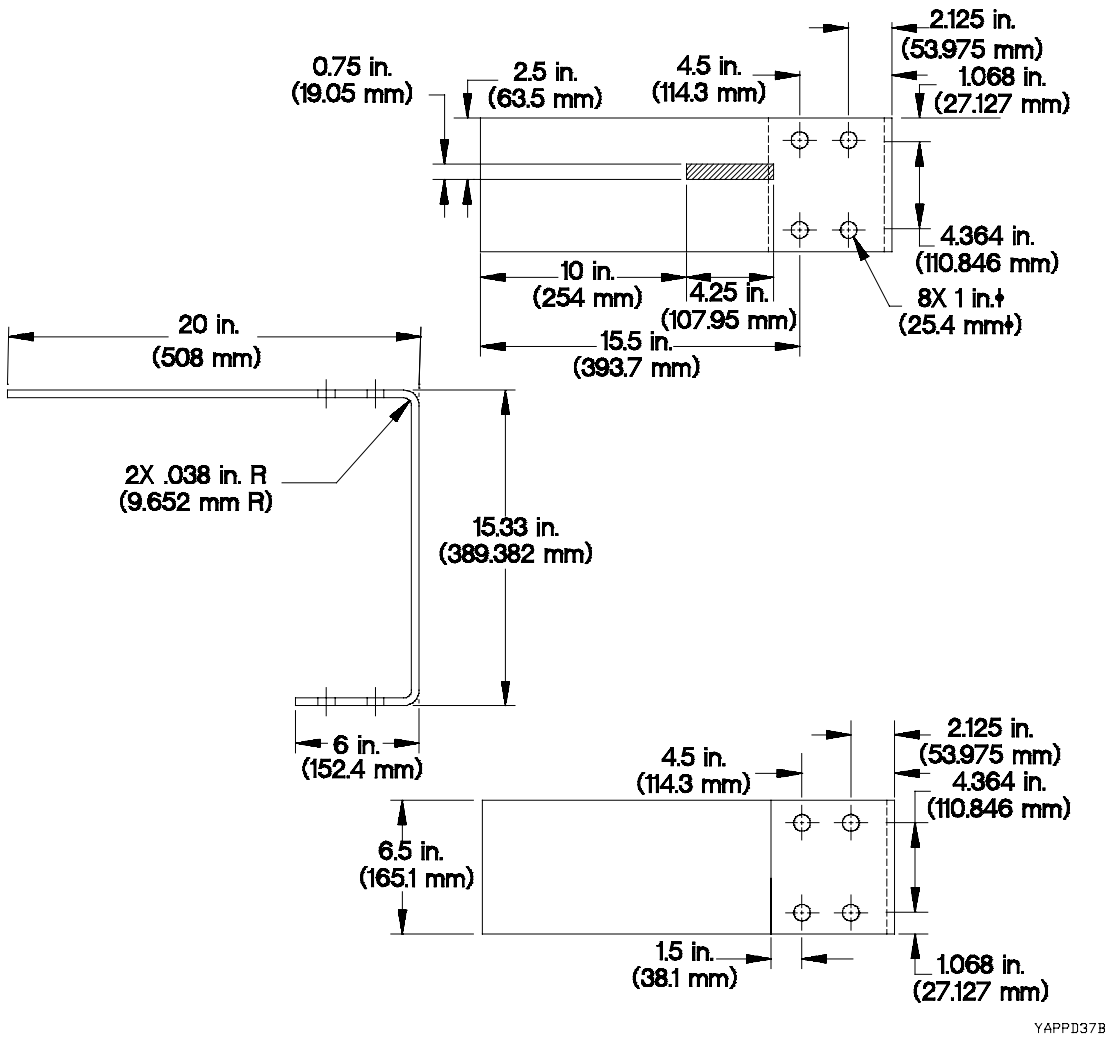


Figure D-30. Transfer Case Lift Bracket Main Mounting Bracket

a. All dimensions are in inches (millimeters).
b. Fabricate main mounting bracket (1) from ASTM A-36 steel plate.
c. Bend two places 90 degrees at 0.38 in. (9.6 mm) radius as shown in **Figure D-30. Transfer Case Lift Bracket Main Mounting Bracket**.
d. All dimensions are after bends are made.
e. Drill 1 in. (25.4 mm) diameter hole through 8 places as shown in **Figure D-30. Transfer Case Lift Bracket Main Mounting Bracket**.
f. De-burr and remove sharp edges.

Item	Part Number	Material Description	Size	Qty
2	12419141-002	Plate, Steel, ASTM A-36	10.62 in. (269.7 mm) x 10.50 in. (266.7 mm) x 0.375 in. (9.6 mm) thick	1

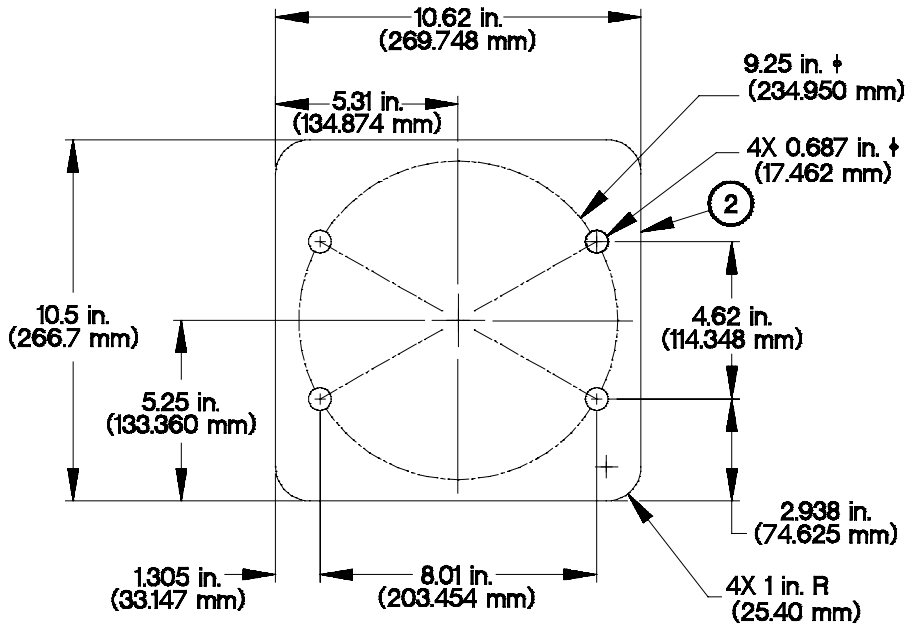


Figure D-31. Transfer Case Lift Bracket Bolt Mounting Bracket

a. All dimensions are in inches (millimeters).
b. Fabricate bolt mounting bracket (2) from ASTM A-36 steel plate.
c. Drill 11/16 in. (17.5 mm) diameter hole through 4 places on a 9.25 in. (234.9 mm) radius spaced as shown in **Figure D-31. Transfer Case Lift Bracket Bolt Mounting Bracket**.
d. Round four corners to 1.0 in. (25.4 mm) radius as shown in **Figure D-31. Transfer Case Lift Bracket Bolt Mounting Bracket**.
e. De-burr and remove sharp edges.

D-18. TRANSFER CASE LIFT BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
3	12419141-003	Plate, Steel, ASTM A-36	4.00 in. (101.6 mm) x 3.00 in. (76.2 mm) x 0.50 in. (12.7 mm) thick	1

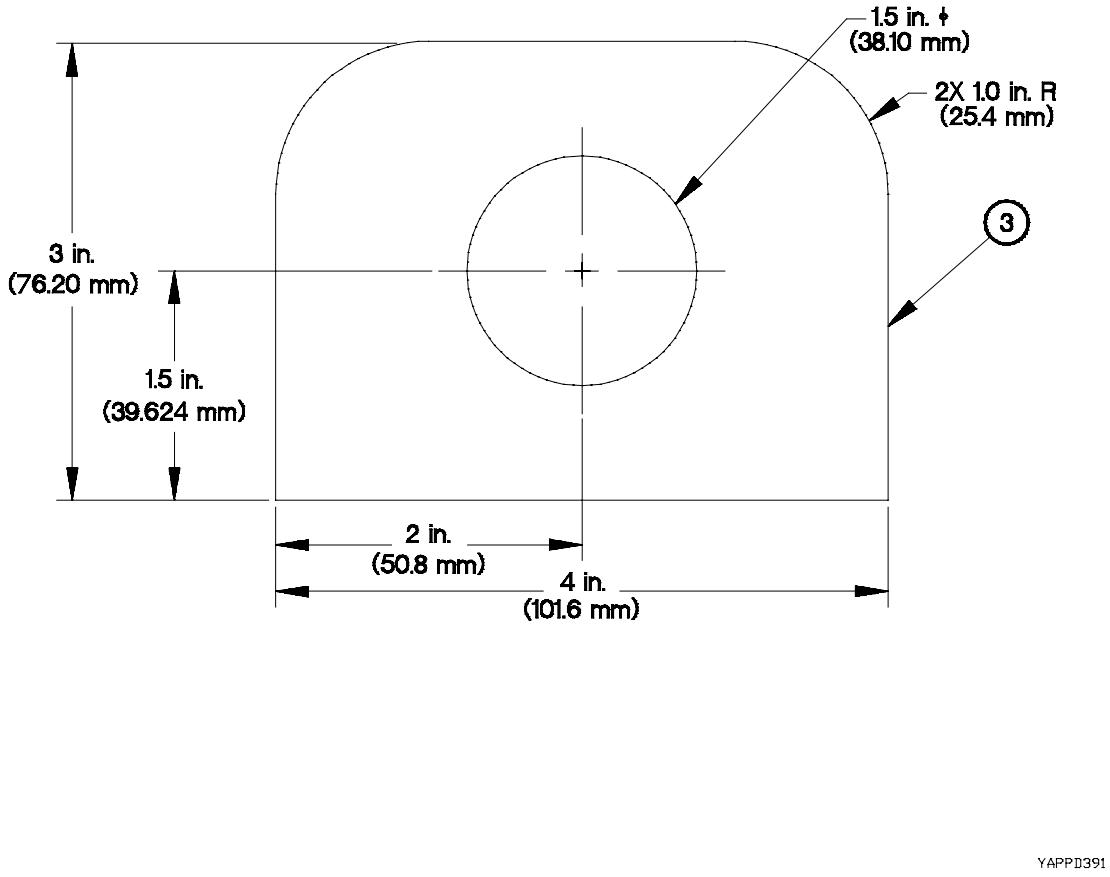


Figure D-32. Transfer Case Lift Bracket Lifting Plate

a. All dimensions are in inches (millimeters).
b. Fabricate lifting plate (3) from ASTM A-36 steel plate.
c. Drill 1.50 in. (38.1 mm) diameter hole through 1 place as shown in **Figure D-32. Transfer Case Lift Bracket Lifting Plate**.
d. Round two corners to 1.0 in. (25.4 mm) radius as shown in **Figure D-32. Transfer Case Lift Bracket Lifting Plate**.
e. De-burr and remove sharp edges.

Item	Part Number	Material Description	Size	Qty
4	T12419141-004	Plate, Steel, ASTM A-36	1.99 in. (50.5 mm) x 19.62 in. (498.3 mm) x 0.38 in. (9.6 mm) thick	1

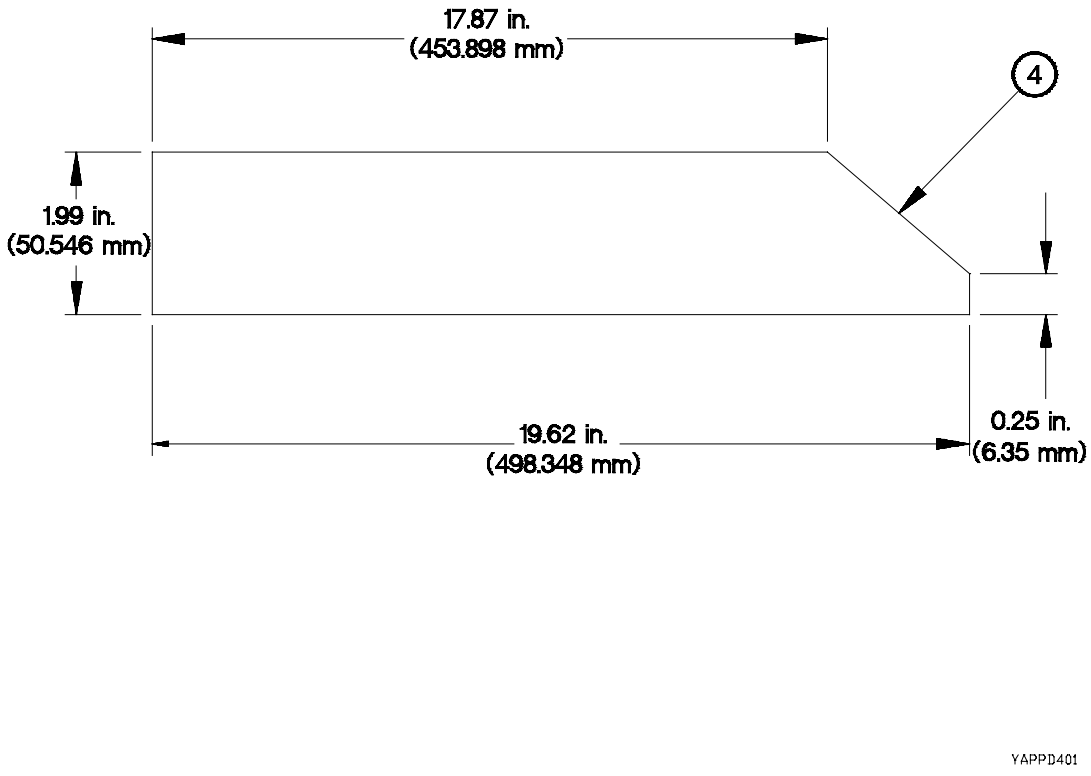


Figure D-33. Transfer Case Lift Bracket Center Support Plate

a. All dimensions are in inches (millimeters).
b. Fabricate center support plate (4) from ASTM A-36 steel plate.
c. De-burr and remove sharp edges.

D-18. TRANSFER CASE LIFT BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
5	T12419141-005	Plate, Steel, ASTM A-36	2.50 in. (63.5 mm) x 2.50 in. (63.5 mm) x 0.38 in. (9.6 mm) thick	2

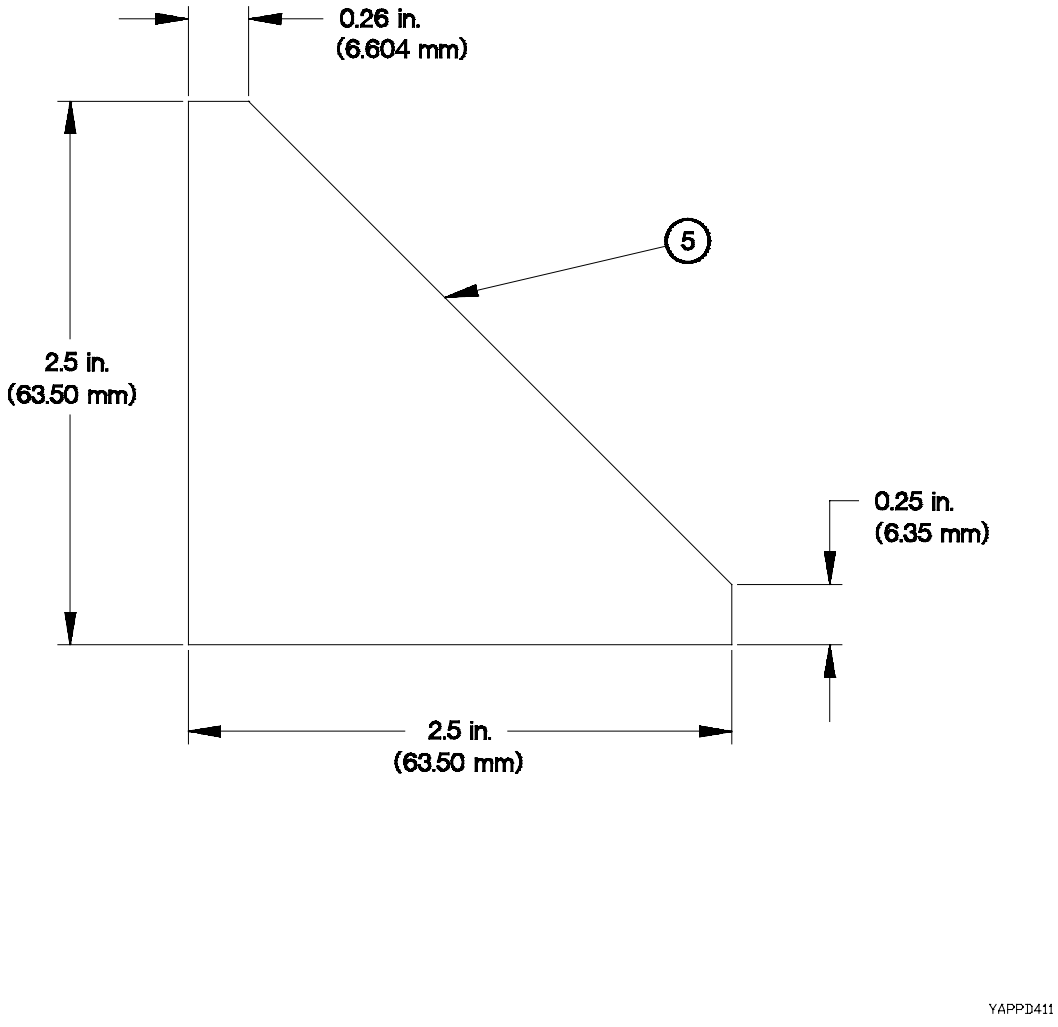


Figure D-34. Transfer Case Lift Bracket Lifting Plate Braces

a. All dimensions are in inches (millimeters).
b. Fabricate two lifting plate braces (5) from ASTM A-36 steel plate.
c. De-burr and remove sharp edges.

Item	Part Number	Material Description	Size	Qty
6	T12419141-006	Plate, Steel, ASTM A-36	2.00 in. (50.8 mm) x 10.50 in. (266.7 mm) x 0.50 in. (12.7 mm) thick	2

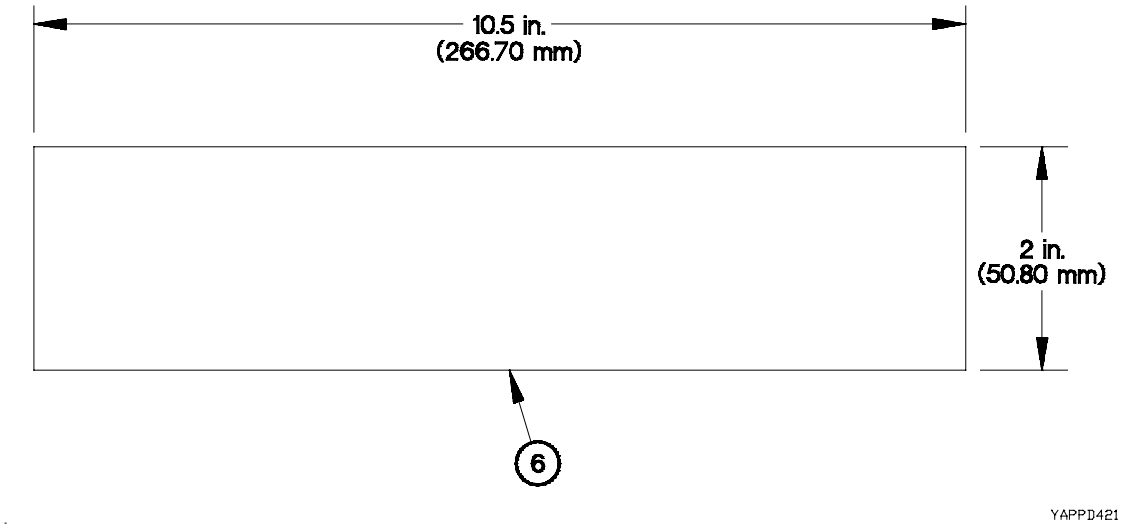


Figure D-35. Transfer Case Lift Bracket Bolt Mounting Bracket Supports

a. All dimensions are in inches (millimeters).
b. Fabricate two bolt mounting bracket supports (6) from ASTM A-36 steel plate.
c. De-burr and remove sharp edges.

D-19. TRANSMISSION AUXILIARY OIL COOLER RUBBER SEAL

Fabricate transmission auxiliary oil cooler rubber seals in accordance with the following parts list.

Part Number	Description	National Stock Number	Cut Length	
			in.	mm
MIL-R-6130	Tape, Adhesive, Rubber	9320-00-501-7537	24.7	627

D-20. TRANSMISSION LIFT AND MOUNTING BRACKET ASSEMBLY

Make the transmission lift and mounting bracket assembly from the front, rear, and side plates according to the following instructions. Refer to the parts list tables and accompanying figures for details.

Item	Part Number	Name/Description	Qty
1	T12419143-001	Plate, Bottom	1
2	T12419143-002	Plate, Side	2
3	T12419143-003	Plate, Top	1
4	T12419143-004	Brace, Top/Bottom	2
5	T12419143-005	Side Support	4
6	T12319143-006	Plate, Bolt Mounting	2

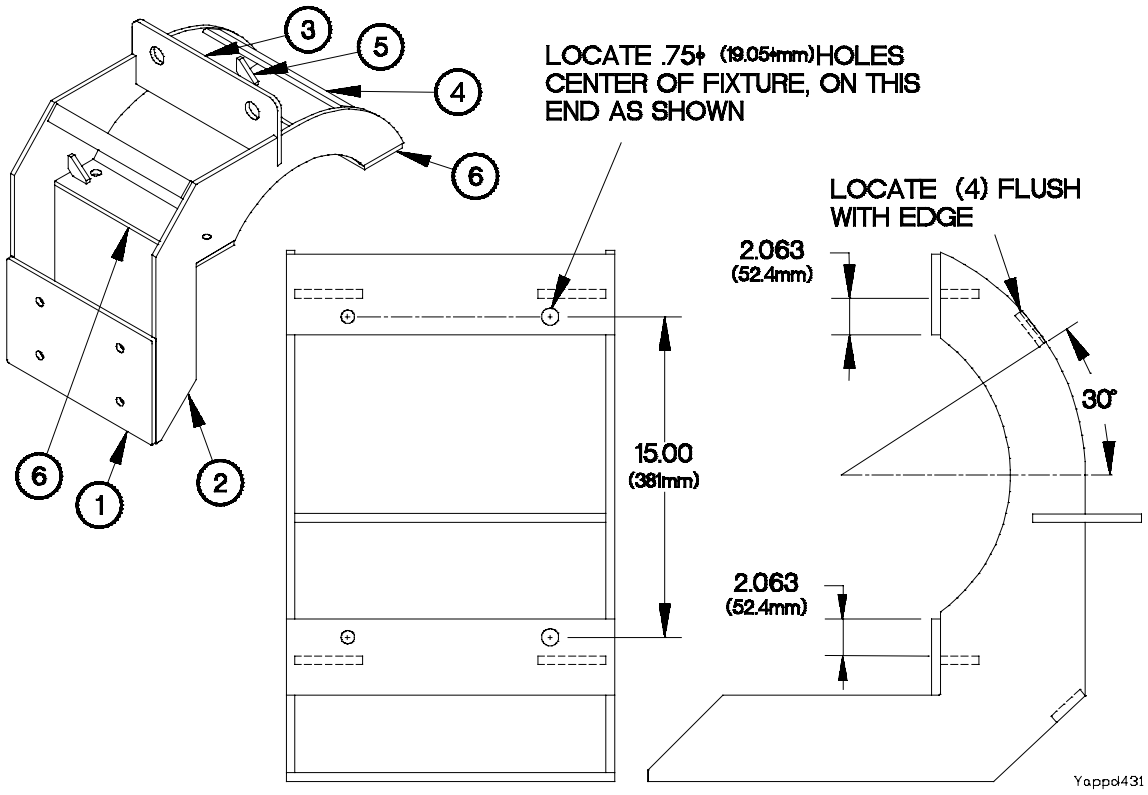


Figure D-36. Transmission Lift and Mounting Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Position items (1 through 6) together as shown by dimensions in **Figure D-36. Transmission Lift and Mounting Bracket Assembly**.
c. Weld items (1 through 6) together as shown by Section A - A in **Figure D-36. Transmission Lift and Mounting Bracket Assembly**.
d. Tolerance on dimensions given to two decimal places will be held to ±0.03 in. (±0.76 mm).
e. Drill 3/4 in. (19 mm) diameter hole through 2 places in two bolt mounting plates (6) as shown in **Figure D-36. Transmission Lift and Mounting Bracket Assembly**.
f. Drill 37/64 in. (14.7 mm) diameter hole through 2 places in two bolt mounting plates (6) as shown in **Figure D-36. Transmission Lift and Mounting Bracket Assembly**.

Item	Part Number	Material Description	Size	Qty
1	T12419143-001	Plate, Steel, ASTM A-36	14.49 in. (368.05 mm) x 9.0 in. (228.6 mm) x 0.38 in. (9.6 mm) thick	1

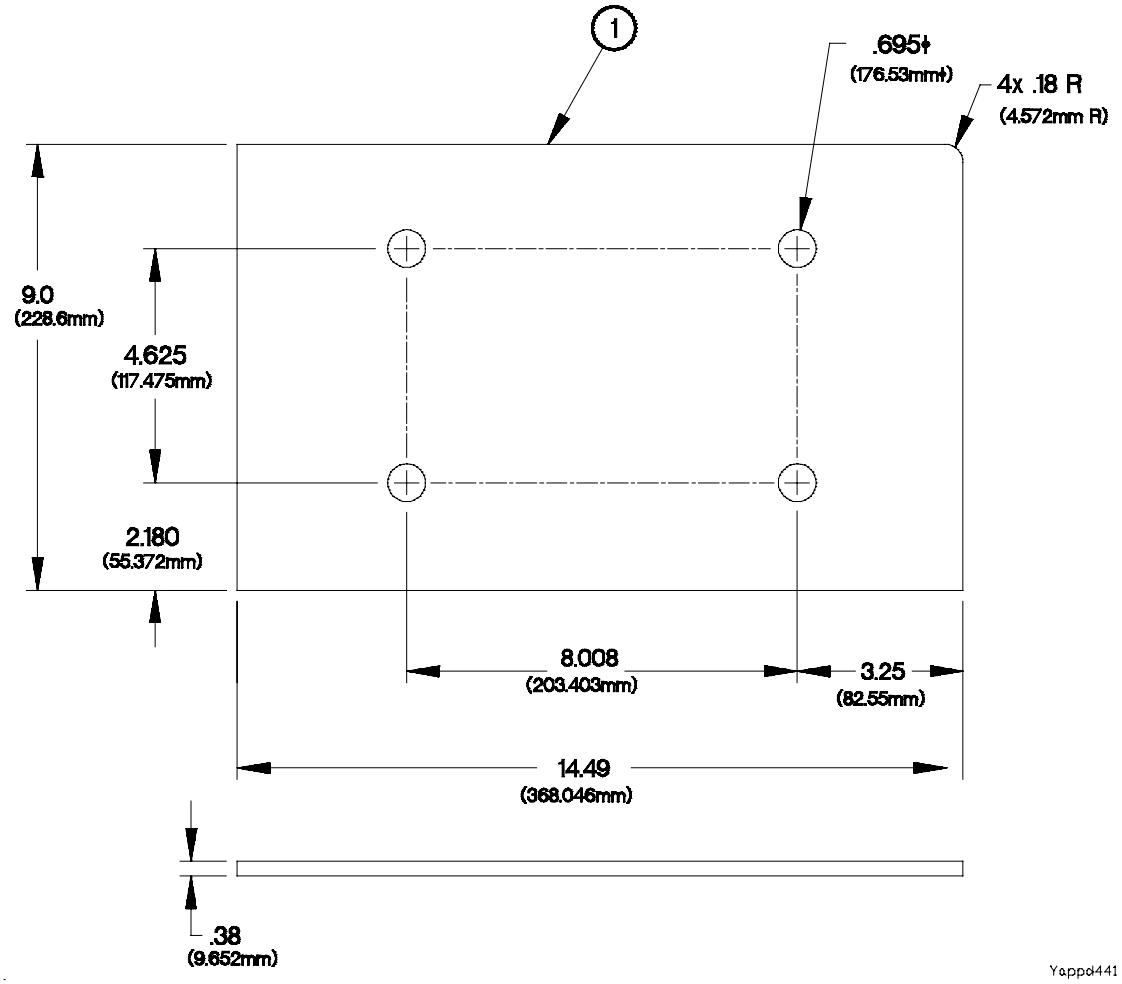


Figure D-37. Transmission Lift and Mounting Bracket Bottom Plate

a. All dimensions are in inches (millimeters).
b. Fabricate bottom plate (1) from ASTM A-36 steel plate.
c. Drill 11/16 in. (17.5 mm) diameter hole through 4 places as shown in **Figure D-37. Transmission Lift and Mounting Bracket Bottom Plate**.
d. Round four corners to 0.18 in. (4.6 mm) radius as shown in **Figure D-37. Transmission Lift and Mounting Bracket Bottom Plate**.
e. De-burr and remove sharp edges.

D-20. TRANSMISSION LIFT AND MOUNTING BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
2	T12419143-002	Plate, Steel, ASTM A-36	18.75 in. (476.2 mm) x 20.50 in. (520.7 mm) x 0.38 in. (9.6 mm) thick	2

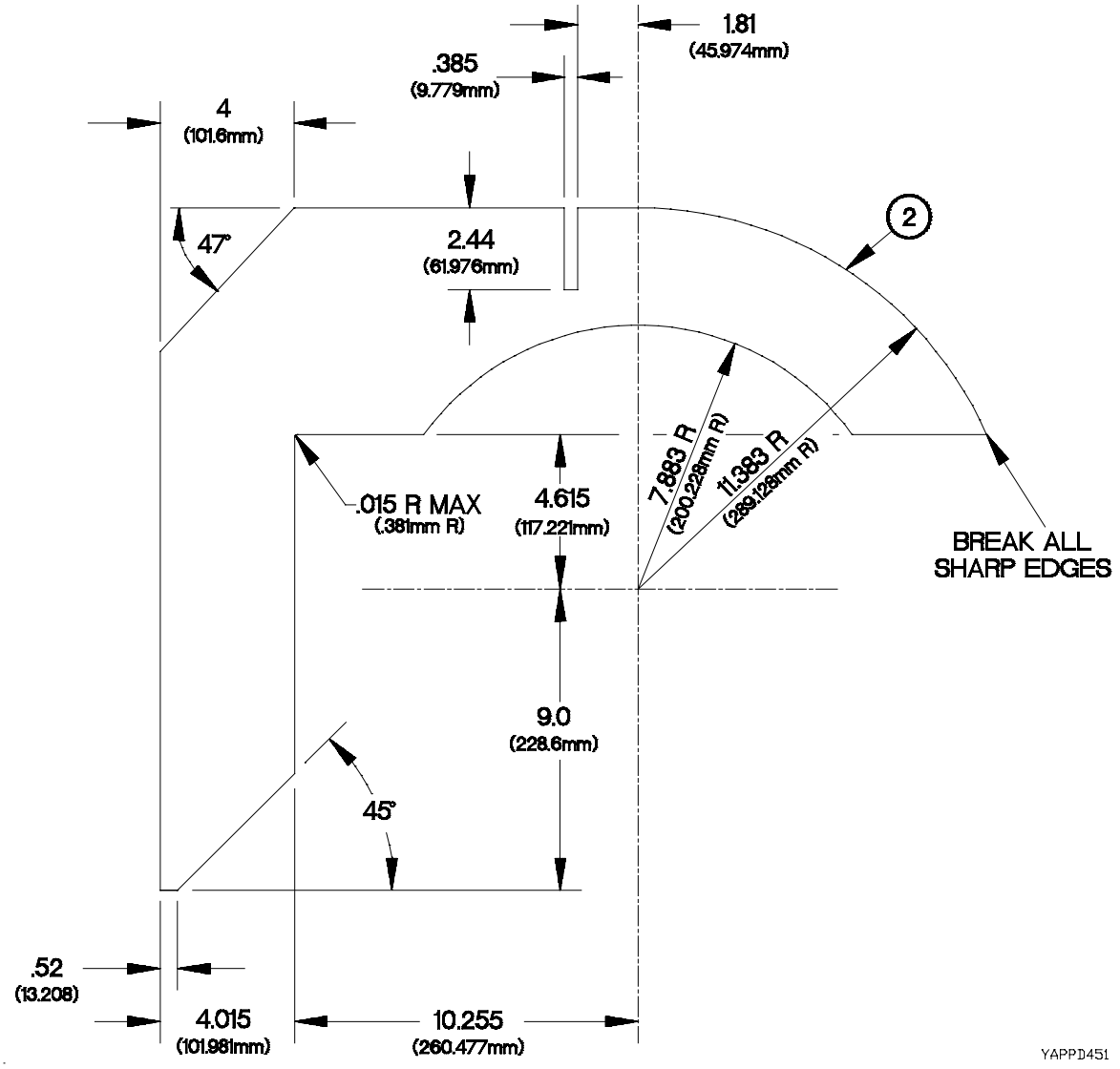


Figure D-38. Transmission Lift and Mounting Bracket Side Plates

a. All dimensions are in inches (millimeters).
b. Fabricate two side plates (2) from ASTM A-36 steel plate.
c. Cut slot 0.385 in. (9.8 mm) wide X 2.00 in. (50.8 mm) long in each side plate (2) as shown in **Figure D-38. Transmission Lift and Mounting Bracket Side Plates**.
d. De-burr and remove sharp edges.

Item	Part Number	Material Description	Size	Qty
3	T12419143-003	Plate, Steel, ASTM A-36	14.49 in. (368 mm) x 5.50 in. (140.1 mm) x 0.38 in. (9.6 mm) thick	2

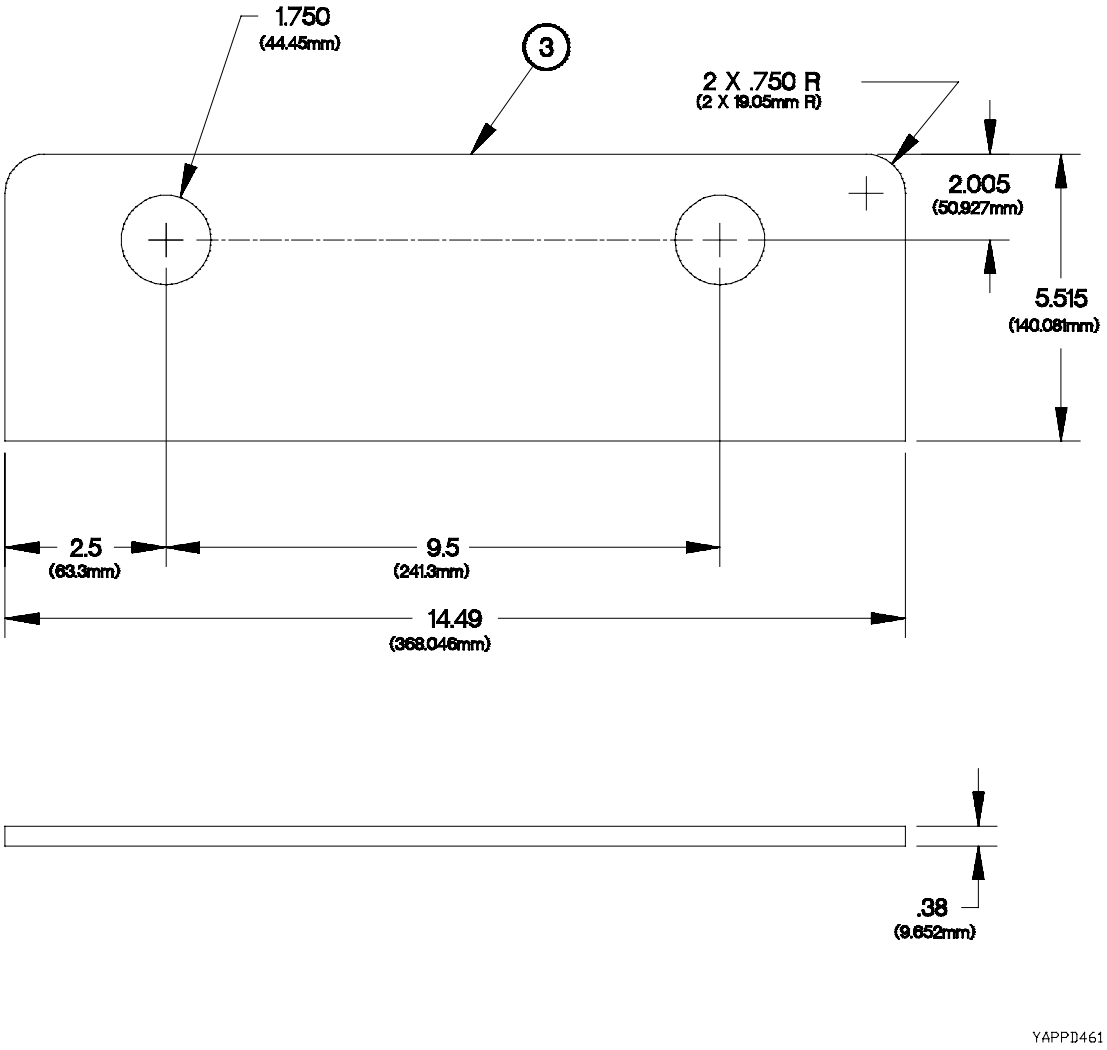


Figure D-39. Transmission Lift and Mounting Bracket Top Plate

a. All dimensions are in inches (millimeters).
b. Fabricate top plate (3) from ASTM A-36 steel plate.
c. Drill 1-3/4 in. (44.4 mm) diameter hole through 2 places as shown in **Figure D-39. Transmission Lift and Mounting Bracket Top Plate**.
d. Round two corners to 0.750 in (19 mm) radius as shown in **Figure D-39. Transmission Lift and Mounting Bracket Top Plate**.
e. De-burr and remove sharp edges.

D-20. TRANSMISSION LIFT AND MOUNTING BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
4	T12419143-004	Plate, Steel, ASTM A-36	13.745 in. (349.1 mm) x 1.55 in. (39.4 mm) x 0.38 in. (9.6 mm) thick	2

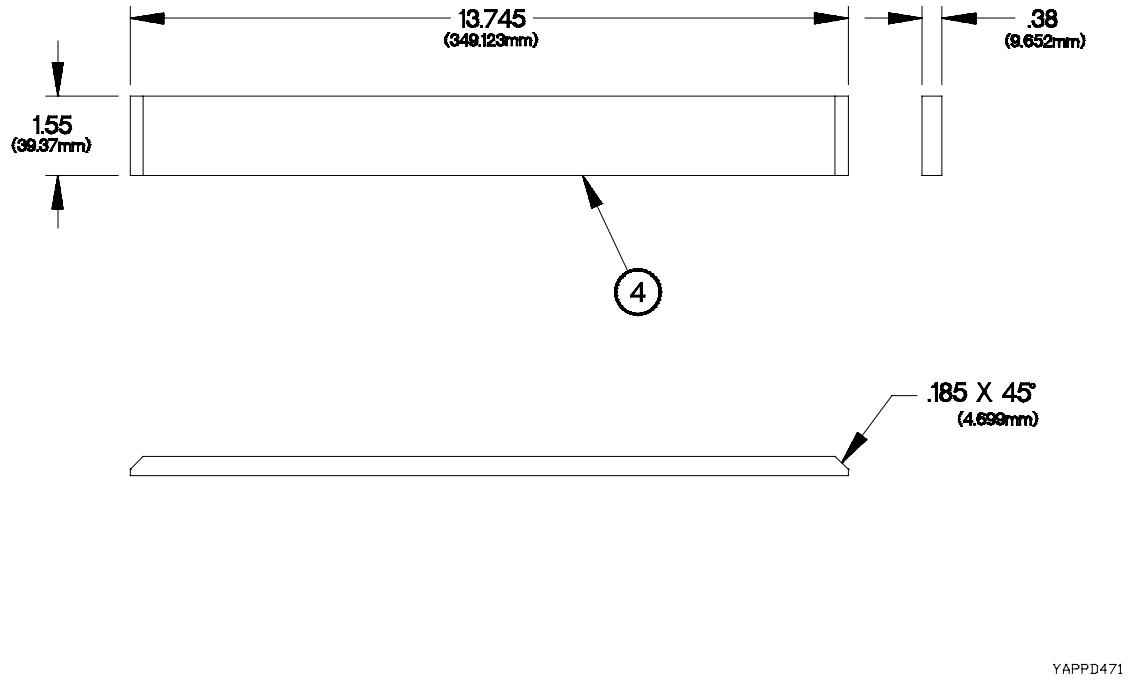


Figure D-40. Transmission Lift and Mounting Bracket Top and Bottom Braces

a. All dimensions are in inches (millimeters).
b. Fabricate top and bottom braces (4) from ASTM A-36 steel plate.
c. Chamfer two edges of top and bottom braces (4) as shown in **Figure D-40. Transmission Lift and Mounting Bracket Top and Bottom Braces**.
d. De-burr and remove sharp edges.

Item	Part Number	Material Description	Size	Qty
5	T12419143-005	Plate, Steel, ASTM A-36	2.06 in. (52.3 mm) x 2.06 in. (52.3 mm) x 0.38 in. (9.6 mm) thick	4

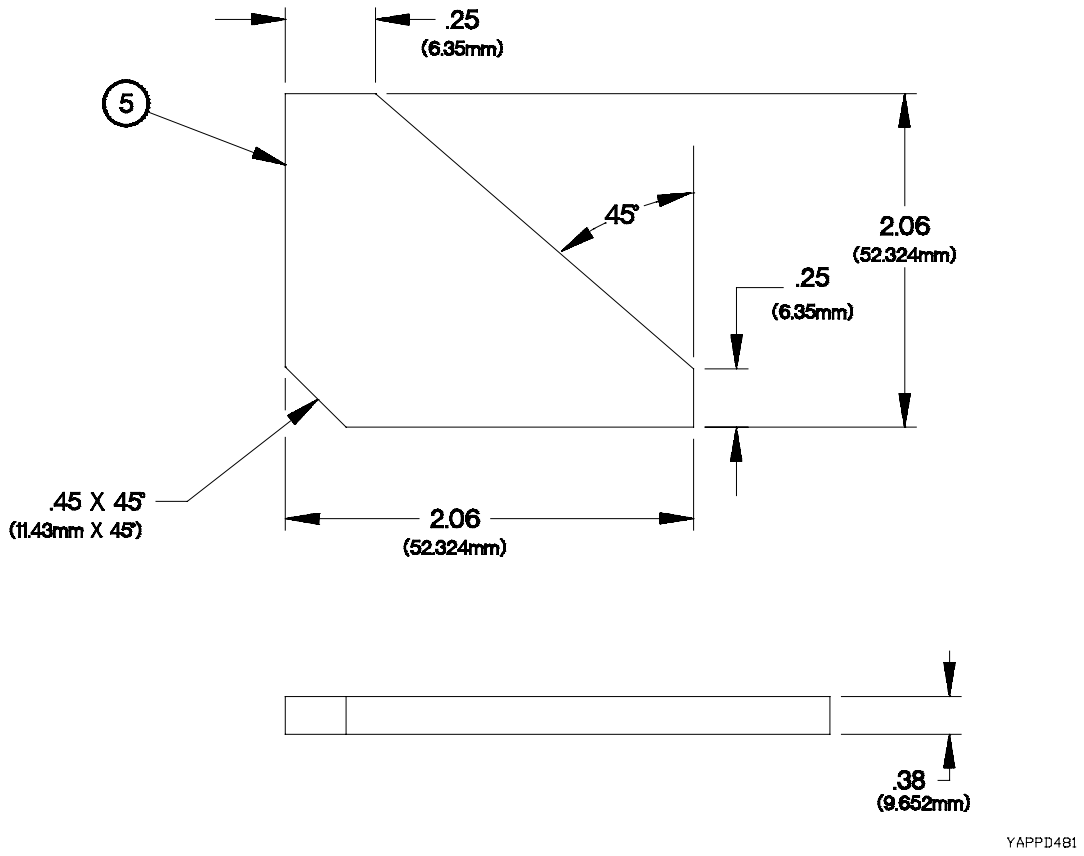


Figure D-41. Transmission Lift and Mounting Bracket Side Supports

a. All dimensions are in inches (millimeters).
b. Fabricate four side supports (5) from ASTM A-36 steel plate.
c. De-burr and remove sharp edges.

D-20. TRANSMISSION LIFT AND MOUNTING BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
6	T12419143-006	Plate, Steel, ASTM A-36	14.49 in. (368 mm) x 3.75 in. (95.2 mm) x 0.38 in. (9.6 mm) thick	2

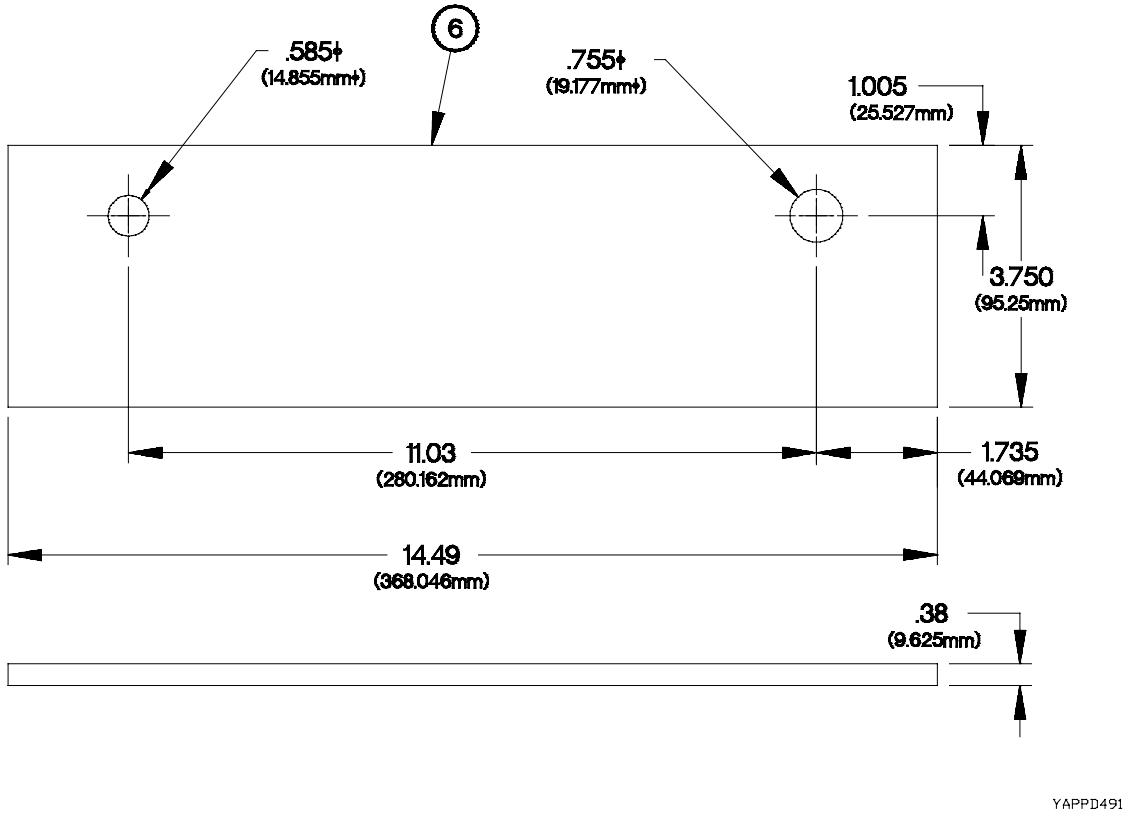


Figure D-42. Transmission Lift and Mounting Bracket Bolt Mounting Plates

a. All dimensions are in inches (millimeters).
b. Fabricate two bolt mounting plates (6) from ASTM A-36 steel plate.
c. Drill 0.755 in. (19.2 mm) diameter hole through as shown in **Figure D-42. Transmission Lift and Mounting Bracket Bolt Mounting Plates**.
d. Drill 0.585 in. (14.8 mm) diameter hole through as shown in **Figure D-42. Transmission Lift and Mounting Bracket Bolt Mounting Plates**.
e. De-burr and remove sharp edges.

D-21. TRANSMISSION LIFTING BRACKET

Make the transmission lifting bracket assembly from upper and lower lift brackets according to the following instructions. Refer to the parts lists and accompanying figures for details.

Item	Part Number	Name/Description	Qty
1	1T12419142-001	Bracket, Lower Lift	1
2	1T12419142-002	Bracket, Upper Lift	1

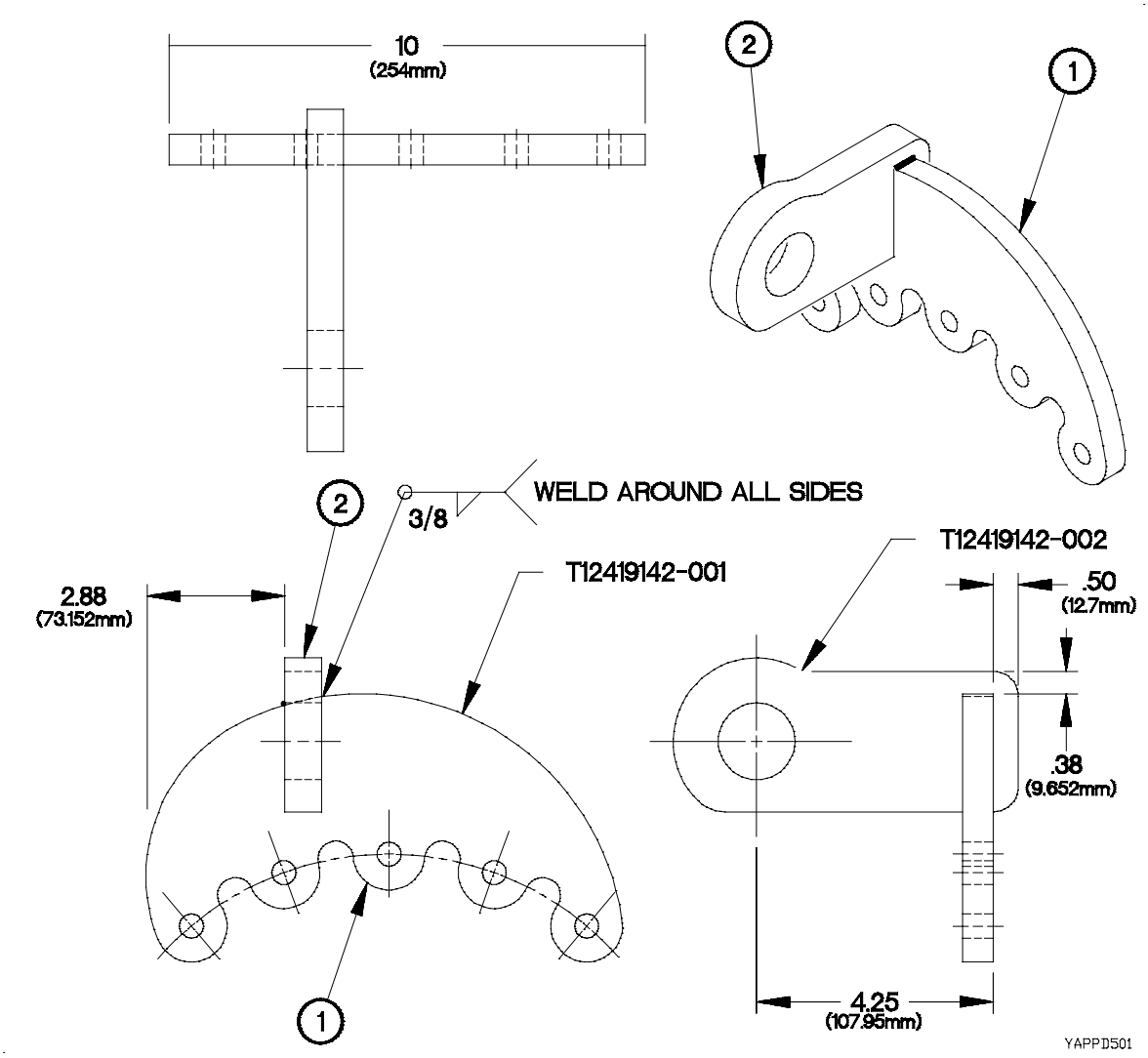


Figure D-43. Transmission Lift Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Weld (1) to (2) on both sides in accordance with dimensions in **Figure D-43. Transmission Lift Bracket Assembly**. Weld to be magnetic particle inspected per ASTM E1444. No cracks allowed.

D-21. TRANSMISSION LIFTING BRACKET (CONT)

Item	Part Number	Material Description	Size	Qty
1	T12419142-001	Plate, Steel, ASTM A829, Grade 4130, Hardness Rockwell C28-32	10.08 in. (256 mm) x 5.50 in. (139.7 mm) x 0.50 in. (12.7 mm) thick	1

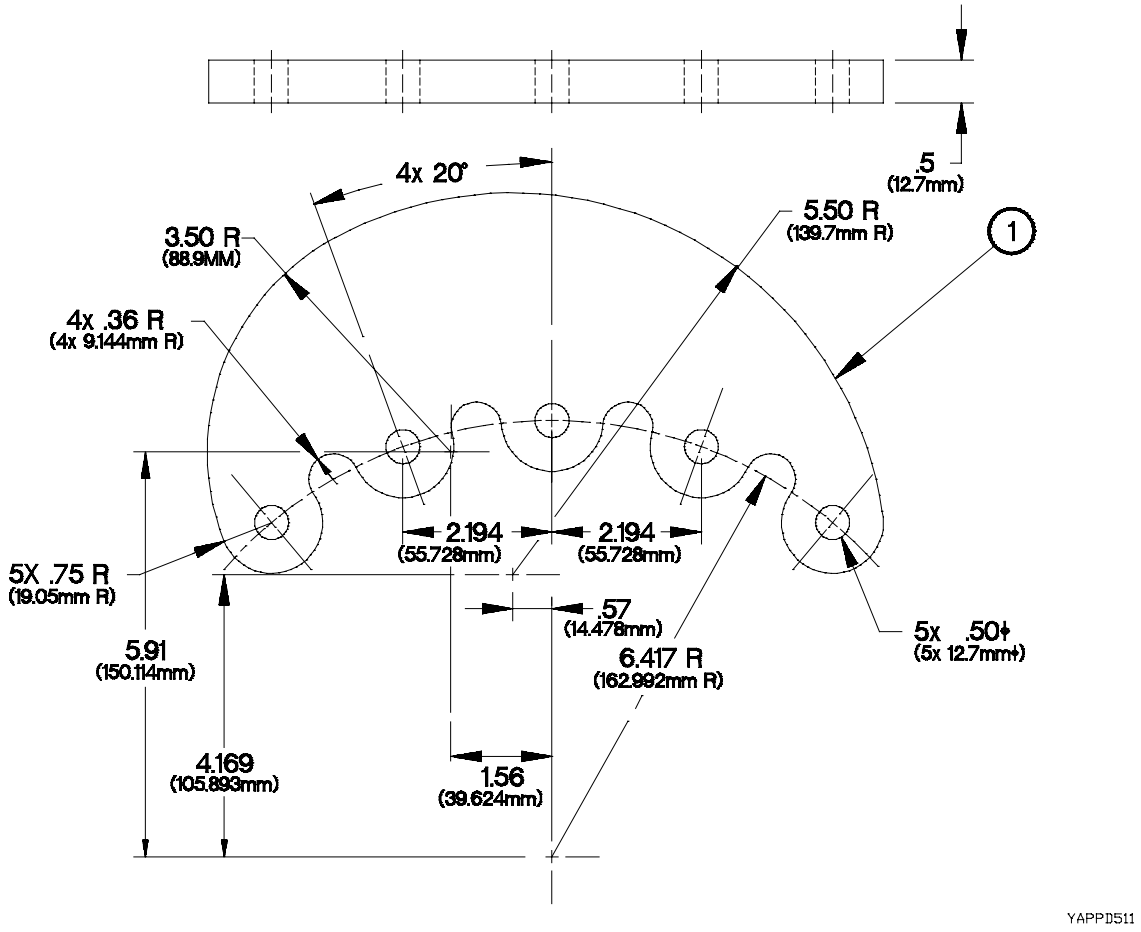


Figure D-44. Lower Lift Bracket

a. All dimensions are in inches (millimeters).
b. Fabricate (1) from ASTM A829, Grade 4130, Hardness Rockwell C28-32 steel plate.
c. Tolerance on dimensions shown to two decimal places in **Figure D-44. Lower Lift Bracket** will be held to ±0.01 in. (±0.25 mm).
d. Tolerance on dimensions shown to three decimal places in **Figure D-44. Lower Lift Bracket** are held to ±0.005 in. (±0.13 mm).
e. Drill 0.50 in. (12.7 mm) diameter hole through 5 places on a 6.417 in. (163 mm) radius equally spaced at 20° apart as identified in **Figure D-44. Lower Lift Bracket**.
f. Round piece to 5.50 in. (139.7 mm) radius as shown in **Figure D-44. Lower Lift Bracket**.
g. Drill 4 slots 0.37 in. (9.4 mm) diameter on 6.417 in. (163 mm) radius as shown in **Figure D-44. Lower Lift Bracket**.
h. De-burr and remove all sharp edges.

Item	Part Number	Material Description	Size	Qty
2	T12419142-002	Plate, Steel, ASTM A829, Grade 4130, Hardness Rockwell C28-32	6.38 in. (162 mm) x 3.50 in. (69.8 mm) x 0.75 in. (19 mm) thick	1

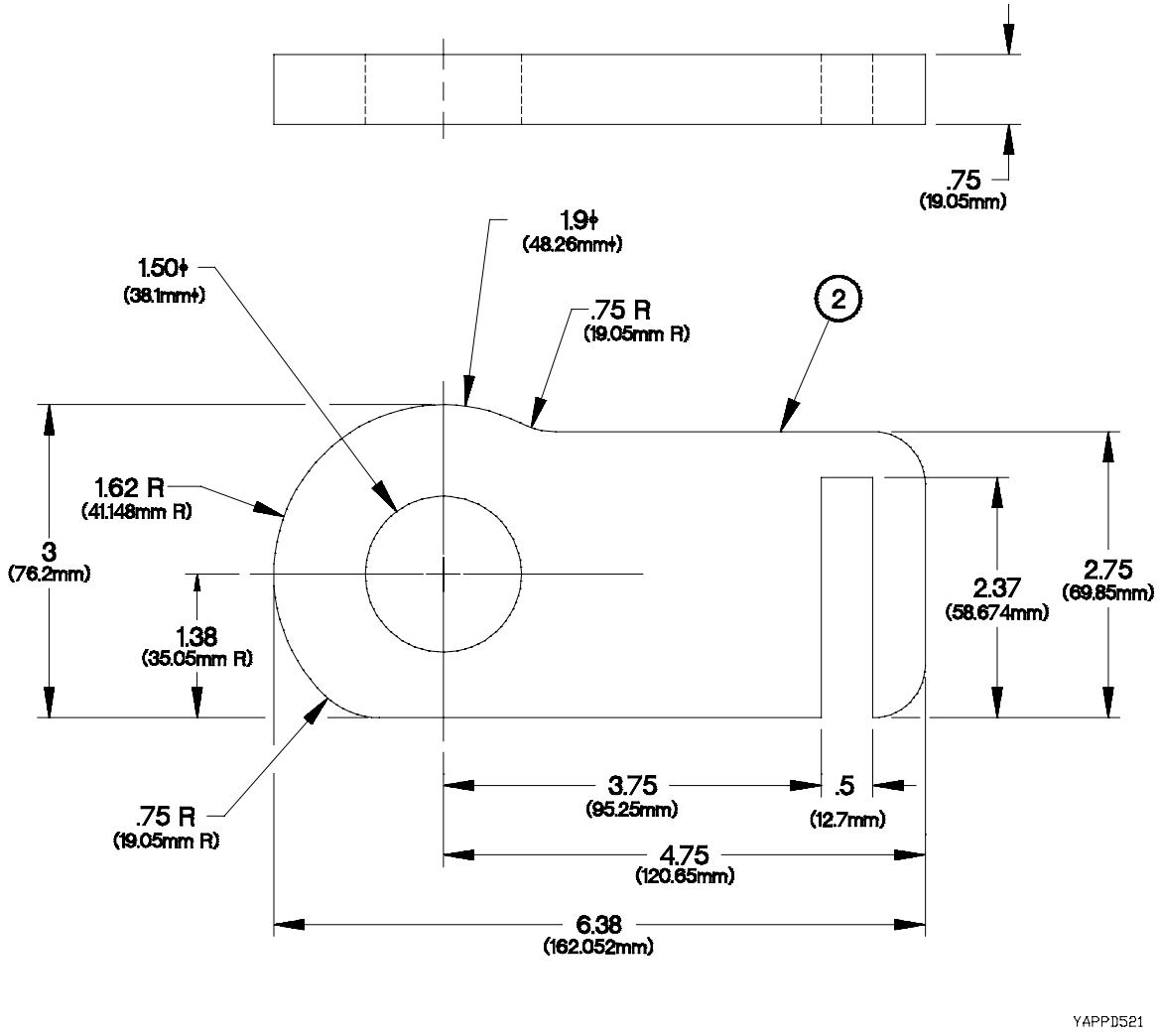


Figure D-45. Upper Lift Bracket

a. All dimensions are in inches (millimeters).
b. Fabricate (2) from ASTM A829, Grade 4130, Hardness Rockwell C28-32 steel plate.
c. Tolerance on dimensions shown as two decimal places in **Figure D-45. Upper Lift Bracket** will be held to ±0.01 in (±0.25 mm).
d. Drill 1.50 in. (38.1 mm) diameter hole through 1 place as shown in **Figure D-45. Upper Lift Bracket**.
e. Cutout slot 0.50 in. (1.27 mm) X 2.37 in. (60.2 mm) 1 place as shown in **Figure D-45. Upper Lift Bracket**.
f. De-burr and remove all sharp edges.
g. Round off sharp corners and round to radius shown in **Figure D-45. Upper Lift Bracket**.

D-22. WHEEL BEARING SHIM TOOL REST

Fabricate the wheel bearing shim tool rest according to the following steps. Refer to the following parts list for materials.

Part Number	National Stock Number	Size
QQ-T-570	9510-00-866-1037	Bar, Metal

D-23. BATTERY 12V CABLE ASSEMBLY 12378512

Make the Battery 12V Cable Assembly from electrical cable, lug terminals, and sleeves according to the following steps. Refer to the following parts list and **Figure D-46. Battery 12V Cable Assembly** for details. Refer to specification Mil-B-43436 for requirements.

Item	Part Number	Material Description	Size		Qty
			in.	mm	
1	12378873-050	Electrical cable 2 AWG	38.6	980	1
2	12378873-050	Electrical cable 2 AWG	7.9	201	1
3	12414644-001	Positive Terminal			2
4	12414644-005	Positive Terminal			1
5	M20659-120	Terminal, Lug			1
6	M43436/1-3	Band, Marker			1
7	12414663-006	Sleeve, Band Marker	1.0	25.4	2
8	M23053/5-210C	Sleeve, Cable	1.0	25.4	2
9	M23053/4-3050	Sleeving	1.0	25.4	8
10	12414580	Thermoplastic Adhesive			A/R
11a,b	12378873-050	Electrical cable 2 AWG	7.5	190	2
12a,b	12414644-002	Negative Terminal			2

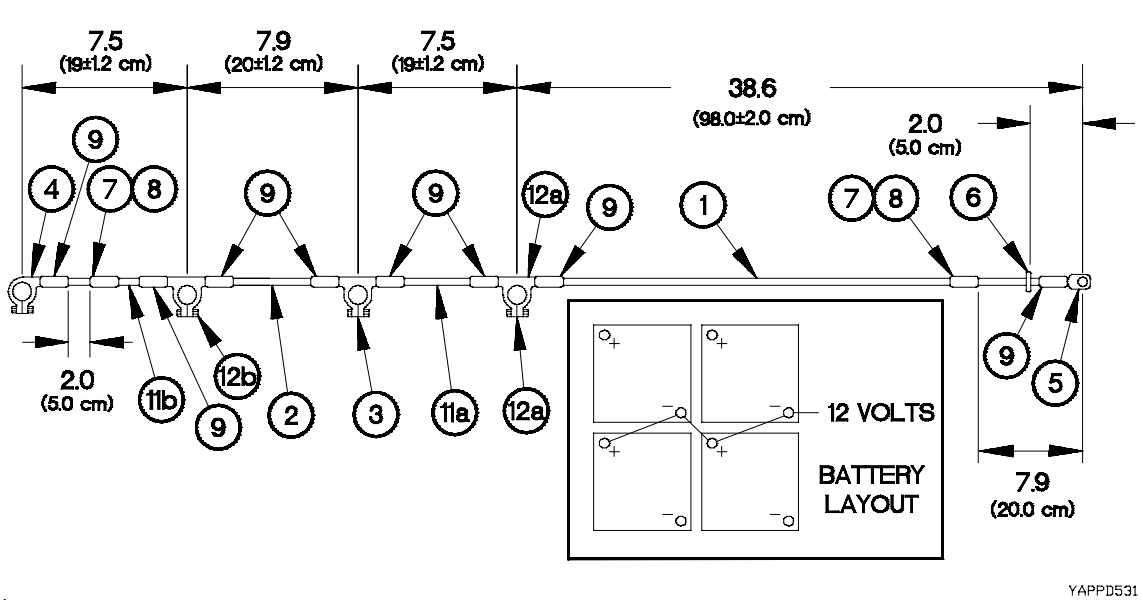


Figure D-46. Battery 12V Cable Assembly

a. All dimensions are in inches (millimeters).
b. Strip 0.69 in. (13 mm) insulation from ends of three cables (1, 2 and 11).
c. Install band marker (6) on cable (1) at position shown in **Figure D-46. Battery 12V Cable Assembly**.
d. Mark two marker sleeves (7) in ink with characters 1/8 in. (3 mm) high, as follows: **19207-12378575**.
e. Install marker sleeve (7) on cable (1) at position shown in **Figure D-46. Battery 12V Cable Assembly**.
f. Install marker sleeve (7) on cable (11) at position shown in **Figure D-46. Battery 12V Cable Assembly**.
g. Install sleeve (8) on cable over marker sleeves (7).
h. Install sleeve (8) on cable over marker sleeves (7).
i. Stamp **12V** using metal stamping tools on lug terminal (5). Make sure **12V** is stamped on lug terminal side that can be seen when battery 12V cable assembly is installed on vehicle battery. See battery layout in **Figure D-46. Battery 12V Cable Assembly**.
j. Stamp a plus (**+**) sign using metal stamping tools on lug terminals (3 and 4). Make sure (**+**) is stamped on lug terminal side that can be seen when battery 12V cable assembly is installed on vehicle battery. See battery layout in **Figure D-46. Battery 12V Cable Assembly**.
k. Stamp a minus (**-**) sign using metal stamping tools on two lug terminals (12). Make sure (**-**) is stamped on lug terminal side that can be seen when battery 12V cable assembly is installed on vehicle battery. See battery layout in **Figure D-46. Battery 12V Cable Assembly**.
l. Install sleeving (9) over each end of cable (1).
m. Install sleeving (9) over each end of cable (2).
n. Install sleeving (9) over each end of cable (11a).
o. Install sleeving (9) over each end of cable (11b).
p. Insert ends of cable (11a) into lug terminals (12a and 3). Make sure lug terminals are turned so stamped marks on lug terminal sides can be seen when battery 12V cable assembly is installed on vehicle battery. See battery layout in **Figure D-46. Battery 12V Cable Assembly**.
q. Crimp lug terminals (3 and 12a) to ends of cable (11a).
r. Insert end of cable (2) into lug terminal (3).
s. Crimp lug terminal (3) to end of cable (2).
t. Insert end of cable (2) into lug terminal (12b). Make sure lug terminals are turned so stamped marks on lug terminal sides can be seen when battery 12V cable assembly is installed on vehicle battery. See battery layout in **Figure D-46. Battery 12V Cable Assembly**.
u. Crimp lug terminal (12b) to end of cable (2).
v. Insert end of cable (11b) into lug terminal (12b).

D-23. BATTERY 12V CABLE ASSEMBLY 12378512 (CONT)

w. Crimp lug terminal (12b) to end of cable (11b).
x. Insert end of cable (11b) into lug terminal (4). Make sure lug terminals are turned so stamped marks on lug terminal sides can be seen when battery 12V cable assembly is installed on vehicle battery. See battery layout in **Figure D-46. Battery 12V Cable Assembly**.
y. Crimp lug terminal (4) to end of cable (11b).
z. Insert end of cable (1) into lug terminal (12a).
za. Crimp lug terminal (12a) to end of cable (1).
zb. Install lug terminal (5) on end of cable (1). Make sure lug terminal is turned so stamped marks on lug terminal sides can be seen when battery 12V cable assembly is installed on vehicle battery. See battery layout in **Figure D-46. Battery 12V Cable Assembly**.
zc. Apply thermoplastic adhesive filler (10) to eight sleevings (9).
zd. Seal terminals sleevings (9) over crimp on lug terminals (5) and lug terminals (3, 4 12a and 12b) using thermal heat gun to dry thermoplastic adhesive filler.

D-24. BATTERY GROUND CABLE ASSEMBLY 12378575

Make the Battery Cable Assembly from electrical cable, lug terminals, and sleeves according to the following steps. Refer to the following parts list and **Figure D-47. Battery Ground Cable Assembly** for details. Refer to specification Mil-B-43436 for requirements.

Item	Part Number	Material Description	Size		Qty
			in.	mm	
1	12378873-050	Electrical cable 2 AWG	50.4	1280	1
2	12378873-050	Electrical cable 2 AWG	11.8	300	1
3	12414644-002	Negative Terminal			1
4	12414644-004	Negative Terminal			1
5	M20659-120	Terminal, Lug			1
6	M43436/1-3	Band, Marker			1
7	12414663-006	Sleeve, Band Marker	1.0	25.4	2
8	M23053/5-210C	Sleeve, Cable	1.0	25.4	2
9	M23053/4-3050	Sleeving	1.0	25.4	4
10	12414580	Adhesive Thermoplastic			A/R

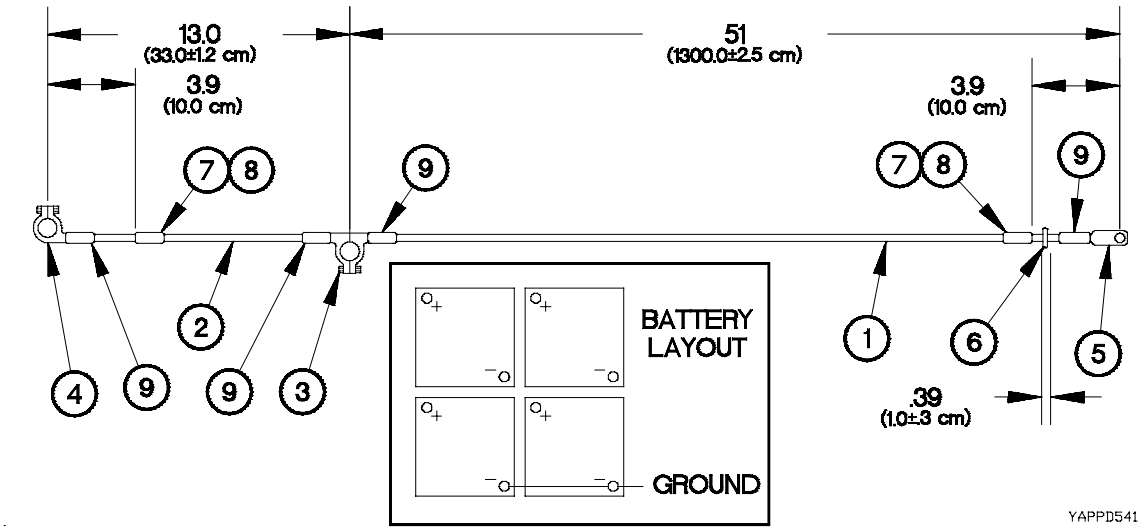


Figure D-47. Battery Ground Cable Assembly

a. All dimensions are in inches (millimeters).
b. Strip 0.69 in. (18 mm) insulation from ends of cables (1 and 2).
c. Install band marker (6) on cable (1) at position shown on **Figure D-47. Battery Ground Cable Assembly**.
d. Mark two marker sleeves (7) in ink with characters 0.13 in. (3 mm) high, as follows: **19207-12378575**.
e. Install marker sleeve (7) on cable (1) at position shown in **Figure D-47. Battery Ground Cable Assembly**.
f. Install marker sleeve (7) on cable (2) at position shown in **Figure D-47. Battery Ground Cable Assembly**.
g. Install sleeve (8) on cable (1) over marker sleeve (7).
h. Install sleeve (8) on cable (2) over marker sleeve (7).
i. Stamp **Gnd** using metal stamping tools on lug terminal (5). Make sure (**Gnd**) is visible on terminal side that can be seen when battery ground cable assembly is installed on vehicle battery. See battery layout in **Figure D-47. Battery Ground Cable Assembly**.
j. Stamp a minus sign **(-)** using metal stamping tools on lug terminals (3 and 4). Make sure (**-**) is stamped on terminal side that can be seen when battery ground cable assembly is installed on vehicle battery. See battery layout in **Figure D-47. Battery Ground Cable Assembly**.
k. Install sleeving (9) over each end of cable (1).
l. Install sleeving (9) over each end of cable (2).
m. Insert end of cables (1 and 2) into lug terminal (3). Turn lug terminal to make sure stamped mark on lug terminal will be visible when battery ground cable assembly is installed on vehicle battery. See battery layout in **Figure D-47. Battery Ground Cable Assembly**.
n. Crimp lug terminal (3) to end of cables (1 and 2).
o. Insert end of cable (2) into lug terminal (4). Turn lug terminal to make sure stamped mark on lug terminal will be visible when battery ground cable assembly is installed on vehicle battery. See battery layout in **Figure D-47. Battery Ground Cable Assembly**.
p. Crimp lug terminal (4) to end of cable (2).
q. Insert end of cable (1) into lug terminal (5). Turn lug terminal to make sure stamped mark on lug terminal will be visible when battery ground cable assembly is installed on vehicle battery. See battery layout in **Figure D-47. Battery Ground Cable Assembly**.
r. Crimp lug terminal (5) to end of cable (1).
s. Apply thermoplastic adhesive filler (10) to four sleevings (9).
t. Seal four sleevings (9) over crimp on lug terminal (5) and over crimps on lug terminals (3 and 4) using thermal heat gun to dry thermoplastic adhesive filler.

D-25. BATTERY 24V CABLE ASSEMBLY 12378576

Make the Battery 24V Cable Assembly from electrical cable, lug terminals, and sleeves according to the following steps. Refer to the following parts list and **Figure D-48. Battery 24V Cable Assembly** for details. Refer to specification Mil-B-43436 for requirements.

Item	Part Number	Material Description	Size		Qty
			in.	mm	
1	12378873-050	Electrical cable 2 AWG	33.5	851	1
2	12378873-050	Electrical cable 2 AWG	11.8	300	1
3	12414644-001	Positive Terminal			1
4	12414644-003	Positive Terminal			1
5	M20659-120	Terminal, Lug			1
6	M43436/1-3	Band, Marker			1
7	12414663-006	Sleeve, Band Marker	1.0	25.4	2
8	M23053/5-210C	Sleeve, Cable	1.0	25.4	2
9	M23053/4-3050	Sleeving	1.0	25.4	4
10	12414580	Adhesive Thermoplastic			A/R

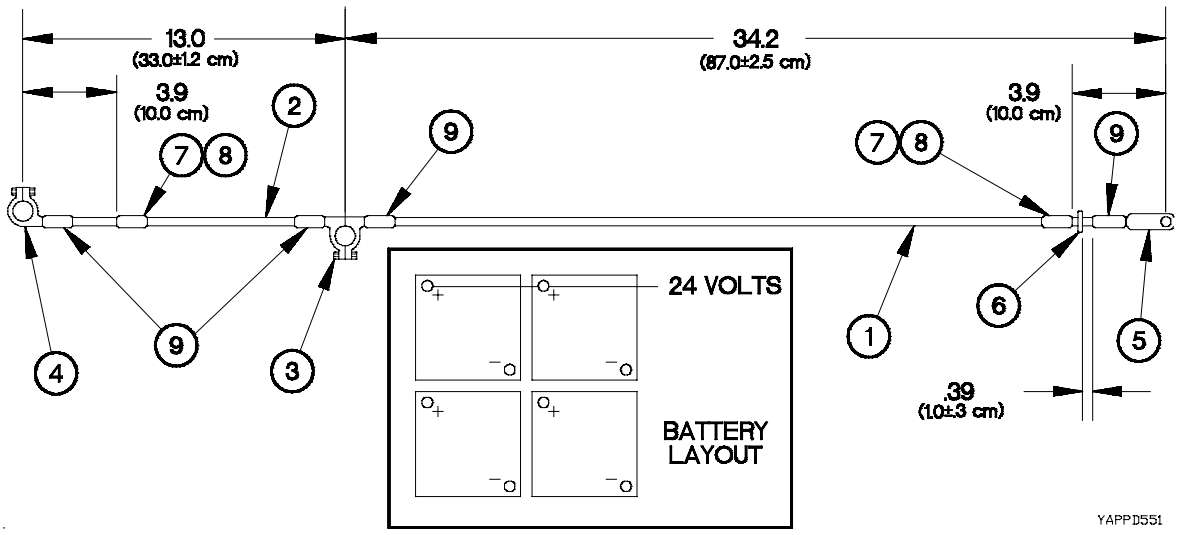


Figure D-48. Battery 24V Cable Assembly

a. All dimensions are in inches (millimeters).
b. Strip 0.69 in. (18 mm) insulation from ends of cables (1 and 2).
c. Install band marker (6) on cable (1) at position shown in **Figure D-48. Battery 24V Cable Assembly**.
d. Mark two marker sleeves (7) in ink with characters 0.13 in. (3 mm) high, as follows: **19207-12378575**.
e. Install marker sleeve (7) on cable (1) at position shown in **Figure D-48. Battery 24V Cable Assembly**.
f. Install marker sleeve (7) on cable (2) at position shown in **Figure D-48. Battery 24V Cable Assembly**.
g. Install sleeve (8) on cable (1) over marker sleeve (7).
h. Install sleeve (8) on cable (2) over marker sleeve (7).
i. Stamp **24V** using metal stamping tools on lug terminal (5). Make sure **24V** is stamped on lug terminal side that can be seen when battery 24V cable assembly is installed on vehicle battery. See battery layout in **Figure D-48.**

Battery 24V Cable Assembly.

j. Stamp a plus sign (**+**) using metal stamping tools on lug terminals (3 and 4). Make sure (**+**) is stamped on lug terminal side that can be seen when battery 24V cable assembly is installed on vehicle battery. See battery layout in **Figure D-48. Battery 24V Cable Assembly**.
k. Install sleeving (9) over each end of cable (1).
l. Install sleeving (9) over each end of cable (2).
m. Insert end of cables (1 and 2) into lug terminal (3). Turn lug terminal to make sure stamped marks on lug terminal can be seen when battery 24V cable assembly is installed on vehicle. See battery layout in **Figure D-48. Battery 24V Cable Assembly**.
n. Crimp lug terminal (3) to ends of cables (1 and 2).
o. Insert end of cable (2) into lug terminal (4). Turn lug terminal to make sure stamped marks on lug terminal can be seen when battery 24V cable assembly is installed on vehicle battery. See battery layout in **Figure D-48. Battery 24V Cable Assembly**.
p. Crimp lug terminal (4) to end of cable (2).
q. Insert end of cable (1) into lug terminal (5). Turn lug terminal to make sure stamped marks on lug terminal can be seen when battery 24V cable assembly is installed on vehicle battery. See battery layout in **Figure D-48. Battery 24V Cable Assembly**.
r. Crimp lug terminal (5) to end of cable (1).
s. Apply thermoplastic adhesive filler (10) to four sleevings (9).
t. Seal four sleevings (9) over crimp on lug terminal (5) and over crimps on lug terminals (3 and 4) using thermal heat gun to dry thermoplastic adhesive filler.

D-26. DOUBLE-SIDED TAPE 12420265X2

Make from P/N 4940(52152) X 2 in. (51 mm)

D-27. BLOCK SEAL 12420489 FABRICATION

Make block seal from P/N (0VXY8) STN2.38X.5. Use a suitable cutting tool to cut seal to 0.52 in. (13.2 mm) long.

D-28. AIR DUCT HOSE FABRICATION 12412332

Cut air duct lengths from bulk hose NB-4-035 using a fine-toothed hacksaw or suitable cutting device. The following table identifies the hoses and the lengths to which they are cut.

Hose Part Number	Cut Length
12412332-003	3 in. (76.2 mm)
12412332-012	12 in. (304.8 mm)
12412332-040	40 in. (1016 mm)
12412332-048	48 in. (1219.2 mm)
12412332-066	66 in. (1676.4 mm)
12412332-096	96 in. (2438.4 mm)
12412332-180	180 in. (4572 mm)

D-29. NON-METALLIC FLEX CONDUIT FABRICATION 12412367

Cut conduit lengths from bulk conduit part number 68707-R using a small toothed hacksaw or suitable cutting device. The following table lists the conduit part numbers and the lengths of the cut pieces.

Cutoff Length Part Number	Cutoff Length in in. (mm)	Cutoff Length Part Number	Cutoff Length in in. (cm)
12412367-038	38 (965.2)	12412367-094	94 (238.76)
12412367-046	46 (1168.4)	12412367-178	178 (452.12)
12412367-064	64 (1625.6)		

D-30. PNEUMATIC TUBES FABRICATION

Cut pneumatic tubes from bulk tubing stock listed **Table D-1. Pneumatic Tube Lengths**. Use a fine-toothed hacksaw or suitable cutting device and cut tubing to required length.

Table D-1. Pneumatic Tube Lengths

Tube Part Number	Bulk Tubing Part Number	Cut Length	
		in.	mm
12414690-001	NT-100-4 (79470)	18.1	460
12414690-002	NT-100-4 (79470)	16.0	406
12414690-004	NT-100-4 (79470)	74.8	1900
12414690-005	NT-100-4 (79470)	69.7	1770
12414690-006	NT-100-4 (79470)	239.0	6070
12414690-007	NT-100-4 (79470)	254.8	6470
12414690-008	NT-100-4 (79470)	286.3	7270
12414690-009	NT-100-4 (79470)	394.1	7470
12414690-010	NT-100-4 (79470)	180.0	4572
12414690-101	J844TYBSIZE 3/8 (81343)	18.0	457
12414690-102	J844TYBSIZE 3/8 (81343)	35.4	900
12414690-103	J844TYBSIZE 3/8 (81343)	20.9	530
12414690-104	J844TYBSIZE 3/8 (81343)	13.8	350
12414690-105	J844TYBSIZE 3/8 (81343)	11.8	300
12414690-106	J844TYBSIZE 3/8 (81343)	20.5	520
12414690-107	J844TYBSIZE 3/8 (81343)	39.0	990
12414690-108	J844TYBSIZE 3/8 (81343)	15.4	390
12414690-109	J844TYBSIZE 3/8 (81343)	23.0	584
12414690-112	J844TYBSIZE 3/8 (81343)	80.0	1980
12414690-113	J844TYBSIZE 3/8 (81343)	11.4	290
12414690-115	J844TYBSIZE 3/8 (81343)	82.8	2102
12414690-118	J844TYBSIZE 3/8 (81343)	11.8	300
12414690-119	J844TYBSIZE 3/8 (81343)	269.5	6845
12414690-120	J844TYBSIZE 3/8 (81343)	11.9	302

Table D-1. Pneumatic Tube Lengths (Cont)

Tube Part Number	Bulk Tubing Part Number	Cut Length	
		in.	mm
12414690-121	J844TYBSIZE 3/8 (81343)	43.0	1092
12414690-122	J844TYBSIZE 3/8 (81343)	44.1	1120
12414690-123	J844TYBSIZE 3/8 (81343)	259.4	6590
12414690-124	J844TYBSIZE 3/8 (81343)	288.2	7320
12414690-125	J844TYBSIZE 3/8 (81343)	10.8	273
12414690-126	J844TYBSIZE 3/8 (81343)	17.0	432
12414690-127	J844TYBSIZE 3/8 (81343)	17.0	432
12414690-201	C608-100BLK (13174)	14.8	376
12414690-202	C608-100BLK (13174)	14.1	358
12414690-203	C608-100BLK (13174)	6.5	165
12414690-205	C608-100BLK (13174)	14.5	368
12414690-206	C608-100BLK (13174)	14.8	377
12414690-207	C608-100BLK (13174)	15.6	395
12414690-208	C608-100BLK (13174)	6.7	170
12414690-209	C608-100BLK (13174)	19.5	495
12414690-210	C608-100BLK (13174)	15.5	393
12414690-211	C608-100BLK (13174)	8.0	203
12414690-213	C608-100BLK (13174)	118.5	3010
12414690-214	C608-100BLK (13174)	124.0	3150
12414690-212	C608-100BLK (13174)	17.0	430
12414690-215	C608-100BLK (13174)	163.0	4140
12414690-216	C608-100BLK (13174)	160.0	4064
12414690-217	C608-100BLK (13174)	62.6	1590
12414690-218	C608-100BLK (13174)	119.8	3042
12414690-219	C608-100BLK (13174)	69.0	1753
12414690-220	C608-100BLK (13174)	45.5	1156
12414690-221	C608-100BLK (13174)	12.6	320
12414690-222	C608-100BLK (13174)	5.5	140
12414690-223	C608-100BLK (13174)	14.6	371
12414690-224	C608-100BLK (13174)	170.0	4318
12414690-225	C608-100BLK (13174)	174.0	4420
12414690-226	C608-100BLK (13174)	103.5	2630
12414690-227	C608-100BLK (13174)	328.0	832
12414690-228	C608-100BLK (13174)	3.5	89
12414690-229	C608-100BLK (13174)	62.2	1581
12414690-230	C608-100BLK (13174)	14.6	370
12414690-231	C608-100BLK (13174)	60.5	1537
12414690-301	PFT-10B-BLK-100 (61424)	19.0	483
12414690-302	PFT-10B-BLK-100 (61424)	56.0	1422
12414690-303	PFT-10B-BLK-100 (61424)	118.1	3000

D-31. PNEUMATIC HOSE ASSEMBLY FABRICATION

Make pneumatic hose assemblies by cutting hose lengths from bulk hose using a fine-toothed hacksaw or suitable cutting device and assembling to end fittings. The following hose table list the assemblies and the components from which the assemblies are made.

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length in in. (mm)	Fitting A	Fitting B
12420062-002	4720-00-143-9390	97.1 (2466)	6-6 3014xx 5/8-18	6-6 3001xx 5/8-18
12420062-003	4720-00-143-9390	48.7 (1237)	6-6 3014xx 5/8-18	6-6 3001xx 5/8-18
12420062-004	J30R2Type1 1/2 ID	65. (1651)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420062-005	J30R2Type1 1/2 ID	57. (1448)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420064-001	4720-00-912-3092	25. (635)	4-4 3001xx 7/16-20	4-4 3001xx 7/16-20
12420064-002	4720-00-912-3092	30. (762)	4-4 3001xx 7/16-20	4-4 3001xx 7/16-20
12420064-007	4720-00-143-9390	15. (378)	6-6 3002xx 5/8-18	6-6 3002xx 5/8-18
12420064-009	4720-00-143-9390	14. (356)	6-6 3002xx 5/8-18	6-6 3001xx 5/8-18
12414694-X508	4720-00-095-1011	20. (508)	300166 5/8-18 UNF	150166 3/8 NPTF
12414694-X558	4720-00-095-1011	22. (558)	300166 5/8-18 UNF	150166 3/8 NPTF

D-32. NON-METALLIC ELECTRICAL CABLE CONDUIT FABRICATION

Make conduit to cover electrical cables described on 1241638 from bulk tube stock listed in **Table D-2. Non-Metallic Electrical Cable Conduit Lengths**. Use a fine-toothed hacksaw or suitable cutting device and cut hose/tube to required length.

Table D-2. Non-Metallic Electrical Cable Conduit Lengths

Tube Part Number	Bulk Tube Part Number	Cut Length	
		in.	mm
12416381P1	49008	8.9	226
12416381P10	49008	17.8	452
12416381P11	49008	29.9	759
12416381P12	49008	33.0	838
12416381P13	49008	13.9	353
12416381P14	49008	4.0	102
12416381P15	49008	17.4	442
12416381P16	49008	3.2	81
12416381P17	49008	4.5	114
12416381P2	49008	16.2	411
12416381P20	27413	32.8	833
12416381P21	27413	9.2	234
12416381P22	27413	8.0	203
12416381P23	27413	23.3	592
12416381P26	49008	2.5	64
12416381P3	27413	7.3	185

Table D-2. Non-Metallic Electrical Cable Conduit Lengths (Cont)

Tube Part Number	Bulk Tube Part Number	Cut Length	
		in.	mm
12416381P30	49007	17.0	432
12416381P32	49005	1.7	43
12416381P34	49005	20.7	526
12416381P35	49005	21.8	554
12416381P36	49005	5.5	140
12416381P37	49005	8.0	203
12416381P38	49008	3.7	94
12416381P4	49008	12.0	305
12416381P5	49008	26.0	660
12416381P6	49008	7.7	196
12416381P7	49008	26.7	678
12416381P8	49008	5.2	132
12416381P9	49008	16.8	427

D-33. COMPRESSOR HOSE FABRICATION 12417926

Cut compressor hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device. Assemble the cut hoses to the fittings. The following table lists the hoses and the components from which the assemblies are made.

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length in in. (mm)	Fitting A	Fitting B
12417926-001	SAE 100R14-10	110 (2794)	SAE 30011010	SAE 30011010
12417926-002	SAE 100R14-10	16.5 (419)	SAE 30011010	SAE 30011010
12417926-004	SAE 100R14-4	16.5 (419)	SAE 300144	SAE 300144

D-34. STEERING GEAR RETURN HOSE AND TRANSMISSION OIL COOLER HOSES FABRICATION

Cut the following hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device.

Hose Part Number	Bulk Hose Part Number	Cut Length	
		in.	mm
12418037	A110 (30327)	75.5	1917
12418460-001	MS521302B110360 (96906)	17.5	444
12418460-002	MS521301A206R (96906)	16.0	406

D-35. LANYARD ASSEMBLIES P/N 12418763 AND 12420196 FABRICATION

Make the following lanyard assemblies from bulk cable material, sleeves, and tab material and assemble according to **Figure D-49. Lanyard Assembly**. The following parts list identifies part numbers and lengths of cut pieces.

Item	Part Number	Material Description	Size	Qty
1	MIL-W-83420 Type 1, Comp B	1/16 in. stranded wire cable	4 in. (102 mm)	1
2	MS51844-22	Sleeve		2
3	N/A	Tab, Stainless Steel ASTM A617	0.06 in. (1.5 mm) X 0.37 in. (9.5 mm) X 1.25 in. (32 mm)	1

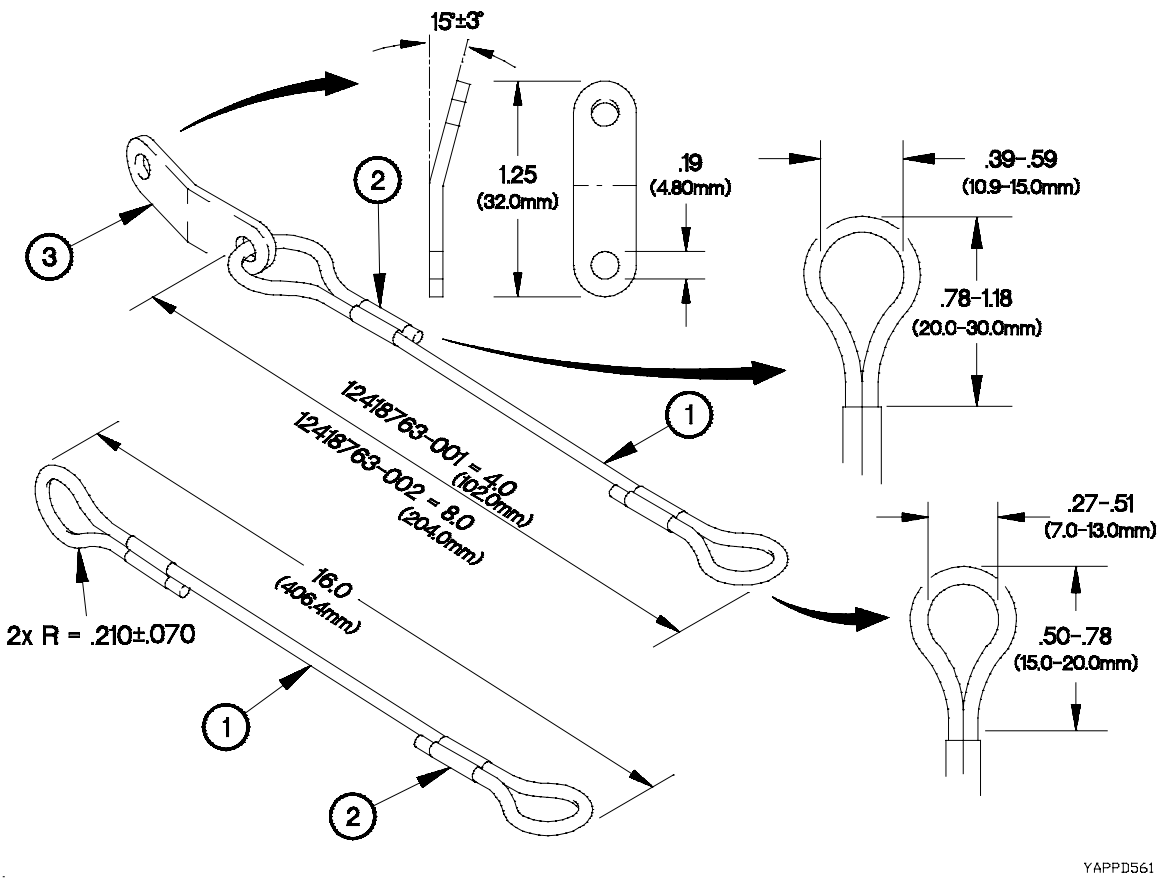


Figure D-49. Lanyard Assembly

a. All dimensions are in inches (millimeters).
b. Make from bulk cable and flat steel material as identified in parts list.
c. Drill two 0.19 in. (4.8 mm) diameter holes through tab material as shown in **Figure D-49 Lanyard Assembly**.
d. De-burr and remove sharp edges.
e. Bend tab as shown in **Figure D-49 Lanyard Assembly**.
f. Form loops on cable ends and insert sleeve material over cable on one end of cable and over cable and through sleeve at other end of cable as shown in **Figure D-49. Lanyard Assembly**.
g. Crimp two sleeves over cable ends.

D-36. WOODEN SKID FABRICATION 12420036

Cut, shape and drill the wooden skid from bulk wood stock according to the following information. **Figure D-50. Wooden Skid** illustrates the dimensions and hole locations.

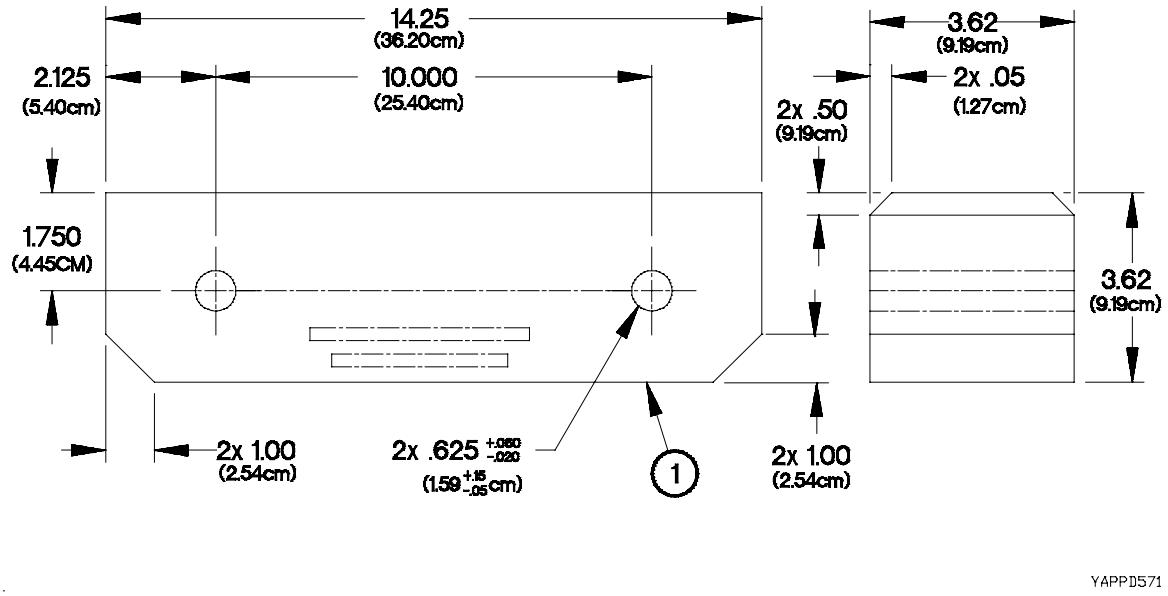


Figure D-50. Wooden Skid

a. All dimensions are in inches (millimeters).
b. Fabricate (1) from MIL-STD 736 Group IV untreated bulk wood stock as illustrated in **Figure D-50. Wooden Skid**.
c. Drill 0.625 in. (15.8 mm) diameter hole 2 places as shown in **Figure D-50. Wooden Skid**.
d. Sand and remove sharp edges.
e. Mark 19207-12420036 with characters 0.25 in. (6.5 mm) high using ink TT-I-1795 where shown in **Figure D-50 Wooden Skid** and clear coat with lacquer per TT-L-50.

D-37. NON-METALLIC VENT AIR HOSES FABRICATION

Cut the following vent air hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device.

Hose Part Number	Bulk Hose Part Number	Cut Length	
		in.	mm
12420197-001	483666 (02280)	180.0	4572
12420197-002	483666 (02280)	120.0	3048
12420197-003	483666 (02280)	96.0	2438
12420197-004	483666 (02280)	36.0	914
12420197-005	483666 (02280)	156.0	3962
12420197-006	483666 (02280)	72.0	1829
12420198-001	881-16 (98441)	120.0	3048
12420198-002	11657469	36.0	914

D-38. PERSONNEL HEATER AIR DUCT HOSE FABRICATION

Cut the following hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device.

Hose Part Number	Bulk Hose Part Number	Cut Length	
		in.	mm
12420308-457	8711054 (19207)	18.3	464
12420308-760	8711054 (19207)	30.4	772

D-39. CTIS QUICK RELEASE VALVE SPACER FABRICATION 12420398

Cut the spacer to length from bulk ASTM A53 Type F or ASTM A106 seamless tubing according to the following information.

a. Cut 1 in. (25.4 mm) from bulk stock using fine toothed hack saw.
b. Remove burrs from edges and corners.
c. Overcoat with Zinc plate chromate in accordance with ASTM B633.

D-40. CTIS VENT HOSE FABRICATION 12420419

Cut vent hoses from bulk hose using a fine-toothed hacksaw or suitable cutting device. The table list the hoses and the components from which the assemblies are made.

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length in in. (mm)	Fitting A	Fitting B
12420419-001	4720-01-226-3715	39.0 (991)	10-10301447	10-10300147
12420419-002	4720-01-226-3715	37.0 (94)	10-1031447	10-10300147

D-41. CTIS SEAL DRIVER (3256-H-1048)

Used on Front and Rear Axle CTIS Seals.

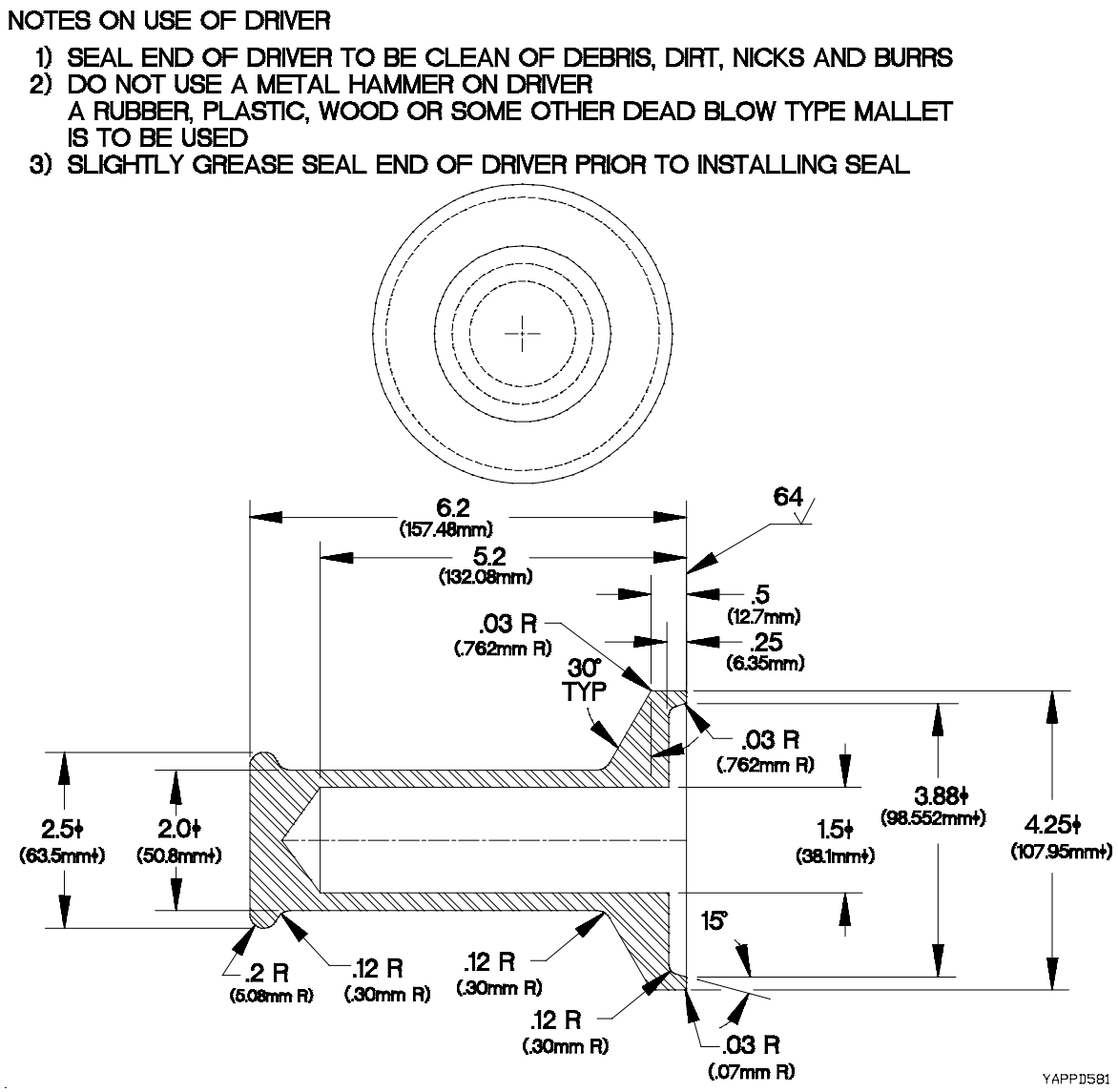


Figure D-51. CTIS Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.
d. Tolerance:
   1 place +/- .06
   angles +/- 2°
   unless otherwise specified.

D-42. FRONT AXLE SHAFT SEAL DRIVER (3256-J-1050)

NOTES ON USE OF DRIVER

1) SEAL END OF DRIVER TO BE CLEAN OF DEBRIS, DIRT, NICKS AND BURRS
2) DO NOT USE A METAL HAMMER ON DRIVER
   A RUBBER, PLASTIC, WOOD OR SOME OTHER DEAD BLOW TYPE MALLET
   IS TO BE USED
3) SLIGHTLY GREASE SEAL END OF DRIVER PRIOR TO INSTALLING SEAL

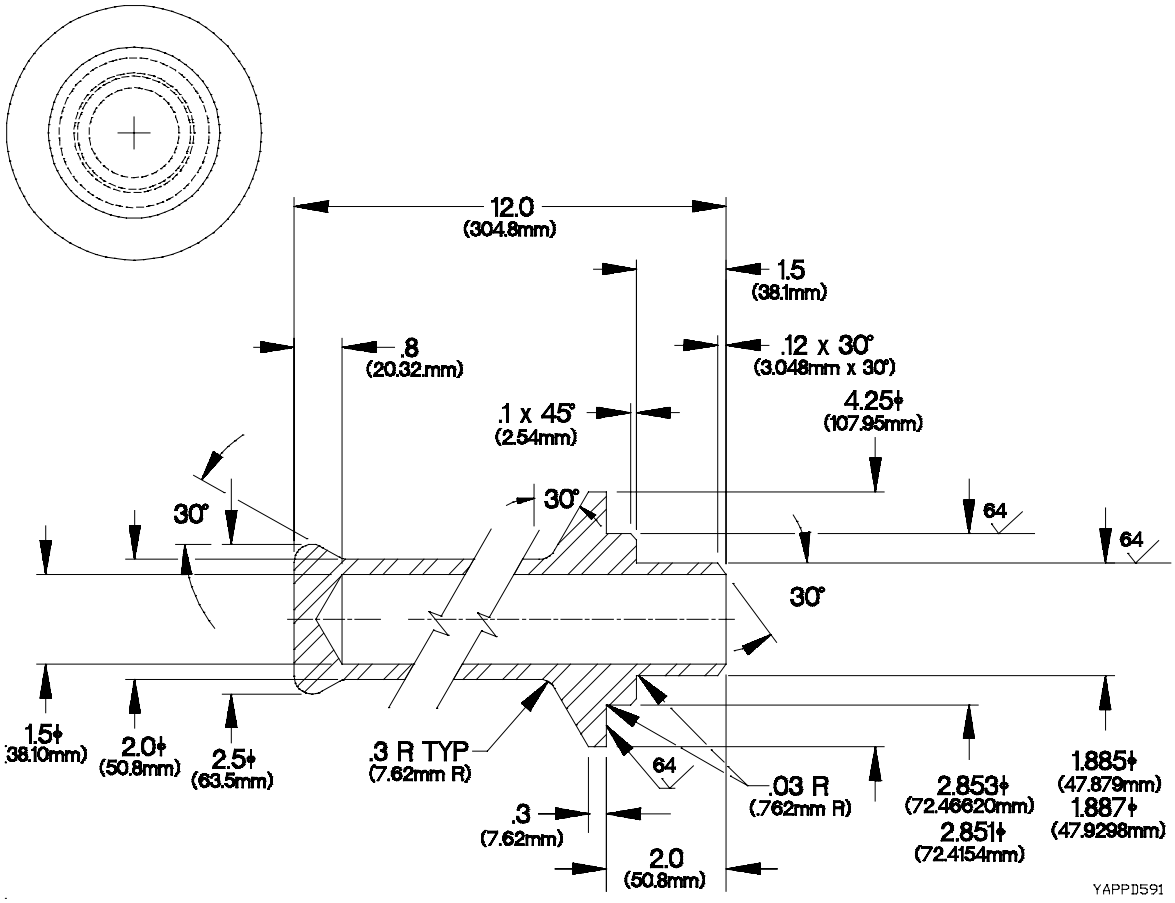


Figure D-52. Front Axle Shaft Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.
d. Tolerance:
   1 place $^{+}$/- .06
   2 place $^{+}$/- .03
   3 place $^{+}$/- .005
   angles $^{+}$/- 2°
   unless otherwise specified.
e. Surface texture: 125 $\sqrt{.}$ unless otherwise specified.

D-43. WHEEL HUB GREASE SEAL DRIVER (3256-K-1051)

NOTES ON USE OF DRIVER

1) SEAL END OF DRIVER TO BE CLEAN OF DEBRIS, DIRT, NICKS AND BURRS
2) DO NOT USE A METAL HAMMER ON DRIVER
   A RUBBER, PLASTIC, WOOD OR SOME OTHER DEAD BLOW TYPE MALLET
   IS TO BE USED
3) SLIGHTLY GREASE SEAL END OF DRIVER PRIOR TO INSTALLING SEAL

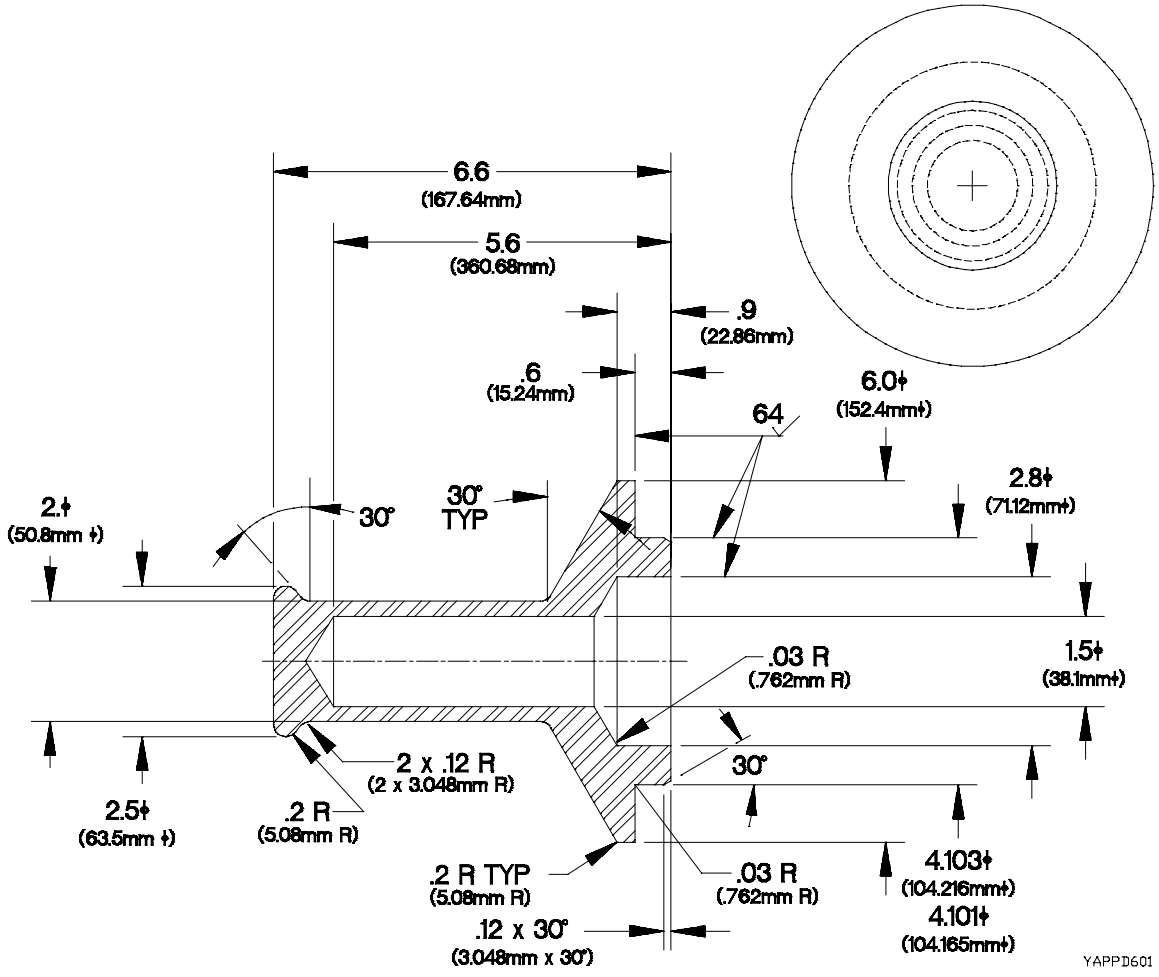


Figure D-53. Wheel Hub Grease Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.
d. Tolerance:
   1 place $^{+}$/- .06
   angles $^{+}$/- 2°
   unless otherwise specified.

D-44. DIFFERENTIAL PINION SEAL DRIVER (3256-M-1053)

Used on Front and Rear Differential Pinion Seals.

NOTES ON USE OF DRIVER

1) SEAL END OF DRIVER TO BE CLEAN OF DEBRIS, DIRT, NICKS AND BURRS
2) DO NOT USE A METAL HAMER ON DRIVER
   A RUBBER, PLASTIC, WOOD OR SOME OTHER DEAD BLOW TYPE MALLET
   IS TO BE USED
3) SLIGHTLY GREASE SEAL END OF DRIVER PRIOR TO INSTALLING SEAL

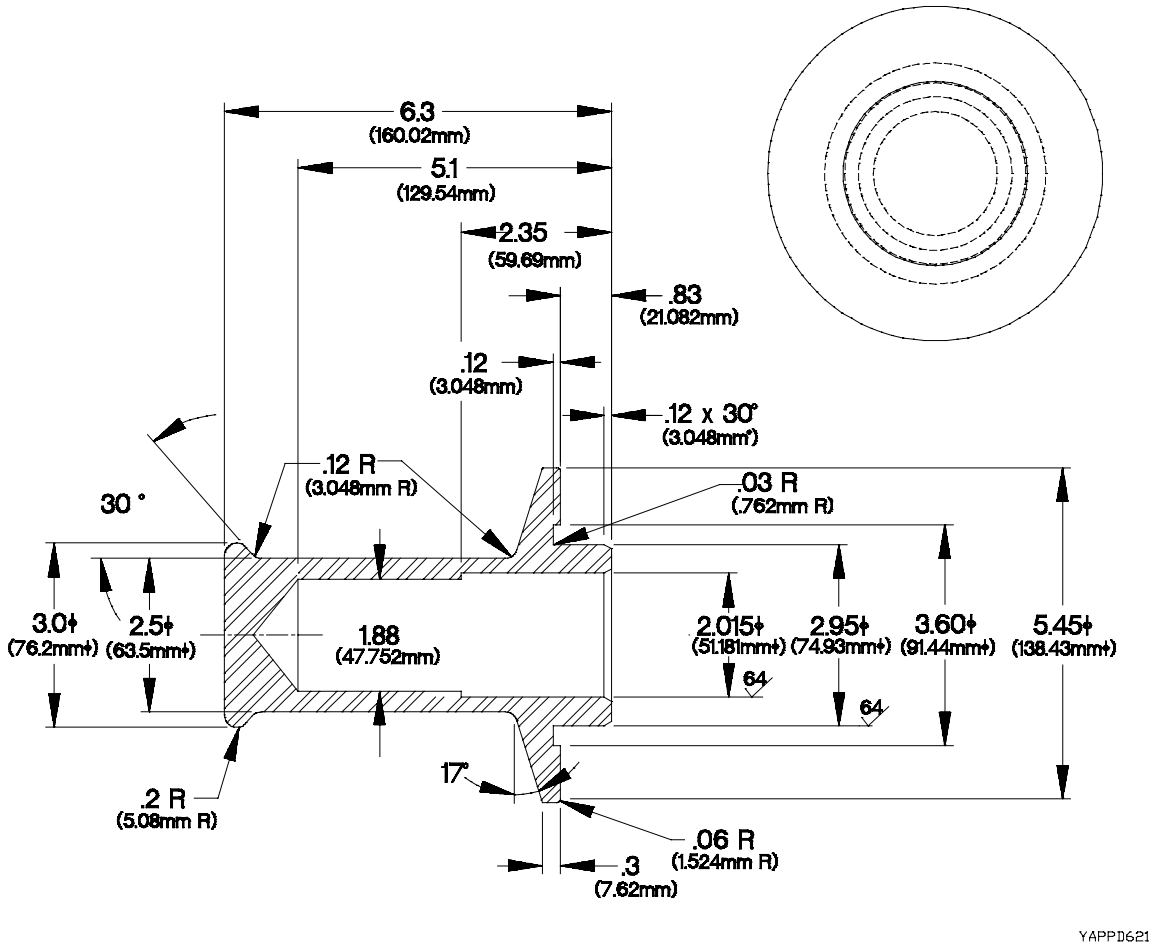


Figure D-54. Differential Pinion Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.
d. Tolerance:
   1 place +/- .06
   2 place +/- .03
   3 place +/- .005
   angles +/- 2° unless otherwise specified.
e. Surface texture: 125 $\sqrt{.}$ unless otherwise specified.

D-45. FRONT AND REAR DIFFERENTIAL YOKE SEAL DRIVER (3256-S-1059)

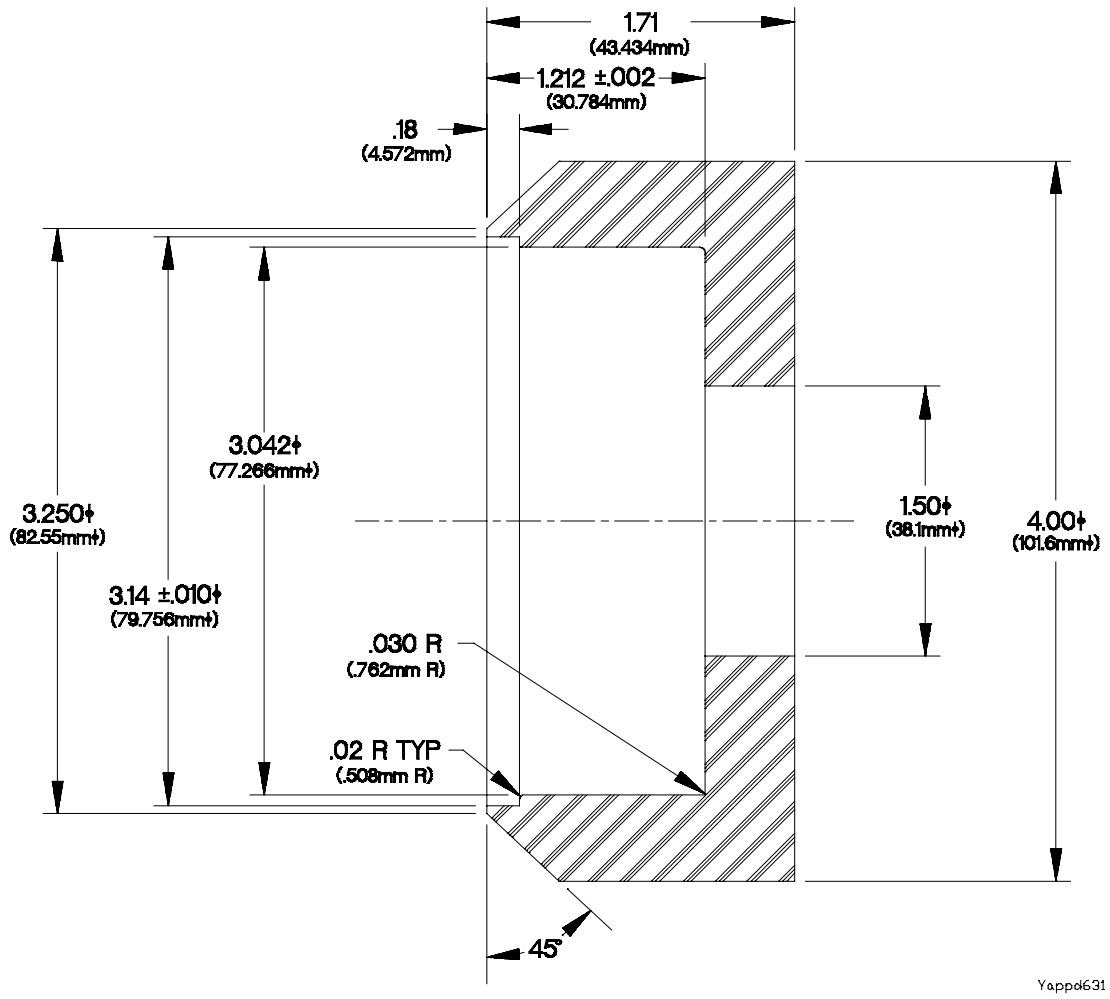


Figure D-55. Front and Rear Differential Yoke Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from hard plastic.
c. De-burr and remove sharp edges.
d. Tolerance:
   1 place +/- .06
   2 place +/- .03
   3 place +/- .015
   angles +/- 2° unless otherwise specified.
e. Surface texture: 125 $\sqrt{.}$ unless otherwise specified.

D-46. DIMMER SWITCH TEST WIRE

Fabricate the dimmer switch test wire according to the following steps. Refer to the following parts list for materials.

Material Description	National Stock Number	Quantity	Cut Length
Wire, Electrical (M168678/14BKE9)	6145-01-229-4134	1	12 in (305 mm)
Pin, Grooved, Headless (12258939-1)	5315-01-156-6314	1	
Contact, Electrical (12258939-2)	5999-01-150-8808	1	

a. Dimensions are in inches (millimeters).
b. Cut a length of electrical wire approximately 12 in. (305 mm) long.
c. Remove approximately 1/4 in. (6 mm) of insulation from each end of electrical wire.
d. Crimp headless grooved pin on one end of electrical wire.
e. Crimp electrical contact on opposite end of electrical wire.

D-47. PURGE VALVE TOOL

Fabricate Purge Valve Tool according to the following instructions. Refer to Figure D-56. Purge Valve Tool for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, ASTM A 108 or A576 Grade 1015-1025, BAR (Ref UNS G10150-G10250). Finish Black Oxide Coat, Class I, IAW MIL-C-13924.	14.0 in. (356 mm)	1

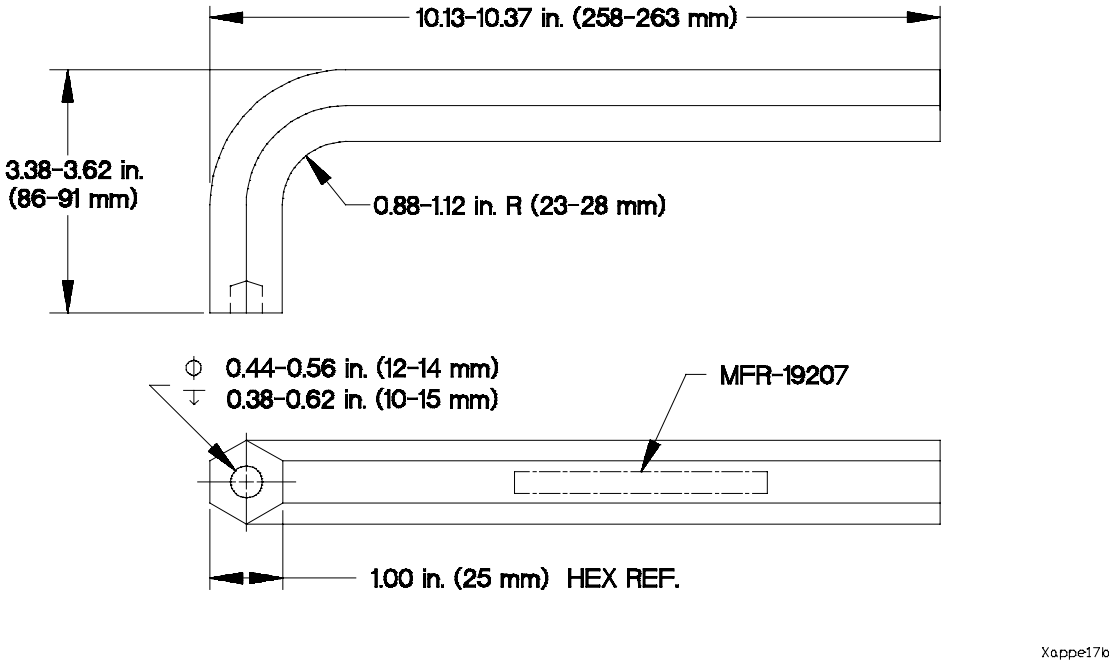


Figure D-56. Purge Valve Tool

a. All dimensions are in inches (cm).
b. Cut steel bar (1) and bend to shape as shown in Figure D-56.
c. Dimensional limits apply after coating.
d. All edges shall be broken and free from burrs.
e. Metal Stamp, electro etch, or engrave with the following marking IAW MIL-STD-130: 19207-12379968 MFR-19207.

D-48. M1079 BLACKOUT SHIELD SEALS

Fabricate the M1079 blackout shield seals according to the following steps. Refer to the following parts list for materials.

Description	Material Part Number	CAGE Code	Cut Length
Blackout Shield Header Seal	942P00001	0SHR6	28-3/4 in. (730 mm)
Blackout Shield Jamb Seal (van body serial numbers 001 through 190)	942P00001	0SHR6	63-3/8 in. (1610 mm)
Blackout Shield Jamb Seal (van body serial number 191 and higher)	942P00001	0SHR6	33 in. (838 mm)

a. Dimensions are in inches (millimeters).
b. Cut seal material to the specified length using a fine-toothed hacksaw or other suitable cutting tool.

D-49. M1079 DOOR GASKETS

Fabricate the M1079 door gaskets according to the following steps. Refer to the following parts list for materials.

Description	Material Part Number	CAGE Code	Cut Length
LH Door Gasket	12416417	19207	214 in. (5435 mm)
RH Door Gasket	12416417	19207	197 in. (5004 mm)

a. Dimensions are in inches (millimeters).
b. Cut seal material to the specified length using a fine-toothed hacksaw or other suitable cutting tool.
c. Glue ends of gasket to each other using adhesive MIL-A-46106 GP1TY1 (Item 11, Appendix D).

D-50. M1079 WINDOW SASH GLAZING SEALS

Fabricate the M1079 window sash glazing seals according to the following steps. Refer to the following parts list for materials.

Description	Material Part Number	CAGE Code	Cut Length
Window Sash Top/Bottom Seal	941P00001	0SHR6	26-13/16 in. (681 mm)
Window Sash Side Seal (van body serial numbers 001 through 190)	941P00001	0SHR6	28-1/2 in. (724 mm)
Window Sash Side Seal (van body serial number 191 and higher)	941P00001	0SHR6	12-11/16 in. (322 mm)

a. Dimensions are in inches (millimeters).
b. Cut seal material to the specified length using a fine-toothed hacksaw or other suitable cutting tool.

NOTE

Cut miters so that short side of seal faces toward glass.

c. Cut 45-degree miters on ends of window sash seals.

D-51. BLOCK SEAL 12420489 FABRICATION

Make block seal from P/N (0VXY8) STN2.38X.5. Use a suitable cutting tool to cut seal to 0.52 inch (1.3 cm) long.

APPENDIX E
TORQUE LIMITS

E-1. GENERAL

This appendix provides general torque limits for screws and nuts used on the vehicle. Special torque limits are shown in the maintenance procedures for applicable components. Use the general torque limit given in this appendix when specific torque limits are not given in the maintenance procedure. These general torque limits can not be applied to screws that retain rubber components. The rubber components will be damaged before the torque limit is reached. If a special torque limit is not given in the maintenance instructions for a fastener which retains a rubber component, tighten the screw or nut until it touches metal, then tighten one more turn. Whenever possible, the tightening force (torque) should be applied to the nut side of the fastener group.

E-2. TORQUE LIMITS

Refer to **Table E-1. Torque Limits for SAE and ANSI Fasteners** for torque limits on standard (SAE and ANSI) screws and free spinning nuts. Refer to **Table E-2. Torque Limits for SAE and ANSI Prevailing Torque Nuts** for torque limits on standard (SAE and ANSI) self-locking nuts. Refer to **Table E-3. Torque Limits for Metric Screws and Free Spinning Nuts** for torque limits on metric screws and free spinning nuts. Refer to **Table E-4. Torque Limits for Metric Prevailing Torque Nuts** for torque limits on metric self-locking nuts.

E-3. USE OF TORQUE TABLES

(1) Measure the diameter of the screw to be installed.

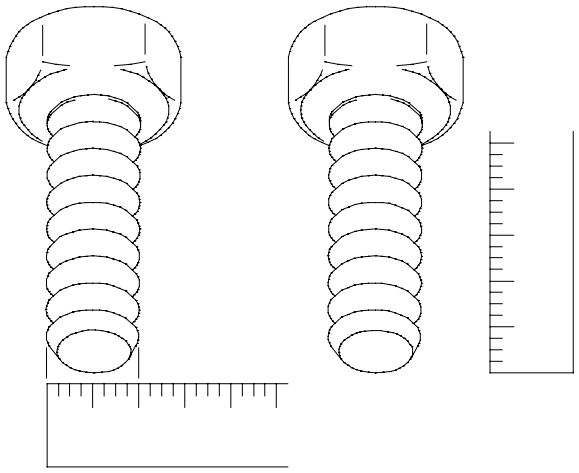
(2) Count the number of threads per inch.

(3) Under the heading DIAMETER look down the column until the diameter of the screw is found. (There are usually two lines beginning with the same diameter.)

(4) Under the heading THREADS PER INCH (SAE and ANSI) or THREAD PITCH (metric), find the number of threads per inch that matches the number counted in step (2).

(5) To find the grade of the screw, match the markings on the head to the correct picture under CAPSCREW HEAD MARKINGS on the torque table.

(6) Look down the column under the picture found in step (5) until the torque limit (lb-ft or N·m) for the diameter and threads per inch (or thread pitch, in the case of metric fasteners) of the screw are located.



YAPPE011

APPENDIX E
TORQUE LIMITS

Table E-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts

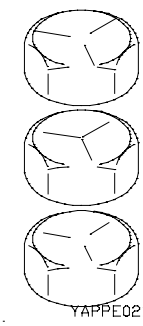
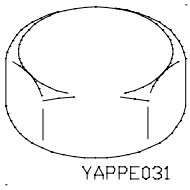
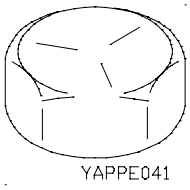
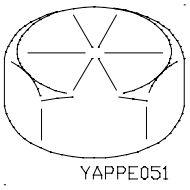
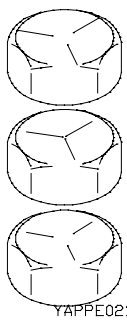
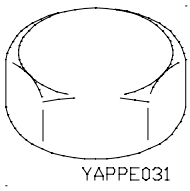
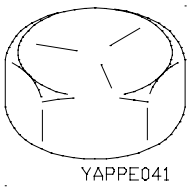
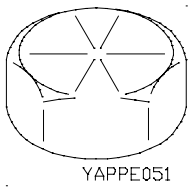
 YAPPE021 **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.**		**Material Grade Markings**					
		 YAPPE031 **SAE Grade 2**		 YAPPE041 **SAE Grade 5**		 YAPPE051 **SAE Grade 8**	
Diameter	**Threads per inch**	**Torque**					
inch		**lb-ft**	**N·m**	**lb-ft**	**N·m**	**lb-ft**	**N·m**
1/4	20	3-5	5-7	5-7	8-10	8-10	10-14
1/4	28	4-6	5-7	6-8	9-11	8-12	12-16
1/4	32	4-6	5-7	7-9	9-11	9-13	12-16
5/16	18	7-9	9-13	11-15	15-21	15-21	21-29
5/16	24	8-10	11-15	12-16	17-23	17-23	24-32
5/16	32	9-11	12-16	14-18	18-24	19-25	27-34
3/8	16	13-17	17-23	20-26	27-35	28-38	38-50
3/8	24	15-19	20-26	22-30	31-41	32-42	43-57
3/8	32	15-21	21-27	24-32	33-43	33-45	55-61
7/16	14	20-28	28-38	32-42	43-57	44-60	61-81
7/16	20	23-31	31-41	35-47	48-64	49-67	68-90
7/16	28	25-33	33-45	37-51	51-69	54-72	73-97
1/2	13	32-42	43-57	49-65	66-88	68-92	93-123
1/2	20	35-47	48-64	55-73	74-98	77-103	105-139
1/2	28	38-50	51-67	58-78	79-105	82-110	111-149
9/16	12	55-61	62-82	70-94	95-127	98-132	134-178
9/16	18	50-68	69-91	78-104	105-141	109-147	149-199
9/16	24	53-71	72-96	82-110	111-149	115-155	158-210
5/8	11	62-84	85-113	95-129	131-175	136-182	184-246
5/8	18	70-94	96-128	108-146	148-198	154-206	209-279
5/8	24	73-99	100-134	114-154	155-207	161-217	219-293

Table E-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)

 YAPPE021 Manufacturer's marks may vary. These are all SAE Grade 5		Material Grade Markings					
		 YAPPE031 SAE Grade 2		 YAPPE041 SAE Grade 5		 YAPPE051 SAE Grade 8	
Diameter	Threads per inch	Torque					
inch		lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
11/16	24	99-133	135-181	153-207	209-279	217-291	296-394
3/4	10	110-148	150-200	171-229	232-310	240-324	328-438
3/4	16	123-165	168-224	190-256	259-345	269-361	366-488
3/4	20	127-171	174-232	197-265	268-358	278-374	379-505
13/16	20			252-340	345-459	357-481	487-649
7/8	9			275-369	374-498	387-521	528-704
7/8	14			303-407	413-551	427-575	583-777
7/8	20			319-429	435-579	450-606	614-818
15/16	20			395-531	538-718	558-750	760-1014
1	8			411-553	560-748	581-781	792-1056
1	12			450-606	614-818	636-856	867-1155
1	20			483-649	658-878	681-917	929-1239
1-1/16	18			576-776	782-1044	813-1095	1109-1479
1-1/8	7			507-683	693-923	824-1108	1123-1497
1-1/8	12			570-766	776-1034	923-1241	1258-1678
1-1/8	18			600-806	817-1089	971-1307	1324-1766
1-3/16	18			709-953	966-1288	1149-1545	1566-2088
1-1/4	7			716-964	976-1302	1161-1563	1584-2112
1-1/4	12			793-1067	1081-1441	1286-1730	1754-2338
1-1/4	18			831-1117	1132-1510	1346-1812	1835-2447
1-5/16	18			965-1299	1316-1754	1565-2105	2134-2846
1-3/8	6			939-1263	1281-1707	1523-2049	2076-2768

APPENDIX E
TORQUE LIMITS

Table E-2. Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts

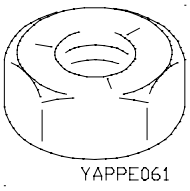
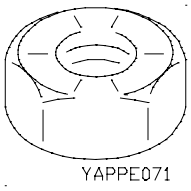
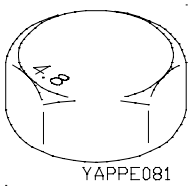
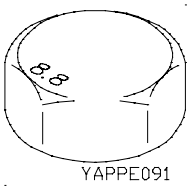
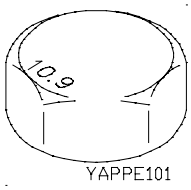
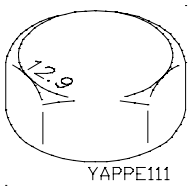
		Material Grade Markings			
		 YAPPE061		 YAPPE071	
		SAE Grade 5		SAE Grade 8	
Hole Diameter	Threads per inch	Torque			
inch		lb-ft	N·m	lb-ft	N·m
1/4	20	10-12	14-16	15-17	20-24
1/4	28	12-14	16-18	14-18	21-25
5/16	18	20-24	27-33	26-32	36-44
5/16	24	22-26	30-36	29-35	40-48
3/8	16	35-41	47-55	48-58	65-77
3/8	24	38-46	53-63	53-63	72-86
7/16	14	55-65	74-88	75-91	103-123
7/16	20	60-70	81-97	80-98	110-132
1/2	13	86-102	116-138	113-137	154-184
1/2	20	92-110	125-149	127-153	177-207
9/16	12	120-144	162-194	168-202	229-273
9/16	18	135-161	183-219	179-217	244-294
5/8	11	165-199	226-270	226-272	306-368
5/8	18	181-219	246-296	244-296	331-401
3/4	10	296-354	402-480	395-479	538-648
3/4	16	310-376	422-508	424-516	576-698
7/8	9	460-554	625-749	612-746	833-1009
7/8	14	503-607	684-822	652-800	888-1082
1	8	686-828	933-1121	941-1141	1280-1544

Table E-3. Dry Torque Limits for Metric Screws and Free Spinning Nuts

		Material Grade Markings							
		 Metric Grade 4.8		 Metric Grade 8.8		 Metric Grade 10.9		 Metric Grade 12.9	
Diameter	Thread Pitch	Torque							
mm		lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
6	1	3	4-5	5-7	7-9	7-9	10-13	8-11	11-15
8	1.25	7-9	9-11	13-17	17-23	17-23	23-31	21-27	27-37
8	1	7-9	9-13	14-18	18-24	19-25	25-33	21-29	29-39
10	1.5	13-17	17-23	25-33	33-45	34-46	46-62	40-54	54-72
10	1.25	14-18	18-24	26-34	35-47	36-48	49-65	42-56	57-77
10	0.75	15-19	21-27	29-39	39-53	40-54	54-72	47-63	63-85
12	1.75	22-30	30-40	43-57	58-78	60-80	81-107	69-93	94-126
12	1.5	23-31	32-42	46-60	61-81	63-83	85-113	73-97	99-131
12	1.25	24-32	33-45	47-63	65-85	65-87	88-118	76-102	104-138
12	1	26-34	34-46	49-65	67-89	68-90	93-123	80-106	108-144
14	2	36-48	48-74	69-91	93-125	95-127	129-173	112-148	151-201
14	1.5	39-51	52-70	75-99	99-135	103-137	140-186	120-160	163-217
15	1	51-69	69-93	100-132	135-179	137-183	187-249	160-214	218-290
16	2	55-73	75-99	107-143	145-193	148-198	201-267	173-231	235-313
16	1.5	59-79	80-106	114-152	155-207	158-210	214-286	184-246	250-334
18	1.5			166-222	225-301	230-306	311-415	268-358	364-486
20	2.5			209-279	283-377	289-385	392-522	338-450	458-610
20	1.5			232-308	315-419	321-427	435-579	375-499	508-678
20	1			244-324	330-440	337-449	457-609	394-524	534-712
22	2.5			285-379	387-515	394-524	534-712	461-613	624-832
22	1.5			313-417	424-566	432-576	586-782	664-884	900-1200
24	3			361-481	489-653	499-665	677-903	584-778	791-1055
24	2			394-524	534-712	545-725	738-984	725-965	982-1310
25	1.5			467-621	633-843	645-859	875-1167	754-1004	1023-1363

APPENDIX E
TORQUE LIMITS

Table E-4. Dry Torque Limits for Metric Prevailing Torque Nuts

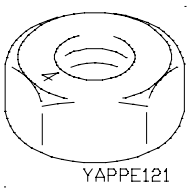
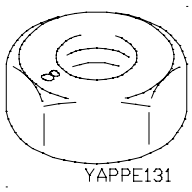
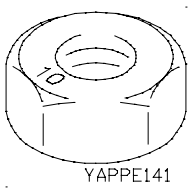
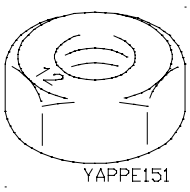
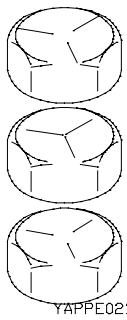
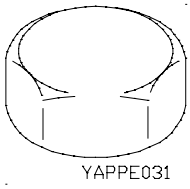
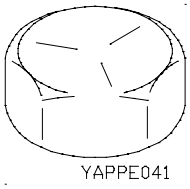
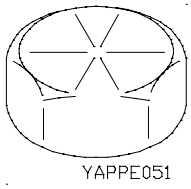
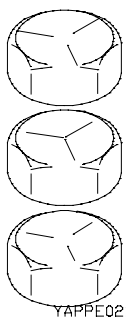
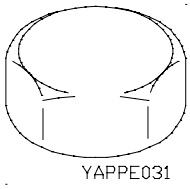
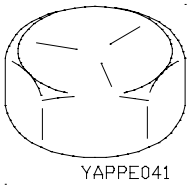
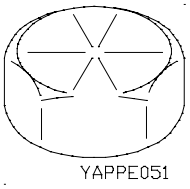
		Material Grade Markings							
		 Metric Grade 4.8		 Metric Grade 8.8		 Metric Grade 10.9		 Metric Grade 12.9	
Diameter	Thread Pitch	Torque							
mm		lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
6	1	5-6	7-8	7-9	10-12	10-12	14-17	11-14	15-19
8	1.25	12-14	16-18	18-22	24-30	24-30	32-40	27-33	36-46
8	1	12-14	16-20	19-23	25-31	25-31	34-42	28-36	38-48
10	1.5	21-25	28-34	33-41	44-56	44-56	60-76	50-64	68-86
10	1.25	21-25	29-35	34-42	46-58	46-58	63-79	53-67	71-91
10	0.75	23-27	31-37	37-47	49-63	50-64	68-86	57-73	77-99
12	1.75	33-41	46-56	55-69	74-94	75-95	102-128	85-109	115-147
12	1.5	35-43	47-57	56-72	77-97	78-98	106-134	89-113	120-152
12	1.25	36-44	48-60	58-74	79-101	81-103	109-139	91-117	125-159
12	1	37-45	50-62	61-77	82-104	84-106	114-144	95-121	129-165
14	2	53-65	72-88	87-109	117-149	118-150	160-204	134-172	182-232
14	1.5	57-69	76-94	92-116	125-159	126-160	171-217	143-183	194-248
16	2	79-97	107-131	130-166	177-225	178-228	243-309	204-262	277-355
16	1.5	82-102	112-138	138-176	187-239	189-241	256-328	215-277	292-376
18	1.5			197-253	267-343	271-347	367-471	309-399	420-542
20	2.5			248-318	337-431	342-438	464-594	391-503	530-682
20	1.5			271-349	369-473	374-480	507-651	428-552	580-750
20	1			283-365	384-494	390-502	529-681	447-577	606-784
22	2.5			335-429	455-583	460-592	624-802	526-680	714-922
22	1.5			363-467	492-634	499-643	676-872	730-950	990-1290
24	3			420-540	569-733	577-743	783-1009	662-856	897-1161
24	2			453-583	614-792	622-804	844-1090	803-1043	1088-1416

Table E-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts

 YAPPE021 **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.**		**Material Grade Markings**					
		 YAPPE031 **SAE Grade 2**		 YAPPE041 **SAE Grade 5**		 YAPPE051 **SAE Grade 8**	
Diameter	**Threads per inch**	**Torque**					
inch		**lb-ft**	**N·m**	**lb-ft**	**N·m**	**lb-ft**	**N·m**
1/4	20	4	6	6	8	9	12
1/4	28	5	7	7	9	10	14
5/16	18	8	11	13	18	18	24
5/16	24	9	12	14	19	20	27
3/8	16	15	20	23	31	35	47
3/8	24	17	23	25	34	35	47
7/16	14	24	33	35	47	55	75
7/16	20	25	34	40	54	60	81
1/2	13	35	47	55	75	80	108
1/2	20	40	54	65	88	90	122
9/16	12	50	68	80	108	110	149
9/16	18	55	75	90	122	130	176
5/8	11	70	95	110	149	170	231
5/8	18	80	108	130	176	180	244
3/4	10	120	163	200	271	280	380
3/4	16	140	190	220	298	320	434
7/8	9	110	149	300	407	460	624
7/8	14	120	163	320	434	500	678
1	8	160	217	440	597	680	922
1	12	170	231	480	651	740	1003
1-1/8	7	220	298	600	814	960	1302
1-1/8	12	260	353	660	895	1080	1464

APPENDIX E
TORQUE LIMITS

Table E-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)

 YAPPE021 Manufacturer's marks may vary. These are all SAE Grade 5		Material Grade Markings					
		 YAPPE031 SAE Grade 2		 YAPPE041 SAE Grade 5		 YAPPE051 SAE Grade 8	
Diameter	**Threads per inch**	**Torque**					
inch		**lb-ft**	**N·m**	**lb-ft**	**N·m**	**lb-ft**	**N·m**
1-1/4	7	320	434	840	1139	1360	1844
1-1/4	12	360	488	920	1248	1500	2034
1-3/8	6	420	570	1100	1492	1780	2414
1-3/8	12	460	624	1260	1709	2040	2766

APPENDIX F
MANDATORY REPLACEMENT PARTS

Section I. INTRODUCTION

F-1. SCOPE

This appendix lists mandatory replacement parts you will need to maintain the LMTV vehicle.

F-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to each entry in the listing and is referenced in the Initial Setup of the applicable task under Materials/Parts.

b. Column (2) - Nomenclature. Name or identification of the part.

c. Column (3) - Part Number. The manufacturer's part number.

d. Column (4) - National Stock Number. The National stock number of the part.

Section II. MANDATORY REPLACEMENT PARTS LIST

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
1	BEARING, WASHER, THRUST	1225K-1259	3120-01-362-4365
2	BOLT	12414307-079	5306-01-381-9941
3	BOLT	12414307-080	5306-01-381-9928
4	BOLT	12414307-138	5306-01-372-0786
5	BOLT	12414307-140	5306-01-372-3536
6	BOLT	12414307-141	5306-01-371-7161
7	BOLT	12414307-142	5306-01-372-3537
8	BOLT	12414307-143	5306-01-372-0787
9	BOLT	12414307-145	5306-01-386-3966
10	BOLT	12414307-147	5306-01-377-0750
11	BOLT	12414307-149	5306-01-384-3485
12	BOLT	12421697-001	
13	BOLT	12421697-002	
14	BOLT	12421697-003	
15	BOLT	12421697-004	

MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
15.1	BOLT, U	12417904-002	5306-01-371-3099
15.2	BOOT	225313 (35510)	
16	BRACKET	3280-M-9243	
17	BRUSH SET	5702711	3120-00-089-2707
18	BRUSH SET, ELECTRICAL CONTACT	71035	5977-00-758-9555
19	BUSHING, BLANK	4001-40690-01	5365-01-331-9503
20	BUSHING, NON-METALLIC	12418159	5365-01-371-9556
20.1	BUSHING, SLEEVE	Z082095780	3120-01-306-9870
21	BUSHING, SLEEVE	12418155	3120-01-371-7961
22	BUSHING, SLEEVE	12419961	3120-01-420-8269
22.1	BUSHING, SLEEVE	71059	3120-00-064-1723
22.2	BUSHING, SLEEVE	73644	3120-00-111-3711
23	BUSHING, SLEEVE	N9405	3120-01-362-5055
24	EXCLUDER	4R9999	
25	FILTER ELEMENT	29502194	2940-01-360-7986
26	GASKET	28239	5330-01-300-1216
27	GASKET	350903	5330-00-576-4626
28	GASKET	6776456	5330-01-329-9093
29	GASKET	12420037	5330-01-394-2410
30	GASKET	12420056	5330-01-394-2411
31	GASKET	23042433	5330-01-360-7516
32	GASKET	23048037	5330-01-360-7520
33	GASKET	29501144	5330-01-407-1644
34	GASKET	29503185	5330-01-360-7518
35	GASKET	29503263	5330-01-360-9034
36	GASKET	29503283	5330-01-360-9035
37	GASKET	29503288	5330-01-361-0274
38	GASKET	29534357	5330-01-360-7521
39	GASKET	29506210	5330-01-360-9036
40	GASKET	29506211	5330-01-360-7519
41	GASKET	29506212	5330-01-360-9038

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
42	GASKET	29506213	5330-01-360-9039
43	GASKET	29506323	5330-01-360-5262
44	GASKET	29506352	5330-01-360-9037
45	GASKET	113-6200	5330-01-361-1458
46	GASKET	113-6250	5330-01-360-5933
47	GASKET	115-4202	5330-01-360-5939
48	GASKET	1S7057	5330-00-105-0339
49	GASKET	22-P-53	5330-01-043-5832
50	GASKET	35P-74	5330-01-381-2357
51	GASKET	3N4087	5330-01-061-8003
52	GASKET	4P1623	5330-01-360-5932
53	GASKET	4P6930	5330-01-360-7172
54	GASKET	6D1004	5330-01-059-9593
55	GASKET	7C0358	5330-01-360-5936
56	GASKET	7C1160	5330-01-360-5937
57	GASKET	7C7431	5330-01-360-5940
58	GASKET	7E0844	5330-01-360-5492
59	GASKET	7E9817	5330-01-360-5938
60	GASKET	7W2398	5330-01-360-5935
61	GASKET	7W5340	5330-01-360-7173
62	GASKET	7W6552	5330-01-360-5929
63	GASKET	7W9699	5330-01-360-5928
64	GASKET	9Y4634	5330-01-360-5930
65	INSULATION PANEL	12418384-001	2510-01-377-4333
66	INSULATION PANEL	12418384-004	
67	INSULATION PANEL	12418384-005	
68	INSULATION PANEL	12418384-006	
69	INSULATION PANEL	12418384-007	
70	INSULATION PANEL	12418384-008	
71	INSULATION SLEEVING, ELECTRICAL	313H232-6-250	5970-01-373-5692
72	INSULATION SLEEVING, ELECTRICAL	313H243-6-250	5970-01-373-5690
73	INSULATION SLEEVING, ELECTRICAL	313H253-6-250	5970-01-373-5691

MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
74	INSULATION SLEEVING, ELECTRICAL	313H274-6-250	5970-01-374-0823
75	INSULATION SLEEVING, ELECTRICAL	313H285-6-250	5970-01-374-0822
76	INSULATION SLEEVING, ELECTRICAL	333H263-6-250	5970-01-374-0339
77	INSULATION SLEEVING, ELECTRICAL	333H274-6-250	5970-01-387-7008
78	INSULATION SLEEVING, ELECTRICAL	333H285-6-250	5970-01-387-7193
79	INSULATION SLEEVING, ELECTRICAL	EPS-3003/4B	5970-01-379-7195
80	INSULATION SLEEVING, ELECTRICAL	M23053/4-302-0	5970-01-161-6796
81	INSULATION SLEEVING, ELECTRICAL	M23053/4-304-0	5970-01-163-1103
82	INSULATION SLEEVING, ELECTRICAL	M23053/4-305-0	5970-01-210-3272
83	INSULATION SLEEVING, ELECTRICAL	M23053/5-210-C	5970-00-990-9911
84	INSULATION SLEEVING, ELECTRICAL	M23053/5-303-9	5970-01-312-5497
85	KEY, WOODRUFF	N9040	5315-01-166-2355
85.1	KIT, REPAIR	1033-05432-02	
86	KIT, SEAL	9638	5330-01-344-2573
87	LOCKNUT, TUBE FITTING	9X6620	4730-01-360-4179
88	LOCKWASHER	152.269	5310-00-189-8468
89	LOCKWASHER	152.544	5310-01-395-0823
90	LOCKWASHER	152.552	5310-01-308-8205
91	LOCKWASHER	1388	5310-01-162-5737
92	LOCKWASHER	1395	5310-00-194-9209
93	LOCKWASHER	1495	5310-01-161-2527
94	LOCKWASHER	2434	5310-00-775-5139
95	LOCKWASHER	10241	5310-01-416-3010
96	LOCKWASHER	12414560-017	5310-01-395-0820
97	LOCKWASHER	12414560-018	5310-01-381-3281
97.1	LOCKWASHER	12414560-019	5310-01-369-6074
97.2	LOCKWASHER	12414570-019	5310-01-470-2362
98	LOCKWASHER	3059-00870-03	5310-00-397-4524
99	LOCKWASHER	6V5839	5310-01-360-0983
100	LOCKWASHER	9B7233	5310-00-559-0070
101	LOCKWASHER	D70336/1-20	5310-01-110-7933
102	LOCKWASHER	MS35335-38	5310-00-616-6354

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
103	LOCKWASHER	MS35335-62	5310-00-184-9562
104	LOCKWASHER	MS35338-48	5310-00-003-4094
105	LOCKWASHER	MS35335-61	5310-00-527-3634
106	LOCKWASHER	N9015	5310-01-046-0186
107	LOCKWASHER	N9018	5310-01-032-4827
108	LOCKWASHER	N9265	5310-01-136-4888
109	LOCKWASHER	N9459	5310-01-348-8393
109.1	LOCKWASHER	Z093078423	5310-01-145-4355
110	LOCKWASHER	2523	5310-00-775-5182
111	LOCKWASHER	12414560-029	5310-01-395-0817
112	LOCKWASHER	N9461	5310-01-348-8392
113	LOCKWASHER	N9574	
114	LOCKWASHER	Z0930-78423	5310-01-120-6997
115	MOUNT, RESILIENT	12414590	5340-01-374-0501
116	NUT, CLINCH	ALS3-470-2.0	5310-01-384-7280
117	NUT, CLINCH	ALS3-610-4.2	5310-01-368-8065
118	NUT, PLAIN, HEX	12414474-011	5310-01-363-4879
119	NUT, PLAIN, HEX	12414474-018	5310-01-376-0488
120	NUT, PLAIN, HEX	12414474-010	5310-01-370-7447
121	NUT, PLAIN, HEX	0770-023-003	5310-01-423-3725
122	NUT, SELF-LOCKING	11649930	5310-01-390-5105
123	NUT, SELF-LOCKING	11649930	5310-00-402-5220
123.1	NUT, SELF LOCKING	12411174-008	
124	NUT, SELF-LOCKING	12418084	5310-01-371-8419
125	NUT, SELF-LOCKING	29507834	5310-01-359-8789
126	NUT, SELF-LOCKING	12414308-002	5310-01-381-9819
127	NUT, SELF-LOCKING	12414308-004	5310-01-369-5703
128	NUT, SELF-LOCKING	12414308-007	5310-01-369-6073
129	NUT, SELF-LOCKING	12414308-016	5310-01-381-9945
130	NUT, SELF-LOCKING	12414308-017	5310-01-381-9830
131	NUT, SELF-LOCKING	12414308-018	5310-01-369-3337

MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
135	NUT, SELF-LOCKING	12414308-027	5310-01-369-3339
135.1	NUT, SELF-LOCKING	12414315-004	5310-01-342-2739
136	NUT, SELF-LOCKING	12414315-006	5310-01-369-3332
137	NUT, SELF-LOCKING	12414315-009	5310-01-365-7236
138	NUT, SELF-LOCKING	12414315-011	5310-01-368-8667
139	NUT, SELF-LOCKING	12414315-012	5310-01-369-3331
140	NUT, SELF-LOCKING	12414315-017	5310-01-368-8065
141	NUT, SELF-LOCKING	12414315-020	5310-01-372-6337
142	NUT, SELF-LOCKING	12414315-021	5310-01-434-3778
143	NUT, SELF-LOCKING	3029-01371-01	5310-01-194-0481
144	NUT, SELF-LOCKING	40-X-1241	5310-01-391-5249
145	NUT, SELF-LOCKING	DIN 934 ST M6	5310-01-342-2739
146	NUT, SELF-LOCKING	MS20500-524	5310-00-208-4023
147	NUT, SELF-LOCKING	MS21083N6	5310-00-926-1852
148	NUT, SELF-LOCKING	MS51943-52	5310-00-241-6666
149	NUT, SELF-LOCKING	N9091	5310-01-050-5005
150	NUT, SELF-LOCKING	N9099	5310-01-165-1312
151	NUT, SELF-LOCKING	N9406	5310-01-362-6171
152	NUT, SELF-LOCKING	N9410	5310-01-348-8398
153	NUT, SELF-LOCKING	N9416	5310-01-348-8360
154	NUT, SELF-LOCKING	N9467	5310-01-350-4257
155	NUT, SELF-LOCKING	N9556	5310-01-423-0880
155.1	PACKING, PREFORMED	F4001-16	5331-01-466-0354
155.2	PACKING, PREFORMED	J515-16-3	5331-01-465-3634
155.3	PACKING, PREFORMED	XA-2265	5331-01-459-5254
156	PACKING, PREFORMED	9612	5330-01-357-0846
157	PACKING, PREFORMED	9972	5330-01-359-2151
158	PACKING, PREFORMED	11446	5330-00-996-3989
159	PACKING, PREFORMED	14121	5330-01-400-1864
160	PACKING, PREFORMED	197755	5330-01-415-9632

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
160.1	PACKING, PREFORMED	225163 (35510)	
161	PACKING, PREFORMED	71041	5330-00-633-6827
162	PACKING, PREFORMED	74980	5330-00-838-6729
163	PACKING, PREFORMED	250192	5330-00-510-3255
164	PACKING, PREFORMED	251216	5330-01-417-5170
165	PACKING, PREFORMED	251217	5330-01-417-5104
166	PACKING, PREFORMED	251391	
167	PACKING, PREFORMED	420828	5340-01-417-3788
168	PACKING, PREFORMED	23014057	5330-01-360-6016
169	PACKING, PREFORMED	23019664	5330-01-361-0235
170	PACKING, PREFORMED	23043446	5330-01-424-6629
171	PACKING, PREFORMED	23046274	5330-01-360-6018
172	PACKING, PREFORMED	29500969	5330-01-360-7852
173	PACKING, PREFORMED	29501439	5330-01-388-1528
174	PACKING, PREFORMED	29503380	5330-01-360-6014
175	PACKING, PREFORMED	29503381	5330-01-360-6015
176	PACKING, PREFORMED	29503382	5330-01-360-6013
177	PACKING, PREFORMED	29503383	5330-01-360-6017
178	PACKING, PREFORMED	29507700	5330-01-424-4552
179	PACKING, PREFORMED	114-8718	5330-01-348-2720
180	PACKING, PREFORMED	125-8274	5330-01-360-6012
181	PACKING, PREFORMED	1J9671	5330-00-613-6500
182	PACKING, PREFORMED	1T1068	5330-01-336-8776
183	PACKING, PREFORMED	22-P-92	5330-01-361-6962
184	PACKING, PREFORMED	28-P-120	5330-00-832-9514
185	PACKING, PREFORMED	28-P-121	5330-01-064-6284
186	PACKING, PREFORMED	28-P-190	
187	PACKING, PREFORMED	28-P-191	5330-01-361-6959
188	PACKING, PREFORMED	2M9780	5330-00-939-0687
189	PACKING, PREFORMED	3-906-N522-90	5330-01-104-1093
190	PACKING, PREFORMED	3J1907	5330-01-333-6444

MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
191	PACKING, PREFORMED	3J7354	5330-00-952-8008
192	PACKING, PREFORMED	3K0360	5330-00-948-6482
193	PACKING, PREFORMED	3P1156	5330-00-385-7587
194	PACKING, PREFORMED	4F7391	5330-00-562-1073
195	PACKING, PREFORMED	4F9029	5330-00-118-6559
196	PACKING, PREFORMED	4F9653	5330-00-038-4327
197	PACKING, PREFORMED	4J5477	5330-00-885-8059
198	PACKING, PREFORMED	5F9657	5330-00-291-9572
199	PACKING, PREFORMED	6F6673	5330-00-865-0404
200	PACKING, PREFORMED	8L2786	5330-00-973-8301
201	PACKING, PREFORMED	8M4445	5330-00-914-5821
202	PACKING, PREFORMED	9002-00491-68	5330-01-393-5630
203	PACKING, PREFORMED	9002-00741-58	5330-01-195-1500
203.1	PACKING, PREFORMED	9730	
204	PACKING, PREFORMED	Z053-074979	5330-00-579-6495
205	PACKING, PREFORMED	M83248-2-908	5330-00-167-5173
206	PACKING, PREFORMED	M83248/1-906	5330-00-020-0186
207	PACKING, PREFORMED	M83461/1-438	5330-01-160-4337
208	PACKING, PREFORMED	M83461/1-442	5330-01-183-0987
209	PACKING, PREFORMED	MS28778-12	5330-01-251-8839
210	PACKING, PREFORMED	MS28778-16	5330-00-804-5694
211	PACKING, PREFORMED	MS28778-20	5330-01-816-3546
212	PACKING, PREFORMED	MS28778-4	5330-00-805-2966
213	PACKING, PREFORMED	MS28778-6	5330-00-804-5695
214	PACKING, PREFORMED	MS9770-116	5330-01-388-4084
215	PACKING, PREFORMED	Z053-074979	5330-00-579-6495
215.1	PACKING, PREFORMED	Z053095777	5331-01-304-3453
216	PACKING, RETAINER	23049377	5330-01-361-9052
217	PACKING, RETAINER	29503208	5330-01-361-9785
218	PANEL, DEFROSTER	12420495-004	

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
219	PARTS KIT, DISC AND SPRING	94012	2530-01-344-5748
220	PARTS KIT, ENGINE FUEL PUMP	5R9065	2910-01-363-6816
221	PARTS KIT, SEAL REPLACEMENT	9403	5330-01-344-2572
222	PARTS KIT, SEAL REPLACEMENT	23042434	5330-01-360-5459
223	PARTS KIT, SEAL REPLACEMENT	29503974	5330-01-388-1576
224	PARTS KIT, WINCH	9402	2590-01-374-2510
225	PIN, COTTER	1199R2176	5315-00-880-6027
226	PIN, COTTER	K-2412-Z	5315-01-179-9882
226.1	PIN, COTTER	MS24665-385	5315-00-187-9382
227	PIN, COTTER	MS24665-423	5315-00-013-7228
228	PIN, COTTER	MS24665-457	5315-00-187-9393
229	PIN, COTTER	MS24665-459	5315-00-187-9394
230	PIN, COTTER	XB-781-1	5315-01-369-1346
231	PIN, SPRING	M16562-50	5315-00-814-3531
231.1	PIN, STRAIGHT, HEADED	12417962-081	5315-01-447-2297
232	PLUG	3h5552	5340-00-007-6350
233	PLUG, EXPANSION	2M6471	5340-00-410-6762
234	PLUG, PLASTIC	12418065-004	4730-01-375-1450
235	PLUG, PLASTIC	12418065-005	4730-01-375-0329
236	PLUG, RUBBER	12417526	5340-01-375-3042
237	PLUG, RUBBER	12417527	5340-01-377-1543
238	PLUG, RUBBER	12417599	5340-01-381-3855
239	PLUG, RUBBER	12418348	5340-01-384-0869
240	PLUG, RUBBER	12420305-001	5340-01-384-1120
241	PLUG, RUBBER	12420305-003	5970-01-089-7447
242	RETAINER, PACKING	202624	5330-01-417-7794
243	RETAINER, PACKING	11863-012	5330-01-292-7266
244	RING, PISTON	14265	4320-01-301-8429
245	RING, RETAINING	6I3033	5365-01-360-0953
246	RING, RETAINING	6I3035	5365-01-360-0954

MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
247	RING, RETAINING	N9008	5365-01-032-4222
248	RING, RETAINING	N9009	5365-01-034-2757
248.1	RING, SEAL	225148	5331-01-459-6517
249	RING, SEAL	9M4849	5330-00-847-4351
249.1	RIVET, BLIND	12421770-004	
250	RIVET, COMPRESSION	12420756	
250.1	RIVET, COMPRESSION	12418469	5320-01-376-0699`
251	RUBBER STRIP	12420421	5330-01-389-6109
251.1	SCREW, CAP	CSH5-24-39	5305-01-479-7857
252	SCREW, CAP	639A52710	5305-01-081-7393
253	SCREW, CAPTIVE	12421366	
253.1	SCREW, SELF-LOCKING	7X3347	5305-01-360-0952
254	SEAL	12415307	5340-01-376-0672
255	SEAL	12418327	5365-01-381-3976
256	SEAL, CONNECTOR TUBE	4K1388	5330-00-933-3305
257	SEAL, DOOR	12417485	5330-01-375-2909
258	SEAL, INPUT	A-1205-F-2502	
259	SEAL, NON-METALLIC	23046376	5330-01-360-6006
260	SEAL, NON-METALLIC	23048727	5330-01-360-7826
261	SEAL, NON-METALLIC	1205F2164	5330-01-362-3392
262	SEAL ,PLAIN	3018-01507-01	5330-01-393-5626
263	SEAL, PLAIN	3018-01519-01	5330-01-331-9283
263.1	SEAL, PLAIN ENCASED	KIT-4451	5330-01-362-6102
264	SEAL, PLAIN ENCASED	29507528	5330-01-360-5917
265	SEAL, PLAIN ENCASED	29515690	5330-01-430-3477
266	SEAL, PLAIN ENCASED	115-4109	5330-01-361-1456
267	SEAL, PLAIN ENCASED	28-P-119	5330-01-044-6592
268	SEAL, PLAIN ENCASED	4R8831	5330-01-360-9023
269	SEAL, PLAIN ENCASED	A-1205-D-2344	5330-01-360-5253
270	SEAL, PLAIN ENCASED	97799	5330-01-079-6372
271	SEAL, PLAIN ENCASED	28-P-193	5330-00-483-2296
272	SEAL, URETHANE FOAM	12420420-001	
273	SEAL, URETHANE FOAM	12420420-003	

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
274	SEALRING	23045611	5330-01-360-9099
275	SEALRING	23045612	5330-01-360-9100
276	SEALRING	23045613	5330-01-360-9101
277	SEALRING	23045614	5330-01-360-9102
278	SEALRING	23045615	5330-01-360-9103
279	SEALRING	23045654	5330-01-360-9104
280	SEALRING	23045655	5310-01-360-9105
281	SEALRING	23046868	5330-01-360-5980
282	SEALRING	29501189	5330-01-360-5978
283	SEALRING	29501190	5330-01-360-5979
284	SEALRING	29502161	5365-01-360-1675
285	SEALRING	29502164	5365-01-360-1674
286	SEALRING	29506399	5330-01-360-5980
287	SETSCREW	29506222	5305-01-360-1667
288	SPRING	4088-40615-01	5360-01-392-9389
289	SPRING, COMPRESSION	2322	5360-01-345-5384
290	SPRING, FLAT	29500064	5360-01-360-2023
291	SPRING, HELICAL COMPRESSION	9L9188	5360-00-175-2701
292	STRAINER, SUCTION	29503670	4730-01-360-4458
292.1	TERMINAL, LUG	12420344	5940-01-082-3321
293	VALVE CHECK	7C1493	4820-01-284-5435
294	WASHER	1229-M-1625	5310-01-059-7130
295	WASHER	MS27183-10	5310-00-809-4058
296	WASHER, BRAKE HOUSING	1911644	5310-00-130-8033
297	WASHER, FIBER	Z095077721	3120-01-302-9301
297.1	WASHER, FLAT	12414473-014	5310-01-363-0740
298	WASHER, FLAT	36900	5310-00-482-1999
299	WASHER, FLAT	78302	5310-01-112-1738
299.1	WASHER, INSULATION	MES-76 (35510)	

MANDATORY REPLACEMENT PARTS LIST (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
299.1	WASHER, SEAL	XA 1470	5310-01-460-5998
300	WASHER, SEAL	29500025	5310-01-359-8840
301	WASHER, SEAL	29506215	5310-01-359-8842
301.1	WASHER, SEAL	12422577	5310-01-493-6806
302	WASHER, SPRING TENSION	12417503	5310-01-406-6326
303	WASHER, SPRING TENSION	12418220	5310-01-372-3495
304	WASHER, SPRING TENSION	12414560-019	5310-01-369-6074
305	WASHER, SPRING TENSION	D63474/1-27	5310-01-PAE-6769
306	WASHER, SPRING TENSION	75777	5310-01-112-1740
306.1	WASHER, THRUST	57023	3120-01-460-9421
307	WICK	225165	9390-01-459-7969
308	WICK	99278	9390-01-204-7151

APPENDIX G
ADDITIONAL AUTHORIZATION LIST (AAL)

Section I. INTRODUCTION

G-1. SCOPE

This appendix lists additional items you are authorized for the support of the LMTV.

G-2. GENERAL

This list identifies items that do not have to accompany the LMTV and that do not have to be turned in with it. These items are all authorized to you by Common Tables of Allowance (CTA), Modification Table of Organization and Equipment (MTOE), Tables of Distribution and Allowances (TDA), or Joint Table of Allowance (JTA).

G-3. EXPLANATION OF LISTING

National Stock Numbers, description, and quantities are provided to help you identify and request the additional items you require to support this equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description (CAGE) Part Number	(3) U/M	(4) Qty Auth
6685-01-193-1733	Transmitter, Pressure (0-10,000 PSI) (19207) 12258956	EA	1

APPENDIX H
TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART

Section I. INTRODUCTION

H-1. INTRODUCTION

This appendix lists the various transmission controls and configuration modifications that may be required to permit the transmission to function correctly. This appendix will guide the mechanic through the hardware selection process by identifying compatibility issues between the transmission controls (WTEC II/WTEC III) and the numerous revisions of the Allison MD3070PT transmission (PRE-ID w/ 24-pin connector, PRE-ID w/ 31-pin connector, TID 1, TID 2, and TID 3). Refer to Figure 1. After replacing any component of the transmission controls or the transmission assembly, perform calibration procedures in TM 9-2320-365-20-3 paragraph 8-2 or 8-3.

H-2. EXPLANATION OF COLUMNS

a. Column (1) - Installed Controls or Controls Being Installed. This column lists all of the variables concerning which version of transmission controls are installed in the vehicle, or may need to be installed, to communicate correctly with the transmission.

b. Column (2) - Installed Transmission or Transmission Being Installed. This column lists all of the various revisions of the Allison MD3070PT transmissions that may be installed in the vehicle.

c. Column (3) - Required Modification. This column lists the various electrical interface (hardware) modifications that may be required to allow the transmission controls to communicate with the transmission.

H-3. HOW TO USE THIS CHART

a. Determine which controls and transmission are installed in the vehicle.

b. Determine which component requires replacement.

c. Read across the row to column (3) to determine the required modification.

Section II.

TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART

(1) Installed Controls or Controls Being Installed	(2) Installed Transmission or Transmission Being Installed	(3) Required Modification (Refer to Section III)
WTEC II (with 24-pin connector)	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	No modification required.
WTEC II (with 24-pin connector)	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	Install 31-pin connector.
WTEC II (with 24-pin connector)	TID 1 (transmission serial number 6510090786 to 6510142171)	Install 31-pin connector.
WTEC II (with 24-pin connector)	TID 2 (transmission serial number 6510142172 to 6510262116)	Install 31-pin connector and replace transmission internal wiring harness.

TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART (CONT)

(1) Installed Controls or Controls Being Installed	(2) Installed Transmission or Transmission Being Installed	(3) Required Modification (Refer to Section III)
WTEC II (with 24-pin connector)	TID 3 (transmission serial number 6510262117 and subsequent)	Install 31-pin connector, replace transmission internal wiring harness, and reprogram WTEC II TEPSS. [1]
WTEC II (with 31-pin connector)	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	Install adapter cable assembly.
WTEC II (with 31-pin connector)	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	No modification required.
WTEC II (with 31-pin connector)	TID 1 (transmission serial number 6510090786 to 6510142171)	No modification required.
WTEC II (with 31-pin connector)	TID 2 (transmission serial number 6510142172 to 6510262116)	Replace transmission internal wiring harness.
WTEC II (with 31-pin connector)	TID 3 (transmission serial number 6510262117 and subsequent)	Replace transmission internal wiring harness and reprogram WTEC II TEPSS. [1]
WTEC III (with ECU manufactured prior to October 1999) [2]	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	Install adapter cable assembly and ID harness.
WTEC III (with ECU manufactured prior to October 1999) [2]	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	Install ID harness.
WTEC III (with ECU manufactured prior to October 1999) [2]	TID 1 (transmission serial number 6510090786 to 6510142171)	No modification required.
WTEC III (with ECU manufactured prior to October 1999) [2]	TID 2 (transmission serial number 6510142172 to 6510262116)	No modification required.
WTEC III (with ECU manufactured prior to October 1999) [2]	TID 3 (transmission serial number 6510262117 and subsequent)	Reprogram WTEC III ECU [1] or install new WTEC III ECU (P/N 12421787-002).
WTEC III (with ECU manufactured after October 1999) [3]	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	Install adapter cable assembly and ID harness.
WTEC III (with ECU manufactured after October 1999) [3]	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	Install ID harness.
WTEC III (with ECU manufactured after October 1999) [3]	TID 1 (transmission serial number 6510090786 to 6510142171)	No modification required.

[1] Reprogramming can only be accomplished by an authorized Allison Transmission distributor. You must provide the transmission serial number of the transmission being installed to ensure correct reprogramming. If at a later time, an earlier version transmission is installed in a WTEC II equipped vehicle, WTEC II TEPSS will require reprogramming again.
[2] Vehicle serial number 012477 and lower. Refer to Figure 1.
[3] Vehicle serial number 012478 and higher. Refer to Figure 1.

(1) Installed Controls or Controls Being Installed	(2) Installed Transmission or Transmission Being Installed	(3) Required Modification (Refer to Section III)
WTEC III (with ECU manufactured after October 1999) [3]	TID 2 (transmission serial number 6510142172 to 6510262116)	No modification required.
WTEC III (with ECU manufactured after October 1999) [3]	TID 3 (transmission serial number 6510262117 and subsequent)	No modification required.

Section III.

MODIFICATION PARTS IDENTIFICATION

Identification	Part Number/NSN	Description
31-pin connector	300130 5935-21-921-1813	Converts a transmission external wiring harness from a 24-pin ("D" type) connector to a 31-pin (round type) connector.
Transmission internal wiring harness	29529474 6150-01-481-8088	Converts a TID 2 transmission to a TID 1 configuration to allow WTEC II controls to communicate with the transmission.
Gasket	29503283 5330-01-360-9035	Required when replacing transmission internal wiring harness.
ID harness	200100 6150-21-921-1191	Allows WTEC III controls to communicate with a PRE-ID transmission.
Adapter cable assembly	29519210 6150-01-420-5987	Adapts a PRE-ID transmission with 24-pin ("D" type) connector to a transmission external wiring harness with a 31-pin (round) connector.

MODIFICATION PARTS IDENTIFICATION (CONT)

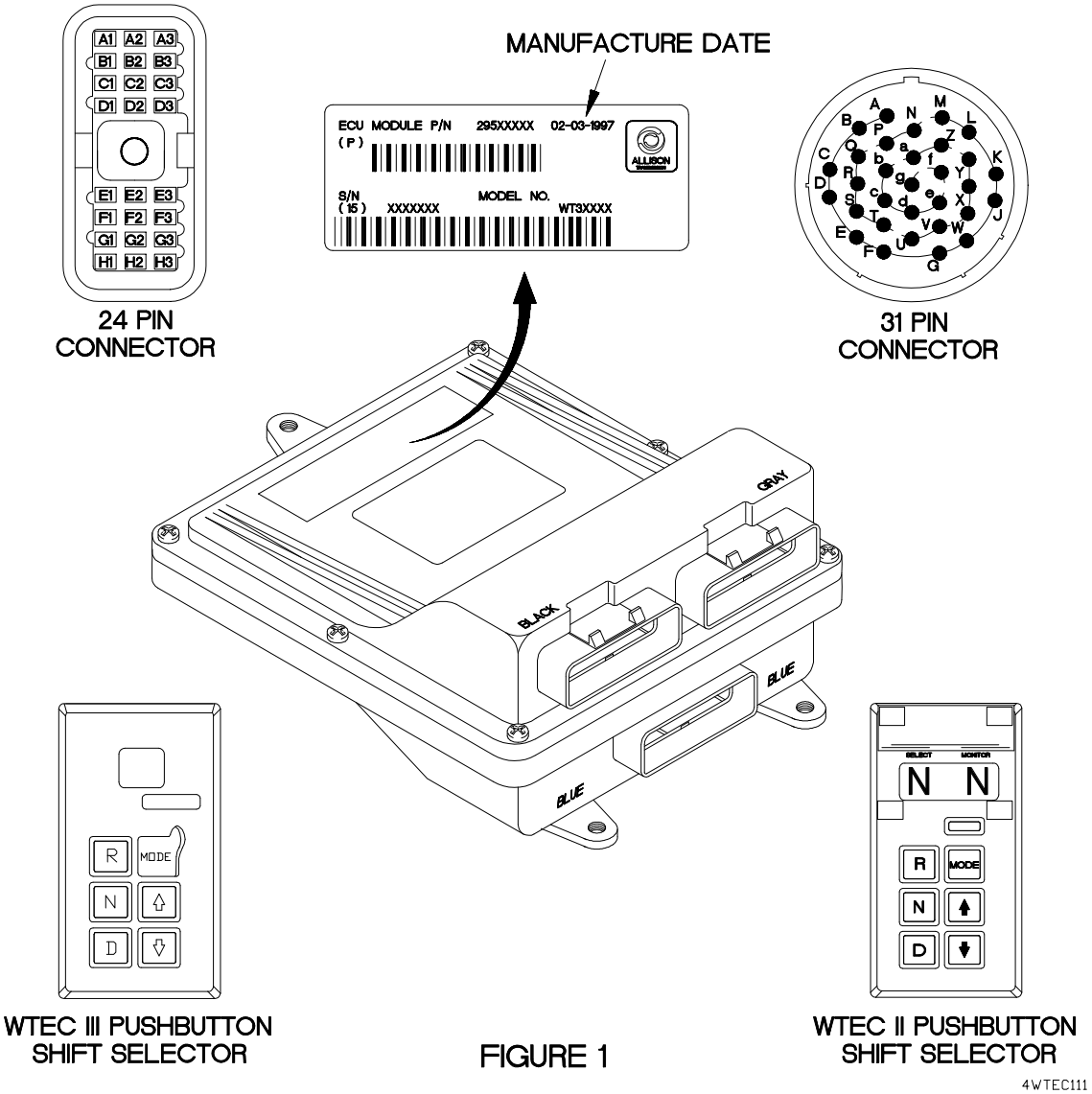


FIGURE 1

SUBJECT INDEX

Subject Para

A

Adapter
Housing Module Repair 21-6
Transmission Adapter Cable Assembly Replacement 6-8
Air
Compressor Replacement 11-2
Inlet Elbow Replacement 3-20
Alternator
100 Amp Alternator Repair 6-2
200 Amp Alternator Repair 18-3
Amp
100 Amp Alternator Repair 6-2
200 Amp Alternator Repair 18-3
Angle
Front Angle Bracket Replacement 13-3
M1081 Angle Bracket Replacement 13-10
Arm
Rocker Arm and Push Rod Replacement /Repair 3-12
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Axle
Front Axle Assembly Replacement 9-2
Front Axle Differential Carrier Repair 23-2
Front Axle Differential Carrier Replacement 9-4
Front Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 9-5
Front Axle Maintenance Introduction 9-1
Front Axle Maintenance Introduction 23-1
Front Axle Shaft and Seals Replacement 9-3
Rear Axle Assembly Replacement 10-2
Rear Axle Differential Carrier Repair 24-2
Rear Axle Differential Carrier Replacement 10-4
Rear Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 10-3
Rear Axle Maintenance Introduction 10-1
Rear Axle Maintenance Introduction 24-1

Subject Para

B

Base
Oil Filter Base Replacement 3-18
Beam
Rear Tension Beam and Taillight Mounting Bracket Replacement 13-5
Bearing(s)
Camshaft and Bearing Replacement /Repair 20-7
Crankshaft and Main Bearings Replacement/Repair 20-5
Bed
Cargo Bed Replacement/Repair 15-8
Block
Cylinder Block Repair 20-4
Body
And Cab Maintenance Introduction 15-1
Main Valve Body Assembly Repair 7-12
Bracket(s)
Engine and Transmission Mount Bracket Replacement 7-17
Engine Bracket Replacement 3-5
Engine Front Resilient Mount and Mounting Bracket Replacement 3-4
Frame Muffler Support Bracket Replacement 13-18
Front Lifting Bracket Replacement 13-12
M1081 Angle Bracket Replacement 13-10
M1081 Sideload Bracket Replacement 13-2
Radiator Bracket Replacement 13-19
Rear Spring Brackets Replacement 13-9
Rear Tension Beam and Taillight Mounting Bracket Replacement 13-5
Transmission Oil Cooler Mounting Bracket Replacement 7-15
Transmission Resilient Mount and Bracket Replacement 7-6
Brake System Maintenance Introduction 11-1
Bumper
Rear Bumper Replacement 13-8

C

C3/C4 Clutch Module Repair 21-13
C6
Clutch Housing Assembly Repair 21-14
Clutch Solenoid Assembly Replacement /Repair 7-9
C7 Clutch Housing and Front Output Housing Assembly Repair 21-15

SUBJECT INDEX (CONT)

Subject Para

C (Cont)

Cab
- Body and Cab Maintenance Introduction 15-1
- Front Support Replacement/Repair 15-3
- M1081 Cab Rear Wall Replacement /Repair 15-5
- M1081 Cab Side Wall Replacement /Repair 15-4
- M1081 Cab Windshield Frame Replacement /Repair 15-6
- Replacement 15-2
- Windshield, Side Windows and Door Side Window Replacement 15-7

Cable
- Transmission Adapter Cable Assembly Replacement 6-8

Cam Roller Followers Replacement 3-13
Camshaft and Bearing Replacement /Repair 20-7
Cargo
- Bed Replacement/Repair 15-8

Carrier
- Front Axle Differential Carrier Repair 23-2
- Front Axle Differential Carrier Replacement 9-4
- P1 Planetary Carrier Module Repair 21-10
- P2 Planetary Carrier Module Repair 21-9
- P3 Planetary Carrier Module Repair 21-7
- P4 Planetary Carrier Assembly Repair 21-12
- Rear Axle Differential Carrier Repair 24-2
- Rear Axle Differential Carrier Replacement 10-4

Cartridge/Counterbalance
- 11K Self-Recovery Winch (SRW) Cartridge /Counterbalance Valve Replacement 16-3

Case
- Transfer Case Control Valve Assembly Replacement/Repair 8-2
- Transfer Case Housing Repair 22-4
- Transfer Case Module Seal and Drive Yoke Replacement 8-3

Charging
- Front Support/Charging Pump Module Repair 21-3

Check(s)
- Fuel Setting Check 4-4
- Fuel Timing Checks 4-5

Subject Para

C (Cont)

Clearance
- Valve Clearance Adjustment 3-14

Clutch
- C3/C4 Clutch Module Repair 21-13
- C6 Clutch Housing Assembly Repair 21-14
- C6 Clutch Solenoid Assembly Replacement /Repair 7-9
- C7 Clutch Housing and Front Output Housing Assembly Repair 21-15
- Engine Fan Clutch Repair (P/N 1090-08000-01) 5-3
- Rotating Clutch Module Repair 21-4
- Rotating Clutch Solenoid Assembly Replacement/Repair 7-8
- Stationary Clutch Solenoid Assembly Replacement/Repair 7-7

Compressor
- Air Compressor Replacement 11-2

Conditions
- Transmission Assembly Replacement (Unusual Conditions) 7-18

Connecting
- Piston and Connecting Rod Assembly Replacement/Repair 20-6

Control
- Fuel Control Linkage Replacement 4-7
- Transfer Case Control Valve Assembly Replacement/Repair 8-2
- Valve Module Repair 7-11
- Valve Module Replacement 7-10
- Valve Module Strainer Replacement 7-14

Converter
- Housing Module Repair 21-5
- Torque Converter Replacement/Repair 7-2

Cooler
- Oil Cooler Replacement 3-19
- Transmission Oil Cooler Mounting Bracket Replacement 7-15

Cooling
- System Maintenance Introduction 5-1

Cover
- Engine Front Cover Replacement 3-15
- Inlet Manifold Cover Replacement 3-21

Crankshaft
- And Main Bearings Replacement/Repair 20-5
- Front Seal Replacement 3-8
- Rear Seal Replacement 3-9

Subject Para

C (Cont)

Crossmember
Front Crossmember Replacement 13-16
Intermediate Crossmember Replacement 13-17
Rear Crossmember Replacement 13-6
Shock Mount Crossmember Replacement 13-7
Cylinder
Block Repair 20-4
Head Repair 20-3
Head/Head Gasket Replacement 3-6
Suspension Cylinder Replacement 17-2

D

Damper
Pulley Damper Replacement 3-7
Differential
Front Axle Differential Carrier Repair 23-2
Front Axle Differential Carrier Replacement 9-4
Front Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 9-5
Rear Axle Differential Carrier Repair 24-2
Rear Axle Differential Carrier Replacement 10-4
Rear Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 10-3
Digitization Kit Initial Installation 18-4
Door
Cab Windshield, Side Windows and Door Side Window Replacement 15-7
Dressed Engine Unpacking/Packing 3-2
Drive
Front Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 9-5
Power Transfer and Final Drive Assembly Maintenance Introduction 8-1
Power Transfer and Final Drive Assembly Maintenance Introduction 22-1
Rear Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 10-3
Transfer Case Module Seal and Drive Yoke Replacement 8-3

E

Elbow
Air Inlet Elbow Replacement 3-20
Electrical System Maintenance Introduction 6-1

Subject Para

E (Cont)

Engine
And Transmission Mount Bracket Replacement 7-17
Assembly Replacement 3-3
Bracket Replacement 3-5
Dressed Engine Unpacking/Packing 3-2
Fan Clutch Repair 5-3
Front Cover Replacement 3-15
Front Resilient Mount and Mounting Bracket Replacement 3-4
Maintenance Introduction 20-1
System Introduction 3-1
To Maintenance Stand Mounting 20-2
Exhaust Manifold Replacement 3-23
Extension
M1078/M1079 Pintle Hook Extension Kit Initial Installation 18-2
External
Transmission External Wiring Harness Replacement 6-7
Enhanced Resilient Mount Initial Installation 18-5

F

Fan
Engine Fan Clutch Repair (P/N 1090-08000-01) 5-3
Filter
Oil Filter Base Replacement 3-18
Fire
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Flexplate Assembly Replacement 3-10
Flywheel Housing Replacement 3-11
Followers
Cam Roller Followers Replacement 3-13
Frame
M1081 Cab Windshield Frame Replacement /Repair 15-6
M1081 Frame Plate Replacement 13-11
Maintenance Introduction 13-1
Muffler Support Bracket Replacement 13-18
Rail Replacement 13-13
Frame Plate
M1081 Frame Plate Replacement 13-11
Front
Angle Bracket Replacement 13-3
Axle Assembly Replacement 9-2
Axle Differential Carrier Repair 23-2

SUBJECT INDEX

Subject Para

F (Cont)

Front (Cont)
Axle Maintenance Introduction 23-1
Axle Shaft and Seals Replacement 9-3
C7 Clutch Housing and Front Output Housing Assembly Repair 21-15
Cab Front Support Replacement/Repair 15-3
Crankshaft Front Seal Replacement 3-8
Crossmember Replacement 13-16
Engine Front Cover Replacement 3-15
Engine Front Resilient Mount and Mounting Bracket Replacement 3-4
Gear Housing and Idler Gear Replacement 20-8
Leaf Spring Replacement 14-2
Leaf Spring Shackle and Pin Replacement 14-3
Lifting Bracket Replacement 13-12
Support/Charging Pump Module Repair 21-3
Fuel
Control Linkage Replacement 4-7
Governor Replacement/Repair 4-9
Injector Replacement 4-2
Injector Synchronization 4-3
Setting Check 4-4
Shutoff Solenoid Replacement 6-4
System Maintenance Introduction 4-1
Timing Checks 4-5

G

Gasket
Cylinder Head/Head Gasket Replacement 3-6
Gear
Front Gear Housing and Idler Gear Replacement 20-8
Steering Gear Assembly Adjustment 12-3
Steering Gear Replacement 12-2
Governor
Fuel Governor Replacement/Repair 4-9
Gun
Initial Machine Gun Ring Kit Installation/Removal 19-2

H

Harness
Transmission External Wiring Harness Replacement 6-7

Subject Para

H (Cont)

Harness (Cont)
Transmission Internal Wiring Harness Replacement 7-13
Head
Cylinder Head Repair 20-3
Cylinder Head/Head Gasket Replacement 3-6
Head Gasket
Cylinder Head/Head Gasket Replacement 3-6
Hook
M1078/M1079 Pintle Hook Extension Kit Initial Installation 18-2
Housing
Adapter Housing Module Repair 21-6
C6 Clutch Housing Assembly Repair 21-14
C7 Clutch Housing and Front Output Housing Assembly Repair 21-15
Converter Housing Module Repair 21-5
Flywheel Housing Replacement 3-11
Front Gear Housing and Idler Gear Replacement 20-8
Rear Output Housing Repair 21-11
Transfer Case Housing Repair 22-4
Hydraulic
11K Self-Recovery Winch (SRW) Hydraulic Motor Replacement 16-4
Rotary Pump Replacement 16-5
System Maintenance Introduction 17-1

I

Idle Speed Adjustment 4-8
Idler
Front Gear Housing and Idler Gear Replacement 20-8
Initial Machine Gun Ring Kit Installation/Removal 19-2
Injector
Fuel Injector Replacement 4-2
Fuel Injector Synchronization 4-3
Inlet
Air Inlet Elbow Replacement 3-20
Manifold Cover Replacement 3-21
Manifold Replacement 3-22
Intermediate Crossmember Replacement 13-17
Internal
Transmission Internal Wiring Harness Replacement 7-13

Subject Para

I (Cont)

Introduction
11K Self-Recovery Winch (SRW) Maintenance Introduction 16-1
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Body and Cab Maintenance Introduction 15-1
Brake System Maintenance Introduction 11-1
Cooling System Maintenance Introduction 5-1
Electrical System Maintenance Introduction 6-1
Engine Maintenance Introduction 20-1
Engine System Introduction 3-1
Frame Maintenance Introduction 13-1
Front Axle Maintenance Introduction 9-1
Front Axle Maintenance Introduction 23-1
Fuel System Maintenance Introduction 4-1
Hydraulic System Maintenance Introduction 7-1
Power Transfer and Final Drive Assembly Maintenance Introduction 8-1
Power Transfer and Final Drive Assembly Maintenance Introduction 22-1
Rear Axle Maintenance Introduction 10-1
Rear Axle Maintenance Introduction 24-1
Special Purpose Kits Maintenance Introduction 18-1
Steering System Maintenance Introduction 12-1
Transmission Maintenance Introduction 21-1
Transmission System Maintenance Introduction 7-1

K

Kit(s)
Cab Arctic Kit Installation/Removal 18-2
Cargo Arctic Kit Installation/Removal 18-3
Initial Machine Gun Ring Kit Installation/Removal 19-2
M1078/M1079 Pintle Hook Extension Kit Initial Installation 18-2
Special Purpose Kits Maintenance Introduction 18-1
Knuckle
Steering Knuckle Mechanism Replacement . . . 9-6

L

Leaf
Front Leaf Spring Replacement 14-2

Subject Para

L (Cont)

Leaf (Cont)
Front Leaf Spring Shackle and Pin Replacement 14-3
Rear Leaf Spring Replacement 14-4
Lifting
Front Lifting Bracket Replacement 13-12
Linkage
Fuel Control Linkage Replacement 4-7

M

M1078 Subframe Rail Replacement 13-14
M1078/M1079 Pintle Hook Extension Kit Initial Installation 18-2
M1079 Subframe Rail Replacement 13-20
M1081
Angle Bracket Replacement 13-10
Cab Rear Wall Replacement/Repair 15-5
Cab Side Wall Replacement/Repair 15-4
Cab Windshield Frame Replacement /Repair 15-6
Frame Plate Replacement 13-11
Parachute Suspension Assembly Replacement 13-4
Sideload Bracket Replacement 13-2
Subframe Rail Replacement 13-15
Machine
Initial Machine Gun Ring Kit Installation/Removal 19-2
Main
Crankshaft and Main Bearings Replacement/Repair 20-5
Shaft Module Repair 21-8
Valve Body Assembly Repair 7-12
Maintenance
11K Self-Recovery Winch (SRW) Maintenance Introduction 16-1
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Body and Cab Maintenance Introduction 15-1
Brake System Maintenance Introduction 11-1
Cooling System Maintenance Introduction 5-1
Electrical System Maintenance Introduction 6-1
Engine Maintenance Introduction 20-1
Engine To Maintenance Stand Mounting 20-2
Frame Maintenance Introduction 13-1
Front Axle Maintenance Introduction 9-1
Front Axle Maintenance Introduction 23-1
Fuel System Maintenance Introduction 4-1

SUBJECT INDEX

Subject Para

M (Cont)

Maintenance (Cont)
- Hydraulic System Maintenance Introduction 7-1
- Power Transfer and Final Drive Assembly Maintenance Introduction 8-1
- Power Transfer and Final Drive Assembly Maintenance Introduction 22-1
- Rear Axle Maintenance Introduction 10-1
- Rear Axle Maintenance Introduction 24-1
- Special Purpose Kits Maintenance Introduction 18-1
- Steering System Maintenance Introduction 12-1
- Transmission Maintenance Introduction 21-1
- Transmission System Maintenance Introduction 7-1
- Transmission To Maintenance Stand 7-5

Manifold
- Exhaust Manifold Replacement 3-23
- Inlet Manifold Cover Replacement 3-21
- Inlet Manifold Replacement 3-22

Module
- Adapter Housing Module Repair 21-6
- C3/C4 Clutch Module Repair 21-13
- Control Valve Module Repair 7-11
- Control Valve Module Replacement 7-10
- Control Valve Module Strainer Replacement 7-14
- Converter Housing Module Repair 21-5
- Front Support/Charging Pump Module Repair 21-3
- Main Shaft Module Repair 21-8
- P1 Planetary Carrier Module Repair 21-10
- P2 Planetary Carrier Module Repair 21-9
- P3 Planetary Carrier Module Repair 21-7
- Rotating Clutch Module Repair 21-4
- Transfer Case Module Removal 22-2
- Transfer Case Module Repair 22-3
- Transfer Case Module Seal and Drive Yoke Replacement 8-3

Motor
- 11K Self-Recovery Winch (SRW) Hydraulic Motor Replacement 16-4
- Starting Motor Repair (P/N M0017730MD) 6-3
- Starting Motor Repair (P/N M0017730ME) 6-6

Subject Para

M (Cont)

Mount
- Engine and Transmission Mount Bracket Replacement 7-17
- Engine Front Resilient Mount and Mounting Bracket Replacement 3-4
- Shock Mount Crossmember Replacement . . . 13-7
- Transmission Resilient Mount and Bracket Replacement 7-6

Muffler
- Frame Muffler Support Bracket Replacement 13-18

O

Oil
- Cooler Replacement 3-19
- Filter Base Replacement 3-18
- Pan Replacement 3-16
- Pump Replacement 3-17
- Transmission Oil Cooler Mounting Bracket Replacement 7-15

Output
- C7 Clutch Housing and Front Output Housing Assembly Repair 21-15
- Rear Output Housing Repair 21-11

P

P1 Planetary Carrier Module Repair 21-10
P2 Planetary Carrier Module Repair 21-9
P3 Planetary Carrier Module Repair 21-7
P4 Planetary Carrier Assembly Repair 21-12

Packing
- Dressed Engine Unpacking/Packing 3-2
- Transmission Unpacking/Packing 7-3

Pan
- Oil Pan Replacement 3-16

Parachute
- M1081 Parachute Suspension Assembly Replacement 13-4

Pinion
- Front Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 9-5
- Rear Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement . . . 10-3

Subject Para

P (Cont)

Pintle
M1078/M1079 Pintle Hook Extension Kit Initial Installation 18-2
Piston and Connecting Rod Assembly Replacement/Repair 20-6
Planetary
P1 Planetary Carrier Module Repair 21-10
P2 Planetary Carrier Module Repair 21-9
P3 Planetary Carrier Module Repair 21-7
P4 Planetary Carrier Assembly Repair 21-12
Plate
M1081 Frame Plate Replacement 13-11
Power
Takeoff (PTO) Replacement/Repair 16-6
Transfer and Final Drive Assembly Maintenance Introduction 8-1
Transfer and Final Drive Assembly Maintenance Introduction 22-1
PTO
Power Takeoff (PTO) Replacement/Repair . . 16-6
Pulley Damper Replacement 3-7
Pump
Front Support/Charging Pump Module Repair 21-3
Hydraulic Rotary Pump Replacement 16-5
Oil Pump Replacement 3-17
Scavenge Pump Assembly Replacement 7-16
Push Rod
Rocker Arm and Push Rod Replacement /Repair 3-12

R

Radiator
Bracket Replacement 13-19
Radiator Repair 5-2
Rail
Frame Rail Replacement 13-13
M1078 Subframe Rail Replacement 13-14
M1079 Subframe Rail Replacement 13-20
M1081 Subframe Rail Replacement 13-15
Rear
Axle Assembly Replacement 10-2
Axle Differential Carrier Repair 24-2
Axle Differential Carrier Replacement 10-4
Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 10-3
Axle Maintenance Introduction 10-1
Axle Maintenance Introduction 24-1

Subject Para

R (Cont)

Rear (Cont)
Bumper Replacement 13-8
Crankshaft Rear Seal Replacement 3-9
Crossmember Replacement 13-6
Leaf Spring Replacement 14-4
M1081 Cab Rear Wall Replacement /Repair 15-5
Output Housing Repair 21-11
Spring Brackets Replacement 13-9
Tension Beam and Taillight Mounting Bracket Replacement 13-5
Resilient
Engine Front Resilient Mount and Mounting Bracket Replacement 3-4
Transmission Resilient Mount and Bracket Replacement 7-6
Ring
Initial Machine Gun Ring Kit Installation/Removal 19-2
Rocker Arm and Push Rod Replacement /Repair 3-12
Rod
Piston and Connecting Rod Assembly Replacement/Repair 20-6
Rocker Arm and Push Rod Replacement /Repair 3-12
Roller
Cam Roller Followers Replacement 3-13
Rotary
Hydraulic Rotary Pump Replacement 16-5
Rotating
Clutch Module Repair 21-4
Clutch Solenoid Assembly Replacement /Repair 7-8

S

Scavenge Pump Assembly Replacement 7-16
Seal(s)
Crankshaft Front Seal Replacement 3-8
Crankshaft Rear Seal Replacement 3-9
Front Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement 9-5
Front Axle Shaft and Seals Replacement 9-3
Rear Axle Differential Pinion Seal, Yoke Seal and Drive Yoke Replacement . . . 10-3
Transfer Case Module Seal and Drive Yoke Replacement 8-3

SUBJECT INDEX

Subject Para

S (Cont)

Self-Recovery
11K Self-Recovery Winch (SRW) Assembly Replacement/Repair 16-2
11K Self-Recovery Winch (SRW) Cartridge /Counterbalance Valve Replacement 16-3
11K Self-Recovery Winch (SRW) Hydraulic Motor Replacement 16-4
11K Self-Recovery Winch (SRW) Maintenance Introduction 16-1
Sensor
Transmission Turbine Speed Sensor Replacement 6-5
Setting
Fuel Setting Check 4-4
Shackle
Front Leaf Spring Shackle and Pin Replacement 14-3
Shaft
Front Axle Shaft and Seals Replacement 9-3
Main Shaft Module Repair 21-8
Shock Mount Crossmember Replacement 13-7
Shutoff
Fuel Shutoff Solenoid Replacement 6-4
Side
M1081 Cab Side Wall Replacement /Repair 15-4
Sideload
M1081 Sideload Bracket Replacement 13-2
Sighting
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Solenoid
C6 Clutch Solenoid Assembly Replacement /Repair 7-9
Fuel Shutoff Solenoid Replacement 6-4
Rotating Clutch Solenoid Assembly Replacement/Repair 7-8
Stationary Clutch Solenoid Assembly Replacement/Repair 7-7
Special Purpose Kits Maintenance Introduction 18-1
Speed
Idle Speed Adjustment 4-8
Transmission Turbine Speed Sensor Replacement 6-5

Subject Para

S (Cont)

Spring
Front Leaf Spring Replacement 14-2
Front Leaf Spring Shackle and Pin Replacement 14-3
Rear Leaf Spring Replacement 14-4
Rear Spring Brackets Replacement 13-9
Stand
Engine To Maintenance Stand Mounting 20-2
Transmission To Maintenance Stand 7-5
Starting Motor Repair (P/N M0017730MD) 6-3
Starting Motor Repair (P/N M0017730ME) 6-6
Stationary Clutch Solenoid Assembly Replacement/Repair 7-7
Steering
Gear Assembly Adjustment 12-3
Gear Replacement 12-2
Knuckle Mechanism Replacement 9-6
System Maintenance Introduction 12-1
Strainer
Control Valve Module Strainer Replacement 7-14
Subframe
M1078 Subframe Rail Replacement 13-14
M1079 Subframe Rail Replacement 13-20
M1081 Subframe Rail Replacement 13-15
Support
Cab Front Support Replacement/Repair 15-3
Frame Muffler Support Bracket Replacement 13-18
Front Support/Charging Pump Module Repair 21-3
Suspension
M1081 Parachute Suspension Assembly Replacement 13-4
Maintenance Introduction 14-1
Suspension Cylinder Replacement 17-2
Synchronization
Fuel Injector Synchronization 4-3
System
Brake System Maintenance Introduction 11-1
Cooling System Maintenance Introduction 5-1
Electrical System Maintenance Introduction 6-1

Subject Para

S (Cont)

System (Cont)
Engine System Introduction 3-1
Fuel System Maintenance Introduction 4-1
Hydraulic System Maintenance Introduction 7-1
Steering System Maintenance Introduction 12-1
Transmission System Maintenance Introduction 7-1

T

Taillight
Rear Tension Beam and Taillight Mounting Bracket Replacement 13-5
Tension
Rear Tension Beam and Taillight Mounting Bracket Replacement 13-5
Timing
Fuel Timing Checks 4-5
Torque Converter Replacement/Repair 7-2
Transfer Case
Control Valve Assembly Replacement/Repair 8-2
Housing Repair 22-4
Module Removal 8-4
Module Repair 22-3
Module Seal and Drive Yoke Replacement 8-3
Transmission
Adapter Cable Assembly Replacement 6-8
Assembly Replacement (Unusual Conditions) 7-18
Assembly Replacement (Usual Conditions) 7-4
Engine and Transmission Mount Bracket Replacement 7-17
External Wiring Harness Replacement 6-7
Internal Wiring Harness Replacement 7-13
Maintenance Introduction 21-1
Oil Cooler Mounting Bracket Replacement 7-15
Repair 21-2
Resilient Mount and Bracket Replacement 7-6
To Maintenance Stand 7-5
Transmission System Maintenance Introduction 7-1
Turbine Speed Sensor Replacement 6-5
Unpacking/Packing 7-3

Subject Para

T (Cont)

Turbine
Transmission Turbine Speed Sensor Replacement 6-5
Turbocharger Replacement 4-6

U

Unpacking
Dressed Engine Unpacking/Packing 3-2
Transmission Unpacking/Packing 7-3

V

Valve
11K Self-Recovery Winch (SRW) Cartridge /Counterbalance Valve Replacement 16-3
Clearance Adjustment 3-14
Control Valve Module Repair 7-11
Control Valve Module Replacement 7-10
Control Valve Module Strainer Replacement 7-14
Main Valve Body Assembly Repair 7-12
Transfer Case Control Valve Assembly Replacement/Repair 8-2

W

Wall
M1081 Cab Rear Wall Replacement/ Repair 15-5
M1081 Cab Side Wall Replacement /Repair 15-4
Winch
11K Self-Recovery Winch (SRW) Assembly Replacement/Repair 16-2
11K Self-Recovery Winch (SRW) Cartridge /Counterbalance Valve Replacement 16-3
11K Self-Recovery Winch (SRW) Hydraulic Motor Replacement 16-4
11K Self-Recovery Winch (SRW) Maintenance Introduction 16-1
Windows
Cab Windshield, Side Windows and Door Side Window Replacement 15-7
Windshield
Cab Windshield, Side Windows and Door Side Window Replacement 15-7
M1081 Cab Windshield Frame Replacement /Repair 15-6

SUBJECT INDEX

Subject Para

W (Cont)

Wiring
  Transmission External Wiring Harness
    Replacement 6-7
  Transmission Internal Wiring Harness
    Replacement 7-13

Y

Yoke
  Front Axle Differential Pinion Seal, Yoke
    Seal and Drive Yoke Replacement 9-5
  Rear Axle Differential Pinion Seal,
    Yoke Seal and Drive Yoke Replacement . . . 10-3
  Transfer Case Module Seal and Drive
    Yoke Replacement 8-3

GLOSSARY
ABBREVIATIONS

CTIS	Central Tire Inflation System
ECU	Electronic Control Unit
LH	Left Hand
LMHC	Light Material Handling Crane
PTO	Power Takeoff
RH	Right Hand
SRW	11K Self-Recovery Winch
STE/ICE-R	Simplified Test Equipment/Internal Combustion Engine-Reprogrammable
TEPSS	Transmission ECU Pushbutton Shift Selector
TM	Technical Manual
TPS	Throttle Position Sensor
TPSS	Transmission Pushbutton Shift Selector
VIM	Vehicle Interface Module
WTEC II	World Transmission Electronic Controls (version 2)
WTEC III	World Transmission Electronic Controls (version 3)

By Order of the Secretary of the Amy:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
04989

DISTRIBUTION: To be distributed in accordance with the initial distribution number (IDN) 380937 requirements for TM 9-2320-365-34-2.

*U.S. GOVERNMENT PRINTING OFFICE: 1998-646-039/80031

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is OAASA	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE Date you filled out this form
TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	FROM: *(Activity and location) (Include ZIP Code)* Enter your mailing address	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
	Publication Date	Publication Title

ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
10	15-33 19-6	15-7 19-2		4		Item 10. Change Illustration. Reason: Text calls out 90-degree fitting. Art shows straight fitting. Text is correct. Step (4) of removal says to disconnect four hydraulic hoses from manifold. The correct number of hydraulic hoses is five. correct the text to reflect the actual quantity of hydraulic hoses. The supporting illustration is correct.

SAMPLE

* *Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Your title	Your telephone number	Your signature

TO: *(Forward direct to addressee listed in publication)*	FROM: *(Activity and location) (Include ZIP Code)*	DATE
	Enter your mailing address	Date you filled out this form.

PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
	Publication Date	Your Title

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Your title	Your telephone number	Your signature

SAMPLE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2320-365-34-2	17 June 1998	M1078 Series Light Medium Tactical Vehicle (LMTV)

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

TO: (*Forward direct to addressee listed in publication*) AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 9-2320-365-34-2	17 June 1998	M1078 Series Light Medium Tactical Vehicle (LMTV)

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2320-365-34-2	17 June 1998	M1078 Series Light Medium Tactical Vehicle (LMTV)

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

TO: (*Forward direct to addressee listed in publication*) AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 9-2320-365-34-2	17 June 1998	M1078 Series Light Medium Tactical Vehicle (LMTV)

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2320-365-34-2	17 June 1998	M1078 Series Light Medium Tactical Vehicle (LMTV)

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

TO: (*Forward direct to addressee listed in publication*) AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 9-2320-365-34-2	17 June 1998	M1078 Series Light Medium Tactical Vehicle (LMTV)

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

USAPPC V3.00

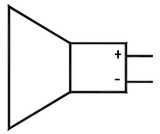
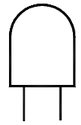
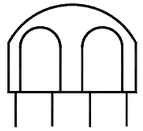
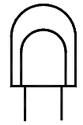
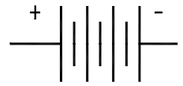
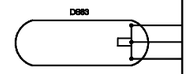
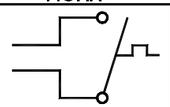
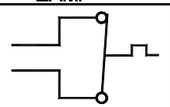
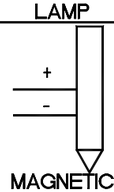
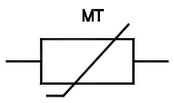
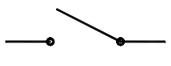
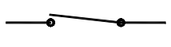
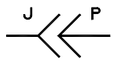
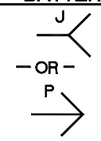
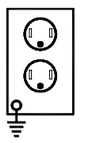
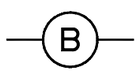
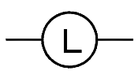
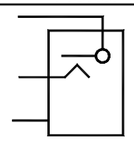
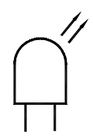
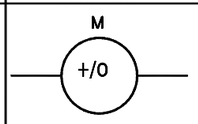
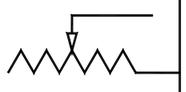
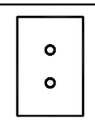
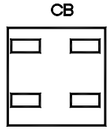
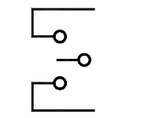
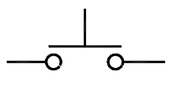
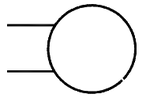
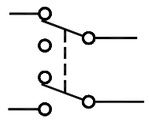
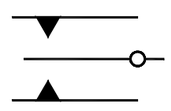
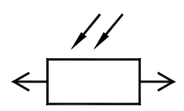
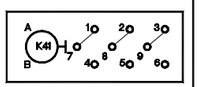
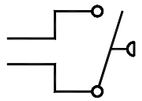
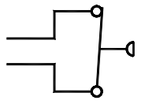
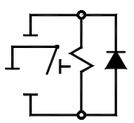
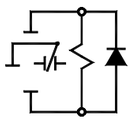
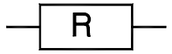
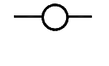
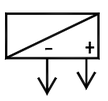
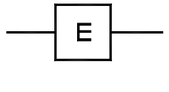
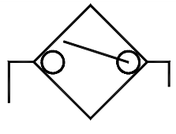
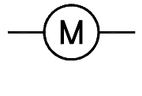
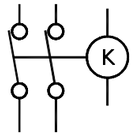
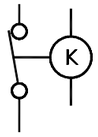
 HORN	BLACKOUT LAMP	 LAMP	 DUALBEAM LAMP	GROUND	 POWER LAMP	OPEN CONTACT	 BATTERY	 FLUORESCENT LIGHT
 TEMPERATURE SWITCH OPEN	 TEMPERATURE SWITCH CLOSED	 MAGNETIC PICKUP	 SENSOR	 NORMALLY OPEN	 NORMALLY CLOSED	 CONNECTOR	 RECEPTACLE	 ELECTRICAL OUTLET
 MOTOR	 SOLENOID	 LEVEL SENSOR	FILTER	 LED	 METER OR GAGE	CLOSED CONTACT	 DIMMER MODULE	 TELEPHONE RECEPTACLE
 CIRCUIT BREAKER	 TWO-WAY SWITCH	 PUSHBUTTON	 CIRCULATING PUMP	 DPDT SWITCH	 DPST SWITCH	 PHOTOCELL	FUSE	 RELAY
 PRESSURE SWITCH OPEN	 PRESSURE SWITCH CLOSED	 NORMALLY OPEN	 NORMALLY CLOSED	ALTERNATOR	 RESISTOR	 TERMINAL LUG	 ELECTRONIC IGNITION UNIT	
DIODE	 SPLICE	 SENSING SWITCH	 MOTOR	 GROUND RELAY	 RELAY	CIRCUIT BREAKER	FLASHER	

FIGURE FO-1 ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 1 OF 34

SIZE	ILL NO.	
B	5WD01L1B	FP-1/ (FP-2 BLANK)

CONNECTORS			
NUMBER	ZONE	SH	DESCRIPTION
A13	A66	8	WTEC II TRANSMISSION CONNECTOR A
A13	A70	8	WTEC II TRANSMISSION CONNECTOR B
A13	A74	9	WTEC II TRANSMISSION CONNECTOR C
J1	D285	32	VAN 110 VAC POWER ENTRY
J2	A185	21	EMI FILTER
J2	E285	32	VAN 110 VAC POWER ENTRY
J3	D205	23	AIRDROP ONLY
J5	A38	5	VEHICLE HORN
J6	A38	5	VEHICLE HORN
J7	A188	21	WTEC II TRANSMISSION DIMMER MODULE
J8	B38	5	BLACKOUT MARKER RIGHT FRONT
J9	C38	5	FRONT RIGHT TURN SIGNAL
J10	B38	5	PARKING LIGHT FRONT RIGHT
J12	D38	5	RIGHT HEADLIGHT
J13	C38	5	RIGHT HEADLIGHT
J14	C38	5	RIGHT HEADLIGHT
J17	H38	5	BLACKOUT DRIVE LIGHT
J18	D38	5	LEFT HEADLIGHT
J19	E38	5	LEFT HEADLIGHT
J19	C177	20	CAB - DASH - LEFT - UNDERDASH
J20	D38	5	LEFT HEADLIGHT
J22	G38	5	PARKING LIGHT FRONT LEFT
J23	F38	5	FRONT LEFT TURN SIGNAL
J24	H38	5	BLACKOUT MARKER LEFT FRONT
J25	G85	10	WINDSHIELD WASHER ROTARY PUMP (B3)
J27	A43	5	CHASSIS - FRONT
J31	E55	7	ENGINE
J31X	F175	20	CAB - DASH - LEFT - UNDERDASH
J39	G61	7	ENGINE
J43	G42	5	CHASSIS - FRONT
J43X	F42	5	CHASSIS - FRONT
J43X	G175	20	CAB - DASH - LEFT - UNDERDASH
J50	E85	10	CAB MARKER LIGHT FRONT UPPER LEFT
J51	D42	5	CHASSIS - FRONT
J52	E38	5	CHASSIS - FRONT BUMPER
J52	B203	23	CHASSIS - FRONT
J53	F200	23	AIRDROP ONLY
J55	C85	10	CAB MARKER LIGHT FRONT UPPER RIGHT
J57	D85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
J59	C85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
J60	D85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
J62	E88	10	ROTARY WARNING LIGHT CONNECTOR
J65	E186	21	ROTARY WARNING LIGHT CONNECTOR
J78	F185	21	CAB RADIO CONNECTOR
J80	D78	9	AIR DRYER (EXCEPT DUMP)
J93	B50	6	CHASSIS - SPARE TIRE
J95	E38	5	12V INTERVEHICULAR
J95	B206	23	ENGINE
J99	E187	21	CHEMICAL ALARM CONNECTOR
J106	F50	6	CHEMICAL DETECTOR RECEPTACLE
J108	B222	25	CAB - DASH - CENTER - OPTIONS PANEL
J111	E122	14	CTIS ELECTRONIC CONTROL UNIT
J113	G186	21	CTIS PRESSURE TRANSDUCER
J114	B165	21	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
J114	D298	34	WTEC III TRANSMISSION HARNESS (TID1)
J114	D303	34	WTEC III TRANSMISSION HARNESS (TID2)
J115	C154	18	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
J116	C159	18	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
J117	F161	18	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
J117	B289	33	WTEC III DIAGNOSTIC CONNECTOR
J118	D161	18	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
J119	B169	19	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
J119	D301	34	WTEC III CAB TRANSMISSION HARNESS (TID1)
J119	D305	34	WTEC III CAB TRANSMISSION HARNESS (TID2)
J129	F85	10	CAB MARKER LIGHT FRONT LOWER LEFT
J130	F85	10	CAB MARKER LIGHT LEFT DOOR
J130	F202	23	12 PIN CONNECTOR
J131	B85	10	CAB MARKER LIGHT RIGHT DOOR
J132	B85	10	CAB MARKER LIGHT FRONT LOWER RIGHT
J150	B271	31	VAN FRONT MARKER LIGHT
J151	B271	31	VAN FRONT MARKER LIGHT
J152	B271	31	VAN FRONT MARKER LIGHT
J153	A271	31	VAN FRONT MARKER LIGHT

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
J154	A271	31	VAN FRONT MARKER LIGHT
J155	B287	32	VAN CURBSIDE MARKER LIGHT
J156	B287	32	VAN CURBSIDE MARKER LIGHT
J157	C287	32	VAN ROADSIDE MARKER LIGHT
J158	C287	32	VAN ROADSIDE MARKER LIGHT
J159	D287	32	VAN REAR CENTER MARKER LIGHT
J160	E287	32	VAN REAR CENTER MARKER LIGHT
J161	E287	32	VAN REAR CENTER MARKER LIGHT
J162	B273	31	VAN CURBSIDE BLACKOUT LIGHT
J163	B274	31	VAN CURBSIDE EMERGENCY LIGHT
J164	H274	31	VAN ROADSIDE BLACKOUT LIGHT
J165	H275	31	VAN ROADSIDE EMERGENCY LIGHT
J166	C271	31	VAN FRONT EMERGENCY LIGHT
J167	D287	32	VAN REAR EMERGENCY LIGHT
J173	G272	31	VAN 12/24 VDC POWER RECEPTACLE
J209A	C230	26	PTO EQUIPPED
J209B	D230	26	PTO EQUIPPED
J210	F222	25	CAB - DASH - CENTER - OPTIONS PANEL
J215	E230	26	PTO EQUIPPED
J230	A282	32	VAN CURBSIDE 110 VAC OUTLET
J231	A283	32	VAN CURBSIDE 110 VAC OUTLET
J232	A284	32	VAN CURBSIDE 110 VAC OUTLET
J233	H282	32	VAN ROADSIDE 110 VAC OUTLET
J234	H283	32	VAN ROADSIDE 110 VAC OUTLET
J235	H284	32	VAN ROADSIDE 110 VAC OUTLET
J236	H275	31	VAN ROADSIDE 24 VDC OUTLET
J237	275	31	VAN CURBSIDE 24 VDC OUTLET
J242	D271	31	VAN A/C
J244	E271	31	VAN THERMOSTAT
J245	F271	31	VAN HEATER
J912	B124	14	CAB - DASH - CENTER - HEATER / CTIS ECU
J912	D209	24	CAB - DASH - CENTER - OPTIONS PANEL
J913	B122	14	CAB - DASH - CENTER - HEATER / CTIS ECU
J921	G62	7	TROOP TRANSPORT ALARM
P2	A185	21	EMI FILTER
P3	D204	23	AIRDROP ONLY
P5	A38	5	VEHICLE HORN
P6	A38	5	VEHICLE HORN
P8	B38	5	BLACKOUT MARKER RIGHT FRONT
P9	C38	5	FRONT RIGHT TURN SIGNAL
P10	B38	5	PARKING LIGHT FRONT RIGHT
P12	D38	5	RIGHT HEADLIGHT
P13	C38	5	RIGHT HEADLIGHT
P14	C38	5	RIGHT HEADLIGHT
P17	H38	5	BLACKOUT DRIVE LIGHT
P18	D38	5	LEFT HEADLIGHT
P18	A177	20	CAB - DASH - LEFT - UNDERDASH
P19	E38	5	LEFT HEADLIGHT
P20	D38	5	LEFT HEADLIGHT
P22	G38	5	PARKING LIGHT FRONT LEFT
P23	F38	5	FRONT LEFT TURN SIGNAL
P24	H38	5	BLACKOUT MARKER LEFT FRONT
P25	G85	10	WINDSHIELD WASHER ROTARY PUMP (B3)
P27	A43	5	CHASSIS - FRONT
P31	E56	7	ENGINE
P31X	D56	7	ENGINE
P32	F59	7	ENGINE OIL PRESSURE SENSOR
P33	H59	7	FUEL/WATER SEPARATOR
P34	E59	7	OIL PRESSURE WARNING LIGHT SWITCH
P36	A57	7	WATER COOLER TEMPERATURE
P37	C57	7	WATER TEMPERATURE SWITCH
P38	F61	7	ENGINE SPEED MAGNETIC PICKUP
P39	G61	7	ENGINE
P41	B57	7	WATER TEMPERATURE SENSOR
P410	E240	27	ARCTIC KIT W/PTO EQUIPPED
P42	F57	7	ETHER SENSOR SWITCH
P43	G42	5	CHASSIS - FRONT
P43X	F42	5	CHASSIS - FRONT
P50	E85	10	CAB MARKER LIGHT FRONT UPPER LEFT
P50	F206	23	LH FRONT TOP CAB MARKER LIGHT
P51	D190	22	CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL
P52F	E38	5	CHASSIS - FRONT
P52R	E196	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
P53R	D196	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
P54	D197	22	LEFT REAR MARKER
P55	C85	10	CAB MARKER LIGHT FRONT UPPER RIGHT
P55	D206	23	RH FRONT TOP CAB MARKER LIGHT
P56	E197	22	MIDDLE REAR MARKER
P57	D85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
P57	F206	23	LH FRONT TOP CAB CLEARANCE LIGHT
P58	E197	22	RIGHT REAR MARKER
P59	C85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
P59	D206	23	RH FRONT TOP CAB CLEARANCE LIGHT
P60	D85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
P60	E206	23	MIDDLE FRONT TOP CLEARANCE LIGHT
P61	F197	22	RH COMPOSITE LIGHT
P62	F197	22	RH COMPOSITE LIGHT
P63	G197	22	RH COMPOSITE LIGHT
P64	F197	22	RH COMPOSITE LIGHT
P65	E186	21	ROTARY WARNING LIGHT CONNECTOR
P67	A74	9	PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION EXTERNAL
P67	B69	8	WIRING HARNESS TO TRANSMISSION CONNECTOR TID1, TID2, AND TID3 TRANSMISSION EXTERNAL WIRING
			HARNESS TO TRANSMISSION CONNECTOR
P69	D59	7	ENGINE
P71	E66	8	PRE-BLOCK SEVEN TRANSMISSION OUTPUT SPEED SENSOR
P71	E70	8	CONNECTOR TID1, TID2, AND TID3 TRANSMISSION OUTPUT SPEED
P71	E75	9	SENSOR CONNECTOR PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION OUTPUT
P72	F66	8	SPEED SENSOR CONNECTOR PRE-BLOCK SEVEN TRANSMISSION ENGINE SPEED
P72	F70	8	SENSOR CONNECTOR TID1, TID2, AND TID3 TRANSMISSION ENGINE SPEED
P72	E75	9	SENSOR CONNECTOR PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION ENGINE
P73	F66	8	SPEED SENSOR CONNECTOR PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION
P73	F70	8	SENSOR CONNECTOR TID1, TID2, AND TID3 TRANSMISSION THROTTLE POSITION
P73	F75	9	SENSOR CONNECTOR PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION THROTTLE
			POSITION SENSOR CONNECTOR
P74	B197	22	LH COMPOSITE LIGHT
P76	C197	22	LH COMPOSITE LIGHT
P77	C197	22	LH COMPOSITE LIGHT
P78	B197	22	LH COMPOSITE LIGHT
P80	G51	6	CHASSIS - REAR
P81	C47	6	CHASSIS - FRONT
P81	D62	7	STARTER THERMO SWITCH
P82	B51	6	FUEL TANK LEVEL SENSOR
P83	B172	20	CAB - DASH - LEFT - UNDERDASH
P84	F51	6	CHASSIS - REAR
P85	A197	22	LH SIDE MARKER LIGHT
P86	A197	22	LH REAR MARKER LIGHT
P87	C197	22	BACKUP LIGHT
P88	H197	22	RH SIDE MARKER LIGHT
P89	G197	22	RH REAR MARKER LIGHT
P99	F186	21	CHEMICAL ALARM CONNECTOR
P10	B38	5	PARKING LIGHT FRONT RIGHT
P110	E119	14	CTIS ELECTRONIC CONTROL UNIT
P111	E122	14	CTIS ELECTRONIC CONTROL UNIT
P112	G123	14	CAB - DASH - CENTER - HEATER / CTIS ECU
P113	F123	14	CTIS ELECTRONIC CONTROL UNIT
P115	C290	33	WTEC III - CAB - DASH - RIGHT - KICK PANEL
P116	C185	21	CAB - DASH - RIGHT - UNDERDASH
P118	D161	18	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
P116	E291	33	WTEC III - CAB - DASH - RIGHT - KICK PANEL
P119	A64	8	PRE-BLOCK SEVEN TRANSMISSION CONNECTOR
P119	A69	8	TID1, TID2, AND TID3 TRANSMISSION CONNECTOR
P119	A73	9	PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION CONNECTOR
P119	B169	19	CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS
P125	G84	10	WINDSHIELD WASHER ROTARY PUMP (B3)
P129	F85	10	CAB MARKER LIGHT FRONT LOWER LEFT
P130	F85	10	CAB MARKER LIGHT LEFT DOOR
P131	A85	10	CAB MARKER LIGHT RIGHT DOOR

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
P132	B85	10	CAB MARKER LIGHT FRONT LOWER RIGHT
P150	B272	31	VAN FRONT MARKER LIGHT
P151	B272	31	VAN FRONT MARKER LIGHT
P152	B272	31	VAN FRONT MARKER LIGHT
P153	A272	31	VAN FRONT MARKER LIGHT
P154	A272	31	VAN FRONT MARKER LIGHT
P155	B287	32	VAN CURBSIDE MARKER LIGHT
P156	B287	32	VAN CURBSIDE MARKER LIGHT
P157	C287	32	VAN ROADSIDE MARKER LIGHT
P158	C287	32	VAN ROADSIDE MARKER LIGHT
P159	D287	32	VAN REAR CENTER MARKER LIGHT
P160	E287	32	VAN REAR CENTER MARKER LIGHT
P161	D287	32	VAN REAR CENTER MARKER LIGHT
P162	B273	31	VAN CURBSIDE BLACKOUT LIGHT
P163	B274	31	VAN CURBSIDE EMERGENCY LIGHT
P164	G274	31	VAN ROADSIDE BLACKOUT LIGHT
P165	G275	31	VAN ROADSIDE EMERGENCY LIGHT
P166	C272	32	VAN FRONT EMERGENCY LIGHT
P167	D287	31	VAN REAR EMERGENCY LIGHT
P172	E264	30	DUMP BODY CONNECTOR
P173	G271	31	VAN 12/24 VDC POWER
P201	G61	7	ENGINE
P210	F222	25	CAB - DASH - CENTER - OPTIONS PANEL
P210	C227	26	PTO EQUIPPED
P215	E230	26	PTO EQUIPPED
P216	E229	26	PTO EQUIPPED
P217	C229	26	PTO EQUIPPED
P217	B268	30	PTO EQUIPPED
P901	A209	24	CAB - DASH - CENTER - OPTIONS PANEL
P902A	D214	24	CAB - DASH - CENTER - OPTIONS PANEL
P903	C212	24	CAB - DASH - CENTER - OPTIONS PANEL
P903A	D212	24	CAB - DASH - CENTER - OPTIONS PANEL
P904	C211	24	CAB - DASH - CENTER - OPTIONS PANEL
P904A	D211	24	CAB - DASH - CENTER - OPTIONS PANEL
P905	A211	24	CAB - DASH - CENTER - OPTIONS PANEL
P905A	B211	24	CAB - DASH - CENTER - OPTIONS PANEL
P906	A212	24	CAB - DASH - CENTER - OPTIONS PANEL
P906A	B212	24	CAB - DASH - CENTER - OPTIONS PANEL
P908	A215	24	CAB - DASH - CENTER - OPTIONS PANEL
P908A	B215	24	CAB - DASH - CENTER - OPTIONS PANEL
P909	A220	25	CAB - DASH - CENTER - OPTIONS PANEL
P909A	B220	25	CAB - DASH - CENTER - OPTIONS PANEL
P910	C215	24	CAB - DASH - CENTER - OPTIONS PANEL
P910A	D215	24	CAB - DASH - CENTER - OPTIONS PANEL
P911	C220	25	CAB - DASH - CENTER - OPTIONS PANEL
P911A	D220	25	CAB - DASH - CENTER - OPTIONS PANEL
P912	B124	14	CAB - DASH - CENTER - HEATER / CTIS ECU
P913	B122	14	CAB - DASH - CENTER - HEATER / CTIS ECU
P913	F209	24	CAB - DASH - CENTER - OPTIONS PANEL
P914	A214	24	CAB - DASH - CENTER - OPTIONS PANEL
P914A	B214	24	CAB - DASH - CENTER - OPTIONS PANEL
P921	G62	7	TROOP TRANSPORT ALARM
PBSS	C93	11	WTEC II PUSHBUTTON SHIFT SELECTOR
PX1	A92	11	ENGINE FAN OFF SWITCH
PX10	D107	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX11	G107	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX12	C112	13	ROTATING WARNING LIGHT SWITCH
PX12A	E112	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX13	F92	11	ETHER STARTER SWITCH
PX13A	G92	11	CAB - DASH - LEFT - INSTRUMENT PANEL
PX14	F112	13	FULL HAZARD WARNING SWITCH
PX14A	H112	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX15	C115	13	MAIN LIGHT SWITCH
PX17	A112	13	IGNITION SWITCH
PX17A	C112	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX1A	B92	11	CAB - DASH - LEFT - INSTRUMENT PANEL
PX2	D92	11	LAMP TEST SWITCH
PX20	C188	21	TURN SIGNAL FLASHER
PX21	A134	15	WIPER DELAY MODULE

FIGURE FO-1 ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 2 OF 34

SIZE B | ILL. NO. 5WD01L2B | FP-3/ (FP-4 BLANK)

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
PX22	A184	21	EMI FILTER
PX24	G115	13	INSTRUMENT PANEL LIGHTS DIMMER MODULE
PX25	C119	14	CAB DASH CENTER HEATER / CTIS ECU
PX26	B179	20	CAB - DASH - LEFT - UNDERDASH
PX2A	E92	11	CAB - DASH - LEFT - INSTRUMENT PANEL
PX33	B182	21	CAB - DASH - RIGHT - UNDERDASH
PX33	G292	33	WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR
PX34	E188	21	FRONT AIR PRESSURE METER
PX4	F97	11	FAN SOLENOID
PX5	B97	11	REAR AIR PRESSURE METER
PX6	B107	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX7	A104	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX8	G102	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX9	D97	11	FUEL LEVEL METER

LIGHTS			
NUMBER	ZONE	SH	DESCRIPTION
DS1	B257	29	POWER LAMP
DS2	B257	29	POWER LAMP
DS1	D96	11	CAB - DASH - LEFT - INSTRUMENT PANEL
DS2	G106	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS3	F96	11	CAB - DASH - LEFT - INSTRUMENT PANEL
DS4	B96	11	CAB - DASH - LEFT - INSTRUMENT PANEL
DS5	B106	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS6	G101	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS7	D106	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS8	C91	11	CAB - DASH - LEFT - INSTRUMENT PANEL
DS9	B101	12	DUMP BODY UP
DS10	E111	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS11	G91	11	CAB - DASH - LEFT - INSTRUMENT PANEL
DS12	H111	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS13	C111	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS14	B101	12	LEFT TURN SIGNAL
DS15	B101	12	RIGHT TURN SIGNAL
DS16	E101	12	HIGH BEAM
DS17	D119	14	HEATER CONTROL PANEL ILLUMINATION
DS18	A208	24	CAB - DASH - CENTER - OPTIONS PANEL
DS19	E101	12	RADIATOR FAN OFF
DS21	C101	12	EMERGENCY BRAKE
DS22	D101	12	PARKING BRAKE
DS23	C101	12	PTO ON
DS24	D101	12	OIL PRESSURE
DS25	C101	12	WATER TEMPERATURE
DS27	C101	12	REAR BRAKE AIR
DS28	E101	12	FRONT AIR BRAKE
DS29	D101	12	ENGINE OIL LEVEL
DS30	F101	12	MASTER STOP
DS31	D213	24	CAB - DASH - CENTER - OPTIONS PANEL
DS32	B101	12	CHEMICAL DETECT
DS34	C101	12	CTIS OVERSPEED
DS35	C198	22	REAR LH COMPOSITE LIGHT
DS36	G198	22	REAR RH COMPOSITE LIGHT
DS37	B198	22	REAR LH COMPOSITE LIGHT
DS38	F198	22	REAR RH COMPOSITE LIGHT
DS39	F37	5	FRONT LEFT TURN SIGNAL
DS41	D101	12	TRANSMISSION OIL TEMPERATURE
DS42	C38	5	FRONT RIGHT TURN SIGNAL
DS43	D212	24	CAB - DASH - CENTER - OPTIONS PANEL
DS44	D37	5	RIGHT HEADLIGHT
DS45	C198	22	BACKUP LIGHT
DS46	D210	24	CAB - DASH - CENTER - OPTIONS PANEL
DS47	G37	5	PARKING LIGHT FRONT LEFT
DS48	B38	5	PARKING LIGHT FRONT RIGHT
DS49	G37	5	BLACKOUT MARKER LEFT FRONT
DS50	B38	5	BLACKOUT MARKER RIGHT FRONT
DS51	C198	22	REAR LH COMPOSITE LIGHT
DS52	F198	22	REAR RH COMPOSITE LIGHT
DS53	H37	5	BLACKOUT DRIVE LIGHT
DS54	D84	10	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
DS54	F206	23	LH FRONT TOP CAB CLEARANCE LIGHT
DS55	D84	10	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
DS55	E206	23	MIDDLE FRONT TOP CLEARANCE LIGHT

LIGHTS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
DS56	C84	10	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
DS56	D206	23	RH FRONT TOP CAB CLEARANCE LIGHT
DS57	C84	10	CAB MARKER LIGHT FRONT UPPER RIGHT
DS57	D206	23	RH FRONT TOP CAB MARKER LIGHT
DS58	E84	10	CAB MARKER LIGHT FRONT UPPER LEFT
DS58	F206	23	LH FRONT TOP CAB MARKER LIGHT
DS59	B84	10	CAB MARKER LIGHT RIGHT DOOR
DS60	F84	10	CAB MARKER LIGHT FRONT LOWER LEFT
DS61	A84	10	CAB MARKER LIGHT RIGHT DOOR
DS62	F84	10	CAB MARKER LIGHT LEFT DOOR
DS63	B210	24	CAB - DASH - CENTER - OPTIONS PANEL
DS64	B212	24	CAB - DASH - CENTER - OPTIONS PANEL
DS65	A198	22	LH SIDE MARKER LIGHT
DS66	A198	22	LH REAR MARKER LIGHT
DS67	H198	22	RH SIDE MARKER LIGHT
DS68	G198	22	RH REAR MARKER LIGHT
DS69	D198	22	LEFT REAR MARKER
DS70	E198	22	MIDDLE REAR MARKER
DS71	E198	22	RIGHT REAR MARKER
DS72	B198	22	REAR LH COMPOSITE LIGHT
DS73	F198	22	REAR RH COMPOSITE LIGHT
DS74	D37	5	LEFT HEADLIGHT
DS75	A273	31	VAN CURBSIDE BLACKOUT LIGHT
DS76	H274	31	VAN ROADSIDE BLACKOUT LIGHT
DS78	A274	31	VAN CURBSIDE EMERGENCY LIGHT
DS79	H275	31	VAN ROADSIDE EMERGENCY LIGHT
DS80	H284	32	VAN ROADSIDE FLUORESCENT LIGHT
DS81	H286	32	VAN ROADSIDE FLUORESCENT LIGHT
DS82	A286	32	VAN CURBSIDE FLUORESCENT LIGHT
DS83	A284	32	VAN CURBSIDE FLUORESCENT LIGHT
DS84	B271	31	VAN FRONT MARKER LIGHT
DS85	B271	31	VAN FRONT MARKER LIGHT
DS86	B271	31	VAN FRONT MARKER LIGHT
DS87	A271	31	VAN FRONT MARKER LIGHT
DS88	A271	31	VAN FRONT MARKER LIGHT
DS89	B288	32	VAN CURBSIDE MARKER LIGHT
DS90	B288	32	VAN CURBSIDE MARKER LIGHT
DS91	C288	32	VAN ROADSIDE MARKER LIGHT
DS92	C288	32	VAN ROADSIDE MARKER LIGHT
DS93	D288	32	VAN REAR CENTER MARKER LIGHT
DS94	E288	32	VAN REAR CENTER MARKER LIGHT
DS95	E288	32	VAN REAR CENTER MARKER LIGHT
DS96	B215	24	CAB - DASH - CENTER - OPTIONS PANEL
DS96	C271	31	VAN FRONT EMERGENCY LIGHT
DS97	B219	25	CAB - DASH - CENTER - OPTIONS PANEL
DS97	C271	32	VAN REAR EMERGENCY LIGHT
DS100	B213	24	CAB - DASH - CENTER - OPTIONS PANEL
DS101	D119	14	HEATER CONTROL PANEL ILLUMINATION
DS108	E91	11	CAB - DASH - LEFT - INSTRUMENT PANEL

CIRCUIT BREAKERS			
NUMBER	ZONE	SH	DESCRIPTION
CB1	C285	32	VAN 110 VAC MAIN CIRCUIT BREAKER
CB2	C284	32	VAN A/C
CB3	D284	32	VAN 110 VAC POWER OUT
CB4	D284	32	VAN NOT USED
CB5	E284	32	VAN BLACKOUT OVERRIDE
CB6	E284	32	VAN LIGHTS
CB7	E284	32	VAN 110 VAC OUTLETS
CB8	E284	32	VAN THERMOSTAT/FAN
CB9	E284	32	VAN 110 VAC OUTLETS
CB10	D277	31	VAN BLACKOUT LIGHTS
CB11	D277	31	VAN EMERGENCY/BLACKOUT LIGHTS
CB20	C140	16	CAB RADIO
CB21	C149	17	WTEC II VIM STE/ICE
CB22	C149	17	FAN/ETHER
CB23	C147	17	HEATER BLOWER
CB30	C139	16	CHEMICAL ALARM
CB35	D149	17	WTEC II VIM POWER
CB36	C147	17	HORN POWER
CB37	C151	17	WINDSHIELD WIPER/WASHER
CB38	D147	17	ROTATING BEACON
CB39	C146	17	TRAILER BLACKOUT STOP

CIRCUIT BREAKERS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
CB40	C150	17	CTIS COOLER
CB41	C142	16	TRAILER REAR LIGHTS POWER
CB42	C142	16	BLACKOUT MARKER LIGHTS POWER
CB43	C143	16	REAR COMPOSITE LIGHTS/WTEC III ECU
CB44	C143	16	REAR COMPOSITE LIGHTS
CB45	C139	16	FUEL PREHEAT
CB48	C140	16	ARCTIC CAB/ENGINE KILL
CB49	C151	17	PTO POWER
CB50	F256	29	MAIN POWER CIRCUIT BREAKER SWITCH
CB53	D140	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB54	D142	16	BLACKOUT HEADLIGHT
CB61	D153	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB62	D153	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB63	D151	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB64	D151	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB65	D140	16	PARKING LIGHTS
CB66	D143	16	BLACKOUT MARKER POWER
CB67	D139	16	MARKER LIGHTS
CB68	C152	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB70	D146	17	IGNITION/MAIN LIGHT SWITCH
CB71	D149	17	HAZARD/FLASHER WORKLIGHTS
CB72	D139	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB73	D150	17	BACK-UP LIGHT POWER
CB74	D150	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB76	D143	16	BLACKOUT STOP RELAY POWER
CB77	C152	17	ENGINE INSTR POWER
CB78	D147	17	HEADLIGHTS
CB79	C150	17	WTEC II VIM POWER/WTEC III REVERSE WARNING RELAY
CB80	D142	16	TAILLIGHTS

TERMINAL LUGS			
NUMBER	ZONE	SH	DESCRIPTION
TL1	B54	6	POLARITY PROTECTION
TL1	E60	7	ALTERNATOR
TL2	B53	6	POLARITY PROTECTION
TL2	D60	7	ALTERNATOR
TL2	D53	6	POLARITY PROTECTION (P/P)
TL3	C85	10	CAB MARKER LIGHT FRONT UPPER RIGHT
TL3	D206	23	RH FRONT TOP CAB MARKER LIGHT
TL4	C85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
TL4	D206	23	RH FRONT TOP CAB CLEARANCE LIGHT
TL5	D60	7	ALTERNATOR
TL6	D60	7	ALTERNATOR
TL8	D85	10	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
TL8	E206	23	MIDDLE FRONT TOP CLEARANCE LIGHT
TL9	D47	6	24V AUXILIARY STARTER SOLENOID
TL10	C52	6	CHASSIS - REAR (REF E1)
TL12	C49	6	BATTERIES
TL12	C62	7	STARTER/STARTER SOLENOID
TL14	E88	10	ROTARY WARNING LIGHT CONNECTOR
TL15	A198	22	LH SIDE MARKER LIGHT
TL16	A198	22	LH REAR MARKER LIGHT
TL17	C198	22	BACKUP LIGHT
TL18	C198	22	LONG WHEEL BASE
TL19	H198	22	RH SIDE MARKER LIGHT
TL20	G198	22	RH REAR MARKER LIGHT
TL21	G198	22	RH COMPOSITE LIGHT
TL22	D85	10	CAB MARKER LIGHTS
TL22	E206	23	LH FRONT TOP CAB CLEARANCE LIGHT
TL23	D47	6	24V AUXILIARY STARTER SOLENOID
TL24	D47	6	24V AUXILIARY STARTER SOLENOID
TL25	C47	6	CHASSIS - FRONT
TL25	C62	7	STARTER/STARTER SOLENOID
TL26	C47	6	CHASSIS - FRONT
TL26	C62	7	STARTER/STARTER SOLENOID
TL27	E85	10	CAB MARKER LIGHT FRONT UPPER RIGHT
TL27	F206	23	CAB MARKER LIGHTS FRONT UPPER RIGHT
TL28	G57	7	FUEL SOLENOID
TL29	H57	7	FUEL SOLENOID
TL30	D198	22	LEFT REAR MARKER

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL31	E198	22	MIDDLE REAR MARKER
TL32	E198	22	RIGHT REAR MARKER
TL33	E47	6	24V AUXILIARY STARTER SOLENOID
TL35	D61	7	ALTERNATOR
TL36	B54	6	POLARITY PROTECTION
TL37	F54	6	POLARITY PROTECTION
TL37	C54	6	POLARITY PROTECTION
TL38	E50	6	SHUNT
TL39	C52	6	CHASSIS - REAR (REF E1)
TL41	C53	6	POLARITY PROTECTION
TL42	B54	6	POLARITY PROTECTION
TL44	B54	6	POLARITY PROTECTION
TL44	E54	6	POLARITY PROTECTION
TL45	D50	6	SHUNT
TL46	D49	6	SHUNT
TL46	D62	7	STARTER/STARTER SOLENOID
TL47	C54	6	POLARITY PROTECTION
TL48	E52	6	CHASSIS - REAR (REF E2)
TL49A	D52	6	CHASSIS - REAR (REF E1)
TL49A	F52	6	NATO SLAVE RECEPTACLE
TL50	G121	14	CHASSIS GROUND
TL50A	F52	6	NATO SLAVE RECEPTACLE
TL51	E50	6	SHUNT
TL52	E50	6	SHUNT
TL53	B47	6	CHASSIS - FRONT
TL53	B62	7	STARTER/STARTER SOLENOID
TL55	B47	6	CHASSIS - FRONT
TL55	C62	7	STARTER/STARTER SOLENOID
TL56	F136	16	X3 GROUND
TL57	F136	16	CAB GROUND
TL58	D60	7	ALTERNATOR
TL59	C61	7	ALTERNATOR
TL60	C53	6	POLARITY PROTECTION
TL60	D60	7	ALTERNATOR
TL61	C54	6	POLARITY PROTECTION
TL61	E60	7	ALTERNATOR
TL62	C47	6	CHASSIS - FRONT
TL63	C47	6	CHASSIS - FRONT
TL63	B62	7	STARTER/STARTER SOLENOID
TL66	H61	7	ENGINE (REF P201)
TL68	D224	25	CAB - DASH - CENTER - OPTIONS PANEL
TL69	E224	25	CAB - DASH - CENTER - OPTIONS PANEL
TL70	B38	5	FRONT RH COMPOSITE LIGHT
TL71	A85	10	CAB MARKER LIGHT RIGHT DOOR
TL72	H38	5	BLACKOUT DRIVE LIGHT
TL73	B86	10	CAB - MARKER LIGHTS
TL74	D86	10	CAB - MARKER LIGHTS
TL74	E204	23	AIRDROP ONLY
TL75	F87	10	CAB - MARKER LIGHTS
TL76	D229	26	PTO EQUIPPED
TL79	F38	5	FRONT LH COMPOSITE LIGHT
TL80	C54	6	POLARITY PROTECTION
TL80	F54	6	200 AMP
TL81	C39	5	CHASSIS GROUND
TL82	F38	5	CHASSIS GROUND
TL83	B52	6	FUEL TANK LEVEL SENSOR
TL84	B49	6	CHASSIS - SPARE TIRE (REF J93)
TL85	G52	6	CHASSIS - REAR
TL86	C86	10	CAB - MARKER LIGHTS
TL86	D204	23	AIRDROP ONLY
TL87	F86	10	CAB - MARKER LIGHTS
TL92	F195	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
TL93	G194	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
TL94	G85	10	WINDSHIELD WASHER ROTARY PUMP (B3)
TL96	H271	31	VAN BODY GROUND
TL97	B88	10	CHEMICAL ALARM CONNECTOR
TL98	B88	10	CHEMICAL ALARM CONNECTOR

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL99	D52	6	CHASSIS - REAR (REF E2)
TL100	E54	6	POLARITY PROTECTION
TL110	D61	7	ALTERNATOR
TL111	D230	26	PTO EQUIPPED
TL123	E38	5	CHASSIS - FRONT (REF J19)
TL126	E126	14	CHASSIS GROUND
TL130	F85	10	CAB - MARKER LIGHTS
TL131	A85	10	CAB - MARKER LIGHTS
TL133	F85	10	CAB - MARKER LIGHTS
TL134	B85	10	CAB - MARKER LIGHTS
TL150	F177	20	SENSOR/FRONT AIR PRESSURE TRANSMITTER
TL151	G177	20	SENSOR/REAR AIR PRESSURE TRANSMITTER
TL152	C179	20	STOPLIGHT SWITCH
TL153	C179	20	STOPLIGHT SWITCH
TL154	D179	20	STOPLIGHT SWITCH
TL154	D179	20	STOPLIGHT SWITCH
TL155	D179	20	STOPLIGHT SWITCH
TL156	F177	20	SWITCH/FRONT AIR PRESSURE TRANSMITTER
TL157	G177	20	SWITCH/REAR AIR PRESSURE TRANSMITTER
TL158	E137	16	START INHIBIT PUSHBUTTON
TL159	E136	16	START INHIBIT PUSHBUTTON
TL160	H102	12	AUDIBLE ALARM
TL161	H102	12	AUDIBLE ALARM
TL162	B114	13	STARTER PUSHBUTTON
TL163	B114	13	STARTER PUSHBUTTON
TL164	G62	7	ENGINE (REF J921)
TL165	G62	7	ENGINE (REF J921)
TL166	F54	6	TERMINAL BLOCK
TL167	E54	6	TERMINAL BLOCK
TL169	D53	6	POLARITY PROTECTION (P/P)
TL171	F54	6	TERMINAL BLOCK
TL172	F54	6	TERMINAL BLOCK
TL173	E54	6	POLARITY PROTECTION (P/P)
TL174	D54	6	POLARITY PROTECTION (P/P)
TL190	D290	33	WTEC III PRESSURE SWITCH GROUND
TL201	E125	14	PARKING BRAKE SWITCH
TL202	E125	14	PARKING BRAKE SWITCH
TL320	E232	26	PTO EQUIPPED
TL320	C241	27	ARCTIC KIT W/PTO EQUIPPED

SWITCHES			
NUMBER	ZONE	SH	DESCRIPTION
S3	A177	20	COLUMN SWITCH
S3	C177	20	COLUMN SWITCH
S4	D114	13	MAIN LIGHT SWITCH
S5/1	B111	13	IGNITION SWITCH
S5/11	A91	11	ENGINE FAN OFF SWITCH
S5/14	C213	24	WINCH ON OFF
S5/15	B212	24	WINCH IN-OUT
S5/16	F91	11	ETHER STARTER SWITCH
S5/2	D91	11	LAMP TEST SWITCH
S5/2	D111	13	ROTATING WARNING LIGHT SWITCH
S5/22	G111	13	FULL HAZARD WARNING SWITCH
S5/25	A219	25	SWINGFIRE PUMP SWITCH
S5/6	B210	24	PTO ON/OFF SWITCH
S5/8	A213	24	BLACKOUT OVERRIDE SWITCH
S5/9	A214	24	FUEL PRE-HEAT SWITCH
S6	A114	13	STARTER PUSHBUTTON
S7	F137	16	START INHIBIT PUSHBUTTON
S10A	C179	20	STOPLIGHT SWITCH
S10B	D179	20	STOPLIGHT SWITCH
S11	A287	32	VAN CURBSIDE WINDOW BLACKOUT SWITCH
S12	A287	32	VAN CURBSIDE WINDOW BLACKOUT SWITCH
S13	G288	32	VAN ROADSIDE WINDOW BLACKOUT SWITCH
S14	G288	32	VAN ROADSIDE WINDOW BLACKOUT SWITCH
S15	G288	32	VAN ROADSIDE WINDOW BLACKOUT SWITCH
S17	G288	32	VAN DOOR WINDOW BLACKOUT SWITCH (S/N 191 AND HIGHER)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 3 OF 34

SIZE B | ILL. NO. 5WD01L3B | FP-5/ (FP-6 BLANK)

SWITCHES (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
S17	G288	32	VAN CURBSIDE WINDOW BLACKOUT SWITCH (S/N 001 THROUGH 190)
S18	D269	30	PTO PRESSURE SWITCH
S20	E177	20	SWITCH/FRONT AIR PRESSURE TRANSMITTER
S23	F52	6	AIR PRESSURE SWITCH FOR CTIS
S24	E125	14	PARKING BRAKE SWITCH
S26	C57	7	WATER TEMPERATURE SENSOR
S27	E59	7	OIL PRESSURE WARNING LIGHT SWITCH
S29	G177	20	SWITCH/REAR AIR PRESSURE TRANSMITTER
S31	A216	24	ARCTIC TROOP HEATER SWITCH
S32	F288	32	VAN LIGHTS ON/OFF SWITCH
S33	E277	31	VAN BLACKOUT SWITCH
S34	D278	31	VAN BLACKOUT SWITCH
S35	H273	31	VAN BLACKOUT OVERRIDE SWITCH
S40	F58	7	ETHER SENSOR SWITCH
S45	E62	7	TROOP ALARM SWITCH
S45	G62	31	VAN FAN ON/OFF SWITCH
S56	A57	7	WATER TEMPERATURE SWITCH
S57	G77	9	LMHC IN/OUT SWITCH

GAGES			
NUMBER	ZONE	SH	DESCRIPTION
M2	D106	12	VOLTMETER
M3	B106	12	ENGINE OIL PRESSURE METER
M4	F96	11	FRONT AIR PRESSURE METER
M5	B96	11	REAR AIR PRESSURE METER
M6	G107	12	WATER TEMPERATURE METER
M7	D96	11	FUEL LEVEL METER
M8	G102	12	SPEEDOMETER
M9	A210	24	TACHOMETER

RELAYS			
NUMBER	ZONE	SH	DESCRIPTION
K1	F149	17	STARTER RELAY
K2	B143	16	CONTROL PANEL RELAY
K6	F144	16	STOPLIGHT RELAY
K7	G153	17	HEADLIGHT RELAY
K8	G151	17	HEADLIGHT LO/HI-BEAM RELAY
K9	A142	16	HAZARD FLASHER BLACKOUT OVERRIDE
K10	F150	17	STOP HAZARD FLASHER RELAY
K11	F146	17	ALTERNATOR EXCITATION RELAY
K12	B139	16	WORKLIGHT RELAY
K13	B149	17	ROTATING BEACON BLACKOUT OVERRIDE RELAY
K15	B140	16	AUXILIARY COOLER RELAY
K19	B150	17	START INHIBIT RELAY
K20	H138	16	MARKER LIGHTS RELAY
K24	B151	17	CRANKING LOCKOUT RELAY
K25	B292	33	WTEC III REVERSE WARNING RELAY
K26	B290	33	WTEC III NEUTRAL START RELAY
K27	H143	16	BLACKOUT STOP RELAY
K28	H142	16	TRAILER REAR LIGHTS RELAY
K29	F142	16	BLACKOUT MARKER RELAY/WTEC III BLACKOUT DRIVE RELAY
K30	H147	17	REAR LEFT COMPOSITE LAMP RELAY
K31	H149	17	REAR RIGHT COMPOSITE LAMP RELAY
K32	B147	17	HORN RELAY
K35	E277	31	VAN 110 VAC OUTLETS
K36	F277	31	VAN FLUORESCENT LIGHTS
K37	B294	33	WTEC III PTO ENABLE OUTPUT RELAY
K52	H139	16	CTIS OVERSPEED INDICATION RELAY
K53	H140	16	RADIO POWER RELAY

RESISTORS			
NUMBER	ZONE	SH	DESCRIPTION
R2	E172	20	CAB - DASH - LEFT - UNDERDASH
R4	D175	20	CAB - DASH - LEFT - UNDERDASH
R5	C175	20	CAB - DASH - LEFT - UNDERDASH
R6	F172	20	CAB - DASH - LEFT - UNDERDASH

SOLENOIDS			
NUMBER	ZONE	SH	DESCRIPTION
KS	D47	6	24V AUXILIARY STARTER SOLENOID
L1	E189	21	FAN SOLENOID
L2	H57	7	FUEL SOLENOID
L3	D269	30	PTO SOLENOID
L4	E233	26	WINCH IN SOLENOID
L5	D233	26	SOLENOID
L15	B51	6	CHASSIS - SPARE TIRE
	E80	9	LMHC IN SOLENOID
	F80	9	LMHC OUT SOLENOID

HORNS AND ALARMS			
NUMBER	ZONE	SH	DESCRIPTION
LS1	A37	5	VEHICLE HORN
LS2	H101	12	AUDIBLE ALARM

MOTORS			
NUMBER	ZONE	SH	DESCRIPTION
B2	A183	21	WINDSHIELD WIPER MOTOR
B4	C118	14	FAN MOTOR
	F81	9	LMHC HOIST MOTOR

BATTERIES			
NUMBER	ZONE	SH	DESCRIPTION
BT1	C52	6	BATTERY
BT2	D52	6	BATTERY
BT3	D52	6	BATTERY
BT4	E52	6	BATTERY

MISCELLANEOUS			
NUMBER	ZONE	SH	DESCRIPTION
10A	C183	21	WTECII VEHICLE INTERFACE MODULE
10A	E183	21	WTECII VEHICLE INTERFACE MODULE
A2	F118	14	CTIS ELECTRONIC CONTROL UNIT
A3	G114	13	INSTRUMENT PANEL LIGHTS DIMMER MODULE
A5	A135	15	WIPER DELAY MODULE
A7	B179	20	FREQUENCY DIVIDER
A18	A103	12	LIGHTED INDICATOR DISPLAY
A20	H59	7	FUEL/WATER SEPARATOR
B1	C63	7	STARTER/STARTER SOLENOID
B3	G83	10	WINDSHIELD WASHER ROTARY PUMP
B10	E67	8	WTEC II TRANSFER CASE (SERIAL # 29513233)
B10	E70	8	WTEC II TRANSFER CASE (SERIAL # 29513233)
B10	E66	8	WTEC II TRANSMISSION (SERIAL # 29513233)
B10	E71	8	WTEC II TRANSFER CASE (SERIAL # 29517497)
B10	E70	8	WTEC II TRANSMISSION (SERIAL # 29517497)
B10	E76	9	WTEC II TRANSFER CASE (SERIAL # 29513233)
B10	E74	9	WTEC II TRANSMISSION (SERIAL # 29513233)
BJ1	A175	20	JUNCTION BOX
BL1	F257	29	FURNACE CONTROL UNIT
BL2	F256	29	FURNACE CONTROL UNIT
BL3	F256	29	FURNACE CONTROL UNIT
D1A	C138	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D1B	C138	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D2A	D138	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D2B	D138	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D3A	B138	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D3B	B138	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E1	C52	6	BATTERY
E1	D52	6	BATTERY
E1	D52	6	BATTERY
E1	E52	6	BATTERY
E2	C43	5	CHASSIS FRONT BUMPER (REF J27)
E2	C52	6	BATTERY
E2	D52	6	BATTERY
E2	E52	6	BATTERY
E2	E52	6	BATTERY
E3	H148	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E4	H150	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E5	B151	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E14	E194	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE

MISCELLANEOUS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
E15	E197	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E16	A197	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E17	G195	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E18	G194	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E19	F194	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E20	E194	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E21	D195	22	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E22	B86	10	CAB - MARKER LIGHTS
E23	D86	10	CAB - MARKER LIGHTS
E23	D205	23	AIRDROP ONLY
E24	C85	10	CAB - MARKER LIGHTS
E24	D205	23	AIRDROP ONLY
E25	F86	10	CAB - MARKER LIGHTS
E60	B41	31	24 VDC VAN POWER
E65	B41	5	CHASSIS - FRONT
E66	C41	5	CHASSIS - FRONT
E66	D300	34	WTEC III CAB TRANSMISSION HARNESS (TID1)
E66	D305	34	WTEC III CAB TRANSMISSION HARNESS (TID2)
E67	D38	5	CHASSIS - FRONT
E68	D40	5	CHASSIS - FRONT
E70	C229	26	PTO EQUIPPED
E71	F173	20	CAB - DASH - LEFT - UNDERDASH
E88	B106	12	CAB - DASH - LEFT - INSTRUMENT PANEL
E89	C106	12	CAB - DASH - LEFT - INSTRUMENT PANEL
E90	D300	34	WTEC III CAB TRANSMISSION HARNESS (TID1)
E90	D305	34	WTEC III CAB TRANSMISSION HARNESS (TID2)
E91	C300	34	WTEC III CAB TRANSMISSION HARNESS (TID1)
E91	C305	34	WTEC III CAB TRANSMISSION HARNESS (TID2)
E501	B275	31	VAN EMERGENCY/BLACKOUT LIGHT/24 VDC OUTLET
E502	G274	31	VAN EMERGENCY/BLACKOUT LIGHT
E503	B273	31	VAN MARKER LIGHT
E504	B272	31	VAN MARKER LIGHT
E505	B287	32	VAN REAR MARKER LIGHTS
E506	C287	32	VAN REAR MARKER LIGHTS
E514	C274	31	VAN EMERGENCY LIGHT
E516	H272	31	VAN 24 VDC
F2	H271	31	VAN 24 VDC POWER
FL	E183	21	WTEC II VEHICLE INTERFACE MODULE
FL1	G85	10	EMI FILTER
FL2	A184	21	EMI FILTER
FL3	C118	14	FAN MOTOR
G1	D60	7	ALTERNATOR
MPU1	F61	7	ENGINE SPEED MAGNETIC PICKUP
MT3	F60	7	ENGINE OIL PRESSURE SENSOR
MT4	E177	20	SENSOR/FRONT AIR PRESSURE TRANSMITTER
MT5	G177	20	SENSOR/REAR AIR PRESSURE TRANSMITTER
MT6	B57	7	WATER COOLER TEMPERATURE
MT7	B52	6	FUEL TANK LEVEL SENSOR
NS	E183	21	WTEC II VEHICLE INTERFACE MODULE
P/P	B54	6	POLARITY PROTECTION
P/P	D54	6	POLARITY PROTECTION
R11	D50	6	SHUNT
R1	D79	9	AIR DRYER
TB1	C128	15	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
TB2	F130	15	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
X1	C137	16	24 VDC
X11	F52	6	NATO SLAVE RECEPTACLE
X2	D137	16	24 VDC
X3	F137	16	GROUND
X5	D137	16	24 VDC
X7	D137	16	24 VDC
PHONE 1	A285	32	VAN PHONE 1
PHONE 2	H287	32	VAN PHONE 2

MISCELLANEOUS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
	E77	9	LIGHT MATERIAL HANDLING CRANE (LMHC)
	E77	9	LMHC REMOTE CONTROL BOX
	E77	9	LMHC POWER CABLE
	G78	9	LMHC REMOTE CONTROL IN/OUT
	G302	34	WTEC III TRANSMISSION PRESSURE SWITCH
	B304	34	WTEC III OUTPUT SPEED SENSOR
	C304	34	WTEC III ENGINE SPEED SENSOR
	E304	34	WTEC III SUMP TEMP SENSOR

TRANSMISSION			
NUMBER	ZONE	SH	DESCRIPTION
A10	B183	21	WTEC II VEHICLE INTERFACE MODULE
A13	B67	8	WTEC II TRANSMISSION A13 (SERIAL # 29513233)
A13	A72	8	WTEC II TRANSMISSION A13 (SERIAL # 29517497)
A13	A76	9	WTEC II TRANSMISSION A13 (SERIAL # 29513233)
B10	E67	8	PRE-BLOCK SEVEN TRANSMISSION OUTPUT SPEED SENSOR
B10	E72	8	TID1, TID2, AND TID3 TRANSMISSION OUTPUT SPEED SENSOR
B10	E76	9	PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION OUTPUT SPEED SENSOR
MT9	F67	8	PRE-BLOCK SEVEN TRANSMISSION ENGINE SPEED SENSOR
MT9	F72	8	TID1, TID2, AND TID3 TRANSMISSION ENGINE SPEED SENSOR
MT9	F76	9	PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION ENGINE SPEED SENSOR
MT11	F67	8	PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION SENSOR
MT11	F72	8	TID1, TID2, AND TID3 TRANSMISSION THROTTLE POSITION SENSOR
MT11	F76	9	PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION THROTTLE POSITION SENSOR
REV	C183	21	WTEC II VEHICLE INTERFACE MODULE
RW	D183	21	WTEC II VEHICLE INTERFACE MODULE
S02	F183	21	WTEC II VEHICLE INTERFACE MODULE
S03	F183	21	WTEC II VEHICLE INTERFACE MODULE
SF01	D183	21	WTEC II VEHICLE INTERFACE MODULE
SF01	D183	21	WTEC II VEHICLE INTERFACE MODULE
SF02	C183	21	WTEC II VEHICLE INTERFACE MODULE
SF02	D183	21	WTEC II VEHICLE INTERFACE MODULE
SF04	C183	21	WTEC II VEHICLE INTERFACE MODULE
SF3	F183	21	WTEC II VEHICLE INTERFACE MODULE
SF4	D183	21	WTEC II VEHICLE INTERFACE MODULE

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 4 OF 34

SIZE B | ILL NO. 5WD01L4B | FP-7/ (FP-8 BLANK)

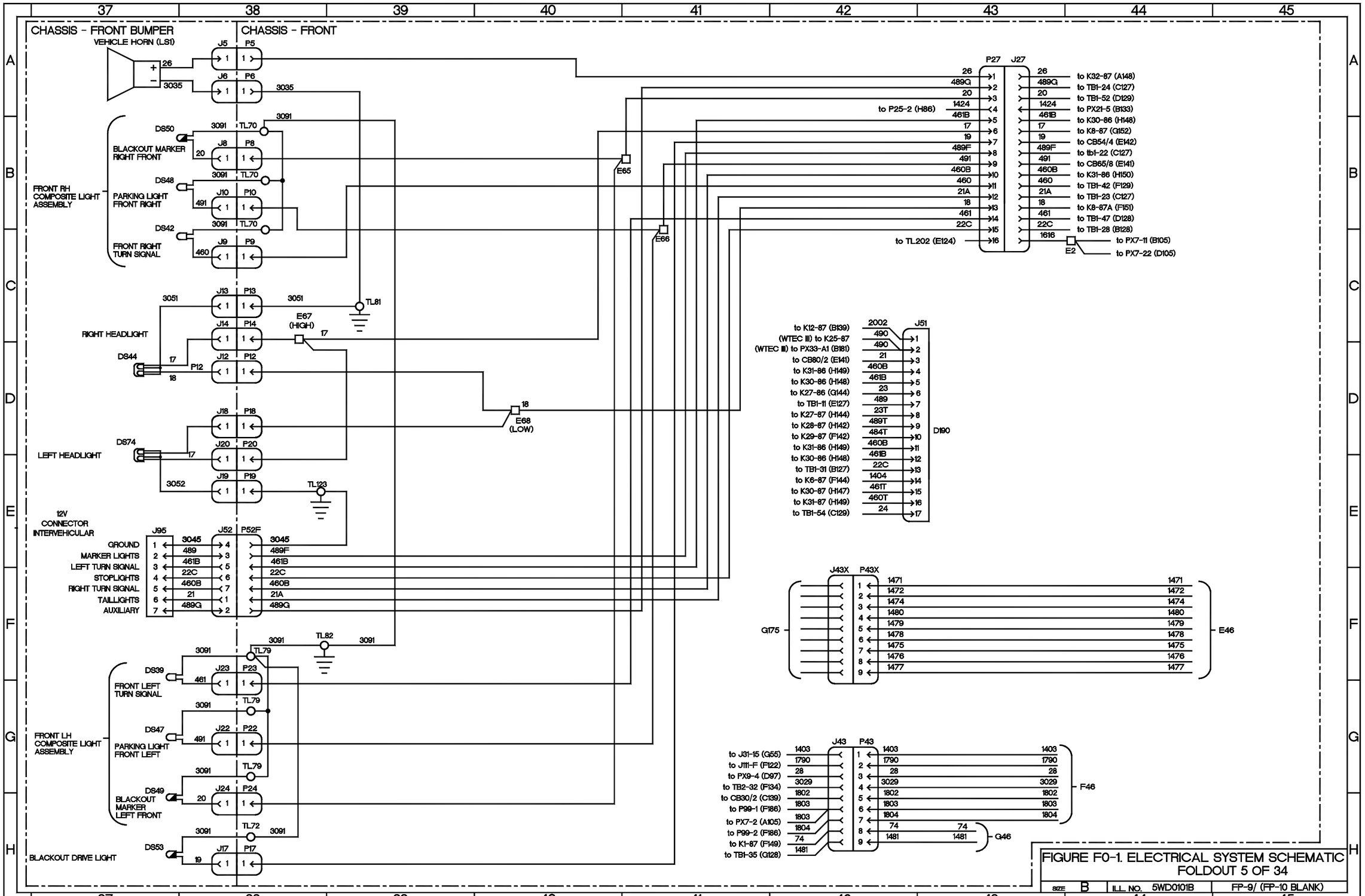


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 5 OF 34

SIZE	ILL. NO.	
B	5WD0101B	FP-9/ (FP-10 BLANK)

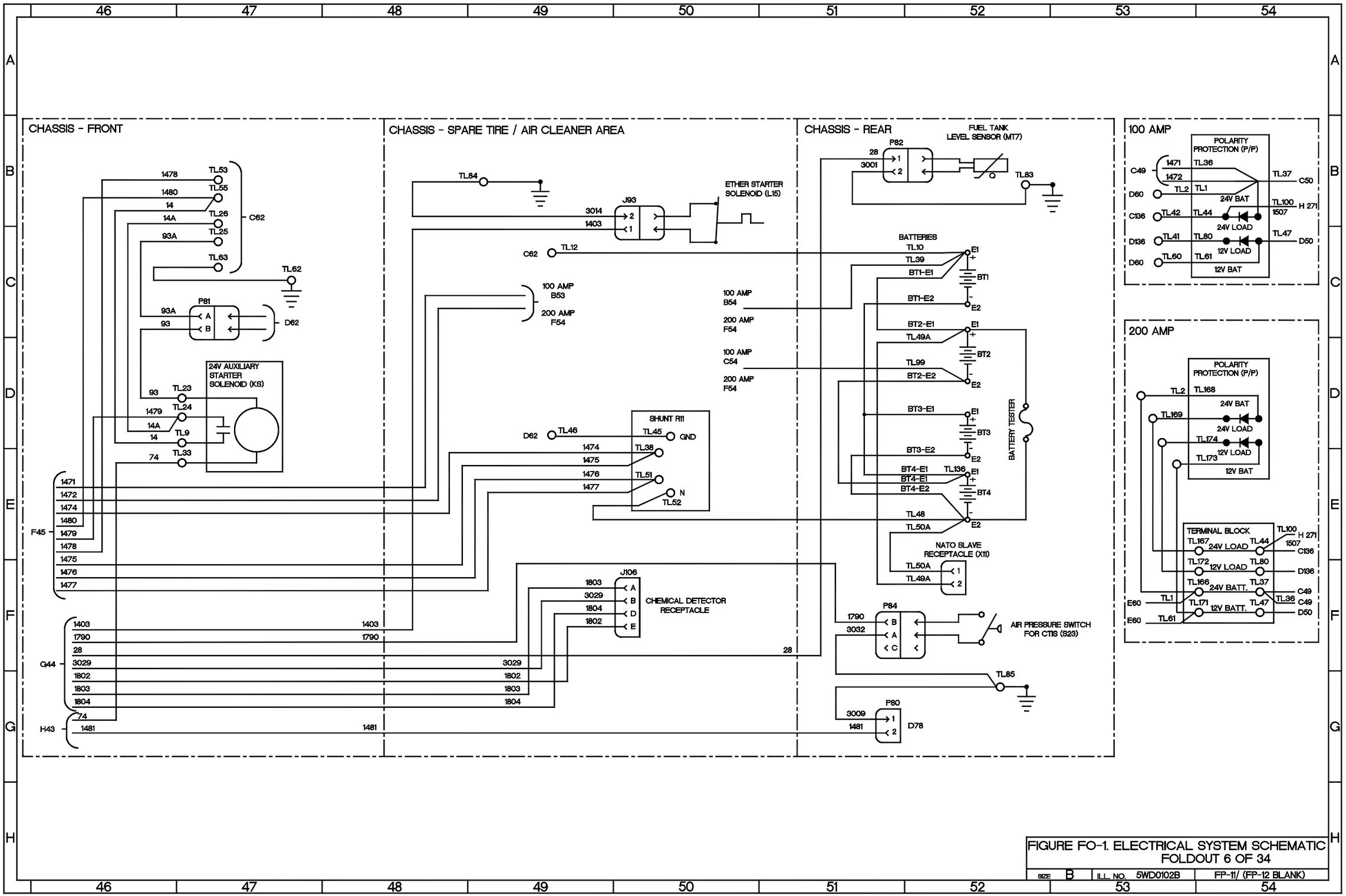


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 6 OF 34

SIZE	B	ILL. NO. 5WD0102B	FP-11/ (FP-12 BLANK)

ENGINE

WATER COOLER TEMPERATURE (S56)
P36
1807
1805

WATER TEMPERATURE SENSOR (MT6)
P41
33
MT6

WATER TEMPERATURE SWITCH (S26)
P37
3026
35

MT11
F66 124
F70 135A
F75 156
THROTTLE POSITION SENSOR (MT11)

STARTER/STARTER SOLENOID (B1)
TL63
TL53
B47 TL55
L
B1
TL26
TL25
C49 TL12
D49 TL46

STARTER THERMO SWITCH
P81
C47
A
B

P31X
F176
1 1441
2 1452
3 3A
4 1432
5 1433
6 1430
7 1435
8 1434
9 1428
10 1453

P69
1430
1435
1434
1428
Not Used

TL59
100 AMP/200 AMP ALTERNATOR (G1)
1452
TL6
TL2
TL58
3A
TL5
TL60
VOLTAGE REGULATOR
24V
GND G1
12V
TL35
TL110
1453
568A
TL61 F53 (200 AMP) C53 (100 AMP)
TL1 F53 (200 AMP) B53 (100 AMP)

P31 J31
to K11-87A (F146) 568A 1 568A
to PX13-3 (F92) 1402 2 1402
to TB1-38 (F129) 1807 3 1807
to PX1-1 (A92) 1806 4 1805
to TB2-18 (F132) 3015 5 3015
to TB2-10 (F131) 3006 7 3006
to PX26-1 (B180) 1444 8 1444
to TB2-36 (F135) 3028 9 3028
to TB2-28 (F134) 3026 10 3026
to PX6-4 (B107) 36 11 36
to CB49/3 (C152) 1460 13 1460
to K19-87B (B151) 54 14 54
to J43-1 (G42) 1403 15 1403
to PX26-4 (B180) 3083 16 3083
to TL178 (D102) 32 17 32
to K11-87 (F146) 1538 18 1538
to PX7-1 (A105) 1523 19 1523
to PX11-4 (H107) 33 20 33
to K11-85 (H146) 34 21 34
to PX7-12 (C106) 35 22 35
to PX26-5 (B180) 1432 25 1432
to PX26-2 (B180) 1433 26 1433

P42
1402
1403
ETHER SENSE SWITCH (S40)

P34
34
3006
OIL PRESSURE WARNING LIGHT SWITCH (S27)

ENGINE SPEED MAGNETIC PICKUP (MPU1)
P38
3083
1444
(-)
(+)

P32
36
P
ENGINE OIL PRESSURE SENSOR (MT3)

TROOP TRANSPORT ALARM
P39 J39
3028
32
1538
P921 J921
3028
32
TL164
TL165
1
2
TROOP ALARM SWITCH (S45)

1441 TL28
54
3015 TL29
3017 TL29
L
FUEL SOLENOID (L2)

P33
1460
3017
FUEL/WATER SEPARATOR (A20)

P201
1523
TL66 3027
NOT USED

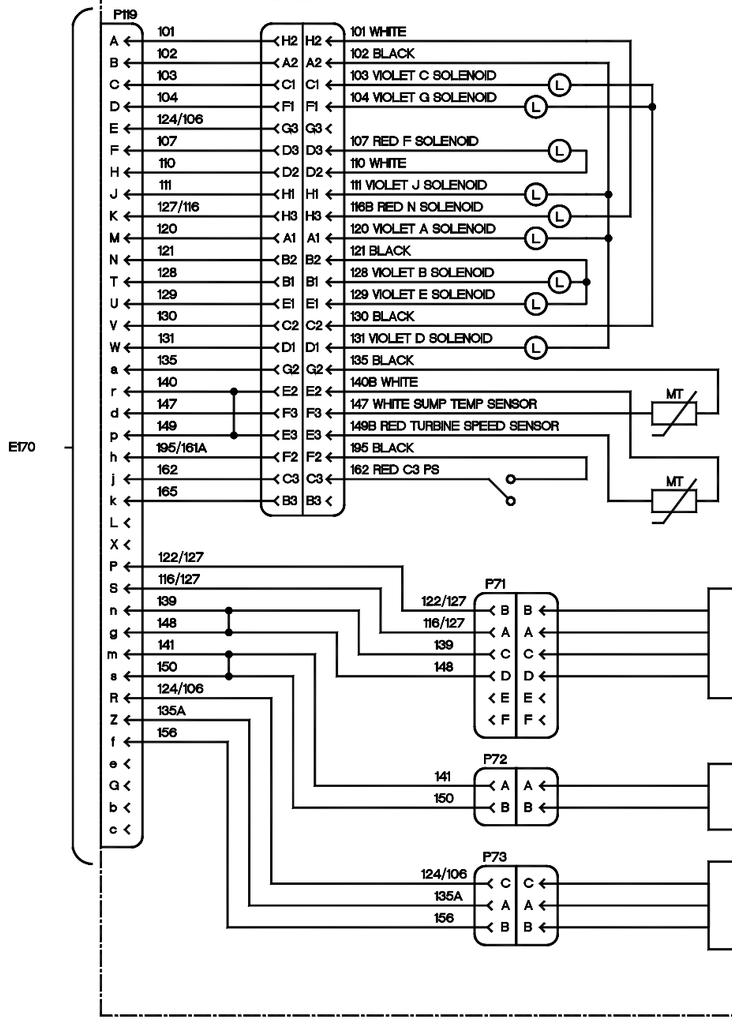
FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 7 OF 34

SIZE	ILL. NO.	
B	5WD0103B	FP-13/ (FP-14 BLANK)

PRIOR TO SERIAL NUMBER 6510032369

PRE-BLOCK SEVEN TRANSMISSION

EXTERNAL WIRING HARNESS TO TRANSMISSION CONNECTOR



SERIAL NUMBER 6510032369 AND HIGHER

TID1, TID2, AND TID3 TRANSMISSIONS

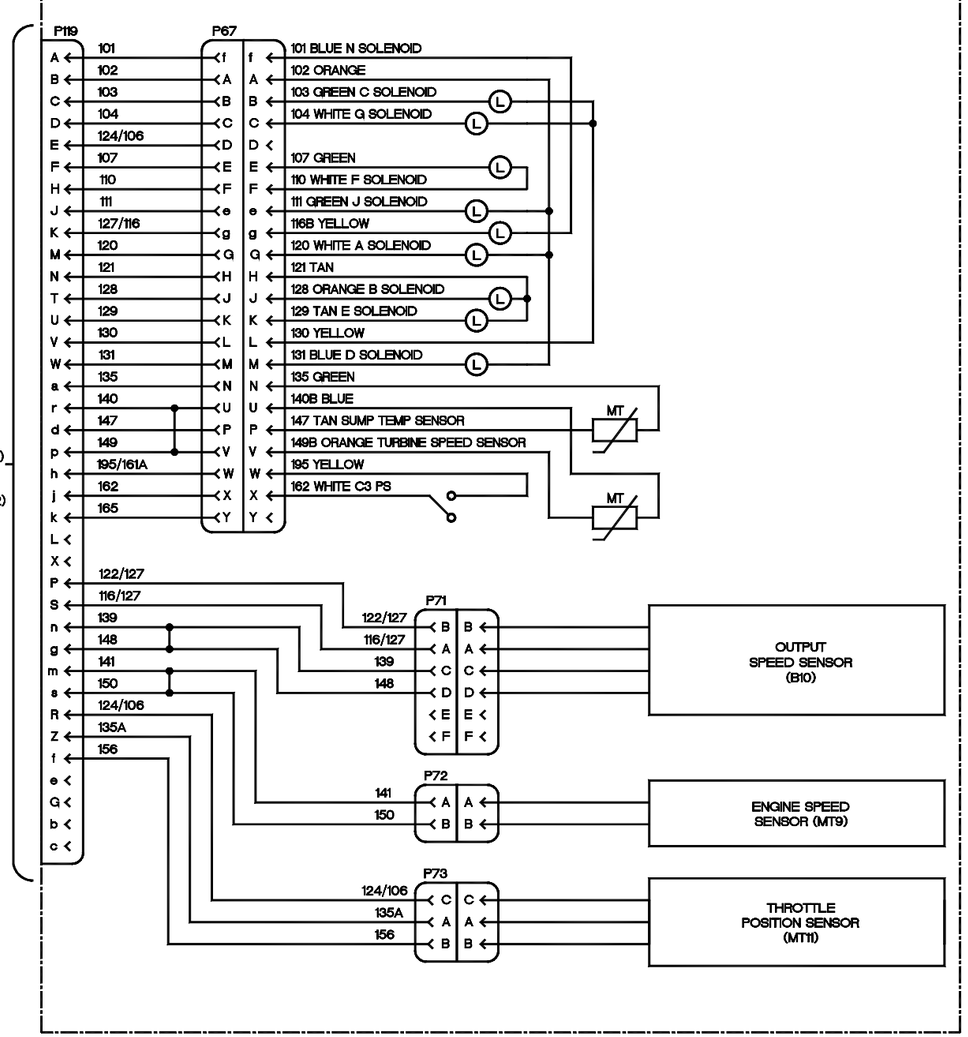
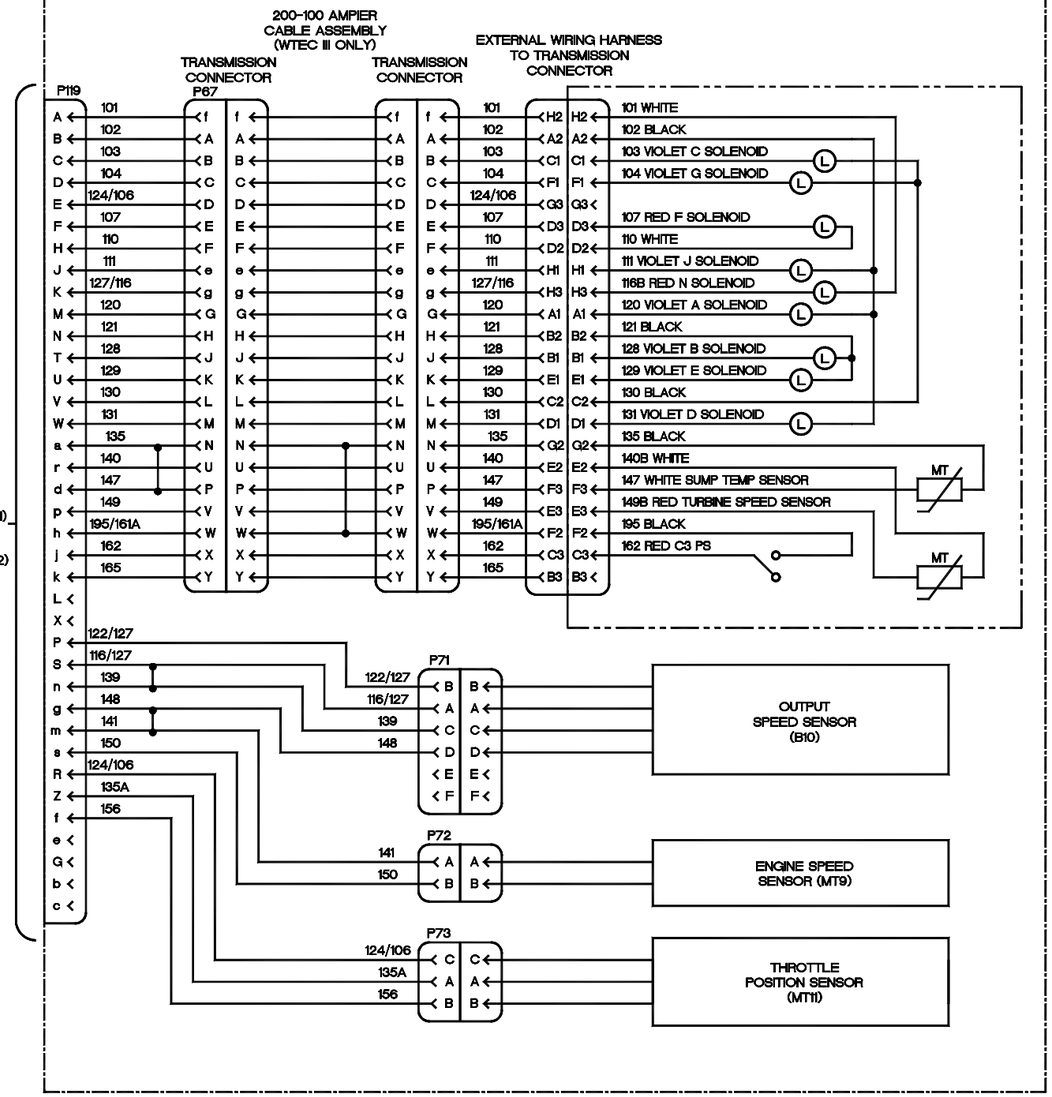


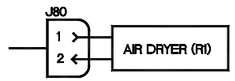
FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 34

SIZE	B	ILL. NO. 5WD0104B	FP-15/ (FP-16 BLANK)

PRIOR TO SERIAL NUMBER 6510032369 WITH ADAPTER CABLE ASSEMBLY

PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION





LIGHT MATERIAL HANDLING CRANE (LMHC)

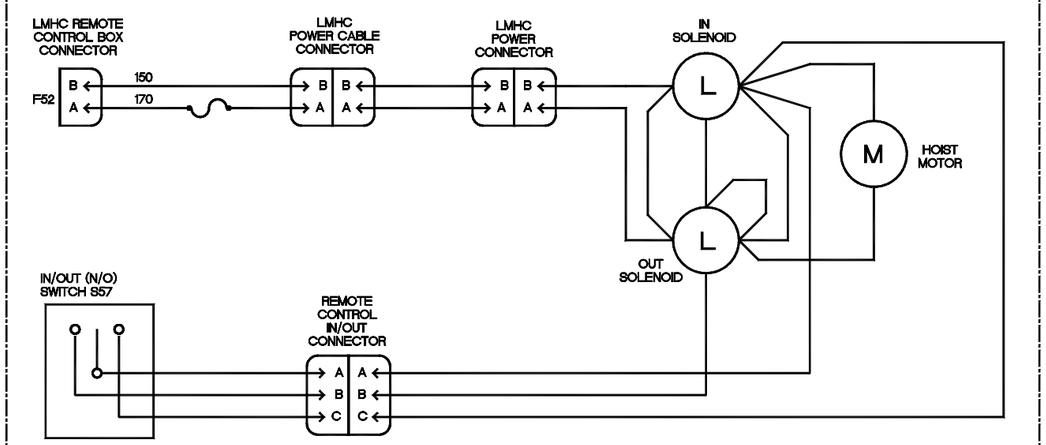


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 34

SIZE	ILL. NO.	
B	5WD0105B	FP-17/ (FP-18 BLANK)

CAB - MARKER LIGHTS

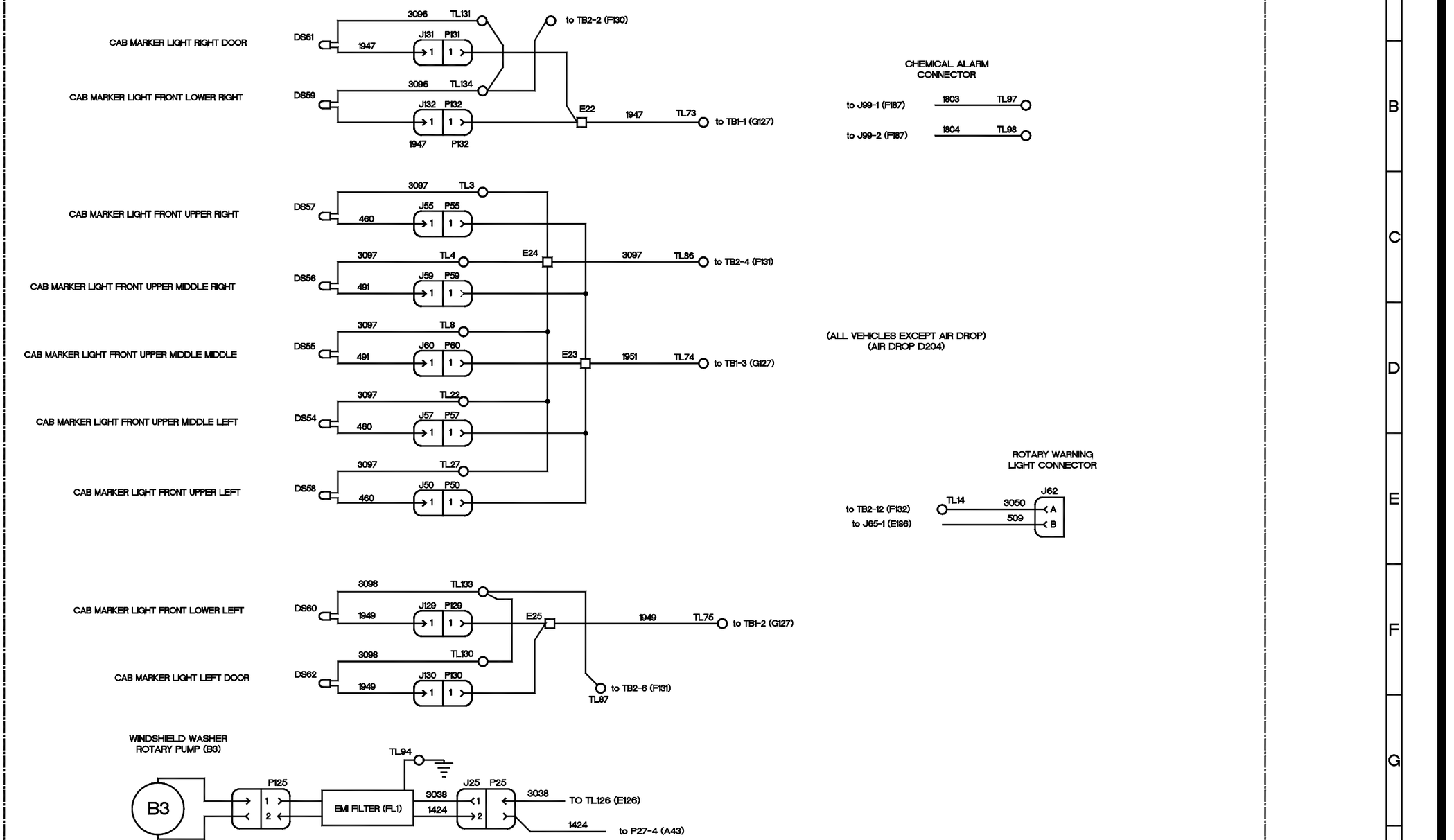


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 10 OF 34

SIZE	ILL. NO.	
B	5WD0106B	FP-19/ (FP-20 BLANK)

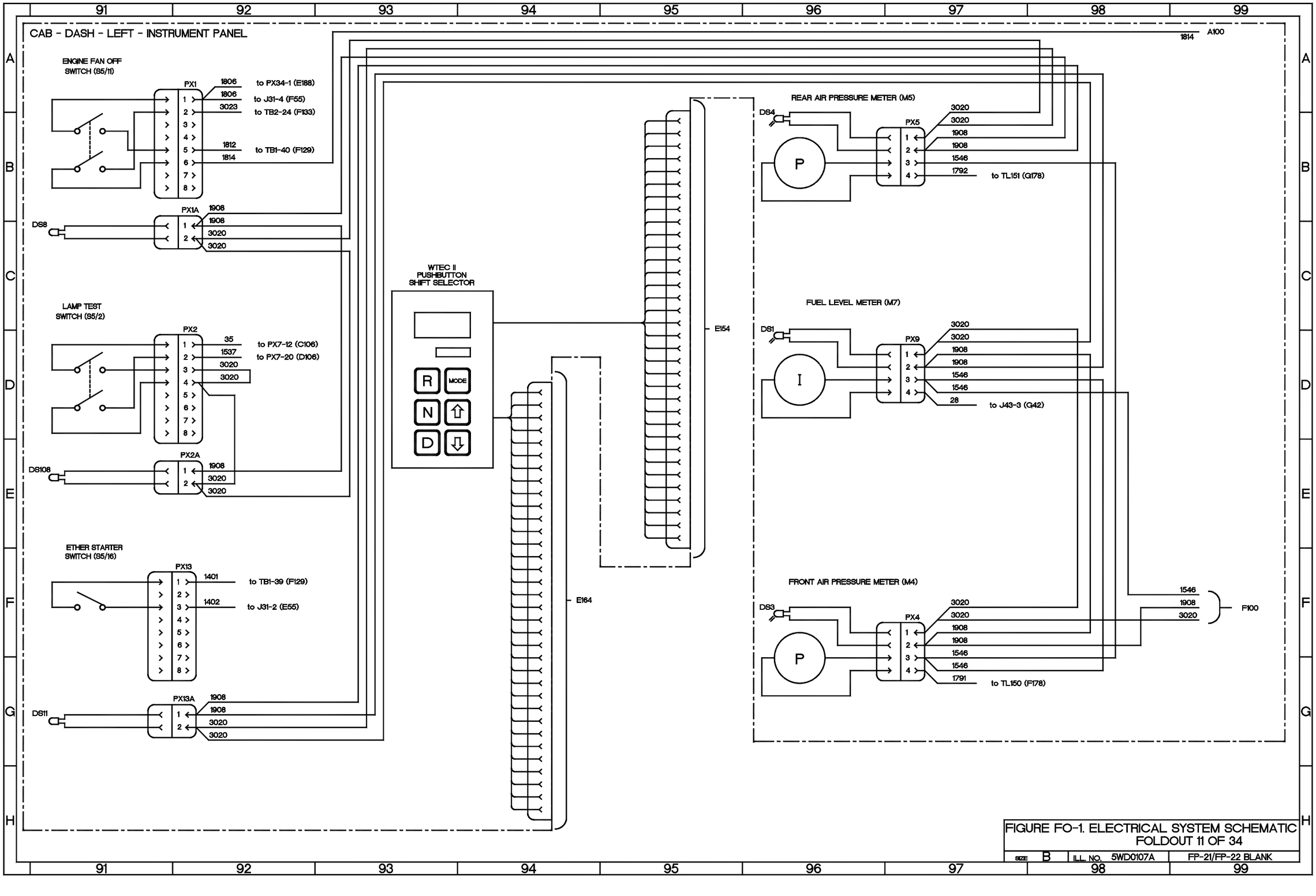


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 11 OF 34

SIZE	ILL. NO.	
B	5WD0107A	FP-21/FP-22 BLANK

CAB - DASH - LEFT - INSTRUMENT PANEL

A99 — 1814

LIGHTED INDICATOR DISPLAY (A18)

PX7

CHEM DETECT	DS32	1	1523 to J31-19 (Q55)
RIGHT TURN SIGNAL	DS15	2	1803 to J43-6 (H42)
LEFT TURN SIGNAL	DS14	4	1580 to TB1-41 (E129)
	DS9	6	1570 to TB1-47 (E129)
CTIS OVRSPD	DS34	7	3021 to TB2-25 (G133)
PTO ON	DS23	8	2034 to P912-9 (C124)
EMER BRAKE	DS21	9	1528 to J111-D (F122)
WATER TEMPERATURE	DS25	10	2021 to J913-13 (C121)
REAR BRAKE AIR	DS27	11	1616 to J27-16 (C43)
TRANS OIL TEMP	DS41	12	35
ENGINE OIL LEVEL	DS29	13	1525 to TL157 (H178)
PARK BRAKE	DS22	16	1532
OIL PRESSURE	DS24	17	3030 to TB2-33 (G134)
HIGH BEAM	DS16	19	1536
FRONT AIR BRAKE	DS28	20	1537
RADIATOR FAN OFF	DS19	22	1616 to J27-16 (C43)
MASTER STOP	DS30	23	34A to D3B-4 (A138)
		24	1681 to K8-87 (F152)
		25	1530 to TL156 (F178)
		26	1814
		27	1658 to TB1-61 (B129)
		28	2010 to P912-7 (B124)

ENGINE OIL PRESSURE METER (M3)

DS5 — OP — PX6

1	3020	
2	3020	
3	1908	
4	1908	B109
	1546	
	1546	
	36	to J31-11 (F55)

E88: 35 to PX2-1 (D92); 35 to J31-22 (H55)

E89: 1537 to PX2-2 (D92); 1537 to J118-1 (D162); 105 to P115-19

VOLTMETER (M2)

DS7 — V — PX10

1	3020	
2	3020	
3	1908	D109
4	1908	
	1546	
	1546	to J913-9 (C121) E109
	3004	to TB2-9 (G131)

F99: 1546, 1908, 3020 — 3020, 1908 F109

SPEEDOMETER (M8)

DS6 — KM — PX8

1	3020	
2	3020	
3	1908	
4	1908	
	1546	
	1546	
	1793	to PX33-H2 (E181) (WTEC II)
	1793	to J111-B (F122) (WTEC II)
	157	to J111-B (F122) (WTEC III)
	157	to P116-30 (F291) (WTEC III)

AUDIBLE ALARM (LS2)

	32	TL178	32 to J31-17 (Q55)
−	1536	TL160	
+	1532	TL161	

WATER TEMPERATURE METER (M6)

DS2 — t° — PX11

1	3020	
2	3020	
3	1908	
4	1908	G109
	1546	
	1546	
	33	to J31-20 (G55)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 34

SIZE	ILL NO.	
B	5WD0108B	FP-23/ (FP-24 BLANK)

CAB - DASH - LEFT - INSTRUMENT PANEL

IGNITION SWITCH (S5/1)

PX17
1 — 1548 — to K2-86 (A143)
2
3
4
5 — 1586 — to CB70/4 (E146)
6
7
8

PX17A
DS13
1 — 1908, 1908
2 — 3020, 3020

B108: 3020, 3020, 1908, 1908, 1546, 1546

STARTER PUSHBUTTON (S6)

TL163 — TL162 — 1405 — to K24-87 (A152)
3007 — to TB2-11 (G131)

ROTATING WARNING LIGHT SWITCH (S5/2)

PX12
1 — 1559 — to K13-86 (A149)
2
3
4
5 — 1575
6 — 1575 — to K20-86 (G138)
7
8

PX12A
DS10
1 — 1908, 1908
2 — 3020, 3020

D108: 3020, 3020, 1908, 1908, 1546
E108: 1546

MAIN LIGHT SWITCH (S4)

PX15
A
B — 1542
C — 22 — to D1A-2 (C138)
D — 19 — to CB54/3 (D142)
E — 1572 — to CB66/1 (D143)
F — 1586 — to CB70/4 (D146)
H — 1575
J — 1577 — to CB74/5 (D150)
K — 1404 — to K6-87 (F143)
L — 491 — to CB65/7 (D141)
M — 16 — to P18-3 (B178)
N — 23 — to K27-86 (G143)

F108: 3020, 1908

FULL HAZARD WARNING SWITCH (S5/22)

PX14
1 — 1565 — to K9-87 (B142)
2 — 1566 — to J19-5 (D177)
3 — 1566 — to K10-87A (F150)
4
5 — 1567 — to PX20-B (C188)
6 — 1568 — to J19-12 (E177)
7 — 1568 — to PX20-A (C188)
8 — 1514 — to CB74/6 (E150)

PX14A
DS12
1 — 1908, 1908 — to J913-11 (C121)
2 — 3020, 3020 — to J913-10 (C121)

G108: 3020, 3020, 1908, 1908, 1546

INSTRUMENT PANEL LIGHTS DIMMER MODULE (A3)

PX24
2 — 1908, 1908
1 — 1542

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 13 OF 34

SIZE B | ILL. NO. 5WD0109A | FP-25/FP-26 BLANK

CAB - DASH - CENTER - HEATER / CTIS ECU

PERSONNEL HEATER

FAN MOTOR
B4
FL3
3 HIGH
2 MED
1 LOW
OFF

PX25
1 1601 to CB23/7 (C147)
2 1908
3 3003 to TB2-8 (F131)
4 3003

HEATER CONTROL PANEL ILLUMINATION
DS17
DS101

J913 P913 — G208
1 1673 ← to K12-86 (A139)
2 1674 ← to CB72/2 (D139)
3 1672 ← to D2B-3 (D138)
4 1670 ← to CB45/4 (C139)
5 1925 ← to CB49/3 (C152)
6 1954 ← to J118-9 (E162)
7 161 ← (WTEC II) to PX33-A3 (C181)
8 153 ← (WTEC III) to P115-12 (D291)
9 1546 ← to TB1-61 (B129)
10 3020 ← to PX14A-2 (H112)
11 1908 ← to PX14A-1 (H112)
12 1550 ← to PX26-1 (B179)
13 2021 ← to PX7-10 (B105)
14 2019 ← (WTEC II) to PX33-E2 (D181)
15 1904 ← (WTEC II) to PX33-E3 (D181)

161 ← (WTEC II) to J118-13 (E162)
161/1952 ← (WTEC III) to P115-31 (D291)
153 ← (WTEC II) to J118-8 (D162)
1908 ← to PX10-3 (E107)
1908 ← to TB2-31 (G134)
1908 ← (WTEC III) to K37-87 (B294)
1904 ← (WTEC III) to K37-30 (B294)

P912 J912 — E208
1 2006 ← to CB50/2 (C145)
2 2069 ← to CB48/8 (C141)
3
4 2004 ← to K12-87 (B139)
5 1328 ← to CB63/1 (D151)
6
7 2010 ← to PX7-28 (D105)
8 2033 ← to CB53/6 (E140)
9 2034 ← to PX7-8 (B105)
10 2040 ← to TB1-20 (D127)
11 2041 ← to TB1-50 (D129)
12 1650 ← to X1 (C136)
13 1653 ← to X1 (C136)
14 2037 ← to K19-87 (B150)
15 1811 ← to K15-87A (A140)

2006
2006
2069
2069
2012
2004
1328
2010
2033
2033
2034
2040
2041
1650
1653
2037
1811

PARKING BRAKE SWITCH

C42 — TL-202 — 1616 — S24 — 3024 — TL201 — TL126
S24 — to P25-1 (Q86) — 3038 — TL201

CTIS ELECTRONIC CONTROL UNIT (A2)

P110
H 01
F 02
Z
M 01
U 03
S 04
E 05
T 06
P 07
b 08
c 09
j 10
R 11
B 12
C 13

P111 J111
01 E E 1911 to CB40/7 (C150)
02 A A 3031 to TB2-35 (G135)
03 B B 1793 to PX8-4 (G103) (WTEC II)
04 G G 157 to PX8-4 (G103) (WTEC III)
05 D D 1911 to K52-87A (G139)
06 F F 1528 to PX7-9 (B105)
1790 to J43-2 (G42)

P113
B
C
A

P112 — Q186
D
F
E
A
B

TL50 — CHASSIS GROUND

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 14 OF 34

SIZE B | ILL. NO. 5WD0110B | FP-27/ (FP-28 BLANK)

CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL

PX21

to P18-9 (B178) 1599
to CB37/1 (C152) 1569
to J2-4 (B185) 1916
to TB2-37 (G135) 3034
to P18-8 (B178) 1424
to J27-4 (A43) 1424
to P18-7 (B178) 1597

WIPER DELAY MODULE (A5)

22C J51-13 (E42)
1940 K10-87 (F150)
1940 K10-86 (F150)
22 D1A-1 (C138)
22C J27-15 (C43)
1912 CB67-4 (E139)
21A J27-12 (B43)
489G J27-2 (A43)
489F J27-8 (B43)
2040 P912-10 (C124)
489 J51-7 (D42)
1426 J7-1 (A188)
1955 K28-86 (H142)
1951 TL74 (D86)
1951 TL74 (E205)
1947 TL73 (B86)
1949 TL75 (F86)

1930 K11-86 (F146)
1929 CB77/5 (C152)
1658 K11-30 (F146)
1546 J913-9 (C122)
1658 PX7-27 (D105)
1690 CB79/5 (C150)
1462 K19-30 (A150)
1460 PX33-C1 (C181) (WTEC II)
146 K25-86 (B292) (WTEC III)
1463 TL159 (E136)
146 J17-C (C289) (WTEC III)
1572 CB66/2 (E143)
1408 K29-86 (F142)
24 J51-17 (E42)
1329 K52-86 (H139)
20 J27-3 (A43)
2041 P912-11 (C124)
461 J27-14 (B43)
1570 PX7-6 (B105)
1581 J19-1 (C177)
1524 J19-4 (D178)
1580 PX7-4 (B105)
460 J27-11 (B43)
1401 PX13-1 (F92)
1812 PX1-5 (B92)
1935 CB22/3 (C149)
1807 J31-3 (F55)
1481 J43-9 (H42)
1692 CB21/1 (C149)
1692 PX26-3 (B179)
(WTEC II) 1692 PX33-E1 (D181)
(WTEC III) 1692 K34-30 (B293)
1692 PX33-F1 (D181) (WTEC II)
1692 K26-30 (B290) (WTEC III)

TB1

3101 K37-85 (B294) (WTEC III)
3054 K20-85 (H138)
3036 K32-85 (A147)
3047 K30-85 (H147)
3039 K9-85 (A142)
3099 J7-3 (B188)
3046 K10-85 (F150)
3016 K19-85 (A150)
3053 K8-85 (F151)
3002 K7-85 (F152)
3041 K2-85 (A143)
3043 TL153 (C180)
3048 K31-85 (G149)
3049 PX20-C (C189)
3012 K15-85 (A141)
3011 PX34-2 (E188)

1603 TB2-1 — F136

1603 X3

TB2

3096 TL71 (A86)
3097 TL86 (C86)
3098 TL87 (F86)
3003 PX25-3 (C120)
3006 J31-7 (F55)
3050 TL14 (E88)
3008 PX50-1 (D188)
3101 PX33-K1 (F181) (WTEC II)
143 P115-32 (D291) (WTEC III)
3015 J31-5 (F55)
3040 K29-85 (F142)
3056 K28-85 (G142)
3023 PX1-2 (B92)
3083 PX26-6 (B179)
3026 J31-10 (F55)
3067 K12-85 (A139)
3029 J43-4 (H42)
3044 K27-85 (H143)
3028 J31-9 (F55)
3045 K52-85 (H139)
3004 PX10-4 (E108)
3007 TL163 (B115)
(WTEC III) 188 TB2-13 (H292)
(WTEC III) 188 TB2-15 (H292)
(WTEC II) 3102 PX33-K2 (F181)
(WTEC III) 3102 K26-85 (B290)
3038 J78-2 (F185)
3039 J78-4 (F185)
3021 PX7-7 (B105)
(WTEC III) 143 P115-17 (D291)
(WTEC III) 143 J117-E (C289)
3020 J913-10 (C121)
3060 PX7-17 (C105)
3031 J111-A (F122)
3034 PX21-4 (A193)
3037 J2-3 (A185)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 15 OF 34

SIZE	ILL. NO.	
B	5WD0111B	FP-29/ (FP-30 BLANK)

CAB - DASH - RIGHT
POWER DISTRIBUTION PANEL

34 K24-85 (A151)
34A PX7-23 (D105)
D3B
D3A
74 K24-30 (A151)
1674 CB72/2
3067 TB2-30 (F134)
2004 P912-4 (B124)
K12
WORKLIGHT RELAY
2002 J51-1 (D42)
1673 J913-1 (B121)
1808 CB68/7
1806 PX34-1 (E187)
1811 P912-15 (C134)
3039 TB2-56 (B132)
3012 TB2-77 (C135)
K15
AUX. COOLER RELAY
1566 CB71/4
1514 CB74/6
1565 D2B-4
1565 PX14-1 (F112)
K9
HAZARD FLASHER BO OVERIDE
1602 X1
1548 PX17-1 (A112)
3041 TB2-43 (C130)
K2
CONTROL PANEL RELAY
1548 CB76/3
1904A X6
1637
A145
B145
3054
1566
to CB43 (C289)
to CB79 (B289)
to P912-12 (C124)
1650
to P912-13 (C124)
1653
to TL44 (E54)
to TL44 (B53)
TL42
X1
+24 VDC
X4 1602 K2-30
1602 K1-30
461B J19-2 (C178)
22 PX15-C (D115)
D1B
D1A
461B K30-86
22 TB1-27 (B127)
+24V
CHEMICAL ALARM
CB30
CB45
FUEL PREHEAT
1670 J913-4 (B121)
1802 J43-5 (H42)
CAB RADIO
CB20
CB48
ARCTIC CAB/ ENGINE KILL
1906 K53-30
2069 P912-2 (B124)
TRAILER REAR LIGHTS POWER
CB41
CB42
BO MARKER LIGHTS POWER
1957 K28-30
1958 K29-30
REAR COMPOSITE LIGHTS
CB44
CB43
REAR COMPOSITE LIGHTS WTEC III ECU
136 P115-1 (C289)(WTEC III)
136 P115-1 (D289)(WTEC III)
1922 K30-30 (WTEC II)
1956 K31-30
1956
C145
X7 1601
X5 1601
1601
D145
+12V
19 PX15-D (D115)
1914A K20-87
1572 PX15-E (D115)
1548 K2-86
BO MARKER POWER
CB66
CB76
BO STOP RELAY POWER
1572 TB1-56 (C129)
1641 K6-30
1565 K9-87
460B J19-3 (D178)
D2B
D2A
460B K31-86
1674 K12-30
1914 K20-87
CB72
CB67
MARKER LIGHTS
1674 J913-2 (B121)
1912 TB1-26 (C128)
1672 J913-3 (B121)
491 PX15-L (E116)
2033 P912-8 (C124)
CB53
CB65
PARKING LIGHTS
491 J27-9 (B43)
TAIL LIGHTS
CB80
CB54
BO HEADLIGHT
21 J51-3 (D42)
19 J27-7 (B43)
1514
1808
1911
E145
to TL80 (C53)
to TL80 (F54)
TL41
X2
+12 VDC
1501
TL159
TL158
to TB1-57 (C129)
1463
1637 K19-86
START INHIBIT PUSHBUTTON (S7)
D135
1603 TB2-1
TL57
TL56
CAB GND
X3 GROUND
1958 CB42/4
178 P115-28 (D291)(WTEC III)
1408 J7-2 (B188)
1408 TB1-53 (C129)
3040 TB2-20 (F133)
484T J51-10 (D42)
K29
BO MARKER RELAY WTEC III BLACKOUT DRIVE RELAY
1641 CB76-4
1404 PX15-K (D115)
1404 J51-14 (E42)
1594 TL152 (C180)
K6
STOP LIGHT RELAY
1602
461B D1B-3
460B
1691
74
G145
1691 K1-86
1911 CB40/7
1906 CB20/6
74 K1-85
3054 K13-85
1575 PX12-5 (D113)
3054 TB2-44 (B131)
1914 CB67/3
1914A CB80/1
K20
MARKER LIGHTS RELAY
1329 TB1-51 (D129)
1911 J111-G (F123)
3045 TB2-3 (G130)
K52
CTIS OVERSPEED INDICATION RELAY
1906 J78-3 (F185)
K53
RADIO POWER RELAY
1957 CB41/2
3056 TB2-22 (F133)
1955 TB1-5 (F127)
489T J51-9 (D42)
TRAILER REAR LIGHTS RELAY
K28
3044 TB2-34 (F135)
1959 CB39/4
23 PX15-N (E115)
23 J51-6 (D42)
23T J51-8 (D42)
BO STOP RELAY
K27

FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 16 OF 34

SIZE B | ILL. NO. 5WD0112B | FP-31/ (FP-32 BLANK)

CAB - DASH - RIGHT
POWER DISTRIBUTION PANEL

A144 1637
B144 1604 X6
3054
1566
C144
D144 1601
E144 1514 1808 1911
Q145 1602 461B D1B-3 460B 1691 74 1959

1637 TL158
1658 K11-30
74 D3B-3(B137)
74 K1-85
34 K11-85

26 CB36/5 — 3036 TB2-46 (B131) — 25 P18-12 (C178) — 26 J27-1 (A43) — K32 — HORN RELAY
509 CB38/8 — 3054 K20-85 — 509 P65-1 (E186) — 1559 PX12-1 (D113) — K13 — ROTATING BEACON BO OVRD RELAY
1462 TB1-59 (B129) — 3016 TB2-62 (B133) — K19 — START INHIBIT RELAY — 2037 P912-14 (C124) — 54 J31-14 (Q55)
34 D3B-4 (B138) — 1405 TL162 (B115) — K24 — CRANKING LOCKOUT RELAY

+24V
SWING FIRE PUMP POWER — CB50 CB39 — TRAILER BO STOP LIGHTS
2006 P912-1 (B124) — 1959 K27-30
26 K32-30 — 1601 PX25-1 (C120) — HORN POWER — CB36 CB23 — HEATER BLOWER
1692 TB1-36 (C129) — WTEC II VIM STE/ICE — CB21 CB22 — FAN/ETHER — 1935 TB1-57 (F129)
1690 TB1-62 (B129) — 1911 J111-E (E123) — 1911 K52-30 — WTEC II VIM POWER — CB79 CB40 — CTIS COOLER
E5 — 1569 J2-2 (A185) — 1569 P18-4 (B177) — 1569 PX21-2 (A133)
1925 J913-5 (B121) — 1460 J31-13 (F55) — WINDSHIELD WIPER/WASHER — CB37 CB49 — PTO POWER
1929 TB1-64 (B129) — 1808 K15-30 — ENGINE INSTR POWER — CB77 CB68

+12V
IGNITION/MAIN LIGHT SWITCH — CB70
1586 PX15-F (D115)
1586 PX17-5 (B112)
HEAD LIGHTS — CB78 CB38 — ROTATING BEACON
509 K13-30
VIM POWER — CB35 CB71 — HAZARD/FLASHER WORKLIGHTS
1566 K9-30
1900 PX33-J1 (E182)
1900 PX33-J2 (E182)
1577 PX15-J (D115) — BACK-UP LIGHT POWER — CB74 CB73
1514 PX14-7 (G113)
1903 PX33-B1 (C181)(WTEC II)
1903 K25-30 (B292)(WTEC III)
1328 P912-5 (B124) — CB63 CB64
CB61 CB62
1514 K9-86
1416 K7-30
1416
1911

34 K24-85
1658 K24-86
1658 TB1-64 (B129)
1930 TB1-63 (B129)
568A J31-1 (E55)
1538 J31-18 (G55)
34 J31-21 (Q55) — ALTERNATOR EXCITATION RELAY — K11

1691 K26-87 (B290)(WTEC III)
1602 X1
1691 PX33-G1 (E181)(WTEC II)
1691 K53-86
74 K24-30
74 K53-85
74 J43-8 (H42)
STARTER RELAY — K1

1594 J19-6 (D178)
1940 TB1-30 (B128)
3046 TB2-60 (B133) — STOP/HAZARD FLASHER RELAY — K10
1940 TB1-29 (B127)
1566 PX14-2 (G113)

1417 K7-87
16A P18-2 (B178)
18 J27-13 (B43) — 3053 TB2-70 (B134) — HEADLIGHT LO/HI-BEAM RELAY — K8
17 J27-6 (B43)
1681 PX7-24 (D105)

9002 TB2-74 (B135) — 1416 CB78/6
16 P18-3 (B178)
1417 K8-30
HEADLIGHT RELAY — K7

1922 CB43/8
3047 TB2-50 (B131)
461T J51-15 (E42)
461B — E3 — 461B J51-12 (E42) — 461B J27-5 (B43) — 461B J51-5 (D42) — 461B D1B-3
REAR LEFT COMPOSITE LAMP RELAY — K30

1956 CB44/6
3048 TB2-53 (C132)
460T J51-16 (E42)
REAR RIGHT COMPOSITE LAMP RELAY — K31

460B D2A-1 — E4 — 460B J51-4 (D42) — 460B J51-11 (E42) — 460B J27-10 (B43)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 34

SIZE B | ILL. NO. 5WD0113B | FP-33/ (FP-34 BLANK)

CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS

G166: 123 118 115 113 105 / 125 119 117 114 112

H168: 135A/B 156 147 149 161A/B / 162 148 150 165

G167 G167 G167 G165

J115
1 135A/B
2 136A/D
3 137
4
5 139
6 140
7 141
8 142A/B
9 143A/D
10 144
11 136C/D
12 146
13 147
14 148
15 149
16 150
17 151A/B
18 143C/D
19 153
20 154
21 155
22 156
23 157
24 158
25
26
27 161A/B
28 162
29 163
30
31 165
32
33
34

C95

J116
143A A1
132 B1
C1
123 D1
136A E1
146 F1
143C A2
157 B2
125 C2
112 D2
136C E2
113 F2
115 A3
B3
158 C3
D3
E3
114 F3

D185

P118 J118
105 1 1537 PX7-20 (C105)
118 2
119 3
4
137 5
142B 6
151B 7
153 8 153 J913-8 (B121)
155 9 1954 J913-6 (B121)
10
11
154 12
161B 13 161 J913-7 (B121)
163 14 163 PX33-A2 (C181)
15
117 16

J117
143D A
B
C
D
E
F
WTEC II DIAGNOSTIC CONNECTOR
G
136D H
142A J
151A K
L
M

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 34

SIZE B | ILL. NO. 5WD0114B | FP-35/ (FP-36 BLANK)

CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS

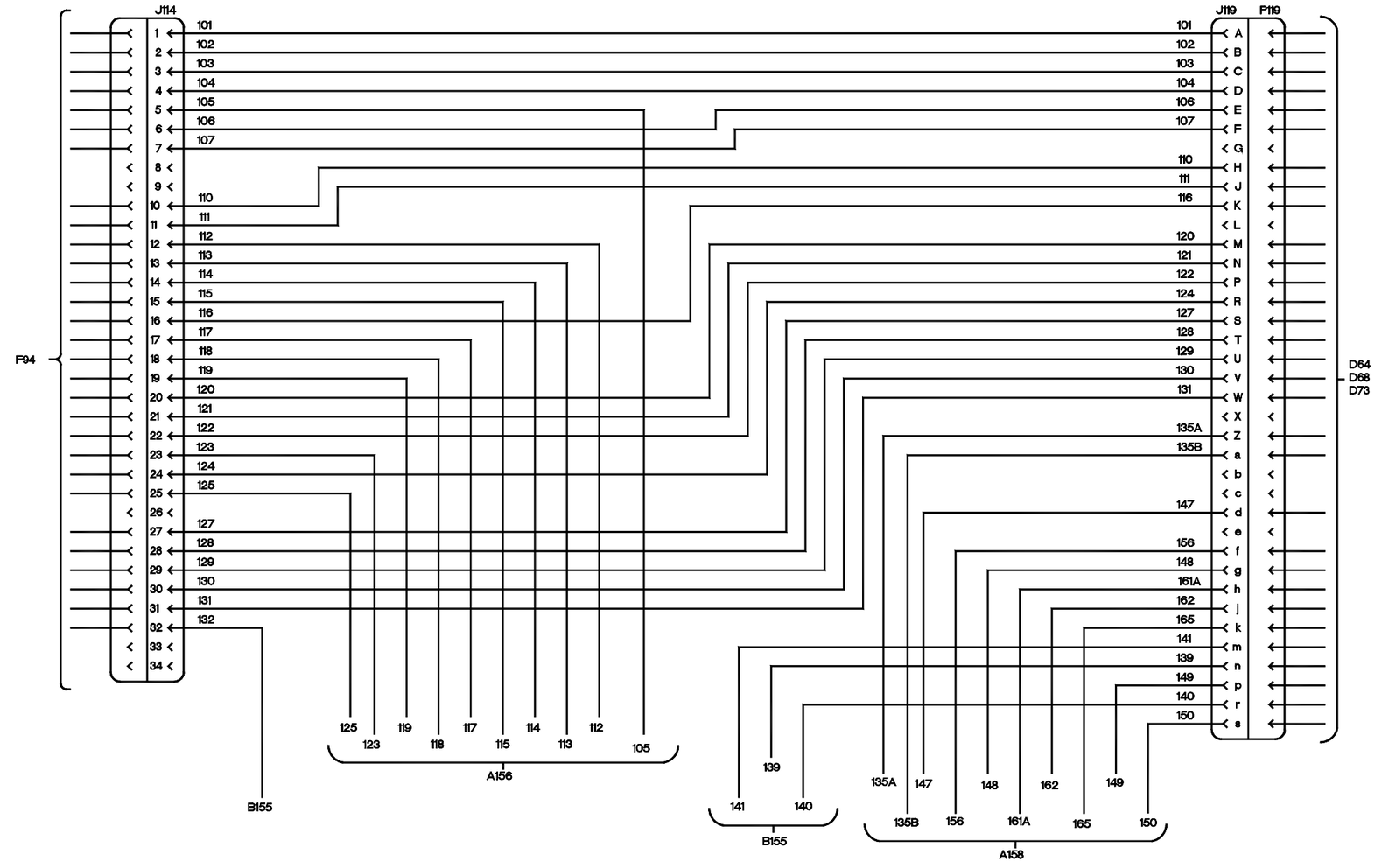


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 34

SIZE	ILL NO.	
B	5WD0115B	FP-37/ (FP-38 BLANK)

CAB - DASH - LEFT - UNDERDASH

JUNCTION BOX (BJ1)

P83

STE / ICE RECEPTACLE

f	1610	1610
AB	1437	1430
AD	1431	
z	1446	
x	1427	
p	1423	
m	1438	
AA	1436	
g	1612	1437
k	1439	1431
n	1421	1446
w	1425	1427
y	1447	1423
AC	1429	1438
R	1441	
N	1452	1436
P	3A	1612
d	1432	1434
c	1433	
v	1435	1439
u	1428	1421
O	1453	1425
E	1471	1447
V	1472	1429
Y	1474	
T	1480	
S	1479	
M	1478	
F	1475	
X	1476	
W	1477	
h	R2	
j		
s	R6	
U	1482	
Z	1482	E71
a	1482	
b	1482	

R5 — BLUE / BROWN / GREEN

R4 — RED / YELLOW / BLACK

WHITE

J31X

1441	1
1452	2
3A	3
1432	4
1433	5
1430	6
1435	7
1434	8
1428	9
1453	10

D55

J43X

1471	1
1472	2
1474	3
1480	4
1479	5
1478	6
1475	7
1476	8
1477	9

F42

COLUMN SWITCH (S3)

P18

1	16A	to K8-86 (F152)
2	16	to K7-86 (F153)
3	16	to PX15-M (E116)
4	1569	to CB37/1 (B152)
5	1527	to J2-5 (B186)
6	1590	to J2-1 (A186)
7	1597	to PX21-6 (B133)
8	1424	to PX21-5 (B133)
9	1599	to PX21-1 (A133)
10		
11		
12	25	to K32-86 (A147)

HORN PUSHBUTTON SWITCH

COLUMN SWITCH (S3)

J19

1	1581	to TB1-46 (E129)
2	461B	to D1B-4 (C138)
3	460B	to D2A-2 (D138)
4	1524	to TB1-43 (E129)
5	1566	to PX14-2 (G113)
6	1594	to K10-30 (F150)
7		
8		
9		
10		
11		
12	1568	to PX14-6 (G113)

FREQUENCY DIVIDER (A7)

PX26

INPUT (+)	1	1550 to J913-12 (C121)
OUTPUT (+)	2	1444 to J31-8 (F55)
+24V POWER	3	1433 to J31-26 (H55)
INPUT (-)	4	1692 to TB1-36 (G129)
OUTPUT (-)	5	3083 to J31-16 (G55)
GROUND	6	1432 to J31-25 (H55)
		3083 to TB2-26 (F133)

STOP LIGHT SWITCH (S10A)

TL152 — TL153 — 3043 — 3043 to TB2/47 (C131)

1594 — 1594 to K6-85 (F143)

STOP LIGHT SWITCH (S10B)

TL154 — TL155 — 3043

1594

FRONT AIR PRESSURE TRANSMITTER

SENSOR (MT4) / SWITCH (S20)

TL150 — 1791 to PX4-4 (G97)

P

N/C

TL156 — 1530 to PX7-25 (D105)

REAR AIR PRESSURE TRANSMITTER

SENSOR (MT5) / SWITCH (S29)

TL151 — 1792 to PX5-4 (B97)

P

N/C

TL157 — 1525 to PX7-13 (C105)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 34

SIZE B | ILL. NO. 5WD0116B | FP-39/ (FP-40 BLANK)

CAB - DASH - RIGHT - UNDERDASH

WINDSHIELD WIPER MOTOR (B2)

B2

PX22

EMI FILTER (FL2)

P2 J2

1590 to P18-6 (B178)
1569 to CB37/1 (B152)
3037 to TB2-39 (G135)
1916 to PX21-3 (A133)
1527 to P18-5 (B178)

TRANSMISSION DIMMER MODULE

J7

1426 to TB1-9 (F127)
1408 to K29-86 (F142)
3099 to TB2-58 (B132)
158

WTEC II VEHICLE INTERFACE MODULE (A10)

PX33

to J51-2 (D42) A1 490
to J118-14 (E162) A2 163
to J913-7 (B121) A3 161
to CB73/8 (E150) B1 1903
B2
B3
to TB1-60 (B129) C1 1460
C2
C3
1697 D1 1697
D2
D3
to TB1-33 (G129) E1 1692
to J913-14 (D121) E2 2019
to J913-15 (D121) E3 1904
to TB1-34 (G129) F1 1692
F2
F3
to K1-86 (F149) G1 1691
G2
G3
H1 1793
to PX8-4 (G103) H2 1793
H3
to CB35/2 (E149) J1 1900
to CB35/2 (E149) J2 1900
J3 158
to TB2-16 (F132) K1 3101
to TB2-17 (G132) K2 3102
K3

490 REV
1903
SF02 132
SF04 125
1460 10A
RW 113
SF01 114
163 SF01
161
1697 SF4
1692
2019 SF02
1904
1692 NS
1691
FL
1793 157
1900 10A 136A
1900 136C
158 158
3101 143A
143C
3102 NS 123
SF3 112
115
S02
S03

P116

143A A1 143A
132 B1 132
C1
123 D1 123
136A E1 136A
146 F1 146
143C A2 143C
157 B2 157
125 C2 125
112 D2 112
136C E2 136C
113 F2 113
115 A3 115
B3
158 C3 158
D3
E3
114 F3 114

D159

TURN SIGNAL FLASHER (A1)

OUTPUT
INPUT
GROUND

PX20

1568 to PX14-6 (G113)
1567 to PX14-5 (G113)
3049 to TB2-55 (C132)

PX50

to TB2-14 (F132) 3008
(WTEC II) 1697
(WTEC III) K34-87A (B293) 1697

ROTARY WARNING LIGHTS CONNECTION

P65 J65

to K13-87 (B149) 509 509 to J62-B (E88)

CHEMICAL ALARM CONNECTION

P99 J99

to J43-6 (H42) 1803 1803 to TL88 (B88)
to J43-7 (H42) 1804 1804 to TL98 (B88)

FAN SOLENOID (L1)

to K15-86 (A141) 1806
to PX1-1 (A92) 1806
to TB2-79 (C135) 3011

PX34

L

CAB RADIO CONNECTION

J78

to TB2-21 (G133) 3018
to K53-87A (H141) 1906
to TB2-23 (G133) 3019

J113

G123

CTIS PRESSURE TRANSDUCER

CTIS PNEUMATIC CONTROLLER

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 21 OF 34

SIZE B | ILL. NO. 5WD0117B | FP-41/ (FP-42 BLANK)

REAR LIGHTS

CAB-DASH-RIGHT-POWER DISTRIBUTION PANEL

D43 — P51

1	490
2	21
3	460B
4	461B
5	23
6	489
7	23T
8	489T
9	484T
10	460B
11	461B
12	22C
13	1404
14	461T
15	460T
16	24
17	

E21 — P53R — F200

3094	1
489T	2
3094	3
1404	4
460T	5
23T	6
484T	7
461T	8
484T	9
484T	10

E14 — E20 — P52R — B203

21	1
	2
489	3
3045	4
461B	5
22C	6
460B	7

3045 / 3095 — TL92

E19 — E18 — TL93

E16

P85	489	TL15	DS65 — LH SIDE MARKER LIGHT
P86	489	TL16	DS66 — LH REAR MARKER LIGHT
P74	461B		DS37 — LH TURN AND STOPLIGHT
P78	21		DS72 — LH TAILLIGHT
P76	24		DS51 — BLACKOUT MARKER LH REAR
P77	23	TL18 (3094 / 3094)	DS35 — BLACKOUT STOP LH REAR
P87	490	TL17 (3094)	DS45 — BACKUP LIGHT

LH REAR COMPOSITE LIGHT

E15

P54	489	TL30 (3094)	DS69 — LEFT REAR MARKER
P56	489	TL31 (3094)	DS70 — MIDDLE REAR MARKER
P58	489	TL32 (3094)	DS71 — RIGHT REAR MARKER

E17

P61	460B		DS38 — RH TURN AND STOPLIGHT
P64	21		DS73 — RH TAILLIGHT
P62	24		DS52 — BLACKOUT MARKER RH REAR
P63	23	TL21 (3095 / 3095)	DS36 — BLACKOUT STOP RH REAR
P89	489	TL20 (3095 / 3095)	DS68 — RH REAR MARKER LIGHT
P88	489	TL19 (3095)	DS67 — RH SIDE MARKER LIGHT

RH REAR COMPOSITE LIGHT

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 22 OF 34

SIZE	ILL. NO.	
B	5WD0118B	FP-43/ (FP-44 BLANK)

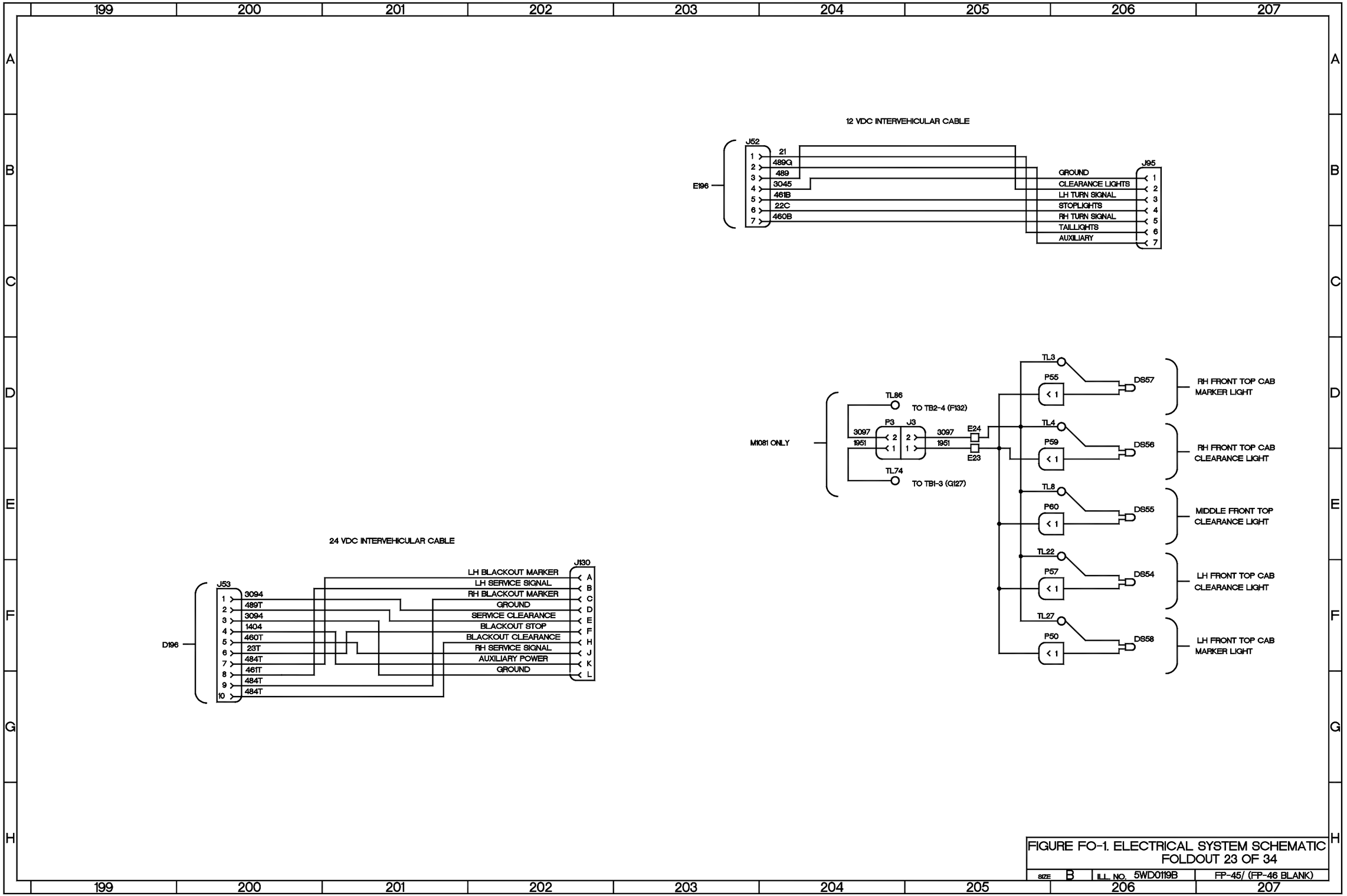


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 23 OF 34

SIZE	ILL. NO.	
B	5WD0119B	FP-45/ (FP-46 BLANK)

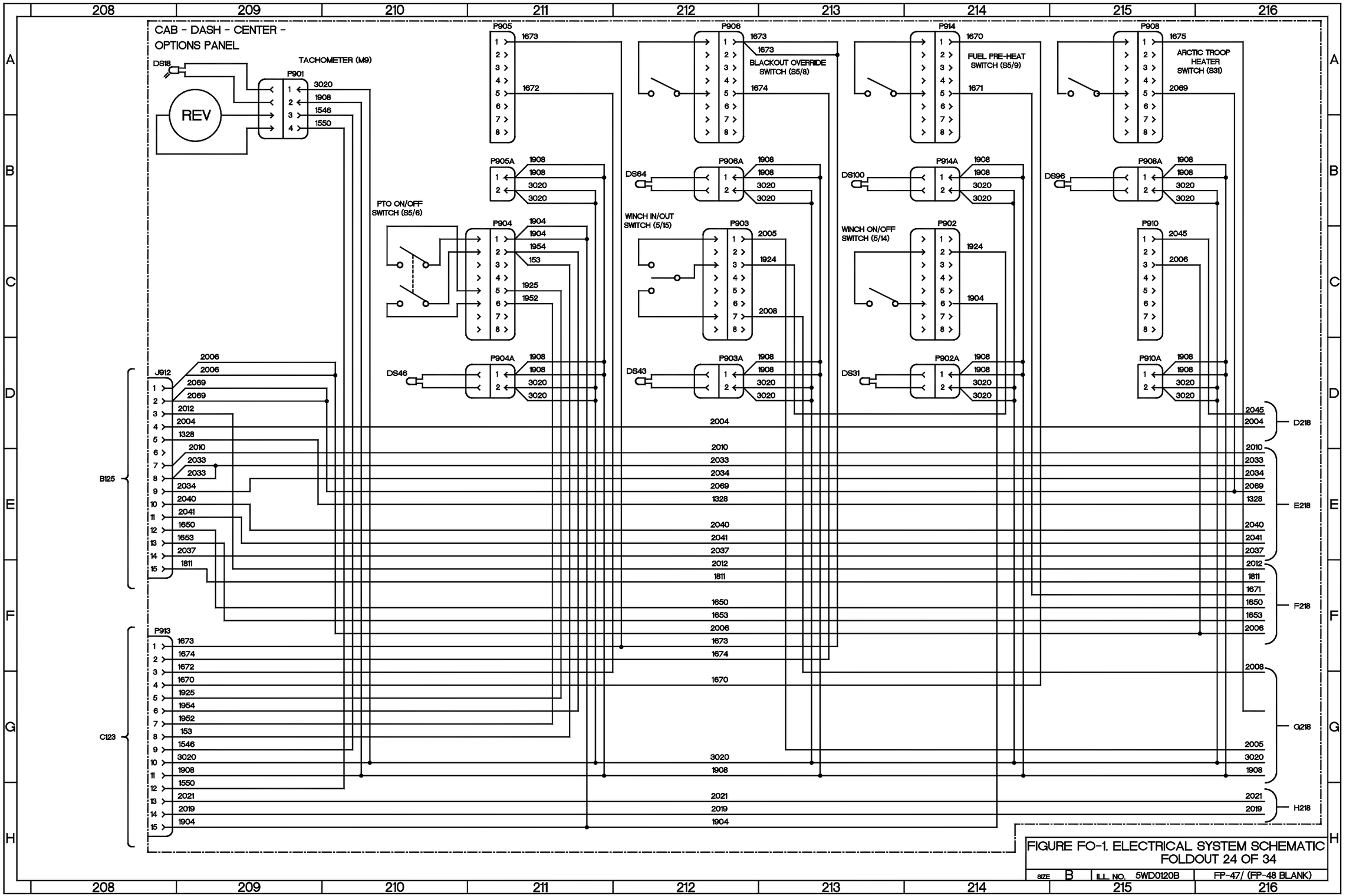


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 24 OF 34

SIZE B | ILL. NO. 5WD0120B | FP-47/ (FP-48 BLANK)

CAB - DASH - CENTER - OPTIONS PANEL

SWING FIRE PUMP SWITCH (S5/25)

P909
2007
2006
2006

DS97
P909A
1908
1908
3020
3020

P911
2044
2006
2006
2043

P911A
1908
1908
3020
3020

J108 P108
1328
2040
2041
2043
2044
2045
2033
2010
2037
2033
2069
2006
2034
2004

2040 H 271
2041 H 271
2010 H 271
2006 H 271

D216
2045
2004

E216
2010
2033
2034
2069
1328
2040
2041
2037

F216
2012
1811
1671
1650
1653
2006

G216
2008
1675
2005
3020
1908

H216
2021
2019

J210 P210
1811
1671
1650
2019
2021
2008
1675
2012
1653
2005
2007

C226

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 25 OF 34

SIZE	ILL. NO.	
B	5WD0121B	FP-49/ (FP-50 BLANK)

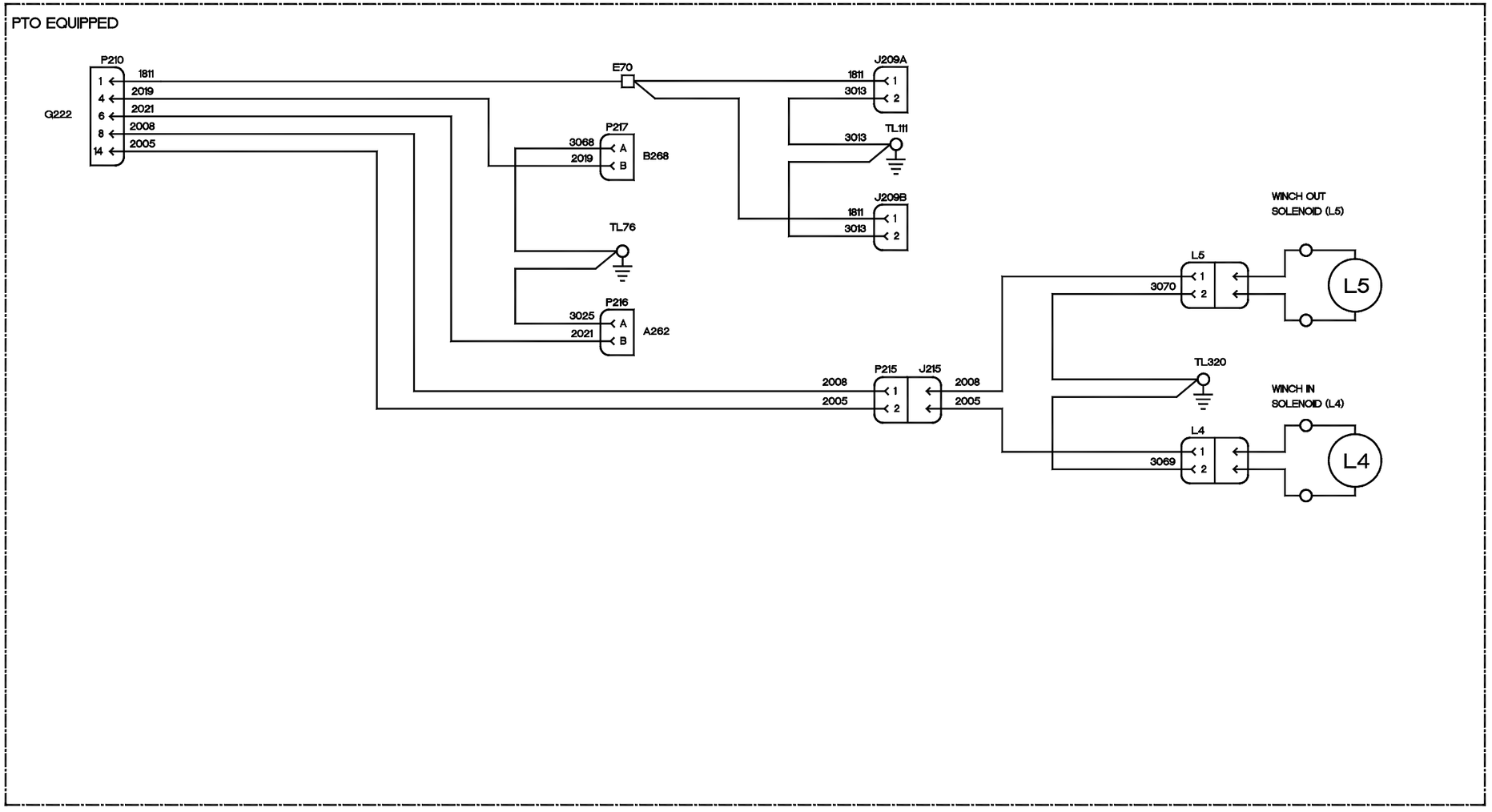


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 26 OF 34

SIZE	I.L. NO.	
B	5WD0122B	FP-51/ (FP-52 BLANK)

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 27 OF 34

SIZE B | ILL. NO. 5WD0123B | FP-53/ (FP-54 BLANK)

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 28 OF 34

SIZE B | ILL NO. 5WD0124B | FP-55/ (FP-56 BLANK)

253 254 255 256 257 258 259 260 261

A B C D E F G H

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 29 OF 34

SIZE B | ILL. NO. 5WD0125B | FP-57/ (FP-58 BLANK)

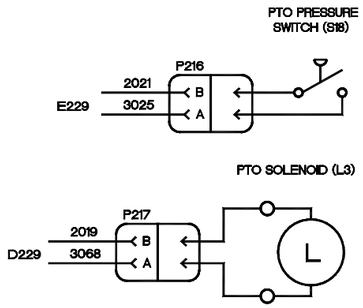


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 30 OF 34

SIZE B | ILL. NO. 5WD0126B | FP-59/ (FP-60 BLANK)

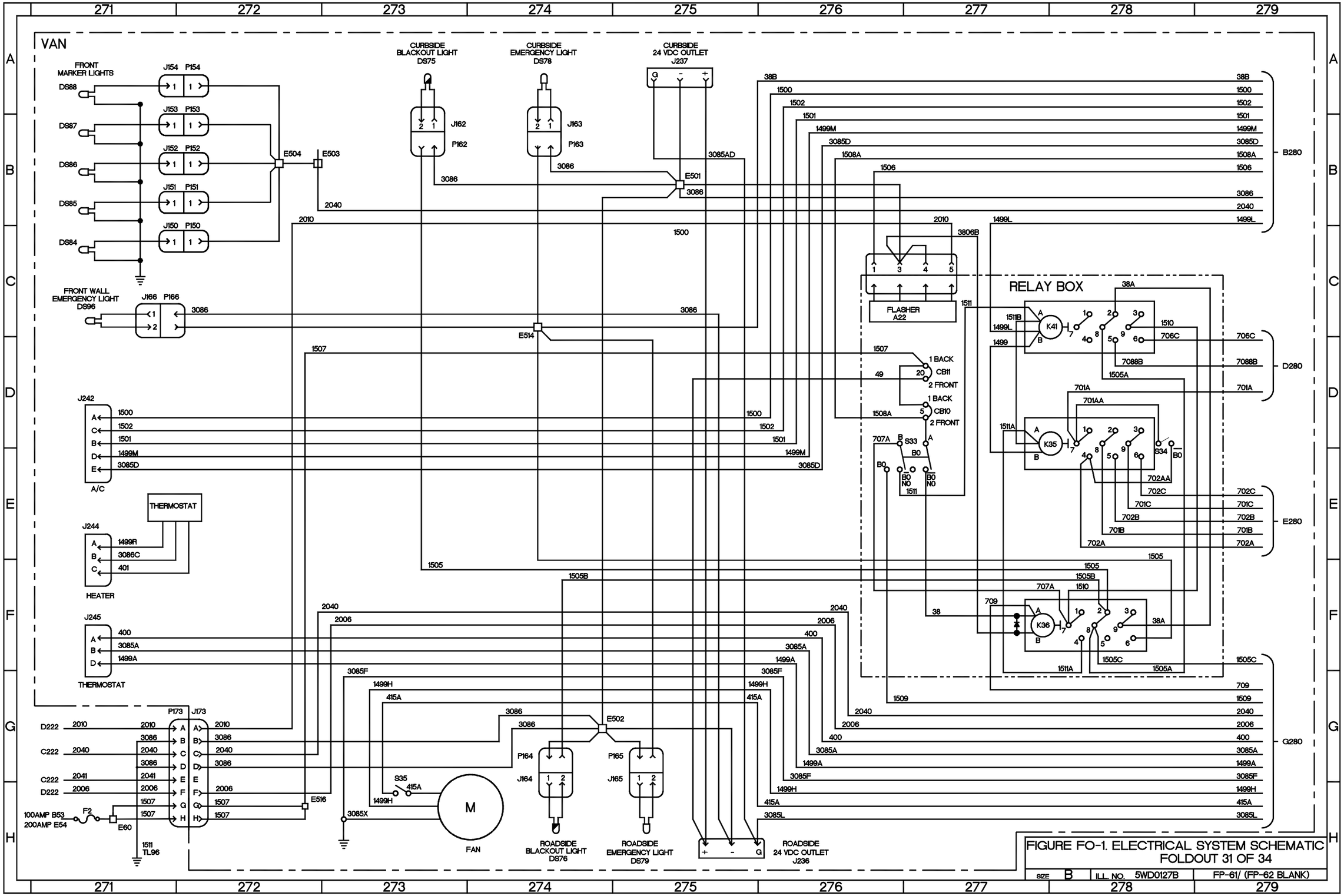


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 31 OF 34

SIZE B | ILL NO. 5WD0127B | FP-61/ (FP-62 BLANK)

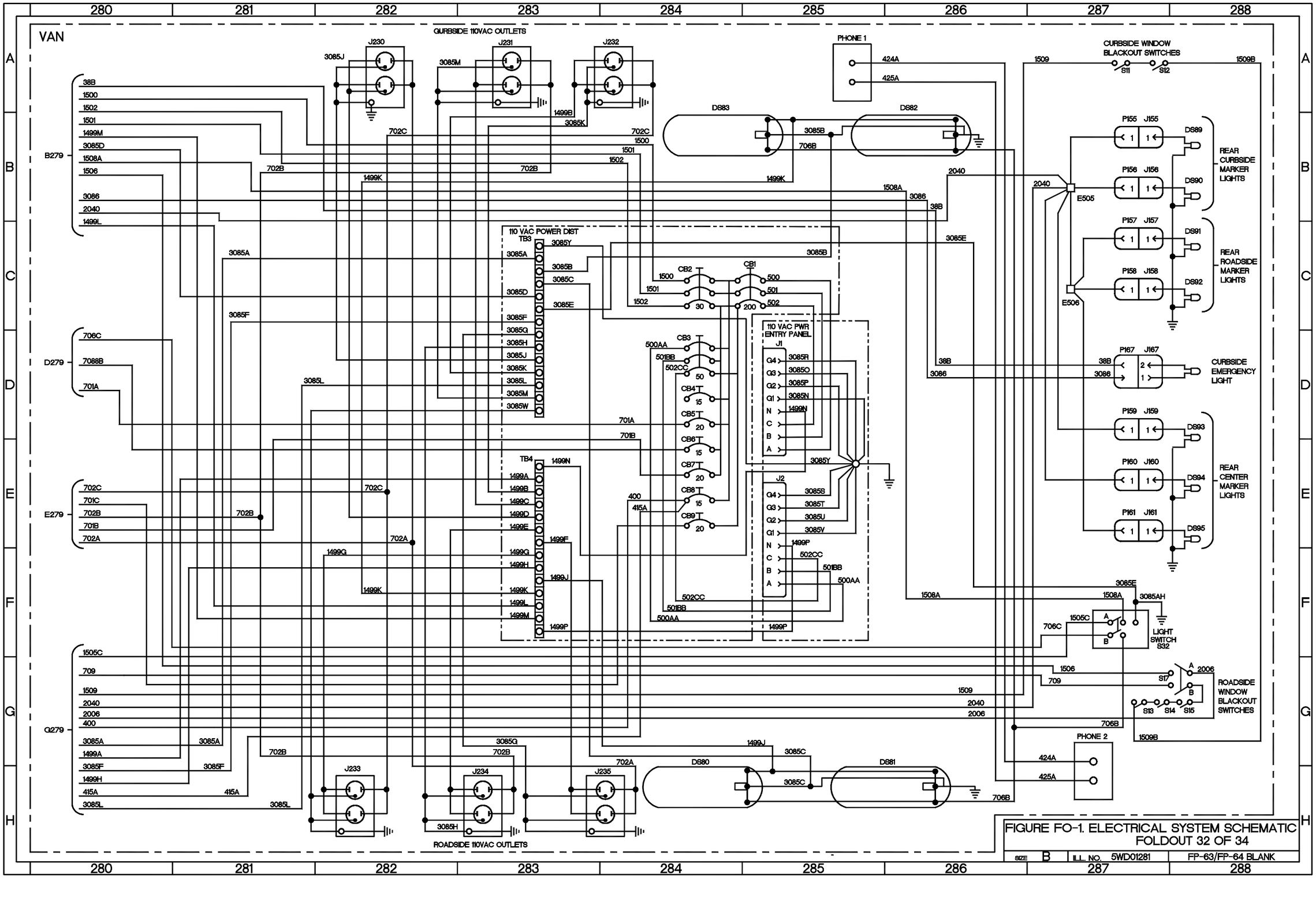


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 32 OF 34

SIZE B | ILL. NO. 5WD01281 | FP-63/FP-64 BLANK

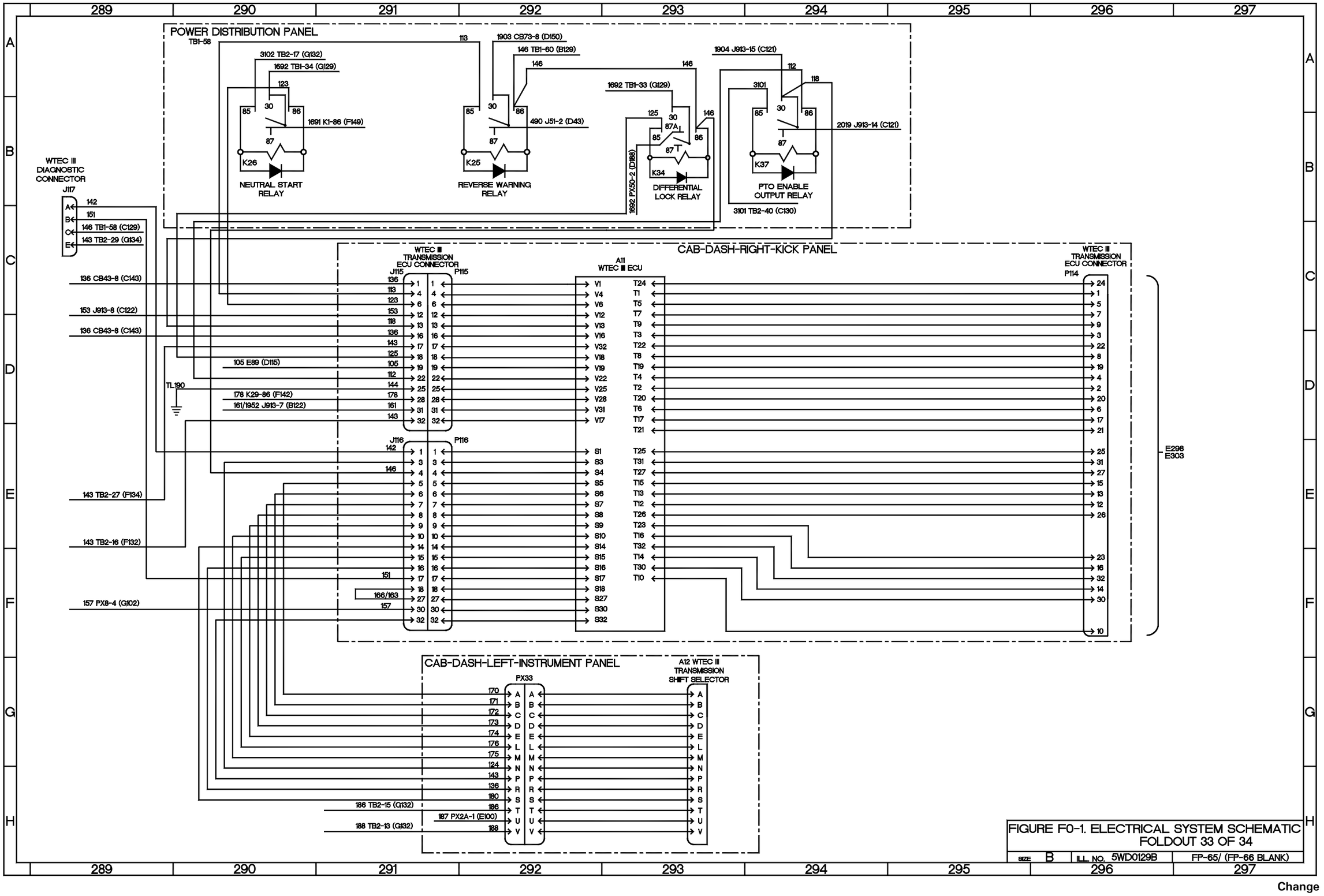
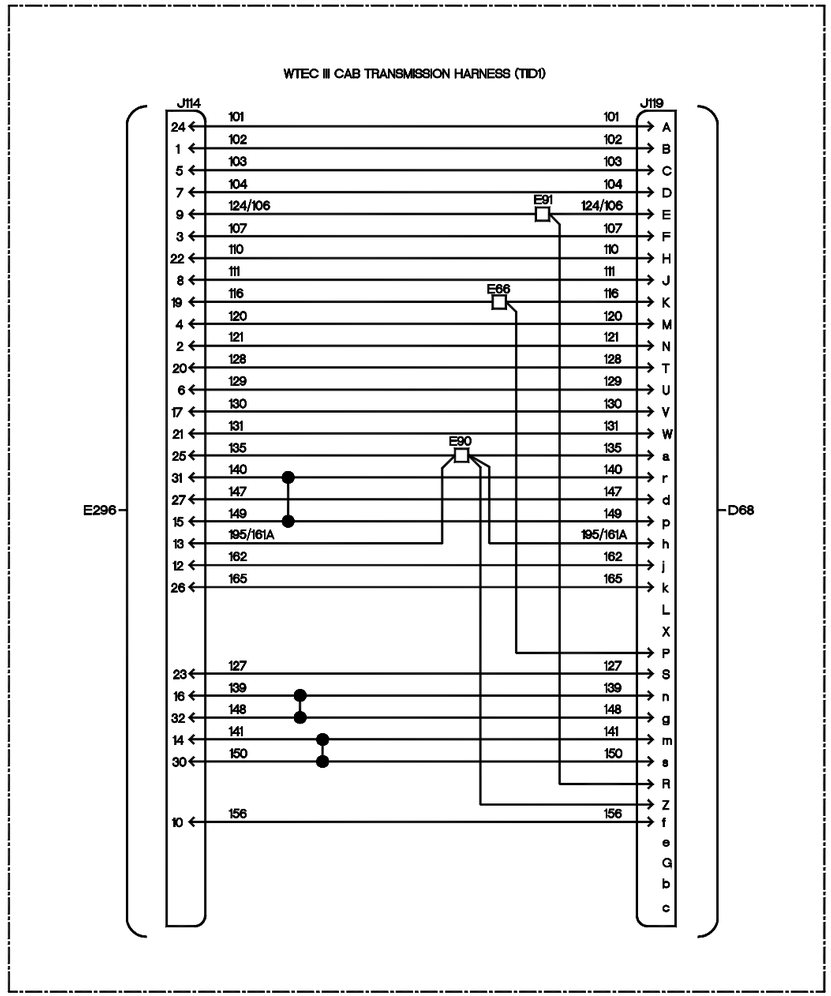


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 33 OF 34

SIZE B | ILL. NO. 5WD0129B | FP-65/ (FP-66 BLANK)

TRANSMISSION SERIAL # 6510090785 AND LOWER



TRANSMISSION SERIAL # 6510090786 AND HIGHER

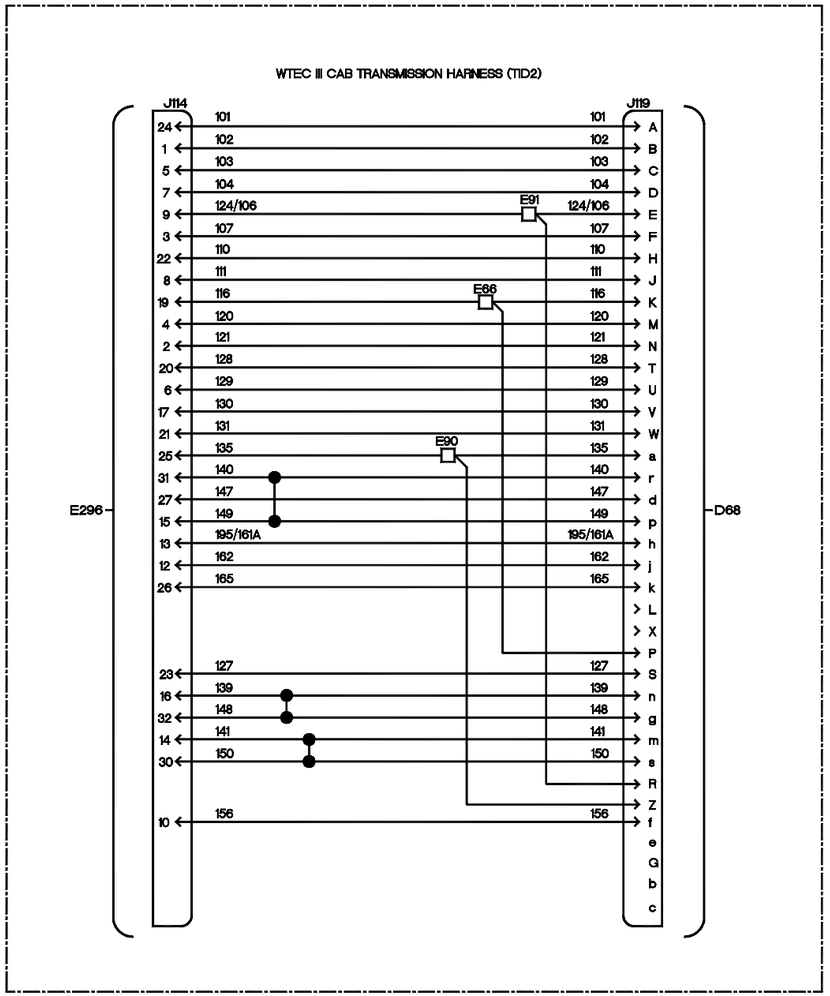


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 34 OF 34

SIZE B | ILL. NO. 5WD0130B | FP-67/ (FP-68 BLANK)

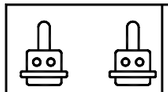
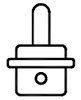
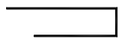
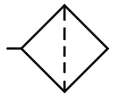
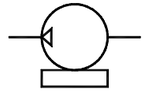
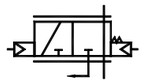
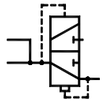
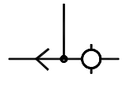
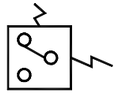
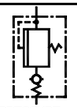
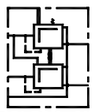
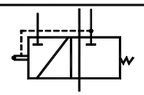
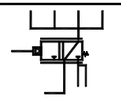
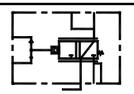
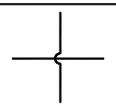
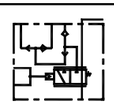
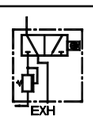
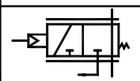
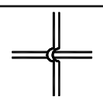
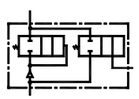
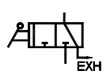
 REAR AXLE BRAKE CHAMBER	 FRONT AXLE BRAKE CHAMBER	 COUPLER AIR BRAKE	AIR DRYER	 AIR CLEANER INTAKE	 AIR COMPRESSOR WITH GOVERNOR	AIR TANKS	DASH GAUGE
MANUAL VALVE	ONE WAY CHECK VALVE	FAN CLUTCH	 MODULATED CONTROL VALVE	 QUICK RELEASE VAVLE	 TWO WAY CHECK VALVE	TIRE	 PRESSURE SWITCH
 PRESSURE RELIEF VALVE	 FOOT CONTROL VALVE	 PARK CONTROL VALVE (HAND OPERATED)	TRAILER AIR SUPPLY VALVE (HAND OPERATED)	LOAD SENSING VALVE (MECHANICALLY CONTROLLED)	 DIRECTIONAL RELAY VALVE	 CONTROL VALVE WITH TWO WAY CHECK VALVE	STOPLIGHT SWITCH
CONNECTION	SUPPLY AIR HOSE	 NO CONNECTION	DELIVERY AIR HOSE	PARK/EMERGENCY AIR HOSE	 AIR BRAKE PROTECTING VALVE	CTIS MANIFOLD VALVE	AIR BR AKE PRESSURE TRANSMITTER
 EXH KNEELING VALVE	 AIR/HYDRAULIC INVERSION VALVE	 DELIVERY AIR HOSE NO CONNECTION	 WHEEL VALVE	 EXH BLEED VALVE			

FIGURE F0-2 PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 1 OF 4

SIZE B | ILL. NO. 5PD01AL1 | FP-1/FP-2 BLANK

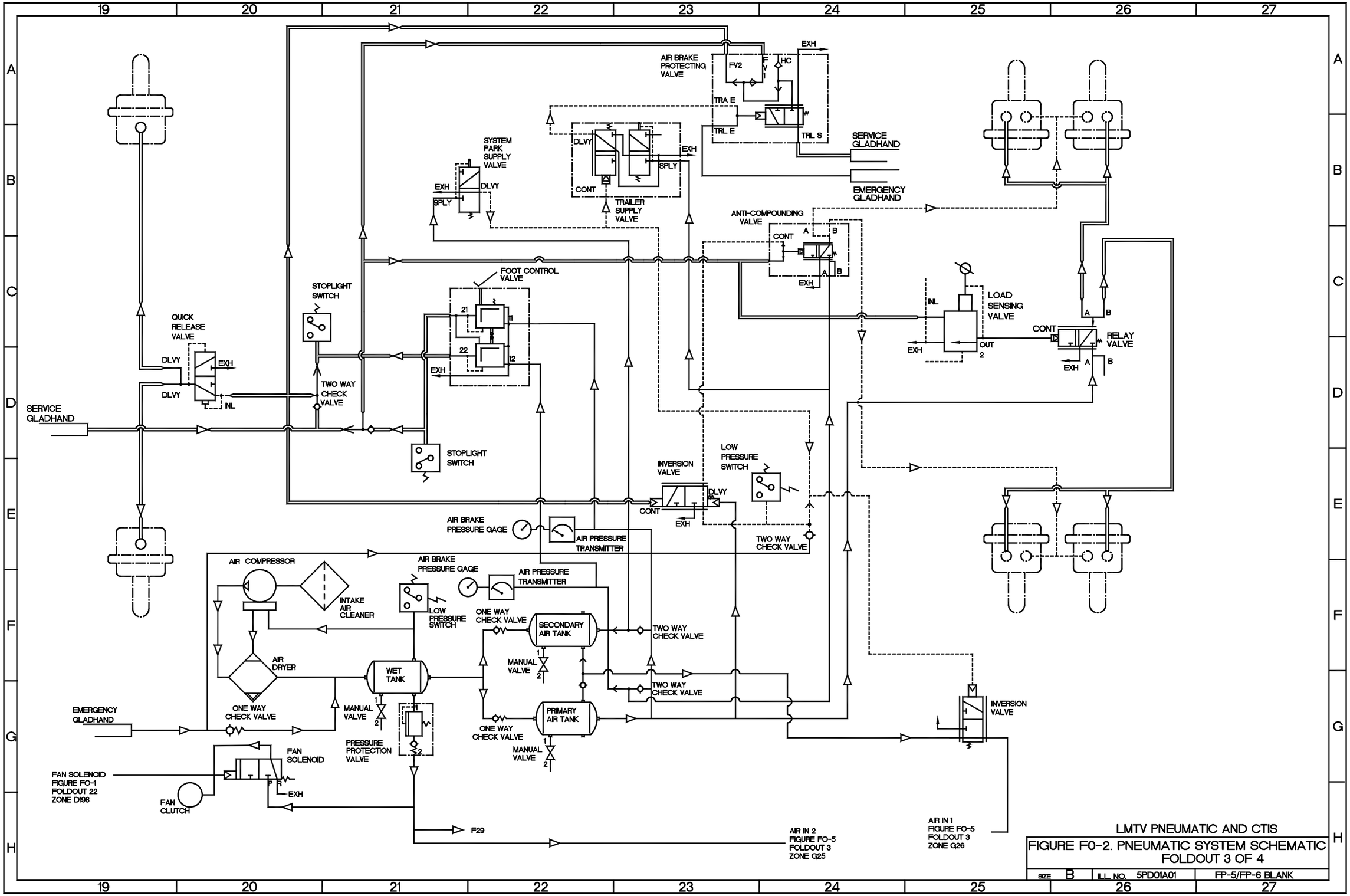
SH	ZONE	DESCRIPTION
3	E22	AIR BRAKE PRESSURE GAGE
3	F22	AIR BRAKE PRESSURE GAGE
3	A23	AIR BRAKE PROTECTING VALVE
3	F20	AIR COMPRESSOR
3	F20	AIR DRYER
3	E22	AIR PRESSURE TRANSMITTER
3	E22	AIR PRESSURE TRANSMITTER
3	C24	ANTI-COMPOUNDING VALVE
4	E31	CONTROL VALVE
4	E31	CTIS MANIFOLD VALVE
4	E32	DEFLATE VALVE
3	G19	EMERGENCY GLADHAND
3	B24	EMERGENCY GLADHAND
3	H20	FAN CLUTCH
3	G20	FAN SOLENOID
3	C22	FOOT CONTROL VALVE
3	F20	INTAKE AIR CLEANER
3	G25	INVERSION VALVE
3	E23	INVERSION VALVE
4	C28	KNEELING VALVE
4	E28	KNEELING VALVE
3	C25	LOAD SENSING VALVE
3	E23	LOW PRESSURE SWITCH
3	F21	LOW PRESSURE SWITCH
3	F22	MANUAL VALVE
3	G22	MANUAL VALVE
3	G21	MANUAL VALVE
3	F22	ONE WAY CHECK VALVE
3	G22	ONE WAY CHECK VALVE
3	G20	ONE WAY CHECK VALVE
3	G21	PRESSURE PROTECTION VALVE
3	G22	PRIMARY AIR TANK
3	C20	QUICK RELEASE VALVE
4	C34	QUICK RELEASE VALVE
4	D30	QUICK RELEASE VALVE
3	D26	RELAY VALVE
3	F22	SECONDARY AIR TANK

SH	ZONE	DESCRIPTION
3	D19	SERVICE GLADHAND
3	B24	SERVICE GLADHAND
3	C20	STOPLIGHT SWITCH
3	E21	STOPLIGHT SWITCH
4	F32	SUPPLY VALVE
3	B21	SYSTEM PARK SUPPLY VALVE
3	B22	TRAILER SUPPLY VALVE
3	D21	TWO WAY CHECK VALVE
3	E24	TWO WAY CHECK VALVE
3	F23	TWO WAY CHECK VALVE
3	G23	TWO WAY CHECK VALVE
3	F21	WET TANK
4	C29	WHEEL VALVE
4	C33	WHEEL VALVE
4	E29	WHEEL VALVE
4	E33	WHEEL VALVE

LMTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 4

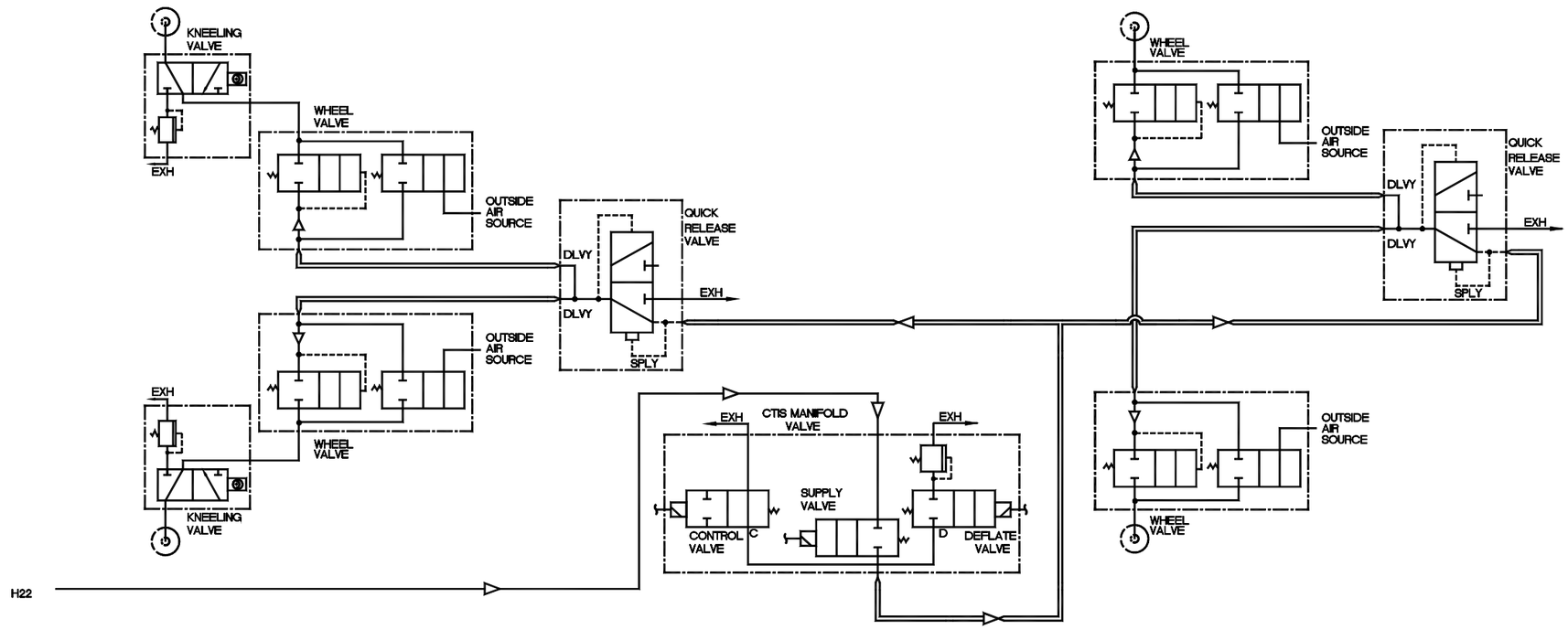
SIZE B | ILL. NO. 5PD01AL2 | FP-3/FP-4 BLANK



LMTV PNEUMATIC AND CTIS

FIGURE FO-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 3 OF 4

SIZE	ILL. NO.	
B	5PD01A01	FP-5/FP-6 BLANK



LMTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 4 OF 4

SIZE	ILL. NO.	
B	5PD01A02	FP-7/FP-8 BLANK

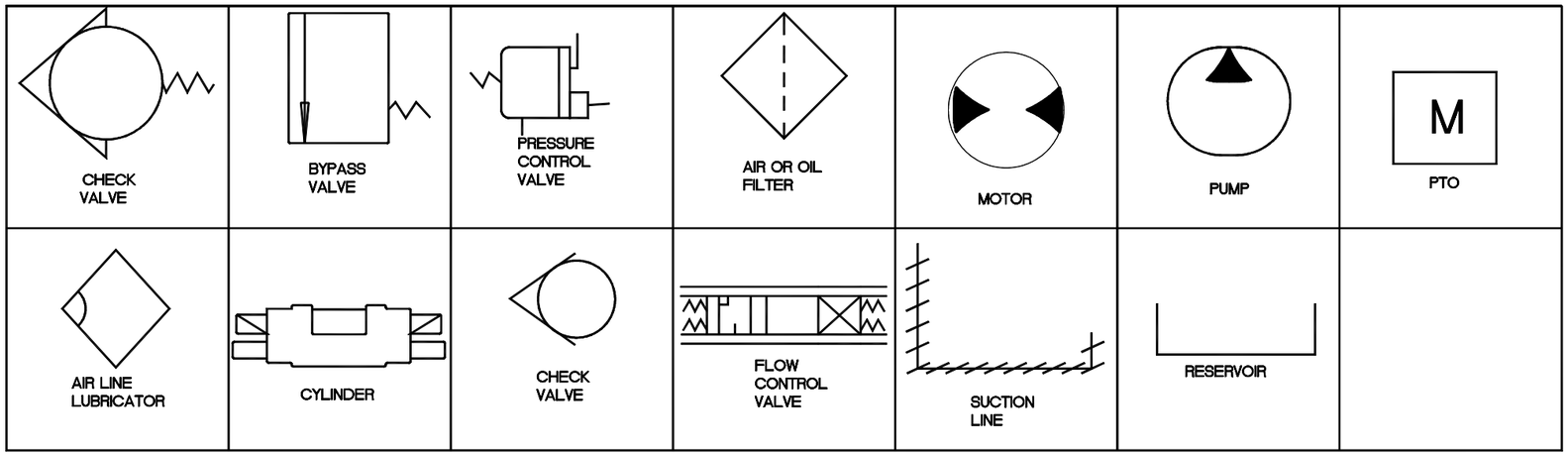


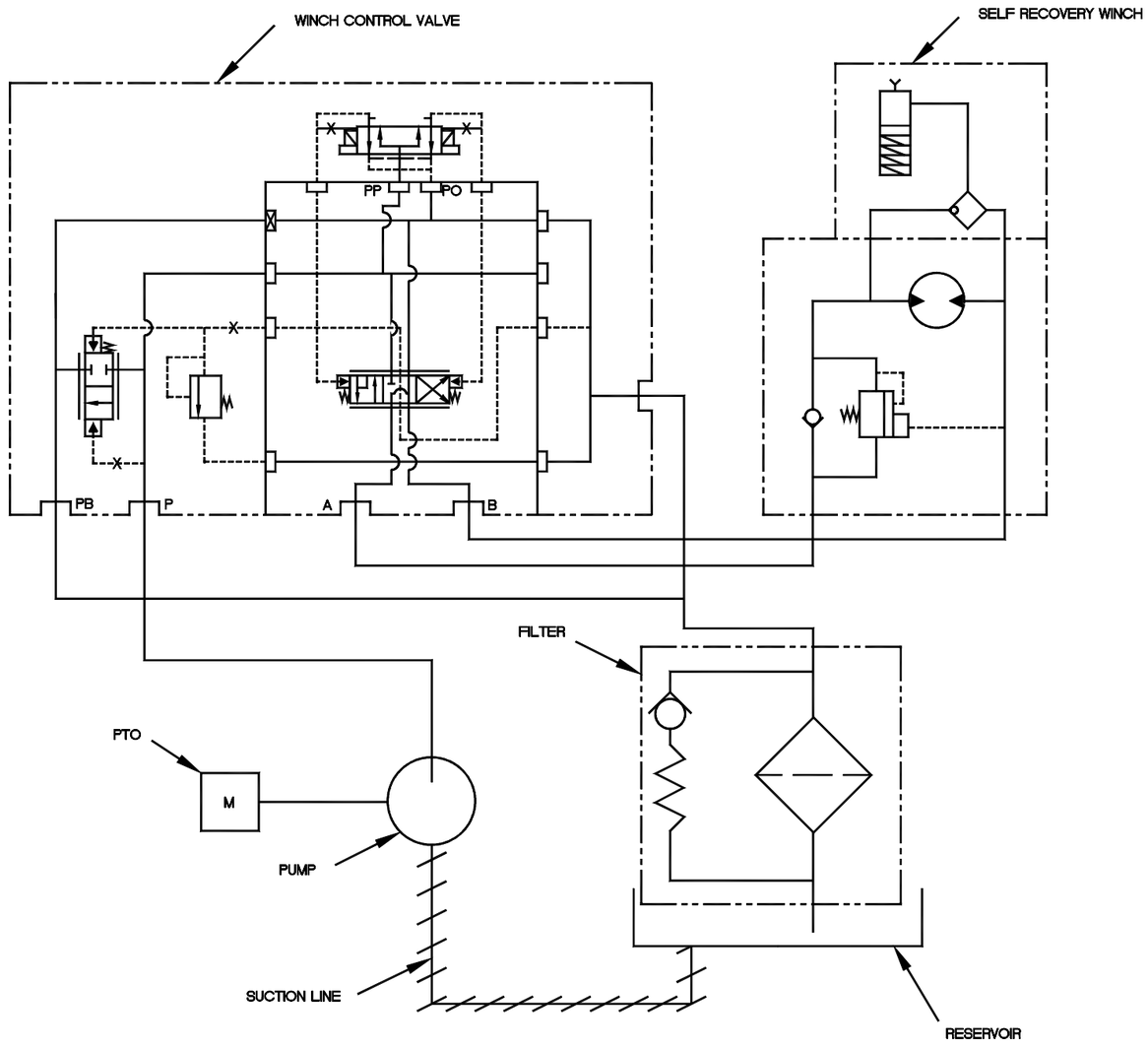
FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 1 OF 3

SIZE B | ILL. NO. 5HD01AL1 | FP-1/FP-2 BLANK

SHEET	ZONE	DESCRIPTION
3	B21	WINCH CONTROL VALVE
3	B24	SELF RECOVERY WINCH
3	F21	PTO
3	F22	PUMP
3	E23	FILTER
3	G23	RESERVOIR
3	G22	SUCTION LINE

FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 3

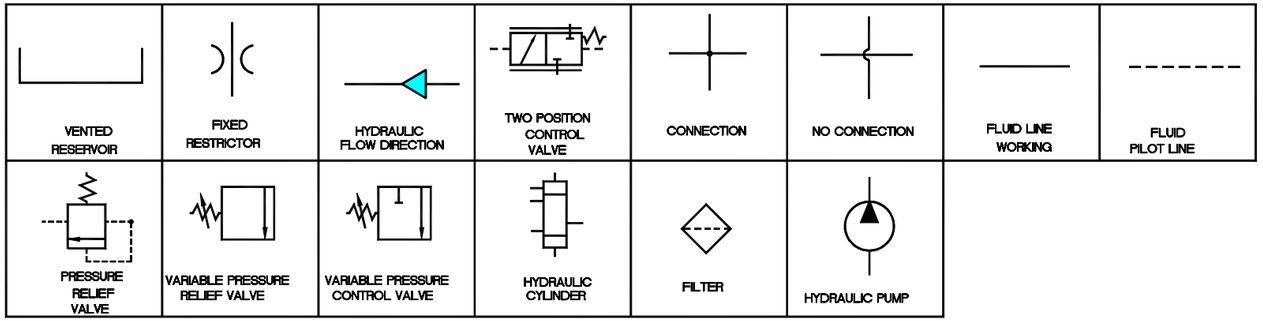
SIZE B | ILL NO. 5HD01-L2 | FP-3/FP-4 BLANK



LMTV TRUCK W/WINCH

FIGURE F0-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 3

SIZE	ILL. NO.	
B	5HD01-01	FP-5/FP-6 BLANK



SH	ZONE	DESCRIPTION
2	D11	FILTER
2	D14	FIXED RESTRICTOR
2	E17	HYDRAULIC CYLINDER
2	E13	HYDRAULIC PUMP
2	C13	PRESSURE RELIEF VALVE
2	D13	TWO POSITION CONTROL VALVE
2	E16	VARIABLE PRESSURE CONTROL VALVE
2	E16	VARIABLE PRESSURE RELIEF VALVE
2	C11	VENTED RESERVOIR

FIGURE FO-4 HYDRAULIC STEERING SYSTEM

FOLDOUT 1 OF 2

SIZE B | ILL. NO. YSD01AL1 | FP-1/FP-2 BLANK

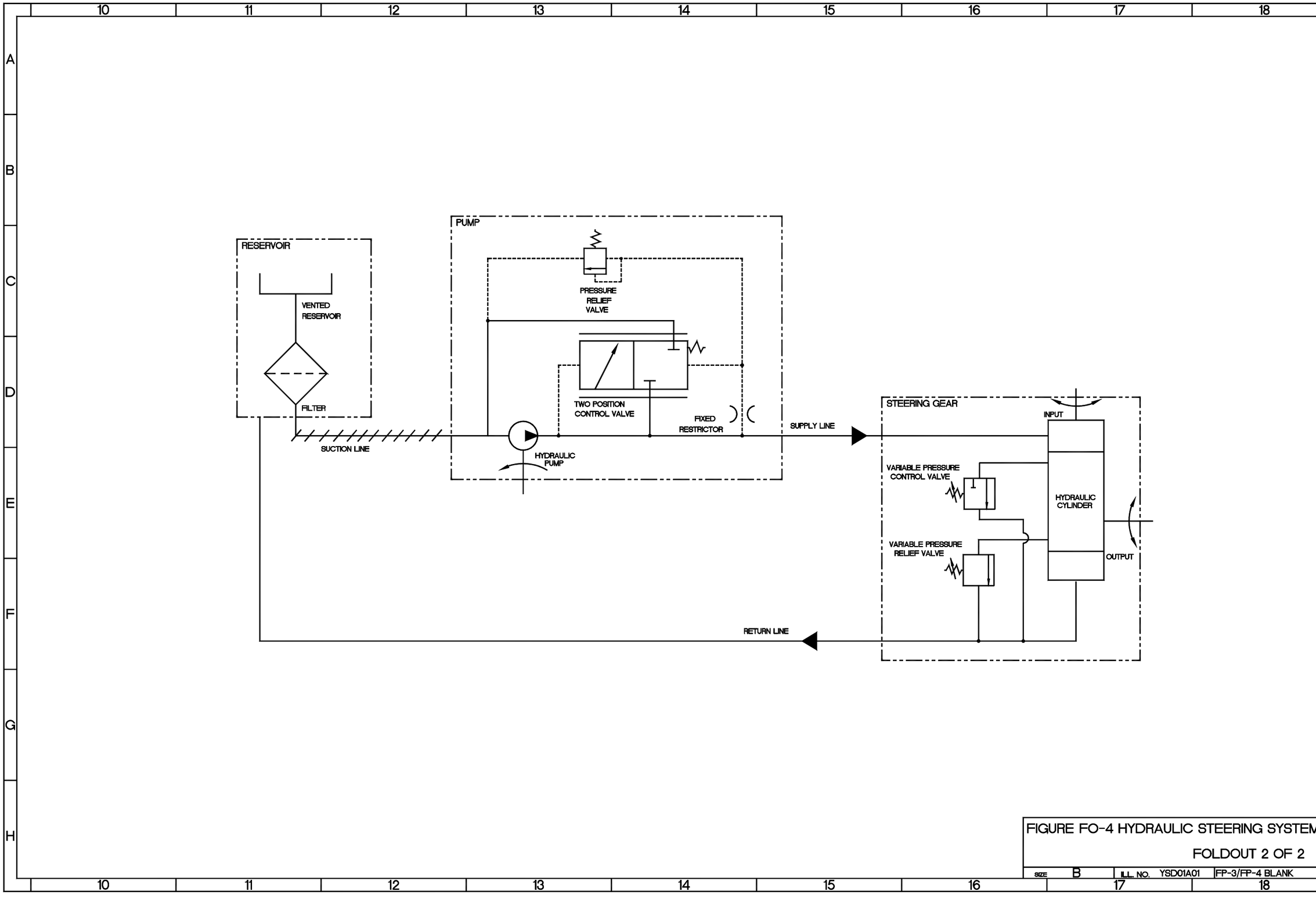


FIGURE FO-4 HYDRAULIC STEERING SYSTEM

FOLDOUT 2 OF 2

SIZE	ILL. NO.	
B	YSD01A01	FP-3/FP-4 BLANK

VENTED RESERVOIR	ABOVE FLUID LEVEL RESERVOIR	HYDRAULIC FLOW DIRECTION	PNEUMATIC FLOW DIRECTION	CONNECTION	NO CONNECTION	FLUID LINE WORKING	FLUID PILOT LINE
FIXED RESTRICTOR	CHECK VALVE	VARIABLE CONTROL CHECK VALVE	CHECK PILOT	PRESSURE RELIEF VALVE	FILTER	HAND PUMP	DETENT
TWO POSITION CAB SUSPENSION VALVE	MUFFLER	HYDRAULIC CYLINDER	CAB AIR SUSPENSION W/DAMPER	REAR CAB LATCH	TWO POSITION AIR PUMP VALVE	PRESSURE INTENSIFIER	HEIGHT CONTROL VALVE
TWO POSITION CAB TILT VALVE	TWO POSITION SUSPENSION VALVE	TWO POSITION SPARE TIRE VALVE	THREE POSITION SELECTION VALVE				

FIGURE F0-5 AIR TRANSPORTABILITY
HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC

FOLDOUT 1 OF 3

SIZE B | ILL. NO. YAD01AL1 | FP-1/FP-2 BLANK

SH	ZONE	DESCRIPTION
3	A25	CAB AIR SUSPENSION W/DAMPER
3	F21	CHECK PILOT
3	A22	CHECK VALVE
3	A23	CHECK VALVE
3	B22	CHECK VALVE
3	B23	CHECK VALVE
3	B25	CHECK VALVE
3	C20	CHECK VALVE
3	C21	CHECK VALVE
3	E19	CHECK VALVE
3	E24	CHECK VALVE
3	E25	CHECK VALVE
3	F19	CHECK VALVE
3	F21	CHECK VALVE
3	G21	CHECK VALVE
3	A22	FILTER
3	B22	FILTER
3	A24	FILTER
3	B24	FILTER
3	D19	FILTER
3	D20	FILTER
3	D21	FILTER
3	E19	FILTER
3	G19	FILTER
3	G21	FILTER
3	A22	FIXED RESTRICTOR
3	B22	FIXED RESTRICTOR
3	A23	FIXED RESTRICTOR
3	B23	FIXED RESTRICTOR
3	F19	HAND PUMP
3	B25	HEIGHT CONTROL VALVE
3	B22	HYDRAULIC CYLINDER
3	B23	HYDRAULIC CYLINDER
3	C21	HYDRAULIC CYLINDER
3	F20	MUFFLER
3	F21	PRESSURE INTENSIFIER
3	F19	PRESSURE RELIEF VALVE
3	A24	REAR CAB LATCH
3	E21	THREE POSITION SELECTION VALVE
3	D26	TWO POSITION AIR PUMP VALVE
3	D25	TWO POSITION CAB SUSPENSION VALVE
3	C24	TWO POSITION CAB TILT VALVE
3	C23	TWO POSITION SPARE TIRE VALVE
3	D21	TWO POSITION SUSPENSION VALVE
3	G22	VARIABLE CONTROL CHECK VALVE
3	G22	VENTED RESERVOIR

FIGURE F0-5 AIR TRANSPORTABILITY
HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 3

SIZE B | ILL NO. YAD01AL2 | FP-3/FP-4 BLANK

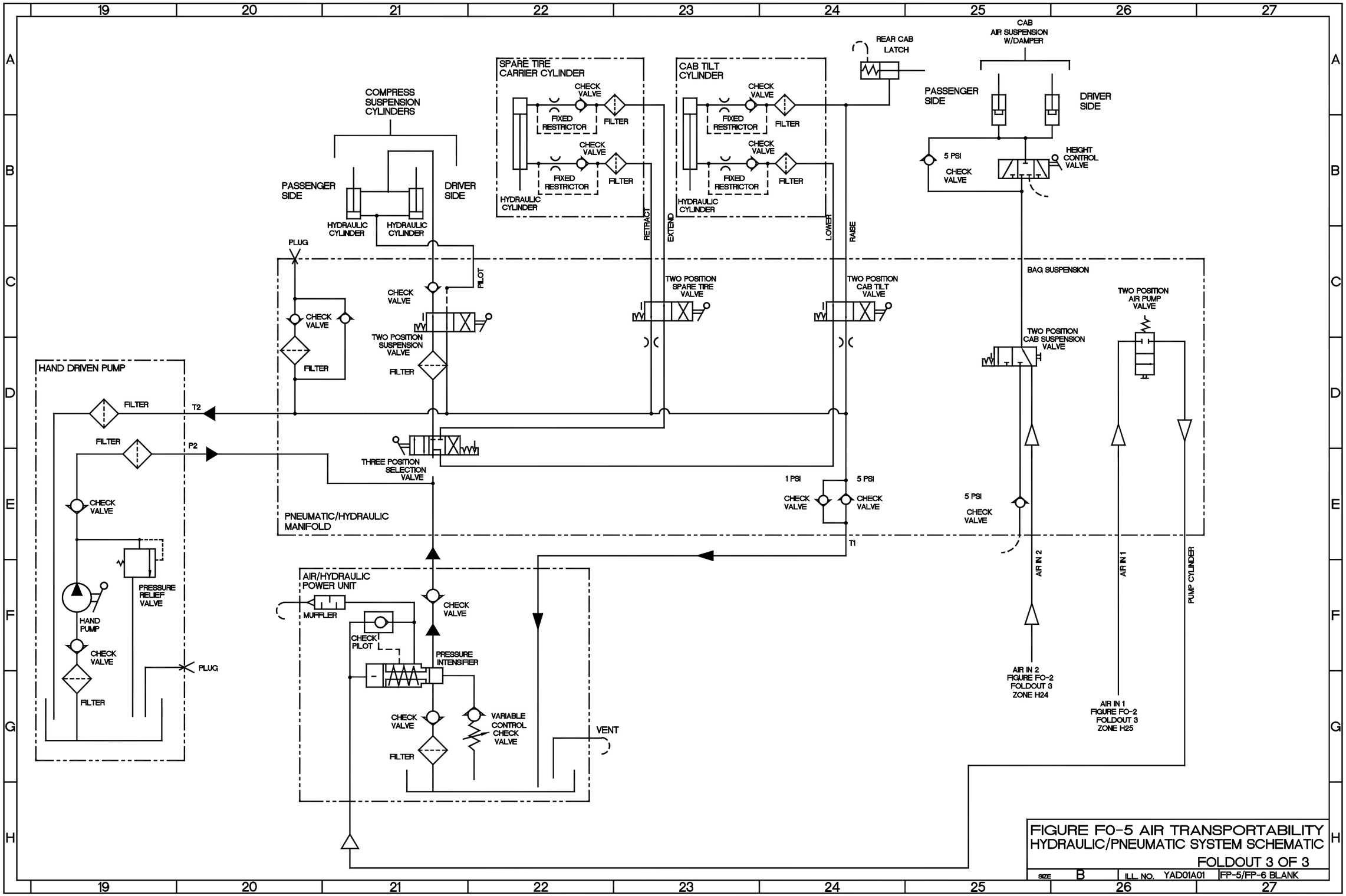


FIGURE FO-5 AIR TRANSPORTABILITY HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 3

SIZE B | ILL NO. YAD01A01 | FP-5/FP-6 BLANK

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

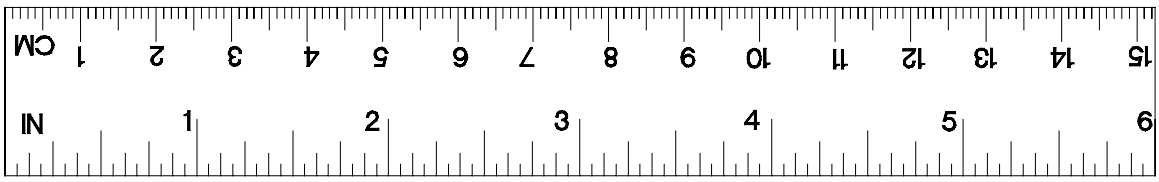
TEMPERATURE

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° + 32 = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Inches	Millimeters	25.4
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.57
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.35
Pounds	Kilograms	0.454
Pounds (force)	Newtons	4.448
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds/Sq Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Millimeters	Inches	0.0394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Sq Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Newtons	Pounds (force)	0.2248
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Sq Inch	0.145
Km per Liter	Miles per Gallon	2.354
Km per Hour	Miles per Hour	0.621



YMET001A

PIN: 074422-000