TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
M1083 SERIES, 5-TON, 6 X 6,
MEDIUM TACTICAL VEHICLES (MTV)

VOLUME NO. 4 OF 4

MODEL	NSN	EIC
TRK, CAR., MTV, M1083		
W/WN	2320-01-360-1895	BT3
W/O WN	2320-01-354-3386	BR2
TRK, CAR., MTV, W/MATL HDLG EQPT (MHE), M1084	2320-01-354-3387	BR3
TRK, CAR., MTV, LWB, M1085		
W/WN	2320-01-360-1897	BT5
W/O WN	2320-01-354-4530	BR7
TRK, CAR., MTV, LWB, W/MATL HDLG EQPT (MHE), M1086	2320-01-354-4531	BR8
TRK, TRACTOR, MTV, M1088		
W/WN	2320-01-360-1892	BTY
W/O WN	2320-01-355-4332	BTJ
TRK, WKR, MTV, M1089	2320-01-354-4528	BR4
TRK, DUMP, MTV, M1090		
W/WN	2320-01-360-1893	BTZ
W/O WN	2320-01-354-4529	BR5
TRK, CHAS, MTV, M1092	2320-01-354-3382	BRZ
TRK, CAR., MTV, AIR DROP, M1093		
W/WN	2320-01-360-1896	BT4
W/O WN	2320-01-355-3063	BR9
TRK, DUMP, MTV, AIR DROP, M1094		
W/WN	2320-01-360-1984	BT2
W/O WN	2320-01-355-3062	BTK
TRK, CHAS, MTV, LWB, M1096	2320-01-354-4527	BR6

HOW TO USE THIS MANUAL PAGE v
ENGINE MAINTENANCE PAGE 20-1
TRANSMISSION MAINTENANCE PAGE 21-1
POWER TRANSFER AND FINAL DRIVE ASSEMBLY MAINTENANCE PAGE 22-1
FRONT AXLE MAINTENANCE PAGE 23-1
INTERMEDIATE AND REAR AXLE MAINTENANCE PAGE 24-1
FRAME, TOWING ATTACHMENT, AND DRAWBARS MAINTENANCE PAGE 25-1
MATERIAL HANDLING CRANE (MHC) AND UNDERLIFT MAINTENANCE PAGE 26-1
HYDRAULIC MAINTENANCE PAGE 27-1

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

HEADQUARTERS, DEPARTMENTS OF THE ARMY AND THE AIR FORCE

SEPTEMBER1998

WARNING SUMMARY

WARNING

EXHAUST GASES CAN KILL

1. **DO NOT** operate your vehicle engine in an 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. Failure to comply may result in injury to personnel.

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. Failure to comply may result in injury to personnel.

WARNING (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

Use care when moving oxygen/acetylene bottles. Oxygen/acetylene bottles can act as projectiles if punctured and discharge explosive gases. Failure to comply may result in serious injury or death to personnel or damage to equipment.

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 can cause injury 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

Use care when installing springs. Springs are under tension and can act as projectiles when removed. 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

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 (CONT)

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 severe 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 severe 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

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 SUMMARY (CONT)

WARNING

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

Hydraulic components are hot when hydraulic oil reaches operating temperature. Use caution when handling hydraulic components. Wear gloves or use rags to hold metal objects. Failure to comply may result in 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

Drop hydraulic pressure to zero before disconnecting any hydraulic hose, tube, or fitting. Failure to comply may result in injury to personnel.

WARNING

Wear approved eye protecting when performing pressure checks. Failure to comply may result in oil getting into eyes. If oil contacts eyes, seek medical attention immediately.

WARNING

Fuel and oil are slippery and can cause falls. Wipe up spilled fuel or oil with rags. Failure to comply may result in injury to personnel.

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

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

WARNING SUMMARY (CONT)

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

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

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

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

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.

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

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 SUMMARY (CONT)

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

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

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

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

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 SUMMARY (CONT)

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

Intermediate axle assembly weighs approximately 1580 lbs (717 kgs) and must be supported during removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Intermediate axle assembly weighs approximately 1580 lbs (717 kgs) and must be supported during installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.

WARNING

Intermediate 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

Intermediate 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

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 must 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

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 90 lbs (41 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 90 lbs (41 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 SUMMARY (CONT)

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 injury to personnel or damage to equipment.

WARNING

Frame rail weighs approximately 250 lbs (113 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 320 lbs (145 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Frame rail weighs approximately 320 lbs (145 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 280 lbs (127 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Frame rail weighs approximately 280 lbs (127 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 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

Frame rail 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

Frame rail 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

Frame rail 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

Subframe rail 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

Subframe rail 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

Subframe weighs approximately 630 lbs (286 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Subframe weighs approximately 630 lbs (286 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

Subframe rail weighs approximately 280 lbs (127 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 280 lbs (127 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Subframe rail weighs approximately 240 lbs (109 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 240 lbs (109 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

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 injury to personnel or damage to equipment.

WARNING

Intermediate crossmember 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

Fifth wheel assembly weighs approximately 930 lbs (422 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Fifth wheel assembly weighs approximately 930 lbs (422 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Fifth wheel top plate weighs approximately 210 lbs (141 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Fifth wheel top plate weighs approximately 210 lbs (141 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

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 appropriate eye protection when drilling out rivets. 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 SUMMARY (CONT)

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

Standard cab weighs approximately 1400 lbs (636 kgs). M1093/M1094 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

Standard cab weighs approximately 1400 lbs (636 kgs). M1093/M1094 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.

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

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

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

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

WARNING

Cargo bed weighs approximately 2660 lbs (1208 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 2660 lbs (1208 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

Cargo bed weighs approximately 3520 lbs (1598 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 3520 lbs (1598 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

Dump body weighs approximately 3,030 lbs (1,377 kg). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Dump body weighs approximately 3,030 lbs (1,377 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Cab protector weighs approximately 185 lbs (84 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Cab protector weighs approximately 185 lbs (84 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

Support structure weighs approximately 600 lbs (272 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Support structure weighs approximately 600 lbs (272 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Material Handling Crane (MHC) weighs approximately 3030 lbs (1375 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in serious injury or death to personnel or damage to equipment.

WARNING

Personnel must stand clear during lifting operations. Failure to comply may result in serious injury or death to personnel.

WARNING

A guide rope must be attached to aid in controlling Material Handling Crane (MHC) during removal. Failure to comply may result in serious injury or death to personnel.

WARNING

Material Handling Crane (MHC) assembly weighs approximately 3030 lbs (1375 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.

WARNING

A guide rope must be attached to aid in controlling Material Handling Crane (MHC) during installation. Failure to comply may result in serious injury or death to personnel.

WARNING

Boom assembly weighs approximately 800 lbs (363 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Drive pivot shaft far enough to release tension link cylinder. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Drive pivot shaft far enough to release mast. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom assembly weighs approximately 800 lbs (363 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom fly section weighs approximately 120 lbs (55 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

A guide rope must be attached to aid in controlling boom fly section during removal. Failure to comply may result in injury to personnel.

WARNING

Boom fly section weighs approximately 120 lbs (55 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

A guide rope must be attached to aid in controlling boom fly section during installation. Failure to comply may result in injury to personnel.

WARNING

Boom mid section and telescopic cylinder combined weigh approximately 320 lbs (145 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (CONT)

WARNING

A guide rope must be attached to aid in controlling boom mid section and telescopic cylinder during removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

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

WARNING

Telescopic cylinder 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

Boom mid section and telescopic cylinder combined weigh approximately 320 lbs (145 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

A guide rope must be attached to aid in controlling boom mid section and telescopic cylinder during installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom base section weighs approximately 370 lbs (169 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel and damage to equipment.

WARNING

Boom base section weighs approximately 370 lbs (169 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Lift cylinder assembly weighs approximately 100 lbs (45 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Lift cylinder assembly weighs approximately 100 lbs (45 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Erection cylinder weighs approximately 50 lbs (23 Kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel.

WARNING

Erection cylinder weighs approximately 50 lbs (23 Kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel.

WARNING

RH lift cylinder assembly weighs approximately 100 lbs (45 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Mast weighs approximately 120 lbs (54 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Mast weighs approximately 120 lbs (54 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

RH Lift cylinder assembly weighs approximately 100 lbs (45 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

Turntable 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

Turntable bearing 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

Turntable bearing 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

Turntable 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

Do not remove swivel nut on back side of tension load cell. Failure to comply may result in injury to personnel and damage to equipment.

WARNING

Cylinder housing is under tension. Use care when removing cylinder housing from end cover. Failure to comply may result in injury to personnel.

WARNING

Hoist assembly weighs approximately 210 lbs (95 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Hoist assembly weighs approximately 210 lbs (95 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Swing drive assembly weighs approximately 70 lbs (32 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Swing drive assembly weighs approximately 70 lbs (32 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Jack cylinder weighs approximately 170 lbs (77 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Jack cylinder weighs approximately 170 lbs (77 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

When loads are applied to boom cable all personnel must move to a safe distance. Failure to comply may result in injury to personnel.

WARNING

Personnel shall wear proper eye protection. Failure to comply may result in injury to personnel.

WARNING

Material Handling Crane (MHC) weighs approximately 4575 lbs (2077 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Material Handling Crane (MHC) weighs approximately 4575 lbs (2077 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

Boom assembly weighs approximately 1330 lbs (604 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom assembly weighs approximately 1330 lbs (604 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Remove pivot shaft far enough to release RH tension link cylinder. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Lift cylinders must be supported to remove pivot shafts. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Lift cylinders must be supported to install pivot shaft. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom fly section weighs approximately 210 lbs (95 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom fly section weighs approximately 210 lbs (95 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom mid section and telescopic cylinder combined weigh approximately 510 lbs (231 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Attach a guide rope to boom mid section and telescopic cylinder prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom mid section and telescopic cylinder combined weigh approximately 510 lbs (231 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Attach a guide rope to boom mid section and telescopic cylinder prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Telescopic cylinder weighs approximately 240 lbs (109 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel.

WARNING

Telescopic cylinder weighs approximately 240 lbs (109 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel.

WARNING

Boom base section weighs approximately 540 lbs (245 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

Boom base section weighs approximately 540 lbs (245 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.

WARNING

Lift cylinder 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 SUMMARY (CONT)

WARNING

Lift cylinder 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

Remove pivot shaft enough to release tension link cylinder and erection cylinder. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Erection cylinder weighs approximately 70 lbs (32 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Erection cylinder weighs approximately 70 lbs (32 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Swing drive assembly weighs approximately 70 lbs (32 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Swing drive assembly weighs approximately 70 lbs (32 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Outrigger beam weighs approximately 175 lbs (80 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Outrigger beam weighs approximately 175 lbs (80 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Crane control panel 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

Crane control panel 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

30K winch assembly weighs approximately 1450 lbs (658 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel.

WARNING

A guide rope must be attached to 30K winch frame to aid in controlling winch assembly during removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Ensure banding strap around 30K winch is secured tightly and will not slip off. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Winch weighs approximately 550 lbs (250 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

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

WARNING

Ensure banding strap around 30K winch is removed carefully. Failure to comply may result in injury to personnel.

WARNING SUMMARY (CONT)

WARNING

Drum weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to assembly. Failure to comply may result in injury to personnel and/or damage to equipment.

WARNING

Winch weighs approximately 550 lbs (250 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

30K winch assembly weighs approximately 1450 lbs (658 kgs). Use suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

A guide rope must be attached to 30K winch frame to aid in controlling 30K winch assembly during installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Use care when installing balance ring springs because ring springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

WARNING

Underlift and stiffleg assembly weighs approximately 4000 lbs (1816 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Crossbar weighs approximately 350 lbs (158 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Underlift and stiffleg assembly weighs approximately 4000 lbs (1816 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Crossbar weighs approximately 350 lbs (158 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Telescopic lift cylinder weighs approximately 225 lbs (102 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Telescopic lift cylinder weighs approximately 225 lbs (102 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.

WARNING

Upper arm weighs approximately 190 lbs (86 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Remove retaining pin far enough to release telescopic cylinders. Failure to comply may result injury to personnel or damage to equipment.

WARNING

Prior to removing retaining pin and retaining pin covers, ensure upper arm assembly is properly balanced. Failure to comply may result in injury to personnel.

WARNING

Upper arm weighs approximately 190 lbs (86 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Prior to installing retaining pin and retaining pins covers, ensure upper arm is properly balanced. Failure to comply may result in injury to personnel.

WARNING SUMMARY (CONT)

WARNING

Drive retaining pin out far enough to release telescopic cylinder. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom frame weighs approximately 320 lbs (145 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom frame weighs approximately 320 lbs (145 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Spooler weldment 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

Spooler weldment 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

Stiffleg 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

Stiffleg 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

Tow bar 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

Tow bar 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

Pressure hose to monoblock valve operates at high pressure and flow. Ensure pressure and return lines are connected to the correct ports. Failure to comply may result in serious injury or death to personnel or damage to equipment.

WARNING

15K Self-Recovery Winch (SRW) 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

15K Self-Recovery Winch (SRW) 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

Three stage hydraulic pump weighs approximately 70 lbs (32 Kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Three stage hydraulic pump weighs approximately 70 lbs (32 Kgs). Attach 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 SUMMARY (CONT)

WARNING

Use care in placement of pressure gage and STE/ICE-R instruments used to perform these adjustments. Hydraulic system pressures are 3000 PSI (20685 kPa). Hoses will move or jump under this pressure. Secure test instruments, as required. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Cap, fitting, and four way relief may be very hot, use gloves while removing. Failure to comply may result in injury to personnel.

WARNING

Use care while performing adjustments. Stay clear of dump body while operating. Failure to comply may result in injury to personnel.

WARNING

Hoist cylinder weighs approximately 430 lbs (195 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Hoist cylinder weighs approximately 430 lbs (195 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

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

Machine gun ring assembly 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

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

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

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

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 SUMMARY (CONT)

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

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 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

Intermediate differential 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 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

Lift cylinder weighs approximately 180 lbs (82 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Telescopic lift cylinder weighs approximately 180 lbs (89 kgs). Attach a suitable lifting device prior to repair. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Both cylinder rods together weigh approximately 65 lbs (88 kgs). Do not remove both cylinder rods together. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

There may be excess hydraulic pressure in stiffleg cylinder. Loosen plugs slowly before removing. Failure to comply may result in serious injury to personnel.

WARNING

Cover is under pressure. Loosen bolts equally when removing cover. Failure to comply may result in injury to personnel.

WARNING

Lift cylinder weighs approximately 100 lbs (45 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Erection cylinder weighs approximately 70 lbs (32 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (CONT)

WARNING

Boom telescopic cylinder weighs approximately 150 lbs (68 kgs). Attach a suitable lifting prior to repair. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Boom telescopic cylinder weighs approximately 230 lbs (104 kgs). Attach a suitable lifting prior to repair. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Jack cylinder weighs approximately 110 lbs (50 kgs). Attach a suitable lifting prior to repair. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Dump body lift cylinder weighs approximately 200 lbs (91 kg). Attach a suitable lifting device prior to lifting. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Cylinder rod weighs approximately 110 lbs (50 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Cylinder rod weighs approximately 110 lbs (50 kgs). Attach a suitable lifting device prior to lifting. Failure to comply may result in injury to personnel or damage to equipment.

ARMY TM 9-2320-366-34-4
AIR FORCE T.O. 36A12-1C-1092-4

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
M1083 SERIES, 5-TON, 6x6,
MEDIUM TACTICAL VEHICLE
(MTV)

VOLUME NO. 4 OF 4

TM 9-2320-366-34-4, 15 September 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 out margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration.

Remove Pages	Insert Pages
A and B	A and B
none	Change 2 Authentication Sheet
18-1 and 18-2	18-1 and 18-2
18-77/(18-78 Blank)	18-77 and 18-78
none	18-79 thru 18-108
19-1 thru 19-4	19-1 thru 19-4
none	19-4.1/(19-4.2 Blank)
19-5 thru 19-6	19-5 thru 19-6
19-15 thru 19-17/(19-18 Blank)	19-15 thru 19-18
20-5 and 20-6	20-5 and 20-6
21-11 and 21-12	21-11 and 21-12
22-1 and 22-2	22-1 and 22-2
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
24-11 and 24-12	24-11 and 24-12
24-17 thru 24-20	24-17 thru 24-20
24-23 and 24-24	24-23 and 24-24
24-35 thru 24-38	24-35 thru 24-38
26-1 and 26-2	26-1 and 26-2
none	26-2.1/(26-2.2 Blank)
26-11 and 26-12	26-11 and 26-12
C-1 and C-2	C-1 and C-2
C-7 and C-8	C-7 and C-8
F-7 and F-8	F-7 and F-8
F-13 thru F-16	F-13 thru F-16
H-1 thru H-4	H-1 thru H-4
INDEX-1 and INDEX-2	INDEX-1 and INDEX-2
INDEX-5/ (INDEX-6 BLANK)	INDEX-5/ (INDEX-6 BLANK)
FO-1 FP-69/(FP-70 Blank)	FO-1 FP-69/(FP-70 Blank)
Metric Conversion Chart /PIN	Metric Conversion Chart /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
0401521

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) 380942, requirements for TM 9-2320-366-34-4.

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
M1083 SERIES, 5-TON, 6x6,
MEDIUM TACTICAL VEHICLE
(MTV)

VOLUME NO. 4 OF 4

TM 9-2320-366-34-4, 15 September 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 out margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration.

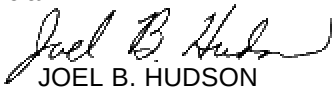
Remove Pages	Insert Pages
e thru kk/(ll Blank)	e thru al
none	A and B
i thru v/(vi Blank)	i thru vi
none	vii/(viii Blank)
18-1 thru 18-78	18-1 thru 18-77/(18-78 Blank)
18-79 thru 18-131/ (18-132 Blank)	none
19-1 thru 19-17/ (19-18 Blank)	19-1 thru 19-17/ (19-18 Blank)
20-1 and 20-2	20-1 and 20-2
20-5 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
21-39 and 21-40	21-39 and 21-40
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 thru 24-12	24-7 thru 24-12
24-17 thru 24-24	24-17 thru 24-24
24-27 and 24-28	24-27 and 24-28
24-33 thru 24-40	24-33 thru 24-40
26-61 and 26-62	26-61 and 26-62
26-67 and 26-68	26-67 and 26-68
26-73 and 26-74	26-73 and 26-74
A-1 and A-2	A-1 and A-2
C-1 thru C-8	C-1 thru C-8
none	C-9/(C-10 Blank)
D-1 and D-2	D-1 and D-2
none	D-4.1/(D-4.2 Blank)
D-5 and D-6	D-5 and D-6
D-25 thru D-28	D-25 thru D-28
D-31 and D-32	D-31 and D-32
D-39 thru D-48	D-39 thru D-48
none	D-81 thru D-86
F-1 thru F-15/(F-16 Blank)	F-1 thru F-16
none	F-17/(F-18 Blank)
G-1/(G-2 Blank)	G-1/(G-2 Blank)
none	H-1 thru H-4
INDEX-1 thru INDEX-4	INDEX-1 thru INDEX-4
none	INDEX-5/(INDEX-6 Blank)
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-21/(FP-22 Blank)	thru FP-21/(FP-22 Blank)
FO-1 FP-25/(FP-26 Blank)	FO-1 FP-25/(FP-26 Blank)
FO-1 FP-29/(FP-30 Blank)	FO-1 FP-29/(FP-30 Blank)
thru FP-67/(FP-68 Blank)	thru FP-67/(FP-68 Blank)
FO-1 FP-75/(FP-76 Blank)	FO-1 FP-75/(FP-76 Blank)
thru FP-79/(FP-80 Blank)	thru FP-79/(FP-80 Blank)
BackCover	BackCover

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
0110117

DISTRIBUTION: To be distributed in accordance with the initial distribution number (IDN) 380942, requirements for TM 9-2320-366-34-4

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 ..... 15 September 1998
Change ..... 1 ..... 31 July 2001
Change ..... 2 ..... 20 August 2005

THE TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 786, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover	1
Blank	0
a thru e	0
f thru al	1
A and B Added	2
i thru vi	1
vii Added	1
viii Blank Added	1
18-1	2
18-2 thru 18-76	1
18-77	2
18-78	2
18-79 thru 18-108 Added	2
18-109 thru 18-131 Deleted	1
18-132 Blank Deleted	1
19-1	1
19-2	2
19-3	0
19-4	2
19-4.1 Added	2
19-4.2 Blank Added	2
19-5	2
19-6	1
19-7	0
19-8 thru 19-15	1
19-16 thru 19-18	2
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	1
21-11 and 21-12	2
21-13 thru 21-39	0
21-40	1
21-41 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 and 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 and 24-4	1
24-5 and 24-6	0
24-7	1
24-8	0
24-9	1
24-10	0
24-11	2
24-12 thru 24-17	0
24-18	2
24-19	1
24-20	2
24-21 and 24-22	1
24-23	2
24-24	1
24-25 thru 24-27	0
24-28	1
24-29 thru 24-33	0
24-34 and 24-35	1
24-36	2
24-37	0
24-38	2
24-38 and 24-40	1
25-1 thru 25-33	0
25-34 Blank	0
26-1	0
26-2	2
26-2.1 Added	2
26-2.2 Blank Added	2
26-3 thru 26-11	0
26-12	2
26-13 thru 26-60	0
26-61	1
26-62 thru 26-66	0
26-67	1
26-68 thru 26-72	0
26-73	1
26-74 thru 26-82	0
27-1 thru 27-9	0
27-10 Blank	0
A-1	0
A-2	1
A-3 and A-4	0
B-1 thru B-6	0
C-1	1
C-2	2
C3 thru C-6	1
C7 and C-8	2
C-9 Added	1
C-10 Blank Added	1
D-1	1
D-2 thru D-4	0
D-4.1 Added	1
D-4.2 Blank Added	1
D-5 and D-6	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.
D-7 thru D-24	0
D-25 thru D-28	1
D-29 thru D-31	0
D-32	1
D-33 thru D-38	0
D-39	1
D-40 and D-41	0
D-42 thru D-47	1
D-48 thru D-80	0
D-81 thru D-86 Added	1
E-1 thru E-8	0
F-1 thru F-6	1
F-7	2
F-8 thru F-13	1
F14	2
F15	1
F-16	2
F-17 Added	1
F-18 Blank Added	1
G-1	1
G-2 Blank	0
H-1 Added	1
H-2 and H-3	2
H-4 Added	1
INDEX-1	2
INDEX-2 thru INDEX-4	1
INDEX-5	2
INDEX-6 Blank Added	1
Glossary-1	0
Glossary-2 Blank	0
FO-1 FP-1	1
FO-1 FP-2 Blank	0
FO-1 FP-3	1
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	1
FO-1 FP-22 Blank	0
FO-1 FP-23	0
FO-1 FP-24 Blank	0
FO-1 FP-25	1
FO-1 FP-26 Blank	0
FO-1 FP-27	0
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	1
FO-1 FP-62 Blank	0
FO-1 FP-63	1
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-1 FP-69	2
FO-1 FP-70 Blank	0
FO-1 FP-71	0
FO-1 FP-72 Blank	0
FO-1 FP-73	0
FO-1 FP-74 Blank	0
FO-1 FP-75	1
FO-1 FP-76 Blank	0
FO-1 FP-77	1
FO-1 FP-78 Blank	0
FO-1 FP-79	1
FO-1 FP-80 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-3 FP-7	0
FO-3 FP-8 Blank	0
FO-3 FP-9	0
FO-3 FP-10 Blank	0
FO-3 FP-11	0
FO-3 FP-12 Blank	0
FO-3 FP-13	0
FO-3 FP-14 Blank	0
FO-3 FP-15	0
FO-3 FP-16 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. 9-2320-366-34-4

TECHNICAL ORDER
NO. 36A12-1C-1092-4

HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE

Washington, D.C., 15 September 1998

Direct Support and General Support Maintenance Manual

M1083 SERIES, 5-TON, 6 x 6, MEDIUM TACTICAL VEHICLES (MTV)

VOLUME NO. 4 OF 4

MODEL	NSN	EIC
TRK, CAR., MTV, M1083		
W/WN	**2320-01-360-1895**	**BT3**
W/O WN	**2320-01-354-3386**	**BR2**
TRK, CAR., MTV, W/MATL HDLG EQPT (MHE), M1084	**2320-01-354-3387**	**BR3**
TRK, CAR., MTV, LWB, M1085		
W/WN	**2320-01-360-1897**	**BT5**
W/O WN	**2320-01-354-4530**	**BR7**
TRK, CAR., MTV, LWB, W/MATL HDLG EQPT (MHE), M1086	**2320-01-354-4531**	**BR8**
TRK, TRACTOR, MTV, M1088		
W/WN	**2320-01-360-1892**	**BTY**
W/O WN	**2320-01-355-4332**	**BTJ**
TRK, WKR, MTV, M1089	**2320-01-354-4528**	**BR4**
TRK, DUMP, MTV, M1090		
W/WN	**2320-01-360-1893**	**BTZ**
W/O WN	**2320-01-354-4529**	**BR5**
TRK, CHAS, MTV, M1092	**2320-01-354-3382**	**BRZ**
TRK, CAR., MTV, AIR DROP, M1093		
W/WN	**2320-01-360-1896**	**BT4**
W/O WN	**2320-01-355-3063**	**BR9**
TRK, DUMP, MTV, AIR DROP, M1094		
W/WN	**2320-01-360-1984**	**BT2**
W/O WN	**2320-01-355-3062**	**BTK**
TRK, CHAS, MTV, LWB, M1096	**2320-01-354-4527**	**BR6**

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

CHAPTER 18 SPECIAL PURPOSE 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 FINAL 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 INTERMEDIATE AND REAR AXLE MAINTENANCE 24-1
Section I Introduction 24-1
Section II Maintenance Procedures 24-2

CHAPTER 25 FRAME, TOWING ATTACHMENT, AND DRAWBARS MAINTENANCE 25-1
Section I Introduction 25-1
Section II Maintenance Procedures 25-2

CHAPTER 26 MATERIAL HANDLING CRANE (MHC) AND UNDERLIFT MAINTENANCE 26-1
Section I Introduction 26-1
Section II Maintenance Procedures 26-2

CHAPTER 27 HYDRAULIC MAINTENANCE 27-1

Section I **Introduction** 27-1
Section II **Maintenance Procedures** 27-2

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

SUBJECT INDEX Index-1
GLOSSARY Glossary-1

LIST OF ILLUSTRATIONS

Figure	Title	Page
D-1	Brake Adjusting Tool Support	D-6
D-2	Brake Plunger Seal Driver	D-7
D-3	Cab Front Support Spanner Socket	D-8
D-4	Cab Maintenance Stand Angle Brackets and Straight Braces	D-10
D-5	Cab Maintenance Stand Base Angle Bracket Locations	D-11
D-6	Cab Maintenance Stand Base Fabrication	D-12
D-7	Cab Maintenance Stand Brace Bracket Locations	D-13
D-8	Cab Maintenance Stand Brace to Base Assembly	D-14
D-9	Cab Maintenance Stand Side Braces Side View	D-15
D-10	Cab Maintenance Stand Assembly	D-16
D-11	Cab Support Tool Strut and Cab Rest	D-17
D-12	Cab Support Tool Seat	D-18
D-13	Cab Support Tool Seat Layout	D-19
D-14	Cab Support Tool Assembly	D-20
D-15	Dump Body Cab Protector Pivot Pin Removal Tool Assembly	D-21
D-16	Dump Body Lifting Bracket	D-22
D-17	Rear, Top, and Guide Plate	D-23
D-18	Front and Mounting Plate	D-24
D-19	Engine Stand Bracket Assembly	D-25
D-20	Engine Stand Bracket Front Plate	D-26
D-21	Engine Stand Bracket Rear Plate	D-27
D-22	Engine Stand Bracket Side Plates	D-28
D-23	Headlight Adjustment Screen	D-29
D-24	Machine Gun Ring Drill Stop	D-30
D-25	Main Valve Body Spring Compression Tool	D-31
D-26	M1089 30K Winch Test Adapter	D-32
D-27	M1089 Solenoid Test Adapter	D-33
D-28	Spanner Socket Tool	D-34
D-29	Spanner Wrench Tool Assembly	D-35
D-30	Spanner Wrench Jaw	D-36
D-31	Spanner Wrench Handle Piece	D-36
D-32	Spreader Bar Layout	D-37

LIST OF ILLUSTRATIONS (CONT)

Figure	Title	Page
D-33	Spreader Bar Assembly	D-38
D-34	Steering Stop Shim Gage	D-39
D-35	Swingdrive Assembly Bracket	D-40
D-36	Transfer Case Lift Bracket Assembly	D-41
D-37	Transfer Case Lift Bracket Main Mounting Bracket	D-42
D-38	Transfer Case Bracket Bolt Mounting Bracket	D-43
D-39	Transfer Case Lift Bracket Lifting Bracket	D-44
D-40	Transfer Case Lift Bracket Center Support Plate	D-45
D-41	Transfer Case Lift Bracket Lifting Plate Braces	D-46
D-42	Transfer Case Lift Bracket Bolt Mounting Bracket Supports	D-47
D-43	Transmission Lift and Mounting Bracket Assembly	D-48
D-44	Transmission Lift and Mounting Bracket Bottom Plate	D-49
D-45	Transmission Lift and Mounting Bracket Side Plates	D-50
D-46	Transmission Lift and Mounting Bracket Top Plate	D-51
D-47	Transmission Lift and Mounting Bracket Top and Bottom Braces	D-52
D-48	Transmission Lift and Mounting Bracket Side Supports	D-53
D-49	Transmission Lift and Mounting Bracket Bolt Mounting Plates	D-54
D-50	Transmission Lift Bracket Assembly	D-55
D-51	Lower Lift Bracket	D-56
D-52	Upper Lift Bracket	D-57
D-53	Battery 12V Cable Assembly	D-59
D-54	Battery Ground Cable Assembly	D-61
D-55	Battery 24V Cable Assembly	D-62
D-56	Lanyard Assembly	D-70
D-57	Wooden Skid	D-71
D-58	CTIS Seal Driver	D-73
D-59	Front Axle Shaft Seal Driver	D-74
D-60	Wheel Hub Grease Seal Driver	D-75
D-61	Intermediate Differential Output (Rear) Seal Driver	D-76
D-62	Differential Pinion Seal Driver	D-77
D-63	Intermediate Input Yoke Seal Driver	D-78
D-64	Intermediate Output Yoke Seal Driver	D-79
D-65	Front and Rear Differential Yoke Seal Driver	D-80
D-66	Purge Valve Tool	D-82
D-67	M1089 30K Winch Pneumatic Test Adapter	D-85

LIST OF TABLES

Number	Title	Page
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

LIST OF TABLES (CONT)

Number	Title	Page
23-1	Pinion Bearing Preload Chart	23-12
23-2	Pinion Cone Variation Chart	23-15
24-1	Pinion Cone Variation Chart	24-11
24-2	Pinion Bearing Preload Chart	24-34
24-3	Pinion Cone Variation Chart	24-37
D-1	Pneumatic Tube Lengths	D-64
D-2	Non-Metallic Electrical Cable Conduit Lengths	D-68
D-3	M1089 30K Air Hose Lengths and Fittings	D-83
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 MTV at the Direct Support (DS) and General Support (GS) Maintenance levels. This volume, Volume 4, contains information which will assist you in the performance of DS and GS Maintenance on the MTV. Volume 4 contains the following major sections in order of appearance:

- **WARNING SUMMARY.** Provides a summary of the most important warnings that apply throughout the manual. Read all **WARNINGS** and **CAUTIONS** before performing any 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 MTV. Chapters 18 and 19 are Direct Support Maintenance procedures. General Support Maintenance procedures are contained in chapters 20 through 27. Become familiar with the entire maintenance procedure before beginning any maintenance task.

  DIRECT SUPPORT MAINTENANCE

  - **CHAPTER 18, SPECIAL PURPOSE 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**

OVERVIEW (CONT)

GENERAL SUPPORT MAINTENANCE (CONT)

- **CHAPTER 24, INTERMEDIATE AND REAR AXLE MAINTENANCE**
- **CHAPTER 25, FRAME, TOWING ATTACHMENT, AND DRAWBARS MAINTENANCE**
- **CHAPTER 26, MATERIAL HANDLING CRANES (MHC) AND UNDERLIFT MAINTENANCE**
- **CHAPTER 27, HYDRAULIC MAINTENANCE**

- **APPENDIX A, REFERENCES.** Lists publications used with the MTV 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 MTV.
- **APPENDIX E, TORQUE LIMITS.** Lists the standard torque values for specific attaching hardware.
- **APPENDIX F, MANDATORY REPLACEMENT PARTS.**
- **APPENDIX G, ADDITIONAL AUTHORIZATION LIST (AAL).** Lists additional items you are authorized for support of the MTV.
- **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 4 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.** Lists paragraphs contained in the individual chapters with paragraph and page numbers in order of appearance.

- **SUBJECT INDEX.** Lists all maintenance procedures contained in Volume 4 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 18
SPECIAL PURPOSE KITS MAINTENANCE

Section I. INTRODUCTION 18-1
18-1. INTRODUCTION 18-1

Section II. MAINTENANCE PROCEDURES 18-2
18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION 18-2
18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION 18-20
18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION 13-34
18-5. M1085 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION 18-51
18-6. 200 AMP ALTERNATOR REPAIR 18-62
18-7. DIGITIZATION KIT, INITIAL INSTALLATION 18-79
18-8. ENHANCED RESILIENT MOUNT INITIAL INSTALLATION 18-107

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.

Section II. MAINTENANCE PROCEDURES

18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION

This task covers:

a. Installation

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-366-10-1).
Air tanks drained (TM 9-2320-366-10-1).
Cargo bed removed (para 15-9).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Socket, Socket Wrench (TM 9-2320-366-20)
Drill, Electric, Portable (Item 21, Appendix B)
Drill Set, Twist (Item 20, Appendix B)
Socket Set, Impact (Item 58, Appendix B)

Tools and Special Tools (Cont)
Wrench, Impact, Electric (Item 88, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Shop Equipment, Automotive Vehicle (Item 58, Appendix B -20)

Materials/Parts
Ties, Cable, Plastic (Item 99, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, 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.

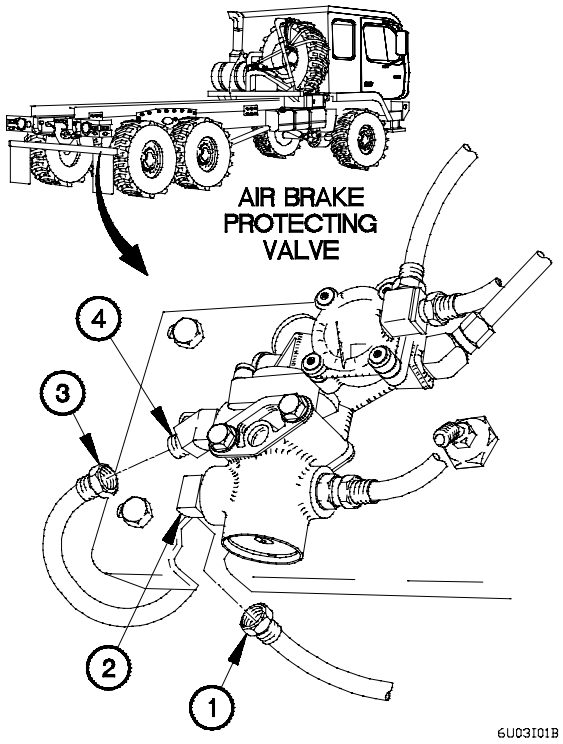
a. Installation.

NOTE

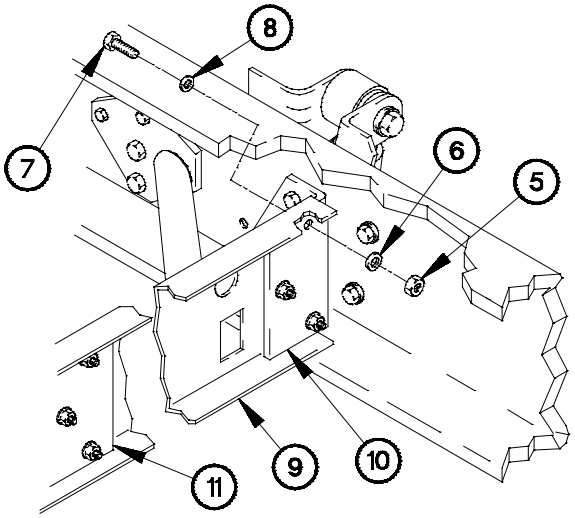
- Remove plastic cable ties as required.
- Tag air hoses and connection points prior to disconnecting.

(1) Disconnect air hose (1) from 90-degree fitting (2).

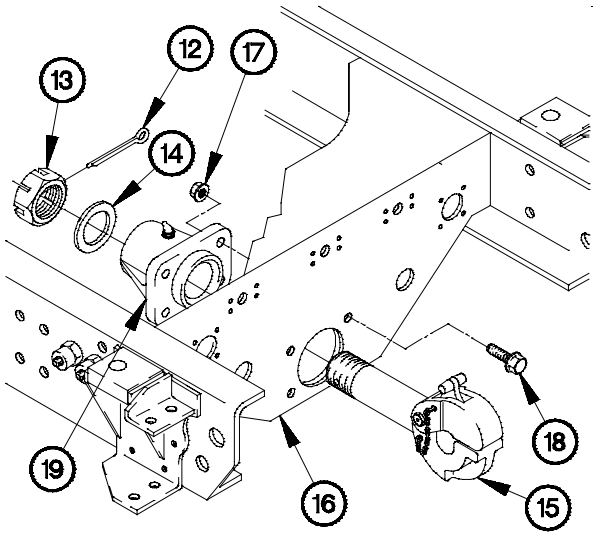
(2) Disconnect air hose (3) from 45-degree fitting (4).



(3) Remove six self-locking nuts (5), washers (6), screws (7), washers (8), and valve control panel (9) from brackets (10 and 11).



6U03I02B



6U03I03B

(4) Remove cotter pin (12) from nut (13). Discard cotter pin.

(5) Remove nut (13) and washer (14) from pintle hook (15).

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.

(6) Remove pintle hook (15) from rear crossmember (16).

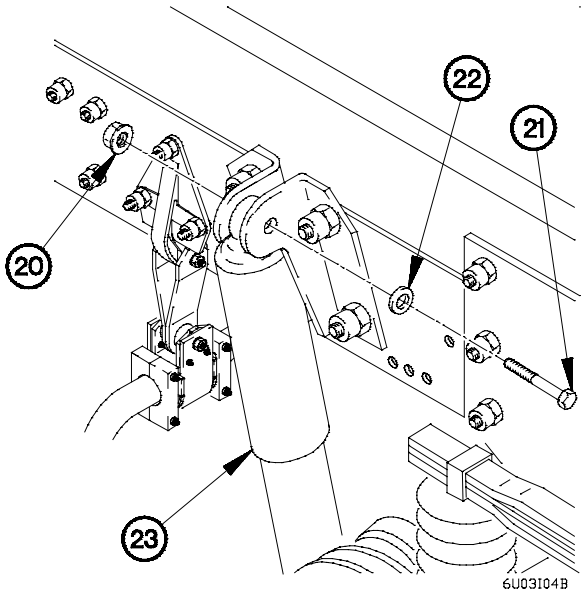
(7) Remove four self-locking nuts (17), screws (18), and support (19) from rear crossmember (16). Discard self-locking nuts.

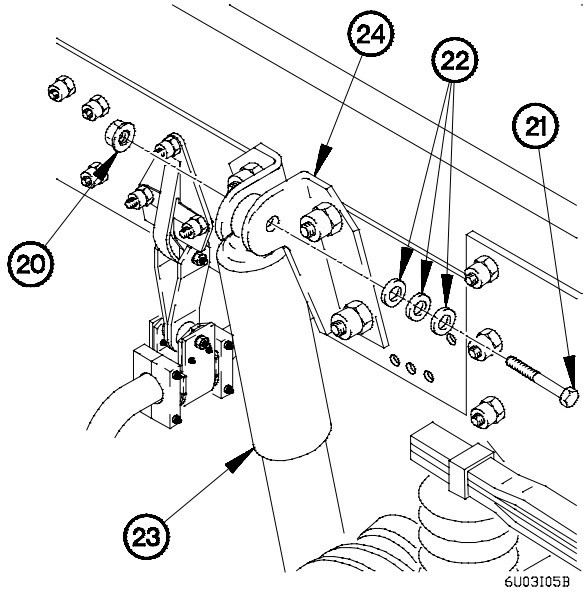
18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

- Perform steps (8) through (14) on RH side of vehicle.
- Perform step (8) on vehicle serial numbers 0001 through 1398, and 2988 and higher serial numbers.
- Steps (8) through (21) require the aid of an assistant.

(8) Remove self-locking nut (20), bolt (21), and washer (22) from rear axle shock absorber (23). Discard self-locking nut.





NOTE

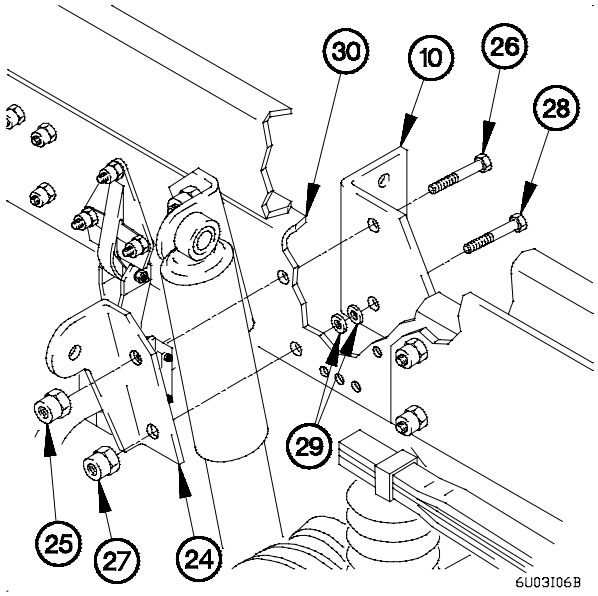
Perform step (9) on vehicle serial numbers 1399 through 2987.

(9) Remove self-locking nut (20), bolt (21), and three washers (22) from rear axle shock absorber (23). Discard self-locking nut.

(10) Remove rear axle shock absorber (23) from rear axle shock absorber front bracket (24) and set to side.

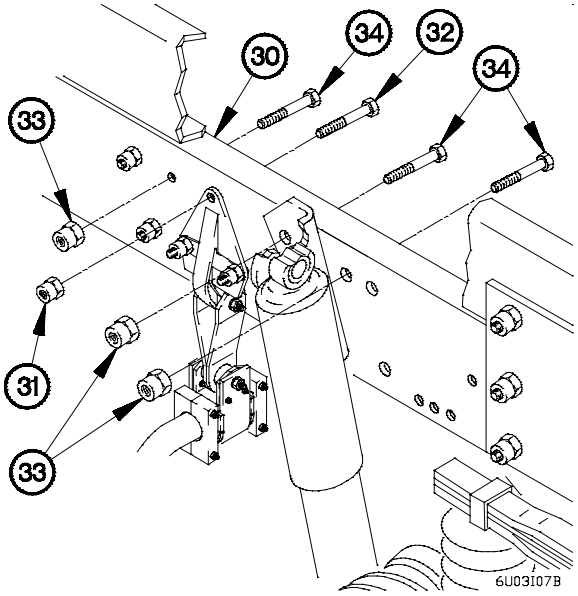
(11) Remove collar (25) and bolt (26) from rear axle shock absorber front bracket (24). Discard collar and bolt.

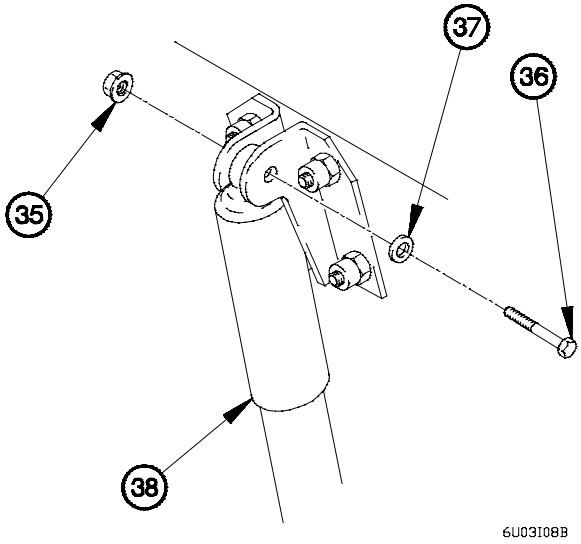
(12) Remove collar (27), bolt (28), bracket (10), two washers (29) and rear axle shock absorber front bracket (24) from RH frame rail (30). Discard collar and bolt.



(13) Remove collar (31) and bolt (32) from RH frame rail (30). Discard collar and bolt.

(14) Remove three collars (33) and bolts (34) from RH frame rail (30). Discard collars and bolts.





NOTE

Perform step (16) on vehicle serial numbers 1399 through 2987.

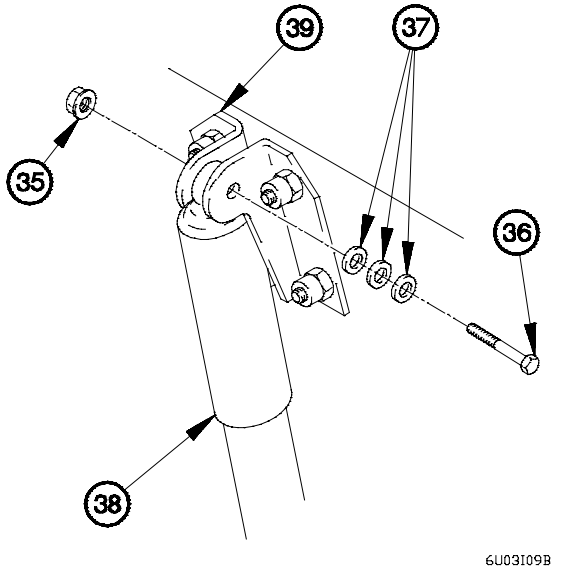
(16) Remove self-locking nuts (35), bolt (36), and three washers (37) from rear axle shock absorbers (38). Discard self-locking nut.

(17) Remove rear axle shock absorber (38) from rear axle shock absorber front bracket (39) and set to side.

NOTE

- Perform step (15) through (21) on LH side of vehicle.
- Perform step (15) on vehicle serial numbers 0001 through 1398, and 2988 and higher serial numbers.

(15) Remove self-locking nut (35), bolt (36), and washer (37) from rear axle shock absorber (38). Discard self-locking nut.



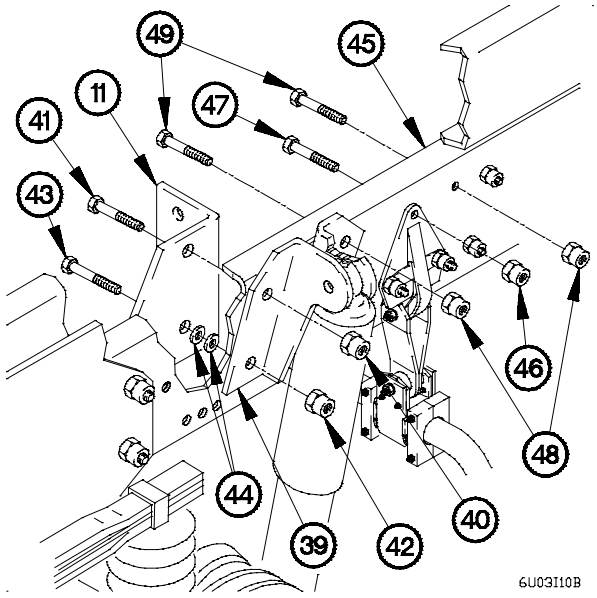
18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

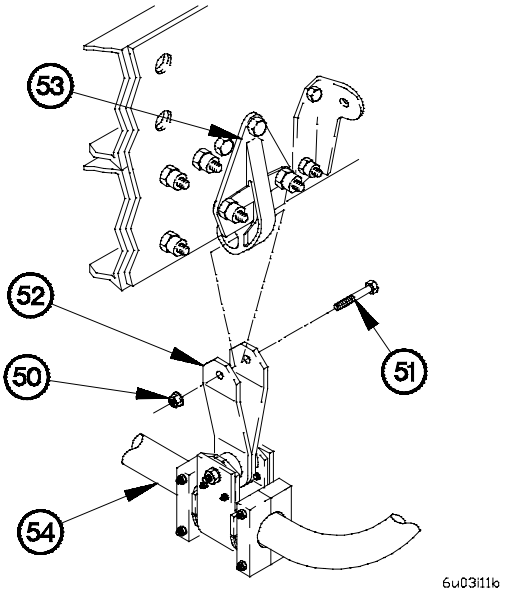
(18) Remove collar (40) and bolt (41) from rear axle shock absorber front bracket (39). Discard collar and bolt.

(19) Remove collar (42), bolt (43), bracket (11), two washers (44) and rear axle shock absorber front bracket (39) from LH frame rail (45). Discard collar and bolt.

(20) Remove collar (46) and bolt (47) from LH frame rail (45). Discard collar and bolt.

(21) Remove two collars (48) and bolts (49) from LH frame rail (45). Discard collars and bolts.





NOTE

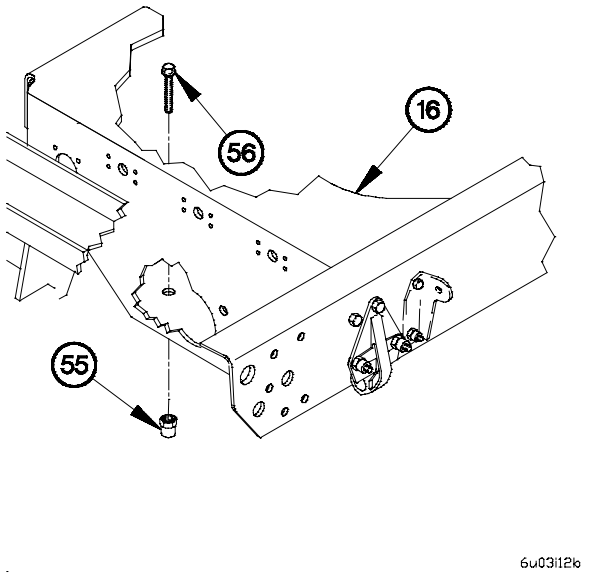
Left and right sides of rear stabilizer bar are disconnected the same way. Right side shown.

(22) Remove self-locking nut (50), bolt (51), and bracket assembly (52) from frame bracket (53). Discard self-locking nut.

(23) Perform step (22) on left side of vehicle.

(24) Lower rear stabilizer bar (54).

(25) Remove two collars (55) and bolts (56) from rear crossmember (16). Discard collars and bolts.

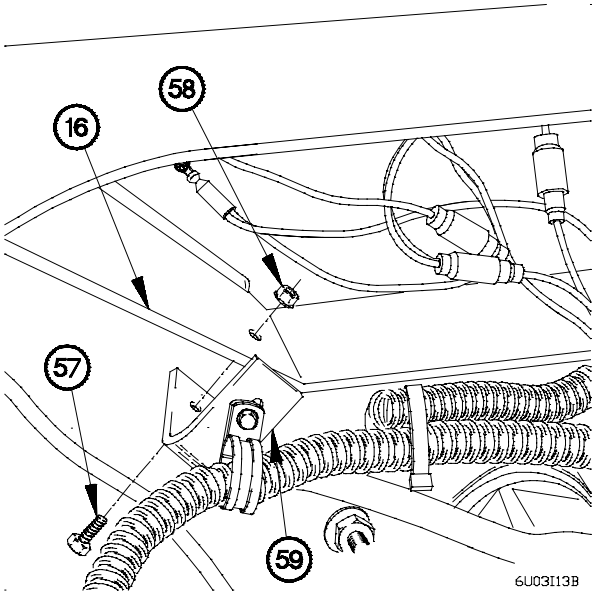


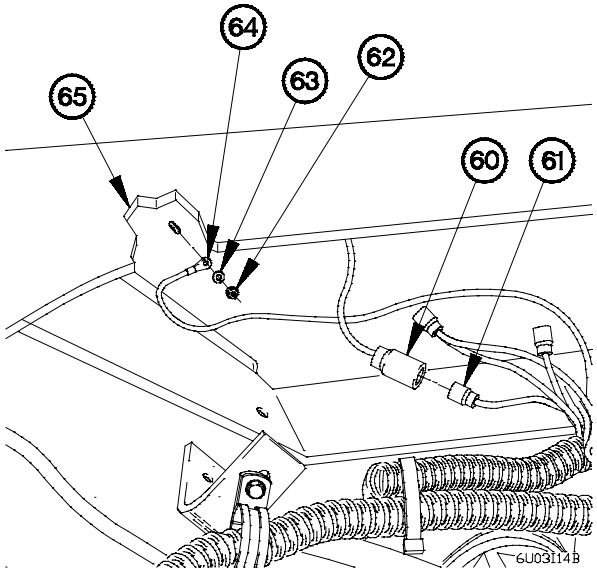
NOTE

Left and right L-brackets are removed the same way. Right side shown.

(26) Remove screw (57), self-locking nut (58), and L-bracket (59) from rear crossmember (16).

(27) Perform step (26) on left side L-bracket.



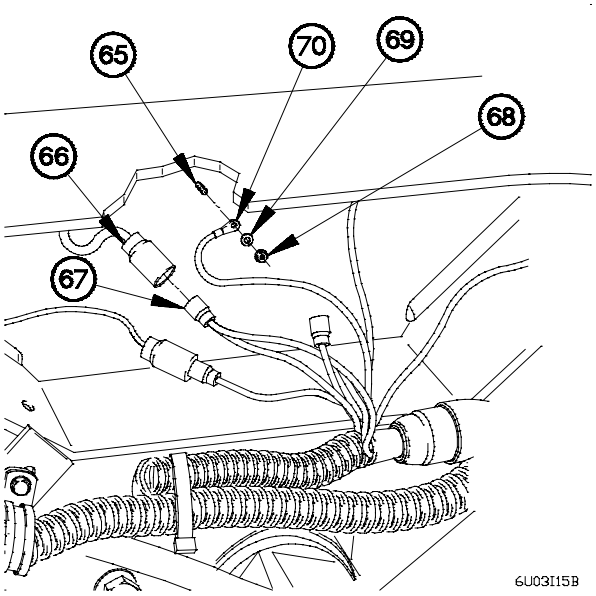


(28) Disconnect connector (60) from connector P58 (61).

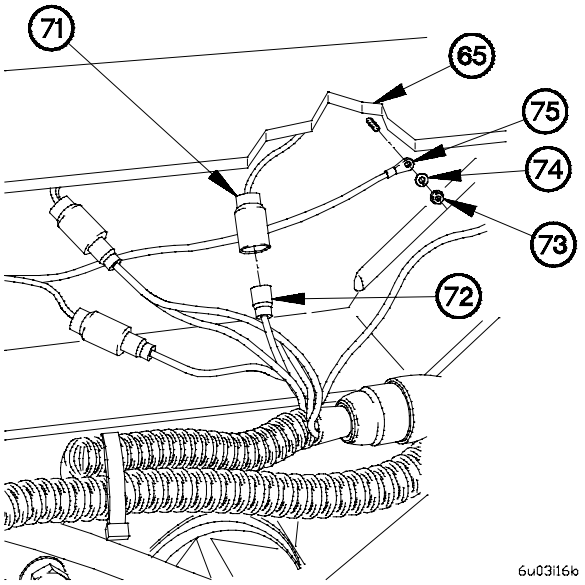
(29) Remove nut (62), lockwasher (63), and terminal lug TL32 (64) from base (65).

(30) Disconnect connector (66) from connector P56 (67).

(31) Remove nut (68), lockwasher (69), and terminal lug TL31 (70) from base (65).

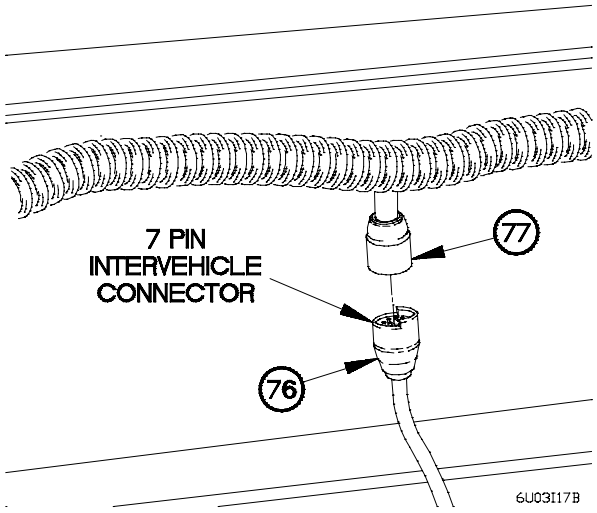


18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

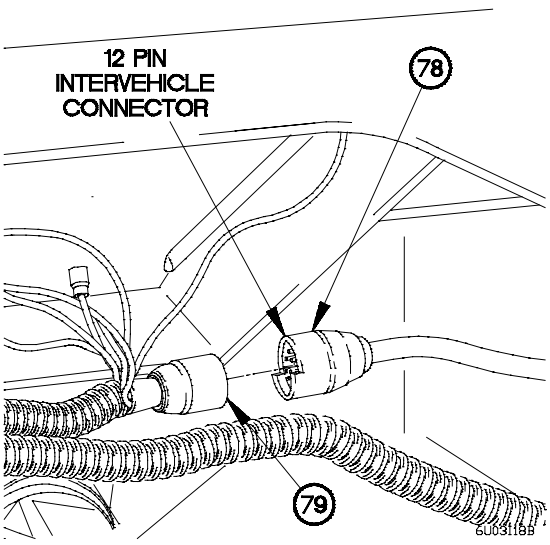


(32) Disconnect connector (71) from connector P54 (72).

(33) Remove nut (73), lockwasher (74), and terminal lug TL30 (75) from base (65).



(34) Disconnect connector J52 (76) from connector P52R (77).



(35) Disconnect connector J53 (78) from connector P53 (79).

NOTE

Use bolts P/N 12414307-143 on step (36).

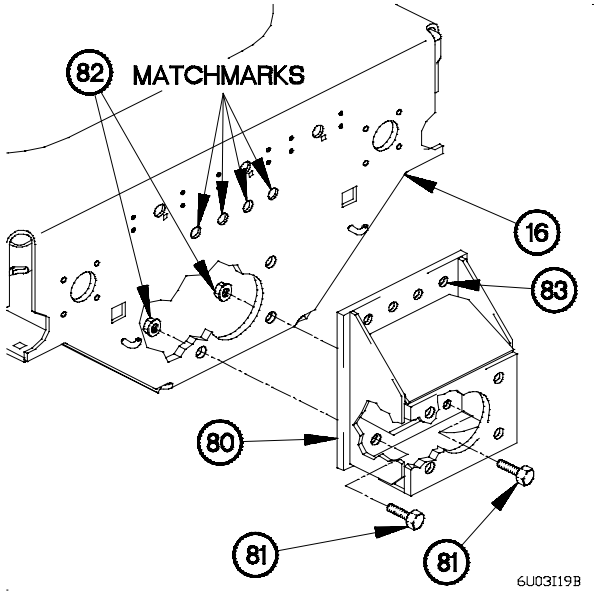
(36) Install pintle hook extension (80) on rear crossmember (16) with two bolts (81) and self-locking nuts (82).

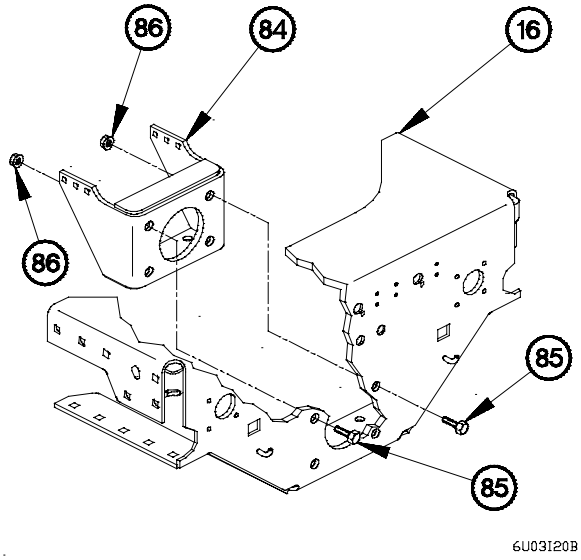
(37) Match mark four top holes (83) on rear crossmember (16).

(38) Remove two self-locking nuts (82), bolts (81) and pintle hook extension (80) from rear crossmember (16).

(39) Drill four 0.375 in. (9.5 mm) pilot holes in rear crossmember (16) at matchmarks.

(40) Drill four 0.75 in. (19 mm) holes in rear crossmember (16).





NOTE

Use bolts P/N 12414307-140 on step (41).

(41) Position rear lower crossmember support (84) on rear crossmember (16) with two bolts (85) and self-locking nuts (86).

18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

- Position two spacers on frame rails with beveled edges facing down.
- Use bolts P/N 12414307-149 and 12414307-148 on step (42).
- 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.

(42) Position two spacers (87) and rear main crossmember support (88) on LH and RH frame rails (30 and 45) with two bolts (89 and 90) and four self-locking nuts (91).

NOTE

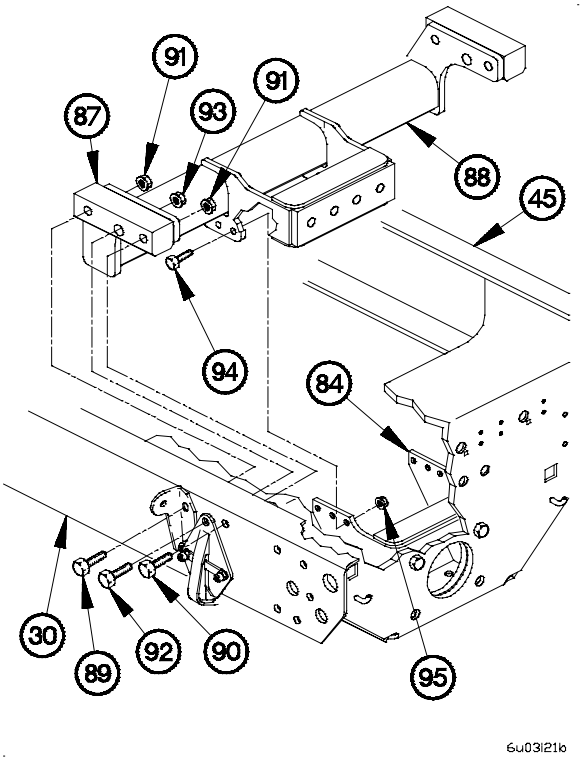
Use bolts P/N 12414307-090 on step (43).

(43) Position two bolts (92) and self-locking nuts (93) on rear main crossmember support (88).

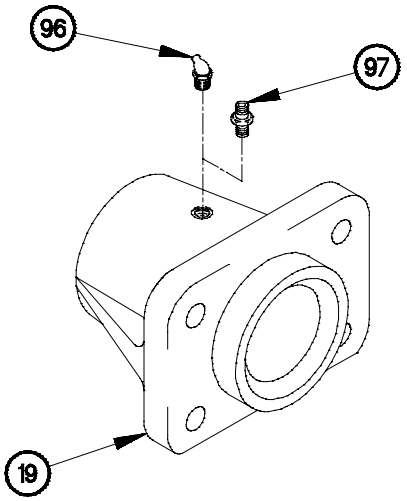
NOTE

Use bolts P/N 12414307-079 on step (44).

(44) Position six bolts (94) and self-locking nuts (95) on rear lower crossmember support (84).



6U03I21B



6U03I22B

(45) Remove 45-degree grease fitting (96) from support (19).

(46) Install grease fitting (97) in support (19).

NOTE

- Use bolts P/N 12414307-142 on step (47).
- Support will be installed with grease fitting facing down.

(47) Position support (19) on pintle hook extension (80) with four bolts (18) and self-locking nuts (17).

(48) Position pintle hook extension (80) in vise.

(49) Tighten four self-locking nuts (17) to 196-240 lb-ft (265-325 N·m).

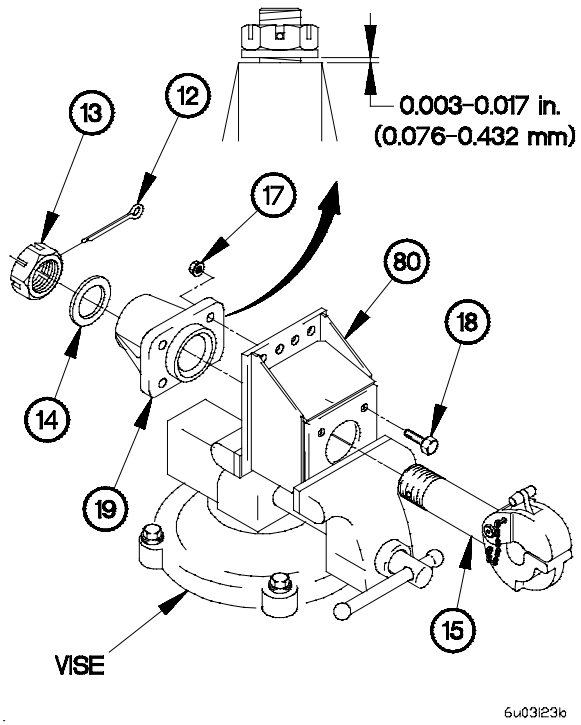
(50) Position pintle hook (15) in pintle hook extension (80) with washer (14) and nut (13).

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.

(51) Adjust nut (13) until clearance is 0.003-0.017 in. (0.076-0.432 mm) with alignment holes lined up between nut (13) and pintle hook (15).

(52) Install cotter pin (12) in nut (13).



18-2. M1083 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 (53) requires the aid of two assistants.
- Use bolt P/N 12414307-142 on step (53).

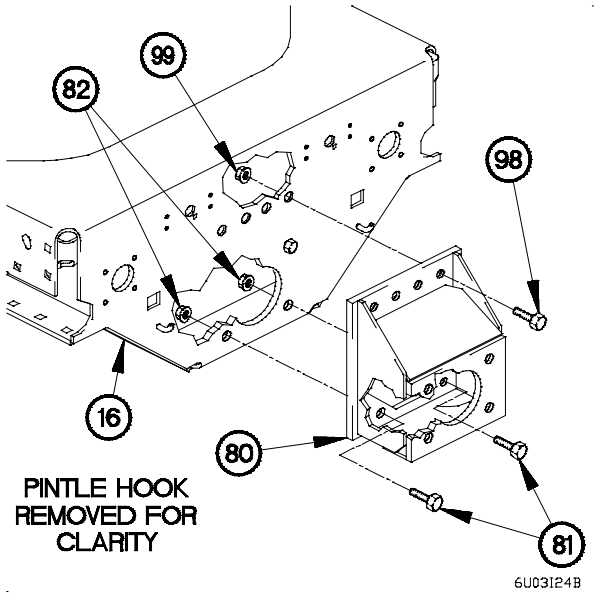
(53) Position pintle hook extension (80) on rear crossmember (16) with four bolts (98) and self-locking nuts (99).

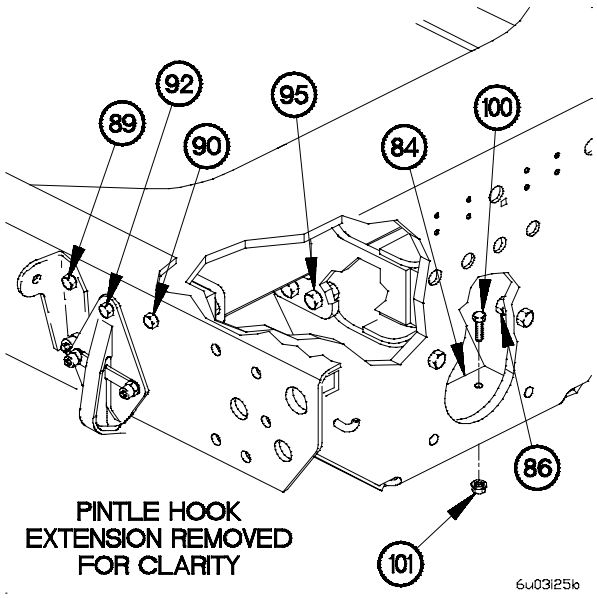
NOTE

Use bolt P/N 12414307-143 on step (54).

(54) Position two bolts (81) and self-locking nuts (82) in pintle hook extension (80).

(55) Tighten four self-locking nuts (99) and two self-locking nuts (82) to 196-240 lb-ft (265-325 N·m).





NOTE

Use bolts P/N 12414307-141 on step (56).

(56) Position two bolts (100) and self-locking nuts (101) in rear lower crossmember support (84).

(57) Tighten two self-locking nuts (86 and 101) to 196-240 lb-ft (196-240 N·m).

(58) Tighten six self-locking nuts (95) to 76-94 lb-ft (103-125 N·m).

(59) Tighten two bolts (89 and 90) to 236-288 lb-ft (319-389 N·m).

(60) Tighten two bolts (92) to 92-112 lb-ft (124-152 N·m).

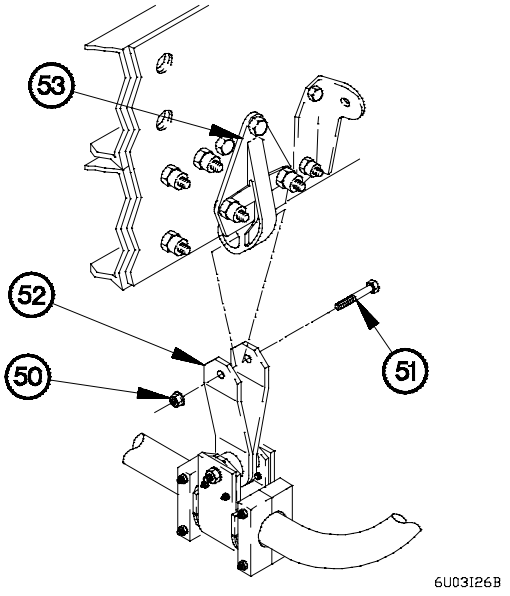
NOTE

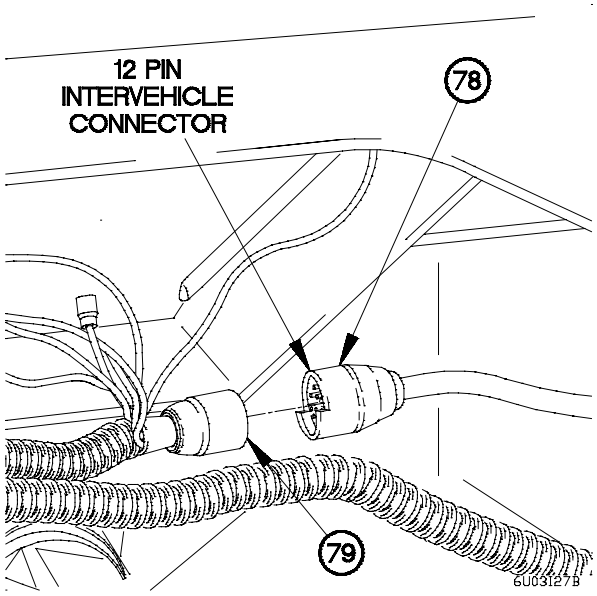
Left and right side bracket assemblies are installed the same way. Right side shown.

(61) Position bracket assembly (52) on frame bracket (53) with bolt (51) and self-locking nut (50).

(62) Tighten self-locking nut (50) to 130-158 lb-ft (175-215 N·m).

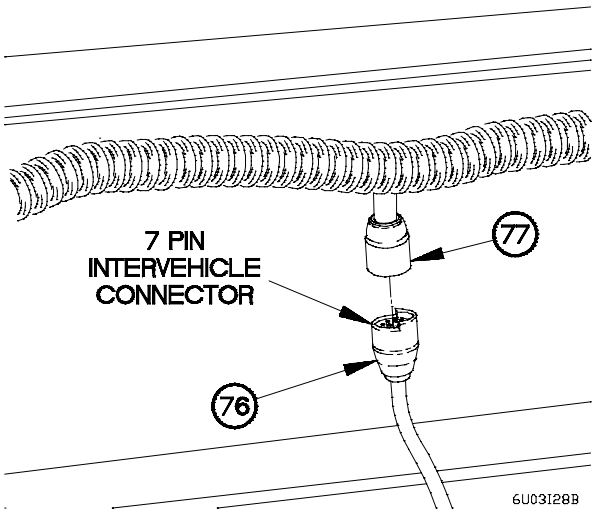
(63) Perform steps (61) and (62) on left side of vehicle.



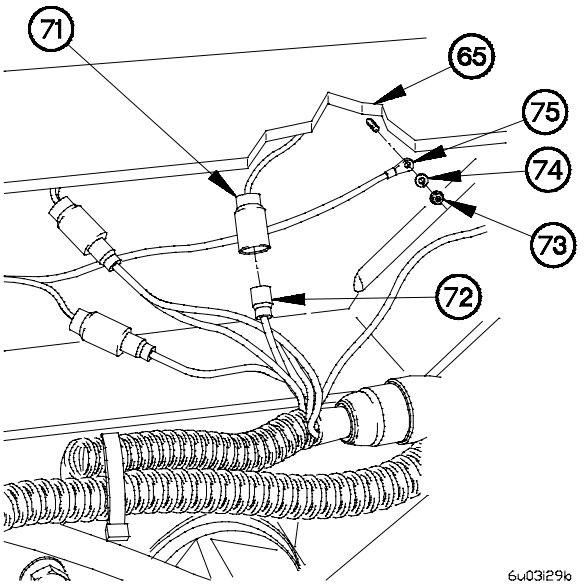


(64) Connect connector J53 (78) to connector P53 (79).

(65) Connect connector J52 (76) to connector P52R (77).

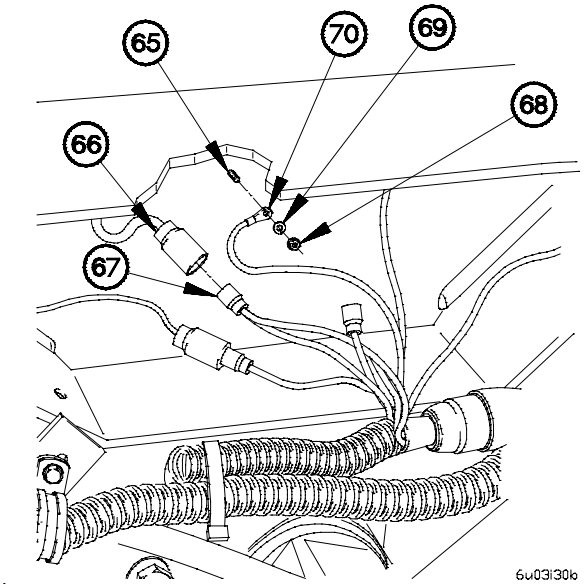


18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)



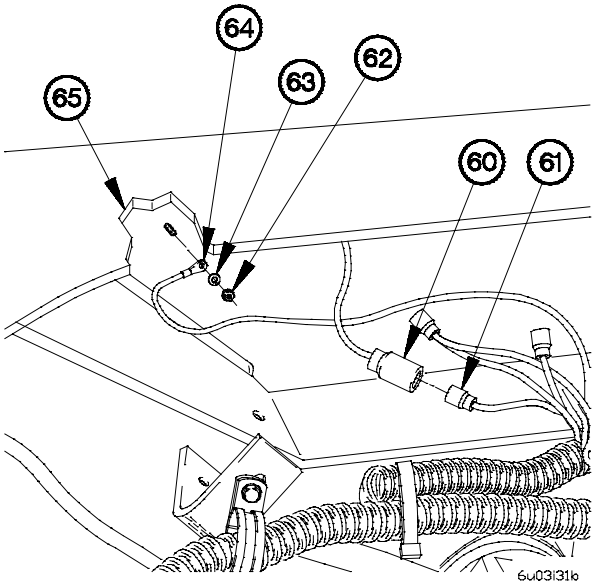
(66) Install terminal lug TL30 (75) on base (65) with lockwasher (74) and nut (73).

(67) Connect connector (71) to connector P54 (72).



(68) Install terminal lug TL31 (70) on base (65) with lockwasher (69) and nut (68).

(69) Connect connector (66) to connector P56 (67).



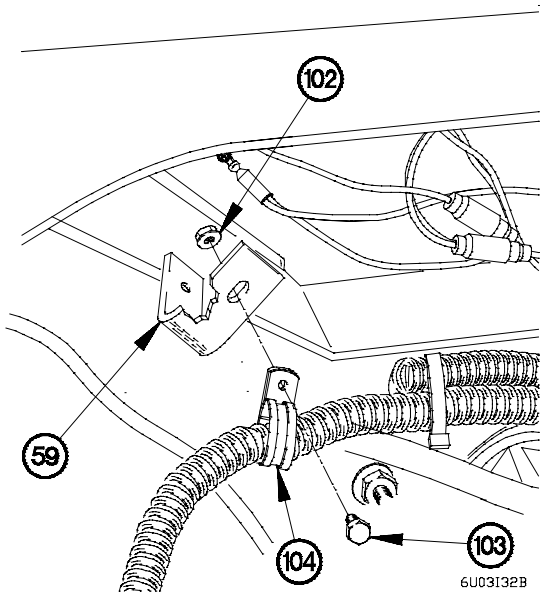
(70) Install terminal lug TL32 (64) on base (65) with lockwasher (63) and nut (62).

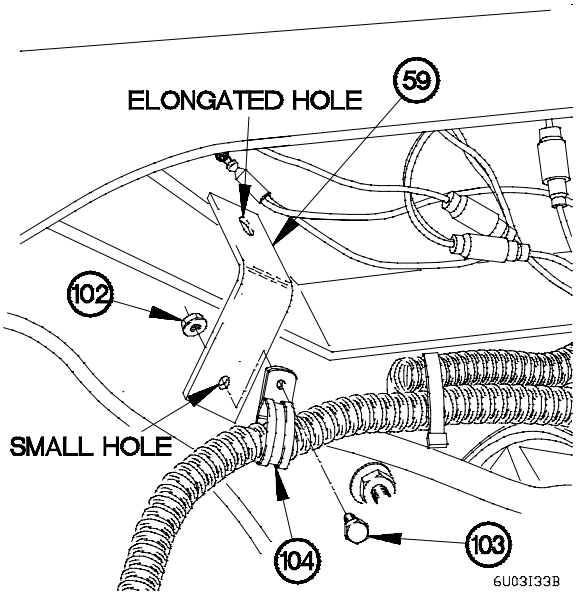
(71) Connect connector (60) to connector P58 (61).

NOTE

Left and right side L-brackets are removed and installed the same way. Right side shown.

(72) Remove self-locking nut (102), screw (103) and clamp (104) from L-bracket (59).





NOTE

The L-bracket will be mounted with elongated hole against the rear cross-member and the long end of L-bracket pointing down.

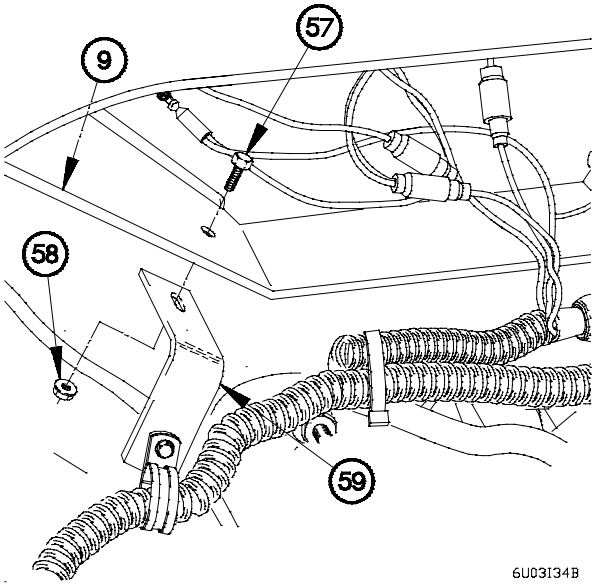
(73) Install clamp (104) in small hole on bracket (59) with screw (103) and self-locking nut (102).

NOTE

Position L-bracket on rear crossmember with long side of L-bracket facing down.

(74) Install L-bracket (59) on rear crossmember (16) with screw (57) and self-locking nut (58).

(75) Perform steps (72) through (74) on left side L-brackets.



18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

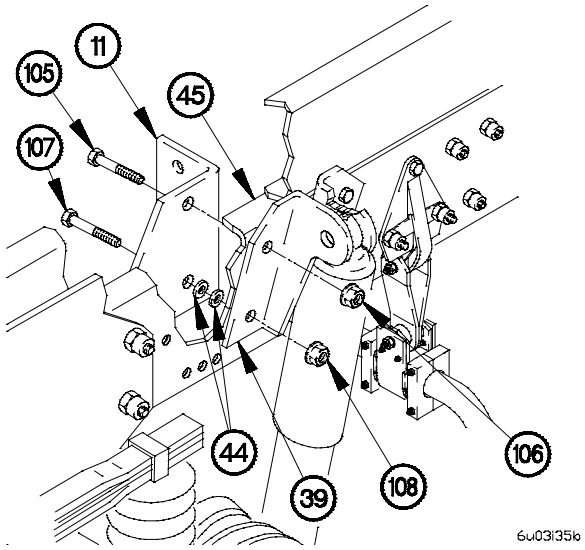
NOTE

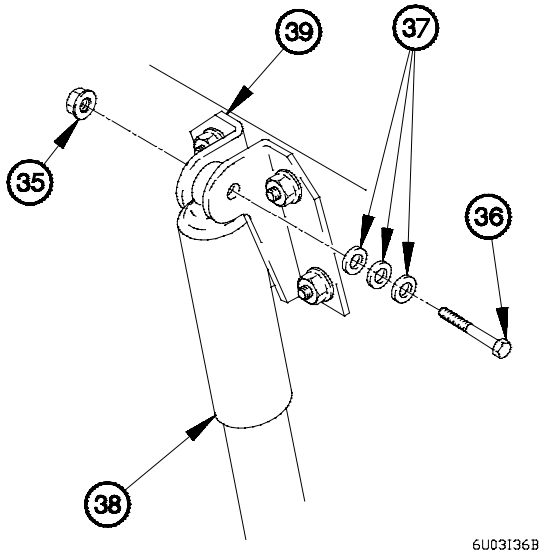
- Perform steps (76) through (81) on LH side of vehicle.
- Use bolts P/N 12414307-141 on steps (76) and (77).

(76) Position rear axle shock absorber front bracket (39) and bracket (11) on LH frame rail (45) with bolt (105) and self-locking nut (106).

(77) Position bolt (107), two washers (44) and self-locking nut (108) on rear axle shock absorber front bracket (39).

(78) Tighten self-locking nuts (106 and 108) to 196-240 lb-ft (265-325 N·m).





(79) Extend rear axle shock absorber (38) length to align with hole in rear axle shock absorber front bracket (39).

NOTE

Perform steps (80) and (81) on vehicle serial numbers 1399 through 2987.

(80) Position rear axle shock absorber (38) in rear axle shock absorber front bracket (39) with three washers (37), bolt (36), and self-locking nut (35).

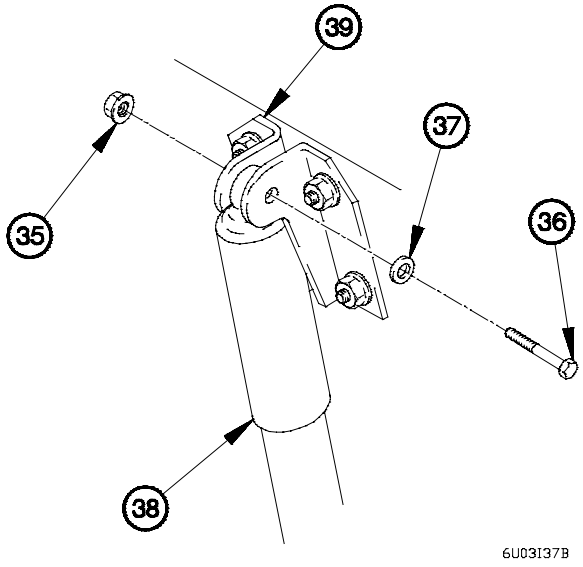
(81) Tighten self-locking nut (35) to 196-240 lb-ft (265-325 N·m).

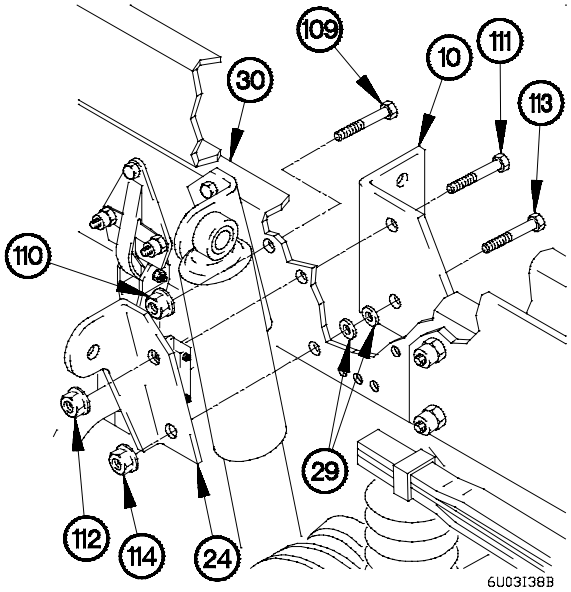
NOTE

Perform steps (82) and (83) on vehicle serial numbers 0001 through 1398, and 2988 and higher serial numbers.

(82) Position rear axle shock absorber (38) in rear axle shock absorber front bracket (39) with washer (37), bolt (36), and self-locking nut (35).

(83) Tighten self-locking nut (35) to 196-240 lb-ft (265-325 N·m).





NOTE

- Perform step (84) through (93) on right side of vehicle.
- Use bolt P/N 12414307-138 on step (84).

(84) Position bolt (109) and self-locking nut (110) in RH frame rail (30).

(85) Tighten self-locking nut (110) to 196-240 lb-ft (265-325 N·m).

NOTE

Use bolt P/N 12414307-141 on step (86).

(86) Position rear axle shock absorber front bracket (24) and bracket (10) on RH frame rail (30) with bolt (111) and self-locking nut (112).

(87) Position bolt (113), two washers (29) and self-locking nut (114) on rear axle shock absorber front bracket (24).

(88) Tighten self-locking nuts (112 and 114) to 196-240 lb-ft (265-325 N·m).

18-2. M1083 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

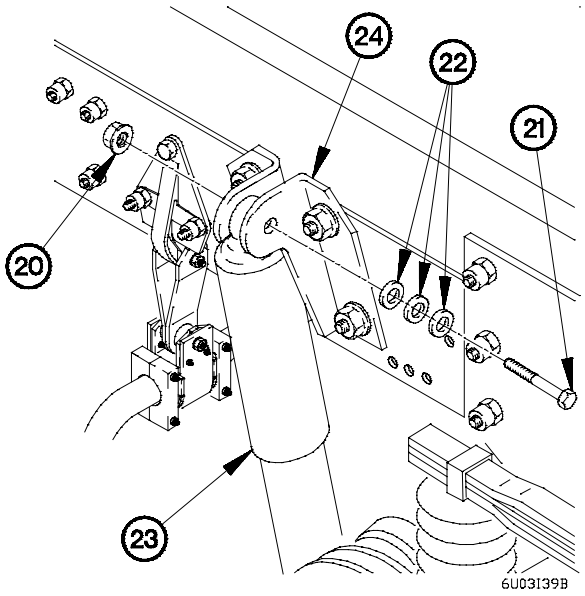
(89) Extend rear axle shock absorber (23) length to align with hole in rear axle shock absorber front bracket (24).

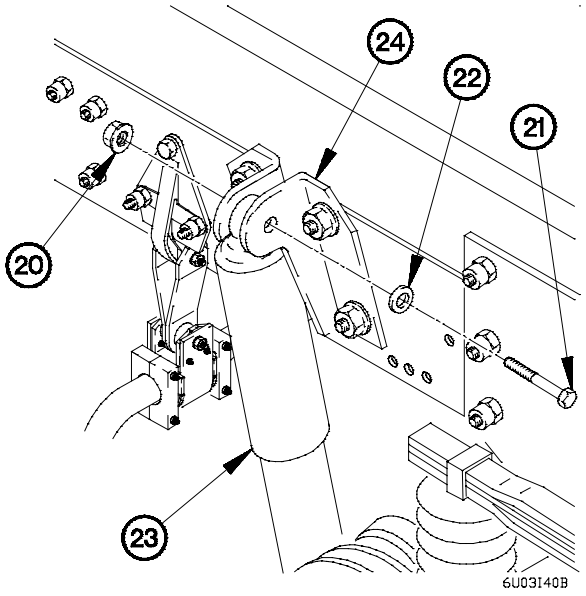
NOTE

Perform steps (90) and (91) on vehicle serial numbers 1399 through 2987.

(90) Position rear axle shock absorber (23) in rear axle shock absorber front bracket (24) with three washers (22), bolt (21), and self-locking nut (20).

(91) Tighten self-locking nut (20) to 196-240 lb-ft (265-325 N·m).





NOTE

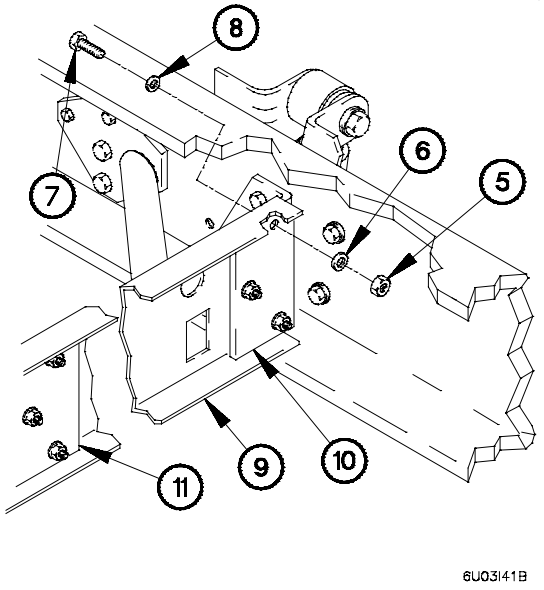
Perform steps (92) and (93) on vehicle serial numbers 0001 through 1398, and 2988 and higher serial numbers.

(92) Position rear axle shock absorber (23) in rear axle shock absorber front bracket (24) with washer (22), bolt (21), and self-locking nut (20).

(93) Tighten self-locking nut (20) to 196-240 lb-ft (265-325 N·m).

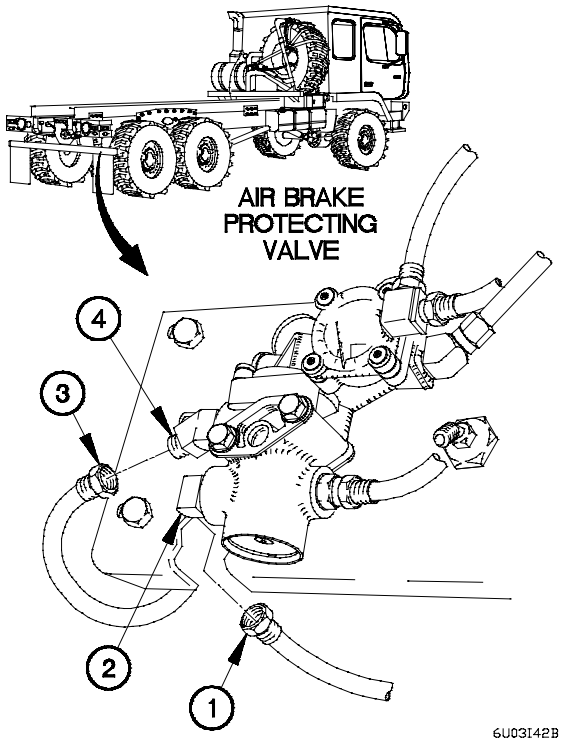
(94) Position valve control panel (9) on brackets (10 and 11) with six washers (8), screws (7), washers (6), and self-locking nuts (5).

(95) Tighten six screws (7) to 16-21 lb-ft (24-28 N·m).



(96) Connect air hose (3) to 45-degree fitting (4).

(97) Connect air hose (1) to 90-degree fitting (2).



b. Follow-On Maintenance.

(1) Install cargo bed (para 15-9).

(2) Lubricate pintle hook (TM 9-2320-366-20).

End of Task.

18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION

This task covers:

a. Installation

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Dump bed raised to maintenance position (TM 9-2320-366-10-1).
Engine shut down (TM 9-2320-366-10-1).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Socket, Socket Wrench (TM 9-2320-366-20)
Drill, Electric, Portable (Item 21, Appendix B)
Drill Set, Twist (Item 20, Appendix B)
Socket Set, Impact (Item 58, Appendix B)

Tools and Special Tools (Cont)
Wrench, Impact, Electric (Item 88, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Shop Equipment, Automotive Vehicle (Item 58, Appendix B -20)

Materials/Parts
Ties, Cable, Plastic (Item 99, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, 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

The kit is installed the same on M1090 and M1094. M1094 shown.

(1) Remove cotter pin (1) from nut (2). Discard cotter pin.

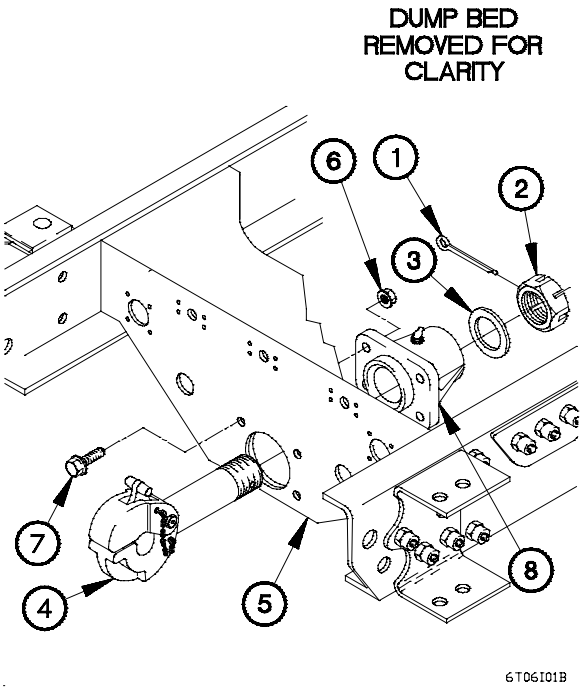
(2) Remove nut (2) and washer (3) from pintle hook (4).

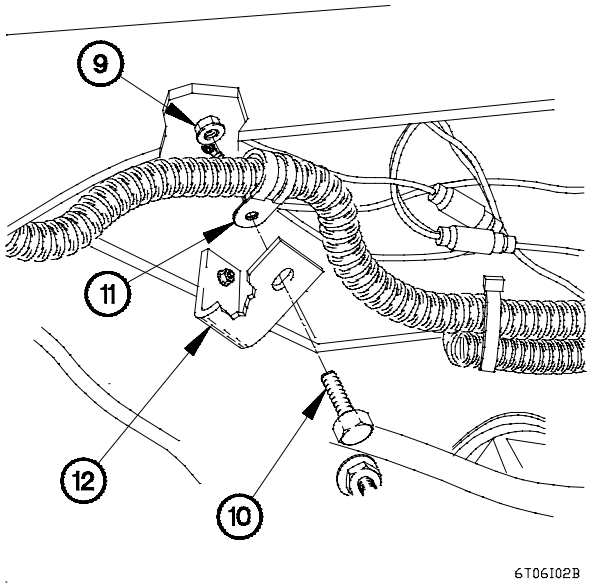
WARNING

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.

(3) Remove pintle hook (4) from rear crossmember (5).

(4) Remove four self-locking nuts (6), bolts (7), and support (8) from rear crossmember (5). Discard self-locking nuts.





NOTE

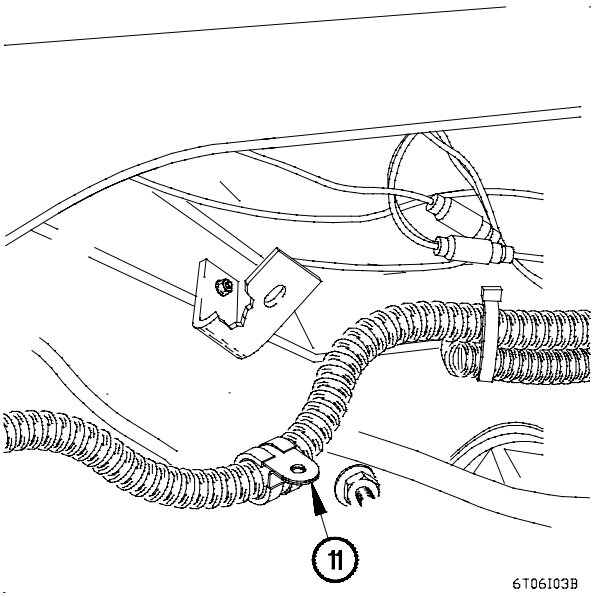
- Left and right clamps are removed the same way. Right side shown.
- Remove plastic cable ties as required.

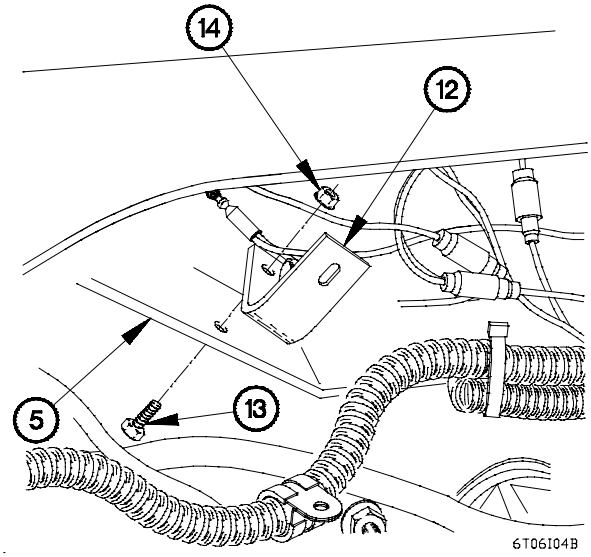
(5) Remove self-locking nut (9), screw (10), and clamp (11) from L-bracket (12).

18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

(6) Rotate clamp (11) 180 degrees.

(7) Perform steps (5) and (6) on left side clamp.





NOTE

Left and right side L-brackets are repositioned the same way. Right side shown.

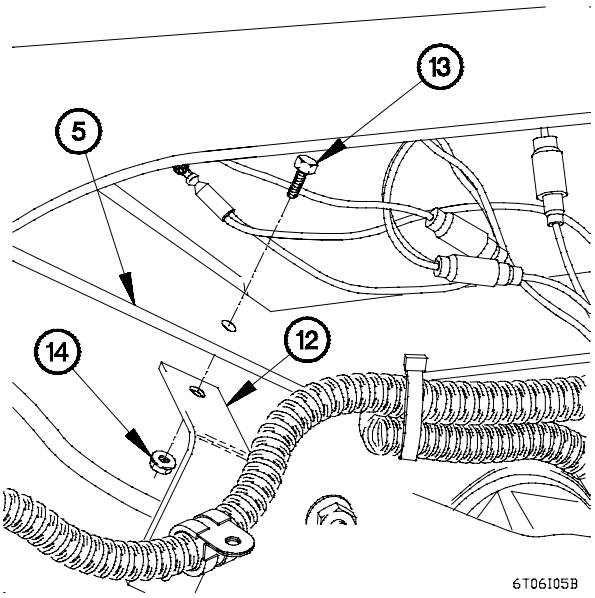
(8) Remove screw (13), self-locking nut (14), and L-bracket (12) from rear crossmember (5).

NOTE

The L-bracket will be mounted with elongated hole against the rear crossmember and long end of L-bracket pointing down.

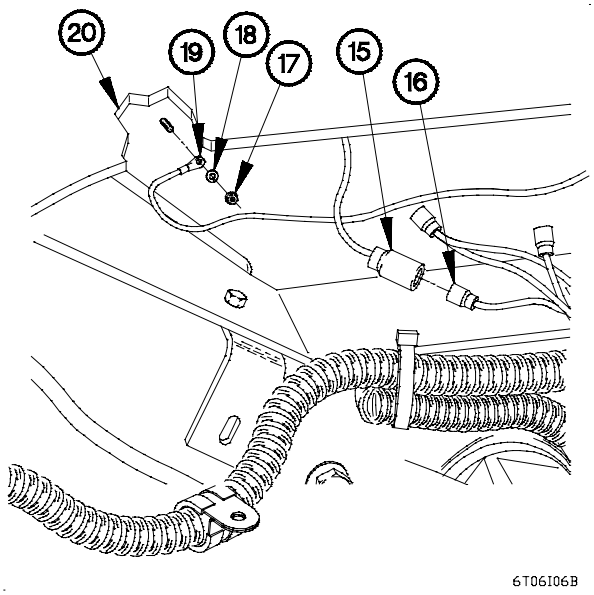
(9) Position L-bracket (12) on rear crossmember (5) with screw (13) and self-locking nut (14).

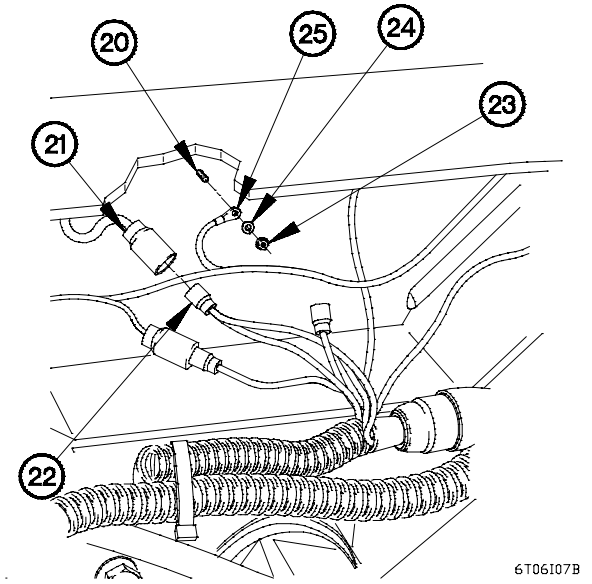
(10) Perform steps (8) and (9) on left side L-bracket.



(11) Disconnect connector (15) from connector P58 (16).

(12) Remove nut (17), lockwasher (18), and terminal lug TL32 (19) from base (20).



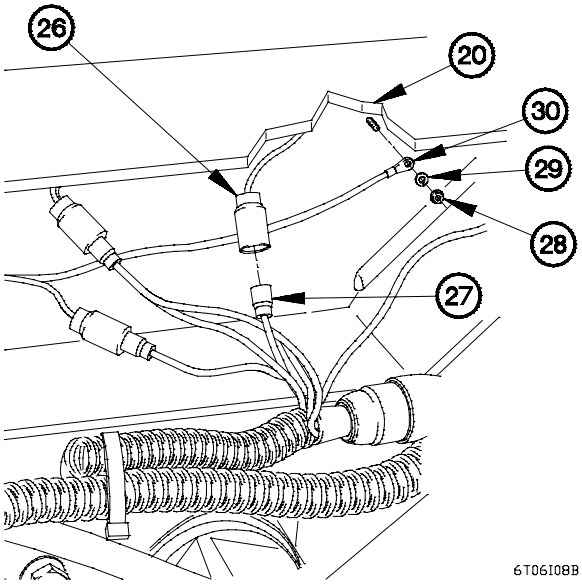


(13) Disconnect connector (21) from connector P56 (22).

(14) Remove nut (23), lockwasher (24), and terminal lug TL31 (25) from base (20).

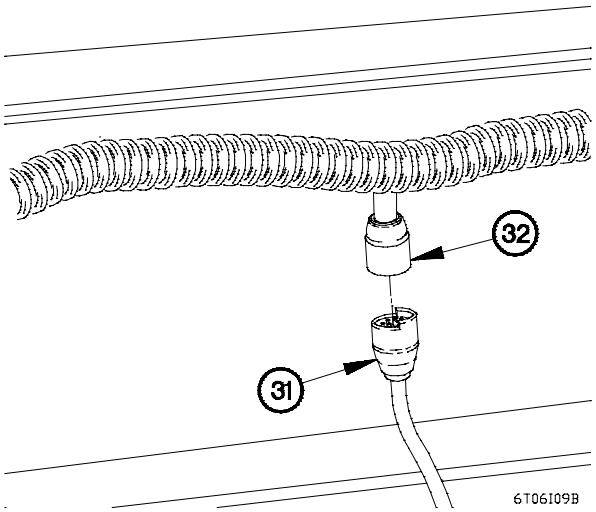
(15) Disconnect connector (26) from connector P54 (27).

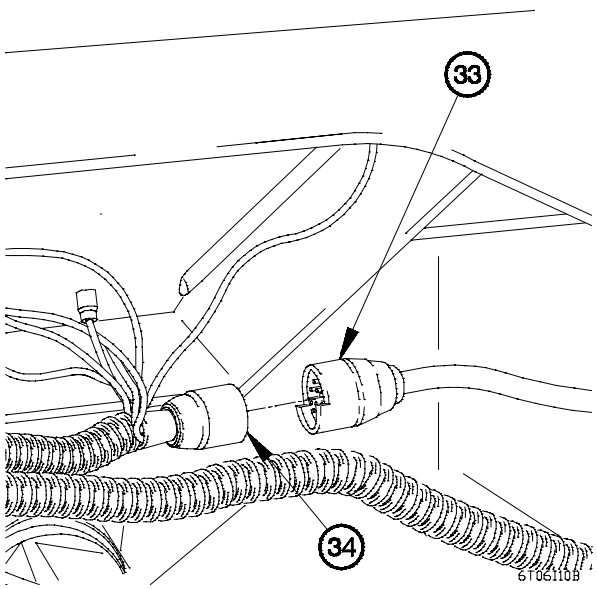
(16) Remove nut (28), lockwasher (29), and terminal lug TL30 (30) from base (20).



18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

(17) Disconnect connector J52 (31) from connector P52R (32).





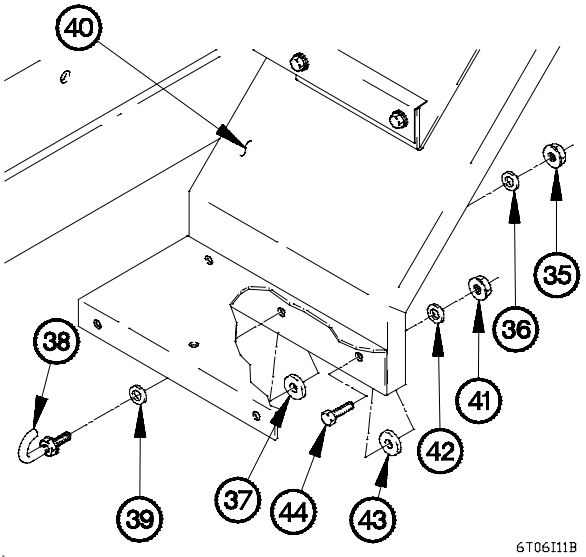
(18) Disconnect connector J53 (33) from connector P53 (34).

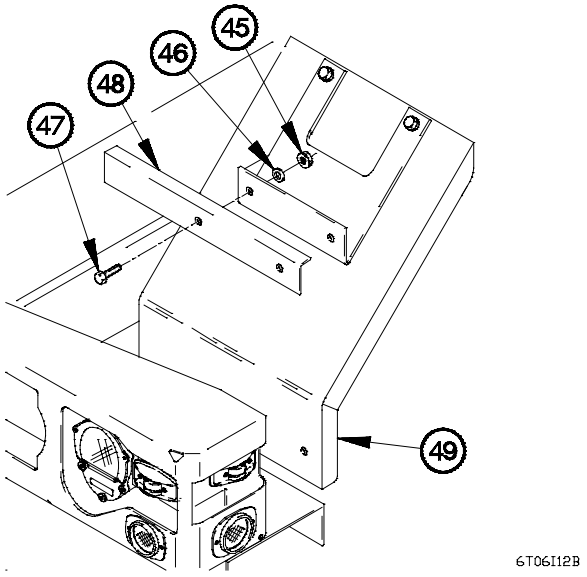
NOTE

Left and right rear fenders are removed the same way. Right side shown.

(19) Removed self-locking nut (35), washer (36), resilient mount (37), hook (38), and washer (39) from rear fender (40).

(20) Remove two self-locking nuts (41), washers (42), resilient mounts (43), and screws (44) from rear fender (40).





(21) Remove two self-locking nuts (45), washers (46) screws (47) and bracket (48) from support bracket (49).

(22) Perform steps (19) through (21) on left side rear fender.

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

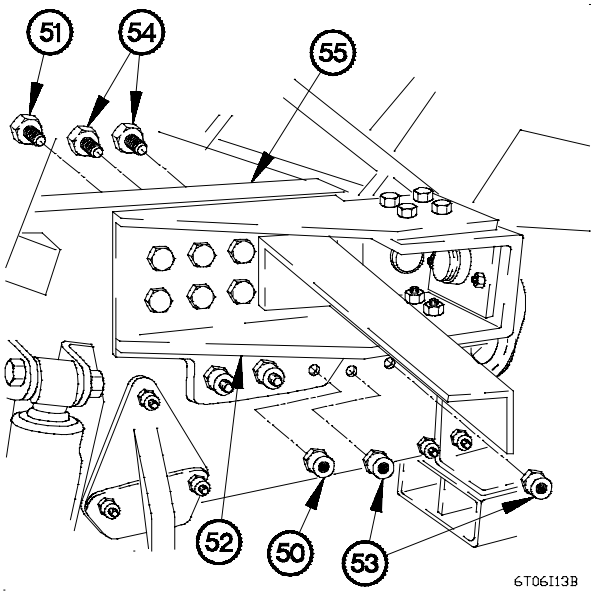
NOTE

Left and right collars and bolts are removed the same way. Right side shown.

(23) Remove collar (50) and bolt (51) from extraction tube (52). Discard collar and bolt.

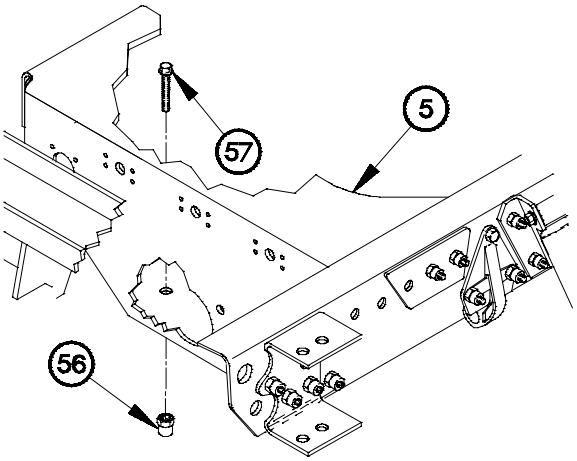
(24) Remove two collars (53) and bolts (54) from RH frame rail (55). Discard collars and bolts.

(25) Perform steps (23) and (24) on left side collars and bolts.

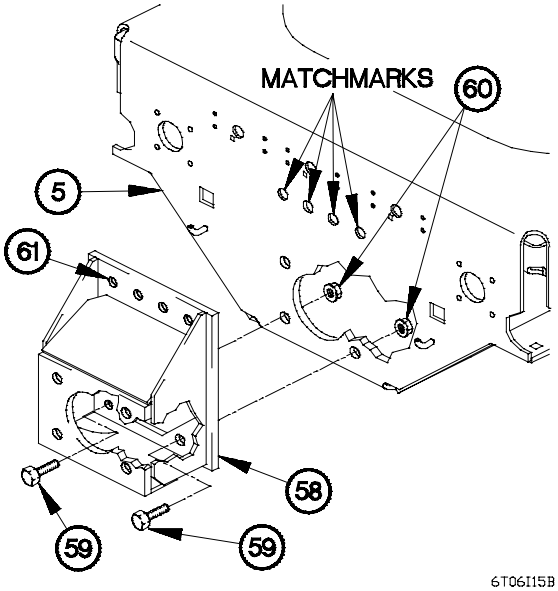


18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

(26) Remove two collars (56) and bolts (57) from rear crossmember (5). Discard collars and bolts.



6T06I14B



6T06I15B

NOTE

Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (27).

(27) Install pintle hook extension (58) on rear crossmember (5) with two bolts (59) and self-locking nuts (60).

(28) Match mark four top holes (61) on rear crossmember (5).

(29) Remove two self-locking nuts (60), bolts (59) and pintle hook extension (58) from rear crossmember (5).

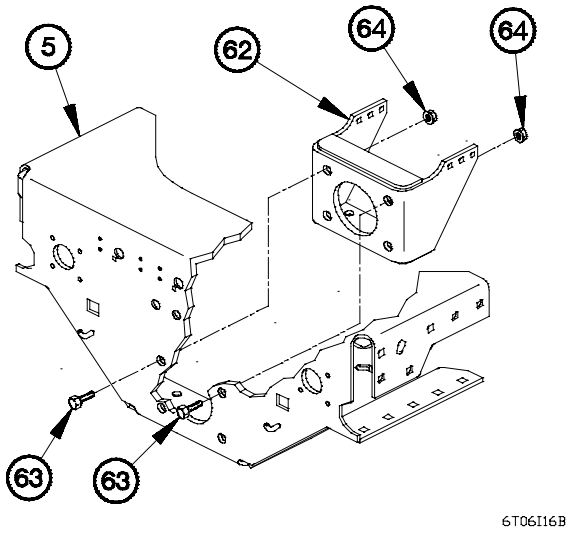
(30) Drill four 0.375 in. (9.5 mm) pilot holes in rear crossmember (5) at matchmarks.

(31) Drill four 0.75 in. (19 mm) holes in rear crossmember (5).

NOTE

Use bolts P/N 12414307-140 and self-locking nuts P/N 12414308-025 on step (32).

(32) Position rear lower crossmember support (62) on rear crossmember (5) with two bolts (63) and self-locking nuts (64).



NOTE

- Position two spacers on frame rails with beveled edges facing down.
- Use bolts P/N 12414307-148 and P/N 12414307-149 and self-locking nuts P/N 12414308-025 on steps (33 and 34).
- 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.

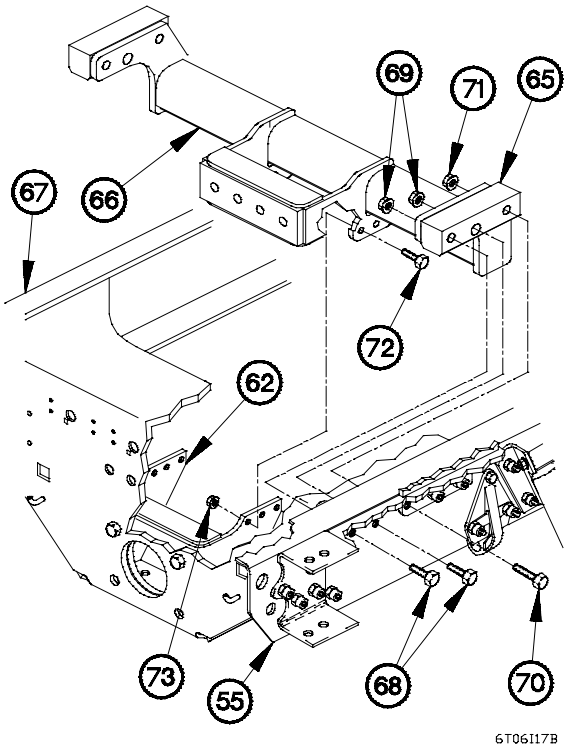
(33) Position two spacers (65) and rear main crossmember support (66) on LH and RH frame rails (67 and 55) with four bolts (68) and self-locking nuts (69).

(34) Position two bolts (70) and self-locking nuts (71) on rear main crossmember support (66).

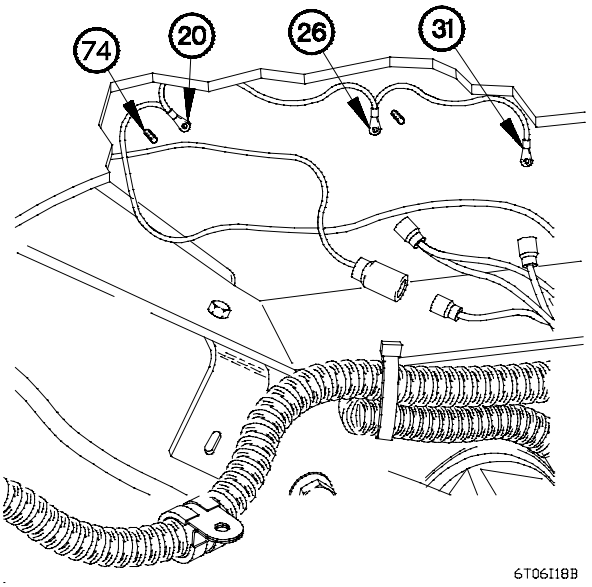
NOTE

Use bolts P/N 12414307-079 and self-locking nuts P/N 12414308-021 on step (35).

(35) Position six bolts (72) and self-locking nuts (73) on rear lower crossmember support (62).



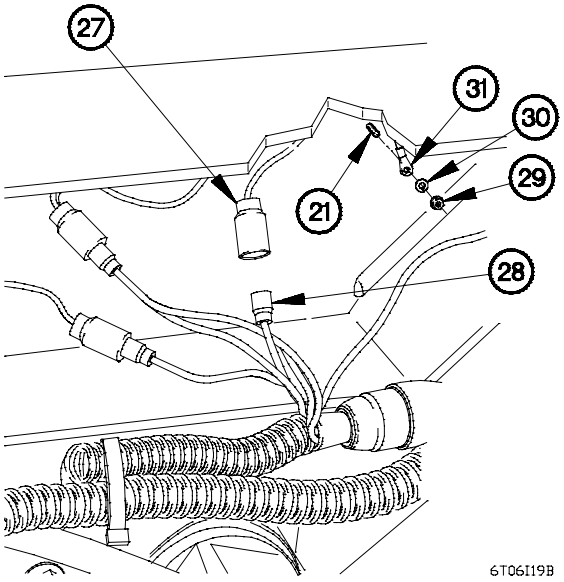
18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)



NOTE

Rotate cable assembly with terminal lugs 180 degrees (upside down) from previous position.

(36) Route terminal lugs TL32 (20), TL31 (26), and TL30 (31) to three ground terminals (74).

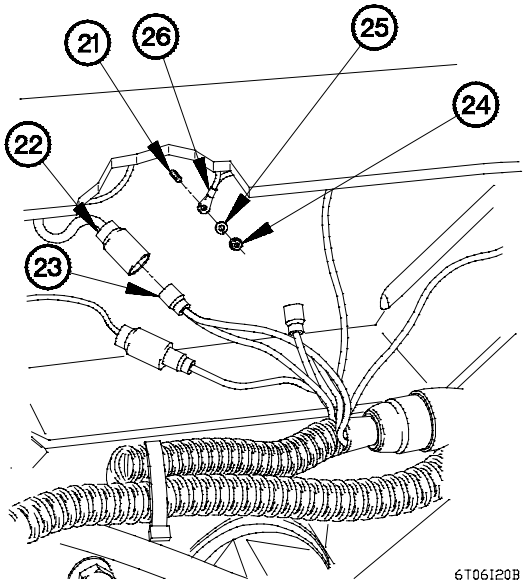


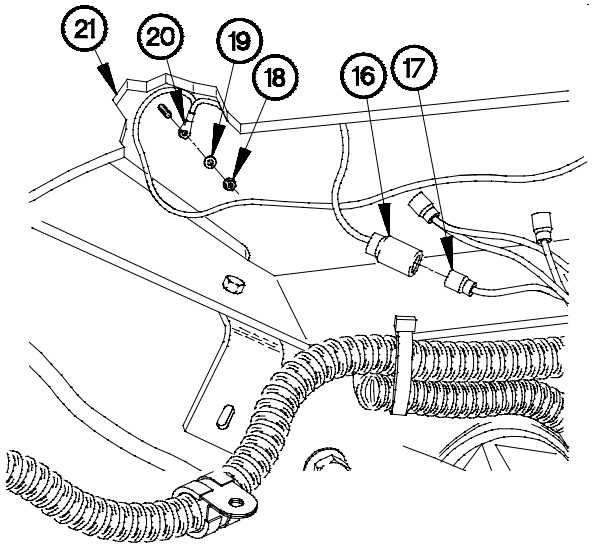
(37) Install terminal lug TL30 (31) on base (21) with lockwasher (30) and nut (29).

(38) Connect connector (27) to connector P54 (28).

(39) Install terminal lug TL31 (26) on base (21) with lockwasher (25) and nut (24).

(40) Connect connector (22) to connector P56 (23).

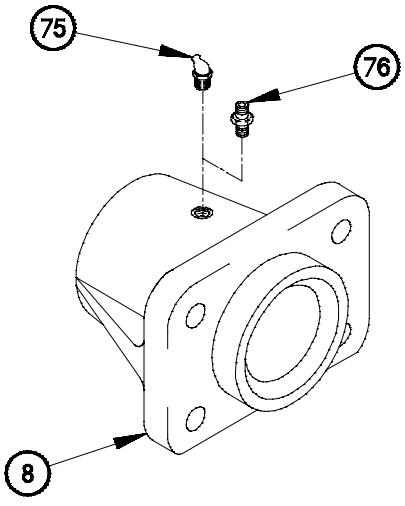




6T06I21B

(41) Install terminal lug TL32 (20) on base (21) with lockwasher (19) and nut (18).

(42) Connect connector (16) to connector P58 (17).



6T06I22B

(43) Remove 45-degree grease fitting (75) from support (8).

(44) Install grease fitting (76) in support (8).

18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (45).
- Support will be installed with fitting facing down.

(45) Position support (8) on pintle hook extension (58) with four bolts (7) and self-locking nuts (6).

(46) Position pintle hook extension (58) in vise.

(47) Tighten four self-locking nuts (6) to 196-240 lb-ft (265-325 N·m).

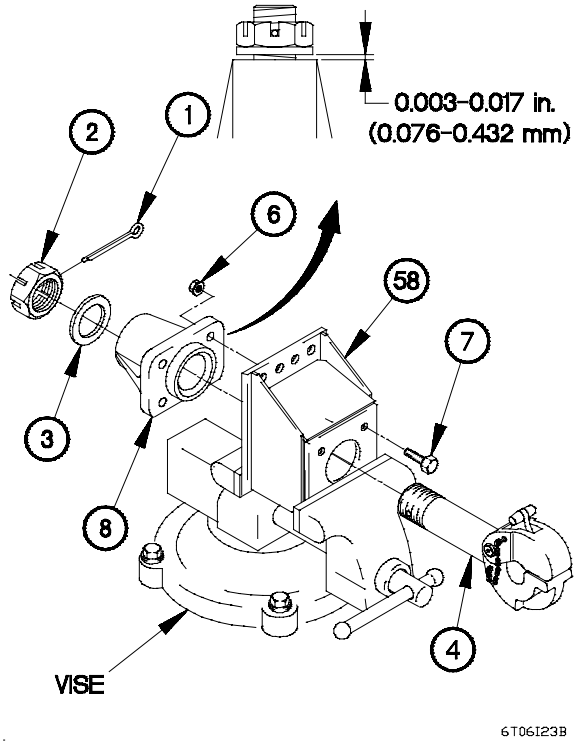
(48) Position pintle hook (4) in pintle hook extension (58) with washer (3) and nut (2).

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.

(49) Adjust nut (2) until clearance is 0.003-0.017 in. (0.076-0.432 mm) with alignment holes lined up between nut (2) and pintle hook (4).

(50) Install cotter pin (1) in nut (2).



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 (51) requires the aid of two assistants.
- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (51).

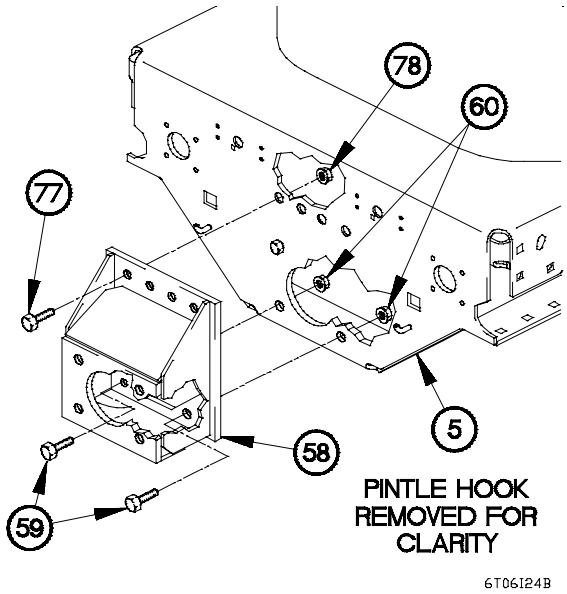
(51) Position pintle hook extension (58) on rear crossmember (5) with four bolts (77) and self-locking nuts (78).

NOTE

- Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (52).
- Steps (52) through (57) require the aid of an assistant.

(52) Position two bolts (59) and self-locking nuts (60) in pintle hook extension (58).

(53) Tighten four self-locking nuts (78) and two self-locking nuts (60) to 196-240 lb-ft (265-325 N·m).



18-3. M1090/M1094 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

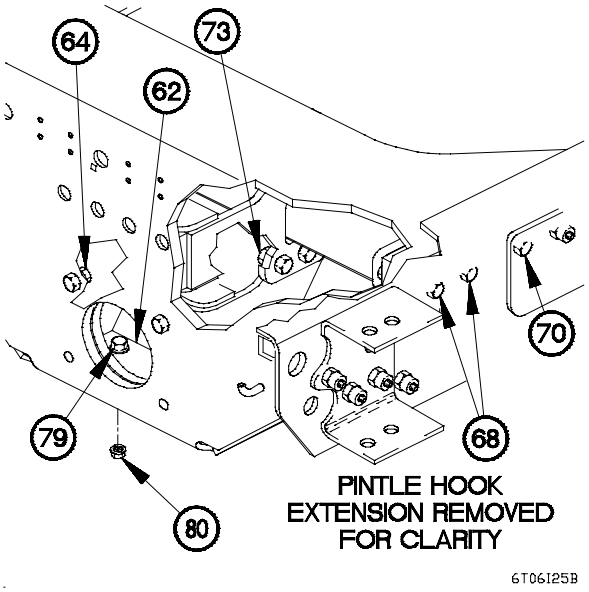
Use bolts P/N 12414307-141 and self-locking nuts P/N 12414308-025 on step (54).

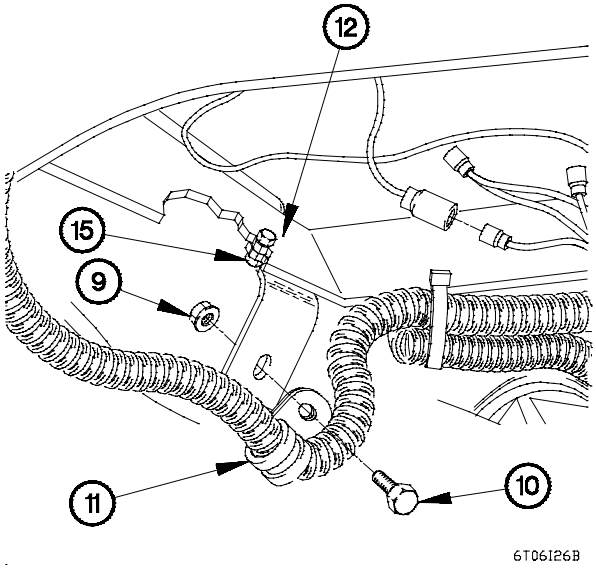
(54) Position two bolts (79) and self-locking nuts (80) in rear lower crossmember support (62).

(55) Tighten two self-locking nuts (64 and 80) to 196-240 lb-ft (265-325 N·m).

(56) Tighten six self-locking nuts (73) to 76-94 lb-ft (103-125 N·m).

(57) Tighten four bolts (68) and two bolts (70) to 236-288 lb-ft (319-389 N·m).





(58) Tighten two self-locking nuts (15) on L-brackets (12).

NOTE

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

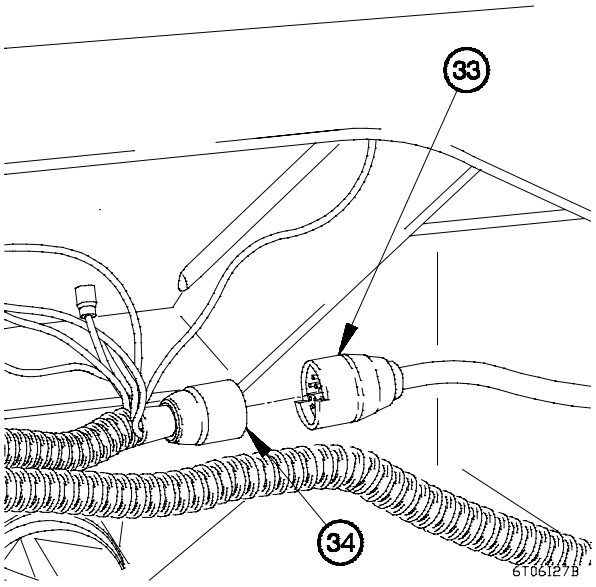
(59) Install clamp (11) on L-bracket (12) with screw (10) and self-locking nut (9).

(60) Perform step (59) on left side clamp.

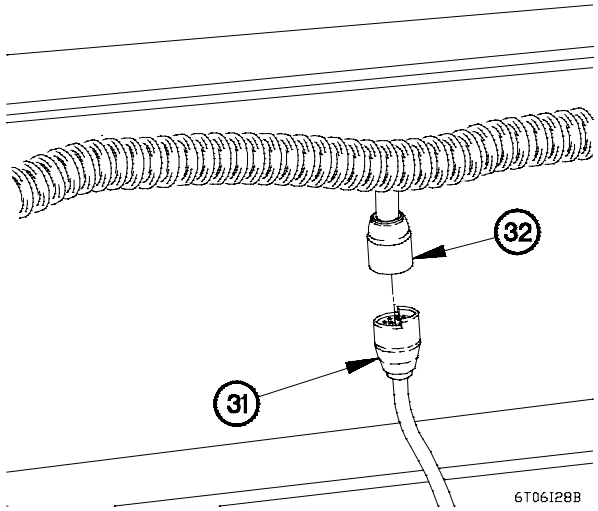
NOTE

Install plastic cable ties as required.

(61) Connect connector J53 (33) to connector P53 (34).

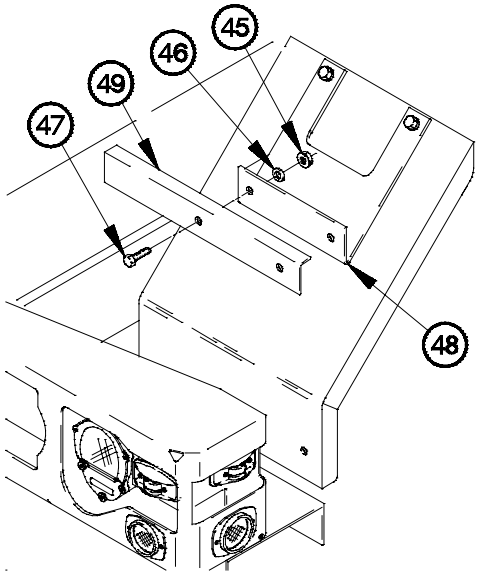


(62) Connect connector J52 (31) to connector P52R (32).



NOTE

Left and right rear fenders are installed the same way. Right side shown.



(63) Position bracket (48) on support bracket (49) with two screws (47), washers (46), and self-locking nuts (45).

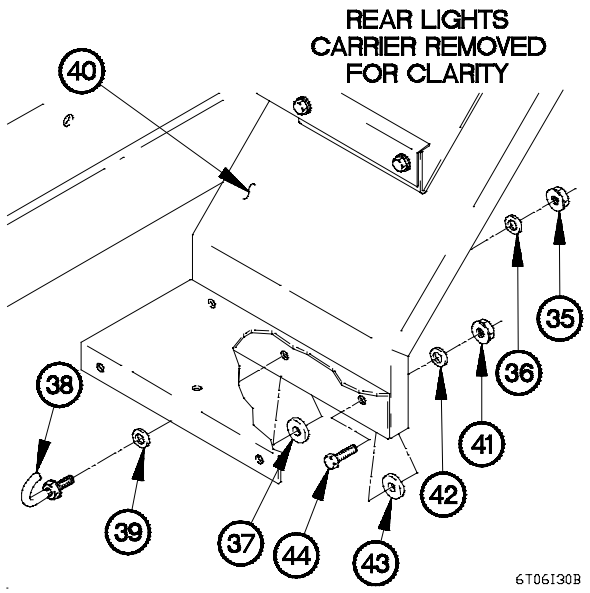
(64) Tighten two self-locking nuts (45) to 18-22 lb-ft (24-30 N·m).

(65) Position two resilient mounts (43) on rear fender (40) with two screws (44), washers (42), and self-locking nuts (41).

(66) Position washer (39) and hook (38) on rear fender (40) with resilient mount (37), washer (36), and self-locking nut (35).

(67) Tighten two self-locking nuts (41) and self-locking nut (35) to 18-22 lb-ft (24-30 N·m).

(68) Perform steps (63) through (67) on left side rear fender.



b. Follow-On Maintenance.

Lower dump bed (TM 9-2320-366-10-1).

End of Task.

18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION

This task covers:

a. Installation

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-366-10-1).
Air tanks drained (TM 9-2320-366-10-1).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Socket, Socket Wrench (TM 9-2320-366-20)
Drill, Electric, Portable (Item 21, Appendix B)
Drill Set, Twist (Item 20, Appendix B)
Socket Set, Impact (Item 58, Appendix B)
Pan, Drain (Item 43, Appendix B)

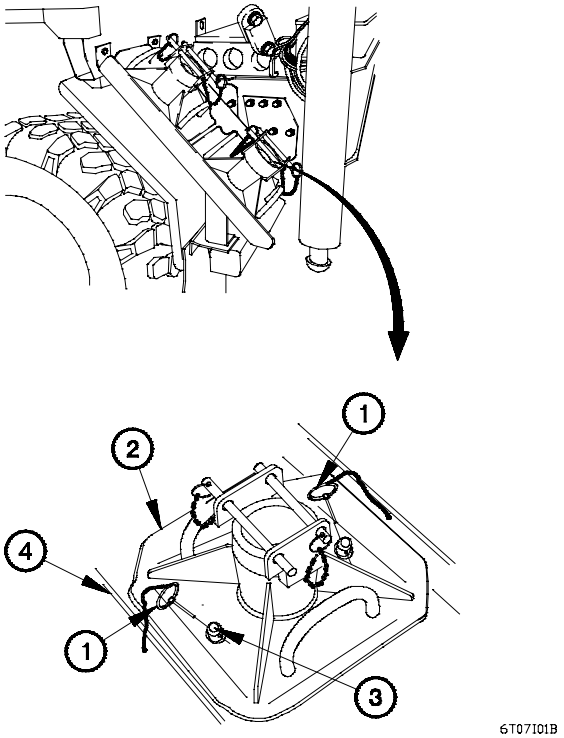
Tools and Special Tools (Cont)
Wrench, Impact, Electric (Item 88, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Shop Equipment, Automotive Vehicle (Item 58, Appendix B -20)

Materials/Parts
Ties, Cable, Plastic (Item 99, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

Personnel Required
(3)

a. Installation.

(1) Remove four pins (1) and two outrigger pads (2) from four studs (3) on stowage bracket (4).



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.

(2) Remove cotter pin (5) from nut (6). Discard cotter pin.

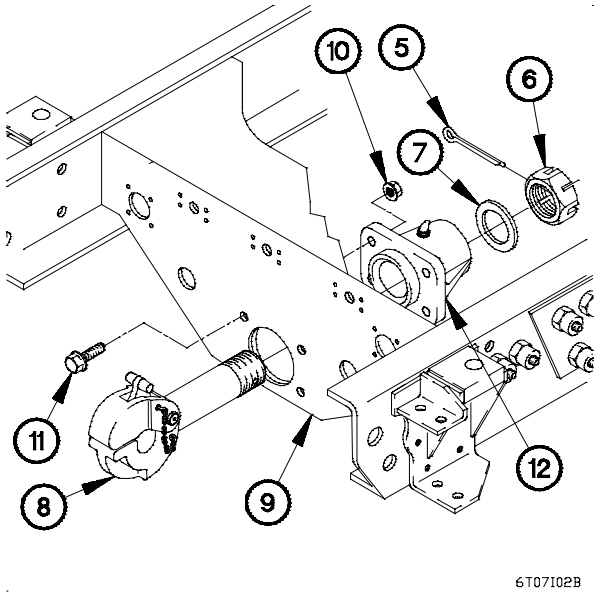
(3) Remove nut (6) and washer (7) from pintle hook (8).

WARNING

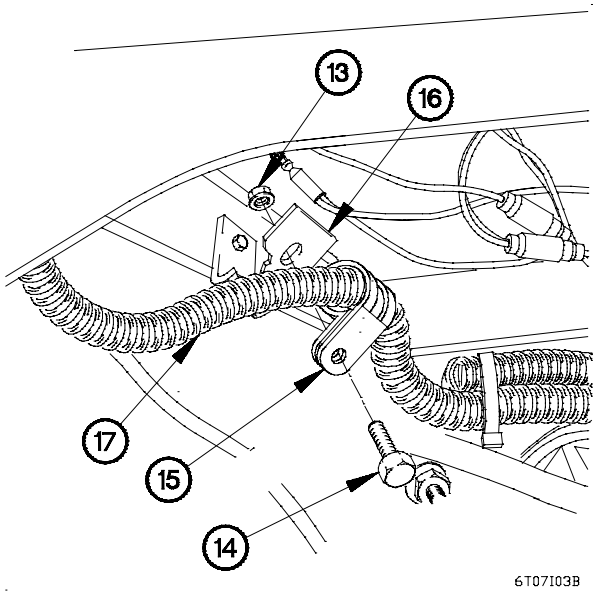
Pintle hook weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(4) Remove pintle hook (8) from rear crossmember (9).

(5) Remove four self-locking nuts (10), bolts (11), and support (12) from rear crossmember (9). Discard self-locking nuts.



6T07I02B



6T07I03B

NOTE

- Left and right clamps are removed the same way. Right side shown.
- Remove plastic cable ties as required.

(6) Remove self-locking nut (13), screw (14), and clamp (15) from L-bracket (16).

(7) Remove clamp (15) from L-bracket (16).

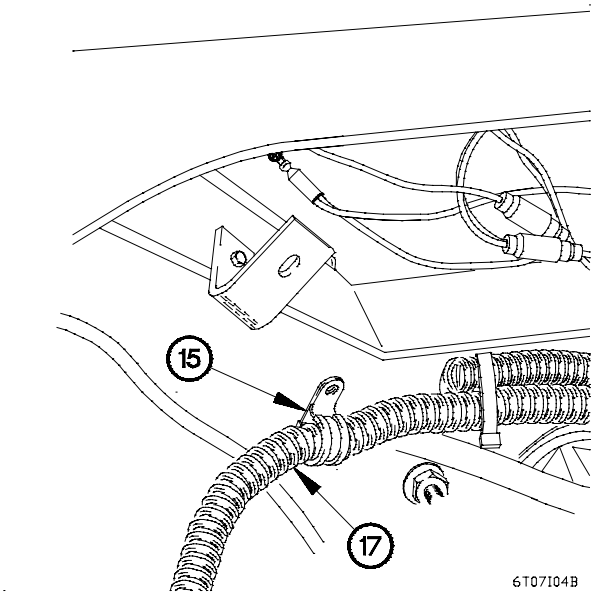
(8) Remove clamp (15) from cable assembly (17).

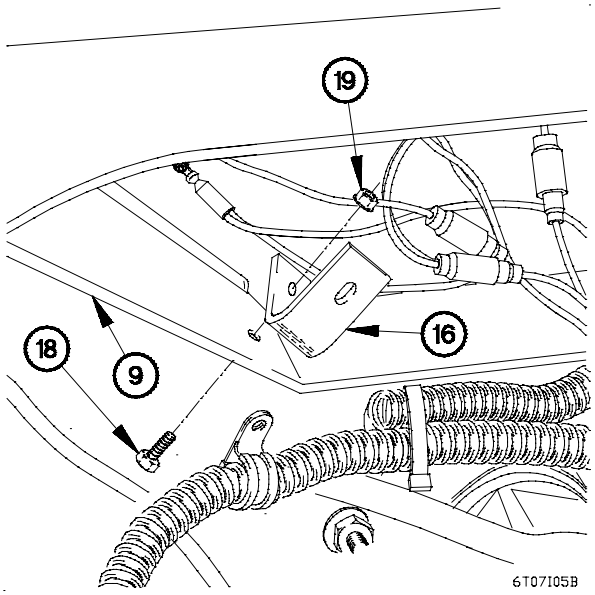
18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

(9) Rotate clamp (15) 180 degrees.

(10) Install clamp (15) on cable assembly (17).

(11) Perform steps (6) through (10) on left side clamp.





NOTE

Left and right L-brackets are removed the same way. Right side shown.

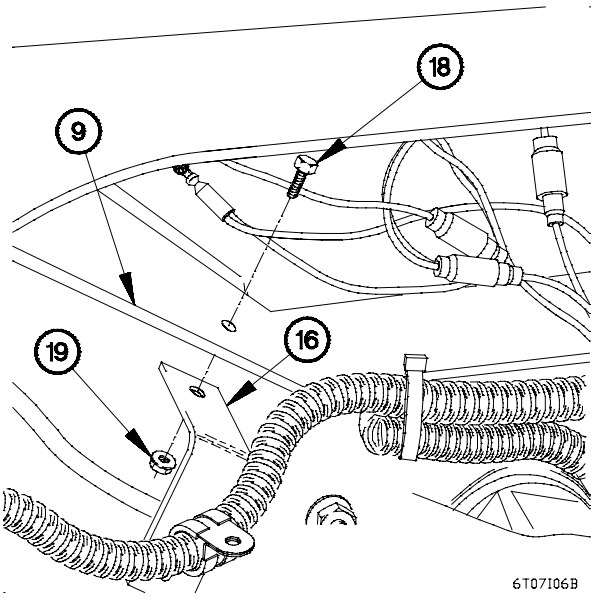
(12) Remove screw (18), self-locking nut (19), and L-bracket (16) from rear crossmember (9).

NOTE

L-brackets are rotated 180 degrees and positioned underneath the rear crossmember.

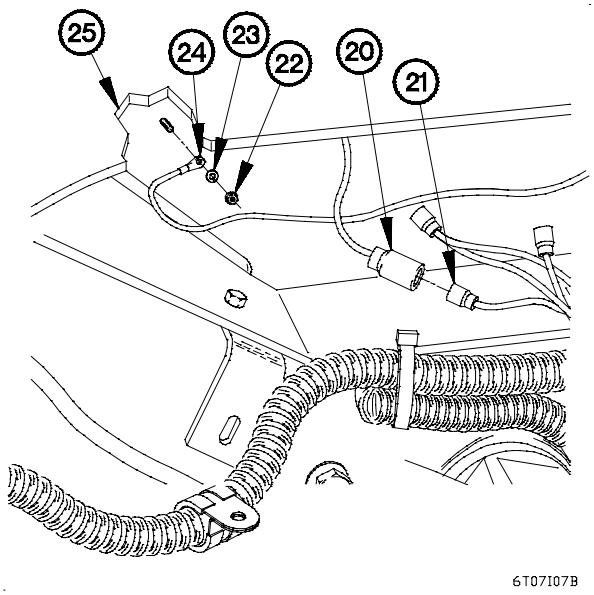
(13) Position L-bracket (16) on rear crossmember (9) with screw (18) and self-locking nut (19).

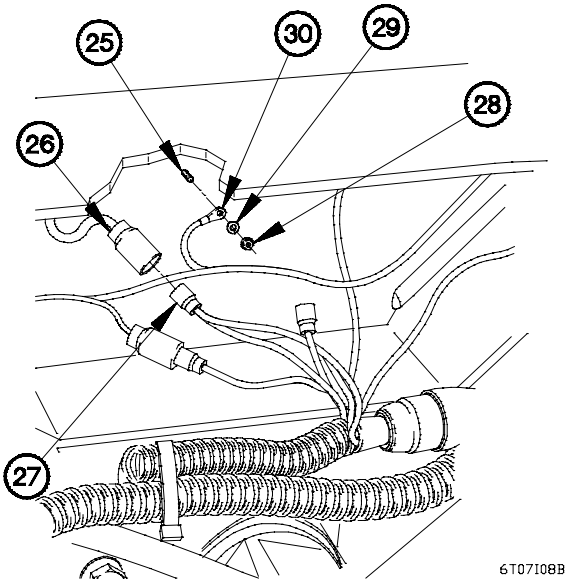
(14) Perform steps (12) and (13) on left side L-bracket.



(15) Disconnect connector (20) from connector P58 (21).

(16) Remove nut (22), lockwasher (23), and terminal lug TL32 (24) from base (25).



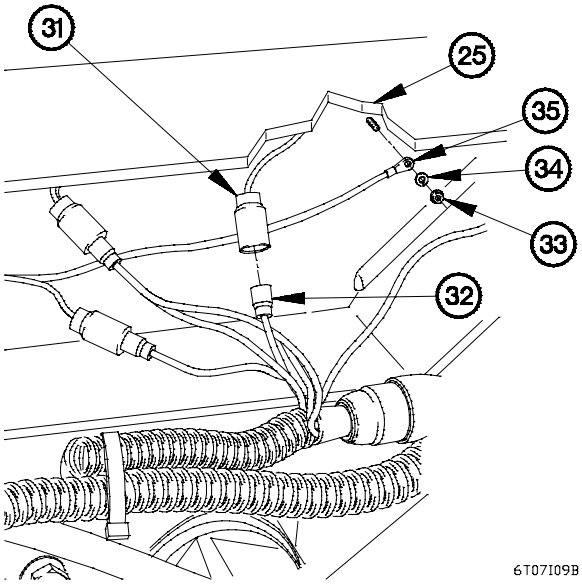


(17) Disconnect connector (26) from connector P56 (27).

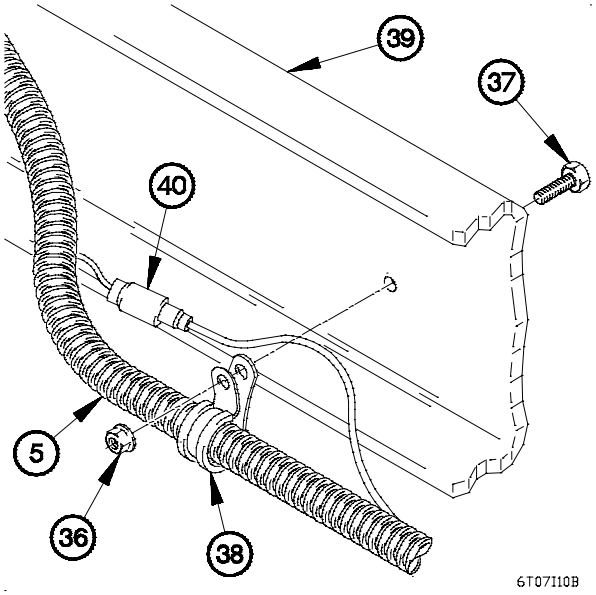
(18) Remove nut (28), lockwasher (29), and terminal lug TL31 (30) from base (25).

(19) Disconnect connector (31) from connector P54 (32).

(20) Remove nut (33), lockwasher (34), and terminal lug TL30 (35) from base (25).

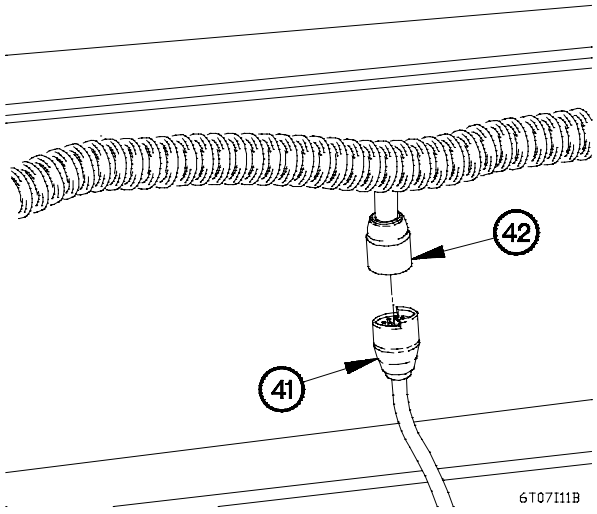


18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

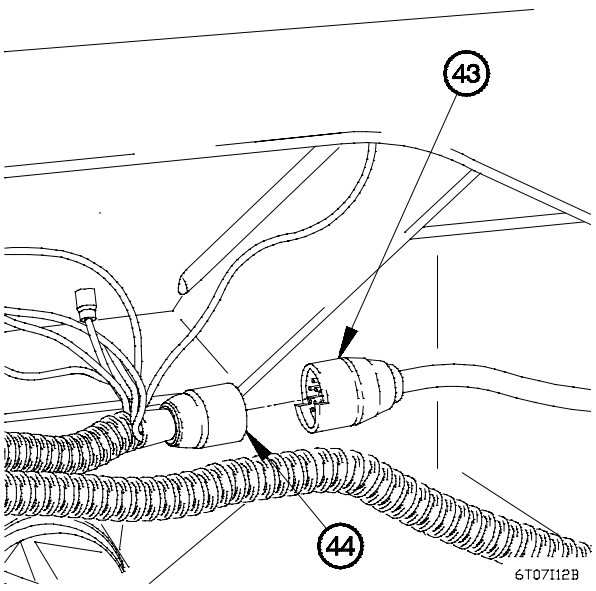


(21) Remove self-locking nut (36), screw (37), and clamp (38) from RH frame rail (39).

(22) Remove connectors P52R/J52 (40) from clamp (38).

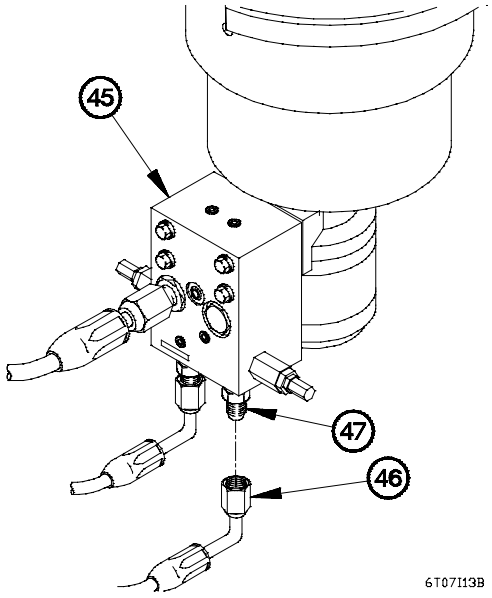


(23) Disconnect connector J52 (41) from connector P52R (42).



(24) Disconnect connector J53 (43) from connector P53 (44).

(25) Position drain pan under cross relief valve (45).



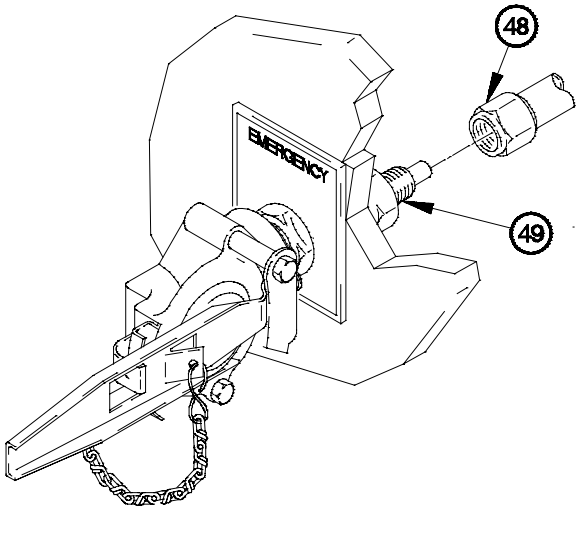
CAUTION

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.

(26) Disconnect two hoses (46) from fittings (47).



NOTE

Both EMERGENCY and SERVICE gladhand air hoses are disconnected the same way. One shown.

(27) Disconnect air hose (48) from reducer fitting (49).

(28) Perform step (27) on remaining air hose.

18-4. M1084/M1086 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.

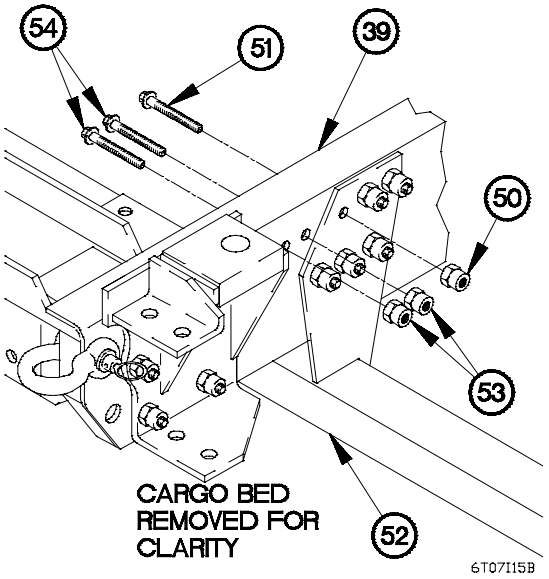
NOTE

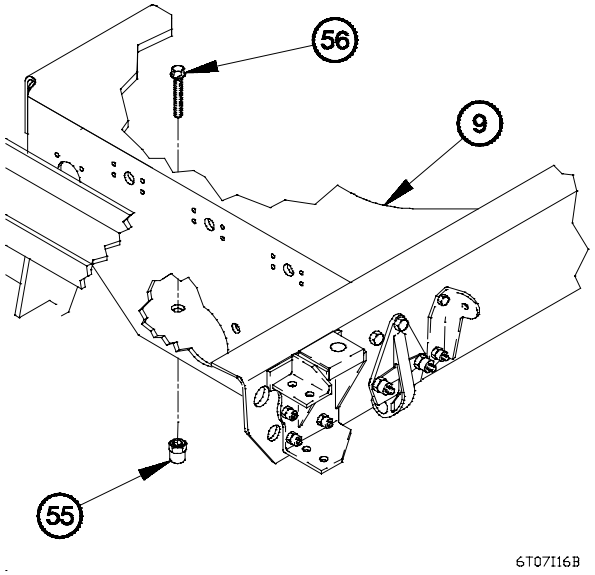
Left and right collars and bolts are removed the same way. Right side shown.

(29) Remove collar (50) and bolt (51) from rear bumper (52). Discard collar and bolt.

(30) Remove two collars (53) and bolts (54) from RH frame rail (39). Discard collars and bolts.

(31) Perform steps (29) and (30) on left side collars and bolts.





(32) Remove two collars (55) and bolts (56) from rear crossmember (9). Discard collars and bolts.

NOTE

Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (33).

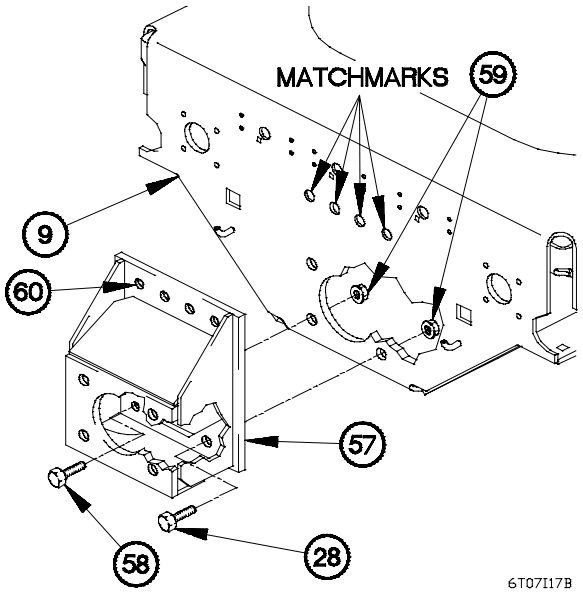
(33) Install pintle hook extension (57) on rear crossmember (9) with two bolts (58) and self-locking nuts (59).

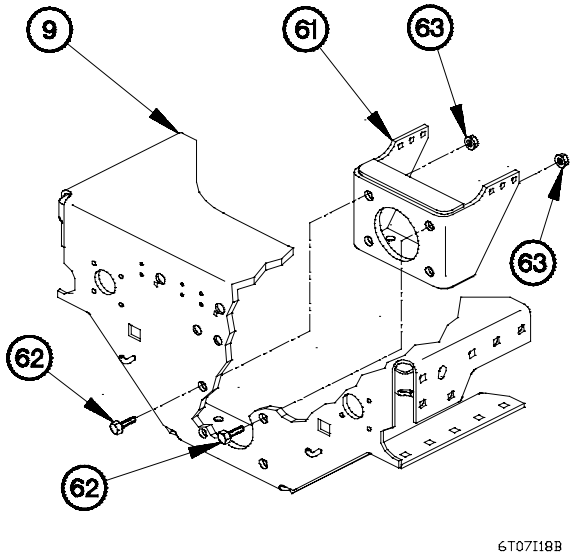
(34) Match mark four top holes (60) on rear crossmember (9).

(35) Remove two self-locking nuts (59), bolts (58) and pintle hook extension (57) from rear crossmember (9).

(36) Drill four 0.375 in. (9.5 mm) pilot holes in rear crossmember (9) at matchmarks.

(37) Drill four 0.75 in. (19 mm) holes in rear crossmember (9).





NOTE

Use bolts P/N 12414307-140 and self-locking nuts P/N 12414308-025 on step (38).

(38) Position rear lower crossmember support (61) on rear crossmember (9) with two bolts (62) and self-locking nuts (63).

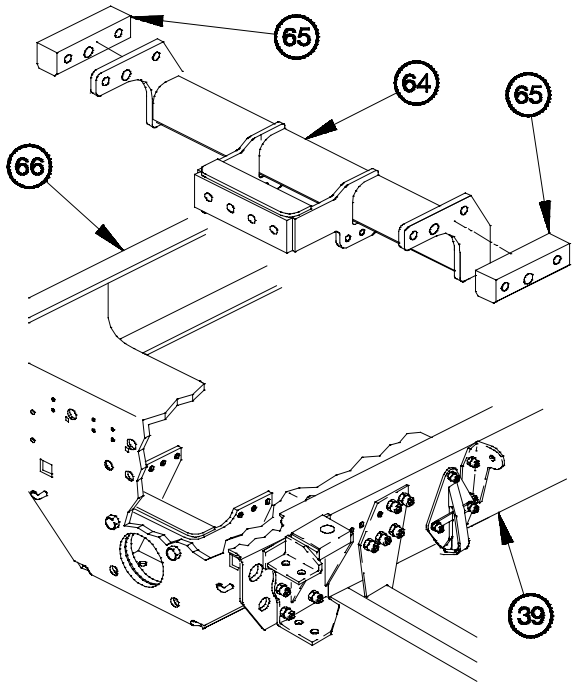
18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

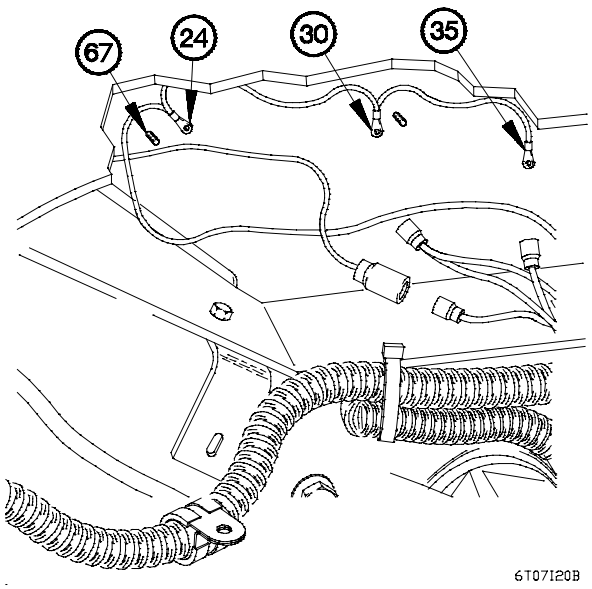
- Position two spacers on frame rails with beveled edges facing down.
- Route connectors and terminal lugs under rear main crossmember.

(39) Position rear main crossmember support (64) on vehicle.

(40) Position two spacers (65) between rear main crossmember support (64) and LH and RH frame rail (66 and 39).



6T07I19B



6T07I20B

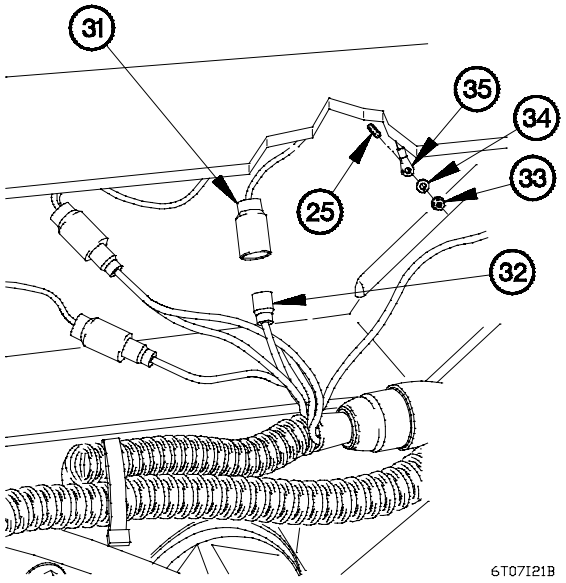
NOTE

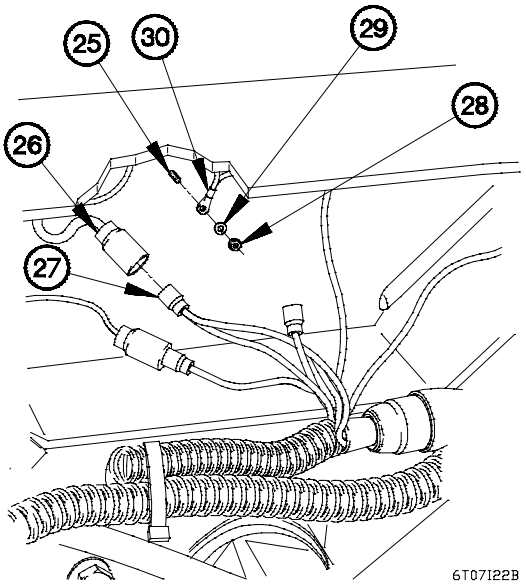
- Rotate cable assembly with terminal lugs 180 degrees (upside down) from previous position.
- Position rear main crossmember support for access to ground terminals

(41) Route terminal lugs TL32 (24), TL31 (30), and TL30 (35) to three ground terminals (67).

(42) Install terminal lug TL30 (35) on base (25) with lockwasher (34) and nut (33).

(43) Connect connector (31) to connector P54 (32).



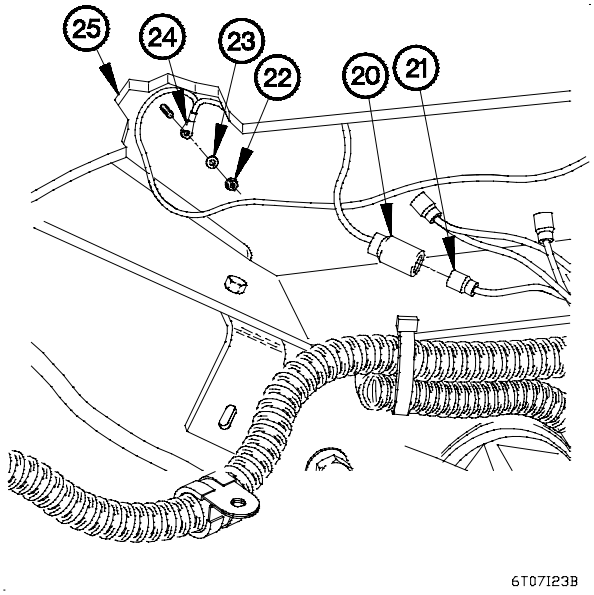


(44) Install terminal lug TL31 (30) on base (25) with lockwasher (29) and nut (28).

(45) Connect connector (26) to connector P56 (27).

(46) Install terminal lug TL32 (24) on base (25) with lockwasher (23) and nut (22).

(47) Connect connector (20) to connector P58 (21).



18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

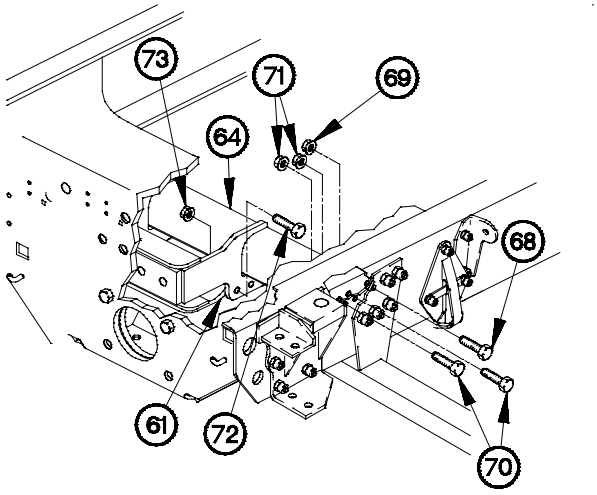
NOTE

Use bolts P/N 12414307-079, P/N 12414307-148, P/N 12414307-149 and self-locking nuts P/N 12414308-021 and P/N 12414308-025 on steps (48) through (50).

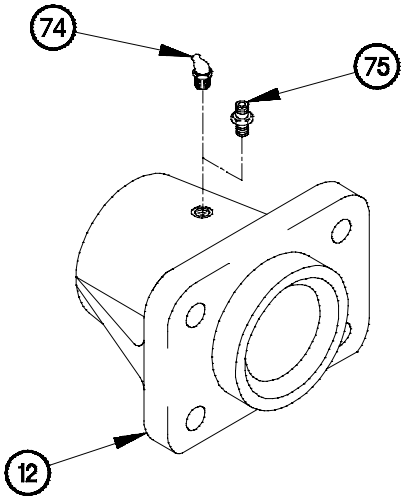
(48) Position two bolts (68) and self-locking nuts (69) on rear main crossmember support (64).

(49) Position four bolts (70) and self-locking nuts (71) on rear main crossmember support (64).

(50) Position six bolts (72) and self-locking nuts (73) on rear lower crossmember support (61).



6T07I24B



6T07I25B

(51) Remove 45-degree grease fitting (74) from support (12).

(52) Install grease fitting (75) in support (12).

NOTE

- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (53).
- Support will be installed with fitting facing down.

(53) Position support (12) on pintle hook extension (57) with four bolts (11) and self-locking nuts (10).

(54) Position pintle hook extension (57) in vise.

(55) Tighten four self-locking nuts (10) to 196-240 lb-ft (265-325 N·m).

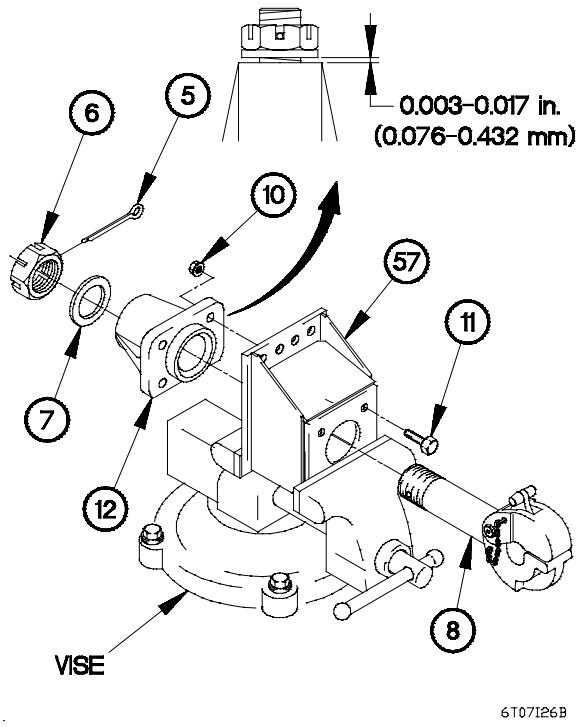
(56) Position pintle hook (8) in pintle hook extension (57) with washer (7) and nut (6).

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.

(57) 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).

(58) Install cotter pin (5) in nut (6).



18-4. M1084/M1086 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 (59) requires the aid of two assistants.
- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (59).

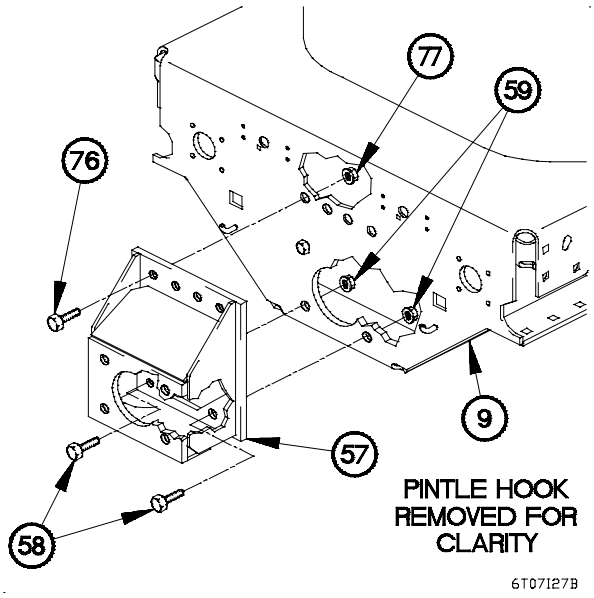
(59) Position pintle hook extension (57) on rear crossmember (9) with four bolts (76) and self-locking nuts (77).

NOTE

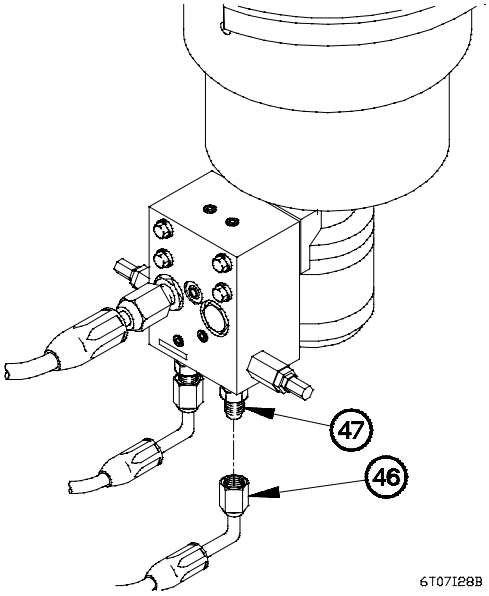
- Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (60).
- Steps (60) and (61) require the aid of an assistant.

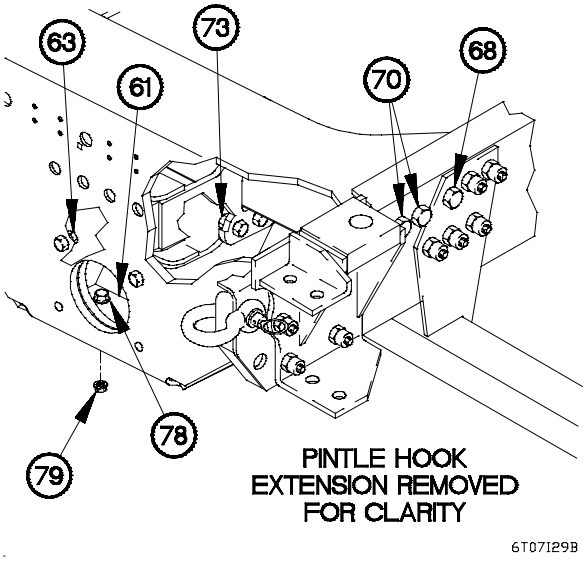
(60) Position two bolts (58) and self-locking nuts (59) in pintle hook extension (57).

(61) Tighten four self-locking nuts (77) and two self-locking nuts (59) to 196-240 lb-ft (265-325 N·m).



(62) Connect two hoses (46) to fittings (47).





NOTE

Use bolts P/N 12414307-141 and self-locking nuts P/N 12414308-025 on step (63).

(63) Position two bolts (78) and self-locking nuts (79) in rear lower crossmember support (61).

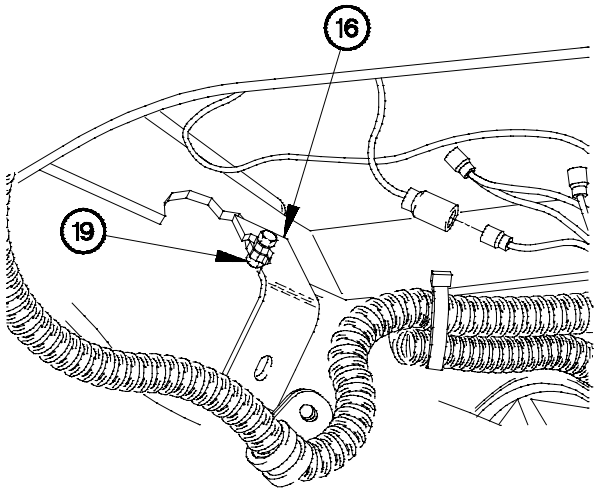
(64) Tighten two self-locking nuts (79 and 63) to 196-240 lb-ft (265-325 N·m).

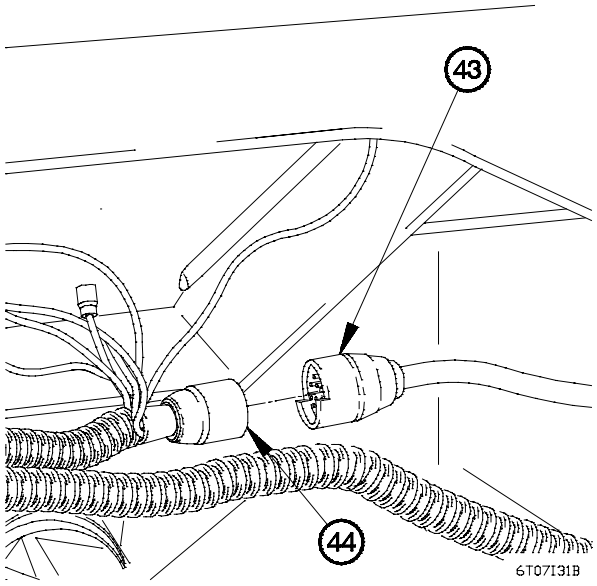
(65) Tighten six self-locking nuts (73) to 76-94 lb-ft (103-125 N·m).

(66) Tighten two bolts (68) and four bolts (70) to 236-288 lb-ft (319-389 N·m).

18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

(67) Tighten two self-locking nuts (19) on L-brackets (16).



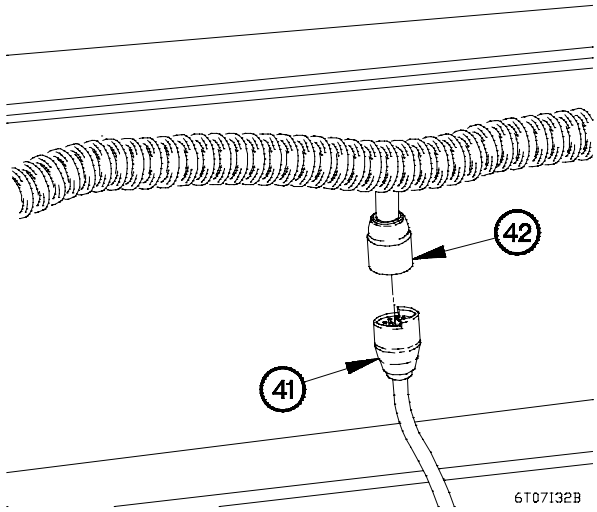


NOTE

Install plastic cable ties as required.

(68) Connect connector J53 (43) to connector P53 (44).

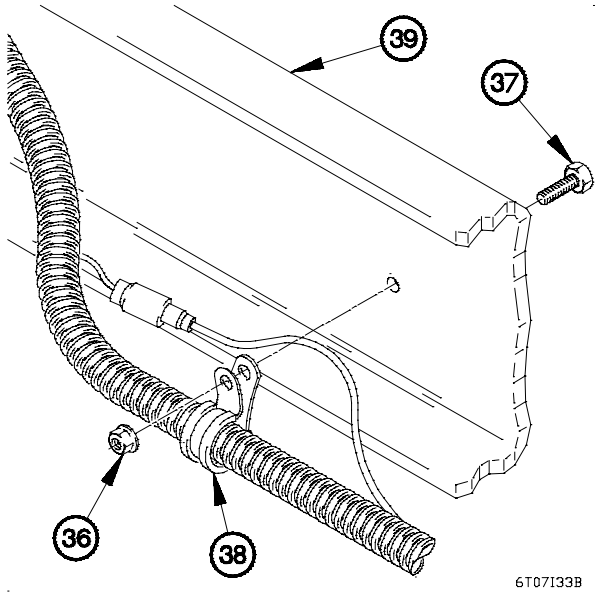
(69) Connect connector J52 (41) to connector P52R (42).

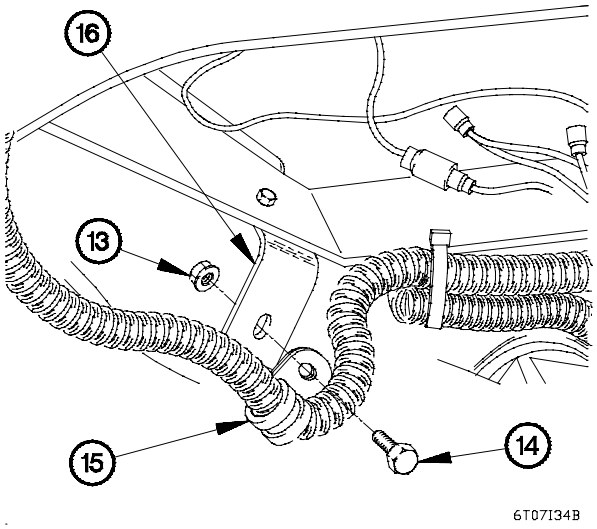


CAUTION

Do not put connector P52R/J52 in clamp. Failure to comply may result in disconnection of connectors.

(70) Install clamp (38) on RH frame rail (39) with screw (37) and self-locking nut (36).





NOTE

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

(71) Install clamp (15) on L-bracket (16) with screw (14) and self-locking nut (13).

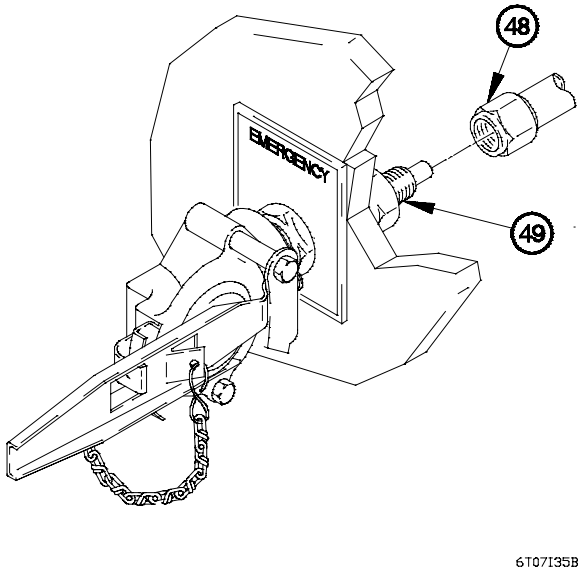
(72) Perform step (71) on left side clamp.

NOTE

Both EMERGENCY and SERVICE gladhand air hoses are connected the same way. One shown.

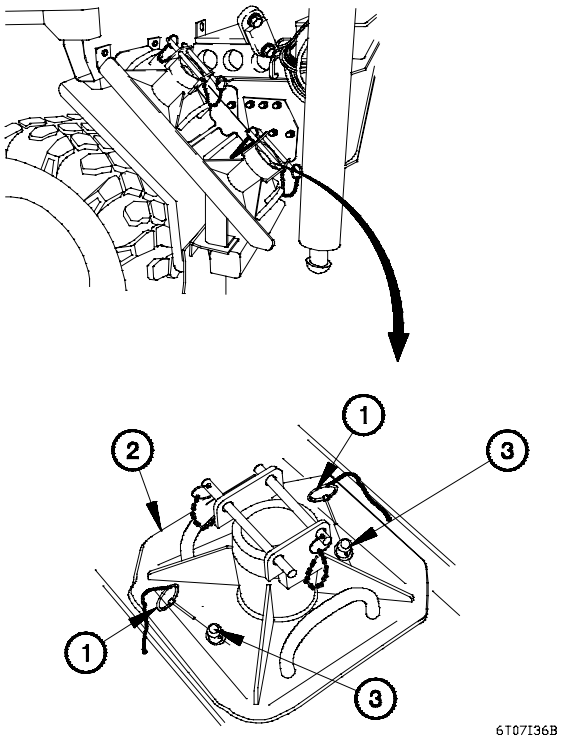
(73) Connect air hose (48) to reducer fitting (49).

(74) Perform step (73) on remaining air hose.



18-4. M1084/M1086 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

(75) Install two outrigger pads (2) on four studs (3) with pins (1).



End of Task.

18-5. M1085 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION

This task covers:

a. Installation

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-366-10-1).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Socket, Socket Wrench (TM 9-2320-366-20)
Drill, Electric, Portable (Item 21, Appendix B)
Drill Set, Twist (Item 20, Appendix B)
Socket Set, Impact (Item 58, Appendix B)
Vise, Machinist (Item 82, Appendix B)

Tools and Special Tools (Cont)
Wrench, Impact, Electric (Item 88, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Shop Equipment, Automotive Vehicle (Item 58, Appendix B -20)

Materials/Parts
Ties, Cable, Plastic (Item 99, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, 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.

18-5. M1085 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

a. Installation.

(1) Remove cotter pin (1) from nut (2). Discard cotter pin.

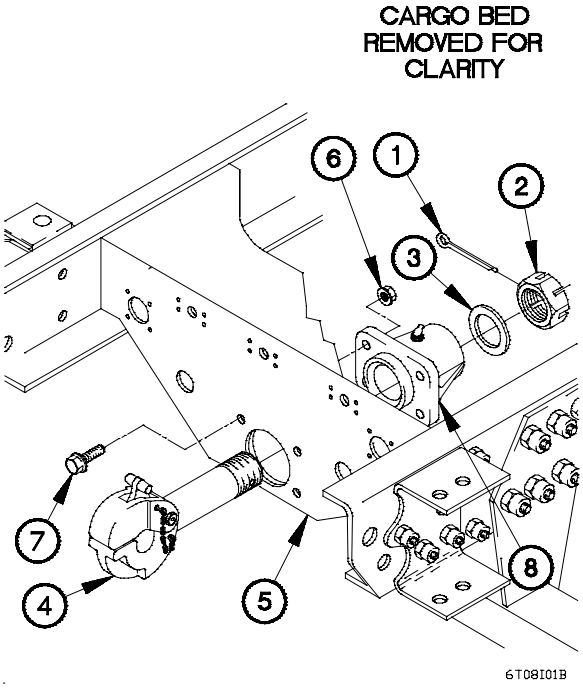
(2) Remove nut (2) and washer (3) from pintle hook (4).

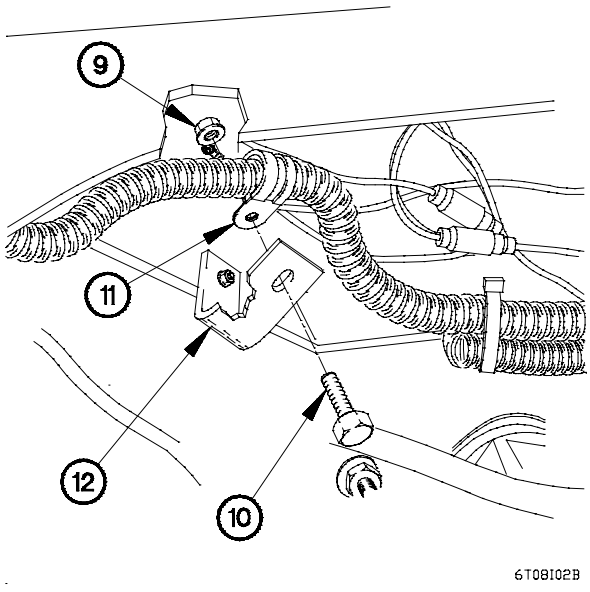
WARNING

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.

(3) Remove pintle hook (4) from rear crossmember (5).

(4) Remove four self-locking nuts (6), bolts (7), and support (8) from rear crossmember (5). Discard self-locking nuts.





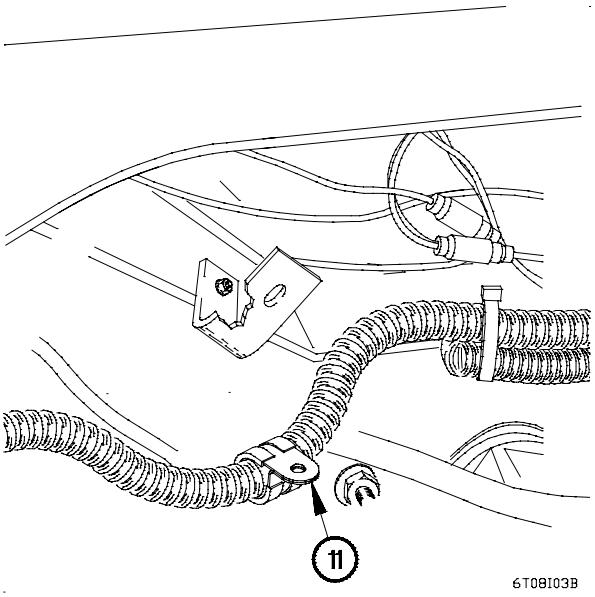
NOTE

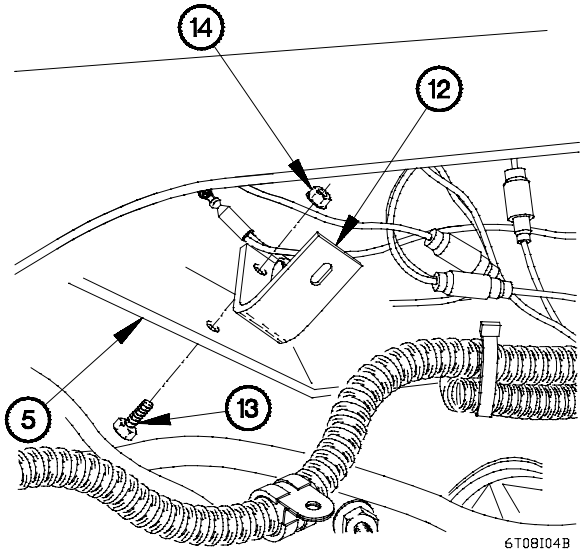
- Left and right clamps are removed the same way. Right side shown.
- Remove plastic cable ties as required.

(5) Remove self-locking nut (9), screw (10), and clamp (11) from L-bracket (12).

(6) Rotate clamp (11) 180 degrees.

(7) Perform steps (5) and (6) on left side clamp.





NOTE

Left and right side L-brackets are repositioned the same way. Right side shown.

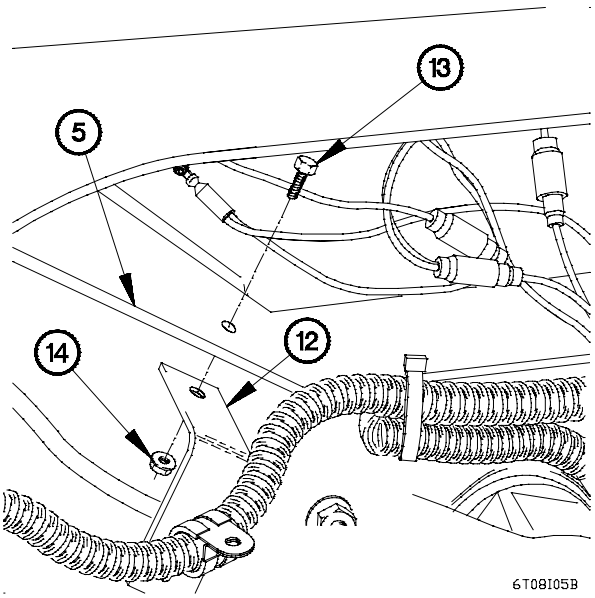
(8) Remove screw (13), self-locking nut (14), and L-bracket (12) from rear crossmember (5).

NOTE

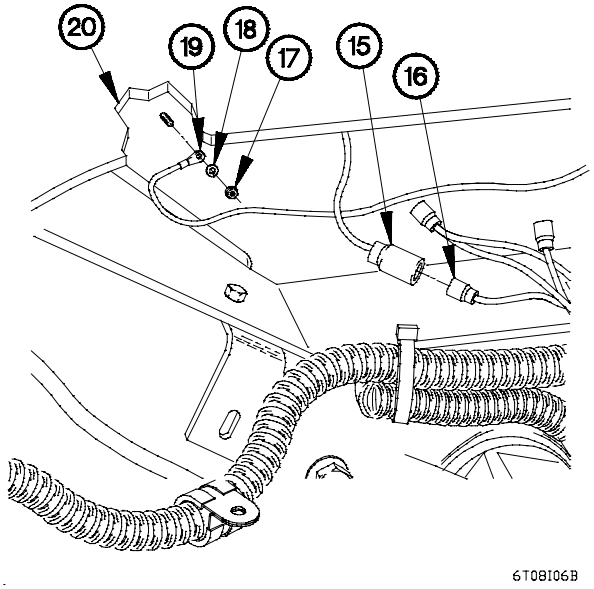
The L-bracket will be mounted with elongated hole against the rear crossmember and long end of L-bracket pointing down.

(9) Position L-bracket (12) on rear crossmember (5) with screw (13) and self-locking nut (14).

(10) Perform steps (8) and (9) on left side L-bracket.

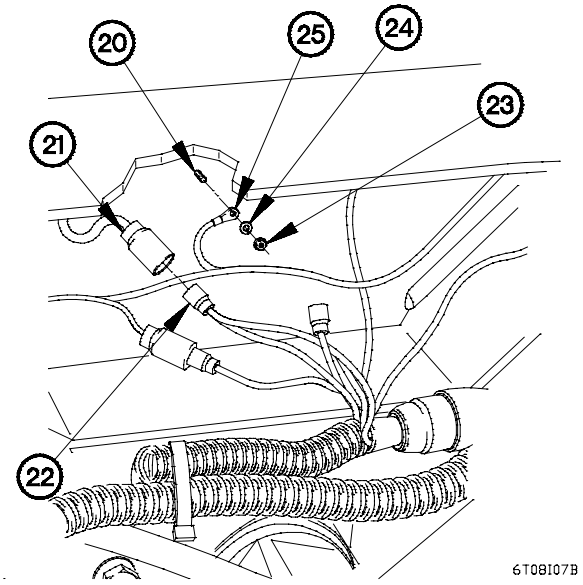


18-5. M1085 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)



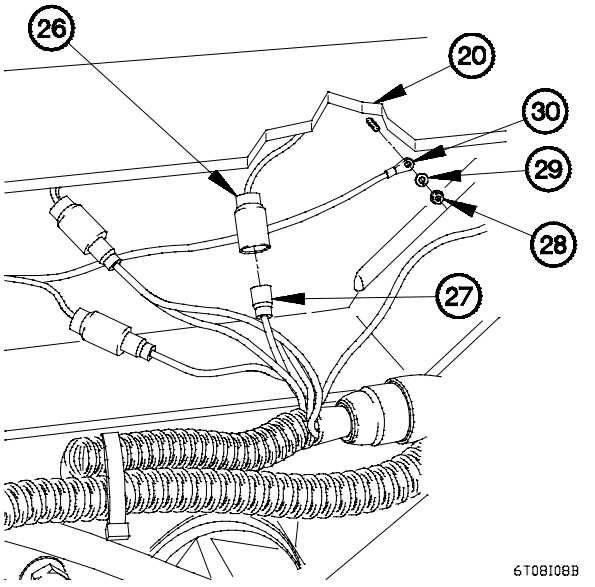
(11) Disconnect connector (15) from connector P58 (16).

(12) Remove nut (17), lockwasher (18), and terminal lug TL32 (19) from base (20).



(13) Disconnect connector (21) from connector P56 (22).

(14) Remove nut (23), lockwasher (24), and terminal lug TL31 (25) from base (20).



(15) Disconnect connector (26) from connector P54 (27).

(16) Remove nut (28), lockwasher (29), and terminal lug TL30 (30) from base (20).

CAUTION

When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

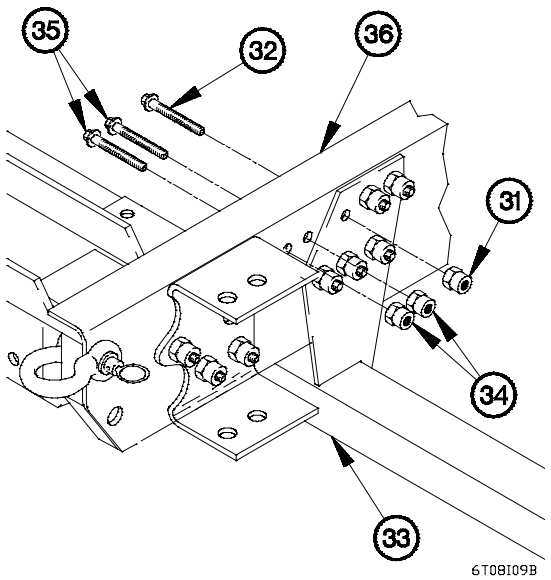
NOTE

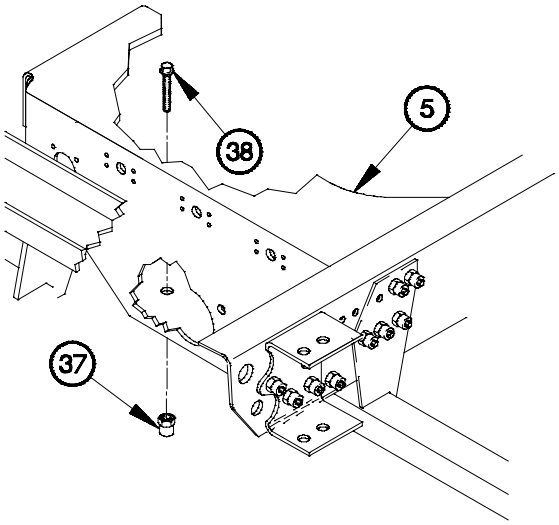
Left and right collars and bolts are removed the same way. Right side shown.

(17) Remove collar (31) and bolt (32) from rear bumper (33). Discard collar and bolt.

(18) Remove two collars (34) and bolts (35) from RH frame rail (36). Discard collars and bolts.

(19) Perform steps (17) and (18) on left side collars and bolts.





(20) Remove two collars (37) and bolts (38) from rear crossmember (5). Discard collars and bolts.

18-5. M1085 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

NOTE

Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (21).

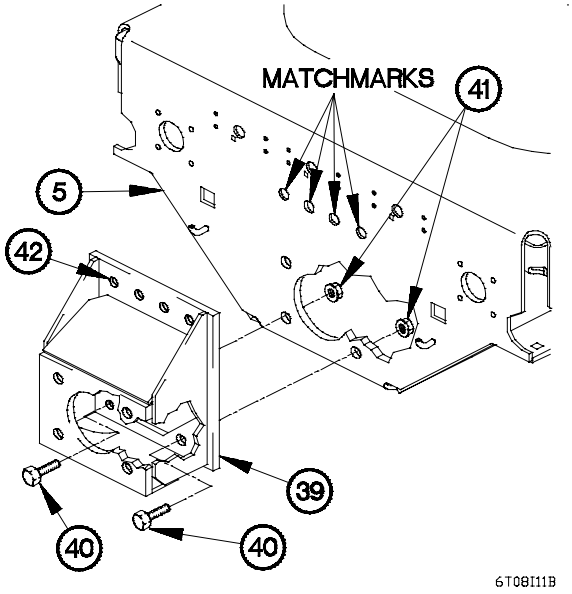
(21) Install pintle hook extension (39) on rear crossmember (5) with two bolts (40) and self-locking nuts (41).

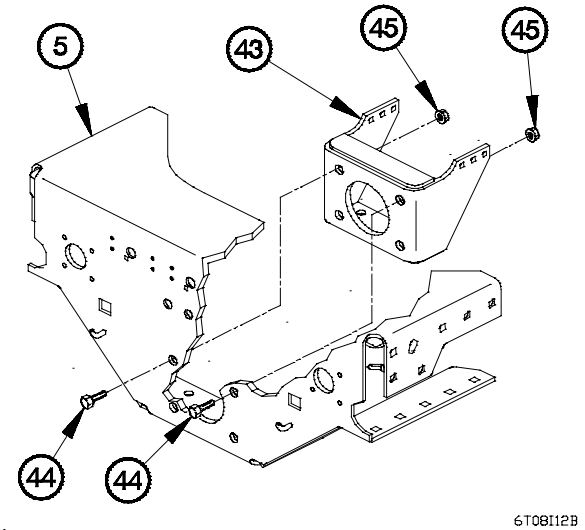
(22) Match mark four top holes (42) on rear crossmember (5).

(23) Remove two self-locking nuts (41), bolts (40) and pintle hook extension (39) from rear crossmember (5).

(24) Drill four 0.375 in. (9.5 mm) pilot holes in rear crossmember (5) at matchmarks.

(25) Drill four 0.75 in. (19 mm) holes in rear crossmember (5).





NOTE

Use bolts P/N 12414307-140 and self-locking nuts P/N 12414308-025 on step (26).

(26) Position rear lower crossmember support (43) on rear crossmember (5) with two bolts (44) and self-locking nuts (45).

NOTE

- Position two spacers on frame rails with beveled edges facing down.
- Use bolts P/N 12414307-148 and P/N 12414307-149 and self-locking nuts P/N 12414308-025 on steps (27) and (28).
- 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.

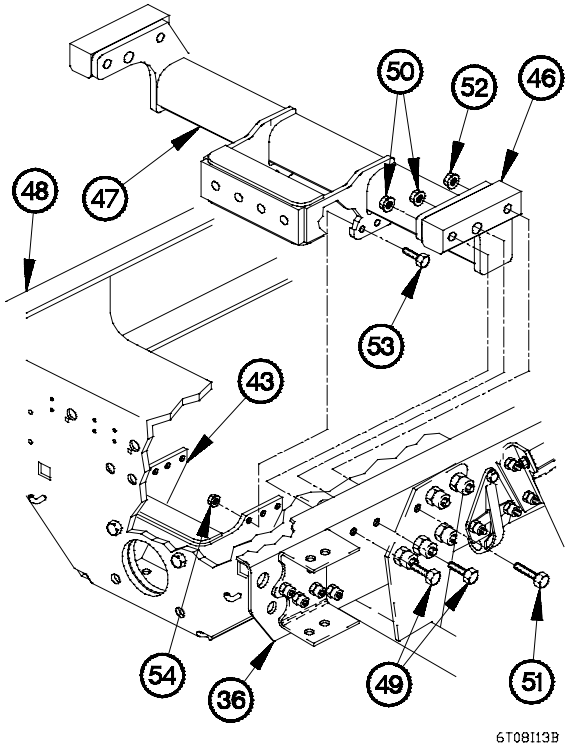
(27) Position two spacers (46) and rear main crossmember support (47) on LH and RH frame rails (48 and 36) with four bolts (49) and self-locking nuts (50).

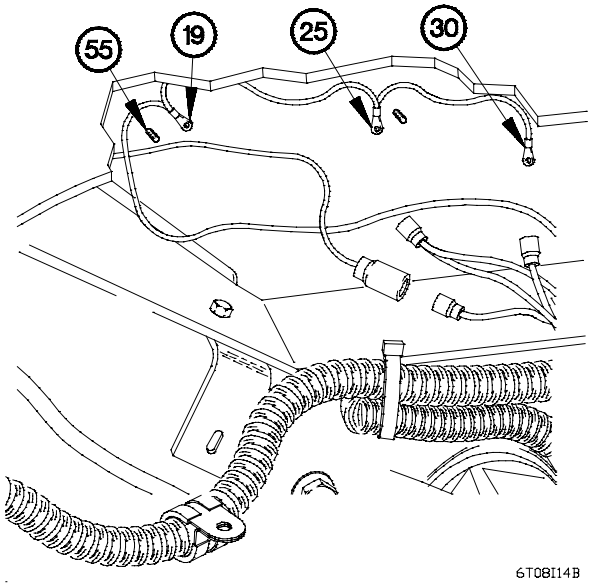
(28) Position two bolts (51) and self-locking nuts (52) on rear main crossmember support (47).

NOTE

Use bolts P/N 12414307-079 and self-locking nuts P/N 12414308-021 on step (29).

(29) Position six bolts (53) and self-locking nuts (54) on rear lower crossmember support (43).





NOTE

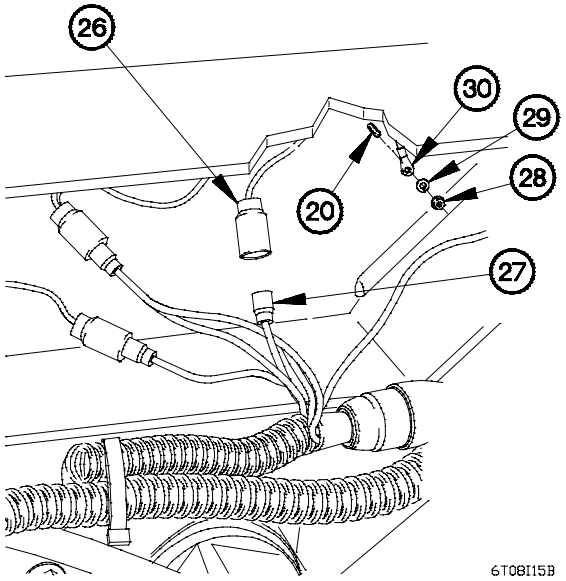
Rotate cable assembly with terminal lugs 180 degrees (upside down) from previous position.

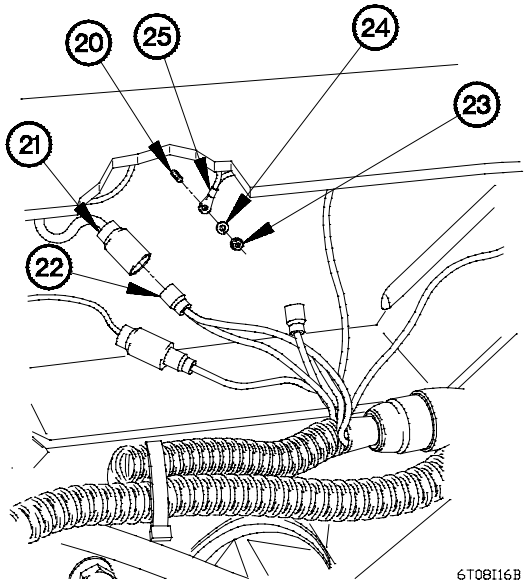
(30) Route terminal lugs TL32 (19), TL31 (25), and TL30 (30) to three ground terminals (55).

18-5. M1085 PINTLE HOOK EXTENSION KIT INITIAL INSTALLATION (CONT)

(31) Install terminal lug TL30 (30) on base (20) with lockwasher (29) and nut (28).

(32) Connect connector (26) to connector P54 (27).



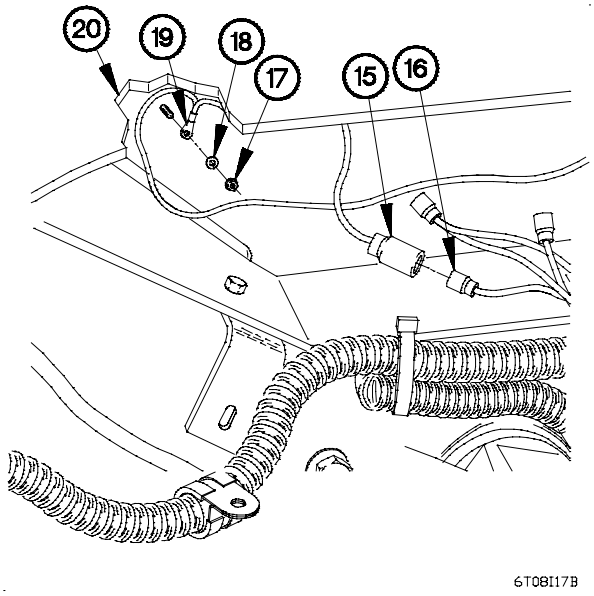


(33) Install terminal lug TL31 (25) on base (20) with lockwasher (24) and nut (23).

(34) Connect connector (21) to connector P56 (22).

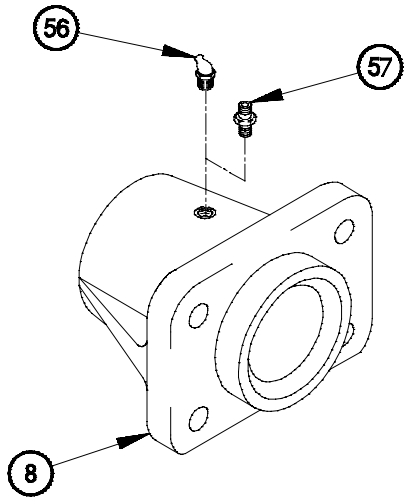
(35) Install terminal lug TL32 (19) on base (20) with lockwasher (18) and nut (17).

(36) Connect connector (15) to connector P58 (16).

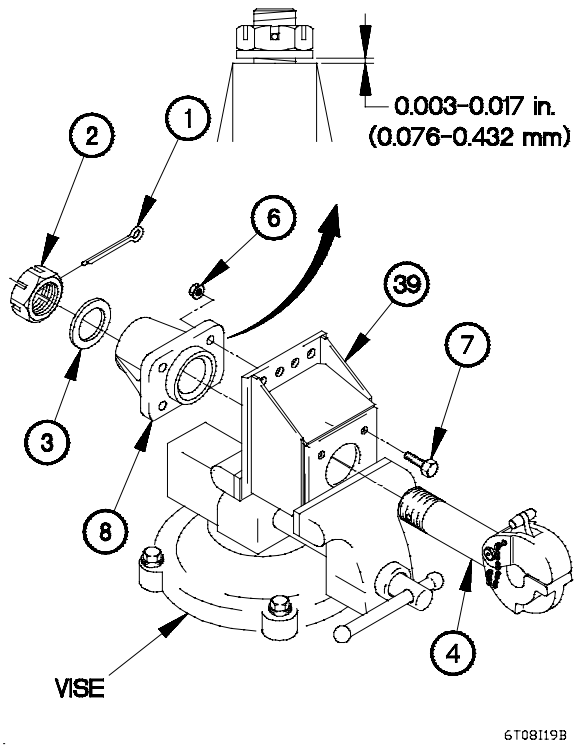


(37) Remove 45-degree grease fitting (56) from support (8).

(38) Install grease fitting (57) in support (8).



6T08I18B



6T08I19B

NOTE

- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (39).
- Support will be installed with fitting facing down.

(39) Position support (8) on pintle hook extension (39) with four bolts (7) and self-locking nuts (6).

(40) Position pintle hook extension (39) in vise.

(41) Tighten four self-locking nuts (6) to 196-240 lb-ft (265-325 N·m).

(42) Position pintle hook (4) in pintle hook extension (39) with washer (3) and nut (2).

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.

(43) Adjust nut (2) until clearance is 0.003-0.017 in. (0.076-0.432 mm) with alignment holes lined up between nut (2) and pintle hook (4).

(44) Install cotter pin (1) in nut (2).

18-5. M1085 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 (45) requires the aid of two assistants.
- Use bolts P/N 12414307-142 and self-locking nuts P/N 12414308-025 on step (45).

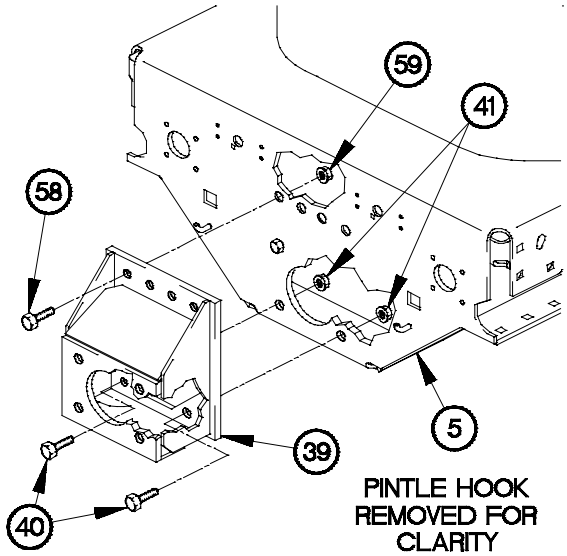
(45) Position pintle hook extension (39) on rear crossmember (5) with four bolts (58) and self-locking nuts (59).

NOTE

- Use bolts P/N 12414307-143 and self-locking nuts P/N 12414308-025 on step (46).
- Steps (46) through (57) require the aid of an assistant.

(46) Position two bolts (40) and self-locking nuts (41) in pintle hook extension (39).

(47) Tighten four self-locking nuts (59) and two self-locking nuts (41) to 196-240 lb-ft (265-325 N·m).



NOTE

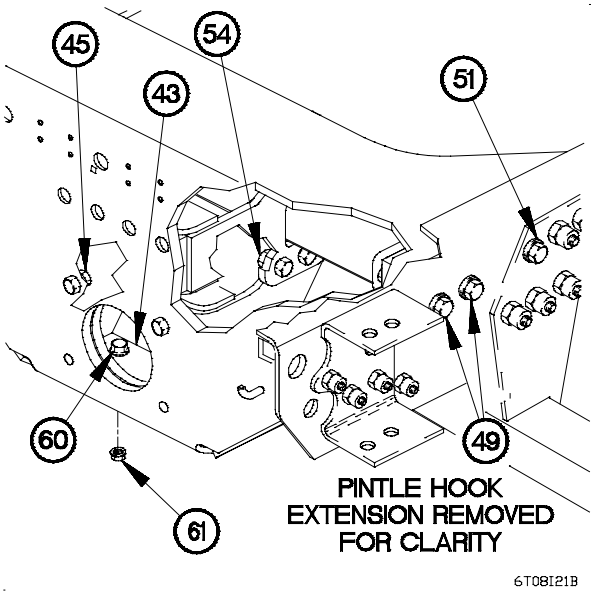
Use bolts P/N 12414307-141 and self-locking nuts P/N 12414308-025 on step (48).

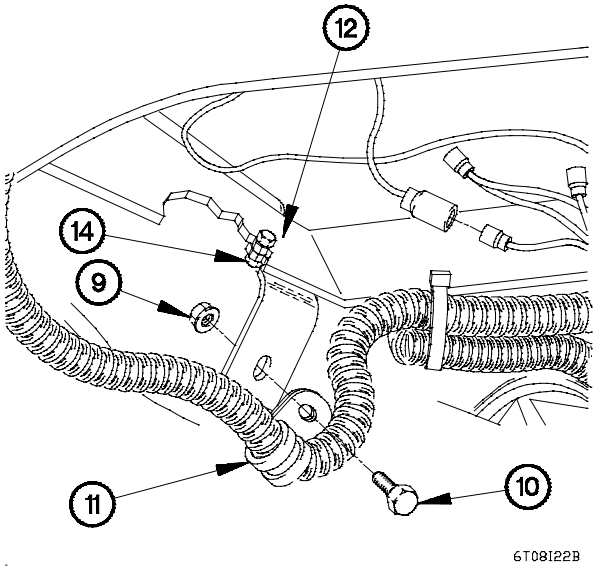
(48) Position two bolts (60) and self-locking nuts (61) in rear lower crossmember support (43).

(49) Tighten two self-locking nuts (45 and 61) to 196-240 lb-ft (265-325 N·m).

(50) Tighten six self-locking nuts (54) to 76-94 lb-ft (103-125 N·m).

(51) Tighten four bolts (49) and two bolts (51) to 236-288 lb-ft (319-389 N·m).





(52) Tighten two self-locking nuts (14) on L-brackets (12).

NOTE

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

(53) Install clamp (11) on L-bracket (12) with screw (10) and self-locking nut (9).

(54) Perform step (53) on left side clamp.

End of Task.

18-6. 200 AMP ALTERNATOR REPAIR

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque 0-175 lb-ft (Item 92, Appendix B)
Puller Kit, Universal (TM 9-2320-366-20)
Wrench, Torque 0-200 lb-in. (Item 93, Appendix B)
Hammer, Soft Head (Item 33, Appendix B)
Press, Arbor Hand Operated (Item 48, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)

Materials/Parts
Screw, Cap, Hex (3) (Item 78, Appendix C)
Nut, Self-locking (Item 54, Appendix C)
Pulley, Groove (Item 59, Appendix C)
Grease, Molybdenum Disulfide (Item 37, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 71, Appendix C)
Sealing Compound (Item 76, Appendix C)

Materials/Parts (Cont)
Nut, Self-locking (Item 186, Appendix F)
Key, Woodruff (Item 92, Appendix F)
Nut, Self-locking (Item 197, Appendix F)
Lockwasher (8) (Item 149, Appendix F)
Nut, Self-locking (Item 188, Appendix F)
Lockwasher (Item 137, Appendix F)
Nut, Self-locking (13) (Item 189, Appendix F)
Lockwasher (2) (Item 153, Appendix F)
Lockwasher (Item 148, Appendix F)
Nut, Self-locking (18) (Item 185, Appendix F)
Nut, Self-locking (12) (item 184, Appendix F)
Bushing, Sleeve (Item 27, Appendix F)
Ring, Retaining (Item 360, Appendix F)
Ring, Retaining (Item 359, Appendix F)
Lockwasher (2) (Item 150, Appendix F)

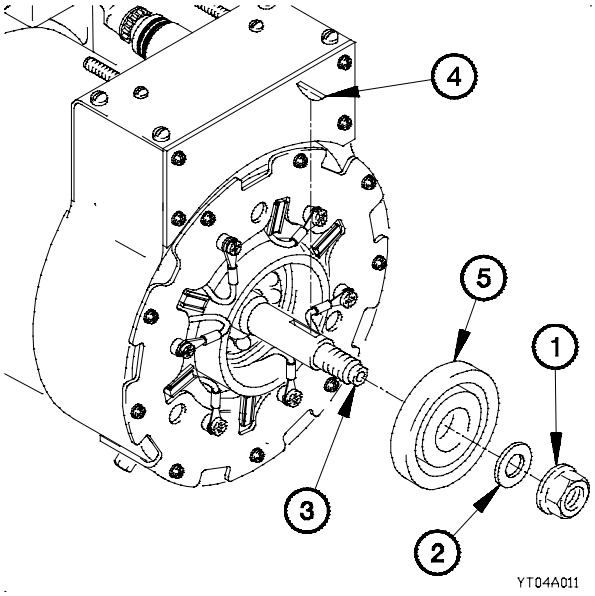
Personnel Required
(2)

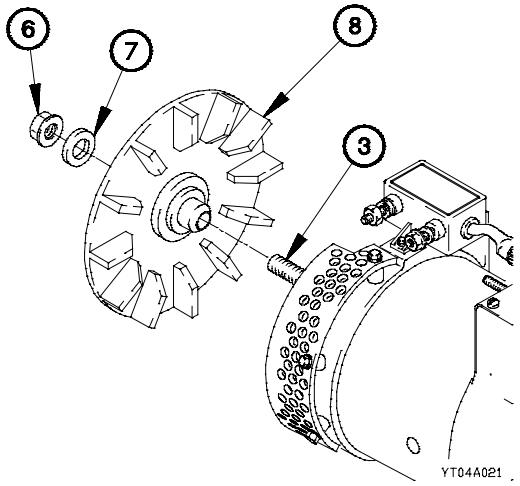
a. Disassembly

(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).

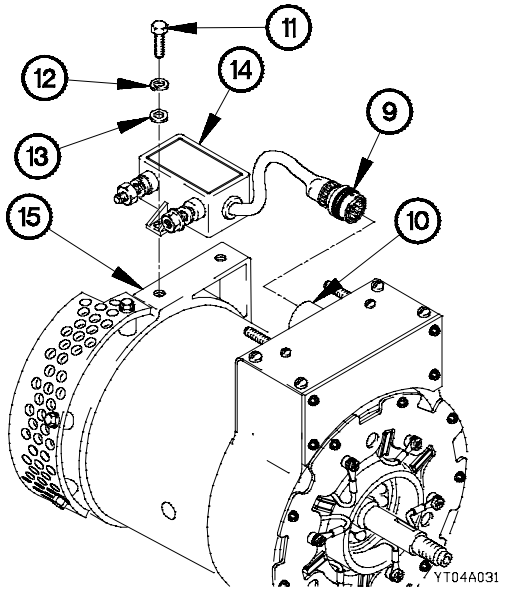


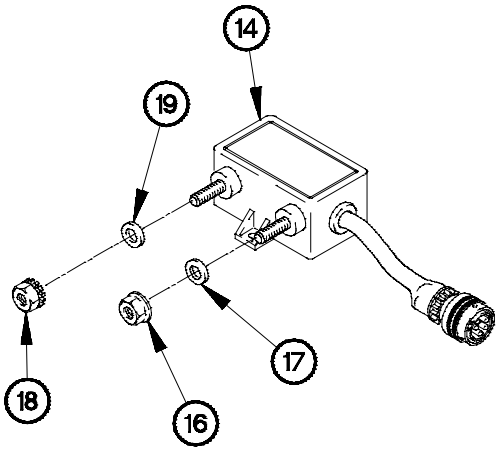


(4) Remove self-locking nut (6), washer (7), and fan (8) from shaft (3). Discard self-locking nut.

(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.

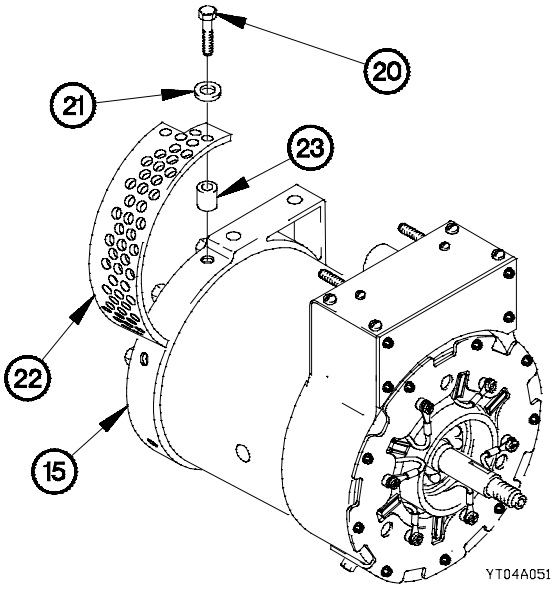




(7) Remove self-locking nut (16) and washer (17) from voltage regulator (14). Discard self-locking nut.

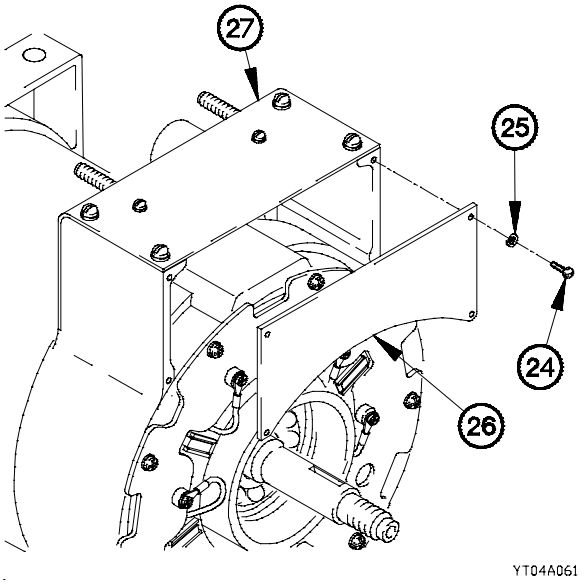
(8) Remove self-locking nut (18), and washer (19) from voltage regulator (14). Discard self-locking nut.

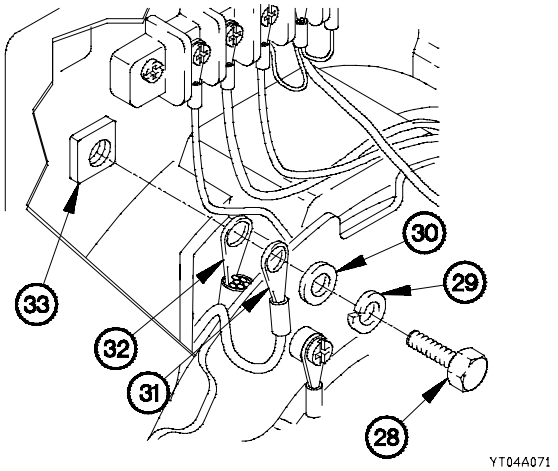
(9) Remove three screws (20), washers (21), fan guard (22), and three spacers (23) from end housing (15).



18-6. 200 AMP ALTERNATOR REPAIR (CONT)

(10) Remove four screws (24), lockwashers (25), and cover (26) from front housing (27). Discard lockwashers.



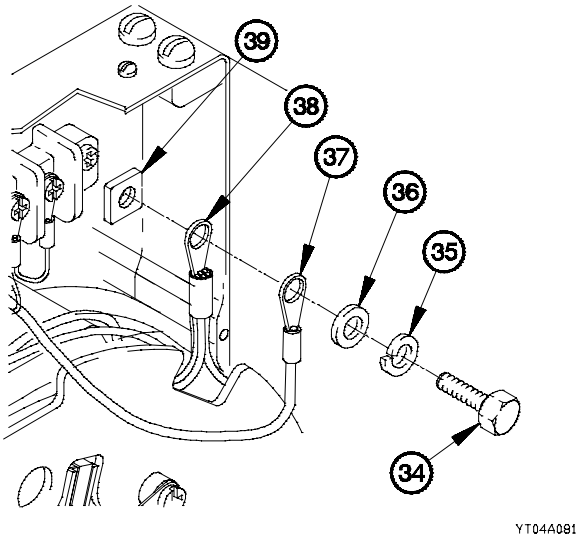


NOTE

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.

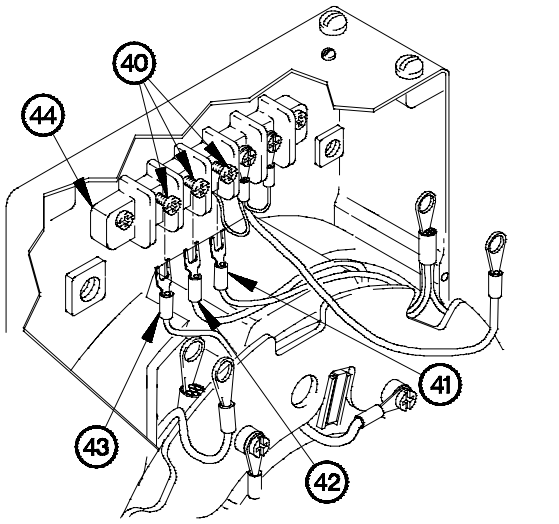
(12) Remove adhesive, screw (34), lockwasher (35), washer (36), terminal lugs (37 and 38) from 12 vdc post (39). Discard lockwasher.



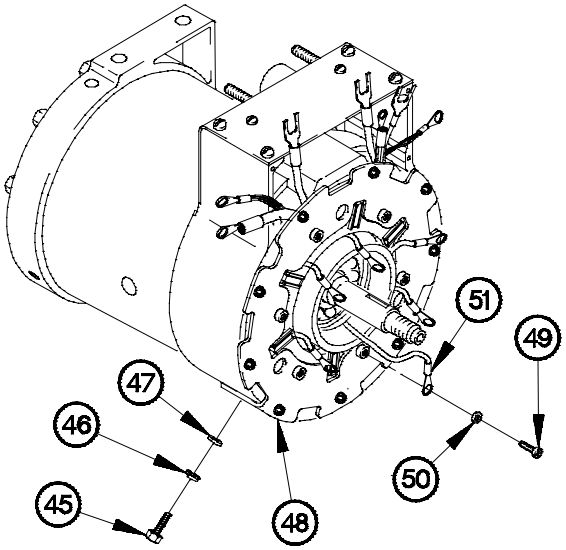
(13) Remove adhesive from three screws (40).

(14) Loosen three screws (40).

(15) Remove terminal lugs (41, 42, and 43) from terminal block (44).



YT04A091

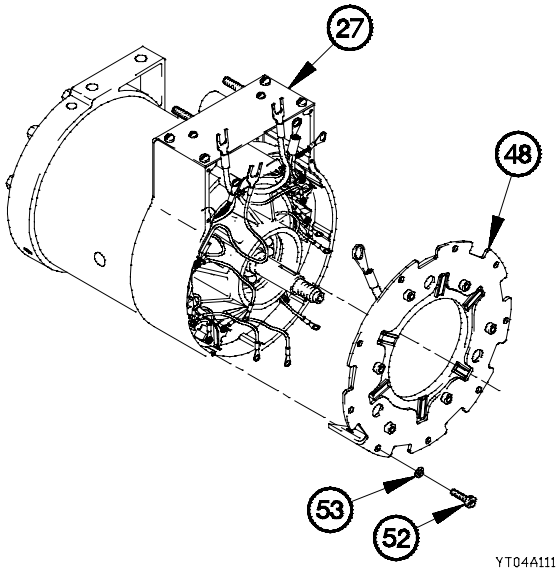


YT04A101

(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.

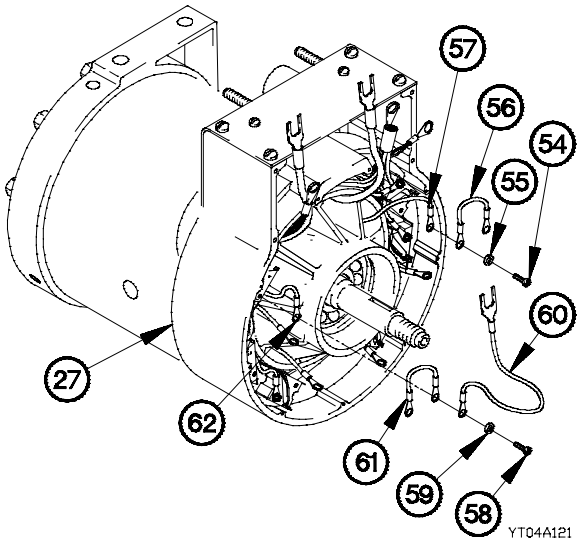


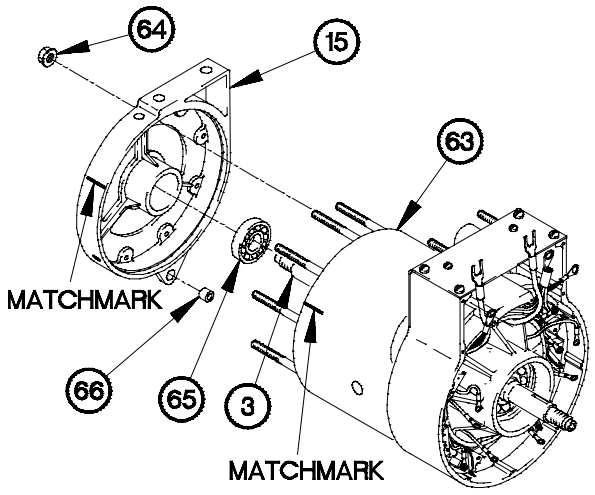
YT04A111

18-6. 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.

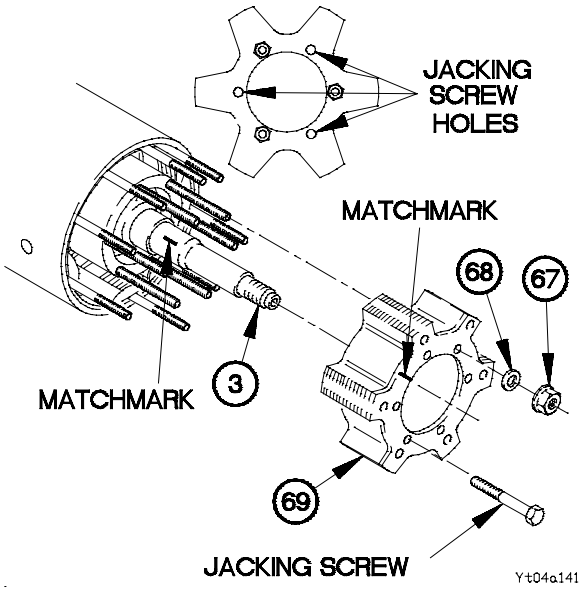
(25) Remove six self-locking nuts (67) and washers (68) from rotor (69). Discard self-locking nuts.

(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).

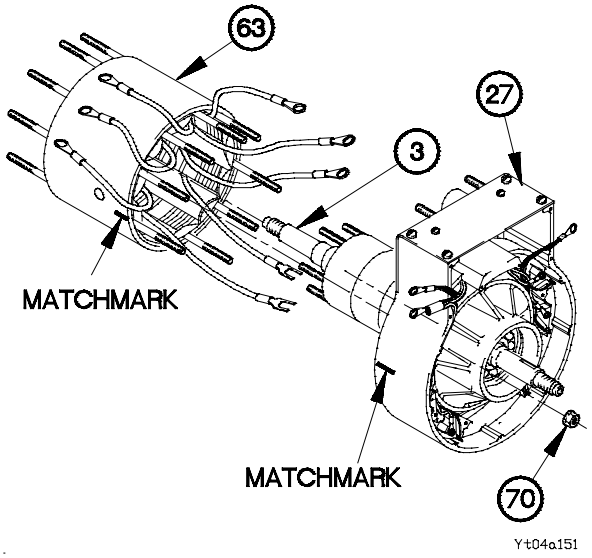
CAUTION

Use care when removing front housing and shaft from stator. Failure to comply may result in damage to equipment.

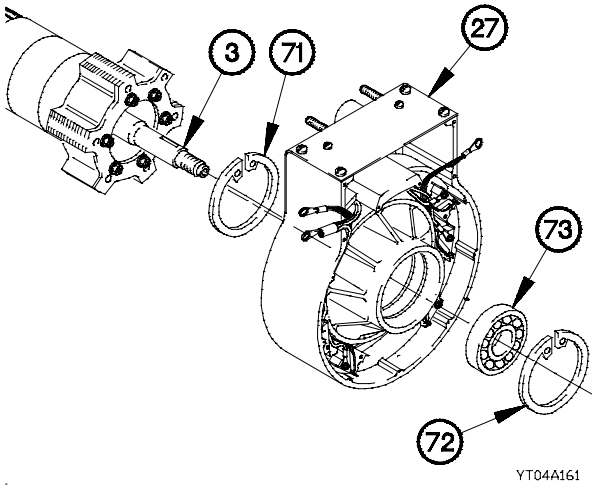
NOTE

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).

18-6. 200 AMP ALTERNATOR REPAIR (CONT)

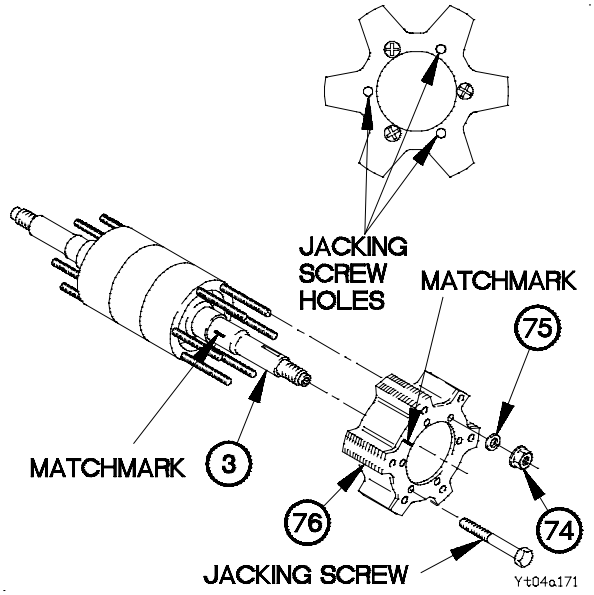
(35) Remove six self-locking nuts (74) and washers (75) from rotor (76). Discard self-locking nuts.

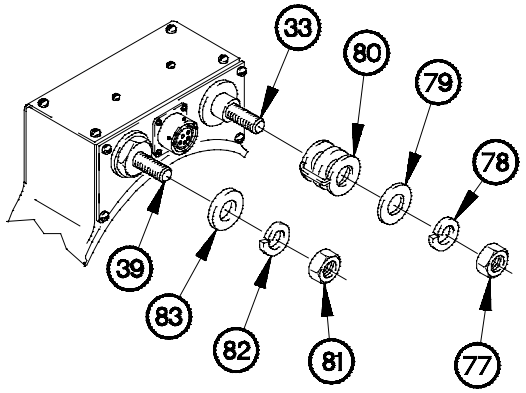
(36) Match mark rotor (76) to shaft (3).

(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

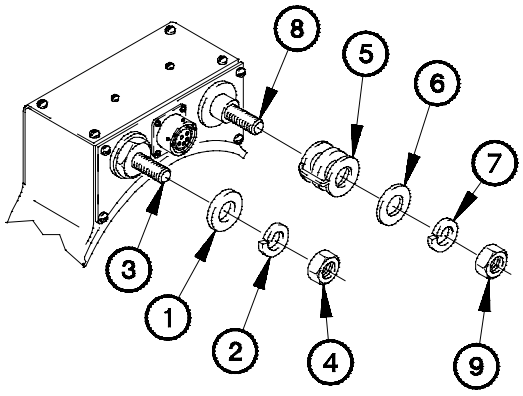
(40) Remove nut (77), lockwasher (78), washer (79), and fuse (80) from 24 vdc post (33). Discard lockwasher.

(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

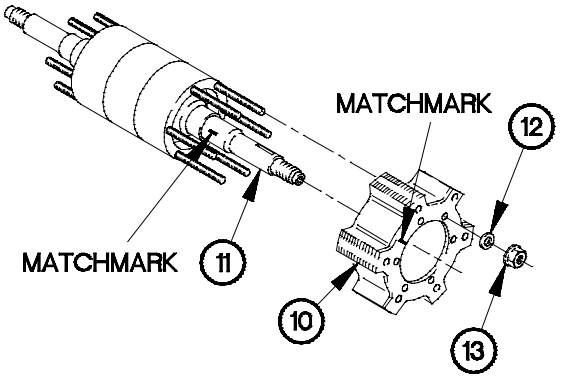
NOTE

Transfer matchmarks to replacement parts prior to installation.

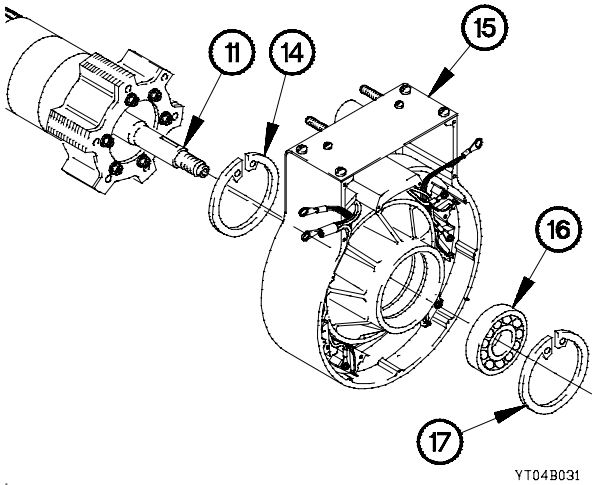
(3) Position rotor (10) on shaft (11) with matchmarks aligned.

(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).

18-6. 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.

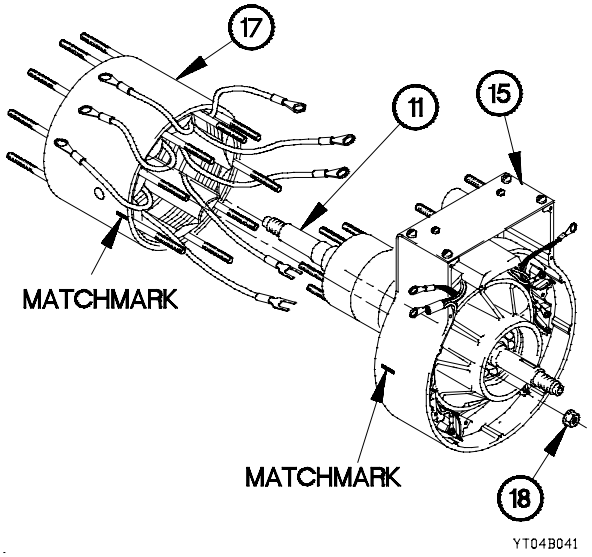
NOTE

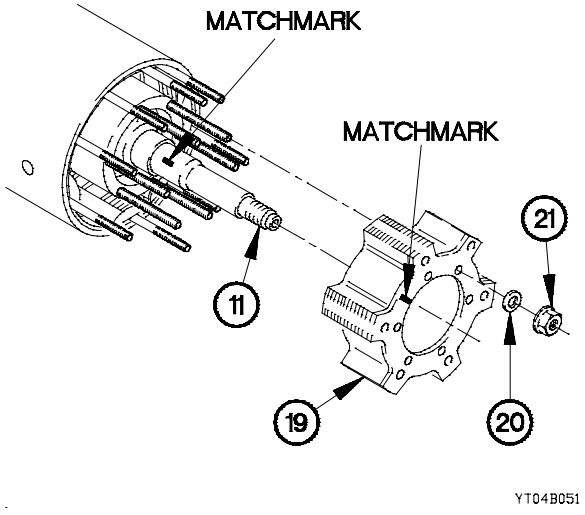
- Transfer matchmarks to replacement parts prior to installation.
- Step (10) requires the aid of an assistant.

(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).

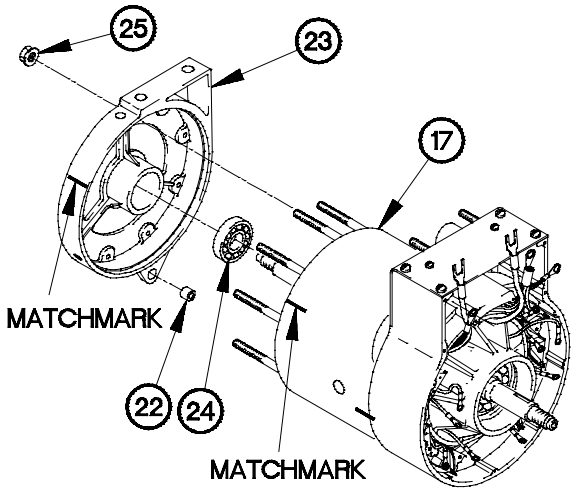
NOTE

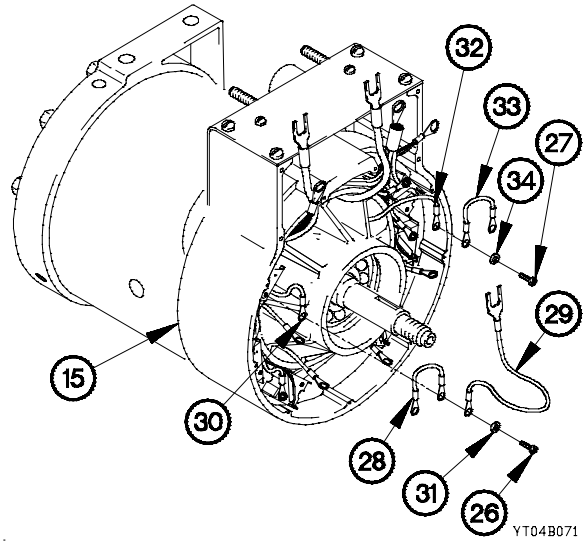
Transfer matchmarks to replacement parts prior to installation.

(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).

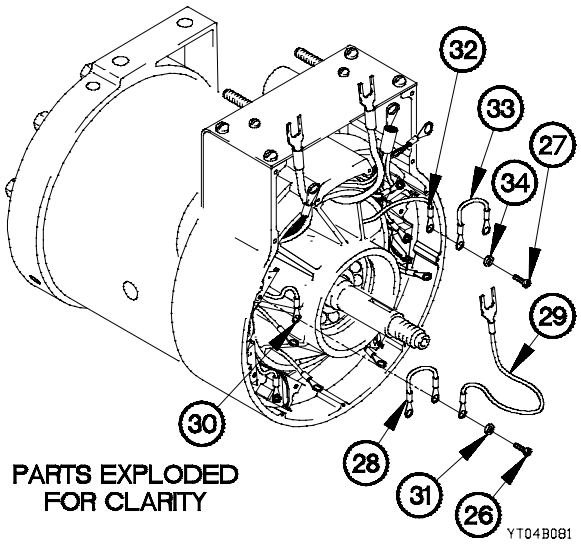
(24) Tighten screw (26) and five screws (27) to 30 lb-in. (3 N·m).

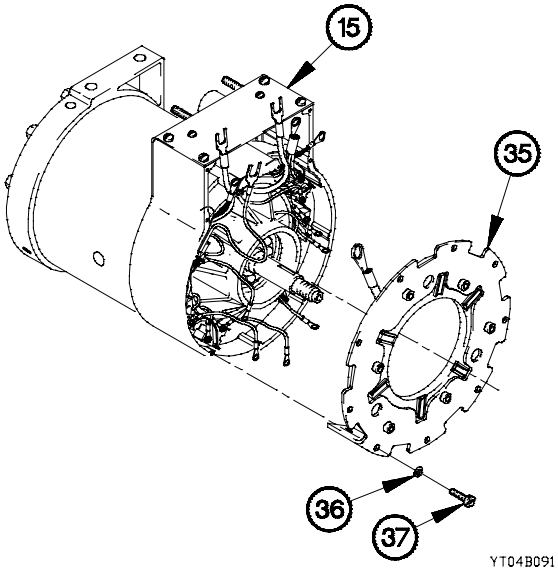
18-6. 200 AMP ALTERNATOR REPAIR (CONT)

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).

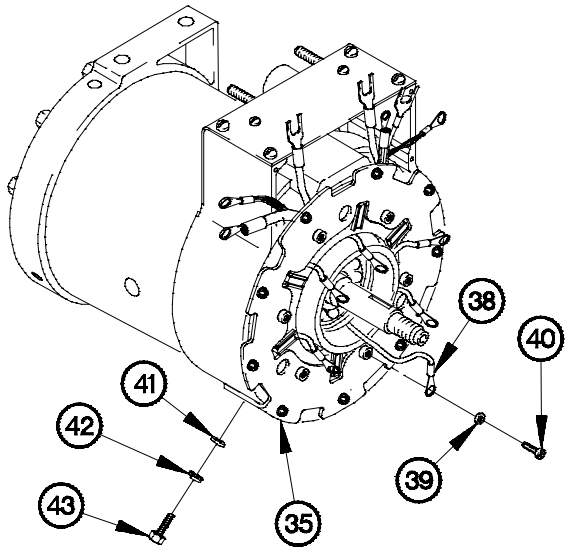
(29) Tighten six screws (40) to 30 lb-in. (3 N·m).

WARNING

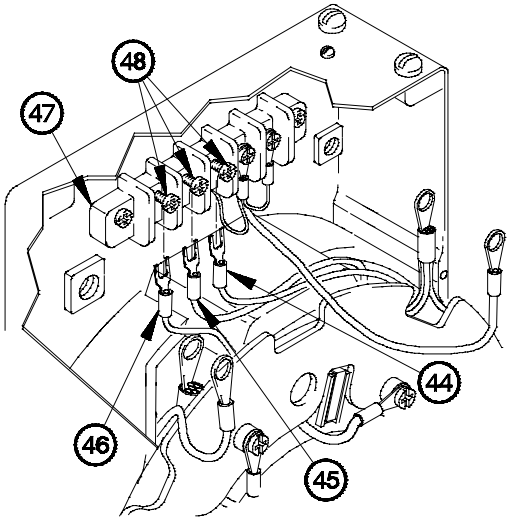
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

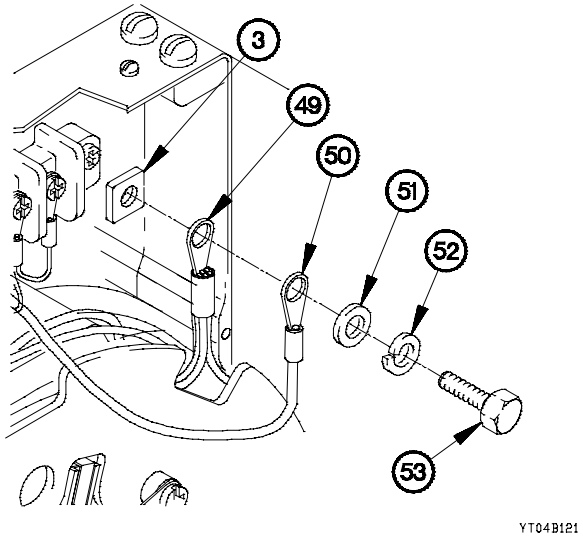
(34) Apply sealing compound to three screws (48) and terminal lugs (44, 45, and 46).

18-6. 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).

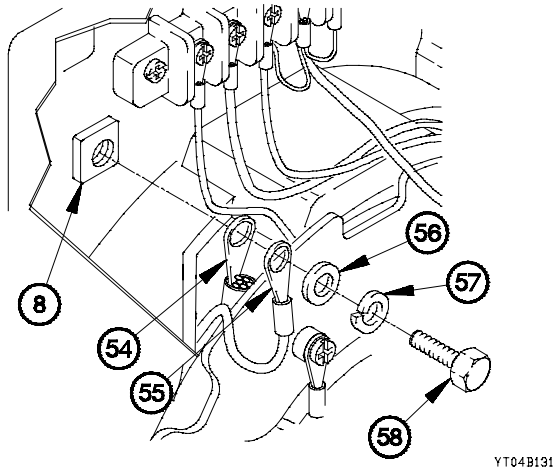
(36) Tighten screw (53) to 80 lb-in. (9 N·m).

(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).



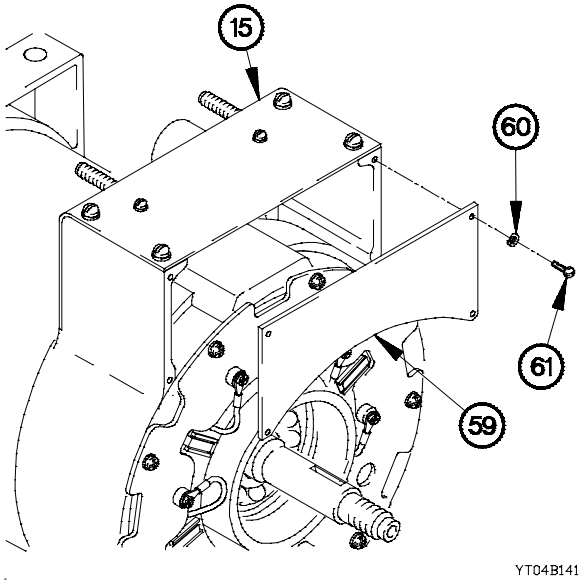
WARNING

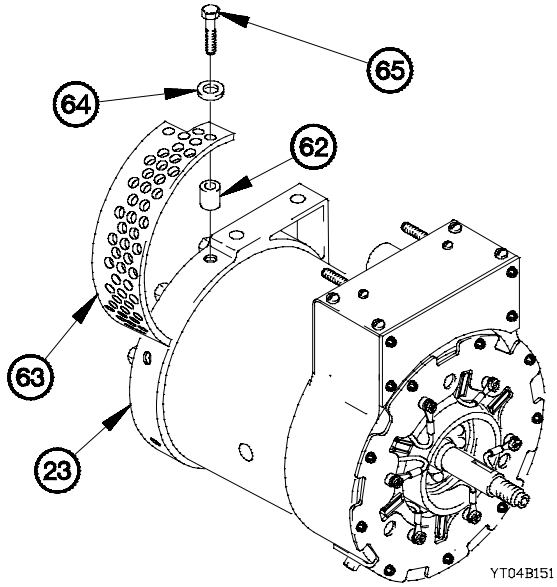
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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





(43) Position three spacers (62) and fan guard (63) on end housing (23) with three washers (64) and screws (65).

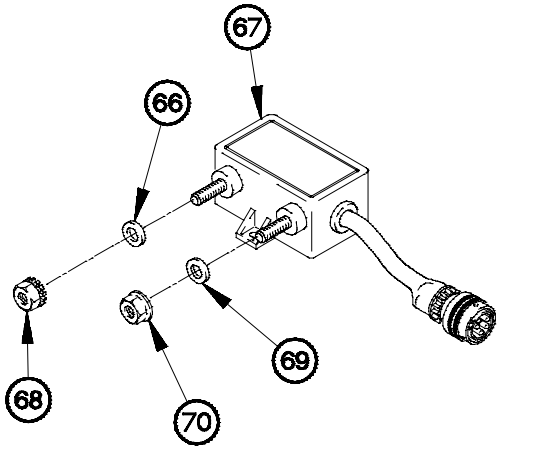
(44) Tighten three screws (65) to 75 lb-in. (9 N·m).

(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).

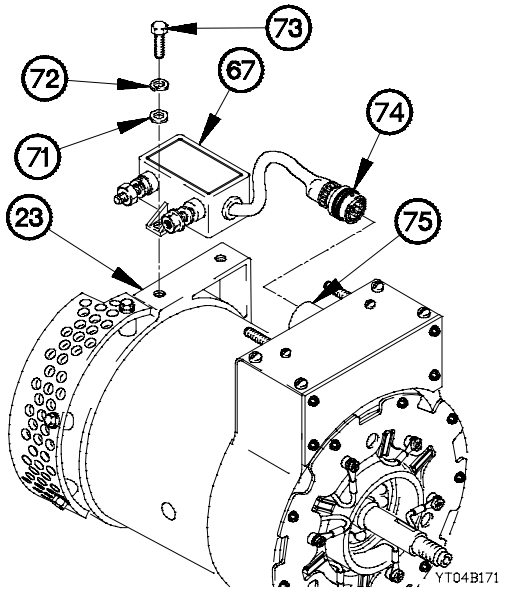


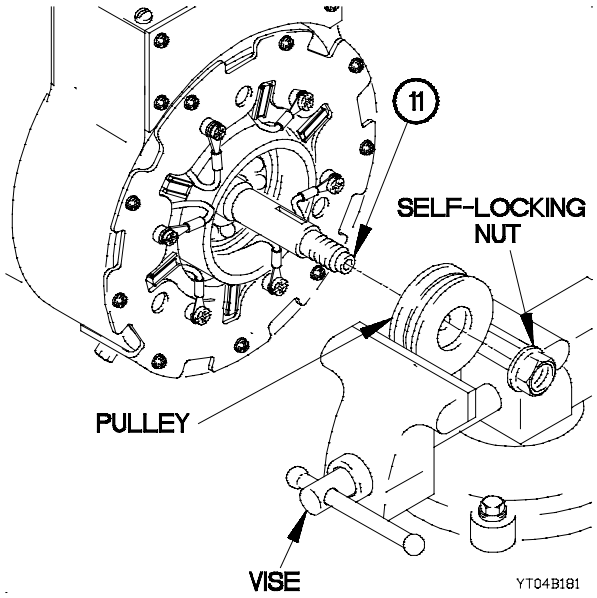
18-6. 200 AMP ALTERNATOR REPAIR (CONT)

(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).



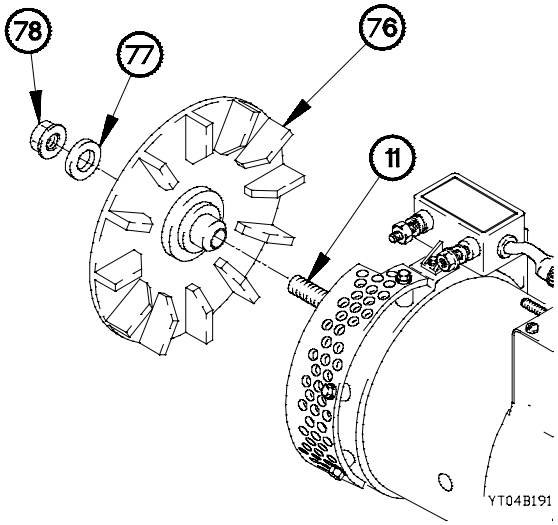


(50) Position pulley on shaft (11) with self-locking nut.

(51) Position pulley in vise.

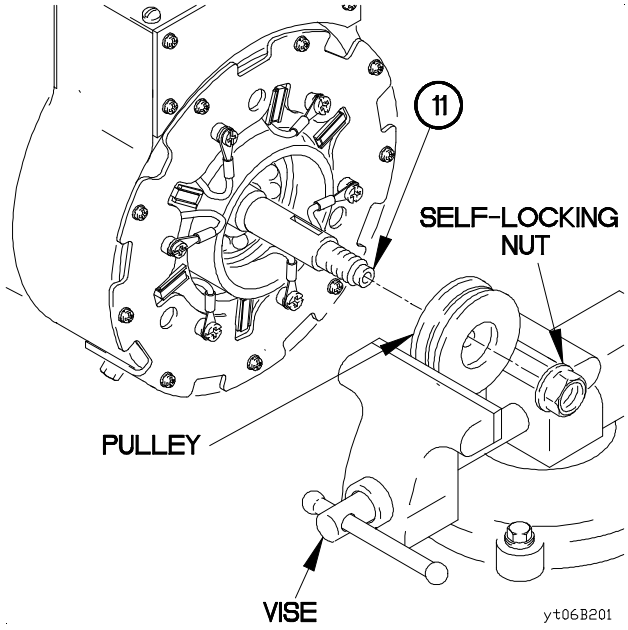
(52) Position fan (76) on shaft (11) with washer (77) and self-locking nut (78).

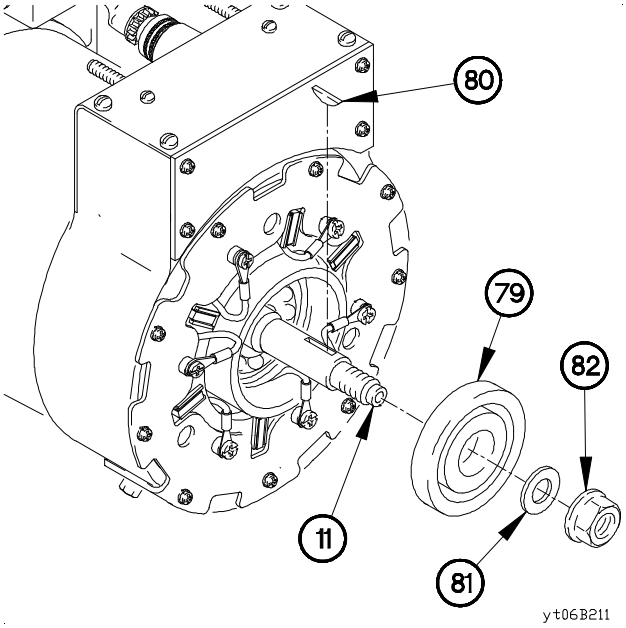
(53) Tighten self-locking nut (78) to 50 lb-ft (68 N·m).



(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.

18-7. DIGITIZATION KIT INITIAL INSTALLATION

This task covers:

a. Installation

b. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Cab storage boxes removed (TM 9-2320-366-20-4).
Seat belts removed (TM 9-2320-366-20-4)
Small arms mounts removed (TM 9-2320-366-20-4)
Rear boarding handles removed (TM 9-2320-366-20-4)
RH seat removed (TM 9-2320-366-20-4)
Power distribution panel removed for access (TM 9-2320-366-20-4)
Kick panel removed (TM 9-2320-366-20-4)

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B).
Drill Electric, Portable (Item 21, Appendix B)
Drill Set, Twist (Item 20, Appendix B)
Machine Gun Ring Drill Stop (Item D12, Appendix D)

Tools and Special Tools (Cont.)
Clamp (2) (Item 13, Appendix B)
Wrench, Torque (0-200 lb-in) (Item 93, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Drill Stop Collar Set (366-20 Appendix B)

Materials/Parts
Ties, Cable Plastic (Item 99, Appendix C)
Rivet, Compression (4) (Item 365.1, Appendix F)
Sealant (Item 65.1, Appendix C)
Antiseize (Item 12.1, Appendix C)

Personnel Required
(2)

Reference Material
TB43-0242

a. Installation

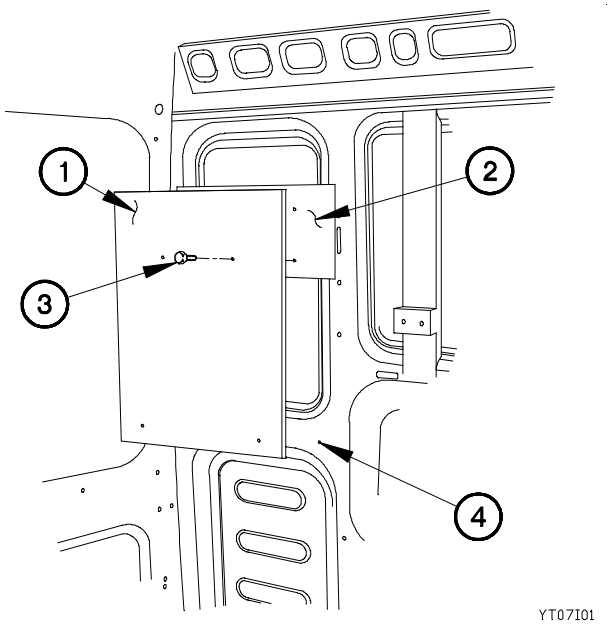
(1) Position RH template (1) on rear cab wall (2) with two screws (3).

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).

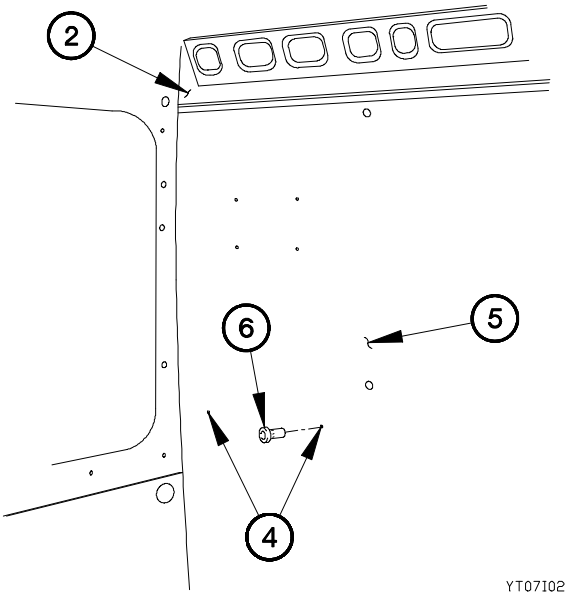
NOTE

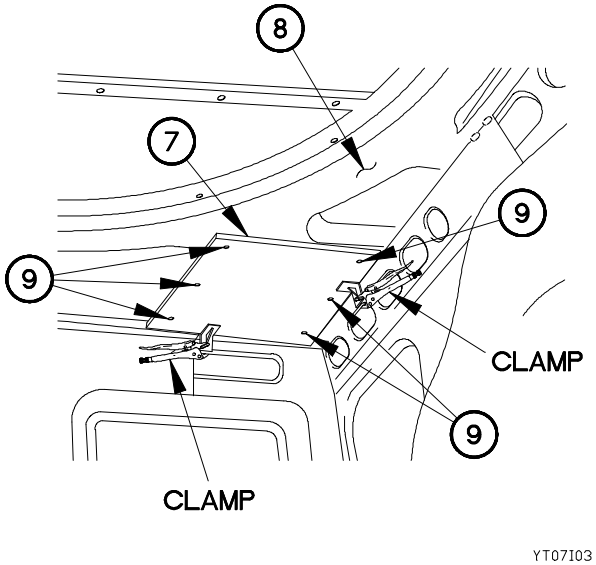
Use primer and paint as indicated in TM Paint TB43-0242.

(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).

18-7. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(12) Enlarge holes at location (9) to 17/32” (13 mm).

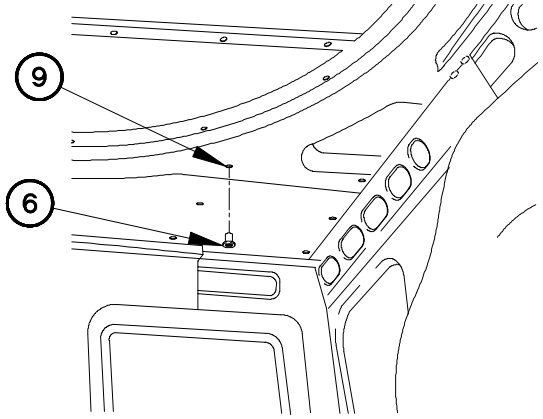
NOTE

Use primer and paint as indicated in TM Paint, TB43-0242.

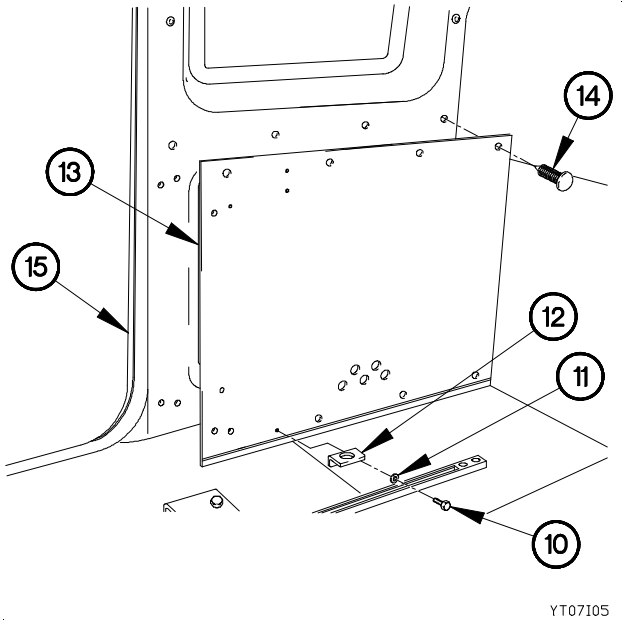
(13) Apply primer and paint to RH roof holes at location (9).

(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).

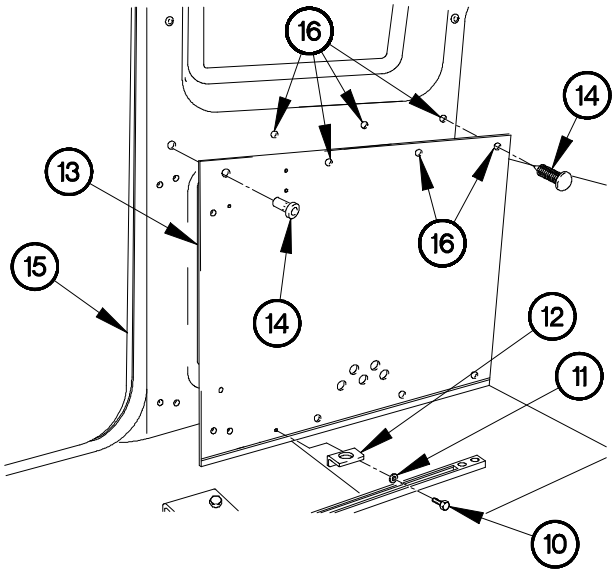
NOTE

Steps (22) through (24) require the aid of an assistant.

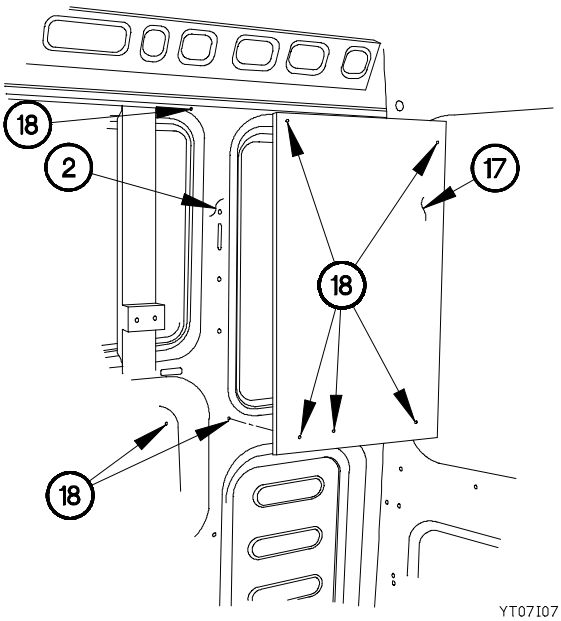
(22) Enlarge three holes in right side panel (13) at location (16) to 1/2” (13 mm).

(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).

18-7. 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).

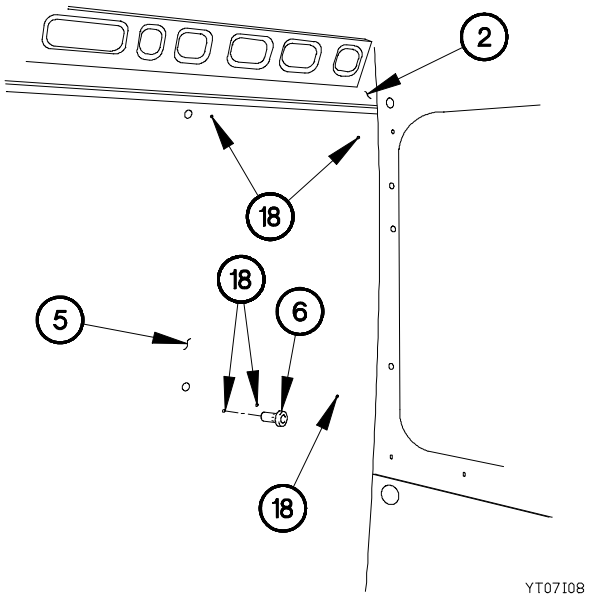
NOTE

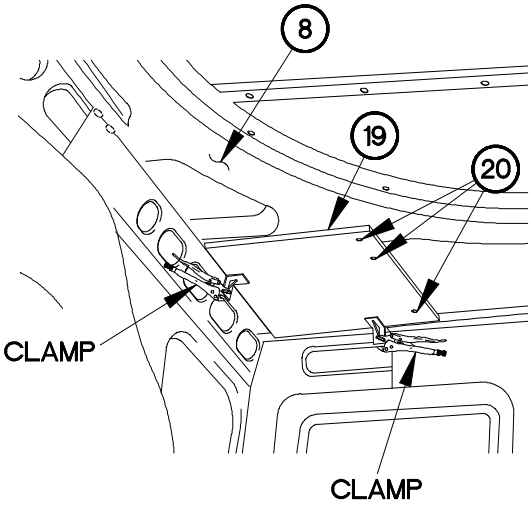
Use primer and paint as indicated in TM Paint TB43-0242

(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).

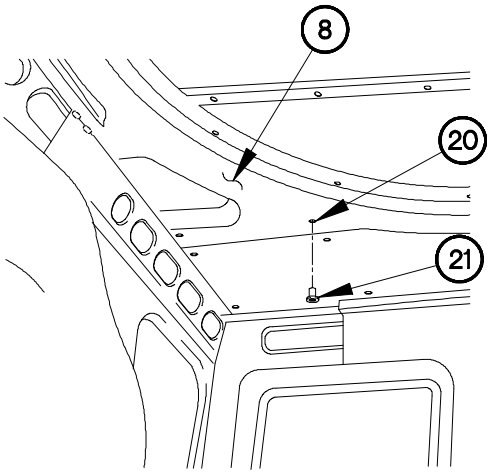
NOTE

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).

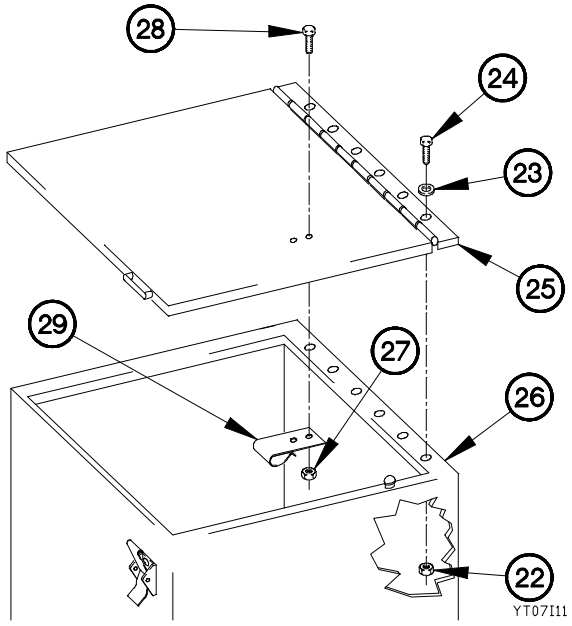
(38) Apply primer and paint to three rivuts (21).

(39) Install three rivnuts (21) in cab roof (8) at locations (20).



YT07I10

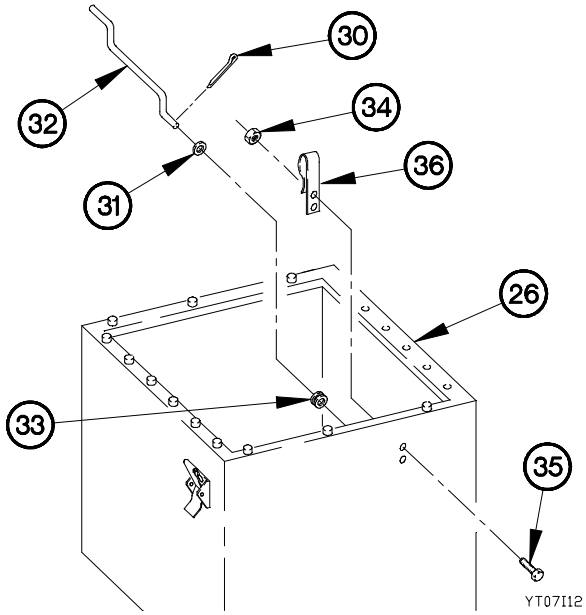
b. LH Stowage Box Assembly.



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.

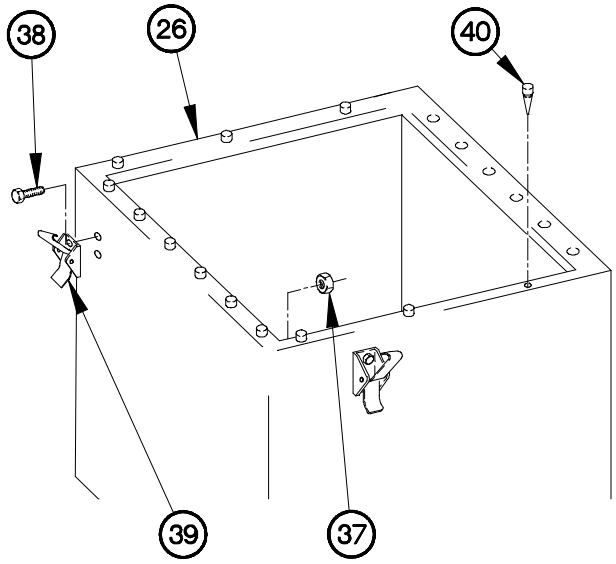
(43) Remove rubber grommet (33) from storage box (26). Discard rubber grommet.

(44) Remove two nuts (34), screws (35), and clamp (36) from storage box (26).

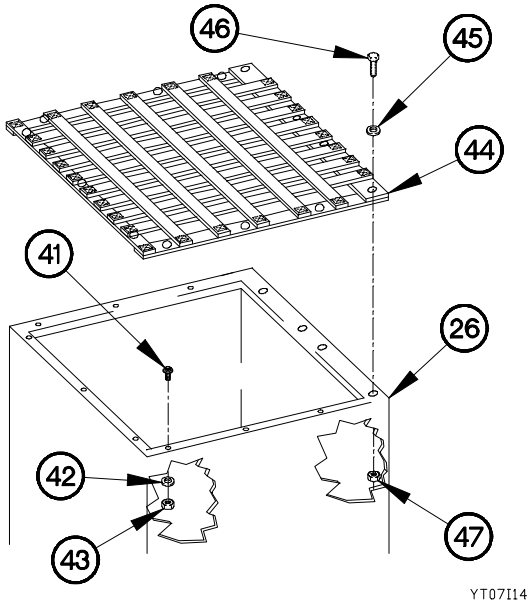
18-7. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(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.

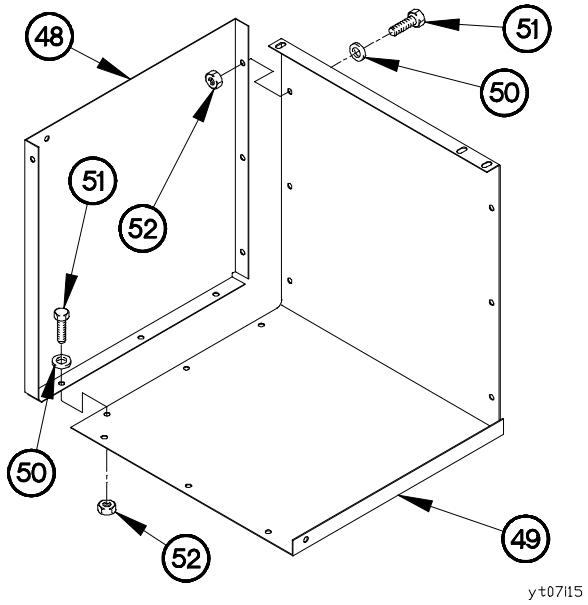
(47) Apply sealant to threads of nine snap screws (41).

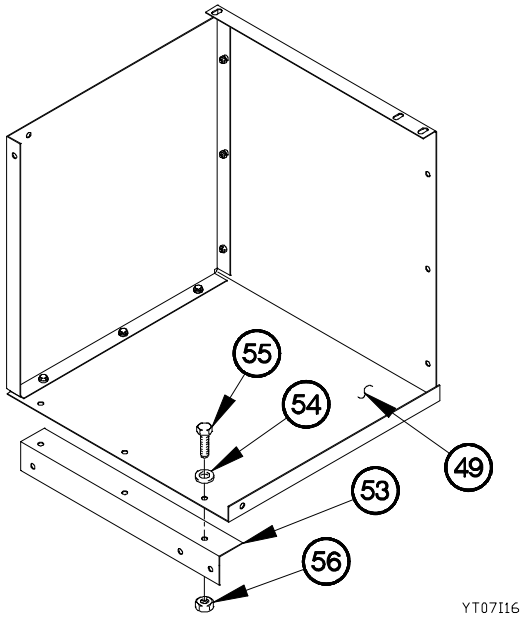
(48) Install nine snap screws (41) on Driver's Storage Box (26) with nine lockwashers (42) and nuts (43).

(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).



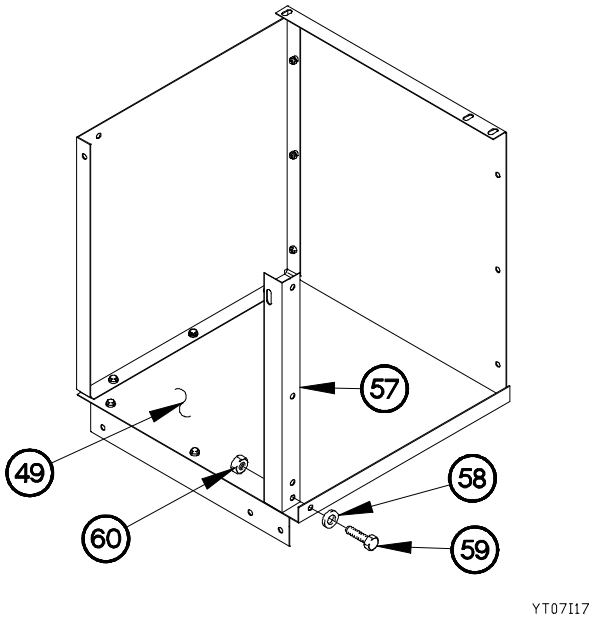


(52) Position support (53) on AFT Storage Compartment (49) with three washers (54), screws (55), and self-locking nuts (56).

(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).

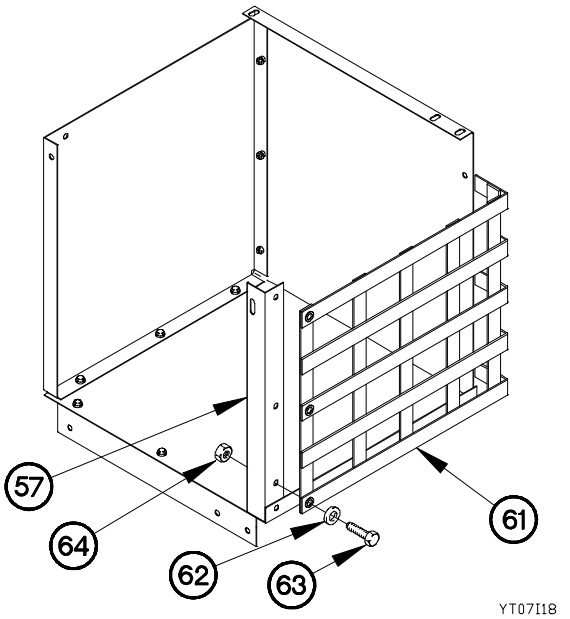
(55) Tighten self-locking nut (60) to 106 lb-in (12 N•m).

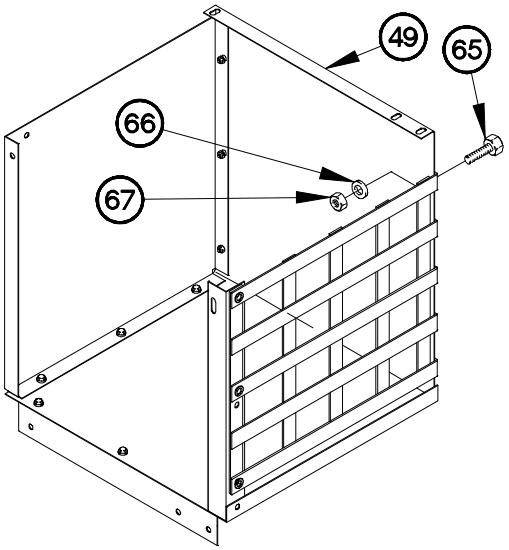


18-7. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

(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).





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).

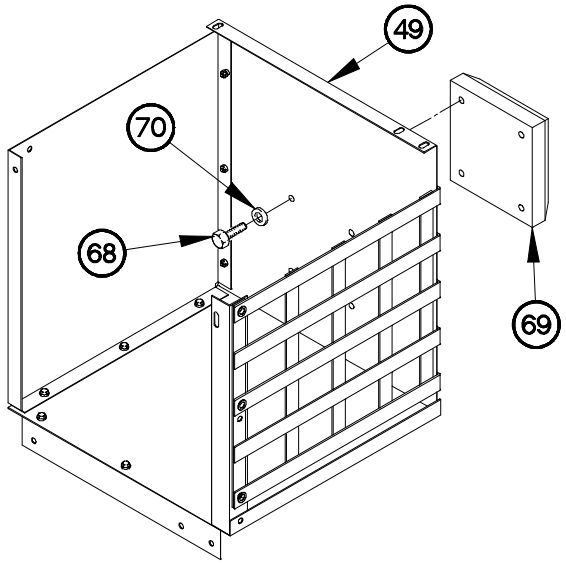
WARNING

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.

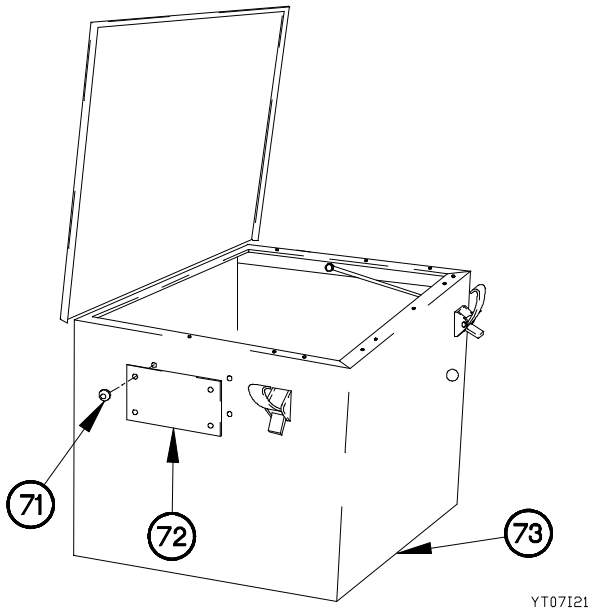
(60) Apply sealant to threads of four screws (68).

(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

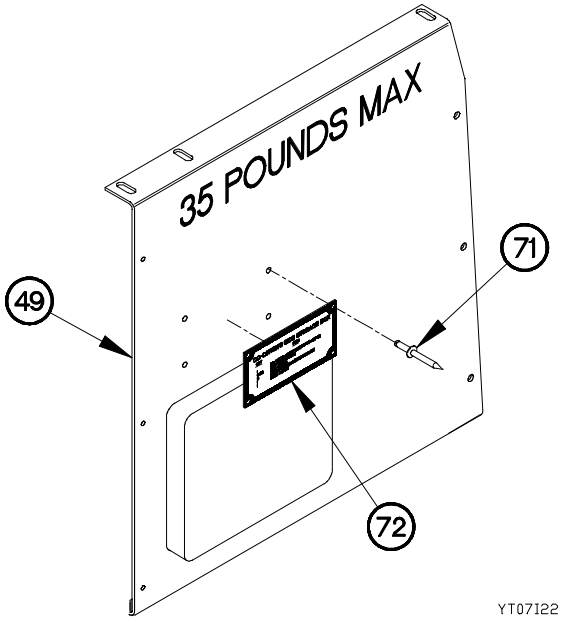


YT07I21

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).

18-7. 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.

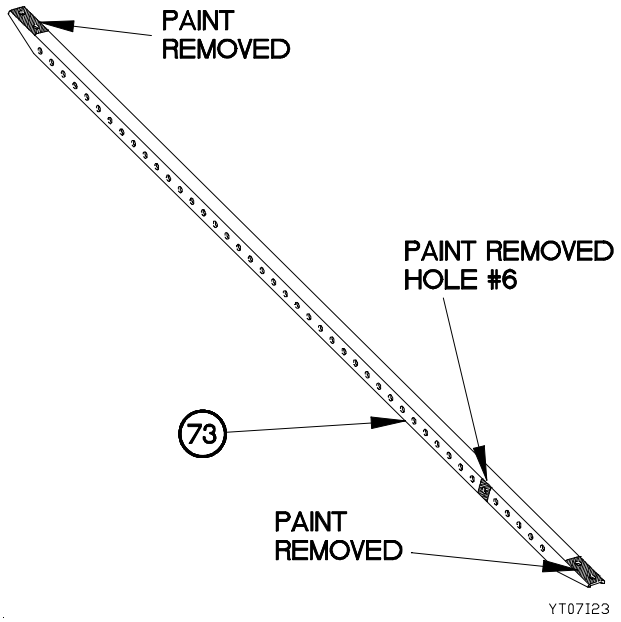


Table 18-1 Support Leg Hole Locations

Shelf	Hole Location
FBCB2 Shelf	6
EPLRS Shelf	17
Power Distribution Shelf	26
Lower Head Rest Support	33
Singars Shelf	36

WARNING

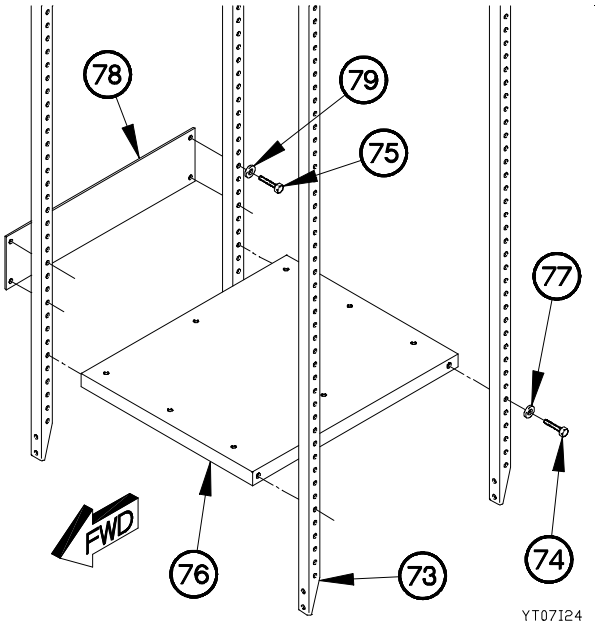
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

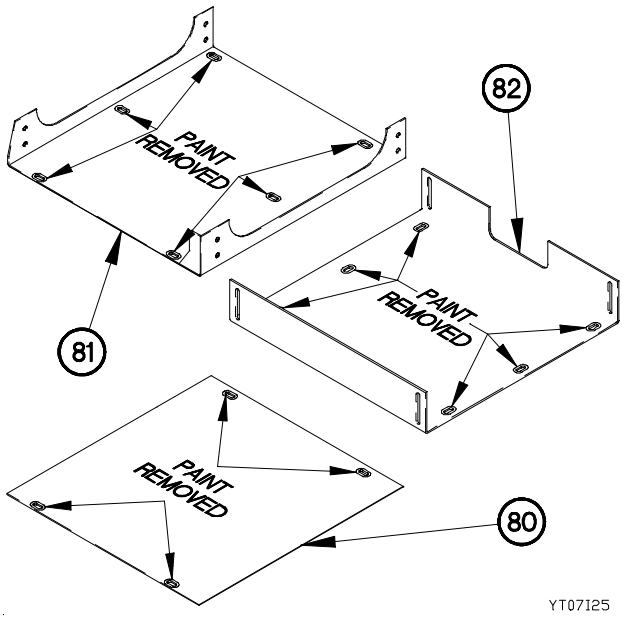
(68) Apply sealant to support legs (73) at locations paint was removed.

(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.

18-7. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

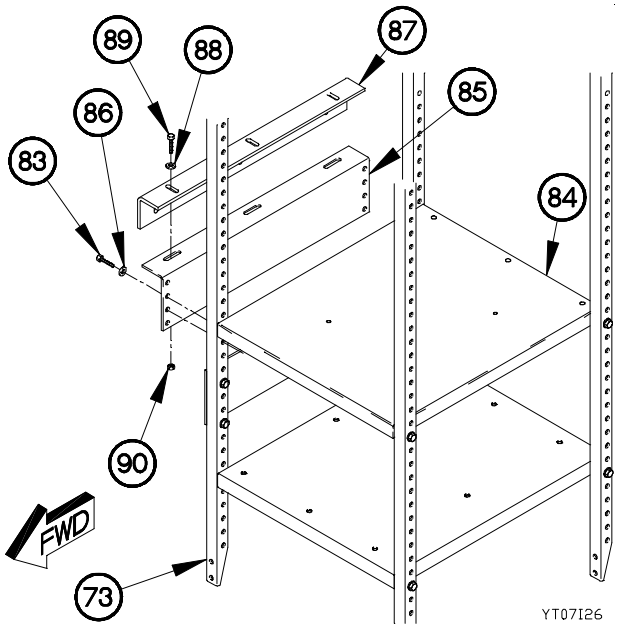
WARNING

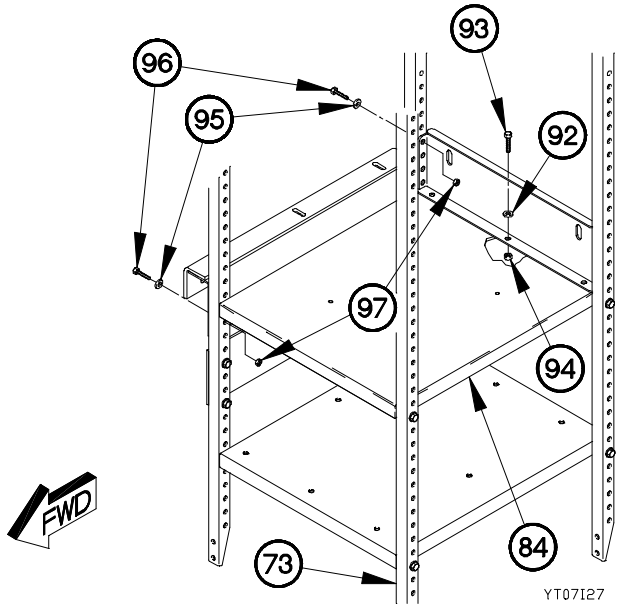
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

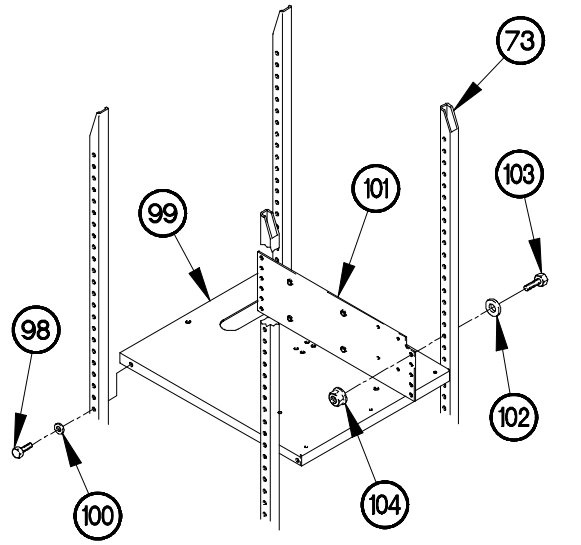
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

(80) Apply sealant to threads of four screws (98).

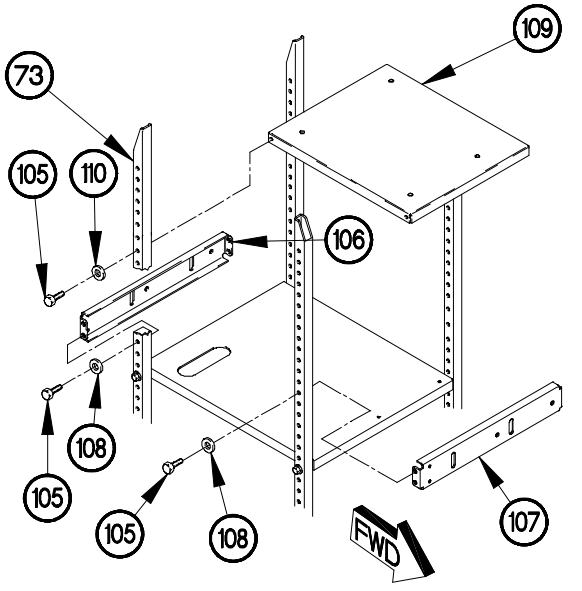
(81) Install Power Distribution Panel (99) on support legs (73) with four washers (100) and screws (98). Refer to Table 18-1 for hole locations.

(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).



YT07I28

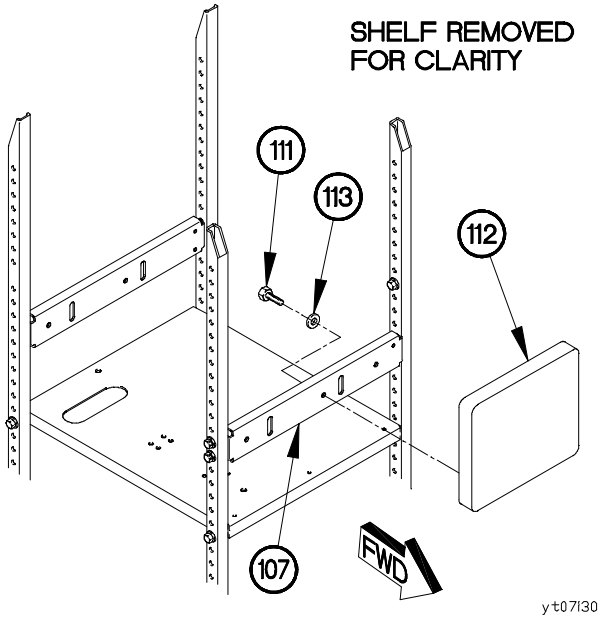


YT07I29

(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.



yt07I30

(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).

18-7. 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

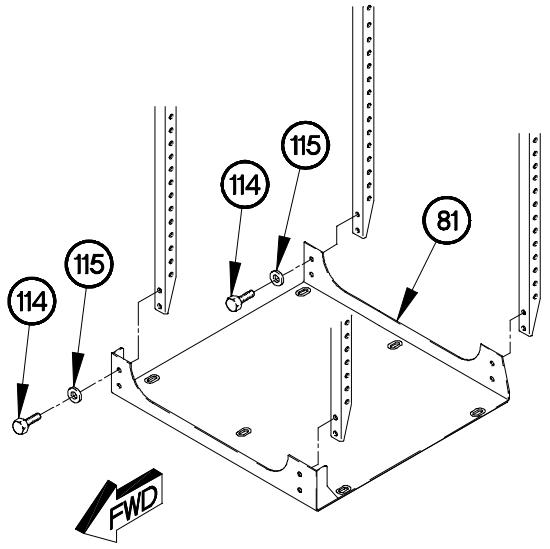
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

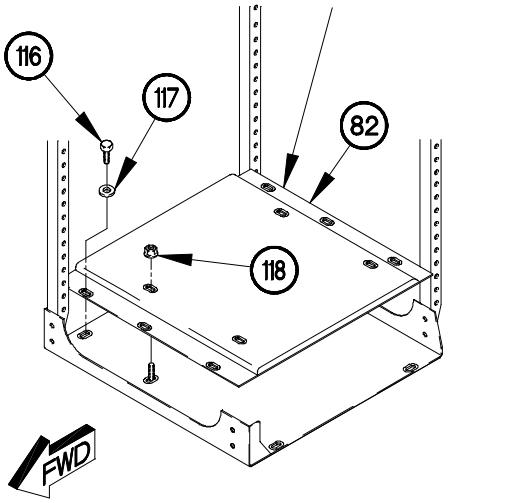
Position MTS plate with slotted holes towards rear of cab.

(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).

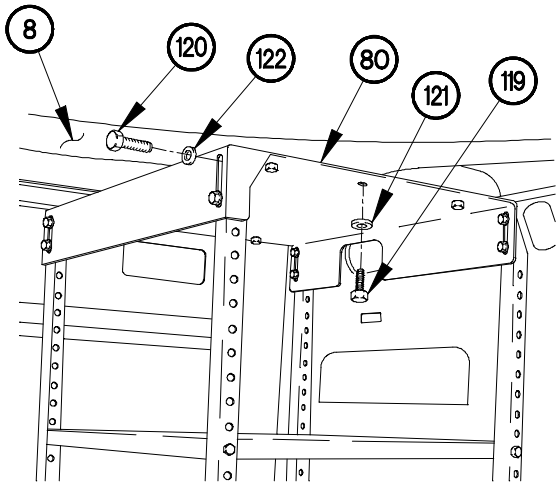
(99) Position top support (80) on top of radio rack.

(100) Position six washers (121) and screws (119) in cab roof (8).

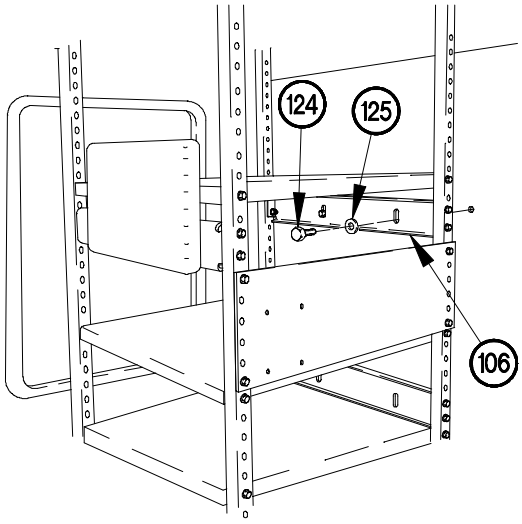
(101) Tighten six screws (119) to 70-80 lb-in (8-9 N•m).

(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).

18-7. 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.

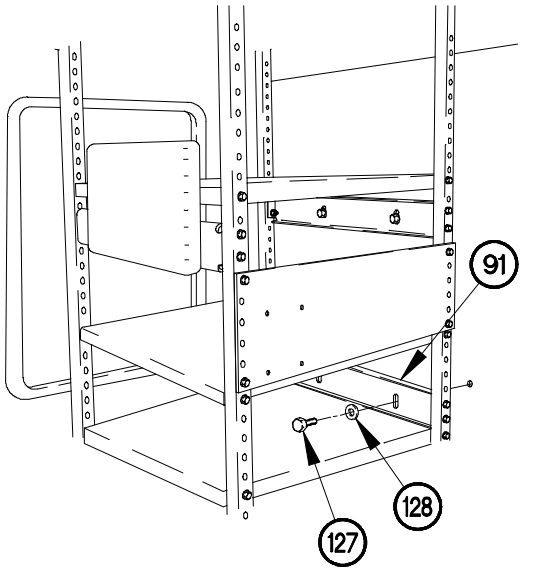
WARNING

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).

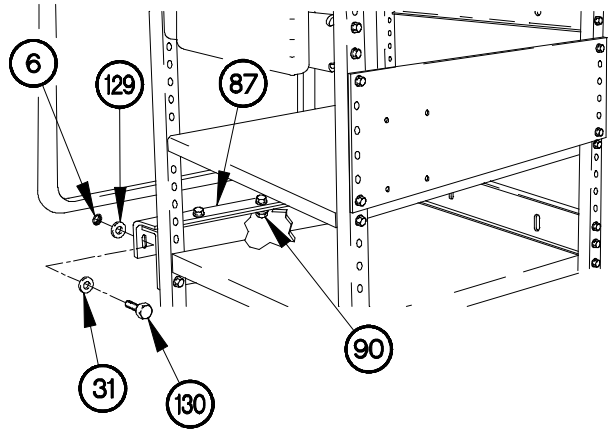
(111) Tighten two screws (127) to 70-80 lb-in (8-9 N•m).



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).

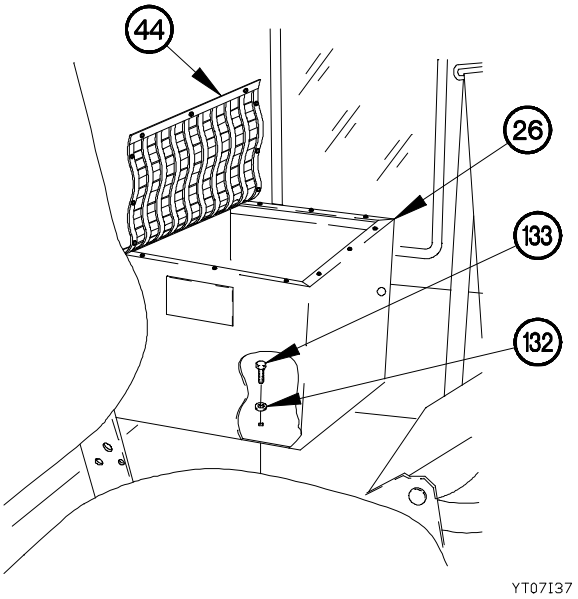
(116) Tighten three self-locking nuts (90) to 110-120 lb-in (12-14 N•m).

(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).

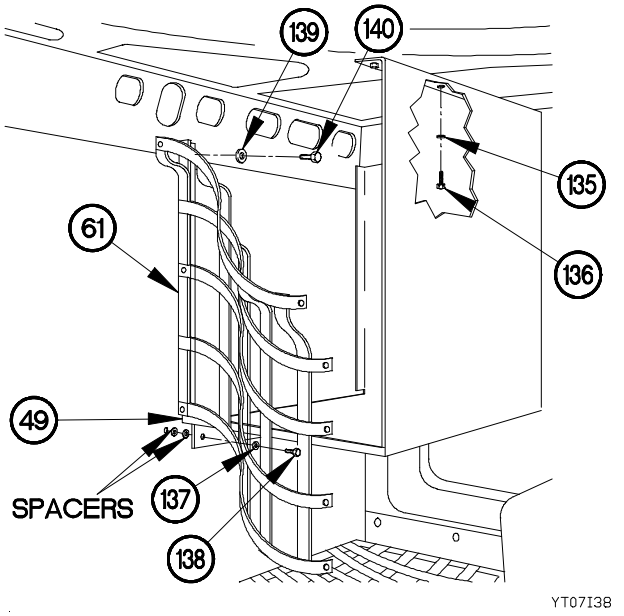
(119) Tighten six screws (133) to 70-85 lb-in (8-10 N•m).

(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.

18-7. 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.

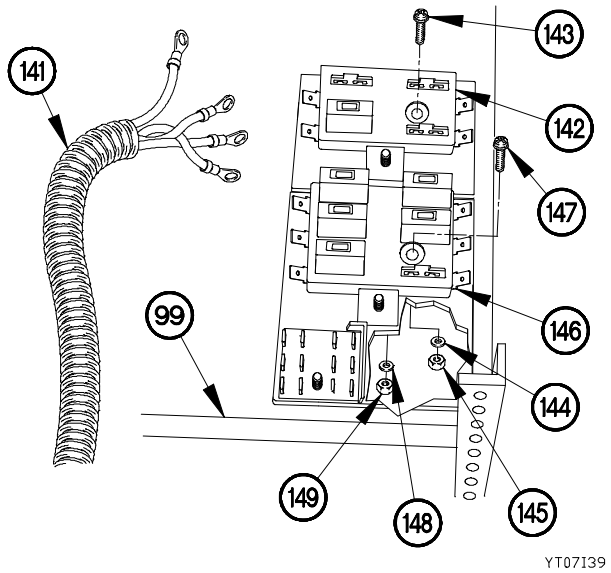


Figure 18-1. Power Distribution Circuit Breaker Locations.

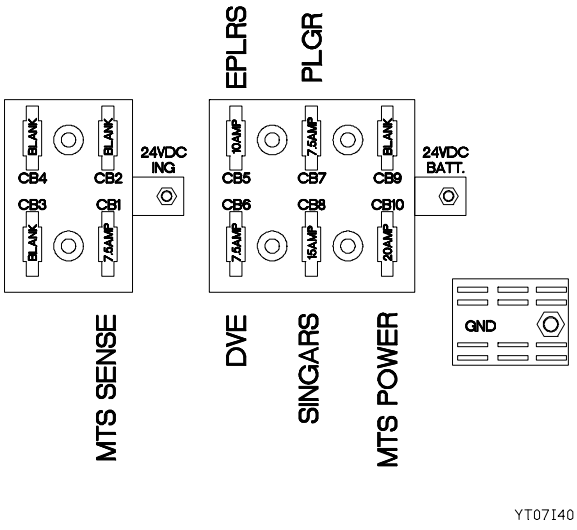


Table 18-2. Power Distribution Panel Circuit Breakers.

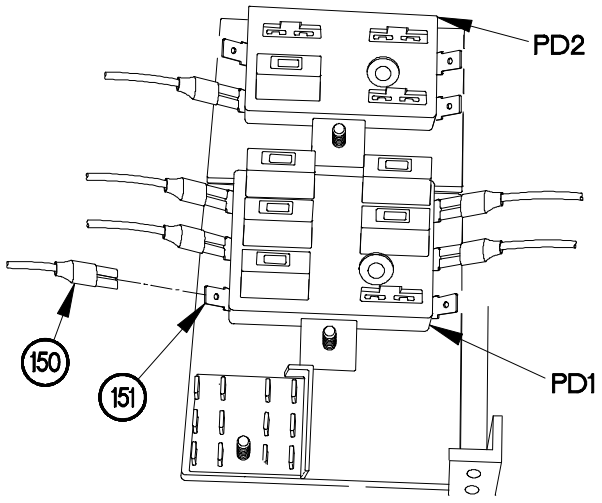
CB	Amp	Function	Reset	P/N
CB1	7.5 AMP	MTS SENSE	Manual	223-7.5-400
CB2		Blank		
CB3		Blank		
CB4		Blank		
CB5	10 AMP	EPLARS	Manual	223-10-400
CB6	7.5 AMP	DVE	Manual	223-7.5-400
CB7	7.5 AMP	PLGR	Manual	223-7.5-400
CB8	15 AMP	SINCGARS/FBCB2	Manual	223-15-400
CB9		Blank		
CB10	20 AMP	MTS POWER	Manual	223-20-400

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.



YT07I41

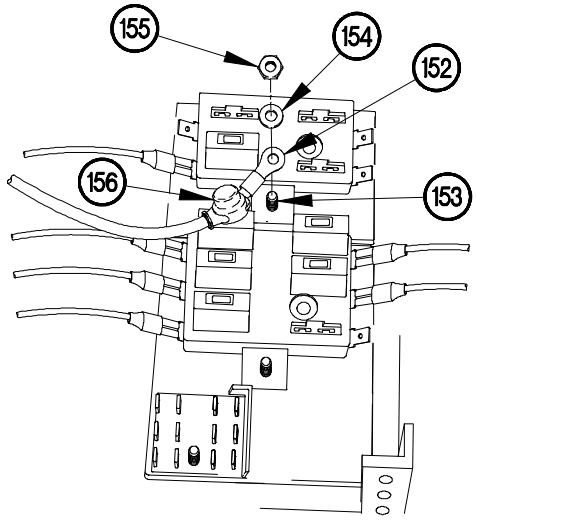
18-7. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

Table 18-3-Terminal Lug Locations and Connector

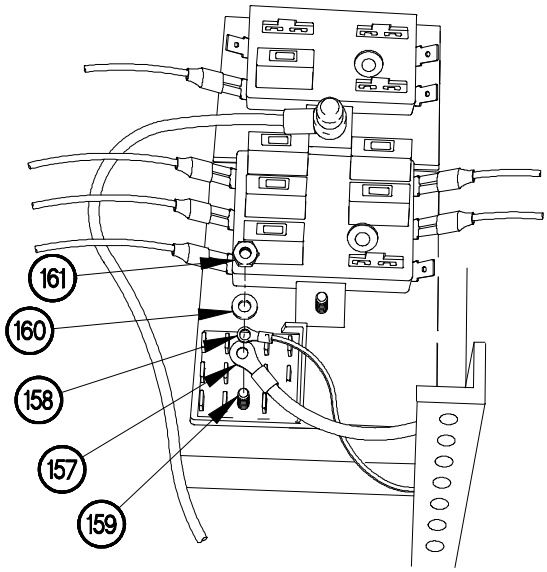
LOCATION	FUNCTION	PD	CONNECTOR	AMP
CB1	MTS SENSE	PD2	TL6	7.5 A
CB2	Spare	PD2		spare
CB3	Spare	PD2		spare
CB4	spare	PD2		spare
CB5	EPLRS	PD1	TL8	10 A
CB6	DVE	PD1	TL3	7.5 A
CB7	PLGR	PD1	TL9	7.5 A
CB8	SINCGAR/FBCB2	PD1	TL2	15 A
CB9	Spare	PD1		spare
CB10	MTS PWR	PD1	TL1	20 A

(134) Install terminal lug TL15 (152) on stud (153) with washer (154) and nut (155).

(135) Install dust boot (156) on stud (153).



YT07I42

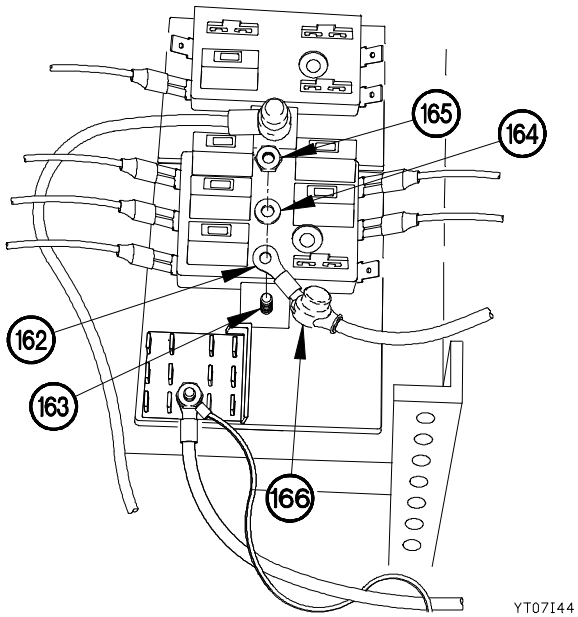


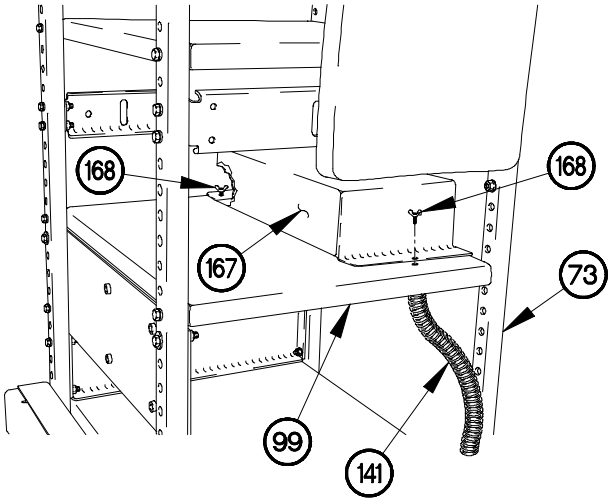
YT07I43

(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).

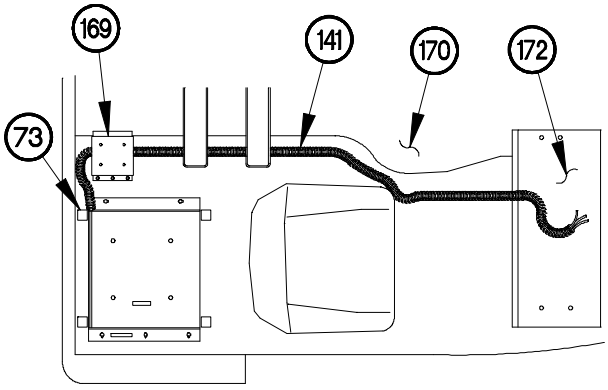
(140) Route Digitization Power cable (141) down support leg (73).

(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).



18-7. 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).

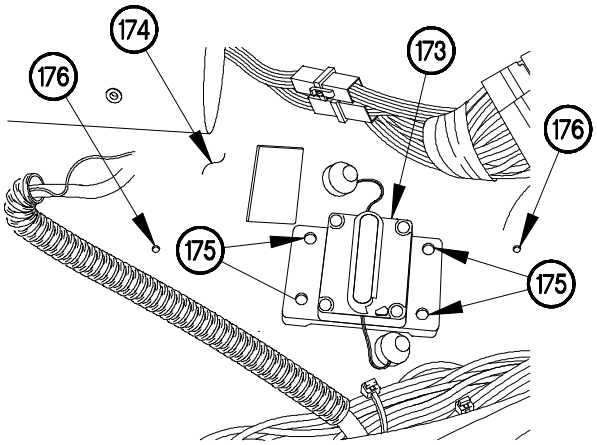
(147) Remove circuit breaker CB11 (173) from dashboard (174).

WARNING

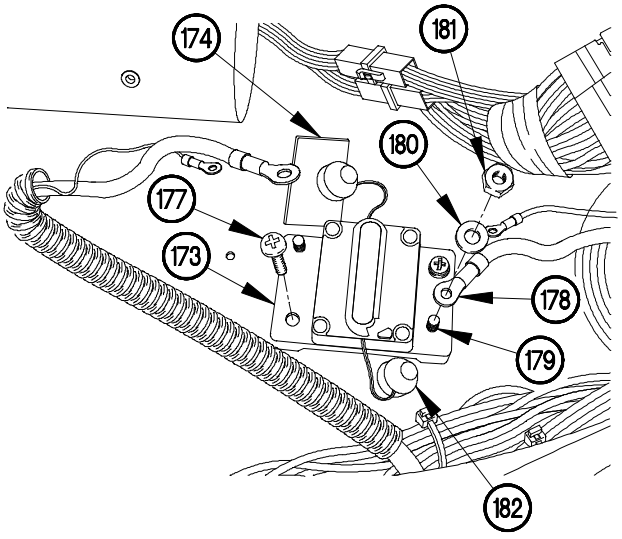
Wear appropriate eye protection when drilling holes. Failure to comply may result in injury to personnel.

(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

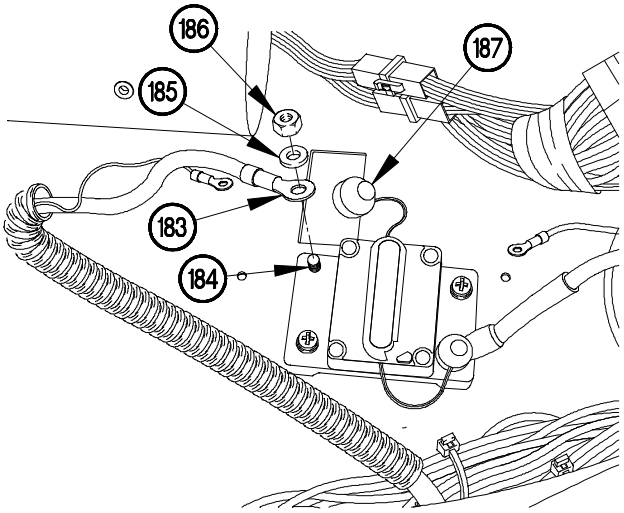


YT07I48

(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).



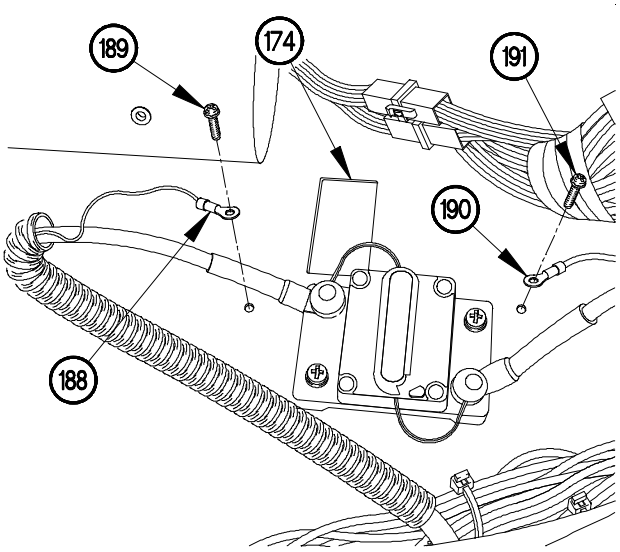
YT07I49

(153) Install terminal lug TL23 (183) on stud (184) with washer (185) and nut (186).

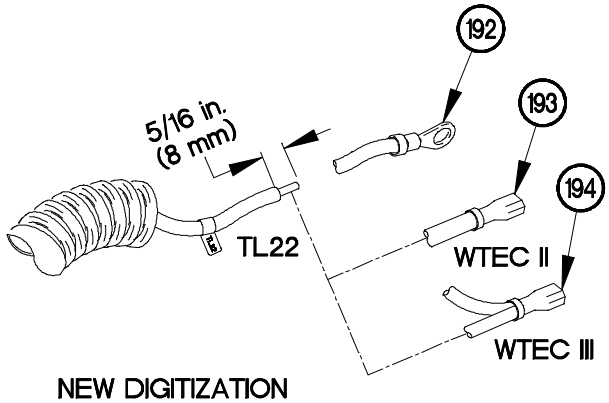
(154) Install dust boot (187) on stud (184).

(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.

18-7. 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.

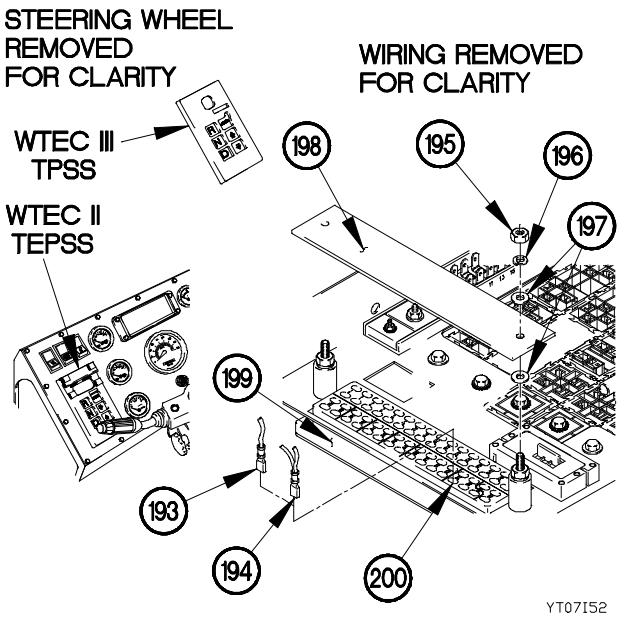
(162) Install terminal lug TL22 (193) on terminal block TB1 connector 58 (200).

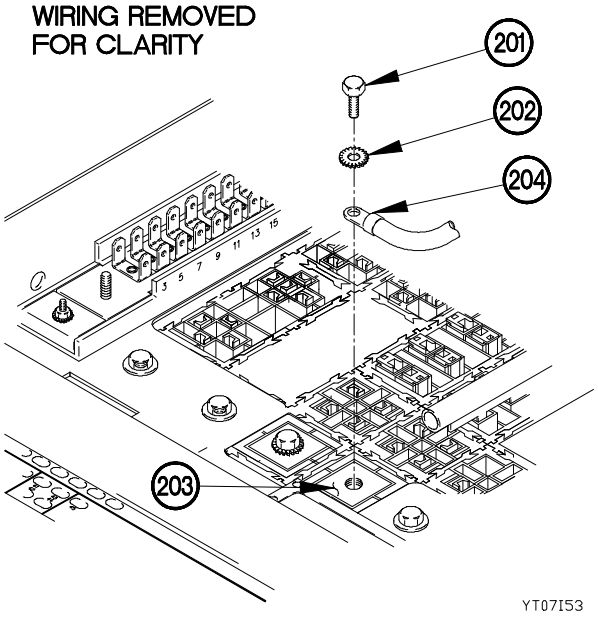
NOTE

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).





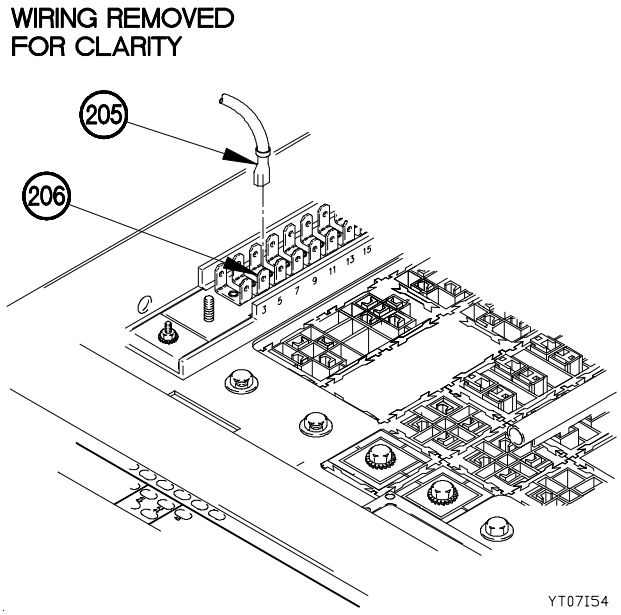
NOTE

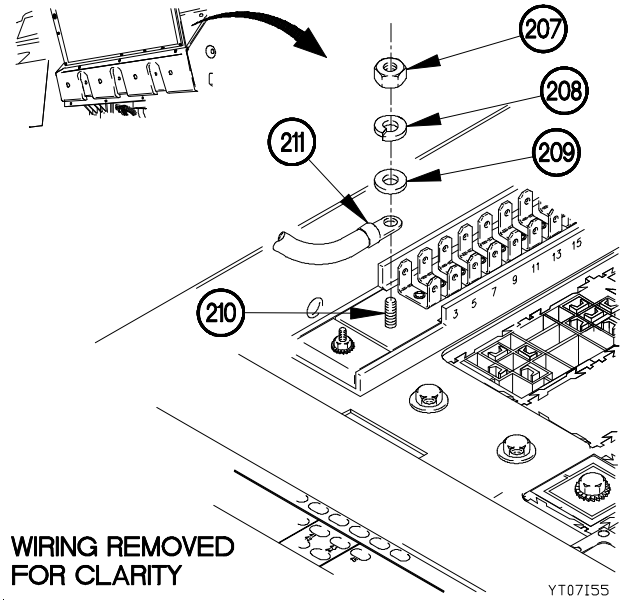
Other terminal lugs are present at this location.

(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.

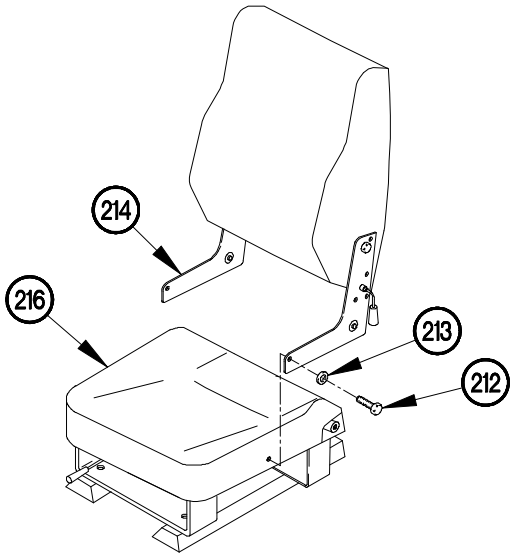
(169) Install terminal lug TL21 (211) on ground stud (210) with washer (209), lockwasher (208), and nut (207).

18-7. DIGITIZATION KIT INITIAL INSTALLATION (CONT)

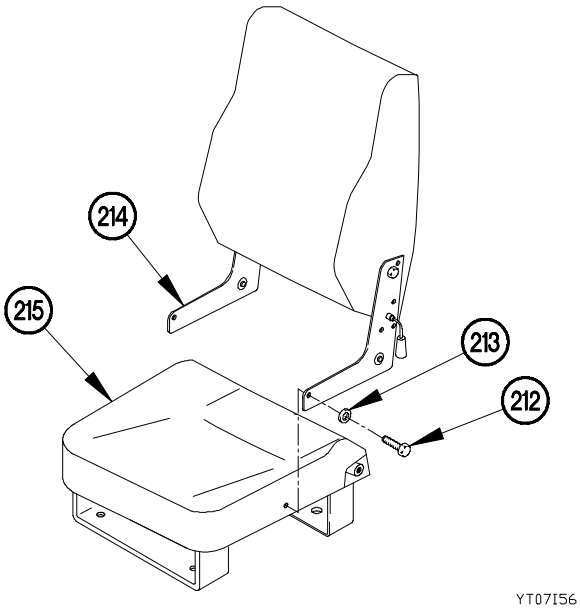
NOTE

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 9-2320-366-20-4)

(2) Power distribution panel installed (TM 9-2320-366-20-4)

(3) RH seat installed (TM 9-2320-366-20-4)

(4) Rear boarding handles installed (TM 9-2320-366-20-4)

(5) Small arms mounts installed (TM 9-2320-366-20-4)

(6) Seat belts installed (TM 9-2320-366-20-4)

(7) Cab storage boxes installed (TM 9-2320-366-20-4).

(8) Batteries connected (TM 9-2320-366-20-3).

End of Task.

18-8. 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 9-2320-366-10).
Gravel deflector removed (TM 9-2320-366-10).
Cab raised (TM 9-2320-366-10).
Front leaf spring removed (front leaf spring resilient mount only) (TM 9-2320-366-34)

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Drill Set, Twist (Item 20, Appendix B)
Drill, Portable Electric (Item 21, Appendix B)
Wrench, Torque 0-200 lb-in (Item 93, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
C-Clamp (Item 13, Appendix B)
Jack, Dolly Type, Hydraulic (Item 37, Appendix B)
Trestles, Motor Vehicle Maintenance (2) (Item 81, Appendix B)

Tools and Special Tools (Cont)
Crowfoot Attachment, Socket Wrench (Item 17, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Socket, Left Front Spring, U-Bolt (Item D11, Appendix D)

Materials/Parts
Bolt, U (2) (Item 20.1, Appendix F)
Nut, Self-locking (5) (Item 210, Appendix F)
Nut, Self-locking (4) (Item 366, Appendix F)
Nut, Self-locking (2) (Item 216, Appendix F)
Nut, Self-locking (2) (Item 211, Appendix F)
Pin, Cotter (Item 333, Appendix F)
Sealing Compound (Item 76, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)

WARNING

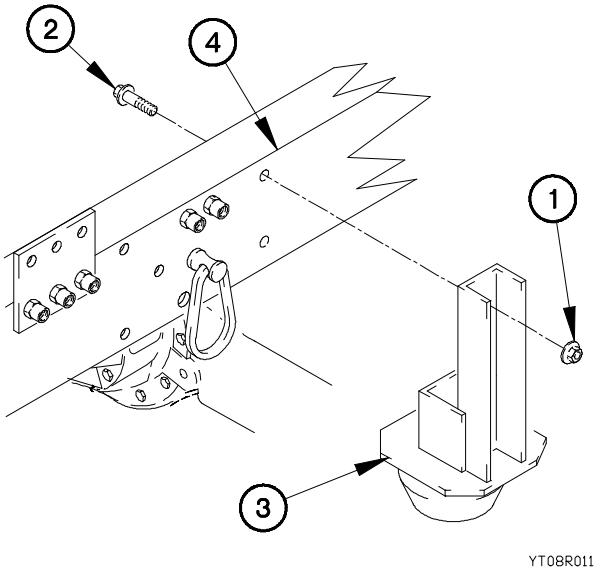
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

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.



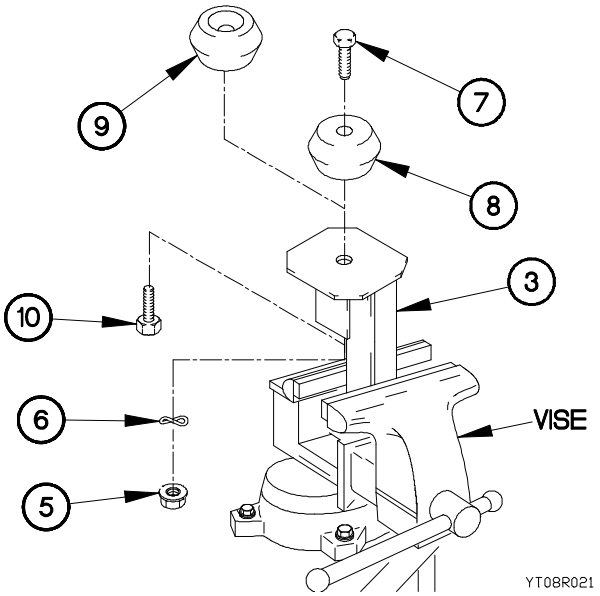
18-8. ENHANCED RESILIENT MOUNT INITIAL INSTALLATION (CONT)

(2) Position mechanical stop (3) in vise.

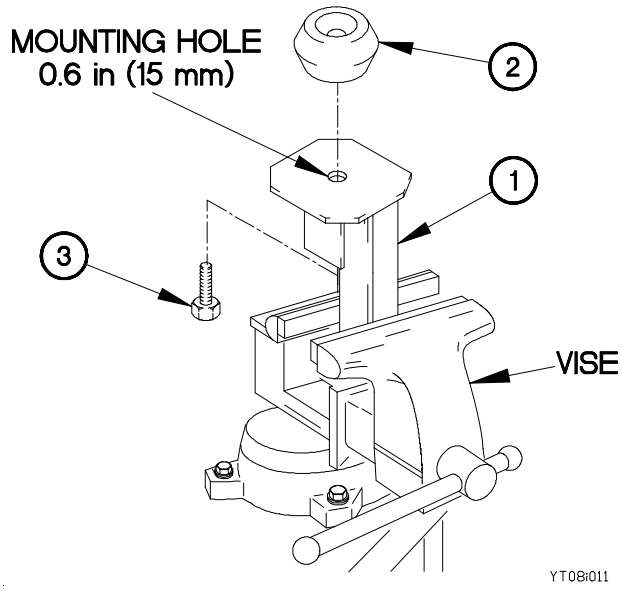
NOTE

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).

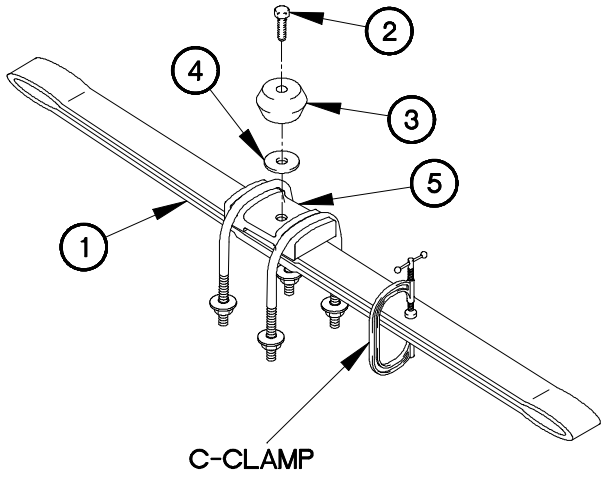
c. Front Leaf Spring Resilient Mount Removal.

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.

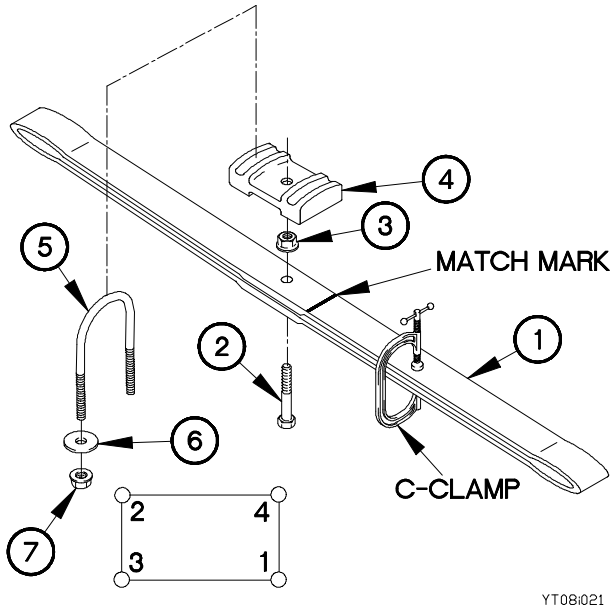
(1) Install c-clamp on leaf spring (1).

(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.

18-8. ENHANCED RESILIENT MOUNT INITIAL INSTALLATION (CONT)

WARNING

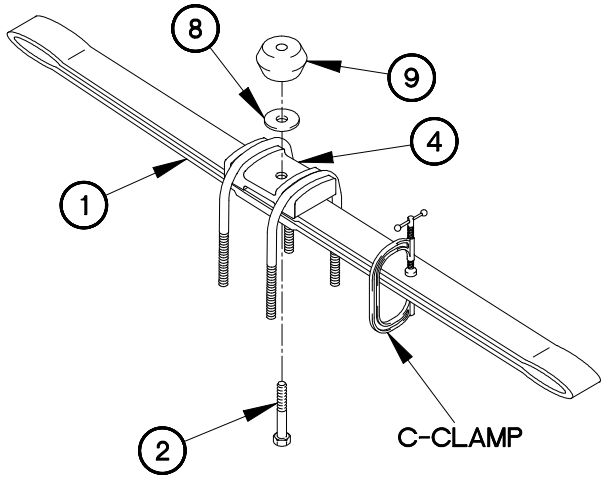
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure 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 9-2320-366-10).

(2) Install front leaf spring (TM 9-2320-366-34).

(3) Lower cab (TM 9-2320-366-10).

End of Task.

All data on pages 18-109 thru 18-131, including page 18-109 through 18-132 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 contain 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.

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 9-2320-366-10-1).
Roof hatch removed (All models except M1093/M1094) (TM 9-2320-366-20-4)
Roof hatch removed (M1093/M1094) (TM 9-2320-366-20-4)

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Drill, Electric, Portable (Item 21, Appendix B)
Drill Set, Twist (Item 20, Appendix B)
Blade, Hand, Hacksaw, (Item 7, Appendix B)
Frame, Hand, Hacksaw, (Item 23, Appendix B)
Wrench, Torque, 0-175 lb ft (Item 92, Appendix B)
Tap and Die Set, (Item 55, Appendix B)
Square Combination (Item 67, Appendix B)
Wrench Set, Crowfoot Ratcheting, (TM 9-2320-366-20)
Tool Kit, Blind Rivet, (Item 76, Appendix B)
Wrench, Torque 0-200 lb-in. (Item 93, Appendix B)
Machine Gun Ring Drill Stop (Item 12, Appendix D)

Tools and Special Tools (Cont)
Machine Gun Ring Wooden Support (3) (Item 13, Appendix D)
Screwdriver Attachment, Socket Wrench (Item 49.1, TM 9-2320-366-20 Appendix B)
Dispenser, Sealant (Item 16.1, TM 9-2320-366-20 Appendix B)

Materials/Parts
Sealing Compound (Item 71, Appendix C)
Sealant, Adhesive (Item 67, Appendix C)
Seal (Item 374, Appendix F)
Panel, Defroster (Item 305, Appendix F)
Seal, Urethane Foam (102.25 in. 259.7 cm) (Item 399, Appendix F)
Seal, Urethane Foam (86.75 in. 220.3 cm) (Item 398, Appendix F)
Rubber Strip (Item 366, Appendix F)
Sealing Compound (Item 76.1, Appendix C)
Spacer (Item 42.01, Appendix F)

Personnel Required
(2)

a. Installation.

(1) Remove four screws (1) and washers (2) from center seat side brackets (3).

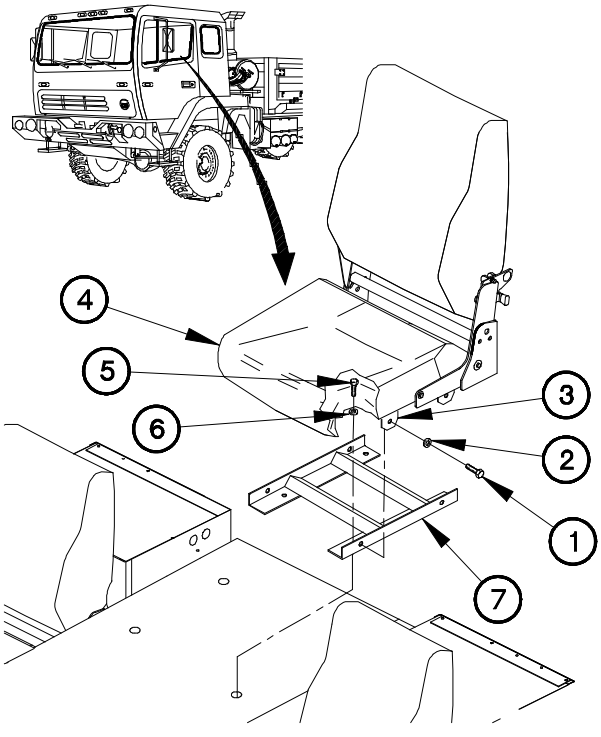
NOTE

Store center seat, mount, screws, and washers for future installation.

(2) Remove center seat (4) from vehicle.

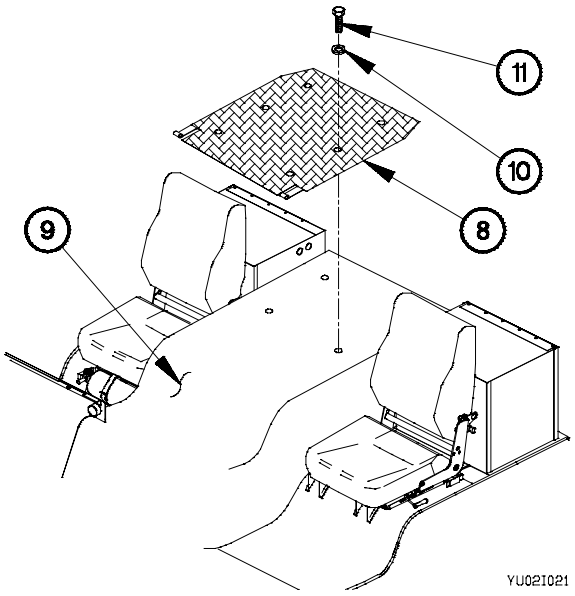
(3) Remove four screws (5) and washers (6) from center seat mount (7).

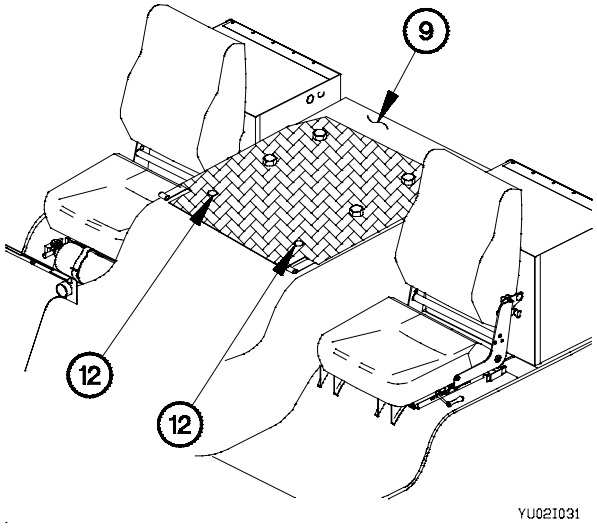
(4) Remove center seat mount (7) from vehicle.



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).

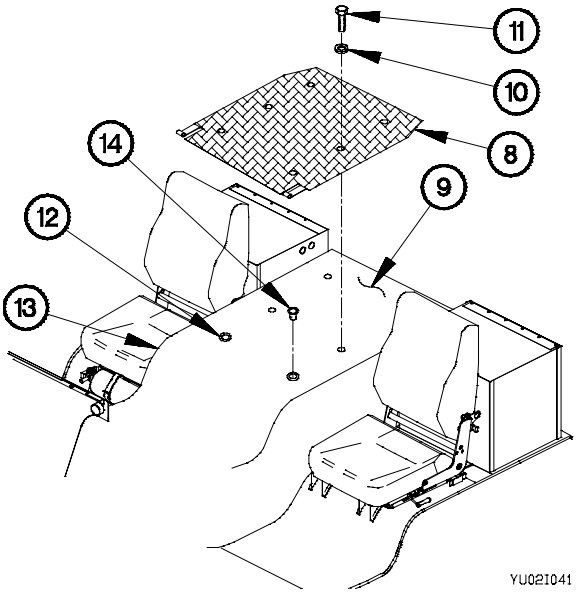
(7) Remove four screws (11), washers (10), and top platform (8) from cab floor (9).

NOTE

Remove all rubber material around holes to ensure metal to metal contact between clinch nuts and cab floor.

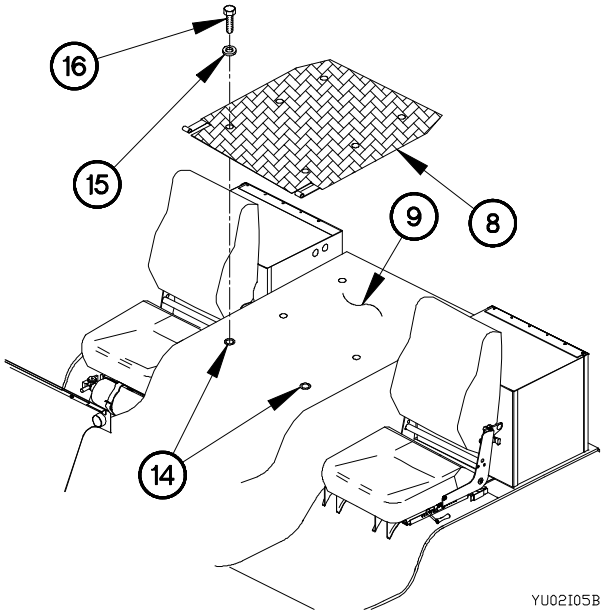
(8) Cut rubber material from around two holes (12) in floor mat (13) to approximately 3/4 inch.

(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.

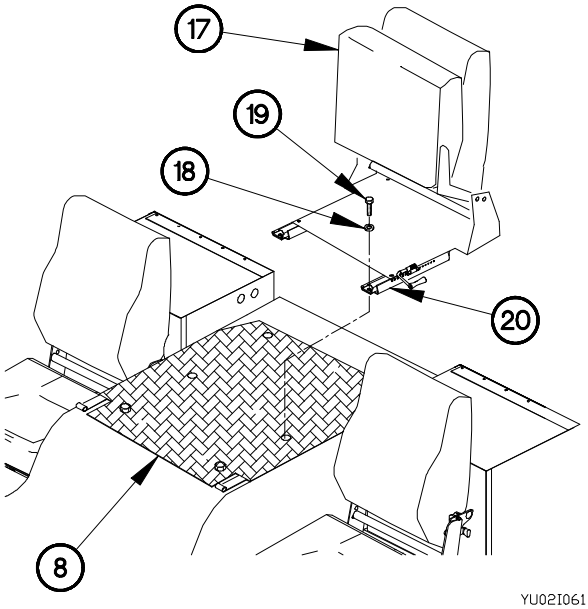
(11) Apply sealing compound to threads of two screws (19).

(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).



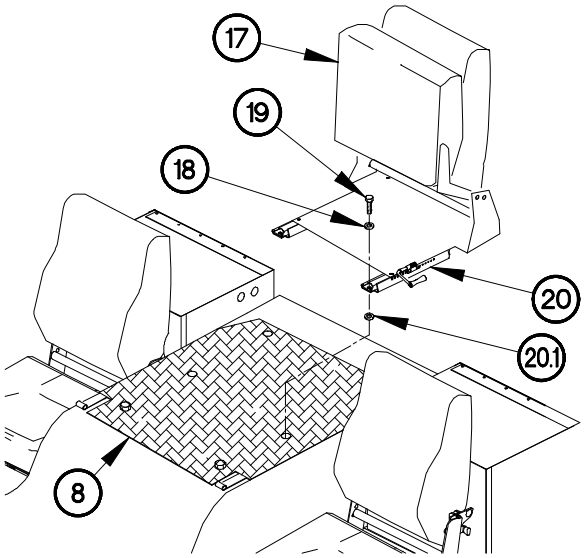
NOTE

Perform step (13.1) on vehicles with cab S/N 12076G or higher. Cab S/N located on B Pillar.

(13.1) Position two spacers (20.1), washers (18), and screws (19) in seat mount (20).

(14) Slide center seat (17) fully forward.

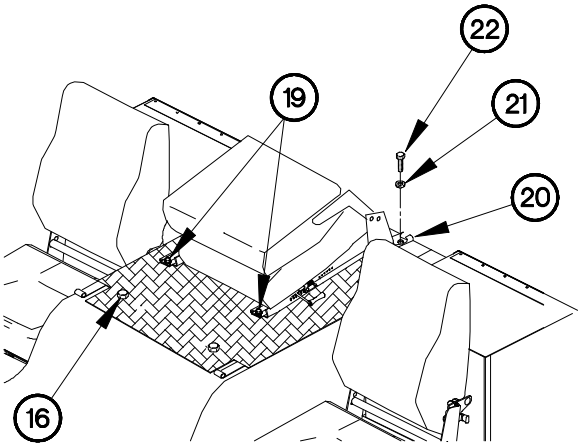
(15) Fold center seat (17) down.



yu02i171

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.



YU02I071

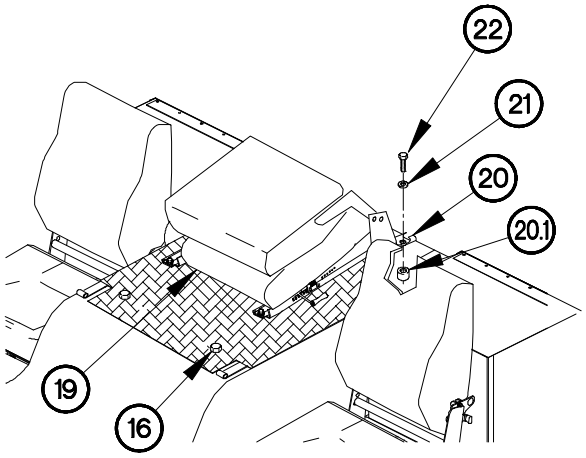
(16) Apply sealing compound to threads of two screws (22).

(17) Position two washers (21) and screws (22) in seat mount (20).

(17.1) Position two spacers (20.1), washers (21) and screws (22) in seat mount (20).

NOTE

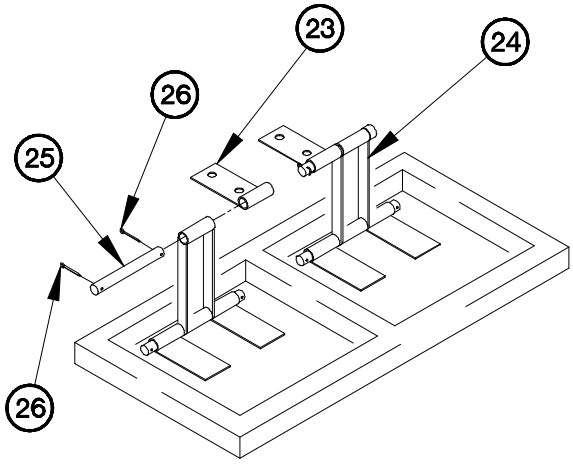
- Perform step (17.1) on vehicles with cab S/N 12076G or higher. Cab S/N located on B Pillar.
- When tightening screws, flat sides of screws are to be in line with track sides.



YU02I072

(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).



YU02I081

(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).

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).

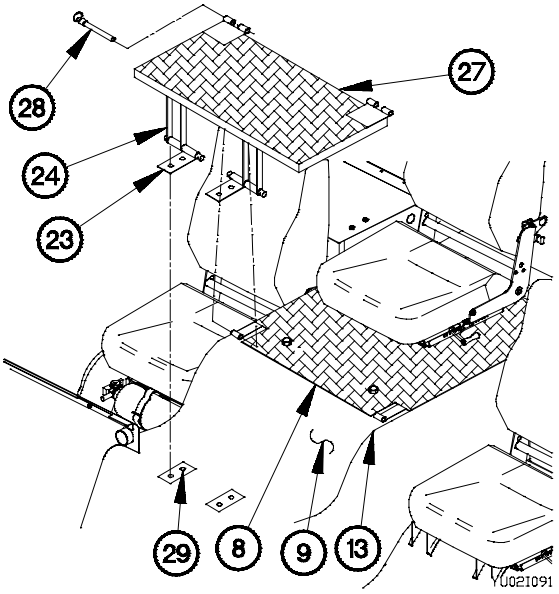
(23) Mark outline of support bracket (23).

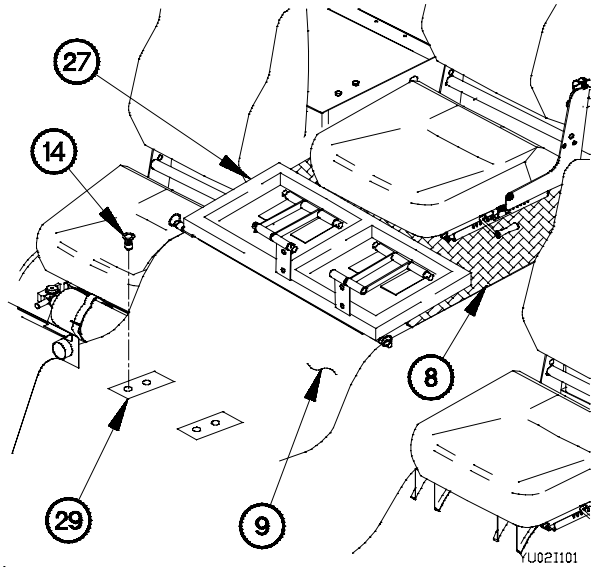
(24) Cut floor mat (13) around outline of support bracket (23).

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).

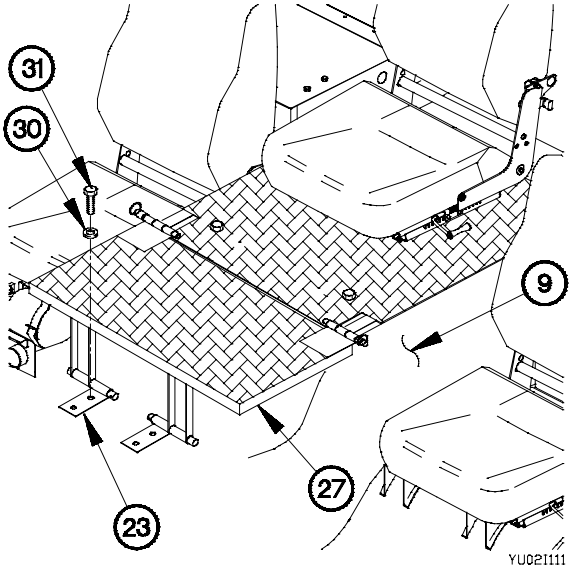




(26) Fold lower platform (27) back to rest on top platform (8).

(27) Drill four 10 mm holes (29) in cab floor (9).

(28) Install four clinch nuts (14) in holes (29).



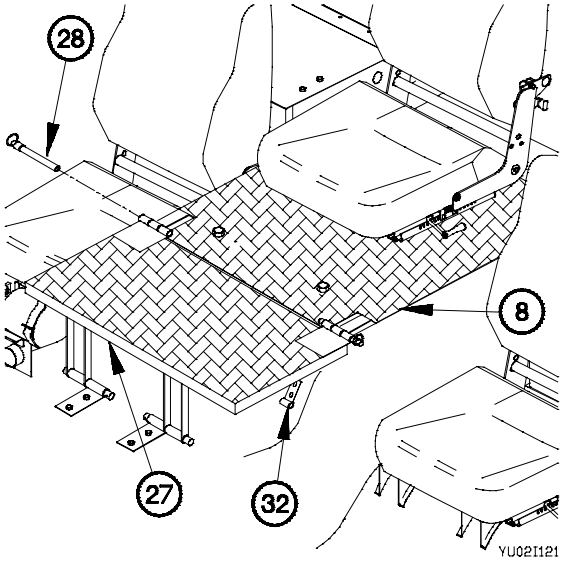
(29) Rotate lower platform (27) back in raised position.

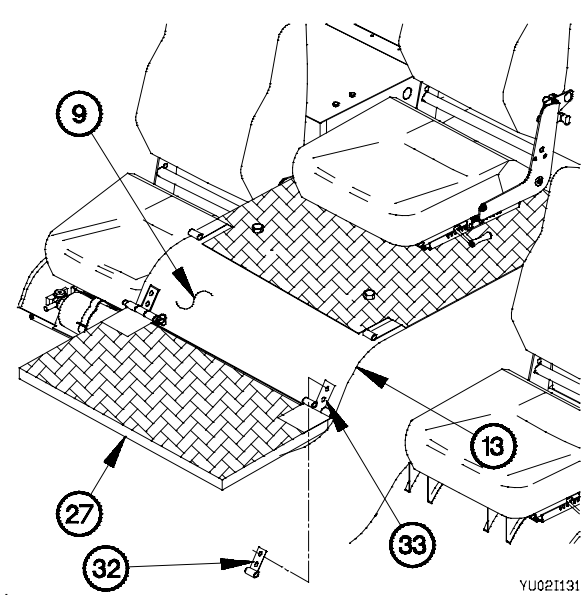
(30) Position two brackets (23) on cab floor (9) with four washers (30) and screws (31).

(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).

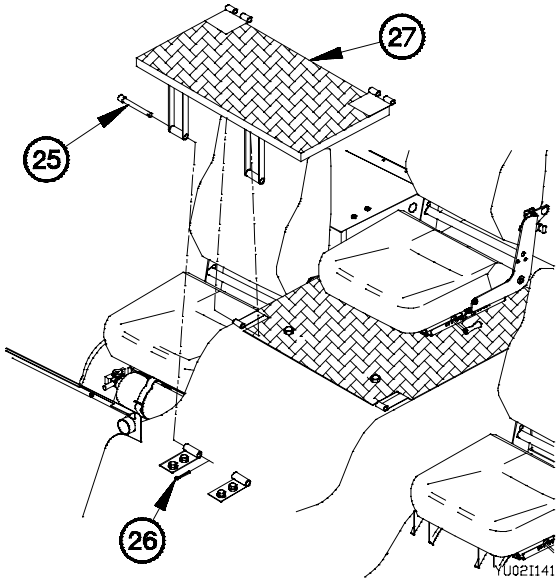
(35) Cut floor mat (13) around outline of storage bracket (32).

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).

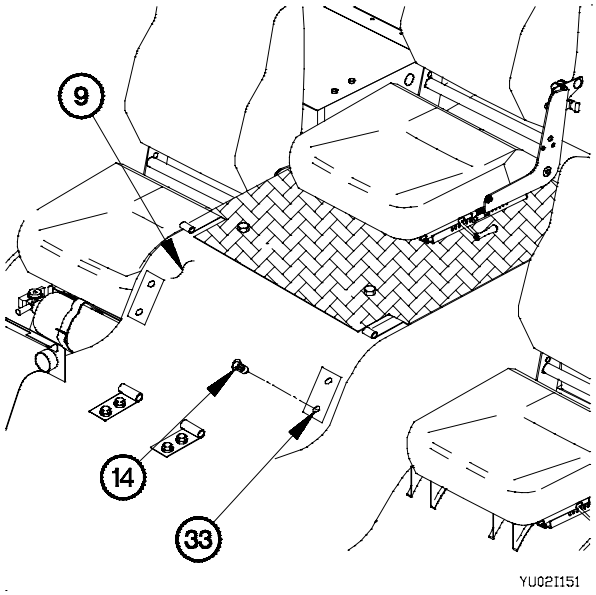
19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)



(37) Raise lower platform (27).

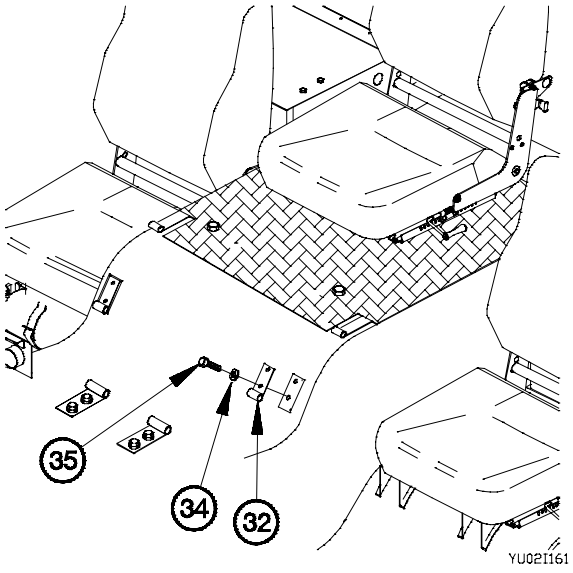
(38) Remove two cotter pins (26) and straight pins (25) from lower platform legs (27).

(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).

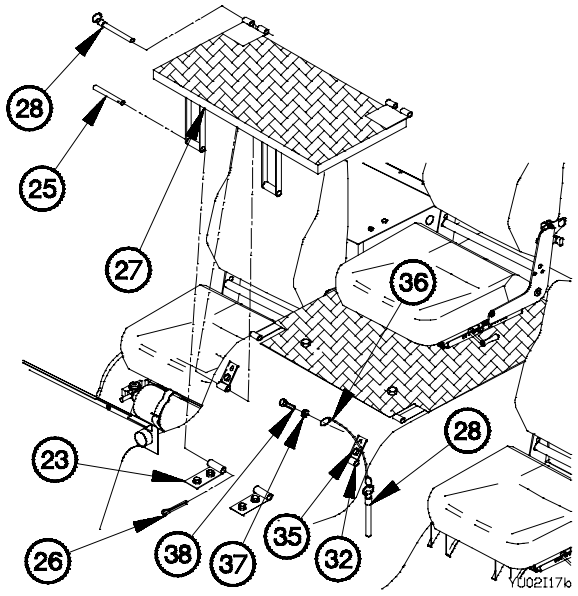
(43) Position two lanyards (36), washers (37), and screws (38) to top holes of storage brackets (32).

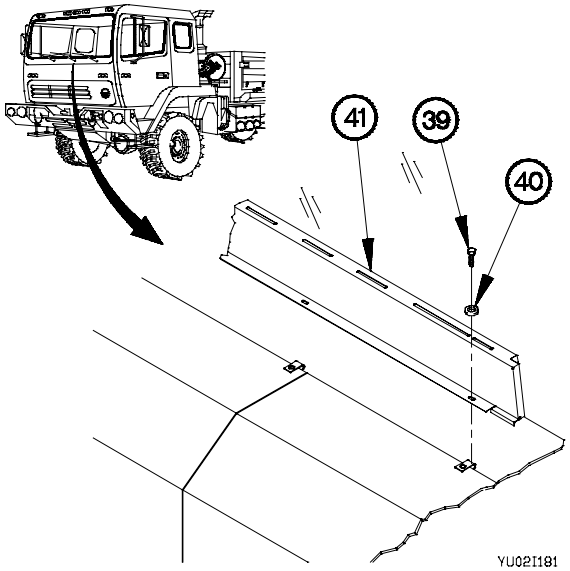
(43.1) Tighten two screws (35 and 38) to 71-89 lb-in. (8-10 N·m).

(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

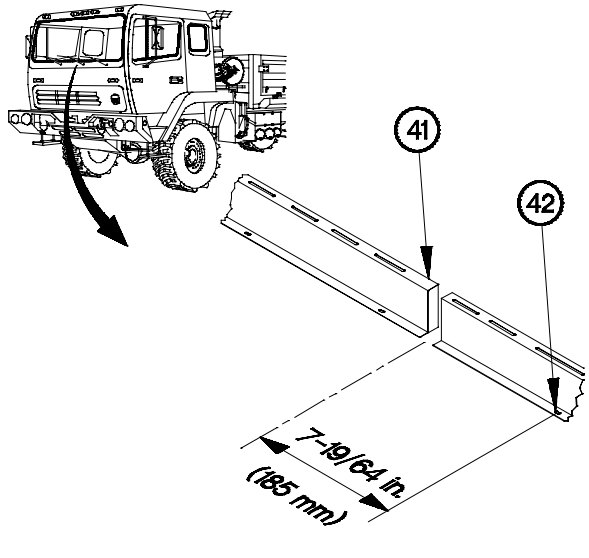
Perform steps (47) through (60) on all vehicles except M1093/M1094.

(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).

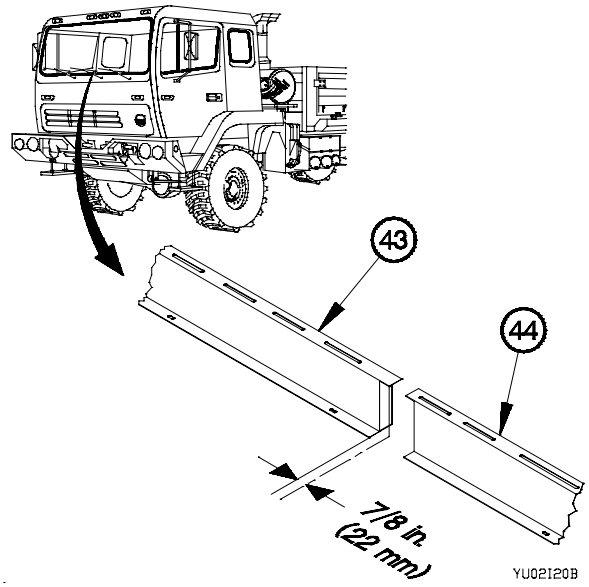
(50) Cut out marked 7 19/64 in. (185 mm) center line on defrost cover (41).

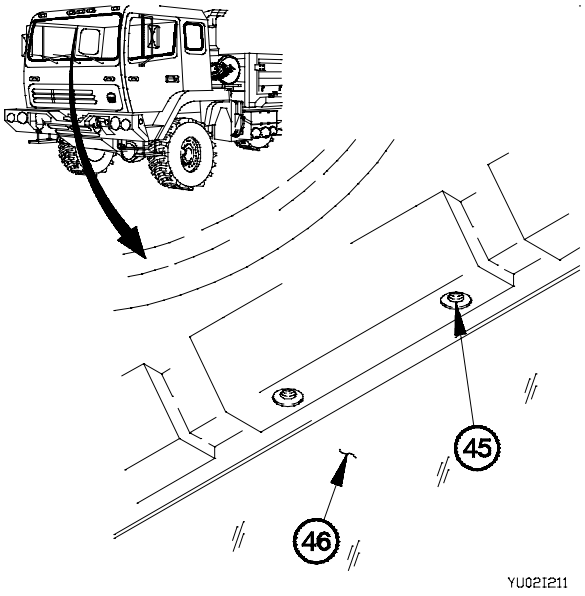


19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(51) Measure and mark 7/8 in. (22 mm) in from flat edges of LH defrost cover (43) and RH defrost cover (44).

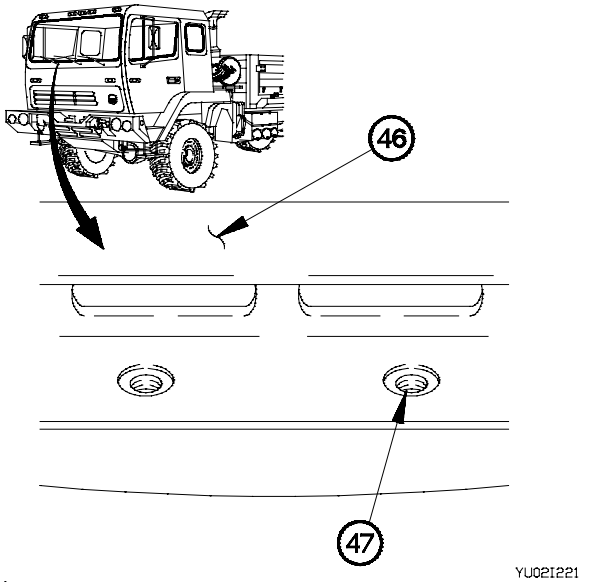
(52) Cut out marked 7/8 in. (22 mm) from bottom and center flat edges of LH defrost cover (43) and RH defrost cover (44).





(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

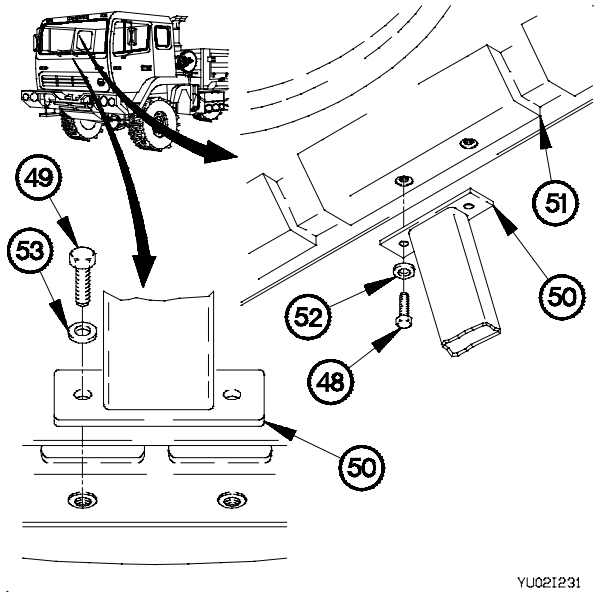
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

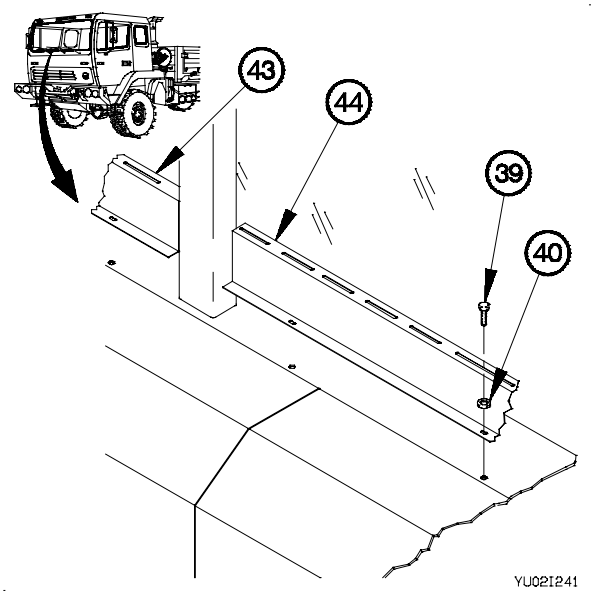
(55) Apply adhesive sealant to two screws (48 and 49).

(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).

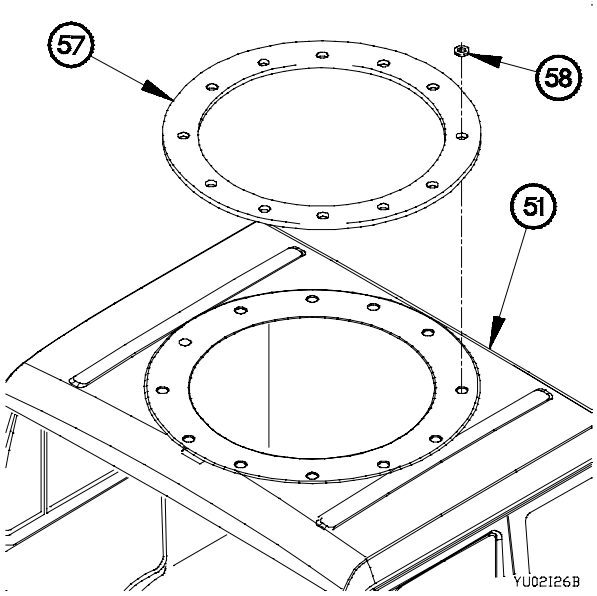
(60) Tighten six screws (39) to 22-27 lb-in. (2-3 N·m).

19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(61) Deleted.

(62) Deleted.

(63) Deleted.



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.

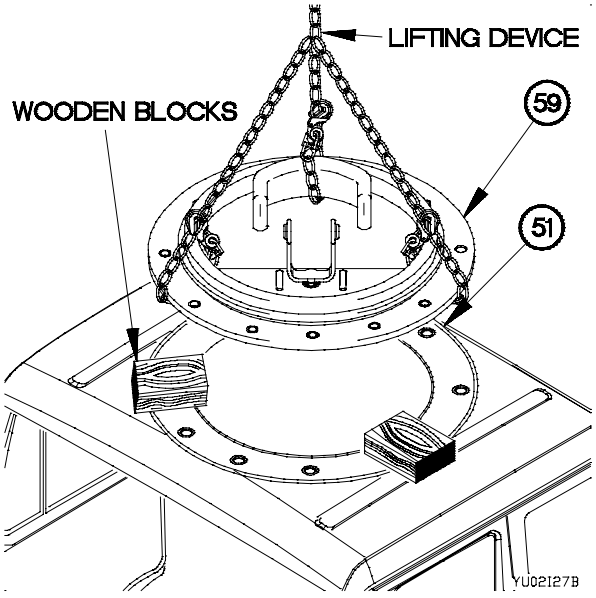
(65) Position three wooden blocks on cab roof (51).

(66) Position machine gun ring (59) on three wooden blocks.

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).



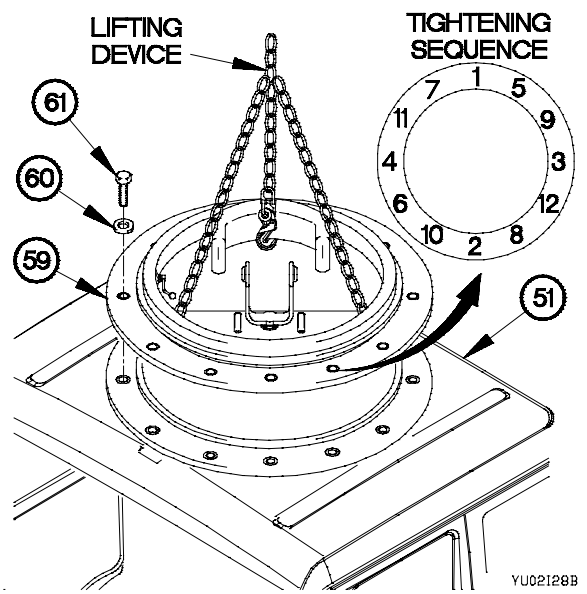
(67) Re-position lifting device on machine gun ring (59).

(68) Remove three wooden blocks from cab roof (51).

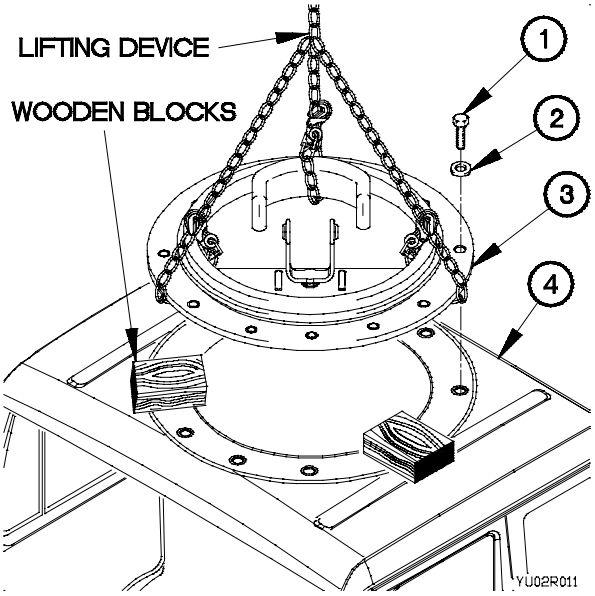
(69) Position machine gun ring (59) on cab roof (51).

(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.

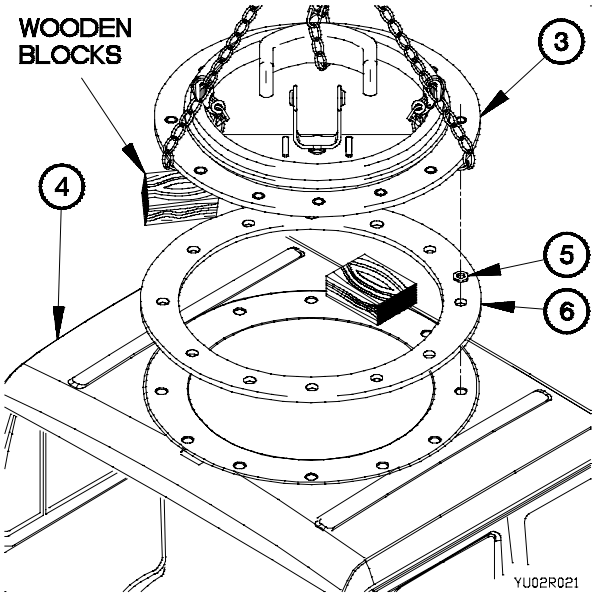
NOTE

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).

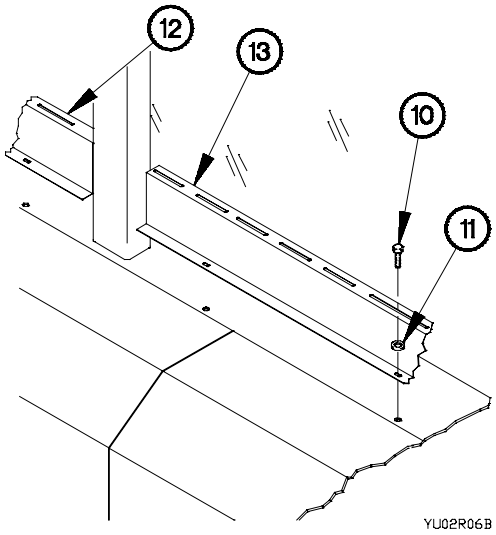
(7) Remove 12 washers (5) and ring spacer (6) from cab roof (4).

(8) Deleted.

(9) Deleted.

(10) Deleted.

(11) Deleted.



NOTE

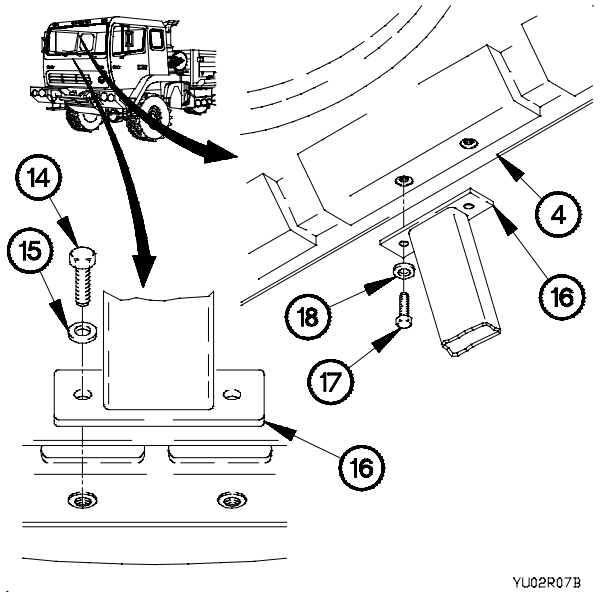
- Perform steps (12) through (16) on all vehicles except M1093/M1094.
- Store defrost covers for future installation.

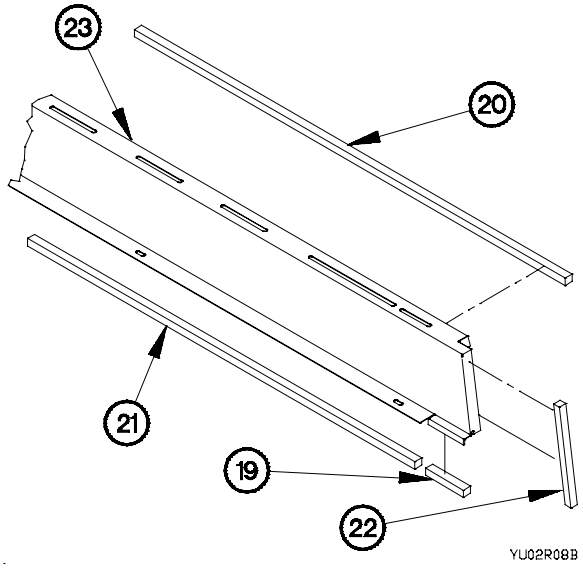
(12) Remove six screws (10), washers (11), LH defrost cover (12) and RH defrost cover (13) from vehicle.

(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).

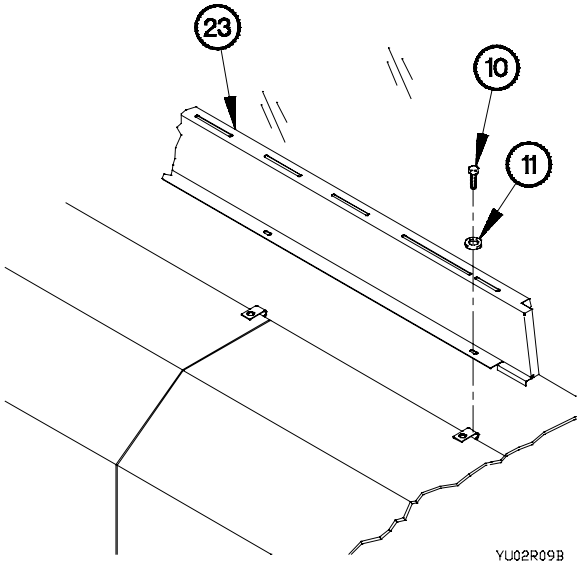
(18) Cut seal (21) to 86 3/4 in. (2203 mm).

(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).



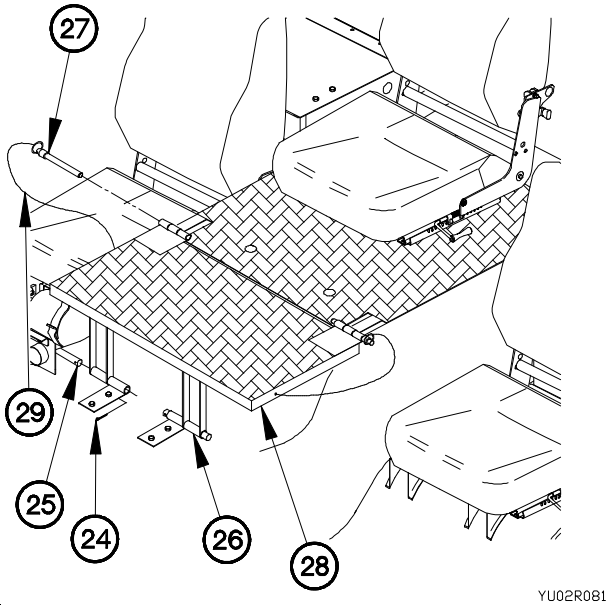
19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(23) Remove two cotter pins (24) and straight pins (25) from lower platform legs (26).

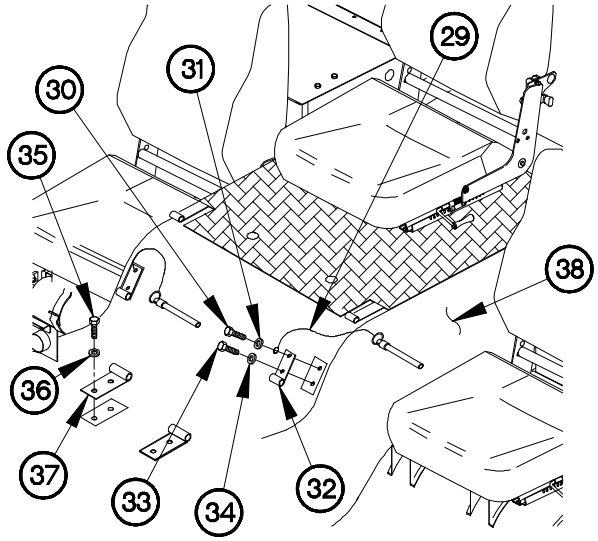
(24) Remove two quick-release pins (27) from lower platform (28).

(25) Remove lower platform (28) from vehicle.

(26) Remove two lanyards (29) from quick-release pins (27).



YU02R081



YU02R091

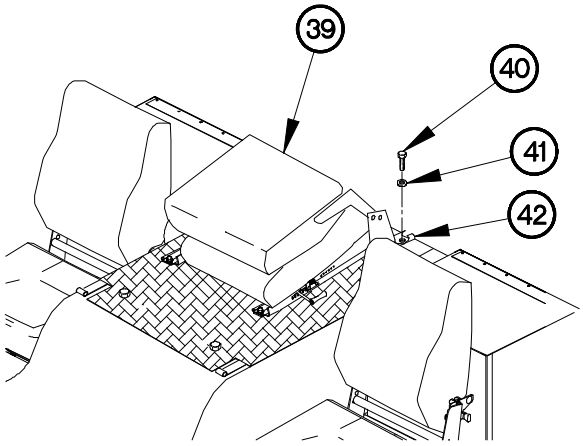
(27) Remove two screws (30), lanyards (29), and washers (31) from storage brackets (32).

(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).

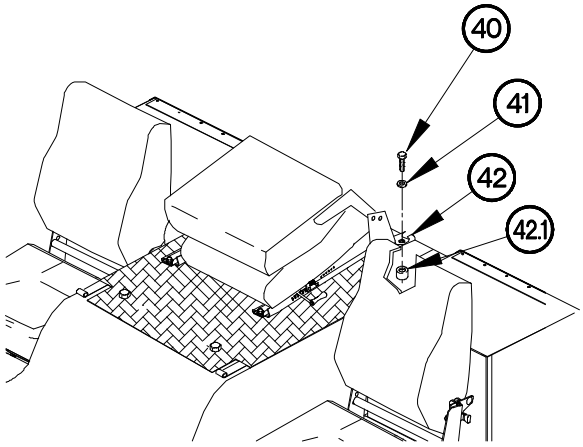


YU02R101

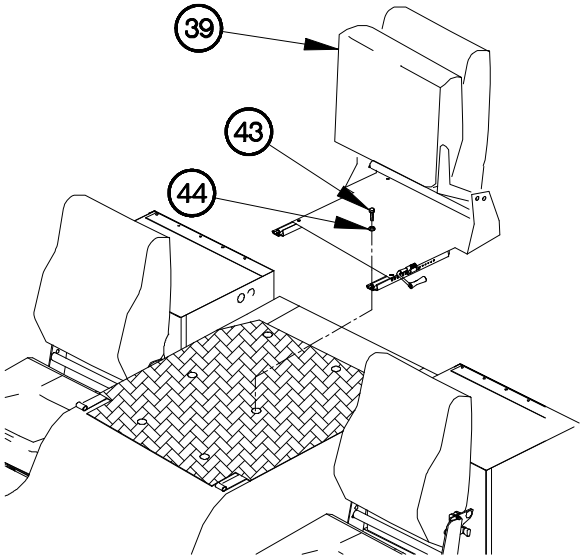
NOTE

Perform step (31.1) on vehicles with cab S/N 12076G or higher. Cab S/N located on B Pillar.

(31.1) Remove two screws (40), washers (41) and spacers (42.1) from seat mount (42). Discard spacer.



YU02R102



YU02R13B

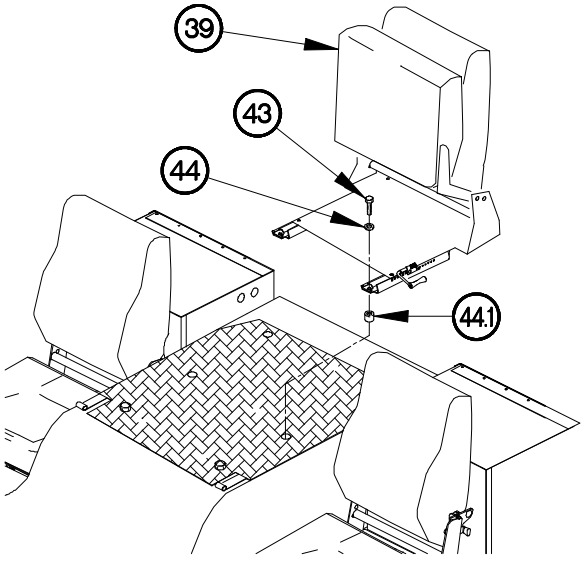
(32) Slide center seat (39) fully rearward.

(33) 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.

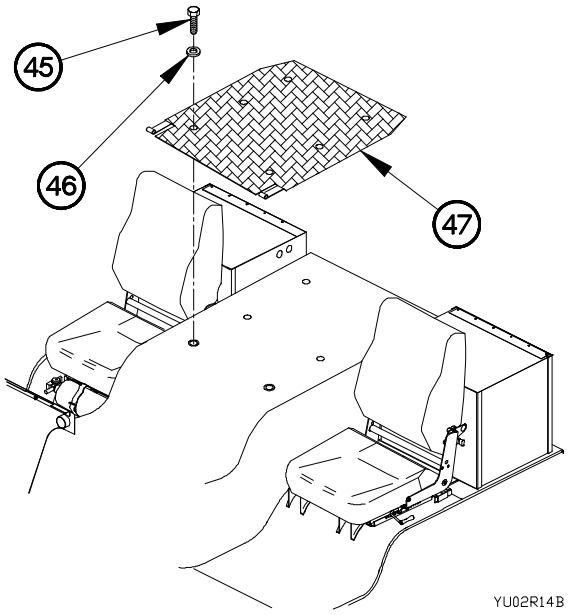


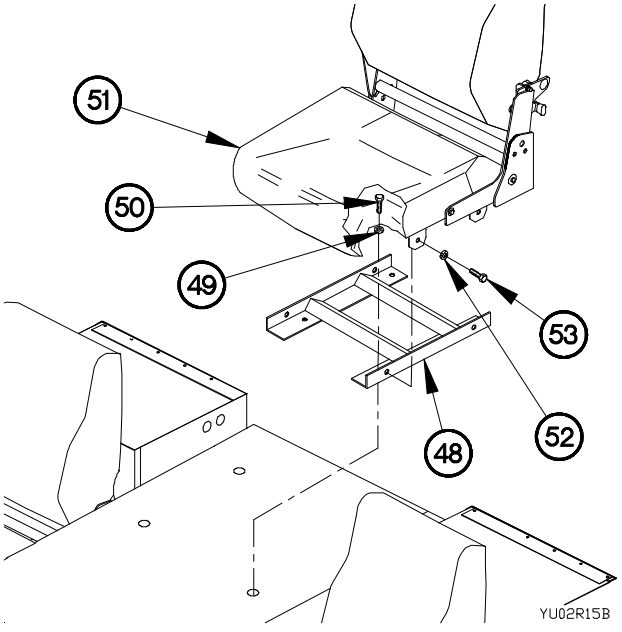
YU02R10B

19-2. INITIAL MACHINE GUN RING KIT INSTALLATION/REMOVAL (CONT)

(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).

c. Follow-On Maintenance.

(1) Install roof hatch (All models except M1093/M1094) (TM 9-2320-366-20-4).

(2) Install roof hatch (M1093/M1094) (TM 9-2320-366-20-4).

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 Transmission 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

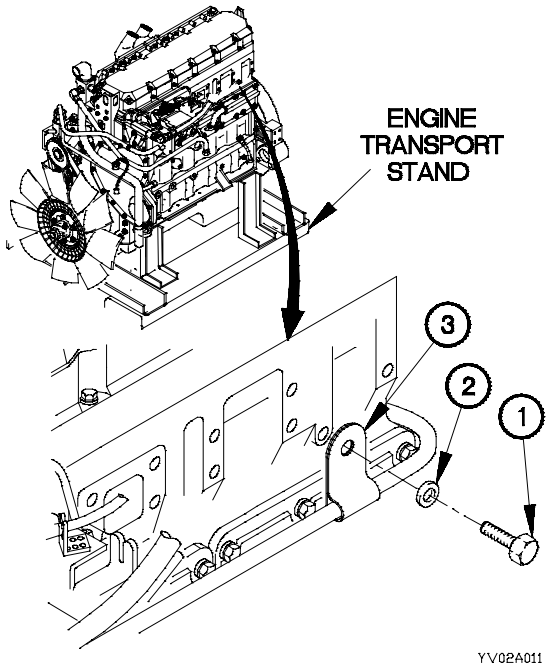
Equipment Conditions
Engine assembly removed (para 3-3).
Starter removed (TM 9-2320-366-20-3).
Throttle position sensor cable assembly removed (TM 9-2320-366-20-3).
Fuel/water separator removed (TM 9-2320-366-20-3).
Fuel filter base removed (TM 9-2320-366-20-3).
Air compressor removed (para 11-2).
Engine bracket removed (para 3-5).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Engine Stand Bracket (Item 9, Appendix D)
Stand, Maintenance, Engine (TM 9-2320-366-20)

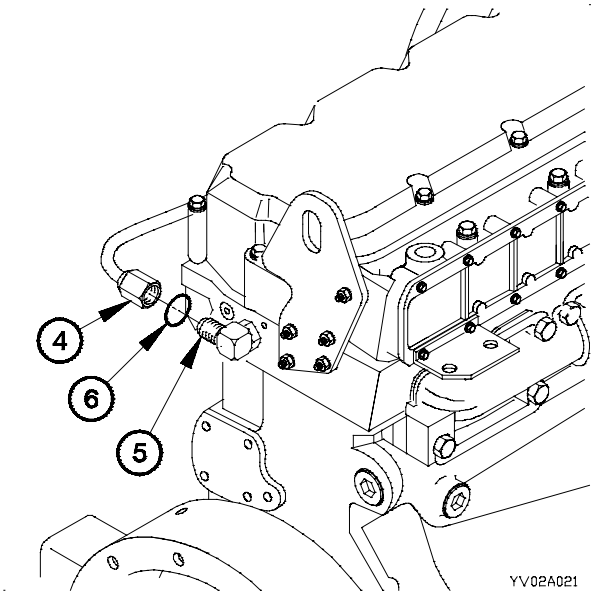
Materials/Parts
Packing, Preformed (Item 240, Appendix F)
Gasket (Item 41, Appendix F)
Packing, Preformed (Item 253, Appendix F)

Personnel Required
(2)

a. Mounting.



(1) Remove bolt (1) and washer (2) from fuel tube clip (3).

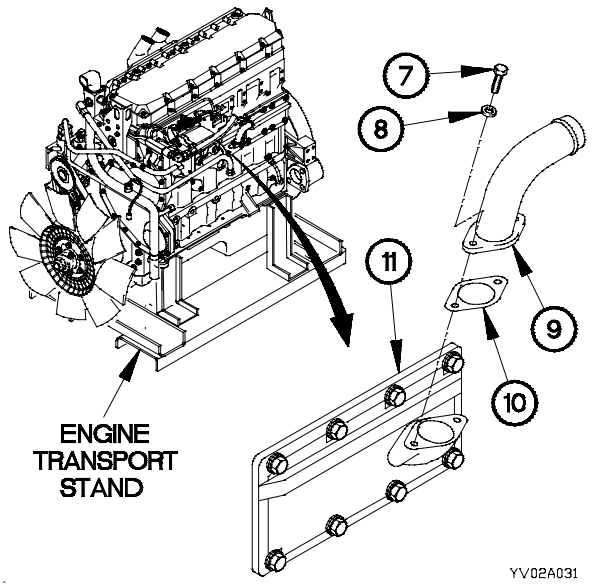


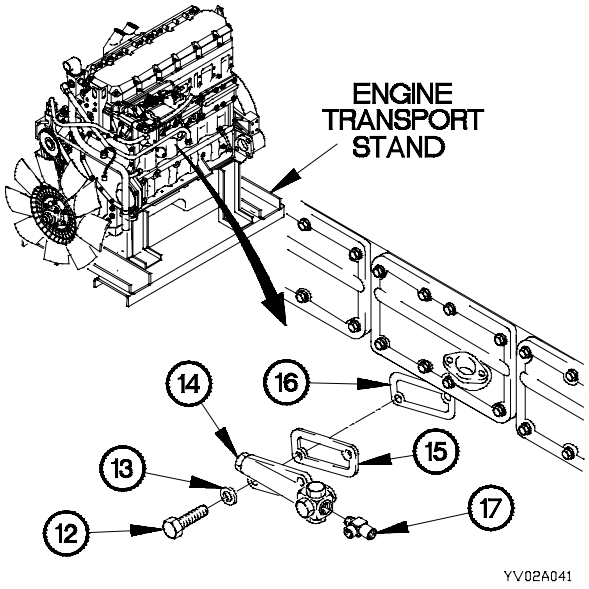
(2) Disconnect fuel tube (4) from 90-degree fitting (5).

(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

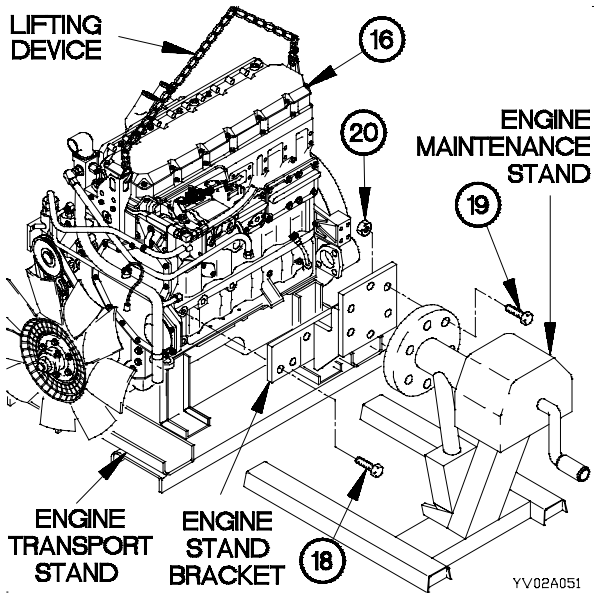
Engine weighs approximately 1500 lbs (681 kgs). Attach a suitable lifting device prior to mounting on maintenance stand. Failure to comply may result in injury to personnel or damage to equipment.

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)

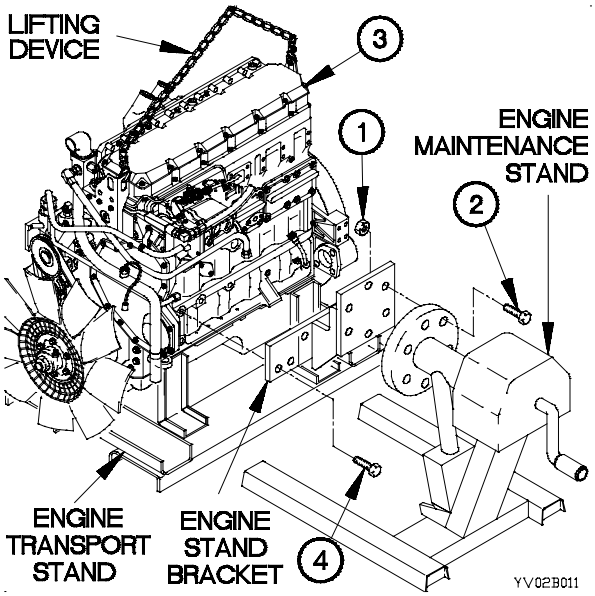
b. Demounting.

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

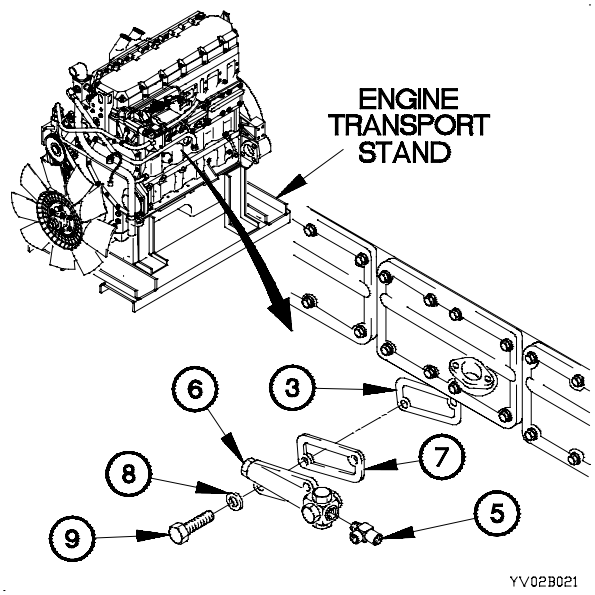
Steps (1) and (2) require the aid of an assistant.



(1) Remove four nuts (1), bolts (2), and engine (3) from engine maintenance stand.

(2) Position engine (3) on engine transport stand.

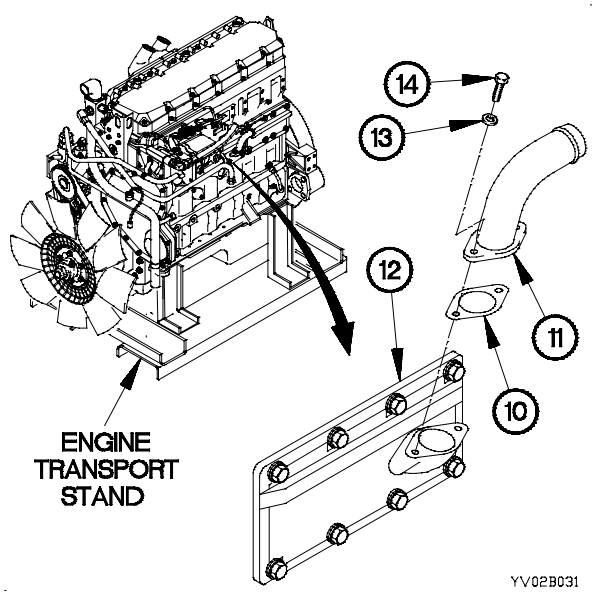
(3) Remove six bolts (4) and engine stand bracket from engine (3).



(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).

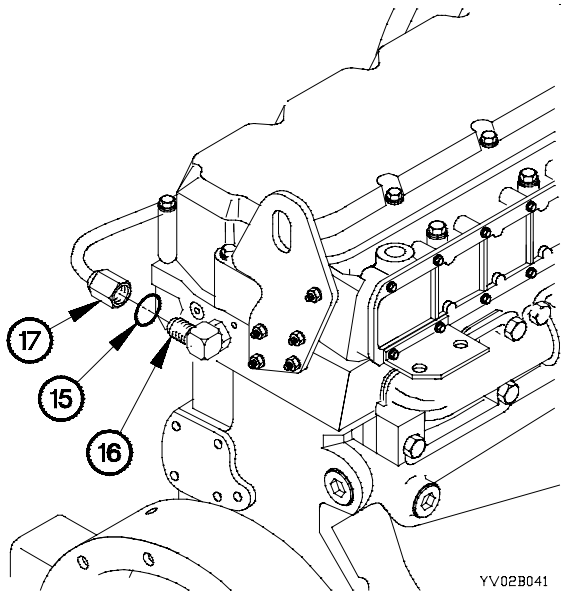


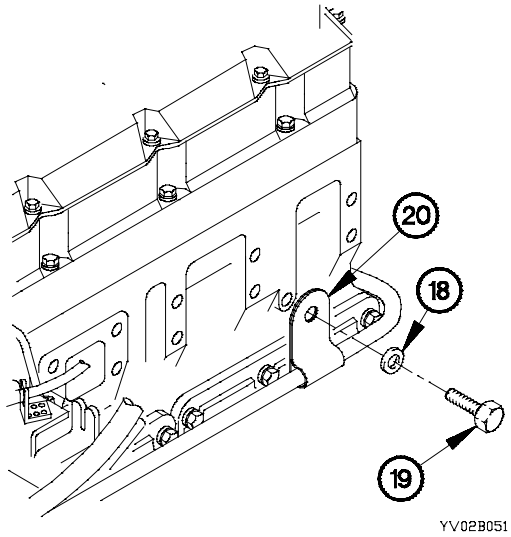
(7) Position gasket (10) and oil tube (11) on center side cover (12).

(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 9-2320-366-20-3).

(5) Install fuel/water separator assembly (TM 9-2320-366-20-3).

(6) Install throttle position sensor cable (TM 9-2320-366-20-3).

(7) Install starter (TM 9-2320-366-20-3).

(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 78, Appendix B)
Lifter, Valve Spring (Item 40, Appendix B)
Tool Kit, Valve Seat Ring Inserter (Item 79, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Drill, Electric Portable (Item 21, Appendix B)
Tool Kit, Diesel Injector (TM 9-2320-366-20, Appendix B, Item 83))
Press, Arbor, Hand Operated (Item 48, Appendix B)
Compressor Unit, Reciprocating (Item 15, Appendix B)
Gun, Air Blow (Item 30, Appendix B)
Hose Assembly, Nonmetallic (Item 35, Appendix B)
Cleaner, Steam, Pressure Jet (Item 14, Appendix B)
Degreaser, Portable Liquid Type (Item 18, Appendix B)
Caliper Set, Micrometer, Inside (Item 10, Appendix B)
Straight Edge (Item 71, Appendix B)
Grinding Kit, Valve Seat (Item 29, Appendix B)

Materials/Parts
Solvent, Dry Cleaning (Item 83, Appendix C)
Carbon Removing Compound (Item 18, Appendix C)
Protector, Hearing (Item 57, Appendix C)
Compound, Antiseize (Item 12, Appendix C)
Grease, Molybdenum (Item 37, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (3) (Item 245, Appendix F)
Plug, Expansion (2) (Item 341, Appendix F)
Primer, Sealing Compound (Item 56, Appendix C)

a. Disassembly.

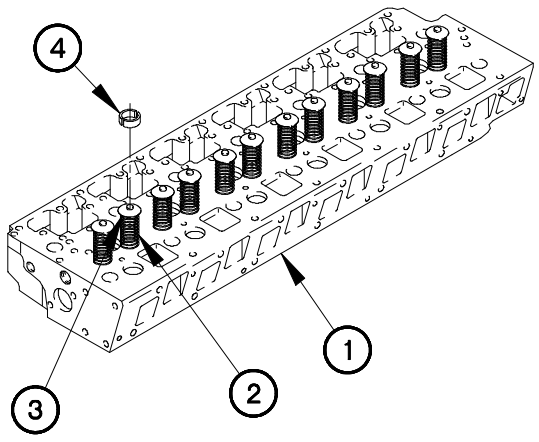
(1) Place cylinder head (1) on flat surface with valve faces down.

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

(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).

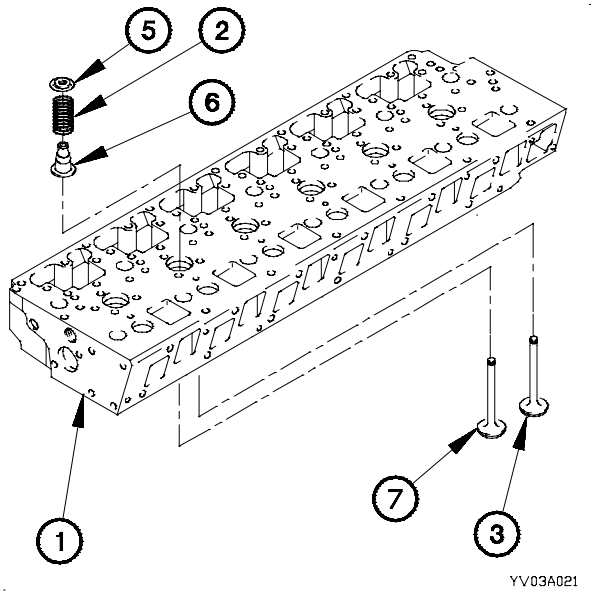
(6) Remove valve spring (2) from cylinder head (1).

(7) Remove valve seal (6) from cylinder head (1).

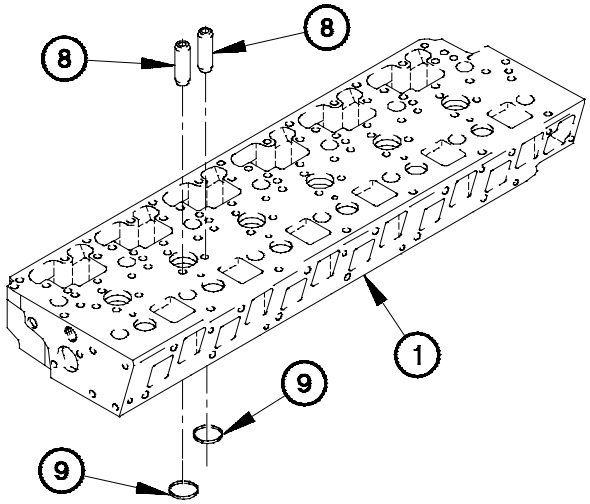
(8) Remove No. 1 intake valve (3) from bottom side of cylinder head (1).

(9) Perform steps (2) through (8) for No. 1 exhaust valve (7).

(10) Perform steps (2) through (9) for remaining intake and exhaust valves.



YV03A021



YV03A031

(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).

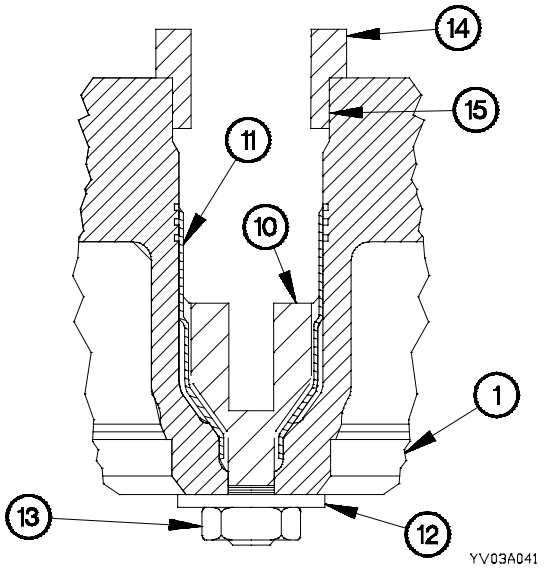
(14) Install washer (12) and nut (13), loosely, at bottom side of cylinder head (1).

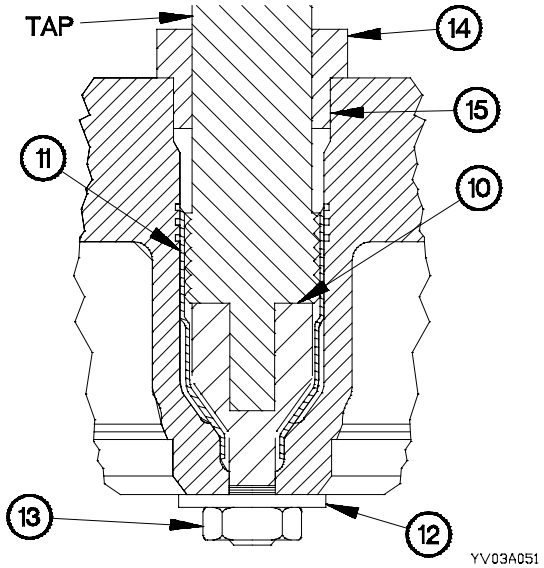
NOTE

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. (0.9525 cm). 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).

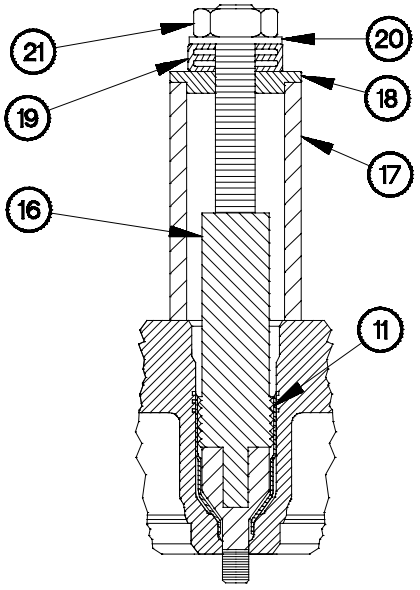
(28) Install puller assembly (16) into injector sleeve (11).

(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).

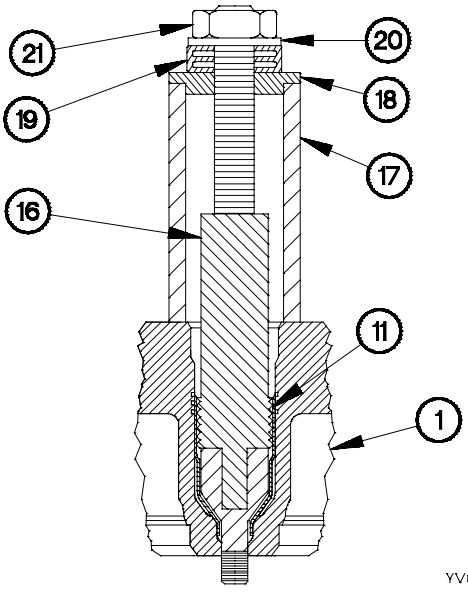


CAUTION

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

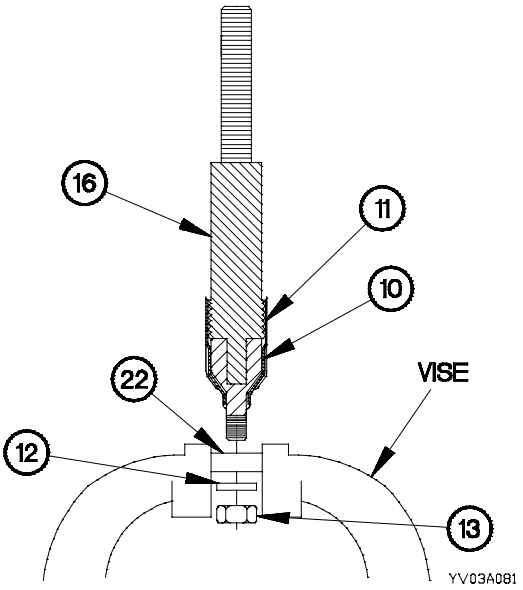
If injector sleeve can not be removed by hand, perform steps (36) through (39), using release block.

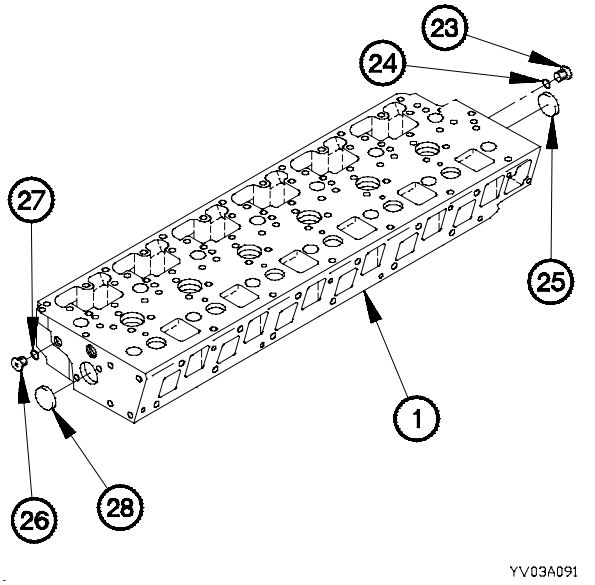
(36) Position release block (22) in vise. Tighten vise only enough to secure release block.

(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.**

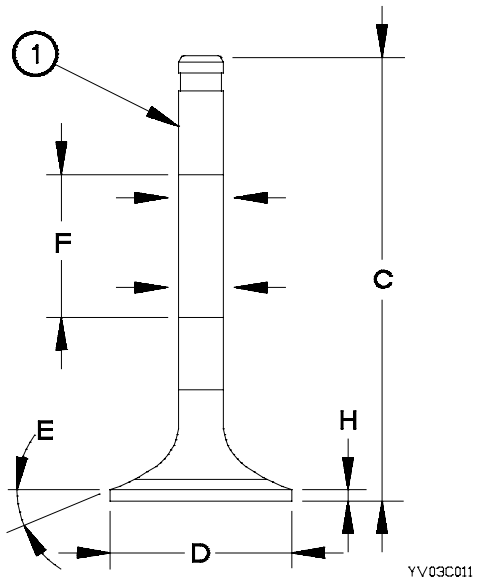


Table 20-1. Valve Specifications

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.**

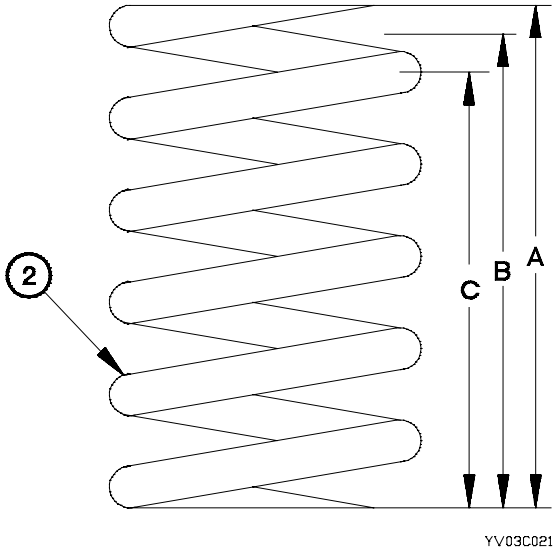
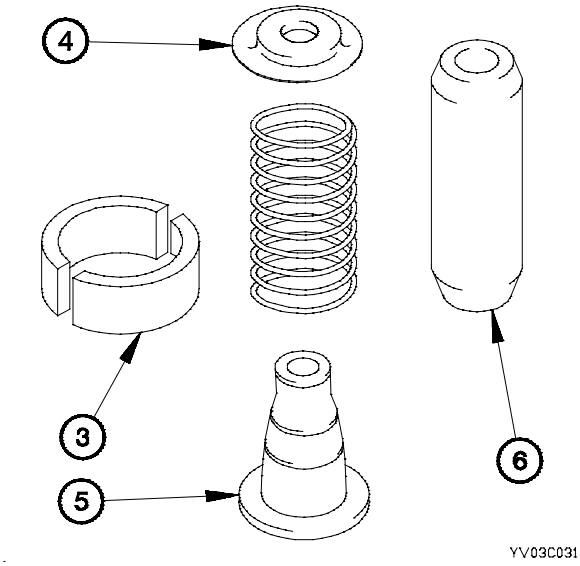


Table 20-2. Valve Spring Specifications

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.**

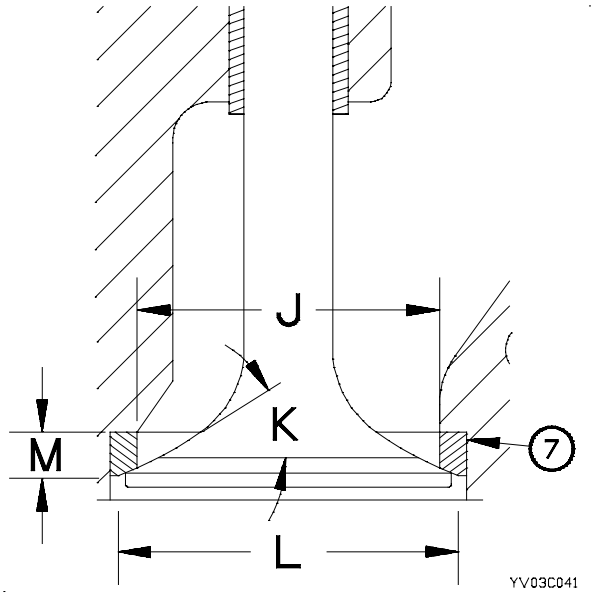


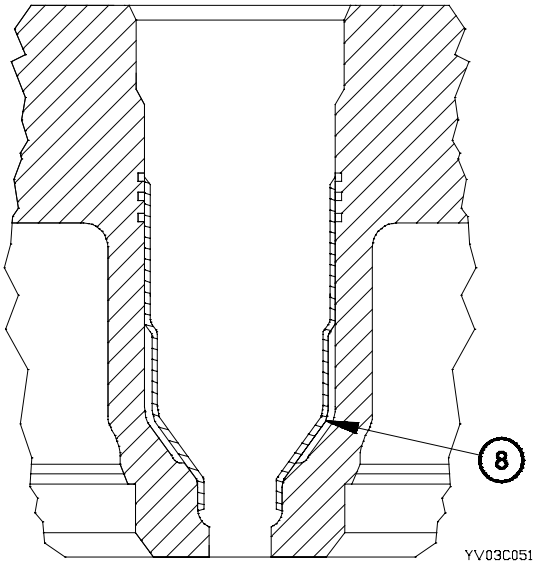
Table 20-3. Valve Seat Insert Specifications

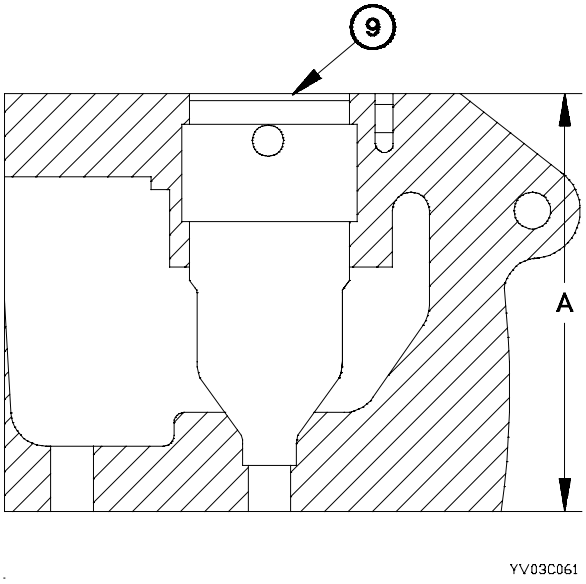
Intake valve seat insert bore diameter	(J)	1.9608-1.9708 in. (4.998-5.005 cm)
Exhaust valve seat insert bore diameter	(J)	1.6853-1.6953 in. (4.280-4.306 cm)
Intake valve seat insert face angle	(K)	29.75-30.75 degrees 0.52-0.536 (rad)
Exhaust valve seat insert face angle	(K)	45-46 degrees 0.785-0.803 (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.

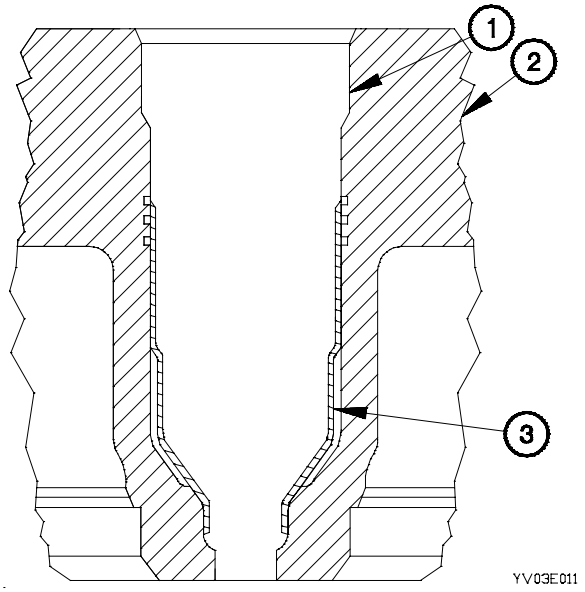
(c) Apply dye penetrant chemical on surface. Allow the dye penetrant approximately three to five minutes to enter any cracks.

(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.

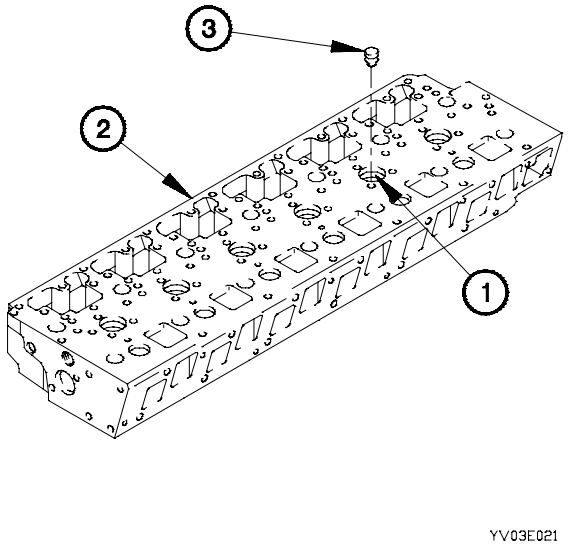


NOTE

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).

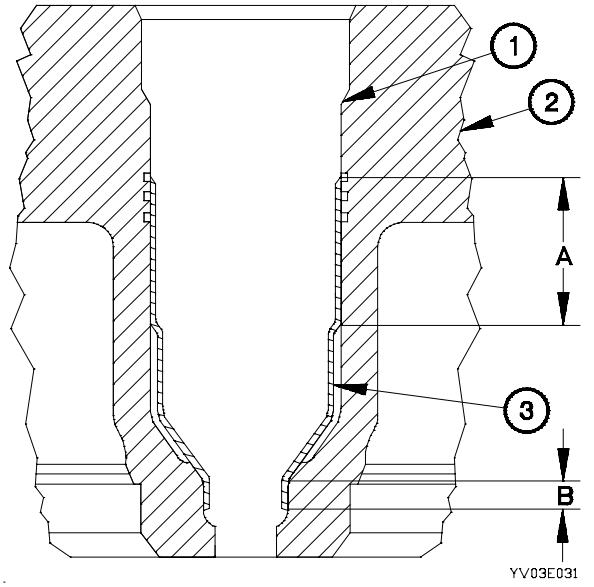


WARNING

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.

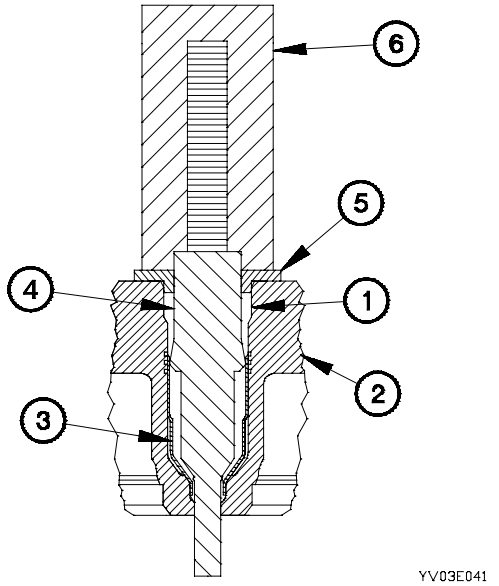
(3) Spray dry cleaning solvent inside of each injector sleeve bore (1) in cylinder head (2) and outside of each injector sleeve (3).

(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)

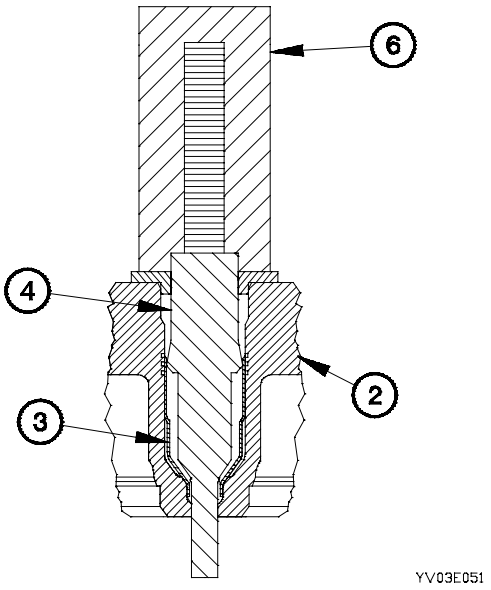
NOTE

The centerline of the injector sleeve bore in the cylinder head must be parallel to the centerline of the arbor press ram.

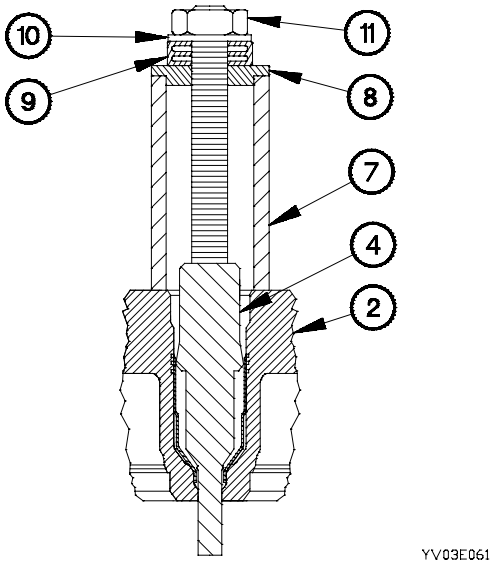
(11) Position cylinder head (2) on arbor press so driver (6) is centered under arbor press arm.

(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).

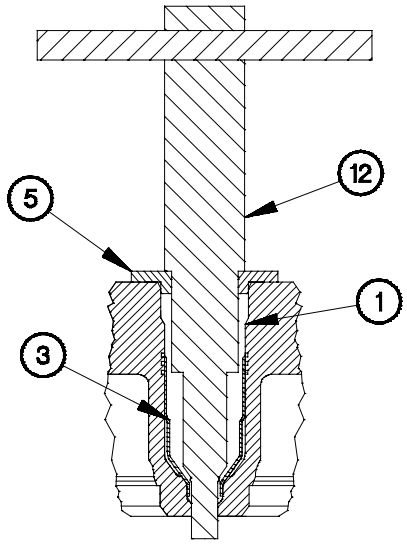
NOTE

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).

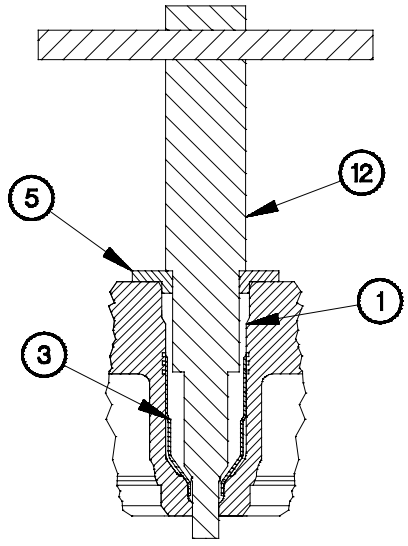
(23) Install reamer assembly (12) in guide bushing (5).



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.

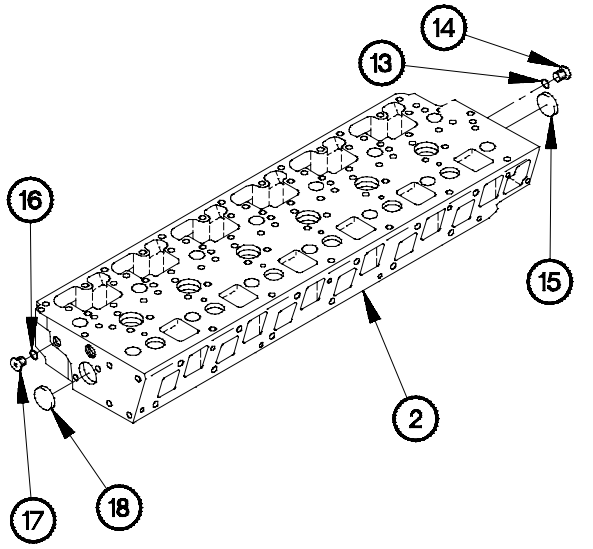
(25) Remove reamer assembly (12) and guide bushing (5) from injector sleeve bore (1).

(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.

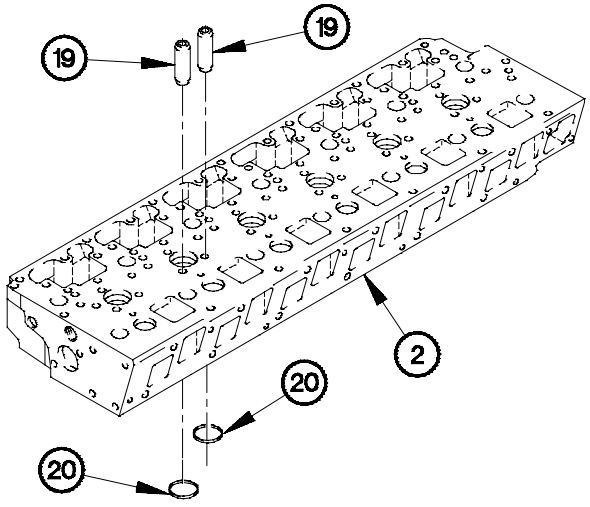
20-3. CYLINDER HEAD REPAIR (CONT)

(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.

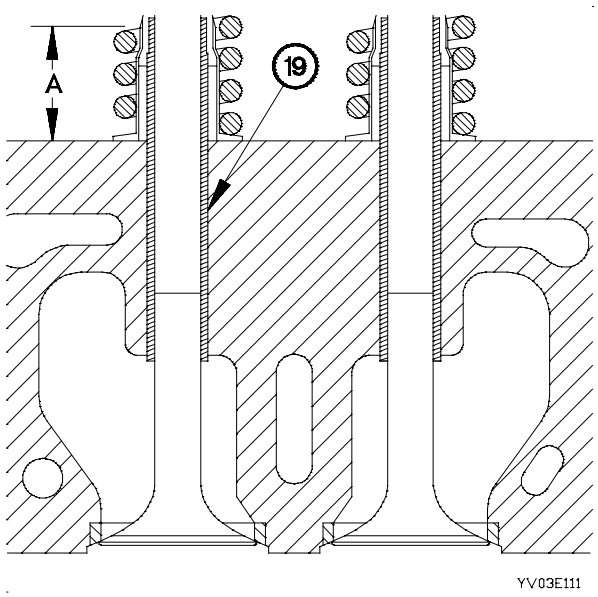
(30) Install 12 valve seat inserts (20) in cylinder head (2).

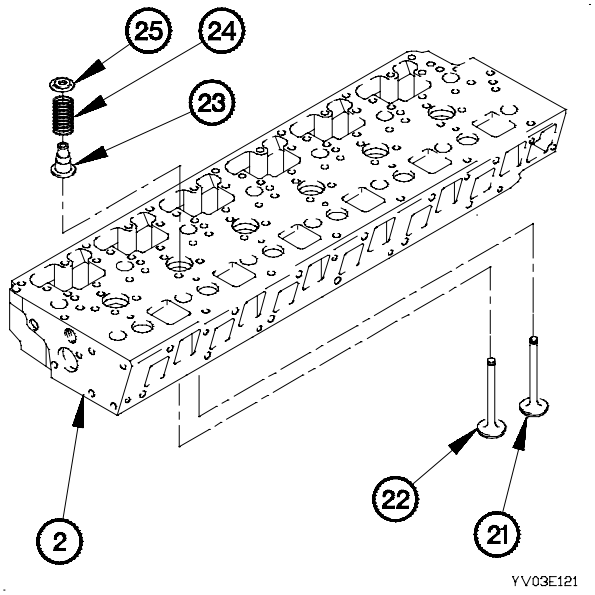
NOTE

- 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).

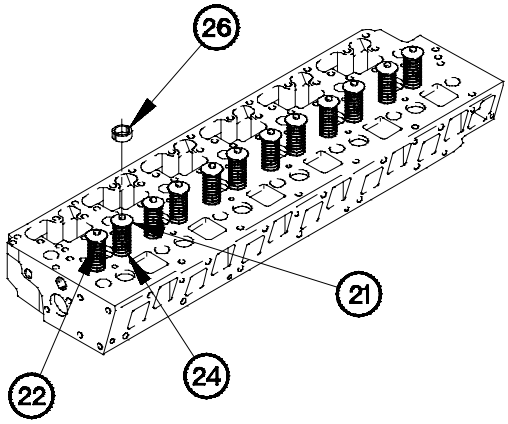
(37) Install 12 valve spring retainers (25) on valve stems (21 and 22).

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 9-2320-366-20-3).
Alternator brackets/bracket assembly removed (TM 9-2320-366-20-3).
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 78, Appendix B)
Cleaner, Steam, Pressure Jet (Item 14, Appendix B)

Tools and Special Tools (cont)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Compressor Unit, Reciprocating (Item 15, Appendix B)
Gun, Air Blow (Item 30, Appendix B)
Hose Assembly, Nonmetallic (Item 35, Appendix B)
Caliper, Micrometer, Inside (Item 10, Appendix B)

Materials/Parts
Protector, Hearing (Item 57, Appendix C)
Packing, Preformed (2) (Item 248, Appendix F)
Plug (Item 340, Appendix F)
Plug (2) (Item 341, Appendix F)
Gasket (Item 39, Appendix F)
Packing, Preformed (Item 254, Appendix F)

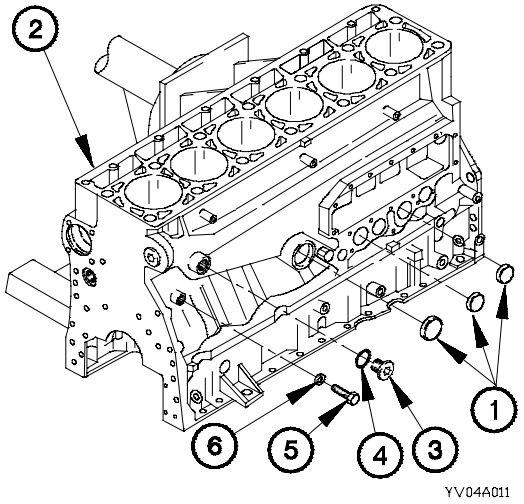
a. Disassembly.

(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.

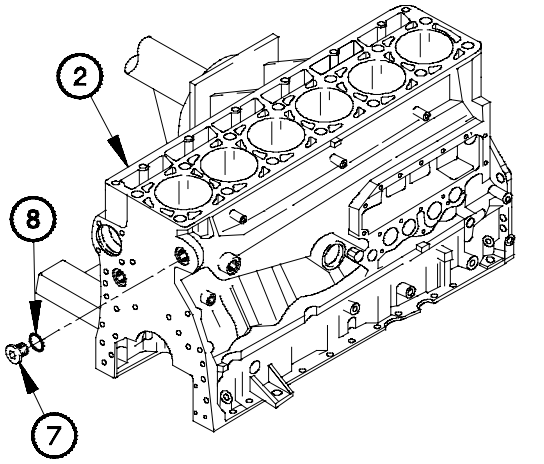
(4) Remove bolt (5) and washer (6) from cylinder block (2).



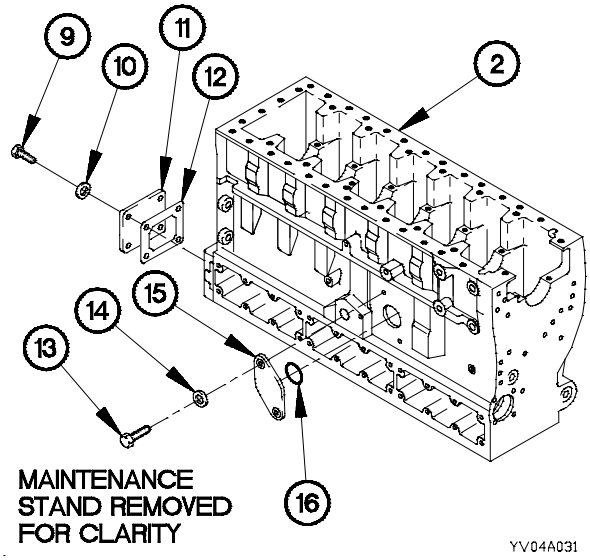
20-4. CYLINDER BLOCK REPAIR (CONT)

(5) Remove plug (7) from cylinder block (2).

(6) Remove preformed packing (8) from plug (7). Discard preformed packing.



YV04A021



YV04A031

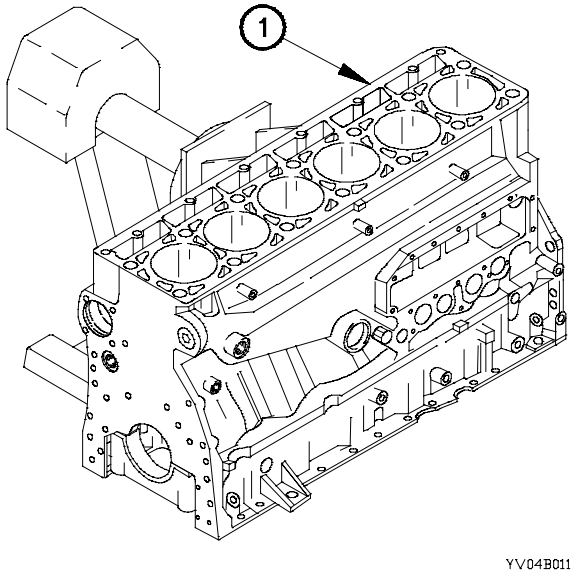
(7) Remove four bolts (9), washers (10), cover plate (11), and gasket (12) from cylinder block (2). Discard gasket.

(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

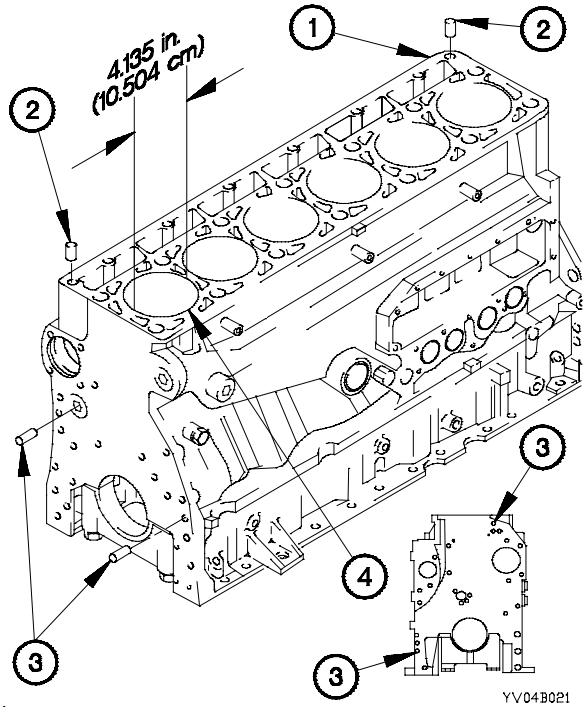
High pressure steam may blow particles into eyes, may cause severe burns, and creates hazardous noise levels. Eye, skin, and hearing protection is required. Failure to comply may result in injury to personnel.

(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 4.135 in. (10.504 cm).

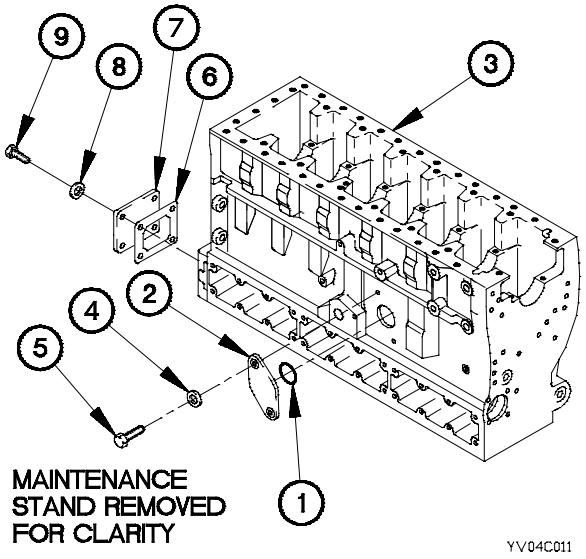
20-4. CYLINDER BLOCK REPAIR (CONT)

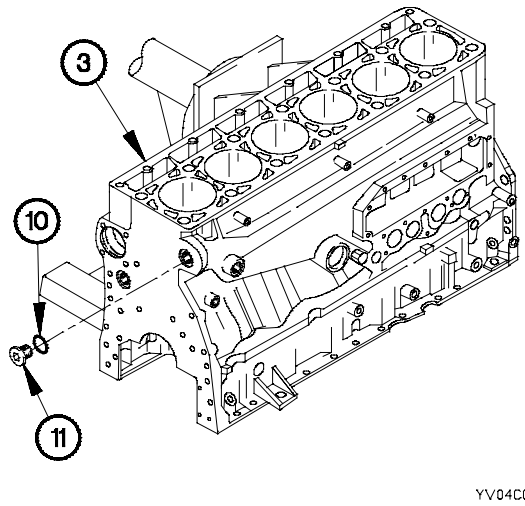
c. Assembly.

(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).

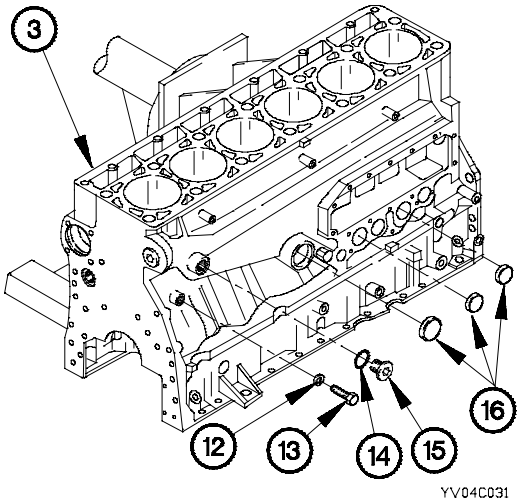
(5) Install plug (11) in cylinder block (3).

(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).



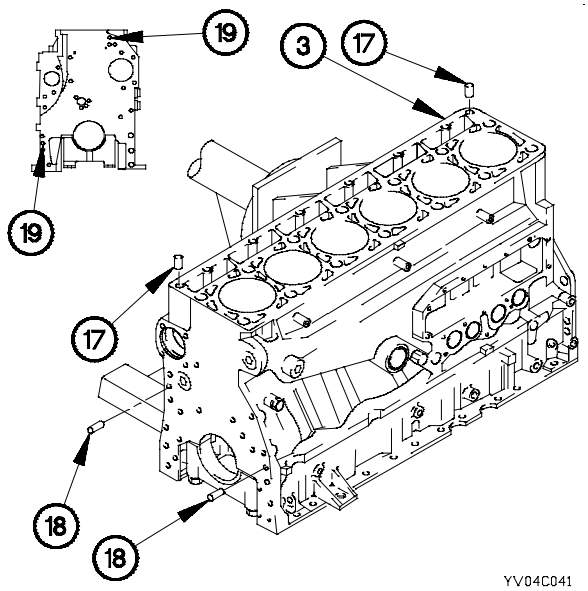
NOTE

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 9-2320-366-20-3).

(10) Install water pump (TM 9-2320-366-20-3).

(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
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).
Camshaft and bearings removed (para 20-7).
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 78, Appendix B)
Indicator, Dial (Item 36, Appendix B)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)

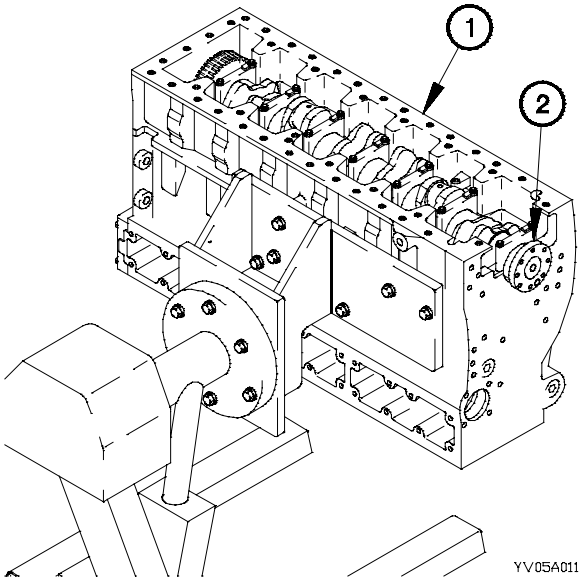
Tools and Special Tools
Puller Kit, Universal (TM 9-2320-366-20)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Sling, Cargo (Item 56, Appendix B)

Materials/Parts
Diesel Fuel (Item 28, Appendix C)
Gage, Bearing Clear (Item 33, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Lubricating Oil, Gear (Item 50, Appendix C)

Personnel Required
(2)

a. Removal.

(1) Rotate cylinder block (1) for access to crankshaft (2).

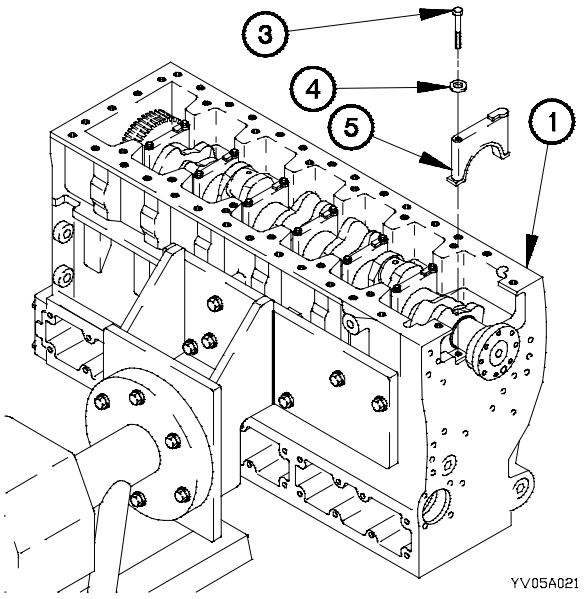


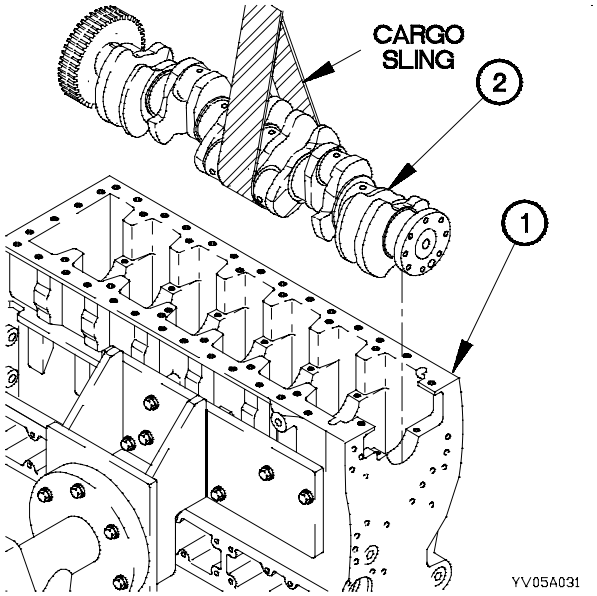
(2) Remove 14 bolts (3) and washers (4) from seven crankshaft main bearing caps (5).

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

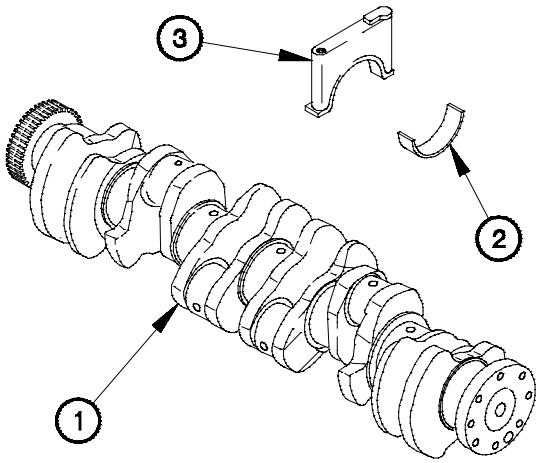
Diesel fuel is flammable. Keep diesel fuel away from open fire and keep a fire extinguisher within easy reach when working with diesel fuel. Do not smoke when working with diesel fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death to personnel.

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.

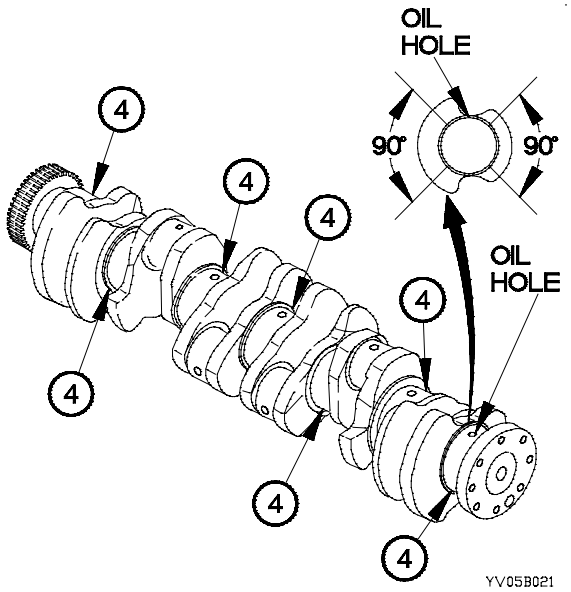
NOTE

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

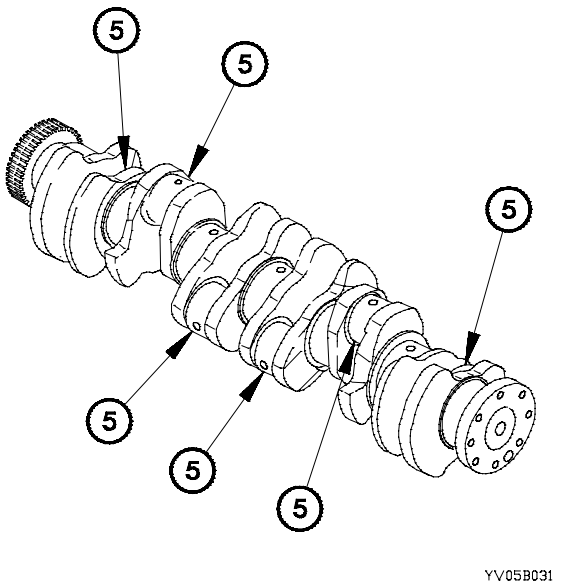
Check crankshaft main bearing journals in two places, 90 degrees apart, on each main bearing journal. Do not use area immediately around oil hole where journal surface is lower. Failure to comply may result in inaccurate readings and damage to equipment.

(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.



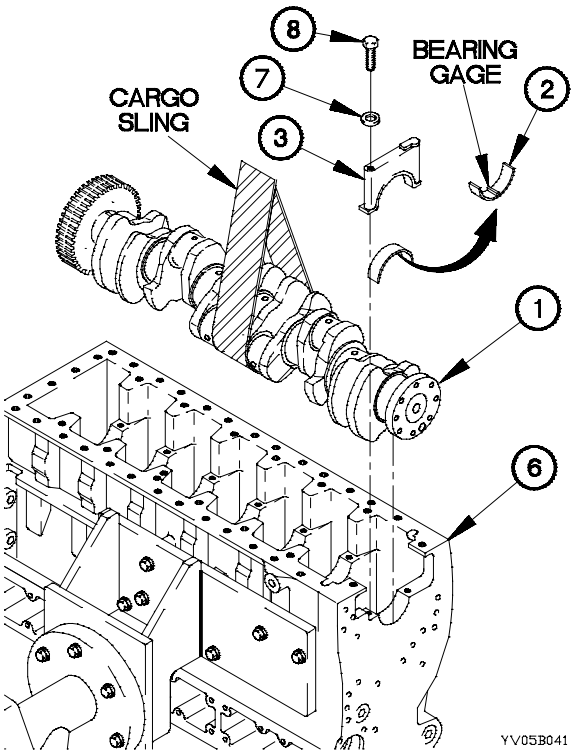
CAUTION

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).

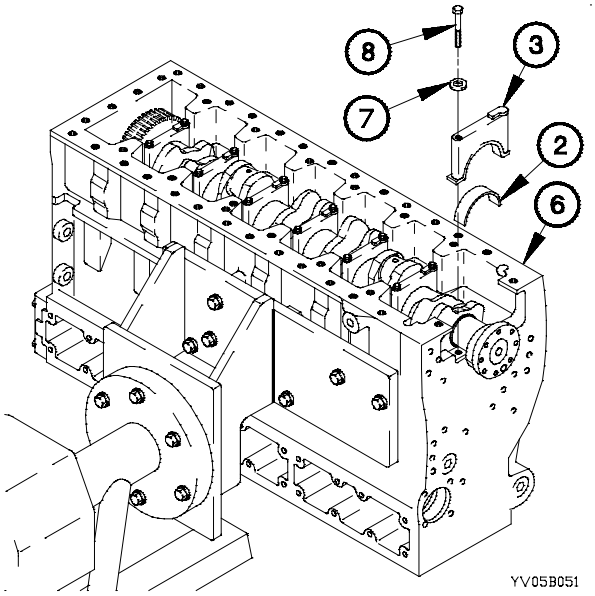
(8) Position seven main bearings (2) and crankshaft main bearing caps (3) on cylinder block (6) with 14 washers (7) and bolts (8).

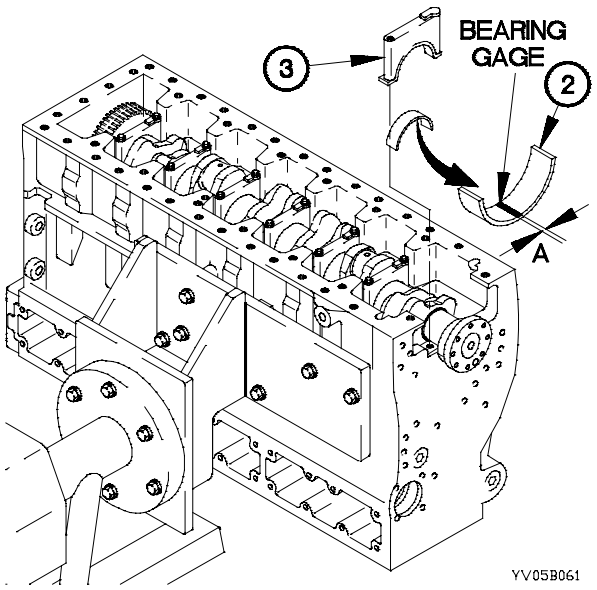
(9) Tighten 14 bolts (8) to 35-45 lb-ft (47-61 N·m).

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).

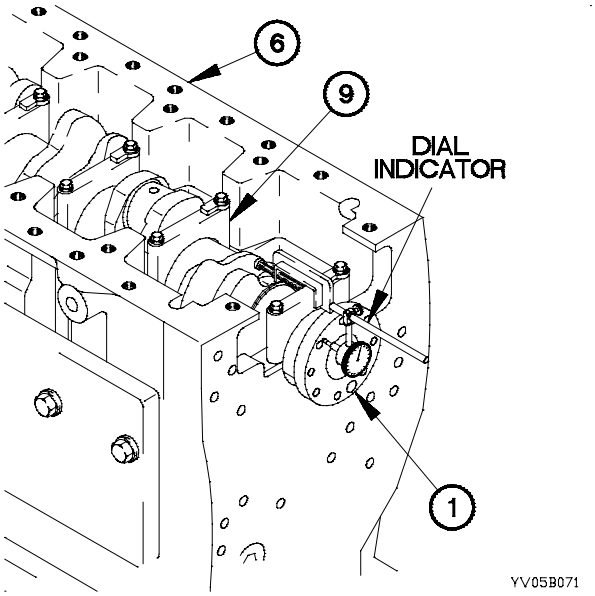
(15) Mount dial indicator on cylinder block (6).

(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).

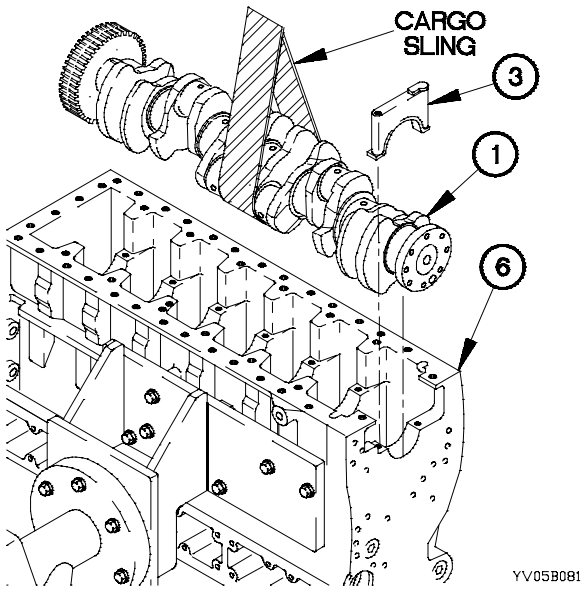
WARNING

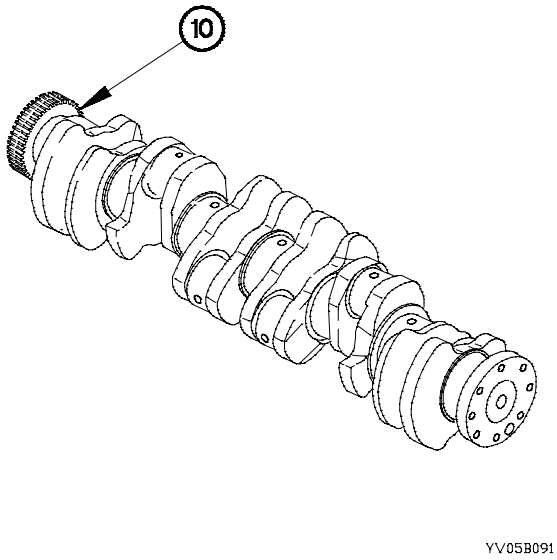
Crankshaft weighs approximately 130 lbs (59 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

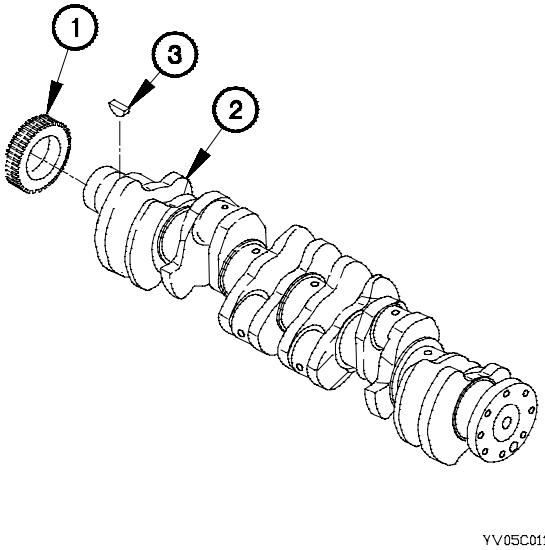
Step (21) requires the aid of an assistant.

(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.

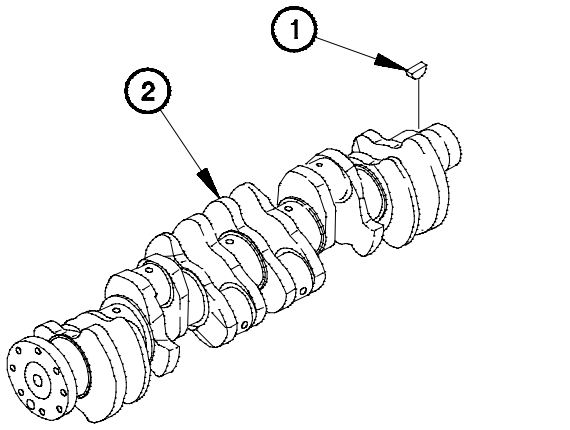
(1) Remove gear (1) from crankshaft (2).

(2) Remove key (3) from crankshaft (2).

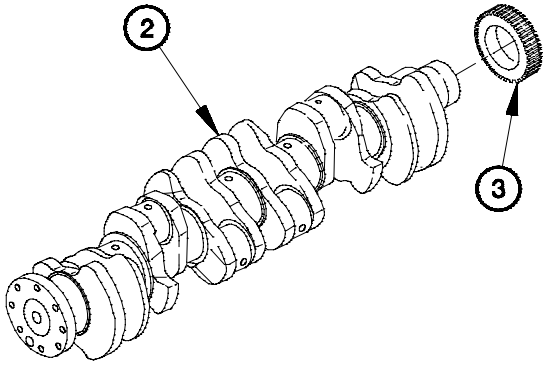
20-5. CRANKSHAFT AND MAIN BEARINGS REPLACEMENT/REPAIR (CONT)

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

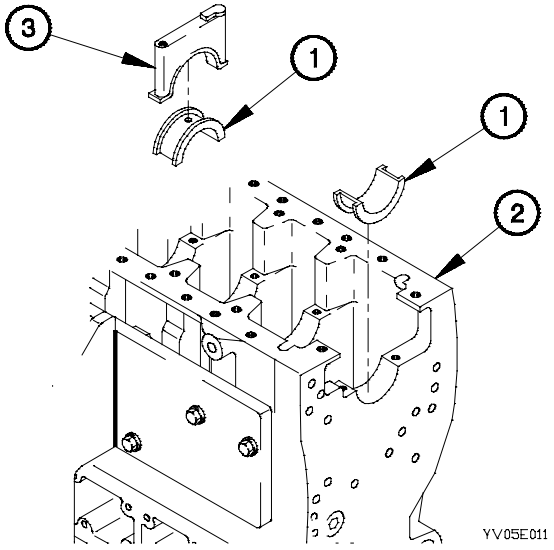
Number six bearing is crankshaft thrust bearing. Upper (or block) half of main bearings two, three, five, and six are slotted for oil flow to connecting rod bearings. Ensure no oil is allowed on back of bearings.

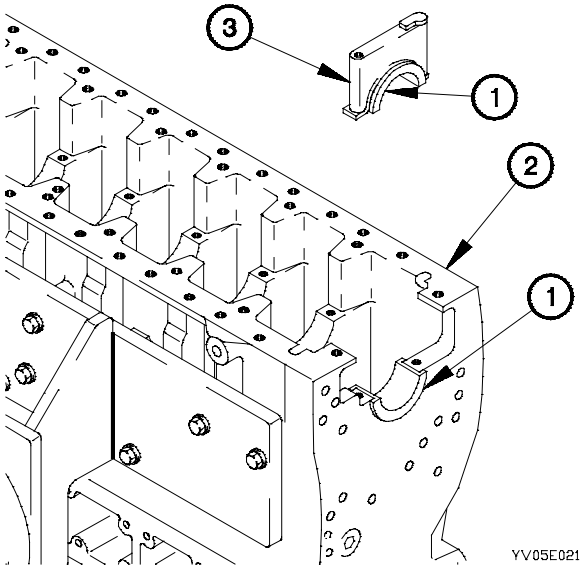
(1) Install thrust bearing (1) in No. 6 journal of cylinder block (2).

(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)

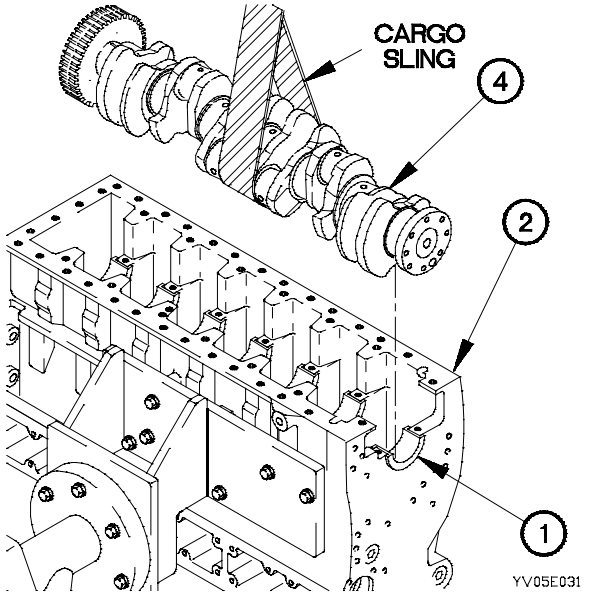
WARNING

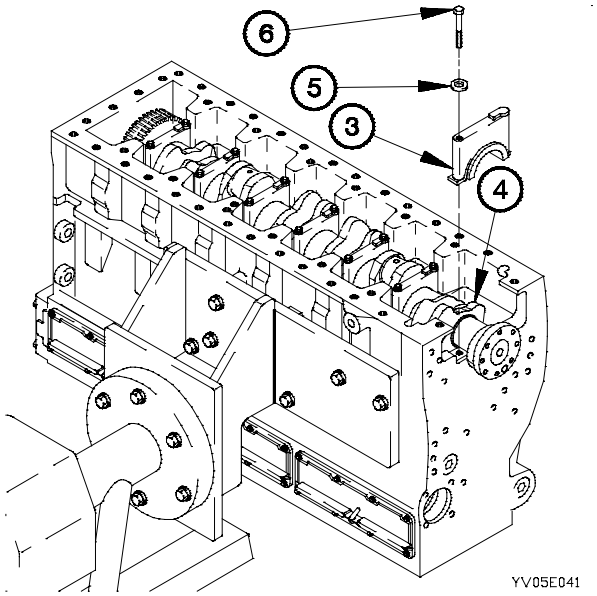
Crankshaft weighs 130 lbs (59 kgs). Use appropriate lifting device to lift crankshaft. Failure to comply may result in injury to personnel or damage to equipment.

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).

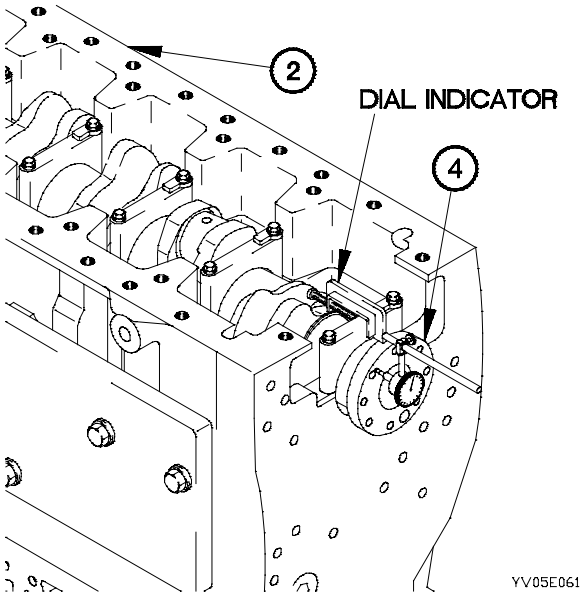
(13) Match mark each bolt (6) and crankshaft main bearing cap (3).

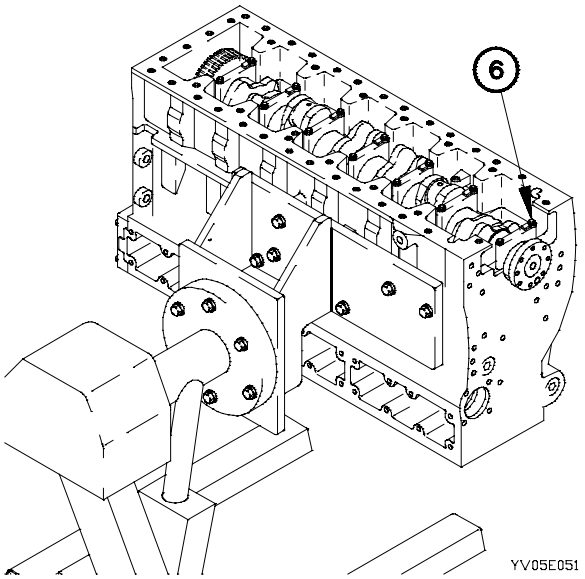
NOTE

Use matchmarks 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. (0.008-0.023 cm).

(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) Install cylinder head (para 3-6).

(8) 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 78, Appendix B)
Extractor, Screw (Item 22, Appendix B)
Caliper, Micrometer, Inside (Item 10, Appendix B)
Pliers, Retaining Ring (Item 45, Appendix B)
Degreaser, Portable Liquid Type (Item 18, Appendix B)
Compressor, Ring, Piston (Item 16, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)

Tools and Special Tools
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

Materials/Parts
Gage, Bearing Clearance (Item 33, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 48, Appendix C)
Carbon Removing Compound (Item 18, Appendix C)

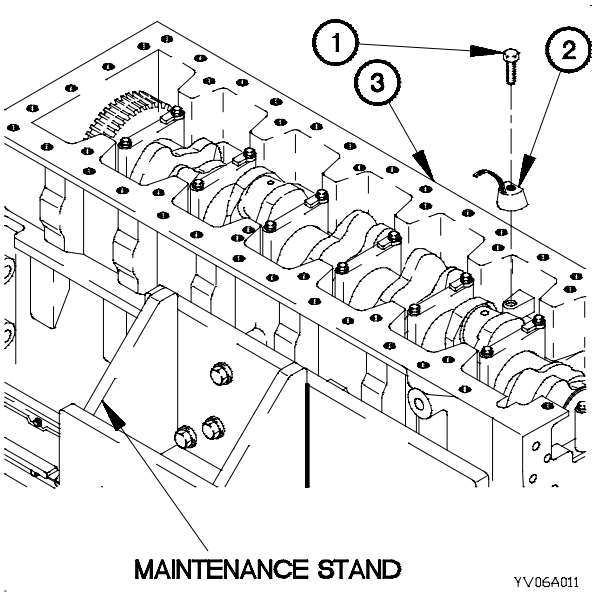
Personnel Required
(2)

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).

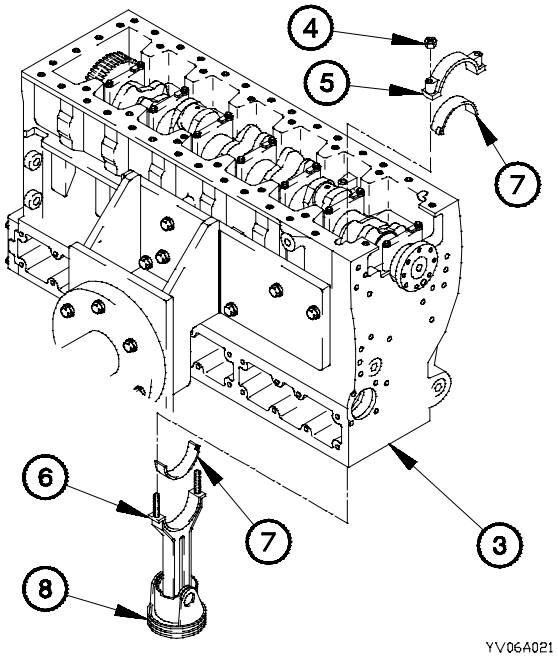
CAUTION

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.

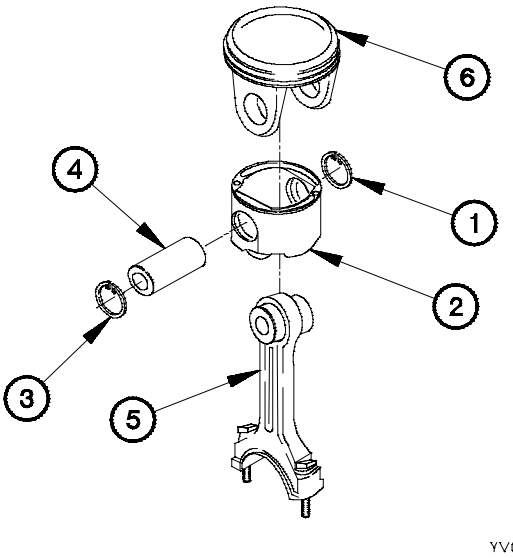
(4) Remove piston and connecting rod assembly (8) from cylinder block (3).

(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).

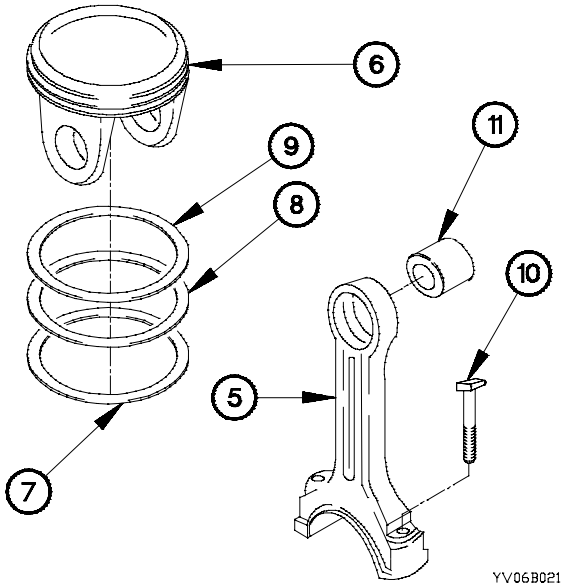
20-6. PISTON AND CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR (CONT)

(5) Remove No. 1 piston ring (7), No. 2 piston ring (8) and oil control ring (9) from piston crown (6).

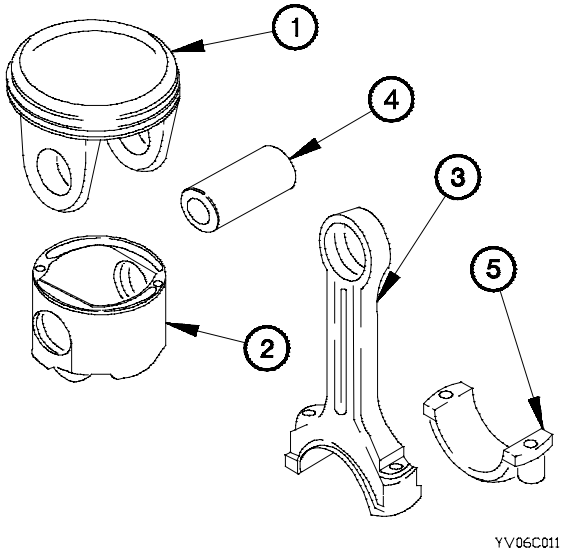
(6) Remove two connecting rod bolts (10) from connecting rod (5).

(7) Remove piston pin bearing (11) from connecting rod (5).

(8) Perform steps (1) through (7) on remaining pistons.



c. Cleaning/Inspection.



WARNING

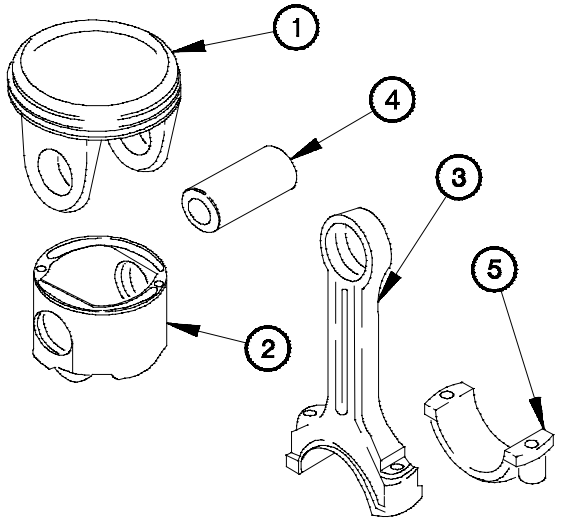
Some chemical agents (detergents, solvents, alkalis, etc.) may irritate skin or be harmful to the eyes, nose, and throat. Some must be used only with adequate ventilation. When working with potentially harmful chemical substances, read and heed all warnings on the product labels and follow prescribed 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.

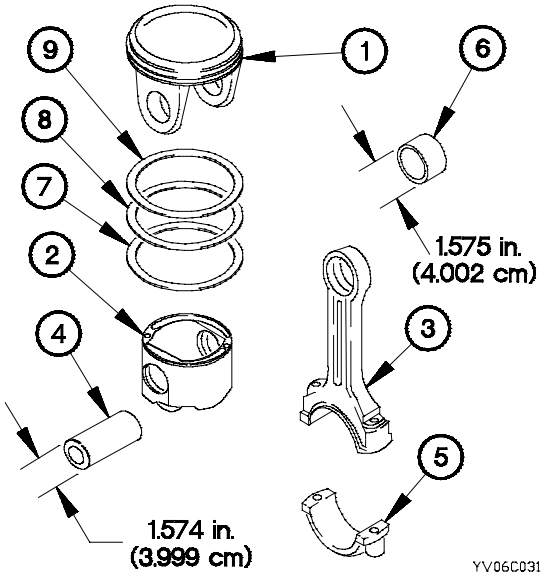
(6) Measure inside diameter of six piston pin bearings (6). Minimum inside diameter is 1.575 in. (4.002 cm).

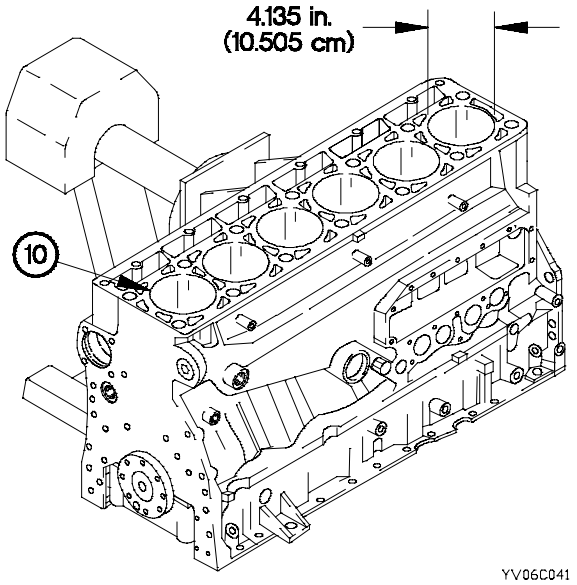
(7) Inspect six rod caps (5) for cracks, wear and corrosion.

(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 1.574 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 4.135 in. (10.505 cm).

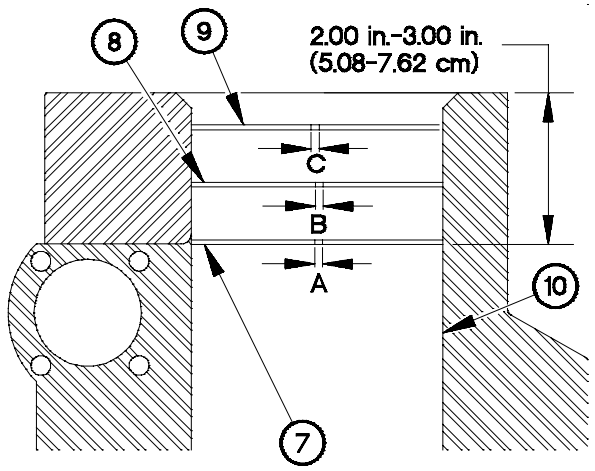
(12) Insert No. 1 piston ring (7) inside No. 1 cylinder bore (10) far enough to be within area of ring travel, 2.00-3.00 in. (5.08-7.62 cm) deep.

CAUTION

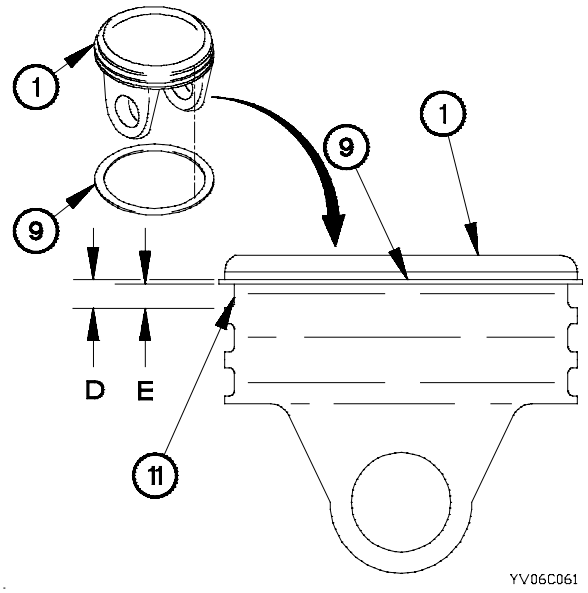
Ends of ring must be filed if gap is not within limits. File from outer surface of ring toward inner surface. Failure to comply may result in damage to equipment.

(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).

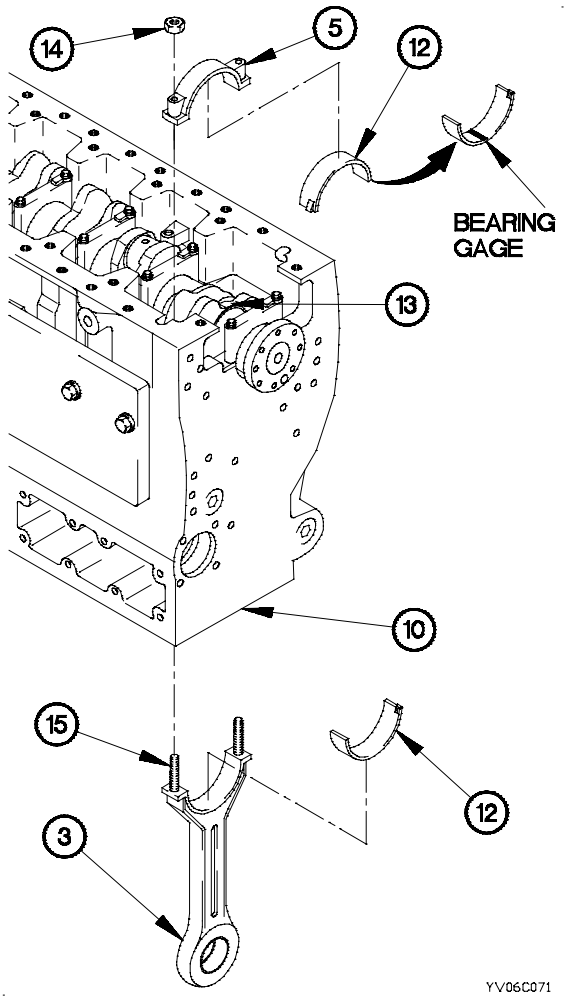
(24) Position rod cap (5) on connecting rod (3).

(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.

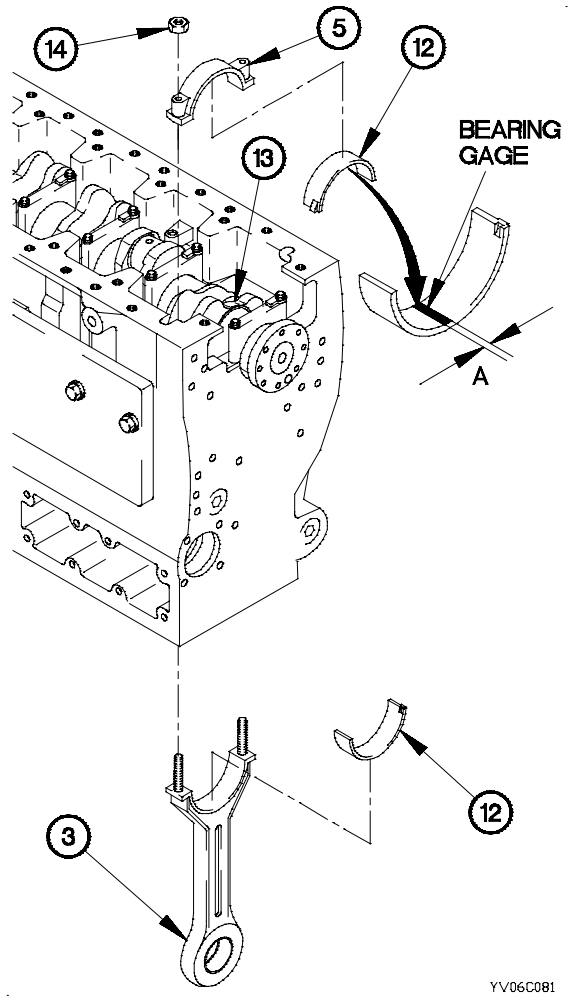
(29) Remove two connecting rod cap nuts (14) and connecting rod (3) from rod cap (5).

(30) Remove rod cap (5) from connecting rod journal (13).

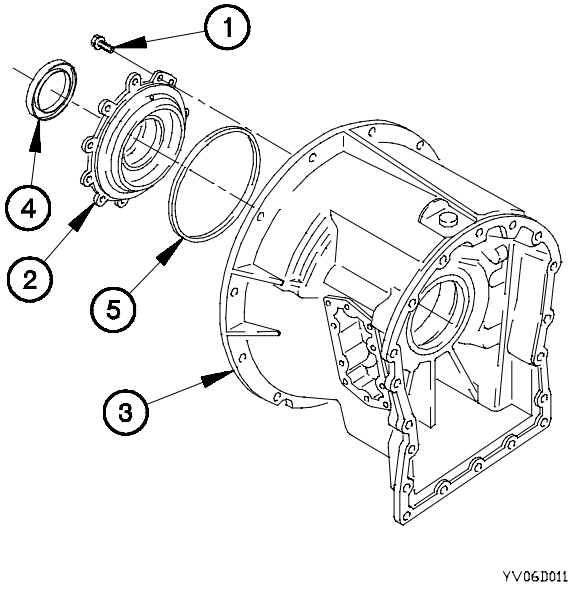
(31) Measure greatest width (A) of bearing gage in connecting rod bearing half (12) against chart contained in gage package. Maximum clearance is 0.0061 in. (0.015 cm). Record clearance reading.

(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.



NOTE

Steps (1) through (9) require the aid of an assistant.

(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.

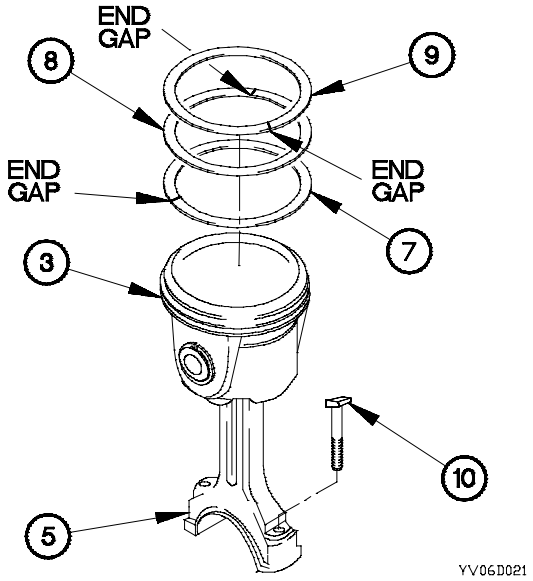
(5) Install oil control ring (7) in bottom groove of piston crown (3).

(6) Install No. 2 ring (8) in middle groove of piston crown (3) with marking "UP-2" toward top of piston.

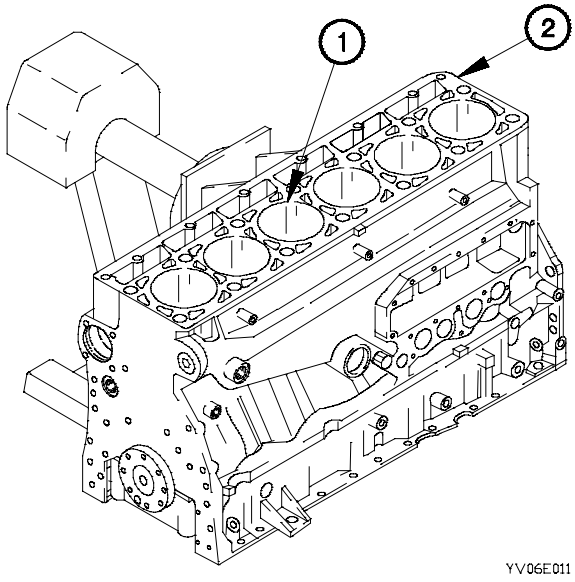
(7) Install No. 1 ring (9) in top groove of piston crown (3) with marking "UP-1" toward top of piston.

(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).

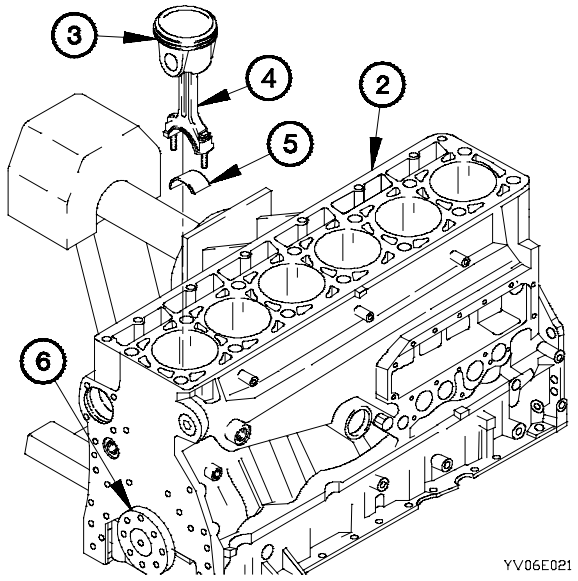
NOTE

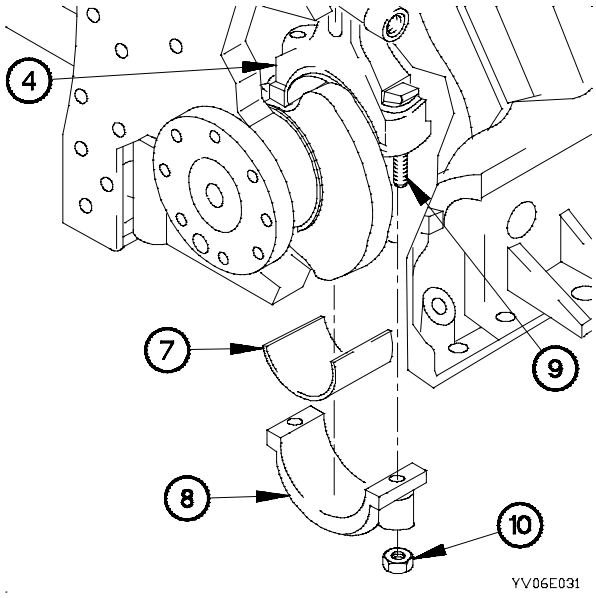
Bearing tab must engage groove in connecting rod.

(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).

(3) Demount engine from maintenance stand (para 20-2).

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 removed (para 3-15).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Degreaser, Portable Liquid Type (Item 18, Appendix B)
Caliper Set, Micrometer, Inside (Item 10, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Driver Kit, Bearing (TM 9-2320-366-20)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 51, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Gloves, Welders (Item 27, Appendix B)

Materials/Parts
Carbon Removing Compound (Item 18, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Grease, Molybdenum Disulfide (Item 37, Appendix C)

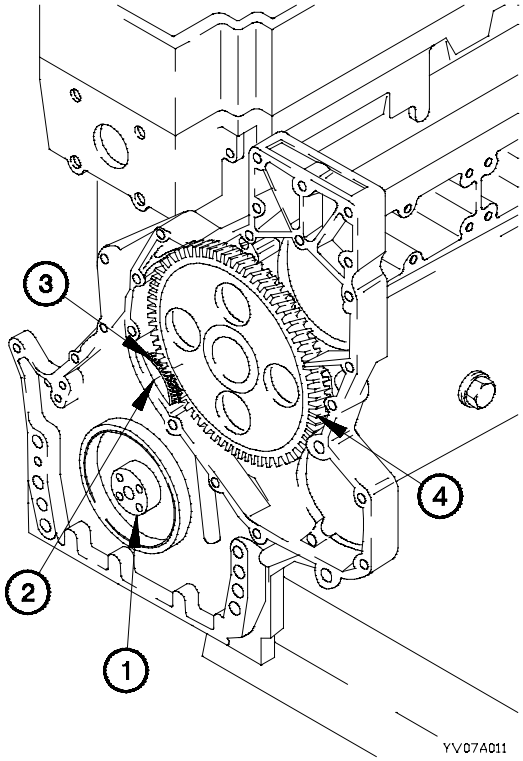
Personnel Required
(2)

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).

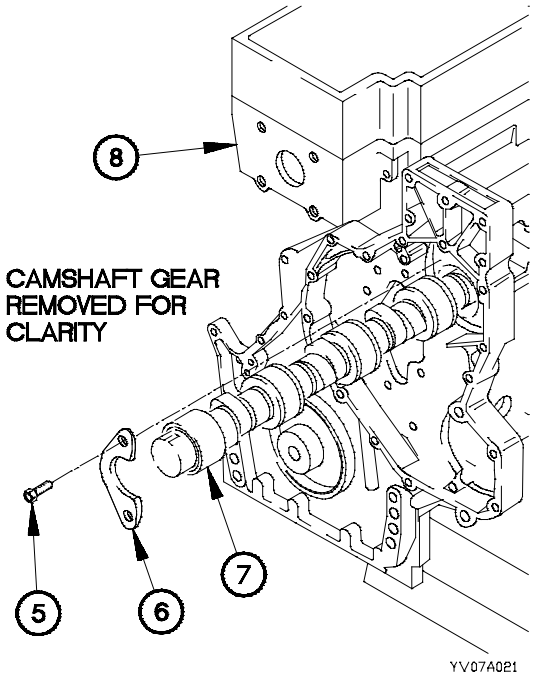


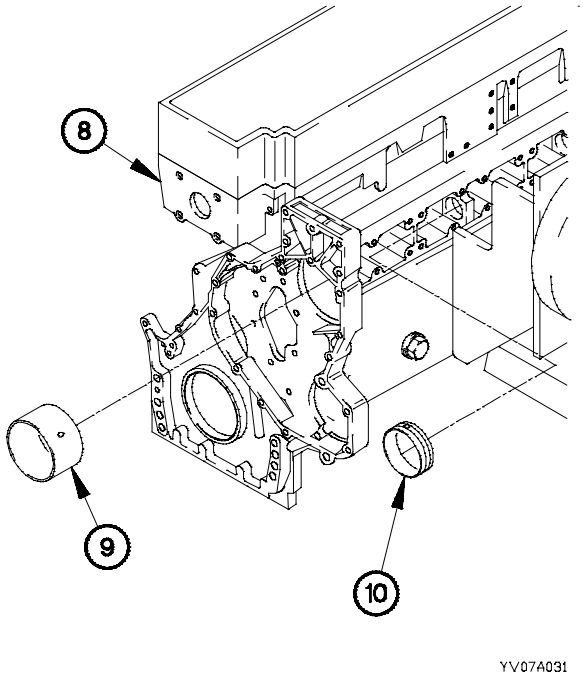
(2) Remove two screws (5) from thrust plate (6).

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).

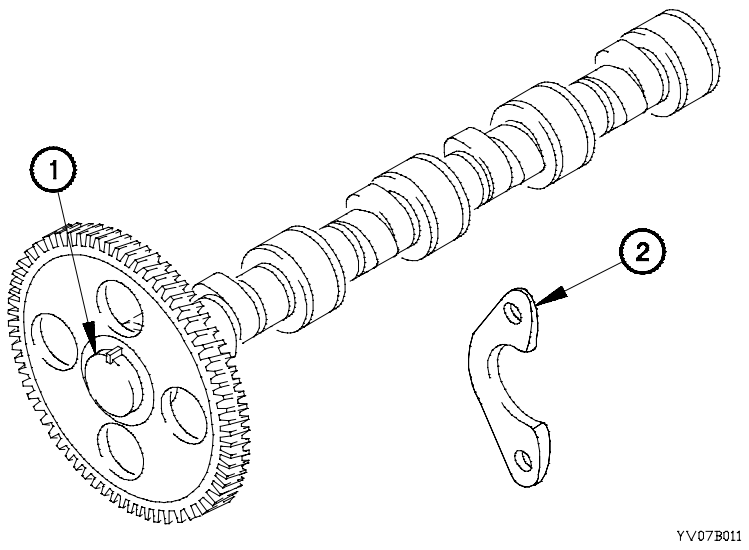
20-7. CAMSHAFT AND BEARING REPLACEMENT/REPAIR (CONT)

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.**

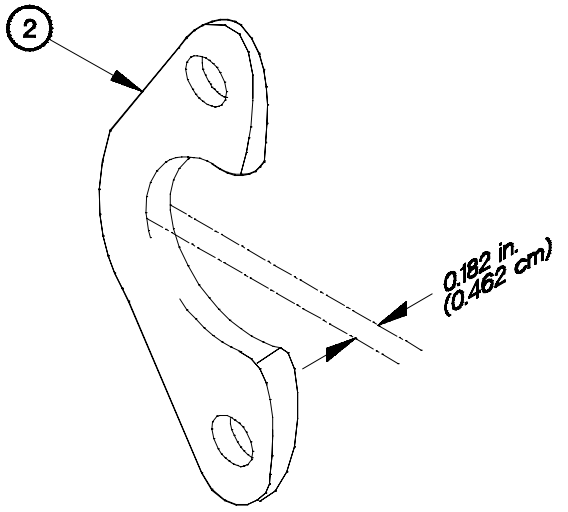
- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to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

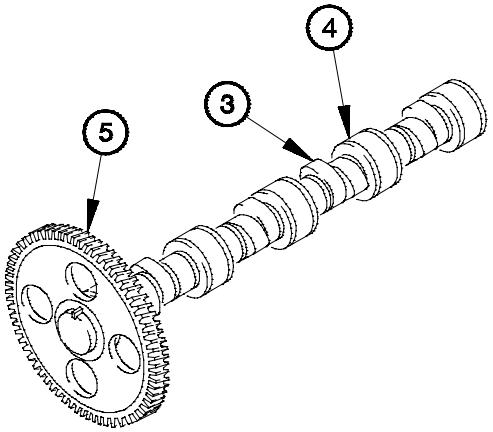
NOTE

Replace any part that fails visual inspection or size measurement requirements.

(3) Measure thickness of thrust plate (2). Minimum thickness is 0.182 in. (0.462 cm).



YV07B021



YV07B031

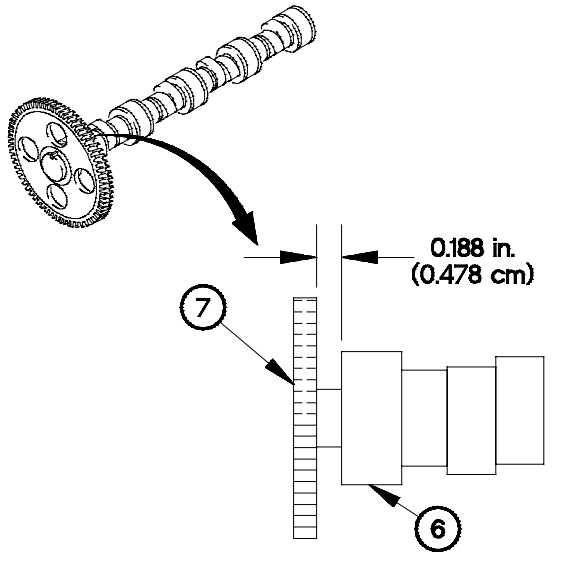
NOTE

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. (0.478 cm).



YV07B041

20-7. CAMSHAFT AND BEARING REPLACEMENT/REPAIR (CONT)

(7) Measure diameter of camshaft journals (4). Minimum diameter is 2.563 in. (6.511 cm).

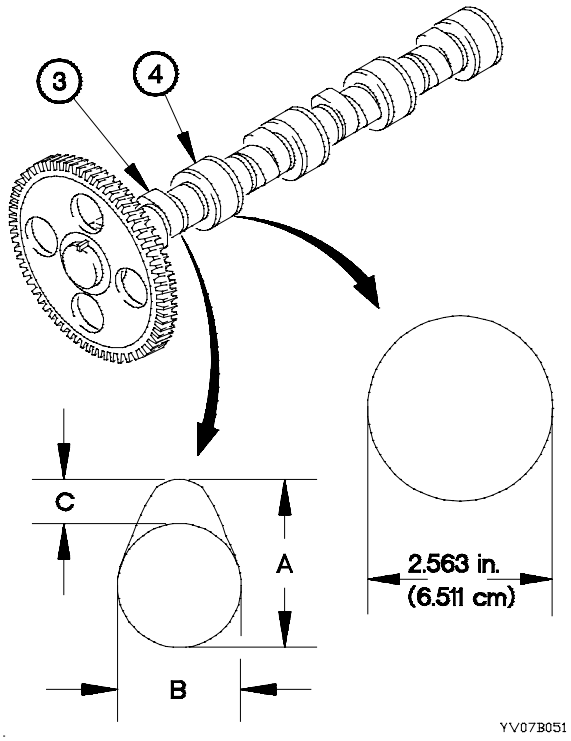
(8) Measure height (A) of all camshaft lobes (3). Record measurement.

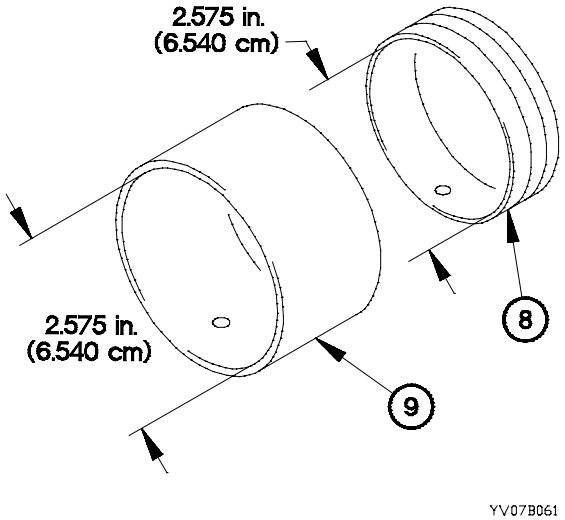
(9) Measure base circle (B) of all camshaft lobes (3). Record measurement.

(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. (0.9284 cm)
Intake lobe lift	0.3655 in. (0.9284 cm)
Injector lobe lift	0.3832 in. (0.9733 cm)





(11) Measure inside diameter of six camshaft bearings (8). Maximum inside diameter is 2.575 in. (6.540 cm).

(12) Measure inside diameter of No. 1 camshaft bearing (9). Maximum inside diameter is 2.575 in. (6.540 cm).

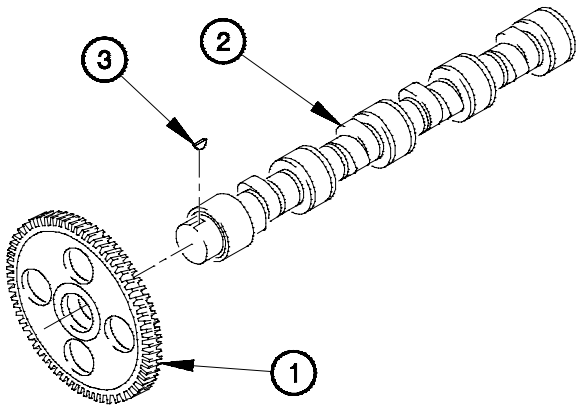
c. Disassembly.

NOTE

Perform Steps (1) and (2) if camshaft or camshaft gear fails inspection.

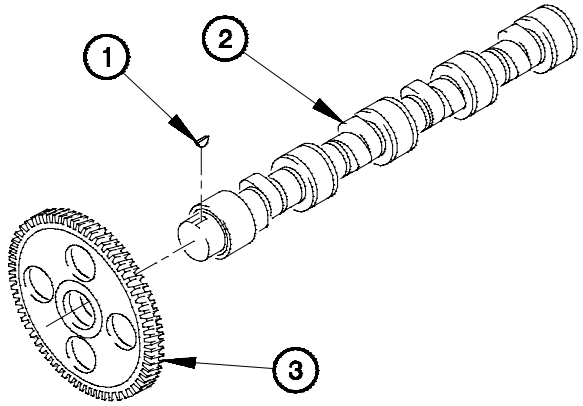
(1) Remove camshaft gear (1) from camshaft (2).

(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

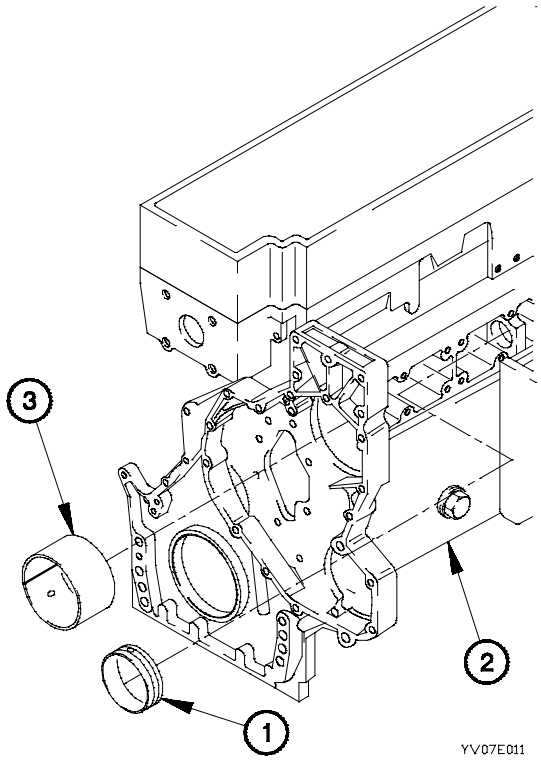
Camshaft bearing joints and oil holes must be properly aligned. Failure to comply will result in damage to equipment.

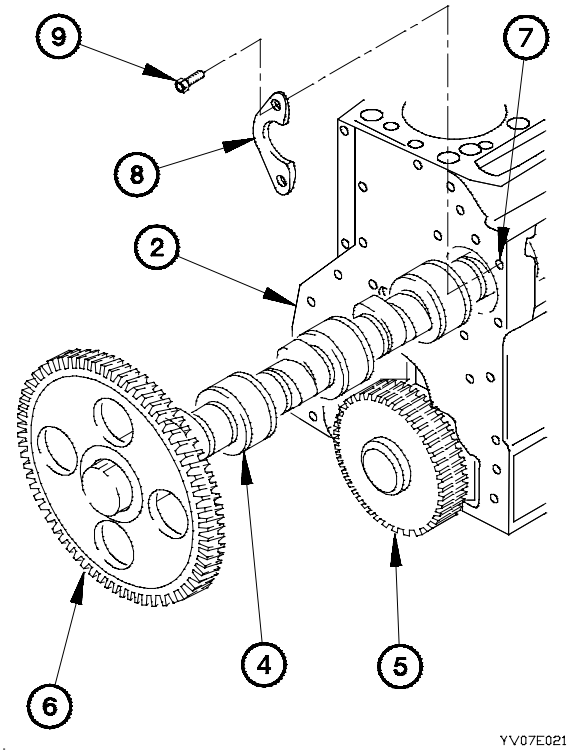
NOTE

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 20-5).
Oil pan removed (para 3-16).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)

Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

Materials/Parts
Sealing Compound (Item 76, Appendix C)

Personnel Required
(2)

a. Removal.

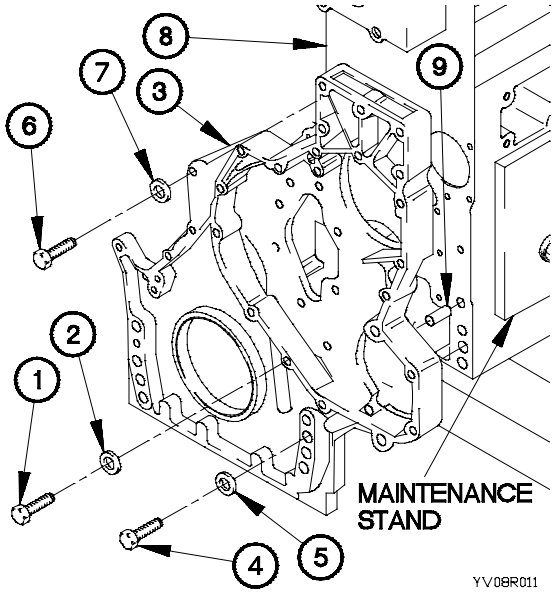
(1) Remove eight bolts (1) and washers (2) from front gear housing (3).

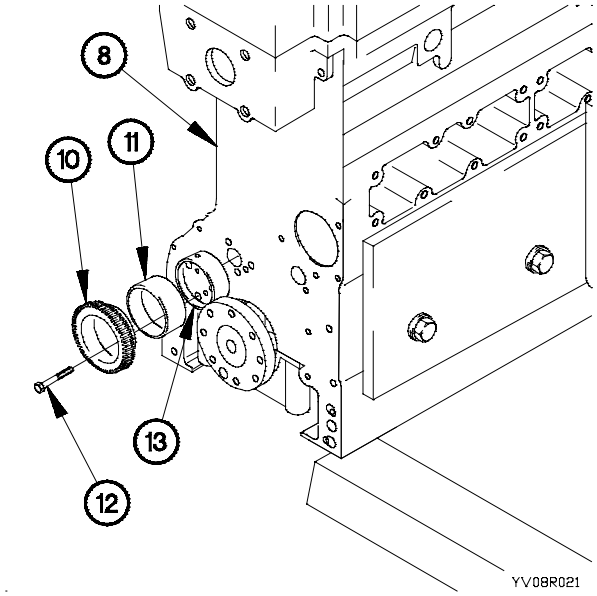
(2) Remove five bolts (4) and washers (5) from front gear housing (3).

(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.

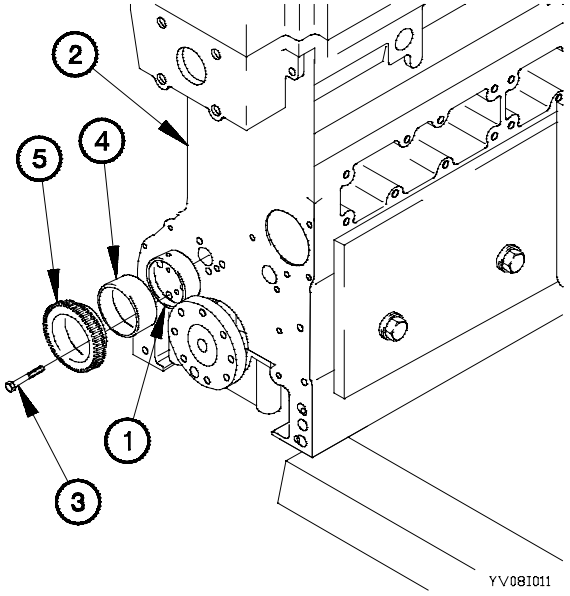
(1) Position stub shaft (1) on cylinder block (2) with three bolts (3).

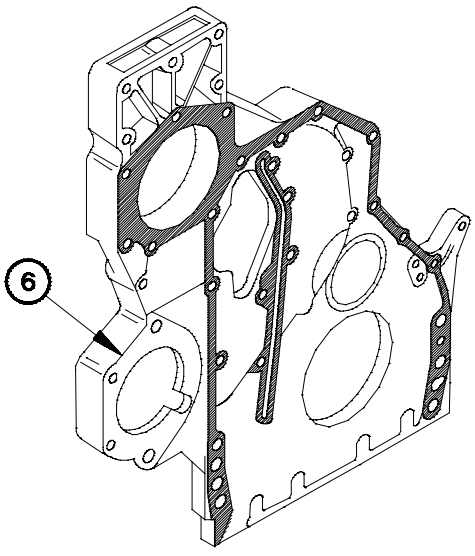
(2) Tighten three bolts (3) to 33-47 lb-ft (45-65 N·m).

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.

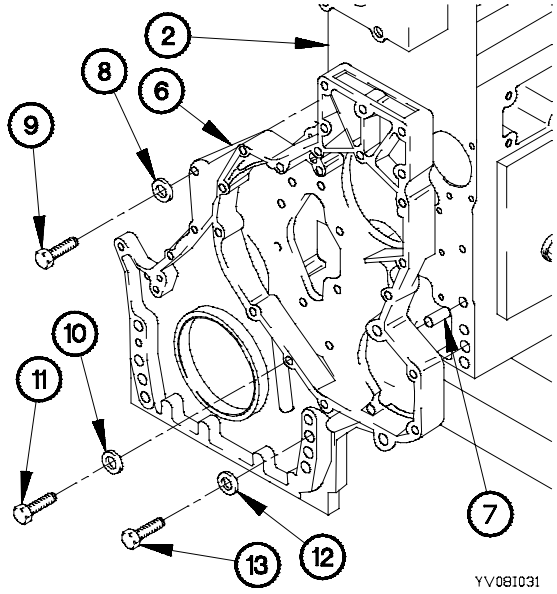
(6) Position front gear housing (6) on cylinder block (2) with two washers (8) and bolts (9).

(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 20-5).

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 Transfer Case Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

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 78, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)
Suitable container [33 qt (31 L) capacity]
Caliper, Vernier (Item 11, Appendix B)
Straight Edge (Item 71, Appendix B)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)
Indicator, Dial (Item 36, Appendix B)

Tools and Special Tools (Cont)
Caliper, Micrometer, Inside (Item 10, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Gage, Profile (TM 9-2320-366-20)

Materials/Parts
Gasket (Item 60, Appendix F)
Gasket (Item 65, Appendix F)
Gasket (Item 66, Appendix F)
Lubricating Oil, Engine (Item 45, Appendix C)
Cloth, Abrasive (Item 22, Appendix C)

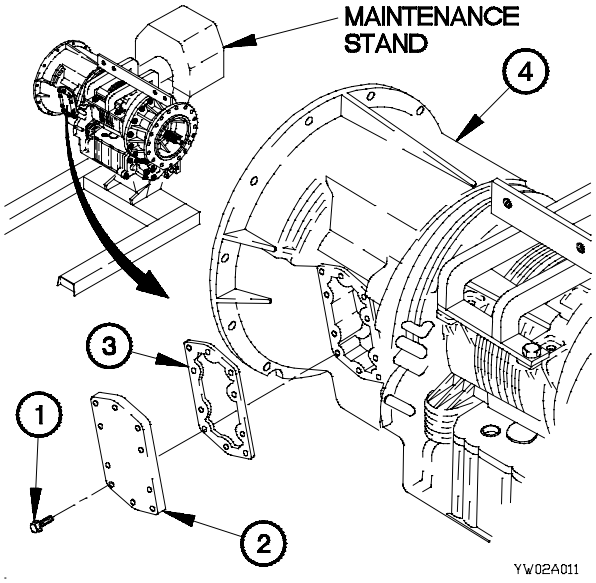
Personnel Required
(2)

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.



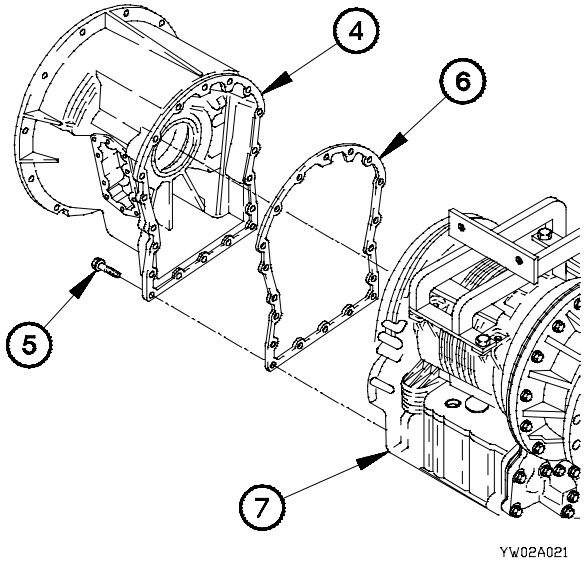
WARNING

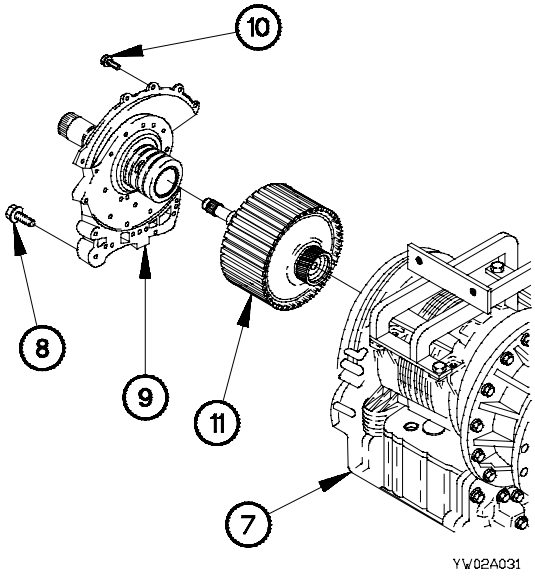
Torque converter housing weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

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).

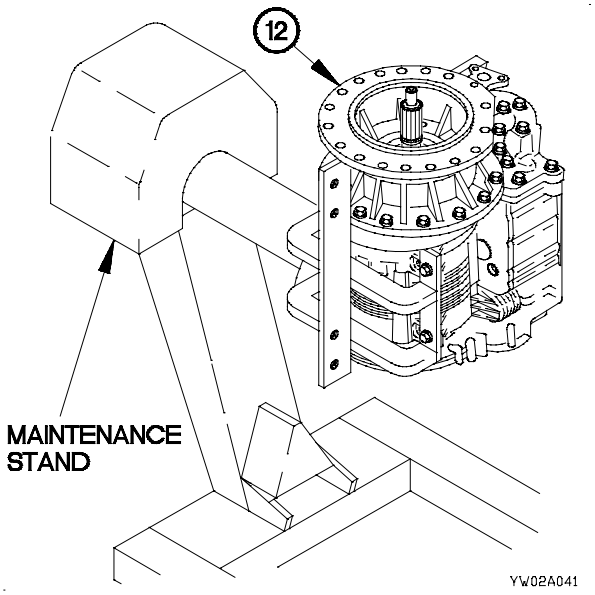
CAUTION

Hold main shaft in place while removing adapter housing. Failure to comply may result in damage to equipment.

NOTE

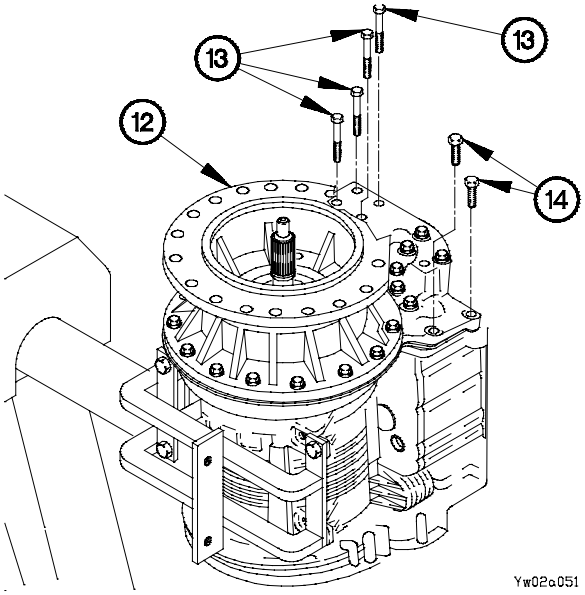
Steps (6) through (9) requires the aid of an assistant.

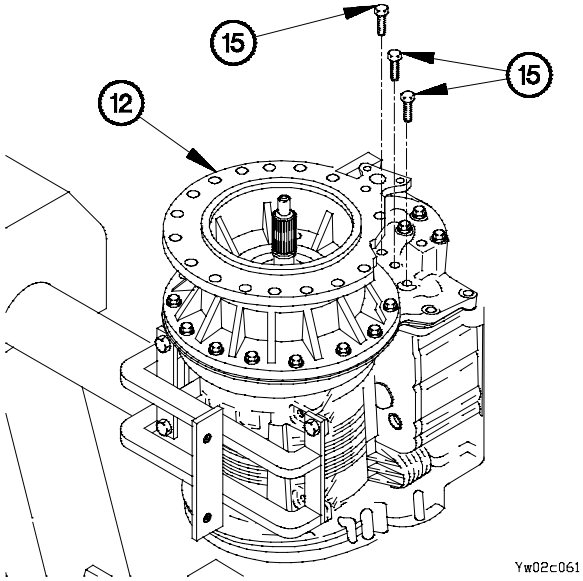
(6) Position transmission with adapter housing (12) facing up.



21-2. TRANSMISSION REPAIR (CONT)

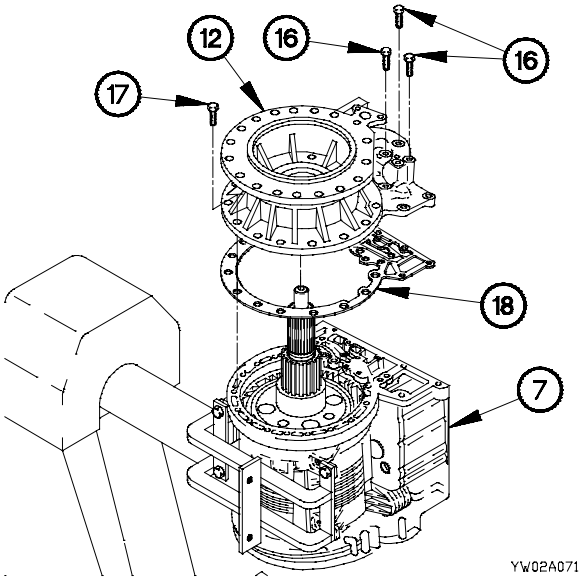
(7) Remove four bolts (13) and two bolts (14) from adapter housing (12).





(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.



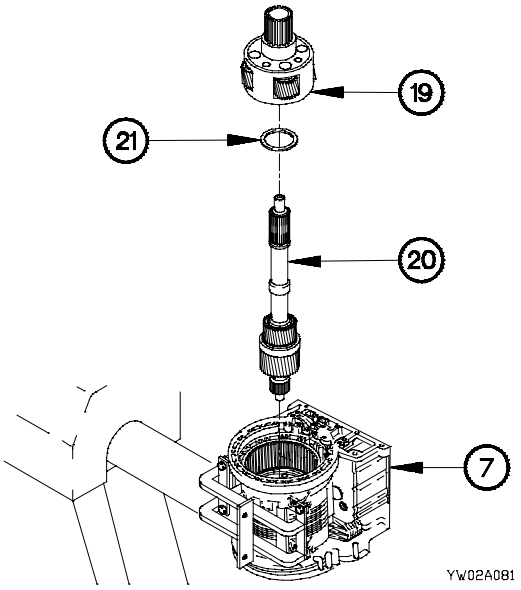
(10) Remove P3 planetary (19) from main housing (7).

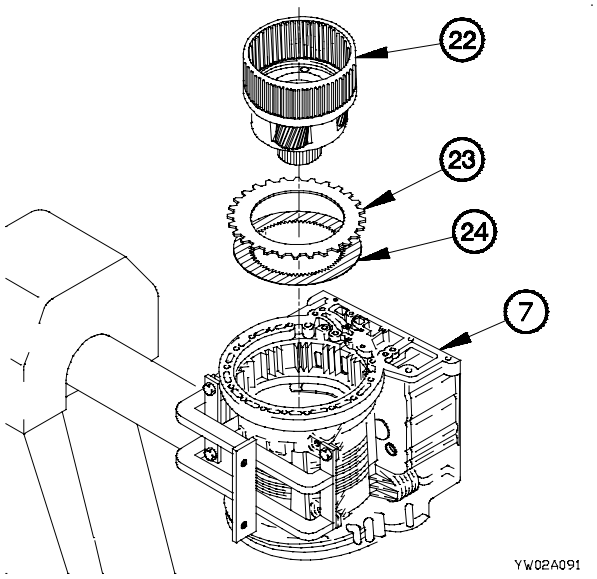
(11) Remove main shaft (20) from main housing (7).

NOTE

Perform step (12) if shim is installed on main shaft.

(12) Remove shim (21) from main shaft (20).

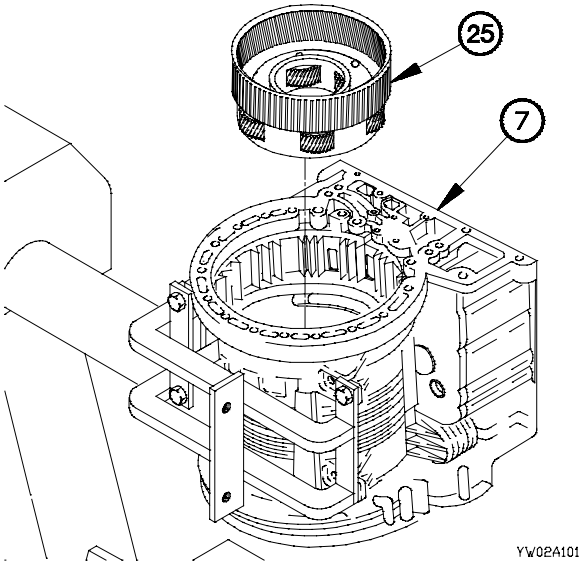




(13) Remove P2 planetary (22) from main housing (7).

(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).



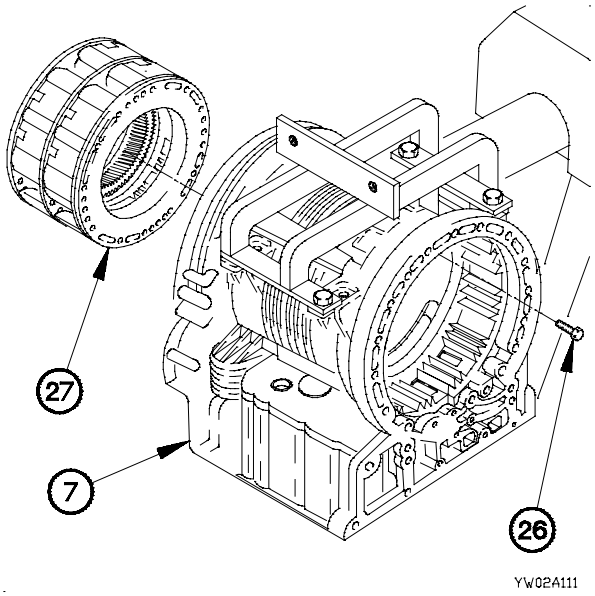
21-2. TRANSMISSION REPAIR (CONT)

CAUTION

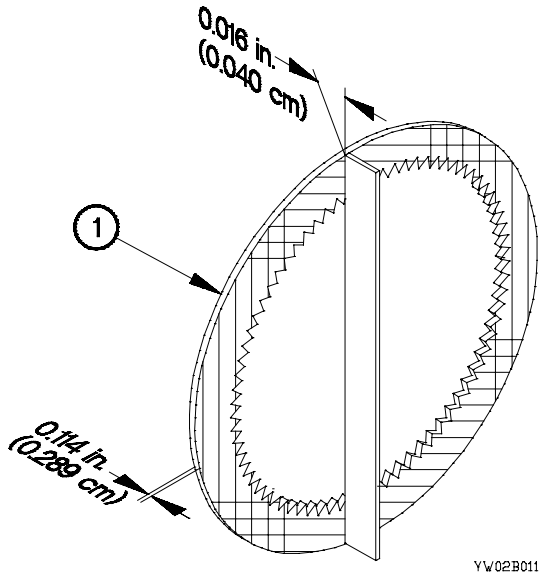
The main housing module must be horizontal before removing C3 and C4 clutch module. Failure to comply may result in damage to equipment.

(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).



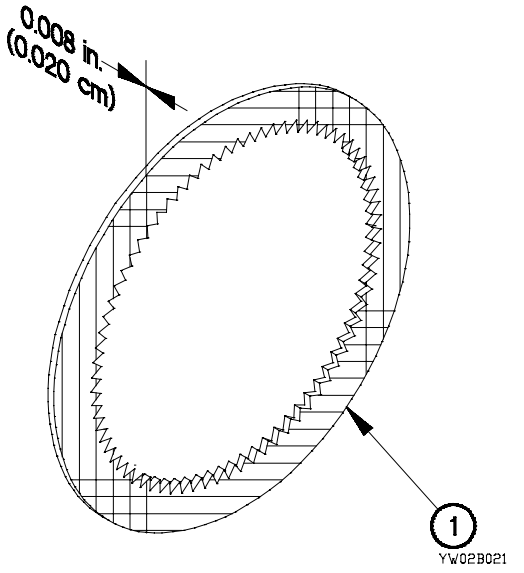
b. Inspection



(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.

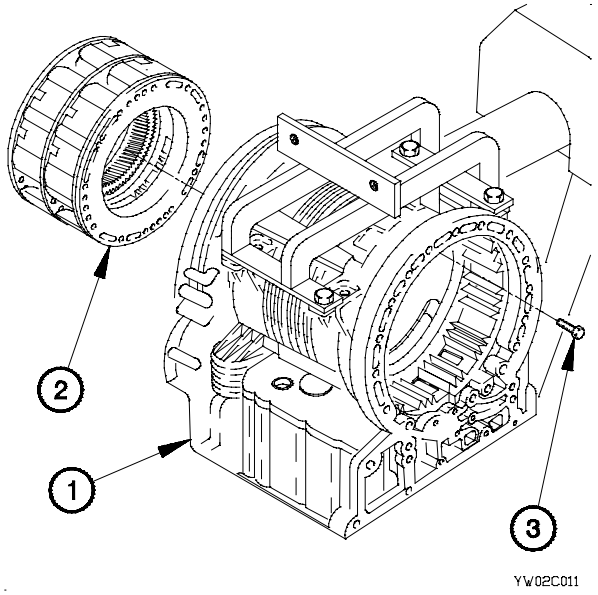
NOTE

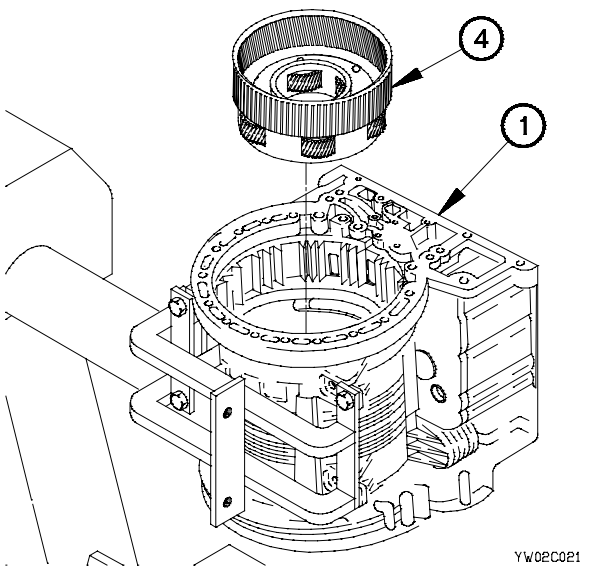
Apply lubricating oil to all parts during assembly.

(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).

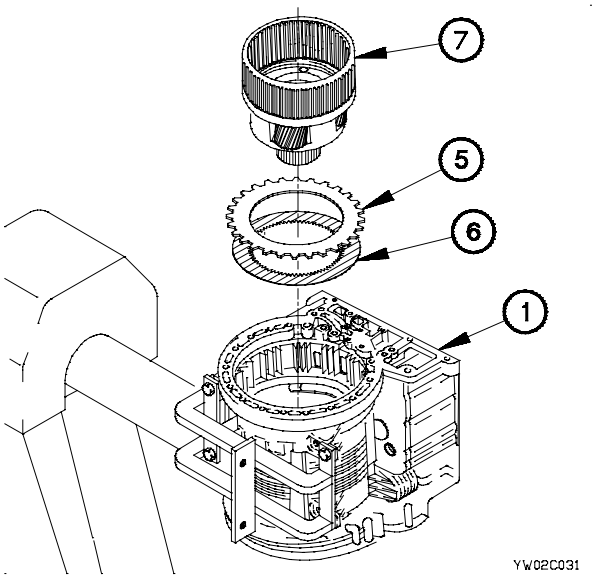




(4) Position rear of main housing (1) facing up.

(5) Install P1 planetary (4) in main housing (1).

21-2. TRANSMISSION REPAIR (CONT)

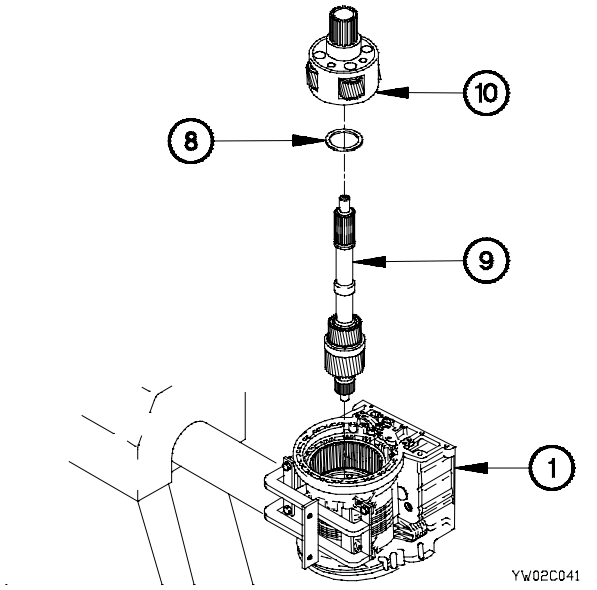


NOTE

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.

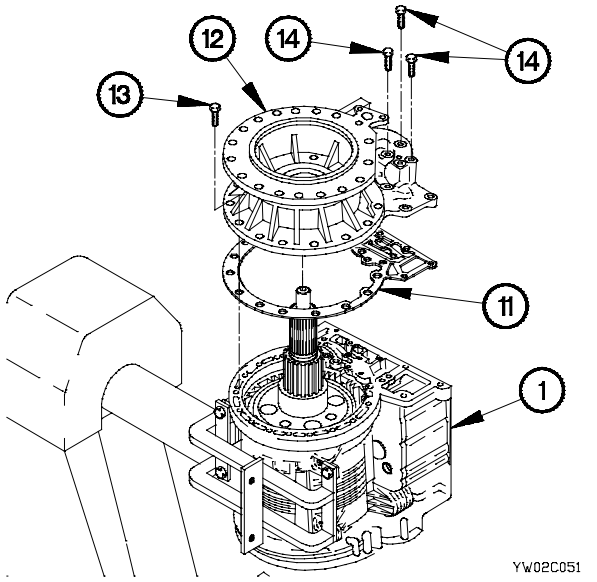
(8) Install shim (8) on main shaft (9).

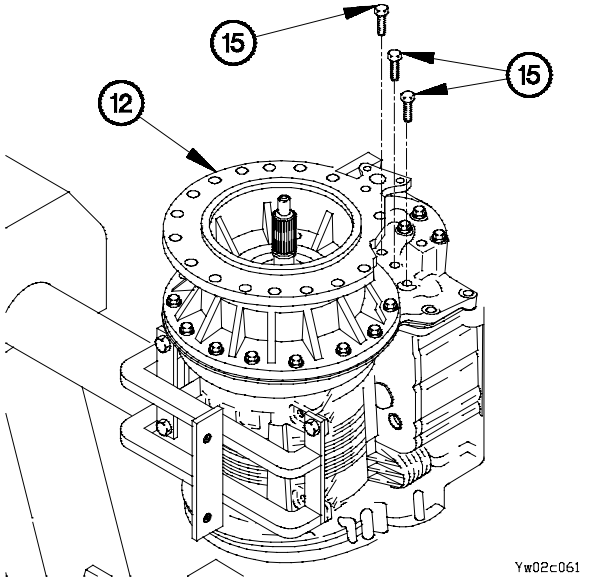
(9) Install main shaft (9) in main housing (1).

(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).

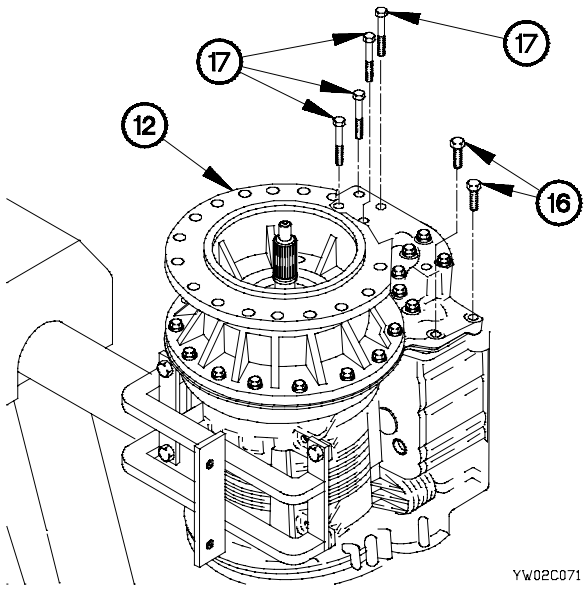




(13) Position three bolts (15) in adapter housing (12).

(14) Position two bolts (16) and four bolts (17) in adapter housing (12).

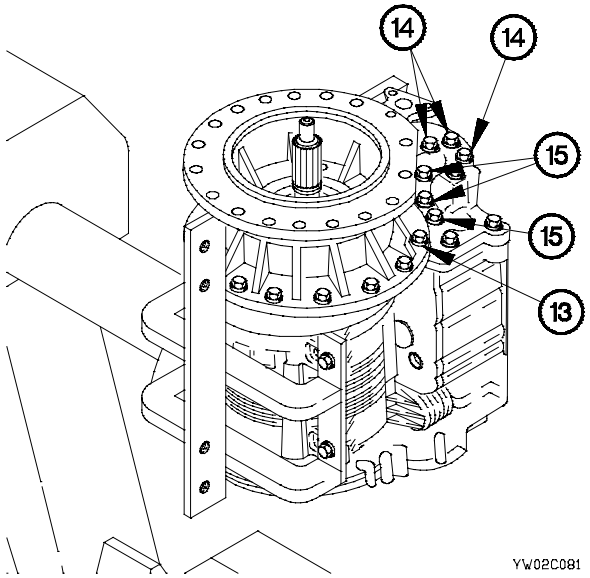
(15) Tighten four bolts (17) and two bolts (16) to 66-81 lb-ft (90-110 N·m).

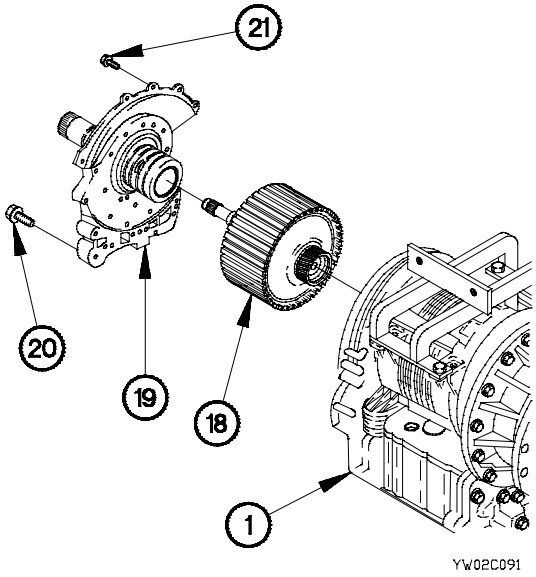


21-2. TRANSMISSION REPAIR (CONT)

(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

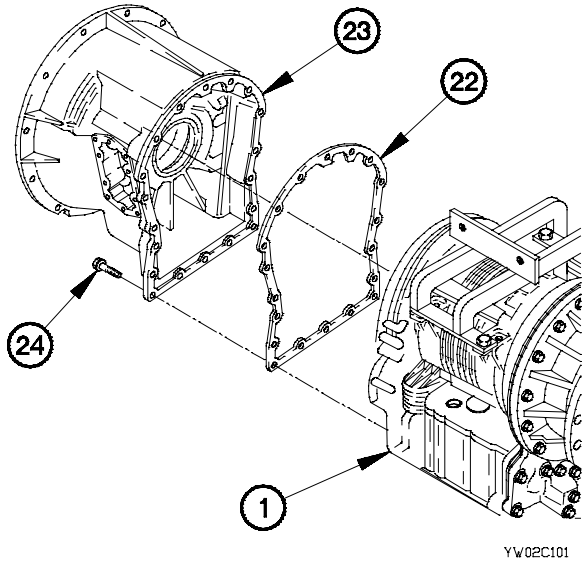
Torque converter housing weighs approximately 65 lbs (30 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

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).



(24) Deleted.

(25) Deleted

(26) Deleted.

(27) Deleted.

(28) Deleted.

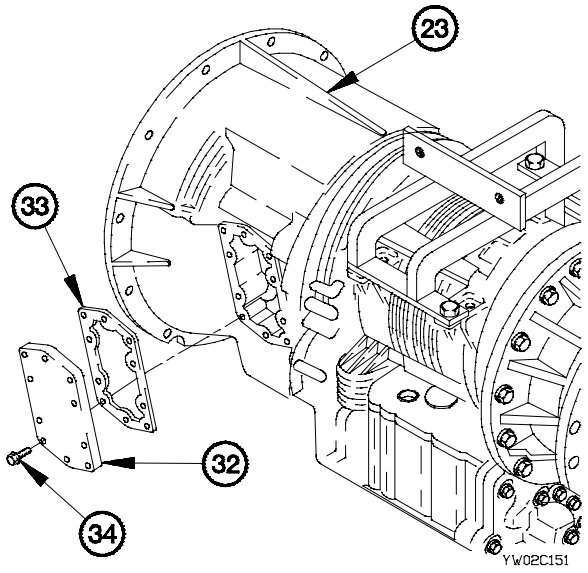
(29) Deleted.

(30) Deleted.

(31) Deleted.

(32) Deleted.

(33) 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 7-2).

(2) Install control valve module (para 7-10).

(3) Install scavenge assembly pump (7-16).

(4) Install transfer case module (para 22-2).

(5) Demount 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 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Puller Kit, Universal (Item 50, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Caliper, Vernier (Item 11, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

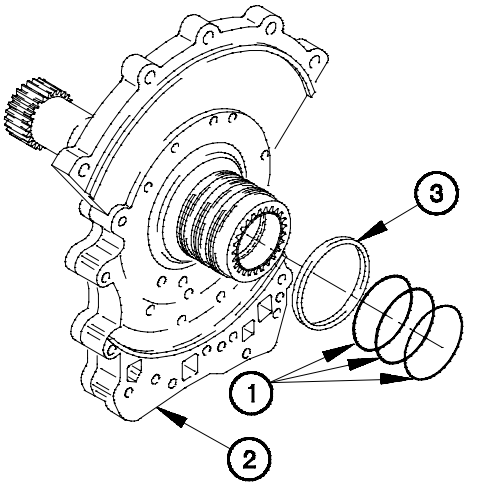
Tools and Special Tools (Cont)
Gloves, Rubber (Item 26, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-366-20)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Parts Kit, Seal Replacement (Item 314, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)

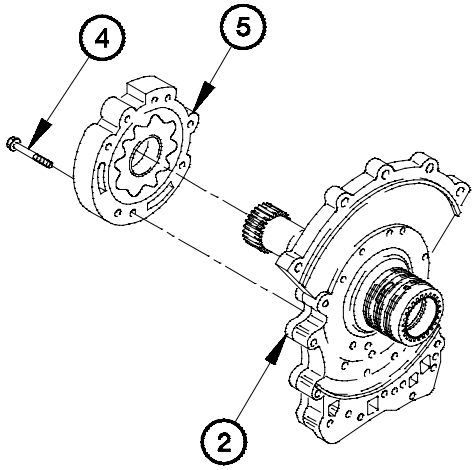
a. Disassembly.

(1) Remove three sealrings (1) from front support (2). Discard sealrings.

(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.

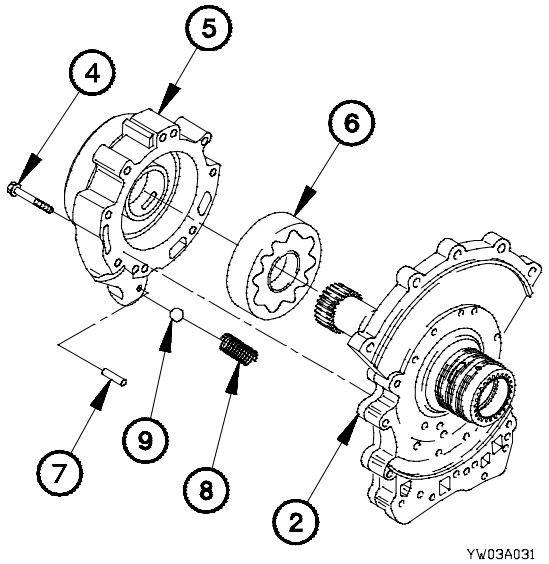
NOTE

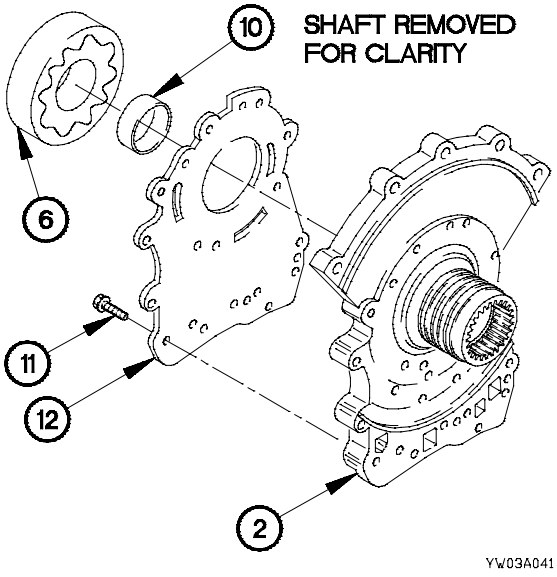
Perform step (4) through (6) on pump housings equipped with a main relief valve.

(4) Remove eight screws (4) and pump housing (5) from front support (2).

(5) Remove gear (6) from pump housing (5).

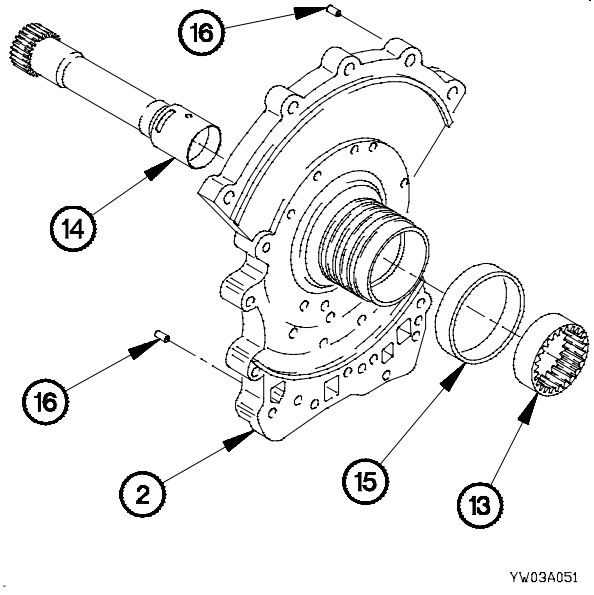
(6) Remove pin (7), spring (8), and ball (9) from pump housing (5).





(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.

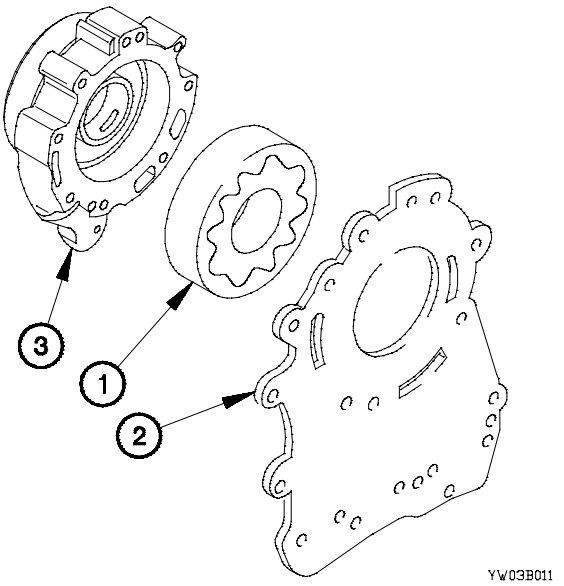
NOTE

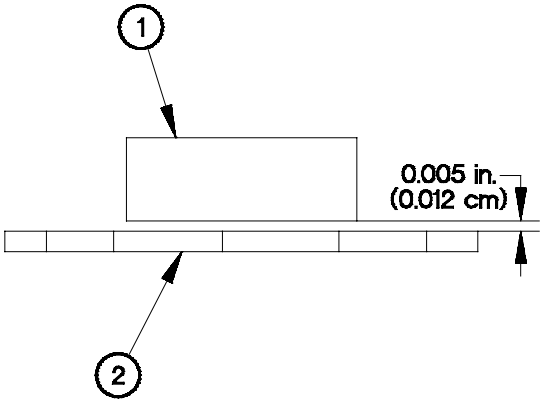
Replace any part that fails visual inspection or size measurement requirements.

(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. (0.0127 cm).

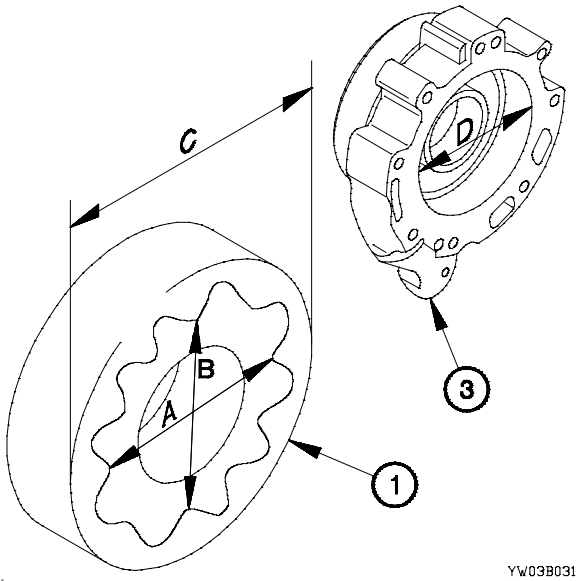
(6) Measure tooth tip clearances of gear (1) at dimension (A and B); record measurements.

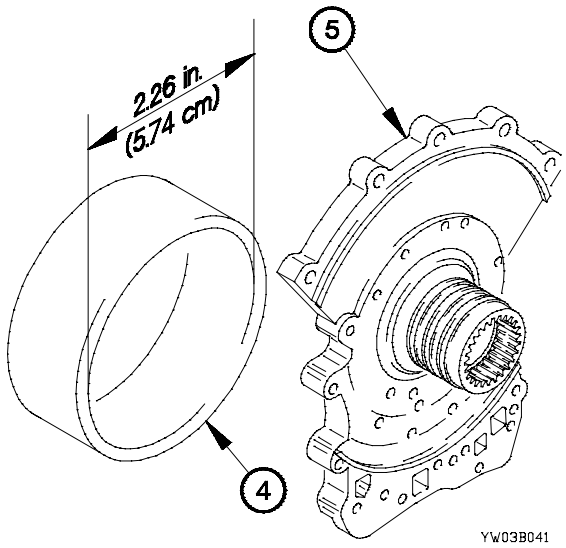
(7) Subtract dimension (B) from dimension (A), maximum difference 0.005 in. (0.012 cm).

(8) Measure outside diameter of gear (1) at dimension (C), maximum outside diameter 4.998 in. (12.694 cm); 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. (0.035 cm).





(11) Measure inside diameter of bushing (4), maximum inside diameter 2.26 in. (5.74 cm).

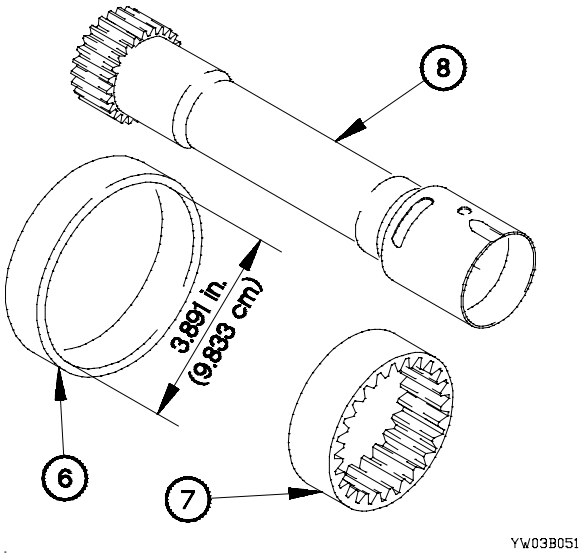
(12) Inspect front support (5) for cracks, nicks, and seal ring groove damage.

(13) Inspect spacer (6) for scoring and cracks.

(14) Measure outside diameter of spacer (6), minimum outside diameter 3.891 in. (9.883 cm).

(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 20-5).

(2) Replace converter pump PN 29503570 or 29511380 with converter pump PN 29514788 (para 7-14).

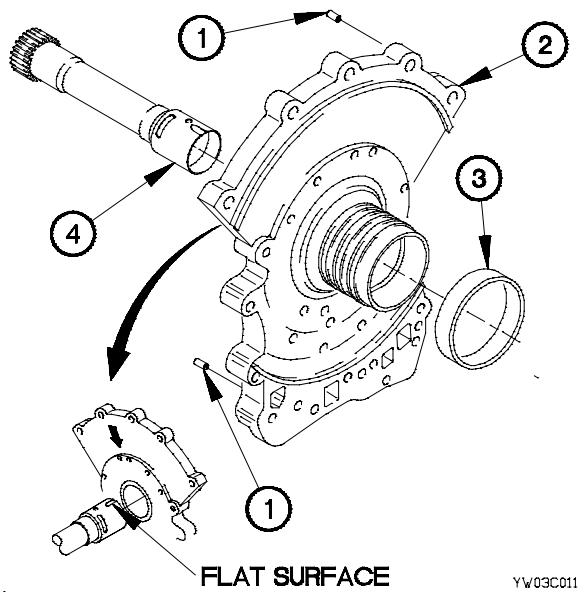
(3) Install two dowel pins (1) in front support (2).

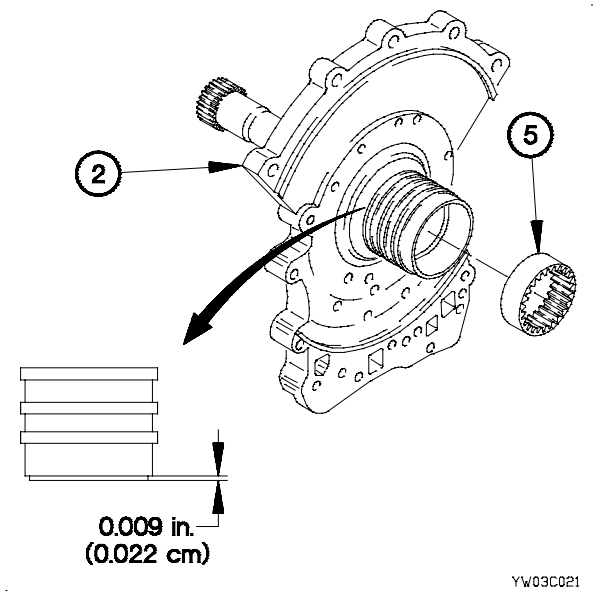
(4) Install spacer (3) on front support (2).

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).



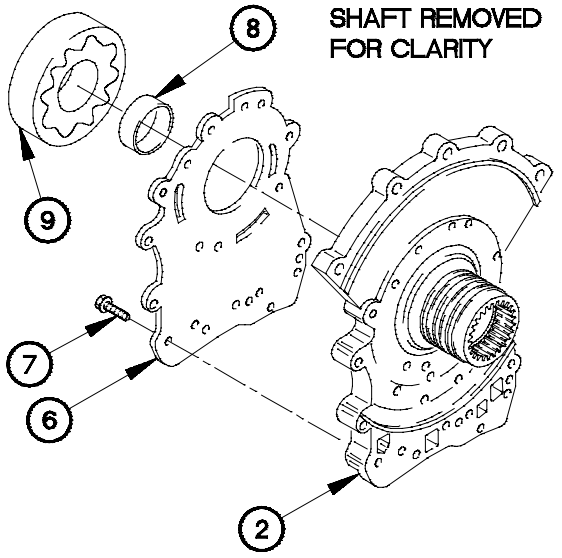


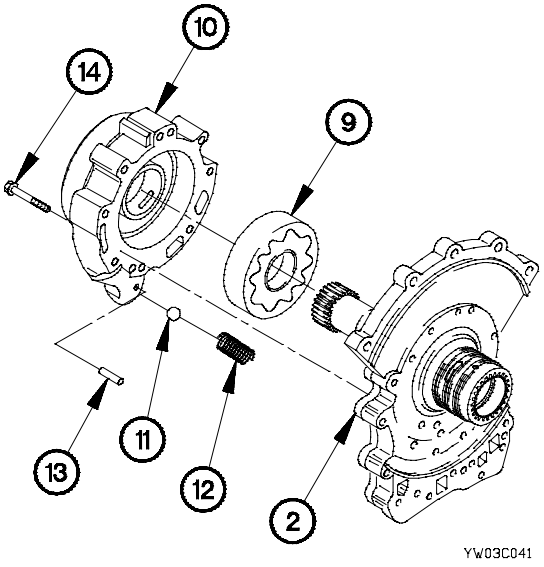
(6) Install roller bearing (5) on front support (2) flush to within 0.009 in. (0.022 cm) of top edge of front support (2).

(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).

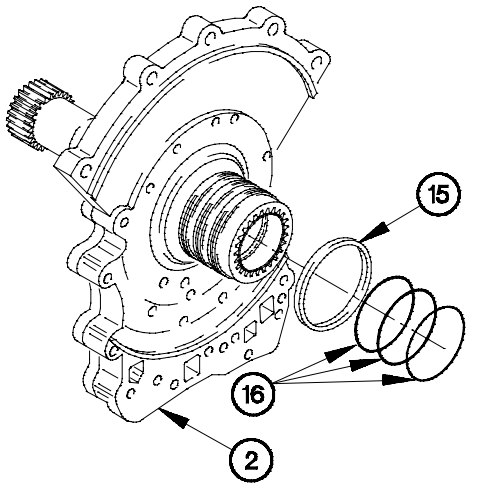
(11) Install ball (11) in pump housing (10) with spring (12) and pin (13).

(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 sealrings (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 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Inserter and Remover, Spring (TM 9-2320-366-20)
Bushing Driver Set (TM 9-2320-366-20)
Handle, Drive (TM 9-2320-366-20)
Caliper, Vernier (Item 11, Appendix B)
Straight Edge (Item 71, Appendix B)
Pliers, Retaining Ring (Item 45, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

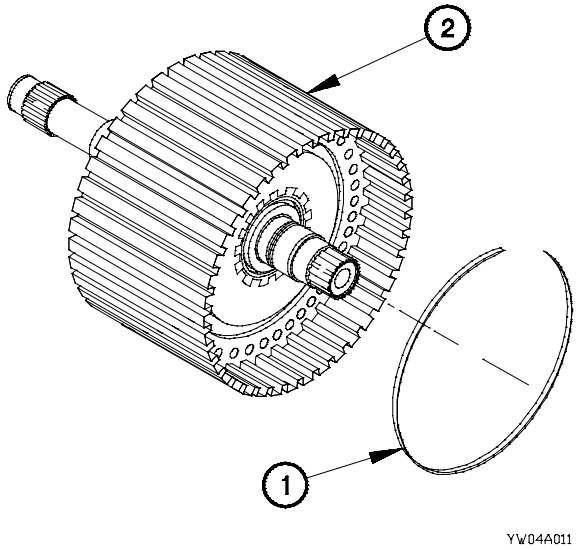
Materials/Parts
Parts Kit, Seal Replacement (Item 317, Appendix F)
Packing, Preformed (Item 295, Appendix F)
Sealring (Item 400, Appendix F)
Sealring (Item 401, Appendix F)
Sealring (Item 402, Appendix F)
Sealring (Item 403, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Cloth, Abrasive (Item 22, Appendix C)
Solvent, Dry Cleaning (Item 83, 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).

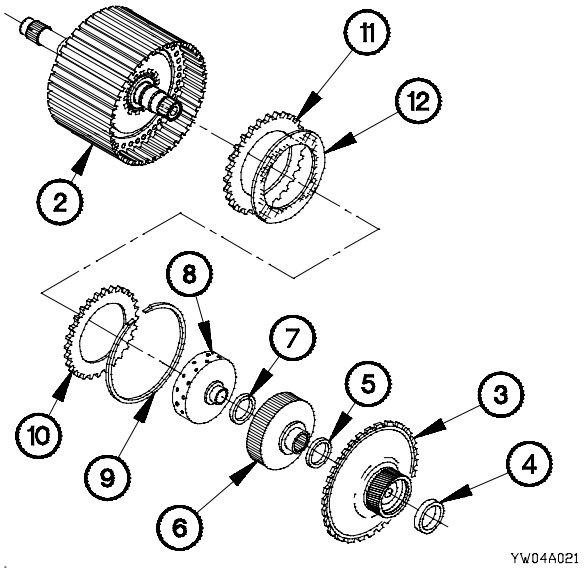
(3) Remove bushing (4) from spur gear (3).

(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).



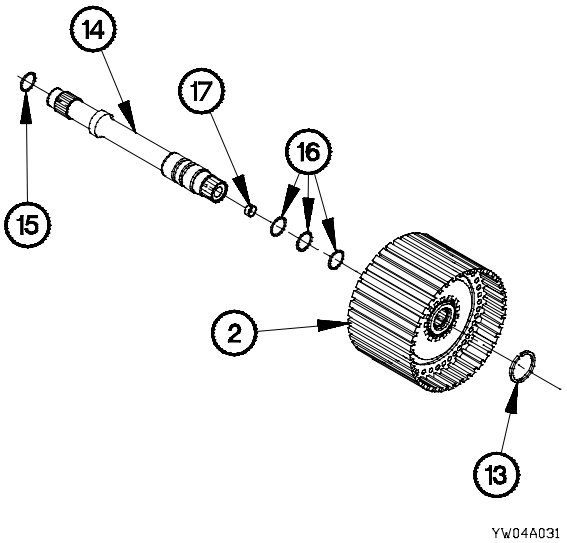
WARNING

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.

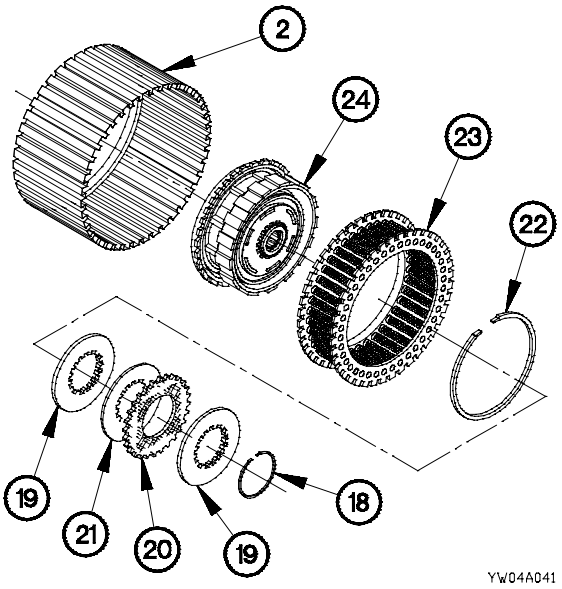
(14) Remove retaining ring (18) from clutch assembly (2).

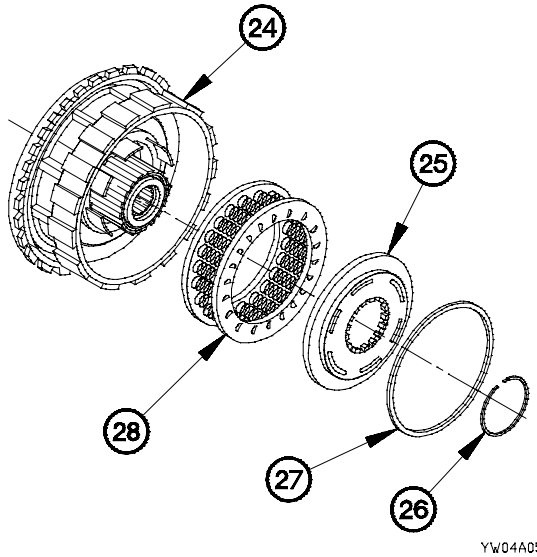
(15) Remove two C1 pressure plates (19), six friction plates (20), and five reaction plates (21) from clutch assembly (2).

(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).

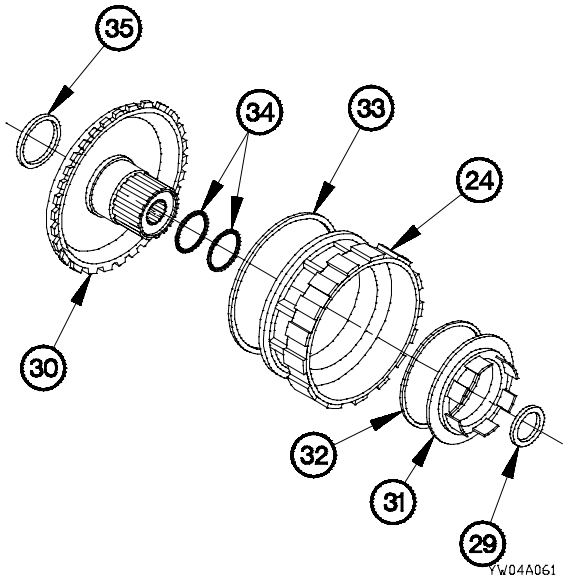
(25) Remove C1 piston (31) from C2 piston (24).

(26) Remove sealring (32) from C1 piston (31). Discard sealring.

(27) Remove sealring (33) from C2 piston (24). Discard sealring.

(28) Remove two seals (34) from gear (30). Discard seals.

(29) Remove bushing (35) from gear (30).

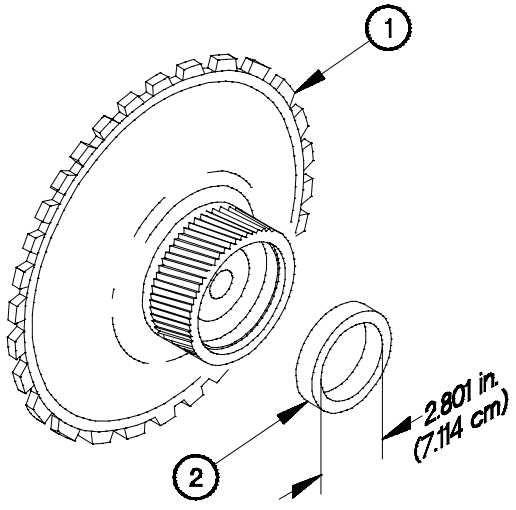


b. Cleaning/Inspection.

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. (7.114 cm).

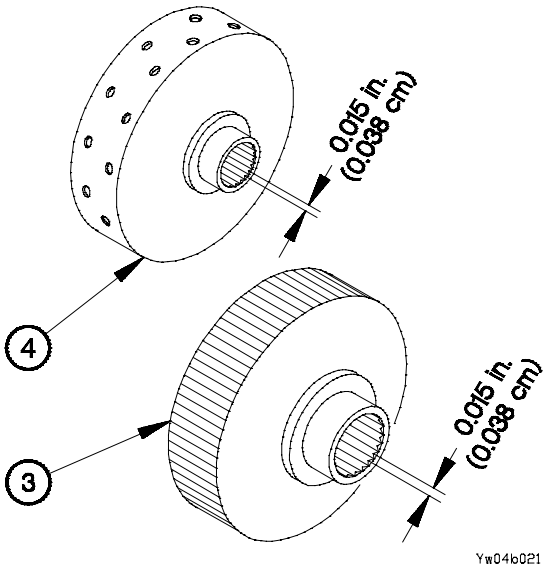
21-4. ROTATING CLUTCH MODULE REPAIR (CONT)

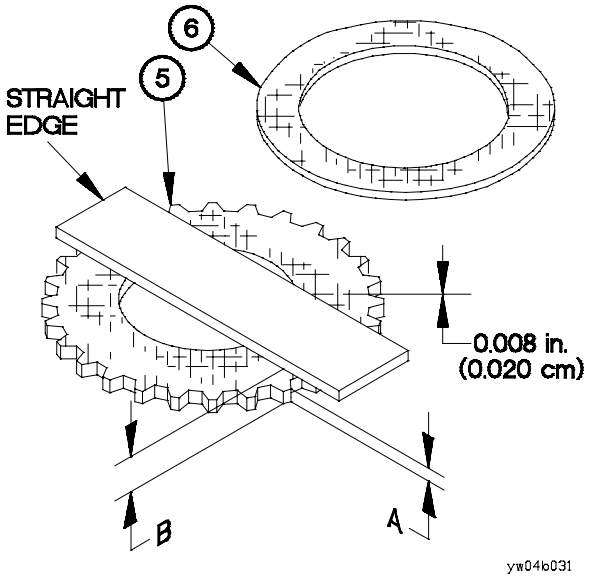
(5) Inspect spline of C2 drive hub (3) for cracks and burrs.

(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).

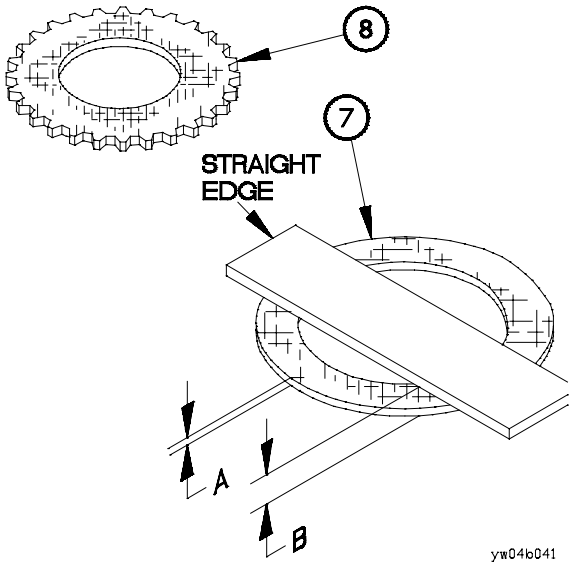
(11) Perform steps (9) and (10) on six intermediate plates (6).

(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.

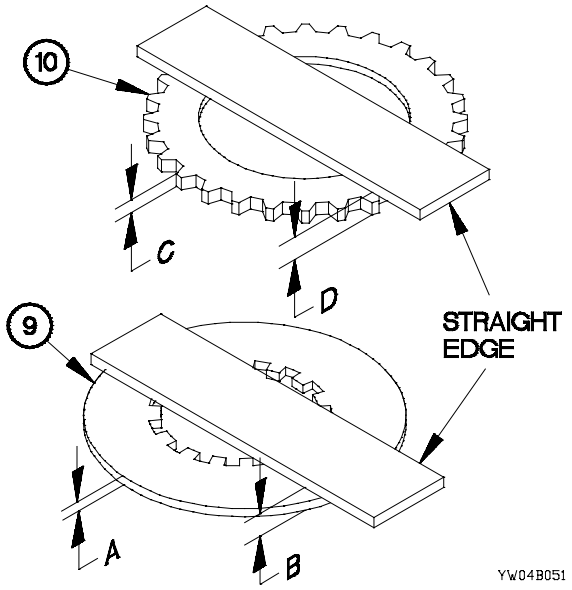
(17) Measure thickness (A) of each C1 pressure plate (9), minimum thickness at wear surface 0.246 in. (0.624 cm).

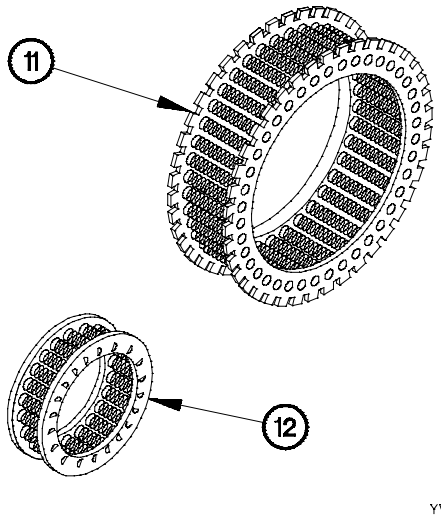
(18) Lay straight edge across each C1 pressure plate (9), subtract measurement (B) from (A), maximum bend in pressure plate 0.006 in. (0.015 cm).

(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. (0.624 cm).

(21) Lay straight edge across C2 pressure plate (10), subtract measurement (D) from (C), maximum bend in pressure plate 0.018 in. (0.045 cm).





(22) Inspect C2 spring (11) for broken or missing springs.

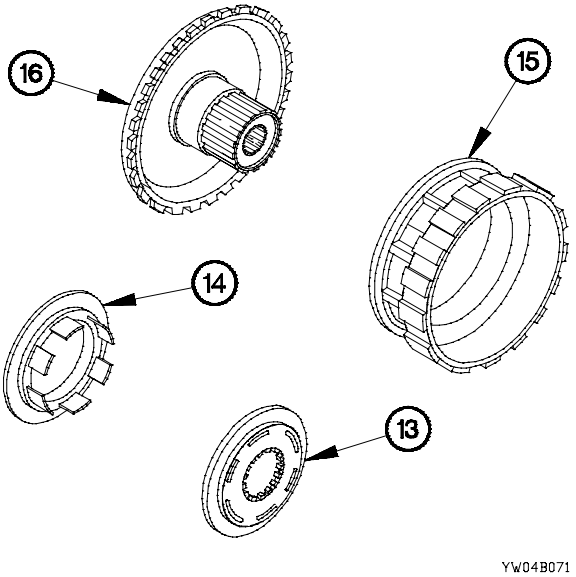
(23) Inspect C1 spring (12) for broken or missing springs.

(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.

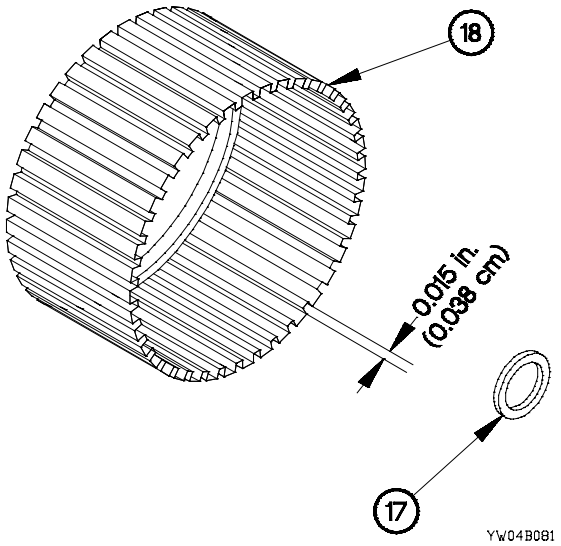


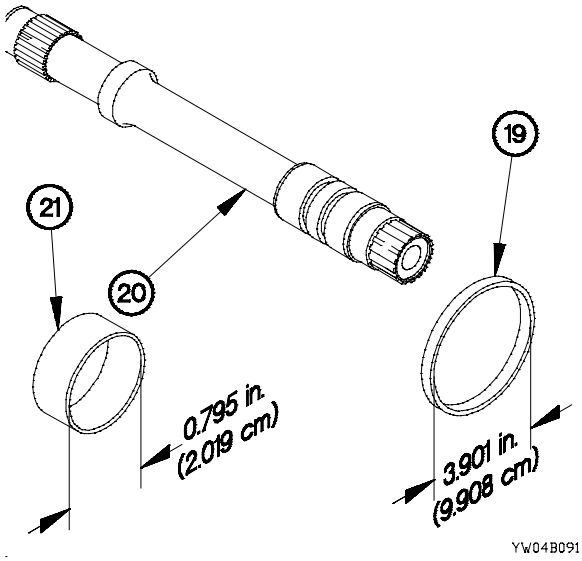
21-4. ROTATING CLUTCH MODULE REPAIR (CONT)

(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. (0.038 cm).





(31) Measure bushing (19), maximum inside diameter of bushing is 3.901 in. (9.908 cm).

(32) Inspect shaft (20) for cracks, nicks, and scuffing.

(33) Measure inside diameter of bushing (21), maximum diameter 0.795 in. (2.019 cm).

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).

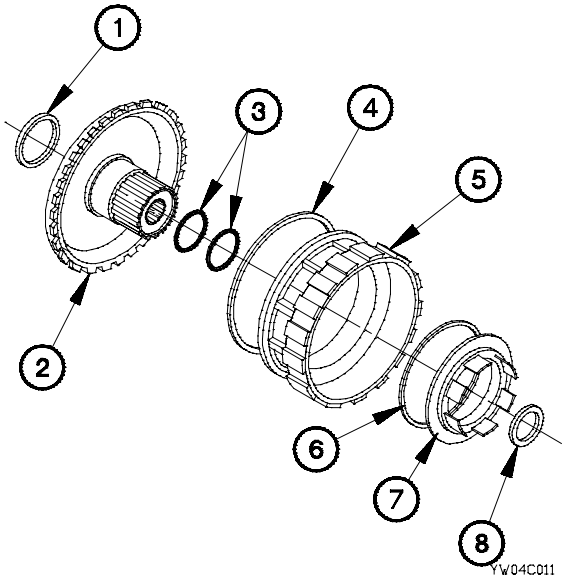
(3) Install sealring (4) on C2 piston (5).

(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.

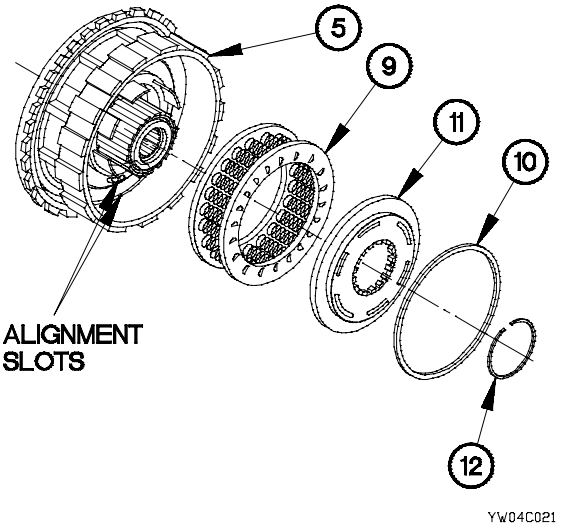
(10) Install C1 balance piston (11) in C2 piston (5).

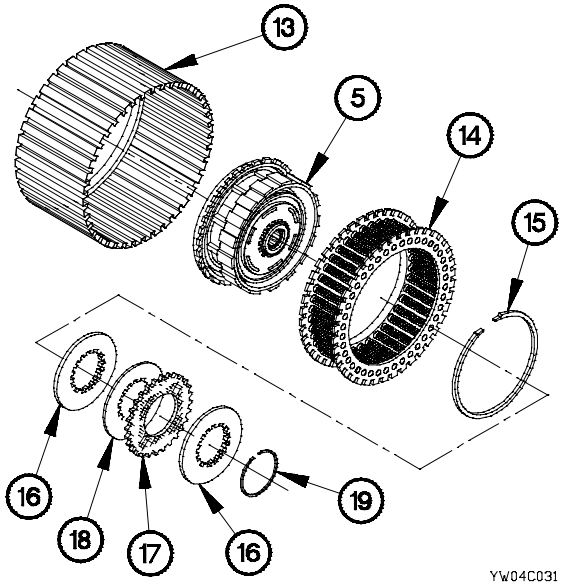
(11) Compress C1 balance piston (11) for installation of retaining ring (12).

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)

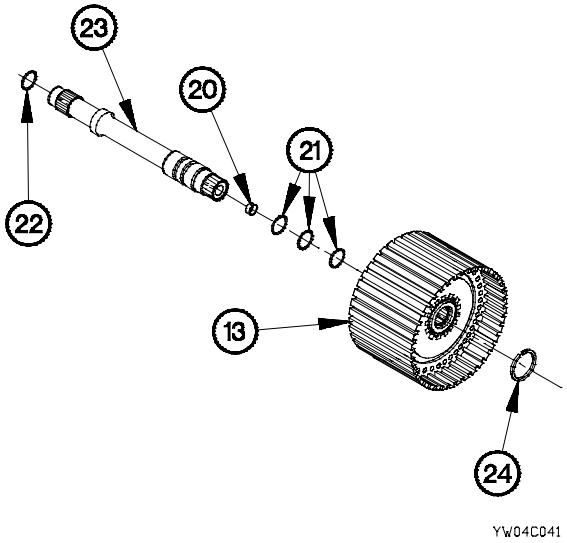
(18) Install bushing sleeve (20), three sealrings (21), and preformed packing (22) on shaft (23).

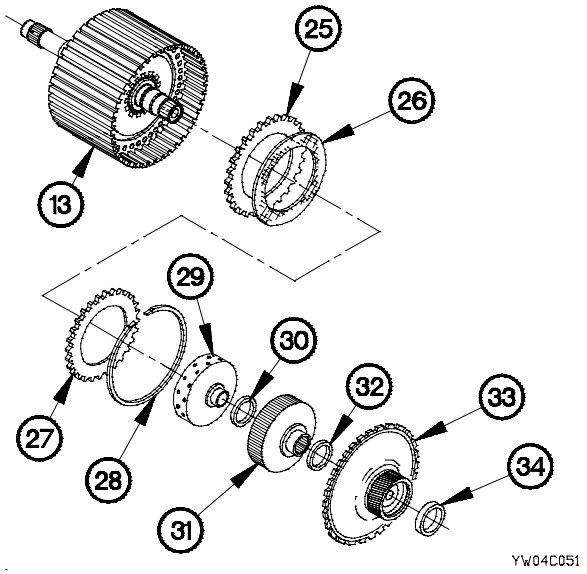
(19) Install shaft (23) in clutch assembly (13).

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).

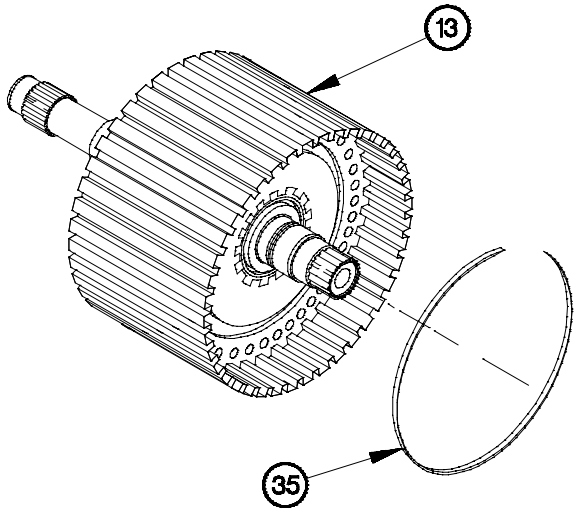
(28) Install spur gear (33) in clutch assembly (13).

(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 78, Appendix B)
Puller Set, Universal (Item 51, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Caliper, Vernier (Item 11, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Bushing Driver Set (TM 9-2320-366-20)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Handle, Drive (TM 9-2320-366-20)

Tools and Special Tools (Cont)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Seal, Plain Encased (Item 394, Appendix F)
Sealring (Item 402, Appendix F)
Packing, Preformed (Item 301, Appendix F)
Parts Kit, Seal Replacement (2) (Item 314, Appendix F)
Solvent, Dry Cleaning (Item 83, 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.

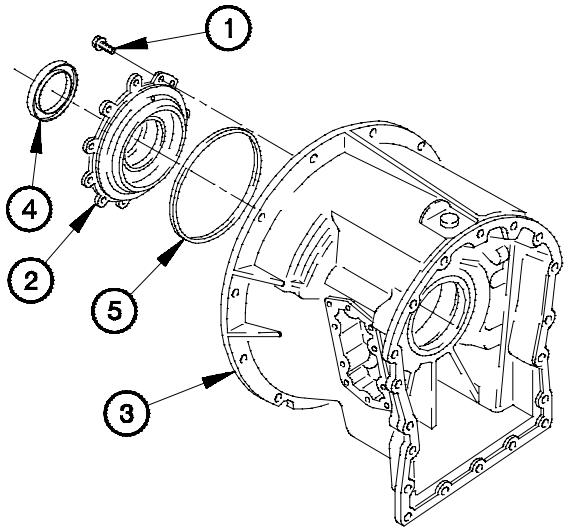
(3) Tighten two bolts (1) on bearing retainer (2).

(4) Remove bearing retainer (2) from converter housing (3).

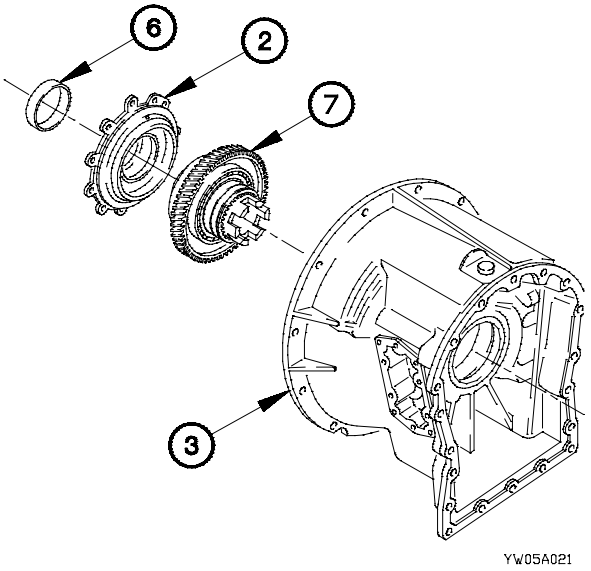
(5) Remove two bolts (1) from bearing retainer (2).

(6) Remove seal (4) from bearing retainer (2). Discard seal.

(7) Remove sealring (5) from bearing retainer (2). Discard sealring.

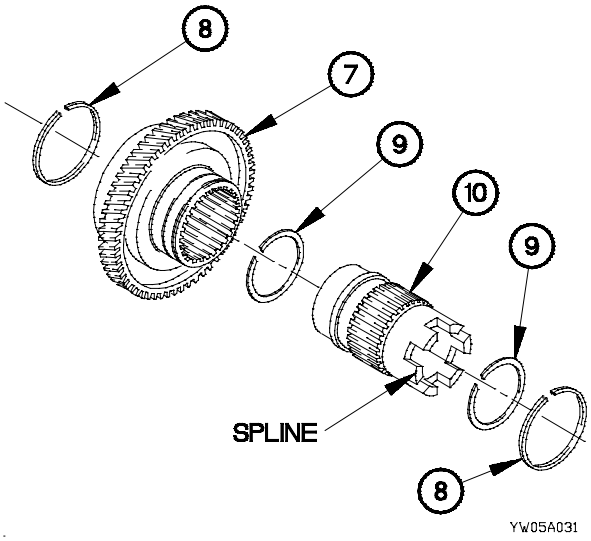


YW05A011



(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.

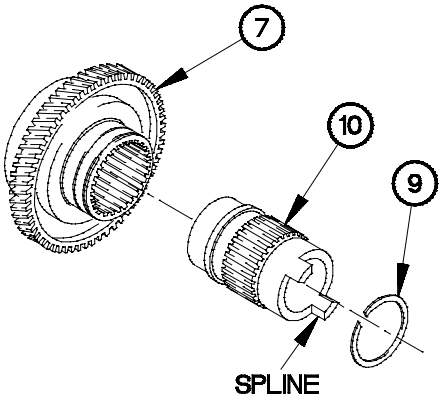
21-5. CONVERTER HOUSING MODULE REPAIR (CONT)

NOTE

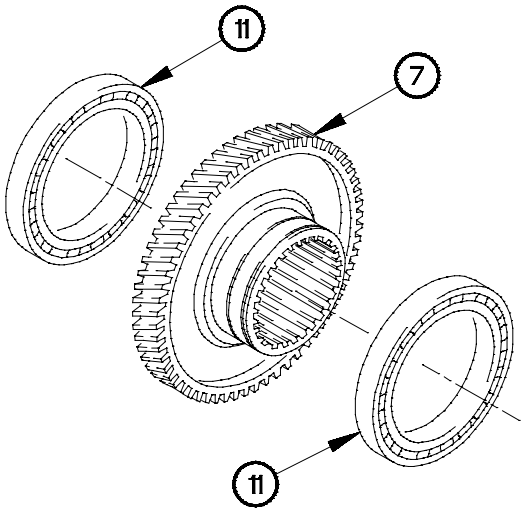
Perform steps (13) and (14) on drive hubs with two splines.

(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).

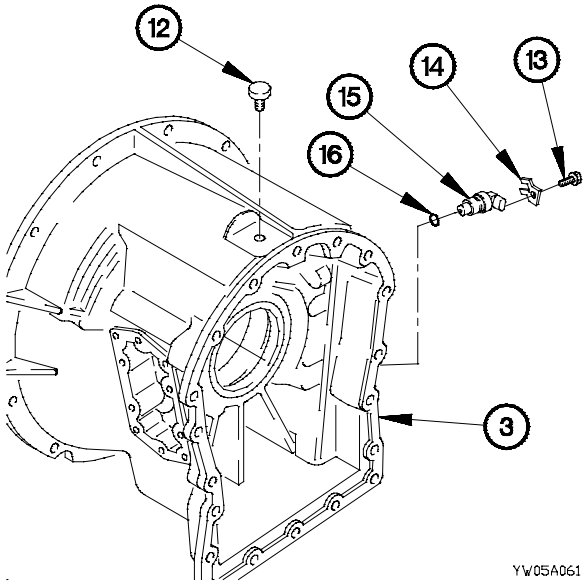
(16) Remove vent plug (12) from converter housing (3).

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.**

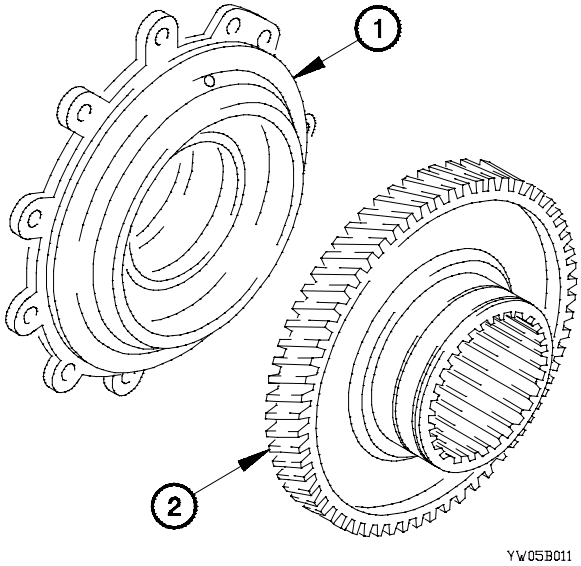
(1) Clean all metal parts with dry cleaning solvent.

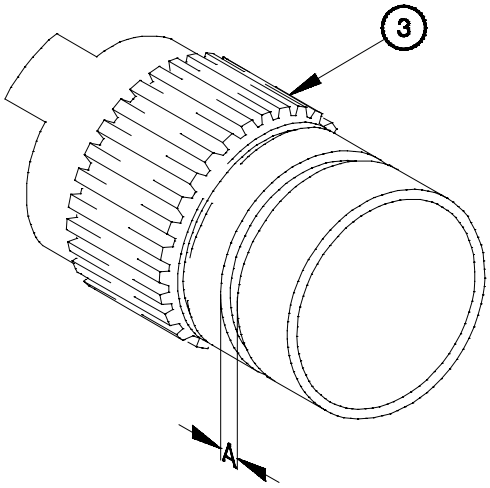
NOTE

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.

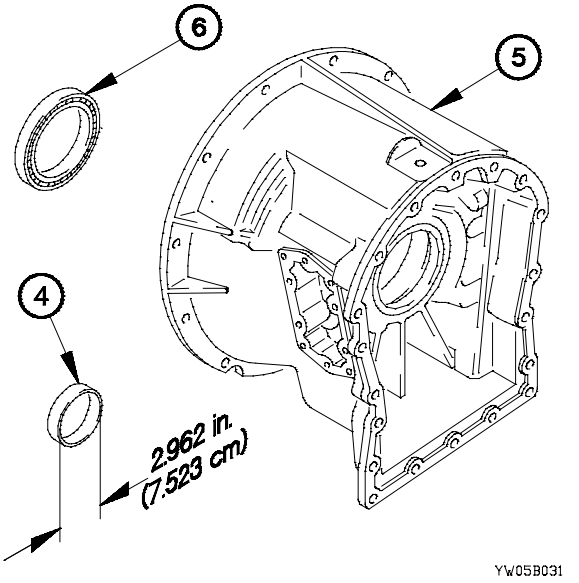
(5) Measure drive hub (3) sealring end gap (A) for maximum depth of 0.045 in. (0.114 cm).

21-5. CONVERTER HOUSING MODULE REPAIR (CONT)

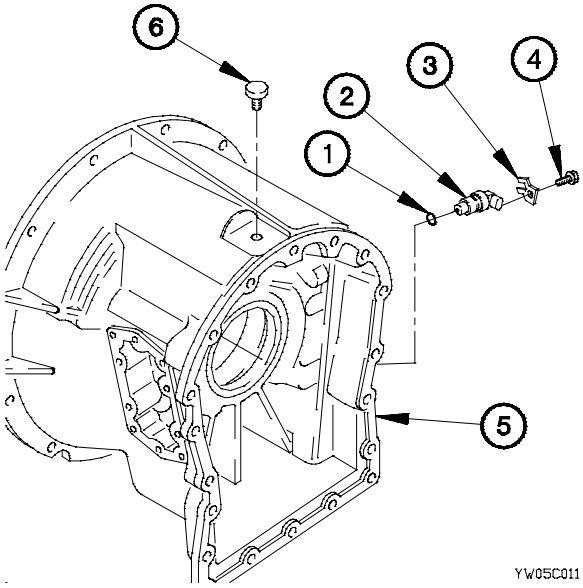
(6) Measure inside diameter of bushing (4), maximum inside diameter 2.962 in. (7.523 cm).

(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

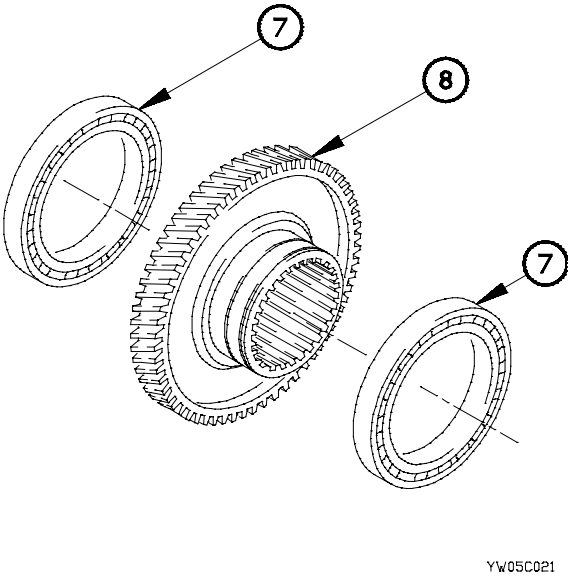
Perform steps (4) through (6) if replacing a six splined drive hub and gear with a two splined drive hub and gear.

(4) Replace cycloidal gear PN 23049376 and gear bushing PN 6881926 with cycloidal gear PN 29514537 and gear bushing PN 29514538 (para 20-3).

(5) Replace pump housing PN 29502322 with pump housing PN 29514801, ball PN 145651, spring PN 29507709, and pin PN 29516030 (para 20-3).

(6) Replace converter pump PN 29503570 or 29511380 with converter pump PN 29514788 (para 7-14).

(7) Install two bearings (7) on gear (8).



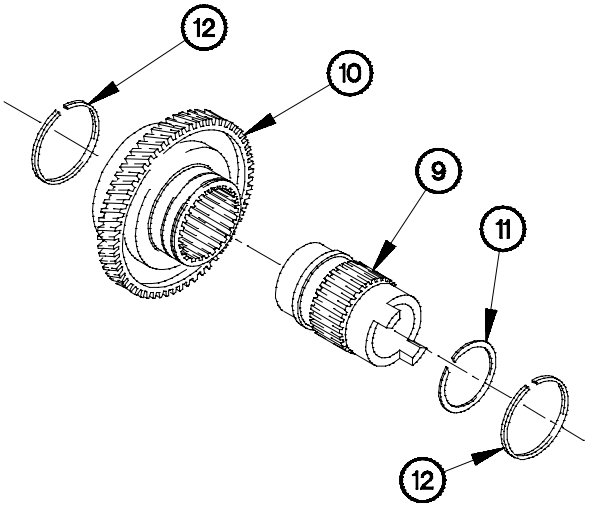
(8) Install drive hub (9) in gear (10).

WARNING

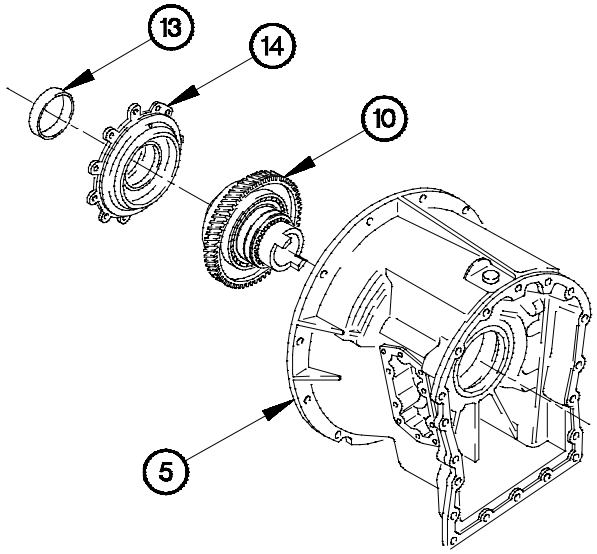
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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).

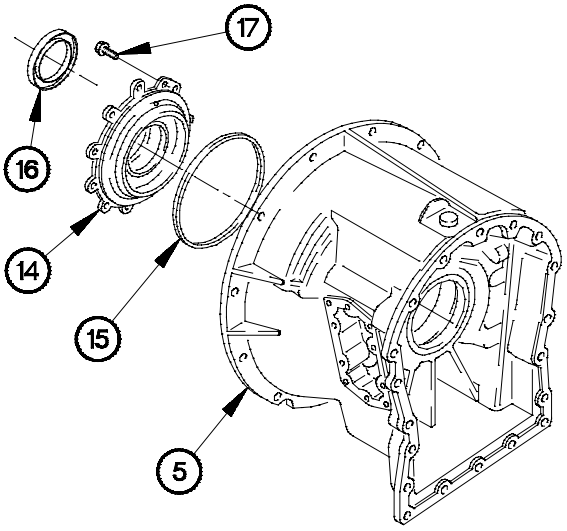
(13) Install sealring (15) on bearing retainer (14).

(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 78, Appendix B)
Pliers, Retaining Ring (Item 45, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Inserter and Remover, Spring (TM 9-2320-366-20)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Sealring (Item 404, Appendix F)
Sealring (Item 405, Appendix F)
Packing, Preformed (Item 302, Appendix F)
Cloth Abrasive Crocus Cloth (Item 21, Appendix C)

Personnel Required
(2)

a. Disassembly.

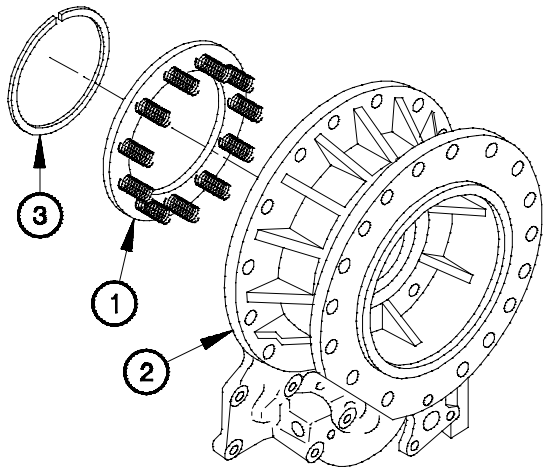
(1) Apply pressure to spring retainer (1) in adapter housing (2).

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

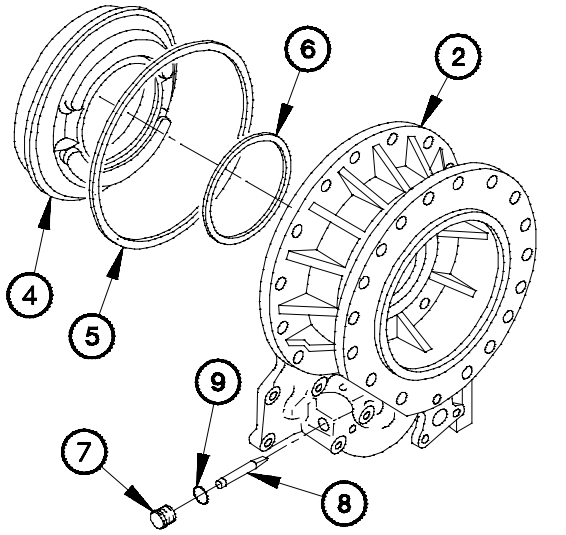
NOTE

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.



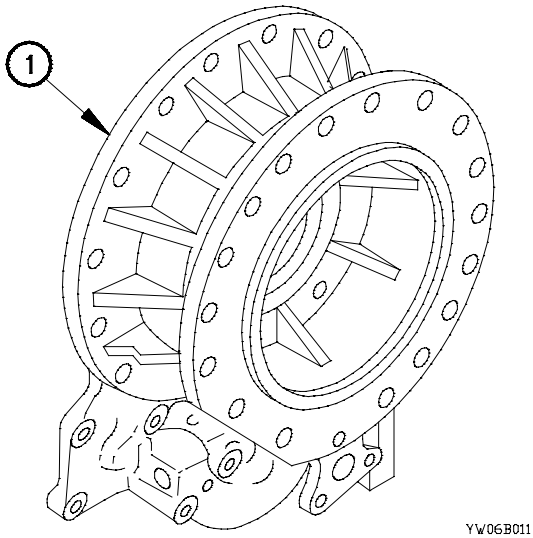
YW06A021

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.

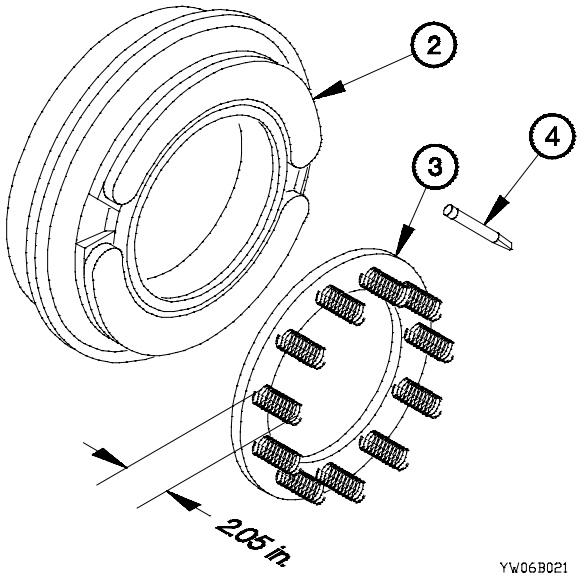
21-6. ADAPTER HOUSING MODULE REPAIR (CONT)

(3) Inspect clutch piston (2) for cracks, nicks, scoring, and burring.

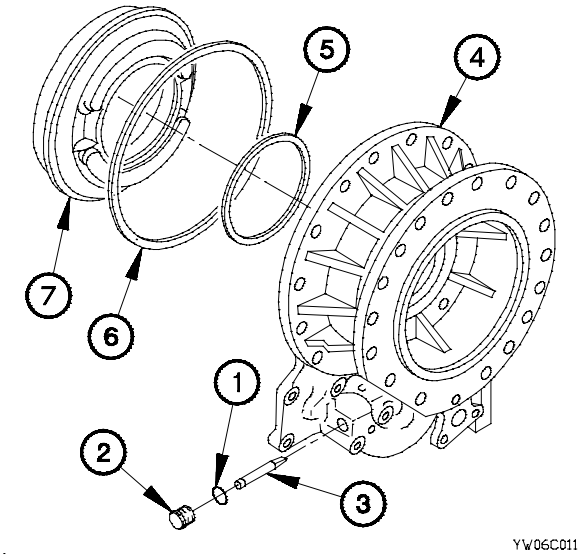
(4) Inspect spring retainer (3) for cracks, nicks, scoring, burring, and missing and broken springs.

(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

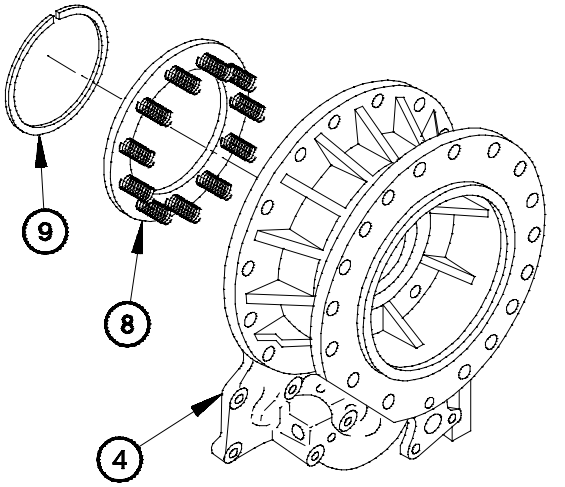
Apply pressure on at least three places on spring retainer to prevent damage to spring retainer assembly.

(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 78, Appendix B)
Caliper, Vernier (Item 11, Appendix B)
Handle, Drive (TM 9-2320-366-20)
Press, Arbor, Hand Operated (Item 48, Appendix B)

Tools and Special Tools (Cont)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Pliers, Retaining Ring (Item 44, Appendix B)

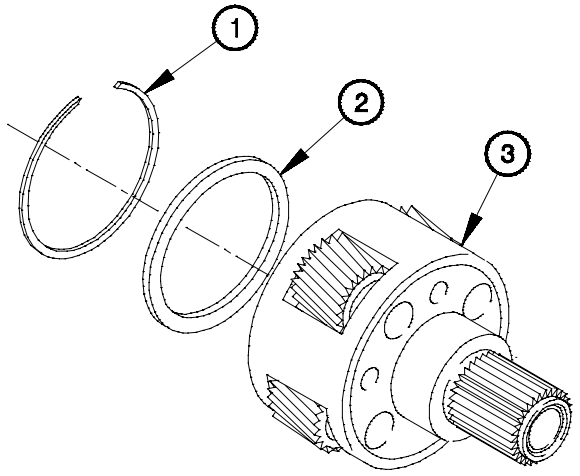
Materials/Parts
Rag, Wiping (Item 60, Appendix C)

a. Disassembly.

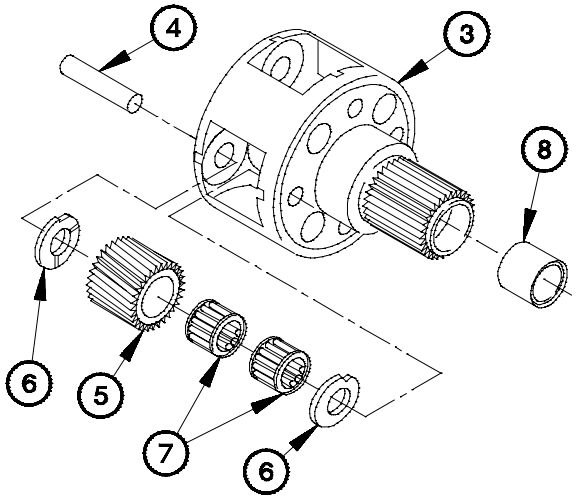
WARNING

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



Yw07a02lo

(2) Remove four spindles (4), pinion gears (5), and eight thrust washers (6) from planetary carrier (3).

(3) Remove eight roller bearings (7) from four pinion gears (5).

(4) Remove bushing (8) from planetary carrier (3).

b. Cleaning/Inspection.

(1) Wipe clean all metal parts.

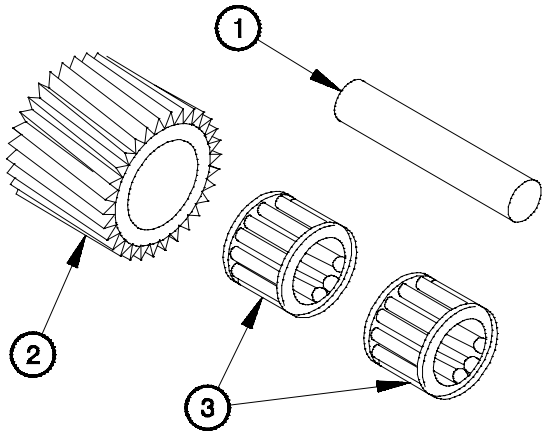
NOTE

Replace any part that fails visual inspection or size measurement requirements.

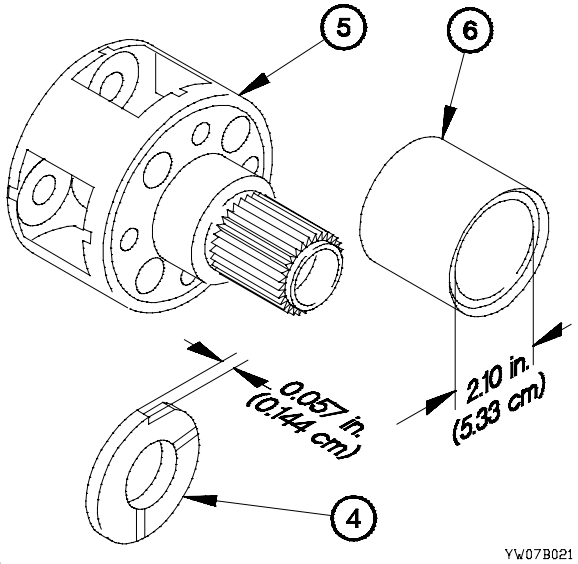
(2) Inspect four spindles (1) for cracks, pitting, burring, and evidence of excessive wear.

(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.

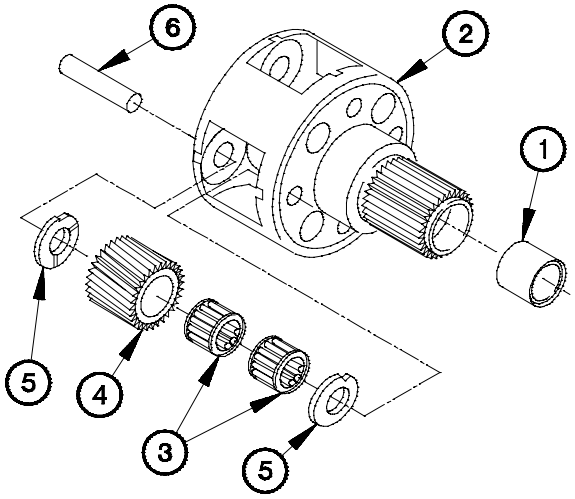
(9) Measure inside diameter of bushing (6), minimum inside diameter 2.10 in. (5.33 cm).

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).



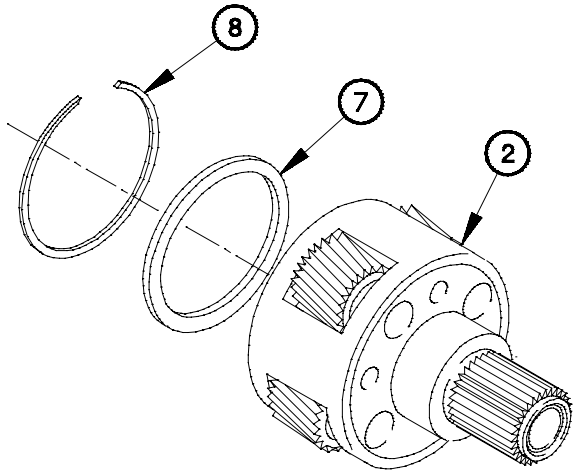
YW07C011

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 78, Appendix B)

Tools and Special Tools (Cont)
Goggles, Industrial (Item 26, Appendix B)
Caliper, Vernier (Item 11, Appendix B)

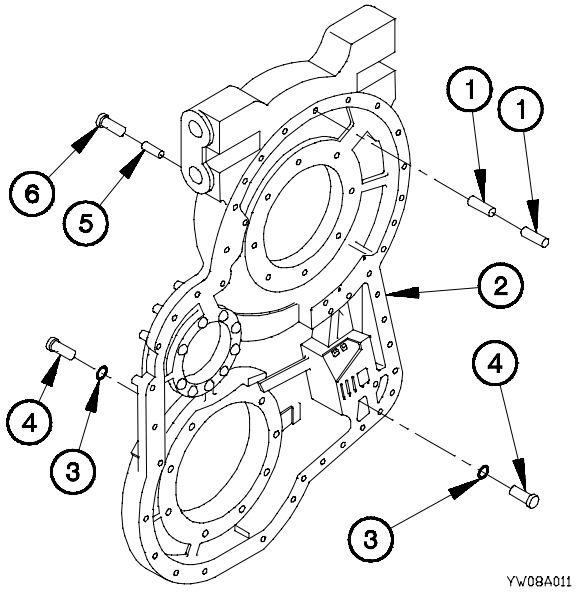
Materials/Parts
Rag, Wiping (Item 60, Appendix C)

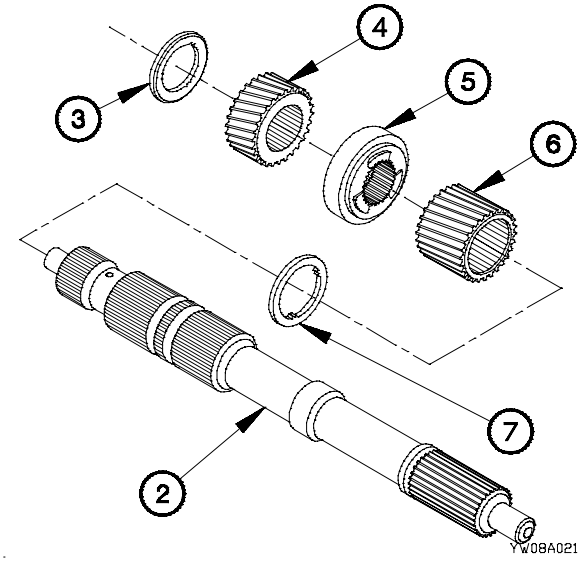
a. Disassembly.

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).





(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.

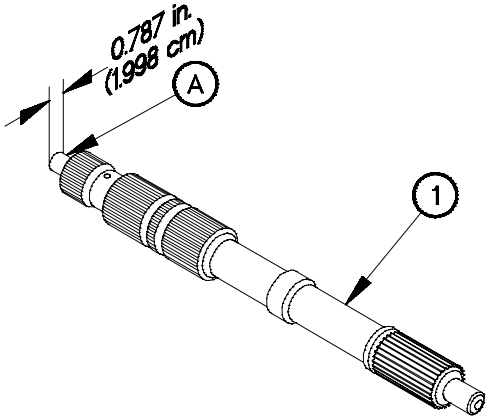
(1) Wipe clean all metal parts.

NOTE

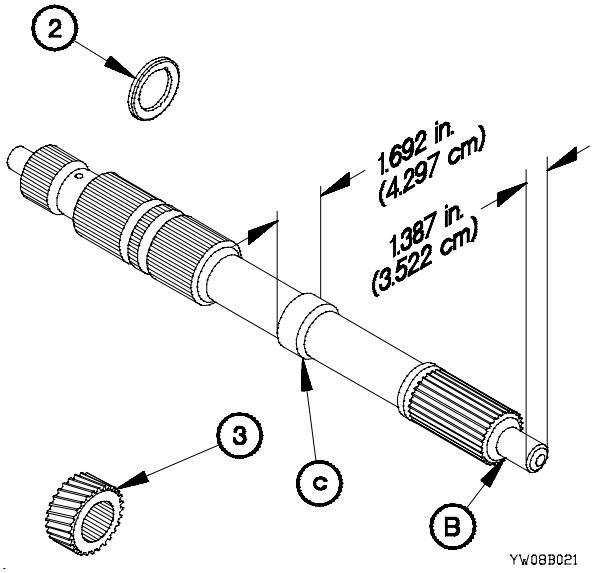
Replace any part that fails visual inspection or size measurement requirements.

(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. (1.998 cm).



YW08B011



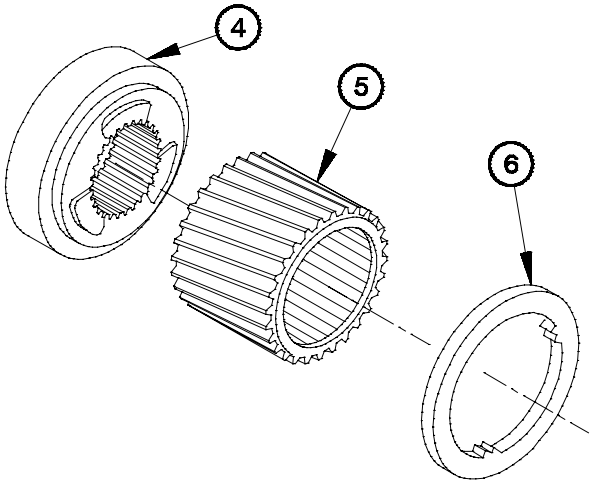
YW08B021

(4) Measure diameter of main shaft pilot (B), minimum diameter 1.387 in. (3.522 cm).

(5) Measure outside diameter of main shaft journal area (C) with P2 planetary bushing, minimum outside diameter 1.692 in. (4.297 cm).

(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

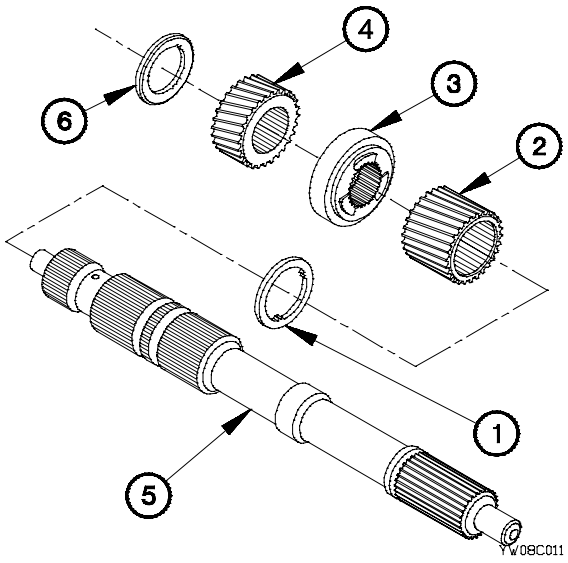
(8) Inspect spacer (4) for nicks, cracks, burrs, and evidence of excessive wear.

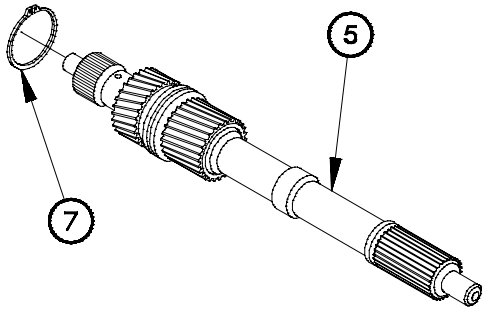
(9) Inspect gear (5) for nicks, burrs, cracks, damaged or missing teeth, and corrosion.

(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 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Caliper, Micrometer, Inside (Item 10, Appendix B)
Caliper, Vernier (Item 11, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Bushing Driver Set (TM 9-2320-366-20)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 50, Appendix B)
Handle, Drive (TM 9-2320-366-20)
Indicator, Dial (Item 36, Appendix B)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Parts Kit, Seal Replacement (Item 318, Appendix F)

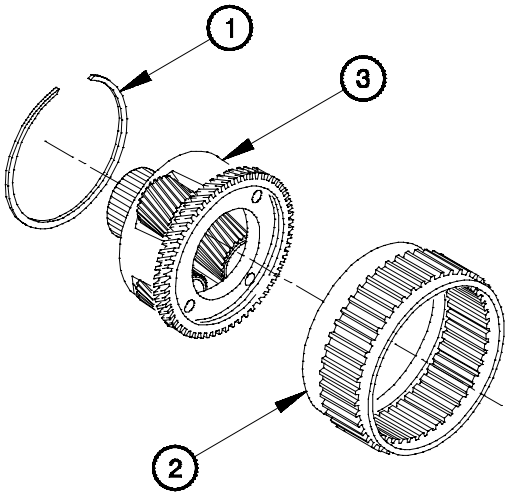
a. Disassembly.

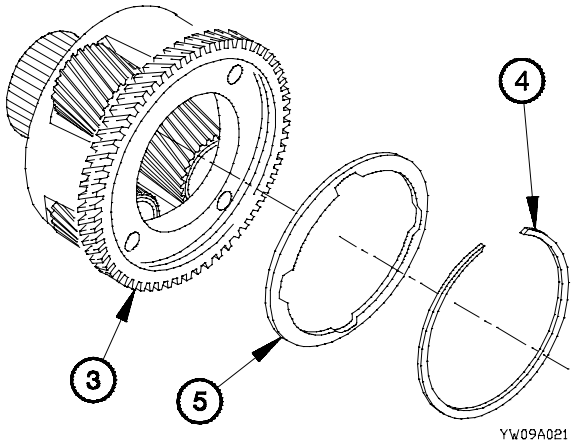
WARNING

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).



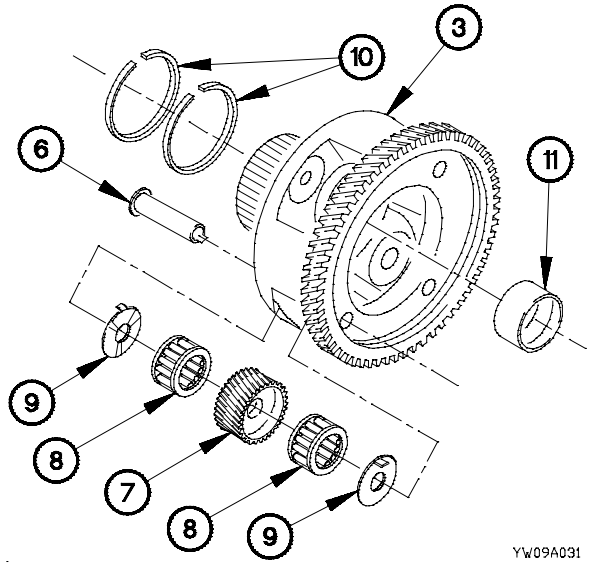


(3) Remove retaining ring (4) and P2 indexing ring (5) from P2 planetary carrier (3).

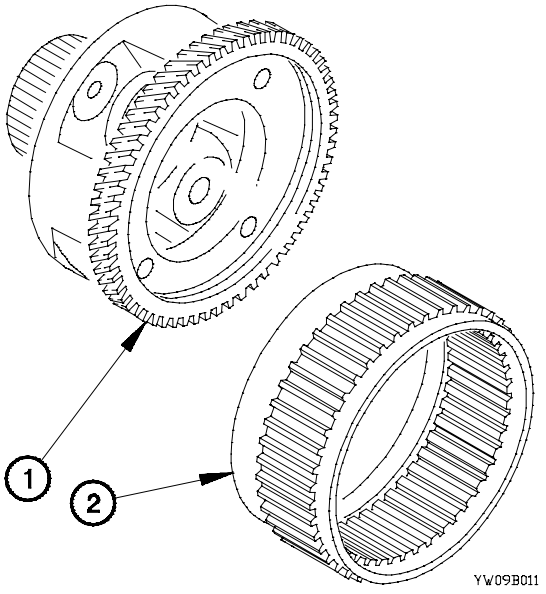
(4) Remove four spindles (6), P2 pinion gears (7), eight roller bearings (8), and thrust washers (9) from P2 planetary carrier (3).

(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.

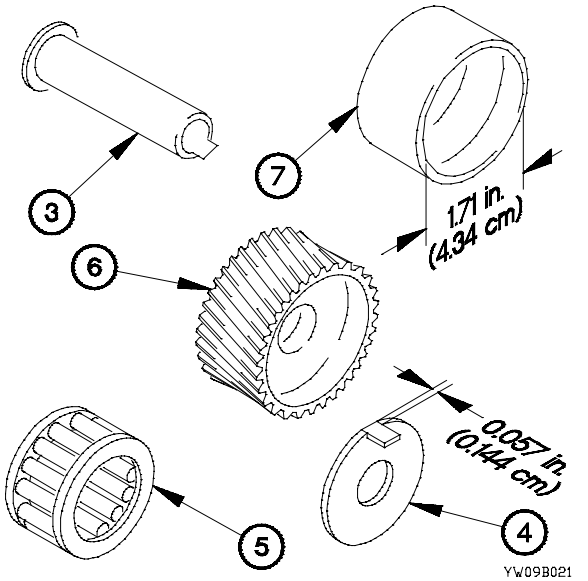
(5) Inspect eight thrust washers (4) for scoring, nicks, cracks, and burring.

(6) Measure thickness of eight thrust washers (4), minimum thickness 0.057 in. (0.144 cm).

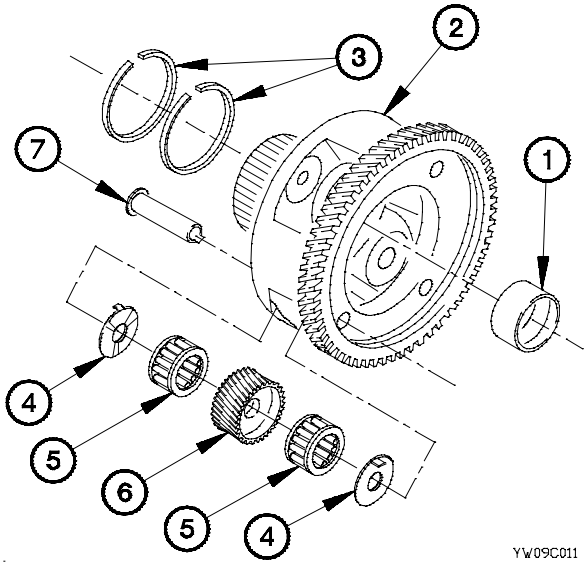
(7) Inspect eight roller bearings (5) for cracked or broken cages, and pitting.

(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. (4.34 cm).



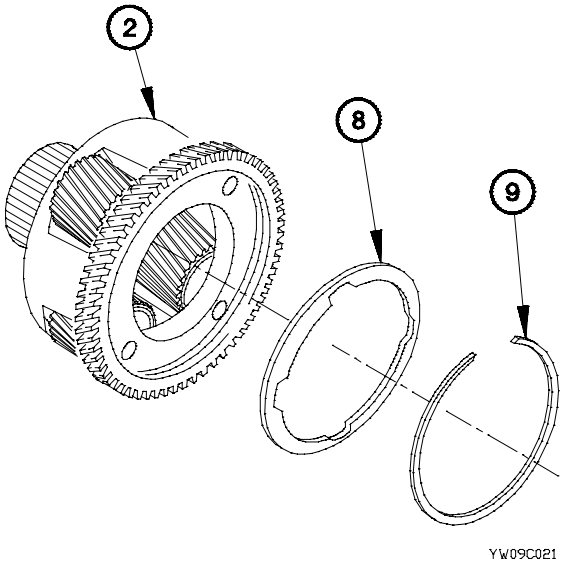
c. Assembly.



(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).



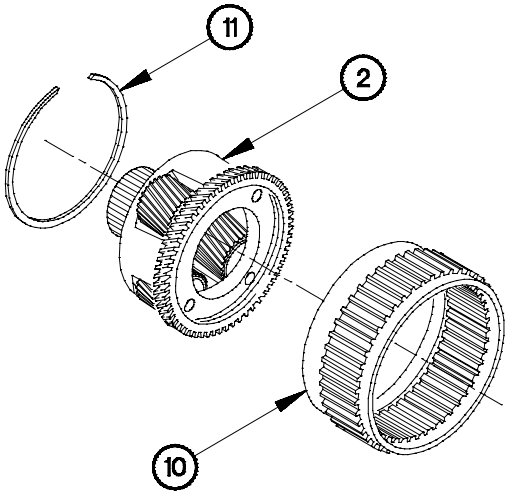
WARNING

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 78, Appendix B)
Indicator, Dial (Item 36, Appendix B)

Tools and Special Tools (Cont)
Caliper, Vernier (Item 11, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)

a. Disassembly.

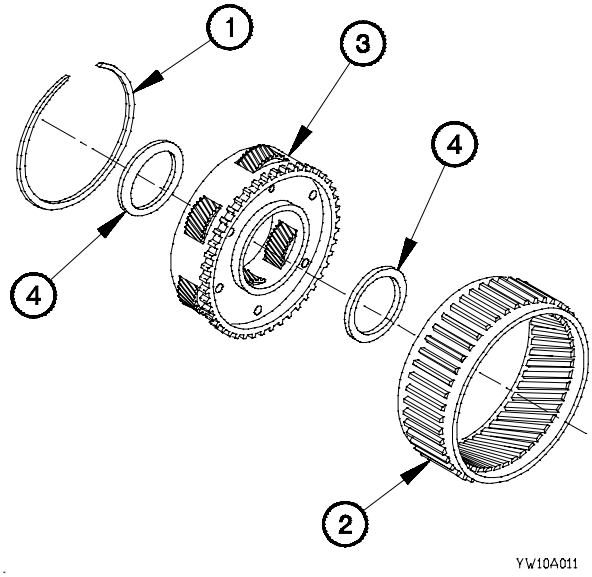
WARNING

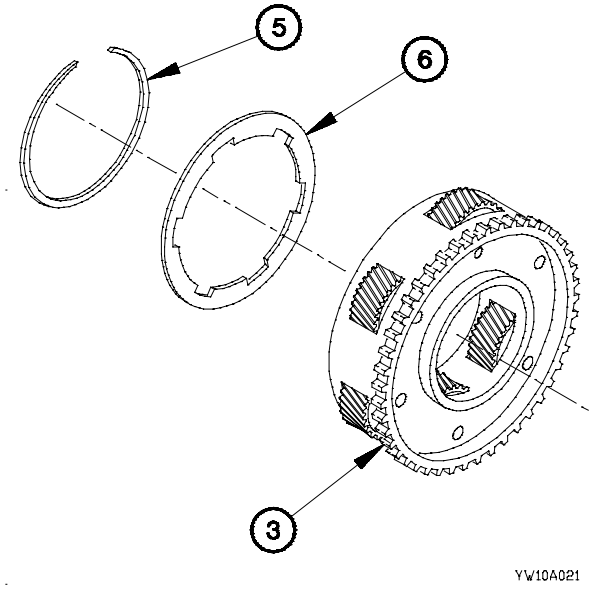
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(1) Remove retaining ring (1) from ring gear (2).

(2) Remove planetary housing (3) from ring gear (2).

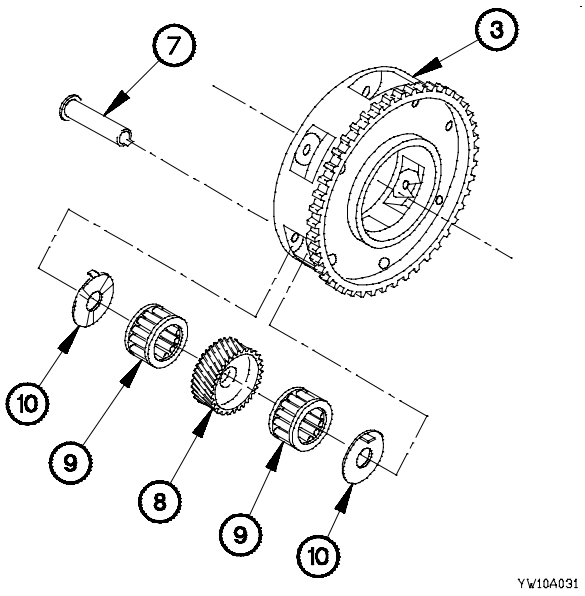
(3) Remove two thrust bearings (4) from planetary housing (3).



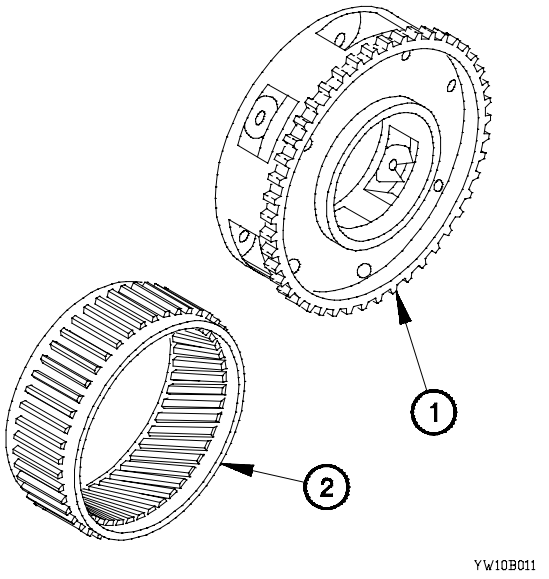


(4) Remove retaining ring (5) and ring (6) from planetary housing (3).

(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.

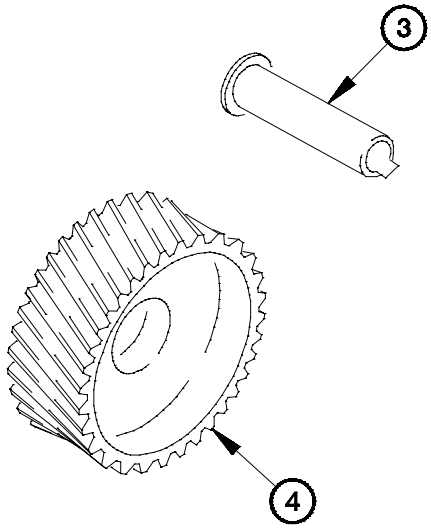
(2) Inspect planetary housing (1) for cracks, scoring, nicks, burring, and corrosion.

(3) Inspect ring gear (2) for cracks, nicks, scoring, burring, broken or missing teeth, excessive wear, and corrosion.

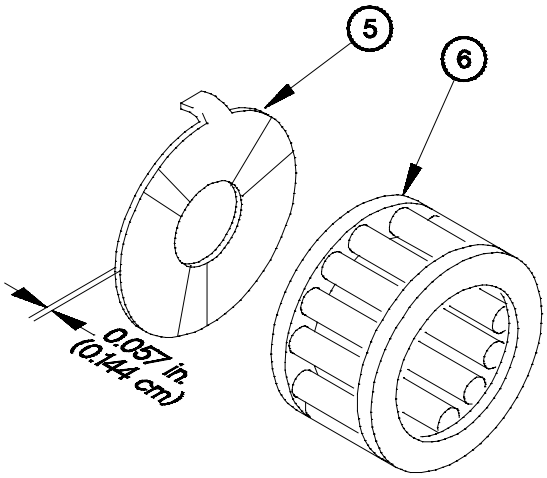
21-10. P1 PLANETARY CARRIER MODULE REPAIR (CONT)

(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

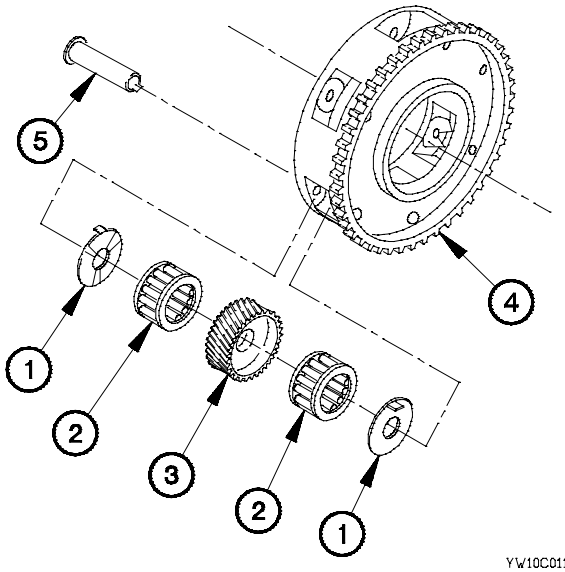
(6) Inspect 12 thrust washers (5) for scoring, nicks, burring, and excessive wear.

(7) Measure thickness of 12 thrust washers (5), minimum thickness 0.057 in. (0.144 cm).

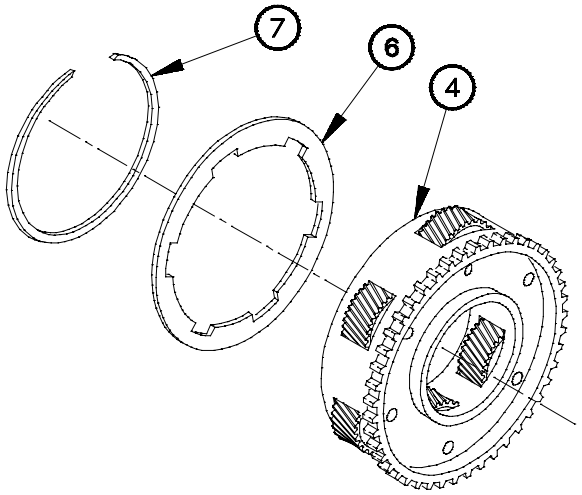
(8) Inspect 12 roller bearings (6) for broken cages, scoring, nicks, and pitting.

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

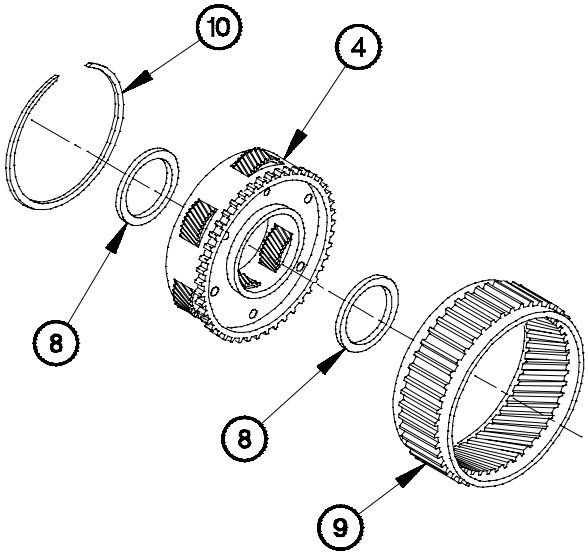


YW10C021

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 78, Appendix B)
Puller Kit, Universal (Item 51, Appendix B)
Indicator, Dial (Item 36, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Gloves, Rubber (Item 26, Appendix B)
Handle, Drive (TM 9-2320-366-20)
Caliper, Vernier (Item 11, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-366-20)

Tools and Special Tools (Cont)
Pliers, Retaining Ring (Item 44, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Inserter, Bearing and Bushing (TM 9-2320-366-20)

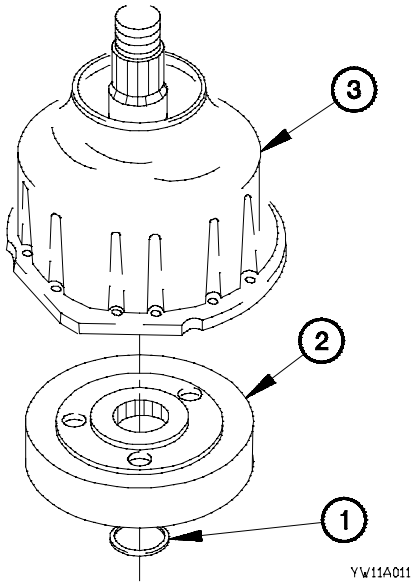
Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Oil, Lubricating (Item 45, Appendix C)
Seal, Plain Encased (Item 393, Appendix F)
Shim(s) (Item 418, Appendix F)
Shim(s) (Item 419, Appendix F)
Shim(s) (Item 420, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)

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).



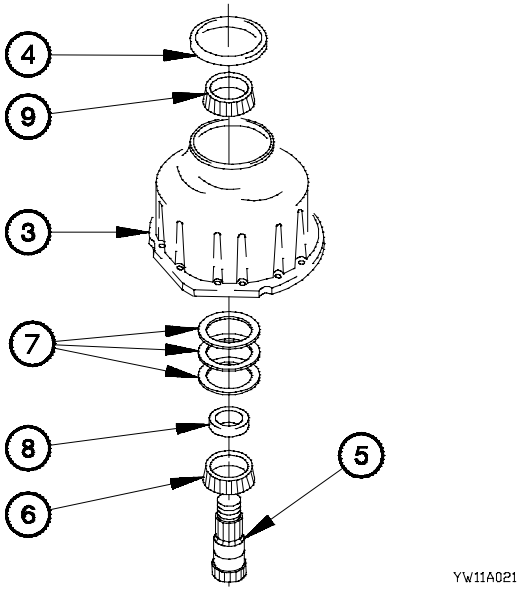
(2) Remove oil seal (4) from output housing (3). Discard oil seal.

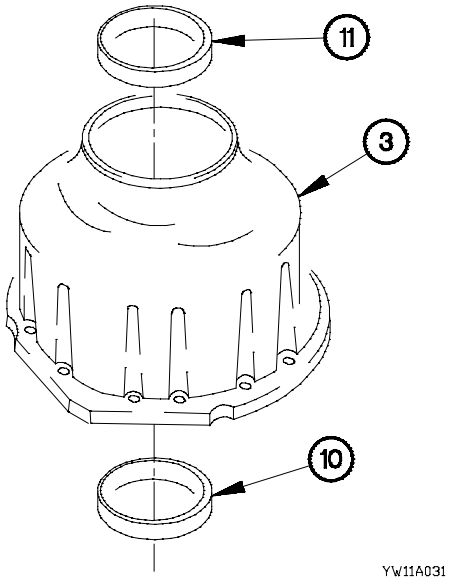
NOTE

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

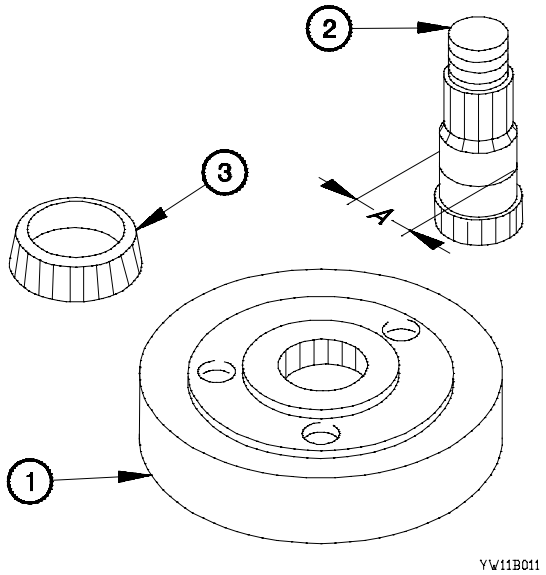
Replace any part that fails visual inspection or size measurement requirements.

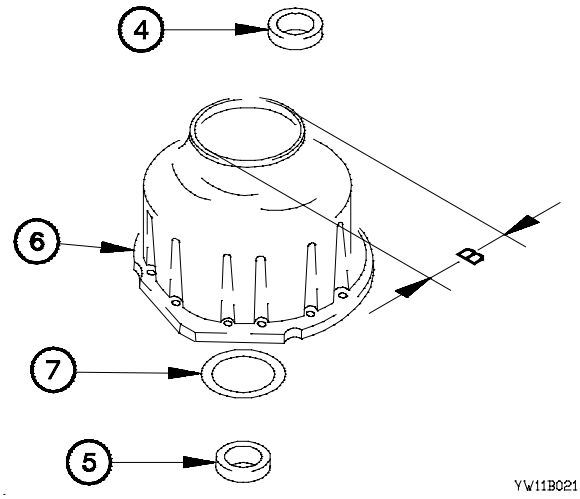
(2) Inspect ring gear (1) for scoring, burring, cracks, missing teeth, and excessive wear.

(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.

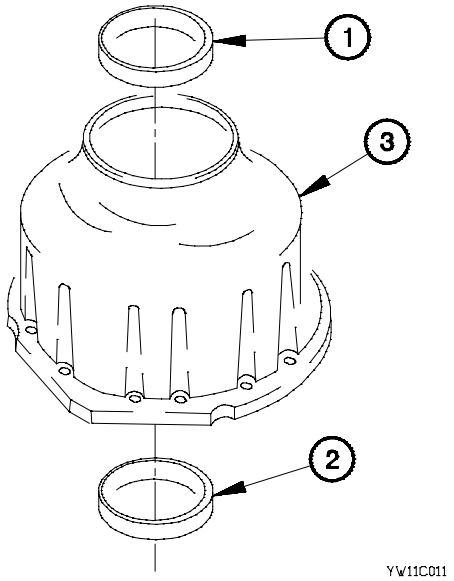
(7) Inspect spacer (5) for damage, cracks, and excessive wear.

(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.

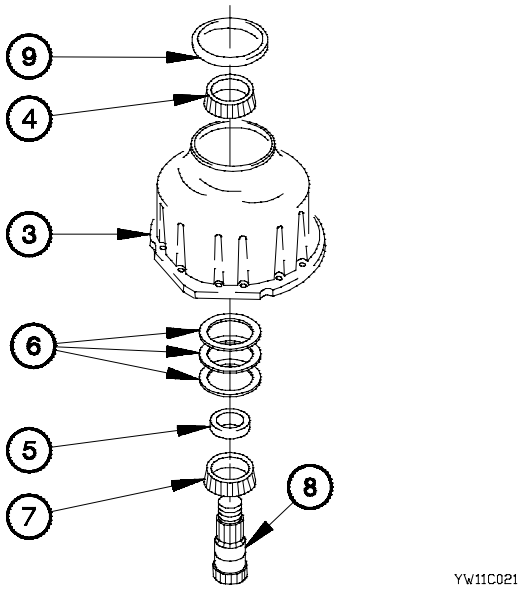
c. Assembly.



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).

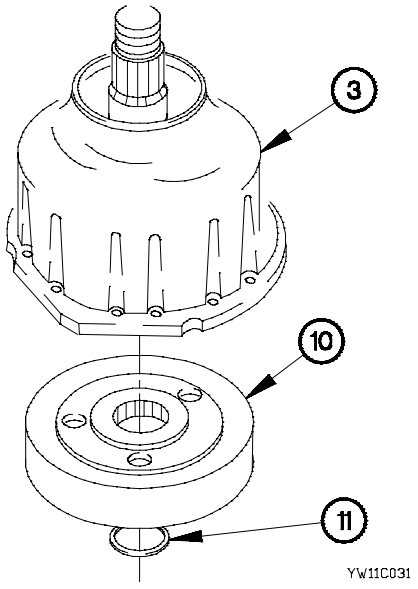
(3) Install spacer (5), shim(s) (6), roller bearing cone (7), and output shaft (8) in output housing (3).

(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).

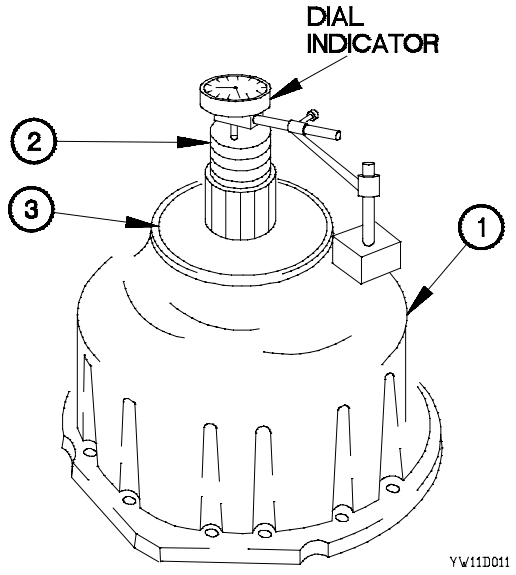
(2) Adjust dial indicator to read zero.

(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. (0.162 cm).
- 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. (0.003-0.013 cm). 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

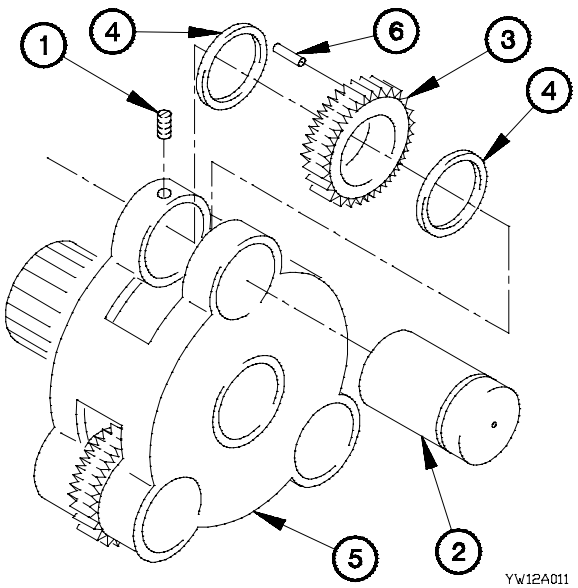
Equipment Conditions
Transfer case module disassembled (para 22-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 95, Appendix B)
Caliper, Vernier (Item 11, Appendix B)
Adapter, Socket Wrench, (Item 3, Appendix B)

Tools and Special Tools (Cont)
Socket Wrench Attachment, Screwdriver (TM 9-2320-366-20)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Setscrew (3) (Item 412, 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.

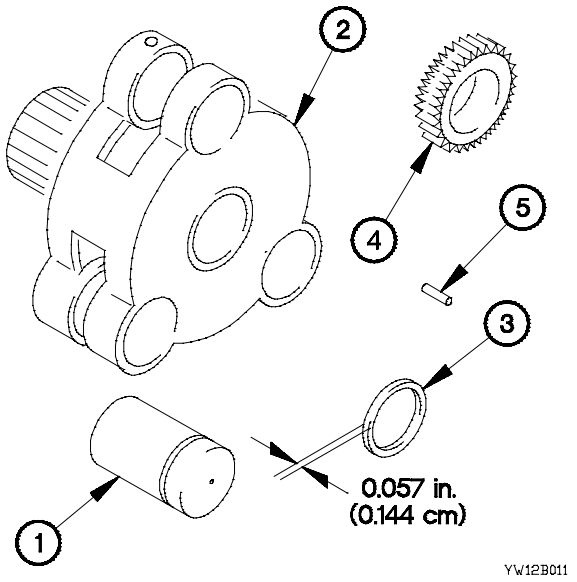
(2) Inspect three spindles (1) for scoring, pitting, and wear.

(3) Inspect planetary carrier (2) for scoring, pitting, cracks, and wear.

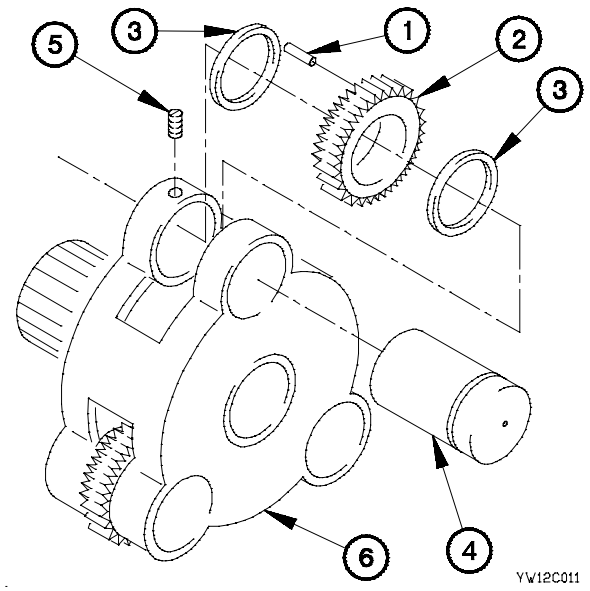
(4) Inspect three thrust washers (3) for scoring, pitting, cracks, wear, and minimum thickness of 0.057 in. (0.144 cm).

(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 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Straight Edge (Item 71, Appendix B)
Riveter, Yoke, Hand (TM 9-2320-366-20)
Caliper, Vernier (Item 11, Appendix B)

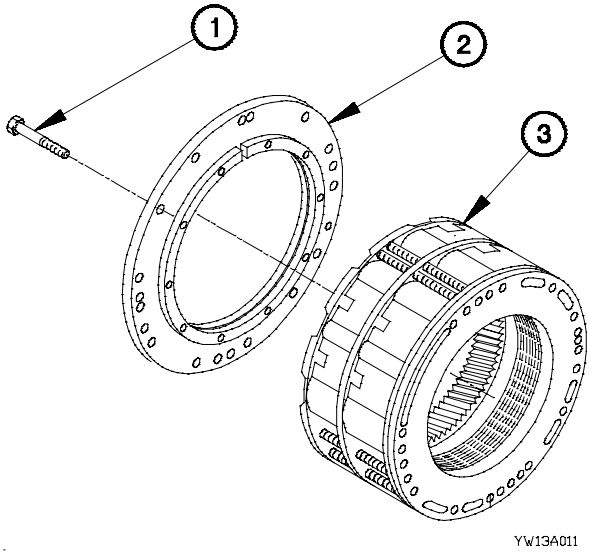
Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Cloth, Abrasive (Item 22, Appendix C)

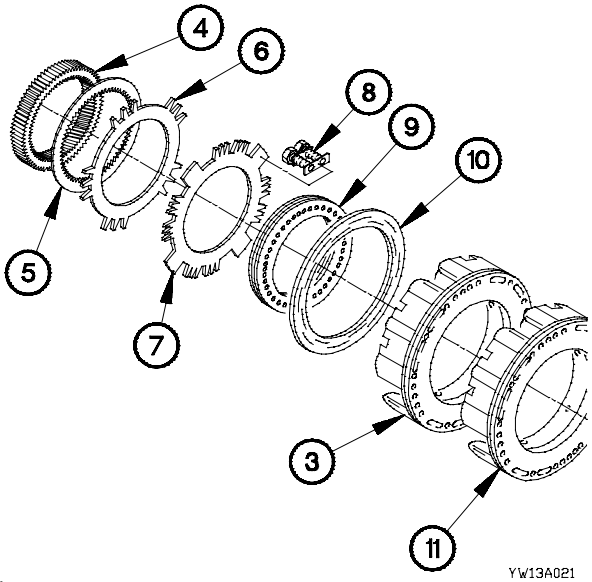
a. Disassembly.

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).

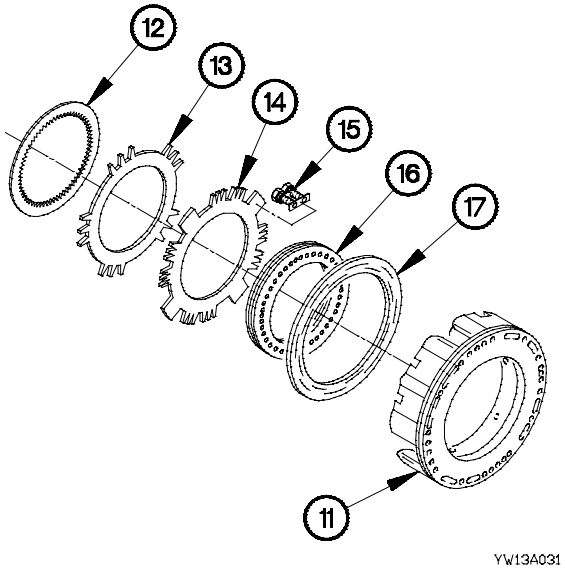
(5) Remove C3 clutch housing (3) from C4 clutch housing (11).

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).



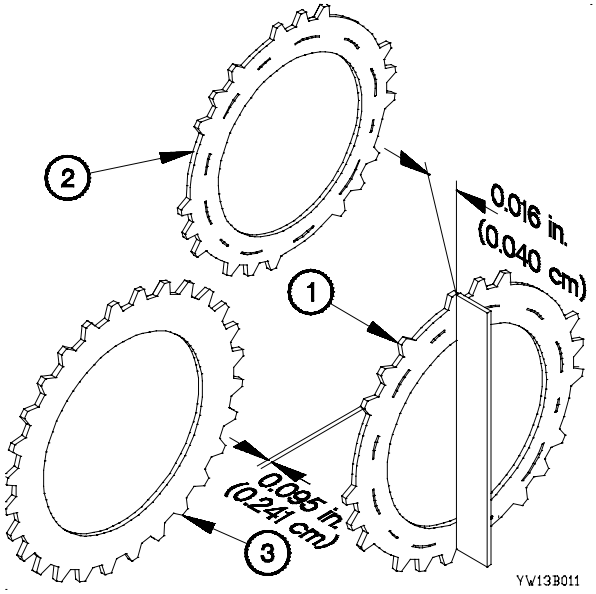
b. Cleaning/Inspection.

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. (0.241 cm).

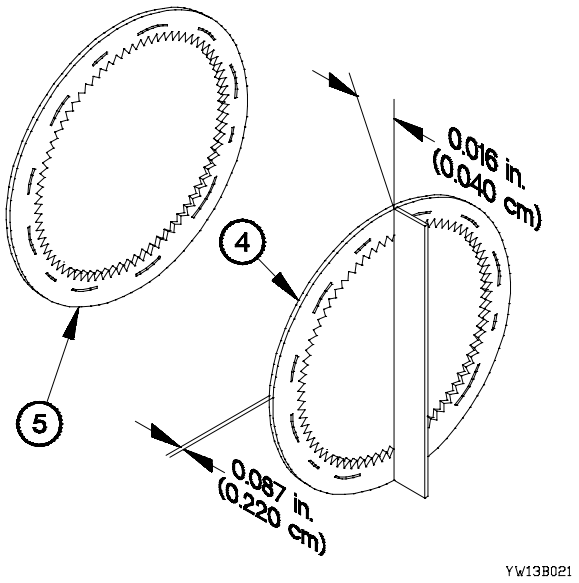
(2) Lay a straight edge across each C3 reaction plate (1), maximum bend in reaction plate 0.016 in. (0.040 cm).

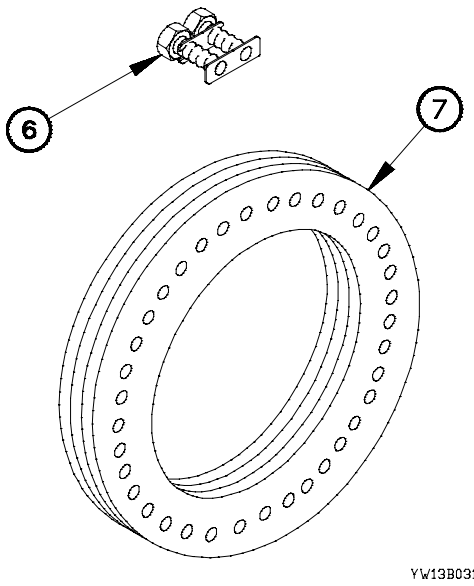
(3) Perform steps (1) and (2) for five C4 reaction plates (2) and eight C5 reaction plates (3).

(4) Measure thickness of five C3 friction plates (4), minimum thickness 0.087 in. (0.220 cm).

(5) Lay a straight edge across each C3 friction plate (4), maximum bend in friction plate 0.016 in. (0.040 cm).

(6) Perform steps (5) and (6) for five C4 friction plates (5).





(7) Inspect eight return springs (6) for broken or missing springs.

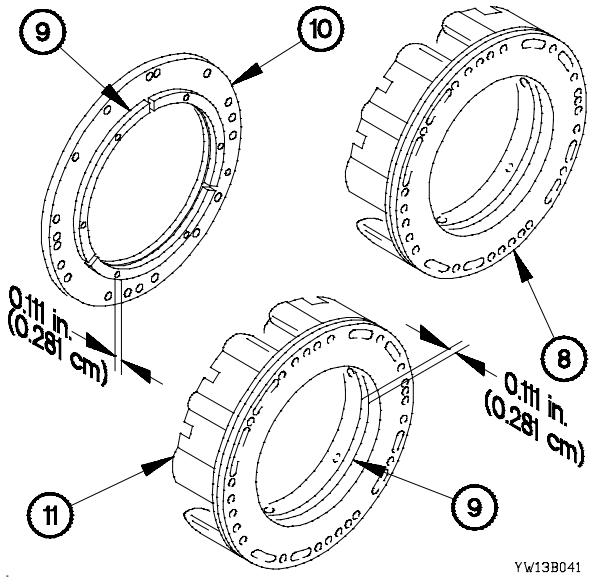
(8) Inspect two spring retainers (7) for broken or missing springs.

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. (0.281 cm).



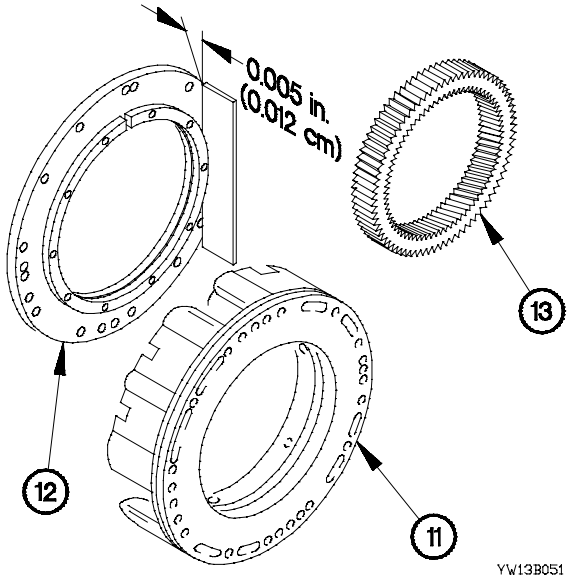
21-13. C3/C4 CLUTCH MODULE REPAIR (CONT)

(11) Inspect C4 clutch housing (11) for scratches, nicks, and burrs.

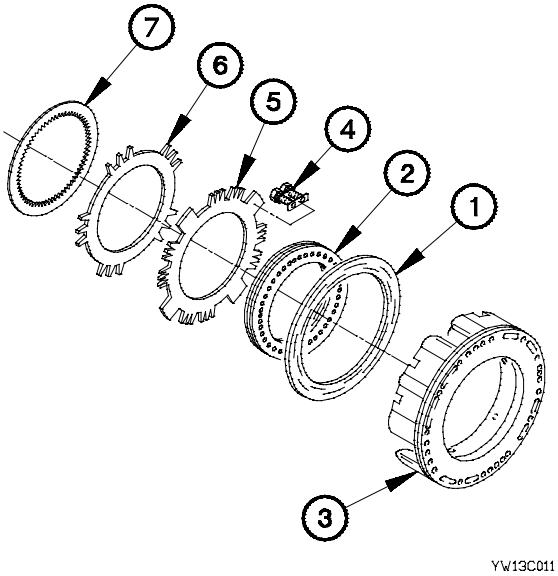
(12) Inspect C3 backing plate (12) for scratches, nicks, and burrs.

(13) Lay a straight edge on seating surfaces of C3 backing plate (12) and verify flatness within 0.005 in. (0.012 cm).

(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).

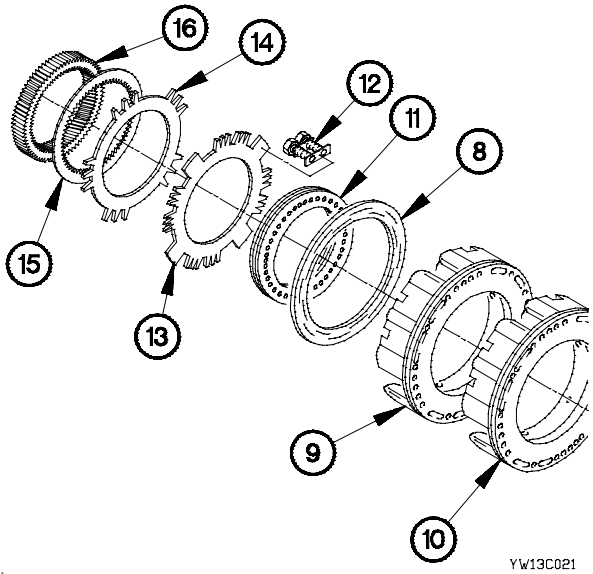
(6) Install spring retainer (11) in C3 clutch housing (9).

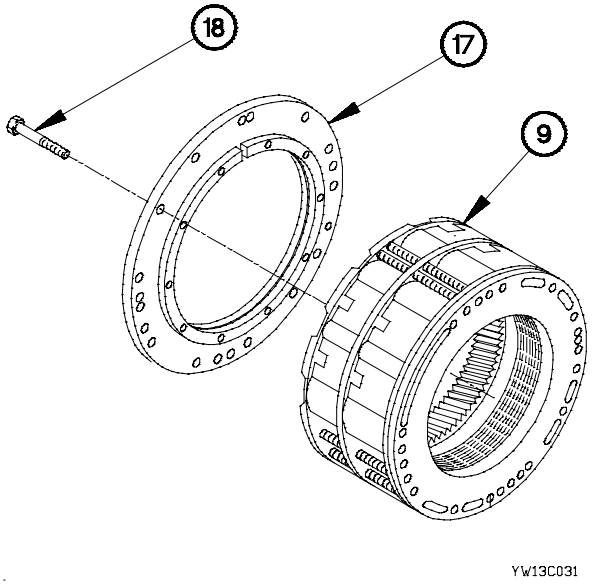
(7) Install four return springs (12) on return plate (13).

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 78, Appendix B)
Caliper, Vernier (Item 11, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Handle, Drive (TM 9-2320-366-20)
Inserter and Remover, Spring (TM 9-2320-366-20)
Press, Arbor, Hand Operated (Item 48, Appendix B)

Tools and Special Tools (Cont)
Puller Kit, Mechanical (Item 50, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

Materials/Parts
Oil, Engine Lubricating (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Seal Ring (Item 406, Appendix F)
Seal Ring (Item 407, Appendix F)

a. Disassembly.

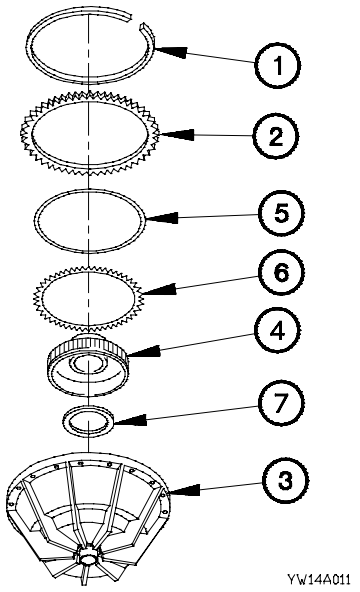
WARNING

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).

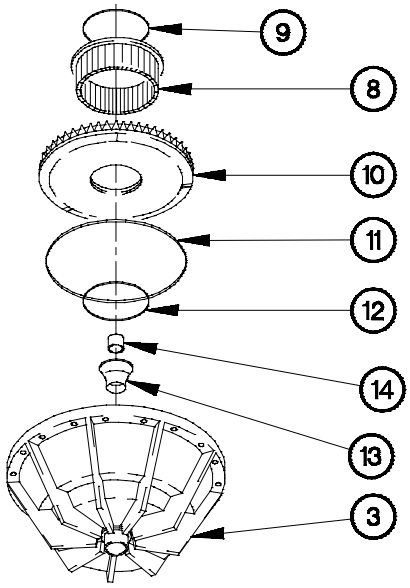
(7) Release pressure on spring retainer (8) in C6 clutch housing (3).

(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.

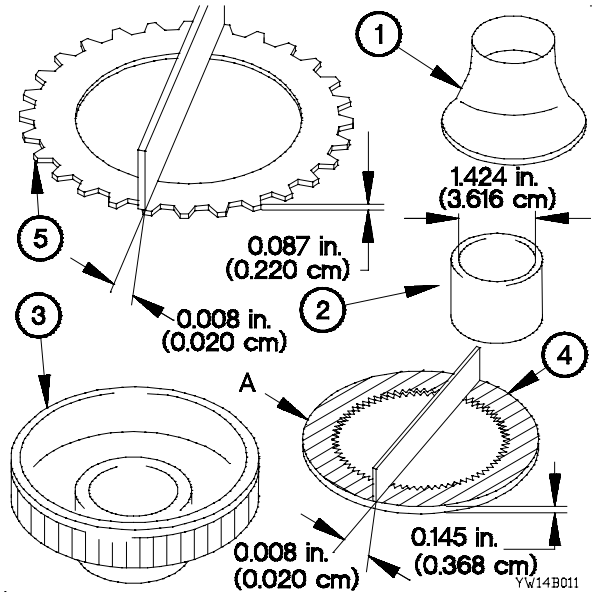
(2) Inspect sleeve (1) for excessive wear.

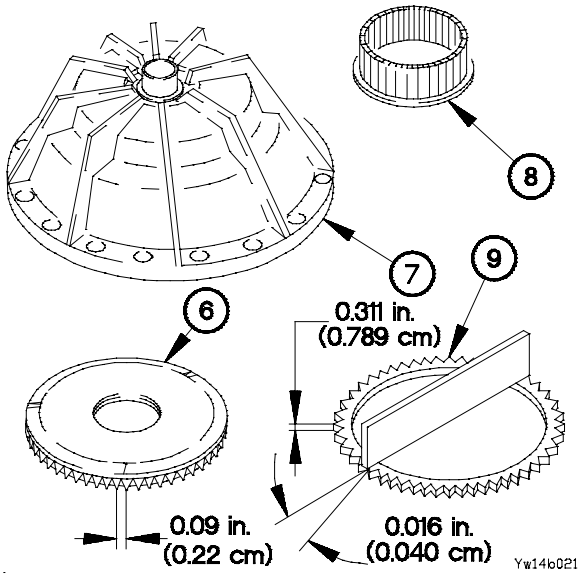
(3) Inspect bushing (2) for excessive wear. Maximum inside diameter is 1.424 in. (3.617 cm).

(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. (0.368 cm). Maximum bend 0.016 in. (0.040 cm), and measure oil groove depth (A), minimum oil groove depth is 0.008 in. (0.020 cm).

(6) Inspect C6 reaction plates (5) for wear. Minimum thickness is 0.087 in. (0.220 cm). Maximum bend is 0.016 in. (0.040 cm).





(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).

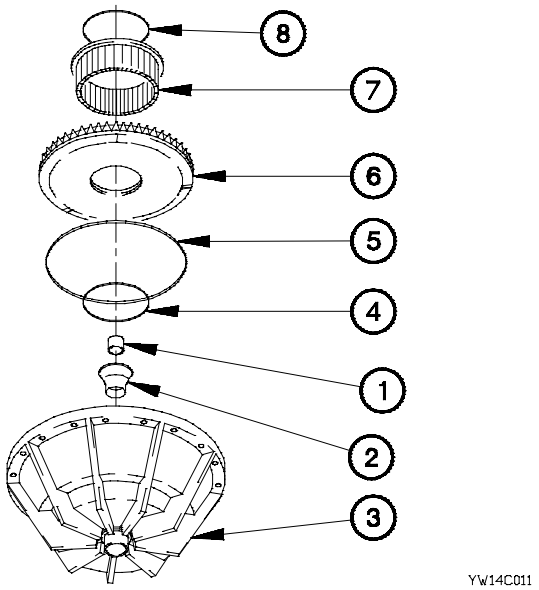
(2) Install sleeve (2) in C6 clutch housing (3).

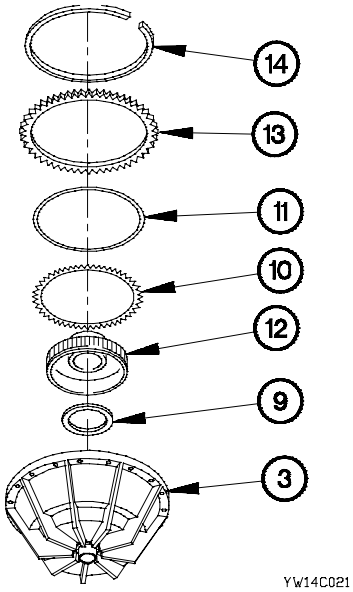
(3) Install seal rings (4 and 5) and C6 piston (6) in C6 clutch housing (3).

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 78, Appendix B)
Puller Kit, Universal (Item 51, Appendix B)
Indicator, Dial (Item 36, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Handle, Drive (TM 9-2320-366-20)
Caliper, Vernier (Item 11, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)

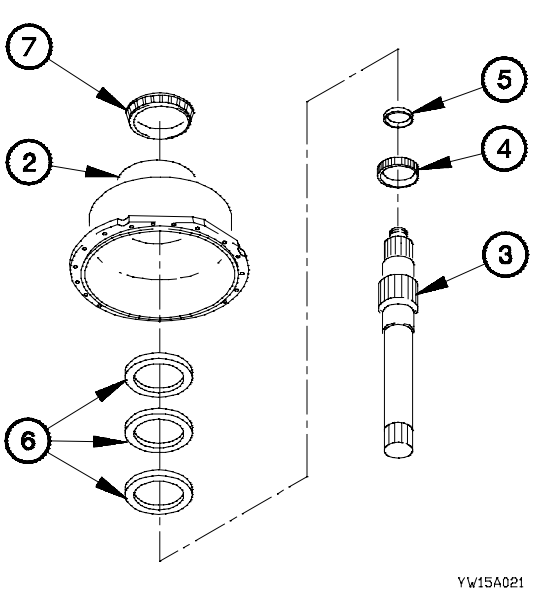
Tools and Special Tools (Cont)
Puller Kit, Universal (Item 50, Appendix B)
Gage Set, Telescoping (Item 24, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

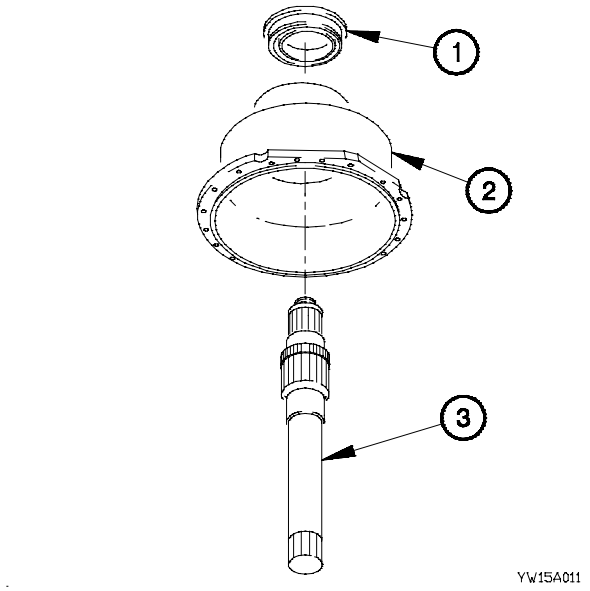
Materials/Parts
Sealring (Item 409, Appendix F)
Sealring (Item 410, Appendix F)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Sealring (Item 408, Appendix F)
Seal, Plain Encased (Item 393, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)

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).



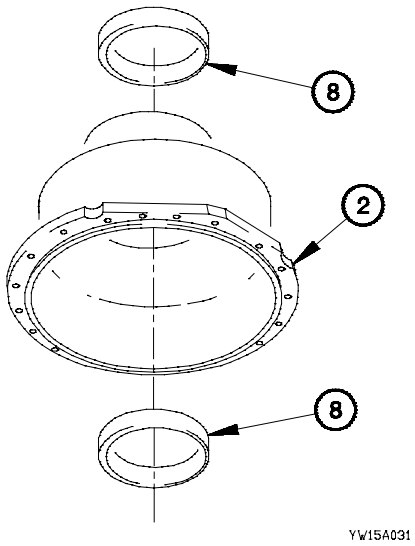


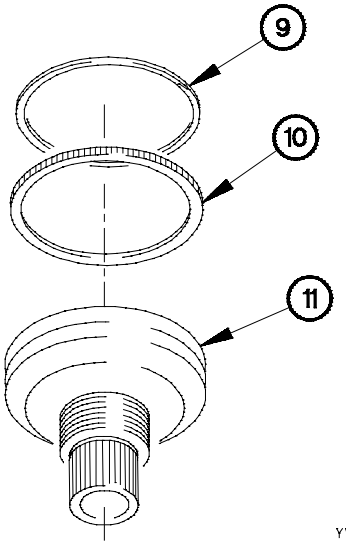
(3) Remove roller bearing cone (4) from front output shaft (3).

(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.

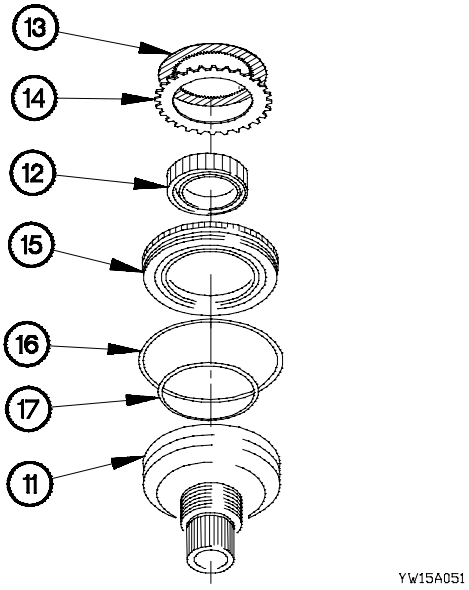
(7) Remove internal retaining ring (9) and backing plate (10) from C7 clutch housing (11).

(8) Remove C7 clutch hub (12) from C7 clutch housing (11).

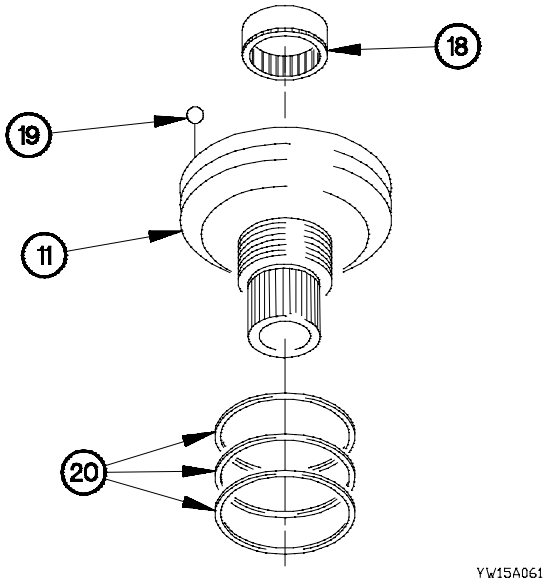
(9) Remove five C7 friction plates (13) and C7 reaction plates (14) from C7 clutch hub (12).

(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.**

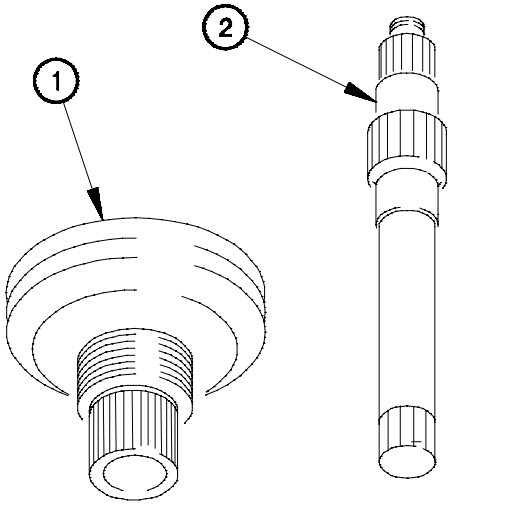
(1) Clean all metal parts with dry cleaning solvent.

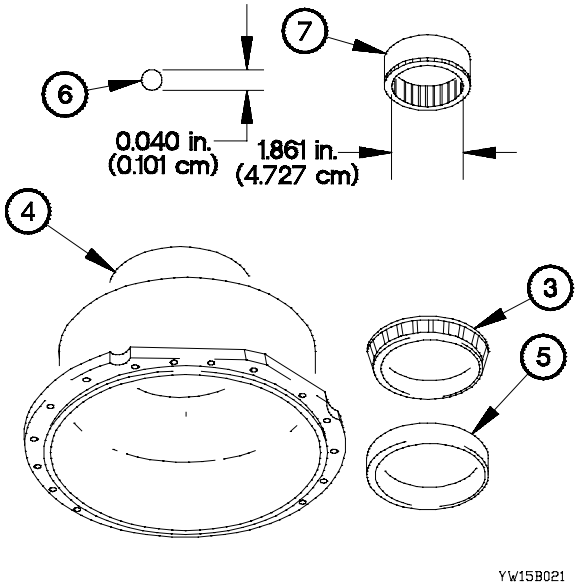
NOTE

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. (0.101 cm).

(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. (0.220 cm).

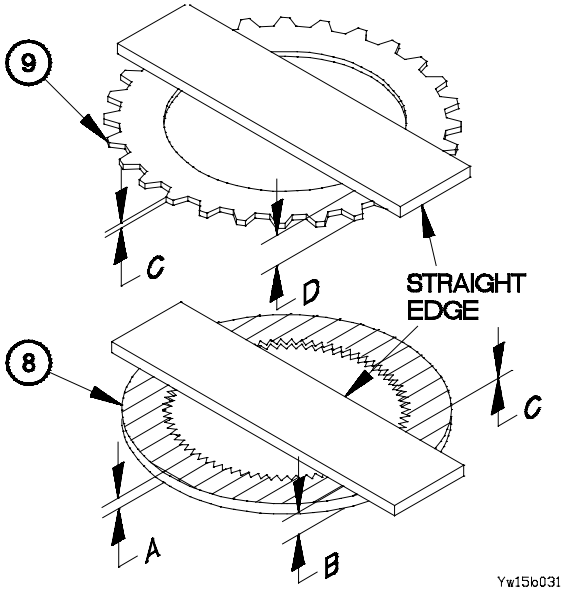
(11) Lay straight edge across each C7 friction plate (8), subtract measurement (B) from (A), maximum bend 0.010 in. (0.025 cm).

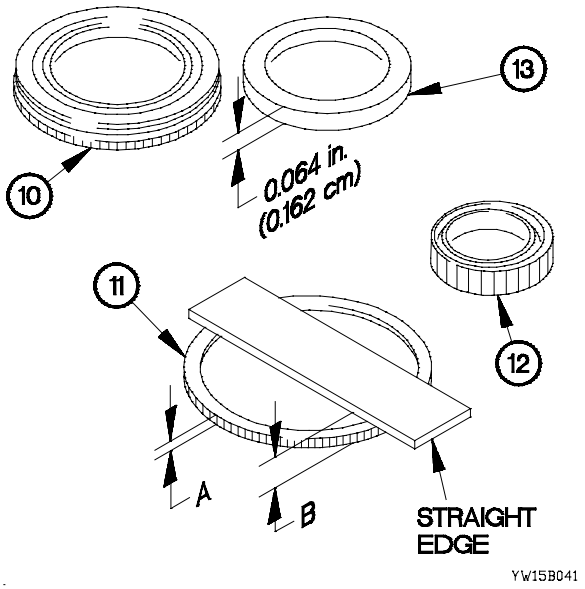
(12) Measure oil groove depth (A) of each C7 friction plate (8), minimum oil groove depth is 0.008 in. (0.020 cm).

(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. (0.210 cm).

(15) Lay straight edge across each C7 reaction plate (9), subtract measurement (D) from (C), maximum bend is 0.010 in. (0.025 cm).





(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. (0.86 cm).

(19) Lay straight edge across each C7 backing plate (11), subtract measurement (B) from (A), maximum bend is 0.010 in. (0.025 cm).

(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. (0.162 cm). Add or subtract shims to achieve proper dimension.

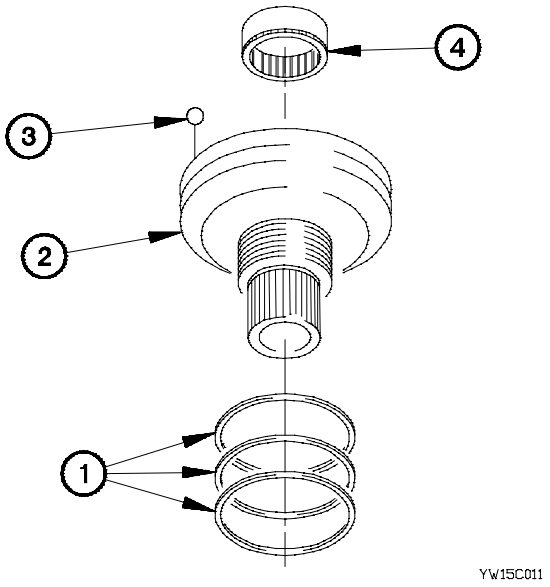
c. Assembly.

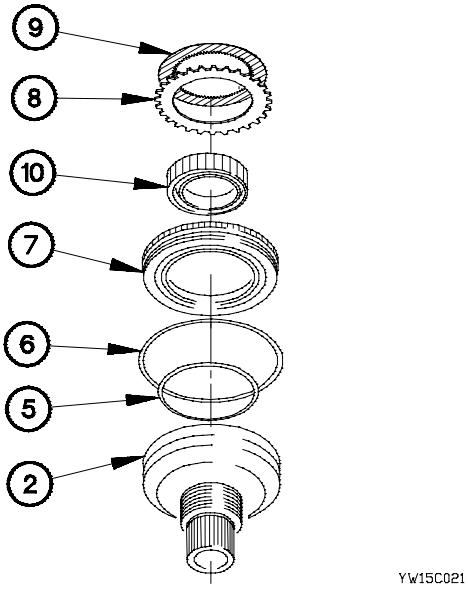
NOTE

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).

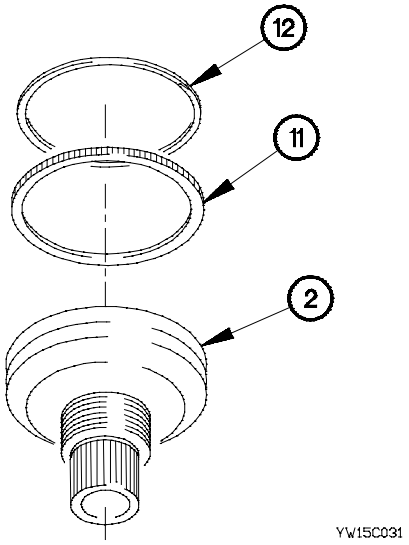
21-15. C7 CLUTCH HOUSING AND FRONT OUTPUT HOUSING ASSEMBLY REPAIR (CONT)

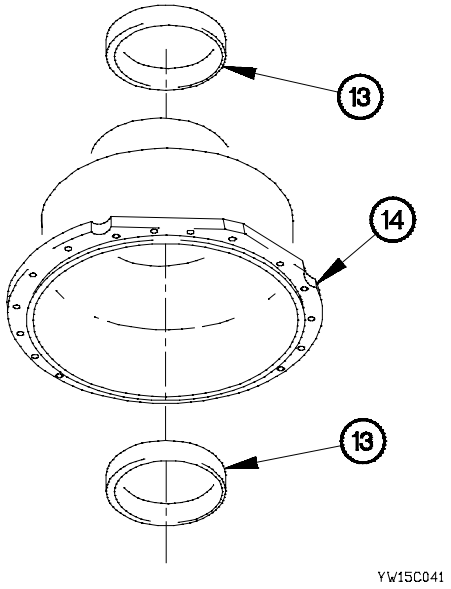
(7) Install C7 backing plate (11) in C7 clutch housing (2).

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).



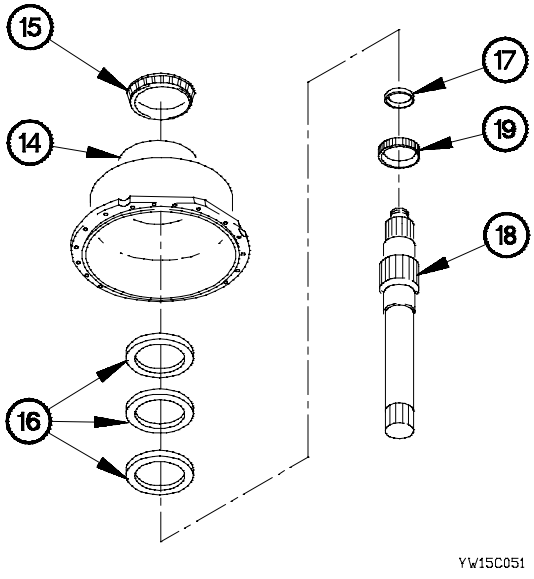


(9) Install two roller bearing cups (13) in front output housing (14).

(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).

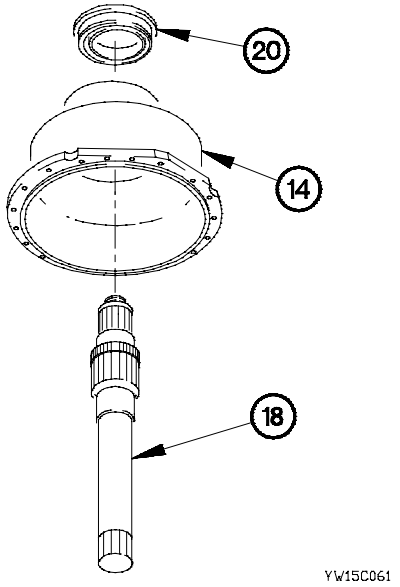


NOTE

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).



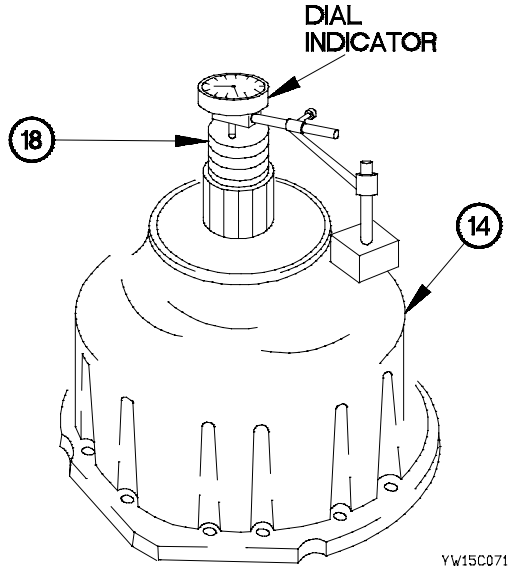
NOTE

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. (0.162 cm).
- 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. (0.002-0.012 cm). 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.

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 78, Appendix B)
Holding Bar, Pinion (TM 9-2320-366-20)
Wrench, Impact, Electric (Item 88, Appendix B)
Socket, Socket Wrench (Item 69, Appendix B)
Multiplier, Torque (Item 42, Appendix B)
Socket Set, Impact (Item 58, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Adapter, Socket Wrench (Item 2, Appendix B)

Tools and Special Tools (Cont)
Puller Kit, Universal (Item 51, Appendix B)
Socket, Socket Wrench (Item 69, Appendix) (TM 9-2320-366-20)

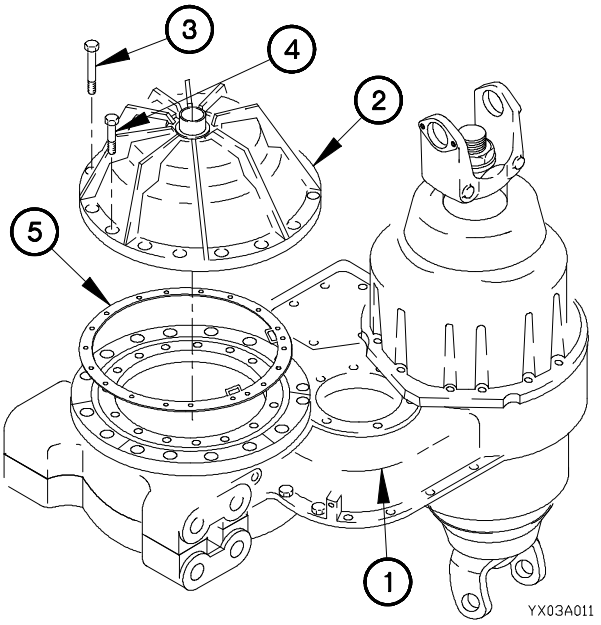
Materials/Parts
Gasket (2) (Item 69, Appendix F)
Gasket (Item 62, Appendix F)
Oil, Lubricating (Item 45, Appendix C)

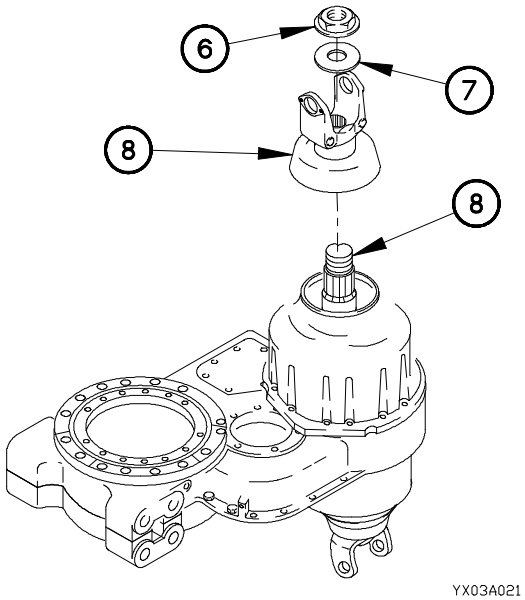
Personnel Required
(2)

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).

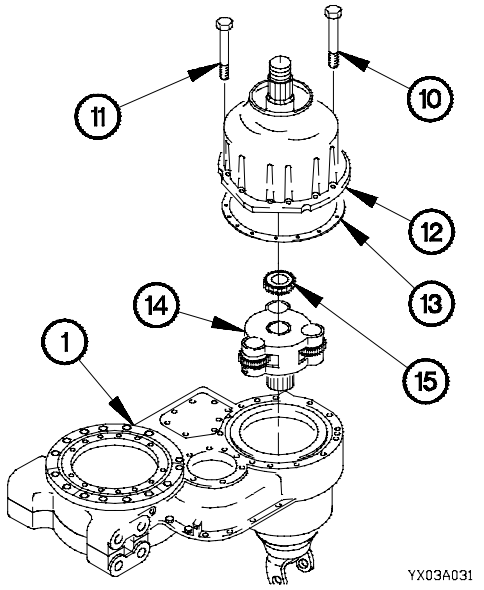
NOTE

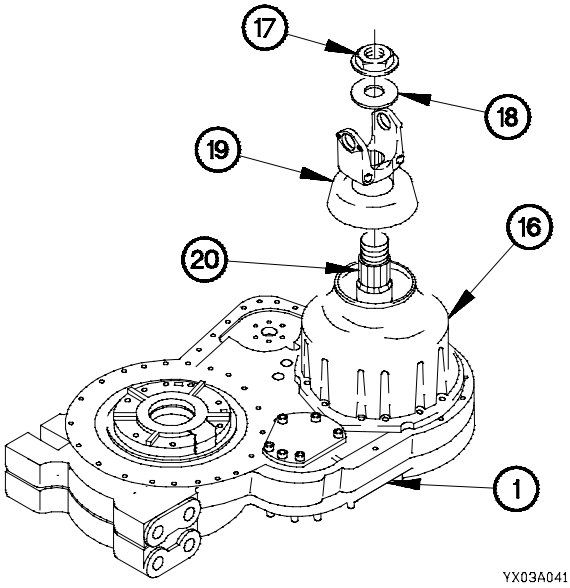
Step (5) requires the aid of an assistant.

(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).

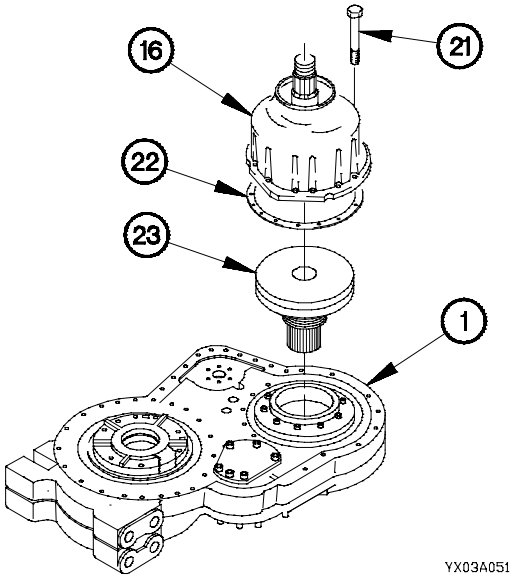
(10) Remove 15 screws (21) from front output housing (16).

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.

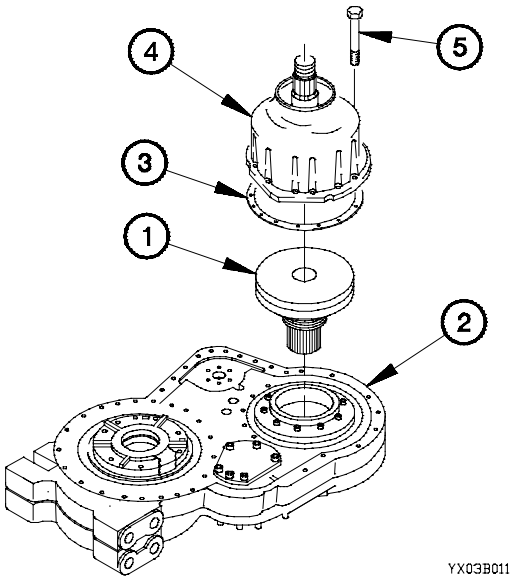
NOTE

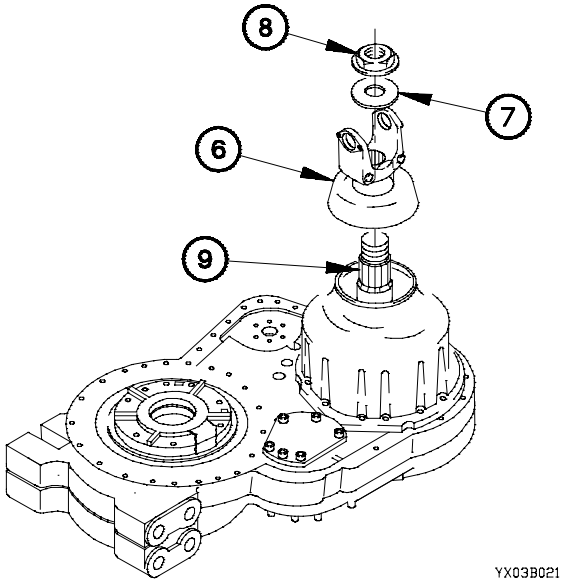
Apply lubricating oil to all parts during assembly.

(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).

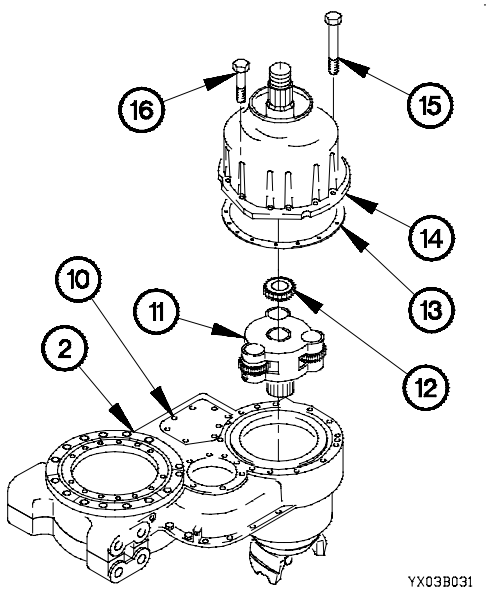
(5) Tighten nut (8) to 450-600 lb-ft (610-814 N·m).

(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).

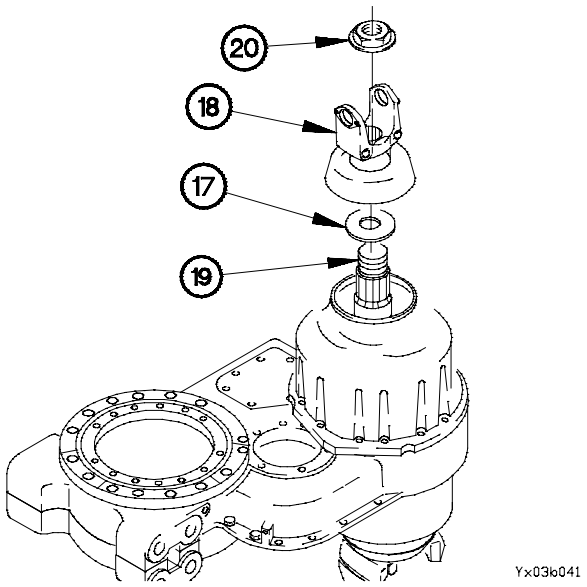
(8) Position gasket (13) and rear output housing (14) on transfer case module (2) with nine screws (15) and six screws (16).

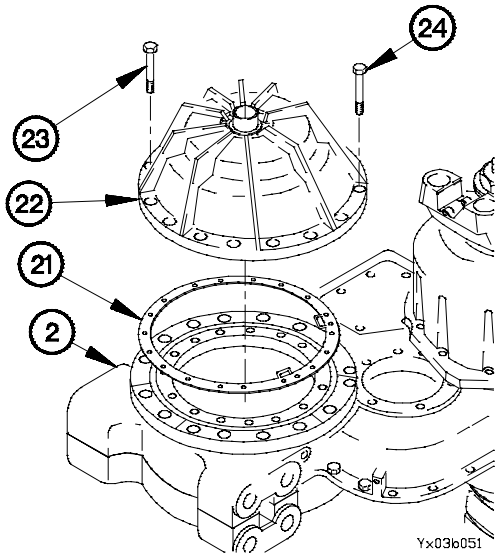
(9) Tighten nine screws (15) and six screws (16) to 44-55 lb-ft (60-75 N·m).



(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).

c. Follow-On Maintenance.

Install transfer case module (para 22-2).

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

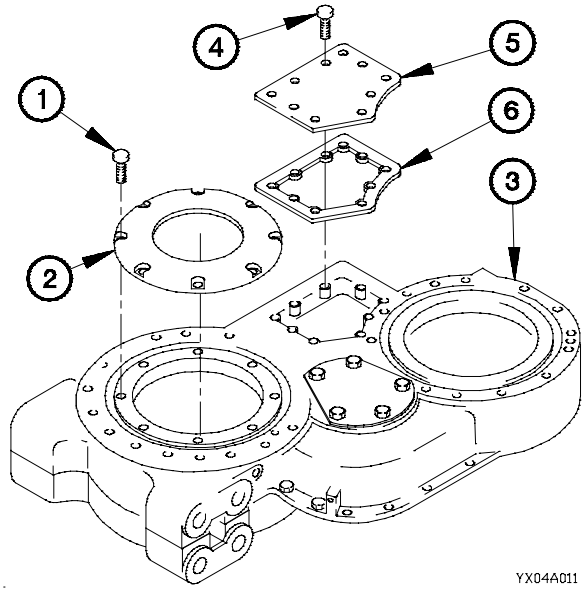
Equipment Conditions
Transfer case module disassembled (para 22-3).

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Caliper, Vernier (Item 11, Appendix B)
Indicator, Dial (Item 36, Appendix B)
Hammer, Soft Head (Item 33, Appendix B)
Inserter, Bearing and Bushing (TM 9-2320-366-20)
Inserter and Remover, Spring (TM 9-2320-366-20)
Puller Kit, Universal (Item 51, Appendix B)
Puller Kit, Universal (Item 50, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)

Materials/Parts
Gasket (2) (Item 67, Appendix F)
Gasket (Item 71, Appendix F)
Oil, Lubricating (Item 45, Appendix C)
Kit, Seal (Item 120, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Gasket (Item 68, Appendix F)
Gasket (Item 67, Appendix F)
Washer, Seal (2) (Item 310, Appendix F)
Packing, Preformed (3) (Item 294, Appendix F)
Plug (Item 343, Appendix F)

Personnel Required
(2)

a. Disassembly.



(1) Remove eight screws (1) from C6 bearing retainer (2).

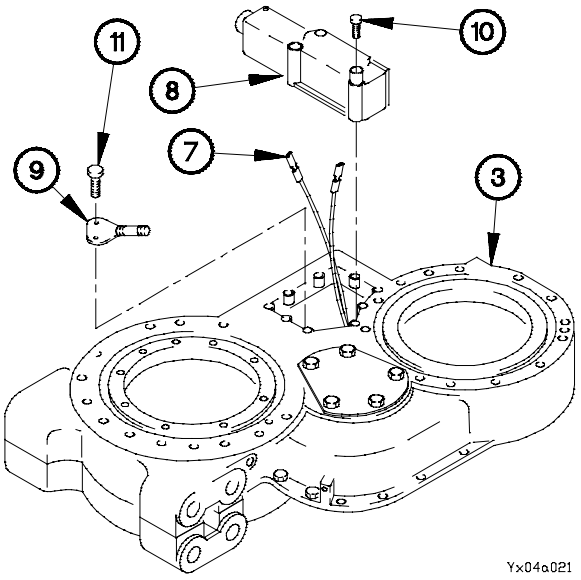
(2) Remove C6 bearing retainer (2) from transfer case cover (3).

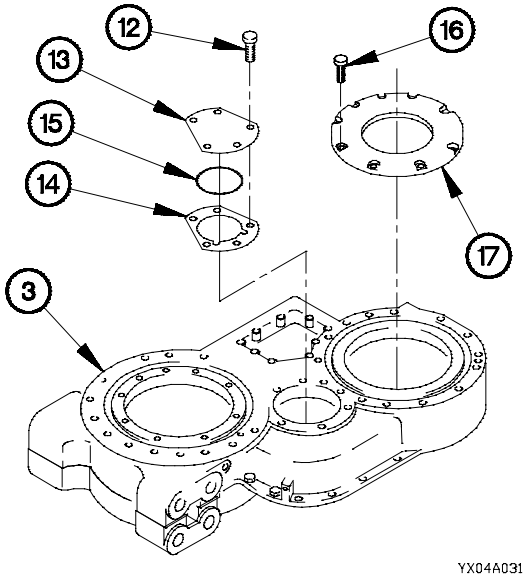
(3) Remove 10 screws (4), access cover (5), and gasket (6) from transfer case cover (3). Discard gasket.

(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).





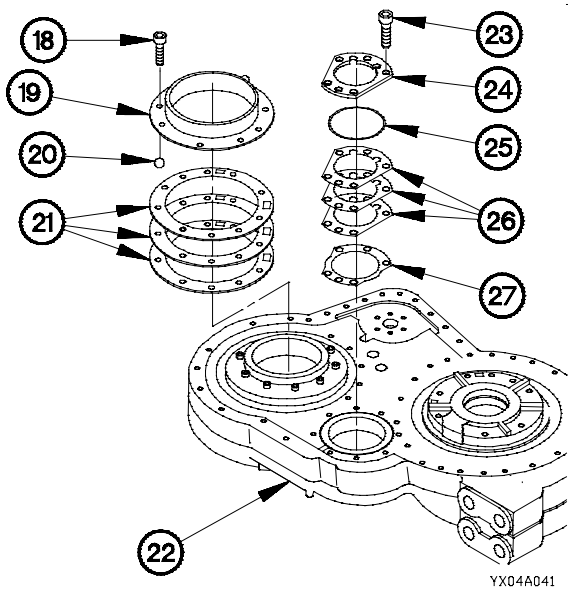
(7) Remove five screws (12), idler gear cover (13), and gasket (14) from transfer case cover (3). Discard gasket.

(8) Remove seal washer (15) from idler gear cover (13). Discard seal washer.

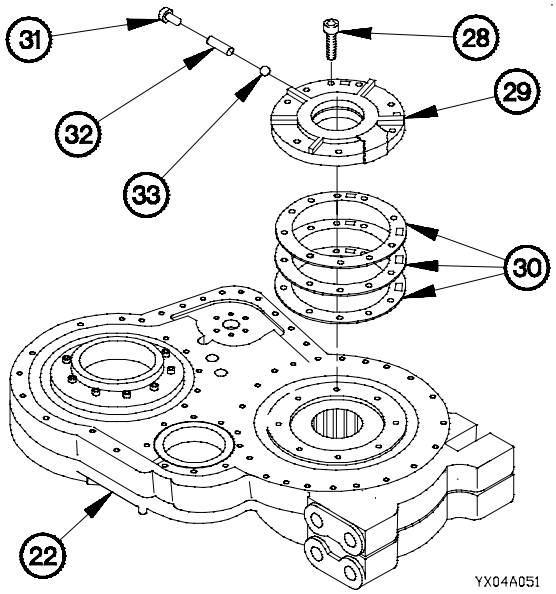
(9) Remove eight bolts (16) and rear output bearing retainer (17) from transfer case cover (3).

(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.

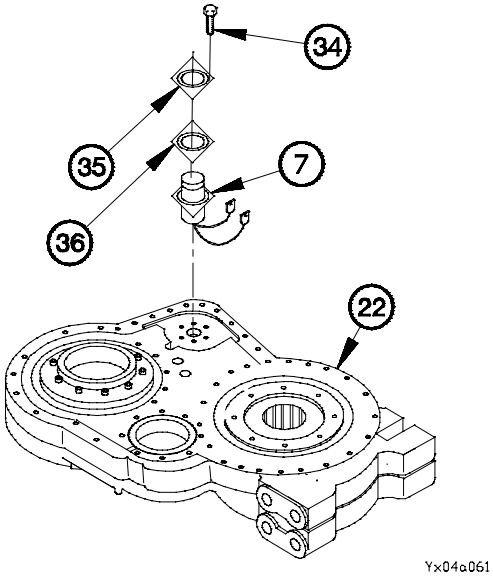


22-4. TRANSFER CASE HOUSING REPAIR (CONT)



(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).

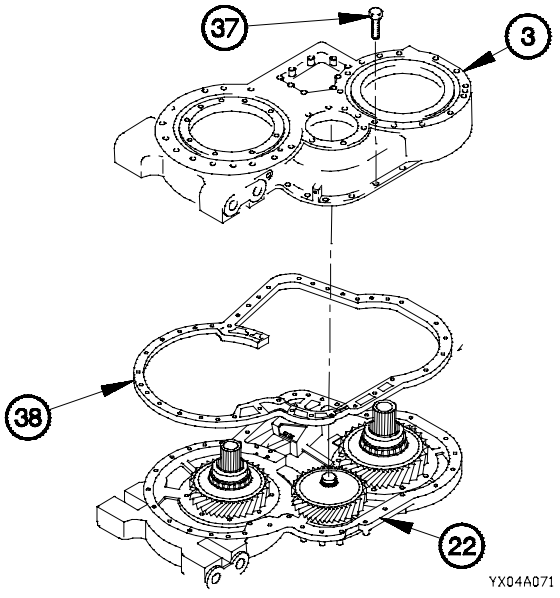
WARNING

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

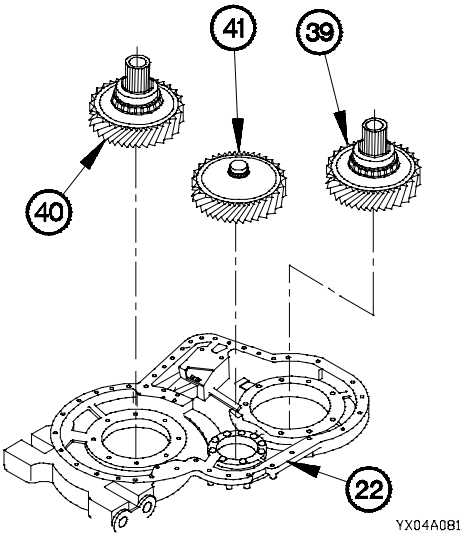
Step (17) requires the aid of an assistant.

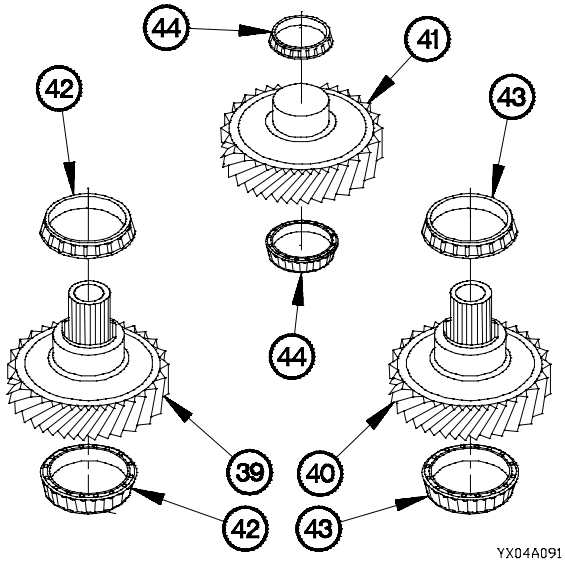
(17) Remove transfer case cover (3), and gasket (38) from transfer case housing (22). Discard gasket.



(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).

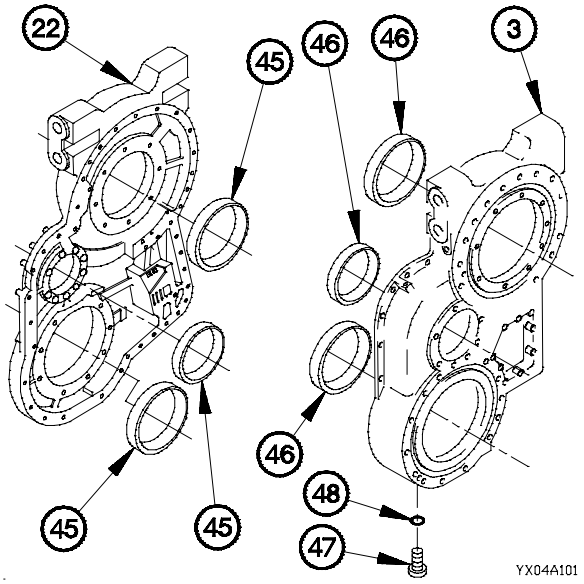
(22) Remove two bearing cones (44) from center idler gear (41).

(23) Remove three bearing cups (45) from transfer case housing (22).

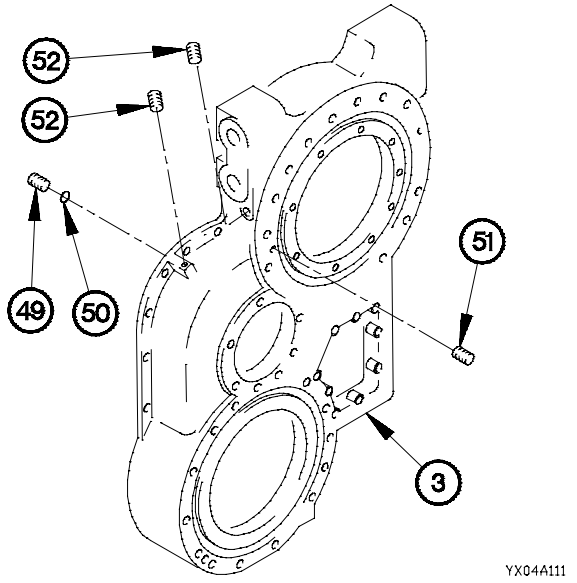
(24) Remove three bearing cups (46) from transfer case cover (3).

(25) Remove plug (47) from transfer case cover (3).

(26) Remove preformed packing (48) from plug (47). Discard preformed packing.



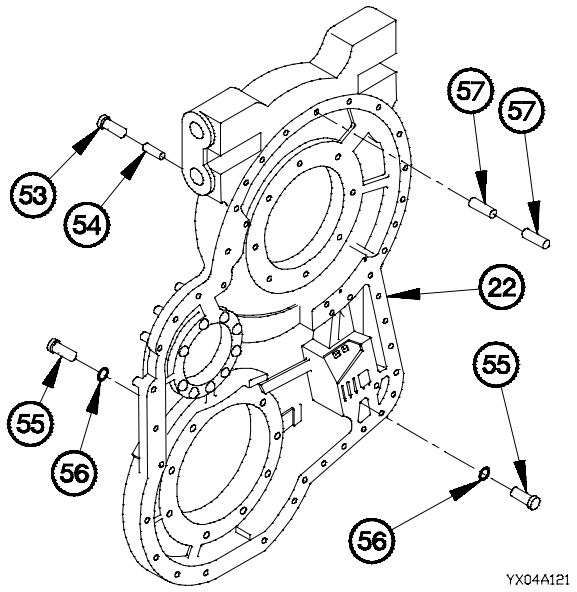
22-4. TRANSFER CASE HOUSING REPAIR (CONT)



(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.

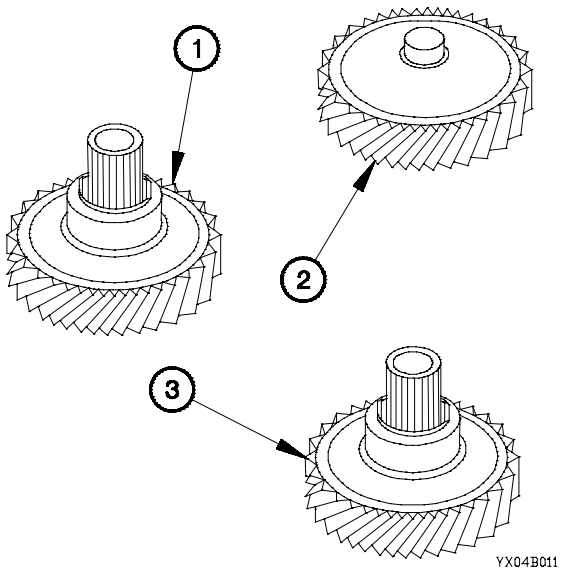
NOTE

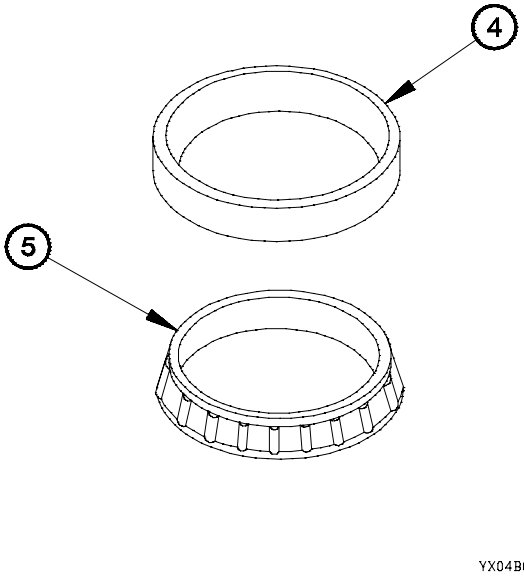
Replace any part that fails visual inspection.

(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

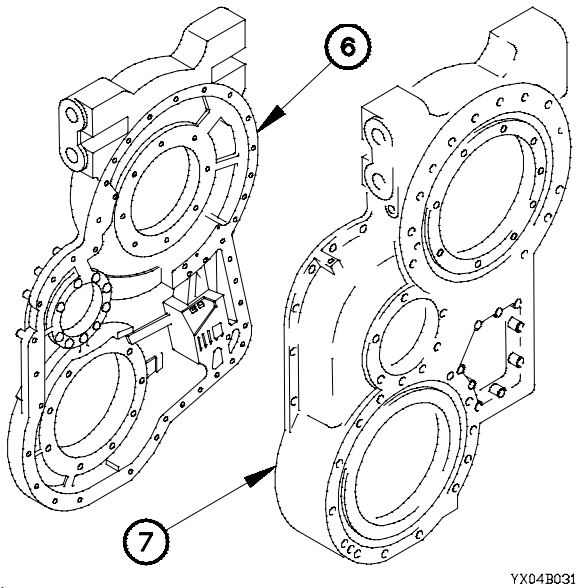
Bearing cones and cups must be replaced as a set. Never use an old bearing cone or cup with a new bearing cone or cup. Failure to comply may result in damage to equipment.

(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.



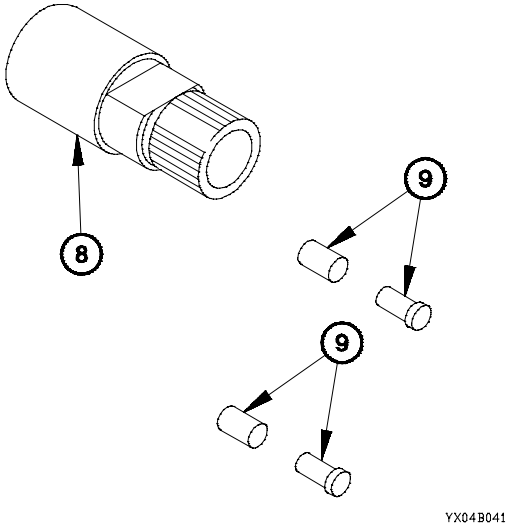
22-4. TRANSFER CASE HOUSING REPAIR (CONT)

NOTE

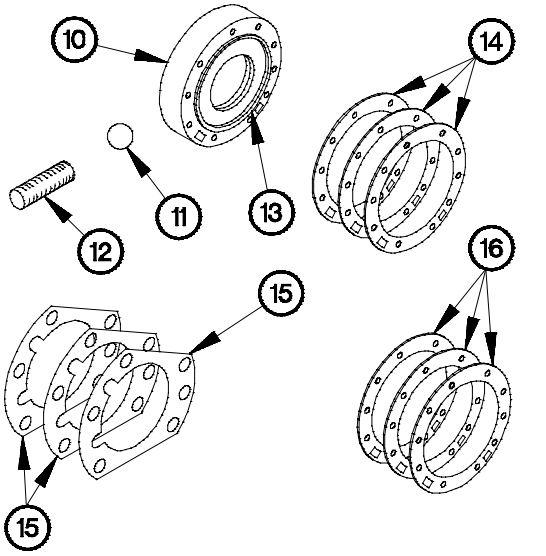
Transmission shaft adapter may have stayed with transmission.

(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

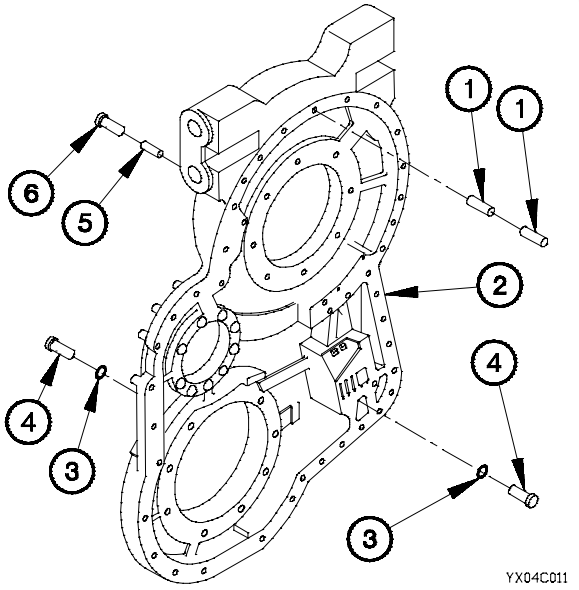
Lubricate all parts with lubricating oil during assembly.

(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).

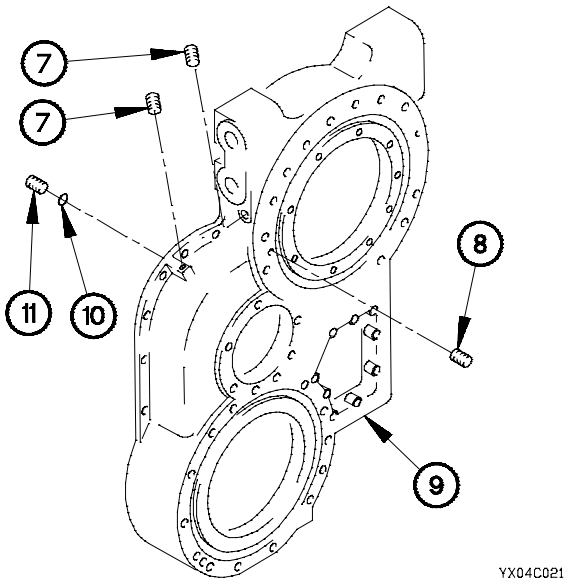


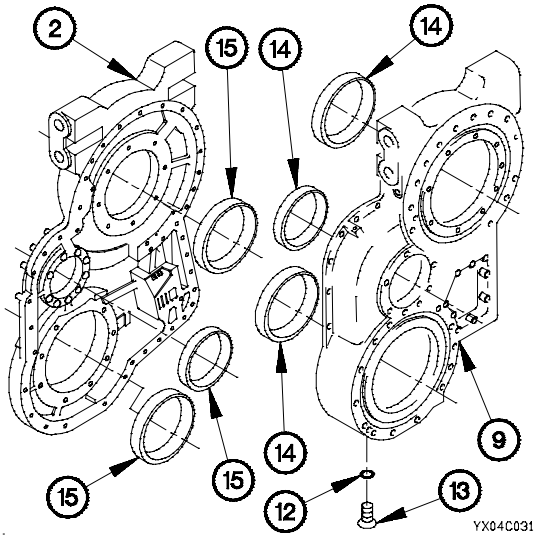
YX04C011

(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).

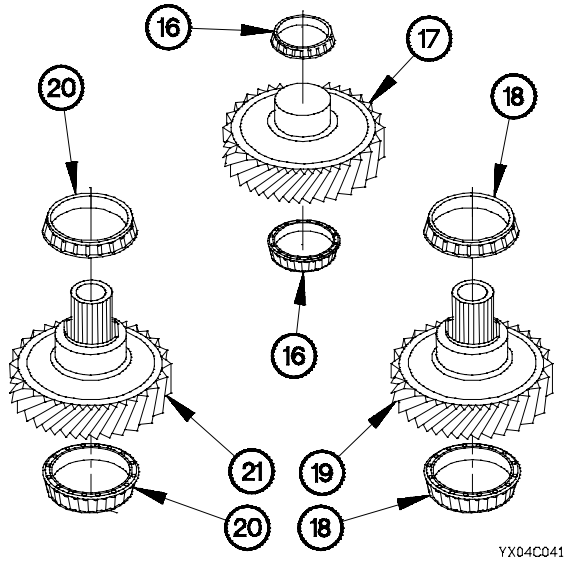
CAUTION

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)

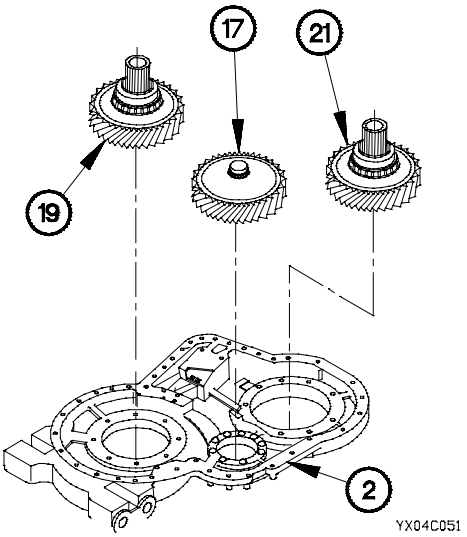
(15) Rotate transfer case housing (2) until open end is facing up.

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

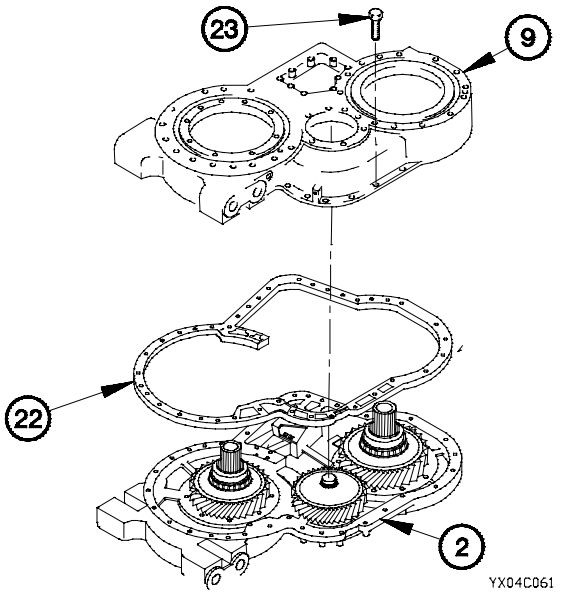
Install idler gear with threaded hole toward transfer case housing.



(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).

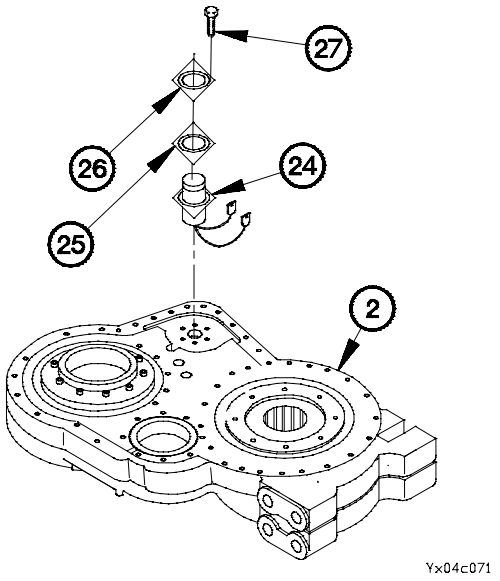
(20) Position 15 bolts (23) in transfer case housing (2).

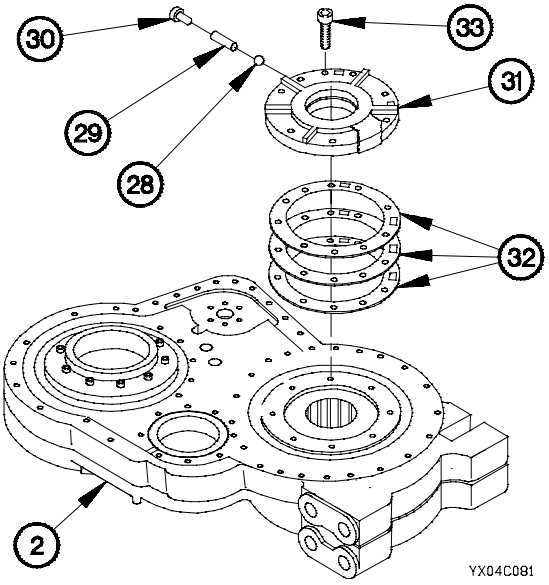
(21) Tighten 15 bolts (23) to 44-55 lb-ft (60-75 N·m).

(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

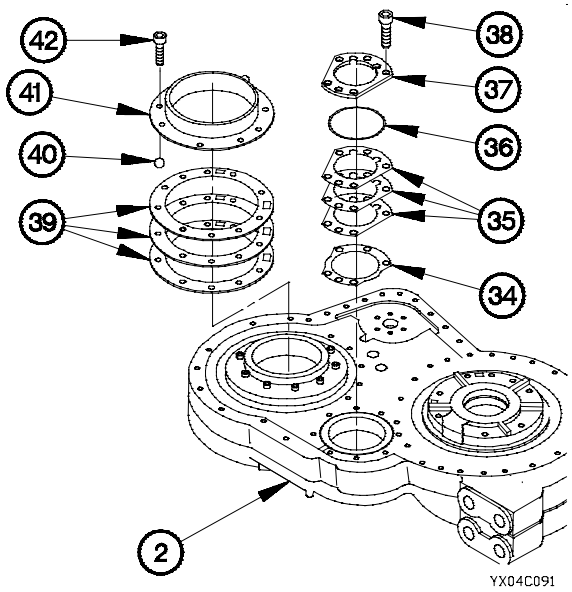
Shim(s) are selected during bearing preload adjustment (para. 22-4.d) to compensate for differences in drive gear end play. The initial shim(s) should have a minimum thickness of 0.076 in. (0.193 cm).

(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)

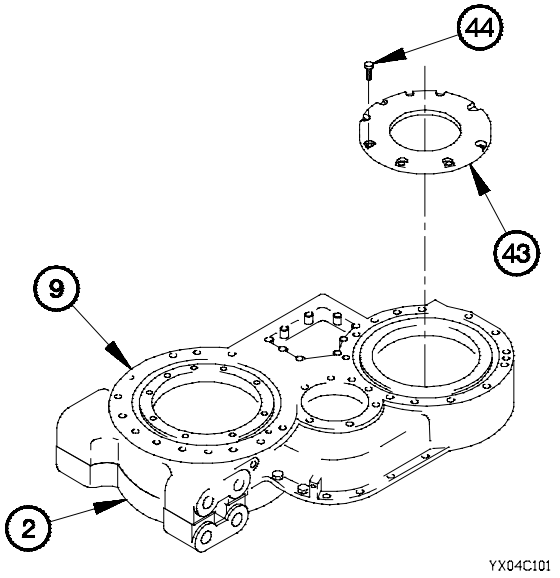


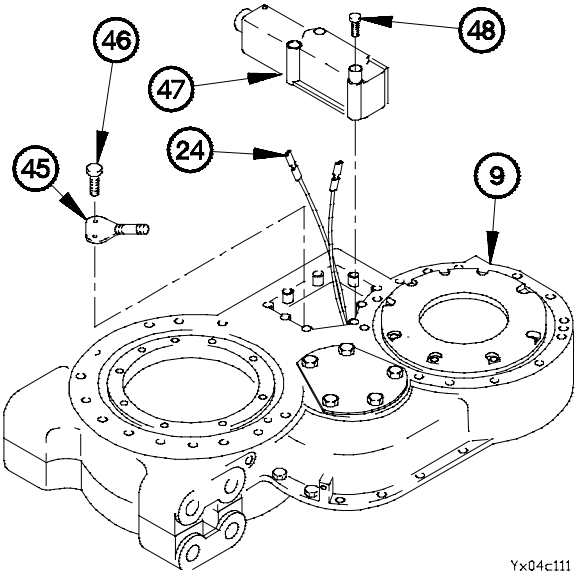
22-4. TRANSFER CASE HOUSING REPAIR (CONT)

(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).

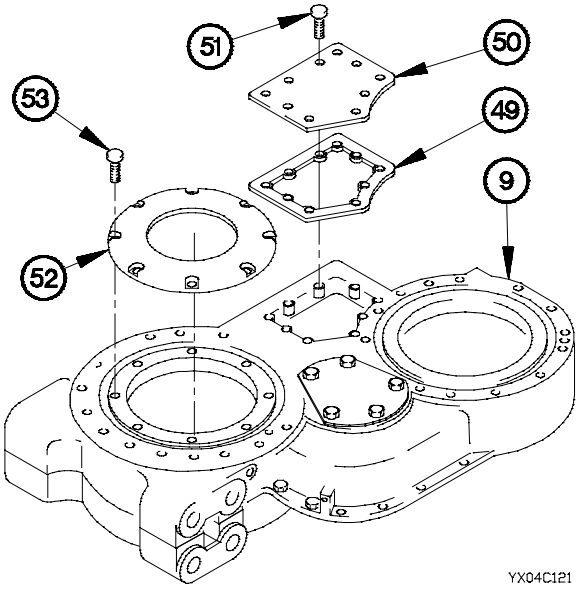
(40) Connect wiring harness (24) to output speed sensor (45) and control valve (47).

(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.

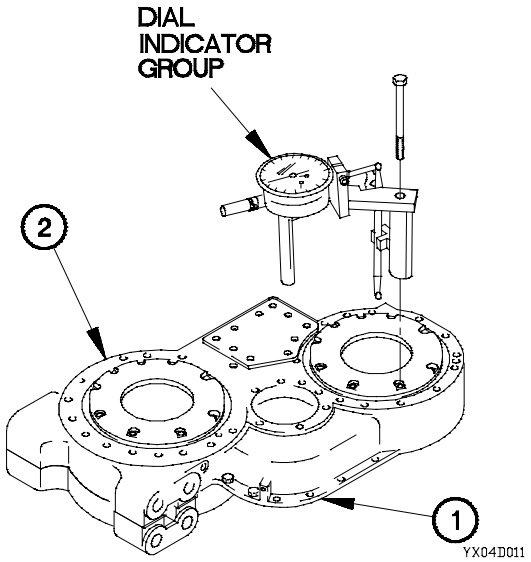
(1) Rotate transfer case housing (1) until transfer case cover (2) is facing up.

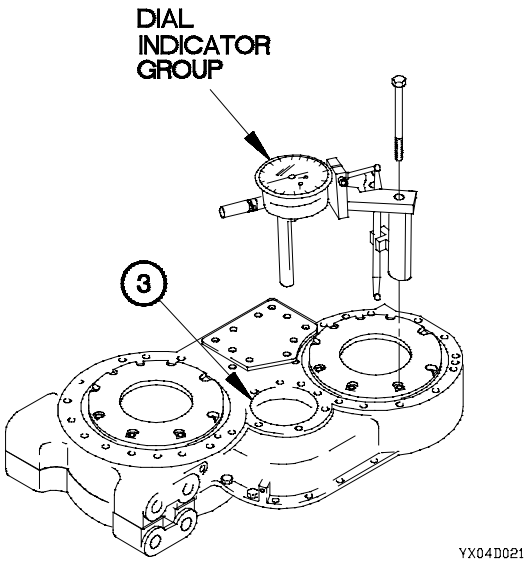
NOTE

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. (0.193 cm).

(6) Measure end play of bearing (3). Reading should be 0.001-0.005 in. (0.002-0.012 cm).

22-4. TRANSFER CASE HOUSING REPAIR (CONT)

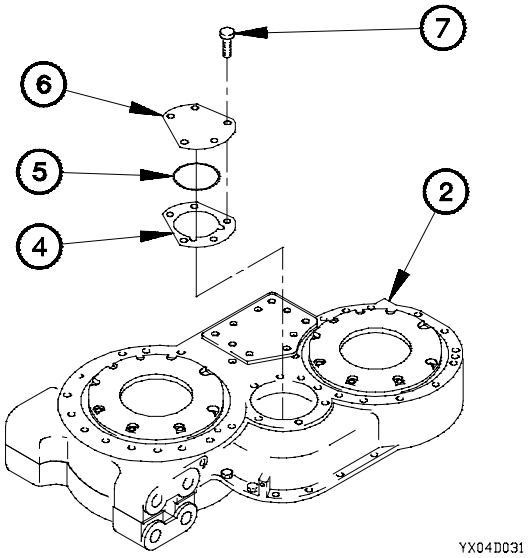
NOTE

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 PROCEDURES 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 78, Appendix B)
Stand, Differential Carrier, Repair (TM 9-2320-366-20)
Puller Kit, Universal (Item 51, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 25, Appendix B)
Indicator Dial (Item 36, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Multiplier, Torque (Item 42, Appendix B)
Holding Bar, Pinion (TM 9-2320-366-20)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Puller Kit, Universal (TM 9-2320-366-20)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)
Socket Set, Impact (Item 58, Appendix B)
Wrench, Impact, Electric (Item 88, Appendix B)
Wrench, Torque, 0-75 lb-in. (Item 98, Appendix B)

Materials/Parts
Sealant, Adhesive (Item 66, Appendix C)
Sealant, Adhesive (Item 67, Appendix C)
Sealant, Adhesive (Item 68, Appendix C)
Adhesive (Item 5, Appendix C)
Compound, Sealing (Item 71, Appendix C)
Compound, Sealing (Item 76.3, Appendix C)
Lubricating Oil Gear (Item 52, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Nut, Self-Locking (Item 193, Appendix F)
Parts Kit, Seal Replacement (Item 386.1, Appendix F)
Pin, Cotter (2) (Item 335, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)

Personnel Required
(2)

a. Disassembly.

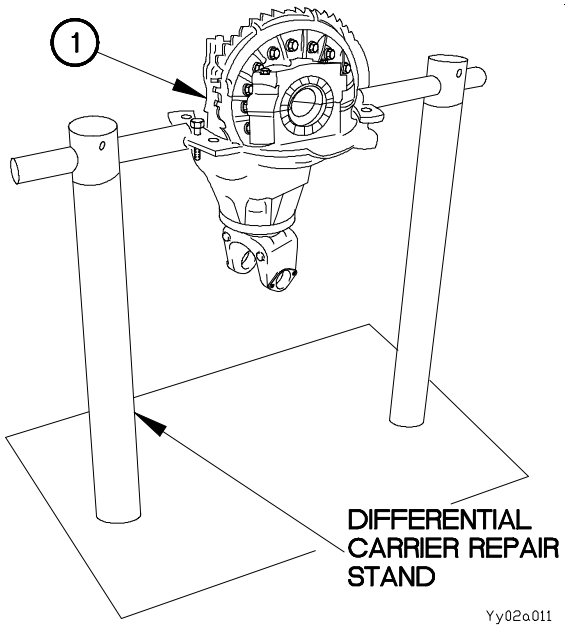
WARNING

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.

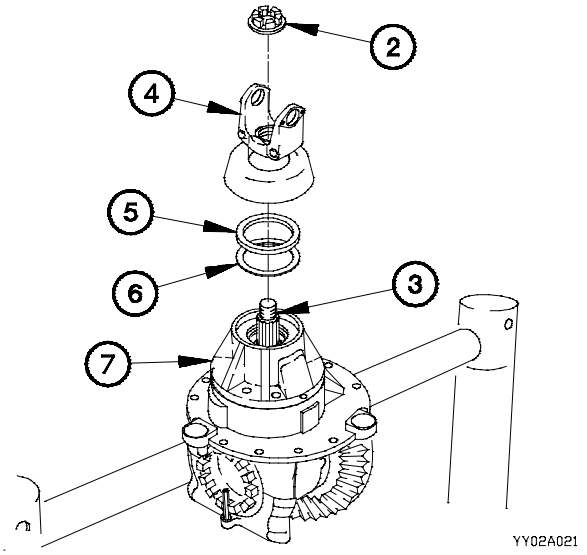
(3) Remove input yoke (4) from pinion drive (3).

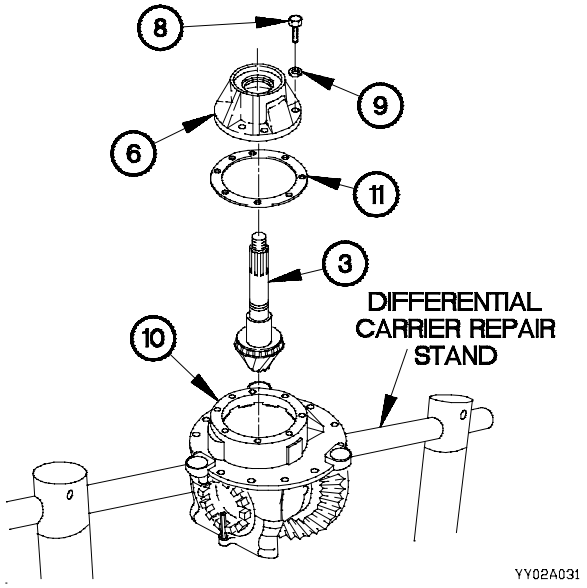
NOTE

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).

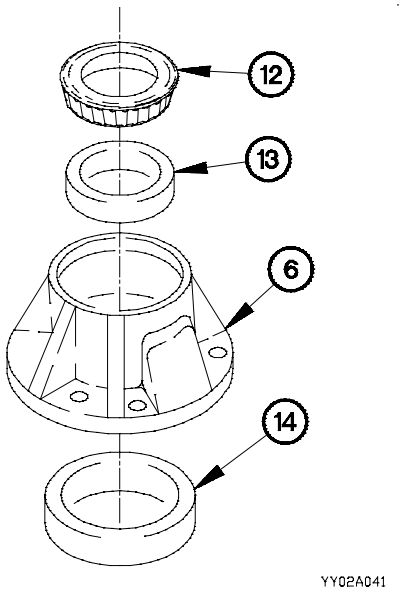
(10) Measure and record the thickness of shims (11).

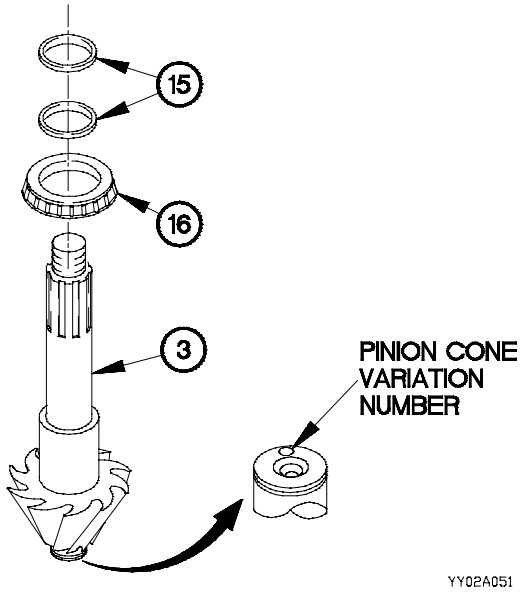
23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(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).



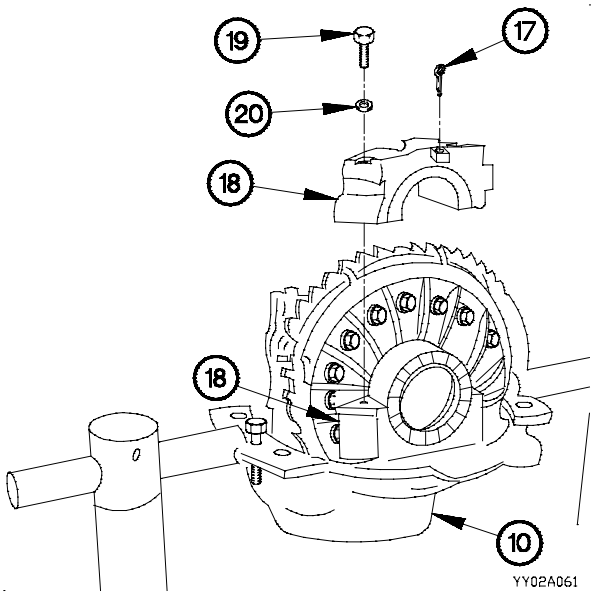


(14) Remove two bearing spacers (15) and inner bearing cone (16) from pinion drive (3).

(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.

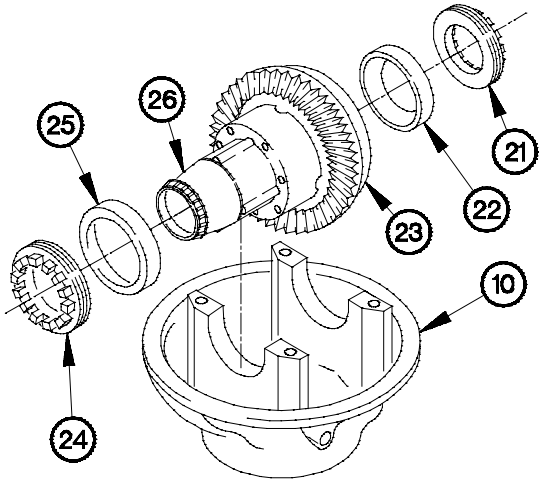
(17) Remove four screws (19), washers (20), and two differential bearing caps (18) from differential carrier housing (10).



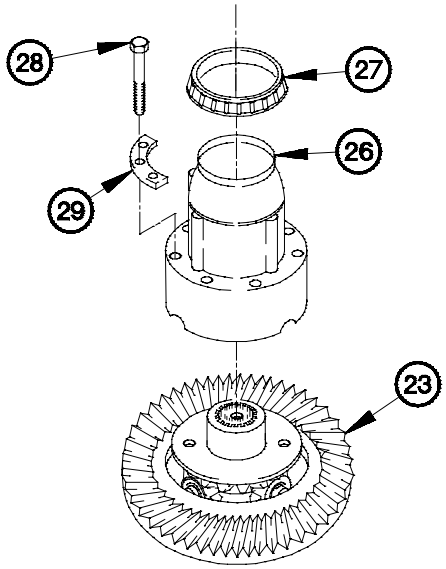
(18) Remove adjusting ring (21) and bearing cup (22) from ring gear (23).

(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



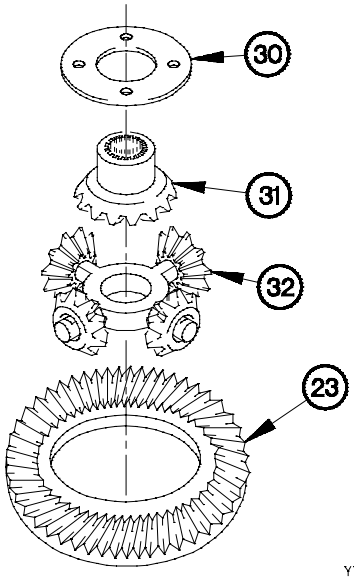
YY02A081

(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).

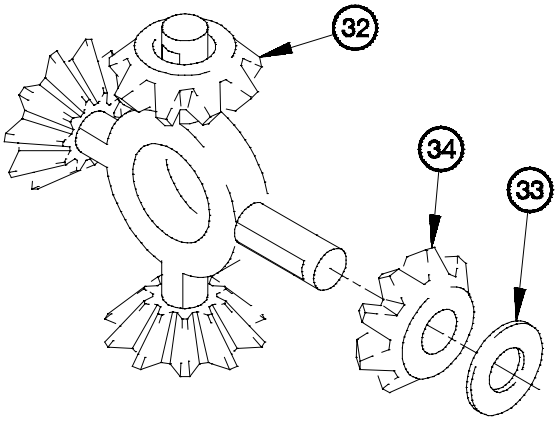
(24) Remove thrust washer (30), side gear (31), and differential spider (32) from ring gear (23).



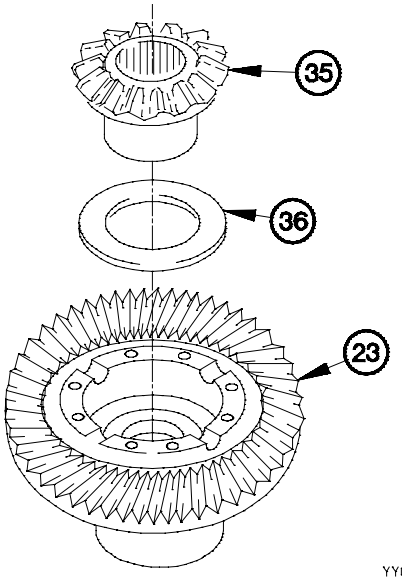
YY02A091

23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(25) Remove four thrust washers (33) and differential pinion gears (34) from differential spider (32).



YY02A101

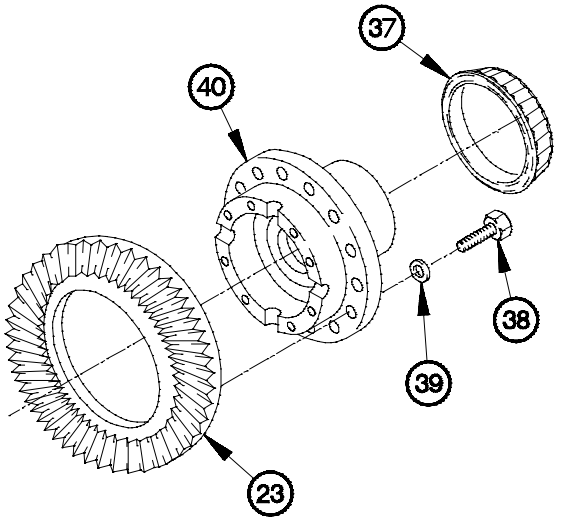


YY02A111

(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.

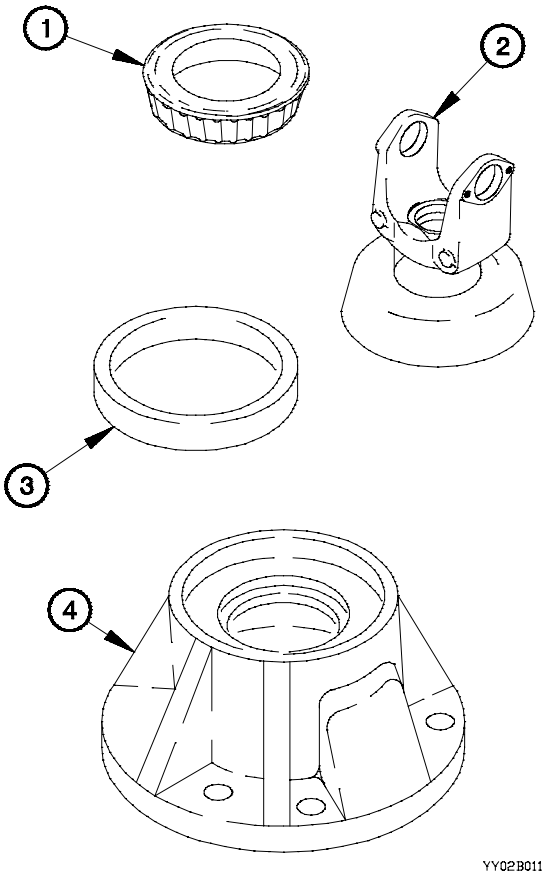
NOTE

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)

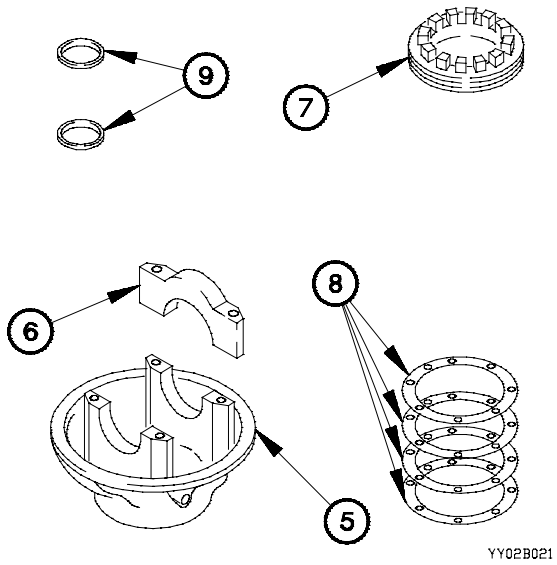
(7) Inspect differential carrier housing (6) for visible cracks, wear, or damage.

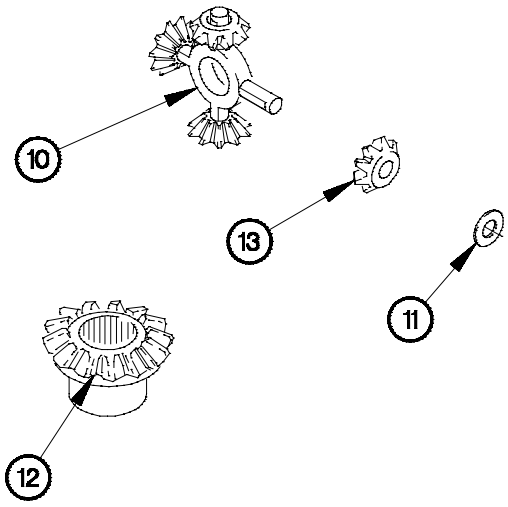
(8) Inspect differential bearing caps (7) for visible cracks, wear, or damage.

(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

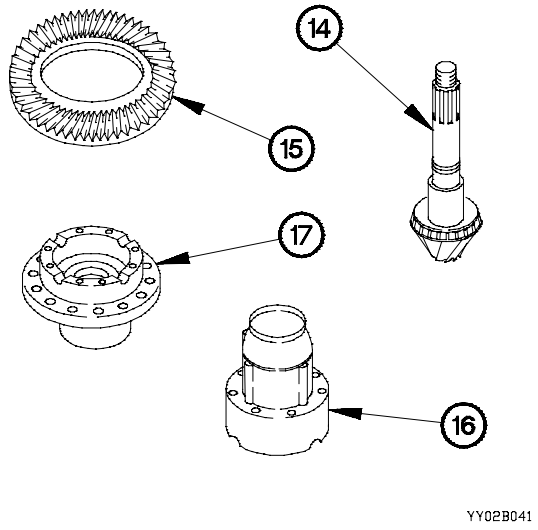
Pinion drive and ring gear are machined in matched sets and must be replaced at the same time. Failure to comply may result in damage to equipment.

(16) Inspect pinion drive (15) for visible cracks, wear, or damage.

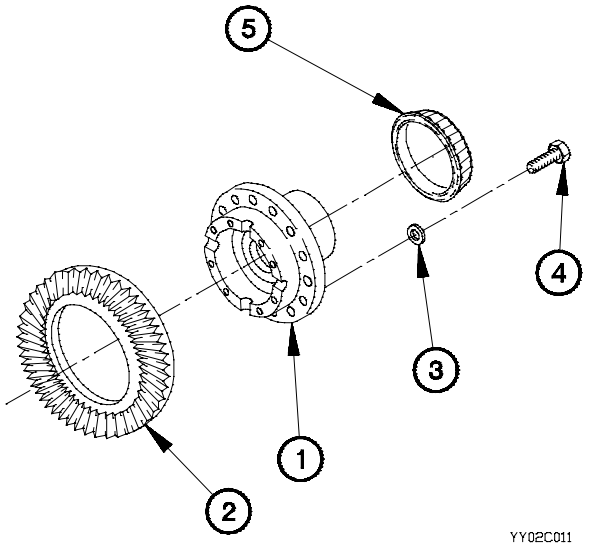
(17) Inspect ring gear (16) for visible cracks, wear, or damage.

(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).

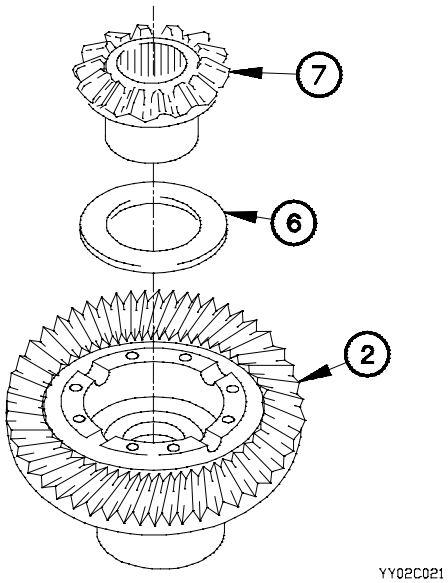
(2) Apply sealing compound to mounting surface of hub body (1).

(3) Position ring gear (2) on hub body (1) with 16 washers (3) and screws (4).

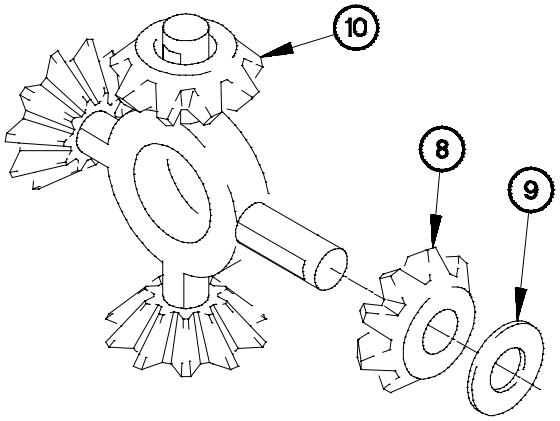
(4) Tighten 16 screws (4) to 85-115 lb-ft (115-156 N·m).

(5) Install bearing cone (5) on hub body (1).

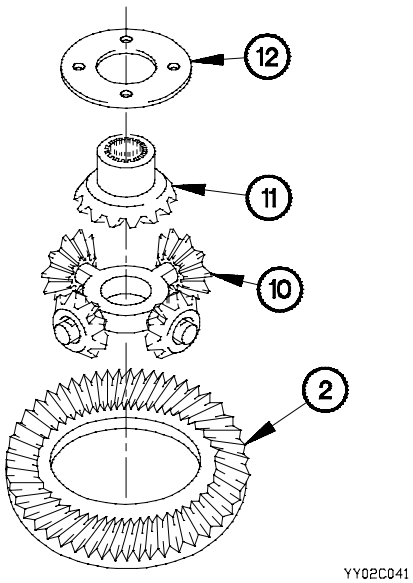
23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)



(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

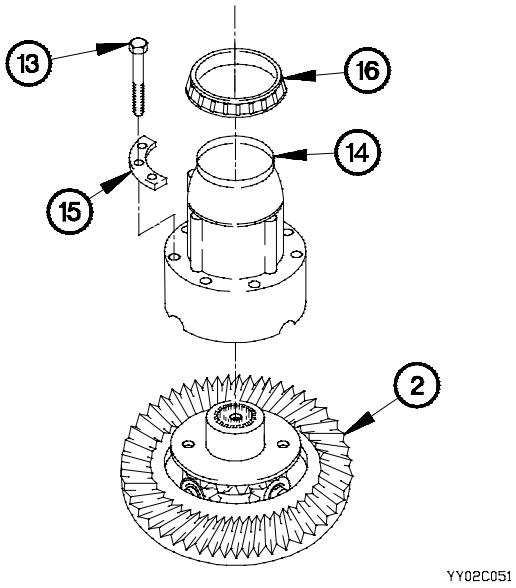
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

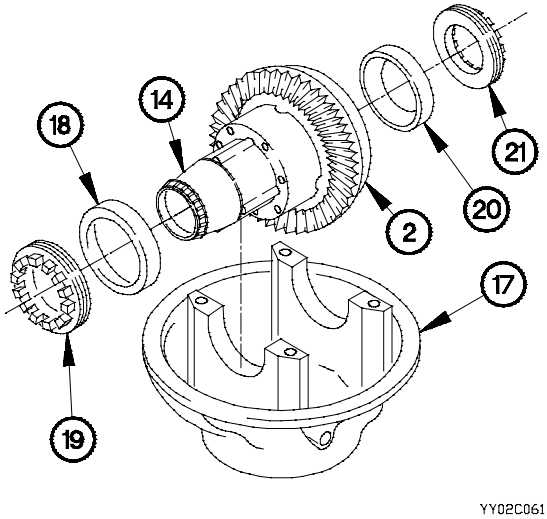
(10) Apply adhesive sealant to threads of 12 screws (13).

(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) with adjusting ring (19) on differential case (14).

(16) Install bearing cup (20) with adjusting ring (21) on ring gear (2).

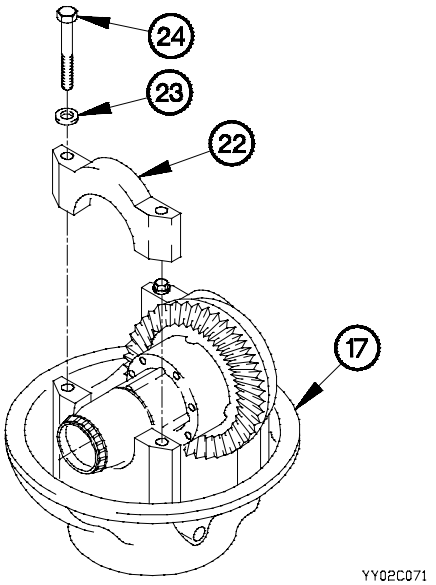
23-2. FRONT AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

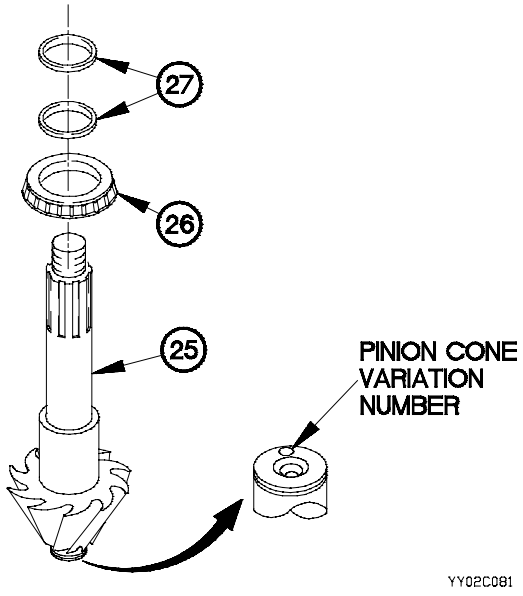
WARNING

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).



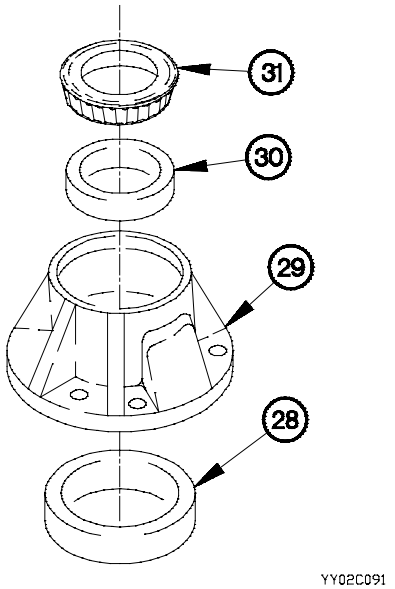


NOTE

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).

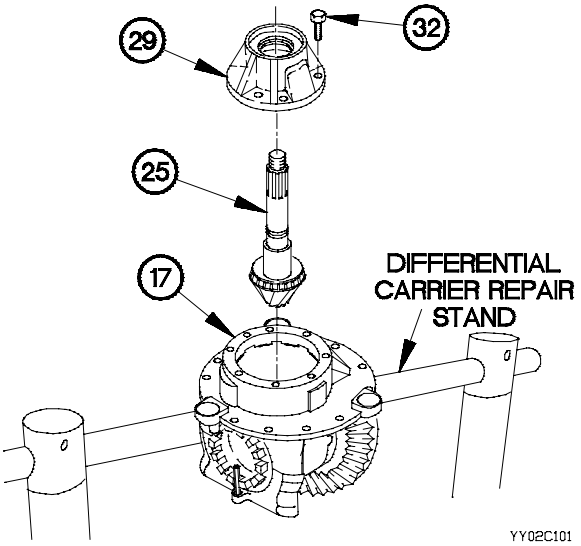
(22) Install outer bearing cup (30) and outer bearing cone (31) in bearing cage (29).

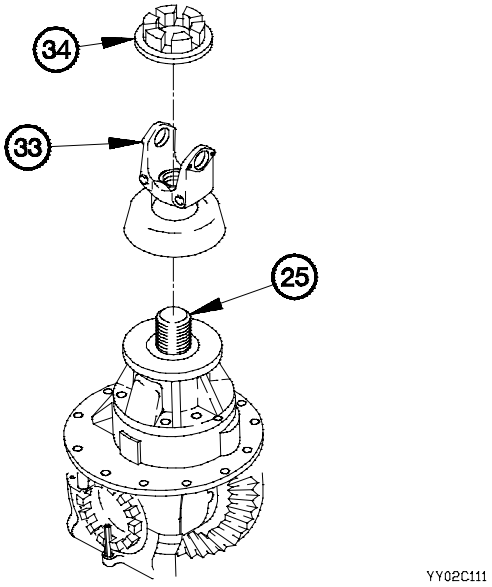
NOTE

- 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)

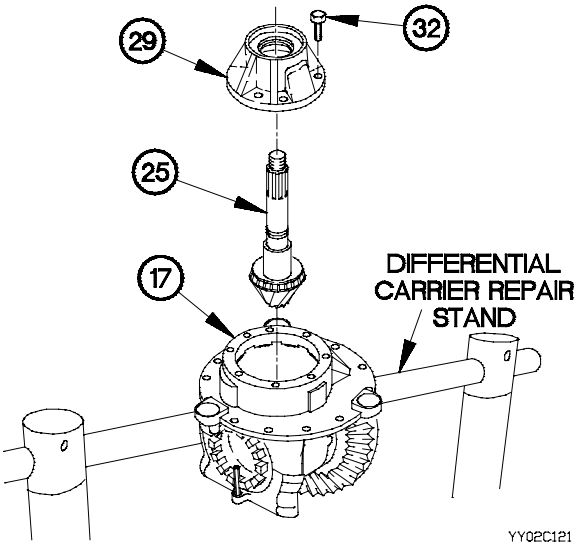
NOTE

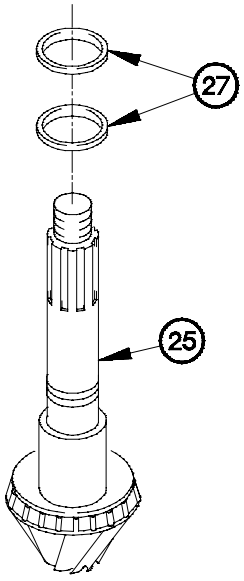
Perform steps (28) through (33) only if torque value is not within specifications. If torque value is within specifications go to step (34).

(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).





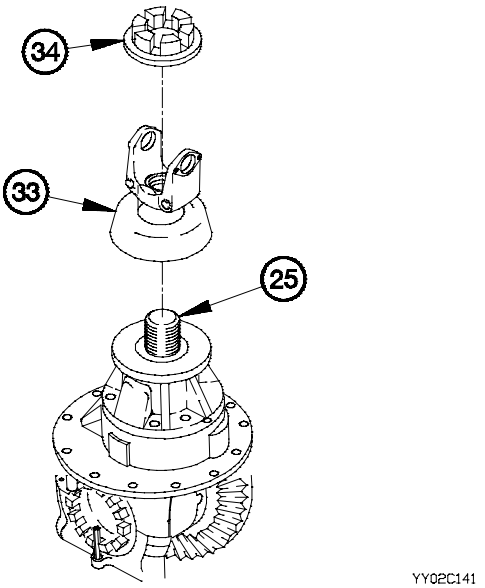
(30) Remove two bearing spacers (27) from pinion drive (25).

(31) Install thinner pinion spacers (27) to increase preload.

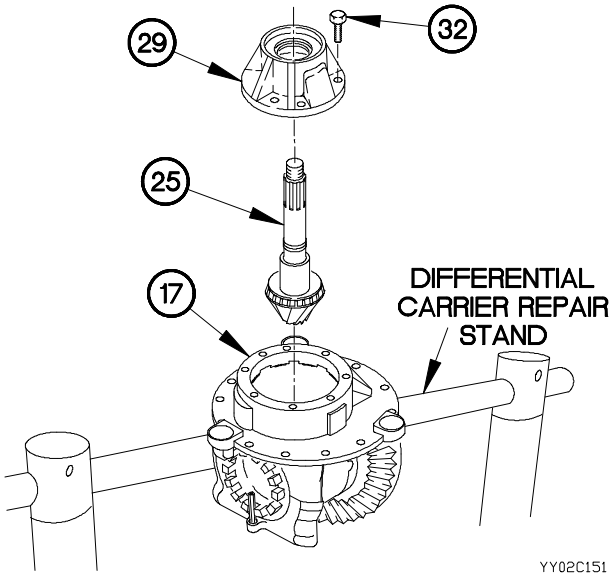
(32) Install thicker pinion spacers (27) to decrease preload.

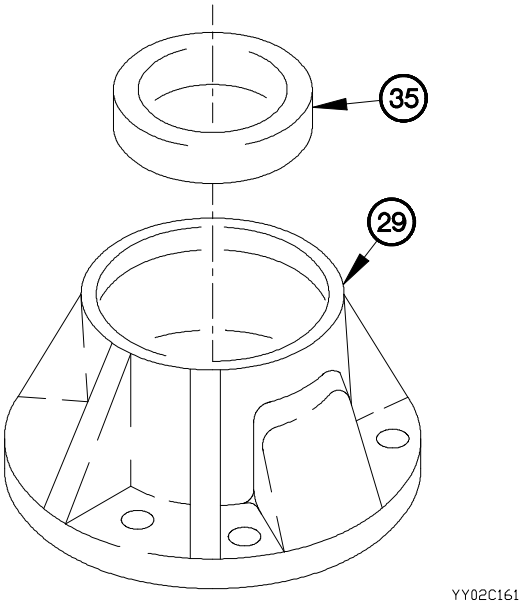
(33) Repeat steps (23) through (27) to determine if preload on inner and outer bearing cones is within specifications.

(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 0.001 cm. For example, PC +4 equals +0.004 in., PC -.005 cm equals -0.005 cm.

(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 +.001 cm through +.009 cm	+0.001 cm through +0.009 cm
+.001 cm through +.009 cm	
PC -.001 cm through PC -.009 cm	-0.001 cm through -0.009 cm
-.001 cm through -.009 cm	

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.

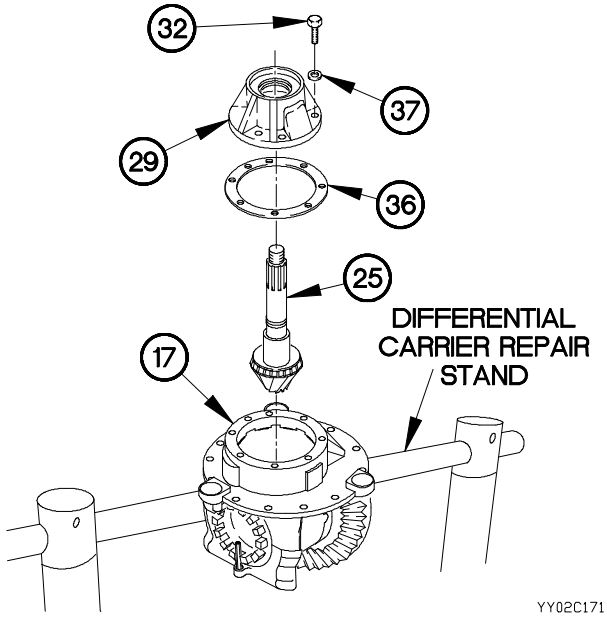
(40) Apply adhesive sealant to shims (36) and mounting flange of differential carrier housing (17).

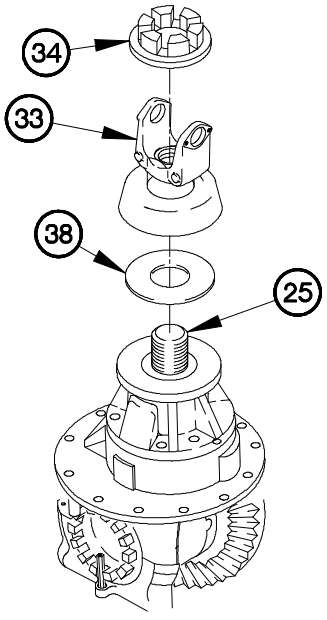
NOTE

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 of yoke seal (38).

(44) Install yoke seal (38) on input yoke (33).

(45) Apply adhesive sealant to threads of self-locking nut (34).

(46) Install input yoke (33) on pinion drive (25) with self-locking nut (34).

(47) 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).

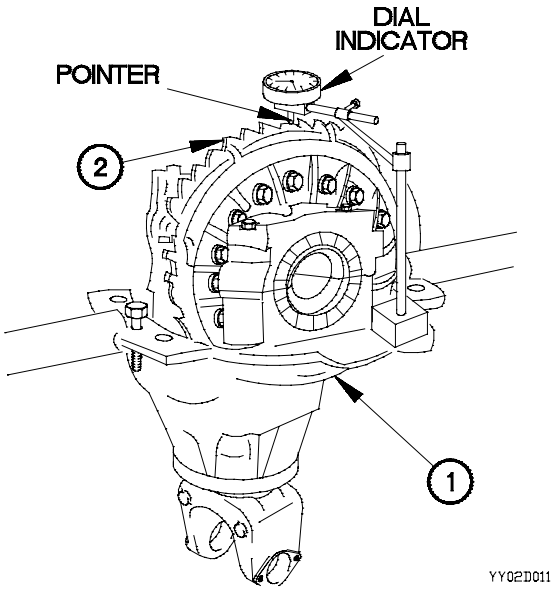
(2) Adjust dial indicator so pointer is against back surface of ring gear (2).

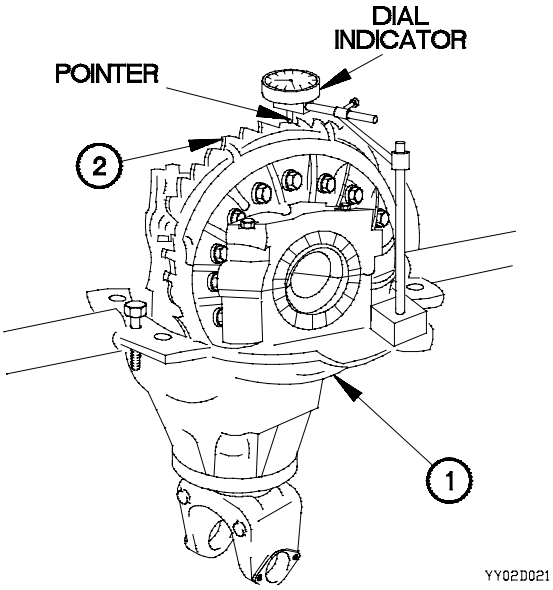
(3) Adjust dial indicator to zero.

NOTE

If dial indicator reading is greater than .008 in. (0.020 cm) repair or replace parts as required.

(4) Rotate ring gear (2); dial indicator should not exceed .008 in. (0.020 cm).





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. (0.020-0.045 cm).

NOTE

Perform step (5) if backlash reading is less than 0.008 in. (0.020 cm).

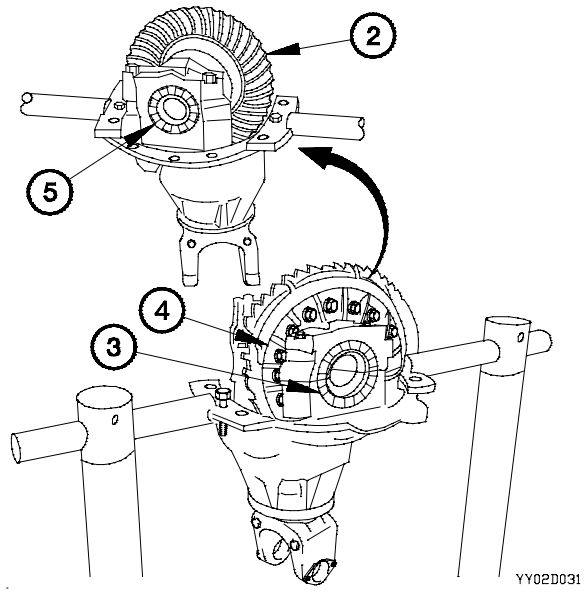
(5) Loosen adjusting ring (3) on back side of hub body (4) and tighten adjusting ring (5) facing the ring gear (2) to increase backlash.

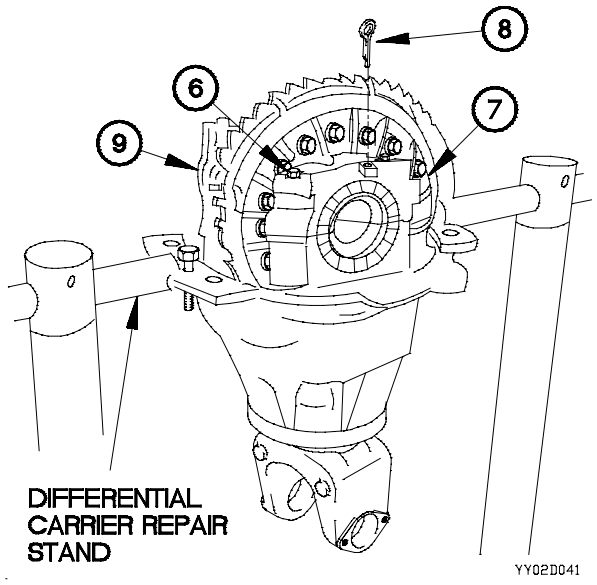
NOTE

Perform step (6) if backlash reading is greater than 0.018 in. (0.045 cm).

(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. (0.020-0.045 cm).





(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
INTERMEDIATE AND REAR AXLE MAINTENANCE

Section I. INTRODUCTION 24-1
24-1. INTRODUCTION 24-1

Section II. MAINTENANCE PROCEDURES
24-2. INTERMEDIATE DIFFERENTIAL REPAIR 24-2
24-3. REAR AXLE DIFFERENTIAL CARRIER REPAIR 24-23

Section I. INTRODUCTION

24-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Intermediate and Rear Axle Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

24-2. INTERMEDIATE DIFFERENTIAL REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Adjustment

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Stand, Differential Carrier Repair (TM 9-2320-366-20)
Puller Kit, Mechanical (Item 52, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Indicator Dial (Item 36, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Multiplier, Torque Wrench (Item 42, Appendix B)
Holding Bar, Pinion (TM 9-2320-366-20)
Wrench Set, Socket (Item 84, Appendix B)
Puller Kit, Universal (Item 50, Appendix B)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Socket, Socket Wrench (TM 9-2320-366-20)
Socket Set, Impact (Item 58, Appendix B)
Socket, Socket Wrench (TM 9-2350-366-20) (Item 69, Appendix B)
Wrench, Impact, Electric (Item 88, Appendix B)

Materials/Parts
Sealant Adhesive (Item 67, Appendix C)
Sealant Adhesive (Item 68, Appendix C)
Adhesive (Item 5, Appendix C)
Adhesive (Item 6, Appendix C)
Compound, Sealing (Item 76.3, Appendix C)
Lubrication Oil Gear (Item 51, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Pin, Cotter (2) (Item 335, Appendix F)
Nut, Self-Locking (Item 194, Appendix F)
Parts Kit, Seal Replacement (Item 313.4, Appendix F)
Parts Kit, Seal Replacement (Item 313.5, Appendix F)
Nut, Self-Locking (Item 192, Appendix F)
Nut, Self-Locking (Item 193, Appendix F)
Packing, Preformed (Item 256.2, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Sealant Adhesive (Item 66, Appendix C)
Packing, Preformed (Item 256.1, Appendix F)

Personnel Required
(2)

a. Disassembly

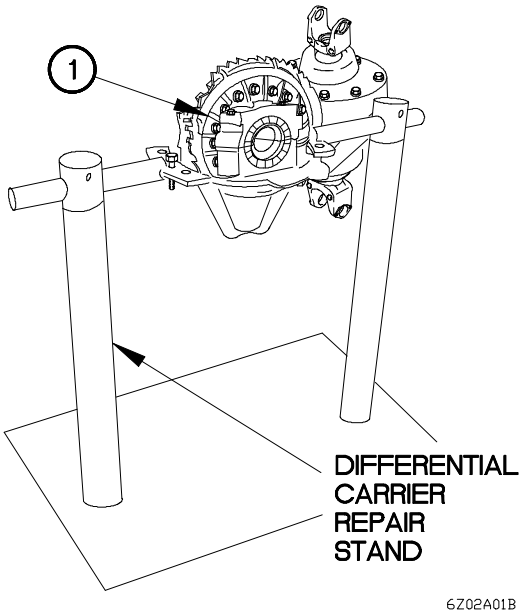
WARNING

Intermediate differential 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.



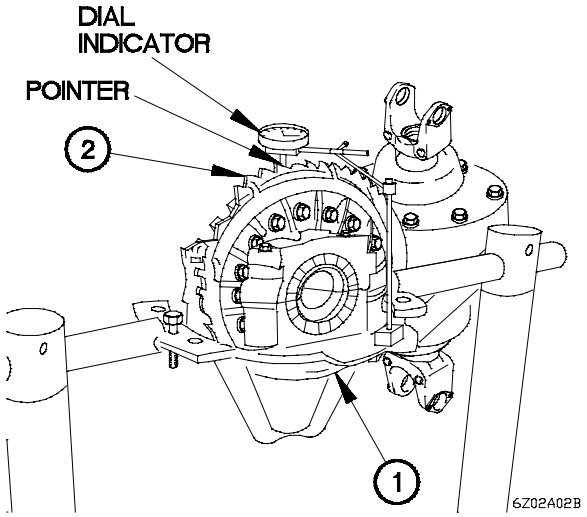
(2) Attach dial indicator on mounting flange of differential carrier (1).

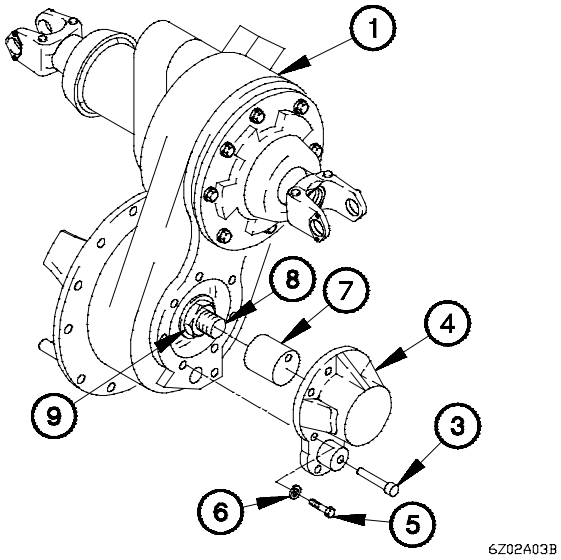
(3) Adjust dial indicator so pointer is against tooth surface of ring gear (2).

(4) Adjust dial indicator to zero.

(5) Rotate ring gear (2) a small amount in both directions. Dial indicator should read between 0.008-0.018 in. (0.020-0.045 cm). Record results.

(6) Perform steps (2) through (5) at two other locations on ring gear (2).





(7) Remove oil filter screen (3) from pump cover (4).

(8) Remove nine screws (5), washers (6), and oil pump cover (4) from differential carrier (1).

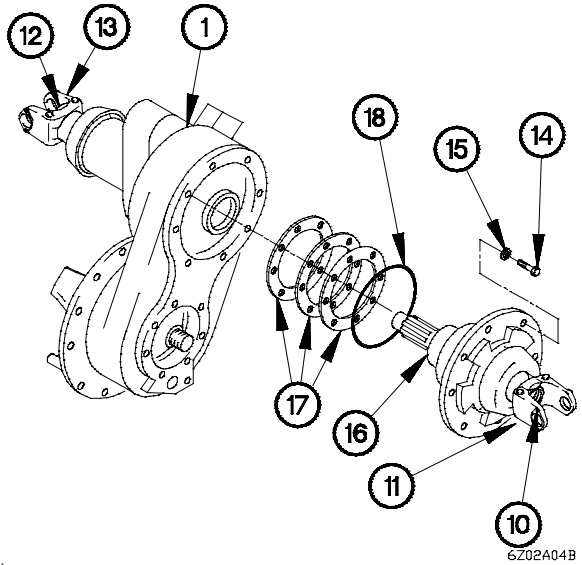
(9) Remove oil pump (7) from pinion drive shaft (8).

(10) Loosen self-locking nut (9) on pinion drive shaft (8).

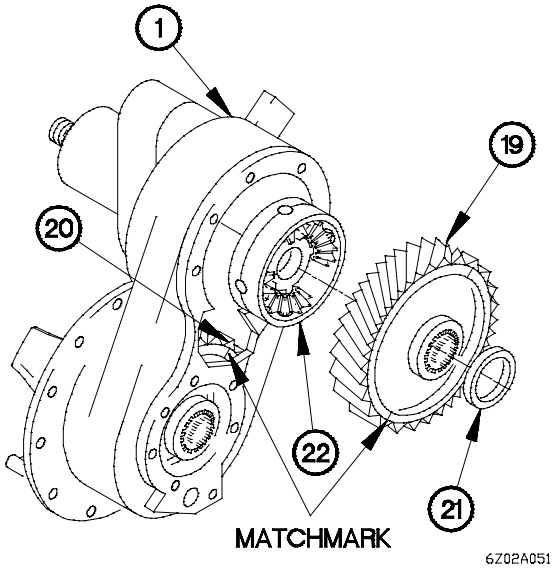
(11) Loosen self-locking nut (10) on input yoke (11).

(12) Loosen self-locking nut (12) on output yoke (13).

(13) Remove eight screws (14), washers (15), input bearing cage (16), three shims (17) and preformed packing (18) from differential carrier (1). Discard preformed packing.



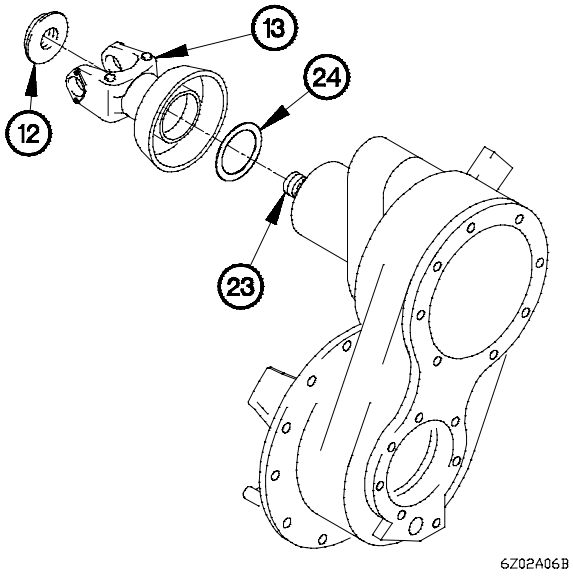
24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)



(14) Match mark helical drive gear (19) and helical driven gear (20).

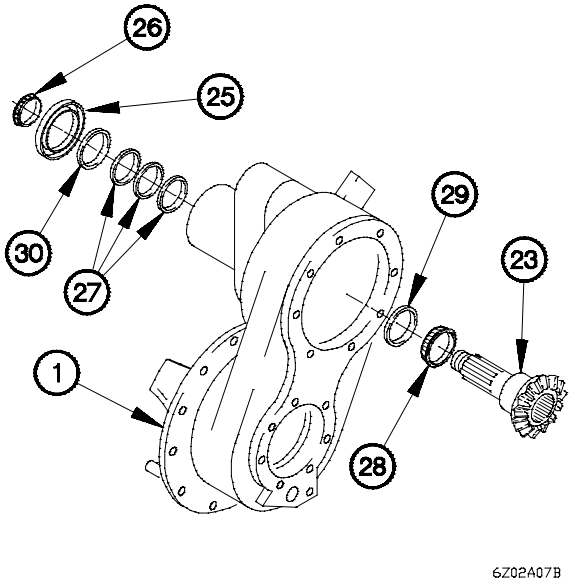
(15) Remove thrust washer (21) and helical drive gear (19) from differential carrier (1).

(16) Remove inter-axle nest assembly (22) from differential carrier (1).



(17) Remove self-locking nut (12) and output yoke (13) from inter-axle rear slide gear (23). Discard self-locking nut.

(17.1) Remove yoke seal (24) from output yoke (13). Discard yoke seal



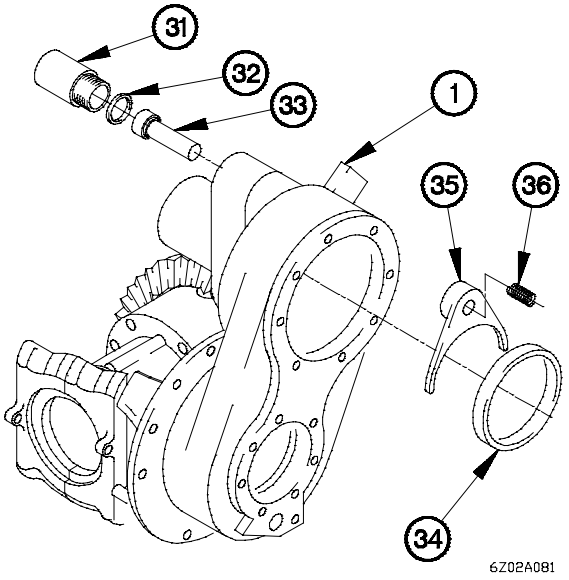
(18) Remove oil seal (25) from differential carrier (1). Discard oil seal.

(19) Remove bearing cone (26) from inter-axle rear slide gear (23).

(20) Remove inter-axle rear slide gear (23) and three shims (27) from differential carrier (1).

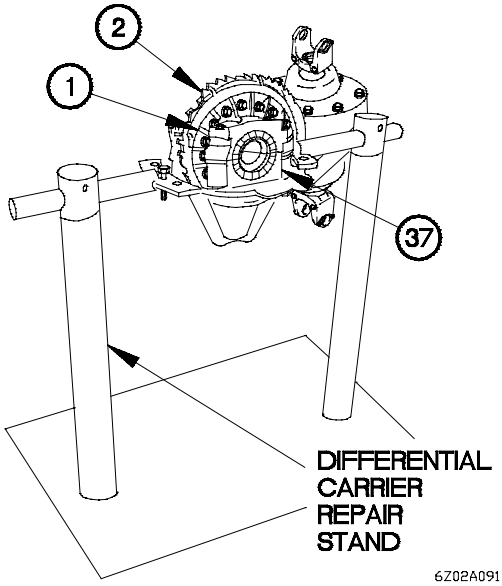
(21) Remove bearing cone (28) from inter-axle slide gear (23).

(22) Remove bearing cups (29 and 30) from differential carrier (1).



(23) Remove inter-axle shift cylinder (31), preformed packing (32), and inter-axle shift shaft (33), from differential carrier (1). Discard preformed packing.

(24) Remove clutch collar (34), shift fork (35), and spring (36) from differential carrier assembly (1).



NOTE

Perform steps (2) through (6) to determine gear and pinion backlash.

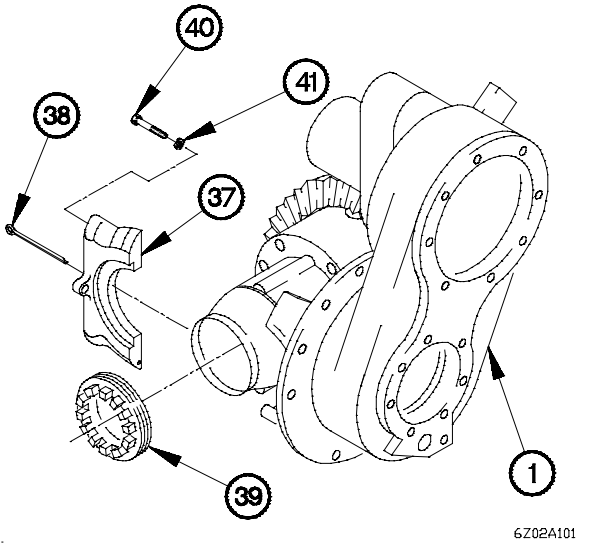
(25) Position differential carrier (1) on differential carrier repair stand with ring gear (2) up.

(26) Match mark two differential bearing caps (37) to differential carrier (1).

(27) Remove two cotter pins (38) from differential bearing caps (37). Discard cotter pins.

(28) Remove two adjusting rings (39) from differential carrier (1).

(29) Remove four screws (40), washers (41) and two differential bearing caps (37) from differential carrier (1).

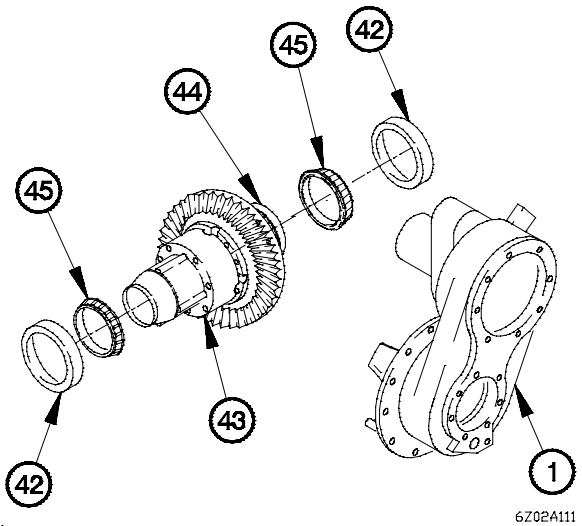


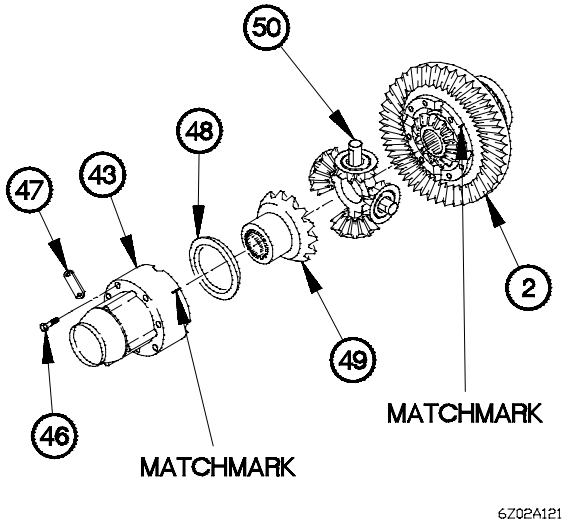
24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)

(30) Remove two roller cups (42) from housing (43) and hub body (44).

(31) Remove two bearing cones (45) from housing (43) and hub body (44).

(32) Remove housing (43) and hub body (44) from differential carrier (1).





(33) Match mark housing (43) to ring gear (2).

(34) Remove 12 screws (46), four plate spacers (47) and housing (43) from ring gear (2).

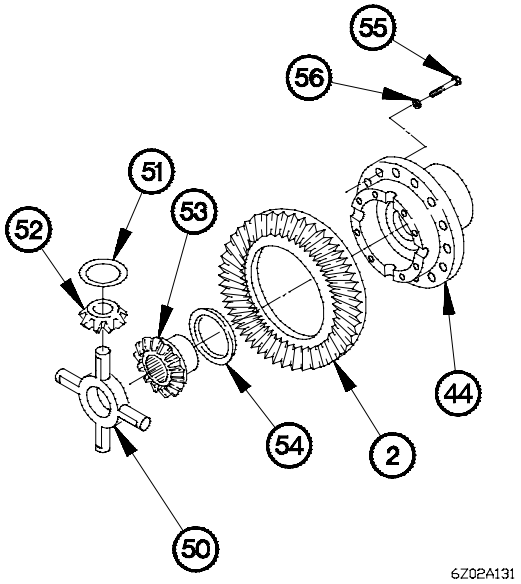
(35) Remove thrust washer (48) and side gear (49) from ring gear (2).

(36) Remove differential spider (50) from ring gear (2).

(37) Remove four thrust washers (51) and pinion gears (52) from differential spider (50).

(38) Remove side gear (53) and thrust washer (54) from ring gear (2).

(39) Remove 16 screws (55), washers (56) and ring gear (2) from hub body (44).



(40) Remove self-locking nut (9) from pinion drive shaft (8). Discard self-locking nut.

CAUTION

Use care when removing pinion assembly. Failure to comply may result in damage to equipment.

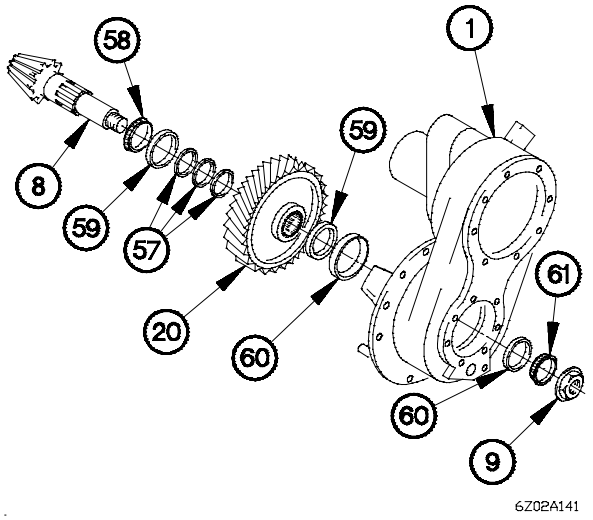
(41) Remove pinion drive shaft (8) from differential carrier (1).

(42) Record pinion cone variation number at gear end of pinion drive shaft (8).

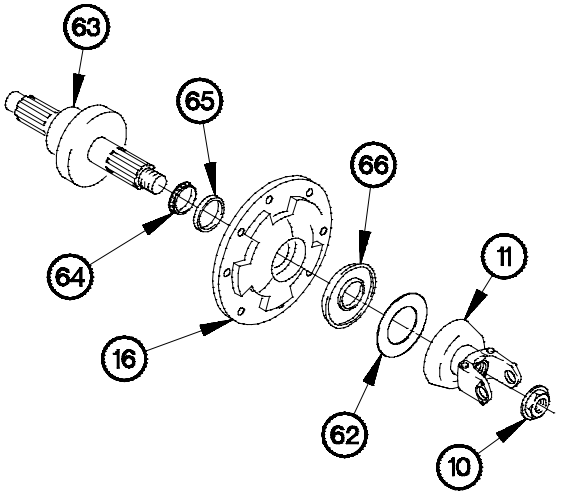
(43) Remove three shims (57) and bearing cone (58) from pinion drive shaft (8).

(44) Remove helical driven gear (20) and two spacers (59), from differential carrier (1).

(45) Remove two bearing cones (60) and bearing cup (61) from differential carrier (1).



6Z02A141



6Z02A15B

(46) Remove self-locking nut (10) and input yoke (11) from input bearing cage (16). Discard self-locking nut.

(46.1) Remove yoke seal (62) from input yoke (11). Discard yoke seal.

(47) Remove input shaft (63) from input bearing cage (16).

(48) Remove bearing cone (64) from input shaft (63).

(49) Remove bearing cup (65) from input bearing cage (16).

(50) Remove oil seal (66) from input bearing cage (16). Discard oil seal.

24-2. INTERMEDIATE DIFFERENTIAL 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 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 sealant residue from threaded holes with dry cleaning solvent.

CAUTION

Wash machined parts separately to avoid damage from parts bumping together. Failure to comply may result in damage to equipment.

(2) Clean all metal parts with dry cleaning solvent.

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.

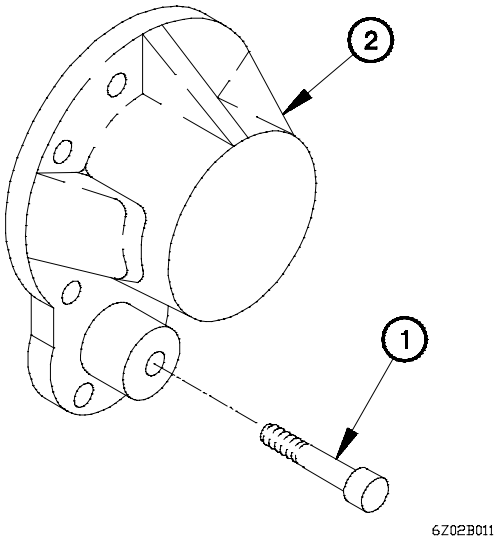
(3) Dry all metal parts, except bearing cones with compressed air. Allow bearing cones to air dry.

NOTE

Replace any part that fails visual inspection.

(4) Inspect oil filter screen (1) for visible cracks, tears or damage.

(5) Inspect oil pump cover (2) for visible cracks or damage.

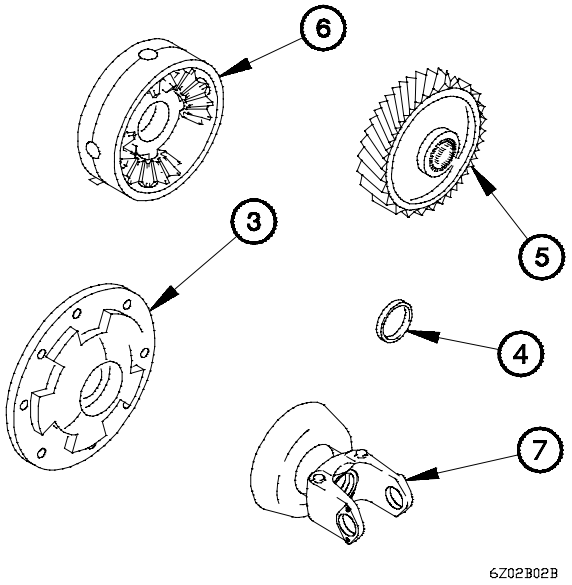


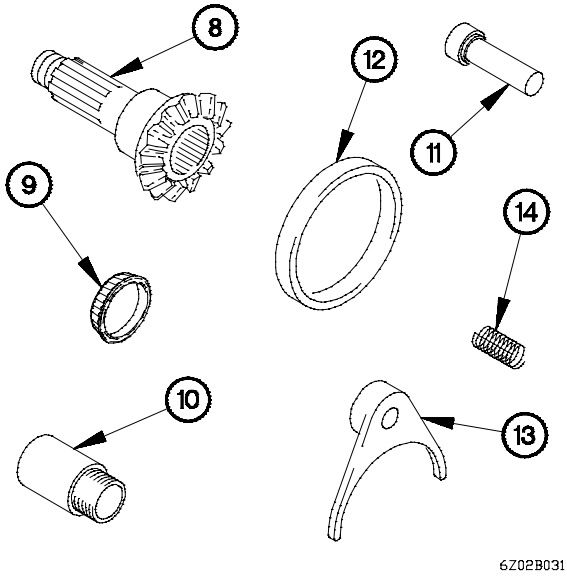
(6) Inspect input bearing cage (3) for visible cracks or damage.

(7) Inspect thrust washer (4) and helical gear (5) for visible cracks or damage.

(8) Inspect inter-axle nest assembly (6) for visible cracks or damage.

(9) Inspect two yoke (7) for visible cracks or damage.





(10) Inspect inter-axle rear slide gear (8) bearing (9) for visible cracks or damage.

(11) Inspect inter-axle shift cylinder (10) and shift shaft (11) for visible cracks or damage.

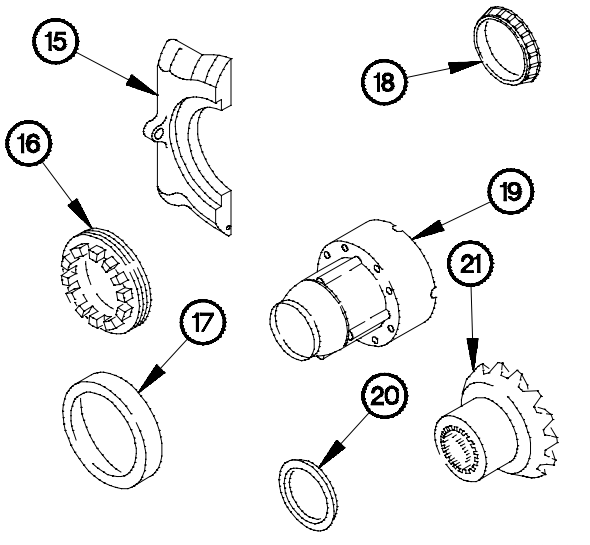
(12) Inspect shift collar (12), shift fork (13) and spring (14) for visible cracks or damage.

(13) Inspect two bearing caps (15) and adjusting rings (16) for visible cracks or damage.

(14) Inspect two tapered roller cups (17) and bearing cones (18) for visible cracks or damage.

(15) Inspect mechanical housing (19) for visible cracks or damage.

(16) Inspect thrust washer (20) and slide gear (21) for visible cracks or damages.

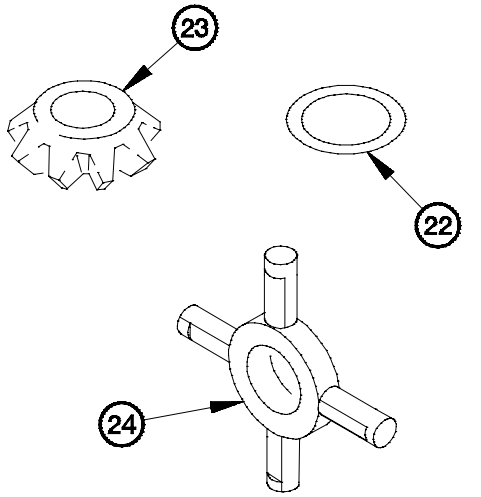


24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)

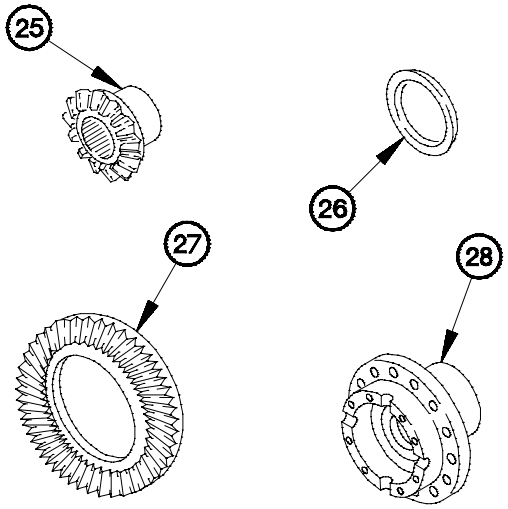
CAUTION

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 differential carrier.

(17) Inspect four thrust washers (22), pinion gears (23) and spider (24) for visible cracks or damage.



6Z02B051



6Z02B061

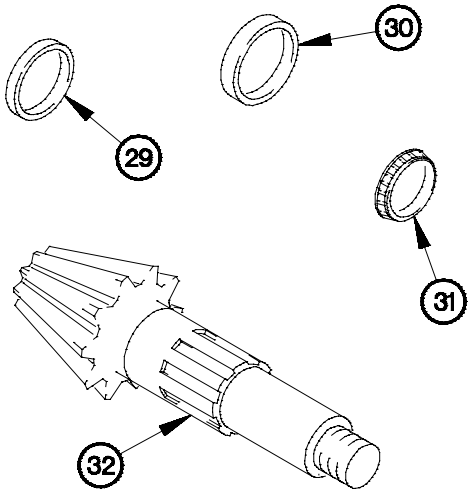
(18) Inspect slide gear (25) and thrust washer (26) for visible cracks or damage.

CAUTION

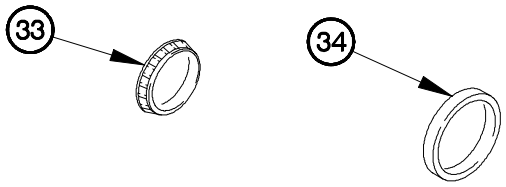
The pinion and drive gear are machined in matched sets and must both be replaced at the same time. Failure to comply may result in damage to differential carrier.

(19) Inspect ring gear (27) and hub body (28) for visible cracks or damage.

(20) Inspect two spacers (29), bearing cup (30), bearing cone (31) and pinion shaft (32) for visible cracks or damage.

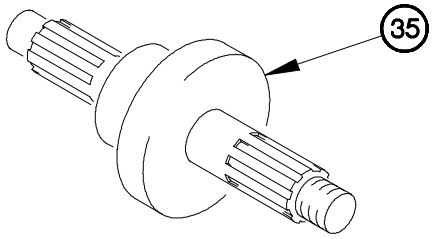


6Z02B071

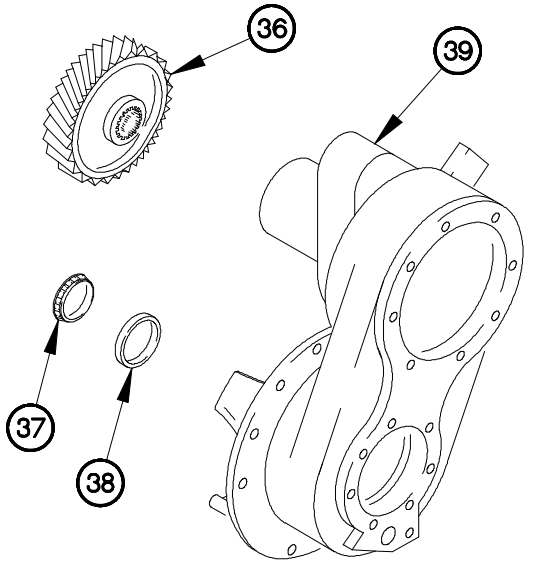


(21) Inspect bearing cone (33) and bearing cup (34) for visible cracks or damage.

(22) Inspect input shaft (35) for visible cracks or damage.



6Z02B081



6Z02B091

(23) Inspect helical driven gear (36) for visible cracks or damage.

(24) Inspect bearing cone (37) and bearing cup (38) for visible cracks or damage.

(25) Inspect differential carrier housing (39) for visible cracks or damage.

c. Assembly.

(1) Install bearing cup (1) in input bearing cage (2).

(2) Install bearing cone (3) on input shaft (4).

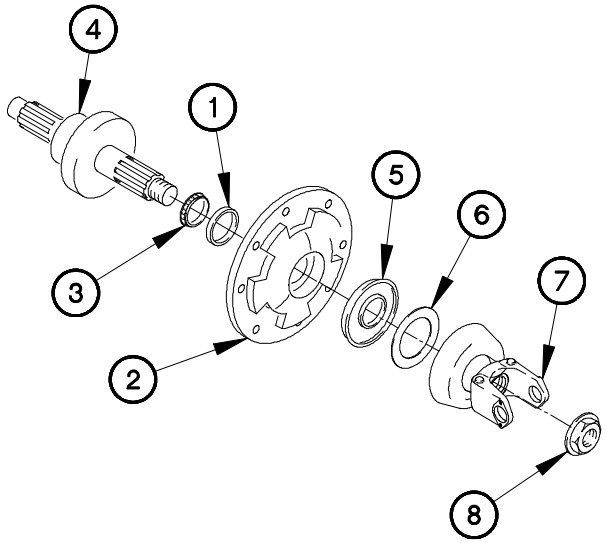
(3) Position input shaft (4) in input bearing cage (2).

(3.1) Apply a small amount of sealing compound to outside edge and spring cavity of oil seal (5).

(4) Install oil seal (5) in input bearing cage (2).

(4.1) Install yoke seal (6) on input yoke (7).

(5) Position input yoke (7) on input shaft (4) with self-locking nut (8).



6Z02C01B

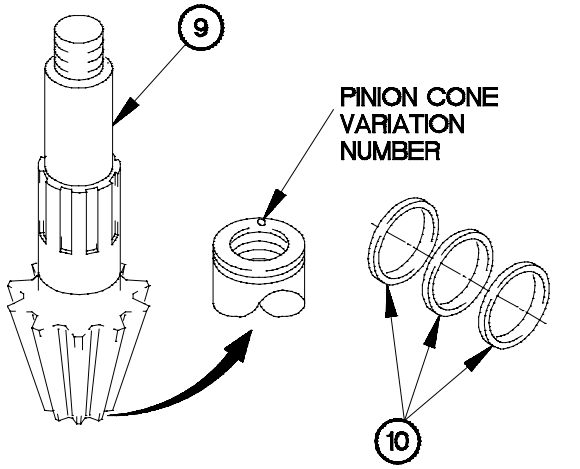
24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)

NOTE

Perform steps (6) through (8) if pinion drive and drive gear set were replaced. If old pinion drive and drive gear is installed, go to step (9).

(6) Record pinion cone variation number at gear end of pinion drive shaft (9).

(7) Record thickness of shim pack (10) that was removed from pinion drive shaft (9).



NOTE

The pinion cone variation number can be either 1000th of an in. or 1000th of a cm. For example, PC +4 equals +0.004 in., PC-0.005 cm equals -0.005 cm.

Table 24-1. 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 +0.001 cm through PC +0.009 cm	+0.001 cm through +0.009 cm
+0.001 cm through +0.009 cm	
PC -0.001 cm through PC -0.009 cm	-0.001 cm through -0.009 cm
-0.001 cm through -0.009 cm	

(8) If pinion cone variation number recorded in step (42) of disassembly is negative, subtract it from the thickness of the shim pack. If number is positive, add it to the thickness of the shim pack.

NOTE

The value obtained in step (8) is the thickness of the new pinion shim pack to be installed. Use as many shims as required to equal value obtained in step (8).

(9) If pinion cone variation number recorded in step (6) of assembly is negative, add it to value from step (7). If number is positive, subtract it from value from step (8).

(10) Install bearing cone (11), bearing cup (12) and shim pack (10) on pinion drive shaft (9).

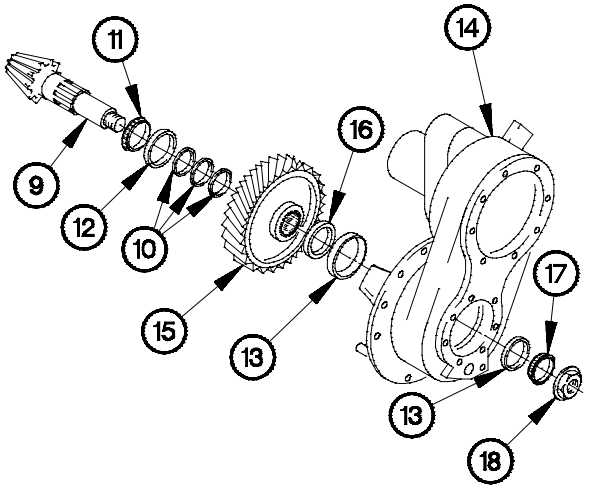
(11) Install bearing cup (13) in differential carrier (14).

(12) Install pinion drive shaft (9), helical gear (15) and spacer (16) in differential carrier (14).

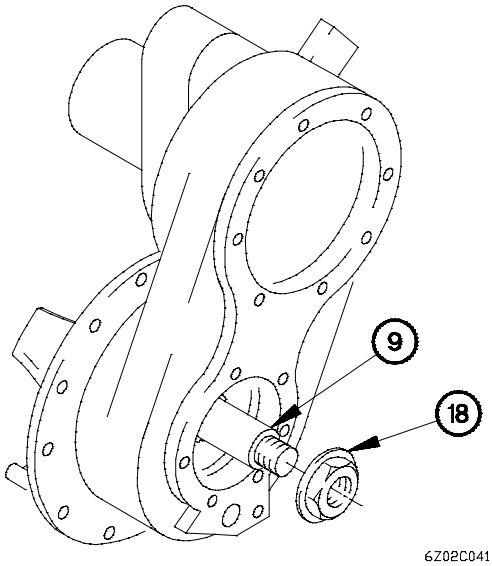
(13) Install bearing cup (13) in differential carrier (14).

(14) Install bearing cone (17) on pinion drive shaft (9).

(15) Position self-locking nut (18) on pinion drive shaft (9).



6Z02C031



6Z02C041

NOTE

- Bearing preload of the pinion assembly must be within the following limits; new bearings 5-45 lb-in. (0.5-5 N·m), used bearings 10-30 lb-in. (1-3 N·m).
- Perform steps (16) through (20) if torque value is not within specifications. If torque value is within specifications go to step (21).

(16) Record amount of torque required to rotate pinion drive shaft (9).

(17) Remove self-locking nut (18) on pinion drive shaft (9).

24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)

(18) Remove bearing cone (17) from pinion drive shaft (9).

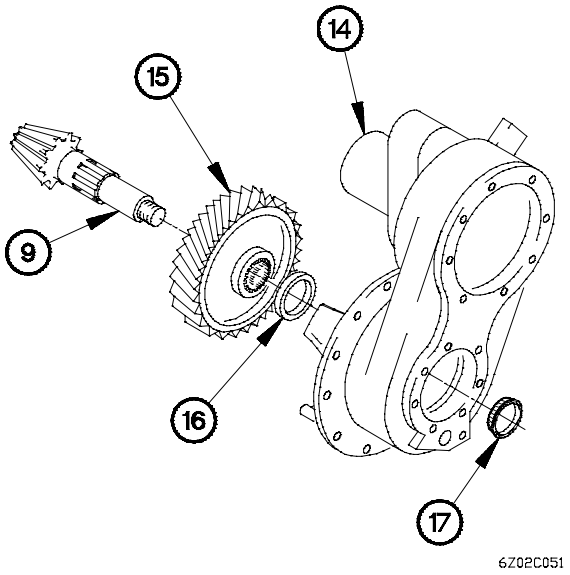
(19) Remove pinion drive shaft (9) from differential carrier (14).

(20) Remove helical driven gear (15) and spacer (16) from differential carrier (14).

NOTE

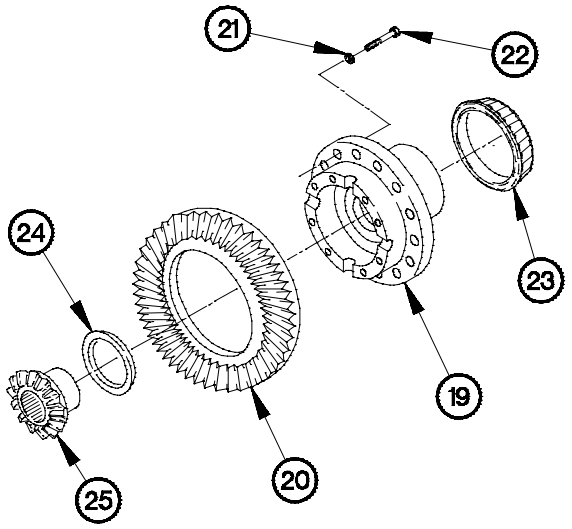
Install thinner spacers to increase preload and thicker spacers to decrease the preload.

(21) Repeat steps (9) through (15) to determine if preload on bearing cones is within specifications.



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.



(22) Apply four or five drops of adhesive sealant in 16 threaded holes on hub body (19).

(23) Apply sealing compound to mounting surface of hub body (19).

(24) Position ring gear (20) on hub body (19) with 16 washers (21) and screws (22).

(25) Tighten screws (22) to 85-115 lb-ft (115-156 N·m).

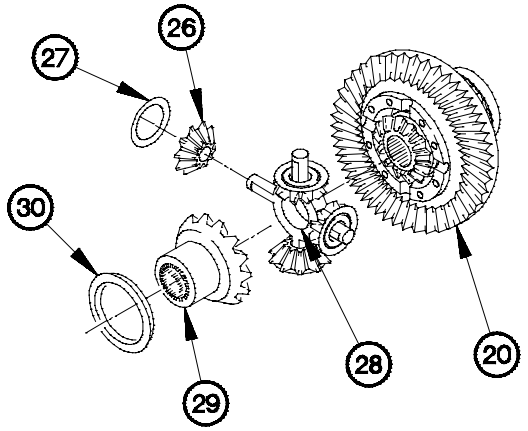
(26) Install bearing cone (23) in hub body (19).

(27) Install thrust washer (24) and slide gear (25) in ring gear (20).

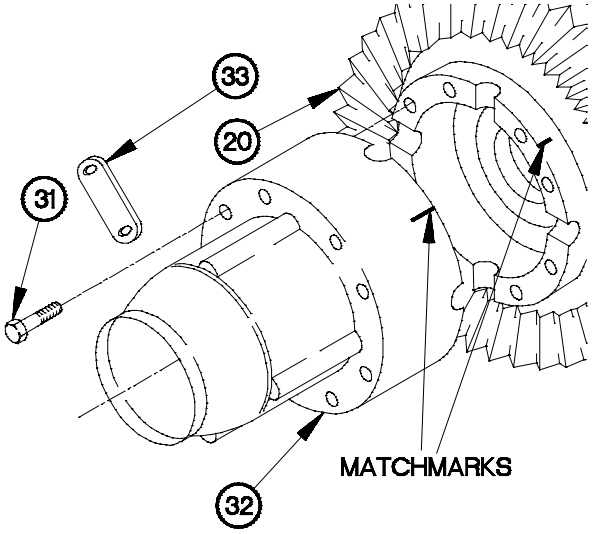
(28) Install four differential pinions (26) and thrust washers (27) on differential spider (28).

(29) Install differential spider (28) on ring gear (20).

(30) Install side gear (29) and thrust washer (30) in ring gear (20).



6Z02C071



6Z02C081

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.

(31) Apply adhesive sealant to 12 screws (31).

(32) Install housing (32) on ring gear (20) with match marks aligned.

(33) Position four plate spacers (33) and 12 screws (31) in housing (32).

(34) Tighten screws (31) to 74-96 lb-ft (100-130 N·m).

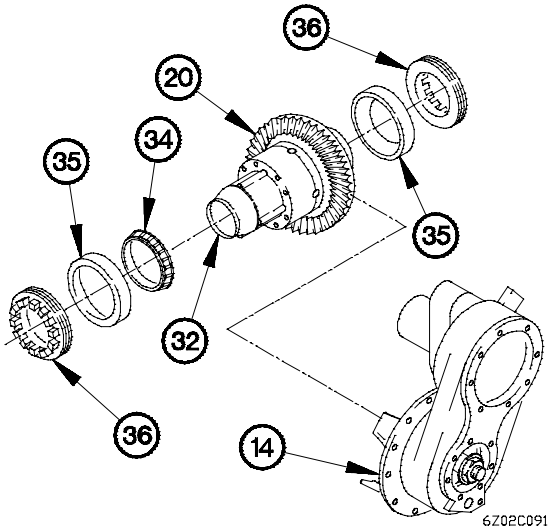
24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)

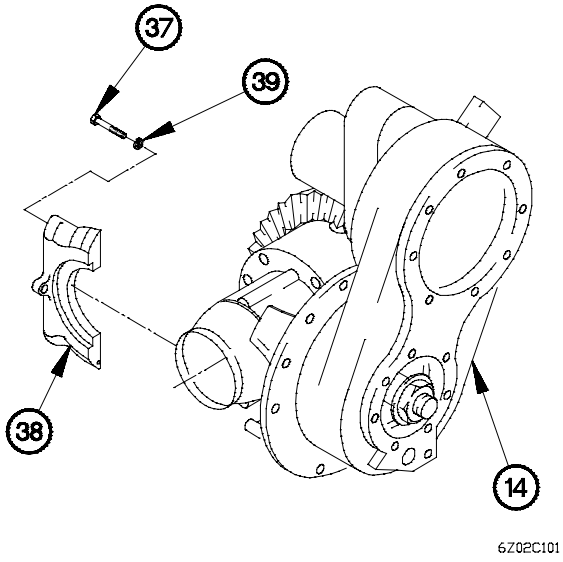
(35) Install bearing cone (34) on housing (32).

(36) Install two bearing cups (35) on ring gear (20) and housing (32).

(37) Install ring gear (20) in differential carrier (14).

(38) Install two adjusting rings (36) on differential carrier (14).





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.

(39) Apply four or five drops of adhesive sealant to threads of four screws (37).

NOTE

Bearing caps and carrier legs are matched, use bearing cap match marked to carrier leg.

(40) Position two bearing caps (38) on differential carrier (14) with four washers (39) and screws (37).

(41) Tighten screws (37) to 132-169 lb-ft (179-229 N·m).

(42) Position spring (40), shift fork (41), and shift collar (42) on differential carrier (14).

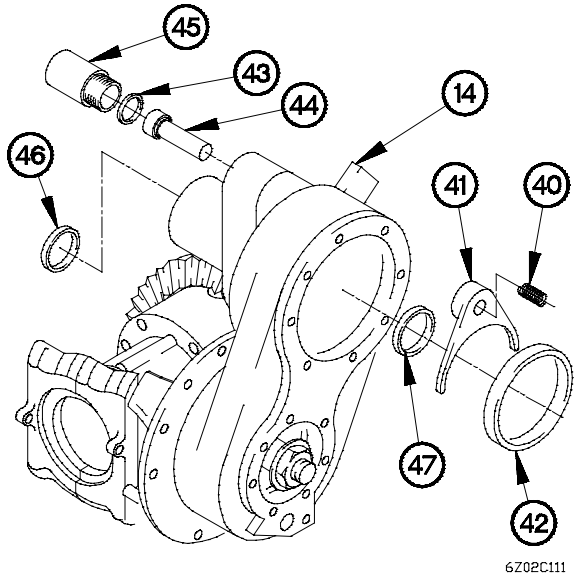
(43) Install preformed packing (43) on inter-axle shift shaft (44).

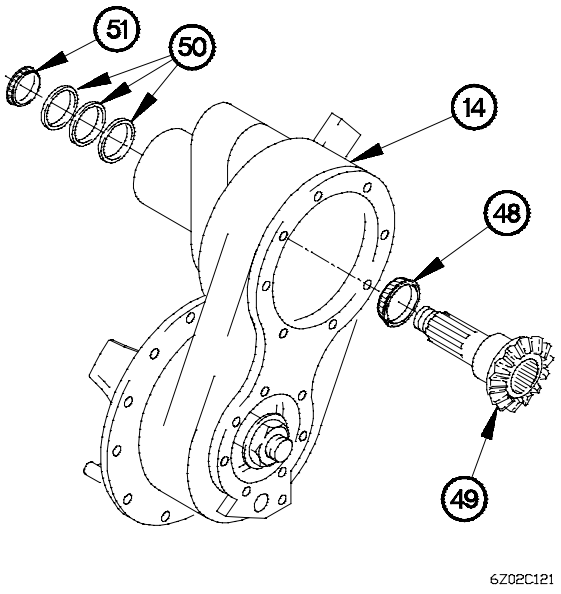
(44) Position inter-axle shift shaft (44) and inter-axle shift cylinder (45) on differential carrier (14).

(45) Tighten inter-axle shift cylinder (45) to 80-100 lb-ft (108-136 N·m).

(46) Install bearing cup (46) in differential carrier (14).

(47) Install bearing cup (47) in differential carrier (14).





(48) Install bearing cone (48) on inter-axle rear side gear (49).

(49) Install shims (50) on inter-axle rear side gear (49).

(50) Position inter-axle rear side gear (49) in differential carrier (14).

(51) Install bearing cone (51) on inter-axle side gear (49).

NOTE

End play should be 0.001-0.006 in. (0.002-0.015 cm), if the end play is too high, remove shims. If there is no end play, add shims.

(52) Measure inter-axle rear slide gear (49) end play.

(53) Repeat steps (48) through (52) until end play is within specifications.

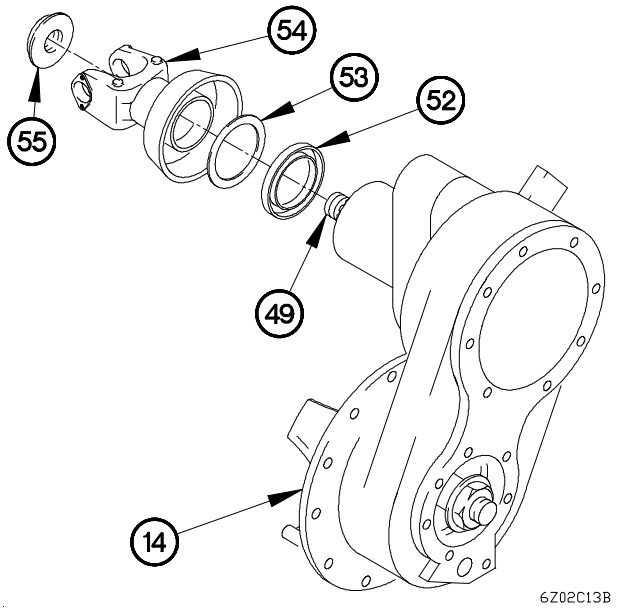
24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)

(53.1) Apply a small amount of sealing compound to outside edge and spring cavity of oil seal (52).

(54) Install oil seal (52) on differential carrier (14).

WARNING

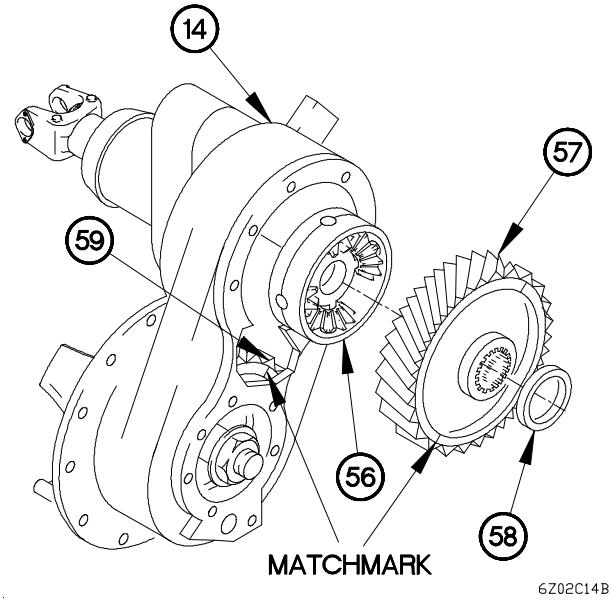
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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



(55) Install yoke seal (53) in output yoke (54).

(56) Apply adhesive sealant to threads of self-locking nut (55).

(57) Position output yoke (54) on inter-axle slide gear (49) with self-locking nut (55).



(58) Position inter-axle nest assembly (56) in differential carrier (14).

(59) Position helical drive gear (57) and thrust washer (58) on differential carrier (14) with match marks aligned to helical driven gear (59).

(60) Install preformed packing (60) on bearing cage (2).

(61) Apply gear oil to preformed packing (60).

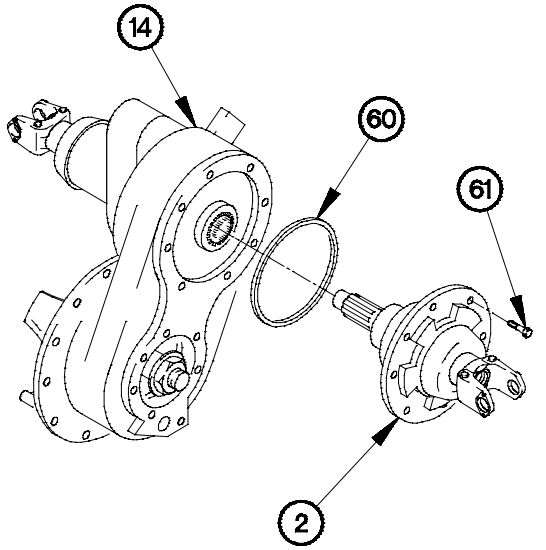
NOTE

- End play of the input shaft assembly is adjusted by thickness of shim pack.
- Measure the gap between the input bearing cage and differential carrier at four equally spaced points. Add all four measurements together and divide by four to determine the average gap. Add 0.005 in. (0.012 cm) to the average gap value.

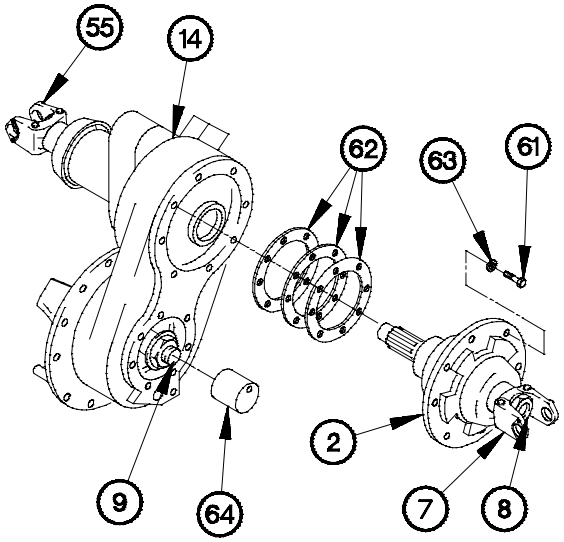
(62) Position bearing cage (2) on differential carrier (14) with eight screws (61).

(63) Measure gap between bearing cage (2) and differential carrier (14). Record measurement.

(64) Remove eight screws (61) and bearing cage (2) from differential carrier (14).



6Z02C151



6Z02C161

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.

(65) Apply adhesive sealant to shim pack (62) and mounting flange of differential carrier (14).

(66) Position shim pack (62) and bearing cage (2) on differential carrier (14) with eight washers (63) and screws (61).

(67) Tighten screws (61) to 74-96 lb-ft (100-130 N·m).

(68) Tighten self-locking nut (8) to 450-601 lb-ft (610-815 N•m).

(69) Tighten self-locking nut (55) to 450-601 lb-ft (610-815 N·m).

(70) Install oil pump (64) on pinion drive shaft (9)

24-2. INTERMEDIATE DIFFERENTIAL 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.

(71) Apply adhesive sealant to mounting flange of differential carrier (14) and threads of oil screen (65).

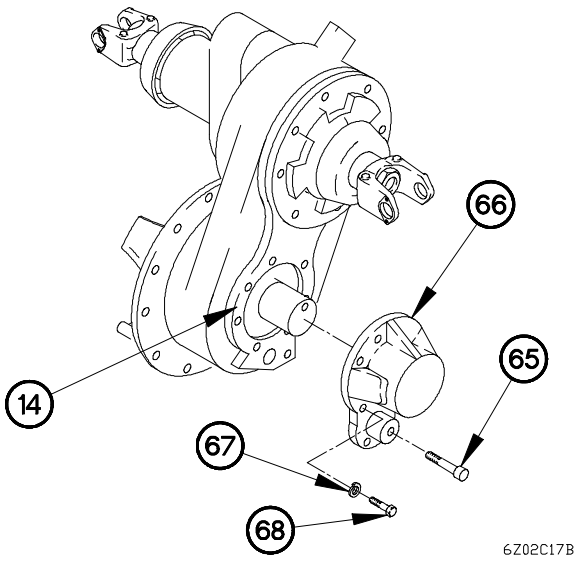
NOTE

Ensure pin inside oil pump cover fits in notch of pump. Failure to comply may result in damage to equipment.

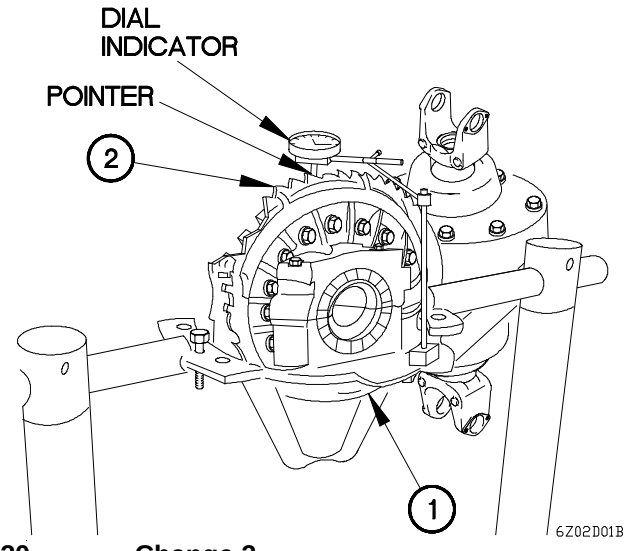
(72) Position oil pump cover (66) on differential carrier (14)
with nine washers (67) and screws (68).

(73) Tighten screws (68) to 74-96 lb-ft (100-130 N•m).

(74) Install oil screen (65) on oil pump cover (66).



d. Adjustment



A. Ring Gear Runout:

(1) Attach dial indicator on mounting flange of differential carrier (1).

(2) Adjust dial indicator so plunger is against the back surface of ring gear (2).

(3) Adjust dial indicator to zero.

(4) Rotate ring gear (2) a complete rotation. Dial indicator should not exceed 0.008 in. (0.020 cm) runout.

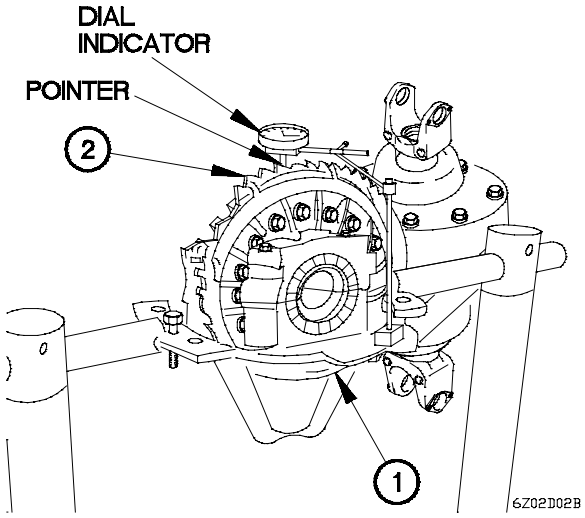
B. Ring Gear Backlash:

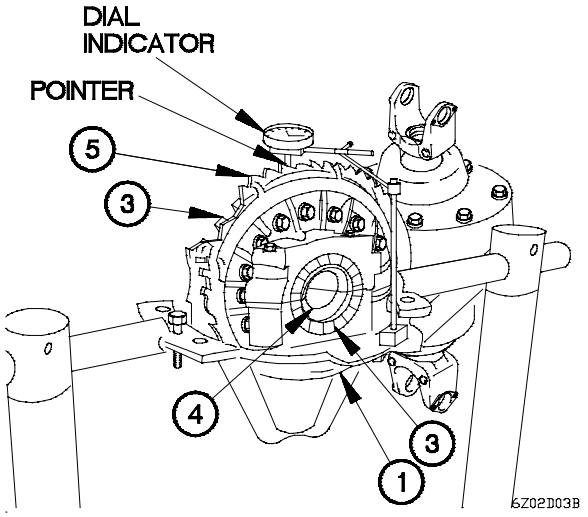
(1) Attach dial indicator on the mounting flange on differential carrier (1).

(2) Adjust the dial indicator so plunger 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. (0.020-0.045 cm).





NOTE

Perform step (5) if backlash reading is less than 0.008 in. (0.020 cm).

(5) Loosen adjusting ring (3) on back side of hub body (4) and tighten adjusting ring facing the ring gear (5) to increase backlash.

24-2. INTERMEDIATE DIFFERENTIAL REPAIR (CONT)

NOTE

Perform step (6) if backlash reading is greater than 0.018 in. (0.045 cm).

(6) Tighten adjusting ring (3) on backside of hub body (4) and loosen adjusting ring (3) facing the ring gear (5) to decrease backlash.

(7) Repeat steps (2) through (6) until backlash is between 0.008-0.018 in. (0.020-0.045 cm).

(8) Install two cotter pins (6) on differential bearing caps (7).

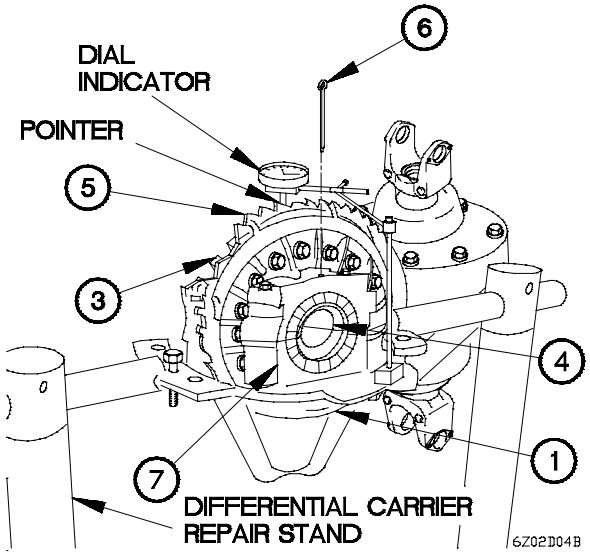
WARNING

Intermediate differential 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

Step (9) requires the aid of an assistant.

(9) Remove differential carrier (1) from differential carrier repair stand.



End of Task.

24-3. 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 78, Appendix B)
Stand, Differential Carrier, Repair (TM 9-2320-366-20)
Puller Kit, Universal (Item 52, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Indicator Dial (Item 36, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Multiplier, Torque (Item 42, Appendix B)
Holding Bar, Pinion (TM 9-2320-366-20)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Puller Kit, Universal (TM 9-2320-366-20)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)
Socket, Set, Impact (Item 58, Appendix B)
Wrench, Impact, Electric (Item 88, Appendix B)

Materials/Parts
Sealant, Adhesive (Item 66, Appendix C)
Sealant, Adhesive (Item 67, Appendix C)
Sealant, Adhesive (Item 68, Appendix C)
Adhesive (Item 5, Appendix C)
Sealing Compound (Item 70, Appendix C)
Sealing Compound (Item 76.3, Appendix C)
Oil Lubricating Gear (Item 51, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Nut, Self-Locking (Item 193, Appendix F)
Seal, Plain Encased (Item 386.1, Appendix F)
Pin, Cotter (2) (Item 335, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)

Personnel Required
(2)

a. Disassembly.

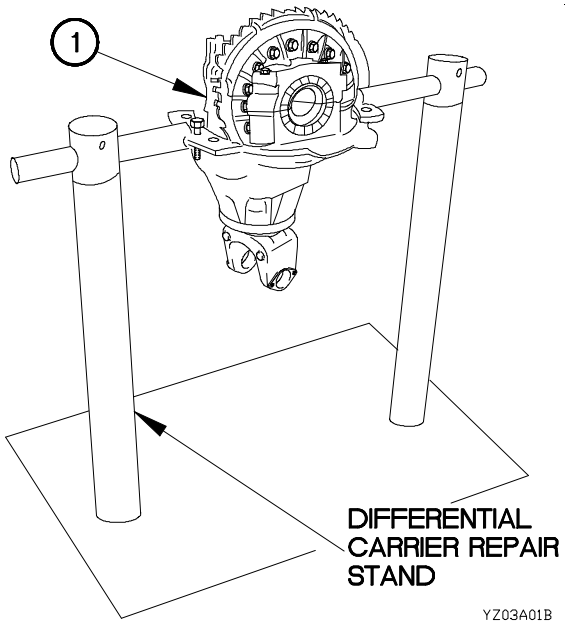
WARNING

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.

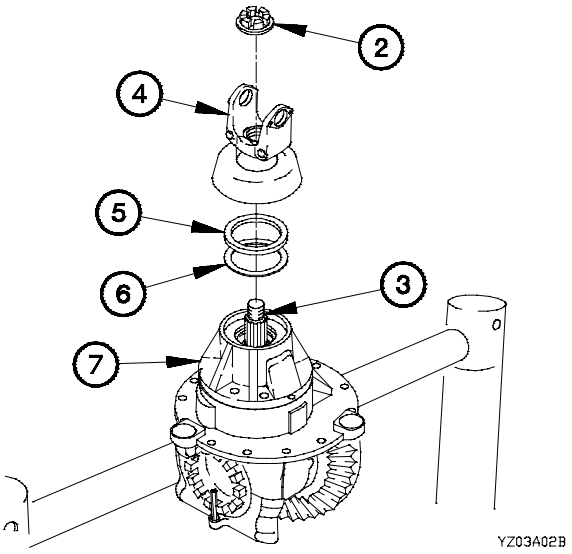
NOTE

Step (1) requires the aid of an assistant.

(1) Install differential carrier (1) on differential carrier repair stand.



24-3. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)



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

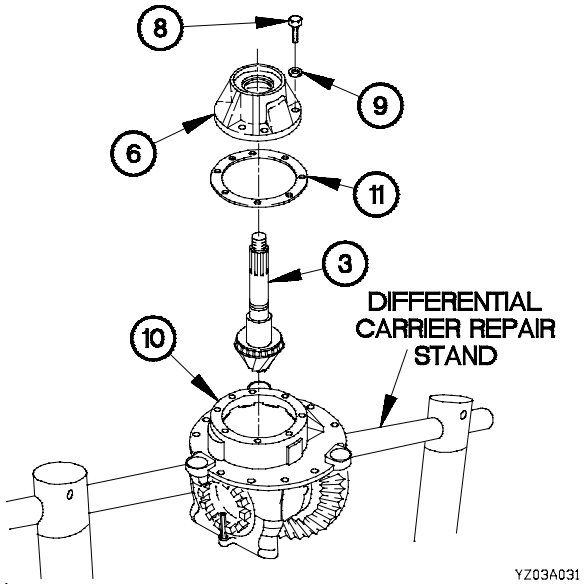
(3) Remove input yoke (4) from pinion drive (3).

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 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.

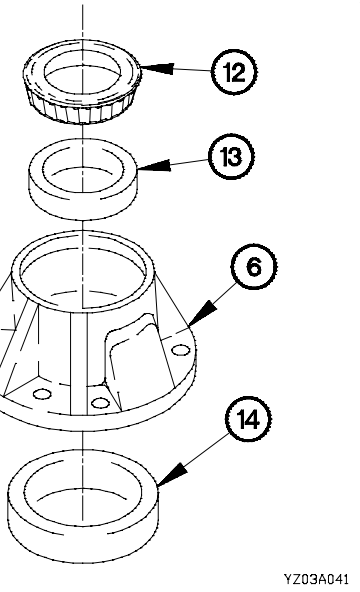
(9) Remove shims (11) from differential carrier housing (10).

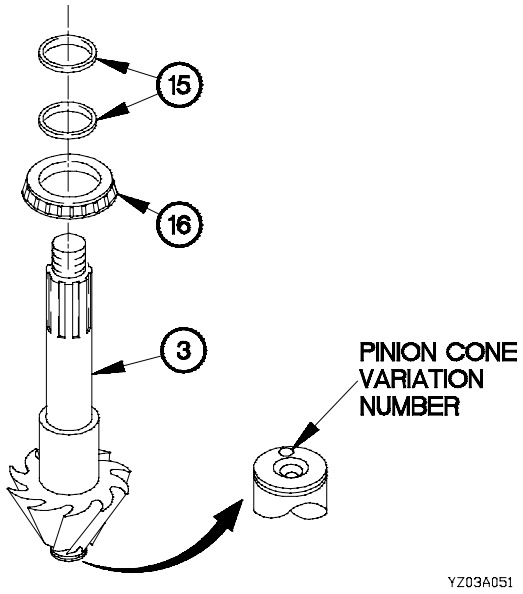
(10) Measure and record thickness of shims (11).

(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).



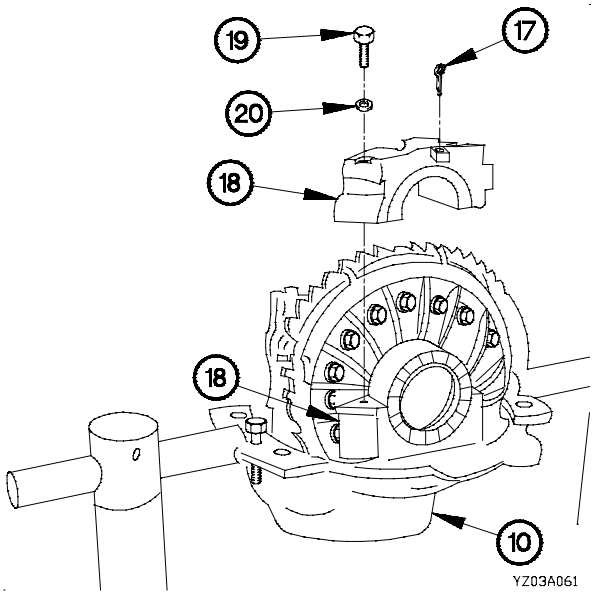


(14) Remove two bearing spacers (15) and inner bearing cone (16) from pinion drive (3).

(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).

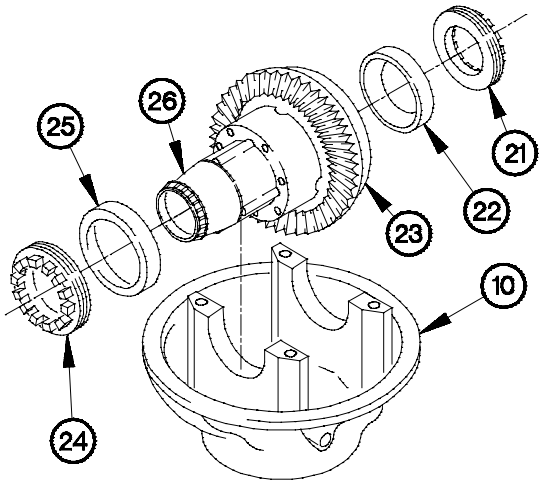


24-3. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

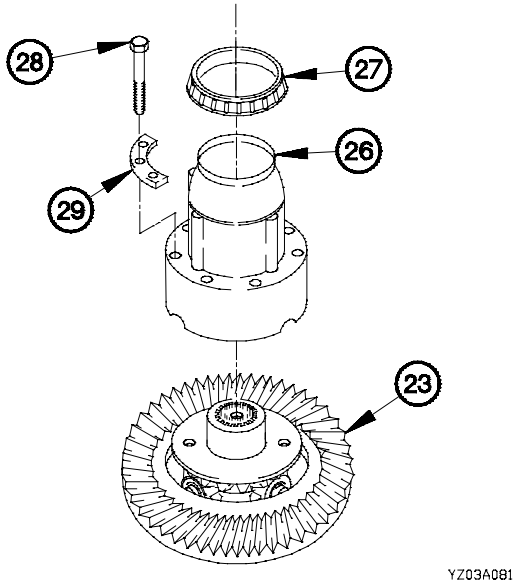
(18) Remove adjusting ring (21) and bearing cup (22) from ring gear (23).

(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



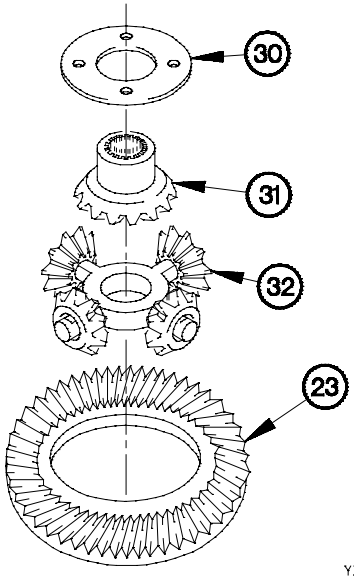
YZ03A081

(21) Remove bearing cone (27) from differential case (26).

(22) Remove 12 screws (28) and four plate spacers (29) from differential case (26).

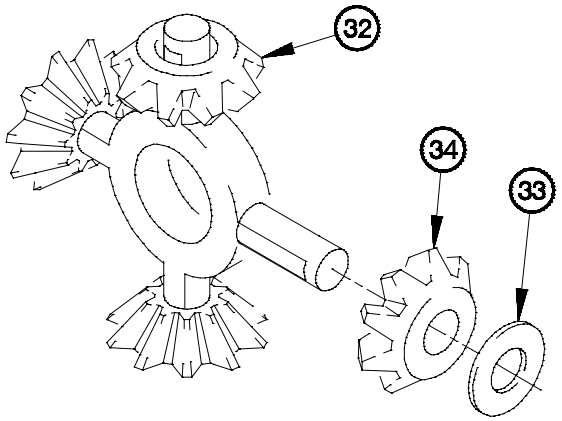
(23) Remove differential case (26) from ring gear (23).

(24) Remove thrust washer (30), side gear (31), and differential spider (32) from ring gear (23).

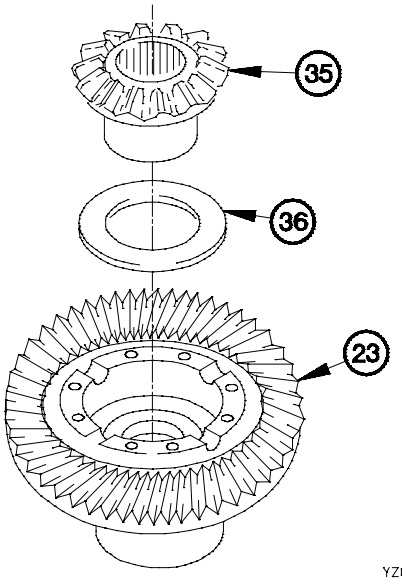


YZ03A091

(25) Remove four thrust washers (33) and differential pinion gears (34) from differential spider (32).



YZ03A101

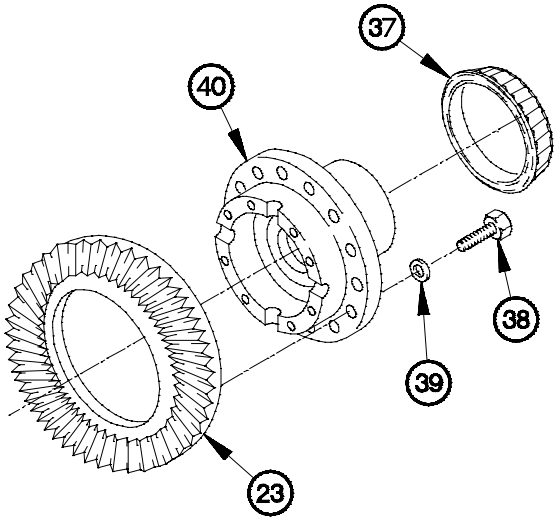


YZ03A111

(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

24-3. REAR AXLE DIFFERENTIAL CARRIER 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 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.

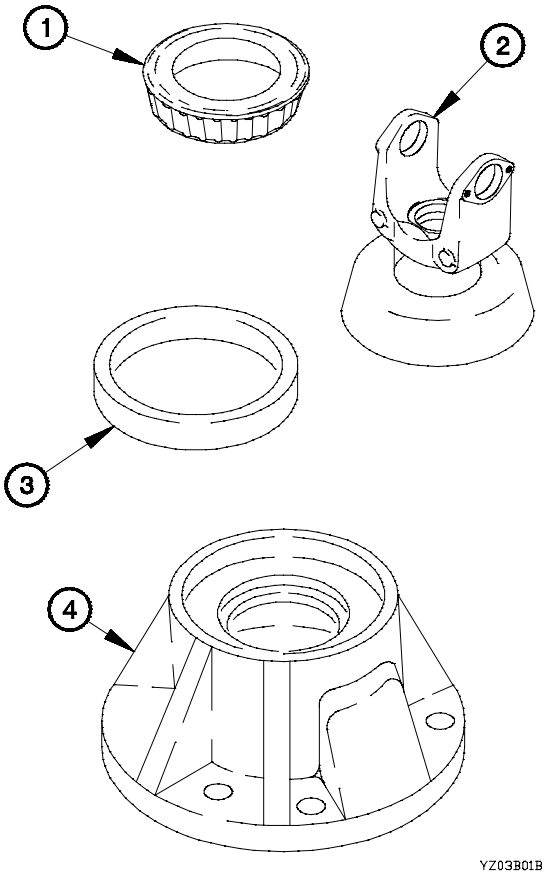
(4) Inspect input yoke (2) for visible cracks, wear, or damage.

(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.



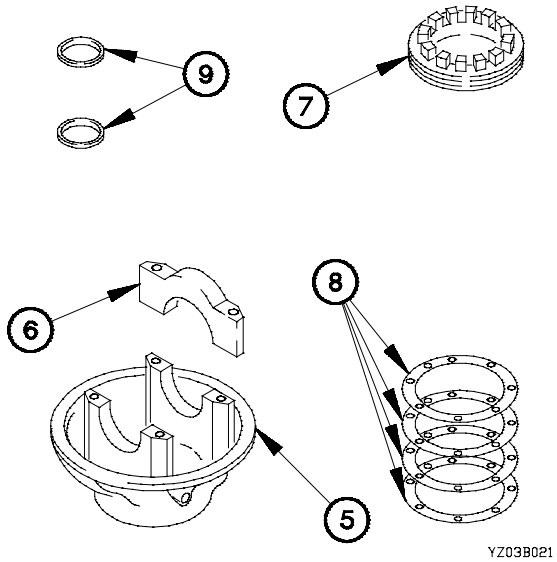
(9) Inspect differential carrier housing (6) for visible cracks, wear, or damage.

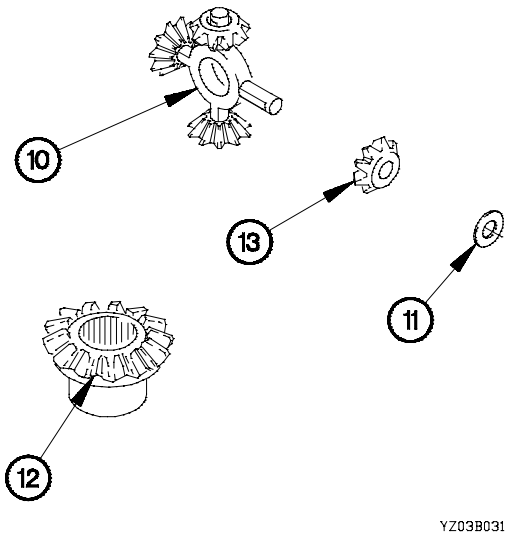
(10) Inspect differential bearing caps (7) for visible cracks, wear, or damage.

(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.

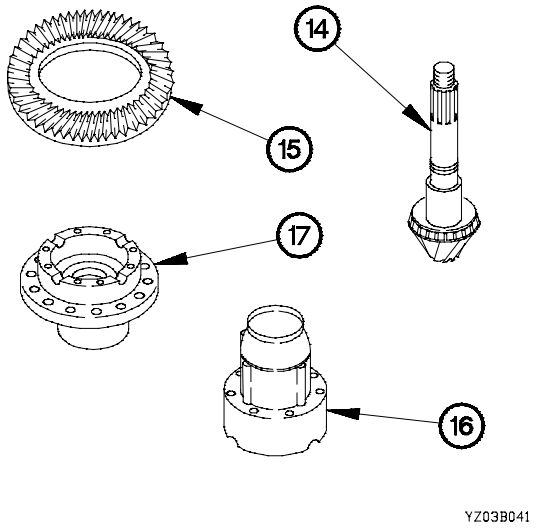
(16) Inspect two side gears (13) for visible cracks, wear, or damage.

(17) Inspect four differential pinion gears (14) for visible cracks, wear, or damage.

24-3. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

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.



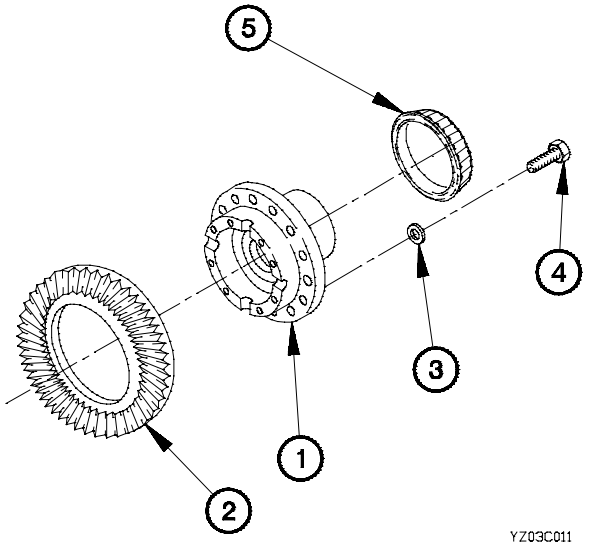
(18) Inspect pinion drive (15) for visible cracks, wear, or damage.

(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).

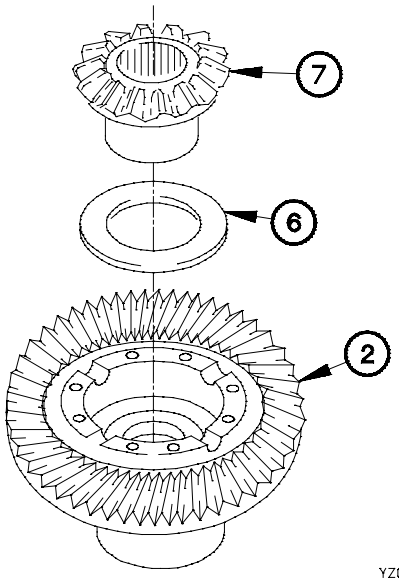
(2) Apply sealing compound to mounting surface of hub body (1).

(3) Position ring gear (2) on hub body (1) with 16 washers (3) and screws (4).

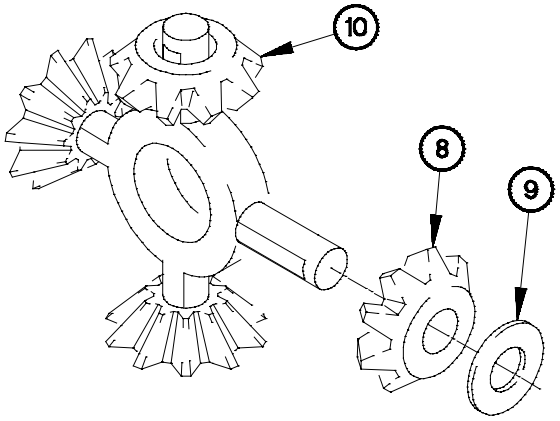
(4) Tighten 16 screws (4) to 85-115 lb-ft (115-156 N·m).

(5) Install bearing cone (5) on hub body (1).

(6) Install thrust washer (6) and side gear (7) in ring gear (2).



YZ03C021

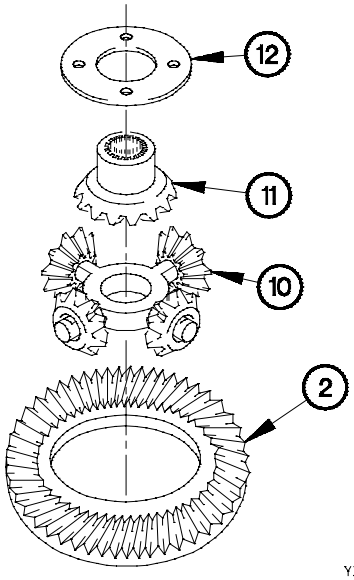


YZ03C031

(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).

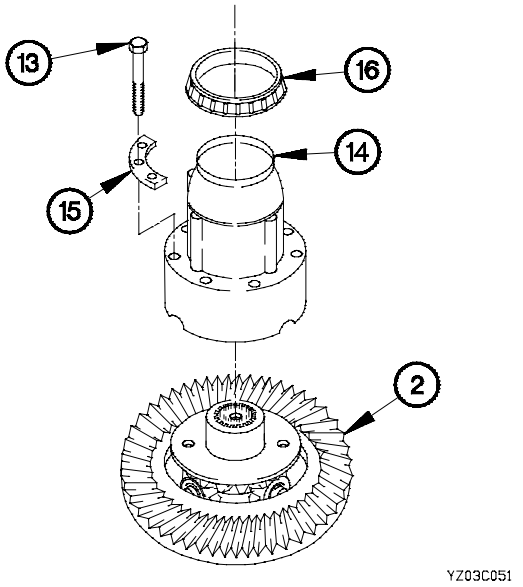


YZ03C041

24-3. 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.

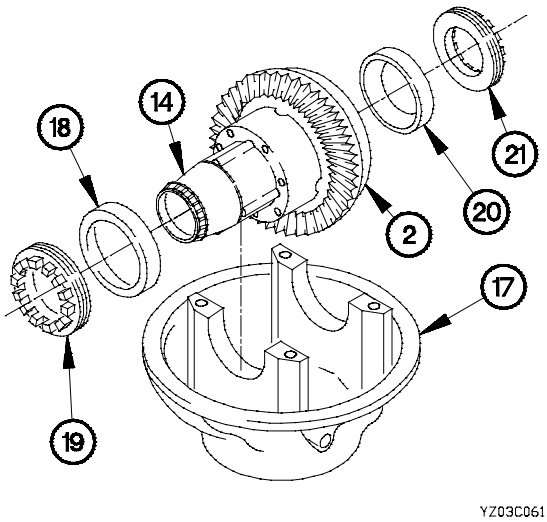


(10) Apply adhesive sealant to threads of 12 screws (13).

(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).

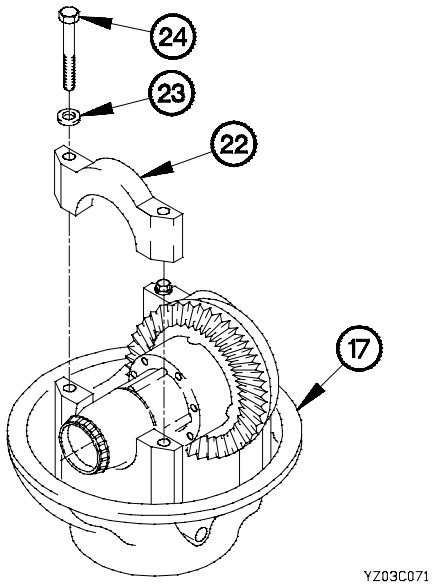
(16) Install bearing cup (20) and adjusting ring (21) on ring gear (2).

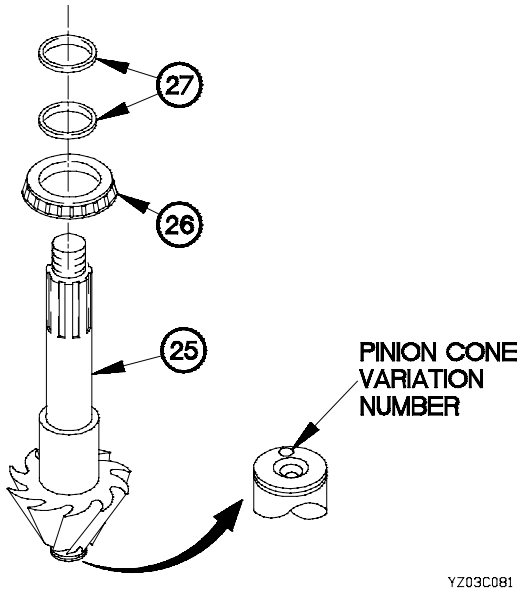
WARNING

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).



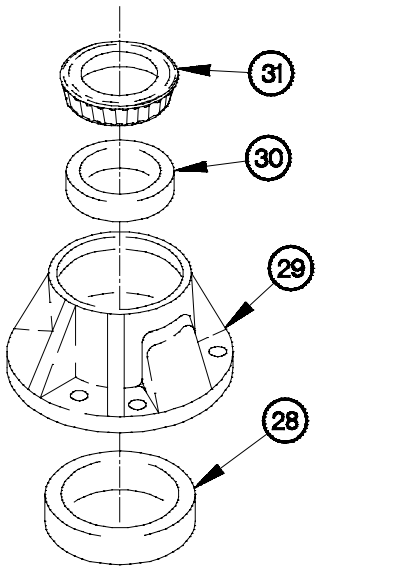


NOTE

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).

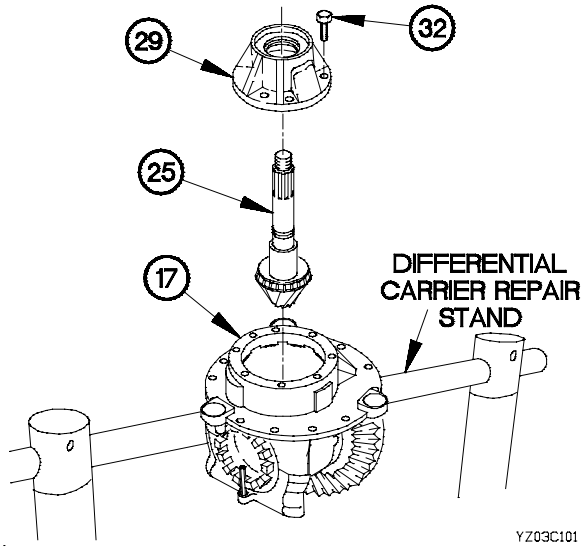
24-3. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

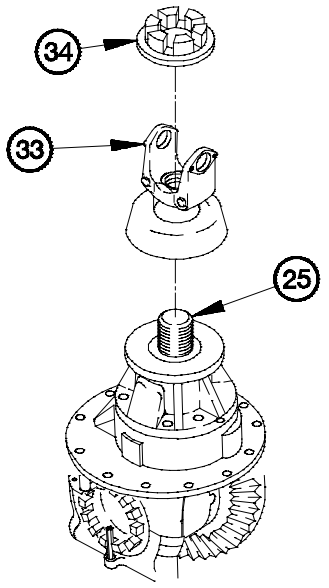
NOTE

- 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 24-2 Pinion Bearing Preload Chart.**

NOTE

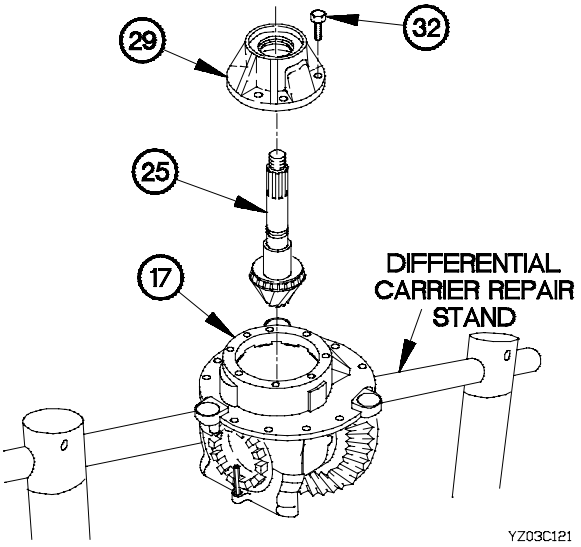
Perform steps (28) through (33) only if torque value is not within specifications. If torque value is within specifications go to step (34).

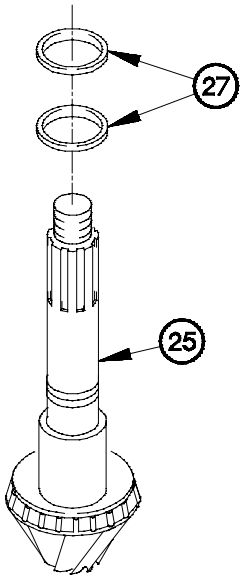
(28) Remove self-locking nut (34) and input yoke (33) from pinion drive (25).

Table 24-2. 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)

(29) Remove eight screws (32), pinion drive (25), and bearing cage (29) from differential carrier housing (17).





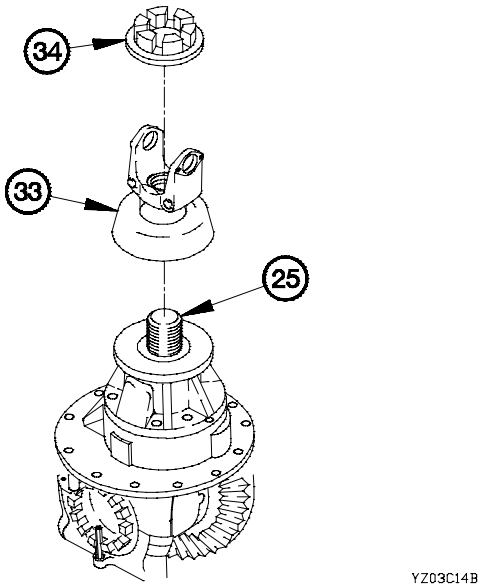
(30) Remove two bearing spacers (27) from pinion drive (25).

(31) Install thinner pinion spacers (27) to increase preload.

(32) Install thicker pinion spacers (27) to decrease preload.

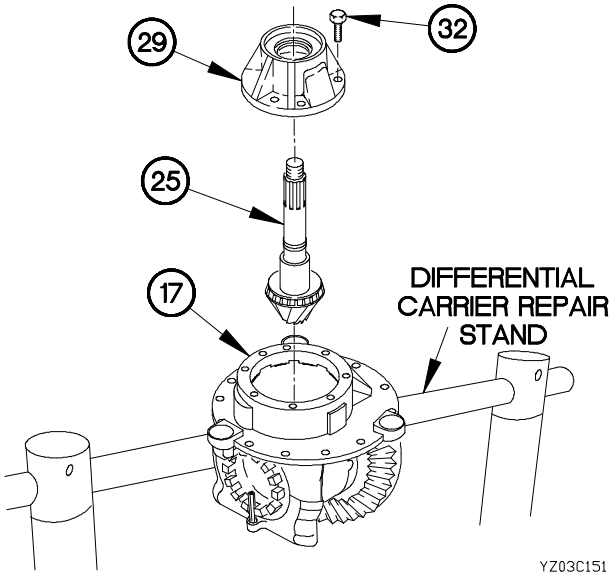
(33) Perform steps (23) through (27) to determine if preload on inner and outer bearing cones are within specifications.

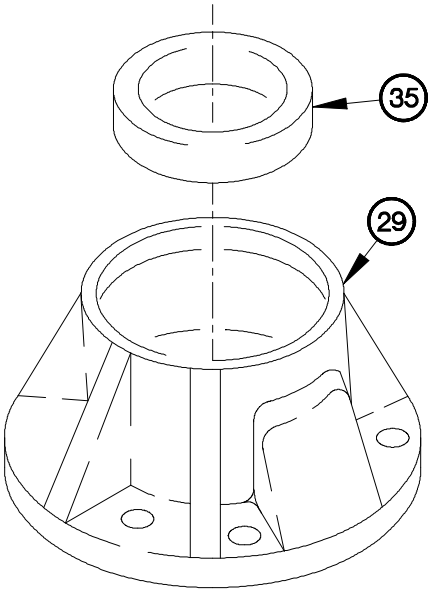
(34) Remove self-locking nut (34) and input yoke (33) from pinion drive (25). Discard self-locking nut.



24-3. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

(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).

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 0.001 cm. For example, PC +4 equals +0.004 in., PC -.005 cm equals -0.005 cm.

(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 24-3 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 24-3 Pinion Cone Variation Chart.**

Table 24-3. 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 +.001 cm through +.009 cm	+0.001 cm through +0.009 cm
+.001 cm through +.009 cm	
PC -.001 cm through PC -.009 cm	-0.001 cm through -0.009 cm
-.001 cm through -.009 cm	

24-3. 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.

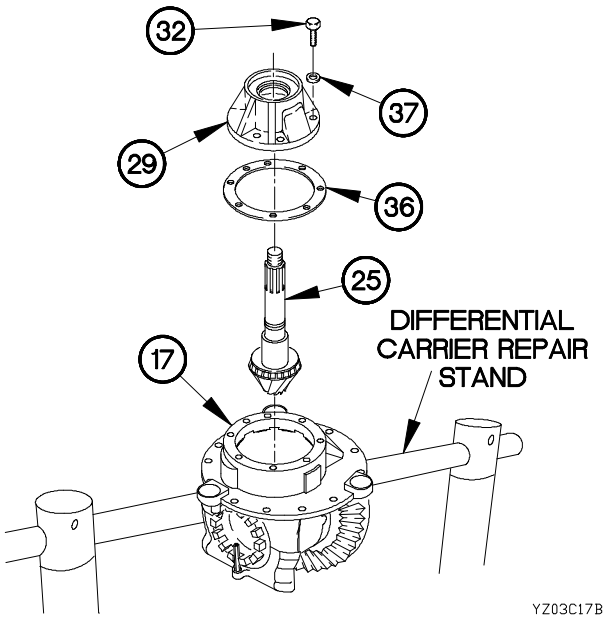
(40) Apply adhesive sealant to shims (36) and mounting flange of differential carrier housing (17).

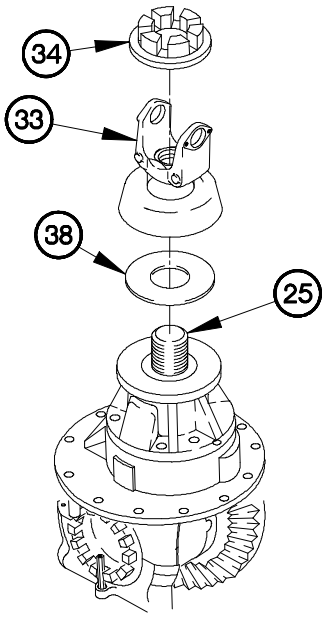
NOTE

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).

(45) Apply adhesive sealant to threads of self-locking nut (34).

(46) Install input yoke (33) on pinion drive (25) with self-locking nut (34).

(47) Tighten self-locking nut (34) to 920-1130 lb-ft (1248-1532 N•m).

d. Adjustment.

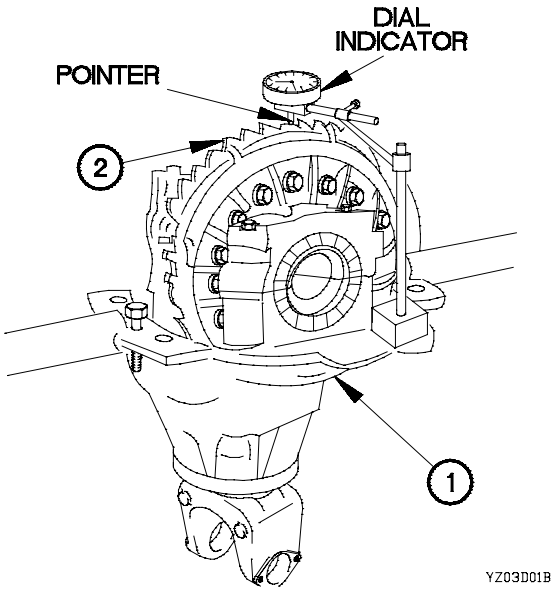
A. Ring Gear Runout:

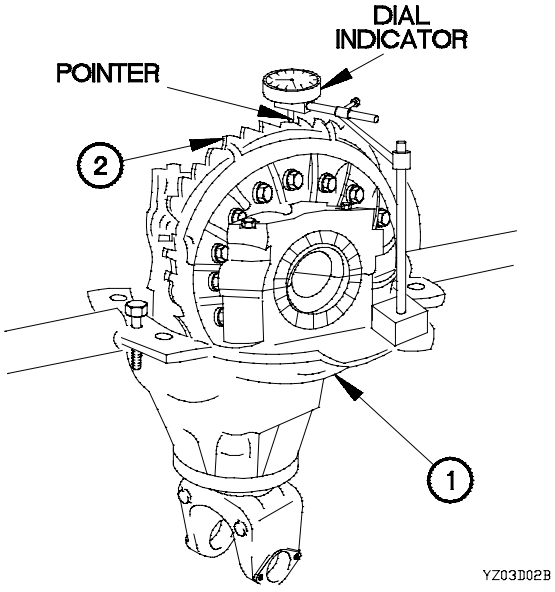
(1) Attach dial indicator on mounting flange of differential carrier (1).

(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. (0.020 cm).





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. (0.020-0.045 cm).

24-3. REAR AXLE DIFFERENTIAL CARRIER REPAIR (CONT)

NOTE

Perform step (5) if backlash reading is less than 0.008 in. (0.020 cm).

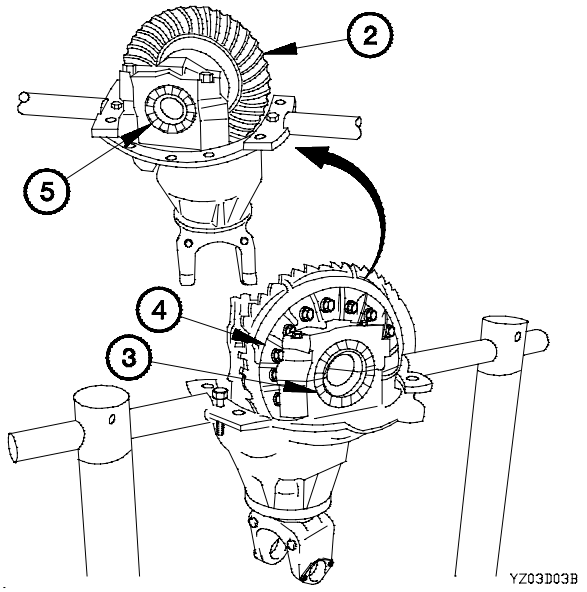
(5) Loosen adjusting ring (3) on back side of hub body (4) and tighten adjusting ring (5) facing the ring gear (2) to increase backlash.

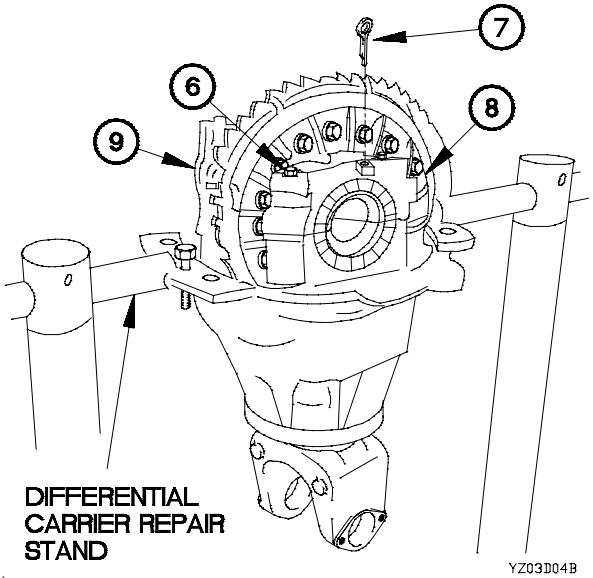
NOTE

Perform step (6) if backlash reading is greater than 0.018 in. (0.045 cm).

(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. (0.020-0.045 cm).





(8) Tighten four screws (6) to 132-169 lb-ft (179-229 N·m).

(9) Install two cotter pins (7) in bearing caps (8).

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 (10) requires the aid of an assistant.

(10) Remove differential carrier (9) from differential carrier repair stand.

End of Task.

CHAPTER 25
FRAME, TOWING ATTACHMENT, AND DRAWBARS

Section I. INTRODUCTION 25-1
25-1. INTRODUCTION 25-1

Section II. MAINTENANCE PROCEDURES 25-2
25-2. M1089 LIFT CYLINDER REPAIR 25-2
25-3. M1089 STINGER CYLINDER REPAIR 25-8
25-4. M1089 FOLD CYLINDER REPAIR 25-13
25-5. M1089 TELESCOPIC LIFT CYLINDER REPAIR 25-19
25-6. M1089 STIFFLEG CYLINDER REPAIR 25-28

Section I. INTRODUCTION

25-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Frame, Towing Attachment, and Drawbar Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

25-2. M1089 LIFT CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Hammer, Non-Sparking (Item 32, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Vise, Machinists (Item 82, Appendix B)
Pan, Drain (Item 43, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Materials/Parts
Kit, Repair (Item 99, Appendix F)
Kit, Repair (Item 102, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

Personnel Required
(2)

a. Disassembly.

WARNING

Lift cylinder weighs approximately 180 lbs (82 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of an assistant.

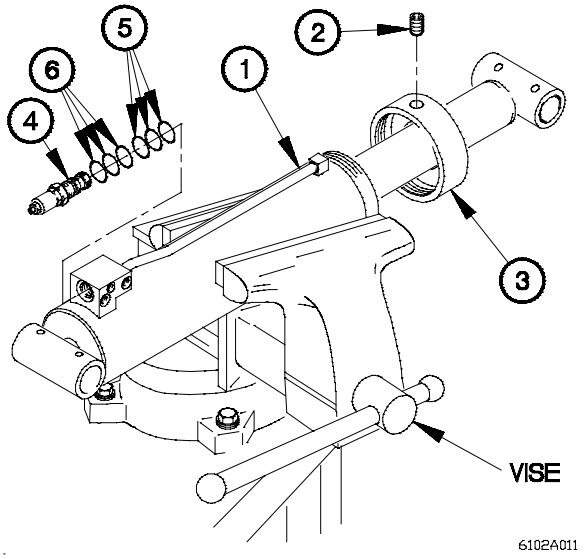
(1) Position cylinder barrel (1) in vise.

(2) Place drain pan under cylinder barrel (1).

(3) Remove setscrew (2) and retaining ring (3) from cylinder barrel (1).

(4) Remove cartridge holding valve (4) from cylinder barrel (1).

(5) Remove three back-up rings (5) and preformed packings (6) from cartridge holding valve (4). Discard back-up rings and preformed packings.

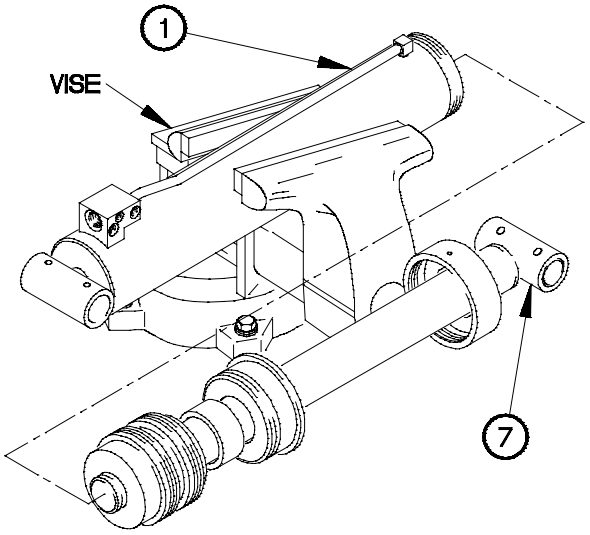


(6) Remove rod (7) from cylinder barrel (1).

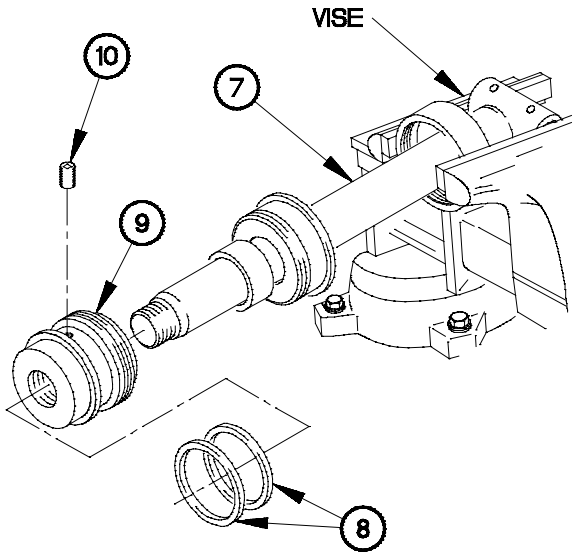
NOTE

Steps (7) and (8) require the aid of an assistant.

(7) Remove cylinder barrel (1) from vise.



6102A021



6102A031

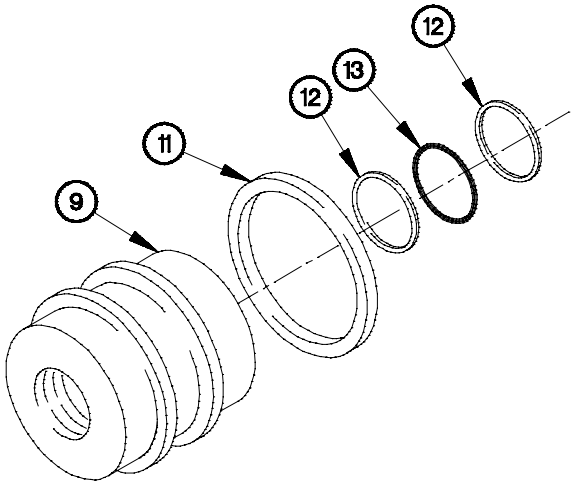
(8) Position rod (7) in vise.

(9) Remove seal assembly (8) from piston (9). Discard seal assembly.

(10) Remove setscrew (10) and piston (9) from rod (7).

(11) Remove guide lock ring (11) from piston (9).

(12) Remove two back-up rings (12) and preformed packing (13) from piston (9). Discard back-up rings and preformed packing.



6102A041

25-2. M1089 LIFT CYLINDER REPAIR (CONT)

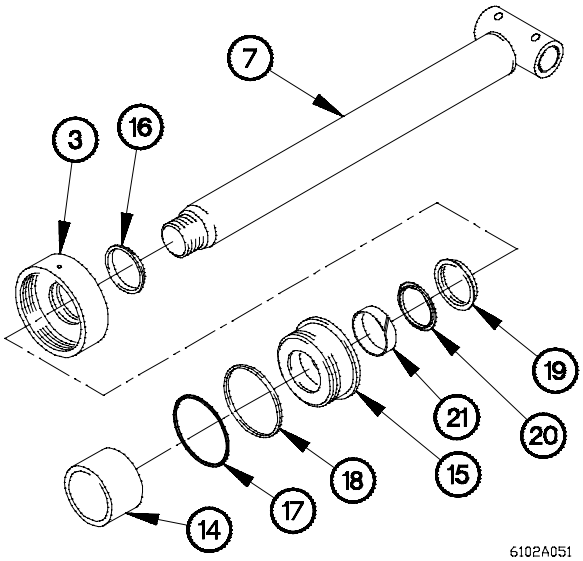
(13) Remove spacer (14) from rod (7).

(14) Remove cylinder head (15) and retaining ring (3) from rod (7).

(15) Remove wiper ring (16) from retaining ring (3). Discard wiper ring.

(16) Remove preformed packing (17) and back-up ring (18) from cylinder head (15). Discard preformed packing and back-up ring.

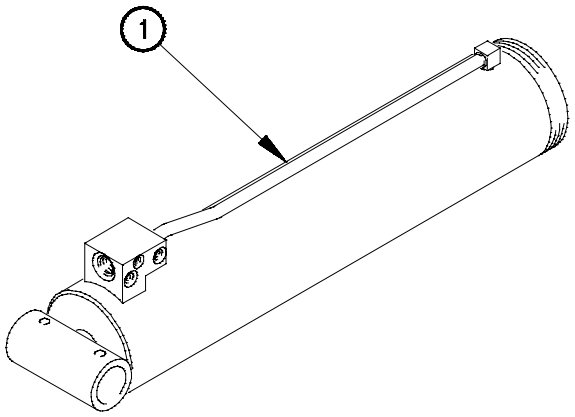
(17) Remove rod seal (19), buffer seal (20), and wiper ring (21) from cylinder head (15). Discard wear ring, buffer seal, and rod seal.



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.**



(1) Clean all metal parts with dry cleaning solvent.

NOTE

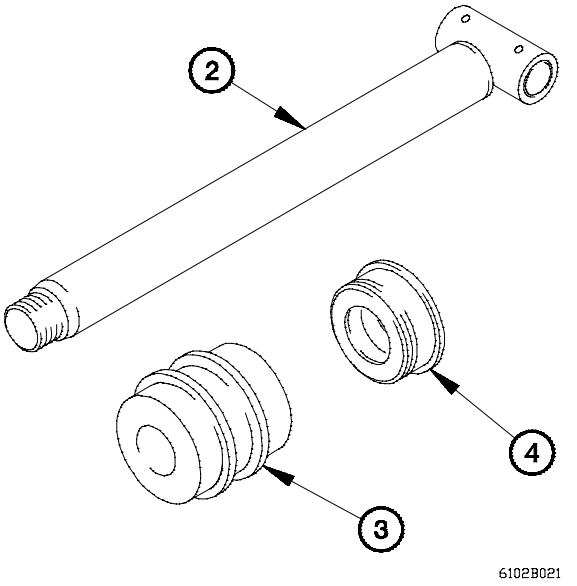
Replace any part that fails visual inspection.

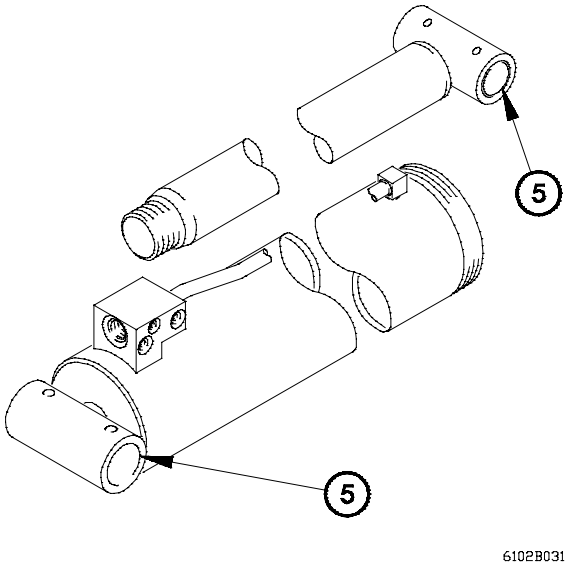
(2) Inspect inner walls of cylinder barrel (1) for pitting, corrosion, or evidence of binding.

(3) Inspect rod (2) for pitting, corrosion, or evidence of binding.

(4) Inspect piston (3) for pitting, corrosion, or evidence of binding.

(5) Inspect cylinder head (4) for pitting and corrosion.





(6) Inspect two brass bushings (5) for pitting, corrosion, or evidence of binding.

c. Assembly.

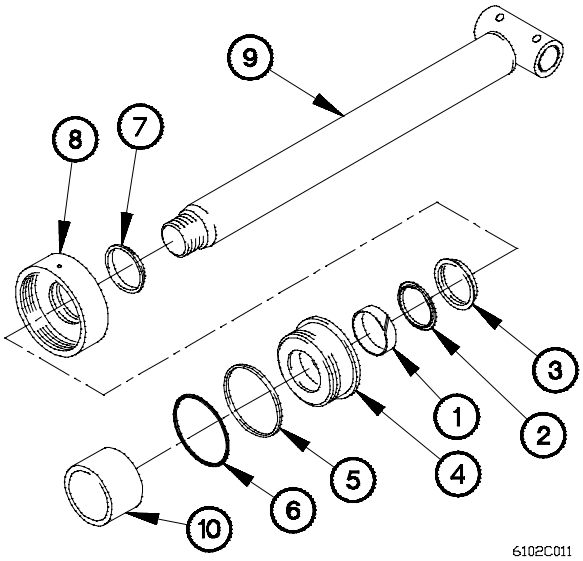
(1) Install wiper ring (1), buffer seal (2), and rod seal (3) in cylinder head (4).

(2) Install back-up ring (5) and preformed packing (6) on cylinder head (4).

(3) Install wiper ring (7) in retaining ring (8).

(4) Install retaining ring (8) and cylinder head (4) on rod (9).

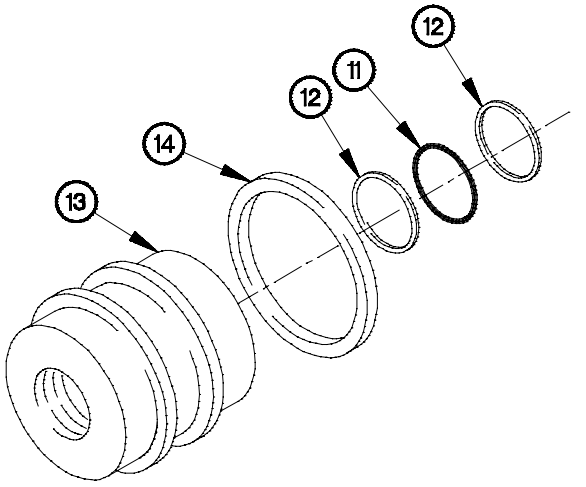
(5) Install spacer (10) on rod (9).



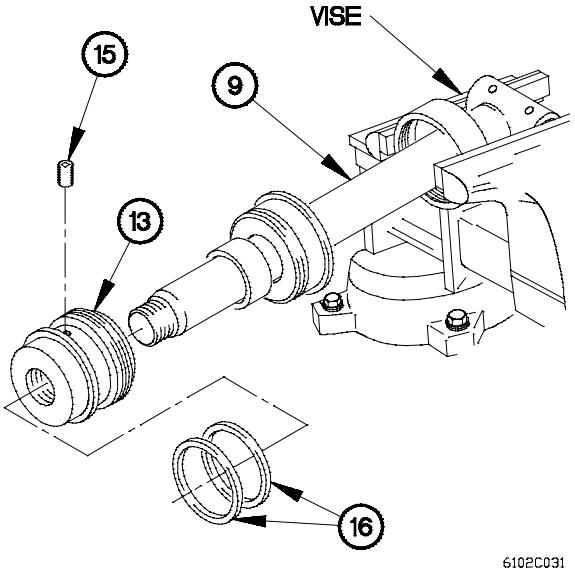
25-2. M1089 LIFT CYLINDER REPAIR (CONT)

(6) Install preformed packing (11) and two back-up rings (12) on piston (13).

(7) Install guide lock ring (14) on piston (13).



6102C021



6102C031

NOTE

Step (8) requires the aid of an assistant.

(8) Position rod (9) in vise.

(9) Install piston (13) on rod (9) with setscrew (15).

(10) Install seal assembly (16) on piston (13).

NOTE

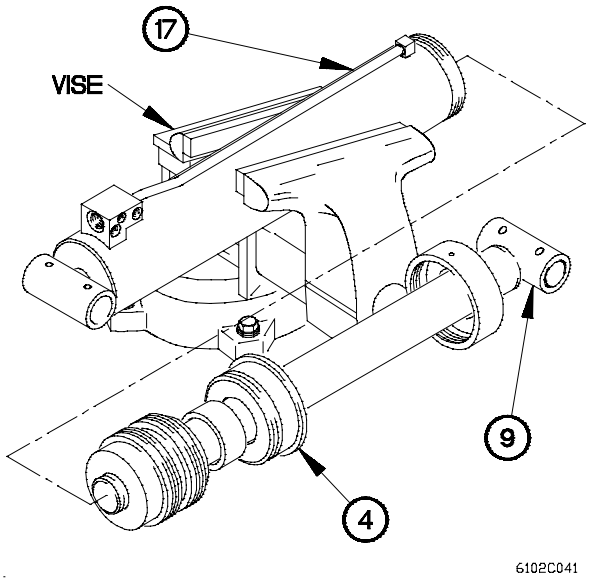
Steps (11) and (12) require the aid of an assistant.

(11) Remove rod (9) from vise.

(12) Position cylinder barrel (17) in vise.

(13) Position rod (9) in cylinder barrel (17).

(14) Install cylinder head (4) in cylinder barrel (17).

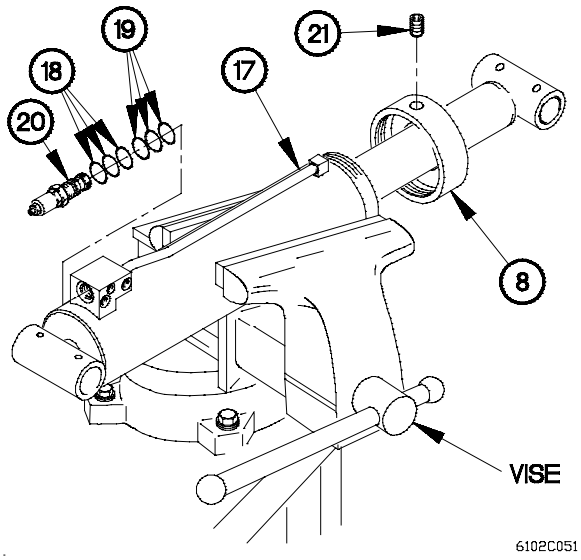


(15) Install three preformed packings (18) and back-up rings (19) on cartridge holding valve (20).

(16) Position cartridge holding valve (20) in cylinder barrel (17).

(17) Install retaining ring (8) on cylinder barrel (17) with setscrew (21).

(18) Tighten cartridge holding valve (20) to 30-36 lb-ft (41-49 N·m).



WARNING

Lift cylinder weighs approximately 180 lbs (82 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (19) requires the aid of an assistant.

(19) Remove cylinder barrel (17) from vise.

End of Task.

25-3. M1089 STINGER CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket, (Item 84, Appendix B)
Socket Set, Socket Wrench (TM 9-2320-366-20)
Pan, Drain (Item 43, Appendix B)
Vise, Machinists (Item 82, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Tools and Special Tools
Spanner, Wrench Tool (Item 20, Appendix D)

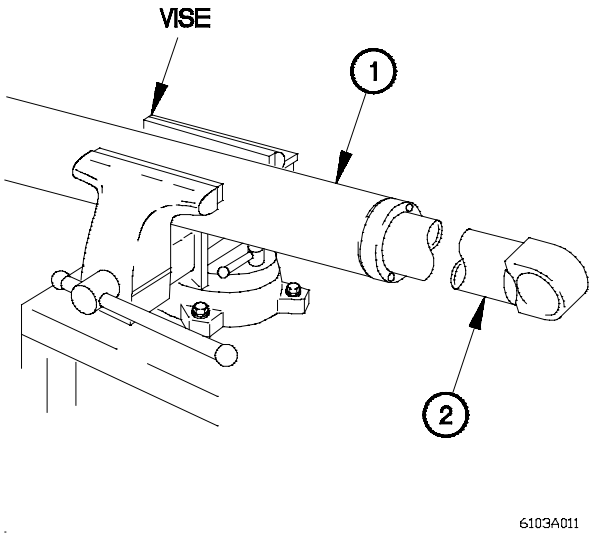
Materials/Parts
Kit, Seal (Item 124, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)

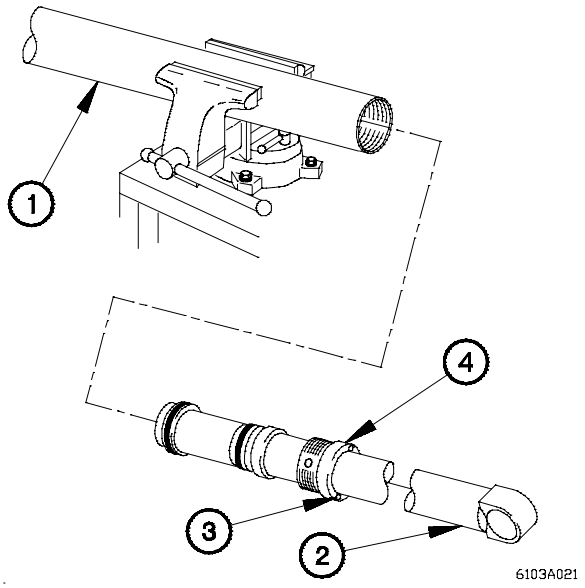
a. Disassembly.

(1) Position stinger cylinder (1) in vise.

(2) Place drain pan under stinger cylinder (1).

(3) Extend cylinder rod (2) approximately 12 in. (31 cm).





(4) Loosen screw (3) in cylinder rod retainer (4).

(5) Unscrew cylinder rod retainer (4) from stinger cylinder (1).

(6) Remove cylinder rod (2) and cylinder rod retainer (4) from stinger cylinder (1).

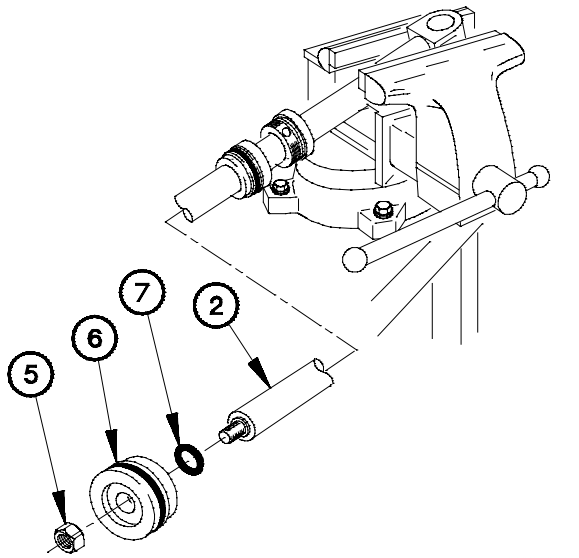
(7) Remove stinger cylinder (1) from vise.

(8) Position cylinder rod (2) in vise with eye of cylinder rod between vise jaws.

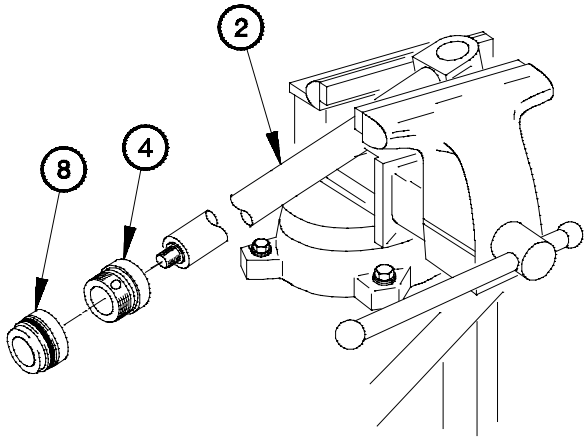
(9) Remove nut (5) from cylinder rod (2).

(10) Remove piston (6) from cylinder rod (2).

(11) Remove preformed packing (7) from cylinder rod (2). Discard preformed packing.



6103A031

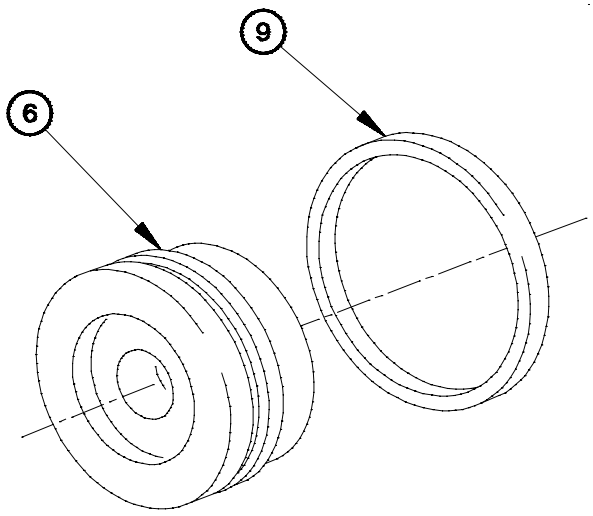


6103A041

(12) Remove bearing (8) from cylinder rod (2).

(13) Remove cylinder rod retainer (4) from cylinder rod (2).

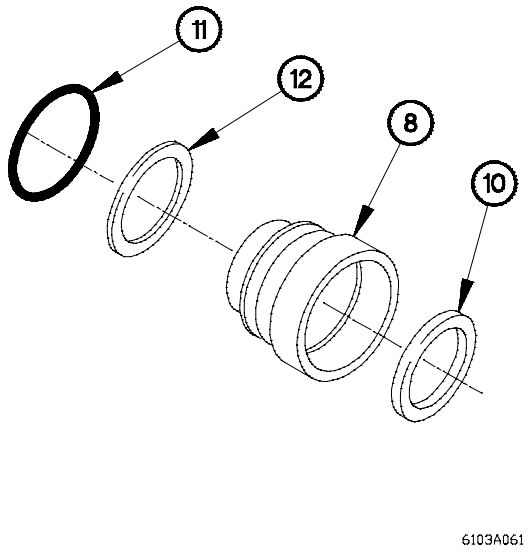
(14) Remove seal (9) from piston (6). Discard seal.



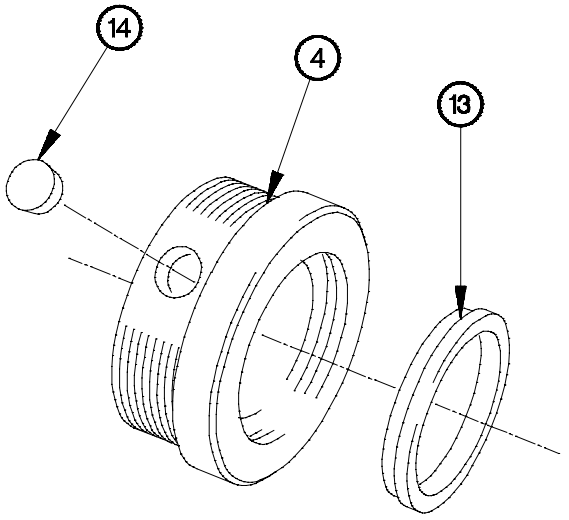
6103A051

25-3. M1089 STINGER CYLINDER REPAIR (CONT)

(15) Remove seal (10), preformed packing (11), and back-up ring (12) from bearing (8). Discard seal, preformed packing, and back-up ring.



6103A061



6103A071

(16) Remove dust seal (13) from cylinder rod retainer (4). Discard dust seal.

(17) Remove nylon plug (14) from cylinder rod retainer (4). Discard nylon plug.

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent 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 breath 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 138°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 all metal parts thoroughly with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection.

(2) Inspect all metal parts for uneven wear, pitting, or nicks.

c. Assembly.

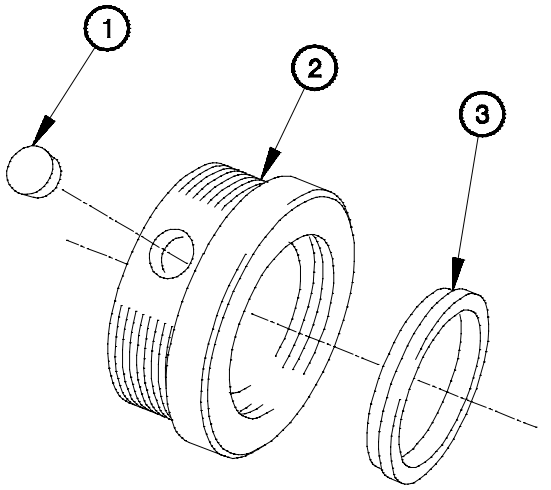
NOTE

Apply lubricating oil to all parts during assembly.

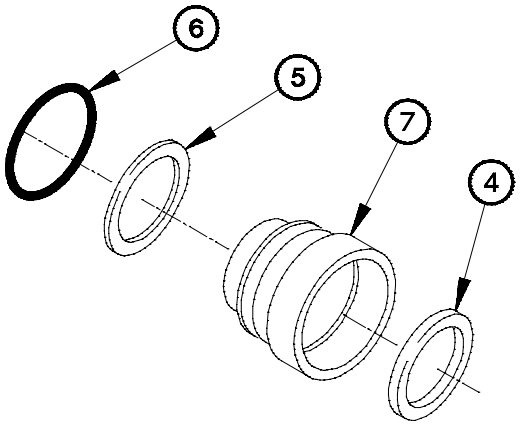
(1) Install nylon plug (1) in cylinder rod retainer (2).

(2) Trim nylon plug (1) even with threads of cylinder rod retainer (2).

(3) Install dust seal (3) in cylinder rod retainer (2).



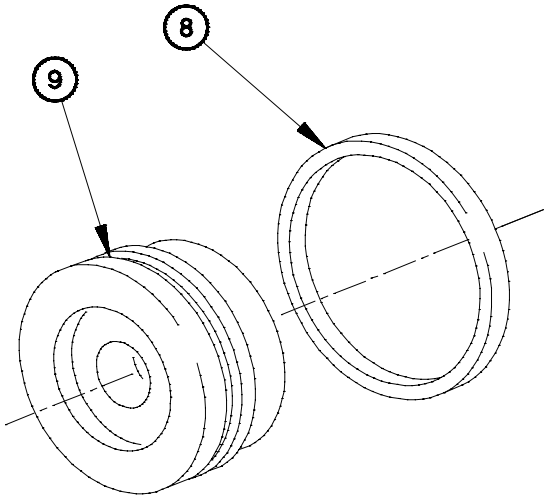
6103C011



6103C021

(4) Install seal (4), back-up ring (5), and preformed packing (6) on bearing (7).

(5) Install seal (8) on piston (9).



6103C031

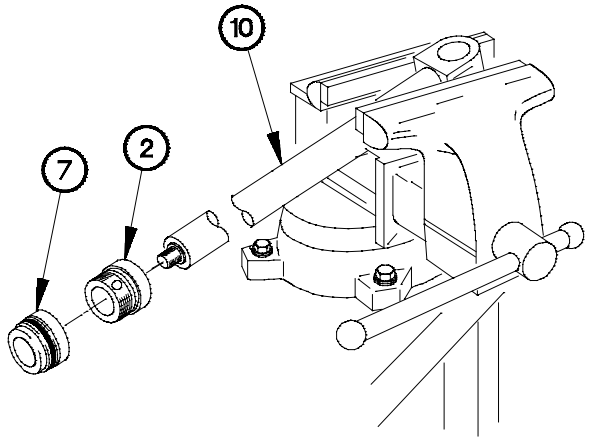
25-3. M1089 STINGER CYLINDER REPAIR (CONT)

CAUTION

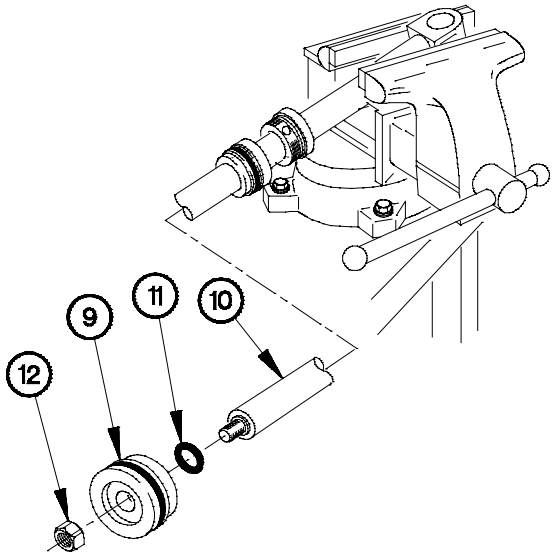
Use care when installing cylinder rod retainer to prevent damage to dust seal. Failure to comply may result in damage to equipment.

(6) Install cylinder rod retainer (2) on cylinder rod (10).

(7) Install bearing (7) on cylinder rod (10).



6103C041



6103C051

(8) Install preformed packing (11) on cylinder rod (10).

(9) Install piston (9) on cylinder rod (10).

(10) Position nut (12) on cylinder rod (10).

(11) Tighten nut (12) to 195-265 lb-ft (264-359 N·m).

(12) Remove cylinder rod (10) from vise.

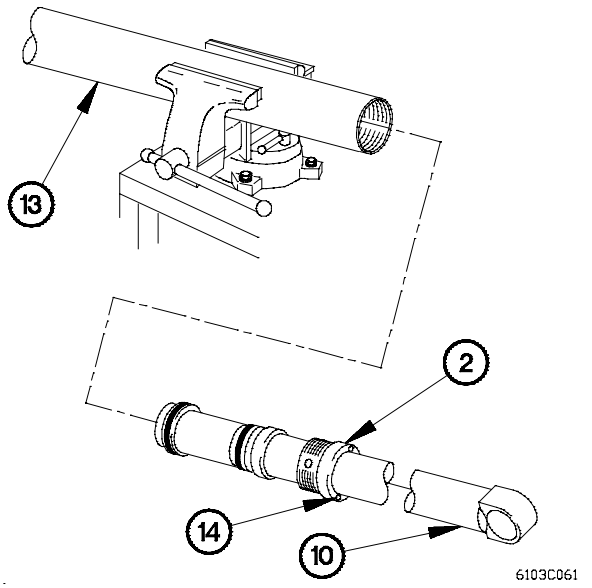
(13) Position stinger cylinder (13) in vise.

(14) Install cylinder rod (10) and cylinder rod retainer (2) in stinger cylinder (13).

(15) Tighten screw (14) to 92-144 lb-in. (10-16 N·m).

(16) Push cylinder rod (10) fully in stinger cylinder (13).

(17) Remove stinger cylinder (13) from vise.



6103C061

End of Task.

25-4. M1089 FOLD CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Spanner Wrench Tool (Item 20, Appendix D)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pan, Drain (Item 43, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)
Vise, Machinists (Item 82, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

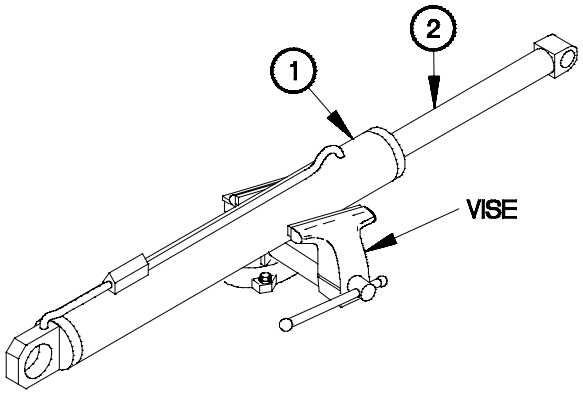
Materials/Parts
Kit, Seal (Item 123, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)

a. Disassembly.

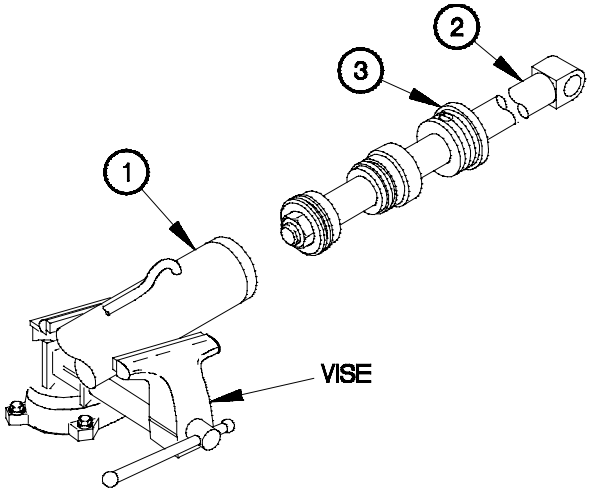
(1) Position fold cylinder (1) in vise.

(2) Place drain pan under fold cylinder (1).

(3) Extend cylinder rod (2) approximately 12 in. (31 cm).



6104A011



6104A021

(4) Unscrew cylinder rod retainer (3) from fold cylinder (1).

(5) Remove cylinder rod (2) and cylinder rod retainer (3) from fold cylinder (1).

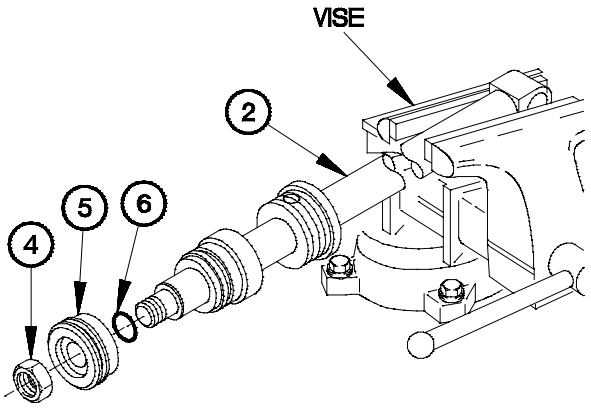
25-4. M1089 FOLD CYLINDER REPAIR (CONT)

(6) Position cylinder rod (2) in vise with eye of cylinder rod between vise jaws.

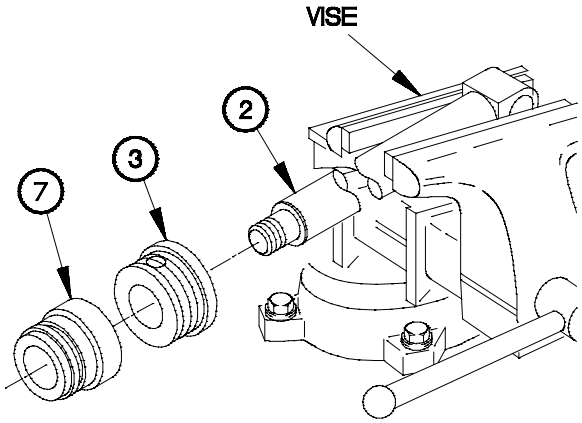
(7) Remove nut (4) from cylinder rod (2).

(8) Remove piston (5) from cylinder rod (2).

(9) Remove preformed packing (6) from cylinder rod (2). Discard preformed packing.



6104A031

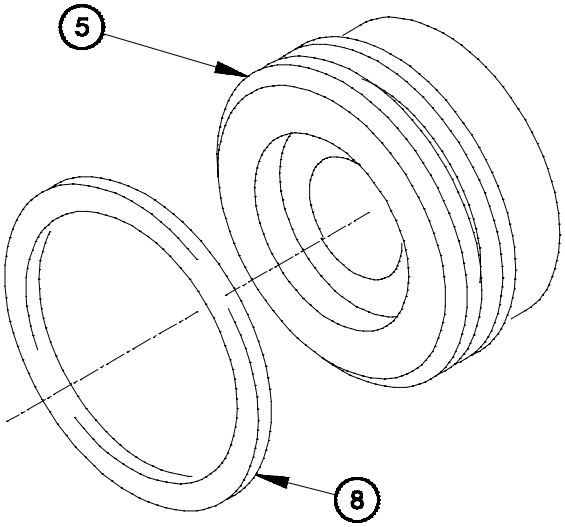


6104A041

(10) Remove bearing (7) from cylinder rod (2).

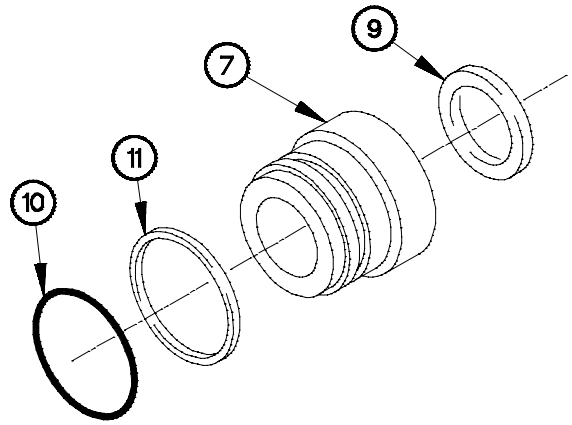
(11) Remove cylinder rod retainer (3) from cylinder rod (2).

(12) Remove seal (8) from piston (5). Discard seal.

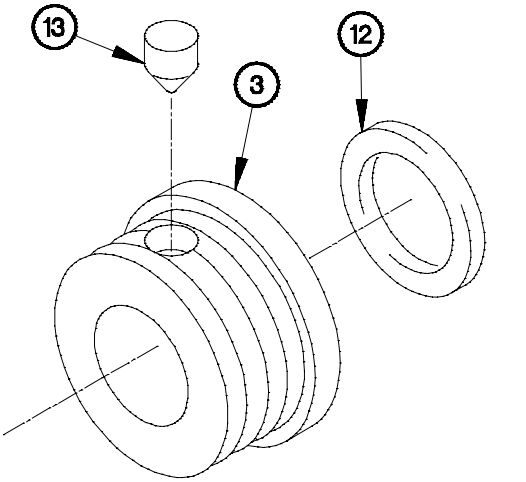


6104A051

(13) Remove seal (9), preformed packing (10), and back-up ring (11) from bearing (7). Discard seal, preformed packing, and back-up ring.



6104A061



6104A071

(14) Remove dust seal (12) from cylinder rod retainer (3). Discard dust seal.

(15) Remove nylon plug (13) from cylinder rod retainer (3). Discard nylon plug.

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent 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 breath 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 138°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 all metal parts thoroughly with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection.

(2) Inspect all metal parts for uneven wear, pitting, or nicks.

25-4. M1089 FOLD CYLINDER REPAIR (CONT)

c. Assembly.

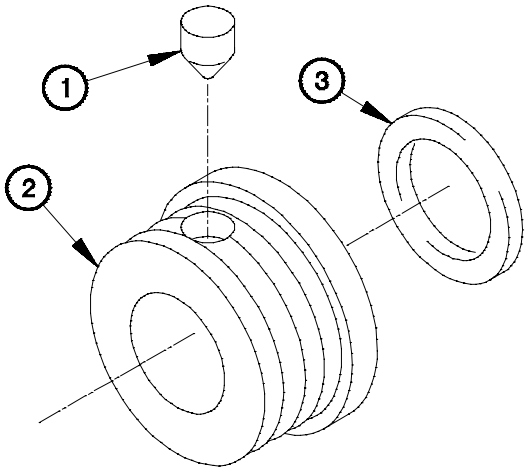
NOTE

Apply lubricating oil to all parts during assembly.

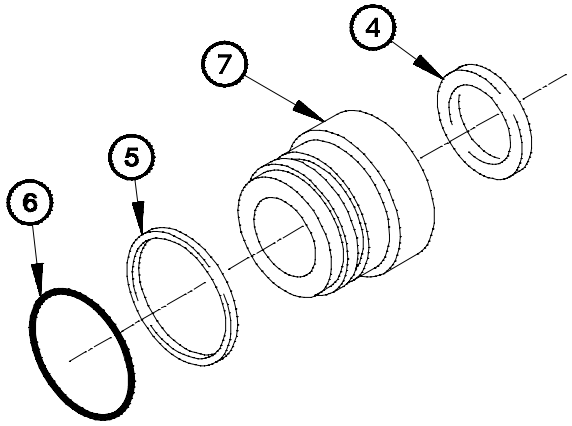
(1) Install nylon plug (1) in cylinder rod retainer (2).

(2) Trim nylon plug (1) even with threads of cylinder rod retainer (2).

(3) Install dust seal (3) in cylinder rod retainer (2).



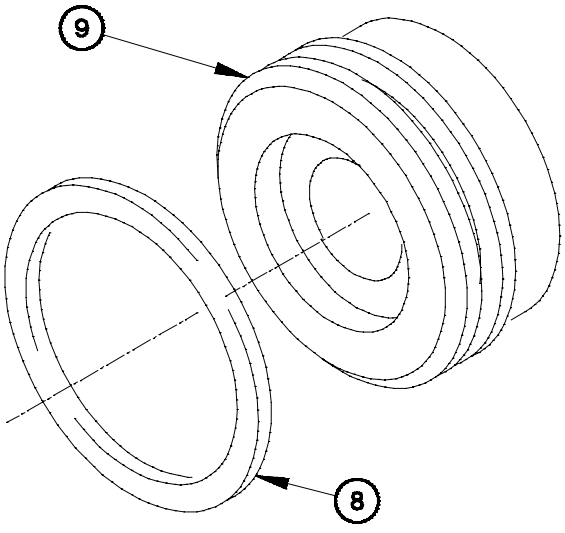
6104C011



6104C021

(4) Install seal (4), back-up ring (5), and preformed packing (6) on bearing (7).

(5) Install seal (8) on piston (9).



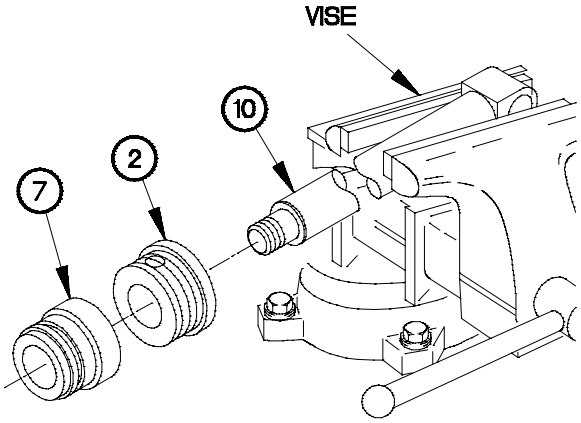
6104C031

CAUTION

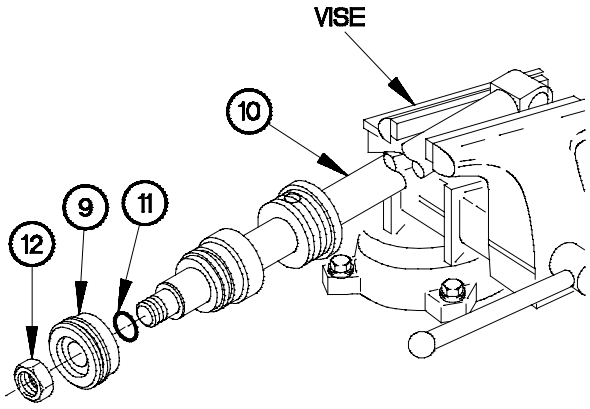
Use care when installing cylinder rod retainer to prevent damage to dust seal. Failure to comply may result in damage to equipment.

(6) Install cylinder rod retainer (2) on cylinder rod (10).

(7) Install bearing (7) on cylinder rod (10).



6104C041



6104C051

(8) Install preformed packing (11) on cylinder rod (10).

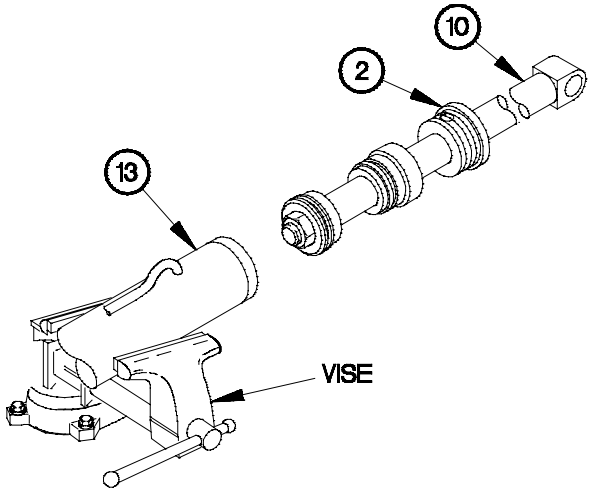
(9) Install piston (9) on cylinder rod (10).

(10) Position nut (12) on cylinder rod (10).

(11) Tighten nut (12) to 130-170 lb-ft (176-231 N·m).

(12) Position fold cylinder (13) in vise.

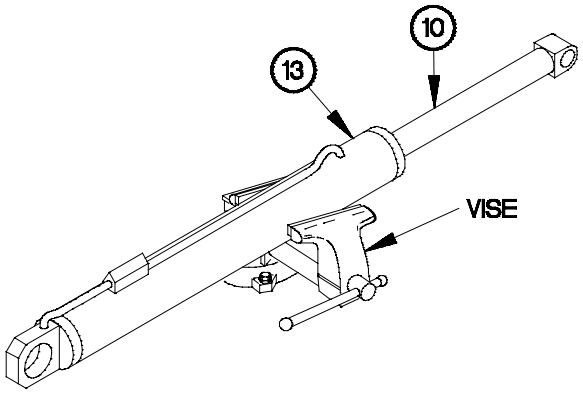
(13) Install cylinder rod (10) and cylinder rod retainer (2) in fold cylinder (13).



6104C061

25-4. M1089 FOLD CYLINDER REPAIR (CONT)

(14) Push cylinder rod (10) completely in fold cylinder (13).



End of Task.

25-5. M1089 TELESCOPIC LIFT CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

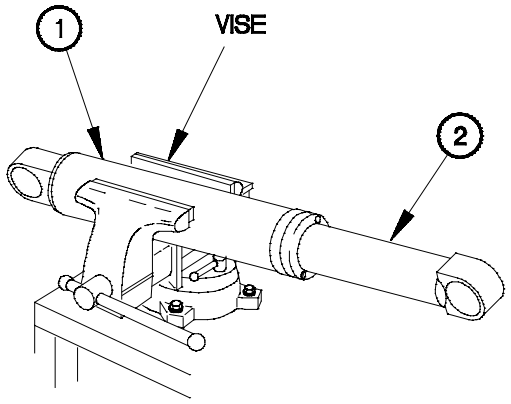
Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)
Vise, Machinists (Item 82, Appendix B)
Spanner Wrench Tool (Item 20, Appendix D)
Sling, Cargo (Item 56, Appendix B)

Materials/Parts
Tape, Antiseizing (Item 85, Appendix C)
Kit, Seal (Item 122, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)

Personnel Required
(2)

WARNING

Telescopic lift cylinder weighs approximately 180 lbs (89 kgs). Attach a suitable lifting device prior to repair. Failure to comply may result in injury to personnel or damage to equipment.



6105A011

a. Disassembly.

NOTE

Step (1) requires the aid of an assistant.

(1) Position telescopic lift cylinder (1) in vise.

(2) Place drain pan under telescopic lift cylinder (1).

(3) Extend inner cylinder rod (2) approximately 12 in. (31 cm).

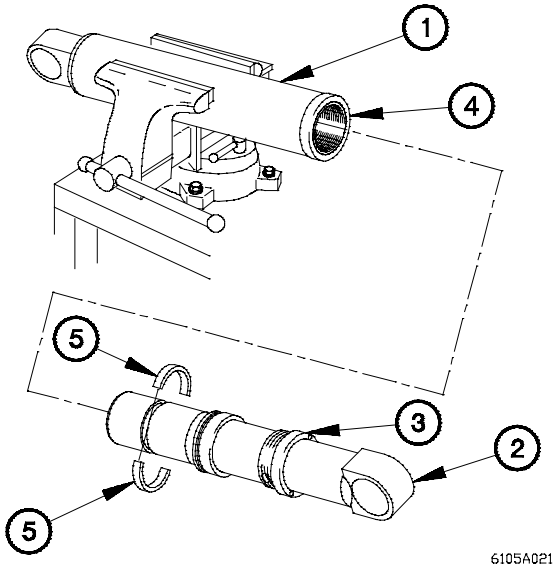
25-5. M1089 TELESCOPIC LIFT CYLINDER REPAIR (CONT)

(4) Unscrew inner cylinder rod retainer (3) from outer cylinder rod retainer (4).

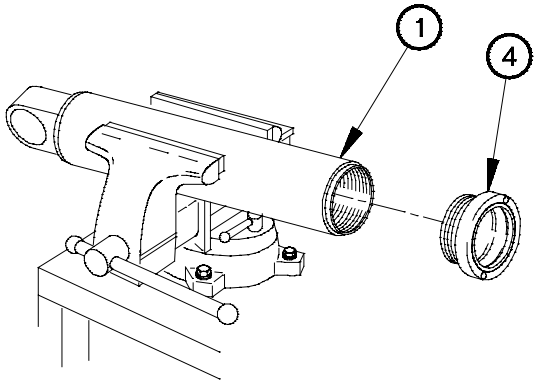
CAUTION

Piston rings may fall out when cylinder rod is removed. Use care when removing cylinder rod. Failure to comply may result in damage to equipment.

(5) Remove inner cylinder rod (2), inner cylinder rod retainer (3), and two piston rings (5) from telescopic lift cylinder (1).



6105A021

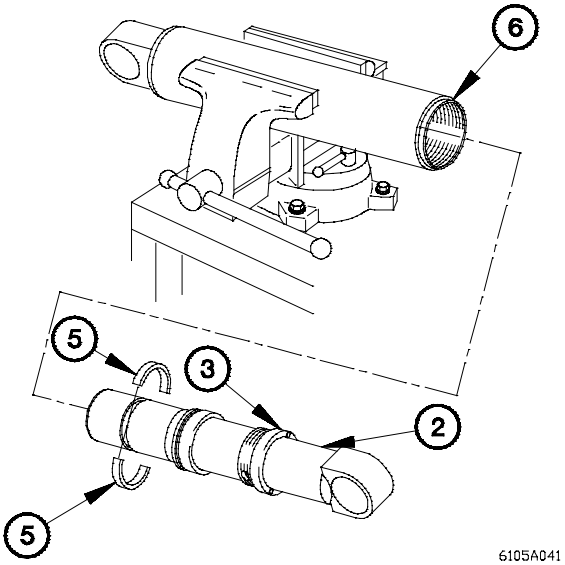


6105A031

(6) Remove outer cylinder rod retainer (4) from telescopic lift cylinder (1).

(7) Position inner cylinder rod (2), two piston rings (5), and inner cylinder rod retainer (3) in outer cylinder rod (6).

(8) Hand tighten inner cylinder rod retainer (3) approximately three turns.



6105A041

WARNING

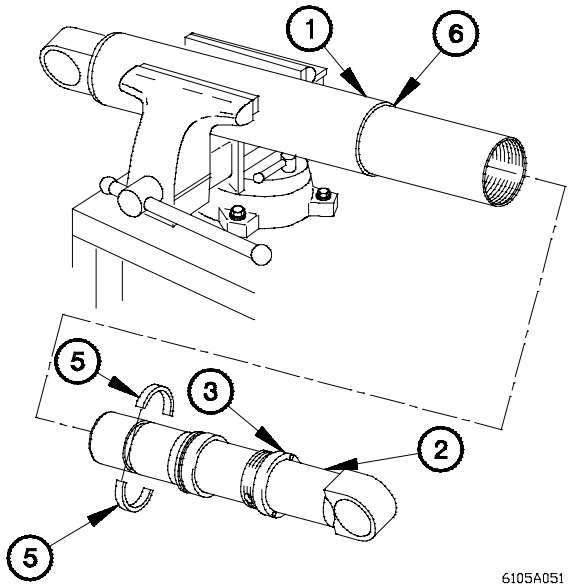
Both cylinder rods together weigh approximately 65 lbs (88 kgs). Do not remove both cylinder rods together. Failure to comply may result in injury to personnel or damage to equipment.

(9) Use inner cylinder rod (2) to break outer cylinder rod (6) free from telescopic lift cylinder (1).

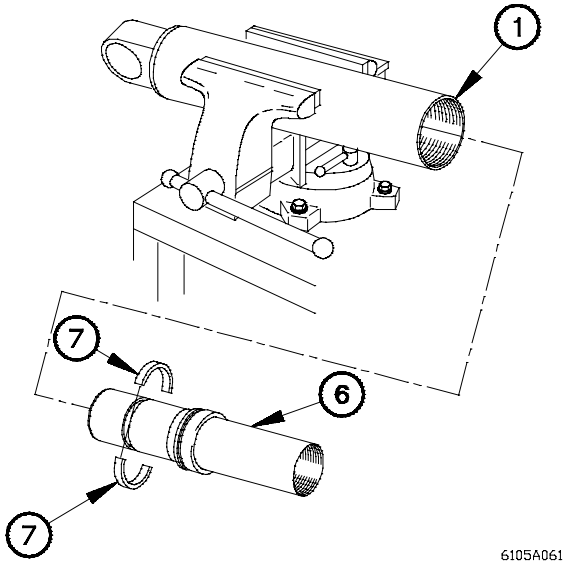
CAUTION

Piston rings may fall out when cylinder rod is removed. Use care when removing cylinder rod to prevent damage to piston. Failure to comply may result in damage to equipment.

(10) Remove inner cylinder rod (2), two piston rings (5), and inner cylinder rod retainer (3) from outer cylinder rod (6).



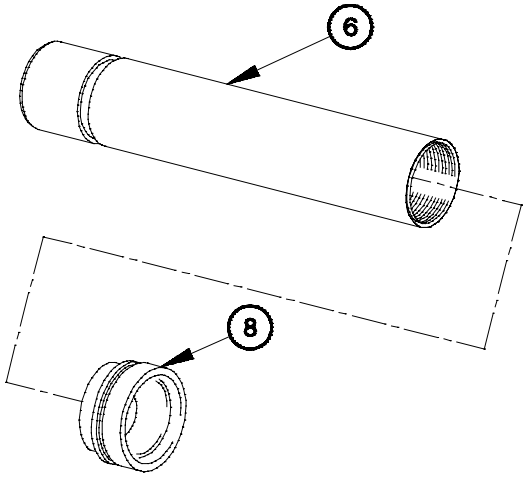
6105A051



6105A061

(11) Remove outer cylinder rod (6) and two piston rings (7) from telescopic lift cylinder (1).

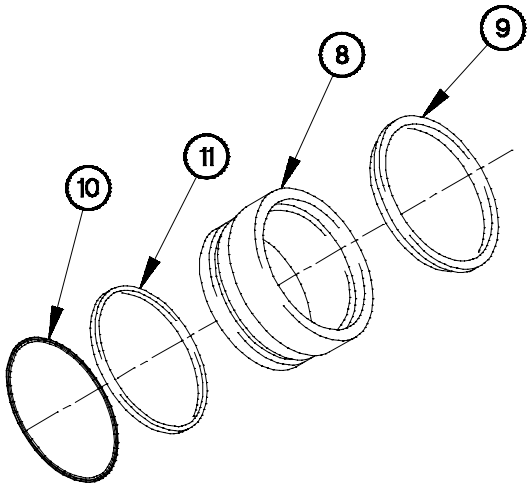
(12) Remove bearing (8) from outer cylinder rod (6).



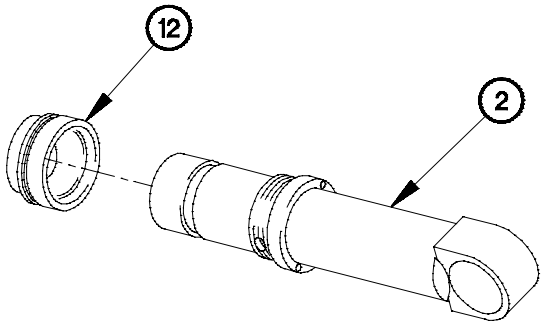
6105A071

25-5. M1089 TELESCOPIC LIFT CYLINDER REPAIR (CONT)

(13) Remove seal (9), preformed packing (10), and back-up ring (11) from bearing (8). Discard seal, preformed packing, and back-up ring.



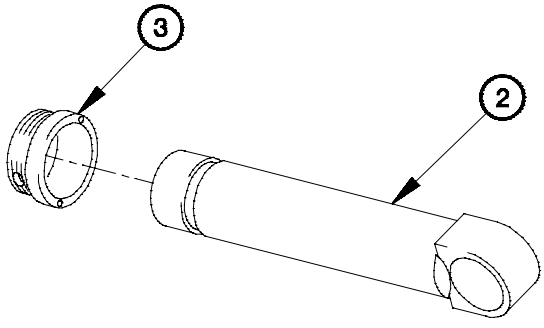
6105A081



(14) Remove bearing (12) from inner cylinder rod (2).

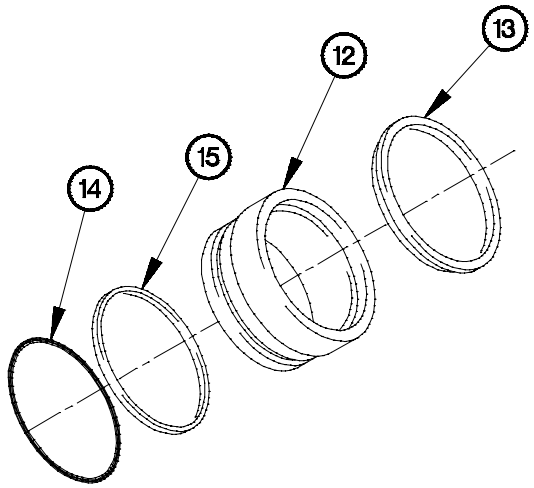
6105A091

(15) Remove inner cylinder rod retainer (3) from inner cylinder rod (2).

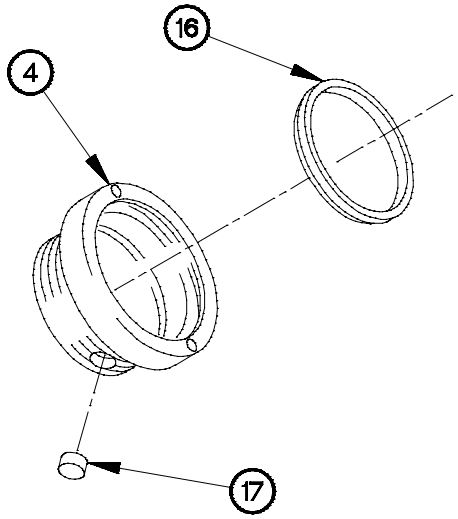


6105A101

(16) Remove seal (13), preformed packing (14), and back-up ring (15) from bearing (12). Discard seal, preformed packing, and back-up ring.



6105A111



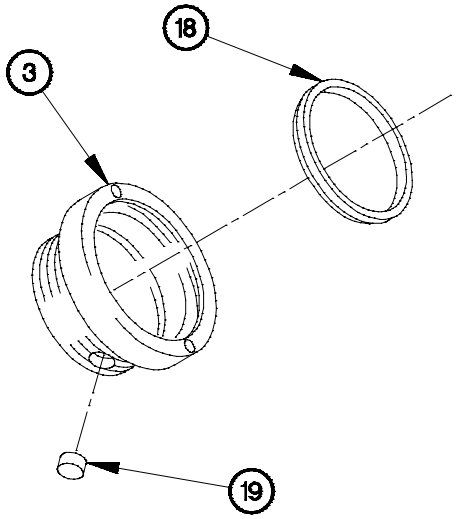
6105A121

(17) Remove dust seal (16) from outer cylinder rod retainer (4). Discard dust seal.

(18) Remove nylon plug (17) from outer cylinder rod retainer (4). Discard nylon plug.

(19) Remove dust seal (18) from inner cylinder rod retainer (3). Discard dust seal.

(20) Remove nylon plug (19) from inner cylinder rod retainer (3). Discard nylon plug.



6105A131

25-5. M1089 TELESCOPIC LIFT CYLINDER REPAIR (CONT)

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent 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 breath 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 138°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 all metal parts with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection.

(2) Inspect all metal parts for uneven wear, pitting, or nicks.

c. Assembly.

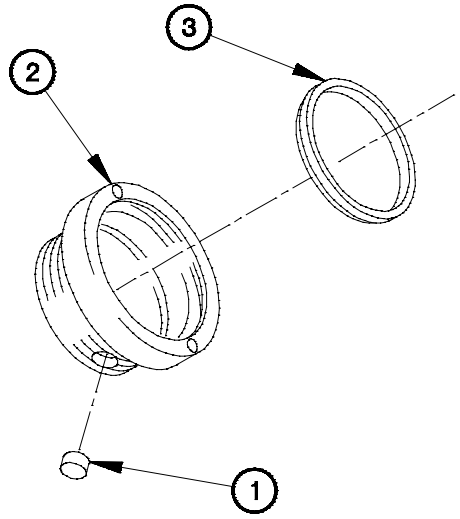
NOTE

Apply lubricating oil to all parts during assembly.

(1) Install nylon plug (1) in inner cylinder rod retainer (2).

(2) Trim nylon plug (1) even with threads of inner cylinder rod retainer (2).

(3) Install dust seal (3) in inner cylinder rod retainer (2).

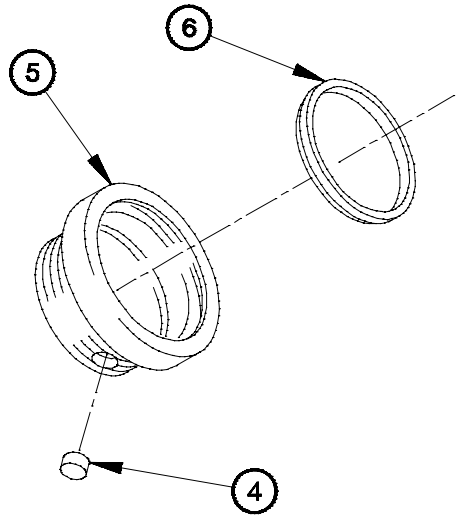


6105C011

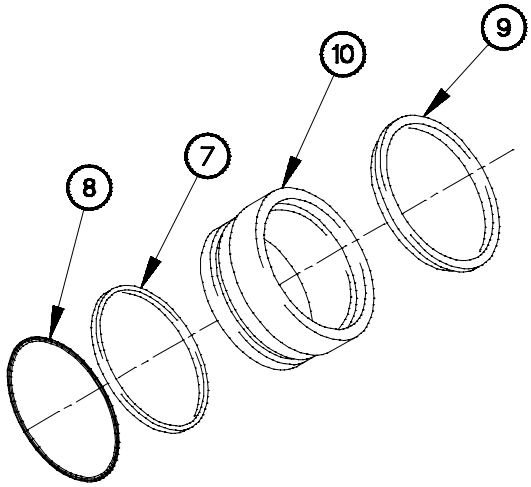
(4) Install nylon plug (4) in outer cylinder rod retainer (5).

(5) Trim nylon plug (4) even with threads of outer cylinder rod retainer (5).

(6) Install dust seal (6) in outer cylinder rod retainer (5).



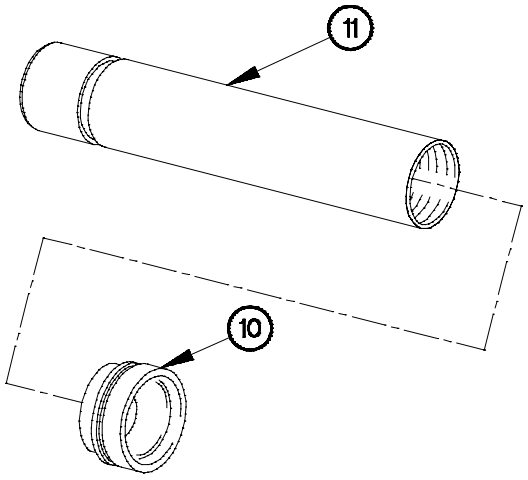
6105C021



6105C031

(7) Install back-up ring (7), preformed packing (8), and seal (9) on bearing (10).

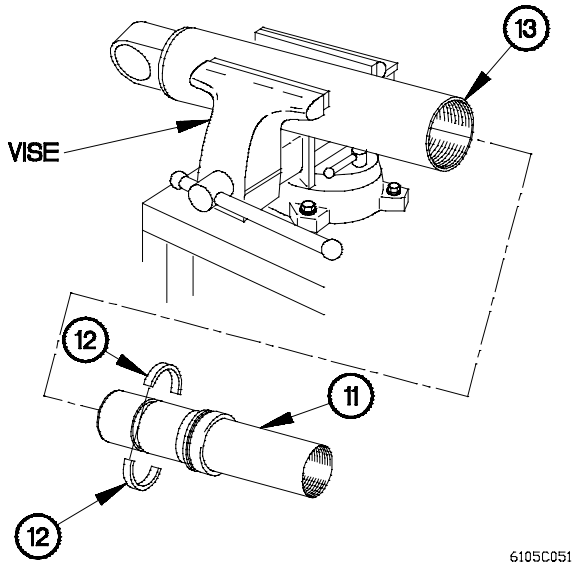
(8) Install bearing (10) on outer cylinder rod (11).



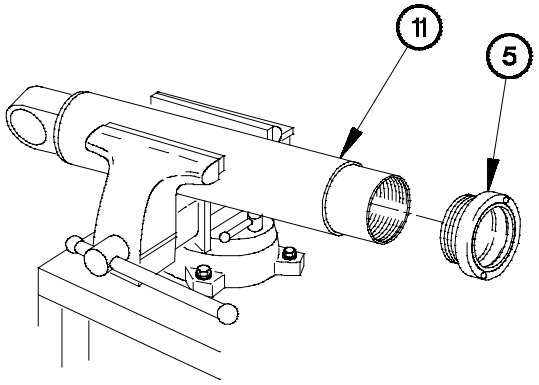
6105C041

25-5. M1089 TELESCOPIC LIFT CYLINDER REPAIR (CONT)

(9) Install outer cylinder rod (11) and two piston rings (12) in telescopic lift cylinder (13).



6105C051



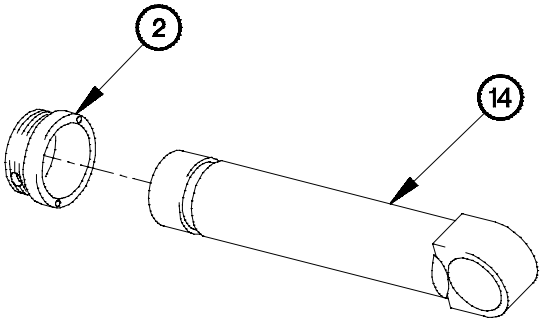
6105C061

CAUTION

Use care when installing outer cylinder rod retainer to prevent damage to dust seal. Failure to comply may result in damage to equipment.

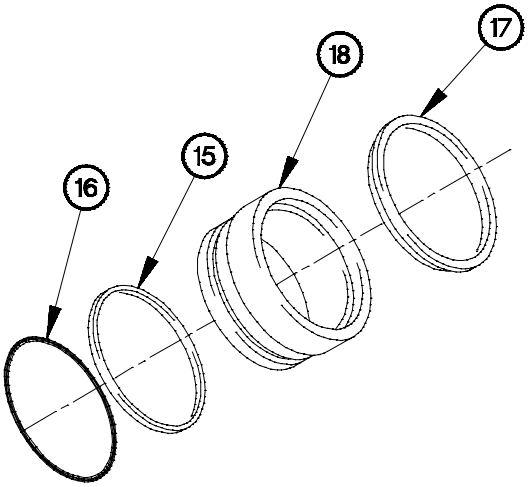
(10) Install outer cylinder rod retainer (5) on outer cylinder rod (11).

(11) Install inner cylinder rod retainer (2) on inner cylinder rod (14).

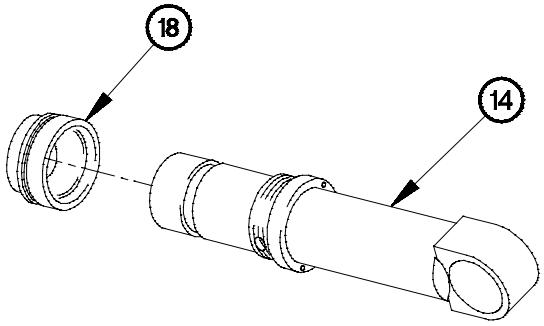


6105C071

(12) Install back-up ring (15), preformed packing (16), and seal (17) on bearing (18).



6105C081



(13) Install bearing (18) on inner cylinder rod (14).

6105C091

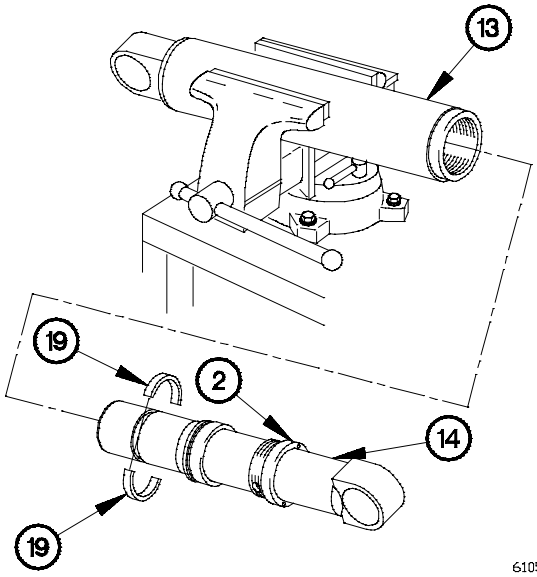
(14) Install inner cylinder rod (14), inner cylinder rod retainer (2), and two piston rings (19) in telescopic lift cylinder (13).

(15) Push inner cylinder rod (14) fully in telescopic lift cylinder (13).

NOTE

Step (16) requires the aid of an assistant.

(16) Remove telescopic lift cylinder (13) from vise.



6105C101

End of Task.

25-6. M1089 STIFFLEG CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket, (Item 85, Appendix B)
Socket Set, Socket Wrench (TM 9-2320-366-20)
Pan, Drain (Item 43, Appendix B)
Vise, Machinists (Item 82, Appendix B)

Tools and Special Tools (Cont)
Caps, Vise Jaw (Item 12, Appendix B)
Wrench, Spanner Tool (Item 20, Appendix D)

Materials/Parts
Kit, Seal (Item 125, Appendix F)
Parts Kit, Seal (Item 320, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)

a. Disassembly.

WARNING

There may be excess hydraulic pressure in stiffleg cylinder. Loosen plugs slowly before removing. Failure to comply may result in serious injury to personnel.

(1) Position stiffleg cylinder (1) in vise.

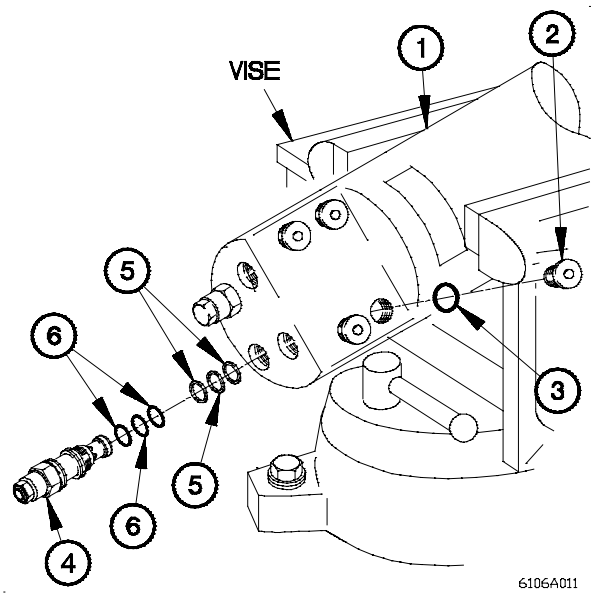
(2) Place drain pan under stiffleg cylinder (1).

(3) Remove four plugs (2) from stiffleg cylinder (1).

(4) Remove four preformed packings (3) from plugs (2). Discard preformed packings.

(5) Remove two counterbalance valves (4) from stiffleg cylinder (1).

(6) Remove three preformed packings (5) and back-up rings (6) from two counterbalance valves (4). Discard preformed packings and back-up rings.

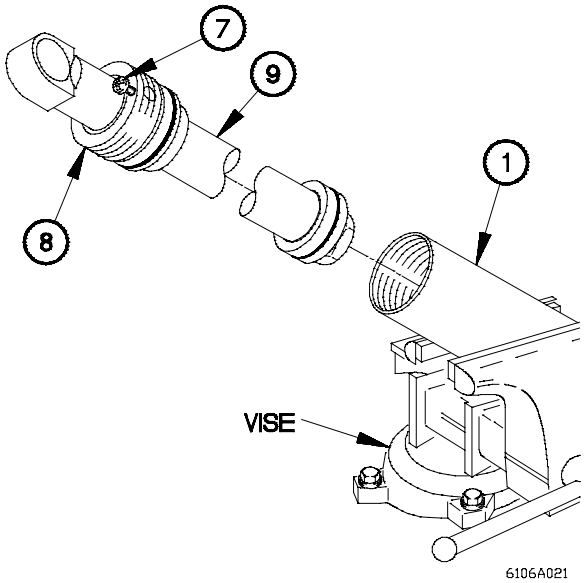


(7) Loosen screw (7) in cylinder rod retainer (8).

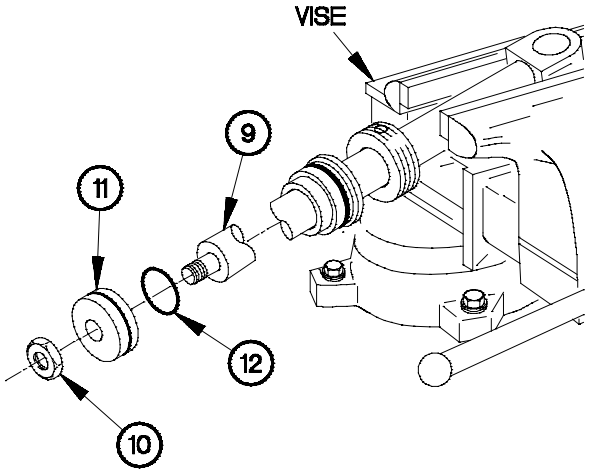
(8) Unscrew cylinder rod retainer (8) from stiffleg cylinder (1).

(9) Remove cylinder rod (9) and cylinder rod retainer (8) from stiffleg cylinder (1).

(10) Remove stiffleg cylinder (1) from vise.



6106A021



6106A031

(11) Position cylinder rod (9) in vise with eye of cylinder rod between vise jaws.

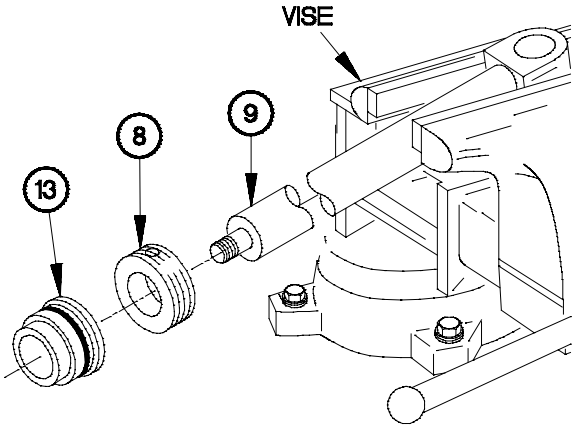
(12) Remove nut (10) from cylinder rod (9).

(13) Remove piston (11) from cylinder rod (9).

(14) Remove preformed packing (12) from piston (11). Discard preformed packing.

(15) Remove bearing (13) from cylinder rod (9).

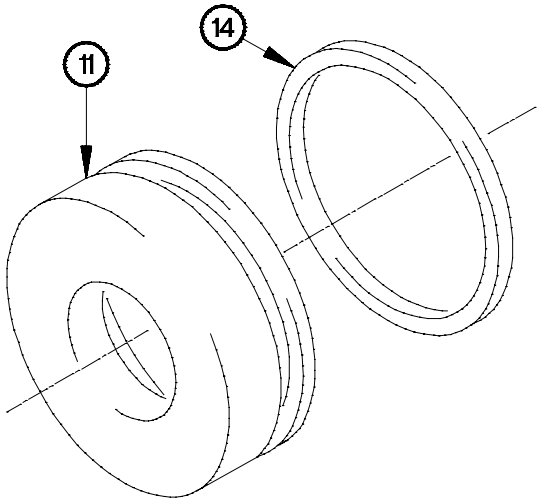
(16) Remove cylinder rod retainer (8) from cylinder rod (9).



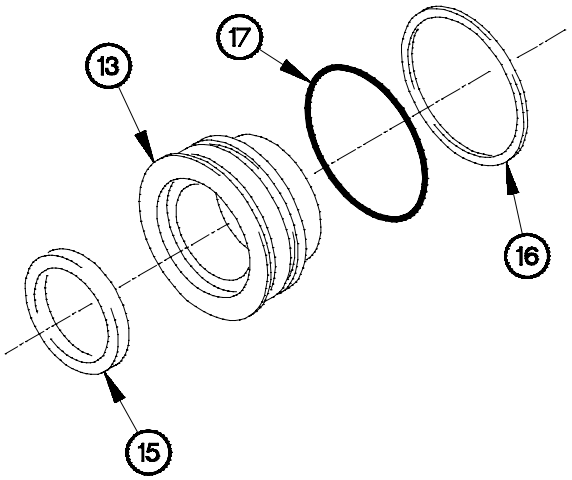
6106A041

25-6. M1089 STIFFLEG CYLINDER REPAIR (CONT)

(17) Remove seal (14) from piston (11). Discard seal.



6106A051

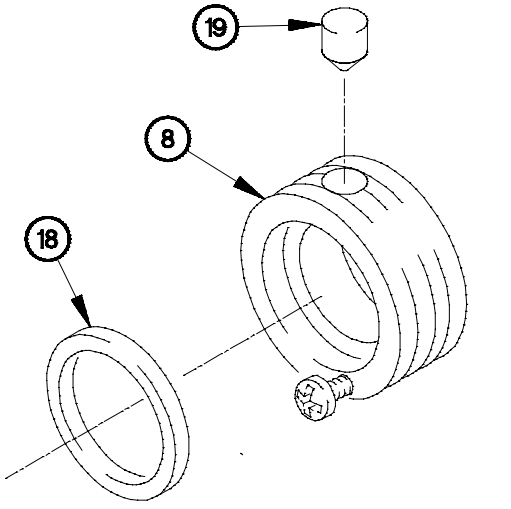


6106A061

(18) Remove seal (15), back-up ring (16), and preformed packing (17) from bearing (13). Discard seal, preformed packing, and back-up ring.

(19) Remove dust seal (18) from cylinder rod retainer (8). Discard dust seal.

(20) Remove nylon plug (19) from cylinder rod retainer (8). Discard nylon plug.



6106A071

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 all metal parts thoroughly with dry cleaning solvent.

NOTE

Replace any part that fails visual inspection.

(2) Inspect all metal parts for uneven wear, pitting, or nicks.

c. Assembly.

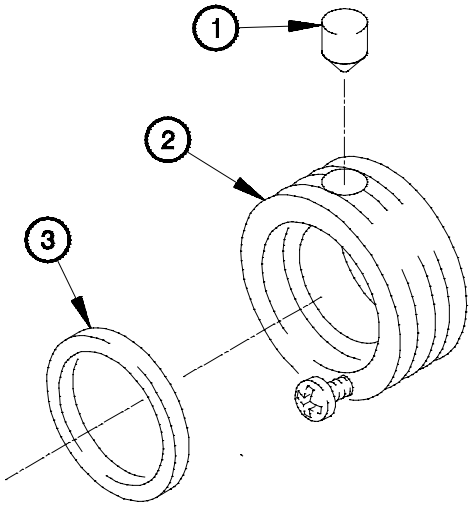
NOTE

Apply lubricating oil to parts during assembly.

(1) Install nylon plug (1) in cylinder rod retainer (2).

(2) Trim nylon plug (1) even with threads of cylinder rod retainer (2).

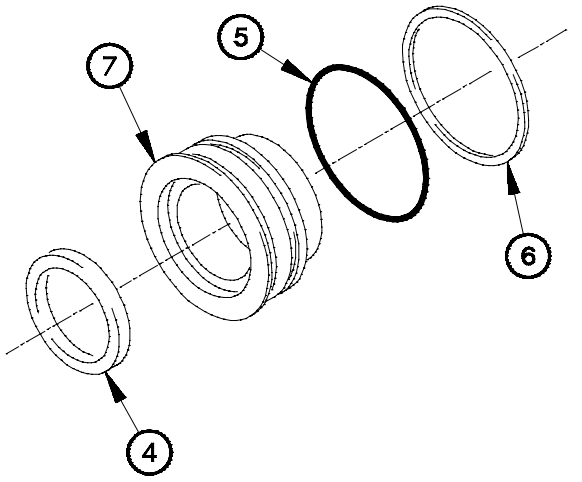
(3) Install dust seal (3) in cylinder rod retainer (2).



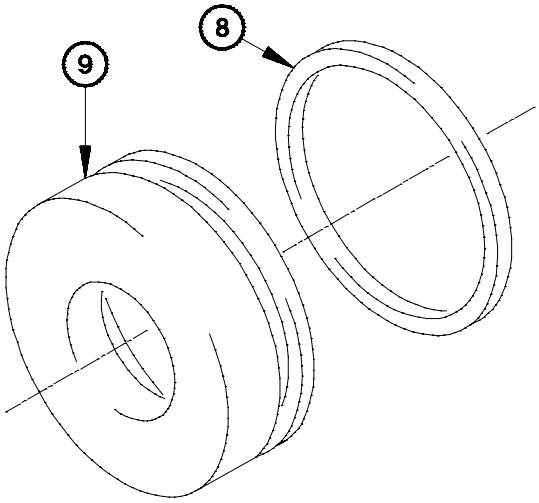
6106C011

25-6. M1089 STIFFLEG CYLINDER REPAIR (CONT)

(4) Install seal (4), preformed packing (5), and back-up ring (6) on bearing (7).



6106C021



6106C031

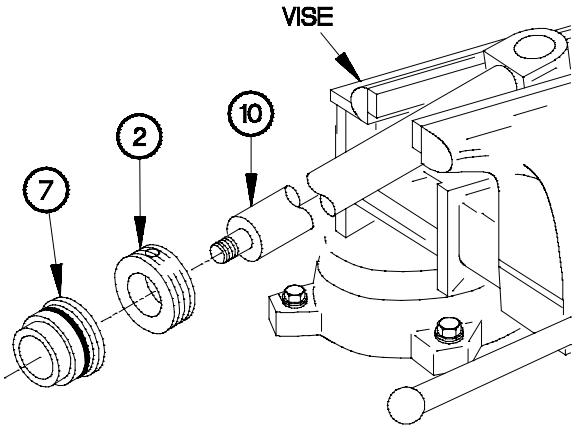
(5) Install seal (8) on piston (9).

CAUTION

Use care when installing cylinder rod retainer to prevent damage to dust seal. Failure to comply may result in damage to equipment.

(6) Install cylinder rod retainer (2) on cylinder rod (10).

(7) Install bearing (7) on cylinder rod (10).



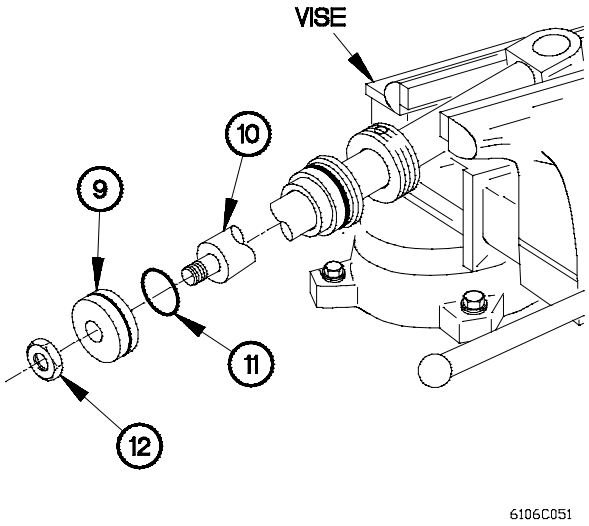
6106C041

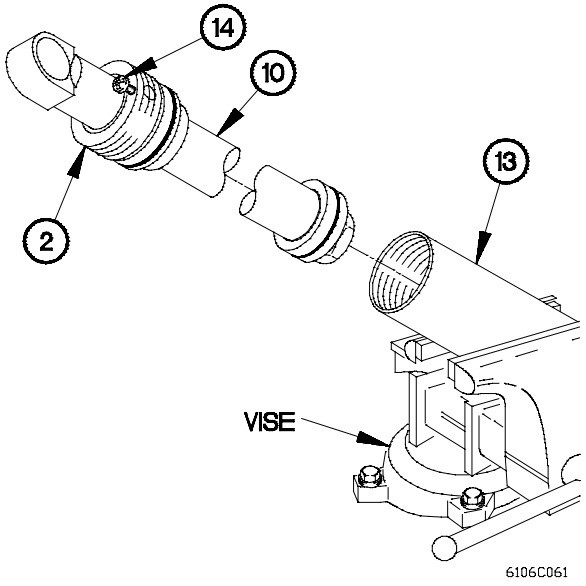
(8) Install preformed packing (11) in piston (9).

(9) Install piston (9) on cylinder rod (10).

(10) Position nut (12) on cylinder rod (10).

(11) Tighten nut (12) to 195-265 lb-ft (264-359 N·m).





(12) Install cylinder rod (10) in stiffleg cylinder (13).

(13) Tighten screw (14) to 35-45 lb-in. (4-5 N·m).

(14) Push cylinder rod (10) fully into stiffleg cylinder (13).

(15) Screw cylinder rod (10) into stiffleg cylinder (13).

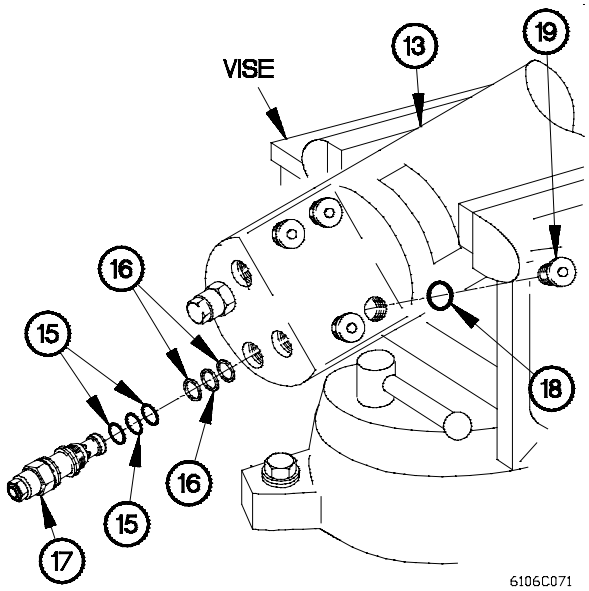
(16) Install three preformed packings (15) and back-up rings (16) on two counterbalance valves (17).

(17) Position two counterbalance valves (17) in stiffleg cylinder (13).

(18) Tighten counterbalance valves (17) to 30-35 lb-ft (41-48 N·m).

(19) Install four preformed packings (18) on plugs (19).

(20) Install four plugs (19) in stiffleg cylinder (13).



End of Task.

CHAPTER 26
MATERIAL HANDLING CRANES (MHC) AND UNDERLIFT MAINTENANCE

Section I. INTRODUCTION 26-1
26-1. INTRODUCTION 26-1

Section II. MAINTENANCE PROCEDURES 26-2
26-2. M1089 THREE STAGE HYDRAULIC PUMP REPAIR 26-2
26-3. M1084/M1086 SWING DRIVE HYDRAULIC MOTOR REPAIR 26-13
26-4. M1089 SWING DRIVE HYDRAULIC MOTOR REPAIR 26-19
26-5. M1084/M1086/M1089 HOIST HYDRAULIC MOTOR REPAIR 26-26
26-6. M1084/M1086/M1089 OIL FILLED DISC BRAKE ASSEMBLY REPAIR 26-33
26-7. M1084/M1086 LIFT CYLINDER REPAIR 26-40
26-8. M1084/M1086 ERECTION CYLINDER REPAIR 26-46
26-9. M1089 ERECTION CYLINDER REPAIR 26-53
26-10. M1084/M1086 BOOM TELESCOPIC CYLINDER REPAIR 26-61
26-11. M1089 BOOM TELESCOPIC CYLINDER REPAIR 26-67
26-12. JACK CYLINDER REPAIR 26-73
26-13. M1089 OUTRIGGER EXTENSION CYLINDER REPAIR 26-79

Section I. INTRODUCTION

26-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Material Handling Crane (MHC) and Underlift Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

26-2. M1089 THREE STAGE HYDRAULIC PUMP REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb ft (Item 97, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Puller, Mechanical (Item 52, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)

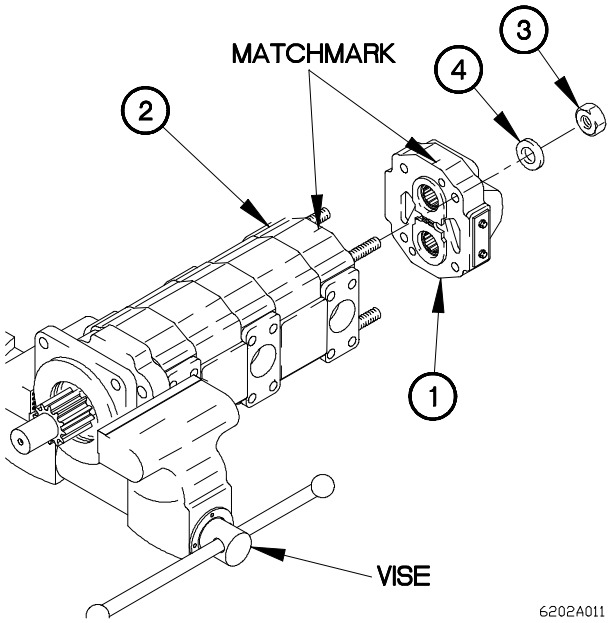
Tools and Special Tools (Cont)
Wrench Set, Socket (Item 87, Appendix B)

Materials/Parts
Seal (36) (Item 369, Appendix F)
Seal, Plain (6) (Item 383, Appendix F)
Plug, Machine Thread (Item 342, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Adhesive (Item 4, Appendix C)

a. Disassembly.

CAUTION

- When removing sections of pump, use care not to damage machined surfaces. Failure to comply may result in damage to equipment.
- Gears are matched as sets. Keep sets together during disassembly. Failure to comply may result in damage to equipment.
- Pump sections must be installed in the same way they are removed. Match mark all sections to insure correct assembly. Failure to comply may result in damage to



(1) Position pump in vise.

(2) Match mark port end cover (1) to third stage gear housing (2).

NOTE

Hydraulic pumps manufactured prior to February 2001 will have one washer and nut on four corners of port end cover.

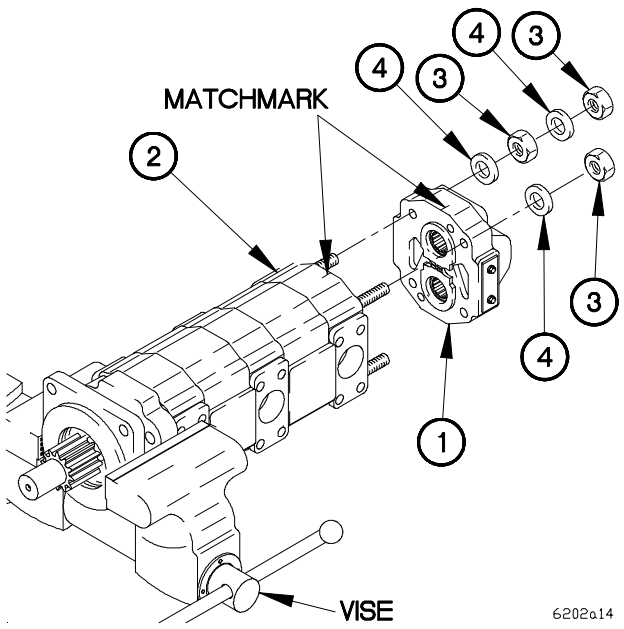
(3) Remove four nuts (3), washers (4) and port end cover (1) from third stage gear housing (2).

NOTE

- Hydraulic pumps manufactured after February 2001 will have two additional washers and nuts on one side of port end cover.
- Note side of pump with extra hardcovers prior to removal.

(3.1) Remove two nuts (3) and washers (4) from port end cover.

(3.2) Remove four nuts (3), washers (4), and port end cover (1) from third stage gear housing (2).

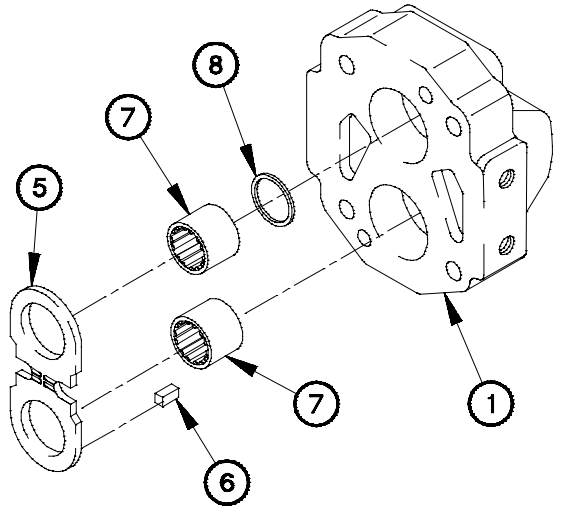


(4) Remove thrust plate (5) from port end cover (1).

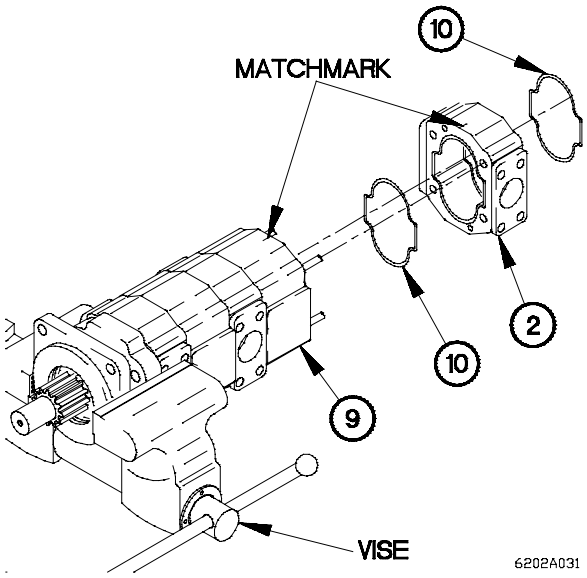
(5) Remove six seals (6) from thrust plate (5). Discard seals.

(6) Remove two roller bearings (7) from port end cover (1).

(7) Remove ring seal (8) from port end cover (1).



6202A021



6202A031

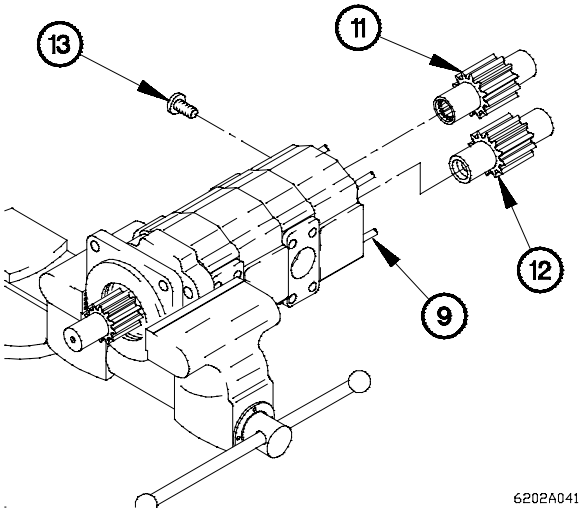
(8) Match mark third stage gear housing (2) to second and third stage bearing carrier (9).

(9) Remove third stage gear housing (2) from second and third stage bearing carrier (9).

(10) Remove two gasket seals (10) from third stage gear housing (2). Discard gasket seals.

(11) Remove drive gear (11) and driven gear (12) from second and third stage bearing carrier (9).

(12) Remove pressure port plug (13) from second and third stage bearing carrier (9). Discard pressure port plug.



6202A041

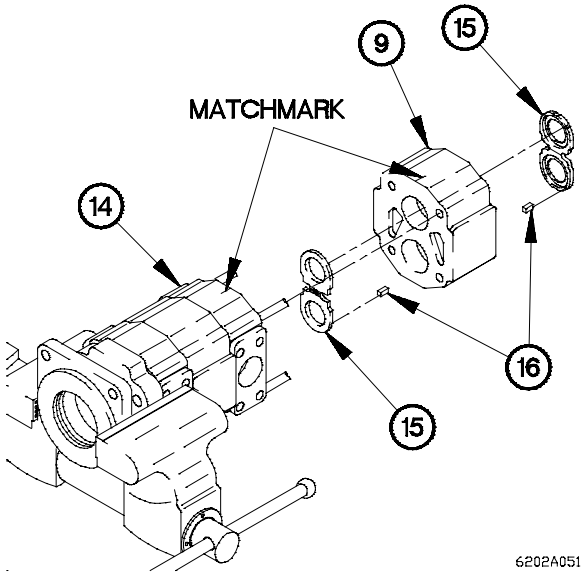
26-2. M1089 THREE STAGE HYDRAULIC PUMP REPAIR (CONT)

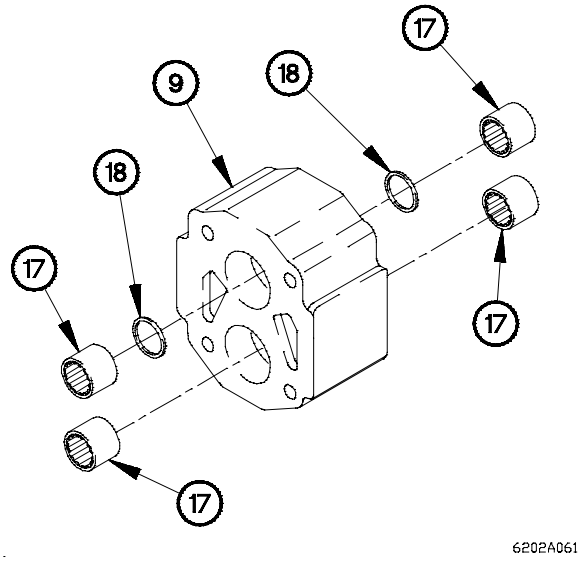
(13) Match mark second and third stage bearing carrier (9) to second stage gear housing (14).

(14) Remove second and third stage bearing carrier (9) from second stage gear housing (14).

(15) Remove two thrust plates (15) from second and third stage bearing carrier (9).

(16) Remove 12 seals (16) from two thrust plates (15). Discard seals.





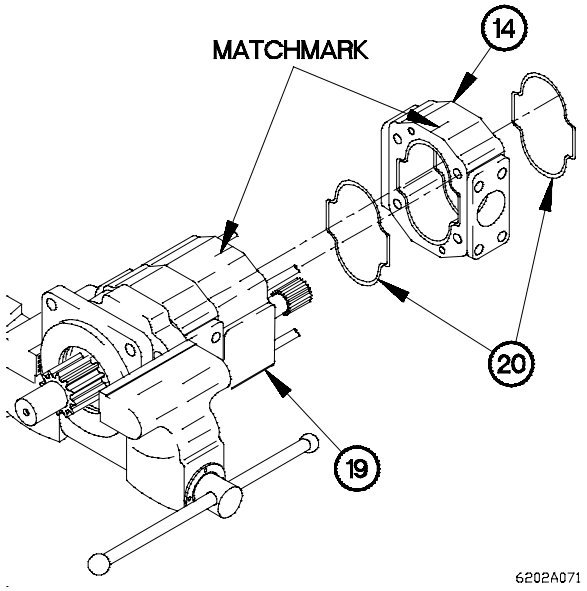
(17) Remove four roller bearings (17) from second and third stage bearing carrier (9).

(18) Remove two ring seals (18) from second and third stage bearing carrier (9).

(19) Match mark second stage gear housing (14) to second stage bearing carrier (19).

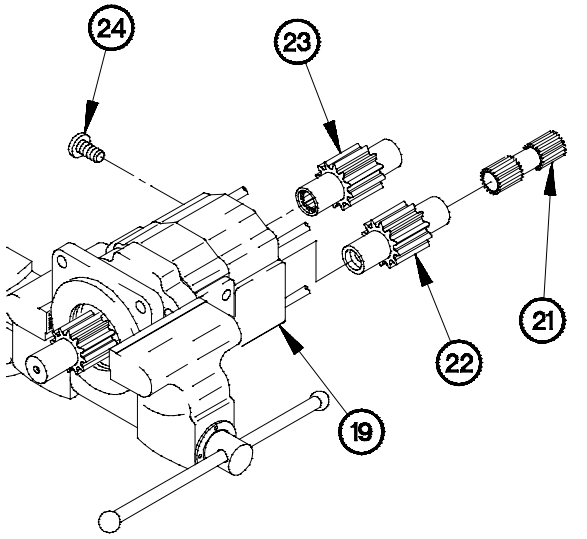
(20) Remove second stage gear housing (14) from first and second stage bearing carrier (19).

(21) Remove two gasket seals (20) from second stage gear housing (19). Discard gasket seals.

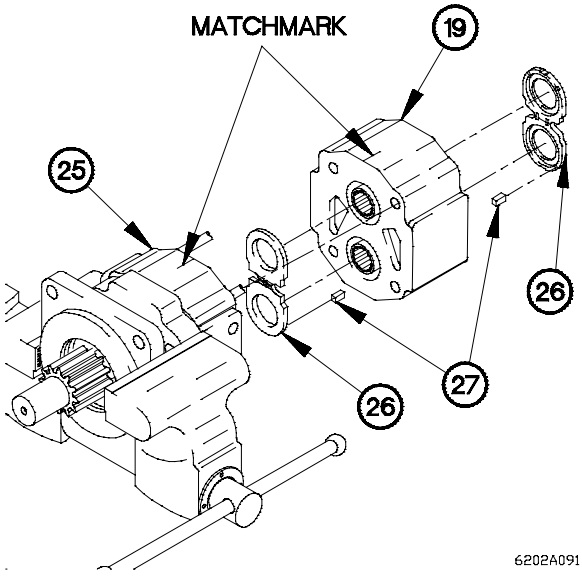


(22) Remove connecting shaft (21), driven gear (22) and drive gear (23) from first and second stage bearing carrier (19).

(23) Remove pressure port plug (24) from first and second stage bearing carrier (19). Discard pressure port plug.



6202A081



6202A091

(24) Match mark first and second stage bearing carrier (19) to first stage gear housing (25).

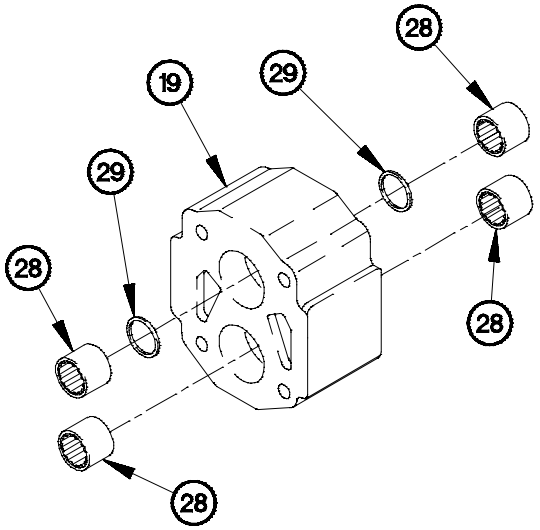
(25) Remove first and second stage bearing carrier (19) from first stage gear housing (25).

(26) Remove two thrust plates (26) from first and second stage bearing carrier (19).

(27) Remove 12 seals (27) from two thrust plates (26). Discard seals.

(28) Remove four roller bearings (28) from first and second stage bearing carrier (19).

(29) Remove two ring seals (29) from first and second stage bearing carrier (19).



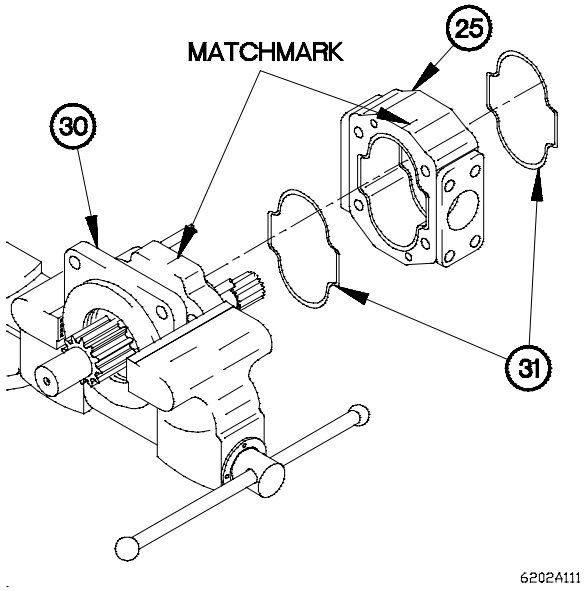
6202A101

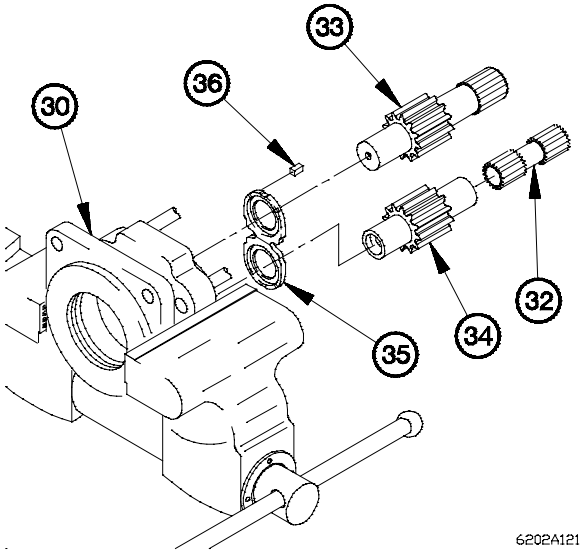
26-2. M1089 THREE STAGE HYDRAULIC PUMP REPAIR (CONT)

(30) Match mark first stage gear housing (25) to shaft end cover (30).

(31) Remove first stage gear housing (25) from end cover (30).

(32) Remove two gasket seals (31) from gear housing (25). Discard gasket seals.





(33) Remove connecting shaft (32), driven shaft (33), and drive shaft (34).

(34) Remove thrust plate (35) from shaft end cover (30).

(35) Remove six seals (36) from thrust plate (35). Discard seals.

(36) Remove two roller bearings (37) from shaft end cover (30).

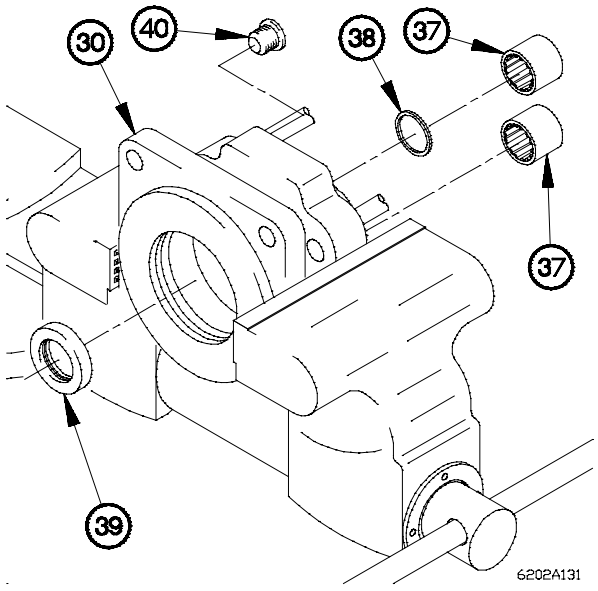
(37) Remove ring seal (38) from shaft end cover (30). Discard ring seal.

(38) Remove seal (39) from shaft end cover (30). Discard seal.

CAUTION

Mark location of plug prior to removal. Failure to comply may result in damage to equipment.

(39) Remove plug (40) from shaft end cover (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 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 all metal parts with dry cleaning solvent.

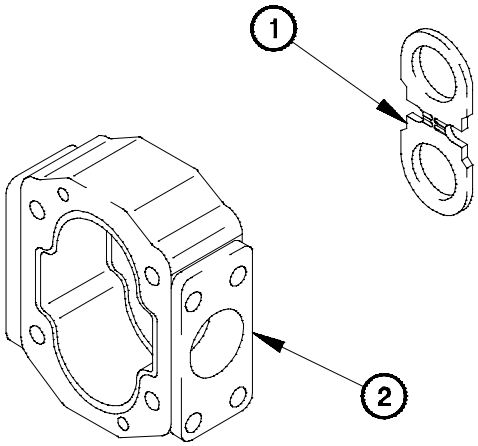
NOTE

Replace any part that fails visual inspection or size measurement requirements.

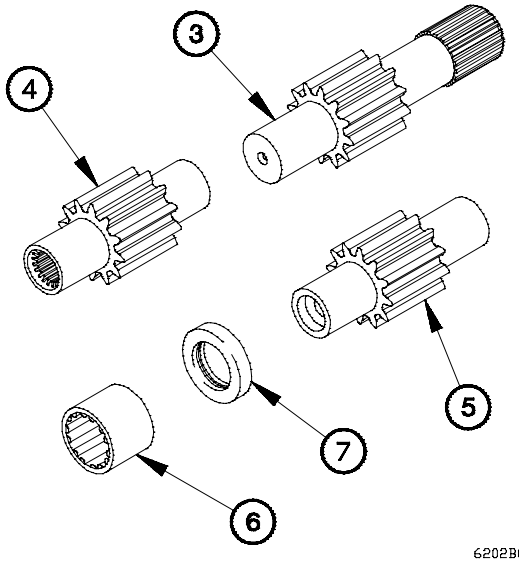
(2) Inspect six thrust plates (1) for scoring, corrosion, pitting, or discoloration.

(3) Inspect machined surface of the first, second, and third stage gear housings (2) for scoring, corrosion, pitting, or discoloration.

(4) Place a straight edge along bore of each gear housing (2) walls. Maximum wear 0.005 in. (0.01 cm).



6202B011



6202B021

(5) Inspect driven shaft (3), drive gears (4) and driven gears (5) for scoring, grooving, burring or nicks on teeth surfaces. Replace gears as a set.

(6) Inspect roller bearings (6) for scoring, corrosion, pitting, or discoloration.

(7) Inspect ring seal (7) for scoring, corrosion, pitting, or discoloration.

26-2. M1089 THREE STAGE HYDRAULIC PUMP REPAIR (CONT)

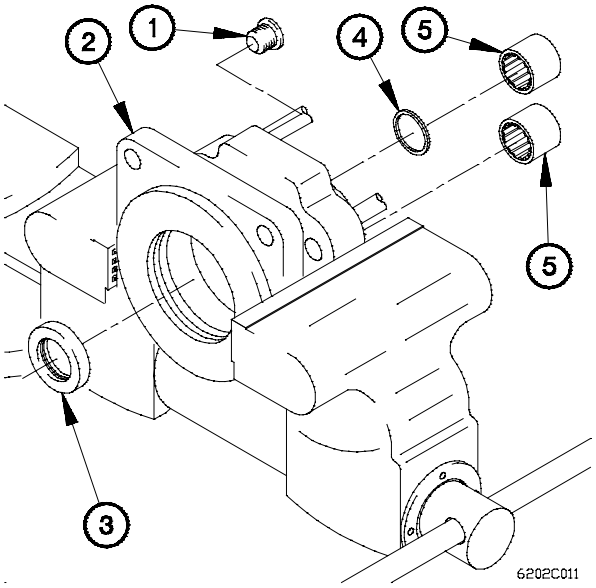
c. Assembly.

CAUTION

Plug must be installed in location marked during removal. Failure to comply may result in damage to equipment.

NOTE

Lubricate all parts with hydraulic fluid during assembly.

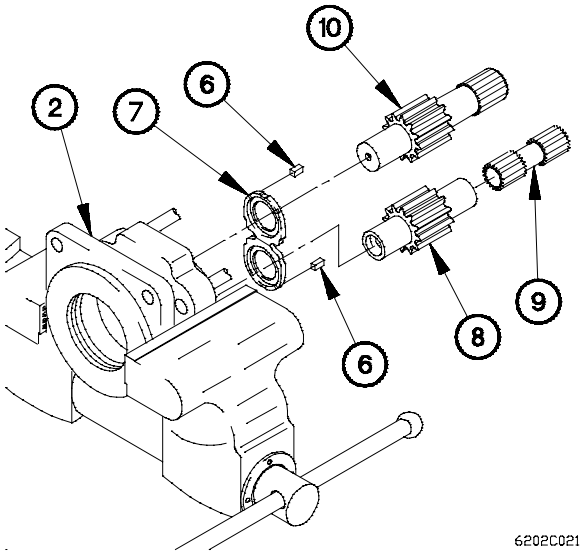


(1) Install plug (1) in shaft end cover (2).

(2) Install seal (3) in shaft end cover (2).

(3) Install ring seal (4) in shaft end cover (2).

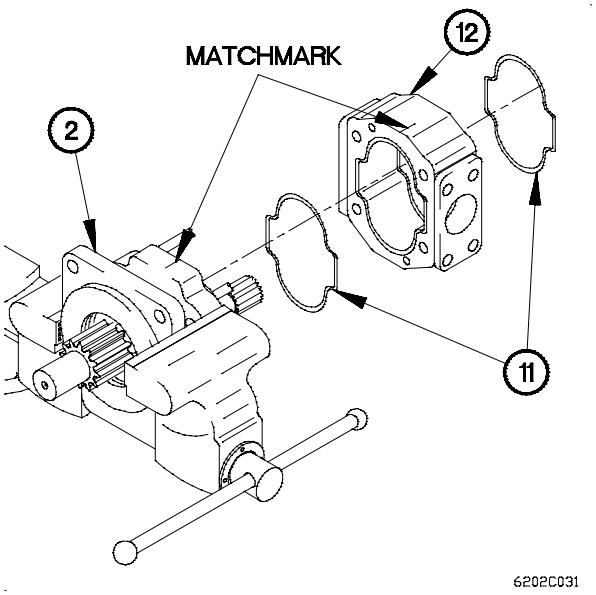
(4) Install two roller bearings (5) in shaft end cover (2).



(5) Install six seals (6) on thrust plate (7).

(6) Install thrust plate (7) on shaft end cover (2).

(7) Install drive shaft (8), connecting shaft (9), and driven shaft (10) in shaft end cover (2).

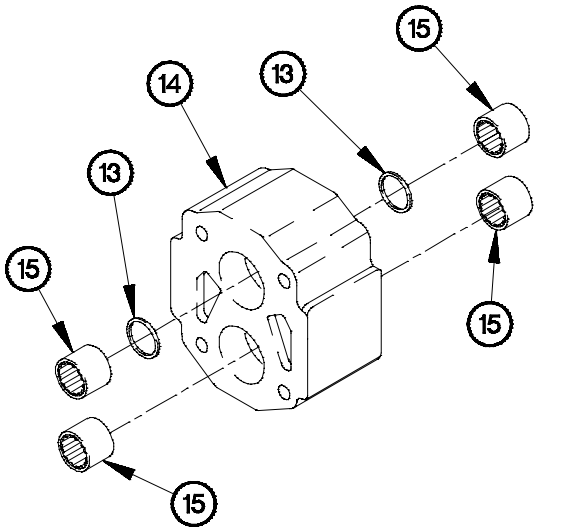


(8) Install two gasket seals (11) on first stage gear housing (12).

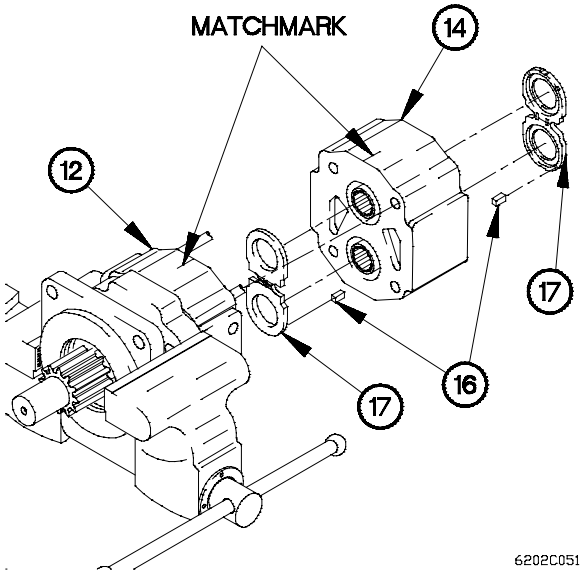
(9) Install first stage gear housing (12) on shaft end cover (2) with matchmarks aligned.

(10) Install two ring seals (13) in first and second stage bearing carrier (14).

(11) Install four roller bearings (15) in first and second stage bearing carrier (14).



6202C041



6202C051

(12) Install 12 seals (16) in two thrust plates (17).

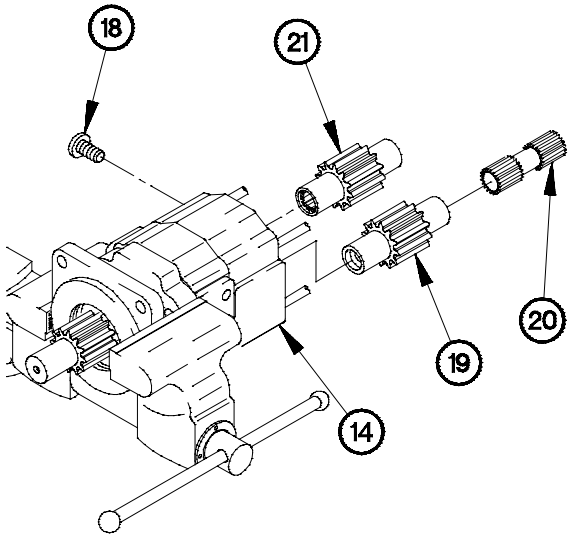
(13) Install thrust plates (17) on first and second stage bearing carrier (14).

(14) Install first and second stage bearing carrier (14) on first stage gear housing (12) with matchmarks aligned.

(15) Position pressure port plug (18) in first and second stage bearing carrier (14).

(16) Tighten pressure port plug (18) to 140 lb-in. (16 N·m).

(17) Install drive gear (19), connecting shaft (20), and driven gear (21) in first and second stage bearing carrier (14).

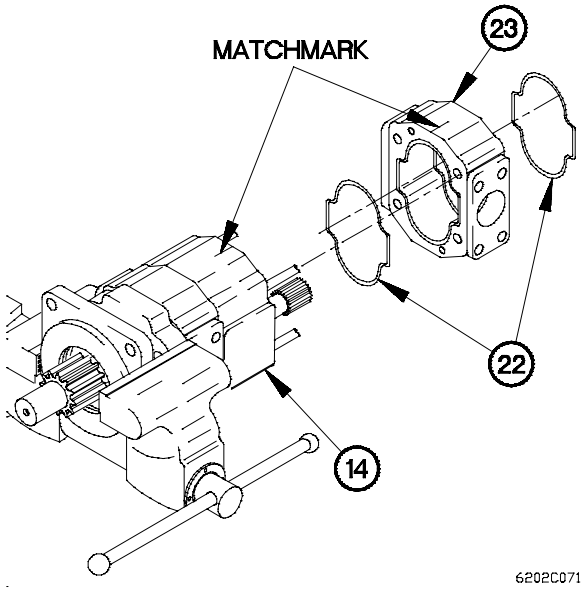


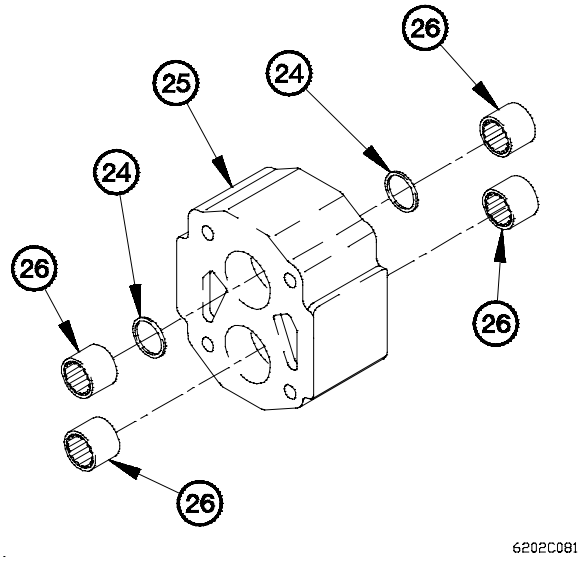
6202C061

26-2. M1089 THREE STAGE HYDRAULIC PUMP REPAIR (CONT)

(18) Install two gasket seals (22) on second stage gear housing (23).

(19) Install second stage gear housing (23) on first and second stage bearing carrier (14) with matchmarks aligned.





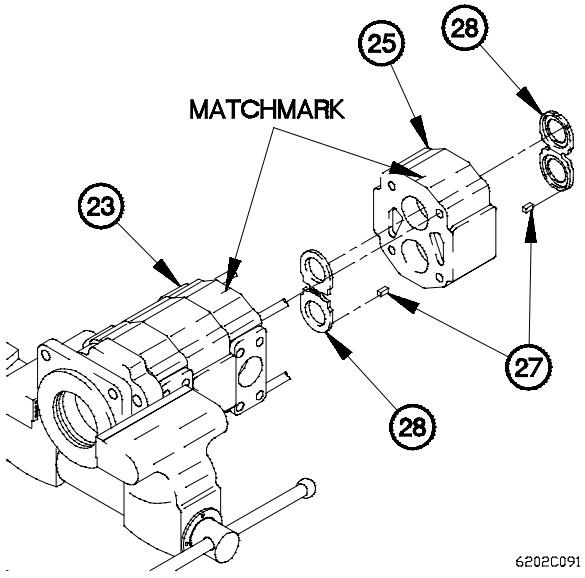
(20) Install two ring seals (24) on second and third stage bearing carrier (25).

(21) Install four roller bearings (26) in second and third stage bearing carrier (25).

(22) Install 12 seals (27) on two thrust plates (28).

(23) Install thrust plates (28) on second and third stage bearing carrier (25).

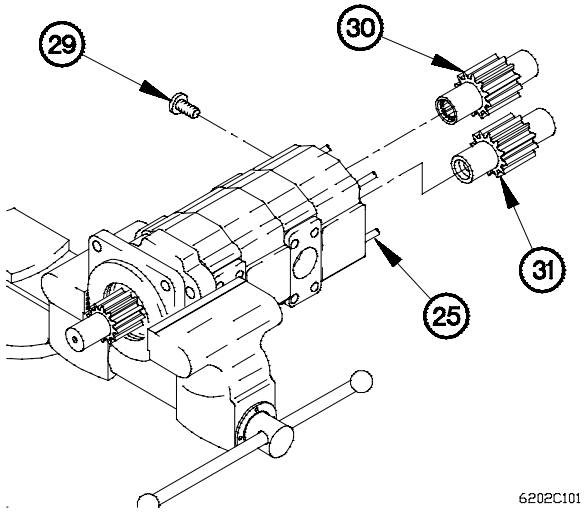
(24) Install second and third stage bearing carrier (25) on second stage gear housing (23) with matchmarks aligned.

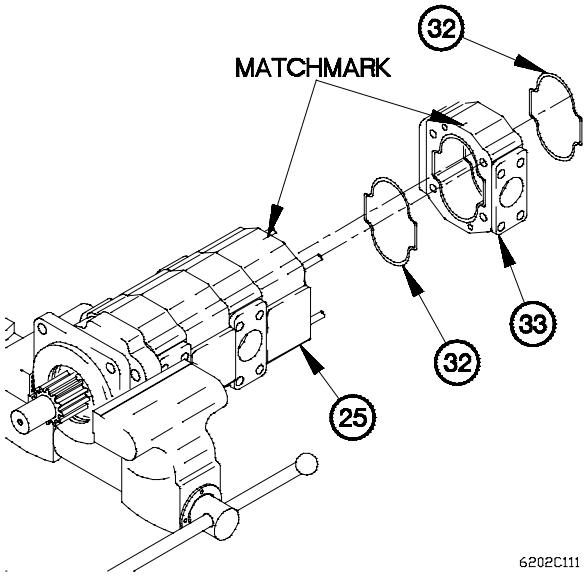


(25) Position pressure port plug (29) in second and third stage bearing carrier (25).

(26) Tighten pressure port plug (29) to 140 lb-in. (16 N·m).

(27) Install drive gear (30) and driven gear (31) in second and third stage bearing carrier (25).





(28) Install two gasket seals (32) on third stage gear housing (33).

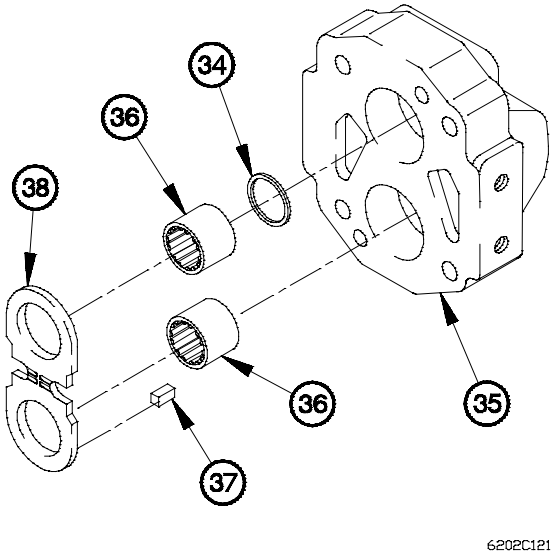
(29) Install third stage gear housing (33) on second and third stage bearing carrier (25) with matchmarks aligned.

(30) Install ring seal (34) on port end cover (35).

(31) Install two roller bearings (36) in port end cover (35).

(32) Install six seals (37) in thrust plate (38).

(33) Install thrust plate (38) in port end cover (35).



26-2. M1089 THREE STAGE HYDRAULIC PUMP REPAIR (CONT)

(34) Install port end cover (35) on third stage gear housing (33) with matchmarks aligned.

NOTE

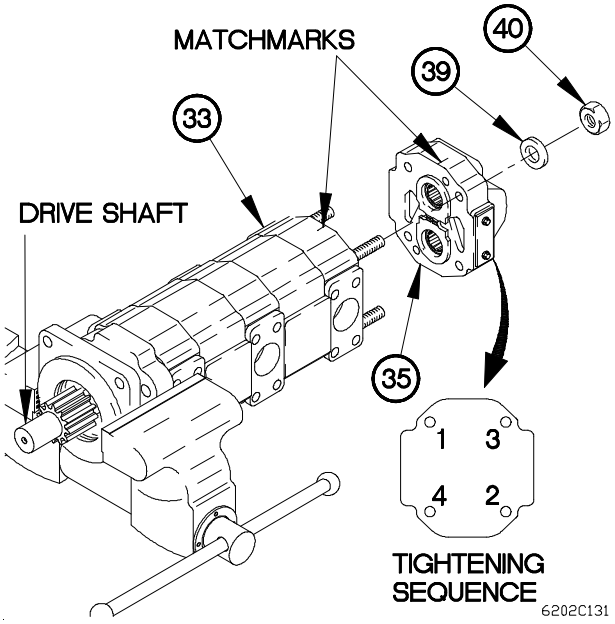
Hydraulic pump manufactured prior to February 2001 will have one washer and nut on four corners of port end cover.

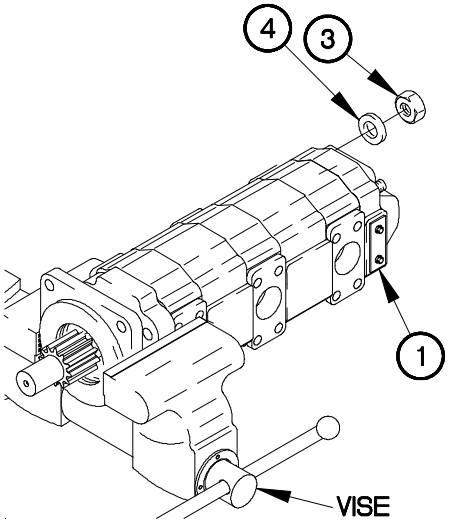
(35) Position four washers (39) and nuts (40) on port end cover (35).

CAUTION

Driven shaft must be turned during tightening of port end cap nuts to ensure no binding occurs. Driven shaft must turn freely after nuts have been fully tightened. Failure to comply may result in damage to equipment.

(36) Tighten nuts (40), in 10 lb-ft increments, to 200 lb-ft (271 N•m) in sequence shown.





NOTE

Hydraulic pump manufactured after February 2001 will have two additional washers and nuts on one side of port end cover.

(36.1) Position two washers (4) and nuts (3) on port end cover (1).

End of Task.

26-3. M1084/M1086 SWING DRIVE HYDRAULIC MOTOR REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Adapter, Socket Wrench, (Item 1, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Materials/Parts
Packing, Preformed (Item 285, Appendix F)
Gasket (Item 55, Appendix F)
Retainer, Packing (Item 357, Appendix F)
Parts Kit, Seal (Item 315, Appendix F)
Seal, Plain (Item 384, Appendix F)
Packing, Preformed (Item 279, Appendix F)
Packing, Preformed (Item 281, Appendix F)
Gasket (Item 49, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Sealing Compound (Item 76, Appendix C)

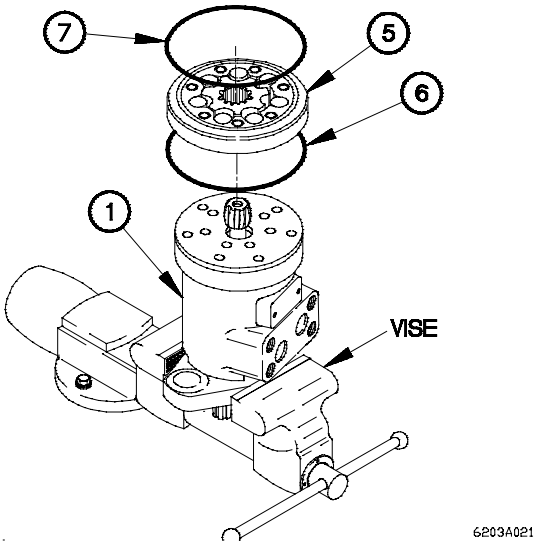
a. Disassembly.

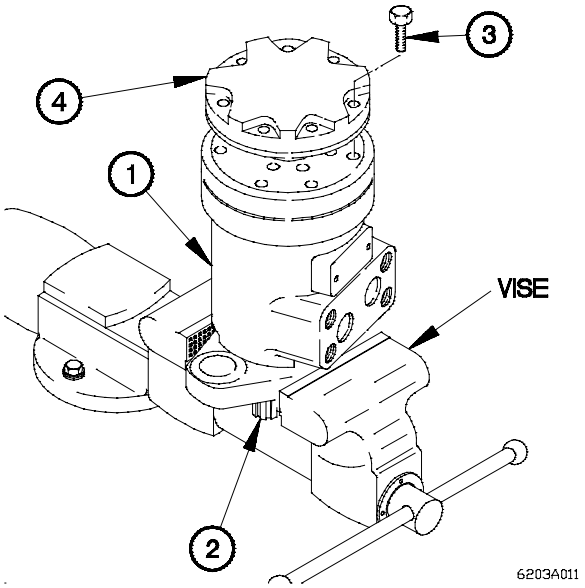
CAUTION

Use vise jaw caps to protect edges of motor housing flange when placed in vise. Failure to comply may result in damage to equipment.

(1) Position motor housing (1) in vise with output shaft (2) down.

(2) Remove seven screws (3) and end cap (4) from motor housing (1).





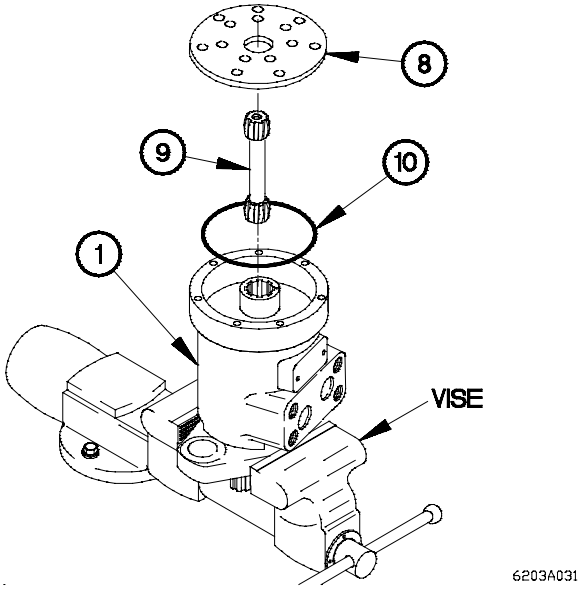
CAUTION

Use care when removing geroler. Do not allow parts to separate. Failure to comply may result in damage to equipment.

(3) Remove geroler (5) from motor housing (1).

(4) Remove preformed packings (6 and 7) from geroler (5). Discard preformed packings.

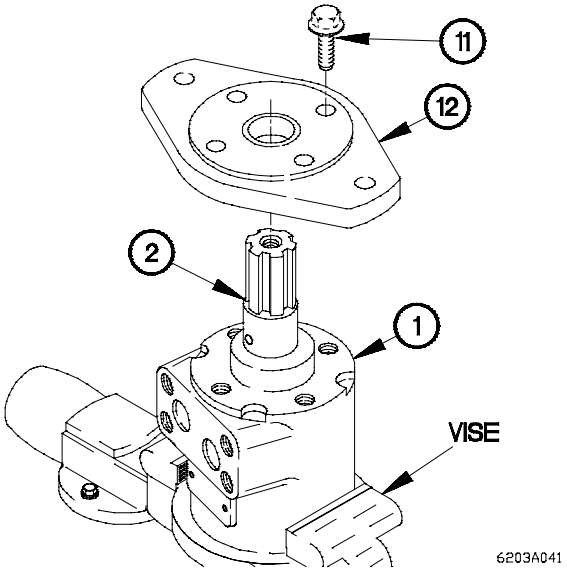
26-3. M1084/M1086 SWING DRIVE HYDRAULIC MOTOR REPAIR (CONT)



(5) Remove spacer plate (8) from motor housing (1).

(6) Remove spur gear shaft (9) from motor housing (1).

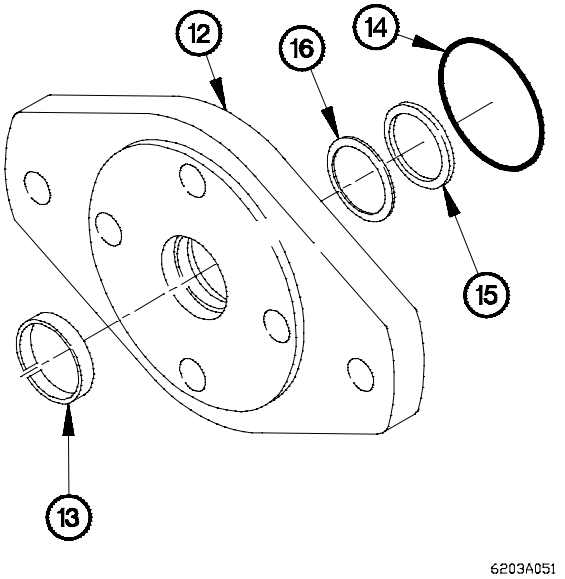
(7) Remove preformed packing (10) from motor housing (1). Discard preformed packing.



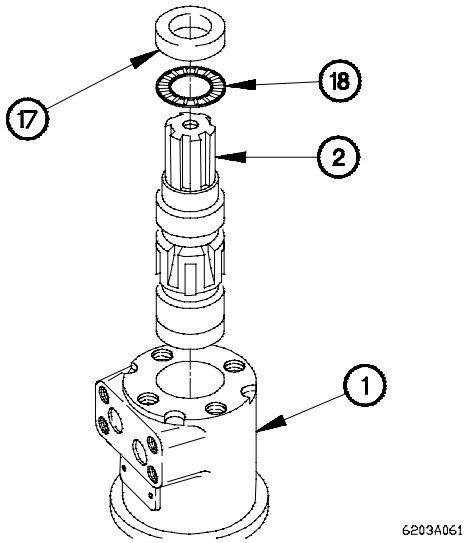
(8) Reposition motor housing (1) in vise with output shaft (2) up.

(9) Remove four screws (11) from motor housing flange (12).

(10) Remove motor housing flange (12) from motor housing (1).



(11) Remove gasket (13), preformed packing (14), seal (15), and retainer (16) from motor housing flange (12). Discard gasket, preformed packing, seal, and retainer.



(12) Remove motor housing (1) from vise.

(13) Remove output shaft (2) from motor housing (1).

(14) Remove inner bearing ring (17) and roller retainer (18) from output shaft (2).

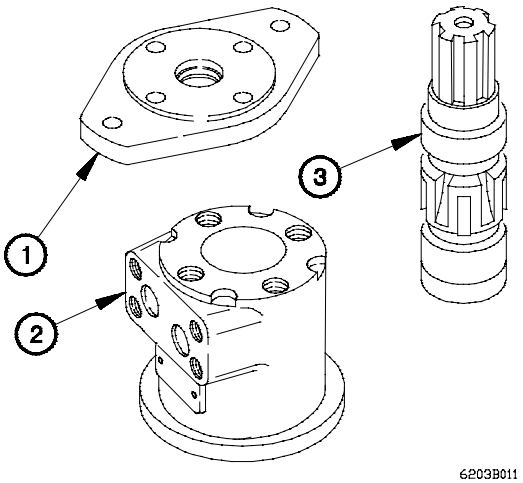
b. Cleaning/Inspection.

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 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 injury to personnel.**



(1) Clean all metal parts with dry cleaning solvent and dry with compressed air.

NOTE

Replace any part that fails visual inspection.

(2) Inspect motor housing flange (1) for cracks, nicks, burrs, pitting, or corrosion.

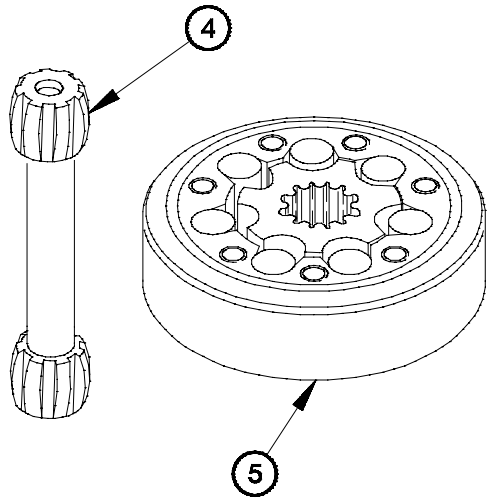
(3) Inspect motor housing (2) for cracks, nicks, burrs, pitting, or corrosion.

(4) Inspect output shaft (3) for nicks, burrs, pitting, or corrosion.

26-3. M1084/M1086 SWING DRIVE HYDRAULIC MOTOR REPAIR (CONT)

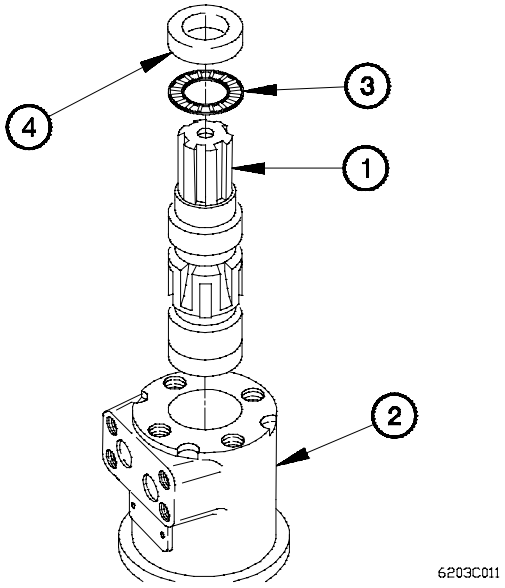
(5) Inspect spur gear shaft (4) for nicks, pitting, or corrosion.

(6) Inspect geroler (5) for cracks, scoring, pitting, or corrosion.



6203B021

c. Assembly.



6203C011

NOTE

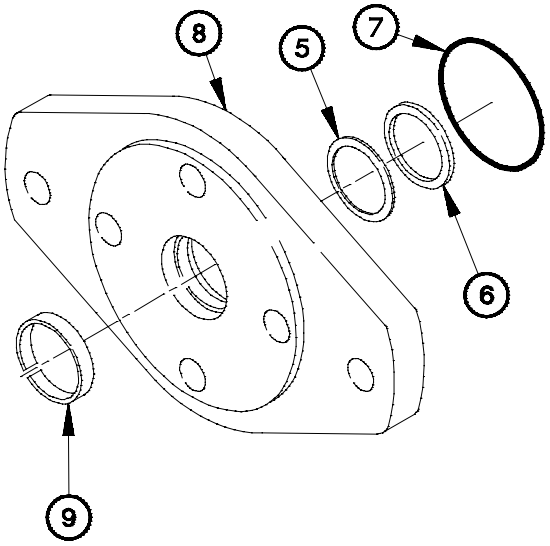
Apply lubricating oil to all parts during assembly.

(1) Install output shaft (1) in motor housing (2).

(2) Install roller retainer (3) and inner bearing (4) on output shaft (1).

(3) Install retainer (5), seal (6), and preformed packing (7) in motor housing flange (8).

(4) Install gasket (9) in motor housing flange (8).



6203C021

(5) Position motor housing (2) in vise with output shaft (1) up.

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.

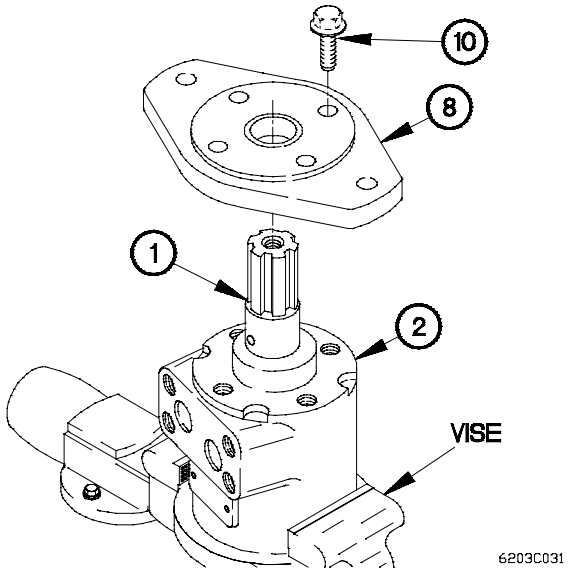
(6) Apply sealing compound to four screws (10).

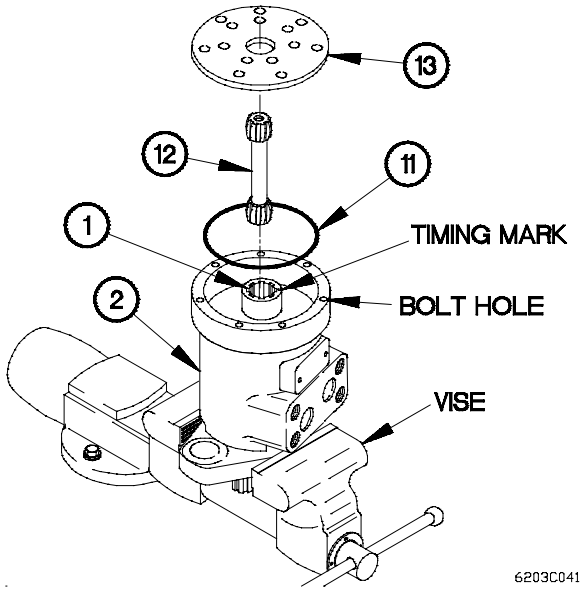
(7) Position motor housing flange (8) on output shaft (1) with four screws (10).

CAUTION

Tighten screws in a crisscross pattern to properly seat mounting flange. Failure to comply may result in damage to equipment.

(8) Tighten screws (10) to 21 lb-ft (28 N·m).





(9) Reposition motor housing (2) in vise with output shaft (1) down.

CAUTION

Mark bolt hole on motor housing that aligns with timing mark on output shaft. Failure to comply may result in damage to equipment.

(10) Align timing mark on output shaft (1) with any bolt hole in motor housing (2).

(11) Install preformed packing (11) on motor housing (2).

(12) Install spur gear shaft (12) in output shaft (1).

(13) Fill motor housing (2) with lubricating oil.

(14) Install spacer plate (13) on motor housing (2).

26-3. M1084/M1086 SWING DRIVE HYDRAULIC MOTOR REPAIR (CONT)

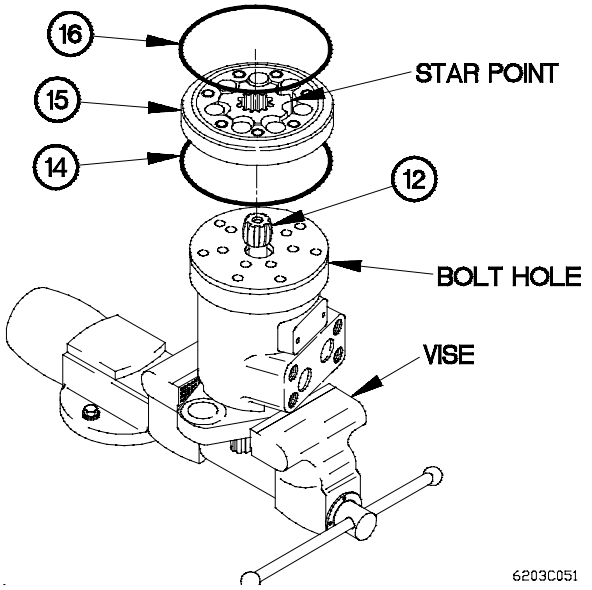
(15) Install preformed packing (14) on geroler (15).

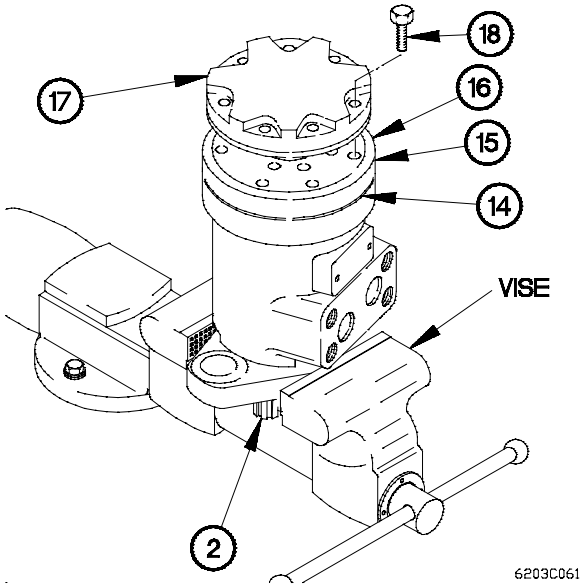
CAUTION

Position geroler with largest star point aligned with marked bolt hole on motor housing. Failure to comply may result in damage to equipment.

(16) Install geroler (15) on spur gear shaft (12).

(17) Install preformed packing (16) on geroler (15).





(18) Position end cap (17) on geroler (15) with seven screws (18).

CAUTION

Tighten screws in a crisscross pattern to properly seat end cap. Failure to comply may result in damage to equipment.

(19) Tighten screws (18) to 15-40 lb-in. (2-5 N·m).

(20) Verify geroler (15) and preformed packings (14 and 16) are properly seated.

(21) Tighten screws (18) to 20-30 lb-ft (27-41 N·m).

End of Task.

26-4. M1089 SWING DRIVE HYDRAULIC MOTOR REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Adapter, Socket Wrench (Item 3, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Materials/Parts
Packing, Preformed (Item 285, Appendix F)
Gasket (Item 55, Appendix F)

Materials/Parts (Cont)
Retainer, Packing (Item 357, Appendix F)
Parts, Kit Seal (Item 315, Appendix F)
Kit, Seal (Item 120, Appendix F)
Packing, Preformed (Item 279, Appendix F)
Packing, Preformed (Item 281, Appendix F)
Gasket (Item 56, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (Item 235, Appendix F)
Packing, Preformed (Item 275, Appendix F)

a. Disassembly.

CAUTION

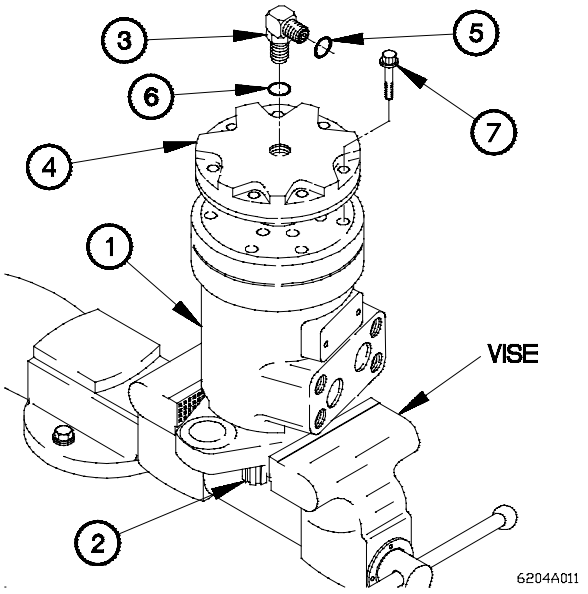
Use vise jaw caps to protect edges of motor housing flange when placed in vise. Failure to comply may result in damage to equipment.

(1) Position motor housing (1) in vise with output shaft (2) down.

(2) Remove 90-degree fitting (3) from end cap (4).

(3) Remove preformed packings (5 and 6) from 90-degree fitting (3). Discard preformed packings.

(4) Remove seven bolts (7) and end cap (4) from motor housing (1).



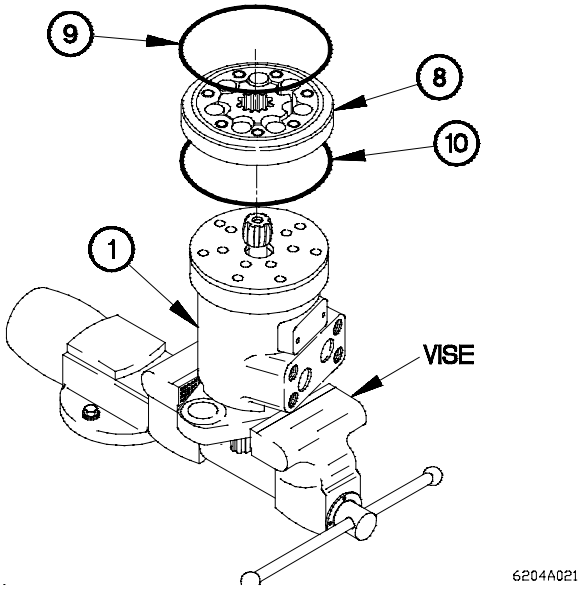
26-4. M1089 SWING DRIVE HYDRAULIC MOTOR REPAIR (CONT)

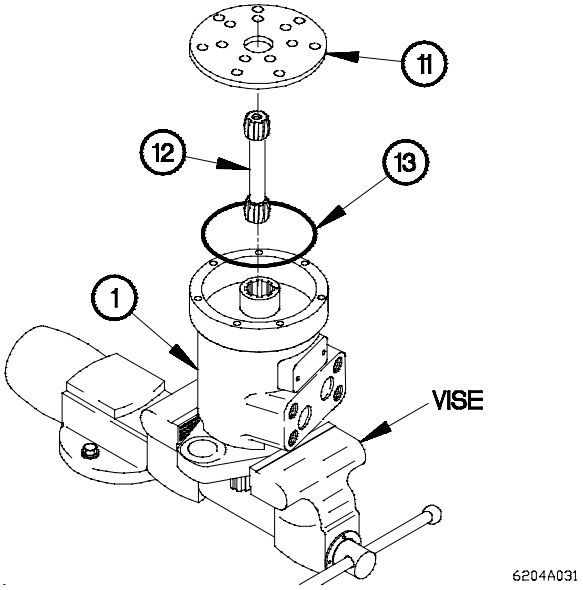
CAUTION

Use care when removing geroler. Do not allow parts to separate. Failure to comply may result in damage to equipment.

(5) Remove geroler (8) from motor housing (1).

(6) Remove preformed packings (9 and 10) from geroler (8). Discard preformed packings.





(7) Remove spacer plate (11) from motor housing (1).

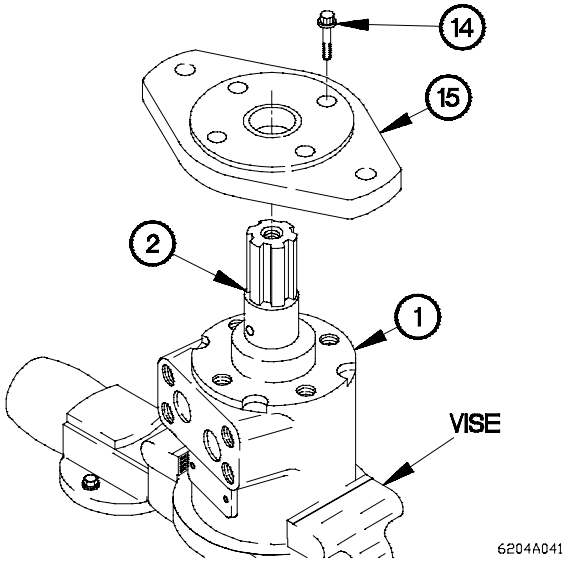
(8) Remove spur gear shaft (12) from motor housing (1).

(9) Remove preformed packing (13) from motor housing (1). Discard preformed packing.

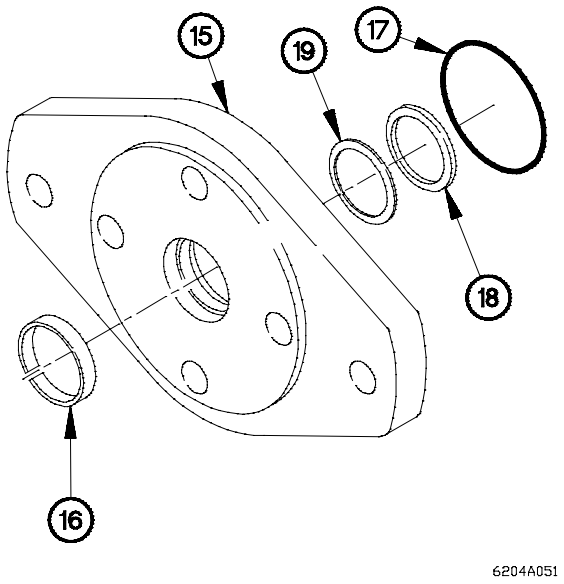
(10) Reposition motor housing (1) in vise with output shaft (2) up.

(11) Remove four screws (14) from motor housing flange (15).

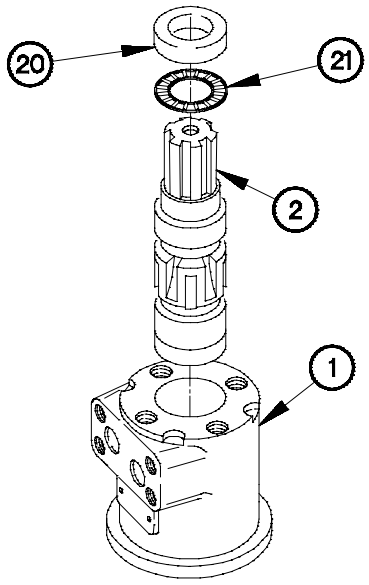
(12) Remove motor housing flange (15) from motor housing (1).



(13) Remove gasket (16), preformed packing (17), seal (18), and retainer (19) from motor housing flange (15). Discard gasket, preformed packing, seal, and retainer.



6204A051



6204A061

(14) Remove motor housing (1) from vise.

(15) Remove output shaft (2) from motor housing (1).

(16) Remove inner bearing ring (20) and roller retainer (21) from output shaft (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 (39°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 injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent and dry with compressed air.

26-4. M1089 SWING DRIVE HYDRAULIC MOTOR REPAIR (CONT)

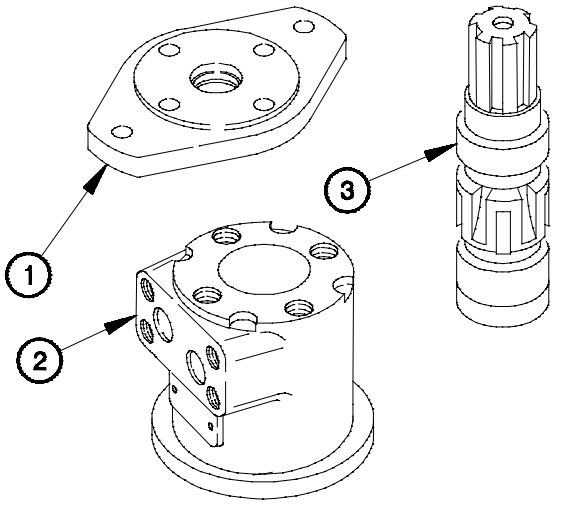
NOTE

Replace any part that fails visual inspection.

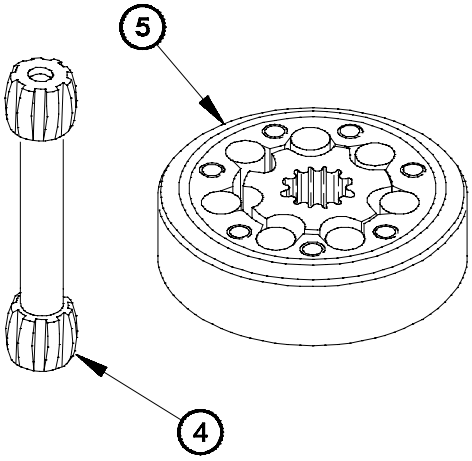
(2) Inspect motor housing flange (1) for cracks, nicks, burrs, pitting, or corrosion.

(3) Inspect motor housing (2) for cracks, nicks, burrs, pitting, or corrosion.

(4) Inspect output shaft (3) for nicks, burrs, pitting, or corrosion.



6204B011



6204B021

(5) Inspect spur gear shaft (4) for nicks, burrs, pitting, or corrosion.

(6) Inspect geroler (5) for cracks, scoring, pitting, or corrosion.

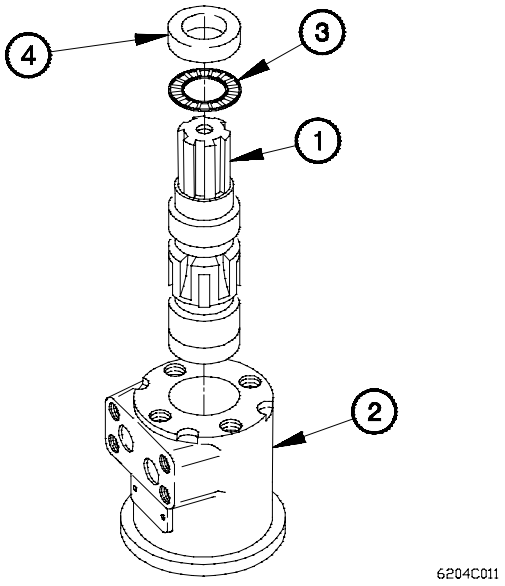
c. Assembly.

NOTE

Apply lubricating oil to all parts during assembly.

(1) Install output shaft (1) in motor housing (2).

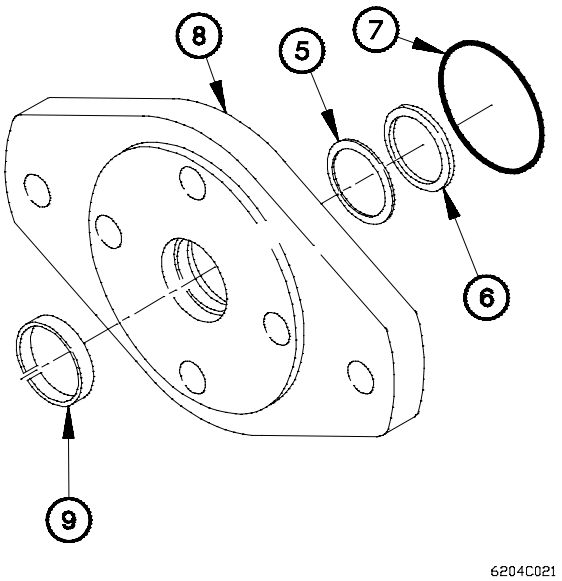
(2) Install roller retainer (3) and inner bearing ring (4) on output shaft (1).

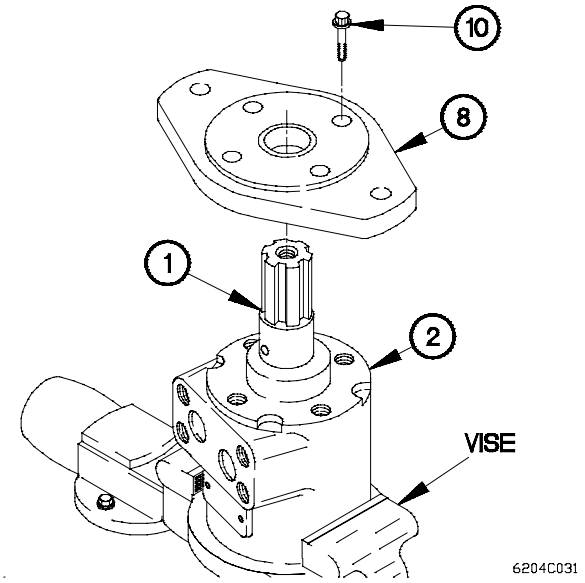


6204C011

(3) Install retainer (5), seal (6), and preformed packing (7) in motor housing flange (8).

(4) Install gasket (9) in motor housing flange (8).





(5) Position motor housing (2) in vise with output shaft (1) up.

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 four screws (10).

(7) Position motor housing flange (8) on output shaft (1) with four screws (10).

CAUTION

Tighten screws in a crisscross pattern to properly seat mounting flange. Failure to comply may result in damage to equipment.

(8) Tighten screws (10) to 21 lb-ft (28 N·m).

26-4. M1089 SWING DRIVE HYDRAULIC MOTOR REPAIR (CONT)

(9) Reposition motor housing (2) in vise with output shaft (1) down.

CAUTION

Mark bolt hole on motor housing that aligns with timing mark on output shaft. Failure to comply may result in damage to equipment.

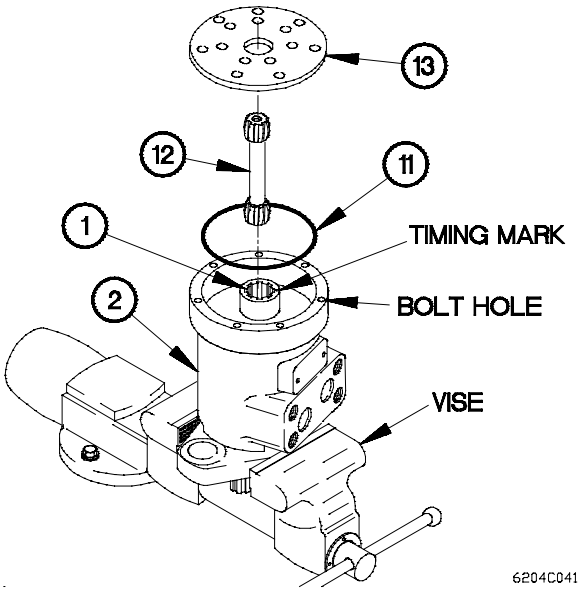
(10) Align timing mark on output shaft (1) with any bolt hole in motor housing (2).

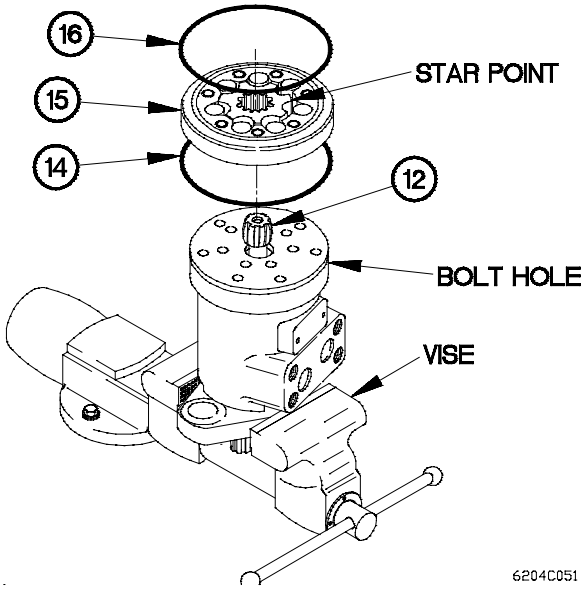
(11) Install preformed packing (11) on motor housing (2).

(12) Install spur gear shaft (12) in output shaft (1).

(13) Fill motor housing (2) with lubricating oil.

(14) Install spacer plate (13) on motor housing (2).





(15) Install preformed packing (14) on geroler (15).

CAUTION

Position geroler with largest star point aligned with bolt hole on motor housing and timing mark on output shaft. Failure to comply may result in damage to equipment.

(16) Install geroler (15) on spur gear shaft (12).

(17) Install preformed packing (16) on geroler (15).

(18) Position end cap (17) on geroler (15) with seven bolts (18).

CAUTION

Tighten screws in a crisscross pattern to properly seat end cap. Failure to comply may result in damage to equipment.

(19) Tighten bolts (18) to 15-40 lb-in. (2-5 N·m).

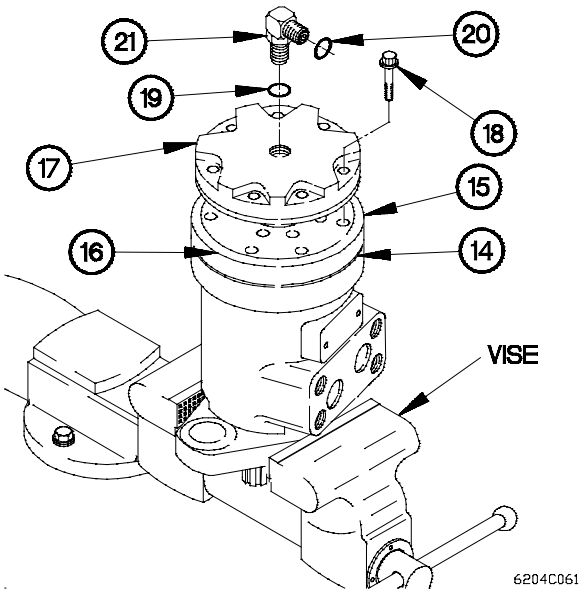
(20) Verify geroler (15) and preformed packings (14 and 16) are properly seated.

(21) Tighten bolts (18) to 20-30 lb-ft (27-41 N·m).

(22) Install preformed packings (19 and 20) on 90-degree fitting (21).

(23) Install 90-degree fitting (21) in end cap (17).

End of Task.



26-5. M1084/M1086/M1089 HOIST HYDRAULIC MOTOR REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Adapter, Socket Wrench (Item 3, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Materials/Parts
Packing, Preformed (Item 285, Appendix F)
Gasket (Item 55, Appendix F)

Materials/Parts (Cont)
Retainer, Packing (Item 357, Appendix F)
Parts, Kit (Item 315, Appendix F)
Kit, Seal (Item 120, Appendix F)
Packing, Preformed (Item 279, Appendix F)
Packing, Preformed (Item 281, Appendix F)
Gasket (Item 49, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (Item 235, Appendix F)
Packing, Preformed (Item 261, Appendix F)

a. Disassembly.

CAUTION

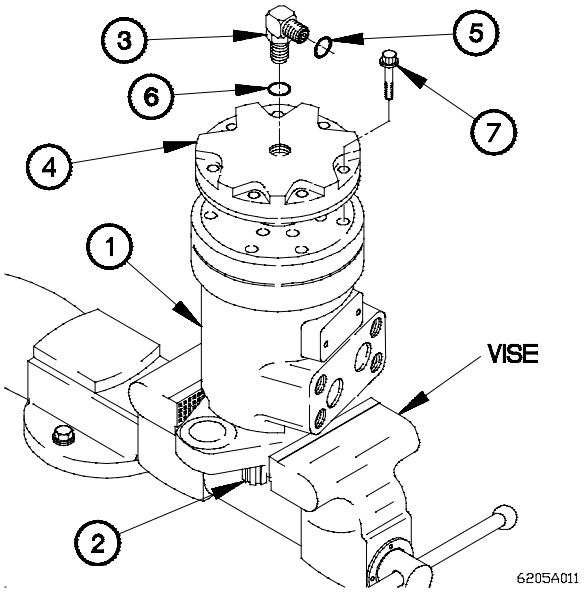
Use vise jaw caps to protect edges of motor housing flange when placed in vise. Failure to comply may result in damage to equipment.

(1) Position motor housing (1) in vise with output shaft (2) down.

(2) Remove 90-degree fitting (3) from end cap (4).

(3) Remove preformed packings (5 and 6) from 90-degree fitting (3). Discard preformed packings.

(4) Remove seven bolts (7) and end cap (4) from motor housing (1).

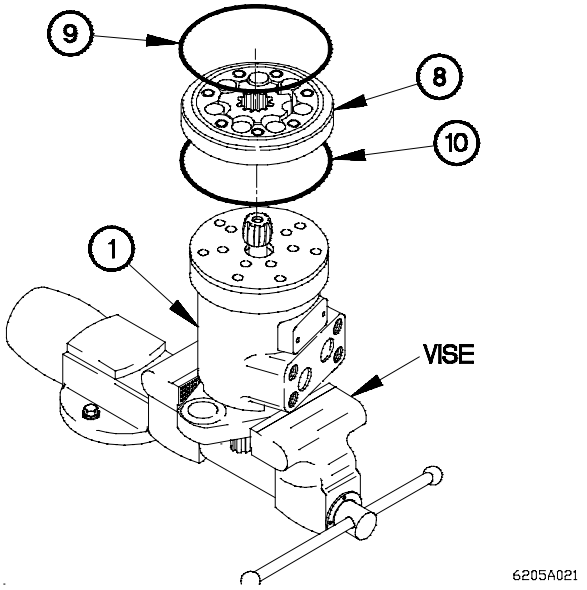


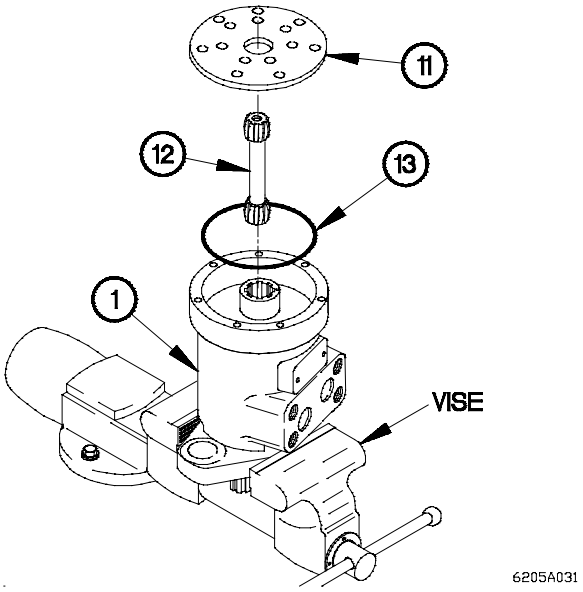
CAUTION

Use care when removing geroler. Do not allow parts to separate. Failure to comply may result in damage to equipment.

(5) Remove geroler (8) from motor housing (1).

(6) Remove preformed packings (9 and 10) from geroler (8). Discard preformed packings.





(7) Remove spacer plate (11) from motor housing (1).

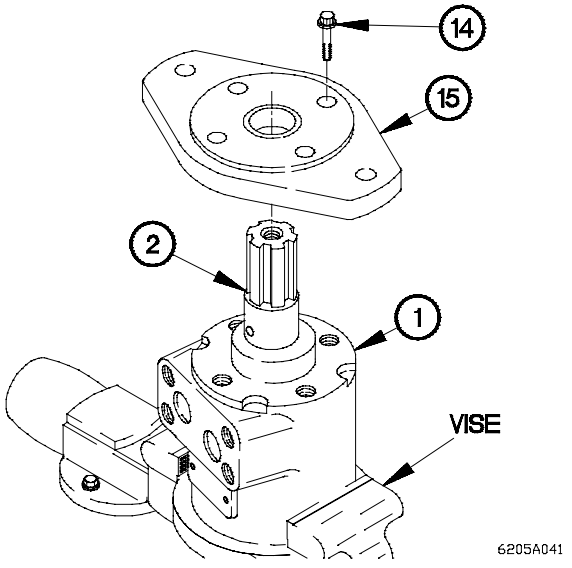
(8) Remove spur gear shaft (12) from motor housing (1).

(9) Remove preformed packing (13) from motor housing (1). Discard preformed packing.

(10) Reposition motor housing (1) in vise with output shaft (2) up.

(11) Remove four screws (14) from motor housing flange (15).

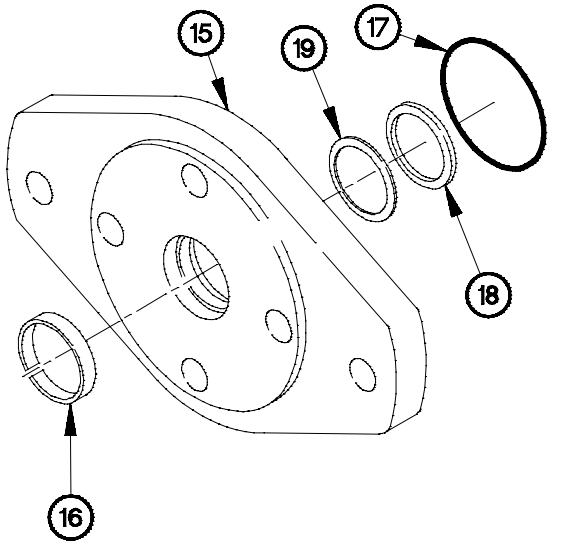
(12) Remove motor housing flange (15) from motor housing (1).



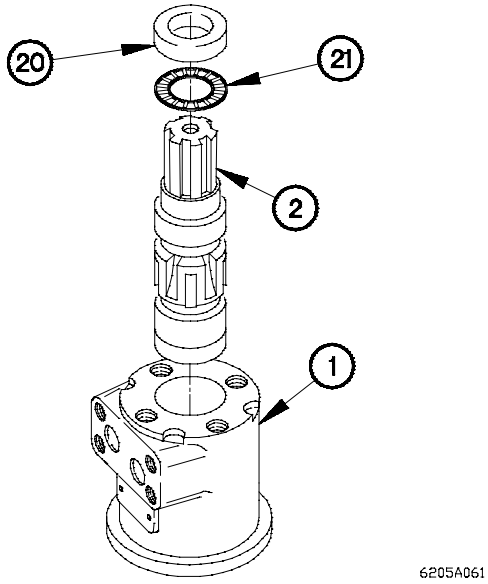
26-5. M1084\M1086\M1089 HOIST HYDRAULIC MOTOR REPAIR (CONT)

(13) Remove gasket (16) from motor housing flange (15). Discard gasket.

(14) Remove preformed packing (17), seal (18), and retainer (19) from motor housing flange (15). Discard preformed packing, seal, and retainer.



6205A051



6205A061

(15) Remove motor housing (1) from vise.

(16) Remove output shaft (2) from motor housing (1).

(17) Remove inner bearing ring (20) and roller retainer (21) from output shaft (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 (39°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 injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent and dry with compressed air.

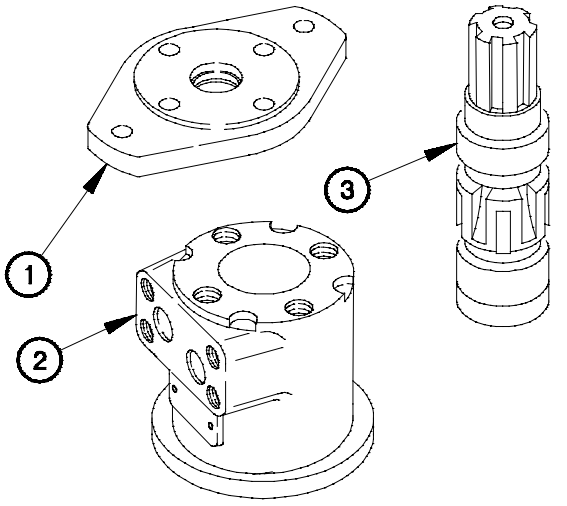
NOTE

Replace any part that fails visual inspection.

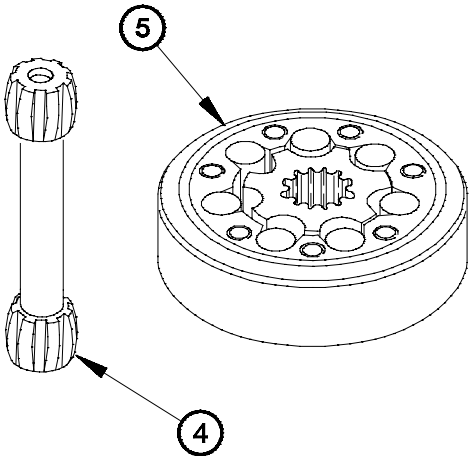
(2) Inspect motor housing flange (1) for cracks, nicks, burrs, pitting, or corrosion.

(3) Inspect motor housing (2) for cracks, nicks, burrs, pitting, or corrosion.

(4) Inspect output shaft (3) for nicks, burrs, pitting, or corrosion.



6205B011



6205B021

(5) Inspect spur gear shaft (4) for nicks, burrs, pitting, or corrosion.

(6) Inspect geroler (5) for cracks, scoring, pitting, or corrosion.

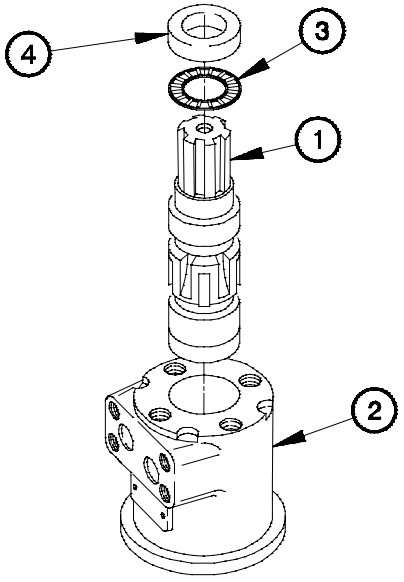
c. Assembly.

NOTE

Apply lubricating oil to all parts during assembly.

(1) Install output shaft (1) in motor housing (2).

(2) Install roller retainer (3) and inner bearing ring (4) on output shaft (1).

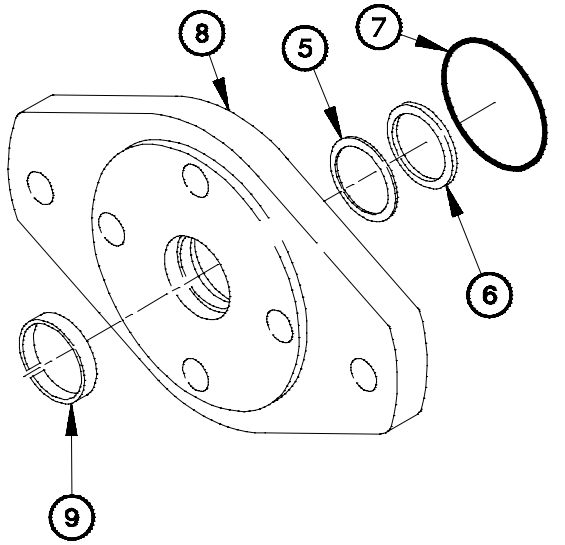


6205C011

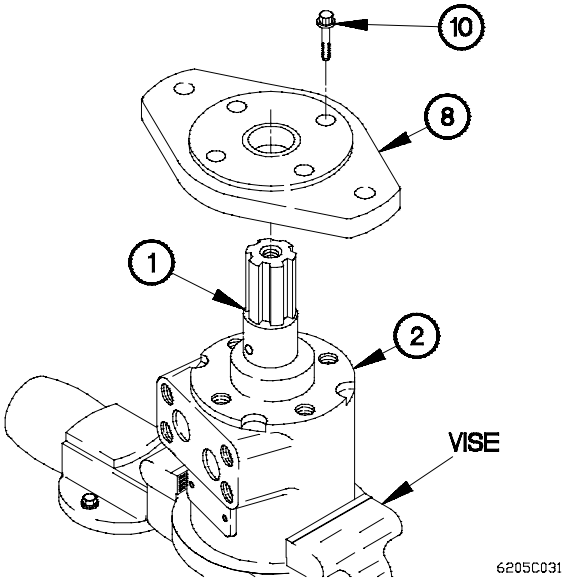
26-5. M1084/M1086/M1089 HOIST HYDRAULIC MOTOR REPAIR (CONT)

(3) Install retainer (5), seal (6), and preformed packing (7) in motor housing flange (8).

(4) Install gasket (9) in motor housing flange (8).



(5) Position motor housing (2) in vise with output shaft (1) up.



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 four screws (10).

(7) Position motor housing flange (8) on output shaft (1) with four screws (10).

CAUTION

Tighten screws evenly to properly seat mounting flange. Failure to comply may result in damage to equipment.

(8) Tighten screws (10) to 21 lb-ft (28 N·m).

(9) Reposition motor housing (2) in vise with output shaft (1) down.

CAUTION

Mark bolt hole on motor housing that aligns with timing mark on output shaft. Failure to comply may result in damage to equipment.

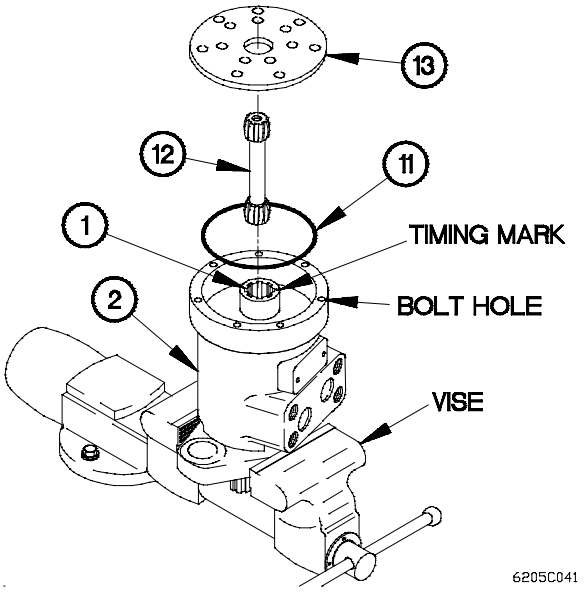
(10) Align timing mark on output shaft (1) with any bolt hole in motor housing (2).

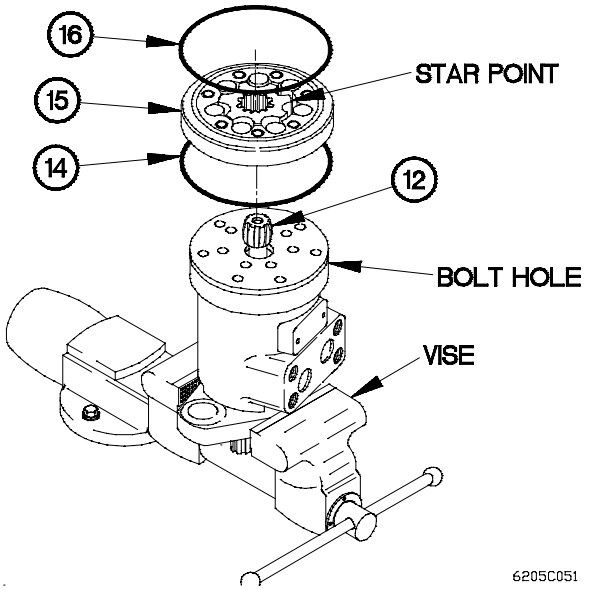
(11) Install preformed packing (11) on motor housing (2).

(12) Install spur gear shaft (12) in output shaft (1).

(13) Fill motor housing (2) with lubricating oil.

(14) Install spacer plate (13) on motor housing (2).





(15) Install preformed packing (14) on geroler (15).

CAUTION

Position geroler with largest star point aligned with marked bolt hole on motor housing. Failure to comply may result in damage to equipment.

(16) Install geroler (15) on spur gear shaft (12).

(17) Install preformed packing (16) on geroler (15).

26-5. M1084/M1086/M1089 HOIST HYDRAULIC MOTOR REPAIR (CONT)

(18) Position end cap (17) on geroler (15) with seven bolts (18).

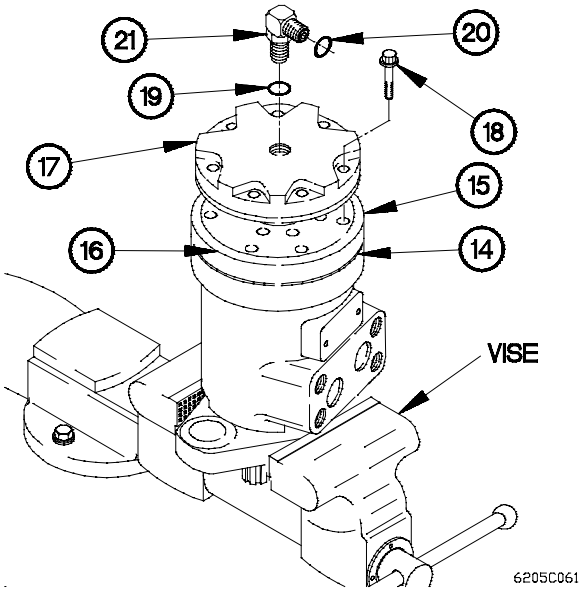
(19) Tighten bolts (18) to 15-40 lb-in. (2-5 N·m).

(20) Verify geroler (15) and preformed packings (14 and 16) are properly seated.

(21) Tighten bolts (18) to 20-30 lb-ft (27-41 N·m).

(22) Install preformed packings (19 and 20) on 90-degree fitting (21).

(23) Install 90-degree fitting (21) in end cap (18).



End of Task.

26-6. M1084/M1086/M1089 OIL FILLED DISC BRAKE ASSEMBLY REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

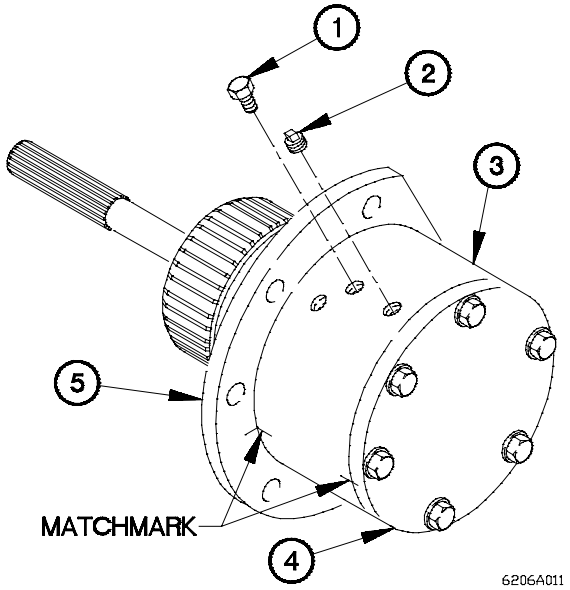
Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Hammer, Non-Sparking (Item 32, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

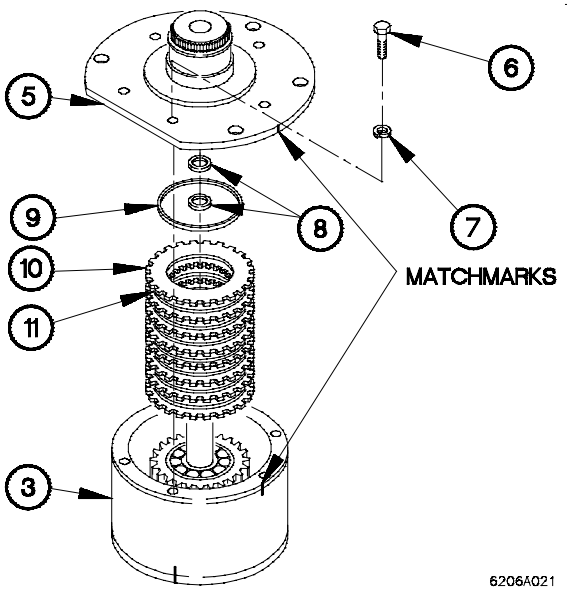
Materials/Parts
Kit, Hoist Seal (Item 93, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Cloth, Abrasive (Item 22, Appendix C)
Sealing Compound (Item 76, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

a. Disassembly.

(1) Remove plug (1) and bleeder valve (2) from ring gear (3).

(2) Match mark ring gear (3) to cover (4) and end cap (5).





(3) Remove six screws (6), washers (7), and end cap (5) from ring gear (3).

(4) Remove two oil seals (8) and preformed packing (9) from end cap (5). Discard oil seals and preformed packing.

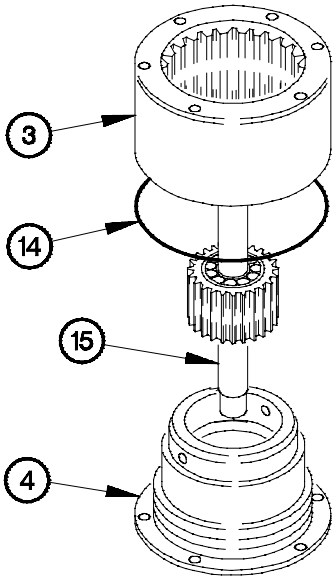
(5) Remove eight stators (10) and seven discs (11) from ring gear (3).

26-6. M1084/M1086/M1089 OIL FILLED DISC BRAKE ASSEMBLY REPAIR (CONT)

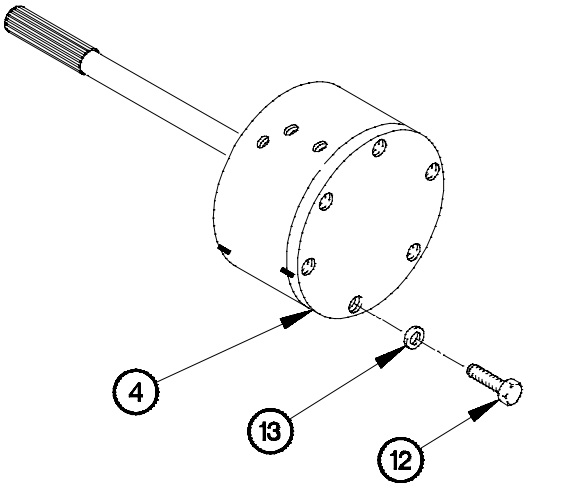
WARNING

Cover is under pressure. Loosen bolts equally when removing cover. Failure to comply may result in injury to personnel.

(6) Remove six bolts (12) and washers (13) from cover (4).



6206A041



6206A031

(7) Remove ring gear (3) from cover (4).

(8) Remove preformed packing (14) from ring gear (3). Discard preformed packing.

(9) Remove shaft (15) from cover (4).

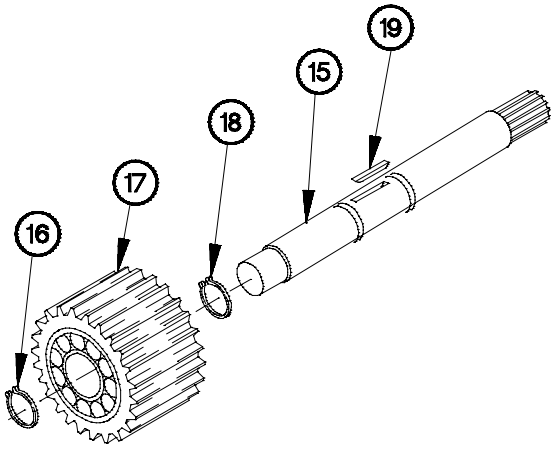
WARNING

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.

(10) Remove retaining ring (16) from shaft (15).

NOTE

Note direction of holes in gear face prior to removing.



6206A051

(11) Remove gear (17) from shaft (15).

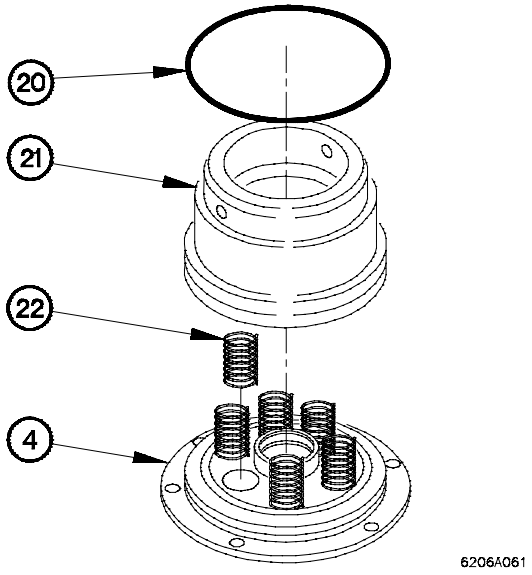
(12) Remove retaining ring (18) from shaft (15).

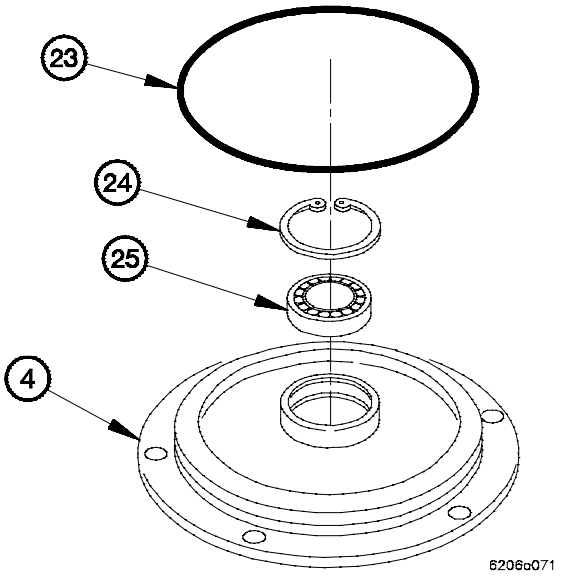
(13) Remove key (19) from shaft (15).

(14) Remove preformed packing (20) from piston (21). Discard preformed packing.

(15) Remove piston (21) from cover (4).

(16) Remove six springs (22) from cover (4).





(17) Remove preformed packing (23) from cover (4). Discard preformed packing.

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.

(18) Remove retaining ring (24) and bearing (25) from cover (4).

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 all metal parts with dry cleaning solvent.

26-6. M1084/M1086/M1089 OIL FILLED DISC BRAKE ASSEMBLY REPAIR (CONT)

NOTE

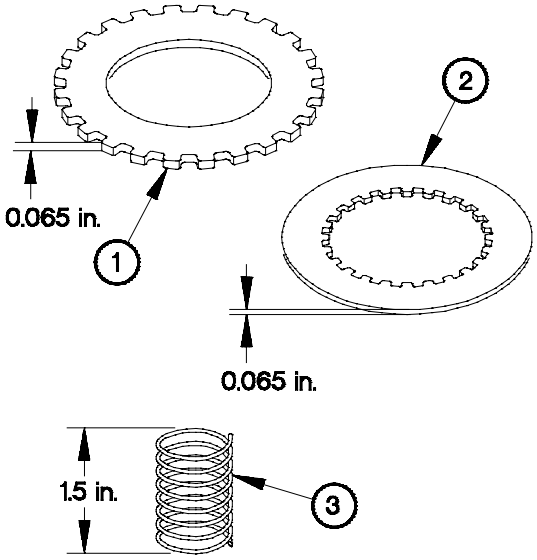
Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect all parts for pitting, corrosion, scoring, damaged splines, damaged teeth, or evidence of binding.

(3) Check eight stators (1) for wear, minimum thickness 0.065 in. (0.162 cm).

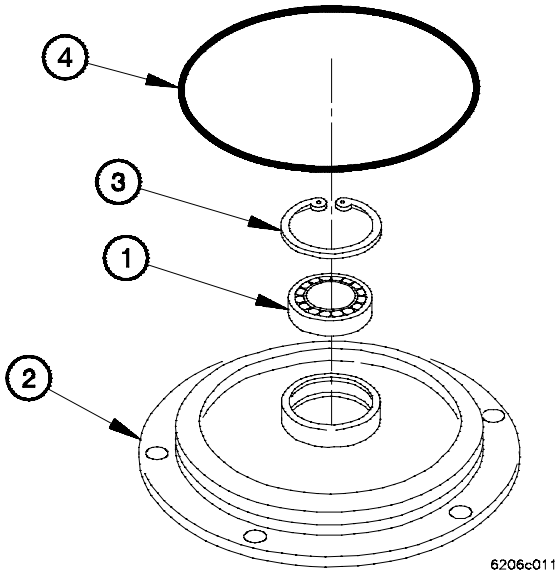
(4) Check seven discs (2) for wear, minimum thickness 0.058 in. (0.144 cm).

(5) Check six springs (3) for length, minimum length 1.5 in. (3.8 cm).



6206B011

c. Assembly



6206c011

(3) Install preformed packing (5) on piston (6).

(4) Install six springs (7) in cover (2).

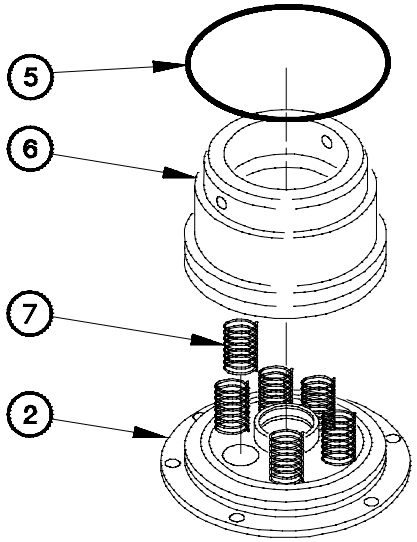
(5) Install piston (6) on cover (2).

(1) Install bearing (1) in cover (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.

(2) Install retaining ring (3) and preformed packing (4) on cover (2).



6206C021

(6) Install ring (8) on shaft (9).

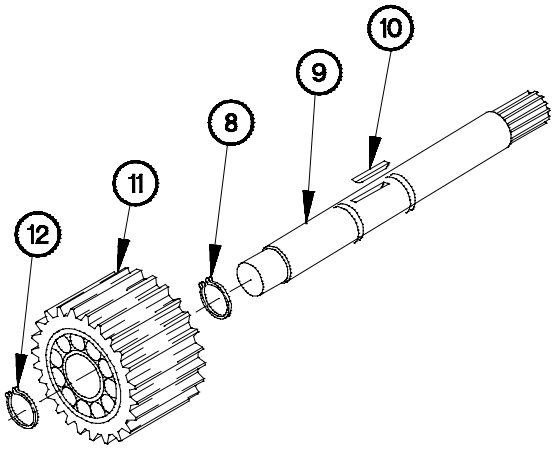
(7) Install key (10) on shaft (9).

CAUTION

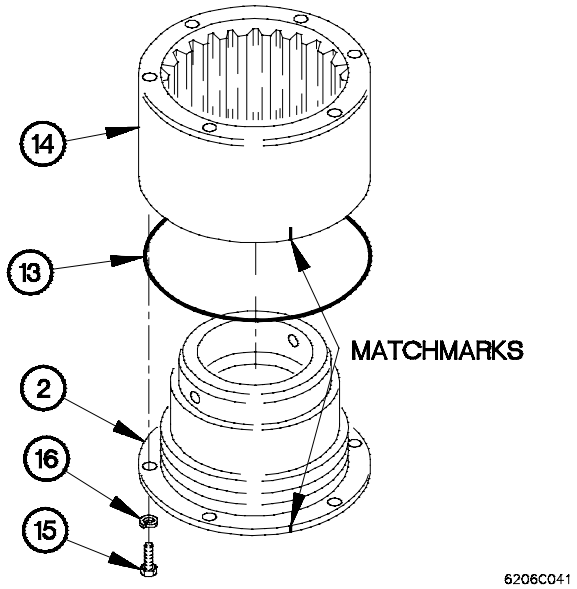
Install gear with holes in direction noted during disassembly. Failure to comply may result in damage to equipment.

(8) Install gear (11) on shaft (9).

(9) Install retaining ring (12) on shaft (9).



6206C031



6206C041

(10) Install preformed packing (13) on ring gear (14).

(11) Install ring gear (14) on cover (2) with match marks 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

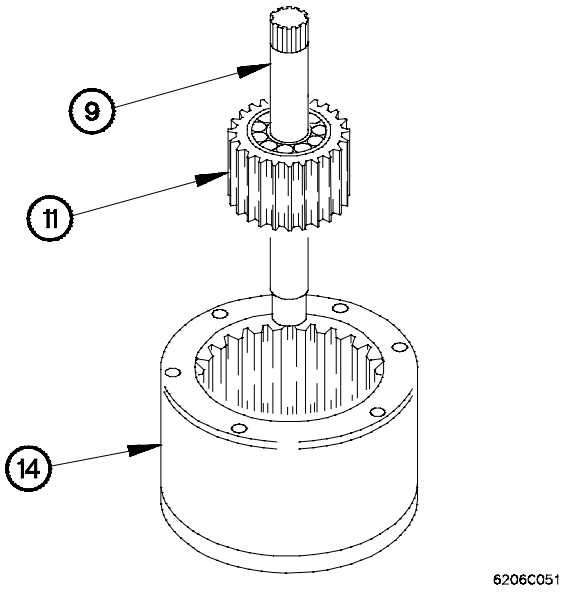
(12) Apply sealing compound to threads of six bolts (15).

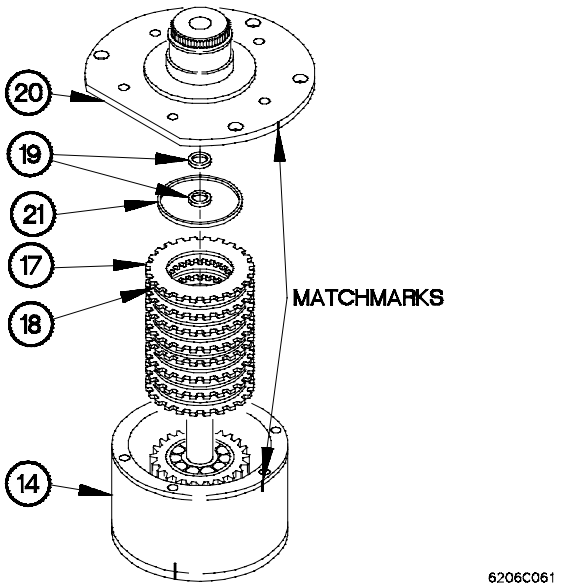
(13) Position six bolts (15) and washers (16) on cover (2).

(14) Tighten bolts (15) to 30-38 ft-lb (41-52 N•m).

26-6. M1084/M1086/M1089 OIL FILLED DISC BRAKE ASSEMBLY REPAIR (CONT)

(15) Position shaft (9) in ring gear (14) with gear (11) resting slightly above ring gear.





(16) Alternately install eight stators (17) and seven discs (18) in ring gear (14).

(17) Install two oil seals (19) in end cap (20).

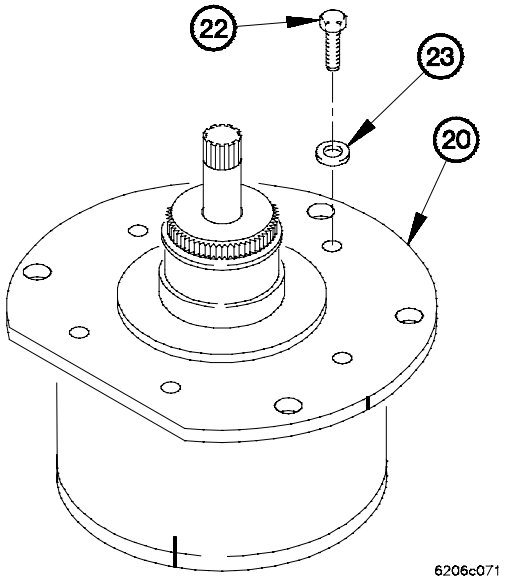
(18) Install preformed packing (21) in end cap (20).

(19) Fill ring gear (14) with oil.

(20) Install end cap (20) on ring gear (14) with match marks 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.



(21) Apply sealing compound to threads of six bolts (22).

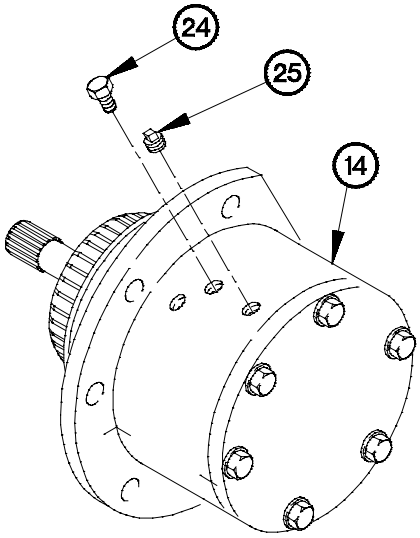
(22) Position six washers (23) and bolts (22) in end cap (20).

(23) Tighten bolts (22) to 30-38 ft-lb (41-52 N.m).

(24) Apply sealing compound to threads of plug (24) and bleeder valve (25).

(25) Install plug (24) in ring gear (14).

(26) Install bleeder valve (25) in ring gear (14).



6206C081

End of Task.

26-7. M1084/M1086 LIFT CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Hammer, Non-Sparking (Item 33, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Vise, Machinists (Item 82, Appendix B)
Pan, Drain (Item 43, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Materials/Parts
Kit, Repair (Item 94, Appendix F)
Kit, Repair (Item 102, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

Personnel Required
(2)

a. Disassembly.

WARNING

Lift cylinder weighs approximately 100 lbs (45 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

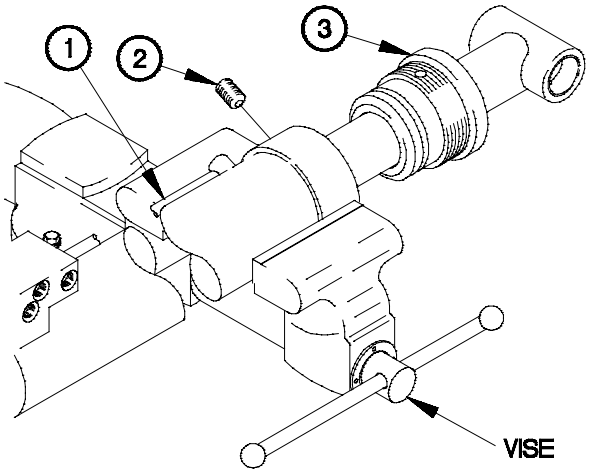
NOTE

Step (1) requires the aid of an assistant.

(1) Position cylinder barrel (1) in vise.

(2) Place drain pan under cylinder barrel (1).

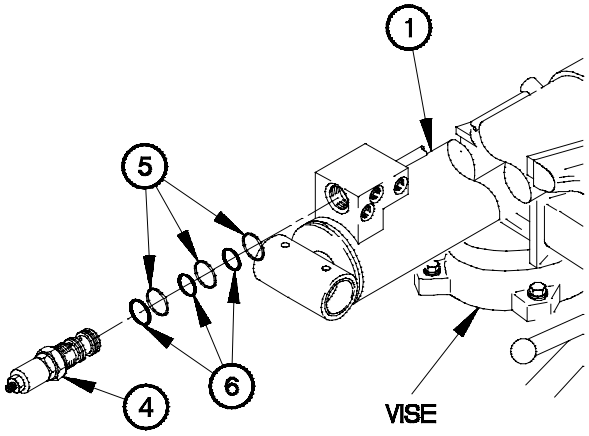
(3) Remove set screw (2) and cylinder head (3) from cylinder barrel (1).



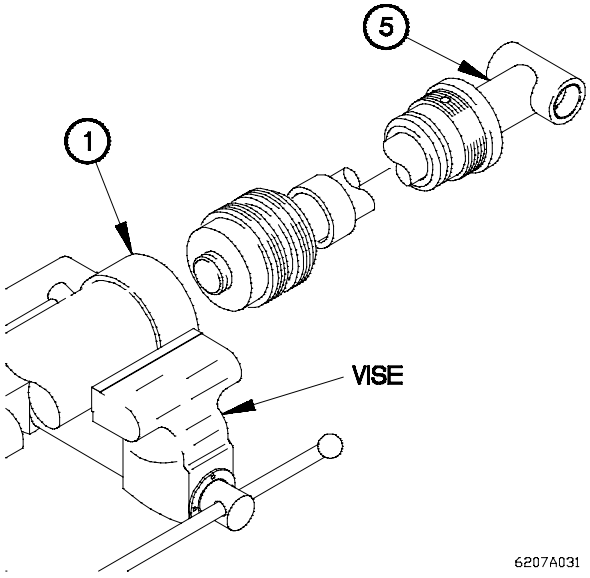
6207A011

(4) Remove cartridge holding valve (4) from cylinder barrel (1).

(5) Remove three back-up rings (5) and preformed packings (6) from cartridge holding valve (4). Discard back-up rings and preformed packings.



6207A021



6207A031

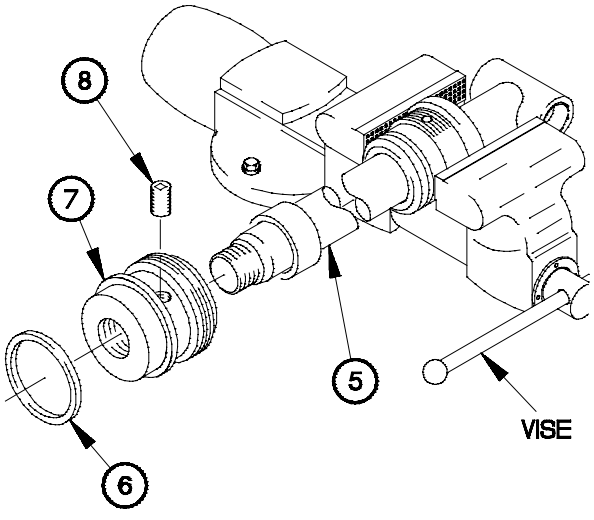
(6) Remove rod (5) from cylinder barrel (1).

(7) Remove cylinder barrel (1) from vise.

(8) Position rod (5) in vise.

(9) Remove seal assembly (6) from piston (7). Discard seal assembly.

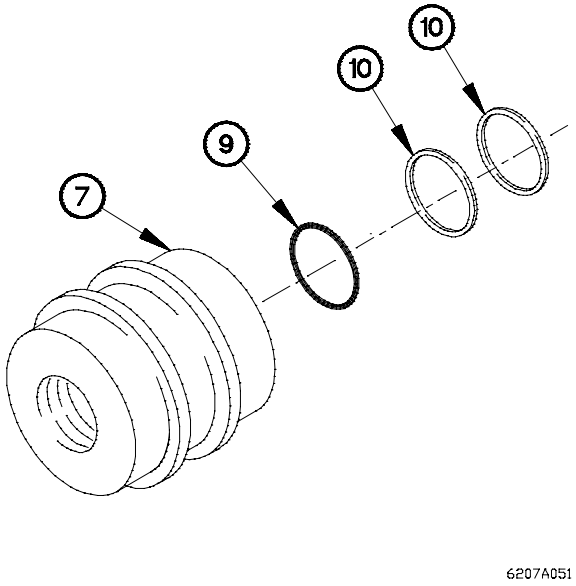
(10) Remove set screw (8) and piston (7) from rod (5).

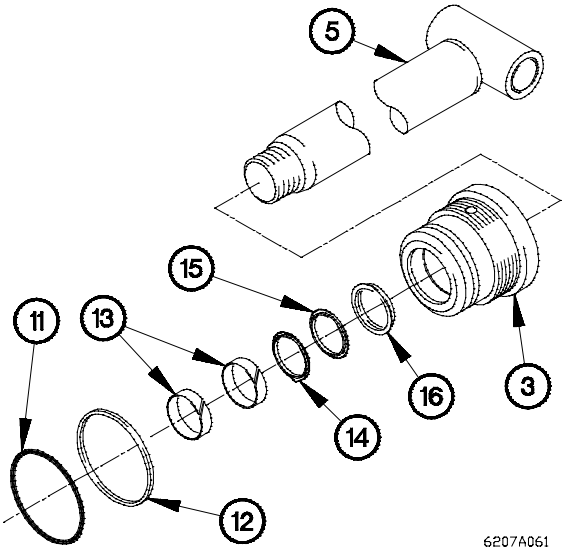


6207A041

26-7. M1084/M1086 LIFT CYLINDER REPAIR (CONT)

(11) Remove preformed packing (9) and two back-up rings (10) from piston (7). Discard preformed packing and back-up rings.





(12) Remove cylinder head (3) from rod (5).

(13) Remove preformed packing (11) and back-up ring (12) from cylinder head (3). Discard preformed packing and back-up ring.

(14) Remove two wear rings (13), buffer seal (14), rod seal (15), and wiper ring (16) from cylinder head (3). Discard wear rings, buffer seal, rod seal, and wiper ring.

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.**

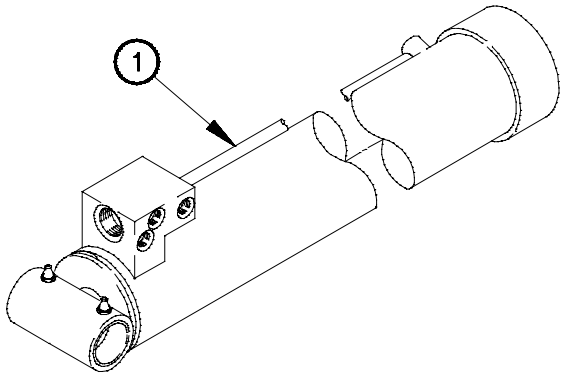
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious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

(1) Clean all metal parts with dry cleaning solvent.

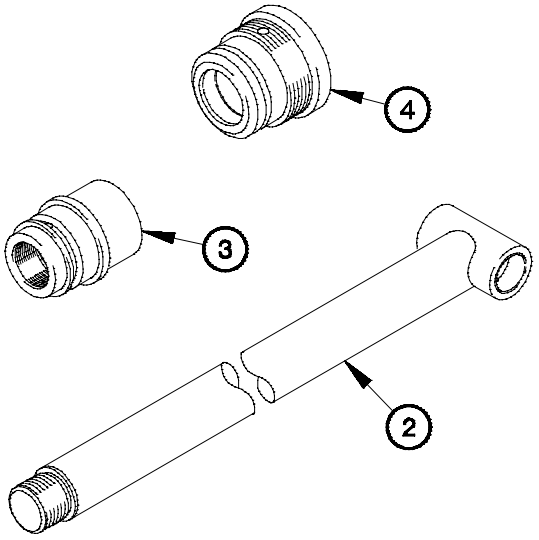
NOTE

Replace any part that fails visual inspection.

(2) Inspect inner walls of cylinder barrel (1) for pitting, corrosion, or evidence of binding.



6207B011



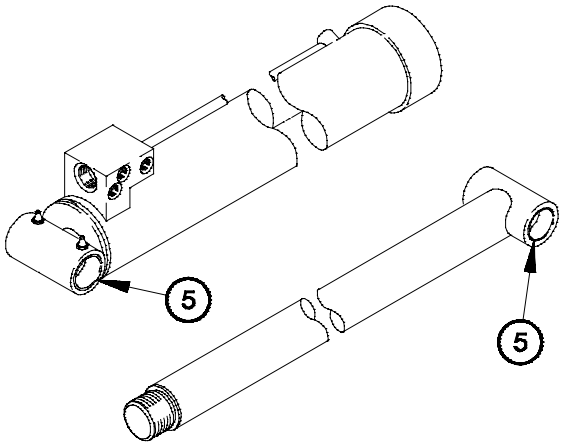
6207B021

(3) Inspect rod (2) for pitting, corrosion, or evidence of binding.

(4) Inspect piston (3) for pitting, corrosion, or evidence of binding.

(5) Inspect cylinder head (4) for pitting, or corrosion.

(6) Inspect two brass bushings (5) for pitting, corrosion, or evidence of binding.



6207B031

26-7. M1084/M1086 LIFT CYLINDER REPAIR (CONT)

c. Assembly.

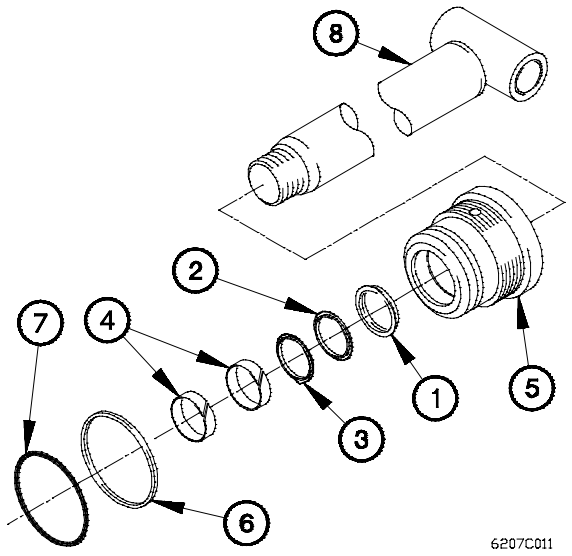
NOTE

Apply lubricating oil to all parts during assembly.

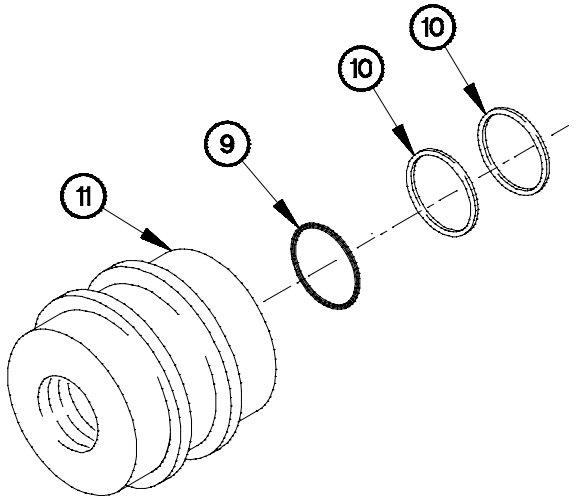
(1) Install wiper ring (1), rod seal (2), buffer seal (3), and two wear rings (4) in cylinder head (5).

(2) Install back-up ring (6) and preformed packing (7) on cylinder head (5).

(3) Install cylinder head (5) on rod (8).



6207C011



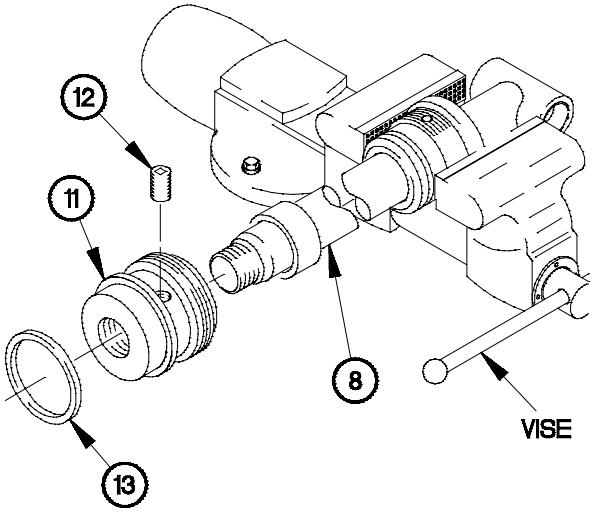
6207C021

(4) Install preformed packing (9) and two back-up rings (10) in piston (11).

(5) Position rod (8) in vise.

(6) Install piston (11) on rod (8) with setscrew (12).

(7) Install seal assembly (13) on piston (11).

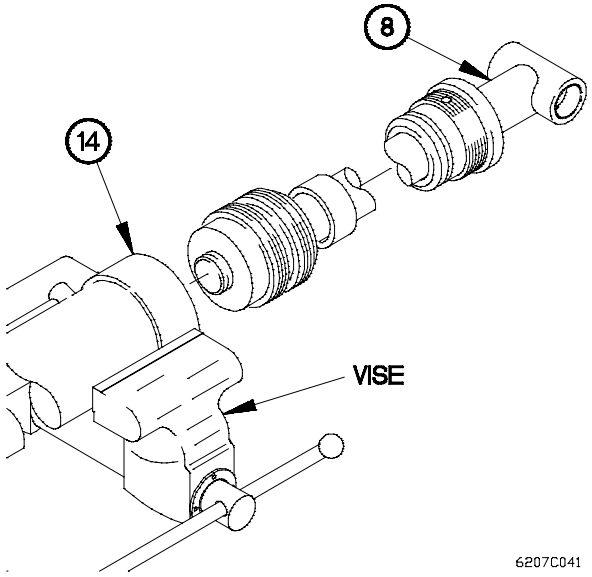


6207C031

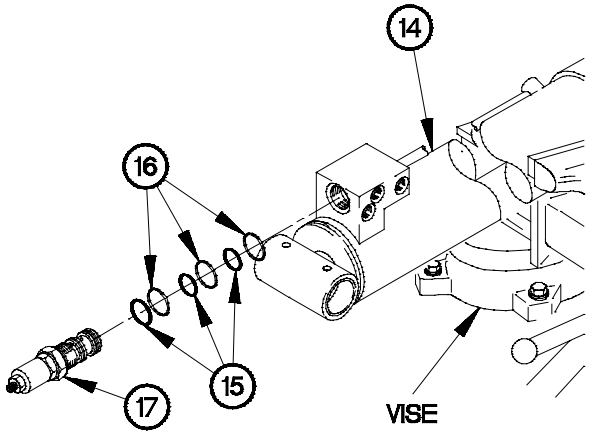
(8) Remove rod (8) from vise.

(9) Position cylinder barrel (14) in vise.

(10) Install rod (8) in cylinder barrel (14).



6207C041



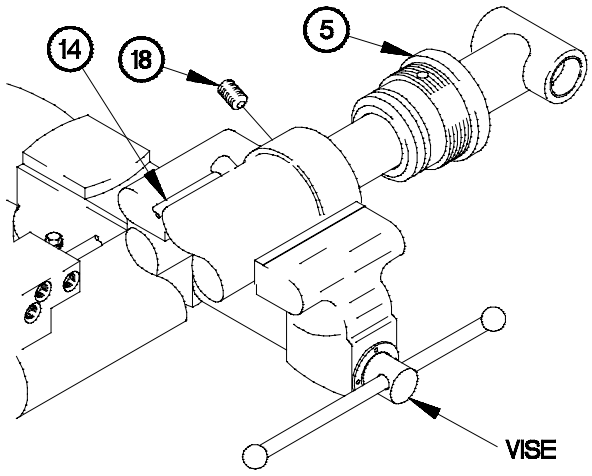
6207C051

(11) Install three back-up rings (15) and preformed packings (16) on cartridge holding valve (17).

(12) Position cartridge holding valve (17) in cylinder barrel (14).

(13) Tighten cartridge holding valve to 30-36 lb-ft (41-49 N·m).

(14) Install cylinder head (5) in cylinder barrel (14) with setscrew (18).



6207C061

End of Task.

26-8. M1084/M1086 ERECTION CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Pipe (Item 89, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Hammer Non-sparking (Item 32, Appendix B)
Vise, Machinists (Item 82, Appendix B)
Pan, Drain (Item 43, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Materials/Parts
Kit, Repair (Item 103, Appendix F)

Materials/Parts (Cont)
Packing, Preformed (2) (Item 227, Appendix F)
Kit, Repair (2) (Item 101, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Packing, Preformed (2) (Item 235, Appendix F)
Packing with Retainer (2) (Item 222, Appendix F)
Packing, Preformed (Item 228, Appendix F)
Retainer, Packing (Item 354, Appendix F)
Ring, Wear (Item 364, Appendix F)

Personnel Required
(2)

a. Disassembly.

NOTE

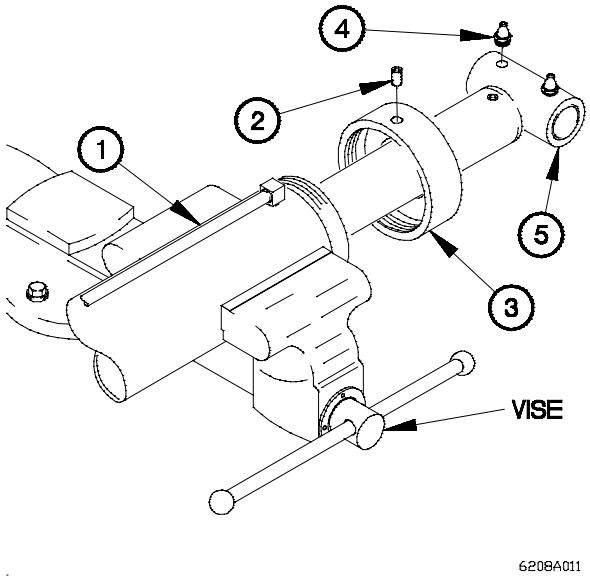
Step (1) requires the aid of an assistant.

(1) Position cylinder barrel (1) in vise.

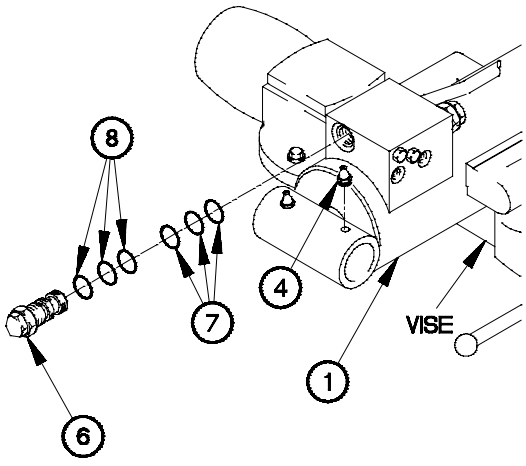
(2) Place drain pan under cylinder barrel (1).

(3) Remove setscrew (2) and retaining ring (3) from cylinder barrel (1).

(4) Remove two lubrication fittings (4) from rod end (5).



6208A011



6208A021

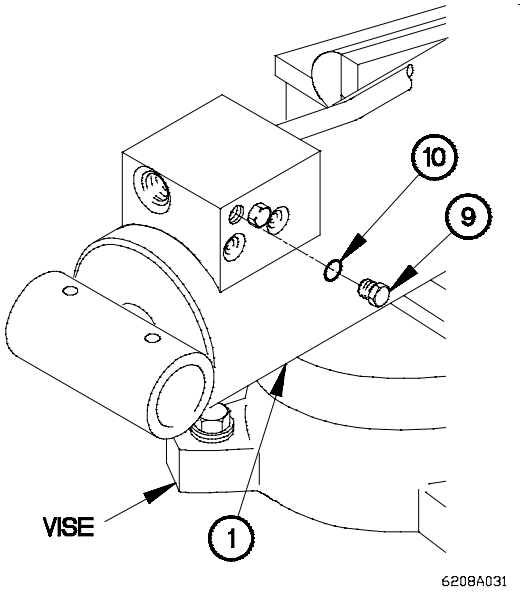
(5) Remove two cartridge holding valves (6) from cylinder barrel (1).

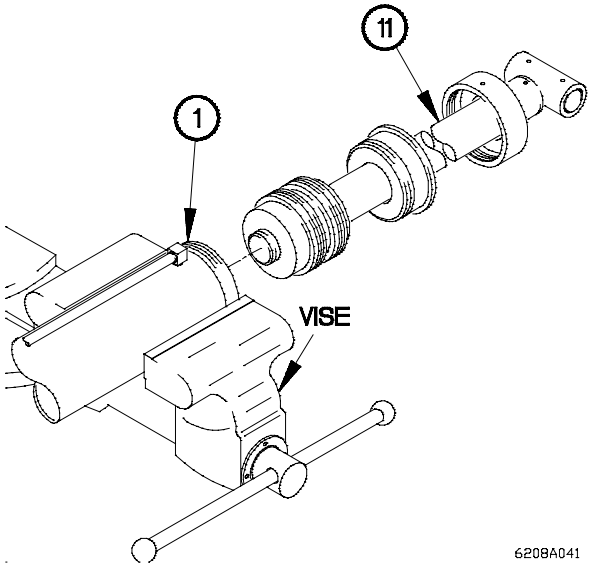
(6) Remove three back-up rings (7) and preformed packings (8) from two cartridge holding valves (6). Discard back-up rings and preformed packings.

(7) Remove two lubrication fittings (4) from cylinder barrel (1).

(8) Remove two plugs (9) from cylinder barrel (1).

(9) Remove two preformed packings (10) from plugs (9). Discard preformed packings.





(10) Remove rod (11) from cylinder barrel (1).

NOTE

Steps (11) requires the aid of an assistant.

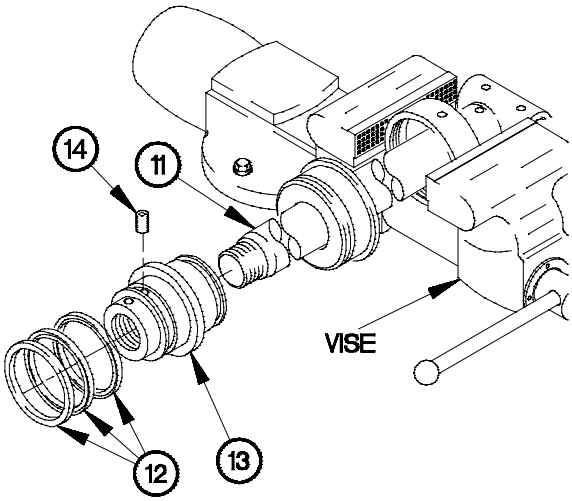
(11) Remove cylinder barrel (1) from vise.

(12) Position rod (11) in vise.

(13) Remove seal assembly (12) from piston (13). Discard seal assembly.

(14) Remove setscrew (14) and piston (13) from rod (11).

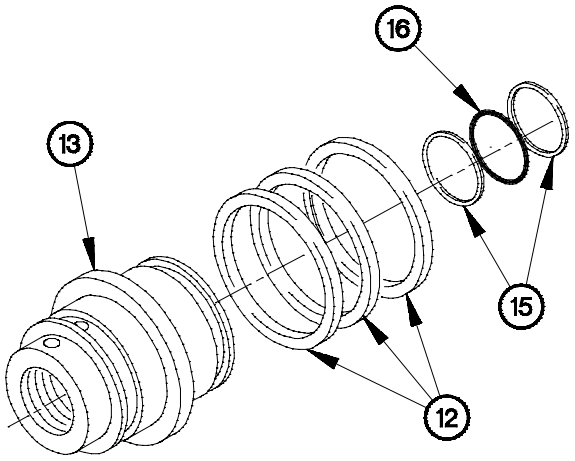
(15) Remove rod (11) from vise.



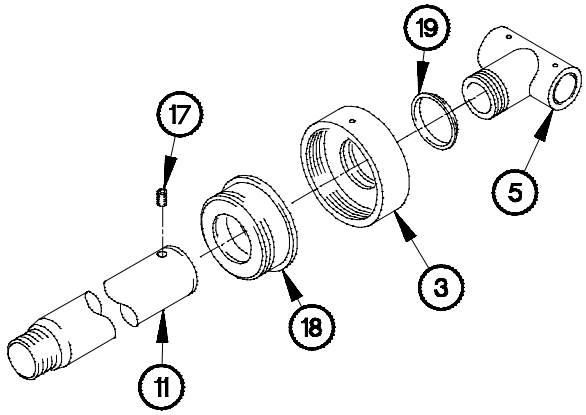
26-8. M1084/M1086 ERECTION CYLINDER REPAIR (CONT)

(16) Remove seal assembly (12) from piston (13). Discard seal assembly.

(17) Remove two back-up rings (15) and preformed packing (16) from piston (13). Discard back-up rings and preformed packing.



6208A061



6208A071

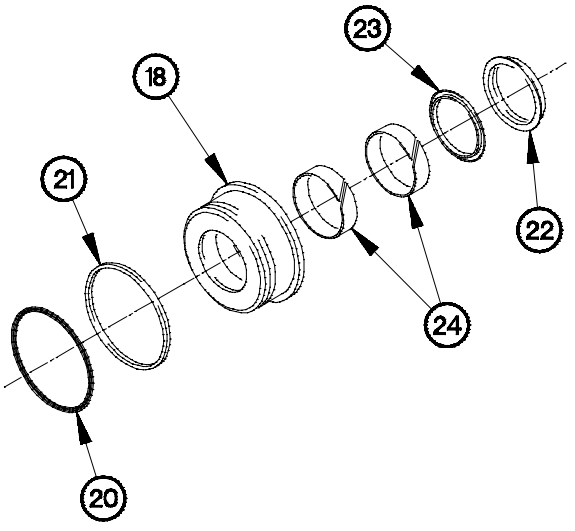
(18) Remove setscrew (17) and rod end (5) from rod (11).

(19) Remove retaining ring (3) and cylinder head (18) from rod (11).

(20) Remove wiper ring (19) from retaining ring (3). Discard wiper ring.

(21) Remove preformed packing (20) and back-up ring (21) from cylinder head (18). Discard preformed packing and back-up ring.

(22) Remove rod seal (22), buffer seal (23), and two wear rings (24) from cylinder head (18). Discard rod seal, buffer seal, and wear rings.



6208A081

b. Cleaning/Inspection.

WARNING

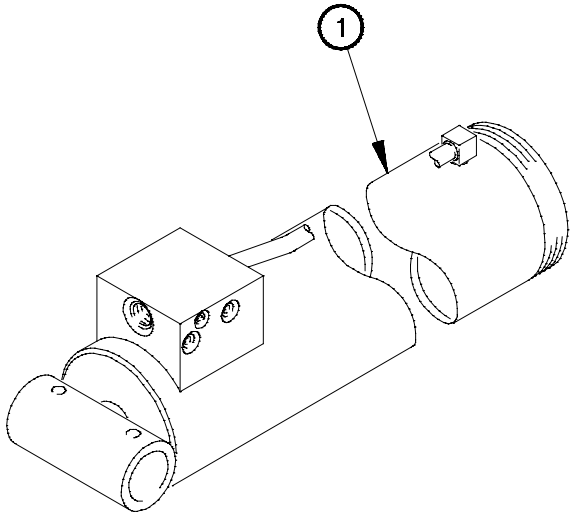
- **Dry Cleaning Solvent (P-D-680 is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent 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 eater 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.

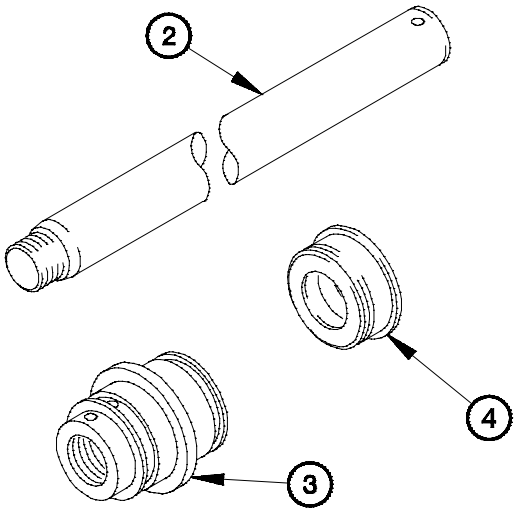
NOTE

Replace any part that fails visual inspection.

(2) Inspect inner walls of erection cylinder barrel (1) for pitting, corrosion, or evidence of binding.



6208B011



6208B021

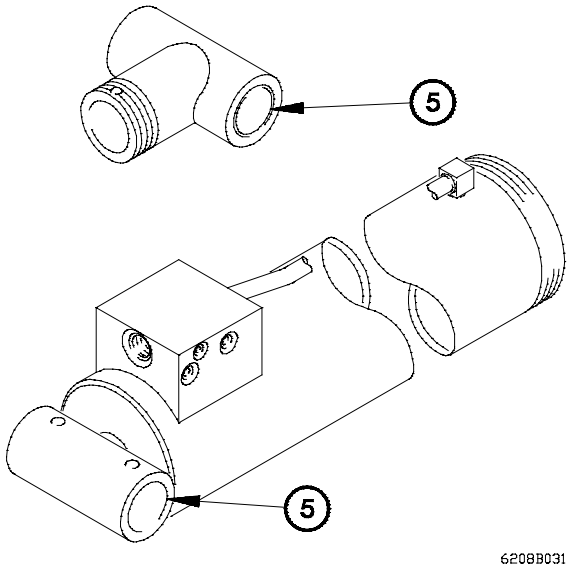
(3) Inspect rod (2) for pitting or corrosion.

(4) Inspect piston (3) for pitting or corrosion.

(5) Inspect cylinder head (4) for pitting or corrosion.

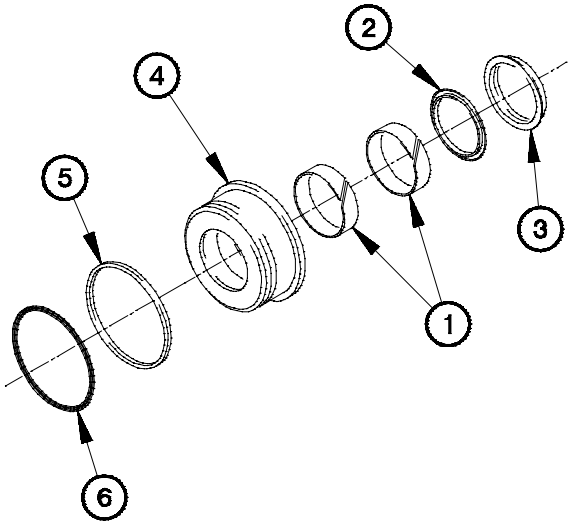
26-8. M1084/M1086 ERECTION CYLINDER REPAIR (CONT)

(6) Inspect two bushings (5) for pitting, corrosion, or evidence of binding.



6208B031

c. Assembly.



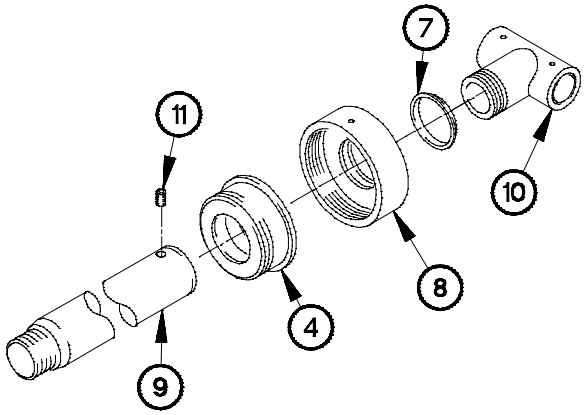
6208C011

NOTE

Apply lubricating oil to all parts during assembly.

(1) Install two wear rings (1), buffer seal (2), and rod seal (3) in cylinder head (4).

(2) Install back-up ring (5) and preformed packing (6) on cylinder head (4).



6208C021

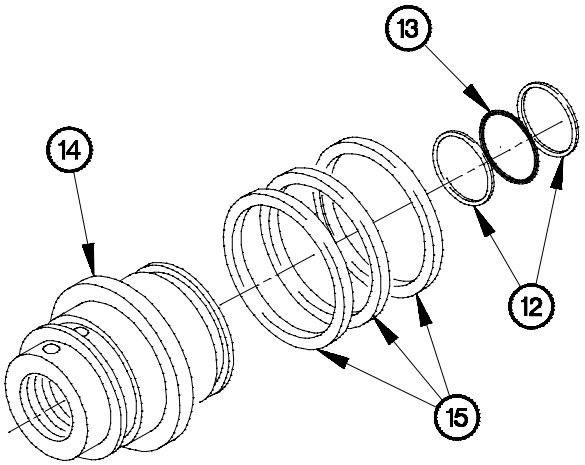
(3) Install wiper ring (7) in retaining ring (8).

(4) Install cylinder head (4) and retaining ring (8) on rod (9).

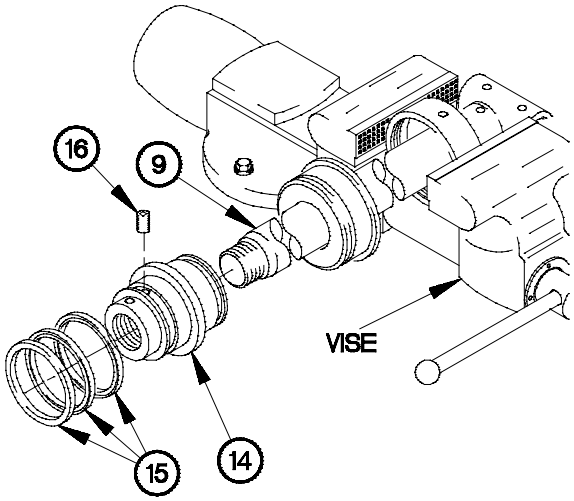
(5) Install rod end (10) on rod (9) with set screw (11).

(6) Install two back-up rings (12) and preformed packing (13) in piston (14).

(7) Install seal assembly (15) on piston (14).



6208C031



6208C041

(8) Position rod (9) in vise.

(9) Install piston (14) on rod (9) with setscrew (16).

(10) Install seal assembly (15) on piston (14).

(11) Remove rod (9) from vise.

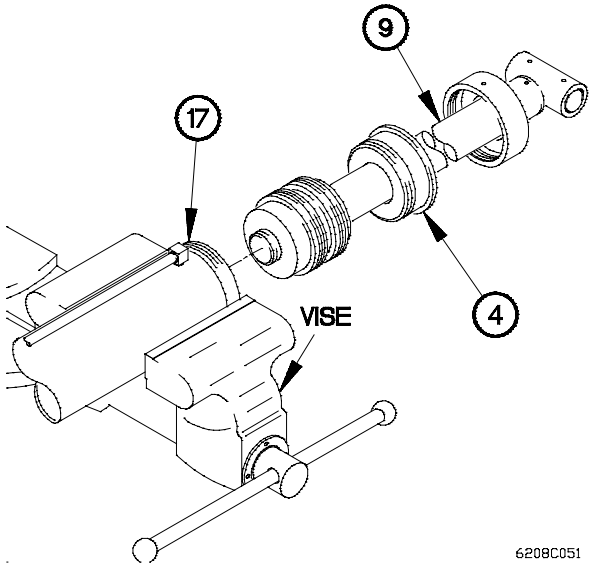
NOTE

Step (12) requires the aid of an assistant.

(12) Position cylinder barrel (17) in a vise.

(13) Install rod (9) in cylinder barrel (17).

(14) Install cylinder head (4) in cylinder barrel (17)

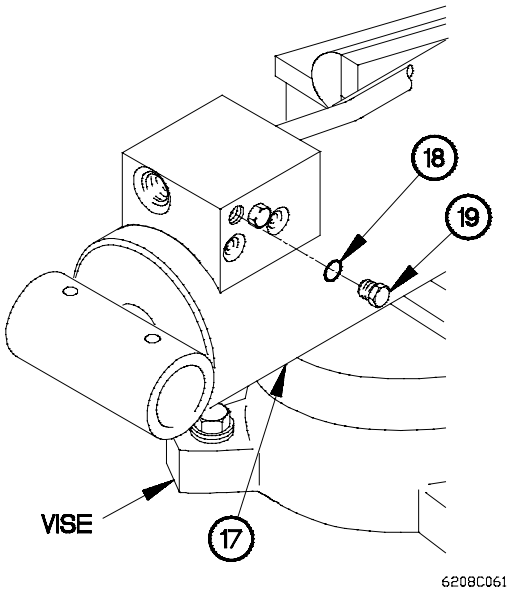


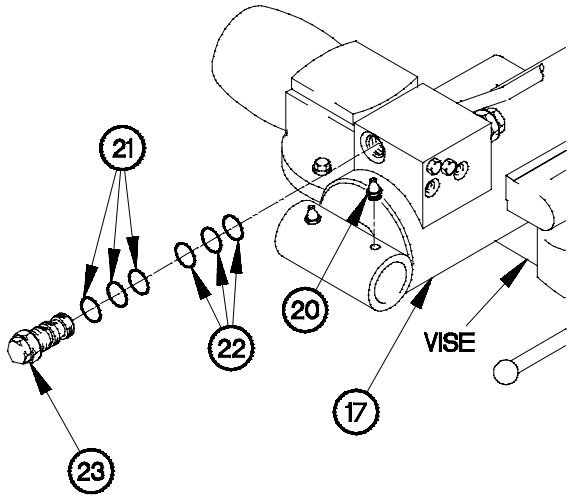
6208C051

26-8. M1084/M1086 ERECTION CYLINDER REPAIR (CONT)

(15) Install two preformed packings (18) on plugs (19).

(16) Install two plugs (19) in cylinder barrel (17).





(17) Install two lubrication fittings (20) in cylinder barrel (17).

(18) Install three preformed packings (21) and back-up rings (22) on two cartridge holding valves (23).

(19) Position two cartridge holding valves (23) in cylinder barrel (17).

(20) Tighten cartridge holding valves (23) to 30-36 lb-ft (41-49 N·m).

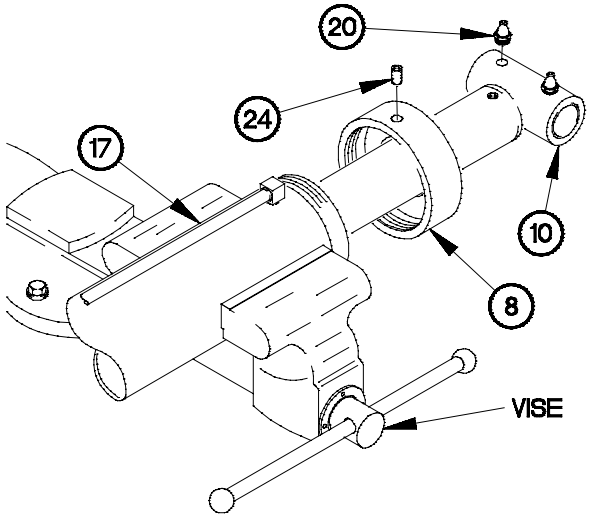
(21) Install two lubrication fittings (20) in rod end (10).

(22) Install retaining ring (8) on cylinder barrel (17) with setscrew (24).

NOTE

Step (23) requires the aid of an assistant.

(23) Remove cylinder barrel (17) from vise.



End of Task.

26-9. M1089 ERECTION CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Pipe (Item 89, Appendix B)
Pan, Drain (Item 43, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Hammer, Non-sparking (Item 32, Appendix B)
Vise, Machinists (Item 82, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

Materials/Parts
Kit, Repair (Item 100, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Kit, Repair (Item 105, Appendix F)

Personnel Required
(2)

a. Disassembly.

WARNING

Erection cylinder weighs approximately 70 lbs (32 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

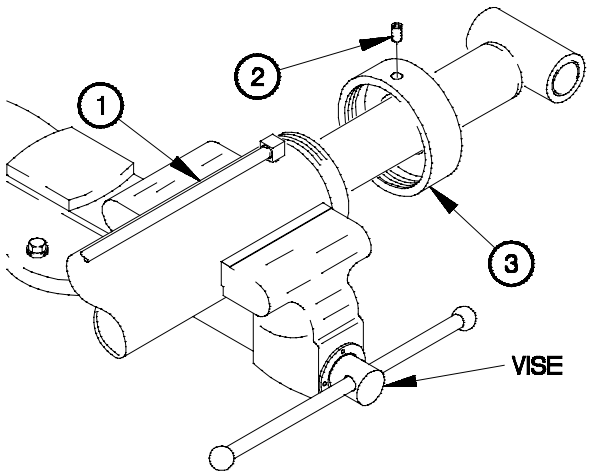
NOTE

Step (1) requires the aid of an assistant.

(1) Position cylinder barrel (1) in vise.

(2) Place drain pan under cylinder barrel (1).

(3) Remove set screw (2) and retaining ring (3) from cylinder barrel (1).

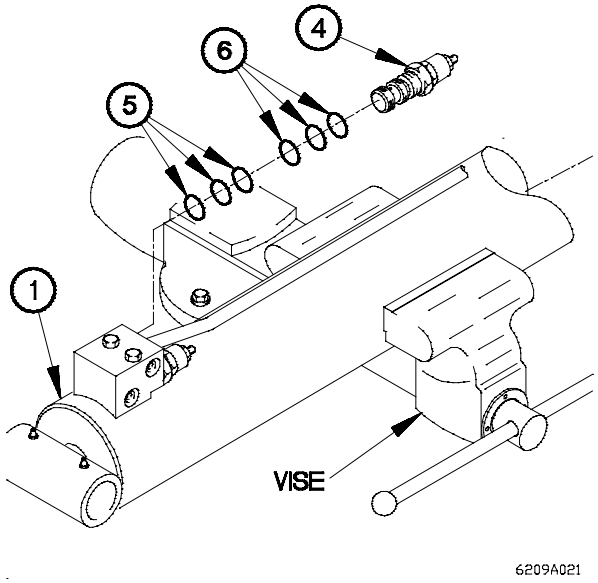


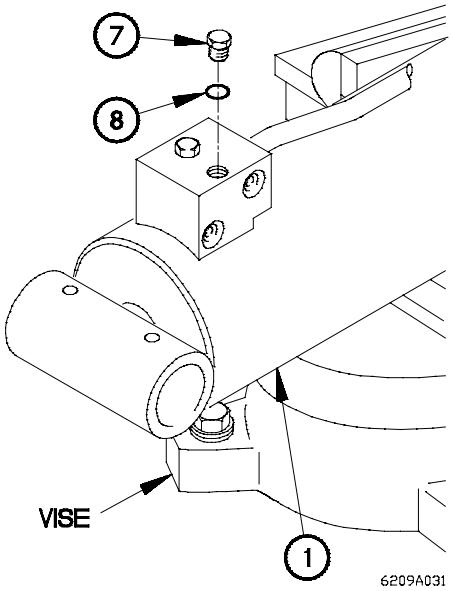
6209A011

26-9. M1089 ERECTION CYLINDER REPAIR (CONT)

(4) Remove cartridge holding valve (4) from cylinder barrel (1).

(5) Remove three back-up rings (5) and preformed packings (6) from cartridge holding valve (4). Discard back-up rings and preformed packings.





(6) Remove two plugs (7) from cylinder barrel (1).

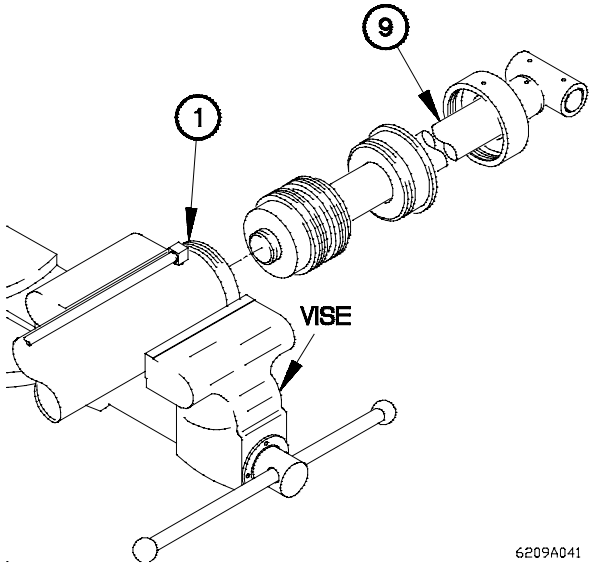
(7) Remove two preformed packings (8) from plugs (7). Discard preformed packings.

CAUTION

Do not pry cylinder head from cylinder barrel. Failure to comply will result in damage to equipment.

(8) Remove rod (9) from cylinder barrel (1).

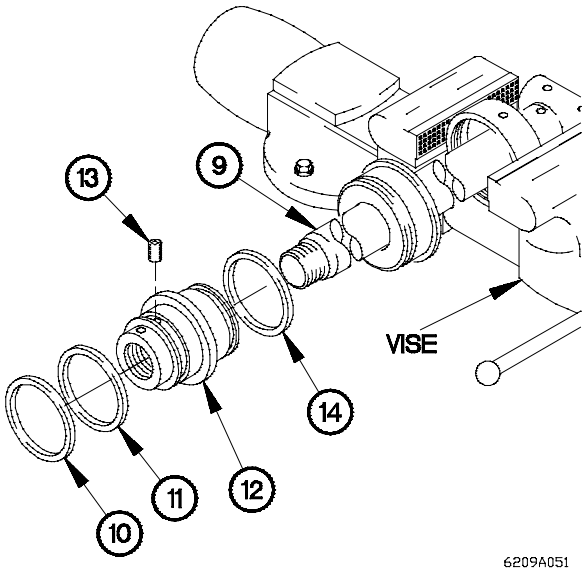
(9) Remove cylinder barrel (1) from vise.



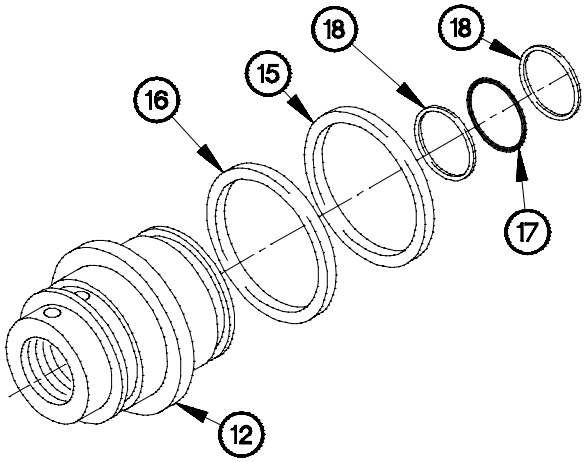
(10) Position rod (9) in vise.

(11) Remove guide lock ring (10) and seal (11) from piston (12). Discard seal.

(12) Remove set screw (13), piston (12), and spacer (14) from rod (9).



6209A051



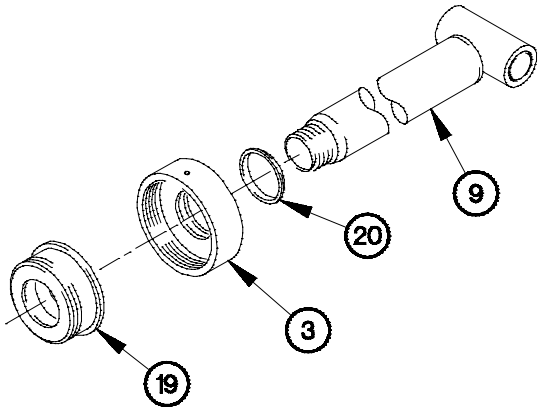
6209A061

(13) Remove guide lock ring (15) and seal (16) from piston (12). Discard seal.

(14) Remove preformed packing (17) and two back-up rings (18) from piston (12). Discard preformed packing and back-up rings.

(15) Remove cylinder head (19) and retaining ring (3) from rod (9).

(16) Remove wiper ring (20) from retaining ring (3). Discard wiper ring.

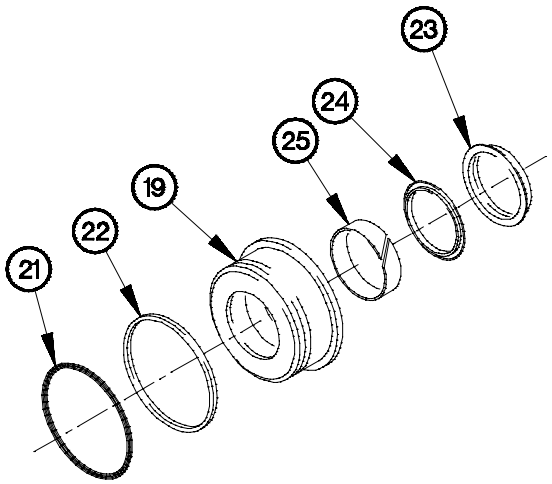


6209A071

26-9. M1089 ERECTION CYLINDER REPAIR (CONT)

(17) Remove preformed packing (21) and back-up ring (22) from cylinder head (19). Discard preformed packing and back-up ring.

(18) Remove rod seal (23), buffer seal (24), and wear ring (25) from cylinder head (19). Discard wear ring, buffer seal, and rod seal.

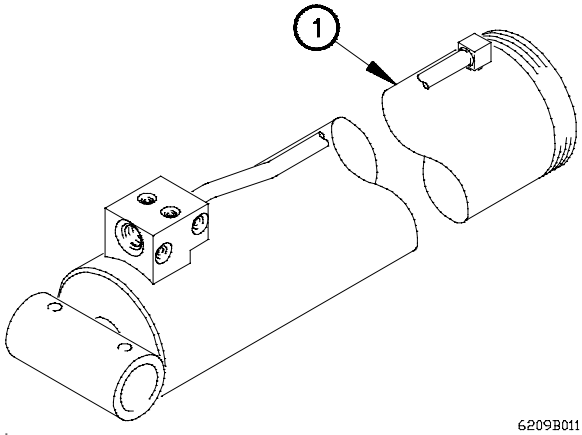


6209A081

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 eater and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**



6209B011

(1) Clean all metal parts with dry cleaning solvent.

NOTE

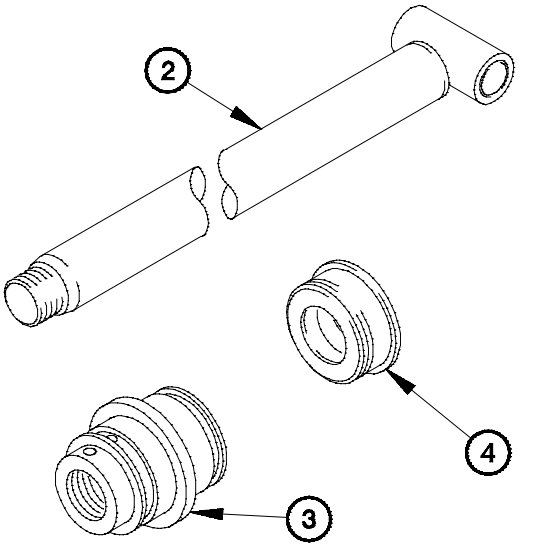
If cylinder barrel fails inspection in Step (2) stop inspection procedure and replace erection cylinder assembly.

(2) Inspect inner walls of erection cylinder barrel (1) for pitting, corrosion, or evidence of binding.

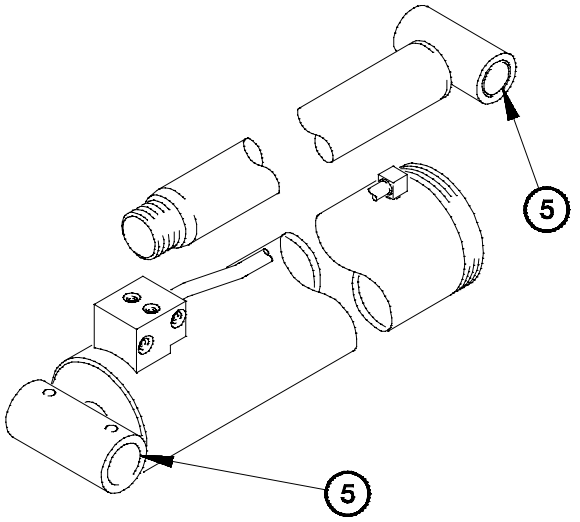
(3) Inspect rod (2) for pitting or corrosion.

(4) Inspect piston (3) for pitting or corrosion.

(5) Inspect cylinder head (4) for pitting or corrosion.



6209B021



6209B031

(6) Inspect two bushings (5) for pitting, corrosion, or evidence of binding.

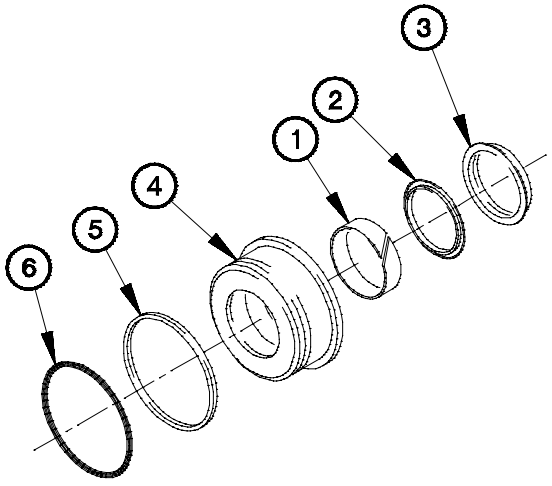
c. Assembly.

NOTE

Apply lubricating oil to all parts during assembly.

(1) Install wear ring (1), buffer seal (2), and rod seal (3) in cylinder head (4).

(2) Install back-up ring (5) and preformed packing (6) on cylinder head (4).



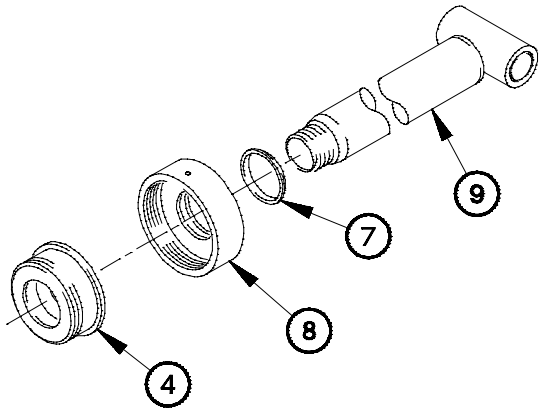
6209C011

26-9. M1089 ERECTION CYLINDER REPAIR (CONT)

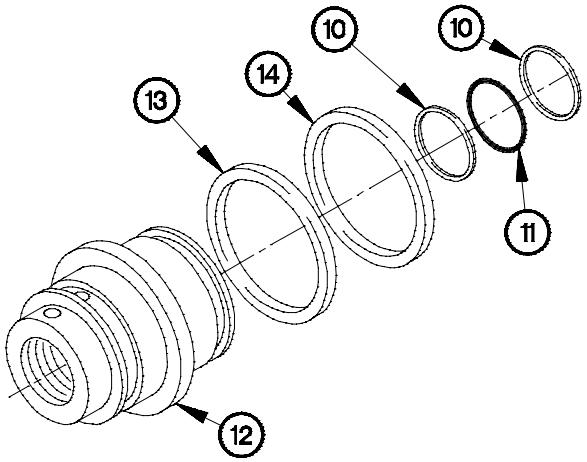
(3) Install wiper ring (7) in retaining ring (8).

(4) Install retaining ring (8) on rod (9).

(5) Install cylinder head (4) on rod (9).



6209C021



6209C031

(6) Install two back-up rings (10) and preformed packing (11) in piston (12).

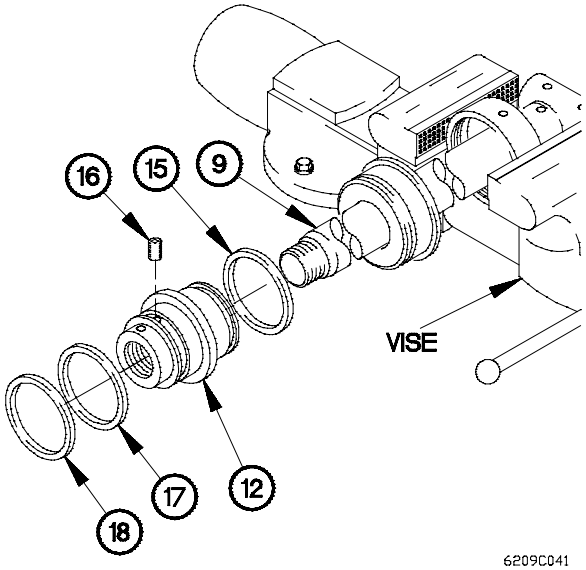
(7) Install seal (13) and guide lock ring (14) on piston (12).

(8) Place rod (9) in vise.

(9) Install spacer (15) and piston (12) on rod (9) with setscrew (16).

(10) Install seal (17) and guide lock ring (18) on piston (12).

(11) Remove rod (9) from vise.



6209C041

WARNING

Erection cylinder weighs approximately 70 lbs (32 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

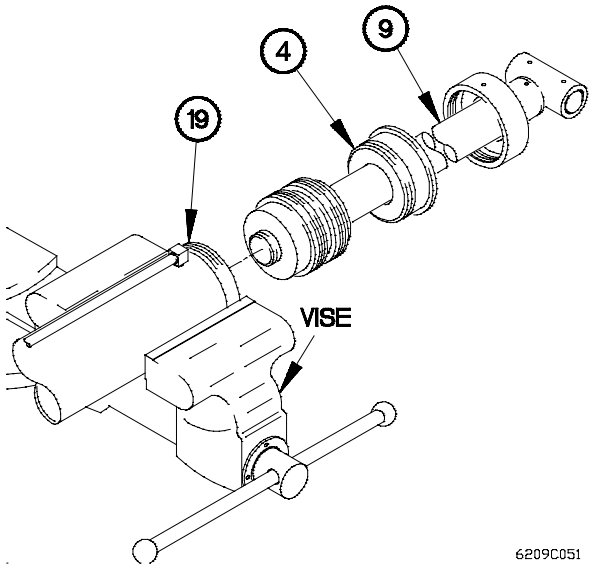
NOTE

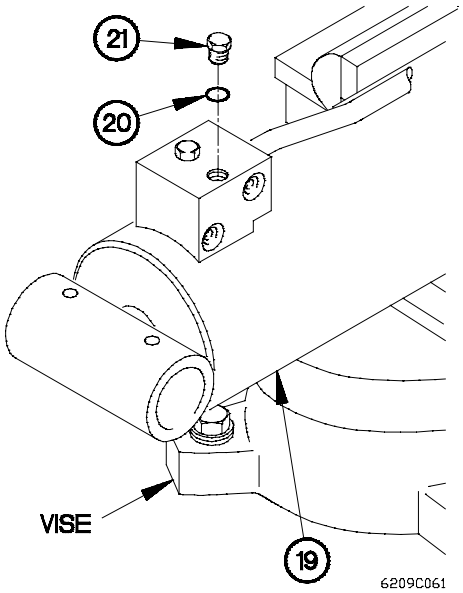
Step (12) requires the aid of an assistant.

(12) Position cylinder barrel (19) in vise.

(13) Install rod (9) in cylinder barrel (19).

(14) Install cylinder head (4) in cylinder barrel (19).





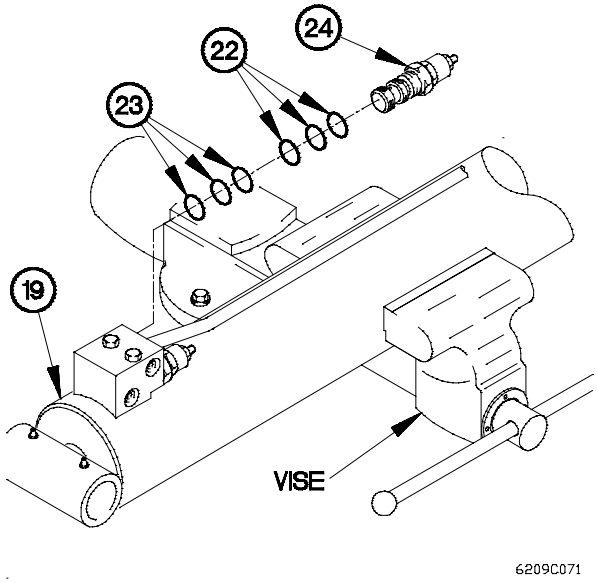
(15) Install two preformed packings (20) on plugs (21).

(16) Install two plugs (21) in cylinder barrel (19).

(17) Install three preformed packings (22) and back-up rings (23) on cartridge holding valve (24).

(18) Position cartridge holding valve (24) in erection cylinder barrel (19).

(19) Tighten cartridge holding valve (24) to 30-36 lb-ft (41-49 N·m).



26-9. M1089 ERECTION CYLINDER REPAIR (CONT)

(20) Install retaining ring (8) on cylinder barrel (19) with setscrew (25).

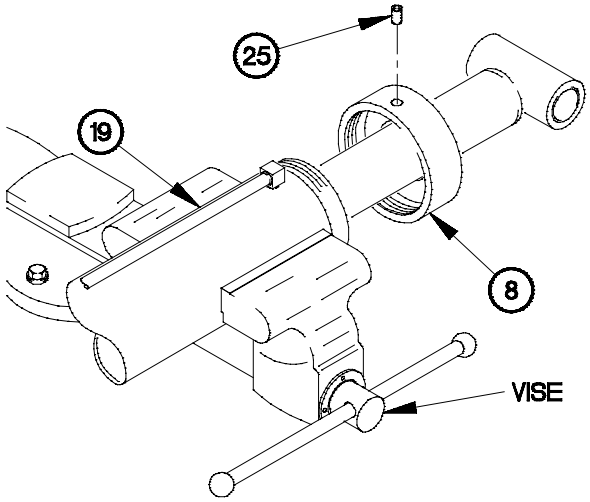
WARNING

Erection cylinder weighs approximately 70 lbs (32 kgs). The aid of an assistant is required to safely move it. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (21) requires the aid of an assistant.

(21) Remove erection cylinder barrel (19) from vise.



6209C081

End of Task.

26-10. M1084/M1086 BOOM TELESCOPIC CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Hammer, Non-sparking (Item 32, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Sling, Cargo (Item 56, Appendix B)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Kit, Repair (Item 101, Appendix F)
Kit, Repair (Item 196, Appendix F)

Personnel Required
(2)

WARNING

Boom telescopic cylinder weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to repair. Failure to comply may result in injury to personnel or damage to equipment.

a. Disassembly.

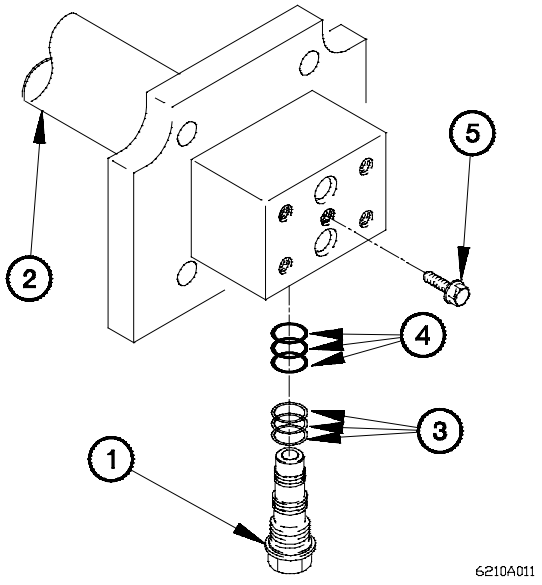
NOTE

Disassemble lower cylinder first.

(1) Remove cartridge holding valve (1) from rod (2).

(2) Remove three preformed packings (3) and back-up rings (4) from cartridge holding valve (1). Discard preformed packings and back-up rings.

(3) Remove plug (5) from rod (2).



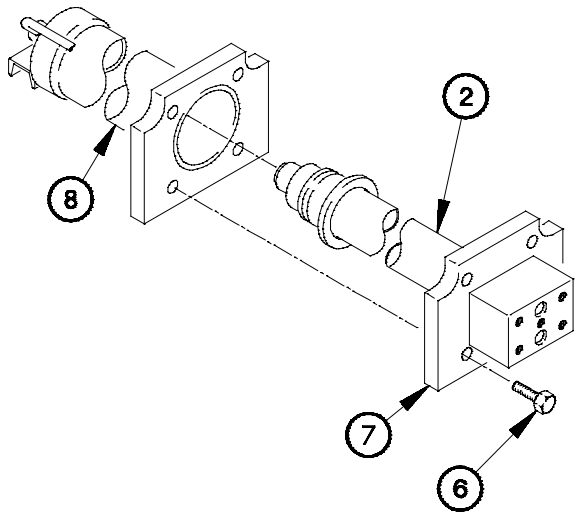
26-10. M1084/M1086 BOOM TELESCOPIC CYLINDER REPAIR (CONT)

NOTE

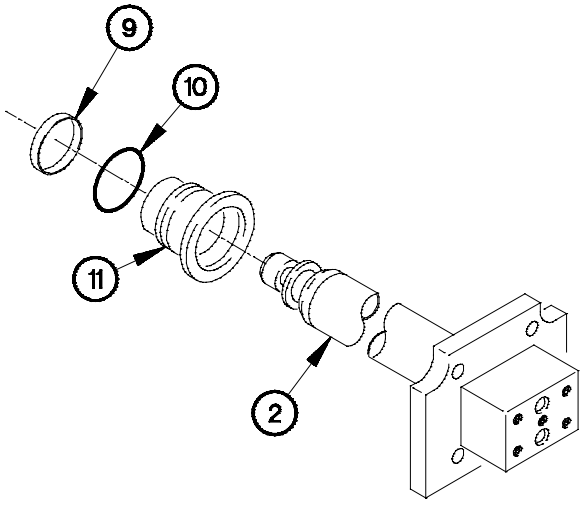
Steps (4) and (5) require the aid of an assistant.

(4) Remove four screws (6) from retaining plate (7).

(5) Remove rod (2) from telescopic cylinder (8).



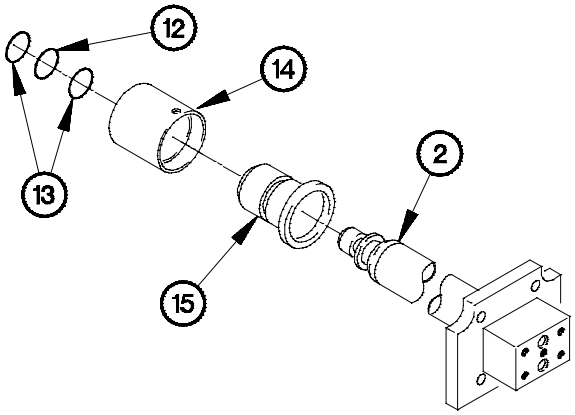
6210A021



6210A031

(6) Remove guide lock ring (9) and seal (10) from piston (11). Discard seal.

(7) Remove piston (11) from rod (2).



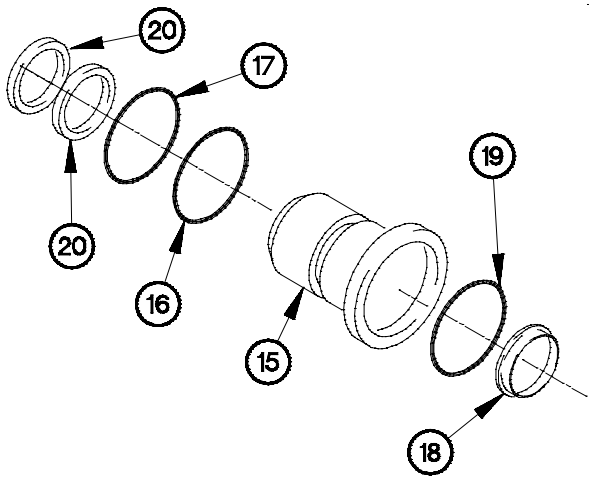
6210A041

(8) Remove preformed packing (12) and two back-up rings (13) from rod (2). Discard preformed packing and back-up rings.

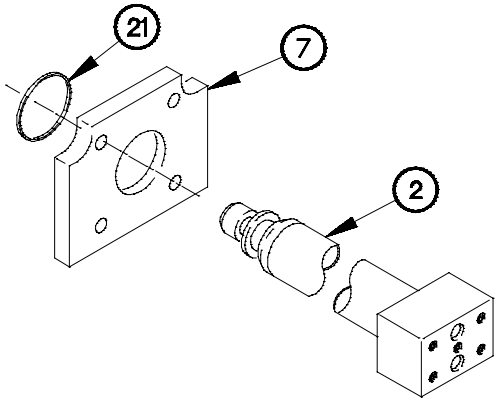
(9) Remove spacer (14) and cylinder head (15) from rod (2).

(10) Remove preformed packing (16) and back-up ring (17) from cylinder head (15). Discard preformed packing and back-up ring.

(11) Remove rod seal (18), buffer seal (19), and two wear rings (20) from cylinder head (15). Discard rod seal, buffer seal, and wear ring.



6210A051



6210A061

(12) Remove wiper ring (21) from rod (2). Discard wiper ring.

(13) Remove retaining plate (7) from rod (2).

(14) Perform steps (4) through (13) on upper cylinder.

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.**

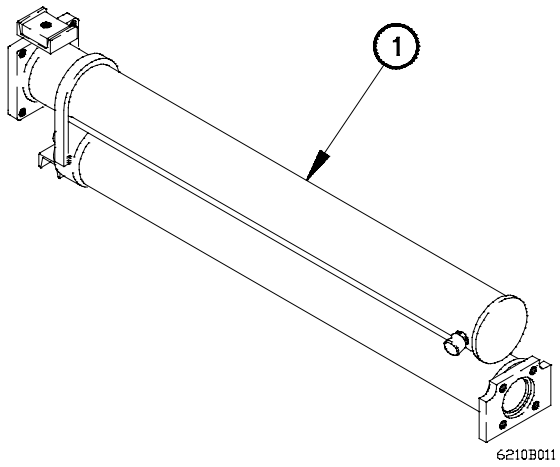
26-10. M1084/M1086 BOOM TELESCOPIC CYLINDER REPAIR (CONT)

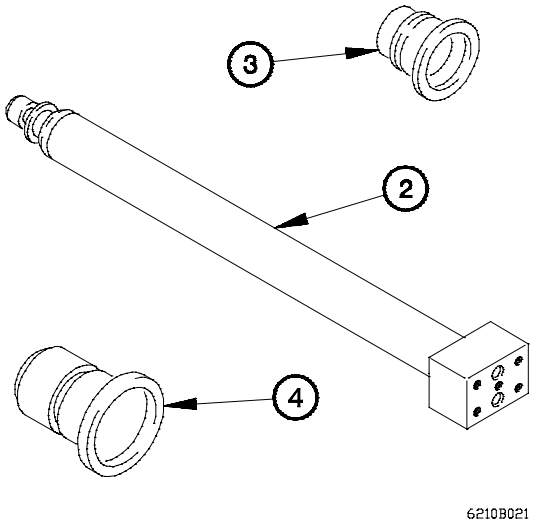
(1) Clean all parts with dry cleaning solvent.

NOTE

If cylinder barrel fails inspection in Step (2) stop inspection procedure and replace cylinder assembly.

(2) Inspect inner walls of telescopic cylinder (1) for pitting, corrosion, or evidence of binding.





NOTE

Replace any part that fails visual inspection.

(3) Inspect two rods (2) for pitting, corrosion, or evidence of binding.

(4) Inspect two pistons (3) for pitting, corrosion, or evidence of binding.

(5) Inspect two cylinder heads (4) for pitting and corrosion.

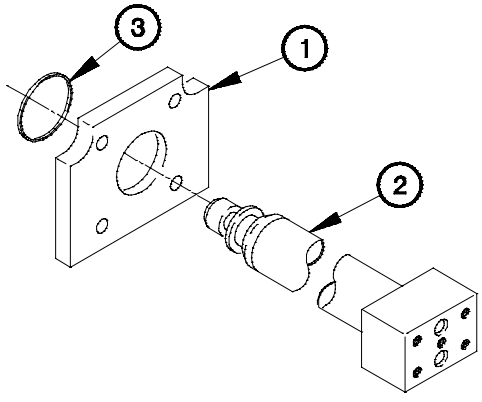
c. Assembly.

NOTE

- Apply lubricating oil to all parts during assembly.
- Assemble upper cylinder first.

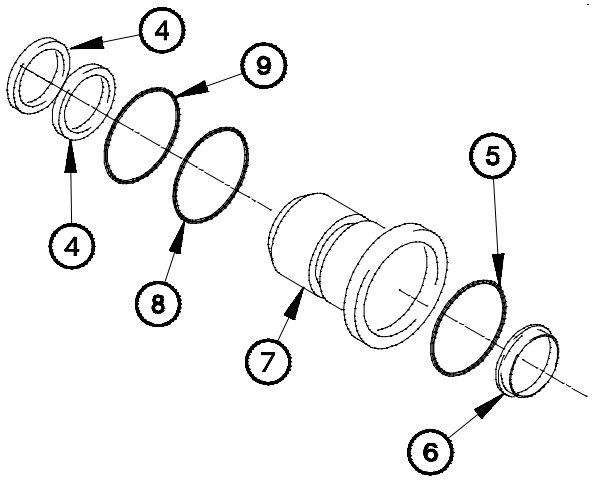
(1) Install retaining plate (1) on rod (2).

(2) Install wiper ring (3) on rod (2).

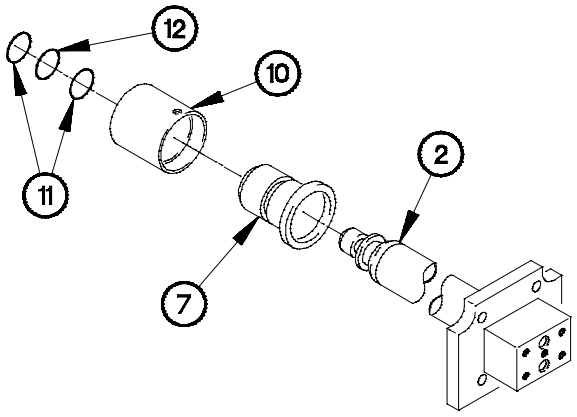


(3) Install two wear rings (4), buffer seal (5), and rod seal (6) in cylinder head (7).

(4) Install back-up ring (8) and preformed packing (9) on cylinder head (7).



6210C021



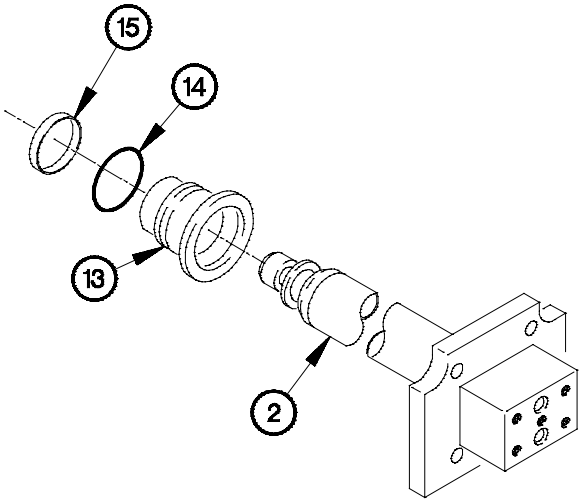
6210C031

(5) Install cylinder head (7) and spacer (10) on rod (2).

(6) Install two back-up rings (11) and preformed packing (12) on rod (2).

(7) Install piston (13) on rod (2).

(8) Install seal (14) and guide lock ring (15) on piston (13).



6210C041

26-10. M1084/M1086 BOOM TELESCOPIC CYLINDER REPAIR (CONT)

NOTE

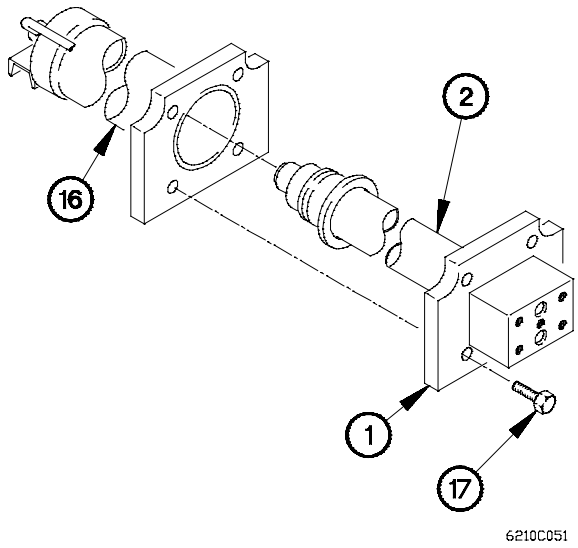
Steps (9) and (10) require the aid of an assistant.

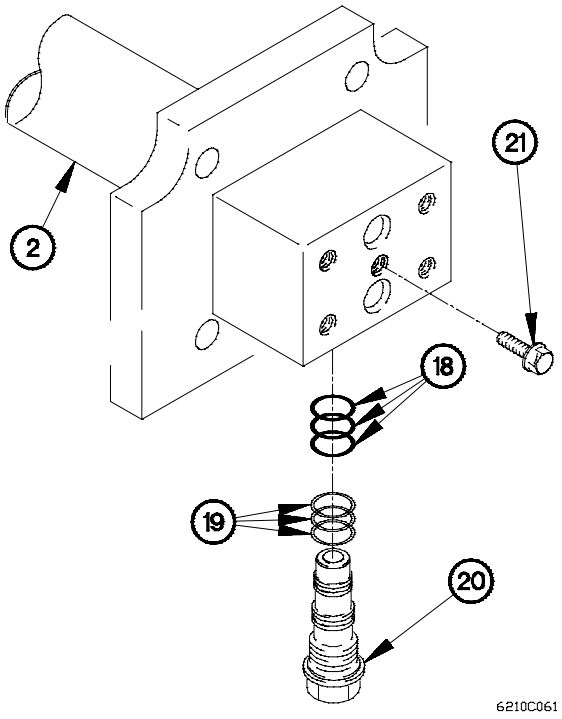
(9) Install rod (2) in telescopic cylinder (16).

(10) Position head retaining plate (1) to telescopic cylinder (16) with four screws (17).

(11) Tighten screws (17) to 60-90 lb-ft (81-122 N·m).

(12) Perform steps (1) through (11) on lower cylinder.





NOTE

Perform steps (13) through (16) on lower cylinder.

(13) Install three preformed packings (18) and back-up rings (19) on cartridge holding valve (20).

(14) Position cartridge holding valve (20) on rod (2).

(15) Tighten cartridge holding valve (20) to 30-36 lb-ft (41-49 N·m).

(16) Install plug (21) in rod (2).

End of Task.

26-11. M1089 BOOM TELESCOPIC CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Hammer, Non-sparking (Item 32, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Sling, Cargo (Item 56, Appendix B)

Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Kit, Repair (Item 101, Appendix F)

Materials/Parts (Cont)
Kit, Repair (Item 97, Appendix F)
Packing, Preformed (Item 269, Appendix F)
Retainer, Packing (2) (Item 357.1, Appendix F)
Retainer, Packing (Item 357.2, Appendix F)
Packing, Preformed (Item 257.1, Appendix F)
Packing, Preformed (Item 255.1, Appendix F)

Personnel Required
(2)

WARNING

Boom telescopic cylinder weighs approximately 230 lbs (104 kgs). Attach a suitable lifting device prior to repair. Failure to comply may result in injury to personnel or damage to equipment.

a. Disassembly.

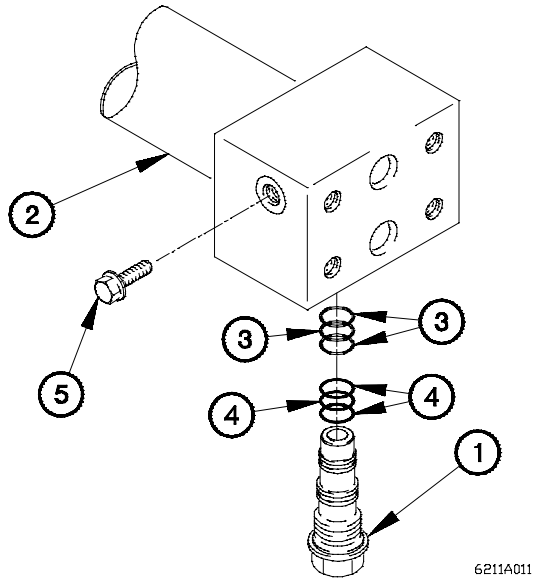
NOTE

Disassemble lower cylinder first.

(1) Remove cartridge holding valve (1) from rod (2).

(2) Remove three back-up rings (3) and preformed packings (4) from cartridge holding valve (1). Discard preformed packings and back-up rings.

(3) Remove plug (5) from rod (2).



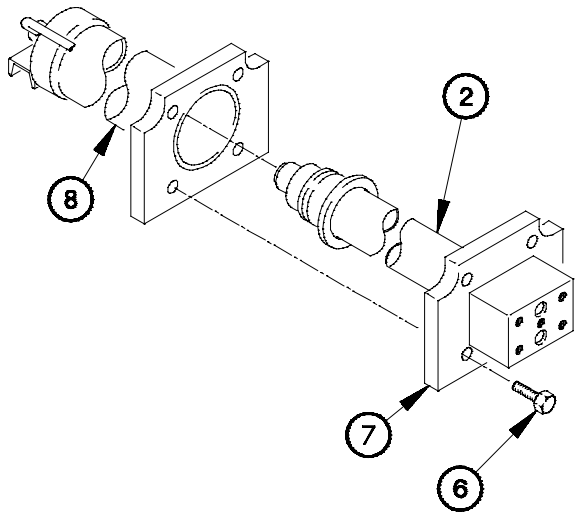
26-11. M1089 BOOM TELESCOPIC CYLINDER REPAIR (CONT)

NOTE

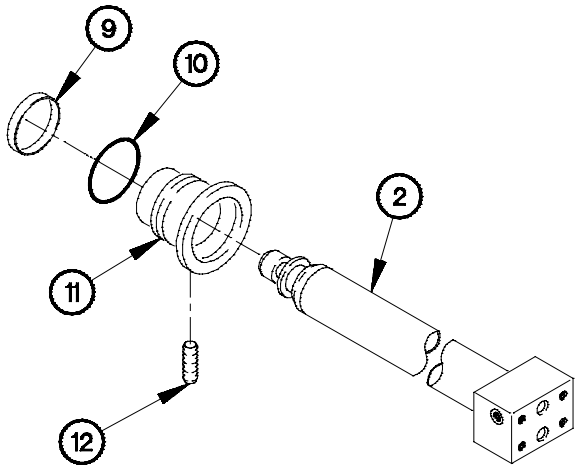
Steps (4) and (5) require the aid of an assistant.

(4) Remove four screws (6) from retaining plate (7).

(5) Remove rod (2) from telescopic cylinder (8).



6211A021



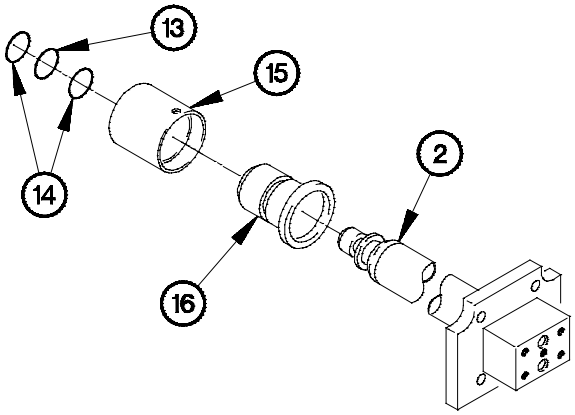
6211A031

(6) Remove guide lock ring (9) and seal (10) from piston (11). Discard seal.

(7) Remove setscrew (12) and piston (11) from rod (2).

(8) Remove preformed packing (13), two back-up rings (14) from rod (2). Discard preformed packing and back-up rings.

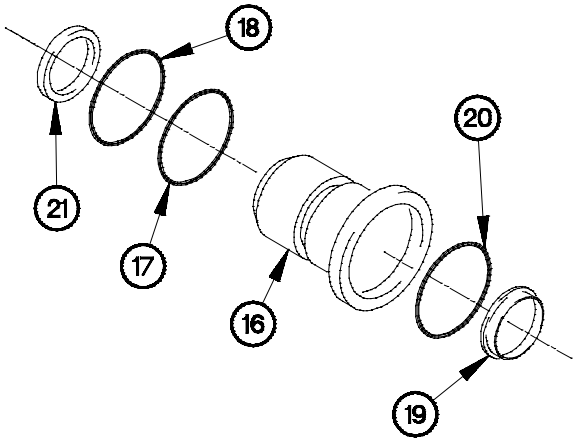
(9) Remove spacer (15) and cylinder head (16) from rod (2).



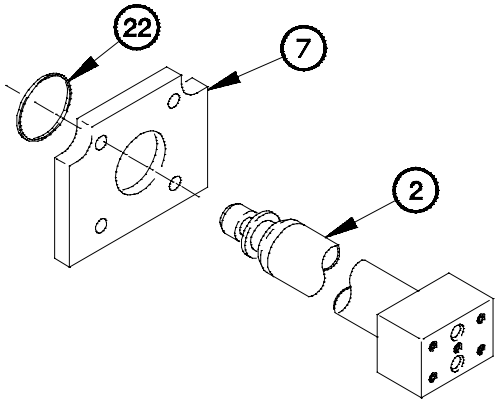
6211A041

(10) Remove preformed packing (17) and back-up ring (18) from cylinder head (16). Discard preformed packing and back-up ring.

(11) Remove rod seal (19), buffer seal (20), and wear ring (21) from cylinder head (16). Discard rod seal, buffer seal, and wear ring.



6211A051



6211A061

(12) Remove wiper ring (22) from rod (2). Discard wiper ring.

(13) Remove retaining plate (7) from rod (2).

(14) Perform steps (4) through (13) on upper cylinder.

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.**

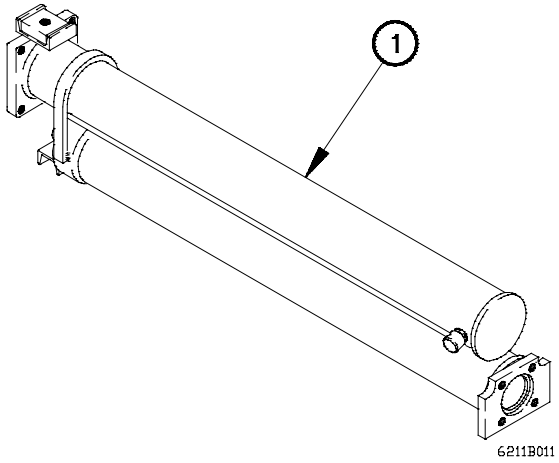
26-11. M1089 BOOM TELESCOPIC CYLINDER REPAIR (CONT)

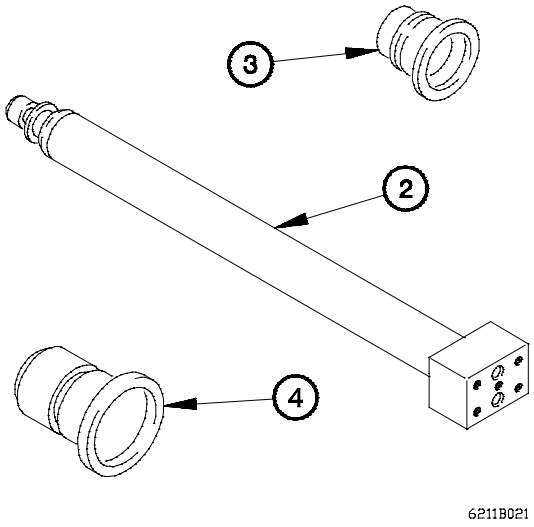
(1) Clean all parts with dry cleaning solvent.

NOTE

If cylinder barrel fails inspection in Step (2) stop inspection procedure and replace cylinder assembly.

(2) Inspect inner walls of telescopic cylinder (1) for pitting, corrosion, or evidence of binding.





c. Assembly.

NOTE

- Apply lubricating oil to all parts during assembly.
- Assemble upper cylinder first.

(1) Install retaining plate (1) on rod (2).

(2) Install wiper ring (3) on rod (2).

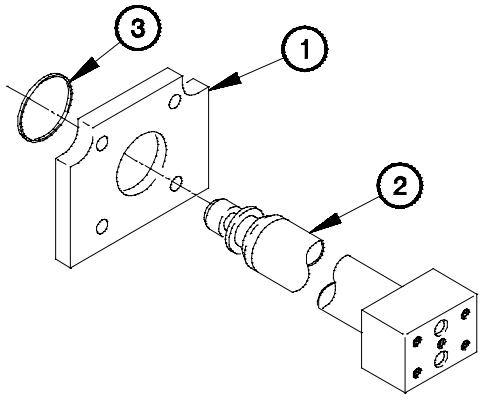
NOTE

Replace any part that fails visual inspection.

(3) Inspect two rods (2) for pitting, corrosion, or evidence of binding.

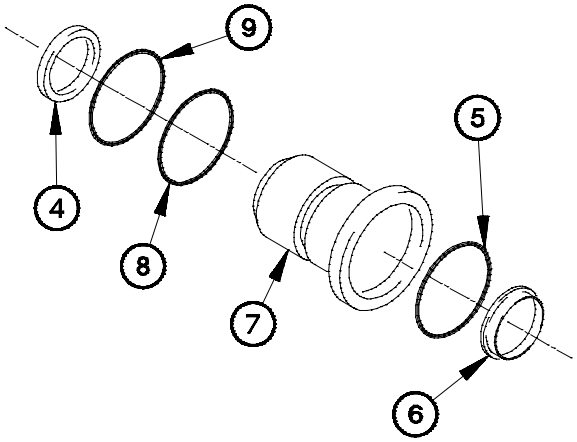
(4) Inspect two pistons (3) for pitting, corrosion, or evidence of binding.

(5) Inspect two cylinder heads (4) for pitting and corrosion.

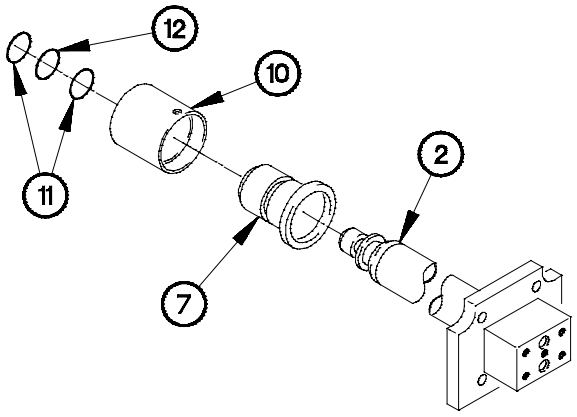


(3) Install wear ring (4), buffer seal (5), and rod seal (6) in cylinder head (7).

(4) Install back-up ring (8) and preformed packing (9) on cylinder head (7).



6211C021



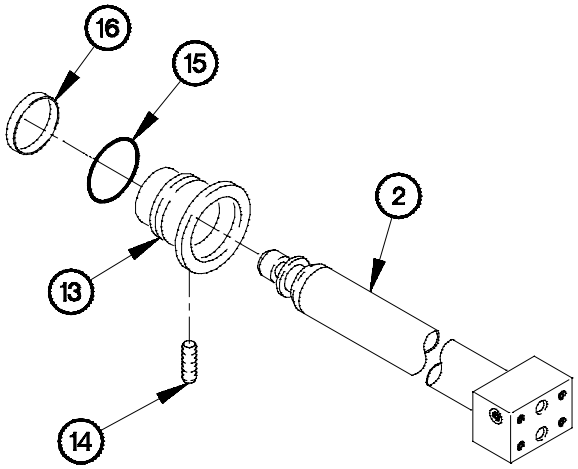
6211C031

(5) Install cylinder head (7) and spacer (10) on rod (2).

(6) Install two back-up rings (11) and preformed packing (12) on rod (2).

(7) Install piston (13) on rod (2) with setscrew (14).

(8) Install seal (15) and guide lock ring (16) on piston (13).



6211C041

26-11. M1089 BOOM TELESCOPIC CYLINDER REPAIR (CONT)

NOTE

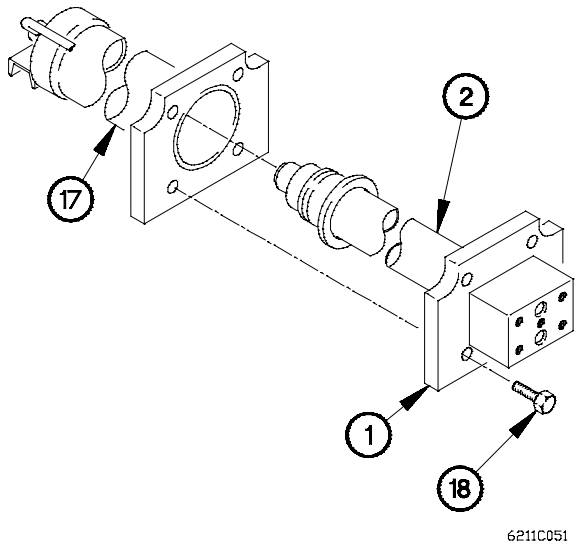
Steps (9) and (10) require the aid of an assistant.

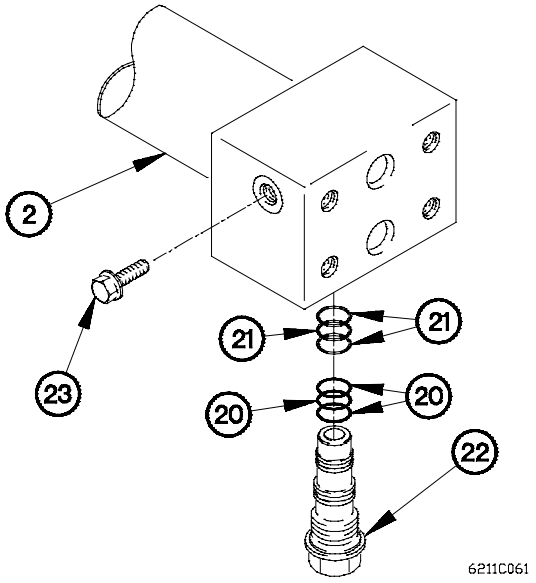
(9) Install rod (2) in telescopic cylinder (17).

(10) Position head retaining plate (1) to telescopic cylinder (17) with four screws (18).

(11) Tighten screws (18) to 60-90 lb-ft (81-122 N·m).

(12) Perform steps (1) through (11) on lower cylinder.





NOTE

Perform steps (13) through (16) on lower cylinder.

(13) Install three preformed packings (20) and back-up rings (21) on cartridge holding valve (22).

(14) Position cartridge holding valve (22) on rod (2).

(15) Tighten cartridge holding valve (22) to 30-36 lb-ft (41-49 N·m).

(16) Install plug (23) in rod (2).

End of Task.

26-12. JACK CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Pan, Drain (Item 43, Appendix B)
Sling, Cargo (Item 56, Appendix B)

Materials/Parts
Kit, Repair (M1089) (Item 104, Appendix F)
Kit, Repair (M1084/M1086) (Item 95, Appendix F)
Kit Repair (2) (Item 101, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

WARNING

Jack cylinder weighs approximately 110 lbs (50 kgs). Attach a suitable lifting device prior to repair. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

M1084/M1086/M1089 jack cylinders are repaired the same way. M1089 jack cylinder shown.

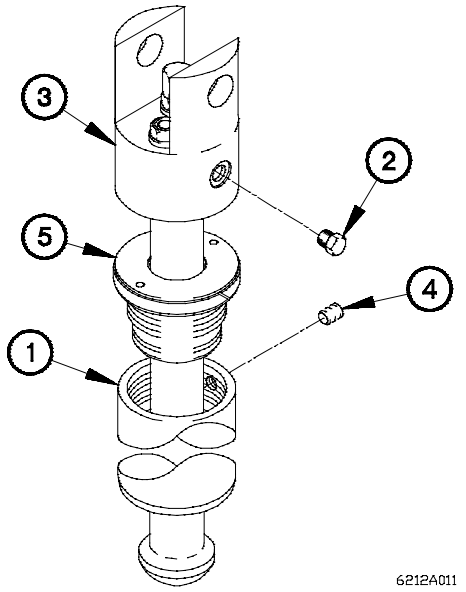
a. Disassembly.

(1) Place drain pan under cylinder barrel (1).

(2) Remove two plugs (2) from rod (3).

(3) Remove setscrew (4) from cylinder barrel (1).

(4) Remove cylinder head (5) from cylinder barrel (1).



26-12. JACK CYLINDER REPAIR (CONT)

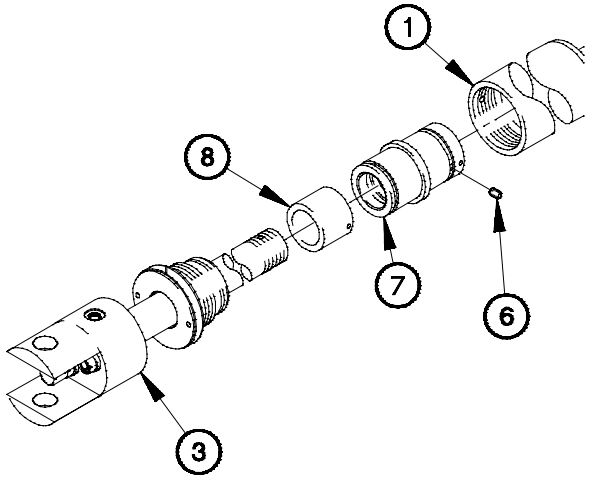
CAUTION

Do not pry cylinder head from cylinder barrel. Failure to comply may result in damage to equipment.

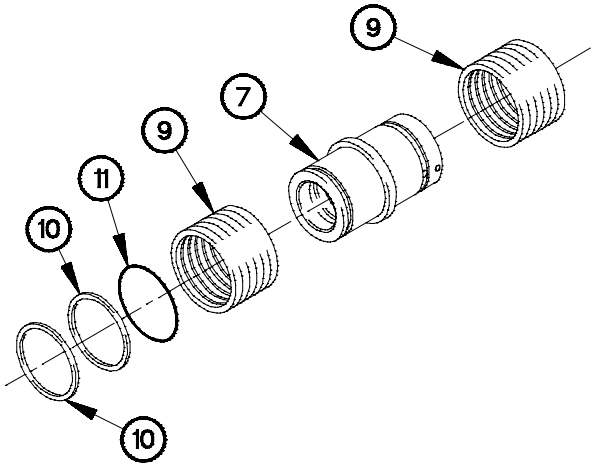
(5) Remove rod (3) from cylinder barrel (1).

(6) Remove setscrew (6) and piston (7) from rod (3).

(7) Remove spacer (8) from rod (3).



6212A021



6212A031

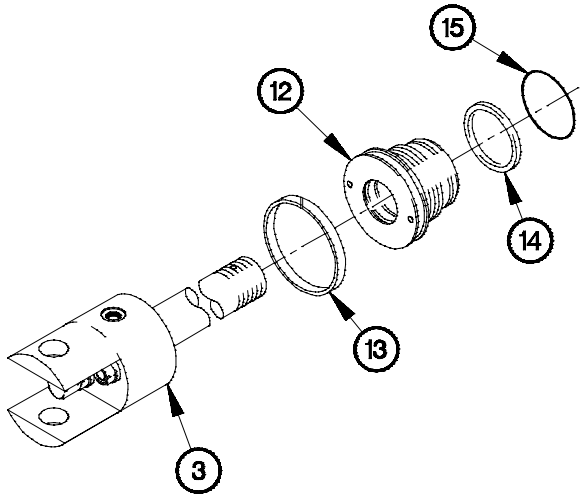
(8) Remove two seal assemblies (9) from piston (7). Discard seal assemblies.

(9) Remove two back-up rings (10) and preformed packing (11) from piston (7). Discard back-up rings and preformed packing.

(10) Remove cylinder head (12) from rod (3).

(11) Remove wear ring (13) from cylinder head (12). Discard wear ring.

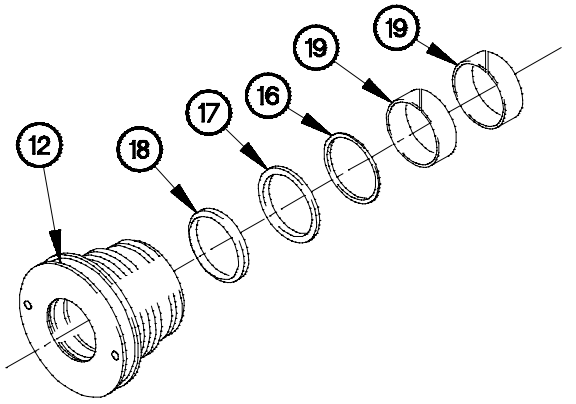
(12) Remove back-up ring (14) and preformed packing (15) from cylinder head (12). Discard back-up ring and preformed packing.



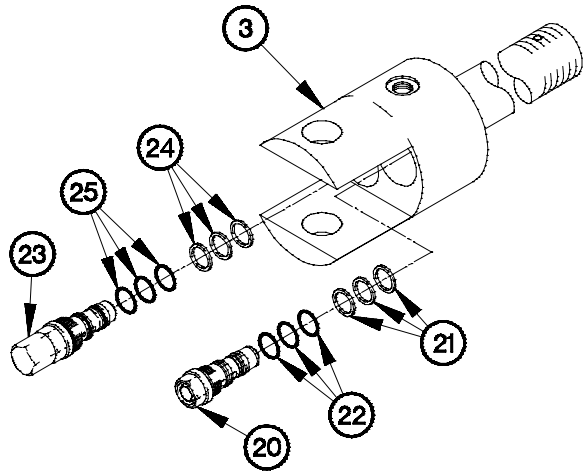
6212A041

(13) Remove buffer seal (16), rod seal (17), and wiper ring (18) from cylinder head (12). Discard wiper ring, rod seal, and buffer seal.

(14) Remove two wear rings (19) from cylinder head (12). Discard wear rings.



6212A051



6212A061

(15) Remove check valve (20) from rod (3).

(16) Remove three back-up rings (21) and preformed packings (22) from check valve (20). Discard preformed packings and back-up rings.

(17) Remove cartridge holding valve (23) from rod (3).

(18) Remove three back-up rings (24) and preformed packings (25) from cartridge holding valve (23). Discard preformed packings and back-up rings.

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.**

26-12. JACK CYLINDER REPAIR (CONT)

(1) Clean all parts with dry cleaning solvent.

NOTE

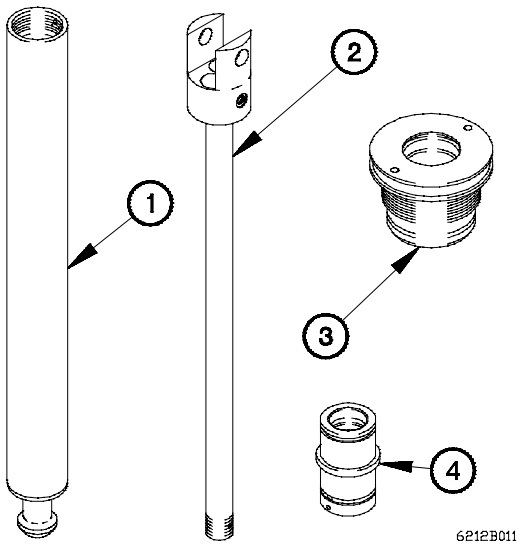
Replace any part that fails visual inspection. If cylinder barrel fails inspection, replace jack cylinder assembly.

(2) Inspect inner walls of cylinder barrel (1) for pitting, corrosion, or evidence of binding.

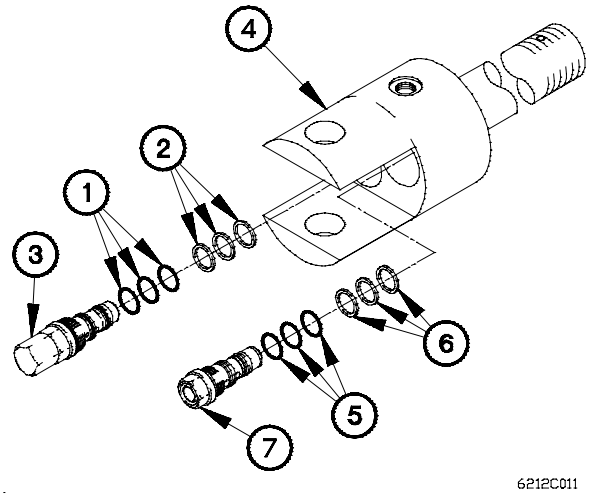
(3) Inspect rod (2) for pitting, corrosion, scoring, or evidence of binding.

(4) Inspect cylinder head (3) for pitting or corrosion.

(5) Inspect piston (4) for pitting, corrosion, or evidence of binding.



c. Assembly.



NOTE

Apply lubricating oil to all parts during assembly.

(1) Install three preformed packings (1) and back-up rings on cartridge holding valve (3).

(2) Position cartridge holding valve (3) in rod (4).

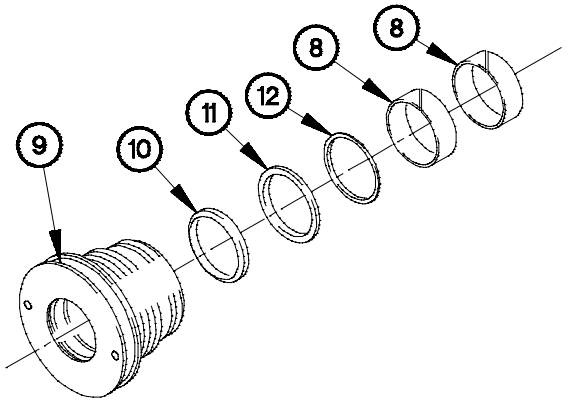
(3) Tighten cartridge holding valve (3) to 30-36 lb-ft (41-49 N·m).

(4) Install three preformed packings (5) and back-up rings (6) on check valve (7).

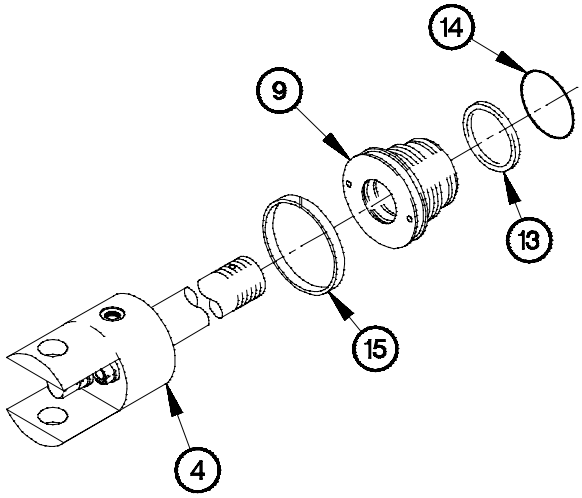
(5) Install check valve (7) in rod (4).

(6) Install two wear rings (8) on cylinder head (9).

(7) Install wiper ring (10), rod seal (11), and buffer seal (12) on cylinder head (9).



6212C021



6212C031

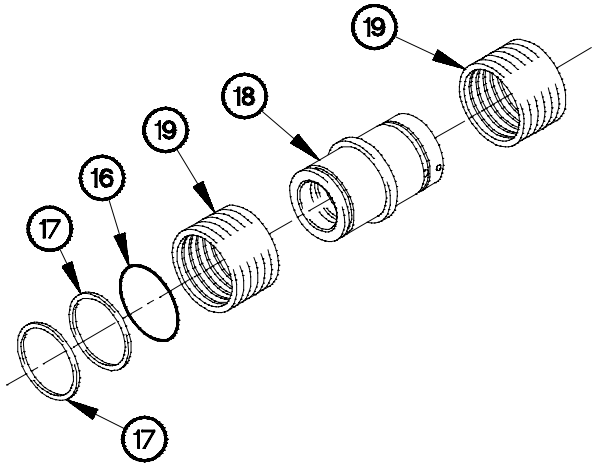
(8) Install back-up ring (13) and preformed packing (14) on cylinder head (9).

(9) Install wear ring (15) on cylinder head (9).

(10) Install cylinder head (9) on rod (4).

(11) Install preformed packing (16) and two back-up rings (17) on piston (18).

(12) Install two seal assemblies (19) on piston (18) with vee in seals facing opposite directions.



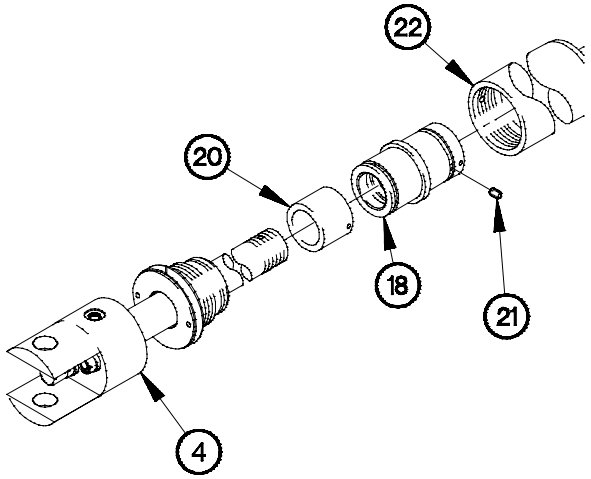
6212C041

26-12. JACK CYLINDER REPAIR (CONT)

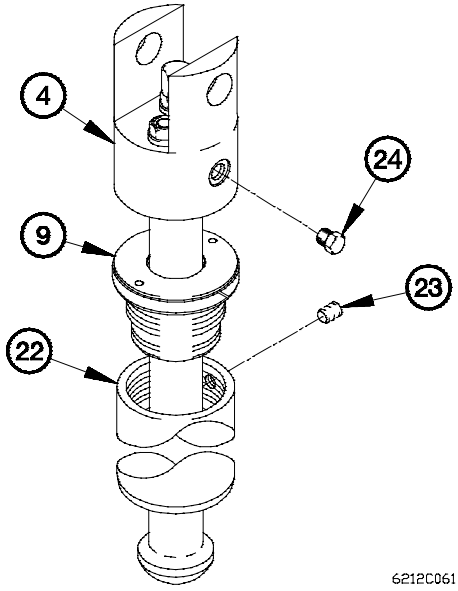
(13) Install spacer (20) on rod (4).

(14) Install piston (18) on rod (4) with setscrew (21).

(15) Install rod (4) in cylinder barrel (22).



6212C051



6212C061

(16) Install cylinder head (9) in cylinder barrel (22).

(17) Install setscrew (23) in cylinder barrel (22).

(18) Install two plugs (24) in rod (4).

End of Task.

26-13. M1089 OUTRIGGER EXTENSION CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)

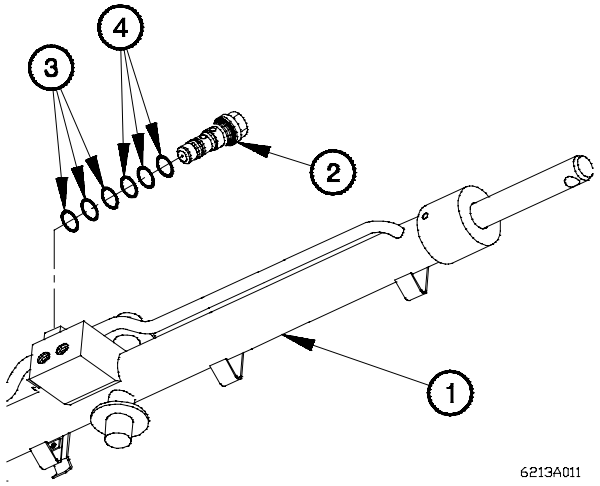
Materials/Parts
Kit, Repair (Item 98, Appendix F)
Kit, Repair (Item 101, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

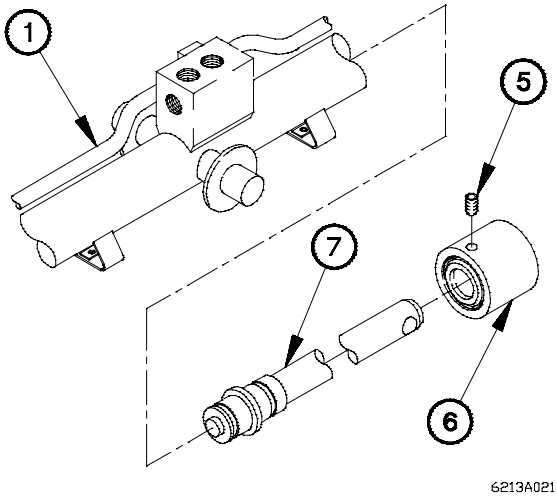
a. Disassembly.

(1) Place drain pan under cylinder barrel (1).

(2) Remove check valve (2) from cylinder barrel (1).

(3) Remove three preformed packings (3) and back-up rings (4) from check valve (2). Discard preformed packings and back-up rings.





NOTE

Both rods are disassembled the same way. One is shown.

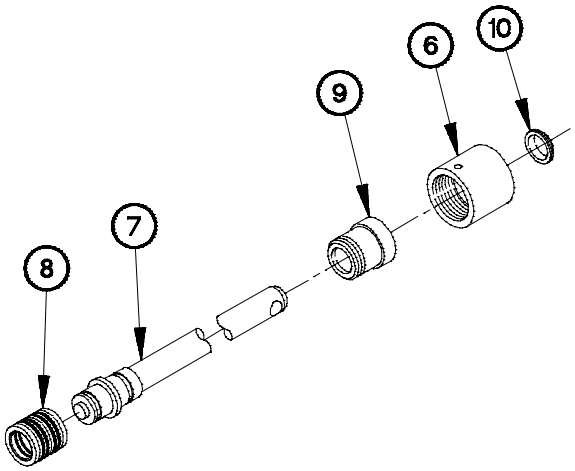
(4) Remove setscrew (5), ring (6), and rod (7) from cylinder barrel (1).

26-13. M1089 OUTRIGGER EXTENSION CYLINDER REPAIR (CONT)

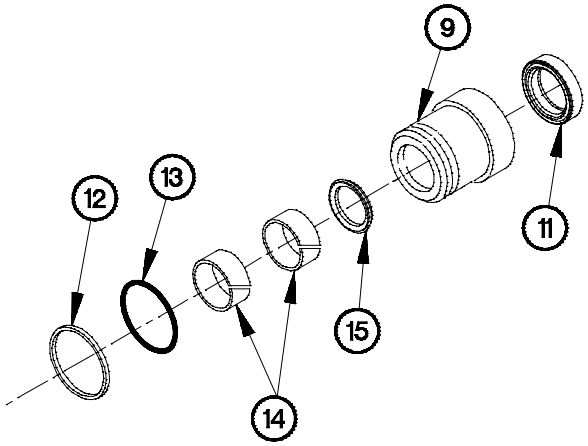
(5) Remove seal (8) from rod (7). Discard seal.

(6) Remove ring (6) and cylinder head (9) from rod (7).

(7) Remove wiper ring (10) from ring (6). Discard wiper ring.



6213A031



6213A041

(8) Remove seal (11), back-up ring (12), preformed packing (13), two wear rings (14), and buffer seal (15) from cylinder head (9). Discard seal, back-up ring, preformed packing, wear rings, and buffer seal.

(9) Perform steps (4) through (8) on remaining rod.

b. Cleaning/Inspection.

WARNING

- **Dry Cleaning Solvent 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 breath 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 138°F (50°C). Failure to comply may result in serious injury or death to personnel.**

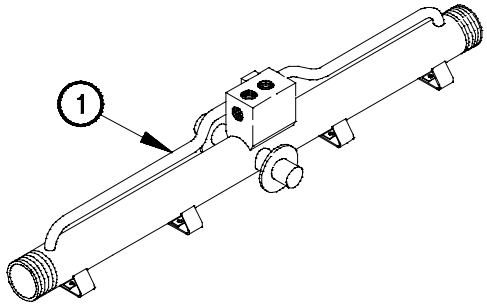
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious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

(1) Clean all metal parts with dry cleaning solvent.

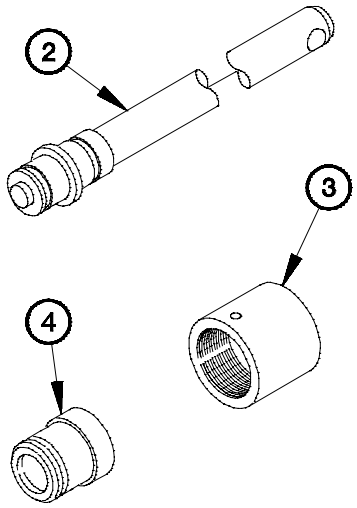
NOTE

Replace any part that fails visual inspection. If cylinder barrel fails inspection, replace outrigger extension cylinder assembly.

(2) Inspect inner walls of cylinder barrel (1) for pitting, corrosion, or evidence of binding.



6213B011



6213B021

(3) Inspect two rods (2) for pitting, corrosion, or evidence of binding around piston.

(4) Inspect two rings (3) for pitting or corrosion.

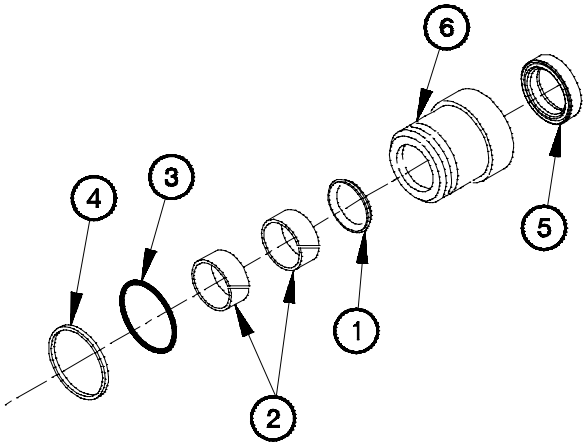
(5) Inspect two cylinder heads (4) for pitting or corrosion.

c. Assembly.

NOTE

- Apply lubricating oil to all parts during assembly.
- Both rods are assembled the same way. One is shown.

(1) Install buffer seal (1), two wear rings (2), preformed packing (3), back-up ring (4), and rod seal (5) in cylinder head (6).



6213C011

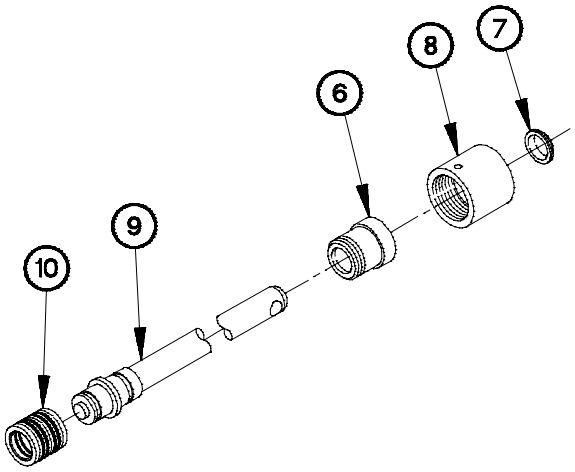
26-13. M1089 OUTRIGGER EXTENSION CYLINDER REPAIR (CONT)

(2) Install wiper ring (7) on ring (8).

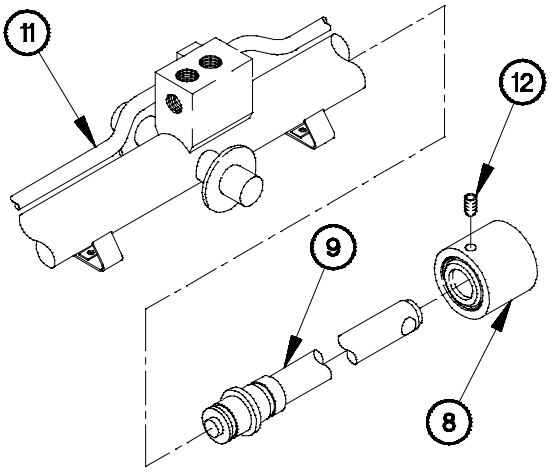
(3) Install ring (8) on cylinder head (6).

(4) Install cylinder head (6) and ring (8) on rod (9).

(5) Install seal (10) on rod (9) with vee in seals facing in opposite directions.



6213C021



6213C031

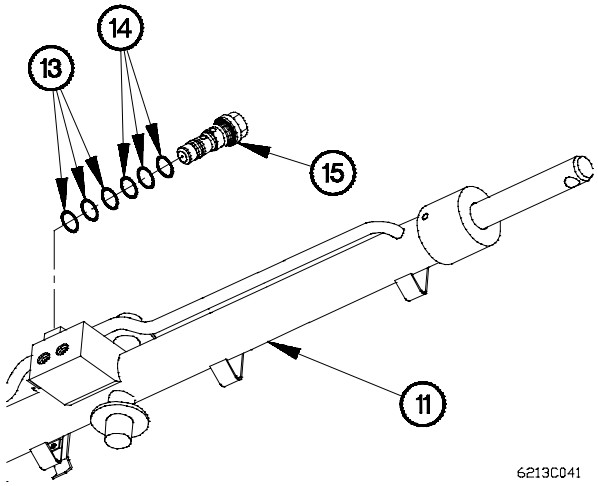
(6) Install rod (9) in cylinder barrel (11) with ring (8).

(7) Install setscrew (12) in ring (8).

(8) Perform steps (1) through (7) on remaining rod.

(9) Install three back-up rings (13) and preformed packings (14) on check valve (15).

(10) Install check valve (15) on cylinder barrel (11).



6213C041

End of Task.

CHAPTER 27
HYDRAULIC MAINTENANCE

Section I. INTRODUCTION 27-1
27-1. INTRODUCTION 27-1

Section II. MAINTENANCE PROCEDURES
27-2. M1090/M1094 DUMP BODY LIFT CYLINDER REPAIR 27-2

Section I. INTRODUCTION

27-1. INTRODUCTION

This chapter contains maintenance instructions for repairing Hydraulic Components authorized by the Maintenance Allocation Chart (MAC) at the General Support (GS) Maintenance level.

Section II. MAINTENANCE PROCEDURES

27-2. M1090/M1094 DUMP BODY LIFT CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly

INITIAL SETUP

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Spanner (TM 9-2320-366-20)
Multiplier, Torque Wrench (Item 42, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Pan, Drain (Item 43, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

Materials/Parts
Kit, Seal (Item 117, Appendix F)
Tape, Antiseizing (Item 85, Appendix C)
Packing, Preformed (Item 288, Appendix F)

Materials/Parts (Cont)
Packing, Preformed (Item 287, Appendix F)
Nut, Self-Locking (Item 196, Appendix F)
Washer, Wave (Item 439, Appendix F)
Spacer, Nylon (Item 421, Appendix F)
Sealing Compound (Item 69, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)

Personnel Required
(2)

a. Disassembly.

WARNING

Dump body lift cylinder weighs approximately 200 lbs (91 kg). Attach a suitable lifting device prior to lifting. Failure to comply may result in injury to personnel or damage to equipment.

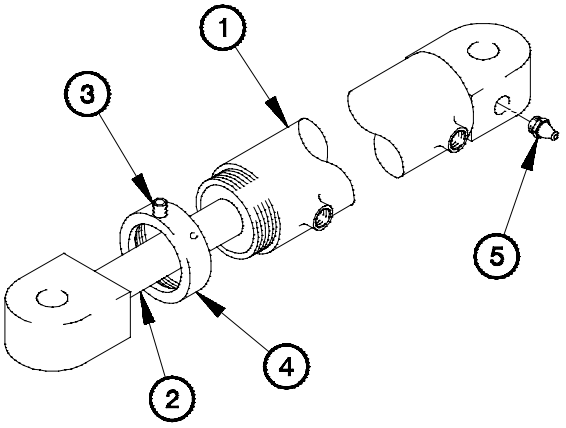
(1) Place drain pan under lift cylinder barrel (1).

(2) Extend cylinder rod (2) approximately 12 inches (31 cm).

(3) Loosen screw (3) on collar (4).

(4) Remove collar (4) from lift cylinder barrel (1).

(5) Remove lubrication fitting (5) from lift cylinder barrel (1).



6302A011

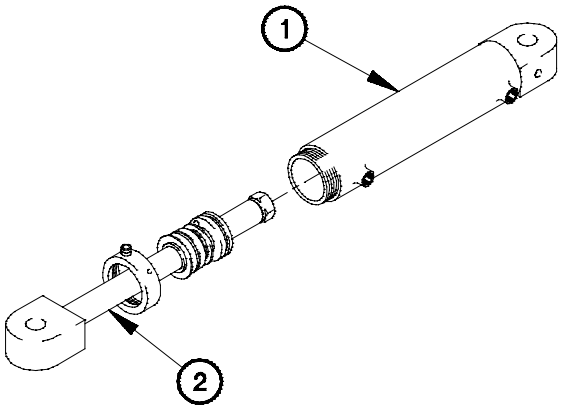
WARNING

Cylinder rod weighs approximately 110 lbs (50 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

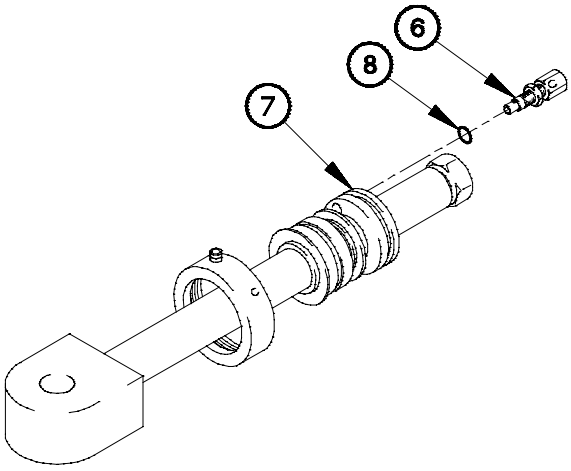
NOTE

Step (6) requires the aid of an assistant.

(6) Remove cylinder rod (2) from lift cylinder barrel (1).



6302A021



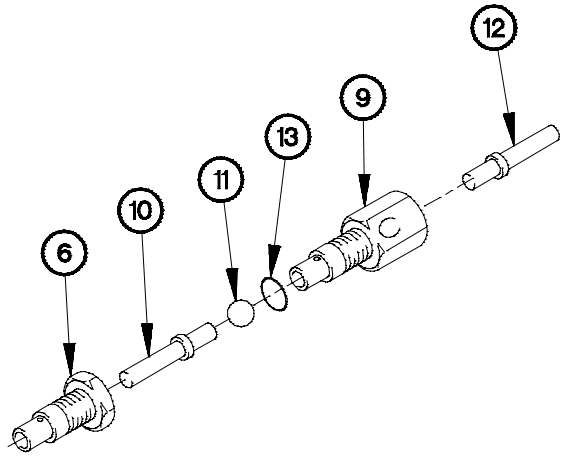
6302A031

(7) Remove bypass valve (6) from piston (7).

(8) Remove preformed packing (8) from bypass valve (6). Discard preformed packing.

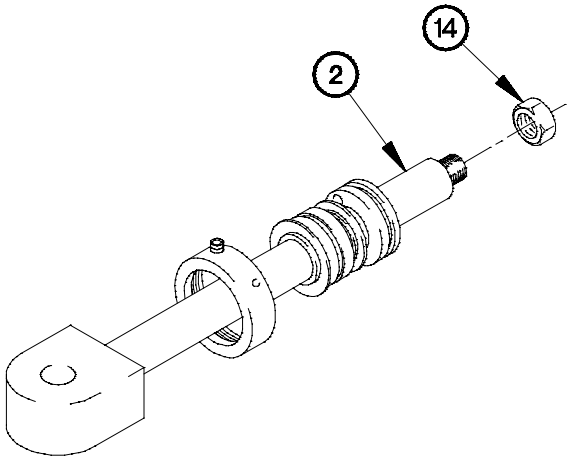
(9) Remove bypass housing (9), pin (10), ball (11), and pin (12) from bypass valve (6).

(10) Remove preformed packing (13) from bypass housing (9). Discard preformed packing.



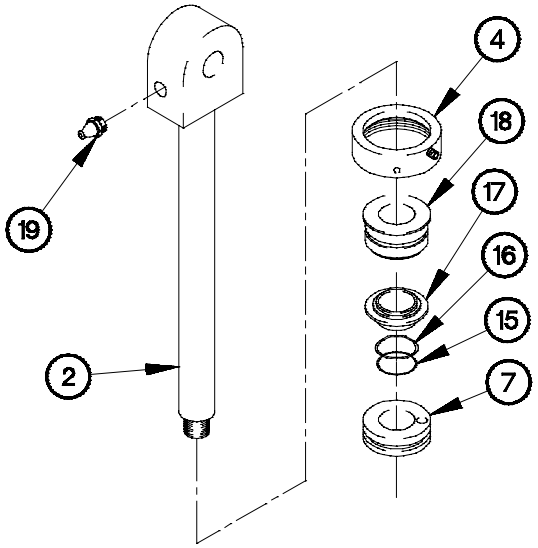
6302A041

27-2. M1090/M1094 DUMP BODY LIFT CYLINDER REPAIR (CONT)



6302A051

(11) Remove self-locking nut (14) from cylinder rod (2). Discard self-locking nut.



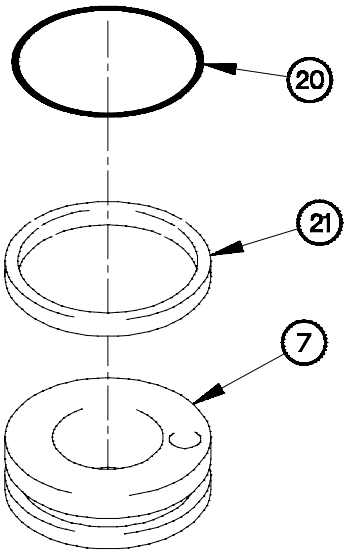
6302A061

(12) Remove piston (7) from cylinder rod (2).

(13) Remove preformed packing (15) and wave washer (16) from cylinder rod (2). Discard preformed packing and wave washer.

(14) Remove spacer (17), gland (18), and collar (4) from cylinder rod (2).

(15) Remove lubrication fitting (19) from cylinder rod (2).

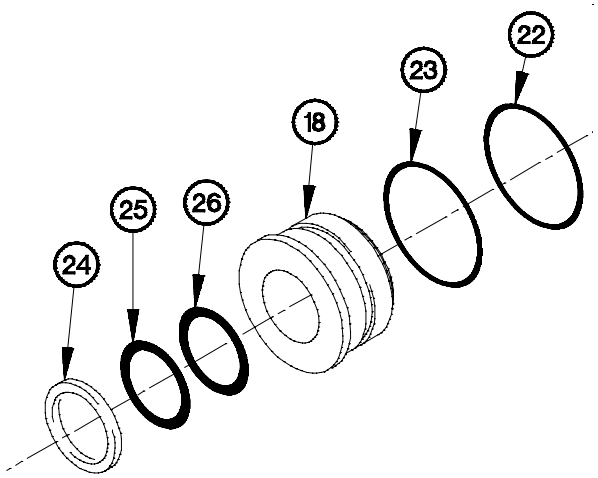


6302A071

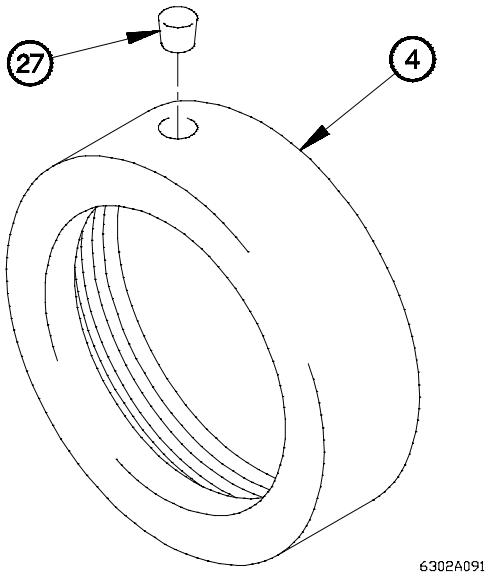
(16) Remove back-up ring (20) and piston seal (21) from piston (7). Discard back-up ring and piston seal.

(17) Remove preformed packing (22) and back-up ring (23) from gland (18). Discard preformed packing and back-up ring.

(18) Remove wear ring (24), rod seal (25), and wiper (26) from gland (18). Discard wear ring, rod seal, and wiper.



6302A081



6302A091

(19) Remove nylon plug (27) from collar (4). Discard nylon plug.

27-2. M1090/M1094 DUMP BODY LIFT CYLINDER 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 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.

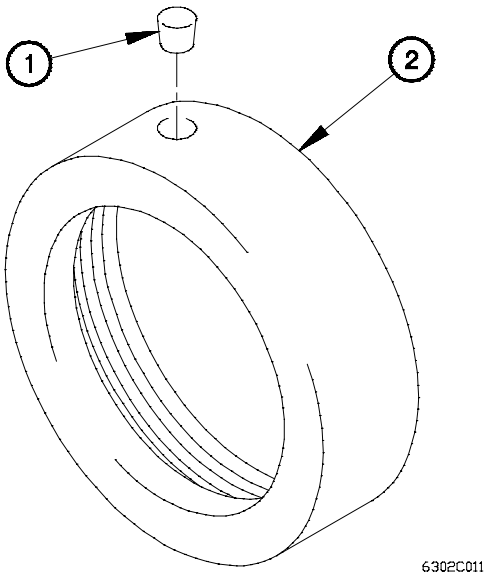
WARNING

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.

(2) Dry metal parts with compressed air.

(3) Inspect machine surfaces for pitting, cracks, scratches, and groves.

c. Assembly.



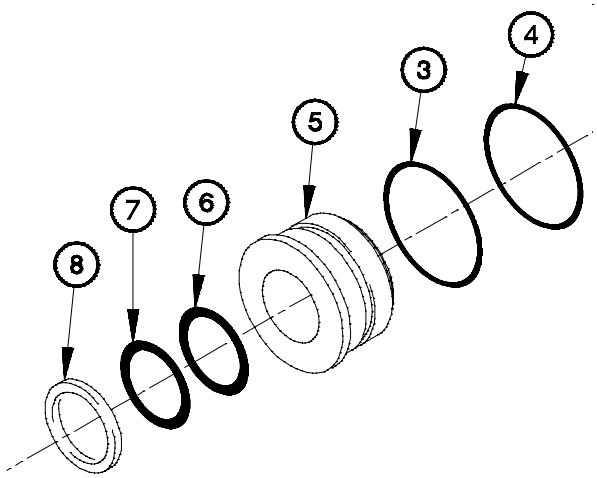
(1) Install nylon plug (1) in collar (2).

NOTE

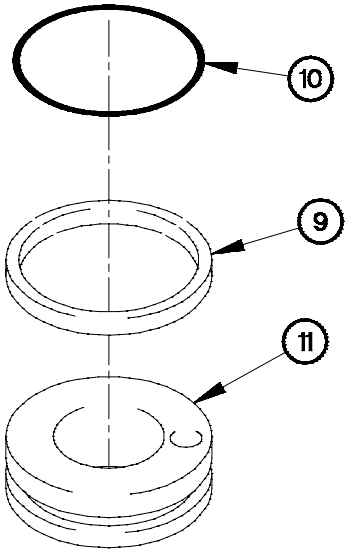
Apply lubricating oil to preformed packings during assembly.

(2) Install backup ring (3) and preformed packing (4) on gland (5).

(3) Install wiper (6), rod seal (7), and wear ring (8) on gland (5).



6302C021



6302C031

(4) Install piston seal (9) and back-up ring (10) on piston (11).

NOTE

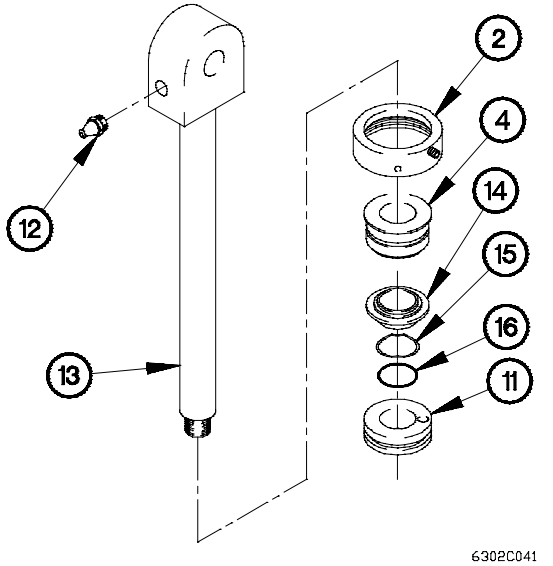
Apply lubricating oil to cylinder rod during assembly.

(5) Install lubrication fitting (12) in cylinder rod (13).

(6) Install collar (2), gland (4), and spacer (14) on cylinder rod (13).

(7) Install wave washer (15) and preformed packing (16) on cylinder rod (13).

(8) Install piston (11) on cylinder rod (13).



6302C041

27-2. M1090/M1094 DUMP BODY LIFT CYLINDER REPAIR (CONT)

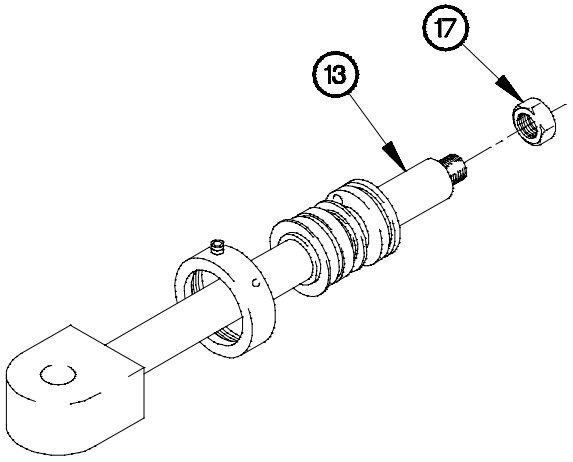
WARNING

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.

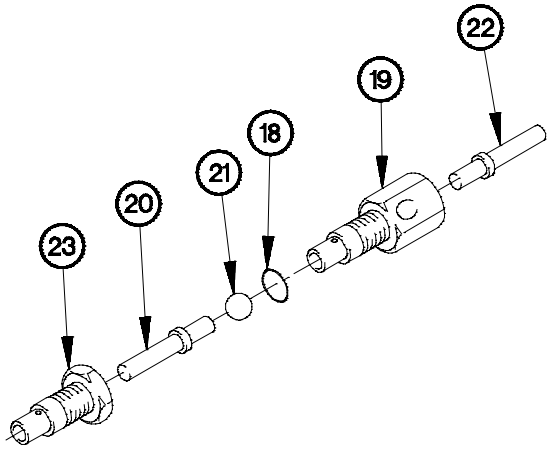
(9) Apply adhesive-sealant to threads of nut (17).

(10) Position nut (17) on cylinder rod (13).

(11) Tighten nut (17) to 1563-1719 lb-ft (2119-2331 N·m).



6302C051



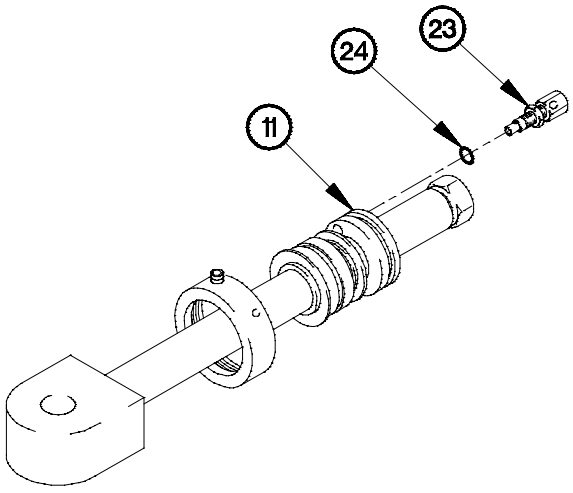
6302C061

(12) Install preformed packing (18) on bypass housing (19).

(13) Install pin (20), ball (21), pin (22), and bypass housing (19) in bypass valve (23).

(14) Install preformed packing (24) on bypass valve (23).

(15) Install bypass valve (23) on piston (11).



6302C071

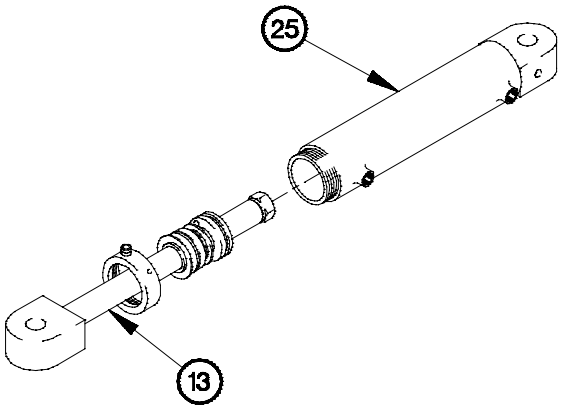
WARNING

Cylinder rod weighs approximately 110 lbs (50 kgs). Attach a suitable lifting device prior to lifting. Failure to comply may result in injury to personnel or damage to equipment.

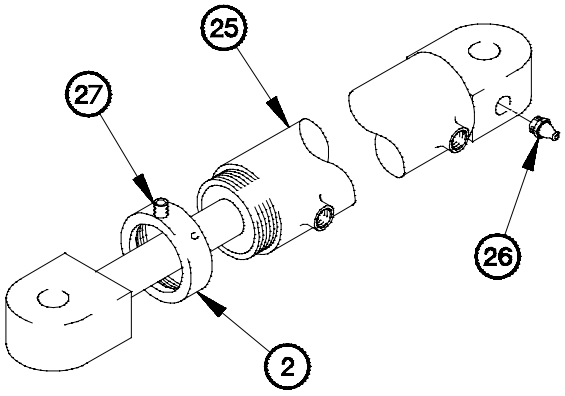
NOTE

Step (16) requires the aid of an assistant.

(16) Position cylinder rod (13) in lift cylinder barrel (25).



6302C081



6302C091

(17) Install collar (2) on lift cylinder barrel (25).

(18) Install lubrication fitting (26) in lift cylinder barrel (25).

(19) Tighten screw (27) on collar (2).

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 MTV 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. MTV.

Hand Receipt Covering Contents of Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL), for M1083 Series, 5-Ton, 6x6, Medium Tactical Vehicles (MTV) . . . . . TM 9-2320-366-10-HR

A-4. OTHER PUBLICATIONS (CONT)

b. MTV (cont)

Warranty Program for M1083 Series, 5-Ton, 6x6, Medium Tactical Vehicle (MTV) . . . . . TB 9-2300-366-15
Operator's Manual for M1083 Series, 5-Ton, 6x6, Medium Tactical Vehicle (MTV) . . . . . TM 9-2320-366-10
Organizational Maintenance Repair Parts and Special Tools List for M1083 Series, 5-Ton, 6x6, Medium Tactical Vehicle (MTV) . . . . . TM 9-2320-366-24P
Organizational Maintenance Manual for M1083 Series, 5-Ton, 6x6, Medium Tactical Vehicle (MTV) . . . . . TM 9-2320-366-20
Direct Support and General Support Repair Parts and Special Tools List for M1083 Series, 5-Ton, 6x6, Medium Tactical Vehicle (MTV) . . . . . TM 9-2320-366-24P

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 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
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

d. General Maintenance and Repair. (Cont)

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	5120-00-227-8095	GGG-W-641	SC 4940-95-B20
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	ADAPTER, SOCKET WRENCH	5120-00-144-5207	11655788-3	SC 4910-95-A31
5	ADAPTER, SOCKET WRENCH	5120-01-355-1895	GLA72A	SC 4910-95-CL-A72
6	BAR, WRECKING	5120-00-293-0665	55-130	SC 4910-95-CL-A72
7	BLADE, HAND, HACKSAW	5110-00-277-4587	RS1018	SC 5180-90-CL-N05

TOOLS IDENTIFICATION LIST (CONT)

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
8	BRUSH, WIRE	7920-00-291-5815	D-1416	SC 4910-95-A31
9	CALIPER SET, MICROMETER, OUTSIDE	5120-01-117-0468	6181	SC 4910-95-A31
10	CALIPER, MICROMETER, INSIDE	5120-00-221-1921	124B	SC 4910-95-A02
11	CALIPER, VERNIER	5120-01-113-1548	6420	SC 4910-95-A31
12	CAPS, VISE JAW	5120-00-221-1506	404-4	SC 4910-95-A31
13	CLAMP	5120-00-203-6431	A-A-431	SC 4910-95-A02
14	CLEANER, STEAM, PRESSURE JET	4940-00-186-0027	200-A0	SC 4910-95-A31
15	COMPRESSOR UNIT, RECIPROCATING	4310-00-542-4566	MIL-C-52980	SC 4910-95-A62
16	COMPRESSOR, PISTON RING	5120-00-250-6055	GGG-C-555	SC 4910-95-A63
17	CROWFOOT ATTACHMENT, SOCKET WRENCH	5120-00-222-7975	GGG-W-646	SC 4910-95-A31
18	DEGREASER, PORTABLE LIQUID TYPE	4940-00-449-6689	MILD12491	SC 4910-95-A31
19	DISPENSING PUMP, HAND DRIVEN	4930-00-263-9886	BR2-10	SC 4910-95-A74
20	DRILL SET, TWIST	5130-00-293-0983	58	SC 4910-95-A62
21	DRILL, ELECTRIC, PORTABLE	5130-00-293-1849	W-D-661	SC 4910-95-A62
22	EXTRACTOR, SCREW	5120-00-610-1888	A-A-283SZ1-9	SC 5180-90-CL-N05
23	FRAME, HAND HACKSAW	5110-00-289-9657	163-20	SC 4910-95-A02
24	GAGE SET, TELESCOPING	5210-00-473-9350	GGG-G-17	SC 4910-95-A63
25	GAGE, DEPTH MICROMETER	5210-00-619-4045	445B-Z-6RL	CTA 50-909
26	GLOVES, RUBBER	8415-00-641-4601	ZZ-G-381	SC 4910-95-A74
27	GLOVES, WELDER'S	8415-00-268-7859	A-A-50022	SC 4910-95-A02
28	GOGGLES, INDUSTRIAL	4240-00-052-3776	A-A-1110	SC 4910-95-A74

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
29	GRINDING KIT, VALVE SEAT	4910-00-473-6437	1750	SC 4910-95-A02
30	GUN, AIR BLOW	4940-00-333-5541	GGGG770	SC 4910-95-A31
31	HAMMER, HAND	5120-00-902-0093	A-A-1292	SC 4910-95-A02
32	HAMMER, HAND, NON-SPARKING	5120-01-065-2211	57-534	SC 4910-95-A31
33	HAMMER, HAND, SOFT HEAD	5120-01-065-9037	57-533	SC 5180-90-CL-N05
34	HEATER, GUN TYPE, ELECTRIC	4940-00-561-1002	500A	SC 4910-95-A31
35	HOSE ASSEMBLY, NONMETALLIC	4720-00-356-8557	ZZ-4-461	SC 4910-95-A31
36	INDICATOR, DIAL	5210-00-277-8840	196A	SC 4940-95-CL-B20
37	JACK, DOLLY TYPE, HYDRAULIC	4910-00-289-7233	93660	SC 4910-95-A31
38	KEY SET, SOCKET HEAD SCREW	5120-01-046-5079	B18.3.2M	SC 4910-95-A31
39	LIFT, TRANSMISSION AND DIFFERENTIAL	4910-00-585-3622	49	SC 4910-95-A62
40	LIFTER, VALVE SPRING	5120-00-239-8686	T286A	SC 4910-95-A63
41	MULTIMETER, DIGITAL	6625-01-139-2512	T00377	SC 4910-95-CL-A74
42	MULTIPLIER, TORQUE WRENCH	5120-00-574-9318	292	SC 4910-95-CL-A72
43	PAN, DRAIN	4910-00-387-9592	450	SC 4910-95-A31
44	PLIERS, RETAINING RING	5120-00-293-0045	0300	SC 4910-95-A31
45	PLIERS, RETAINING RING	5120-00-293-0048	0409	SC 4910-95-A31
46	PLIERS, RETAINING RING	5120-00-293-0186	0900	SC 4910-95-CL-A74
47	PLIERS, SLIP JOINT	5120-00-624-8065	529-10	SC 4910-95-A31
48	PRESS, ARBOR, HAND OPERATED	3444-00-449-7295	A-A-51194	SC 4910-95-A0249
49	PRESSURE TESTER, RADIATOR	4910-00-728-8227	J24460-01	SC 4910-95-CL-A74
50	PULLER KIT, UNIVERSAL	5180-00-313-9496	1178	SC 4910-95-A62

TOOLS IDENTIFICATION LIST (CONT)

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
51	PULLER KIT, UNIVERSAL	5180-00-423-1596	PE12	SC 4910-95-A31
52	PULLER, MECHANICAL	5120-00-378-4293	1042	SC 4910-95-A31
53	PULLER, MECHANICAL	5120-00-595-9305	GGGP781	SC 4910-95-A31
54	RESPIRATOR, AIR FILTERING	4240-00-022-2524	GGG-M-125/6	SC 4910-95-A62
55	SET, TAP AND DIE	5136-01-119-0005	TDM99117	SC 4910-95-A31
56	SLING, CARGO	1670-00-823-5043	63J4261-13	CTA 50-970
57	SLING, ENGINE AND TRANSMISSION MOTOR VEHICLE	4910-01-243-5556	DFP-188	SC 4910-95-A02
58	SOCKET SET, IMPACT	5130-01-117-0466	415IMMY	SC 4910-95-A31
59	SOCKET SET, SOCKET WRENCH	5120-01-117-3876	B107.5	SC 4910-95-A31
60	SOCKET WRENCH ATTACHMENT, SCREWDRIVER	5120-00-596-8508	GGG-W-641	SC 4910-95-A31
61	SOCKET WRENCH ATTACHMENT, SCREWDRIVER	5120-01-079-8033	SAM14A	SC 4910-95-A31
62	SOCKET WRENCH ATTACHMENT, SCREWDRIVER	5120-01-101-1943	J35174-A	SC 4910-95-A31
63	SOCKET, SOCKET WRENCH	5120-00-236-2263	4707	SC 4910-95-A31
64	SOCKET, SOCKET WRENCH	5130-01-112-0558	B107.2	SC 4910-95-A31
65	SOCKET, SOCKET WRENCH	5130-01-116-1643	IMM 300	SC 4910-95-A02
66	SOLDERING & BRAZING OUTFIT, RESISTANCE HEATING	3439-00-460-7198	W-TCP-K	SC 4940-95-CL-B20
67	SQUARE, COMBINATION	5210-00-078-8948	GGG-S-656	SC 4910-95-A02

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
68	STAND, RADIATOR TEST AND REPAIR	4910-00-505-4786	60A	SC 4910-95-A02
69	STAND, TRANSPORT, ENGINE	4910-00-338-6673	8708857	SC 4910-95-A62
70	STE/ICE-R	4910-222-6589	12259266	TM 9-4910-571-12&P
71	STRAIGHT EDGE	6675-00-224-8807	564000-36	SC 4910-95-A02
72	TEST STAND, AUTOMOTIVE GENERATOR AND STARTER	4910-00-767-0218	MILT4544	SC 4910-95-A02
73	TESTER, HYDRAULIC	4940-01-136-4830	13222E4767	SC 4940-95-CL-B07
74	TIE DOWN, CARGO AIRCRAFT	1670-00-725-1437	SP4067	CTA 50-970
75	TOOL KIT, AUTO FUEL & ELECTRICAL SYSTEM REPAIR	5180-00-754-0655	SC 4910-95-CLA50	SC 4910-95-CL-A50
76	TOOL KIT, BLIND RIVET	5180-01-201-4978	D-100-MIL-1	SC 4910-95-CL-A72
77	TOOL KIT, ELECTRICAL CONTACT REPAIR	5180-00-876-9336	7550526	SC 4910-95-CL-A72
78	TOOL KIT, GENERAL MECHANIC'S	5180-00-177-7033	SC 5180-90-CL-N26	SC 5180-90-CL-N26
79	TOOL KIT, VALVE SEAT RING INSERTER	5120-00-698-7979	MILT13918	SC 4910-95-A63
80	TORCH SET, CUTTING AND WELDING	3433-00-294-6743	MIL-T-13880	SC 4910-95-A02
81	TRESTLE, MOTOR VEHICLE MAINTENANCE	4910-00-251-8013	306	SC 4910-95-A31
82	VISE, MACHINIST	5120-00-293-1439	504M2	SC 4910-95-A62
83	WRENCH SET, SOCKET	5120-00-081-2309	GGG-W-641	SC 5180-90-CL-N05
84	WRENCH SET, SOCKET	5120-00-204-1999	GGG-W-641	SC 4910-95-A02
85	WRENCH SET, SOCKET	5120-00-322-6231	GGG-W-641	SC 5180-90-CL-N05
86	WRENCH, ADJUSTABLE	5120-00-264-3793	2117080	SC 4910-95-A02

TOOLS IDENTIFICATION LIST (CONT)

(1) Item Number	(2) Item Name	(3) National Stock Number	(4) Part Number	(5) Reference
87	WRENCH, ADJUSTABLE	5120-00-423-6728	6187328	SC 4910-95-A31
88	WRENCH, IMPACT, ELECTRIC	5130-00-221-0607	WW650	SC 4910-95-A31
89	WRENCH, PIPE	5120-00-277-1485	GGG-W-651	SC 5180-90-CL-N05
90	WRENCH, TORQUE, 0-150 LB-FT	5120-00-247-2540	1503BFP	SC 4910-95-A31
91	WRENCH, TORQUE, 0-150 LB-IN.	5120-00-230-6380	TQ12B	SC 4910-95-A62
92	WRENCH, TORQUE, 0-175 LB-FT	5120-00-640-6364	1753LDF	SC 4910-95-A02
93	WRENCH, TORQUE, 0-200 LB-IN.	5120-00-853-4538	F200I	SC 4910-95-CL-A72
94	WRENCH, TORQUE, 0-250 NM	5120-01-115-1723	1753DFE	SC 4910-95-A31
95	WRENCH, TORQUE, 0-300 LB-IN.	5120-00-247-2536	F3001	SC 4910-95-A31
96	WRENCH, TORQUE, 0-60 NM	5120-01-112-9531	TESI60	SC 4910-95-A31
97	WRENCH, TORQUE, 0-600 LB-FT	5120-00-221-7983	SW130-301	SC 4910-95-A31
98	WRENCH, TORQUE, 0-75 LB-IN.	5120-01-112-9532	B107.14MTY1CLCST1	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 MTV 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) 2022-12-12S	ea
2	F/H	4730-01-286-4614	Adapter, Pipe (81343) 2028-8-12S	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	O/F/H	8040-00-118-2695	Adhesive (72799) RTV162	kt
5	F/H	8040-00-728-3088	Adhesive (78500) 1199-T-3842 6 oz kit	oz

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
5.1	F	8040-00-941-9984	Adhesive (66195) 917252C1 6 oz kit	kt
6	O/F/H	8040-01-250-3969	Adhesive (05972) 242	ea
7	F/H	8040-01-331-7470	Adhesive (81349) MIL-A-46106 5 oz tube	tu
8	F/H	8040-01-126-1422	Adhesive (52152) 1099	qt
9	O/F/H	6850-00-174-1806	Antifreeze (81349) MIL-A-11755 55 gl drum	gl
10	H		Adhesive (04963) DP-100 1.7 oz tube	tu
10.1	F		Adhesive (0FW39) 12421700	tu
10.2	O/F	8040-01-446-7842	Adhesive (01139) RTV123 10 oz	ca
11	O/F/H		Antifreeze (81349) MIL-A-46153	
		6850-00-181-7929	1 gl can	gl
		6850-00-181-7940	55 gl drum	gl
12	F/H	8030-00-597-5367	Antiseize Compound (81349) MIL-A-907 2-1/2 lb can	lb
12.1	O/F/H	8030-00-292-1102	Antiseize 12Z31001-1	tu
13	F/H	8415-00-222-8074	Apron, Plastic, Disposable (32075) E2-2845 Box of 100	ea
14	F/H	5306-00-174-4150	Bolt, Machine (11083) 3B4772	ea
15	F/H	5306-00-381-9928	Bolt, Machine (19207) 12414307-080	ea
15.1	F/H		Bolt, Machine (19207) 12414307-075	ea
16	F/H	7920-00-926-5243	Bucket, Mop (88001) C1122F	ea
17	F/H	5340-00-450-5718	Cap and Plug Set (19207) 10935405	ea
17.1	F	4730-00-542-5911	Cap, Tube (96906) MS51532B10	ea
17.2	F	4730-00-585-6565	Cap, Tube (22031) 304C8	ea
17.3	F	4730-00-647-3311	Cap, Tube (96906) MS51532B12	ea
18	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
19	F/H	7510-00-162-2910	Chalk Line, Marking Powder (89942) 09-304147 8 oz can	cn

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
20	O/F/H	6850-01-347-0073	Cleaning Compound, Windshield (81349) O-C-1901	
			1 gl can	gl
21	F/H	5350-00-221-0872	Cloth Abrasive Crocus Cloth (81348) P-C-458	
			50 sheet package	sh
22	F/H	5350-00-174-0985	Cloth, Abrasive, 600 Grit (81348) GGG-C-520	
			Box of 100	sh
23	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
24	F/H	4730-00-881-1161	Coupling, Pipe (81343) 207P-6	ea
25	F/H	6850-00-856-7955	Desiccant, Activated (81349) MIL-D-3464	
			Eighteen, 5 gl bags	bg
26		DELETED		
27	C/O/F/H		Diesel Fuel (Arctic) (81348) VVF800FRADEDDFA	
		9140-00-286-5282	5 gl can	cn
		9140-00-286-5283	Bulk	gl
		9140-00-286-5284	55 gl drum	gl
		9140-00-286-5285	55 gl drum	gl
28	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
29	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
30	C/O/F/H	7520-01-209-1152	Dispenser, Pressure Sensitive Adhesive Tape (55203) 5006-0-9	ea
31	F/H		Fitting (81343) 190923-02S	ea
32	F/H		Fitting (81343) 2027-8-4S	ea

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
33	F/H	5210-00-640-6176	Gage, Bearing Clearance (77220) PLASTIGAGEPB1	
			Box of 12	ea
34	F/H	8040-01-038-5043	Gasket Cement (11083) 5H2471	
			8 oz can	oz
34.1	F/H	8040-01-437-6864	Gasket Cement (11083) 1U-8846	
34.2	F/H	8145-00-274-2433	Gloves, Mens (81348) KK-G-476	pr
35	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
36	F/H	9150-00-180-6382	Grease, General Purpose (81349) MIL-T-24139	
			6-1/2 lb can	lb
37	F/H	9150-00-223-4004	Grease, Molybdenum Disulfide (81349) MIL-G-21164	
			6-1/2 lb can	lb
38	F/H	9150-00-664-0050	Grease, Ordnance, Extreme Pressure (12474) Molylube 80	
			1 pt can	pt
39	F/H	5345-01-356-8913	Honing Stone Assembly (10133) R150761-SA	ea
40	F/H		Hose FC 324-12	ea
40.1	F		Hose Assembly, Nonmetallic 4C2T-FJX-FJX-90-120	ea
40.2	F	4720-00-988-3842	Hose Assembly, Nonmetallic (50599) R25679-1	ea
40.3	O/F		Hydraulic Fluid (81349) MIL-H-5606	
		9150-00-252-6383	1 qt can	qt
		9150-00-223-4134	1 gal can	gl
40.4	F	6685-01-095-4182	Indicator, Temperature, Label (82682) 6MA-130/54	ea
41	O/F/H	5970-01-100-4464	Insulating Compound, Electrical (08800) RTV-102 White	
			2.8 oz tube	ea
42	O/F/H	5970-00-767-0524	Insulation Sleeving, Electrical (81349) MIL-I-23053/5	
			4 in.	ea

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
42.1	F	5970-01-378-3018	Insulation Sleeving, Electrical (06090) ATUM-1/4-0-4FT	lg
43	F/H	8135-01-015-4040	Kit, Banding (02563) GS-10012	kt
44	F/H	1650-00-166-4834	Lockwire (90166) 68A33 210 in. package	ea
45	C/O/F/H		Lubricating Oil, Engine (81349) MIL-L-2104OE/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
46	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
47	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
48	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
49	O/F/H	9150-01-152-4117	Lubricating Oil, Engine (81349) MIL-L-2104 OE/HDO 15W-40 1 qt can	qt
50	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
51	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
52	O/F/H	9150-01-035-5395	Lubricating Oil, Gear (81349) MIL-L-2105 85W-140 5 gl can	gl
52.1	F		Lubrication, Rubber Emulsion 5391-06 1 pt bottle	bt

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
53	F/H	5310-01-369-6073	Nut, Self-Locking (19207) 12414308-007	ea
54	F/H	5310-01-362-6171	Nut, Self-Locking (76761) N9406	ea
54.1	F		Paper, Abrasive 2347	pk
55	O/F/H	6530-01-283-6227	Paraffin and Mineral Oil (25973) 76-1026 7 lb can	lb
55.1	F	4730-01-070-9214	Plug, Tube Fitting, Threaded (81343) 8 070109C	ea
55.2	F	4730-01-249-9707	Plug, Tube Fitting, Threaded (96906) MS51518B10	ea
55.3	F	4730-01-270-9651	Plug, Tube Fitting, Threaded (81343) 12 070109C	ea
56	F/H	8030-00-043-1688	Primer, Sealing Compound (81349) MIL-S-224373 1 gl can	gl
57	F/H	4204-00-759-3290	Protector, Hearing (71483) 19A	ea
58	F/H	8010-00-652-3626	Prussian Blue, Paste, Bearing Surface (81349) MIL-P-30501 1 oz tube	oz
59	F/H		Pulley, Groove (19207) 12421165	ea
60	C/O/F/H	7920-00-205-1711	Rag, Wiping (58536) A-A-531 50 lb bale	ea
60.1	F	4730-00-719-2789	Reducer, Tube (81343) 12-4 070123SA	ea
60.2	F	4730-01-030-5207	Reducer, Tube (96906) MS51534A10-4	ea
61	F/H	4730-01-113-9251	Reducer, Tube (81343) 2027-8-12S	ea
62	F/H	4020-00-593-9584	Rope, Fibrous (96169) 9868-165X4PC50	ea
63	F/H	5210-00-293-3393	Rule, Multiple, Folding (81348) GGG-R-791	ea
64	F/H	5330-00-003-5427	Rubber Sheet, Solid (81349) MIL-R-3065	sh
64.1	F	5305-01-157-1391	Screw, Cap, Hex Hd (56161) 10501611	ea

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
64.2	F	5305-01-377-0696	Screw, Cap, Hex Hd (19207) 12414419-075	ea
65	F/H		Sealant (11083) 2P2333	ea
65.1	O/F	8030-00-728-9665	Sealant (62377) 80017 1 pt can	pt
65.2	F/H	8030-01-255-4144	Sealant (P/N 12297953)	ea
66	F/H	8030-00-981-7005	Sealant, Adhesive (05972) AA15-1	ea
67	F/H		Sealant, Adhesive (78500) 1199-E-3931	ea
68	F/H		Sealant, Adhesive (78500) 2297-B-5436	ea
68.1	F	1015-01-255-4144	Sealant, Pipe (19207) 12297953 50 ml tube	tu
68.2	F	8030-00-111-6404	Sealing Compound (05972) 640-31 50 cc bottle	bt
69	O/F/H	8030-00-204-9149	Sealing Compound (05972) 592-41 250 cc tube	tu
70	F/H	8030-00-656-1426	Sealing Compound (81349) MIL-S-45180 1 pt can	pt
71	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
71.1	F	8030-01-142-9830	Sealing Compound (05972) 262-31 50 cc bottle	bt
72	O/F/H	8030-01-155-3238	Sealing Compound (11083) 6V6640 50 ml tube (box contains 6 tubes)	bx
73	F/H	8030-00-220-6973	Sealing Compound (81349) MIL-S-45180 4 oz can	cn
74	F/H		Sealing Compound (IN 8846)	
75	F/H	8030-01-171-7628	Sealing Compound (05972) 272-40 50 cc bottle	bt
76	O/F/H	8030-00-148-9833	Sealing Compound (05972) 271 10 cc bottle (box contains 10 bottles)	bx
76.1	F	8030-01-371-8405	Sealing Compound (83574) PR-1422 B-1/2 6 oz cartridge (case contains 36 cartridges)	ca
76.2	F	8030-01-396-3362	Sealing Compound (05972) RC-680 50 cc bottle	bt
76.3	F/H	8030-01-374-3504	Sealing Compound (51831) 50 cc tube	tu

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
77	F/H	5305-00-152-0533	Screw, Cap, Hex Hd (77873) 2-0B113	ea
78	F/H	5305-01-359-8004	Screw, Cap, Hex Hd (73342) 29505612	ea
79	F/H	5305-01-374-1087	Screw, Cap, Hex Hd (19207) 12414307-194	ea
80	F/H	4030-00-066-0184	Shackle (90202) XB178	ea
81	C/O/F/H	7930-00-082-0584	Soap, Laundry (81348) P-S-1792 2 lb box	bx
82	F/H	3439-01-164-0593	Solder (61404) 14675 5 lb spool	sl
83	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
83.1	F	5940-01-456-1319	Splice, Conductor (0FW39) 12420927-001	ea
83.2	F/H		Spindle Compound #2 (ODUG2) #279	ea
84	F/H	8030-00-060-3167	Tape, Antiseizing (73165) FEL-PRO 51520 520 in. roll	ro
85	O/F/H	8030-00-889-3534	Tape, Antiseizing (81349) MIL-T-27730	ea
86	O/F/H	5640-00-103-2254	Tape, Duct (39428) 1791K70 60 yd roll	ro
87	O/F/H	5970-00-644-3167	Tape, Insulation, Electrical (80063) TL83 85 ft roll	ro
88	F/H	4730-01-146-4113	Tee, Pipe to Tube (96906) MS51514A6	ea
88.1	F	4730-00-074-0713	Tee, Tube (81343) 8-8-8 070432CA	ea
88.2	F	4730-00-738-7558	Tee, Tube (81343) 12-12-12 070432CA	ea
88.3	F	4730-01-024-0915	Tee, Tube (81343) 10-10-10 070432CA	ea
89	F/H		Tee, Swivel R6X/063T12R6X	ea
90	F/H		Tee, Union JTX/003T12JTX	ea
91	F/H	8010-00-242-2089	Thinner, Paint Products (80244) A-A-2904 TY1 1 gl can	gl

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
92	O/F/H	5935-01-379-4997	Ties, Cable, Plastic (06383) PLT3S-C-0 box of 100	 bx
92.1	C		Turbine Fuel, Aviation, Kerosene Type (MIL-T-83133), Grade JP-8	
92.2	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
92.3	C		Turbine Fuel, (MIL-F-5624), Grade JP-4 (NATO Code No. F40)	
		9130-00-273-2380	Drum, 16 gage	dr
92.4	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
93	F/H	4020-00-241-8893	Twine, Fibrous (80063) 6Z8827 860 ft ball	 ea
94	F/H	5310-00-110-8978	Washer, Flat (05606) 133B6663-6	ea
95	F/H	5310-01-267-1686	Washer, Flat (96906) MS51412-3	ea
96	F/H	5130-00-289-9586	Wheel, Abrasive (81348) GGG-W-290	ea
97	F/H	6145-01-148-2263	Wire, Electrical (80009) 175-0825-00 50 ft	 ft
98	F/H	9505-00-221-2650	Wire, Nonelectrical (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
Dump Bed Wooden Brace		D-6
Dump Body Cab Protector Pivot Pin Removal Tool		D-7
Dump Body Lifting Bracket		D-8
Engine Stand Bracket Assembly		D-9
Headlight Adjustment Screen		D-10
Left Front Leaf Spring U-Bolt Socket		D-11
Machine Gun Ring Drill Stop		D-12
Machine Gun Ring Wooden Support		D-13
Main Valve Body Spring Compression Tool		D-14
Marking Sleeve		D-15
M1089 30K Winch Test Adapter		D-16
M1089 Solenoid Test Adapter		D-17
Relay Test Wire		D-18
Spanner Socket Tool		D-19
Spanner Wrench Tool		D-20
Spreader Bar		D-21
Steering Stop Shim Gage		D-22
Swingdrive Assembly Bracket		D-23
Transfer Case Lift Bracket Assembly		D-24
Transmission Auxiliary Oil Cooler Rubber Seal		D-25
Transmission Lift and Mounting Bracket Assembly		D-26
Transmission Lifting Bracket		D-27
Wheel Bearing Shim Tool Rest		D-28
12378512	Battery 12V Cable Assembly	D-29
12378575	Battery Ground Cable Assembly	D-30
12378576	Battery 24V Cable Assembly	D-31
12420265	Double-Sided Tape	D-32

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12420489	Block Seal	D-33
12412332-003	Air Duct Hose	D-34
12412332-012	Air Duct Hose	D-34
12412332-040	Air Duct Hose	D-34
12412332-048	Air Duct Hose	D-34
12412332-066	Air Duct Hose	D-34
12412332-096	Air Duct Hose	D-34
12412332-180	Air Duct Hose	D-34
12412367-038	Non-Metallic Flex Conduit	D-35
12412367-046	Non-Metallic Flex Conduit	D-35
12412367-064	Non-Metallic Flex Conduit	D-35
12412367-094	Non-Metallic Flex Conduit	D-35
12412367-178	Non-Metallic Flex Conduit	D-35
12414690-001	Pneumatic Tube	D-36
12414690-002	Pneumatic Tube	D-36
12414690-003	Pneumatic Tube	D-36
12414690-004	Pneumatic Tube	D-36
12414690-005	Pneumatic Tube	D-36
12414690-006	Pneumatic Tube	D-36
12414690-007	Pneumatic Tube	D-36
12414690-008	Pneumatic Tube	D-36
12414690-009	Pneumatic Tube	D-36
12414690-010	Pneumatic Tube	D-36
12414690-101	Pneumatic Tube	D-36
12414690-102	Pneumatic Tube	D-36
12414690-103	Pneumatic Tube	D-36
12414690-104	Pneumatic Tube	D-36
12414690-105	Pneumatic Tube	D-36
12414690-106	Pneumatic Tube	D-36
12414690-107	Pneumatic Tube	D-36
12414690-108	Pneumatic Tube	D-36
12414690-109	Pneumatic Tube	D-36
12414690-112	Pneumatic Tube	D-36
12414690-113	Pneumatic Tube	D-36
12414690-115	Pneumatic Tube	D-36
12414690-118	Pneumatic Tube	D-36
12414690-120	Pneumatic Tube	D-36
12414690-125	Pneumatic Tube	D-36
12414690-128	Pneumatic Tube	D-36
12414690-129	Pneumatic Tube	D-36
12414690-130	Pneumatic Tube	D-36
12414690-131	Pneumatic Tube	D-36
12414690-132	Pneumatic Tube	D-36
12414690-133	Pneumatic Tube	D-36
12414690-134	Pneumatic Tube	D-36
12414690-135	Pneumatic Tube	D-36
12414690-136	Pneumatic Tube	D-36
12414690-137	Pneumatic Tube	D-36
12414690-138	Pneumatic Tube	D-36
12414690-139	Pneumatic Tube	D-36
12414690-140	Pneumatic Tube	D-36
12414690-141	Pneumatic Tube	D-36
12414690-142	Pneumatic Tube	D-36

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12414690-143	Pneumatic Tube	D-36
12414690-144	Pneumatic Tube	D-36
12414690-145	Pneumatic Tube	D-36
12414690-146	Pneumatic Tube	D-36
12414690-147	Pneumatic Tube	D-36
12414690-148	Pneumatic Tube	D-36
12414690-149	Pneumatic Tube	D-36
12414690-150	Pneumatic Tube	D-36
12414690-151	Pneumatic Tube	D-36
12414690-152	Pneumatic Tube	D-36
12414690-153	Pneumatic Tube	D-36
12414690-154	Pneumatic Tube	D-36
12414690-155	Pneumatic Tube	D-36
12414690-156	Pneumatic Tube	D-36
12414690-157	Pneumatic Tube	D-36
12414690-158	Pneumatic Tube	D-36
12414690-159	Pneumatic Tube	D-36
12414690-160	Pneumatic Tube	D-36
12414690-161	Pneumatic Tube	D-36
12414690-162	Pneumatic Tube	D-36
12414690-163	Pneumatic Tube	D-36
12414690-164	Pneumatic Tube	D-36
12414690-165	Pneumatic Tube	D-36
12414690-166	Pneumatic Tube	D-36
12414690-167	Pneumatic Tube	D-36
12414690-168	Pneumatic Tube	D-36
12414690-169	Pneumatic Tube	D-36
12414690-201	Pneumatic Tube	D-36
12414690-202	Pneumatic Tube	D-36
12414690-203	Pneumatic Tube	D-36
12414690-205	Pneumatic Tube	D-36
12414690-206	Pneumatic Tube	D-36
12414690-207	Pneumatic Tube	D-36
12414690-208	Pneumatic Tube	D-36
12414690-209	Pneumatic Tube	D-36
12414690-210	Pneumatic Tube	D-36
12414690-211	Pneumatic Tube	D-36
12414690-212	Pneumatic Tube	D-36
12414690-215	Pneumatic Tube	D-36
12414690-216	Pneumatic Tube	D-36
12414690-217	Pneumatic Tube	D-36
12414690-218	Pneumatic Tube	D-36
12414690-219	Pneumatic Tube	D-36
12414690-220	Pneumatic Tube	D-36
12414690-221	Pneumatic Tube	D-36
12414690-222	Pneumatic Tube	D-36
12414690-223	Pneumatic Tube	D-36
12414690-224	Pneumatic Tube	D-36
12414690-225	Pneumatic Tube	D-36
12414690-228	Pneumatic Tube	D-36

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12414690-229	Pneumatic Tube	D-36
12414690-230	Pneumatic Tube	D-36
12414690-231	Pneumatic Tube	D-36
12414690-232	Pneumatic Tube	D-36
12414690-233	Pneumatic Tube	D-36
12414690-234	Pneumatic Tube	D-36
12414690-235	Pneumatic Tube	D-36
12414690-236	Pneumatic Tube	D-36
12414690-237	Pneumatic Tube	D-36
12414690-238	Pneumatic Tube	D-36
12414690-239	Pneumatic Tube	D-36
12414690-240	Pneumatic Tube	D-36
12414690-241	Pneumatic Tube	D-36
12414690-242	Pneumatic Tube	D-36
12414690-243	Pneumatic Tube	D-36
12414690-244	Pneumatic Tube	D-36
12414690-245	Pneumatic Tube	D-36
12414690-246	Pneumatic Tube	D-36
12414690-247	Pneumatic Tube	D-36
12414690-248	Pneumatic Tube	D-36
12414690-249	Pneumatic Tube	D-36
12414690-301	Pneumatic Tube	D-36
12414690-302	Pneumatic Tube	D-36
12414690-303	Pneumatic Tube	D-36
12414694-X508	Pneumatic Hose Assembly	D-37
12414694-X558	Pneumatic Hose Assembly	D-37
12416381P1	Non-Metallic Electrical Cable Conduit	D-38
12416381P10	Non-Metallic Electrical Cable Conduit	D-38
12416381P11	Non-Metallic Electrical Cable Conduit	D-38
12416381P12	Non-Metallic Electrical Cable Conduit	D-38
12416381P13	Non-Metallic Electrical Cable Conduit	D-38
12416381P14	Non-Metallic Electrical Cable Conduit	D-38
12416381P15	Non-Metallic Electrical Cable Conduit	D-38
12416381P16	Non-Metallic Electrical Cable Conduit	D-38
12416381P17	Non-Metallic Electrical Cable Conduit	D-38
12416381P2	Non-Metallic Electrical Cable Conduit	D-38
12416381P20	Non-Metallic Electrical Cable Conduit	D-38
12416381P21	Non-Metallic Electrical Cable Conduit	D-38
12416381P22	Non-Metallic Electrical Cable Conduit	D-38
12416381P23	Non-Metallic Electrical Cable Conduit	D-38
12416381P26	Non-Metallic Electrical Cable Conduit	D-38
12416381P3	Non-Metallic Electrical Cable Conduit	D-38
12416381P30	Non-Metallic Electrical Cable Conduit	D-38
12416381P32	Non-Metallic Electrical Cable Conduit	D-38
12416381P34	Non-Metallic Electrical Cable Conduit	D-38
12416381P35	Non-Metallic Electrical Cable Conduit	D-38
12416381P36	Non-Metallic Electrical Cable Conduit	D-38
12416381P37	Non-Metallic Electrical Cable Conduit	D-38
12416381P38	Non-Metallic Electrical Cable Conduit	D-38
12416381P4	Non-Metallic Electrical Cable Conduit	D-38
12416381P5	Non-Metallic Electrical Cable Conduit	D-38

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12416381P6	Non-Metallic Electrical Cable Conduit	D-38
12416381P8	Non-Metallic Electrical Cable Conduit	D-38
12416381P9	Non-Metallic Electrical Cable Conduit	D-38
12417926-001	Compressor Hose	D-39
12417926-002	Compressor Hose	D-39
12417926-004	Compressor Hose	D-39
12418037	Steering Gear Return Hose	D-40
12418460-001	Transmission Oil Cooler Hose	D-40
12418460-002	Transmission Oil Cooler Hose	D-40
12418763	Lanyard Assembly	D-41
12420036	Wooden Skid	D-42
12420062-008	Pneumatic Hose Assembly	D-37
12420062-009	Pneumatic Hose Assembly	D-37
12420062-010	Pneumatic Hose Assembly	D-37
12420062-011	Pneumatic Hose Assembly	D-37
12420062-012	Pneumatic Hose Assembly	D-37
12420062-013	Pneumatic Hose Assembly	D-37
12420062-014	Pneumatic Hose Assembly	D-37
12420062-016	Pneumatic Hose Assembly	D-37
12420062-017	Pneumatic Hose Assembly	D-37
12420063-002	Pneumatic Hose Assembly	D-37
12420063-004	Pneumatic Hose Assembly	D-37
12420064-001	Pneumatic Hose Assembly	D-37
12420064-002	Pneumatic Hose Assembly	D-37
12420064-003	Pneumatic Hose Assembly	D-37
12420064-004	Pneumatic Hose Assembly	D-37
12420064-006	Pneumatic Hose Assembly	D-37
12420064-007	Pneumatic Hose Assembly	D-37
12420064-008	Pneumatic Hose Assembly	D-37
12420196	Lanyard Assembly	D-41
12420197-001	Non-Metallic Vent Air Hose	D-43
12420197-002	Non-Metallic Vent Air Hose	D-43
12420197-003	Non-Metallic Vent Air Hose	D-43
12420197-004	Non-Metallic Vent Air Hose	D-43
12420197-005	Non-Metallic Vent Air Hose	D-43
12420197-006	Non-Metallic Vent Air Hose	D-43
12420198-001	Non-Metallic Vent Air Hose	D-43
12420198-002	Non-Metallic Vent Air Hose	D-43
12420308-457	Personnel Heater Air Duct Hose	D-44
12420308-760	Personnel Heater Air Duct Hose	D-44
12420398	CTIS Quick Release Valve Spacer	D-45
12420419-001	CTIS Vent Hose	D-46
12420419-002	CTIS Vent Hose	D-46
3256-H-1048	CTIS Seal Driver	D-47
3256-J-1050	Front Axle Shaft Seal Driver	D-48
3256-K-1051	Wheel Hub Grease Seal Driver	D-49
3256-L-1052	Intermediate Differential Output Pinion Seal Driver	D-50
3256-M-1053	Differential Pinion Seal Driver	D-51
3256-Q-1057	Intermediate Input Yoke Seal Driver	D-52
3256-R-1058	Intermediate Output Yoke Seal Driver	D-53
3256-S-1059	Front and Rear Differential Yoke Seal Driver	D-54

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
Dimmer Switch Test Wire		D-55
Purge Valve Tool		D-56
M1089 30K Winch Air Hoses		D-57
M1089 30K Winch Pneumatic Test Adapters		D-58
Block Seal 12420489 Fabrication		D-59

Section III. MANUFACTURED ITEMS

D-1. BRAKE ADJUSTING TOOL SUPPORT

Make the brake adjusting tool support from .134 inch (.34 cm) flat steel stock according to the following instructions. Refer to the parts list and **Figure D-13. 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

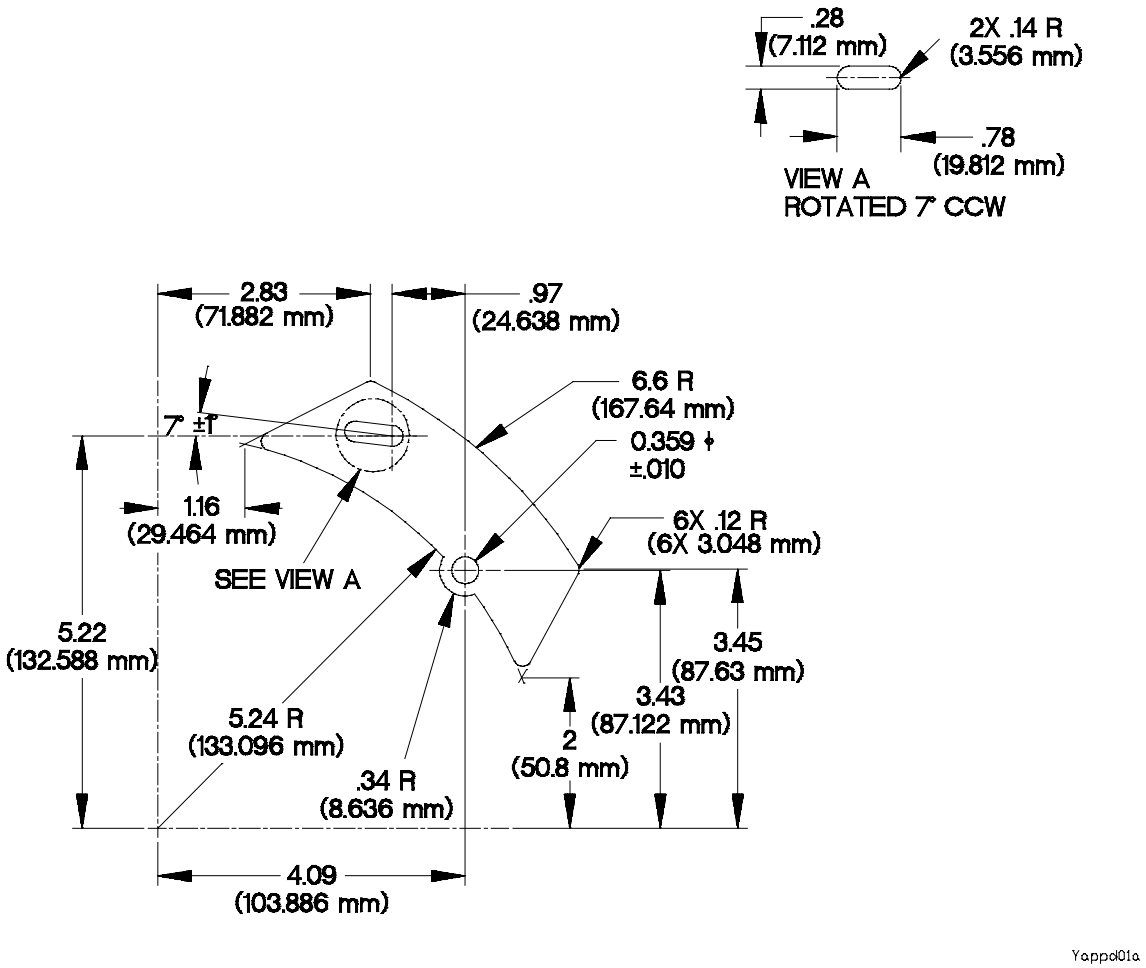


Figure D-1. Brake Adjusting Tool Support

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

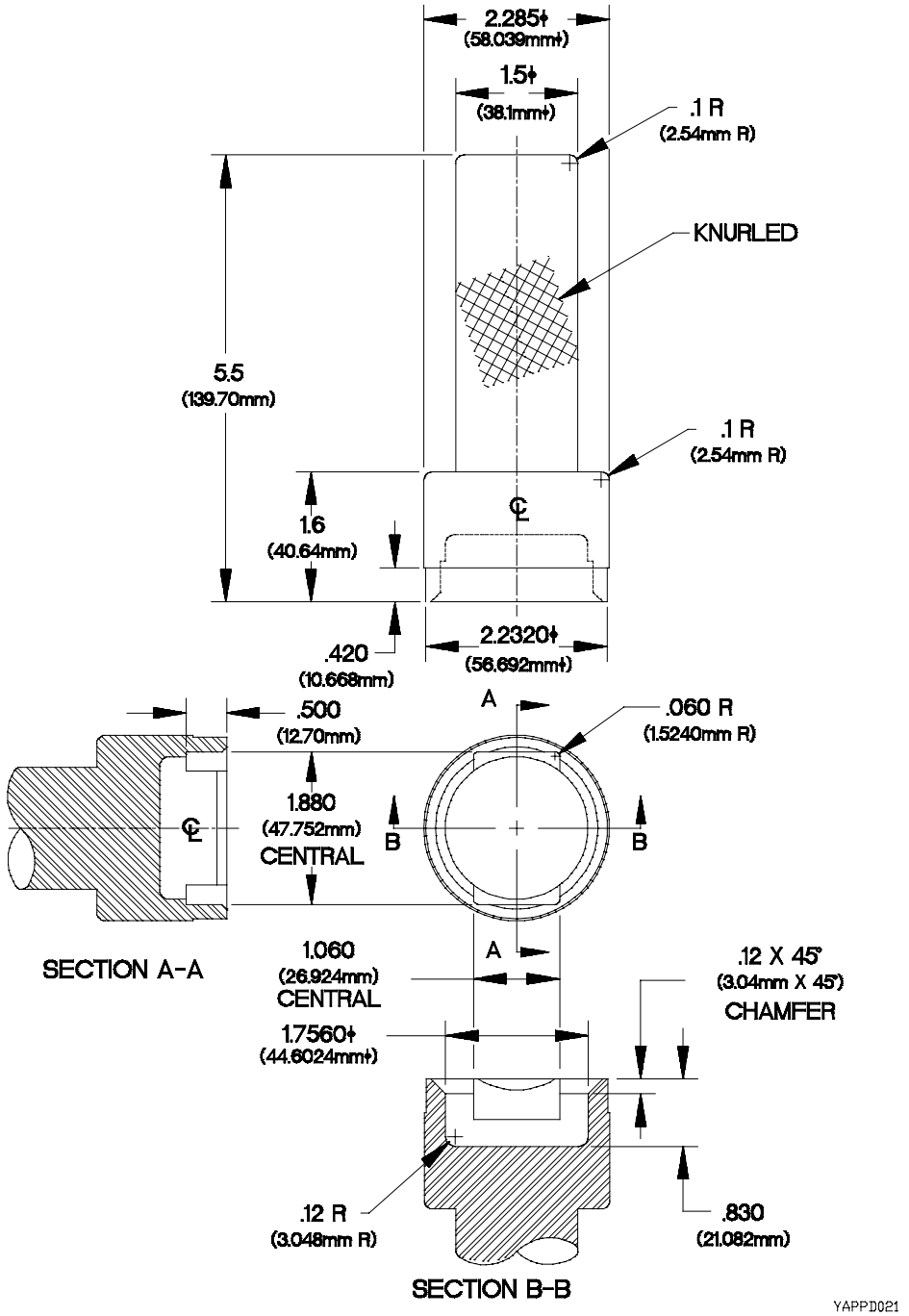


Figure D-2. Brake Plunger Seal Driver

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

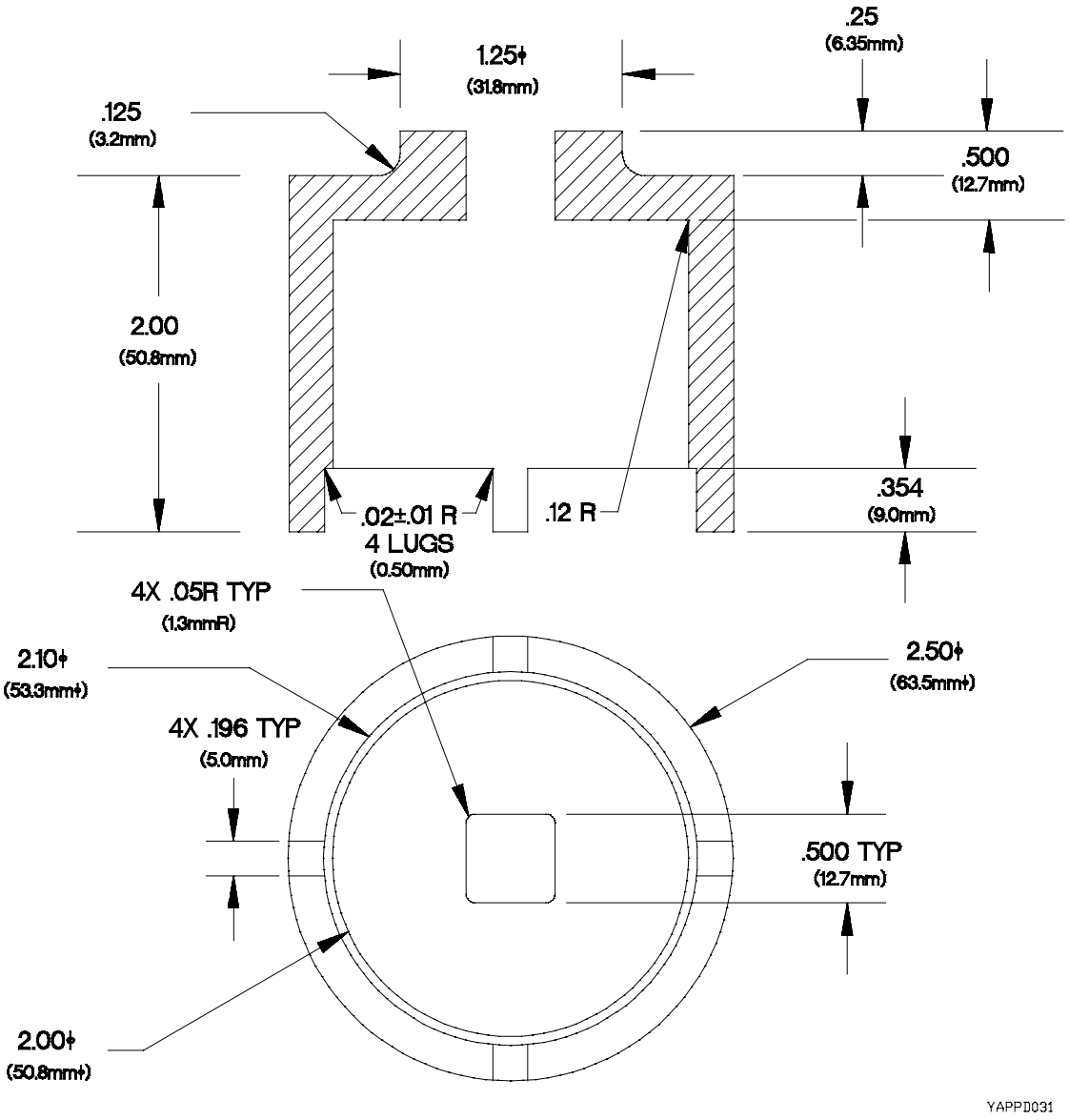


Figure D-3. Cab Front Support Spanner Socket

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

D-4. CAB MAINTENANCE STAND (CONT)

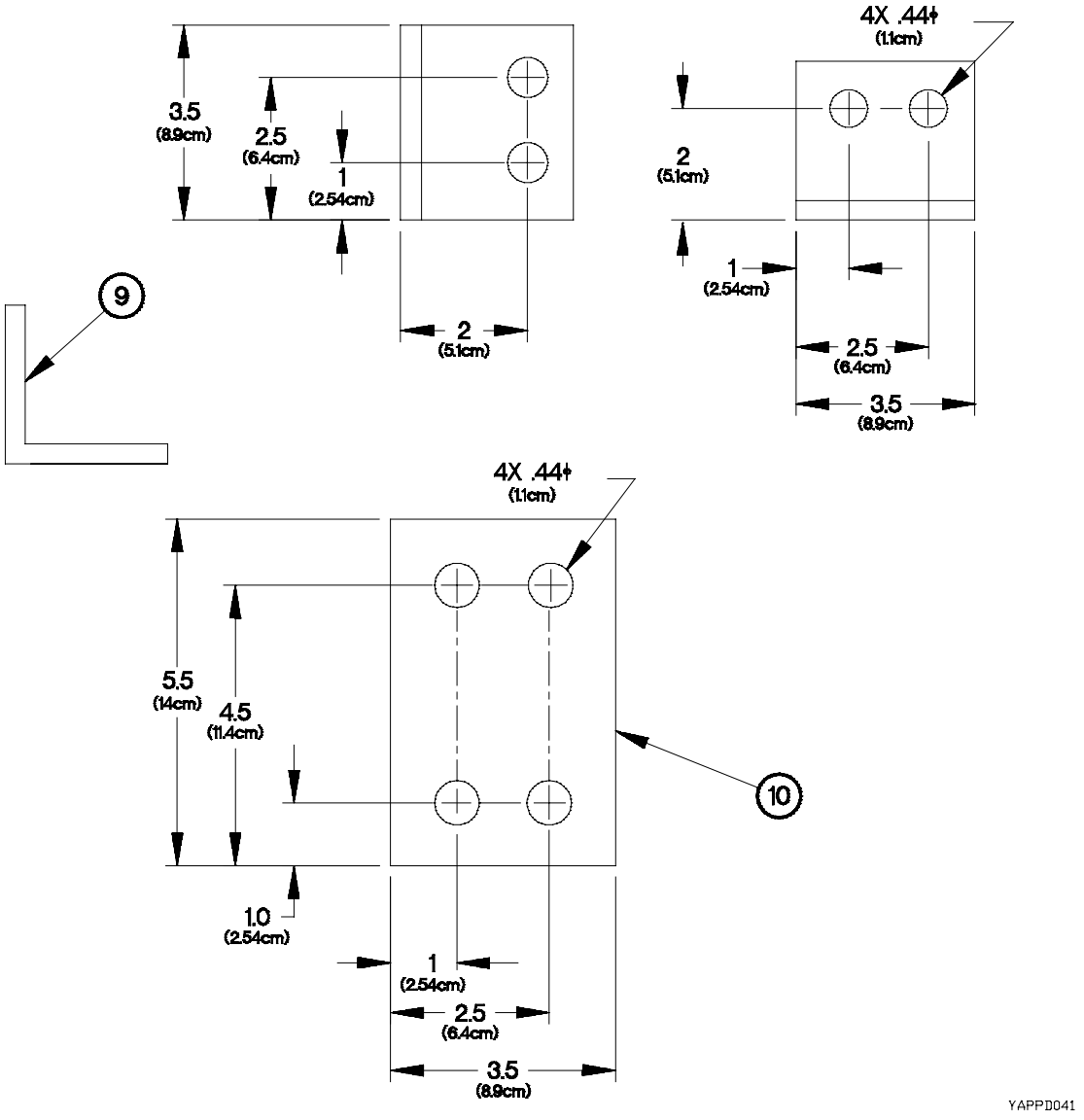


Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets

a. All dimensions are in inches (centimeters).
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.

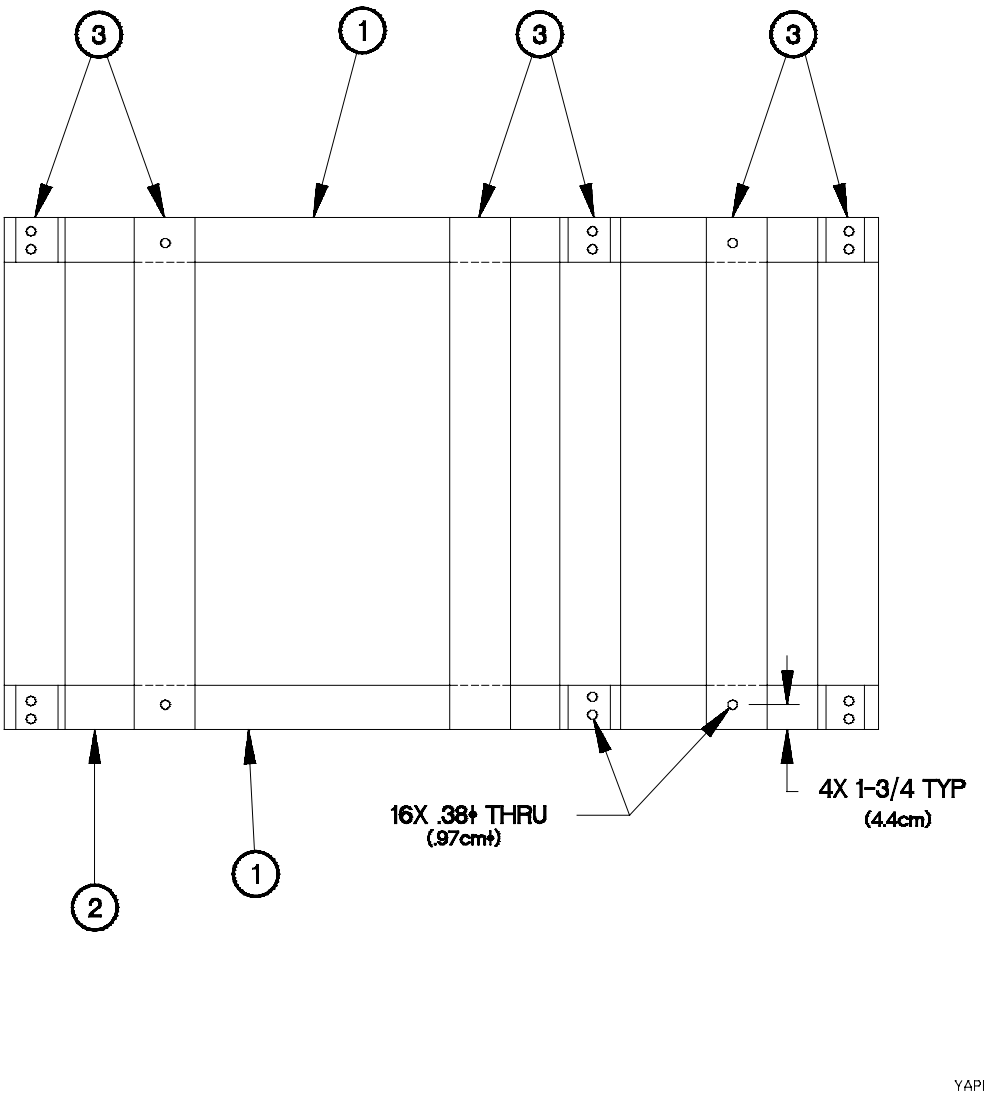


Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations

e. Using angle bracket (9) as a template, mark holes and match drill .38 in (0.96 cm) 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.

D-4. CAB MAINTENANCE STAND (CONT)

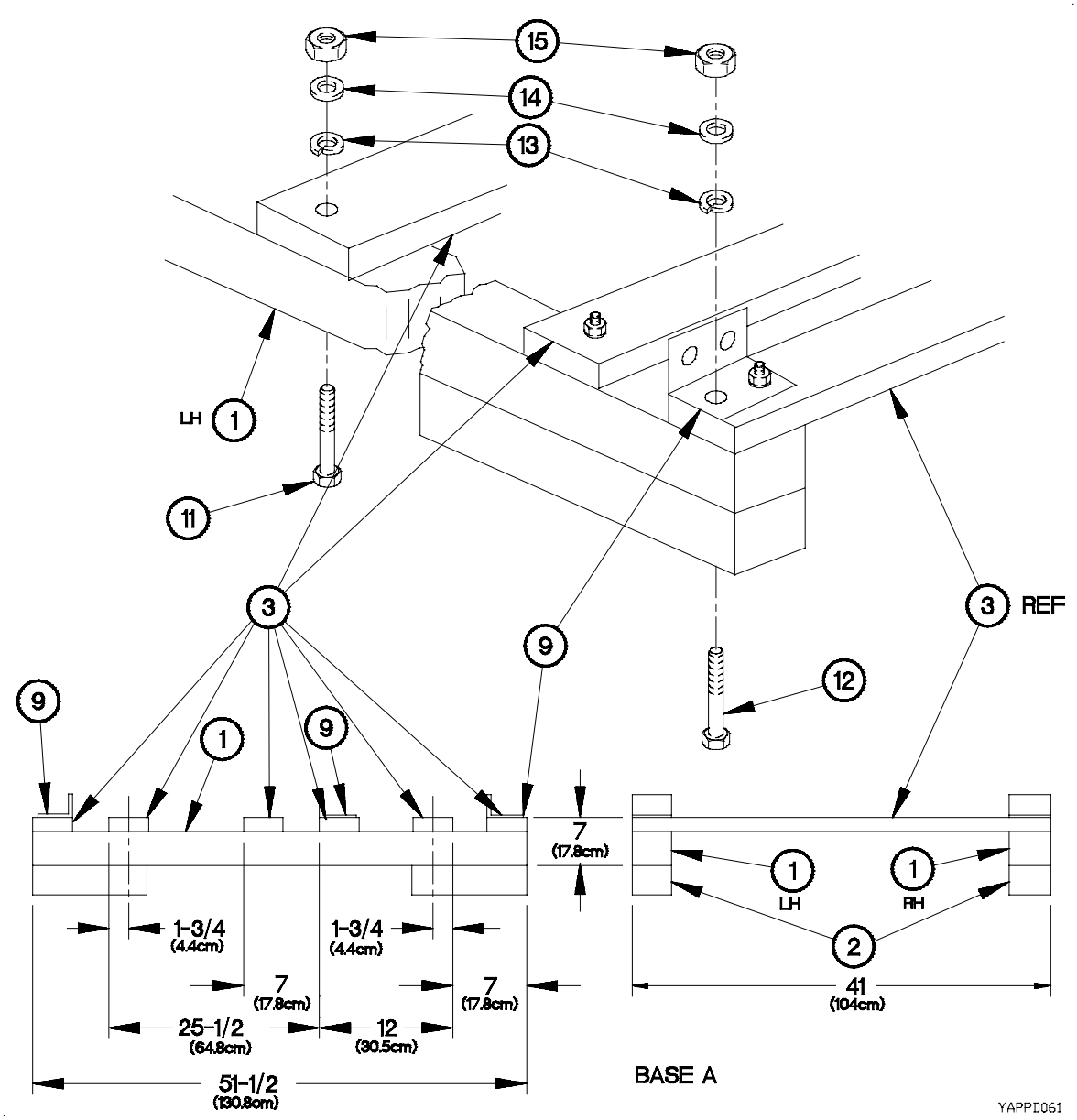


Figure D-6. Cab Maintenance Stand Base Fabrication

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**.

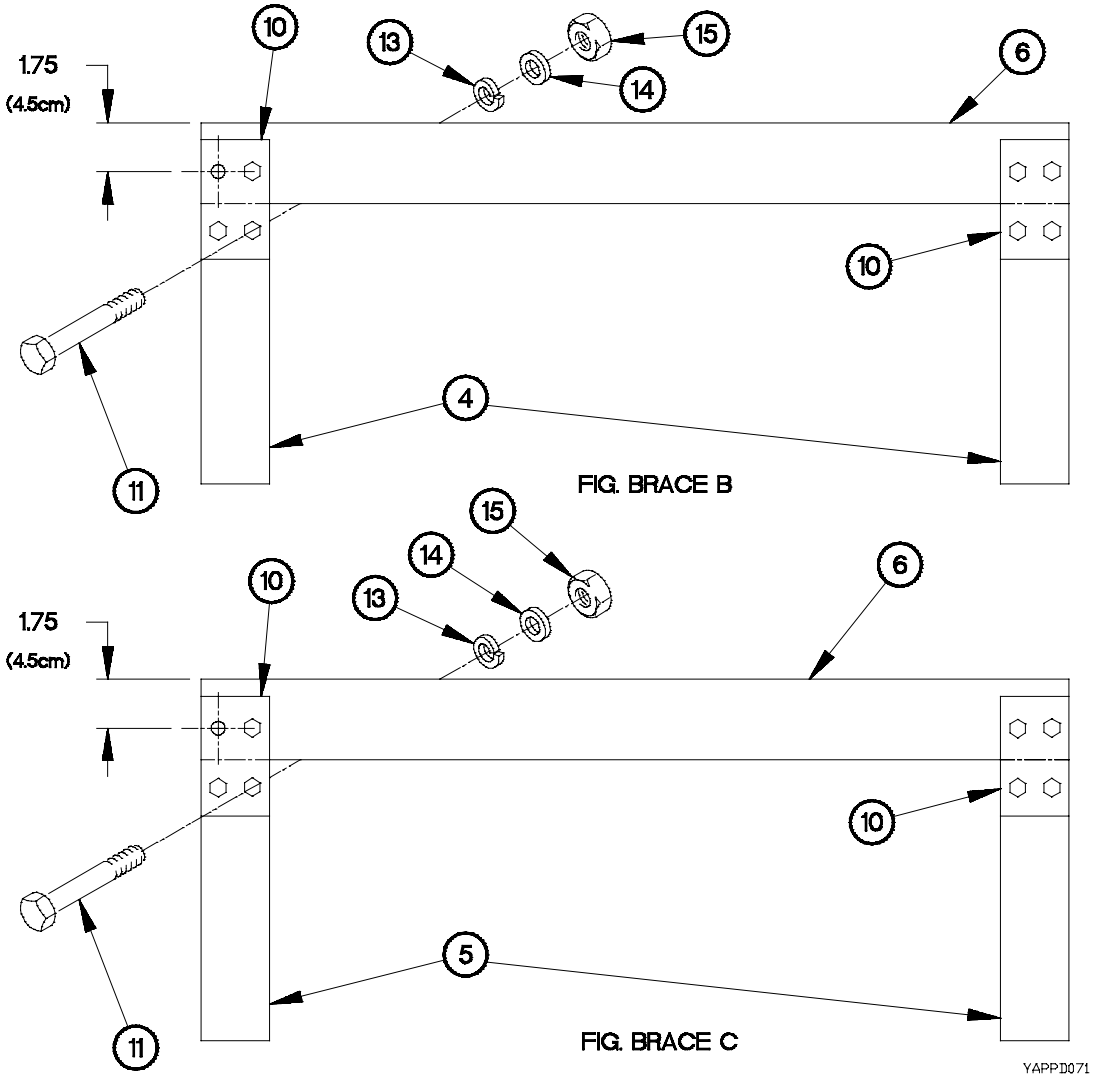


Figure D-7. Cab Maintenance Stand Brace Bracket Locations

h. Using straight bracket (10) as a template, mark holes and match drill 0.38 in. (0.96 cm) 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. (0.96 cm) 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).

D-4. CAB MAINTENANCE STAND (CONT)

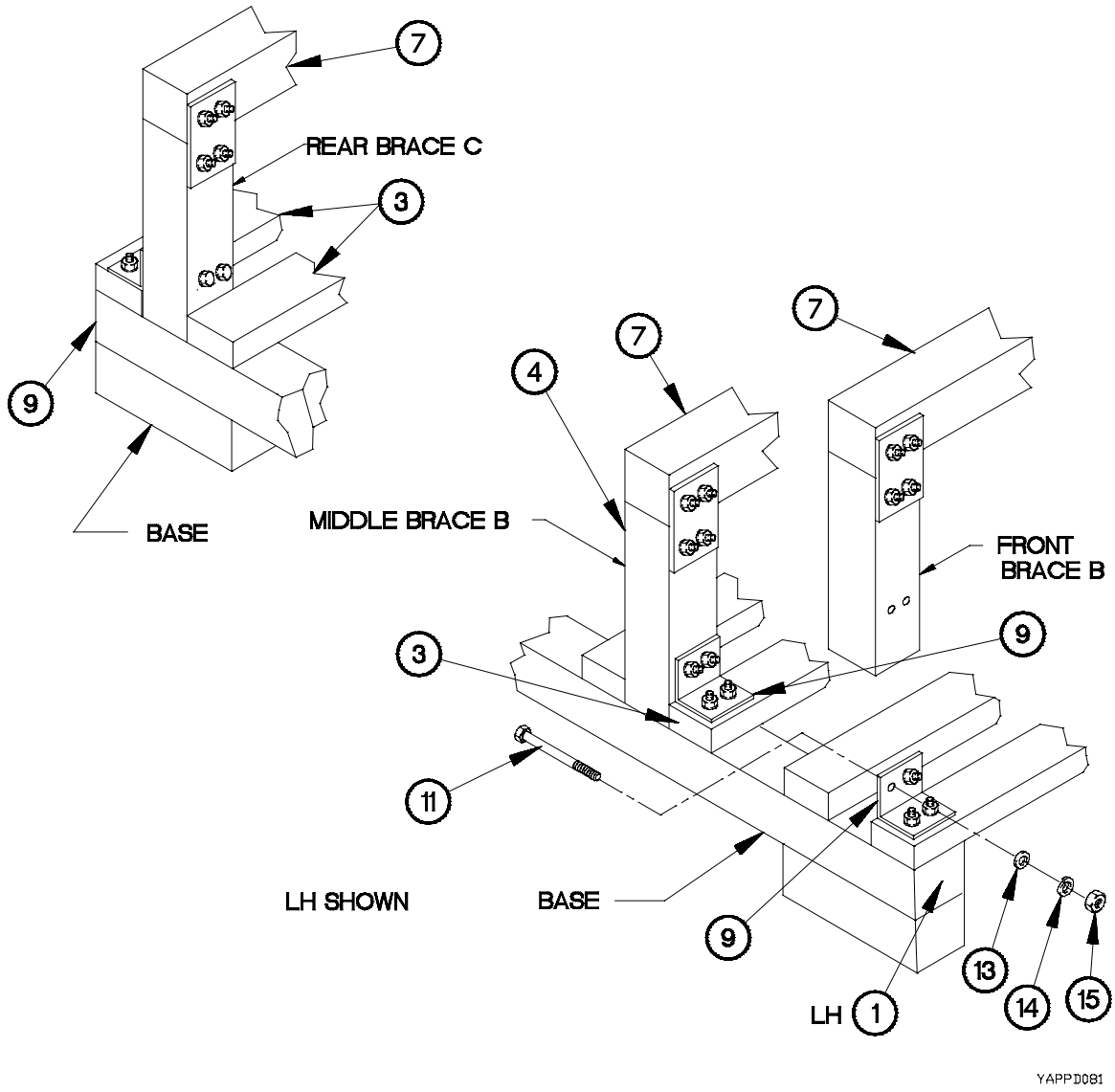


Figure D-8. Cab Maintenance Stand Brace to Base Assembly

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. (0.96 cm) 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.

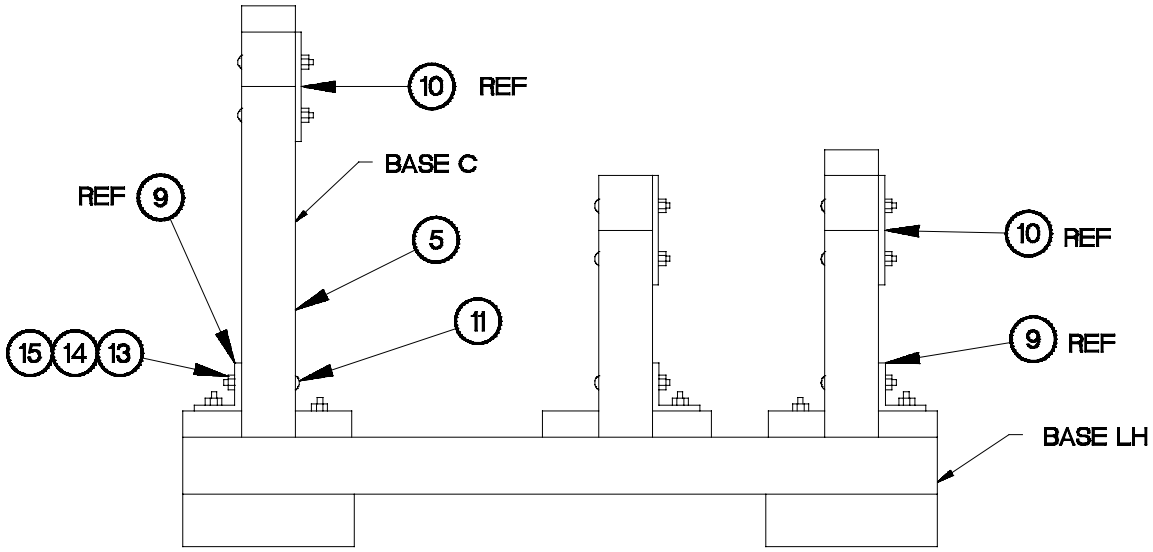


Figure D-9. Cab Maintenance Stand Side Braces Side View

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. (0.96 cm) 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.

D-4. CAB MAINTENANCE STAND (CONT)

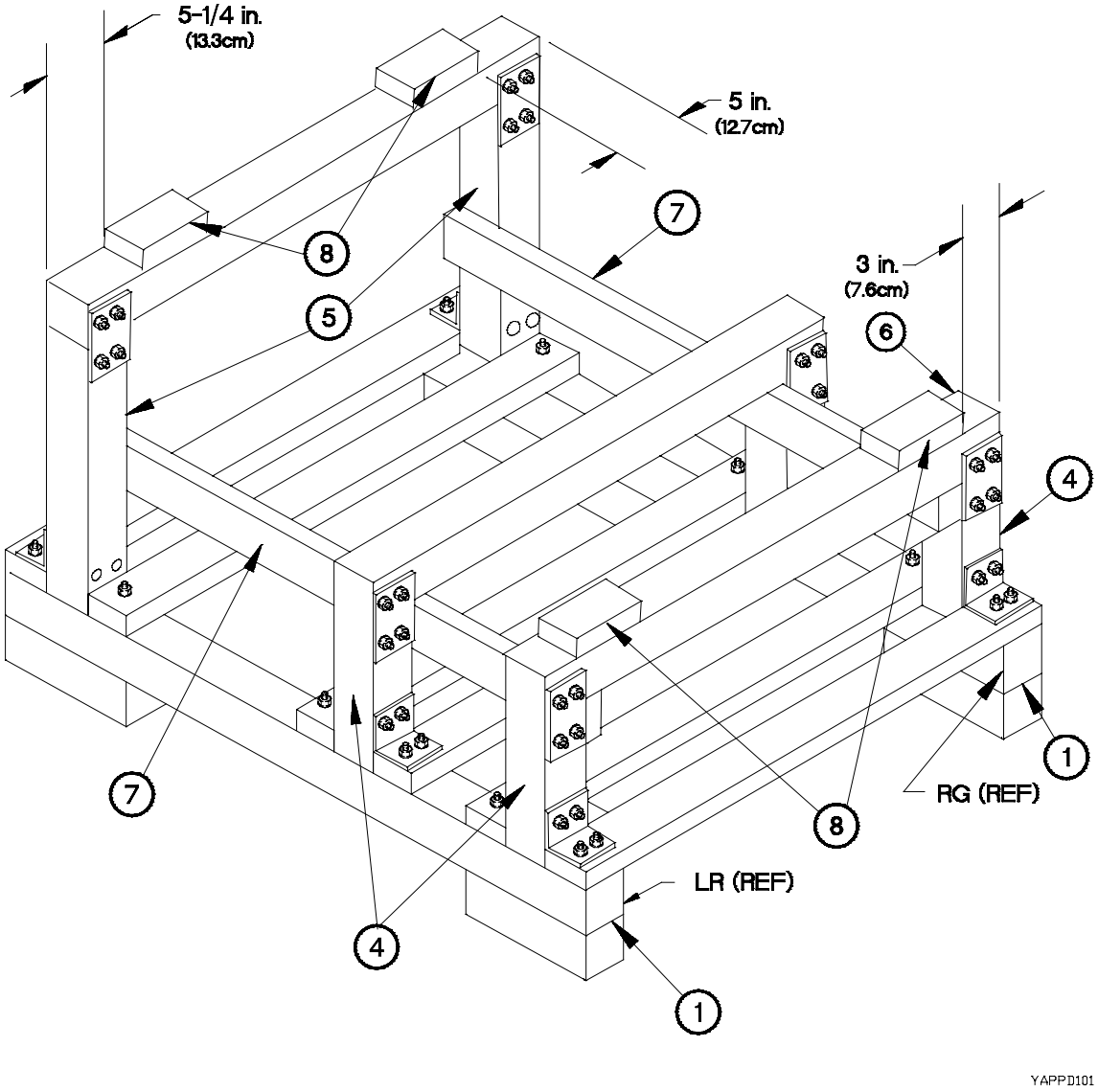


Figure D-10. Cab Maintenance Stand Assembly

t. Nail 1 pad (8) to support (6) at rear of stand 5-1/4 in. (13.3 cm) from left hand rear brace (5). Nail 1 pad (8) to support (6) at rear of stand 5 in. (12.7 cm) from right hand rear brace (5) using number 16 nails.
u. Nail 2 pads (8) to support (6) at front of stand 3 in. (7.6 cm) 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 inch (0.96 cm) 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. (10.2 cm) X 33.38 in. X (84.8 cm) X 0.38 in. (0.96 cm)	1
2	N/A	Steel, Flat Bar	4.0 in. (10.2 cm) X 12.0 in. (30.5 cm) X 0.38 in. (0.96 cm)	1
3	N/A	Angle Iron	2.0 in. (5.1 cm) X 2.0 in. (5.1 cm) X 3.5 in. (8.9 cm)	2
4	H.S.105VW-1	Omsi;gro[. CSA 105 C		
5	IC 551	Coating, Compound, Plastisol	NA	1

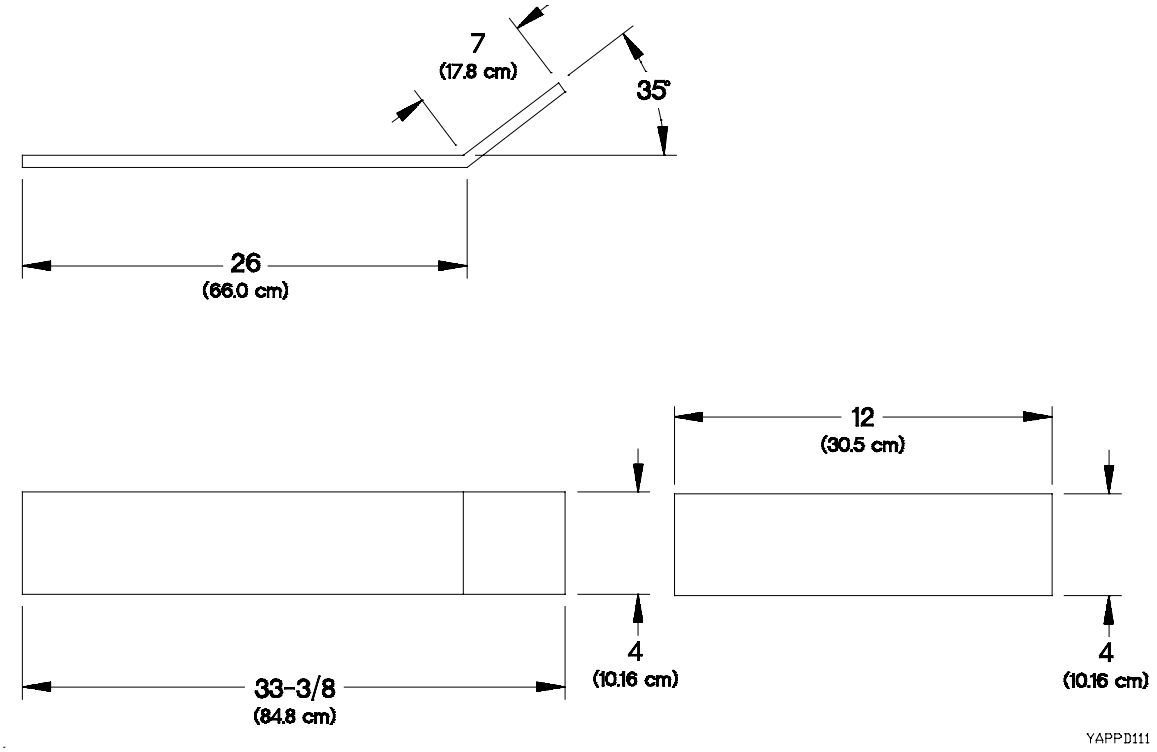


Figure D-11. Cab Support Tool Strut and Cab Rest

a. All dimensions are in inches (centimeters).
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.

D-5. CAB SUPPORT TOOL (CONT)

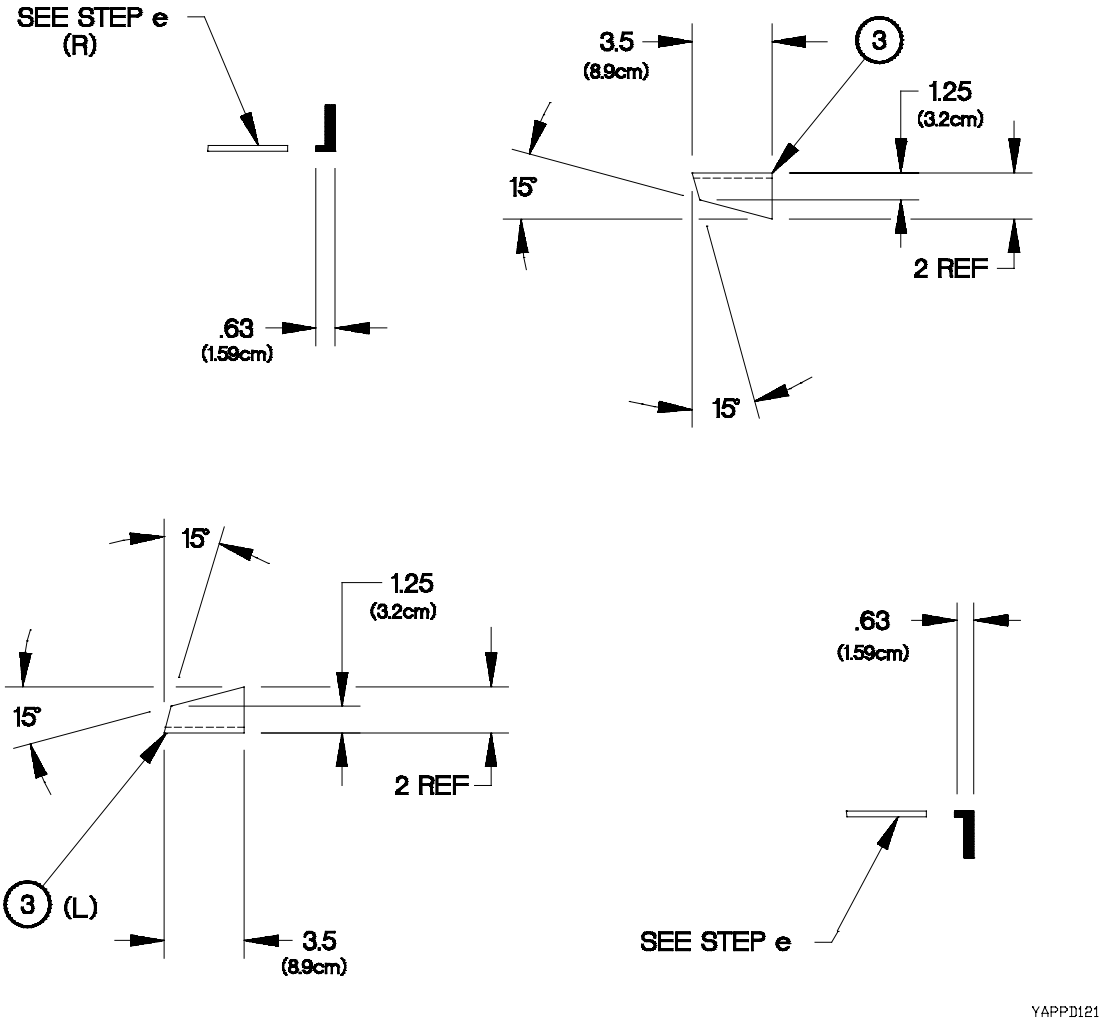


Figure D-12. Cab Support Tool Seat

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.

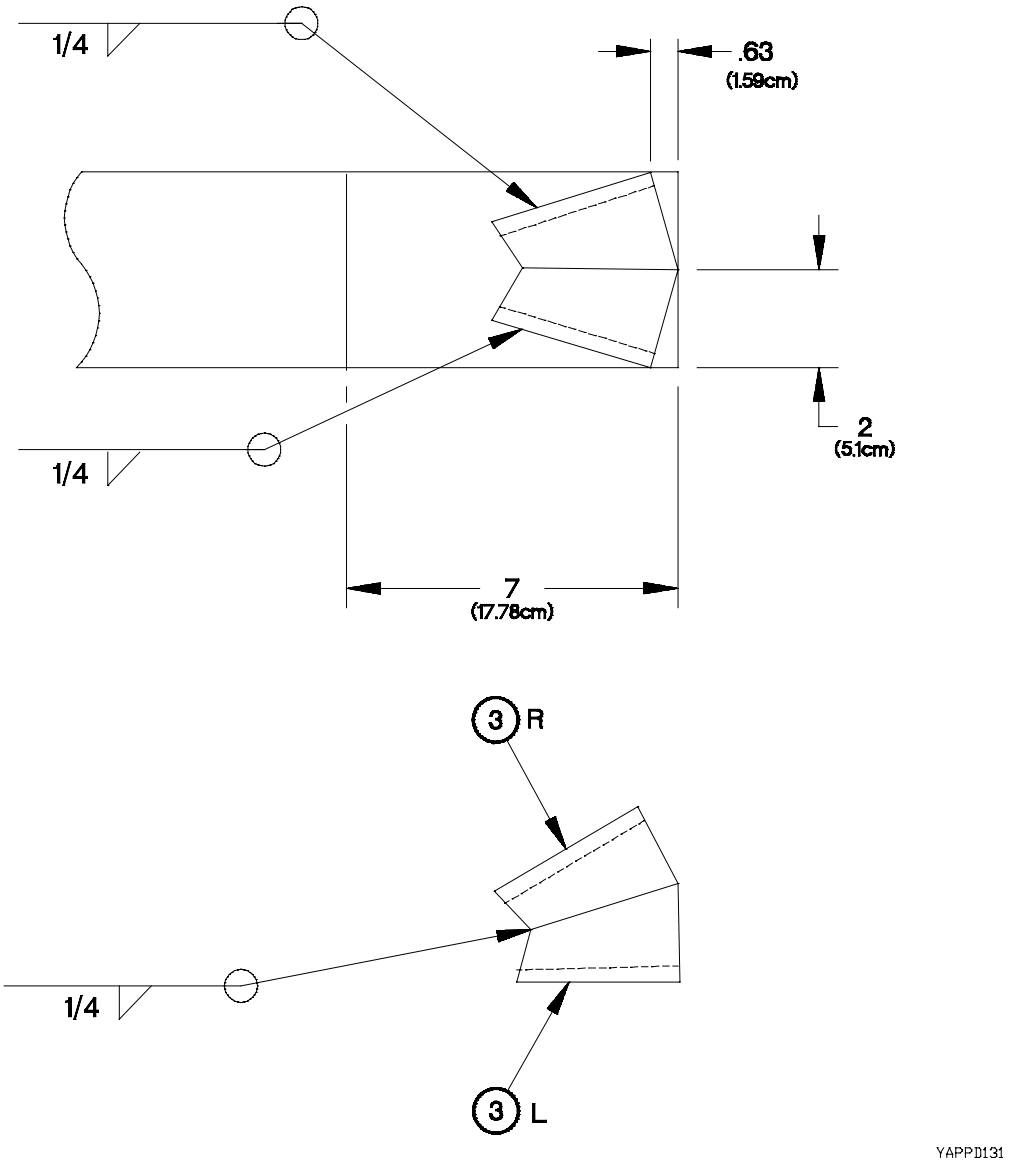


Figure D-13. Cab Support Tool Seat Layout

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.

D-5. CAB SUPPORT TOOL (CONT)

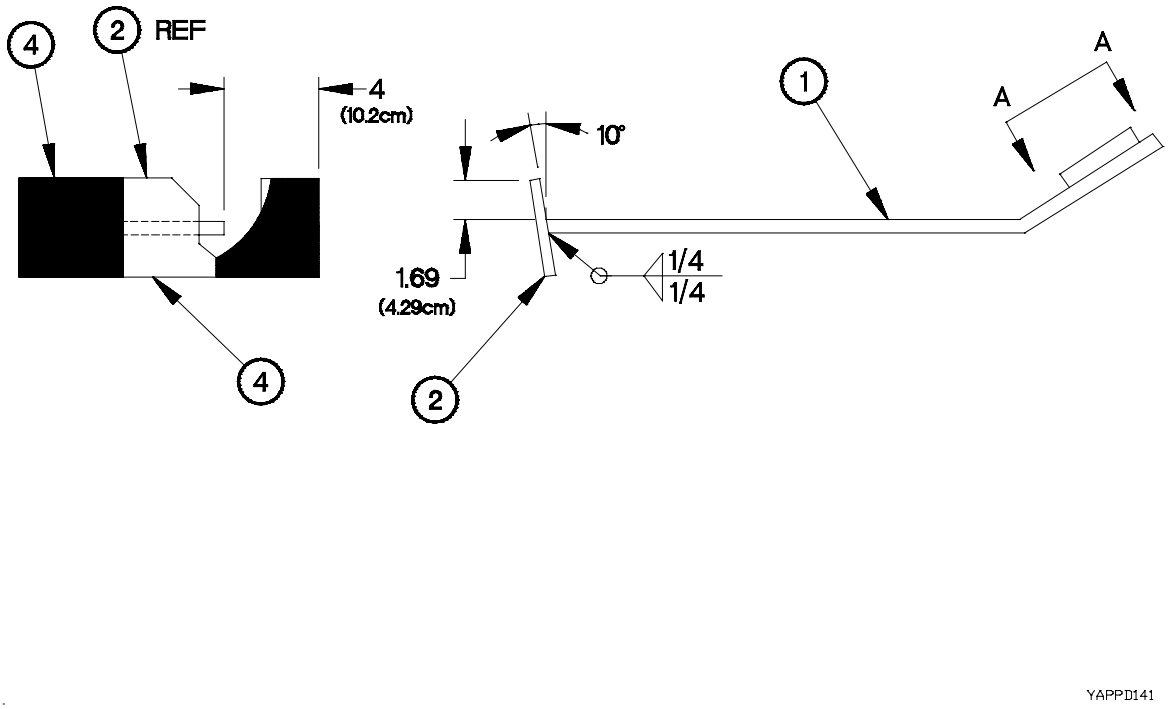


Figure D-14. Cab Support Tool Assembly

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. DUMP BED WOODEN BRACE FABRICATION

Cut the wooden braces from bulk wood stock according to the information in the table. Finish as described in the following steps.

Item Description	Size or Dimension	Material Description	Qty
Braces	4 X 4 X 48 in. (10.1 X 10.1 X 121.9 cm)	4 X 4 in. Lumber (MIL-STD-731)	2

a. All dimensions are in inches (centimeters).
b. Cut 2 of item 1 from MIL-STD 736 Group IV untreated bulk wood stock as indicated in table.
c. Sand and remove sharp edges.

D-7. DUMP BODY CAB PROTECTOR PIVOT PIN REMOVAL TOOL

Make the dump body cab protector pivot pin removal tool from 0.50 inch (1.3 cm) round steel stock according to the following figures. Refer to the parts list and figure for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, Round Bar	108.0 in. (274.3 cm) x 0.50 in. (1.3 cm) OD	1
2	N/A	Steel, Round Bar	5.00 in. (13 cm) x 0.50 in. (1.3 cm) OD	1

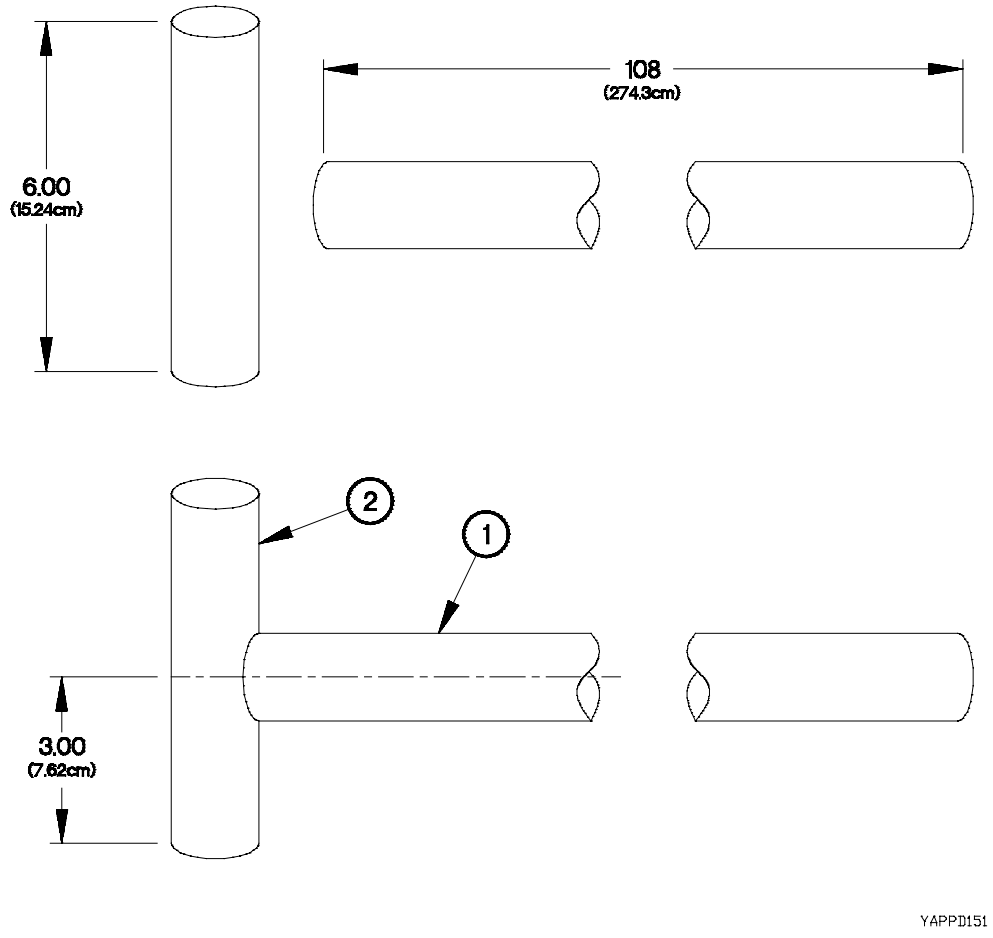


Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly

a. All dimensions are in inches (centimeters).
b. Position and clamp (1) and (2) pieces together as shown by dimensions in **Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly**.
c. Weld (1) to (2) as identified on assembly table and shown in **Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly**.
d. Weld both sides indicated in **Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly**.
e. De-burr and remove sharp edges.

D-8. DUMP BODY LIFTING BRACKET

Make the dump body lifting bracket assembly from the front, rear, top, guide, and mount plates according to the following instructions. Refer to the parts list tables and accompanying figures for details.

Item	Part Number	Name/Description	Qty
1	N/A	Rear Plate	1
2	N/A	Top Plate	1
3	N/A	Front Plate	1
4	N/A	Guide Brace	1
5	N/A	Plate, Mounting	1

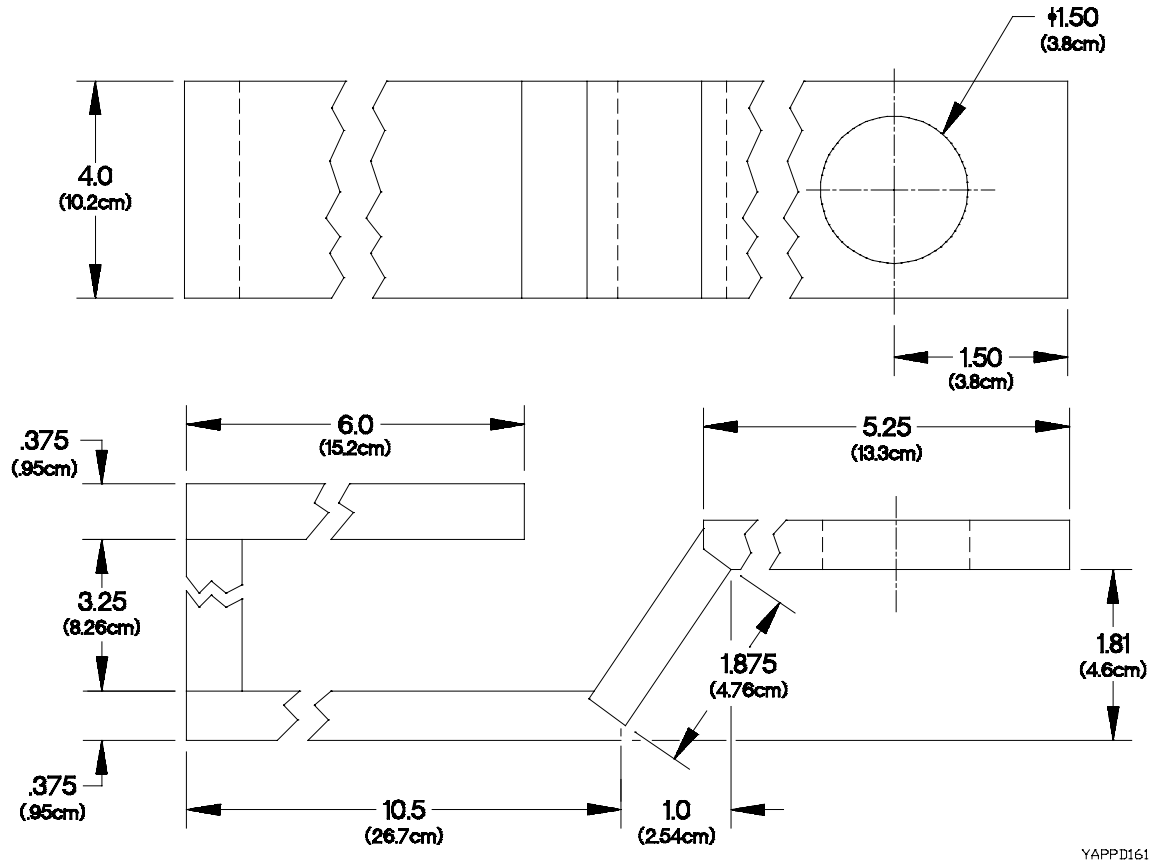


Figure D-16 Dump Body Lifting Bracket

a. All dimensions are in inches (centimeters).
b. Position and clamp pieces (1 through 5) together as shown by dimensions in Figure Dump Body Lifting Bracket.
c. Weld pieces together as shown in **Figure D-16. Dump Body Lifting Bracket**.
d. Coat all surfaces with Plastisol (6).
e. Maximum lifting capacity of Dump Body Lifting Bracket is 900 lbs (409 kgs).

Item	Part Number	Material Description	Size	Qty
1	N/A	Plate, steel, ASTM A-36	6.0 in. (15.2 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1
2	N/A	Plate, steel, ASTM A-36	3.25 in. (8.26 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1
4	N/A	Plate, steel, ASTM A-36	1.875 in. (10.2 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1

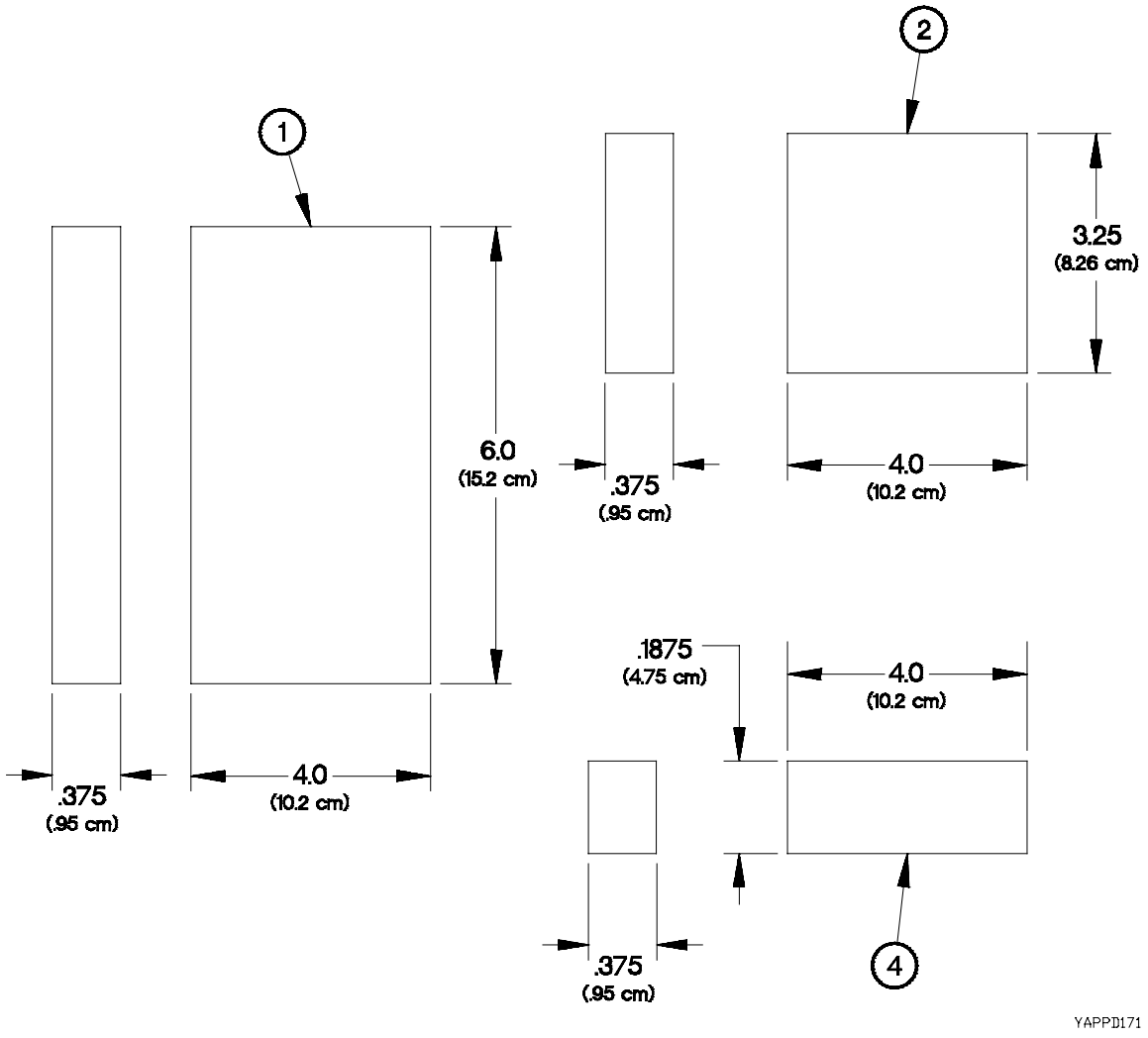


Figure D-17. Rear, Top, and Guide Plate

a. All dimensions are in inches (centimeters).
b. Fabricate (1),(2), and (4) from ASTM A-36 steel plate as shown in **Figure D-17. Rear, Top, and Guide Plate**.
c. De-burr and remove sharp edges.

D-8. DUMP BODY LIFTING BRACKET (CONT)

Item	Part Number	Material Description	Size	Qty
3	N/A	Plate steel, ASTM A36	10.5 in. (26.7 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1
5	N/A	Plate steel, ASTM A36	5.25 in. (13.3 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1

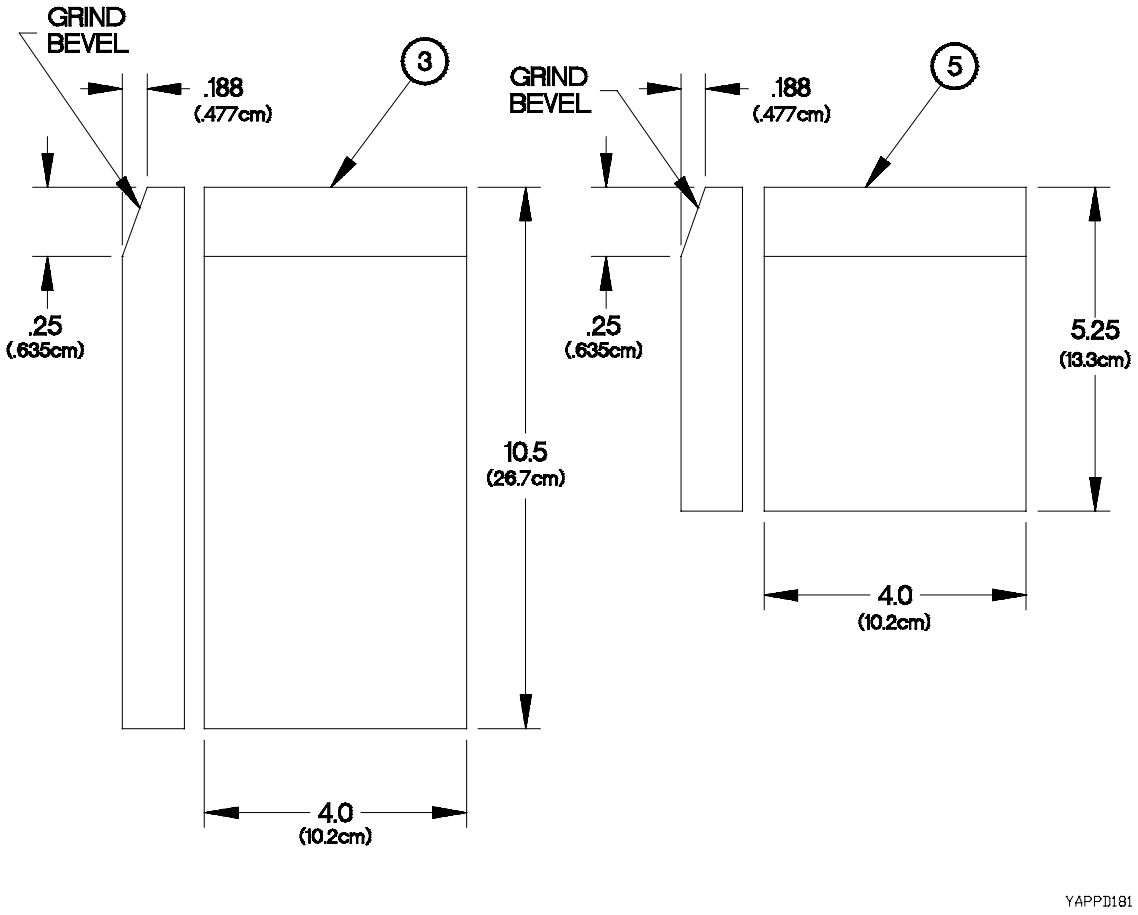


Figure D-18. Front and Mounting Plate

a. All dimensions are in inches (centimeters).
b. Fabricate (3) and (5) from ASTM A-36 steel plate.
c. Drill 1-1/2 inch (3.84 cm) diameter hole in plate (5) as shown in **Figure D-18. Front and Mounting Plate**.
d. Grind bevel on edge of each plate for weld surface as shown in **Figure D-18. Front and Mounting Plate**.
e. De-burr and remove sharp edges.

D-9. 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

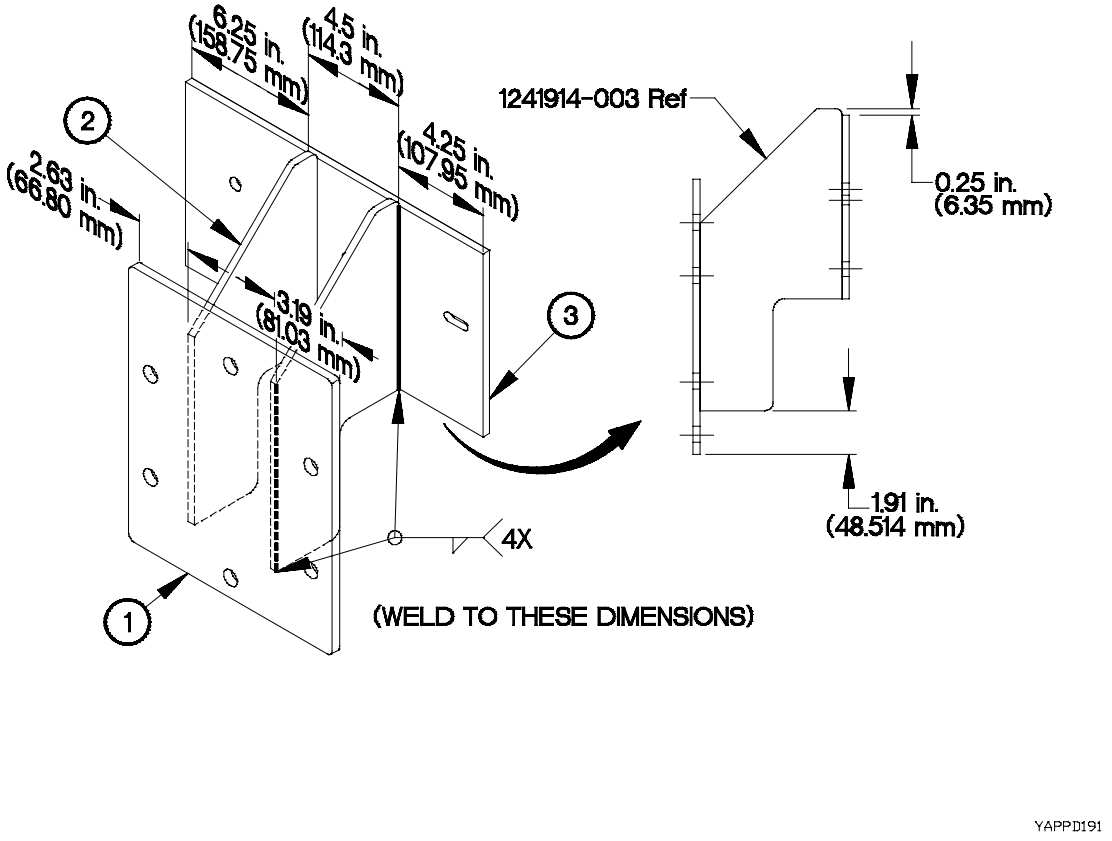


Figure D-19. Engine Stand Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Weld (1), (2) and (3) together as shown by dimensions in **Figure D-19. Engine Stand Bracket Assembly**.

D-9. ENGINE STAND BRACKET ASSEMBLY (CONT)

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

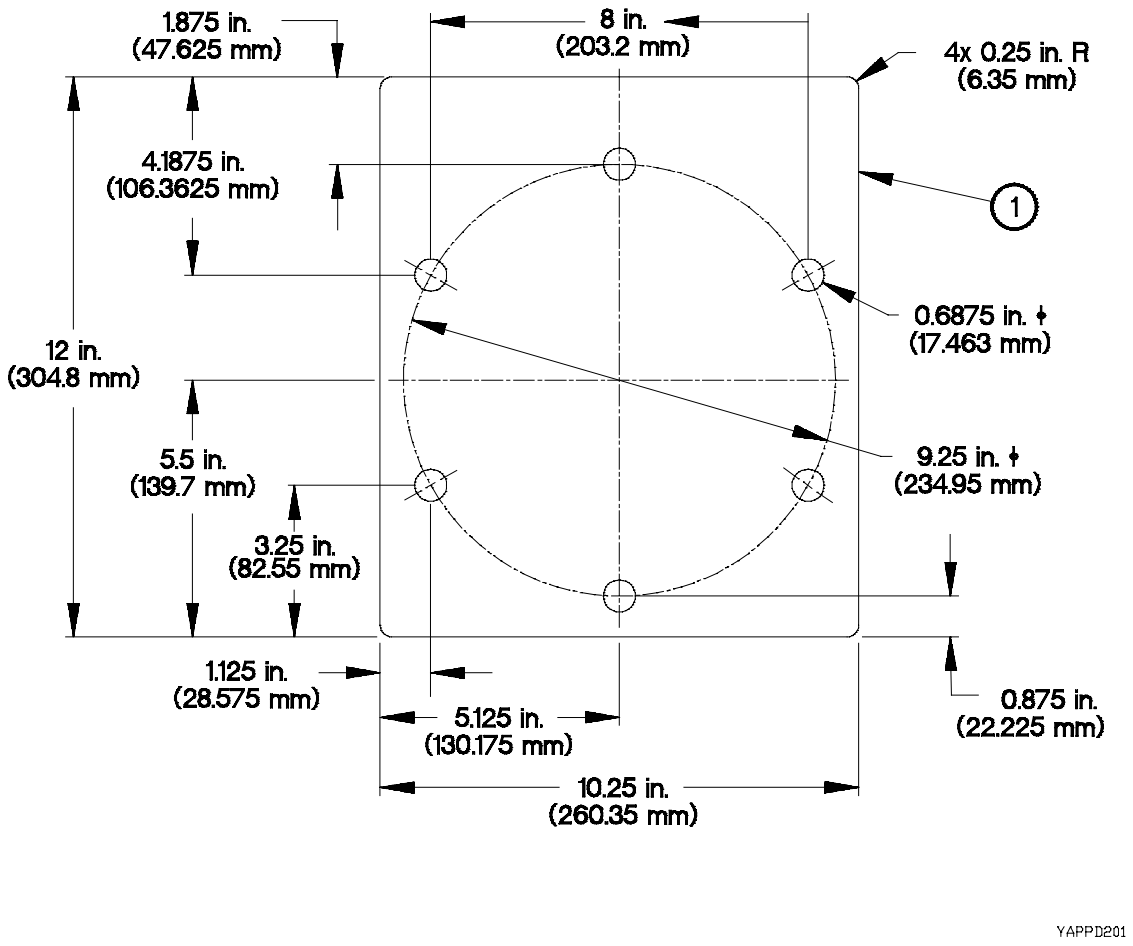


Figure D-20. Engine Stand Bracket Front Plate

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-20. Engine Stand Bracket Front Plate**.
d. Round four corners to 0.25 in. (6.35 mm) radius as shown in **Figure D-20. Engine Stand Bracket Front Plate**.

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

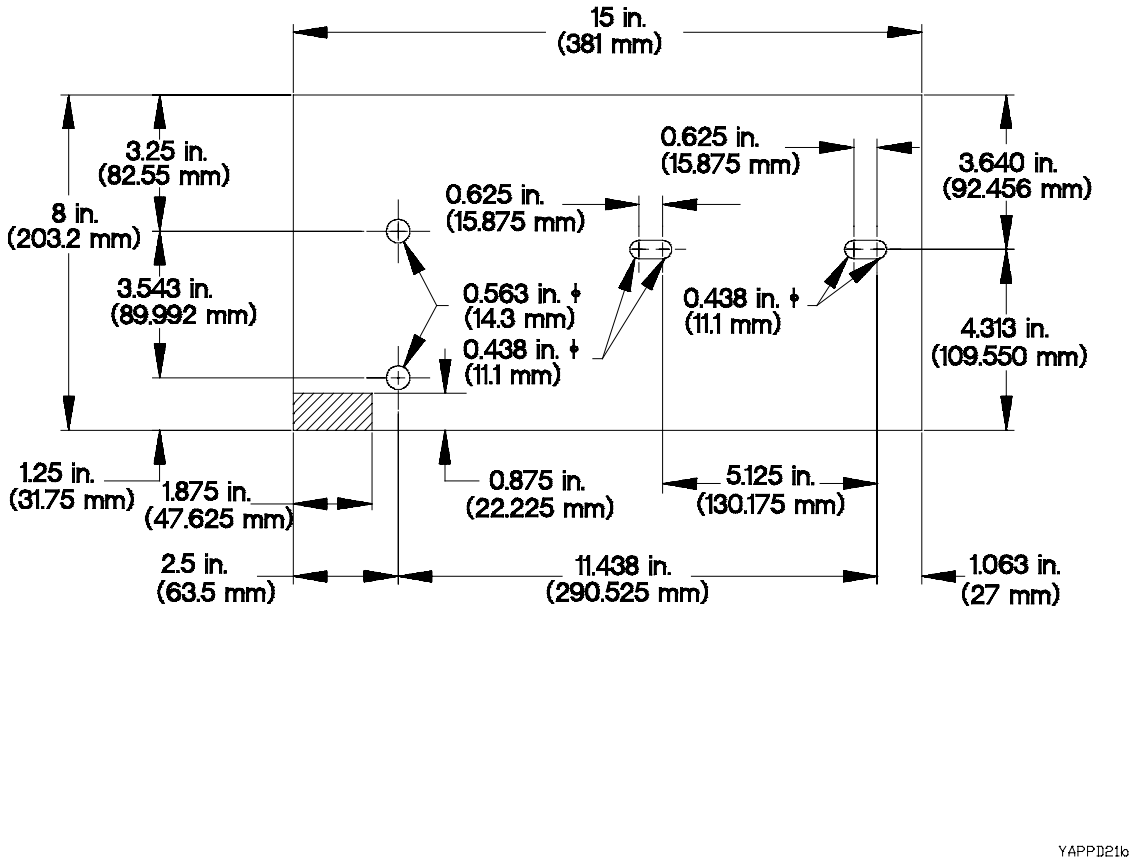


Figure D-21. Engine Stand Bracket Rear Plate

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-21. 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-21. Engine Stand Bracket Rear Plate**.
e. Cut or mill between 0.438 in. (11.1 mm) diameter holes as shown in **Figure D-21. Engine Stand Bracket Rear Plate**.
f. De-burr and remove all sharp edges.

D-9. ENGINE STAND BRACKET ASSEMBLY (CONT)

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

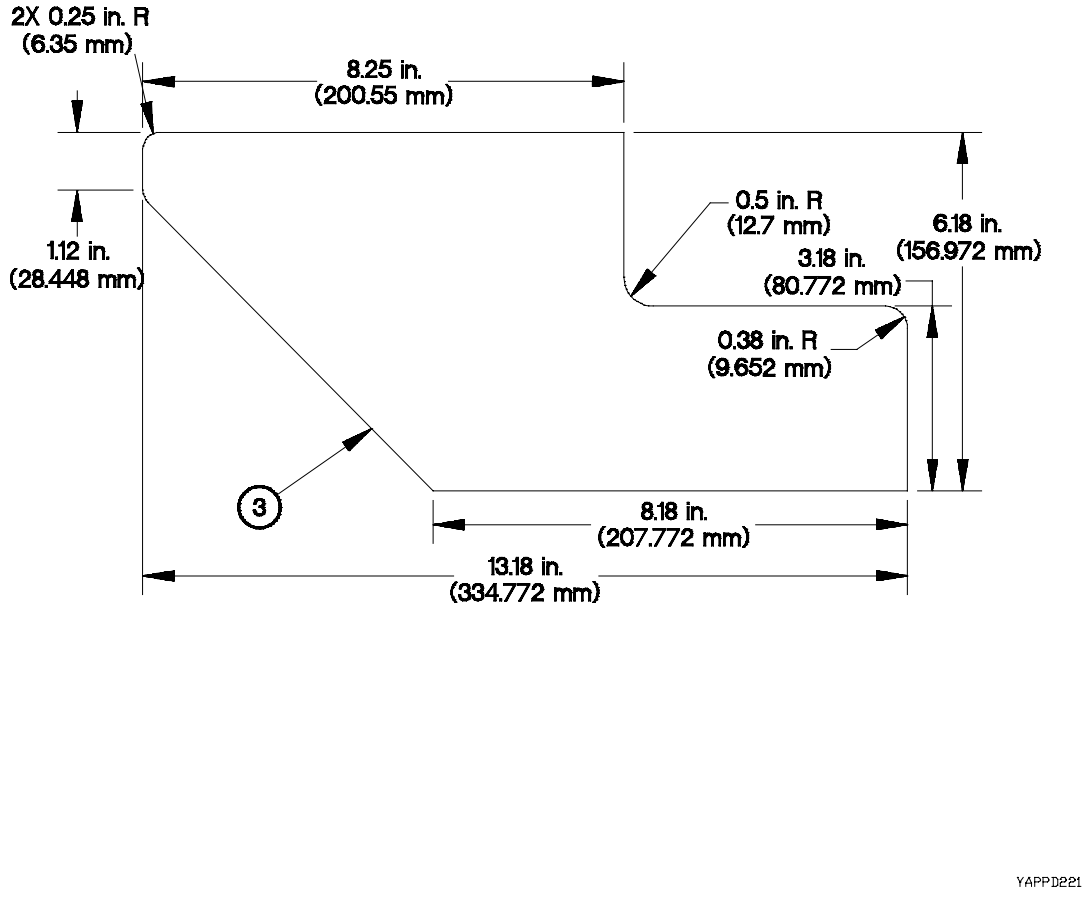


Figure D-22. Engine Stand Bracket Side Plates

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-22. Engine Stand Bracket Side Plates**.
e. Round corner to 0.38 in. (9.65 mm) radius as shown in **Figure D-22. Engine Stand Bracket Side Plates**.
f. De-burr and remove all sharp edges.

D-10. HEADLIGHT ADJUSTMENT SCREEN

The headlight adjustment screen may be drawn on any vertical surface at least 50 in. (127 cm) high and 100 in. (254 cm) wide.

a. Draw two vertical lines (1) 50 in. (127 cm) high and 90.6 in. (230 cm) apart (centered on headlight adjustment screen).

b. Locate two points 40 in. (101.6 cm) from floor and 15.3 in. (38.9 cm) toward the center from each vertical line (1).

c. Draw vertical line (2) about 3-5 in. (8-13 cm) centered on each of the two points.

d. Draw horizontal line (3) about 3-5 in. (8-13 cm) centered on each of the two points.

e. Measure out 4 in. (10 cm) along each vertical line (2) and horizontal line (3) from each of the two points to make 8 in. (20 cm) squares (4).

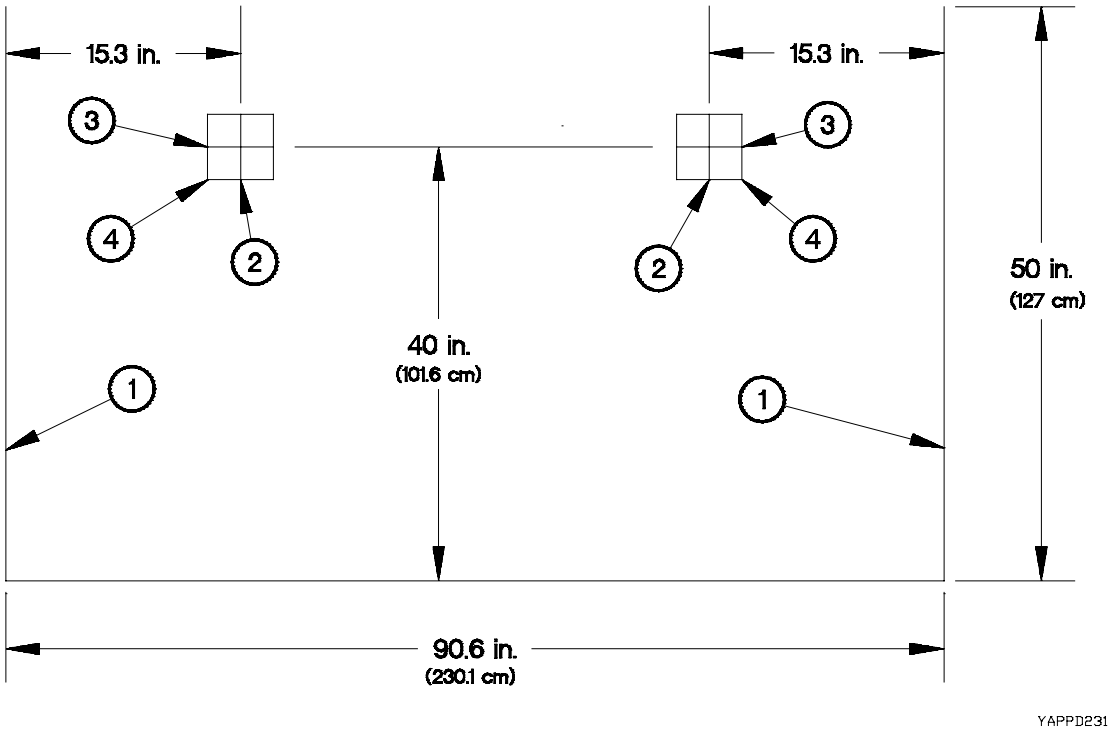


Figure D-23. Headlight Adjustment Screen

D-11. LEFT FRONT LEAF SPRING U-BOLT SOCKET

Use a 6-point 1-1/16 inch or 27 mm 3/4 inch drive impact socket. Grind down wrenching end to a maximum OD of 1.5 inches (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-12. 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 (1.9 cm) X 0.25 in. (0.63 cm) long	1
2	5305-00-404-8272	Setscrew	0.164 in. OD (0.41 cm) x 0.125 in. length (0.32 cm) 32 UNC	1

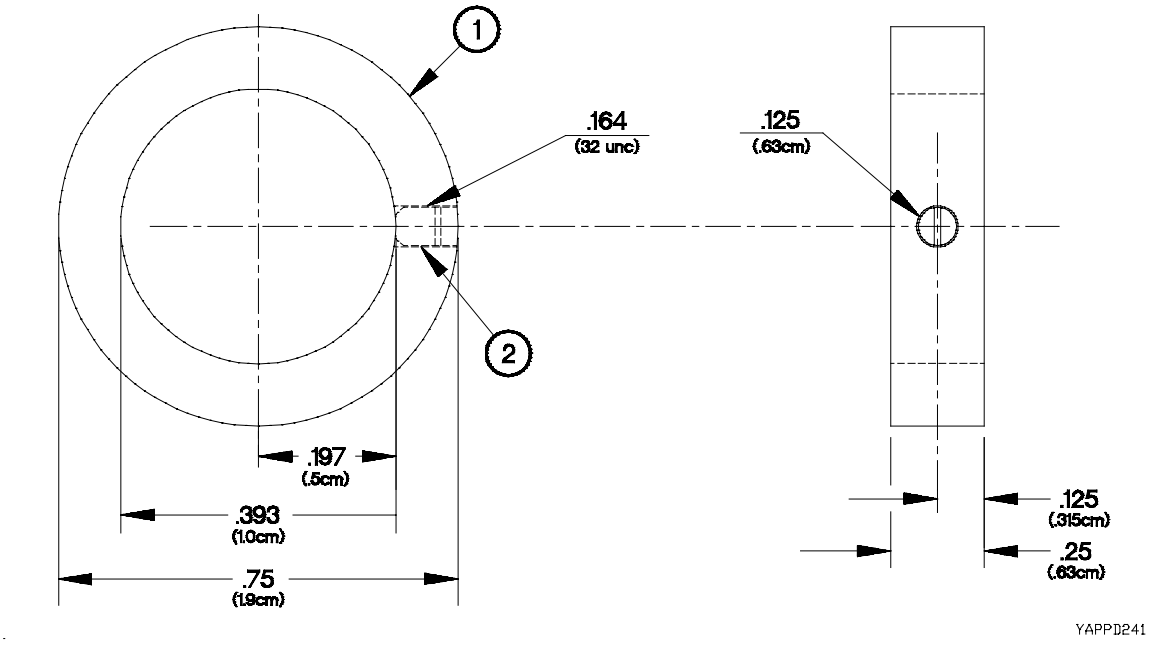


Figure D-24. Machine Gun Ring Drill Stop

a. All dimensions are in inches (centimeters).
b. Drill 0.393 in. (1.0 cm) diameter hole through as shown in **Figure D-24. Machine Gun Ring Drill Stop**.
c. Drill 0.125 in (0.32 cm) diameter hole through for setscrew as shown in **Figure D-24. 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-13. MACHINE GUN RING WOODEN SUPPORT FABRICATION

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 (20.3 cm) long.
d. Sand and remove sharp edges.

D-14. 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. (1.27 cm) ID X 1.50 in. (3.8 cm)	1

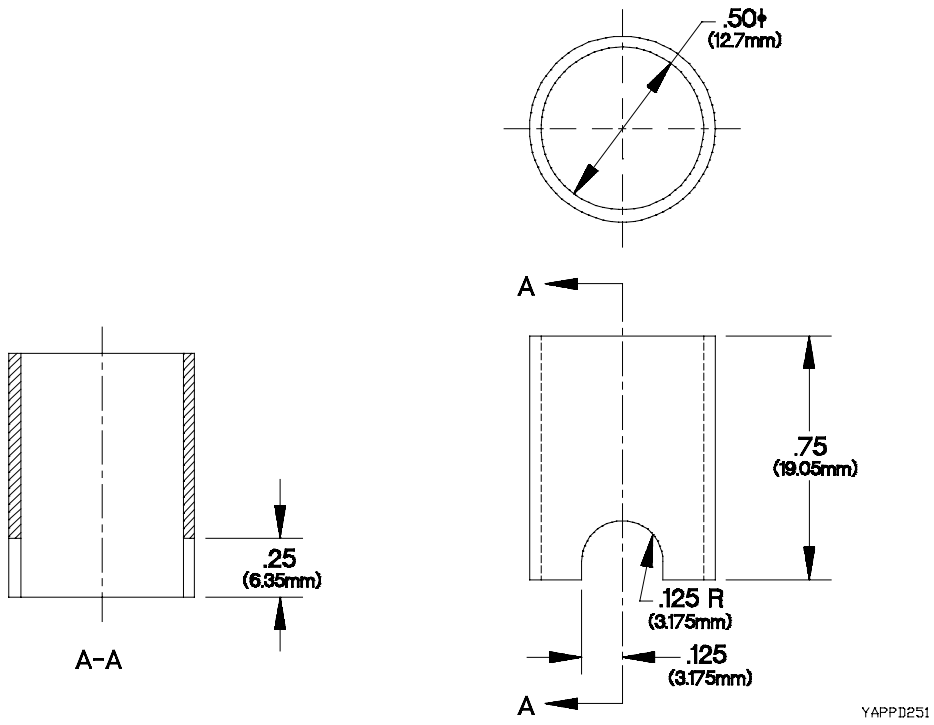


Figure D-25. Main Valve Body Spring Compression Tool

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.
h. Surface texture: 125 $\sqrt{}$ unless otherwise specified.

D-15. MARKING SLEEVE FABRICATION

Fabricate marking sleeves according to the following information.

a. Cut from bulk sleeve material 12414663 FP-301-12.7, 2 inches (5.2 cm).
b. All dimensions are in inches (centimeters).
c. Identify by applying the following applicable numbers to the sleeve according to MIL-STD 130.

CAGE CODE PART NUMBER

D-16. M1089 30K WINCH TEST ADAPTER

Assemble the M1089 30K winch test adapter according to the following steps. Refer to the following parts list and **Figure D-26. M1089 30K Winch Test Adapter** for details.

Part Number	Material Description	National Stock Number	Qty
4-4-4 100401BA	Tee, Tube	4730-01-095-3430	1
4-6 100102BA	Adapter, Straight, Pipe to Tube	4730-01-096-9398	1
207P-4	Coupling, Pipe	4730-00-881-1161	1
NB-4-035	Tubing, Nonmetallic	4720-01-071-4042	4 in.
MIL-T-27730	Tape, Antiseizing	8030-00-889-3534	1 roll

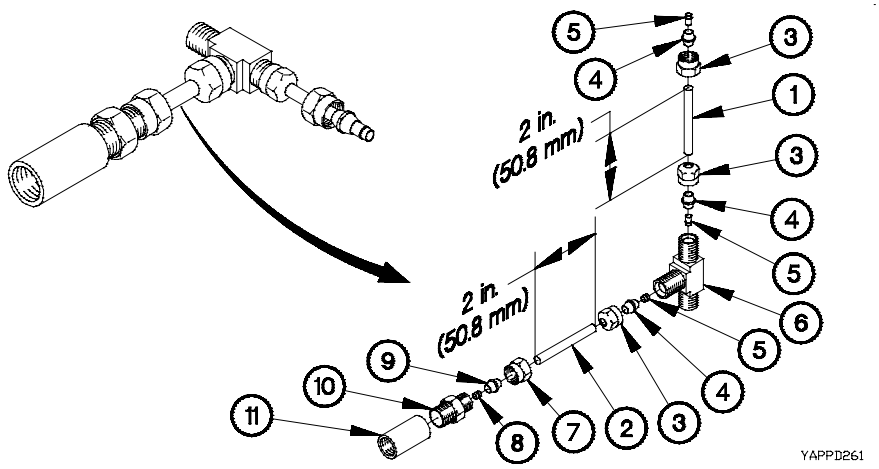


Figure D-26. M1089 30K Winch Test Adapter

a. All dimensions are in inches (millimeters).
b. Cut two pieces of nonmetallic tubing (1 and 2) to 2.0 in. (50.8 mm) long.
c. Remove three nuts (3), sleeves (4), and ferrules (5) from tube tee (6).
d. Install two nuts (3), sleeves (4), and ferrules (5) on nonmetallic tubing (1).
e. Install nonmetallic tubing (1) on tube tee (6).
f. Remove nut (7), sleeve (8), and ferrule (9) from straight adapter (10).
g. Install two nuts (3 and 7), sleeves (4 and 8), and ferrules (5 and 9) on nonmetallic tubing (2).
h. Install nonmetallic tubing (2) on tube tee (6).
i. Install nut (9) on straight adapter (10).
j. Apply one wrap of antiseizing tape to threads of straight adapter (10).
k. Install pipe coupling (11) on straight adapter (10).

D-17. M1089 SOLENOID TEST ADAPTER

Assemble the M1089 solenoid test adapter according to the following steps. Refer to the following parts list and **Figure D-27. M1089 Solenoid Test Adapter** for details.

Part Number	Material Description	National Stock Number	Qty
2-2-2 080401CA	Tee, Tube	4730-01-214-6990	1
2-2 080202CA	Elbow, Pipe to Tube	4730-00-845-5345	1
4-2 130140B	Bushing, Pipe	4730-00-828-0171	1
NB-2-031	Tubing, Nonmetallic	4720-01-287-4499	24 in.

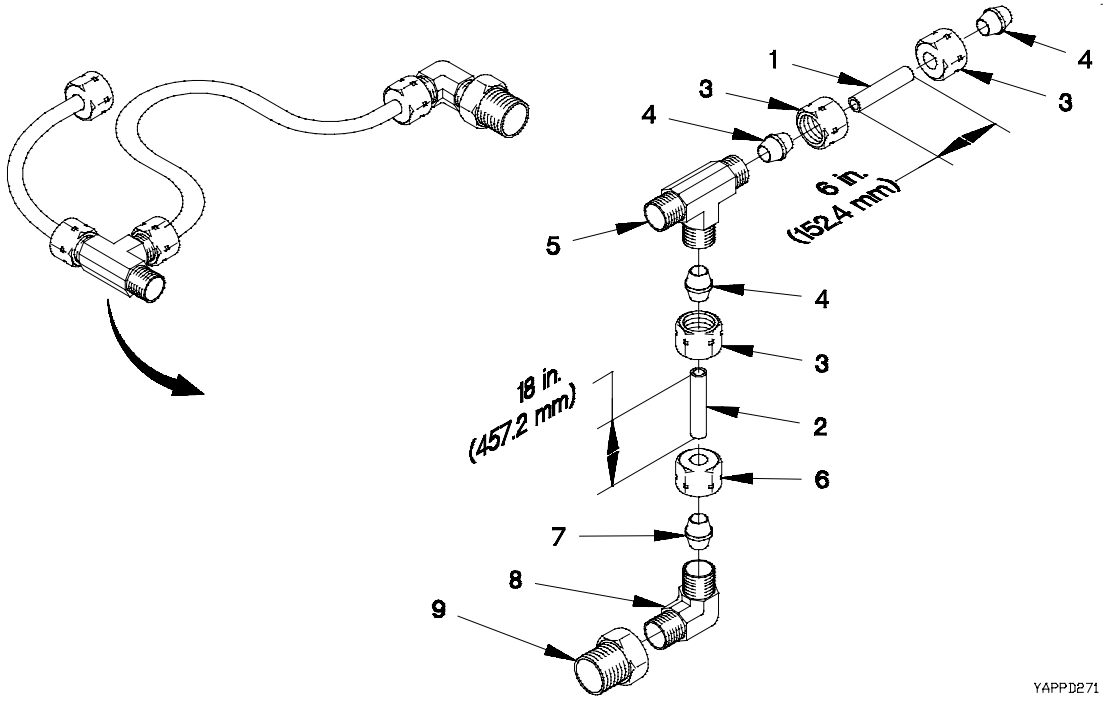


Figure D-27. M1089 Solenoid Test Adapter

a. All dimensions are in inches (millimeters).
b. Cut one piece of nonmetallic tubing (1) to 6.0 in. (152.4 mm) long.
c. Cut one piece of nonmetallic tubing (2) to 18.0 in. (457.2 mm) long.
d. Remove three nuts (3) and ferrule sleeves (4) from tube tee (5).
e. Install two nuts (3) and ferrule sleeves (4) on nonmetallic tubing (1).
f. Install nonmetallic tubing (1) on tube tee (5).
g. Remove nut (6) and ferrule sleeve (7) from pipe to tube elbow (8).
h. Install two nuts (3 and 6) and ferrule sleeves (4 and 7) on nonmetallic tubing (2).
i. Install nonmetallic tubing (2) on tube tee (5).
j. Install nut (6) on pipe to tube elbow (8).
k. Install pipe bushing (9) on pipe to tube elbow (8).

D-18. 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-19. 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

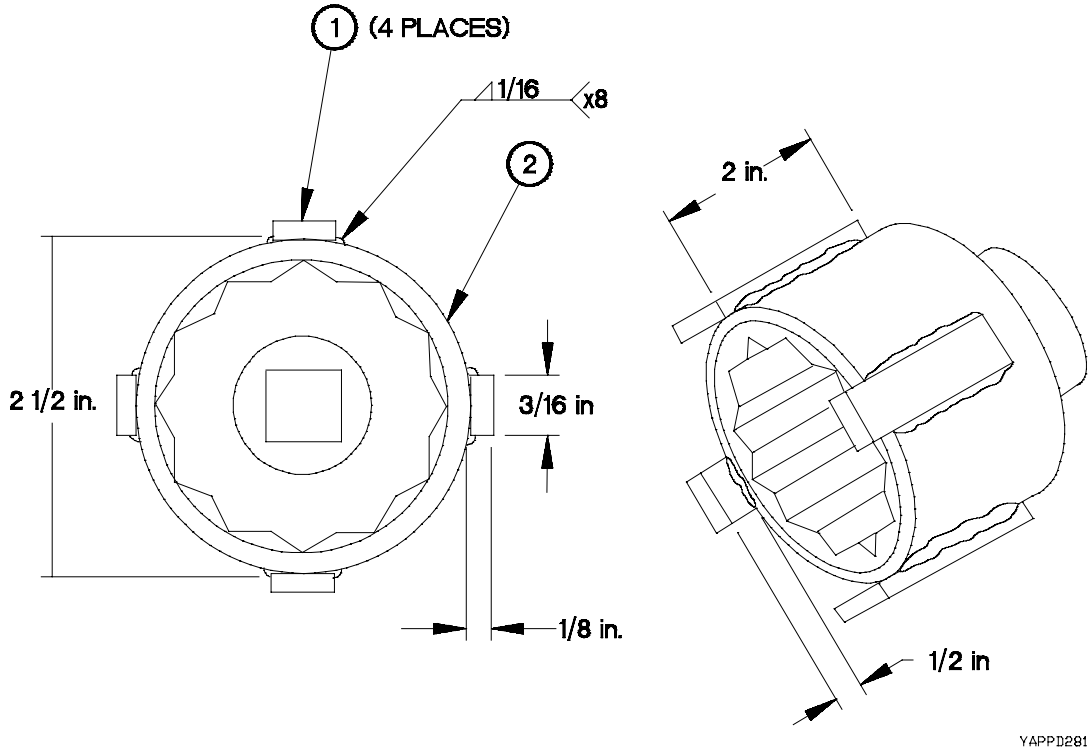


Figure D-28. Spanner Socket Tool

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-28. Spanner Socket Tool**. Ensure keystock extends 1/2 inch beyond socket face.
c. Remove sharp edges.

D-20. SPANNER WRENCH TOOL

Make the spanner wrench tool from 0.38 in. (1 cm) 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

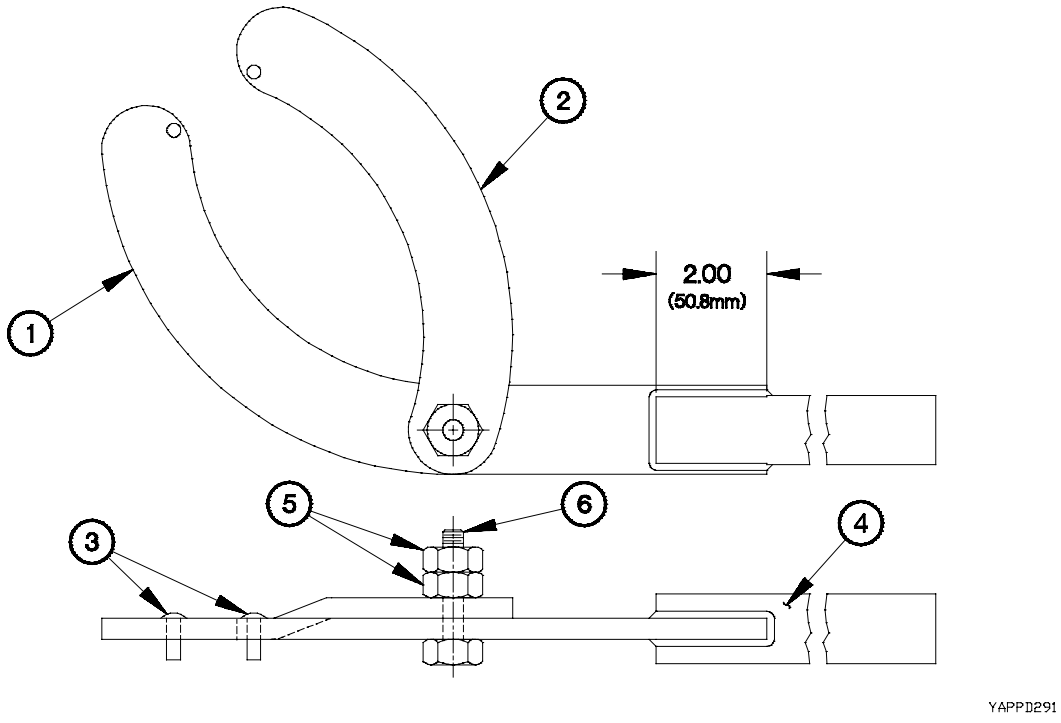


Figure D-29. Spanner Wrench Tool Assembly

a. Weld pins (3) in spanner handle (1) and spanner jaw (2) as shown in **Figure D-29. Spanner Wrench Tool Assembly**.
b. Position and clamp handle (4) to spanner handle piece (1) as shown in **Figure D-29. 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).

D-20. SPANNER WRENCH TOOL (CONT)

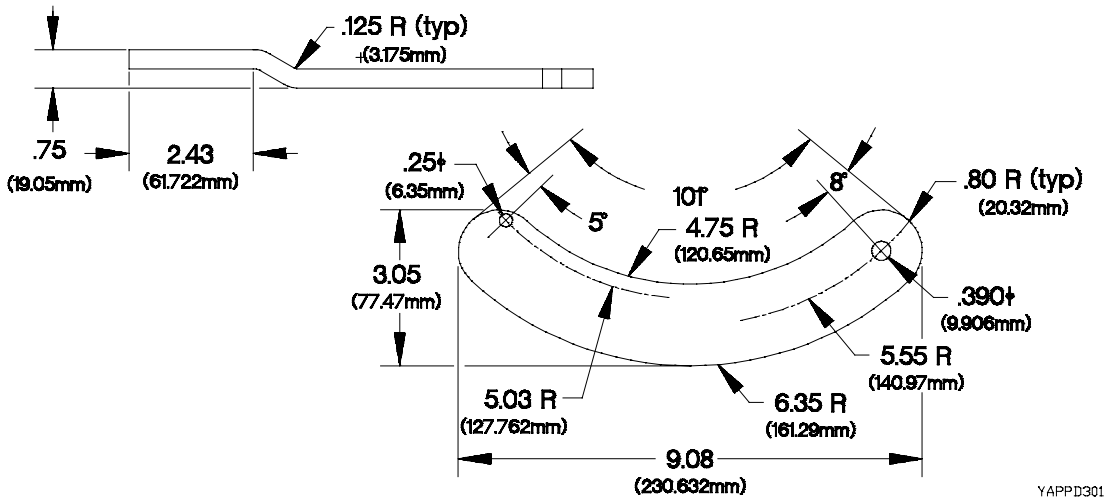


Figure D-30. Spanner Wrench Jaw

a. Shape spanner jaw (2) as shown in **Figure D-30. 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.

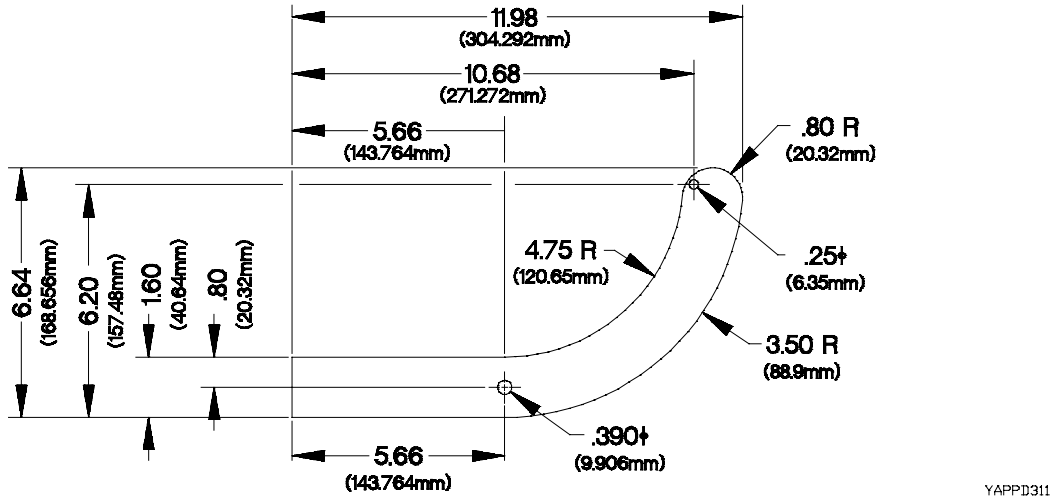


Figure D-31. Spanner Wrench Handle Piece

a. Shape spanner handle piece (1) the same as (2) except as shown in **Figure D-31. 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-31. Spanner Wrench Handle Piece**.
c. Cut slot in handle (4) as shown in **Figure D-31 Spanner Wrench Handle Piece**.
d. De-burr and remove sharp edges.

D-21. 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. (198 cm) X 5.00 in. (12.7 cm) X 1.75 in. (4.4 cm) X 0.38 in. (0.96 cm) thick	1
2	N/A	Rod, steel, ASTM A-36	29.0 in. (73.6 cm) X 1.00 in. OD (2.54 cm)	1
3	N/A	Rod, steel, ASTM A-36	13.0 in. (33.0 cm) X 1.00 in. OD (2.54 cm)	2

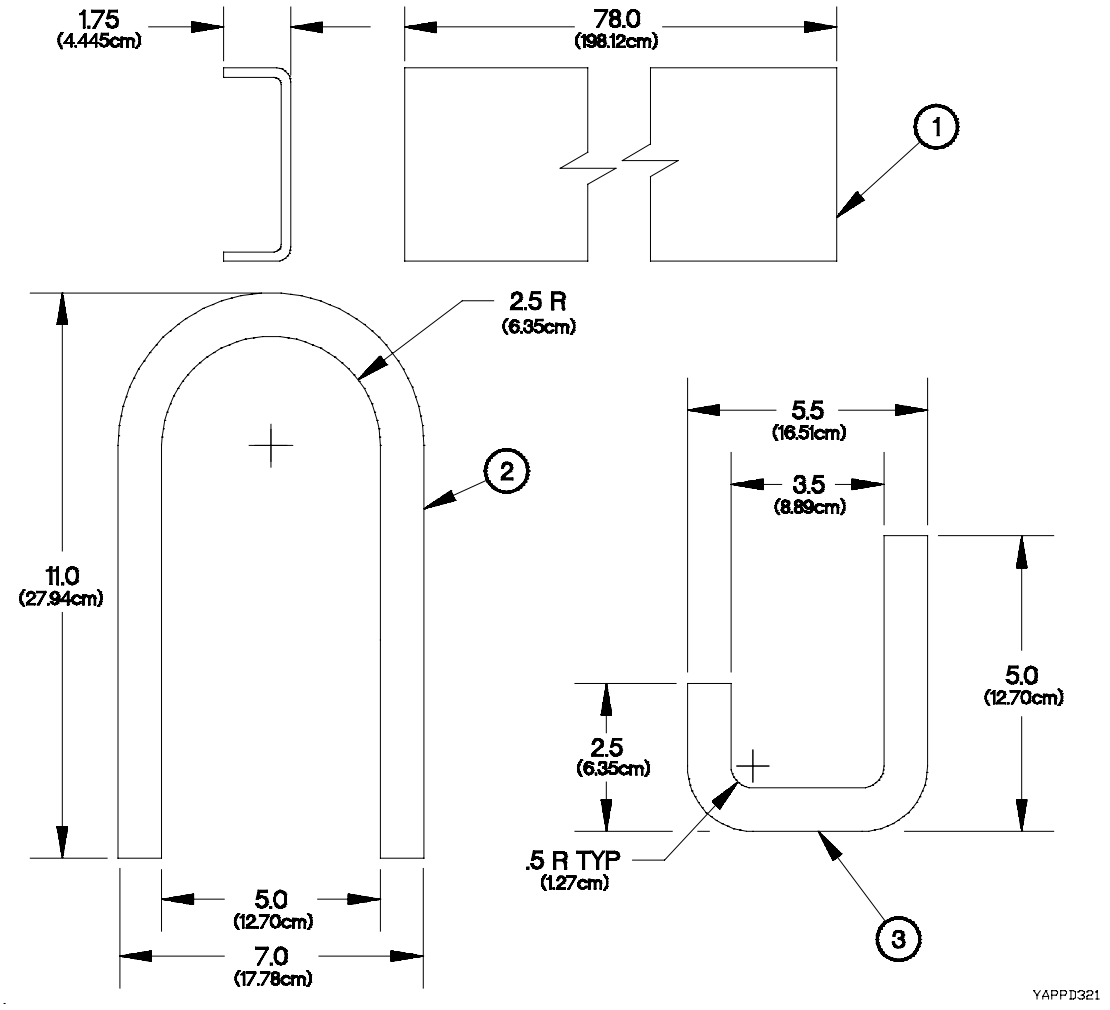


Figure D-32. Spreader Bar Layout

a. All dimensions are in inches (centimeters).
b. Heat and bend lift rod (2) to dimensions shown in **Figure D-32. Spreader Bar Layout**.
c. Heat and bend two guide rods (3) to dimensions shown in **Figure D-32. Spreader Bar Layout**.
d. Cut lift rod (2) and guide rods (3) to final dimensions shown in **Figure D-32 Spreader Bar Layout**.
e. De-burr and remove sharp edges.

D-21. SPREADER BAR (CONT)

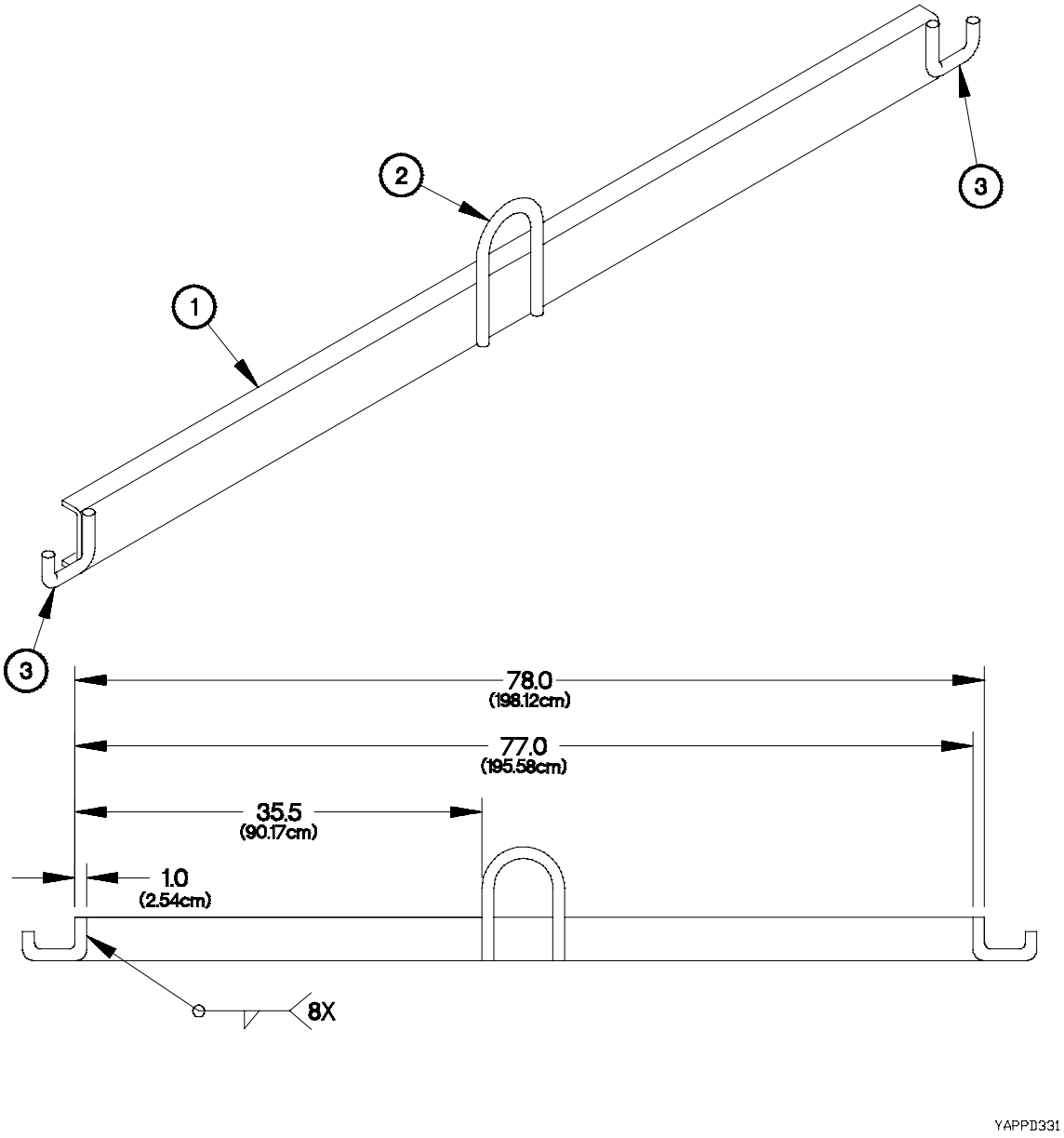


Figure D-33. Spreader Bar Assembly

f. Position and clamp lift rod (2) and guide rods (3) to steel channel (1) as shown in **Figure D-33. Spreader Bar Assembly**.
g. Weld lift rod (2) and guide rods (3) to steel channel (1) as shown in **Figure D-33. Spreader Bar Assembly**.
h. Maximum lifting capacity of the spreader bar is 2040 lbs (926 kgs).

D-22. 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 .118 in. (0.3 cm) thick	2.361 in. (5.9 cm) X 0.625 in. (1.587 cm) X 0.118 (0.3 cm)	1

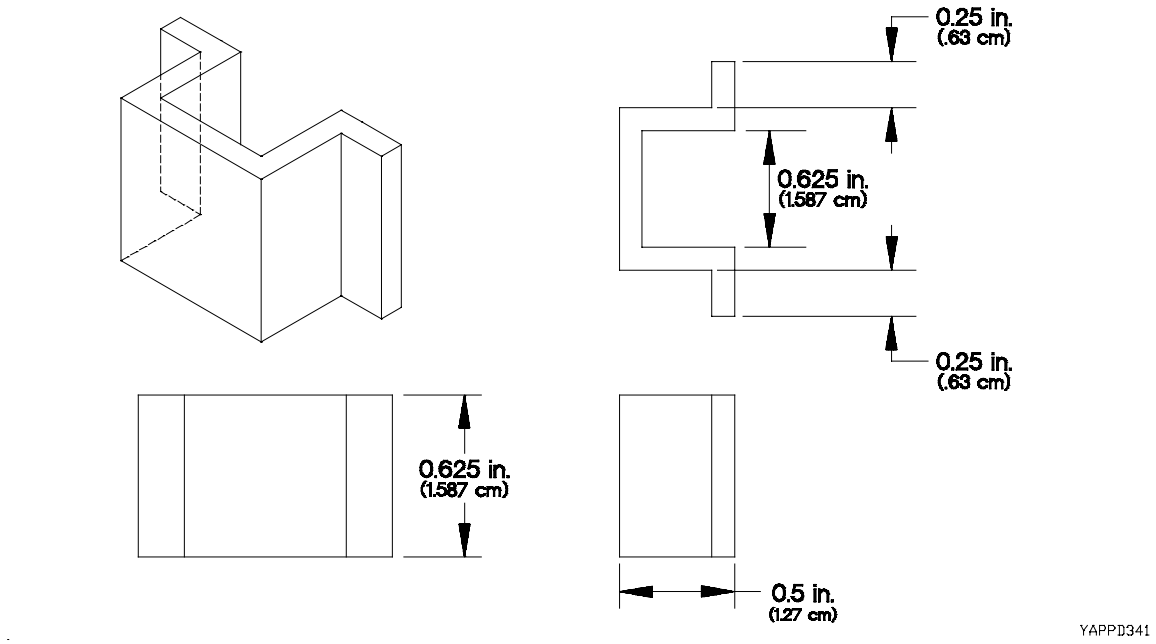


Figure D-34. Steering Stop Shim Gage

a. All dimensions are in inches (centimeters).
b. Form and bend steel stock to contours and dimensions shown in **Figure D-34. Steering Stop Shim Gage**.
c. De-burr and remove sharp edges and corners.

D-23. SWINGDRIVE ASSEMBLY BRACKET

Make the swingdrive assembly bracket from the flat steel bar and flat washer according to the following instructions. Refer to the parts list tables and accompanying figure for details.

Item	Material Description	Size	Qty
1	1/4 in. (0.64 cm) flat steel bar	1.25 in. (3.2 cm) x 2.50 in. (6.4 cm)	1
2	2 1/4 in. (5.7 cm) flat washer	2 1/4 in. OD (5.7 cm) x 1.25 in. ID (3.2)	1

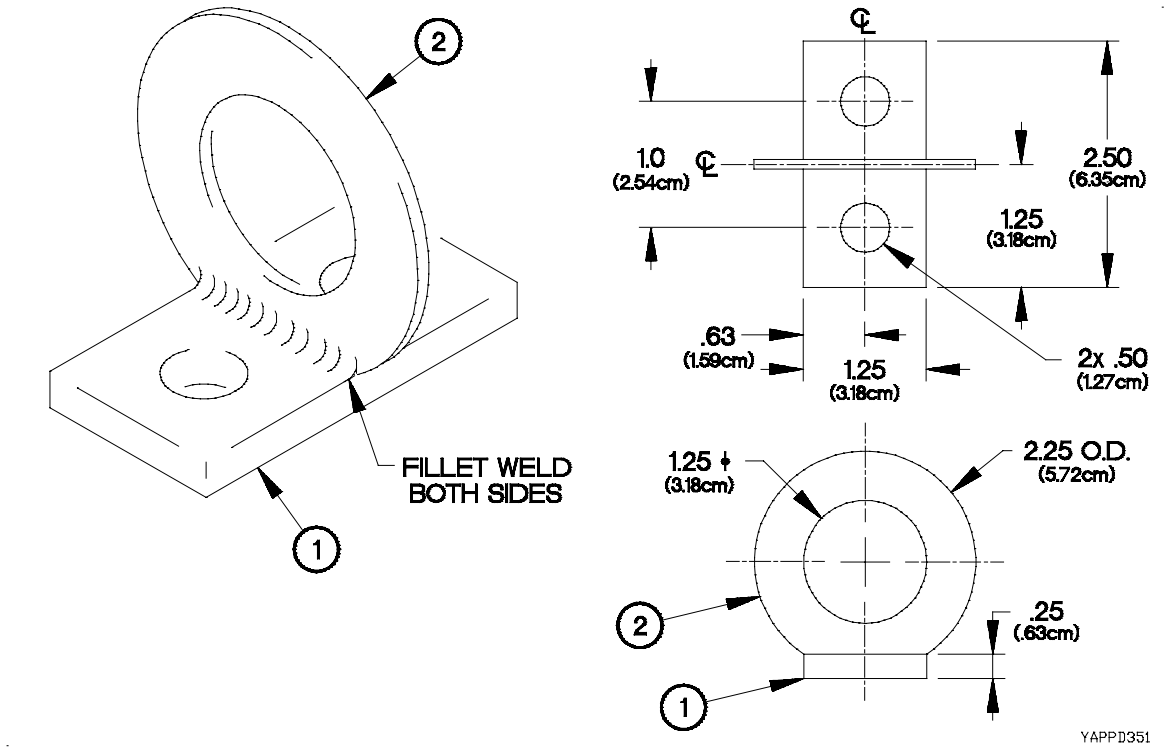


Figure D-35 Swingdrive Assembly Bracket

a. All dimensions are in inches (centimeters).
b. Fabricate (1) from flat steel bar and flat washer (2) as identified in table.
c. Hold tolerances of dimensions given to two decimal places at ±0.01 in. (±0.02 cm).
d. Drill 0.50 in. (1.3 cm) diameter hole 2 places as shown in **Figure D-35. Swingdrive Assembly Bracket**.
e. Grind side of flat washer (2) and weld to flat bar (1) as shown in **Figure D-35. Swingdrive Assembly Bracket**.
f. Dimensions shown in **Figure D-35. Swingdrive Assembly Bracket** are for machining and positioning pieces.
g. De-burr and remove sharp edges.

D-24. 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

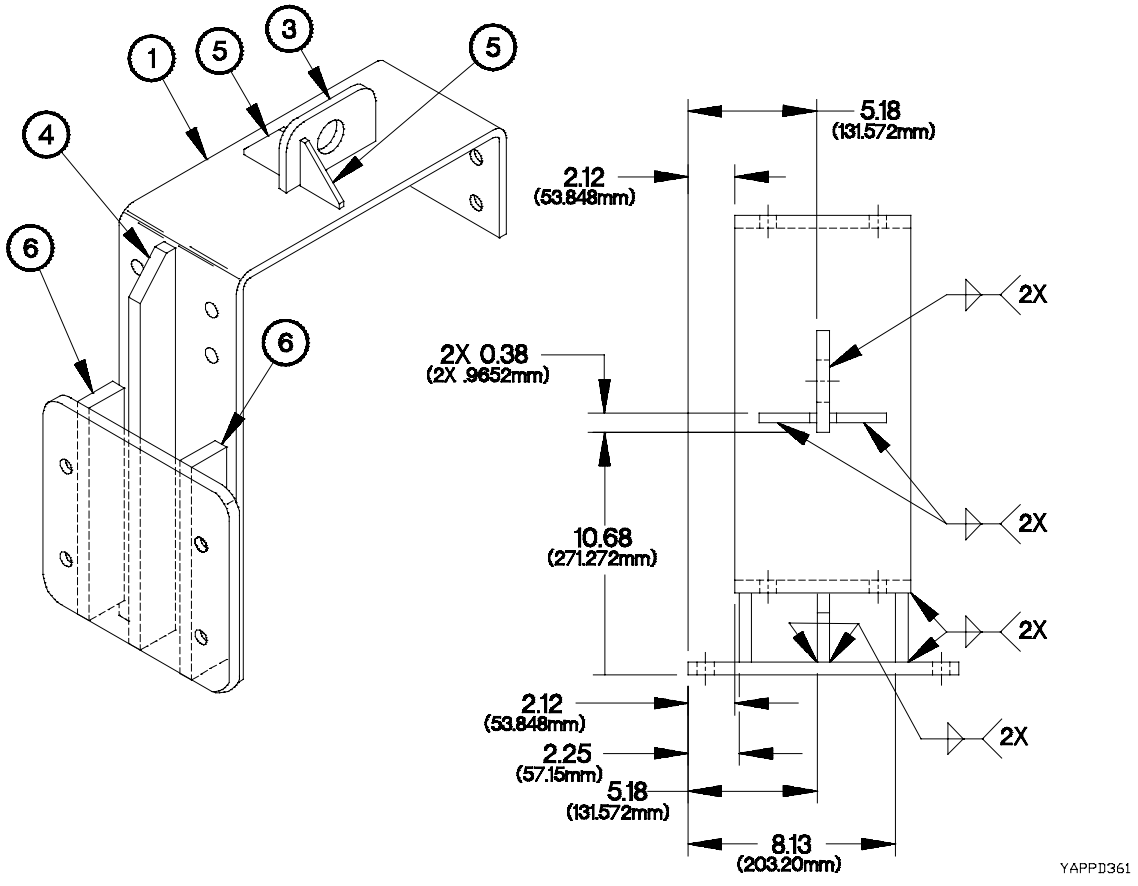


Figure D-36. Transfer Case Lift Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Position items (1 through 6) together as shown by dimensions in **Figure D-36. Transfer Case Lift Bracket Assembly**.
c. Weld items (1 through 6) together as shown in **Figure D-36. Transfer Case Lift Bracket Assembly**.

D-24. 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

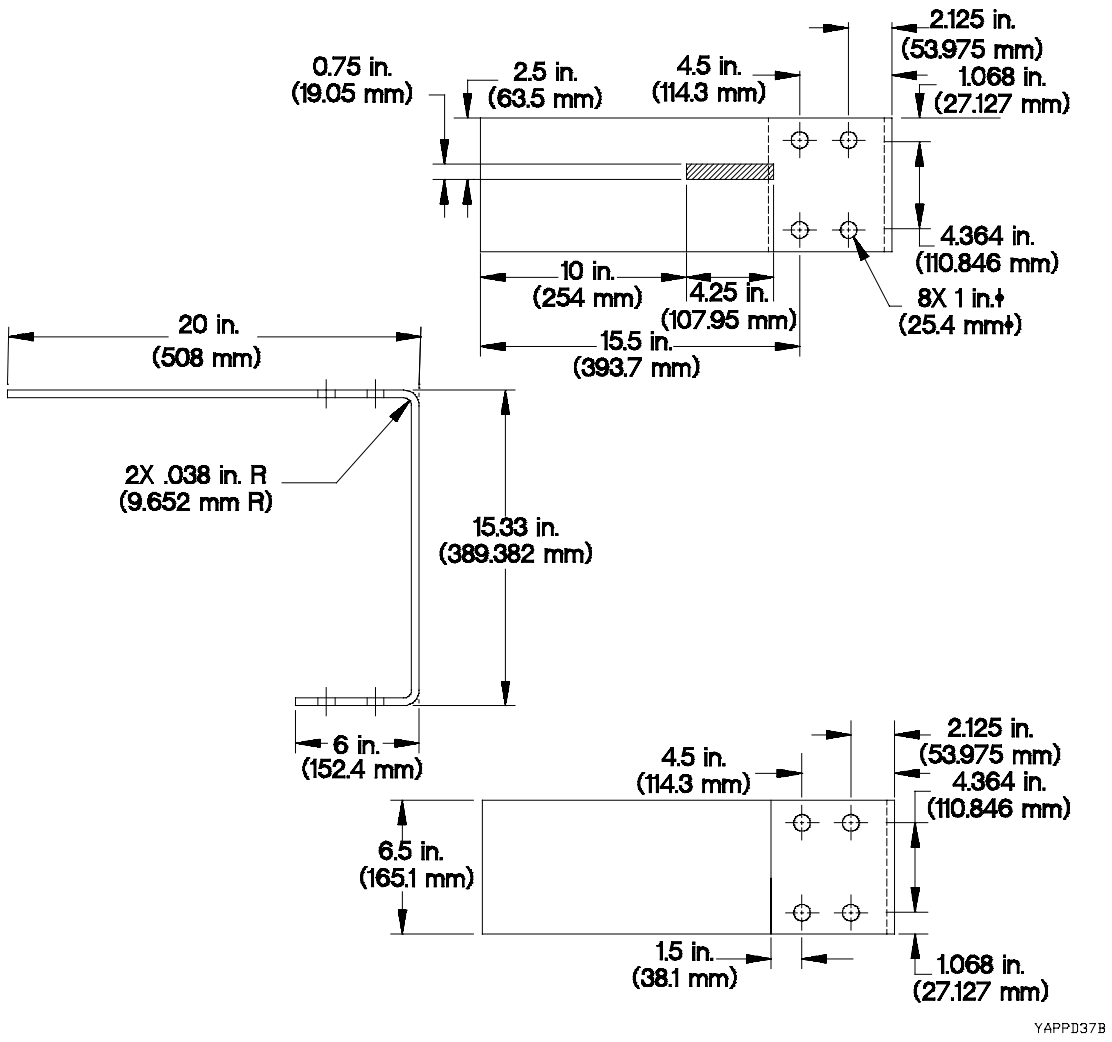


Figure D-37. Transfer Case Lift Bracket Main Mounting Bracket

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-37. 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-37. 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

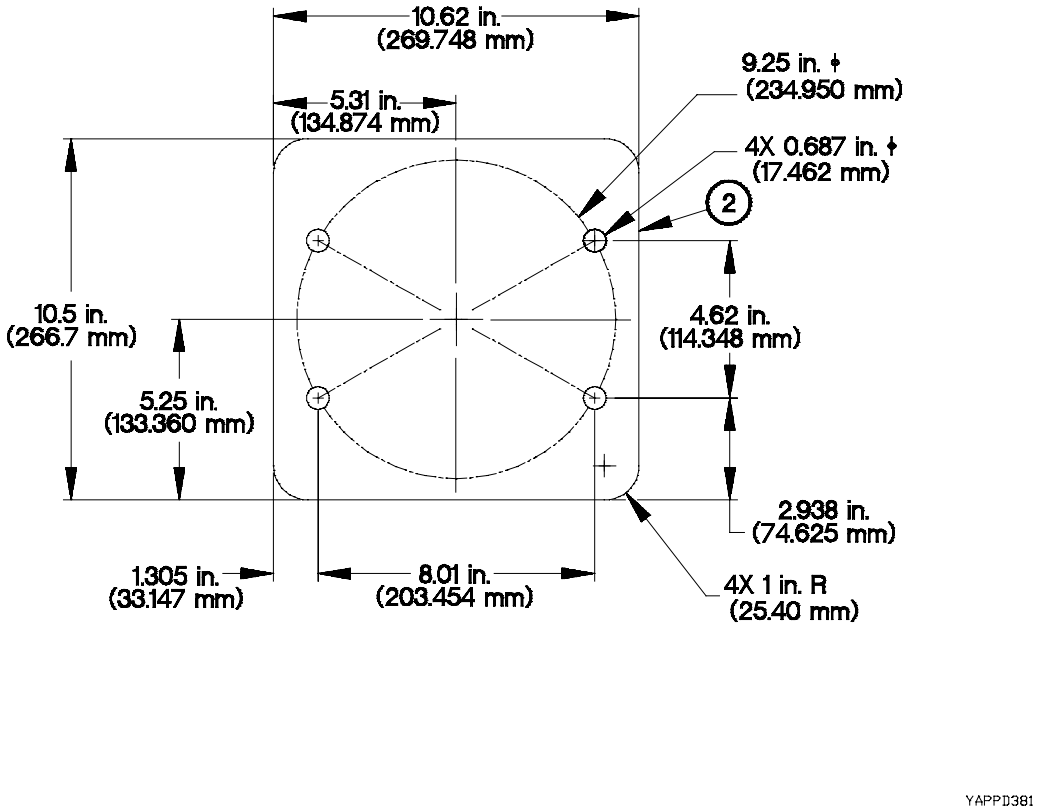


Figure D-38. Transfer Case Lift Bracket Bolt Mounting Bracket

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-38. Transfer Case Lift Bracket Bolt Mounting Bracket**.
d. Round four corners to 1.0 in. (25.4 mm) radius as shown in **Figure D-38. Transfer Case Lift Bracket Bolt Mounting Bracket**.
e. De-burr and remove sharp edges.

D-24. 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

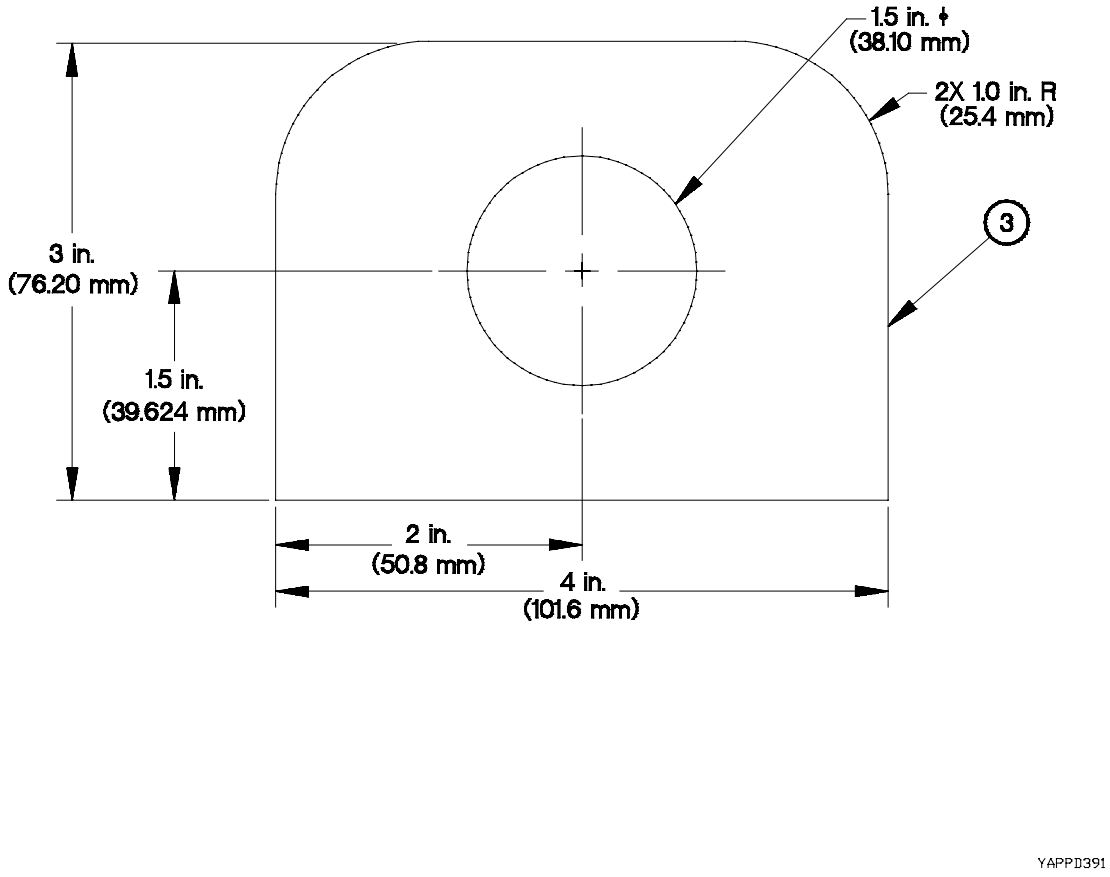


Figure D-39. Transfer Case Lift Bracket Lifting Plate

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-39. Transfer Case Lift Bracket Lifting Plate**.
d. Round two corners to 1.0 in. (25.4 mm) radius as shown in **Figure D-39. 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

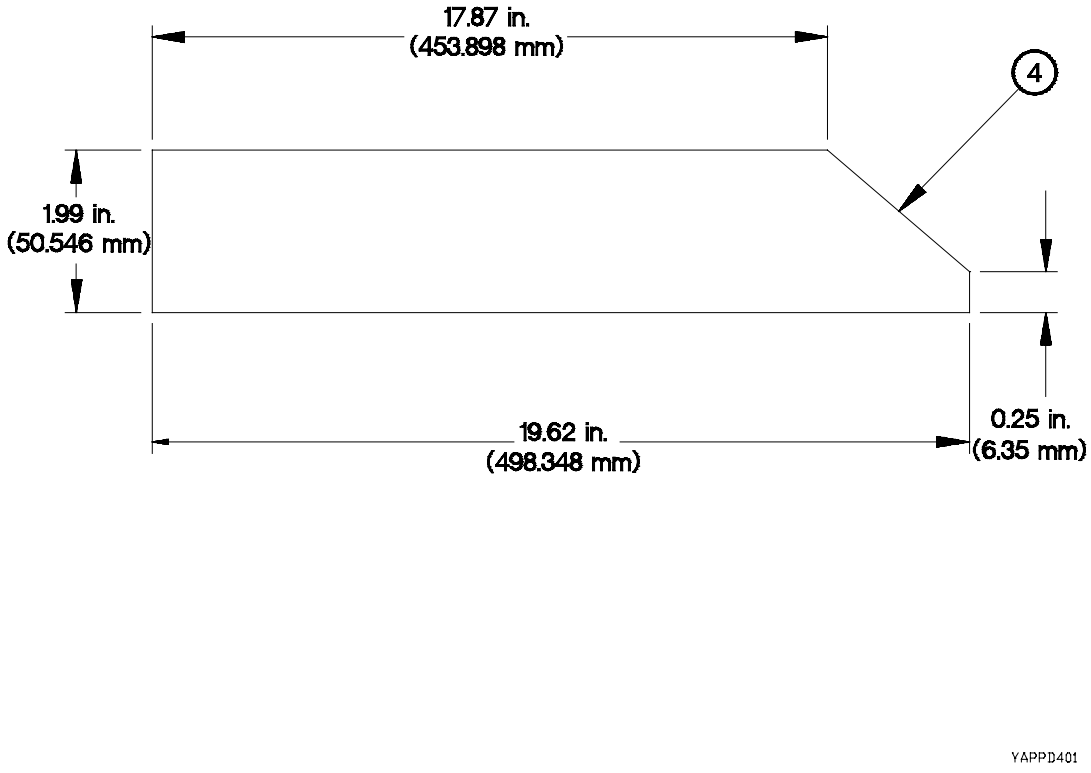


Figure D-40. Transfer Case Lift Bracket Center Support Plate

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-24. 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

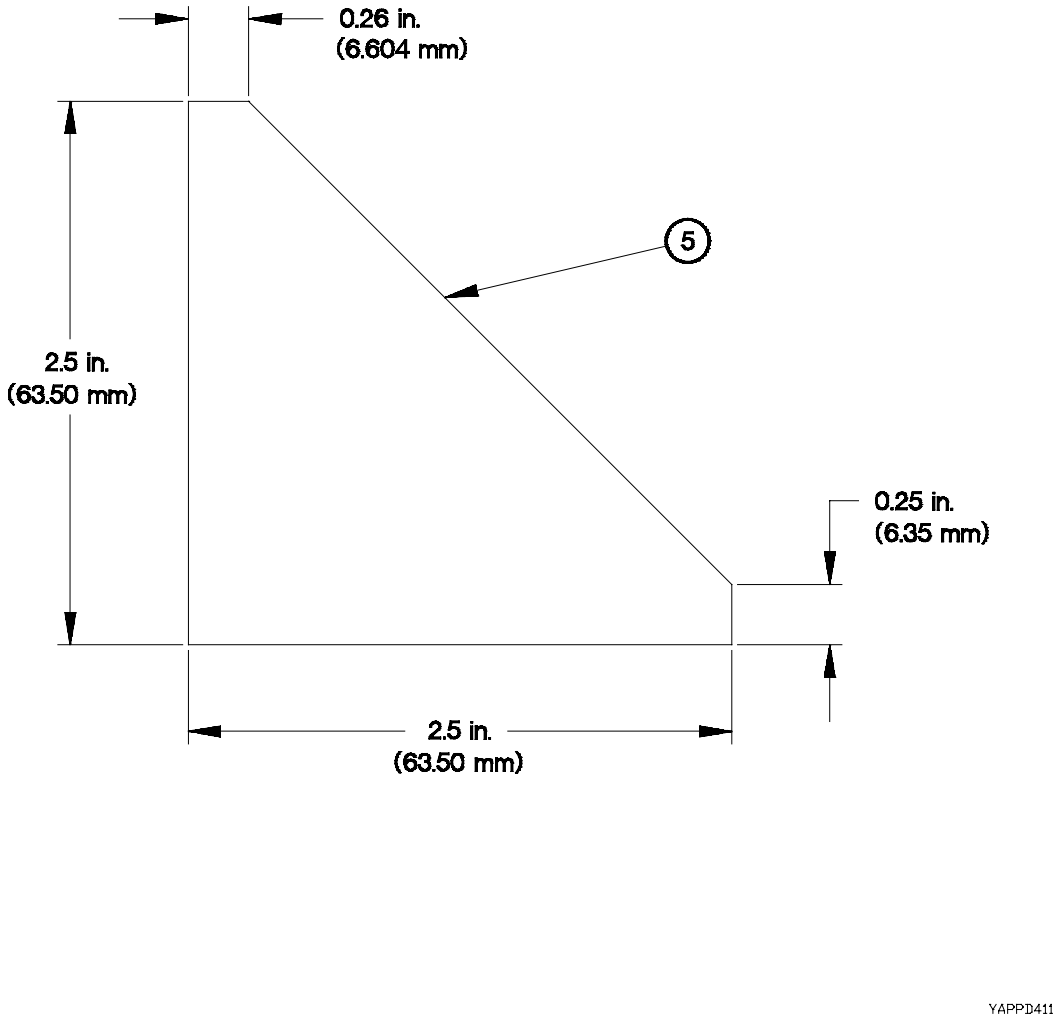


Figure D-41. Transfer Case Lift Bracket Lifting Plate Braces

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

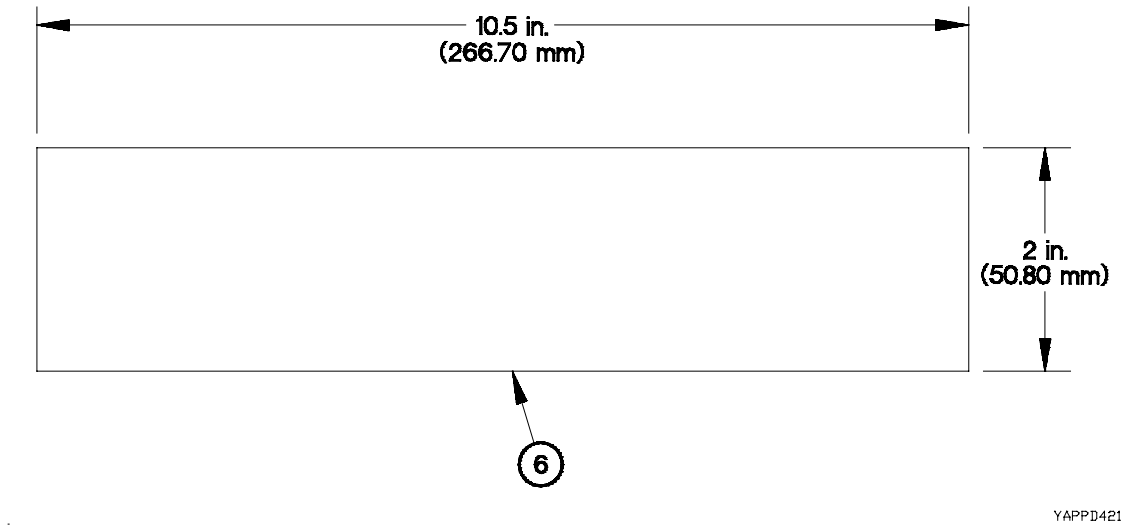


Figure D-42. Transfer Case Lift Bracket Bolt Mounting Bracket Supports

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-25. 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	
			inches	mm
MIL-R-6130	Tape, Adhesive, Rubber	9320-00-501-7537	24.7	627

D-26. 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

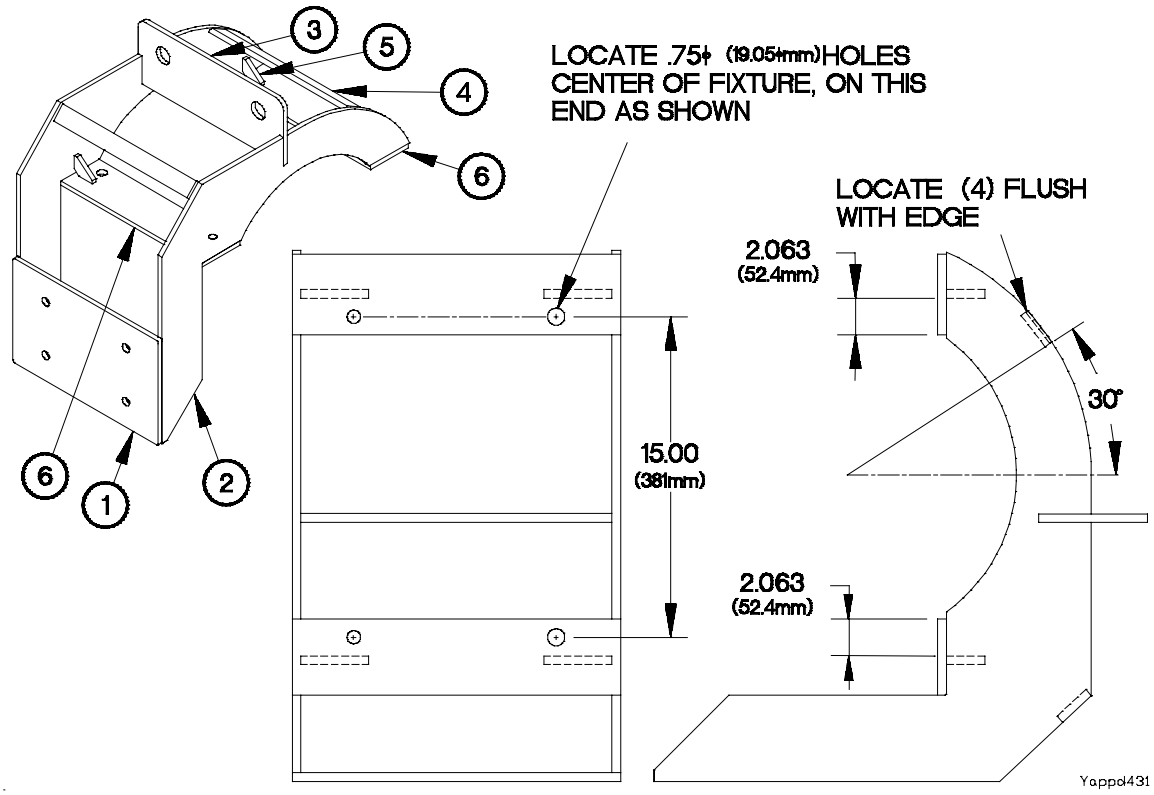


Figure D-43. Transmission Lift and Mounting Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Position items (1 through 6) together as shown by dimensions in **Figure D-43. Transmission Lift and Mounting Bracket Assembly**.
c. Weld items (1 through 6) together as shown by Section A - A in **Figure D-43. 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-43. 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-43. 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

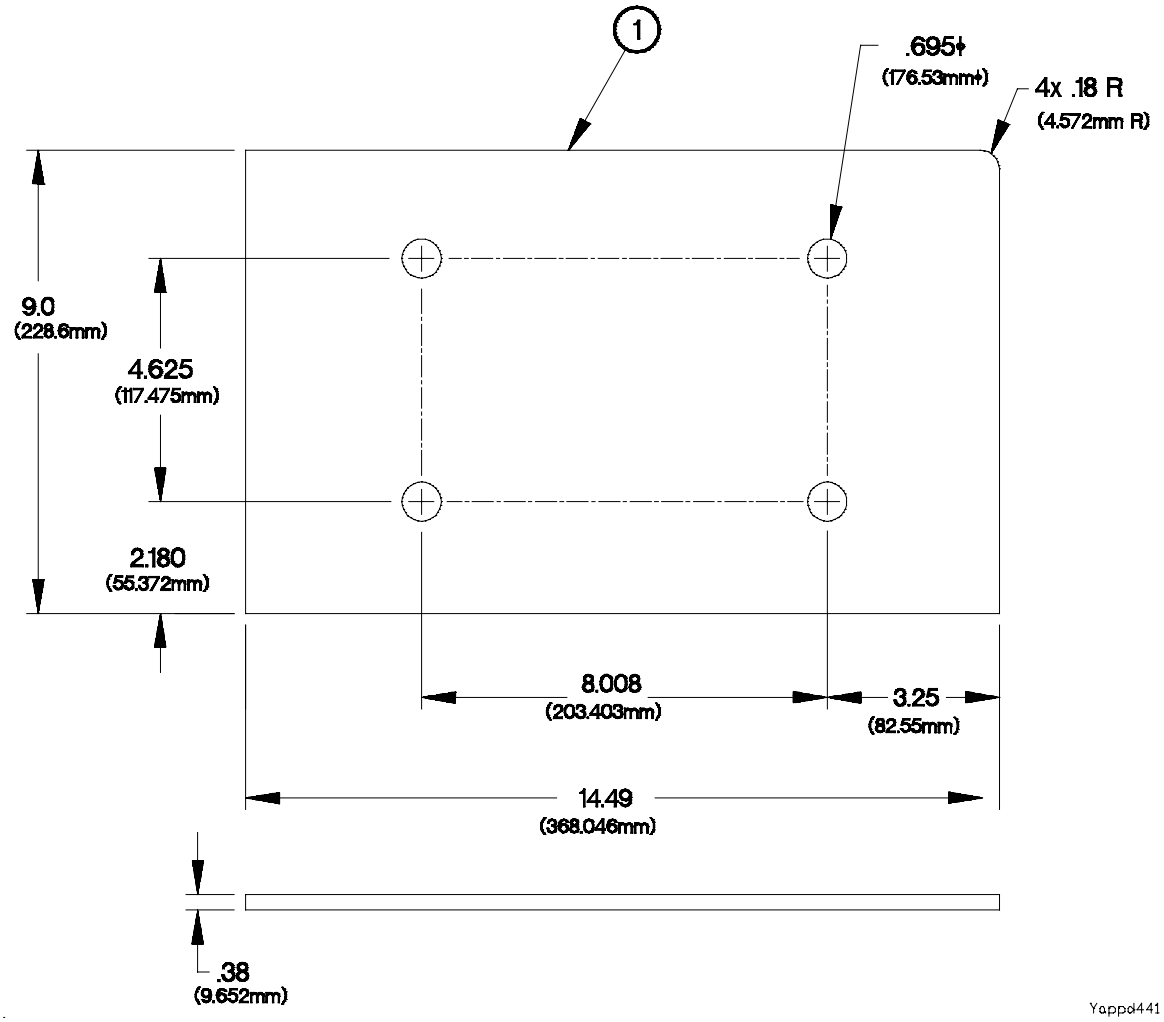


Figure D-44. Transmission Lift and Mounting Bracket Bottom Plate

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-44. Transmission Lift and Mounting Bracket Bottom Plate**.
d. Round four corners to 0.18 in. (4.6 mm) radius as shown in **Figure D-44. Transmission Lift and Mounting Bracket Bottom Plate**.
e. De-burr and remove sharp edges.

D-26. 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

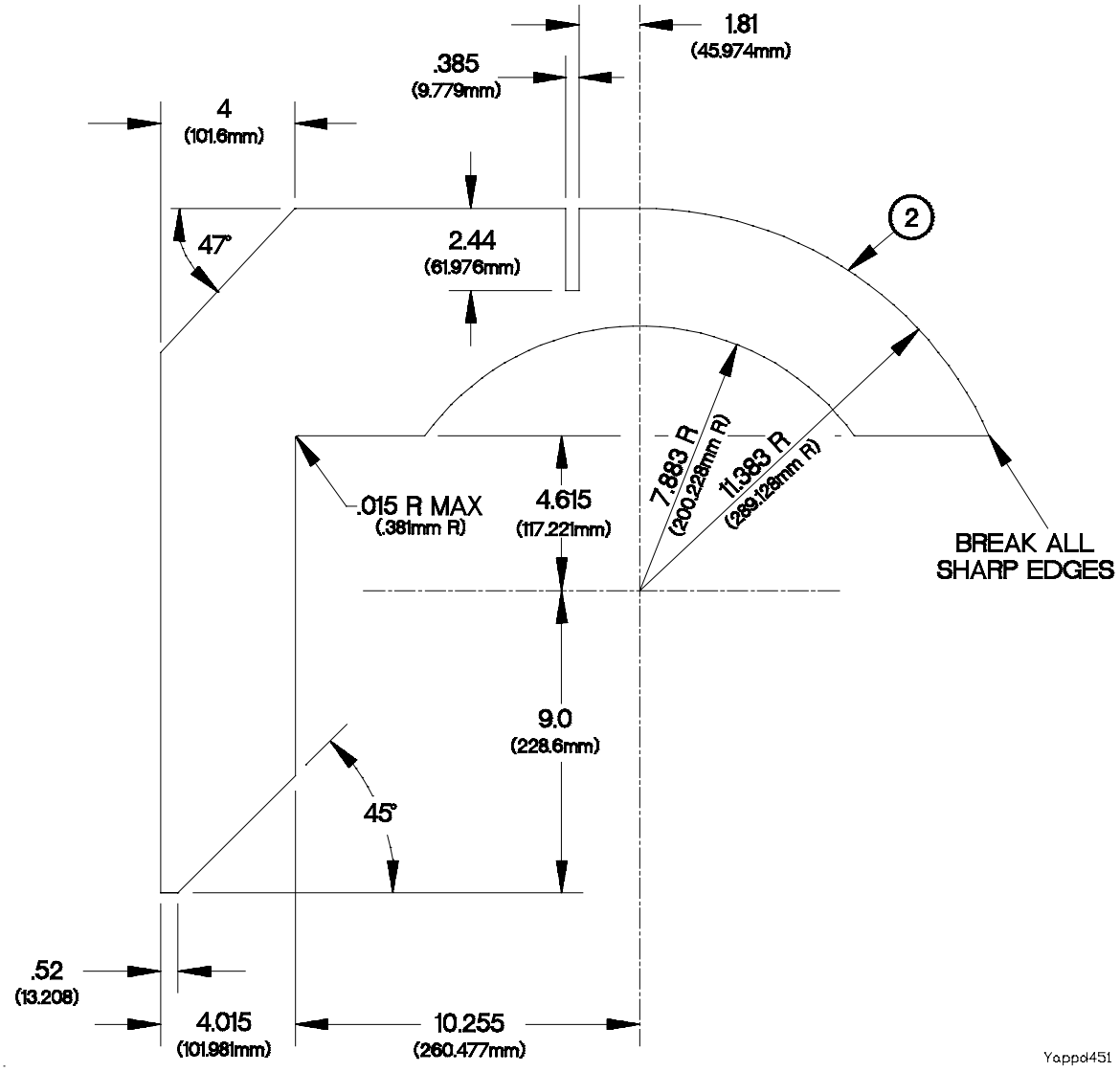


Figure D-45. Transmission Lift and Mounting Bracket Side Plates

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-45. 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

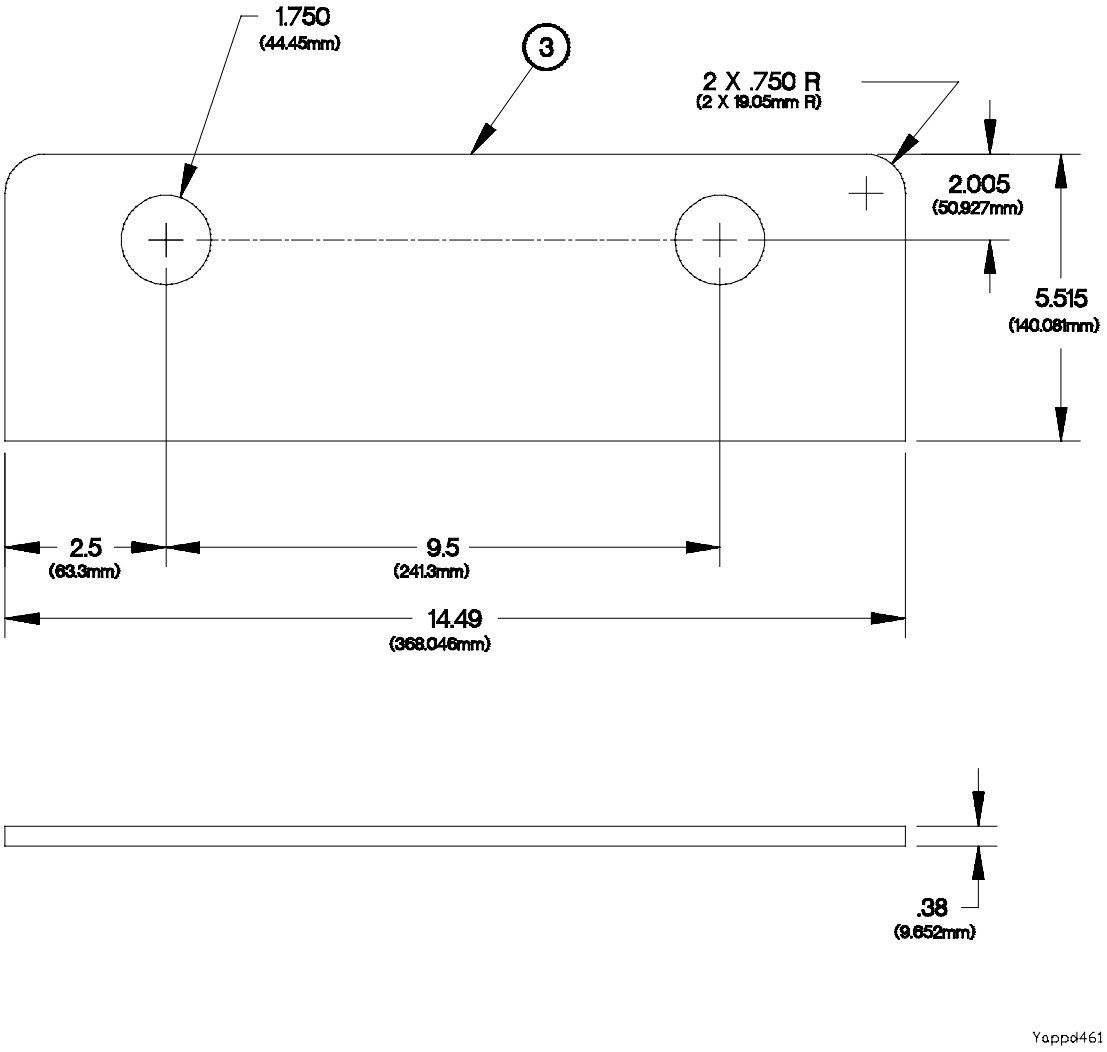


Figure D-46. Transmission Lift and Mounting Bracket Top Plate

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-46. Transmission Lift and Mounting Bracket Top Plate**.
d. Round two corners to 0.750 in (19 mm) radius as shown in **Figure D-46. Transmission Lift and Mounting Bracket Top Plate**.
e. De-burr and remove sharp edges.

D-26. 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

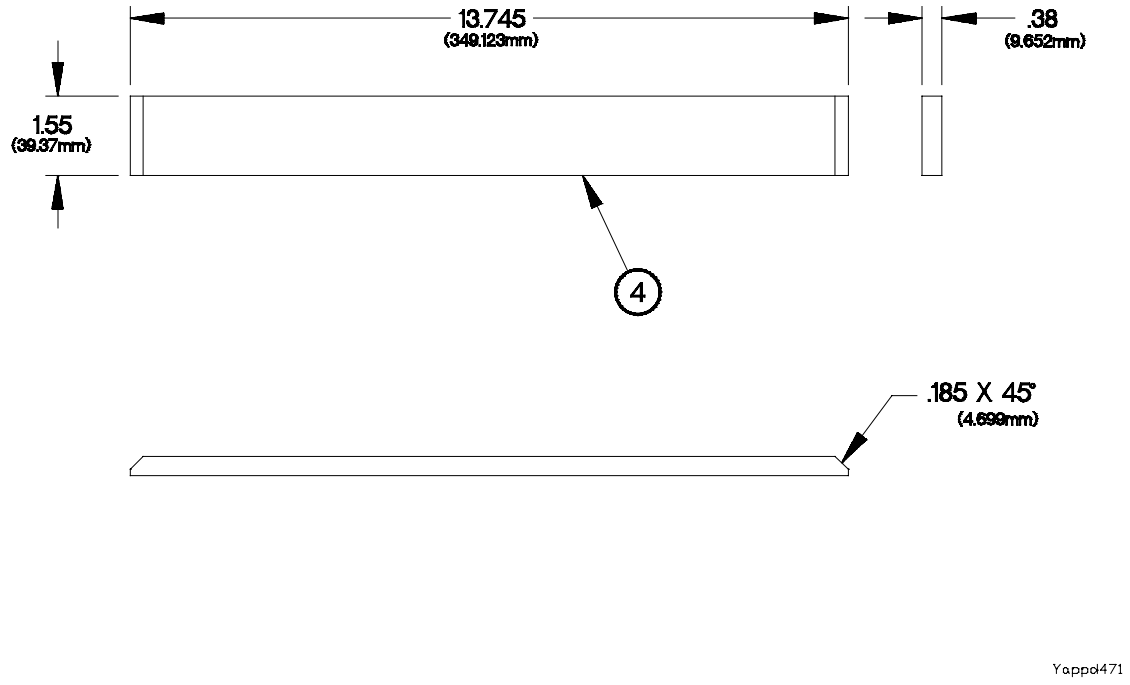


Figure D-47. Transmission Lift and Mounting Bracket Top and Bottom Braces

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-47. 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

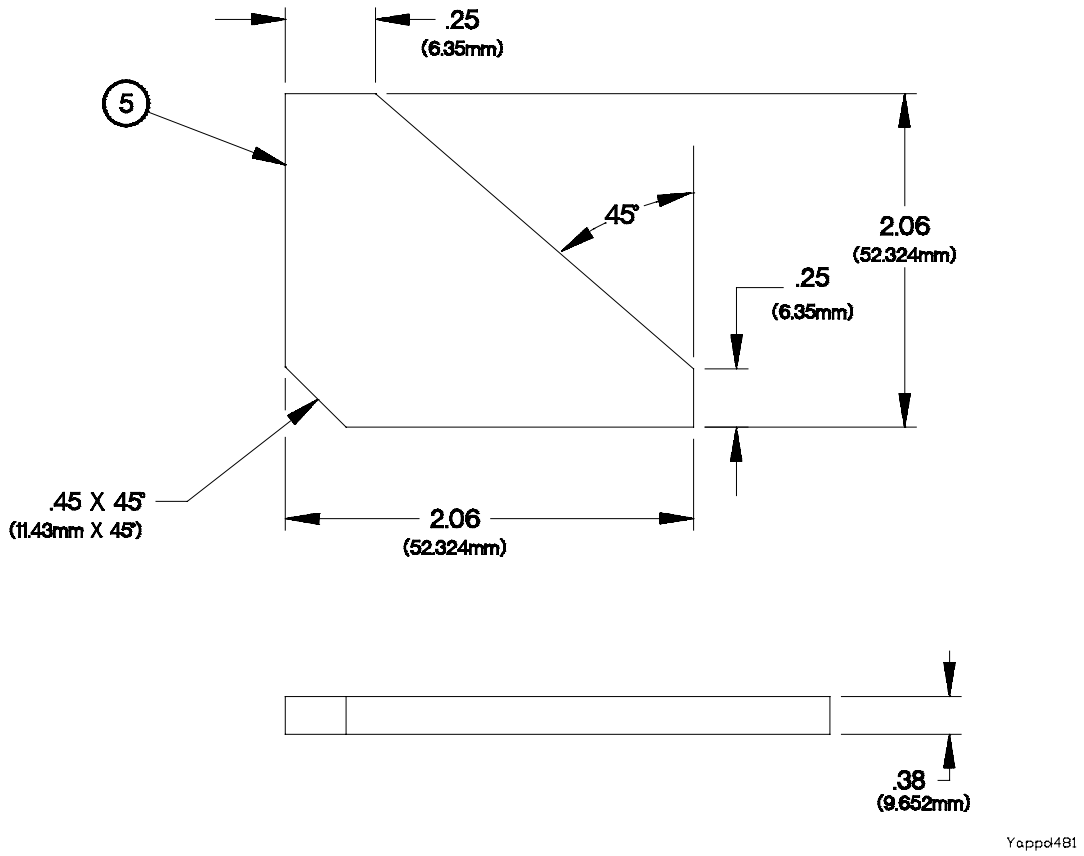


Figure D-48. Transmission Lift and Mounting Bracket Side Supports

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-26. 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

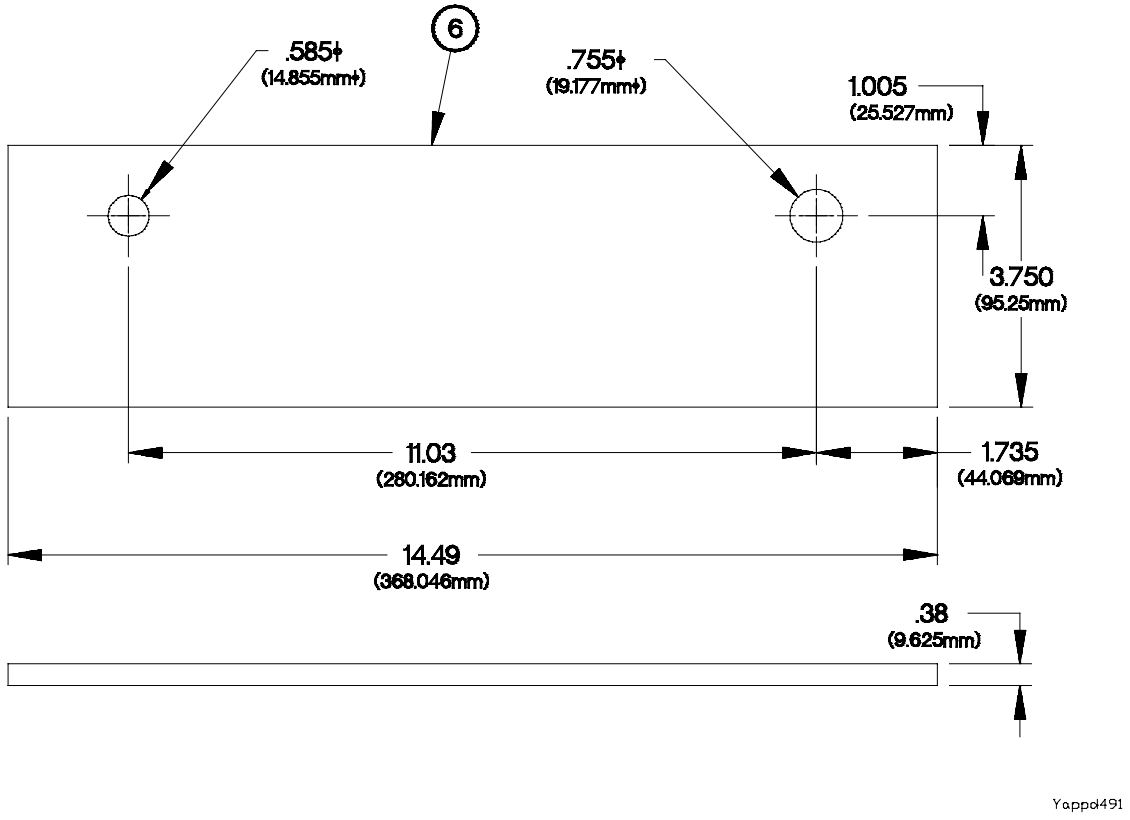


Figure D-49. Transmission Lift and Mounting Bracket Bolt Mounting Plates

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-49. Transmission Lift and Mounting Bracket Bolt Mounting Plates**.
d. Drill 0.585 in. (14.8 mm) diameter hole through as shown in **Figure D-49. Transmission Lift and Mounting Bracket Bolt Mounting Plates**.
e. De-burr and remove sharp edges.

D-27. 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

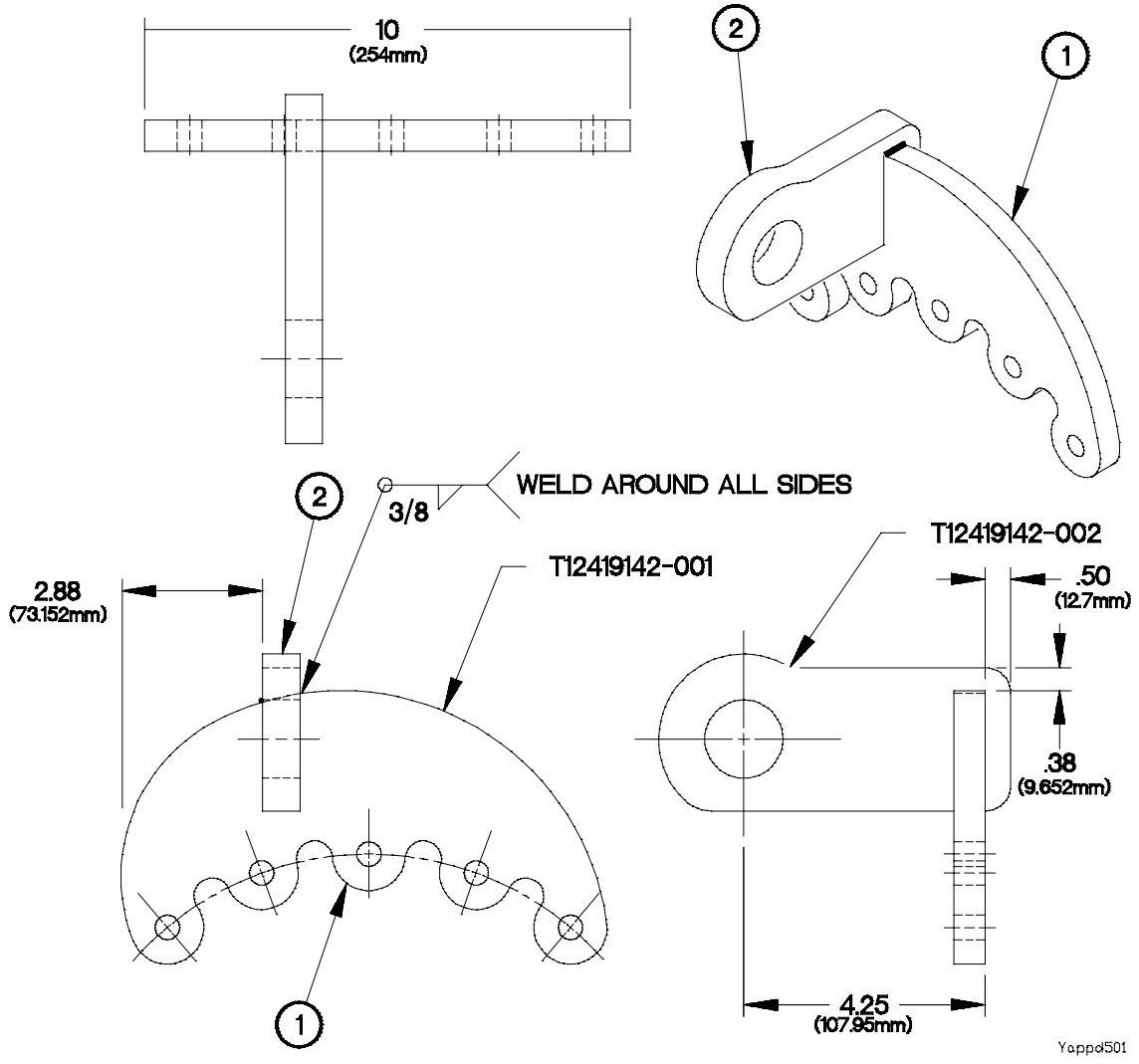


Figure D-50. Transmission Lift Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Weld (1) to (2) on both sides in accordance with dimensions in **Figure D-50. Transmission Lift Bracket Assembly**. Weld to be magnetic particle inspected per ASTM E1444. No cracks allowed.

D-27. 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

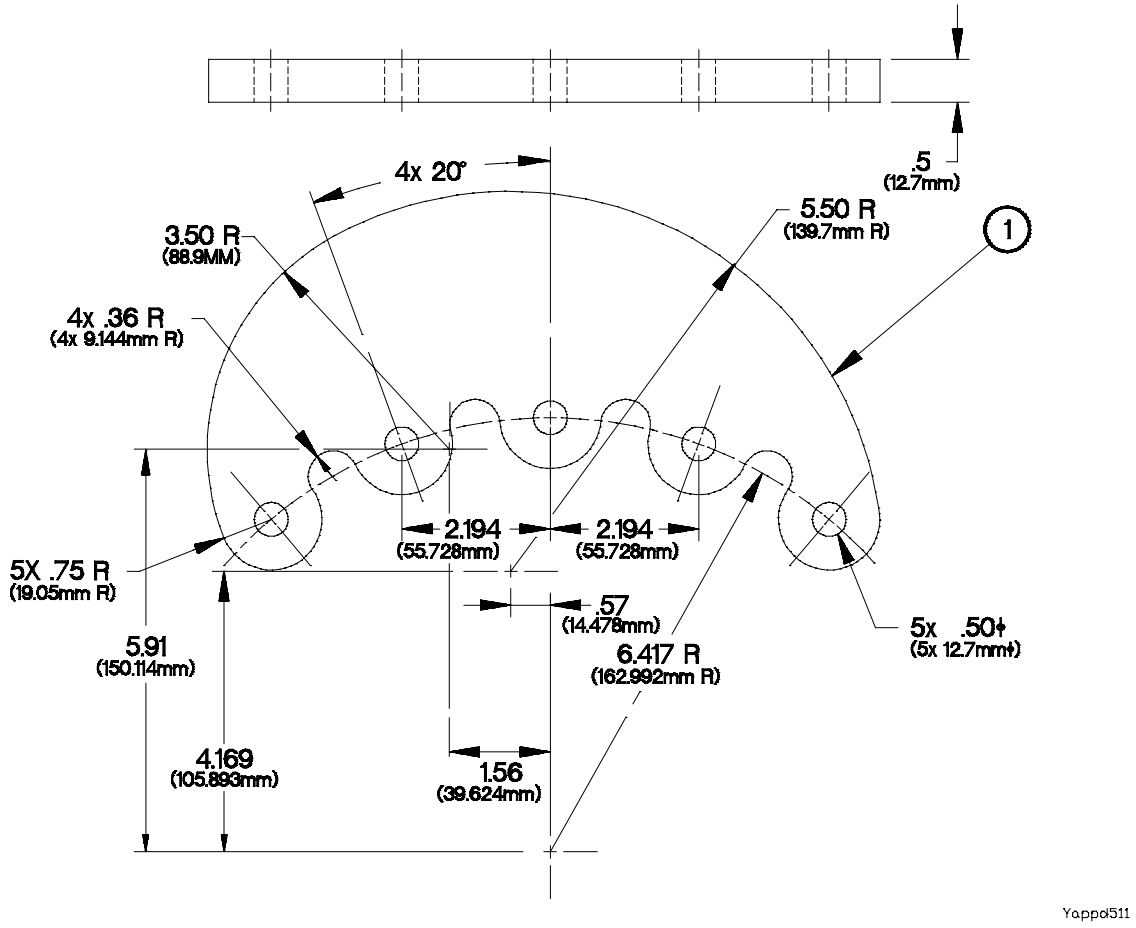


Figure D-51. Lower Lift Bracket

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-51. 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-51. 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-51. Lower Lift Bracket**.
f. Round piece to 5.50 in. (139.7 mm) radius as shown in **Figure D-51. Lower Lift Bracket**.
g. Drill 4 slots 0.37 inch (9.4 mm) diameter on 6.417 in. (163 mm) radius as shown in **Figure D-51. 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

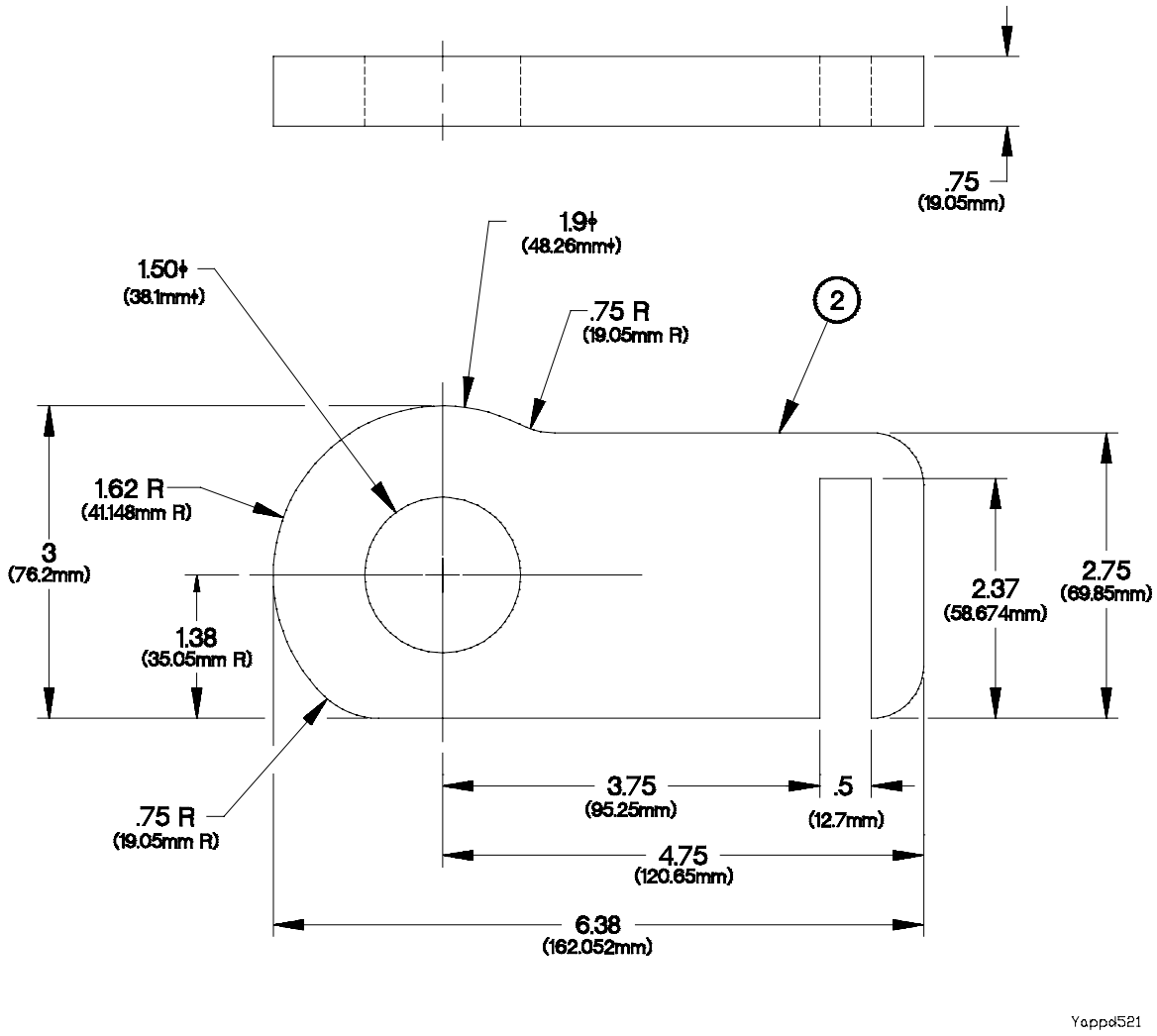


Figure D-52. Upper Lift Bracket

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-52. Upper Lift Bracket** will be held to ±0.01 in (±0.25 mm).
d. Drill 1.50 inch (38.1 mm) diameter hole through 1 place as shown in **Figure D-52. Upper Lift Bracket**.
e. Cutout slot 0.50 inch (1.27 mm) X 2.37 inch (60.2 mm) 1 place as shown in **Figure D-52. Upper Lift Bracket**.
f. De-burr and remove all sharp edges.
g. Round off sharp corners and round to radius shown in **Figure D-52. Upper Lift Bracket**.

D-28. 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

a. Dimensions are in inches (millimeters).
b. Cut metal bar to 9.0 inches (228.6 mm) long.
c. De-burr and remove sharp edges from ends of metal bar.

D-29. 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-53. Battery 12V Cable Assembly** for details. Refer to specification Mil-B-43436 for requirements.

Item	Part Number	Material Description	Size		Qty
			inch	cm	
1	12378873-050	Electrical cable 2 AWG	38.6	98.0	1
2	12378873-050	Electrical cable 2 AWG	7.9	20.0	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	2.5	2
8	M23053/5-210C	Sleeve, Cable	1.0	2.5	2
9	M23053/4-3050	Sleeving	1.0	2.5	8
10	12414580	Thermoplastic Adhesive			A/R
11a,b	12378873-050	Electrical cable 2 AWG	7.5	19.0	2
12a,b	12414644-002	Negative Terminal			2

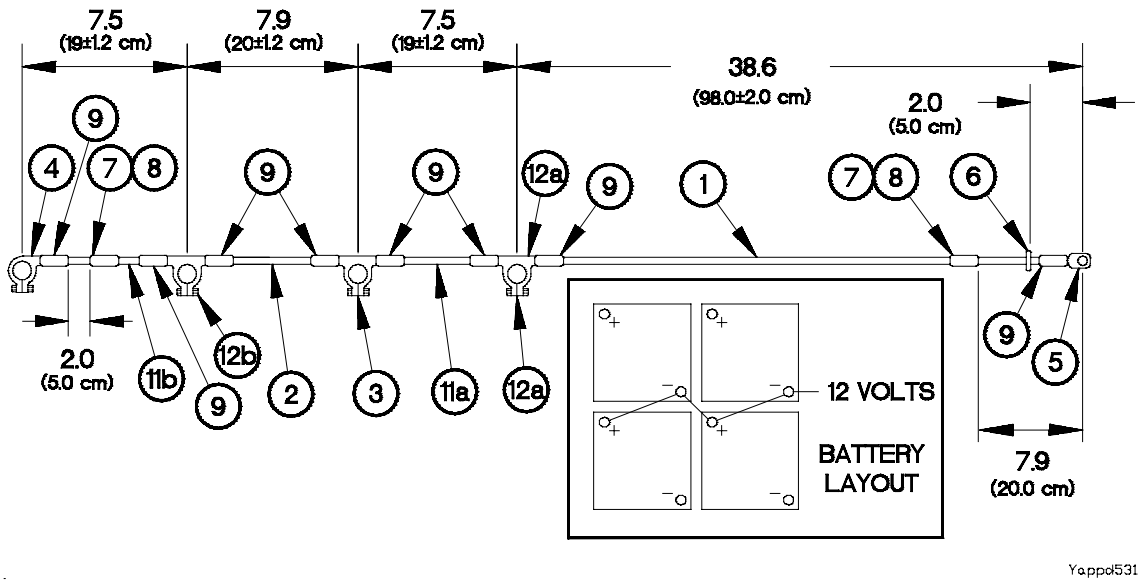


Figure D-53. Battery 12V Cable Assembly

a. All dimensions are in inches (centimeters).
b. Strip 0.69 inch (1.3 cm) insulation from ends of three cables (1, 2 and 11).
c. Install band marker (6) on cable (1) at position shown in **Figure D-53. Battery 12V Cable Assembly**.
d. Mark two marker sleeves (7) in ink with characters 1/8 inch (0.3 cm) high, as follows: **19207-12378575**.
e. Install marker sleeve (7) on cable (1) at position shown in **Figure D-53. Battery 12V Cable Assembly**.
f. Install marker sleeve (7) on cable (11) at position shown in **Figure D-53. 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-53. 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-53. 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-53. 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-53. 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-53. Battery 12V Cable Assembly**.
u. Crimp lug terminal (12b) to end of cable (2).

D-29. BATTERY 12V CABLE ASSEMBLY 12378512 (CONT))

v. Insert end of cable (11b) into lug terminal (12b).
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-53. 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-53. 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-30. 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-54. Battery Ground Cable Assembly** for details. Refer to specification Mil-B-43436 for requirements.

Item	Part Number	Material Description	Size		Qty
			inches	cm	
1	12378873-050	Electrical cable 2 AWG	50.4	128.0	1
2	12378873-050	Electrical cable 2 AWG	11.8	30.0	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	2.5	2
8	M23053/5-210C	Sleeve, Cable	1.0	2.5	2
9	M23053/4-3050	Sleeving	1.0	2.5	4
10	12414580	Adhesive Thermoplastic			A/R

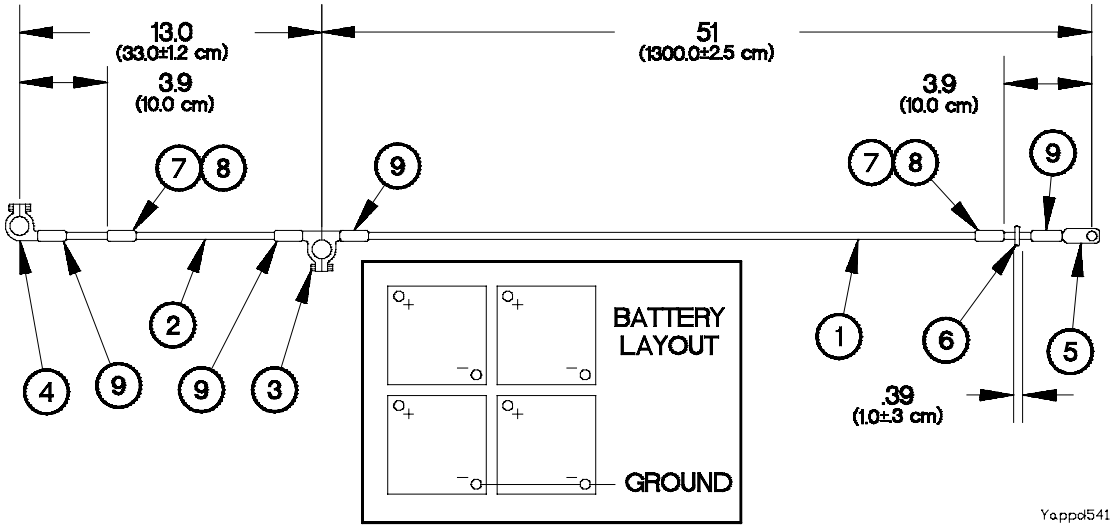


Figure D-54. Battery Ground Cable Assembly

a. All dimensions are in inches (centimeters).
b. Strip 0.69 inch (1.8 cm) insulation from ends of cables (1 and 2).
c. Install band marker (6) on cable (1) at position shown on **Figure D-54. Battery Ground Cable Assembly**.
d. Mark two marker sleeves (7) in ink with characters 0.13 inch (0.3 cm) high, as follows: **19207-12378575**.
e. Install marker sleeve (7) on cable (1) at position shown in **Figure D-54. Battery Ground Cable Assembly**.
f. Install marker sleeve (7) on cable (2) at position shown in **Figure D-54. 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-54. 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-54. 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-54. 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-54. 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-54. 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-31. 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-55. Battery 24V Cable Assembly** for details. Refer to specification Mil-B-43436 for requirements.

Item	Part Number	Material Description	Size		Qty
			inches	cm	
1	12378873-050	Electrical cable 2 AWG	33.5	85.0	1
2	12378873-050	Electrical cable 2 AWG	11.8	30.0	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	2.5	2
8	M23053/5-210C	Sleeve, Cable	1.0	2.5	2
9	M23053/4-3050	Sleeving	1.0	2.5	4
10	12414580	Adhesive Thermoplastic			A/R

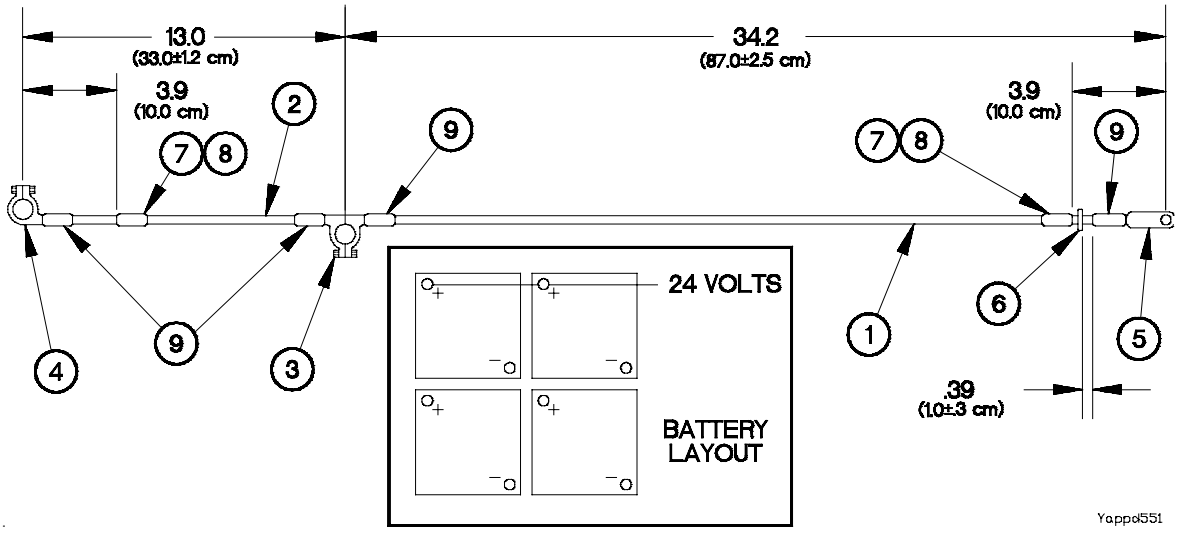


Figure D-55. Battery 24V Cable Assembly

a. All dimensions are in inches (centimeters).
b. Strip 0.69 inch (1.8 cm) insulation from ends of cables (1 and 2).
c. Install band marker (6) on cable (1) at position shown in **Figure D-55. Battery 24V Cable Assembly**.
d. Mark two marker sleeves (7) in ink with characters 0.13 inch (0.3 cm) high, as follows: **19207-12378575**.
e. Install marker sleeve (7) on cable (1) at position shown in **Figure D-55. Battery 24V Cable Assembly**.
f. Install marker sleeve (7) on cable (2) at position shown in **Figure D-55. 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-55. 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-55. 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-55. 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-55. 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-55. 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-32. DOUBLE-SIDED TAPE 12420265X2

Make from P/N 4940(52152) X 2 inches (5.0 cm)

D-33. 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.

D-34. 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. (7.62 cm)
12412332-012	12 in. (30.48 cm)
12412332-040	40 in. (101.6 cm)
12412332-048	48 in. (121.92 cm)
12412332-066	66 in. (167.64 cm)
12412332-096	96 in. (243.84 cm)
12412332-180	180 in. (457.20 cm)

D-35. 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.

12412367-038	38 (96.52)	12412367-094	94 (238.76)
12412367-046	46 (116.84)	12412367-178	178 (452.12)
12412367-064	64 (162.56)		

D-36. 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	
		inches	cm
12414690-001	NT-100-4 (79470)	18.1	46.0
12414690-002	NT-100-4 (79470)	16.0	40.6
12414690-003	NT-100-4 (79470)	15.0	38.1
12414690-004	NT-100-4 (79470)	74.8	190.0
12414690-005	NT-100-4 (79470)	69.7	177.0
12414690-006	NT-100-4 (79470)	239.0	607.0
12414690-007	NT-100-4 (79470)	254.8	647.0
12414690-008	NT-100-4 (79470)	286.3	727.0
12414690-009	NT-100-4 (79470)	394.1	747.0
12414690-010	NT-100-4 (79470)	180.0	457.2
12414690-101	J844TYBSIZE 3/8 (81343)	18.0	45.7
12414690-102	J844TYBSIZE 3/8 (81343)	35.4	90.0
12414690-103	J844TYBSIZE 3/8 (81343)	20.9	53.0
12414690-104	J844TYBSIZE 3/8 (81343)	13.8	35.0
12414690-105	J844TYBSIZE 3/8 (81343)	11.8	30.0
12414690-106	J844TYBSIZE 3/8 (81343)	20.5	52.0
12414690-107	J844TYBSIZE 3/8 (81343)	39.0	99.0
12414690-108	J844TYBSIZE 3/8 (81343)	15.4	39.0
12414690-109	J844TYBSIZE 3/8 (81343)	23.0	58.4
12414690-112	J844TYBSIZE 3/8 (81343)	80.0	198.0
12414690-113	J844TYBSIZE 3/8 (81343)	11.4	29.0
12414690-115	J844TYBSIZE 3/8 (81343)	82.8	210.2
12414690-118	J844TYBSIZE 3/8 (81343)	11.8	30.0
12414690-120	J844TYBSIZE 3/8 (81343)	11.9	30.2
12414690-125	J844TYBSIZE 3/8 (81343)	10.8	27.3
12414690-129	J844TYBSIZE 3/8 (81343)	39.3	99.7

Table D-1. Pneumatic Tube Lengths (Cont)

Tube Part Number	Bulk Tubing Part Number	Cut Length	
		inches	cm
12414690-129	J844TYBSIZE 3/8 (81343)	39.3	99.7
12414690-130	J844TYBSIZE 3/8 (81343)	164.4	417.5
12414690-131	J844TYBSIZE 3/8 (81343)	180.1	457.5
12414690-132	J844TYBSIZE 3/8 (81343)	219.5	557.5
12414690-133	J844TYBSIZE 3/8 (81343)		
12414690-134	J844TYBSIZE 3/8 (81343)	277.4	704.5
12414690-135	J844TYBSIZE 3/8 (81343)	325.0	825.5
12414690-136	J844TYBSIZE 3/8 (81343)	332.5	844.6
12414690-137	J844TYBSIZE 3/8 (81343)	51.0	129.5
12414690-138	J844TYBSIZE 3/8 (81343)	67.0	170.2
12414690-139	J844TYBSIZE 3/8 (81343)	98.5	250.2
12414690-140	J844TYBSIZE 3/8 (81343)	106.0	269.2
12414690-141	J844TYBSIZE 3/8 (81343)	52.5	133.4
12414690-142	J844TYBSIZE 3/8 (81343)	68.5	174.0
12414690-143	J844TYBSIZE 3/8 (81343)	100.0	254.0
12414690-144	J844TYBSIZE 3/8 (81343)	107.5	273.0
12414690-145	J844TYBSIZE 3/8 (81343)		
12414690-146	J844TYBSIZE 3/8 (81343)	267.3	679.0
12414690-147	J844TYBSIZE 3/8 (81343)	283.1	719.0
12414690-148	J844TYBSIZE 3/8 (81343)	314.6	799.0
12414690-149	J844TYBSIZE 3/8 (81343)	322.4	819.0
12414690-150	J844TYBSIZE 3/8 (81343)	296.1	752.0
12414690-151	J844TYBSIZE 3/8 (81343)	343.5	872.5
12414690-152	J844TYBSIZE 3/8 (81343)	36.0	91.5
12414690-153	J844TYBSIZE 3/8 (81343)	32.0	81.3
12414690-154	J844TYBSIZE 3/8 (81343)	48.0	122.0
12414690-155	J844TYBSIZE 3/8 (81343)	79.5	202.0
12414690-156	J844TYBSIZE 3/8 (81343)	87.0	221.0
12414690-157	J844TYBSIZE 3/8 (81343)	59.5	151.1
12414690-158	J844TYBSIZE 3/8 (81343)	66.5	169.0
12414690-159	J844TYBSIZE 3/8 (81343)	98.0	249.0
12414690-160	J844TYBSIZE 3/8 (81343)	105.5	268.0
12414690-161	J844TYBSIZE 3/8 (81343)	48.0	122.0
12414690-162	J844TYBSIZE 3/8 (81343)	36.0	91.5
12414690-163	J844TYBSIZE 3/8 (81343)	161.5	410.2
12414690-164	J844TYBSIZE 3/8 (81343)	120.0	304.8
12414690-165	J844TYBSIZE 3/8 (81343)	78.0	198.1
12414690-166	J844TYBSIZE 3/8 (81343)	108.0	274.3
12414690-167	J844TYBSIZE 3/8 (81343)	168.0	426.7

Table D-1. Pneumatic Tube Lengths (Cont)

Tube Part Number	Bulk Tubing Part Number	Cut Length	
		inches	cm
12414690-168	J844TYBSIZE 3/8 (81343)	108.0	274.3
12414690-169	J844TYBSIZE 3/8 (81343)	72.0	182.9
12414690-201	C608-100BLK (13174)	14.8	37.5
12414690-202	C608-100BLK (13174)	14.1	35.7
12414690-203	C608-100BLK (13174)	6.5	16.5
12414690-205	C608-100BLK (13174)	14.5	36.8
12414690-206	C608-100BLK (13174)	14.8	37.7
12414690-207	C608-100BLK (13174)	15.6	39.5
12414690-208	C608-100BLK (13174)	6.7	17.0
12414690-209	C608-100BLK (13174)	19.5	49.5
12414690-210	C608-100BLK (13174)	15.5	39.3
12414690-211	C608-100BLK (13174)	8.0	20.3
12414690-212	C608-100BLK (13174)	17.0	43.0
12414690-215	C608-100BLK (13174)	163.0	414.0
12414690-216	C608-100BLK (13174)	160.0	406.4
12414690-217	C608-100BLK (13174)	62.6	159.0
12414690-218	C608-100BLK (13174)	119.8	304.2
12414690-219	C608-100BLK (13174)	69.0	175.3
12414690-220	C608-100BLK (13174)	45.5	115.6
12414690-221	C608-100BLK (13174)	12.6	32.0
12414690-222	C608-100BLK (13174)	5.5	14.0
12414690-223	C608-100BLK (13174)	14.6	37.1
12414690-224	C608-100BLK (13174)	170.0	431.8
12414690-225	C608-100BLK (13174)	174.0	442.0
12414690-228	C608-100BLK (13174)	3.5	8.9
12414690-229	C608-100BLK (13174)	62.2	158.1
12414690-230	C608-100BLK (13174)	14.6	37.0
12414690-231	C608-100BLK (13174)	60.5	153.7
12414690-232	C608-100BLK (13174)	126.4	321.0
12414690-233	C608-100BLK (13174)	142.1	361.0
12414690-234	C608-100BLK (13174)		
12414690-235	C608-100BLK (13174)		
12414690-236	C608-100BLK (13174)	131.9	355.0
12414690-237	C608-100BLK (13174)	147.6	375.0
12414690-238	C608-100BLK (13174)	179.5	456.0
12414690-239	C608-100BLK (13174)	187.0	475.0
12414690-240	C608-100BLK (13174)	111.5	283.2
12414690-241	C608-100BLK (13174)	127.5	324.0
12414690-242	C608-100BLK (13174)	159.0	404.0
12414690-243	C608-100BLK (13174)	166.5	423.0

Table D-1. Pneumatic Tube Lengths (Cont)

Tube Part Number	Bulk Tubing Part Number	Cut Length	
		inches	cm
12414690-244	C608-100BLK (13174)	41.0	104.2
12414690-245	C608-100BLK (13174)	57.0	144.8
12414690-246	C608-100BLK (13174)	88.6	225.0
12414690-247	C608-100BLK (13174)	96.0	244.0
12414690-248	C608-100BLK (13174)	48.0	122.0
12414690-249	C608-100BLK (13174)	54.0	137.2
12414690-301	PFT-10B-BLK-100 (61424)	19.0	48.3
12414690-302	PFT-10B-BLK-100 (61424)	56.0	142.2
12414690-303	PFT-10B-BLK-100 (61424)	118.1	300.0

D-37. 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 inches (cm)	Fitting A	Fitting B
12420062-008	J30R2Type1 1/2 ID	61. (155.0)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420062-009	J30R2Type1 1/2 ID	79. (200.6)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420062-010	J30R2Type1 1/2 ID	97. (246.3)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420062-011	4720-00-912-3092	100. (254.0)	6-6 3014xx 5/8-18	6-6 3001xx 5/8-18
12420062-012	J30R2Type1 1/2 ID	120. (304.8)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420062-013	4720-00-912-3092	120. (304.8)	8-8 3014xx 5/8-16	8-8 3001xx 5/8-16
12420062-014	J30R2Type1 1/2 ID	58. (147.4)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420062-016	4720-00-912-3092	128. (325.2)	6-6 3014xx 5/8-18	6-6 3001xx 5/8-18
12420062-017	J30R2Type1 1/2 ID	12.8 (325.2)	8-8 3014xx 3/4-16	8-8 3001xx 3/4-16
12420063-002	J30R2Type1 1/2 ID	39. (99.1)	8-8 3014xx 3/4-16	8-8 1501-1/2 NPTF
12420063-004	J30R2Type1 1/2 ID	37. (94.0)	8-8 3014xx 3/4-16	8-8 1501-1/2 NPTF
12420064-001	4720-00-912-3092	25. (63.5)	4-4 3001xx 7/16-20	4-4 3001xx 7/16-20
12420064-002	4720-00-912-3092	30. (76.2)	4-4 3001xx 7/16-20	4-4 3001xx 7/16-20
12420064-003	4720-00-912-3092	116. (294.7)	4-4 3001xx 7/16-20	4-4 3001xx 7/16-20
12420064-004	4720-00-912-3092	107. (271.8)	4-4 3001xx 7/16-20	4-4 3001xx 7/16-20
12420064-006	J30R2Type1 1/2 ID	13. (34.0)	8-8 3001xx 3/4-16	8-8 3001xx 3/4-16
12420064-007	4720-00-143-9390	15. (37.8)	6-6 3002xx 5/8-18	6-6 3002xx 5/8-18
12420064-008	J30R2Type1 1/2 ID	14. (35.6)	8-8 3001xx 3/4-16	8-8 3001xx 3/4-16
12414694-X508	4720-00-095-1011	20. (50.8)	300166 5/8-18 UNF	150166 3/8 NPTF
12414694-X558	4720-00-095-1011	22. (55.8)	300166 5/8-18 UNF	150166 3/8 NPTF

D-38. 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	
		inch	cm
12416381P1	49008	8.9	22.6
12416381P10	49008	17.8	45.2
12416381P11	49008	29.9	75.9
12416381P12	49008	33.0	83.8
12416381P13	49008	13.9	35.3
12416381P14	49008	4.0	10.2
12416381P15	49008	17.4	44.2
12416381P16	49008	3.2	8.1
12416381P17	49008	4.5	11.4
12416381P2	49008	16.2	41.1
12416381P20	27413	32.8	83.3
12416381P21	27413	9.2	23.4
12416381P22	27413	8.0	20.3
12416381P23	27413	23.3	59.2
12416381P26	49008	2.5	6.4
12416381P3	27413	7.3	18.5
12416381P30	49007	17.0	43.2
12416381P32	49005	1.7	4.3
12416381P34	49005	20.7	52.6
12416381P35	49005	21.8	55.4
12416381P36	49005	5.5	14.0
12416381P37	49005	8.0	20.3
12416381P38	49008	3.7	9.4
12416381P4	49008	12.0	30.5
12416381P5	49008	26.0	66.0
12416381P6	49008	7.7	19.6
12416381P7	49008	26.7	67.8
12416381P8	49008	5.2	13.2
12416381P9	49008	16.8	42.7

D-39. 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 inches (cm)	Fitting A	Fitting B
12417926-001	SAE 100R14-10	110 (279.4)	SAE 30011010	SAE 30011010
12417926-002	SAE 100R14-10	16.5 (41.9)	SAE 30011010	SAE 30011010
12417926-004	SAE 100R14-4	16.5 (41.9)	SAE 300144	SAE 300144

D-40. 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	
		inches	cm
12418037	A110 (30327)	75.5	191.7
12418460-001	MS521302B110360 (96906)	17.5	44.4
12418460-002	MS521301A206R (96906)	16.0	40.6

D-41. 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-56. 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

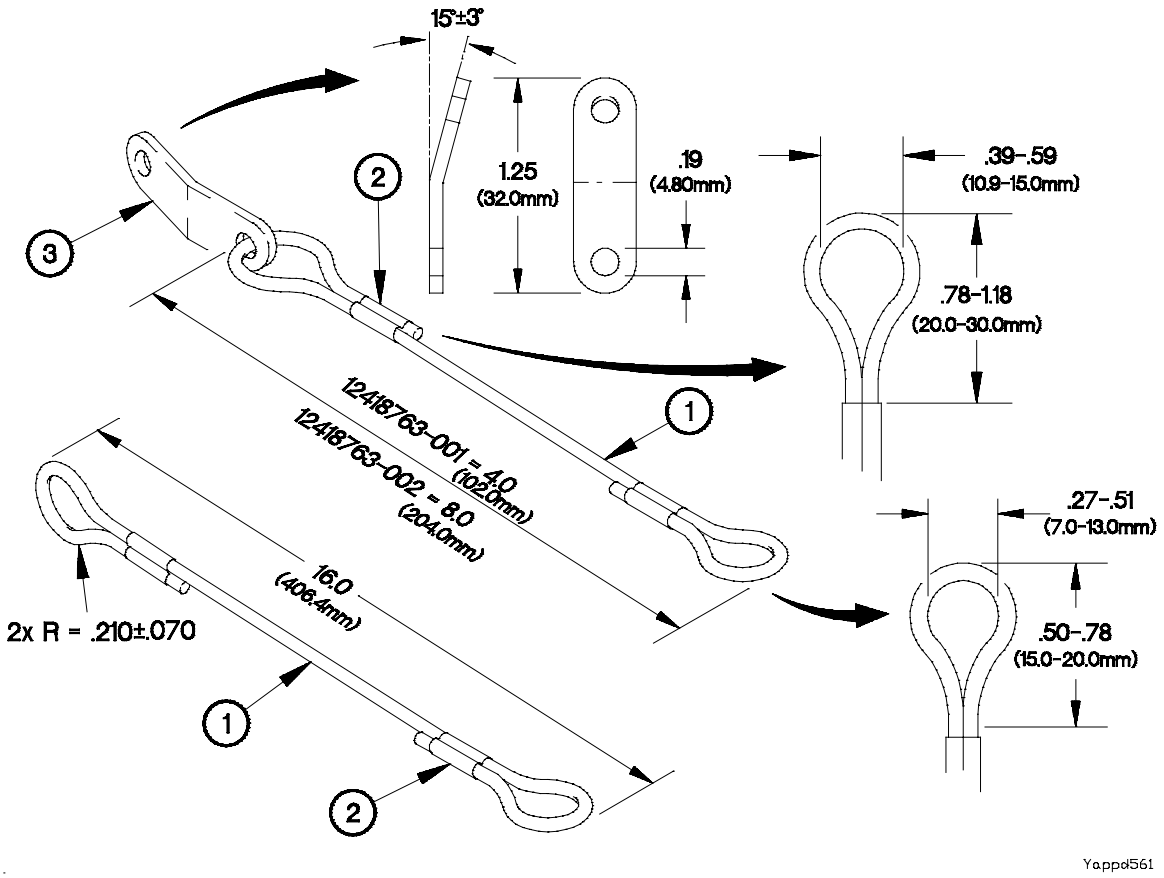


Figure D-56. Lanyard Assembly

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-56 Lanyard Assembly**.
d. De-burr and remove sharp edges.
e. Bend tab as shown in **Figure D-56 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-56. Lanyard Assembly**.
g. Crimp two sleeves over cable ends.

D-42. WOODEN SKID FABRICATION 12420036

Cut, shape and drill the wooden skid from bulk wood stock according to the following information. **Figure D-57. Wooden Skid** illustrates the dimensions and hole locations.

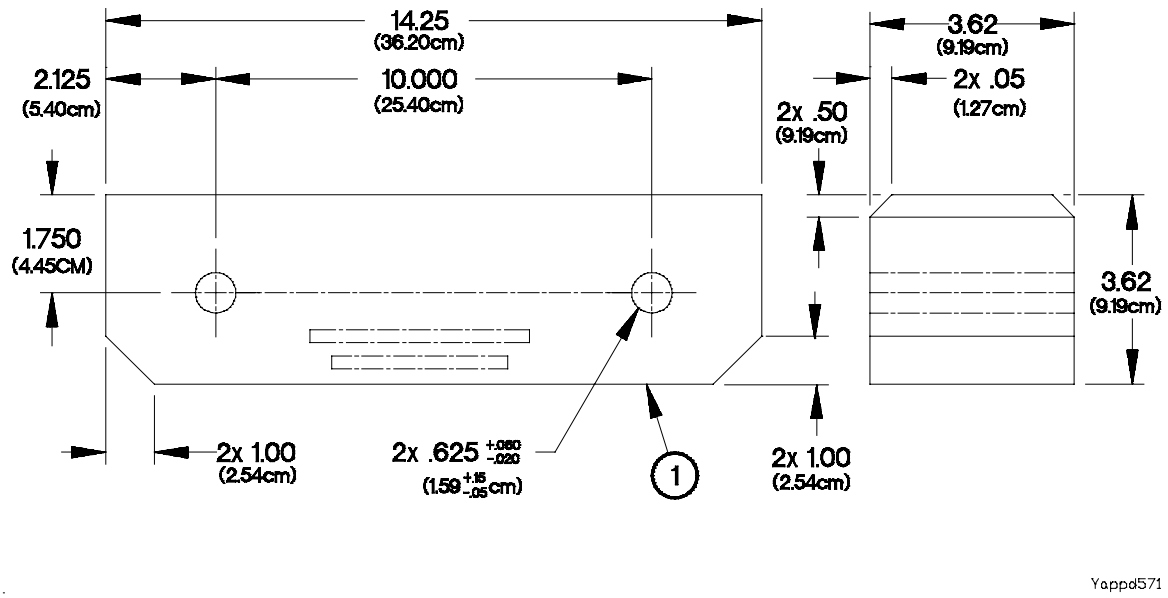


Figure D-57. Wooden Skid

a. All dimensions are in inches (centimeters).
b. Fabricate (1) from MIL-STD 736 Group IV untreated bulk wood stock as illustrated in **Figure D-57. Wooden Skid**.
c. Drill 0.625 inch (1.58 cm) diameter hole 2 places as shown in **Figure D-57. Wooden Skid**.
d. Sand and remove sharp edges.
e. Mark 19207-12420036 with characters 0.25 inch (0.65 cm) high using ink TT-I-1795 where shown in **Figure D-57 Wooden Skid** and clear coat with lacquer per TT-L-50.

D-43. 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	
		inches	cm
12420197-001	483666 (02280)	180.0	457.2
12420197-002	483666 (02280)	120.0	304.8
12420197-003	483666 (02280)	96.0	243.8
12420197-004	483666 (02280)	36.0	91.4
12420197-005	483666 (02280)	156.0	396.2
12420197-006	483666 (02280)	72.0	182.9
12420198-001	881-16 (98441)	120.0	304.8
12420198-002	11657469	36.0	91.4

D-44. 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	
		inches	cm
12420308-457	8711054 (19207)	18.3	46.4
12420308-760	8711054 (19207)	30.4	77.2

D-45. 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 inch (2.54 cm) 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-46. 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 inches (cm)	Fitting A	Fitting B
12420419-001	4720-01-226-3715	39.0 (99.1)	10-10301447	10-10300147
12420419-002	4720-01-226-3715	37.0 (94.)	10-1031447	10-10300147

D-47. CTIS SEAL DRIVER (3256-H-1048)

Used on Front, Intermediate, and Rear Axle CTIS Seals.

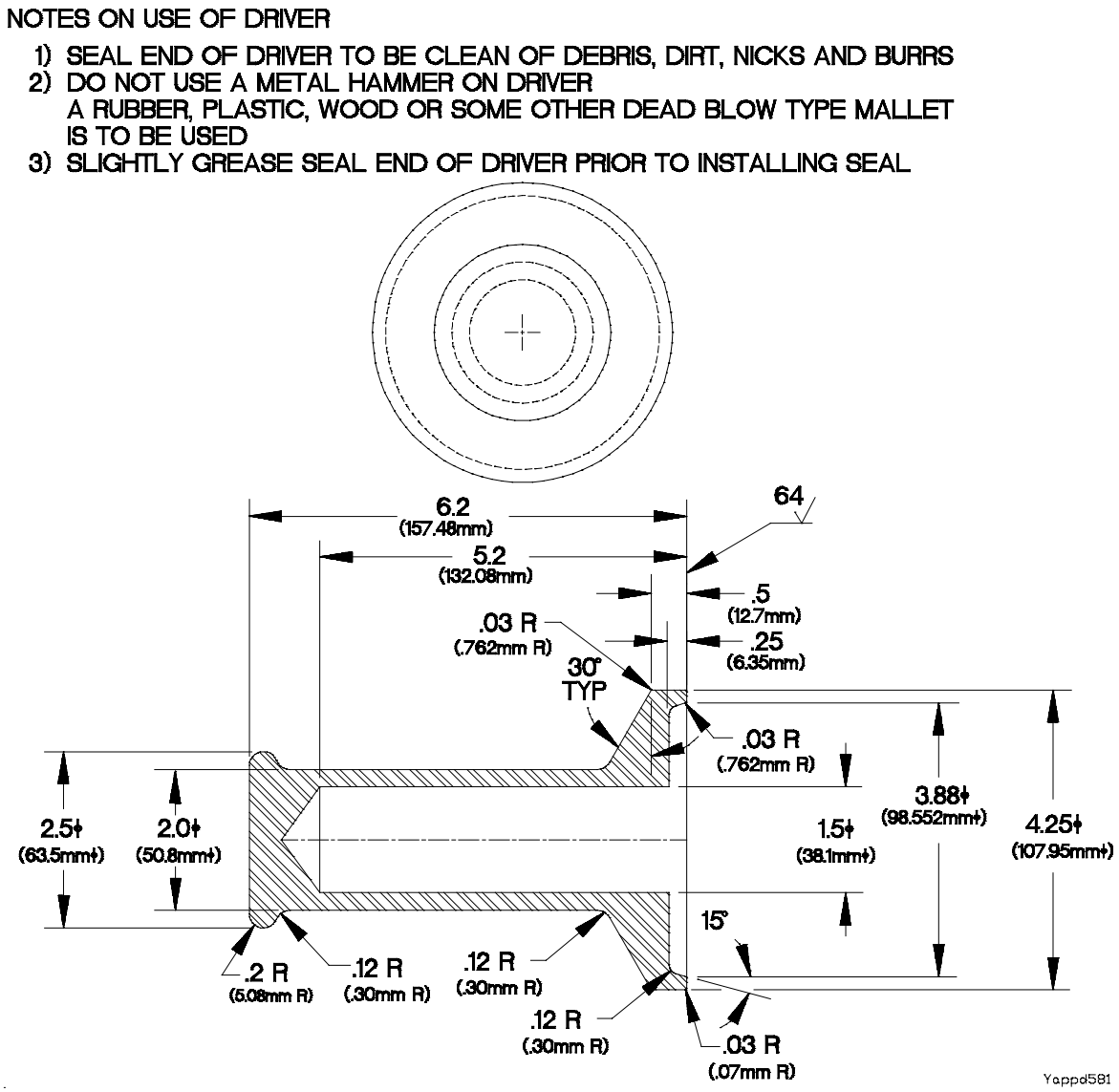


Figure D-58 CTIS Seal Driver

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-48. 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

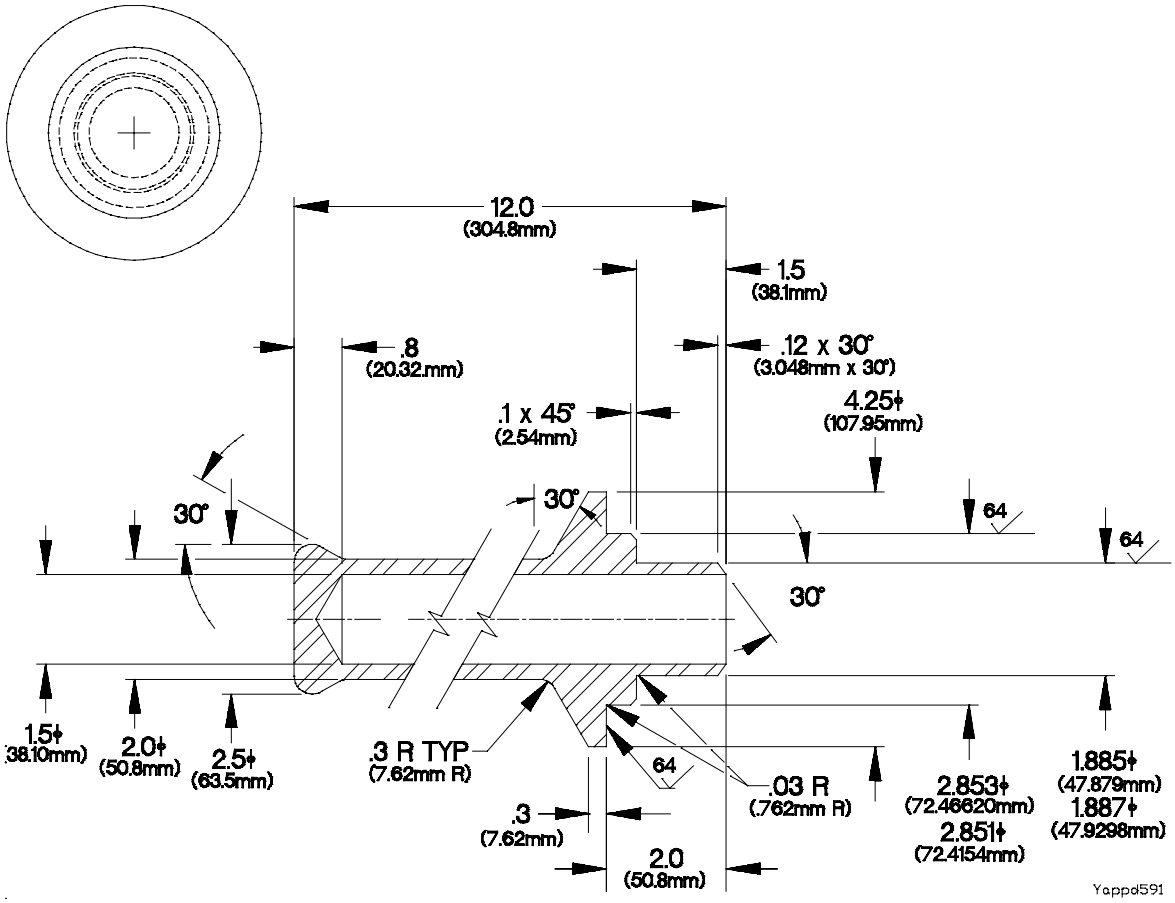


Figure D-59. Front Axle Shaft Seal Driver

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-49. 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

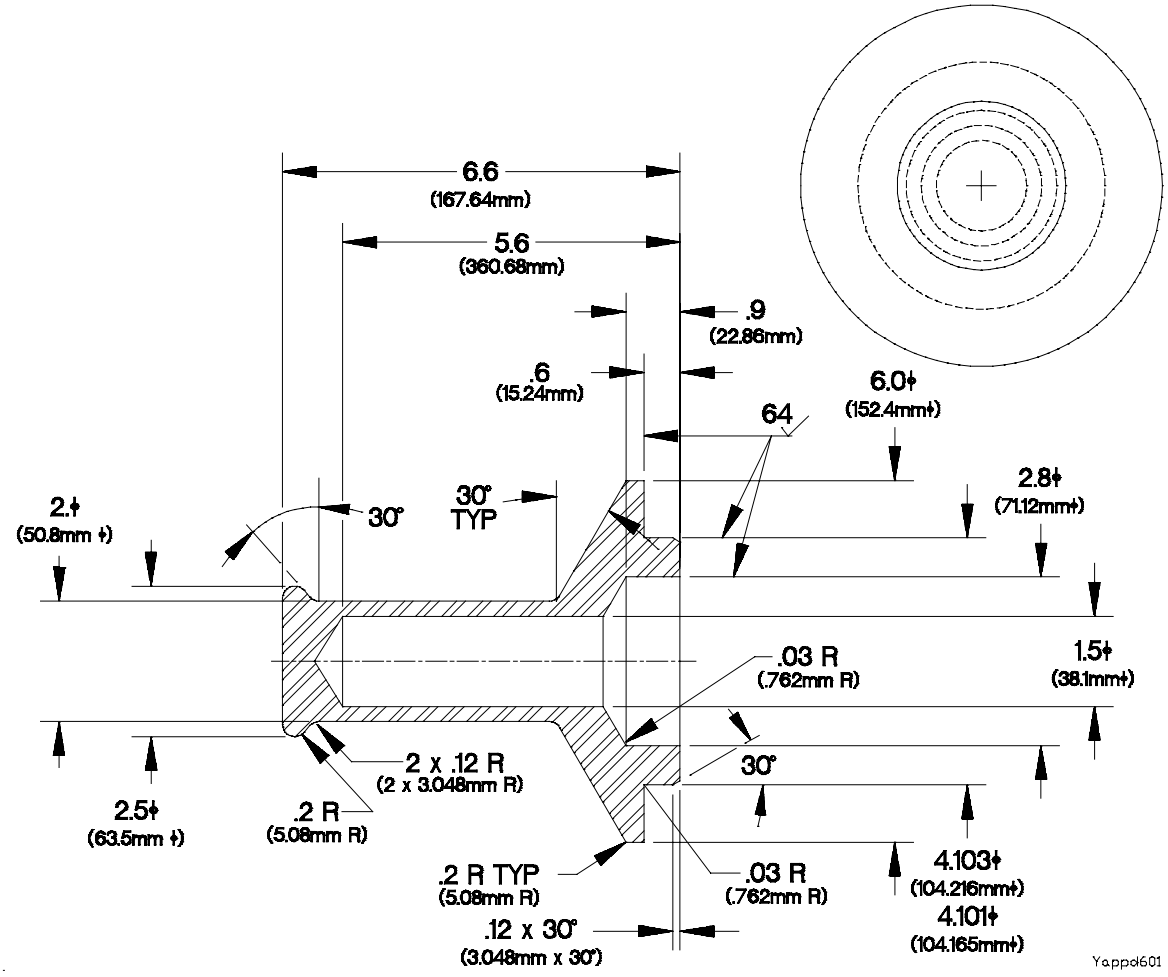


Figure D-60. Wheel Hub Grease Seal Driver

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-50. INTERMEDIATE DIFFERENTIAL OUTPUT (REAR) PINION SEAL DRIVER (3256-L-1052)

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

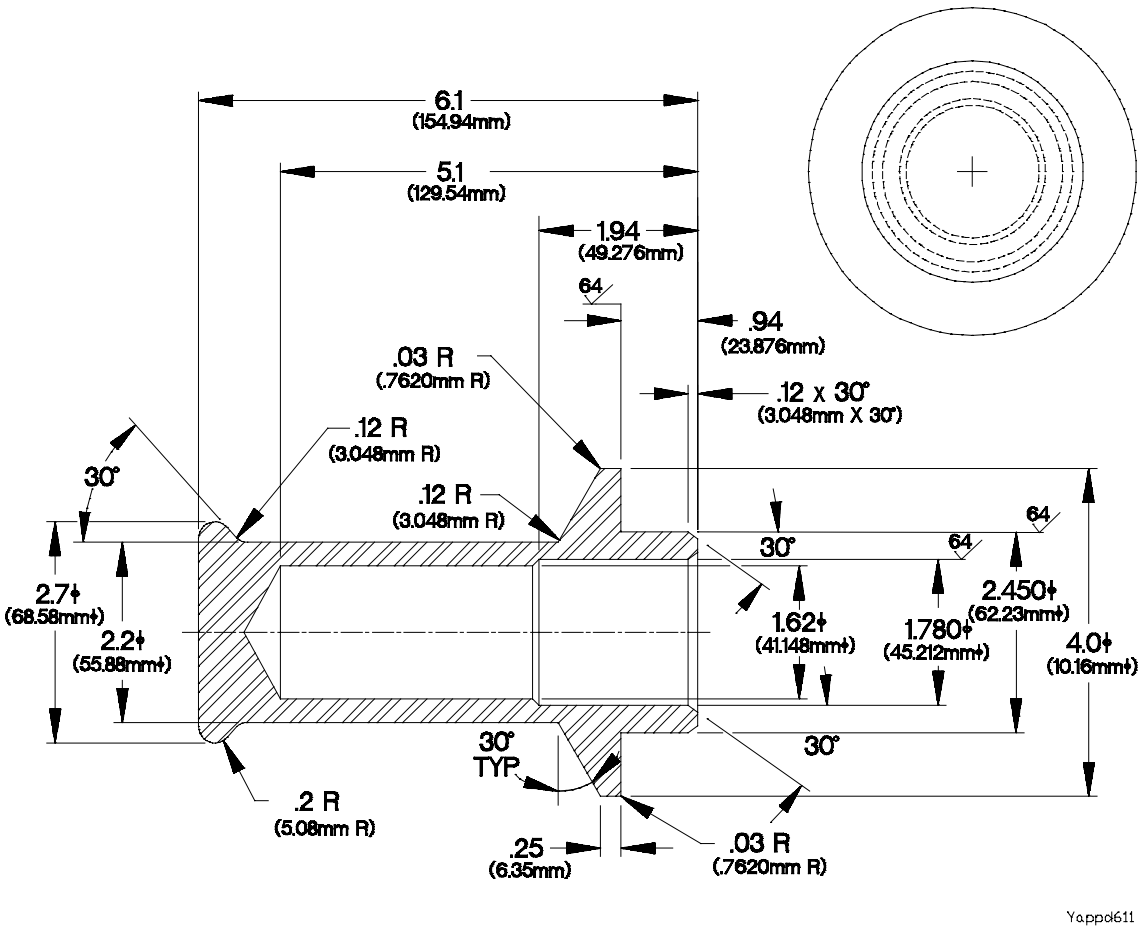


Figure D-61. Intermediate Differential Output (Rear) Seal Driver

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-51. DIFFERENTIAL PINION SEAL DRIVER (3256-M-1053)

Used on Front, Intermediate, and Rear Differential Pinion Seals.

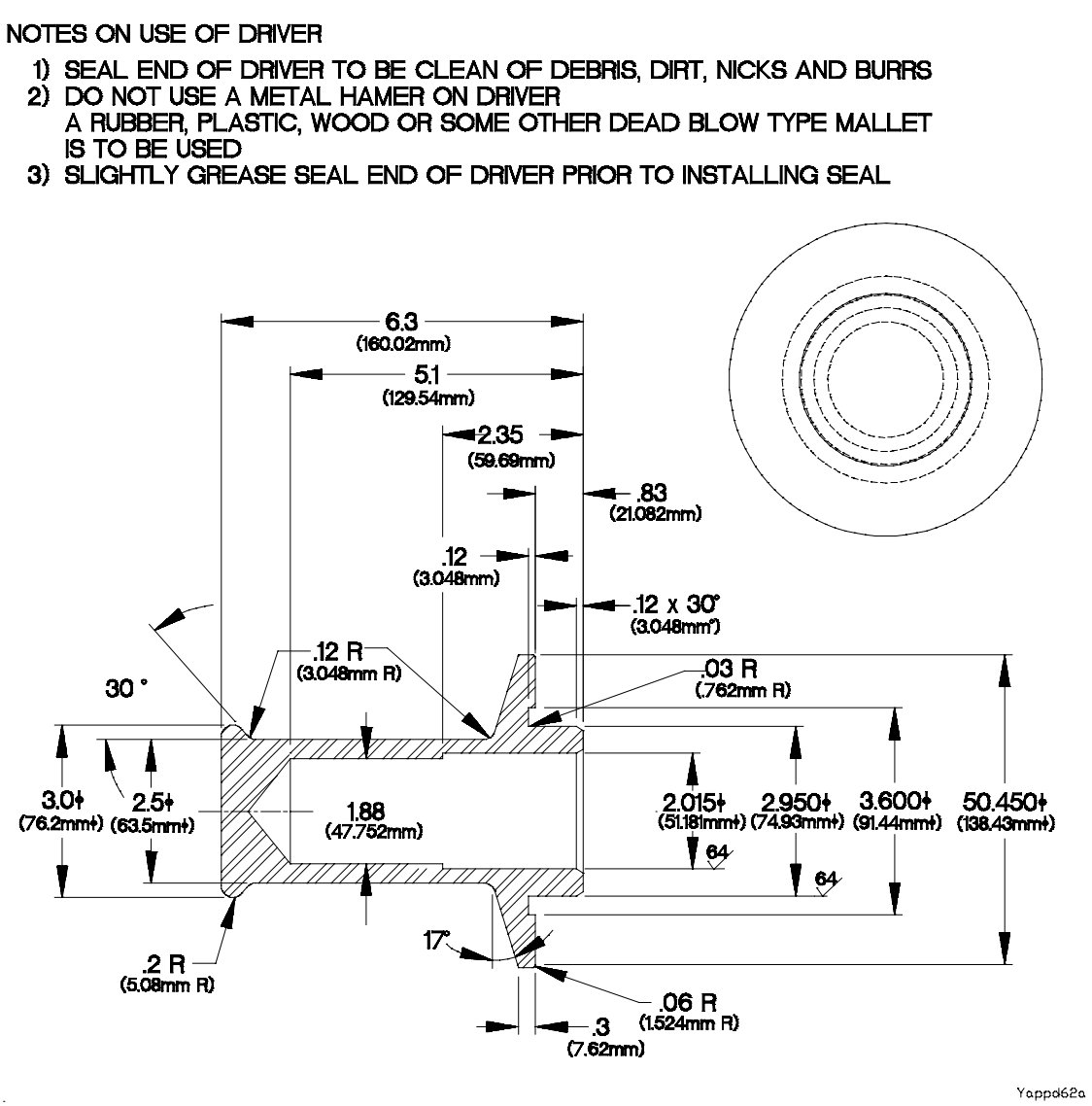


Figure D-62. Differential Pinion Seal Driver

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-52. INTERMEDIATE INPUT (FRONT) YOKE SEAL DRIVER (3256-Q-1057)

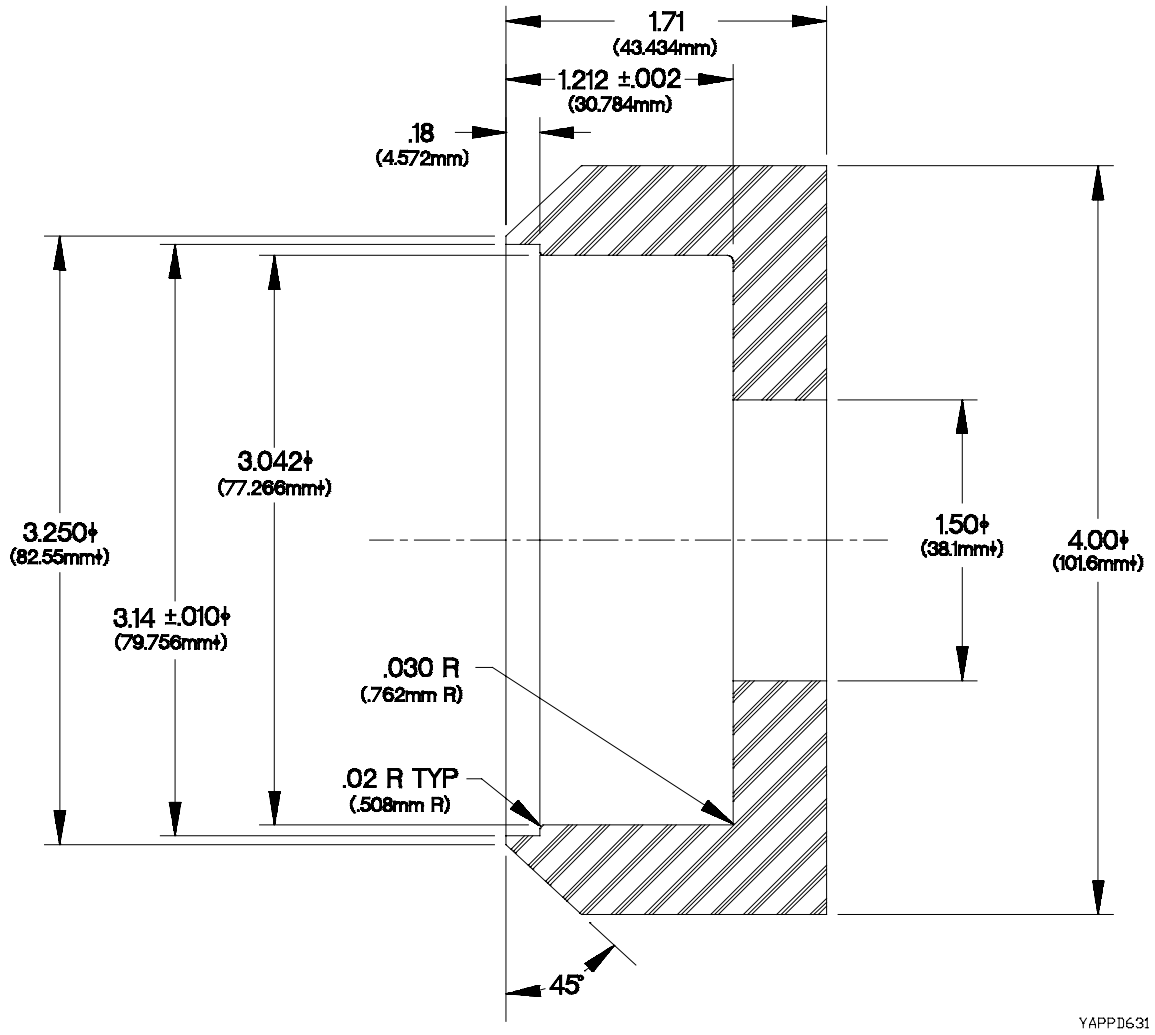


Figure D-63. Intermediate Input Yoke Seal Driver

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-53. INTERMEDIATE OUTPUT (REAR) YOKE SEAL DRIVER (3256-R-1058)

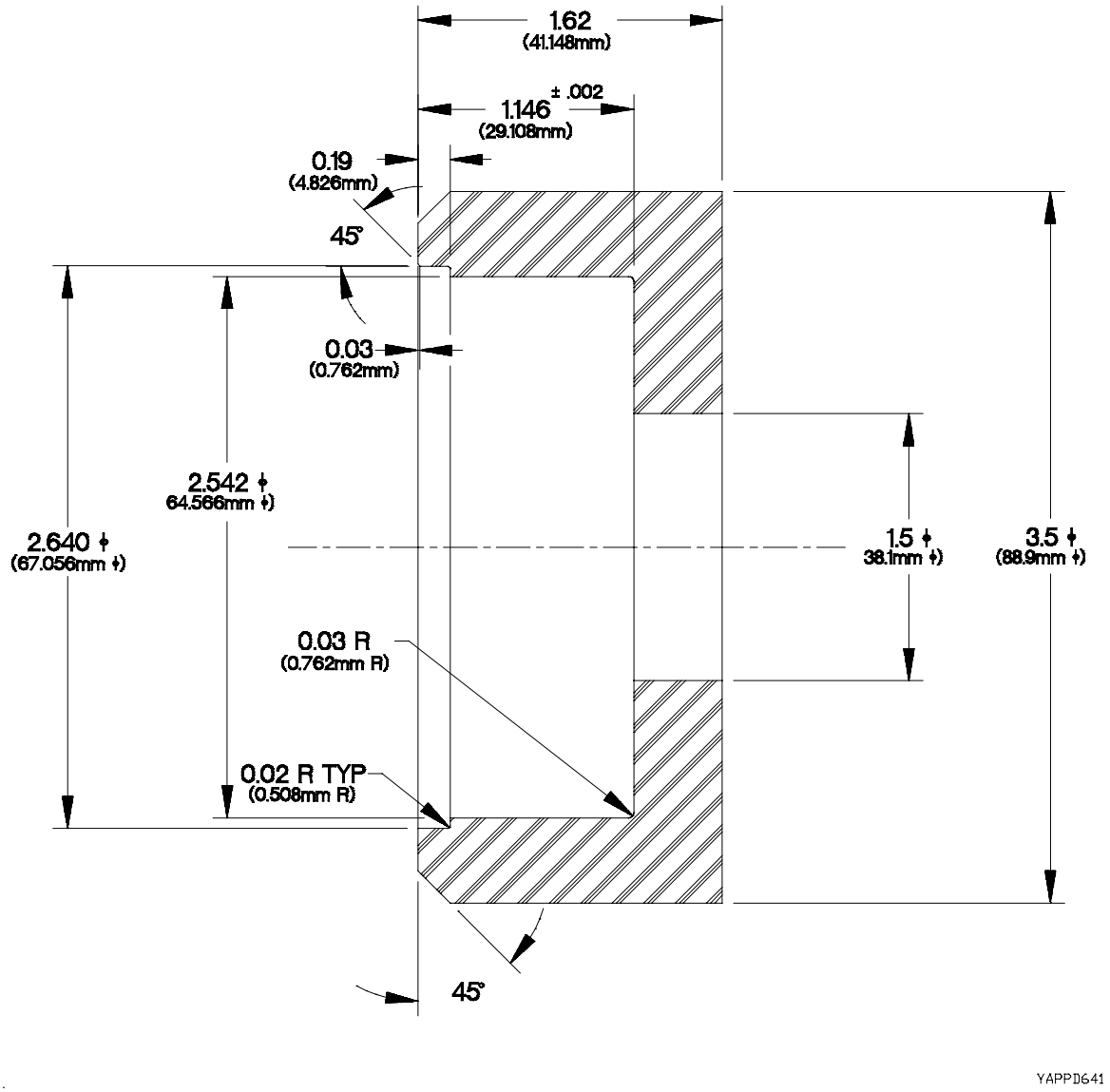


Figure D-64. Intermediate Output Yoke Seal Driver

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 +/- .005
   angles +/- 2° unless otherwise specified.
e. Surface texture: 125 $\sqrt{.}$ unless otherwise specified.

D-54. FRONT AND REAR DIFFERENTIAL YOKE SEAL DRIVER (3256-S-1059)

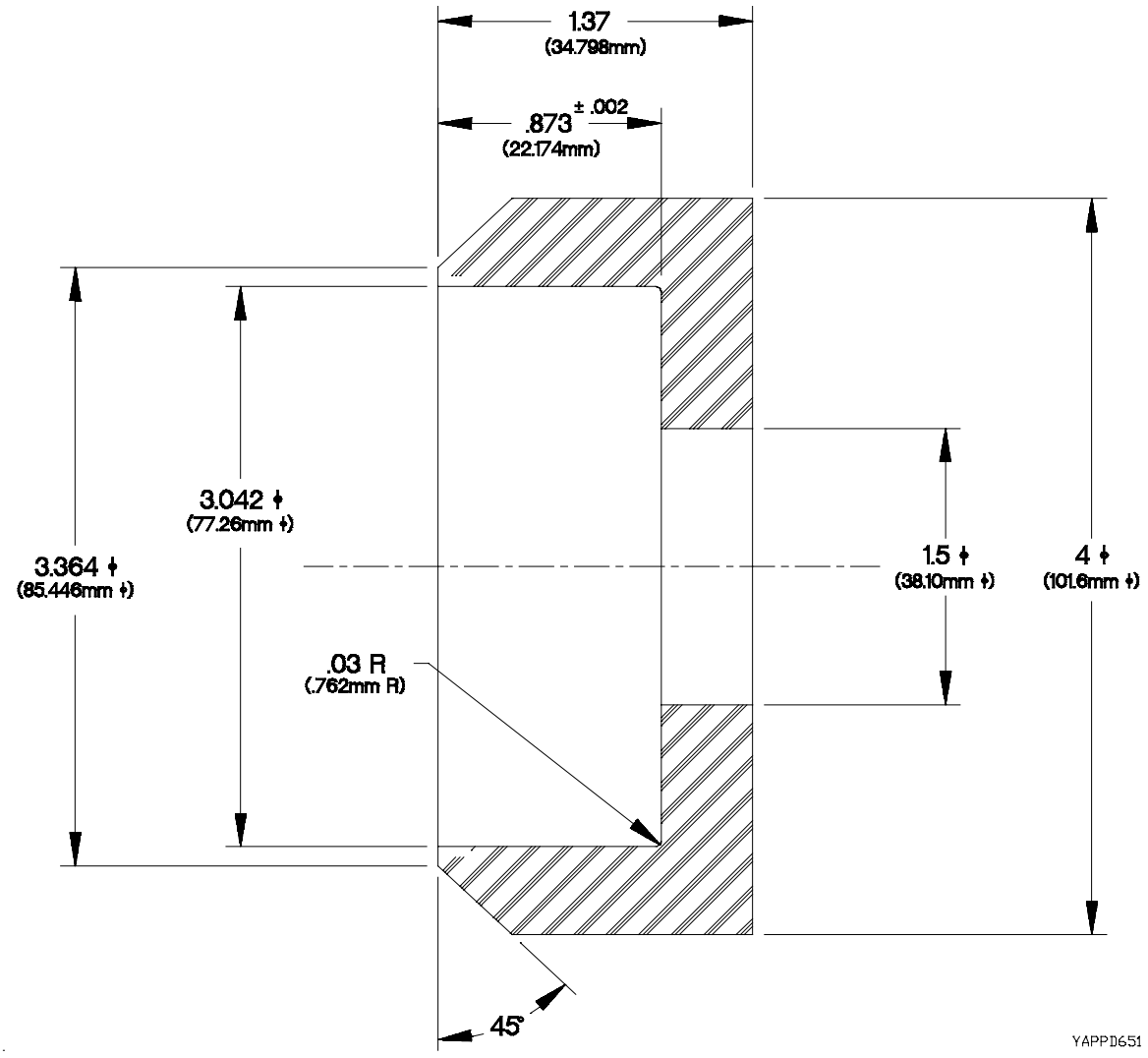


Figure D-65. Front and Rear Differential Yoke Seal Driver

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-55. 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-56. PURGE VALVE TOOL

Fabricate Purge Valve Tool according to the following instructions. Refer to Figure D-66. 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

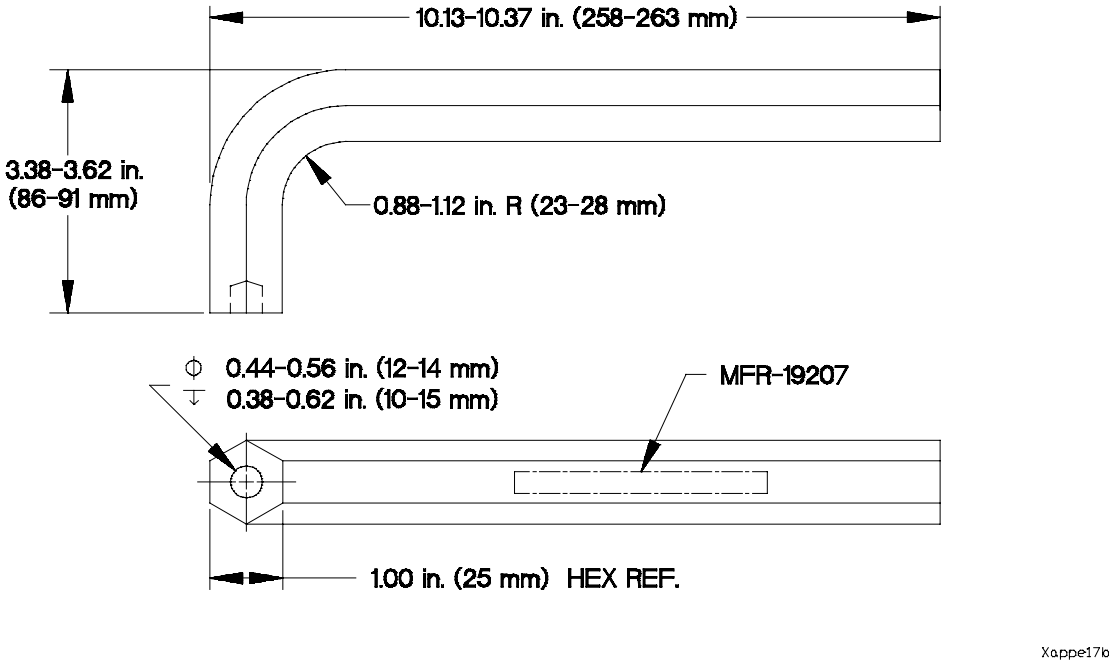


Figure D-66. Purge Valve Tool

a. All dimensions are in inches (cm).
b. Cut steel bar (1) and bend to shape as shown in Figure D-66.
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-57. M1089 30K WINCH AIR HOSES

Cut air hoses and convoluted tubing from bulk hose stock listed in Table D-3. M1089 30K Winch Air Hose Lengths and Fittings. Use a fine-toothed hacksaw or suitable cutting device and cut air hoses and convoluted tubing to required length.

Table D-3. M1089 30K Air Hose Lengths and Fittings

Hose Name	Bulk Hose P/N	Hose Cut Length		Bulk Convoluted Tubing P/N	Convoluted Tubing Cut Length		Fittings P/N	Fittings Qty.
		in.	mm		in.	mm		
Air Supply	NB-4-035	96.0	2438	12420924-001	94.0	2388	4-100110B 4-100115B 63NTA-4	2 2 2
Manifold Supply	NB-4-035	40.0	1016	12420924-001	38.0	965	4-100110B 4-100115B 63NTA-4	2 2 2
LH Free Spool	NB-4-035	66.0	1676	12420924-001	64.0	1626	4-100110B 4-100115B 63NTA-4	2 2 2
RH Free Spool	NB-4-035	48.0	1219	12420924-001	46.0	1168	4-100110B 4-100115B 63NTA-4	2 2 2
LH Regulator Input	NB-4-035	12.0	305	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
RH Regulator Input	NB-4-035	12.0	305	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
LH Check Valve Return	NB-4-035	3.0	76	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
RH Check Valve Return	NB-4-035	3.0	76	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
Front LH Tension Supply	NB-4-035	48.0	1219	12420924-001	46.0	1168	4-100110B 4-100115B 63NTA-4	2 2 2
Front RH Tension Supply	NB-4-035	66.0	1676	12420924-001	64.0	1626	4-100110B 4-100115B 63NTA-4	2 2 2

Table D-3. M1089 30K Air Hose Lengths and Fittings (Cont)

Hose Name	Bulk Hose P/N	Hose Cut Length		Bulk Convoluted Tubing P/N	Convoluted Tubing Cut Length		Fittings P/N	Fittings Qty.
		in.	mm		in.	mm		
RH 30K Winch Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
RH 30K Winch Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2
Underlift Fold Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	1
Underlift Fold Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
Underlift Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2
Underlift Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
Stinger Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2
Stinger Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
LH 30K Winch Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
LH 30K Winch Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2

D-58. M1089 30K WINCH PNEUMATIC TEST ADAPTER

Assembly the M1089 30K winch pneumatic test adapter to the following steps. Refer to the following parts list and Figure D-67. M1089 30K Winch Pneumatic Test Adapter for details.

Part Number	Material Description	National Stock Number	Qty.
NB-4-035	Tubing, Nonmetallic	4720-01-071-4042	14 in. (355.6 mm)
MIL-T-27730	Tape, antiseizing	8030-00-889-3534	1 roll
207P-4	Coupling, Pipe	4730-00-881-1161	1
4-6 100102 BA	Adapter, Straight, Pipe to Tube	4730-01-096-9398	1
4-4 100101 BA	Nipple, Tube	4730-01-091-4012	1

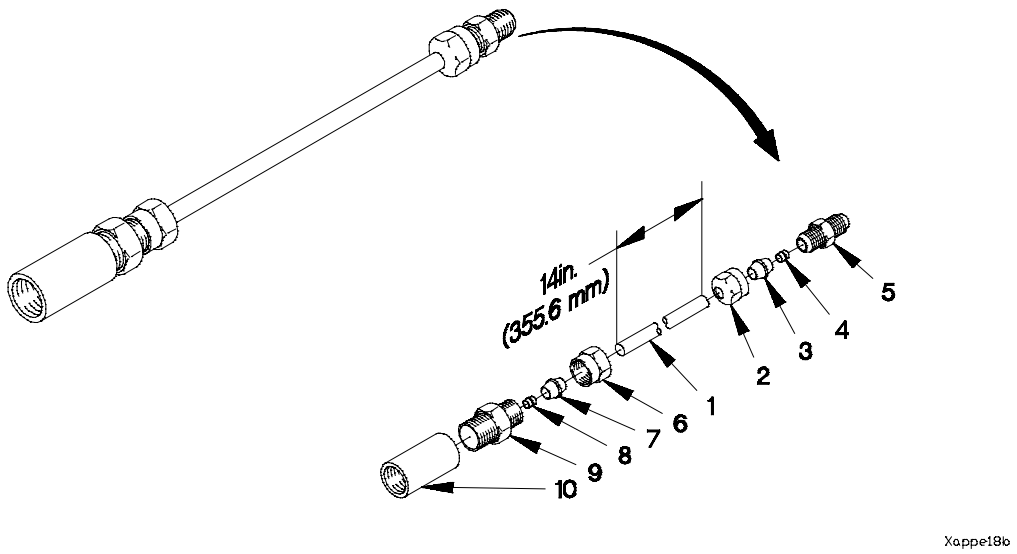


Figure D-67. M1089 30K Winch Pneumatic Test Adapter

a. All dimensions are in inches (millimeter).
b. Cut piece of nonmetallic tubing (1) to 14.0 in. (355.6 mm).
c. Remove two nuts (2), ferrules (3), and sleeves (4) from tube nipple (5).
d. Install nut (2), ferrule (3), and sleeve (4) on nonmetallic tubing (1).
e. Install nonmetallic tubing (1) on tube nipple (5).
f. Remove nut (6), ferrule (7), and sleeve (8) from straight adapter (9).
g. Install nut (6), ferrule (7), and sleeve (8) on nonmetallic tubing (1).
h. Install nonmetallic tubing (1) on straight adapter (9).
i. Apply on wrap of antiseizing tape to threads of straight adapter (9).
j. Install pipe coupling (10) on straight adapter (9).
k. Retain nut (2), ferrule (3), and sleeve (4) for future use.

D-59. BLOCK SEAL 12420489 FABRICATIONy

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.

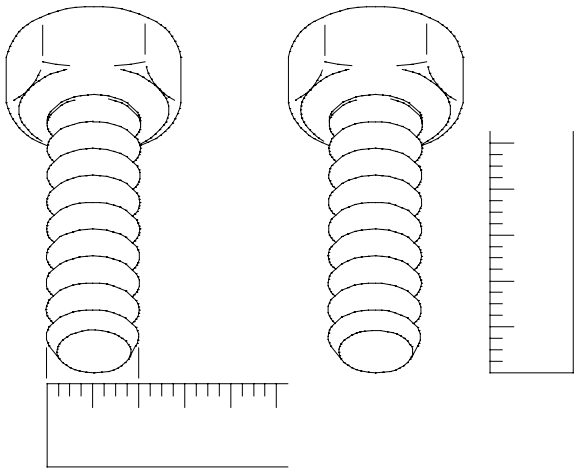
(2) Count the number of threads per inch.

(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

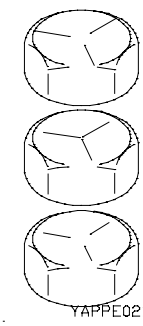
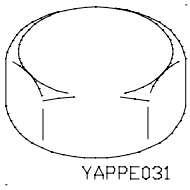
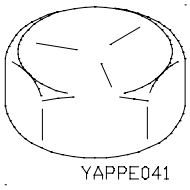
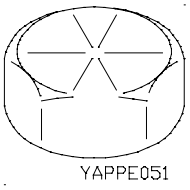
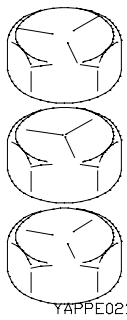
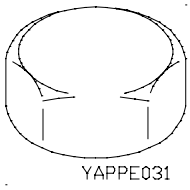
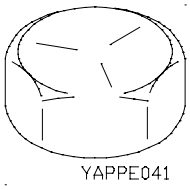
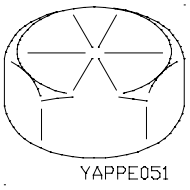
 YAPPE021 **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.**		Material Grade Markings					
		 YAPPE031 **SAE Grade 2**		 YAPPE041 **SAE Grade 5**		 YAPPE051 **SAE Grade 8**	
Diameter	**Threads per inch**	**Torque**					
inch		**lb-ft**	**N·m**	**lb-ft**	**N·m**	**lb-ft**	**N·m**
1/4	20	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

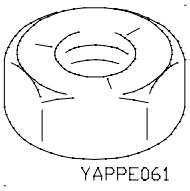
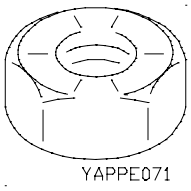
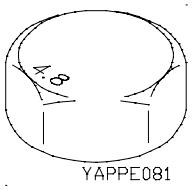
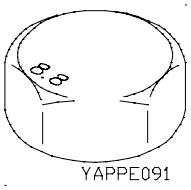
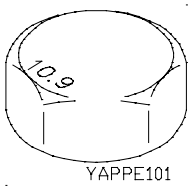
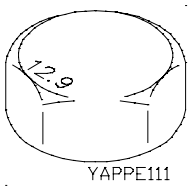
		Material Grade Markings			
		 YAPPE061 SAE Grade 5		 YAPPE071 SAE Grade 8	
Hole Diameter	Threads per inch	Torque			
inch		lb-ft	N·m	lb-ft	N·m
1/4	20	10-12	14-16	15-17	20-24
1/4	28	12-14	16-18	14-18	21-25
5/16	18	20-24	27-33	26-32	36-44
5/16	24	22-26	30-36	29-35	40-48
3/8	16	35-41	47-55	48-58	65-77
3/8	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

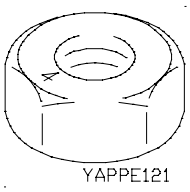
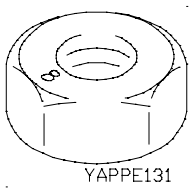
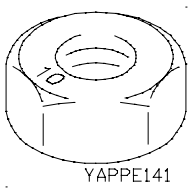
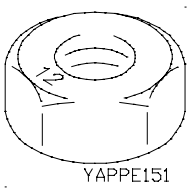
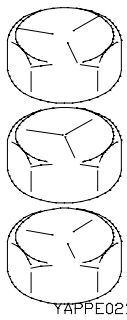
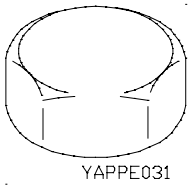
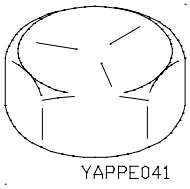
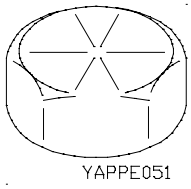
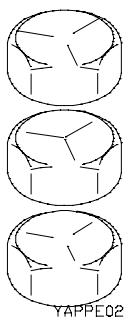
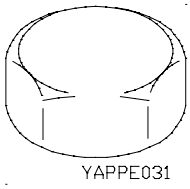
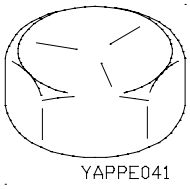
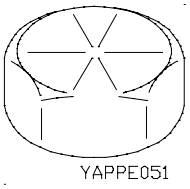
		Material Grade Markings							
		 Metric Grade 4.8		 Metric Grade 8.8		 Metric Grade 10.9		 Metric Grade 12.9	
Diameter	Thread Pitch	Torque							
mm		lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
6	1	5-6	7-8	7-9	10-12	10-12	14-17	11-14	15-19
8	1.25	12-14	16-18	18-22	24-30	24-30	32-40	27-33	36-46
8	1	12-14	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 MTV 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	1225K1259	3120-01-362-4365
2	BOLT, MACHINE	12414307-079	5306-01-381-9941
3	BOLT, MACHINE	12414307-080	5306-01-381-9928
4	BOLT, MACHINE	12414307-081	5306-01-371-7162
5	BOLT, MACHINE	12414307-083	
6	BOLT, MACHINE	12414307-084	
7	BOLT, MACHINE	12414307-140	5306-01-372-3536
8	BOLT, MACHINE	12414307-141	5306-01-371-7161
9	BOLT, MACHINE	12414307-142	5306-01-372-3537
10	BOLT, MACHINE	12414307-143	5306-01-372-0787
11	BOLT, MACHINE	12414307-145	5306-01-386-3966
12	BOLT, MACHINE	12414307-146	5306-01-381-9797
13	BOLT, MACHINE	12414307-147	5306-01-377-0750
14	BOLT, MACHINE	12414307-148	5306-01-453-8618
15	BOLT, MACHINE	12414307-149	5306-01-384-3485

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
16	BOLT, SHOULDER	12421697-001	5306-01-444-7489
17	BOLT, SHOULDER	12421697-002	5306-01-445-3744
18	BOLT, SHOULDER	12421697-003	5306-01-444-8354
19	BOLT, SHOULDER	12421697-004	5306-01-444-8359
20	BOLT, SHOULDER	12421697-005	5306-01-444-8364
20.1	BOLT, U	12418027-001	5306-01-369-0767
20.2	BOLT, U	12418027-003	5306-01-369-3501
20.3	BOOT	225313 (35510)	
21	BRACKET	3280-M-9243	
22	BRUSH SET	5702711	3120-00-089-2707
23	BRUSH SET, ELECTRICAL CONTACT	71035	5977-00-758-9555
24	BUSHING, SLEEVE	9-150-010181	3120-01-461-2735
25	BUSHING, BLANK	4001-40690-01	5365-01-331-9503
26	BUSHING, NON-METALLIC	12418159	5365-01-371-9556
27	BUSHING, SLEEVE	N9405	3120-01-362-5005
27.1	BUSHING, SLEEVE	Z082095780	3120-01-306-9870
28	BUSHING, SLEEVE	12418155	3120-01-371-7961
29	BUSHING, SLEEVE	12419961	3120-01-420-8269
29.1	BUSHING, SLEEVE	71059	3120-00-064-1723
29.2	BUSHING, SLEEVE	73644	3120-00-111-3711
30	CAP, PROTECTIVE, DUST	15036-2A	5340-01-372-9888
31	EXCLUDER	4R9999	5330-01-469-7592
32	FILTER ELEMENT	29502194	2940-01-360-7986
33	GASKET	1S7057	5330-00-105-0339
34	GASKET	115-4202	5330-01-424-7906
35	GASKET	113-6250	5330-01-360-5933
36	GASKET	3N4087	5330-01-061-8003
36.1	GASKET	12421155	5330-01-295-0115
37	GASKET	4P1623	5330-01-360-5932
38	GASKET	4P6930	5330-01-360-7172

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
39	GASKET	6D1004	5330-01-059-9593
40	GASKET	113-6200	5330-01-424-3523
41	GASKET	7C0358	5330-01-360-5936
42	GASKET	7C1160	5330-01-360-5937
43	GASKET	7C7431	5330-01-360-5940
44	GASKET	7E0844	5330-01-360-5492
45	GASKET	7E9817	5330-01-360-5938
46	GASKET	7W2398	5330-01-360-5935
47	GASKET	7W5340	5330-01-360-7173
48	GASKET	7W6552	5330-01-360-5929
49	GASKET	7W8860	5330-01-360-5939
50	GASKET	7W9699	5330-01-360-5928
51	GASKET	9Y4634	5330-01-360-5930
52	GASKET	22-P-53	5330-01-043-5832
53	GASKET	35P-74	5330-01-381-2357
54	GASKET	11262	5330-01-148-9729
55	GASKET	250001-011	5330-01-329-3800
56	GASKET	350903	5330-00-576-4626
57	GASKET	6776456	5330-01-329-9093
58	GASKET	12420037	5330-01-394-2410
59	GASKET	12420056	5330-01-394-2411
60	GASKET	23048037	5330-01-360-7520
61	GASKET	29501144	5330-01-407-1644
62	GASKET	29503185	5330-01-360-7518
63	GASKET	29503263	5330-01-360-9034
64	GASKET	29503283	5330-01-360-9035
65	GASKET	29503288	5330-01-361-0274
66	GASKET	29534357	5330-01-360-7521
67	GASKET	29506211	5330-01-360-7519
68	GASKET	29506212	5330-01-360-9038
69	GASKET	29506213	5330-01-360-9039
70	GASKET	29506323	5330-01-360-5262

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
71	GASKET	29506352	5330-01-360-9037
71.1	GROMMET, NONMETALLIC	MS21266-7N	5325-00-238-6037
72	INSULATION PANEL	12418384-001	2510-01-377-4333
73	INSULATION PANEL	12418384-004	2510-01-428-9699
74	INSULATION PANEL	12418384-005	2510-01-428-1691
75	INSULATION PANEL	12418384-006	2510-01-428-1696
76	INSULATION PANEL	12418384-007	2510-01-445-7001
77	INSULATION PANEL	12418384-008	2510-01-445-6998
78	INSULATION SLEEVING, ELECTRICAL	EPS-3003/4B	5970-01-379-7195
79	INSULATION SLEEVING, ELECTRICAL	M23053/4-302-0	5970-01-161-6796
80	INSULATION SLEEVING, ELECTRICAL	M23053/4-304-0	5970-01-163-1103
81	INSULATION SLEEVING, ELECTRICAL	M23053/4-305-0	5970-01-210-3272
82	INSULATION SLEEVING, ELECTRICAL	M23053/5-210-C	5970-00-990-9911
83	INSULATION SLEEVING, ELECTRICAL	M23053/5-303-9	5970-01-312-5497
84	INSULATION SLEEVING, ELECTRICAL	313H232-6-250	5970-01-373-5692
85	INSULATION SLEEVING, ELECTRICAL	313H243-6-250	5970-01-373-5690
86	INSULATION SLEEVING, ELECTRICAL	313H253-6-250	5970-01-373-5691
87	INSULATION SLEEVING, ELECTRICAL	313H274-6-250	5970-01-374-0823
88	INSULATION SLEEVING, ELECTRICAL	313H285-6-250	5970-01-374-0822
89	INSULATION SLEEVING, ELECTRICAL	333H263-6-250	5970-01-374-0339
90	INSULATION SLEEVING, ELECTRICAL	333H274-6-250	5970-01-387-7088
91	INSULATION SLEEVING, ELECTRICAL	333H285-6-250	5970-01-387-7193
92	KEY, WOODRUFF	N9040	5315-01-199-2355
93	KIT, HOIST SEAL	9-752-100508	2590-01-196-4734
94	KIT, REPAIR	9-752-100810	3040-01-408-1504
95	KIT, REPAIR	9-752-100811	5330-01-406-7489
96	KIT, REPAIR	9-752-100812	3040-01-408-3171
97	KIT, REPAIR	9-752-100818	5330-01-377-5195
98	KIT, REPAIR	9-752-100819	5330-01-431-3096
99	KIT, REPAIR	9-752-100820	5330-01-431-3083
100	KIT, REPAIR	9-752-100821	5330-01-431-3078

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
101	KIT, REPAIR	9-752-100961	5330-01-436-5568
102	KIT, REPAIR	9-752-100962	5330-01-393-4779
103	KIT, REPAIR	9-752-100964	3040-01-408-1503
104	KIT, REPAIR	9-752-101052	5330-01-431-3091
105	KIT, REPAIR	9-752-101082	3040-01-408-3172
105.1	KIT, REPAIR	1033-05432-02	
106	KIT, SEAL	SKMEH-3	5330-01-372-5297
107	KIT, SEAL	SKMEH-4	5330-01-372-5296
108	KIT, SEAL	SKMEH-5	
109	KIT, SEAL	SK2-10-2	5330-01-226-6810
110	KIT, SEAL	SK2-16-4	4820-01-335-7318
111	KIT, SEAL	SK3-10-4	5330-01-463-9558
112	KIT, SEAL	SK3-16-3S	5330-01-358-3740
113	KIT, SEAL	SK10-2K	5330-01-431-3259
114	KIT, SEAL	SK10-3	5330-01-186-0851
115	KIT, SEAL	3J3598	5330-01-162-8277
116	KIT, SEAL	9638	5330-01-344-2573
117	KIT, SEAL	9290-345	
118	KIT, SEAL	9692	5330-01-460-4642
119	KIT, SEAL	75215-07SK	
120	KIT, SEAL	75215-08SK	5330-01-431-3316
121	KIT, SEAL	75215-09SK	5330-01-430-7240
122	KIT, SEAL	13024-33327	
123	KIT, SEAL	13026-33328	
124	KIT, SEAL	13807-30306	
125	KIT, SEAL	13811-34357	
126	LOCKNUT, TUBE FITTING	9X6620	4730-01-360-4179
127	LOCKWASHER	MS19070-101	5310-00-186-0969
128	LOCKWASHER	MS35335-18	5310-00-596-7691
129	LOCKWASHER	MS35335-30	5310-00-209-0788
130	LOCKWASHER	MS35335-37	5310-00-209-5116
131	LOCKWASHER	MS35335-38	5310-00-616-6354

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
132	LOCKWASHER	MS35335-43	5310-00-045-3296
133	LOCKWASHER	MS35335-62	5310-00-184-9562
134	LOCKWASHER	MS35335-63	5310-00-209-0790
135	LOCKWASHER	MS35338-138	5310-00-933-8120
136	LOCKWASHER	MS35338-141	5310-00-984-7042
137	LOCKWASHER	MS35338-43	5310-00-045-3296
138	LOCKWASHER	MS35338-44	5310-00-582-5965
139	LOCKWASHER	MS35338-45	5310-00-407-9566
140	LOCKWASHER	MS35338-46	5310-00-637-9541
141	LOCKWASHER	MS35338-48	5310-00-584-5272
142	LOCKWASHER	MS35338-50	5310-00-004-5034
143	LOCKWASHER	MS35338-61	5310-00-527-3634
144	LOCKWASHER	MS51414-6	5310-01-251-9277
145	LOCKWASHER	MS51414-8	5310-01-358-2863
146	LOCKWASHER	MS35335-33	5310-00-209-0786
147	LOCKWASHER	XB-T-45-1	5310-01-249-4216
148	LOCKWASHER	N9015	5310-01-046-0186
149	LOCKWASHER	N9018	5310-01-032-4827
150	LOCKWASHER	N9265	5310-01-136-4888
151	LOCKWASHER	N9459	5310-01-348-8893
152	LOCKWASHER	N9461	5310-01-348-8392
153	LOCKWASHER	N9574	5310-01-439-0818
154	LOCKWASHER	Z0930-78423	5310-01-145-4355
155	LOCKWASHER	1388	5310-01-162-5737
156	LOCKWASHER	1395	5310-01-166-3657
157	LOCKWASHER	1144	5310-01-165-3363
158	LOCKWASHER	1495	5310-01-161-2527
159	LOCKWASHER	2434	5310-00-755-5139
160	LOCKWASHER	2523	5310-00-775-5182
161	LOCKWASHER	10241	5310-01-416-3010
162	LOCKWASHER	6V5839	5310-01-360-0983

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
163	LOCKWASHER	9B7233	5310-00-559-0070
163.1	LOCKWASHER	12414560-019	5330-01-369-6074
164	LOCKWASHER	12414560-017	5310-01-395-0820
165	LOCKWASHER	12414560-018	5310-01-381-3281
166	LOCKWASHER	12414560-029	5310-01-395-0817
166.1	LOCKWASHER	12414570-019	5310-01-470-2362
167	LOCKWASHER	3059-00870-03	5310-00-397-4524
168	MOUNT, RESILIENT	12414590	5340-01-374-0501
169	NUT, CLINCH	ALS3-610-4.2	5310-01-381-9929
170	NUT, CLINCH	ALS3-4470-.20	5310-01-384-7280
171	NUT, PLAIN, HEX	0770-023-003	5310-01-423-3725
172	NUT, PLAIN, KNURLED	ALS3-470-2.0	5310-01-384-7280
173	NUT, SELF-LOCKING	MS20500-524	5310-00-208-4023
174	NUT, SELF-LOCKING	MS21043-6	5310-00-881-0943
175	NUT, SELF-LOCKING	MS21083N6	5310-00-926-1852
176	NUT, SELF-LOCKING	MS51922-17	5310-00-087-4652
177	NUT, SELF-LOCKING	MS51922-1	5310-00-088-1251
178	NUT, SELF-LOCKING	MS51922-2	5310-00-929-1807
179	NUT, SELF-LOCKING	MS51922-33	5310-00-225-6993
180	NUT, SELF-LOCKING	MS51922-49	5310-00-269-4040
181	NUT, SELF-LOCKING	MS51922-9	5310-00-984-3806
182	NUT, SELF-LOCKING	MS51943-52	5310-00-241-6666
183	NUT, SELF-LOCKING	XB-HNH-34F	5310-01-162-4753
184	NUT, SELF-LOCKING	N9091	5310-01-050-5005
185	NUT, SELF-LOCKING	N9099	5310-01-165-1312
186	NUT, SELF-LOCKING	N9406	5310-01-362-6171
187	NUT, SELF-LOCKING	N9556	5310-01-423-0880
188	NUT, SELF-LOCKING	N9410	5310-01-348-8398
189	NUT, SELF-LOCKING	N9467	5310-01-350-4257
190	NUT, SELF-LOCKING	N9416	5310-01-348-8360
191	NUT, SELF-LOCKING	DIN 934 ST M6	5310-01-342-2739
192	NUT, SELF-LOCKING	40-X-1041	5310-01-391-5251
193	NUT, SELF-LOCKING	40-X-1241	5310-01-391-5249
194	NUT, SELF-LOCKING	40-X-1244	

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
195	NUT, SELF-LOCKING	9-522-010009	5310-01-373-6791
196	NUT, SELF-LOCKING	50066	5310-00-007-0225
196.1	NUT, SELF-LOCKING	11602502	5310-00-930-7979
197	NUT, SELF-LOCKING	11649930	5310-00-402-5220
198	NUT, SELF-LOCKING	12418084	5310-01-371-8419
199	NUT, SELF-LOCKING	12412476-09	5310-01-445-6346
199.1	NUT, SELF-LOCKING	12412476-11	5310-01-407-7178
199.2	NUT, SELF-LOCKING	12412476-13	5310-01-407-7181
200	NUT, SELF-LOCKING	12412478-04	5310-01-381-9901
201	NUT, SELF-LOCKING	12412478-11	5310-01-381-9942
202	NUT, SELF-LOCKING	12414308-002	5310-01-381-9819
203	NUT, SELF-LOCKING	12414308-003	5310-01-374-1382
204	NUT, SELF-LOCKING	12414308-007	5310-01-369-6073
205	NUT, SELF-LOCKING	12414308-016	5310-01-381-9945
206	NUT, SELF-LOCKING	12414308-017	5310-01-381-9830
207	NUT, SELF-LOCKING	12414308-018	5310-01-369-3337
208	NUT, SELF-LOCKING	12414308-019	5310-01-369-9522
209	NUT, SELF-LOCKING	12414308-020	5310-01-381-9849
210	NUT, SELF-LOCKING	12414308-021	5310-01-369-3338
211	NUT, SELF-LOCKING	12414308-025	5310-01-369-6706
212	NUT, SELF-LOCKING	12414308-027	5310-01-369-3339
213	NUT, SELF-LOCKING	12414315-003	5310-01-374-1382
214	NUT, SELF-LOCKING	12414315-004	5310-01-342-2739
214.1	NUT, SELF-LOCKING	12414315-005	5310-01-372-3023
215	NUT, SELF-LOCKING	12414315-006	5310-01-369-3332
216	NUT, SELF-LOCKING	12414315-011	5310-01-368-8667
217	NUT, SELF-LOCKING	12414315-017	5310-01-368-8065
218	NUT, SELF-LOCKING	12414315-020	5310-01-372-6337
219	NUT, SELF-LOCKING	12414315-021	5310-01-434-3778
220	NUT, SELF-LOCKING	15635-93M	5310-01-434-0078
221	NUT, SELF-LOCKING	29507834	5310-01-359-8789

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
221.1	NUT, SELF-LOCKING	40-X-1241	5310-01-391-5249
222	PACKING WITH RETAINER	75-1740-199-025-FB	5330-01-368-8828
223	PACKING, PREFORMED	114-8718	5330-01-348-2720
224	PACKING, PREFORMED	125-8274	5330-01-360-6012
224.1	PACKING, PREFORMED	F4001-16	5331-01-466-0354
224.2	PACKING, PREFORMED	J515-16-3	5331-01-465-3634
224.3	PACKING, PREFORMED	MS28775-006	5330-00-292-0580
224.4	PACKING, PREFORMED	MS28775-010	5331-00-584-0266
225	PACKING, PREFORMED	MS28775-110	5330-00-585-6663
226	PACKING, PREFORMED	MS28775-246	5330-00-585-8249
227	PACKING, PREFORMED	MS28775-208	5330-01-105-7263
228	PACKING, PREFORMED	MS28775-224	5330-00-641-3407
229	PACKING, PREFORMED	MS28778-10	5310-00-285-9842
230	PACKING, PREFORMED	MS28778-12	5330-00-251-8839
231	PACKING, PREFORMED	MS28778-14	5330-00-472-2783
232	PACKING, PREFORMED	MS28778-16	5330-01-804-5694
233	PACKING, PREFORMED	MS28778-20	5330-00-816-3546
234	PACKING, PREFORMED	MS28778-3	5320-00-835-7485
235	PACKING, PREFORMED	MS28778-4	5330-00-805-2966
236	PACKING, PREFORMED	MS28778-6	5330-00-804-5695
237	PACKING, PREFORMED	MS28778-8	5330-00-006-2249
238	PACKING, PREFORMED	MS29512-16	5330-00-263-8034
239	PACKING, PREFORMED	MS9955-113	5330-01-374-2325
240	PACKING, PREFORMED	A82777	5330-00-579-6495
241	PACKING, PREFORMED	M83248-2-906	5331-00-165-1981
242	PACKING, PREFORMED	M83248-2-908	5330-00-167-5173
243	PACKING, PREFORMED	M83461/1-442	5330-01-183-0987
243.1	PACKING, PREFORMED	XA-2265	5331-01-459-5254
244	PACKING, PREFORMED	Z053-074979	5330-00-579-6495
244.1	PACKING, PREFORMED	Z053095777	5331-01-304-3453
245	PACKING, PREFORMED	1J9671	5330-00-613-6500
246	PACKING, PREFORMED	1T1068	5330-01-336-8776

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
247	PACKING, PREFORMED	2M9780	5330-00-939-0687
248	PACKING, PREFORMED	3J1907	5330-01-333-6444
249	PACKING, PREFORMED	3J7354	5330-00-952-8008
250	PACKING, PREFORMED	3K0360	5330-00-948-6482
251	PACKING, PREFORMED	3P1156	5330-00-385-7587
252	PACKING, PREFORMED	4F7391	5330-00-562-1073
253	PACKING, PREFORMED	4F9029	5330-00-118-6559
254	PACKING, PREFORMED	4F9653	5330-00-038-4327
255	PACKING, PREFORMED	4J5477	5330-00-885-8059
255.1	PACKING, PREFORMED	405952	5330-00-454-0528
256	PACKING, PREFORMED	5F9657	5330-00-291-9572
256.1	PACKING, PREFORMED	5X1159	
256.2	PACKING, PREFORMED	5X556	5330-00-203-1172
257	PACKING, PREFORMED	6F6673	5330-00-865-0404
257.1	PACKING, PREFORMED	7-755-018010	5331-01-420-5127
257.2	PACKING, PREFORMED	71041	5331-00-633-6827
258	PACKING, PREFORMED	74980	5330-00-838-6729
259	PACKING, PREFORMED	8L2786	5330-00-973-8301
260	PACKING, PREFORMED	8M4445	5330-00-914-5821
261	PACKING, PREFORMED	2-011-N507-90	5330-01-265-8308
262	PACKING, PREFORMED	2-012-N507-90	5330-01-092-5502
263	PACKING, PREFORMED	2-014-N507-90	5330-01-366-5377
264	PACKING, PREFORMED	2-018-N507-90	5330-01-092-5503
265	PACKING, PREFORMED	2-112-N507-90	5330-01-093-3504
266	PACKING, PREFORMED	2-232-N674-70	5330-01-030-1825
267	PACKING, PREFORMED	2-240-N507-9	5330-01-036-2817
267.1	PACKING, PREFORMED	225163 (35510)	
268	PACKING, PREFORMED	3-906-N552-90	5330-01-104-1093
269	PACKING, PREFORMED	7-755-912003	5330-01-420-5128
270	PACKING, PREFORMED	28-P-120	5330-00-832-9514
271	PACKING, PREFORMED	28-P-121	5330-01-064-6284

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
272	PACKING, PREFORMED	28-P-190	5331-01-443-8050
273	PACKING, PREFORMED	28-P-191	5330-01-361-6959
274	PACKING, PREFORMED	22-P-92	5330-01-361-6962
275	PACKING, PREFORMED	4119-59	5330-00-510-3255
276	PACKING, PREFORMED	11446	5330-00-247-4174
277	PACKING, PREFORMED	9002-00491-68	5330-01-393-5630
278	PACKING, PREFORMED	9002-00741-58	5330-01-195-1500
279	PACKING, PREFORMED	9086-2	5330-01-106-1159
280	PACKING, PREFORMED	250192	5330-01-417-5105
281	PACKING, PREFORMED	9091-1	5330-01-244-8964
282	PACKING, PREFORMED	9612	5330-01-357-0846
283	PACKING, PREFORMED	9891	5330-01-374-2437
284	PACKING, PREFORMED	9972	5330-01-359-2151
285	PACKING, PREFORMED	15058	5330-00-304-9008
286	PACKING, PREFORMED	420828	5340-01-417-3788
287	PACKING, PREFORMED	53125	5365-00-062-3992
288	PACKING, PREFORMED	53155	5330-01-410-7122
289	PACKING, PREFORMED	60539	5330-01-302-2413
290	PACKING, PREFORMED	251216	5331-01-417-5107
291	PACKING, PREFORMED	251391	5310-01-417-1041
292	PACKING, PREFORMED	197755	
293	PACKING, PREFORMED	23014057	5330-01-360-6016
294	PACKING, PREFORMED	23043446	5331-01-424-6629
295	PACKING, PREFORMED	23046274	5330-01-360-6018
296	PACKING, PREFORMED	29500969	5330-01-360-7852
297	PACKING, PREFORMED	29501439	5330-01-388-1528
298	PACKING, PREFORMED	29503380	5330-01-360-6014
299	PACKING, PREFORMED	29503381	5330-01-360-6015
300	PACKING, PREFORMED	29503382	5330-01-360-6013
301	PACKING, PREFORMED	29503383	5330-01-360-6017
302	PACKING, PREFORMED	29507700	5331-01-424-4552
303	PACKING, RETAINER	23049377	5330-01-361-9052

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
304	PACKING, RETAINER	29503208	5330-01-361-9785
305	PANEL, DEFROSTER	12420495-004	2540-01-437-1411
306	PARTS KIT	SKD1VW	5330-01-309-2603
307	PARTS KIT	SK10-2	5330-01-350-4474
308	PARTS KIT	SK10-3	5330-01-186-0851
309	PARTS KIT	990-011-007	5330-01-332-7167
310	PARTS KIT	990-220-006	
311	PARTS KIT, DISC AND SPRING	9401	2530-01-344-5748
312	PARTS KIT, ENGINE FUEL PUMP	5R9065	2910-01-363-6816
313	PARTS KIT, FIFTH WHEEL	RK63506	2510-01-134-8880
313.1	PARTS KIT, SEAL REPLACEMENT	391-1803-387	
313.2	PARTS KIT, SEAL REPLACEMENT	391-1803-457	5330-01-366-5634
313.3	PARTS KIT, SEAL REPLACEMENT	391-1803-469	
313.4	PARTS KIT, SEAL REPLACEMENT	4452	5330-01-469-5782
313.5	PARTS KIT, SEAL REPLACEMENT	4453	5330-01-469-5786
314	PARTS KIT, SEAL REPLACEMENT	9403	5330-01-344-2572
315	PARTS KIT, SEAL REPLACEMENT	60540	5330-01-316-1440
316	PARTS KIT, SEAL REPLACEMENT	61267	5330-01-355-3582
317	PARTS KIT, SEAL REPLACEMENT	23042434	5330-01-360-5459
318	PARTS KIT, SEAL REPLACEMENT	29503974	5330-01-388-1576
319	PARTS KIT, SEAL REPLACEMENT	9752100915	5330-01-354-3834
320	PARTS KIT, SEAL REPLACEMENT	990-011-007	5330-01-332-7167
321	PARTS KIT, WINCH	9402	2590-01-374-2510
322	PARTS KIT, WINCH	9406	5330-01-470-0839
323	PARTS KIT, WINCH	9450	
324	PIN, COTTER	MS24665-181	5315-00-187-9374
325	PIN, COTTER	MS24665-360	5315-00-298-1499
325.1	PIN, COTTER	MS24665-385	5315-00-187-9382
326	PIN, COTTER	MS24665-394	5315-00-234-1628
327	PIN, COTTER	C1949	5315-00-010-3426
328	PIN, COTTER	MS24665-423	5315-00-013-7228

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
329	PIN, COTTER	MS24665-457	5315-00-187-9393
330	PIN, COTTER	MS24665-459	5315-00-187-9394
331	PIN, COTTER	MS24665-498	5315-00-849-9854
332	PIN, COTTER	MS24665-655	5315-00-187-9414
333	PIN, COTTER	XB-781-1	5315-01-369-1346
334	PIN, COTTER	K-2412-Z	5315-01-179-9882
335	PIN, COTTER	1199R2176	5315-00-880-6027
336	PIN, SPRING	XB-07508	5315-01-199-2088
337	PIN, SPRING	XB-21-S-375-1750	5315-01-159-6395
338	PIN, SPRING	1-647-0100004196	
339	PIN, SPRING	586031	5315-00-257-1652
339.1	PIN, STRAIGHT, HEADED	12417962-081	5315-01-447-2297
340	PLUG	3H5552	5340-00-007-6350
341	PLUG, EXPANSION	2M6471	5340-00-410-6762
342	PLUG, MACHINE THREAD	391-2281-010	5365-01-280-5570
343	PLUG, MACHINE THREAD	29503360	5365-01-360-0937
344	PLUG, PLASTIC	12418065-004	4730-01-375-1450
345	PLUG, PLASTIC	12418065-005	4730-01-375-0329
346	PLUG, RUBBER	12417526	5340-01-375-3042
347	PLUG, RUBBER	12417527	5340-01-377-1543
348	PLUG, RUBBER	12417599	5340-01-381-3855
349	PLUG, RUBBER	12420305-001	5340-01-384-1120
350	PLUG, RUBBER	12420305-003	5970-01-089-7447
351	PLUG, RUBBER	12418348	5340-01-384-0869
352	RETAINER, PACKING	MS28783-26	5330-00-944-9577
353	RETAINER, PACKING	MS28783-18	5330-00-171-6761
354	RETAINER, PACKING	8-224-N300-90	5330-00-005-0572
355	RETAINER, PACKING	202624	5330-01-417-7794
356	RETAINER, PACKING	11863-012	5330-01-417-7795
357	RETAINER, PACKING	22000-2	5330-01-322-2471
357.1	RETAINER, PACKING	7-755-016609	5330-01-420-5027
357.2	RETAINER, PACKING	7-755-018609	5330-01-420-5056

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
358	RING	9852	5365-01-224-2304
359	RING, RETAINING	N9008	5365-01-032-4222
360	RING, RETAINING	N9009	5365-01-034-2757
361	RING, RETAINING	6I3033	5365-01-360-0953
362	RING, RETAINING	6I3035	5365-01-360-0954
362.1	RING, SEAL	225148	5331-01-459-6517
363	RING, SEAL	9M4849	5330-00-847-4351
364	RING, WEAR	7-753-000173	3040-01-370-2823
364.1	RIVET, BLIND	12421770-004	
365	RIVET, COMPRESSION	12420756	5325-01-433-4746
365.1	RIVET, COMPRESSION	12418469	5320-01-376-0699
366	RUBBER STRIP	VC08G1R08	5330-01-389-6109
366.1	SCREW, CAP	CSH5-24-39	5305-01-479-7857
367	SCREW, CAP	639AS2710	5305-01-081-7393
368	SCREW, CAPTIVE	12421366	5305-01-439-3247
368.1	SCREW, SELF-LOCKING	7X3347	5305-01-360-0952
369	SEAL	BA3026-1	5330-01-077-4674
370	SEAL	1205F2164	5330-01-362-3392
371	SEAL	9890	5330-01-375-0243
372	SEAL	12415307	5340-01-376-0672
373	SEAL	12417485	5330-01-375-2909
374	SEAL	12418327	5365-01-381-3976
375	SEAL	23046376	5330-01-360-6006
376	SEAL	23048727	5330-01-360-7826
376.1	SEAL KIT	CBV1/2-10	
376.2	SEAL KIT	DG4V-3S	
376.3	SEAL KIT	FCV7-10	
376.4	SEAL KIT	PFR1-16	
376.5	SEAL KIT	PRV1-10	
376.6	SEAL KIT	RV5-10	
377	SEAL, CONNECTOR TUBE	4K1388	5330-00-933-3305
378	SEAL, PLAIN ENCASED	A-1205-E-2501	5330-01-432-2692

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
379	SEAL, PLAIN ENCASED	A-1205-F-2502	5330-01-432-2690
380	SEAL, PLAIN ENCASED	A-1205-D-2500	5330-01-432-2689
381	SEAL, PLAIN	3018-01507-01	5330-01-393-5626
382	SEAL, PLAIN	3018-01519-01	5330-01-331-9283
383	SEAL, PLAIN	3912884-019	5330-01-340-8159
384	SEAL, PLAIN	9057-14	5330-01-306-3438
385	SEAL, PLAIN ENCASED	A-1205-S-2255S	5330-01-360-7754
386	SEAL, PLAIN ENCASED	A-1205-T-2256	5330-01-362-1262
386.1	SEAL, PLAIN ENCASED	KIT-4451	5330-01-362-6102
387	SEAL, PLAIN ENCASED	4R8831	5330-01-360-9023
388	SEAL, PLAIN ENCASED	115-4109	5330-01-361-1456
389	SEAL, PLAIN ENCASED	28-P-119	5330-01-044-6592
390	SEAL, PLAIN ENCASED	28-P-123	
391	SEAL, PLAIN ENCASED	S-19751	5330-01-459-8204
392	SEAL, PLAIN ENCASED	13585	5330-00-202-1292
393	SEAL, PLAIN ENCASED	29515690	5330-01-430-3477
394	SEAL, PLAIN ENCASED	29507528	5330-01-360-5917
395	SEAL, PLAIN ENCASED	A-1205-D-2344	5330-01-360-5253
396	SEAL, PLAIN ENCASED	97799	5330-01-079-6372
397	SEAL, PLAIN ENCASED	S-19750	5330-01-459-8205
398	SEAL, URETHANE FOAM	12420420-001	5680-01-453-8912
399	SEAL, URETHANE FOAM	12420420-003	5680-01-453-8486
400	SEALRING	23045611	5330-01-360-9009
401	SEALRING	23045612	5330-01-360-9100
402	SEALRING	23045614	5330-01-360-9102
403	SEALRING	23045615	5330-01-360-9103
404	SEALRING	23045654	5330-01-360-9104
405	SEALRING	23045655	5330-01-360-9105
406	SEALRING	23041189	5330-01-360-5978
407	SEALRING	29501190	5330-01-360-5979
408	SEALRING	29502161	5365-01-360-1675
409	SEALRING	29502164	5365-01-360-1674

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
410	SEALRING	29506399	5330-01-360-5980
411	SEALRING	23046868	2835-01-360-1757
412	SETSCREW	29506222	5305-01-360-1667
413	SHIM	12421159-001	
414	SHIM	12421159-002	
415	SHIM	12421159-003	
416	SHIM	12421159-004	
417	SHIM	9-684-010052	5365-01-461-0456
418	SHIM, OUTPUT BEARING	29505947	5365-01-360-1030
419	SHIM, OUTPUT BEARING	29505948	5365-01-360-1029
420	SHIM, OUTPUT BEARING	29505949	5365-01-360-1028
421	SPACER, NYLON	1926-33	5365-01-408-5374
422	SPACER, PLATE	XA-0014	5365-01-133-0041
423	SPLICE, CONDUCTOR	JANTX1N3957	5961-00-181-0661
423.1	SPLICE, CONDUCTOR	M83519/1-9	5940-01-136-2540
424	SPRING	4088-40615-01	5360-01-392-9389
425	SPRING, COMPRESSION	9L9188	5360-00-175-2701
426	SPRING, COMPRESSION	2322	5360-01-345-5384
427	SPRING, FLAT	29500064	5360-01-360-2023
428	STRAINER, SUCTION	29503670	4730-01-360-4458
428.1	TERMINAL, LUG	12420344	5940-01-082-3321
429	VALVE CHECK	7C1493	4820-01-284-5435
430	WASHER, FIBER	Z095077721	3120-01-302-9301
431	WASHER	1229-M-1625	5310-01-059-7130
431.1	WASHER, FLAT	12414473-014	5310-01-363-0740
431.2	WASHER, FLAT	78302	5310-01-112-1738
432	WASHER, FLAT	78332	5310-01-204-0219
433	WASHER, FLAT	36900	5310-00-482-1999
433.1	WASHER, INSULATION	MES-76 (35510)	
433.2	WASHER, SEAL	XA 1470	5310-01-460-5998
434	WASHER, SEAL	25008.35	
435	WASHER, SEAL	29500025	5310-01-359-8840
435.1	WASHER, SEAL	12422577	5310-01-493-6806
436	WASHER, BRAKE HOUSING	1911644	5310-00-130-8033

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
437	WASHER, SPRING TENSION	D63474/1-27	5310-01-416-4339
438	WASHER, SPRING TENSION	D63474/1-39	5310-01-PAE-6547
438.1	WASHER, SPRING TENSION	75777	5310-01-112-1740
438.2	WASHER, THRUST	57023	3120-01-460-9421
439	WASHER, WAVE	53117-1	
440	WICK	225165	9390-01-459-7969
441	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 9-2320-366-20-4 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)

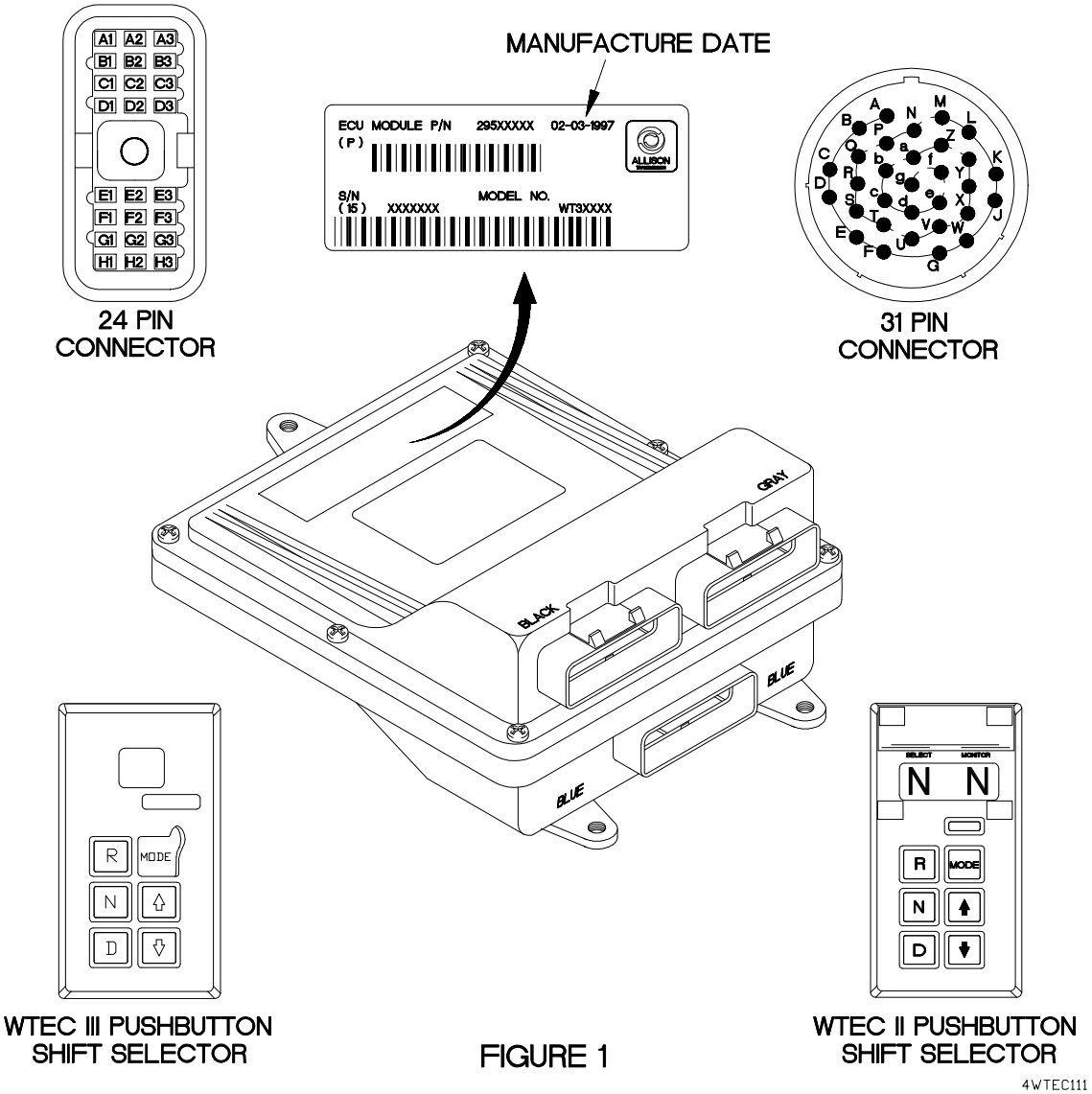


FIGURE 1

SUBJECT INDEX

Subject Para

A

Adapter Housing Module Repair 21-6
Alternator
  200 Amp Alternator Repair 18-6
Armament/Sighting and Fire Control
  Material Maintenance Introduction 19-1
Axle
  Front Axle Differential Carrier Repair 23-2
  Front Axle Maintenance Introduction 23-1
  Intermediate and Rear Axle
    Maintenance Introduction 24-1
  Rear Axle Differential Carrier Repair 24-3

B

Bearing(s)
  Camshaft and Bearing Replacement
    /Repair 20-7
  Crankshaft and Main Bearings
    Replacement/Repair 20-5
Block
  Cylinder Block Repair 20-4
Boom Telescopic Cylinder
  M1084/M1086 Boom Telescopic Cylinder
    Repair 26-10
  M1089 Boom Telescopic Cylinder
    Repair 26-11

C

C3/C4 Clutch Module Repair 21-13
C6 Clutch Housing Assembly Repair 21-14
C7 Clutch Housing and Front Output
  Housing Assembly Repair 21-15
Camshaft and Bearing Replacement
  /Repair 20-7
Carrier
  Front Axle Differential Carrier Repair 23-2
  Intermediate Differential Carrier
    Repair 24-2
  Rear Axle Differential Carrier Repair 24-3
Charging Pump
  Front Support/Charging Pump Module
    Repair 21-3
Clutch
  C3/C4 Clutch Module Repair 21-13
  C6 Clutch Housing Assembly Repair 21-14

Subject Para

C (Cont)

Clutch (Cont)
C7 Clutch Housing and Front Output
  Housing Assembly Repair 21-15
Rotating Clutch Module Repair 21-4
Connecting Rod
  Piston and Connecting Rod Assembly
    Replacement/Repair 20-6
Converter Housing Module Repair 21-5
Crankshaft and Main Bearings
  Replacement/Repair 20-5
Cylinder
  Block Repair 20-4
  Head Repair 20-3
  M1084/M1086 Boom Telescopic Cylinder
    Repair 26-10
  M1084/M1086 Erection Cylinder
    Repair 26-8
  M1084/M1086 Jack Cylinder Repair 26-12
  M1089 Boom Telescopic Cylinder
    Repair 26-11
  M1089 Erection Cylinder Repair 26-9
  M1089 Fold Cylinder Repair 26-9
  M1089 Lift Cylinder Repair 25-2
  M1089 Outrigger Extension Cylinder
    Repair 26-13
  M1089 Stiffleg Cylinder Repair 25-6
  M1089 Stinger Cylinder Repair 25-3

D

Differential
  Front Axle Differential Carrier Repair 23-2
  Intermediate Differential Carrier
    Repair 24-2
  Rear Axle Differential Carrier Repair 24-3
Digitization Kit Initial Installation 18-7
Drawbars
  Frame, Towing Attachment, and
    Drawbars Maintenance Introduction 25-1
Dump Body
  M1090/M1094 Dump Body Lift
    Cylinder Repair 27-2

E

Engine
  Maintenance Introduction 20-1
  to Maintenance Stand Mounting 20-2

SUBJECT INDEX (CONT)

Subject Para

E (Cont)

Erection Cylinder
M1084/M1086 Erection Cylinder Repair 26-8
M1089 Erection Cylinder Repair 26-9
Extension Kit
M1083 Pintle Hook Extension Kit Initial Installation 18-2
M1084/M1086 Pintle Hook Extension Kit Initial Installation 18-4
M1085 Pintle Hook Extension Kit Initial Installation 18-5
M1090/M1094 Pintle Hook Extension Kit Initial Installation 18-3

F

Final Drive
Power Transfer and Final Drive Assembly Maintenance Introduction 22-1
Fire
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Fold Cylinder
M1089 Fold Cylinder Repair 26-9
Frame, Towing Attachment, and Drawbars Maintenance Introduction 25-1
Front
Axle Differential Carrier Repair 23-2
Axle Maintenance Introduction 23-1
C7 Clutch Housing and Front Output Housing Assembly Repair 21-15
Gear Housing and Idler Gear Replacement 20-8
Support/Charging Pump Module Repair 21-3

G

Gear
Front Gear Housing and Idler Gear Replacement 20-8

H

Head
Cylinder Head Repair 20-3

Subject Para

H (Cont)

Hoist
M1084/M1086/M1089 Hoist Hydraulic Motor Repair 26-5
Hook
M1083 Pintle Hook Extension Kit Initial Installation 18-2
M1084/M1086 Pintle Hook Extension Kit Initial Installation 18-4
M1085 Pintle Hook Extension Kit Initial Installation 18-5
M1090/M1094 Pintle Hook Extension Kit Initial Installation 18-3
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
Front Gear Housing and Idler Gear Replacement 20-8
Rear Output Housing Repair 21-11
Transfer Case Housing Repair 22-4
Hydraulic
Maintenance Introduction 27-1
M1084/M1086 Swing Drive Hydraulic Motor Repair 26-3
M1084/M1086/M1089 Hoist Hydraulic Motor Repair 26-5
M1089 Three Stage Hydraulic Pump Repair 26-2

I

Idler Gear
Front Gear Housing and Idler Gear Replacement 20-8
Initial Machine Gun Ring Kit Installation/ Removal 19-2
Intermediate and Rear Axle Maintenance Introduction 24-1
Differential Repair 24-2
Introduction
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Engine Maintenance Introduction 20-1
Frame, Towing Attachment, and Drawbars Maintenance Introduction 25-1

Subject Para

I (Cont)

Introduction (Cont)
- Front Axle Maintenance Introduction 23-1
- Hydraulic Maintenance Introduction 27-1
- Intermediate and Rear Axle Maintenance Introduction 24-1
- Power Transfer and Final Drive Assembly Maintenance Introduction 22-1
- Special Purpose Kits Maintenance Introduction 18-1
- Transmission Maintenance Introduction 21-1

J

Jack Cylinder Repair 26-12

K

Kit(s)
- M1083 Pintle Hook Extension Kit Initial Installation 18-2
- M1084/M1086 Pintle Hook Extension Kit Initial Installation 18-4
- M1085 Pintle Hook Extension Kit Initial Installation 18-5
- M1090/M1094 Pintle Hook Extension Kit Initial Installation 18-3
- Special Purpose Kits Maintenance Introduction 18-1

L

Lift Cylinder
- M1084/M1086 Lift Cylinder Repair 26-7
- M1089 Lift Cylinder Repair 25-2
- M1090/M1094 Dump Body Lift Cylinder Repair 27-2

M

M1083 Pintle Hook Extension Kit Initial Installation 18-2

M1084
- /M1086 Boom Telescopic Cylinder Repair 26-10
- /M1086 Erection Cylinder Repair 26-8
- /M1086 Lift Cylinder Repair 26-7
- /M1086 Pintle Hook Extension Kit Initial Installation 18-4

Subject Para

M (Cont)

M1084 (Cont)
- /M1086 Swing Drive Hydraulic Motor Repair 26-3
- /M1086/M1089 Hoist Hydraulic Motor Repair 26-5
- /M1086/M1089 Oil Filled Disc Brake Assembly Repair 26-6

M1085 Pintle Hook Extension Kit
- Initial Installation 18-5

M1086
- M1084/M1086 Boom Telescopic Cylinder Repair 26-10
- M1084/M1086 Erection Cylinder Repair 26-8
- M1084/M1086 Lift Cylinder Repair 26-7
- M1084/M1086 Pintle Hook Extension Kit Initial Installation 18-4
- M1084/M1086 Swing Drive Hydraulic Motor Repair 26-3
- M1084/M1086/M1089 Hoist Hydraulic Motor Repair 26-5
- M1084/M1086/M1089 Oil Filled Disc Brake Assembly Repair 26-6

M1089
- Boom Telescopic Cylinder Repair 26-11
- Erection Cylinder Repair 26-9
- Fold Cylinder Repair 25-4
- Lift Cylinder Repair 25-2
- M1084/M1086/M1089 Oil Filled Disc Brake Assembly Repair 26-6
- Outrigger Extension Cylinder Repair 26-13
- Stiffleg Cylinder Repair 25-6
- Stinger Cylinder Repair 25-3
- Swing Drive Hydraulic Motor Repair 26-4
- Telescopic Lift Cylinder Repair 25-5
- Three Stage Hydraulic Pump Repair 26-2

M1090
- /M1094 Dump Body Lift Cylinder Repair 27-2
- Pintle Hook Extension Kit Initial Installation 18-3

M1094
- M1090/M1094 Dump Body Lift Cylinder Repair 27-2

Main
- Crankshaft and Main Bearings Replacement/Repair 20-5
- Shaft Module Repair 21-8

Maintenance
- Armament/Sighting and Fire Control Material Maintenance Introduction 19-1

SUBJECT INDEX (CONT)

Subject Para

M (Cont)

Maintenance (Cont)
Engine Maintenance Introduction 20-1
Frame Towing Attachment, and Drawbars Maintenance Introduction 25-1
Front Axle Maintenance Introduction 23-1
Hydraulic Maintenance Introduction 27-1
Intermediate and Rear Axle Maintenance Introduction 24-1
Material Handling Crane (MHC) and Underlift Maintenance 26-1
Power Transfer and Final Drive Assembly Maintenance Introduction 22-1
Transmission Maintenance Introduction 21-1
Maintenance Stand
Engine to Maintenance Stand Mounting 20-2
Material
Armament/Sighting and Fire Control Material Maintenance Introduction 19-1
Material Handling Cranes (MHC) and Underlift Maintenance 26-1
Module
Adapter Housing Module Repair 21-6
C3/C4 Clutch Module Repair 21-13
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 Replacement 21-4
Special Purpose Kits Maintenance Introduction 18-1
Transfer Case Module Repair 22-3
Transfer Case Module Replacement 22-2

O

Oil
M1084/M1086/M1089 Oil Filled Disc Brake Assembly Repair 26-6
Outrigger
M1089 Outrigger Extension Cylinder Repair 26-13

Subject Para

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
Pintle
M1083 Pintle Hook Extension Kit Initial Installation 18-2
M1084/M1086 Pintle Hook Extension Kit Initial Installation 18-2
M1085 Pintle Hook Extension Kit Initial Installation 18-5
M1090/M1094 Pintle Hook Extension Kit Initial Installation 18-2
Piston and Connecting Rod Assembly Replacement/Repair 20-6
Planetary Carrier
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
Power Transfer and Final Drive Assembly Maintenance Introduction 22-1
Pump
Front Support/Charging Pump Module Repair 21-3
M1089 Three Stage Hydraulic Pump Repair 26-2

R

Rear
Axle Differential Carrier Repair 24-3
Output Housing Repair 21-11
Rotating Clutch Module Repair 21-4

S

Special Purpose Kits Maintenance Introduction 18-1
Stiffleg
M1089 Stiffleg Cylinder Repair 25-6
Stinger
M1089 Stinger Cylinder Repair 25-3
Support
Front Support/Charging Pump Module Repair 21-3

SUBJECT INDEX (CONT)

Subject Para

S (Cont)

Swing Drive
  M1084/M1086 Swing Drive Hydraulic
    Motor Repair 26-3
  M1089 Swing Drive Hydraulic
    Motor Repair 26-4

T

Telescopic Cylinder
  M1089 Boom Telescopic Cylinder
    Repair 26-11
Telescopic Lift Cylinder
  M1089 Telescopic Lift Cylinder Repair 25-5
Three Stage
  M1089 Three Stage Hydraulic Pump
    Repair 26-2
Transfer Case
  Housing Repair 22-4
  Module Repair 22-3
Transmission
  Maintenance Introduction 21-1
  Repair 21-2

U

Underlift
  Material Handling Cranes (MHC) and
    Underlift Maintenance 26-1

GLOSSARY
ABBREVIATIONS

CTIS	Central Tire Inflation System
ECU	Electronic Control Unit
LH	Left Hand
LMHC	Light Material Handling Crane
MHC	Material Handling Crane
O/R	Outrigger
PTO	Power Takeoff
RH	Right Hand
SRW	15K 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 Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
05124

DISTRIBUTION: To be distributed in accordance with the Initial Distribution Number (IDN) 380942, requirements for TM 9-2320-366-34-4.

☆U.S. GOVERNMENT PRINTING OFFICE:1998-746-025/80073

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 9-2320-366-34-4	15 September 1998	M1083 Series Medium Tactical Vehicle (MTV)

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 9-2320-366-34-4	15 September 1998	M1083 Series Medium Tactical Vehicle (MTV)

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 9-2320-366-34-4	15 September 1998	M1083 Series Medium Tactical Vehicle (MTV)

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 9-2320-366-34-4	15 September 1998	M1083 Series Medium Tactical Vehicle (MTV)

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

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 9-2320-366-34-4	15 September 1998	M1083 Series Medium Tactical Vehicle (MTV)

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 9-2320-366-34-4	15 September 1998	M1083 Series Medium Tactical Vehicle (MTV)

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

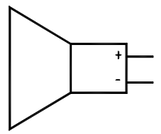
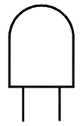
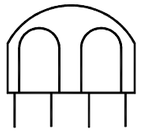
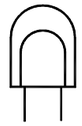
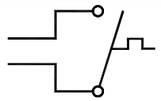
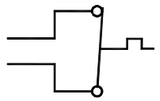
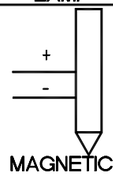
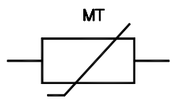
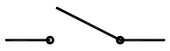
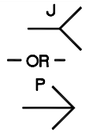
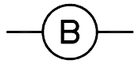
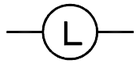
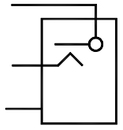
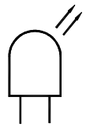
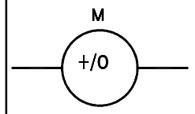
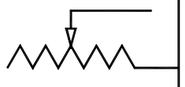
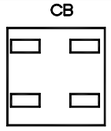
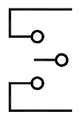
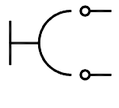
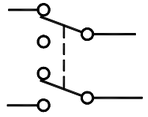
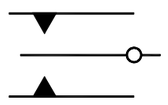
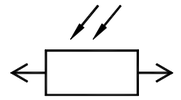
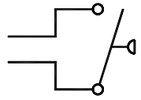
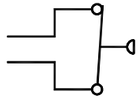
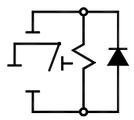
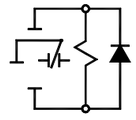
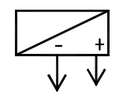
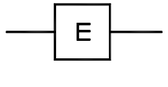
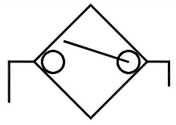
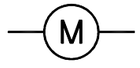
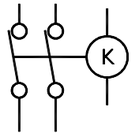
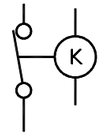
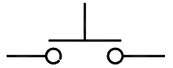
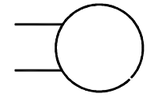
 HORN	 BLACKOUT LAMP	 LAMP	 DUALBEAM LAMP	 GROUND	 POWER LAMP	 OPEN CONTACT	 BATTERY
 TEMPERATURE SWITCH OPEN	 TEMPERATURE SWITCH CLOSED	 MAGNETIC PICKUP	 SENSOR	 NORMALLY OPEN	 NORMALLY CLOSED	 CONNECTOR	 RECEPTACLE
 MOTOR	 SOLENOID	 LEVEL SENSOR	 FILTER	 LED	 METER OR GAGE	 CLOSED CONTACT	 DIMMER MODULE
 CIRCUIT BREAKER	 TWO WAY SWITCH	 BRIDGE RECTIFIER	 POWER SWITCH BREAKER	 DPDT SWITCH	 DPST SWITCH	 PHOTOCELL	 FUSE
 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	 PUSHBUTTON	 CIRCULATING PUMP

FIGURE FO-1 ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 1 OF 40

SIZE B | ILL. NO. 6WD01IL1B | FP-1/ (FP-2 BLANK)

CONNECTORS			
NUMBER	ZONE	SH	DESCRIPTION
CABLE A	G315	35	OVERLOAD SHUTDOWN SYSTEM
CABLE A	D317	36	WRECKER MATERIAL HANDLING CRANE
CABLE A	F324	36	OVERLOAD SHUTDOWN SYSTEM
CABLE A	D340	38	WRECKER CONTROLS
CABLE B	A307	35	CARGO MATERIAL HANDLING CRANE
CABLE C	G308	35	CARGO MATERIAL HANDLING CRANE
CABLE F	B308	36	INTERNAL REMOTE CONNECTOR
CABLE G	F299	35	CARGO MATERIAL HANDLING CRANE
CABLE G	A324	36	INTERNAL REMOTE CONTROL CONNECTOR
CABLE H	F304	35	CRANE CONTROL PANEL
CABLE H	E313	36	CRANE CONTROL PANEL
CABLE I	G313	35	CRANE CONTROL PANEL
CABLE I	F322	36	CRANE CONTROL PANEL
CABLE J	G313	35	CRANE CONTROL PANEL
CABLE J	F322	36	CRANE CONTROL PANEL
CABLE K	G304	35	CRANE CONTROL PANEL
CABLE K	F322	36	CRANE CONTROL PANEL
CABLE L	D304	35	CRANE CONTROL PANEL
CABLE L	C322	36	CRANE CONTROL PANEL
CABLE M	D313	35	CRANE CONTROL PANEL
CABLE M	C322	36	CRANE CONTROL PANEL
CABLE N	D313	35	CRANE CONTROL PANEL
CABLE N	D322	36	CRANE CONTROL PANEL
CABLE O	C313	35	CRANE CONTROL PANEL
CABLE O	G322	36	CRANE CONTROL PANEL
CABLE P	C313	35	CRANE CONTROL PANEL
CABLE P	C322	36	CRANE CONTROL PANEL
CABLE Q	E313	35	CRANE CONTROL PANEL
CABLE Q	E322	36	CRANE CONTROL PANEL
CABLE R	E313	35	CRANE CONTROL PANEL
CABLE R	D322	36	CRANE CONTROL PANEL
CABLE S	F313	35	CRANE CONTROL PANEL
CABLE S	E322	36	CRANE CONTROL PANEL
CABLE T	F313	35	CRANE CONTROL PANEL
CABLE T	E322	36	CRANE CONTROL PANEL
CABLE U	A314	35	CRANE REMOTE CONNECTOR
CABLE V	E313	35	CRANE CONTROL PANEL
CONN F	C335	38	WRECKER REMOTE
CONN G	C340	38	WRECKER REMOTE
J2	A194	22	EMI FILTER
J3	D241	27	AIRDROP ONLY
J4	E340	38	WRECKER CONTROLS
J5	A47	6	VEHICLE HORN
J6	A47	6	VEHICLE HORN
J7	A197	22	WTEC II TRANSMISSION PUSHBUTTON SHIFT SELECTOR DIMMER MODULE
J8	B47	6	BLACKOUT MARKER RIGHT FRONT
J9	C47	6	FRONT RIGHT TURN SIGNAL
J10	B47	6	PARKING LIGHT FRONT RIGHT
J12	D47	6	RIGHT HEADLIGHT
J13	C47	6	RIGHT HEADLIGHT
J14	C47	6	RIGHT HEADLIGHT
J17	H47	6	BLACKOUT DRIVE LIGHT
J18	D47	6	LEFT HEADLIGHT
J19	E47	6	LEFT HEADLIGHT
J19	C186	21	CAB - DASH - LEFT - UNDERDASH
J20	D47	6	LEFT HEADLIGHT
J22	G47	6	PARKING LIGHT FRONT LEFT
J23	F47	6	FRONT LEFT TURN SIGNAL
J24	H47	6	BLACKOUT MARKER LEFT FRONT
J25	G94	11	WINDSHIELD WASHER ROTARY PUMP (B3)
J27	A52	6	CHASSIS - FRONT
J31	E65	8	ENGINE
J31X	F184	21	CAB - DASH - LEFT - UNDERDASH
J39	G70	8	ENGINE
J43	G51	6	CHASSIS - FRONT
J43X	F51	6	CHASSIS - FRONT
J43X	G184	21	CAB - DASH - LEFT - UNDERDASH
J44	B238	27	ROTARY WARNING LIGHT CONNECTOR
J45	C238	27	ROTARY WARNING LIGHT CONNECTOR
J50	E94	11	CAB MARKER LIGHT FRONT UPPER LEFT
J51	D51	6	CHASSIS - FRONT
J52	E47	6	CHASSIS - FRONT BUMPER

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
J52	B239	27	CHASSIS - FRONT
J53	F236	27	AIRDROP ONLY
J55	C94	11	CAB MARKER LIGHT FRONT UPPER RIGHT
J57	D94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
J59	C94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
J60	D94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
J62	E97	11	ROTARY WARNING LIGHT CONNECTOR
J65	E195	22	ROTARY WARNING LIGHT CONNECTOR
J78	F194	22	CAB RADIO CONNECTOR
J80	A299	34	AIR DRYER CONNECTOR
J80	D87	10	AIR DRYER (EXCEPT DUMP)
J93	B59	7	CHASSIS - SPARE TIRE
J95	E47	6	12V INTERVEHICULAR
J95	B242	27	ENGINE
J99	E196	22	CHEMICAL ALARM CONNECTOR
J106	F59	7	CHEMICAL DETECTOR RECEPTACLE
J108	B258	29	CAB - DASH - CENTER - OPTIONS PANEL
J111	E131	15	CTIS ELECTRONIC CONTROL UNIT
J113	G195	22	CTIS PRESSURE TRANSDUCER
J114	B173	20	CAB - DASH - LEFT - TRANSMISSION HARNESS - WTEC II
J114	C353	40	WTEC III CAB TRANSMISSION HARNESS (TIDI) CONNECTOR
J114	C357	40	WTEC III CAB TRANSMISSION HARNESS (TID2) CONNECTOR
J115	C163	19	CAB - DASH - LEFT - WTEC III TRANSMISSION HARNESS
J115	C346	39	WTEC III TRANSMISSION ECU CONNECTOR
J116	C168	19	CAB - DASH - LEFT - WTEC III TRANSMISSION HARNESS
J116	E346	39	WTEC III TRANSMISSION ECU CONNECTOR
J117	F170	19	CAB - DASH - LEFT - WTEC III TRANSMISSION HARNESS
J117	B343	39	WTEC III DIAGNOSTIC CONNECTOR
J118	D170	19	CAB - DASH - LEFT - WTEC III TRANSMISSION HARNESS
J119	B178	20	CAB - DASH - LEFT - TRANSMISSION HARNESS
J119	C355	40	WTEC III CAB TRANSMISSION HARNESS (TIDI)
J119	C359	40	WTEC III CAB TRANSMISSION HARNESS (TID2)
J129	F94	11	CAB MARKER LIGHT FRONT LOWER LEFT
J130	F94	11	CAB MARKER LIGHT LEFT DOOR
J130	F238	27	12 PIN CONNECTOR
J131	B94	11	CAB MARKER LIGHT RIGHT DOOR
J132	B94	11	CAB MARKER LIGHT FRONT LOWER RIGHT
J172	A300	34	DUMP BODY CONNECTOR
J209	F265	30	ALL MTV W/O PTO
J209	G265	30	DUMP, CARGO LWB, CARGO W/MHC, CARGO LWB W/MHC
J209A	G267	30	TRACTOR W/O WINCH
J209A	C266	30	PTO EQUIPPED
J209B	F267	30	TRANSMISSION AUXILIARY OIL COOLER FAN
J209B	D266	30	PTO EQUIPPED
J210	F258	29	CAB - DASH - CENTER - OPTIONS PANEL
J215	E266	30	PTO EQUIPPED
J912	B133	15	CAB - DASH - CENTER - HEATER/CTIS ECU
J912	D245	28	CAB - DASH - CENTER - OPTIONS PANEL
J912	G264	30	ALL MTV W/O PTO
J912	F265	30	TRACTOR W/O WINCH
J913	B131	15	CAB - DASH - CENTER - HEATER/CTIS ECU
J921	G70	8	TROOP TRANSPORT ALARM
L4	E268	30	WINCH IN SOLENOID
L5	D268	30	WINCH OUT SOLENOID
L7	B301	34	TAILGATE RELEASE CONNECTOR
L8	B301	34	DUMP BED UP CONNECTOR
L9	A301	34	DUMP BED DOWN CONNECTOR
P2	A194	22	EMI FILTER
P3	D240	27	AIRDROP ONLY
P5	A47	6	VEHICLE HORN
P6	A47	6	VEHICLE HORN

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
P8	B47	6	BLACKOUT MARKER RIGHT FRONT
P9	C47	6	FRONT RIGHT TURN SIGNAL
P10	B47	6	PARKING LIGHT FRONT RIGHT
P12	D47	6	RIGHT HEADLIGHT
P13	C47	6	RIGHT HEADLIGHT
P14	C47	6	RIGHT HEADLIGHT
P17	H47	6	BLACKOUT DRIVE LIGHT
P18	D47	6	LEFT HEADLIGHT
P18	A186	21	CAB - DASH - LEFT - UNDERDASH
P19	E47	6	LEFT HEADLIGHT
P20	D47	6	LEFT HEADLIGHT
P22	G47	6	PARKING LIGHT FRONT LEFT
P23	F47	6	FRONT LEFT TURN SIGNAL
P24	H47	6	BLACKOUT MARKER LEFT FRONT
P25	G94	11	WINDSHIELD WASHER ROTARY PUMP (B3)
P25	B300	34	DUMP BED SWITCH CONNECTOR
P27	A52	6	CHASSIS - FRONT
P31	E65	8	ENGINE
P31X	D65	8	ENGINE
P32	F68	8	ENGINE OIL PRESSURE SENSOR
P33	H68	8	FUEL/WATER SEPARATOR
P34	E68	8	OIL PRESSURE WARNING LIGHT SWITCH
P36	A66	8	WATER COOLER TEMPERATURE
P37	C66	8	WATER TEMPERATURE SWITCH
P38	F70	8	ENGINE SPEED MAGNETIC PICKUP
P39	G70	8	ENGINE
P41	B66	8	WATER TEMPERATURE SENSOR
P42	F66	8	ETHER SENSOR SWITCH
P43	G51	6	CHASSIS - FRONT
P43X	F51	6	CHASSIS - FRONT
P50	E94	11	CAB MARKER LIGHT FRONT UPPER LEFT
P50	F242	27	LH FRONT TOP CAB MARKER LIGHT
P51	D199	23	CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL
P51	D208	24	REAR LIGHTS TRACTOR
P51	D217	25	LONG WHEEL BASE
P51	D226	26	CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL
P52F	E47	6	CHASSIS - FRONT
P52M	G208	24	REAR LIGHTS TRACTOR
P52R	E205	23	WRECKER REAR LIGHTS
P52R	G214	24	REAR LIGHTS TRACTOR
P52R	E223	25	LONG WHEEL BASE
P52R	E232	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
P53M	F208	24	REAR LIGHTS TRACTOR
P53R	D205	23	WRECKER REAR LIGHTS
P53R	F214	24	REAR LIGHTS TRACTOR
P53R	D223	25	LONG WHEEL BASE
P53R	D232	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
P54	D206	23	LEFT REAR MARKER
P54	F215	24	LEFT REAR MARKER
P54	D224	25	LEFT REAR MARKER
P54	D233	26	LEFT REAR MARKER
P55	C94	11	CAB MARKER LIGHT FRONT UPPER RIGHT
P55	D242	27	RH FRONT TOP CAB MARKER LIGHT
P56	D206	23	MIDDLE REAR MARKER
P56	E224	25	MIDDLE REAR MARKER
P56	F215	24	MIDDLE REAR MARKER
P56	E233	26	MIDDLE REAR MARKER
P57	D94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
P57	F242	27	LH FRONT TOP CAB CLEARANCE LIGHT
P58	E206	23	RIGHT REAR MARKER
P58	E215	24	RIGHT REAR MARKER
P58	E224	25	RIGHT REAR MARKER
P58	E233	26	RIGHT REAR MARKER
P59	C94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
P59	D242	27	RH FRONT TOP CAB CLEARANCE LIGHT
P60	D94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
P60	E242	27	MIDDLE FRONT TOP CLEARANCE LIGHT
P61	E215	24	RH COMPOSITE LIGHT
P61	F206	23	RH COMPOSITE LIGHT
P61	F224	25	RH COMPOSITE LIGHT
P61	F233	26	RH COMPOSITE LIGHT
P62	D215	24	RH COMPOSITE LIGHT
P62	F206	23	RH COMPOSITE LIGHT
P62	F224	25	RH COMPOSITE LIGHT
P62	F233	26	RH COMPOSITE LIGHT
P62A	B236	27	ROTARY WARNING LIGHT CONNECTOR
P63	F224	25	RH COMPOSITE LIGHT
P63	G206	23	RH COMPOSITE LIGHT
P63	D215	24	RH COMPOSITE LIGHT
P63	G233	26	RH COMPOSITE LIGHT
P64	F206	23	RH COMPOSITE LIGHT
P64	F224	25	RH COMPOSITE LIGHT
P64	D215	24	RH COMPOSITE LIGHT
P64	F233	26	RH COMPOSITE LIGHT
P65	E195	22	ROTARY WARNING LIGHT CONNECTOR
P67	A83	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION EXTERNAL WIRING HARNESS TO TRANSMISSION CONNECTOR
P67	B78	9	TIDI, TID2, AND TID3 TRANSMISSION EXTERNAL WIRING HARNESS TO TRANSMISSION CONNECTOR
P69	D68	8	ENGINE
P71	E75	9	PRE-BLOCK SEVEN TRANSMISSION OUTPUT SPEED SENSOR CONNECTOR
P71	E79	9	TIDI, TID2, AND TID3 TRANSMISSION OUTPUT SPEED SENSOR CONNECTOR
P71	E83	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION OUTPUT SPEED SENSOR CONNECTOR
P72	E83	10	PRE-BLOCK SEVEN W/PIGTAIL TRANSMISSION ENGINE SPEED SENSOR CONNECTOR
P72	F75	9	PRE-BLOCK SEVEN TRANSMISSION ENGINE SPEED SENSOR CONNECTOR
P72	F79	9	TIDI, TID2, AND TID3 TRANSMISSION ENGINE SPEED SENSOR CONNECTOR
P73	F75	9	PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION SENSOR CONNECTOR
P73	F79	9	TIDI, TID2, AND TID3 TRANSMISSION THROTTLE POSITION SENSOR CONNECTOR
P73	F83	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION THROTTLE POSITION SENSOR CONNECTOR
P74	A215	24	LH COMPOSITE LIGHT
P74	B206	23	LH COMPOSITE LIGHT
P74	B224	25	LH COMPOSITE LIGHT
P74	B233	26	LH COMPOSITE LIGHT
P76	B206	23	LH COMPOSITE LIGHT
P76	B215	24	LH COMPOSITE LIGHT
P76	B224	25	LH COMPOSITE LIGHT
P76	B233	26	LH COMPOSITE LIGHT
P77	C206	23	LH COMPOSITE LIGHT
P77	B215	24	LH COMPOSITE LIGHT
P77	C224	25	LH COMPOSITE LIGHT
P77	C233	26	LH COMPOSITE LIGHT
P78	B206	23	LH COMPOSITE LIGHT
P78	B215	24	LH COMPOSITE LIGHT
P78	B224	25	LH COMPOSITE LIGHT
P78	B234	26	LH COMPOSITE LIGHT
P80	G60	7	CHASSIS - REAR
P80	A298	34	AIR DRYER CONNECTOR (DUMP)
P80B	A298	34	AIR DRYER CONNECTOR (DUMP)
P80B	A299	34	AIR DRYER CONNECTOR (DUMP)
P81	C56	7	CHASSIS - FRONT
P81	D71	8	STARTER THERMO SWITCH
P82	B60	7	FUEL TANK LEVEL SENSOR
P83	B181	21	CAB - DASH - LEFT - UNDERDASH
P84	F60	7	CHASSIS - REAR
P85	A206	23	LH SIDE MARKER LIGHT
P85	A224	25	LH SIDE MARKER LIGHT

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
P85	A233	26	LH SIDE MARKER LIGHT
P86	A206	23	LH REAR MARKER LIGHT
P86	A215	24	LH REAR MARKER LIGHT
P86	A224	25	LH REAR MARKER LIGHT
P86	A233	26	LH REAR MARKER LIGHT
P87	C206	23	BACKUP LIGHT
P87	B215	24	BACKUP LIGHT
P87	C224	25	BACKUP LIGHT
P87	C233	26	BACKUP LIGHT
P88	G206	23	RH SIDE MARKER LIGHT
P88	H224	25	RH SIDE MARKER LIGHT
P88	H233	26	RH SIDE MARKER LIGHT
P89	G206	23	RH REAR MARKER LIGHT
P89	C215	24	RH REAR MARKER LIGHT
P89	G224	25	RH REAR MARKER LIGHT
P89	G233	26	RH REAR MARKER LIGHT
P107	B199	23	WRECKER REAR LIGHTS
P108	B258	29	CAB - DASH - CENTER - OPTIONS PANEL
P108	F199	23	WRECKER REAR LIGHTS
P110	E128	15	CTIS ELECTRONIC CONTROL UNIT
P111	E131	15	CTIS ELECTRONIC CONTROL UNIT
P112	G132	15	CAB - DASH - CENTER - HEATER/CTIS ECU
P113	F132	15	CTIS ELECTRONIC CONTROL UNIT
P114	C350	39	WTEC III CAB TRANSMISSION HARNESS (TID2)
P115	C346	39	WTEC III CAB - DASH - RIGHT - KICK PANEL
P116	E346	39	WTEC III CAB - DASH - RIGHT - KICK PANEL
P116	C194	22	CAB - DASH - RIGHT - UNDERDASH WTEC II
P118	D170	19	CAB - DASH - LEFT - TRANSMISSION HARNESS
P119	B178	20	CAB - DASH - LEFT - TRANSMISSION HARNESS
P119	D73	9	PRE-BLOCK SEVEN TRANSMISSION CONNECTOR
P119	D78	9	TIDI, TID2, AND TID3 TRANSMISSION CONNECTOR
P119	D82	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION CONNECTOR
P125	G93	11	WINDSHIELD WASHER ROTARY PUMP (B3)
P129	F94	11	CAB MARKER LIGHT FRONT LOWER LEFT
P130	F94	11	CAB MARKER LIGHT LEFT DOOR
P131	A94	11	CAB MARKER LIGHT RIGHT DOOR
P132	B94	11	CAB MARKER LIGHT FRONT LOWER RIGHT
P133	A199	23	LH WORKLIGHTS
P133	B209	24	LH WORKLIGHTS
P133A	B199	23	LH WORKLIGHTS
P133A	B209	24	LH WORKLIGHTS
P134	G199	23	RH WORKLIGHTS
P134	C209	24	RH WORKLIGHTS
P134A	F199	23	RH WORKLIGHTS
P134A	B209	24	RH WORKLIGHTS
P135	D260	29	CAB - DASH - CENTER - OPTIONS PANEL
P136	C260	29	CAB - DASH - CENTER - OPTIONS PANEL
P171	F308	35	CARGO MATERIAL HANDLING CRANE
P172	A300	34	DUMP BODY CONNECTOR
P201	G70	8	ENGINE
P209A	F268	30	TRANSMISSION AUXILIARY OIL COOLER FAN
P209B	G264	30	DUMP, CARGO LWB, CARGO W/MHC, CARGO LWB W/MHC
P209B	G268	30	TRANSMISSION AUXILIARY OIL COOLER FAN
P210	F258	29	CAB - DASH - CENTER - OPTIONS PANEL
P210	C263	30	PTO EQUIPPED
P215	E266	30	PTO EQUIPPED
P216	E265	30	PTO EQUIPPED
P216	A304	34	PTO PRESSURE SWITCH CONNECTOR
P217	C265	30	PTO EQUIPPED
P217	B304	34	PTO SOLENOID CONNECTOR
P901	A245	28	CAB - DASH - CENTER - OPTIONS PANEL
P902	C250	28	CAB - DASH - CENTER - OPTIONS PANEL
P902A	D250	28	CAB - DASH - CENTER - OPTIONS PANEL
P903	C248	28	CAB - DASH - CENTER - OPTIONS PANEL
P903A	D248	28	CAB - DASH - CENTER - OPTIONS PANEL
P904	C247	28	CAB - DASH - CENTER - OPTIONS PANEL
P904A	D247	28	CAB - DASH - CENTER - OPTIONS PANEL
P905	A247	28	CAB - DASH - CENTER - OPTIONS PANEL

FIGURE FO-1 ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 2 OF 40

SIZE B | ILL. NO. 6WD01L2B | FP-3/ (FP-4 BLANK)

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
P905A	B247	28	CAB - DASH - CENTER - OPTIONS PANEL
P906	A248	28	CAB - DASH - CENTER - OPTIONS PANEL
P906A	B248	28	CAB - DASH - CENTER - OPTIONS PANEL
P908	A251	28	CAB - DASH - CENTER - OPTIONS PANEL
P908A	B251	28	CAB - DASH - CENTER - OPTIONS PANEL
P909	A256	29	CAB - DASH - CENTER - OPTIONS PANEL
P909A	B256	29	CAB - DASH - CENTER - OPTIONS PANEL
P910	B251	28	CAB - DASH - CENTER - OPTIONS PANEL
P910A	D251	28	CAB - DASH - CENTER - OPTIONS PANEL
P911	B256	29	CAB - DASH - CENTER - OPTIONS PANEL
P911A	D256	29	CAB - DASH - CENTER - OPTIONS PANEL
P912	B133	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
P912A	F134	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
P913	B131	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
P913	F245	28	CAB - DASH - CENTER - OPTIONS PANEL
P914	A250	28	CAB - DASH - CENTER - OPTIONS PANEL
P914A	B250	28	CAB - DASH - CENTER - OPTIONS PANEL
P921	G70	8	TROOP TRANSPORT ALARM
P94	A199	23	LH INTERMEDIATE MARKER
P94	A217	25	LH INTERMEDIATE MARKER
P95	G199	23	RH INTERMEDIATE MARKER
P95	G217	25	RH INTERMEDIATE MARKER
P99	F195	22	CHEMICAL ALARM CONNECTOR
PX1	A101	12	ENGINE FAN OFF SWITCH
PX10	D116	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX11	G116	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX12	C121	14	ROTATING WARNING LIGHT SWITCH
PX12A	E121	14	CAB - DASH - LEFT - INSTRUMENT PANEL
PX13	F101	12	ETHER STARTER SWITCH
PX13A	G101	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX14	F121	14	FULL HAZARD WARNING SWITCH
PX14A	H121	14	CAB - DASH - LEFT - INSTRUMENT PANEL
PX15	C124	14	MAIN LIGHT SWITCH
PX17	A121	14	IGNITION SWITCH
PX17A	C112	14	CAB - DASH - LEFT - INSTRUMENT PANEL
PX1A	B101	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX2	D101	12	LAMP TEST SWITCH
PX20	C197	22	TURN SIGNAL FLASHER
PX21	A143	16	WIPER DELAY MODULE
PX22	A193	22	EMI FILTER
PX24	G124	14	INSTRUMENT PANEL LIGHTS DIMMER MODULE
PX25	C128	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
PX26	B188	21	CAB - DASH - LEFT - UNDERDASH
PX2A	E101	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX33	B191	22	CAB - DASH - RIGHT - UNDERDASH
PX33	G346	39	WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR
PX34	E197	22	FRONT AIR PRESSURE METER
PX4	F106	12	FAN SOLENOID
PX5	B106	12	REAR AIR PRESSURE METER
PX50	D197	22	INTER-AXLE DIFFERENTIAL SOLENOID
PX6	B116	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX7	A113	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX8	G111	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX9	D106	12	FUEL LEVEL METER

LIGHTS			
NUMBER	ZONE	SH	DESCRIPTION
DS1	D105	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS2	G115	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS3	F105	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS4	B105	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS5	B115	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS6	G110	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS7	D115	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS8	C100	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS9	B110	13	DUMP BODY UP
DS10	E120	14	CAB - DASH - LEFT - INSTRUMENT PANEL
DS11	G100	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS12	H120	14	CAB - DASH - LEFT - INSTRUMENT PANEL
DS13	C120	14	CAB - DASH - LEFT - INSTRUMENT PANEL
DS14	B110	13	LEFT TURN SIGNAL
DS15	B110	13	RIGHT TURN SIGNAL

LIGHTS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
DS16	E110	13	HIGH BEAM
DS17	D128	15	HEATER CONTROL PANEL ILLUMINATION
DS18	A244	28	CAB - DASH - CENTER - OPTIONS PANEL
DS19	E110	13	RADIATOR FAN OFF
DS21	C110	13	EMERGENCY BRAKE
DS22	D110	13	PARKING BRAKE
DS23	C110	13	PTO ON
DS24	D110	13	OIL PRESSURE
DS25	C110	13	WATER TEMPERATURE
DS27	C110	13	REAR BRAKE AIR
DS28	E110	13	FRONT AIR BRAKE
DS29	D110	13	ENGINE OIL LEVEL
DS30	F110	13	MASTER STOP
DS31	D249	28	CAB - DASH - CENTER - OPTIONS PANEL
DS32	B110	13	CHEMICAL DETECT
DS34	C110	13	CTIS OVERSPEED
DS35	C207	23	WRECKER BLACKOUT STOP LEFT REAR
DS35	B216	24	TRACTOR BLACKOUT STOP LEFT REAR
DS35	C225	25	LONG WHEEL BASE BLACKOUT STOP LEFT REAR
DS35	C234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT STOP LEFT REAR
DS36	G207	23	WRECKER BLACKOUT STOP RIGHT REAR
DS36	D216	24	TRACTOR BLACKOUT STOP RIGHT REAR
DS36	G225	25	LONG WHEEL BASE BLACKOUT STOP RIGHT REAR
DS36	G234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT STOP RIGHT REAR
DS37	B207	23	WRECKER REAR LEFT COMPOSITE
DS37	A216	24	TRACTOR REAR LEFT COMPOSITE
DS37	B225	25	LONG WHEEL BASE REAR LEFT COMPOSITE
DS37	B234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR LEFT COMPOSITE
DS38	F207	23	WRECKER REAR RIGHT COMPOSITE
DS38	E216	24	TRACTOR REAR RIGHT COMPOSITE
DS38	F225	25	LONG WHEEL BASE REAR RIGHT COMPOSITE
DS38	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR RIGHT COMPOSITE
DS39	F46	6	FRONT LEFT TURN SIGNAL
DS41	D110	13	TRANSMISSION OIL TEMPERATURE
DS42	C47	6	FRONT RIGHT TURN SIGNAL
DS43	D248	28	CAB - DASH - CENTER - OPTIONS PANEL
DS44	D46	6	RIGHT HEADLIGHT
DS45	D207	23	WRECKER BACKUP LIGHT
DS45	C216	24	TRACTOR BACKUP LIGHT
DS45	C225	25	LONG WHEEL BASE BACKUP LIGHT
DS45	C234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BACKUP LIGHT
DS46	D246	28	CAB - DASH - CENTER - OPTIONS PANEL
DS47	G46	6	PARKING LIGHT FRONT LEFT
DS48	B47	6	PARKING LIGHT FRONT RIGHT
DS49	G46	6	BLACKOUT MARKER LEFT FRONT
DS50	B47	6	BLACKOUT MARKER RIGHT FRONT
DS51	B207	23	WRECKER BLACKOUT MARKER LEFT REAR
DS51	B216	24	TRACTOR BLACKOUT MARKER LEFT REAR
DS51	B225	25	LONG WHEEL BASE BLACKOUT MARKER LEFT REAR
DS51	C234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND WRECKER BLACKOUT MARKER LEFT REAR
DS52	F207	23	WRECKER BLACKOUT MARKER RIGHT REAR
DS52	D216	24	TRACTOR BLACKOUT MARKER RIGHT REAR
DS52	F225	25	LONG WHEEL BASE BLACKOUT MARKER RIGHT REAR
DS52	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT MARKER RIGHT REAR
DS53	H46	6	BLACKOUT DRIVE LIGHT
DS54	D93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
DS54	F242	27	LH FRONT TOP CAB CLEARANCE LIGHT
DS52	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT MARKER RIGHT REAR

LIGHTS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
DS53	H46	6	BLACKOUT DRIVE LIGHT
DS54	D93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
DS54	F242	27	LH FRONT TOP CAB CLEARANCE LIGHT
DS55	D93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
DS55	E242	27	MIDDLE FRONT TOP CLEARANCE LIGHT
DS56	C93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
DS56	D242	27	RH FRONT TOP CAB CLEARANCE LIGHT
DS57	C93	11	CAB MARKER LIGHT FRONT UPPER RIGHT
DS57	D242	27	RH FRONT TOP CAB MARKER LIGHT
DS58	E93	11	CAB MARKER LIGHT FRONT UPPER LEFT
DS58	F242	27	LH FRONT TOP CAB MARKER LIGHT
DS59	B93	11	CAB MARKER LIGHT RIGHT DOOR
DS60	F93	11	CAB MARKER LIGHT FRONT LOWER LEFT
DS61	A93	11	CAB MARKER LIGHT RIGHT DOOR
DS62	F93	11	CAB MARKER LIGHT LEFT DOOR
DS63	B246	28	CAB - DASH - CENTER - OPTIONS PANEL
DS64	B248	28	CAB - DASH - CENTER - OPTIONS PANEL
DS65	A207	23	WRECKER LH SIDE MARKER LIGHT
DS65	A225	25	LONG WHEEL BASE LH SIDE MARKER LIGHT
DS65	A234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE LH SIDE MARKER LIGHT
DS66	A207	23	WRECKER LH REAR MARKER LIGHT
DS66	A216	24	TRACTOR LH REAR MARKER LIGHT
DS66	A225	25	LONG WHEEL BASE LH REAR MARKER LIGHT
DS66	A234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE LH REAR MARKER LIGHT
DS67	H207	23	WRECKER RH SIDE MARKER LIGHT
DS67	H225	25	LONG WHEEL BASE RH SIDE MARKER LIGHT
DS67	H234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE RH SIDE MARKER LIGHT
DS68	G207	23	WRECKER RH REAR MARKER LIGHT
DS68	C216	24	TRACTOR RH REAR MARKER LIGHT
DS68	G225	25	LONG WHEEL BASE RH REAR MARKER LIGHT
DS68	G234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE RH REAR MARKER LIGHT
DS69	D207	23	WRECKER LEFT REAR MARKER
DS69	G216	24	TRACTOR LEFT REAR MARKER
DS69	D225	25	LONG WHEEL BASE LEFT REAR MARKER
DS69	D234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE LEFT REAR MARKER
DS70	E207	23	WRECKER MIDDLE REAR MARKER
DS70	F216	24	TRACTOR MIDDLE REAR MARKER
DS70	E225	25	LONG WHEEL BASE MIDDLE REAR MARKER
DS70	E234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE MIDDLE REAR MARKER
DS71	E207	23	WRECKER RIGHT REAR MARKER
DS71	E216	24	TRACTOR RIGHT REAR MARKER
DS71	E225	25	LONG WHEEL BASE RIGHT REAR MARKER
DS71	E234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE RIGHT REAR MARKER
DS72	B207	23	WRECKER REAR LEFT COMPOSITE
DS72	B216	24	TRACTOR REAR LEFT COMPOSITE
DS72	B225	25	LONG WHEEL BASE REAR LEFT COMPOSITE
DS72	B234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR LEFT COMPOSITE
DS73	F207	23	WRECKER REAR RIGHT COMPOSITE
DS73	E216	24	TRACTOR REAR RIGHT COMPOSITE
DS73	F225	25	LONG WHEEL BASE REAR RIGHT COMPOSITE
DS73	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR RIGHT COMPOSITE
DS74	D46	6	LEFT HEADLIGHT
DS96	B251	28	CAB - DASH - CENTER - OPTIONS PANEL
DS97	B255	29	CAB - DASH - CENTER - OPTIONS PANEL
DS98	D251	28	CAB - DASH - CENTER - OPTIONS PANEL
DS99	D255	29	CAB - DASH - CENTER - OPTIONS PANEL
DS100	B249	28	CAB - DASH - CENTER - OPTIONS PANEL
DS101	D128	15	HEATER CONTROL PANEL ILLUMINATION
DS108	E100	12	CAB - DASH - LEFT - INSTRUMENT PANEL

CIRCUIT BREAKERS			
NUMBER	ZONE	SH	DESCRIPTION
CB20	C149	17	CAB RADIO
CB21	C158	18	WTEC II VIM STE/ICE

CIRCUIT BREAKERS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
CB22	C158	18	FAN/ETHER
CB23	C156	18	HEATER BLOWER
CB30	C148	17	CHEMICAL ALARM
CB35	D158	18	WTEC II VIM POWER
CB36	C156	18	HORN POWER
CB37	C160	18	WINDSHIELD WIPER/WASHER
CB38	D156	18	ROTATING BEACON
CB39	C155	18	TRAILER BLACKOUT STOP
CB40	C159	18	CTIS COOLER
CB41	C151	17	TRAILER REAR LIGHTS POWER
CB42	C151	17	BLACKOUT MARKER LIGHTS POWER
CB43	C152	17	REAR COMPOSITE LIGHTS / WTEC III ECU
CB44	C152	17	REAR COMPOSITE LIGHTS
CB45	C148	17	FUEL PREHEAT
CB48	C149	17	ARCTIC CAB/ENGINE KILL
CB49	C160	18	PTO POWER
CB50	C155	18	SWINGFIRE PUMP POWER
CB53	D149	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB54	D151	17	BLACKOUT HEADLIGHT
CB61	D162	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB62	D162	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB63	D160	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB64	D160	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB65	D149	17	PARKING LIGHTS
CB66	D152	17	BLACKOUT MARKER POWER
CB67	D148	17	MARKER LIGHTS
CB68	C161	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB70	D155	18	IGNITION/MAIN LIGHT SWITCH
CB71	D158	18	HAZARD/FLASHER WORKLIGHTS
CB72	D148	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB73	D159	18	BACK-UP LIGHT POWER
CB74	D159	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB76	D152	17	BLACKOUT STOP RELAY POWER
CB77	C161	18	ENGINE INSTR POWER
CB78	D156	18	HEADLIGHTS
CB79	C159	18	WTEC II VIM POWER / WTEC III REVERSE WARNING RELAY
CB80	D151	17	TAILLIGHTS

TERMINAL LUGS			
NUMBER	ZONE	SH	DESCRIPTION
TL1	B63	7	POLARITY PROTECTION
TL1	E69	8	ALTERNATOR
TL1	F62	7	200 AMP
TL2	D62	7	200 AMP
TL2	B62	7	POLARITY PROTECTION
TL2	D69	8	ALTERNATOR
TL3	C94	11	CAB MARKER LIGHT FRONT UPPER RIGHT
TL3	D242	27	RH FRONT TOP CAB MARKER LIGHT
TL4	C94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
TL4	D242	27	RH FRONT TOP CAB CLEARANCE LIGHT
TL5	D69	8	ALTERNATOR
TL6	D69	8	ALTERNATOR
TL9	D56	7	24V AUXILIARY STARTER SOLENOID
TL8	D94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
TL8	E242	27	MIDDLE FRONT TOP CLEARANCE LIGHT
TL10	C61	7	CHASSIS - REAR (REF E1)
TL12	C58	7	BATTERIES
TL12	C71	8	STARTER/STARTER SOLENOID
TL14	E97	11	ROTARY WARNING LIGHT CONNECTOR
TL15	A206	23	WRECKER REAR LIGHTS
TL15	A224	25	LONG WHEEL BASE
TL15	A233	26	LH SIDE MARKER LIGHT
TL16	B206	23	WRECKER REAR LIGHTS
TL16	G215	24	REAR LIGHTS TRACTOR
TL16	B224	25	LONG WHEEL BASE
TL16	A233	26	LH REAR MARKER LIGHT

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL17	C233	26	BACKUP LIGHT
TL17	C206	23	WRECKER REAR LIGHTS
TL17	C215	24	REAR LIGHTS TRACTOR
TL17	C224	25	LONG WHEEL BASE
TL18	C206	23	WRECKER REAR LIGHTS
TL18	H215	24	REAR LIGHTS TRACTOR
TL18	C224	25	LONG WHEEL BASE REAR LIGHTS
TL18	C233	26	LONG WHEEL BASE
TL19	H206	23	WRECKER REAR LIGHTS
TL19	H224	25	LONG WHEEL BASE
TL19	H233	26	RH SIDE MARKER LIGHT
TL20	G233	26	RH REAR MARKER LIGHT
TL20	C215	24	TRACTOR REAR LIGHTS
TL20	G224	25	LONG WHEELBASE REAR LIGHTS
TL20	G206	23	WRECKER REAR LIGHTS
TL21	G206	23	WRECKER REAR LIGHTS
TL21	D215	24	REAR LIGHTS TRACTOR
TL21	G224	25	LONG WHEEL BASE
TL21	G233	26	RH COMPOSITE LIGHT
TL22	D94	11	CAB MARKER LIGHTS
TL22	E242	27	LH FRONT TOP CAB CLEARANCE LIGHT
TL23	D56	7	24V AUXILIARY STARTER SOLENOID
TL24	D56	7	24V AUXILIARY STARTER SOLENOID
TL25	C56	7	CHASSIS - FRONT
TL25	C71	8	STARTER/STARTER SOLENOID
TL26	B56	7	CHASSIS - FRONT
TL26	C71	8	STARTER/STARTER SOLENOID
TL27	E94	11	CAB MARKER LIGHTS
TL27	F242	27	LH FRONT TOP CAB MARKER LIGHT
TL28	G66	8	FUEL SOLENOID
TL29	H66	8	FUEL SOLENOID
TL30	D206	23	WRECKER REAR LIGHTS
TL30	E215	24	REAR LIGHTS TRACTOR
TL30	D224	25	LONG WHEEL BASE
TL30	D233	26	LEFT REAR MARKER
TL31	E206	23	WRECKER REAR LIGHTS
TL31	F215	24	REAR LIGHTS TRACTOR
TL31	E224	25	LONG WHEEL BASE
TL31	E233	26	MIDDLE REAR MARKER
TL32	E206	23	WRECKER REAR LIGHTS
TL32	G215	24	REAR LIGHTS TRACTOR
TL32	E224	25	LONG WHEEL BASE
TL32	E233	26	RIGHT REAR MARKER
TL320	E268	30	PTO EQUIPPED
TL320	C277	31	ARCTIC KIT W/PTO EQUIPPED
TL33	E56	7	24V AUXILIARY STARTER SOLENOID
TL35	D70	8	ALTERNATOR
TL36	B62	7	POLARITY PROTECTION
TL36	F63	7	200 AMP
TL37	F63	7	200 AMP
TL37	B63	7	POLARITY PROTECTION
TL38	D59	7	SHUNT
TL39	C61	7	CHASSIS - REAR (REF E1)
TL41	B62	7	POLARITY PROTECTION
TL42	B62	7	POLARITY PROTECTION
TL44	B62	7	POLARITY PROTECTION
TL44	E63	7	200 AMP
TL45	D59	7	SHUNT
TL46	D58	7	SHUNT
TL46	D71	8	STARTER/STARTER SOLENOID
TL47	F63	7	200 AMP
TL47	C63	7	POLARITY PROTECTION
TL48	E61	7	CHASSIS - REAR (REF E2)
TL49A	D61	7	CHASSIS - REAR (REF E1)
TL49A	F61	7	NATO SLAVE RECEPTACLE
TL50	G130	15	CHASSIS GROUND
TL50A	F61	7	NATO SLAVE RECEPTACLE
TL51	E59	7	SHUNT
TL52	E59	7	SHUNT

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 3 OF 40

SIZE B | ILL NO. 6WD01L3B | FP-5/ (FP-6 BLANK)

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL53	B56	7	CHASSIS - FRONT
TL53	B71	8	STARTER/STARTER SOLENOID
TL54	C200	23	WRECKER REAR LIGHTS
TL55	B56	7	CHASSIS - FRONT
TL55	C71	8	STARTER/STARTER SOLENOID
TL56	F145	17	X3 GROUND
TL57	F145	17	CAB GROUND
TL58	D69	8	ALTERNATOR
TL59	C70	8	ALTERNATOR
TL60	C62	7	POLARITY PROTECTION
TL60	D69	8	ALTERNATOR
TL61	C62	7	POLARITY PROTECTION
TL61	E69	8	ALTERNATOR
TL61	F62	7	200 AMP
TL62	C56	7	CHASSIS - FRONT
TL63	C56	7	CHASSIS - FRONT
TL63	B71	8	STARTER/STARTER SOLENOID
TL66	H70	8	ENGINE (REF P201)
TL67	F307	35	CARGO MATERIAL HANDLING CRANE
TL68	D260	29	CAB - DASH - CENTER - OPTIONS PANEL
TL69	E260	29	CAB - DASH - CENTER - OPTIONS PANEL
TL70	B47	6	FRONT RH COMPOSITE LIGHT
TL71	A94	11	CAB MARKER LIGHT RIGHT DOOR
TL72	H47	6	BLACKOUT DRIVE LIGHT
TL73	B95	11	CAB MARKER LIGHTS
TL74	D95	11	CAB MARKER LIGHTS
TL74	E240	27	AIRDROP ONLY
TL75	F96	11	CAB MARKER LIGHTS
TL76	D265	30	PTO EQUIPPED
TL77	B299	34	DUMP BODY
TL78	B298	34	DUMP BODY
TL77	B299	34	DUMP BODY
TL78	B298	34	DUMP BODY
TL79	F47	6	FRONT LH COMPOSITE LIGHT
TL80	E63	7	200 AMP
TL80	C62	7	POLARITY PROTECTION
TL81	C48	6	CHASSIS - GROUND
TL82	F47	6	CHASSIS - GROUND
TL83	B61	7	FUEL TANK LEVEL SENSOR
TL84	B58	7	CHASSIS - SPARE TIRE (REF J93)
TL85	G61	7	CHASSIS - REAR
TL86	C95	11	CAB MARKER LIGHTS
TL86	D240	27	AIRDROP ONLY
TL87	F95	11	CAB MARKER LIGHTS
TL88	A199	23	WRECKER REAR LIGHTS
TL88	A217	25	LONG WHEEL BASE
TL89	G199	23	WRECKER REAR LIGHTS
TL89	G217	25	LONG WHEEL BASE
TL90	H199	23	WRECKER REAR LIGHTS
TL90	H217	25	LONG WHEEL BASE
TL92	H200	23	WRECKER REAR LIGHTS
TL92	C215	24	REAR LIGHTS TRACTOR
TL92	G224	25	LONG WHEEL BASE
TL92	F231	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
TL93	H199	23	WRECKER REAR LIGHTS
TL93	G215	24	REAR LIGHTS TRACTOR
TL93	G230	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
TL93M	G208	24	REAR LIGHTS TRACTOR
TL94	G94	11	WINDSHIELD WASHER ROTARY PUMP (B3)
TL97	B97	11	CHEMICAL ALARM CONNECTOR
TL98	B97	11	CHEMICAL ALARM CONNECTOR
TL99	D61	7	CHASSIS - REAR (REF E2)
TL101	G264	30	ALL MTV W/O PTO
TL101	G267	30	TRACTOR W/O WINCH
TL109	C209	24	REAR LIGHTS TRACTOR
TL110	D70	8	ALTERNATOR
TL111	D266	30	PTO EQUIPPED
TL123	E47	6	CHASSIS - FRONT (REF J19)
TL126	E135	15	CHASSIS - GROUND
TL130	F94	11	CAB MARKER LIGHTS
TL131	A94	11	CAB MARKER LIGHTS

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL133	F94	11	CAB MARKER LIGHTS
TL134	B94	11	CAB MARKER LIGHT FRONT LOWER RIGHT
TL150	F186	21	SENSOR/FRONT AIR PRESSURE TRANSMITTER
TL151	G186	21	SENSOR/REAR AIR PRESSURE TRANSMITTER
TL152	C188	21	STOPLIGHT SWITCH
TL501	G197	22	CAB - DASH - RIGHT - UNDERDASH
TL502	G197	22	CAB - DASH - RIGHT - UNDERDASH
TL153	C188	21	STOPLIGHT SWITCH
TL154	D188	21	STOPLIGHT SWITCH
TL155	D188	21	STOPLIGHT SWITCH
TL156	F186	21	SWITCH/FRONT AIR PRESSURE TRANSMITTER
TL157	G186	21	SWITCH/REAR AIR PRESSURE TRANSMITTER
TL158	E146	17	START INHIBIT PUSHBUTTON
TL159	E145	17	START INHIBIT PUSHBUTTON
TL162	B123	14	STARTER PUSHBUTTON
TL163	B123	14	STARTER PUSHBUTTON
TL164	G71	8	ENGINE (REF J921)
TL165	G71	8	ENGINE (REF J921)
TL166	F62	7	200 AMP
TL167	E62	7	200 AMP
TL168	D63	7	200 AMP
TL169	D62	7	200 AMP
TL171	F62	7	200 AMP
TL172	F62	7	200 AMP
TL173	E63	7	200 AMP
TL174	D62	7	200 AMP
TL190	D344	39	WTEC III PRESSURE SWITCH GROUND
TL201	E134	15	PARKING BRAKE SWITCH
TL202	E133	15	PARKING BRAKE SWITCH

SWITCHES			
NUMBER	ZONE	SH	DESCRIPTION
S3	A186	21	COLUMN SWITCH
S3	C186	21	COLUMN SWITCH
S4	D123	14	MAIN LIGHT SWITCH
S5/1	B120	14	IGNITION SWITCH
S5/11	A100	12	ENGINE FAN OFF SWITCH
S5/14	C249	28	WINCH ON OFF
S5/15	B248	28	WINCH IN-OUT
S5/16	F100	12	ETHER STARTER SWITCH
S5/2	D100	12	LAMP TEST SWITCH
S5/2	D120	14	ROTATING WARNING LIGHT SWITCH
S5/22	G120	14	FULL HAZARD WARNING SWITCH
S5/25	A255	29	SWINGFIRE PUMP SWITCH
S5/37	C255	29	DUMP UP DOWN SWITCH
S5/5	A247	28	WORKLIGHTS ON/OFF SWITCH
S5/6	B246	28	PTO ON/OFF SWITCH
S5/8	A249	28	BLACKOUT OVERRIDE SWITCH
S5/9	A250	28	FUEL PRE-HEAT SWITCH
S6	A123	14	STARTER PUSHBUTTON
S7	F146	17	START INHIBIT PUSHBUTTON
S10A	C188	21	STOPLIGHT SWITCH
S10B	D188	21	STOPLIGHT SWITCH
S18	D305	34	PTO PRESSURE SWITCH
S20	E186	21	SWITCH/FRONT AIR PRESSURE TRANSMITTER
S23	F61	7	AIR PRESSURE SWITCH FOR CTIS
S24	E134	15	PARKING BRAKE SWITCH
S25	B299	34	DUMP BED POSITION SWITCH
S26	C66	8	WATER TEMPERATURE SENSOR
S27	E68	8	OIL PRESSURE WARNING LIGHT SWITCH
S29	G186	21	SWITCH/REAR AIR PRESSURE TRANSMITTER
S31	A252	28	ARCTIC TROOP HEATER SWITCH
S36	C251	28	TAILGATE RELEASE SWITCH
S40	F67	8	ETHER SENSOR SWITCH
S45	G71	8	TROOP ALARM SWITCH
S56	A66	8	WATER TEMPERATURE SWITCH

GAGES			
NUMBER	ZONE	SH	DESCRIPTION
M2	D115	13	VOLTMETER
M3	B115	13	ENGINE OIL PRESSURE METER
M4	F105	12	FRONT AIR PRESSURE METER
M5	B105	12	REAR AIR PRESSURE METER

GAGES (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
M6	G116	13	WATER TEMPERATURE METER
M7	D105	12	FUEL LEVEL METER
M8	G111	13	SPEEDOMETER
M9	A246	28	TACHOMETER

RELAYS			
NUMBER	ZONE	SH	DESCRIPTION
K1	F158	18	STARTER RELAY
K2	B152	17	CONTROL PANEL RELAY
K6	F153	17	STOPLIGHT RELAY
K7	G162	18	HEADLIGHT RELAY
K8	G160	18	HEADLIGHT LO/HI-BEAM RELAY
K9	A151	17	HAZARD FLASHER BO OVERIDE
K10	F159	18	STARTER RELAY
K11	F155	18	ALTERNATOR EXCITATION RELAY
K12	B148	17	WORKLIGHT RELAY
K13	B158	18	ROTATING BEACON BO OVRD RELAY
K15	B149	17	AUXILIARY COOLER RELAY
K19	B159	18	START INHIBIT RELAY
K20	H147	17	MARKER LIGHTS RELAY
K24	B160	18	CRANKING LOCKOUT RELAY
K25	B346	39	WTEC III REVERSE WARNING RELAY
K26	B344	39	WTEC III NEUTRAL START RELAY
K27	H152	17	BO STOP RELAY
K28	H151	17	TRAILER REAR LIGHTS RELAY
K29	F151	17	BO MARKER RELAY / WTEC III BLACKOUT DRIVE RELAY
K30	H156	18	REAR LEFT COMPOSITE LAMP RELAY
K31	H158	18	REAR RIGHT COMPOSITE LAMP RELAY
K32	B156	18	HORN RELAY
K37	B348	39	WTEC III PTO ENABLE OUTPUT RELAY
K52	H148	17	CTIS OVERSPEED INDICATION RELAY
K53	H149	17	RADIO POWER RELAY

RESISTORS			
NUMBER	ZONE	SH	DESCRIPTION
R1	D88	10	AIR DRYER
R2	E181	21	CAB - DASH - LEFT - UNDERDASH
R4	D184	21	CAB - DASH - LEFT - UNDERDASH
R5	C184	21	CAB - DASH - LEFT - UNDERDASH
R6	F181	21	CAB - DASH - LEFT - UNDERDASH

SOLENOIDS			
NUMBER	ZONE	SH	DESCRIPTION
KS	D56	7	24V AUXILIARY STARTER SOLENOID
L1	E198	22	FAN SOLENOID
L1	H337	38	RIGHT WINCH OUT
L2	H76	8	FUEL SOLENOID
L2	H337	38	RIGHT WINCH IN
L3	B305	34	PTO SOLENOID
L4	E269	30	WINCH IN SOLENOID
L5	D269	30	WINCH OUT SOLENOID
L5	H340	38	LEFT WINCH IN
L6	D198	22	INTER-AXLE DIFFERENTIAL SOLENOID
L6	H339	38	LEFT WINCH OUT
L7	B302	34	TAILGATE RELEASE SOLENOID
L8	B302	34	DUMP BED UP SOLENOID
L9	A302	34	DUMP BED SOLENOID
L11	H338	38	UNDERLIFT DOWN
L13	H339	38	STINGER OUT
L14	H338	38	UNDERLIFT UP
L15	B60	7	CHASSIS - SPARE TIRE
L15	H337	38	UNDERLIFT FOLD DOWN
L16	H339	38	STINGER IN
L18	H338	38	UNDERLIFT FOLD UP

HORNS AND ALARMS			
NUMBER	ZONE	SH	DESCRIPTION
LS1	A46	6	VEHICLE HORN
LS2	H110	13	AUDIBLE ALARM

MOTORS			
NUMBER	ZONE	SH	DESCRIPTION
B2	A192	22	WINDSHIELD WIPER MOTOR
B4	C127	15	FAN MOTOR
B6	F268	30	TRANSMISSION AUXILIARY OIL COOLER FAN
B6A	G268	30	TRANSMISSION AUXILIARY OIL COOLER FAN

BATTERIES			
NUMBER	ZONE	SH	DESCRIPTION
BT1	C61	7	BATTERY
BT2	D61	7	BATTERY
BT3	D61	7	BATTERY
BT4	E61	7	BATTERY

MISCELLANEOUS			
NUMBER	ZONE	SH	DESCRIPTION
10A	C192	22	WTEC II VEHICLE INTERFACE MODULE
10A	E192	22	WTEC II VEHICLE INTERFACE MODULE
A2	F127	15	CTIS ELECTRONIC CONTROL UNIT
A3	G123	14	INSTRUMENT PANEL LIGHTS DIMMER MODULE
A5	A143	16	WIPER DELAY MODULE
A7	B188	21	FREQUENCY DIVIDER
A18	A112	13	LIGHTED INDICATOR DISPLAY
A20	H68	8	FUEL/WATER SEPARATOR
B1	C72	8	STARTER/STARTER SOLENOID
B10	E76	9	WTEC II TRANSFER CASE (SERIAL # 6510032369)
B10	E81	9	WTEC II TRANSFER CASE (SERIAL # 651032369 AND HIGHER)
B10	E75	9	WTEC II TRANSMISSION (SERIAL # 6510032369)
B10	E79	9	WTEC II TRANSMISSION (SERIAL # 6510032369 AND HIGHER)
B10	E85	10	TRANSFER CASE PRIOR (SERIAL # 6510032369 WITH ADAPTER CABLE ASSEMBLY)
B10	E83	10	TRANSMISSION PRIOR TO (SERIAL # 6510032369 WITH ADAPTER CABLE ASSEMBLY)
B3	G92	11	WINDSHIELD WASHER ROTARY PUMP
BJ1	A184	21	JUNCTION BOX
D1A	C147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D1B	C147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D2A	D147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D2B	D147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D3A	B147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D3B	A147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D7	B307	35	DIODE ASSEMBLY
D7	B318	36	DIODE ASSEMBLY
D8	C307	35	DIODE ASSEMBLY
D8	A318	36	DIODE ASSEMBLY
E1	C61	7	BATTERY
E1	D61	7	BATTERY
E1	D61	7	BATTERY
E1	E61	7	BATTERY
E2	C4	6	CHASSIS - FRONT BUMPER (REF J27)
E2	C52	7	BATTERY
E2	D52	7	BATTERY
E2	E52	7	BATTERY
E2	E52	7	BATTERY
E3	H157	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E4	H159	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E5	B160	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E14	E221	25	LONG WHEEL BASE
E14	E230	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E15	E224	25	LONG WHEEL BASE
E15	E233	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E16	A224	25	LONG WHEEL BASE
E16	A233	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E17	G222	25	LONG WHEEL BASE

MISCELLANEOUS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
E17	G222	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E18	G212	25	LONG WHEEL BASE
E18	G221	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E19	F212	25	LONG WHEEL BASE
E19	F221	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E20	E213	25	LONG WHEEL BASE
E20	E221	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E21	D213	25	LONG WHEEL BASE
E21	D222	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E22	B86	11	CAB MARKER LIGHTS
E27	F213	24	REAR LIGHTS TRACTOR
E28	G215	24	REAR LIGHTS TRACTOR
E29	E209	24	REAR LIGHTS TRACTOR
E30	D214	24	REAR LIGHTS TRACTOR
E31	D213	24	REAR LIGHTS TRACTOR
E32	G212	24	REAR LIGHTS TRACTOR
E33	C209	24	REAR LIGHTS TRACTOR
E34	B210	24	REAR LIGHTS TRACTOR
E35	F209	24	REAR LIGHTS TRACTOR
E36	E210	24	REAR LIGHTS TRACTOR
E37	E211	24	REAR LIGHTS TRACTOR
E38	F209	24	REAR LIGHTS TRACTOR
E39	E210	24	REAR LIGHTS TRACTOR
E40	F210	24	REAR LIGHTS TRACTOR
E41	D211	24	REAR LIGHTS TRACTOR
E42	D210	24	REAR LIGHTS TRACTOR
E43	D210	24	REAR LIGHTS TRACTOR
E44	H213	24	REAR LIGHTS TRACTOR
E45	G209	24	REAR LIGHTS TRACTOR
E46	G203	23	WRECKER REAR LIGHTS
E47	F203	23	WRECKER REAR LIGHTS
E48	E204	23	WRECKER REAR LIGHTS
E49	D203	23	WRECKER REAR LIGHTS
E50	E206	23	WRECKER REAR LIGHTS
E51	A206	23	WRECKER REAR LIGHTS
E52	G204	23	WRECKER REAR LIGHTS
E53	D200	23	WRECKER REAR LIGHTS
E54	B200	23	WRECKER REAR LIGHTS
E55	F200	23	WRECKER REAR LIGHTS
E56	E211	24	REAR LIGHTS TRACTOR
E57	E203	23	WRECKER REAR LIGHTS
E58	D204	23	WRECKER REAR LIGHTS
E59	G204	23	WRECKER REAR LIGHTS
E64	D221	25	LONG WHEEL BASE
E65	B50	6	CHASSIS - FRONT
E66	C50	6	CHASSIS - FRONT
E66	D354	40	WTEC III CAB TRANSMISSION HARNESS (TID1)
E66	D358	40	WTEC III CAB TRANSMISSION HARNESS (TID2)
E67	D47	6	CHASSIS - FRONT
E68	D49	6	CHASSIS - FRONT
E69	D260	29	CAB - DASH - CENTER - OPTIONS PANEL
E70	C265	30	PTO EQUIPPED
E70	F266	30	TRACTOR W/O WINCH
E71	F182	21	CAB - DASH - LEFT - UNDERDASH
E72	G222	25	LONG WHEEL BASE
E74	G266	30	TRACTOR W/O WINCH
E78	A290	34	DUMP BODY
E79	B227	27	ROTARY WARNING LIGHT CONNECTOR
E80	C227	27	ROTARY WARNING LIGHT CONNECTOR
E81	B228	27	ROTARY WARNING LIGHT CONNECTOR
E82	C228	27	ROTARY WARNING LIGHT CONNECTOR
E83	B228	27	ROTARY WARNING LIGHT CONNECTOR
E84	B228	27	ROTARY WARNING LIGHT CONNECTOR
E88	B106	13	CAB - DASH - LEFT - INSTRUMENT PANEL

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 4 OF 40

SIZE B | ILL. NO. 6WD01L4B | FP-7/ (FP-8 BLANK)

MISCELLANEOUS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
E89	C115	13	CAB - DASH - LEFT - INSTRUMENT PANEL
E90	E354	40	WTEC III CAB TRANSMISSION HARNESS (TID1)
E90	E358	40	WTEC III CAB TRANSMISSION HARNESS (TID2)
E91	C354	40	WTEC III CAB TRANSMISSION HARNESS (TID1)
E91	C358	40	WTEC III CAB TRANSMISSION HARNESS (TID2)
FL	E183	22	WTEC II VEHICLE INTERFACE MODULE
FL1	G85	11	EMI FILTER
FL2	A184	22	EMI FILTER
FL3	C118	15	FAN MOTOR
G1	D70	8	ALTERNATOR
MPU1	F61	8	ENGINE SPEED MAGNETIC PICKUP
MT3	G69	8	ENGINE OIL PRESSURE SENSOR
MT4	E177	21	SENSOR/FRONT AIR PRESSURE TRANSMITTER
MT5	G186	21	SENSOR/REAR AIR PRESSURE TRANSMITTER
MT6	B66	8	WATER COOLER TEMPERATURE
MT7	B61	7	FUEL TANK LEVEL SENSOR
NS	E192	22	WTEC II VEHICLE INTERFACE MODULE
NS	F192	22	WTEC II VEHICLE INTERFACE MODULE
R11	D59	7	SHUNT
TB	C309	35	CARGO MATERIAL HANDLING CRANE
TB	F309	35	CARGO MATERIAL HANDLING CRANE
TB	D319	36	WRECKER MATERIAL HANDLING CRANE
TB	E247	38	WRECKER CONTROLS
TB1	C137	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL
TB2	F139	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL
X1	C146	17	24 VDC
X11	F61	7	NATO SLAVE RECEPTACLE
X2	D146	17	24 VDC
X3	F146	17	GROUND

TRANSMISSION			
NUMBER	ZONE	SH	DESCRIPTION
A10	B192	22	WTEC II VEHICLE INTERFACE MODULE
A11	C347	39	WTEC III TRANSMISSION ECU
A12	G347	39	WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR
A13	A75	9	PRE-BLOCK SEVEN TRANSMISSIONS
A13	A78	9	TID1, TID2 AND TID3 TRANSMISSIONS
A13	A82	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSIONS
B10	E76	9	PRE-BLOCK SEVEN TRANSMISSION OUTPUT SPEED SENSOR
B10	E85	10	PRE-BLOCK SEVEN TRANSMISSION WITH PIGTAIL OUTPUT SPEED SENSOR
B10	E80	9	TID1, TID2, AND TID3 TRANSMISSION OUTPUT SPEED SENSOR
MT9	F76	9	PRE-BLOCK SEVEN TRANSMISSION ENGINE SPEED SENSOR
MT9	F85	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION ENGINE SPEED SENSOR
MT9	F80	9	TID1, TID2, AND TID3 TRANSMISSION ENGINE SPEED SENSOR
MT11	G76	9	PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION SENSOR
MT11	F85	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION THROTTLE POSITION SENSOR
MT11	F80	9	TID1, TID2, AND TID3 TRANSMISSION THROTTLE POSITION SENSOR
REV	C192	22	WTEC II VEHICLE INTERFACE MODULE
RW	D192	22	WTEC II VEHICLE INTERFACE MODULE
S02	F192	22	WTEC II VEHICLE INTERFACE MODULE
S03	F192	22	WTEC II VEHICLE INTERFACE MODULE
SF01	D192	22	WTEC II VEHICLE INTERFACE MODULE
SF01	D192	22	WTEC II VEHICLE INTERFACE MODULE
SF02	C192	22	WTEC II VEHICLE INTERFACE MODULE
SF02	D192	22	WTEC II VEHICLE INTERFACE MODULE
SF3	F192	22	WTEC II VEHICLE INTERFACE MODULE
SF04	C192	22	WTEC II VEHICLE INTERFACE MODULE
SF4	D192	22	WTEC II VEHICLE INTERFACE MODULE

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 5 OF 40

SIZE B | ILL. NO. 6WD01IL5B | FP-9/ (FP-10 BLANK)

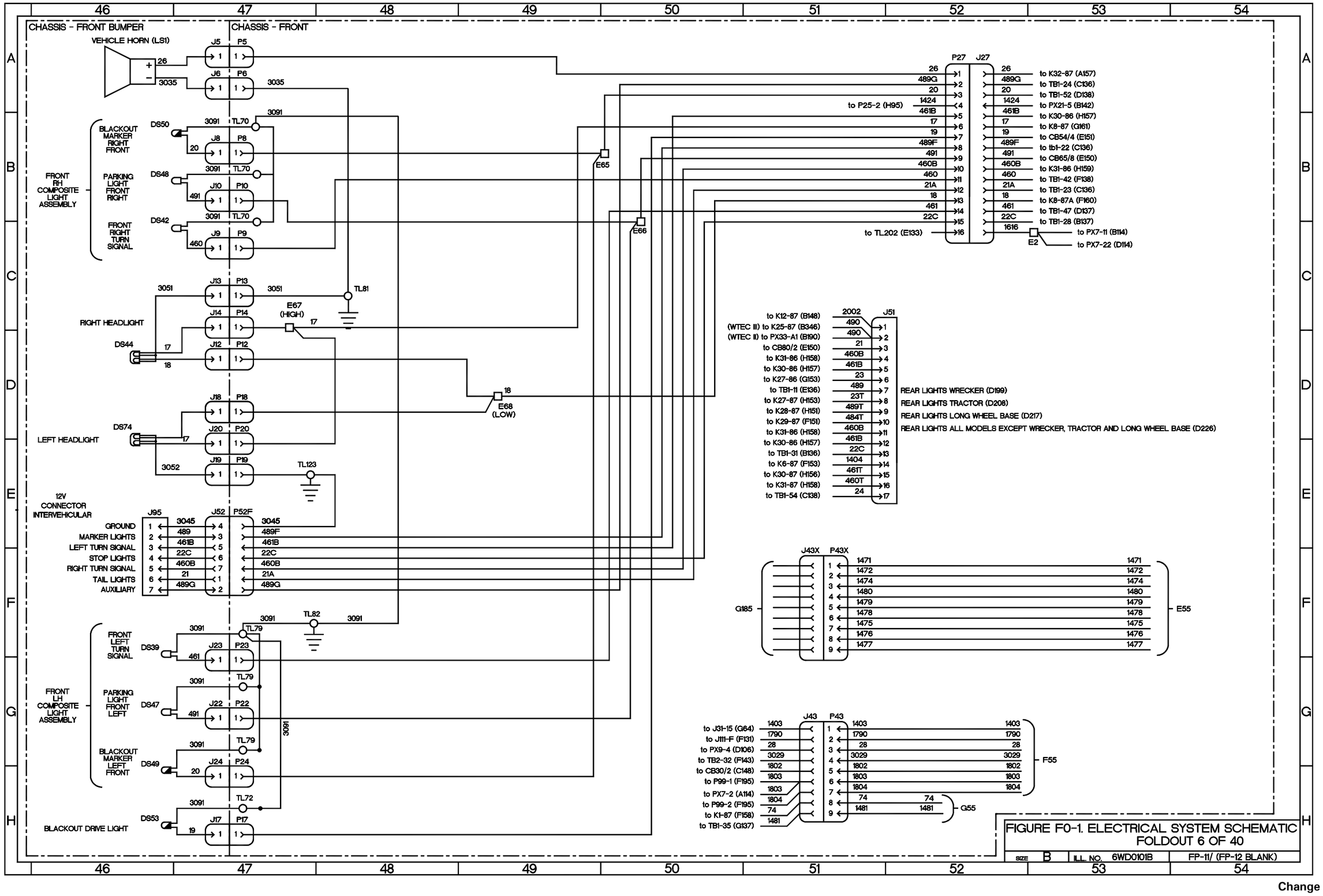


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 6 OF 40

SIZE	ILL. NO.	
B	6WD0101B	FP-11/ (FP-12 BLANK)

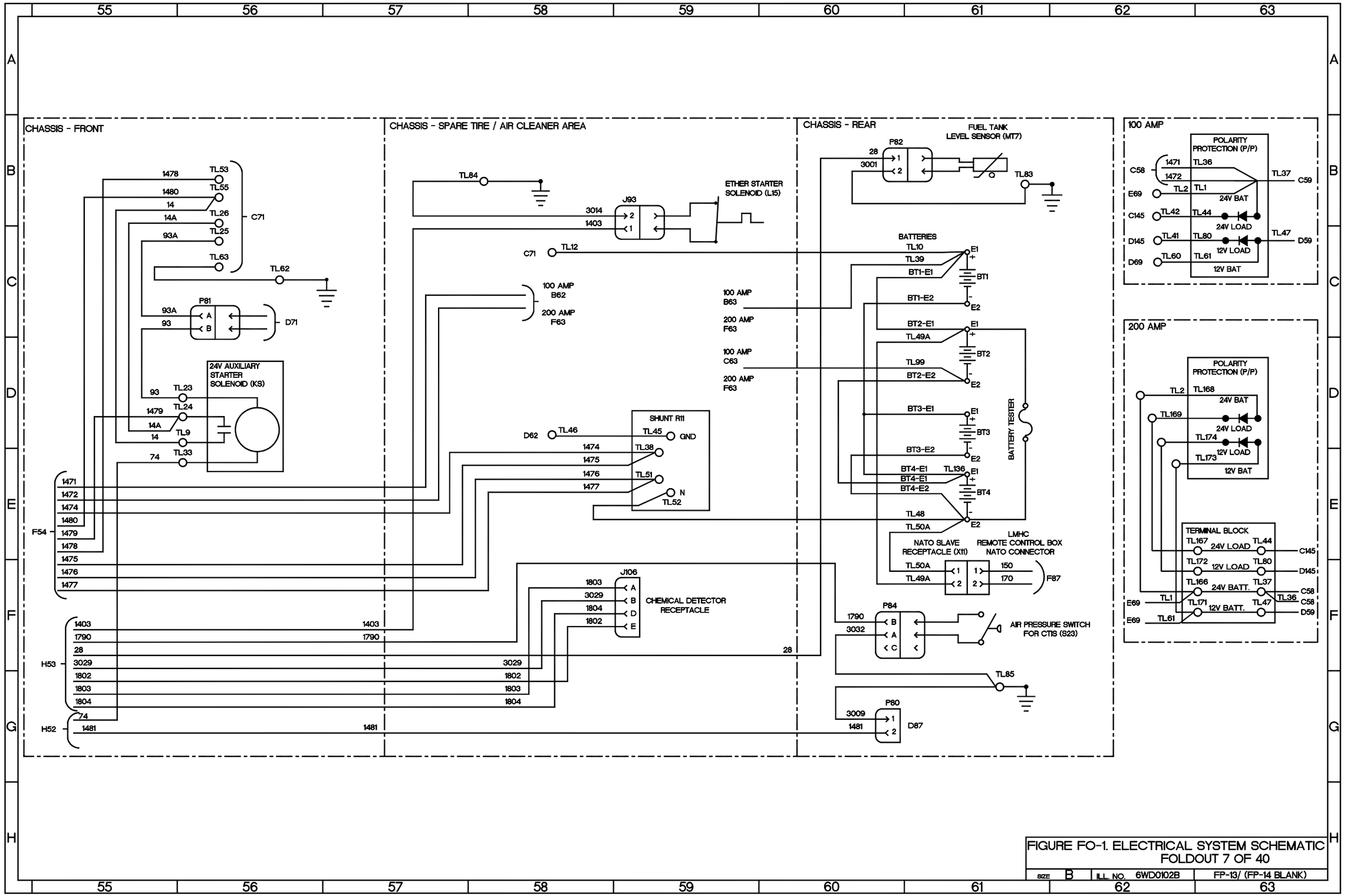


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 7 OF 40

SIZE	ILL. NO.	
B	6WD0102B	FP-13/ (FP-14 BLANK)

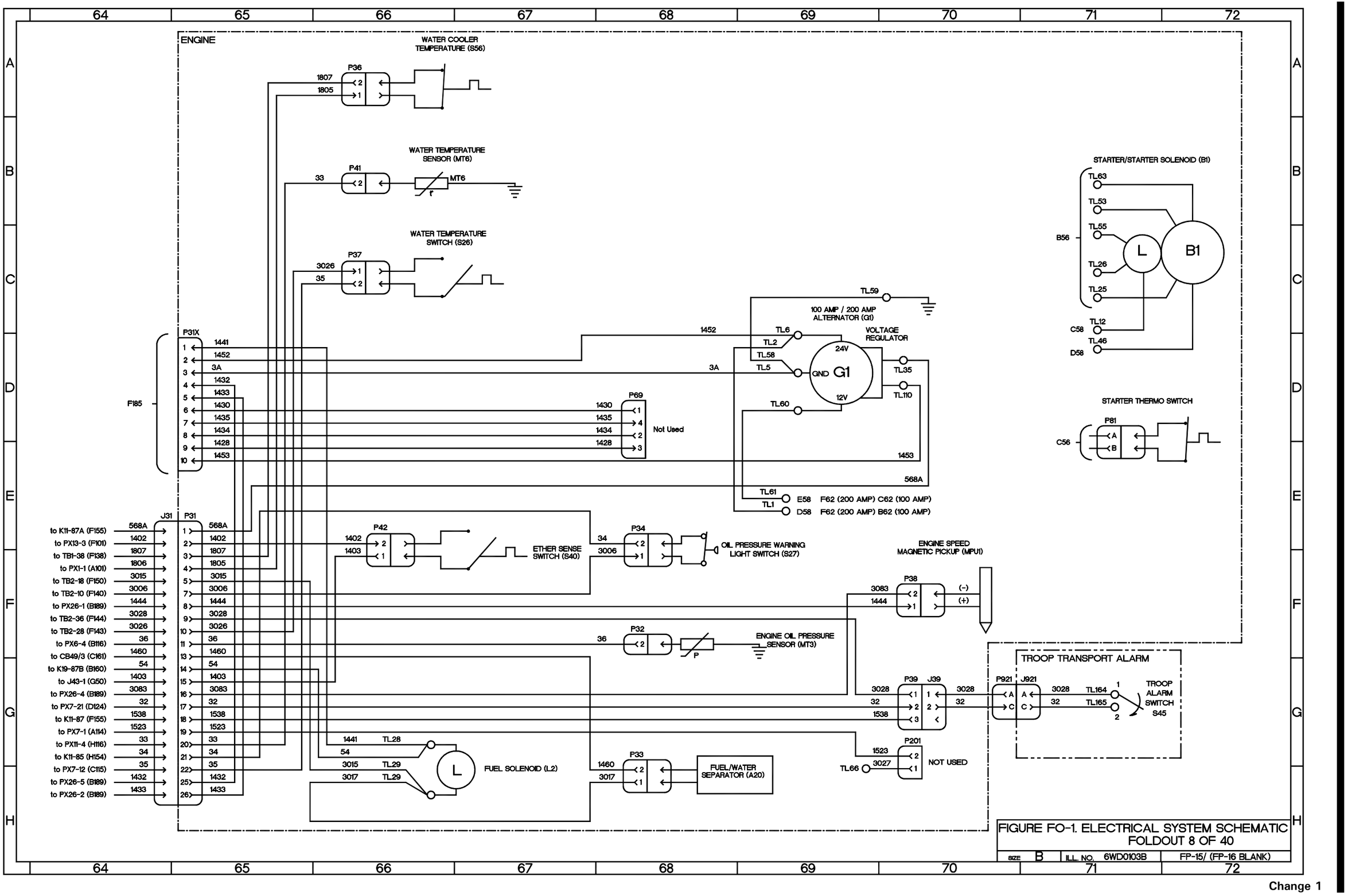


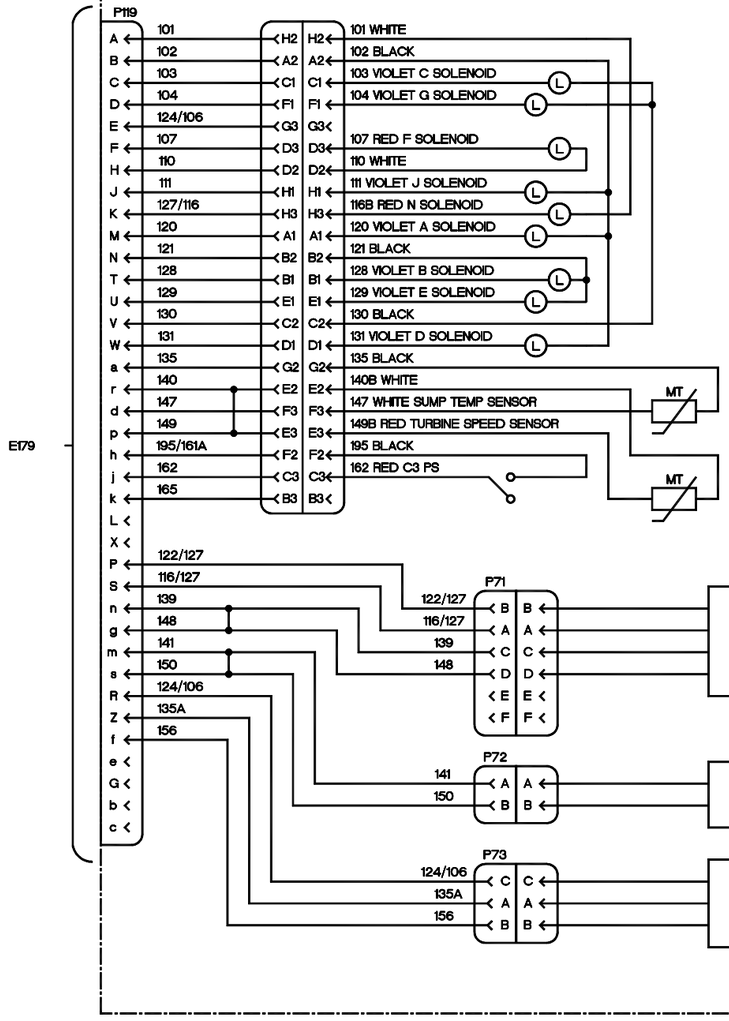
FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 40

SIZE B | ILL. NO. 6WD0103B | FP-15/ (FP-16 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

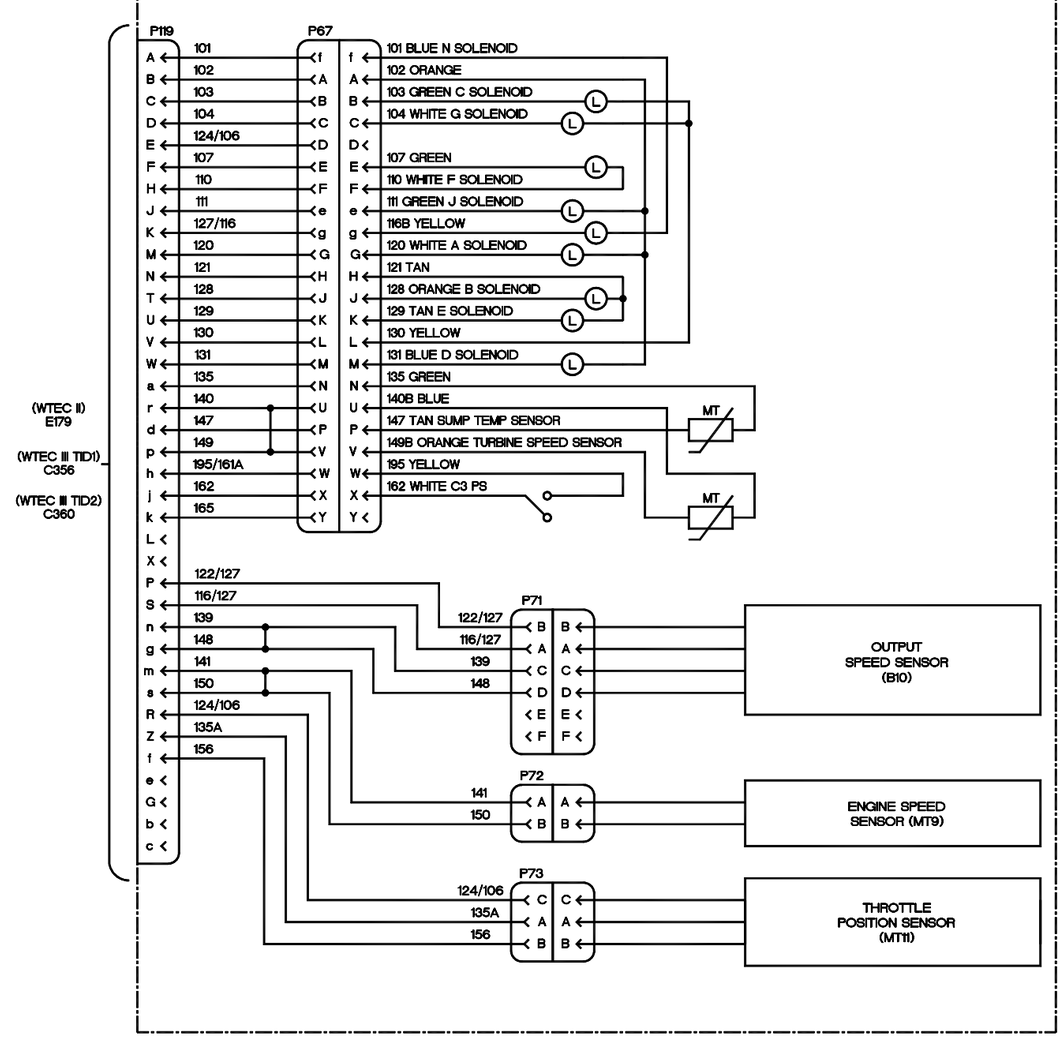
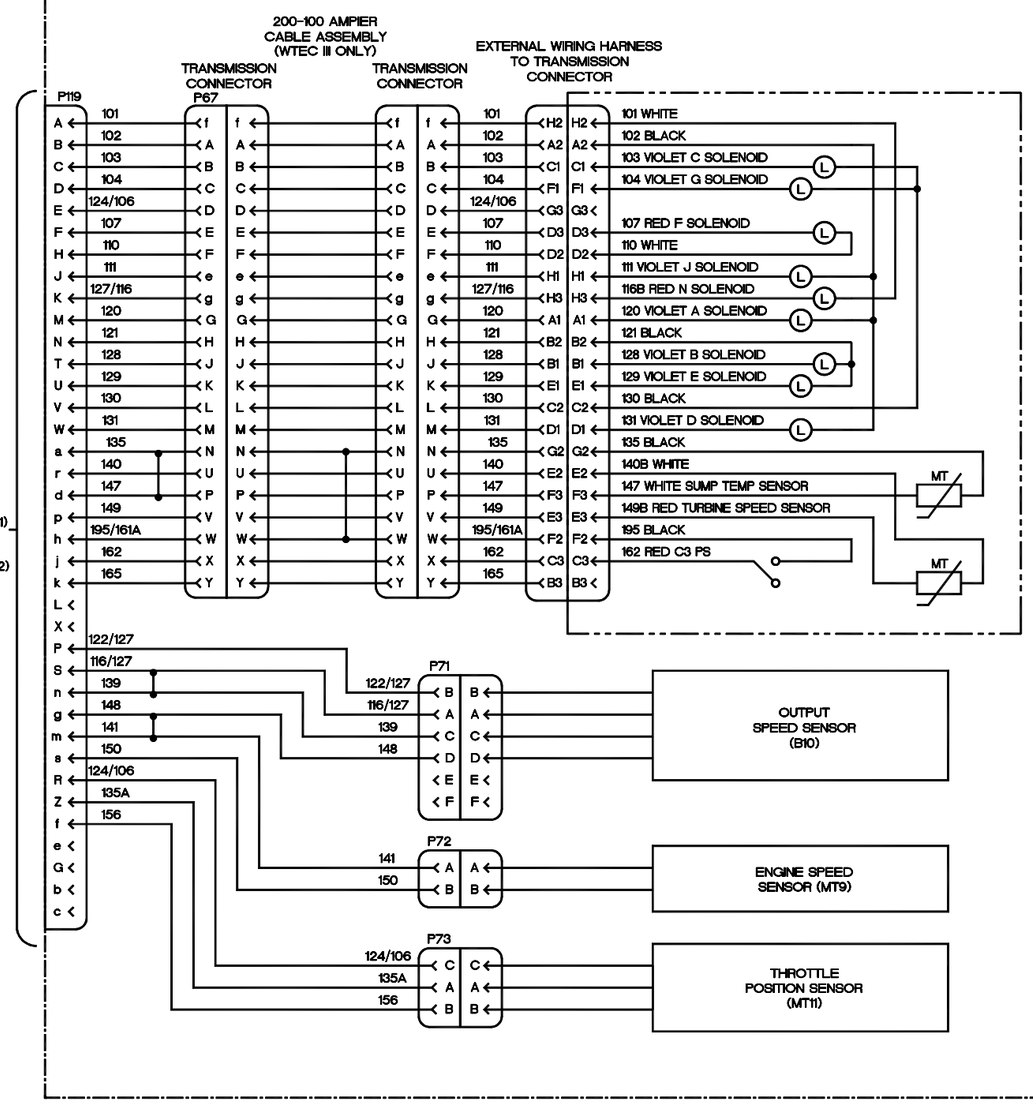


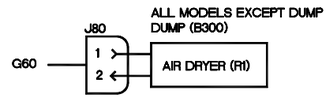
FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 40

SIZE	B	ILL. NO. 6WD0104B	FP-17/ (FP-18 BLANK)

PRIOR TO SERIAL NUMBER 6510032369 WITH ADAPTER CABLE ASSEMBLY

PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION





LIGHT MATERIAL HANDLING CRANE (LMHC)

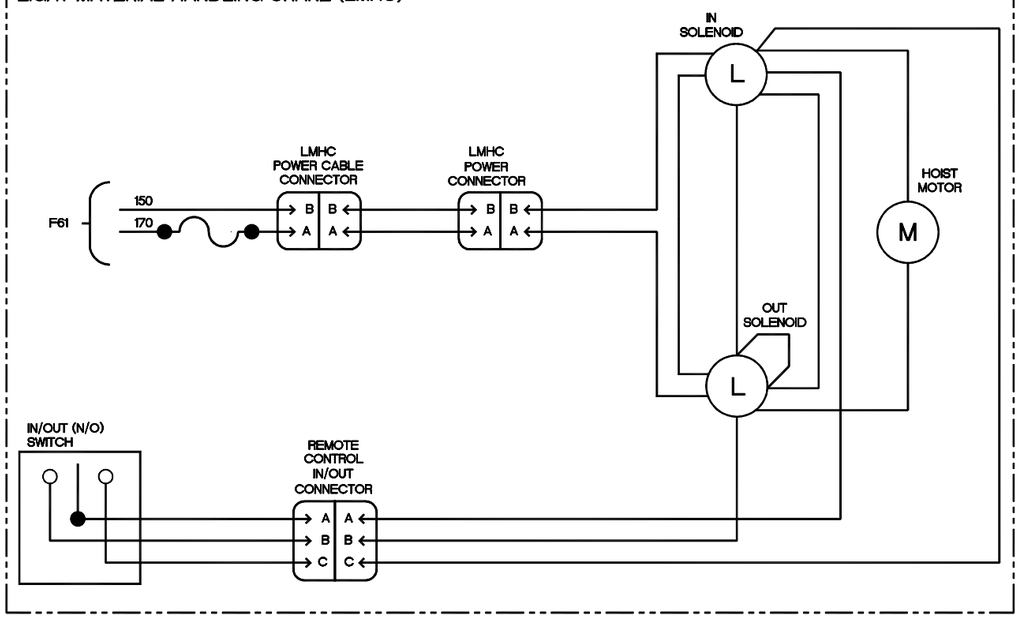


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 10 OF 40

SIZE	ILL. NO.	
B	6WD0105B	FP-19/ (FP-20 BLANK)

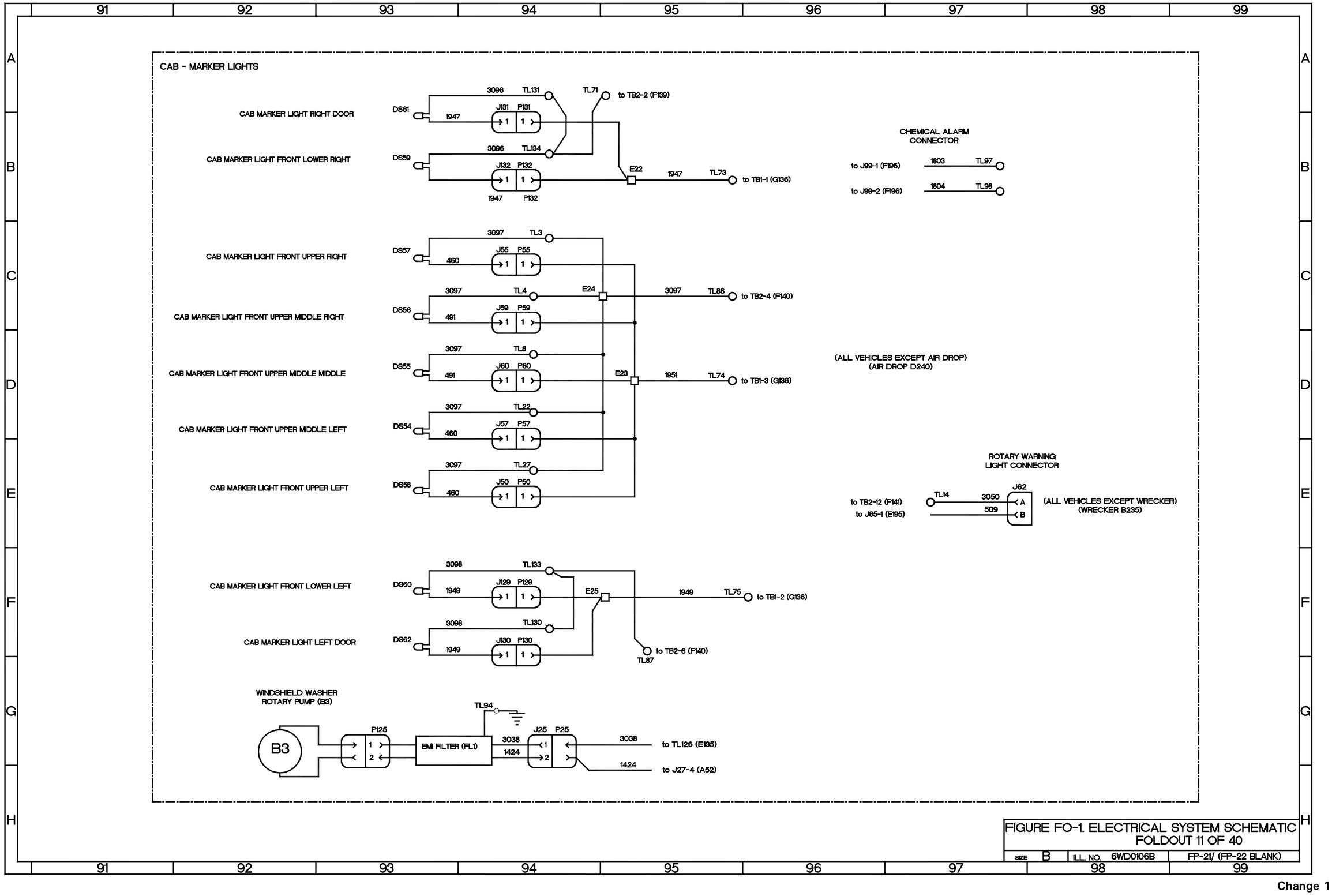


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 11 OF 40

SIZE	ILL. NO.	
B	6WD0106B	FP-21/ (FP-22 BLANK)

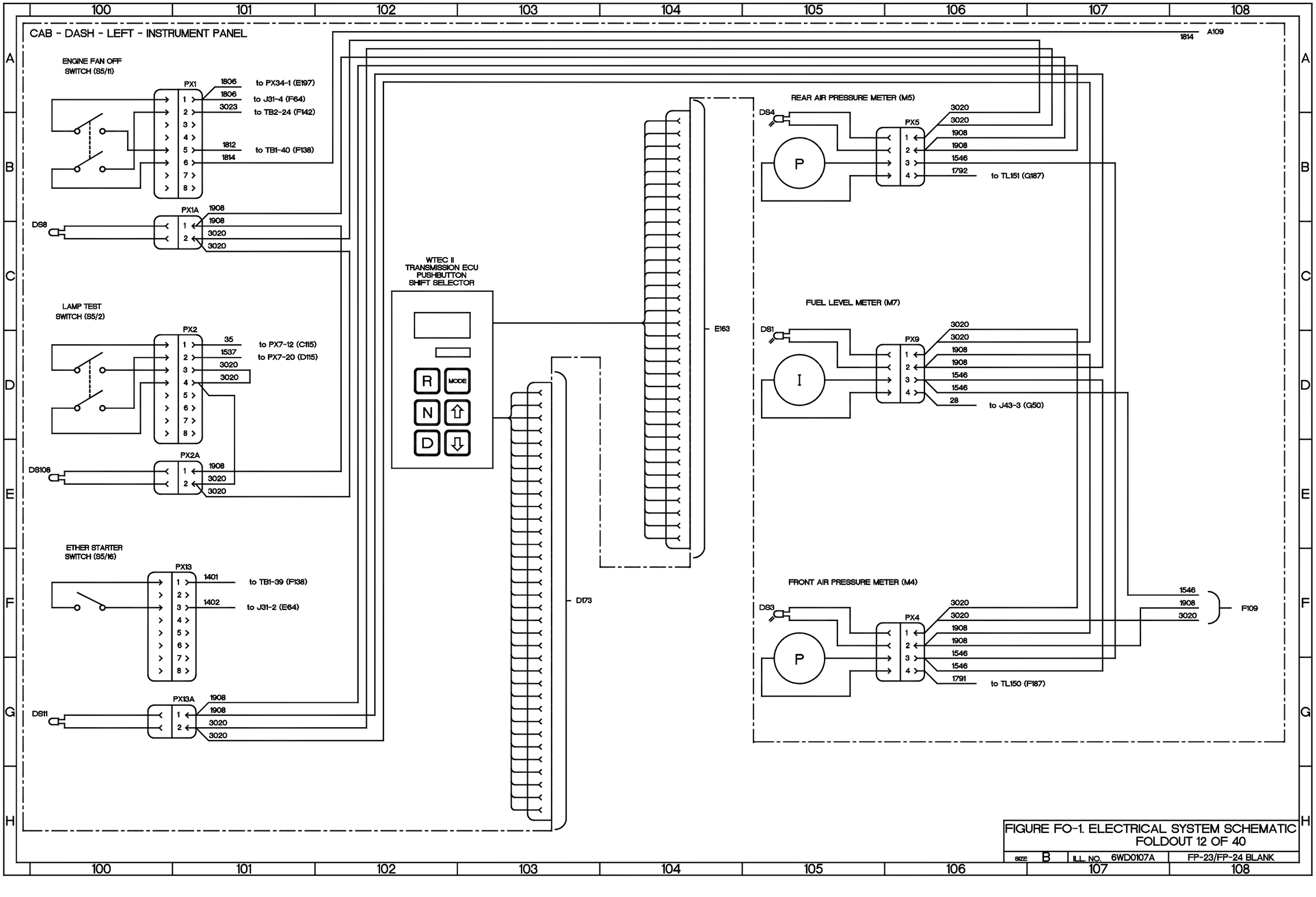


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 40

SIZE	ILL. NO.	
B	6WD0107A	FP-23/FP-24 BLANK

CAB - DASH - LEFT - INSTRUMENT PANEL

A108 — 1814

LIGHTED INDICATOR DISPLAY (A18)

		PX7	
CHEM DETECT	DS32	1	1523 to J31-19 (G64)
RIGHT TURN SIGNAL	DS15	2	1803 to J43-6 (H51)
LEFT TURN SIGNAL	DS14	3	
DUMP BODY UP	DS9	4	1580 to TB1-41 (E138)
CTIS OVRSPD	DS34	5	
PTO ON	DS23	6	1570 to TB1-47 (F138)
EMER BRAKE	DS21	7	3021 to TB2-25 (G142)
WATER TEMPERATURE	DS25	8	2034 to P912-9 (C133)
REAR BRAKE AIR	DS27	9	1528 to J111-D (F131)
TRANS OIL TEMP	DS41	10	2021 to J913-13 (C130)
ENGINE OIL LEVEL	DS29	11	1616 to J27-16 (C52)
PARK BRAKE	DS22	12	35
OIL PRESSURE	DS24	13	1525 to TL157 (H187)
HIGH BEAM	DS16	14	
FRONT AIR BRAKE	DS28	15	
RADIATOR FAN OFF	DS19	16	1532
MASTER STOP	DS30	17	3030 to TB2-33 (F143)
		18	
		19	1536
		20	1537
		21	
		22	1616 to J27-16 (C52)
		23	34A to D3B-4 (A147)
		24	1681 to K8-87 (F160)
		25	1530 to TL156 (F187)
		26	1814
		27	1658 to TB1-61 (B138)
		28	2010 to P912-7 (B133)

ENGINE OIL PRESSURE METER (M3)

DS5 — OP — PX6

1	3020
2	3020
3	1908
4	1908
	1546
	1546
	36 to J31-11 (F64)

B118

E88: 35 to PX2-1 (D101); 35 to J31-22 (H64)

E89: 1537 to PX2-2 (D101); 1537 to J118-1 (D171) (WTEC II); 105 to P115-19 (D344) (WTEC III)

VOLTMETER (M2)

DS7 — V — PX10

1	3020
2	3020
3	1908
4	1908
	1546
	1546 to J913-9 (C130)
	3004 to TB2-9 (G140)

D118 / E118

F108: 1546, 1908, 3020 — 3020, 1908 — F118

SPEEDOMETER (M8)

DS6 — KM — PX8

1	3020
2	3020
3	1908
4	1908
	1546
	1546
	1793 to PX33-H2 (E190) (WTEC II)
	1793 to J111-B (F131) (WTEC II)
	157 to P116-30 (F345) (WTEC III)
	157 to J111-B (F131) (WTEC III)

AUDIBLE ALARM (LS2): 32 TL178 to J31-17 (G64); 1536 TL160; 1532 TL161

WATER TEMPERATURE METER (M6)

DS2 — t° — PX11

1	3020
2	3020
3	1908
4	1908
	1546
	1546
	33 to J31-20 (G64)

G118

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 13 OF 40

SIZE B | ILL. NO. 6WD0108B | FP-25/ (FP-26 BLANK)

CAB - DASH - LEFT - INSTRUMENT PANEL

IGNITION SWITCH (S5/1)

PX17

B117: 3020, 3020, 1908, 1908, 1546, 1546

1548 to K2-86 (A152)

1586 to CB70/4 (E155)

DS13 — PX17A: 1908, 1908, 3020, 3020

STARTER PUSHBUTTON (S6)

TL163 — TL162 — 1405 to K24-87 (A161); 3007 to TB2-11 (G140)

ROTATING WARNING LIGHT SWITCH (S5/2)

PX12

D117: 3020, 3020, 1908, 1908, 1546

E117: 1546

1559 to K13-86 (A158)

1575

1575 to K20-86 (G147)

DS10 — PX12A: 1908, 1908, 3020, 3020

MAIN LIGHT SWITCH (S4)

PX15

1542

22 to D1A-2 (C147)

19 to CB54/3 (D151)

1572 to CB66/1 (D152)

1586 to CB70/4 (D155)

1575

1577 to CB74/5 (D159)

1404 to K6-87 (F152)

491 to CB65/7 (D150)

16 to P18-3 (B187)

23 to K27-86 (G152)

F117: 3020, 1908

FULL HAZARD WARNING SWITCH (S5/22)

PX14

G117: 3020, 3020, 1908, 1908, 1546

1565 to K9-87 (B151)

1566 to J19-5 (D186)

1566 to K10-87A (F159)

1567 to PX20-B (C197)

1568 to J19-12 (E186)

1568 to PX20-A (C197)

1514 to CB74/6 (E159)

DS12 — PX14A: 1908, 1908, 3020, 3020

1908 to J913-11 (C130)

3020 to J913-10 (C130)

INSTRUMENT PANEL LIGHTS DIMMER MODULE (A3)

PX24: 1908, 1908, 1542

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 14 OF 40

SIZE B | ILL. NO. 6WD0109A | FP-27/FP-28 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 (C166)
2 1908
3 3003 to TB2-8 (F149)
4 3003

HEATER CONTROL PANEL ILLUMINATION
DS17
DS101

J913 P913
1673 to K12-86 (A148) — 1 1673
1674 to CB72/2 (D148) — 2 1674
1672 to D2B-3 (D147) — 3 1672
1670 to CB45/4 (C148) — 4 1670
1925 to CB49/3 (C161) — 5 1925
1954 to J118-9 (E171) — 6 1954
161 (WTEC II) to PX33-A3 (C190) — 7 161
161 (WTEC II) to J118-13 (E171) — 8 153
161/1952 (WTEC III) to P115-31 (D344) — 9 1546
153 (WTEC II) to J118-8 (D171) — 10 3020
153 (WTEC II) to P115-12 (C344) — 11 1908
1546 to PX10-3 (E116) — 12 1550
1546 to TB1-61 (B138) — 13 2021
3020 to TB2-31 (G143) — 14 2019
3020 to PX14A-2 (H121) — 15 1904
1908 to PX14A-1 (H121)
1908
1550 to PX26-1 (B188)
2021 to PX7-10 (B114)
2019 (WTEC III) to K37-87 (B348)
2019 (WTEC II) to PX33-E2 (D190)
1904 (WTEC II) to PX33-E3 (D190)
1904 (WTEC III) to K37-30 (A348)
G244

P912 J912
2006 to CB50/2 (C154) — 1 1 2006
2069 to CB48/8 (C150) — 2 2 2069
3 3 2012
2004 to K12-87 (B148) — 4 4 2004
1328 to CB63/1 (D160) — 5 5 1328
6 6 2010
2010 to PX7-28 (D114) — 7 7 2033
2033 to CB53/6 (E149) — 8 8 2033
2034 to PX7-8 (B114) — 9 9 2034
2040 to TB1-20 (D136) — 10 10 2040
2041 to TB1-50 (D138) — 11 11 2041
1650 to X1 (C145) — 12 12 1650
1653 to X1 (C145) — 13 13 1653
2037 to K19-87 (B159) — 14 14 2037
1811 to K15-87A (A149) — 15 15 1811
E244

PARKING BRAKE SWITCH
C51 TL202 1616 S24 3024 TL201 TL126
3038 to P25-1 (Q95)

CTIS ELECTRONIC CONTROL UNIT (A2)

P110
H 01
F 02
Z 01 — 01 (ALL VEHICLES EXCEPT M1089 AND M1088)
M
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 (C159)
02 A A 3031 to TB2-35 (G144)
03 B B 1793 to PX8-4 (G112) (WTEC II)
04 G G 157 to PX8-4 (G112) (WTEC III)
05 D D 1911 to K52-87A (G148)
06 F F 1528 to PX7-9 (B114)
1790 to J43-2 (G51)

P113
B
C
A

P112
D
F
E
A
B
G195

TL50
CHASSIS GROUND

P912A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
M1088 W/O PTO (F265)
M1083/M1085/M1092/M1093/M1096 W/O PTO (F264)
to K15-87A (A150) 1811A

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 15 OF 40

SIZE B ILL. NO. 6WD0110B FP-29/ (FP-30 BLANK)

CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL

PX21

to P18-9 (B187) 1599
to CB37/1 (C161) 1569
to J2-4 (B194) 1916
to TB2-37 (G144) 3034
to P18-8 (B187) 1424
to J27-4 (A52) 1424
to P18-7 (B187) 1597

WIPER DELAY MODULE (A5)

22C J51-13 (E51)
1940 K10-87 (F159)
1940 K10-86 (F159)
22 D1A-1 (C147)
22C J27-15 (C52)
1912 CB67-4 (D148)
21A J27-12 (B52)
489G J27-2 (A52)
489F J27-8 (B52)
2040 P912-10 (C133)
489 J51-7 (D51)
1426 J7-1 (A197)
1955 K28-86 (H151)
1951 TL74 (D95)
1947 TL73 (B95)
1949 TL75 (F95)

1930 K11-86 (F155)
1929 CB77/5 (C161)
1658 K11-30 (F155)
1546 J913-9 (C131)
1658 PX7-27 (D114)
1690 CB79/5 (C159) (WTEC II)
1462 K19-30 (A159)
1460 PX33-C1 (C190) (WTEC III)
146 K25-86 (B246) (WTEC III)
1463 TL159 (E145)
146 J117-C (C343) (WTEC III)
1572 CB66/2 (E152)
1408 K29-86 (F151)
24 J51-17 (F51)
1329 K52-86 (H148)
20 J27-3 (A52)
2041 P912-11 (C133)
461 J27-14 (B52)
1570 PX7-6 (B114)
1581 J19-1 (C186)
1524 J19-4 (D187)
1580 PX7-4 (B114)
460 J27-11 (B52)
1401 PX13-1 (F101)
1812 PX1-5 (B101)
1935 CB22/3 (C158)
1807 J31-3 (F64)
1481 J43-9 (H51)
1692 CB21/1 (C158)
1692 PX26-3 (B188)
(WTEC II) 1692 PX33-E1 (D190)
(WTEC III) 1692 K34-30 (B347)
1692 PX33-F1 (D190) (WTEC II)
1692 K26-30 (B344) (WTEC III)

TB1

3101 K37-85 (B348) (WTEC III)
3054 K20-85 (H147)
3036 K32-85 (A156)
3047 K30-85 (H156)
3039 K9-85 (A151)
3099 J7-3 (B197)
3046 K10-85 (F160)
3016 K19-85 (A159)
3053 K8-85 (F161)
3002 K7-85 (F162)
3041 K2-85 (A152)
3042 TL502 (G196)
3043 TL153 (C189)
3048 K31-85 (G158)
3049 PX20-C (C198)
3012 K15-85 (A150)
3011 PX34-2 (E198)

1603 TB2-1 — F145

1603 X3
TB2

3096 TL71 (A94)
3097 TL86 (C95)
3098 TL87 (F95)
3003 PX25-3 (C129)
3006 J31-7 (F64)
3050 TL14 (E97)
3008 PX50-1 (D197)
3101 PX33-K1 (F190) (WTEC II)
143 P115-32 (D344) (WTEC III)
3015 J31-5 (F64)
3040 K29-85 (F151)
3056 K28-85 (G151)
3023 PX1-2 (B101)
3083 PX26-6 (B188)
3026 J31-10 (F64)
3067 K12-85 (A148)
3029 J43-4 (H52)
3044 K27-85 (A152)
3028 J31-9 (F64)
3045 K52-85 (H148)
3004 PX10-4 (E117)
3007 TL163 (B124)
(WTEC II) 188 PX33-V (H346)
(WTEC III) 188 PX33-7 (H346)
(WTEC II) 3102 PX33-K2 (F190)
(WTEC III) 3102 K26-85 (B344)
3018 J78-2 (F194)
3019 J78-4 (F194)
3021 PX7-7 (B114)
(WTEC III) 143 P115-17 (D344)
(WTEC III) 143 J117-E (C343)
2120 J913-10 (C130)
3030 PX7-17 (C114)
3031 J111-A (F131)
3034 PX21-4 (A142)
3037 J2-3 (A194)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 16 OF 40

SIZE	ILL. NO.	
B	6WD0111B	FP-31/ (FP-32 BLANK)

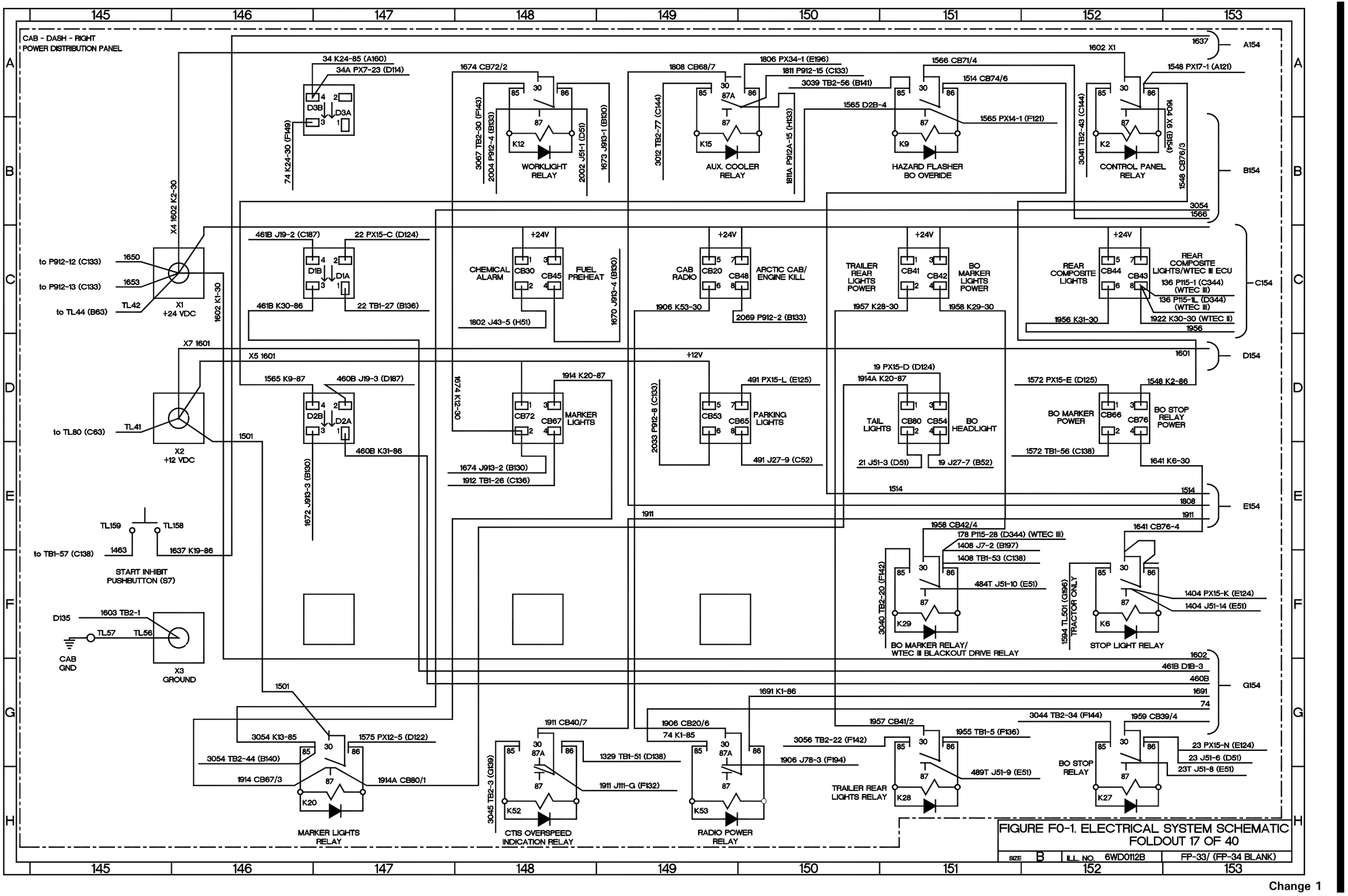


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 40

SIZE B | ILL. NO. 6WD0112B | FP-33/ (FP-34 BLANK)

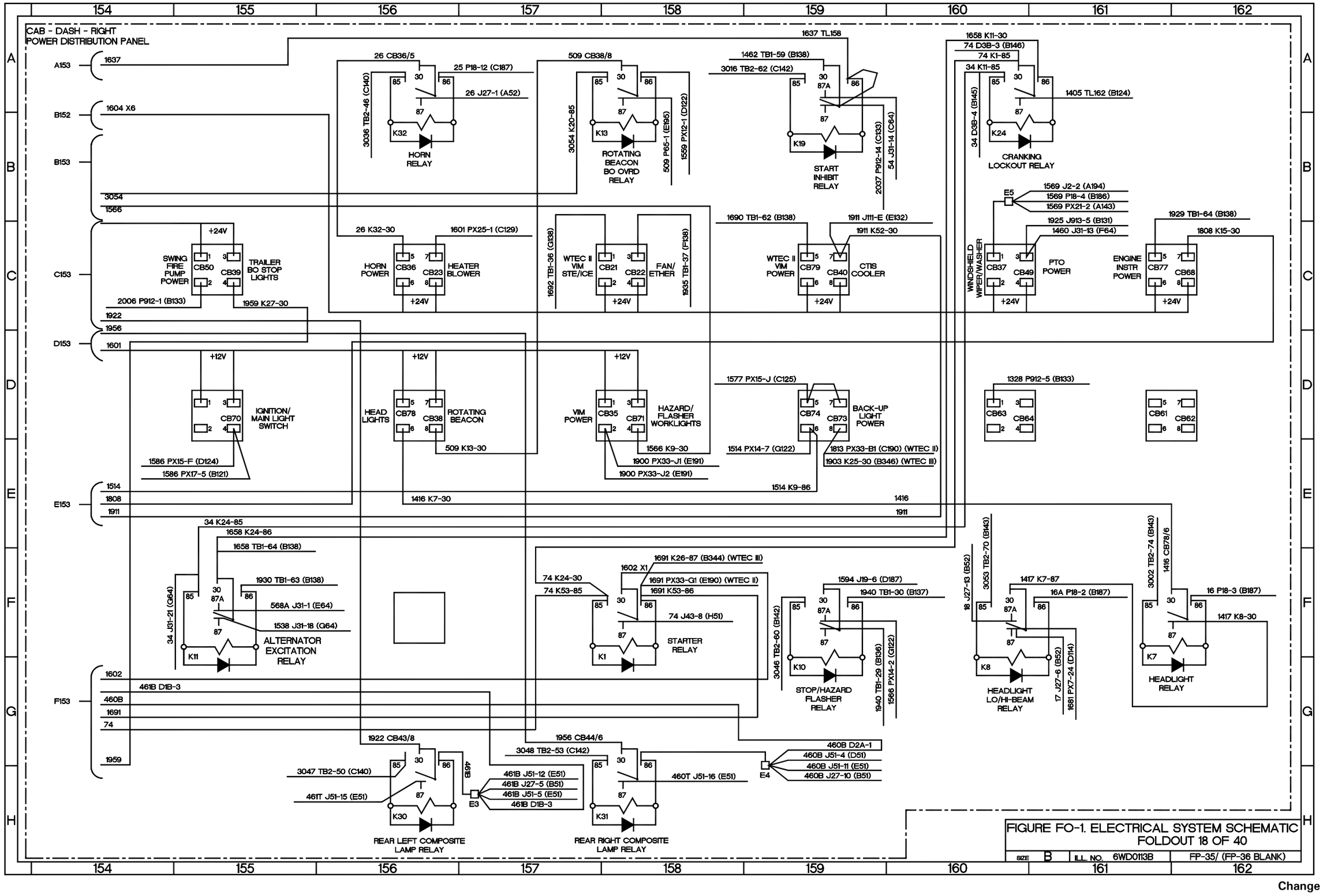


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 40

SIZE B | ILL. NO. 6WD0113B | FP-35/ (FP-36 BLANK)

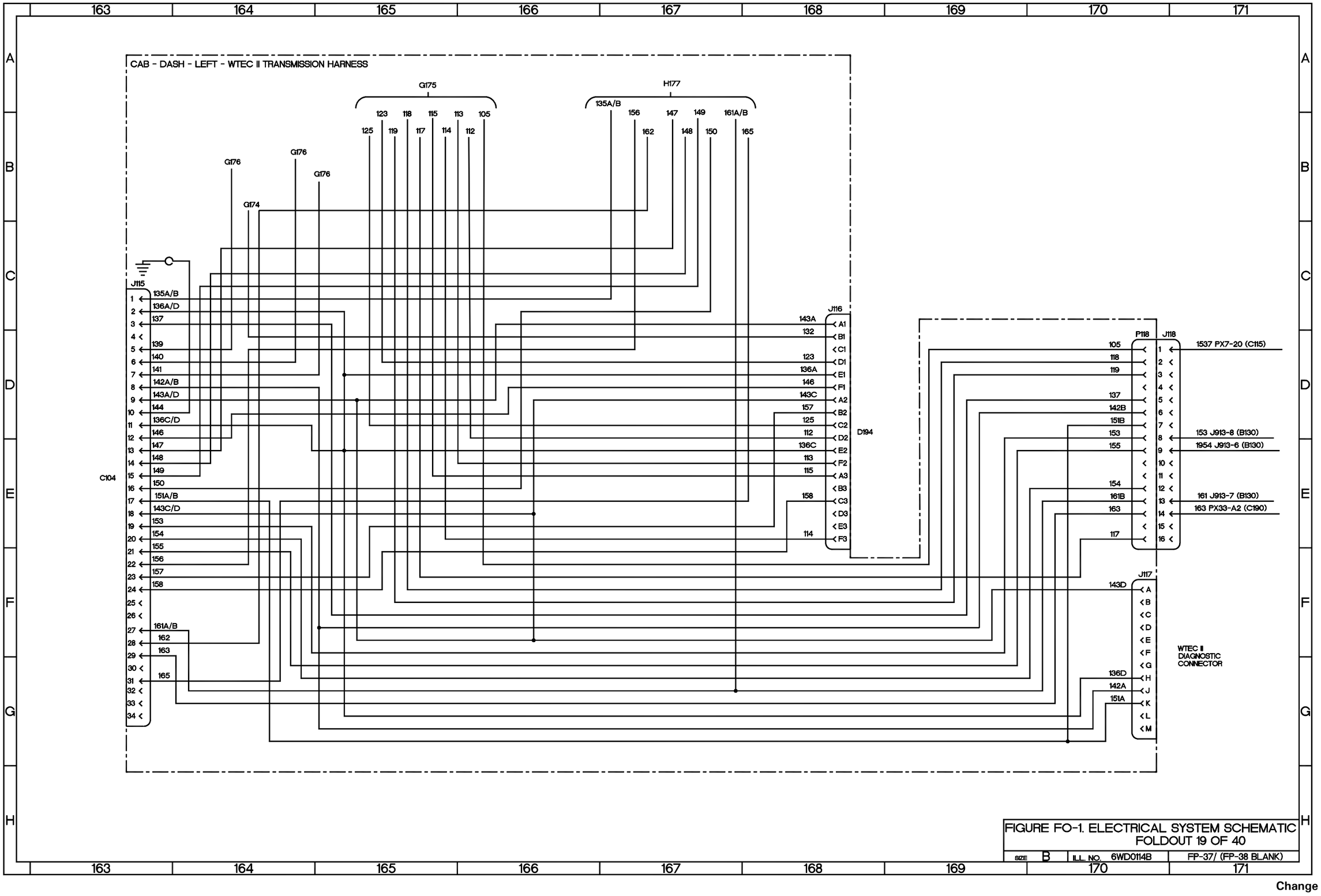


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 40

SIZE	ILL. NO.	
B	6WD0114B	FP-37/ (FP-38 BLANK)

CAB-DASH-LEFT-WTECII TRANSMISSION HARNESS

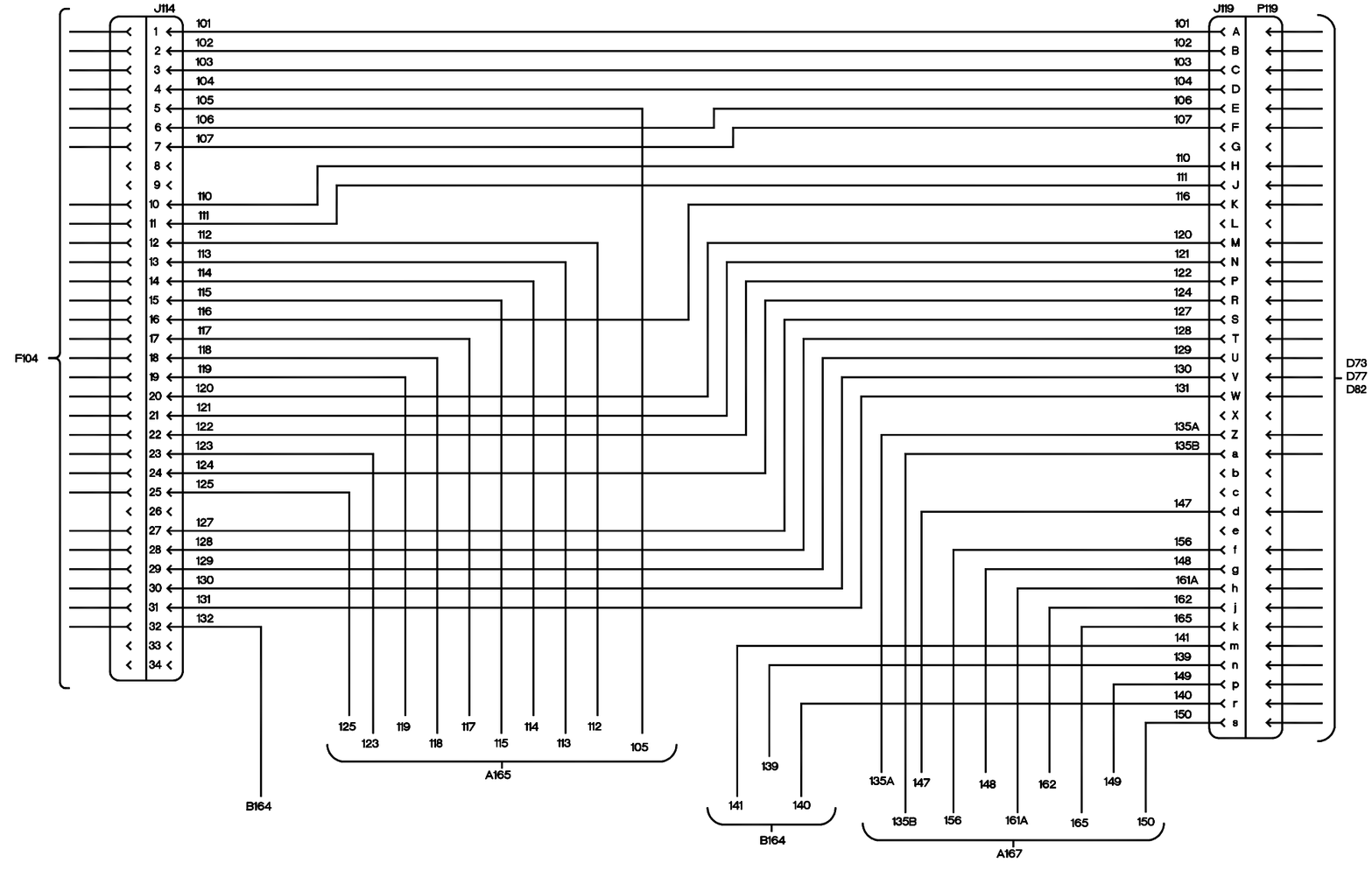


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 40

SIZE	ILL. NO.	
B	6WD0115B	FP-39/ (FP-40 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
R4

BLUE
BROWN
GREEN
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
D64

J43X
1471 1
1472 2
1474 3
1480 4
1479 5
1478 6
1475 7
1476 8
1477 9
F50

COLUMN SWITCH (S3)

P18
1 16A — to K8-86 (F160)
2 16 — to K7-86 (F162)
3 16 — to PX15-M (E125)
4 1569 — to CB37/1 (B161)
5 1527 — to J2-5 (B195)
6 1590 — to J2-1 (A195)
7 1597 — to PX21-6 (B142)
8 1424 — to PX21-5 (B142)
9 1599 — to PX21-1 (A142)
10
11
12 25 — to K32-86 (B156)

HORN PUSHBUTTON SWITCH

COLUMN SWITCH (S3)

J19
1 1581 — to TB1-46 (E138)
2 461B — to D1B-4 (C146)
3 460B — to D2A-2 (D147)
4 1524 — to TB1-43 (E137)
5 1566 — to PX14-2 (G122)
6 1594 — to K10-30 (F159)
7
8
9
10
11
12 1568 — to PX14-6 (G122)

FREQUENCY DIVIDER (A7)

INPUT (+)
OUTPUT (+)
+24V POWER
INPUT (-)
OUTPUT (-)
GROUND

PX26
1 1550 — to J913-12 (C130)
2 1444 — to J31-8 (F64)
3 1433 — to J31-26 (H64)
4 1692 — to TB1-36 (G138)
5 3083 — to J31-16 (G64)
6 1432 — to J31-25 (G64)
3083 — to TB2-26 (F142)

STOP LIGHT SWITCH (S10A)

TL152 — TL153 — 3043 — 3043 — to TB2/47 (C140)
1594 — 1594 — to TL501 (G197) (TRACTOR ONLY)

STOP LIGHT SWITCH (S10B)

TL154 — TL155 — 3043
1594

FRONT AIR PRESSURE TRANSMITTER

SENSOR (MT4) / SWITCH (S20)

TL150 — 1791 — to PX4-4 (G106)
P
TL156 — 1530 — to PX7-25 (D114)

REAR AIR PRESSURE TRANSMITTER

SENSOR (MT5) / SWITCH (S29)

TL151 — 1792 — to PX5-4 (B106)
P
TL157 — 1525 — to PX7-13 (C114)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 21 OF 40

SIZE B | ILL. NO. 6WD0116B | FP-41/ (FP-42 BLANK)

CAB - DASH - RIGHT - UNDERDASH

WINDSHIELD WIPER MOTOR (B2)

B2

PX22

EMI FILTER (FL2)

P2 J2

1590 to P18-6 (B187)
1569 to CB37/1 (B160)
3037 to TB2-39 (G144)
1916 to PX21-3 (A142)
1527 to P18-5 (B187)

TRANSMISSION DIMMER MODULE

J7

1426 to TB1-9 (F139)
1408 to K29-86 (F150)
3099 to TB2-58 (B144)
158

WTEC II VEHICLE INTERFACE MODULE (A10)

PX33

to J51-2 (D51)
to J118-14 (E171)
to J913-7 (B130)
to CB73/8 (E159)
to TB1-60 (B138)
to TB1-33 (G137)
to J913-14 (D130)
to J913-15 (D130)
to TB1-34 (G138)
to K1-86 (F158)
to PX8-4 (G112)
to CB35/2 (E158)
to CB35/2 (E158)
to TB2-16 (F141)
to TB2-17 (G141)

REV
PTO ENABLE OUTPUT RELAY SF02
DIFFERENTIAL LOCK RELAY SF04
REVERSE WARNING RELAY RW
INDICATOR OUTPUT RELAY SF01
10A
SF01
SF4
SF02
NS
FL
10A
NEUTRAL START RELAY NS
NOT USED SF3
S02
S03

P116

D168

TURN SIGNAL FLASHER (A1)

OUTPUT
INPUT
GROUND

PX20

1568 to PX14-6 (G122)
1567 to PX14-5 (G122)
3049 to TB2-55 (C141)

INTER-AXLE DIFFERENTIAL SOLENOID (L6)

PX50

to TB2-14 (F141)
(WTEC III) 1692 K34-97A (B347)

ROTARY WARNING LIGHTS CONNECTION

P65 J65

to K13-87 (B158)
to J62-B (E97)

FAN SOLENOID (L1)

to K15-86 (A149)
to PX1-1 (A101)
to TB2-79 (C144)

PX34

CHEMICAL ALARM CONNECTION

P99 J99

to J43-6 (H51)
to J43-7 (H51)
to TL88 (B97)
to TL98 (B97)

CAB RADIO CONNECTION

J78

to TB2-21 (G142)
to K53-87A (H150)
to TB2-23 (G142)

J113

G132

CTIS PRESSURE TRANSDUCER

CTIS PNEUMATIC CONTROLLER

C180
to K6-85 (F152)
TL501 TL502
to TB2-45 (D140)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 22 OF 40

SIZE B | ILL. NO. 6WD0117B | FP-43/ (FP-44 BLANK)

WRECKER REAR LIGHTS

LH INTERMEDIATE MAKER — P94 — 1 — 489 — TL88 — 3089

LH WORK LIGHTS — P133 (A 3063, B 2002) — P133A (1 3064, 2 2002) — E54

E341 — P107 (a 3088, b 3087, d 2037, e 2033, f 2069, g 2006, z 2033) — TL54

CAB-DASH-RIGHT-POWER DISTRIBUTION PANEL

D52 — P51 (1 2002, 2 490, 3 21, 4 460B, 5 461B, 6 23, 7 489, 8 23T, 9 489T, 10 484T, 11 460B, 12 461B, 13 22C, 14 1404, 15 461T, 16 460T, 17 24) — E53

B258 — P108 (9 2033, 13 2037, 14 2033, 15 2069, 16 2006)

RH WORK LIGHTS — P134A (1 3062, 2 2002) — E55 — P134 (A 3061, B 2002)

RH INTERMEDIATE MARKER — P95 (1 489) — TL89 3089 — T90 3089

TL93 3094 — TL92 3094 3094

E49 — E57 — E48 — E58 — E59 — E46 — E47 — E52

P53R — F236 (3094 1, 489T 2, 3094 3, 1404 4, 460T 5, 23T 6, 484T 7, 461T 8, 484T 9, 484T 10)

P52R — B239 (21 1, 489 2, 3045 3, 461B 4, 22C 5, 460B 6, 7)

E51 — P85 489 — DS65 LH SIDE MARKER LIGHT — 3094 TL15

P86 489 — DS66 LH REAR MARKER LIGHT — 3094 TL16

P74 461B — DS37 LH TURN AND STOPLIGHT

P78 21 — DS72 LH TAILLIGHT

P76 24 — DS51 BLACKOUT MARKER LH REAR

P77 23 — DS35 BLACKOUT STOP LH REAR

LH REAR COMPOSITE LIGHT

3094 3094 TL86 — TL18 — DS45

P87 490 — BACKUP LIGHT — 3094 TL17

E50 — P54 489 — DS69 LEFT REAR MARKER — 3094 TL30

P56 489 — DS70 MIDDLE REAR MARKER — 3094 TL31

P58 489 — DS71 RIGHT REAR MARKER — 3094 TL32

P61 460B — DS38 RH TURN AND STOPLIGHT

P64 21 — DS73 RH TAILLIGHT

P62 24 — DS52 BLACKOUT MARKER RH REAR

P63 23 — DS36 BLACKOUT STOP RH REAR

RH REAR COMPOSITE LIGHT

3095 3095 TL21

P89 489 — DS68 RH REAR MARKER LIGHT — 3095 TL20

P88 489 — DS67 RH SIDE MARKER LIGHT — 3095 TL19

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 23 OF 40

SIZE B | ILL. NO. 6WD0118B | FP-45/ (FP-46 BLANK)

REAR LIGHTS TRACTOR

LH WORKLIGHTS
P133A
P133
RH WORKLIGHTS
P134A
P134
E33
E34
TL109

D52
P51
2002
490
21
460B
461B
23
489
23T
489T
484T
460B
461B
22C
1404
461T
460T
24

F236
P53M
3033
489T
3089
1404
460T
23T
484T
461T
484T
484T
TL93M

B239
P52M
21
489
3045
461B
22C
460B

E29
E35
E36
E41
E43
E39
E40
E38
E45
E42
E37
E56
E26
E32
E31
E30
E27
E44

P53R
3094
489T
3094
1404
460T
23T
484T
461T
484T
484T
F236

P52R
21
489
3045
461B
22C
460B
B239

P86
DS66
LH REAR MARKER LIGHT
P74
461B
DS37
LH TURN AND STOPLIGHT
P78
21
DS72
LH TAILLIGHT
P76
24
DS51
LH BLACKOUT MARKER LIGHT
P77
23
DS35
LH BLACKOUT STOPLIGHT
P87
490
DS45
BACKUP LIGHT
LH REAR COMPOSITE LIGHT

TL17
3095
TL20
TL92
P89
489
DS68
RH REAR MARKER LIGHT
TL21

P63
23
DS36
RH BLACKOUT STOPLIGHT
P62
24
DS52
RH BLACKOUT MARKER LIGHT
P64
21
DS73
RH TAILLIGHT
P61
460B
DS38
RH TURN AND STOPLIGHT
RH REAR COMPOSITE LIGHT

P58
489
DS71
RIGHT REAR MARKER
TL30
3094
P56
489
DS70
REAR MIDDLE MARKER
TL31
3094
P54
489
DS69
LEFT REAR MARKER
TL32
3094

E28
TL93
TL16
TL18
3094
3094

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 24 OF 40

SIZE B | ILL. NO. 6WD0119B | FP-47/ (FP-48 BLANK)

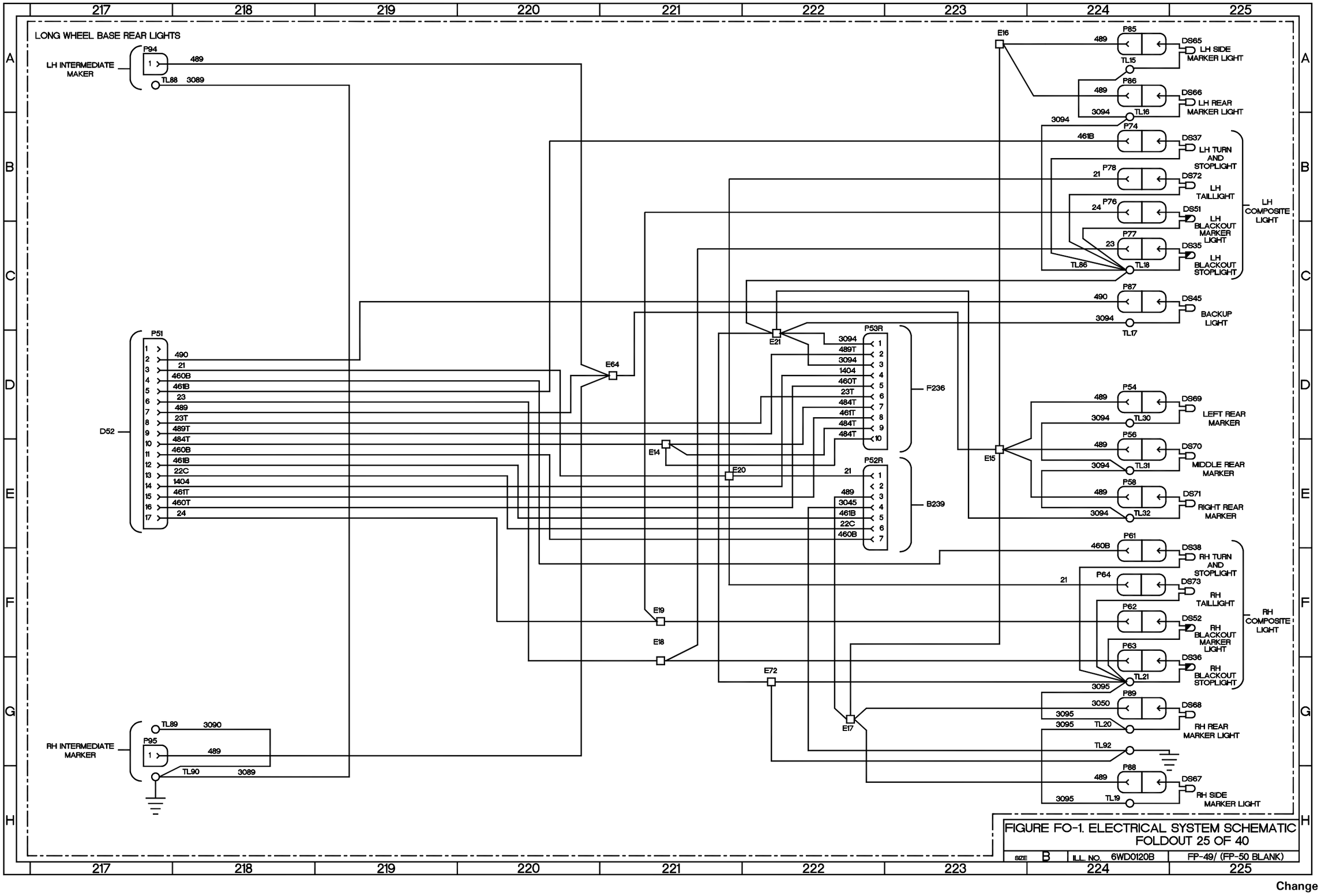


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 25 OF 40

SIZE B | ILL. NO. 6WD0120B | FP-49/ (FP-50 BLANK)

REAR LIGHTS ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE

CAB-DASH-RIGHT-POWER DISTRIBUTION PANEL

D52 — 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
3094 1
489T 2
3094 3
1404 4
460T 5
23T 6
484T 7
461T 8
484T 9
484T 10
F236

E14 — P52R
21 1
489 2
3045 3
461B 4
22C 5
460B 6
7
B239

E20
E19
E18
E17
TL93
3045 TL92 3095
3095 TL21 3095
3094 TL86

E16
P85 489 DS65 LH SIDE MARKER LIGHT — 3094 TL15
P86 489 DS66 LH REAR MARKER LIGHT — 3094 TL16
P74 461B DS37 LH TURN AND STOPLIGHT
P78 21 DS72 LH TAILLIGHT
P76 24 DS51 LH BLACKOUT MARKER LIGHT
P77 23 3094 DS35 LH BLACKOUT STOPLIGHT — TL18
LH COMPOSITE LIGHT
P87 490 DS45 BACKUP LIGHT — 3094 TL17

E15
P54 489 DS69 LEFT REAR MARKER — 3094 TL30
P56 489 DS70 MIDDLE REAR MARKER — 3094 TL31
P58 489 DS71 RIGHT REAR MARKER — 3094 TL32

P61 460B DS38 RH TURN AND STOPLIGHT
P64 21 DS73 RH TAILLIGHT
P62 24 DS52 RH BLACKOUT MARKER LIGHT
P63 23 DS36 RH BLACKOUT STOPLIGHT
RH COMPOSITE LIGHT
P89 489 DS68 RH REAR MARKER LIGHT — 3095 TL20
P88 489 DS67 RH SIDE MARKER LIGHT — 3095 TL19

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 26 OF 40

SIZE B | ILL. NO. 6WD0121B | FP-51/ (FP-52 BLANK)

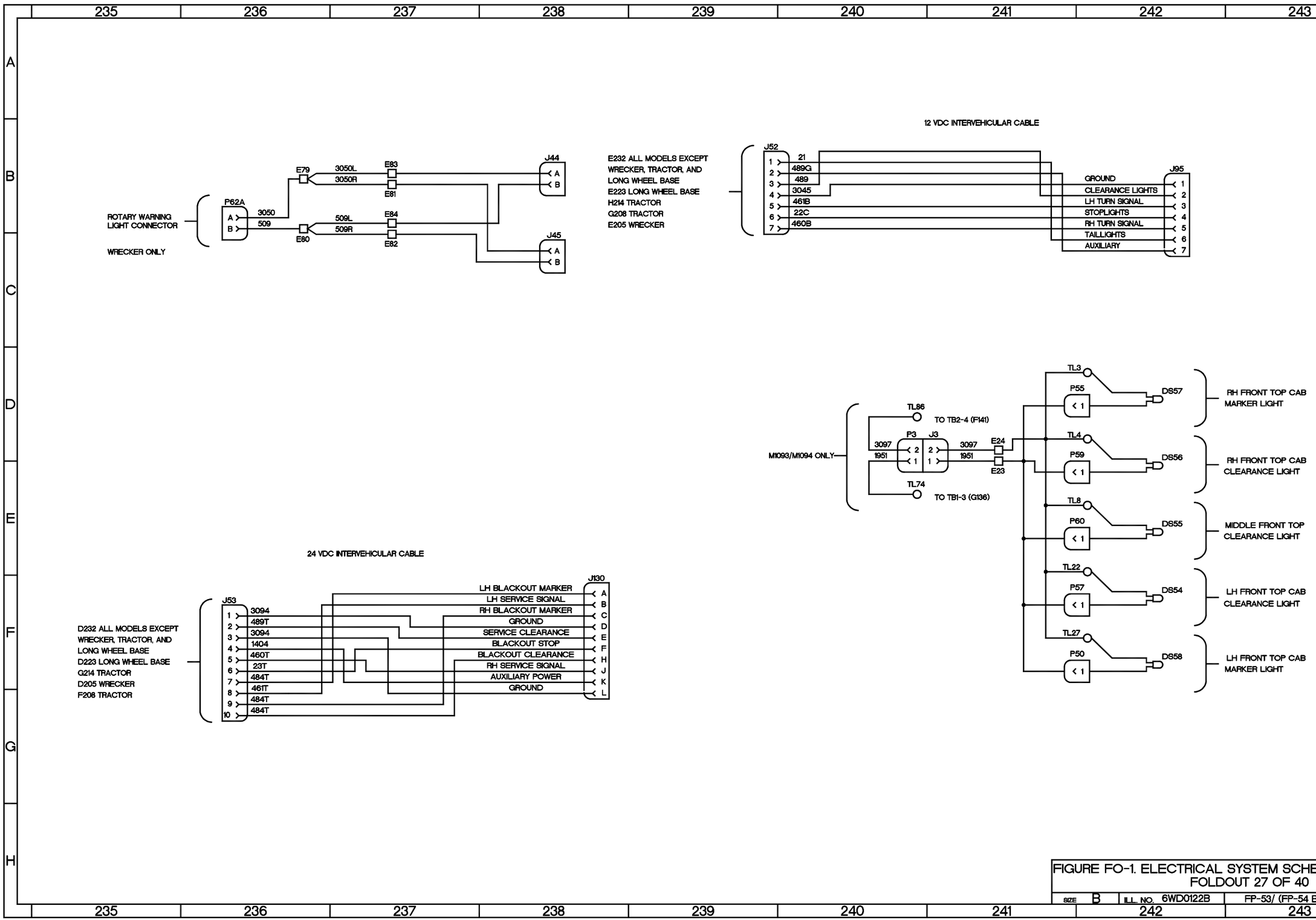


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 27 OF 40

SIZE B | ILL. NO. 6WD0122B | FP-53/ (FP-54 BLANK)

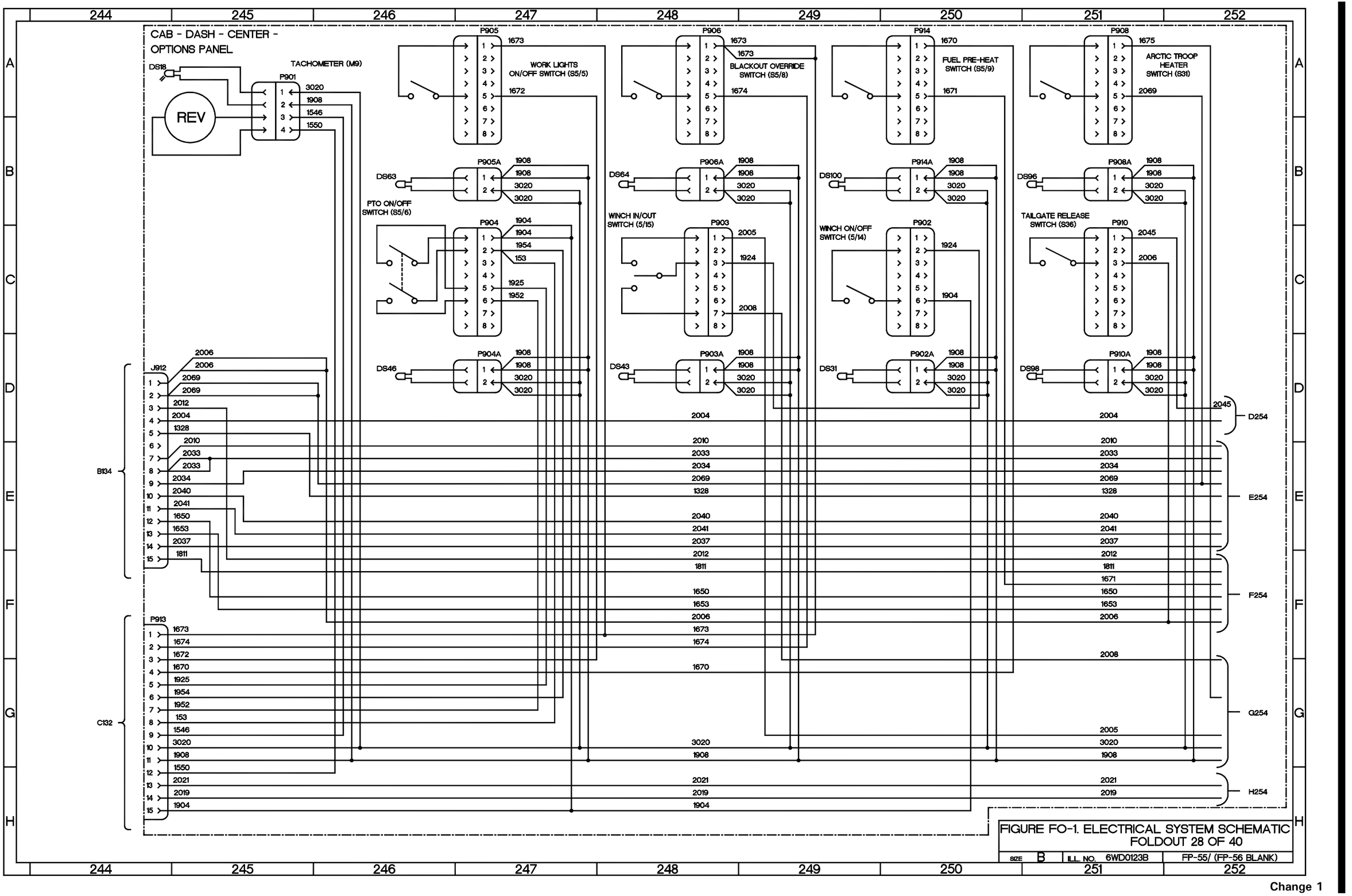


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 28 OF 40

SIZE B | ILL. NO. 6WD0123B | FP-55/ (FP-56 BLANK)

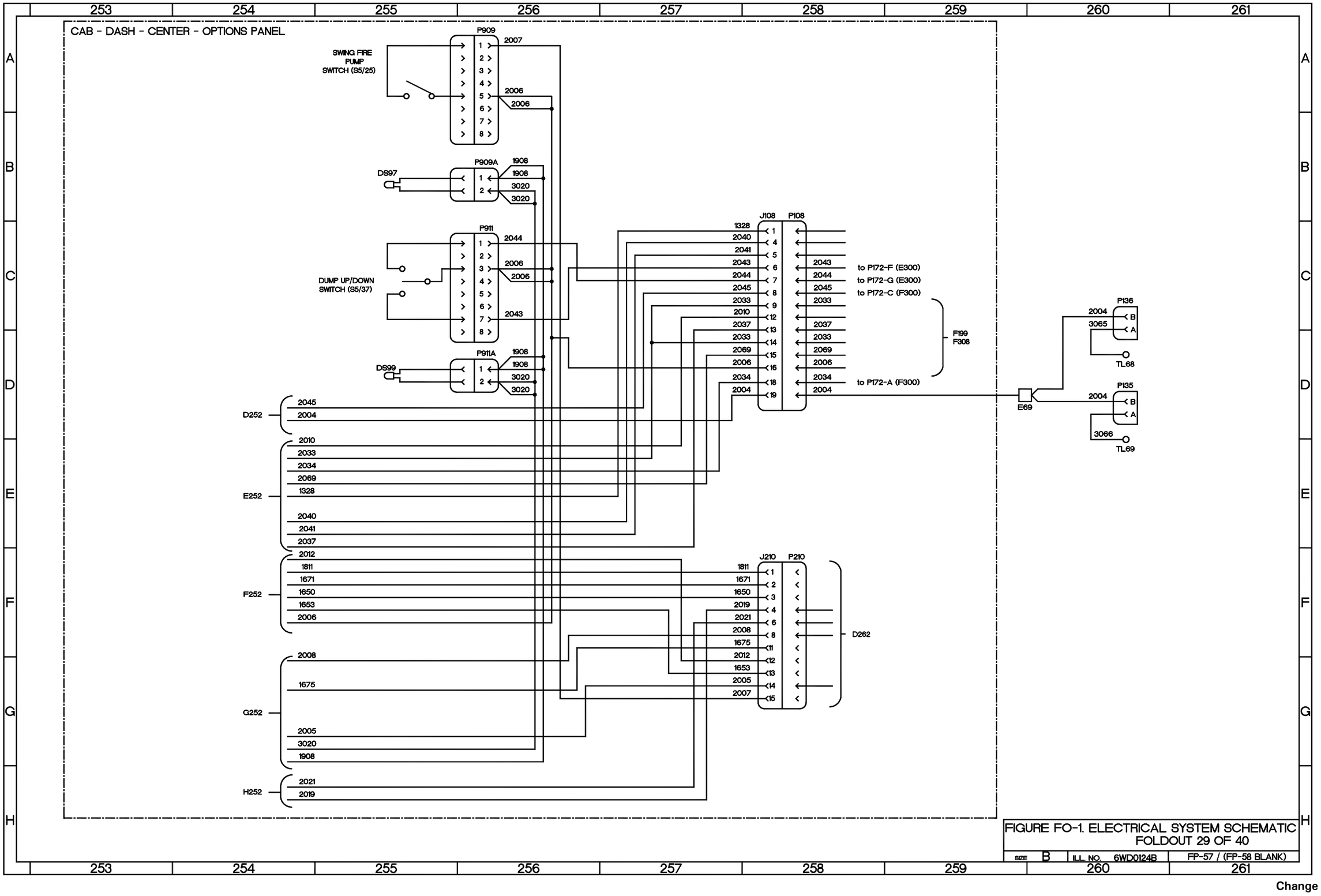


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 29 OF 40

SIZE	ILL. NO.	
B	6WD0124B	FP-57 / (FP-58 BLANK)

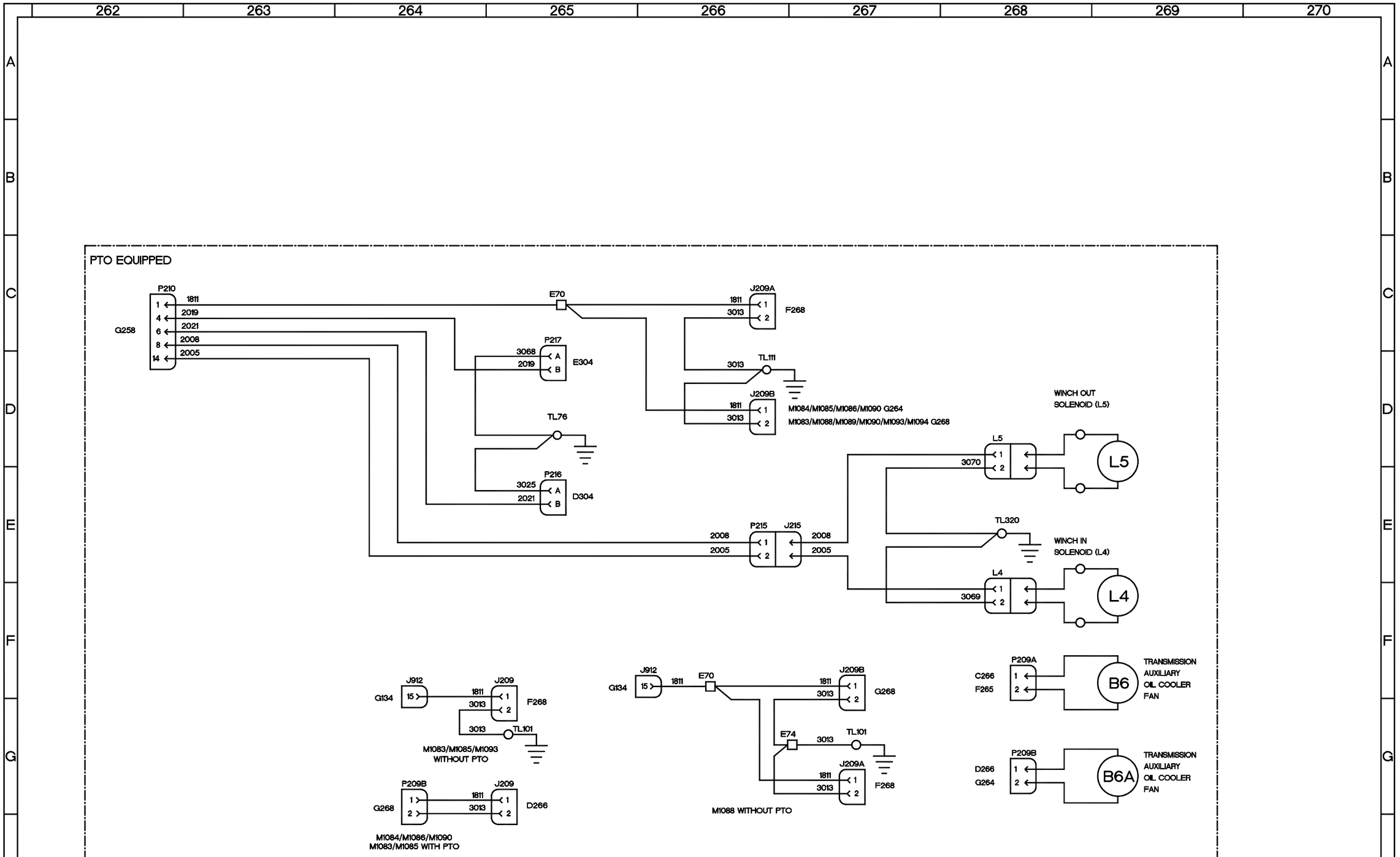


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 30 OF 40

SIZE	ILL. NO.	
B	6WD0125B	FP-59/ (FP-60 BLANK)

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 31 OF 40

SIZE	ILL. NO.	
B	6WD0126B	FP-61/ (FP-62 BLANK)

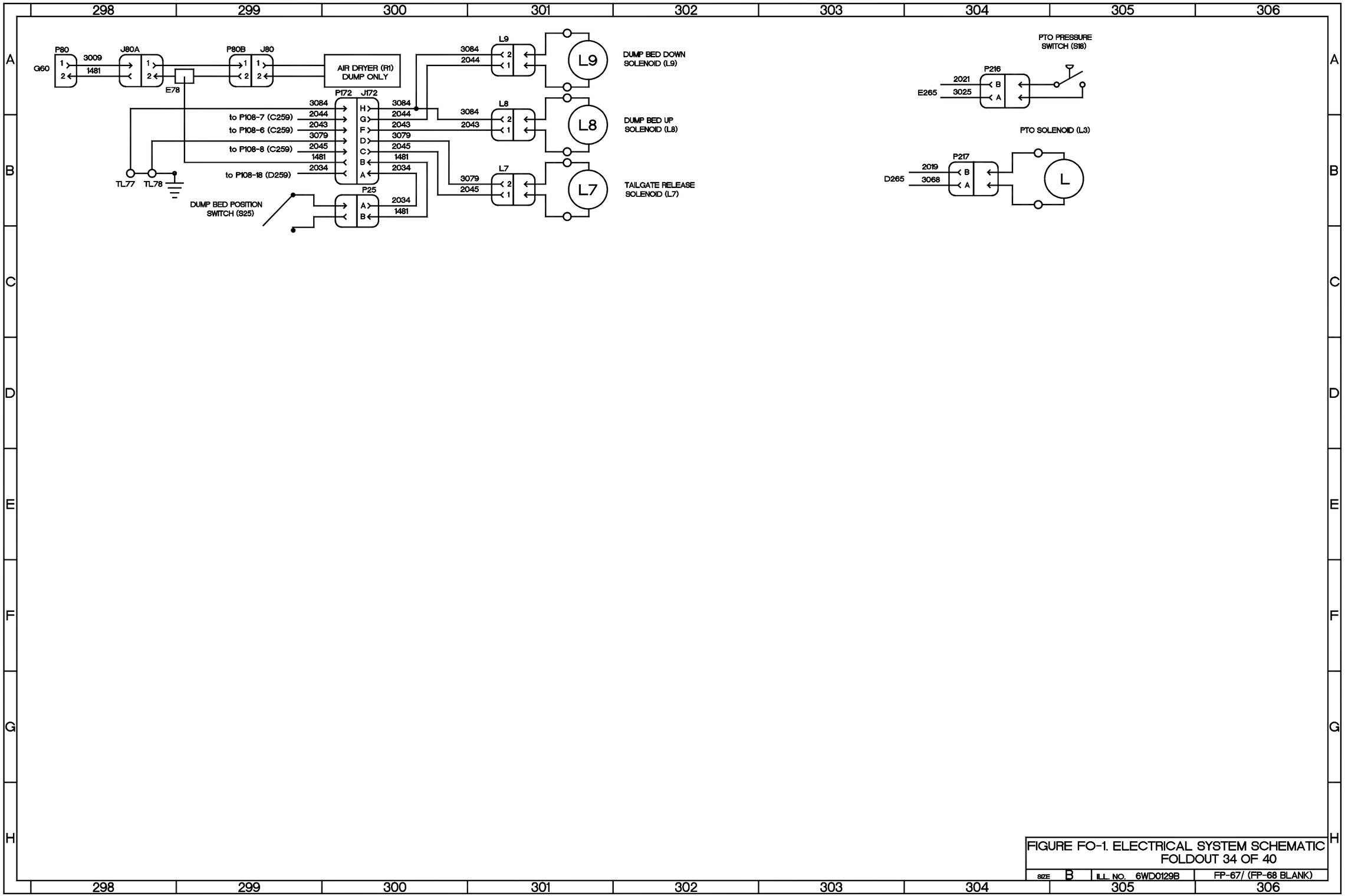


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 34 OF 40

SIZE B | ILL. NO. 6WD0129B | FP-67/ (FP-68 BLANK)

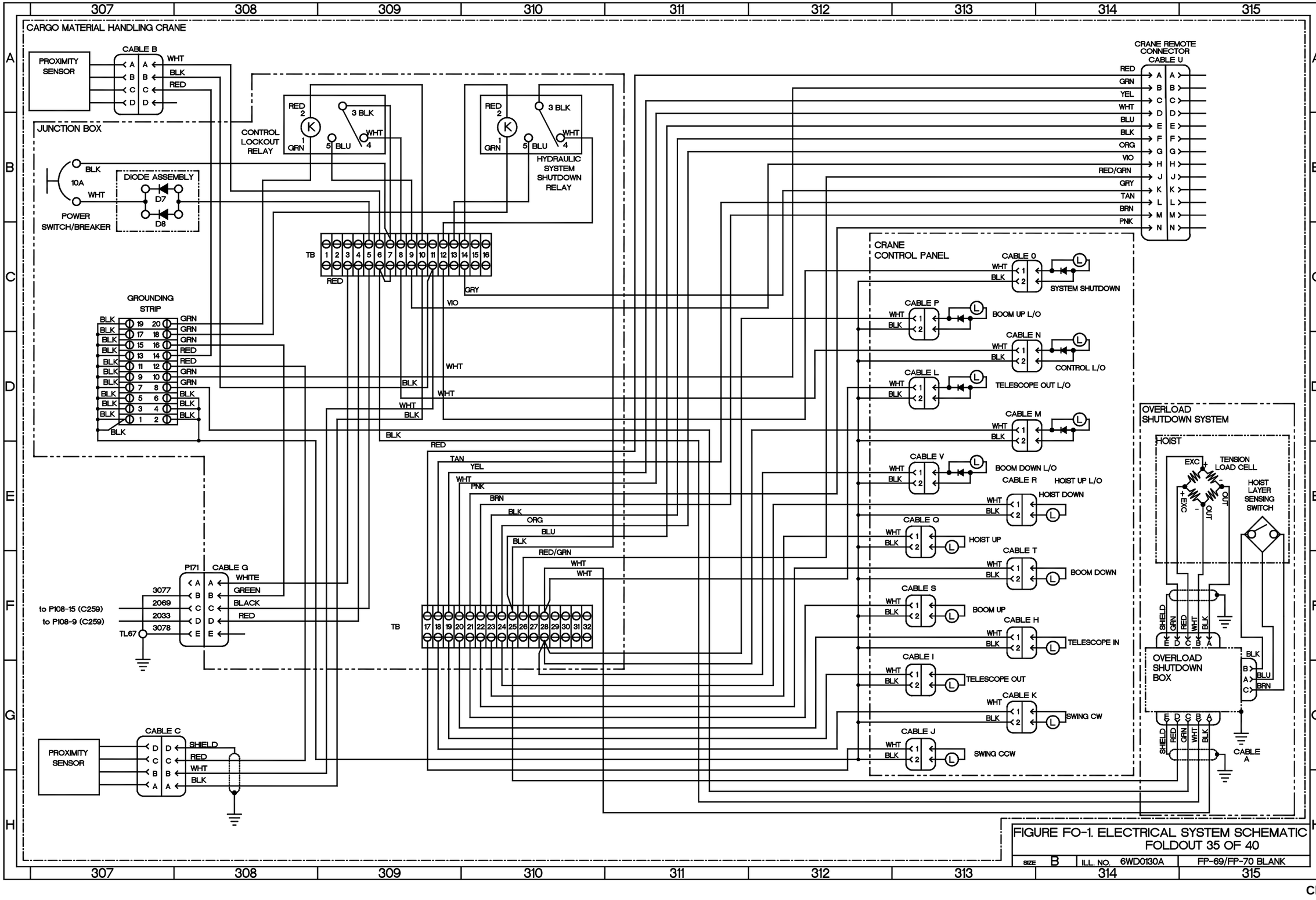


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 35 OF 40

SIZE B | ILL. NO. 6WD0130A | FP-69/FP-70 BLANK

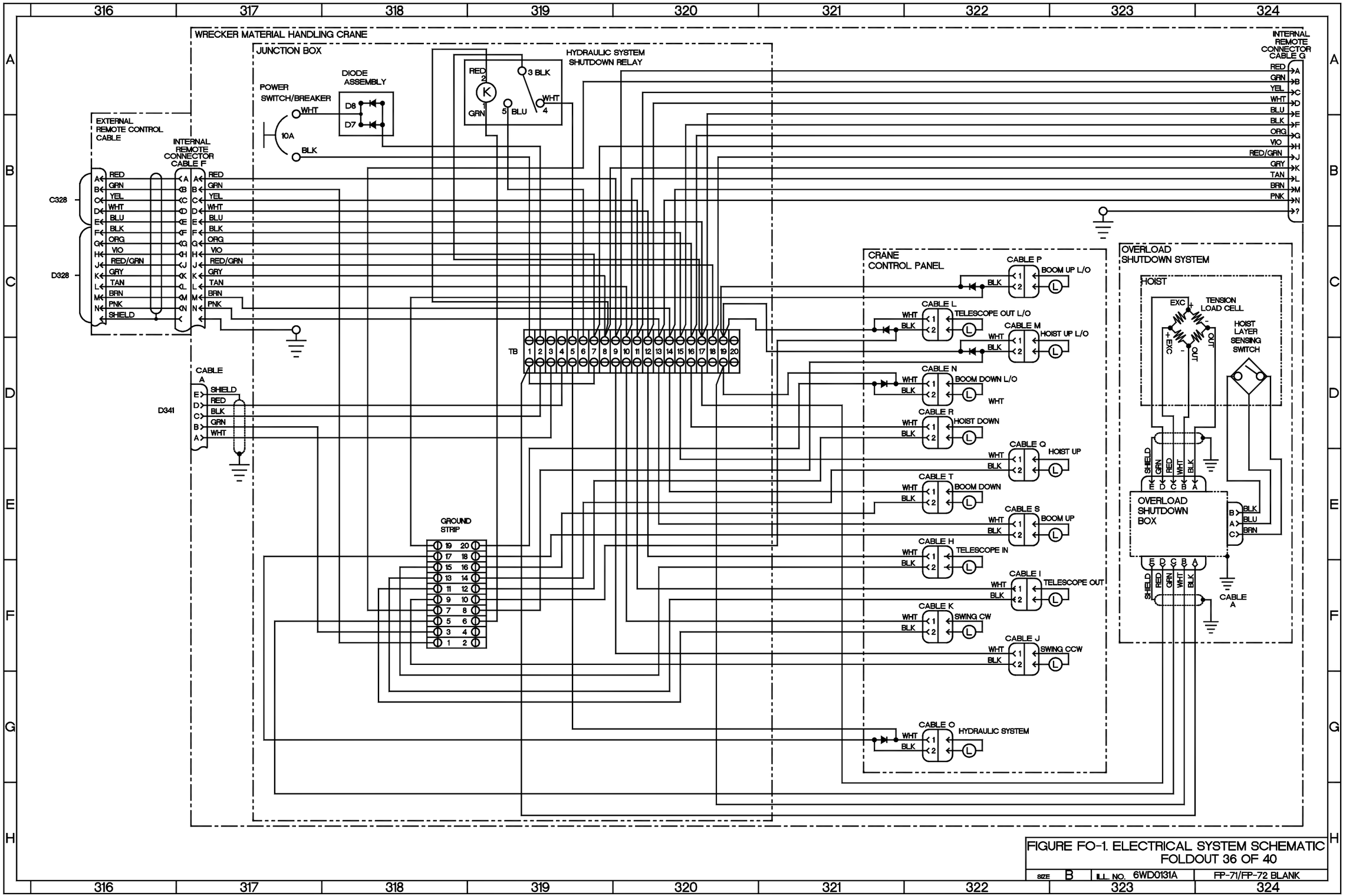


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 36 OF 40

SIZE	ILL. NO.	
B	6WD0131A	FP-71/FP-72 BLANK

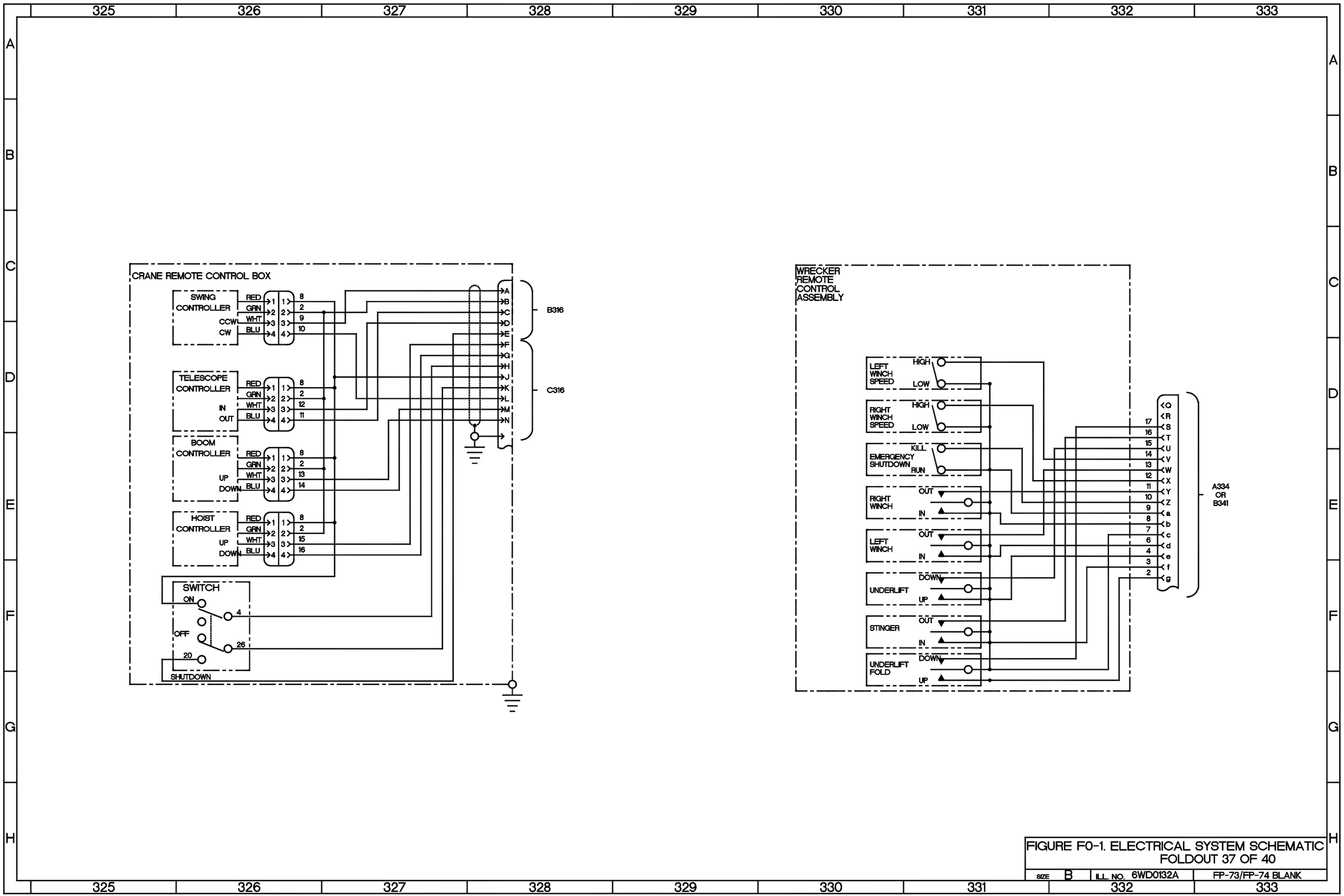


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 37 OF 40

SIZE	ILL. NO.	
B	6WD0132A	FP-73/FP-74 BLANK

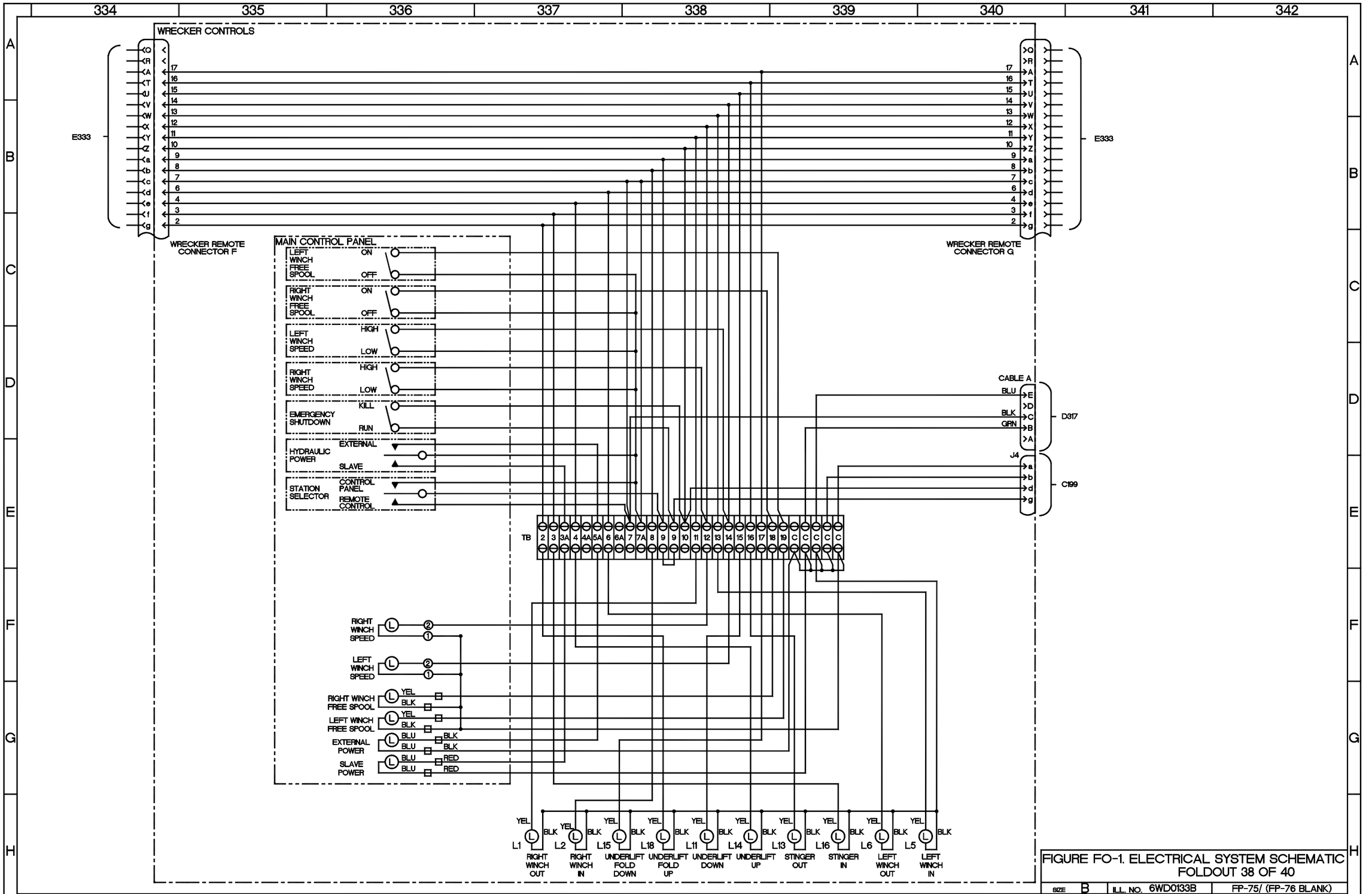


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 38 OF 40

SIZE	ILL. NO.	
B	6WD0133B	FP-75/ (FP-76 BLANK)

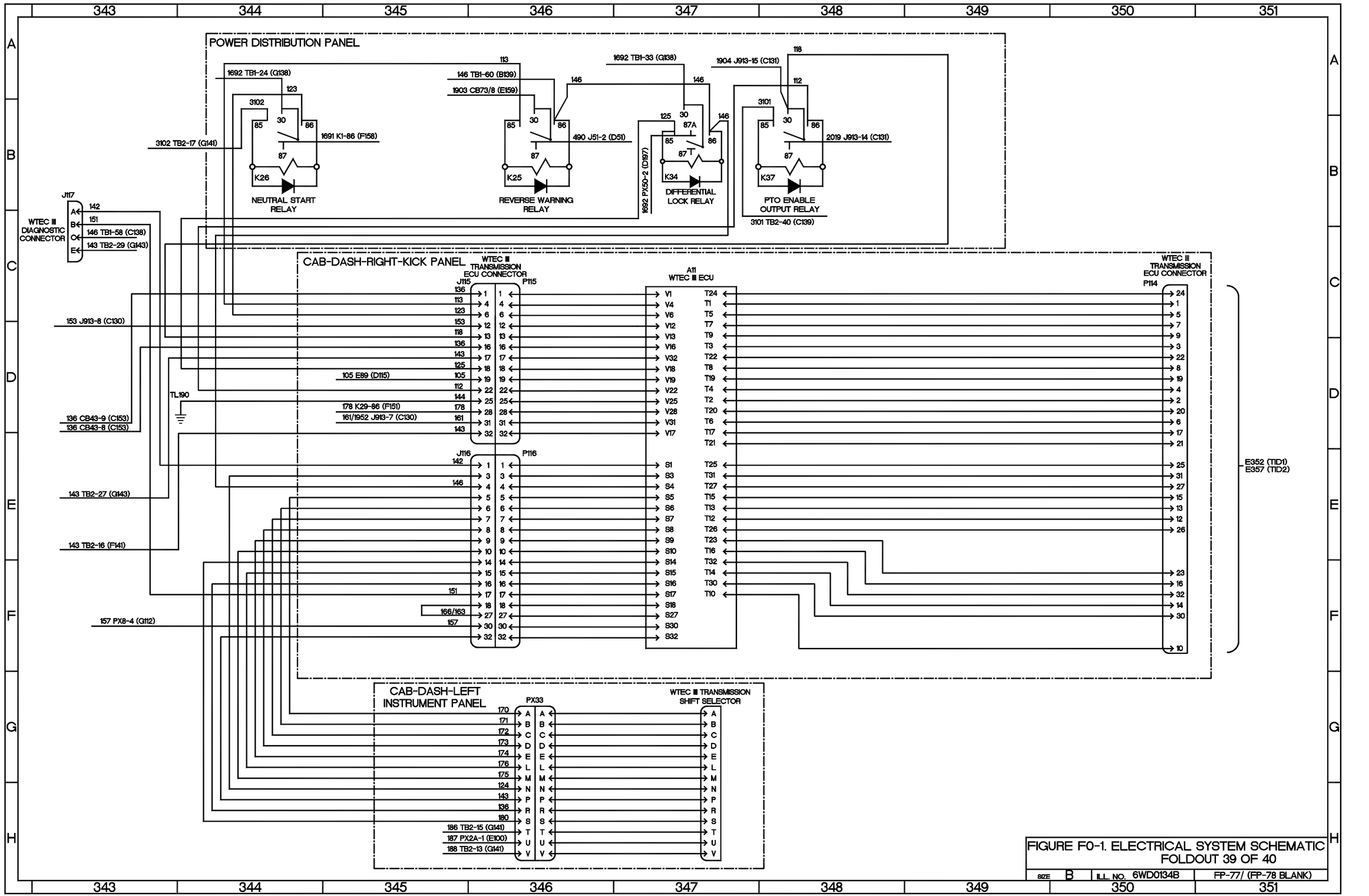


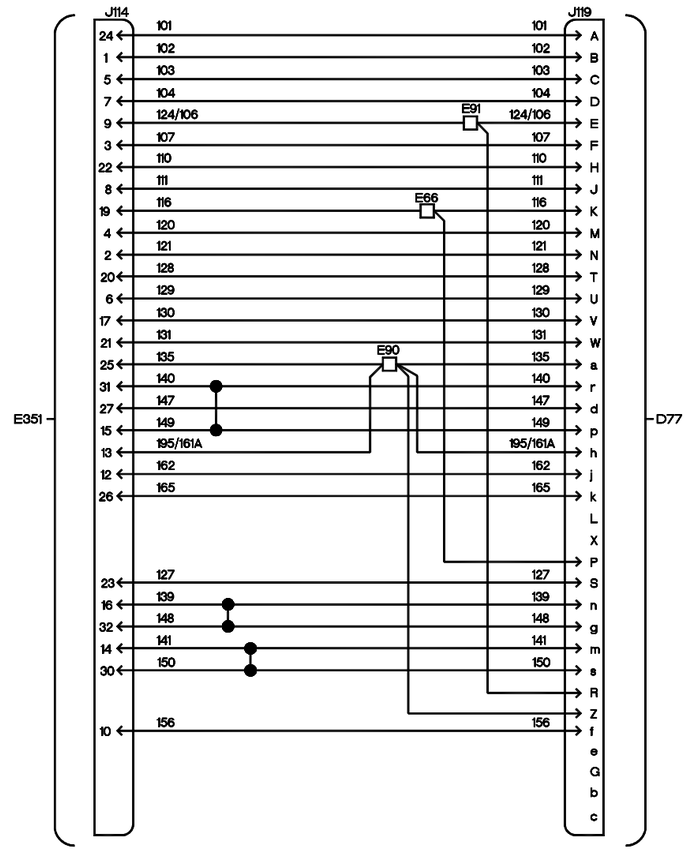
FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 39 OF 40

SIZE	ILL. NO.	
B	6WD0134B	FP-77/ (FP-78 BLANK)

352 353 354 355 356 357 358 359 360

TRANSMISSION SERIAL #: 6510090785 AND LOWER

WTEC III CAB TRANSMISSION HARNESS (TID1)



TRANSMISSION SERIAL #: 6510090786 AND HIGHER

WTEC III CAB TRANSMISSION HARNESS (TID2)

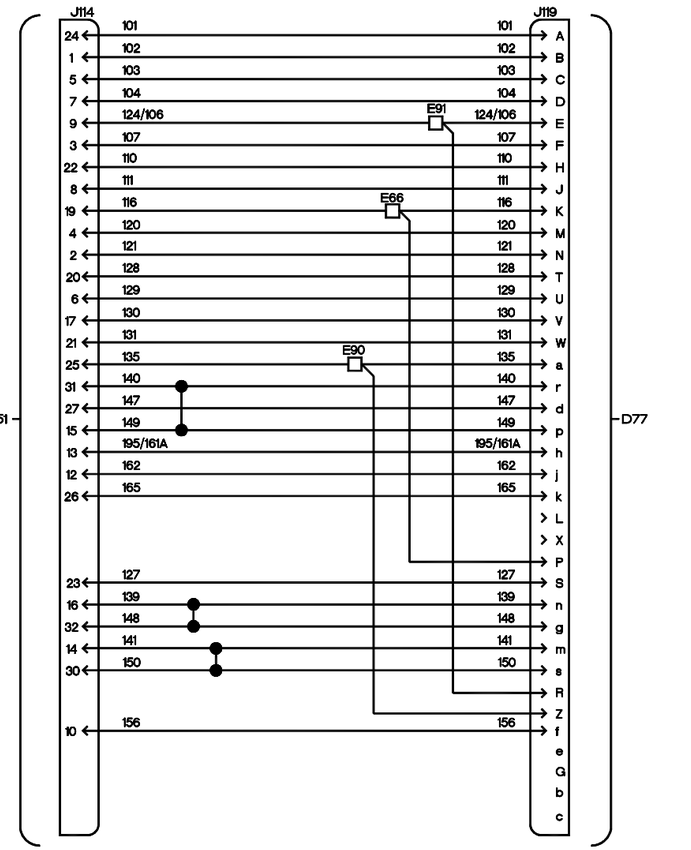


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 40 OF 40

SIZE B | ILL NO. 6WD0135B | FP-79/ (FP-80 BLANK)

352 353 354 355 356 357 358 359 360

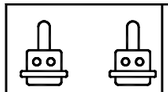
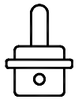
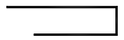
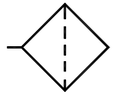
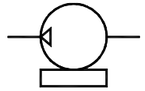
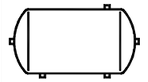
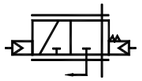
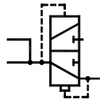
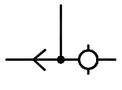
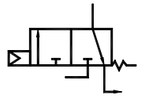
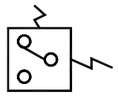
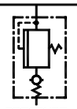
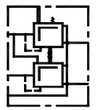
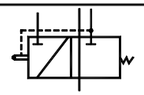
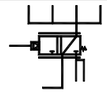
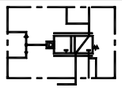
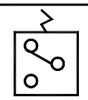
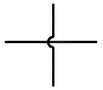
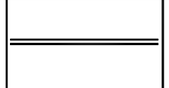
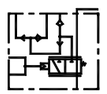
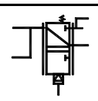
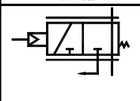
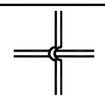
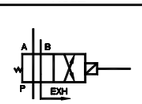
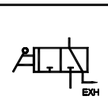
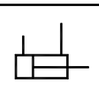
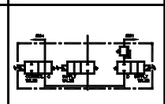
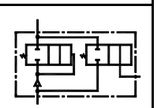
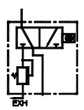
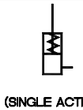
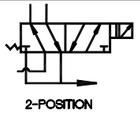
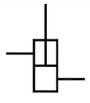
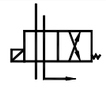
 REAR AXLE BRAKE CHAMBER	 FRONT AXLE BRAKE CHAMBER	 COUPLER AIR BRAKE	 AIR DRYER	 AIR CLEANER INTAKE	 AIR COMPRESSOR WITH GOVERNOR	 AIR TANK	 DASH GAUGE
 MANUAL VALVE	 ONE WAY CHECK VALVE	 FAN CLUTCH	 MODULATED CONTROL VALVE	 QUICK RELEASE VALVE	 TWO WAY CHECK VALVE	 3/2 WAY SOLENOID VALVE	 PRESSURE SWITCH
 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	 INTERMEDIATE DIFFERENTIAL	 AIR BRAKE PRESSURE TRANSMITTER
 BOOSTER VALVE	 AIR/HYDRAULIC INVERSION VALVE	 DELIVERY AIR HOSE NO CONNECTION	 DUMP TAILGATE SOLENOID	 BLEED VALVE	 TAILGATE CYLINDER	 CTIS MANIFOLD VALVE	 WHEEL VALVE
 KNEELING VALVE	 TIRE	 (SINGLE ACTING) CYLINDER RETURN SPRING	 2-POSITION SPRING OFFSET SOLENOID VALVE	 (DOUBLE ACTING) CYLINDER	 MANIFOLD VALVE	 2-POSITION SOLENOID VALVE	

FIGURE F0-2 PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 1 OF 4

SIZE	ILL. NO.	
B	6PD01AL1	FP-1/FP-2 BLANK

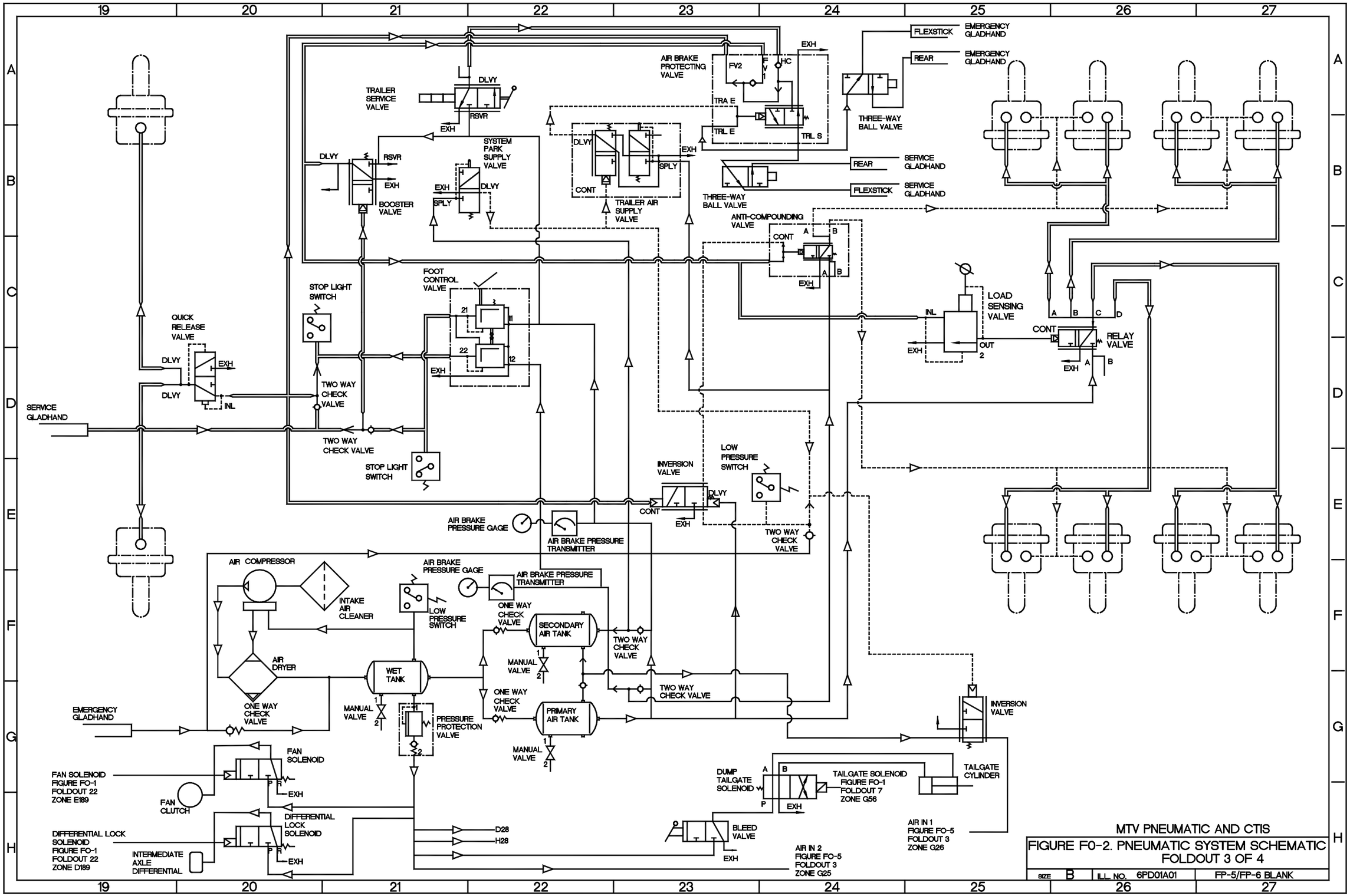
SH	ZONE	DESCRIPTION
3	E22	AIR BRAKE PRESSURE TRANSMITTER
3	F21	AIR BRAKE PRESSURE TRANSMITTER
3	A23	AIR BRAKE PROTECTING VALVE
3	F20	AIR COMPRESSOR
3	F20	AIR DRYER
3	B24	ANTI-COMPOUNDING VALVE
3	H23	BLEED VALVE
3	B21	BOOSTER VALVE
4	D30	CONTROL VALVE
4	C30	CTIS MANIFOLD VALVE
4	D31	DEFLATE VALVE
3	H20	DIFFERENTIAL LOCK SOLENOID
3	G24	DUMP TAILGATE SOLENOID
3	A25	EMERGENCY GLADHAND
3	A25	EMERGENCY GLADHAND
3	G19	EMERGENCY GLADHAND
3	H20	FAN CLUTCH
3	G20	FAN SOLENOID
3	C22	FOOT CONTROL VALVE
3	F20	INTAKE AIR CLEANER
3	H19	INTERMEDIATE AXLE DIFFERENTIAL
3	E23	INVERSION VALVE
3	G25	INVERSION VALVE
4	A28	KNEELING VALVE
4	C28	KNEELING VALVE
4	E28	LH MAIN WINCH FREESPOOL
4	E30	LH MAIN WINCH TENSIONER
4	G29	LH MAIN WINCH VALVE
3	C25	LOAD SENSING VALVE
3	E23	LOW PRESSURE SWITCH
3	F21	LOW PRESSURE SWITCH
4	F28	MANIFOLD
4	G29	MANIFOLD
3	F22	MANUAL VALVE
3	G21	MANUAL VALVE
3	G22	MANUAL VALVE
3	F22	ONE WAY CHECK VALVE
3	G20	ONE WAY CHECK VALVE
3	G22	ONE WAY CHECK VALVE
3	G21	PRESSURE PROTECTION VALVE
3	G22	PRIMARY AIR TANK
4	B30	QUICK RELEASE VALVE
4	B33	QUICK RELEASE VALVE
4	B36	QUICK RELEASE VALVE
3	C20	QUICK RELEASE VALVE
4	E30	REGULATOR
4	E31	REGULATOR

SH	ZONE	DESCRIPTION
4	F28	REGULATOR
3	D26	RELAY VALVE
4	E29	RH MAIN WINCH FREESPOOL
4	E30	RH MAIN WINCH TENSIONER
4	G33	RH MAIN WINCH VALVE
3	F22	SECONDARY AIR TANK
3	B24	SERVICE GLADHAND
3	B24	SERVICE GLADHAND
3	D19	SERVICE GLADHAND
4	G30	STINGER VALVE
3	C20	STOPLIGHT SWITCH
3	E21	STOPLIGHT SWITCH
4	D31	SUPPLY VALVE
3	B21	SYSTEM PARK SUPPLY VALVE
3	G25	TAILGATE CYLINDER
3	A24	THREE WAY BALL VALVE
3	B23	THREE WAY BALL VALVE
3	B22	TRAILER AIR SUPPLY VALVE
3	A21	TRAILER SERVICE VALVE
3	D21	TWO WAY CHECK VALVE
3	D21	TWO WAY CHECK VALVE
3	E24	TWO WAY CHECK VALVE
4	E30	TWO WAY CHECK VALVE
4	E30	TWO WAY CHECK VALVE
3	F23	TWO WAY CHECK VALVE
3	G23	TWO WAY CHECK VALVE
4	G32	UNDERLIFT FOLD VALVE
4	G31	UNDERLIFT VALVE
3	F21	WET TANK
4	C34	WHEEL VALVE
4	A28	WHEEL VALVE
4	A32	WHEEL VALVE
4	A34	WHEEL VALVE
4	C28	WHEEL VALVE
4	C32	WHEEL VALVE

MTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 2 OF 4

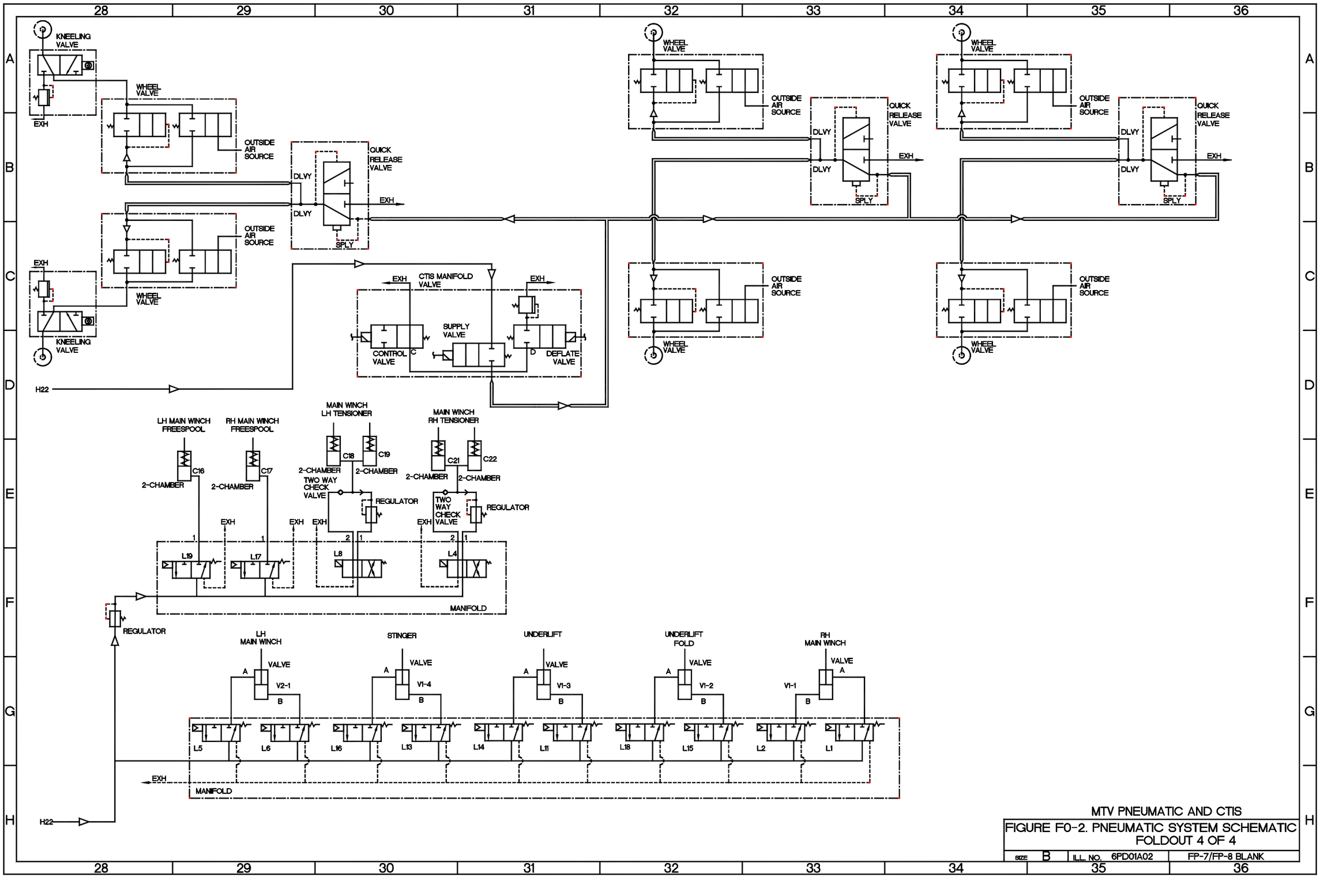
SIZE	ILL. NO.	
B	6PD01AL2	FP-3/FP-4 BLANK



MTV PNEUMATIC AND CTIS

FIGURE FO-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 3 OF 4

SIZE	ILL. NO.	
B	6PD01A01	FP-5/FP-6 BLANK



MTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 4 OF 4

SIZE	ILL. NO.	
B	6PD01A02	FP-7/FP-8 BLANK

CHECK VALVE	BYPASS VALVE	CHECK VALVE	AIR OR OIL FILTER	MOTOR	PUMP	PTO	HOIST CYLINDER
AIR LINE LUBRICATOR	CYLINDER	HYDRAULIC ACCUMULATOR	FLOW CONTROL VALVE	CLOSED 2 WAY VALVE	2 WAY SOLENOID VALVE	VALVE	SWING MOTOR
DIRECTIONAL CONTROL VALVE	PRESSURE CONTROL VALVE	CHECK VALVE	HOLDING VALVE	NORMALLY CLOSED 2 WAY VALVE	PRESSURE RELIEF VALVE	SWING DRIVE	RESERVOIR
VALVE	HYDRAULIC CYLINDER	MANUAL SHUT OFF	SUCTION LINE	CROSS OVER RELIEF VALVE	HAND PUMP	MOTOR CONTROL VALVE	

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC

FOLDOUT 1 OF 8

SIZE B | ILL. NO. 6HD01AL1 | FP-1/FP-2 BLANK

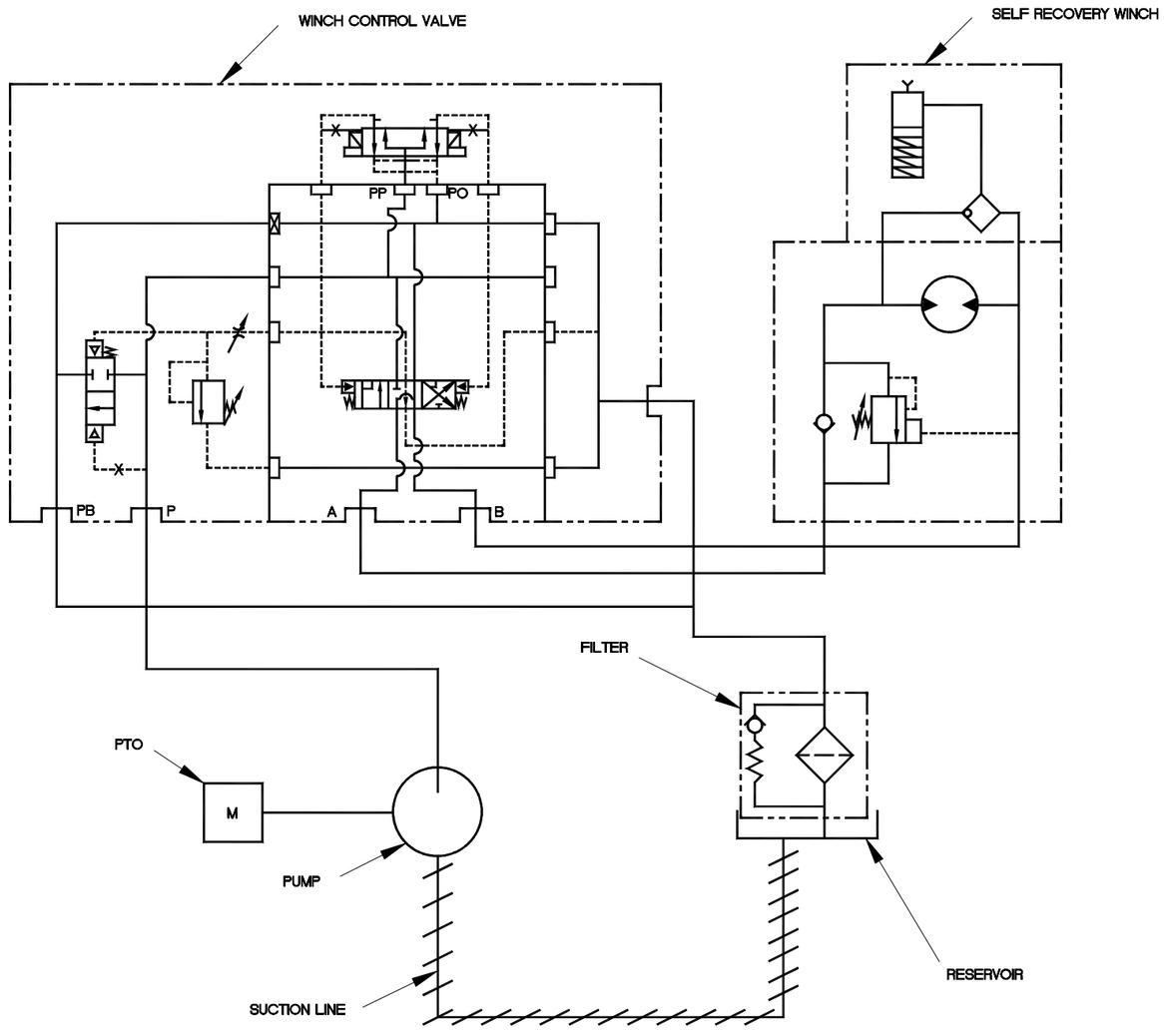
SH	ZONE	DESCRIPTION
6	D46	2 WAY SOLENOID VALVE
7	D60	2 WAY SOLENOID VALVE
7	D55	2 WAY SOLENOID VALVE, OPERATING PRESS
7	F60	3 BANK VALVE ASSEMBLY
7	C61	4 BANK VALVE ASSEMBLY
6	B52	BOOM
7	F55	BULKHEAD PLATE (SUBFRAME)
7	F57	CHECK VALVE
7	G62	CHECK VALVE
7	D55	CHECK VALVE
5	E37	CHECK VALVE CK1
5	E37	CHECK VALVE CK2
5	E37	CHECK VALVE CK3
5	E37	CHECK VALVE CK4
5	E37	CHECK VALVE CK5
5	E37	CHECK VALVE CK6
8	E65	CONTROL VALVE
5	B44	COUNTERBALANCE VALVE
6	B48	CROSS RELIEF VALVE
7	C57	CROSS RELIEF VALVE
8	E64	DUMP BODY HYDRAULIC HOIST
6	G48	ERECTION CYLINDER
5	E38	FC1 SLAVE POWER
5	E38	FC2 EXTERNAL POWER
3	F23	FILTER
4	D34	FILTER
8	E68	FILTER
5	B43	FLOW CONTROL VALVE
5	B45	FLOW CONTROL VALVE
5	B43	FOLD CYLINDER
7	C62	FULL FLOW
6	G54	GAUGE PORT
6	E47	HAND PUMP
7	E56	HAND PUMP
7	G57	HOIST
7	A62	HOIST
6	B53	HOIST
8	G65	HOIST CYLINDER
7	G58	HOIST MOTOR
6	G46	HOIST MOTOR
7	H57	HOIST MOTOR CONTROL VALVE
6	H46	HOIST MOTOR CONTROL VALVE
7	H59	HOLDING VALVE
7	G62	HOLDING VALVE
6	C47	HOLDING VALVE
6	H53	HOLDING VALVE
7	C55	HOLDING VALVE
7	G56	HOLDING VALVES
6	E48	HOLDING VALVES
6	G48	HOLDING VALVES
5	D41	HYDRAULIC MOTOR, PAY-OUT
5	E41	HYDRAULIC MOTOR, PAY-OUT
7	A60	HYDRAULIC ACCUMULATOR

SH	ZONE	DESCRIPTION
6	E54	HYDRAULIC ACCUMULATOR
7	H61	LEFT JACK CYLINDER
6	H49	LEFT JACK CYLINDER
5	G42	LEFT MAIN WINCH
7	A61	LIFT
6	E48	LIFT CYLINDERS
5	C37	LINEAR DIRECTIONAL CONTROL VALVE
5	B42	LOWER MAIN CONTROL VALVE ASSEMBLY
5	D37	M1089 MATERIAL HANDLING CRANE LOC.
6	B51	MANUAL OVERRIDE
7	G61	MAST ERECTION
7	H59	MAST ERECTION CYLINDER
4	C30	MATERIAL HANDLING EQUIPMENT
5	E38	MC1 SLAVE POWER
5	E38	MC2 EXTERNAL POWER
5	D40	MONO BLOCK VALVE ASSEMBLY
7	G58	MOTOR DRAIN
6	G46	MOTOR DRAIN
6	D54	N/C 2 WAY VALVE
6	H52	OUTRIGGER EXTENSION CYLINDER
7	A60	PRESSURE CHECK POINT
3	F21	PTO
4	E32	PTO
8	G68	PTO
3	F22	PUMP
4	E33	PUMP
8	F68	PUMP
5	F37	PUMP ASSEMBLY
5	D41	RELIEF VALVE
5	E41	RELIEF VALVE
5	F42	RELIEF VALVE ASSEMBLY
5	B42	RELIEF VALVE ASSY (RIGHT MAIN WINCH)
3	F24	RESERVOIR
4	F34	RESERVOIR
8	G69	RESERVOIR
5	G40	RETURN VALVE
5	B44	RH UNDERLIFT COUNTERBALANCE VALVE
7	G62	RIGHT JACK CYLINDER
6	H54	RIGHT JACK CYLINDER
5	B42	RIGHT MAIN WINCH
5	F40	SAMPLING VALVE
3	B24	SELF RECOVERY WINCH
5	G41	SELF RECOVERY WINCH
8	B71	SELF RECOVERY WINCH
5	G43	STIFFLEG CYLINDER LH
5	G45	STIFFLEG CYLINDER RH
5	B45	STINGER CYLINDER
7	F55	SUCTION LINE-HAND PUMP
3	G22	SUCTION LINE
4	F33	SUCTION LINE
5	F37	SUPPLY VALVE
7	A58	SWING
6	B50	SWING

SH	ZONE	DESCRIPTION
6	B48	SWING DRIVE
7	B57	SWING DRIVE
6	A48	SWING MOTOR
7	B57	SWING MOTOR
6	C46	TELESCOPE CYLINDER
7	A59	TELESCOPE
6	B51	TELESCOPE
7	B55	TELESCOPE CYLINDER
5	A44	TELESCOPIC LIFT CYLINDER, LH
5	A45	TELESCOPIC LIFT CYLINDER, RH
6	F49	UNLOADER VALVE
7	E56	UNLOADER VALVE
5	E42	UPPER MAIN CONTROL VALVE ASSEMBLY
5	E37	VALVE, SELECTOR
3	B21	WINCH CONTROL VALVE
8	B69	WINCH CONTROL VALVE

FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 8

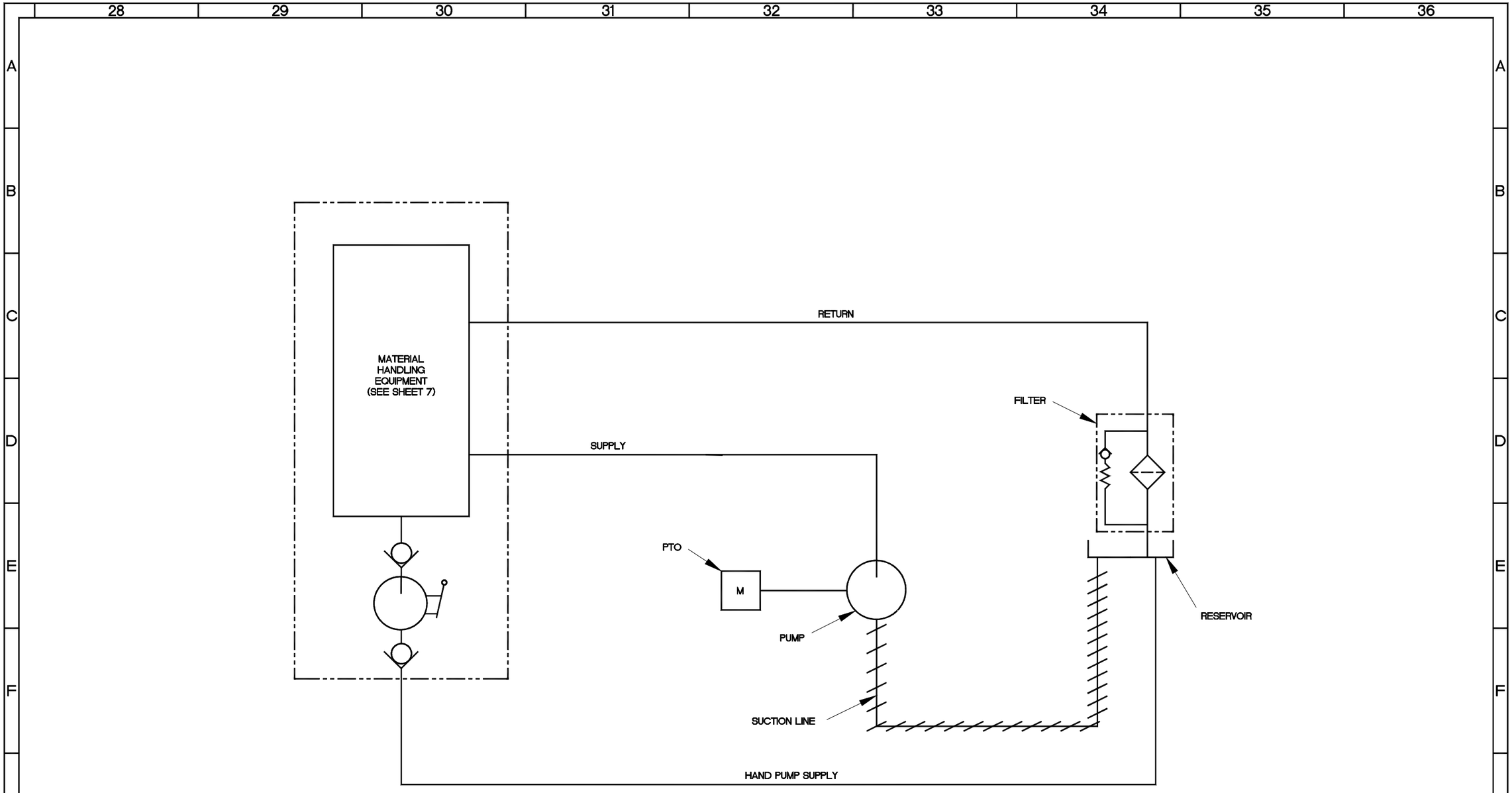
SIZE B | ILL. NO. 6HD01AL2 | FP-3/FP-4 BLANK



MTV TRUCK W/WINCH

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 8

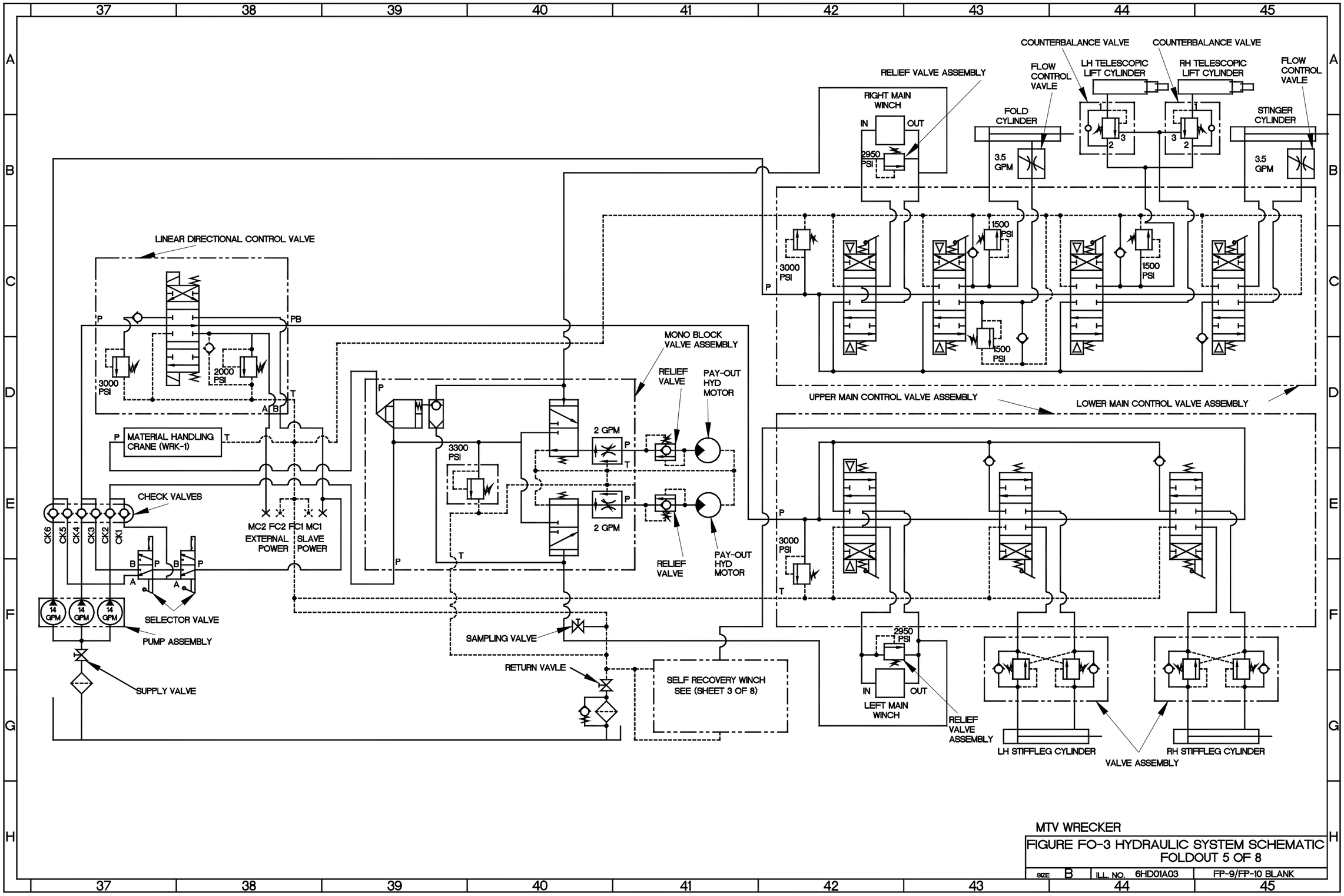
SIZE	ILL. NO.	
B	6HD01A01	FP-5/FP-6 BLANK



MTV MATERIAL HANDLING CRANE

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 4 OF 8

SIZE B | ILL. NO. 6HD01A02 | FP-7/FP-8 BLANK



MTV WRECKER

FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 5 OF 8

SIZE	ILL. NO.	
B	6HD01A03	FP-9/FP-10 BLANK

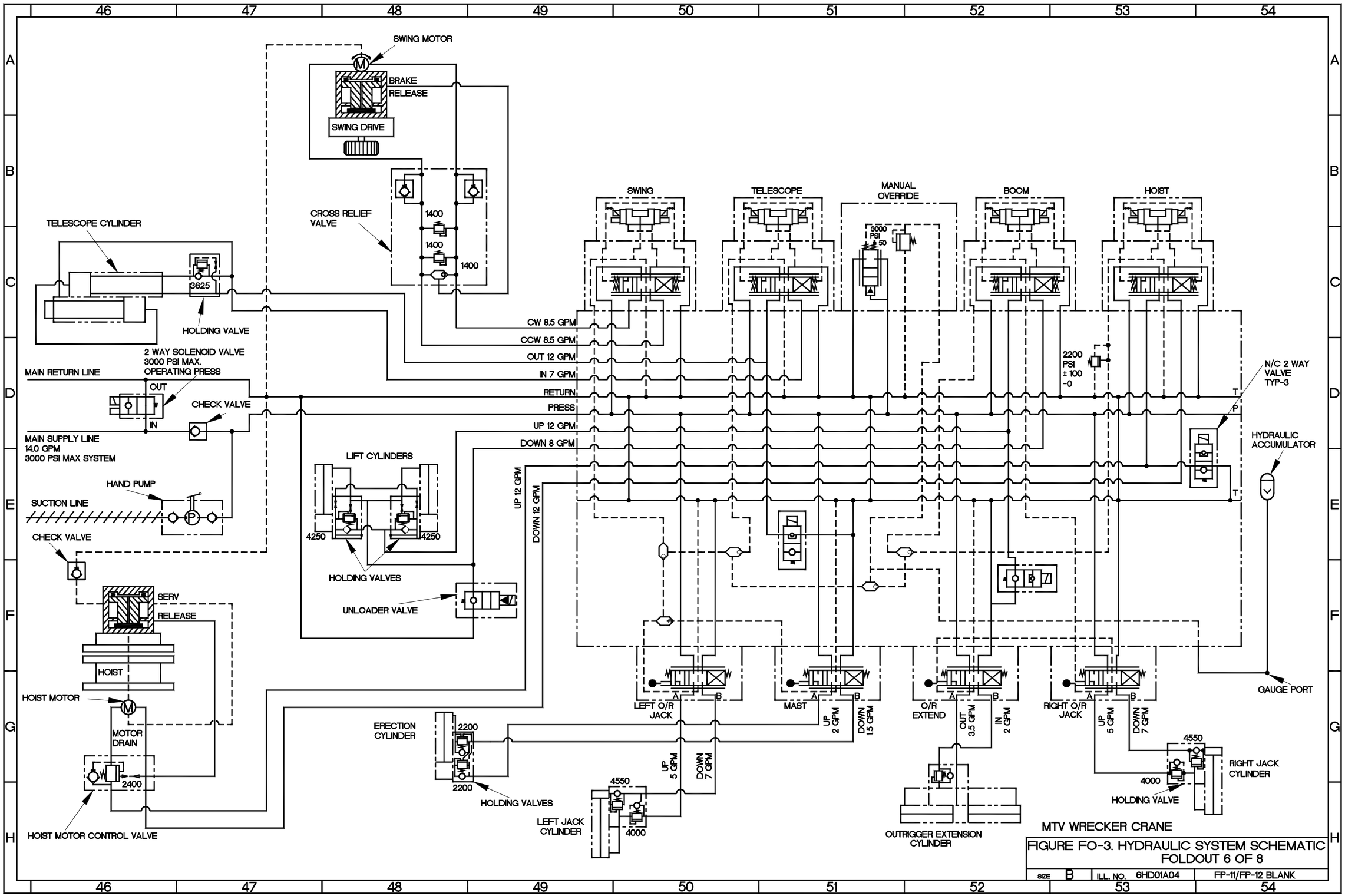
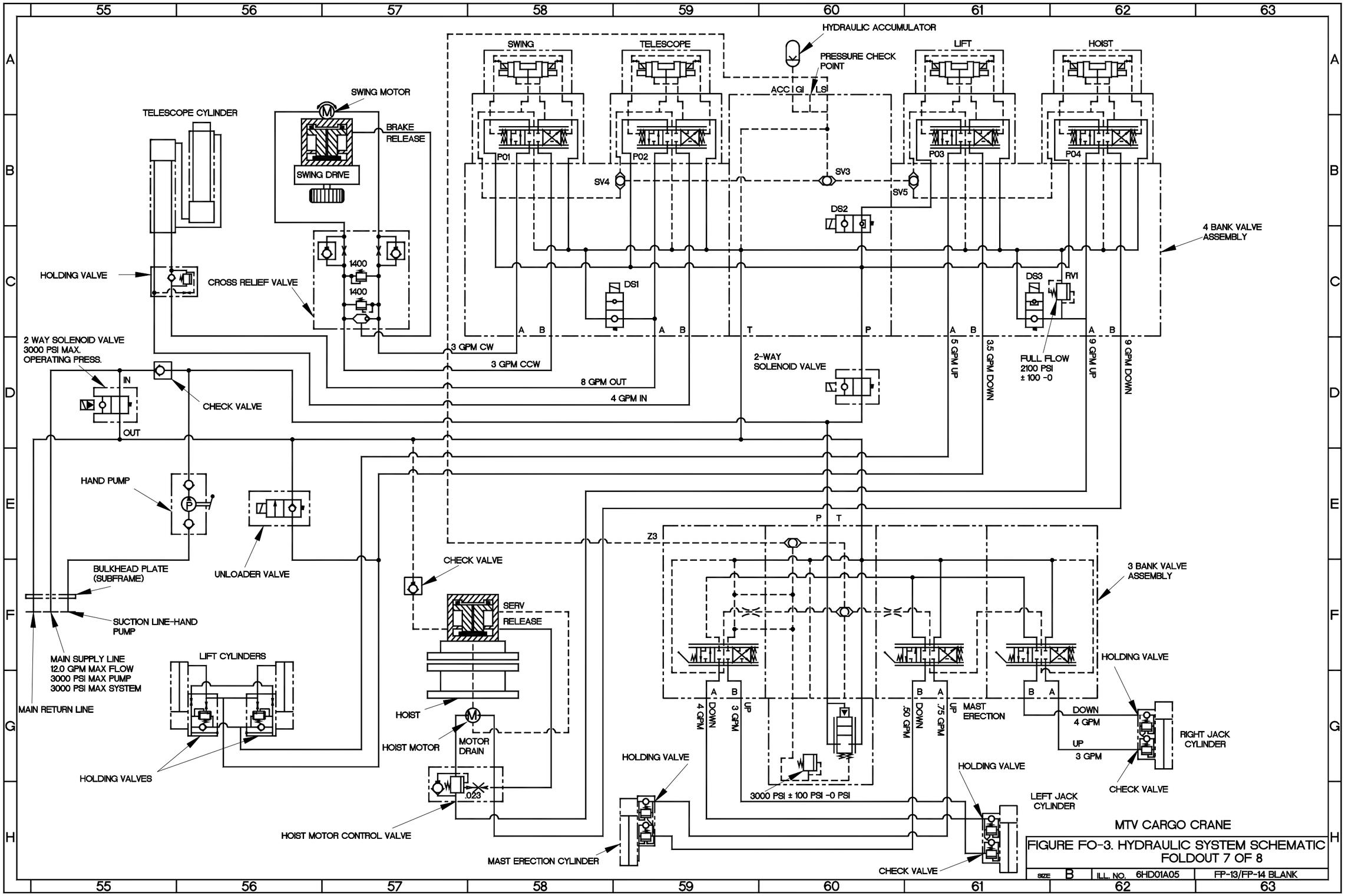


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 6 OF 8

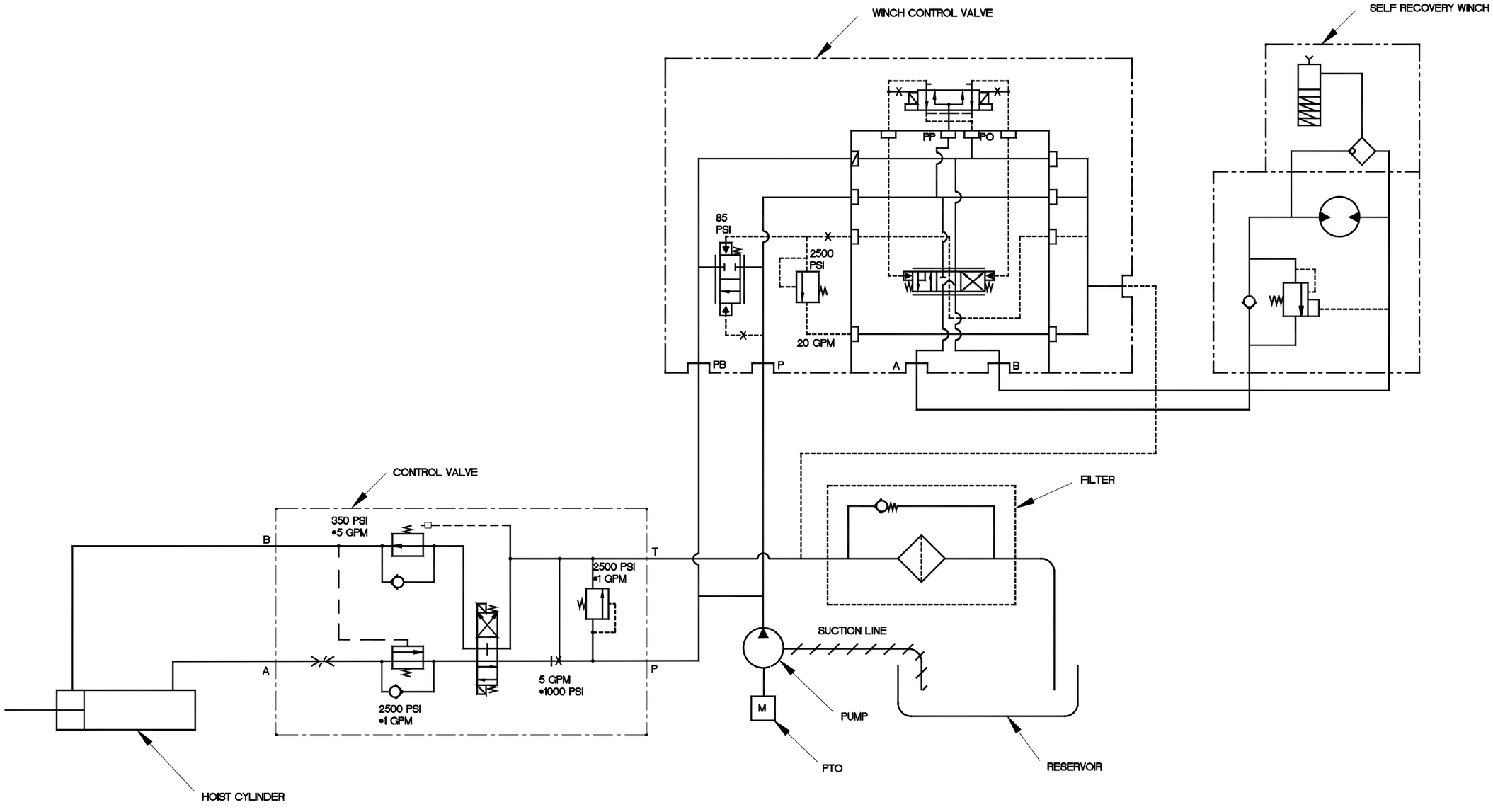
SIZE	ILL. NO.	
B	6HD01A04	FP-11/FP-12 BLANK



MTV CARGO CRANE

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 7 OF 8

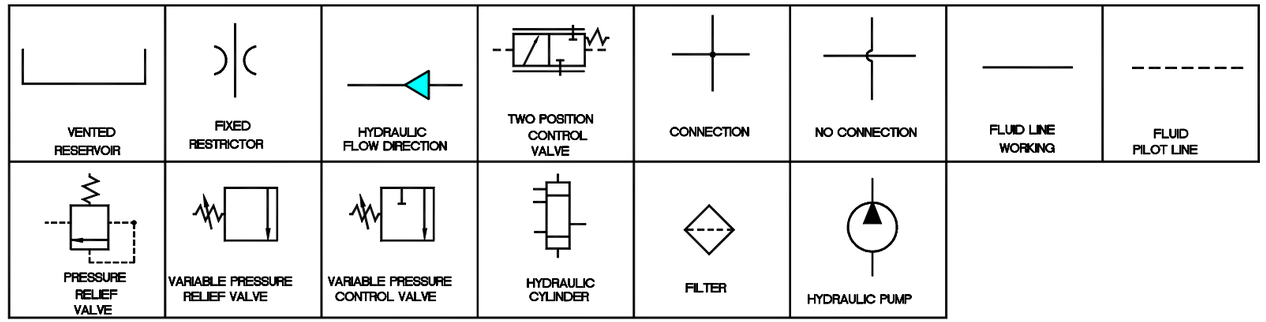
SIZE	ILL. NO.	
B	6HD01A05	FP-13/FP-14 BLANK



MTV DUMP W/ WINCH
MTV DUMP W/O WINCH

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 8 OF 8

SIZE	ILL. NO.	
B	6HD01A06	FP-15/FP-16 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

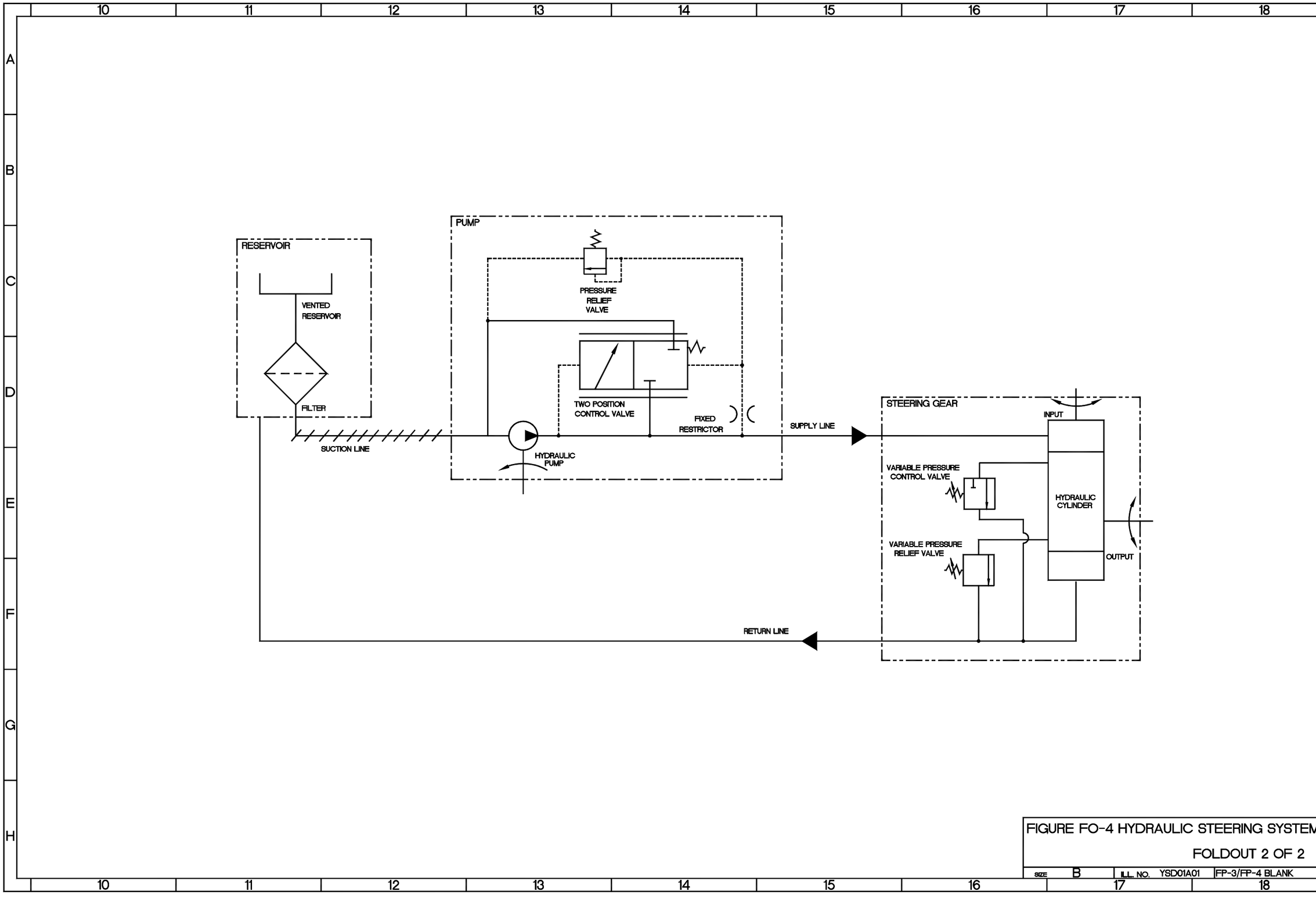


FIGURE FO-4 HYDRAULIC STEERING SYSTEM

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

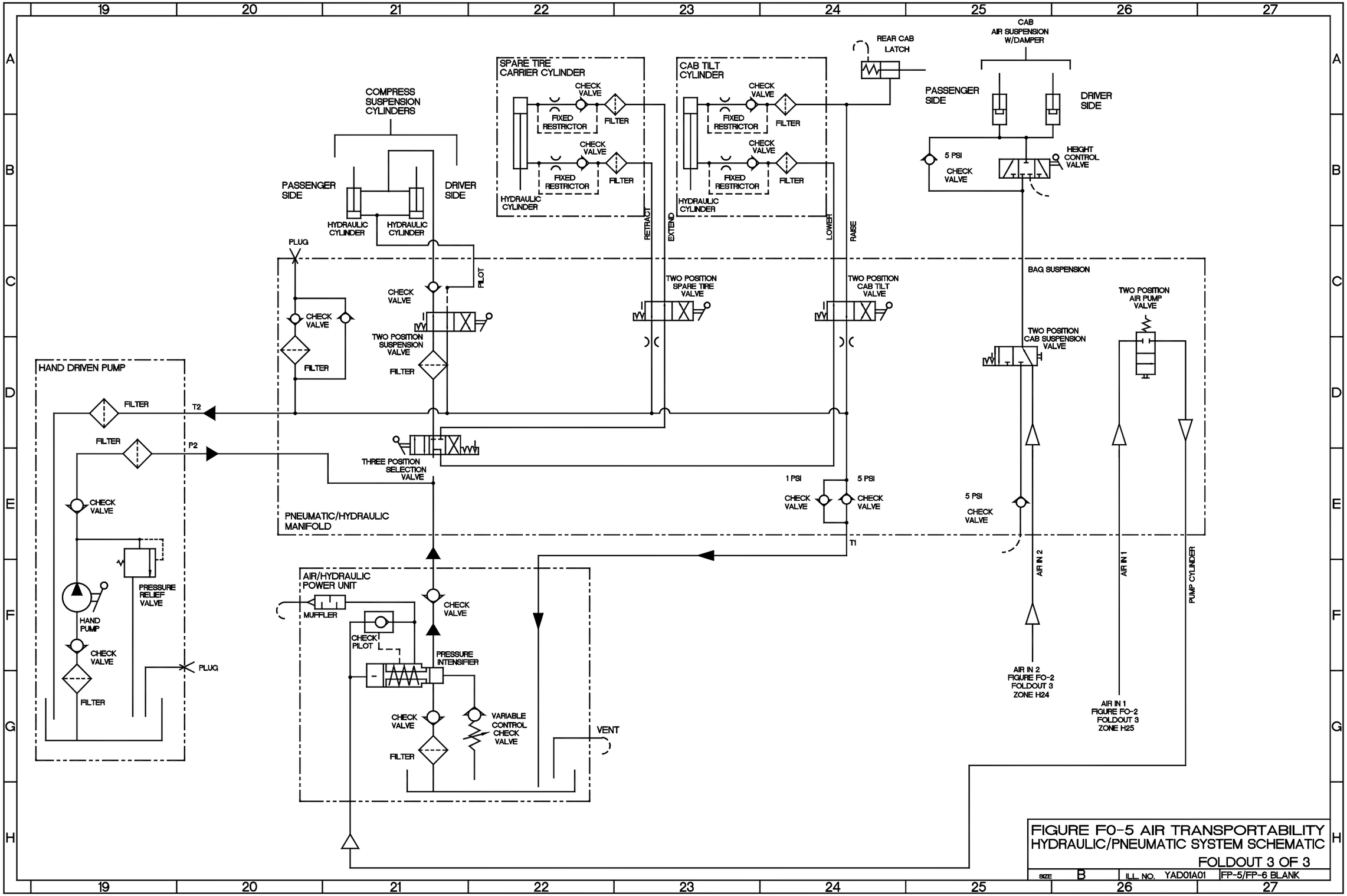


FIGURE FO-5 AIR TRANSPORTABILITY HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 3

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

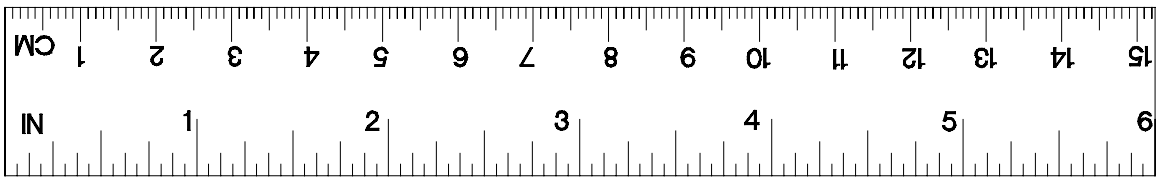
TEMPERATURE

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: 076878-000