# ARMY TM 9-2320-366-34-3
# AIR FORCE T.O. 36A12-1C-1092-3

# TECHNICAL MANUAL
# MAINTENANCE INSTRUCTIONS
# DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
# M1083 SERIES, 5-TON,6X6,
# MEDIUM TACTICAL VEHICLES (MTV)

## VOLUME NO. 3 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
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CAB AND BODY MAINTENANCE
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MATERIAL HANDLING CRANES (MHC), 30K WINCHES, UNDERLIFT, AND 15K SELF-RECOVERY WINCH (SRW) MAINTENANCE
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HYDRAULIC SYSTEM MAINTENANCE
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DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENTS OF THE ARMY AND THE AIR FORCE

15 SEPTEMBER 1998

## 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 protection 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.**

**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. 3 OF 4

TM 9-2320-366-34-3, 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 thru C/(D Blank) |
| i thru iv | i thru iv |
| none | v and vi |
| 15-1 thru 15-6 | 15-1 thru 15-6 |
| 15-11 thru 15-24 | 15-11 thru 15-24 |
| 15-27 thru 15-30 | 15-27 thru 15-30 |
| none | 15-30.1/(15-30.2 Blank) |
| 15-33 thru 15-48 | 15-33 thru 15-48 |
| none | 15-48.1/(15-48.2 Blank) |
| 15-49 and 15-50 | 15-49 and 15-50 |
| 15-53 and 15-54 | 15-53 and 15-54 |
| none | 15-54.1/(15-54.2 Blank) |
| 15-55 thru 15-62 | 15-55 thru 15-62 |
| 15-65 and 15-66 | 15-65 and 15-66 |
| 15-71 and 15-72 | 15-71 and 15-72 |
| none | 15-72.1 and 15-72.2 |
| 15-73 thru 15-76 | 15-73 thru 15-76 |
| none | 15-76.1/(15-76.2 Blank) |
| 15-77 and 15-78 | 15-77 and 15-78 |
| none | 15-82.1/(15-82.2 Blank) |
| 15-83 and 15-84 | 15-83 and 15-84 |
| 15-87 and 15-88 | 15-87 and 15-88 |
| 15-97 thru 15-108 | 15-97 thru 15-108 |
| 15-119 and 15-120 | 15-119 and 15-120 |
| none | 15-120.1 thru 15-120.5/ (15-120.6 Blank) |
| 15-121 and 15-122 | 15-121 and 15-122 |
| 15-125 thru 15-128 | 15-125 thru 15-128 |
| none | 15-128.1 and 15-128.2 |
| 15-129 thru 15-138 | 15-129 thru 15-138 |
| 16-1 and 16-2 | 16-1 and 16-2 |
| 16-133 and 16-134 | 16-133 and 16-134 |
| 16-171 thru 16-174 | 16-171 thru 16-174 |
| 16-345 thru 16-352 | 16-345 thru 16-352 |
| 16-373 thru 16-376 | 16-373 thru 16-376 |
| 16-389 and 16-390 | 16-389 and 16-390 |
| none | 16-390.1 thru 16-390.3/ (16-390.4 Blank) |
| 16-391 thru 16-394 | 16-391 thru 16-394 |
| 16-395 thru 16-400 | none |
| 16-435 and 16-436 | 16-435 and 16-436 |
| 16-487 and 16-488 | 16-487 and 16-488 |
| none | 16-488.1/(16-488.2 Blank) |
| 16-489 and 16-490 | 16-489 and 16-490 |
| 16-497 and 16-498 | 16-497 and 16-498 |
| none | 16-500.1 and 16-500.2 |
| 16-501 and 16-502 | 16-501 and 16-502 |
| none | 16-502.1 thru 16-502.12 |
| 16-503 thru 16-516 | 16-503 thru 16-516 |
| none | 16-516.1 thru 16-516.13/ (16-516.14 Blank) |
| 16-517 thru 16-520 | 16-517 thru 16-520 |
| 16-535 thru 16-538 | 16-535 thru 16-538 |
| 15-567 and 16-570 | 16-567 and 16-570 |
| none | 16-570.1 and 16-570.2 |
| 16-571 thru 16-574 | 16-571 thru 16-574 |
| none | 16-574.1/(16-574.2 Blank) |
| 16-575 and 16-576 | 16-575 and 16-576 |
| none | 16-578.1 and 16-578.2 |
| 6-579 thru 16-582 | 16-579 thru 16-582 |
| none | 16-582.1 and 16-582.2 |
| 16-583 and 16-584 | 16-583 and 16-584 |
| none | 16-584.1/(16-584.2 Blank) |
| 16-585/(16-586 Blank) | 16-585 and 16-586 |
| none | 16-587 thru 16-589/(16-590 Blank) |

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

| Remove Pages | Insert Pages | Remove Pages | Insert Pages |
|---|---|---|---|
| 17-1 thru 17-8 | 17-1 thru 17-7/(17-8 Blank) | | |
| 17-9 and 17-10 | none | | |
| 17-11 and 17-12 | (17-11 Blank)/17-12 | | |
| 17-13 and 17-14 | 17-13 and 17-14 | | |
| none | 17-14.1 thru 17-14.12 | | |
| 17-15 thru 17-26 | 17-15 thru 17-26 | | |
| 17-31/(17-32 Blank) | 17-31/(17-32 Blank) | | |
| 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-8 | INDEX-1 thru INDEX-8 | | |
| DA Form 2028-2 Sample | DA Form 2028 Sample | | |
| DA Form 2028-2 | DA Form 2028 | | |
| DA Form 2028-2 | DA Form 2028 | | |
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**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. 3 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** |

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# HOW TO USE THIS MANUAL

## OVERVIEW

This Technical Manual (TM) is provided to help you maintain the MTV at the Direct Support (DS) Maintenance level. This volume, Volume 3, contains information which will assist you in the performance of DS Maintenance on the MTV. Volume 3 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 Maintenance procedures to assist you in supporting the MTV. Chapters 15 through 17 are Direct Support Maintenance procedures. Become familiar with the entire maintenance procedure before beginning any maintenance task.

  **DIRECT SUPPORT MAINTENANCE**

  - **CHAPTER 15, BODY AND CAB MAINTENANCE**
  - **CHAPTER 16, MATERIAL HANDLING CRANES (MHC), 30K WINCHES, UNDERLIFT, AND 15K SELF-RECOVERY WINCH (SRW) MAINTENANCE**

- **CHAPTER 17, HYDRAULIC SYSTEM 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 3 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 3 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.

## TROUBLESHOOTING (CONT)

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 15
# BODY AND CAB MAINTENANCE

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## Section I. INTRODUCTION

### 15-1. INTRODUCTION

This chapter contains maintenance instructions for replacing and repairing Body and Cab components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

# Section II. MAINTENANCE PROCEDURES

## 15-2. CAB REPLACEMENT

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Cab protector lowered (M1090/M1094) (TM 9-2320-366-10-1).
Air tanks drained (TM 9-2320-366-10-1).
Radiator drained (TM 9-2320-366-20-3).
WTEC II dashboard cable assembly removed, if equipped (TM 9-2320-366-20-3).
WTEC III dashboard cable assembly removed, if equipped (TM 9-2320-366-20-3).
Auxiliary panel cable assembly removed, if equipped (TM 9-2320-366-20-3).
Steering column removed (TM 9-2320-366-20-4).
Foot control valve and brake foot pedal removed (TM 9-2320-366-20-4).
Park control two-way check valve removed (TM 9-2320-366-20-4).
Throttle control cable removed (TM 9-2320-366-20-3).
Throttle control cable threaded rod removed (TM 9-2320-366-20-3).
Accelerator pedal removed (TM 9-2320-366-20-3).
Fan and differential lock solenoids removed (TM 9-2320-366-20-3).
STE-ICE/R cable assembly removed (TM 9-2320-366-20-3).
Manifold valve assembly removed (TM 9-2320-366-20-4).
Clearance light cable assemblies removed (TM 9-2320-366-20-3).
Mirrors removed (TM 9-2320-366-20-5).
Air drop cab liners removed, (M1093/M1094) (TM 9-2320-366-20-4).
Cab liners removed (TM 9-2320-366-20-4).
Cab floor covering removed (TM 9-2320-366-20-4).
Warning light cable removed (TM 9-2320-366-20-5).
Warning light kit removed, if equipped (TM 9-2320-366-10-2).
Chemical kit alarm cable removed, if equipped (TM 9-2320-366-20-3).

**Equipment Conditions (Cont)**
Roof hatch removed (TM 9-2320-366-20-4).
Machine gun ring kit removed, if equipped (para 19-2).
Windshield wipers and linkage removed (TM 9-2320-366-20-5).
Cab windshield and side windows removed (para 15-7).
Boarding handles removed (TM 9-2320-366-20-5).
Horn removed (TM 9-2320-366-20-3).
Fenders and mud flaps removed (TM 9-2320-366-20-4).
Placards removed, as required (TM 9-2320-366-20-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Puller Kit, Universal (Item 50, Appendix B)
Tool Kit, Blind Rivet (Item 76, Appendix B)
Bar, Spreader (Item 21, Appendix D)
Sling, Cargo (Item 56, Appendix B)
Stand, Cab Maintenance (Item 4, Appendix D)
Tool, Cab Support (Item 5, Appendix D)
Dispenser, Sealant (Item 16.1, TM 9-2320-366-20 Appendix B)

**Materials/Parts**
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Ties, Cable, Plastic (Item 92, Appendix C)

## 15-2. CAB REPLACEMENT (CONT)

**INITIAL SETUP (CONT)**

**Materials/Parts (Cont)**
- Antifreeze (Item 11, Appendix C)
- Sealing Compound (Item 70, Appendix C)
- Rubber, Sheet (Item 64, Appendix C)
- Nut, Self-locking (Item 214, Appendix F)
- Lockwasher (Item 128, Appendix F)
- Washer, Spring Tension (Item 437, Appendix F)
- Seal, Door (2) (Item 373, Appendix F)
- Nut, Clinch (61) (Item 169, Appendix F)
- Nut, Clinch (4) (Item 170, Appendix F)
- Pin, Cotter (Item 330, Appendix F)
- Seal (Item 366, Appendix F)
- Plug, Plastic (2) (Item 344, Appendix F)
- Rivet, Compression (5) (Item 365, Appendix F)
- Sealing Compound (Item 76.1, Appendix C)

**Materials/Parts (Cont)**
- Plug, Plastic (10) (Item 345, Appendix F)
- Plug, Rubber (6) (Item 348, Appendix F)
- Plug, Rubber (6) (Item 351, Appendix F)
- Plug, Rubber (6) (Item 347, Appendix F)
- Plug, Rubber (2) (Item 346, Appendix F)
- Plug, Rubber (4) (Item 350, Appendix F)
- Plug, Rubber (13) (Item 349, Appendix F)
- Plug, Rubber (2) (Item 350, Appendix F)
- Lockwasher (4) (Item 132, Appendix F)
- Adhesive (Item 10, Appendix C)
- Rubber Strip (Item 366, Appendix F)
- Adhesive (item 10, Appendix C)
- Nut, Self-Locking (4) (Item 214, Appendix F)

**Personnel Required**
(2)

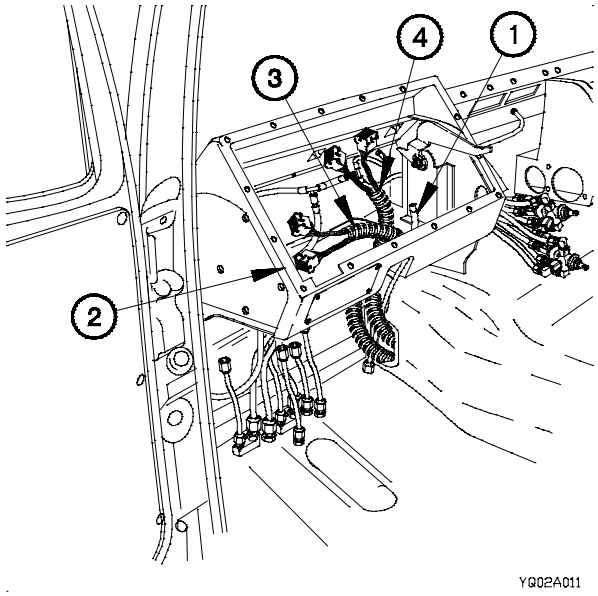
**a. Removal.**

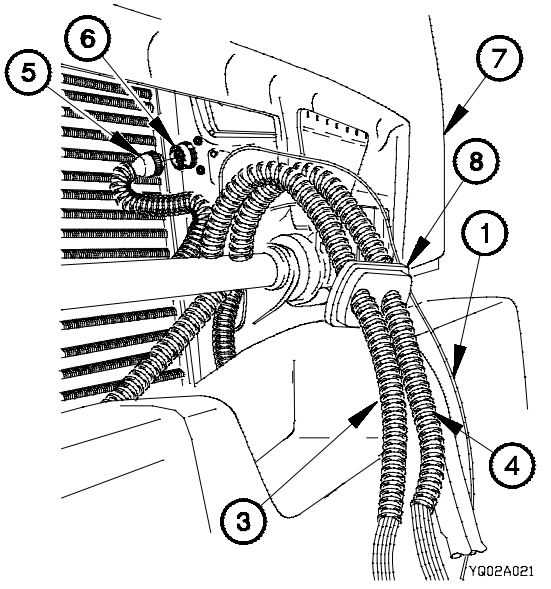
**NOTE**

Remove plastic cable ties as required.

(1) Remove vacuum hose (1) from dashboard (2).

(2) Remove engine control cable assembly (3) and start and charging cable assembly (4) from dashboard (2).




(3) Disconnect connector P119 (5) from connector J119 (6).

**NOTE**

Steps (4) and (5) require the aid of an assistant.

(4) Remove vacuum hose (1) from cab (7).

(5) Remove engine control cable assembly (3), start and charging cable assembly (4), and grommet (8) from cab (7).

## 15-2. CAB REPLACEMENT (CONT)

(6) Remove front lights cable assembly (9), rear lights cable assembly (10), power distribution panel 12 vdc cable (11), and power distribution panel 24 vdc cable (12) from dashboard (2).

**NOTE**

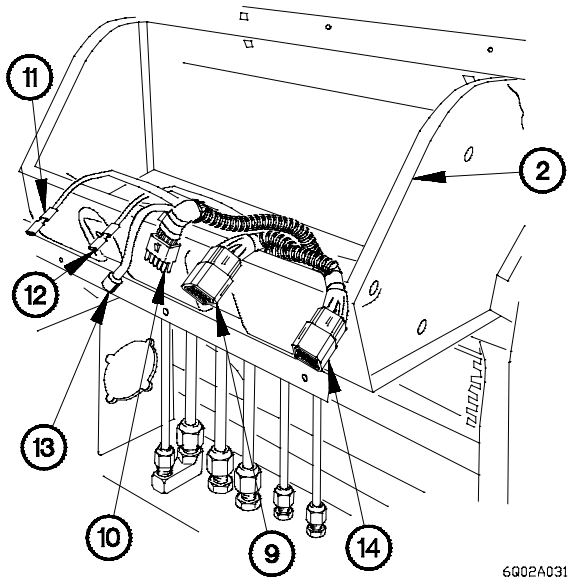
Perform step (7) on vehicles equipped with PTO.

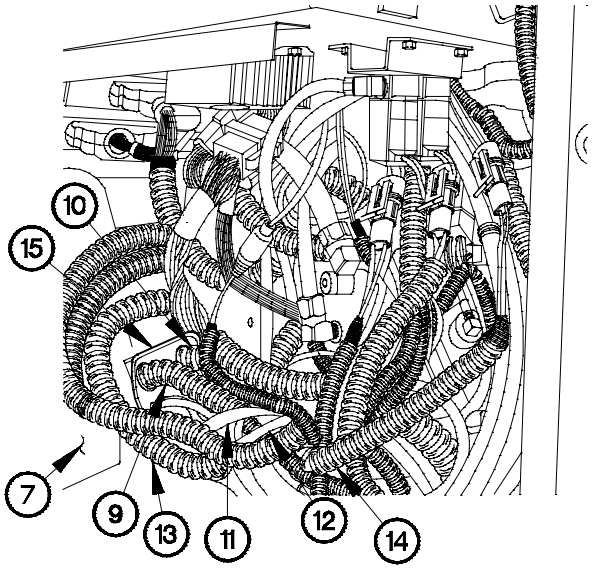
(7) Remove PTO cable assembly (13) from dashboard (2).

**NOTE**

Perform step (8) on M1084, M1086, M1090, and M1094.

(8) Remove crane/dump power cable assembly (14) from dashboard (2).




**NOTE**

Steps (9) through (11) require the aid of an assistant.

(9) Remove front lights cable assembly (9), rear lights cable assembly (10), power distribution panel 12 vdc cable (11), power distribution panel 24 vdc cable (12), and grommet (15) from cab (7).

**NOTE**

Perform step (10) on vehicles equipped with PTO.

(10) Remove PTO cable assembly (13) from cab (7).

**NOTE**

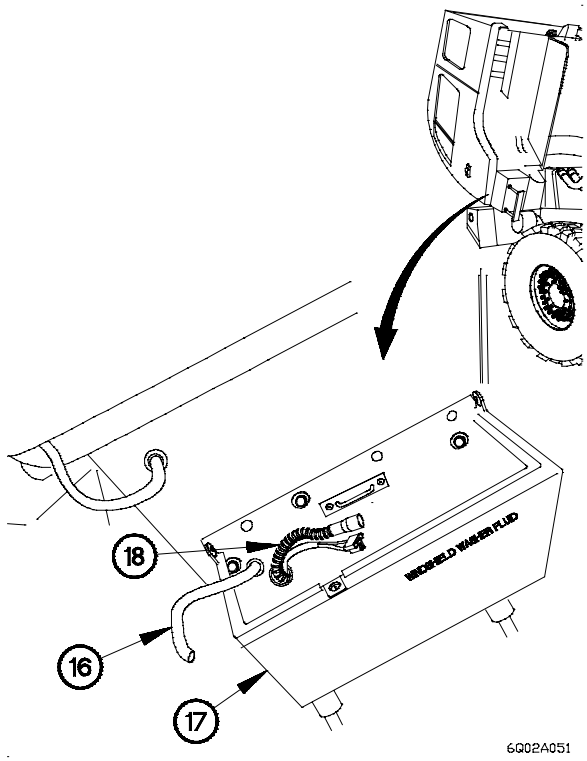
Perform step (11) on M1084, M1086, M1090, and M1094.

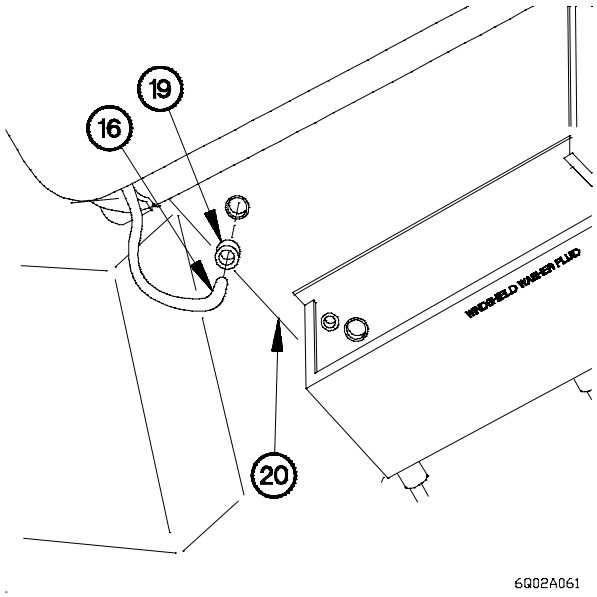
(11) Remove crane/dump power cable assembly (14) from cab (7).

(12) Raise cab (TM 9-2320-366-10-1).

(13) Remove hose (16) from step (17).

(14) Remove windshield washer pump/EMI cable assembly (18) from step (17).




(15) Remove hose (16) and grommet (19) from step mount (20).

**NOTE**

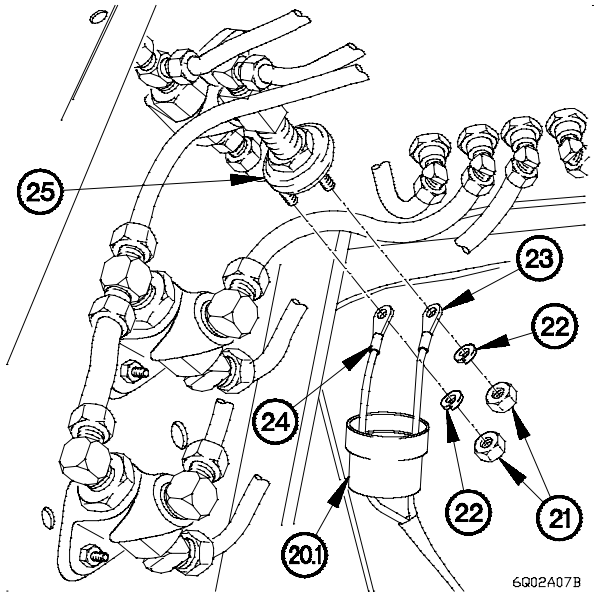
Perform steps (15.1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(15.1) Remove adhesive and boot (20.1) from low pressure transmitter (25).

**NOTE**

Tag wires and connection points prior to disconnecting.

(16) Remove two nuts (21), lockwashers (22), and terminal lugs TL201 (23) and TL202 (24) from low pressure transmitter (25). Discard lockwashers.



## 15-2. CAB REPLACEMENT (CONT)

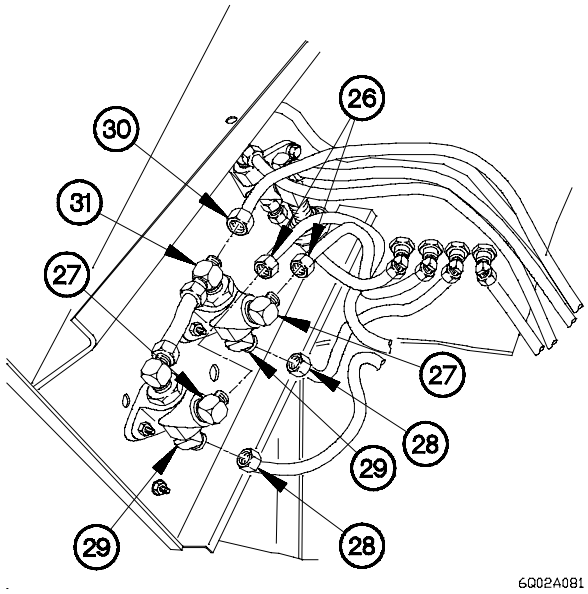
**NOTE**

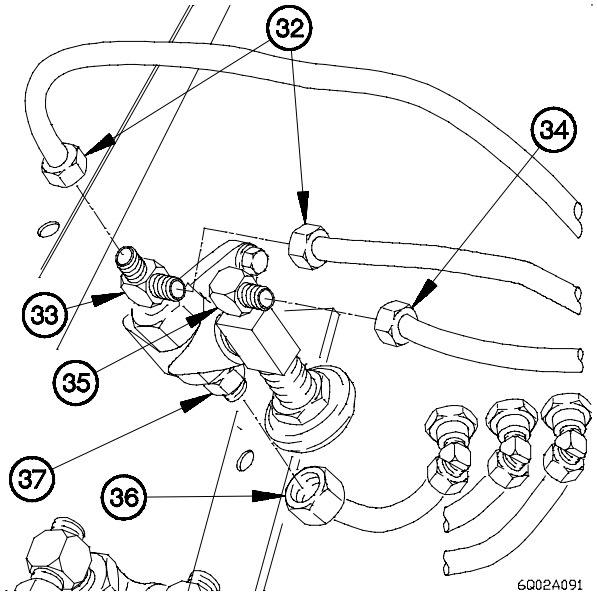
Tag hoses and connection points prior to disconnecting.

(17) Disconnect two hoses (26) from 90-degree fittings (27).

(18) Disconnect two hoses (28) from 45-degree fittings (29).

(19) Disconnect hose (30) from tee fitting (31).



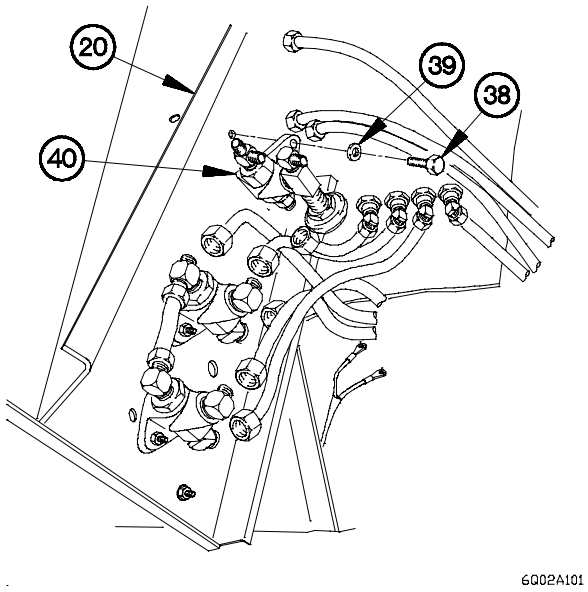




(20) Disconnect two hoses (32) from tee fitting (33).

(21) Disconnect hose (34) from 90-degree fitting (35).

(22) Disconnect hose (36) from fitting (37).

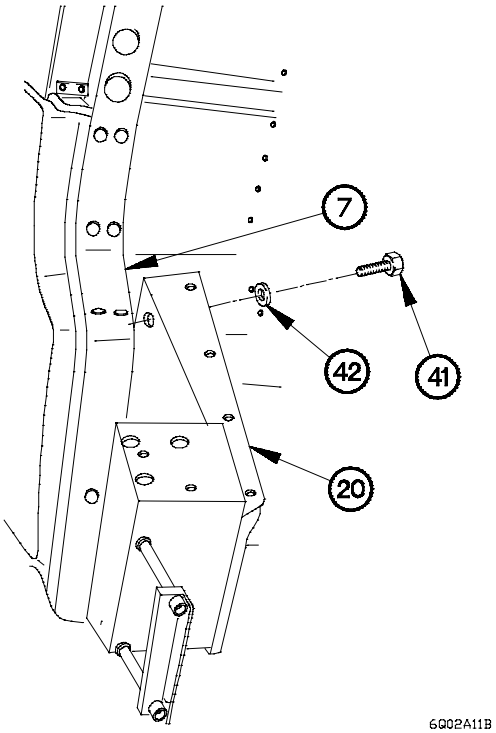
(23) Remove screw (38), washer (39), and valve (40) from step mount (20).

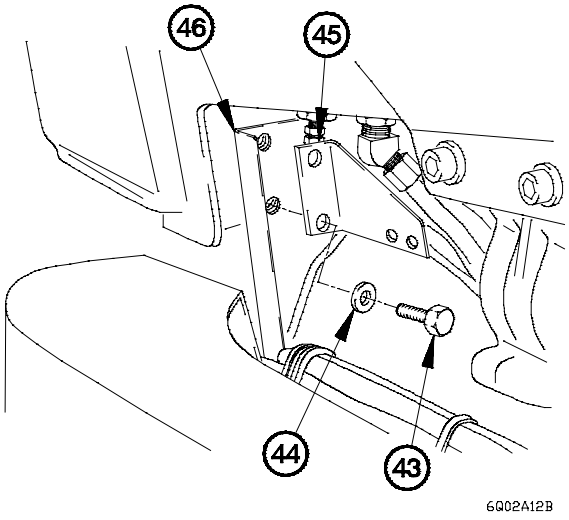


**NOTE**

Step (24) requires the aid of an assistant.

(24) Remove seven screws (41), washers (42), and step mount (20) from cab (7).



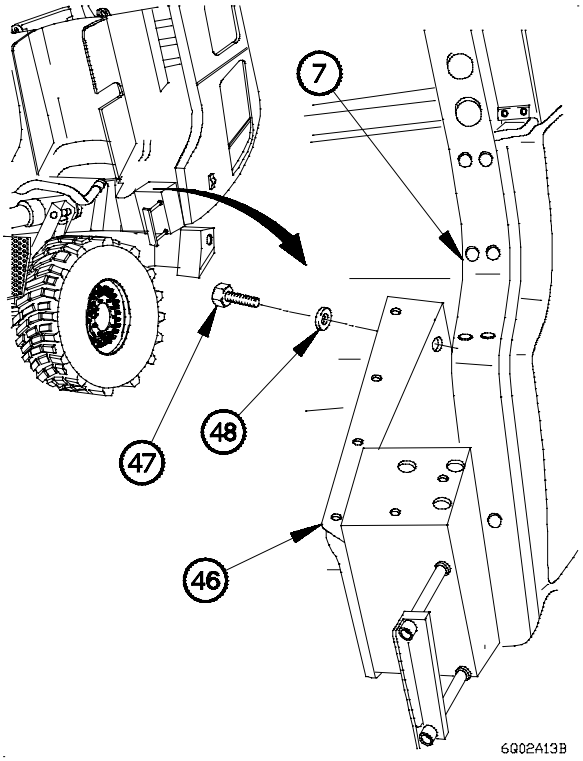




(25) Remove two screws (43), washers (44), and bracket (45) from step mount (46).

**NOTE**

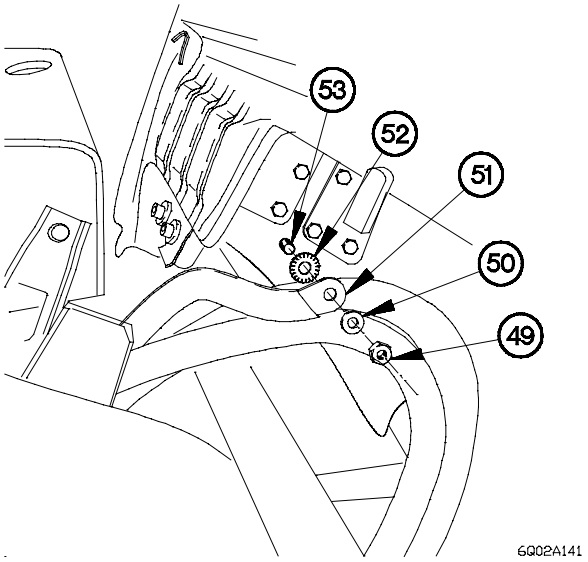
Step (26) requires the aid of an assistant.

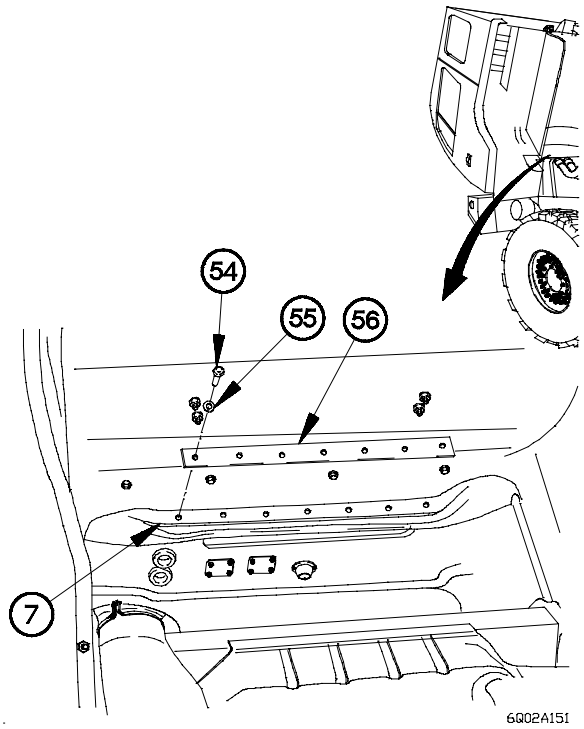
(26) Remove six screws (47), washers (48), and step mount (46) from cab (7).



## 15-2. CAB REPLACEMENT (CONT)

(27) Remove self-locking nut (49), washer (50), ground strap (51), and lockwasher (52) from ground stud (53). Discard self-locking nut and lockwasher.



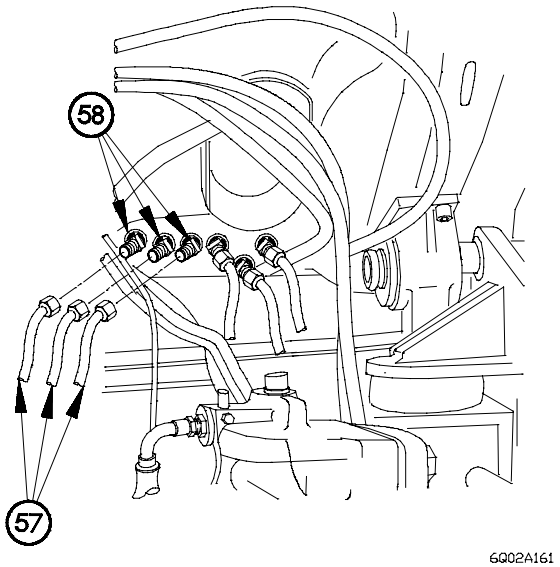




**WARNING**

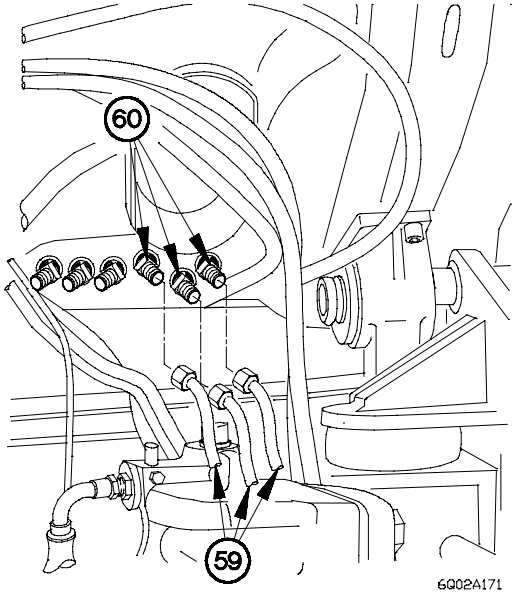
**Wear appropriate eye protection when drilling out rivets. Failure to comply may result in injury to personnel.**

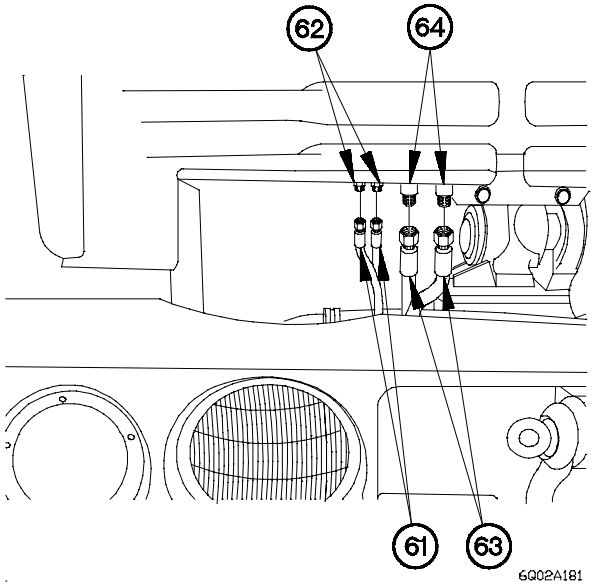
(28) Remove seven rivets (54), washers (55), and baffle (56) from cab (7).

(29) Disconnect three hoses (57) from 45-degree fittings (58).



(30) Disconnect three hoses (59) from 45-degree fittings (60).




**WARNING**

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

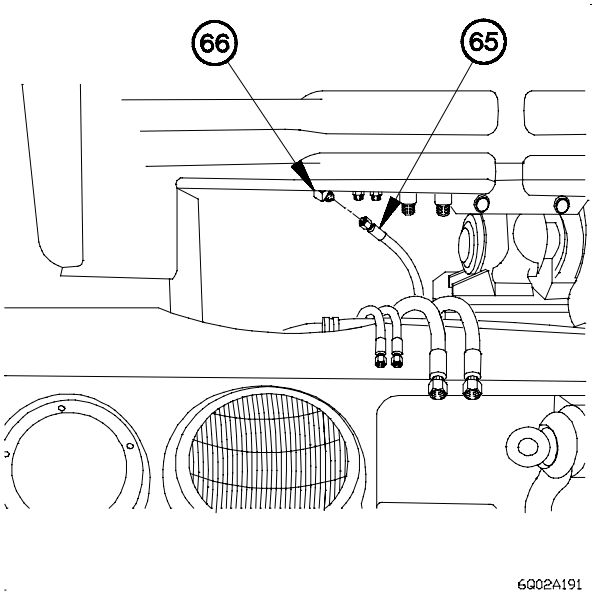
(31) Disconnect two pneumatic hoses (61) from 45-degree fittings (62).

(32) Disconnect two pneumatic hoses (63) from fittings (64).

**NOTE**

Perform step (33) on M1088.

(33) Disconnect pneumatic hose (65) from 45-degree fitting (66).

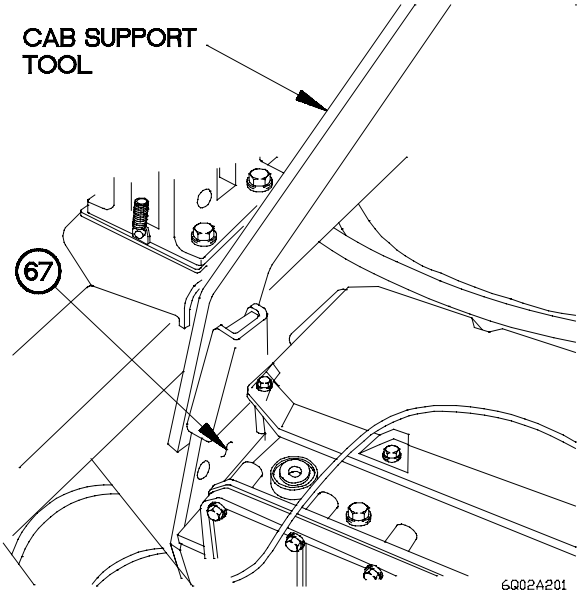


## 15-2. CAB REPLACEMENT (CONT)

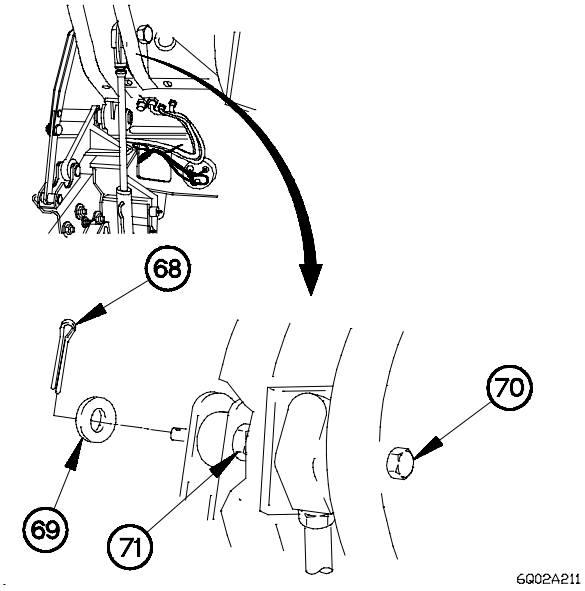
**WARNING**

**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.**

(34) Install cab support tool on engine rear lifting eye (67).

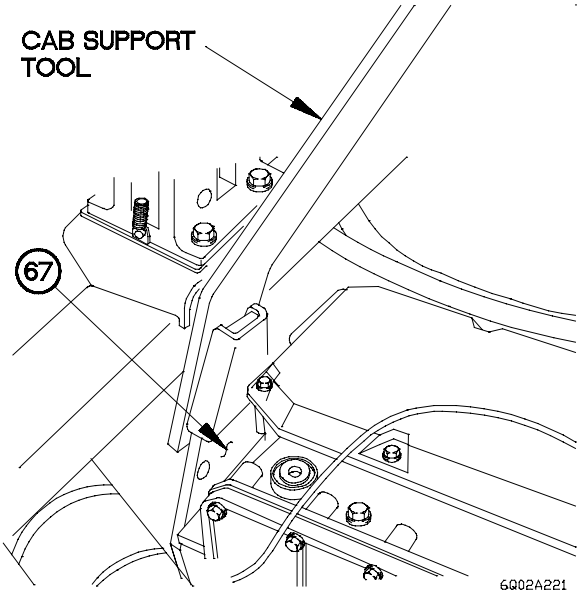



(35) Lower cab until cab rests on cab support tool (TM 9-2320-366-10-1).




(36) Remove cotter pin (68) and washer (69) from cab tilt cylinder mounting bolt (70). Discard cotter pin.

(37) Loosen self-locking nut (71) on cab tilt cylinder mounting bolt (70).

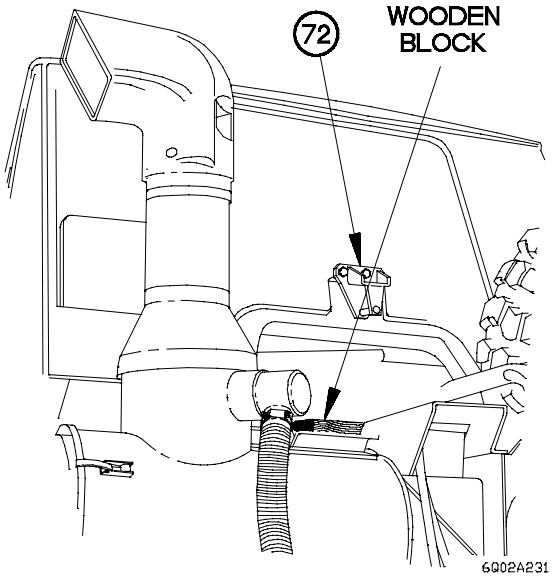


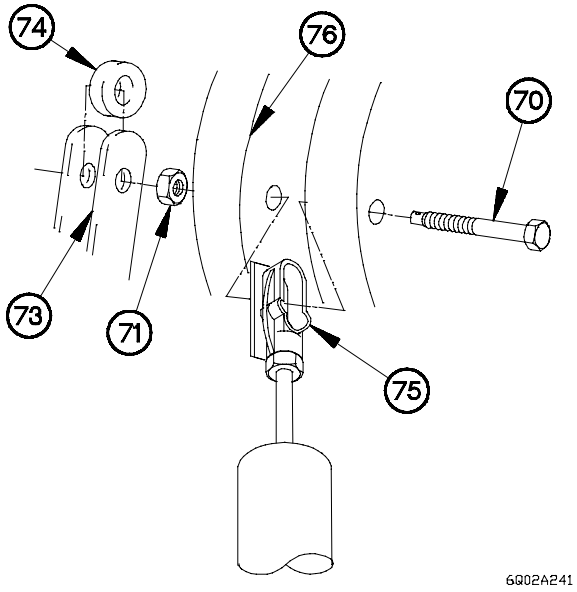

(38) Raise cab slightly and remove cab support tool from engine rear lifting eye (67) (TM 9-2320-366-10-1).

**NOTE**

Use wooden block on top of cab hydraulic latch to prevent cab from latching when cab is lowered.

(39) Lower cab until cab latch (72) rests on wooden block (TM 9-2320-366-10-1).




**NOTE**

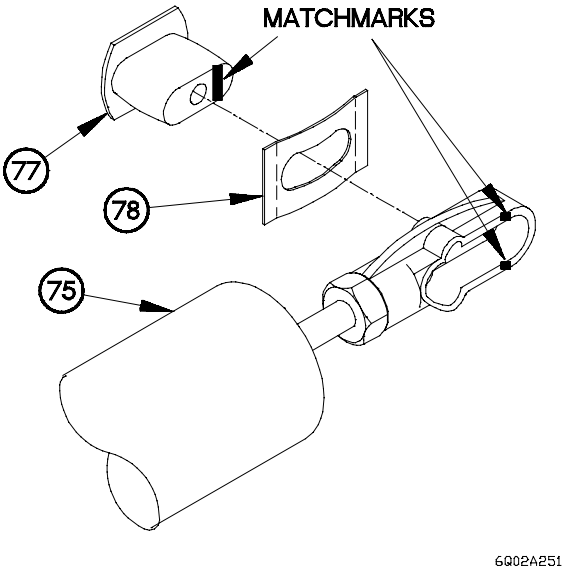
Steps (40) and (41) require the aid of an assistant.

(40) Disengage locking arm (73) and spacer (74) from cab tilt cylinder mounting bolt (70).

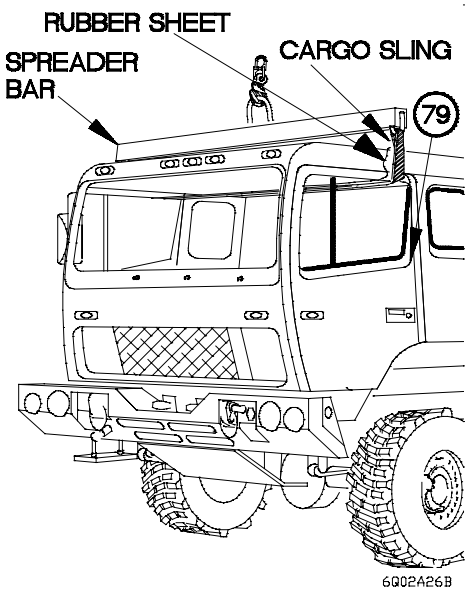
(41) Remove self-locking nut (71), cab tilt cylinder mounting bolt (70), and cab tilt cylinder (75) from bracket (76). Discard self-locking nut.

(42) Match mark remote control cam (77) to cab tilt cylinder (75) prior to removal.

(43) Swing cab tilt cylinder (75) back out of way and remove control cam (77) and spring washer (78) from cab tilt cylinder (75). Discard spring washer.



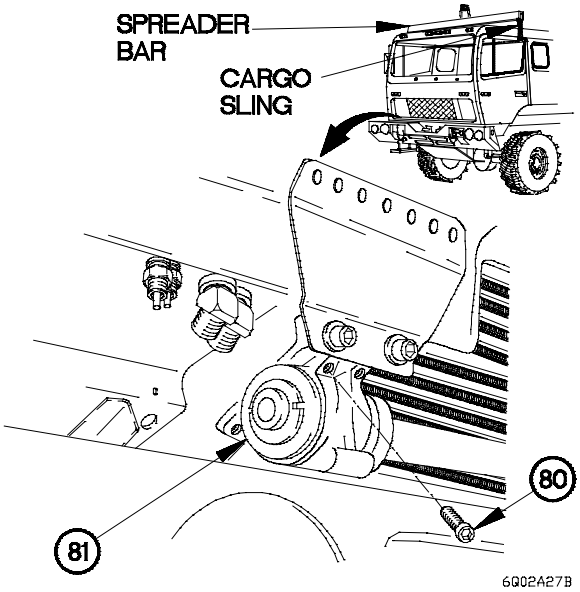
## 15-2. CAB REPLACEMENT (CONT)




**CAUTION**

Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

(44) Lower cab door windows and install cargo sling through rear section of cab doors (79).




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

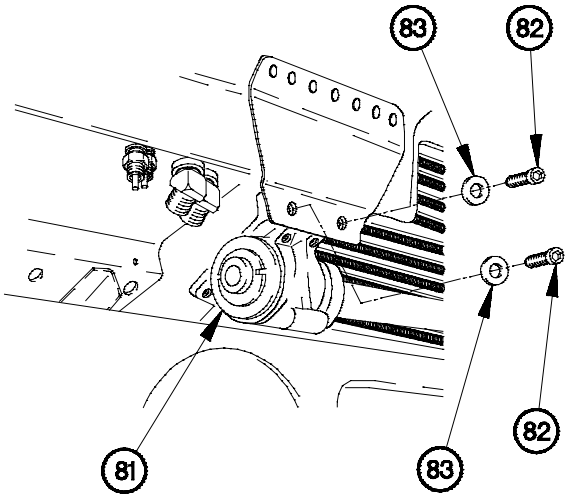
**NOTE**

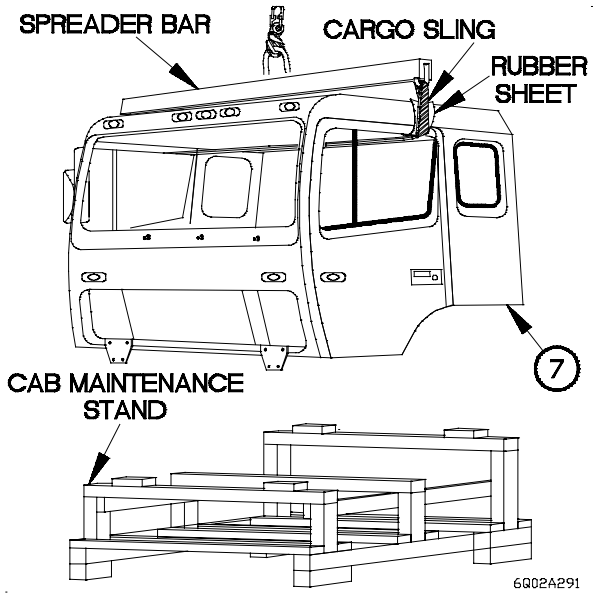
Left and right side cab front support mounts are disconnected the same way. Right side shown.

(45) Remove four screws (80) from cab front support mount (81).

(46) Remove two screws (82) and washers (83) from cab front support mount (81).

(47) Perform steps (45) and (46) on left side cab front support mount.




**CAUTION**

Raise cab straight up to clear radiator. Failure to comply may result in damage to equipment.

(48) Remove cab (7) from vehicle.

(49) Position cab (7) on cab maintenance stand.

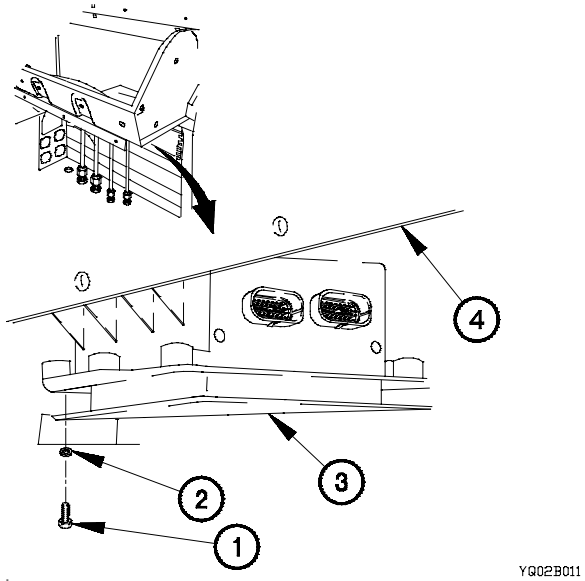
(50) Remove spreader bar, cargo sling, and rubber sheet from cab (7).

**b. Disassembly.**

**NOTE**

Perform step (1) on WTEC II vehicles.

(1) Remove three screws (1), washers (2), and Vehicle Interface Module (VIM) (3) from dashboard (4).

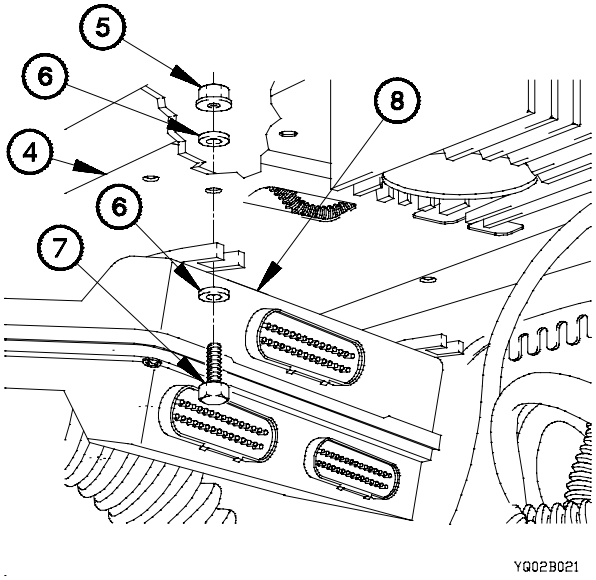


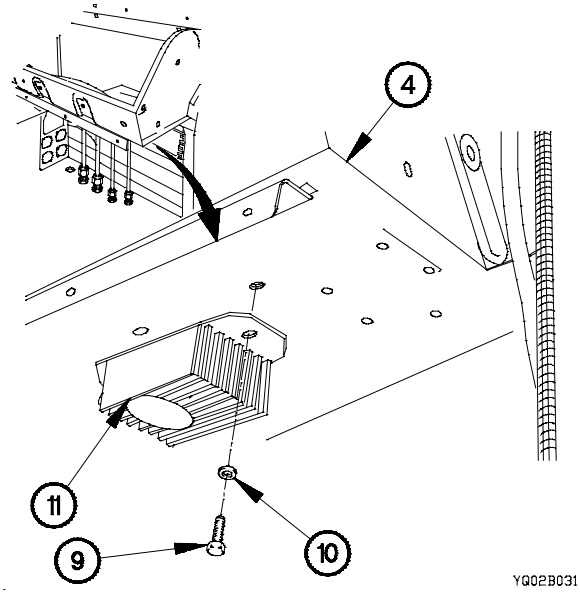
## 15-2. CAB REPLACEMENT (CONT)

**NOTE**

Perform step (2) on WTEC III vehicles.

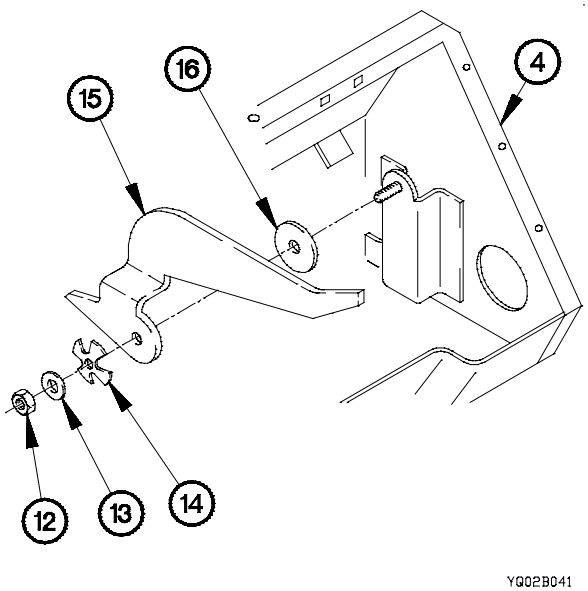
(2) Remove three nuts (5), six washers (6), three screws (7) and WTEC III transmission ECU (8) from dashboard (4).




(3) Remove two screws (9), washers (10), and flasher (11) from dashboard (4).

(4) Remove self-locking nut (12), washer (13), spring washer (14), manual throttle lever (15), and friction disk (16) from dashboard (4). Discard spring washer and self-locking nut.



**NOTE**

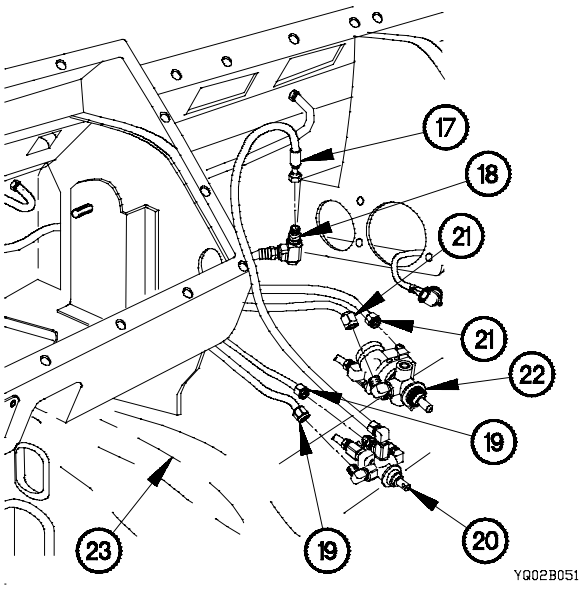
Tag hoses and connection points prior to disconnecting.

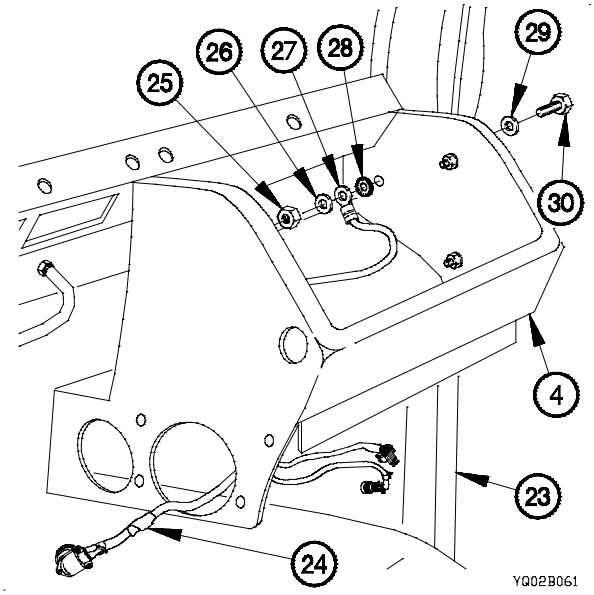
(5) Remove air hose (17) from tee fitting (18).

(6) Disconnect two hoses (19) from trailer air supply valve (20).

(7) Disconnect two hoses (21) from system park valve (22).

(8) Remove trailer air supply valve (20) and system park valve (22) from cab (23).




(9) Remove CTIS electrical harness (24) from cab (23).

(10) Remove self-locking nut (25), washer (26), electrical cable TL56 (27), lockwasher (28), washer (29), and screw (30) from dashboard (4). Discard self-locking nut and lockwasher.

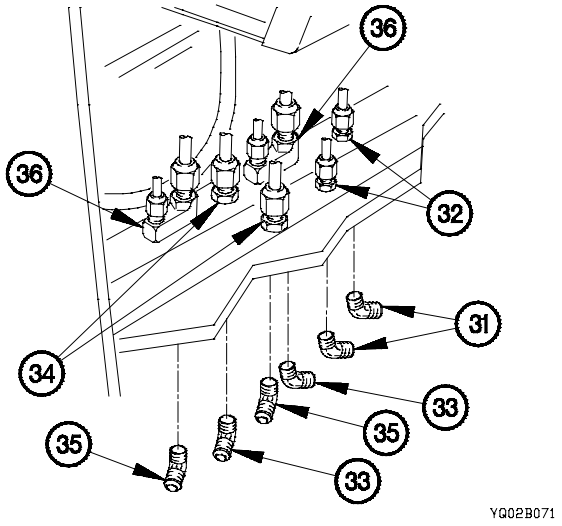
**NOTE**

Record position and location of fittings prior to removal.

(11) Remove two 45-degree fittings (31) from fittings (32).

(12) Remove two 45-degree fittings (33) from fittings (34).

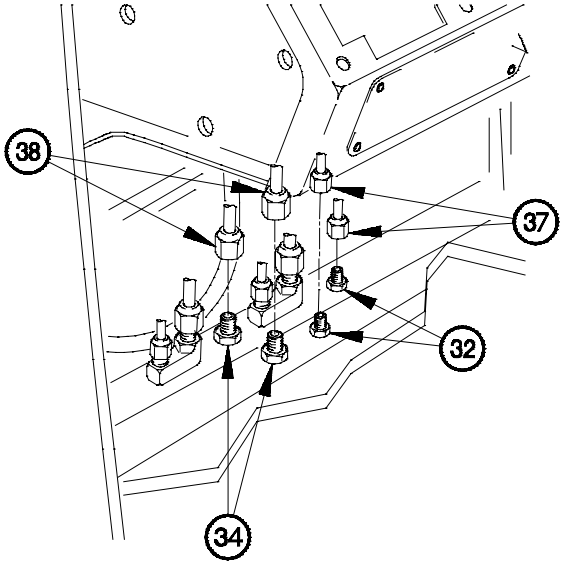
(13) Remove two 45-degree fittings (35) from fittings (36).



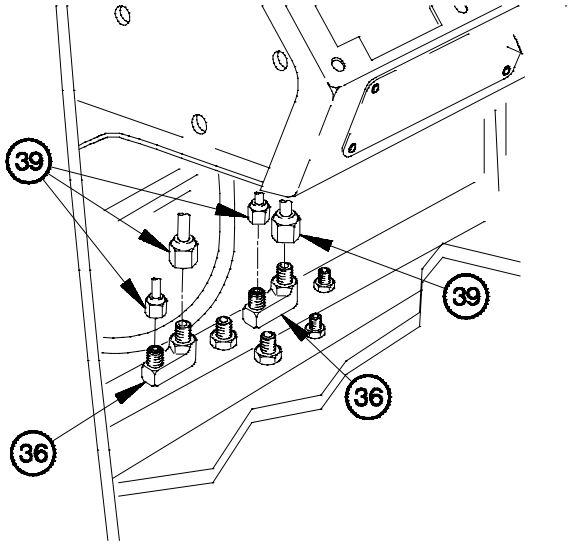
## 15-2. CAB REPLACEMENT (CONT)

(14) Remove two hoses (37) from fittings (32).

(15) Remove two hoses (38) from fittings (34).



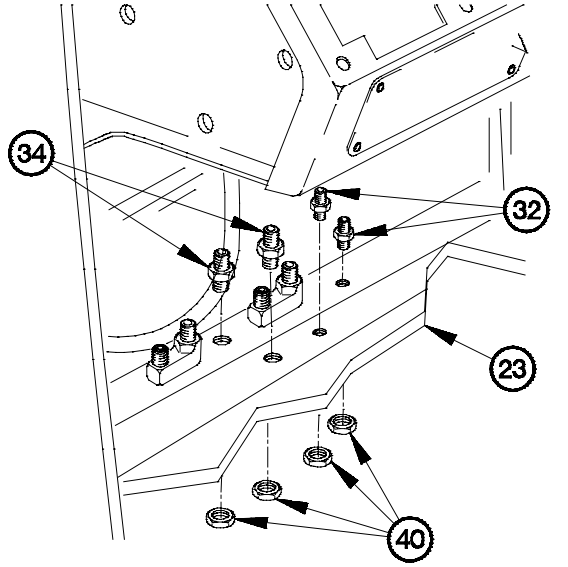

YQ02B081




YQ02B091

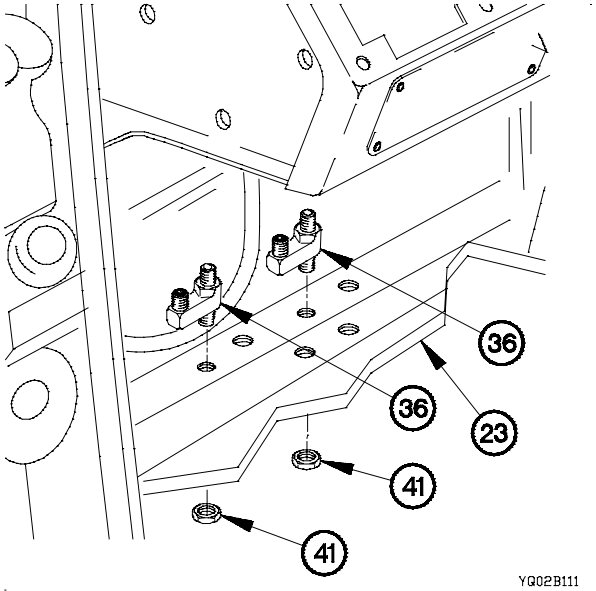
(16) Remove four hoses (39) from two fittings (36).

(17) Remove four nuts (40), two fittings (32), and fittings (34) from cab (23).

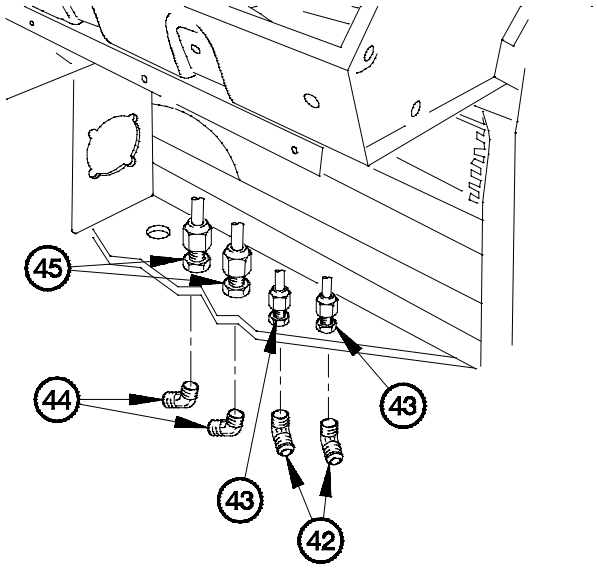



YQ02B101

(18) Remove two nuts (41) and fittings (36) from cab (23).




YQ02B111




YQ02B121

**NOTE**

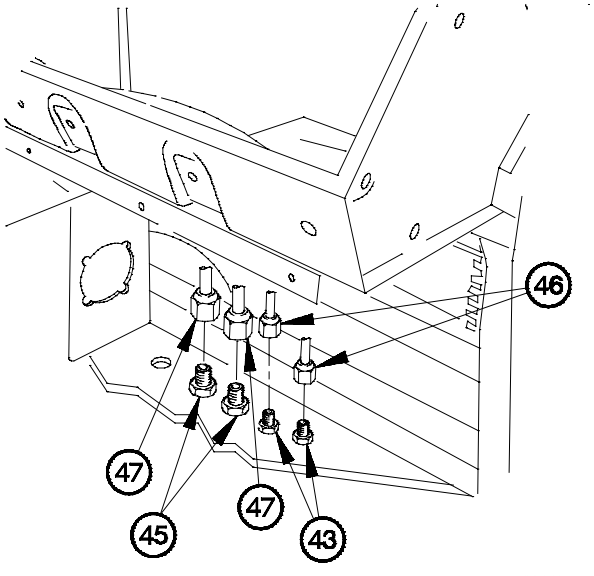
Perform steps (19) through (23) on all models except M1088.

(19) Remove two 45-degree fittings (42) from fittings (43).

(20) Remove two 45-degree fittings (44) from fittings (45).

(21) Remove two hoses (46) from fittings (43).

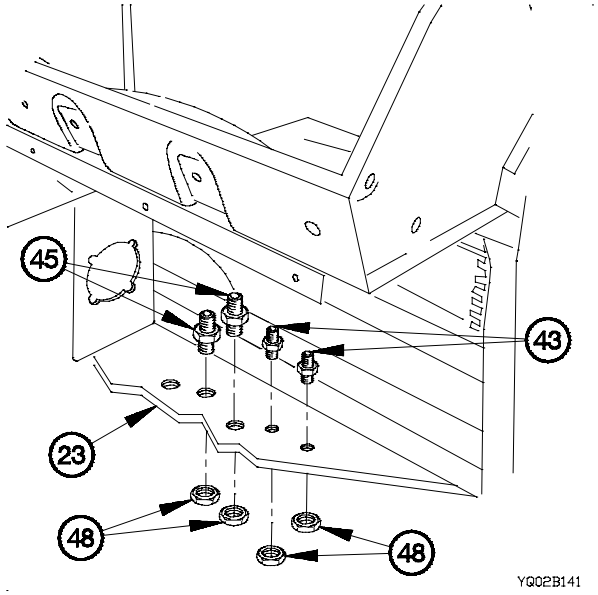
(22) Remove two hoses (47) from fittings (45).

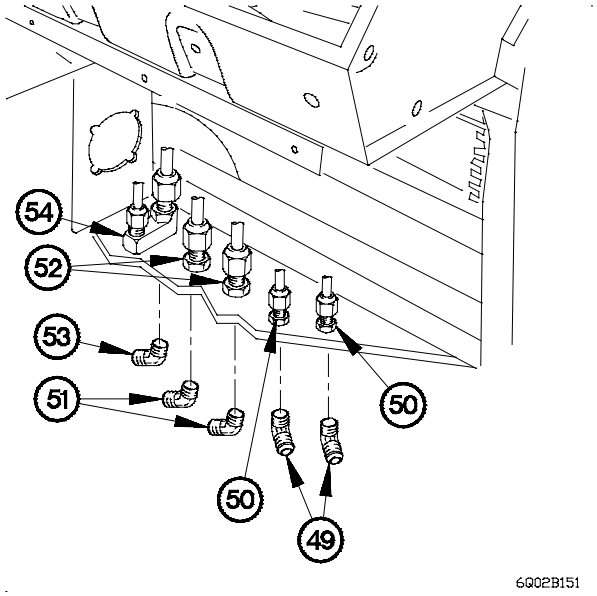



YQ02B131

## 15-2. CAB REPLACEMENT (CONT)

(23) Remove four nuts (48), two fittings (43), and fittings (45) from cab (23).




**NOTE**

Perform steps (24) through (30) on M1088.

(24) Remove two 45-degree fittings (49) from fittings (50).

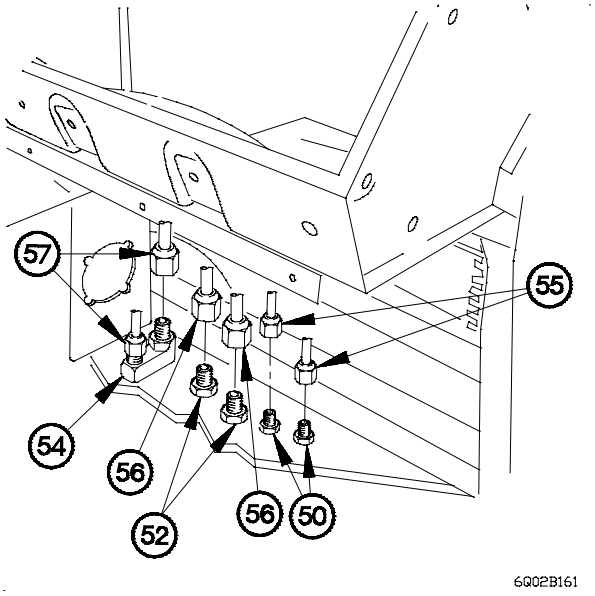
(25) Remove two 45-degree fittings (51) from fittings (52).

(26) Remove 45-degree fitting (53) from fitting (54).

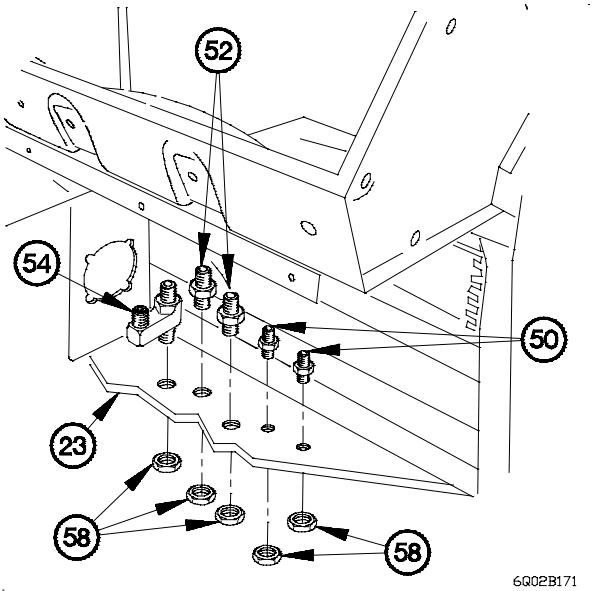
(27) Remove two hoses (55) from fittings (50).

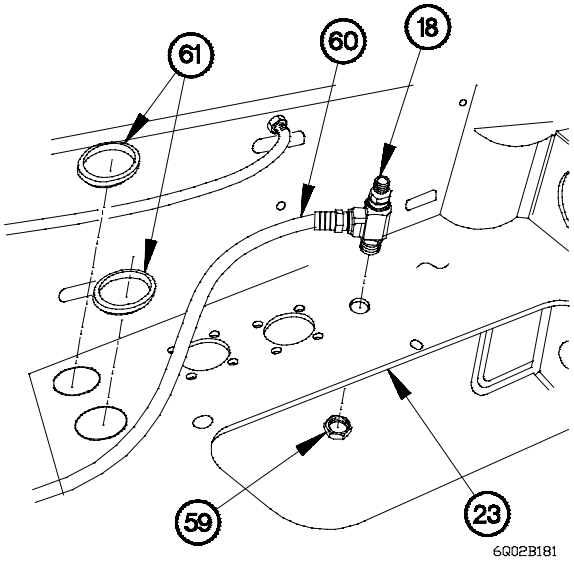
(28) Remove two hoses (56) from fittings (52).

(29) Remove two hoses (57) from fitting (54).



(30) Remove five nuts (58), two fittings (50), fittings (52), and fitting (54) from cab (23).

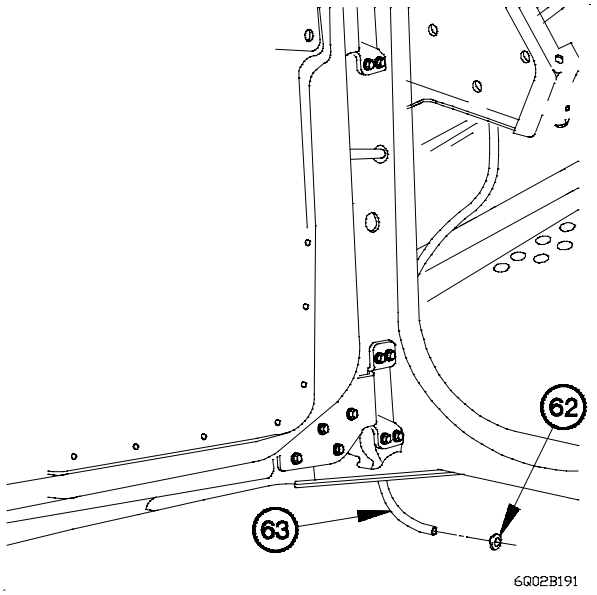


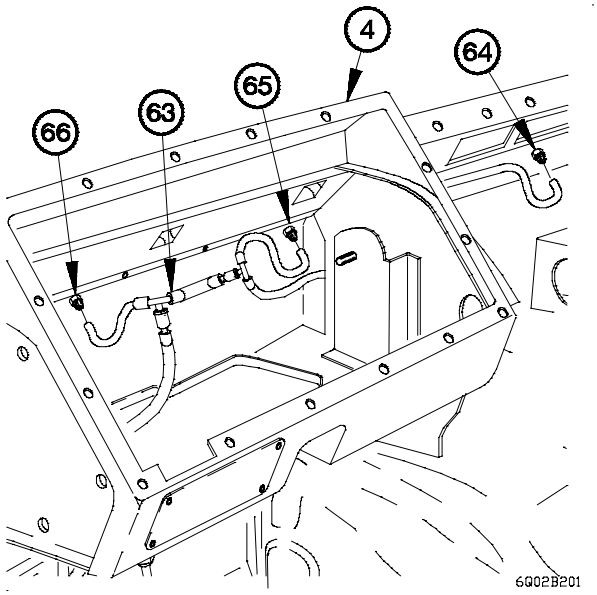

(31) Remove nut (59), tee fitting (18), and hose (60) from cab (23).

(32) Remove two grommets (61) from cab (23).

(33) Remove grommet (62) from window washer hose (63).



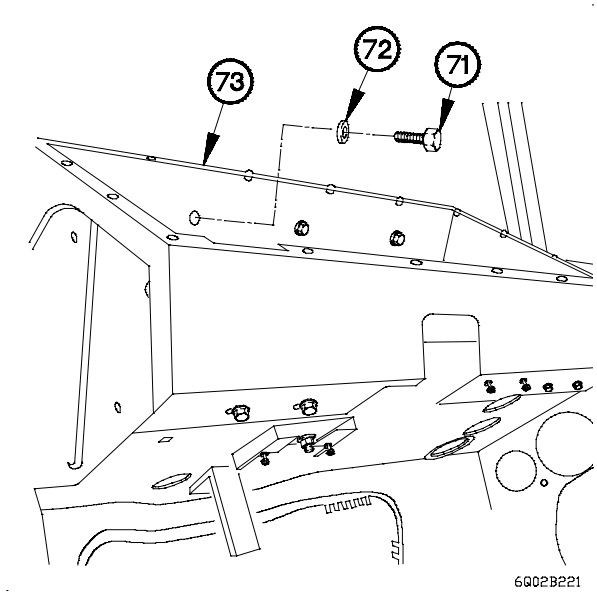
## 15-2. CAB REPLACEMENT (CONT)




(34) Disconnect window washer hose (63) from fittings (64, 65, and 66).

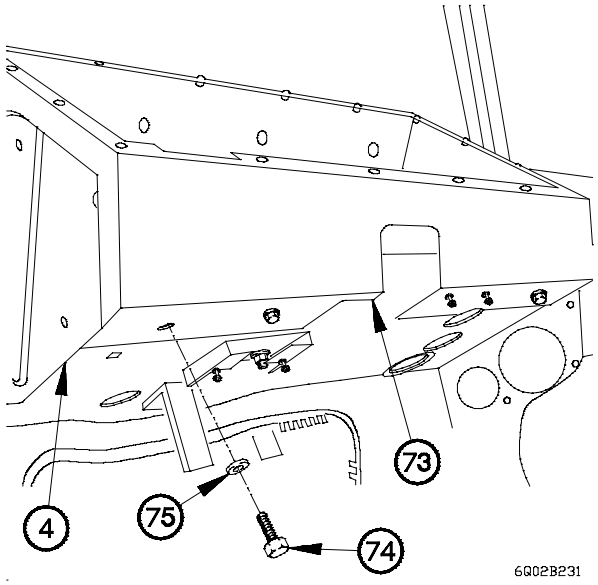
(35) Remove window washer hose (63) from dashboard (4).

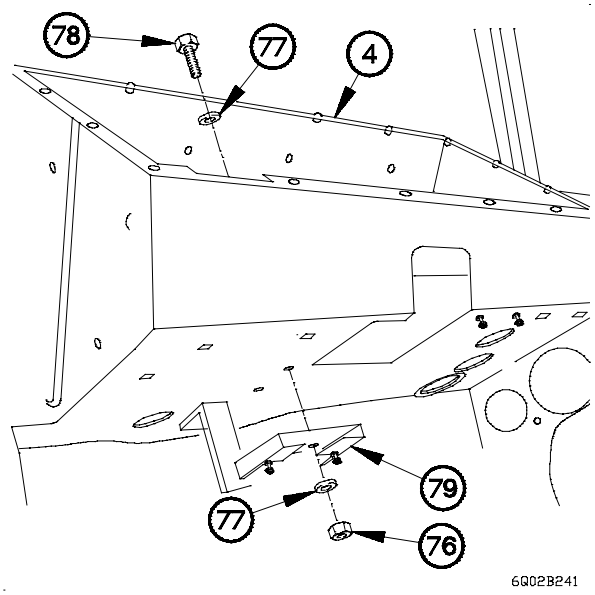
(36) Deleted




(37) Remove three screws (71) and washers (72) from dashboard bezel (73).

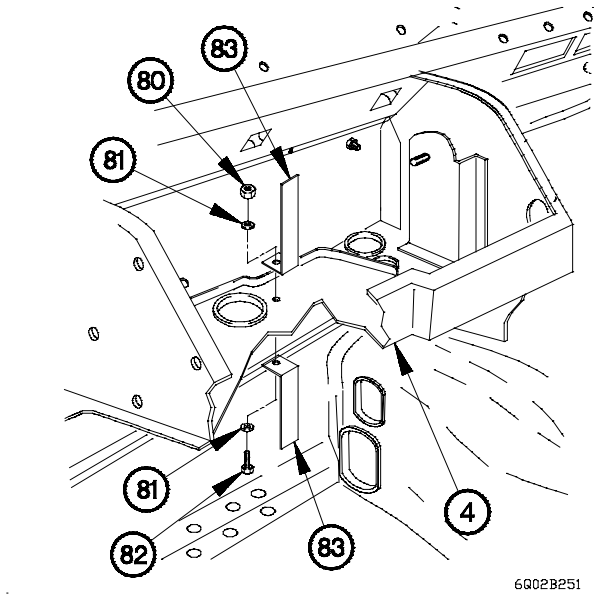
(38) Remove three screws (74), washers (75), and dashboard bezel (73) from dashboard (4).



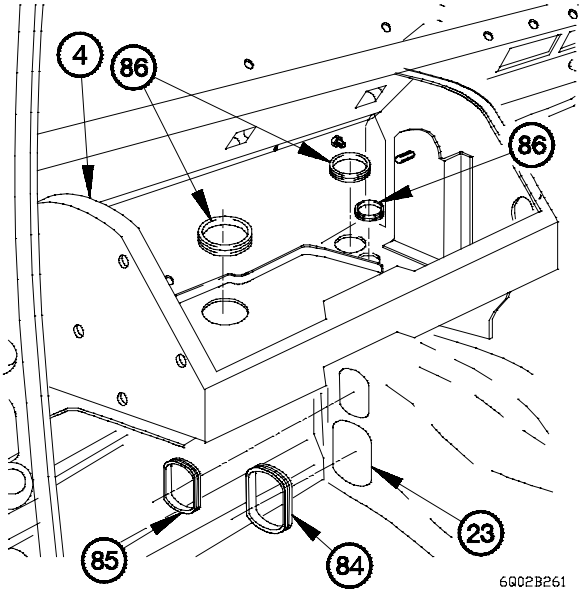




(39) Remove two nuts (76), four washers (77), two screws (78), and bracket (79) from dashboard (4).

(40) Remove self-locking nut (80), two washers (81), screw (82), and two brackets (83) from dashboard (4). Discard self-locking nut.



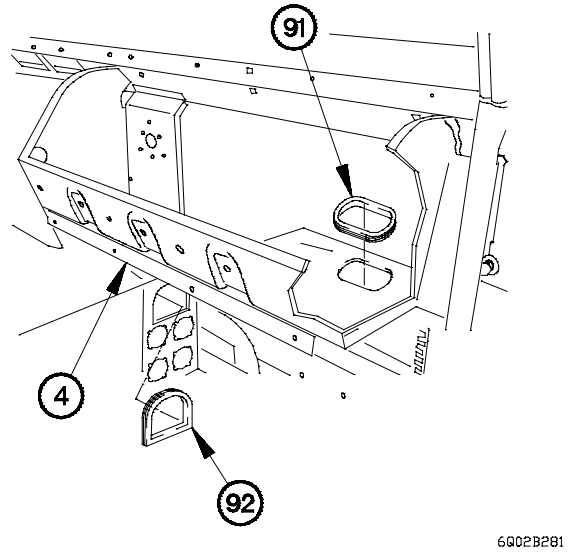
## 15-2. CAB REPLACEMENT (CONT)




(41) Remove rubber edgings (84 and 85) from cab (23).

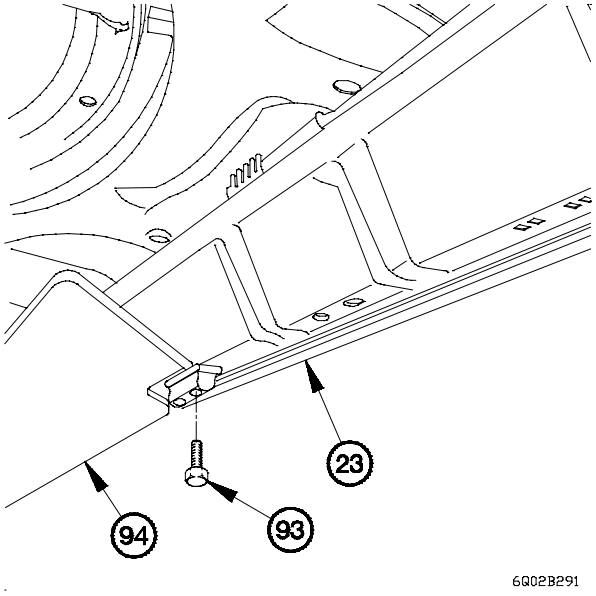
(42) Remove three grommets (86) from dashboard (4).

(43) Deleted.




(44) Remove rubber edgings (91 and 92) from dashboard (4).

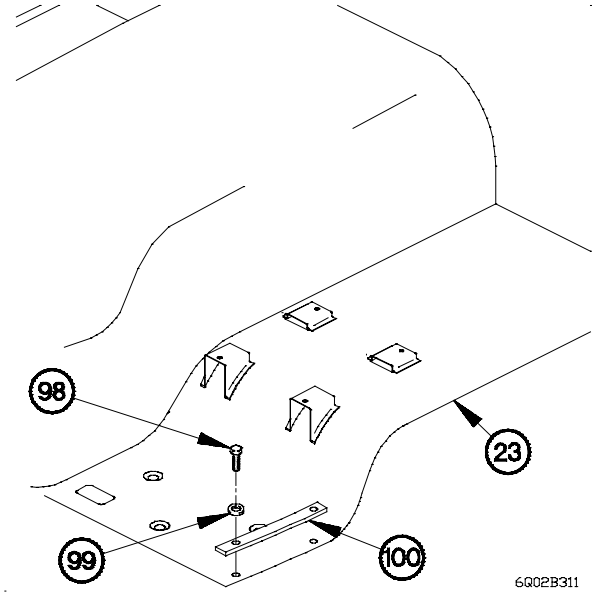
(45) Remove four screws (93) and sunvisor (94) from cab (23).




(46) Deleted.

(47) Deleted.

(48) Remove eight screws (98), washers (99), and two floor moldings (100) from cab (23).

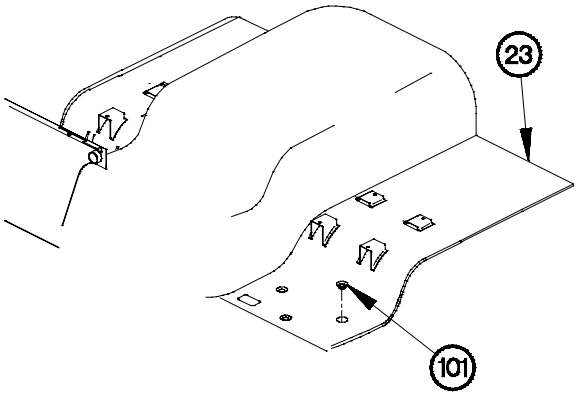


## 15-2. CAB REPLACEMENT (CONT)

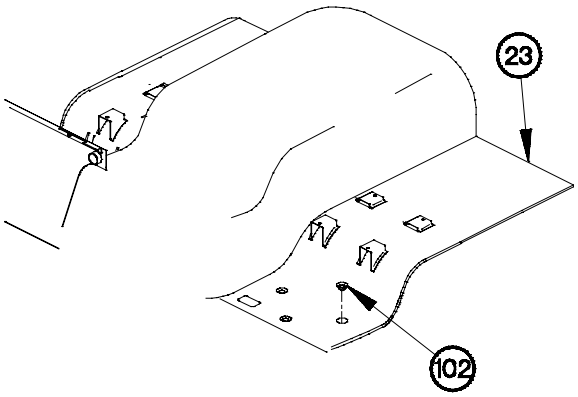
**NOTE**

Perform step (49) on all models except M1093 and M1094.

(49) Remove 12 rubber plugs (101) from cab (23). Discard rubber plugs.




6Q02B321



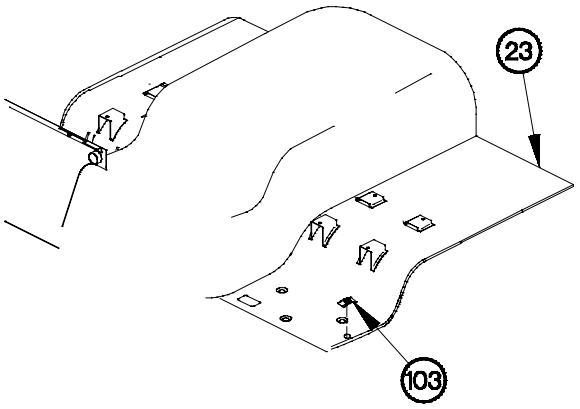

6Q02B331

**NOTE**

Perform step (50) on M1093 and M1094.

(50) Remove 10 rubber plugs (102) from cab (23). Discard rubber plugs.

(51) Remove eight expansion nuts (103) from cab (23).



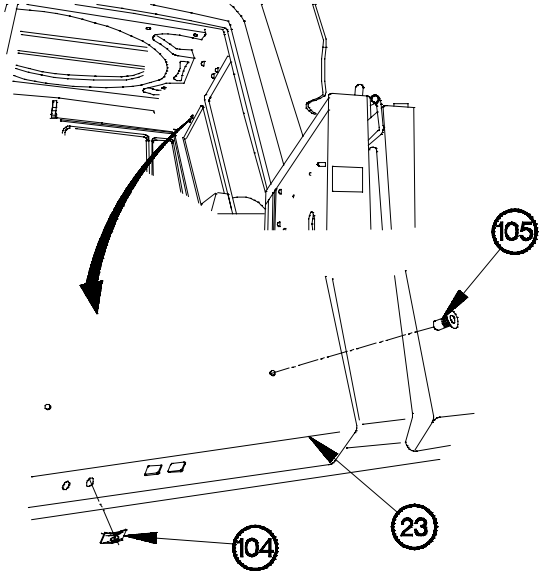

6Q02B341

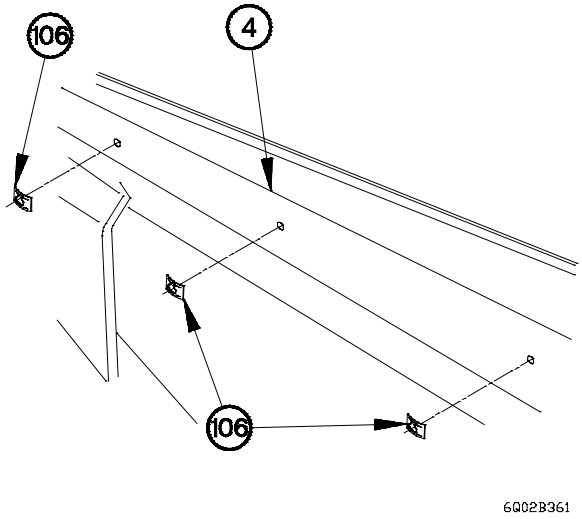
**NOTE**

Perform steps (52) and (53) on all models except M1093 and M1094.

(52) Remove four expansion nuts (104) from cab (23).

(53) Remove five clinch nuts (105) from cab (23).




(54) Remove 12 expansion nuts (106) from dashboard (4).

**NOTE**

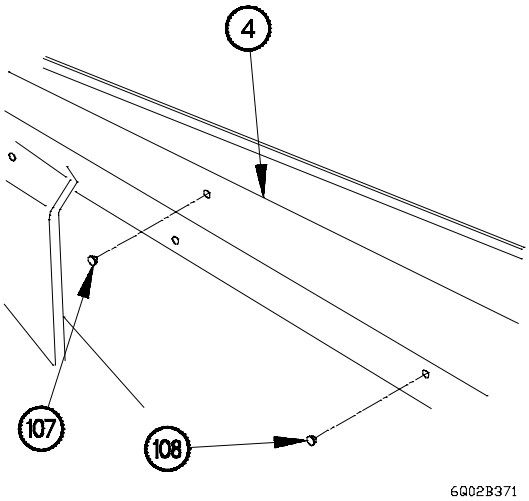
Perform step (55) on all models except M1093 and M1094.

(55) Remove 13 rubber plugs (107) and two rubber plugs (108) from dashboard (4). Discard rubber plugs.

**NOTE**

Perform step (56) on M1093 and M1094.

(56) Remove 13 rubber plugs (107) and four rubber plugs (108) from dashboard (4). Discard rubber plugs.



## 15-2. CAB REPLACEMENT (CONT)

**NOTE**

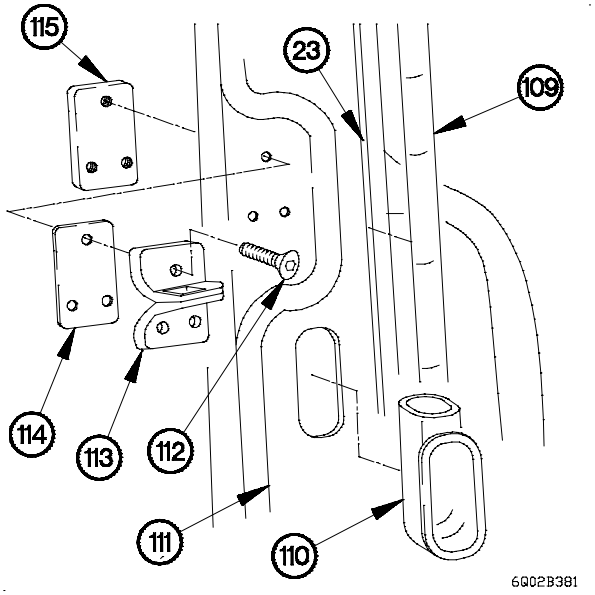
Left and right side door seals, check valve boots, and door strike catch plates are removed the same way. Left side shown.

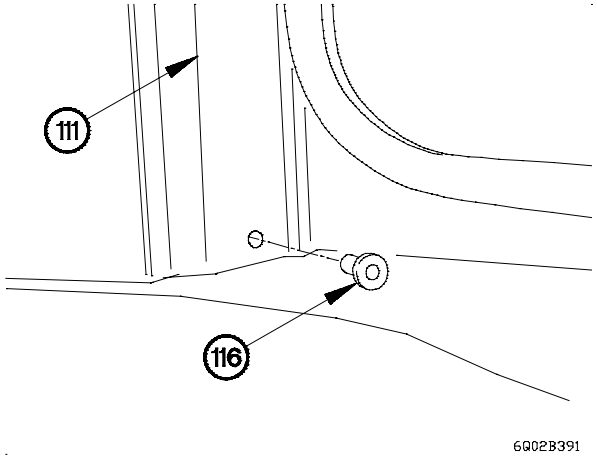
(57) Remove door seal (109) from cab (23). Discard door seal.

(58) Remove ventilation check valve boot (110) from door post (111).

(59) Remove three screws (112), door catch strike plate (113), shim (114), and threaded plate (115) from door post (111).

(60) Perform steps (57) through (59) on right side door seals, check valve boot, and door catch strike plate.




**NOTE**

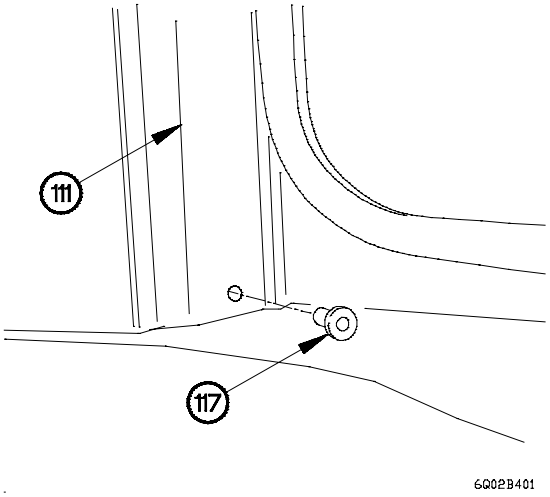
Perform step (61) on all models except M1093 and M1094.

(61) Remove two button plugs (116) from door posts (111). Discard button plugs.

**NOTE**

Perform step (62) on M1093 and M1094.

(62) Remove six button plugs (117) from two door posts (111). Discard button plugs.



(63) Remove three bolts (118) and washers (119) from latch bracket (120).

**NOTE**

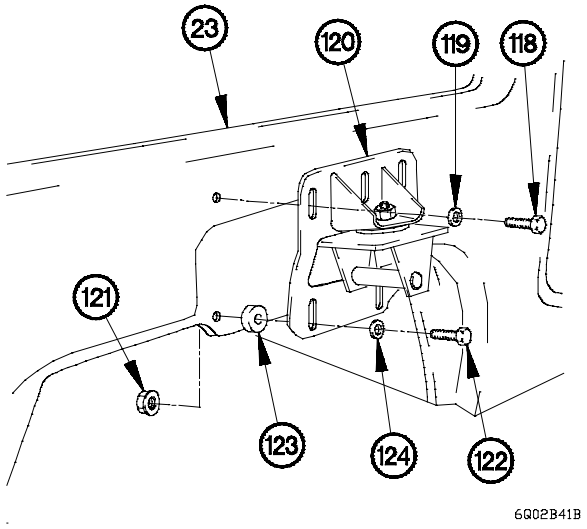
Perform step (64) on vehicles 0001 through 7167.

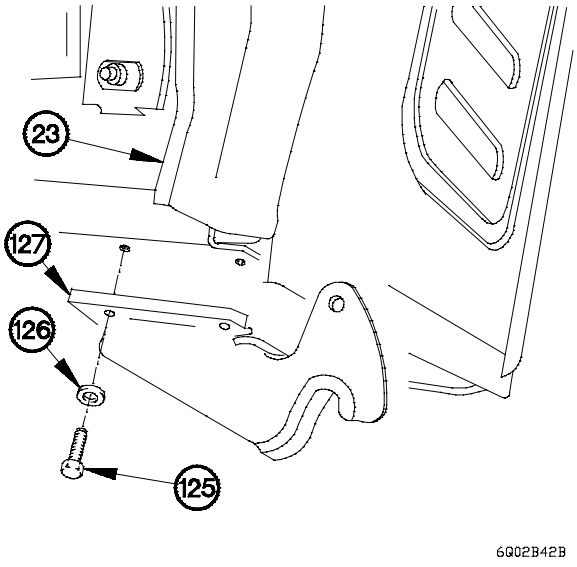
(64) Remove two self-locking nuts (121), screws (122), spacers (123), washers (124), and latch bracket (120) from cab (23). Discard self-locking nuts.

**NOTE**

Perform step (64.1) on vehicles 7168 and higher.

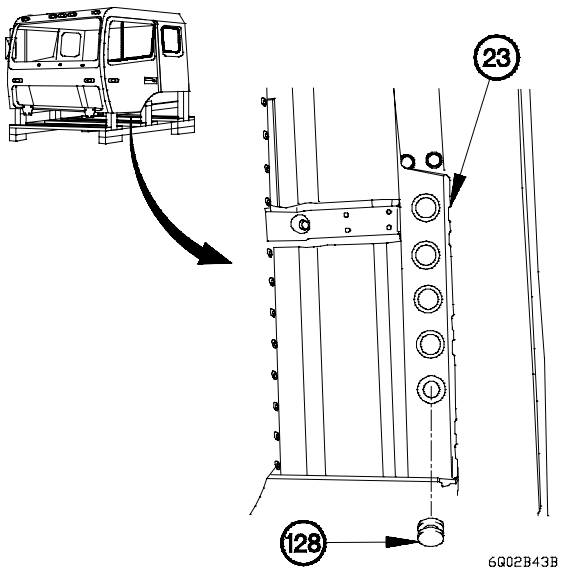
(64.1) Remove two self-locking nuts (121), screws (122), washers (124), and latch bracket (120) from cab (23). Discard self-locking nuts.




(65) Remove four screws (125), washers (126), and two cab latches (127) from cab (23).

(66) Remove 10 plastic plugs (128) from bottom of cab (23). Discard plastic plugs.



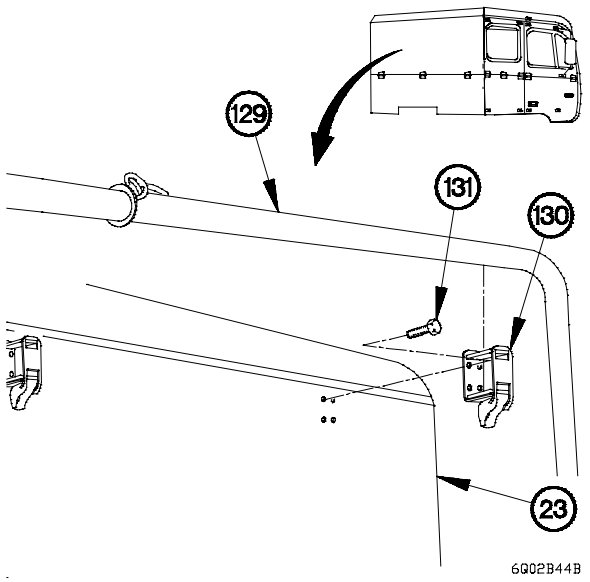
## 15-2. CAB REPLACEMENT (CONT)

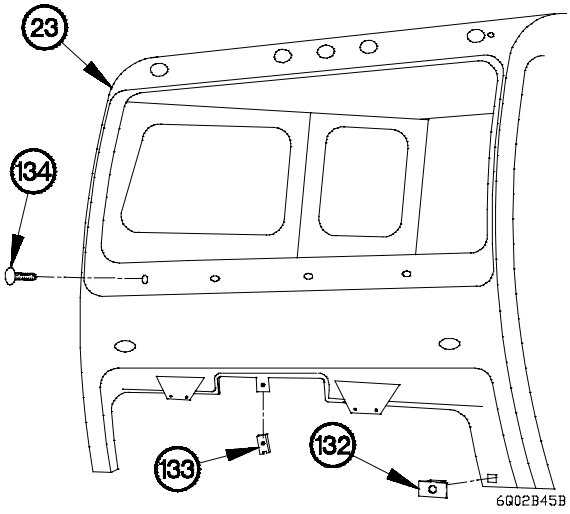
**NOTE**

Perform steps (67) and (68) on M1093 and M1094.

(67) Remove davit (129) from three mounting brackets (130).

(68) Remove 12 screws (131) and three mounting brackets (130) from cab (23).



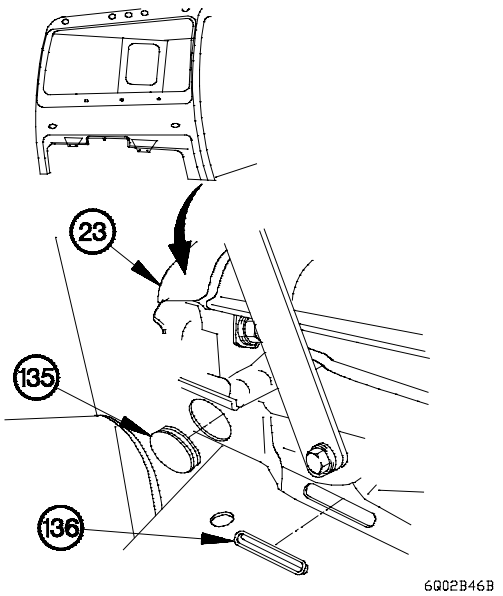

(69) Remove two grille expansion nuts (132) from cab (23).

(70) Remove grille clip-on nut (133) from cab (23).

(71) Remove four plastic plugs (134) from cab (23). Discard plastic plugs.

(72) Remove two plastic plugs (135) from cab (23). Discard plastic plugs.

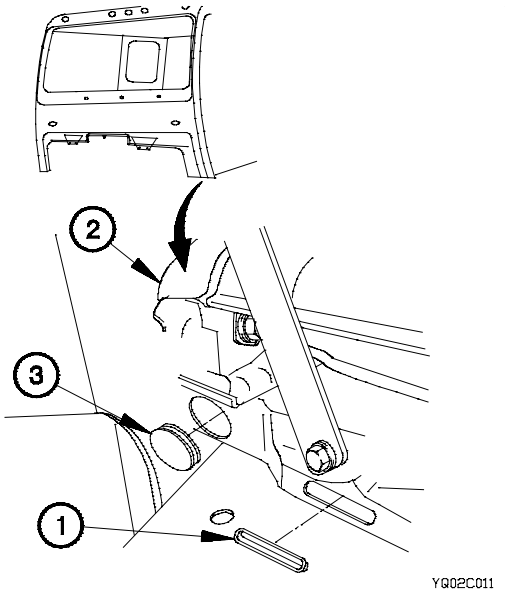
(73) Remove two rubber plugs (136) from cab (23). Discard rubber plugs.

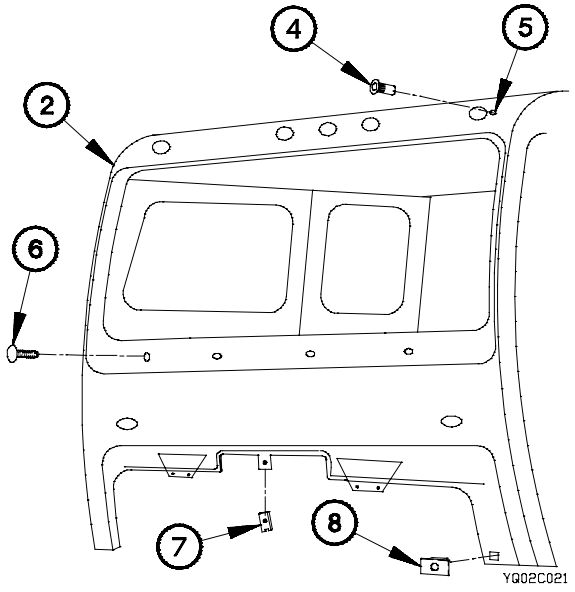


**c. Assembly.**

(1) Install two rubber plugs (1) in cab (2).

(2) Install two plastic plugs (3) in cab (2).




(3) Install 36 clinch nuts (4) in cab clearance and marker light (5) mounting holes.

(4) Install four plastic plugs (6) in cab (2).

(5) Install grille clip-on nut (7) on cab (2).

(6) Install two grille expansion nuts (8) on cab (2).

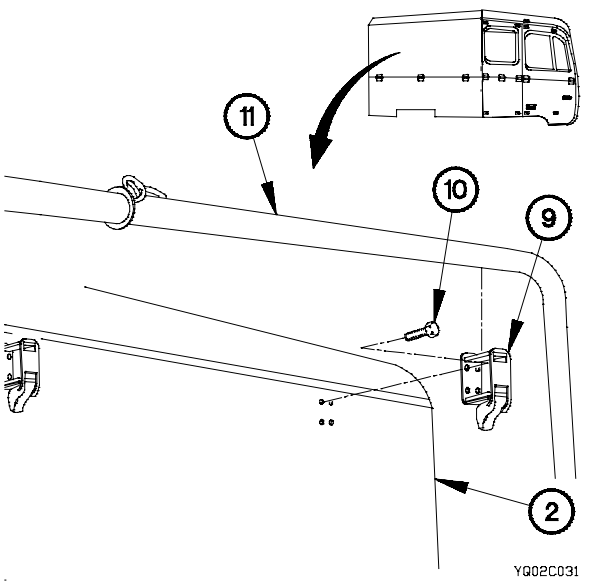
**NOTE**

Perform steps (7) through (9) on M1093 and M1094.

(7) Position three mounting brackets (9) on cab (2) with 12 screws (10).

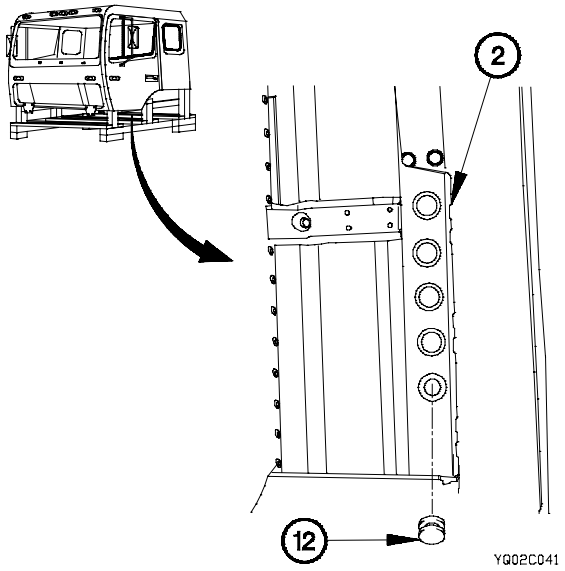
(8) Tighten 12 screws (10) to 36-44 lb-in. (4-5 N·m).

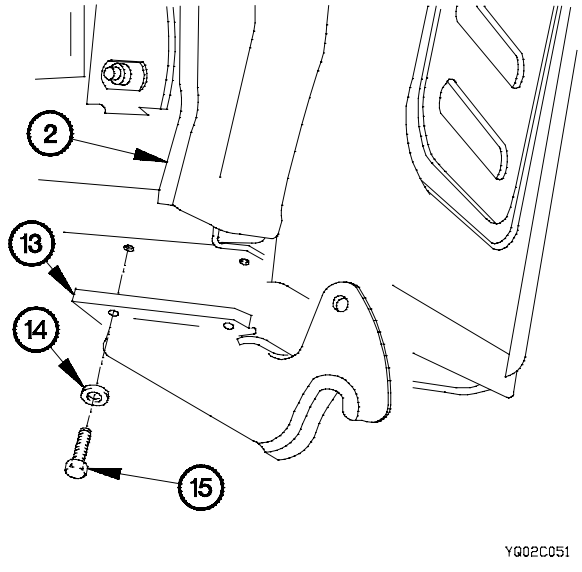
(9) Install davit (11) in mounting brackets (9).



## 15-2. CAB REPLACEMENT (CONT)

(10) Install 10 plastic plugs (12) in cab (2).




**NOTE**

Tighten screws so cab latch can be moved with some resistance.

(11) Position two cab latches (13) on cab (2) with four washers (14) and screws (15).

(12) Deleted.

**NOTE**

Perform step (12.1) on vehicles 7168 and higher.

(12.1) Position latch bracket (16) on cab (2) with two washers (17), screws (19), and self-locking nuts (20).

**NOTE**

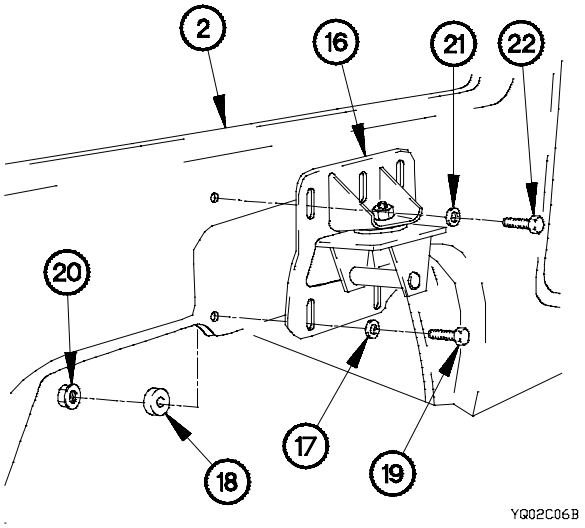
Perform step (13) on vehicles 0001 through 7167.

(13) Position latch bracket (16) on cab (2) with two washers (17), spacers (18), screws (19), and self-locking nuts (20).

(14) Position three washers (21) and screws (22) in cab latch bracket (16).

(15) Tighten three screws (22) and two self-locking nuts (20) to 34-44 lb-ft (44-60 N·m).

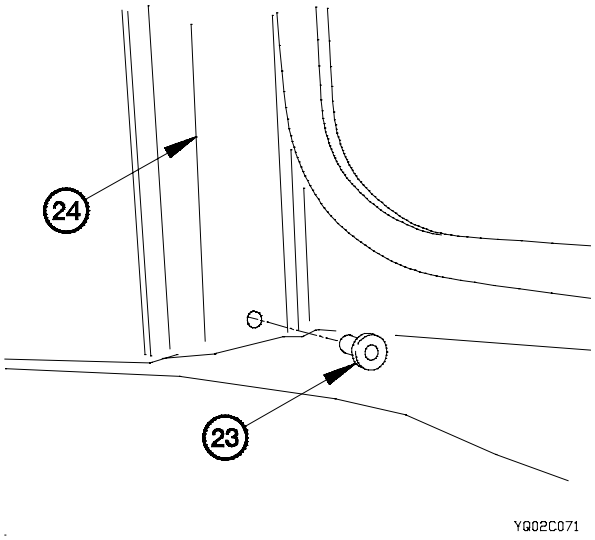
(16) Deleted.

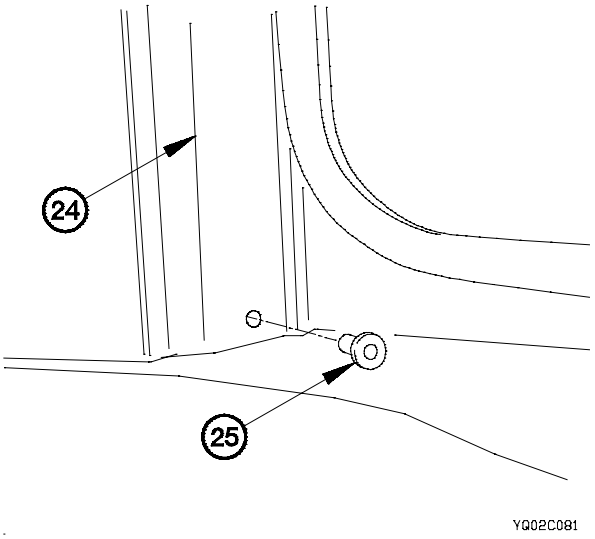


**NOTE**

Perform step (17) on M1093 and M1094.

(17) Install six button plugs (23) in two door posts (24).




**NOTE**

Perform step (18) on all models except M1093 and M1094.

(18) Install two button plugs (25) in door posts (24).

**NOTE**

Left and right side door seals, check valve boots, and door strike catch plates are installed the same way. Left side shown.

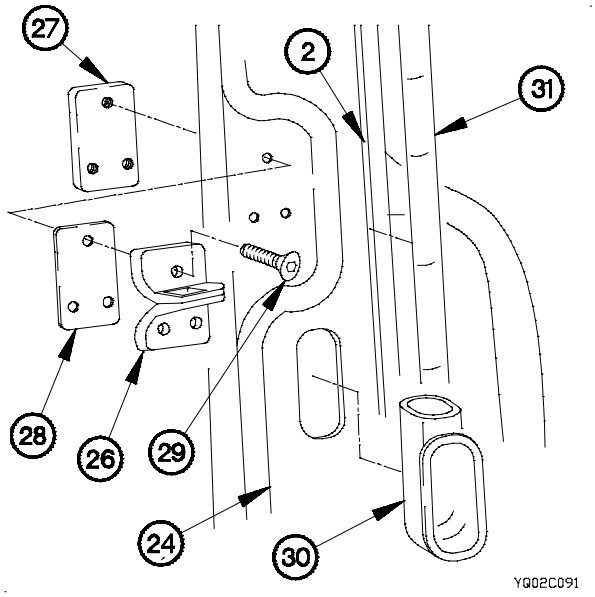
(19) Position catch strike plate (26) on door post (24) with threaded plate (27), shim (28), and three screws (29).

(20) Tighten three screws (29) to 70-85 lb-in. (8-10 N·m).

(21) Install ventilation check valve boot (30) in door post (24).

(22) Install door seal (31) on cab (2).

(23) Perform steps (19) through (22) on right side door seals, check valve boot, and door catch strike plate.

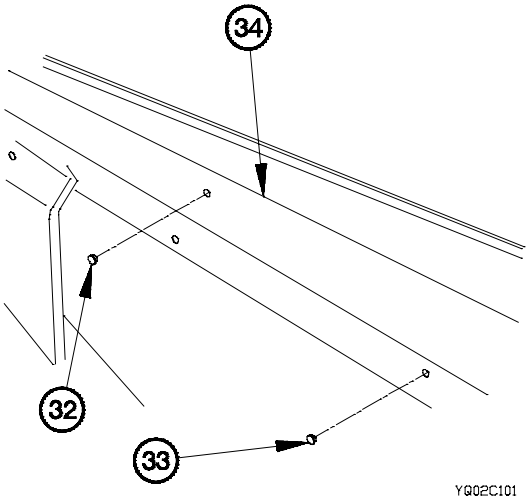


## 15-2. CAB REPLACEMENT (CONT)

**NOTE**

Perform step (24) on M1093 and M1094.

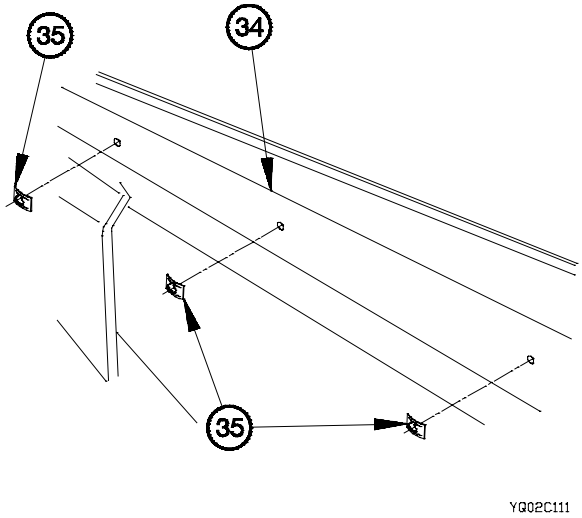
(24) Install 13 plugs (32) and four plugs (33) in dashboard (34).




**NOTE**

Perform step (25) on all models except M1093 and M1094.

(25) Install 13 plugs (32) and two plugs (33) in dashboard (34).



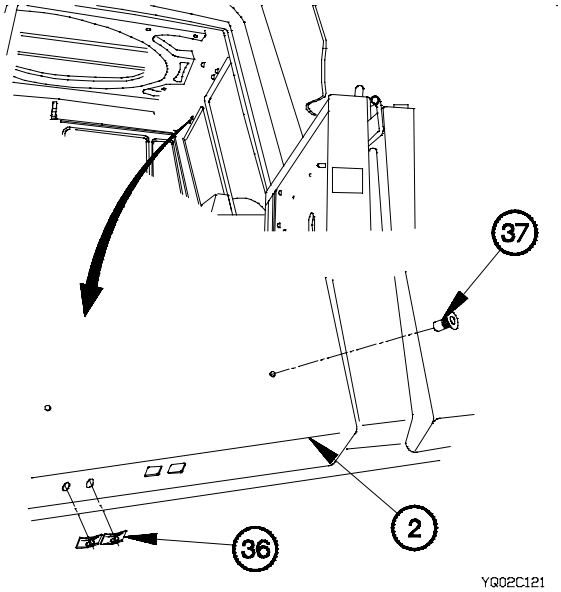

(26) Install 12 expansion nuts (35) in dashboard (34).

**NOTE**

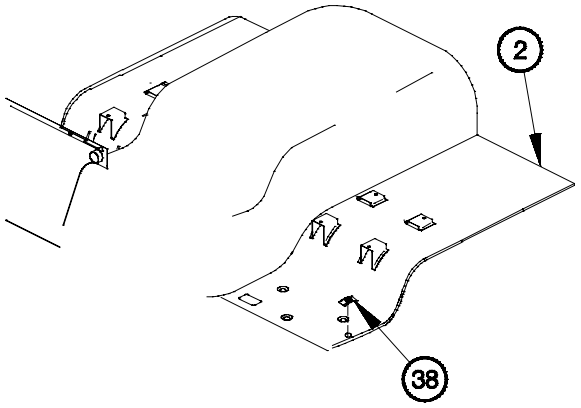
Perform steps (27) and (28) on all models except M1093 and M1094.

(27) Install four expansion nuts (36) in cab (2).

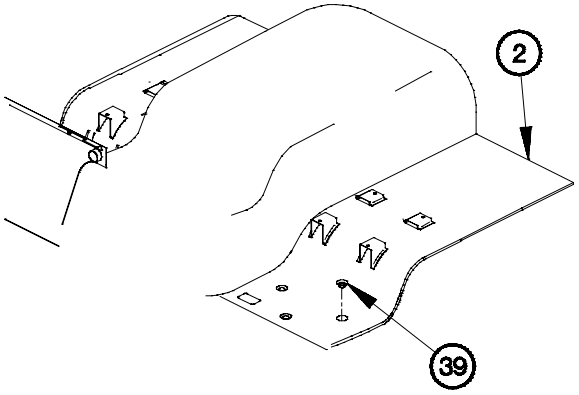
(28) Install five clinch nuts (37) in cab (2).



(29) Install eight expansion nuts (38) in cab (2).




YQ02C131




YQ02C141

**NOTE**

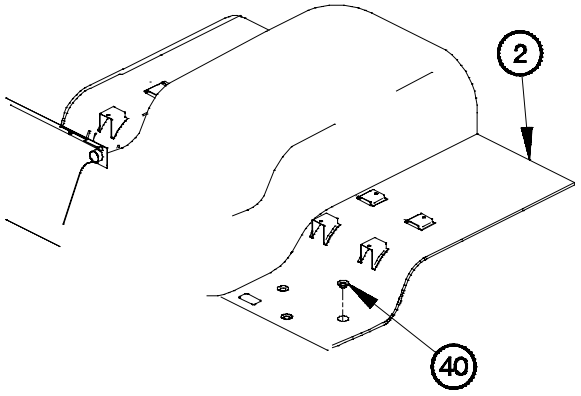
Perform step (30) on M1093 and M1094.

(30) Install 10 rubber plugs (39) in cab (2).

**NOTE**

Perform step (31) on all models except M1093 and M1094.

(31) Install 12 rubber plugs (40) in cab (2).

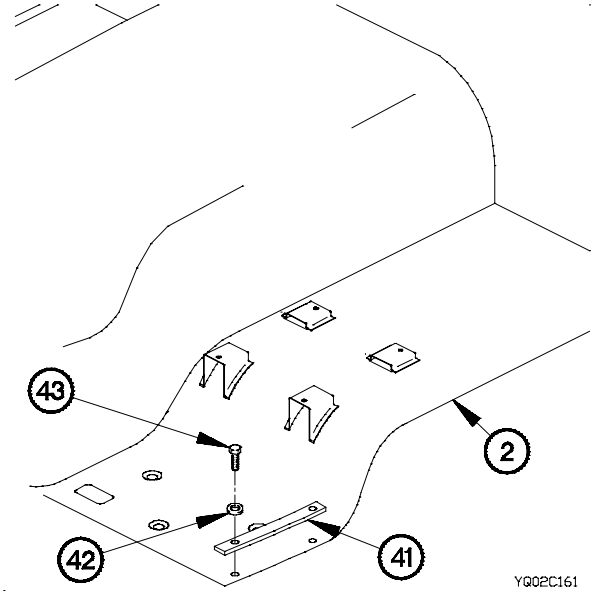



YQ02C151

## 15-2. CAB REPLACEMENT (CONT)

(32) Position two floor moldings (41) on cab (2) with eight washers (42), and screws (43).

(33) Tighten eight screws (43) to 22-27 lb-in. (2-3 N·m).



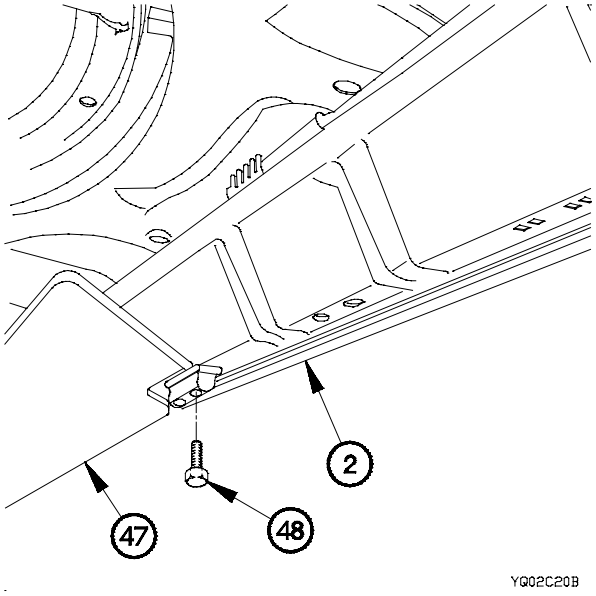

(34) Deleted.

(35) Deleted.

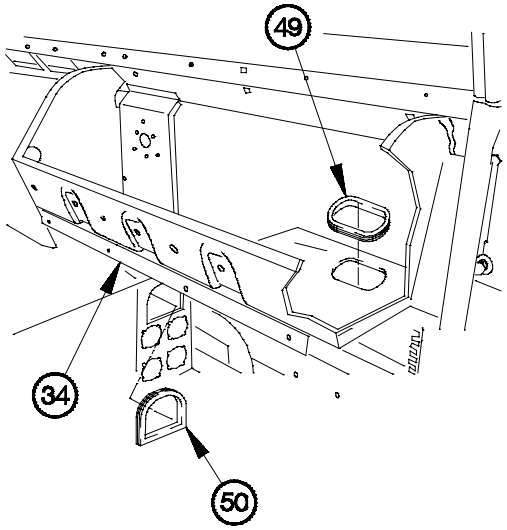
(36) Deleted.

(37) Position sunvisor (47) on cab (2) with four screws (48).

(38) Tighten four screws (48) to 22-27 lb-in. (2-3 N·m).



(39) Install rubber edgings (49 and 50) on dashboard (34).




(40) Deleted.

(41) Deleted.

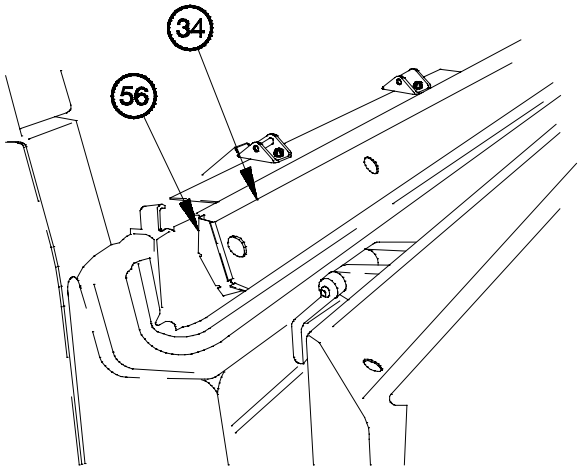
(42) Deleted.

**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 gets 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.**

**NOTE**

Perform steps (43) and (44) on M1093 and M1094.



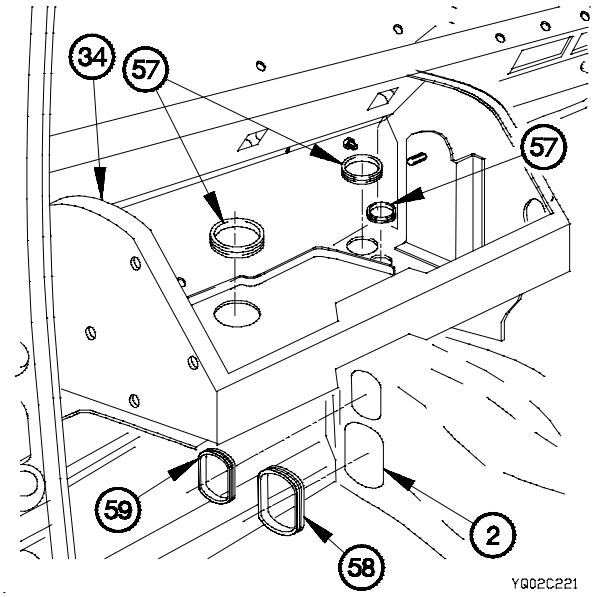

(43) Apply adhesive to two diverters (56).

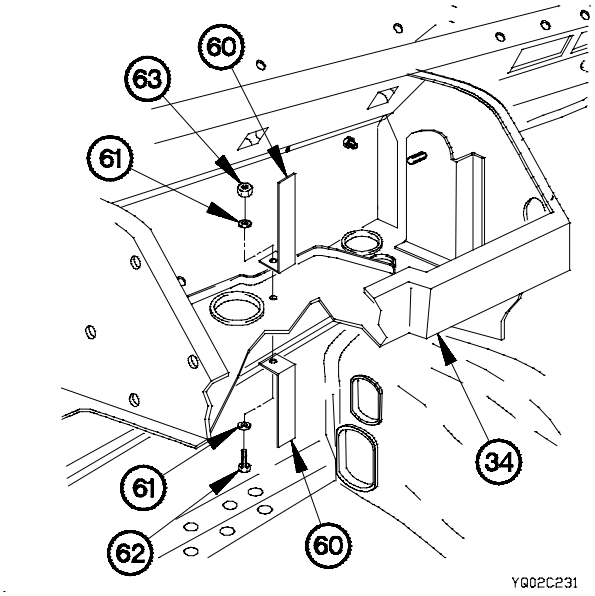
(44) Install two diverters (56) in dashboard (34).

## 15-2. CAB REPLACEMENT (CONT)

(45) Install three grommets (57) in dashboard (34).

(46) Install rubber edgings (58 and 59) in cab (2).



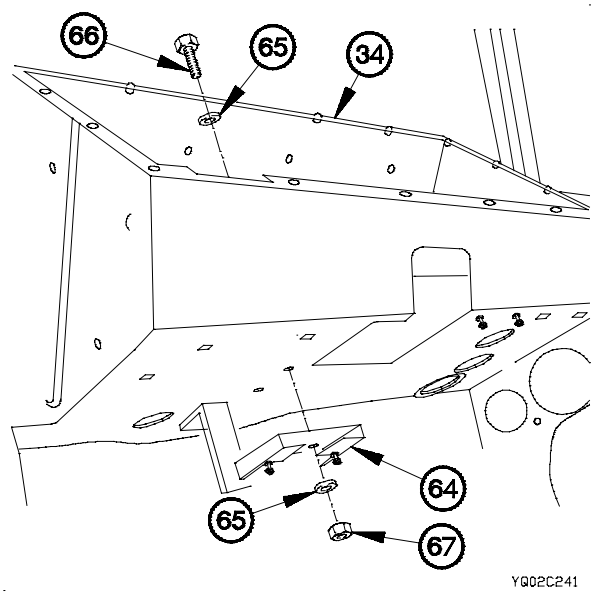




(47) Position two brackets (60) on dashboard (34) with two washers (61), screw (62), and nut (63).

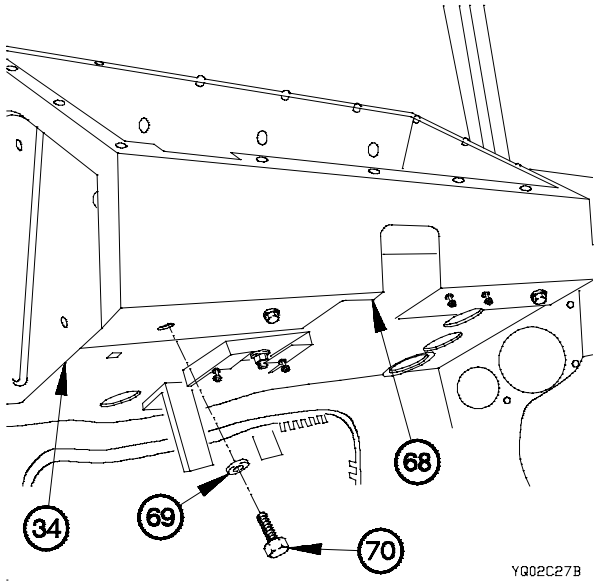
(48) Tighten nut (63) to 62-75 lb-in. (7-8 N·m).

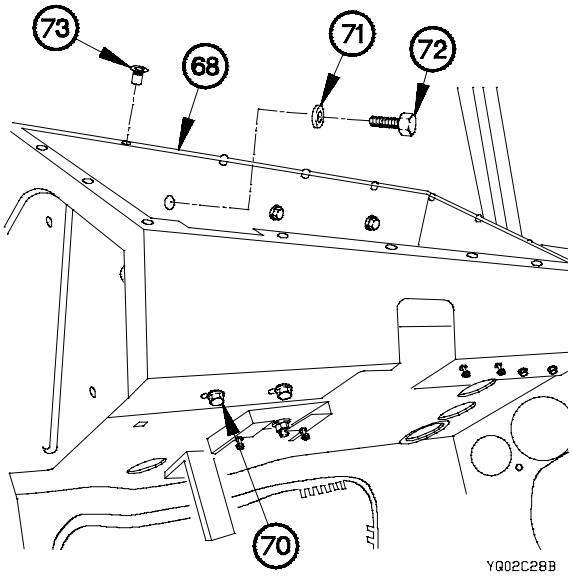
(49) Position bracket (64) on dashboard (34) with four washers (65), two screws (66), and nuts (67).

(50) Tighten two nuts (67) to 16-20 lb-in. (2 N·m).



(51) Position dashboard bezel (68) on dashboard (34) with three washers (69) and screws (70).




(52) Position three washers (71) and screws (72) in dashboard bezel (68).

(53) Tighten three screws (72) to 16-20 lb-in. (2 N·m).

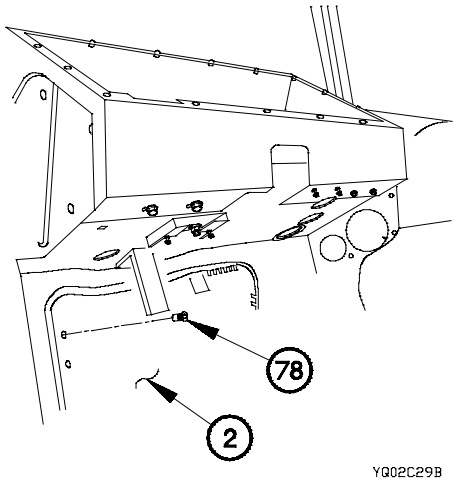
(54) Tighten three screws (70) to 48-60 lb-in. (5-7 N·m).

(55) Install 16 clinch nuts (73) in dashboard bezel (68).

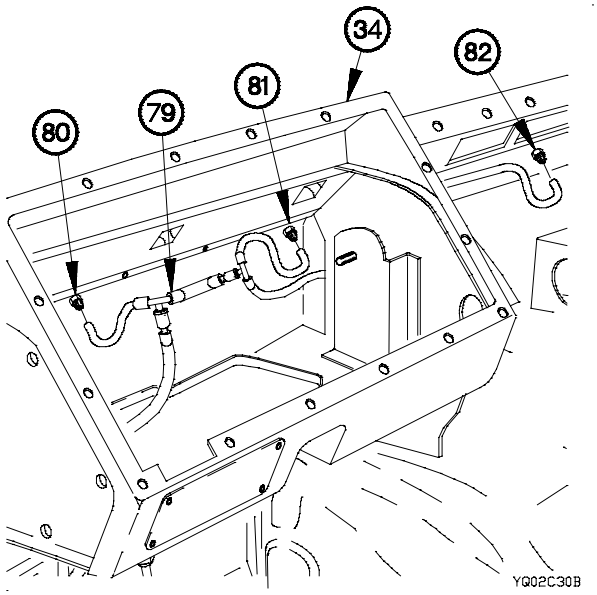
(56) Deleted.

(57) Deleted.

(58) Install two clinch nuts (78) in STE/ICE mounting bracket holes on cab (2).

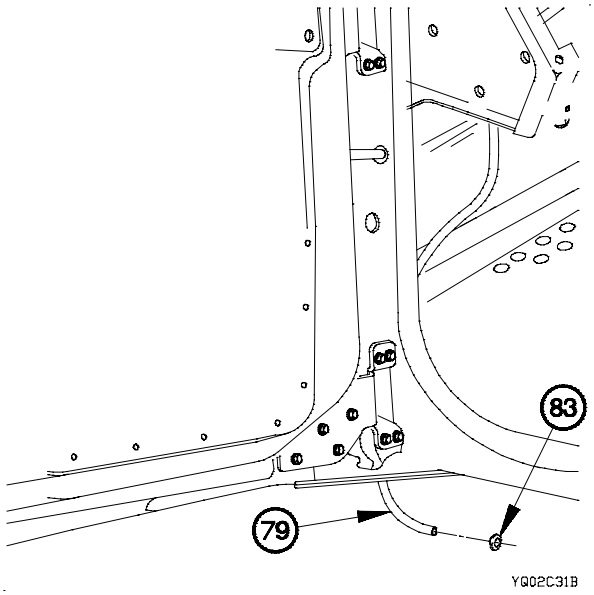


## 15-2. CAB REPLACEMENT (CONT)

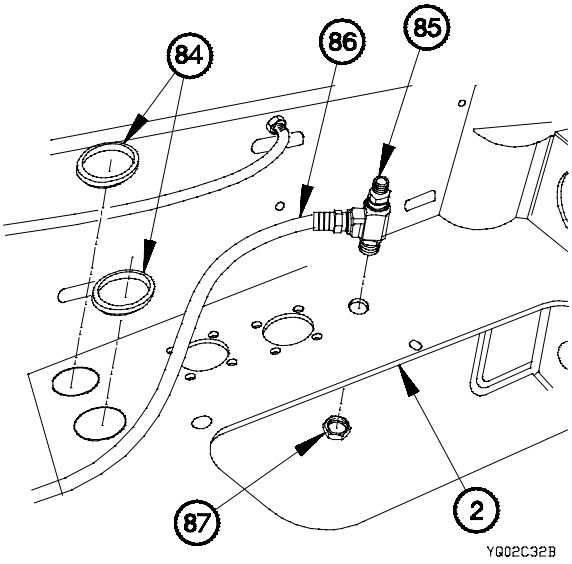



(59) Position window washer hose (79) in dashboard (34).

(60) Connect window washer hose (79) to fittings (80, 81, and 82).




(61) Position grommet (83) on window washer hose (79).



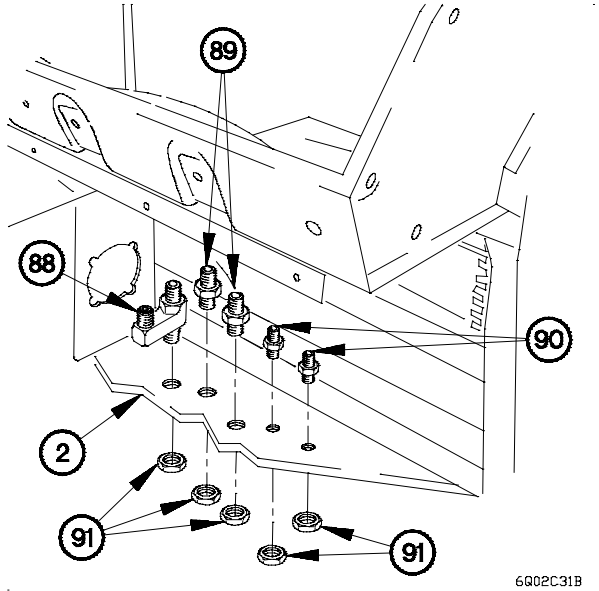

(62) Install two grommets (84) in cab (2).

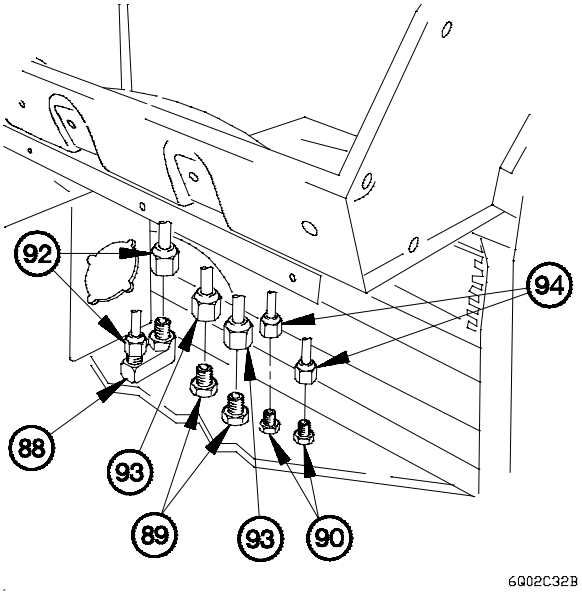
(63) Install tee fitting (85) and hose (86) in cab (2) with nut (87).

**NOTE**

- Perform steps (64) through (70) on M1088.
- Locate and position fittings as noted during disassembly.

(64) Install fitting (88), two fittings (89), and fittings (90) in cab (2) with five nuts (91).




(65) Install two hoses (92) on fitting (88).

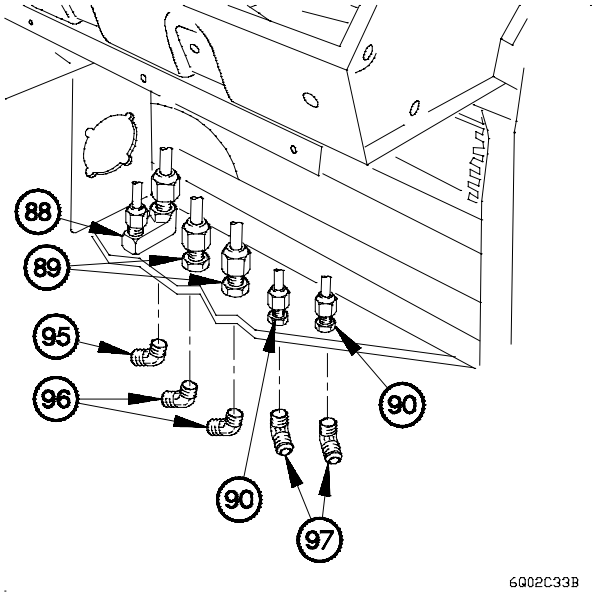
(66) Install two hoses (93) on fittings (89).

(67) Install two hoses (94) on fittings (90).

(68) Install 45-degree fitting (95) in fitting (88).

(69) Install two 45-degree fittings (96) in fittings (89).

(70) Install two 45-degree fittings (97) in fittings (90).

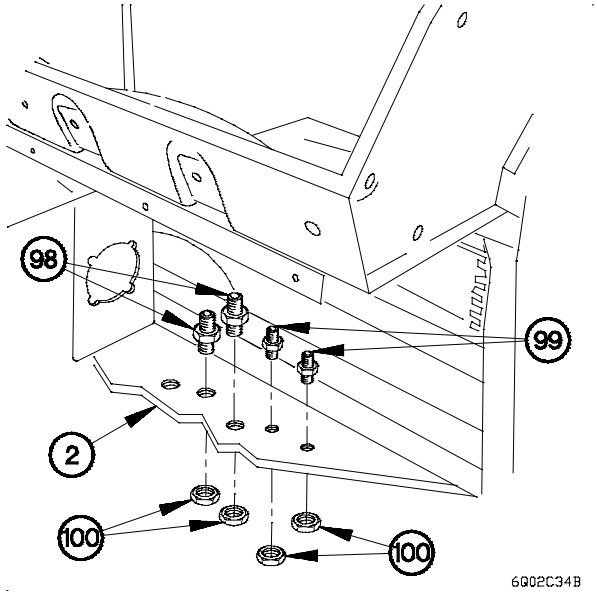


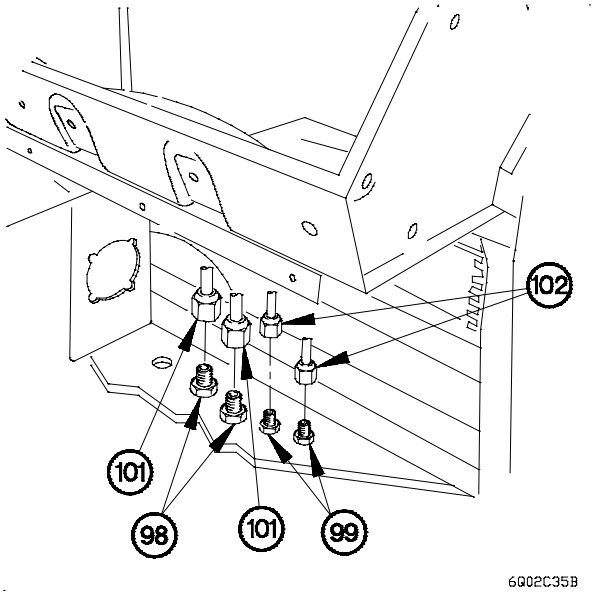
## 15-2. CAB REPLACEMENT (CONT)

**NOTE**

Perform steps (71) through (75) on all models except M1088.

(71) Install two fittings (98) and fittings (99) in cab (2) with four nuts (100).



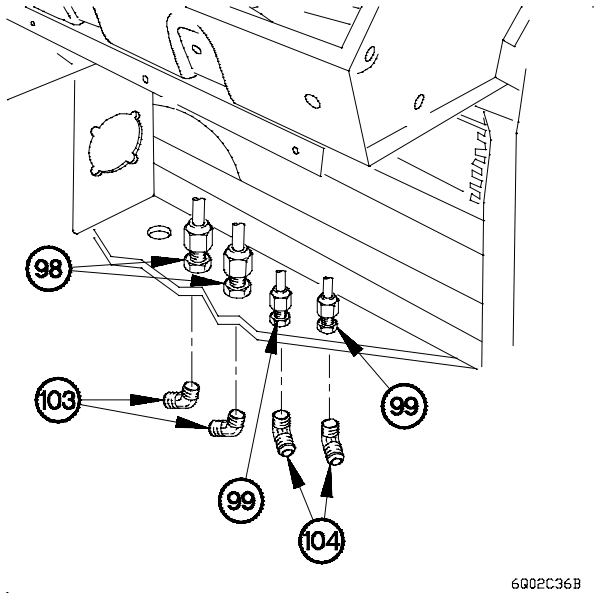




(72) Install two hoses (101) on fittings (98).

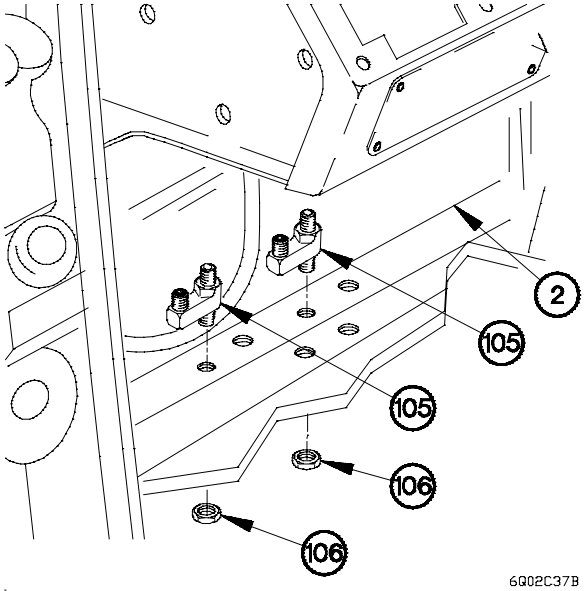
(73) Install two hoses (102) on fittings (99).

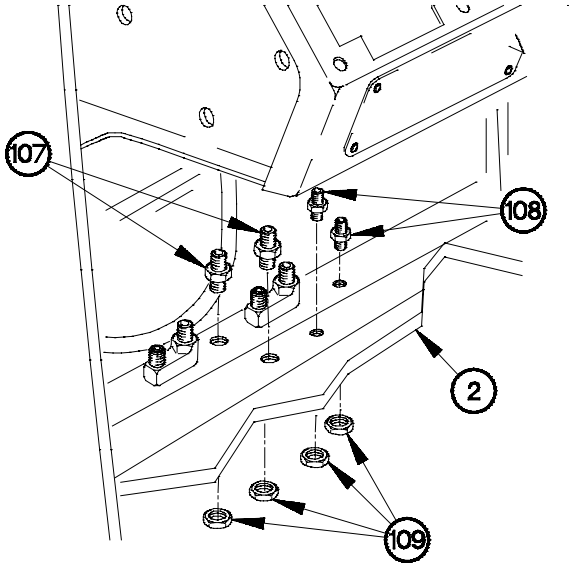
(74) Install two 45-degree fittings (103) in fittings (98).

(75) Install two 45-degree fittings (104) in fittings (99).



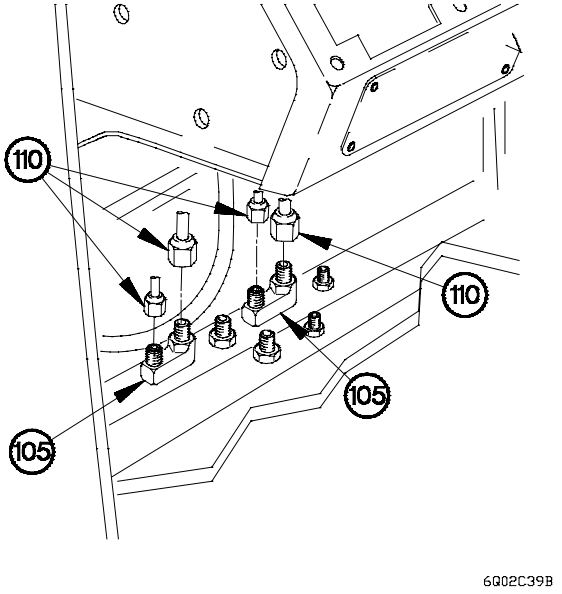
(76) Install two fittings (105) in cab (2) with two nuts (106).



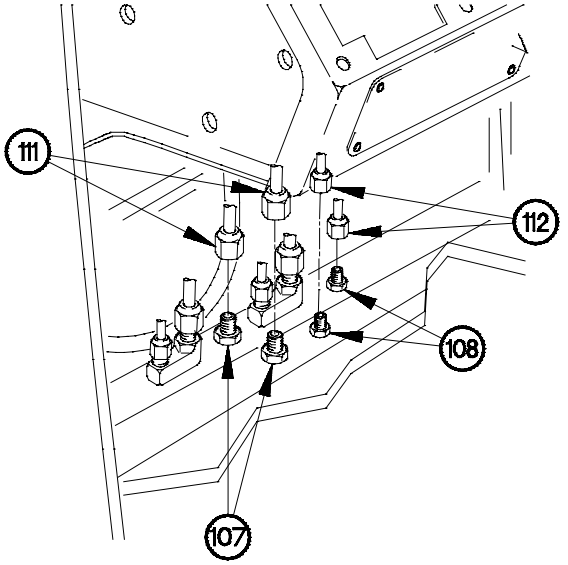




(77) Install two fittings (107) and fittings (108) in cab (2) with four nuts (109).

(78) Install four hoses (110) on two fittings (105).

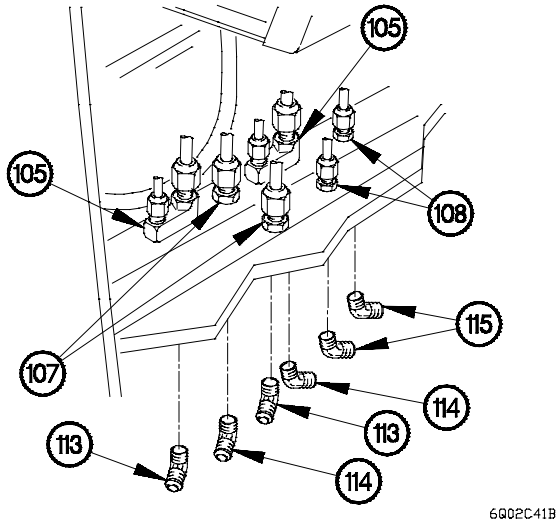


## 15-2. CAB REPLACEMENT (CONT)




(79) Install two hoses (111) on fittings (107).

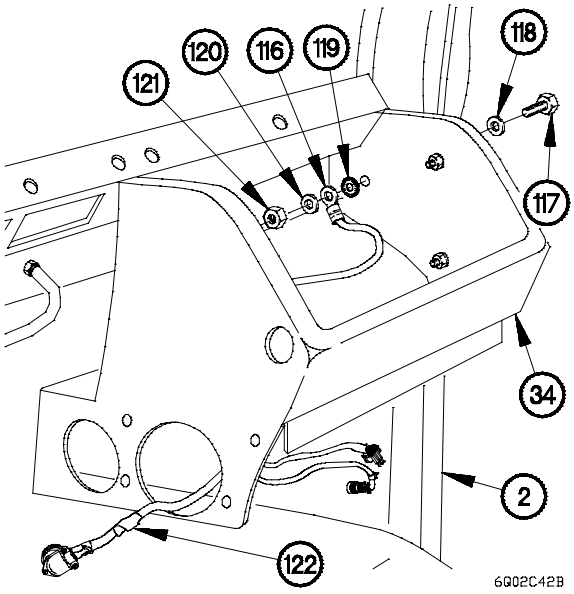
(80) Install two hoses (112) on fittings (108).




(81) Install two 45-degree fittings (113) in fittings (105).

(82) Install two 45-degree fittings (114) in fittings (107).

(83) Install two 45-degree fittings (115) in fittings (108).




(84) Install electrical cable (116) on dashboard (34) with screw (117), washer (118), lockwasher (119), washer (120), and self-locking nut (121).

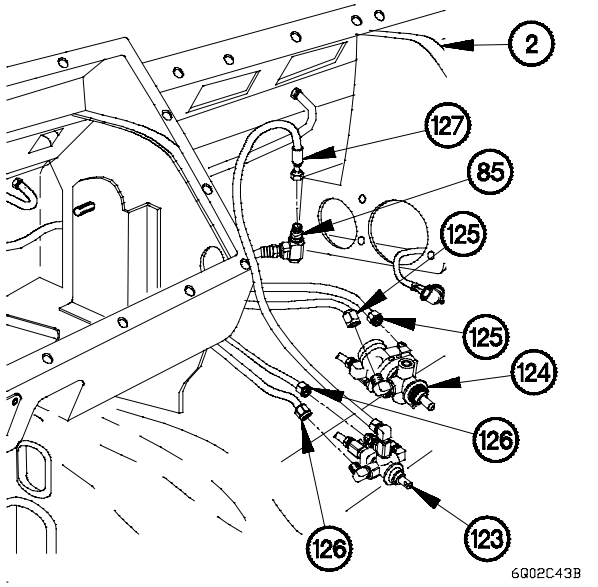
(85) Route CTIS electrical harness (122) in cab (2).

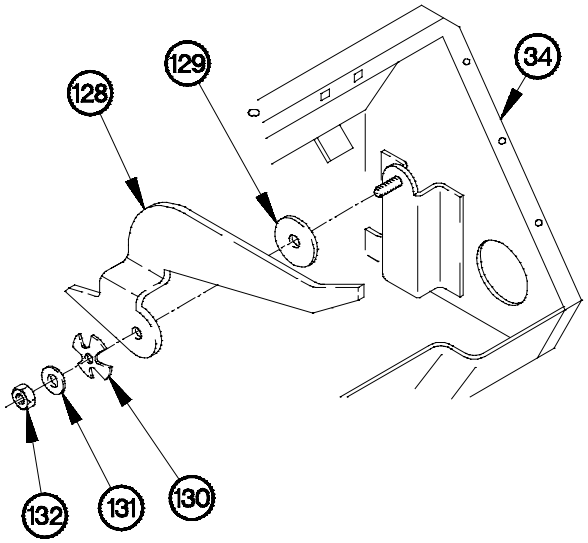
(86) Position trailer air supply valve (123) and system park valve (124) in cab (2).

(87) Connect two hoses (125) to system park valve (124).

(88) Connect two air hoses (126) to trailer air supply valves (123).

(89) Connect air hose (127) to tee fitting (85).

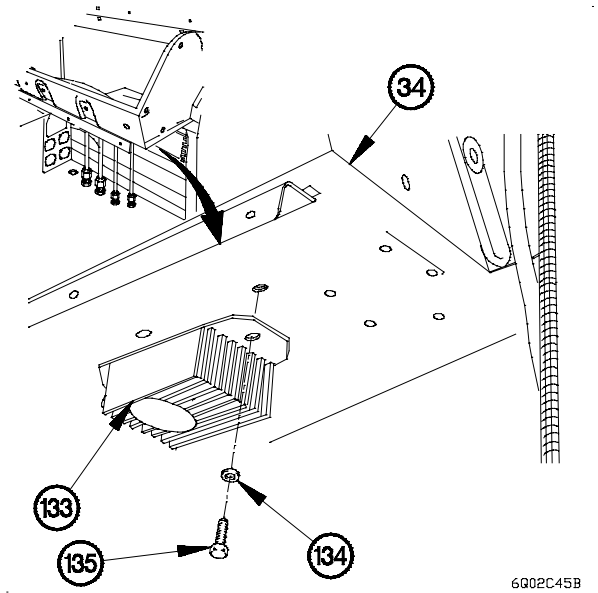


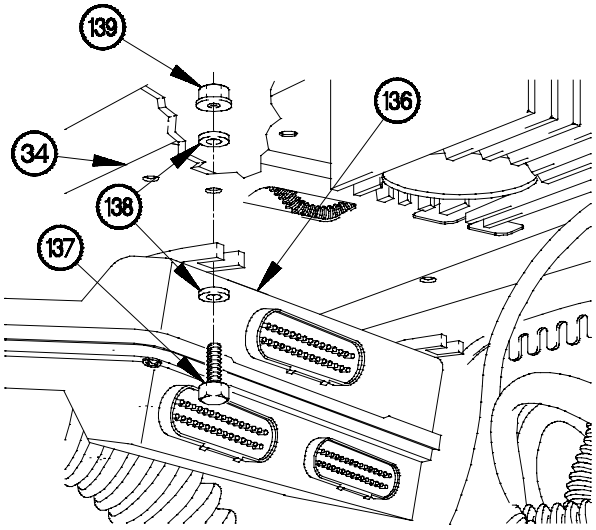

(90) Position manual throttle lever (128) on dashboard (34) with friction disk (129), spring washer (130), washer (131), and self-locking nut (132).

(91) Tighten self-locking nut (132) to 48-50 lb-in. (5-6 N·m).

(92) Install flasher (133) on dashboard (34) with two washers (134) and screws (135).



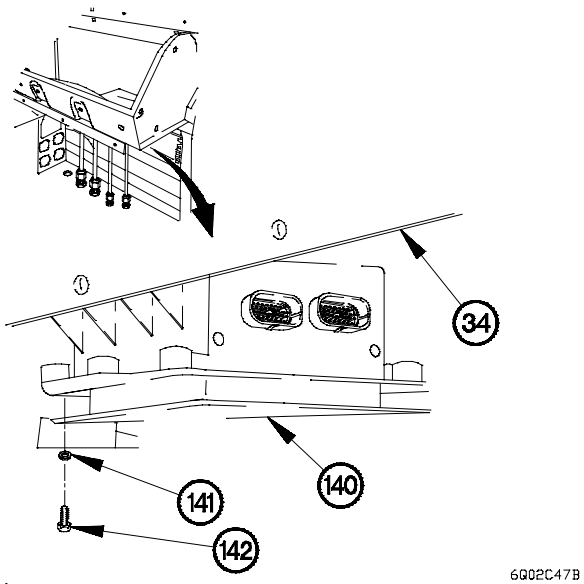
## 15-2. CAB REPLACEMENT (CONT)




**NOTE**

Perform step (93) on WTEC III vehicles.

(93) Install WTEC III transmission ECU (136) on dashboard (34) with three screws (137), six washers (138), and three nuts (139).



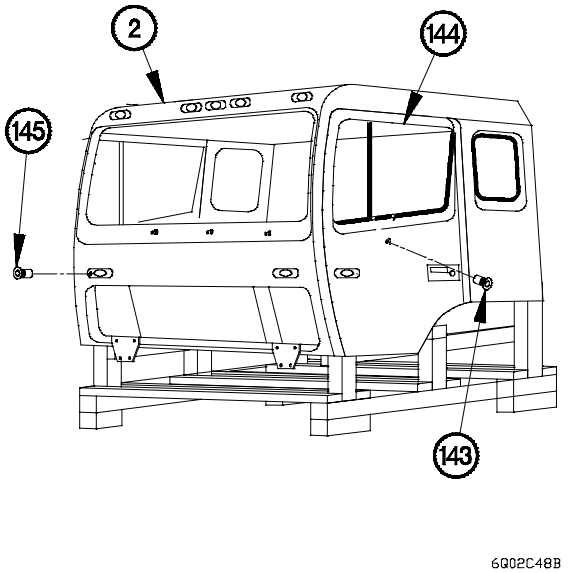

**NOTE**

Perform step (94) on WTEC II vehicles.

(94) Install VIM (140) on dashboard (34) with three washers (141) and screws (142).

(95) Install four clinch nuts (143) in two cab doors (144).

(96) Install 36 cinch nuts (145) in cab (2).



**d. Installation.**

**WARNING**

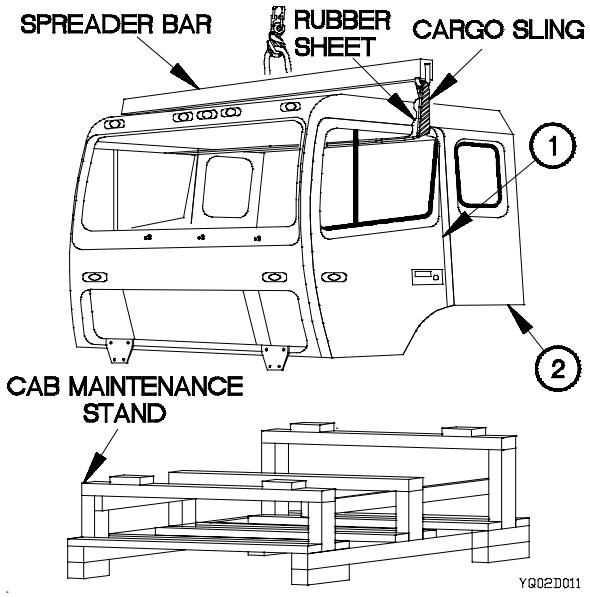
**Standard cab weighs approximately 1400 lbs (636 kgs). M1093/M1094 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.**

**CAUTION**

Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

**NOTE**

Steps (1) through (5) require the aid of an assistant.




(1) Lower cab door windows and install cargo sling through rear section of cab doors (1).

(2) Remove cab (2) from cab maintenance stand.

## 15-2. CAB REPLACEMENT (CONT)

**CAUTION**

Lower cab straight down to clear radiator. Failure to comply may result in damage to equipment.

**NOTE**

Left and right side cab front support mounts are connected the same way. Right side shown.

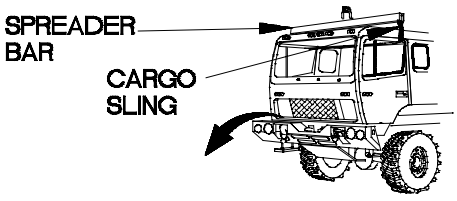
(3) Position cab (2) on two cab front support mounts (3).

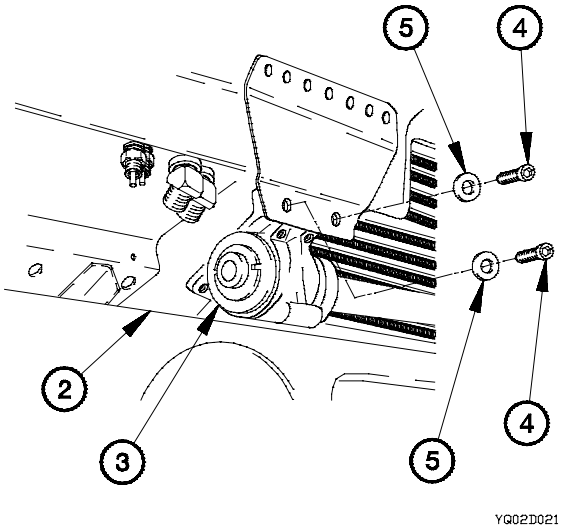
**WARNING**

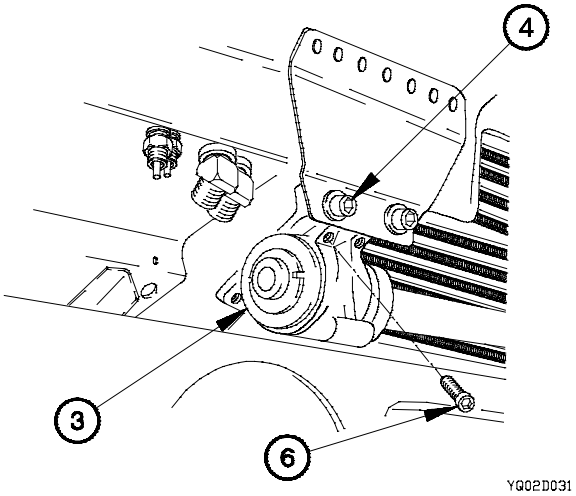
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(4) Apply sealing compound to threads of two screws (4).

(5) Position two washers (5) and screws (4) in right side cab front support mount (3).




(6) Apply sealing compound to threads of four screws (6).

(7) Position four screws (6) in right side cab front support mount (3).

(8) Tighten four screws (6) and two screws (4) to 32-42 lb-ft (45-57 N·m).

(9) Perform steps (3) through (8) on left side cab front support mount (3).

**NOTE**

Perform steps (10) through (16) if rear weld nuts are damaged.

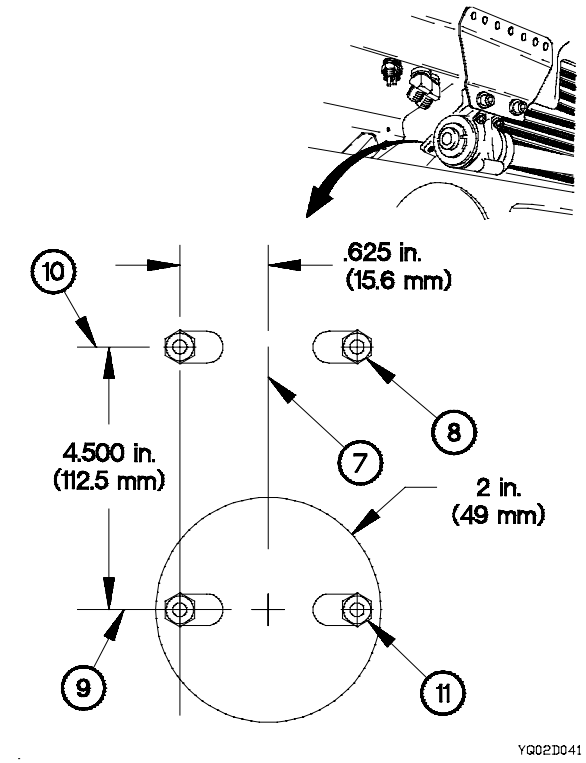
(10) Measure and mark a line (7) half way, 0.625 in. (15.6 mm), between two forward weld nuts (8).

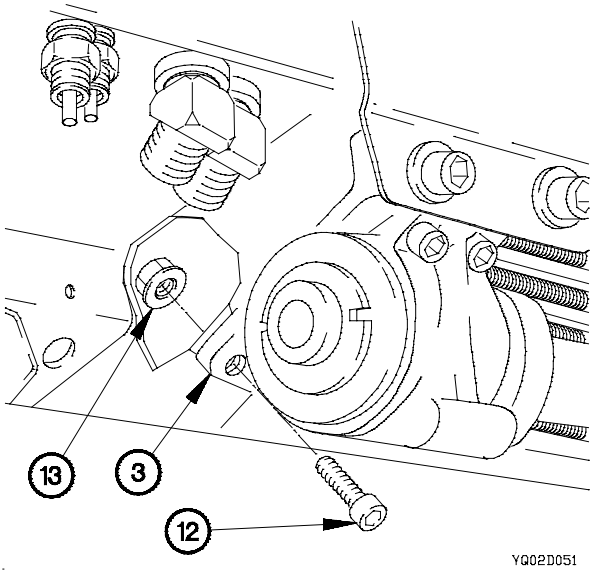
(11) Measure and mark a line (9), 4.500 in. (112.5 mm), in back from front weld nuts (8) on line (10).

(12) Drill a pilot hole at intersection of lines (9 and 10).

(13) Drill a 2 in. (49 mm) hole at pilot hole.

(14) Remove damaged weld nut (11) as required.



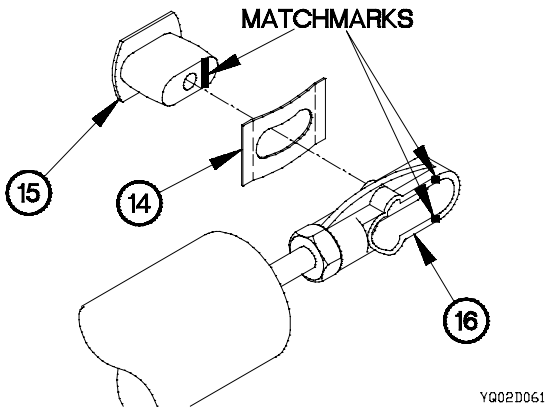

**NOTE**

Steps (15) and (16) require the aid of an assistant.

(15) Position screw (12) and self-locking nut (13) in cab support (3).

(16) Tighten screw (12) to 42-52 lb-ft (57-71 N·m).

(17) Install spring washer (14) and control cam (15) in cab tilt cylinder (16) with matchmarks aligned.



## 15-2. CAB REPLACEMENT (CONT)

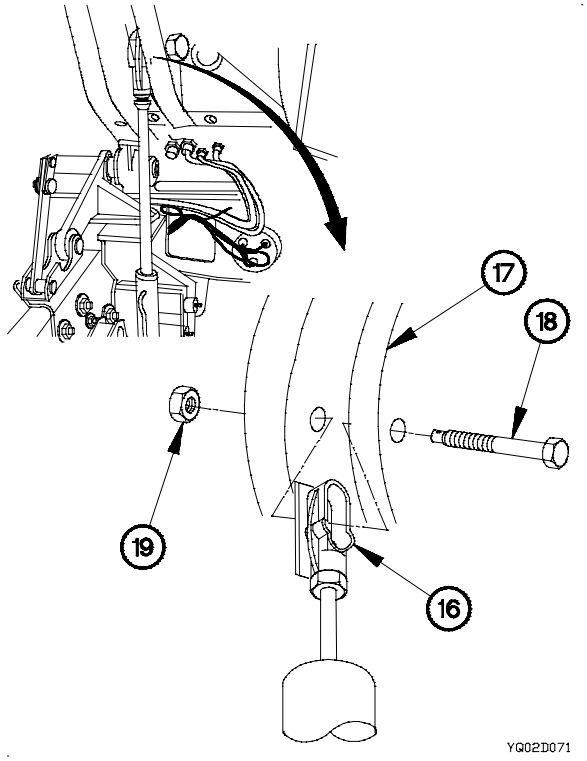
**CAUTION**

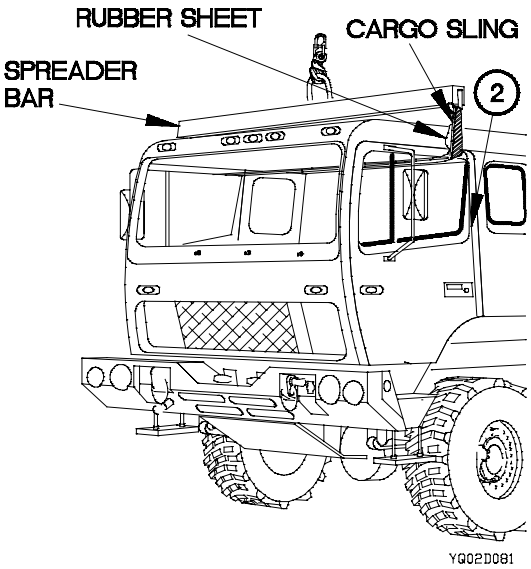
Align arrow on top of tilt cylinder to point toward front of cab. Failure to comply may result in damage to equipment.

(18) Position cab tilt cylinder (16) in tilt cylinder mounting bracket (17).

(19) Position cab tilt cylinder mounting bolt (18) in tilt cylinder mounting bracket (17) and tilt cylinder (16) with self-locking nut (19).

(20) Tighten self-locking nut (19) to 180-232 lb-ft (244-315 N·m).



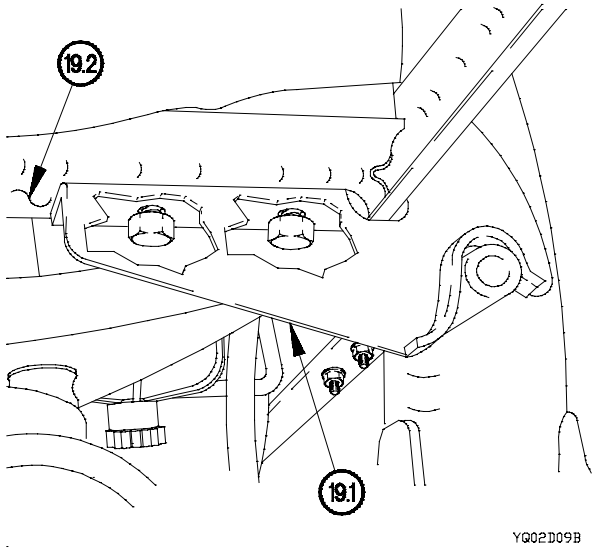




(21) Remove spreader bar, cargo sling and rubber sheet from cab (2).

**CAUTION**

Cab latch must be adjusted so that it rides squarely on the latch support and does not contact the welded area of the latch support. Failure to comply may result in damage to equipment.

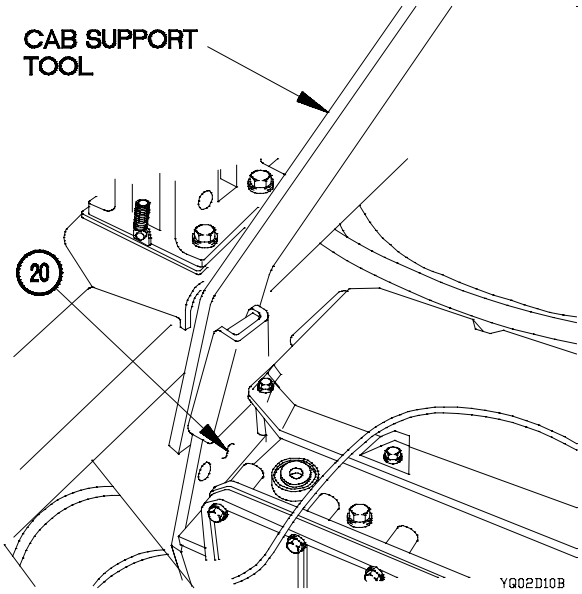
(21.1) Adjust cab latch (19.1) on latch supports (19.2).



**WARNING**

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

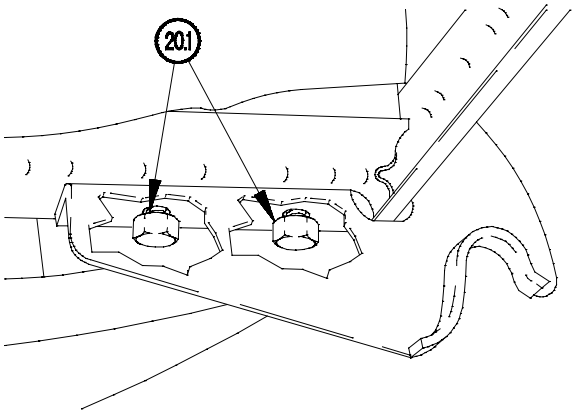
(22) Raise cab enough to install cab support tool on engine rear lifting eye (20) (TM 9-2320-366-10-1).




**WARNING**

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

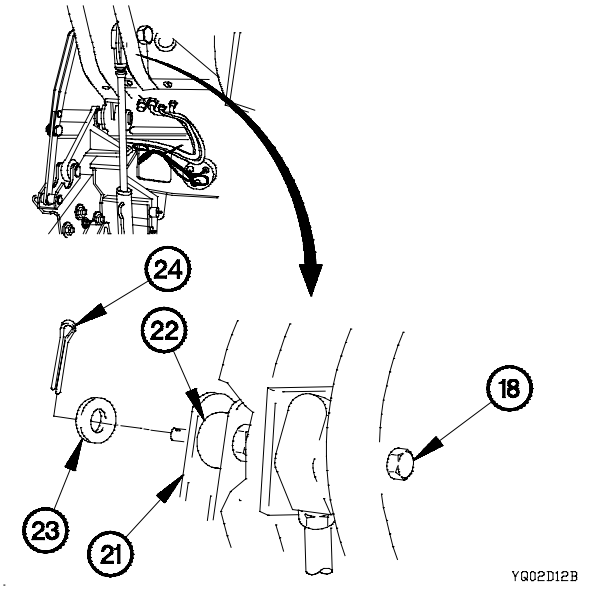
(23) Lower cab on cab support tool (TM 9-2320-366-10-1).




**CAUTION**

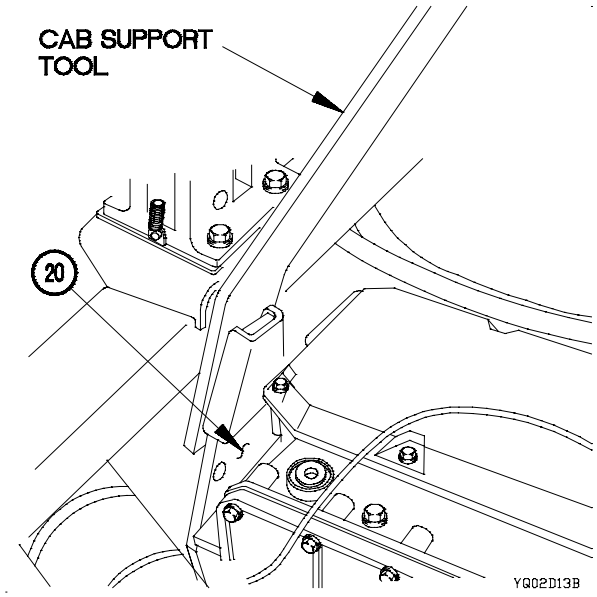
Do not allow cab latch to change position while tightening screws. Failure to comply may result in damage to equipment.

(23.1) Tighten two screws (20.1) to 34-44 lb-ft (44-60 N·m).



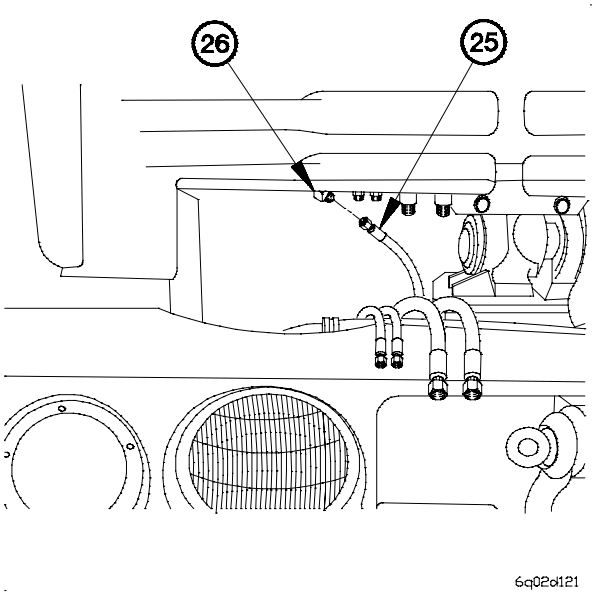

(24) Install locking arms (21), spacer (22), washer (23), and cotter pin (24) on cab tilt cylinder mounting bolt (18).

(25) Raise cab (TM 9-2320-366-10-1).




(26) Remove cab support tool from engine rear lifting eye (20).

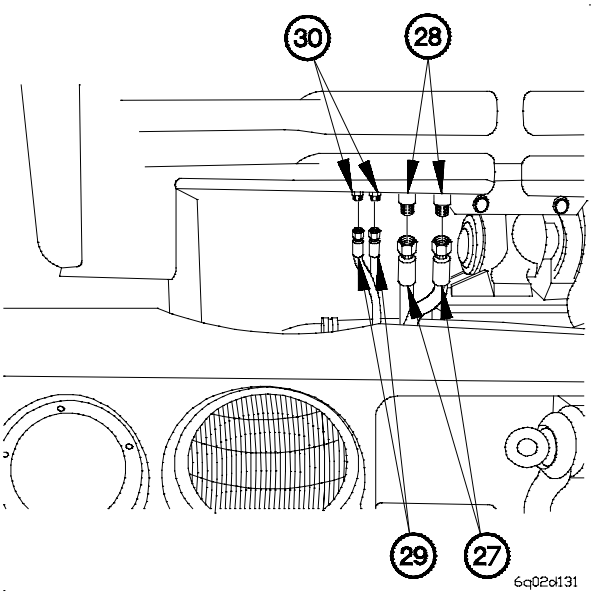
## 15-2. CAB REPLACEMENT (CONT)




**NOTE**

Perform step (27) on M1088.

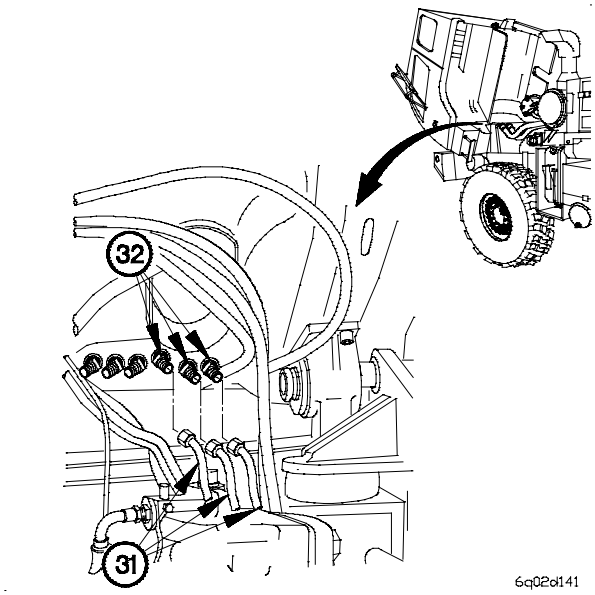
(27) Connect pneumatic hose (25) to 45-degree fitting (26).



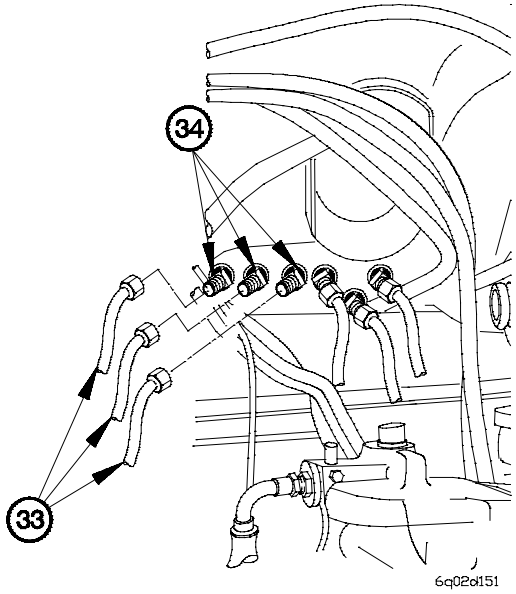

(28) Connect two pneumatic hoses (27) to fittings (28).

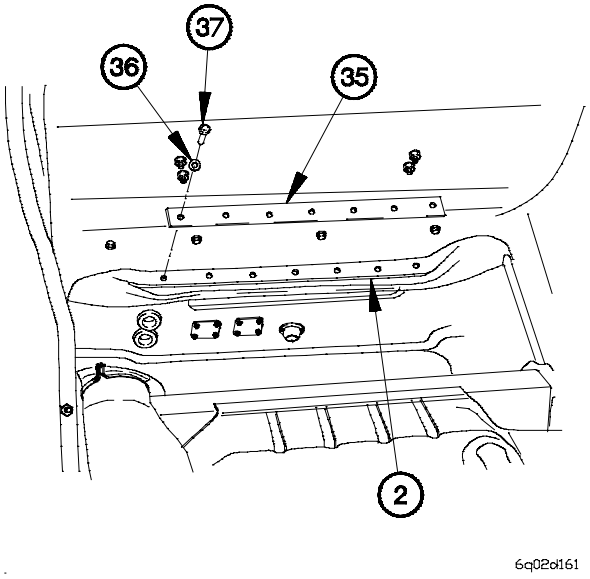
(29) Connect two pneumatic hoses (29) to 45-degree fittings (30).

(30) Connect three pneumatic hoses (31) to 45-degree fittings (32).



(31) Connect three pneumatic hoses (33) to 45-degree fittings (34).



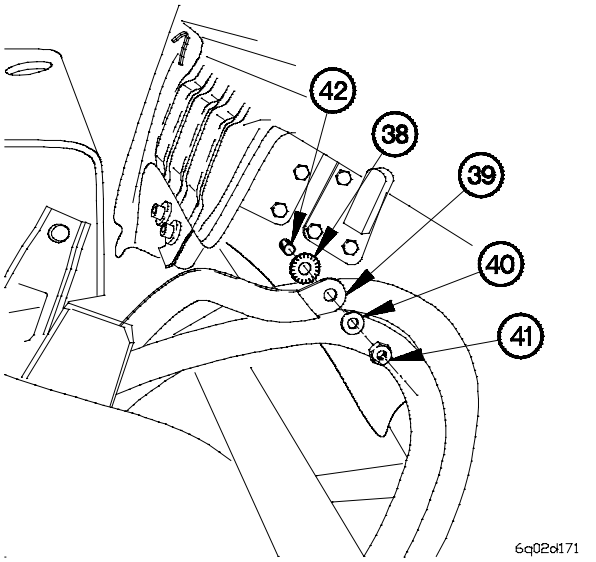




(32) Install baffle (35) on cab (2) with seven washers (36) and rivets (37).

**NOTE**

Vehicle serial numbers 0001 through 1477 have a smaller diameter ground stud than vehicle serial numbers 1478 and higher serial numbers. Vehicle serial number will determine which self-locking nut to use.

(33) Install lockwasher (38), ground strap (39) washer (40) and self-locking nut (41) on ground stud (42).

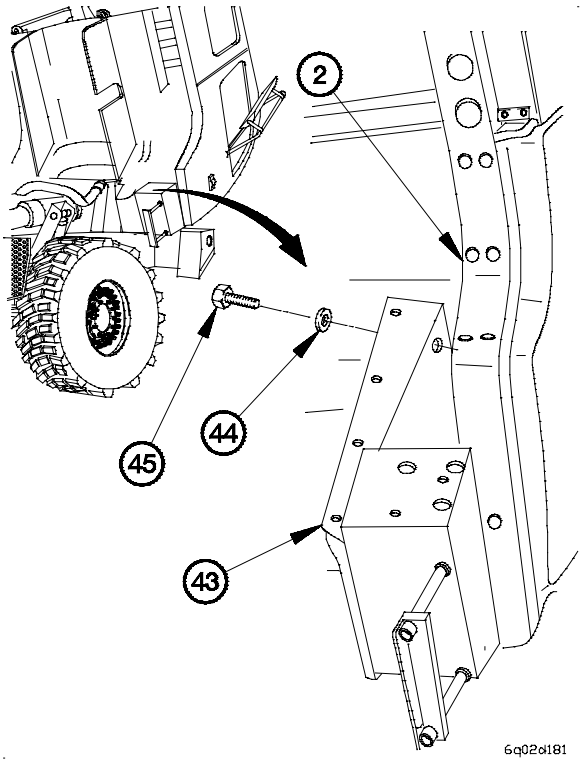


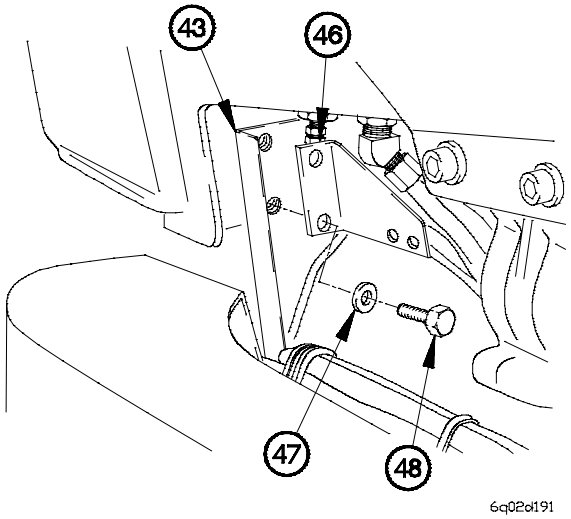
## 15-2. CAB REPLACEMENT (CONT)

**NOTE**

Step (34) requires the aid of an assistant.

(34) Install step mount (43) on cab (2) with six washers (44) and screws (45).



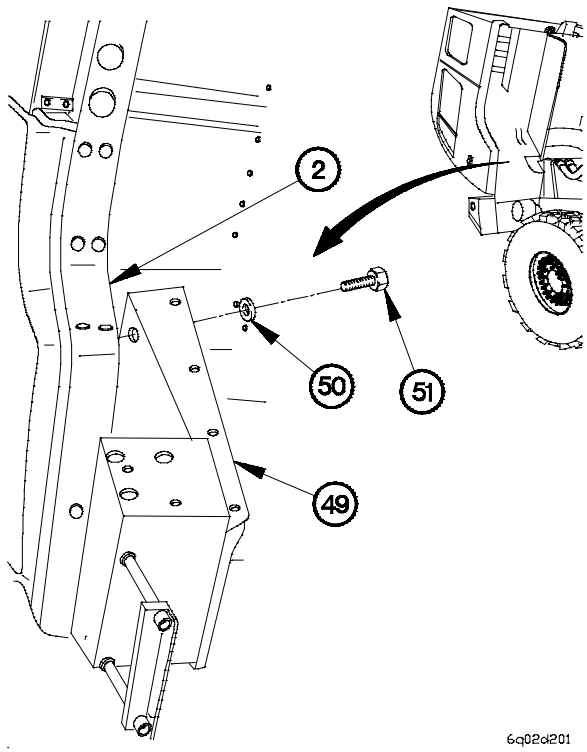



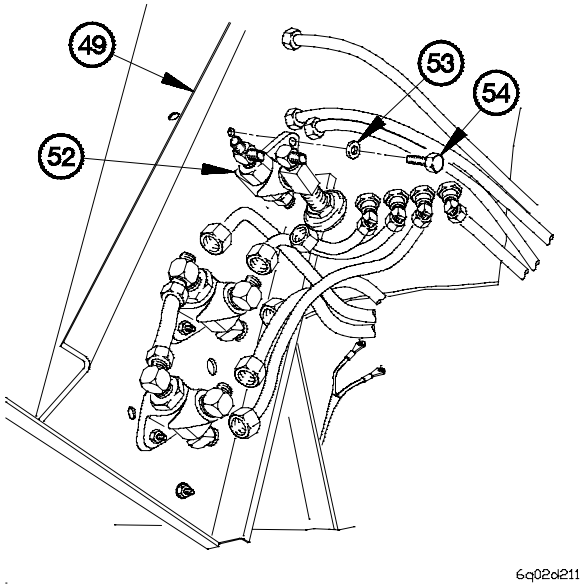

(35) Install bracket (46) on step mount (43) with two washers (47) and screws (48).

**NOTE**

Step (36) requires the aid of an assistant.

(36) Install step mount (49) on cab (2) with seven washers (50) and screws (51).



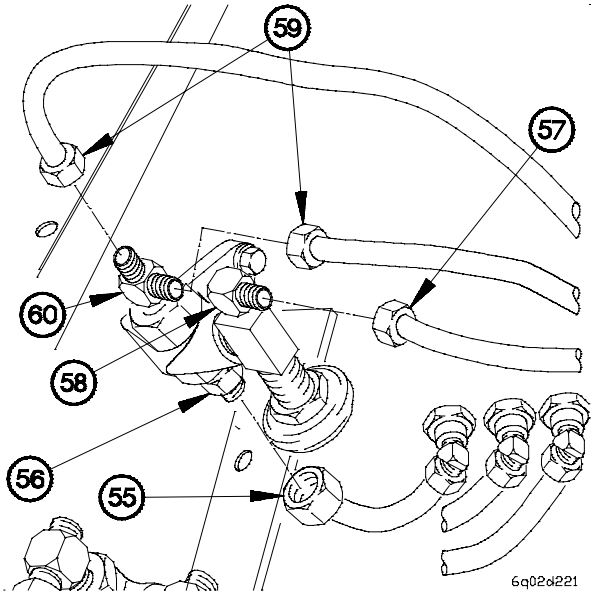




(37) Install valve (52) on step mount (49) with washer (53) and screw (54).

(38) Connect hose (55) to fitting (56).

(39) Connect hose (57) to 90-degree fitting (58).

(40) Connect two hoses (59) to tee fitting (60).

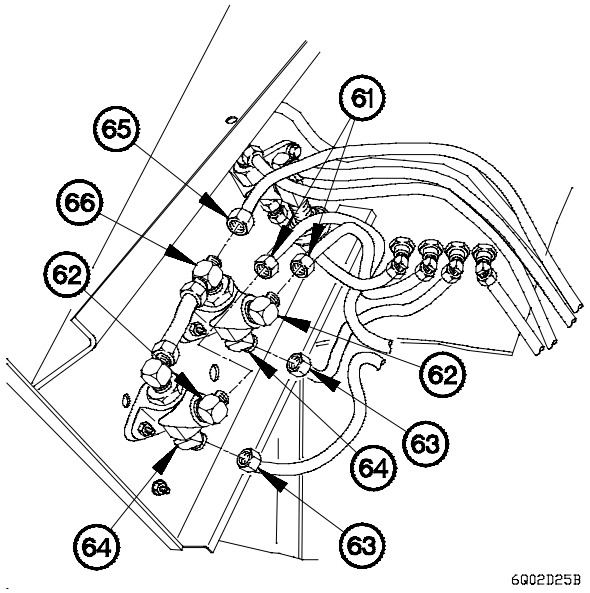


## 15-2. CAB REPLACEMENT (CONT)

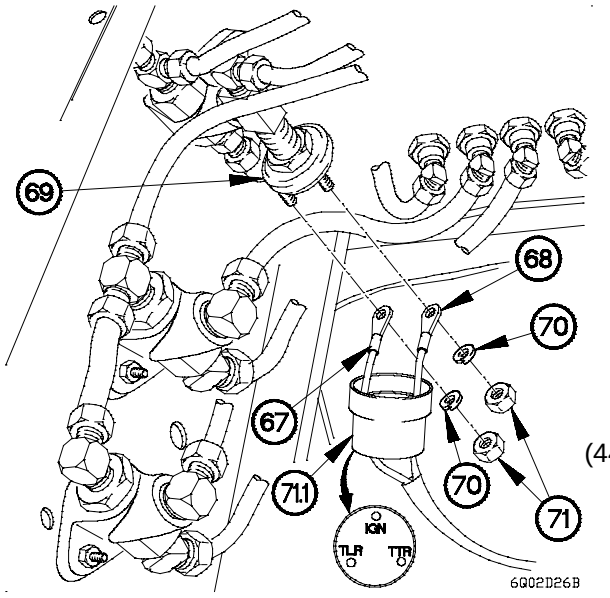
(41) Connect two hoses (61) to 90-degree fittings (62).

(42) Connect two hoses (63) to 45-degree fittings (64).

(43) Connect hose (65) to tee fitting (66).




(44) Install terminal lugs TL201 (67) and TL202 (68) on air pressure transmitter (69) with two lockwashers (70) and nuts (71).




**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 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 serious injury or death to personnel.**

(44.1) Apply sealing compound to nuts (71), lockwashers (70) and terminal lugs TL201 (67) and TL202 (68).

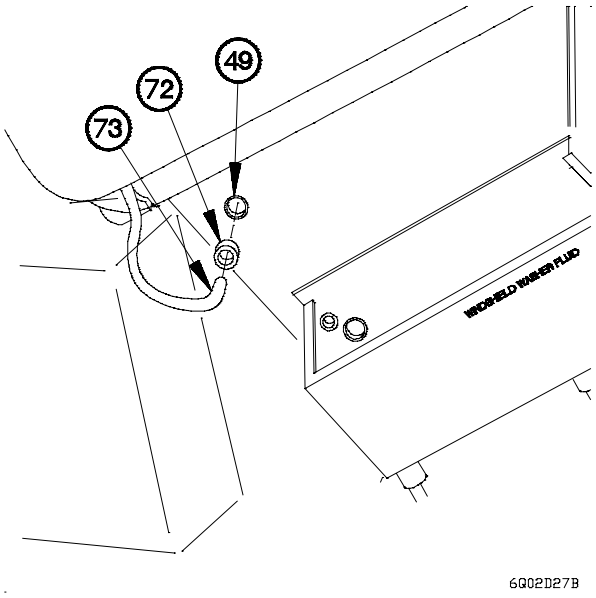
**NOTE**

Perform steps (44.2) and (44.3) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(44.2) Install boot (71.1) on low pressure transmitter (69).

(44.3) Apply antiseize to holes TLR and TTR and around edges of boot (71.1).

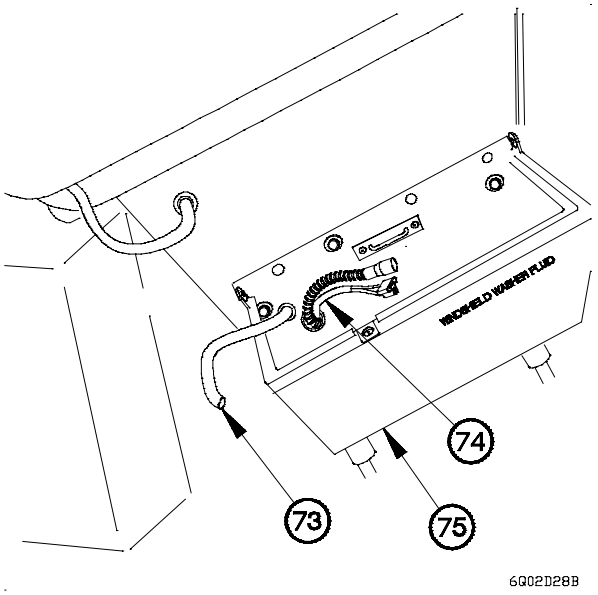
(45) Position grommet (72) and hose (73) in step mount (49).

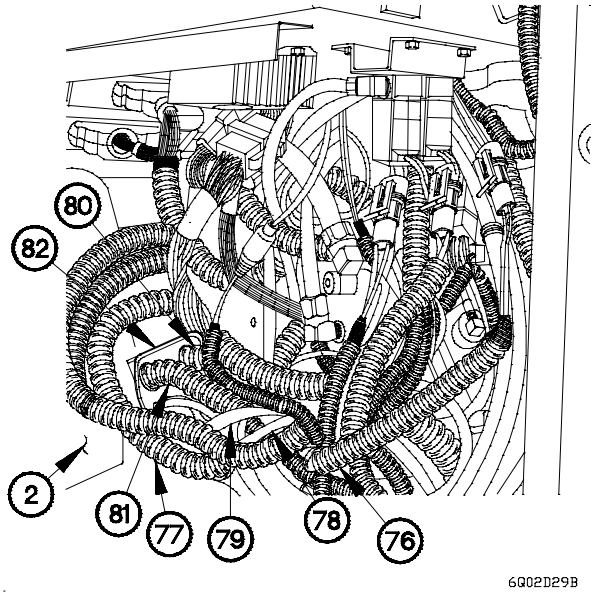


(46) Position windshield washer pump/EMI cable assembly (74) in step (75).

(47) Position hose (73) in step (75).

(48) Lower cab (TM 9-2320-366-10-1).




**NOTE**

Perform step (49) on M1084, M1086, M1090, and M1094.

(49) Route crane/dump power cable assembly (76) in cab (2).

**NOTE**

Perform step (50) on vehicles equipped with PTO.

(50) Route PTO cable assembly (77) inside cab (2).

(51) Route power distribution panel 24 vdc cable (78), power distribution panel 12 vdc cable (79), rear lights cable assembly (80), front lights cable assembly (81), and grommet (82) inside cab (2).

## 15-2. CAB REPLACEMENT (CONT)

**NOTE**

Perform step (52) on M1084, M1086, M1090, and M1094.

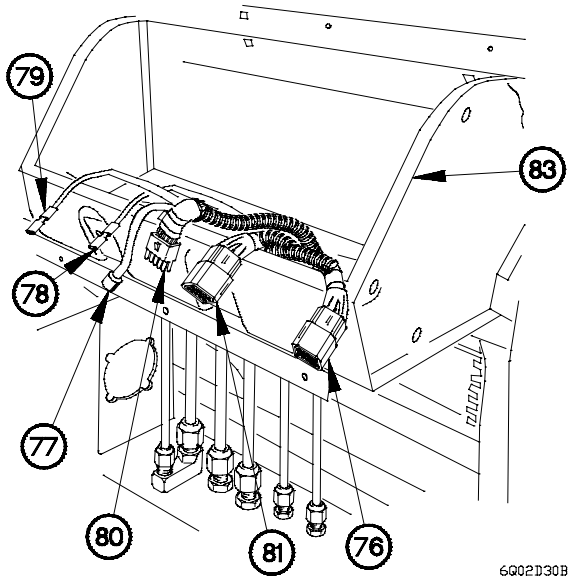
(52) Route crane/dump power cable assembly (76) inside dashboard (83).

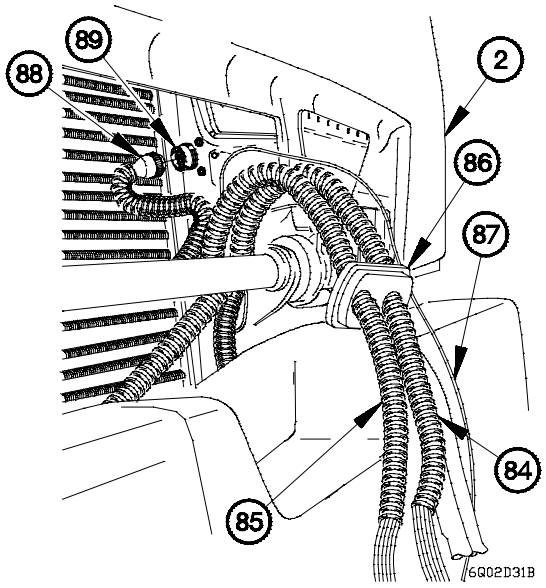
**NOTE**

Perform step (53) on vehicles equipped with PTO.

(53) Route PTO cable assembly (77) inside dashboard (83).

(54) Position power distribution panel 24 vdc cable (78), power distribution panel 12 vdc cable (79), rear lights cable assembly (80), and front lights cable assembly (81) in dashboard (83).




**NOTE**

Install plastic cable ties as required.

(58) Position start and charging cable assembly (84) and engine control cable assembly (85) in dashboard (83).

(59) Position vacuum hose (87) in dashboard (83).

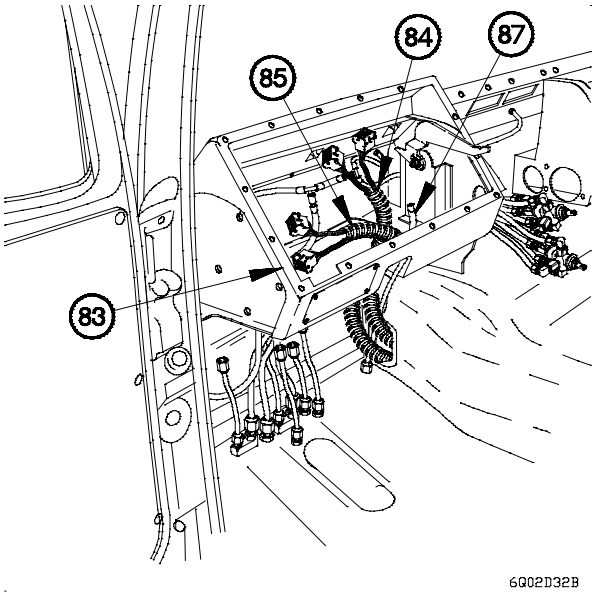
**NOTE**

Steps (55) and (56) require the aid of an assistant.

(55) Position start and charging cable assembly (84), engine control cable assembly (85), and grommet (86) in cab (2).

(56) Position vacuum hose (87) in cab (2).

(57) Connect connector P119 (88) to connector J119 (89).



**e. Follow-On Maintenance.**

(1) Install placards, as required (TM 9-2320-366-20-2).

(2) Install fenders and mud flaps (TM 9-2320-366-20-4).

(3) Install horn (TM 9-2320-366-20-3).

(3.1) Install boarding handles (TM 9-2320-366-20-5).

(4) Install windshield and cab side windows (para 15-7).

(5) Install windshield wipers and linkage (TM 9-2320-366-20-5).

(5.1) Install roof hatch (TM 9-2320-366-20-4).

(6) Install machine gun ring kit, if equipped (para 19-2).

(7) Install chemical kit alarm cable, if equipped (TM 9-2320-366-20-3).

(8) Install warning light kit, if equipped (TM 9-2320-366-10-5).

(9) Install warning light cable (TM 9-2320-366-20-5).

(10) Install cab floor covering (TM 9-2320-366-20-4).

(11) Install cab liners (TM 9-2320-366-20-4).

(12) Install air drop cab liners (M1093/M1094) (TM 9-2320-366-20-4).

(13) Adjust doors (TM 9-2320-366-20-4).

(14) Install mirrors (TM 9-2320-366-20-5).

(15) Install clearance light cable assemblies (TM 9-2320-366-20-3).

(16) Install manifold valve assembly (TM 9-2320-366-20-3).

(17) Install STE-ICE/R cable assembly (TM 9-2320-366-20-3).

(18) Install fan and differential lock solenoids (TM 9-2320-366-20-3).

(19) Install accelerator pedal (TM 9-2320-366-20-3).

(20) Install throttle control cable threaded rod (TM 9-2320-366-20-3).

## 15-2. CAB REPLACEMENT (CONT)

(21) Install throttle control cable (TM 9-2320-366-20-3).

(22) Install park control two-way check valve (TM 9-2320-366-20-4).

(23) Install foot control valve and brake foot pedal (TM 9-2320-366-20-4).

(24) Install steering column (TM 9-2320-366-20-4).

(25) Install auxiliary panel cable assembly, if equipped (TM 9-2320-366-20-3).

(26) Install WTEC III dashboard cable assembly, if equipped (TM 9-2320-366-20-3).

(27) Install WTEC II dashboard cable assembly, if equipped (TM 9-2320-366-20-3).

(28) Fill radiator (TM 9-2320-366-20).

(29) Connect batteries (TM 9-2320-366-20-3).

(30) Start engine and check air system and heater hoses for leaks.

(31) Operate vehicle and check electrical system for proper operation (TM 9-2320-366-10-1).

(32) Shut down engine (TM 9-2320-366-10-1).

(33) Raise cab protector (M1090/M1094) (TM 9-2320-366-10-1).

**End of Task.**

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).
Air tanks drained (TM 9-2320-366-10-1).
Steering wheel removed (TM 9-2320-366-20-4).
Instrument panel removed for access (TM 9-2320-366-20-3).
Kick panel removed (TM 9-2320-366-20-4).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Tool, Cab Support (Item 5, Appendix D)
Bar, Spreader (Item 21, Appendix D)
Stand, Cab Maintenance (Item 4, Appendix D)
Cab Front Support Spanner Socket (Item 3, Appendix D)
Wrench, Torque, 0-75 lb-in. (Item 98, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Socket Set, Socket Wrench (Item 59, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Crowfoot Attachment, Socket Wrench (TM 9-2320-366-20)
Crowfoot Attachment, Socket Wrench (TM 9-2320-366-20)
Socket Wrench Attachment, Screwdriver (Item 62, Appendix B)

**Materials/Parts**
Sealing Compound (Item 76, Appendix C)
Oil, Paraffin and Mineral (Item 55, Appendix C)
Tape, Antiseizing (Item 85, Appendix C)
Rubber Sheeting (Item 64, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Ties, Cable, Plastic (Item 92, Appendix C)
Nut, Self-locking (4) (Item 210, Appendix F)
Washer, Spring Tension (Item 437, Appendix F)
Pin, Cotter (Item 329, Appendix F)
Bushing, Non-Metallic (2) (Item 26, Appendix F)
Bushing, Sleeve (2) (Item 28, Appendix F)
Bushing, Sleeve (2) (Item 29, Appendix F)
Nut, Self-Locking (2) (Item 218, Appendix F)
Nut, Self-Locking (Item 217, Appendix F)
Packing, Preformed (Item 239, Appendix F)
Nut, Plain, Hex (Item 171, Appendix F)
Lockwasher (2) (Item 137, Appendix F)
Lockwasher (Item 131, Appendix F)
Nut, Self-Locking (Item 214/215, Appendix F)
Lockwasher (2) (Item 133, Appendix F)
Washer, Flat (Item 431.1, Appendix F)
Pin, Straight Headed (Item 339.1, Appendix F)
Pin, Cotter (Item 325.1, Appendix F)

**Personnel Required**
(3)

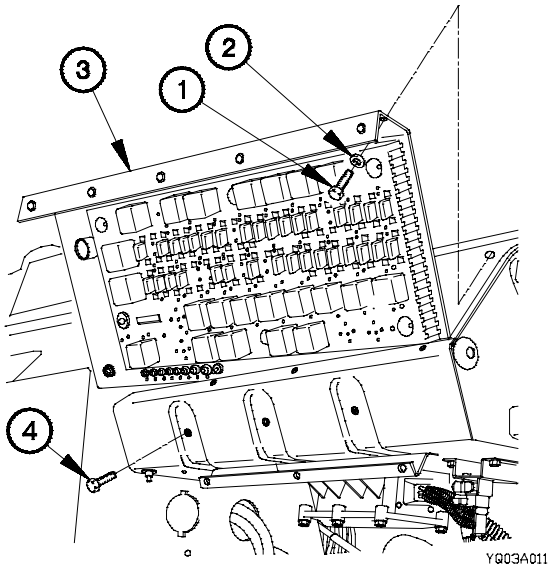
## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

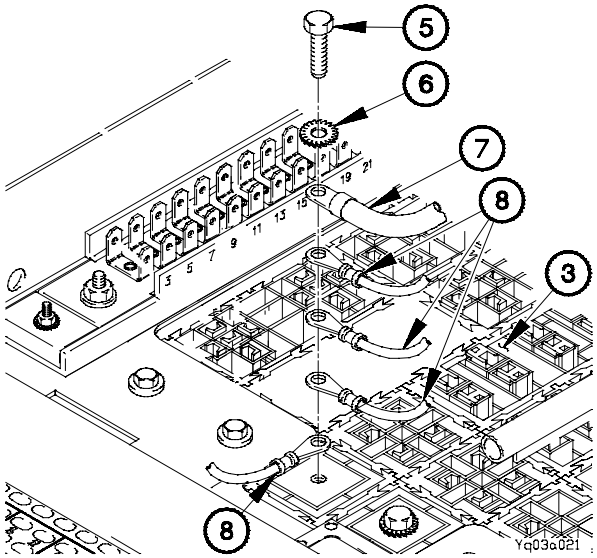
**a. Removal.**

(1) Remove three screws (1) and washers (2) from power distribution panel (3).

(2) Remove three screws (4) from power distribution panel (3).

(3) Lift power distribution panel (3) outward to gain access.




**NOTE**

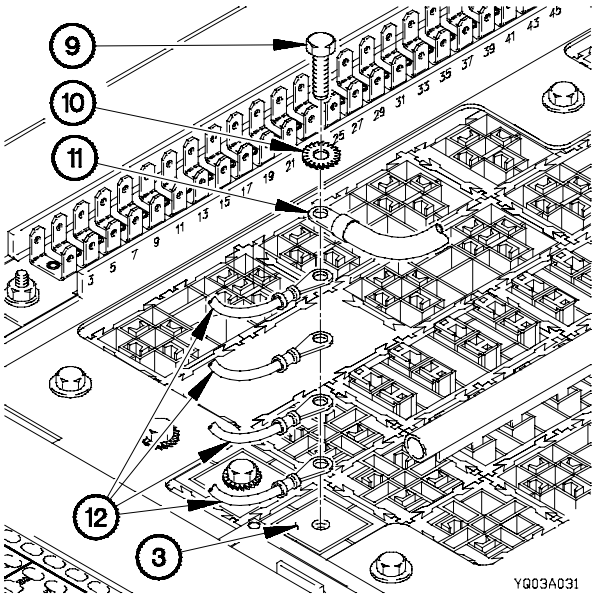
Tag connectors and connection points prior to disconnecting.

(4) Remove screw (5), lockwasher (6), terminal lug TL41 (7), and four terminal lugs (8) from power distribution panel (3). Discard lockwasher.

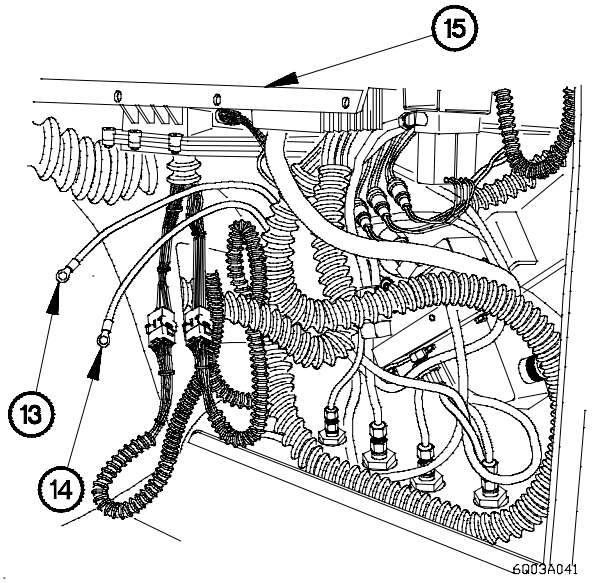
(5) Position four terminal lugs (8) and screw (5) on power distribution panel (3).

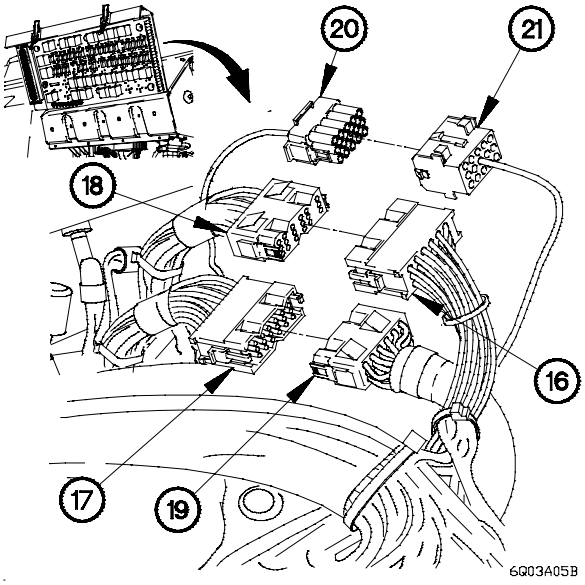
(6) Remove screw (9), lockwasher (10), terminal lug TL42 (11), and four terminal lugs (12) from power distribution panel (3). Discard lockwasher.

(7) Position four terminal lugs (12) and screw (9) on power distribution panel (3).



(8) Remove power distribution panel 12 vdc cable (13) and power distribution panel 24 vdc cable (14) from dashboard (15).




(9) Disconnect connectors J27 (16) and J51 (17) from connectors P27 (18) and P51 (19).

**NOTE**

Perform step (10) on vehicles not equipped with PTO.

(10) Disconnect connector J912 (20) from connector P912A (21).

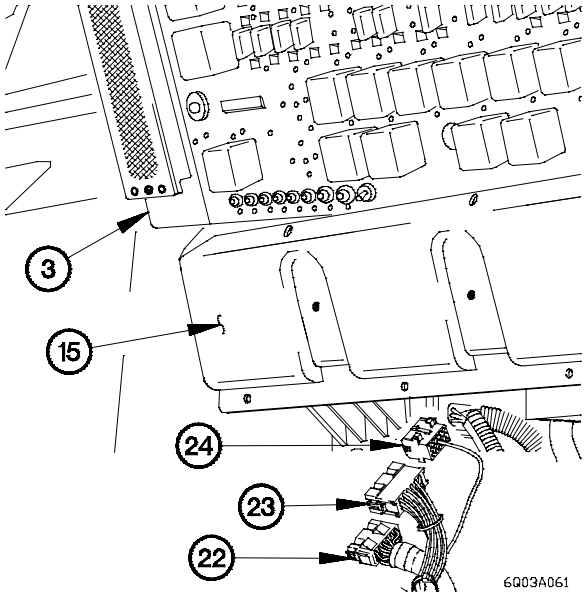
(11) Remove front lights cable assembly (22) and rear lights cable assembly (23) from dashboard (15).

**NOTE**

Perform step (12) on vehicles not equipped with PTO.

(12) Remove auxiliary oil cooler fan cable assembly (24) from dashboard (15).

(13) Position power distribution panel (3) in dashboard (15).



## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

**NOTE**

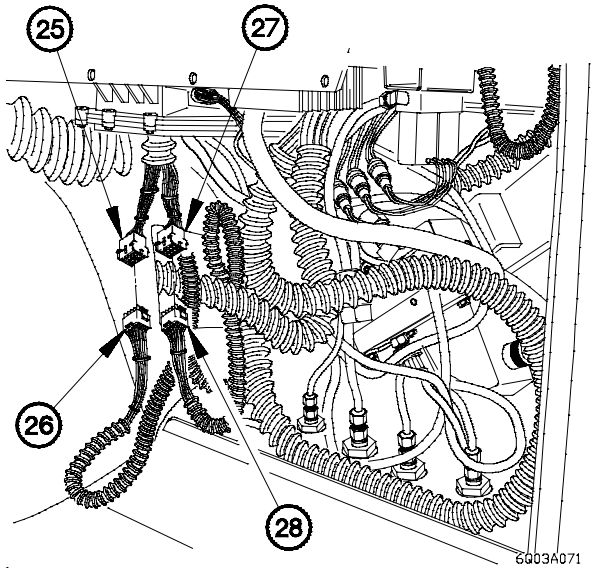
Perform step (14) on vehicles equipped with PTO.

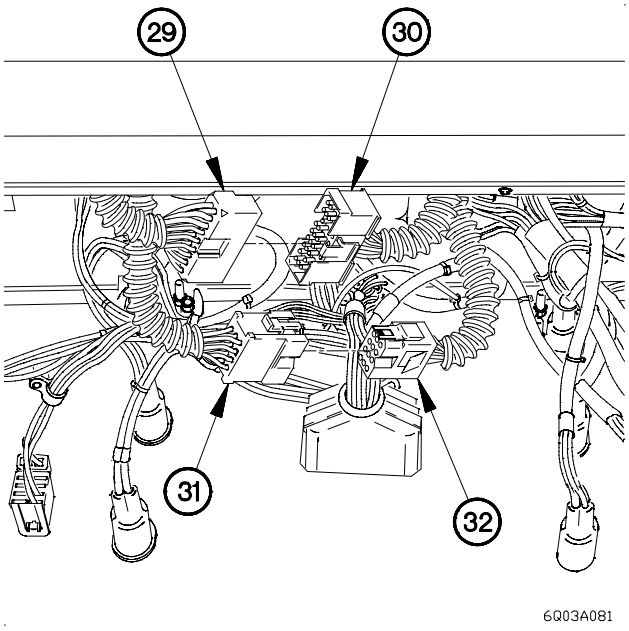
(14) Disconnect connector P210 (25) from connector J210 (26).

**NOTE**

Perform step (15) on vehicles equipped with auxiliary panel.

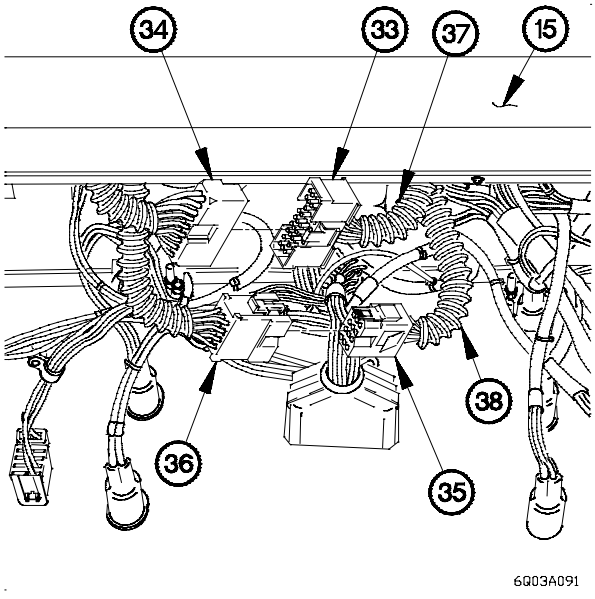
(15) Disconnect connector P108 (27) from connector J108 (28).




(16) Disconnect connector J31X (29) from connector P31X (30).

(17) Disconnect connector J43X (31) from connector P43X (32).




(18) Disconnect connector P31 (33) from connector J31 (34).

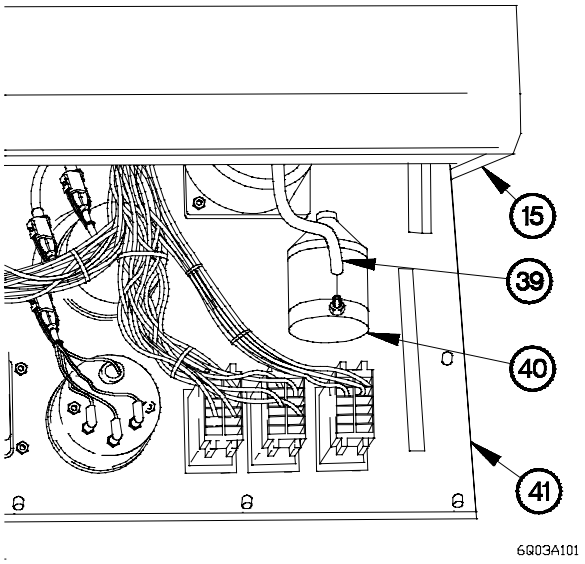
(19) Disconnect P43 (35) from connector J43 (36).

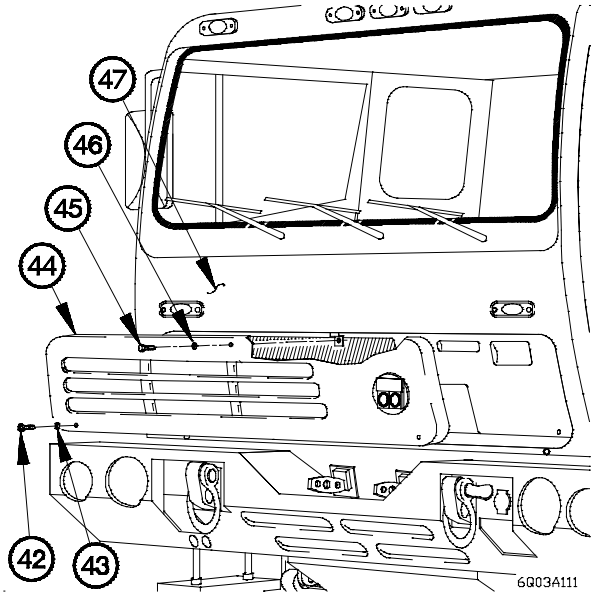
(20) Remove engine control cable assembly (37) and start and charging cable assembly (38) from dashboard (15).

(21) Disconnect vacuum hose (39) from air filter restriction gauge (40).

(22) Remove vacuum hose (39) from dashboard (15).

(23) Position instrument panel assembly (41) in dashboard (15).




(24) Remove two screws (42) and washers (43) from front grille (44).

(25) Remove screw (45), washer (46), and front grille (44) from cab (47).

(26) Place drain pan under two heater hoses (48).

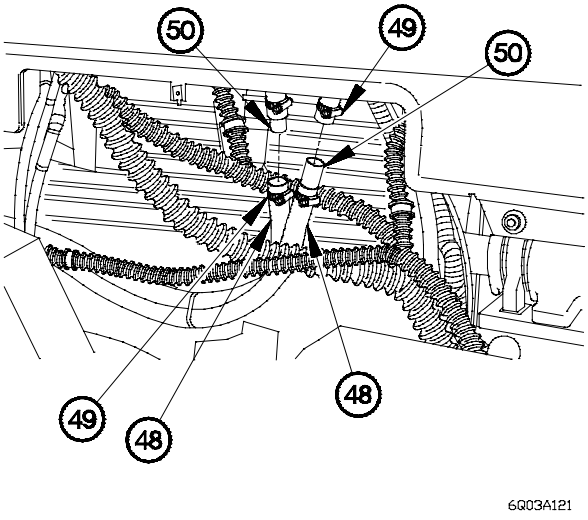
**NOTE**

Tag hoses and connection points prior to disconnecting.

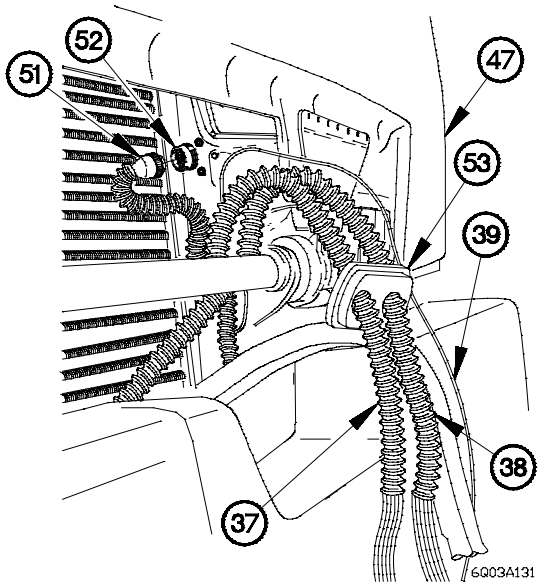
(27) Loosen two hose clamps (49) on heater hoses (48).

(28) Disconnect two heater hoses (48) from tubes (50).

(29) Connect two heater hoses (48) together.



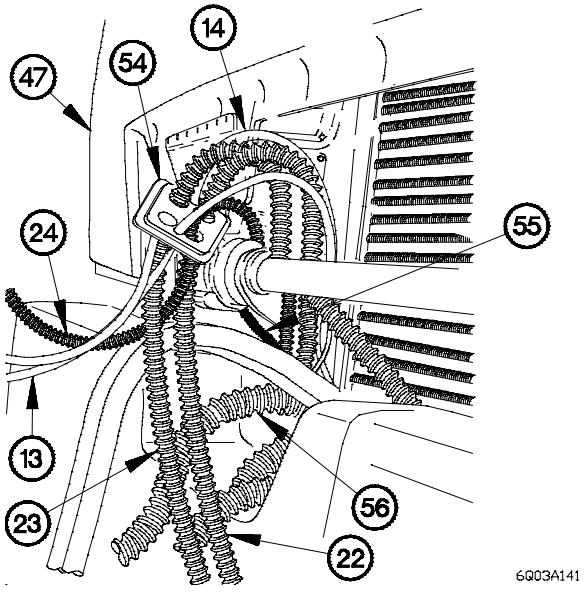
## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)




(30) Disconnect connector P119 (51) from connector J119 (52).

(31) Remove vacuum hose (39) from cab (47).

(32) Remove engine control cable assembly (37), start and charging cable assembly (38), and grommet (53) from cab (47).




(33) Remove front lights cable assembly (22), rear lights cable assembly (23), power distribution panel 12 vdc cable (13), power distribution panel 24 vdc cable (14), and grommet (54) from cab (47).

**NOTE**

Perform step (34) on vehicles not equipped with PTO.

(34) Remove auxiliary oil cooler cable assembly (24) from cab (47).

**NOTE**

Perform step (35) on vehicles equipped with PTO.

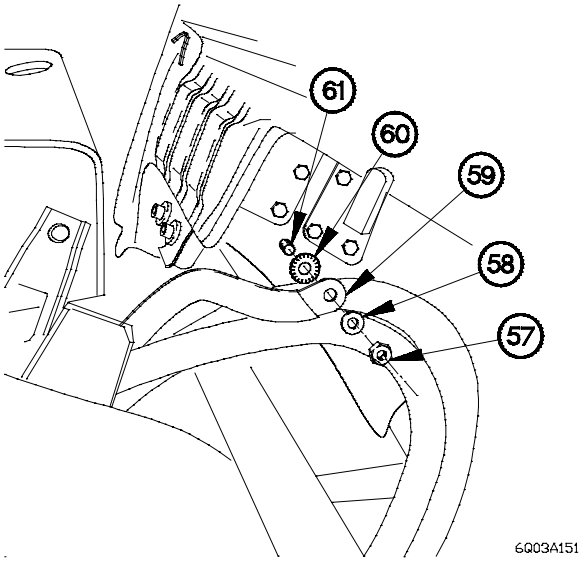
(35) Remove PTO cable assembly (55) from cab (47).

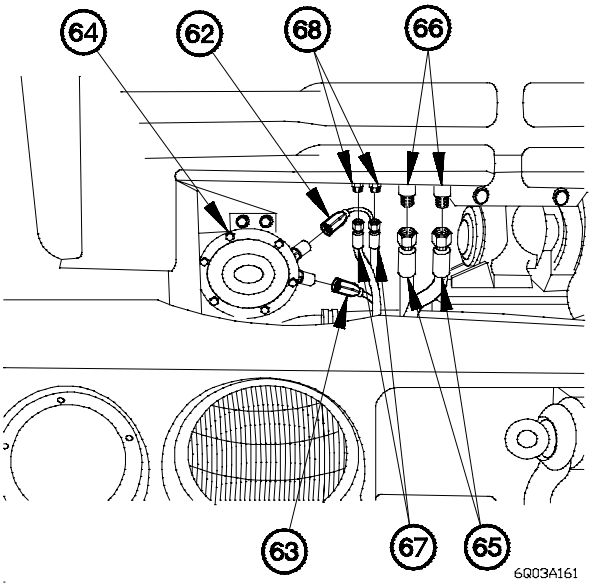
**NOTE**

Perform step (36) on M1084, M1086, M1090, and M1094.

(36) Remove crane/dump power cable assembly (56) from cab (47).

(37) Remove self-locking nut (57), washer (58), ground strap (59), and lockwasher (60) from ground stud (61). Discard self-locking nut and lockwasher.




(38) Disconnect connectors P5 (62) and P6 (63) from horn (64).

**WARNING**

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

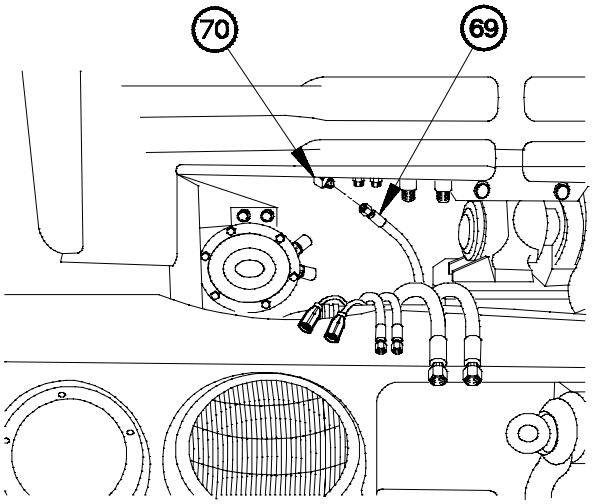
**NOTE**

Tag pneumatic hoses and connection points prior to disconnecting.

(39) Disconnect two pneumatic hoses (65) from 45-degree fittings (66).

(40) Disconnect two pneumatic hoses (67) from fittings (68).

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

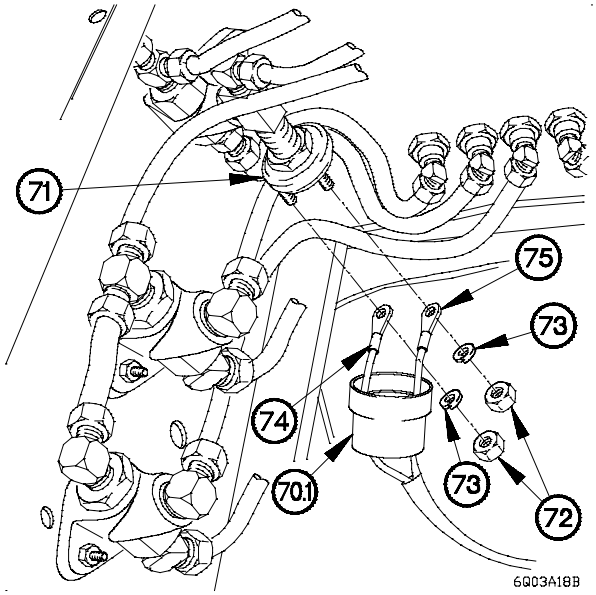



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**NOTE**

Perform step (41) on M1088.

(41) Disconnect pneumatic hose (69) from 45-degree fitting (70).




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(42) Raise cab (TM 9-2320-366-10-1).

**NOTE**

Perform step (42.1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(42.1) Remove adhesive and boot (70.1) from low pressure transmitter (71).

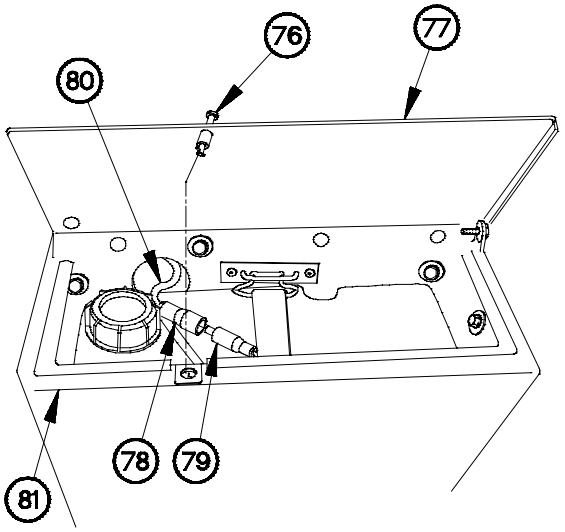
(43) Remove adhesive, two nuts (72), lockwashers (73), and terminal lugs TL201 (74) and TL 202 (75) from low pressure transmitter (71). Discard lockwashers.

(44) Turn screw (76) to the left to unlock step plate (77).

(45) Open step plate (77).

(46) Disconnect connector P25 (78) from connector J25 (79).

(47) Remove windshield washer cable assembly (80) from step (81).

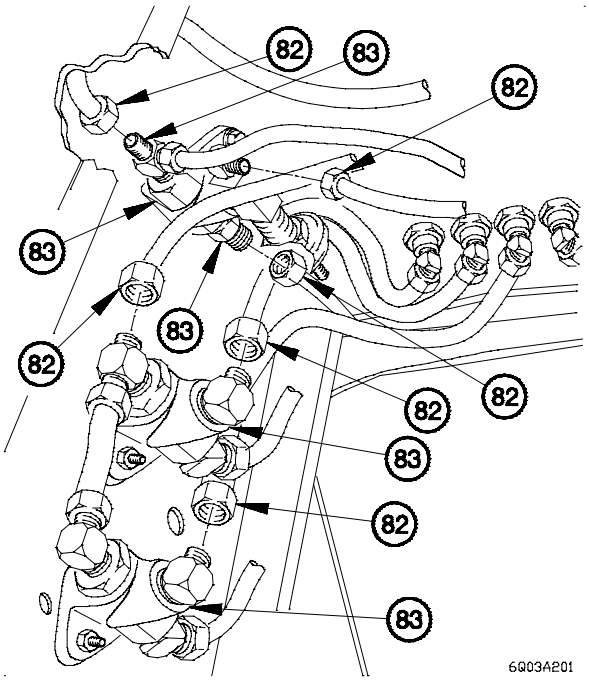


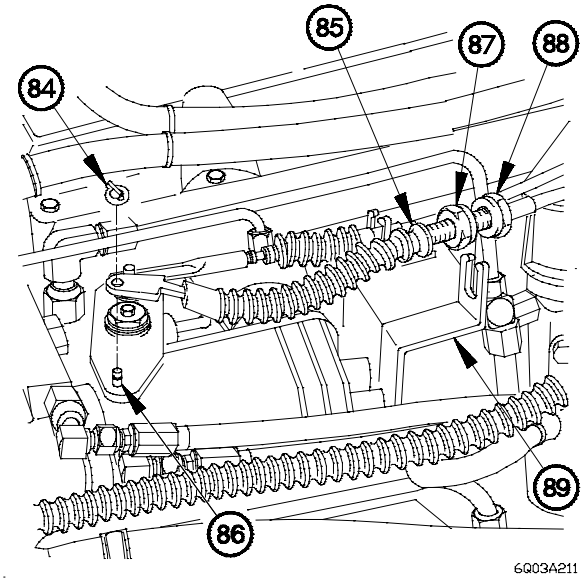

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**NOTE**

- Note positions of pneumatic hoses prior to disconnecting.
- Remove plastic cable ties as required.

(48) Disconnect six pneumatic hoses (82) from three two-way check valves (83).




(49) Remove clip (84) and throttle control cable (85) from stud (86).

**NOTE**

Count the number of threads showing on throttle cable ferrule and record this number prior to removal.

(50) Loosen nut (87) on throttle control cable ferrule (88).

(51) Remove throttle control cable (85) from bracket (89).

**NOTE**

Observe routing of throttle control cable prior to positioning.

(52) Position throttle control cable (85) clear of any interference.

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

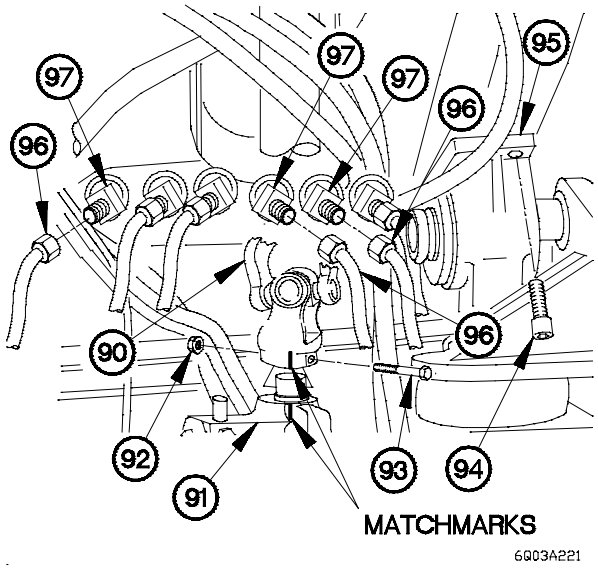
(53) Match mark universal joint (90) to steering gear (91).

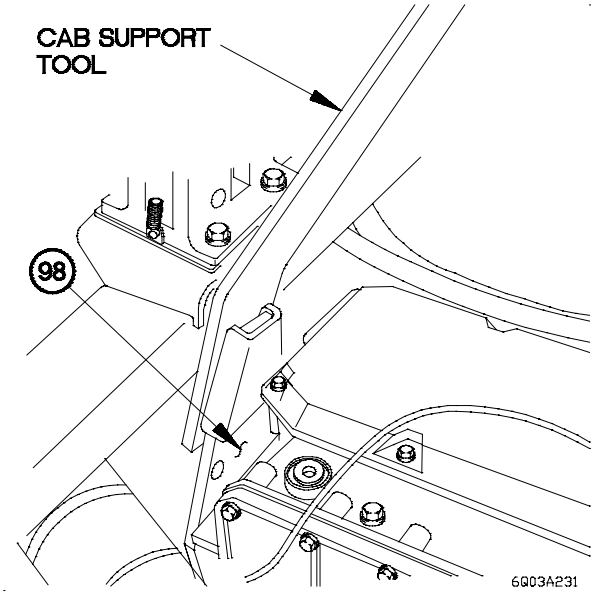
(54) Remove self-locking nut (92) and screw (93) from universal joint (90). Discard self-locking nut.

(55) Remove two screws (94) from left side bearing housing (95).

(56) Perform step (55) on right side bearing housing.

(57) Disconnect three pneumatic hoses (96) from 45-degree fittings (97).



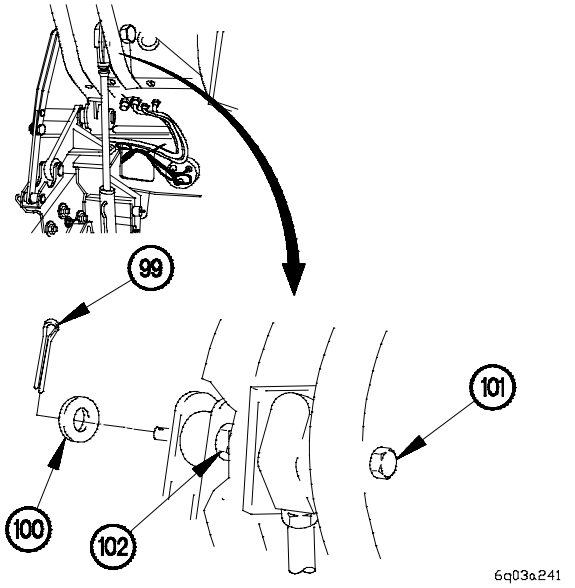




**WARNING**

**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.**

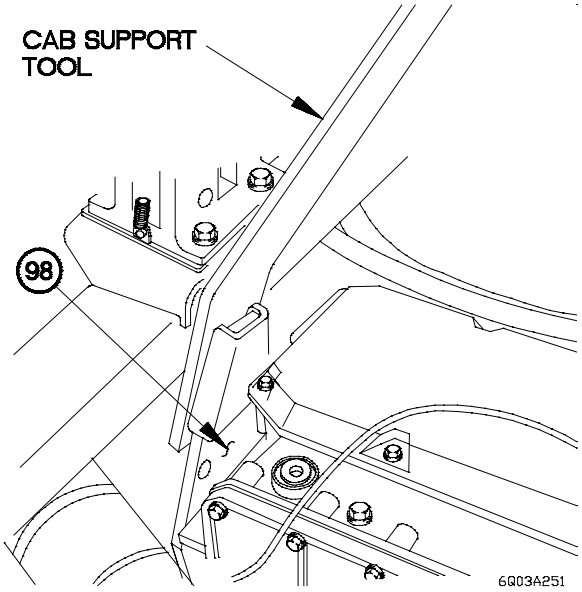
(58) Install cab support tool on engine rear lifting eye (98).

(59) Lower cab until cab rests on cab support tool (TM 9-2320-366-10-1).




(60) Remove cotter pin (99) and washer (100) from cab tilt cylinder mounting bolt (101). Discard cotter pin.

(61) Loosen self-locking nut (102) on cab tilt cylinder mounting bolt (101).

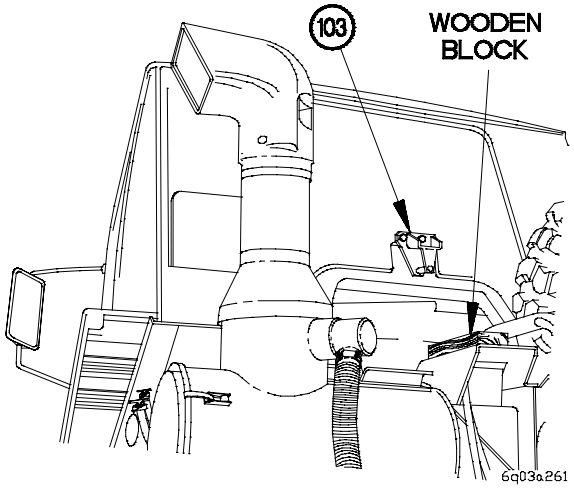



(62) Raise cab slightly and remove cab support tool from engine rear lifting eye (98) (TM 9-2320-366-10-1).

**NOTE**

Use wooden block on top of cab hydraulic latch to prevent cab from latching when cab is lowered.

(63) Lower cab until cab latch (103) rests on wooden block (TM 9-2320-366-10-1).



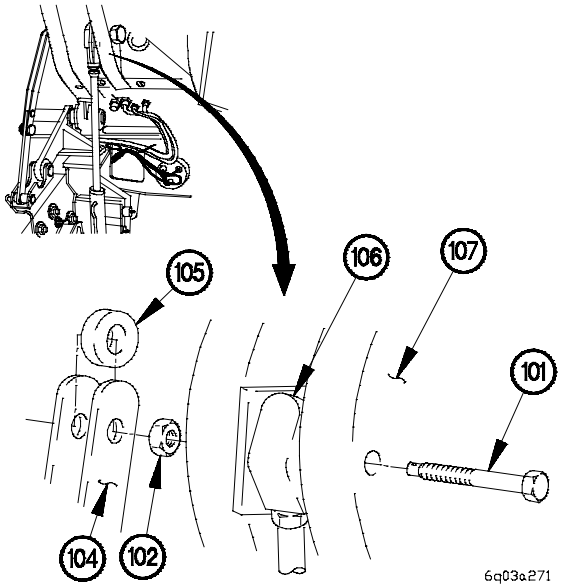
## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

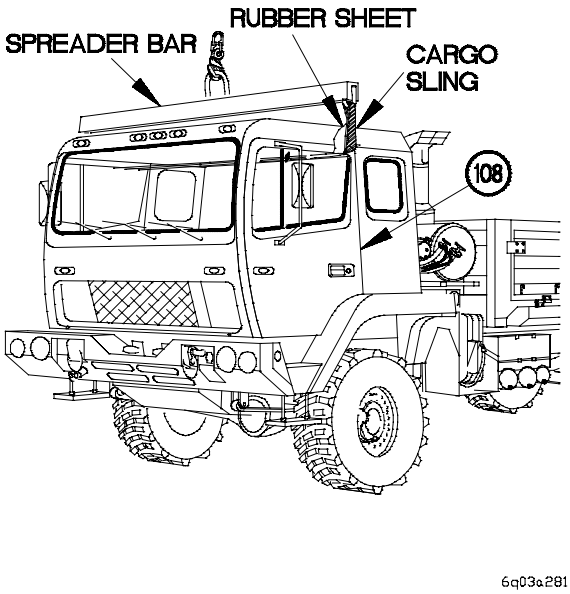
**NOTE**

Steps (64) and (65) require the aid of an assistant.

(64) Disengage pivot arm (104) and spacer (105) from cab tilt cylinder mounting bolt (101).

(65) Remove self-locking nut (102), cab tilt cylinder mounting bolt (101) and cab tilt cylinder (106) from bracket (107).




**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.**

**CAUTION**

Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

**NOTE**

Steps (66) through (72) require the aid of two assistants.

(66) Lower cab door windows and install cargo sling through rear section of cab doors (108).

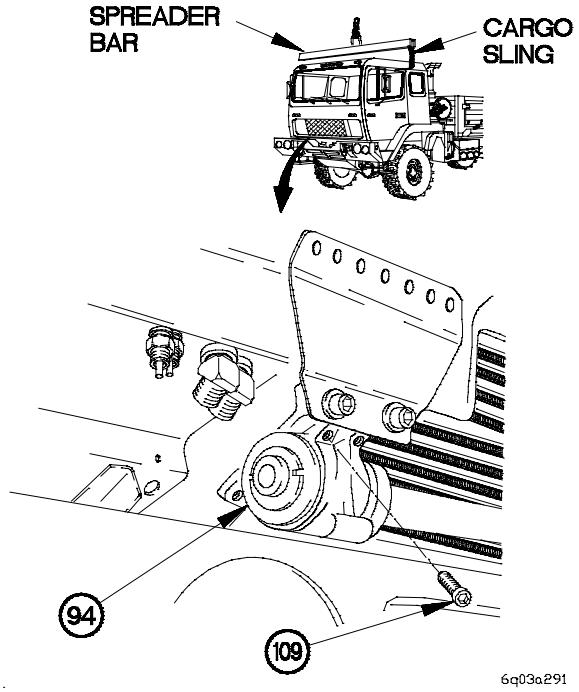
**WARNING**

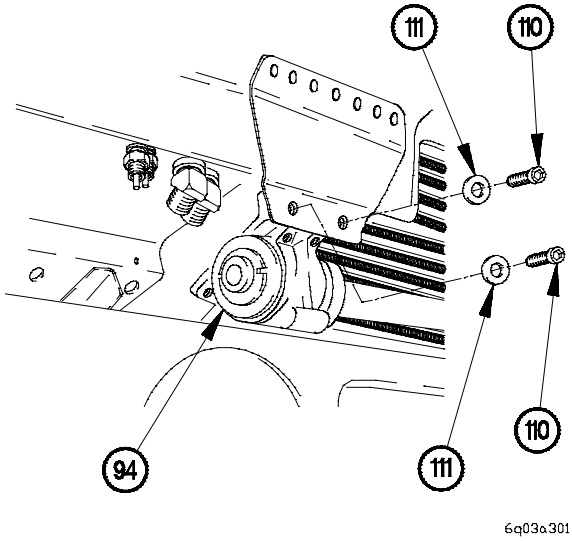
**Cab may swing forward slightly when screws are removed. An assistant is required to steady cab. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Left and right side bearing housing are disassembled the same way. Right side shown.

(67) Remove four screws (109) from right side bearing housing (94).




(68) Remove two screws (110) and washers (111) from right side bearing housing (94).

(69) Perform steps (67) and (68) on left side bearing housing.

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

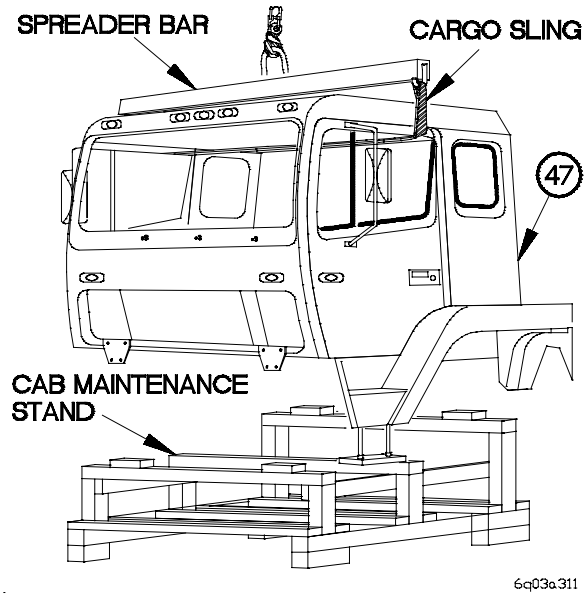
**CAUTION**

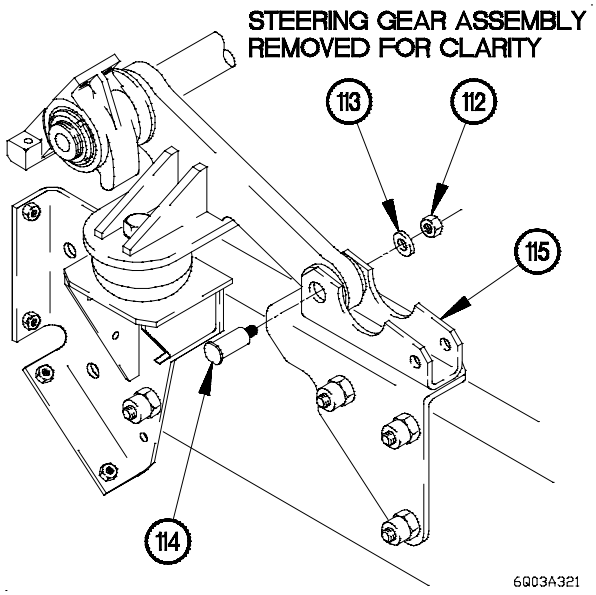
Raise cab straight up to clear radiator. Failure to comply may result in damage to equipment.

(70) Remove cab (47) from vehicle.

(71) Position cab (47) on cab maintenance stand.

(72) Remove cargo sling from cab (47).



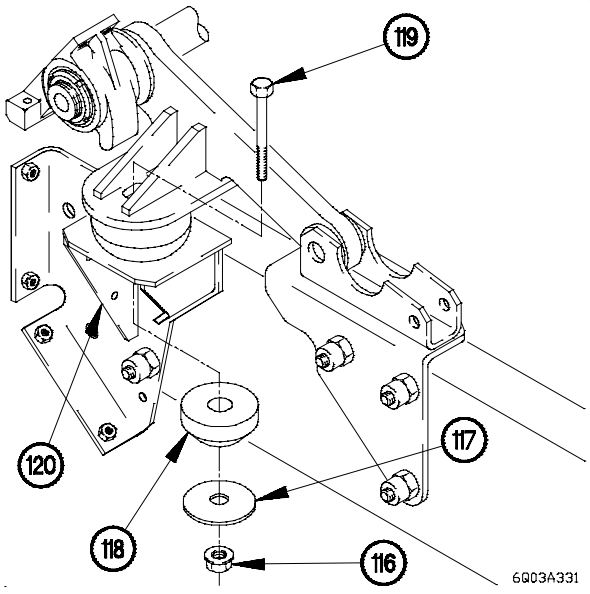




**NOTE**

Left and right side of cab front support assembly is removed the same way. Left side shown.

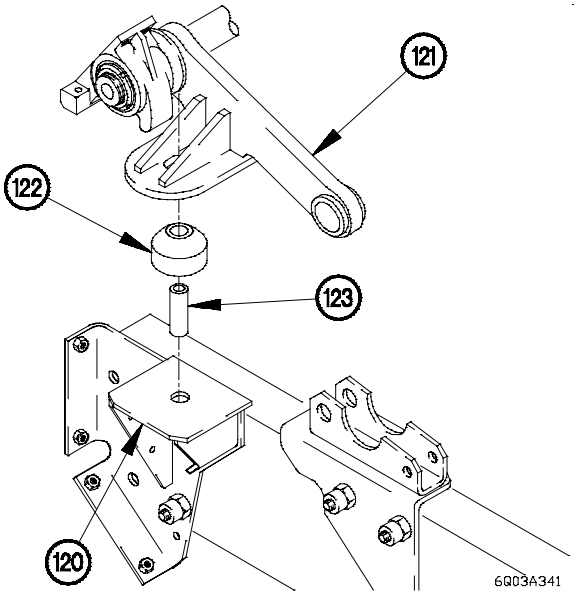
(73) Remove nut (112), washer (113), and shoulder bolt (114) from left side cab mounting bracket (115).

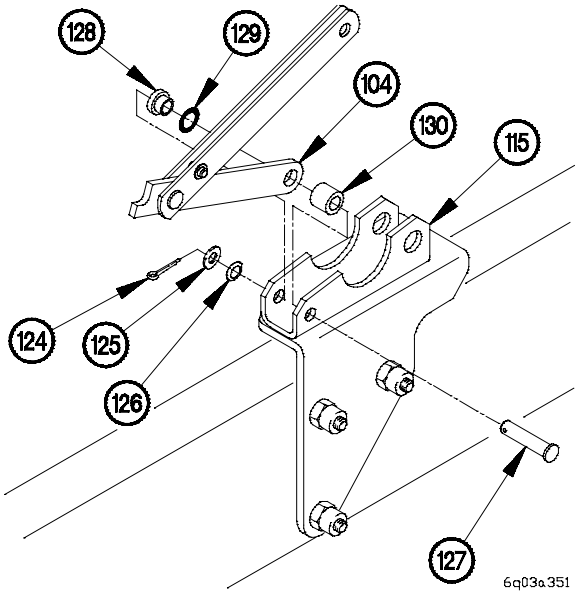
(74) Remove self-locking nut (116), washer (117), lower resilient mount (118) and bolt (119) from left side front bumper mounting bracket (120). Discard self-locking nut.



(75) Remove cab front support assembly (121), two upper resilient mounts (122), and sleeve spacers (123) from front bumper mounting brackets (120).

(76) Perform steps (73) through (75) on right side cab front support assembly.




**NOTE**

Perform step (77) on right side cab mounting bracket.

(77) Remove cotter pin (124), washer (125), spring tension washer (126), pin (127), bushing (128), preformed packing (129), pivot arm (104), and spacer (130) from cab mounting bracket (115). Discard preformed packing, spring tension washer, and cotter pin.

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

**NOTE**

Perform step (77.1) on vehicle serial number 0001 through 7599 that have not previously had pin and spring tension washer replaced.

(77.1) Remove cotter pin (130.1), spring tension washer (130.2) and pin (130.3) from pivot arm (104). Discard pin, spring tension washer and cotter pin.

**NOTE**

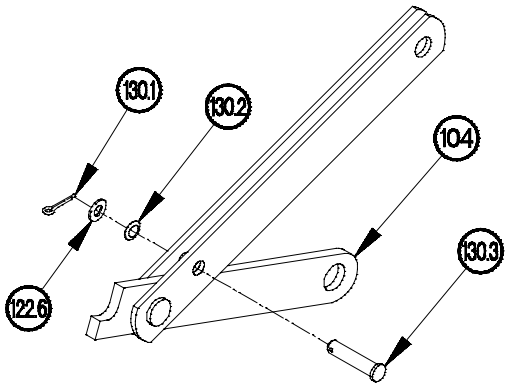
Perform step (77.2) on vehicle serial number 7600 through 9099 that have not previously had pin and washer replaced.

(77.2) Remove cotter pin (130.1), washer (130.2) and pin (130.3) from pivot arm (104). Discard pin, washer and cotter pin.

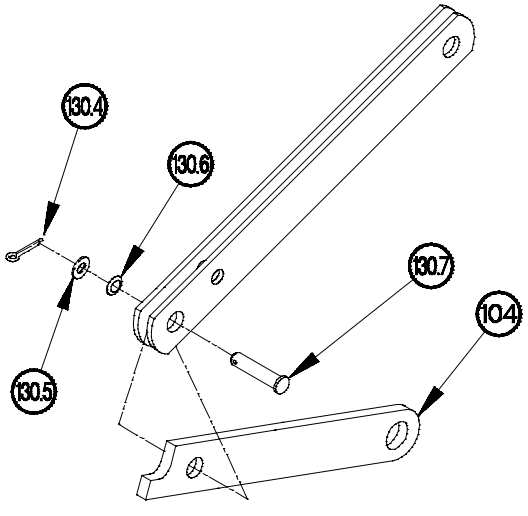
**NOTE**

Perform step (77.3) on vehicle serial number 9100 and higher.

(77.3) Remove cotter pin (130.1), washer (130.2) and pin (130.3) from pivot arm (104). Discard cotter pin.



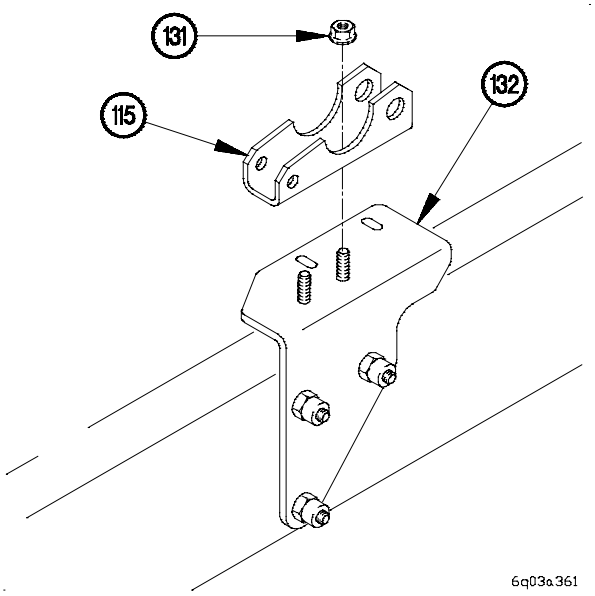

6q03a36b




6q03a37b

(77.4) Remove cotter pin (130.4), washer (130.5), spring tension washer (130.6) and pin (130.7) from pivot arm (104). Discard spring tension washer and cotter pin.

(78) Remove two self-locking nuts (131) and cab mounting bracket (115) from radiator mounting bracket (132). Discard self-locking nuts.

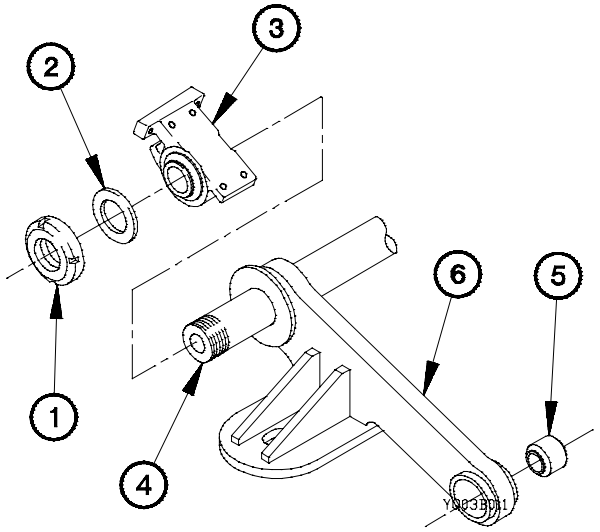


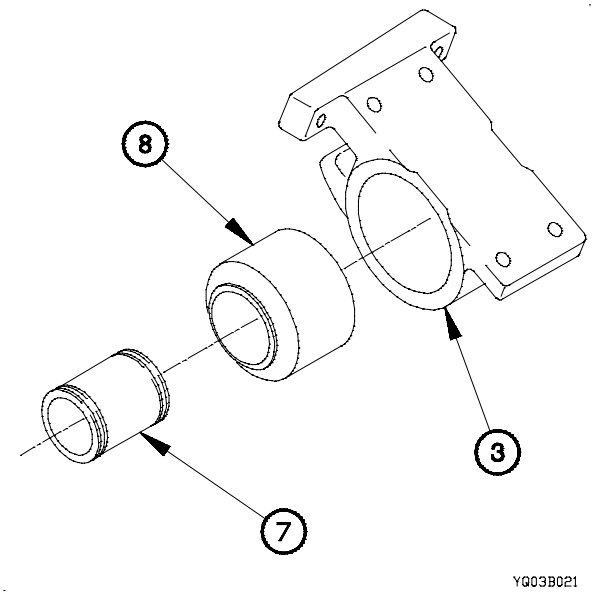
## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

**b. Disassembly.**

(1) Remove spanner nut (1), washer (2), and left side bearing housing (3) from cab front support (4).

(2) Remove sleeve bushing (5) from left side cab tilt arm (6). Discard sleeve bushing.




(3) Remove sleeve bushing (7) from bushing (8).

(4) Remove bushing (8) from left side bearing housing (3). Discard bushing.

(5) Perform steps (1) through (4) on right side of cab front support assembly.

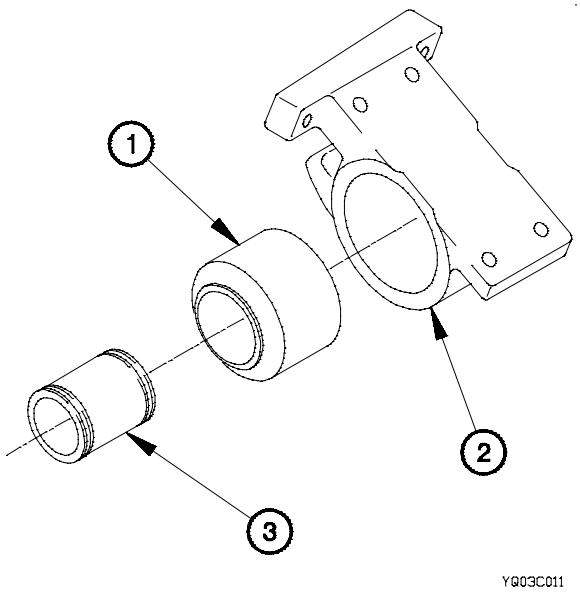
**c. Assembly.**

**NOTE**

Lubricate bushings with paraffin and mineral oil prior to installation.

(1) Install bushing (1) in left side bearing housing (2).

(2) Install sleeve bushing (3) in bushing (1).



**NOTE**

Lubricate sleeve bushings with paraffin and mineral oil prior to installation.

(3) Install sleeve bushing (4) in left side cab tilt arm (5).

**WARNING**

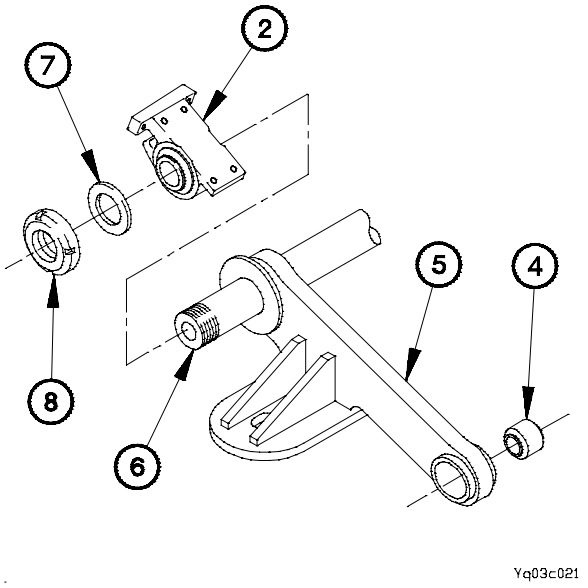
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(4) Apply adhesive sealant to threads on left side of cab front support (6).

(5) Position left side bearing housing (2), washer (7), and spanner nut (8) on cab front support (6).

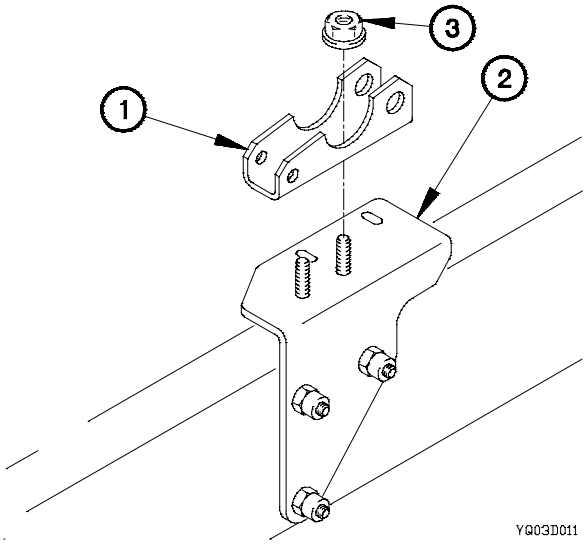
(6) Tighten spanner nut (8) to 138-163 lb-ft (180-220 N·m).

(7) Perform steps (1) through (6) on right side of cab front support assembly.



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**d. Installation.**



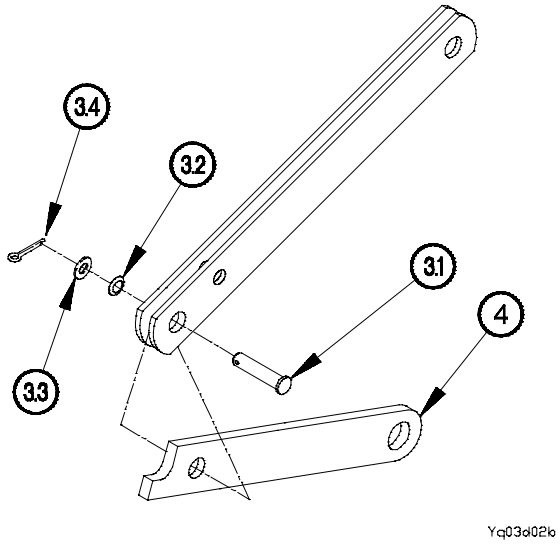
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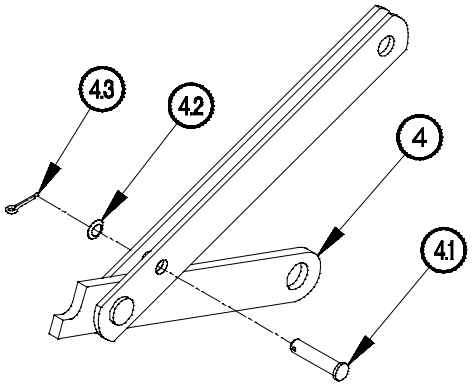
(1) Position cab mounting bracket (1) on radiator mounting bracket (2) with two self-locking nuts (3).

(2) Tighten two self-locking nuts (3) to 76-94 lb-ft (103-127 N·m).

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

(2.1) Install pin (3.1), spring tension washer (3.2), washer (3.3) and cotter pin (3.4) in pivot arm (4).



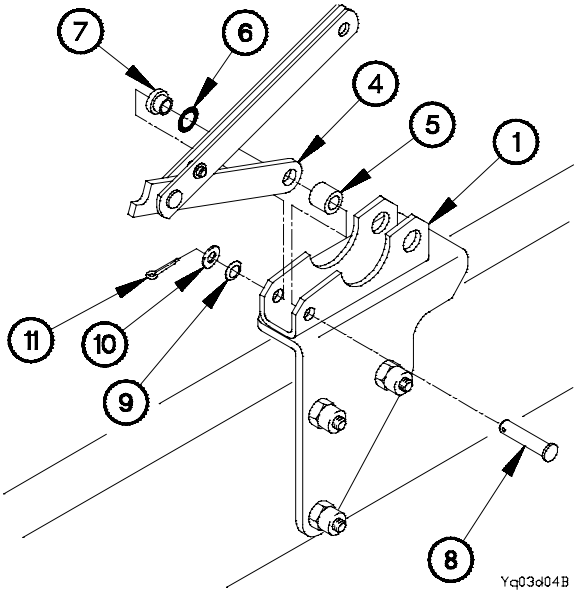



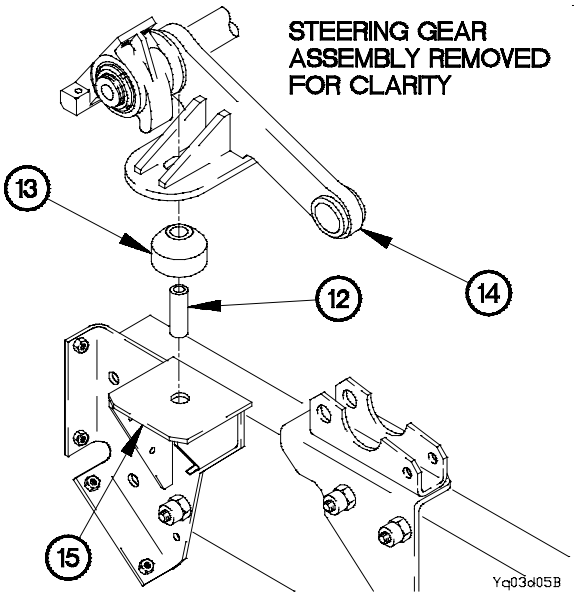

(2.2) Install pin (4.1), washer (4.2), and cotter pin (4.3) in pivot arm (4).

**NOTE**

Perform step (3) on right side cab mounting bracket.

(3) Install pivot arm (4) in cab mounting bracket (1) with spacer (5), preformed packing (6), bushing (7), pin (8), spring tension washer (9), washer (10), and cotter pin (11).

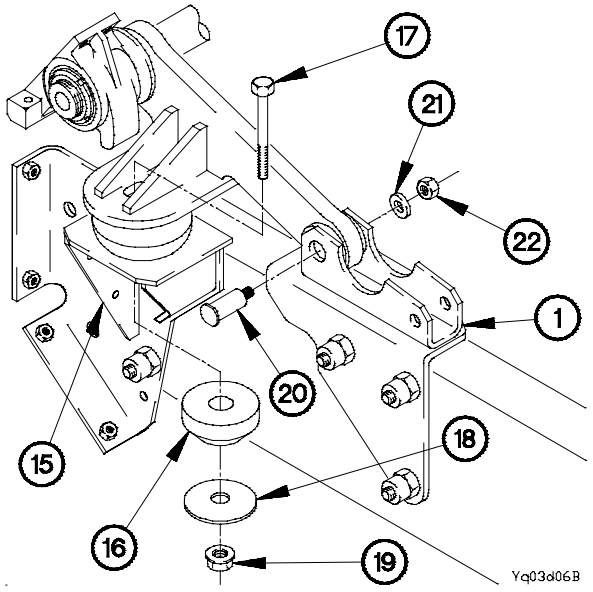





**NOTE**

- Steps (4) and (5) require the aid of an assistant.
- Left and right side of cab front support assembly is installed the same way. Left side shown.

(4) Position two sleeve spacers (12), upper resilient mounts (13), and cab front support assembly (14) on two front bumper mounting brackets (15).




(5) Position two lower resilient mounts (16) on front bumper mounting brackets (15) with two bolts (17), washers (18) and self-locking nuts (19).

**WARNING**

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

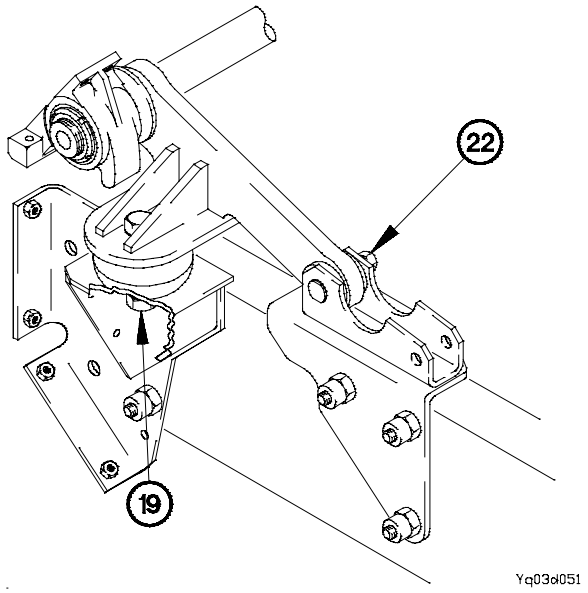
(6) Apply sealing compound to threads of shoulder bolt (20).

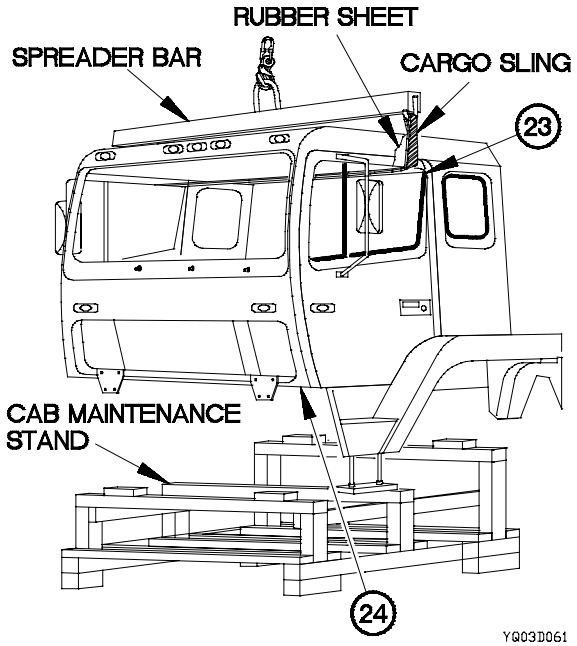
(7) Position shoulder bolt (20), washer (21), and nut (22) in cab mounting bracket (1).

(8) Tighten two self-locking nuts (19) to 199-243 lb-ft (270-330 N·m).

(9) Tighten nut (22) to 40-48 lb-ft (54-66 N·m).

(10) Perform steps (7) through (9) on right side cab mounting bracket.




**WARNING**

**Standard cab weighs approximately 1400 lbs (636 kgs). M1093/M1094 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.**

**CAUTION**

Use spreader bar and place sheet rubber on cargo sling to prevent damage to cab roof. Failure to comply may result in damage to equipment.

**NOTE**

Steps (11) through (23) require the aid of two assistants.

(11) Lower cab door windows and install cargo sling through rear section of cab doors (23).

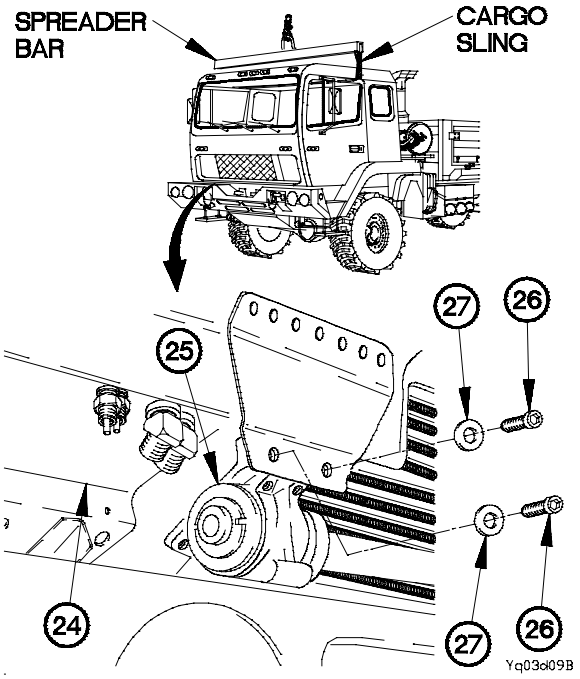
(12) Remove cab (24) from cab maintenance stand.

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

**CAUTION**

Lower cab straight down to clear radiator. Failure to comply may result in damage to equipment.

(13) Position cab (24) on two bearing housings (25).




**WARNING**

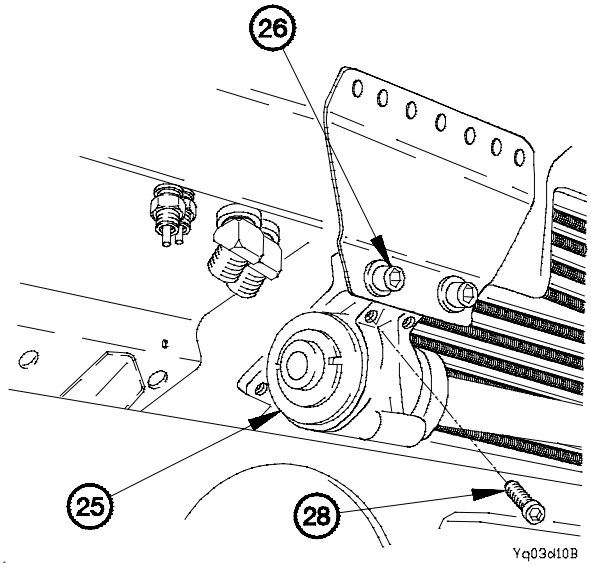
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(14) Apply sealing compound to threads of two screws (26).

**NOTE**

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

(15) Position two washers (27) and screws (26) in right side bearing housing (25).




(16) Apply sealing compound to threads of four screws (28).

(17) Position four screws (28) in right side bearing housing (25).

(18) Tighten four screws (28) and two screws (26) to 34-42 lb-ft (47-57 N·m).

(19) Perform steps (14) through (18) on left side bearing housing.

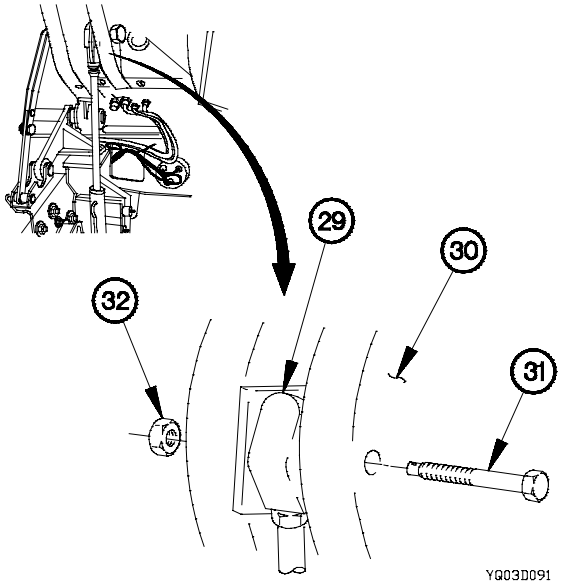
**CAUTION**

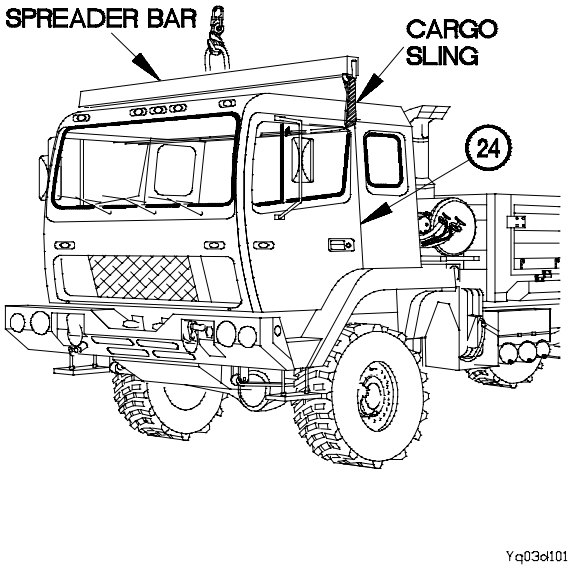
Align arrow on top of tilt cylinder mounting eye to point toward front of cab. Failure to comply may result in damage to equipment.

(20) Position cab tilt cylinder mounting eye (29) in cab tilt cylinder mounting bracket (30).

(21) Position cab tilt cylinder mounting bolt (31) in cab tilt cylinder mounting bracket (30) and tilt cylinder mounting eye (29) with self-locking nut (32).

(22) Tighten self-locking nut (32) to 180-232 lb-ft (244-314 N·m).



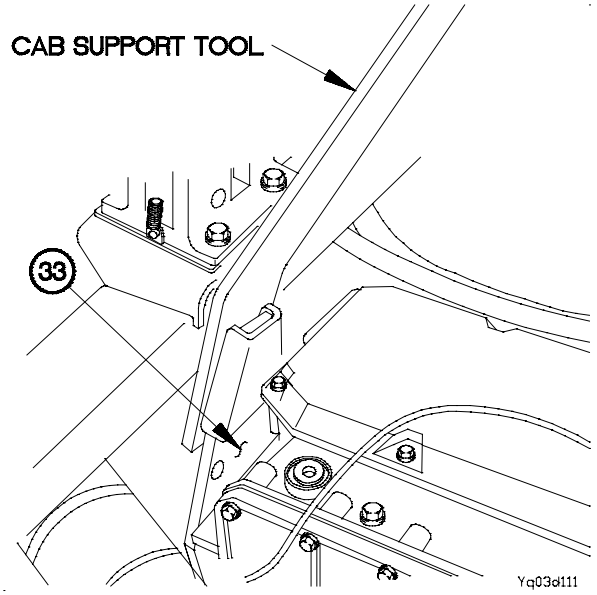

(23) Remove cargo sling from cab (24).

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

**WARNING**

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

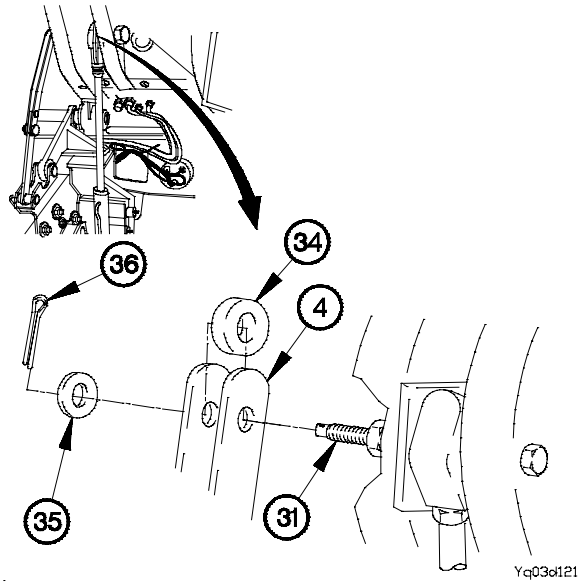
(24) Raise cab enough to install cab support tool on engine rear lifting eye (33) (TM 9-2320-366-10-1).




**WARNING**

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

(25) Lower cab on cab support tool (TM 9-2320-366-10-1).




(26) Install pivot arm (4), spacer (34), washer (35), and cotter pin (36) on cab tilt cylinder mounting bolt (31).

(27) Raise cab (TM 9-2320-366-10-1).

(28) Connect three pneumatic hoses (37) to 45-degree fittings (38).

**WARNING**

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

(29) Apply sealing compound to threads of two screws (39).

(30) Position two screws (39) in left side bearing housing (25).

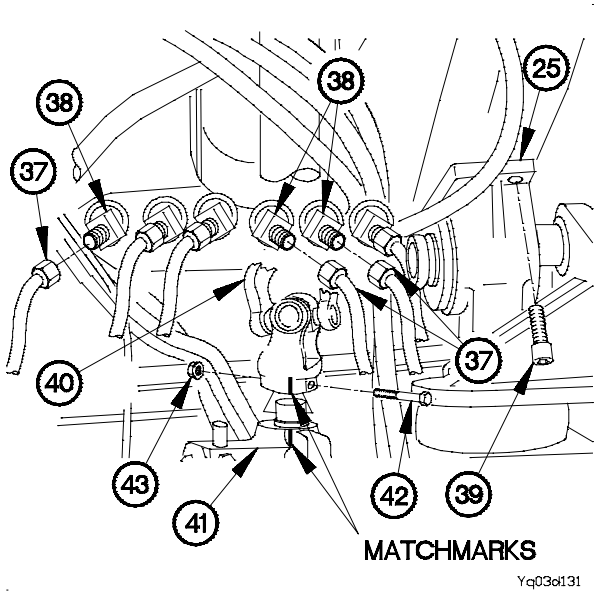
(31) Tighten two screws (39) to 34-42 lb-ft (47-57 N·m).

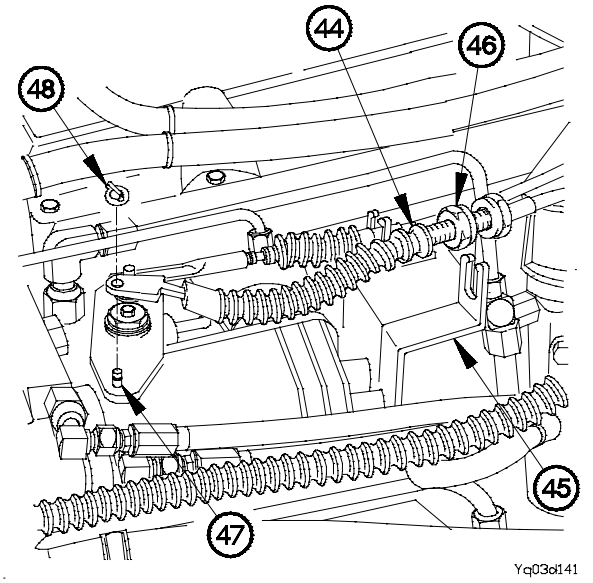
(32) Perform steps (29) through (31) on right side bearing housing.

(33) Position steering column universal joint (40) on steering gear (41) with matchmarks aligned.

(34) Position screw (42) and self-locking nut (43) in steering column universal joint (40).

(35) Tighten self-locking nut (43) to 31-39 lb-ft (43-53 N·m).




**NOTE**

Install plastic cable ties as required.

(36) Route throttle control cable (44) to bracket (45).

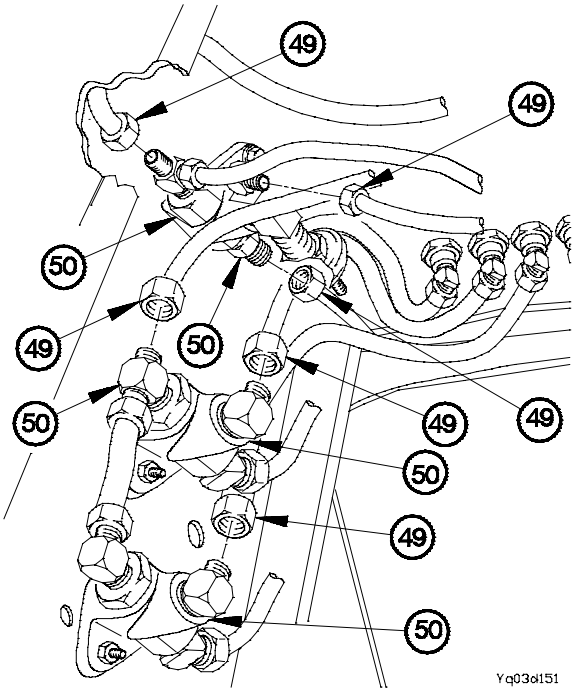
(37) Position throttle control cable (44) in bracket (45) with two nuts (46).

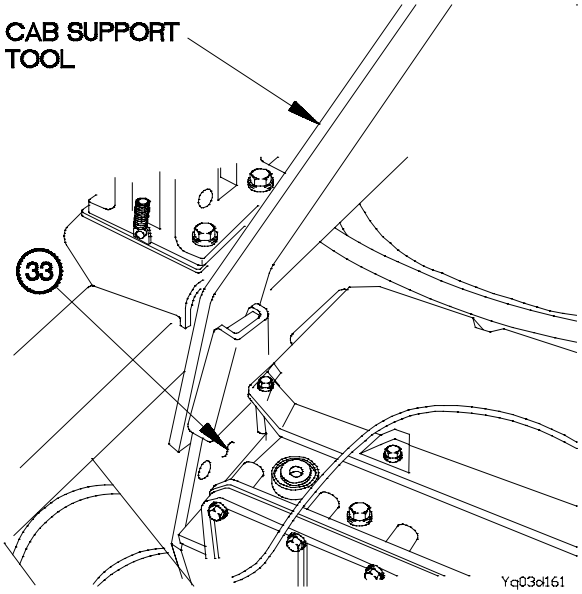
(38) Adjust and tighten nuts (46) to position marked during removal.

(39) Install throttle control cable (44) on stud (47) with clip (48).

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

(40) Connect six pneumatic hoses (49) to three two-way check valves (50).




(41) Remove cab support tool from engine rear lifting eye (33).

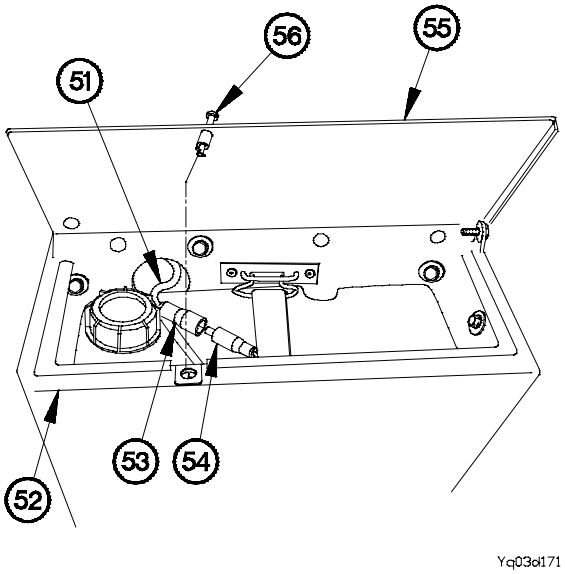
(42) Lower cab (TM 9-2320-366-10-1).

(43) Position windshield washer cable assembly (51) in step (52).

(44) Connect connector P25 (53) to connector J25 (54).

(45) Close step plate (55).

(46) Tighten screw (56) on step plate (55).

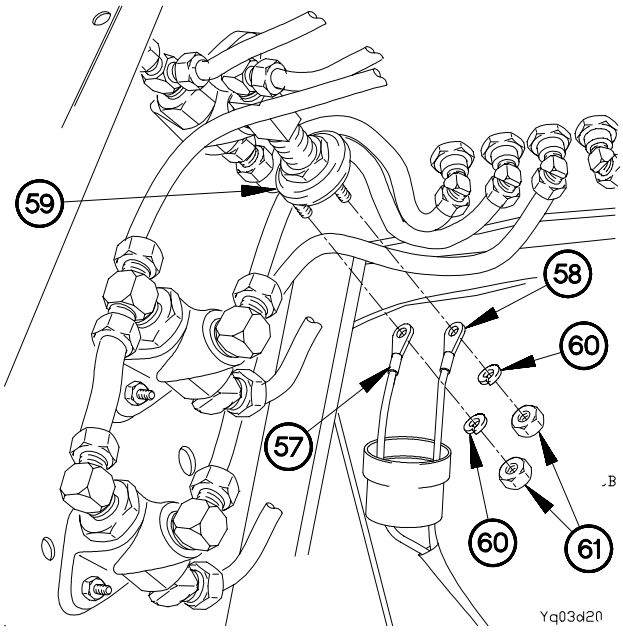


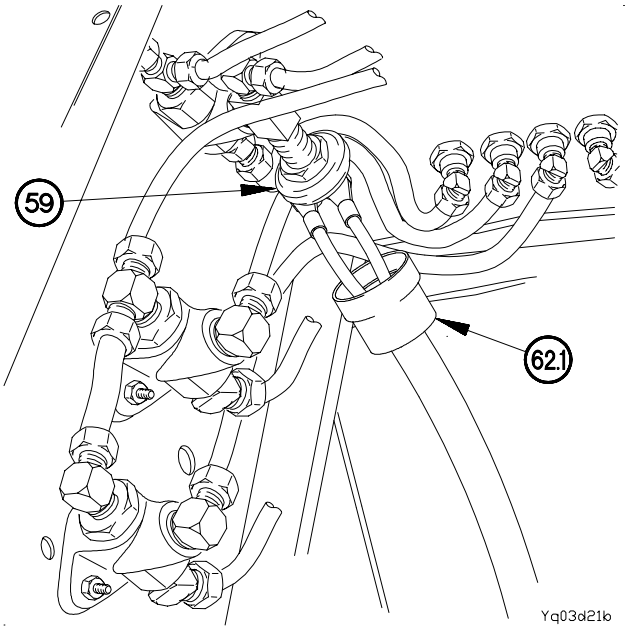
(47) Install terminal lugs TL201 (57) and TL202 (58) on low pressure transmitter (59) with two lockwashers (60) and nuts (61).

**WARNING**

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

(48) Apply sealing compound to nuts (61), lockwashers (60), and terminal lugs TL201 (57) and TL202 (58).




**NOTE**

Perform steps (48.1) and (48.2) on vehicle serial number 7748 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

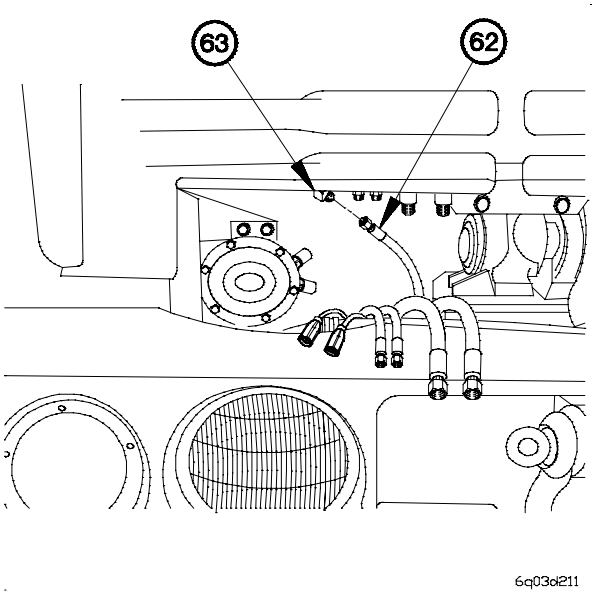
(48.1) Install boot (62.1) on low pressure transmitter (59).

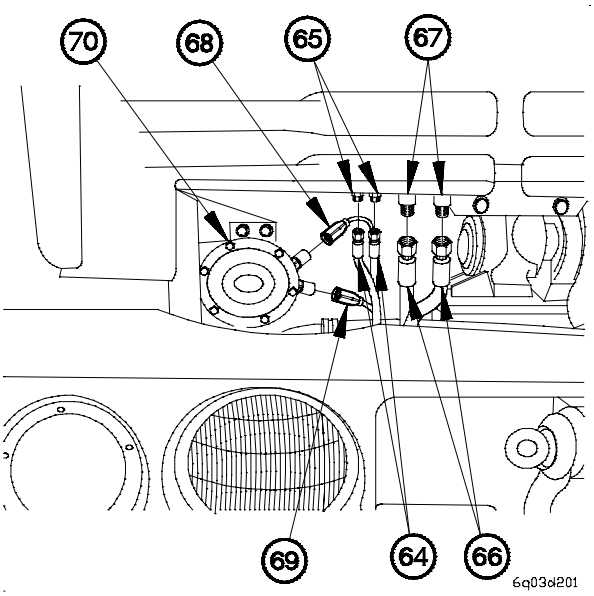
(48.2) Apply antiseize to holes TLR and TTR and around edges of boot (62.1).

**NOTE**

Perform step (49) on M1088.

(49) Connect pneumatic hose (62) to 45-degree fitting (63).




(50) Connect two pneumatic hoses (64) to fittings (65).

(51) Connect two pneumatic hoses (66) to 45-degree fittings (67).

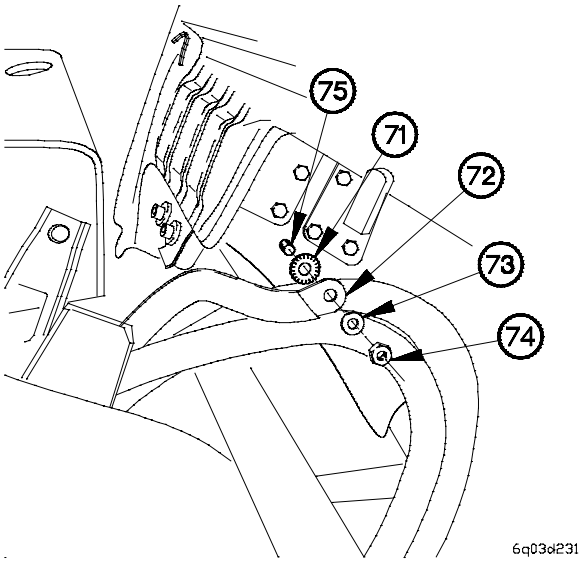
(52) Connect connectors P5 (68) and P6 (69) to horn (70).

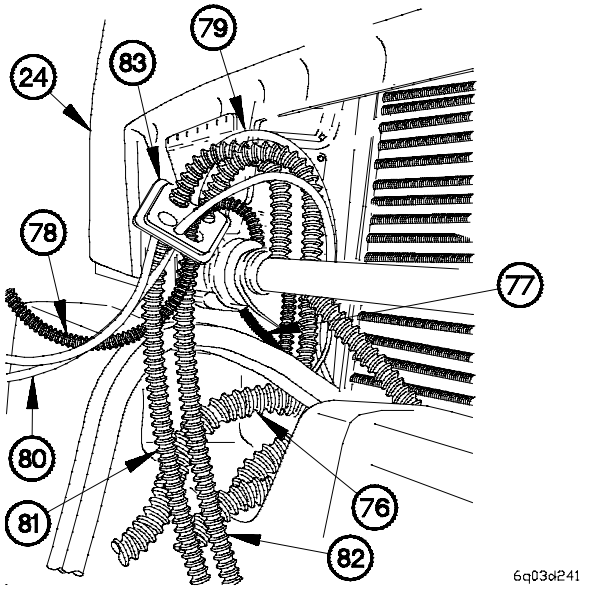
## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

**NOTE**

Vehicle serial numbers 0001 through 1477 have a smaller diameter ground stud than vehicle serial numbers 1478 and higher. Vehicle serial number will determine which self-locking nut to use.

(53) Install lockwasher (71), ground strap (72), washer (73), and self-locking nut (74) on ground stud (75).




**NOTE**

Perform step (54) on M1084, M1086, M1090, and M1094.

(54) Route crane/dump power cable (76) inside cab (24).

**NOTE**

Perform step (55) on vehicles equipped with PTO.

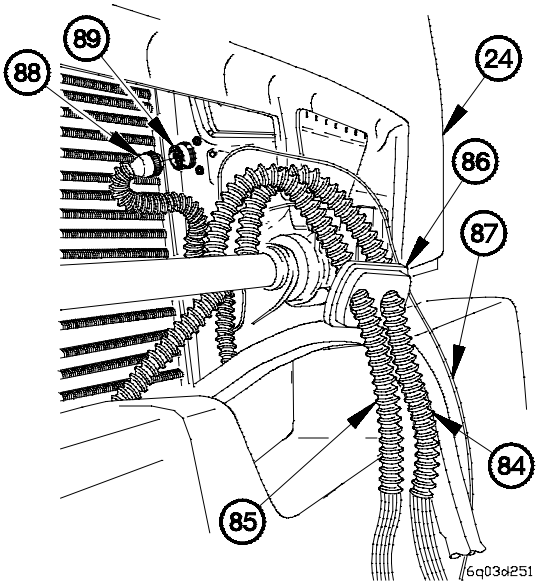
(55) Route PTO cable assembly (77) inside cab (24).

**NOTE**

Perform step (56) on vehicles not equipped with PTO.

(56) Route auxiliary oil cooler fan cable assembly (78) inside cab (24).

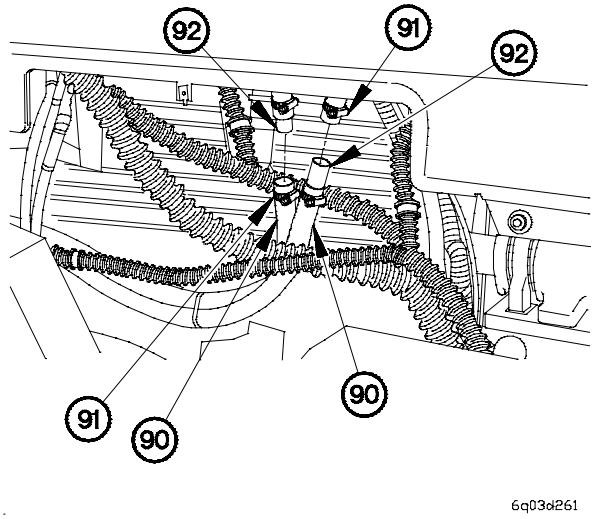
(57) Route power distribution panel 24 vdc cable (79), power distribution panel 12 vdc cable (80), rear lights cable assembly (81), front lights cable assembly (82) and grommet (83) inside cab (24).




(58) Route start and charging cable assembly (84) engine control cable assembly (85) and grommet (86) inside cab (24).

(59) Route vacuum hose (87) inside cab (24).

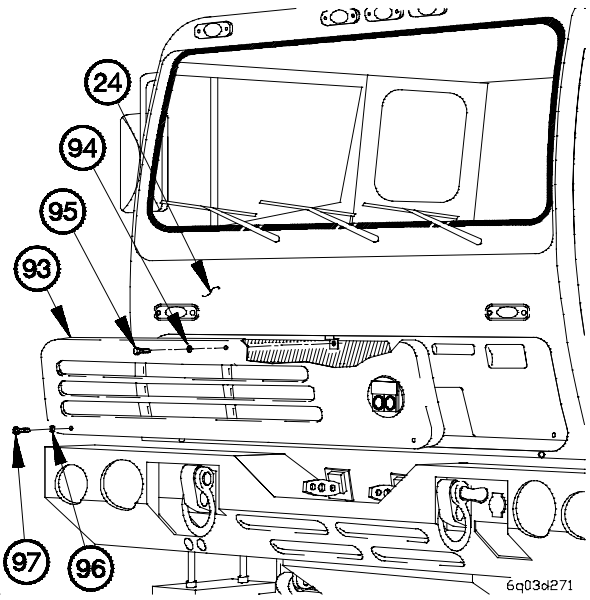
(60) Connect connector P119 (88) to connector J119 (89).




(61) Disconnect two heater hoses (90).

(62) Position two clamps (91) and heater hoses (90) on tubes (92).

(63) Tighten two clamps (91) to 60-72 lb-in. (7-8 N·m).




(64) Position front grille (93) on cab (24) with washer (94) and screw (95).

(65) Position two washers (96) and screws (97) in front grille (93).

(66) Tighten screw (95) to 48-60 lb-in. (5-7 N·m).

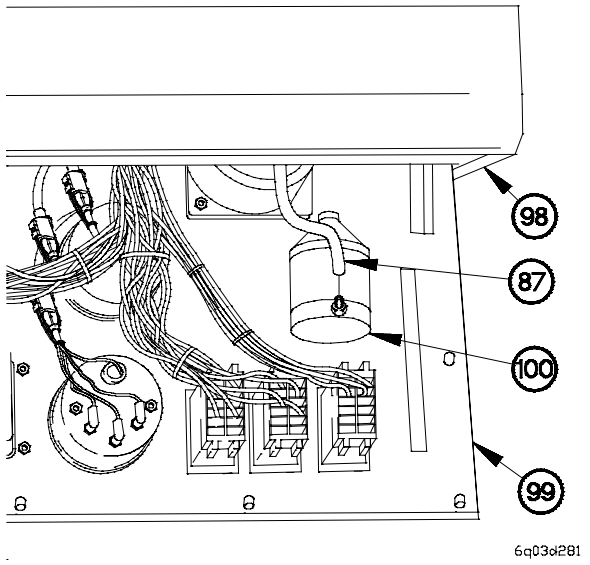
(67) Tighten two screws (97) to 24 lb-in. (3 N·m).

## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

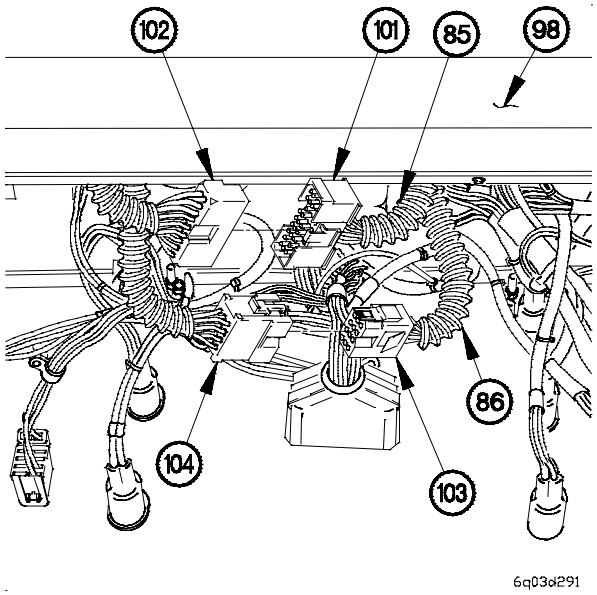
(68) Route vacuum hose (87) inside dashboard (98).

(69) Lift instrument panel assembly (99) outward to gain access.

(70) Connect vacuum hose (87) to air filter restriction gauge (100).



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6q03d291

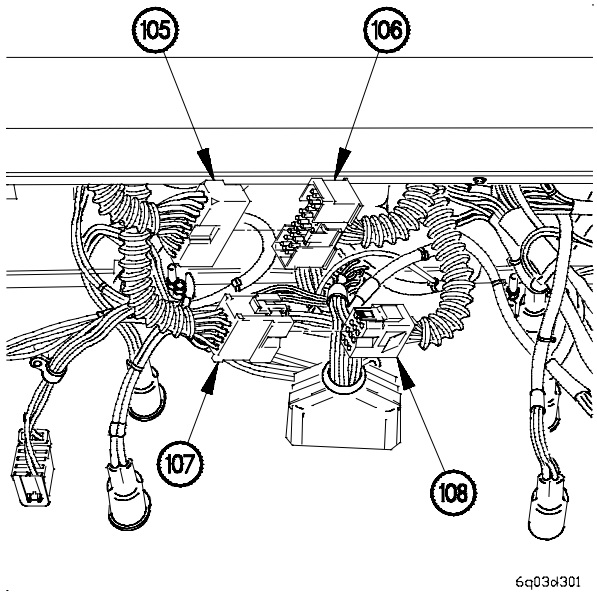
(71) Route start and charging cable assembly (85) and engine control cable assembly (86) inside dashboard (98).

(72) Connect connector P43 (101) to connector J43 (102).

(73) Connect connector P31 (103) to connector J31 (104).

(74) Connect connector J43X (105) to connector P43X (106).

(75) Connect connector J31X (107) to connector P31X (108).



6q03d301

**NOTE**

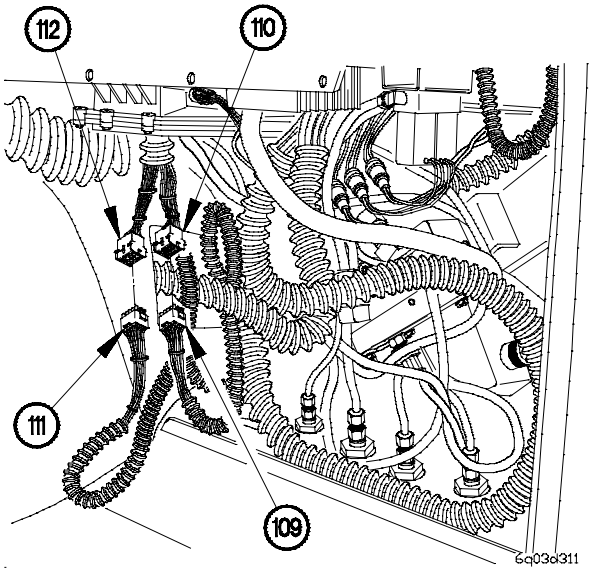
Perform step (76) on M1084, M1086, M1089, M1090, and M1094.

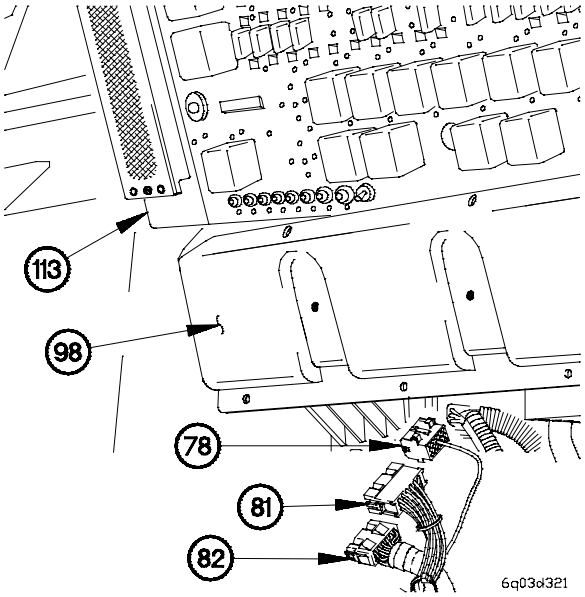
(76) Connect connector P108 (109) to connector J108 (110).

**NOTE**

Perform step (77) on vehicles equipped with PTO.

(77) Connect connector P210 (111) to connector J210 (112).




(78) Lift power distribution panel (113) outward to gain access.

**NOTE**

Perform step (79) on vehicles not equipped with PTO.

(79) Route auxiliary oil cooler fan cable assembly (78) inside dashboard (98).

(80) Route rear lights cable assembly (81) and front lights cable assembly (82) inside dashboard (98).

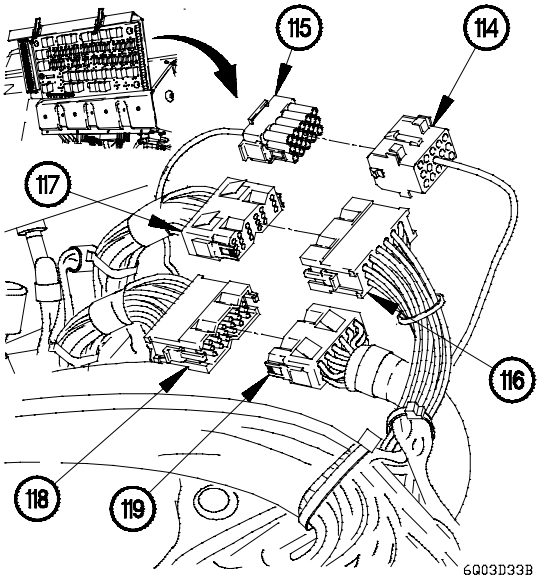
**NOTE**

Perform step (81) on vehicles not equipped with PTO.

(81) Connect connector J912 (114) to connector P912A (115).

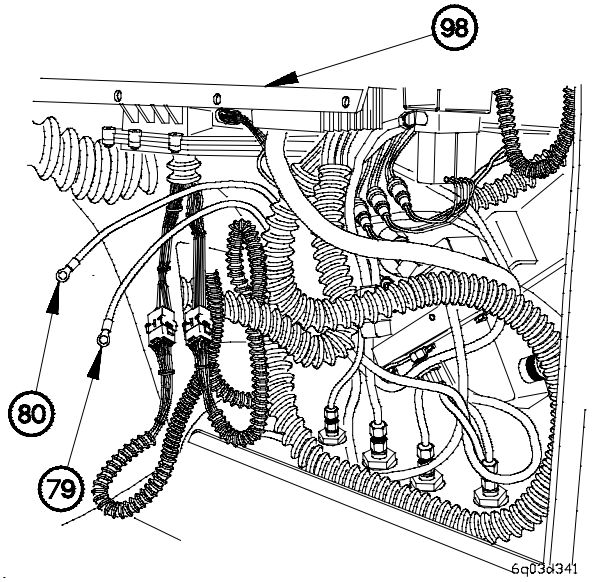
(82) Connect connector J27 (116) to connector P27 (117).

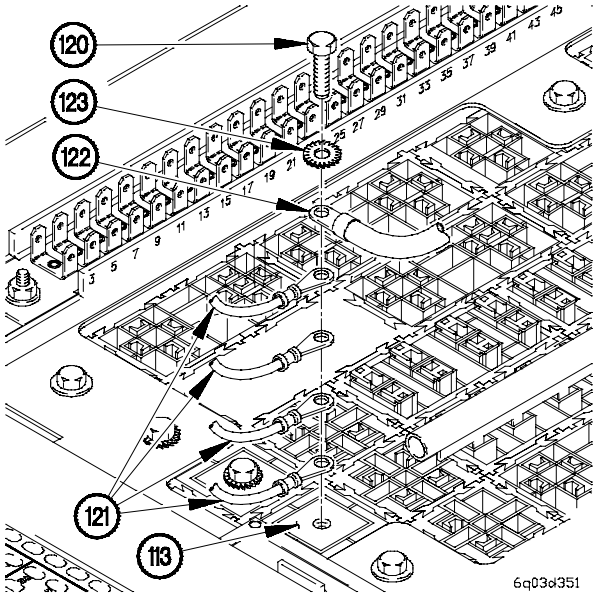
(83) Connect connector J51 (118) to connector P51 (119).



## 15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

(84) Route power distribution panel 24 vdc cable (79) and power distribution panel 12 vdc cable (80) inside dashboard (98).




(85) Remove screw (120) from power distribution panel (113).

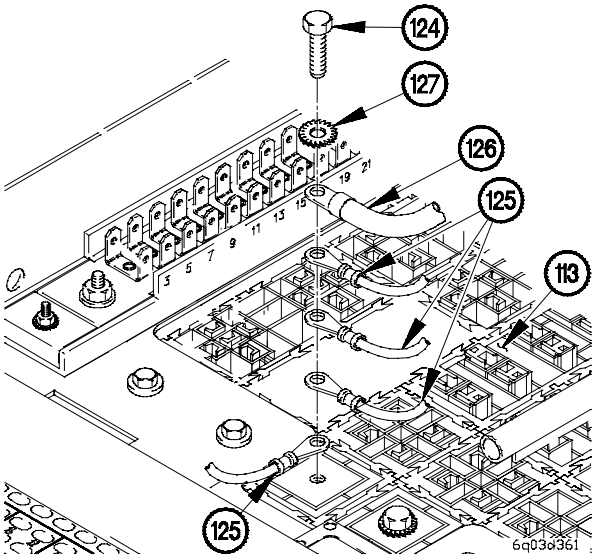
(86) Position four terminal lugs (121), terminal lug TL42 (122), lockwasher (123), and screw (120) on power distribution panel (113).

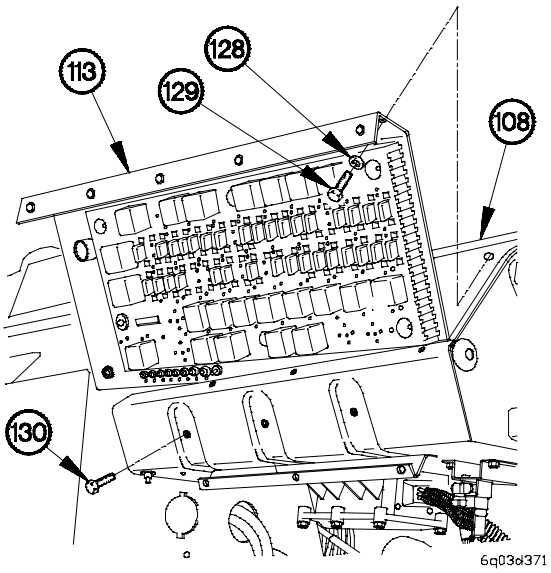
(87) Tighten screw (120) to 35-45 lb-in. (4-5 N·m).

(88) Remove screw (124) from power distribution panel (113).

(89) Position four terminal lugs (125), terminal lug TL41 (126), lockwasher (127), and screw (124) on power distribution panel (113).

(90) Tighten screw (124) to 35-45 lb-in. (4-5 N·m).






(91) Install power distribution panel (113) in dashboard (108) with three washers (128) and screws (129).

(92) Install three screws (130) in power distribution panel (113).

**e. Follow-On Maintenance.**

(1) Install kick panel (TM 9-2320-366-20-4).

(2) Install instrument panel (TM 9-2320-366-20-3).

(3) Install steering wheel (TM 9-2320-366-20-4).

(4) Fill radiator with anti-freeze (TM 9-2320-366-10).

(5) Connect batteries (TM 9-2320-366-20-3).

(6) Start engine (TM 9-2320-366-10-1).

(7) Check air system and heater hoses for leaks (TM 9-2320-366-10-1).

(8) Operate vehicle and electrical system and check for proper operation (TM 9-2320-366-10-1).

(9) Shut down engine (TM 9-2320-366-10-1).

**End of Task.**

## 15-4. M1093/M1094 CAB SIDE WALL REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
M1093/M1094 cab roof removed (TM 9-2320-366-20-4).
Side window removed (para 15-7).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Socket Set, Socket Wrench (Item 59, Appendix B)

**Tools and Special Tools (Cont)**
Wrench Set, Socket (TM 9-2320-366-20)

**Material/Parts**
Washer, Flat (Item 93, Appendix C)
Nut, Self-locking (Item 53, Appendix C)
Screw, Captive (4) (Item 368, Appendix F)
Seal (30 in. (750mm)) (Item 372, Appendix F)
Lubricating Oil, Engine (Item 49, Appendix C)

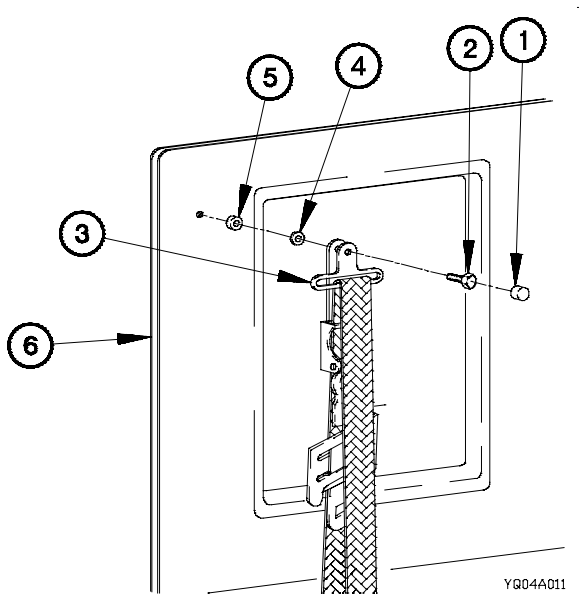
**a. Removal.**

**NOTE**

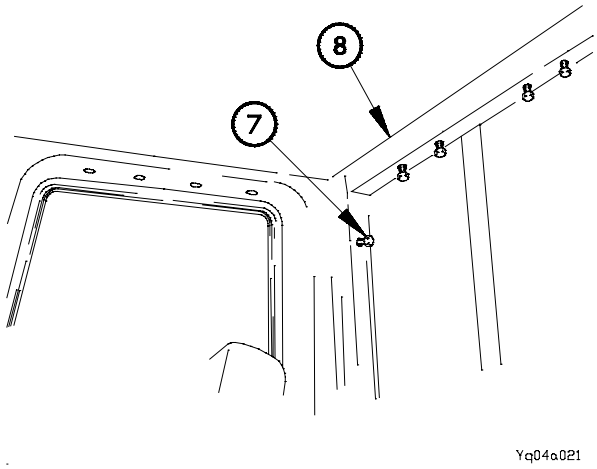
Left and right side cab side walls are removed the same way. Right side shown.

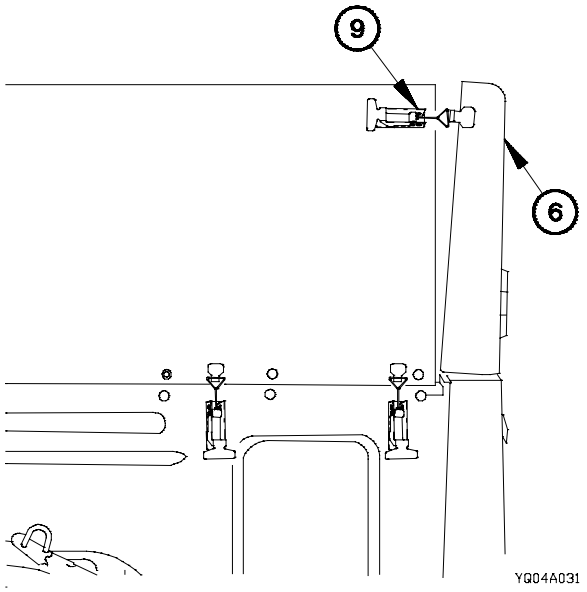
(1) Remove plastic cover (1) from screw (2).

(2) Remove screw (2), seat belt mounting bracket (3), washer (4), and spacer (5) from cab side wall (6).



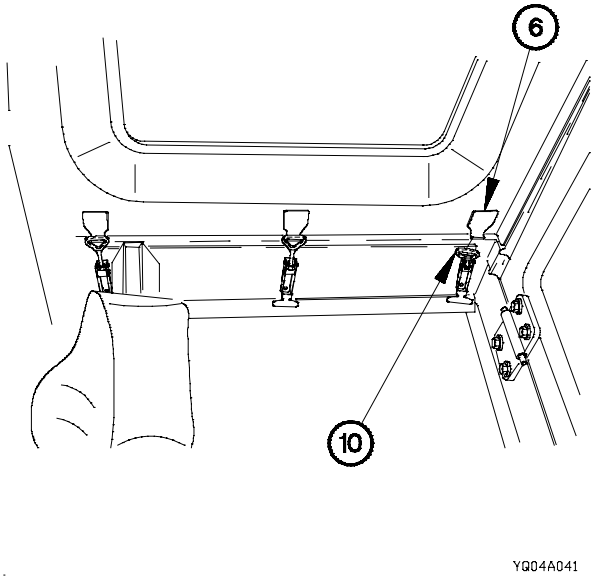
(3) Loosen captive screw (7) in cab rear wall (8).



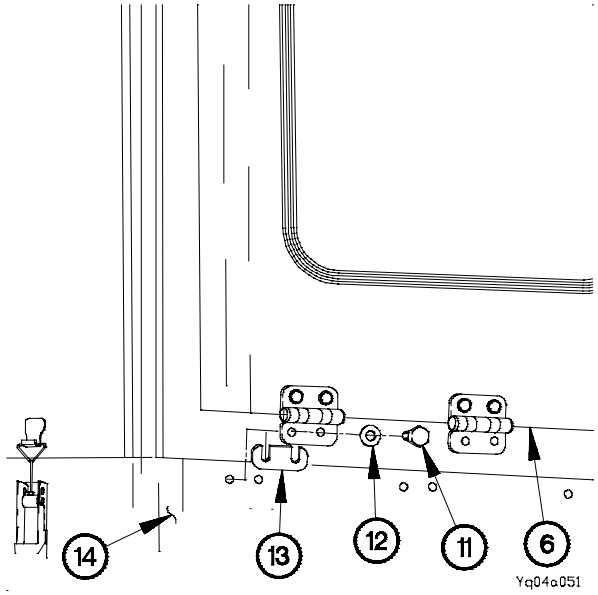

(4) Release latch (9) from cab side wall (6).

(5) Release three latches (10) from cab side wall (6).

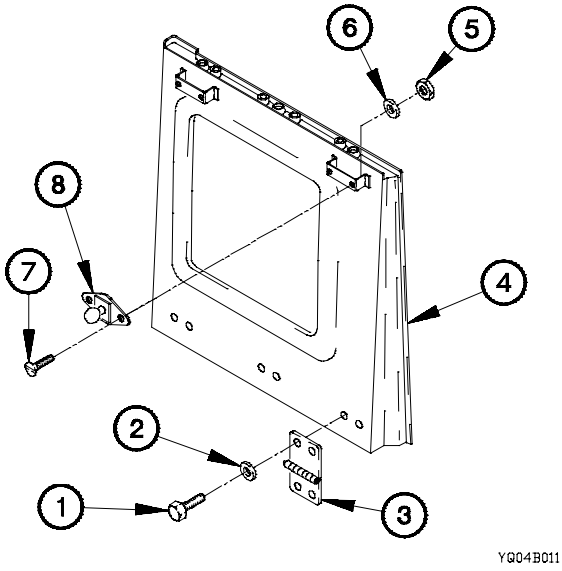


## 15-4. M1093/M1094 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

(6) Remove six screws (11), washers (12), three spacers (13), and cab side wall (6) from cab (14).




**b. Disassembly.**

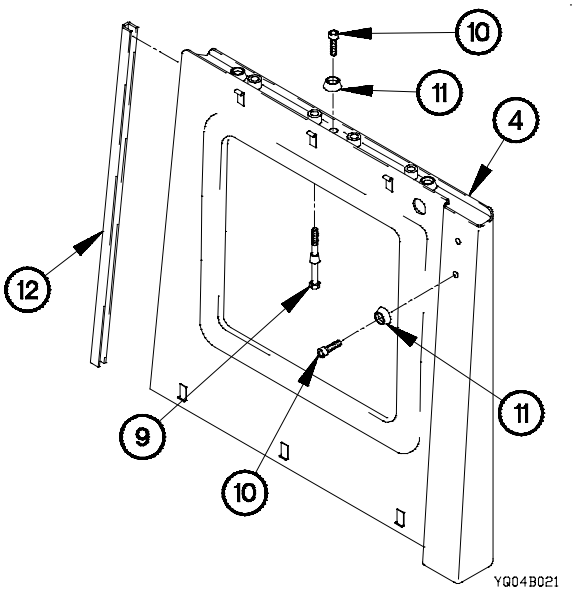



**NOTE**

Left and right side cab side walls are disassembled the same way. Right side shown.

(1) Remove six screws (1), washers (2), and three hinges (3) from cab side wall (4).

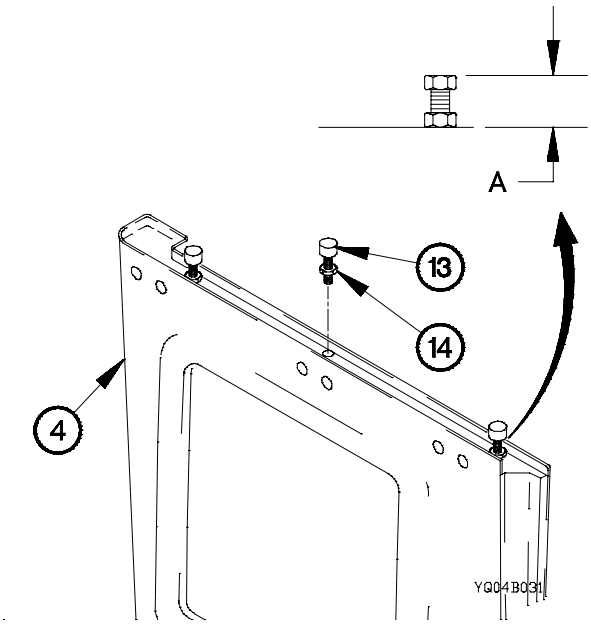
(2) Remove four nuts (5), washers (6), screws (7), and two friction catch studs (8) from cab side wall (4).




(3) Remove four captive screws (9) from cab side wall (4). Discard captive screws.

(4) Remove four screws (10) and centering cones (11) from cab side wall (4).

(5) Remove seal (12) from cab side wall (4). Discard seal.

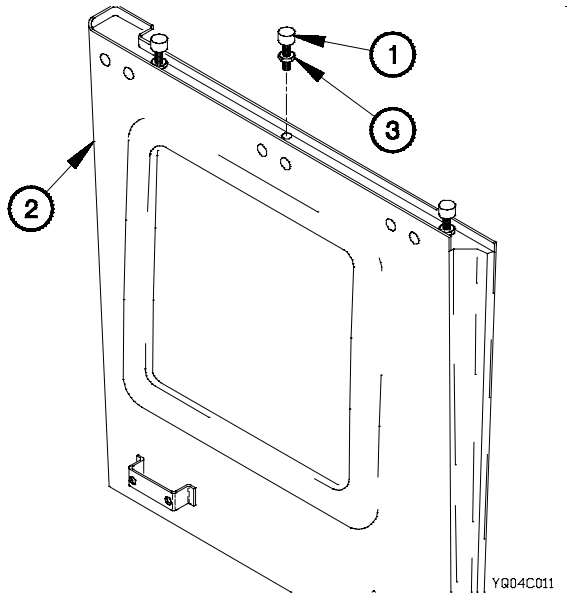



(6) Record distance A on three rubber stoppers (13).

(7) Loosen three nuts (14) on rubber stoppers (13).

(8) Remove three rubber stoppers (13) from cab side wall (4).

**c. Assembly.**




**NOTE**

Install rubber stoppers using measurement A from disassembly.

(1) Install three rubber stoppers (1) in cab side wall (2).

(2) Tighten three nuts (3) on rubber stoppers (1).

## 15-4. M1093/M1094 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

(3) Install seal (4) on cab side wall (2).

(4) Position four centering cones (5) on cab side wall (2) with four screws (6).

(5) Tighten four screws (6) to 62-124 lb-in. (7-14 N·m).

**CAUTION**

Use care when installing captive screws. Failure to comply may result in damage to equipment.

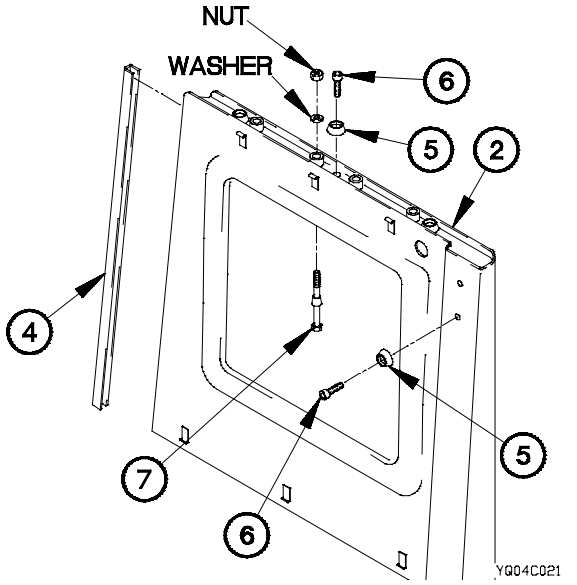
**NOTE**

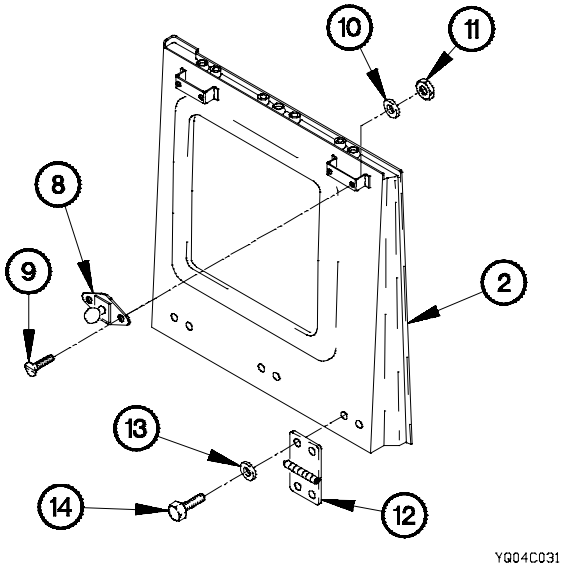
- Lubricate captive screws prior to installation.
- All captive screws are installed the same way. One shown.
- Tighten nut until captive screw is seated.

(6) Install captive screw (7) in cab side wall (2) with washer and nut.

(7) Remove nut and washer from captive screw (7).

(8) Perform steps (6) and (7) on remaining captive screws.




(9) Position two friction catch studs (8) on cab side wall (2) with four screws (9), washers (10) and nuts (11).

(10) Position three hinges (12) on cab side wall (2) with six washers (13) and screws (14).

(11) Tighten six screws (14) to 22-28 lb-ft (30-38 N·m).

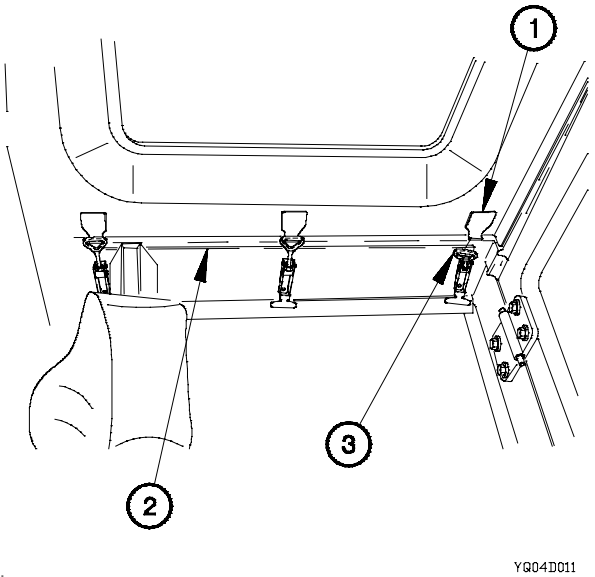
**d. Installation.**

**NOTE**

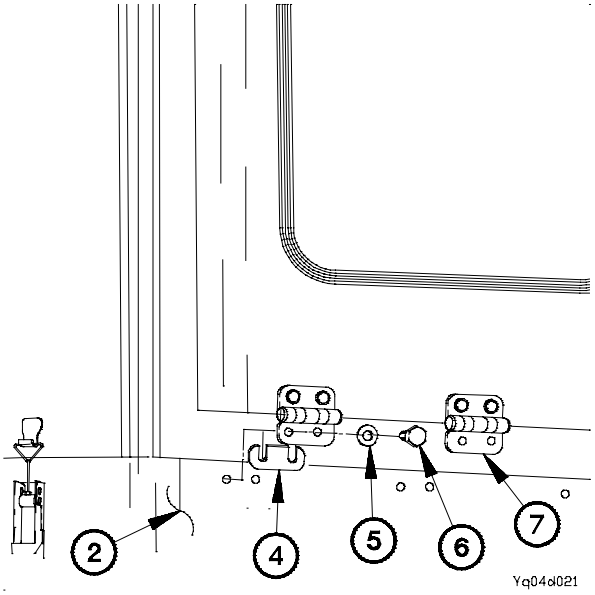
Steps (1) through (7) require the aid of an assistant.

(1) Position cab side wall (1) on cab (2).

(2) Fasten three latches (3) to cab side wall (1).




YQ04D011




Yq04d021

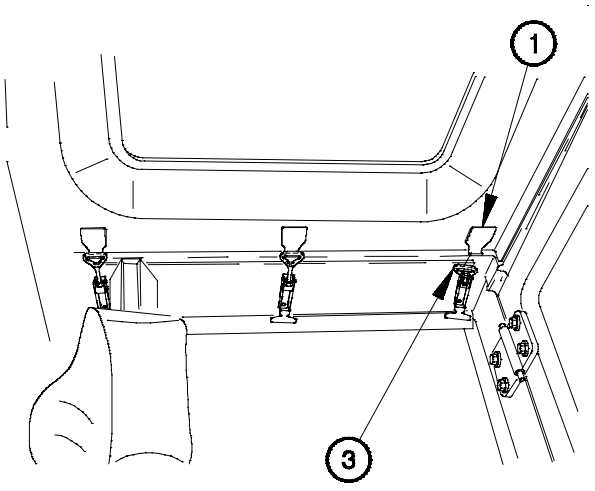
(3) Position three spacers (4), six washers (5), screws (6), and three hinges (7) on cab (2).

(4) Tighten six screws (6) to 22-28 lb-ft (30-38 N·m).

**NOTE**

All friction catch studs are adjusted the same way. One shown.

(5) Release three latches (3) and fold down cab side wall (1).

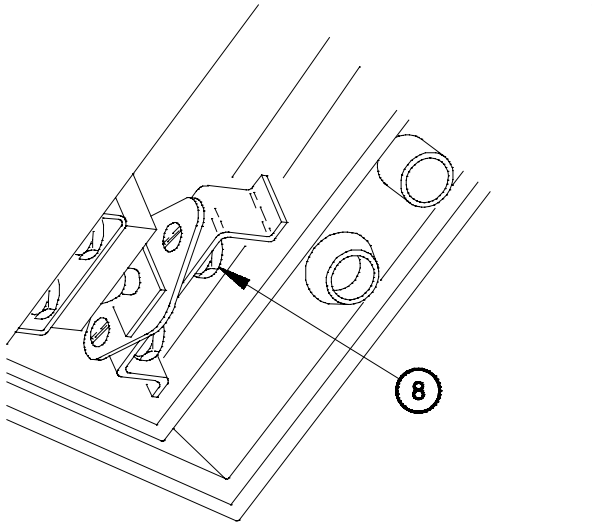



YQ04D031

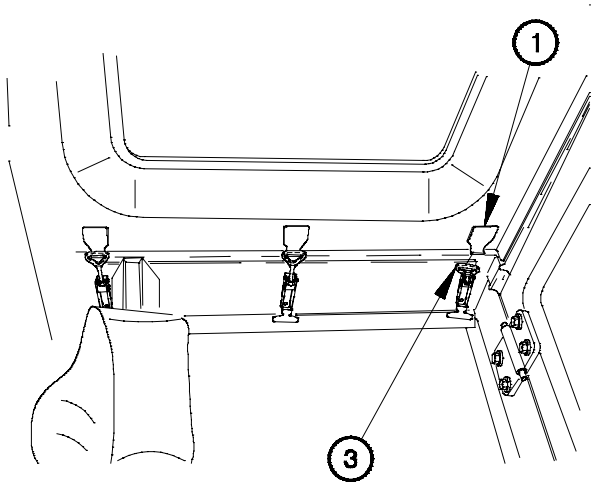
## 15-4. M1093/M1094 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

(6) Tighten two nuts (8) to 62-124 lb-in. (7-14 N·m).

(7) Perform step (6) on remaining friction catch stud (9).



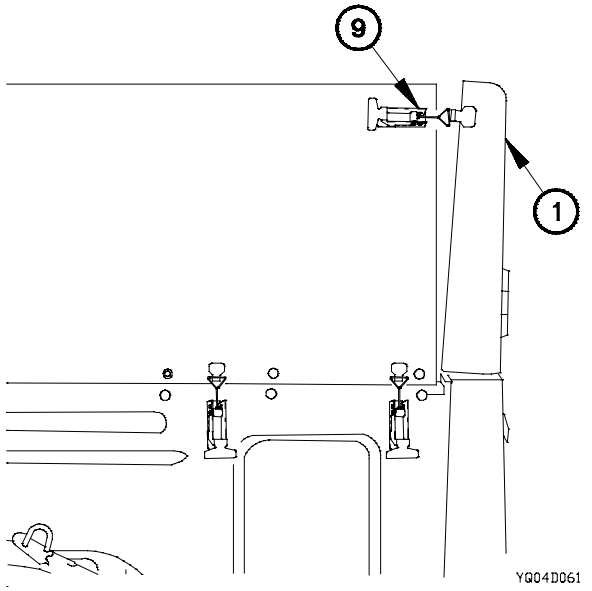

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YQ04D051

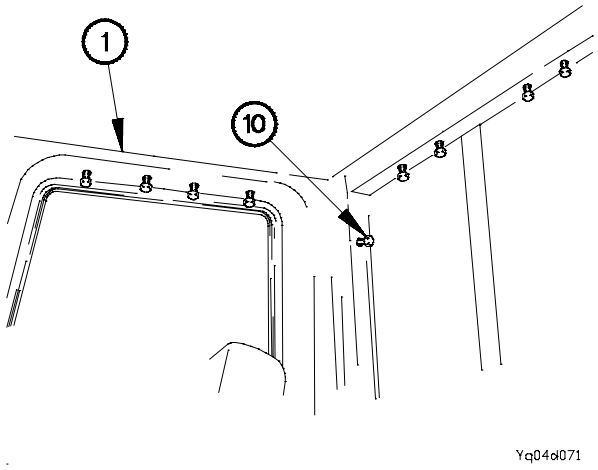
(8) Fold up cab side wall (1) and fasten three latches (3).

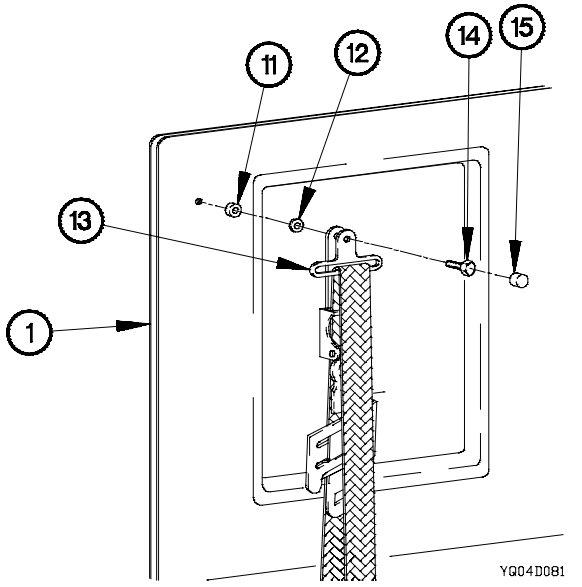
(9) Fasten latch (9) on cab side wall (1).




YQ04D061

(10) Install captive screw (10) in cab side wall (1)




(11) Position spacer (11), washer (12), and seat belt mounting bracket (13) on cab side wall (1) with screw (14).

(12) Tighten screw (14) to 30-35 lb-ft (41-47 N·m).

(13) Install plastic cover (15) on screw (14).

**e. Follow-On Maintenance.**

(1) Install side window (para 15-7).

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

**End of Task.**

## 15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
M1093/M1094 cab roof removed (TM 9-2320-366-20-4).
M42 Alarm removed, if equipped.
Spare tire lowered (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Socket Set, Socket Wrench (Item 59, Appendix B)
Wrench Set, Socket (TM 9-2320-366-20)
Socket Wrench Attachment, Screwdriver (TM 9-2320-366-20)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-75 lb-in. (Item 98, Appendix B)
Tool Kit, Blind Rivet (Item 76, Appendix B)

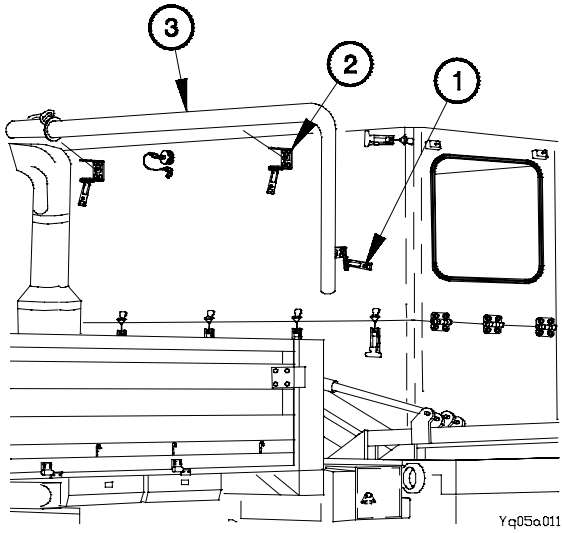
**Materials/Parts**
Washer, Flat (Item 94, Appendix C)
Nut, Self-locking (Item 53, Appendix C)
Seal (2) (30 in. (750mm)) (Item 366, Appendix F)
Screw, Captive (12) (Item 368, Appendix F)
Insulation Panel (Item 72, Appendix F)
Insulation Panel (Item 73, Appendix F)
Insulation Panel (Item 74, Appendix F)
Insulation Panel (Item 75, Appendix F)
Insulation Panel (Item 76, Appendix F)
Insulation Panel (Item 77, Appendix F)
Lubricating Oil, Engine (Item 41, Appendix C)

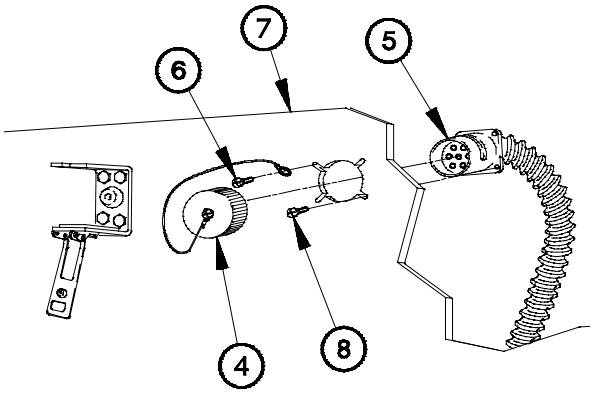
**Personnel Required**
(2)

**a. Removal.**

(1) Release three latches (1) on clamps (2).

(2) Remove davit (3) from three clamps (2).




(3) Remove dustcap (4) from connector J62 (5).

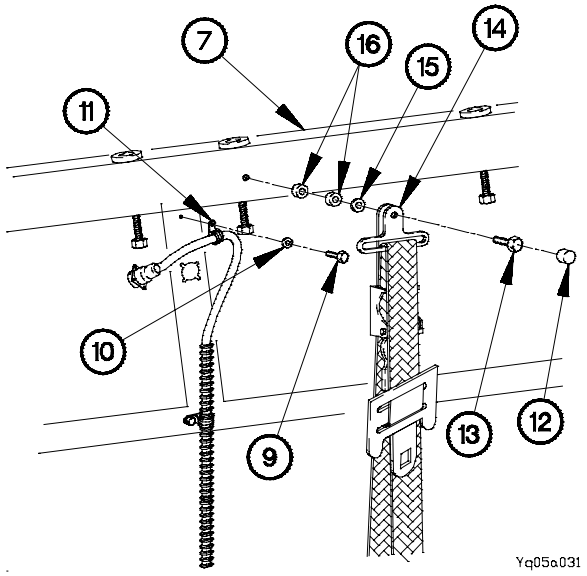
(4) Remove screw (6) and dustcap (4) from cab rear wall (7).

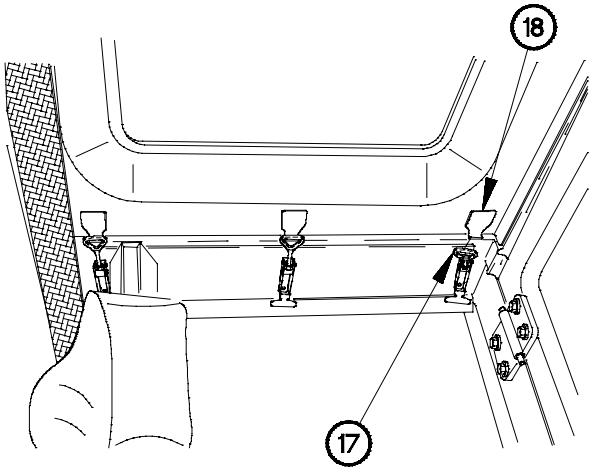
(5) Remove three screws (8) and connector J62 (5) from cab rear wall (7).

(6) Remove three screws (9), washers (10), and clamps (11) from cab rear wall (7).

(7) Remove cover (12) from screw (13).

(8) Remove screw (13), washer (14), center seatbelt mounting braket (15), and two spacers (16) from cab rear wall (7).



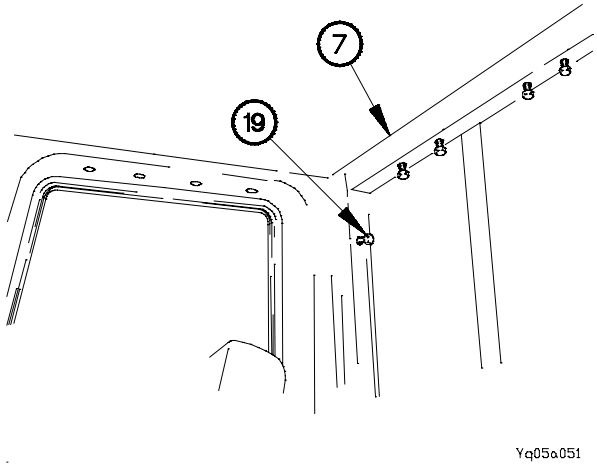




**NOTE**

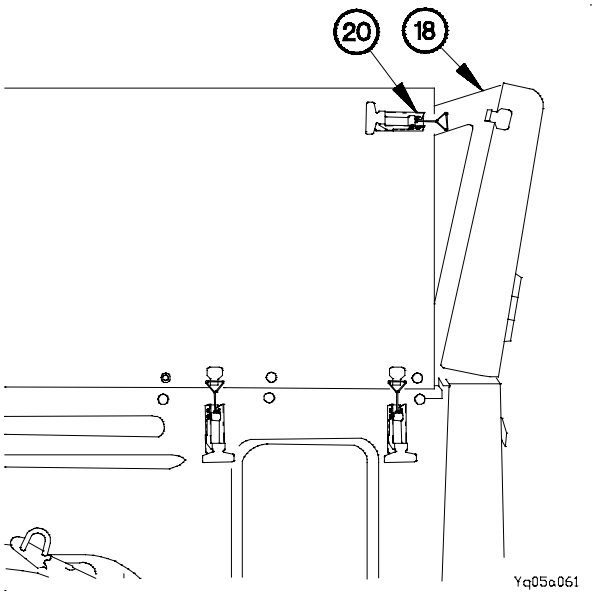
Perform steps (9) and (11) on left and right cab side walls, and step (10) on left and right sides of cab rear wall. Right side shown.

(9) Release three latches (17) on cab side wall (18).

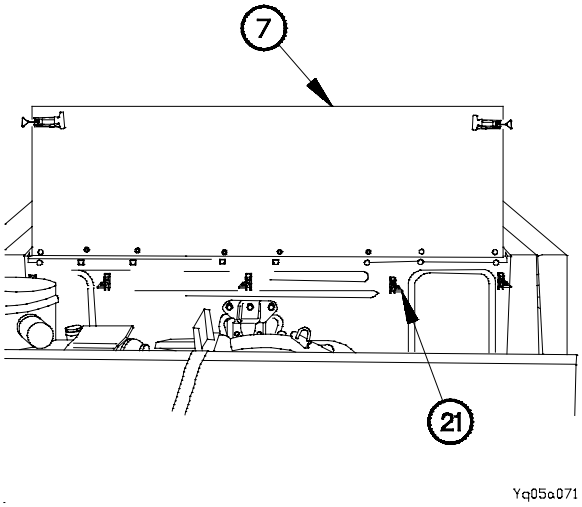
(10) Loosen captive screw (19) in cab rear wall (7).



## 15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)



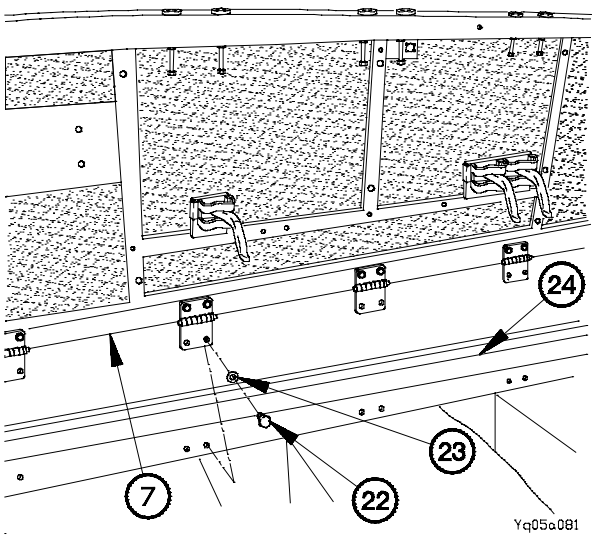

(11) Release latch (20) and fold down cab side wall (18).




**NOTE**

Steps (12) and (13) require the aid of an assistant.

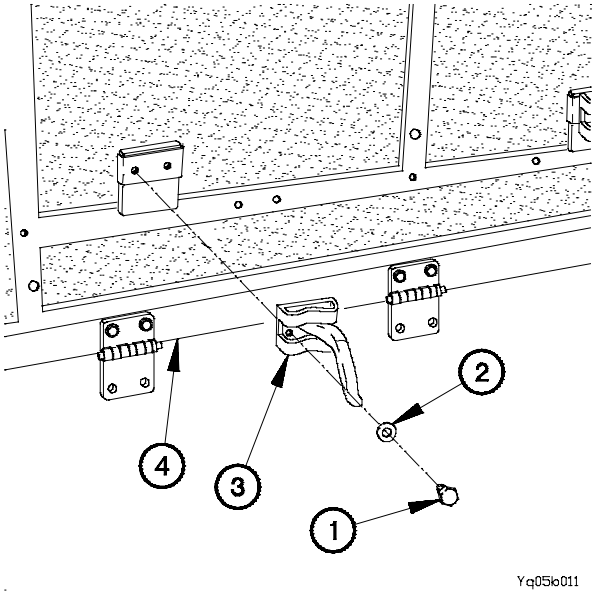
(12) Release five latches (21) on cab rear wall (7).

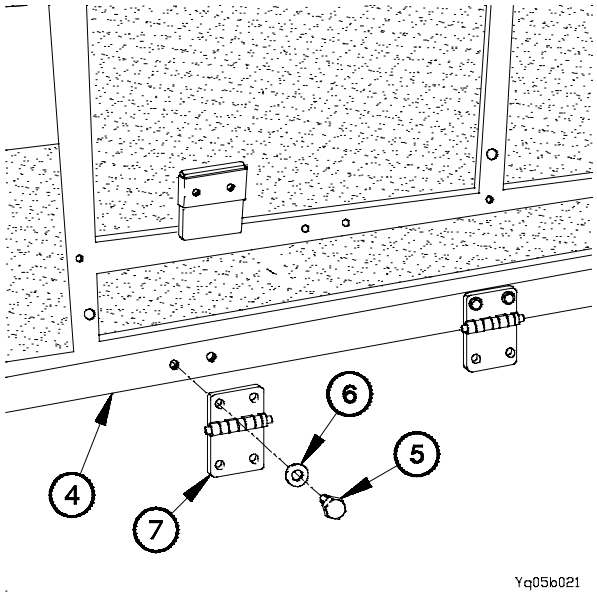



(13) Remove 10 screws (22), washers (23), and cab rear wall (7) from cab (24).

**b. Disassembly.**

(1) Remove six screws (1), washers (2), and three rifle clamps (3) from cab rear wall (4).




(2) Remove 10 screws (5), washers (6), and five hinges (7) from cab rear wall (4).

**NOTE**

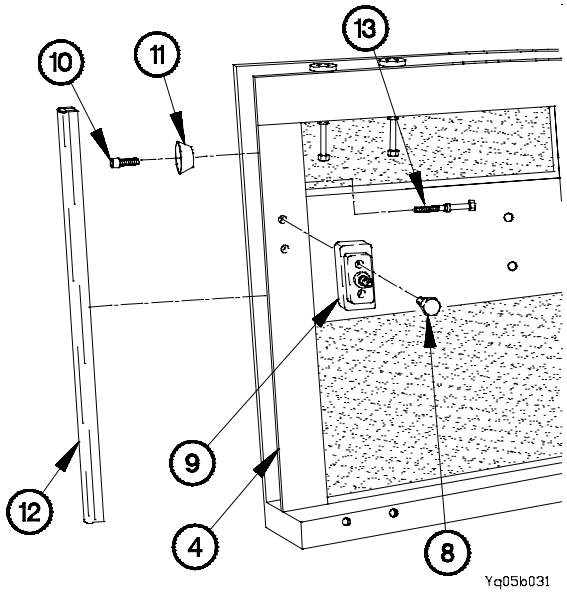
Perform steps (3) through (6) on left and right sides of cab rear wall. Right side shown.

(3) Remove two screws (8) and friction catch stud (9) from cab rear wall (4).

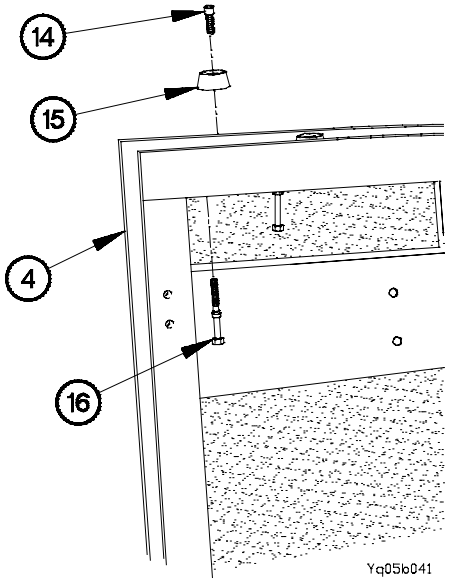
(4) Remove screw (10) and centering cup (11) from cab rear wall (4).

(5) Remove seal (12) from cab rear wall (4). Discard seal.

(6) Remove captive screw (13) from cab rear wall (4). Discard captive screw.

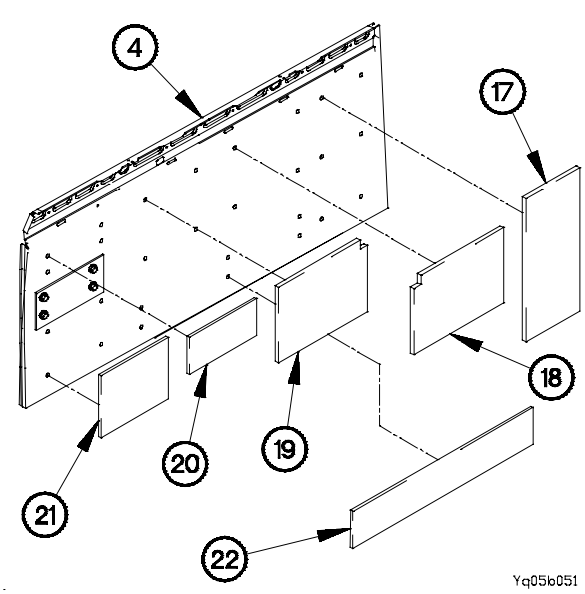


## 15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

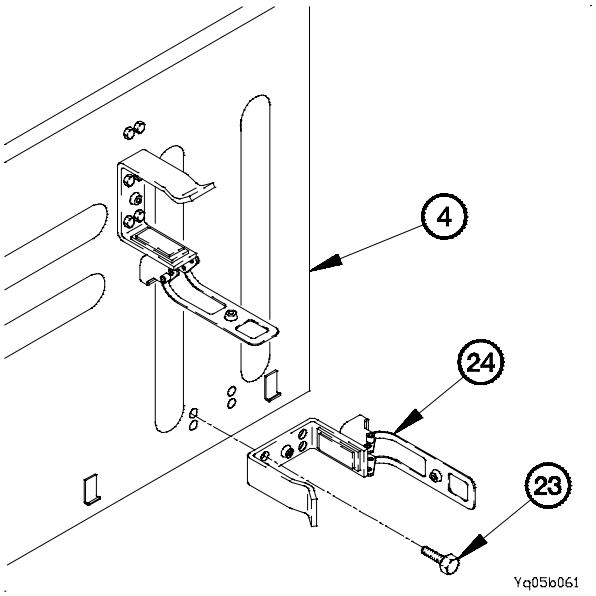



(7) Remove five screws (14) and centering cones (15) from cab rear wall (4).

(8) Remove 10 captive screws (16) from cab rear wall (4). Discard captive screws.



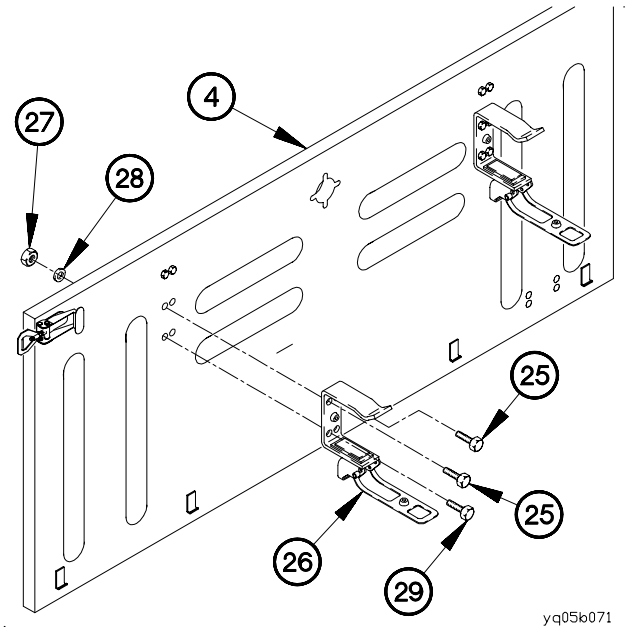

(9) Remove insulation panels (17 through 22) from cab rear wall (4). Discard insulation panels.

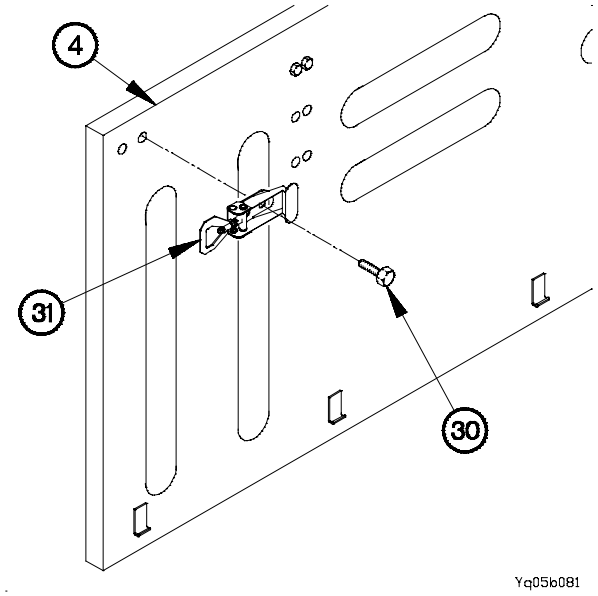



(10) Remove four screws (23) and clamp (24) from cab rear wall (4).

(11) Remove four screws (25) from two clamps (26).

(12) Remove four nuts (27), washers (28), screws (29), and two clamps (26) from cab rear wall (4).




**NOTE**

Perform step (13) on left and right sides of cab rear wall. Left side shown.

(13) Remove two screws (30) and latch (31) from cab rear wall (4).

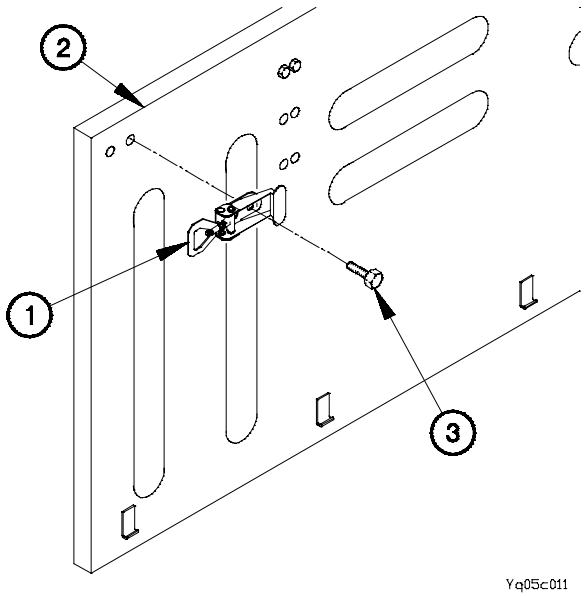
**c. Assembly.**

**NOTE**

Perform steps (1) and (2) on left and right sides of cab rear wall. Left side shown.

(1) Position latch (1) on car rear wall (2) with two screws (3).

(2) Tighten two screws (3) to 62-124 lb-in. (7-14 N·m).

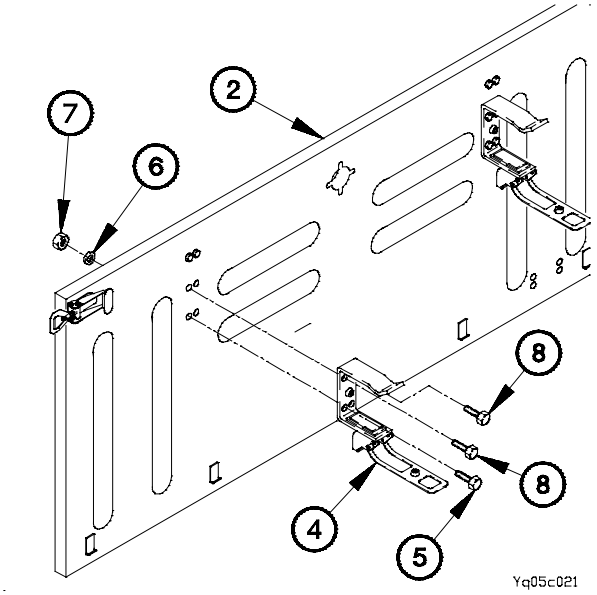


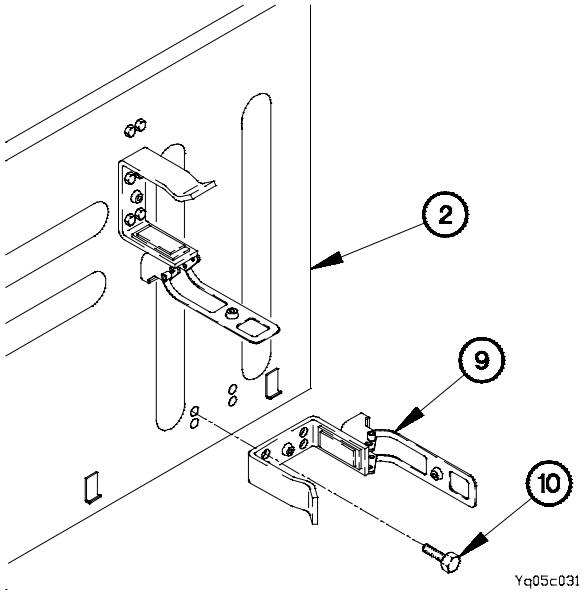
## 15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

(3) Position two clamps (4) on cab rear wall (2) with four screws (5), washers (6), and nuts (7).

(4) Position four screws (8) in two clamps (4).

(5) Tighten four screws (8) and nuts (7) to 35-44 lb-in. (4-5 N·m).

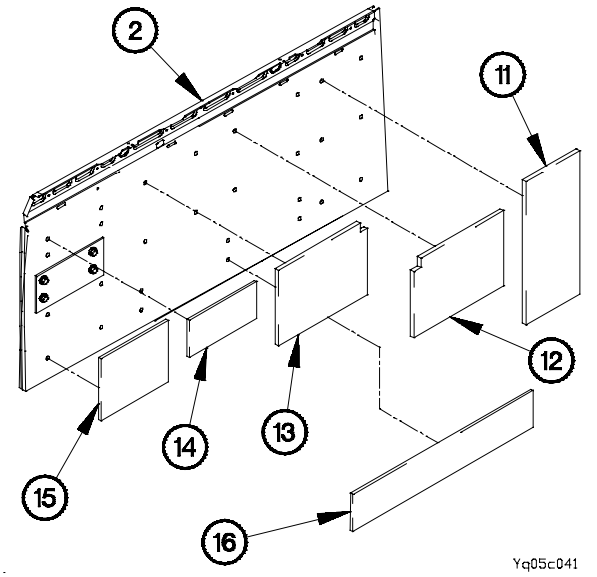



(6) Position clamp (9) on cab rear wall (2) with four screws (10).

(7) Tighten four screws (10) to 35-44 lb-in. (4-5 N·m).

(8) Install insulation panels (11 through 16) on cab rear wall (2).



**CAUTION**

Use care when installing captive screws. Failure to comply may result in damage to equipment.

**NOTE**

- Lubricate all captive screws prior to installation.
- All captive screws are installed the same way. One captive screw shown.
- Tighten nut until captive screw is seated.

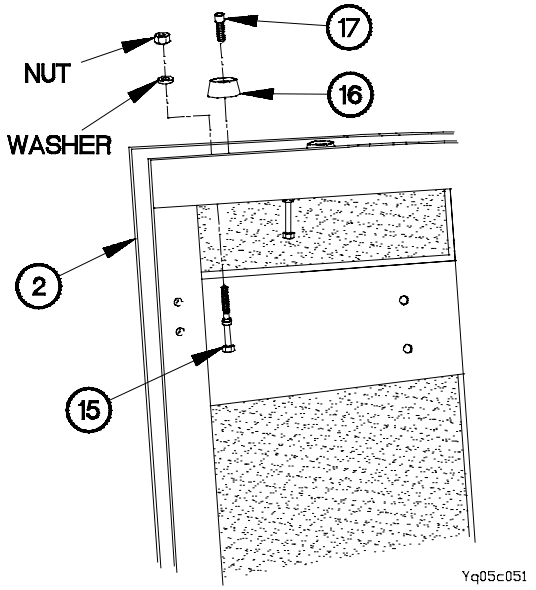
(9) Install captive screw (15) in cab rear wall (2) with washer and nut.

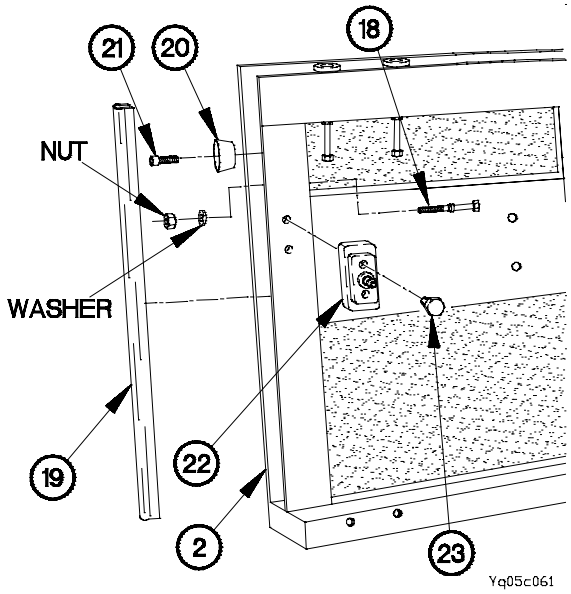
(10) Remove nut and washer from captive screw (15).

(11) Perform steps (9) and (10) on remaining nine captive screws.

(12) Position five centering cups (16) on cab rear wall (2) with five screws (17).

(13) Tighten five screws (17) to 62-124 lb-in. (7-14 N·m).




**NOTE**

- Perform steps (14) through (20) on left and right sides of cab rear wall. Right side shown.
- Tighten nut until captive screw is seated.

(14) Install captive screw (18) in cab rear wall (2) with washer and nut.

(15) Remove nut and washer from captive screw (18).

(16) Install seal (19) on cab rear wall (2).

(17) Position centering cup (20) on cab rear wall (2) with screw (21).

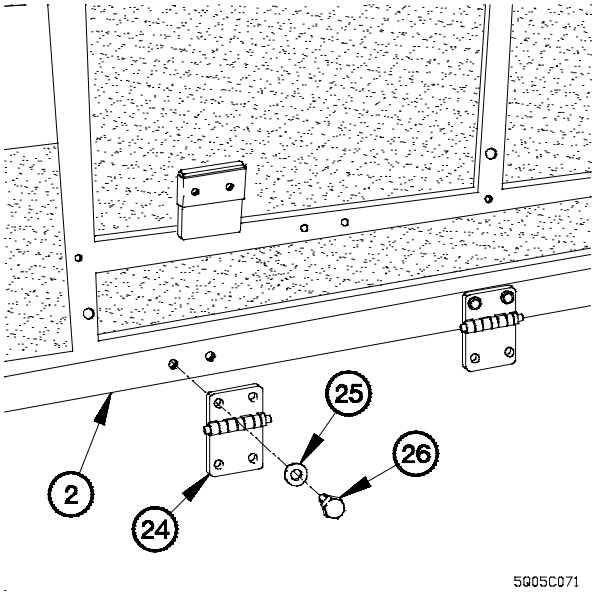
(18) Tighten screw (21) to 62-124 lb-in. (7-14 N·m).

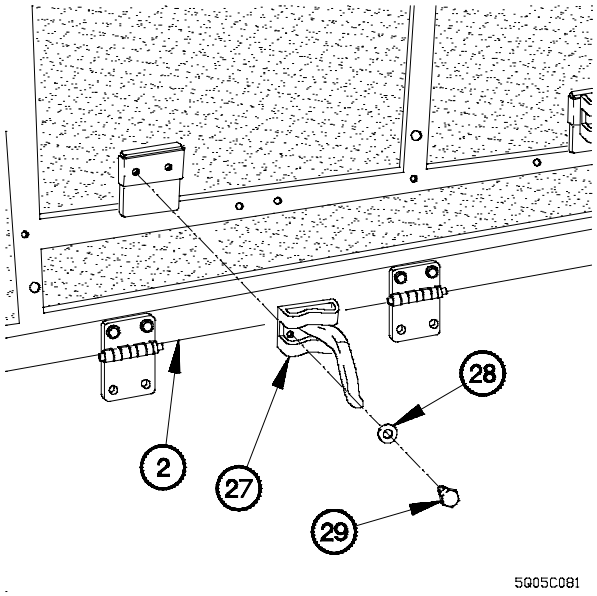
(19) Position friction catch (22) on cab rear wall (2) with two screws (23).

(20) Tighten two screws (23) to 62-124 lb-in. (7-14 N·m).

## 15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

(21) Position five hinges (24) on cab rear wall (2) with 10 washers (25) and screws (26).




(22) Position three rifle clamps (27) on cab rear wall (2) with six washers (28) and screws (29).

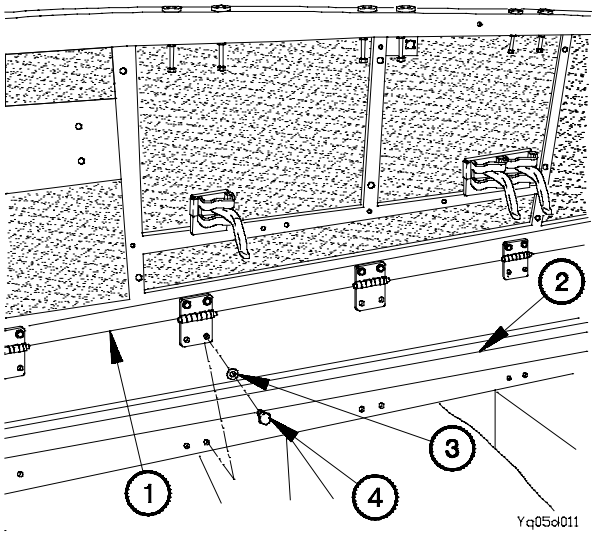
(23) Tighten six screws (29) to 35-44 lb-in. (4-5 N·m).

**d. Installation.**

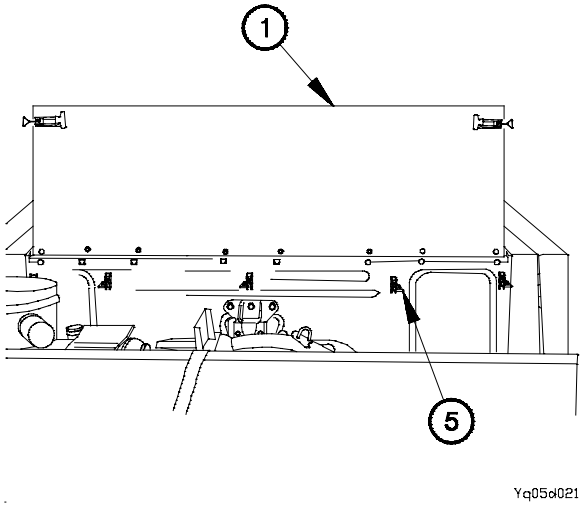
**NOTE**

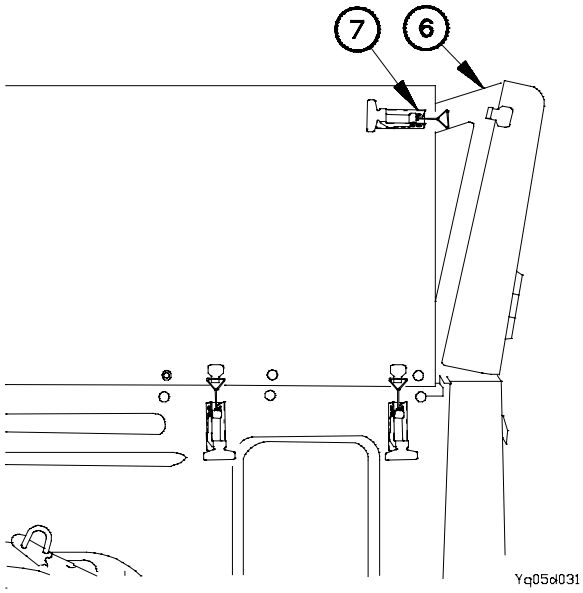
Steps (1) and (2) require the aid of an assistant.

(1) Position cab rear wall (1) on cab (2) with 10 washers (3) and screws (4).



(2) Fasten five latches (5) on cab rear wall (1).



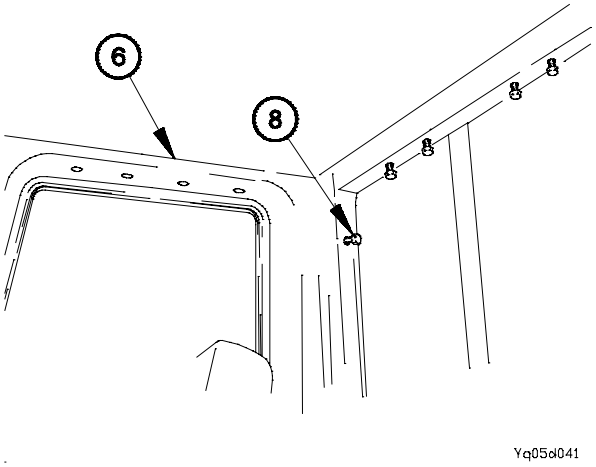




**NOTE**

Perform steps (3) and (5) on left and right cab side walls and step (4) on left and right sides of cab rear wall. Right side shown.

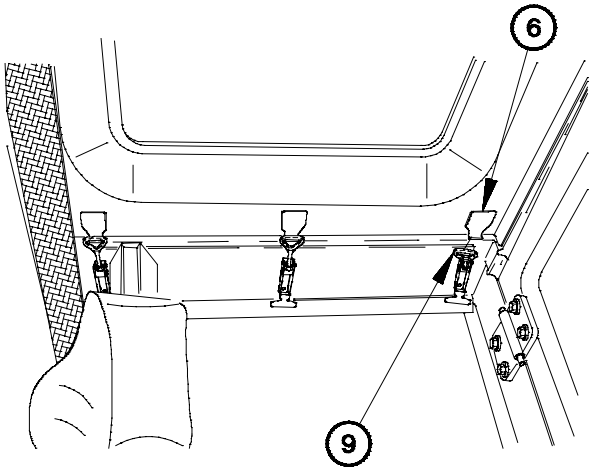
(3) Raise cab side wall (6) and fasten latch (7).

(4) Install captive screw (8) in cab side wall (6).

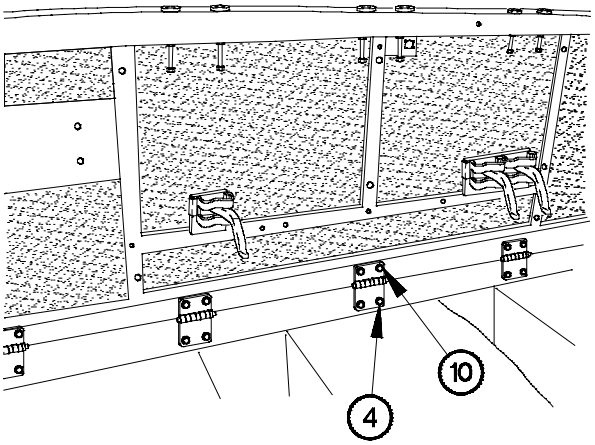


## 15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

(5) Fasten three latches (9) on cab side wall (6).




Yq05a051




Yq05a061

(6) Tighten 10 screws (4) to 22-28 lb-ft (30-38 N·m).

(7) Tighten 10 screws (10) to 22-28 lb-ft (30-38 N·m).

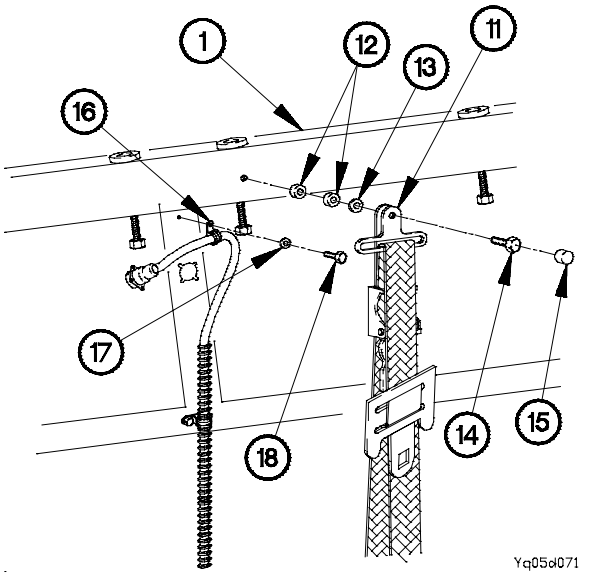
(8) Position center seatbelt mounting bracket (11) on cab rear wall (1) with two spacers (12), washer (13), and screw (14).

(9) Tighten screw (14) to 30-35 lb-ft (41-47 N·m).

(10) Install cover (15) on screw (14).

(11) Position three clamps (16) on cab rear wall (1) with three washers (17) and screws (18).

(12) Tighten three screws (18) to 27-35 lb-in. (3-4 N·m).




Yq05a071

**NOTE**

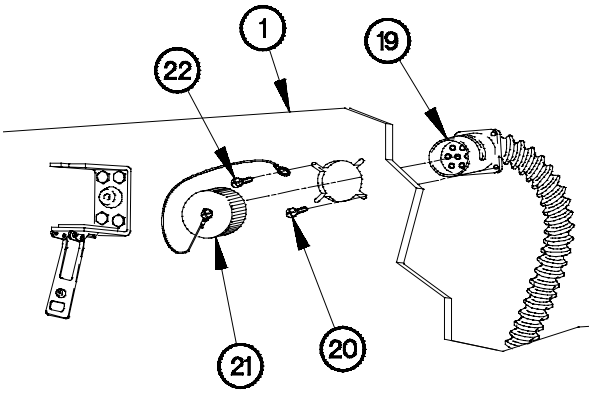
Steps (13) requires the aid of an assistant.

(13) Position connector J62 (19) in cab rear wall (1) with three screws (20).

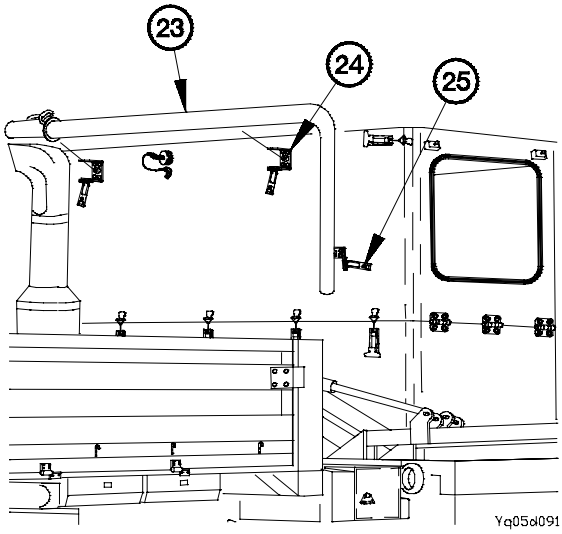
(14) Tighten three screws (20) to 27-35 lb-in. (3-4 N·m).

(15) Position dustcap (21) on cab rear wall (1) with screw (22).

(16) Tighten screw (22) to 27-35 lb-in. (3-4 N·m).



Yq05d081



Yq05d091

(17) Install davit (23) in three clamps (24).

(18) Fasten three latches (25) on clamps (24).

**e. Follow-On Maintenance.**

(1) Raise spare tire (TM 9-2320-366-10-2).

(2) Install M42 Alarm, if equipped.

(3) Install M1093/M1094 cab roof (TM 9-2320-366-20-4).

**End of Task.**

## 15-6. M1093/M1094 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
M1093/M1094 cab roof removed (TM 9-2320-366-20-4).
Cab windshield removed (para 15-7).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Socket (TM 9-2320-366-20)
Socket Set, Socket Wrench (Item 59, Appendix B)

**Materials/Parts**
Washer, Flat (Item 94, Appendix C)
Nut, Self-locking (Item 53, Appendix C)
Screw, Captive (10) (Item 368, Appendix F)
Seal (79 in. (2000 mm)) (Item 372, Appendix F)
Lubricating Oil, Engine (Item 49, Appendix C)
Seal (2) (87 in. (2200 mm)) (Item 372, Appendix F)

**Personnel Required**
(3)

**a. Removal.**

**NOTE**

Left and right side wiper arms are removed the same way. Left side shown.

(1) Disconnect windshield washer hose (1) from fitting (2).

(2) Lift cover (3) at base of wiper arm (4).

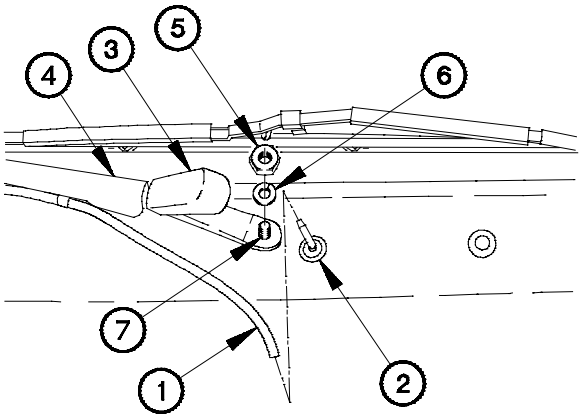
(3) Remove nut (5) and lockwasher (6) from wiper arm shaft (7). Discard lockwasher.

**NOTE**

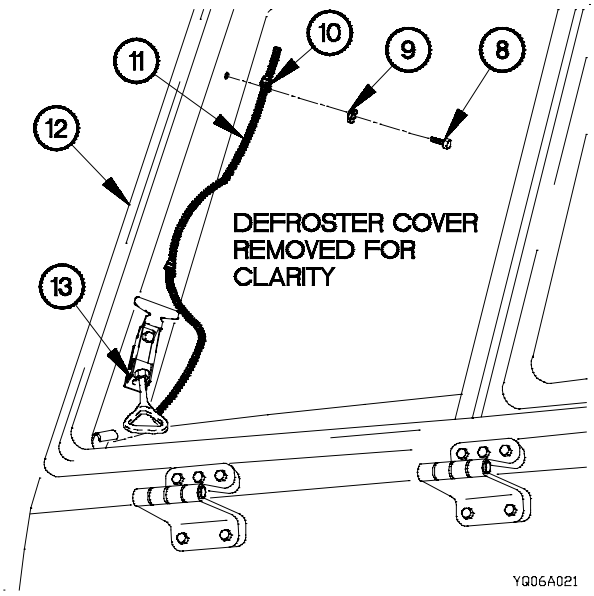
Mark position of wiper arm prior to removal.

(4) Remove wiper arm (4) from wiper arm shaft (7).

(5) Perform steps (1) through (4) on right side wiper arm.

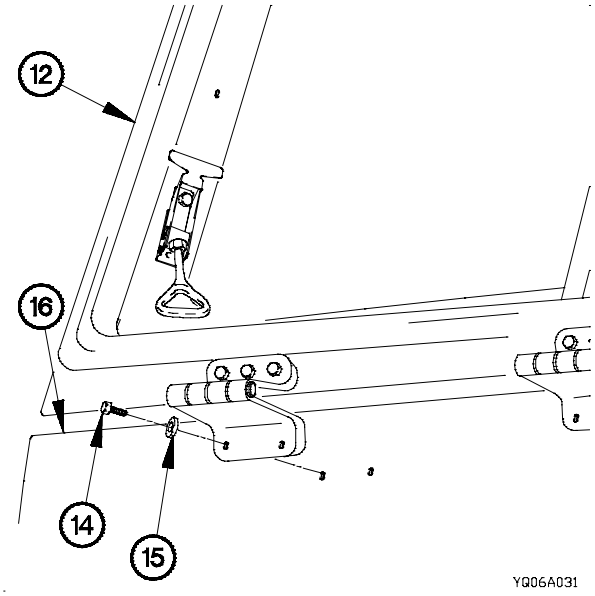



YQ06A011




(6) Remove two screws (8), washers (9), clamps (10), and cable assembly (11) from windshield frame (12).

(7) Release two latches (13) on windshield frame (12).



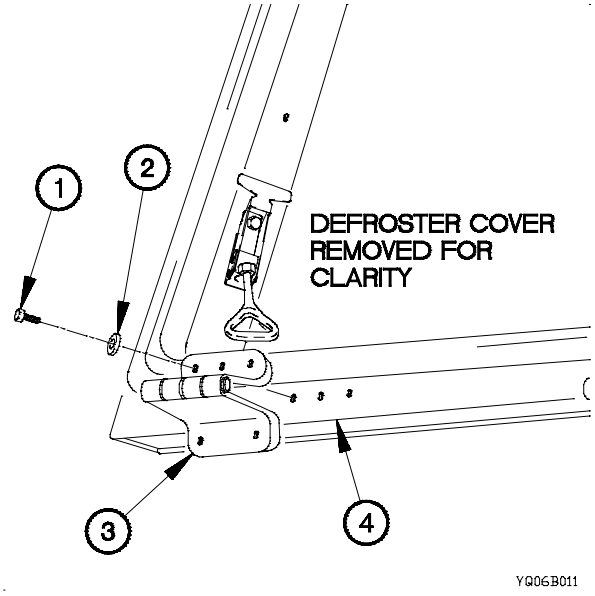

**NOTE**

Step (8) requires the aid of two assistants.

(8) Remove six bolts (14), washers (15), and windshield frame (12) from cab (16).

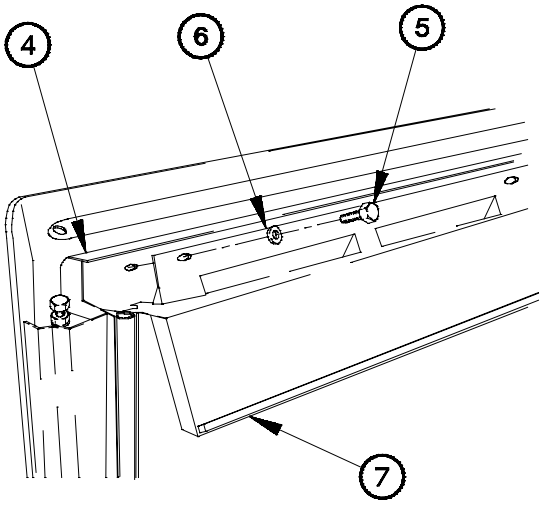
**b. Disassembly.**

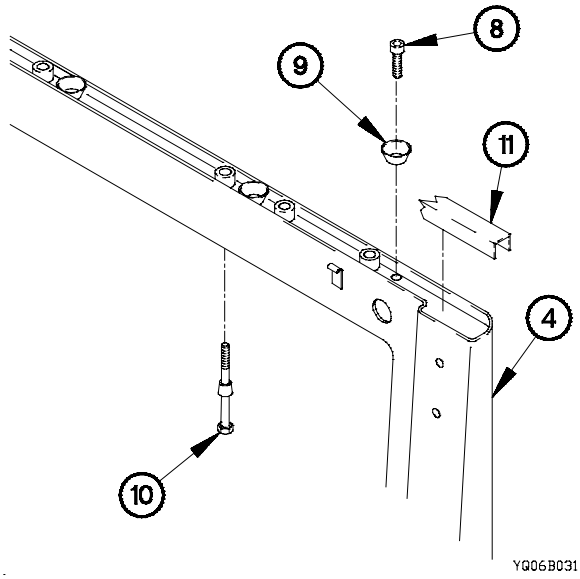
(1) Remove nine screws (1), washers (2), and three hinges (3) from windshield frame (4).



## 15-6. M1093/M1094 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

(2) Remove six screws (5), washers (6), and two defroster covers (7) from windshield frame (4).



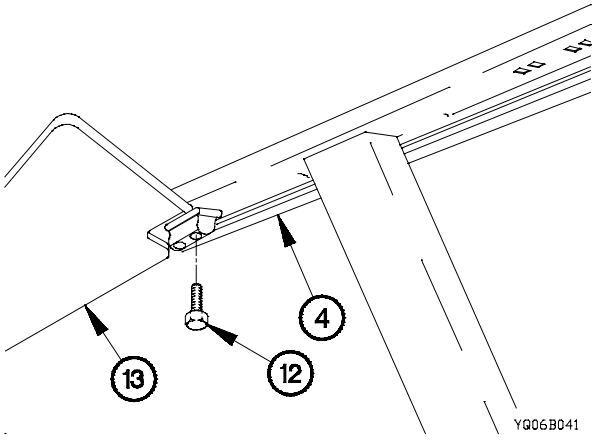




(3) Remove five screws (8) and centering cups (9) from windshield frame (4).

(4) Remove 10 captive screws (10) from windshield frame (4). Discard captive screws.

(5) Remove seal (11) from windshield frame (4). Discard seal.

(6) Remove four screws (12) and sunvisor (13) from windshield frame (4).

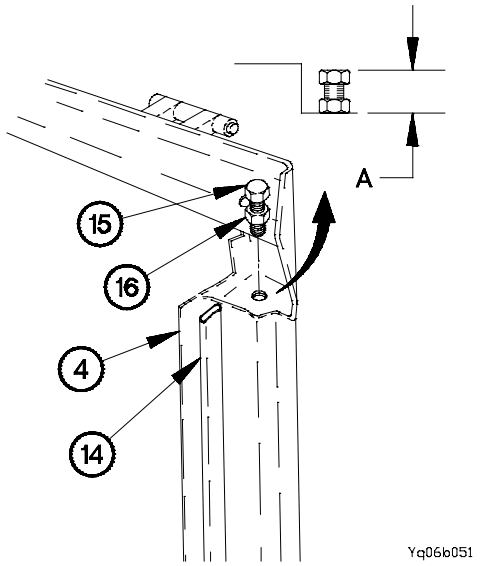


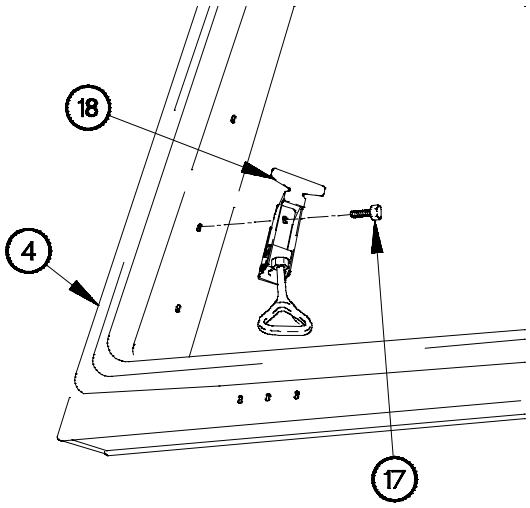
(7) Remove two seals (14) from windshield frame (4). Discard seals

(8) Record distance A on two stoppers (15).

(9) Loosen two nuts (16) on stoppers (15).

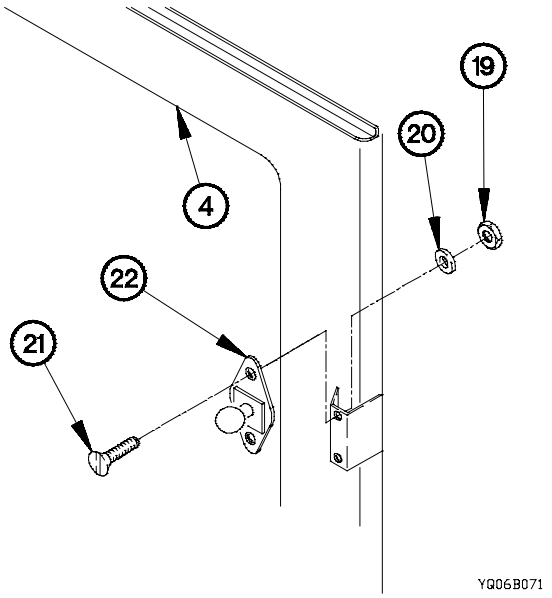
(10) Remove two stoppers (15) from windshield frame (4).




(11) Remove four screws (17) and two latches (18) from windshield frame (4).

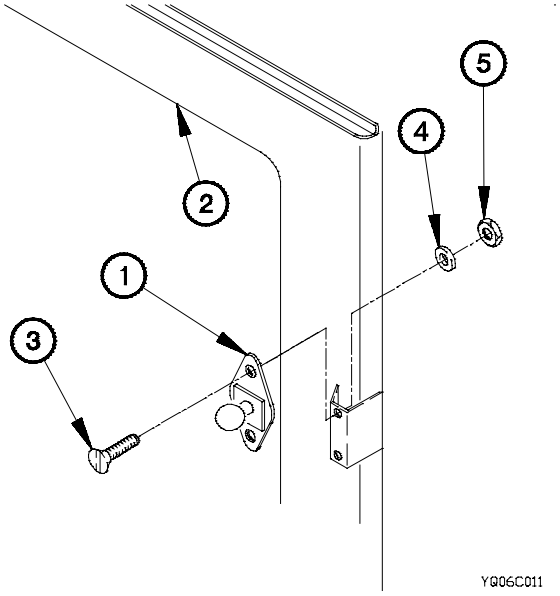
(12) Remove four nuts (19), washers (20), screws (21), and two friction catch studs (22) from windshield frame (4).

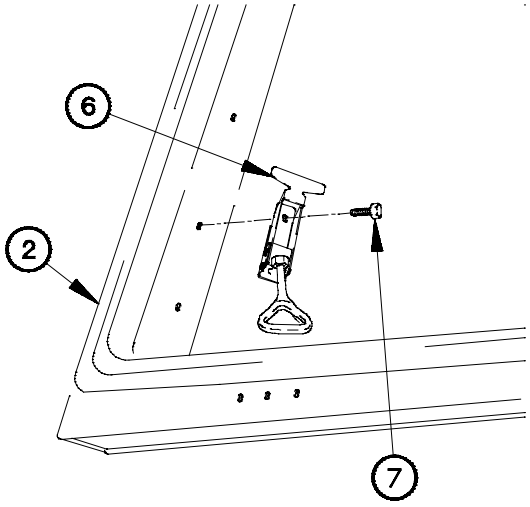


## 15-6. M1093/M1094 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

**c. Assembly.**

(1) Position two friction catch studs (1) on windshield frame (2) with four screws (3), washers (4), and nuts (5).




(2) Position two latches (6) on windshield frame (2) with four screws (7).

(3) Tighten four screws (7) to 62-124 lb-in. (7-14 N·m).

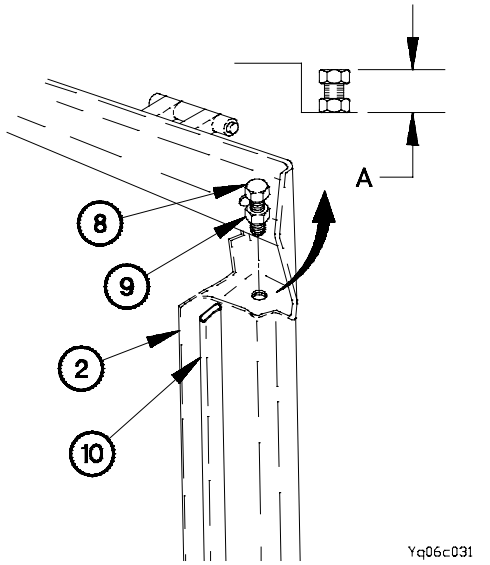
**NOTE**

Install stoppers using measurement A from disassembly.

(4) Install two stoppers (8) in windshield frame (2).

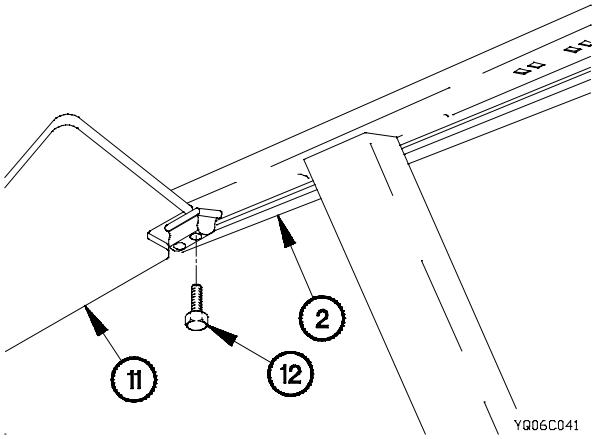
(5) Tighten two nuts (9) on stoppers (8).

(6) Install two seals (10) on windshield frame (2).



(7) Position sunvisor (11) on windshield frame (2) with four screws (12).

(8) Tighten four screws (12) to 22-27 lb-in. (2-3 N·m).



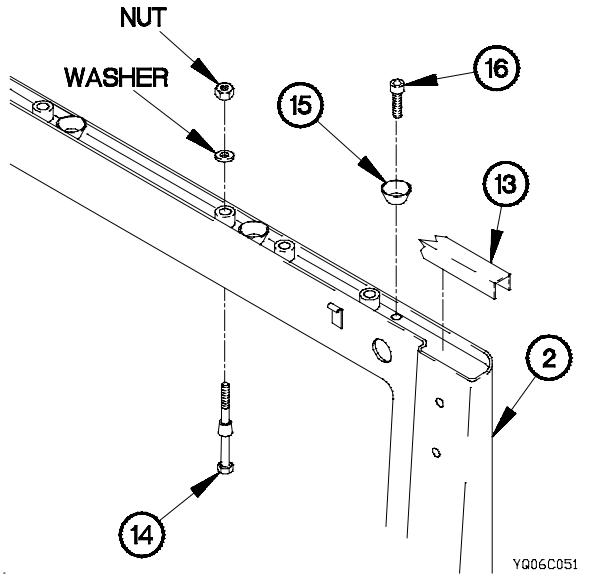

(9) Install seal (13) on windshield frame (2).

**CAUTION**

Use care when installing captive screws. Failure to comply may result in damage to equipment.

**NOTE**

- Lubricate captive screws prior to installation.
- All captive screws are installed the same way. One shown.
- Tighten nut until captive screw is seated.




(10) Install captive screw (14) in windshield frame (2) with washer and nut.

(11) Remove nut and washer from captive screw (14).

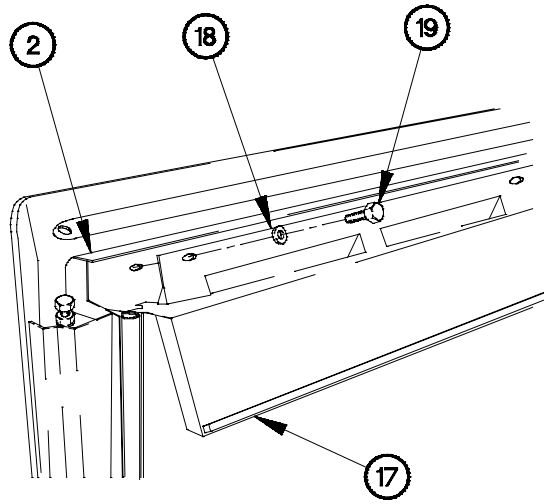
(12) Perform steps (10) and (11) on remaining nine captive screws.

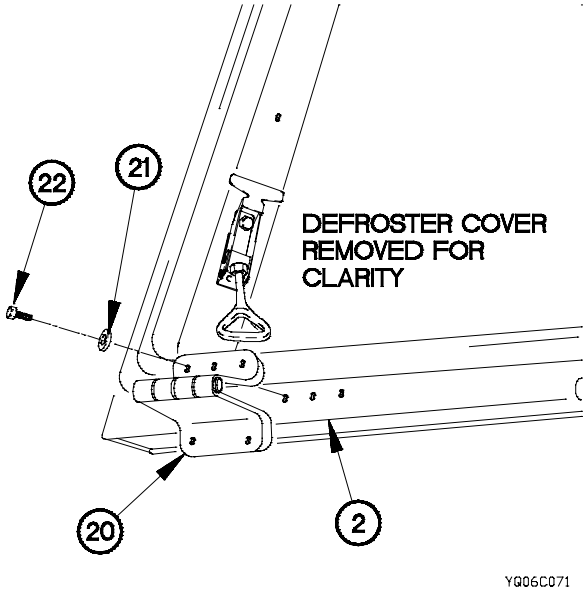
(13) Position five centering cups (15) on windshield frame (2) with five screws (16).

(14) Tighten five screws (16) to 62-124 lb-in. (7-14 N·m).

## 15-6. M1093/M1094 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

(15) Install two defrost covers (17) on windshield frame (2) with six washers (18) and screws (19).




(16) Position three hinges (20) on windshield frame (2) with nine washers (21) and screws (22).

(17) Tighten nine screws (22) to 22-28 lb-ft (30-38 N·m).

**d. Installation.**

**NOTE**

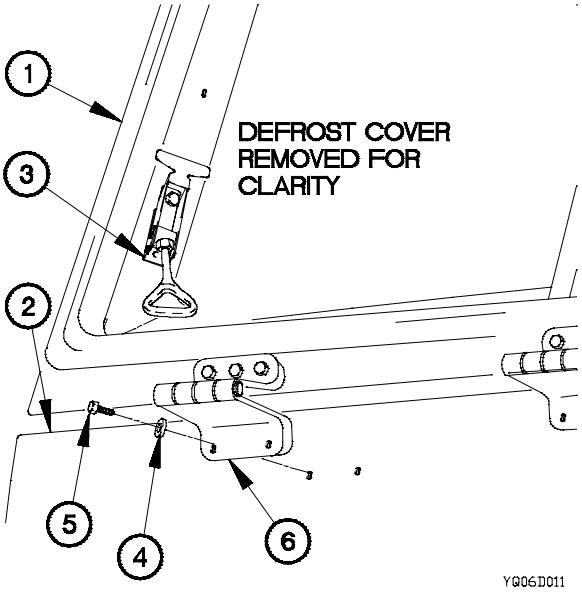
Steps (1) through (7) requires the aid of two assistants.

(1) Position windshield frame (1) on cab (2).

(2) Fasten two latches (3) to cab (2).

(3) Position six washers (4) and bolts (5) in three hinges (6).

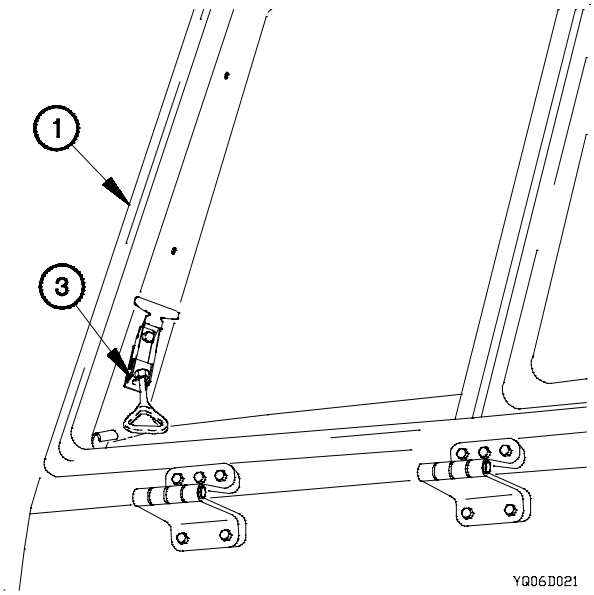
(4) Tighten six bolts (5) to 22-28 lb-ft (30-38 N·m).

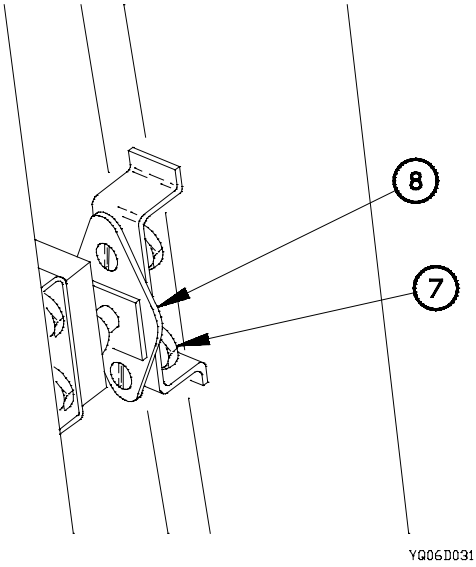


**NOTE**

Both friction catch studs are adjusted the same way. One shown.

(5) Release two latches (3) and fold down windshield frame (1).

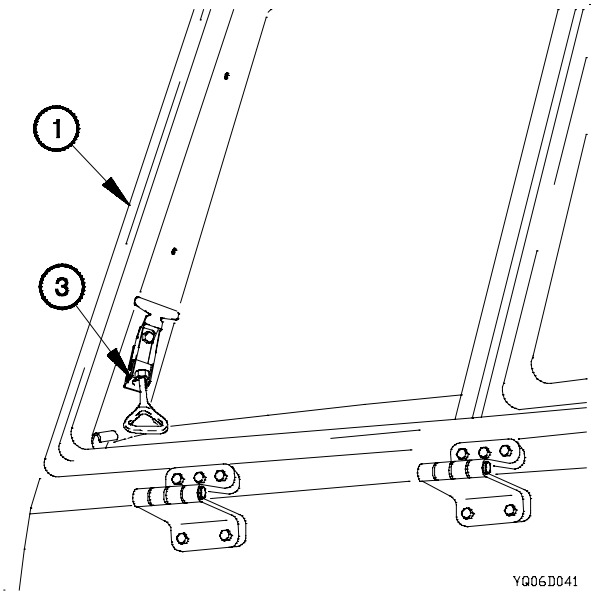



(6) Tighten two nuts (7) to 62-124 lb-in. (7-14 N·m).

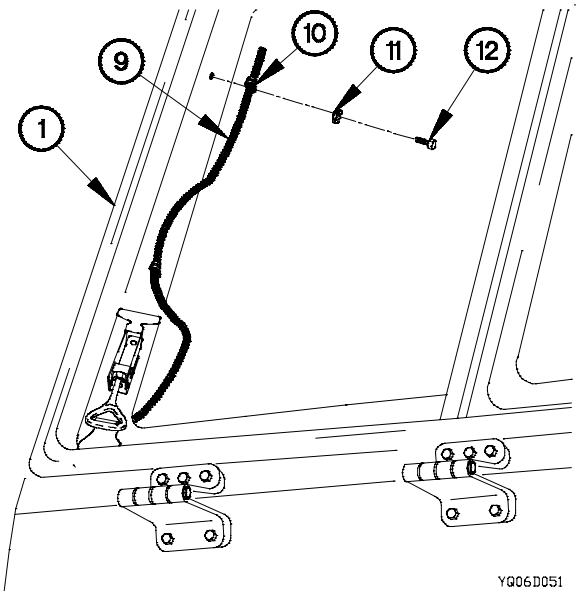
(7) Perform step (6) on remaining friction catch stud (8).

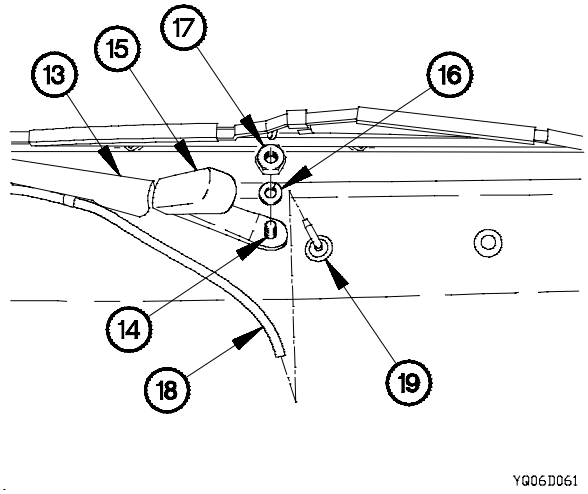
(8) Fold up windshield frame (1) and fasten two latches (3).



## 15-6. M1093/M1094 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

(9) Install cable assembly (9) on windshield frame (1) with two clamps (10), washers (11), and screws (12).




**NOTE**

Left and right side wiper arms are installed the same way. Left side shown.

(10) Position wiper arm (13) on wiper arm shaft (14).

(11) Lift cover (15) and install lockwasher (16) and nut (17) on wiper arm shaft (14).

(12) Snap cover (15) in place on wiper arm (13).

(13) Connect windshield washer hose (18) to fitting (19).

**e. Follow-On Maintenance.**

(1) Install cab windshield (para 15-7).

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

**End of Task.**

## 15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT

This task covers:

a. Windshield Removal
b. Cab Side Window Removal
c. Door Side Window Removal
d. Windshield Installation
e. Cab Side Window Installation
f. Door Side Window Installation
g. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Windshield wipers removed (windshield replacement only) (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Setting Tool, Windshield (TM 9-2320-366-20)
Gloves, Rubber (Item 26, Appendix B)
Hammer, Hand, Soft Head (Item 33, Appendix B)

**Materials/Parts**
Bucket, Mop (Item 16, Appendix C)
Rubber Lubricant Emulsion (Item 52.1, Appendix C)
Twine, Fibrous (Item 93, Appendix C)
Cleaning Compound, Windshield (Item 20, Appendix C)

**Personnel Required**
(2)

**WARNING**

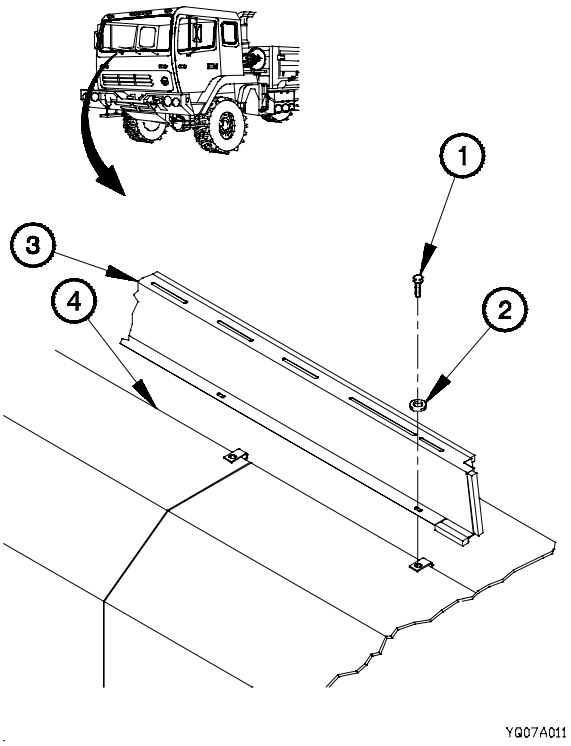
**Goggles and gloves must be worn when working with glass. Failure to comply may result in injury to personnel.**

**a. Windshield Removal.**

**NOTE**

Perform step (1) on all vehicles except M1093/M1094.

(1) Remove six screws (1), washers (2), and defrost cover (3) from dashboard (4).

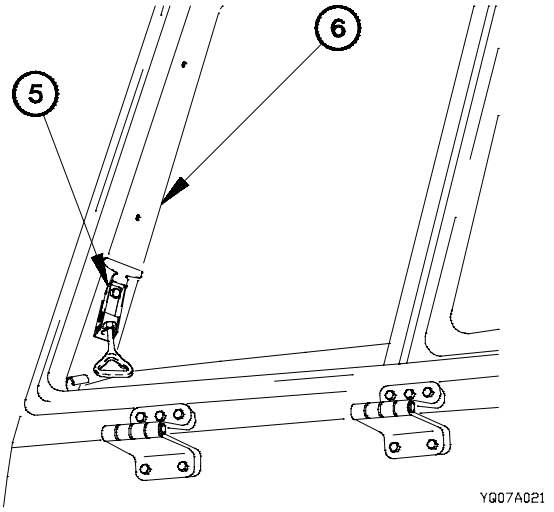


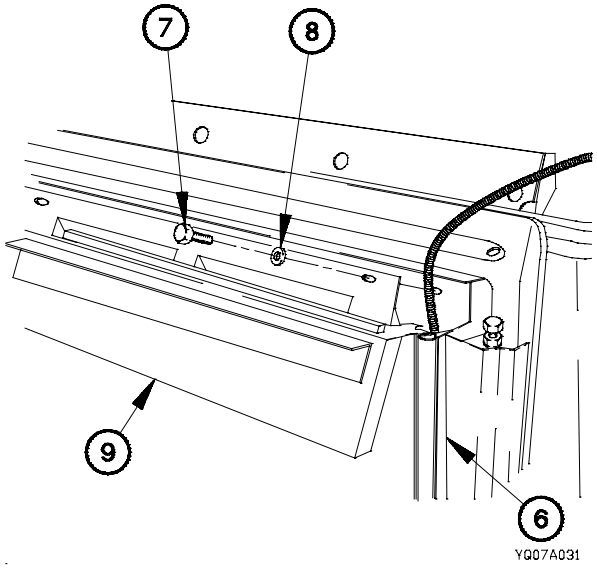
## 15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

**NOTE**

Perform steps (2) through (4) on M1093/M1094.

(2) Release two latches (5) and fold down windshield frame (6).




**NOTE**

Left and right defrost covers are removed the same way. Left defrost cover shown.

(3) Remove four screws (7), washers (8), and defrost cover (9) from windshield frame (6).

(4) Perform steps (2) and (3) on right defrost cover.

**NOTE**

- All model windshields are removed the same way. M1083 shown.
- Steps (5) through (9) require the aid of an assistant.

(5) Insert windshield setting tool under inside upper left lip of seal (10).

**NOTE**

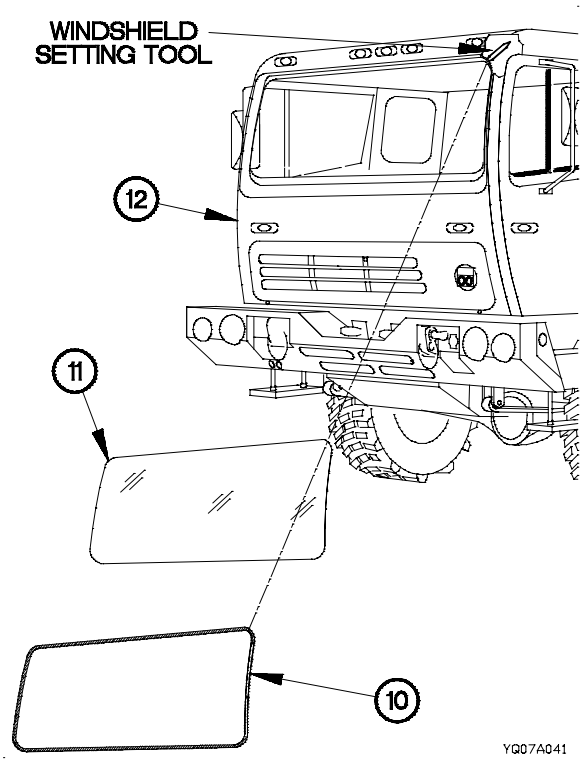
Move windshield setting tool around edge of seal as windshield is removed.

(6) Lift lip of seal (10) around windshield (11).

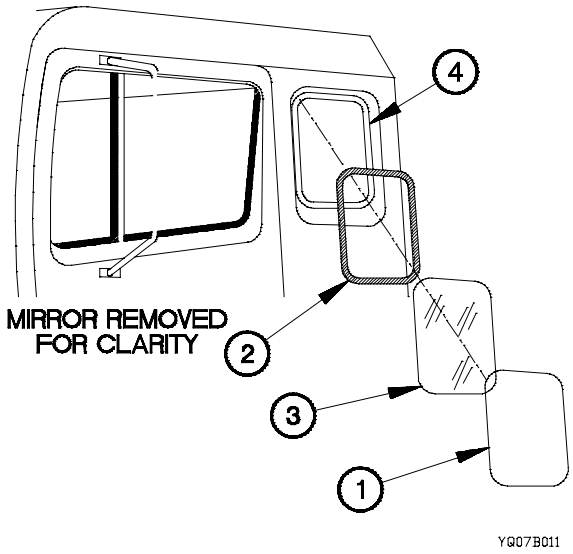
(7) Apply outward pressure to windshield (11).

(8) Remove windshield (11) from cab (12).

(9) Remove seal (10) from windshield (11).




**b. Cab Side Window Removal.**




(1) Remove rubber locking strip (1) from seal (2).

(2) Remove glass (3) from seal (2).

(3) Remove seal (2) from frame (4).

## 15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

**c. Door Side Window Removal.**

(1) Position windshield setting tool under upper corner of door side window seal (1).

**CAUTION**

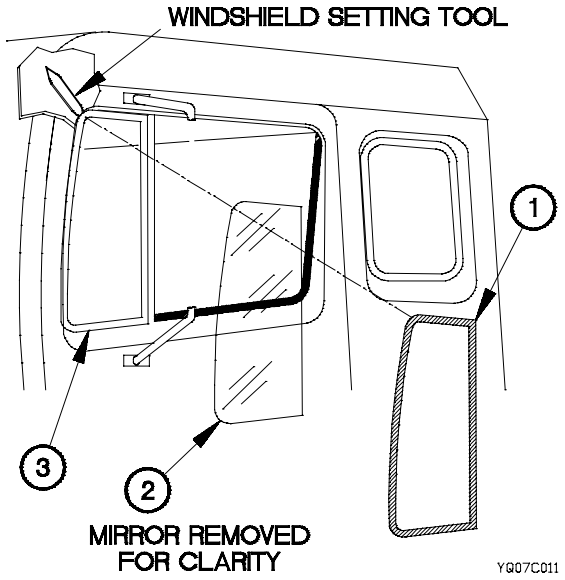
Windshield setting tool must be moved around edge of window as window is removed. Failure to comply may result in damage to equipment.

(2) Lift seal (1) around window (2).

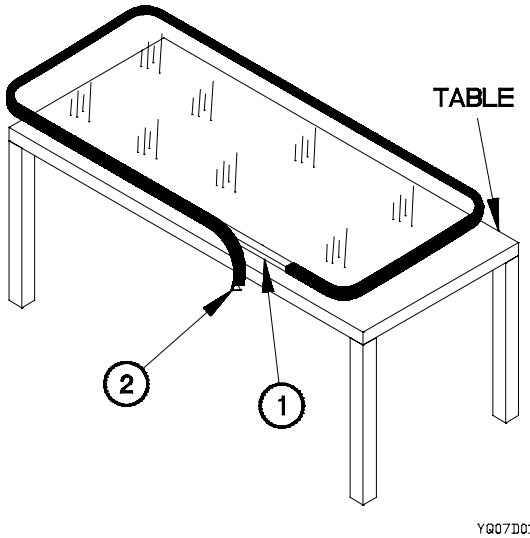
(3) Apply outward pressure to window (2).

(4) Remove window (2) from door (3).

(5) Remove seal (1) from window (2).




**d. Windshield Installation.**




**WARNING**

**Use caution when working with windshield on the table or in the cab frame. Failure to comply may result in injury to personnel or damage to equipment.**

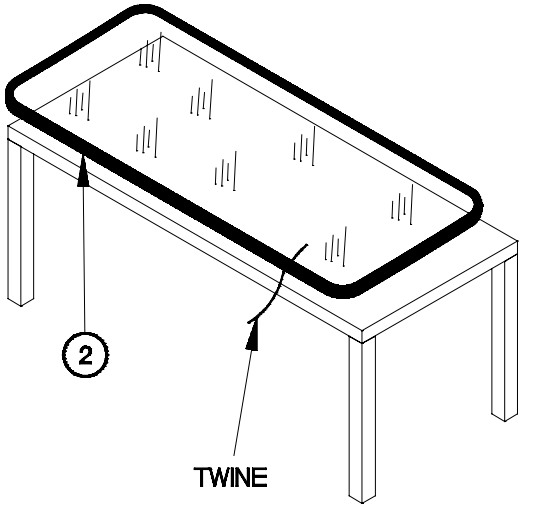
(1) Position windshield (1) on table with cab interior side of windshield facing up.

(2) Install seal (2) on windshield (1).

**NOTE**

Position twine where both ends start and finish at the bottom LH corner of seal.

(3) Position twine on seal (2) as shown.

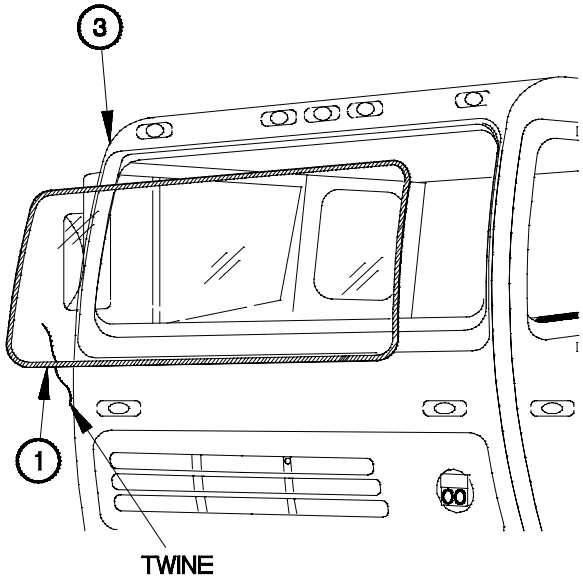



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**WARNING**

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

(4) Apply lubrication compound to seal (2).




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**NOTE**

Steps (5) through (13) require the aid of an assistant.

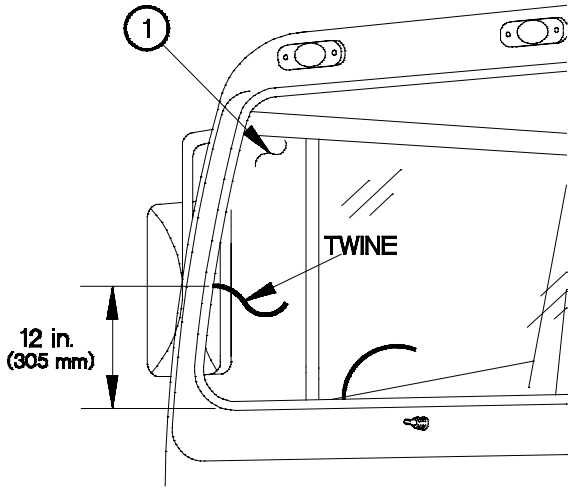
(5) Position windshield (1) in cab (3).

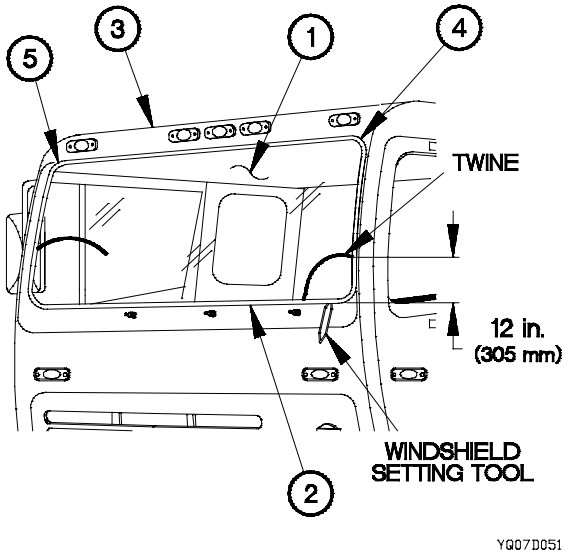
## 15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

**CAUTION**

While twine is being removed from inside of cab, always tap behind the twine (with soft head hammer) on outside of cab to seat seal. Always start from RH lower part of windshield and work to the LH side of vehicle. DO NOT start tapping at the middle of the windshield. Failure to comply may result in damage to equipment.

(6) Remove RH side of twine until twine is 12 in. (305 mm) up RH side on windshield (1) as shown.




(7) Remove LH side of twine until twine is 12 in. (305 mm) up LH side of windshield (1) as shown.

**CAUTION**

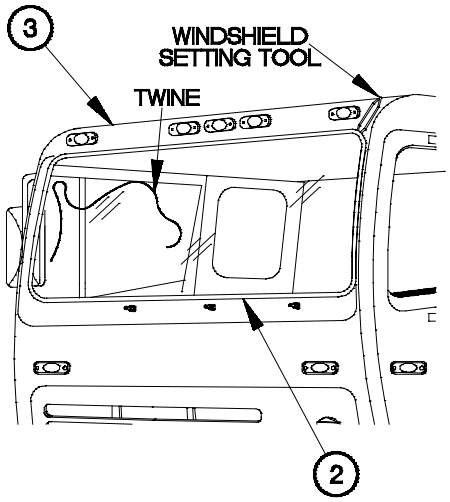
After using windshield setting tool, tap bottom section of seal lightly with soft head hammer to ensure proper fit with cab. Use caution not to hit glass. Failure to comply may result in damage to equipment.

(8) Insert bottom of seal (2) evenly with cab (3) using windshield setting tool and soft head hammer.

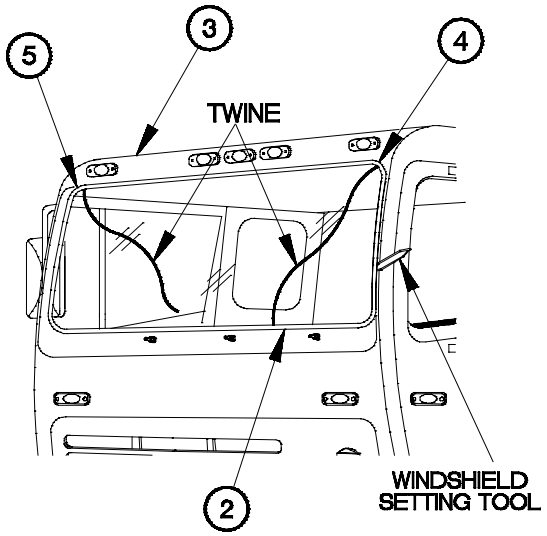
(9) Pull down on LH and RH top corners (4 and 5) of windshield (1).

(10) Pull LH and RH ends of twine up to top corners (4 and 5) of windshield (1) as shown.

(11) Insert sides of seal (2) evenly with cab (3) using windshield setting tool and soft head hammer.




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YQ07D061

(12) Pull LH side of twine over to RH side of cab (3) until completely removed from seal (2).

(13) Insert top of seal (2) evenly with cab (3) using windshield setting tool and rubber hammer.

**NOTE**

Start at lower RH side of windshield

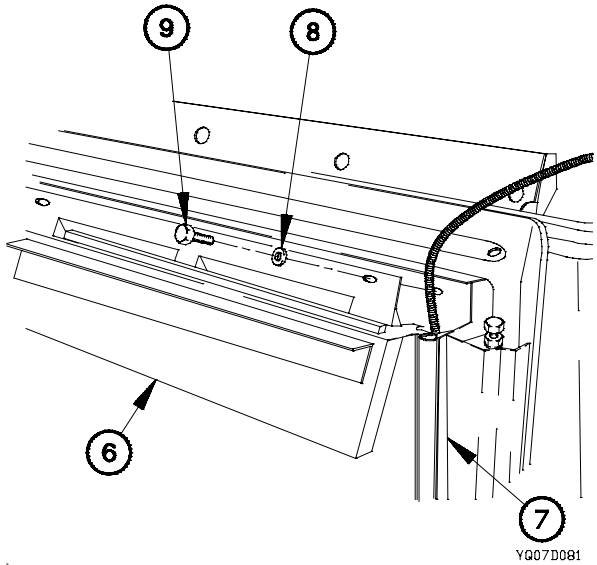
(14) Check seal (2) for proper installation, adjust as required with windshield setting tool and soft head hammer.

**NOTE**

- Perform steps (15) through (17) on M1093/M1094.
- Left and right defrost covers are installed the same way. Left defrost cover shown.

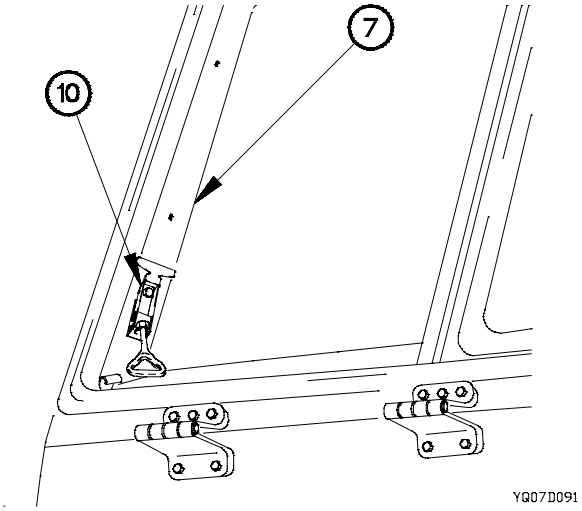
(15) Install defrost cover (6) on windshield frame (7) with four washers (8) and screws (9).

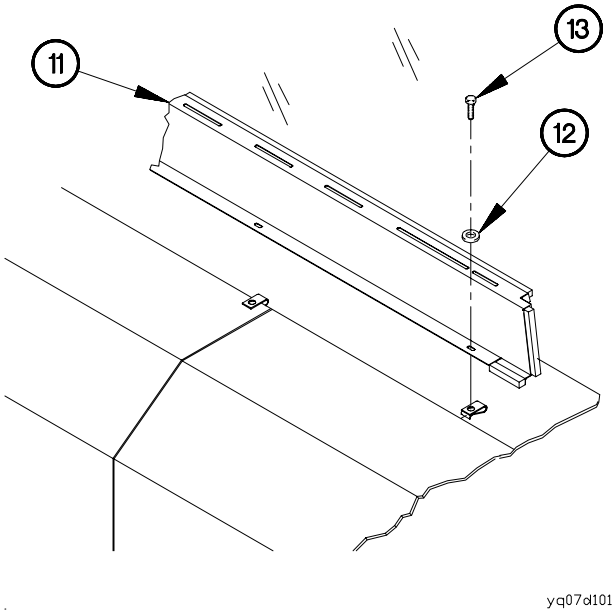
(16) Perform step (15) on right defrost cover.




YQ07D081

(17) Fold up windshield frame (7) and fasten two latches (10).




**NOTE**

Perform steps (18) and (19) on all vehicles except M1093/M1094.

(18) Position defrost cover (11) on vehicle with six washers (12) and screws (13).

(19) Tighten four screws (13) to 22-27 lb-in. (2-3 N·m).

## 15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

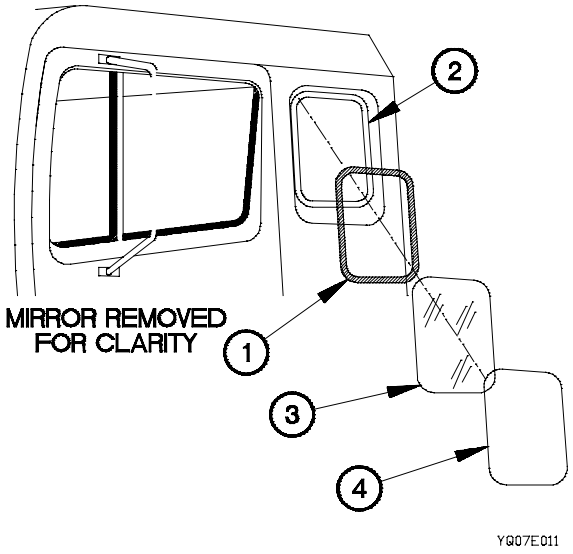
**e. Cab Side Window Installation.**

(1) Position seal (1) in side window frame (2).

(2) Position glass (3) in seal (1).

**WARNING**

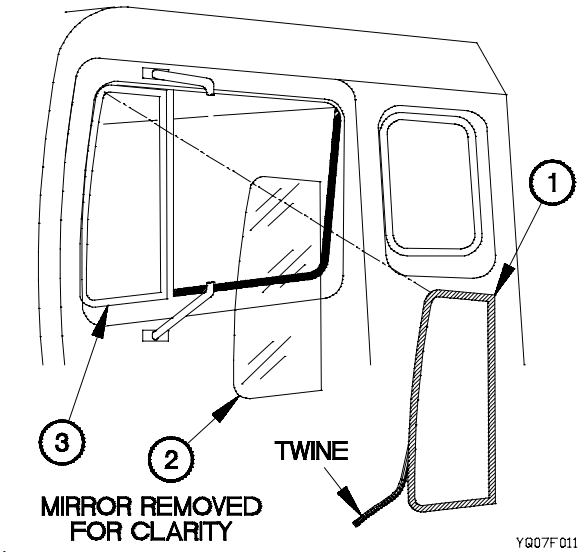
**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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




(3) Apply lubrication to locking groove in seal (1).

(4) Insert rubber locking strip (4) in seal (1).

**f. Door Side Window Installation.**




(1) Apply lubrication to seal (1).

(2) Install seal (1) around window (2).

(3) Install twine around inside lip of seal (1).

(4) Apply lubrication to inside of seal (1).

(5) Position seal (1) and window (2) in frame (3).

(6) Smooth outer lip of seal (1) around outer frame (3).

(7) Pull twine from inside of frame (3) until seal (1) is evenly positioned.

**g. Follow-On Maintenance.**

Install windshield wipers (windshield replacement only) (TM 9-2320-366-20-5).

**End of Task.**

## 15-8. M1090 REAR FENDER MOUNTING BRACKET AND EXTENSION BRACKET REPLACEMENT

**This task covers:**

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

**INITIAL SETUP**

**Equipment Conditions**
Dump body raised to maintenance position (TM 9-2320-366-10-1).
Rear fender 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)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)

**Tools and Special Tools (Cont)**
Wrench Set, Socket (Item 84, Appendix B)

**Materials/Parts**
Bolt (2) (Item 7, Appendix F)
Bolt (3) (Item 8, Appendix F)
Nut, Self-Locking (5) (Item 205, Appendix F)

**Personnel Required**
(2)

**WARNING**

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

**a. Removal.**

**CAUTION**

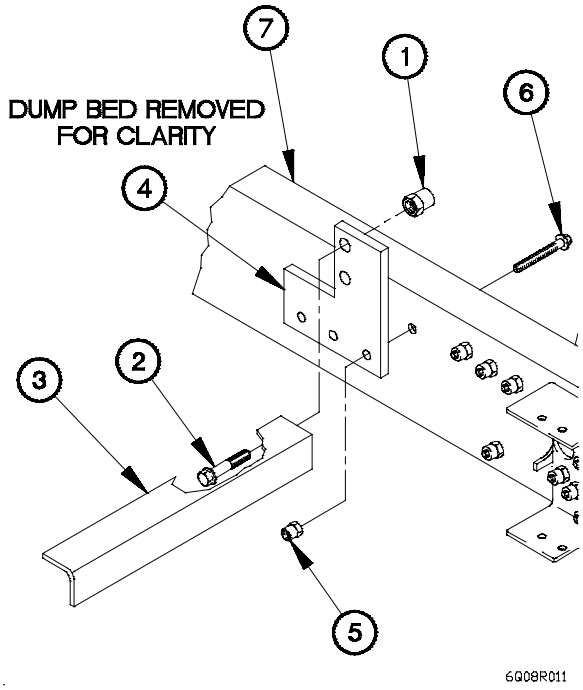
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collar to bolt.

**NOTE**

- Left and right side rear fender mounting brackets and extension brackets are removed the same way. Left side shown.
- Steps (1) and (2) require the aid of an assistant.

(1) Remove two collars (1), bolts (2), and extension bracket (3) from rear fender mounting bracket (4). Discard collars and bolts.

(2) Remove three collars (5), bolts (6), and rear fender mounting bracket (4) from frame rail (7). Discard collars and bolts.



## 15-8. M1090 REAR FENDER MOUNTING BRACKET AND EXTENSION BRACKET REPLACEMENT (CONT)

**b. Installation.**

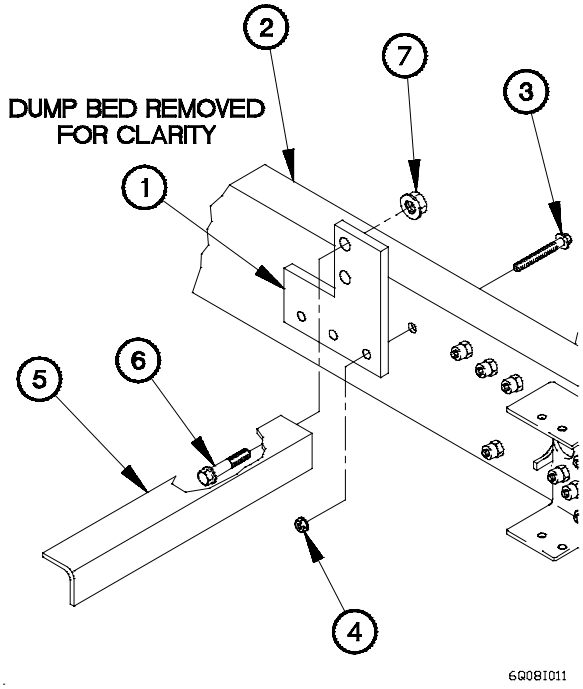
**NOTE**

- Left and right side rear fender mounting brackets and extension brackets are installed the same way. Left side shown.
- Steps (1) through (3) require the aid of an assistant.

(1) Position rear fender mounting bracket (1) on frame rail (2) with three bolts (3) and self-locking nuts (4).

(2) Position extension bracket (5) on rear fender mounting bracket (1) with two bolts (6) and self-locking nuts (7).

(3) Tighten three self-locking nuts (4) and two self-locking nuts (7) to 149-183 lb-ft (202-248 N·m).




**c. Follow-On Maintenance.**

(1) Install rear fender (TM 9-2320-366-20-4).

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

**End of Task.**

## 15-9. CARGO BED REPLACEMENT

**This task covers:**

a. M1083/M1084 Removal
b. M1083/M1084 Installation
c. M1085/M1086 Removal
d. M1085/M1086 Installation
e. M1093 Removal
f. M1093 Installation
g. Hinge Removal
h. Hinge Installation
i. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Ladder removed (TM 9-2320-366-10-1).
Troop seats removed, if equipped (TM 9-2320-366-10-1).
Cargo cover kit removed, if equipped (TM 9-2320-366-10-1).
Cargo bed side panels removed, if equipped (TM 9-2320-366-10-1).
Outrigger pads stowage bracket removed (M1084/M1086) (TM 9-2320-366-20-5).
Air drop brackets removed (M1093) (TM 9-2320-366-10-2).
Fenders and mudflaps removed, if equipped (TM 9-2320-366-20-4).
Light Material Handling Crane (LMHC) removed, if equipped (TM 9-2320-365-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 95, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Impact, Electric (Item 88, Appendix B)
Socket Set, Impact (Item 58, Appendix B)
Sling, Cargo (2) (Item 56, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Nose Assembly (Item 38.2, Appendix B, TM 9-2320-366-20)

**Tools and Special Tools (Cont)**
Riveter, Blind Pneumatic (Item 42.1, Appendix B, TM 9-2320-366-20)
Drill Set, Twist (Item 20, Appendix B)

**Materials/Parts**
Nut, Self-Locking (20) (Item 204, Appendix F) (M1083/M1084/M1085)
Nut, Self-Locking (22) (Item 204, Appendix F) (M1086)
Nut, Self-Locking (14) (Item 211, Appendix F) (M1093)
Bolt (20) (Item 2, Appendix F) (M1083/M1084/M1085)
Bolt (22) (Item 2, Appendix F) (M1086)
Bolt (14) (Item 7, Appendix F) (M1093)
Nut, Self-Locking (2) (Item 209, Appendix F)
Nut, Self-Locking (2) (Item 211, Appendix F)
Washer, Lock (24) (Item 166, Appendix F) (M1093)
Nut, Self-Locking (6) (Item 182, Appendix F) (M1093)
Nut, Self-Locking (4) (Item 208, Appendix F)
Rivet, Blind (12) (Item 364.1, Appendix F)

**Personnel Required**
(4)

**References**
TM 43-0139

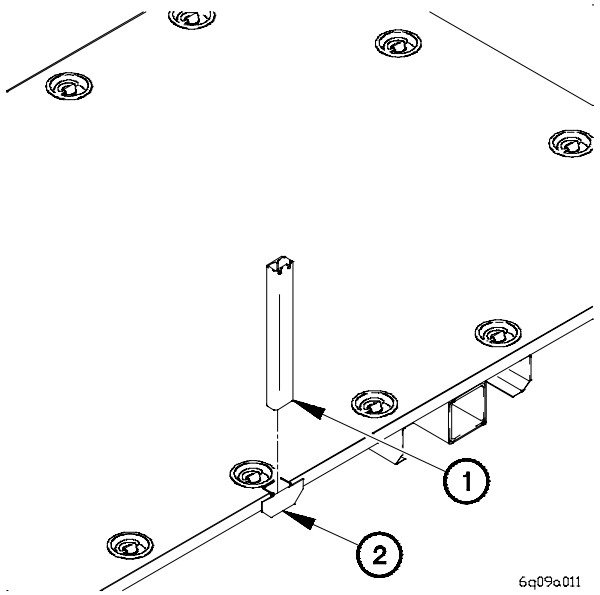
## 15-9. CARGO BED REPLACEMENT (CONT)

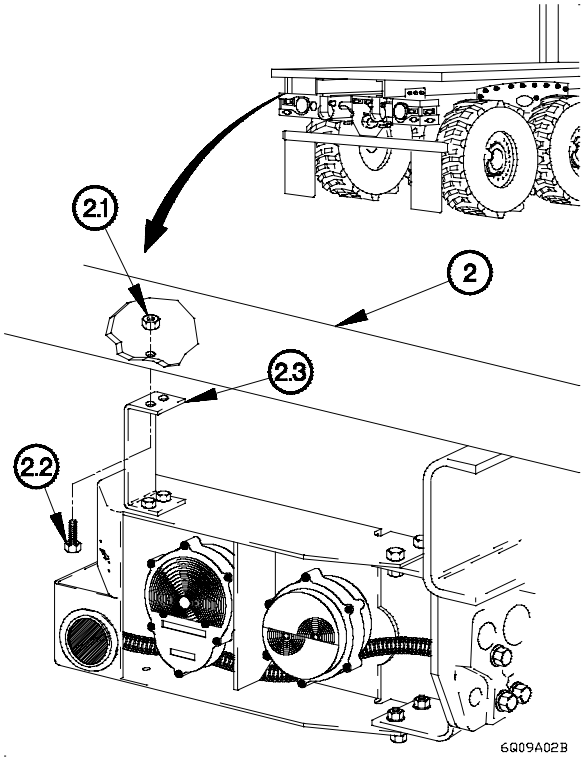
**WARNING**

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

**a. M1083/M1084 Removal.**

(1) Remove four stake posts (1) from cargo bed (2).




**NOTE**

Left and right braces are removed the same way. Left side brace shown.

(1.1) Remove self-locking nut (2.1) and screw (2.2) from bracket (2.3) and cargo bed (2). Discard self-locking nut.

(1.2) Perform step (1.1) on right side brace.

**CAUTION**

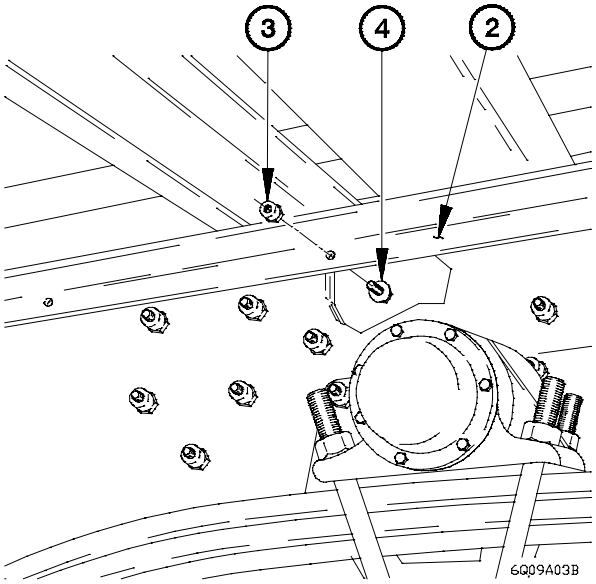
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collars to bolts.

**NOTE**

- Left and right side of cargo bed is removed the same way. Left side shown.
- Step (2) requires the aid of an assistant.

(2) Remove 10 collars (3) and bolts (4) from cargo bed (2). Discard collars and bolts.

(3) Perform step (2) on right side of cargo bed.



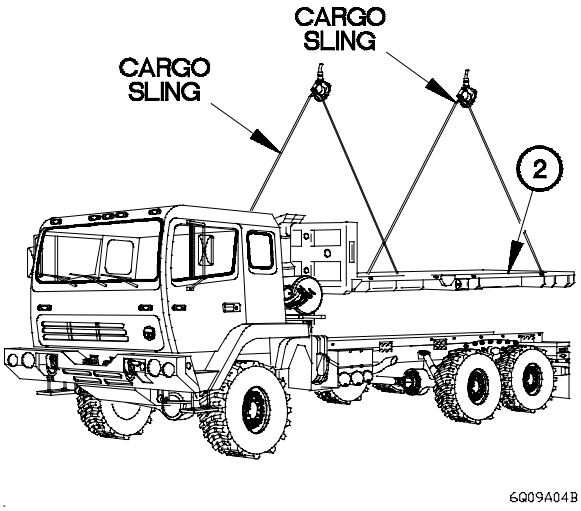

**WARNING**

**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.**

**NOTE**

Step (4) require the aid of three assistants.

(4) Remove cargo bed (2) from vehicle.




**b. M1083/M1084 Installation.**

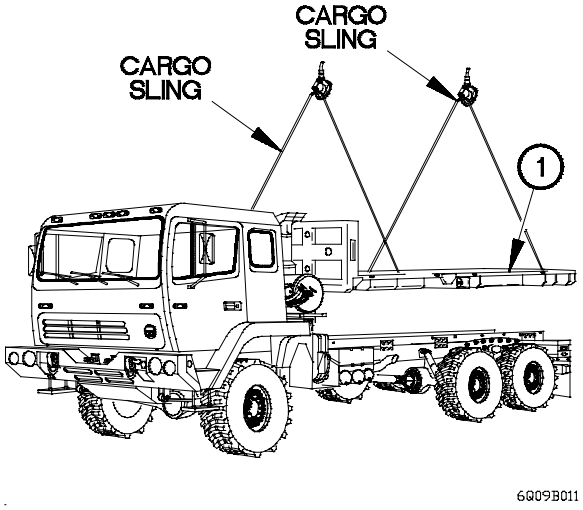
**WARNING**

**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.**

**NOTE**

Step (1) requires the aid of three assistants.

(1) Position cargo bed (1) on vehicle.



## 15-9. CARGO BED REPLACEMENT (CONT)

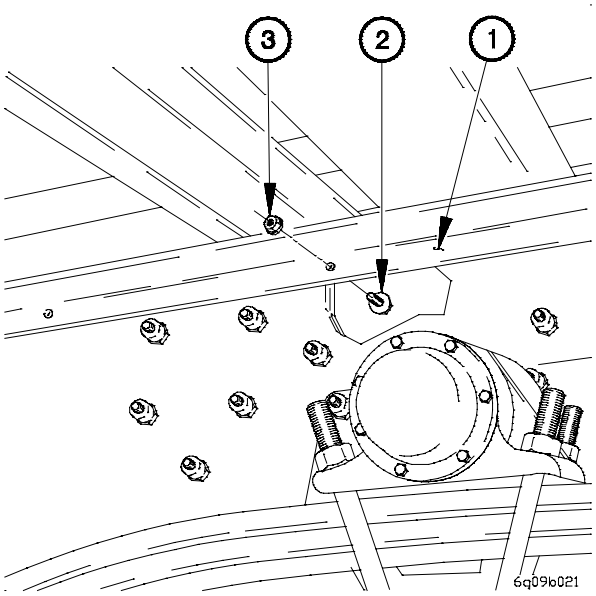
**NOTE**

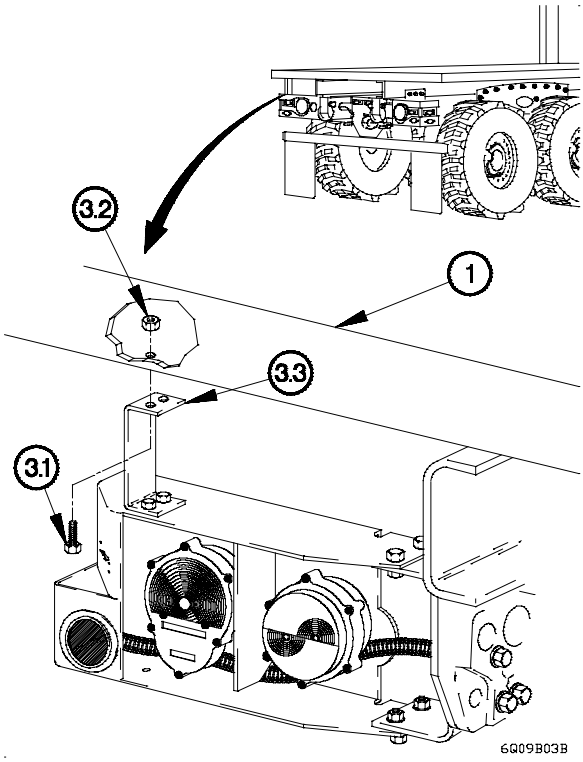
- Left and right side of cargo bed is installed the same way. Left side shown.
- Steps (2) and (3) require the aid of an assistant.

(2) Position 10 bolts (2) and self-locking nuts (3) in cargo bed (1).

(3) Tighten 10 bolts (2) to 77-92 lb-ft (105-125 N·m).

(4) Perform steps (2) and (3) on right side of cargo bed.



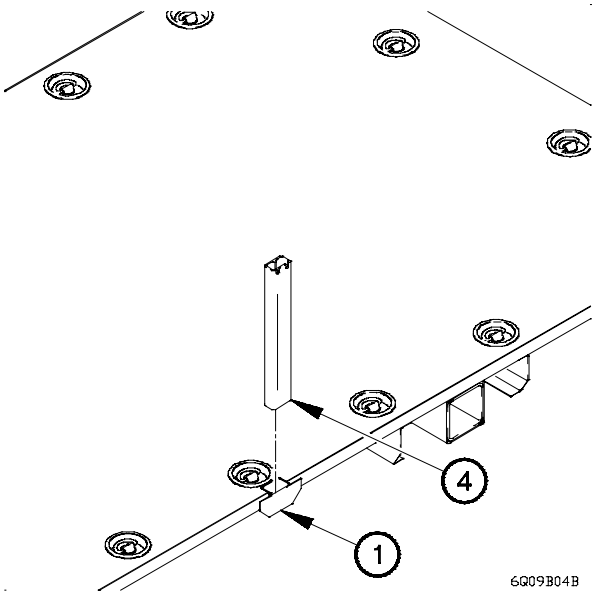

**NOTE**

Left and right braces are installed the same way. Left side brace shown.

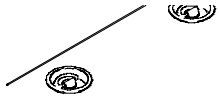
(4.1) Position screw (3.1) and self-locking nut (3.2) in bracket (3.3) and cargo bed (1).

(4.2) Tighten screw (3.1) to 46 lb-ft (64 N·m).

(4.3) Perform steps (4.1) and (4.2) on right side brace.

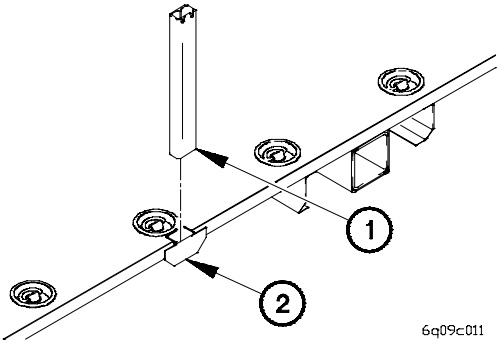


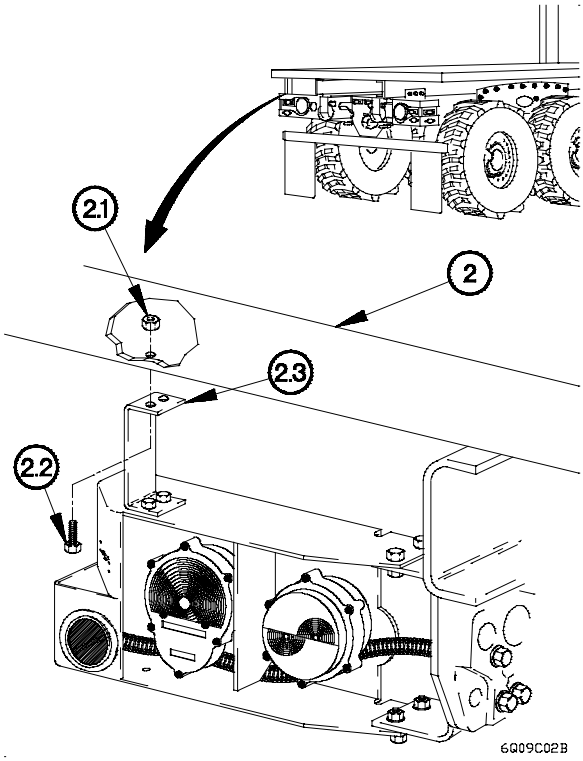

(5) Install four stake posts (4) in cargo bed (1).



**c. M1085/M1086 Removal.**

(1) Remove six stake posts (1) from cargo bed (2).




**NOTE**

Left and right braces are removed the same way. Left side brace shown.

(1.1) Remove self-locking nut (2.1) and screw (2.2) from brace (2.3) and cargo bed (2). Discard self-locking nut.

**CAUTION**

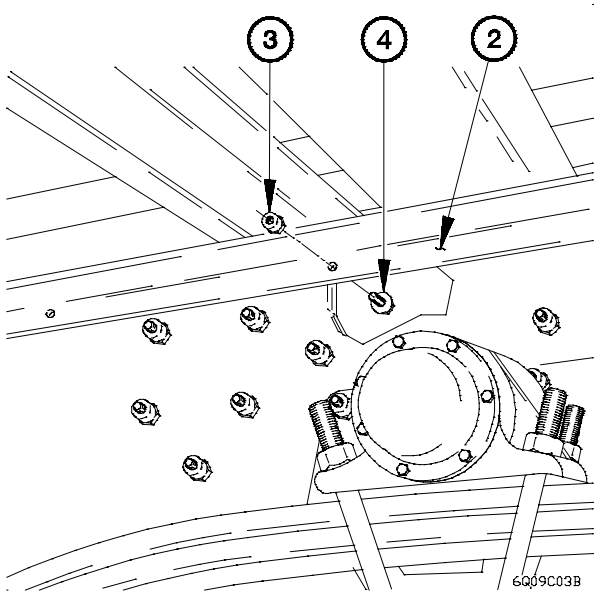
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collars to bolts.

**NOTE**

- Perform steps (2) and (3) on M1085.
- Left and right sides of cargo bed are removed the same way. Left side shown.
- Step (2) requires the aid of an assistant.

(2) Remove 10 collars (3) and bolts (4) from cargo bed (2).

(3) Perform step (2) on right side of cargo bed.



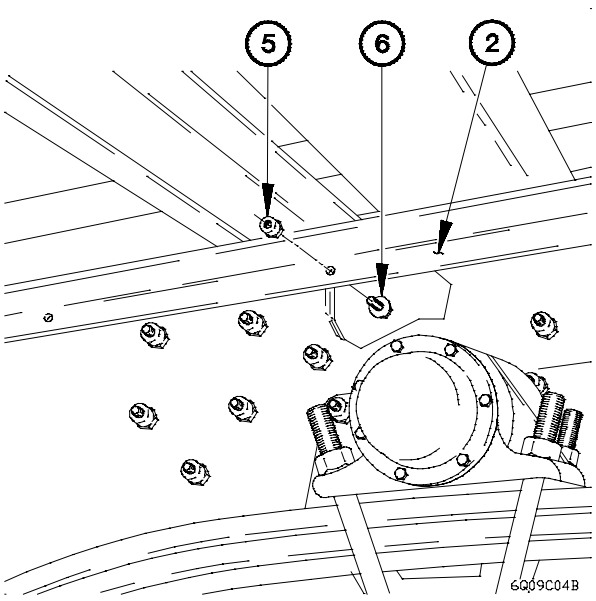
## 15-9. CARGO BED REPLACEMENT (CONT)

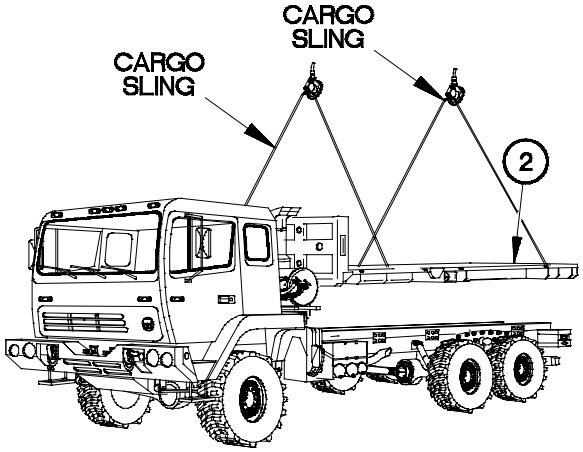
**NOTE**

- Perform steps (4) and (5) on M1086.
- Left and right sides of cargo bed are removed the same way. Left side shown.
- Step (4) requires the aid of an assistant.

(4) Remove 11 collars (5) and bolts (6) from cargo bed (2).

(5) Perform step (4) on right side of cargo bed.




**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.**

**NOTE**

Step (6) requires the aid of three assistants.

(6) Remove cargo bed (2) from vehicle.

**d. M1085/M1086 Installation.**

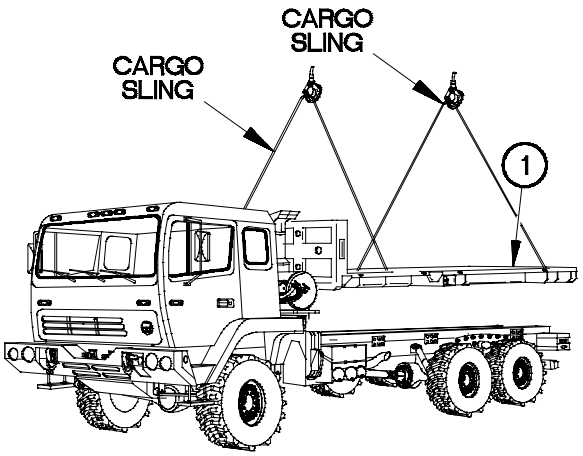
**WARNING**

**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.**

**NOTE**

Step (1) requires the aid of three assistants.

(1) Position cargo bed (1) on vehicle.



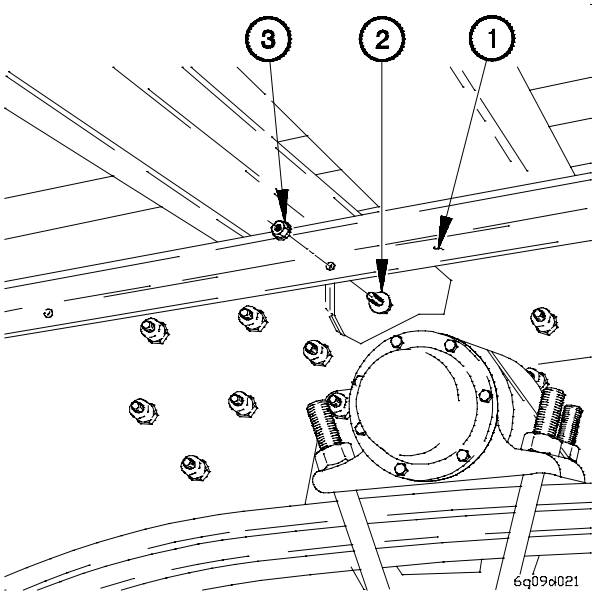
**NOTE**

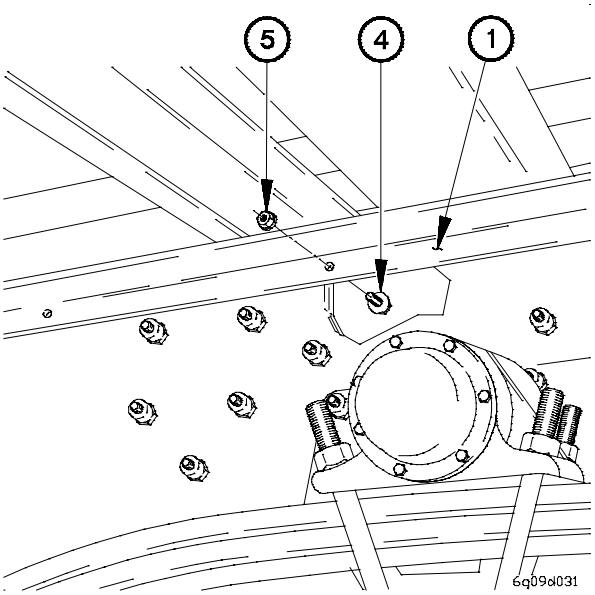
- Perform steps (2) through (4) on M1086.
- Left and right side of cargo bed is installed the same way. Left side shown.
- Steps (2) and (3) require the aid of an assistant.

(2) Position 11 bolts (2) and self-locking nuts (3) in cargo bed (1).

(3) Tighten 11 bolts (2) to 77-92 lb-ft (105-125 N·m).

(4) Perform steps (2) and (3) on right side of cargo bed.




**NOTE**

- Perform steps (5) through (7) on M1085.
- Left and right side of cargo bed is installed the same way. Left side shown.
- Steps (5) and (6) require the aid of an assistant.

(5) Position 10 bolts (4) and self-locking nuts (5) in cargo bed (1).

(6) Tighten 10 self-locking nuts (5) to 77-92 lb-ft (105-125 N·m).

(7) Perform steps (5) and (6) on right side of cargo bed.

## 15-9. CARGO BED REPLACEMENT (CONT)

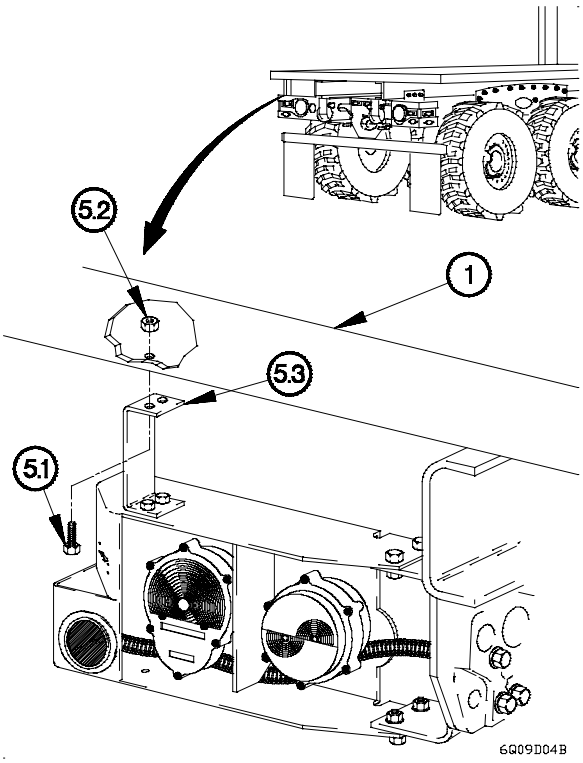
**NOTE**

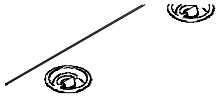
Left and right braces are installed the same way. Left side brace shown.

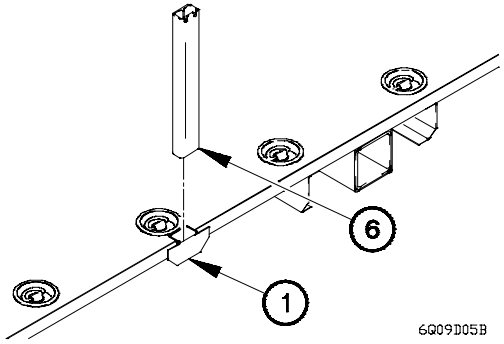
(7.1) Position screw (5.1) and self-locking nut (5.2) in brace (5.3) and cargo bed (1).

(7.2) Tighten screw (5.1) to 47 lb-ft (64 N·m).

(7.3) Perform steps (7.1) and (7.2) on right side brace.



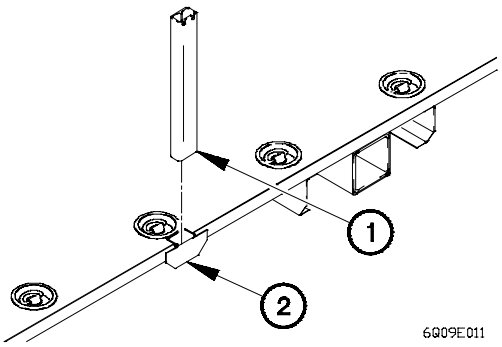



(8) Install six stake posts (6) in cargo bed (1).



**e. M1093 Removal.**

(1) Remove four stake posts (1) from cargo bed (2).

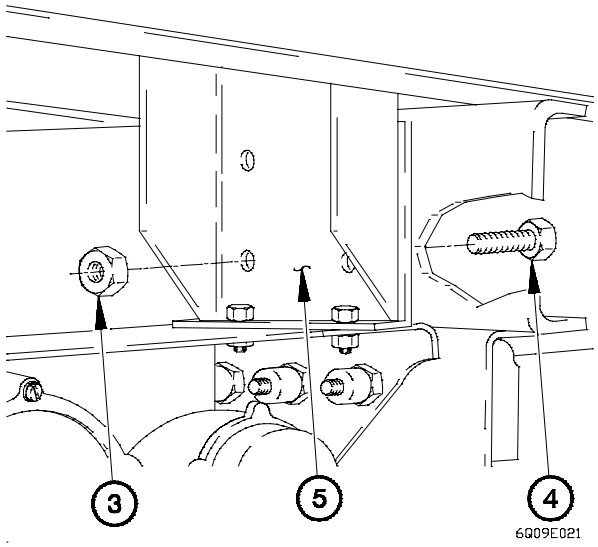


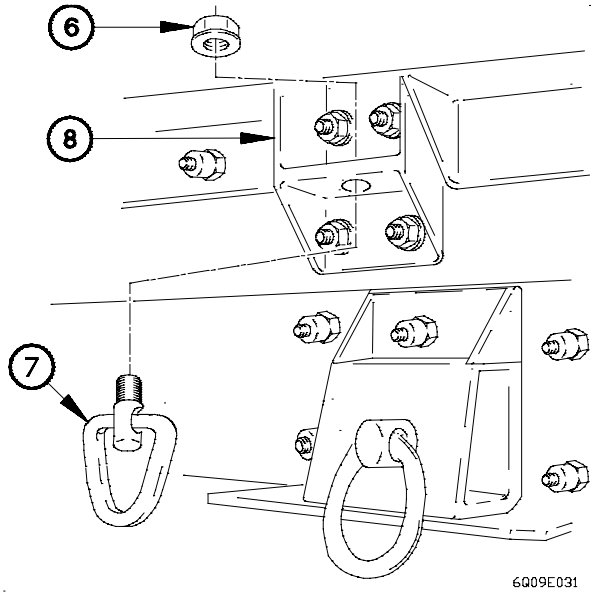
**NOTE**

- Steps (2) through (8) require the aid of an assistant.
- Left and right side brackets are disassembled the same way. Left side shown.

(2) Remove four nuts (3) and bolts (4) from bracket (5).

(3) Perform step (2) on right side bracket.

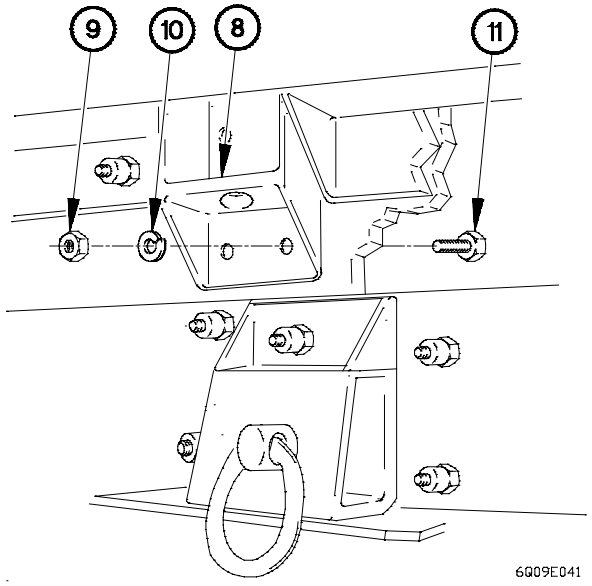



**NOTE**

All tiedown rings and brackets are removed the same way. Left rear tiedown ring and bracket shown.

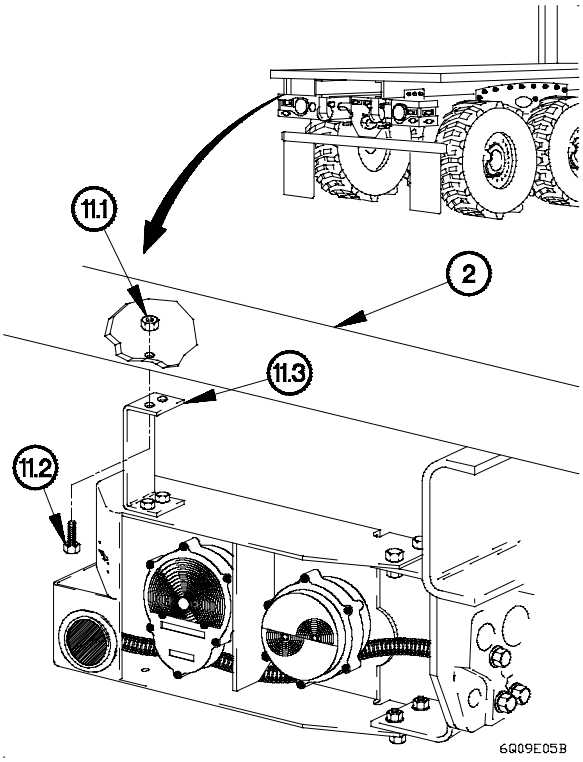
(4) Remove self-locking nut (6) and tiedown ring (7) from bracket (8). Discard self-locking nut.




(5) Remove four nuts (9), lockwashers (10), and bolts (11) from bracket (8). Discard lockwashers.

(6) Perform steps (4) and (5) on remaining tiedown rings and brackets.

## 15-9. CARGO BED REPLACEMENT (CONT)

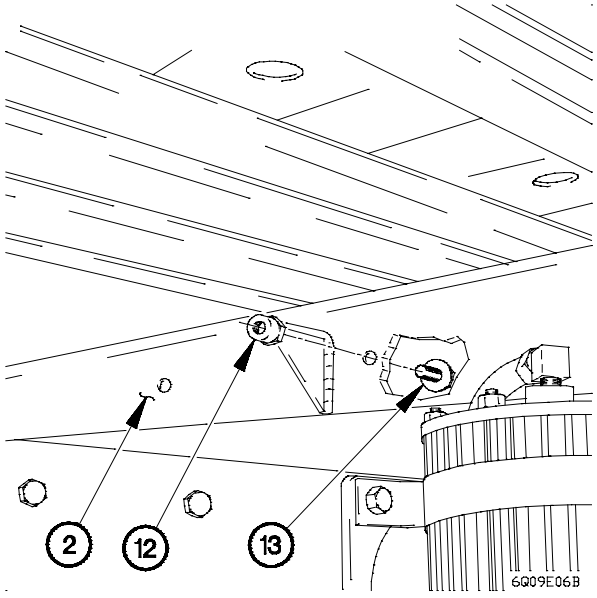



**NOTE**

Left and right braces are removed the same way. Left side brace shown.

(6.1) Remove self-locking nut (11.1) and screw (11.2) from brace (11.3) and cargo bed (2). Discard self-locking nut.

(6.2) Perform step (6.1) on right side brace.




**CAUTION**

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

**NOTE**

Left and right side of cargo bed is removed the same way. Left side shown.

(7) Remove seven collars (12) and bolts (13) from cargo bed (2).

(8) Perform step (8) on right side of cargo bed.

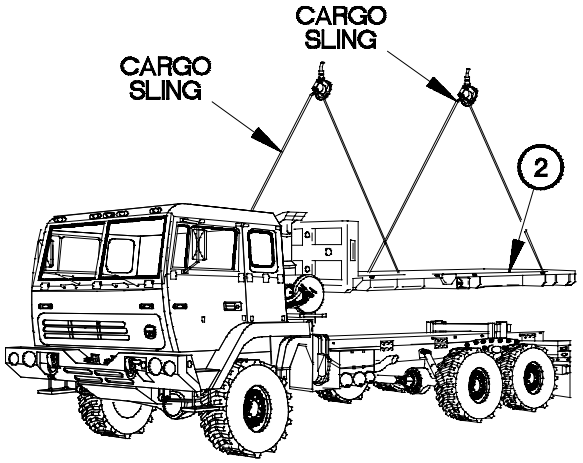
**WARNING**

**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.**

**NOTE**

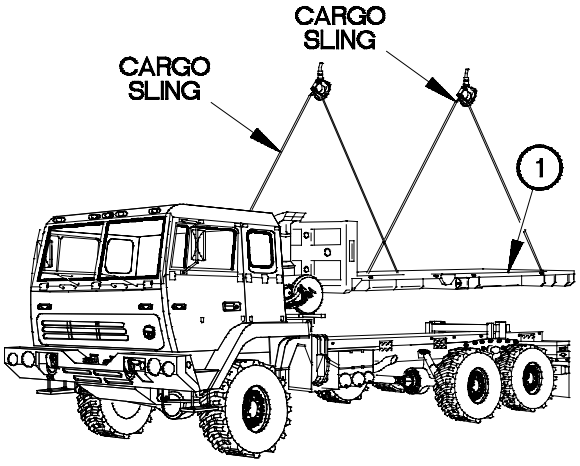
Step (9) requires the aid of three assistants.

(9) Remove cargo bed (2) from vehicle.




6Q09E07B

**f. M1093 Installation.**




6Q09F011

**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.**

**NOTE**

Step (1) requires the aid of three assistants.

(1) Position cargo bed (1) on vehicle.

## 15-9. CARGO BED REPLACEMENT (CONT)

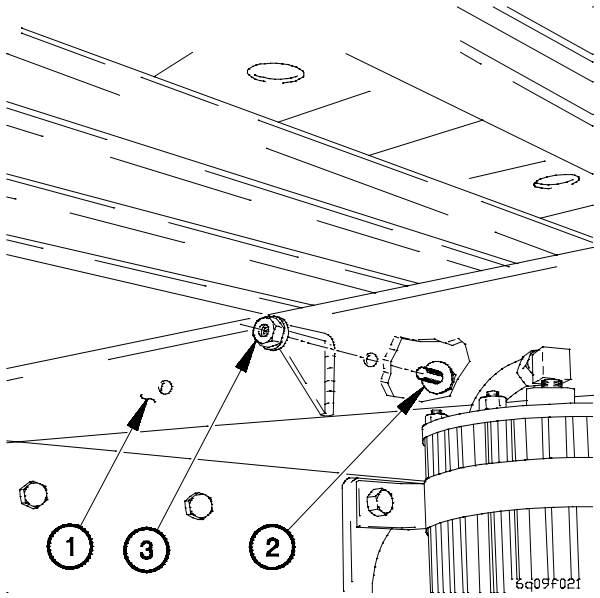
**NOTE**

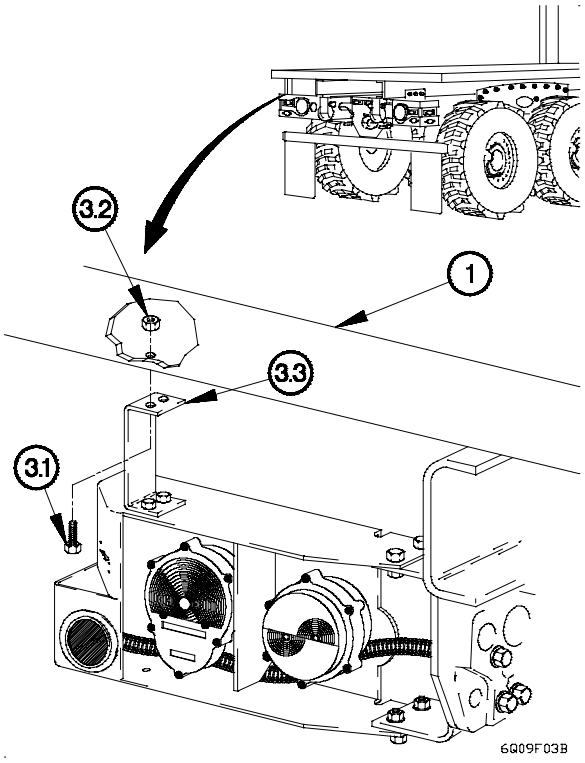
- Left and right side of cargo bed is installed the same way. Left side shown.
- Steps (2) through (11) require the aid of an assistant.

(2) Position seven bolts (2) and self-locking nuts (3) in cargo bed (1).

(3) Tighten seven self-locking nuts (3) to 210-225 lb-ft (285-305 N·m).

(4) Perform steps (2) and (3) on right side of cargo bed.




**NOTE**

Left and right braces are installed the same way. Left side brace shown.

(4.1) Position screw (3.1) and self-locking nut (3.2) on brace (3.3) and cargo bed (1).

(4.2) Tighten self-locking nut (3.2) to 47 lb-ft (64 N·m).

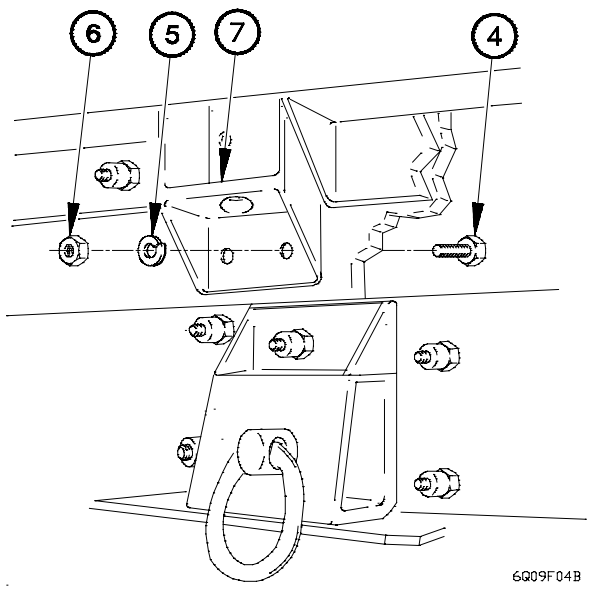
(4.3) Perform steps (4.1) and (4.2) on right side brace.

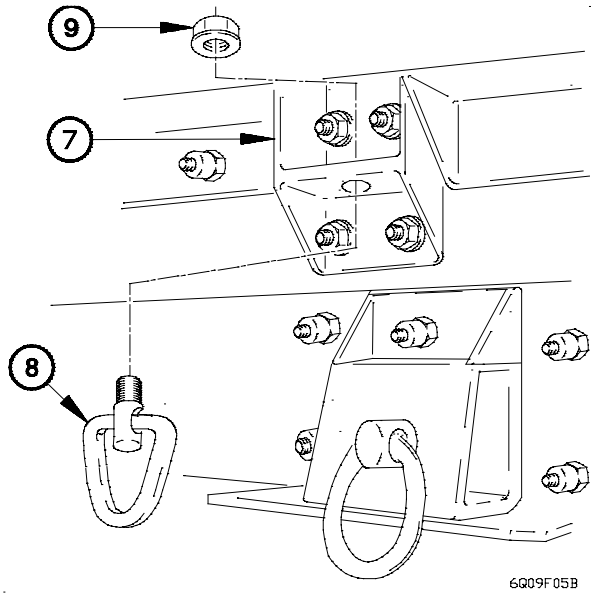
**NOTE**

All tiedown rings and brackets are removed the same way. Left rear tiedown ring and bracket shown.

(5) Position four bolts (4), lockwashers (5), and nuts (6) in bracket (7).

(6) Tighten four nuts (6) to 179-219 lb-ft (243-297 N·m).

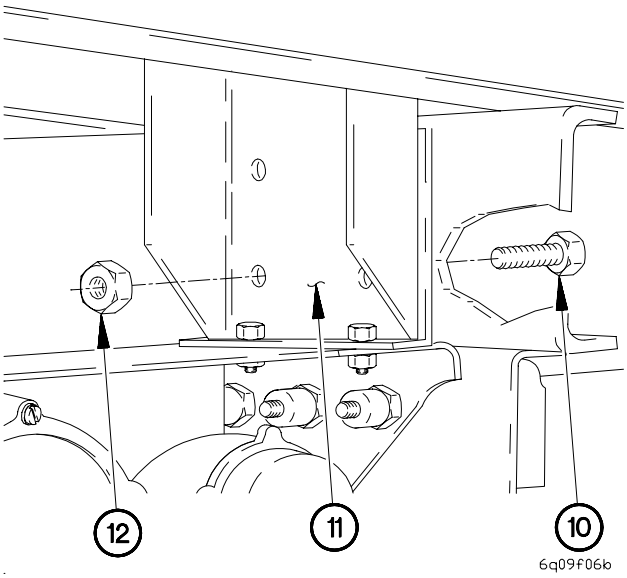





(7) Position tiedown ring (8) in bracket (7) with self-locking nut (9).

(8) Tighten self-locking nut (9) to 113-138 lb-ft (153-187 N·m).

(9) Perform steps (5) through (8) on remaining brackets and tiedown rings.




**NOTE**

Left and right side brackets are assembled the same way. Left side shown.

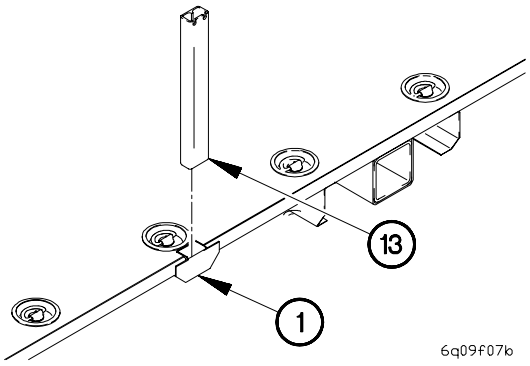
(10) Position four bolts (10) in bracket (11) with four self-locking nuts (12).

(11) Tighten four self-locking nuts (12) to 179-219 lb-ft (243-297 N·m).

(12) Perform steps (10) and (11) on right side bracket.



(13) Install four stake posts (13) in cargo bed (1).



## 15-9. CARGO BED REPLACEMENT (CONT)

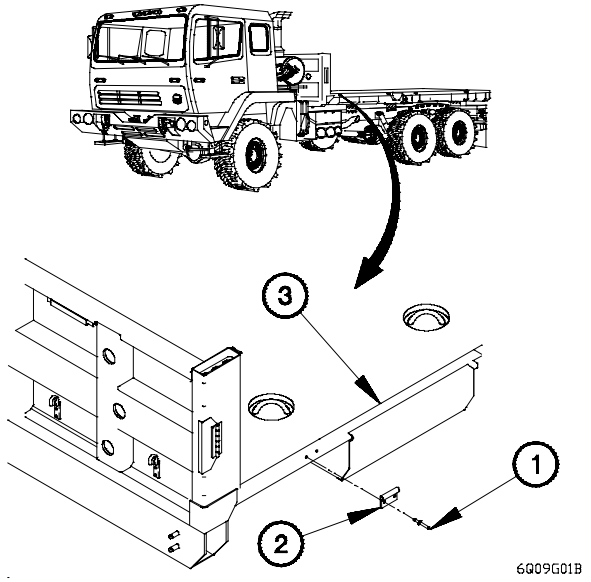
**g. Hinge Removal.**

**NOTE**

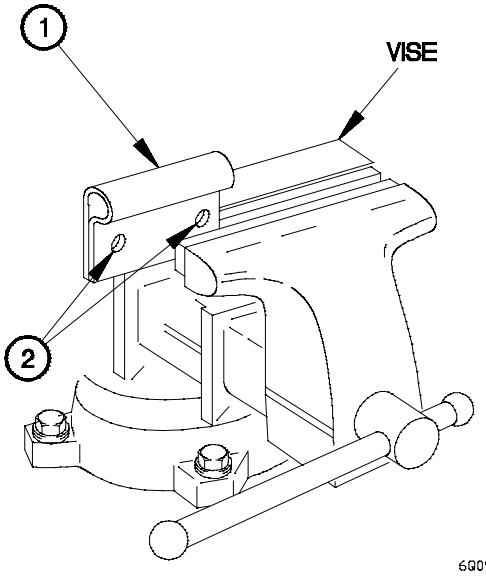
Left, right, and rear hinges are removed the same way. Left side shown.

(1) Remove two rivets (1) from hinge (2).

(2) Remove hinge (2) from cargo bed (3).




**h. Hinge Installation.**

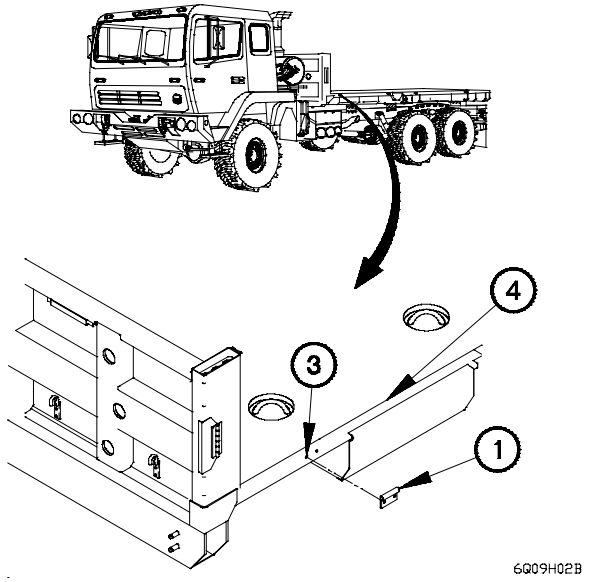



(1) Position hinge (1) in vise.

(2) Enlarge two holes (2) on hinge (1) to 0.327-0.340 in. (8.318-8.636 mm).

(3) Align hinge (1) with two holes (3) on cargo bed (4).

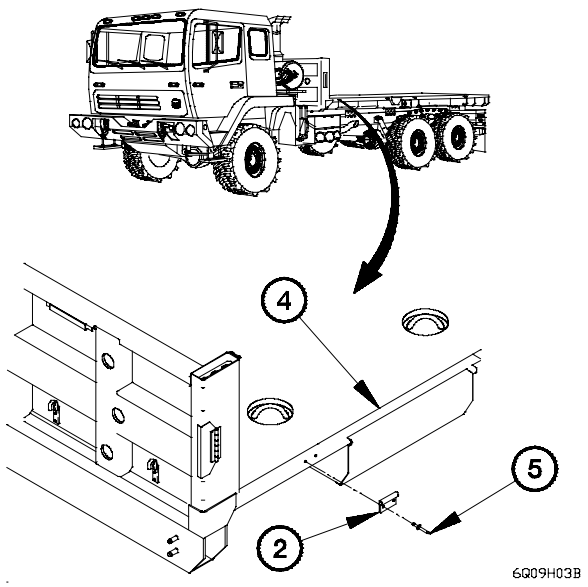
(4) Match drill and enlarge two holes (3) on cargo bed (4) to 0.327-0.340 in. (8.318-8.636 mm).



**NOTE**

Left, right, and rear hinges are installed the same way. Left side shown.

(5) Install hinge (2) on cargo bed (4) with two rivets (5).




**i. Follow-On Maintenance.**

(1) Install light material handling crane (LMHC), if equipped (TM 9-2320-366-10-1).

(2) Install fenders and mudflaps, if equipped (TM 9-2320-366-20-4).

(3) Install air drop brackets (M1093) (TM 9-2320-366-10-2).

(4) Install outrigger pads stowage bracket (M1084/M1086) (TM 9-2320-366-20-5).

(5) Install cargo bed side panels, if equipped (TM 9-2320-366-10-1).

(6) Install cargo cover, if equipped (TM 9-2320-366-10-1).

(7) Install troop seats, if equipped (TM 9-2320-366-10-1).

(8) Install ladder (TM 9-2320-366-10-1).

**End of Task.**

## 15-10. M1090/M1094 DUMP BODY REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Dump body cab protector removed (para 15-11).
Tailgate removed (TM 9-2320-366-20-4).
Pneumatic cylinder removed (TM 9-2320-366-20-5).
Troopseats removed, if equipped (TM 9-2320-366-10-2).
Mudflaps removed (TM 9-2320-366-20-4).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pliers, Retaining Ring (Item 45, Appendix B)

**Tools and Special Tools (Cont)**
Goggles, Industrial (Item 28, Appendix B)
Sling, Cargo (4) (Item 56, Appendix B)
Lifting Brackets, Dump Body (4) (Item 8, Appendix D)

**Material/Parts**
Shackle (4) (Item 80, Appendix C)

**Personnel Required**
(3)

**WARNING**

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

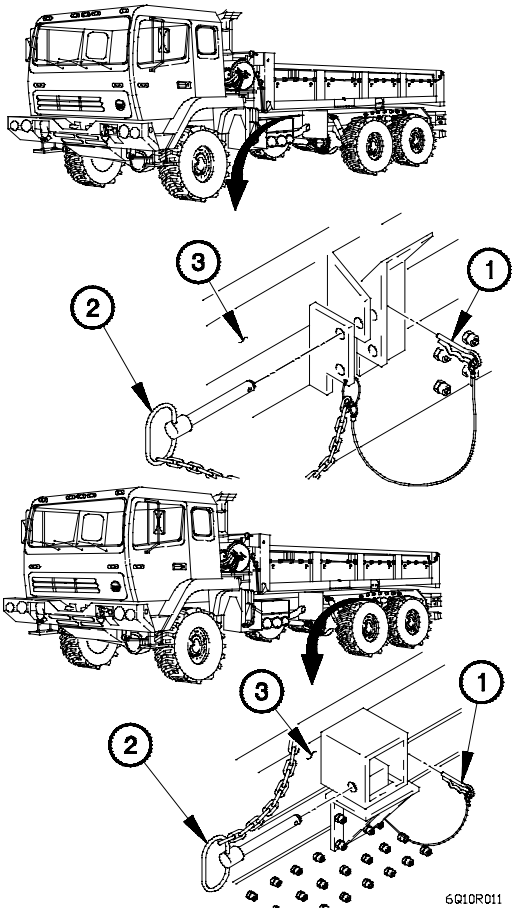
**a. Removal.**

**NOTE**

Two lock pins are installed on each side of dump body.

(1) Remove two safety pins (1) from lock pins (2).

(2) Remove two lock pins (2) from dump body (3).

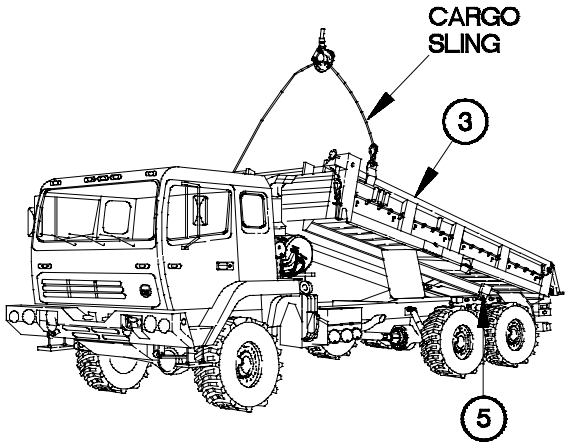


(3) Install two dump body lifting brackets (4) in front slots in dump body (3).

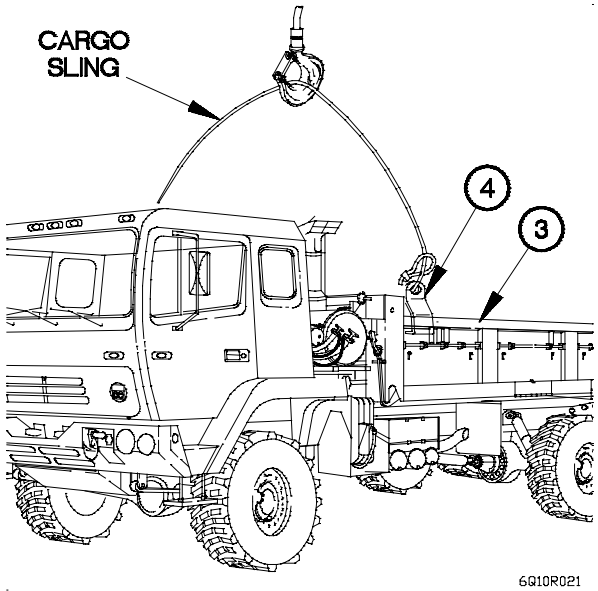
**WARNING**

**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.**

(4) Attach cargo sling to dump body lifting brackets (4).




6Q10R031




6Q10R021

(5) Raise dump body (3) (TM 9-2320-366-10-1).

(6) Raise maintenance legs (5) under dump bed (3).

(7) Lower dump body (3).

(8) Shut down engine (TM 9-2320-366-10-1).

**WARNING**

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

(9) Remove two retaining rings (6) from pins (7).

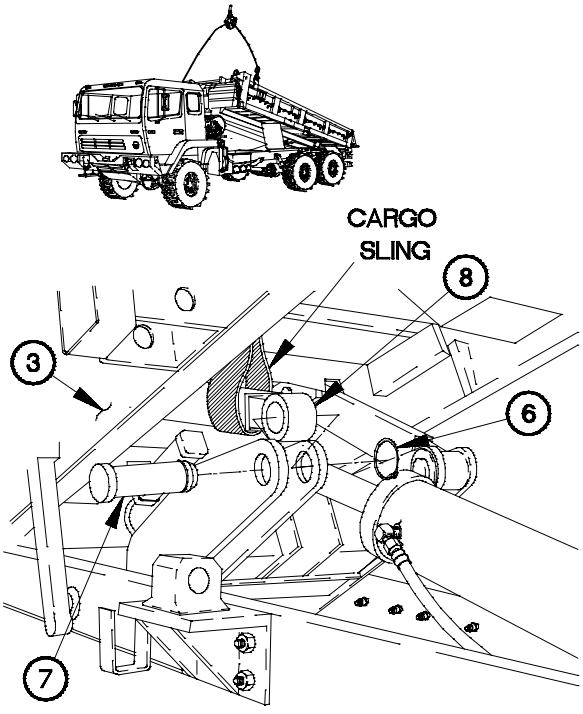
(10) Remove two pins (7) from dump body legs (8).

(11) Attach two dump body legs (8) to dump body (3).

**NOTE**

Performance of step (12) will lower subframe.

(12) Lower dump body (3) (TM 9-2320-366-10-1).



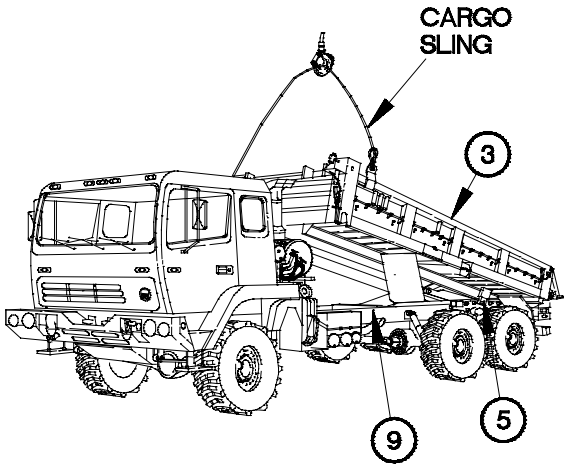

6Q10R041

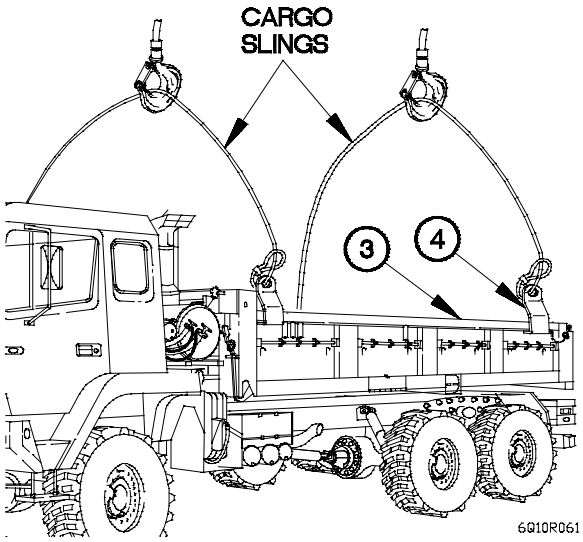
## 15-10. M1090/M1094 DUMP BODY REPLACEMENT (CONT)

(13) Manually raise dump body (3) with lifting device.

(14) Lower maintenance legs (5).

(15) Lower dump body (3) until resting on frame (9).




(16) Install two dump body lifting brackets (4) in rear slots of dump body (3).

**WARNING**

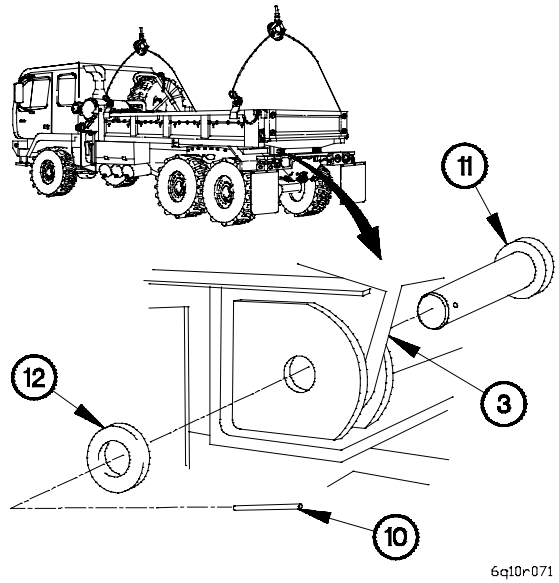
**Dump body weighs approximately 3,030 lbs (1,377 kg). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

(17) Remove slack from lifting device.

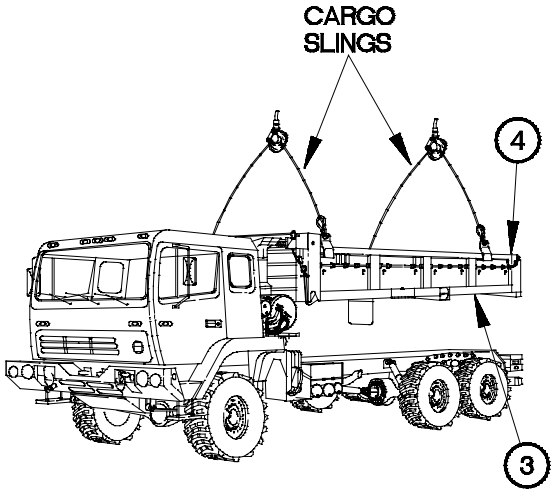
(18) Remove two pins (10) from pins (11).

(19) Remove two shims (12) from pins (11).

(20) Remove two pins (11) from dump body (3).




6q10r071




6Q10R081

(21) Remove dump body (3) from vehicle.

(22) Remove lifting device and cargo slings from dump body lifting brackets (4).

(23) Remove dump body lifting brackets (4) from dump body (3).

**b. Installation.**

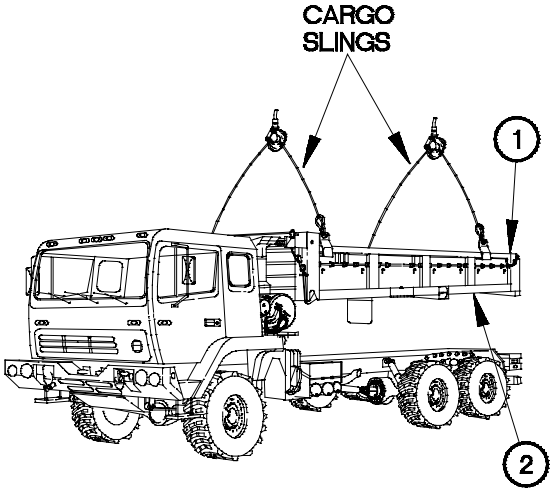
(1) Install four dump body lifting brackets (1) in slots on dump body (2).

(2) Attach cargo slings to four dump body lifting brackets (1).

**WARNING**

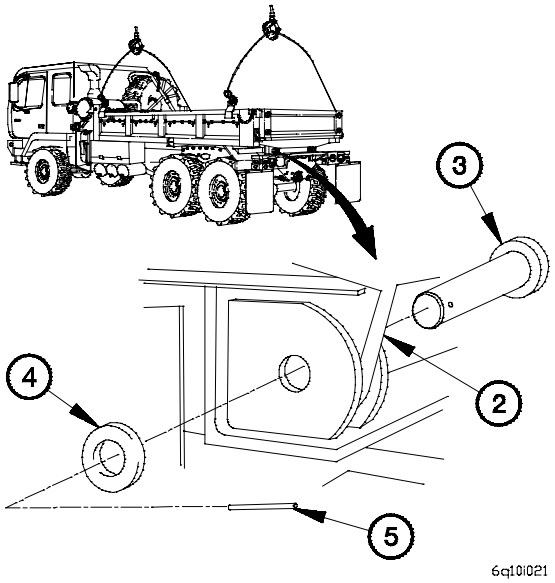
**Dump body weighs approximately 3,030 lbs (1,377 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

(3) Lift dump body (2) in position over vehicle.




6Q10I011

## 15-10. M1090/M1094 DUMP BODY REPLACEMENT (CONT)

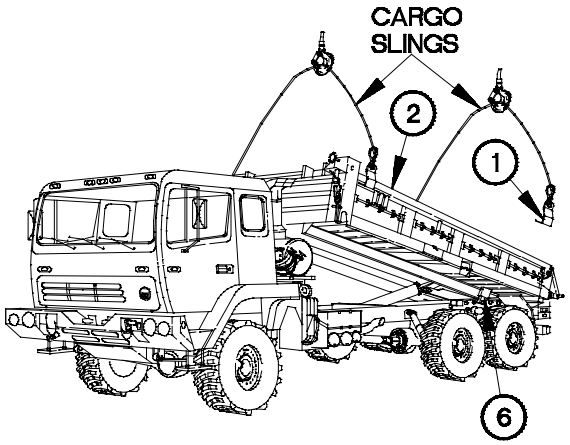



6q10I021

(4) Install two pins (3) in dump body (2).

(5) Install two shims (4) on pins (3).

(6) Install two pin (5) in pins (3).




6Q10I031

(7) Remove cargo sling and two dump body lifting brackets (1) from rear of dump body (2).

(8) Manually raise dump body (2).

(9) Raise maintenance legs (6).

(10) Lower dump body (2) on maintenance legs (6).

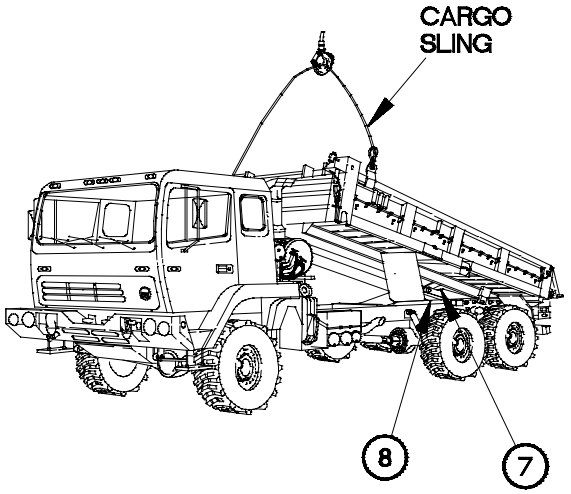
(11) Lower two dump body legs (7).

**NOTE**

Performance of step (12) will raise subframe assembly.

(12) Raise dump body until subframe assembly (8) is aligned with dump body legs (7) (TM 9-2320-366-10-1).

(13) Shut down engine (TM 9-2320-366-10-1).



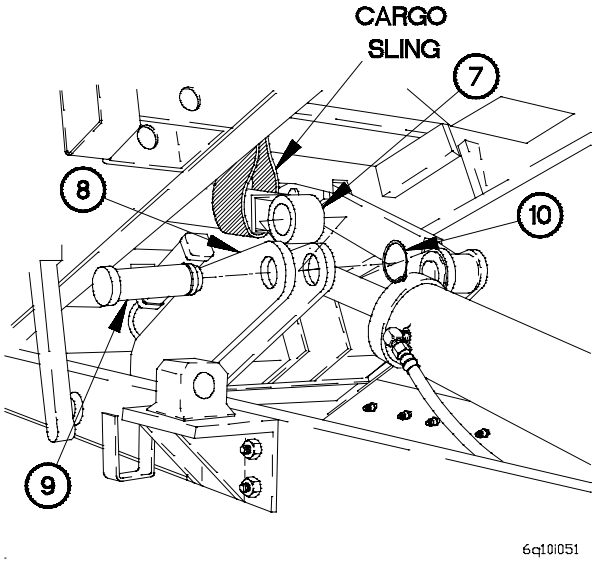

6Q10I041

(14) Install two pins (9) attaching dump body legs (7) to subframe assembly (8).

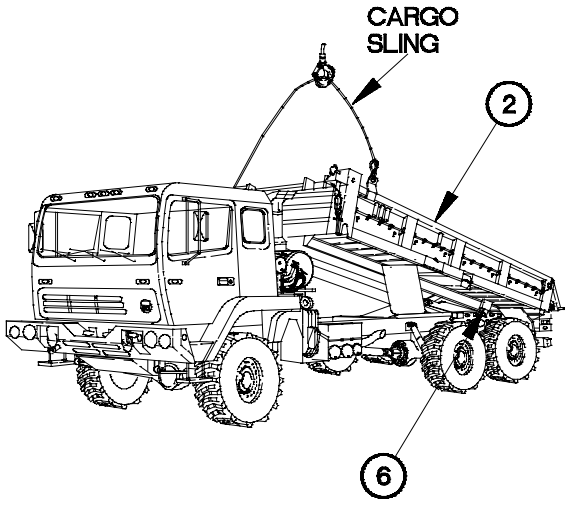
**WARNING**

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

(15) Install two retaining rings (10) on pins (9).




6q10i051




6Q10I061

(16) Raise dump body (2) (TM 9-2320-366-10-1).

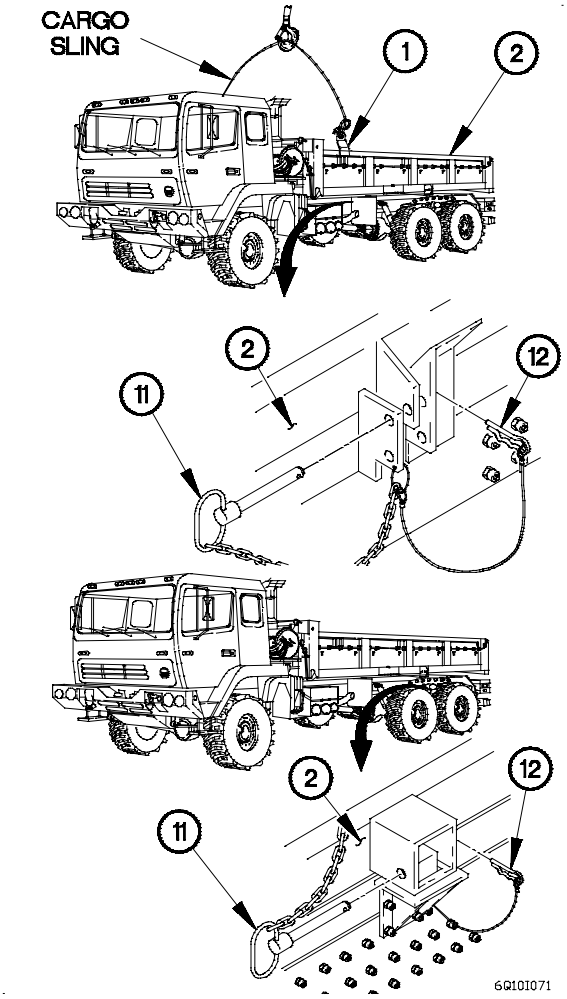
**CAUTION**

As dump body is being lowered, lower lifting device without putting tension on slings. Failure to comply may result in damage to equipment.

(17) Lower maintenance legs (6).

(18) Lower dump body (2) (TM 9-2320-366-10-1).

## 15-10. M1090/M1094 DUMP BODY REPLACEMENT (CONT)




(19) Remove cargo sling and lifting device from dump body lifting brackets (1).

(20) Remove two dump body lifting brackets (1) from dump body (2).

**NOTE**

Two lock pins are installed on each side of dump body.

(21) Install two lock pins (11) in dump body (2).

(22) Install two safety pins (12) in lock pins (11).

**c. Follow-On Maintenance.**

(1) Install mudflaps (TM 9-2320-366-20-4).

(2) Install troopseats, if equipped (TM 9-2320-366-10-2).

(3) Install pneumatic cylinder (TM 9-2320-366-20-5).

(4) Install tailgate (TM 9-2320-366-20-4).

(5) Install dump body cab protector (para 15-11).

**End of Task.**

## 15-11. M1090/M1094 DUMP BODY CAB PROTECTOR REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Cab protector raised (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Hammer, Hand (Item 31, Appendix B)
Pivot Pin Removal Tool, Dump Body Cab Protector (Item 7, Appendix D)

**Tools and Special Tools (Cont)**
Sling, Cargo (Item 56, Appendix B)

**Material/Parts**
Rope, Fibrous (2) (25 ft long) (Item 62, Appendix C)

**Personnel Required**
(3)

**a. Removal.**

(1) Tie guide ropes to each side of cab protector (1).

(2) Remove two spring pins (2) from pivot shaft (3).

**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.**

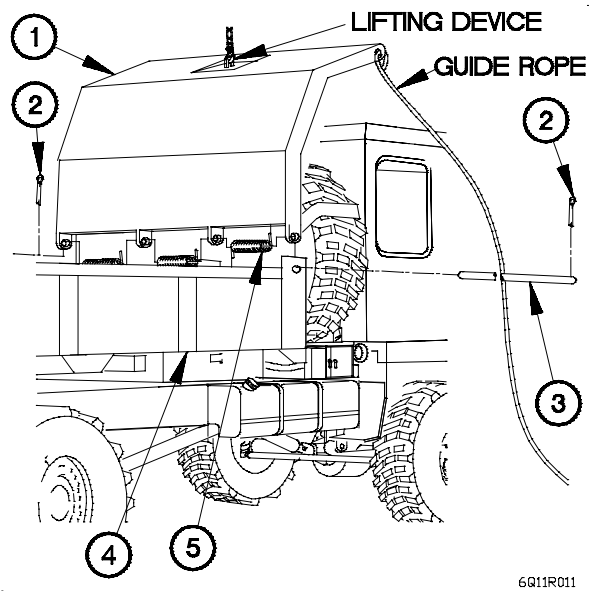
(3) Remove pivot shaft (3) from right side of cab protector (1).

**NOTE**

Step (4) requires the aid of two assistants.

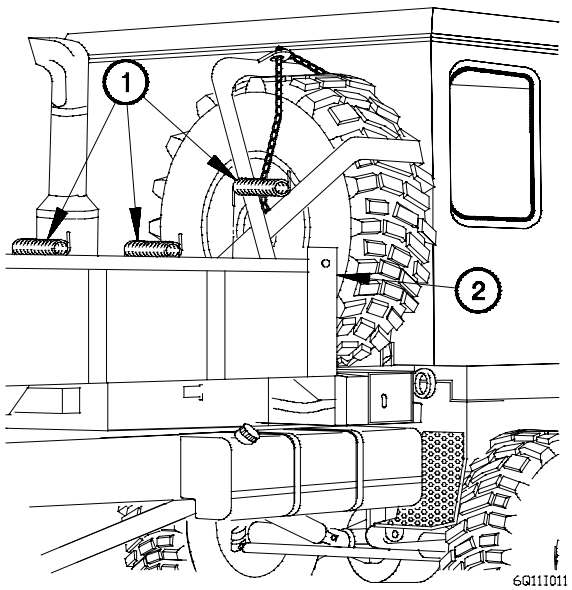
(4) Remove cab protector (1) from dump body (4).

(5) Remove three torsion springs (5) from dump body (4).

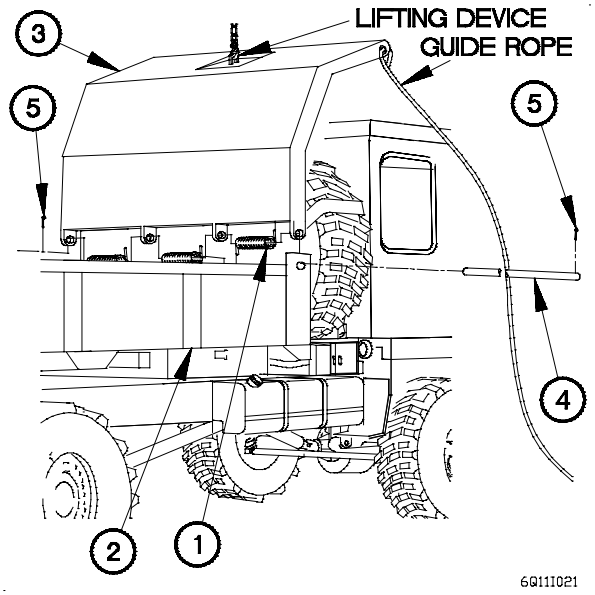


## 15-11. M1090/M1094 DUMP BODY CAB PROTECTOR REPLACEMENT (CONT)

**b. Installation.**




(1) Install three torsion springs (1) in dump body (2).




**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.**

(2) Attach guide ropes to cab protector (3).

**NOTE**

Step (3) requires the aid of two assistants.

(3) Position cab protector (3) on dump body (2) and three torsion springs (1).

(4) Install pivot shaft (4) through right side of cab protector (3).

(5) Install two spring pins (5) on ends of pivot shaft (4).

**c. Follow-On Maintenance.**

Raise and lower cab protector to check operation (TM 9-2320-366-10-1).

**End of Task.**

## 15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Rear side marker lights removed (TM 9-2320-366-20-3).
Back-up lights removed (TM 9-2320-366-20-3).
Stoplights and brackets removed (TM 9-2320-366-20-3).
Worklights removed (TM 9-2320-366-20-3).
Tool boxes and decks removed (TM 9-2320-366-20-4).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pan, Drain (Item 43, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Tools and Special Tools (Cont)**
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Tape, Anti-seizing (Item 84, Appendix C)
Ties, Cable Plastic (Item 92, Appendix C)
Nut, Self-Locking (6) (Item 211, Appendix F)
Nut, Self-Locking (6) (Item 180, Appendix F)
Washer, Lock (6) (Item 142, Appendix F)
Nut, Self-locking (2) (Item 196, Appendix F)
Rope, Fibrous (2) (25 ft long) (Item 62, Appendix C)

**Personnel Required**
(3)

**a. Removal.**

**CAUTION**

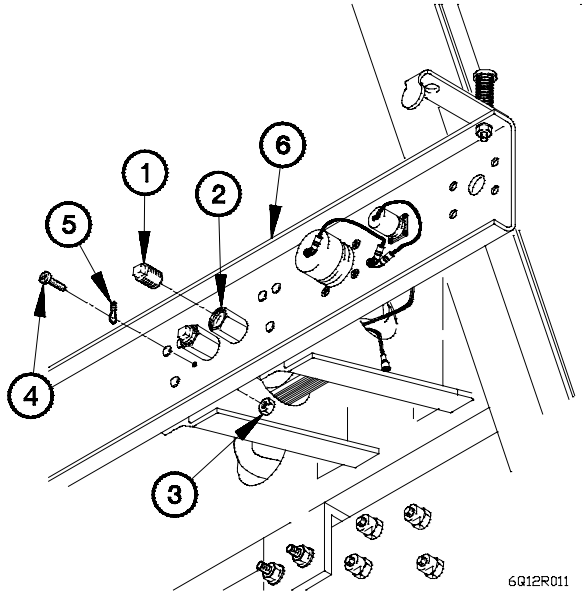
Cap or plug hydraulic hoses to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

- Tag hoses, cables, and connection points prior to disconnecting.
- Perform steps (1) through (5) on left side of support structure.

(1) Remove two plugs (1) from adapters (2).

(2) Remove nut (3), screw (4), lanyard (5) and two plugs (1) from support structure (6).

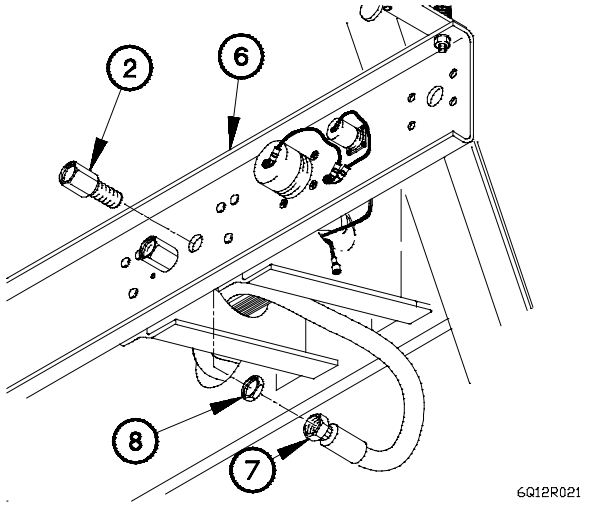


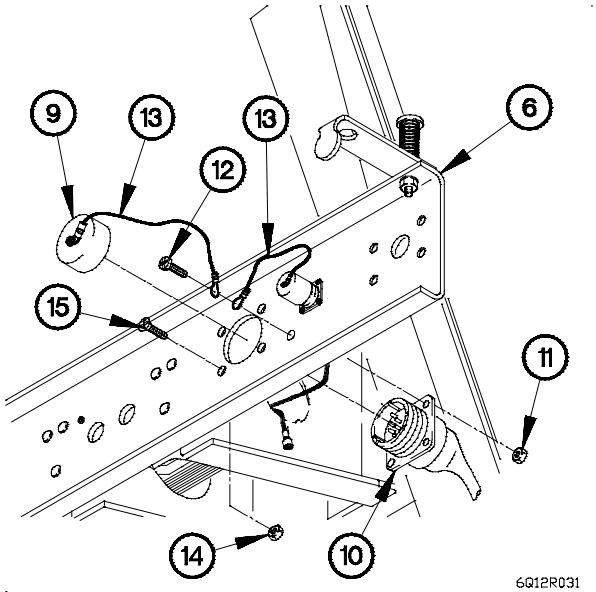
## 15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT (CONT)

(3) Disconnect two hydraulic hoses (7) from adapters (2).

(4) Pull two hydraulic hoses (7) clear of support structure (6).

(5) Remove two nuts (8) and adapters (2) from support structure (6).




**NOTE**

- Remove plastic cable ties as required.
- Left and right side support structure removed the same. Left side shown.

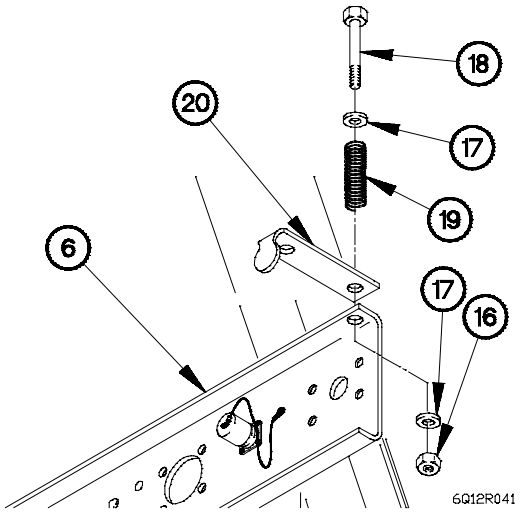
(6) Remove connector cover (9) from remote control cable connector (10).

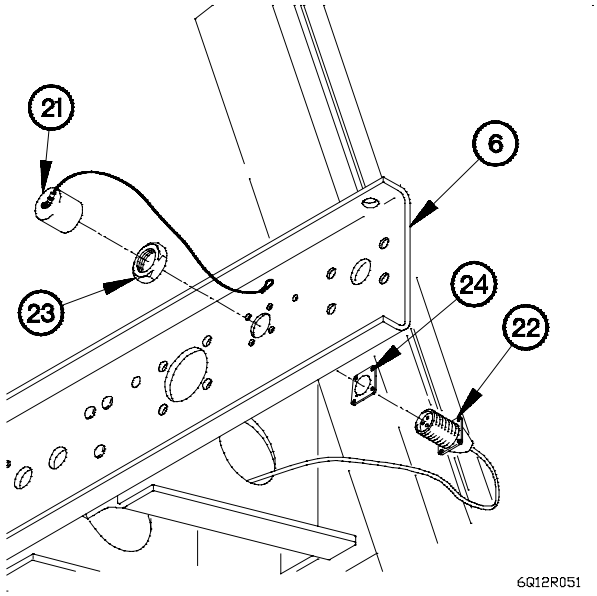
(7) Remove nut (11), screw (12), connector cover (9), and two lanyards (13) from support structure (6).

(8) Remove four nuts (14), screws (15), and remote control cable connector (10) from support structure (6).

(9) Pull remote control cable connector (10) clear of support structure (6).

(10) Remove self-locking nut (16), two washers (17), bolt (18), spring (19), and bracket (20) from support structure (6). Discard self-locking nut.

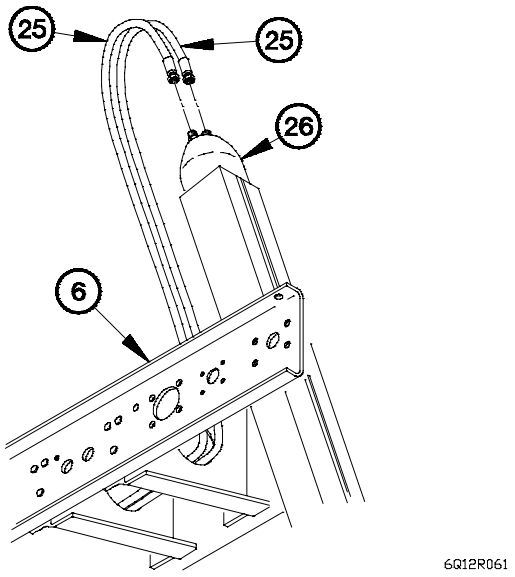





(11) Remove connector cover (21) from portable worklight connector (22).

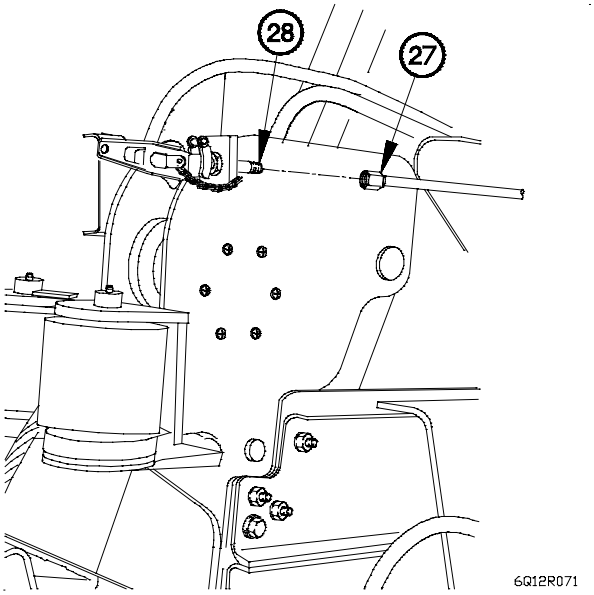
(12) Remove nut (23), retaining plate (24), and portable worklight connector (22) from support structure (6).

(13) Pull portable worklight connector (22) clear of support structure (6).




(14) Disconnect two hydraulic hoses (25) from stiffleg cylinder (26).

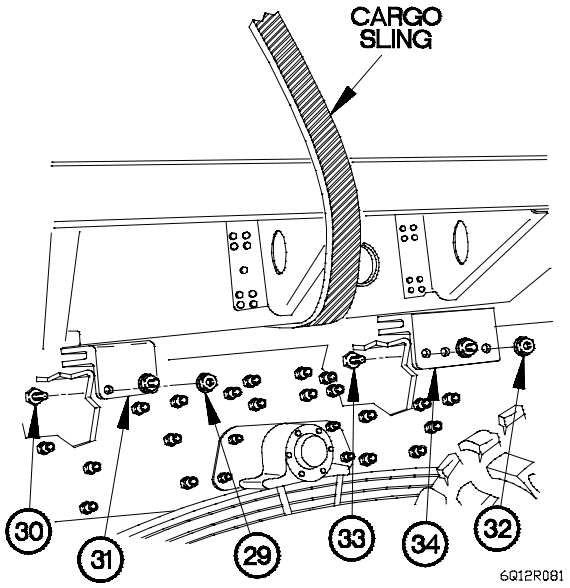
(15) Pull two hydraulic hoses (25) clear of support structure (6).




(16) Disconnect air tube (27) from gladhand (28).

(17) Perform steps (6) through (16) on right side of support structure.

## 15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT (CONT)

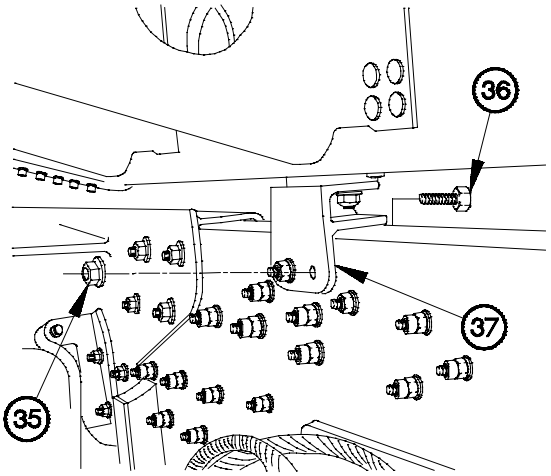



**WARNING**

**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.**

(18) Remove two self-locking nuts (29) and screws (30) from left front mount (31). Discard self-locking nuts.

(19) Remove two self-locking nuts (32) and screws (33) from left rear mount (34). Discard self-locking nuts.



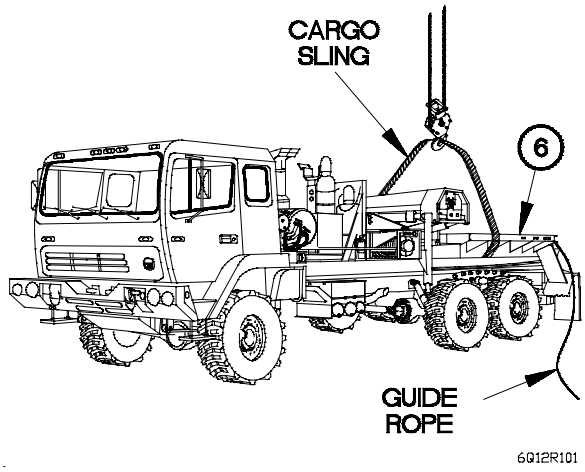

(20) Remove two self-locking nuts (35) and screws (36) from right side mount (37). Discard self-locking nuts.

(21) Attach two guide ropes to support structure (6).

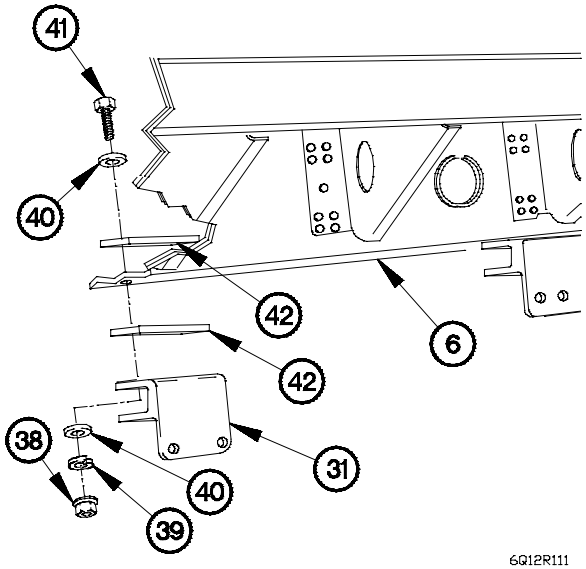
**NOTE**

Step (22) requires the aid of two assistants.

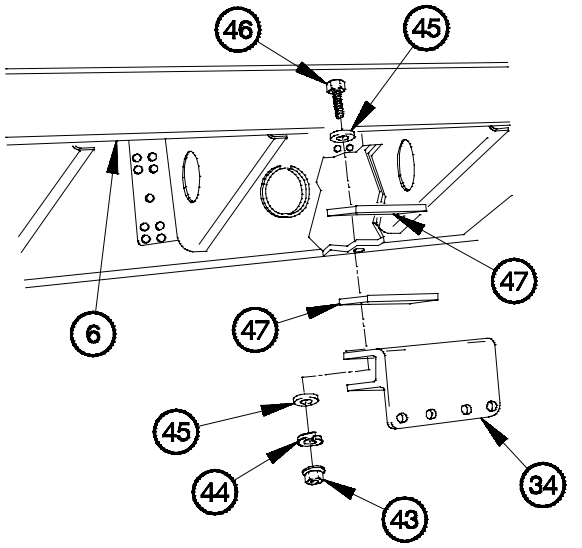
(22) Remove support structure (6) from vehicle.



(23) Remove two self-locking nuts (38), lockwashers (39), four washers (40), two screws (41), cushions (42), and left front mount (31) from support structure (6). Discard self-locking nuts and lockwashers.



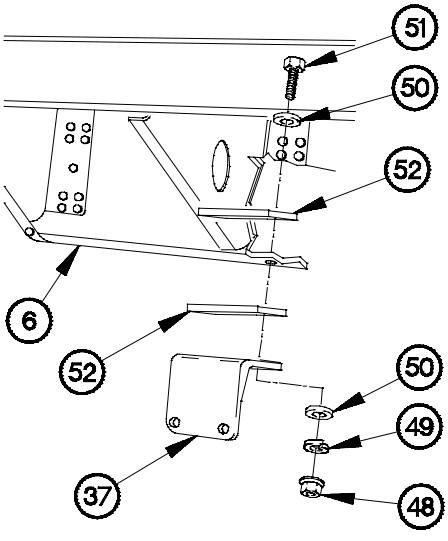

6Q12R111




6Q12R121

(24) Remove two self-locking nuts (43), lockwashers (44), four washers (45), two screws (46) cushions (47), and left rear mount (34) from support structure (6). Discard self-locking nuts and lockwashers.

(25) Remove two self-locking nuts (48), lockwashers (49), four washers (50), two screws (51), cushions (52), and right side mount (37) from support structure (6). Discard self-locking nuts and lockwashers.




6Q12R131

## 15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT (CONT)

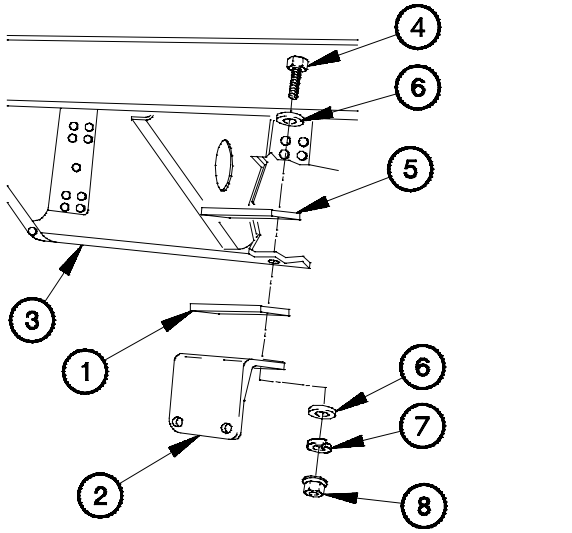
**b. Installation.**

**CAUTION**

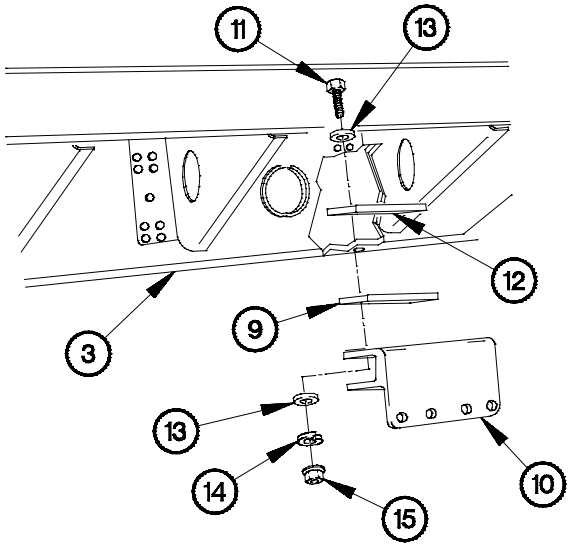
When installing cushions, top cushion must be installed with metal side up and bottom cushion must be installed with metal side down. Failure to comply may result in damage to equipment.

(1) Position cushion (1) and right side mount (2) on support structure (3) with two screws (4), cushion (5), four washers (6), two lockwashers (7), and self-locking nuts (8).

(2) Tighten two self-locking nuts (8) until cushions (1 and 5) begin to bulge.




6Q12I011



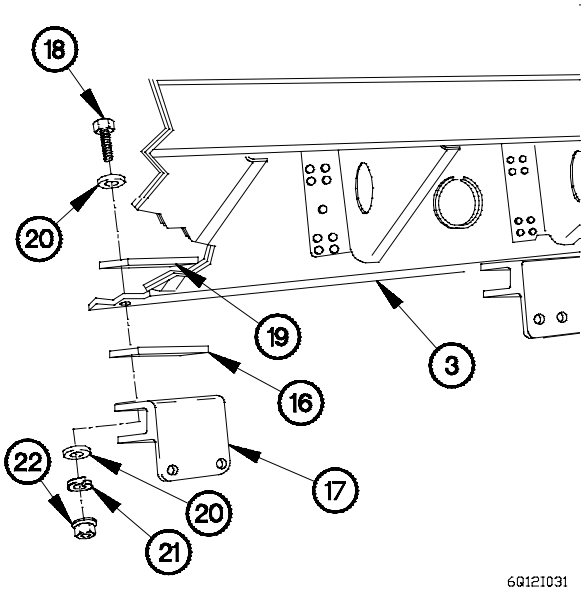

6Q12I021

(3) Position cushion (9) and left rear mount (10) on support structure (3) with two screws (11), cushion (12), four washers (13), two lockwashers (14), and self-locking nuts (15).

(4) Tighten two self-locking nuts (15) until cushions (9 and 12) begin to bulge.

(5) Position cushion (16) and left front mount (17) on support structure (3) with two screws (18), cushion (19), four washers (20), two lockwashers (21), and self-locking nuts (22).

(6) Tighten two self-locking nuts (22) until cushions (16 and 19) begin to bulge.




6Q12I031

(7) Attach two guide ropes to support structure (3).

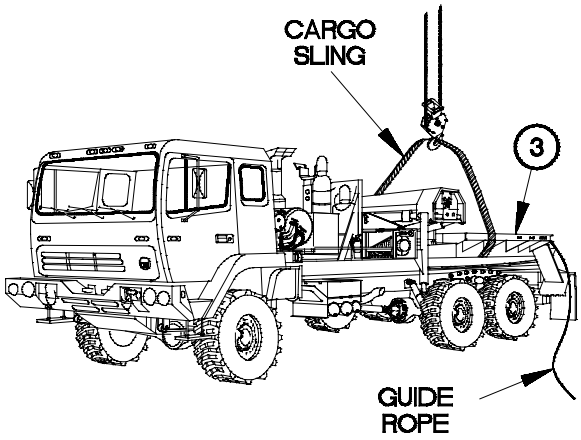
**WARNING**

**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.**

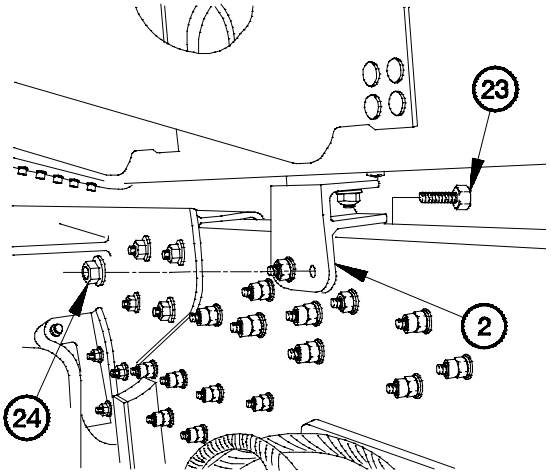
**NOTE**

Step (8) requires the aid of two assistants.

(8) Position support structure (3) in mounting position on vehicle.



6Q12I041



6Q12I051

(9) Position two bolts (23) and self-locking nuts (24) in right side mount (2).

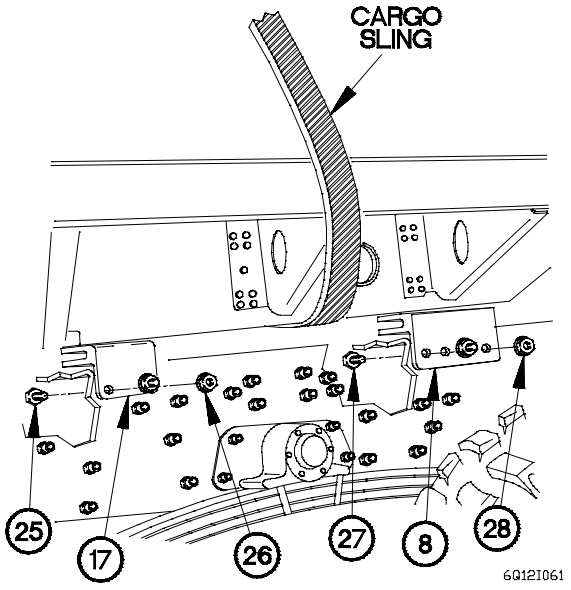
(10) Tighten two self-locking nuts (24) to 285-305 lb-ft (386-414 N·m).

(11) Position two bolts (25) and self-locking nuts (26) in left front mount (17).

(12) Tighten two self-locking nuts (26) to 285-305 lb-ft (386-414 N·m).

(13) Position two bolts (27) and self-locking nuts (28) in left rear mount (8).

(14) Tighten two self-locking nuts (28) to 285-305 lb-ft (386-414 N·m).



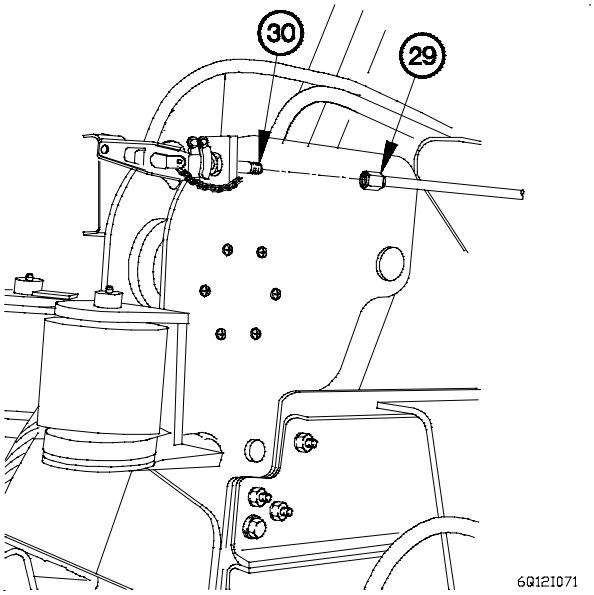
6Q12I061

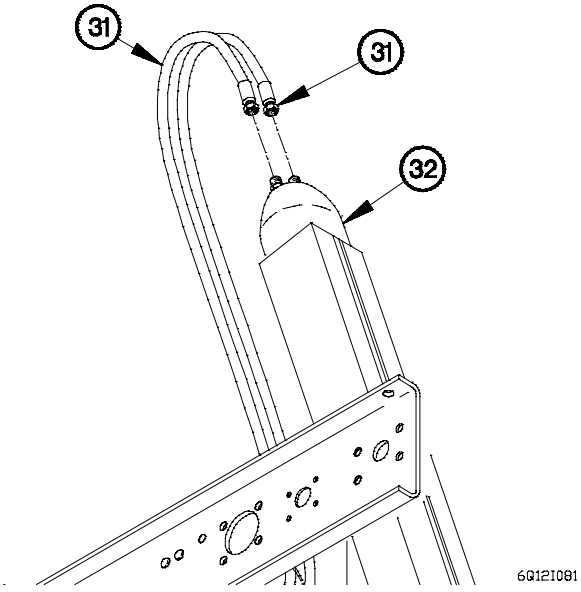
## 15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT (CONT)

**NOTE**

Left and right side of support structure are installed the same way. Left side shown.

(15) Connect air tube (29) to gladhand (30).



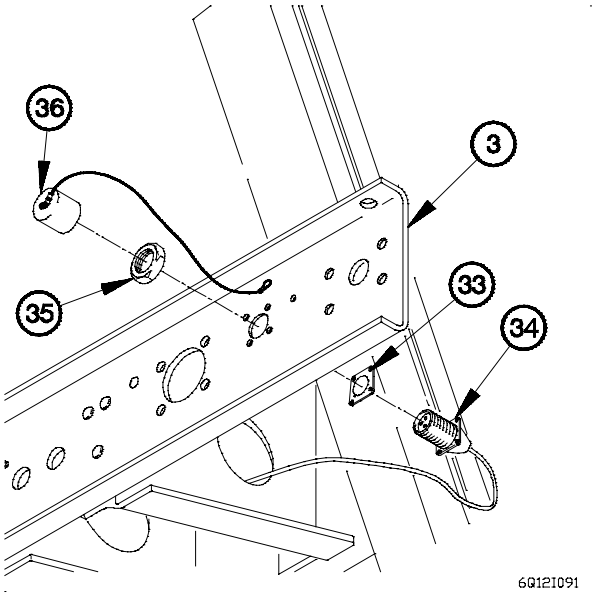

(16) Connect two hydraulic hoses (31) to stiffleg cylinder (32).

**NOTE**

Install plastic cable ties as necessary.

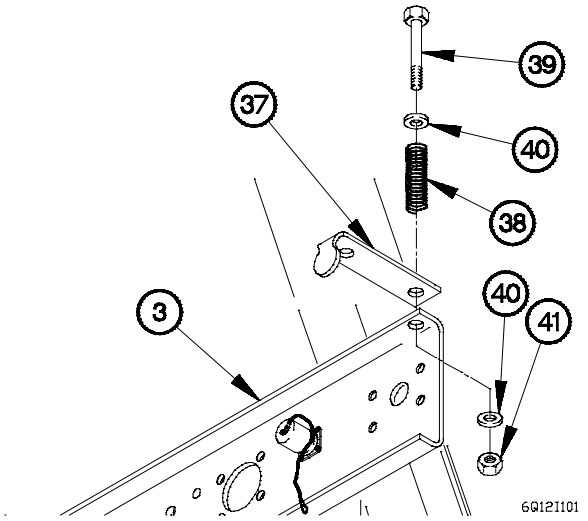
(17) Install retaining plate (33) and portable worklight connector (34) on support structure (3) with nut (35).

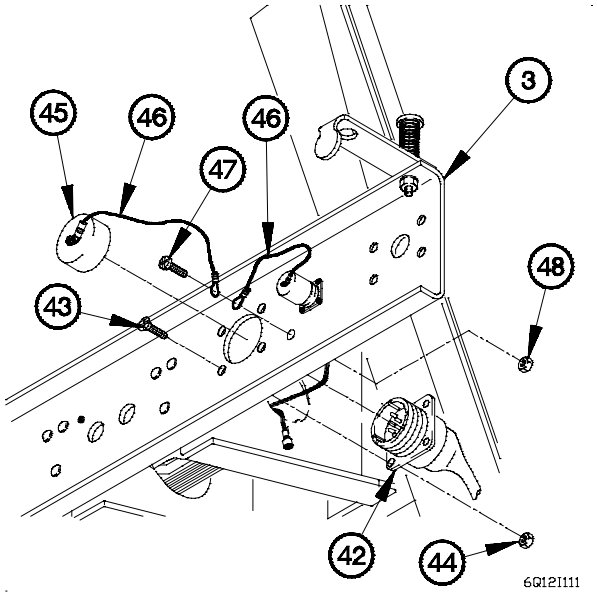
(18) Install connector cover (36) on portable worklight connector (34).



(19) Position bracket (37) on support structure (3) with spring (38), bolt (39), two washers (40), and self-locking nut (41).

(20) Tighten self-locking nut (41) to 76-84 lb-ft (103-114 N·m).




(21) Install remote control cable connector (42) on support structure (3) with four screws (43) and nuts (44).

(22) Install connector cover (45) on remote control cable connector (42).

(23) Install two lanyards (46) on support structure (3) with screw (47) and nut (48).

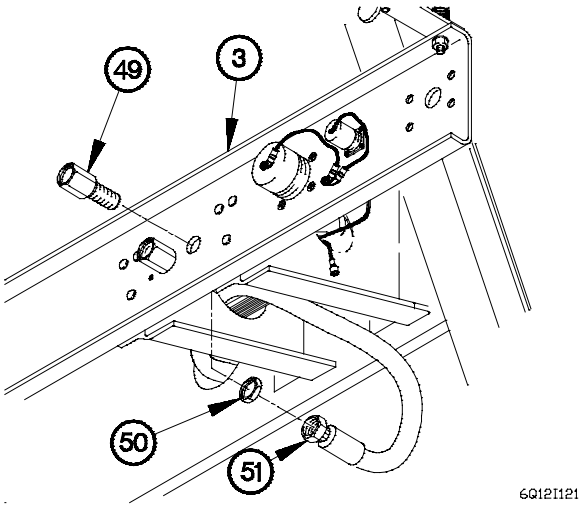
(24) Perform steps (15) through (23) on right side of support structure.

**NOTE**

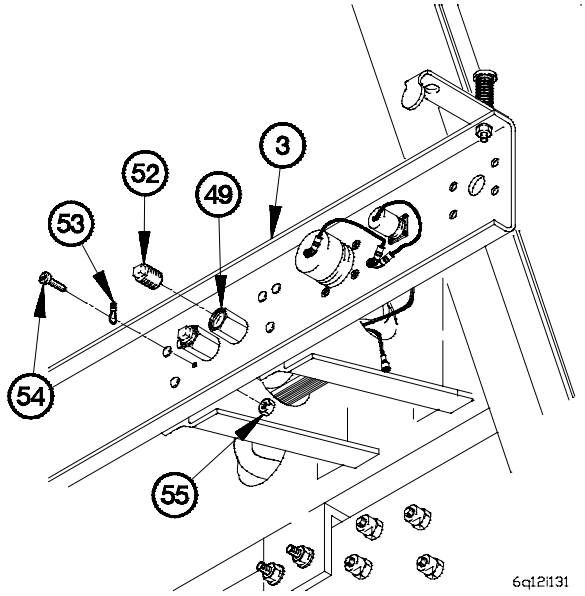
Perform steps (25) through (28) on left side of support structure.

(25) Install two adapters (49) on support structure (3) with two nuts (50).

(26) Connect two hydraulic hoses (51) to adapters (49).



## 15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT (CONT)




(27) Install two plugs (52) in adapters (49).

(28) Install lanyard (53) on support structure (3) with screw (54) and nut (55).

**c. Follow-On Maintenance.**

(1) Install tool boxes and decks (TM 9-2320-366-20-4).

(2) Install worklights (TM 9-2320-366-20-3).

(3) Install stoplights and brackets (TM 9-2320-366-20-3).

(4) Install back-up lights (TM 9-2320-366-20-3).

(5) Install rear side marker lights (TM 9-2320-366-20-3).

(6) Fill hydraulic reservoir (TM 9-2320-366-10).

**End of Task.**

# CHAPTER 16
# MATERIAL HANDLING CRANES (MHC), 30K WINCHES, UNDERLIFT AND 15K SELF-RECOVERY WINCH (SRW) MAINTENANCE


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Section I. INTRODUCTION

## 16-1. INTRODUCTION

This chapter contains instructions for replacement and repairing Material Handling Cranes (MHC), 30K Winches, Underlift, and 15K Self-Recovery Winch (SRW) Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

# Section II. MAINTENANCE PROCEDURES

## 16-2. M1084/M1086 MATERIAL HANDLING CRANE (MHC) REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).
Remote control cable stowage box removed (TM 9-2320-366-20-5).
Remote control stowage box removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Goggles, Industrial (Item 28, Appendix B)
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Adapter, Socket Wrench (Item 3, Appendix B)
Multiplier, Torque Wrench (Item 42, Appendix B)
Sling, Cargo (2) (Item 56, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Trestle, Motor Vehicle Maintenance (Item 81, Appendix B)

**Materials/Parts**
Shackle (4) (Item 80, Appendix C)
Cap and Plug Set (Item 17, Appendix C)
Packing, Preformed (Item 231, Appendix F)
Packing, Preformed (2) (Item 264, Appendix F)
Ties, Cable, Plastic (Item 92, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Shim (as required) (Item 413, Appendix F)
Shim (as required) (Item 414, Appendix F)
Shim (as required) (Item 415, Appendix F)
Shim (as required) (Item 416, Appendix F)
Rope, Fibrous (Item 62, 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. Removal.**

**CAUTION**

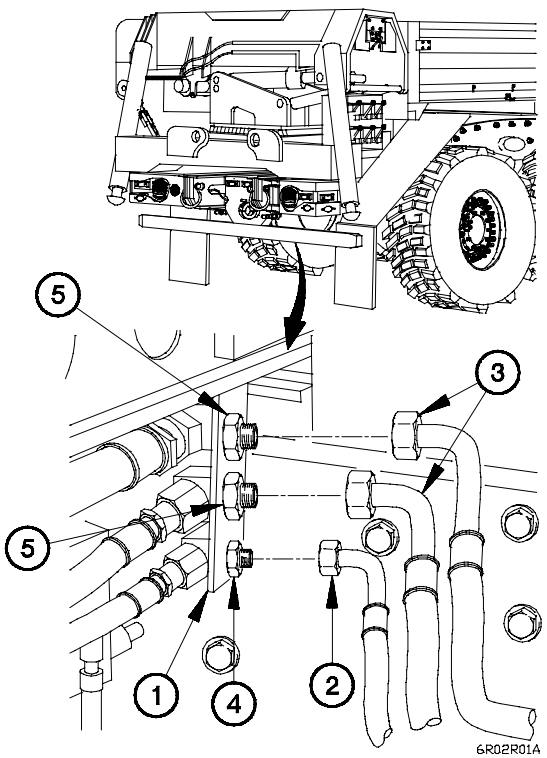
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

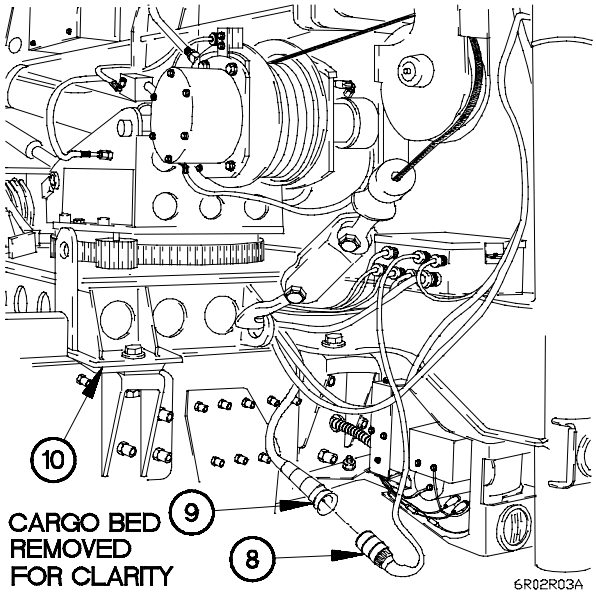
Tag hoses and connection points prior to disconnecting.

(1) Position drain pan under crane hydraulic manifold (1).

(2) Disconnect hydraulic hose (2) and two hydraulic hoses (3) from fitting (4) and two fittings (5).



(3) Remove preformed packing (6) and two preformed packings (7) from fitting (4) and two fittings (5). Discard preformed packings.



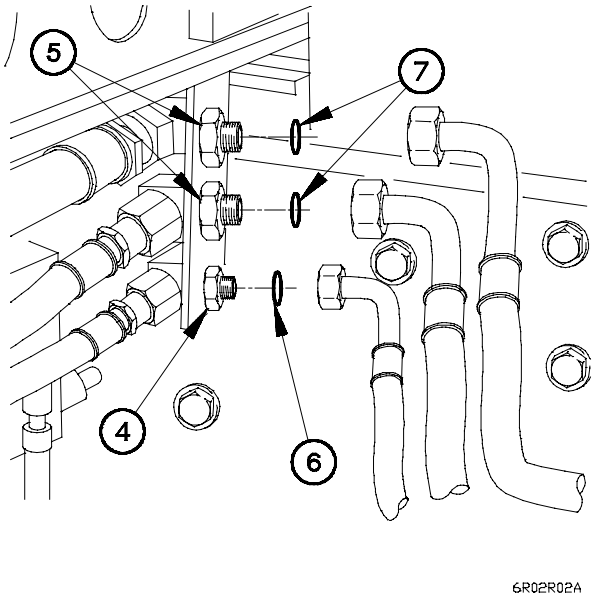

**WARNING**

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

**NOTE**

The number of shim(s) per vehicle may vary.

(6) Remove four nuts (11), eight washers (12), shim(s) (13), four plates (14), and bolts (15) from MHC (10).

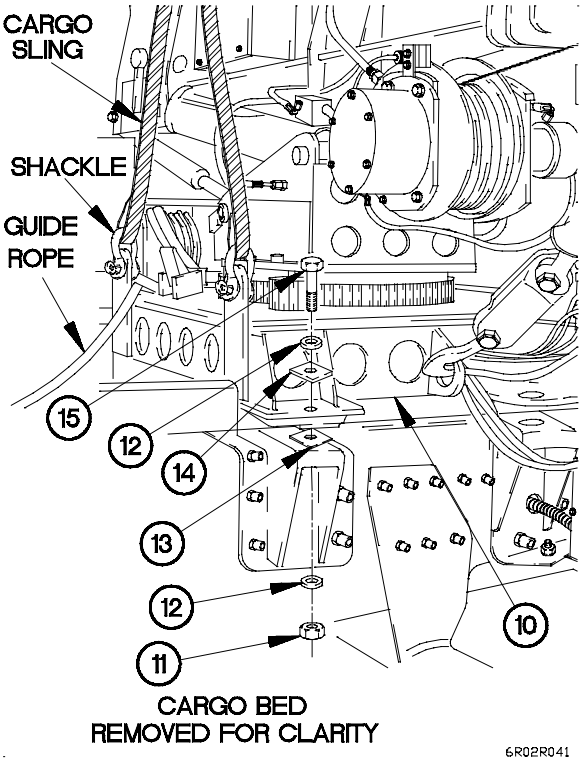



**NOTE**

Remove plastic cable ties as required.

(4) Disconnect power connector (8) from power cable (9).

(5) Pull power connector (8) clear of MHC (10).



## 16-2. M1084/M1086 MATERIAL HANDLING CRANE (MHC) REPLACEMENT (CONT)

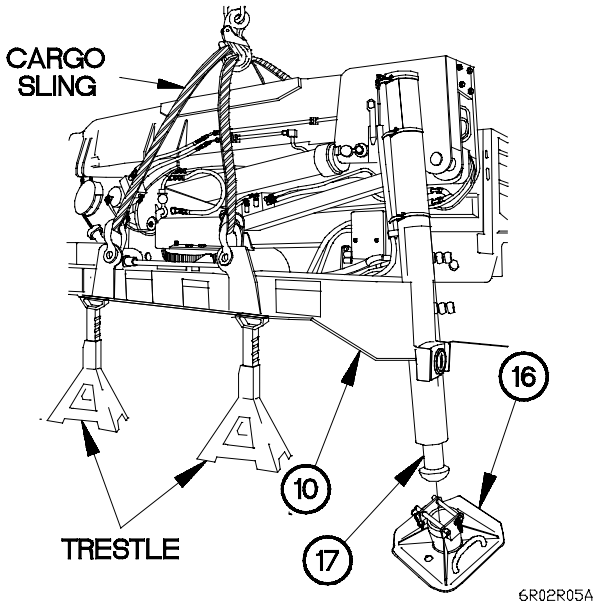
**NOTE**

Step (7) requires the aid of two assistants.

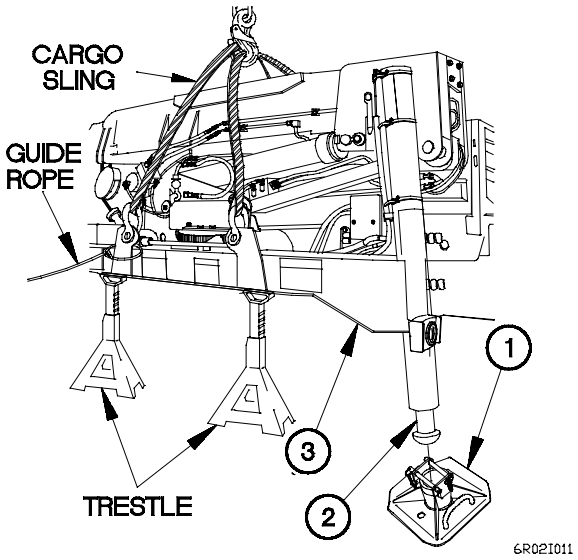
(7) Remove crane (10) from vehicle.

(8) Install outrigger pads (16) on jack cylinders (17).

(9) Position MHC (10) on trestles.




**b. Installation.**




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

(1) Remove outrigger pads (1) from jack cylinders (2).

**NOTE**

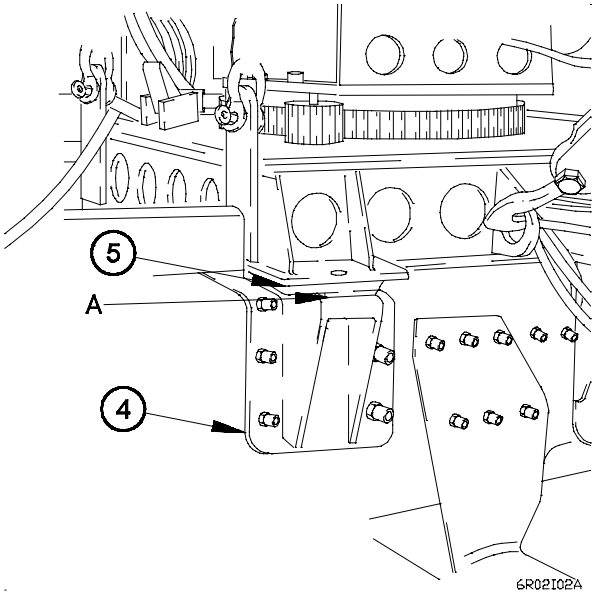
Step (2) requires the aid of two assistants.

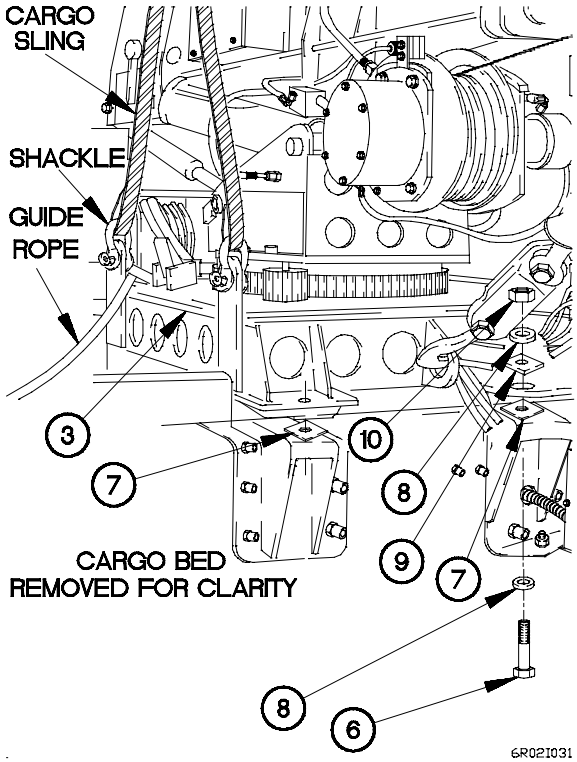
(2) Position MHC (3) on vehicle.

**NOTE**

If gap (A) is larger than .005 in. (0.013 cm), install shim(s) as required.

(3) Measure gap at location (A) between mounting bracket (4) and crane pad (5).

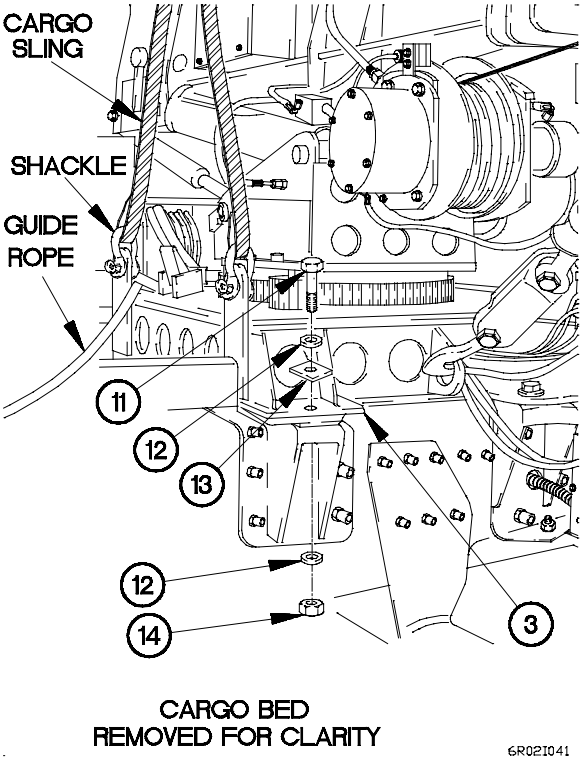



(4) Position two bolts (6), shim(s) (7), four washers (8), two plates (9), and nuts (10) on MHC (3).

(5) Position two bolts (11), four washers (12), two plates (13), and nuts (14) on MHC (3).

(6) Tighten two nuts (14) to 665-735 lb-ft (900-990 N·m).

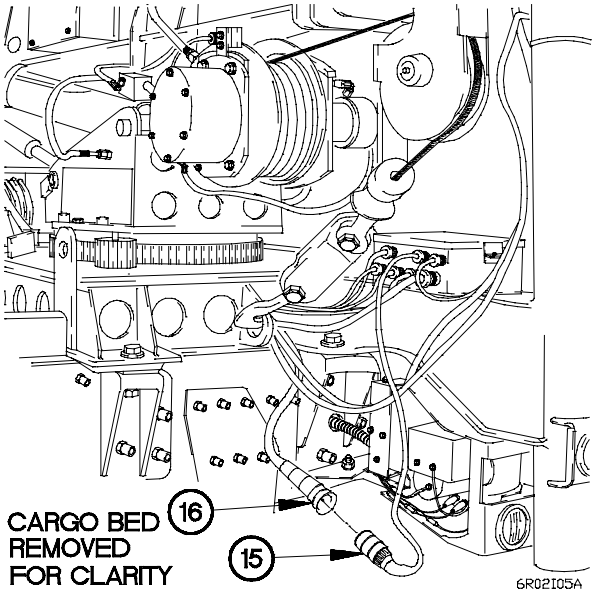


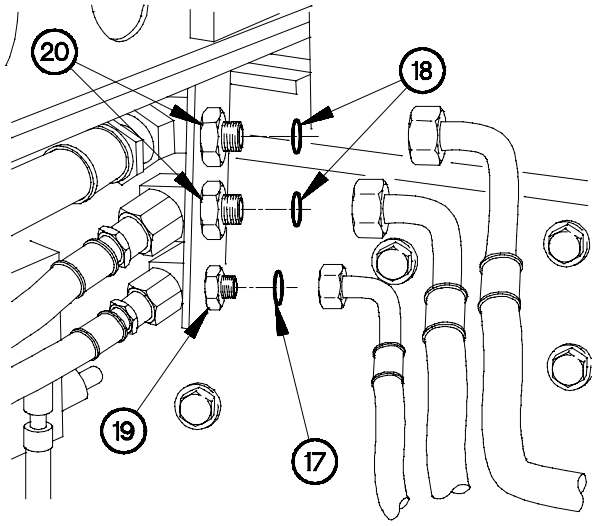
## 16-2. M1084/M1086 MATERIAL HANDLING CRANE (MHC) REPLACEMENT (CONT)

**NOTE**

Install plastic cable ties as required.

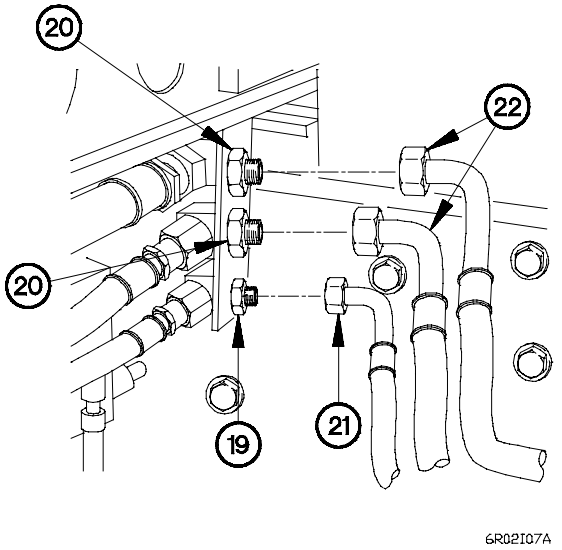
(7) Connect power connector (15) to power cable (16).




(8) Install preformed packing (17) and two preformed packings (18) on fitting (19) and two fittings (20).

(9) Connect hydraulic hose (21) and two hydraulic hoses (22) to fitting (19) and two fittings (20).



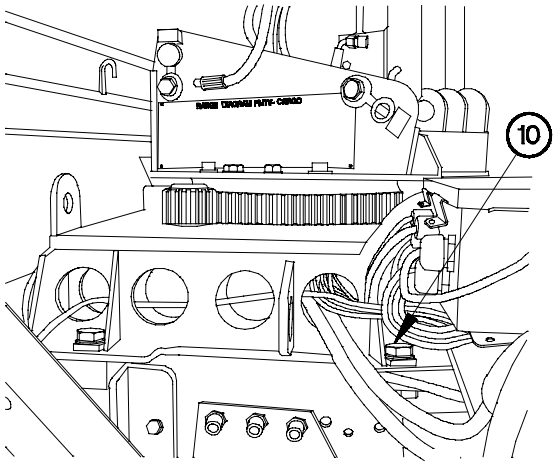
(10) Check fluid level in hydraulic reservoir (TM 9-2320-366-10).

(11) Connect batteries (TM 9-2320-366-20-2).

(12) Position boom over cargo bed (TM 9-2320-366-10).

(13) Tighten two nuts (10) to 665-735 lb-ft (900-990 N·m).

(14) Stow crane (TM 9-2320-366-10).




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**c. Follow-On Maintenance.**

(1) Perform crane load test (para 16-31).

(2) Install remote control cable stowage box (TM 9-2320-366-20-5).

(3) Install remote control stowage box (TM 9-2320-366-20-5).

**End of Task.**

## 16-3. M1084/M1086 BOOM ASSEMBLY REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
MHC erected over cargo bed with boom fully retracted (TM 9-2320-366-10-1).
Hoist cable removed (TM 9-2320-366-20-5).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)
Ties, Cable Plastic (Item 92, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

(1) Disconnect overload lockout connector (1) from overload shutdown box (2).

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

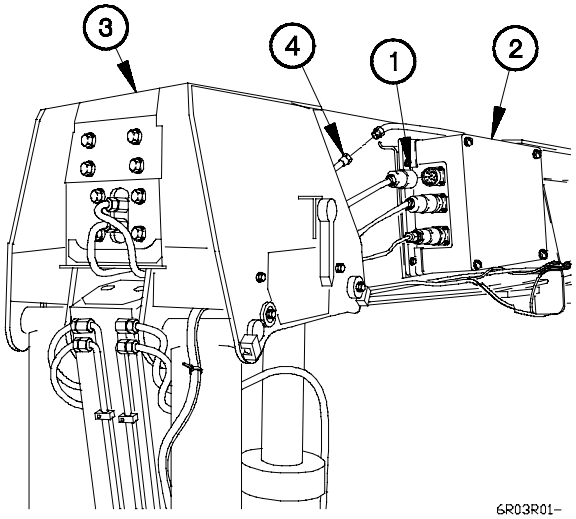
**NOTE**

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

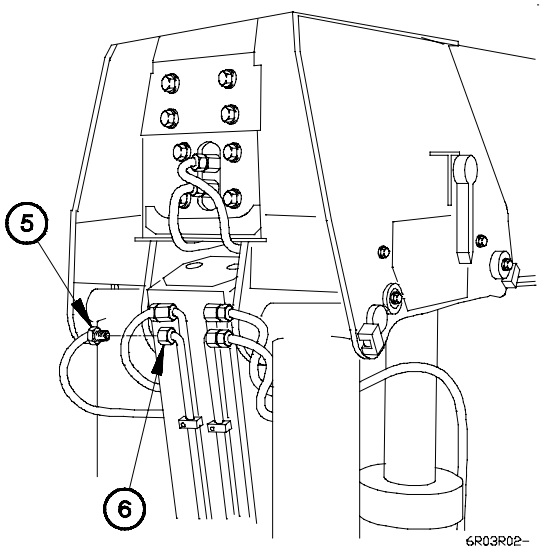
(2) Pull overload lockout connector (1) clear of boom assembly (3).

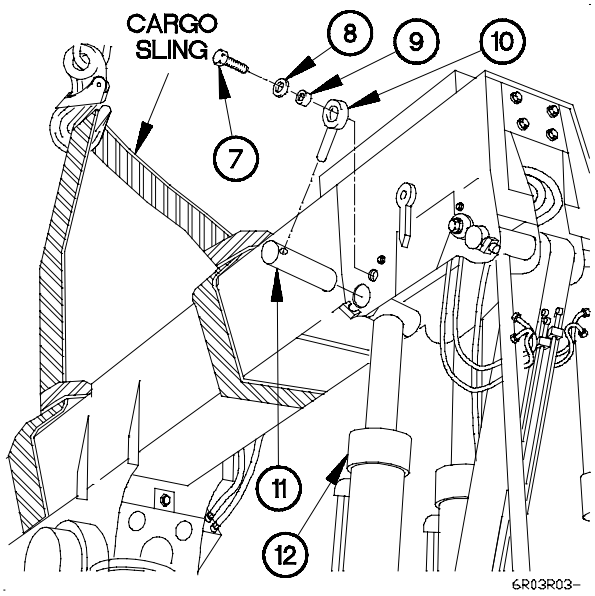
(3) Disconnect hydraulic hose (4) from boom assembly (3).

(4) Pull hydraulic hose (4) clear of boom assembly (3).



(5) Disconnect four hydraulic hoses (5) from fittings (6).




**WARNING**

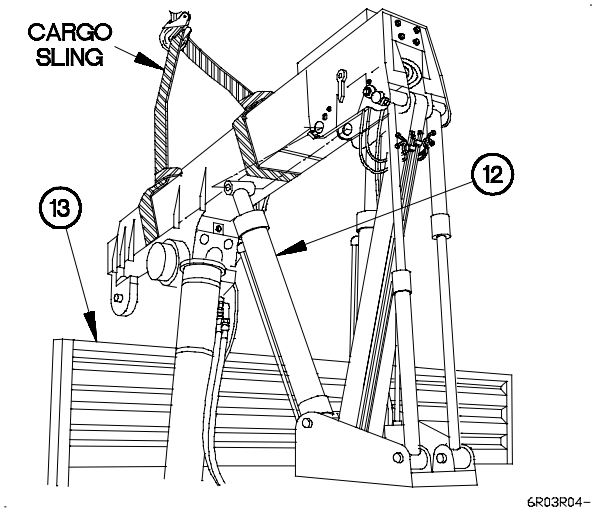
**Boom assembly weighs approximately 800 lbs (363 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

(6) Remove screw (7), washer (8), and bushing (9) from rivet eyebolt (10).

(7) Remove rivet eyebolt (10) from pivot shaft (11).

(8) Remove pivot shaft (11) from LH lift cylinder (12).

(9) Position LH lift cylinder (12) against cargo bed rear panel (13).

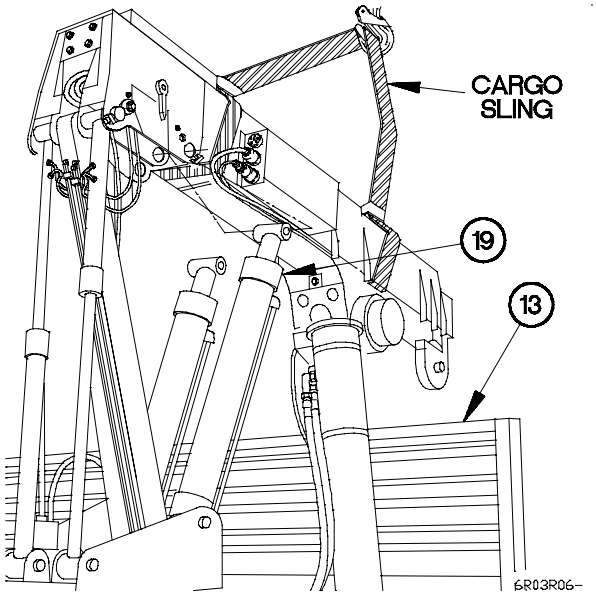


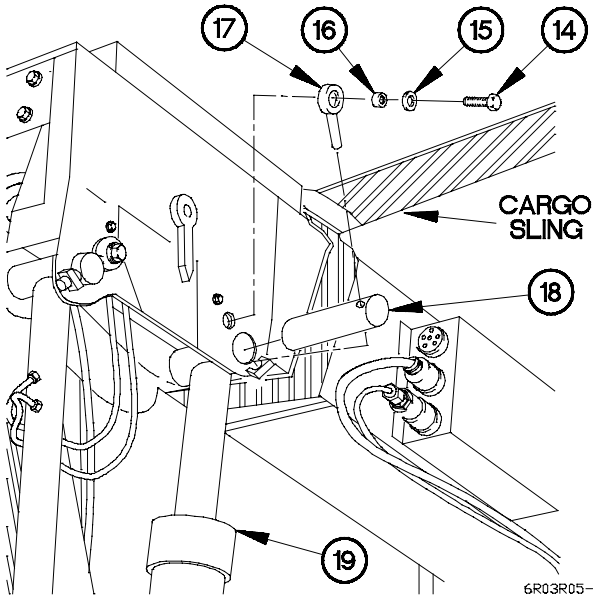
## 16-3. M1084/M1086 BOOM ASSEMBLY REPLACEMENT (CONT)

(10) Remove screw (14), washer (15), and bushing (16) from rivet eyebolt (17).

(11) Remove rivet eyebolt (17) from pivot shaft (18).

(12) Remove pivot shaft (18) from RH lift cylinder (19).




(13) Position RH lift cylinder (19) against cargo bed rear panel (13).

(14) Remove screw (20), washer (21), and bushing (22) from rivet eyebolt (23).

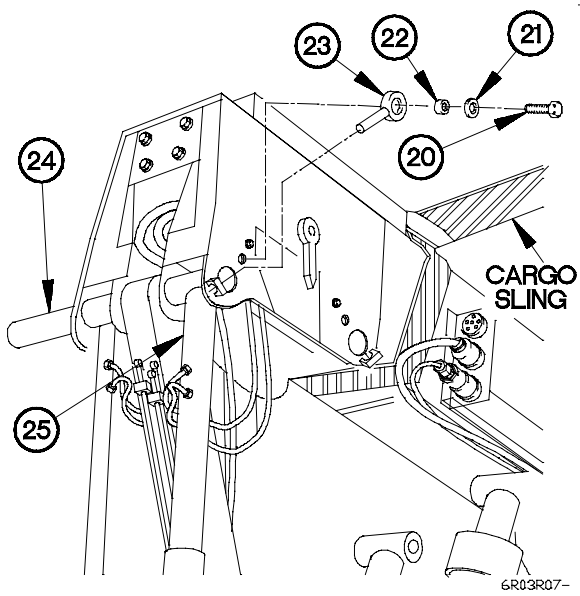
(15) Remove rivet eyebolt (23) from pivot shaft (24).

**WARNING**

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

**NOTE**

Steps (16) through (21) require the aid of assistant.




(16) Drive pivot shaft (24) from tension link cylinder (25).

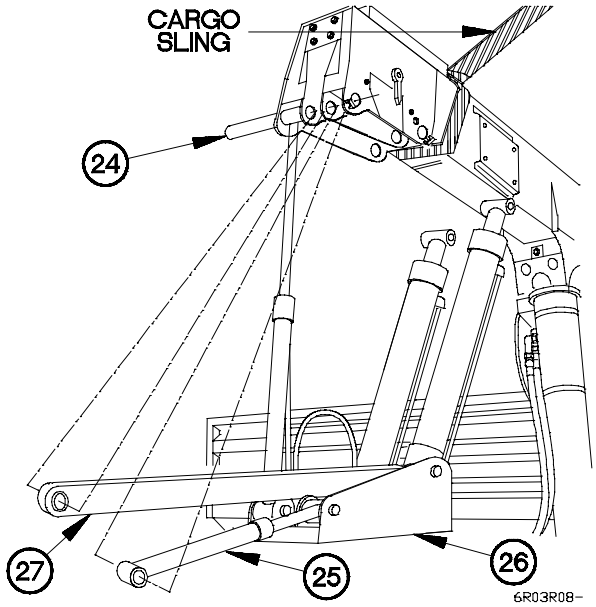
(17) Position tension link cylinder (25) against turntable (26).

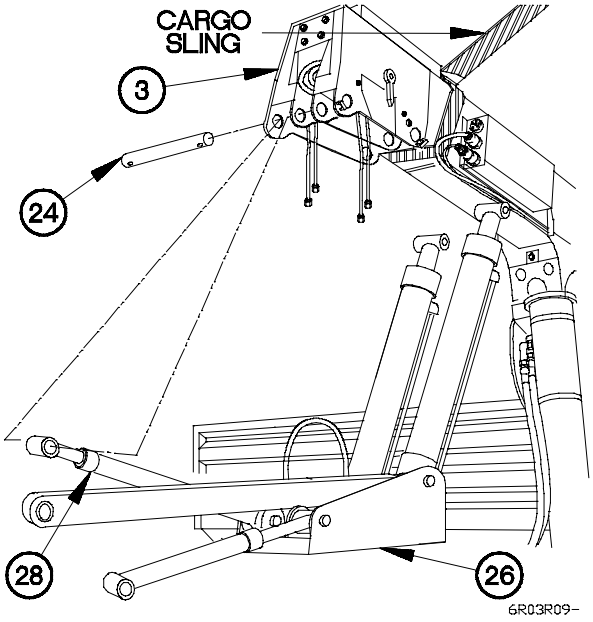
**WARNING**

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

(18) Drive pivot shaft (24) from mast (27).

(19) Position mast (27) against turntable (26).



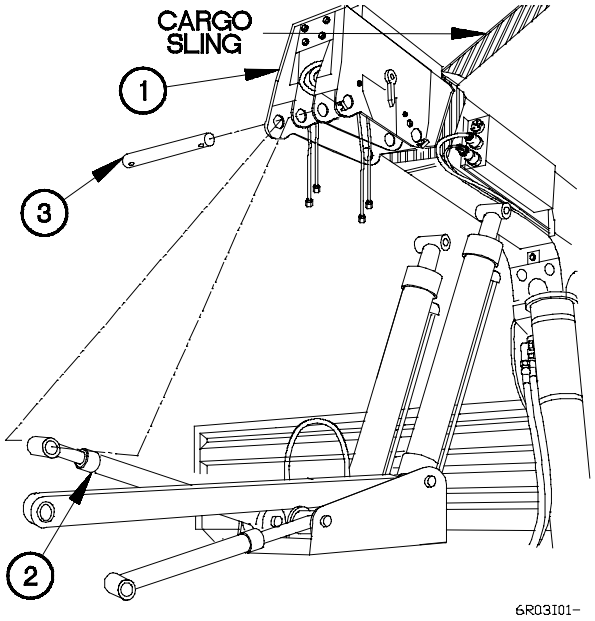

(20) Remove pivot shaft (24) from erection cylinder (28).

(21) Position erection cylinder (28) against turntable (26).

(22) Remove boom assembly (3) from vehicle.

## 16-3. M1084/M1086 BOOM ASSEMBLY REPLACEMENT (CONT)

**b. Installation.**




**WARNING**

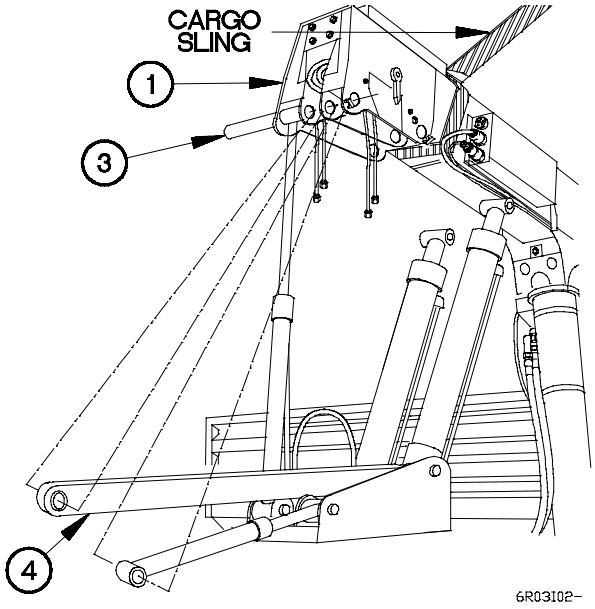
**Boom assembly weighs approximately 800 lbs (363 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

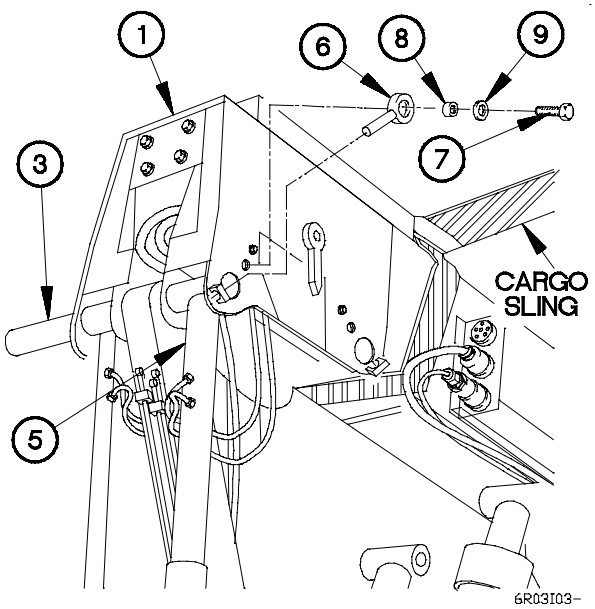
Steps (1) through (17) require the aid of assistant.

(1) Position boom assembly (1) in mounting position over erection cylinder (2).

(2) Install erection cylinder (2) in boom assembly (1) with pivot shaft (3).




(3) Install mast (4) in boom assembly (1) with pivot shaft (3).




(4) Install tension link cylinder (5) in boom assembly (1) with pivot shaft (3).

(5) Install rivet eyebolt (6) in pivot shaft (3).

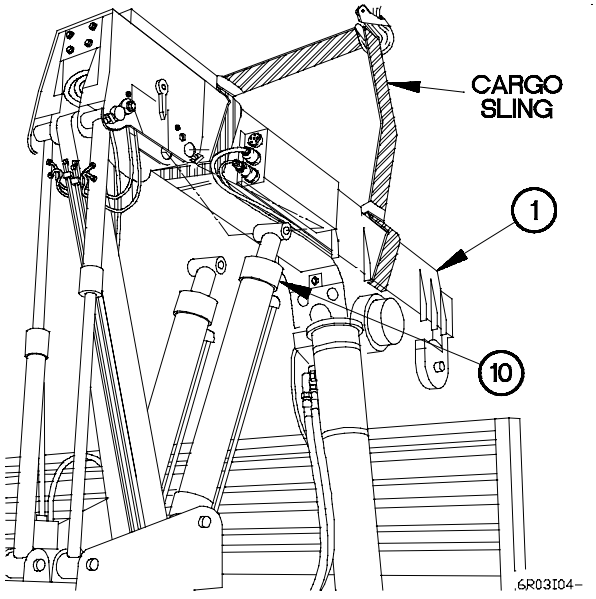
**WARNING**

**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.**

(6) Apply sealing compound to threads of screw (7).

(7) Position bushing (8), washer (9), and screw (7) in rivet eyebolt (6).

(8) Tighten screw (7) to 190-210 lb-ft (258-285 N·m).




(9) Raise RH lift cylinder (10) in position with boom assembly (1).

## 16-3. M1084/M1086 BOOM ASSEMBLY REPLACEMENT (CONT)

(10) Install upper pivot shaft (11) through RH lift cylinder (10) and boom assembly (1).

(11) Install rivet eyebolt (12) in pivot shaft (11).

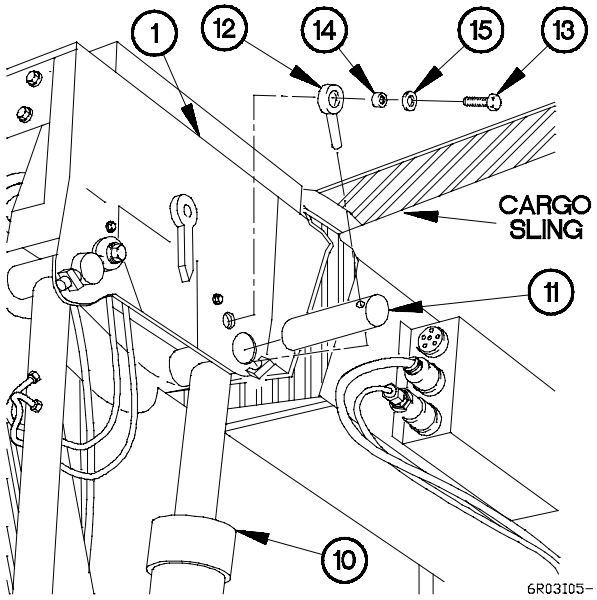
**WARNING**

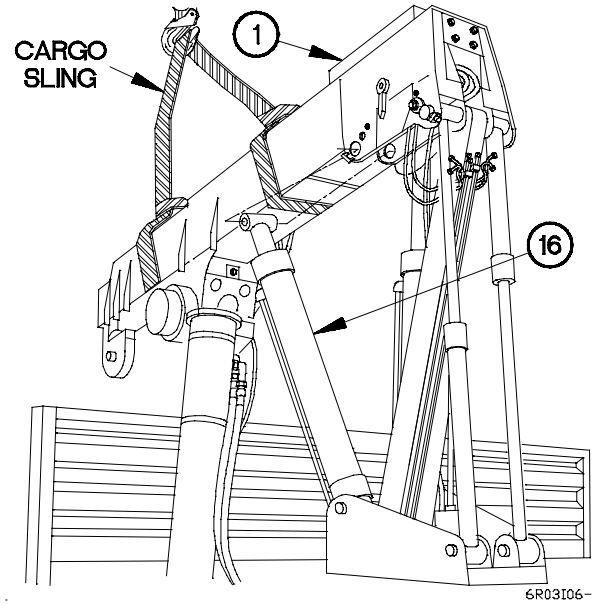
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(12) Apply sealing compound to threads of screw (13).

(13) Position bushing (14), washer (15), and screw (13) in rivet eyebolt (12).

(14) Tighten screw (13) to 190-210 lb-ft (258-285 N·m)




(15) Raise LH lift cylinder (16) in position with boom assembly (1).

(16) Install upper pivot shaft (17) through LH lift cylinder (16) and boom assembly (1).

(17) Install rivet eyebolt (18) in pivot shaft (17).

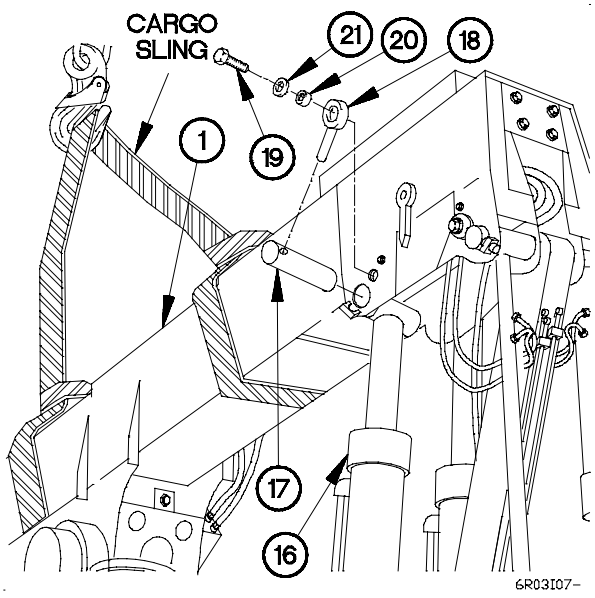
**WARNING**

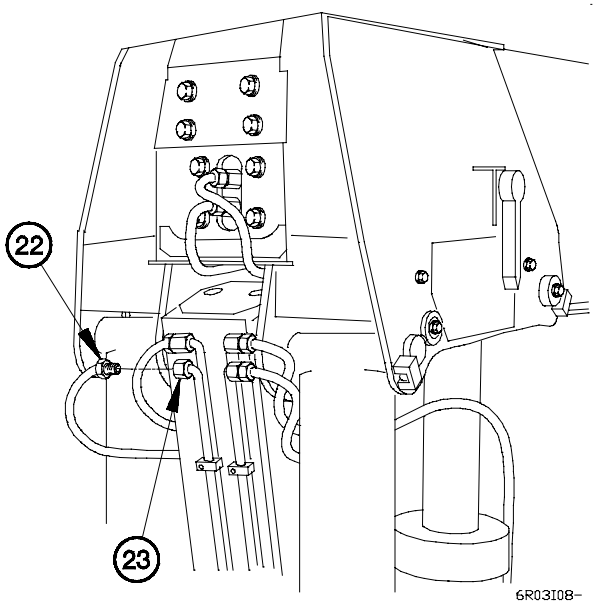
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(18) Apply sealing compound to threads of screws (19).

(19) Position bushing (20), washer (21), and screw (19) in rivet eyebolt (18).

(20) Tighten screw (19) to 190-210 lb-ft (258-285 N·m).



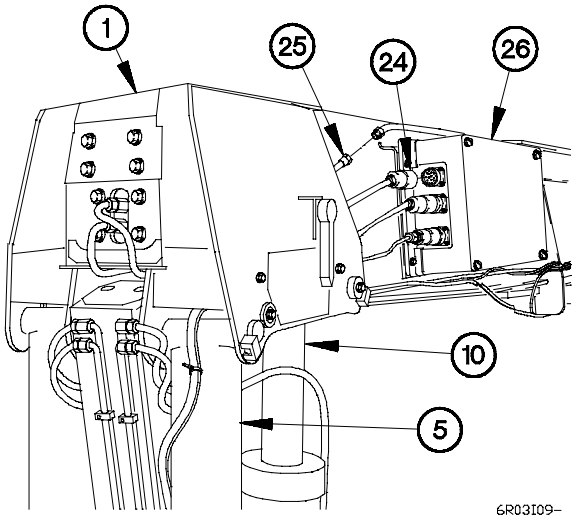




(21) Connect four hydraulic hoses (22) to fittings (23).

## 16-3. M1084/M1086 BOOM ASSEMBLY REPLACEMENT (CONT)

(22) Route overload lockout connector (24) over top of tension link cylinder (5) and RH lift cylinder (10).

(23) Route hydraulic hose (25) over top of tension link cylinder (5) and RH lift cylinder (10).




**NOTE**

Install plastic cable ties and cable clamps as required.

(24) Connect overload lockout connector (24) to top connection on overload shutdown box (26).

(25) Connect hydraulic hose (25) on right side of boom assembly (1).

**c. Follow-on Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Install hoist cable (TM 9-2320-366-20-5)

(3) Lubricate MHC (TM 9-2320-366-20).

(4) Perform crane load test (para 16-31).

**End of Task.**

## 16-4. M1084/M1086 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned level over cargo bed with boom mid section fully extended and boom fly section partially extended (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hook block assembly removed (TM 9-2320-366-20-5).
Boom sheave removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Tools and Special Tools (Cont)**
Caliper Set, Micrometer, Outside (Item 9, Appendix B)

**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Grease, Ord, Extreme Pressure (Item 38, Appendix C)
Pin, Cotter (4) (Item 324, Appendix F)
Sealing Compound (Item 76, Appendix C)
Rope, Fibrous (Item 62, Appendix C)

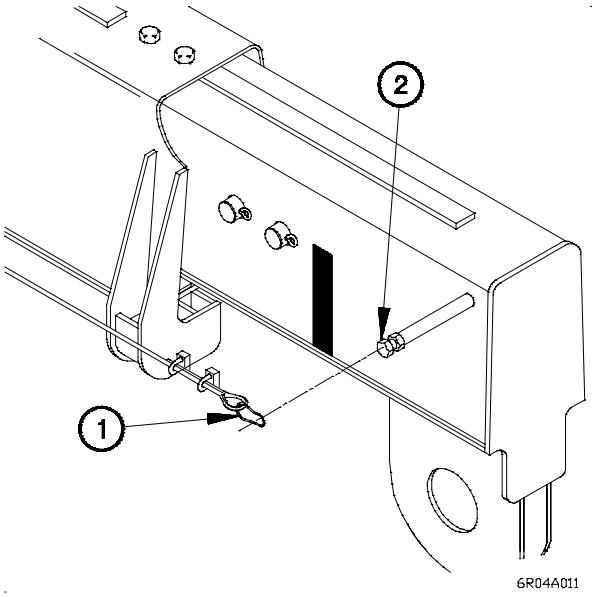
**Personnel Required**
(2)

**a. Removal.**

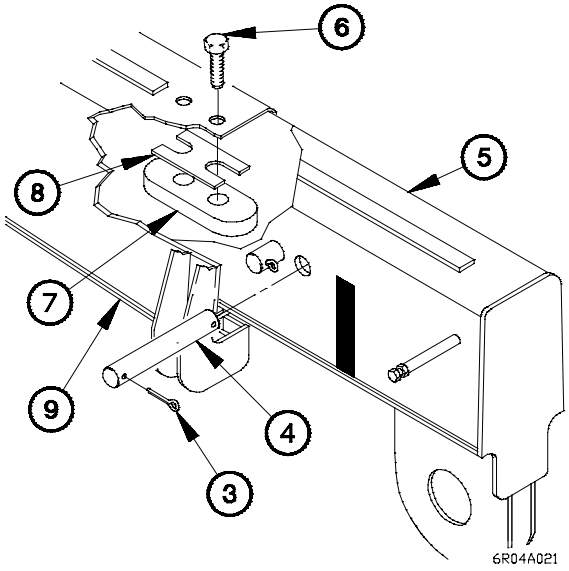
**CAUTION**

Overload shutdown cable is on a tension reel. Allow cable to rewind slowly. Failure to comply may result in damage to equipment.

(1) Remove overload shutdown cable eye (1) from screw (2).



## 16-4. M1084/M1086 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT (CONT)



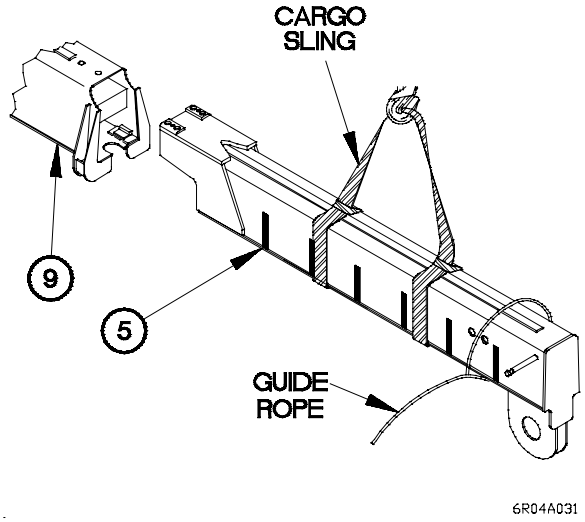

(2) Remove four cotter pins (3) from two shafts (4). Discard cotter pins.

(3) Remove two shafts (4) from boom fly section (5).

(4) Remove two screws (6), spacer block (7), and shim(s) (8) from boom mid section (9).

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



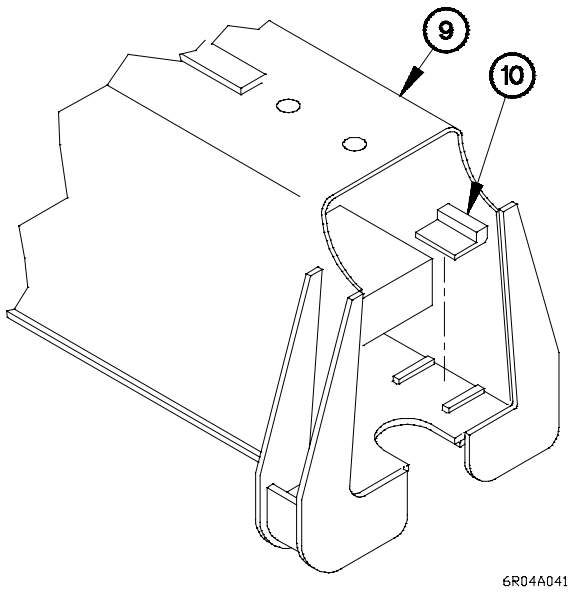

**NOTE**

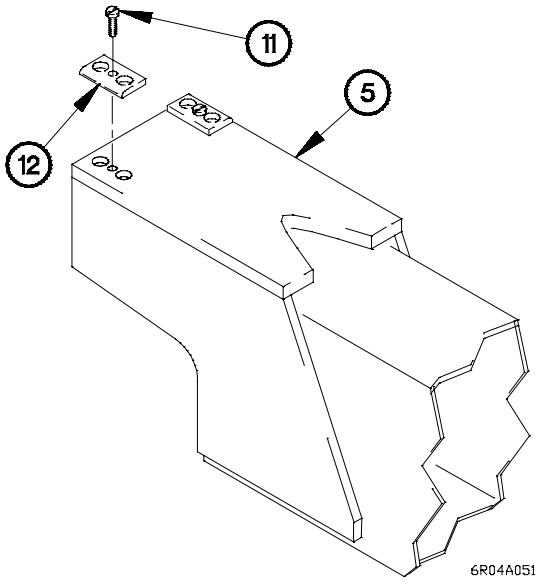
Steps (5) and (6) require the aid of an assistant.

(5) Adjust cargo sling to balance boom fly section (5).

(6) Remove boom fly section (5) from boom mid section (9).

(7) Remove two body wear pads (10) from end of boom mid section (9).




(8) Remove two screws (11) and upper wear pads (12) from boom fly section (5).

## 16-4. M1084/M1086 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT (CONT)

**b. Cleaning/Inspection.**

**WARNING**

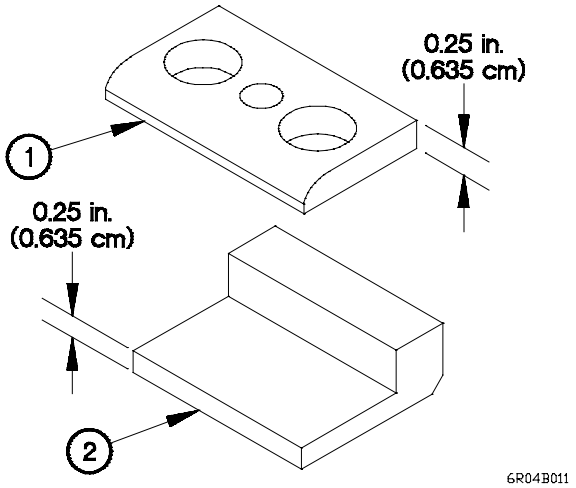
- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I dry cleaning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

(1) Clean two upper wear pads (1) thoroughly with dry cleaning solvent.

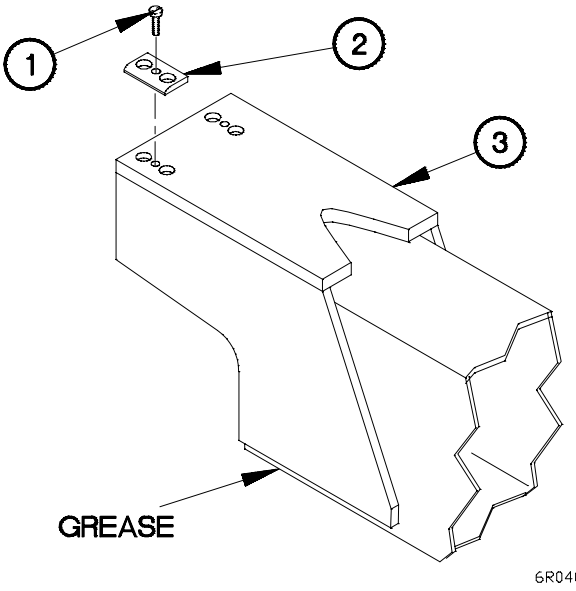
(2) Measure thickness of two upper wear pads (1). Replace wear pad if thickness measures less than 0.25 in. (0.635 cm).

(3) Clean two body wear pads (2) thoroughly with dry cleaning solvent.

(4) Measure thickness of two body wear pads (2). Replace wear pad if thickness measures less than 0.25 in. (0.635 cm).




**c. Installation.**




**WARNING**

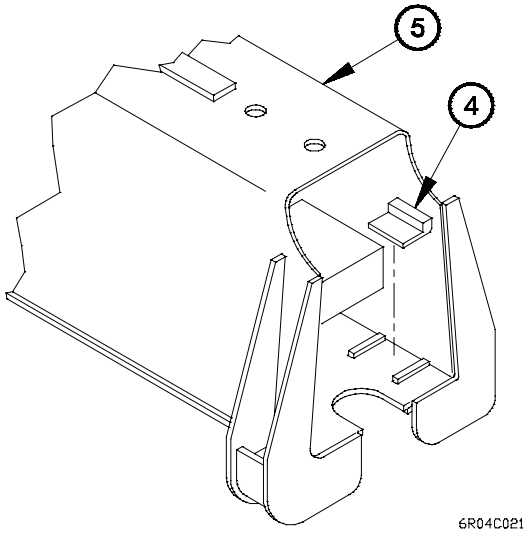
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Apply sealing compound to threads of two screws (1).

(2) Install two upper wear pads (2) on boom fly section (3) with screws (1).

(3) Apply grease to upper wear pads (2) and bottom edges of boom fly section (3).

(4) Install two body wear pads (4) in boom mid section (5).



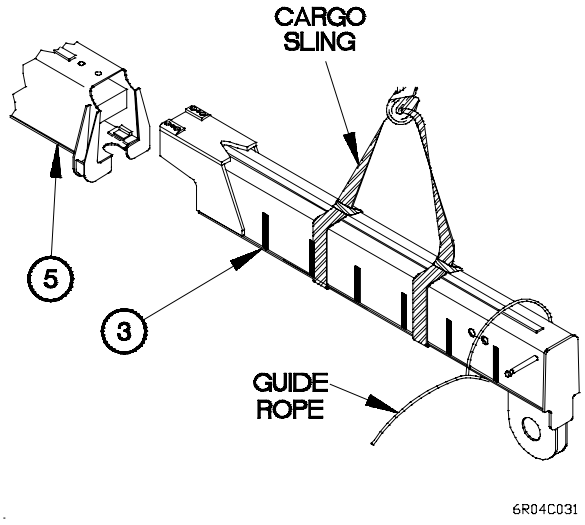

**WARNING**

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

**NOTE**

Step (5) requires the aid of an assistant.

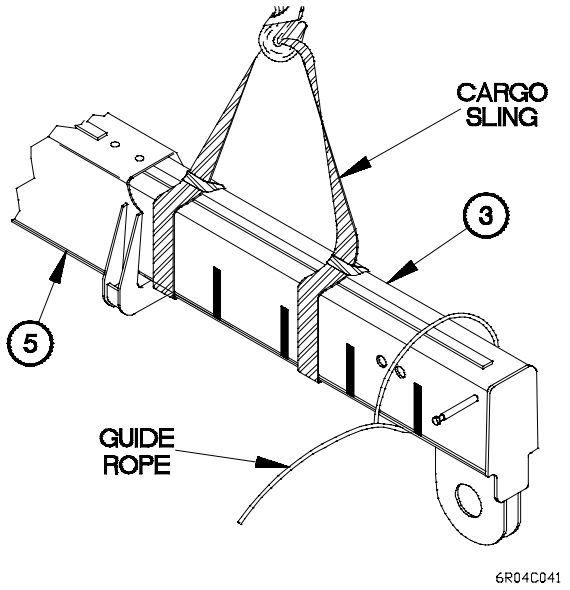
(5) Install boom fly section (3) in boom mid section (5).

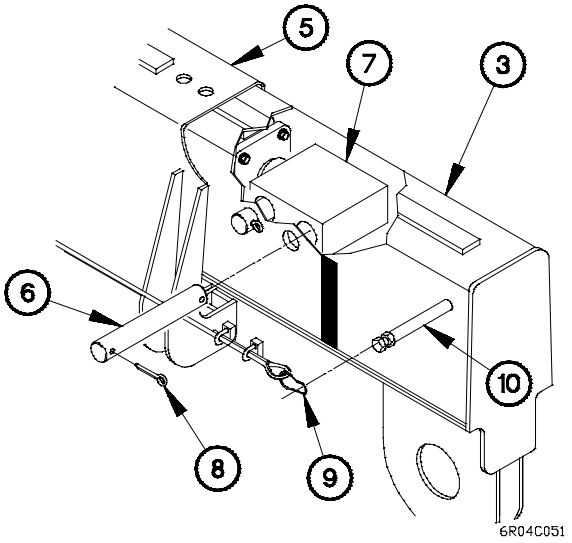


## 16-4. M1084/M1086 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT (CONT)

(6) Slide boom fly section (3) in boom mid section (5) as far as possible.

(7) Remove cargo sling and guide rope from boom fly section (3).




(8) Slide boom fly section (3) into boom mid section (5) as far as possible.

(9) Install two shafts (6) in telescopic cylinder (7).

(10) Install four cotter pins (8) in two shafts (6).

(11) Install overload shutdown cable eye (9) on screw (10).

**d. Adjustment.**

**NOTE**

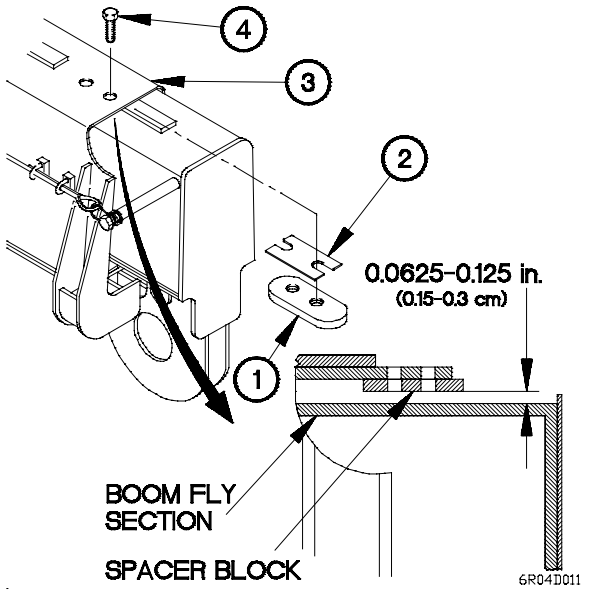
- Average thickness of spacer block is 0.375 in. (0.09 cm). Average thickness of shims is 0.0625 in. (0.15 cm).
- Add shims as required to reach a clearance of 0.0625 - 0.125 in. (0.15 - 0.3 cm) between spacer block and boom fly section.

(1) Position spacer block (1) and shim(s) (2) in boom mid section (3) with two screws (4).

(2) Tighten two screws (4) to 30-32 lb-ft (41-43 N·m).

(3) Connect batteries (TM 9-2320-366-20-3).

(4) Start engine (TM 9-2320-366-10-1).



**NOTE**

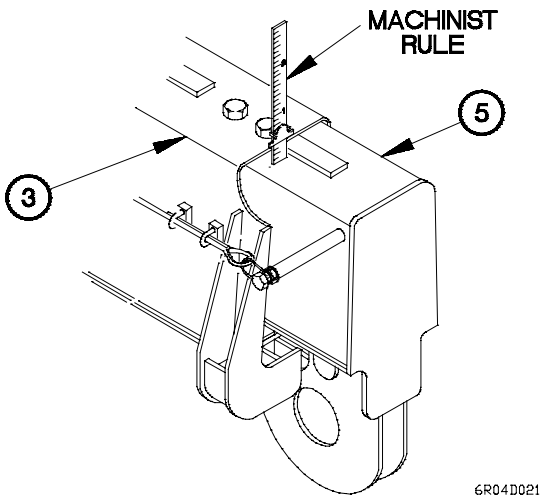
Step (5) requires the aid of an assistant.

(5) Operate crane to extend and retract boom fly section (5). Hold machinists rule at outer end of boom mid section (3) and observe reading on machinists rule to determine high spot of boom fly section (5).

(6) Operate crane to place high spot of boom fly section (5) directly under outer end of boom mid section (3).

(7) Repeat steps (1) and (2) to obtain required shim thickness.

(8) Shut down engine (TM 9-2320-366-10-1).




**e. Follow-On Maintenance.**

(1) Install boom sheave (TM 9-2320-366-20-5).

(2) Install hook block assembly (TM 9-2320-366-20-5).

(3) Perform crane load test (para 16-31).

**End of Task.**

## 16-5. M1084/M1086 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT

This task covers:

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

**INITIAL SETUP**

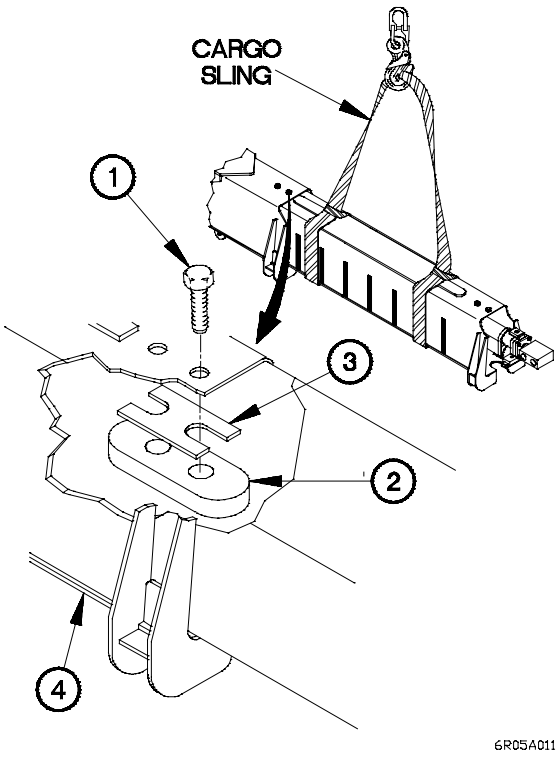
**Equipment Conditions**
Boom fly section removed (para 16-4).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Rope, Fibrous (Ir\tem 62, Appendix C)
Grease, Ord, Extreme Pressure (Item 38, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (2) (Item 262, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**




(1) Remove two screws (1), spacer block (2), and shim(s) (3) from outer end of boom base section (4).

**CAUTION**

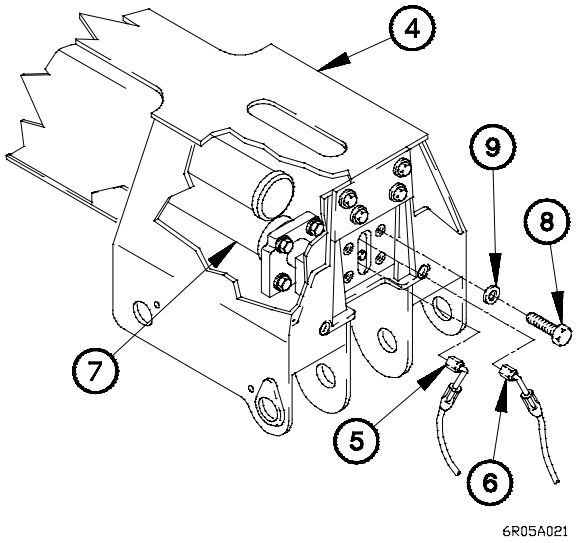
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

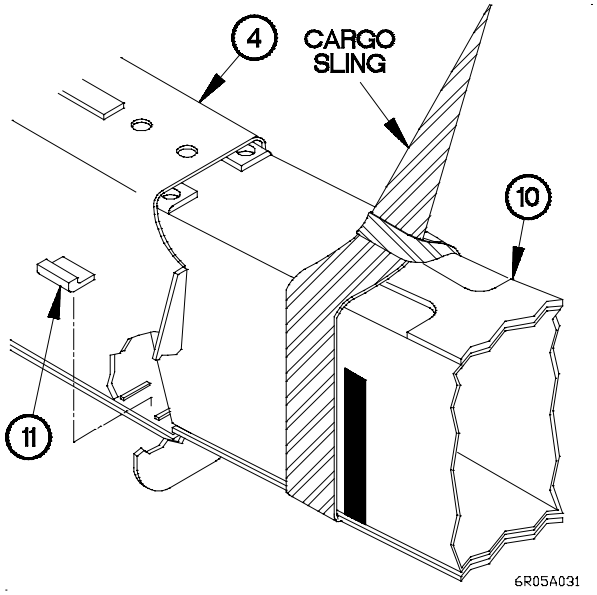
**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect hydraulic hoses (5 and 6) from telescopic cylinder (7).

(3) Remove four screws (8) and washers (9) from boom base section (4).




**NOTE**

Step (4) requires the aid of an assistant.

(4) Lift boom mid section (10) enough to allow removal of two body wear pads (11).

(5) Remove two body wear pads (11) from outer end of boom base section (4).

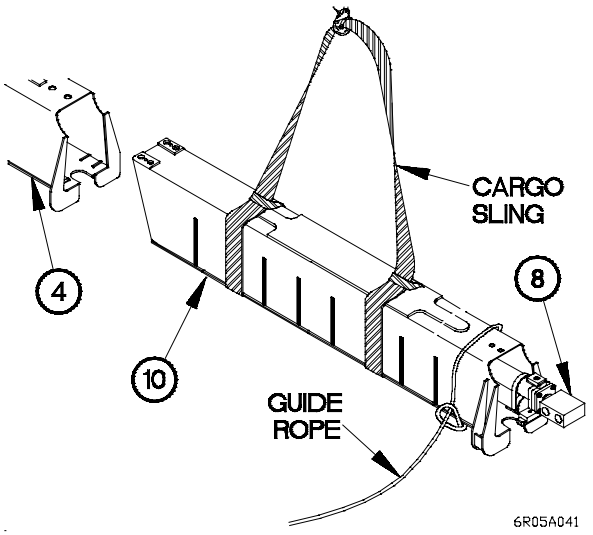
## 16-5. M1084/M1086 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT (CONT)

**WARNING**

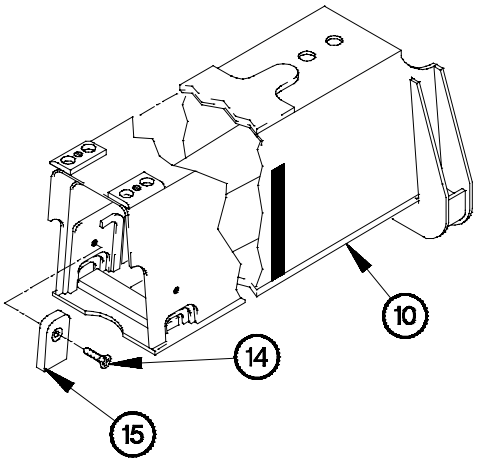
- **Boom mid section and telescopic cylinder combined weigh approximately 320 lbs (145 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**
- **A guide rope must be attached to aid in controlling boom mid section and telescopic cylinder during removal. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Steps (6) and (7) require the aid of an assistant.




(6) Remove boom mid section (10) and telescopic cylinder (8) from boom base section (4).




(7) Remove two screws (14) and cylinder support bars (15) from boom mid section (10).

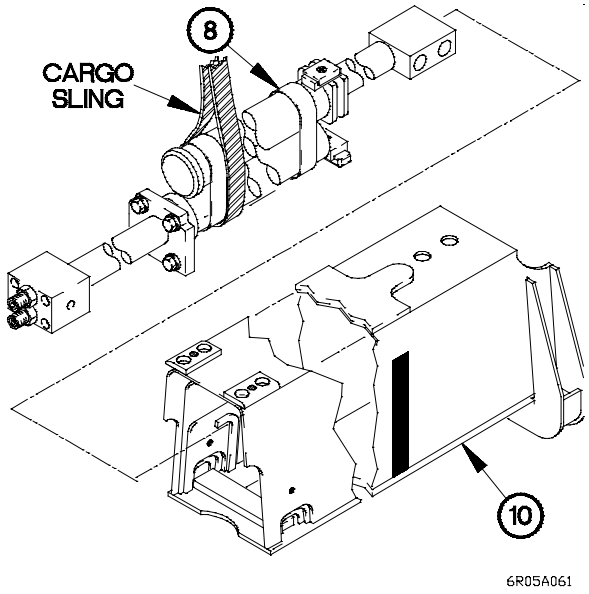
**WARNING**

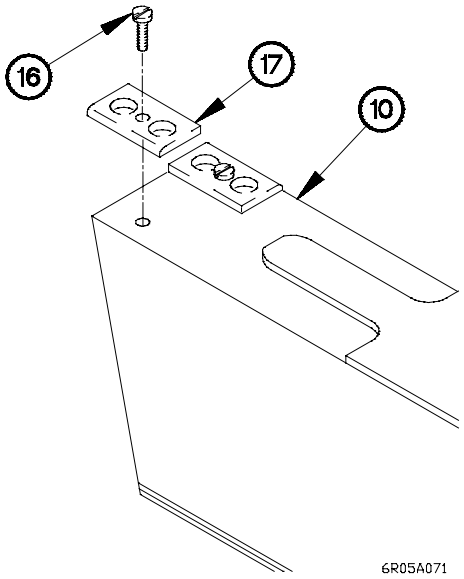
**Telescopic cylinder weighs approximately 150 lbs (68 kg). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Step (8) requires the aid of an assistant.

(8) Remove telescopic cylinder (8) from boom mid section (10).

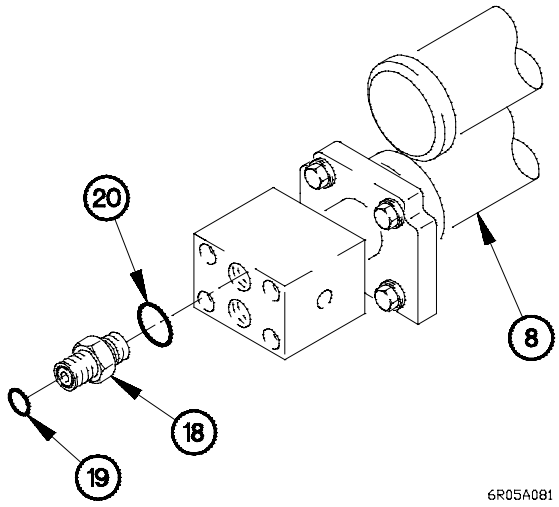



(9) Remove two screws (16) and upper wear pads (17) from top of boom mid section (10).

(10) Remove two fittings (18) from telescopic cylinder (8).

(11) Remove preformed packings (19 and 20) from two fittings (18). Discard preformed packings.



## 16-5. M1084/M1086 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT (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 serious injury or death to personnel.**

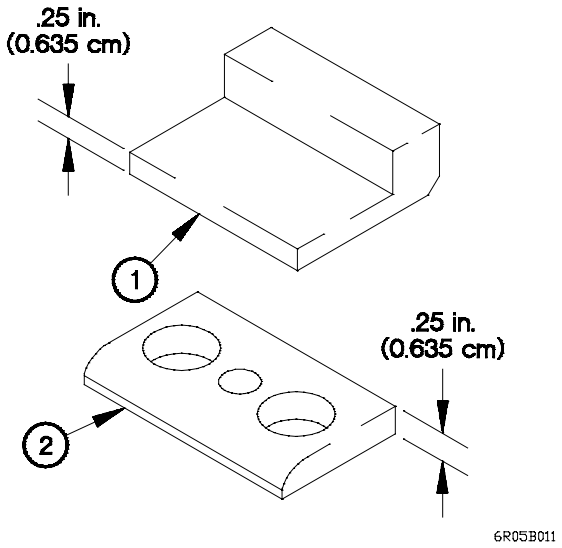
**NOTE**

Replace any part that fails visual inspection or size measurement requirements.

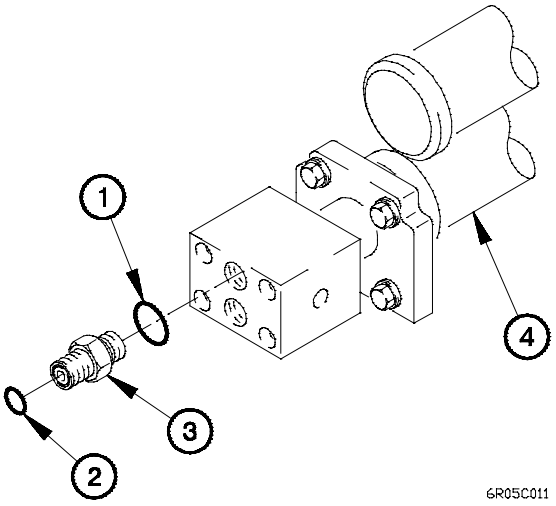
(1) Clean all metal parts with dry cleaning solvent.

(2) Measure thickness of two body wear pads (1), replace body wear pad if thickness measures less than 0.25 in. (0.635 cm).

(3) Measure thickness of two upper wear pads (2), replace upper wear pad if thickness measures less than 0.25 in. (0.635 cm).




**c. Installation.**




(1) Install preformed packings (1 and 2) on two fittings (3).

(2) Install two fittings (3) in telescopic cylinder (4).

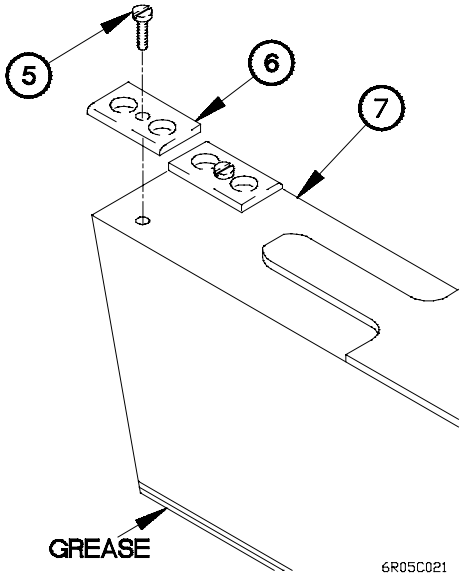
**WARNING**

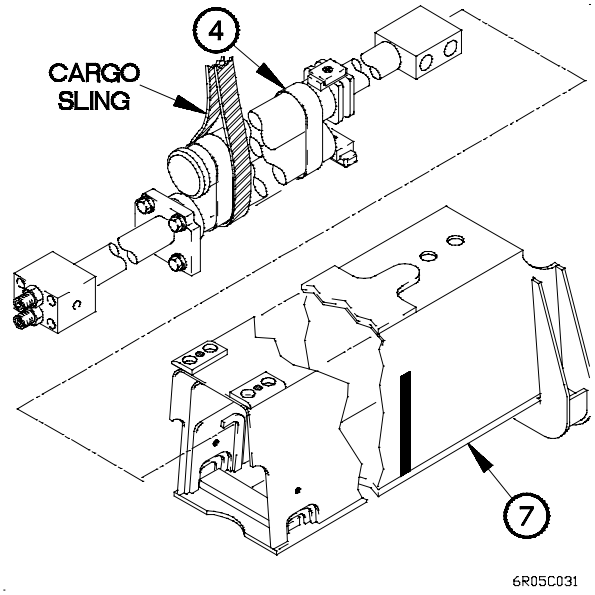
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(3) Apply sealing compound to threads of two screws (5).

(4) Install two upper wear pads (6) on boom mid section (7) with two screws (5).

(5) Apply grease to upper wear pads (6) and bottom edges of boom mid section (7).




(6) Extend telescopic cylinder (4) base shaft fully and fly shaft approximately 2 ft.

**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.**

**NOTE**

Step (7) requires the aid of an assistant.

(7) Install telescopic cylinder (4) in boom mid section (7).

## 16-5. M1084/M1086 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT (CONT)

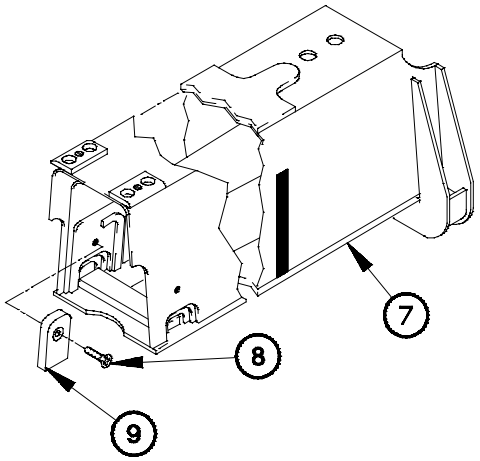
**WARNING**

**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.**

(8) Apply sealing compound to threads of two screws (8).

(9) Position two cylinder support bars (9) and screws (8) in boom mid section (7).

(10) Tighten screws (8) to 72-78 lb-ft (98-106 N·m).




6R05C041

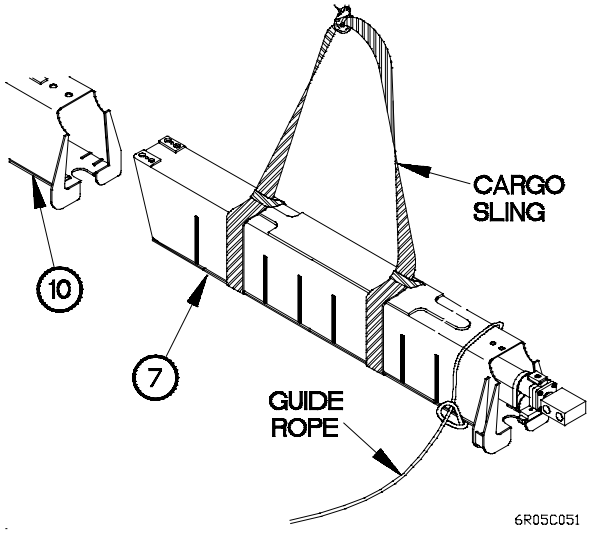
**WARNING**

- **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.**
- **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.**

**NOTE**

Steps (11) through (13) require the aid of an assistant.

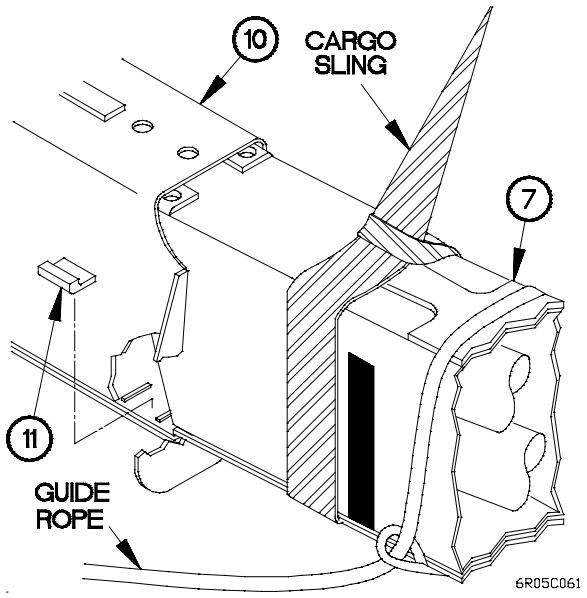
(11) Install boom mid section (7) into boom base section (10).

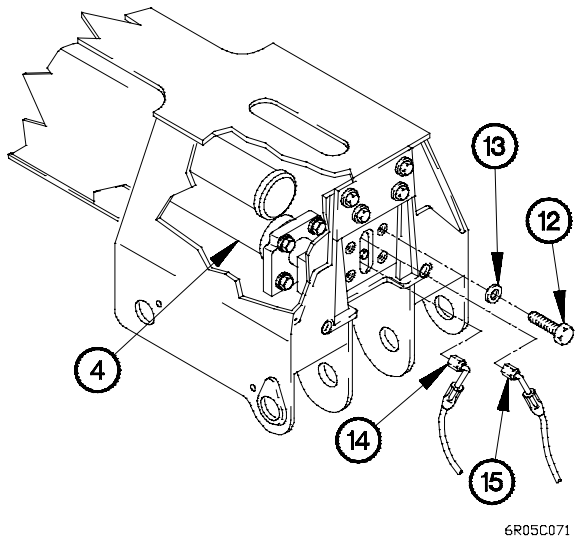



6R05C051

(12) Lift up on boom mid section (7) enough to allow installation of two body wear pads (11).

(13) Install two body wear pads (11) in boom base section (10).




**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.**

(14) Apply sealing compound to threads of four screws (12).

(15) Position four washers (13) and screws (12) in telescopic cylinder (4).

(16) Tighten screws (12) to 144-156 lb-ft (195-212 N·m).

(17) Connect hydraulic hoses (14 and 15) to telescopic cylinder (4).

## 16-5. M1084/M1086 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT (CONT)

**d. Adjustment.**

**NOTE**

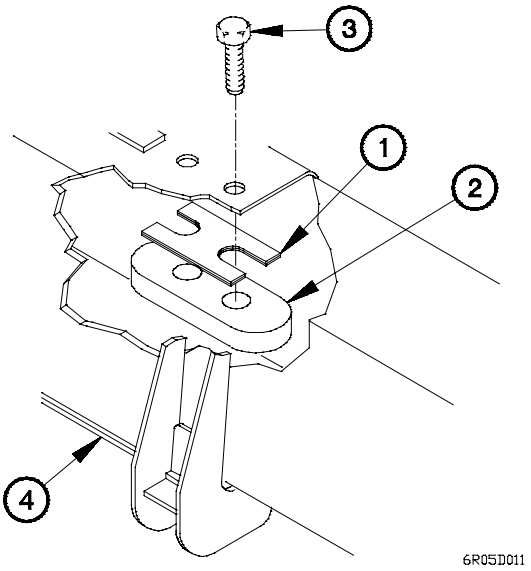
- Nominal thickness of spacer block is 3/8 in. (0.9 cm). Nominal thickness of shims is 1/16 in. (0.15 cm).
- Add shims as required to achieve a clearance of 1/16 - 1/8 in. (0.15 - 0.3 cm) between spacer block and boom fly section.

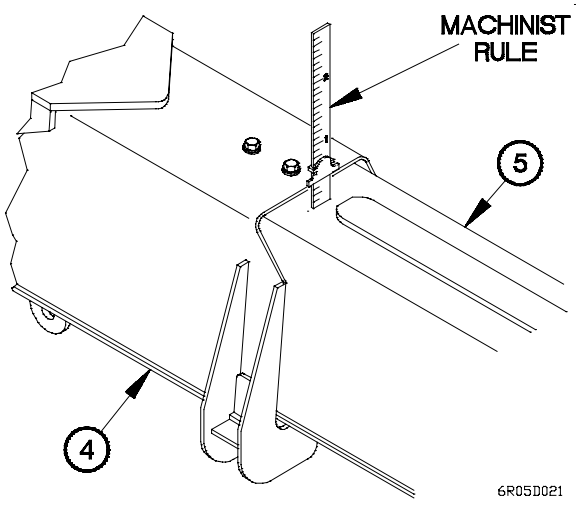
(1) Position shim(s) (1), spacer block (2) and two screws (3) on outer end of boom base section (4).

(2) Tighten screws (3) to 30-32 lb-ft (41-44 N·m).

(3) Connect batteries (TM 9-2320-366-20-3).

(4) Start engine (TM 9-2320-366-10-1).




**NOTE**

Step (5) requires the aid of an assistant.

(5) Operate crane to extend and retract boom mid section.

(6) Hold machinists rule at outer end of boom base section (4) and observe reading on machinists rule to determine high spot of boom mid section (5).

(7) Operate crane to place high spot of boom mid section (5) directly under outer end of boom base section (4).

(8) Repeat Steps (1) and (2) to obtain required shim thickness.

**e. Follow-On Maintenance.**

(1) Install boom fly section (para 16-4).

(2) Perform crane load test (para 16-31).

(3) Shutdown engine (TM 9-2320-366-10-1).

**End of Task.**

## 16-6. M1084/M1086 BOOM BASE SECTION REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned level over cargo bed (TM 9-2320-366-10-1).
Boom mid section and telescopic cylinder removed (para 16-5).
Overload shutdown removed (para 16-22).
Proximity sensor removed (para 16-15).
Hoist assembly removed (para 16-13).
Tension load cell removed (para 16-16).
Boom hoses removed (TM 9-2320-366-20-5).
Boom tubes removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)

**Tools and Special Tools (Cont)**
Wrench Set, Socket (Item 84, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**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.**

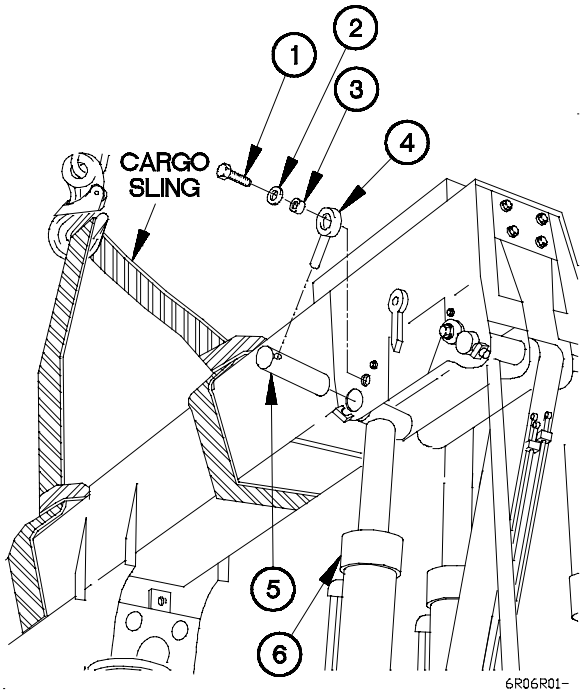
(1) Remove screw (1), washer (2), and bushing (3) from rivet eyebolt (4).

(2) Remove rivet eyebolt (4) from pivot shaft (5).

**NOTE**

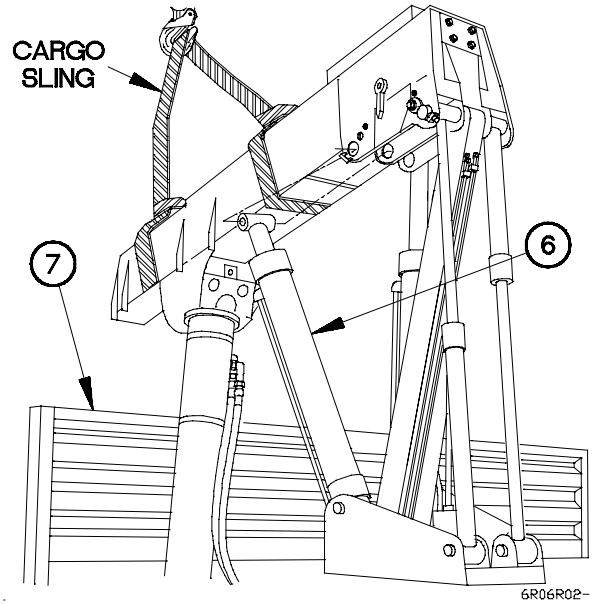
Step (3) requires the aid of an assistant.

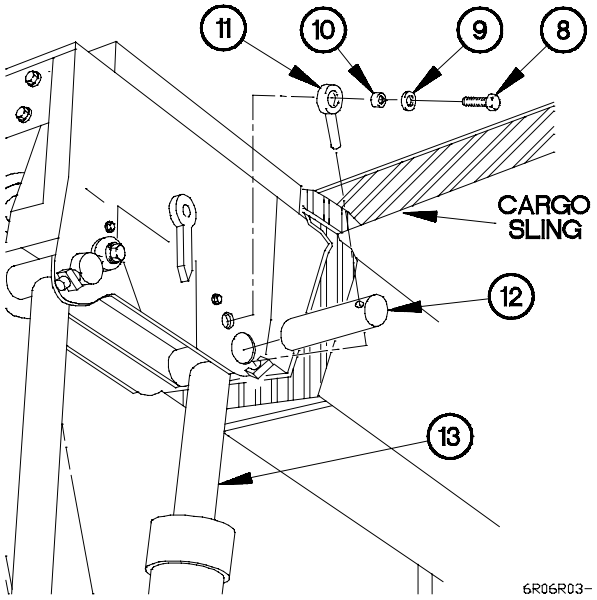
(3) Remove pivot shaft (5) from LH lift cylinder (6).



## 16-6. M1084/M1086 BOOM BASE SECTION REPLACEMENT (CONT)

(4) Position LH lift cylinder (6) against cargo bed rear panel (7).




(5) Remove screw (8), washer (9), and bushing (10) from rivet eyebolt (11).

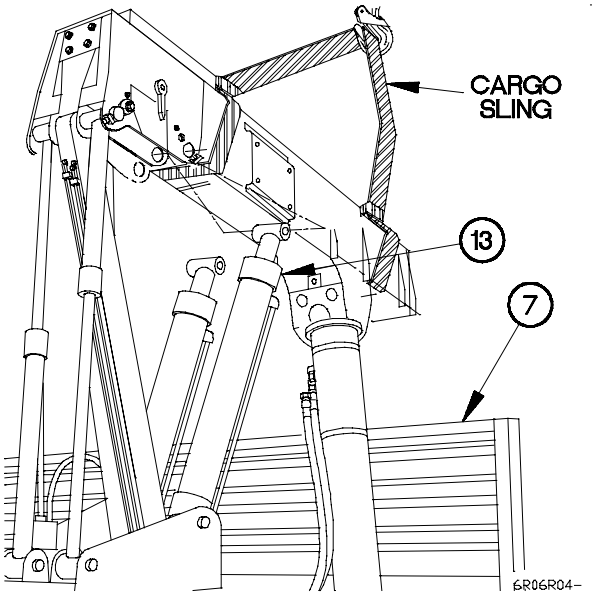
(6) Remove rivet eyebolt (11) from pivot shaft (12).

**NOTE**

Step (7) requires the aid of an assistant.

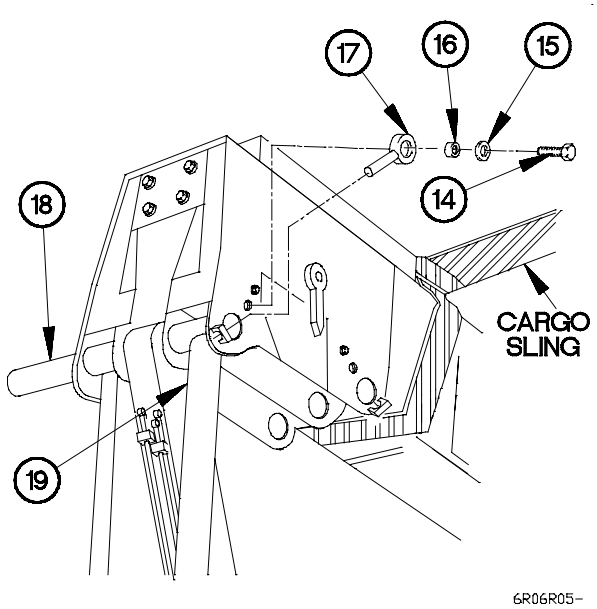
(7) Remove pivot shaft (12) from RH lift cylinder (13).

(8) Position RH lift cylinder (13) against cargo bed rear panel (7).



(9) Remove screw (14), washer (15), and bushing (16) from rivet eyebolt (17).

(10) Remove rivet eyebolt (17) from pivot shaft (18).



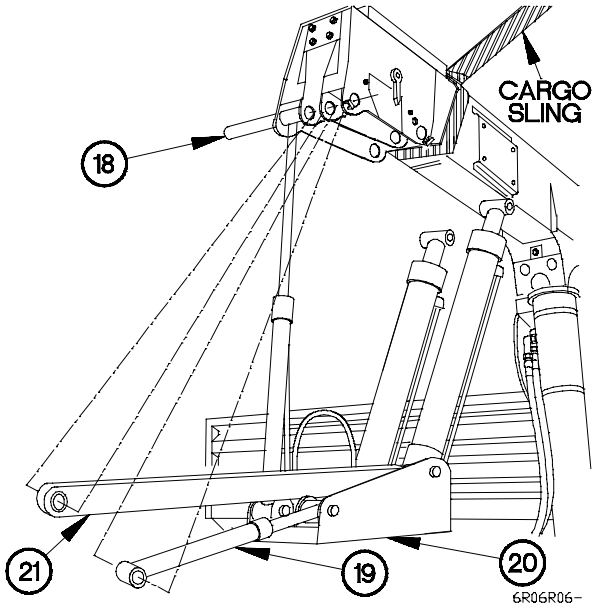

**WARNING**

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

**NOTE**

Steps (11) through (17) require the aid of an assistant.

(11) Drive pivot shaft (18) from tension link cylinder (19).




(12) Position tension link cylinder (19) against turntable (20).

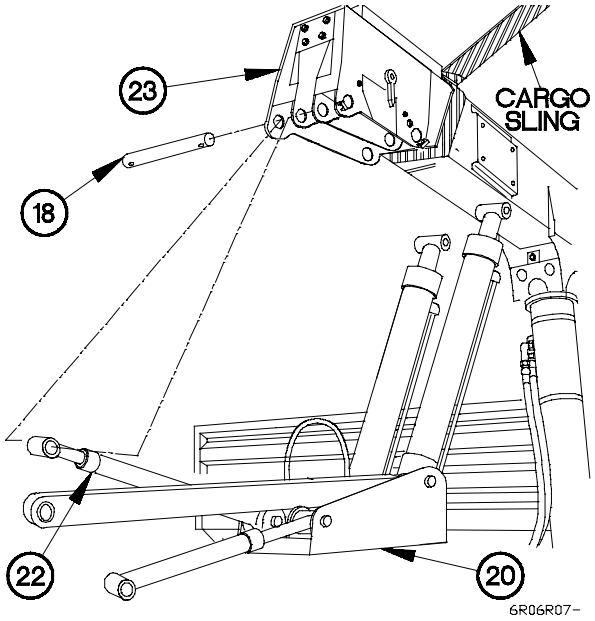
**WARNING**

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

(13) Drive pivot shaft (18) from mast (21).

(14) Position mast (21) against turntable (20).

## 16-6. M1084/M1086 BOOM BASE SECTION REPLACEMENT (CONT)

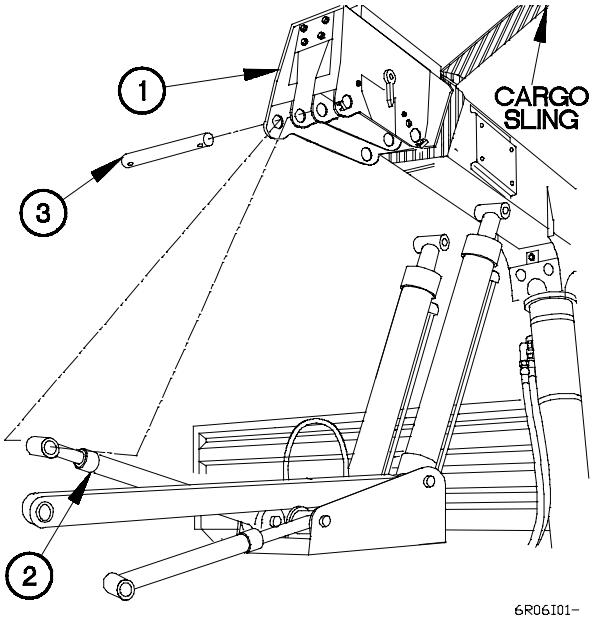



(15) Remove pivot shaft (18) from erection cylinder (22).

(16) Position erection cylinder (22) against turntable (20).

(17) Remove boom base section (23) from vehicle.

**b. Installation.**




**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.**

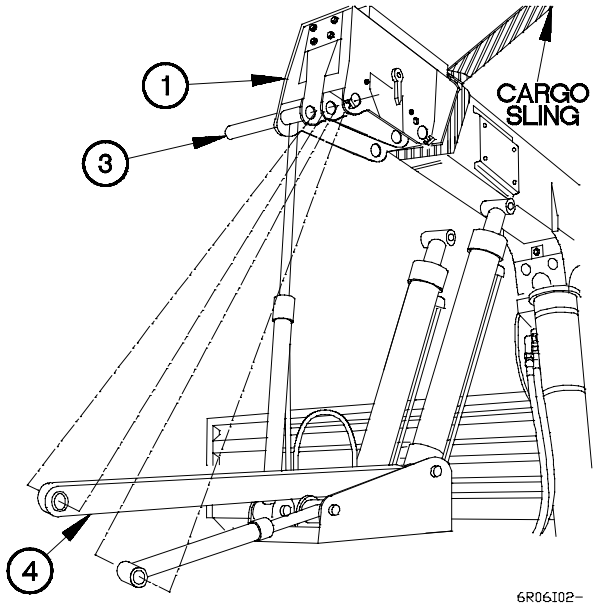
**NOTE**

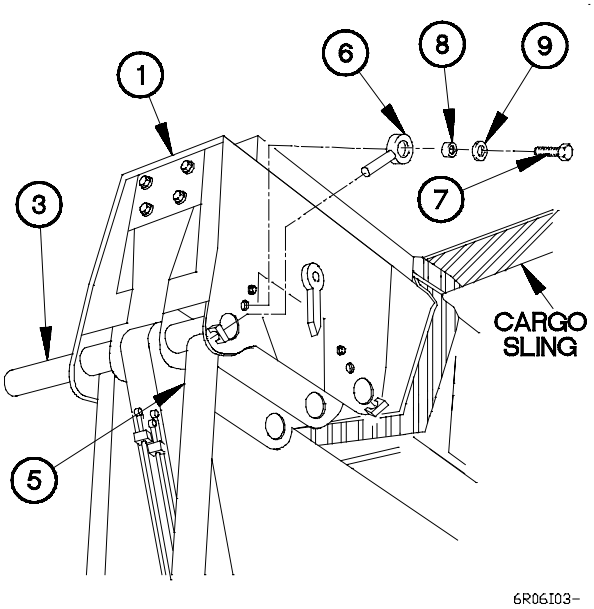
Steps (1) through (4) require the aid of an assistant.

(1) Position boom base section (1) in mounting position over erection cylinder (2).

(2) Install erection cylinder (2) in boom base section (1) with pivot shaft (3).

(3) Install mast (4) in boom base section (1) with pivot shaft (3).




(4) Install tension link cylinder (5) in boom base section (1) with pivot shaft (3).

(5) Install rivet eyebolt (6) in pivot shaft (3).

**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.**

(6) Apply sealing compound to threads of screw (7).

(7) Position bushing (8), washer (9), and screw (7) in rivet eyebolt (6).

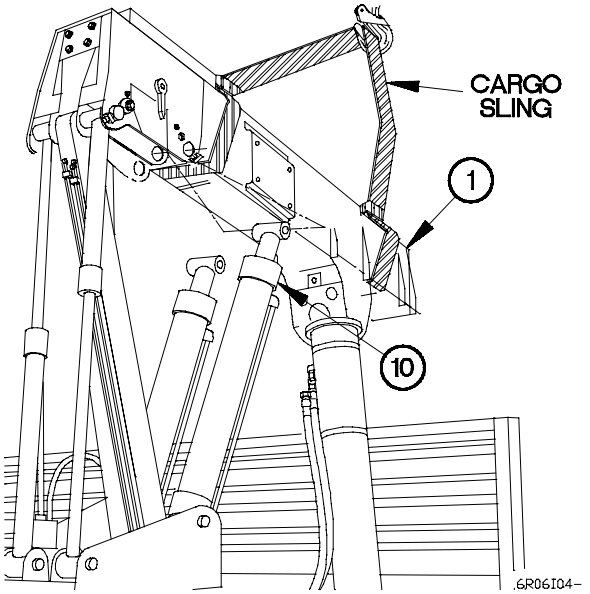
(8) Tighten screw (7) to 190-210 lb-ft (258-285 N·m).

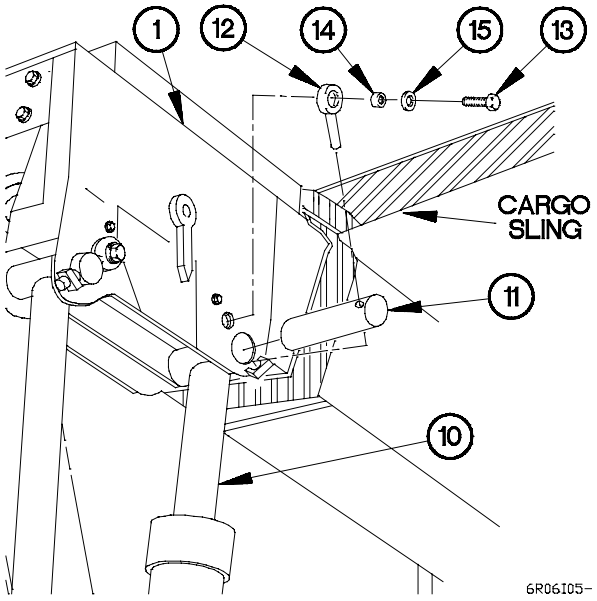
## 16-6. M1084/M1086 BOOM BASE SECTION REPLACEMENT (CONT)

**NOTE**

Step (9) requires the aid of an assistant.

(9) Raise RH lift cylinder (10) in position with boom base section (1).




(10) Install upper pivot shaft (11) in RH lift cylinder (10).

(11) Install rivet eyebolt (12) in pivot shaft (11).

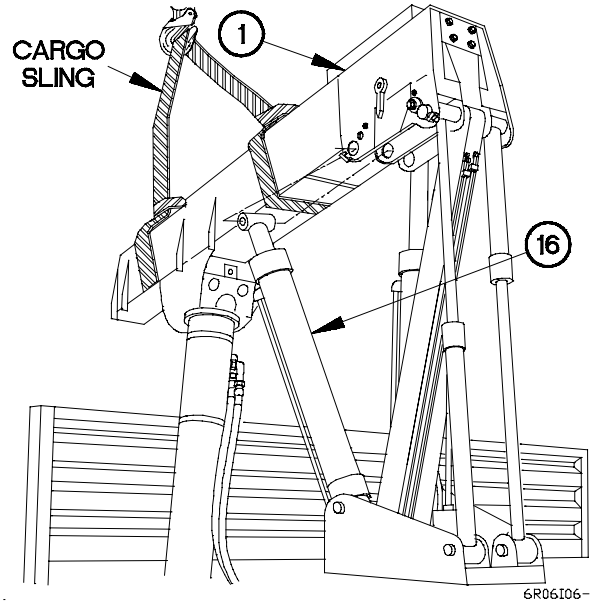
**WARNING**

**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.**

(12) Apply sealing compound to threads of screw (13).

(13) Position bushing (14), washer (15), and screw (13) in rivet eyebolt (12).

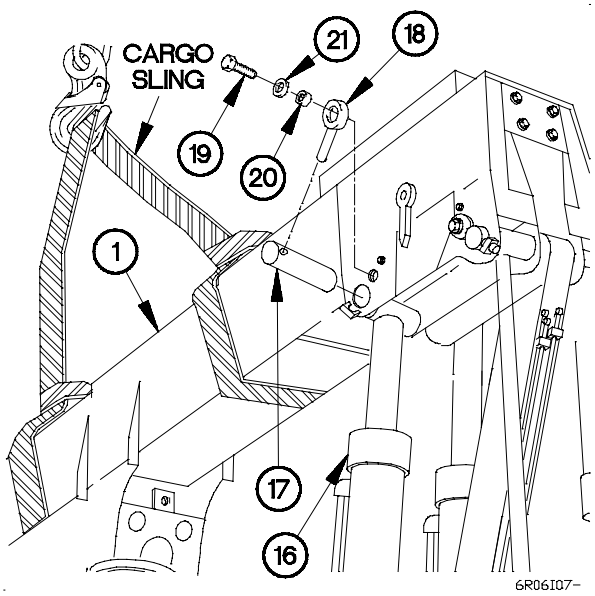
(14) Tighten screw (13) to 190-210 lb-ft (258-285 N·m).




**NOTE**

Step (15) requires the aid of an assistant.

(15) Raise LH lift cylinder (16) in position with boom base section (1).




(16) Install upper pivot shaft (17) in LH lift cylinder (16).

(17) Install rivet eyebolt (18) in pivot shaft (17).

**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.**

(18) Apply sealing compound to threads of screw (19).

(19) Position bushing (20), washer (21), and screw (19) in rivet eyebolt (18).

(20) Tighten screw (19) to 190-210 lb-ft (258-285 N·m).

(21) Apply grease to grease fittings for tension link cylinder, erection cylinder, and lift cylinders (TM 9-2320-366-20-2).

## 16-6. M1084/M1086 BOOM BASE SECTION REPLACEMENT (CONT)

**c. Follow-On Maintenance.**

(1) Install boom tubes (TM 9-2320-366-20-5).

(2) Install boom hoses (TM 9-2320-366-20-5).

(3) Install tension load cell (para 16-16).

(4) Install hoist assembly (para 16-13).

(5) Install proximity switch (para 16-15).

(6) Install overload shutdown (para 16-22).

(7) Install boom mid section and telescopic cylinder (para 16-5).

(8) Check fluid level in hydraulic reservoir; refill as required (TM 9-2320-366-20).

(9) Perform crane load test (para 16-31).

**End of Task.**

## 16-7. M1084/M1086 LIFT CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
MHC erected with end of boom level over cargo bed (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)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)

**Materials/Parts (Cont)**
Grease, Automotive and Artillery (Item 35, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (3) (Item 236, Appendix F)
Packing, Preformed (Item 262, Appendix F)
Packing, Preformed (Item 235, Appendix F)
Packing, Preformed (Item 261, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**CAUTION**

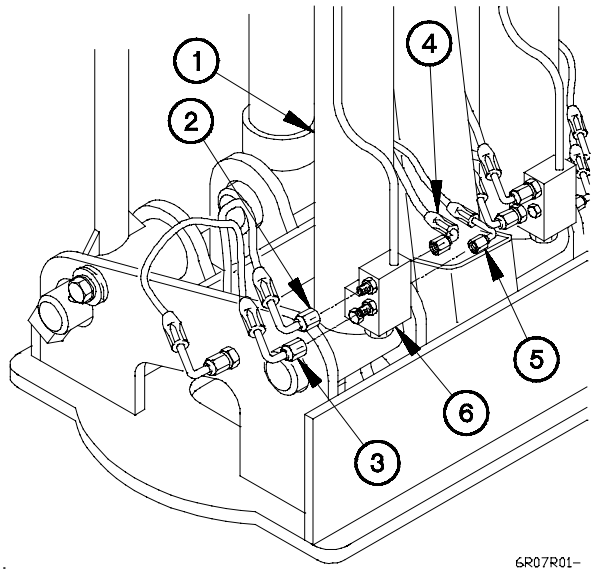
Cap or plug hydraulic connections to prevent contaminating hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

- Tag hydraulic hoses and connection points prior to disconnecting.
- LH and RH lift cylinders are removed the same way. RH lift cylinder shown.

(1) Position drain pan under RH lift cylinder (1).

(2) Disconnect hydraulic hoses (2 through 5) from counterbalance valve (6).



## 16-7. M1084/M1086 LIFT CYLINDER REPLACEMENT (CONT)

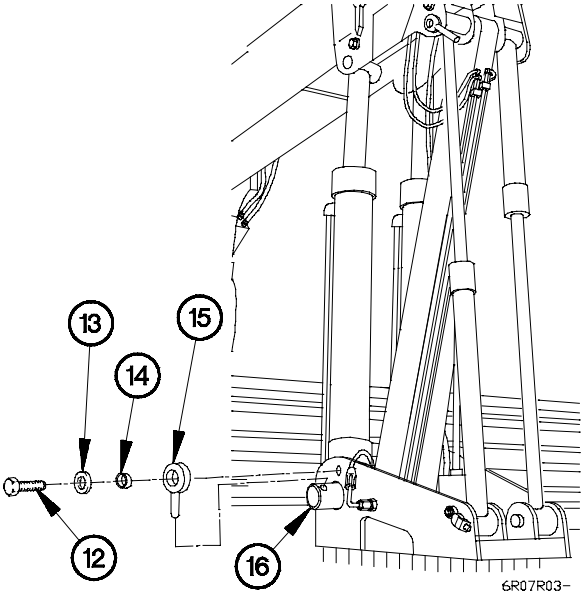
**WARNING**

**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.**

(3) Remove screw (7), washer (8), and bushing (9) from rivet eyebolt (10).

(4) Remove rivet eyebolt (10) from pivot shaft (11).

(5) Remove pivot shaft (11) from RH lift cylinder (1).

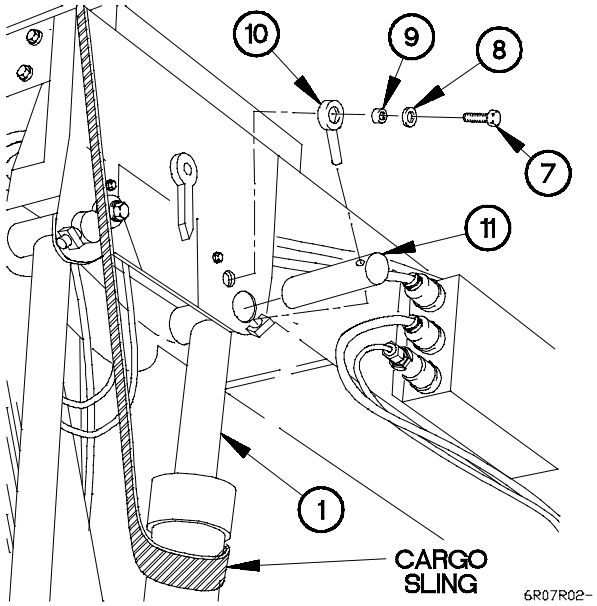



**NOTE**

- Steps (8) and (9) require the aid of an assistant.
- Drive out pivot shaft enough to free RH lift cylinder.

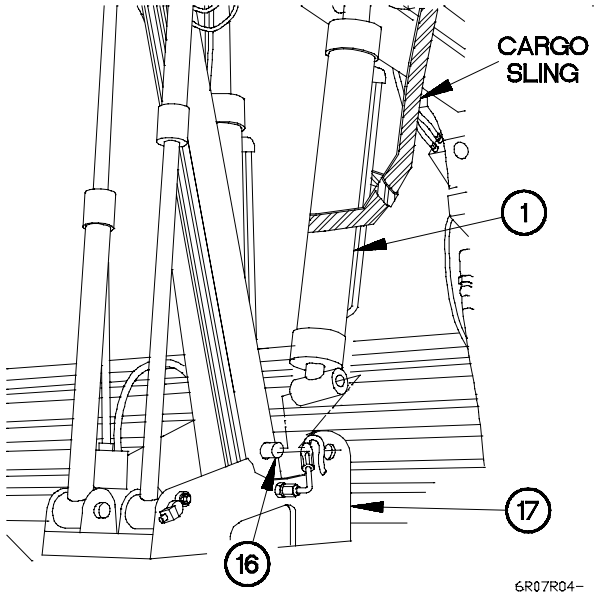
(8) Drive pivot shaft (16) out of RH lift cylinder (1).

(9) Remove RH lift cylinder (1) from turntable (17).




(6) Remove screw (12), washer (13), and bushing (14) from rivet eyebolt (15).

(7) Remove rivet eyebolt (15) from pivot shaft (16).



(10) Remove fitting (19) from counterbalance valve (6).

(11) Remove preformed packings (20 and 21) from fitting (19). Discard preformed packings.

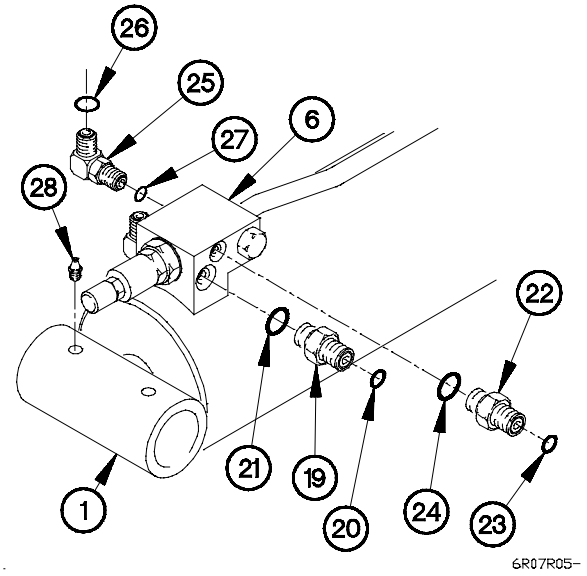
(12) Remove fitting (22) from counterbalance valve (6).

(13) Remove preformed packings (23 and 24) from fitting (22). Discard preformed packings.

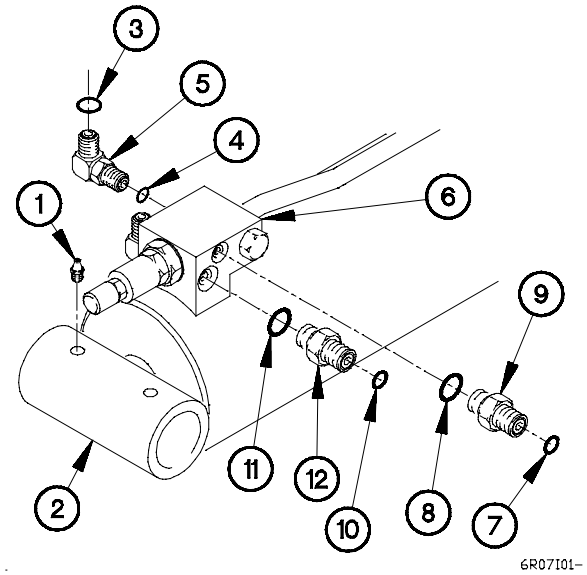
(14) Remove two 90-degree fittings (25) from counterbalance valve (6).

(15) Remove two preformed packings (26 and 27) from 90-degree fittings (25). Discard preformed packings.

(16) Remove two grease fittings (28) from each end of lift cylinder (1).




**b. Installation.**




(1) Install two grease fittings (1) in each end of lift cylinder (2).

(2) Install two preformed packings (3 and 4) on 90-degree fittings (5).

(3) Install two 90-degree fittings (5) in counterbalance valve (6).

(4) Install preformed packings (7 and 8) on fitting (9).

(5) Install fitting (9) in counterbalance valve (6).

(6) Install preformed packings (10 and 11) on fitting (12).

(7) Install fitting (12) in counterbalance valve (6).

## 16-7. M1084/M1086 LIFT CYLINDER REPLACEMENT (CONT)

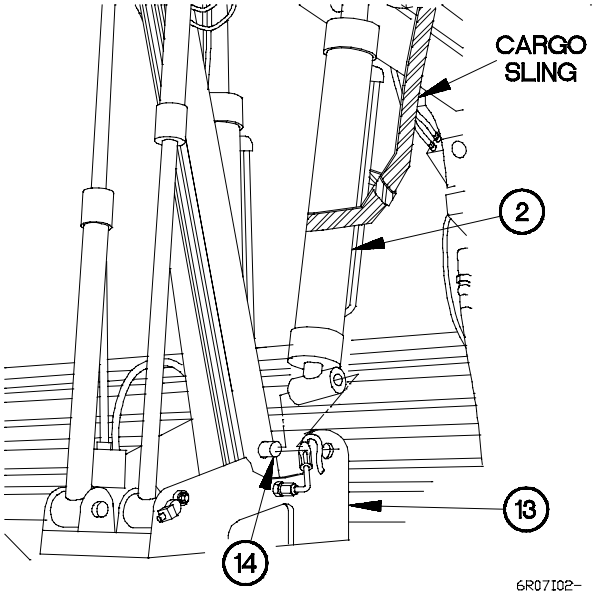
**WARNING**

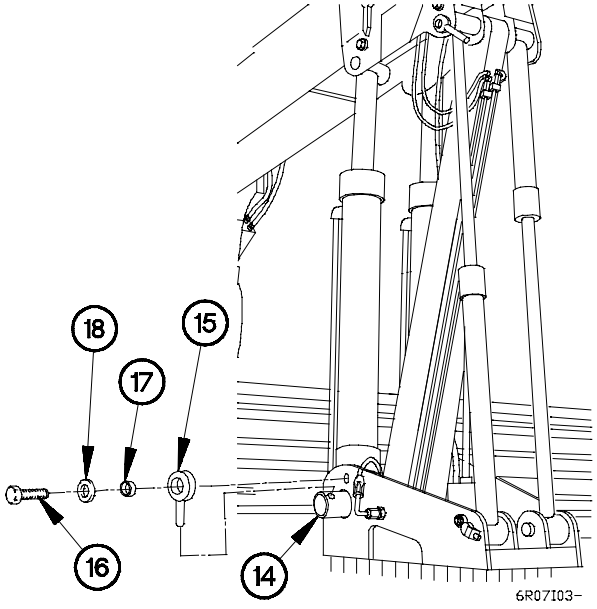
**Lift cylinder assembly weighs approximately 100 lbs (45 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

- Step (8) requires the aid of an assistant.
- LH and RH lift cylinder are installed the same way. RH lift cylinder shown.

(8) Install lift cylinder (2) in turntable (13) with pivot shaft (14).




(9) Install rivet eyebolt (15) in pivot shaft (14).

**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.**

(10) Apply sealing compound to threads of screw (16).

(11) Position bushing (17), washer (18), and screw (16) in rivet eyebolt (15).

(12) Tighten screw (16) to 190-210 lb-ft (258-285 N•m).

(13) Install lift cylinder (2) in boom assembly (19) with pivot shaft (20).

(14) Install rivet eyebolt (21) in pivot shaft (20).

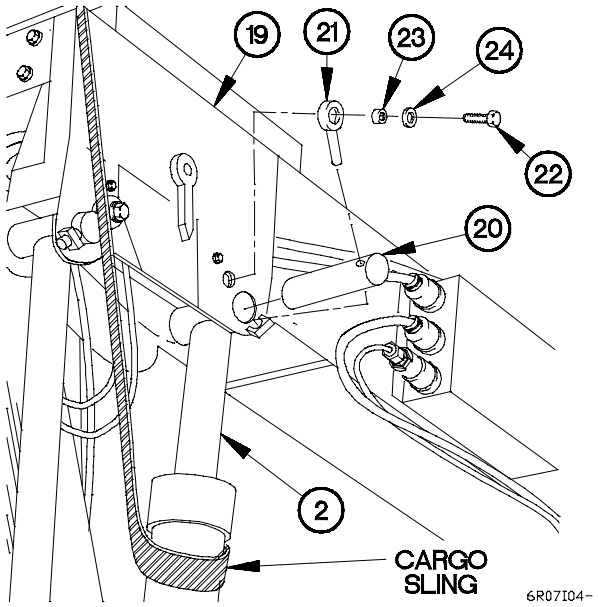
**WARNING**

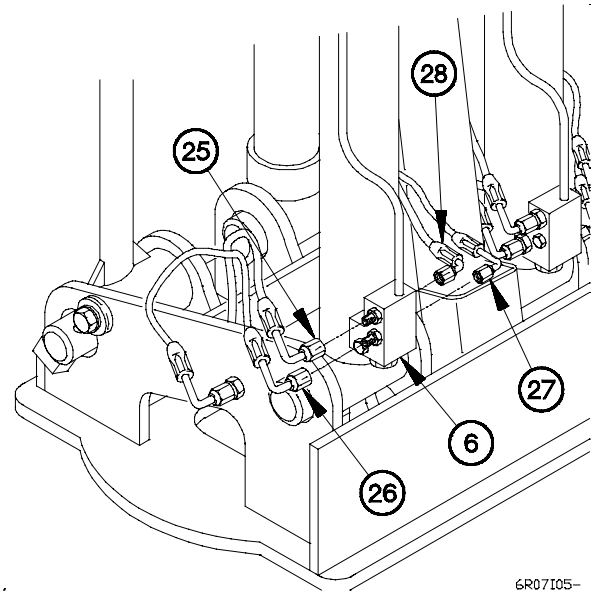
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(15) Apply sealing compound to threads of screw (22).

(16) Install bushing (23), washer (24), and screw (22) in rivet eyebolt (21).

(17) Tighten screw (22) to 190-210 lb-ft (258-285 N·m).




(18) Connect hydraulic hoses (25 through 28) to counterbalance valve (6).

**c. Follow-On Maintenance.**

(1) Lubricate MHC (TM 9-2320-366-20).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-8. M1084/M1086 ERECTION CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
MHC erected with end of boom lowered in cargo bed (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)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)
Packing, Preformed (2) (Item 235, Appendix F)
Packing, Preformed (2) (Item 261, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

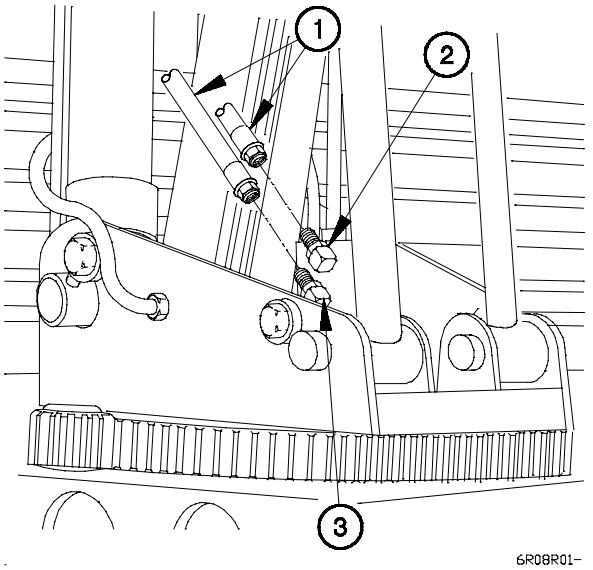
**CAUTION**

Cap or plug hydraulic openings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(1) Disconnect two hydraulic hoses (1) from 90-degree fittings (2 and 3).



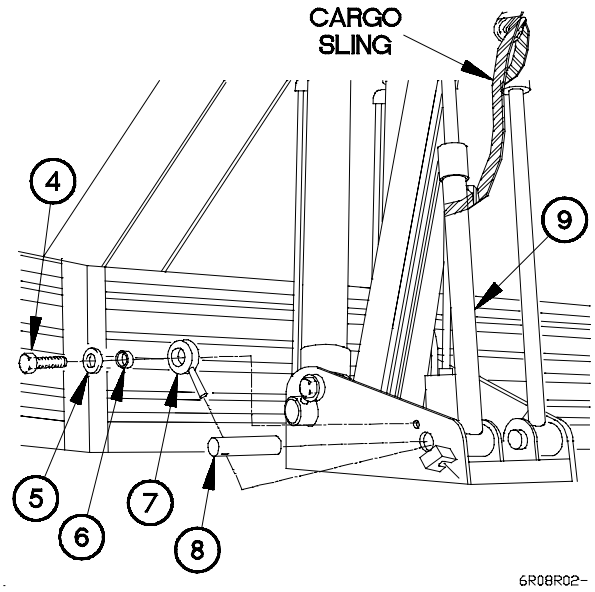
(2) Remove screw (4), washer (5), and bushing (6) from rivet eyebolt (7).

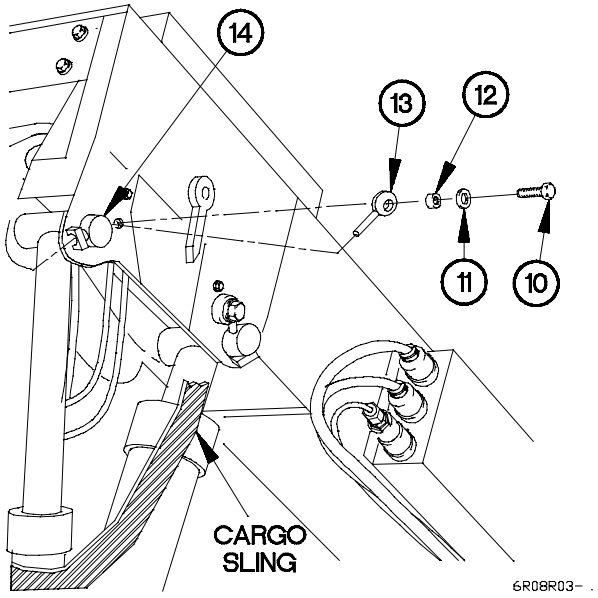
**WARNING**

**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.**

(3) Remove rivet eyebolt (7) from lower pivot shaft (8).

(4) Remove lower pivot shaft (8) from erection cylinder (9).




(5) Remove screw (10), washer (11), and bushing (12) from rivet eyebolt (13).

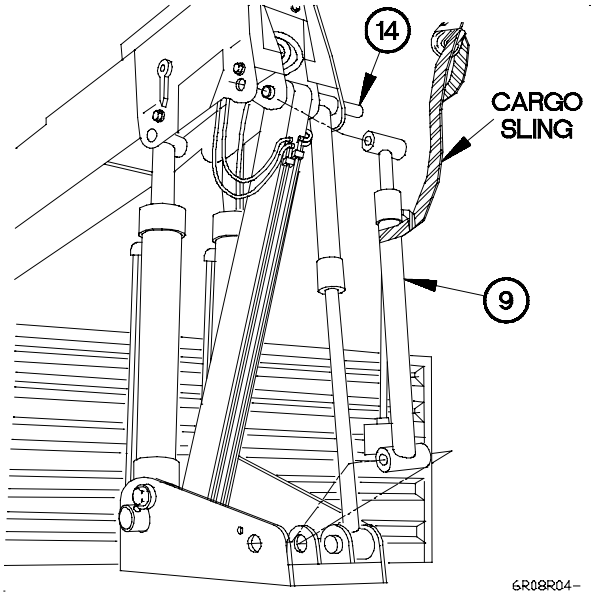
(6) Remove rivet eyebolt (13) from upper pivot shaft (14).

**NOTE**

Drive out upper pivot shaft far enough to free erection cylinder.

(7) Drive upper pivot shaft (14) out of erection cylinder (9).

(8) Remove erection cylinder (9) from vehicle.

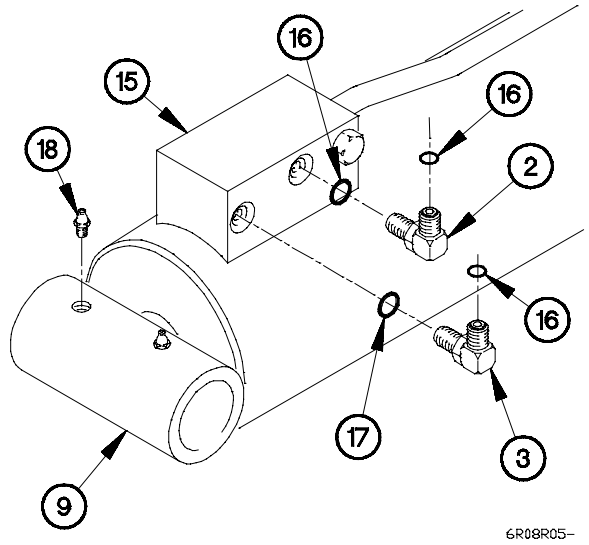


## 16-8. M1084/M1086 ERECTION CYLINDER REPLACEMENT (CONT)

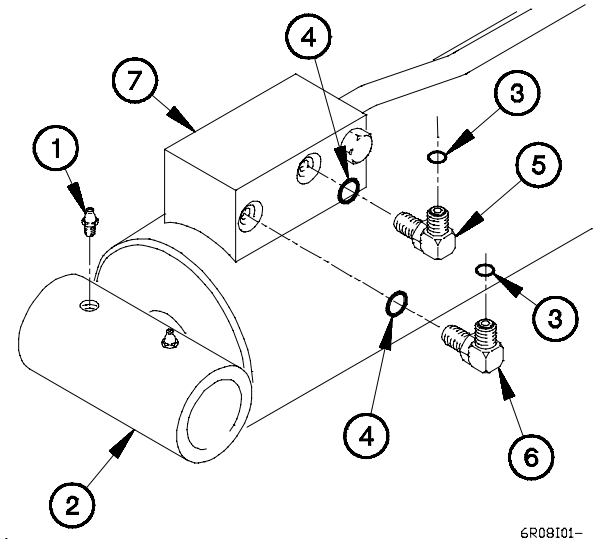
(9) Remove two 90-degree fittings (2 and 3) from counterbalance valve (15).

(10) Remove two preformed packings (16 and 17) from 90-degree fittings (2 and 3). Discard preformed packings.

(11) Remove two grease fittings (18) from each end of erection cylinder (9).




**b. Installation.**



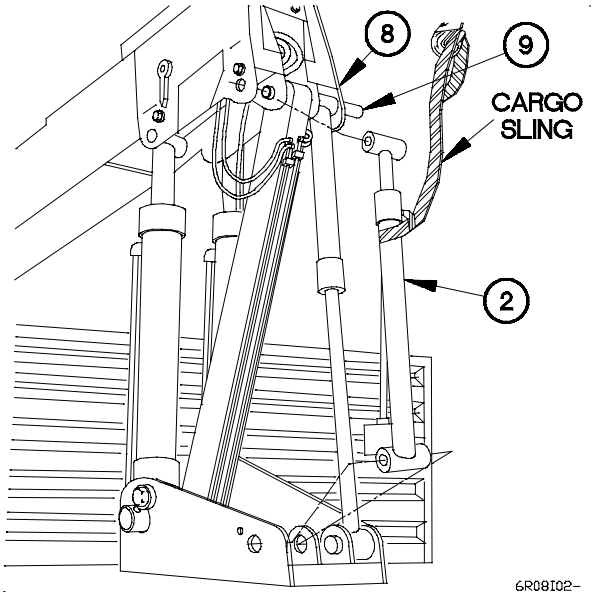

(1) Install two grease fittings (1) on each end of erection cylinder (2).

(2) Install two preformed packings (3 and 4) on 90-degree fittings (5 and 6).

(3) Install 90-degree fittings (5 and 6) in counterbalance valve (7).

**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.**




(4) Position erection cylinder (2) in boom assembly (8)

(5) Install upper pivot shaft (9) in erection cylinder (2).

(6) Install rivet eyebolt (10) in upper pivot shaft (9).

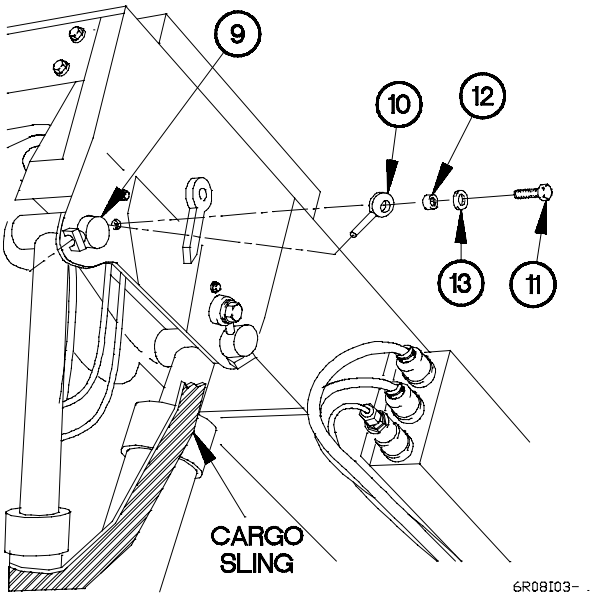
**WARNING**

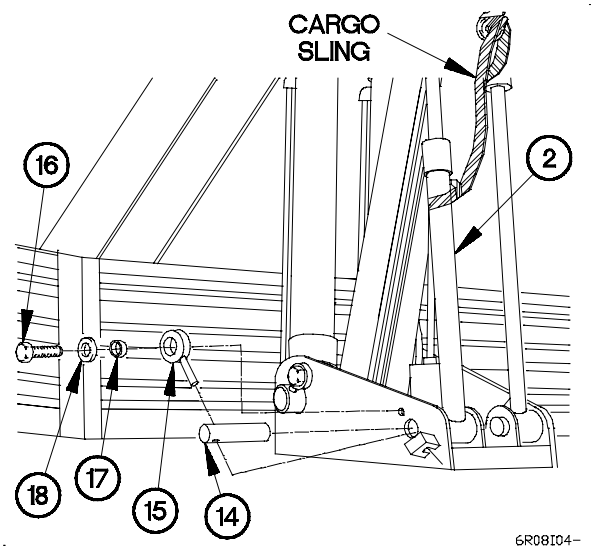
**Adhesive-sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(7) Apply sealing compound to threads of screw (11).

(8) Position bushing (12), washer (13), and screw (11) in rivet eyebolt (10).

(9) Tighten screw (11) to 190-210 lb-ft (258-285 N•m).




(10) Install lower pivot shaft (14) in erection cylinder (2).

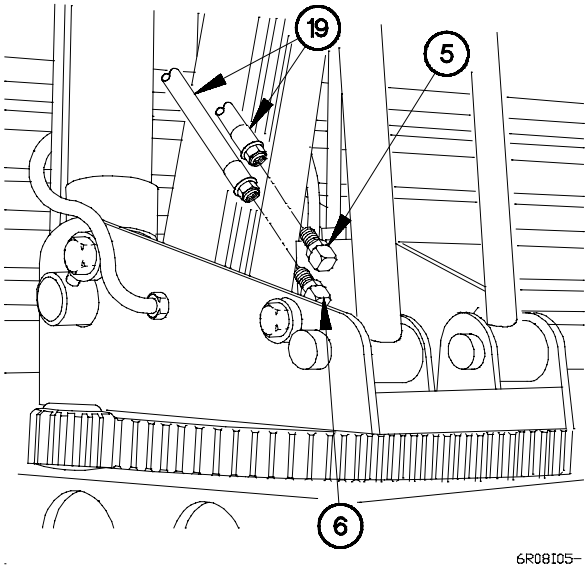
(11) Install rivet eyebolt (15) in lower pivot shaft (14).

(12) Apply sealing compound to threads of screw (16).

(13) Position bushing (17), washer (18), and screw (16) in rivet eyebolt (15).

(14) Tighten screw (16) to 190-210 lb-ft (258-285 N•m).

(15) Connect two hydraulic hoses (19) to 90-degree fittings (5 and 6).




**c. Follow-On Maintenance.**

(1) Lubricate MHC (TM 9-2320-366-20).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-9. M1084/M1086 TENSION LINK CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
MHC erected with end of boom lowered in cargo bed (TM 9-2320-366-10-1).
Engine shutdown (TM 9-2320-366-10-1).

**Materials/Parts**
Sealing Compound (Item 76, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 ft-lb (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

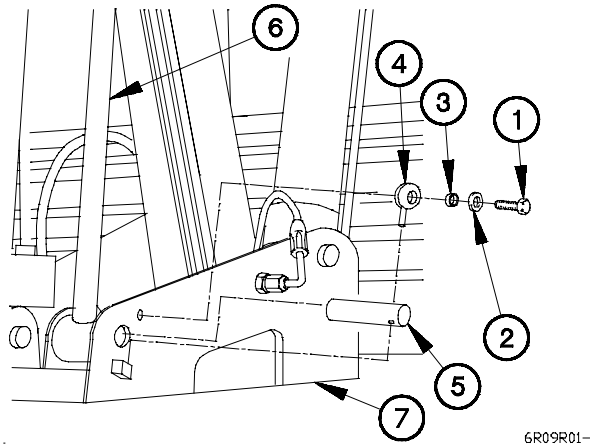
**Personnel Required**
(2)

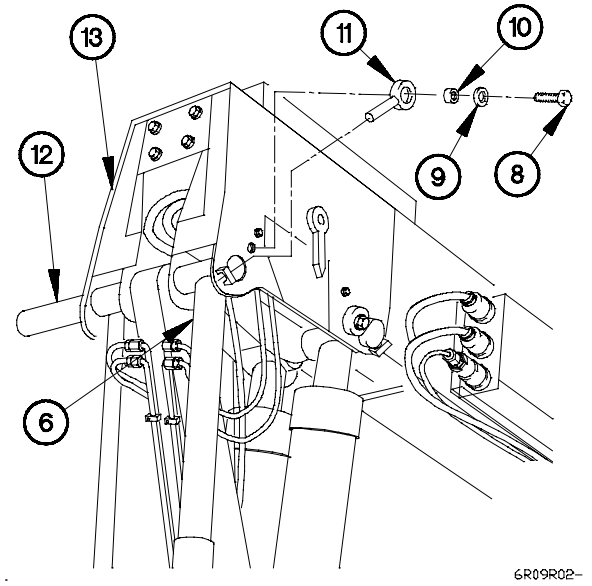
**a. Removal.**

(1) Remove screw (1), washer (2), and bushing (3) from rivet eyebolt (4).

(2) Remove rivet eyebolt (4) from lower pivot shaft (5).

(3) Remove lower pivot shaft (5) and tension link cylinder (6) from turntable (7).




(4) Remove screw (8), washer (9), bushing (10), and rivet eyebolt (11) from upper pivot shaft (12).

**WARNING**

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

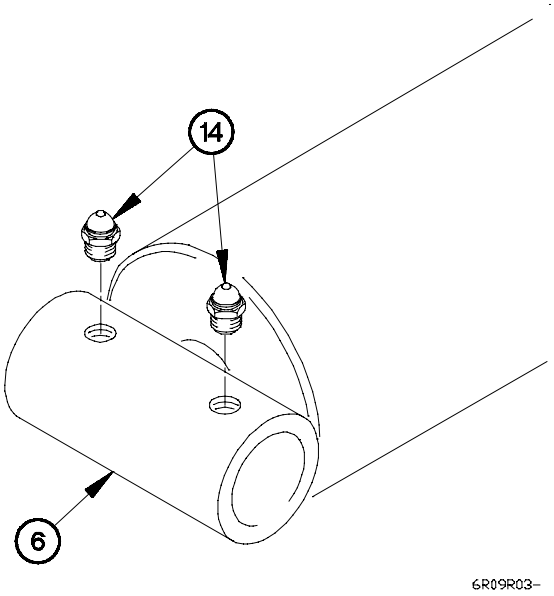
**NOTE**

Steps (5) and (6) require the aid of an assistant.

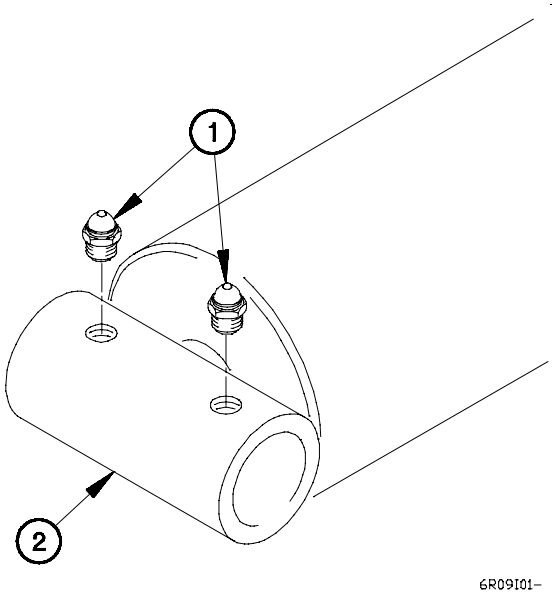
(5) Drive pivot shaft (12) and tension link cylinder (6) from boom assembly (13).

(6) Remove tension link cylinder (6) from boom assembly (13).

(7) Remove four grease fittings (14) from tension link cylinder (6).




**b. Installation.**

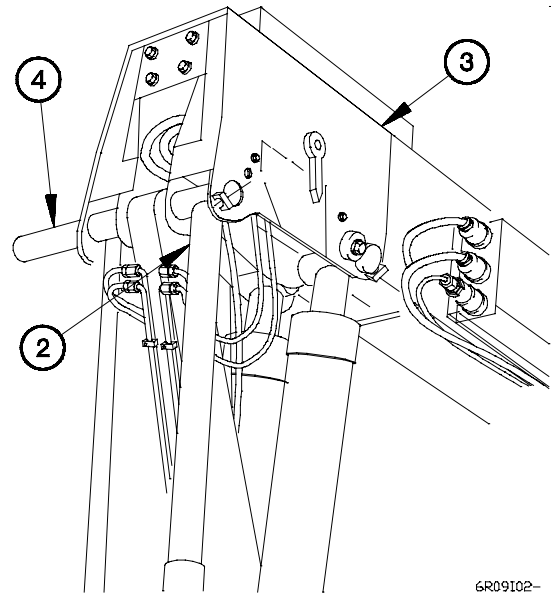



(1) Install four grease fittings (1) in tension link cylinder (2).

**NOTE**

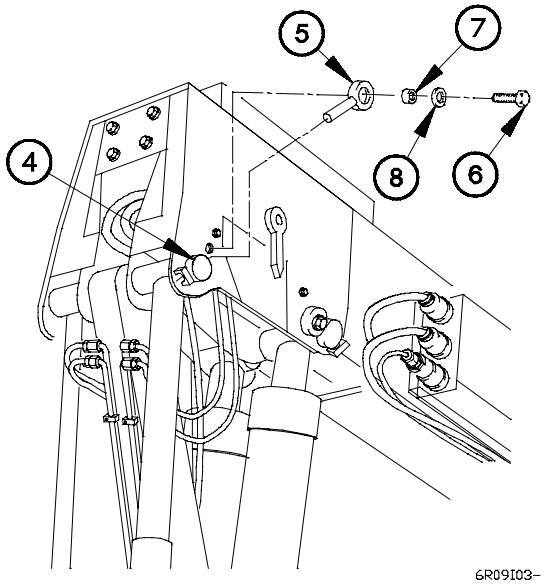
Large end of tension link cylinder goes on boom assembly.

(2) Position tension link cylinder (2) on boom assembly (3) with upper pivot shaft (4).



## 16-9. M1084/M1086 TENSION LINK CYLINDER REPLACEMENT (CONT)

(3) Install rivet eyebolt (5) in upper pivot shaft (4).



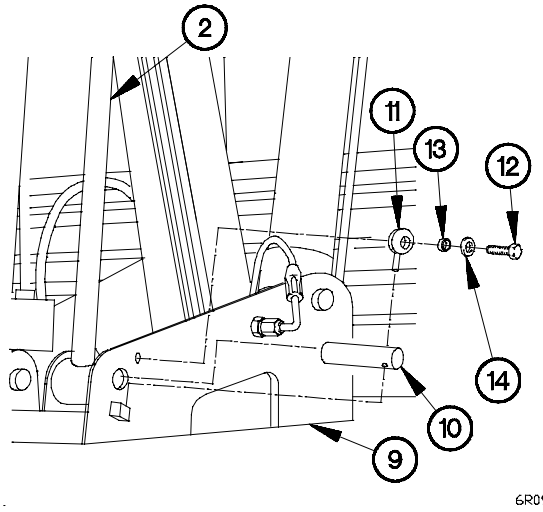

**WARNING**

**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.**

(4) Apply adhesive-sealant to threads of screw (6).

(5) Install bushing (7), washer (8), and screw (6) in rivet eyebolt (5).

(6) Tighten screw (6) to 190-210 lb-ft (258-285 N·m).




(7) Install tension link cylinder (2) in turntable (9) with lower pivot shaft (10).

(8) Install rivet eyebolt (11) in lower pivot shaft (10).

(9) Apply adhesive-sealant to threads of screw (12).

(10) Install bushing (13), washer (14), and screw (12) in rivet eyebolt (11).

(11) Tighten screw (12) to 190-210 lb-ft (258-285 N·m).

**c. Follow-On Maintenance.**

(1) Lubricate MHC (TM 9-2320-366-20).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-10. M1084/M1086 MAST REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom assembly removed (para 16-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Pan, Drain (Item 43, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (2) (Item 261, Appendix F)
Packing, Preformed (2) (Item 235, Appendix F)
Sealing Compound (Item 76, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

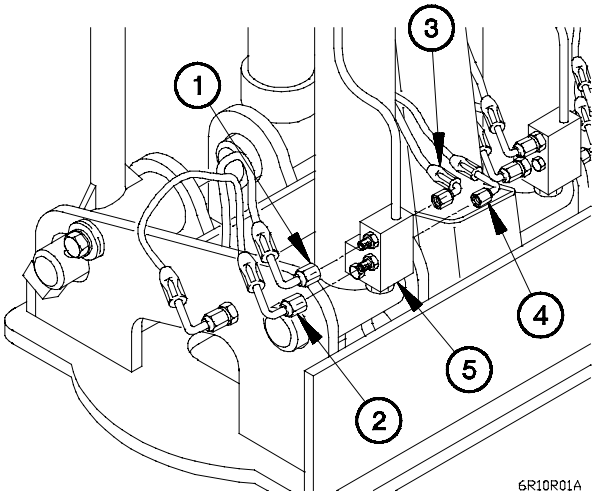
**CAUTION**

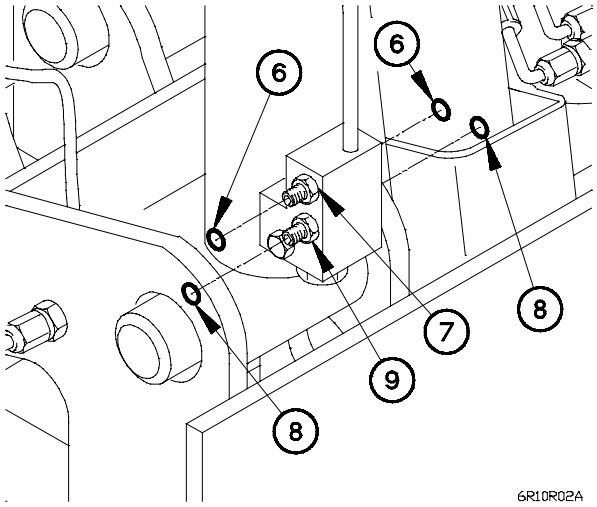
Cap or plug hydraulic hoses to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hoses and connection points prior to disconnecting.

(1) Disconnect hoses (1 through 4) from counterbalance valve (5).




(2) Remove two preformed packings (6) from fittings (7). Discard preformed packings.

(3) Remove two preformed packings (8) from fittings (9). Discard preformed packings.

## 16-10. M1084/M1086 MAST REPLACEMENT (CONT)

**WARNING**

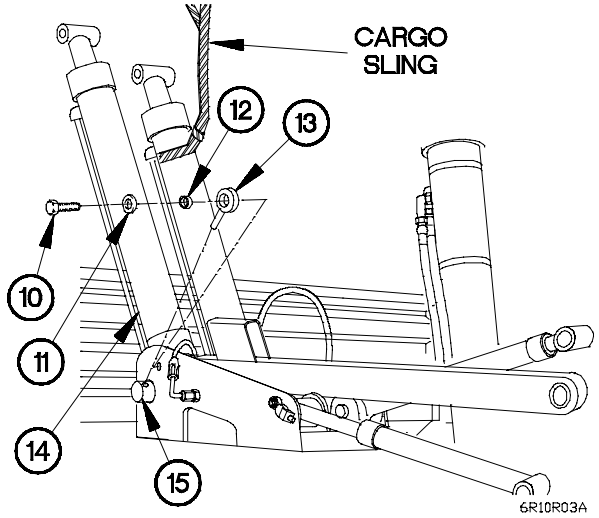
**RH lift cylinder assembly weighs approximately 100 lbs (45 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

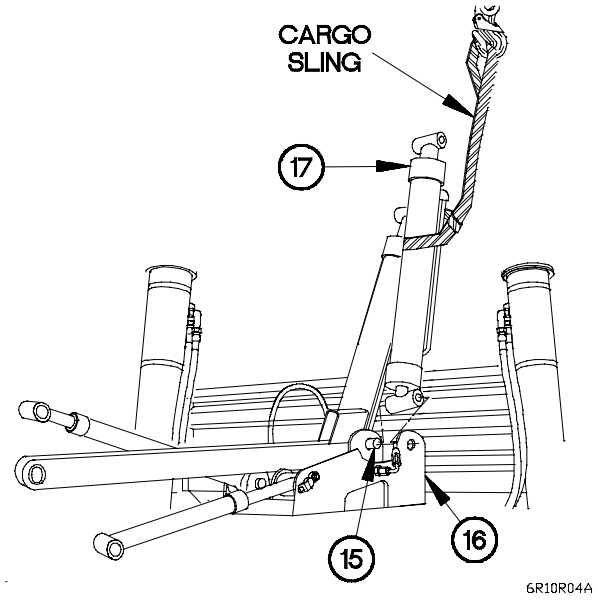
**NOTE**

Step (4) requires the aid of an assistant.

(4) Remove screw (10), washer (11), and bushing (12) from rivet eyebolt (13) at bottom of LH lift cylinder (14).

(5) Remove rivet eyebolt (13) from pivot shaft (15).




(6) Remove pivot shaft (15) from turntable (16).

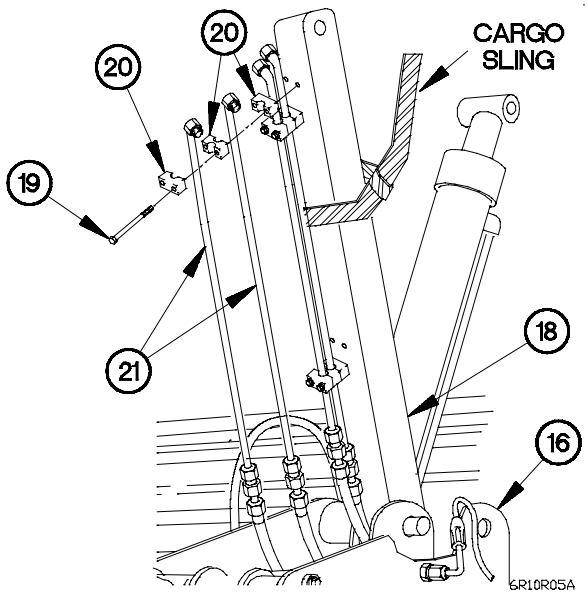
(7) Remove RH lift cylinder (17) from turntable (16).

**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.**

(8) Position mast (18) in upright position on turntable (16).

(9) Remove eight screws (19), four clamps (20), and tubes (21) from mast (18).



**WARNING**

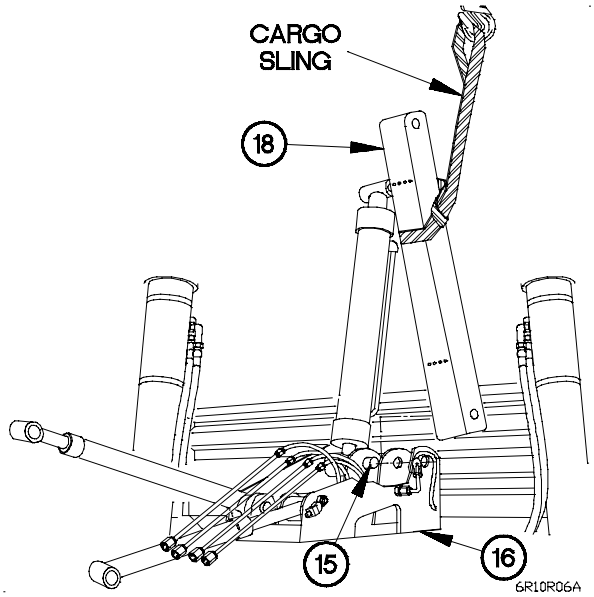
**Drive pivot shaft out far enough to release mast. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

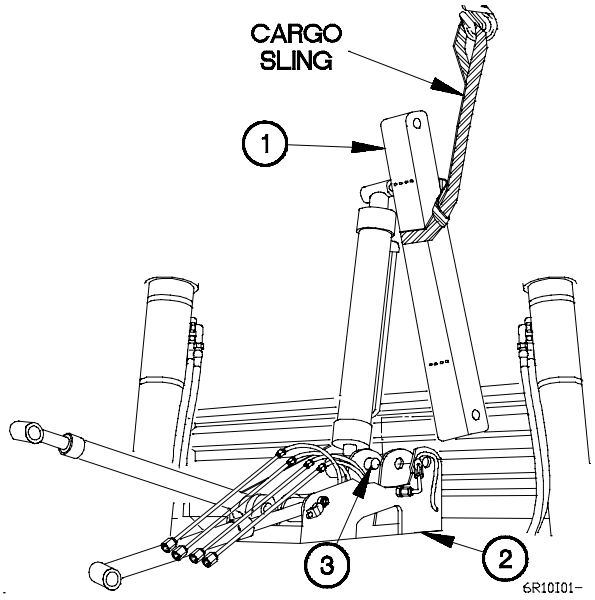
Steps (10) and (11) require the aid of an assistant.

(10) Drive pivot shaft (15) through turntable (16).

(11) Remove mast (18) from turntable (16).




**b. Installation.**




**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.**

**NOTE**

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

(1) Position mast (1) in mounting location on turntable (2).

(2) Drive pivot shaft (3) through mast (1).

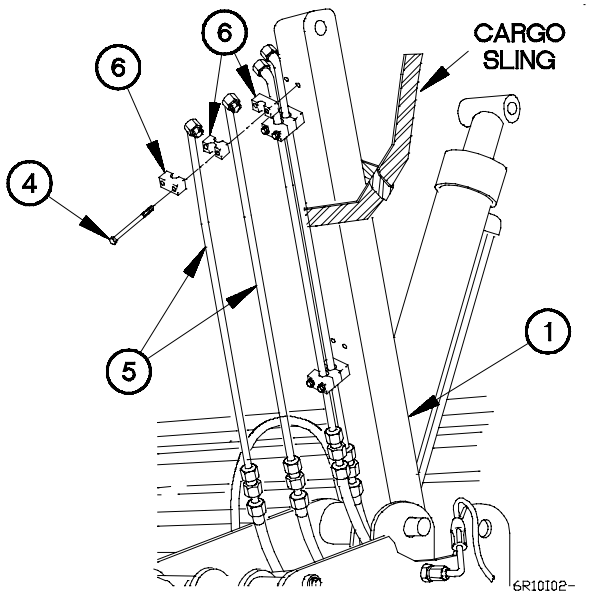
## 16-10. M1084/M1086 MAST REPLACEMENT (CONT)

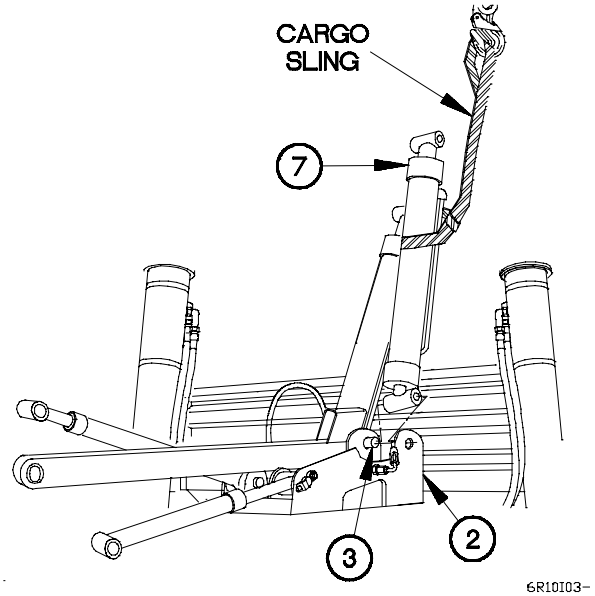
**WARNING**

**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.**

(3) Apply sealing compound to threads of eight screws (4).

(4) Install four tubes (5) on mast (1) with four clamps (6) and eight screws (4).




**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.**

(5) Position RH lift cylinder (7) in mounting location on turntable (2).

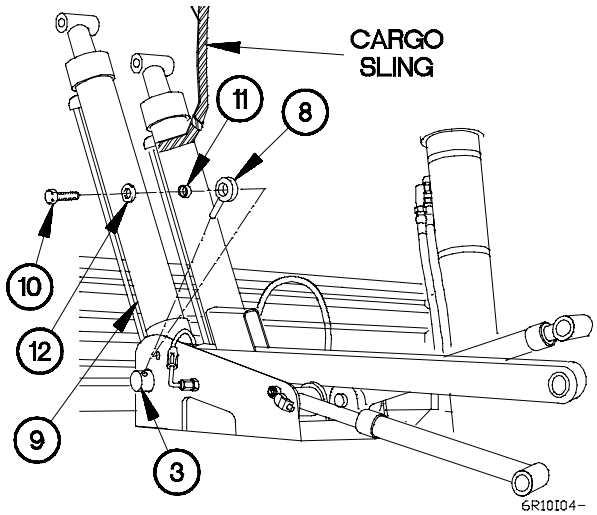
(6) Drive pivot shaft (3) through RH lift cylinder (7).

(7) Install rivet eyebolt (8) in pivot shaft (3) at bottom of LH lift cylinder (9).

(8) Apply adhesive sealant to threads of screw (10).

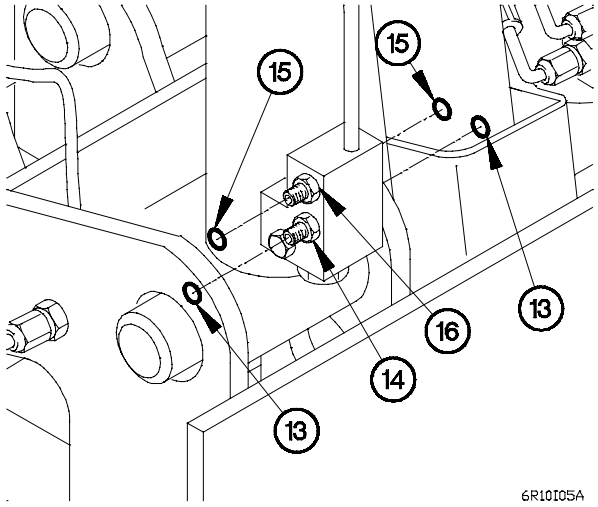
(9) Position bushing (11), washer (12), and screw (10) in rivet eyebolt (8).

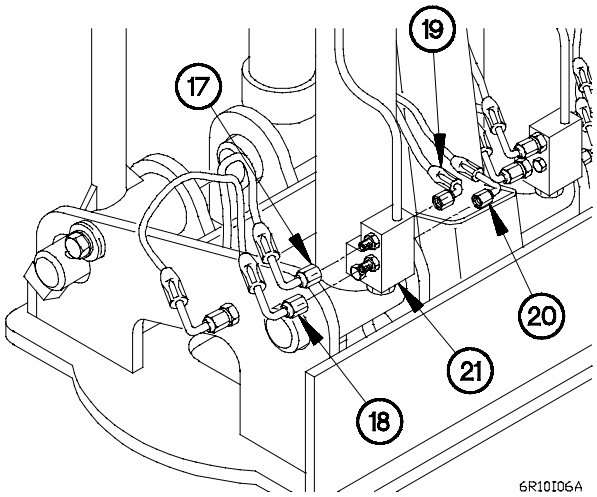
(10) Tighten screw (10) to 190-210 lb-ft (258-285 N·m).



(11) Install two preformed packings (13) on fittings (14).

(12) Install two preformed packings (15) on fittings (16).




(13) Connect hoses (17 through 20) to counterbalance valve (21).

**c. Follow-On Maintenance.**

(1) Install boom assembly (para 16-3).

(2) Check fluid level in hydraulic reservoir. Refill as required (TM 9-2320-366-20).

(3) Perform crane load test (para 16-31).

**End of Task.**

## 16-11. M1084/M1086 TURNTABLE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom assembly removed (para 16-3).
Lift cylinders removed (para 16-7).
Mast removed (para 16-10).
Tension link cylinder removed (para 16-9).
Erection cylinder removed (para 16-8).
Hydraulic reservoir supply and return valves closed (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Tools and Special Tools**
Sling, Cargo (Item 56, Appendix B)
Socket Wrench Attachment, Screwdriver (TM 9-2320-366-20)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Packing, Preformed (2) (Item 236, Appendix F)
Packing, Preformed (2) (Item 262, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hoses and connection points prior to removal.

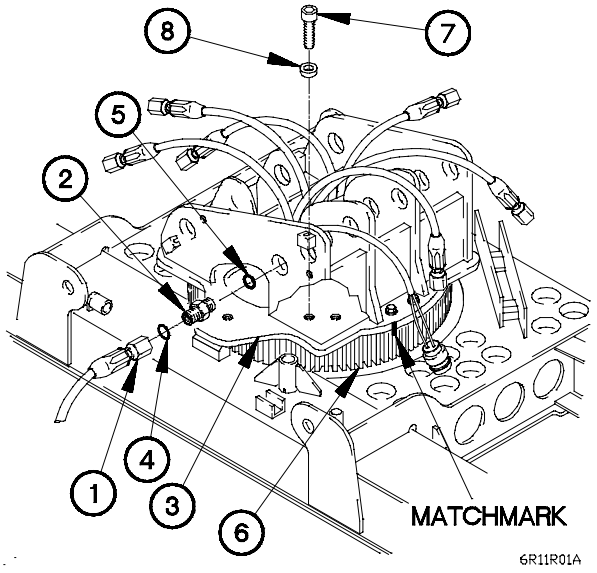
(1) Disconnect two hoses (1) from fittings (2).

(2) Remove two fittings (2) from turntable (3).

(3) Remove two preformed packings (4 and 5) from fittings (2). Discard preformed packings.

(4) Match mark turntable (3) to ring gear (6).

(5) Remove 10 bolts (7) and washers (8) from turntable (3).



**NOTE**

Mark location of eight bolts prior to removal.

(6) Remove eight bolts (9) and washers (10) from turntable (3).

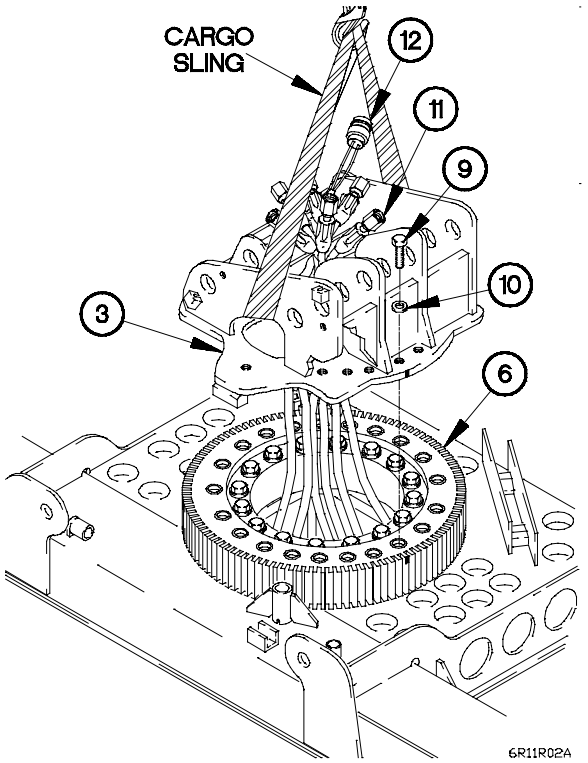
**WARNING**

**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.**

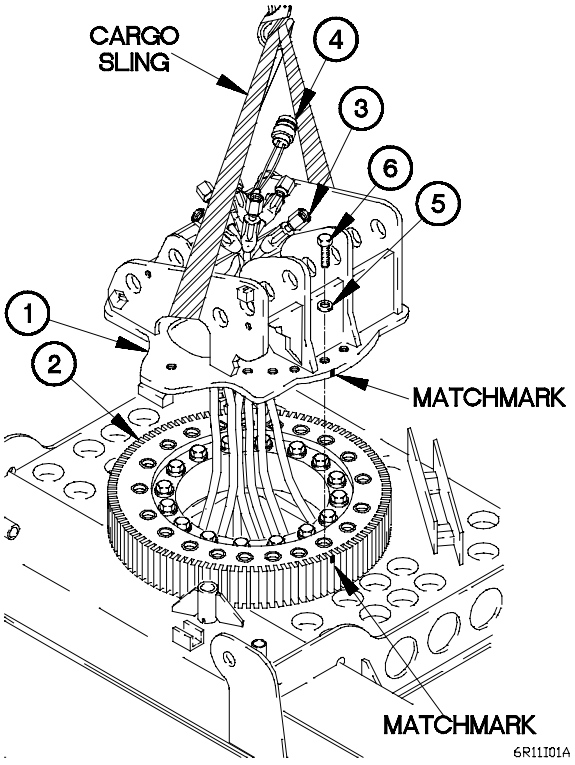
**NOTE**

Step (7) requires the aid of an assistant.

(7) Remove turntable (3) from ring gear (6) and pass hydraulic hoses (11) and electrical connector (12) through center of turntable (3).




**b. Installation.**




**NOTE**

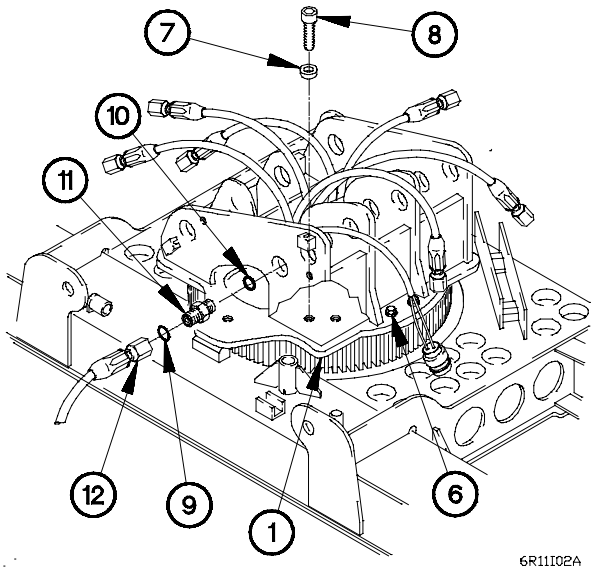
Step (1) requires the aid of an assistant.

(1) Position turntable (1) over ring gear (2) while passing hydraulic hoses (3) and electrical connector (4) through center of turntable (1).

(2) Lower turntable (1) on ring gear (2) with matchmarks aligned.

(3) Position eight washers (5) and bolts (6) on turntable (1) in marked locations.

## 16-11. M1084/M1086 TURNTABLE REPLACEMENT (CONT)




(4) Position 10 washers (7) and bolts (8) in turntable (1).

(5) Tighten eight bolts (6) and 10 bolts (8) to 355-385 lb-ft (481-522 N·m).

(6) Install two preformed packings (9 and 10) on fittings (11).

(7) Install two fittings (11) in turntable (1).

(8) Connect two hoses (12) to fittings (11).

**c. Follow-On Maintenance.**

(1) Install lift cylinders (para 16-7).

(2) Install mast (para 16-10).

(3) Install tension link cylinder (para 16-9).

(4) Install erection cylinder (para 16-8).

(5) Install boom assembly (para 16-3).

(6) Hydraulic reservoir supply and return valves opened (TM 9-2320-366-10-1).

(7) Operate MHC and check for proper operation and hydraulic leaks (TM 9-2320-366-10-1).

**End of Task.**

## 16-12. M1084/M1086 TURNTABLE BEARING REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Turntable removed (para 16-11).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)

**Tools and Special Tools (Cont)**
Chain, Welded (TM 9-2320-366-10)
Wrench Set, Socket (Item 84, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Personnel Required**
(2)

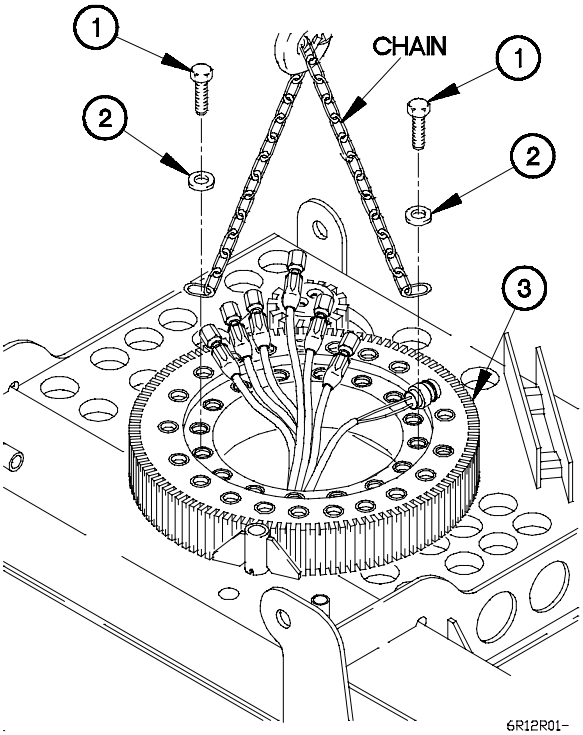
**a. Removal.**

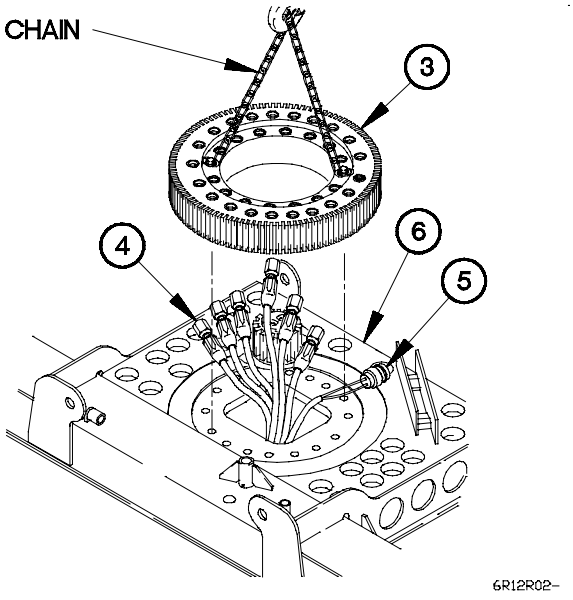
**WARNING**

**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.**

(1) Remove 16 screws (1) and washers (2) from turntable bearing (3).

(2) Install chain on turntable bearing (3) with two washers (2) and screws (1).




**NOTE**

Step (3) requires the aid of an assistant.

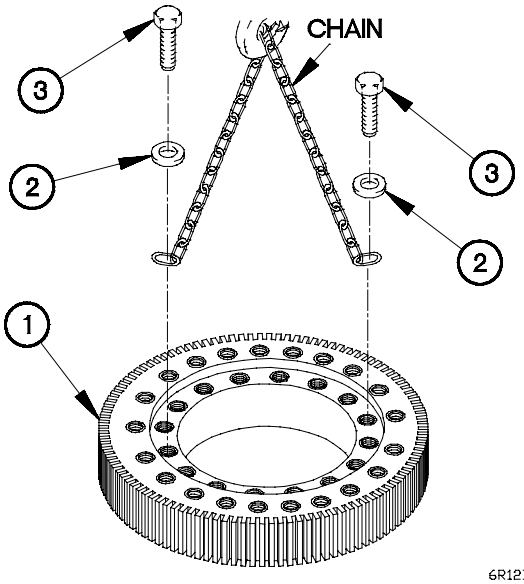
(3) Guide hoses (4) and electrical connector (5) through turntable bearing (3).

(4) Remove turntable bearing (3) from subframe (6).

## 16-12. M1084/M1086 TURNTABLE BEARING REPLACEMENT (CONT)

(5) Remove two screws (1), washers (2), and chain from turntable bearing (3).

**b. Installation.**




**WARNING**

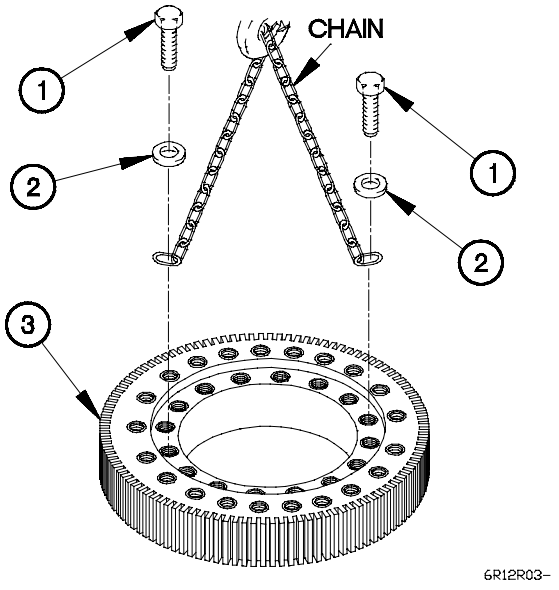
**Turntable bearing weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

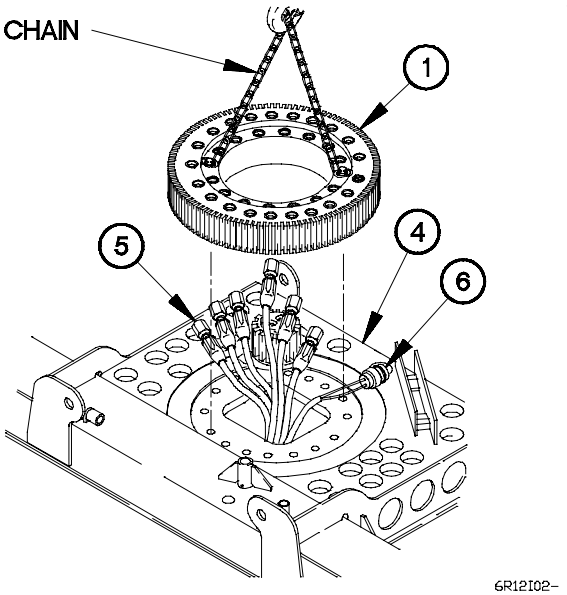
Steps (2) and (3) require the aid of an assistant.

(2) Lift turntable bearing (1) into position over subframe (4).

(3) Feed hydraulic hoses (5) and electrical connector (6) through turntable bearing (1).




(1) Install chain on turntable bearing (1) with two washers (2) and screws (3).

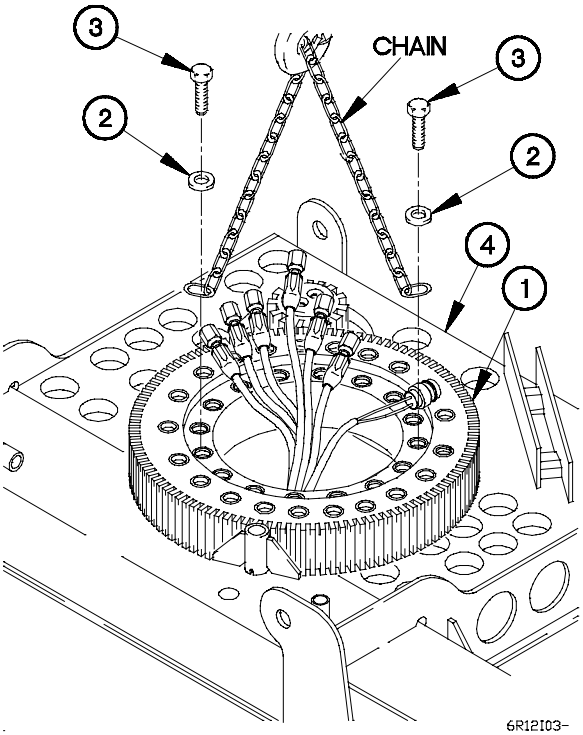


(4) Position turntable bearing (1) on subframe (4) with screw holes aligned.

(5) Remove two screws (3), washers (2), and chain from turntable bearing (1).

(6) Position 16 washers (2) and screws (3) on turntable bearing (1).

(7) Tighten screws (3) to 355-385 lb-ft (481-522 N•m).




**c. Follow-On Maintenance.**

(1) Install turntable (para 16-11).

(2) Operate MHC and check for proper operation and for oil leaks (TM 9-2320-366-10-1).

**End of Task.**

## 16-13. M1084/M1086 HOIST ASSEMBLY REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Hoist cable removed (TM 9-2320-366-20-5).
Boom positioned over cargo bed (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)
Pan, Drain (Item 43, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (Item 261, Appendix F)
Packing, Preformed (2) (Item 231, Appendix F)
Nut, Self-Locking (Item 176, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

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

(2) Place drain pan under hoist assembly (4).

**CAUTION**

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

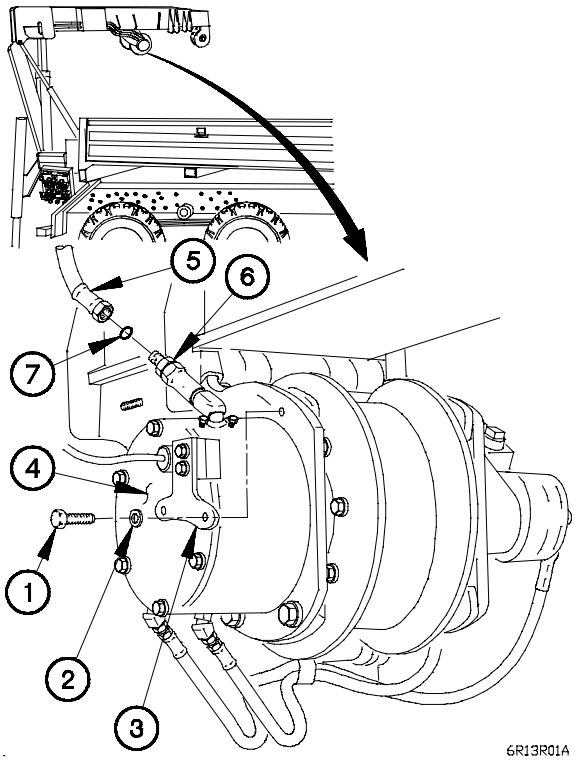
**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(3) Disconnect hydraulic hose (5) from check valve (6).

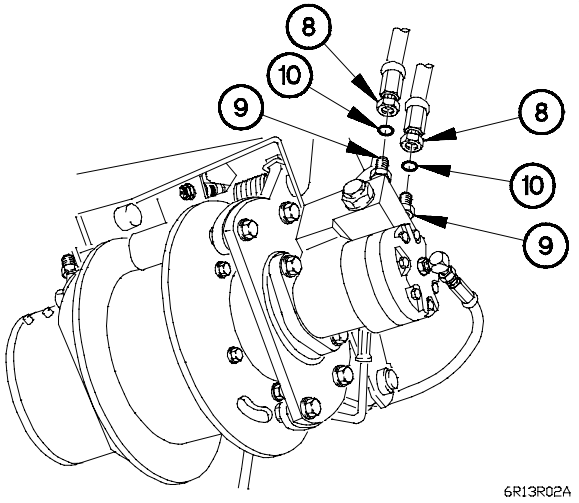
(4) Remove preformed packing (7) from check valve (6). Discard preformed packing.

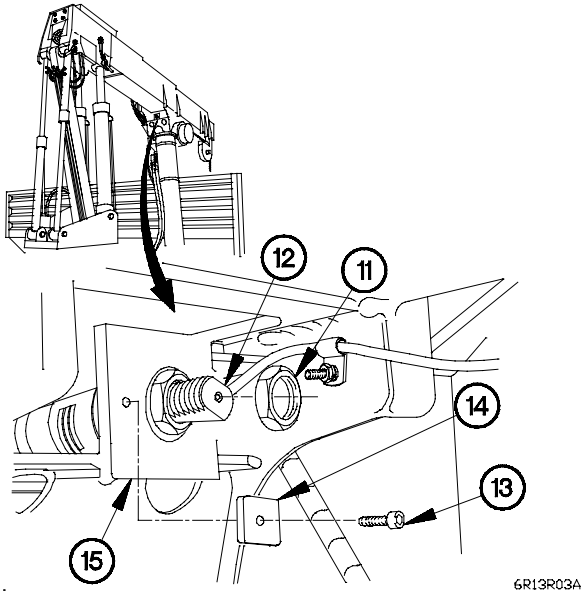
(5) Position hydraulic hose (5) and bracket (3) clear of hoist assembly (4).



(6) Disconnect two hydraulic hoses (8) from fittings (9).

(7) Remove two preformed packings (10) from fittings (9). Discard preformed packings.



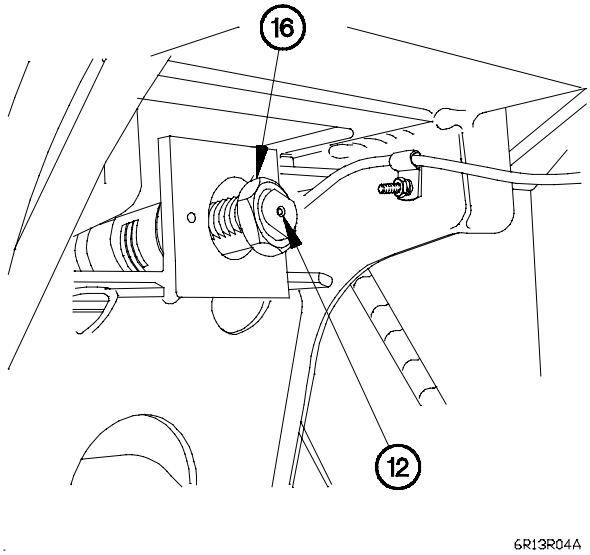

(8) Remove jamnut (11) from backside of tension load cell (12).

(9) Remove screw (13) and stop block (14) from boom brace (15).

**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.**

(10) Loosen swivel nut (16) until flush with end on backside of tension load cell (12).



## 16-13. M1084/M1086 HOIST ASSEMBLY REPLACEMENT (CONT)

**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.**

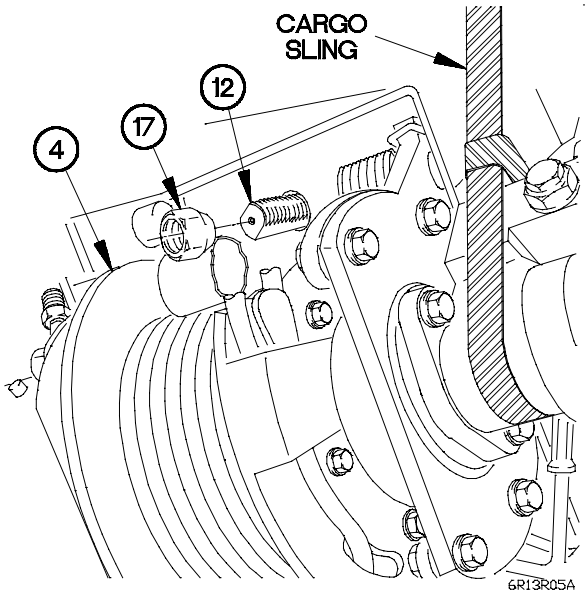
**NOTE**

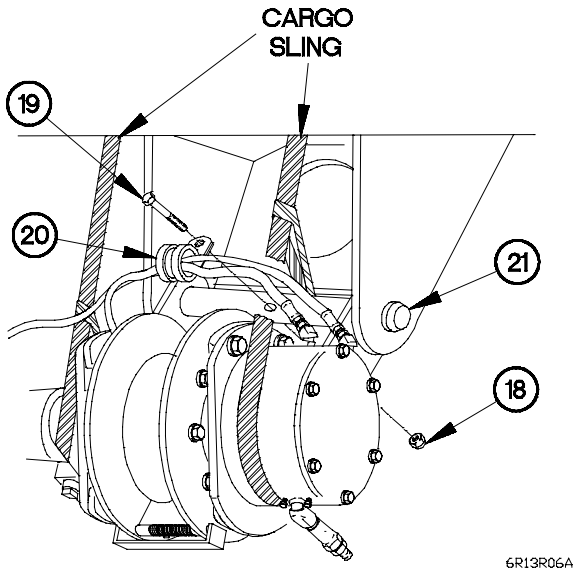
Steps (11) through (13) require the aid of an assistant.

(11) Lift up on hoist assembly (4).

(12) Remove swivel nut (17) from front of tension load cell (12).

(13) Remove hoist assembly (4) from tension load cell (12).



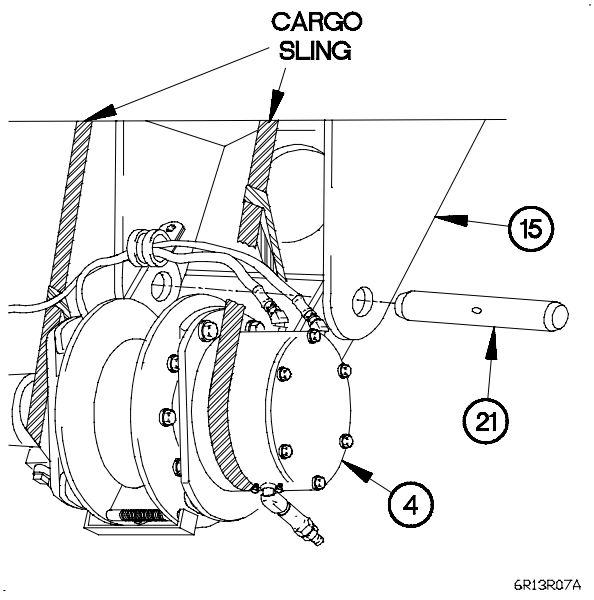




(14) Remove self-locking nut (18), screw (19), and clamp (20) from shaft (21). Discard self-locking nut.

**NOTE**

Step (15) requires the aid of an assistant.

(15) Remove shaft (21) and hoist assembly (4) from boom brace (15).



**b. Installation.**

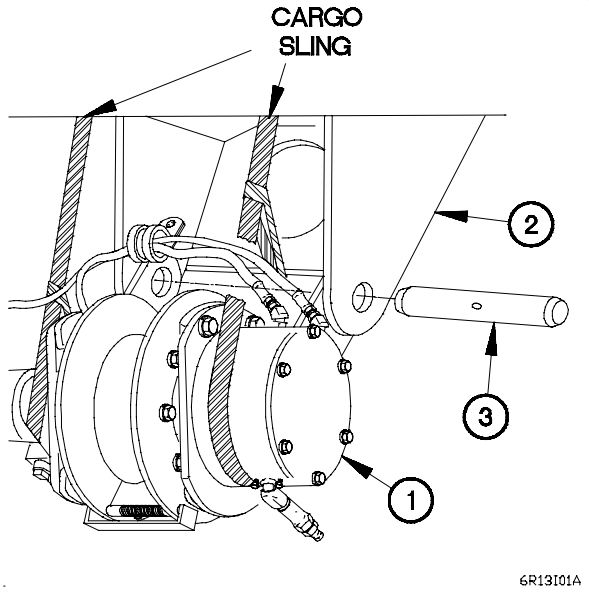
**WARNING**

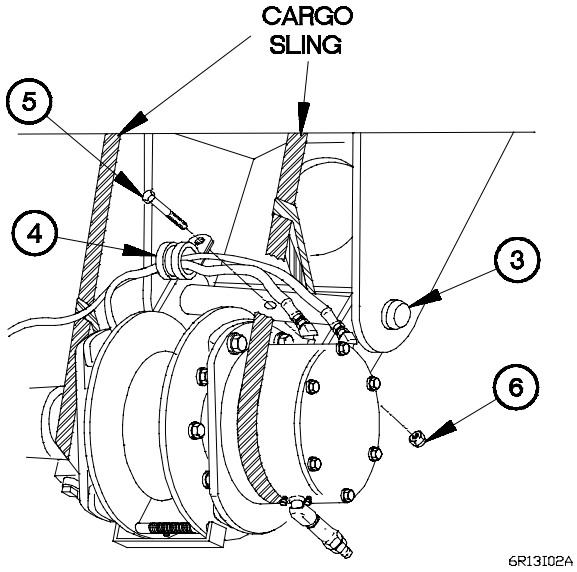
**Hoist assembly weighs approximately 210 lbs (95 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Step (1) requires the aid of an assistant.

(1) Install hoist assembly (1) in boom brace (2) with shaft (3).



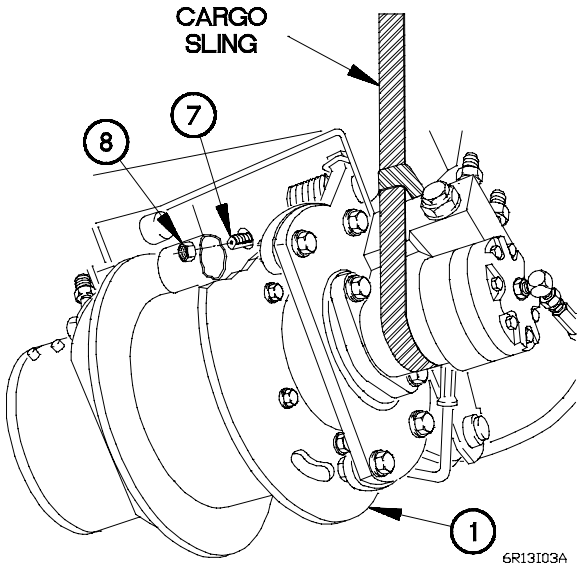




(2) Install clamp (4), screw (5), and self-locking nut (6) on shaft (3).

**NOTE**

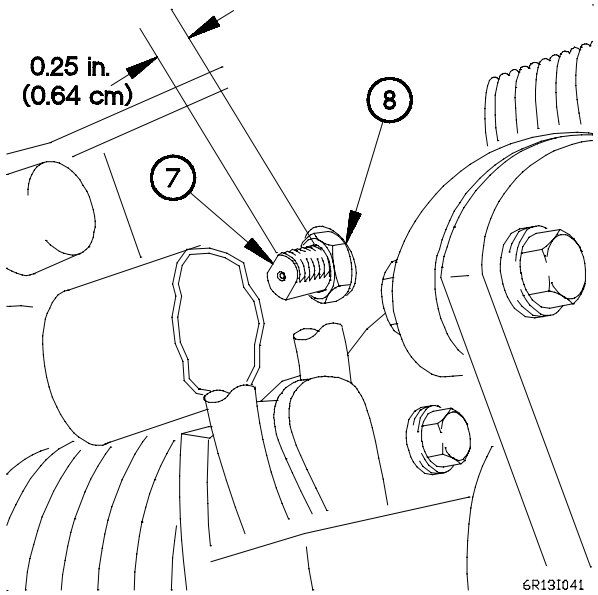
Step (3) requires the aid of an assistant.

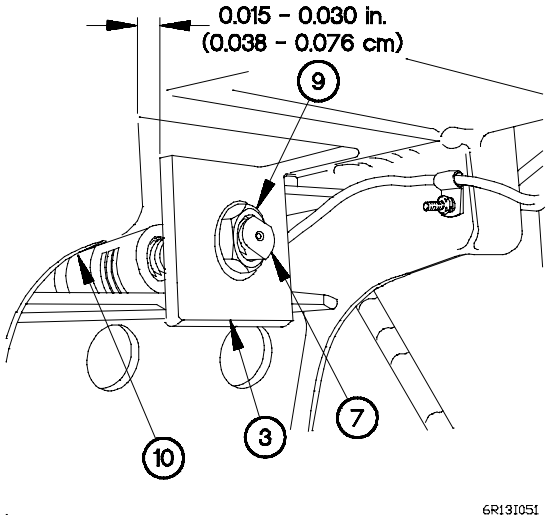
(3) Position hoist assembly (1) on front of tension load cell (7) with front swivel nut (8).



## 16-13. M1084/M1086 HOIST ASSEMBLY REPLACEMENT (CONT)

(4) Adjust front swivel nut (8) on tension load cell (7) until approximately 0.25 in. (0.64 cm) of threads are protruding past front swivel nut.




**NOTE**

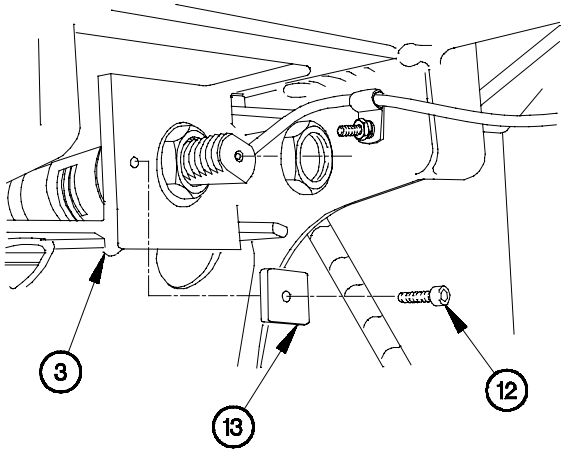
Step (5) requires the aid of an assistant.

(5) Tighten rear swivel nut (9) on tension load cell (7) until a gap between boom assembly (10) and boom brace (3) is 0.015-0.030 in. (0.038-0.076 cm).

(6) Install jam nut (11) on tension load cell (7).

**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.**

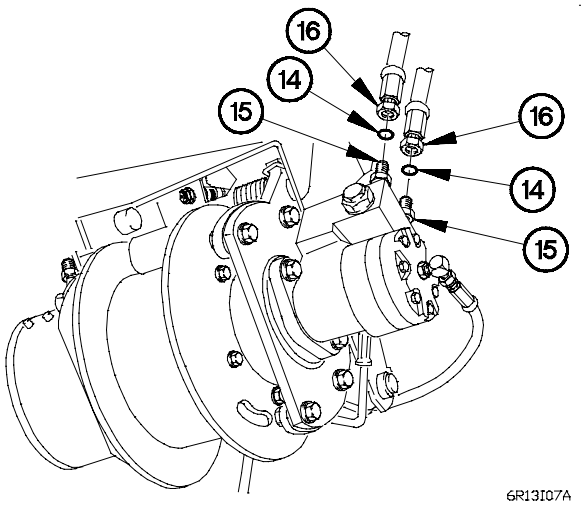


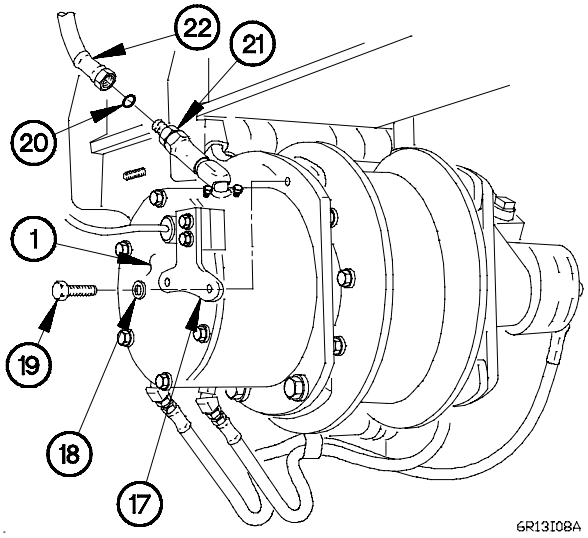

(7) Apply sealing compound to threads of screw (12).

(8) Install stop block (13) and screw (12) on boom brace (3).

(9) Install two preformed packings (14) on fittings (15).

(10) Connect two hydraulic hoses (16) to fittings (15).




(11) Install bracket (17) on hoist assembly (1) with two washers (18) and screws (19).

(12) Install preformed packing (20) on check valve (21).

(13) Connect hydraulic hose (22) to check valve (21).

**c. Follow-On Maintenance.**

(1) Install hoist cable (TM 9-2320-366-20-5).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-14. M1084/M1086 CABLE FOLLOWER REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Hoist assembly removed (para 16-13).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**Tools and Special Tools (Cont)**
Goggles, Industrial (Item 28, Appendix B)

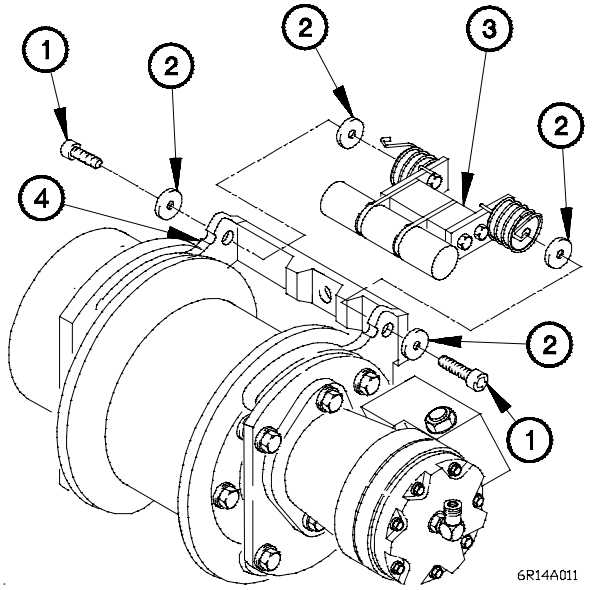
**Materials/Parts**
Sealing Compound (Item 76, Appendix C)

**a. Removal.**

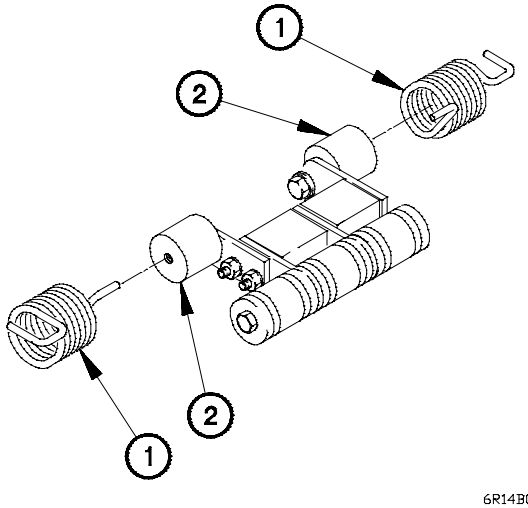
**WARNING**

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

Remove two screws (1), four washers (2), and cable follower assembly (3) from hoist assembly (4).



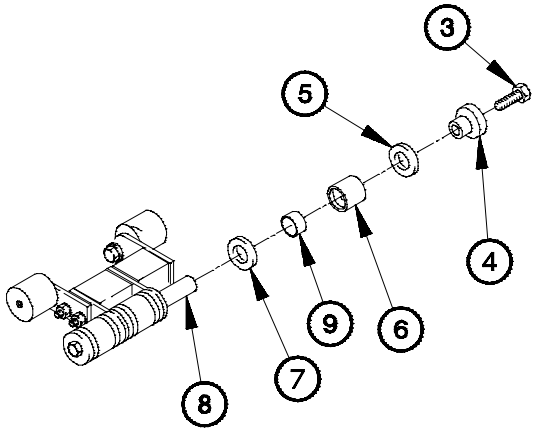

**b. Disassembly.**



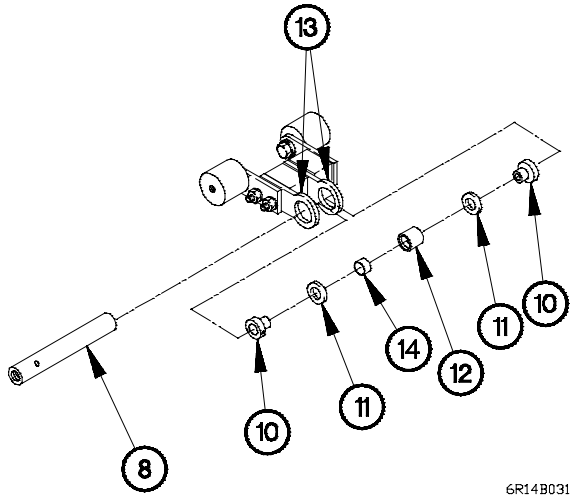

(1) Remove two springs (1) from posts (2).

(2) Remove two screws (3), washers (4), washers (5), rollers (6), and washers (7) from shaft (8).

(3) Remove two bearings (9) from rollers (6).




6R14B021



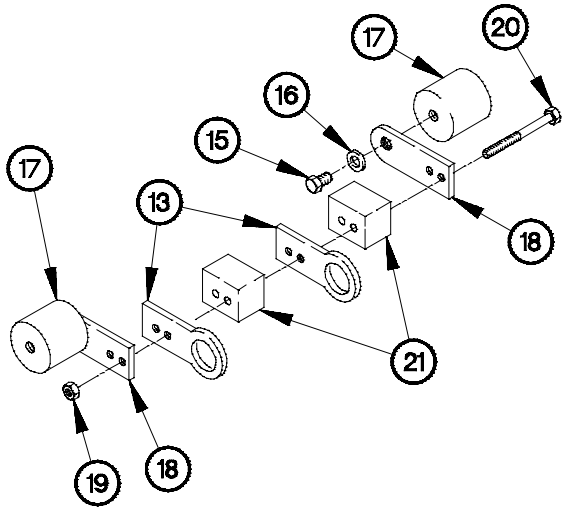

6R14B031

(4) Remove shaft (8), two washers (10), washers (11), and roller (12) from control levers (13).

(5) Remove bearing (14) from roller (12).

(6) Remove two screws (15), washers (16), and posts (17) from manual levers (18).

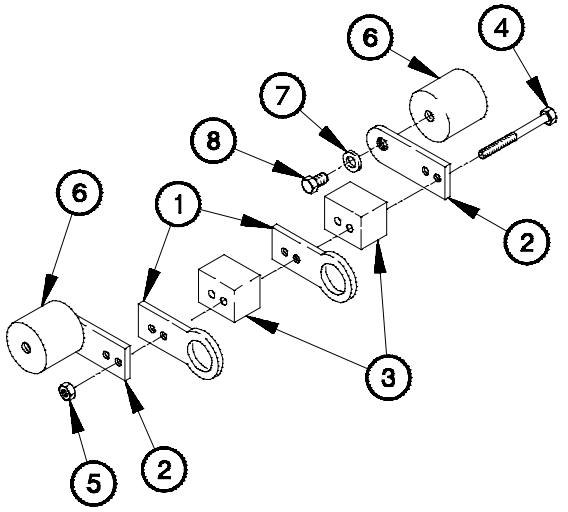
(7) Remove two nuts (19), screws (20), control levers (13), and manual levers (18) from spacers (21).




6R14B041

## 16-14. M1084/M1086 CABLE FOLLOWER REPLACEMENT/REPAIR (CONT)

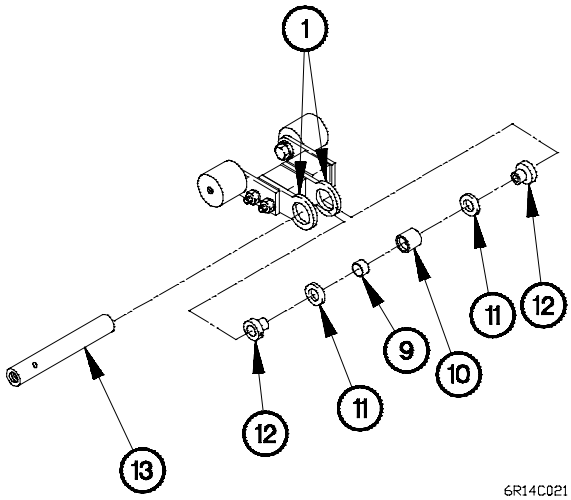
**c. Assembly.**




6R14C011

(1) Install two control levers (1) and manual levers (2) on spacers (3) with two screws (4) and nuts (5).

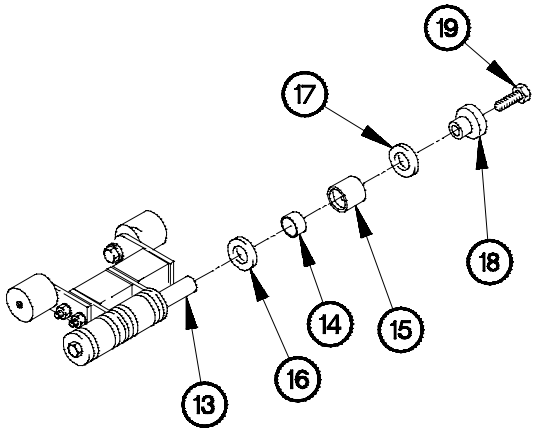
(2) Install two posts (6) on manual levers (2) with two washers (7) and screws (8).




6R14C021

(3) Install bearing (9) in roller (10).

(4) Position two washers (11), washers (12), and roller (10) in control levers (1) with shaft (13).

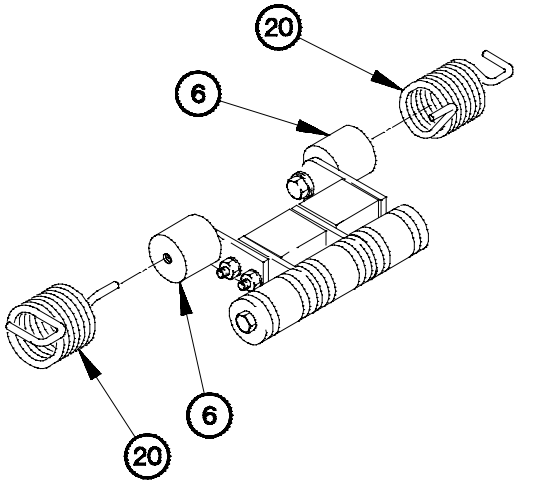



6R14C031

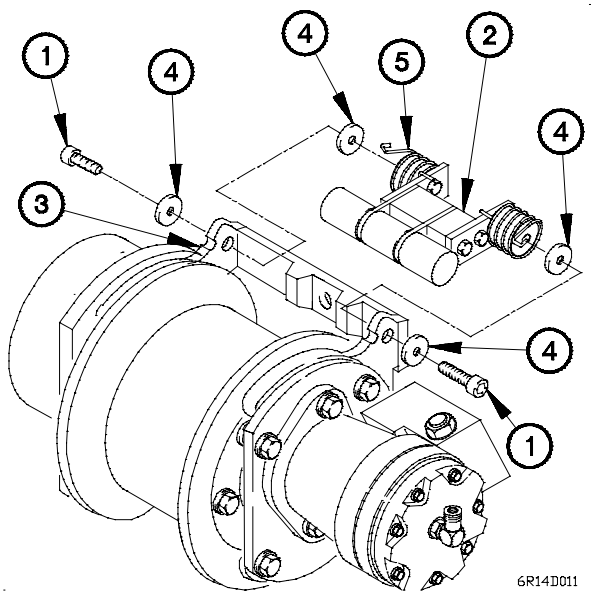
(5) Install two bearings (14) in rollers (15).

(6) Install two washers (16), rollers (15), washers (17), and washers (18) on shaft (13) with screws (19).

(7) Install two springs (20) on posts (6).




**d. Installation.**




**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.**

(1) Apply sealing compound to threads of two screws (1).

(2) Install cable follower assembly (2) on hoist assembly (3) with four washers (4) and two screws (1).

**WARNING**

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

(3) Attach springs (5) to hoist assembly (3).

**e. Follow-On Maintenance.**

(1) Install hoist assembly (para 16-13).

(2) Operate MHC and check for proper operation (TM 9-2320-366-10-1).

**End of Task.**

## 16-15. M1084/M1086 PROXIMITY SENSOR REPLACEMENT

This task covers:

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

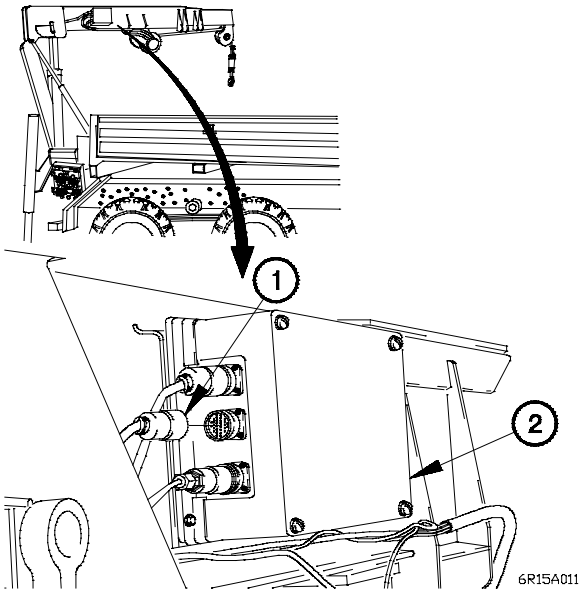
**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over cargo bed (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).

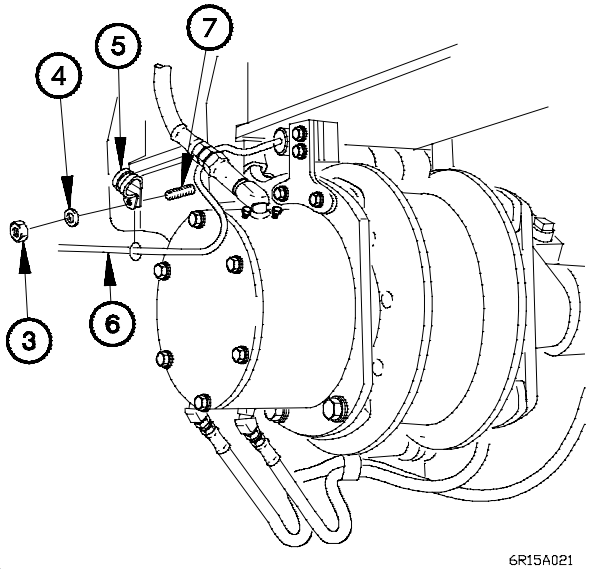
**Materials/Parts**
Lockwasher (2) (Item 139, Appendix F)
Ties, Cable Plastic (Item 92, Appendix C)
Sealing Compound (Item 76, Appendix C)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 ft-lb (Item 92, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**a. Removal.**




(1) Disconnect proximity sensor connector (1) from overload shutdown box (2).



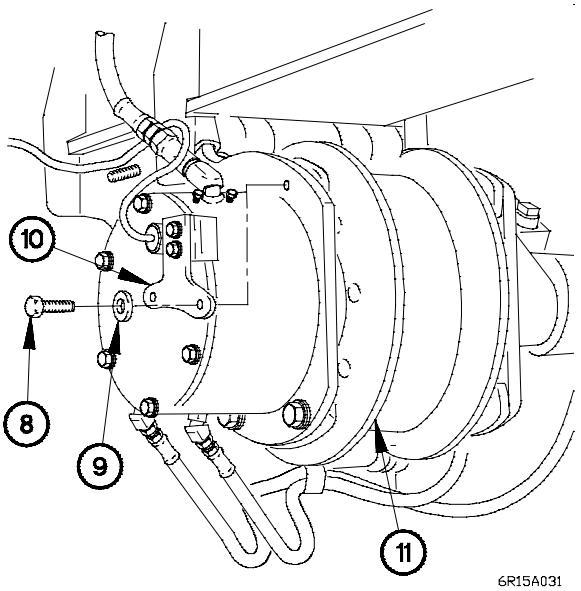

**NOTE**

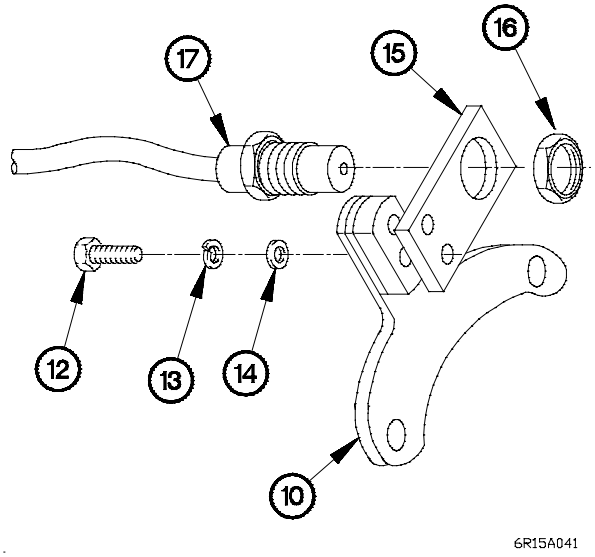
Remove plastic cable ties as required.

(2) Remove nut (3), washer (4), clamp (5), and cable (6) from boom stud (7).

(3) Remove clamp (5) from cable (6).

(4) Remove two screws (8), washers (9), and bracket (10) from hoist assembly (11).




(5) Remove two screws (12), lockwashers (13), washers (14), and plate (15) from bracket (10). Discard lockwashers.

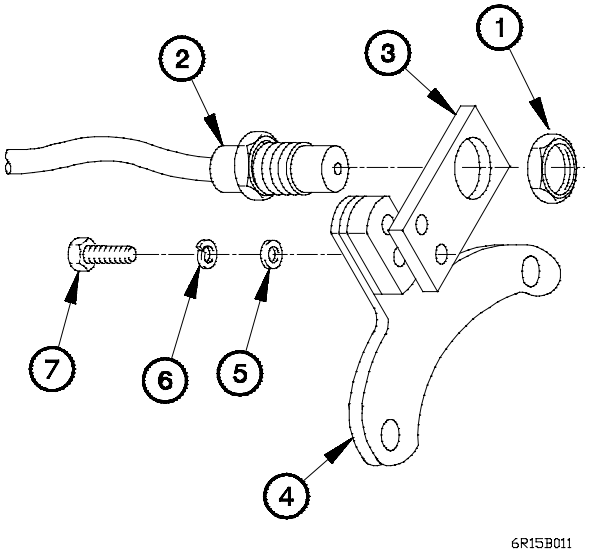
(6) Remove nut (16) and proximity sensor (17) from plate (15).

**b. Installation.**

(1) Remove nut (1) from proximity sensor (2).

(2) Install proximity sensor (2) in plate (3) with nut (1).

(3) Install plate (3) on bracket (4) with two washers (5), washers (6), and screws (7).



## 16-15. M1084/M1086 PROXIMITY SENSOR REPLACEMENT (CONT)

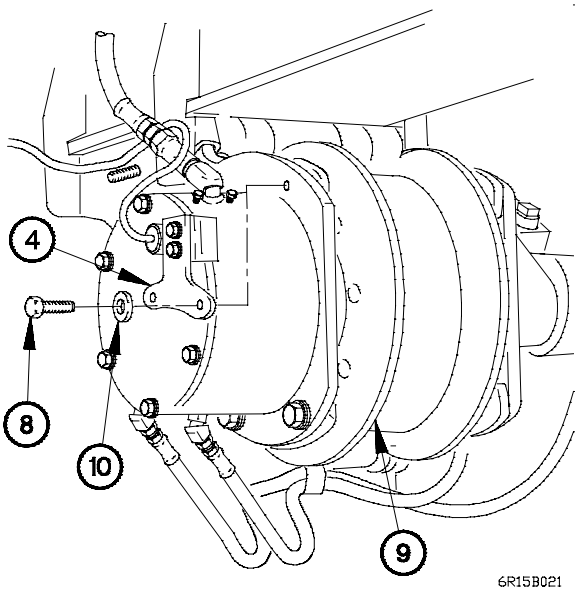
**WARNING**

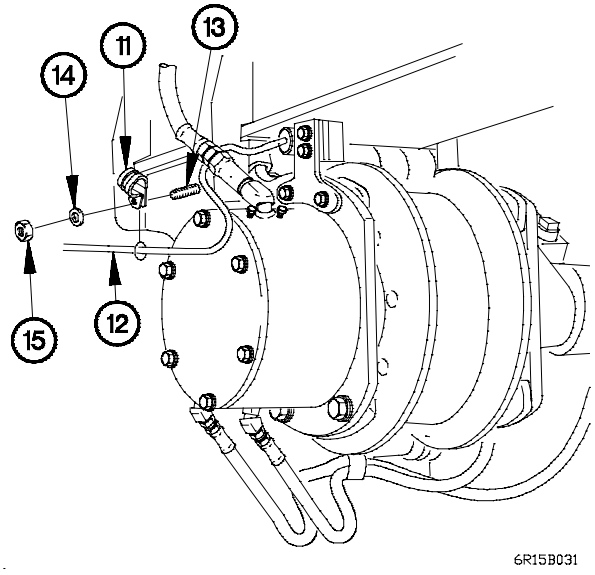
**Adhesive-sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If adhesive-sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(4) Apply sealing compound to threads of two screws (8).

(5) Position bracket (4) on hoist assembly (9) with two washers (10) and screws (8).

(6) Tighten screws (8) to 72-78 lb-ft (98-106 N·m).



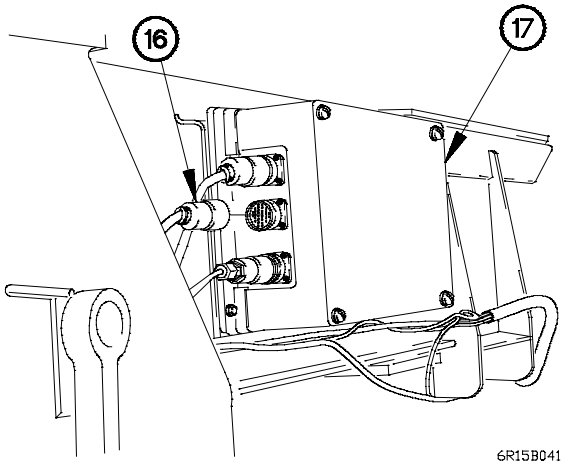

**NOTE**

Install plastic cable ties as required.

(7) Install clamp (11) on cable (12).

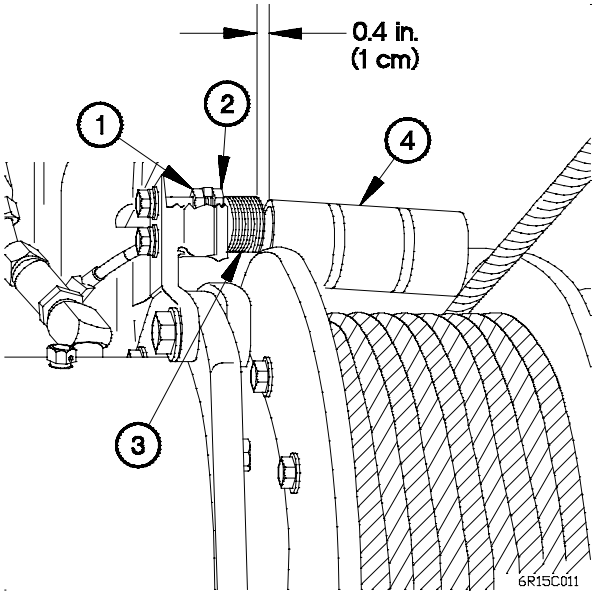
(8) Install clamp (11) on boom stud (13) with washer (14) and nut (15).

(9) Connect connector (16) to overload shutdown box (17).



**c. Adjustment.**

Adjust nuts (1 and 2) to obtain a 0.4 in. (1 cm) gap between proximity sensor (3) and cable follower (4).




**d. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Operate MHC and check for proper hoist operation (TM 9-2320-366-10-1).

**End of Task.**

## 16-16. M1084/M1086 TENSION LOAD CELL REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over cargo bed (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Bar, Wrecking (Item 6, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Packing, Preformed (2) (Item 217, Appendix F)
Packing, Preformed (Item 261, Appendix F)
Lockwasher (Item 138, Appendix F)
Sealing Compound (Item 76, Appendix C)
Ties, Cable Plastic (Item 92, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

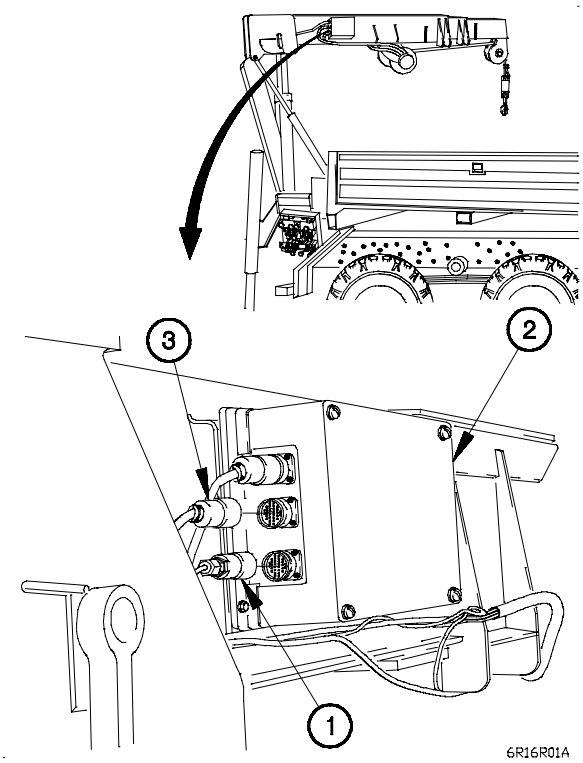
**a. Removal.**

**NOTE**

- Tag electrical connectors and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(1) Disconnect tension load cell connector (1) from overload shutdown box (2).

(2) Disconnect proximity sensor connector (3) from overload shutdown box (2).



**CAUTION**

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

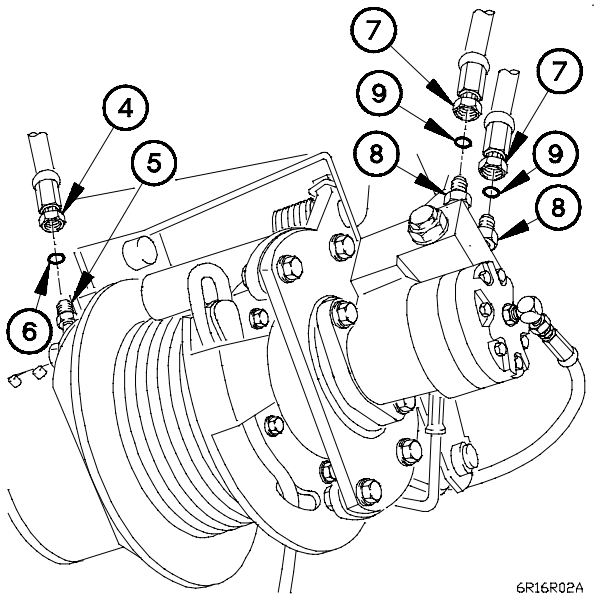
Tag hydraulic hoses and connection points prior to disconnecting.

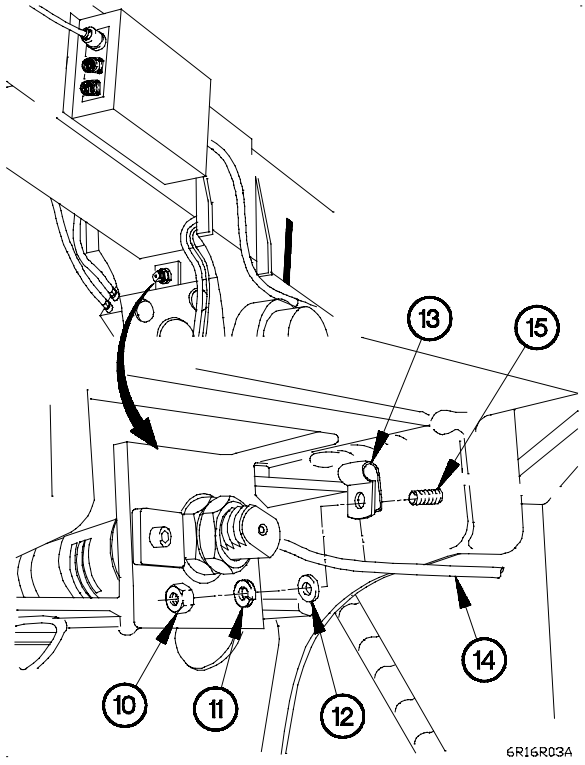
(3) Disconnect hydraulic hose (4) from check valve (5).

(4) Remove preformed packing (6) from check valve (5). Discard preformed packing.

(5) Disconnect two hydraulic hoses (7) from fittings (8).

(6) Remove two preformed packings (9) from fittings (8). Discard preformed packings.



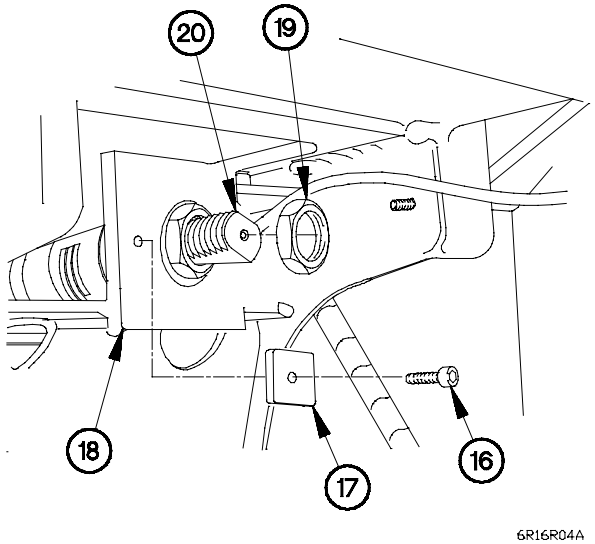




(7) Remove nut (10), lockwasher (11), washer (12), clamp (13), and tension load cell cable (14) from boom stud (15). Discard lockwasher.

(8) Remove clamp (13) from tension load cell cable (14).

(9) Remove screw (16) and stop block (17) from boom brace (18).

(10) Remove jam nut (19) from tension load cell (20).

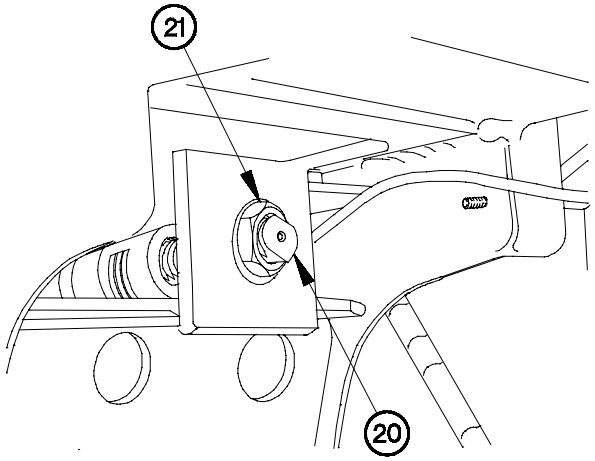


## 16-16. M1084/M1086 TENSION LOAD CELL REPLACEMENT (CONT)

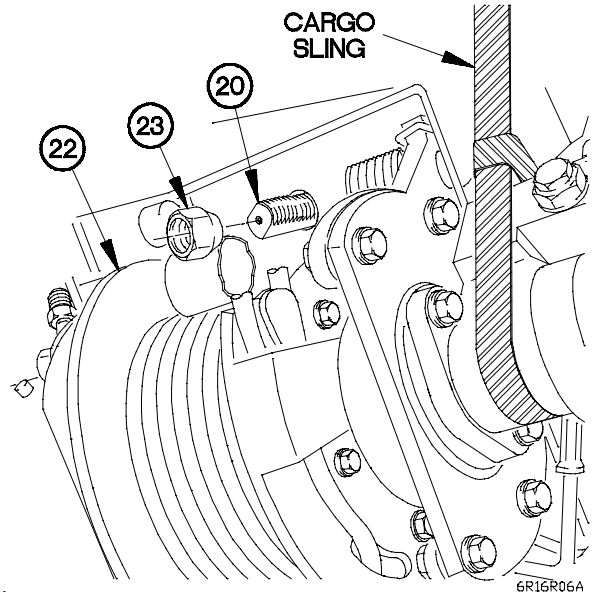
**WARNING**

**Do not remove swivel nut on back side of tension load cell at this time. Failure to comply may result in injury to personnel or damage to equipment.**

(11) Loosen rear swivel nut (21) until flush with rear end of tension load cell (20).




6R16R05A




6R16R06A

**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.**

**NOTE**

Steps (12) and (13) require the aid of an assistant.

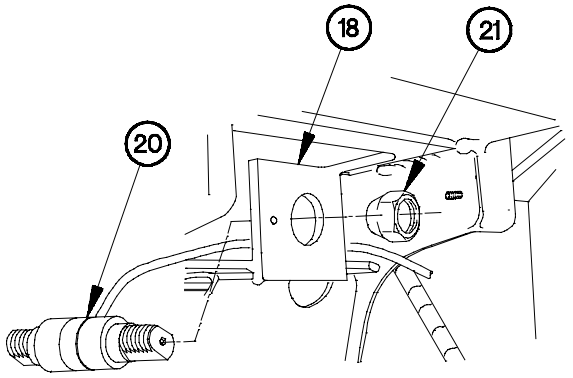
(12) Lift up on hoist assembly (22).

(13) Remove front swivel nut (23) from front of tension load cell (20).

(14) Remove hoist assembly (22) from tension load cell (20).

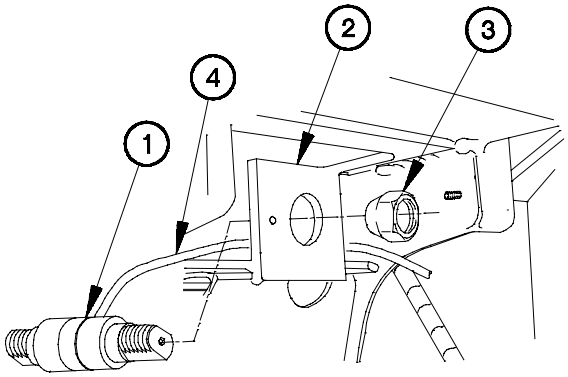
(15) Remove rear swivel nut (21) from tension load cell (20).

(16) Remove tension load cell (20) from boom brace (18).




6R16R07A

**b. Installation.**




6R16I01-

(1) Install rear tension load cell (1) in boom brace (2) with rear swivel nut (3).

(2) Tighten rear swivel nut (3) until flush with end.

(3) Route tension load cell cable (4) through hole in boom brace (2).

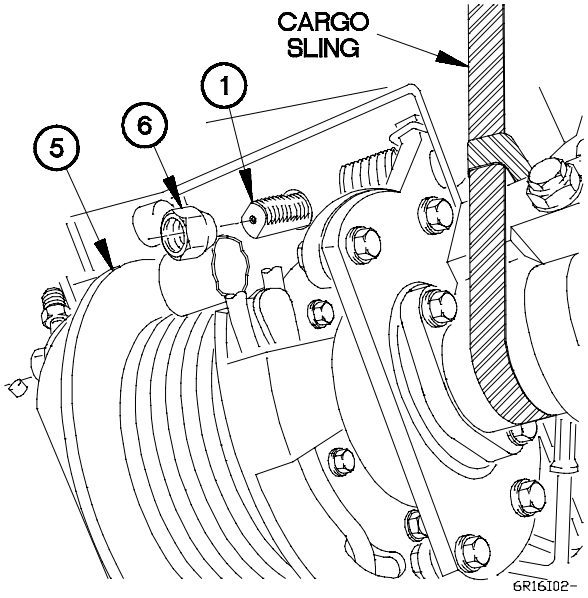
**WARNING**

**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.**

**NOTE**

Step (4) requires the aid of an assistant.

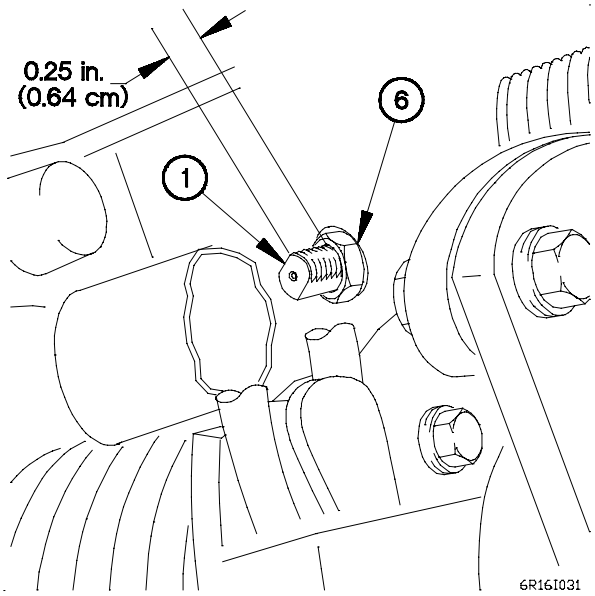
(4) Position hoist assembly (5) on front of tension load cell (1) with front swivel nut (6).

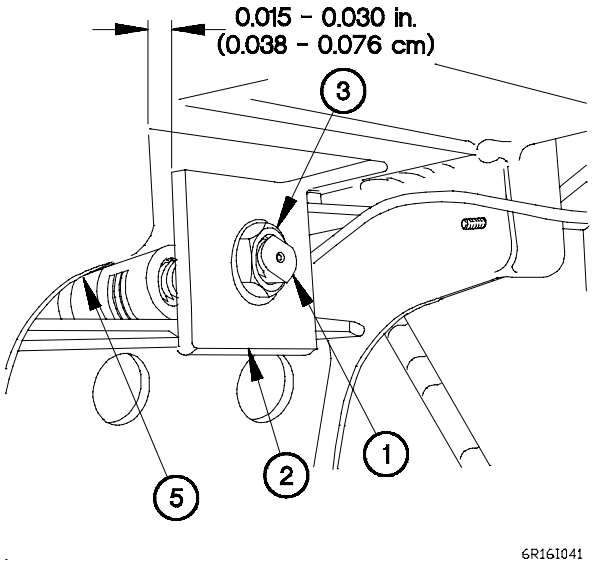



6R16I02-

## 16-16. M1084/M1086 TENSION LOAD CELL REPLACEMENT (CONT)

(5) Adjust front swivel nut (6) on tension load cell (1) until approximately 0.25 in. (0.64 cm) of threads are protruding past front swivel nut.




(6) Tighten rear swivel nut (3) on tension load cell (1) until gap between hoist assembly (5) and boom brace (2) is 0.015-0.030 inches (0.038-0.076 cm).

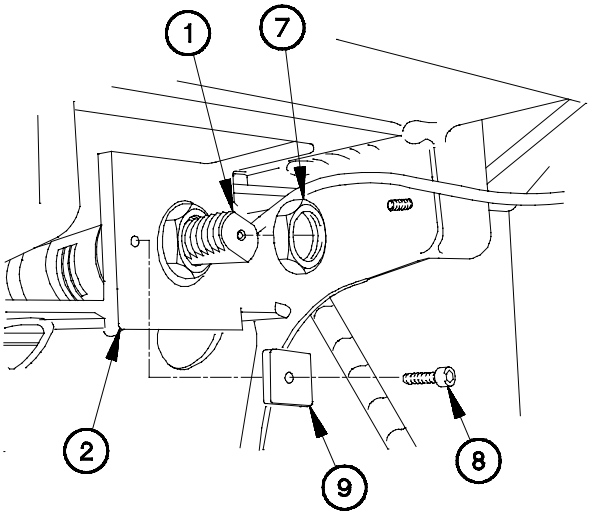
(7) Install jam nut (7) on tension load cell (1).

**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.**

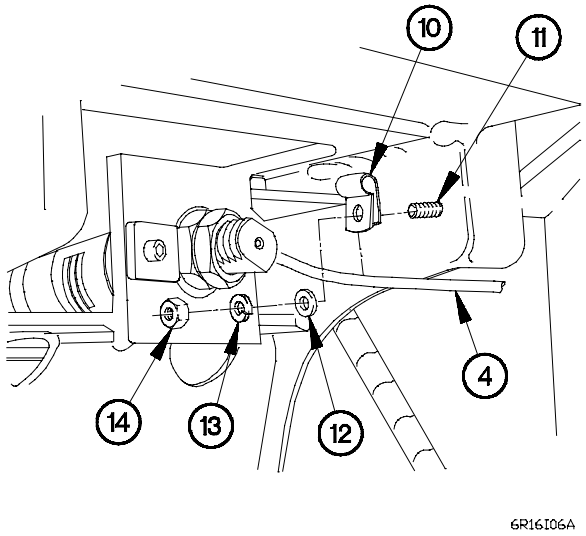
(8) Apply sealing compound to threads of screw (8).

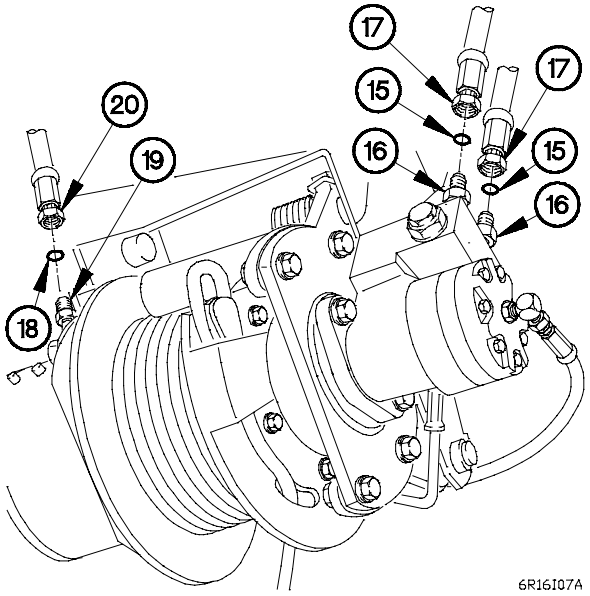
(9) Install stop block (9) on boom brace (2) with screw (8).



(10) Position clamp (10) on tension load cell cable (4).

(11) Install clamp (10) on boom stud (11) with washer (12), lockwasher (13), and nut (14).




(12) Install two preformed packings (15) on fittings (16).

(13) Connect two hydraulic hoses (17) to fittings (16).

(14) Install preformed packing (18) on check valve (19).

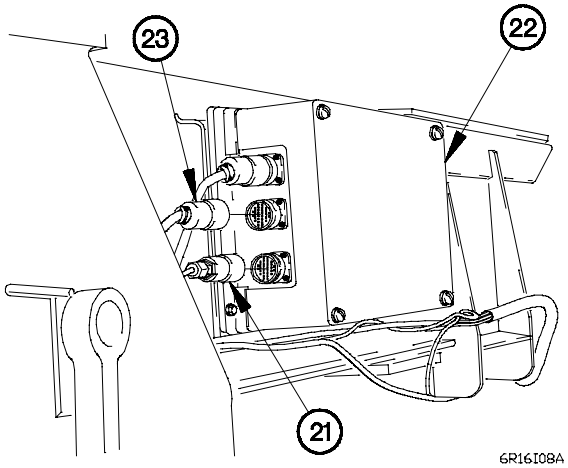
(15) Connect hydraulic hose (20) to check valve (19).

**NOTE**

Install plastic cable ties as required.

(16) Install tension load cell connector (21) on overload shutdown box (22).

(17) Install proximity sensor connector (23) on overload shutdown box (22).



## 16-16. M1084/M1086 TENSION LOAD CELL REPLACEMENT (CONT)

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-17. M1084/M1086 HYDRAULIC MOTOR CONTROL VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. 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)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (4) (Item 139, Appendix F)

**Materials/Parts (Cont)**
Packing, Preformed (Item 262, Appendix F)
Packing, Preformed (Item 236, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Packing, Preformed (2) (Item 265, Appendix F)
Packing, Preformed (2) (Item 231, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**a. Removal.**

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

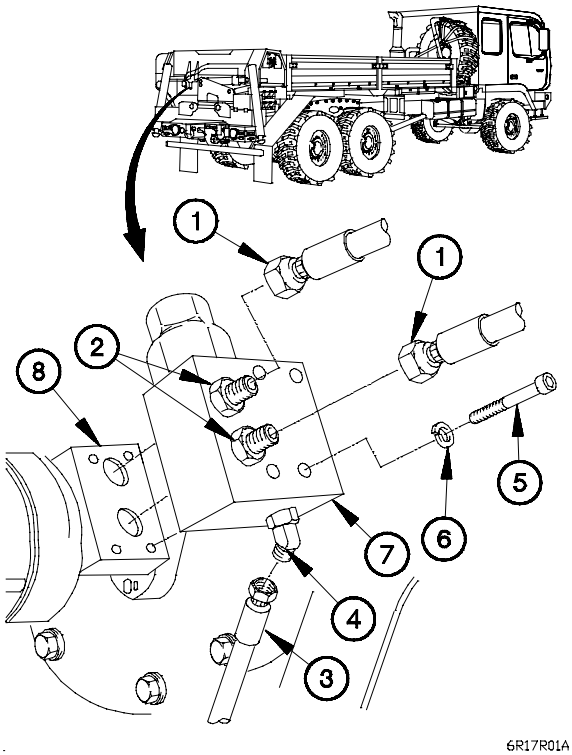
**NOTE**

Tag hoses and connection points prior to disconnecting.

(1) Disconnect two hoses (1) from fittings (2).

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

(3) Remove four screws (5), lockwashers (6), and hydraulic motor control valve (7) from hydraulic motor (8). Discard lockwashers.



## 16-17. M1084/M1086 HYDRAULIC MOTOR CONTROL VALVE REPLACEMENT (CONT)

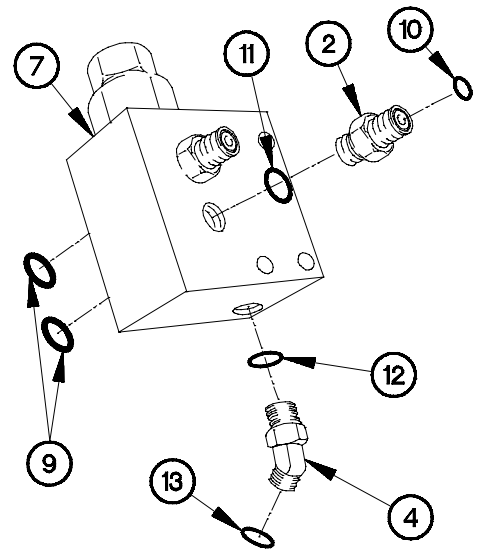
(4) Remove two preformed packings (9) from hydraulic motor control valve (7). Discard preformed packings.

(5) Remove two fittings (2) from hydraulic motor control valve (7).

(6) Remove two preformed packings (10) and preformed packings (11) from fittings (2). Discard preformed packings.

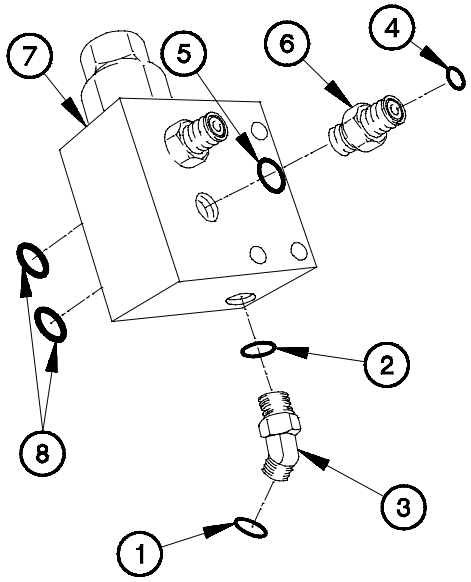
(7) Remove 45-degree fitting (4) from hydraulic motor control valve (7).

(8) Remove preformed packings (12 and 13) from 45-degree fitting (4). Discard preformed packings.




6R17R02-

**b. Installation.**




6R17I01-

(1) Install preformed packings (1 and 2) on 45-degree fitting (3).

(2) Install two preformed packings (4) and preformed packings (5) on fittings (6).

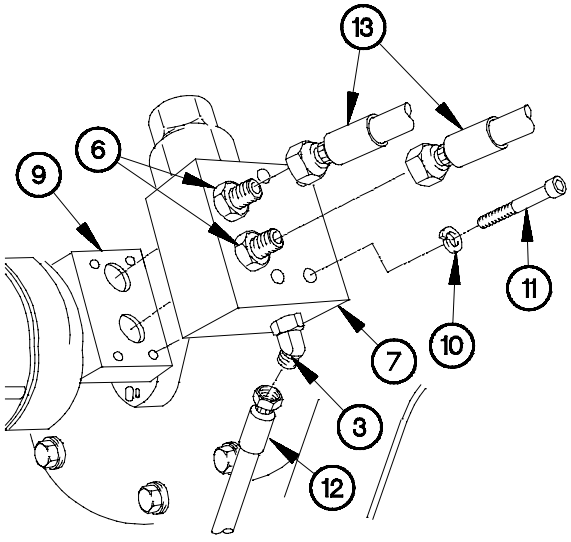
(3) Install 45-degree fitting (3) and two fittings (6) in hydraulic motor control valve (7).

(4) Install two preformed packings (8) on hydraulic motor control valve (7).

(5) Install hydraulic motor control valve (7) on hydraulic motor (9) with four lockwashers (10) and screws (11).

(6) Connect hose (12) to 45-degree fitting (3).

(7) Connect two hoses (13) to fittings (6).




6R17I02-

**c. Follow-On Maintenance.**

Perform crane load test (para 16-31).

**End of Task.**

## 16-18. M1084/M1086 HOLDING VALVE REPLACEMENT

This task covers:

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

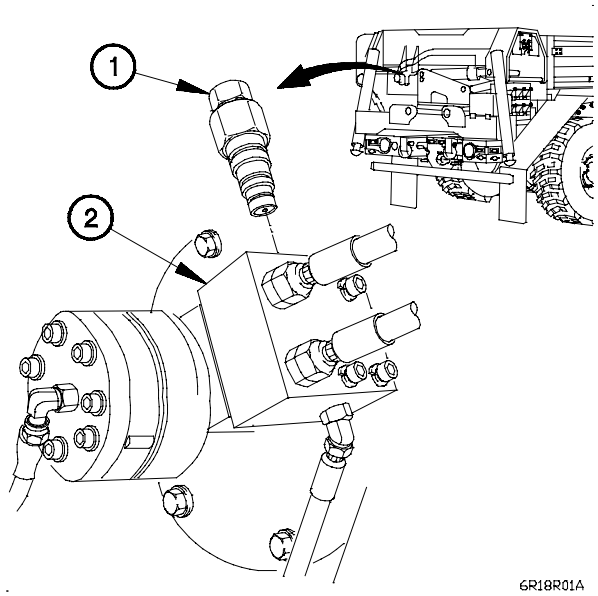
**INITIAL SETUP**

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

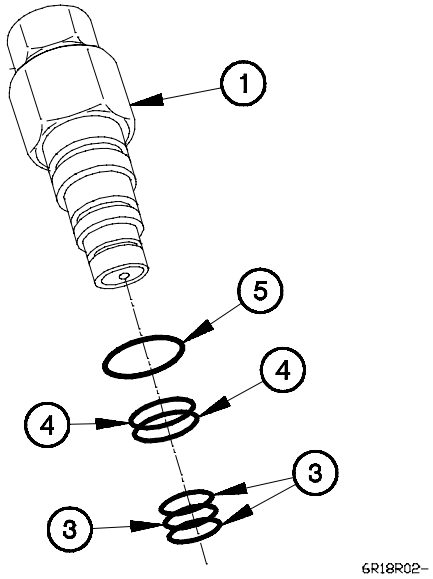
**Materials/Parts**
Kit, Seal (Item 107, Appendix F)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**a. Removal.**




(1) Remove holding valve (1) from motor control valve (2).




(2) Remove three preformed packings (3) from holding valve (1). Discard preformed packings.

(3) Remove two preformed packings (4) from holding valve (1). Discard preformed packings.

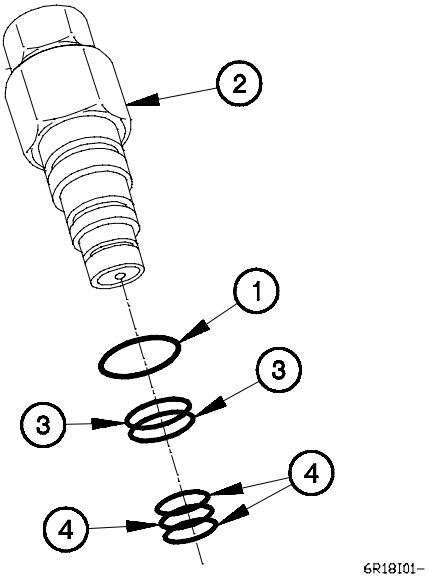
(4) Remove preformed packing (5) from holding valve (1). Discard preformed packing.

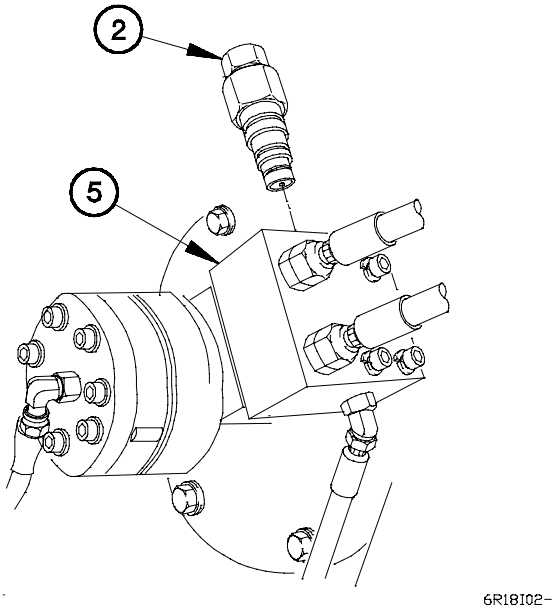
**b. Installation.**

(1) Install preformed packing (1) on holding valve (2).

(2) Install two preformed packing (3) on holding valve (2).

(3) Install three preformed packing (4) on holding valve (2).




(4) Install holding valve (2) in motor control valve (5).

**c. Follow-On Maintenance.**

Perform crane load test (para 16-31).

**End of Task.**

## 16-19. M1084/M1086 HOIST HYDRAULIC MOTOR REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over cargo bed (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic motor valve assembly removed (para 16-17).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Parts Kit, Seal Replacement (Item 319, Appendix F)
Packing, Preformed (Item 262, Appendix F)
Packing, Preformed (Item 237, Appendix F)

**Personnel Required**
(2)

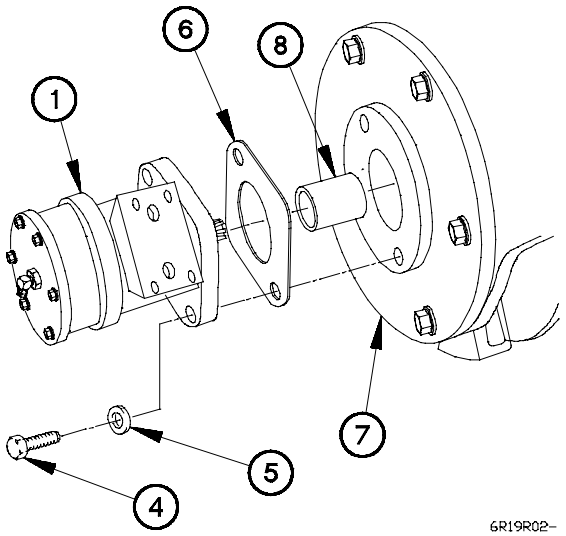
**a. Removal.**

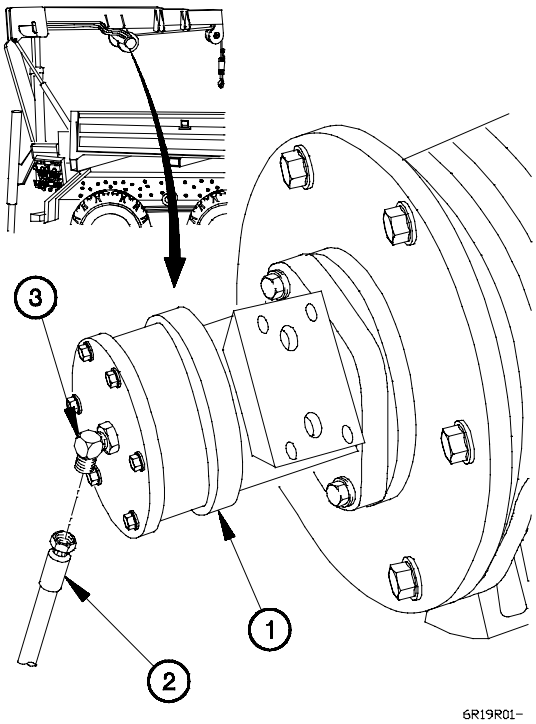
**CAUTION**

Cap or plug hydraulic openings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

(1) Place drain pan under hoist hydraulic motor (1).

(2) Disconnect hose (2) from 90-degree fitting (3).




(3) Remove two screws (4), washers (5), hoist hydraulic motor (1), and gasket (6) from hoist assembly (7). Discard gasket.

**NOTE**

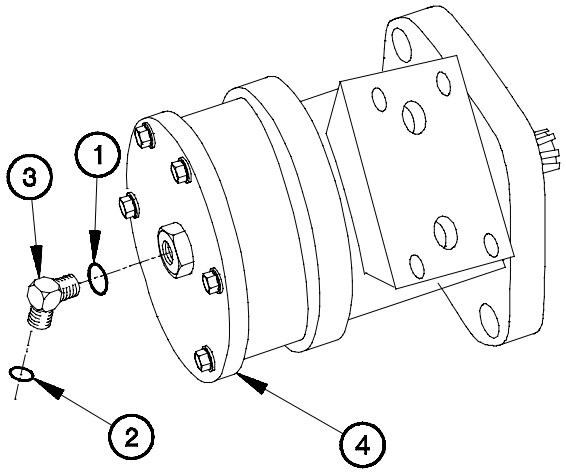
Observe orientation of boss coupling prior to removal.

(4) Remove boss coupling (8) from hoist assembly (7).

(5) Remove 90-degree fitting (3) from hoist hydraulic motor (1).

(6) Remove preformed packings (9 and 10) from 90-degree fitting (3). Discard preformed packings.

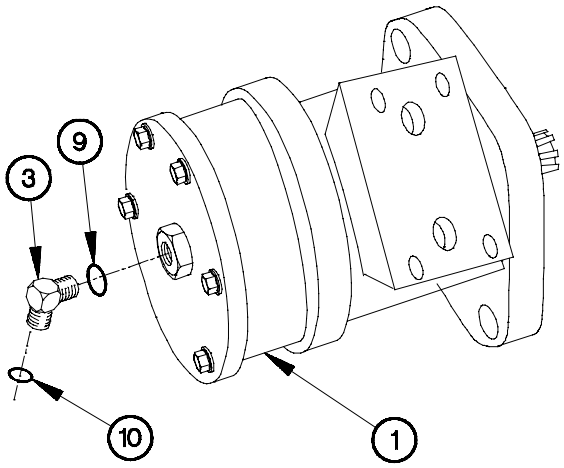
**b. Installation.**




6R19I01-

(1) Install preformed packings (1 and 2) on 90-degree fitting (3).

(2) Install 90-degree fitting (3) on hoist hydraulic motor (4).




6R19R03-

(3) Install unsplined end of boss coupling (5) in hoist assembly (6).

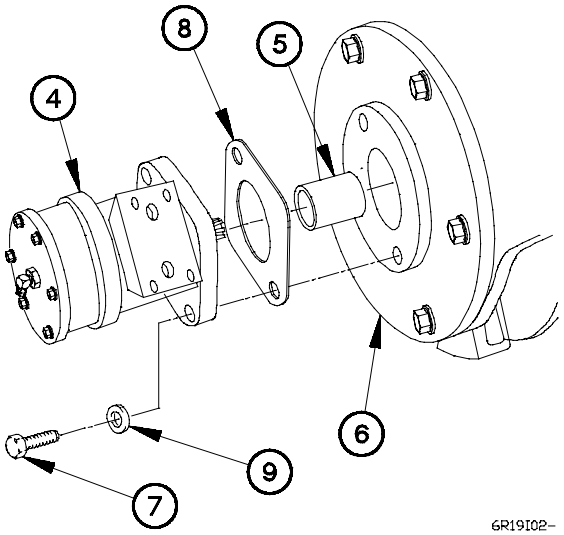
**WARNING**

**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.**

(4) Apply sealing compound to threads of two screws (7).

(5) Position gasket (8) and hoist hydraulic motor (4) on hoist assembly (6) with two washers (9) and screws (7).

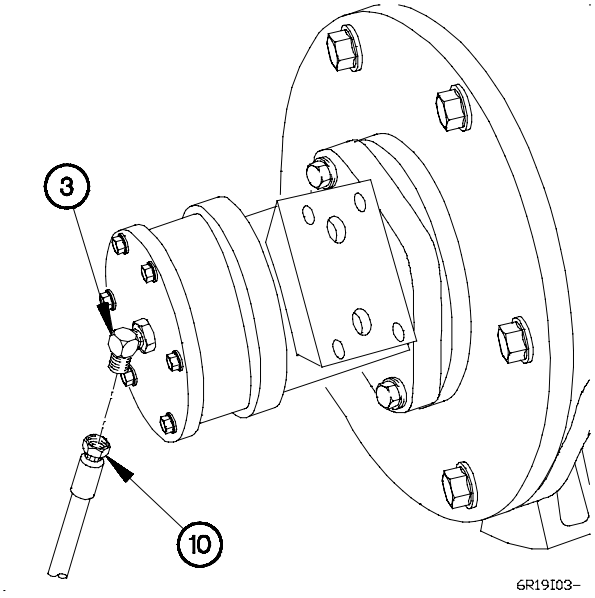
(6) Tighten screws (7) to 60-90 lb-ft (81-122 N·m).




6R19I02-

## 16-19. M1084/M1086 HOIST HYDRAULIC MOTOR REPLACEMENT (CONT)

(7) Connect hose (10) to 90-degree fitting (3).




**c. Follow-On Maintenance.**

(1) Install hydraulic motor valve assembly (para 16-17).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Perform crane load test (para 16-31).

**End of Task.**

## 16-20. M1084/M1086 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Hook assembly removed (TM 9-2320-366-20-5).
Boom positioned over cargo bed (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)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (2) (Item 261, Appendix F)
Packing, Preformed (3) (Item 262, Appendix F)
Packing, Preformed (Item 237, Appendix F)

**a. Removal.**

(1) Place drain pan under oil filled disc brake assembly (1).

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

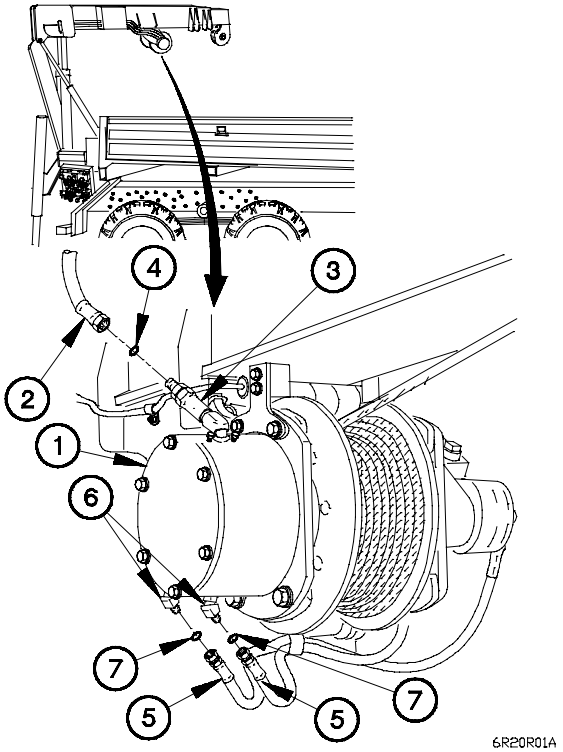
Tag all hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect hose (2) from check valve (3).

(3) Remove preformed packing (4) from check valve (3). Discard preformed packing.

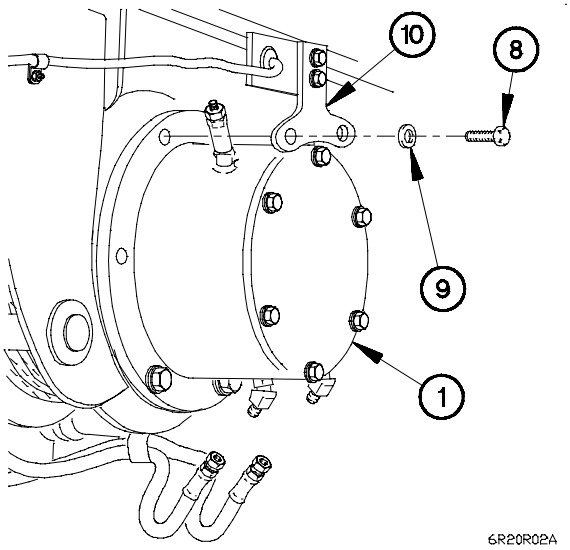
(4) Disconnect two hoses (5) from 45-degree fittings (6).

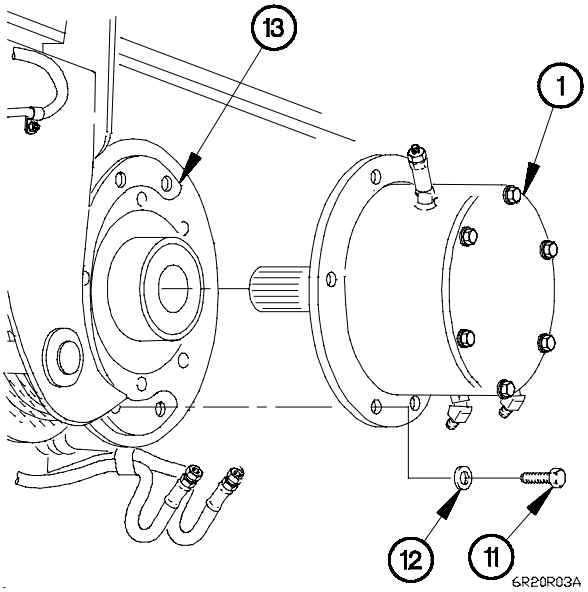
(5) Remove two preformed packings (7) from 45-degree fittings (6). Discard preformed packings.



## 16-20. M1084/M1086 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT (CONT)

(6) Remove two screws (8), washers (9), and bracket (10) from oil filled disc brake assembly (1).



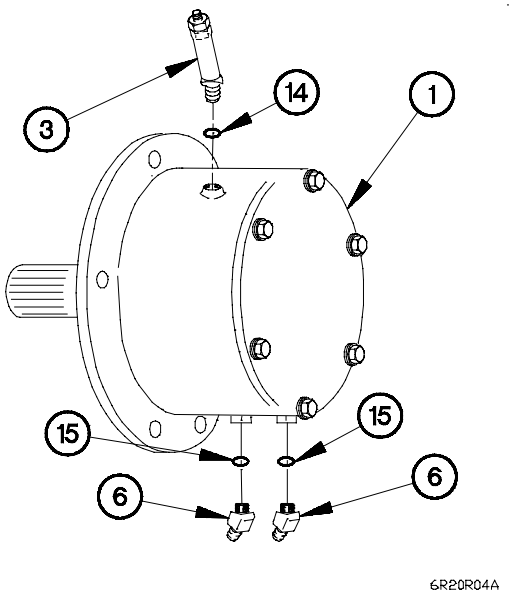

(7) Remove three screws (11), washers (12), and oil filled disc brake assembly (1) from hoist assembly (13).

(8) Remove check valve (3) from oil filled disc brake assembly (1).

(9) Remove preformed packing (14) from check valve (3). Discard preformed packing.

(10) Remove two 45-degree fittings (6) from oil filled disc brake assembly (1).

(11) Remove two preformed packings (15) from 45-degree fittings (6). Discard preformed packings.



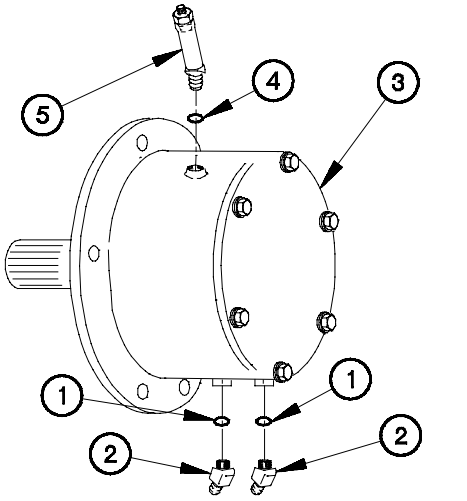
**b. Installation.**

(1) Install two preformed packings (1) on 45-degree fittings (2).

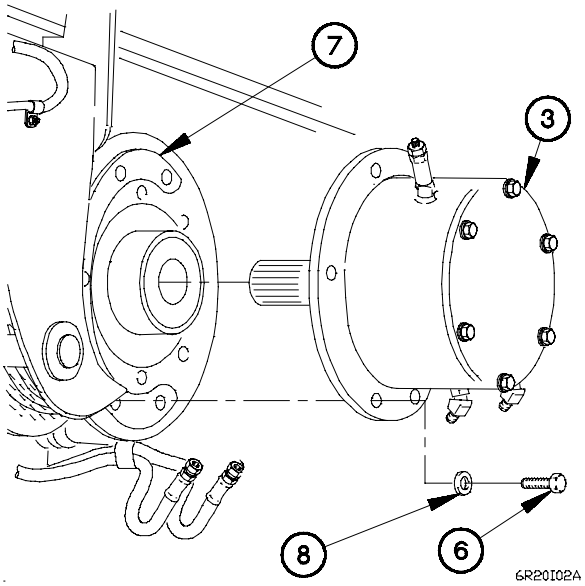
(2) Install two 45-degree fittings (2) on oil filled disc brake assembly (3).

(3) Install preformed packing (4) on check valve (5).

(4) Install check valve (5) on oil filled disc brake assembly (3).




6R20I01A




6R20I02A

**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.**

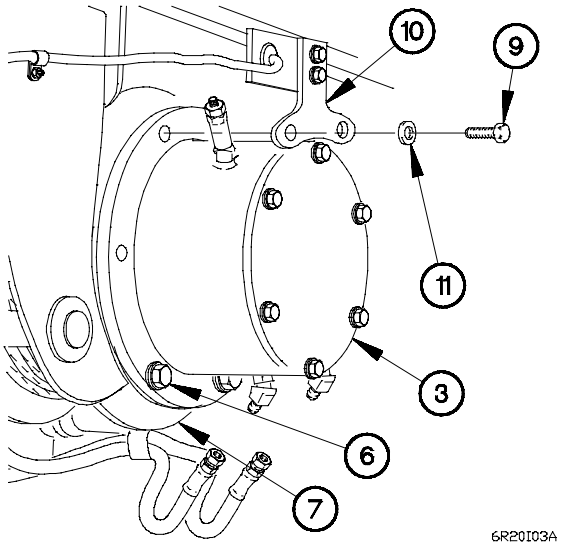
(5) Apply sealing compound to threads of three screws (6).

(6) Position oil filled disc brake assembly (3) on hoist assembly (7) with three washers (8) and screws (6).

(7) Apply sealing compound to threads of two screws (9).

(8) Position bracket (10) on oil fill disc brake assembly (3) with two washers (11) and screws (9).

(9) Tighten screws (6 and 9) to 60-90 lb-ft (81-122 N•m).




6R20I03A

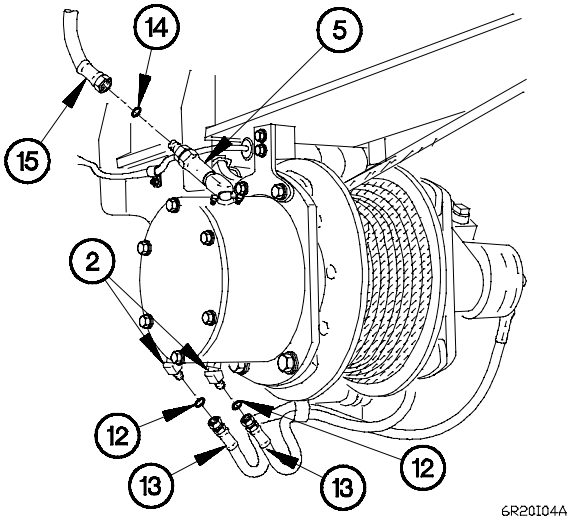
## 16-20. M1084/M1086 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT (CONT)

(10) Install two preformed packings (12) on 45-degree fittings (2).

(11) Connect two hoses (13) to 45-degree fittings (2).

(12) Install preformed packing (14) on check valve (5).

(13) Connect hose (15) to check valve (5).




**c. Follow-On Maintenance.**

(1) Install hook assembly (TM 9-2320-366-20-5).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-21. M1084/M1086 GEAR SET REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Hydraulic motor control valve removed (para 16-17).
Hoist hydraulic motor removed (para 16-19).
Oil filled disc brake assembly removed (para 16-20).
Hoist assembly removed (para 16-13).
Cable follower removed (para 16-14).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

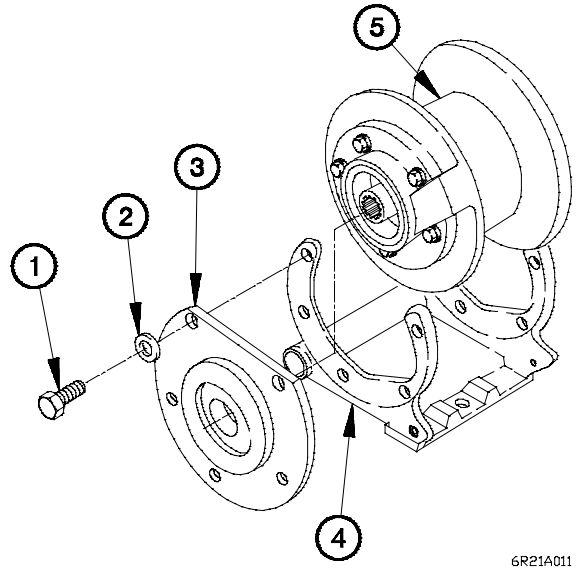
**Tools and Special Tools (Cont)**
Gloves, Rubber (Item 26, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 95, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

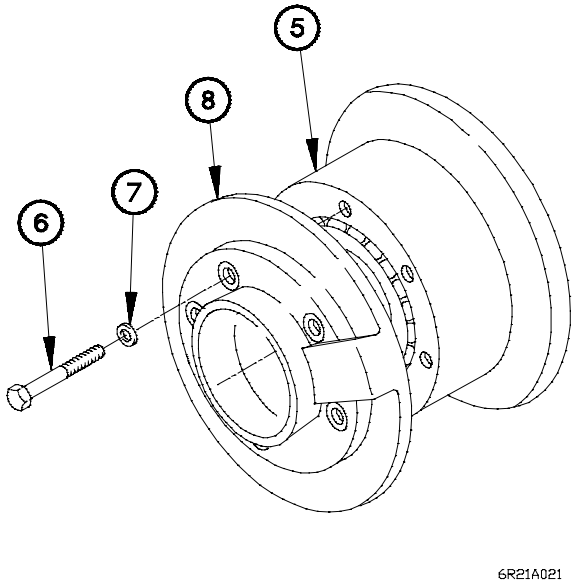
**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Sealing Compound (Item 76, Appendix C)
Parts Kit, Seal Replacement (Item 319, Appendix F)

**a. Disassembly.**

(1) Remove five screws (1), washers (2), and retaining plate (3) from housing (4).

(2) Remove ring gear (5) from housing (4).




(3) Remove six screws (6) and washers (7) from RH drum end (8).

(4) Remove RH drum end (8) from ring gear (5).

## 16-21. M1084/M1086 GEAR SET REPAIR (CONT)

(5) Remove preformed packing (9) from RH drum end (8). Discard preformed packing.

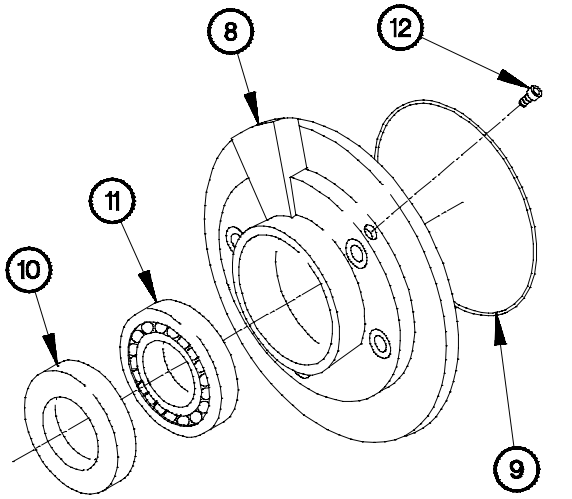
(6) Remove seal (10) from RH drum end (8). Discard seal.

**NOTE**

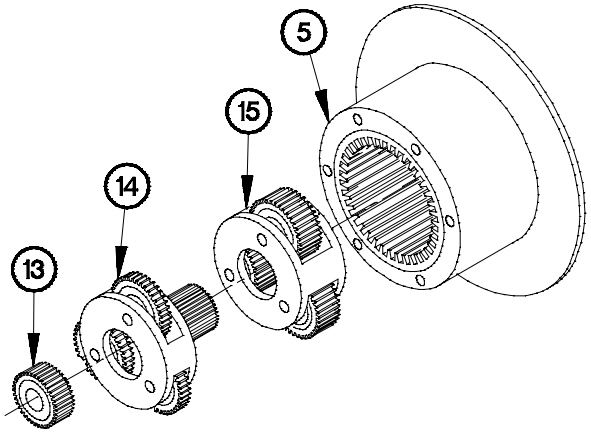
Note position of bearing prior to removal.

(7) Remove bearing (11) from RH drum end (8).

(8) Remove two plugs (12) from RH drum end (8).




6R21A031




6R21A041

(9) Remove sun gear (13) from carrier (14).

(10) Remove carrier (14) from ring gear (15).

(11) Remove ring gear (15) from carrier (5).

**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 three gears are disassembled the same way. One gear shown.

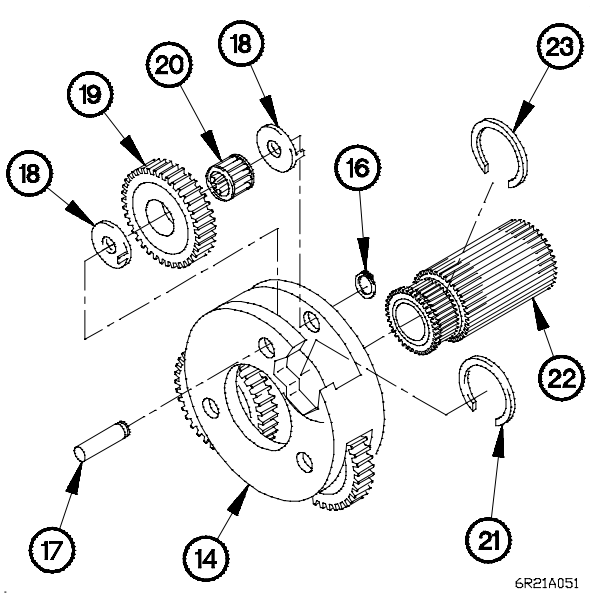
(12) Remove retaining ring (16), pin (17), two washers (18), gear (19), and roller set (20) from carrier (14).

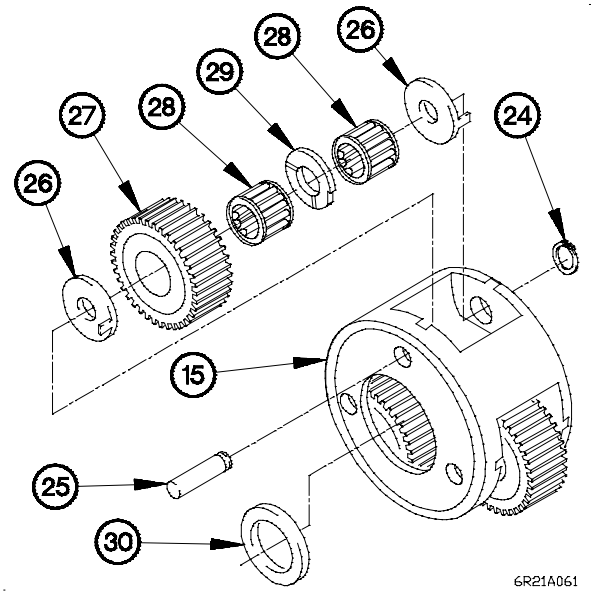
(13) Perform step (12) on two remaining gears (19).

(14) Remove retaining ring (21) from drive gear (22).

(15) Remove drive gear (22) from carrier (14).

(16) Remove retaining ring (23) from drive gear (22).




**NOTE**

All three gears are disassembled the same way. One gear shown.

(17) Remove retaining ring (24) from pin (25).

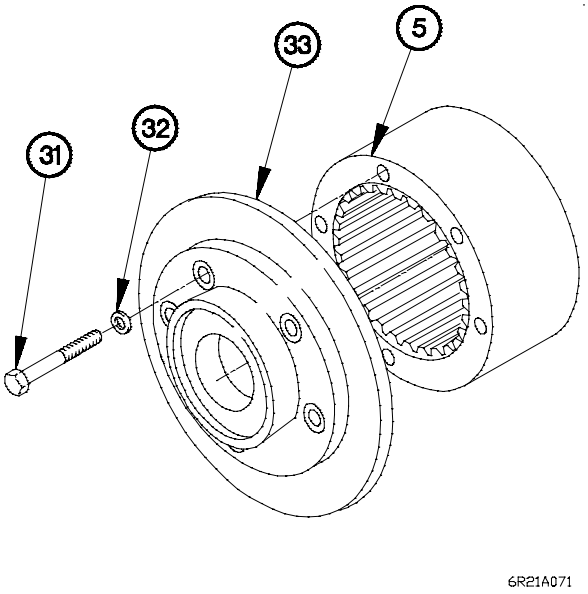
(18) Remove pin (25), two washers (26), and gear (27) from carrier (15).

(19) Remove two roller sets (28) and separator (29) from gear (27).

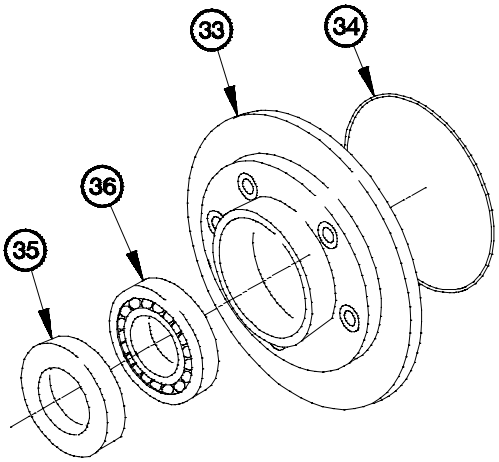
(20) Perform steps (17) through (19) on two remaining gears (27).

(21) Remove washer (30) from carrier (15).

## 16-21. M1084/M1086 GEAR SET REPAIR (CONT)




(22) Remove eight screws (31), washers (32), and LH drum end (33) from ring gear (5).




(23) Remove preformed packing (34) from LH drum end (33). Discard preformed packing.

(24) Remove seal (35) from LH drum end (33). Discard seal.

(25) Remove bearing (36) from LH drum end (33).

**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.

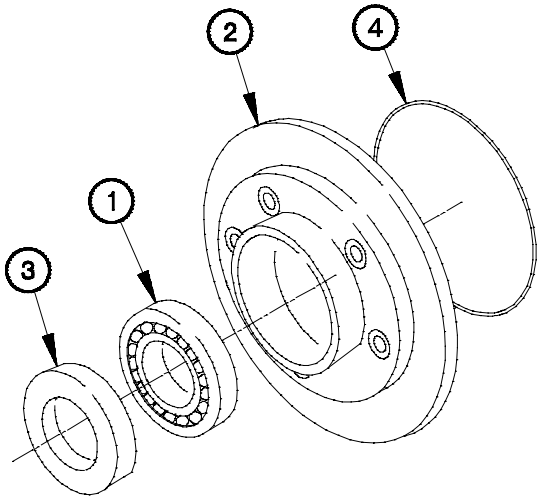
(2) Inspect all parts for pitting, corrosion, or signs of binding.

**c. Assembly.**

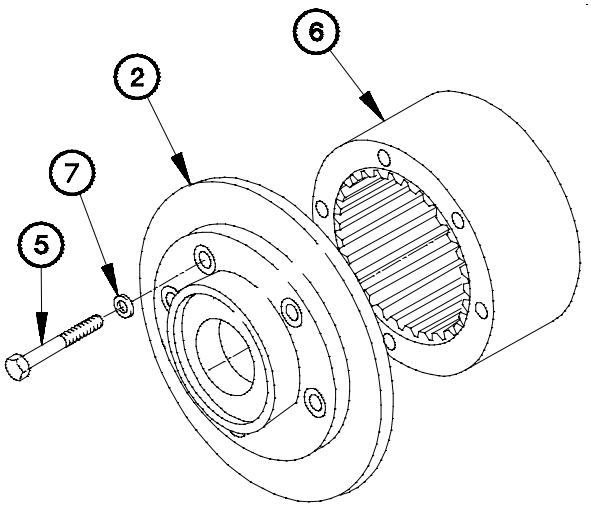
(1) Install bearing (1) in LH drum end (2).

(2) Install seal (3) in LH drum end (2).

(3) Install preformed packing (4) on LH drum end (2).




6R21C011




6R21C021

**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.**

(4) Apply sealing compound to threads of eight screws (5).

(5) Position LH drum end (2) on ring gear (6) with eight washers (7) and screws (5).

(6) Tighten screws (5) to 168-192 lb-in. (19-22 N·m).

## 16-21. M1084/M1086 GEAR SET REPAIR (CONT)

**NOTE**

All three gears are assembled the same way.
One gear shown.

(7) Install two roller sets (8) and separator (9) in gear (10).

(8) Install gear (10) and two washers (11) in carrier (12) with pin (13).

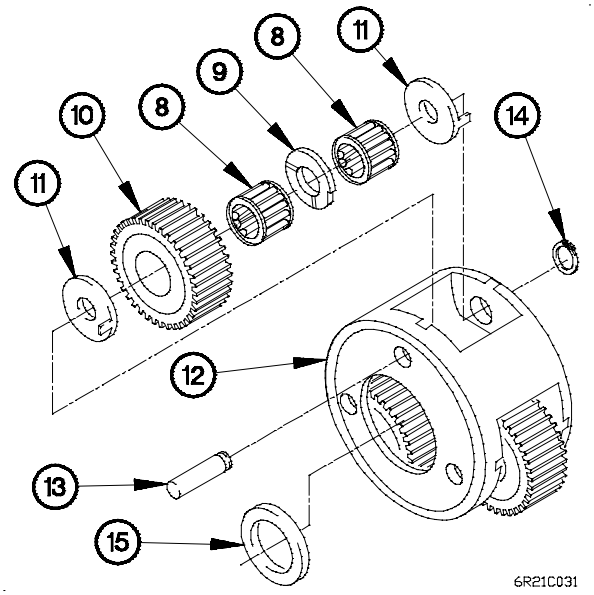
**WARNING**

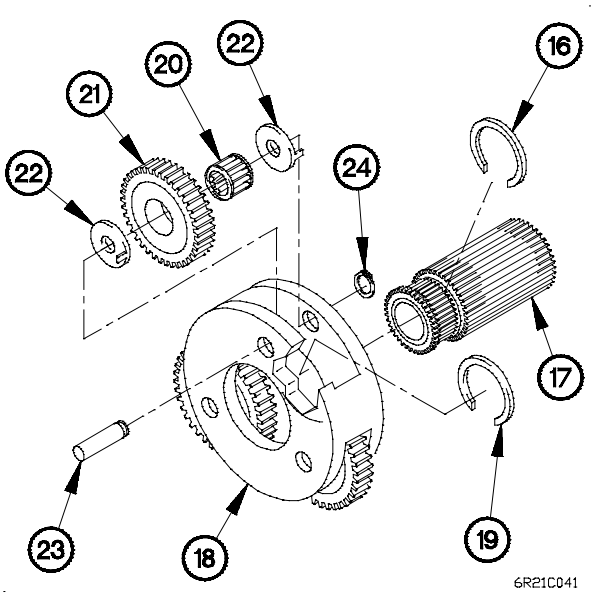
**Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(9) Install retaining ring (14) on pin (13).

(10) Perform steps (7) through (9) on two remaining gears (10).

(11) Install washer (15) in carrier (12).




**NOTE**

All three gears are assembled the same way.
One gear shown.

(12) Install retaining ring (16) on drive gear (17).

(13) Install drive gear (17) in carrier (18).

(14) Install retaining ring (19) on drive gear (17).

(15) Install roller set (20) in gear (21).

(16) Install two washers (22) and gear (21) in carrier (18) with pin (23).

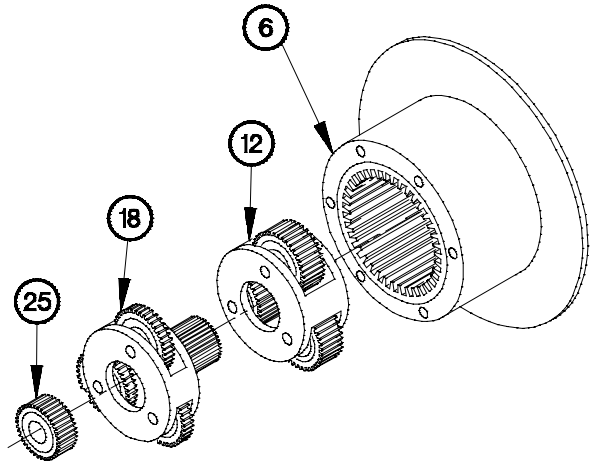
(17) Install retaining ring (24) on pin (23).

(18) Perform steps (12) through (17) on two remaining gears (21).

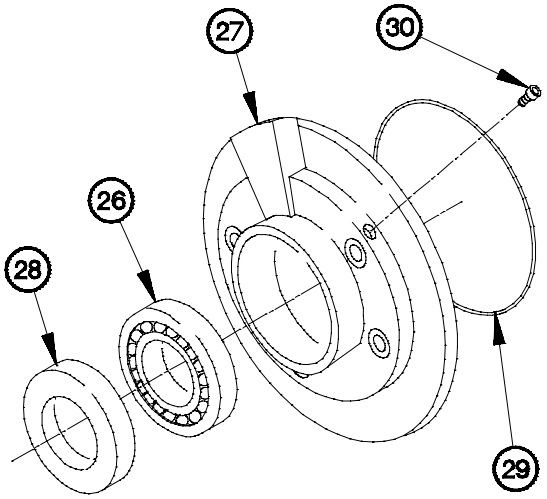
(19) Install carrier (12) in ring gear (6).

(20) Install carrier (18) in ring gear (6).

(21) Install sun gear (25) in carrier (18).




6R21C051




6R21C061

(22) Install bearing (26) in RH drum end (27).

(23) Install seal (28) in RH drum end (27).

(24) Install preformed packing (29) on RH drum end (27).

(25) Install two plugs (30) in RH drum end (27).

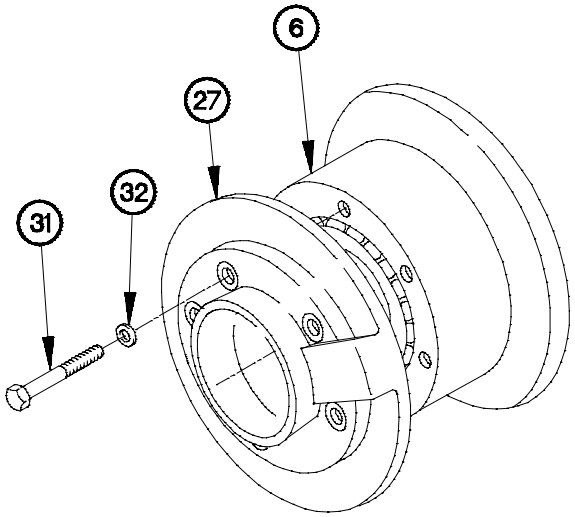
**WARNING**

**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.**

(26) Apply sealing compound to threads of six bolts (31).

(27) Position RH drum end (27) on ring gear (6) with six washers (32) and screws (31).

(28) Tighten screws (31) to 63-69 lb-ft (85-94 N•m).



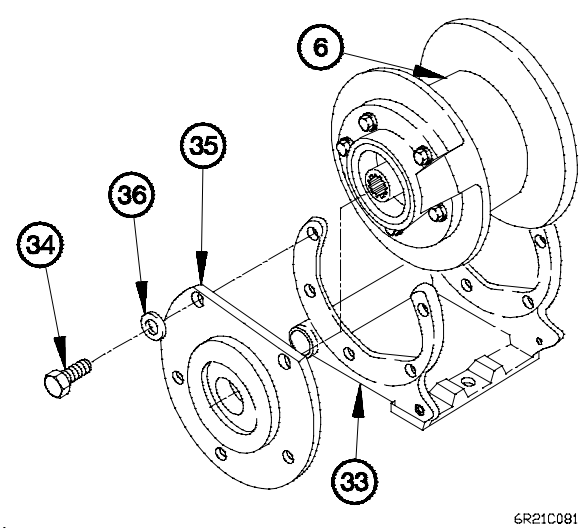

6R21C071

## 16-21. M1084/M1086 GEAR SET REPAIR (CONT)

(29) Install ring gear (6) in housing (33).

**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.**




(30) Apply sealing compound to threads of five screws (34).

(31) Position retaining plate (35) on housing (33) with five washers (36) and screws (34).

(32) Tighten screws (34) to 63-69 lb-ft (85-94 N•m).

**d. Follow-On Maintenance.**

(1) Install cable follower (para 16-14).

(2) Install hoist assembly (para 16-13).

(3) Install oil filled disc brake assembly (para 16-20).

(4) Install hoist hydraulic motor (para 16-19).

(5) Install hydraulic motor valve assembly (para 16-17).

(6) Perform crane load test (para 16-31).

**End of Task.**

## 16-22. M1084/M1086 OVERLOAD SHUTDOWN REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**Materials/Parts**
Lockwasher (3) (Item 139, Appendix F)
Lockwasher (2) (Item 144, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**NOTE**

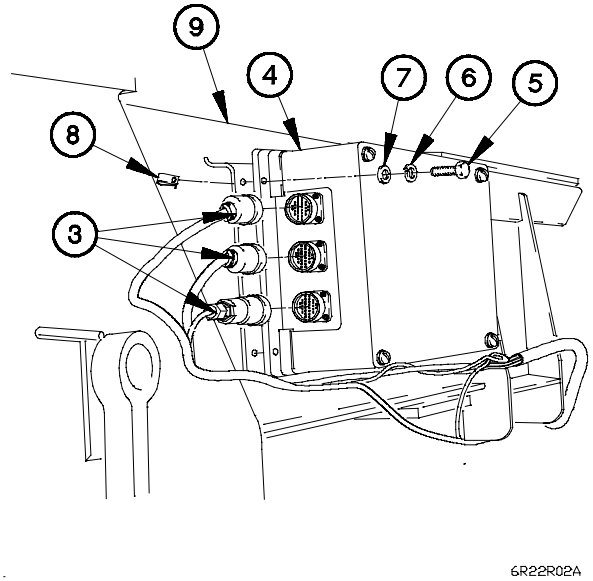
Use serial number of MHC when ordering replacement overload shutdown.

**a. Removal.**

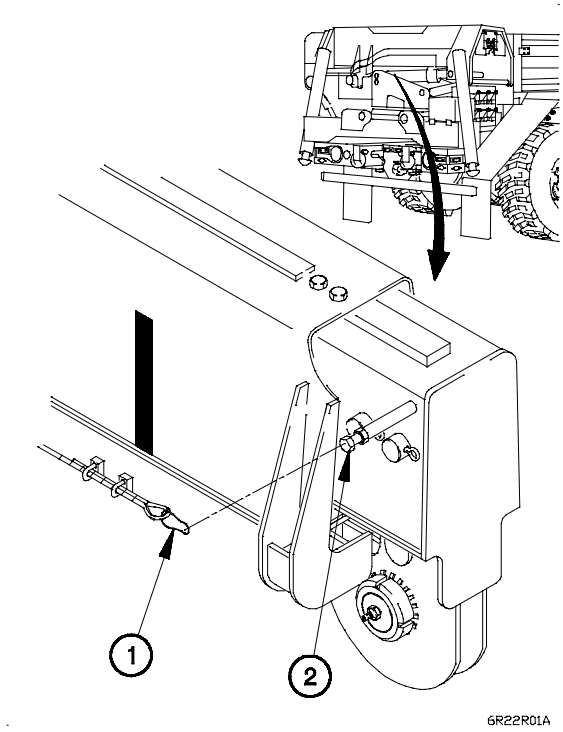
**CAUTION**

Overload shutdown cable is on a tension reel. Allow cable to rewind slowly. Failure to comply may result in damage to equipment.

(1) Disconnect cable eye (1) from bolt (2).




6R22R02A




6R22R01A

**NOTE**

Tag connectors and connection points prior to disconnecting.

(2) Disconnect three connectors (3) from overload shutdown (4).

**NOTE**

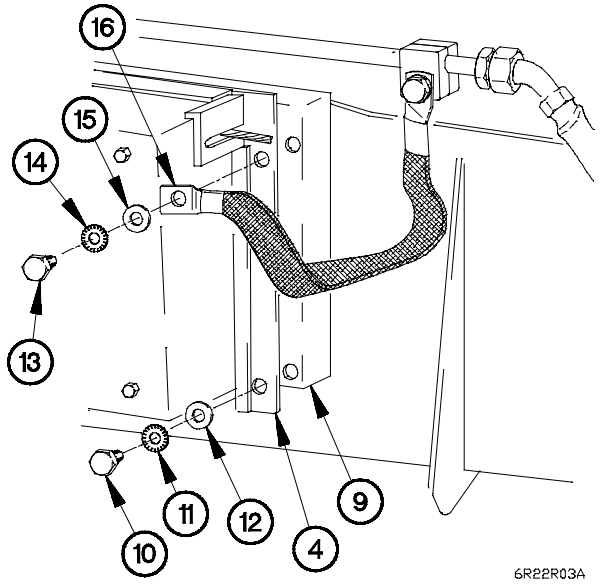
Step (3) requires the aid of an assistant.

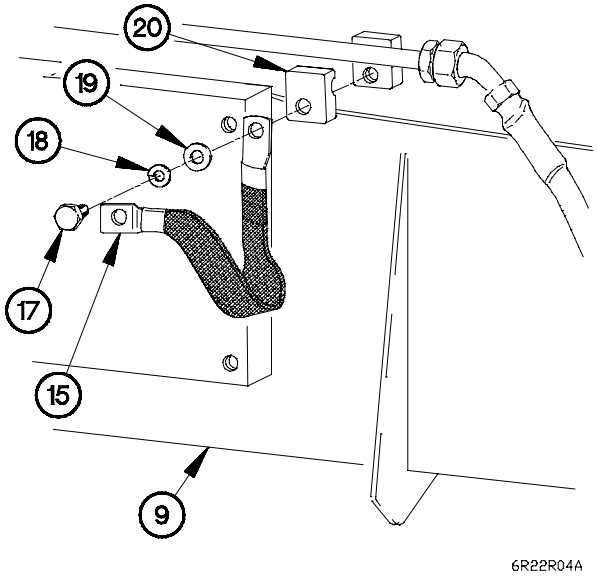
(3) Remove two bolts (5), lockwashers (6), washers (7), and clipnuts (8) from boom assembly (9). Discard lockwashers.

## 16-22. M1084/M1086 OVERLOAD SHUTDOWN REPLACEMENT (CONT)

(4) Remove bolt (10), lockwasher (11), and washer (12) from overload shutdown (4). Discard lockwasher.

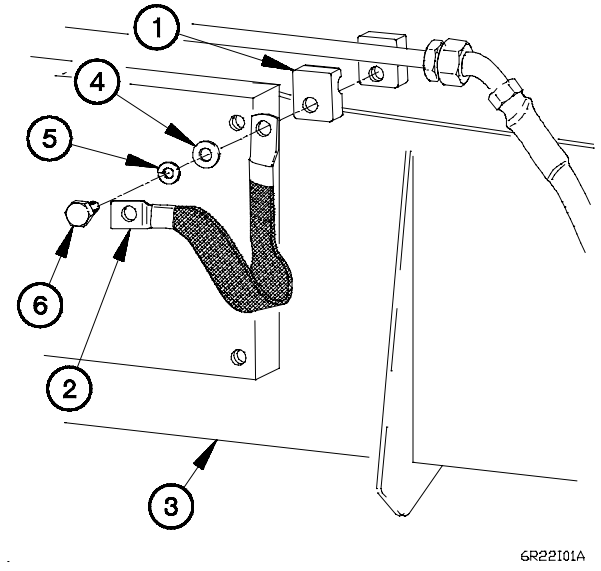
(5) Remove bolt (13), lockwasher (14), washer (15), ground strap (16), and overload shutdown (4) from boom assembly (9). Discard lockwasher.




(6) Remove bolt (17), lockwasher (18), washer (19), ground strap (15), and clamp (20) from boom assembly (9). Discard lockwasher.

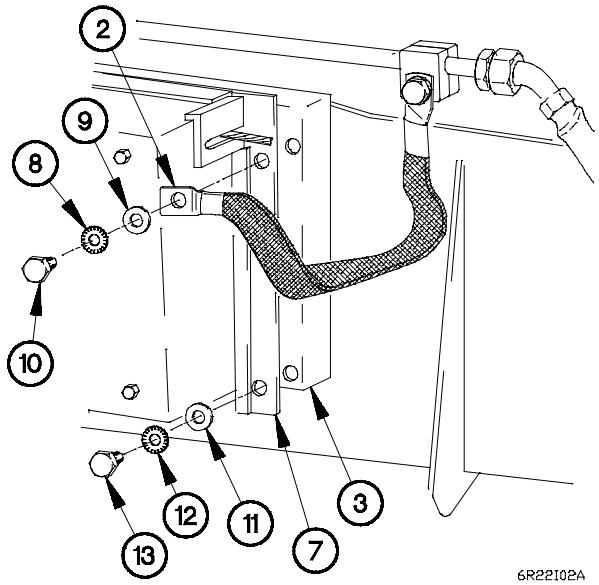
**b. Installation.**

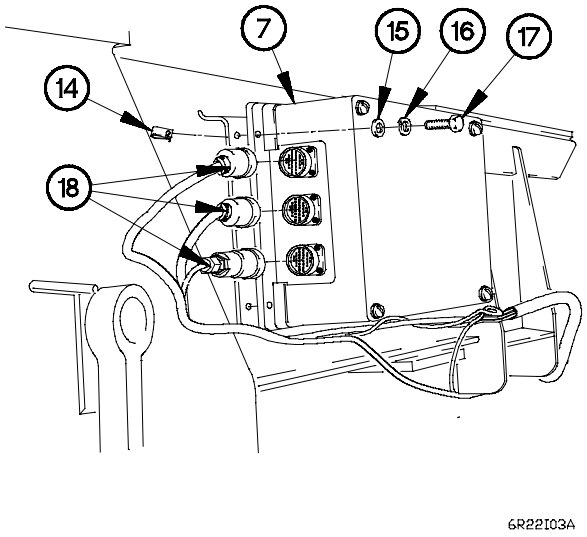



(1) Install clamp (1) and ground strap (2) on boom assembly (3) with washer (4), lockwasher (5), and bolt (6).

(2) Install overload shutdown (7) and ground strap (2) on boom assembly (3) with washer (8), lockwasher (9), and bolt (10).

(3) Install washer (11), lockwasher (12), and bolt (13) on overload shutdown (7).



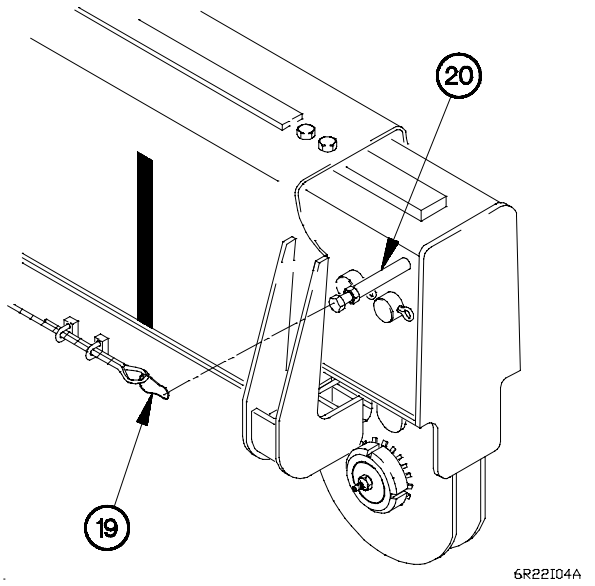




**NOTE**

Step (4) requires the aid of an assistant.

(4) Install two clipnuts (14), washers (15), lockwashers (16), and bolts (17) in overload shutdown (7).

(5) Connect three connectors (18) to overload shutdown (7).




(6) Connect cable eye (19) to bolt (20).

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-23. M1084/M1086 SWING DRIVE 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**
MHC rotated to access swing drive gear (TM 9-2320-366-10-1).
Engine shut down (TM 9-2320-366-10-1).
Hydraulic reservoir supply and return valves closed (TM 9-2320-366-10-1).
Cross relief valve removed (para 16-24).
Hydraulic orbit motor removed (para 16-25).

**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)
Bracket, Swing Drive Assembly (Item 23, Appendix D)
Socket Tool, Spanner (Item 19, Appendix D)
Gloves, Rubber (Item 25, Appendix B)
Caliper, Set, Micrometer, Outside (Item 9, Appendix B)

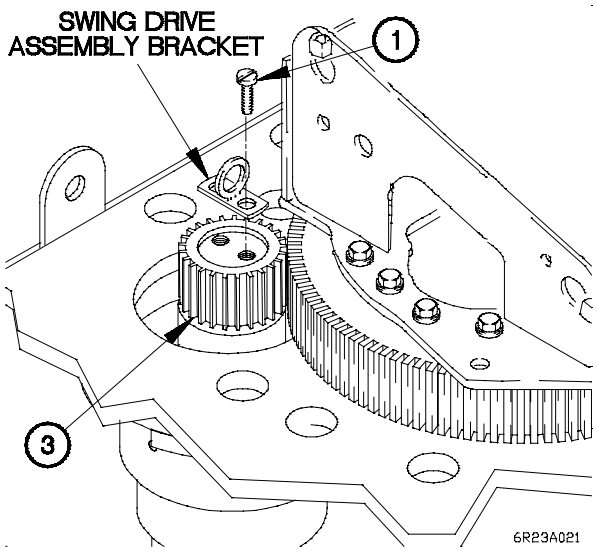
**Tools and Special Tools (Cont)**
Pan, Drain (Item 43, Appendix B)

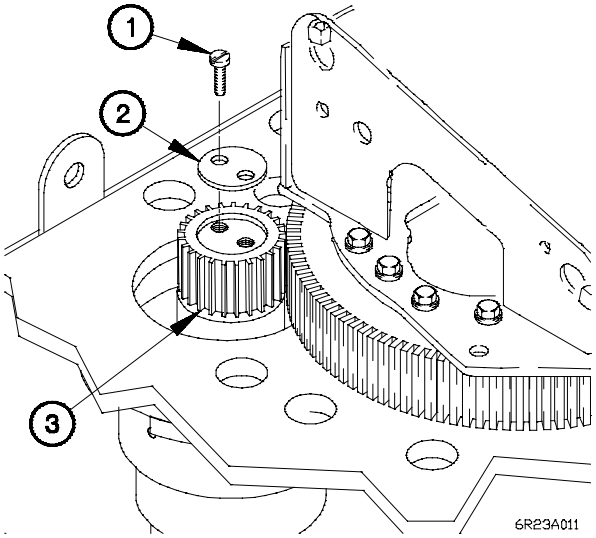
**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Gear (Item 52, Appendix C)
Packing, Preformed (Item 236, Appendix F)
Retainer, Packing (2) (Item 352, Appendix F)
Packing, Preformed (2) (Item 226, Appendix F)
Packing, Preformed (Item 267, Appendix F)
Retainer, Packing (Item 353, Appendix F)
Lockwasher (16) (Item 140, Appendix F)
Seal, Plain Encased (Item 392, Appendix F)
Lockwasher (Item 127, Appendix F)

**Personnel Required**
(3)

**a. Removal.**

(1) Remove two screws (1) and plate (2) from swing drive assembly (3).




(2) Install swing drive assembly bracket in swing drive assembly (3) with two screws (1).

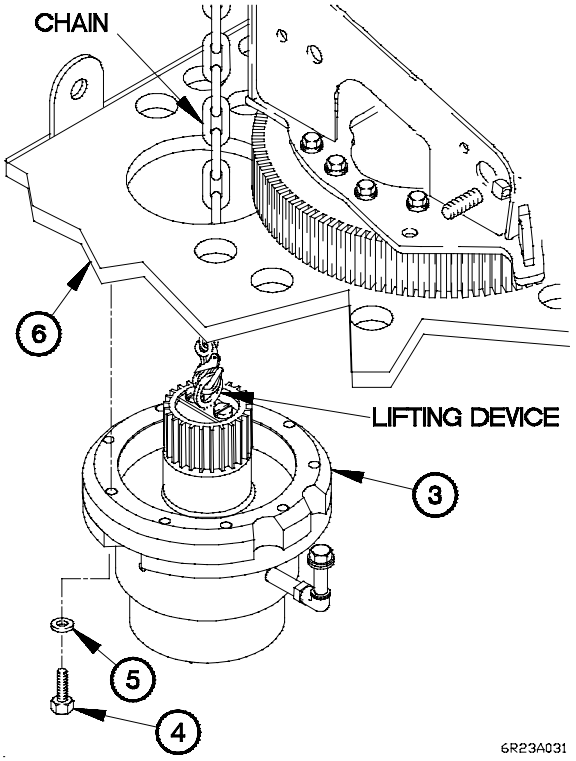
**WARNING**

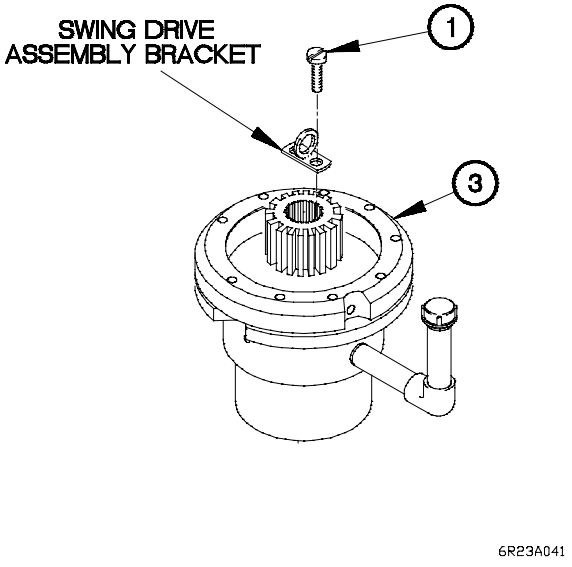
- **Swing drive assembly weighs approximately 70 lbs (32 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**
- **Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**

**CAUTION**

Use caution when lowering swing drive assembly past cables and hoses. Failure to comply may result in damage to equipment.

(3) Remove nine screws (4), washers (5) and swing drive assembly (3) from crane assembly (6).

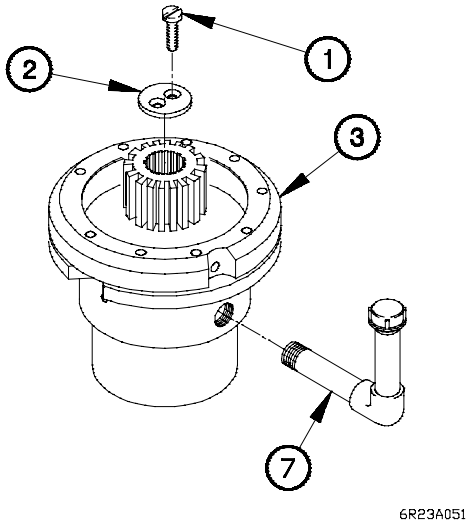



(4) Remove two screws (1) and swing drive assembly bracket from swing drive assembly (3).

(5) Install plate (2) on swing drive assembly (3) with two screws (1).

(6) Remove oil fill pipe (7) from swing drive assembly (3).



## 16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**b. Disassembly.**

(1) Remove hydraulic hose (1) from 90-degree fitting (2).

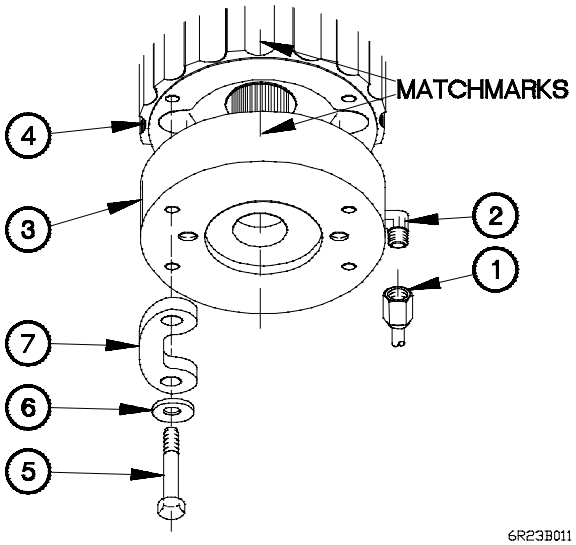
**WARNING**

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

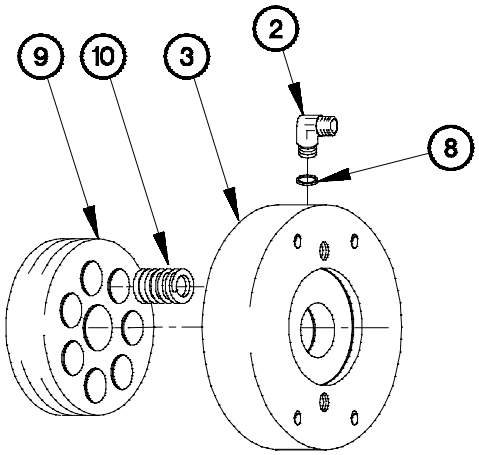
(2) Match mark cylinder housing (3) to end cover (4).

(3) Remove four screws (5), washers (6), and two drive stops (7) from cylinder housing (3).

(4) Remove cylinder housing (3) from end cover (4).



6R23B011



6R23B021

(5) Remove 90-degree fitting (2) from cylinder housing (3).

(6) Remove preformed packing (8) from 90-degree fitting (2). Discard preformed packing.

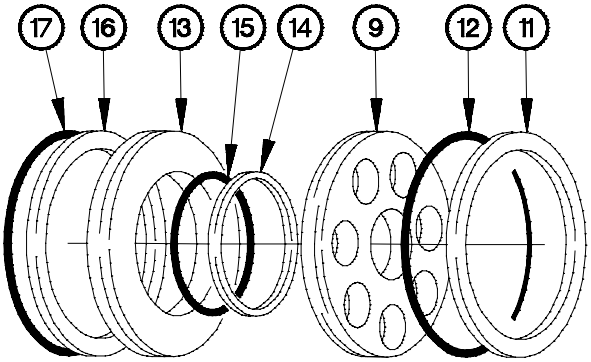
(7) Remove piston (9) and seven springs (10) from cylinder housing (3).

(8) Remove packing retainer (11) and preformed packing (12) from piston (9). Discard packing retainer and preformed packing.

(9) Remove piston (9) from cylinder head (13).

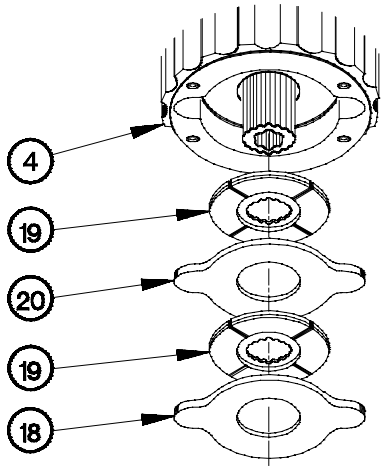
(10) Remove packing retainer (14) and preformed packing (15) from cylinder head (13). Discard packing retainer and preformed packing.

(11) Remove packing retainer (16) and preformed packing (17) from cylinder head (13). Discard packing retainer and preformed packing.

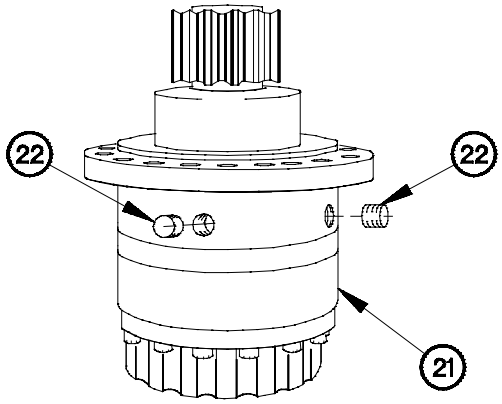


6R23B031

(12) Remove outer stator (18), disc (19), inner stator (20), and disc (19) from end cover (4).




6R23B041




6R23B051

(13) Place drain pan under swing drive (21).

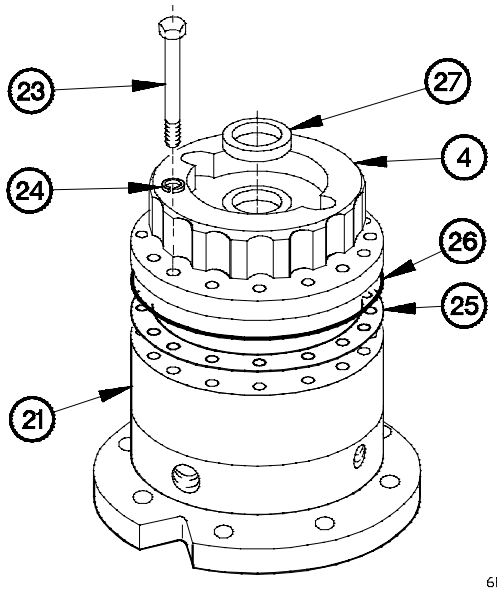
(14) Remove two plugs (22) from swing drive (21).

(15) Remove 16 bolts (23) and lockwashers (24) from swing drive (21). Discard lockwashers.

(16) Remove end cover (4) from swing drive (21).

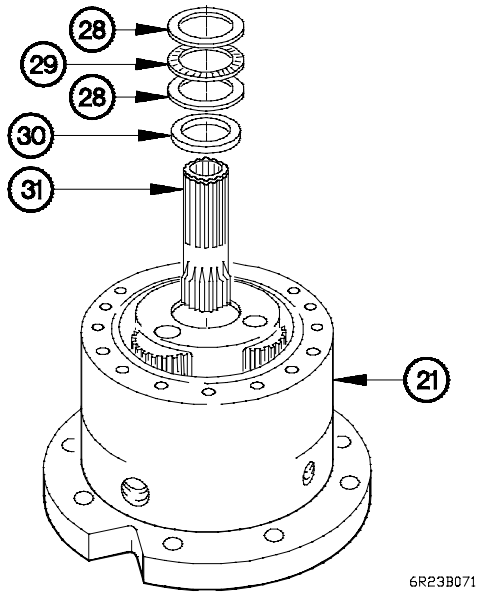
(17) Remove shim (25) and preformed packing (26) from end cover (4). Discard preformed packing.

(18) Remove oil seal (27) from end cover (4). Discard oil seal.



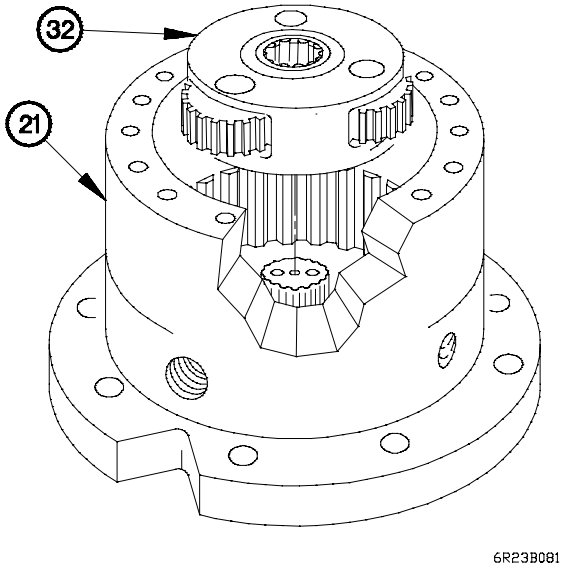

6R23B061

## 16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




(19) Remove race (28), bearing (29), race (28), and spacer (30) from sun gear (31).

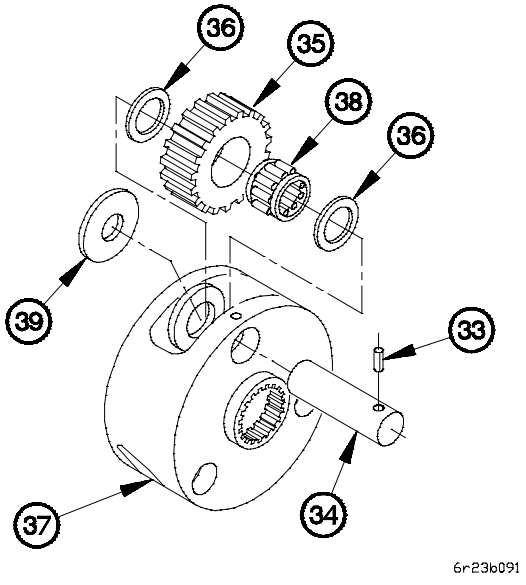
(20) Remove sun gear (31) from swing drive (21).




(21) Remove planetary gear (32) from swing drive (21).

**NOTE**

All three gears are disassembled the same way. One gear shown.




(22) Install roll pin (33) in pin (34).

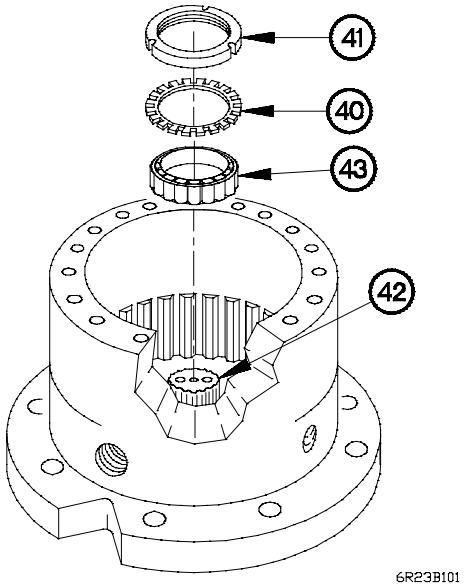
(23) Remove pin (34), gear (35), and two spacers (36) from carrier (37).

(24) Remove roll pin (33) from pin (34).

(25) Remove bearing (38) from gear (35).

(26) Remove center spacer (39) from carrier (37).

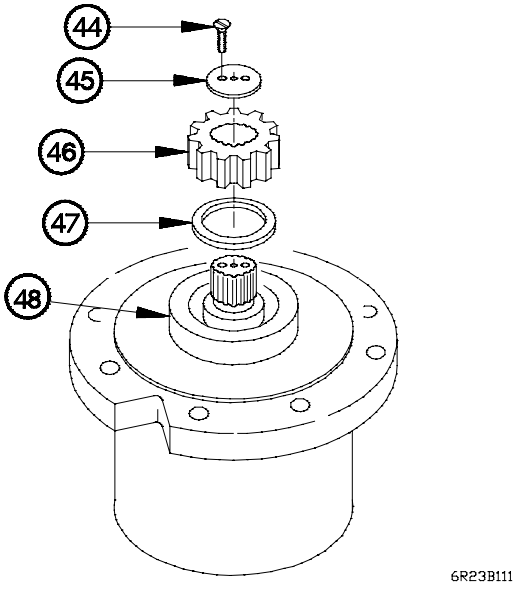
(27) Perform steps (21) through (26) on two remaining gears.



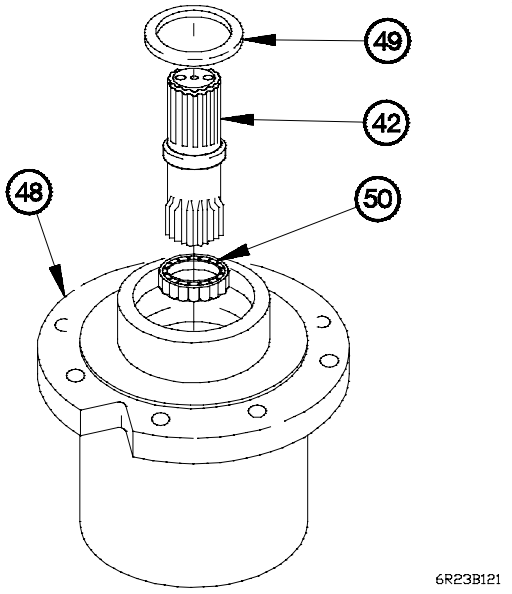

(28) Bend down tab of lockwasher (40).

(29) Remove nut (41) and lockwasher (40) from shaft (42). Discard lockwasher.

(30) Remove bearing (43) from shaft (42).




(31) Remove two screws (44), plate (45), gear (46), and spacer (47) from hub (48).

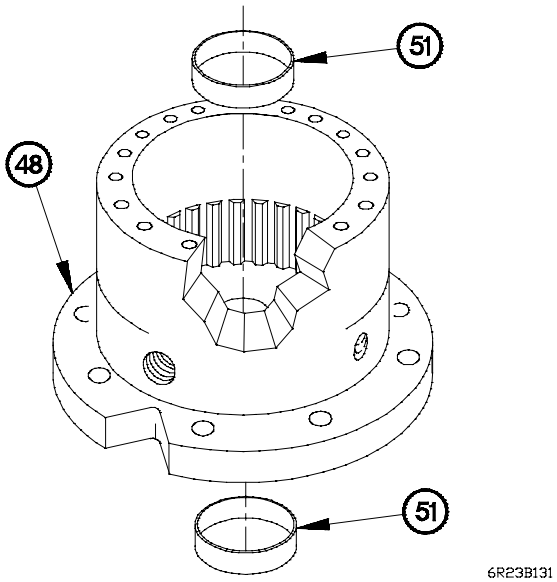



(32) Remove seal (49) and shaft (42) from hub (48).

(33) Remove bearing (50) from shaft (42).

## 16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(34) Remove two races (51) from hub (48).




**c. Cleaning/Inspection.**

**WARNING**

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

(1) Clean all metal parts with dry cleaning solvent.

**NOTE**

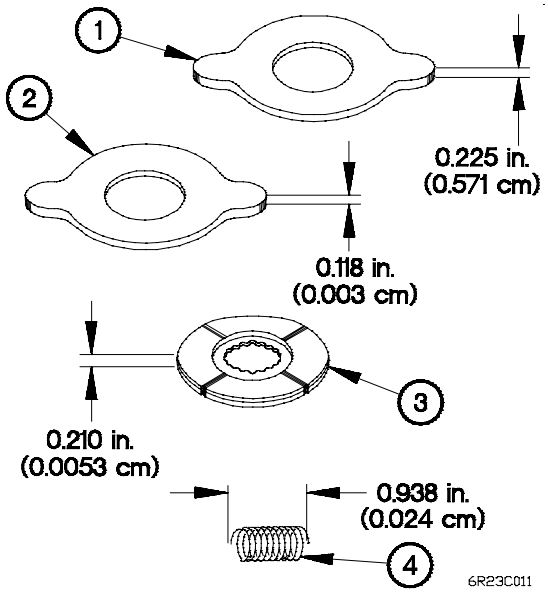
Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect inner stator (1) for pitting, corrosion, scoring, and indication of binding. Minimum thickness is 0.225 in. (0.571 cm).

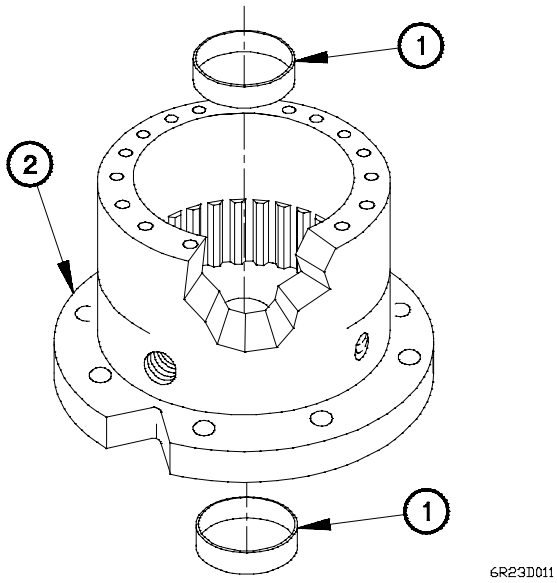
(3) Inspect outer stator (2) for pitting, corrosion, scoring, and indication of binding. Minimum thickness is 0.118 in. (0.003 cm).

(4) Inspect two disc (3) for pitting, corrosion, scoring, and indication of binding. Minimum thickness is 0.210 in. (0.0053 cm).

(5) Inspect seven springs (4) for pitting, corrosion, scoring, and indication of binding. Minimum length is 0.938 in. (0.024 cm).




**d. Assembly.**

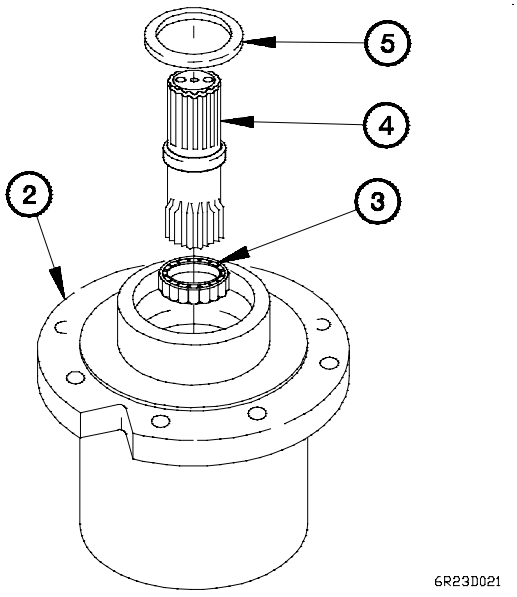



(1) Install two races (1) in hub (2).

(2) Install bearing (3) on shaft (4).

(3) Install shaft (4) in hub (2).

(4) Install seal (5) on shaft (4).

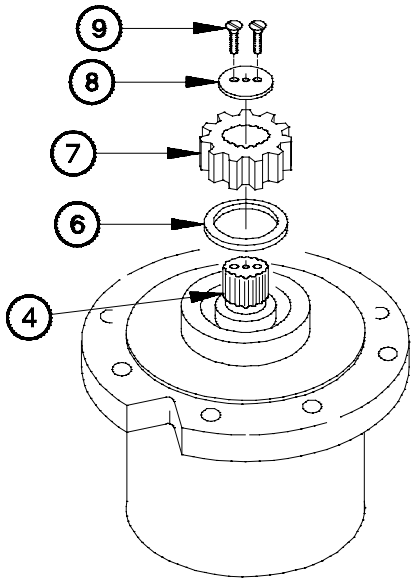


## 16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

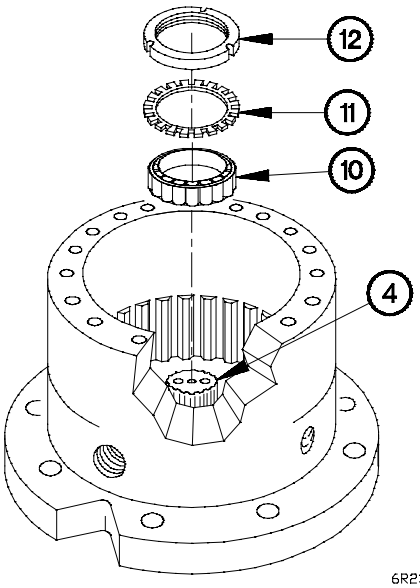
(5) Install spacer (6) on shaft (4).

(6) Install gear (7) on shaft (4).

(7) Install plate (8) on shaft (4) with two screws (9).




6R23D031




6R23D041

(8) Install bearing (10) and lockwasher (11) on shaft (4).

(9) Position nut (12) on shaft (4).

**NOTE**

Rotate shaft when tightening nut.

(10) Tighten nut (12) to 30-100 lb-ft (41-136 N·m).

**NOTE**

All three gears are installed the same way. One gear shown.

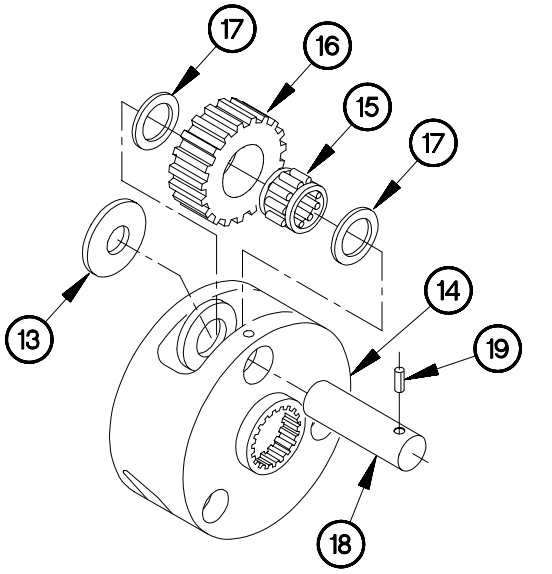
(11) Install center spacer (13) in carrier (14).

(12) Install bearing (15) in gear (16).

(13) Install gear (16), two spacers (17), and pin (18) in carrier (14).

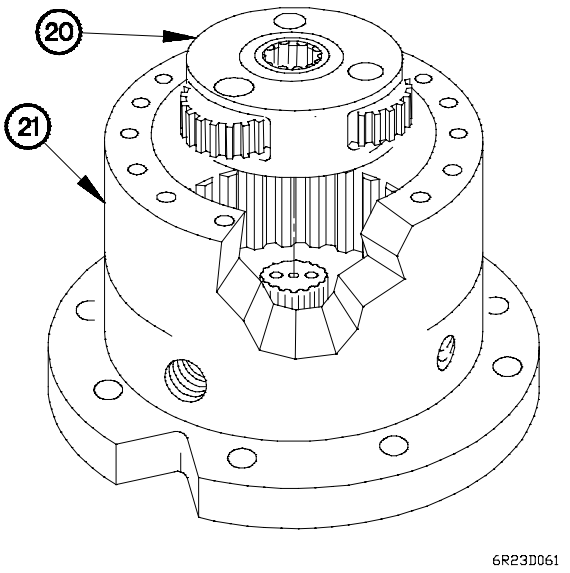
(14) Install roll pin (19) in pin (18).

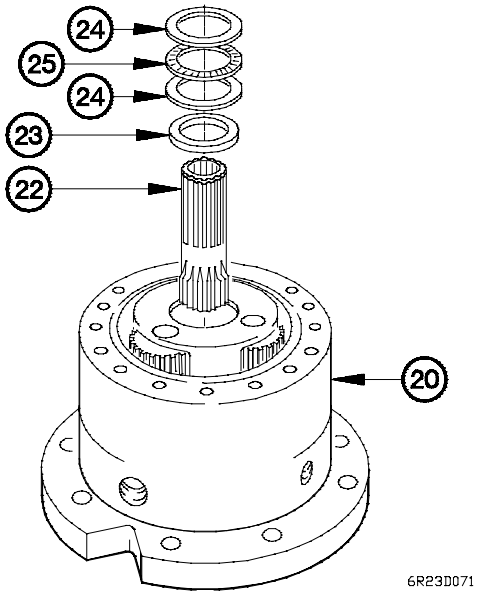
(15) Perform steps (11) through (14) on two remaining gears.




6r23d051

(16) Install planetary gear (20) in swing drive (21).




(17) Install sun gear (22) in planetary gear (20).

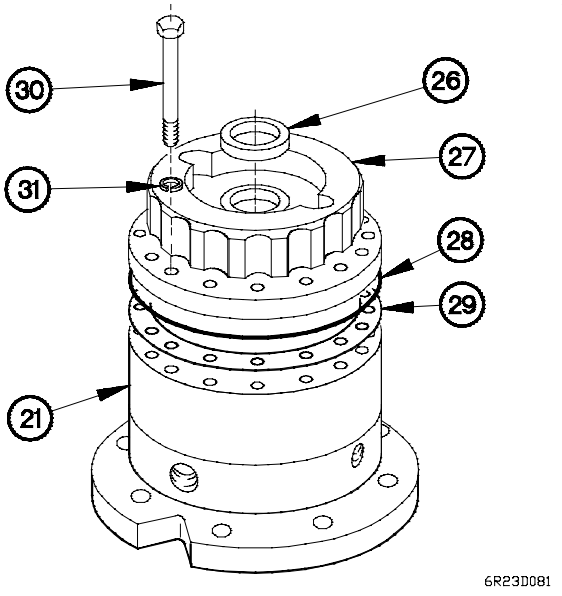
(18) Install spacer (23), race (24), bearing (25), and race (24) on sun gear (22).

(19) Install oil seal (26) in end cover (27).

(20) Install preformed packing (28) and shim (29) on end cover (27).

**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.**




(21) Apply sealing compound to threads of 16 screws (30).

(22) Position end cover (27) on swing drive (21) with 16 lockwashers (31) and screws (30).

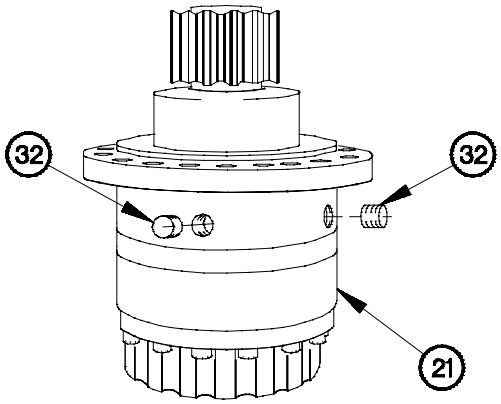
**NOTE**

Use a crisscross pattern to tighten screws.

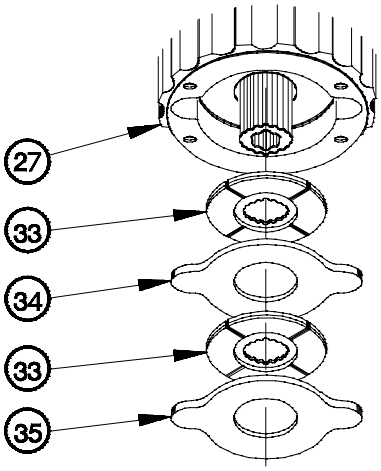
(23) Tighten screws (30) to 35 lb-ft (47 N·m).

## 16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(24) Install two plugs (32) in swing drive (21).




6R23D091




6R23D101

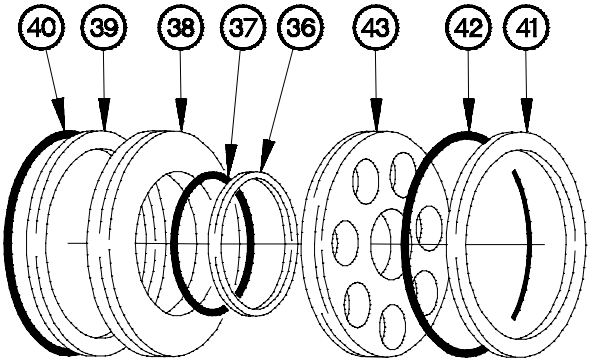
(25) Install disc (33), inner stator (34), disc (33), and outer stator (35) in end cover (27).

(26) Install packing retainer (36) and preformed packing (37) on cylinder head (38).

(27) Install packing retainer (39) and preformed packing (40) on cylinder head (38).

(28) Install packing retainer (41) and preformed packing (42) on piston (43).

(29) Install piston (43) in cylinder head (38).



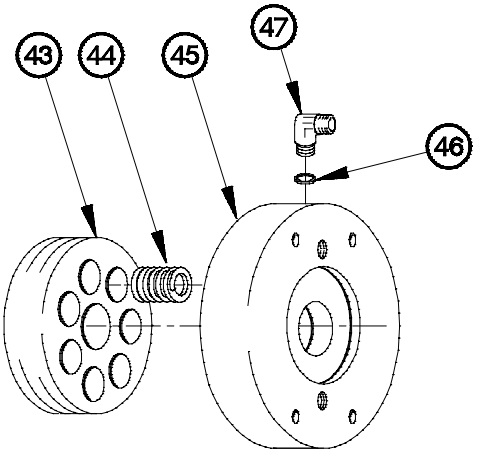

6R23D111

(30) Install seven springs (44) in piston (43).

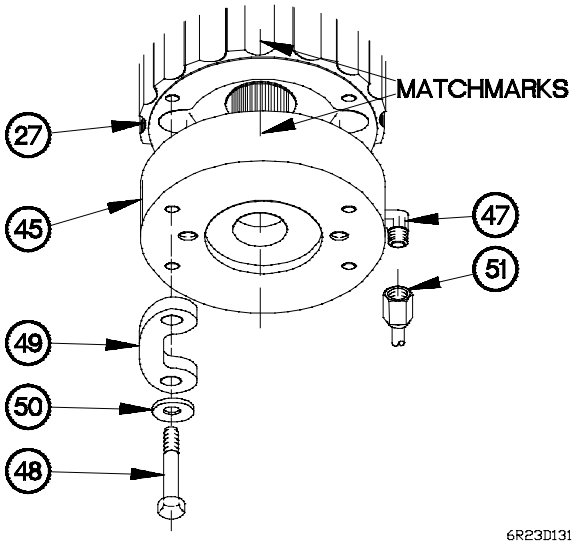
(31) Install piston (43) in cylinder housing (45).

(32) Install preformed packing (46) on 90-degree fitting (47).

(33) Install 90-degree fitting (47) in cylinder housing (45).




6R23D121




6R23D131

(34) Install cylinder housing (45) on end cover (27) with match marks aligned.

**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.**

(35) Apply sealing compound to threads of four screws (48).

(36) Position two drive stops (49), four washers (50), and screws (48) in cylinder housing (45).

(37) Install hydraulic hose (51) on 90-degree fitting (47).

(38) Tighten screws (48) to 35 lb-ft (47 N·m).

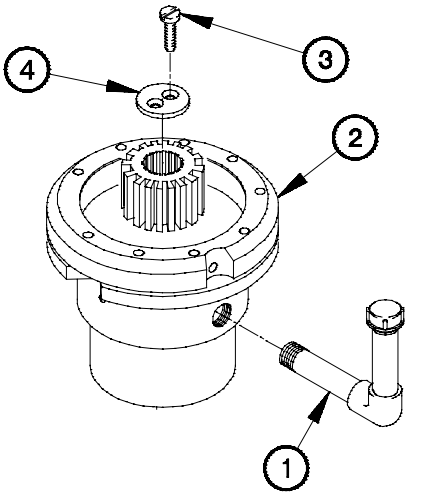
## 16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**e. Installation.**

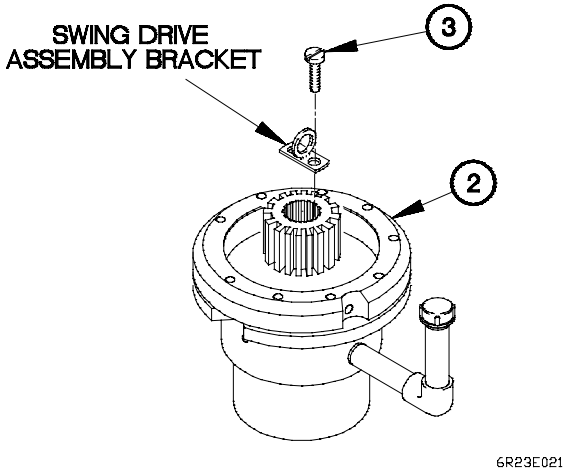
(1) Install oil fill pipe (1) in swing drive assembly (2).

(2) Fill swing drive assembly (2) with oil.

(3) Remove two screws (3) and plate (4) from swing drive assembly (2).




6R23E011




6R23E021

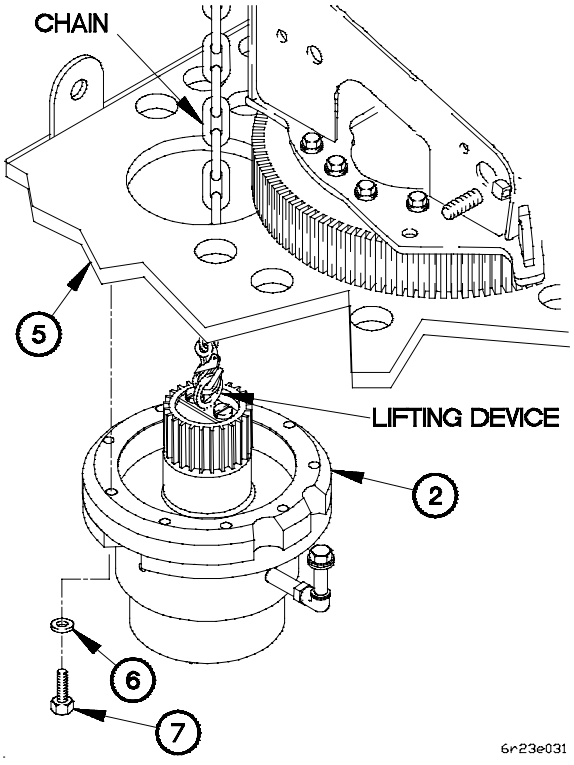
(4) Install swing drive lifting bracket on swing drive assembly (2) with two screws (3).

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

**NOTE**

Swing drive gear must be meshed with rotation gear during installation of swing drive assembly.

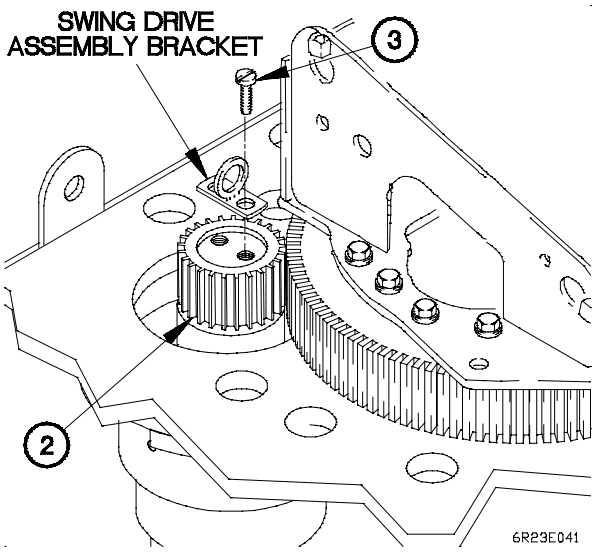



6r23e031

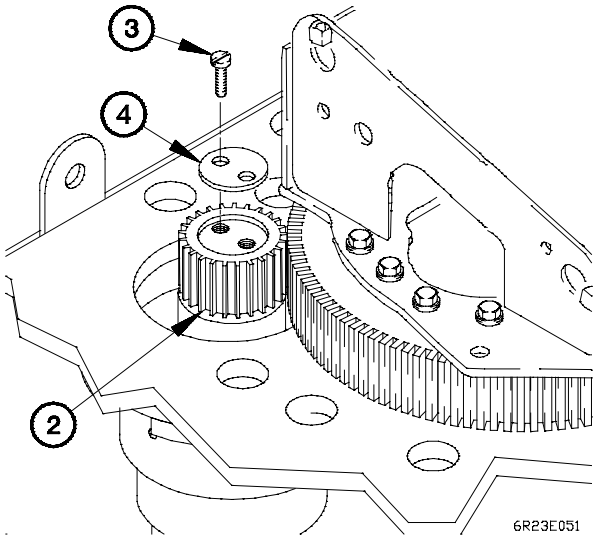
(5) Lift swing drive assembly (2) in mounting position.

(6) Position swing drive assembly (2) in crane assembly (5) with nine washers (6) and screws (7).

(7) Tighten screws (7) to 90-110 lb-ft (122-149 N•m).




(8) Remove two screws (3) and swing drive assembly bracket from swing drive assembly (2).




(9) Install plate (4) on swing drive assembly (2) with two screws (3).

**f. Follow-On Maintenance.**

(1) Install hydraulic orbit motor (Para 16-25).

(2) Install cross relief valve (Para 16-24).

(3) Hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-1).

(4) Perform crane load test (para 16-31).

**End of Task.**

## 16-24. M1084/M1086 CROSS RELIEF VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (4) (Item 139, Appendix F)

**Materials/Parts (Cont)**
Packing, Preformed (3) (Item 262, Appendix F)
Packing, Preformed (3) (Item 236, Appendix F)
Packing, Preformed (2) (Item 263, Appendix F)
Sealing, Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**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.**

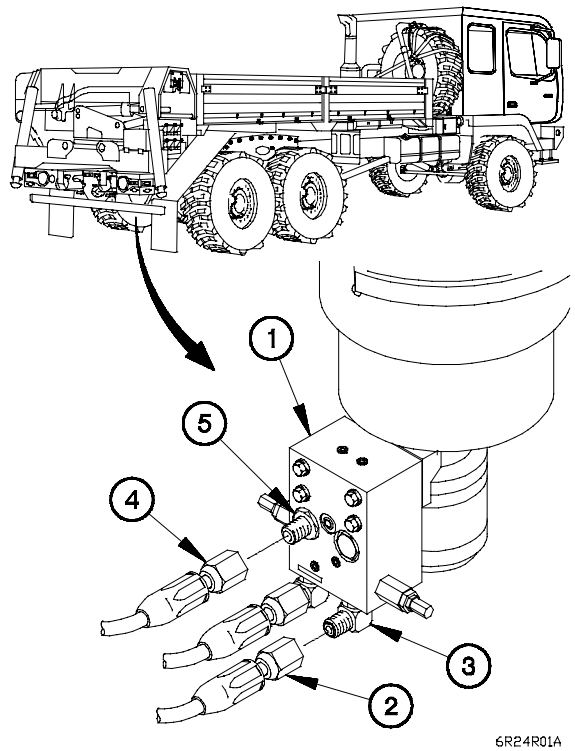
(1) Position drain pan under cross relief valve (1).

**WARNING**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.




(2) Disconnect two hoses (2) from 90-degree fittings (3).

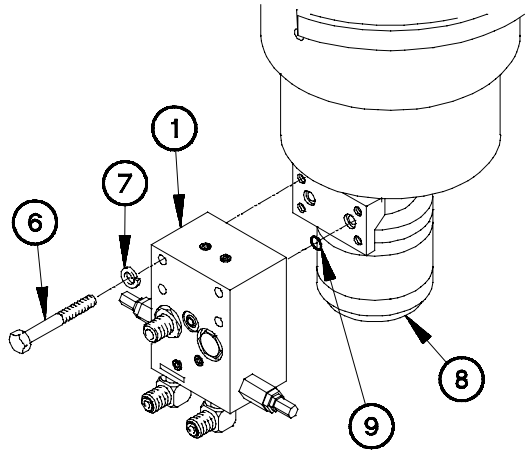
(3) Disconnect hose (4) from fitting (5).

**NOTE**

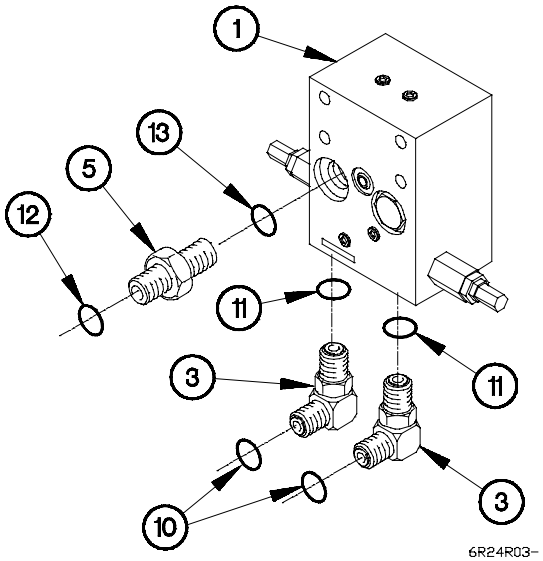
Step (4) requires the aid of an assistant.

(4) Remove four screws (6), lockwashers (7), and cross relief valve (1) from hydraulic motor (8). Discard lockwashers.

(5) Remove two preformed packings (9) from hydraulic motor (8). Discard preformed packings.




6R24R02-




6R24R03-

(6) Remove two 90-degree fittings (3) from cross relief valve (1).

(7) Remove two preformed packings (10) and performed packings (11) from 90-degree fittings (3). Discard preformed packings.

(8) Remove fitting (5) from cross relief valve (1).

(9) Remove preformed packings (12 and 13) from fitting (5). Discard preformed packing.

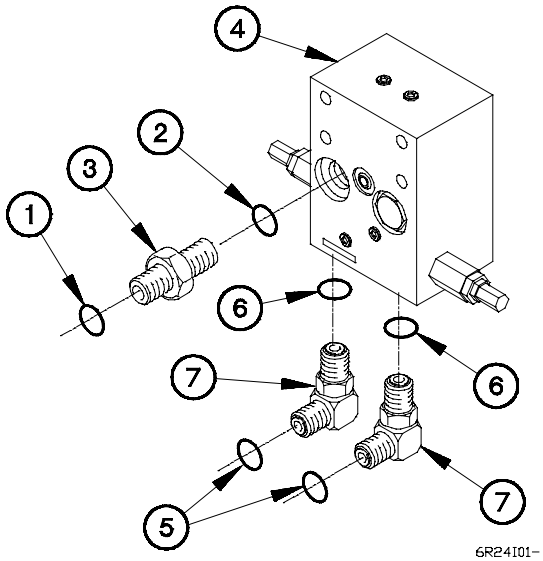
**b. Installation.**

(1) Install preformed packings (1 and 2) on fitting (3).

(2) Install fitting (3) in cross relief valve (4).

(3) Install two preformed packings (5) and preformed packings (6) on 90-degree fittings (7).

(4) Install two 90-degree fittings (7) in cross relief valve (4).




6R24I01-

## 16-24. M1084/M1086 CROSS RELIEF VALVE REPLACEMENT (CONT)

**WARNING**

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

(5) Install two preformed packings (8) on hydraulic motor (9).

**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.**

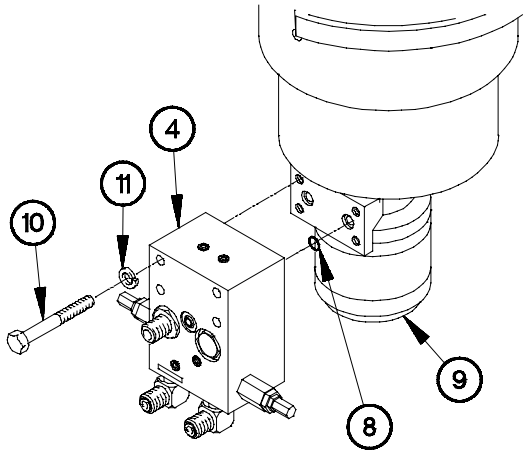
(6) Apply sealing compound to threads of four screws (10).

**NOTE**

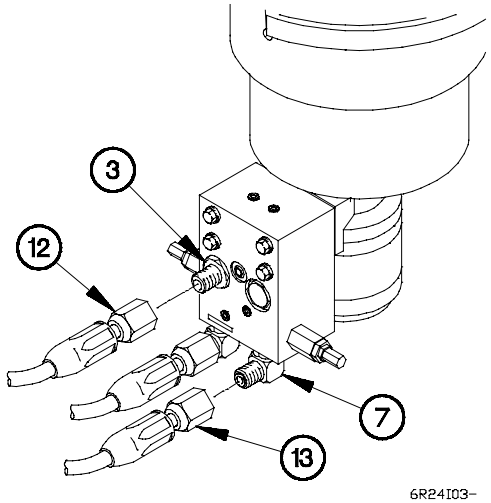
Step (7) requires the aid of an assistant.

(7) Install cross relief valve (4) on hydraulic motor (9) with four lockwashers (11) and screws (10).

(8) Tighten screws (10) to 28-42 lb-ft (38-57 N·m).




6R24I02-




6R24I03-

(9) Connect hose (12) to fitting (3).

(10) Connect two hoses (13) to 90-degree fittings (7).

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-25. M1084/M1086 HYDRAULIC ORBIT MOTOR REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Cross relief valve removed (para 16-24).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Tools and Special Tools (Cont)**
Goggles, Industrial (Item 28, Appendix B)

**Materials/Parts**
Sealing Compound (Item 76, Appendix C)

**WARNING**

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

**a. Removal.**

Remove two screws (1), washers (2), and hydraulic orbit motor (3) from swing drive assembly (4).

**b. Installation.**

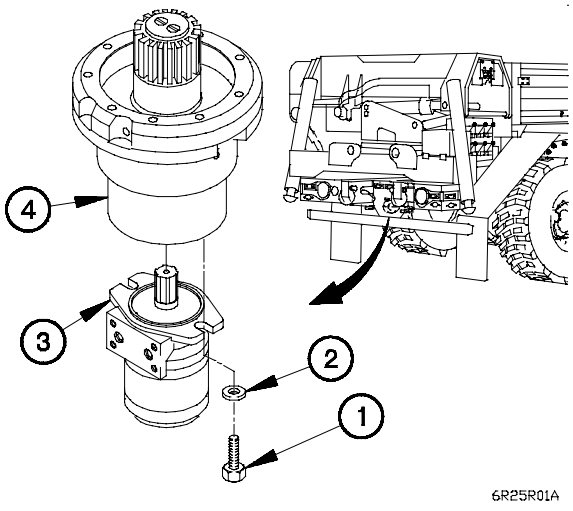
**WARNING**

**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.**

(1) Apply adhesive sealant to threads of two screws (1).

(2) Position hydraulic orbit motor (3) on swing drive assembly (4) with two washers (2) and screws (1).

(3) Tighten screws (1) to 40 lb-ft (54 N·m).




**c. Follow-On Maintenance.**

(1) Install cross relief valve (para 16-24).

(2) Perform crane load test (para 16-31).

**End of Task.**

## 16-26. M1084/M1086 OUTRIGGER JACK CYLINDER REPLACEMENT

This task covers:

a. Removal
b. Installation

**INITIAL SETUP**

**Equipment Conditions**
Jack cylinder lowered approximately 12 inches (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)
Jack, Dolly Type, Hydraulic (Item 37, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (4) (Item 138, Appendix F)
Pin, Cotter (2) (Item 326, Appendix F)
Packing, Preformed (2) (Item 236, Appendix F)
Packing, Preformed (2) (Item 235, Appendix F)

**Personnel Required**
(2)

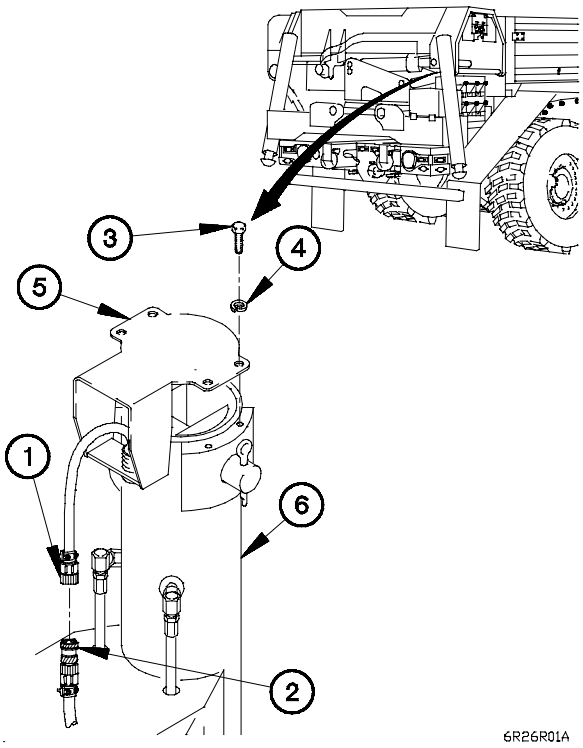
**a. Removal.**

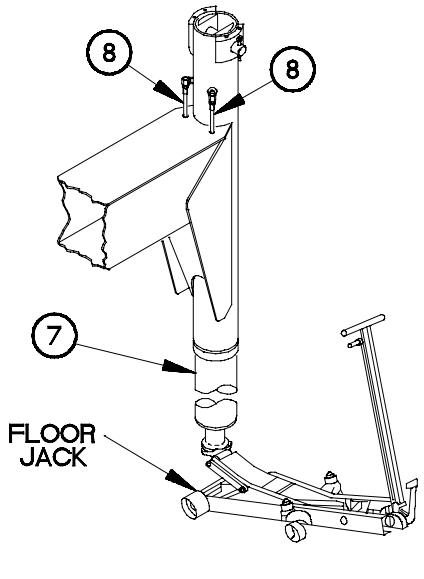
**NOTE**

Left and right outrigger jack cylinders are removed the same way. Right side shown.

(1) Disconnect connector (1) from cable (2).

(2) Remove four screws (3), lockwashers (4), and cover plate (5) from outrigger (6). Discard lockwashers.




(3) Position floor jack under jack cylinder (7).

(4) Place drain pan under hoses (8).

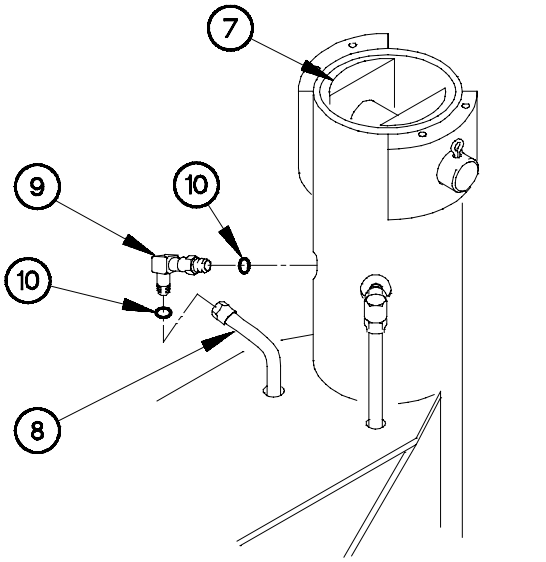
## 16-26. M1084/M1086 OUTRIGGER JACK CYLINDER REPLACEMENT (CONT)

**CAUTION**

Cap or plug hydraulic openings 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.

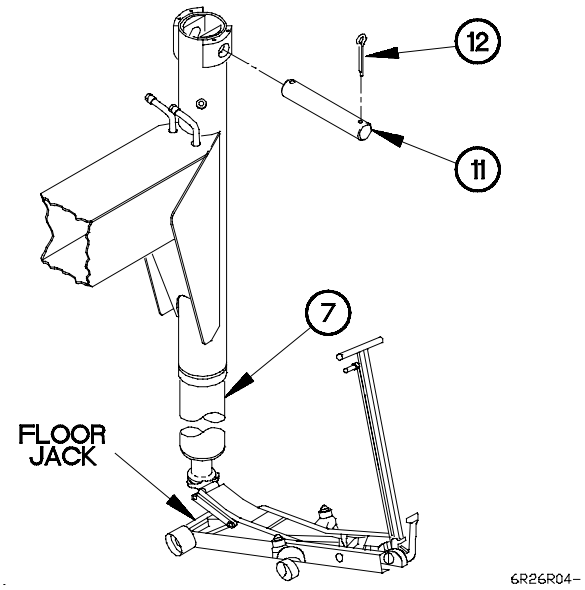


6R26R03-

(5) Disconnect two hoses (8) from adapters (9).

(6) Remove two adapters (9) from jack cylinder (7).

(7) Removed two preformed packings (10) from adapters (9). Discard preformed packings.

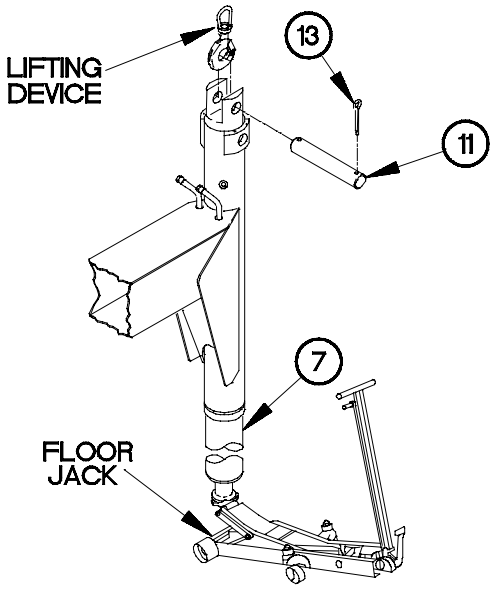


6R26R04-

(8) Raise jack cylinder (7) enough to take weight off pin (11).

(9) Remove two cotter pins (12) from pin (11). Discard cotter pins.

(10) Remove pin (11) from jack cylinder (7).



6R26R05-

(11) Raise jack cylinder (7) up approximately six inches.

(12) Install pin (11) in jack cylinder (7).

(13) Install two cotter pins (13) in pin (11).

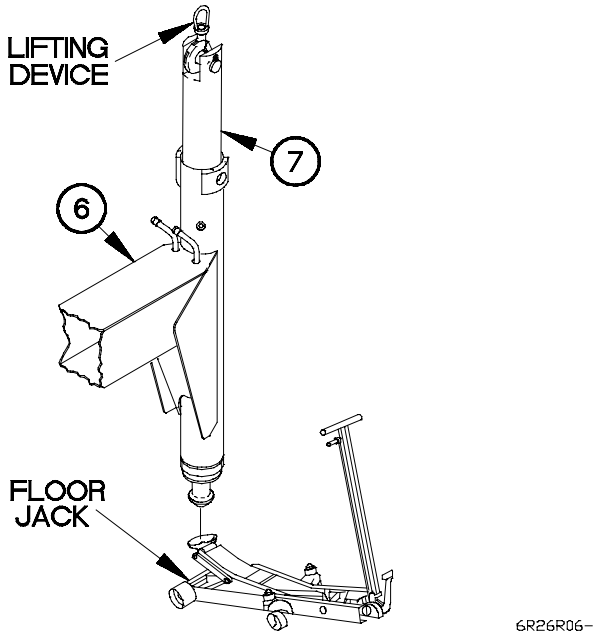
**WARNING**

**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.**

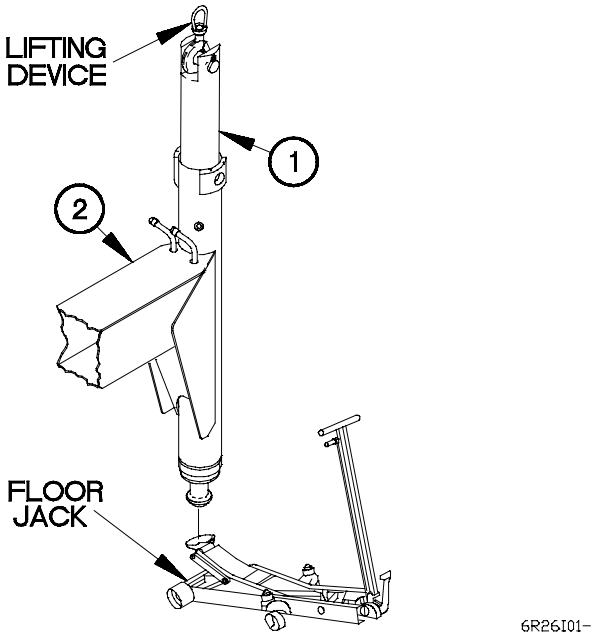
**NOTE**

Step (14) requires the aid of an assistant.

(14) Remove jack cylinder (7) from outrigger (6).




**b. Installation.**




(1) Position floor jack under outrigger (1).

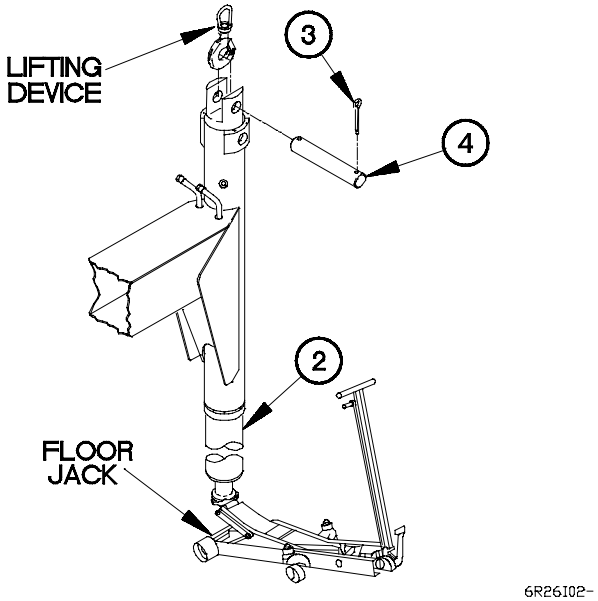
**NOTE**

Step (2) requires the aid of an assistant.

(2) Install jack cylinder (2) in outrigger (1) until jack cylinder rests on floor jack. Adjust jack as necessary.

(3) Remove two cotter pins (3) from pin (4). Discard cotter pins.

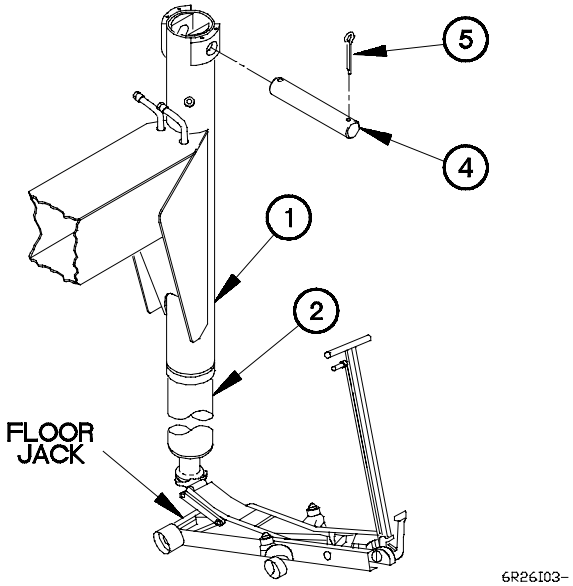
(4) Remove pin (4) from jack cylinder (2).

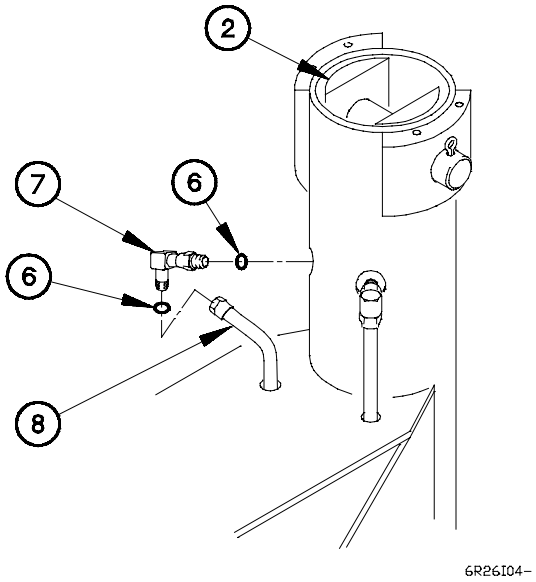


## 16-26. M1084/M1086 OUTRIGGER JACK CYLINDER REPLACEMENT (CONT)

(5) Install jack cylinder (2) in outrigger (1) with pin (4).

(6) Install two cotter pins (5) in pin (4).



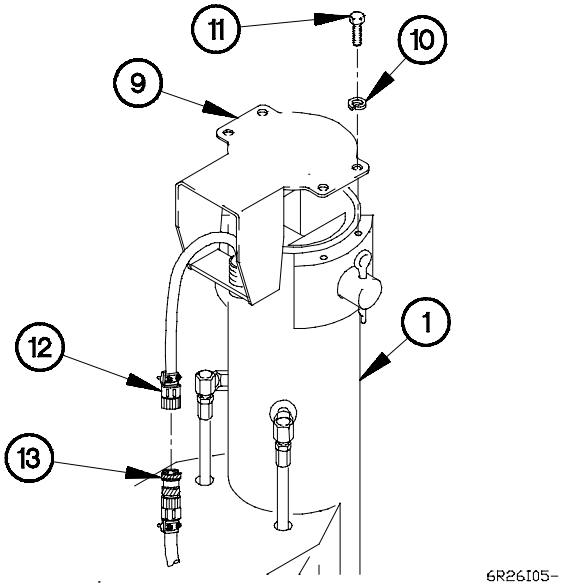

(7) Install two preformed packings (6) on adapters (7).

(8) Install two adapters (7) in jack cylinder (2).

(9) Connect two hoses (8) to adapters (7).

(10) Install cover plate (9) on outrigger (1) with four lockwashers (10) and screws (11).

(11) Connect connector (12) to cable (13).




**c. Follow-On Maintenance.**

Perform crane load test (para 16-31).

**End of Task.**

## 16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Rag, Wiping (Item 60, Appendix C)

**Materials/Parts (Cont)**
Oil, Lubricating (Item 45, Appendix C)
Adhesive (Item 7, Appendix C)
Sealing Compound (Item 76, Appendix C)
Cap, Protective, Dust (3) (Item 30, Appendix F)
Kit, Seal (Item 108, Appendix F)
Kit, Seal (Item 120, Appendix F)
Packing, Preformed (Item 224.3, Appendix F)
Lockwasher (4) (Item 140, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 29, Appendix C)
Kit, Seal (Item 107, Appendix F)
Packing, Preformed (Item 224.4, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

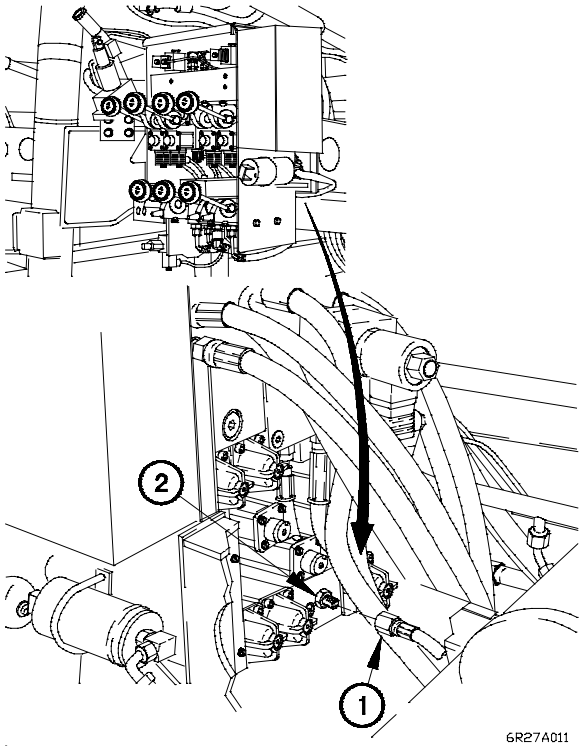
**CAUTION**

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

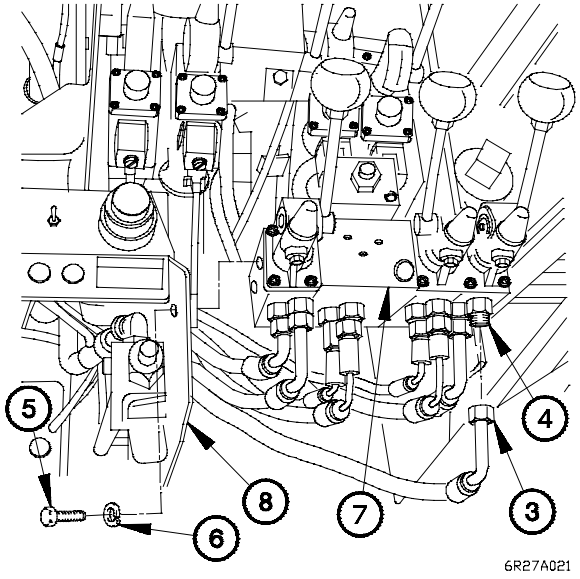
**NOTE**

Tag hydraulic tubes and connection points prior to disconnecting.

(1) Disconnect hydraulic tube (1) from fitting (2).



## 16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)



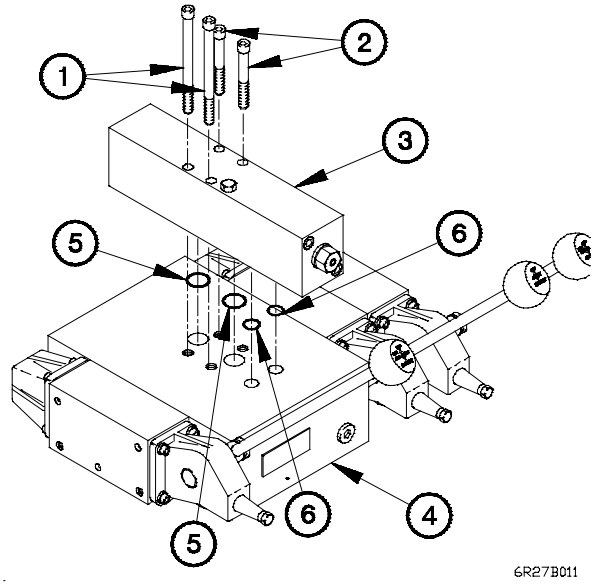

(2) Disconnect eight hydraulic tubes (3) from fittings (4).

**NOTE**

Step (3) requires the aid of an assistant.

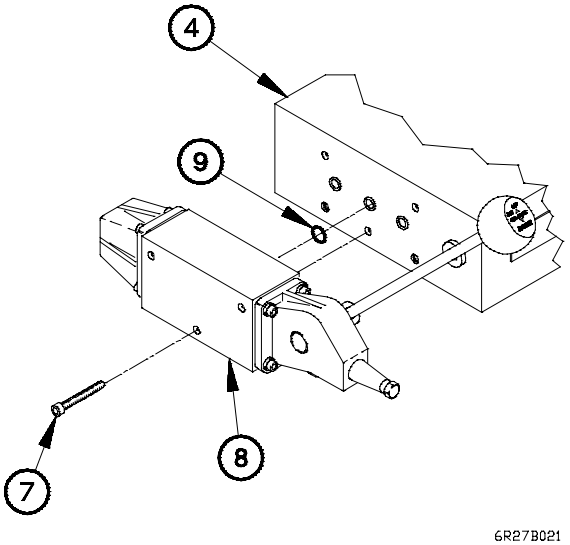
(3) Remove four screws (5), lockwashers (6), and three way control valve assembly (7) from control panel (8). Discard lockwashers.

**b. Disassembly.**




(1) Remove two screws (1), screws (2), and unloader control valve (3) from inlet body (4).

(2) Remove two preformed packings (5) and preformed packings (6) from unloader control valve (3). Discard preformed packings.

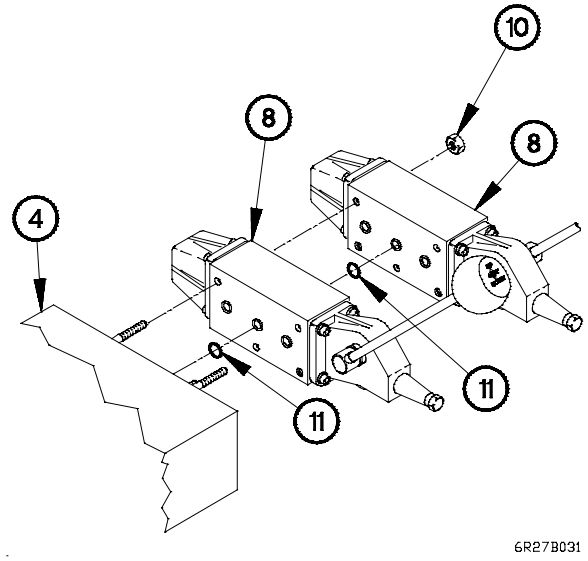



(3) Remove three screws (7) and valve body (8) from inlet body(4).

(4) Remove three preformed packings (9) from inlet body (4). Discard preformed packings.

(5) Remove three nuts (10) and two valve bodies (8) from inlet body (4).

(6) Remove six preformed packings (11) from inlet body (4). Discard preformed packings.




6R27B031

**NOTE**

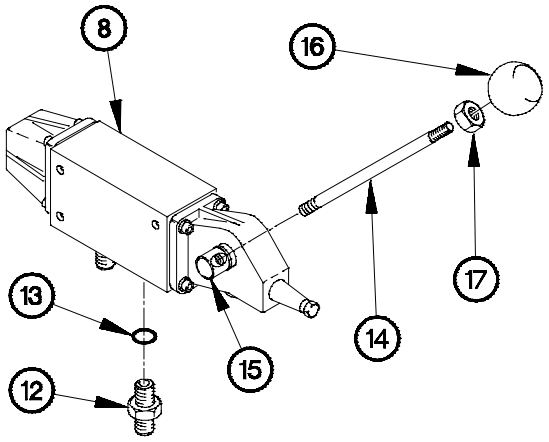
All valve bodies are disassembled the same way. Mast Control valve body shown.

(7) Remove two fittings (12) from valve body (8).

(8) Remove two preformed packings (13) from valve body (8). Discard preformed packings.

(9) Remove lever (14) from pinion seal (15).

(10) Remove knob (16) and nut (17) from lever (14).




6R27B041

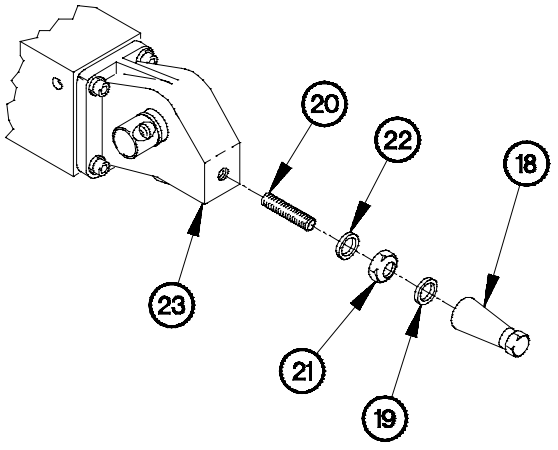
(11) Remove dust cap (18) and sealing washer (19) from setscrew (20). Discard sealing washer and dust cap.

**NOTE**

Count the number of threads on setscrew and record for assembly.

(12) Remove nut (21) and sealing washer (22) from setscrew (20). Discard sealing washer.

(13) Remove setscrew (20) from lever cap (23).




6R27B051

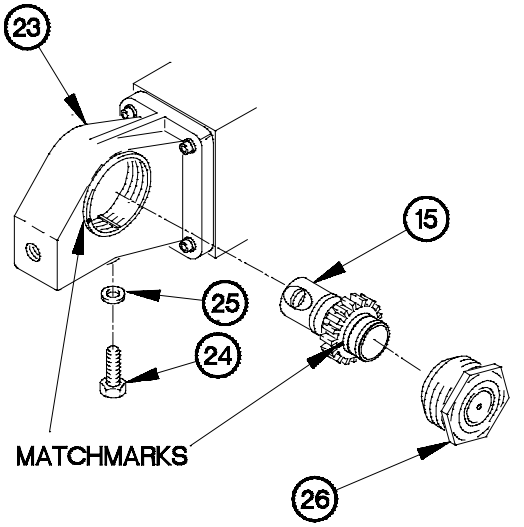
## 16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

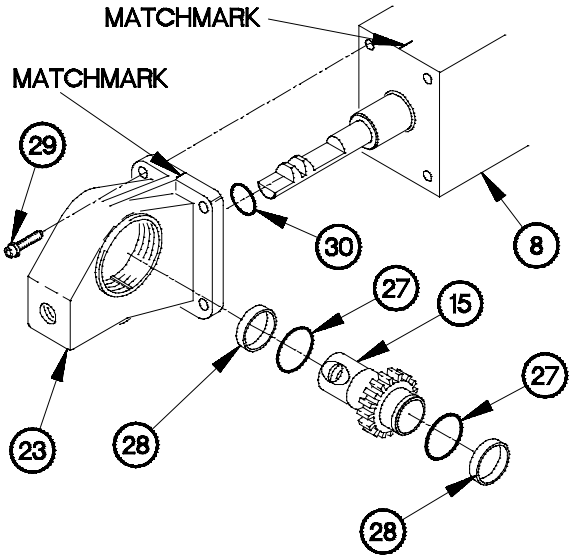
(14) Remove rack support bolt (24) and seal washer (25) from lever cap (23). Discard seal washer.

(15) Match mark pinion seal (15) to lever cap (23).

(16) Remove carrier nut (26) from lever cap (23).

(17) Remove pinion seal (15) from lever cap (23).




(18) Remove two backup rings (27) and quad rings (28) from pinion seal (15). Discard backup rings and quad rings.

(19) Match mark lever cap (23) to valve body (8).

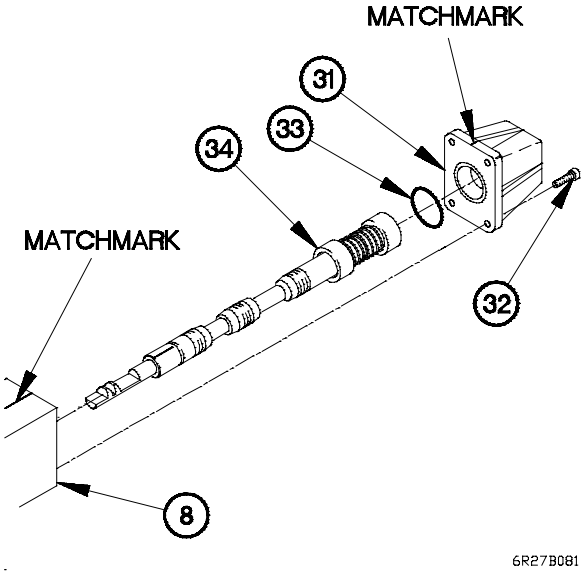
(20) Remove four screws (29), lever cap (23), and preformed packing (30) from valve body (8). Discard preformed packing.

(21) Match mark end cap (31) to valve body (8).

(22) Remove four screws (32), end cap (31), and preformed packing (33) from valve body (8). Discard preformed packing.

(23) Remove spool (34) from valve body (8).

(24) Perform steps (7) through (23) on remaining valve bodies.

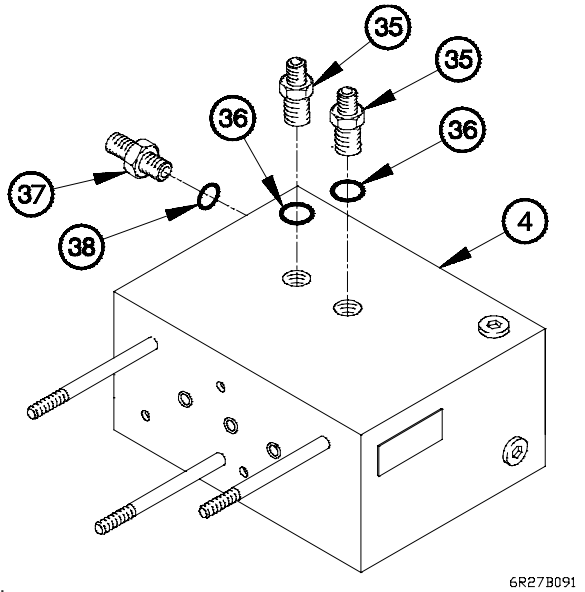


(25) Remove two fittings (35) from inlet body (4).

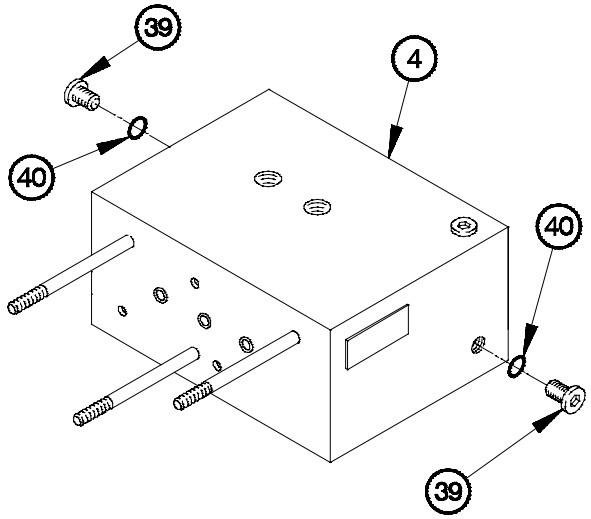
(26) Remove two preformed packings (36) from fittings (35). Discard preformed packings.

(27) Remove fitting (37) from inlet body (4).

(28) Remove preformed packing (38) from fitting (37). Discard preformed packing.




6R27B091




6R27B101

(29) Remove two plugs (39) from inlet body (4).

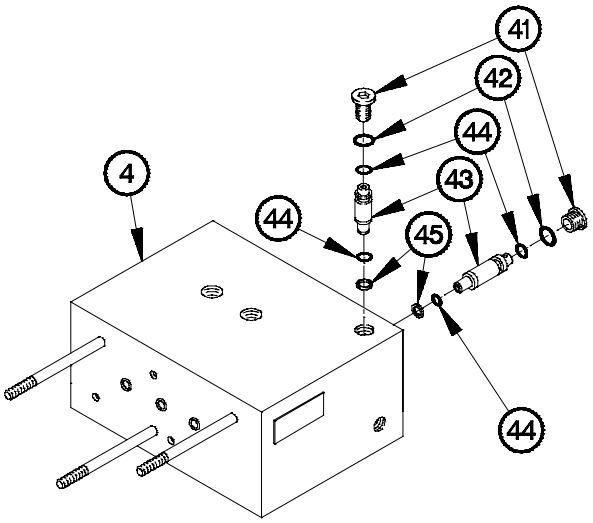
(30) Remove two preformed packings (40) from plugs (39). Discard preformed packings.

(31) Remove two plugs (41) from inlet body (4).

(32) Remove two preformed packings (42) from plugs (41). Discard preformed packings.

(33) Remove two shuttle valves (43) from inlet body (4).

(34) Remove four preformed packings (44) and two backup rings (45) from two shuttle valves (43). Discard preformed packings and backup rings.




6R27B111

## 16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**c. Cleaning/Inspection.**

**WARNING**

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

(1) Clean all metal parts in dry cleaning solvent.

**NOTE**

Replace any part that fails visual inspection

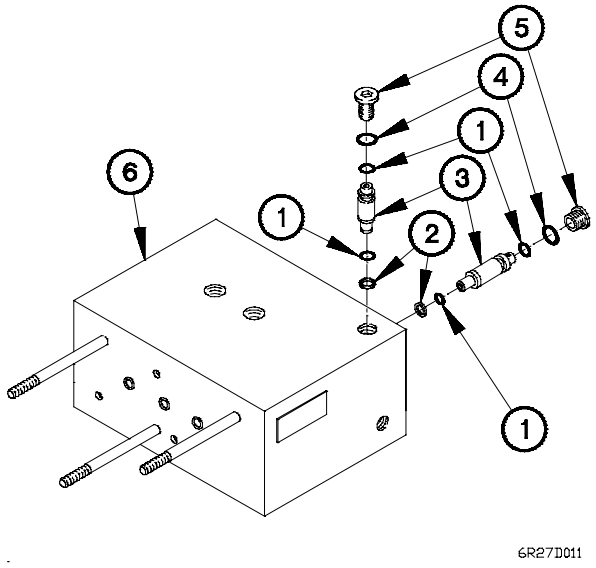
(2) Inspect each part for nicks, scratches, burrs, pitting, and cracks.

**d. Assembly.**

(1) Install four preformed packings (1) and two backup rings (2) on two shuttle valves (3).

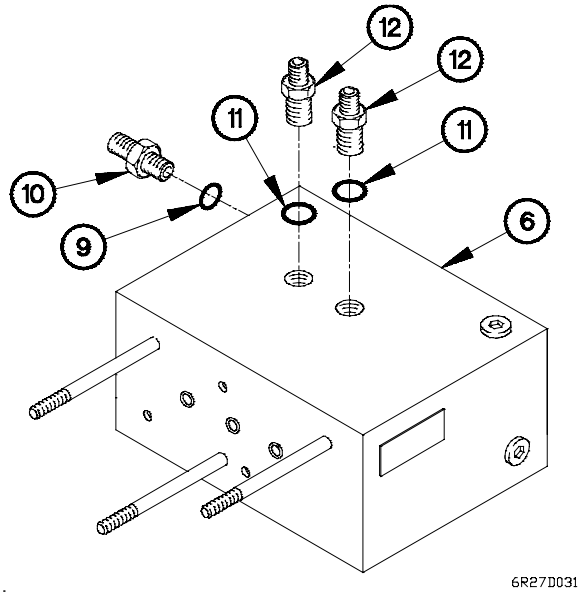
(2) Install two preformed packings (4) on plugs (5).

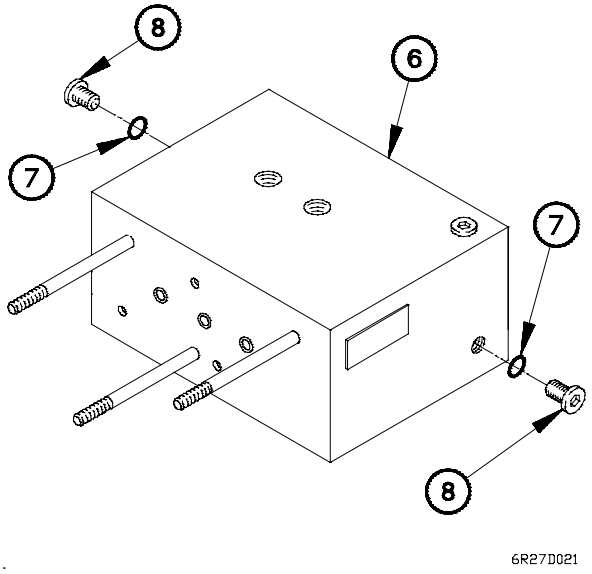
(3) Install two shuttle valves (3) in inlet body (6) with two plugs (5).



(4) Install two preformed packings (7) on plugs (8).

(5) Install two plugs (8) in inlet body (6).




(6) Install preformed packing (9) on fitting (10).

(7) Install fitting (10) in inlet body (6).

(8) Install two preformed packings (11) on fittings (12).

(9) Install two fittings (12) in inlet body (6).

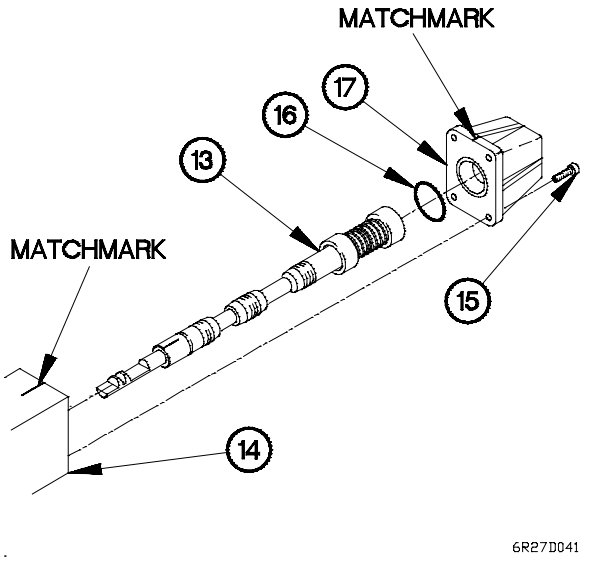
**NOTE**

- Lubricate all parts with lubricating oil during assembly.
- All valve bodies are assembled the same way. Mast control valve body shown.

(10) Install spool (13) in valve body (14).

**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.**




(11) Apply sealing compound to threads of four screws (15).

(12) Install preformed packing (16), end cap (17), and four screws (15) on valve body (14) with matchmarks aligned.

## 16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

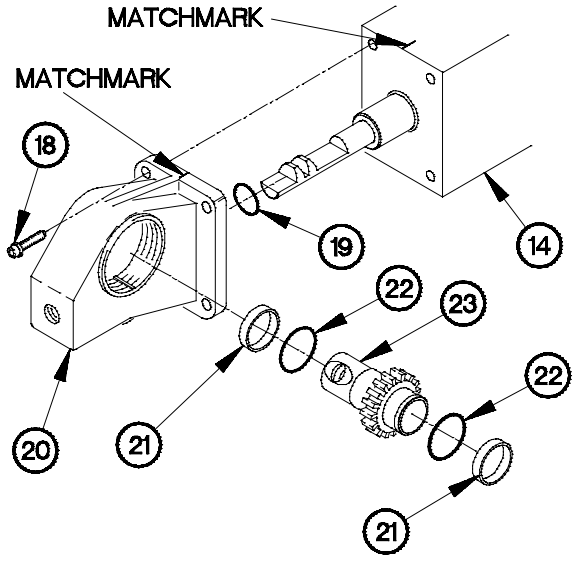
**WARNING**

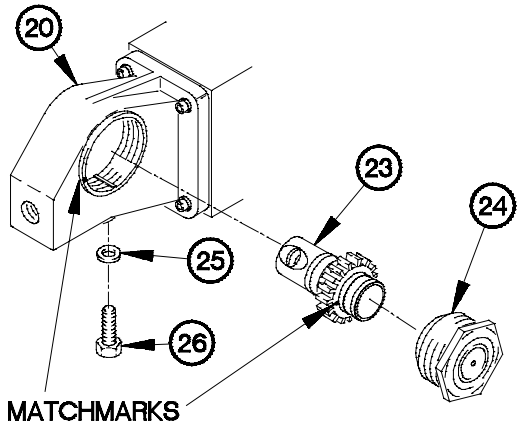
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(13) Apply sealing compound to threads of four screws (18).

(14) Install preformed packing (19), lever cap (20), and four screws (18) on valve body (14) with matchmarks aligned.

(15) Install two quad rings (21) and backup rings (22) on pinion seal (23).




**NOTE**

Pinion seal may be installed for right or left hand use.

(16) Install pinion seal (23) in lever cap (20) with matchmarks aligned.

(17) Install carrier nut (24) on lever cap (20).

(18) Install seal washer (25) and rack support bolt (26) in lever cap (20).

(19) Position setscrew (27) in lever cap (20).

(20) Position washer (28) and nut (29) on setscrew (27).

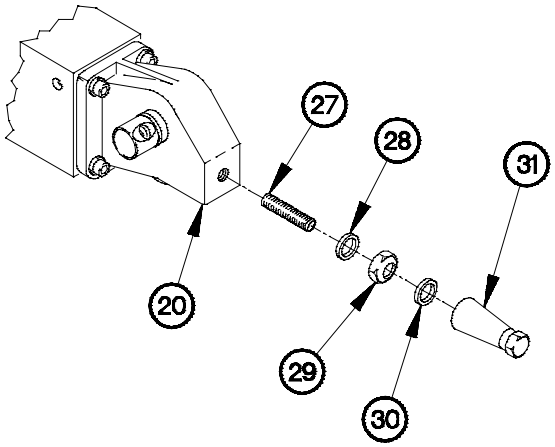
(21) Tighten nut to position noted during removal.

(22) Position washer (30) and dust cap (31) on setscrew (27).

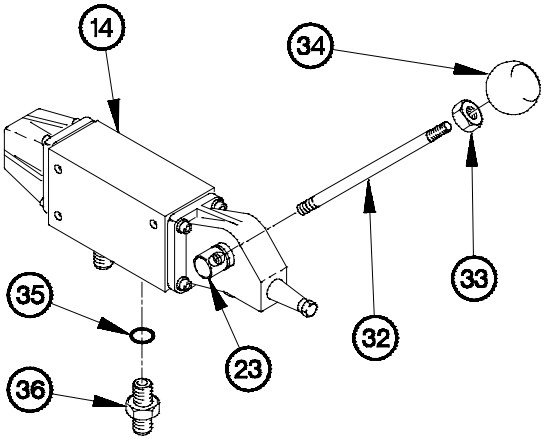
**NOTE**

Dust cap has a break away nut. Nut will break away when correct torque has been reached.

(23) Tighten dust cap (31) until nut breaks away.




6R27D071




6R27D081

**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.**

(24) Apply sealing compound to threads of lever (32).

(25) Install lever (32) in pinion seal (23).

(26) Install nut (33) and knob (34) on lever (32).

(27) Install two preformed packings (35) and fittings (36) on valve body (14).

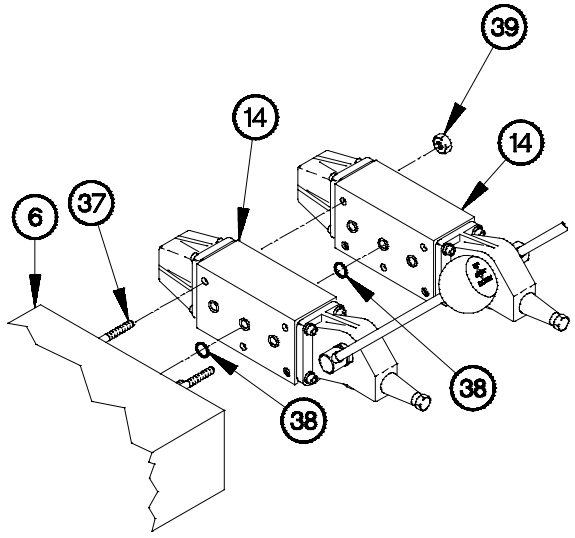
(28) Perform steps (7) through (24) on remaining valve bodies.

## 16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

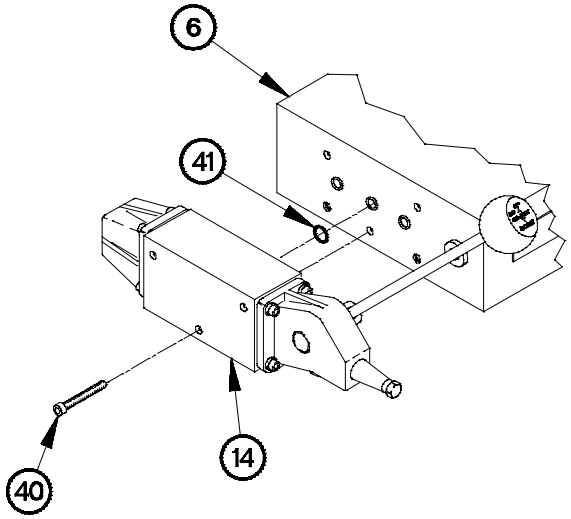
(29) Apply sealing compound to threads of three inlet body studs (37).

(30) Position six preformed packings (38) and two valve bodies (14) on inlet body (6) with three nuts (39).

(31) Tighten three nuts (39) to 132 lb-in. (15 N·m).



6R27D091



6R27D101

**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.**

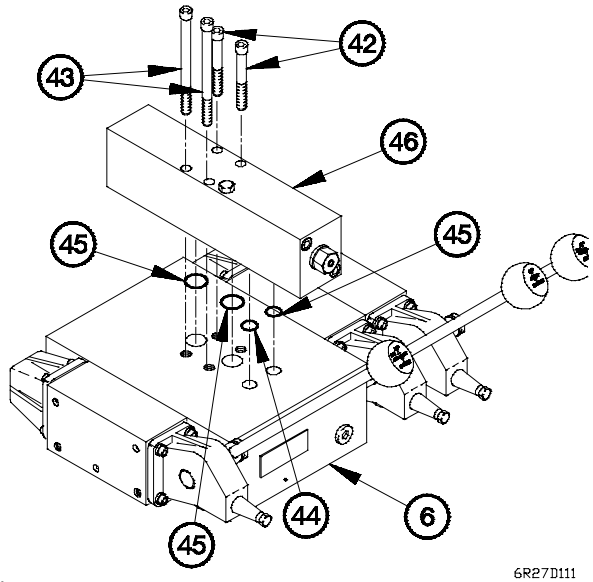
(32) Apply sealing compound to threads of three screws (40).

(33) Position three preformed packings (41) and valve body (14) on inlet body (6) with three screws (40).

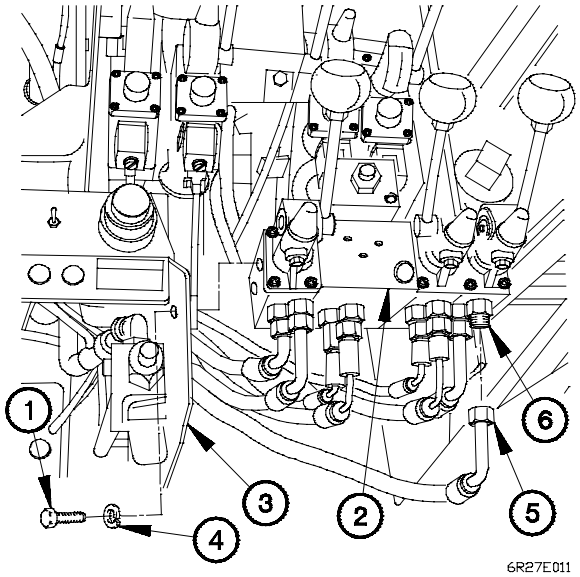
(34) Tighten three screws (40) to 132 lb-in. (15 N•m).

(35) Apply sealing compound to threads of two screws (42) and screws (43).

(36) Install two preformed packings (44), preformed packings (45), and unloader control valve (46) on inlet body (6) with two screws (42) and screws (43).




**e. Installation.**




**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.**

(1) Apply sealing compound to threads of screws (1).

**NOTE**

Step (2) requires the aid of an assistant.

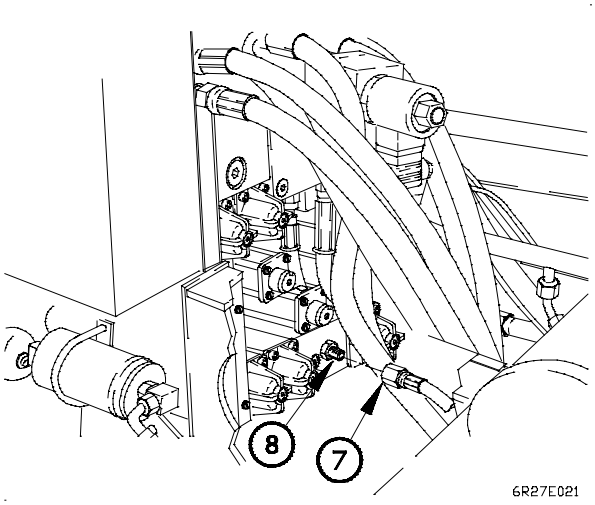
(2) Position three way control valve assembly (2) in crane control panel (3) with four lockwashers (4) and screws (1).

(3) Tighten four screws (1) to 41-45 lb-ft (56-61 N•m).

(4) Connect eight hydraulic tubes (5) to fittings (6).

## 16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(5) Connect hydraulic tube (7) to fitting (8).




**f. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Operate MHC from control panel and check for hydraulic leaks on three way control valve assembly and for proper operation (TM 9-2320-366-10-1).

(3) Operate MHC with REMOTE CONTROL UNIT and check for proper operation (TM 9-2320-366-10-1).

**End of Task.**

## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Remote control stowage box removed (TM 9-2320-366-20-5).
Remote control cable stowage box removed (TM 9-2320-366-20-5).

**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)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)

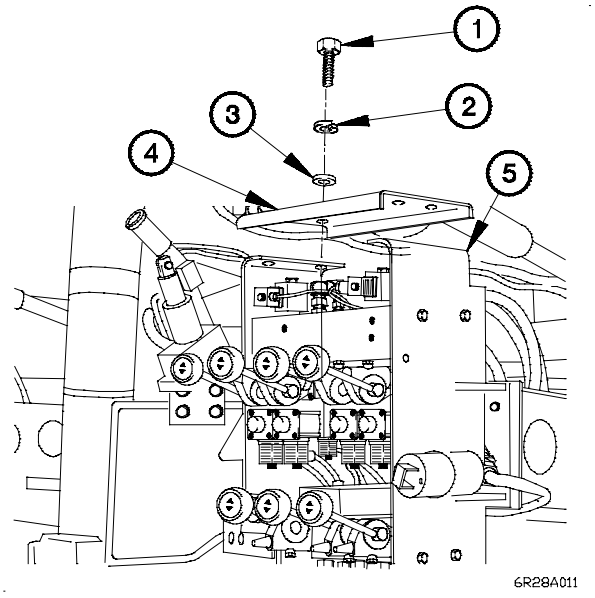
**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

**Materials/Parts (Cont)**
Lubricating Oil, Engine (Item 45, Appendix C)
Adhesive (Item 7, Appendix C)
Sealing Compound (Item 76, Appendix C)
Cap, Protective, Dust (2) (Item 30, Appendix F)
Washer, Sealing (Item 434, Appendix F)
Kit, Seal (Item 113, Appendix F)
Kit, Seal (Item 108, Appendix F)
Packing, Preformed (2) (Item 225, Appendix F)
Lockwasher (14) (Item 140, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Kit, Seal (Item 119, Appendix F)
Kit, Seal (Item 120, Appendix F)
Kit, Seal (Item 121, Appendix F)
Kit, Seal (4) (Item 107, Appendix F)

**Personnel Required**
(3)

**a. Removal.**

(1) Remove two screws (1), lockwashers (2), washers (3), and top cover (4) from crane control panel (5). Discard lockwashers.

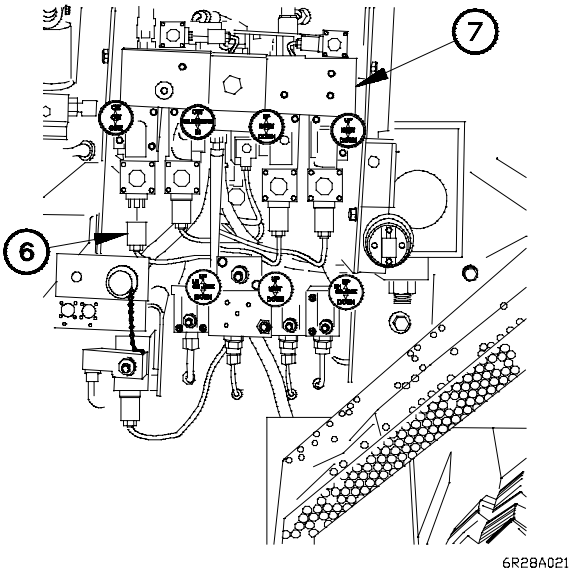


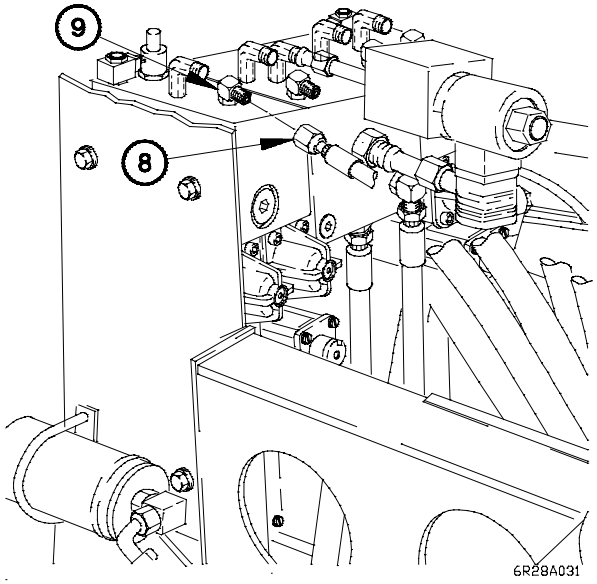
## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

Tag electrical connectors and connection points prior to disconnecting.

(2) Disconnect 11 solenoid electrical connectors (6) from four way valve manifold assembly (7).




**CAUTION**

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

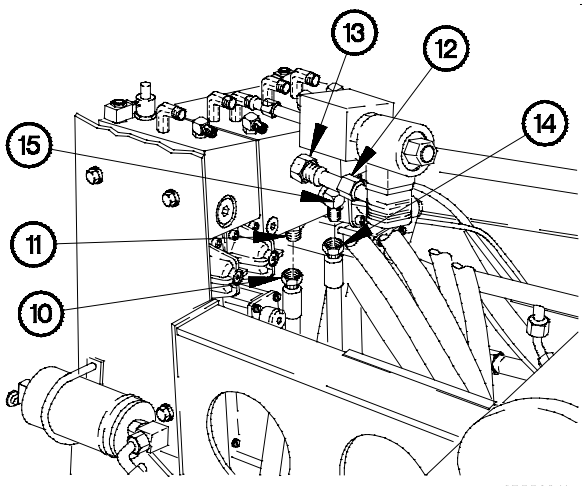
Tag hydraulic hoses, tubes, and connection points prior to disconnecting.

(3) Disconnect nine hydraulic hoses (8) from 90-degree fittings (9).

(4) Disconnect hydraulic hose (10) from fitting (11).

(5) Disconnect hydraulic tube (12) from fitting (13)

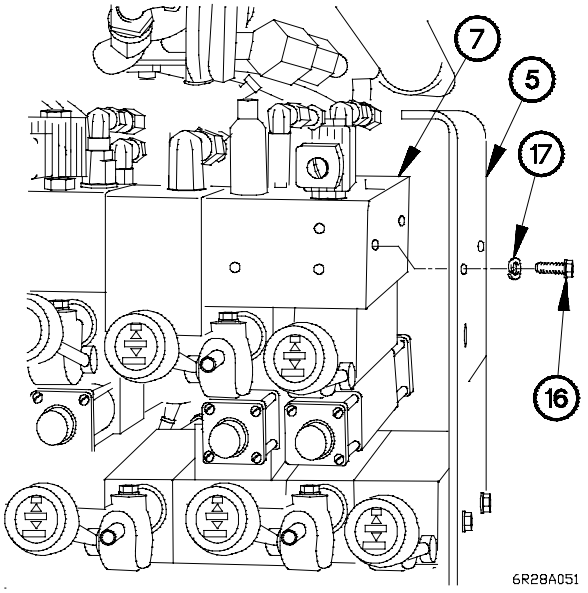
(6) Disconnect hydraulic hose (14) from 90-degree fitting (15).



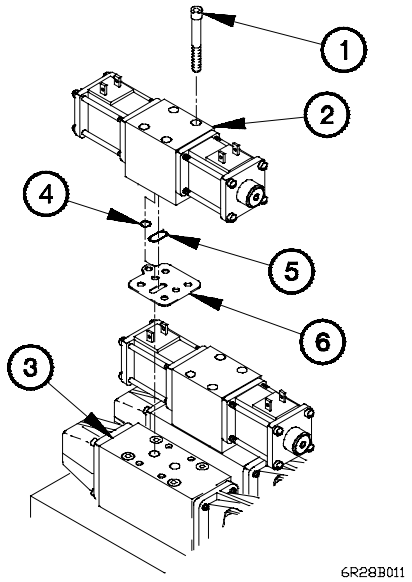
**NOTE**

Step (7) requires the aid of two assistant.

(7) Remove four bolts (16), lockwashers (17) and valve manifold assembly (7) from crane control panel (5). Discard lockwashers.




**b. Disassembly.**




**NOTE**

All pilot valve bodies are disassembled the same way. Lift Control pilot valve body shown.

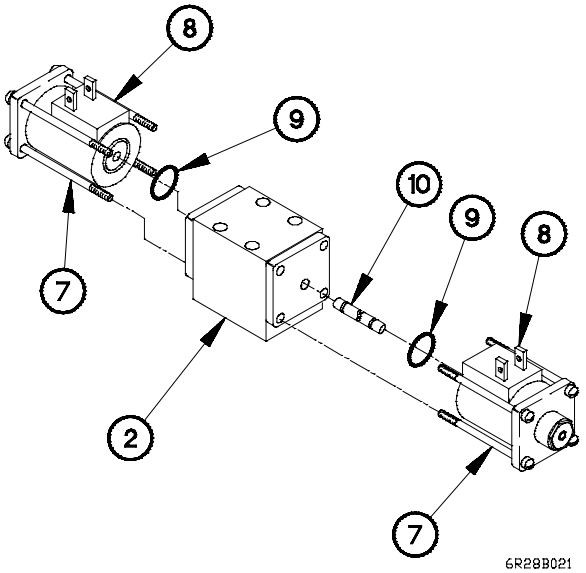
(1) Remove four bolts (1) and pilot valve body (2) from valve body (3).

(2) Remove three preformed packings (4), preformed packing (5), and seal plate (6) from pilot valve body (2). Discard preformed packings.

(3) Loosen eight screws (7) on two solenoids (8).

(4) Remove two solenoids (8) from pilot valve body (2).

(5) Remove two preformed packings (9) and spool (10) from pilot valve body (2).



## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

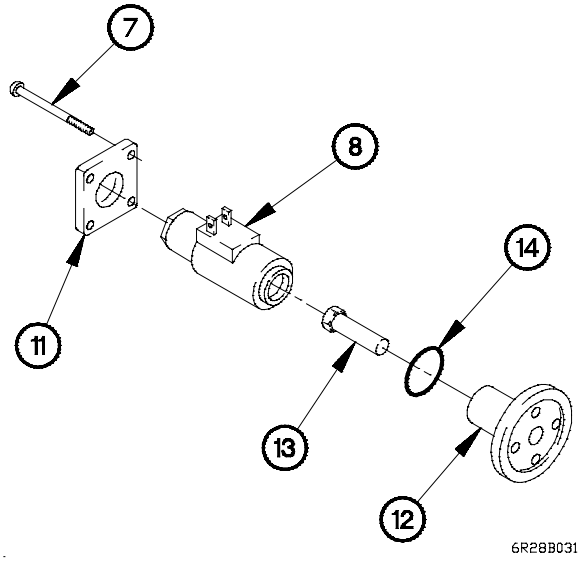
**NOTE**

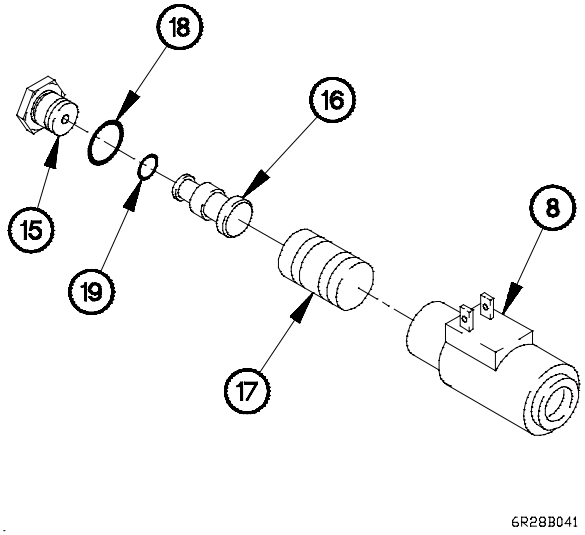
All solenoids are disassembled the same way. One solenoid shown.

(6) Remove four screws (7) and access cover (11) from solenoid (8).

(7) Remove valve body coil (12) and valve body push button (13) from solenoid (8).

(8) Remove preformed packing (14) from valve body coil (12). Discard preformed packing.



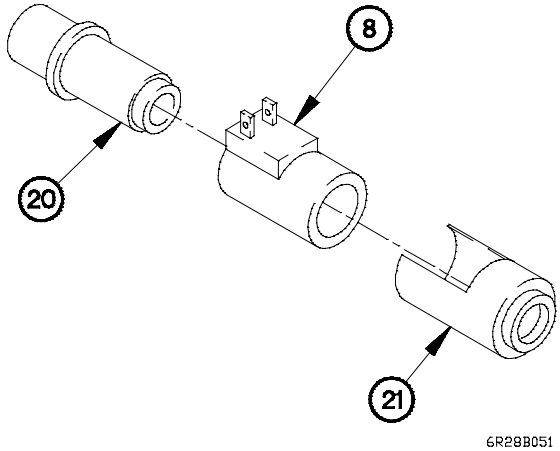



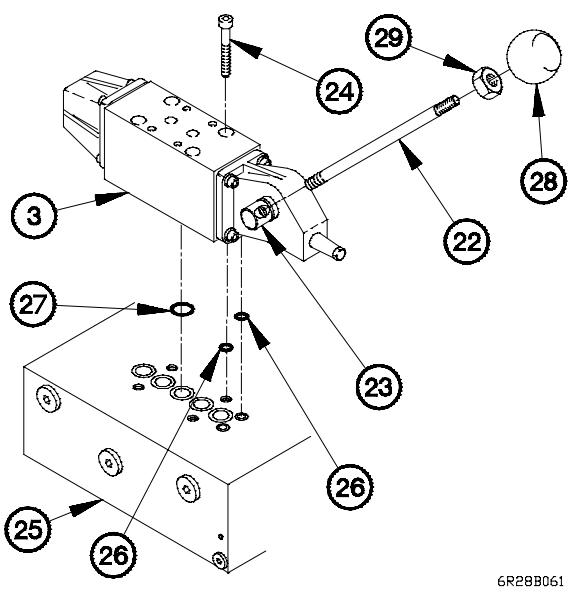

(9) Remove head valve (15), head valve push button (16), and head valve coil (17) from solenoid (8).

(10) Remove preformed packing (18) from head valve (15). Discard preformed packing.

(11) Remove seal (19) from head valve push button (16). Discard seal.

(12) Remove solenoid sleeve (20) and solenoid cylinder (21) from solenoid (8).






**NOTE**

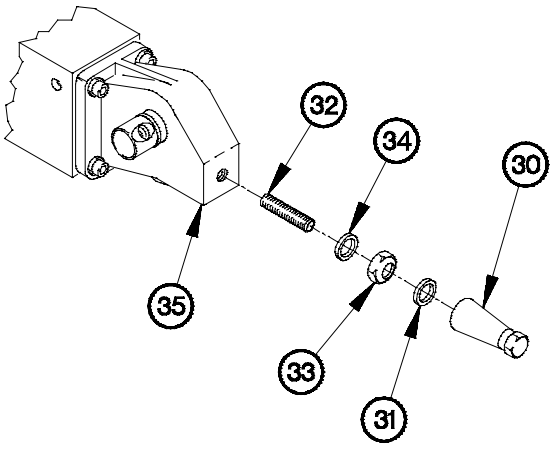
All control valve bodies are disassembled the same way. Lift Control valve body shown.

(13) Remove lever (22) from pinion seal (23).

(14) Remove four screws (24) and valve body (3) from valve manifold (25).

(15) Remove two preformed packings (26) and five preformed packings (27) from valve manifold (25). Discard preformed packings.

(16) Remove knob (28) and nut (29) from lever (22).




**NOTE**

Perform steps (17) through (19) on Telescope and Lift Control lever caps.

(17) Remove dust cap (30) and washer (31) from setscrew (32).

**NOTE**

Count number of threads shown on setscrew and record for assembly.

(18) Remove nut (33) and washer (34) from setscrew (32).

(19) Remove setscrew (32) from lever cap (35).

## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(20) Remove rack support bolt (36) and sealing washer (37) from lever cap (35). Discard sealing washer.

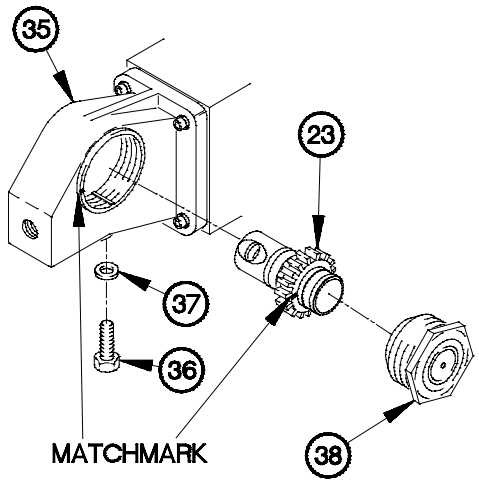
**CAUTION**

Lever cap and carrier nut are a matched set and must be kept together. Failure to comply may result in damage to equipment.

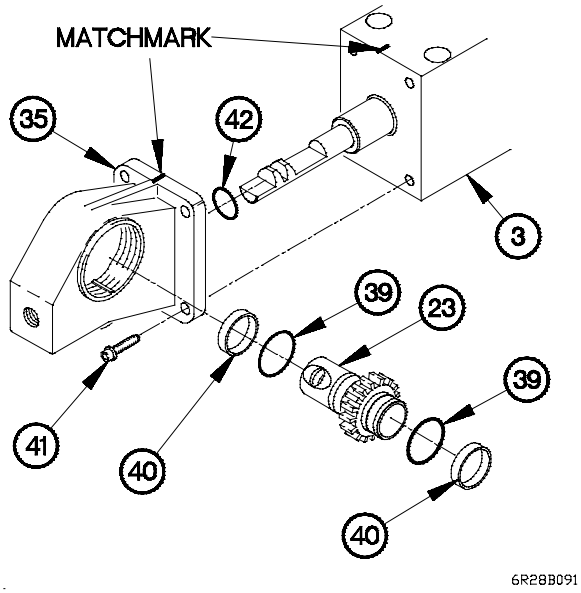
(21) Remove carrier nut (38) from lever cap (35).

(22) Match mark pinion seal (23) to lever cap (35).

(23) Remove pinion seal (23) from lever cap (35).




6R28B081




6R28B091

(24) Remove two backup rings (39) and quad rings (40) from pinion seal (23). Discard backup rings and quad rings.

(25) Match mark lever cap (35) to valve body (3).

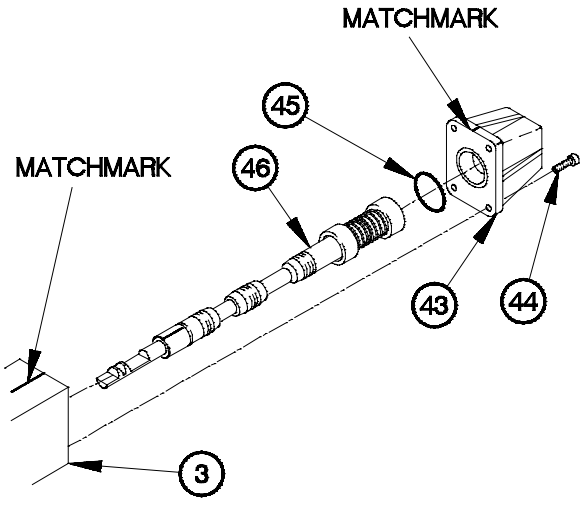
(26) Remove four screws (41), lever cap (35), and preformed packing (42) from valve body (3). Discard preformed packing.

(27) Match mark end cap (43) to valve body (3).

(28) Remove four screws (44), end cap (43), and preformed packing (45) from valve body (3). Discard preformed packing.

(29) Remove spool (46) from valve body (3).

(30) Perform steps (13) through (29) on remaining valve bodies (3).




6R28B101

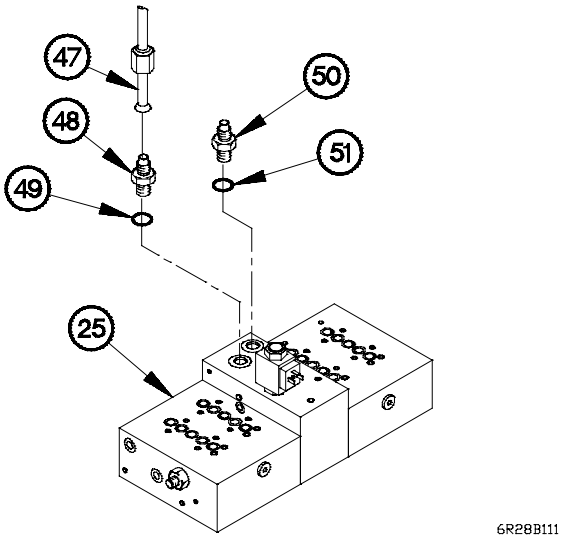
(31) Remove hydraulic tube (47) from fitting (48).

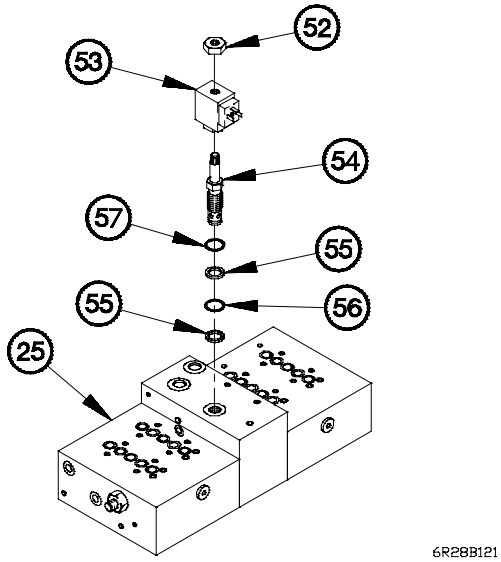
(32) Remove fitting (48) from valve manifold (25).

(33) Remove preformed packing (49) from fitting (48). Discard preformed packing.

(34) Remove fitting (50) from valve manifold (25).

(35) Remove preformed packing (51) from fitting (50). Discard preformed packing.




(36) Remove nut (52) and coil (53) from solenoid (54).

(37) Remove solenoid (54) from valve manifold (25).

(38) Remove two retainers (55) and performed packings (56 and 57) from solenoid (54). Discard retainers and preformed packings.

**NOTE**

Mark position of fittings for correct alignment during assembly.

(39) Remove 90-degree fitting (58) from valve manifold (25).

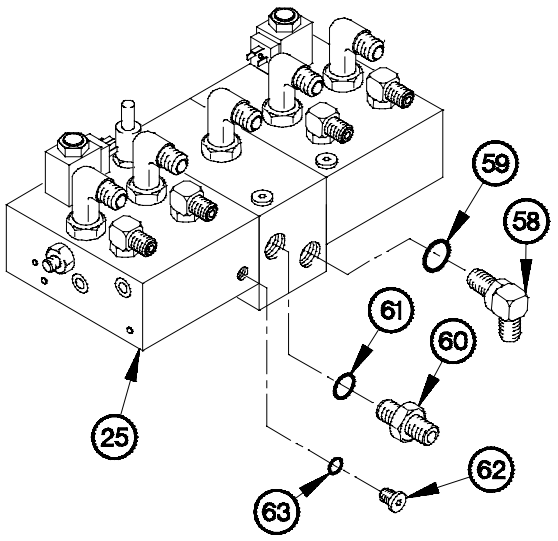
(40) Remove preformed packing (59) from 90-degree fitting (58). Discard preformed packing.

(41) Remove fitting (60) from valve manifold (25).

(42) Remove preformed packing (61) from fitting (60). Discard preformed packing.

(43) Remove plug (62) from valve manifold (25).

(44) Remove preformed packing (63) from plug (62). Discard preformed packing.



## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(45) Remove two 90-degree fittings (64) from valve manifold (25).

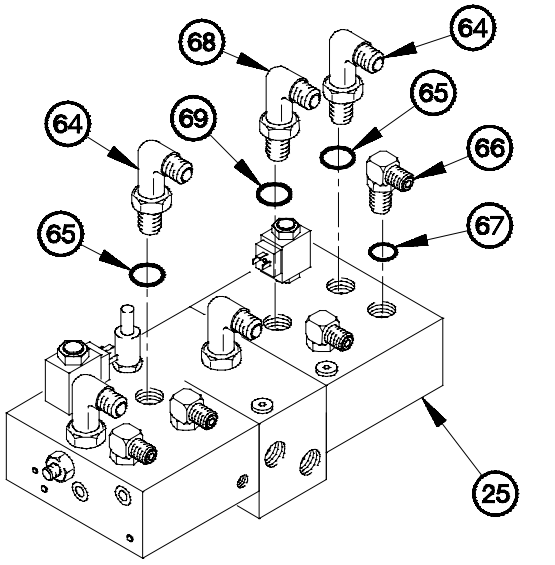
(46) Remove two preformed packings (65) from 90-degree fittings (64). Discard preformed packings.

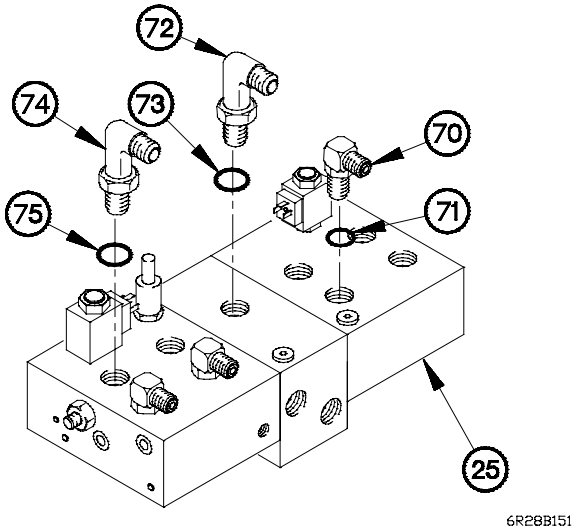
(47) Remove 90-degree fitting (66) from valve manifold (25).

(48) Remove preformed packing (67) from 90-degree fitting (66). Discard preformed packing.

(49) Remove 90-degree fitting (68) from valve manifold (25).

(50) Remove preformed packing (69) from 90-degree fitting (68). Discard preformed packing.




(51) Remove 90-degree fitting (70) from valve manifold (25).

(52) Remove preformed packing (71) from 90-degree fitting (70). Discard preformed packing.

(53) Remove 90-degree fitting (72) from valve manifold (25).

(54) Remove preformed packing (73) from 90-degree fitting (72). Discard preformed packing.

(55) Remove 90-degree fitting (74) from valve manifold (25).

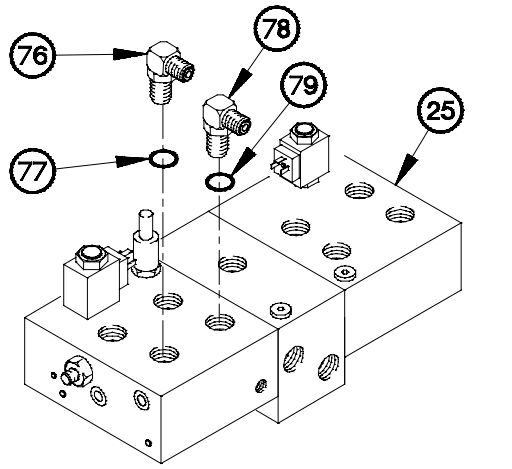
(56) Remove preformed packing (75) from 90-degree fitting (74). Discard preformed packing.

(57) Remove 90-degree fitting (76) from valve manifold (25).

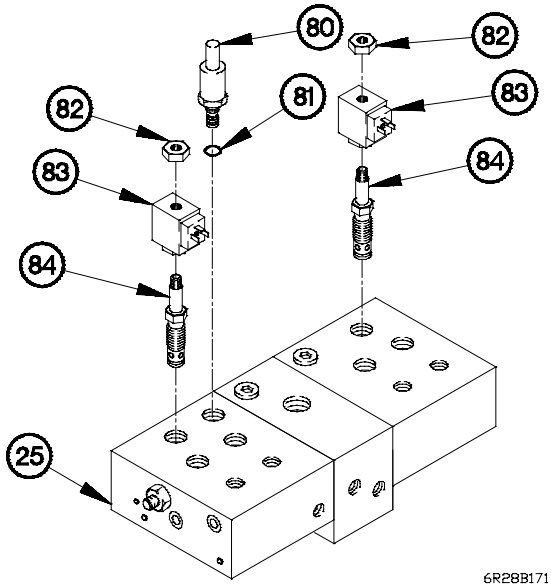
(58) Remove preformed packing (77) from 90-degree fitting (76). Discard preformed packing.

(59) Remove 90-degree fitting (78) from valve manifold (25).

(60) Remove preformed packing (79) from 90-degree fitting (78). Discard preformed packing.




6R28B161




6R28B171

(61) Remove relief valve (80) from valve manifold (25).

(62) Remove preformed packing (81) from relief valve (80). Discard preformed packing.

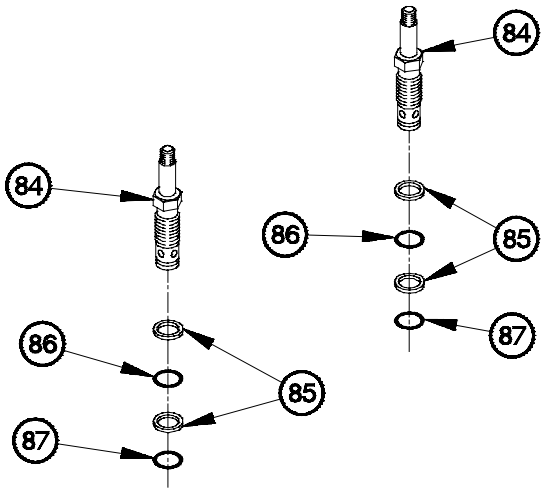
**NOTE**

Mark position of coils for correct alignment during assembly.

(63) Remove two nuts (82) and coils (83) from solenoids (84).

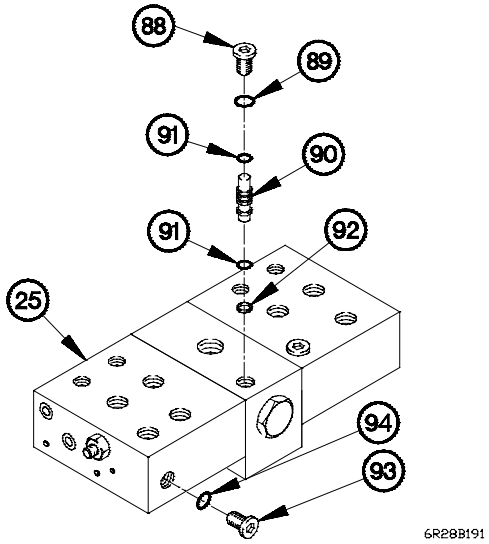
(64) Remove two solenoids (84) from valve manifold (25).

(65) Remove four retainers (85) and two preformed packings (86 and 87) from solenoids (84). Discard retainers and preformed packings.




6R28B181

## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




(66) Remove two plugs (88) from valve manifold (25).

(67) Remove two preformed packings (89) from plugs (88). Discard preformed packings.

(68) Remove two shuttle valves (90) from valve manifold (25).

(69) Remove four preformed packings (91) and two backup rings (92) from shuttle valves (90). Discard preformed packings and backup rings.

(70) Remove plug (93) from valve manifold (25).

(71) Remove preformed packing (94) from plug (93). Discard preformed packing.

**c. Cleaning/Inspection.**

**WARNING**

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

**NOTE**

Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect each part for nicks, scratches, burrs, pitting, and cracks.

**d. Assembly**

**NOTE**

Lubricate all parts with lubricating oil during assembly.

(1) Install preformed packing (1) on plug (2).

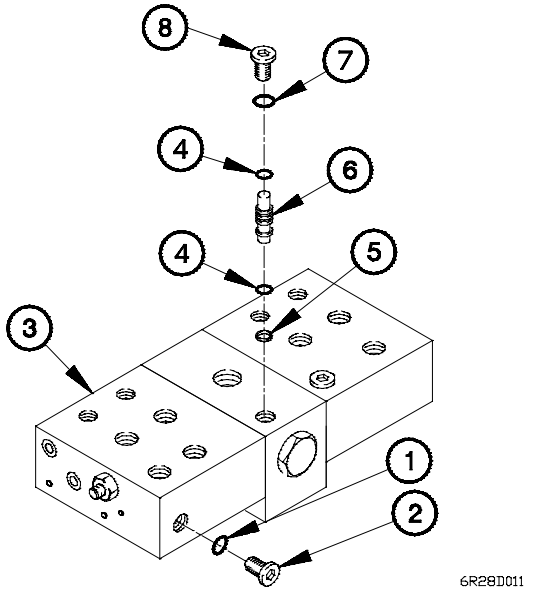
(2) Install plug (2) on valve manifold (3).

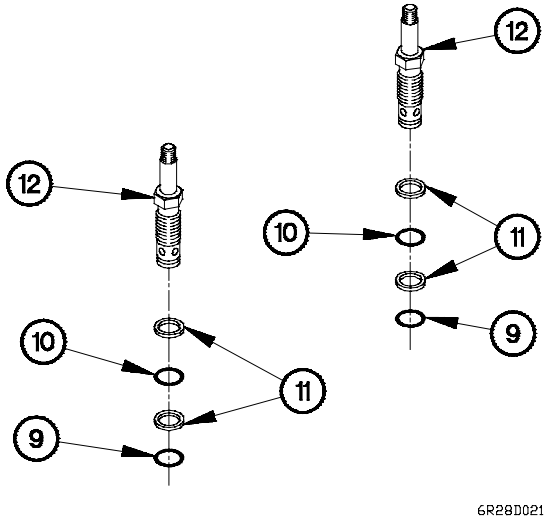
(3) Install four preformed packings (4) and two backup rings (5) on shuttle valves (6).

(4) Install two shuttle valves (6) in top of four way valve manifold (3).

(5) Install two preformed packings (7) on plugs (8).

(6) Install two plugs (8) in valve manifold (3).



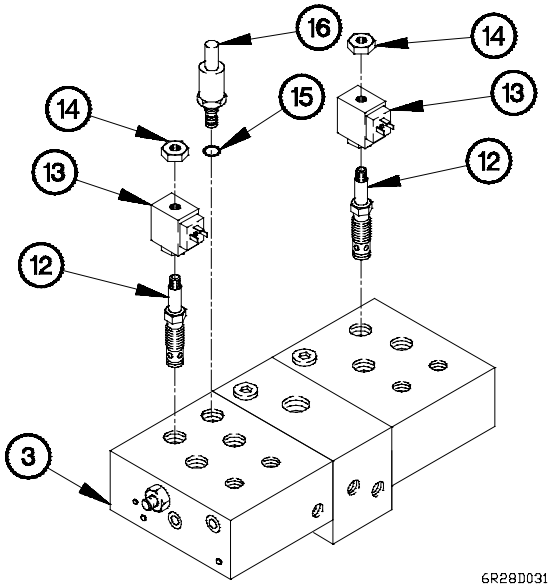

(7) Install two preformed packings (9 and 10) and four retainers (11) on two solenoids (12).

(8) Install two solenoids (12) in valve manifold (3).

(9) Install two coils (13) on solenoids (12) with nuts (14).

(10) Install preformed packing (15) on relief valve (16).

(11) Install relief valve (16) in valve manifold (3).



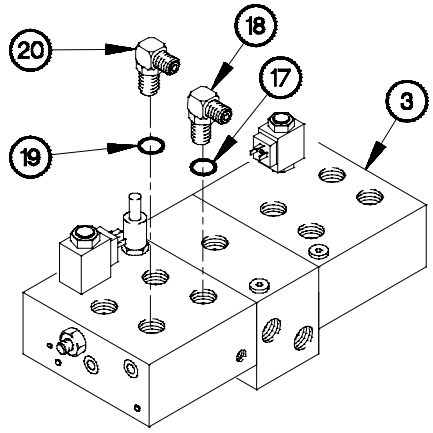
## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(12) Install preformed packing (17) on 90-degree fitting (18).

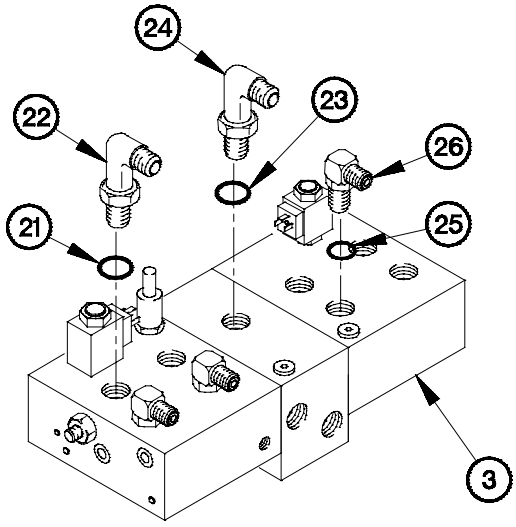
(13) Install 90-degree fitting (18) on valve manifold (3).

(14) Install preformed packing (19) on 90-degree fitting (20).

(15) Install 90-degree fitting (20) on valve manifold (3).




6R28D041




6R28D051

(16) Install preformed packing (21) on 90-degree fitting (22).

(17) Install 90-degree fitting (22) on valve manifold (3).

(18) Install preformed packing (23) on 90-degree fitting (24).

(19) Install 90-degree fitting (24) on valve manifold (3).

(20) Install preformed packing (25) on 90-degree fitting (26).

(21) Install 90-degree fitting (26) on valve manifold (3)

(22) Install preformed packing (27) on 90-degree fitting (28).

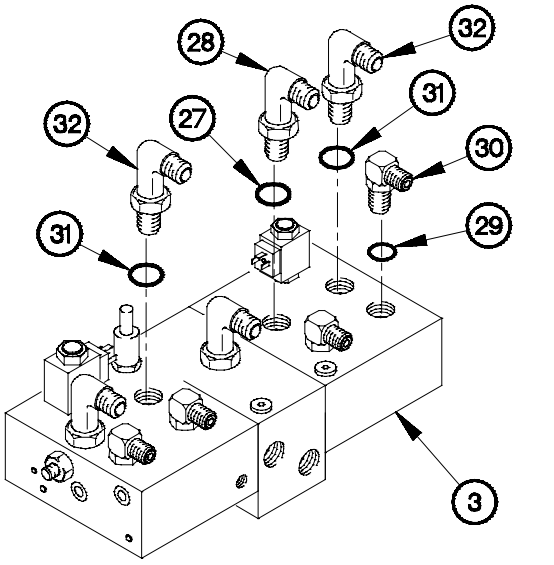
(23) Install 90-degree fitting (28) on valve manifold (3).

(24) Install preformed packing (29) on 90-degree fitting (30).

(25) Install 90-degree fitting (30) on valve manifold (3).

(26) Install two preformed packings (31) on 90-degree fittings (32).

(27) Install two 90-degree fittings (32) on valve manifold (3).




6R28D061

(28) Install preformed packing (33) on plug (34).

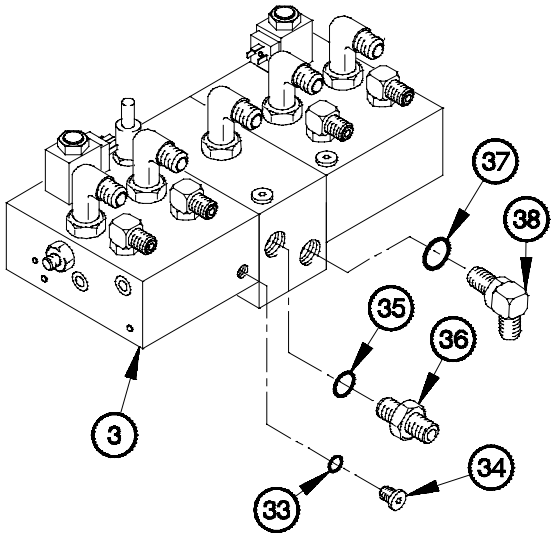
(29) Install plug (34) in valve manifold (3).

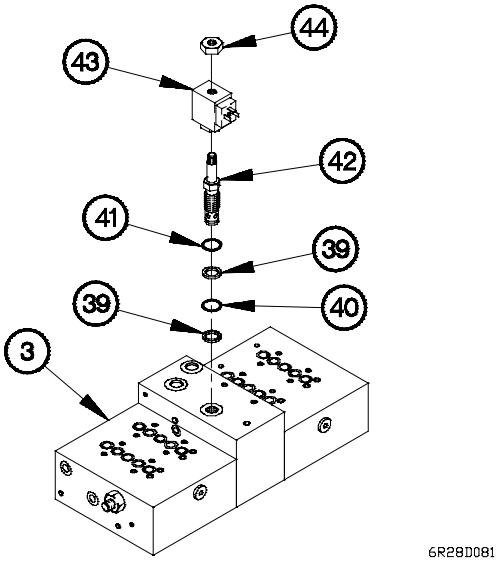
(30) Install preformed packing (35) on fitting (36).

(31) Install fitting (36) in valve manifold (3).

(32) Install preformed packing (37) on 90-degree fitting (38).

(33) Install 90-degree fitting (38) in valve manifold (3).




(34) Install two retainers (39) and preformed packings (40 and 41) on solenoid (42).

(35) Install solenoid (42) in valve manifold (3).

(36) Install coil (43) on solenoid (42) with nut (44).

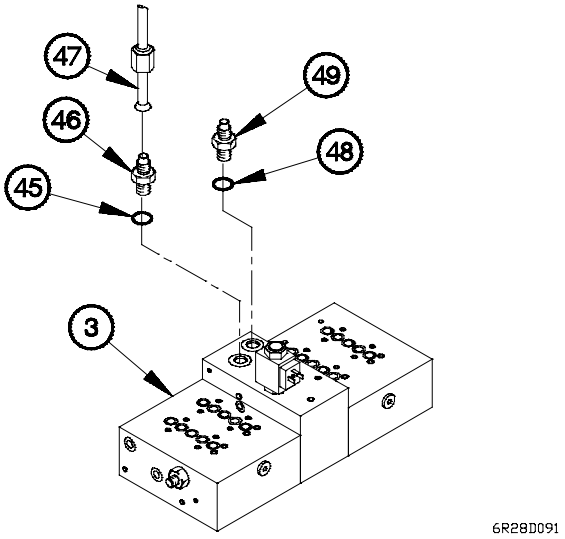
(37) Install preformed packing (45) on fitting (46).

(38) Install fitting (46) in bottom side of four way valve manifold (3).

(39) Install hydraulic tube (47) on fitting (46).

(40) Install preformed packing (48) on fitting (49).

(41) Install fitting (49) on valve manifold (3).



## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

- Lubricate all parts with lubricating oil during assembly.
- All control valve bodies are assembled the same way. Lift Control valve body shown.

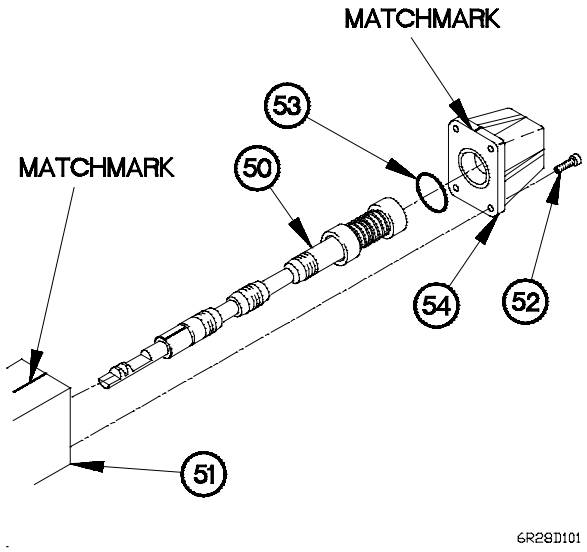
(42) Install spool (50) in valve body (51).

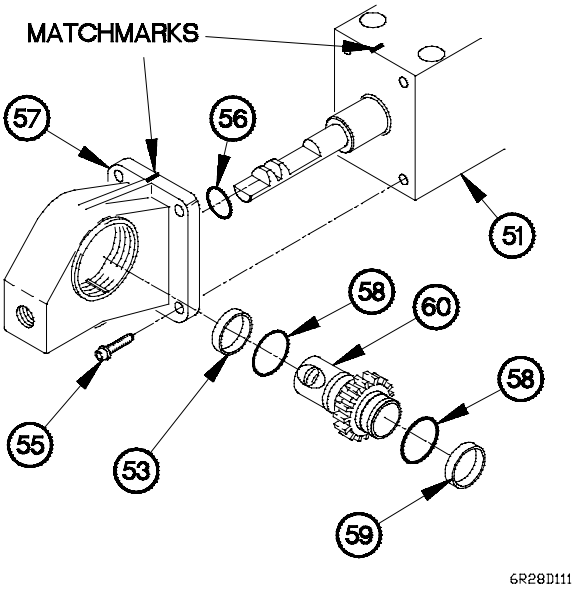
**WARNING**

**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.**

(43) Apply sealing compound to threads of four screws (52).

(44) Install preformed packing (53), end cap (54) and four screws (52) on valve body (51) with matchmarks aligned.

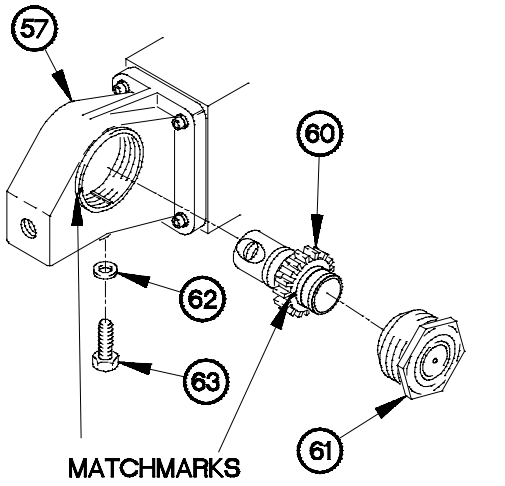



(45) Apply sealing compound to threads of four screws (55).

(46) Install preformed packing (56), lever cap (57) and four screws (55) on valve body (51) with matchmarks aligned.

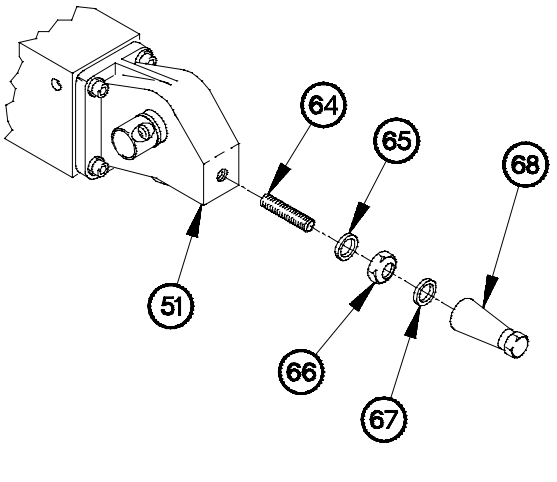
(47) Install two backup rings (58) and quad rings (59) on pinion seal (60).




(48) Install pinion seal (60) in lever cap (57) with matchmarks aligned.

(49) Install carrier nut (61) in lever cap (57).

(50) Install sealing washer (62) and rack support bolt (63) in lever cap (57).




**NOTE**

Perform steps (51) through (54) on Telescopic and Lift Control valves.

(51) Position setscrew (64) in lever cap (51).

(52) Position sealing washer (65) and nut (66) on setscrew (64).

(53) Adjust and tighten setscrew (64) and nut (66) to position marked during removal.

(54) Position sealing washer (67) and dust cap (68) on setscrew (64).

**NOTE**

Dust cap has a break away nut. Nut will break away when correct torque has been reached.

(55) Tighten dust cap (68) until nut breaks away.

## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(56) Install two preformed packings (69) and five preformed packings (70) in valve manifold (3).

**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.**

(57) Apply sealing compound to threads of four screws (71).

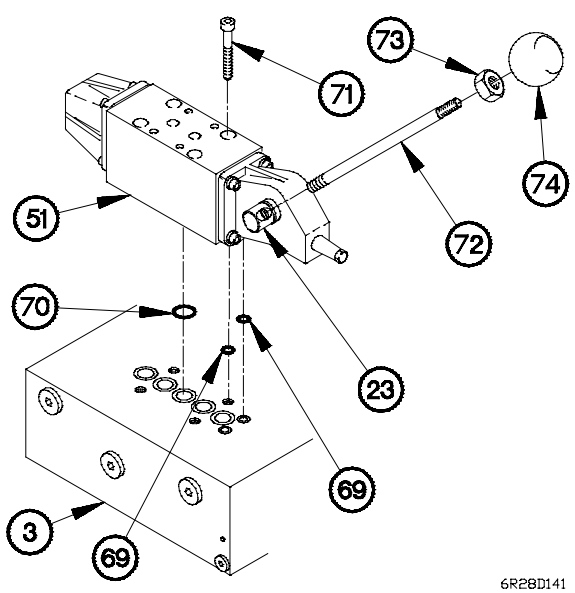
(58) Install valve body (51) on valve manifold (3) with four screws (71).

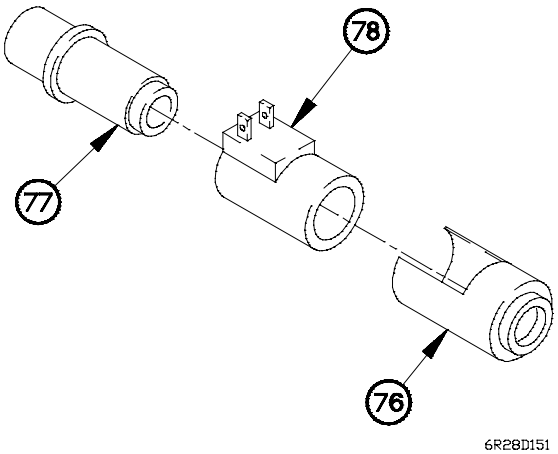
(59) Apply sealing compound to threads of lever (72).

(60) Install lever (72) in pinion seal (60).

(61) Install nut (73) and knob (74) on lever (72).

(62) Perform steps (40) through (61) on remaining valve bodies.




**NOTE**

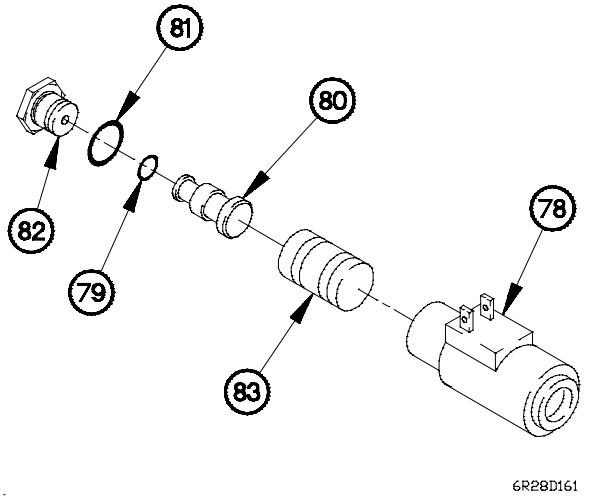
All solenoids are assembled the same way. One solenoid shown.

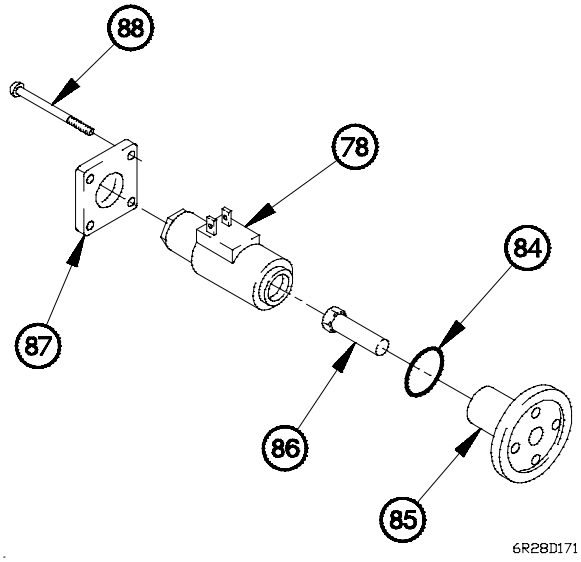
(63) Install solenoid cylinder (76) and solenoid sleeve (77) on solenoid (78).

(64) Install seal (79) on head valve push button (80).

(65) Install preformed packing (81) on head valve (82).

(66) Install head valve coil (83), head valve push button (80), and head valve (82) in solenoid (78).




(67) Install preformed packing (84) on valve body coil (85).

(68) Install valve body coil (85) and valve body push button (86) in solenoid (78).

(69) Install access cover (87) on solenoid (78) with four screws (88).

(70) Perform steps (63) through (69) on remaining solenoids.

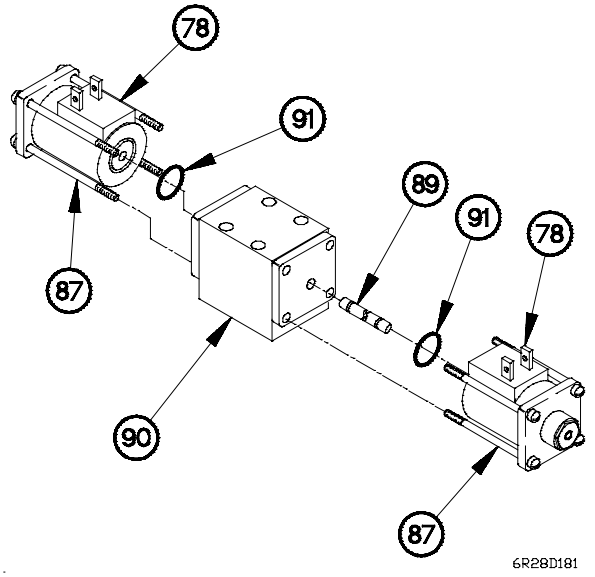
**NOTE**

All pilot valve bodies are assembled the same way. Lift Control pilot valve body shown.

(71) Install spool (89) in pilot valve body (90).

**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.**




(72) Apply sealing compound to threads of eight screws (87).

(73) Position two preformed packings (91) and solenoids (78) on pilot valve body (90) with eight screws (87).

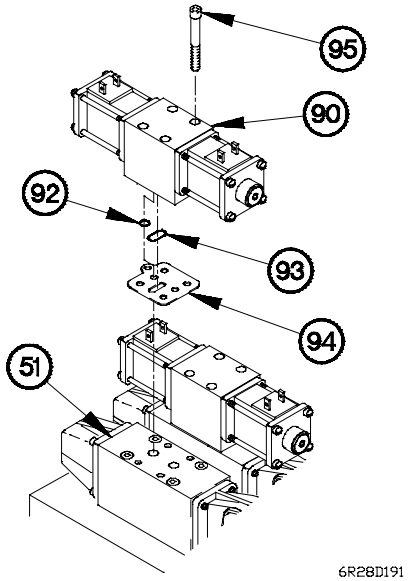
(74) Tighten eight screws (87) to 30-45 lb-in. (3-5 N·m).

## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(75) Install two preformed packings (92), preformed packings (93), and seal plate (94) on pilot valve body (90).

**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.**

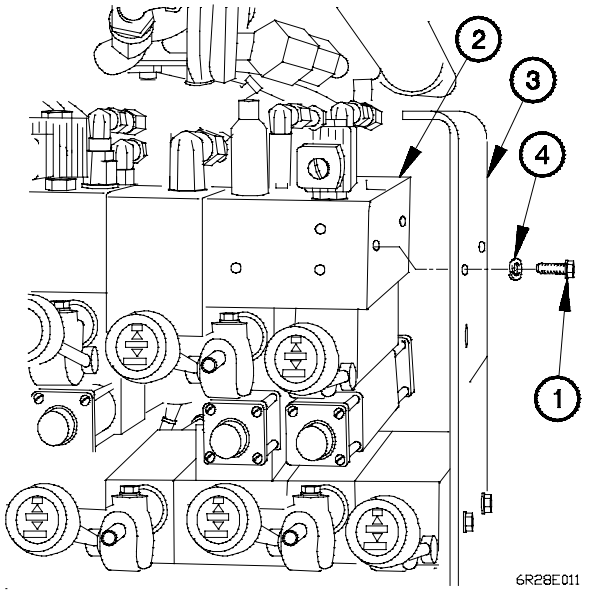



(76) Apply sealing compound to thread of four bolts (95).

(77) Position pilot valve body (90) on valve body (51) with four bolts (95).

(78) Tighten four bolts (95) to 45-55 lb-in. (5-6 N·m).

**e. Installation.**




(1) Apply sealing compound to threads of four bolts (1).

**NOTE**

Step (2) requires the aid of two assistants.

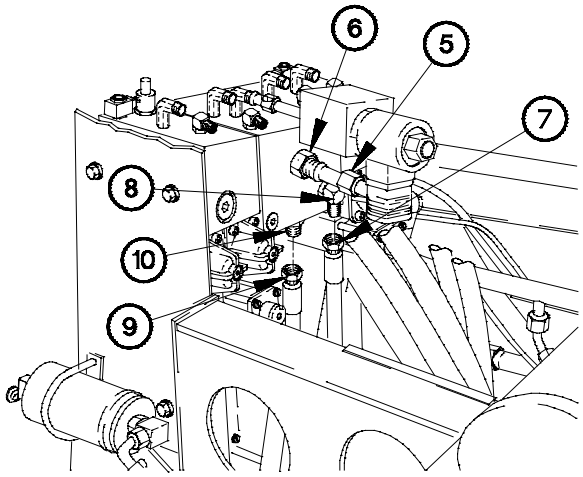
(2) Position valve manifold assembly (2) in crane control panel (3) with four lockwashers (4) and bolts (1).

(3) Tighten four bolts (1) to 41-45 lb-ft (56-61 N•m).

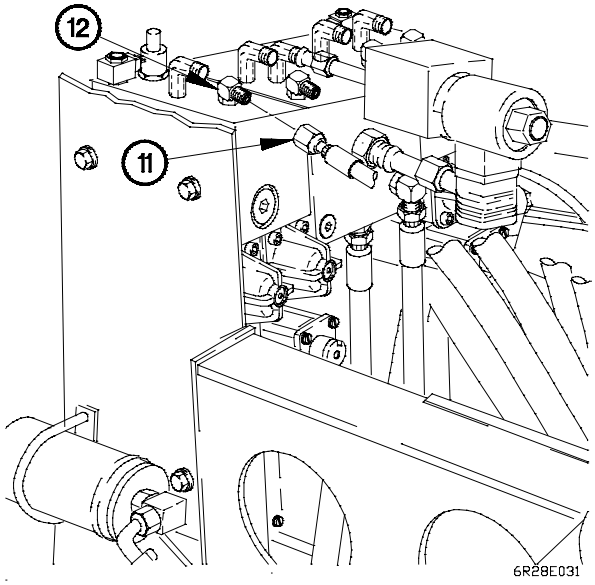
(4) Connect hydraulic tube (5) to fitting (6).

(5) Connect hydraulic hose (7) to 90-degree fitting (8).

(6) Connect hydraulic hose (9) to fitting (10).



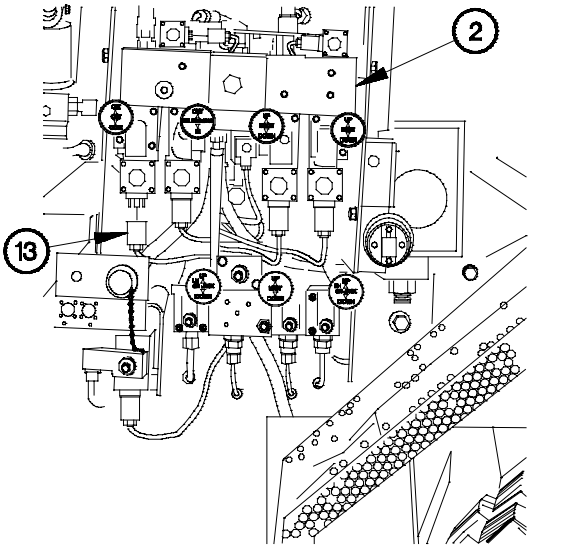

6R28E021




6R28E031

(7) Connect nine hydraulic hoses (11) to 90-degree fittings (12).

(8) Connect 11 solenoid electrical connectors (13) to valve manifold (2).




6R28E041

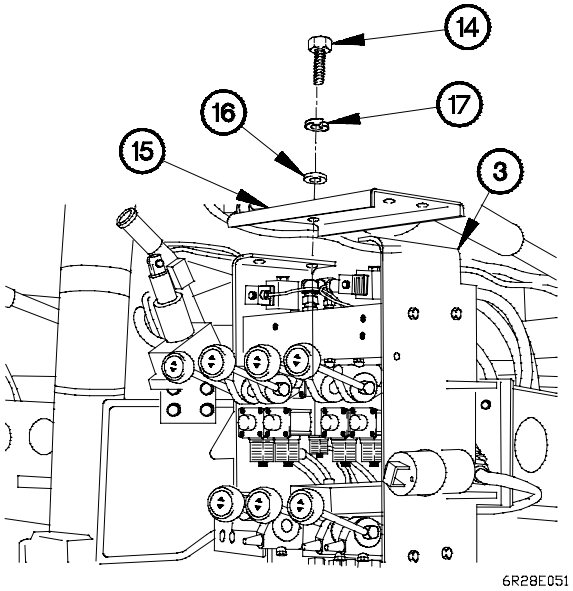
## 16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**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.**

(9) Apply sealing compound on threads of two screws (14).

(10) Install top cover (15) on crane control panel (3) with two washers (16), lockwashers (17), and screws (14).




**f. Follow-On Maintenance.**

(1) Install remote control cable stowage box (TM 9-2320-366-20-5).

(2) Install remote control stowage box (TM 9-2320-366-20-5).

(3) Connect batteries (TM 9-2320-366-20-3).

(4) Operate MHC from control panel and check for hydraulic leaks on four way control valve assembly and check for proper operation (TM 9-2320-366-10-1).

(5) Operate MHC with REMOTE CONTROL UNIT and check for proper operation (TM 9-2320-366-10-1).

**End of Task.**

## 16-29. M1084/M1086 TWO WAY SOLENOID VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Packing, Preformed (2) (Item 264, Appendix F)
Packing, Preformed (2) (Item 269, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**a. Removal.**

**NOTE**

Tag electrical connectors and connection points prior to disconnecting.

(1) Disconnect electrical connector (1) from two way solenoid valve (2).

(2) Place drain pan under two way solenoid valve (2).

**CAUTION**

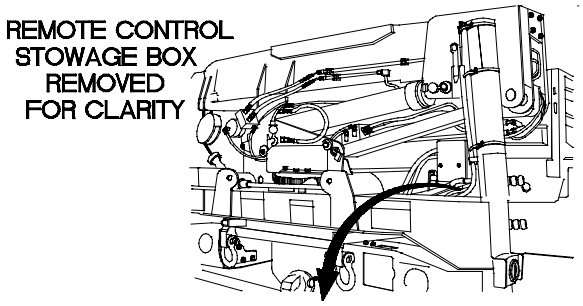
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

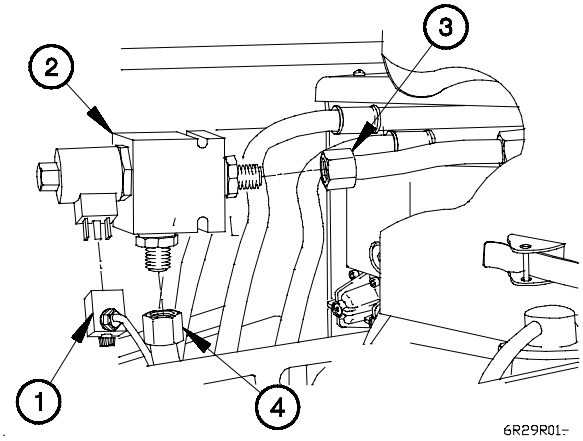
**NOTE**

Tag hydraulic tubes and connection points prior to disconnecting.

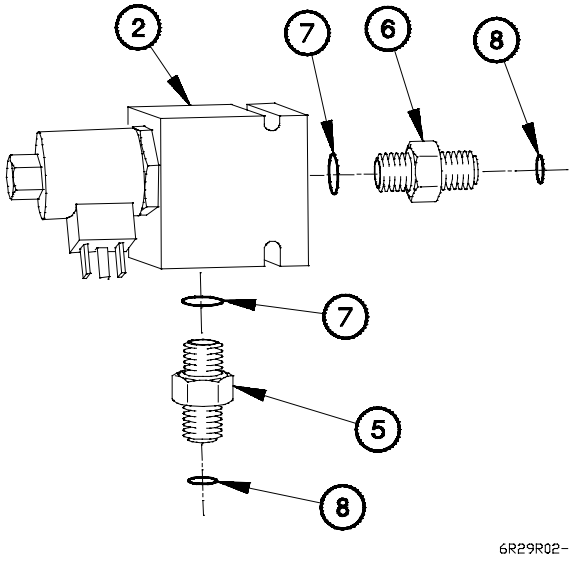
(3) Disconnect hydraulic tube (3) from two way solenoid valve (2).

(4) Remove two way solenoid valve (2) from hydraulic tube (4).



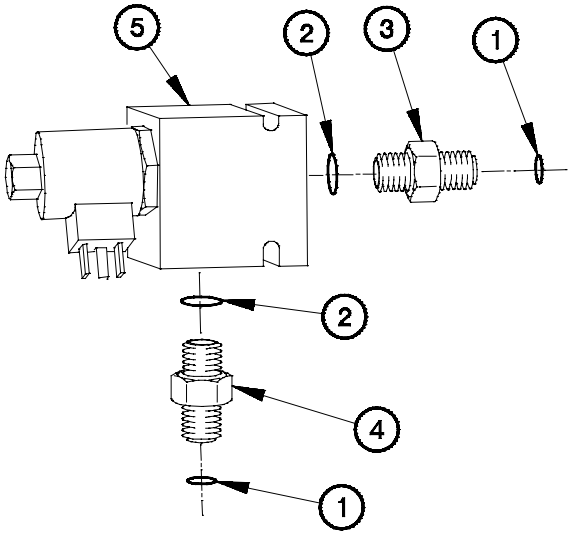
## 16-29. M1084/M1086 TWO WAY SOLENOID VALVE REPLACEMENT (CONT)




(5) Remove fittings (5 and 6) from two way solenoid valve (2).

(6) Remove preformed packings (7 and 8) from fittings (5 and 6). Discard preformed packings.

**b. Installation.**



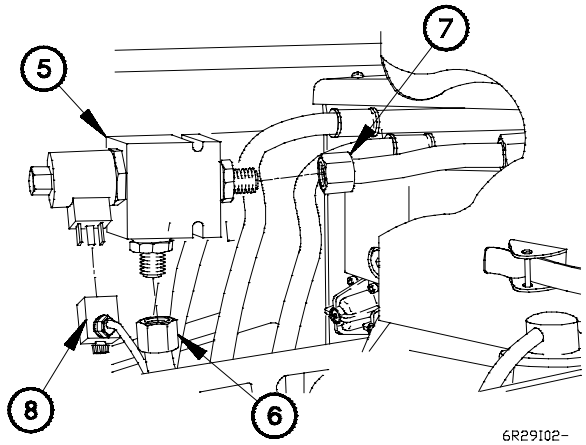

(1) Install preformed packings (1 and 2) on fittings (3 and 4).

(2) Install fittings (3 and 4) in two way solenoid valve (5).

(3) Install two way solenoid valve (5) on hydraulic tube (6).

(4) Connect hydraulic tube (7) to two way solenoid valve (5).

(5) Connect electrical connector (8) to two way solenoid valve (5).




**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Operate MHC and check for hydraulic leaks at two way solenoid valve (TM 9-2320-366-10-1).

**End of Task.**

## 16-30. M1084/M1086 MANUAL OVERRIDE VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (2) (Item 139, Appendix F)
Packing, Preformed (2) (Item 231, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**a. Removal.**

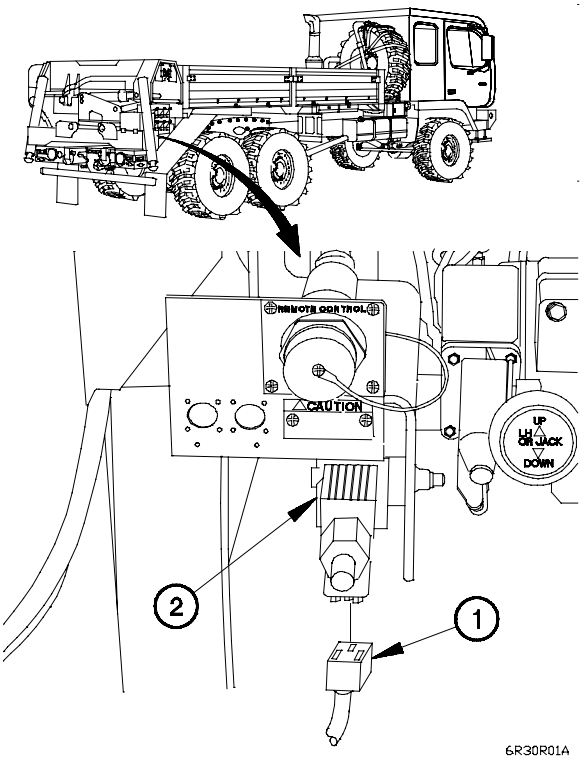
**CAUTION**

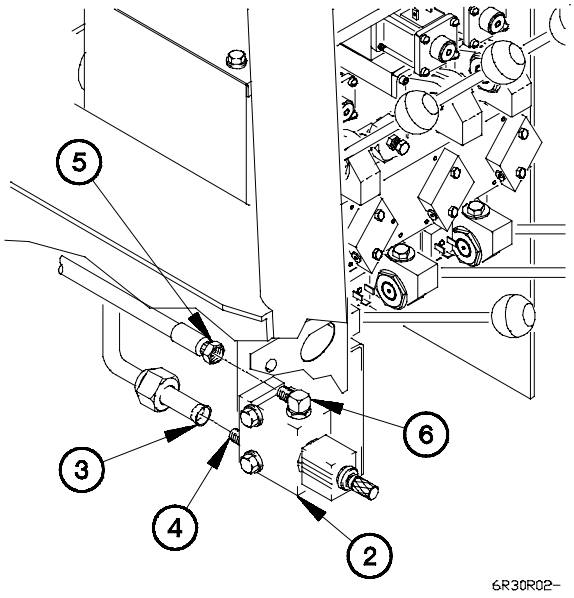
Cap or plug hydraulic connections prior to disconnecting to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag electrical connections and connection points prior to disconnecting.

(1) Disconnect connector (1) from manual override valve (2).




**NOTE**

Tag hydraulic connections and connection points prior to disconnecting.

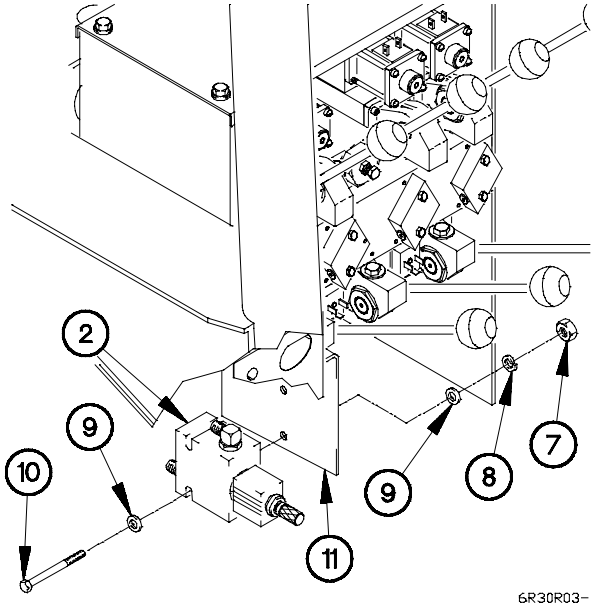
(2) Position drain pan under manual override valve (2).

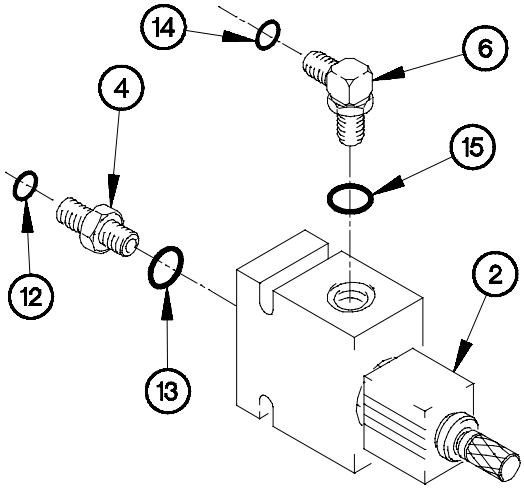
(3) Disconnect tube (3) from fitting (4).

(4) Disconnect hose (5) from 90-degree fitting (6).

## 16-30. M1084/M1086 MANUAL OVERRIDE VALVE REPLACEMENT (CONT)

(5) Remove two nuts (7), lockwashers (8), four washers (9), two bolts (10), and manual override valve (2) from crane control panel (11).




(6) Remove fitting (4) from manual override valve (2).

(7) Remove 90-degree fitting (6) from manual override valve (2).

(8) Remove preformed packings (12 and 13) from fitting (4). Discard preformed packings.

(9) Remove preformed packings (14 and 15) from 90-degree fitting (6). Discard preformed packings.

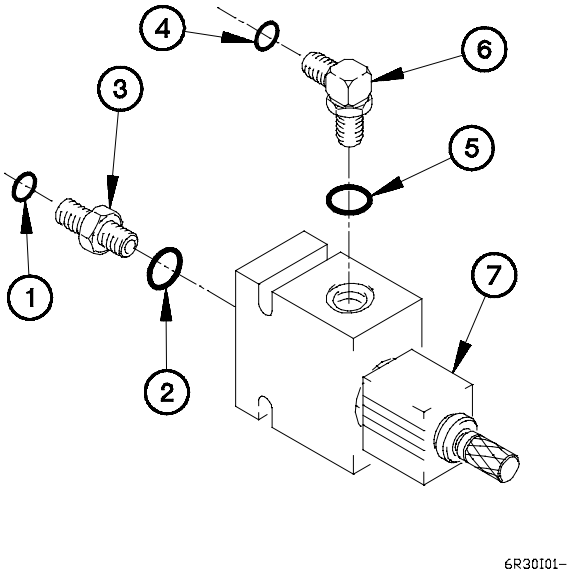
**b. Installation.**

(1) Install preformed packings (1 and 2) on fitting (3).

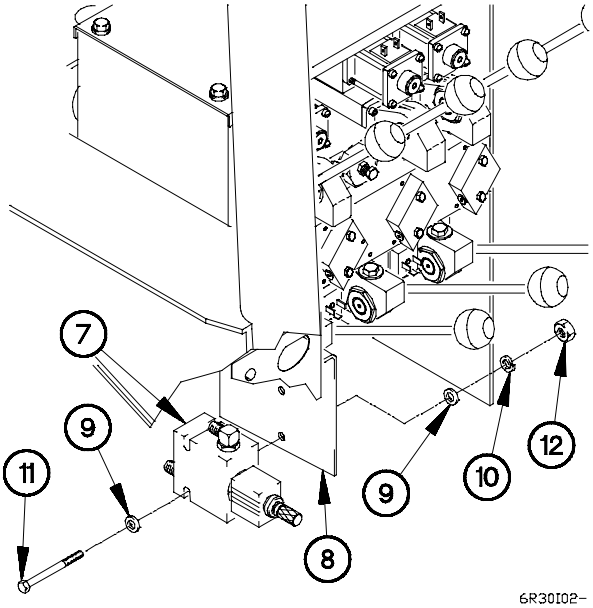
(2) Install preformed packings (4 and 5) on 90-degree fitting (6).

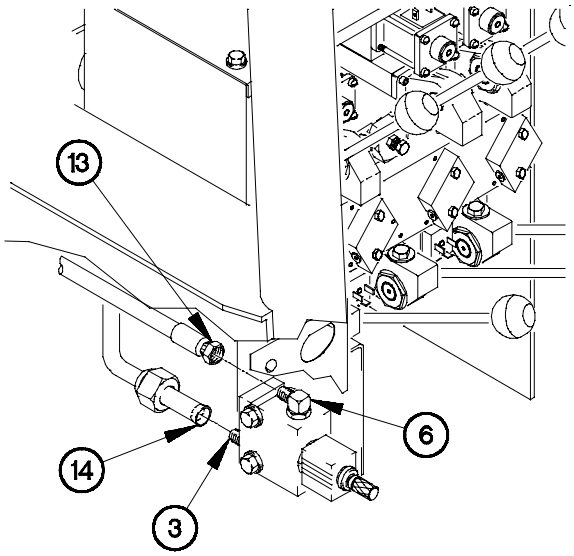
(3) Install fitting (3) on manual override valve (7).

(4) Install 90-degree fitting (6) on manual override valve (7).



(5) Install manual override valve (7) on crane control panel (8) with four washers (9), two lockwashers (10), bolts (11), and nuts (12).

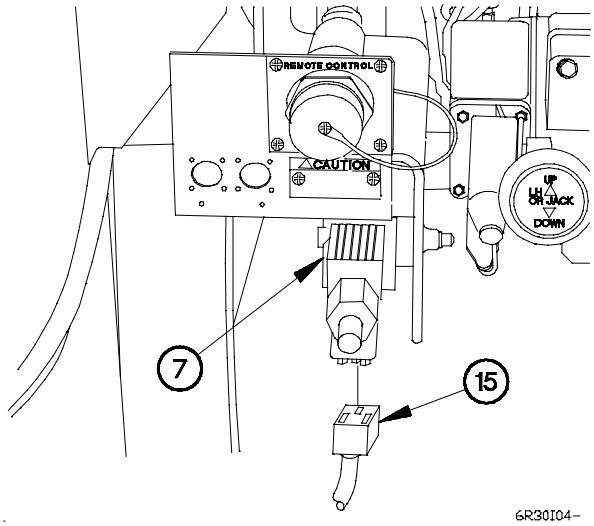



(6) Connect hose (13) to 90-degree fitting (6).

(7) Connect tube (14) to fitting (3).

(8) Connect connector (15) to manual override valve (7).




**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Operate MHC and check for hydraulic leaks and for proper operation (TM 9-2320-366-10-1).

**End of Task.**

## 16-31. M1084/M1086 CRANE LOAD TEST

This task covers:

a. Static Overload Test
b. Static Overload Proof Test
c. Dynamic Test
d. Follow-on Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Vehicle parked on hard level surface (TM 9-2320-366-10-1).
Exercise all MHC crane functions to their full extent with REMOTE CONTROL UNIT (TM 9-2320-366-10-1).
Position MHC to rear center line of vehicle (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Gloves, Welders (Item 27, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Materials/Parts**
6250 lb weight
5500 lb weight
2200 lb weight

**Personnel Required**
(3)

**References**
TB 43-0142

**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.**
- **Personnel shall wear proper eye protection. Failure to comply may result in injury to personnel.**
- **Wire rope can become frayed or contain broken wires, wear heavy leather palmed work gloves when handling wire rope. Failure to comply may result in injury to personnel.**

**NOTE**

Load testing shall be performed from crane local control panel.

**a. Static Overload Test.**

**NOTE**

Static overload test is performed with a test load of 110% of crane rated load on Range Diagram for this boom extension and radius. The overload protection system should prevent lifting of this test weight.

(1) Extend boom (1) to 14 feet, 0 inches.

(2) Raise boom (1) approximately 60° for a load radius of 7 feet, 0 inches.

(3) Lower crane hook (2) with hoist (3).

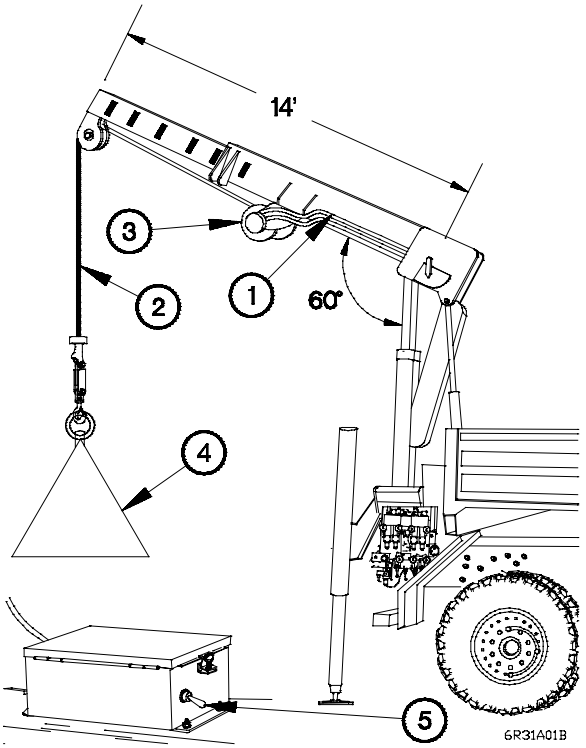
(4) Connect 5500 lb test weight (4) to hook (2).

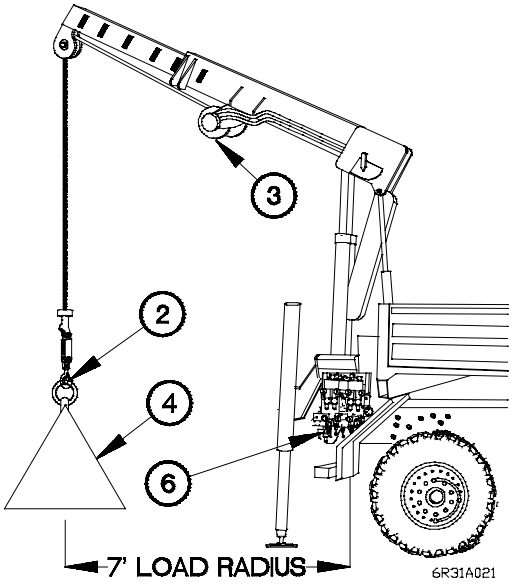
**NOTE**

If test weight is lifted refer to troubleshooting to determine failure of overload protection system.

(5) Attempt to raise test weight (4) with hoist (3).

(6) Place crane power switch (5) to OFF.




**NOTE**

Hold manual override depressed until test weight is raised.

(7) Depress manual override (6).

(8) Raise test weight (4) approximately six inches with hoist (3).

(9) Release manual override (6).

**NOTE**

Test weight will remain suspended.

(10) Depress manual override (6).

(11) Lower test weight (4) to ground with hoist (3).

(12) Release manual override (6).

(13) Disconnect 5500 lb test weight (4) from hook (2).

## 16-31. M1084/M1086 CRANE LOAD TEST (CONT)

**b. Static Overload Proof Test.**

**NOTE**

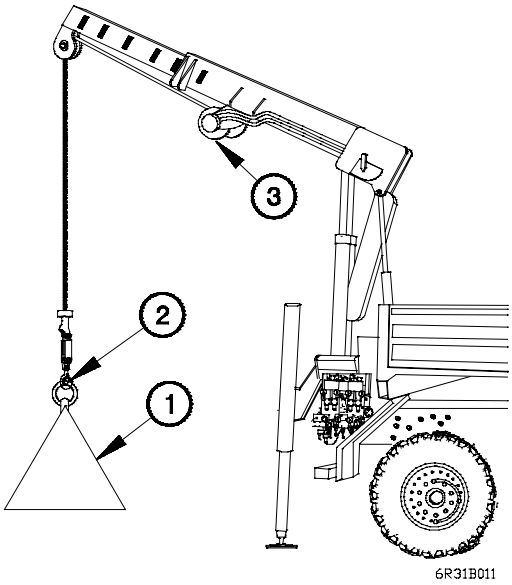
Static overload proof test is performed with a test load of 125% of crane rated load on Range Diagram for this boom extension and radius. The overload protection system should prevent lifting of this test weight.

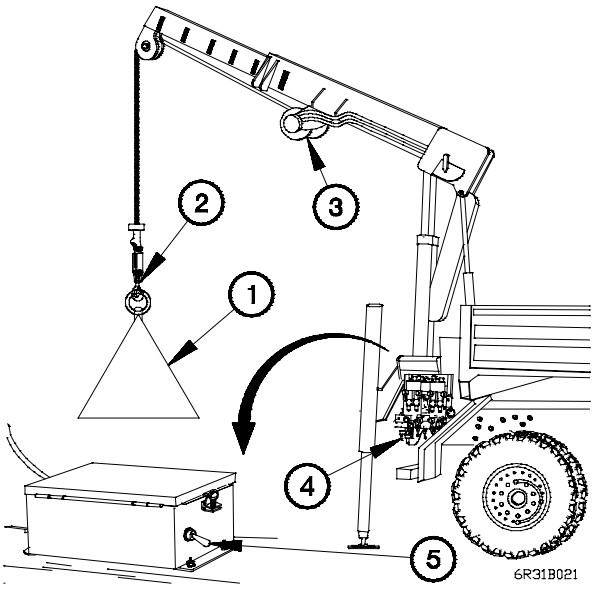
(1) Connect 6250 lb test weight (1) to hook (2).

**NOTE**

If test weight is lifted refer to troubleshooting to determine failure of overload protection system.

(2) Attempt to raise test weight (1) with hoist (3).




**NOTE**

Hold manual override depressed until test weight is raised.

(3) Depress manual override (4).

(4) Raise test weight (1) approximately 18 inches with hoist (3).

(5) Release manual override (4).

**NOTE**

Test weight will remain suspended.

(6) Depress manual override (4).

(7) Lower test weight (1) to ground with hoist (3).

(8) Disconnect 6250 lb test weight (1) from hook (2).

(9) Place crane power switch (5) to off.

**c. Dynamic Test.**

**NOTE**

Dynamic test is performed with a test load of 100% of crane rated load on Range Diagram for this boom extension and radius. The overload protection system should not prevent lifting of this test weight.

(1) Extend boom (1) to 16 feet, 0 inches.

(2) Position boom (1) approximately 15° for a load radius of 15 feet, 6 inches.

(3) Connect 2200 lb test weight (2) to crane hook (3).

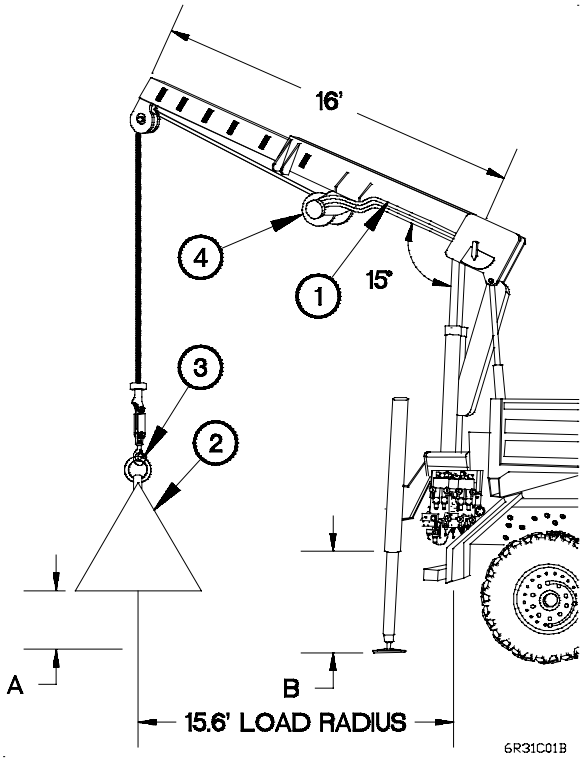
(4) Raise test weight (2) approximately 18 inches with hoist (4).

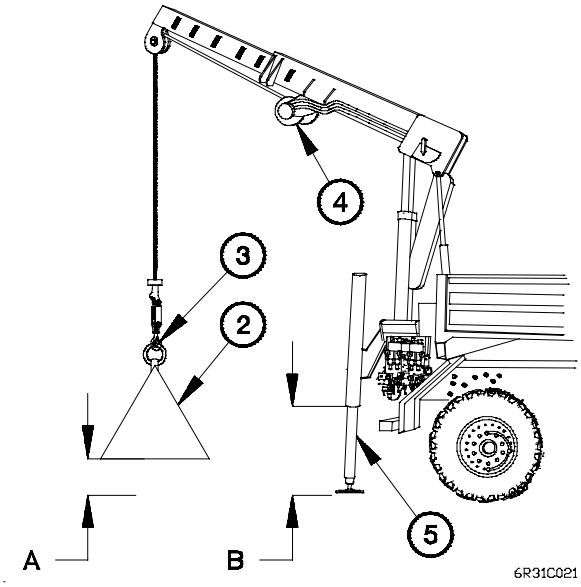
(5) Record dimension A, distance test weight (2) is from ground.

(6) Record dimension B, extension length of jack cylinders (5).

(7) Shut down engine (TM 9-2320-366-10-1).

(8) Allow MHC to remain undisturbed for 30 minutes.




**NOTE**

Maximum allowable drift of jack cylinders and test weight is one inch in 30 minutes.

(9) Measure dimension A, distance test weight (2) is from ground.

(10) Measure dimension B, extension length of jack cylinders (5).

(11) Start engine (TM 9-2320-366-10-1).

(12) Rotate test weight (2) to left and right and back to center line.

(13) Lower test weight (2) to ground with hoist (4).

(14) Disconnect 2200 lb test weight (2) from crane hook (3).

**d. Follow-On Maintenance**

Stow MHC (TM 9-2320-366-10-1).

**End of Test.**

## 16-32. M1089 MATERIAL HANDLING CRANE (MHC) REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
30K winch cables removed (TM 9-2320-366 20-5).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)
Multiplier, Torque Wrench (Item 42, Appendix B)
Adapter, Socket Wrench (Item 3, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Tools and Special Tools (Cont)**
Pan, Drain (Item 43, Appendix B)
Sling, Cargo (2) (Item 56, Appendix B)
Trestle, Motor Vehicle Maintenance (4) (Item 81, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 76, Appendix C)
Ties, Cable Plastic (Item 92, 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.**

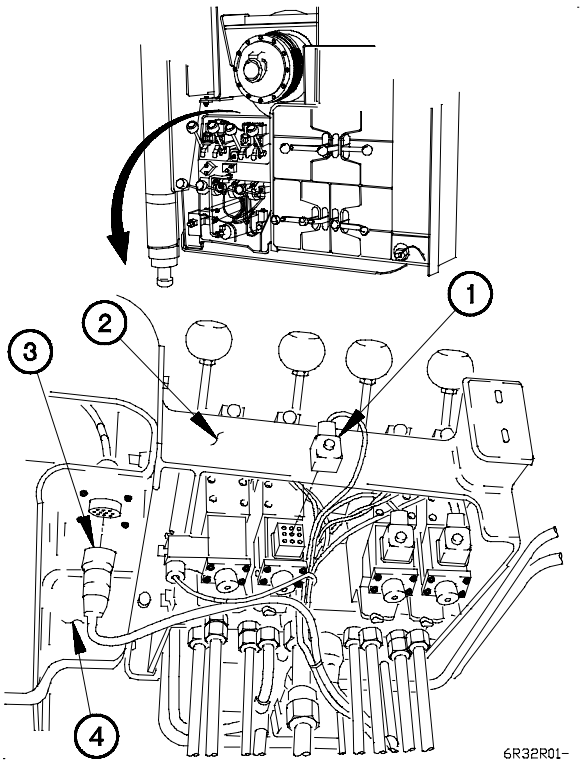
**a. Removal.**

**NOTE**

- Tag electrical connectors and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(1) Disconnect 13 electrical connectors (1) from eight bank control panel (2).

(2) Disconnect connector (3) from main control panel (4).



(3) Position drain pan under center of outrigger beam (5).

**CAUTION**

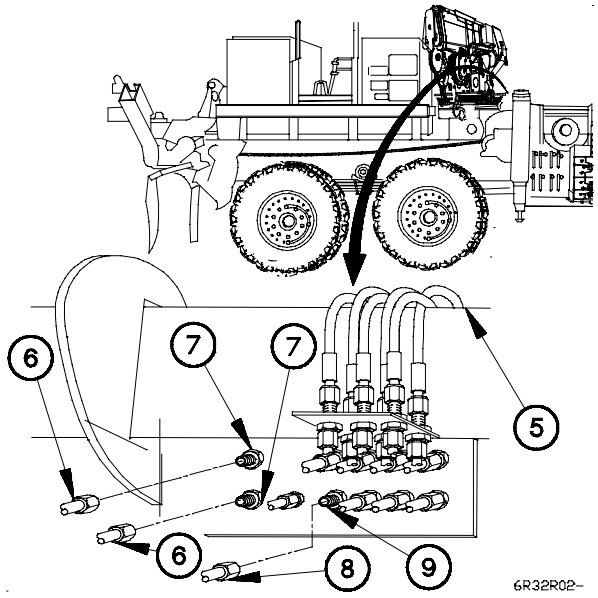
Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

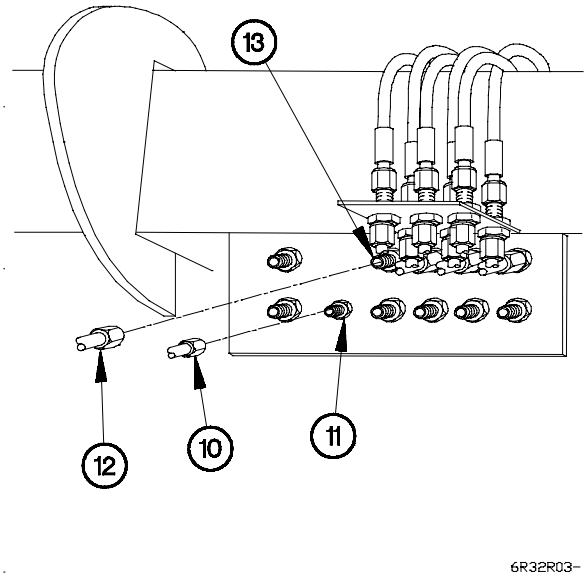
**NOTE**

Tag hydraulic tubes and connection points prior to disconnecting.

(4) Disconnect two tubes (6) from fittings (7).

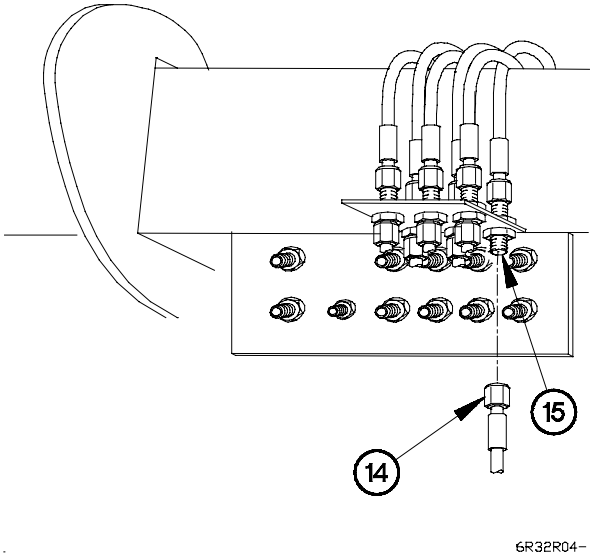
(5) Disconnect four tubes (8) from fittings (9).




(6) Disconnect tube (10) from fitting (11).

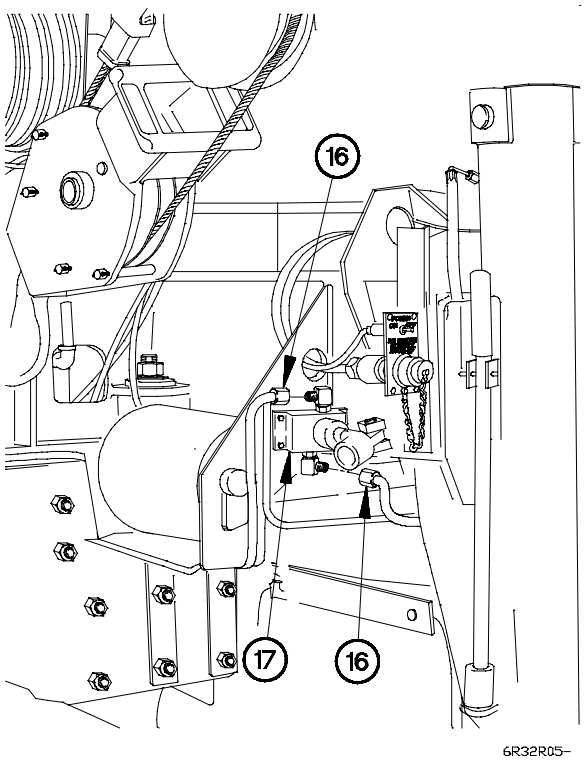
(7) Disconnect four tubes (12) from fittings (13).

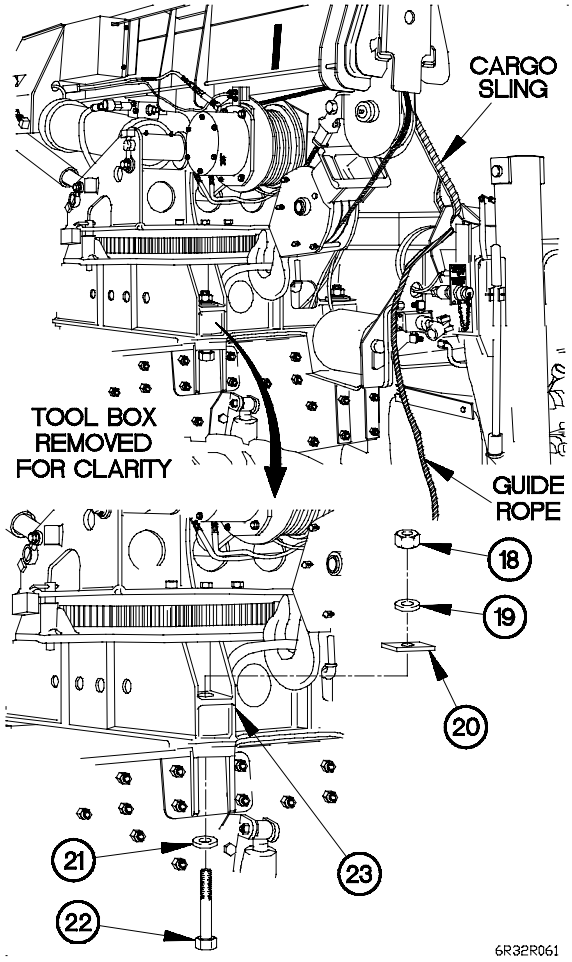



(8) Disconnect six tubes (14) from fittings (15).

## 16-32. M1089 MATERIAL HANDLING CRANE (MHC) REPLACEMENT (CONT)

(9) Disconnect two tubes (16) from hand pump (17).

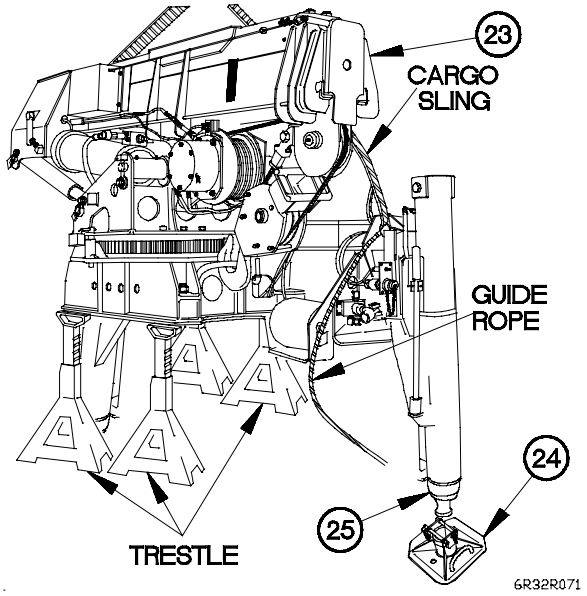



**WARNING**

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

(10) Remove six nuts (18), washers (19), spacers (20), washers (21), and bolts (22) from crane (23).




**NOTE**

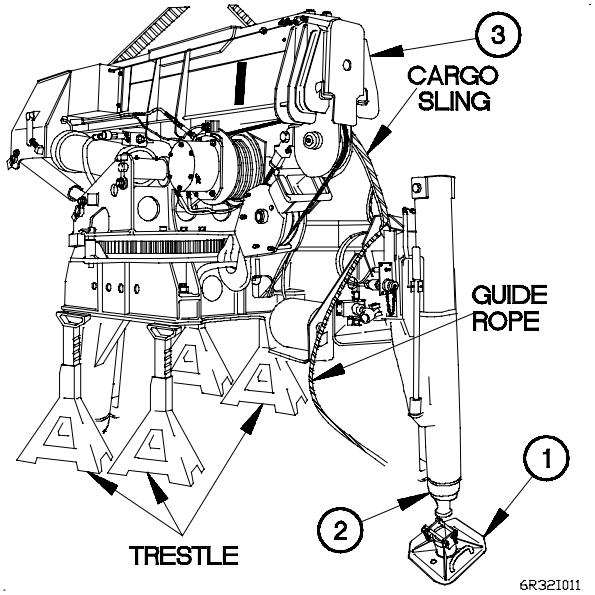
Step (11) requires the aid of two assistants.

(11) Remove MHC (23) from vehicle.

(12) Install outrigger pads (24) on jack cylinders (25).

(13) Position MHC (23) on four trestles.

**b. Installation.**




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

(1) Remove outrigger pads (1) from jack cylinders (2).

**NOTE**

Step (2) requires the aid of two assistants.

(2) Position MHC (3) on vehicle.

## 16-32. M1089 MATERIAL HANDLING CRANE (MHC) REPLACEMENT (CONT)

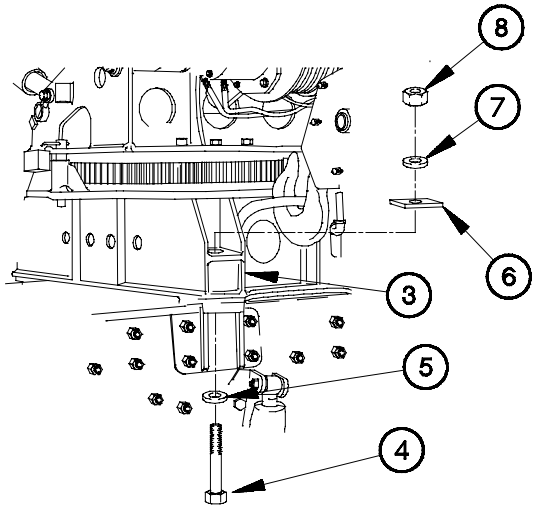
**WARNING**

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

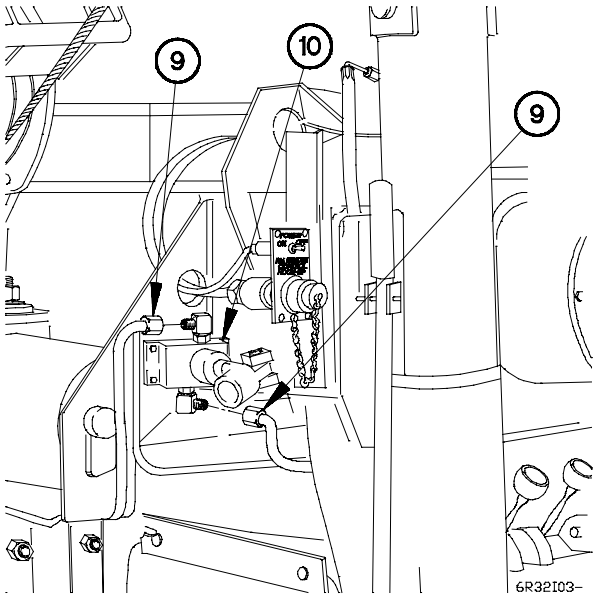
(3) Apply sealing compound to threads of six mounting bolts (4).

(4) Position six washers (5), mounting bolts (4), spacers (6), washers (7), and nuts (8) in crane (3).

(5) Tighten six nuts (8) to 857-929 lb-ft (1162-1260 N•m).




6R32I02-



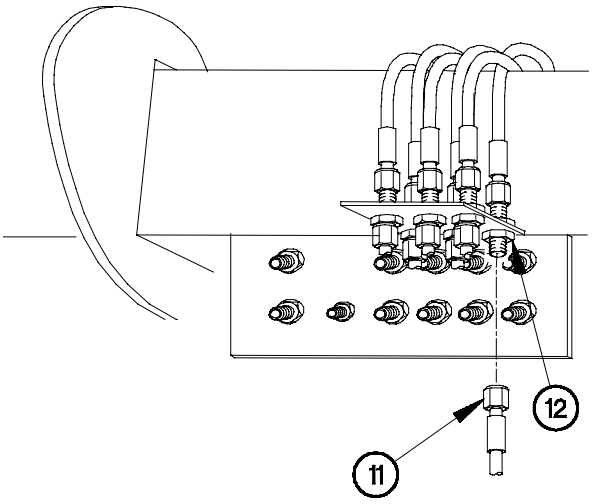

6R32I03-

(6) Position two tubes (9) on hand pump (10).

(7) Tighten two tubes (9) to 32-35 lb-ft (43-47 N•m).

(8) Position six tubes (11) on fittings (12).

(9) Tighten six tubes (11) to 18-20 lb-ft (24-27 N•m).



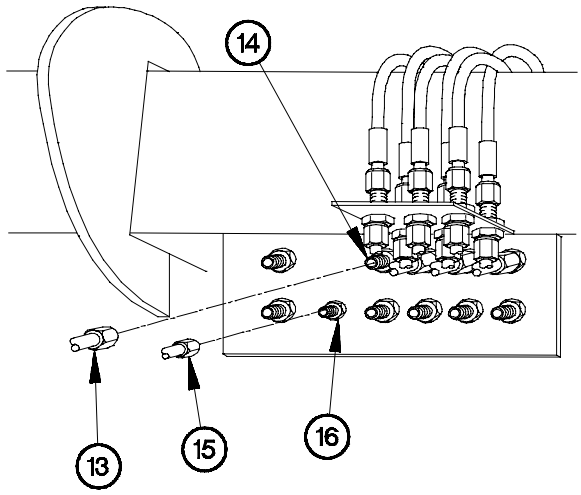

6R32I04-

(10) Position four tubes (13) on fittings (14).

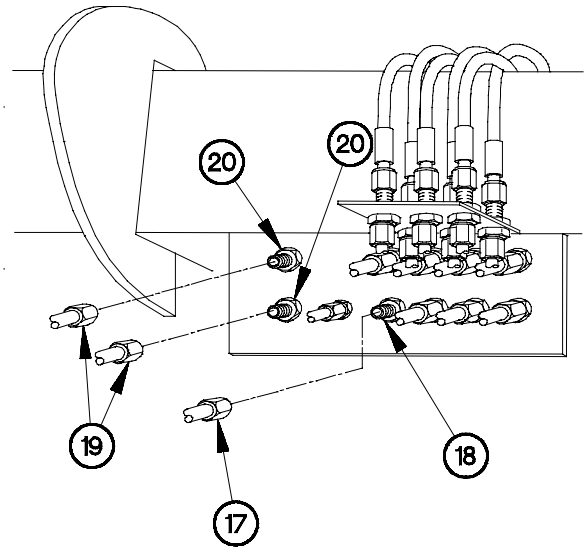
(11) Tighten four tubes (13) to 18-20 lb-ft (24-27 N•m).

(12) Position tube (15) on fitting (16).

(13) Tighten tube (15) to 14-16 lb-ft (19-22 N•m).




6R32I05-




6R32I06-

(14) Position four tubes (17) on fittings (18).

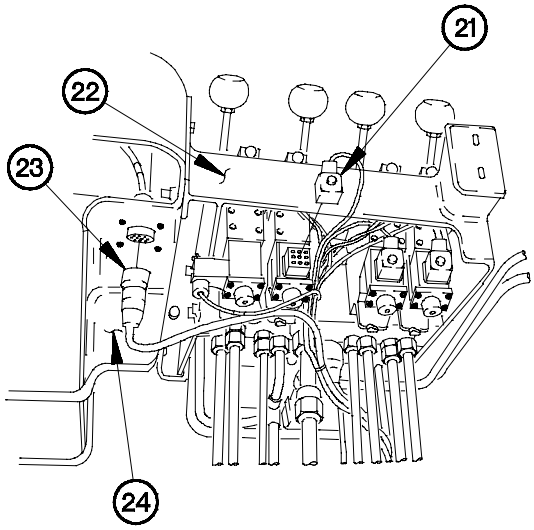
(15) Tighten four tubes (17) to 18-20 lb-ft (24-27 N•m).

(16) Position two tubes (19) on bulkhead fittings (20).

(17) Tighten two tubes (19) to 14-16 lb-ft (19-22 N•m).

(18) Position 13 electrical connectors (21) on eight bank control panel (22).

(19) Connect connector (23) to main control panel (24).




6R32I07-

## 16-32. M1089 MATERIAL HANDLING CRANE (MHC) REPLACEMENT (CONT)

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Position hydraulic reservoir supply valve and return valve to open (TM 9-2320-366-10-2).

(3) Install 30K winch cables (TM 9-2320-366-20-5).

(4) Check hydraulic fluid level (TM 9-2320-366-10-1).

(5) Perform crane load test (para 16-62).

**End of Task.**

## 16-33. M1089 BOOM ASSEMBLY REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Position MHC on boom rest (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Hoist cable removed (TM 9-2320-366-20-5).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic supply and return valves closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Tools and Special Tools (Cont)**
Sling, Cargo (Item 56, Appendix B)
Tool Kit, Genl Mech (Item 78, Appendix B)

**Materials/Parts**
Cap and Plug Set, (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Ties, Cable Plastic (Item 92, Appendix C)
Sealing Compound (Item 75, Appendix C)

**Personnel Required**
(2)

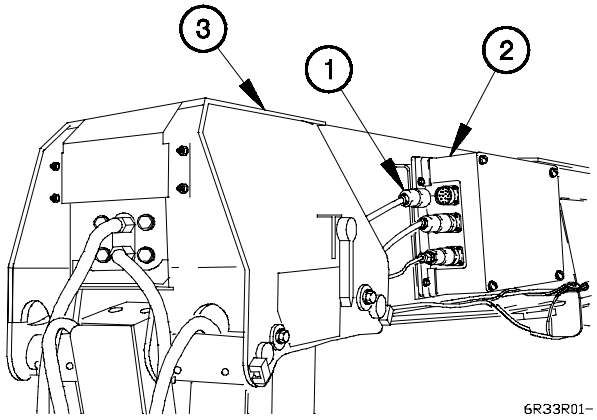
**a. Removal.**

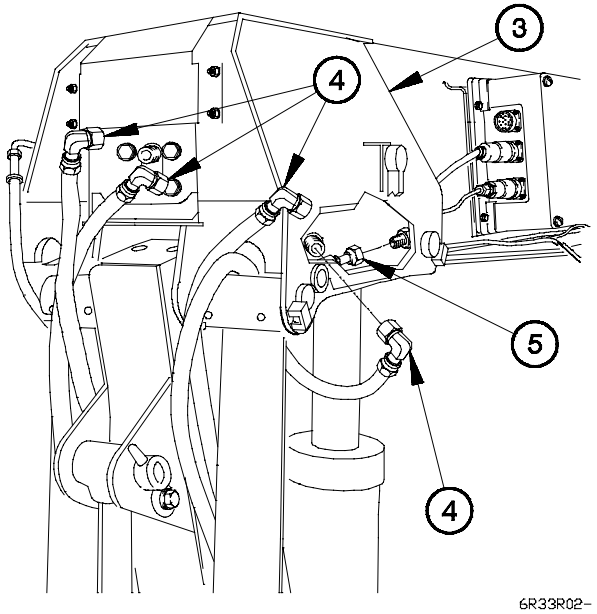
(1) Disconnect overload lockout connector (1) from overload shut down box (2).

**NOTE**

Remove plastic cable ties and cable clamps as required.

(2) Pull overload lockout connector (1) clear of boom assembly (3).




**CAUTION**

Cap and plug hydraulic hoses and connection points prior to removal. Failure to comply may result in damage to equipment.

**NOTE**

- Tag hydraulic hoses and connection points prior to disconnecting.
- Two outer hydraulic hoses are accessed from underneath boom.

(3) Disconnect four hoses (4) from boom assembly (3).

(4) Disconnect hose (5) from boom assembly (3).

## 16-33. M1089 BOOM ASSEMBLY REPLACEMENT (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.**
- **Personnel must stand clear during lifting operations. Failure to comply may result in serious injury or death to personnel.**

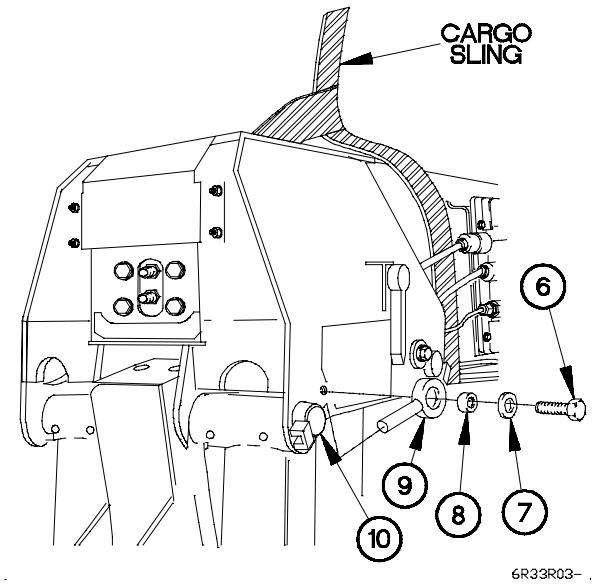
**NOTE**

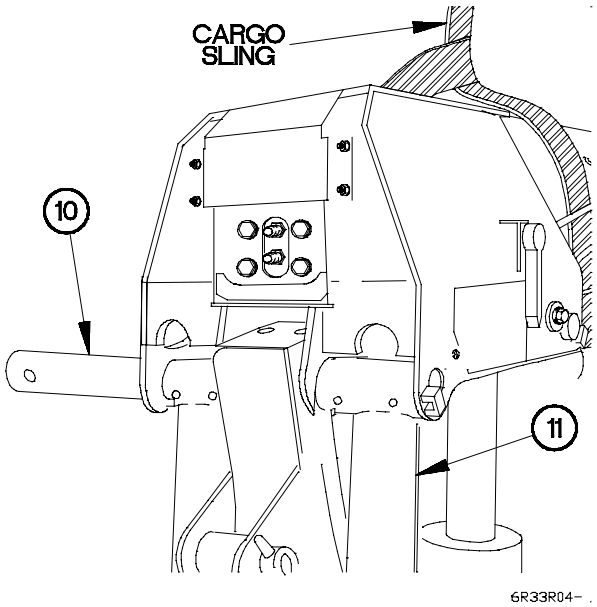
Left and right rivet eyebolts are removed the same way. Right rivet eyebolt shown.

(5) Remove screw (6), washer (7), and bushing (8) from rivet eyebolt (9).

(6) Remove rivet eyebolt (9) from pivot shaft (10).

(7) Perform Steps (5) and (6) on left side rivet eyebolt (9).




**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.**

**NOTE**

Steps (8) through (13) require the aid of an assistant.

(8) Remove pivot shaft (10) from RH tension link cylinder (11).

(9) Position RH tension link cylinder (11) against tool box (12).

**WARNING**

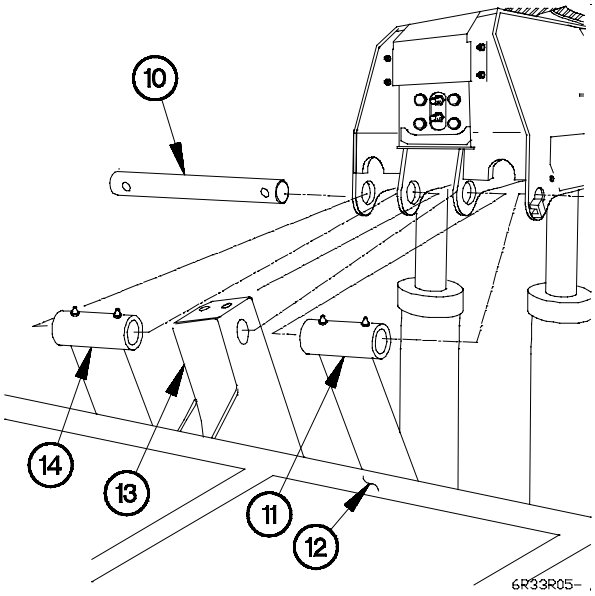
**Remove pivot shaft far enough to release mast. Failure to comply may result in injury to personnel or damage to equipment.**

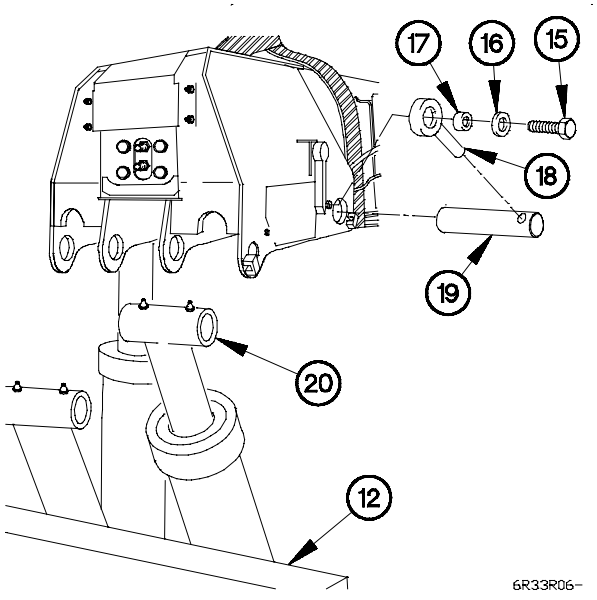
(10) Remove pivot shaft (10) from mast (13).

(11) Position mast (13) against tool box (12).

(12) Remove pivot shaft (10) from LH tension link cylinder (14).

(13) Position LH tension link cylinder (14) against tool box (12).




(14) Remove screw (15), washer (16), and bushing (17) from rivet eyebolt (18).

(15) Remove rivet eyebolt (18) from pivot shaft (19).

**WARNING**

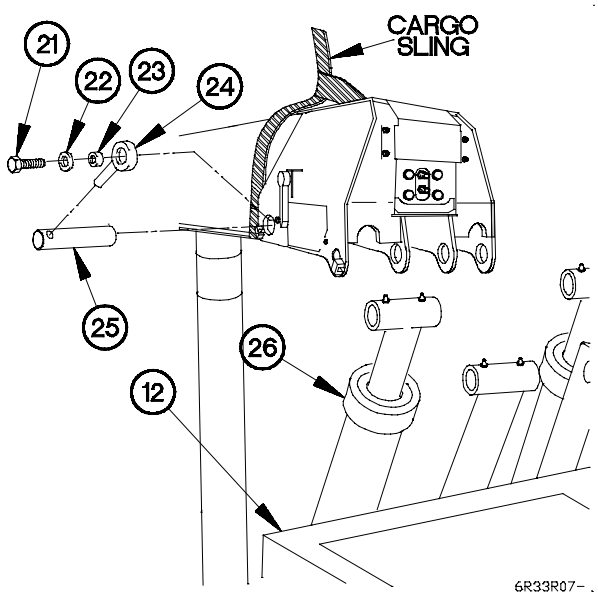
**Lift cylinders must be supported to remove pivot shafts. Failure to comply may result in injury to personnel or damage to equipment.**

(16) Remove pivot shaft (19) from RH lift cylinder (20).

(17) Position RH lift cylinder (20) against tool box (12).

## 16-33. M1089 BOOM ASSEMBLY REPLACEMENT (CONT)

(18) Remove screw (21), washer (22), and bushing (23) from rivet eyebolt (24).



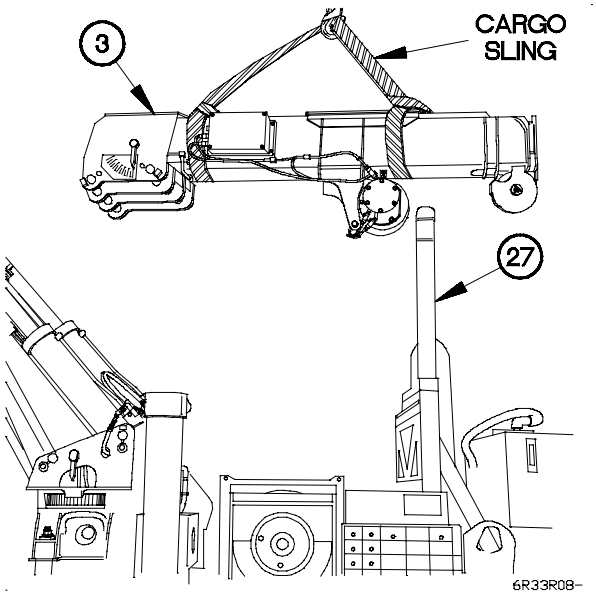

**WARNING**

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

(19) Remove rivet eyebolt (24) from pivot shaft (25).

(20) Remove pivot shaft (25) from LH lift cylinder (26).

(21) Position LH lift cylinder (26) against tool box (12).



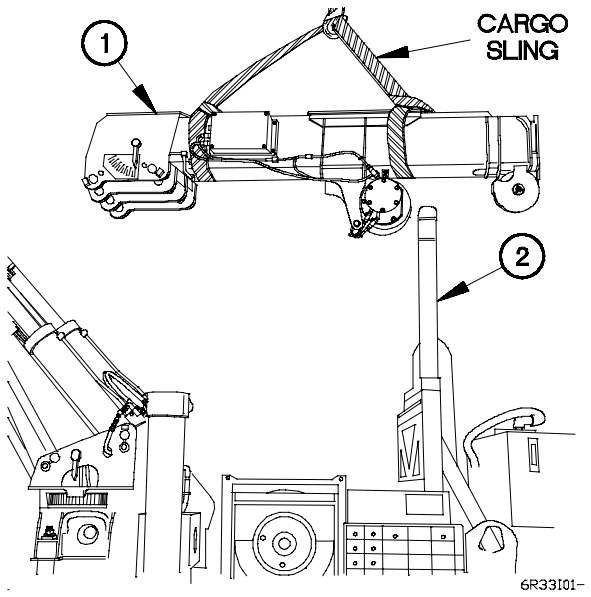

(22) Remove boom assembly (3) from boom rest (27).

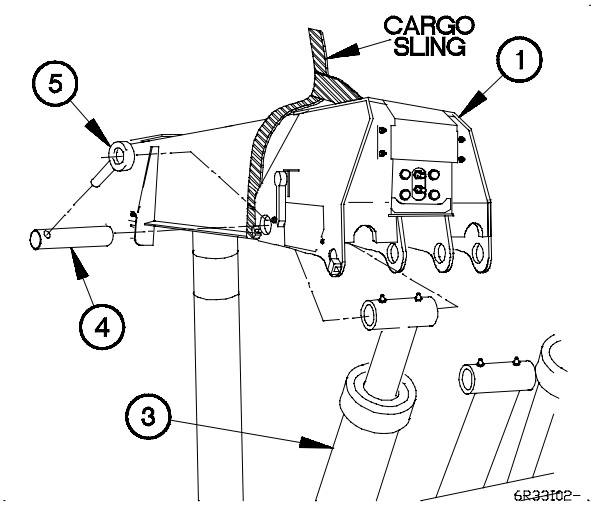
**b. Installation.**

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

(1) Position boom assembly (1) on boom rest (2).




**WARNING**

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

**NOTE**

Step (2) requires the aid of an assistant.

(2) Install LH lift cylinder (3) in boom assembly (1) with pivot shaft (4).

(3) Install rivet eyebolt (5) in pivot shaft (4).

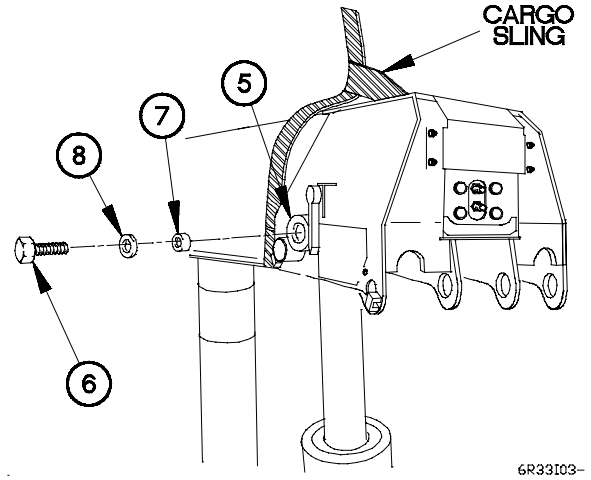
**WARNING**

**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.**

(4) Apply sealing compound to threads of screw (6).

(5) Position bushing (7), washer (8), and screw (6) in rivet eyebolt (5).

(6) Tighten screw (6) to 266-295 lb-ft (361-400 N·m).



## 16-33. M1089 BOOM ASSEMBLY REPLACEMENT (CONT)

**WARNING**

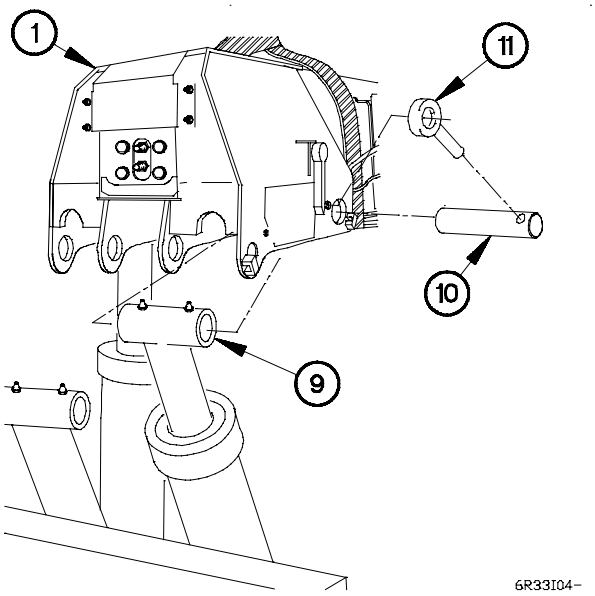
**Lift cylinders must be supported to install pivot shafts. Failure to comply may result in serious injury or death to personnel and damage to equipment.**

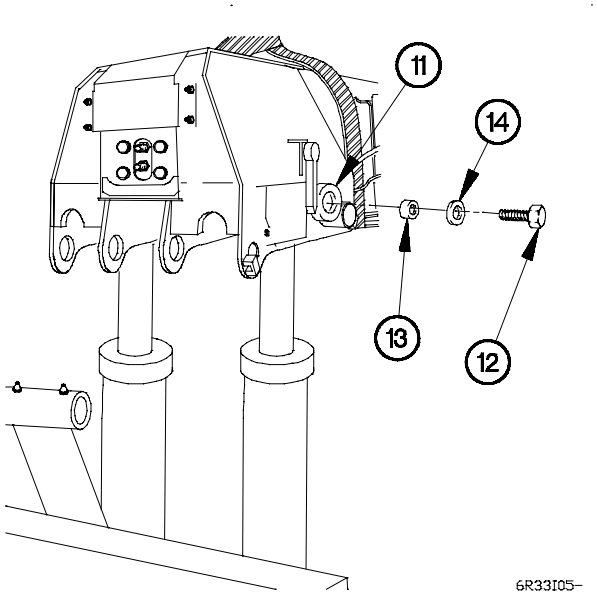
**NOTE**

Step (7) requires the aid of an assistant.

(7) Install RH lift cylinder (9) in boom assembly (1) with pivot shaft (10).

(8) Install rivet eyebolt (11) in pivot shaft (10).




**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.**

(9) Apply sealing compound to threads of screw (12).

(10) Position bushing (13), washer (14), and screw (12) in rivet eyebolt (11).

(11) Tighten screw (12) to 266-295 lb-ft (361-400 N·m).

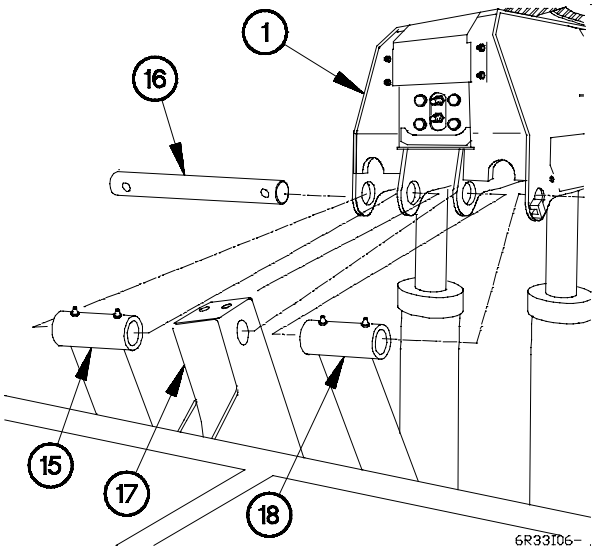
**NOTE**

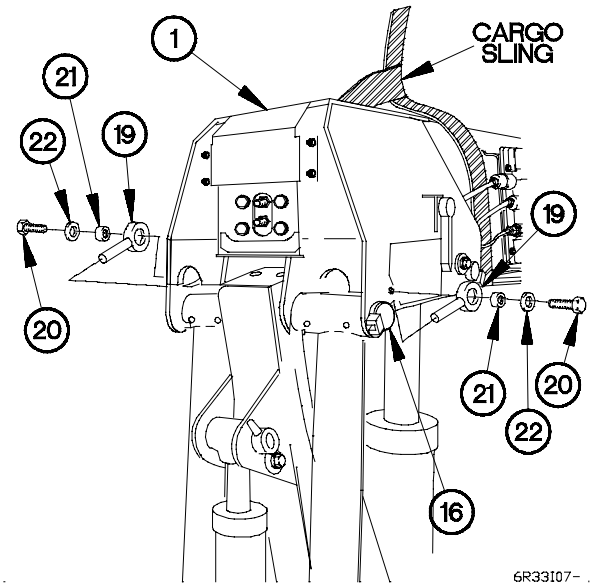
Steps (12) through (14) require the aid of an assistant.

(12) Position LH tension link cylinder (15) in boom assembly (1) with pivot shaft (16).

(13) Install mast (17) in boom assembly (1) with pivot shaft (16).

(14) Position RH tension link cylinder (18) in boom assembly (1) with pivot shaft (16).




(15) Position two rivet eyebolts (19) in pivot shaft (16).

**WARNING**

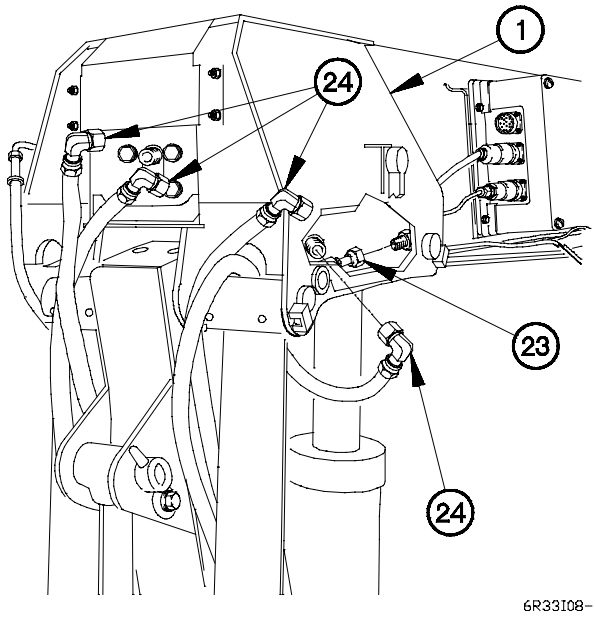
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(16) Apply sealing compound to threads of two screws (20).

(17) Position two bushings (21), washers (22), and screws (20) in rivet eyebolts (19).

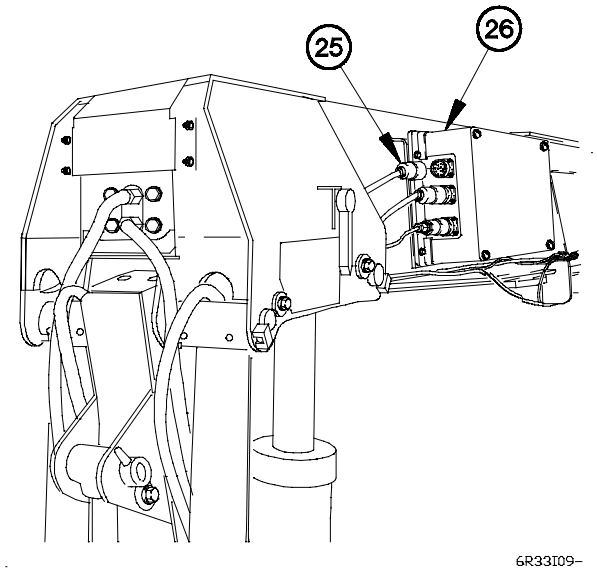
(18) Tighten screws (20) to 240-260 lb-ft (325-353 N·m).

## 16-33. M1089 BOOM ASSEMBLY REPLACEMENT (CONT)




(19) Connect hose (23) to boom assembly (1).

(20) Connect four hoses (24) to boom assembly (1).




**NOTE**

Install plastic cable ties and cable clamps as required.

(21) Connect overload lockout connector (25) to overload shut down box (26).

**c. Follow-On Maintenance.**

(1) Position hydraulic supply and return valves to open (TM 9-2320-366-10-2).

(2) Install hoist cable (TM 9-2320-366-20-5).

(3) Lubricate MHC (TM 9-2320-366-20).

(4) Connect batteries (TM 9-2320-366-20-3).

(5) Perform crane load test (para 16-62).

**End of Task.**

## 16-34. M1089 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over rear of vehicle with boom mid section fully extended and boom fly section partially extended (TM 9-2320-366-10-2).
Hook block assembly removed (TM 9-2320-366-20-5).
Boom sheave removed (TM 9-2320-366-20-4).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

**Tools and Special Tools (Cont)**
Goggles (Item 28, Appendix B)

**Materials/Parts**
Rope, Fibrous (Item 62, Appendix C)
Grease, Ord, Extreme Pressure (Item 38, Appendix C)
Sealing Compound (Item 76, Appendix C)
Pin, Cotter (4) (Item 325, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

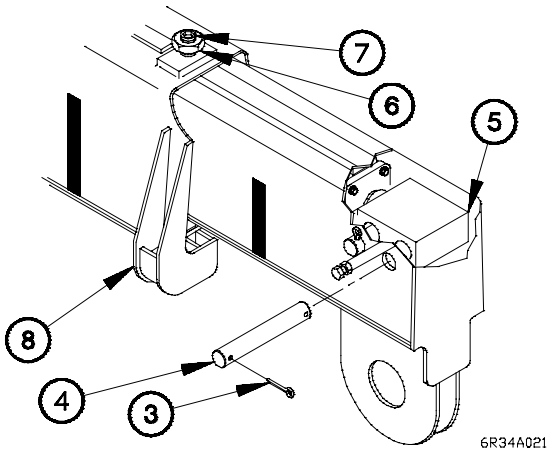
**Personnel Required**
(2)

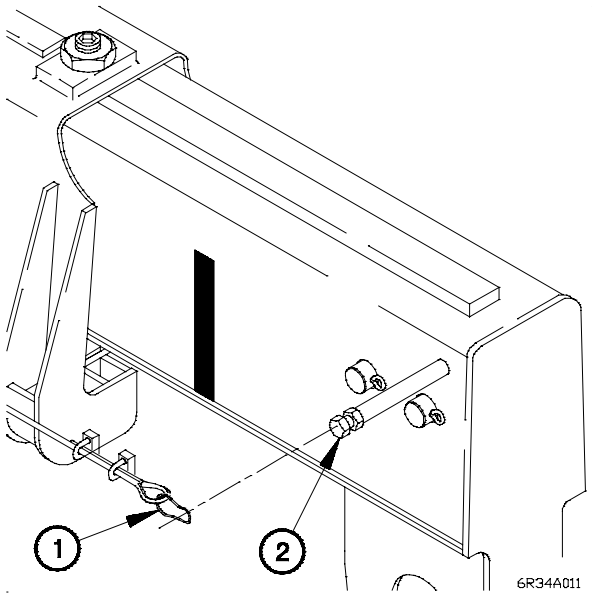
**a. Removal.**

**CAUTION**

Overload shutdown cable is on a tension reel. Allow cable to rewind slowly. Failure to comply may result in damage to equipment.

(1) Disconnect overload shutdown cable eye (1) from screw (2).




(2) Remove four cotter pins (3) from two shafts (4) Discard cotter pins.

(3) Remove two shafts (4) from telescopic cylinder (5).

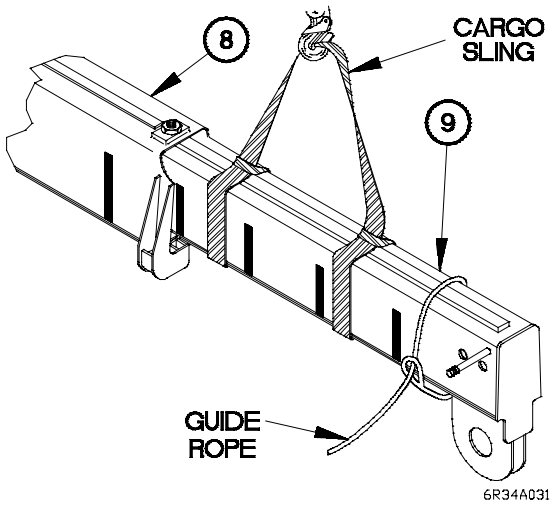
(4) Loosen jam nut (6) on setscrew (7).

(5) Loosen setscrew (7) on outer end of boom mid section (8).

## 16-34. M1089 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT (CONT)

**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.**
- **Personnel must stand clear during lifting operation. Failure to comply may result in serious injury or death to personnel.**
- **Attach a guide rope to outer end of boom fly section to aid in stabilizing and controlling boom fly section during removal. Failure to comply may result in injury to personnel or damage to equipment.**

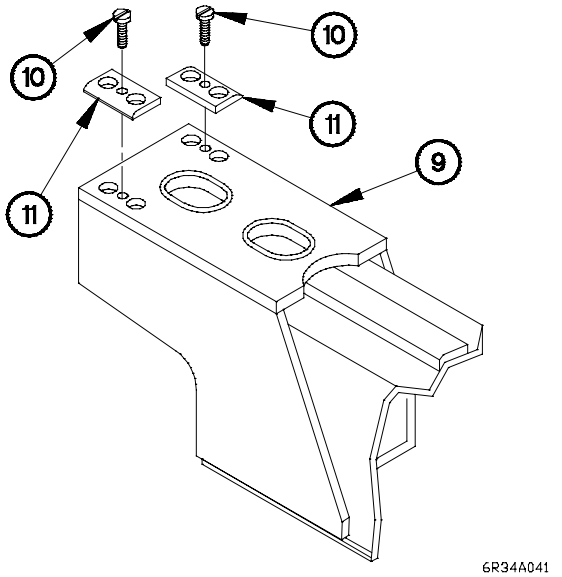



(6) Adjust cargo sling to balance boom fly section (9).

**NOTE**

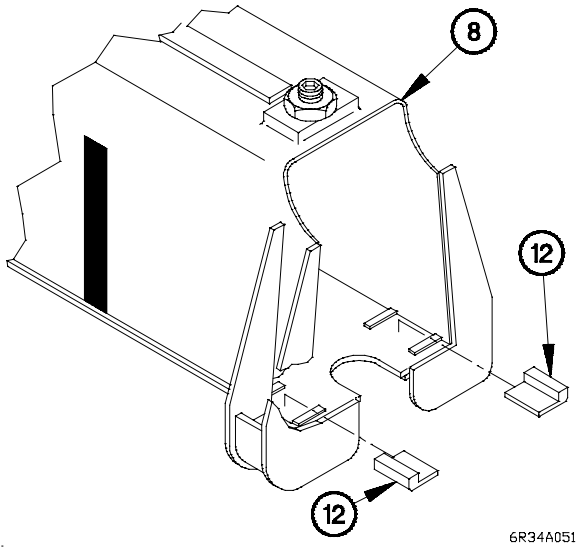
Step (7) requires the aid of an assistant.

(7) Remove boom fly section (9) from boom mid section (8).




(8) Remove two screws (10) and wear pads (11) from boom fly section (9).

(9) Remove two wear pads (12) from end of boom mid section (8).




**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.**

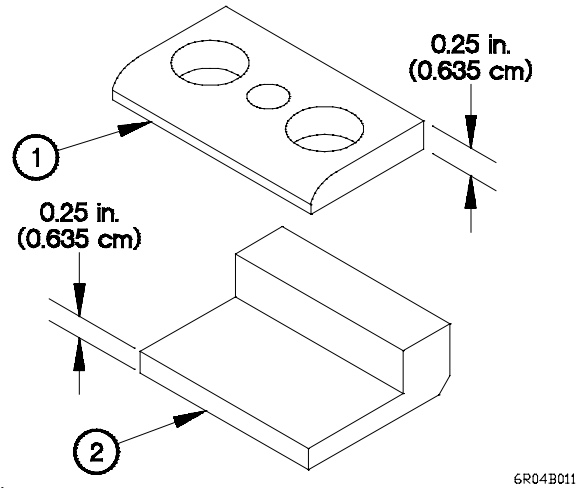
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious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

(1) Clean two upper wear pads (1) thoroughly with dry cleaning solvent.

(2) Measure thickness of two upper wear pads (1). Replace wear pad if thickness measures less than 0.25 in. (0.635 cm).

(3) Clean two body wear pads (2) thoroughly with dry cleaning solvent.

(4) Measure thickness of two body wear pads (2). Replace wear pad if thickness measures less than 0.25 in. (0.635 cm).



## 16-34. M1089 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT (CONT)

**c. Installation.**

**WARNING**

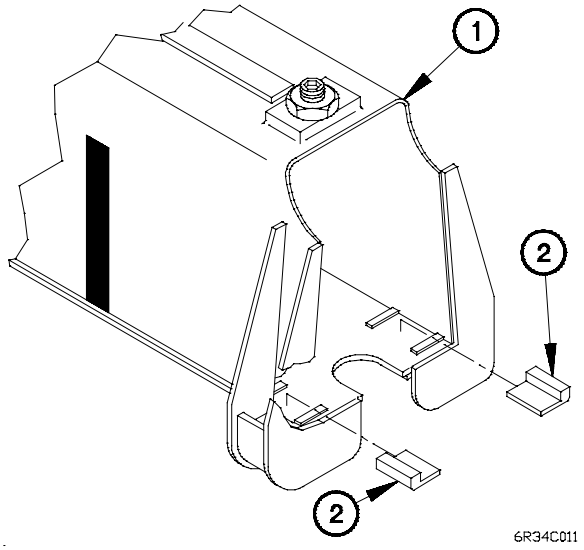
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**

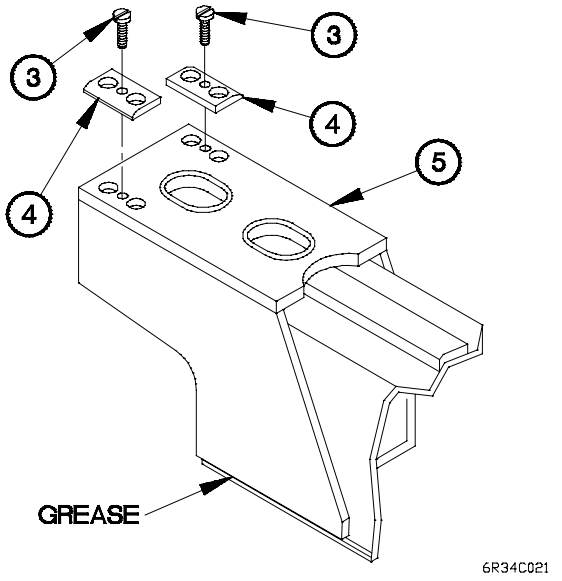
(1) Apply sealing compound to both wear pad mounting locations in outer end of boom mid section (1).

(2) Apply sealing compound to contact side of two wear pads (2).

(3) Install two wear pads (2) in outer end of boom mid section (1).

(4) Apply grease to wear pads (2).



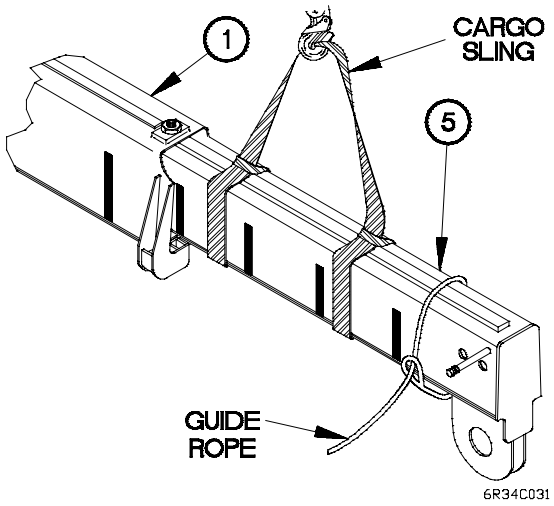

(5) Apply sealing compound to threads of two screws (3).

(6) Install two wear pads (4) on boom fly section (5) with two screws (3).

(7) Apply grease to wear pads (4) and sliding surfaces of boom fly section (5).

**WARNING**

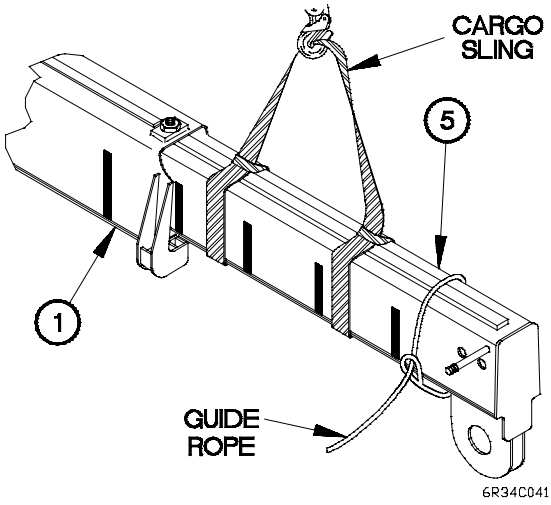
- **Boom fly section weighs approximately 210 lbs (95 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**
- **Personnel must stand clear during lifting operation. Snapped cable or shifted load could cause serious injury or death to personnel.**
- **Attach a guide rope to outer end of boom fly section to aid in stabilizing and controlling boom fly section during installation. Failure to comply may result in injury to personnel or damage to equipment.**




**NOTE**

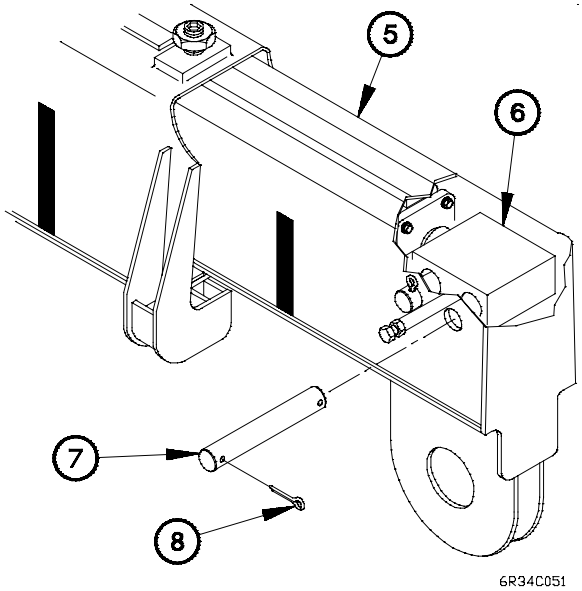
Step (8) requires the aid of an assistant.

(8) Position boom fly section (5) in boom mid section (1).




(9) Slide boom fly section (5) in boom mid section (1).

(10) Remove cargo sling and guide rope from boom fly section (5).

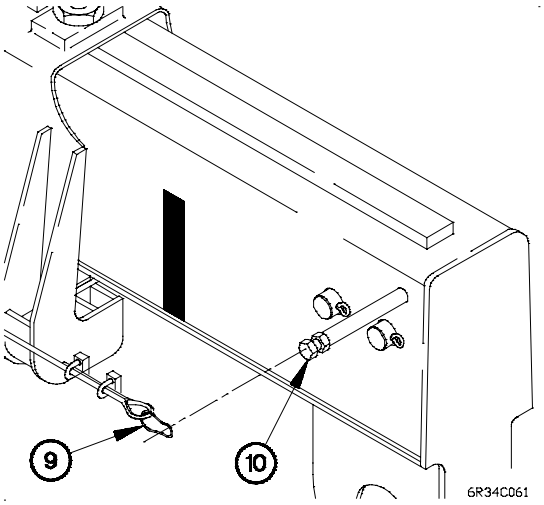



(11) Install boom fly section (5) on telescopic cylinder (6) with two shafts (7).

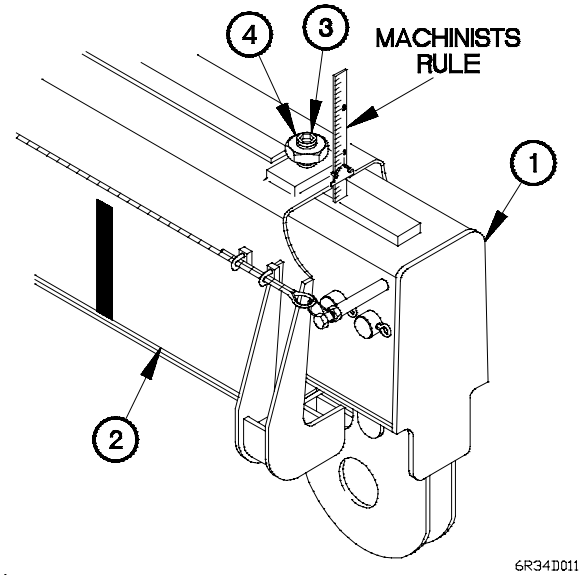
(12) Install four cotter pins (8) in two shafts (7).

## 16-34. M1089 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT (CONT)

(13) Connect overload shut down cable eye (9) to screw (10).




**c. Adjustment.**




(1) Connect batteries (TM 9-2320-366-20-3).

(2) Operate crane to extend and retract boom fly section (1) (TM 9-2320-366-10-1).

(3) Hold machinists rule at outer end of boom mid section (2); obtain reading to determine high spot on boom fly section (1).

(4) Operate crane to place high spot of boom fly section (1) directly under setscrew (3).

(5) Adjust setscrew (3) for 0.06 in. (0.15 cm) maximum clearance between setscrew and high spot of boom fly section (1).

(6) Tighten jam nut (4) on setscrew (3).

**d. Follow-On Maintenance.**

(1) Install boom sheave (TM 9-2320-366-20-4).

(2) Install hook block assembly (TM 9-2320-366-20-4).

(3) Perform crane load test (para 16-62).

**End of Task.**

## 16-35. M1089 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ ADJUSTMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over rear of vehicle with boom mid section fully extended (TM 9-2320-366-10-2).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).
Boom fly section removed (para 16-34).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Rope, Fibrous (Item 62, Appendix C)
Grease, Ord, Extreme Pressure (Item 38, Appendix C)
Rag, Wiping, (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Sealing Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (2) (Item 231, Appendix F)
Packing, Preformed (2) (Item 236, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

**CAUTION**

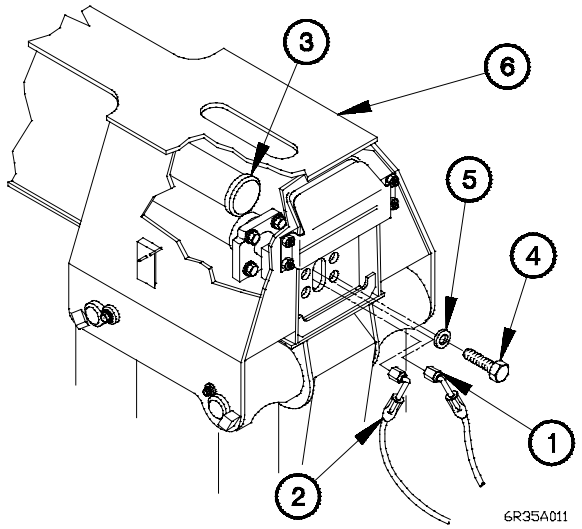
Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

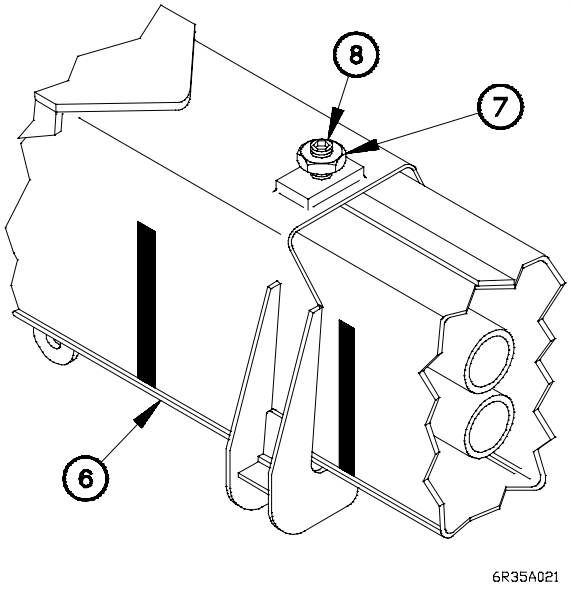
Tag hydraulic hoses and connection points prior to disconnecting.

(1) Disconnect hoses (1 and 2) from telescopic cylinder (3).

(2) Remove four screws (4) and washers (5) from boom base section (6).

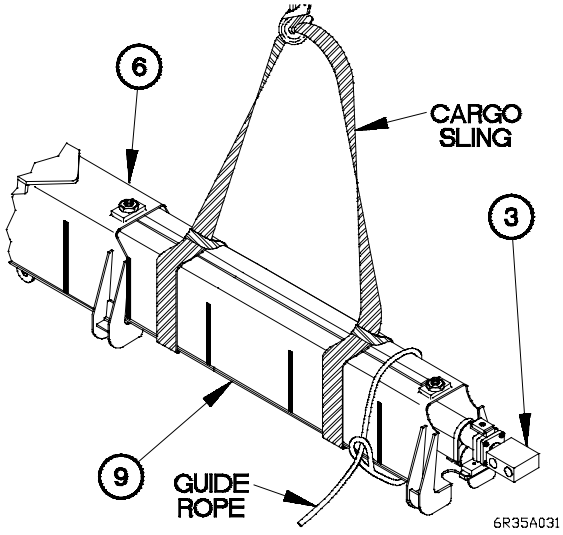


## 16-35. M1089 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ ADJUSTMENT (CONT)




(3) Loosen jam nut (7) on setscrew (8).

(4) Loosen setscrew (8) at outer end of boom base section (6).




**WARNING**

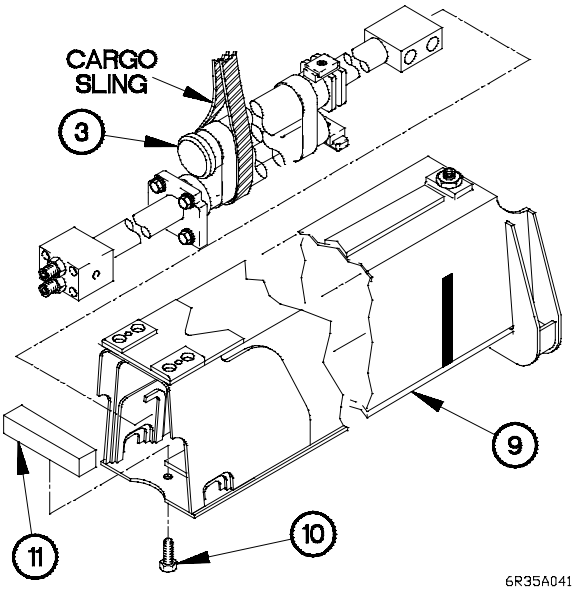
- **Boom mid section and telescopic cylinder combined weigh approximately 510 lbs (231 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**
- **Attach a guide rope to boom mid section and telescopic cylinder prior to removal.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

**NOTE**

Steps (5) and (6) require the aid of assistant.

(5) Remove boom mid section (9) and telescopic cylinder (3) from boom base section (6).

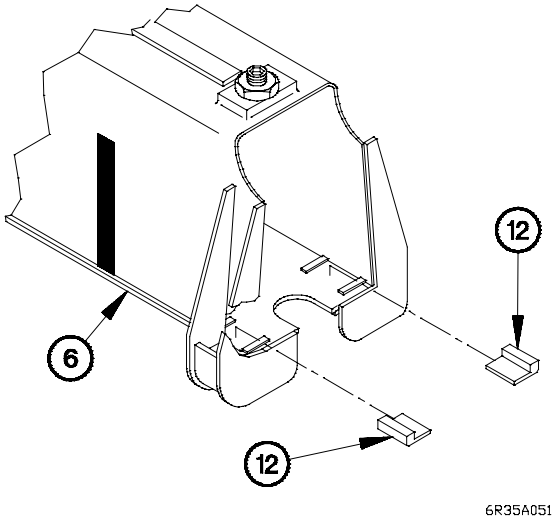
(6) Remove screw (10) and cylinder retainer bar (11) from boom mid section (9).



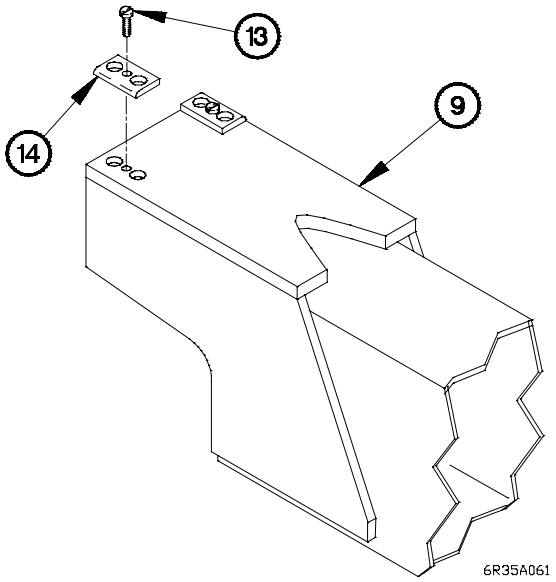

**WARNING**

**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.**

(7) Remove telescopic cylinder (3) from boom mid section (9).

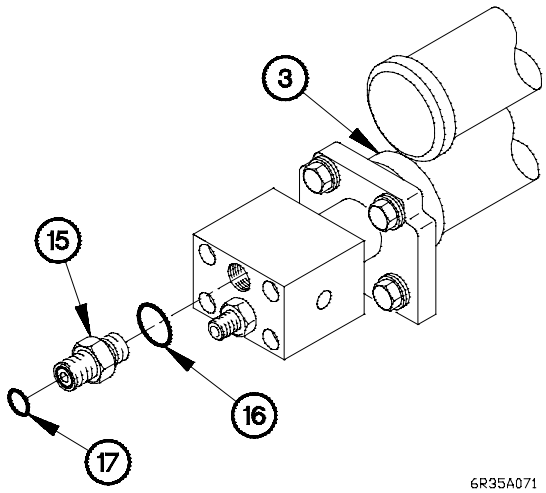



(8) Remove two wear pads (12) from outer end of boom base section (6).




(9) Remove two screws (13) and wear pads (14) from top of boom mid section (9).

## 16-35. M1089 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ ADJUSTMENT (CONT)




(10) Remove two fittings (15) from telescopic cylinder (3).

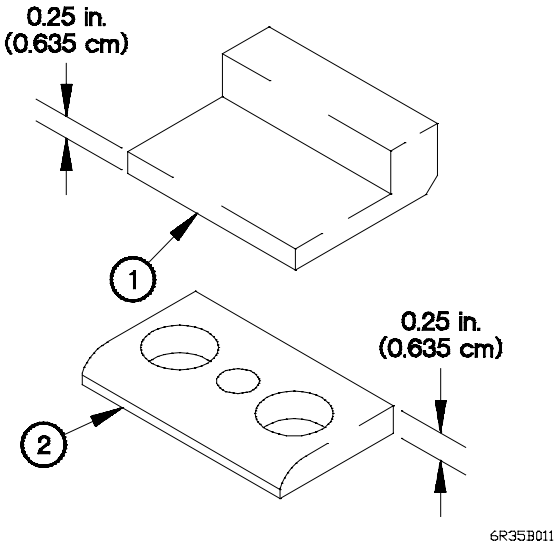
(11) Remove two preformed packings (16) and preformed packings (17) from fittings (15). Discard preformed packings.

**b. Cleaning/Inspection.**

**WARNING**

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

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




**NOTE**

Replace any part that fails visual inspection or size measurement requirements.

(1) Clean all metal parts with dry cleaning solvent.

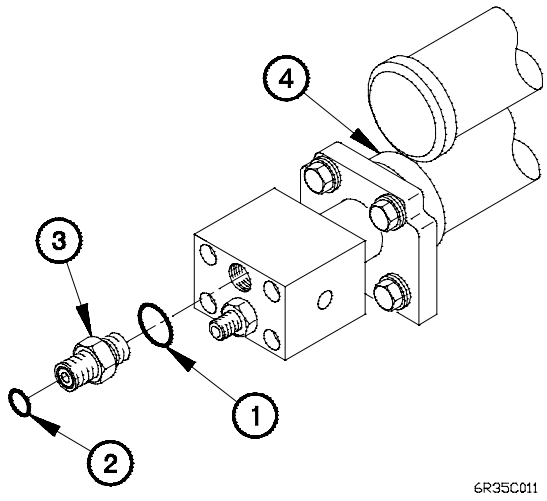
(2) Measure thickness of two body wear pads (1), replace body wear pad if thickness measures less than 0.25 in. (0.635 cm).

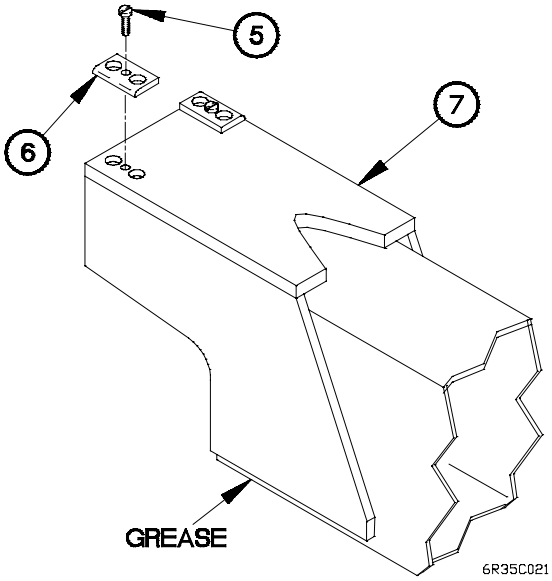
(3) Measure thickness of two upper wear pads (2), replace upper wear pad if thickness measures less than 0.25 in. (0.635 cm).

**c. Installation.**

(1) Install two preformed packings (1) and preformed packings (2) on fittings (3).

(2) Install two fittings (3) in telescopic cylinder (4).




**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.**

(3) Apply sealing compound to threads of two screws (5).

(4) Install two wear pads (6) and screws (5) on top of boom mid section (7).

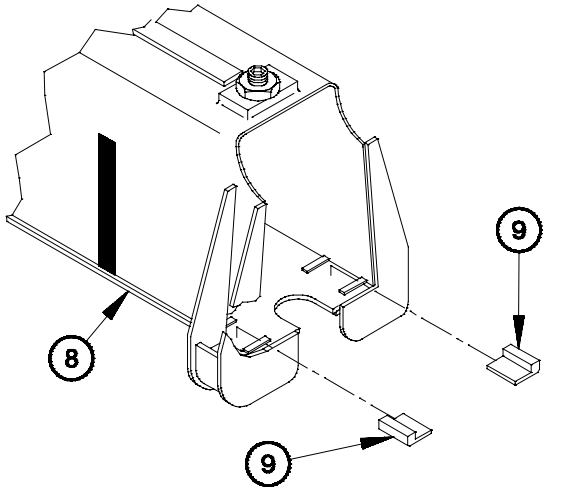
(5) Apply grease to wear pads (6) and bottom edges of boom mid section (7).

(6) Apply sealing compound to both wear pad mounting locations in outer end of boom base section (8).

(7) Apply sealing compound to contact side of two body wear pads (9).

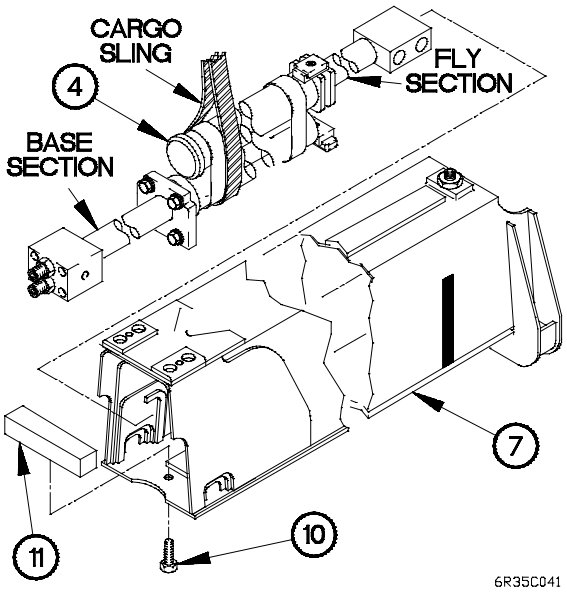
(8) Install two body wear pads (9) in outer end of boom base section (8).

(9) Apply grease to body wear pads (9).



## 16-35. M1089 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ ADJUSTMENT (CONT)

(10) Extend telescopic cylinder (4) base shaft fully and fly section approximately two feet.




**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.**

**NOTE**

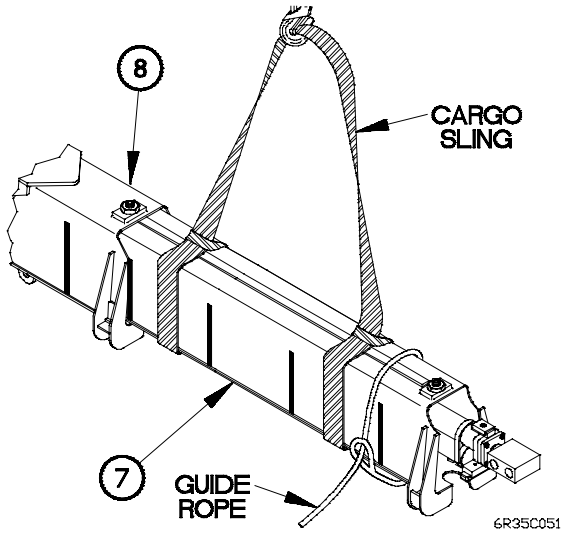
Step (11) requires the aid of an assistant.

(11) Install telescopic cylinder (4) in boom mid section (7).

(12) Apply sealing compound to threads of screw (10).

(13) Position cylinder retainer bar (11) in boom mid section (7) with screw (10).

(14) Tighten screw (10) to 72-78 lb-ft (98-106 N•m).




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

**NOTE**

Step (15) requires the aid of an assistant.

(15) Install boom mid section (7) in boom base section (8) as far as possible.

(16) Remove cargo sling and guide rope from boom mid section (7).

**WARNING**

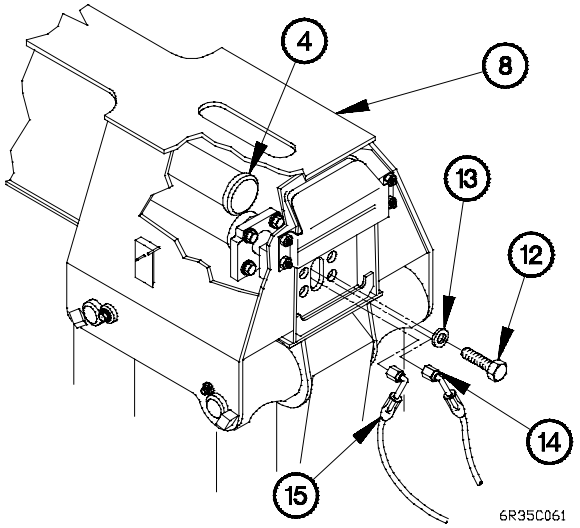
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention.**

(17) Apply sealing compound to threads of four screws (12).

(18) Position telescopic cylinder (4) in boom base section (8) with four washers (13), and screws (12).

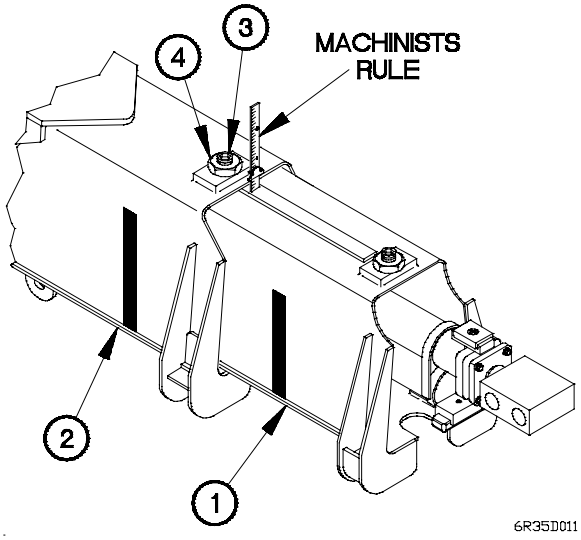
(19) Tighten screws (12) to 151-175 lb-ft (205-237 N·m).

(20) Connect hoses (14 and 15) to telescopic cylinder (4).




**d. Adjustment.**

(1) Connect batteries (TM 9-2320-366-20-3).




**NOTE**

Steps (2) and (3) require the aid of an assistant.

(2) Operate MHC to extend and retract boom mid section (1) (TM 9-2320-366-10-2).

(3) Hold machinists rule at outer end of boom base section (2); obtain reading to determine high spot of boom mid section (1).

(4) Operate MHC to place high spot of boom mid section directly under setscrew (3).

(5) Adjust setscrew (3) for 0.06 in. (0.15 cm) maximum clearance.

(6) Tighten jam nut (4) on setscrew (3).

**d. Follow-On Maintenance.**

(1) Install boom fly section (para 16-34).

(2) Place hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-2).

(3) Perform crane load test (para 16-62).

**End of Task.**

## 16-36. M1089 BOOM BASE SECTION REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned on boom rest (TM 9-2320-366-10-2).
Boom fly section removed (para 16-34).
Boom mid section and telescopic cylinder removed (para 16-35).
Overload shutdown removed (para 16-52).
Proximity switch removed (para 16-45).
Hoist assembly removed (para 16-43).
Tension load cell removed (para 16-46).
Hoist tubing and hoses removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Materials/Parts**
Sealing Compound (Item 76, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

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

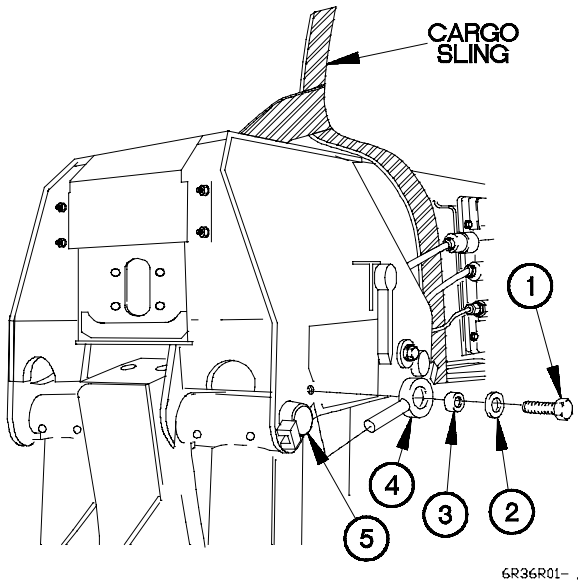
**NOTE**

Left and right rivet eyebolts are removed the same way. Right side shown.

(1) Remove screw (1), washer (2), and bushing (3) from rivet eyebolt (4).

(2) Remove rivet eyebolt (4) from pivot shaft (5).

(3) Perform Steps (1) and (2) on left side rivet eyebolt.



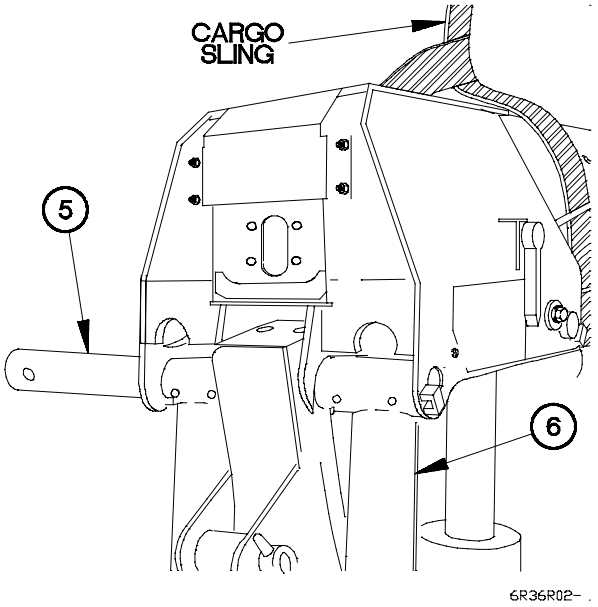
**WARNING**

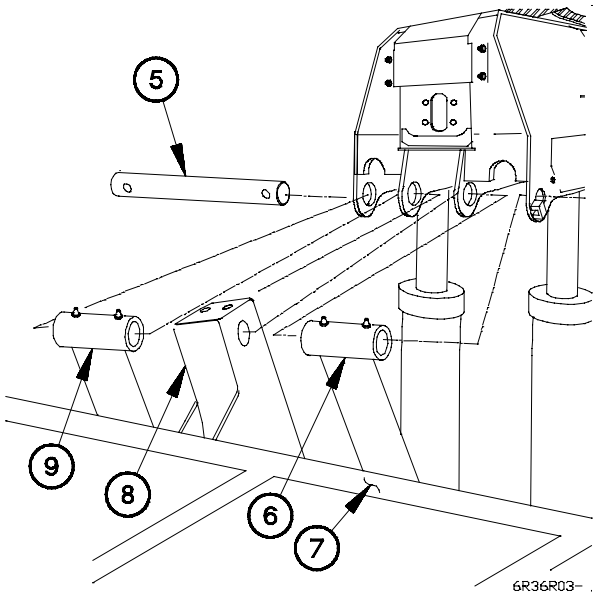
**Remove pivot shaft far enough to release tension link cylinder. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Steps (4) through (18) require the aid of an assistant.

(4) Remove pivot shaft (5) from RH tension link cylinder (6).




(5) Position RH tension link cylinder (6) against tool box (7).

**WARNING**

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

(6) Remove pivot shaft (5) from mast (8).

(7) Position mast (8) against tool box (7).

(8) Remove pivot shaft (5) from LH tension link cylinder (9).

(9) Position LH tension link cylinder (9) against tool box (7).

## 16-36. M1089 BOOM BASE SECTION REPLACEMENT (CONT)

(10) Remove screw (10), washer (11), and bushing (12) from rivet eyebolt (13).

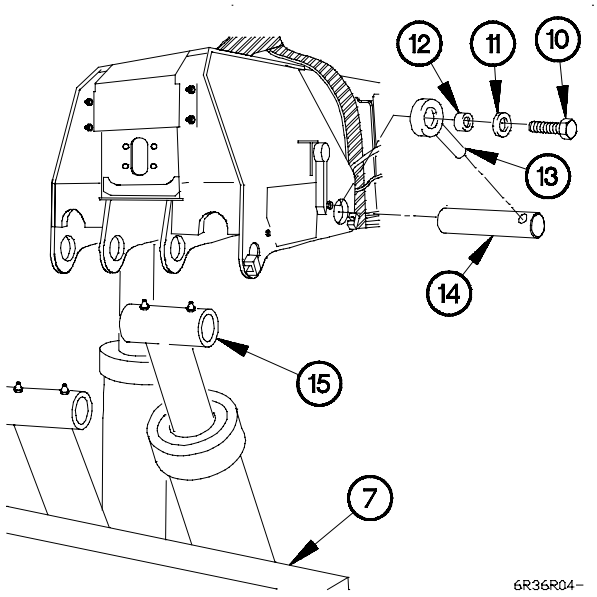
(11) Remove rivet eyebolt (13) from pivot shaft (14).

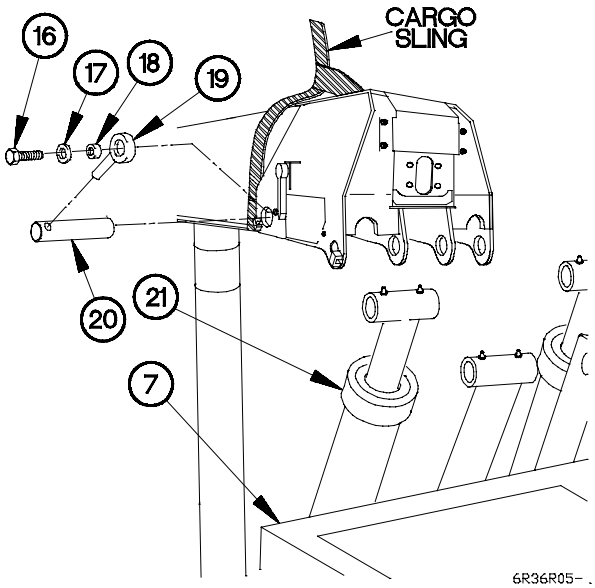
**WARNING**

**Lift cylinder must be supported to remove pivot shaft. Failure to comply may result in serious injury or death to personnel or damage to equipment.**

(12) Remove pivot shaft (14) from RH lift cylinder (15).

(13) Position RH lift cylinder (15) against tool box (7).



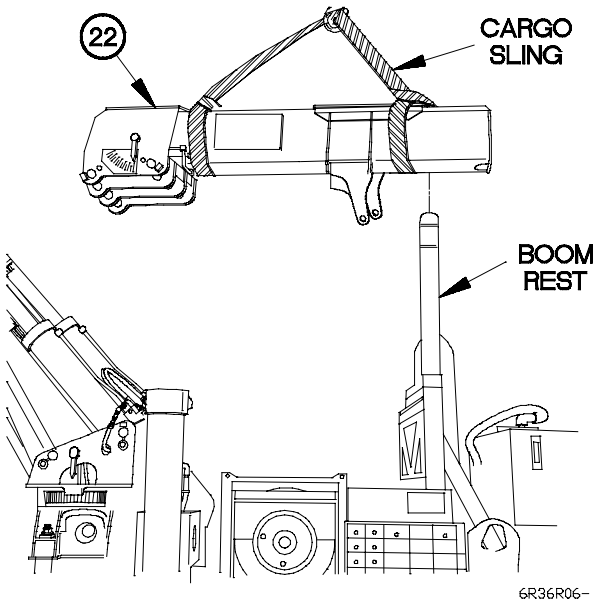

(14) Remove screw (16), washer (17), and bushing (18) from rivet eyebolt (19).

(15) Remove rivet eyebolt (19) from pivot shaft (20).

(16) Remove pivot shaft (20) from LH lift cylinder (21).

(17) Position LH lift cylinder (21) against tool box (7).

(18) Remove boom base section (22) from boom rest.

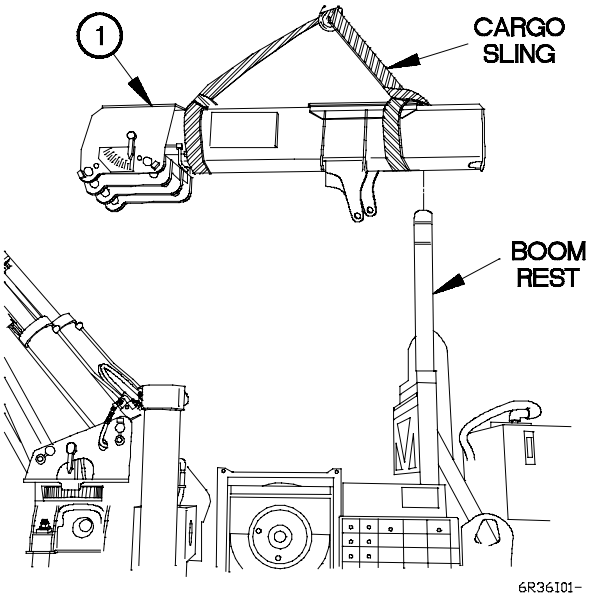


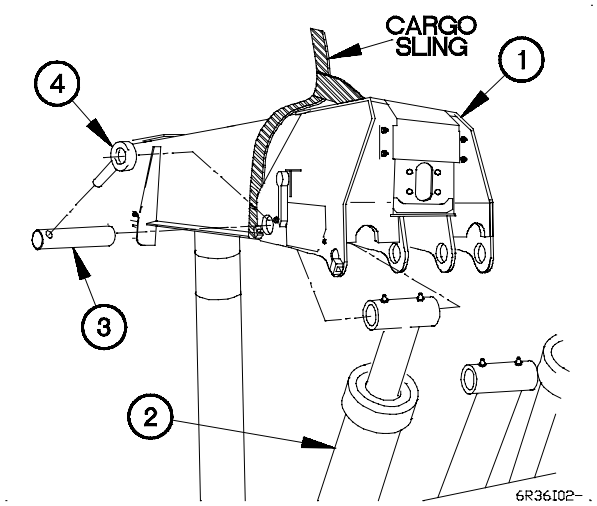
**c. Installation.**

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

(1) Position boom base section (1) over boom rest.




**WARNING**

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

**NOTE**

Steps (2) through (18) require the aid of an assistant.

(2) Install LH lift cylinder (2) in boom base section (1) with pivot shaft (3).

(3) Install rivet eyebolt (4) in pivot shaft (3).

## 16-36. M1089 BOOM BASE SECTION REPLACEMENT (CONT)

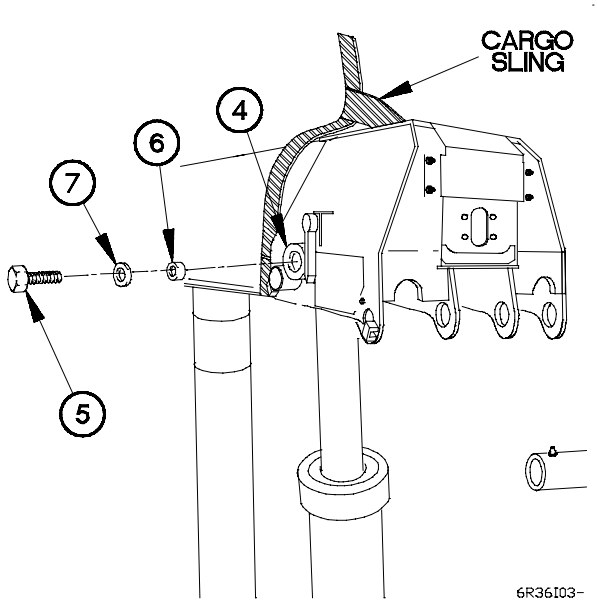
**WARNING**

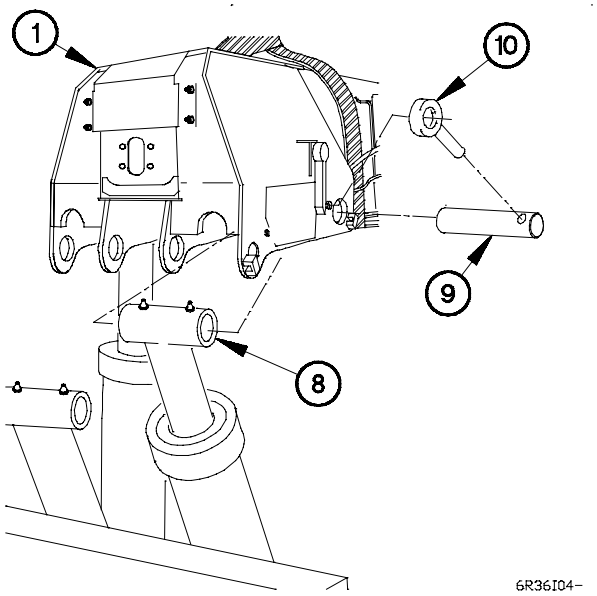
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**

(4) Apply sealing compound to threads of screw (5).

(5) Position bushing (6), washer (7), and screw (5) in rivet eyebolt (4).

(6) Tighten screw (5) to 266-295 lb-ft (361-400 N·m).




**WARNING**

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

**NOTE**

Steps (7) requires the aid of an assistant.

(7) Install RH lift cylinder (8) in boom base section (1) with pivot shaft (9).

(8) Install rivet eyebolt (10) in pivot shaft (9).

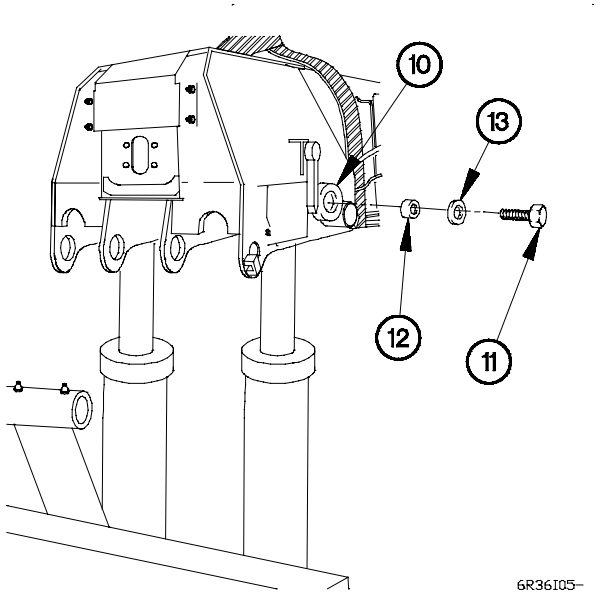
**WARNING**

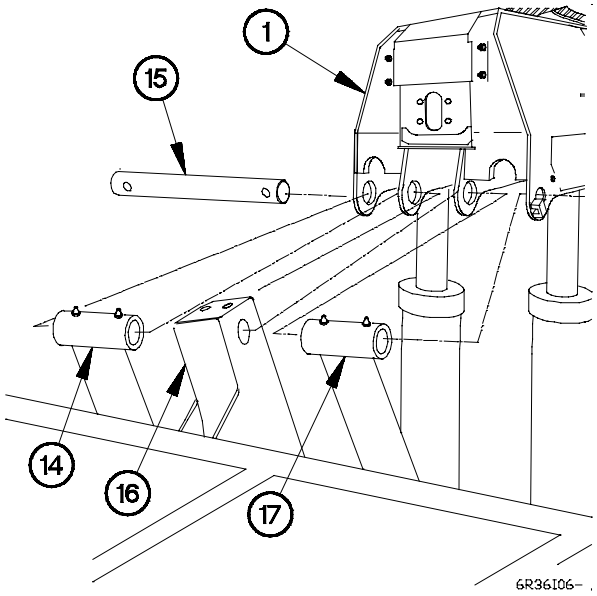
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**

(9) Apply sealing compound to threads of screw (11).

(10) Position bushing (12), washer (13), and screw (11) in rivet eyebolt (10).

(11) Tighten screw (11) to 266-295 lb-ft (361-400 N·m).



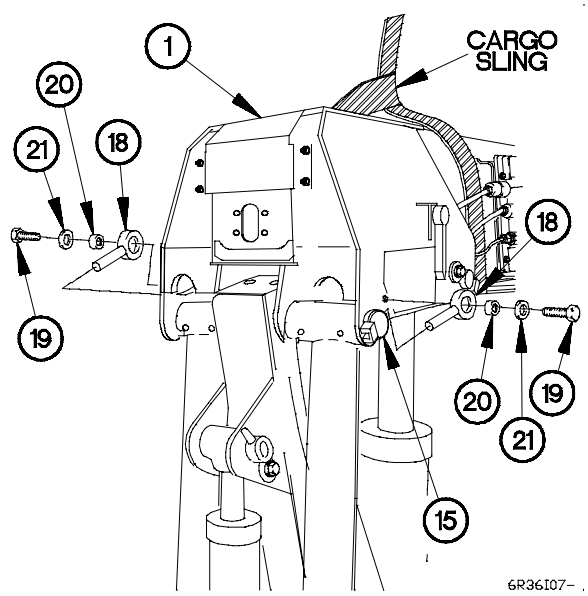




(12) Position LH tension link cylinder (14) in boom assembly (1) with pivot shaft (15).

(13) Install mast (16) in boom assembly (1) with pivot shaft (15).

(14) Position RH tension link cylinder (17) in boom assembly (1) with pivot shaft (15).

## 16-36. M1089 BOOM BASE SECTION REPLACEMENT (CONT)




(15) Position two rivet eyebolts (18) in pivot shaft (15).

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

(17) Position two bushings (20), washers (21), and screws (19) in rivet eyebolts (18).

(18) Tighten screws (19) to 240-260 lb-ft (325-353 N·m).

**d. Follow-On Maintenance.**

(1) Install hoist tubing and hoses (TM 9-2320-366-20-5).

(2) Install tension load cell (para 16-46).

(3) Install hoist assembly (para 16-43).

(4) Install hoist proximity switch (para 16-45).

(5) Install overload shutdown (para 16-52).

(6) Install boom mid section and telescopic cylinder (para 16-35).

(7) Install boom fly section (para 16-34).

(8) Lubricate MHC (TM 9-2320-366-20).

(9) Perform crane load test (para 16-62).

**End of Task.**

## 16-37. M1089 LIFT CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned on boom rest (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Packing, Preformed (2) (Item 235, Appendix F)
Packing, Preformed (4) (Item 262, Appendix F)
Packing, Preformed (Item 231, Appendix F)
Packing, Preformed (Item 236, Appendix F)
Sealing Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

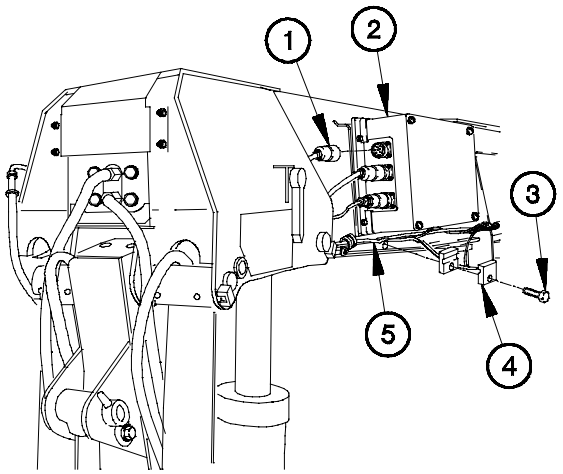
**NOTE**

· Tag electrical connectors and connection points prior to disconnecting.

· Perform steps (1) and (2) on RH lift cylinder.

(1) Disconnect overload lockout connector (1) from overload shutdown assembly (2).

(2) Remove three screws (3) and tubing clamps (4) from hose (5).




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## 16-37. M1089 LIFT CYLINDER REPLACEMENT (CONT)

**CAUTION**

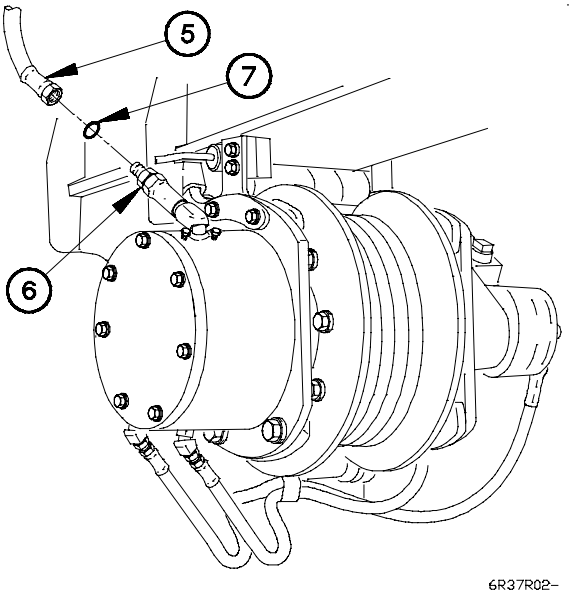
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

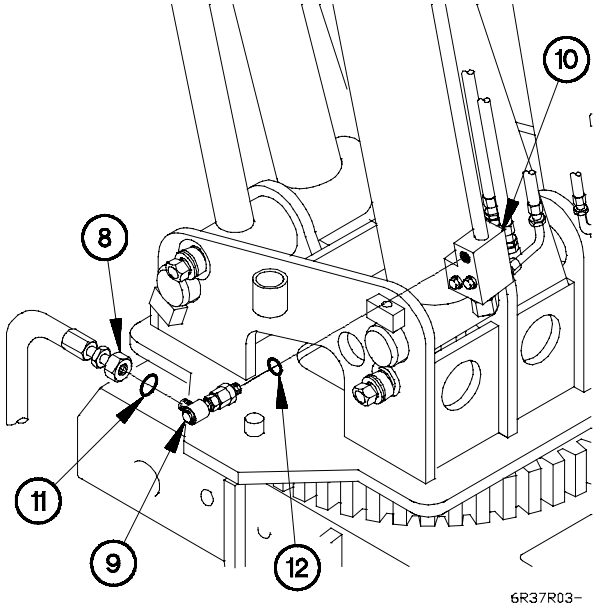
**NOTE**

Tag hydraulic connections and connection points prior to disconnecting.

(3) Disconnect hose (5) from fitting (6).

(4) Remove preformed packing (7) from fitting (6). Discard preformed packing.




(5) Disconnect hose (8) from 90-degree fitting (9).

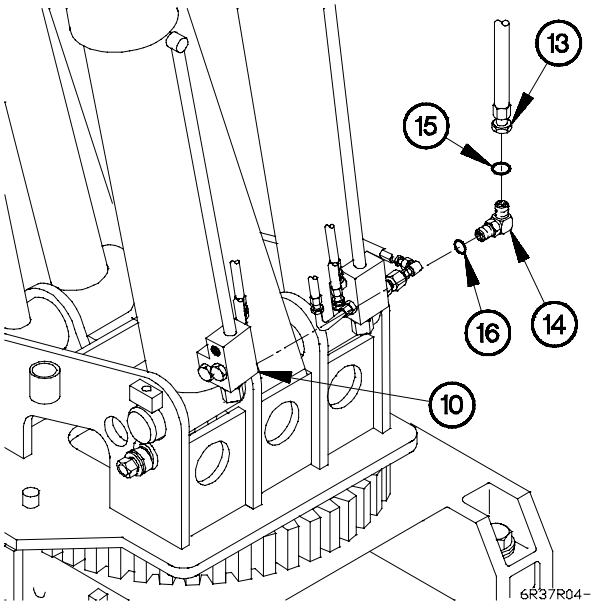
(6) Remove 90-degree fitting (9) from counterbalance valve (10).

(7) Remove preformed packings (11 and 12) from fitting (9). Discard preformed packings.

(8) Disconnect two hoses (13) from 90-degree fittings (14).

(9) Remove two 90-degree fittings (14) from counterbalance valve (10).

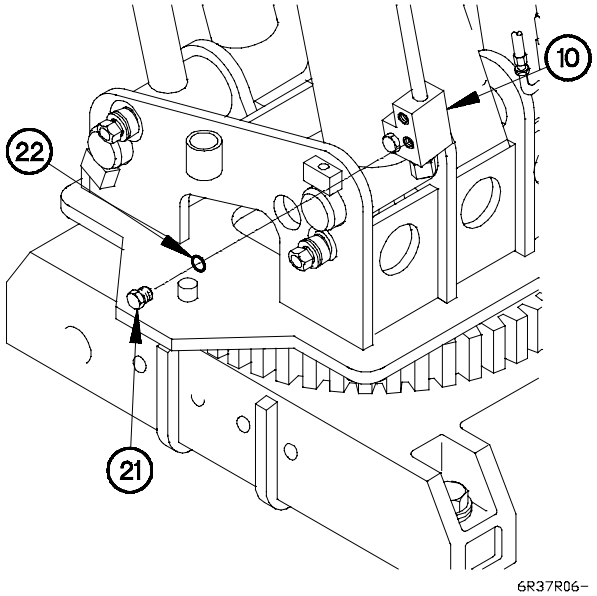
(10) Remove two preformed packings (15) and preformed packings (16) from 90-degree fittings (14). Discard preformed packings.

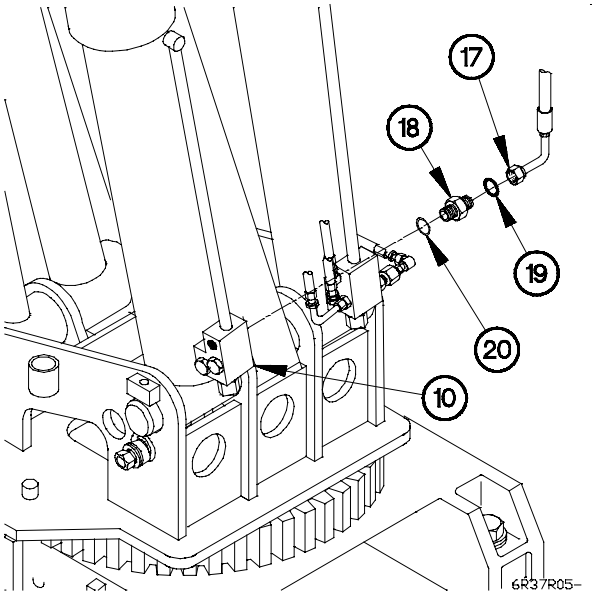


(11) Disconnect hose (17) from fitting (18).

(12) Remove fitting (18) from counterbalance valve (10).

(13) Remove preformed packings (19 and 20) from fitting (18). Discard preformed packings.




(14) Remove two plugs (21) from counterbalance valve (10).

(15) Remove two preformed packings (22) from plugs (21). Discard preformed packings.

**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.**

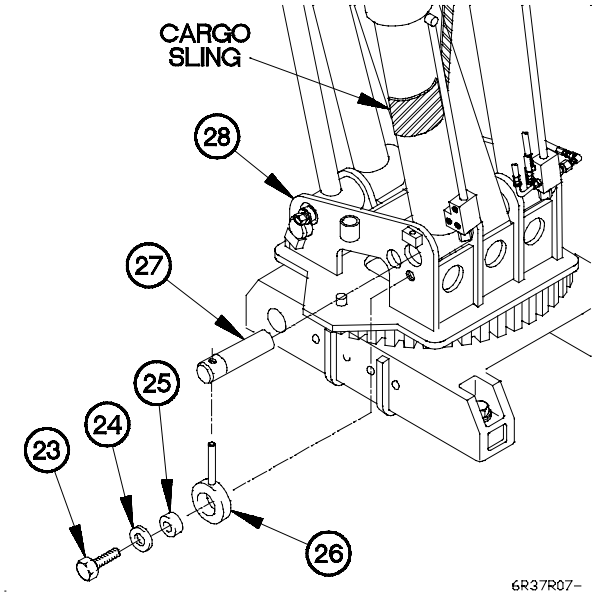
**NOTE**

Steps (16) through (22) require the aid of an assistant.

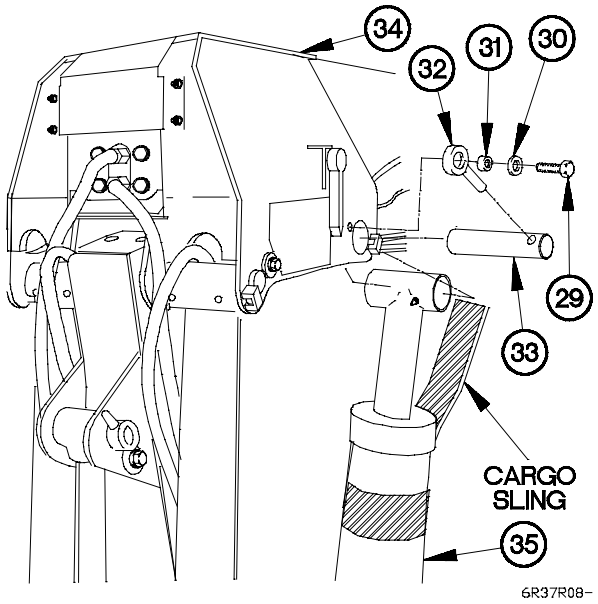
(16) Remove screw (23), washer (24), and bushing (25) from rivet eyebolt (26).

(17) Remove rivet eyebolt (26) from pivot shaft (27).

(18) Remove pivot shaft (27) from turntable (28).



## 16-37. M1089 LIFT CYLINDER REPLACEMENT (CONT)



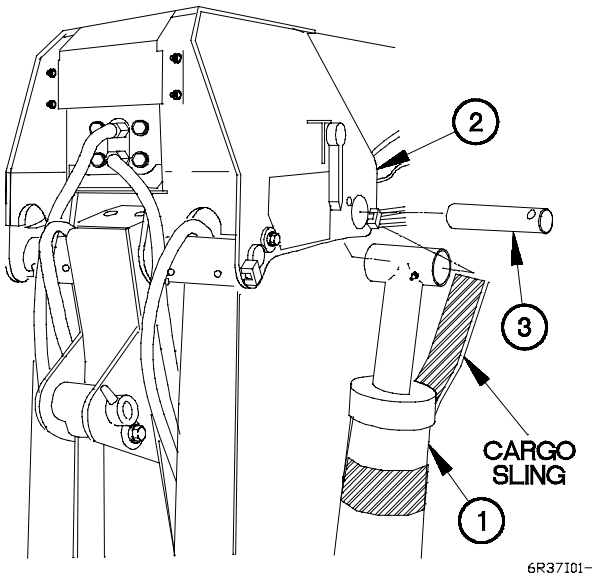

(19) Remove screw (29), washer (30), and bushing (31) from rivet eyebolt (32).

(20) Remove rivet eyebolt (32) from pivot shaft (33).

(21) Remove pivot shaft (33) from boom assembly (34).

(22) Remove lift cylinder (35) from boom assembly (34).

**b. Installation.**




**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.**

**NOTE**

Steps (1) through (9) require the aid of an assistant.

(1) Position lift cylinder (1) in boom assembly (2) with pivot shaft (3).

(2) Install rivet eyebolt (4) in pivot shaft (3).

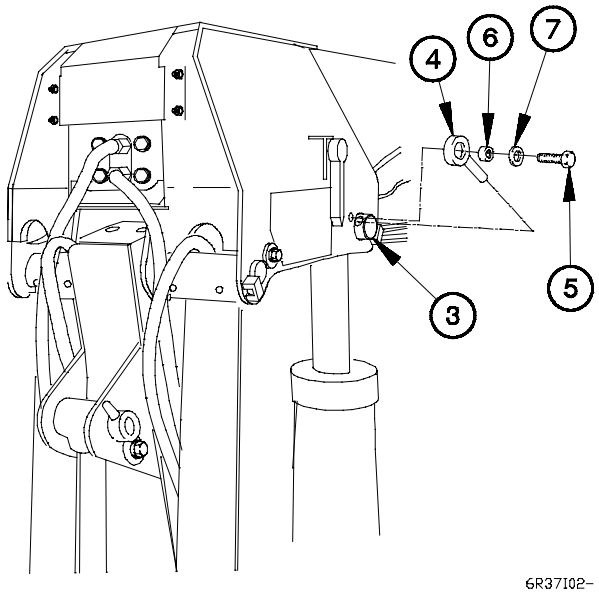
**WARNING**

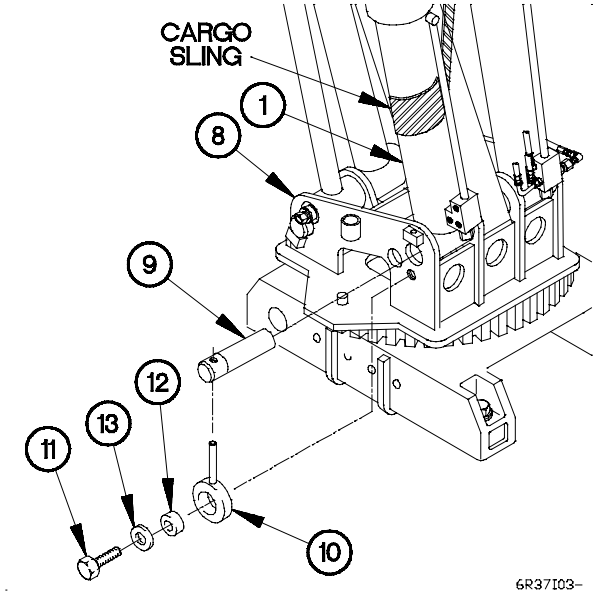
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death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

(3) Apply sealing compound to threads of screw (5).

(4) Position bushing (6), washer (7), and screw (5) in rivet eyebolt (4).

(5) Tighten screw (5) to 240-260 lb-ft (325-353 N·m).




(6) Install lift cylinder (1) in turntable (8) with pivot shaft (9).

(7) Install rivet eyebolt (10) in pivot shaft (9).

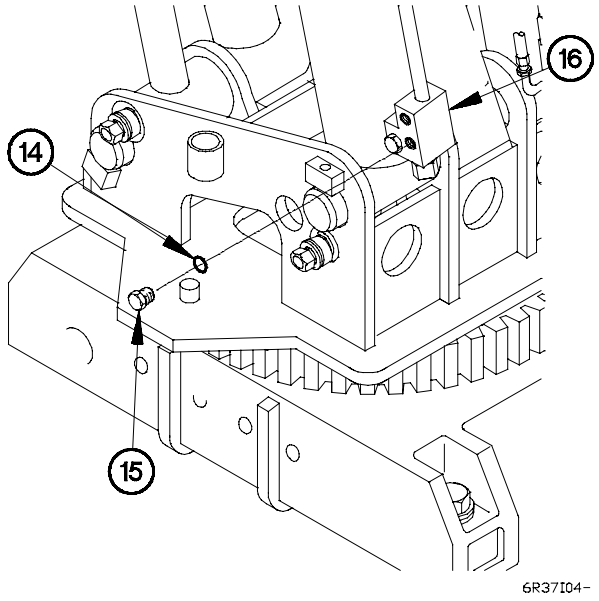
(8) Apply sealing compound to threads of screw (11).

(9) Position bushing (12), washer (13), and screw (11) in rivet eyebolt (10).

(10) Tighten screw (11) to 240-260 lb-ft (325-353 N·m).

(11) Install two preformed packings (14) on plugs (15).

(12) Install two plugs (15) in counterbalance valve (16).

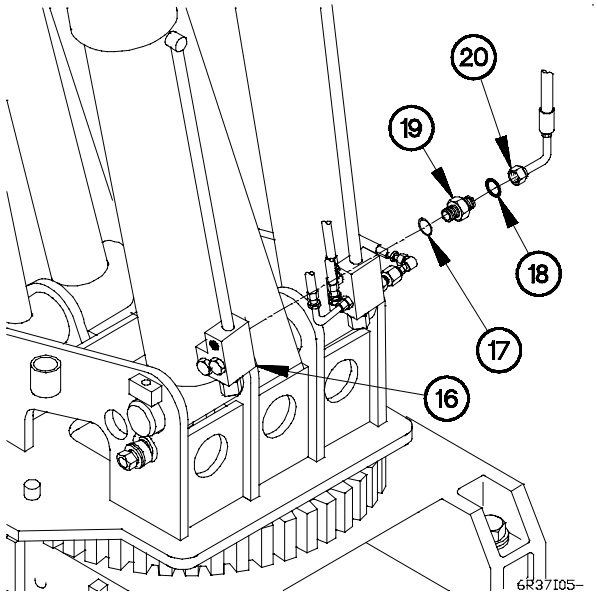


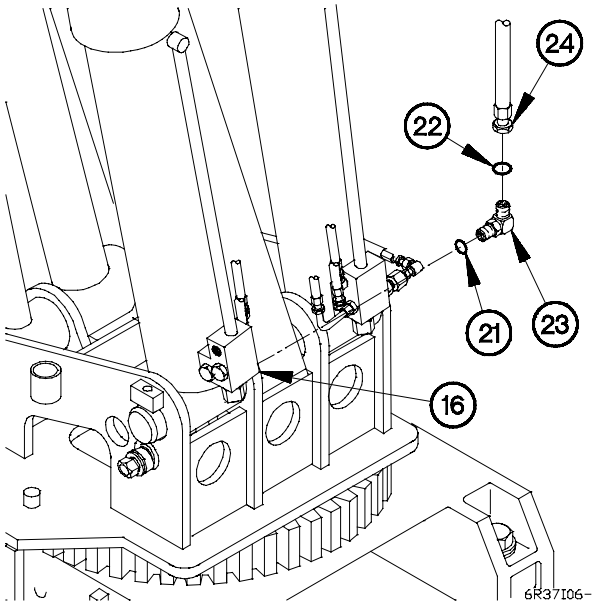
## 16-37. M1089 LIFT CYLINDER REPLACEMENT (CONT)

(13) Install preformed packings (17 and 18) on fitting (19).

(14) Install fitting (19) in counterbalance valve (16).

(15) Connect hose (20) to fitting (19).




(16) Install preformed packings (21 and 22) on two 90-degree fittings (23).

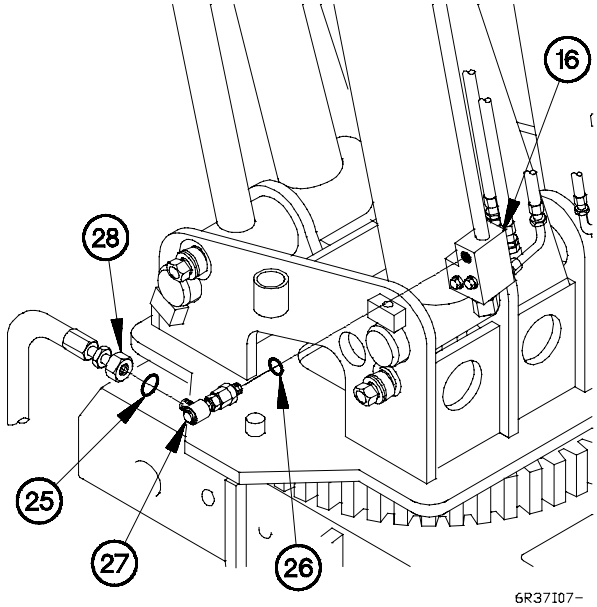
(17) Install 90-degree fittings (23) in counterbalance valve (16).

(18) Connect two hoses (24) to 90-degree fittings (23).

(19) Install preformed packings (25 and 26) on 90-degree fitting (27).

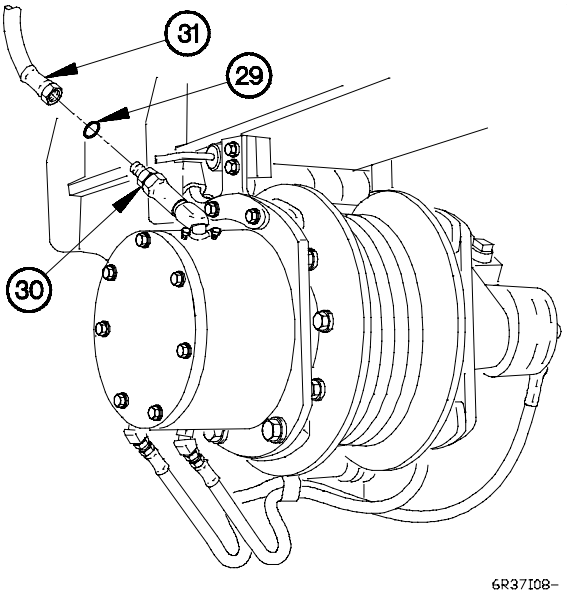
(20) Install 90-degree fitting (27) on counterbalance valve (16).

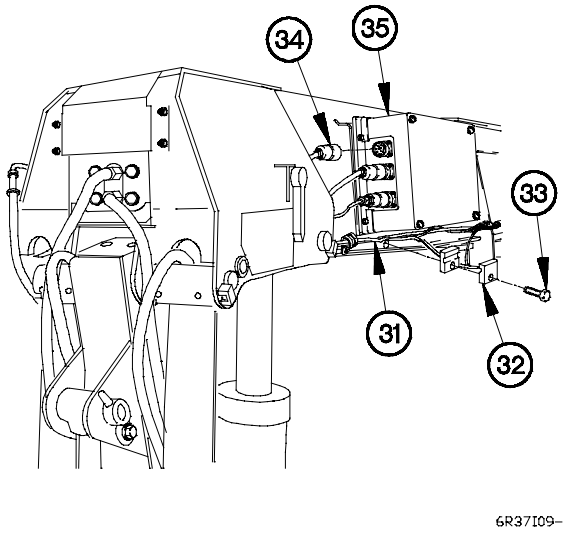
(21) Connect hose (28) to 90-degree fitting (27).



(22) Install preformed packing (29) on fitting (30).

(23) Connect hose (31) to fitting (30).




**NOTE**

Perform steps (24) and (25) on RH lift cylinder.

(24) Install three tubing clamps (32) on hose (31) with three screws (33).

(25) Connect overload lockout connector (34) to overload shutdown assembly (35).

**c. Follow-On Maintenance.**

(1) Position hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-2).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Lubricate lift cylinder (TM 9-2320-266-20).

(4) Perform crane load test (para 16-62).

**End of Task.**

## 16-38. M1089 ERECTION CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Position boom on boom rest (TM 9-2320-366-10-2).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Tools and Special Tools (Cont)**
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

(1) Remove two screws (1), washers (2), and bushings (3) from rivet eyebolts (4).

(2) Remove two rivet eyebolts (4) from pivot shaft (5).

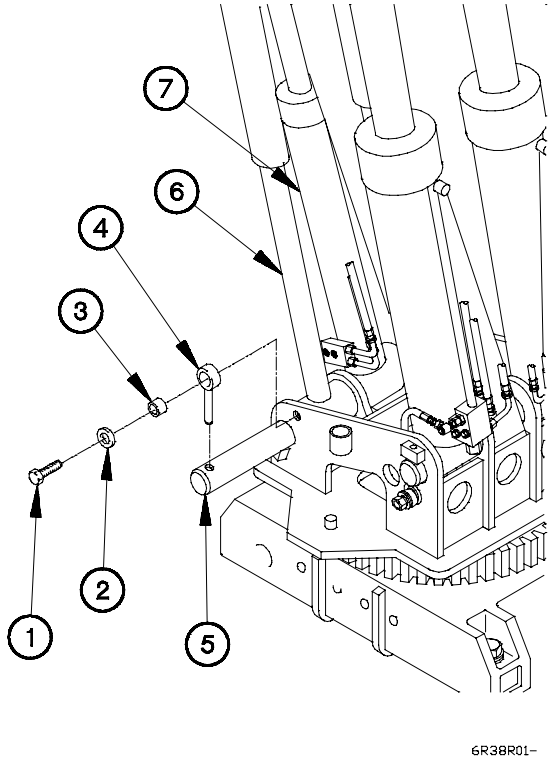
**WARNING**

**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.**

**NOTE**

Step (3) requires the aid of an assistant.

(3) Remove pivot shaft (5) from tension link cylinder (6).




6R38R01-

(4) Place drain pan under erection cylinder (7).

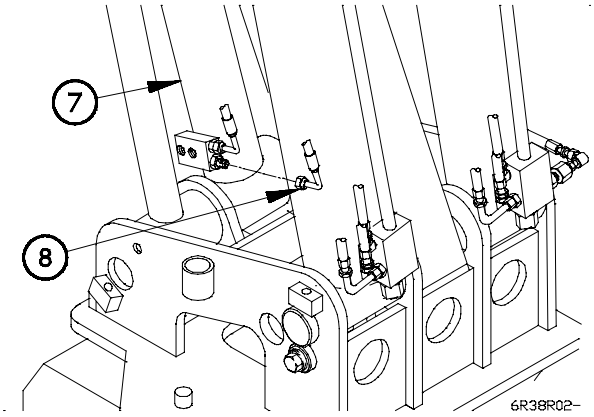
**CAUTION**

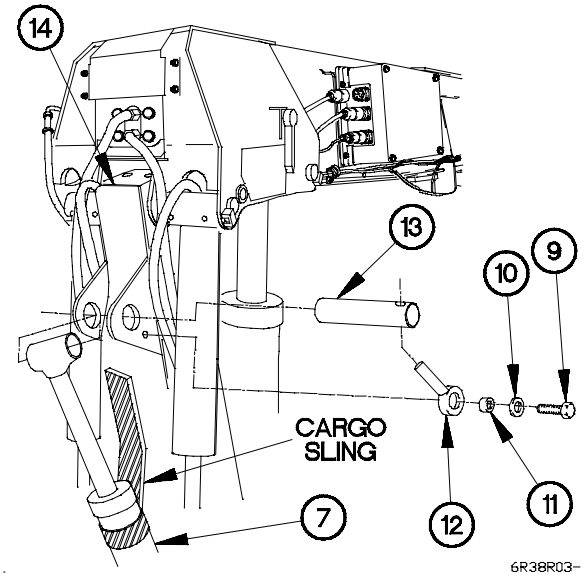
Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic connections and connection points prior to disconnecting.

(5) Disconnect two hydraulic hoses (8) from erection cylinder (7).




**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.**

**NOTE**

Steps (6) through (8) require the aid of an assistant.

(6) Remove screw (9), washer (10), and bushing (11) from rivet eyebolt (12).

(7) Remove rivet eyebolt (12) from pivot shaft (13).

(8) Remove pivot shaft (13) from erection cylinder (7).

(9) Remove erection cylinder (7) from mast (14).

## 16-38. M1089 ERECTION CYLINDER REPLACEMENT (CONT)

**b. Installation.**

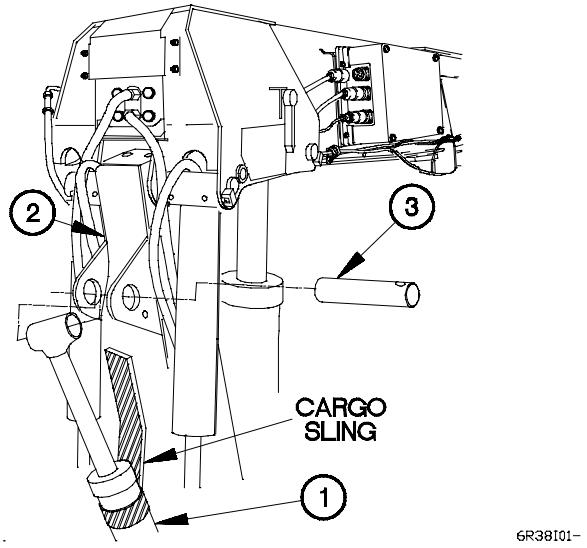
**WARNING**

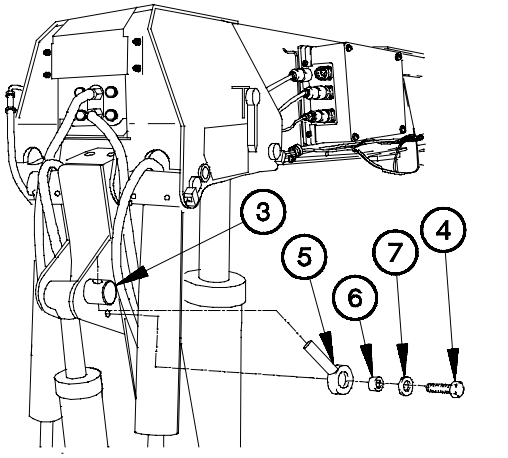
**Erection cylinder weighs approximately 70 lbs (32 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Step (1) requires the aid of an assistant.

(1) Install erection cylinder (1) on mast (2) with pivot shaft (3).




**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.**

(2) Apply sealing compound to threads of screw (4).

(3) Install rivet eyebolt (5) in pivot shaft (3).

(4) Position bushing (6) and washer (7) in rivet eyebolt (5) with screw (4).

(5) Tighten screw (4) to 266-295 lb-ft (360-400 N•m).

**NOTE**

Step (6) requires the aid of an assistant.

(6) Install erection cylinder (1) and tension link cylinder (8) in turntable (9) with pivot shaft (10).

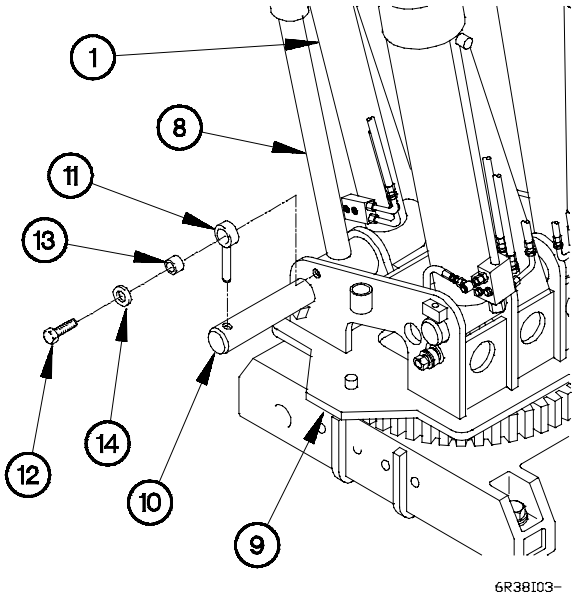
(7) Install two rivet eyebolts (11) in pivot shaft (10).

**WARNING**

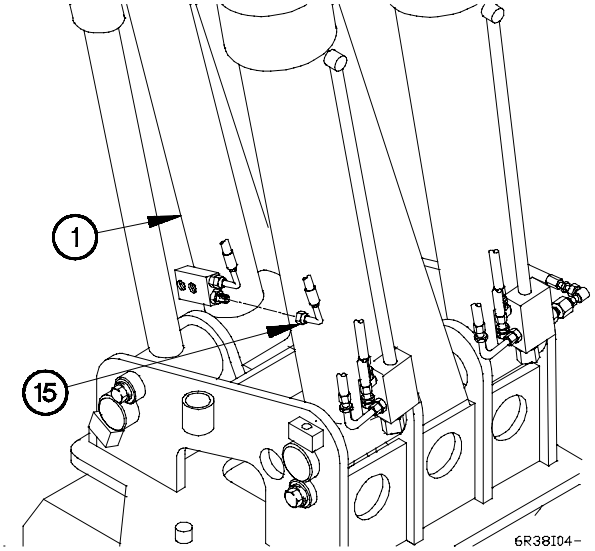
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(8) Apply sealing compound to threads of two screws (12).

(9) Position two bushings (13), washers (14), and screws (12) in rivet eyebolts (11).




(10) Tighten screws (12) to 240-260 lb-ft (325-352 N•m).




(11) Connect two hydraulic hoses (15) to erection cylinder (1).

**c. Follow-On Maintenance.**

(1) Place hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-2).

(2) Perform crane load test (para 16-62).

**End of Task.**

## 16-39. M1089 TENSION LINK CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Position boom on boom rest (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)

**Tools and Special Tools (Cont)**
Wrench Set, Socket (Item 84, Appendix B)

**Materials/Parts**
Sealing Compound (Item 76, Appendix C)

**Personnel Required**
(2)

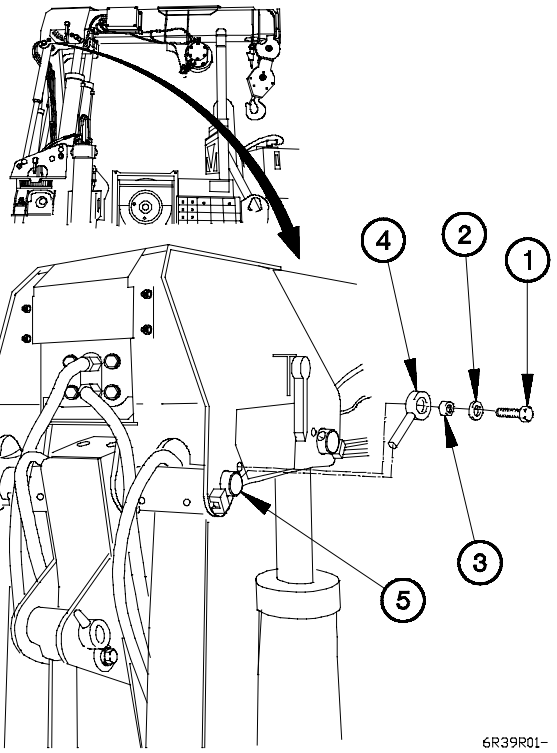
**a. Removal.**

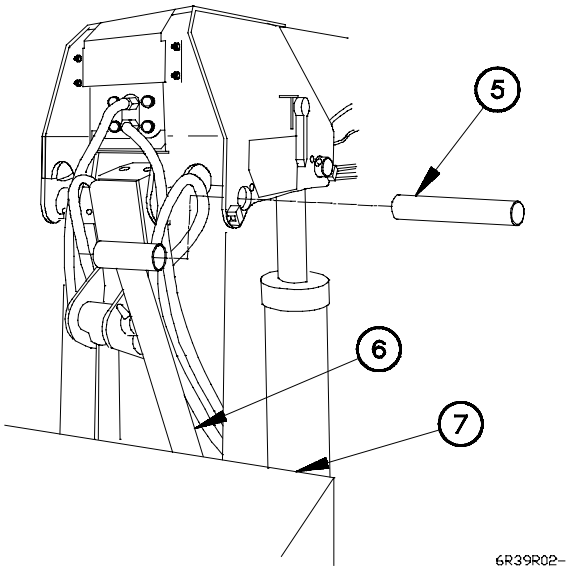
**NOTE**

Left and right side tension link cylinders are removed the same way. Right side shown.

(1) Remove two screws (1), washers (2), and bushings (3) from rivet eyebolts (4).

(2) Remove two rivet eyebolts (4) from pivot shaft (5).




**NOTE**

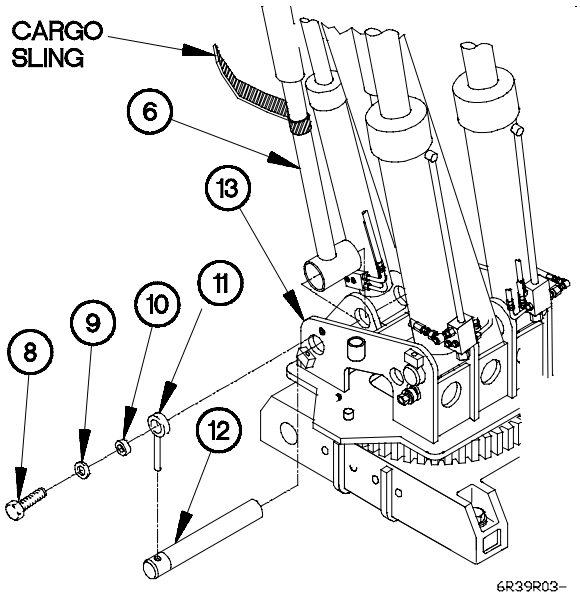
- Steps (3) through (9) require the aid of an assistant.
- Drive out pivot shaft far enough to free tension link cylinder.

(3) Drive pivot shaft (5) out of tension link cylinder (6).

(4) Position tension link cylinder (6) on tool box (7).

(5) Remove two screws (8), washers (9), and bushings (10) from rivet eyebolts (11).

(6) Remove two rivet eyebolts (11) from pivot shaft (12).




**WARNING**

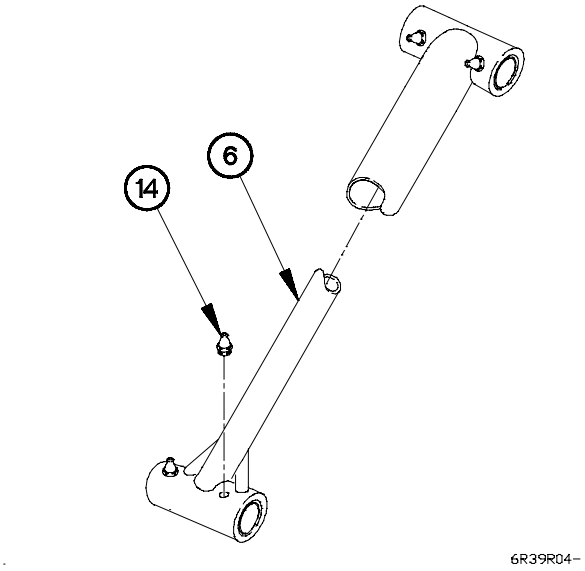
**Tension link cylinder weighs approximately 60 lbs (27 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Drive out pivot shaft far enough to free tension link cylinder.

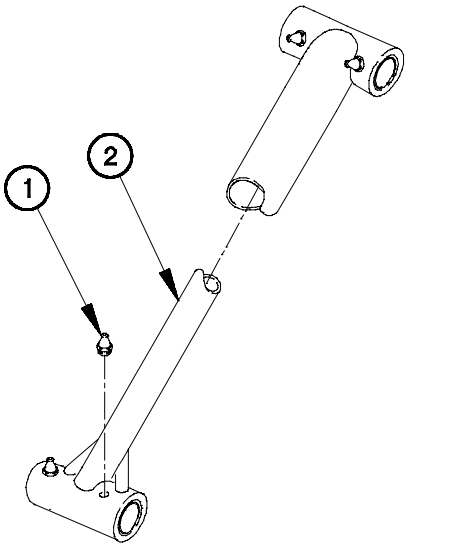
(7) Drive pivot shaft (12) out of tension link cylinder (6).

(8) Remove tension link cylinder (6) from turntable (13).




(9) Remove four grease fittings (14) from tension link cylinder (6).

(10) Perform steps (1) through (9) on left side tension link cylinder (6).




**b. Installation.**

**NOTE**

Left and right side tension link cylinders are installed the same way. Right side shown.

(1) Install four grease fittings (1) in tension link cylinder (2).

## 16-39. M1089 TENSION LINK CYLINDER REPLACEMENT (CONT)

**WARNING**

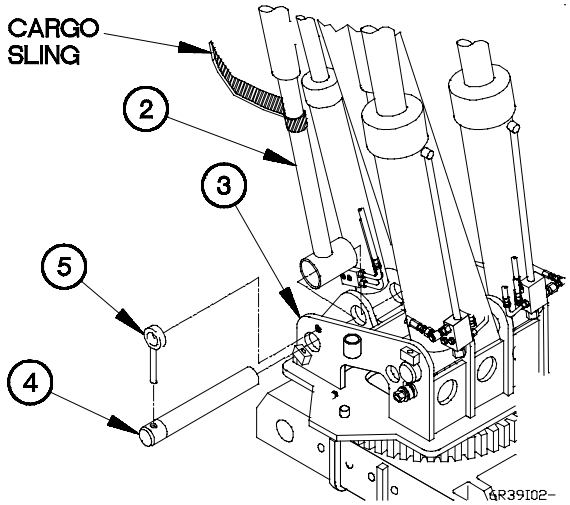
**Tension link cylinder weighs approximately 60 lbs (27 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

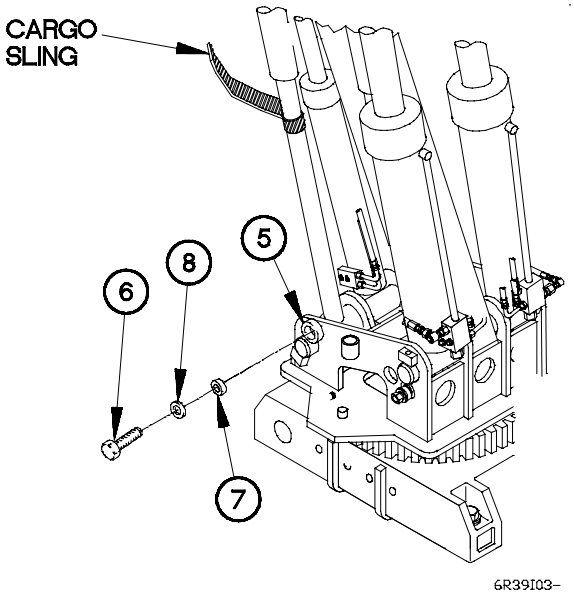
**NOTE**

Steps (2) through (7) require the aid of assistant.

(2) Position tension link cylinder (2) in turntable (3) with pivot shaft (4).

(3) Install two rivet eyebolts (5) in pivot shaft (4).




**WARNING**

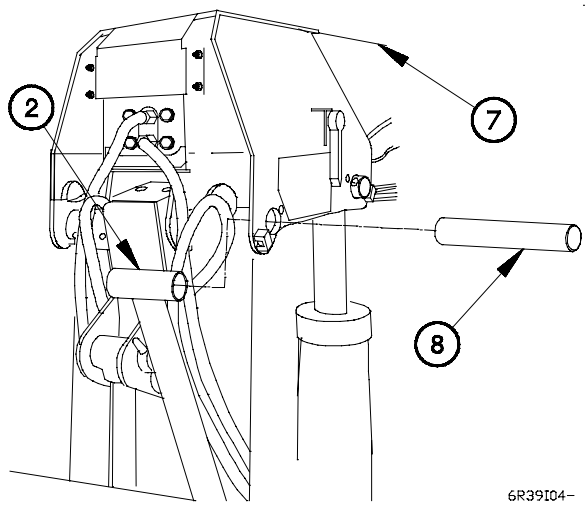
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

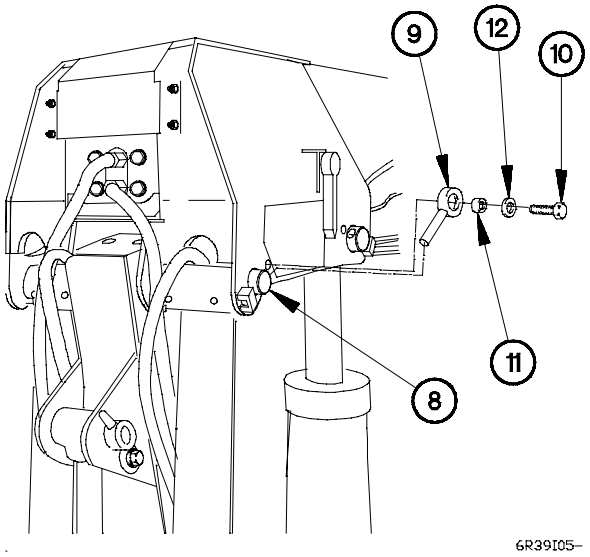
(4) Apply sealing compound to threads of two screws (6).

(5) Position two bushings (7) and washers (8) in rivet eyebolts (5) with screws (6).

(6) Tighten screws (6) to 240-260 lb-ft (325-352 N·m).

(7) Position tension link cylinder (2) in boom assembly (7) with pivot shaft (8).




(8) Install two rivet eyebolts (9) in pivot shaft (8).

**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.**

(9) Apply sealing compound to threads of two screws (10).

(10) Position two bushings (11) and washers (12) in rivet eyebolts (9) with screws (10).

(11) Tighten screws (10) to 240-260 lb-ft (325-352 N·m).

(12) Perform Steps (1) through (11) on left side tension link cylinder.

**c. Follow-On Maintenance.**

Perform crane load test (para 16-62).

**End of Task.**

## 16-40. M1089 MAST REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).
Boom assembly removed (para 16-33).
Lift cylinders removed (para 16-37).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Tools and Special Tools (Cont)**
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 75, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**NOTE**

Left and right side hoses are removed the same way. Left side shown.

(1) Place drain pan under mast (1).

(2) Remove eight screws (2) and four clamps (3) from mast (1).

**CAUTION**

Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

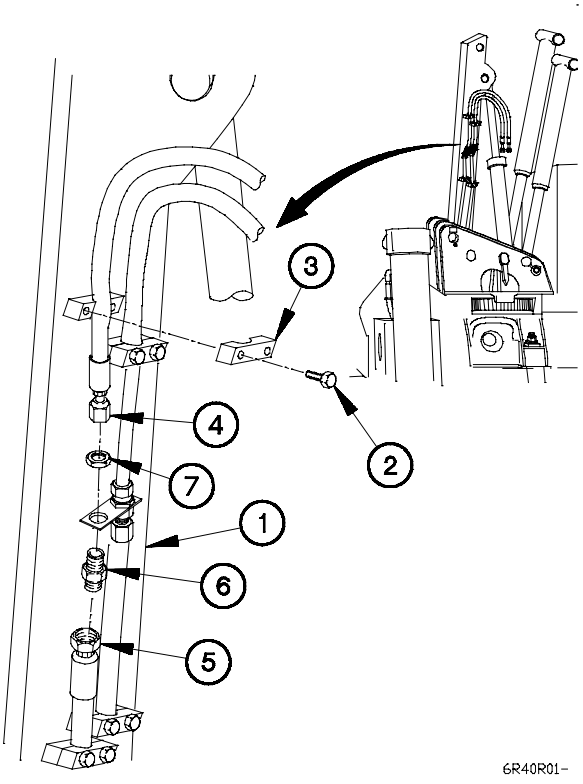
**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(3) Disconnect hoses (4 and 5) from fittings (6).

(4) Remove two nuts (7) and fittings (6) from mast (1).

(5) Perform steps (1) through (4) on right side hoses (4 and 5).



**NOTE**

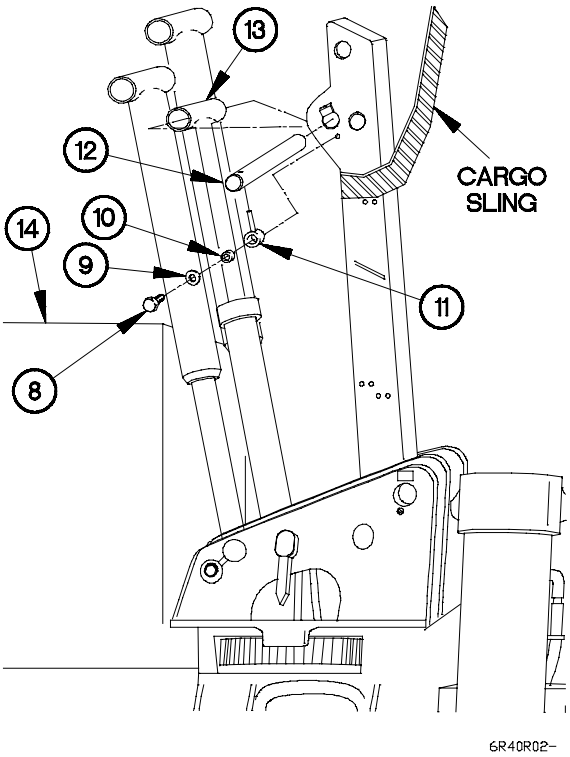
Steps (6) through (13) require the aid of an assistant.

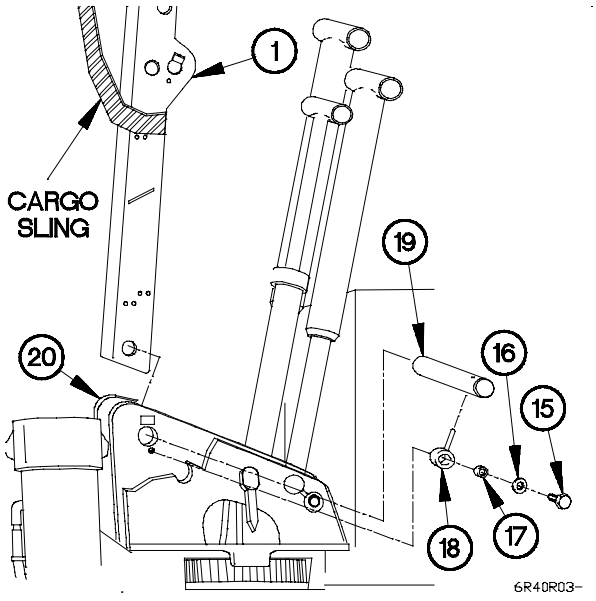
(6) Remove screw (8), washer (9), and bushing (10) from rivet eyebolt (11).

(7) Remove rivet eyebolt (11) from pivot shaft (12).

(8) Remove pivot shaft (12) from erection cylinder (13).

(9) Position erection cylinder (13) against tool box (14).




(10) Remove screw (15), washer (16), and bushing (17) from rivet eyebolt (18).

(11) Remove rivet eyebolt (18) from pivot shaft (19).

(12) Remove pivot shaft (19) from turntable (20).

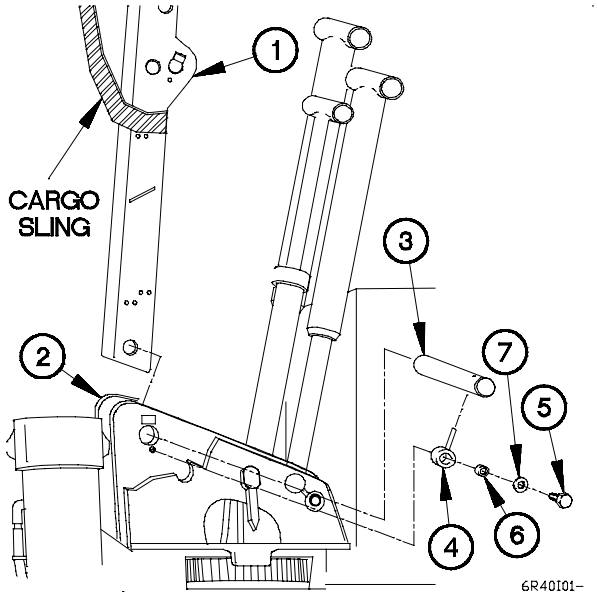
(13) Remove mast (1) from turntable (20).

## 16-40. M1089 MAST REPLACEMENT (CONT)

**b. Installation.**

**NOTE**

Steps (1) through (10) require the aid of assistant.




(1) Position mast (1) on turntable (2) with pivot shaft (3).

(2) Install rivet eyebolt (4) in pivot shaft (3).

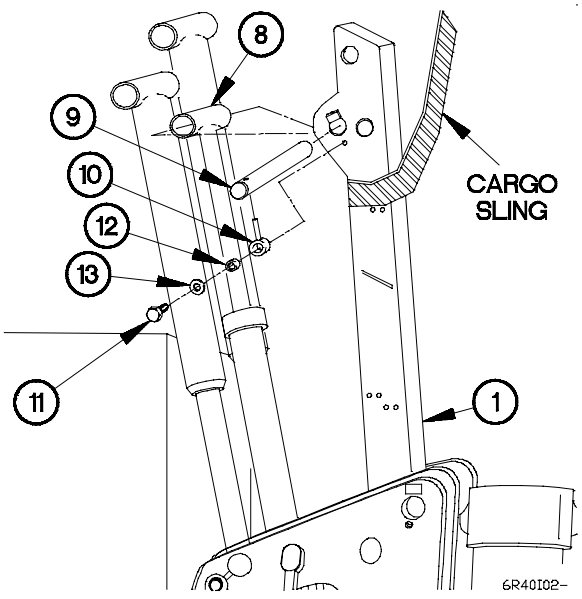
**WARNING**

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

(3) Apply sealing compound to threads of screw (5).

(4) Position bushing (6) and washer (7) in rivet eyebolt (4) with screw (5).

(5) Tighten screw (5) to 250-260 lb-ft (325-352 N·m).




(6) Position erection cylinder (8) in mast (1) with pivot shaft (9).

(7) Install rivet eyebolt (10) in pivot shaft (9).

(8) Apply sealing compound to threads of screw (11).

(9) Position bushing (12) and washer (13) in rivet eyebolt (10) with screw (11).

(10) Tighten screw (11) to 240-260 lb-ft (325-352 N·m).

**NOTE**

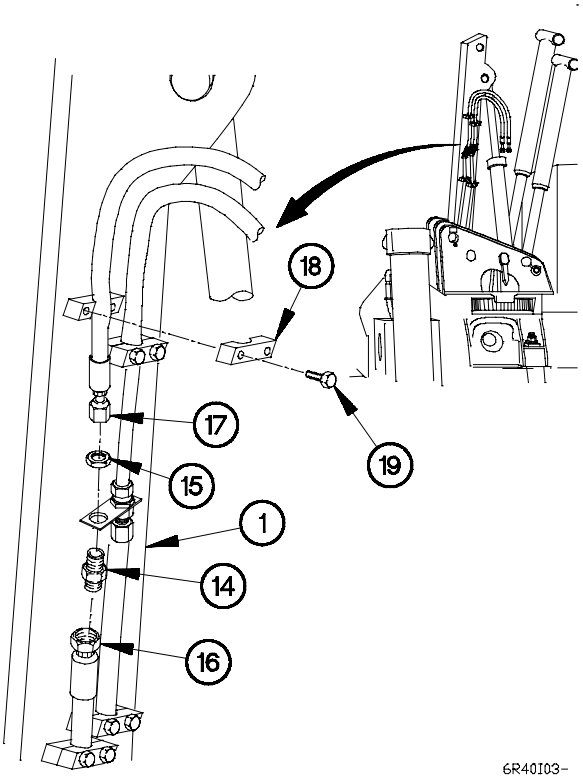
Left and right side hydraulic hoses are installed the same way. Left side shown.

(11) Install two fittings (14) and nuts (15) on mast (1).

(12) Install hoses (16 and 17) on fittings (14).

(13) Install four clamps (18) and eight screws (19) on mast (1).

(14) Perform steps (11) through (13) on right side hoses (16 and 17).




**c. Follow-On Maintenance.**

(1) Install lift cylinders (para 16-37).

(2) Install boom assembly (para 16-33).

(3) Place hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(4) Perform crane load test (para 16-62).

**End of Task.**

## 16-41. M1089 CRANE TURNTABLE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

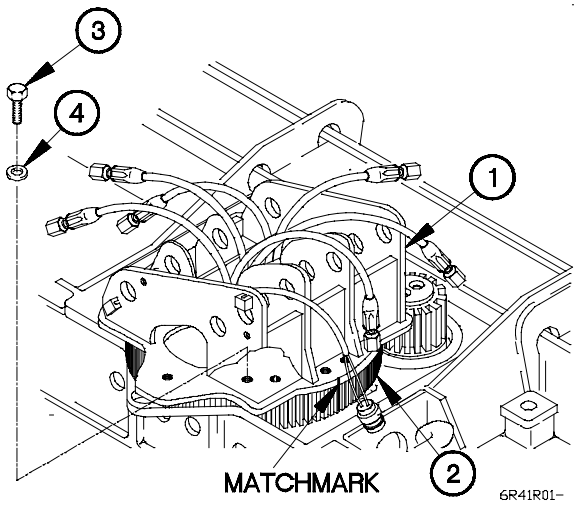
**Equipment Conditions**
Mast removed (para 16-40).
Tension link assembly removed (para 16-39).
Erection cylinder removed (para 16-38).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)

**Tools and Special Tools (Cont)**
Sling, Cargo (Item 56, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

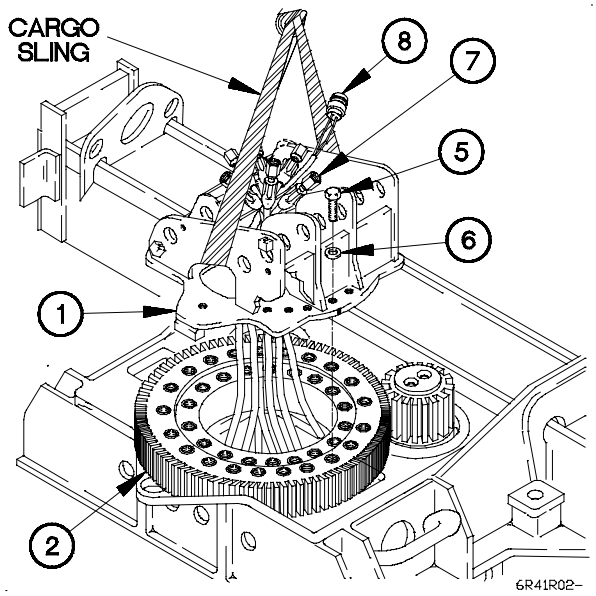
**Personnel Required**
(2)

**a. Removal.**




(1) Match mark turntable (1) to ring gear (2).

(2) Remove 12 bolts (3) and washers (4) from turntable (1).




(3) Remove four screws (5) and washers (6) from turntable (1).

**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.**

**NOTE**

Step (4) requires the aid of an assistant.

(4) Remove turntable (1) from ring gear (2) and pass hydraulic hoses (7) and electrical cable (8) through center of turntable (1).

**b. Installation.**

**NOTE**

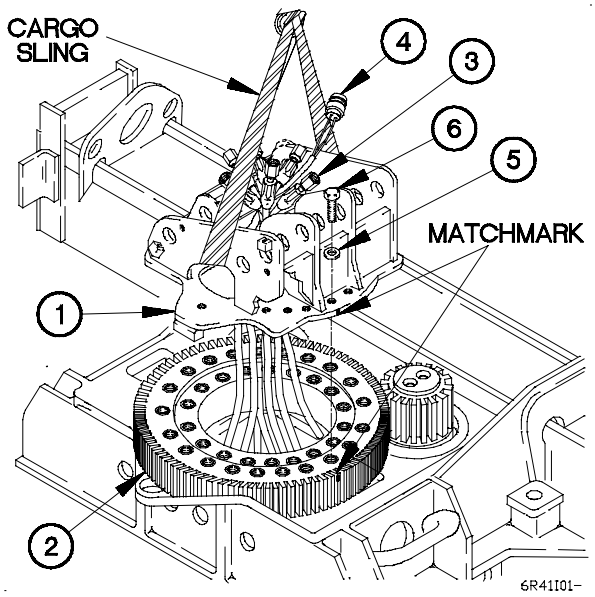
Step (1) requires the aid of an assistant.

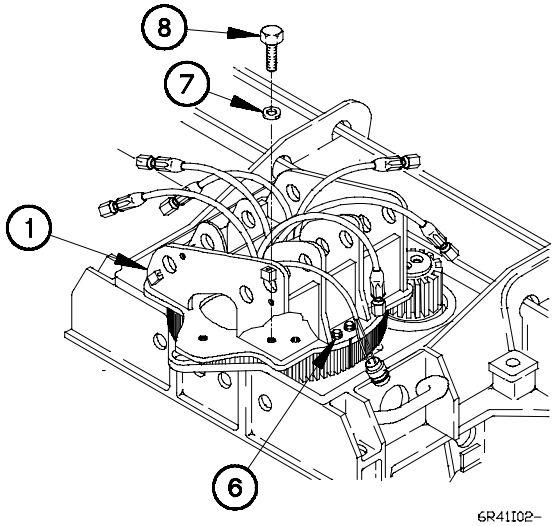
(1) Position turntable (1) over ring gear (2).

(2) Route hydraulic hoses (3) and electrical cable (4) through center of turntable (1).

(3) Lower turntable (1) on ring gear (2) with match marks aligned.

(4) Position four washers (5) and screws (6) on turntable (1) at marked locations.




(5) Position 12 washers (7) and screws (8) in turntable (1).

(6) Tighten bolts (6 and 8) to 355-385 lb-ft (481-522 N·m).

**c. Follow-On Maintenance.**

(1) Install erection cylinder (para 16-38).

(2) Install tension link assembly (para 16-39).

(3) Install mast (para 16-40).

(4) Operate MHC and check for proper operation and for hydraulic leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-42. M1089 TURNTABLE BEARING REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Crane turntable removed (para 16-41).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)

**Tools and Special Tools (Cont)**
Chain, Welded (TM 9-2320-366-10)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)

**Personnel Required**
(2)

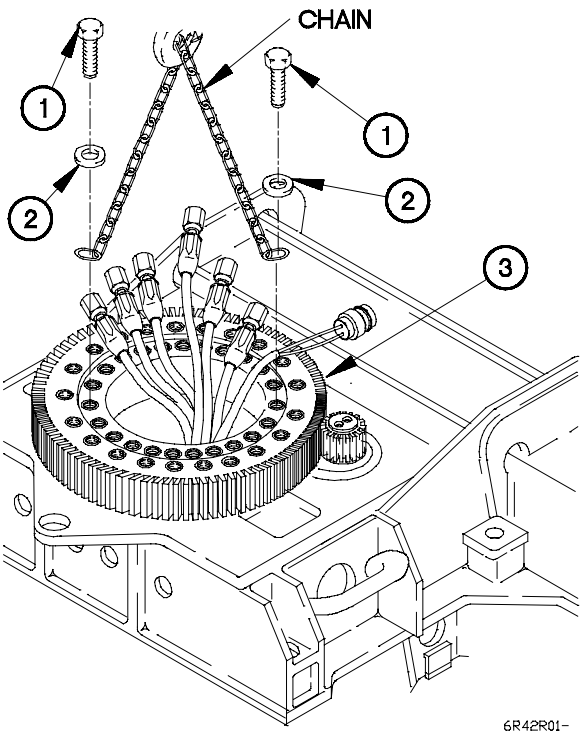
**a. Removal.**

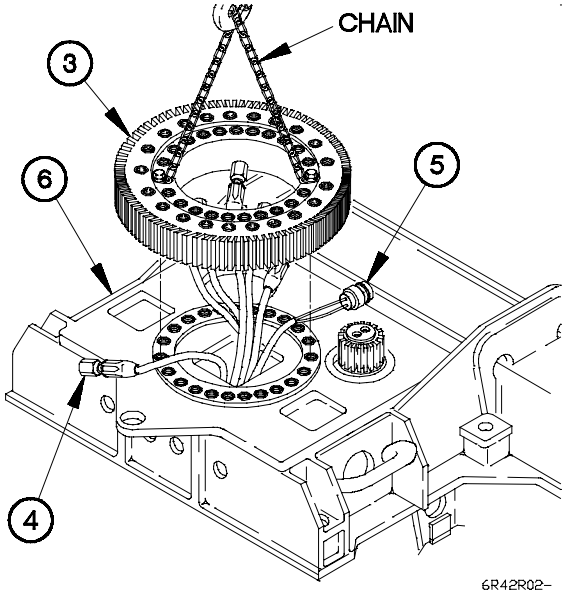
**WARNING**

**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.**

(1) Remove 23 screws (1) and washers (2) from turntable bearing (3).

(2) Install chain on turntable bearing (3) with two washers (2) and screws (1).



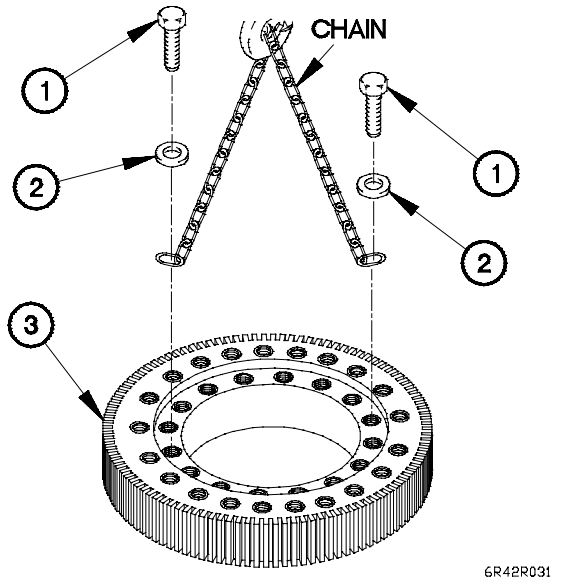

**NOTE**

Step (3) requires the aid of an assistant.

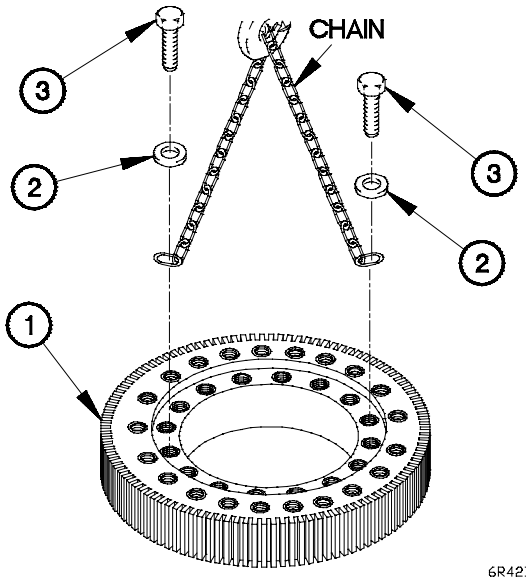
(3) Guide hoses (4) and electrical connector (5) through turntable bearing (3).

(4) Remove turntable bearing (3) from subframe (6).

(5) Remove two screws (1), washers (2), and chain from turntable bearing (3).




**b. Installation.**




(1) Install chain on turntable bearing (1) with two washers (2) and screws (3).

**WARNING**

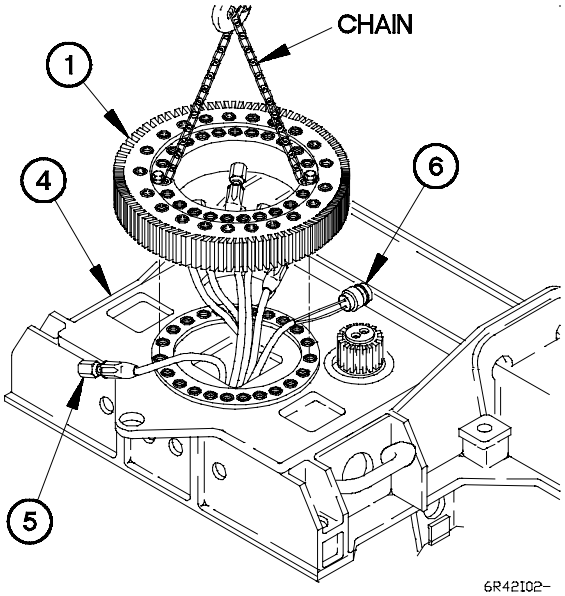
**Turntable bearing weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Steps (2) and (3) require the aid of an assistant.

(2) Lift turntable bearing (1) in position over subframe (4).

(3) Feed hydraulic hoses (5) and electrical connector (6) through turntable bearing (1).



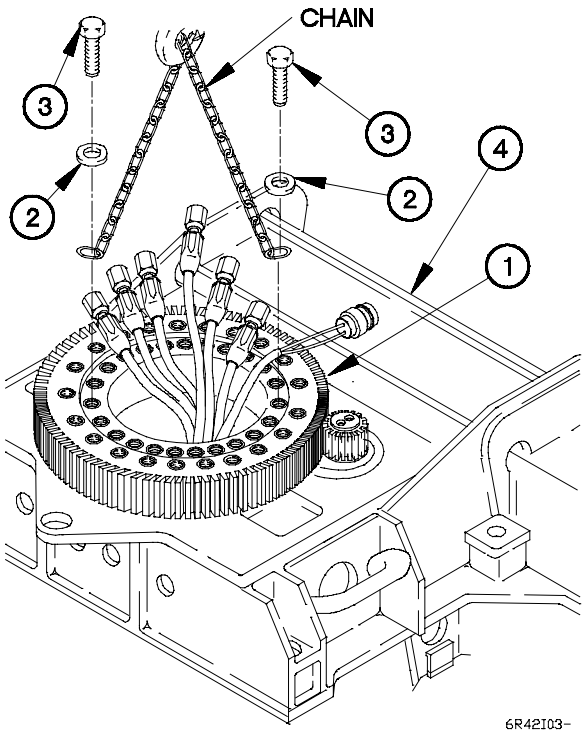
## 16-42. M1089 TURNTABLE BEARING REPLACEMENT (CONT)

(4) Position turntable bearing (1) on subframe (4) with screw holes aligned.

(5) Remove two screws (3), washers (2), and chain from turntable bearing (1).

(6) Position 23 washers (2) and screws (3) on turntable bearing (1).

(7) Tighten screws (3) to 355-385 lb-ft (481-522 N•m).




**c. Follow-On Maintenance.**

(1) Install turntable (para 16-41).

(2) Operate MHC and check for proper operation and for oil leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-43. M1089 HOIST ASSEMBLY REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Hoist cable removed (TM 9-2320-366-20-5).
Boom positioned over tool boxes (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Nut, Self-Locking (Item 176, Appendix F)
Sealing Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (Item 261, Appendix F)
Packing, Preformed (2) (Item 231, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

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

(2) Place drain pan under hoist assembly (4).

**CAUTION**

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

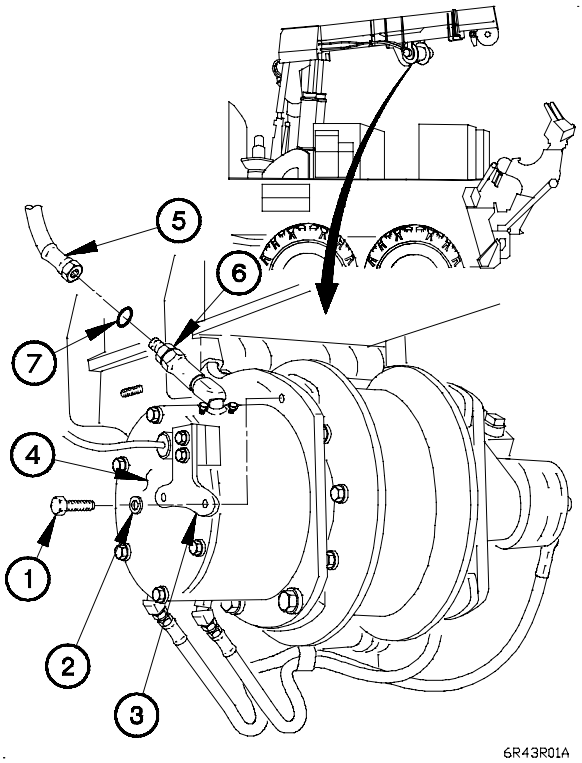
**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

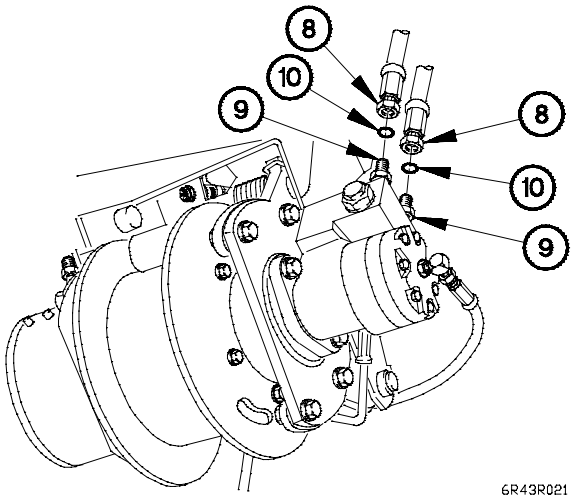
(3) Disconnect hydraulic hose (5) from check valve (6).

(4) Remove preformed packing (7) from check valve (6). Discard preformed packing.

(5) Position hydraulic hose (5) and bracket (3) clear of hoist assembly (4).

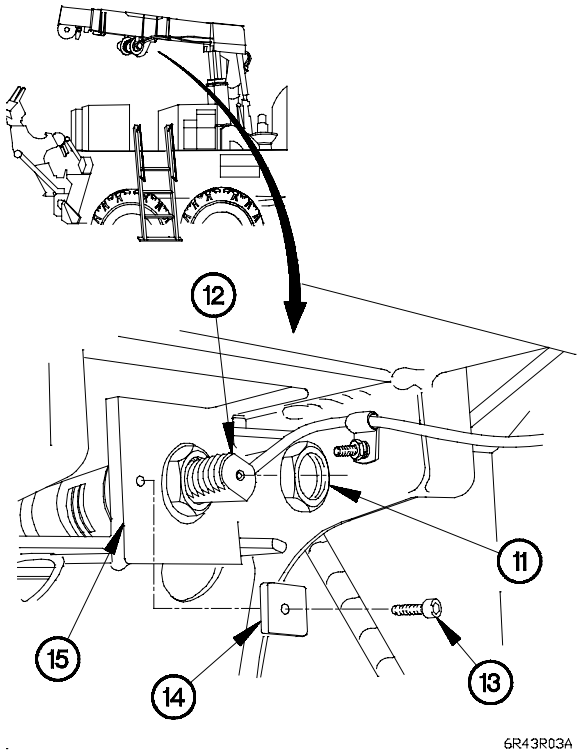


## 16-43. M1089 HOIST ASSEMBLY REPLACEMENT (CONT)




(6) Disconnect two hydraulic hoses (8) from fittings (9).

(7) Remove two preformed packings (10) from fittings (9). Discard preformed packings.

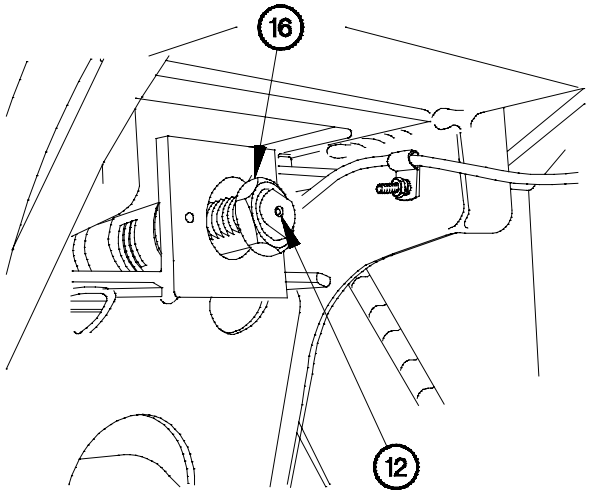



(8) Remove jamnut (11) from backside of tension load cell (12).

(9) Remove screw (13) and stop block (14) from boom brace (15).

**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.**




(10) Loosen swivel nut (16) until flush with end on backside of tension load cell (12).

**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.**

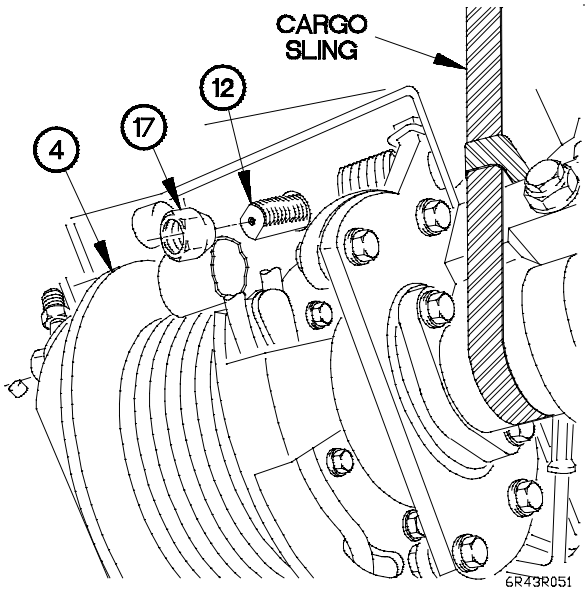
**NOTE**

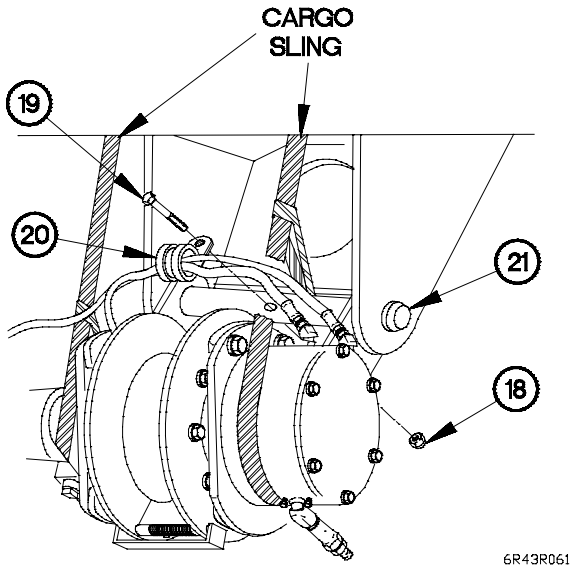
Steps (11) through (13) require the aid of an assistant.

(11) Lift up on hoist assembly (4).

(12) Remove swivel nut (17) from front of tension load cell (12).

(13) Remove hoist assembly (4) from tension load cell (12).



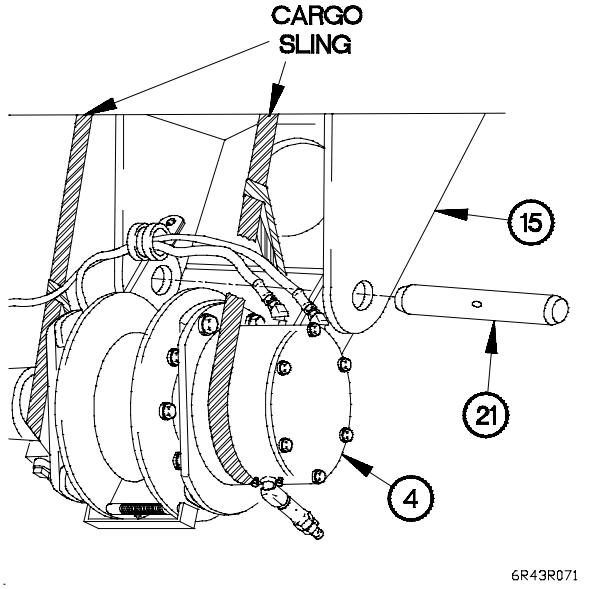




(14) Remove self-locking nut (18), screw (19), and clamp (20) from shaft (21). Discard self-locking nut.

**NOTE**

Step (15) requires the aid of an assistant.

(15) Remove shaft (21) and hoist assembly (4) from boom brace (15).



## 16-43. M1089 HOIST ASSEMBLY REPLACEMENT (CONT)

**b. Installation.**

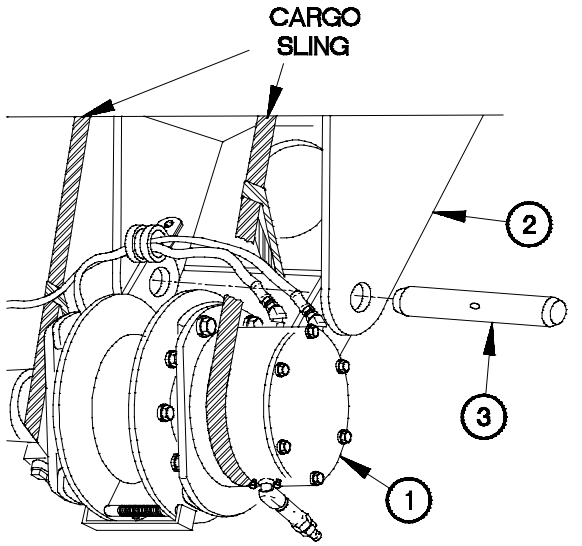
**WARNING**

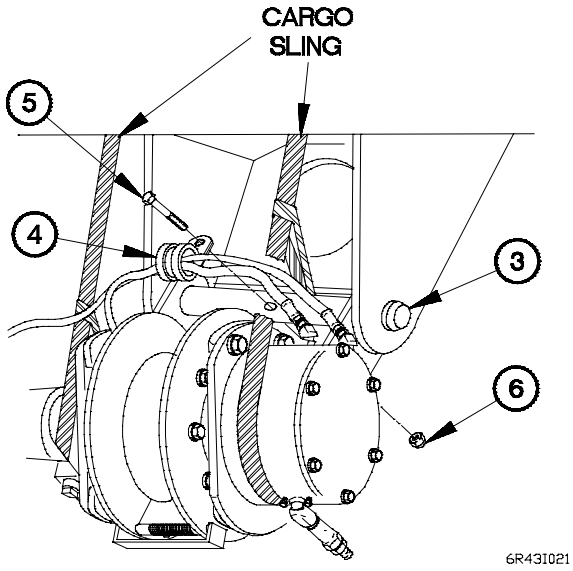
**Hoist assembly weighs approximately 210 lbs (95 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Step (1) requires the aid of an assistant.

(1) Install hoist assembly (1) in boom brace (2) with shaft (3).



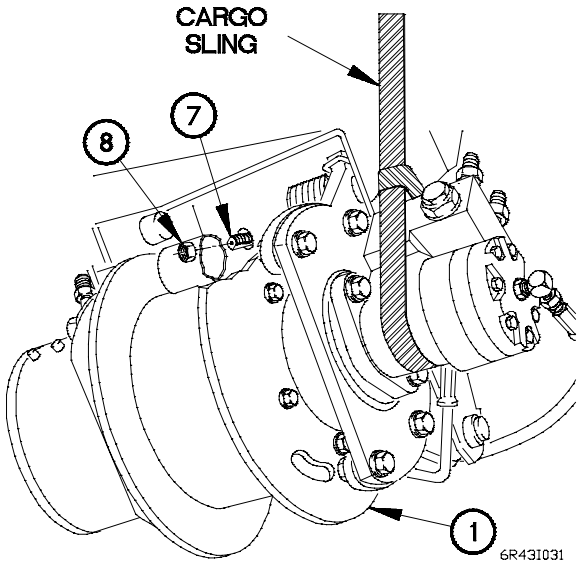




(2) Install clamp (4), screw (5), and self-locking nut (6) on shaft (3).

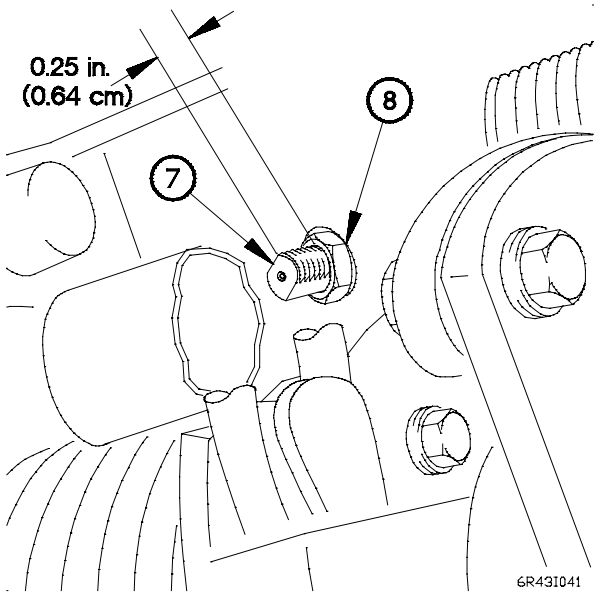
**NOTE**

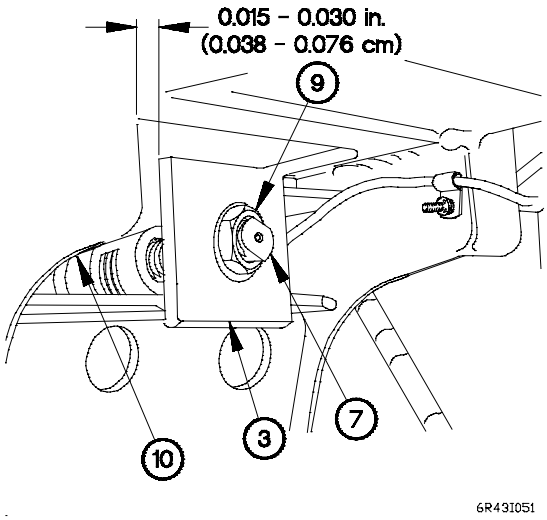
Step (3) requires the aid of an assistant.

(3) Position hoist assembly (1) on front of tension load cell (7) with front swivel nut (8).



(4) Adjust front swivel nut (8) on tension load cell (7) until approximately 0.25 in. (0.64 cm) of threads are protruding past front swivel nut.




**NOTE**

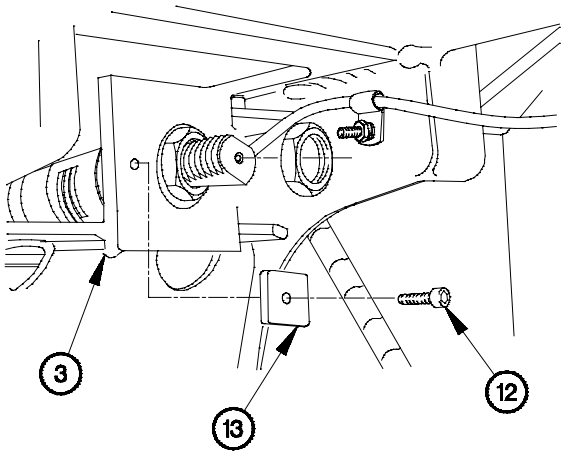
Step (5) requires the aid of an assistant.

(5) Tighten rear swivel nut (9) on tension load cell (7) until a gap between boom assembly (10) and boom brace (3) is 0.015-0.030 in. (0.038-0.076 cm).

(6) Install jam nut (11) on tension load cell (7).

**WARNING**

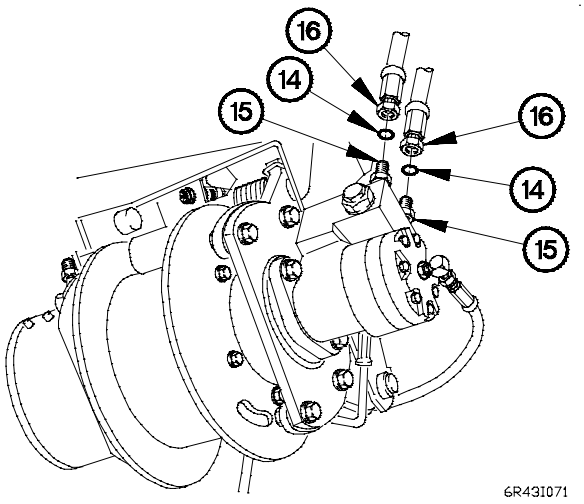
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**




(7) Apply sealing compound to threads of screw (12).

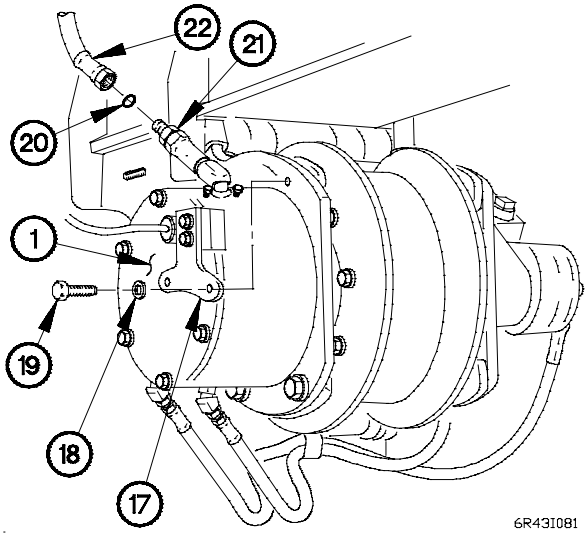
(8) Install stop block (13) and screw (12) on boom brace (3).

## 16-43. M1089 HOIST ASSEMBLY REPLACEMENT (CONT)




(9) Install two preformed packings (14) on fittings (15).

(10) Connect two hydraulic hoses (16) to fittings (15).




(11) Install bracket (17) on hoist assembly (1) with two washers (18) and screws (19).

(12) Install preformed packing (20) on check valve (21).

(13) Connect hydraulic hose (22) to check valve (21).

**c. Follow-On Maintenance.**

(1) Install hoist cable (TM 9-2320-366-20-5).

(2) Perform crane load test (para 16-62).

**End of Task.**

## 16-44. M1089 CABLE FOLLOWER REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Hoist assembly removed (para 16-43).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**Tools and Special Tools (Cont)**
Goggles, Industrial (Item 28, Appendix B)

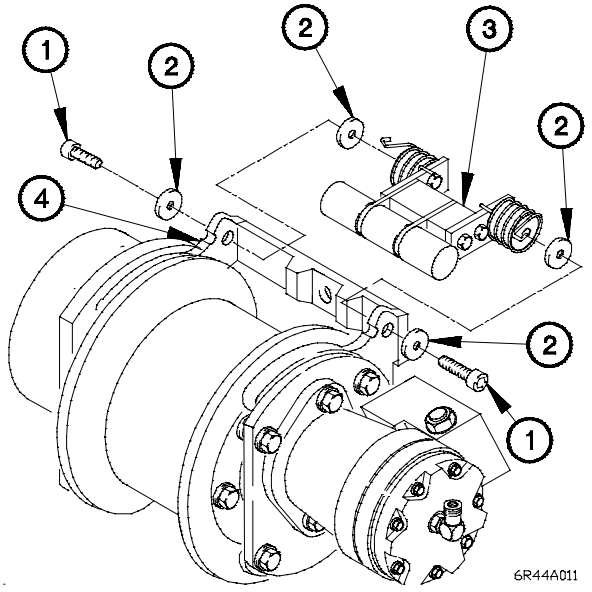
**Materials/Parts**
Sealing Compound (Item 76, Appendix C)

**a. Removal.**

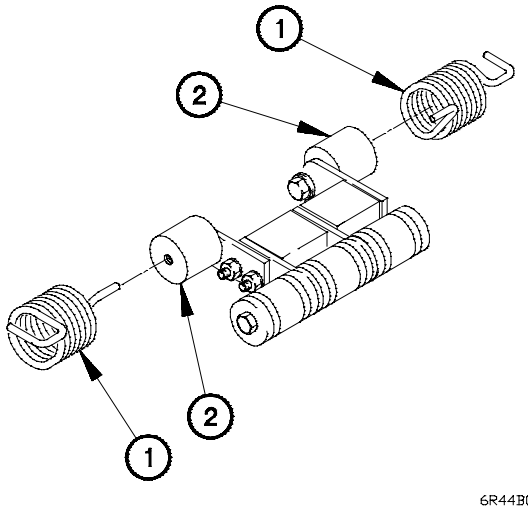
**WARNING**

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

Remove two screws (1), four washers (2), and cable follower assembly (3) from hoist assembly (4).




**b. Disassembly.**

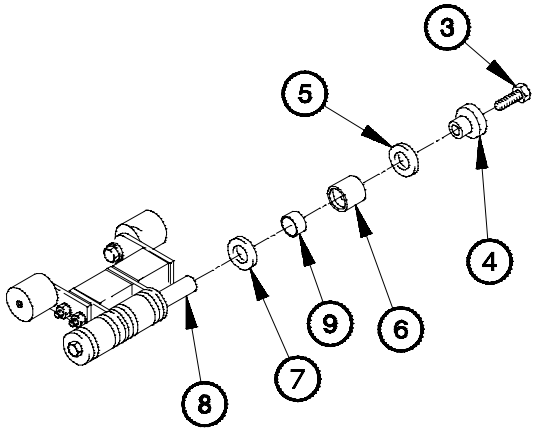



(1) Remove two springs (1) from posts (2).

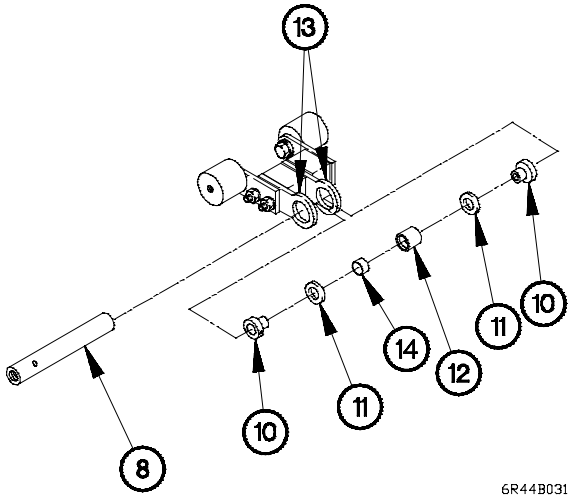
## 16-44. M1089 CABLE FOLLOWER REPLACEMENT/REPAIR (CONT)

(2) Remove two screws (3), washers (4), washers (5), rollers (6), and washers (7) from shaft (8).

(3) Remove two bearings (9) from rollers (6).




6R44B021



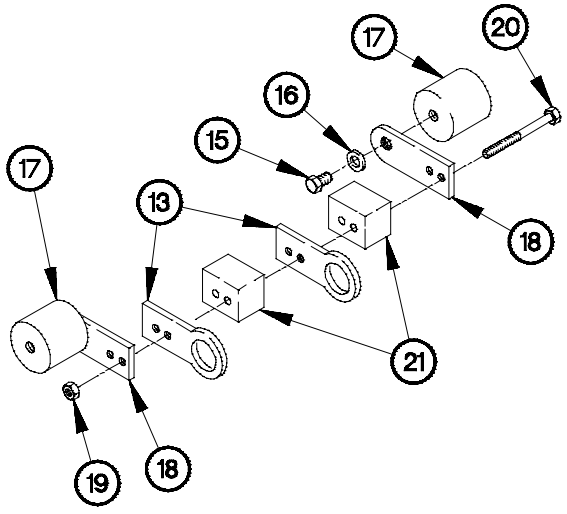

6R44B031

(4) Remove shaft (8), two washers (10), washers (11), and roller (12) from control levers (13).

(5) Remove bearing (14) from roller (12).

(6) Remove two screws (15), washers (16), and posts (17) from manual levers (18).

(7) Remove two nuts (19), screws (20), control levers (13), and manual levers (18) from spacers (21).

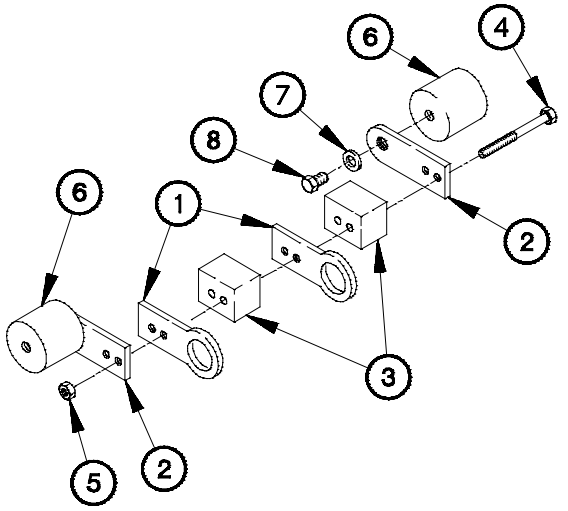



6R44B041

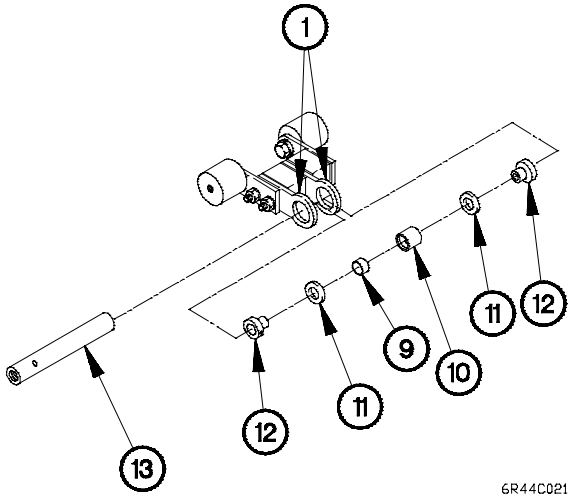
**c. Assembly.**

(1) Install two control levers (1) and manual levers (2) on spacers (3) with two screws (4) and nuts (5).

(2) Install two posts (6) on manual levers (2) with two washers (7) and screws (8).




6R44C011



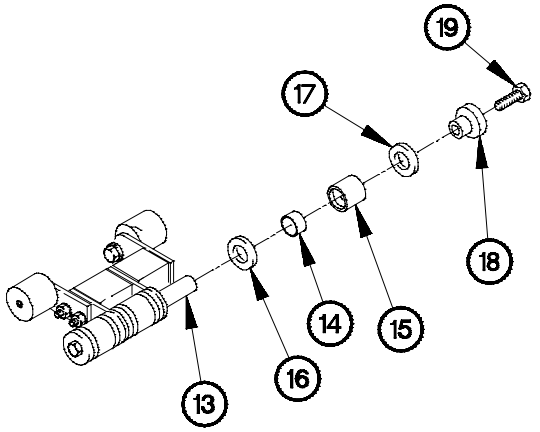

6R44C021

(3) Install bearing (9) in roller (10).

(4) Position two washers (11), washers (12), and roller (10) in control levers (1) with shaft (13).

(5) Install two bearings (14) in rollers (15).

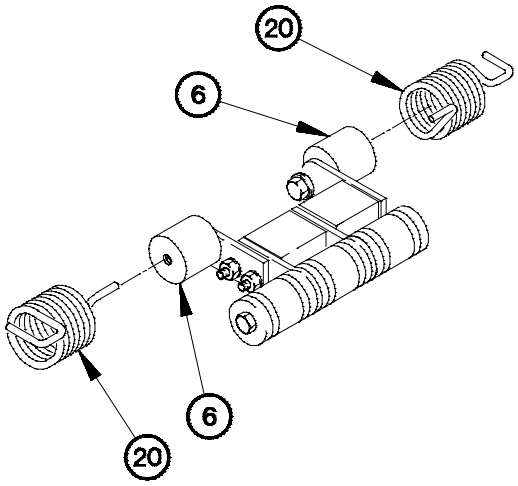
(6) Install two washers (16), rollers (15), washers (17), and washers (18) on shaft (13) with screws (19).




6R44C031

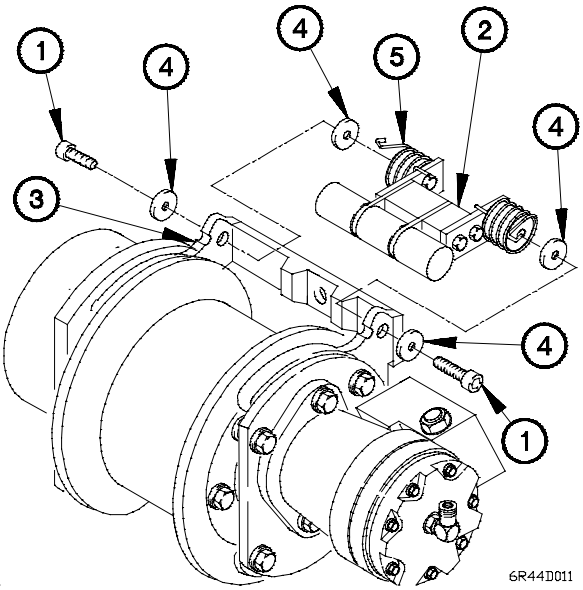
## 16-44. M1089 CABLE FOLLOWER REPLACEMENT/REPAIR (CONT)

(7) Install two springs (20) on posts (6).




6R44C041

**d. Installation.**




6R44D011

**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.**

(1) Apply sealing compound to threads of two screws (1).

(2) Install cable follower assembly (2) on hoist assembly (3) with four washers (4) and two screws (1).

**WARNING**

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

(3) Attach springs (5) to hoist assembly (3).

**e. Follow-On Maintenance.**

(1) Install hoist assembly (para 16-43).

(2) Operate MHC and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-45. M1089 PROXIMITY SENSOR REPLACEMENT

This task covers:

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

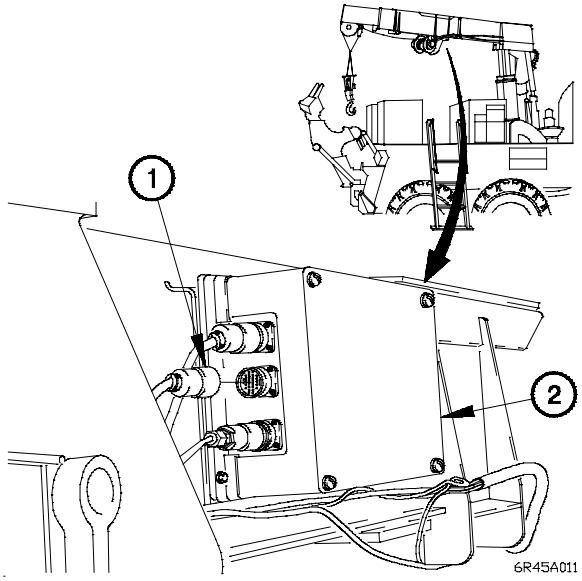
**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over tool boxes (TM 9-2320-366-10-2).
Batteries disconnected (TM 9-2320-366-20-3).

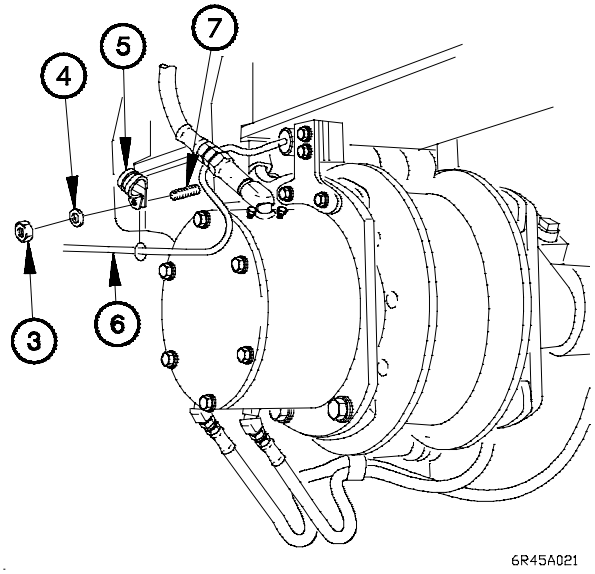
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 ft-lb (Item 92, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Materials/Parts**
Lockwasher (2) (Item 139, Appendix F)
Ties, Cable Plastic (Item 92, Appendix C)
Sealing Compound (Item 76, Appendix C)

**a. Removal.**




(1) Disconnect proximity sensor connector (1) from overload shutdown box (2).




**NOTE**

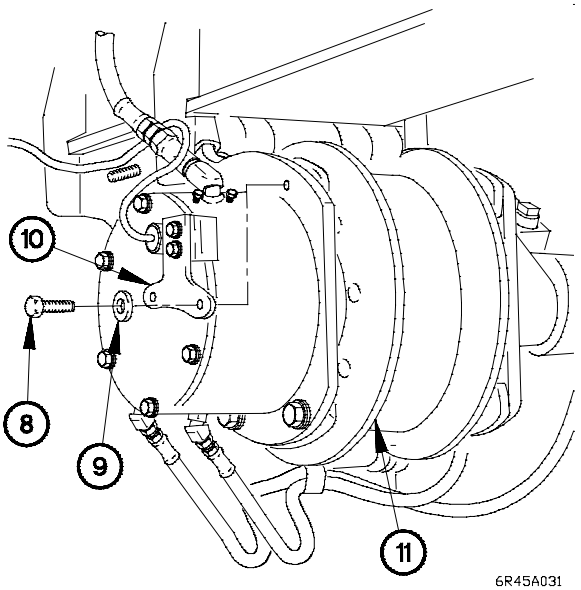
Remove plastic cable ties as required.

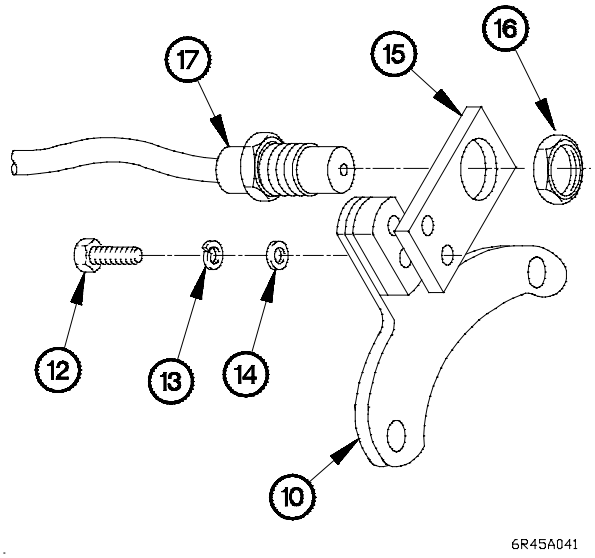
(2) Remove nut (3), washer (4), clamp (5), and cable (6) from boom stud (7).

(3) Remove clamp (5) from cable (6).

## 16-45. M1089 PROXIMITY SENSOR REPLACEMENT (CONT)

(4) Remove two screws (8), washers (9), and bracket (10) from hoist assembly (11).




(5) Remove two screws (12), lockwashers (13), washers (14), and plate (15) from bracket (10). Discard lockwashers.

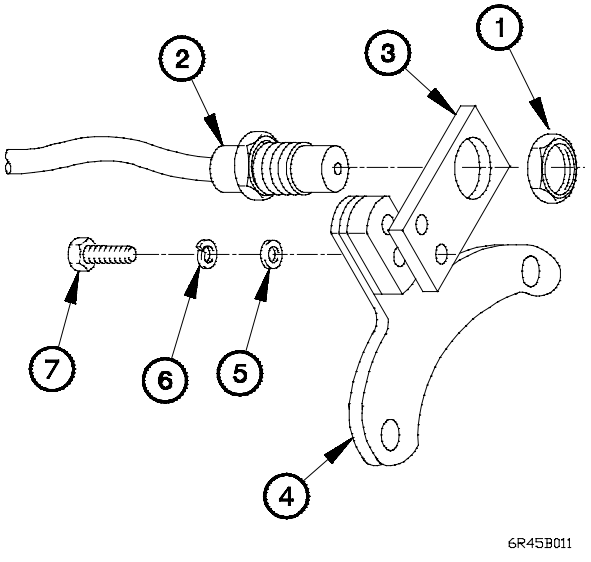
(6) Remove nut (16) and proximity sensor (17) from plate (15).

**b. Installation.**

(1) Remove nut (1) from proximity sensor (2).

(2) Install proximity sensor (2) in plate (3) with nut (1).

(3) Install plate (3) on bracket (4) with two washers (5), lockwashers (6), and screws (7).



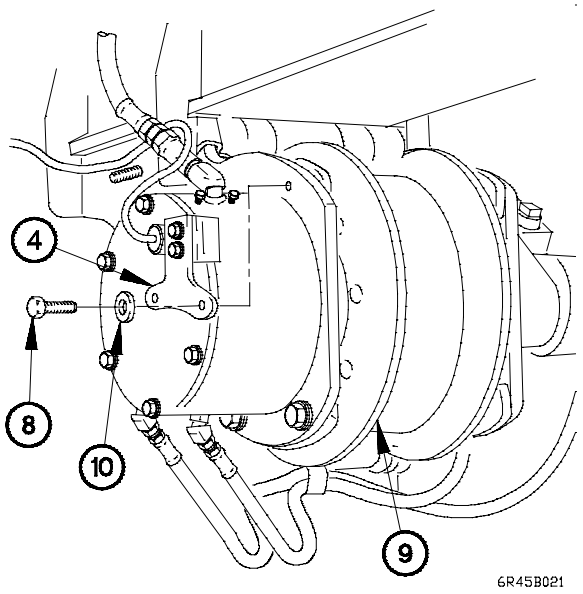
**WARNING**

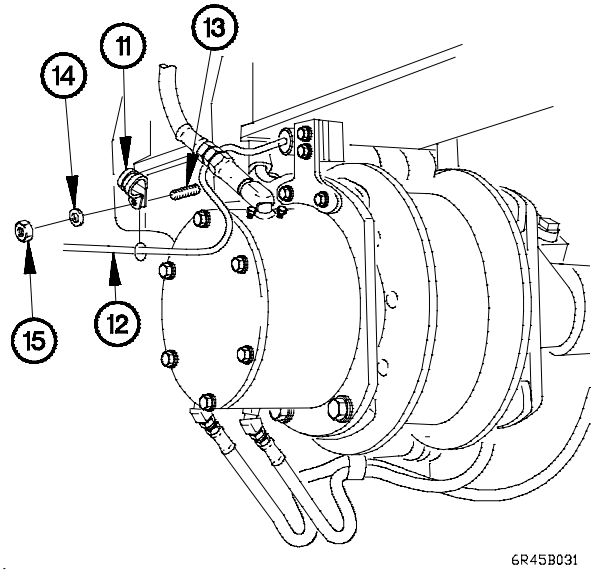
**Adhesive-sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If adhesive-sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(4) Apply sealing compound to threads of two screws (8).

(5) Position bracket (4) on hoist assembly (9) with two washers (10) and screws (8).

(6) Tighten screws (8) to 72-78 lb-ft (98-106 N·m).



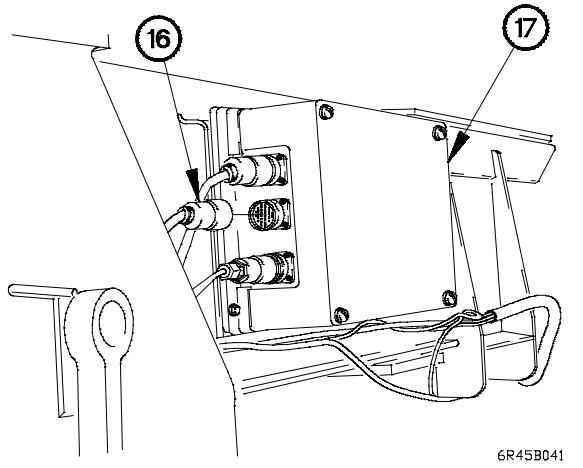

**NOTE**

Install plastic cable ties as required.

(7) Install clamp (11) on cable (12).

(8) Install clamp (11) on boom stud (13) with washer (14) and nut (15).

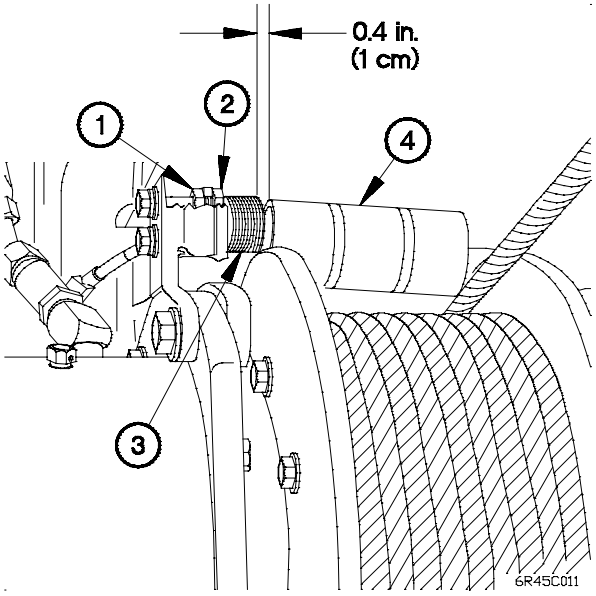
(9) Connect connector (16) to overload shutdown box (17).



## 16-45. M1089 PROXIMITY SENSOR REPLACEMENT (CONT)

**c. Adjustment.**

Adjust nuts (1 and 2) to obtain a 0.4 in. (1 cm) gap between proximity sensor (3) and cable follower (4).




**d. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Operate MHC and check for proper hoist operation. (TM 9-2320-366-10-2).

**End of Task.**

## 16-46. M1089 TENSION LOAD CELL REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over tool boxes (TM 9-2320-366-10-2).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Bar, Wrecking (Item 6, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)

**Materials/Parts (Cont)**
Packing, Preformed (2) (Item 231, Appendix F)
Packing, Preformed (Item 261, Appendix F)
Sealing Compound (Item 76, Appendix C)
Ties, Cable Plastic (Item 92, Appendix C)
Lockwasher (Item 138, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

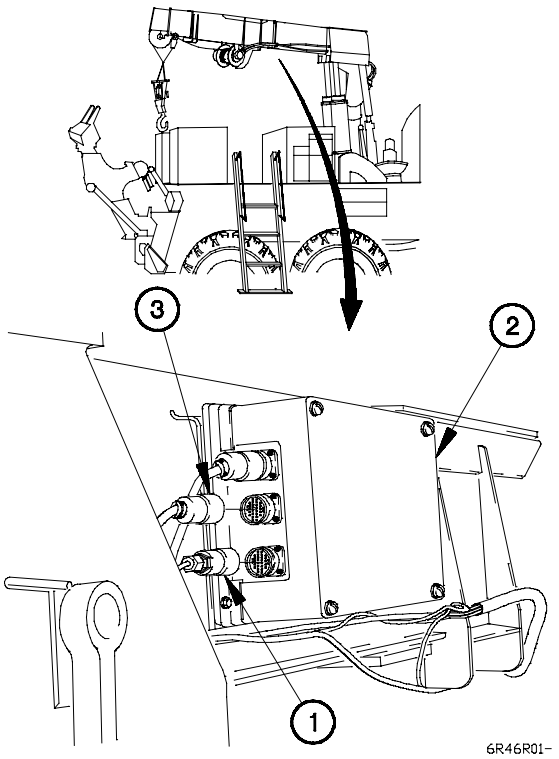
**a. Removal.**

**NOTE**

- Tag electrical connectors and connection points prior to disconnecting.
- Remove plastic cable ties as required.

(1) Disconnect tension load cell connector (1) from overload shutdown box (2).

(2) Disconnect proximity sensor connector (3) from overload shutdown box (2).



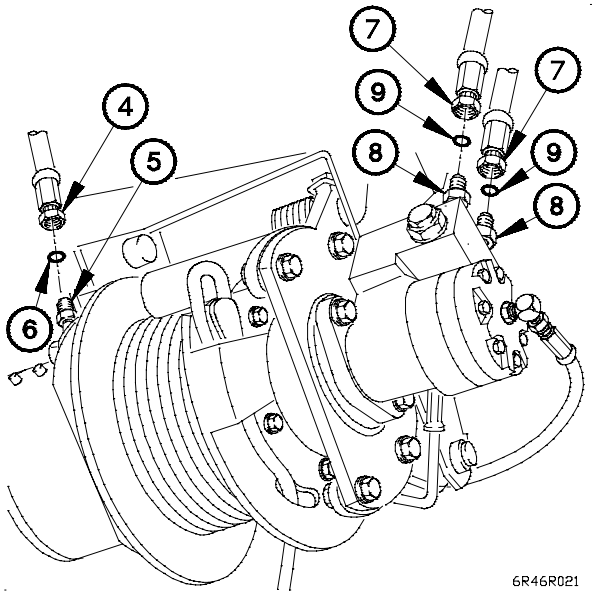
## 16-46. M1089 TENSION LOAD CELL REPLACEMENT (CONT)

**CAUTION**

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

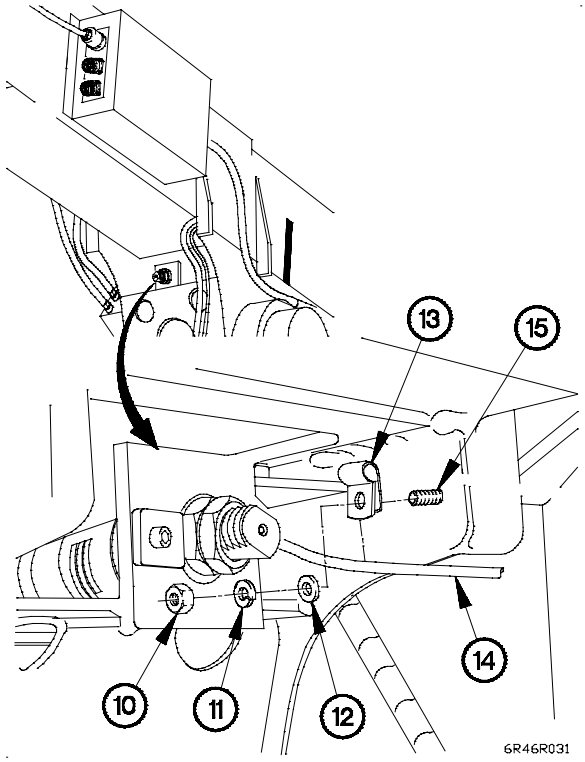



(3) Disconnect hydraulic hose (4) from check valve (5).

(4) Remove preformed packing (6) from check valve (5). Discard preformed packing.

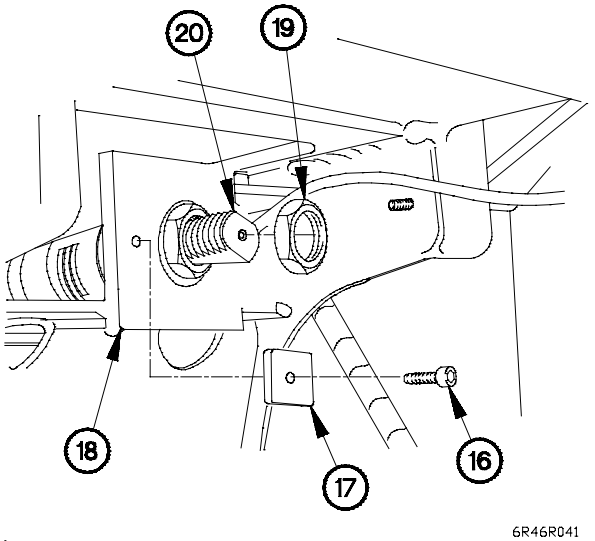
(5) Disconnect two hydraulic hoses (7) from fittings (8).

(6) Remove two preformed packings (9) from fittings (8). Discard preformed packings.




(7) Remove nut (10), lockwasher (11), washer (12), clamp (13), and tension load cell cable (14) from boom stud (15). Discard lockwasher.

(8) Remove clamp (13) from tension load cell cable (14).



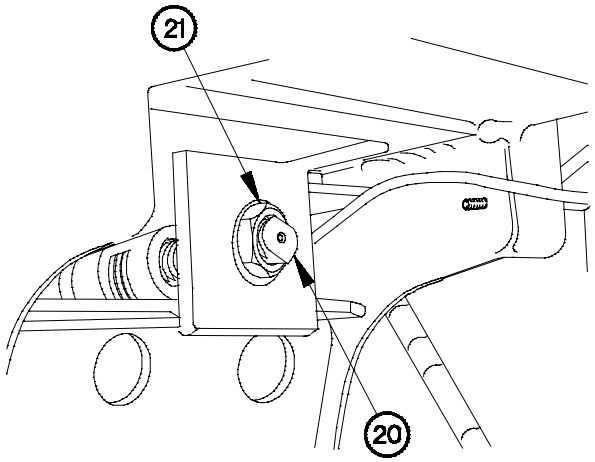

(9) Remove screw (16) and stop block (17) from boom brace (18).

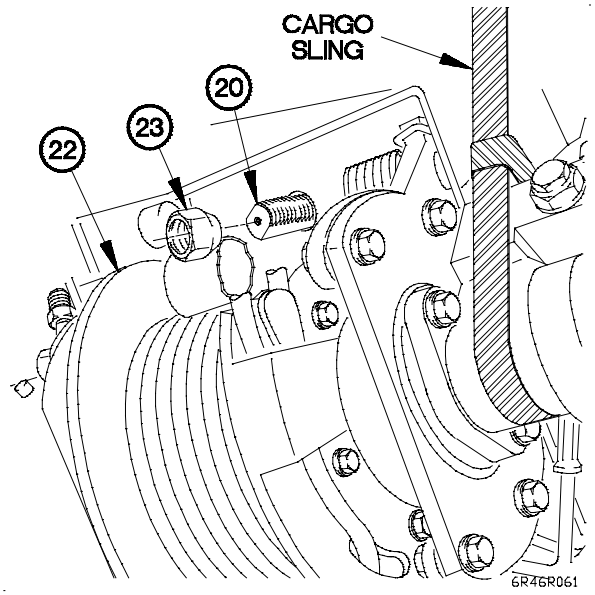
(10) Remove jam nut (19) from tension load cell (20).

**WARNING**

**Do not remove swivel nut on back side of tension load cell at this time. Failure to comply may result in injury to personnel or damage to equipment.**

(11) Loosen rear swivel nut (21) until flush with rear end of tension load cell (20).




**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.**

**NOTE**

Steps (12) and (13) require the aid of an assistant.

(12) Lift up on hoist assembly (22).

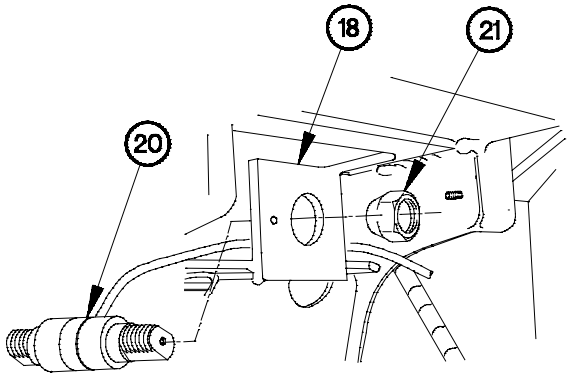
(13) Remove front swivel nut (23) from front of tension load cell (20).

(14) Remove hoist assembly (22) from tension load cell (20).

## 16-46. M1089 TENSION LOAD CELL REPLACEMENT (CONT)

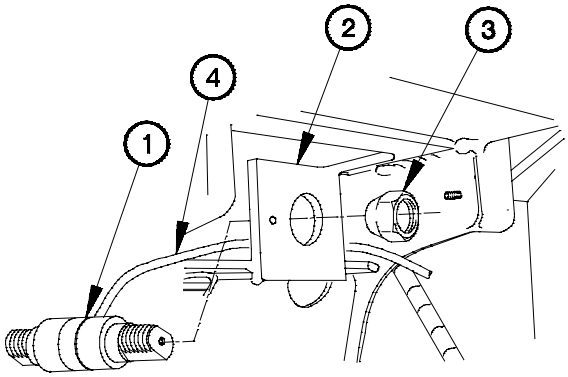
(15) Remove rear swivel nut (21) from tension load cell (20).

(16) Remove tension load cell (20) from boom brace (18).




6R46R071

**b. Installation.**




6R46I011

(1) Install rear tension load cell (1) in boom brace (2) with rear swivel nut (3).

(2) Tighten rear swivel nut (3) until flush with end.

(3) Route tension load cell cable (4) through hole in boom brace (2).

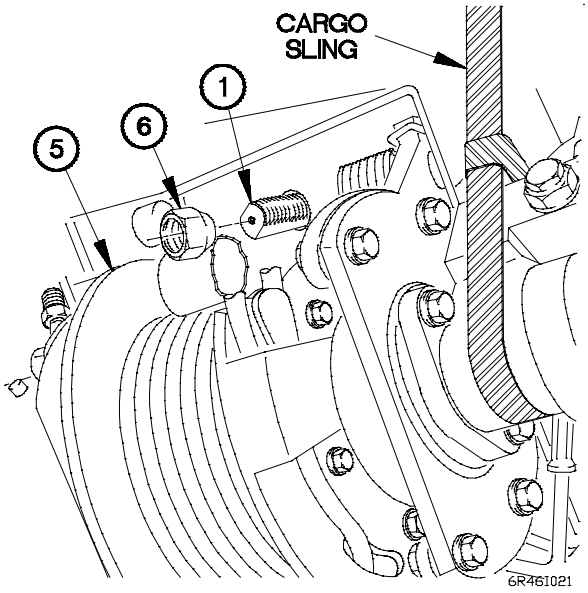
**WARNING**

**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.**

**NOTE**

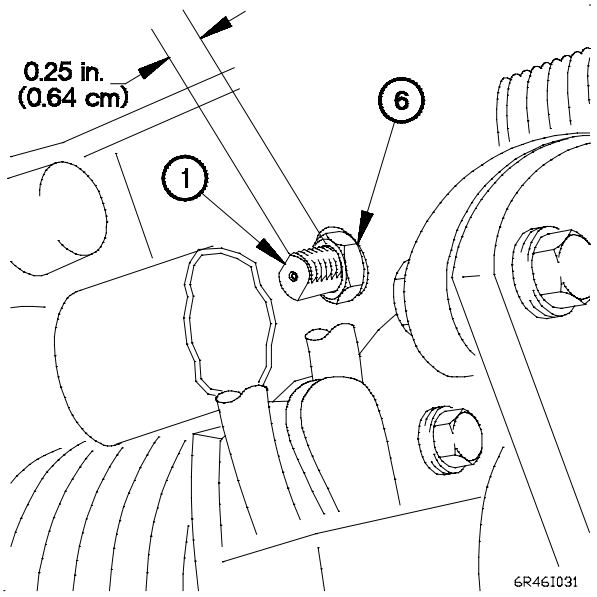
Step (4) requires the aid of an assistant.

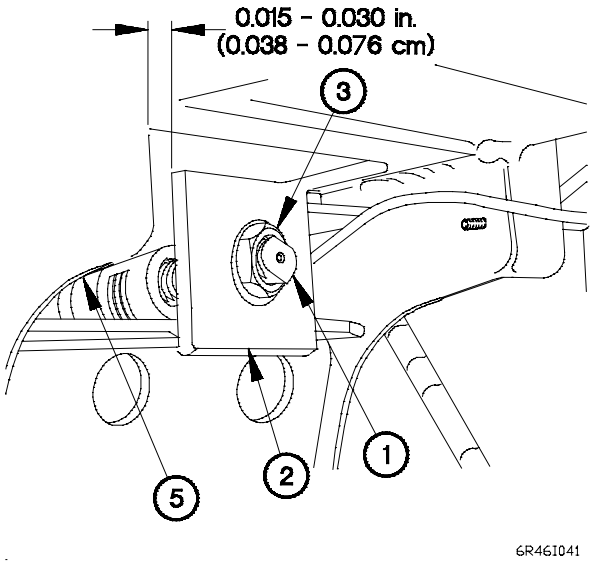
(4) Position hoist assembly (5) on front of tension load cell (1) with front swivel nut (6).




6R46I021

(5) Adjust front swivel nut (6) on tension load cell (1) until approximately 0.25 in. (0.64 cm) of threads are protruding past front swivel nut.




(6) Tighten rear swivel nut (3) on tension load cell (1) until gap between hoist assembly (5) and boom brace (2) is 0.015-0.030 inches (0.038-0.076 cm).

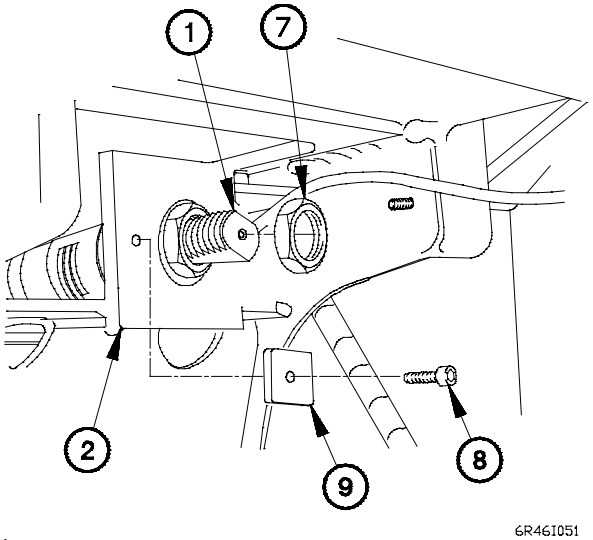
(7) Install jam nut (7) on tension load cell (1).

**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.**

(8) Apply sealing compound to threads of screw (8).

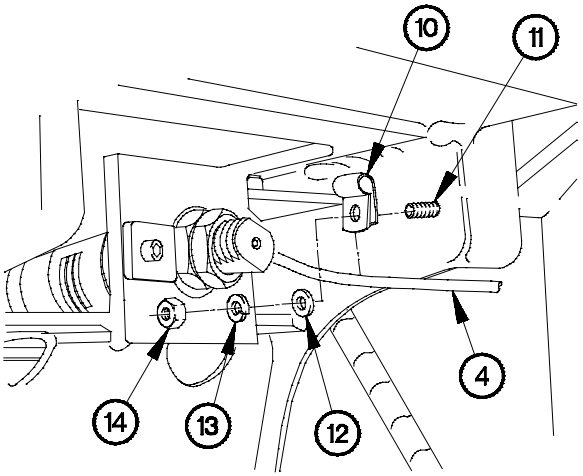
(9) Install stop block (9) on boom brace (2) with screw (8).



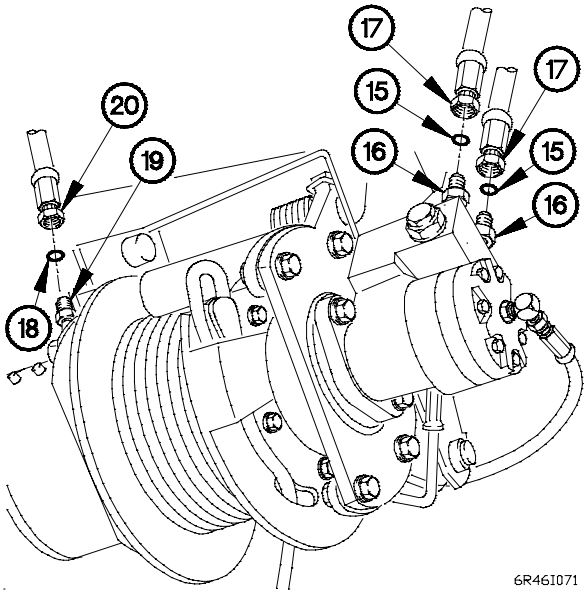
## 16-46. M1089 TENSION LOAD CELL REPLACEMENT (CONT)

(10) Position clamp (10) on tension load cell cable (4).

(11) Install clamp (10) on boom stud (11) with washer (12), lockwasher (13), and nut (14).




6R46I061




6R46I071

(12) Install two preformed packings (15) on fittings (16).

(13) Connect two hydraulic hoses (17) to fittings (16).

(14) Install preformed packing (18) on check valve (19).

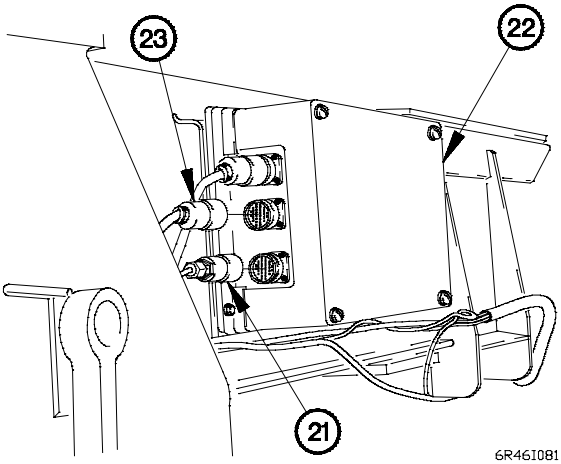
(15) Connect hydraulic hose (20) to check valve (19).

**NOTE**

Install plastic cable ties as required.

(16) Install tension load cell connector (21) on overload shutdown box (22).

(17) Install proximity sensor connector (23) on overload shutdown box (22).




6R46I081

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Perform crane load test (para 16-62).

**End of Task.**

## 16-47. M1089 HYDRAULIC MOTOR CONTROL VALVE REPLACEMENT

This task covers:

a. Removal
b. Installation
c. 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)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (4) (Item 139, Appendix F)

**Materials/Parts (Cont)**
Packing, Preformed (2) (Item 231, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Packing, Preformed (Item 262, Appendix F)
Packing, Preformed (Item 236, Appendix F)
Packing, Preformed (2) (Item 265, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**a. Removal.**

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

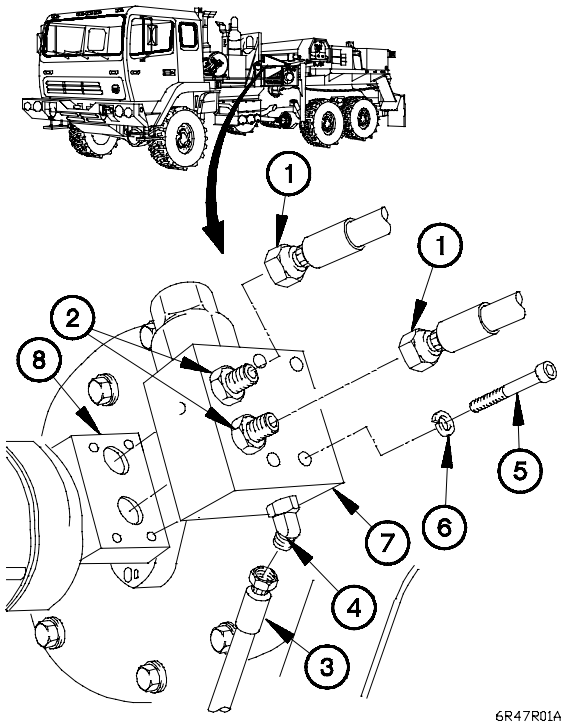
**NOTE**

Tag hoses and connection points prior to disconnecting.

(1) Disconnect two hoses (1) from fittings (2).

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

(3) Remove four screws (5), lockwashers (6), and hydraulic motor control valve (7) from hydraulic motor (8). Discard lockwashers.



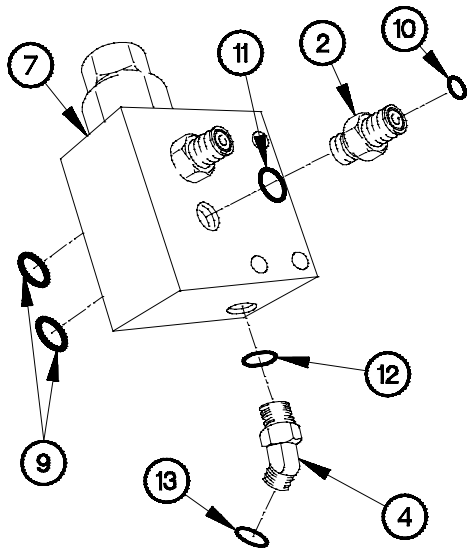
(4) Remove two preformed packings (9) from hydraulic motor control valve (7). Discard preformed packings.

(5) Remove two fittings (2) from hydraulic motor control valve (7).

(6) Remove two preformed packings (10) and preformed packings (11) from fittings (2). Discard preformed packings.

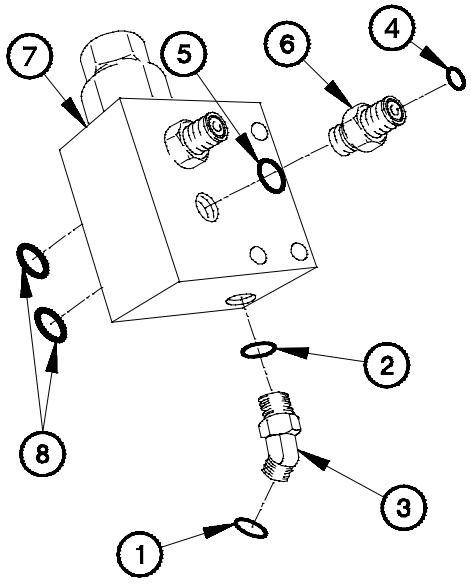
(7) Remove 45-degree fitting (4) from hydraulic motor control valve (7).

(8) Remove preformed packings (12 and 13) from 45-degree fitting (4). Discard preformed packings.



6R47R021

**b. Installation.**



6R47I011

(1) Install preformed packings (1 and 2) on 45-degree fitting (3).

(2) Install two preformed packings (4) and preformed packings (5) on fittings (6).

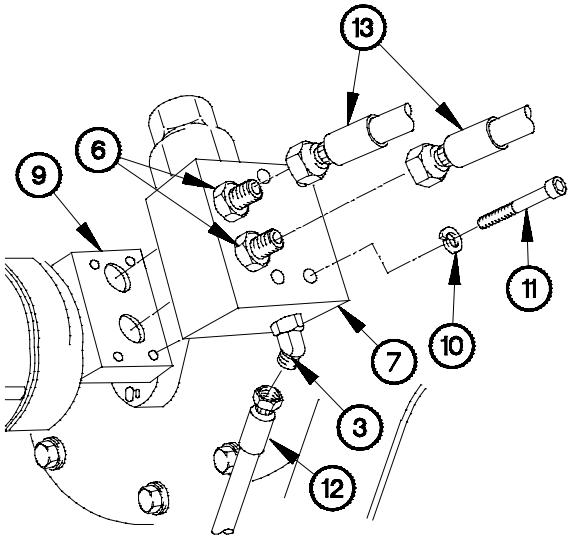
(3) Install 45-degree fitting (3) and two fittings (6) in hydraulic motor control valve (7).

(4) Install two preformed packings (8) on hydraulic motor control valve (7).

(5) Install hydraulic motor control valve (7) on hydraulic motor (9) with four lockwashers (10) and screws (11).

(6) Connect hose (12) to 45-degree fitting (3).

(7) Connect two hoses (13) to fittings (6).



6R47I021

## 16-47. M1089 HYDRAULIC MOTOR CONTROL VALVE REPLACEMENT (CONT)

**c. Follow-On Maintenance.**

Perform crane load test (para 16-62).

**End of Task.**

## 16-48. M1089 HOLDING VALVE REPLACEMENT

This task covers:

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

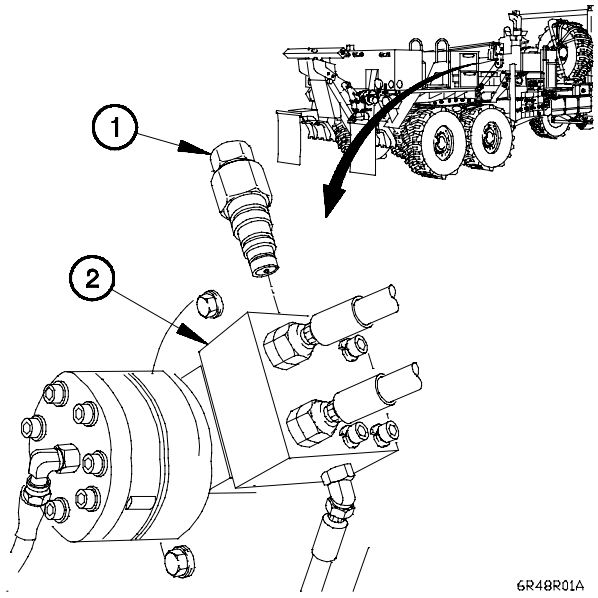
**INITIAL SETUP**

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

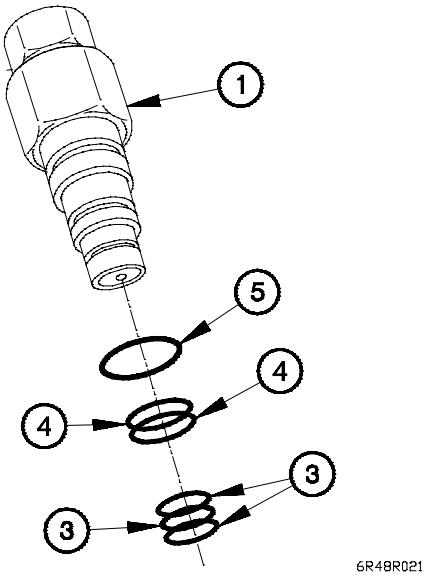
**Materials/Parts**
Kit, Seal (Item 107, Appendix F)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**a. Removal.**




(1) Remove holding valve (1) from motor control valve (2).




(2) Remove three preformed packings (3) from holding valve (1). Discard preformed packings.

(3) Remove two preformed packings (4) from holding valve (1). Discard preformed packings.

(4) Remove preformed packing (5) from holding valve (1). Discard preformed packing.

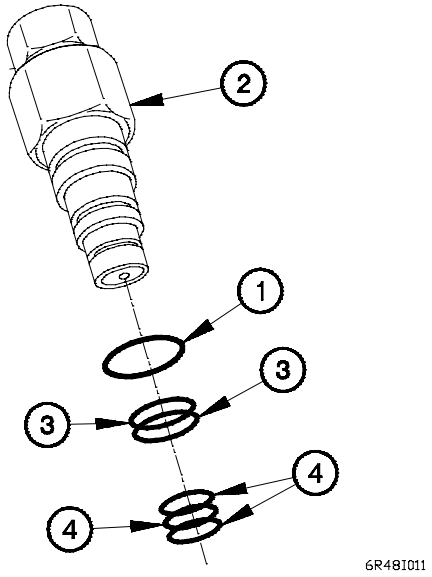
## 16-48. M1089 HOLDING VALVE REPLACEMENT (CONT)

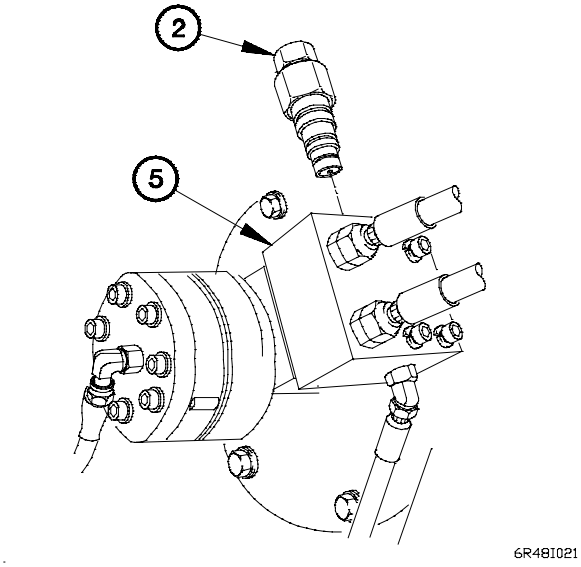
**b. Installation.**

(1) Install preformed packing (1) on holding valve (2).

(2) Install two preformed packings (3) on holding valve (2).

(3) Install three preformed packings (4) on holding valve (2).




(4) Install holding valve (2) in motor control valve (5).

**c. Follow-On Maintenance.**

Perform crane load test (para 16-62).

**End of Task.**

## 16-49. M1089 HOIST HYDRAULIC MOTOR REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Boom positioned over tool box (TM 9-2320-366-10-2).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic motor control valve removed (para 16-47).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Tools and Special Tools (Cont)**
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Parts Kit, Seal Replacement (Item 319, Appendix F)
Packing, Preformed (Item 262, Appendix F)
Packing, Preformed (Item 237, Appendix F)

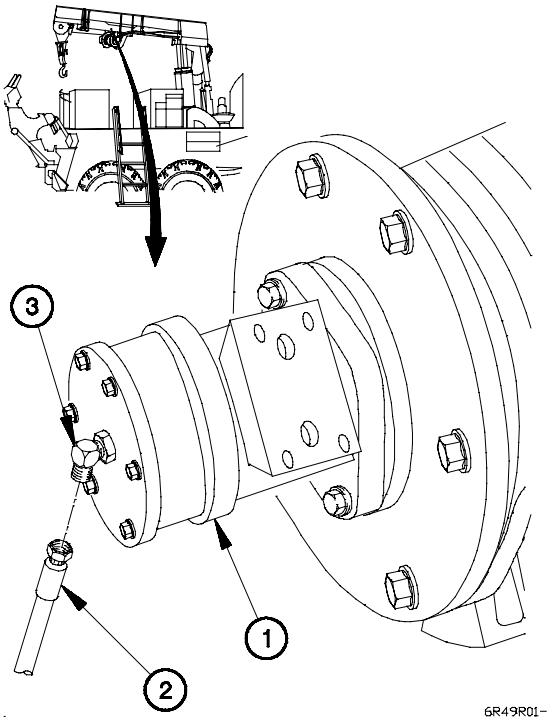
**a. Removal.**

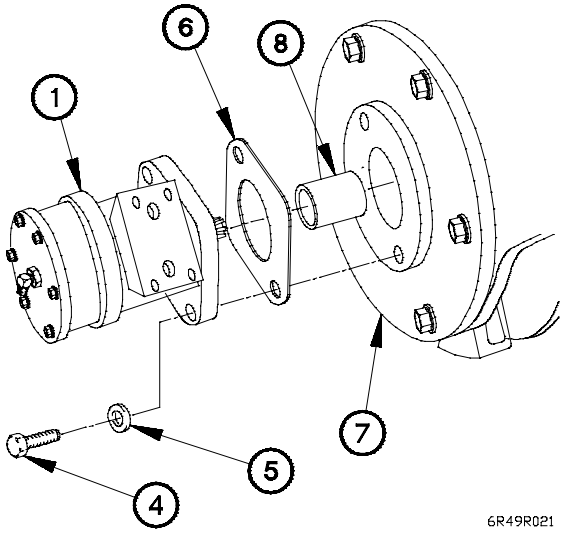
**CAUTION**

Cap or plug hydraulic openings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

(1) Place drain pan under hoist hydraulic motor (1).

(2) Disconnect hydraulic hose (2) from 90-degree fitting (3).




(3) Remove two screws (4), washers (5), hoist hydraulic motor (1), and gasket (6) from hoist assembly (7). Discard gasket.

**NOTE**

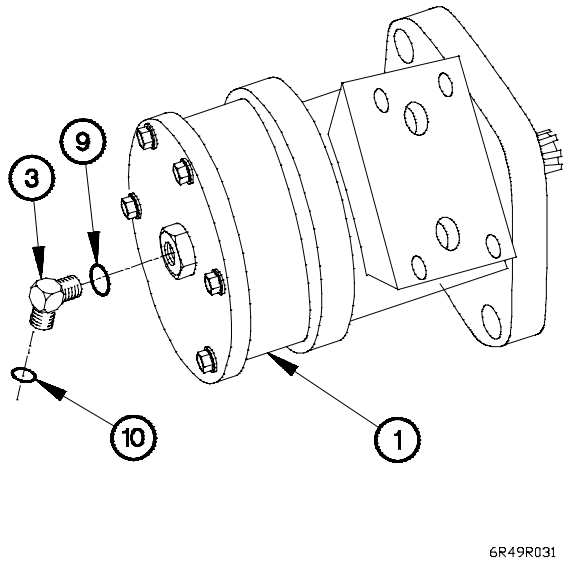
Observe orientation of boss coupling prior to removal.

(4) Remove boss coupling (8) from hoist assembly (7).

## 16-49. M1089 HOIST HYDRAULIC MOTOR REPLACEMENT (CONT)

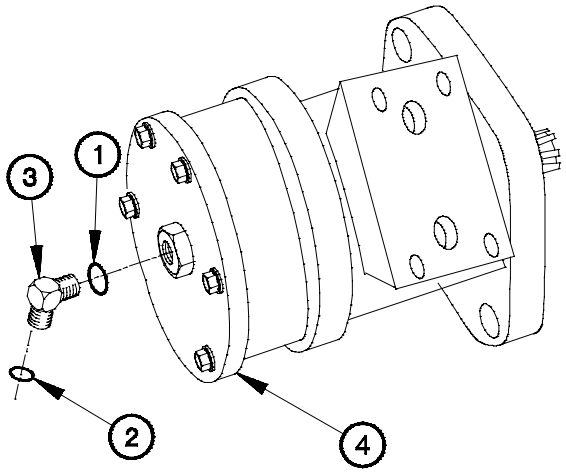
(5) Remove 90-degree fitting (3) from hoist hydraulic motor (1).

(6) Remove preformed packings (9 and 10) from 90-degree fitting (3). Discard preformed packings.




6R49R031

**b. Installation.**




6R49I011

(1) Install preformed packings (1 and 2) on 90-degree fitting (3).

(2) Install 90-degree fitting (3) on hoist hydraulic motor (4).

(3) Install unsplined end of boss coupling (5) in hoist assembly (6).

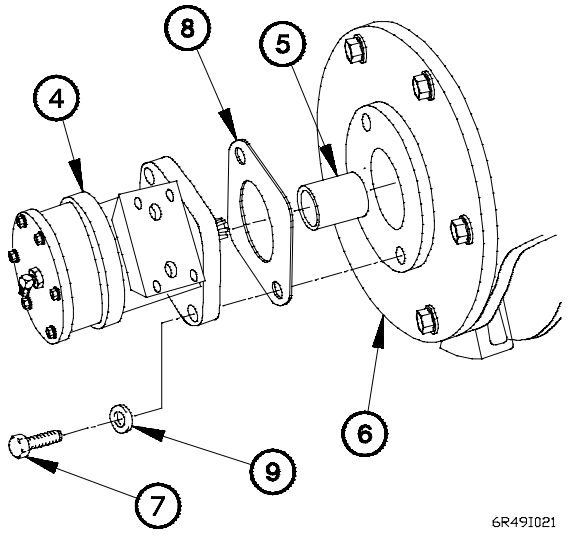
**WARNING**

**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.**

(4) Apply sealing compound to threads of two screws (7).

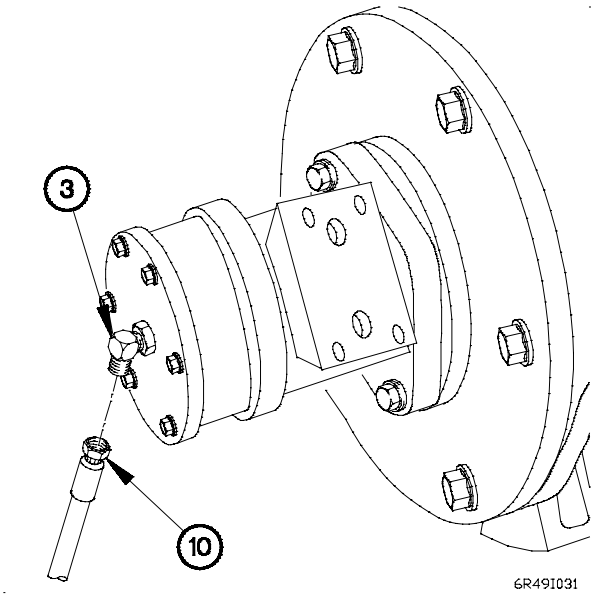
(5) Position gasket (8) and hoist hydraulic motor (4) on hoist assembly (6) with two washers (9) and screws (7).

(6) Tighten screws (7) to 60-90 lb-ft (81-122 N·m).




6R49I021

(7) Connect hydraulic hose (10) to 90-degree fitting (3).




**c. Follow-On Maintenance.**

(1) Install hydraulic motor valve assembly (para. 16-47).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Perform crane load test (para 16-62).

**End of Task.**

## 16-50. M1089 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Hook assembly removed (TM 9-2320-366-20-5).
Boom positioned over tool box (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (2) (Item 261, Appendix F)
Packing, Preformed (3) (Item 262, Appendix F)
Packing, Preformed (Item 263, Appendix F)

**a. Removal.**

(1) Place drain pan under oil filled disc brake assembly (1).

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

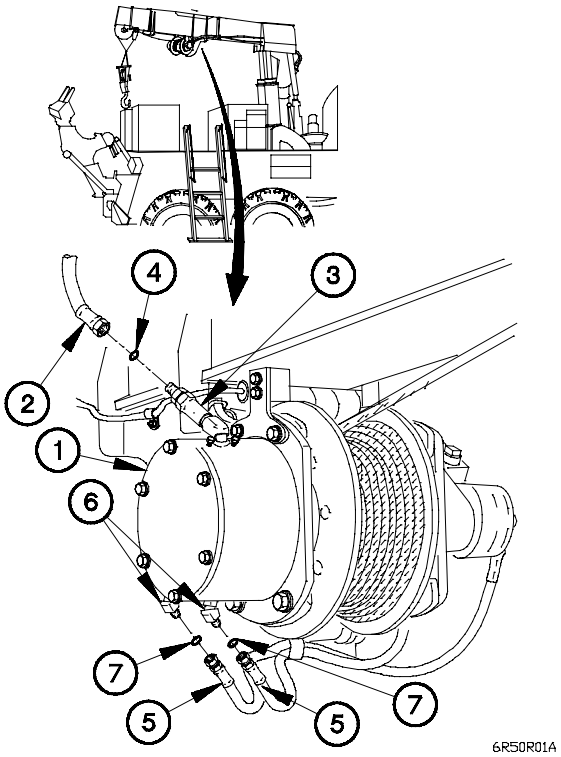
Tag all hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect hose (2) from check valve (3).

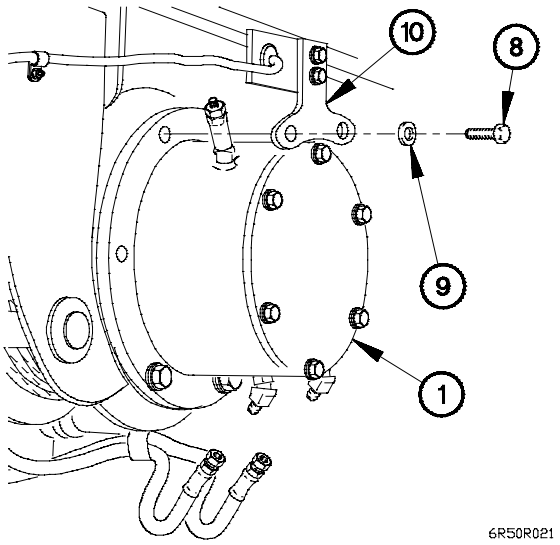
(3) Remove preformed packing (4) from check valve (3). Discard preformed packing.

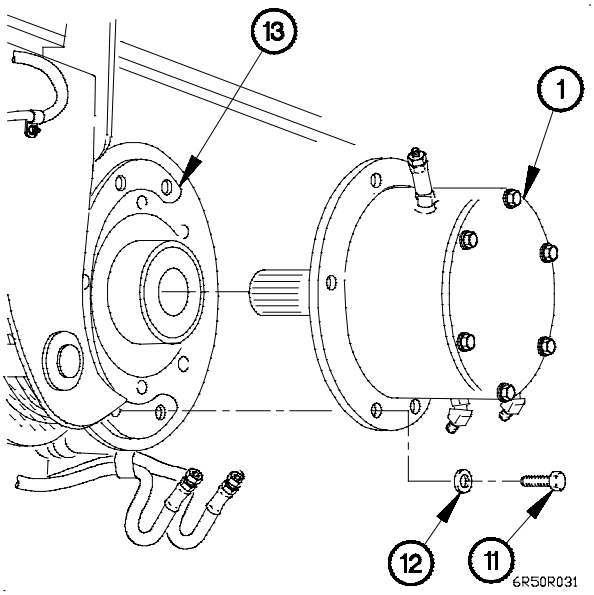
(4) Disconnect two hoses (5) from 45-degree fittings (6).

(5) Remove two preformed packings (7) from 45-degree fittings (6). Discard preformed packings.



(6) Remove two screws (8), washers (9), and bracket (10) from oil filled disc brake assembly (1).



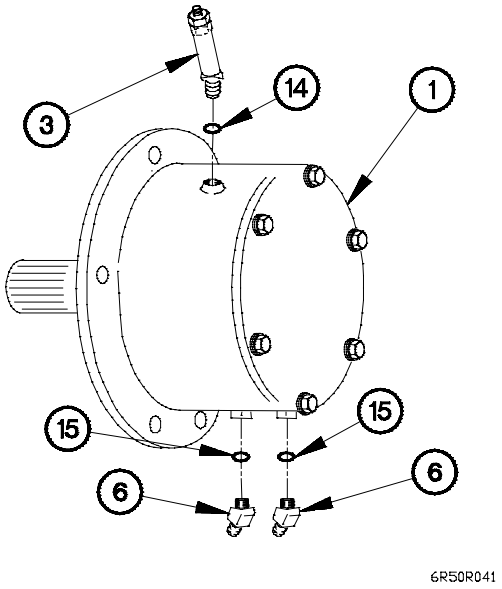

(7) Remove three screws (11), washers (12), and oil filled disc brake assembly (1) from hoist (13).

(8) Remove check valve (3) from oil filled disc brake assembly (1).

(9) Remove preformed packing (14) from check valve (3). Discard preformed packing.

(10) Remove two 45-degree fittings (6) from oil filled disc brake assembly (1).

(11) Remove two preformed packings (15) from 45-degree fittings (6). Discard preformed packings.



## 16-50. M1089 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT (CONT)

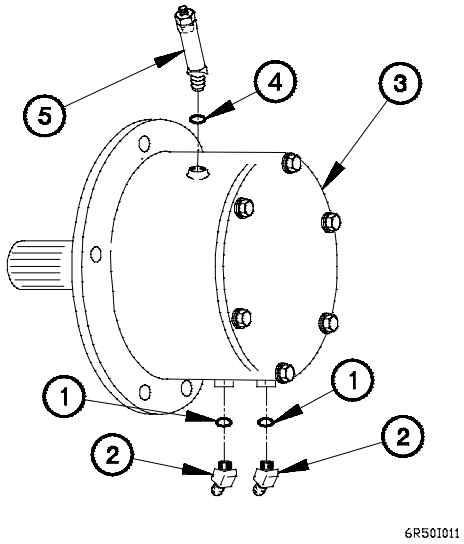
**b. Installation.**

(1) Install two preformed packings (1) on 45-degree fittings (2).

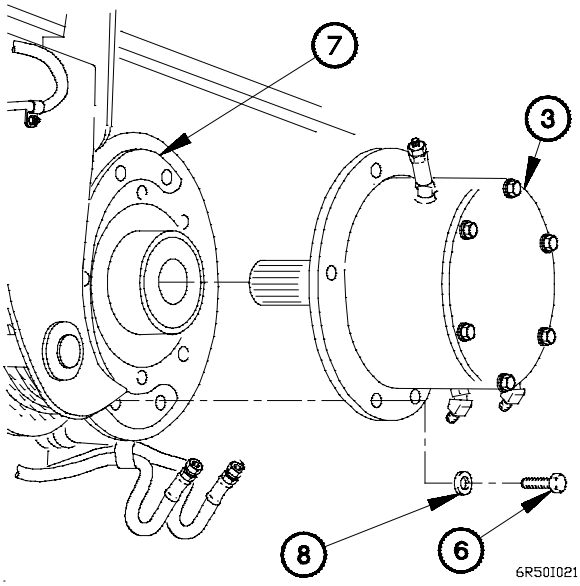
(2) Install two 45-degree fittings (2) on oil filled disc brake assembly (3).

(3) Install preformed packing (4) on check valve (5).

(4) Install check valve (5) on oil filled disc brake assembly (3).



6R50I011



6R50I021

**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.**

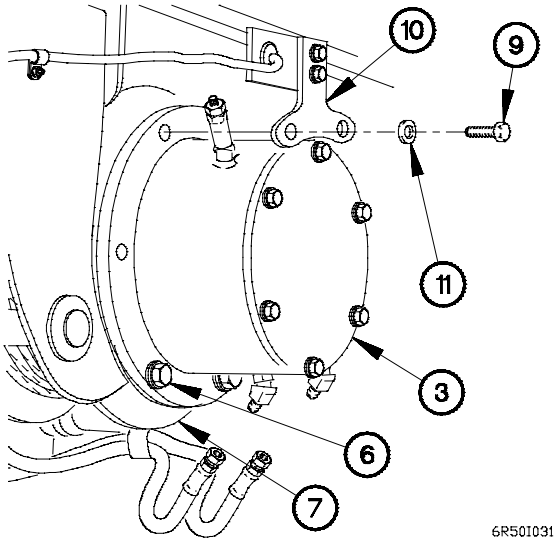
(5) Apply sealing compound to threads of three screws (6).

(6) Position oil filled disc brake assembly (3) on hoist (7) with three washers (8) and screws (6).

(7) Apply sealing compound to threads of two screws (9).

(8) Position bracket (10) on oil fill disc brake assembly (3) with two washers (11) and screws (9).

(9) Tighten screws (6 and 9) to 60-90 lb-ft (81-122 N•m).



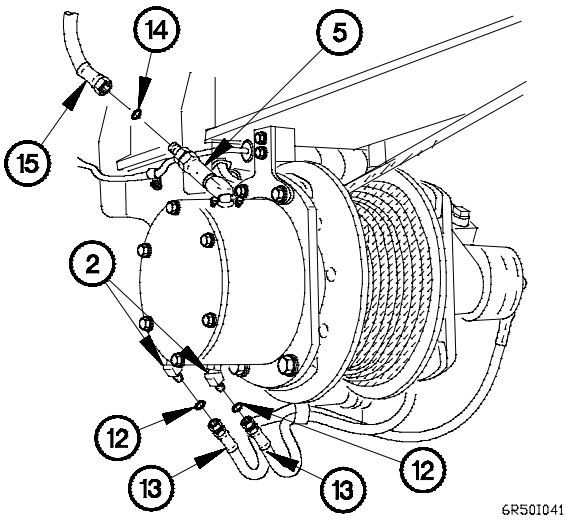
6R50I031

(10) Install two preformed packings (12) on 45-degree fittings (2).

(11) Connect two hoses (13) to 45-degree fittings (2).

(12) Install preformed packing (14) on check valve (5).

(13) Connect hose (15) to check valve (5).




**c. Follow-On Maintenance.**

(1) Install hook assembly (TM 9-2320-366-20-5).

(2) Perform crane load test (para 16-62).

**End of Task.**

## 16-51. M1089 GEAR SET REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

**INITIAL SETUP**

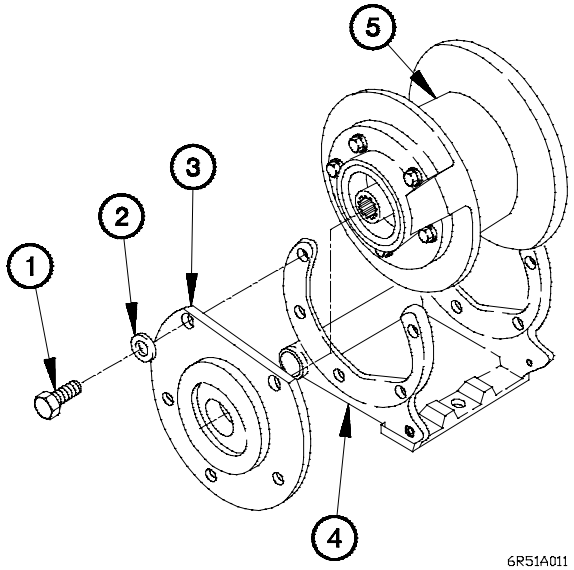
**Equipment Conditions**
Hydraulic motor control valve assembly removed (para 16-47).
Hoist hydraulic motor removed (para 16-49).
Oil filled disc brake assembly removed (para 16-50).
Hoist assembly removed (para 16-43).
Cable follower removed (para 16-44).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**Tools and Special Tools (Cont)**
Gloves, Rubber (Item 26, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 95, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

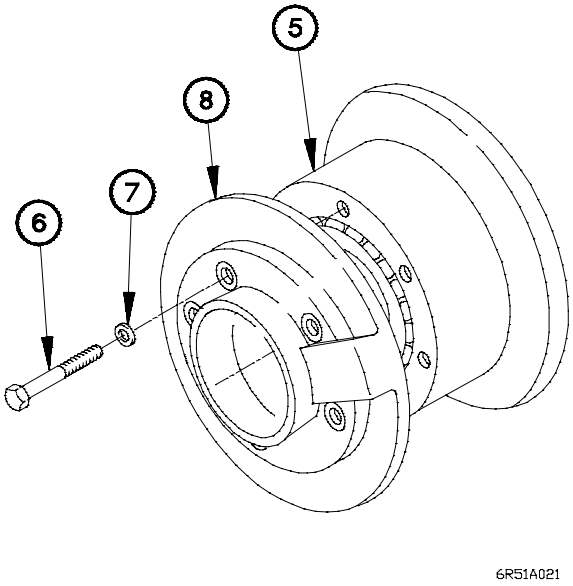
**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Sealing Compound (Item 76, Appendix C)
Parts Kit, Seal Replacement (Item 319, Appendix F)

**a. Disassembly.**




(1) Remove five screws (1), washers (2), and retaining plate (3) from housing (4).

(2) Remove ring gear (5) from housing (4).




(3) Remove six screws (6) and washers (7) from RH drum end (8).

(4) Remove RH drum end (8) from ring gear (5).

(5) Remove preformed packing (9) from RH drum end (8). Discard preformed packing.

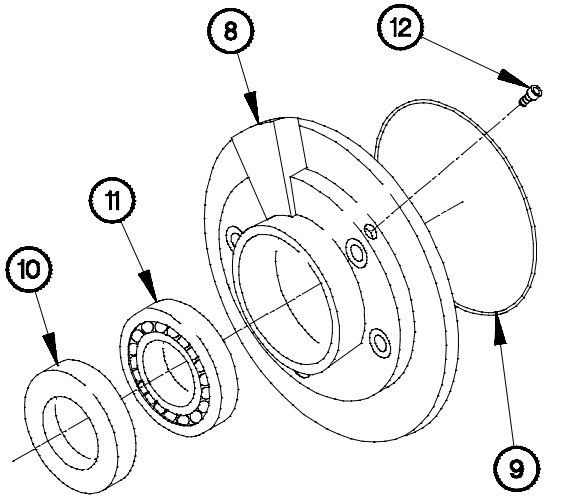
(6) Remove seal (10) from RH drum end (8). Discard seal.

**NOTE**

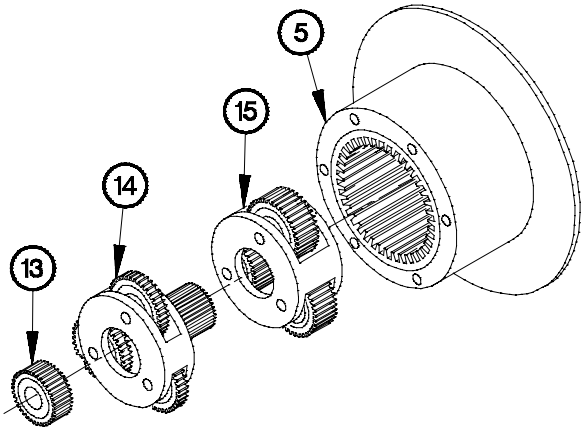
Note position of bearing prior to removal.

(7) Remove bearing (11) from RH drum end (8).

(8) Remove two plugs (12) from RH drum end (8).




6R51A031




6R51A041

(9) Remove sun gear (13) from carrier (14).

(10) Remove carrier (14) from ring gear (15).

(11) Remove ring gear (15) from carrier (5).

## 16-51. M1089 GEAR SET 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.**

**NOTE**

All three gears are disassembled the same way. One gear shown.

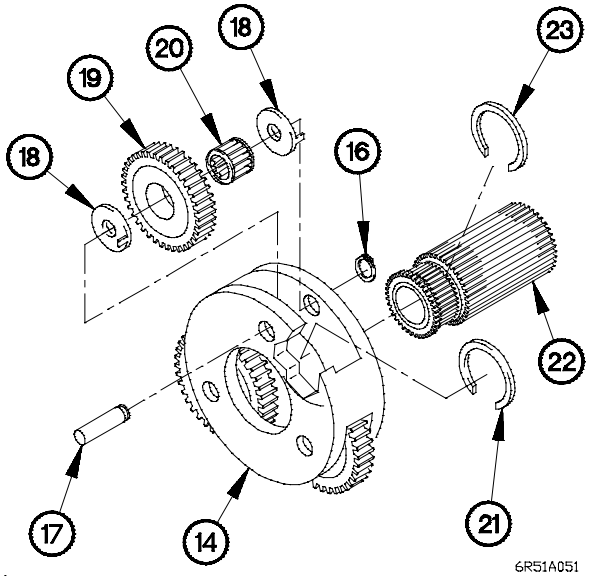
(12) Remove retaining ring (16), pin (17), two washers (18), gear (19), and roller set (20) from carrier (14).

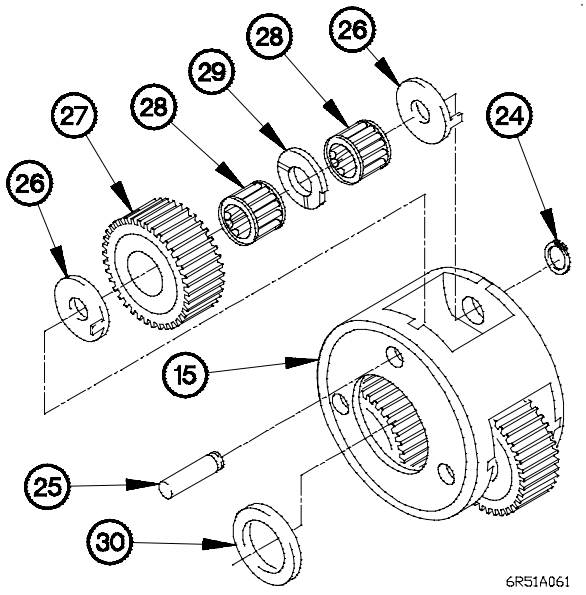
(13) Perform step (12) on two remaining gears (19).

(14) Remove retaining ring (21) from drive gear (22).

(15) Remove drive gear (22) from carrier (14).

(16) Remove retaining ring (23) from drive gear (22).




**NOTE**

All three gears are disassembled the same way. One gear shown.

(17) Remove retaining ring (24) from pin (25).

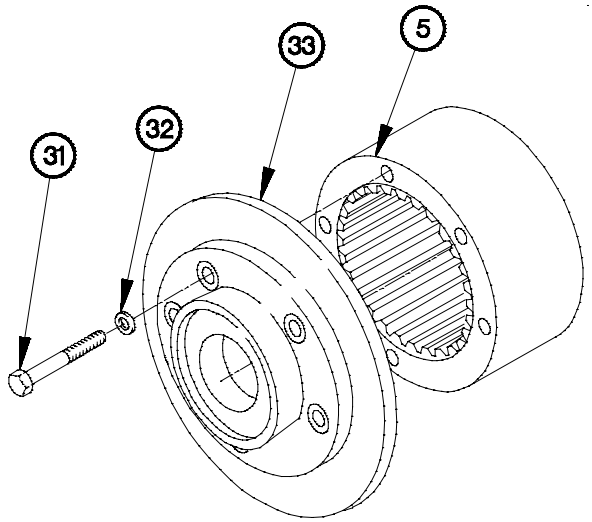
(18) Remove pin (25), two washers (26), and gear (27) from carrier (15).

(19) Remove two roller sets (28) and separator (29) from gear (27).

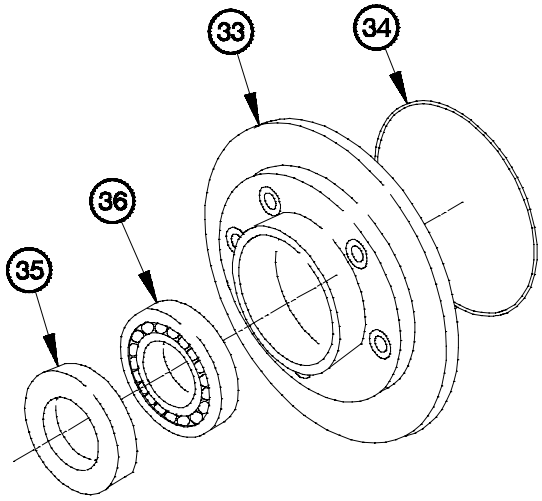
(20) Perform steps (17) through (19) on two remaining gears (27).

(21) Remove washer (30) from carrier (15).

(22) Remove eight screws (31), washers (32), and LH drum end (33) from ring gear (5).




6R51A071




6R51A081

(23) Remove preformed packing (34) from LH drum end (33). Discard preformed packing.

(24) Remove seal (35) from LH drum end (33). Discard seal.

(25) Remove bearing (36) from LH drum end (33).

## 16-51. M1089 GEAR SET 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.**

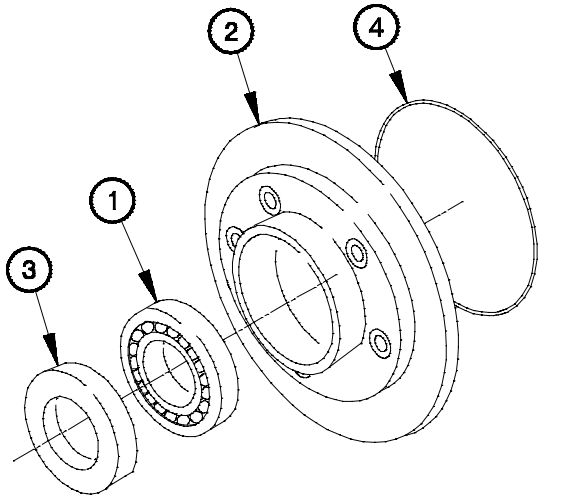
(1) Clean all metal parts with dry cleaning solvent.

**NOTE**

Replace any part that fails visual inspection.

(2) Inspect all parts for pitting, corrosion, or signs of binding.

**c. Assembly.**




6R51C011

(1) Install bearing (1) in LH drum end (2).

(2) Install seal (3) in LH drum end (2).

(3) Install preformed packing (4) on LH drum end (2).

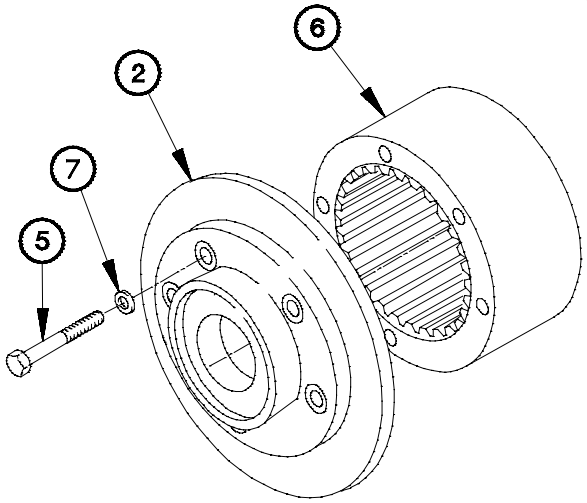
**WARNING**

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

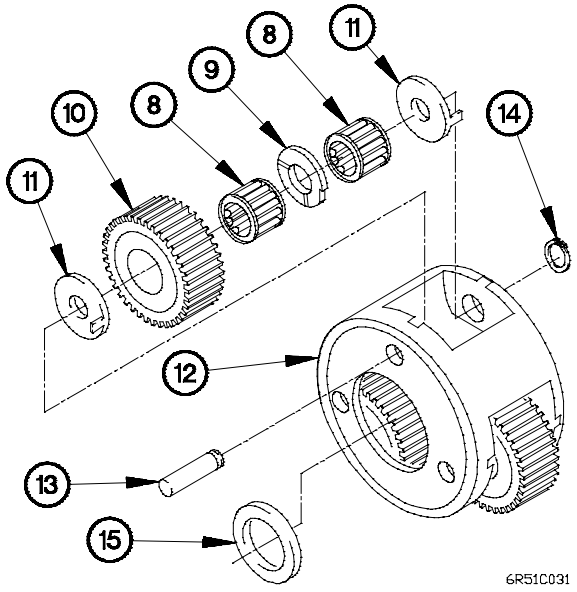
(4) Apply sealing compound to threads of eight screws (5).

(5) Position LH drum end (2) on ring gear (6) with eight washers (7) and screws (5).

(6) Tighten screws (5) to 168-192 lb-in. (19-22 N·m).




6R51C021




6R51C031

**NOTE**

All three gears are assembled the same way. One gear shown.

(7) Install two roller sets (8) and separator (9) in gear (10).

(8) Install gear (10) and two washers (11) in carrier (12) with pin (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.**

(9) Install retaining ring (14) on pin (13).

(10) Perform steps (7) through (9) on two remaining gears (10).

(11) Install washer (15) in carrier (12).

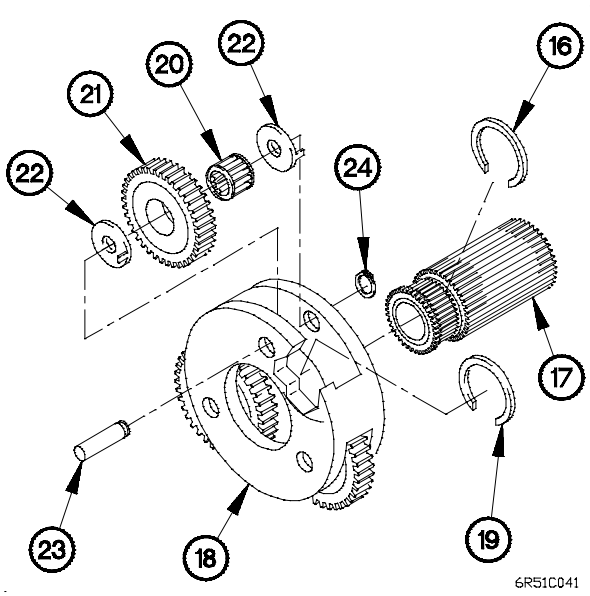
## 16-51. M1089 GEAR SET REPAIR (CONT)

**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.**

**NOTE**

All three gears are assembled the same way. One gear shown.




(12) Install retaining ring (16) on drive gear (17).

(13) Install drive gear (17) in carrier (18).

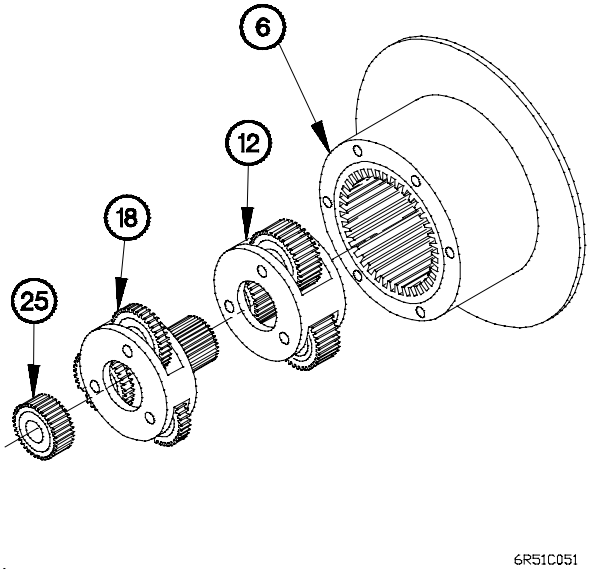
(14) Install retaining ring (19) on drive gear (17).

(15) Install roller set (20) in gear (21).

(16) Install two washers (22) and gear (21) in carrier (18) with pin (23).

(17) Install retaining ring (24) on pin (23).

(18) Perform steps (12) through (17) on two remaining gears (21).




(19) Install carrier (12) in ring gear (6).

(20) Install carrier (18) in ring gear (6).

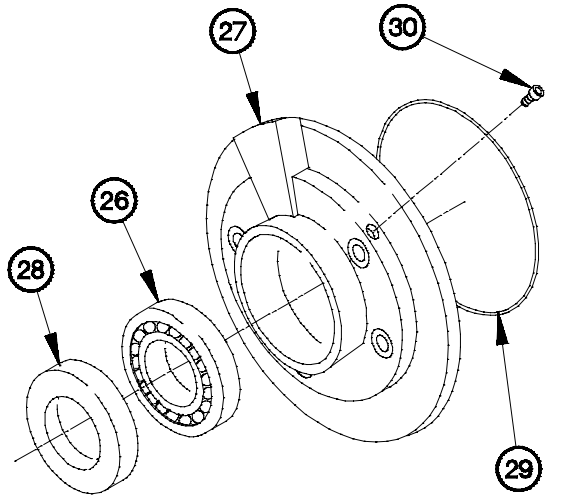
(21) Install sun gear (25) in carrier (18).

(22) Install bearing (26) in RH drum end (27).

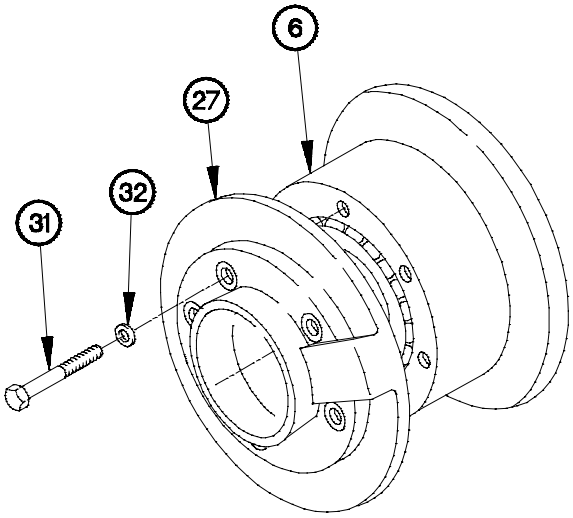
(23) Install seal (28) in RH drum end (27).

(24) Install preformed packing (29) on RH drum end (27).

(25) Install two plugs (30) in RH drum end (27).




6R51C061




6R51C071

**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.**

(26) Apply sealing compound to threads of six bolts (31).

(27) Position RH drum end (27) on ring gear (6) with six washers (32) and screws (31).

(28) Tighten screws (31) to 63-69 lb-ft (85-94 N•m).

## 16-51. M1089 GEAR SET REPAIR (CONT)

(29) Install ring gear (6) in housing (33).

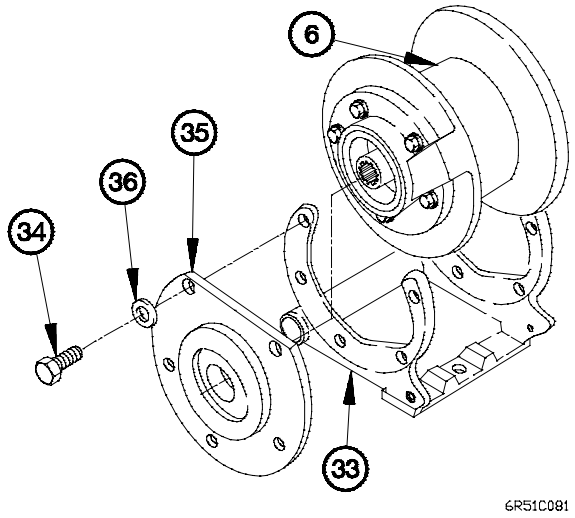
**WARNING**

**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.**

(30) Apply sealing compound to threads of five screws (34).

(31) Position retaining plate (35) on housing (33) with five washers (36) and screws (34).

(32) Tighten screws (34) to 63-69 lb-ft (85-94 N•m).




**d. Follow-On Maintenance.**

(1) Install cable follower (para 16-44).

(2) Install hoist assembly (para 16-43).

(3) Install oil filled disc brake assembly (para 16-50).

(4) Install hoist hydraulic motor (para 16-49).

(5) Install hydraulic motor valve assembly (para 16-47).

(6) Perform crane load test (para 16-62).

**End of Task.**

## 16-52. M1089 OVERLOAD SHUTDOWN REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**Materials/Parts**
Lockwasher (3) (Item 139, Appendix F)
Lockwasher (2) (Item 144, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**NOTE**

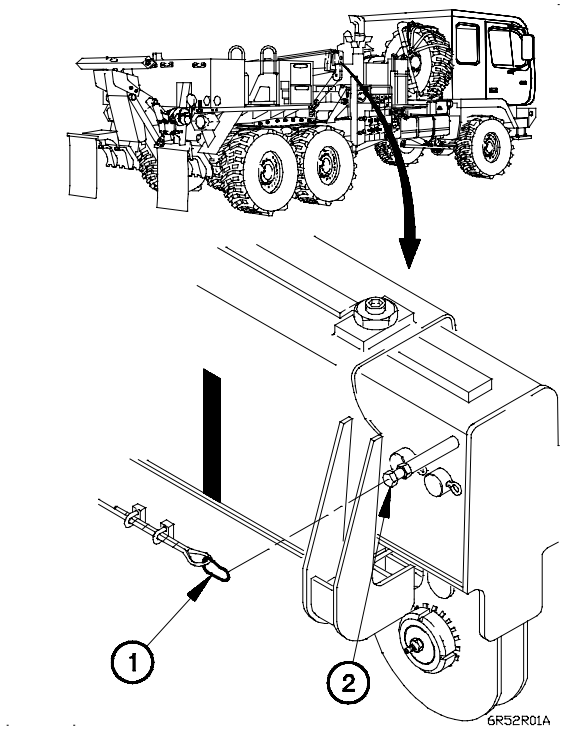
Use serial number of MHC when ordering replacement overload shutdown.

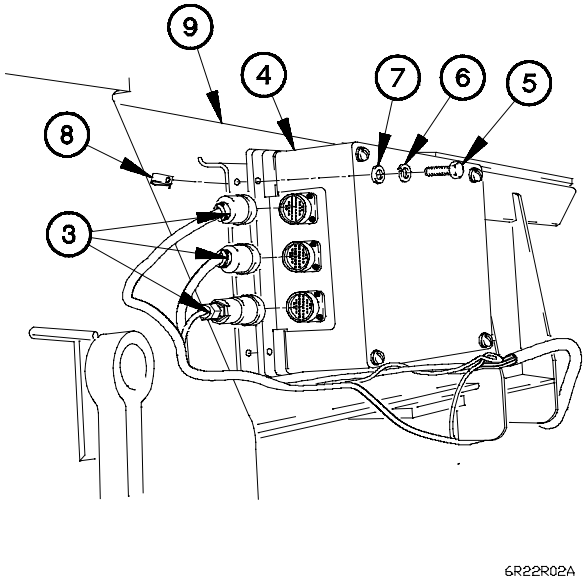
**a. Removal.**

**CAUTION**

Overload shutdown cable is on a tension reel. Allow cable to rewind slowly. Failure to comply may result in damage to equipment.

(1) Disconnect cable eye (1) from bolt (2).




**NOTE**

Tag connectors and connection points prior to disconnecting.

(2) Disconnect three connectors (3) from overload shutdown (4).

**NOTE**

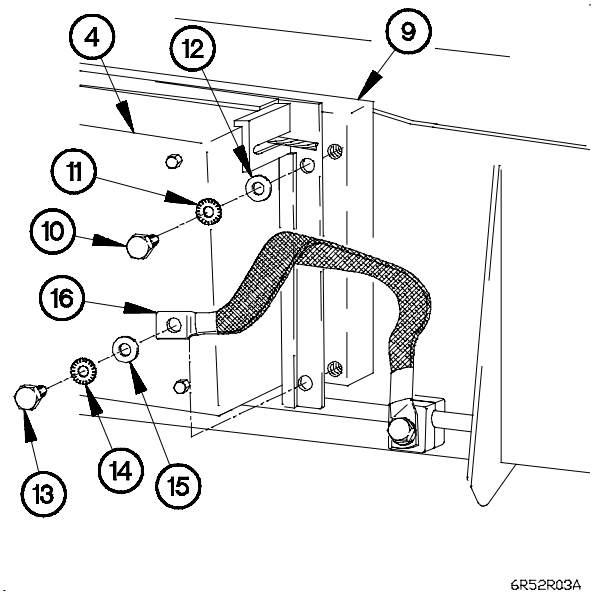
Step (3) requires the aid of an assistant.

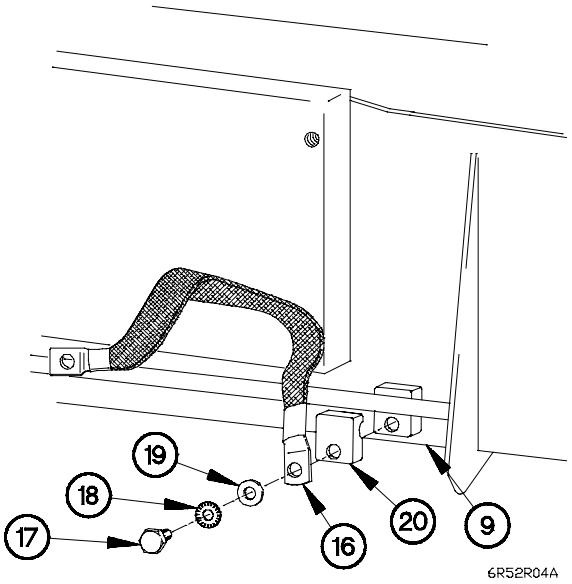
(3) Remove two bolts (5), lockwashers (6), washers (7), and clipnuts (8) from boom assembly (9). Discard lockwashers.

## 16-52. M1089 OVERLOAD SHUTDOWN REPLACEMENT (CONT)

(4) Remove bolt (10), lockwasher (11), and washer (12) from overload shutdown (4).

(5) Remove bolt (13), lockwasher (14), washer (15), ground strap (16), and overload shutdown (4) from boom assembly (9). Discard lockwasher.

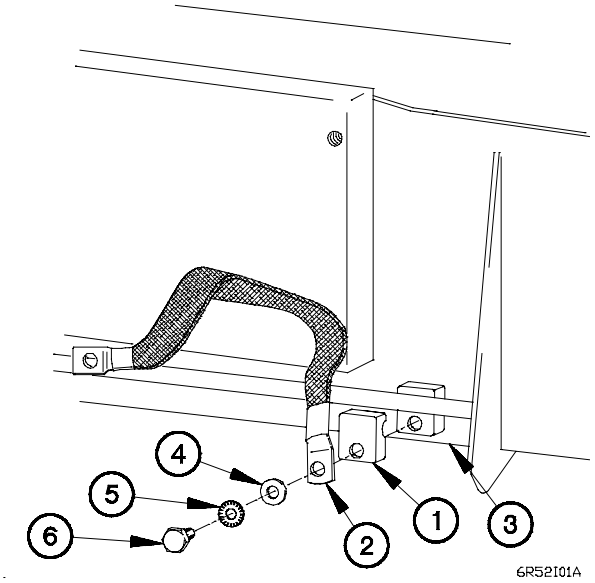



(6) Remove bolt (17), lockwasher (18), washer (19), ground strap (16), and clamp (20) from boom assembly (9). Discard lockwasher.

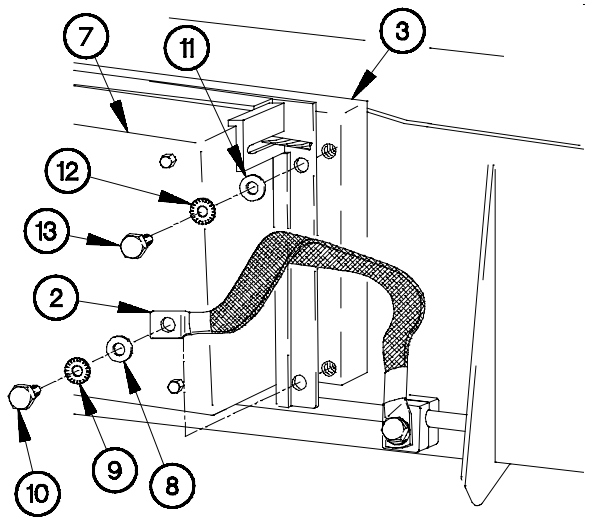
**b. Installation.**

(1) Install clamp (1) and ground strap (2) on boom assembly (3) with washer (4), lockwasher (5), and bolt (6).

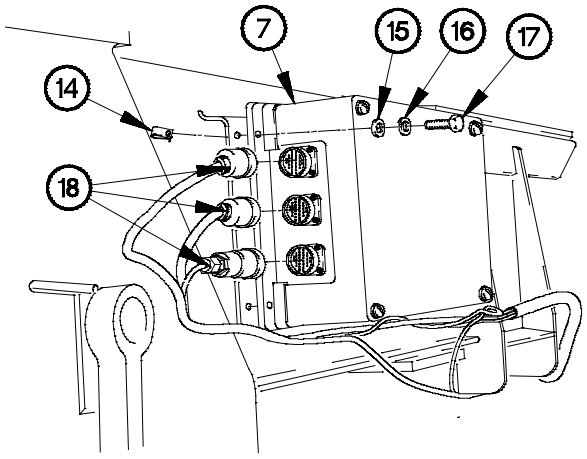


(2) Install overload shutdown (7) and ground strap (2) on boom assembly (3) with washer (8), lockwasher (9), and bolt (10).

(3) Install washer (11), lockwasher (12) and bolt (13) in overload shutdown (7).




6R52102A




6R521031

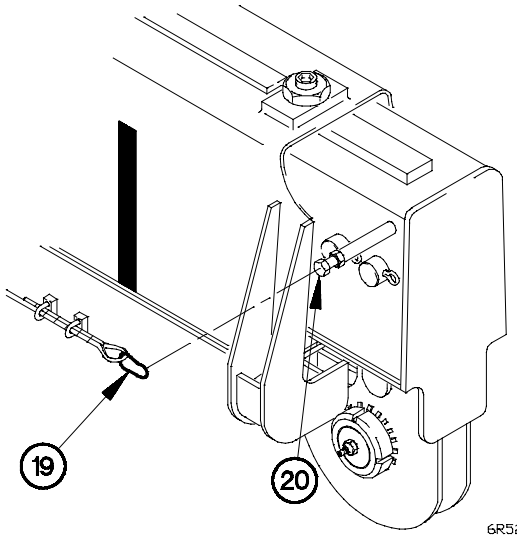
**NOTE**

Step (4) requires the aid of an assistant.

(4) Install two clipnuts (14), washers (15), lockwashers (16), and bolts (17) in overload shutdown (7).

(5) Connect three connectors (18) to overload shutdown (7).

(6) Connect cable eye (19) to bolt (20).




6R52104A

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Perform crane load test (para 16-62).

**End of Task.**

## 16-53. M1089 SWING DRIVE 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**
MHC rotated to access swing drive gear (TM 9-2320-366-10-2).
Engine shutdown (TM 9-2320-366-10-1).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).
Cross relief valve removed (para 16-54).
Hydraulic orbit motor removed (para 16-55).

**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)
Bracket, Swing Drive Assembly (Item 23, Appendix D)
Gloves, Rubber (Item 26, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Tools and Special Tools (Cont)**
Socket Tool, Spanner (Item 19, Appendix D)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Sealing Compound (Item 76, Appendix C)
Lubricating Oil, Gear (Item 52, Appendix C)
Packing, Preformed (Item 236, Appendix F)
Retainer, Packing (2) (Item 352, Appendix F)
Packing, Preformed (2) (Item 226, Appendix F)
Packing, Preformed (Item 267, Appendix F)
Retainer, Packing (Item 353, Appendix F)
Lockwasher (16) (Item 140, Appendix F)
Seal, Plain Encased (Item 392, Appendix F)
Lockwasher (Item 127, Appendix F)

**Personnel Required**
(3)

**WARNING**

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

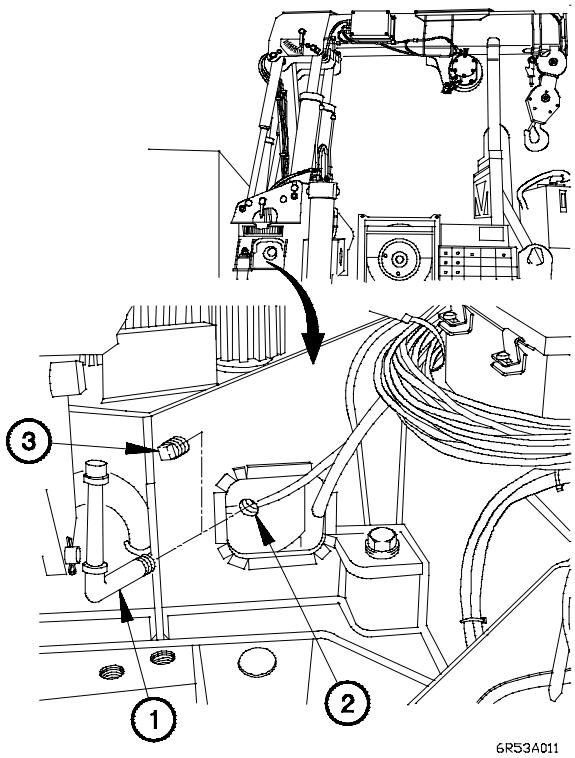
**a. Removal.**

**CAUTION**

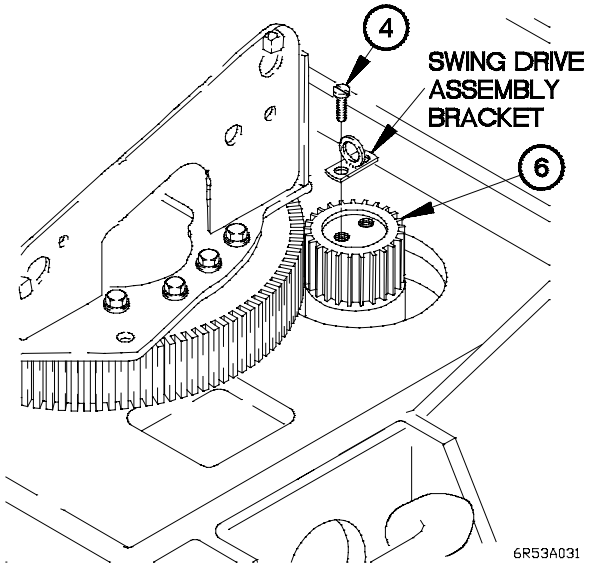
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

(1) Remove oil fill pipe (1) from oil fill pipe hole (2).

(2) Install plug (3) in oil fill pipe hole (2).



(3) Remove two screws (4) and plate (5) from swing drive assembly (6).



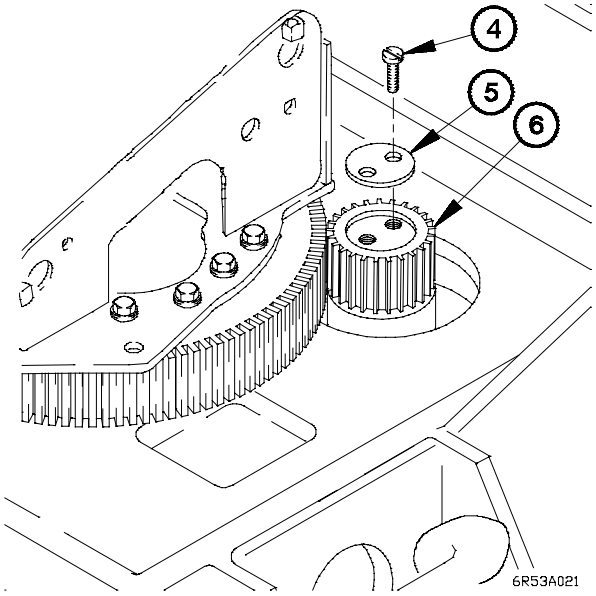

**WARNING**

**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.**

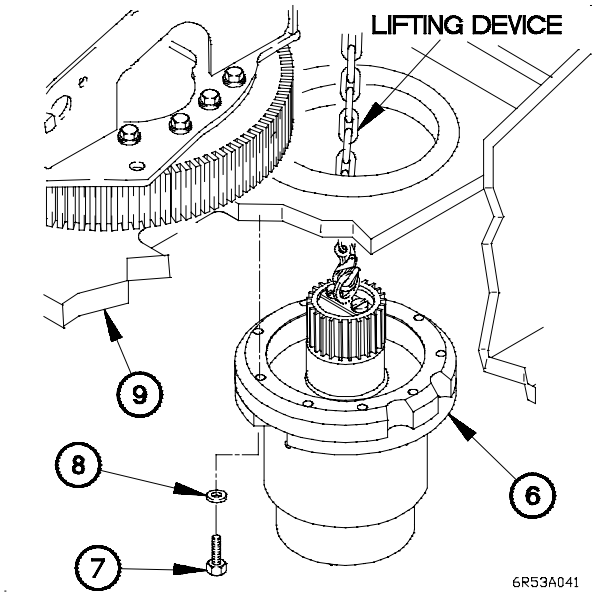
**CAUTION**

Use caution when lowering swing drive assembly past cables and hoses. Failure to comply may result in damage to equipment.

(5) Remove nine screws (7), washers (8), and swing drive assembly (6) from crane assembly (9).

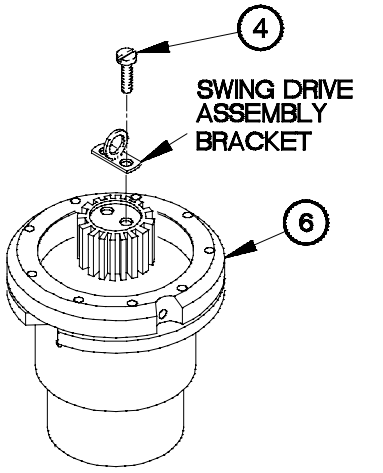


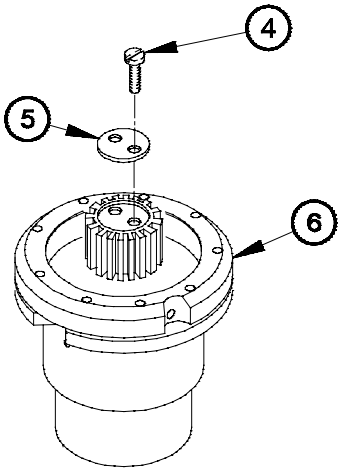

(4) Install swing drive assembly bracket on swing drive assembly (6) with two screws (4).



## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(6) Remove two screws (4) and swing drive assembly bracket from swing drive assembly (6).




(7) Install plate (5) in swing drive assembly (6) with two screws (4).

**b. Disassembly.**

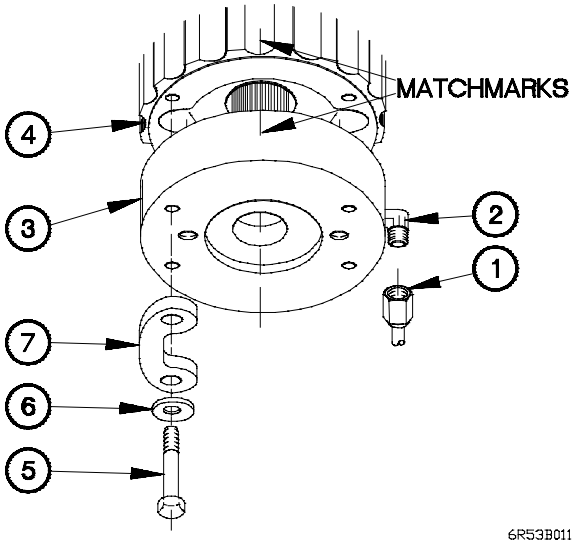
(1) Remove hydraulic hose (1) from 90-degree fitting (2).

(2) Match mark cylinder housing (3) to end cover (4).

(3) Remove four screws (5), washers (6), and two drive assembly stops (7) from cylinder housing (3).

**WARNING**

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

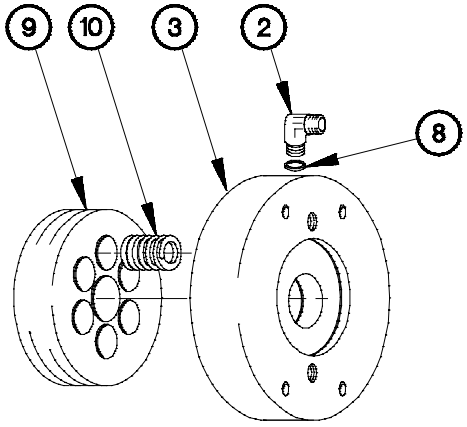



(4) Remove cylinder housing (3) from end cover (4).

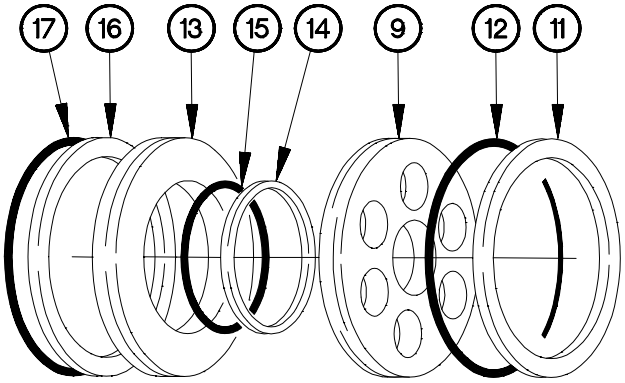
(5) Remove 90-degree fitting (2) from cylinder housing (3).

(6) Remove preformed packing (8) from 90-degree fitting (2). Discard preformed packing.

(7) Remove piston (9) and six springs (10) from cylinder housing (3).




6R53B021




6r53b031

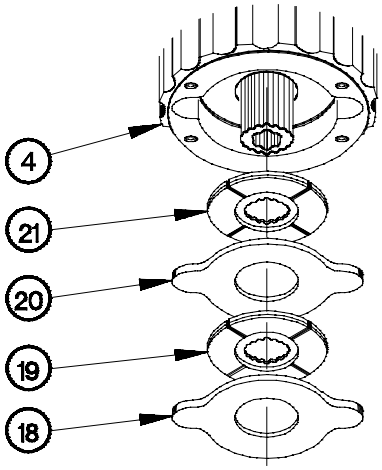
(8) Remove packing retainer (11) and preformed packing (12) from piston (9). Discard packing retainer and preformed packing.

(9) Remove piston (9) from cylinder head (13).

(10) Remove packing retainer (14) and preformed packing (15) from cylinder head (13). Discard packing retainer and preformed packing.

(11) Remove packing retainer (16) and preformed packing (17) from cylinder head (13). Discard packing retainer and preformed packing.

(12) Remove outer stator (18), outer disc (19), inner stator (20), and inner disc (21) from end cover (4).

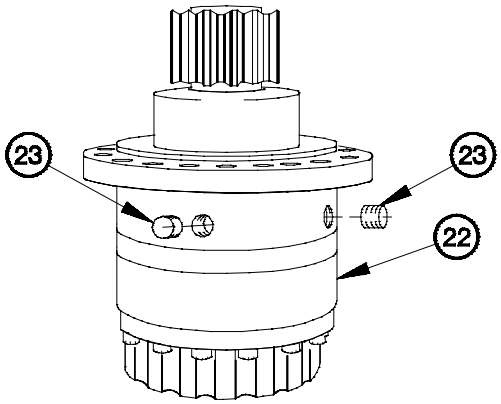



6R53B041

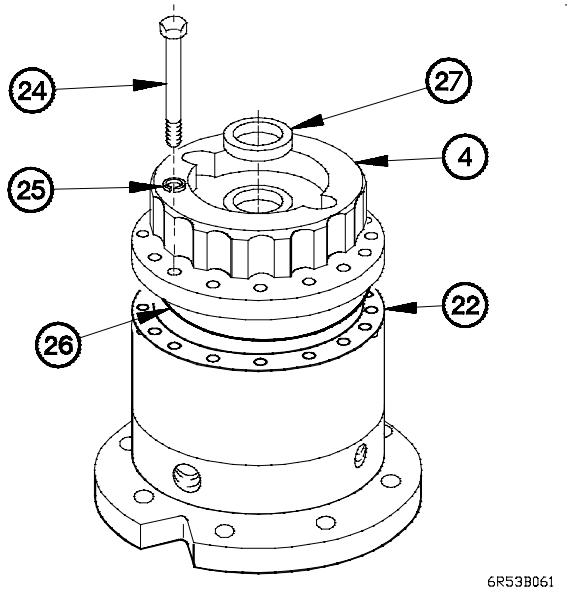
## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(13) Position drain pan under swing drive (22).

(14) Remove two plugs (23) from swing drive (22).




6r53b051



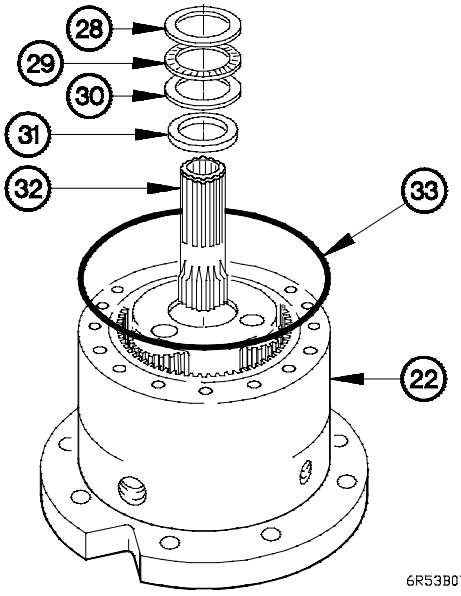

6R53B061

(15) Remove 16 bolts (24) and lockwashers (25) from end cover (4). Discard lockwashers.

(16) Remove end cover (4) from swing drive (22).

(17) Remove preformed packing (26) from end cover (4). Discard preformed packing.

(18) Remove oil seal (27) from end cover (4). Discard oil seal.



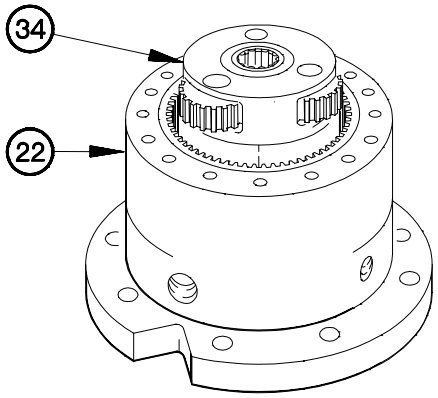

6R53B071

(19) Remove race (28), bearing (29), race (30), and spacer (31) from sun gear (32).

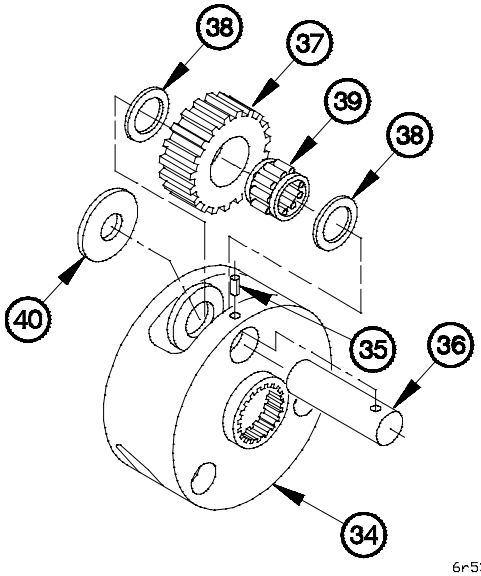
(20) Remove sun gear (32) from swing drive (22).

(21) Remove preformed packing (33) from swing drive (22). Discard preformed packing.

(22) Remove planetary carrier (34) from swing drive (22).




6r53b081




6r53b091

(23) Drive roll pin (35) in pin (36).

(24) Remove pin (36), gear (37), and two spacers (38) from planetary carrier (34).

(25) Remove roll pin (35) from pin (36).

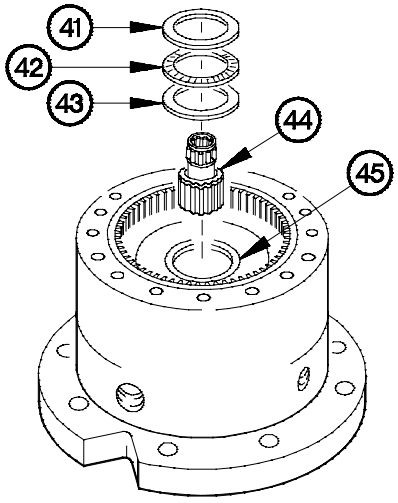
(26) Remove bearing (39) from gear (37).

(27) Perform steps (23) through (26) on two remaining gears (37).

(28) Remove center spacer (40) from planetary carrier (34).

(29) Remove race (41), bearing (42), and race (43) from secondary sun gear (44).

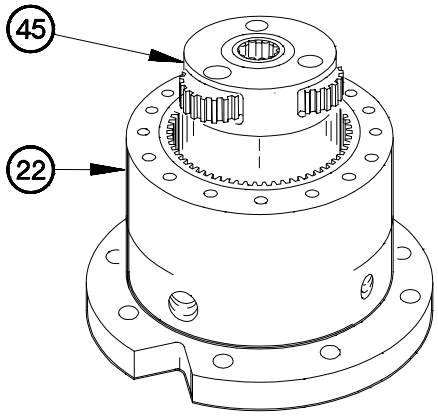
(30) Remove secondary sun gear (44) from planetary carrier (45).



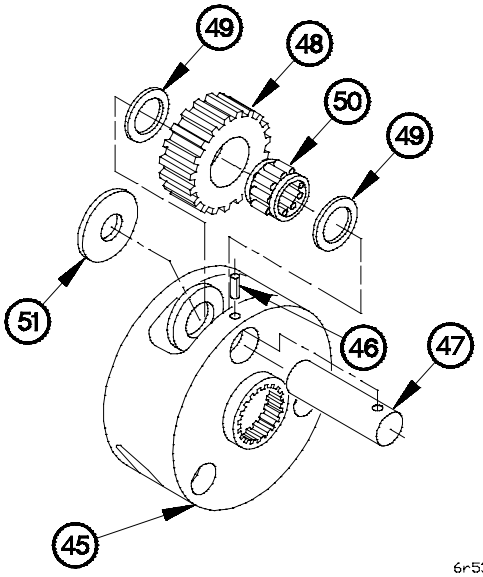

6r53b101

## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(31) Remove planetary carrier (45) from swing drive (22).




6r53b111




6r53b121

(32) Drive roll pin (46) in pin (47).

(33) Remove pin (47), gear (48), and two spacers (49) from planetary carrier (45).

(34) Remove roll pin (46) from pin (47).

(35) Remove bearing (50) from gear (48).

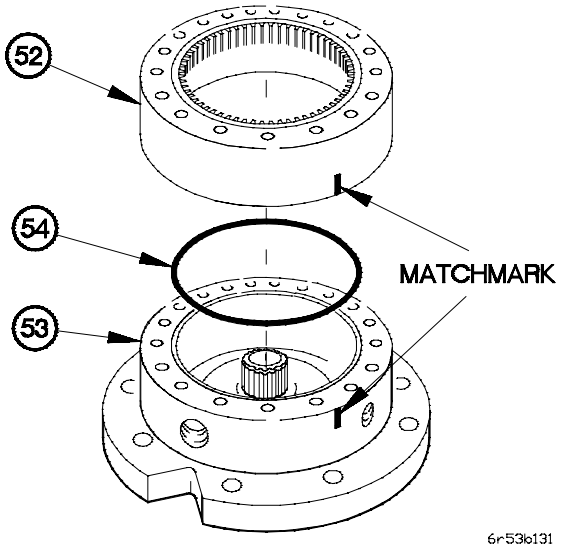
(36) Perform Steps (32) through (35) for other two gears (48).

(37) Remove center spacer (51) from planetary carrier (45).

(38) Match mark ring gear (52) to hub (53).

(39) Remove ring gear (52) from hub (53).

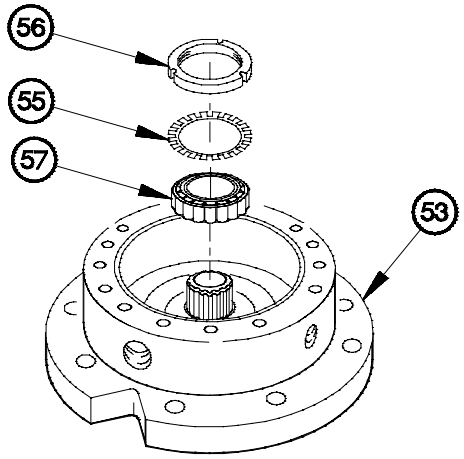
(40) Remove preformed packing (54) from hub (53). Discard preformed packing.



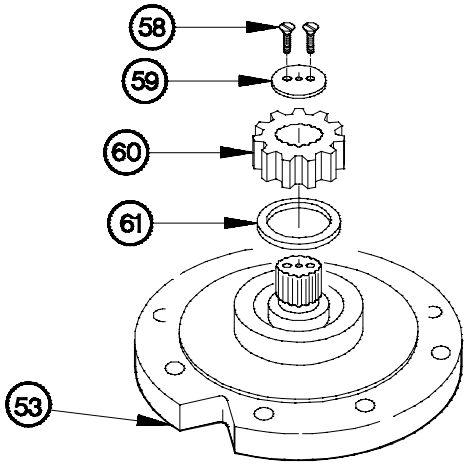

6r53b131

(41) Bend down tang of lockwasher (55).

(42) Remove nut (56), lockwasher (55), and bearing (57) from hub (53). Discard lockwasher.




6r53b141

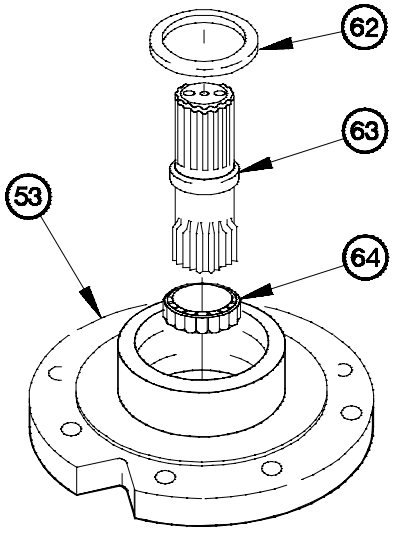



6R53B151

(43) Remove two screws (58), plate (59), gear (60), and spacer (61) from hub (53).

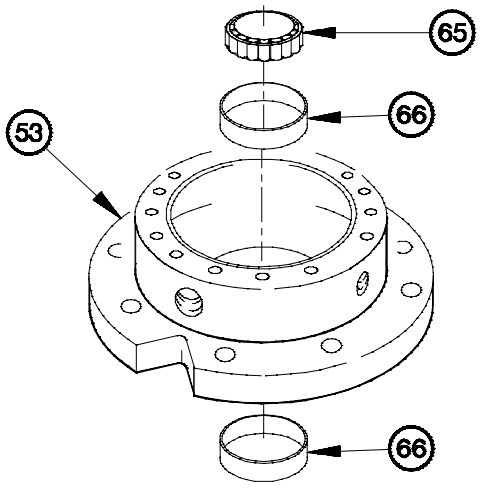
(44) Remove seal (62) and shaft (63) from hub (53).

(45) Remove bearing (64) from shaft (63).




6r53b161

## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




6R53B171

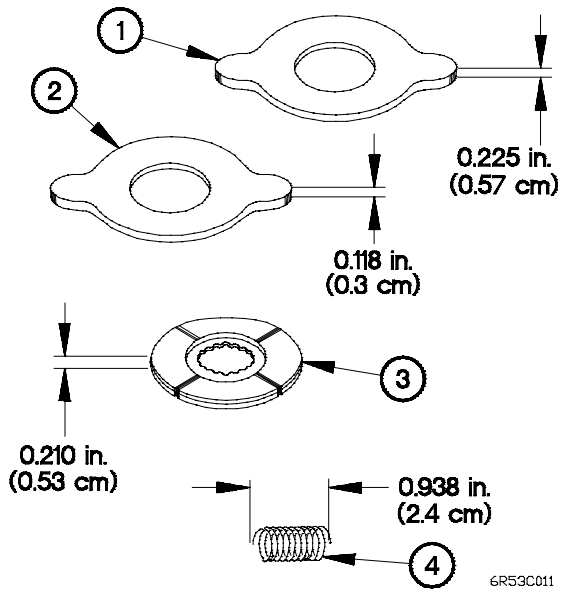
(46) Remove bearing (65) from hub (53).

(47) Remove two races (66) from hub (53).

**c. Cleaning/Inspection.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**




6R53C011

**NOTE**

Replace any part that fails visual inspection or size measurement requirements.

(1) Clean all metal parts with dry cleaning solvent.

(2) Inspect all parts for pitting, corrosion, scoring, and indication of binding.

(3) Inspect inner stator (1) for thickness, minimum thickness 0.225 in. (0.57 cm).

(4) Inspect outer stator (2) for thickness, minimum thickness 0.118 in. (0.3 cm).

(5) Inspect two disc (3) for thickness, minimum thickness 0.210 in. (0.53 cm).

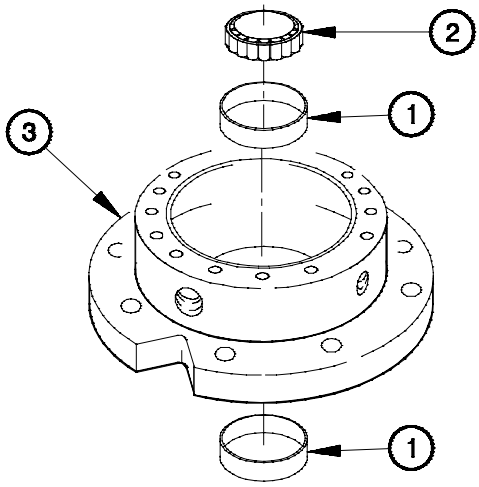
(6) Inspect six springs (4) for length, minimum length 0.938 in. (2.4 cm).

**d. Assembly.**

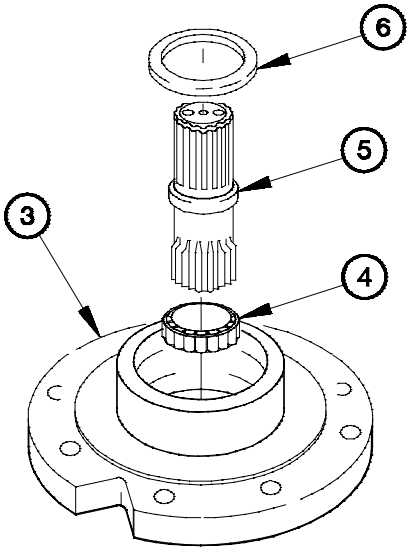
**NOTE**

Apply lubricating oil to all parts during assembly.

(1) Install two races (1) and bearing (2) in hub (3).




6R53D011




6r53d021

(2) Install bearing (4) on shaft (5).

(3) Install shaft (5) in hub (3).

(4) Install seal (6) in hub (3).

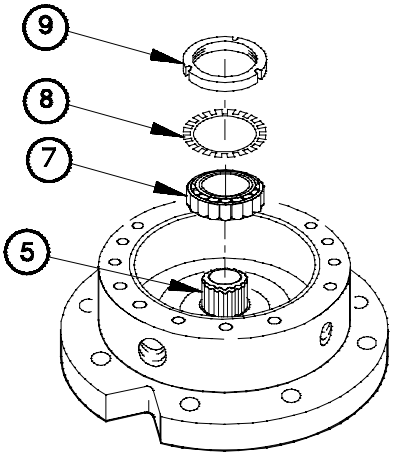
(5) Install bearing (7) on shaft (5).

(6) Position lockwasher (8) and nut (9) on shaft (5).

(7) Tighten nut (9) until shaft (5) starts to turn.

(8) Tighten nut (9) until one tang on lockwasher (8) aligns with slot in nut (9).

(9) Bend tang of lockwasher (8) up in slot of nut (9).




6R53D031

## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(10) Install spacer (10) on shaft (5).

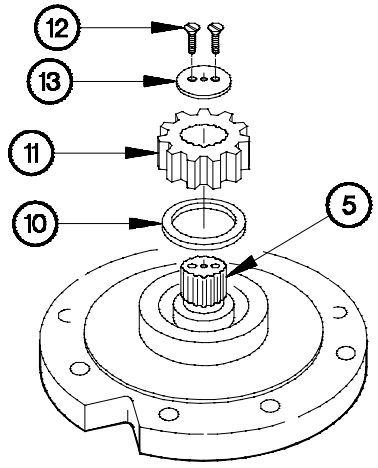
(11) Install gear (11) on shaft (5).

**WARNING**

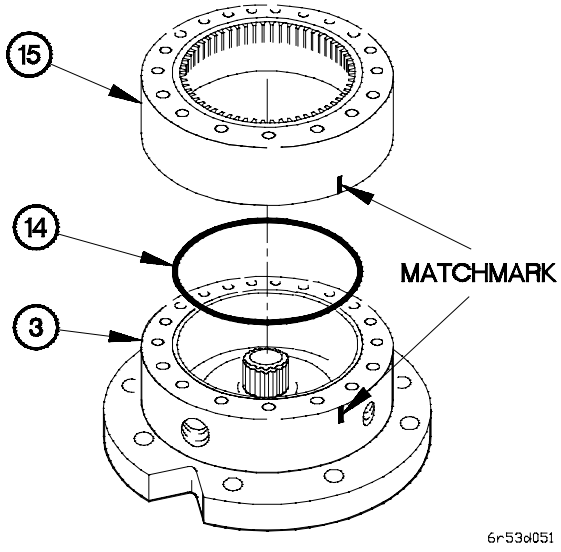
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(12) Apply sealing compound to threads of two screws (12).

(13) Install plate (13) on shaft (5) with two screws (12).




6R53D041

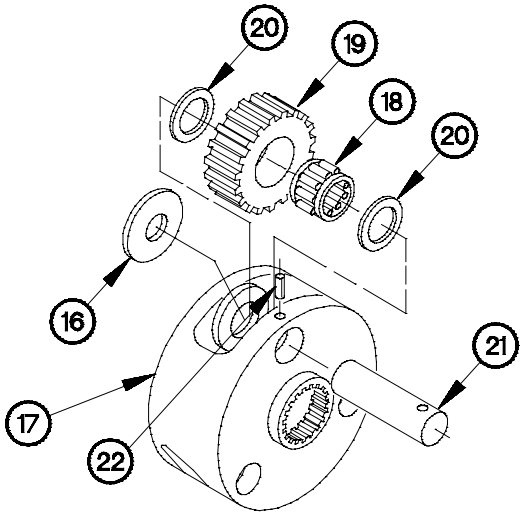



6r53d051

(14) Install preformed packing (14) on hub (3).

(15) Apply sealing compound to ring gear (15).

(16) Install ring gear (15) on hub (3) with match marks aligned.




6R53D061

(17) Install center spacer (16) in planetary carrier (17).

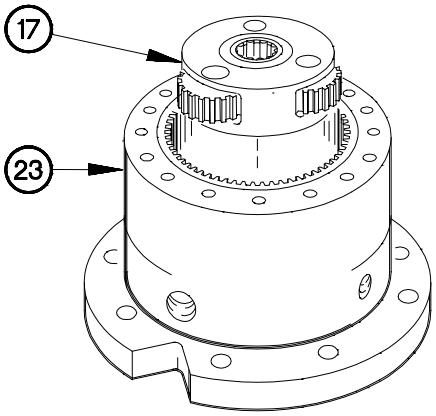
(18) Install bearing (18) in gear (19).

(19) Install gear (19), two spacers (20), and pin (21) in planetary carrier (17).

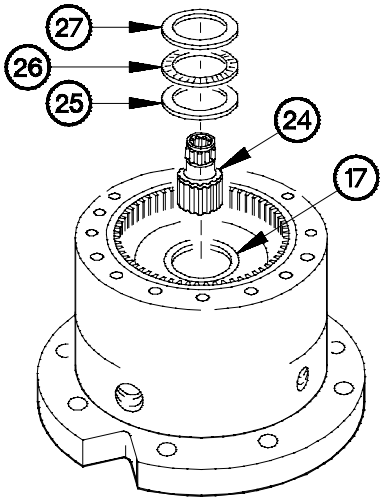
(20) Install roll pin (22) in pin (21).

(21) Perform steps (17) through (20) on two remaining gears (19).

(22) Install planetary carrier (17) in swing drive (23).




6r53d071




6r53d081

(23) Install secondary sun gear (24) in planetary carrier (17).

(24) Install race (25), bearing (26), and race (27) on planetary carrier (17).

**NOTE**

All three gears are installed the same way. One gear shown.

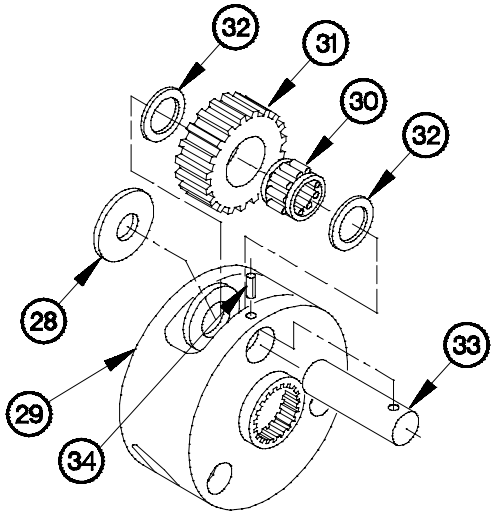
(25) Install center spacer (28) in planetary carrier (29).

(26) Install bearing (30) in gear (31).

(27) Install gear (31), two spacers (32), and pin (33) in planetary carrier (29).

(28) Install roll pin (34) in pin (33).

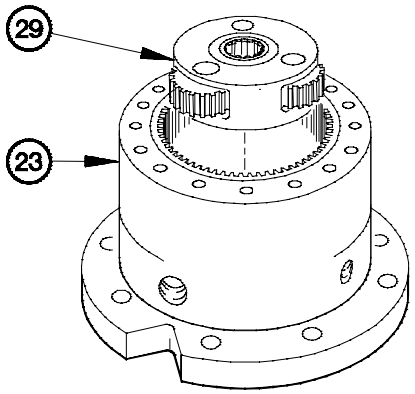
(29) Perform steps (25) through (28) on two remaining gears (31).



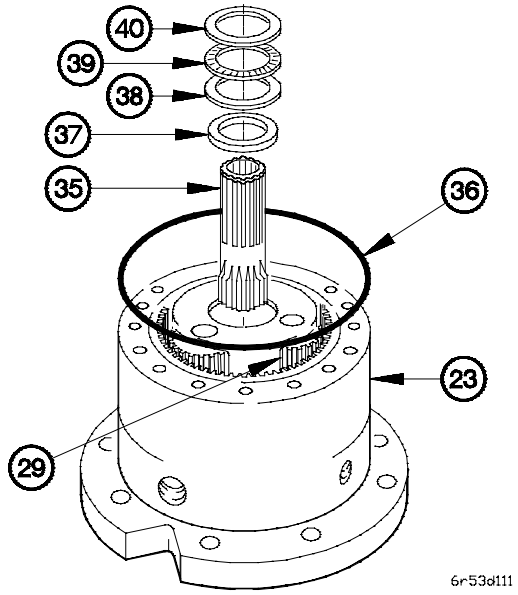

6R53D091

## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(30) Install planetary carrier (29) in swing drive (23).




6r53d101




6r53d111

(31) Install sun gear (35) in planetary carrier (29).

(32) Install preformed packing (36) on swing drive (23).

(33) Install spacer (37) on sun gear (35).

(34) Install race (38), bearing (39), and race (40) on sun gear (35).

(35) Install oil seal (41) in end cover (42).

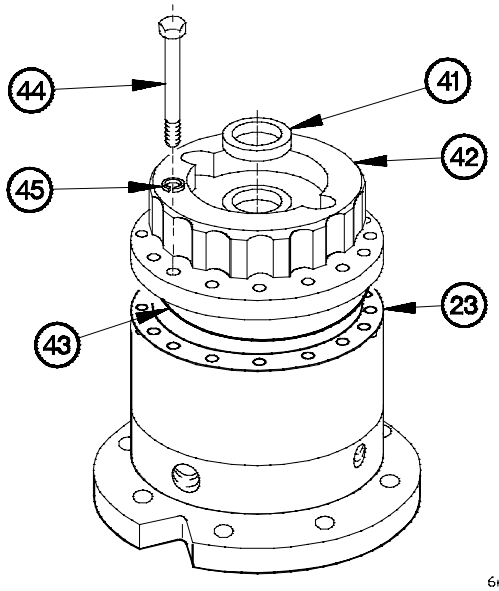
(36) Install preformed packing (43) on end cover (42).

**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.**

(37) Apply sealing compound to end cover (42) and threads of 16 bolts (44).

(38) Install end cover (42) on swing drive (23) with 16 lockwashers (45), and bolts (44).



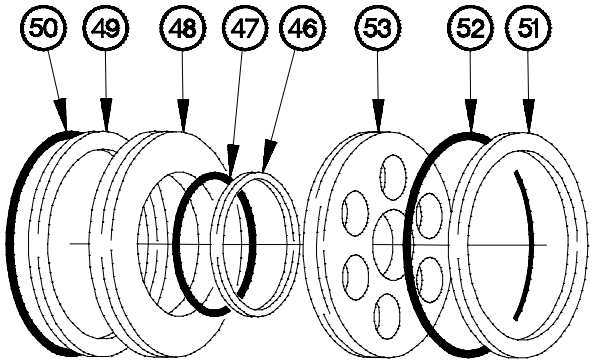

6r53d121

(39) Install packing retainer (46) and preformed packing (47) on cylinder head (48).

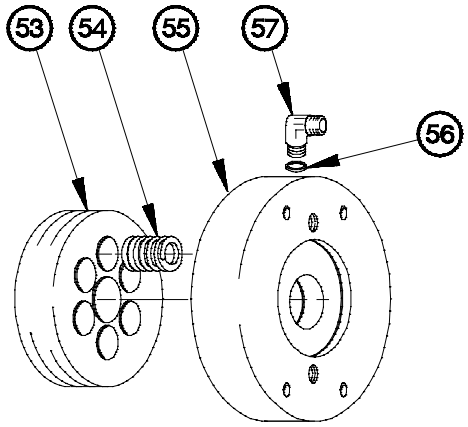
(40) Install packing retainer (49) and preformed packing (50) on cylinder head (48).

(41) Install packing retainer (51) and preformed packing (52) on piston (53).

(42) Install piston (53) in cylinder head (48).




6R53D131




6R53D141

(43) Install six springs (54) in cylinder housing (55).

(44) Install piston (53) in cylinder housing (55).

(45) Install preformed packing (56) on 90-degree fitting (57).

**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.**

(46) Apply sealing compound to threads of fitting 90-degree (57).

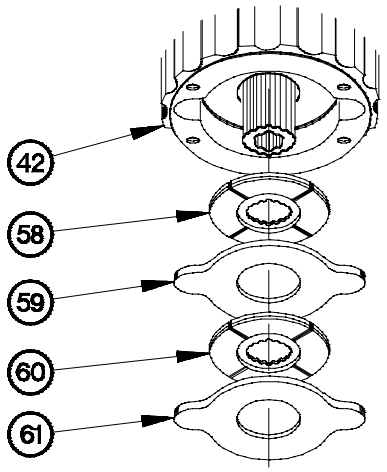
(47) Install 90-degree fitting (57) in cylinder housing (55).

## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

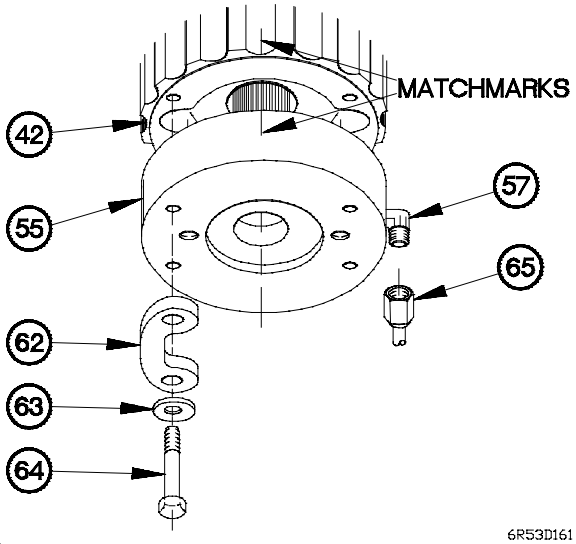
**CAUTION**

Thickest stator must be installed first. Failure to comply may result in damage to equipment.

(48) Install inner disc (58), inner stator (59), outer disc (60), and outer stator (61) in end cover (42).




6r53d151




6R53D161

**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.**

(49) Apply sealing compound to cylinder housing (55).

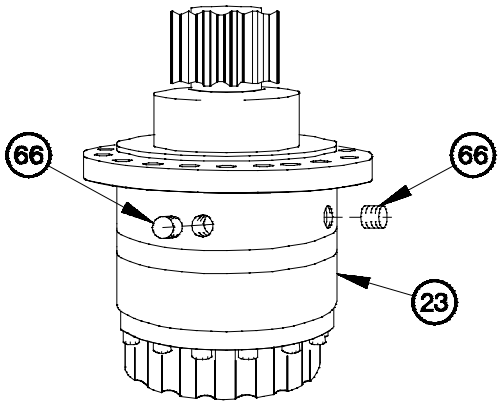
(50) Install cylinder housing (55) on end cover (42) with match marks aligned.

(51) Install two drive assembly stops (62), four washers (63), and screws (64) in cylinder housing (55).

(52) Install hydraulic hose (65) on 90-degree fitting (57).

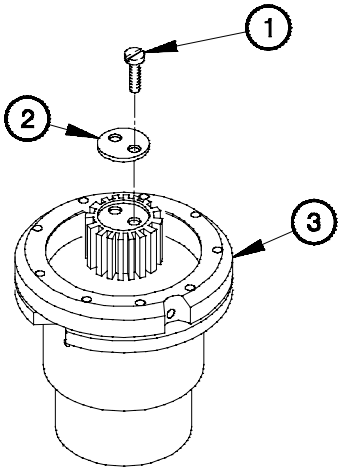
(53) Fill swing drive (23) with oil.

(54) Install two plugs (66) in swing drive (23).




6R53D171

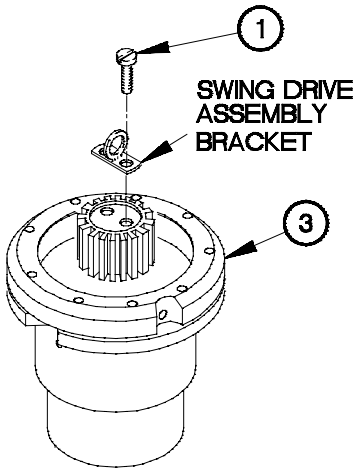
**e. Installation.**




6r53e011

(1) Remove two screws (1) and plate (2) from swing drive assembly (3).

(2) Install swing drive assembly bracket on swing drive assembly (3) with two screws (1).




6R53E021

## 16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**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.**

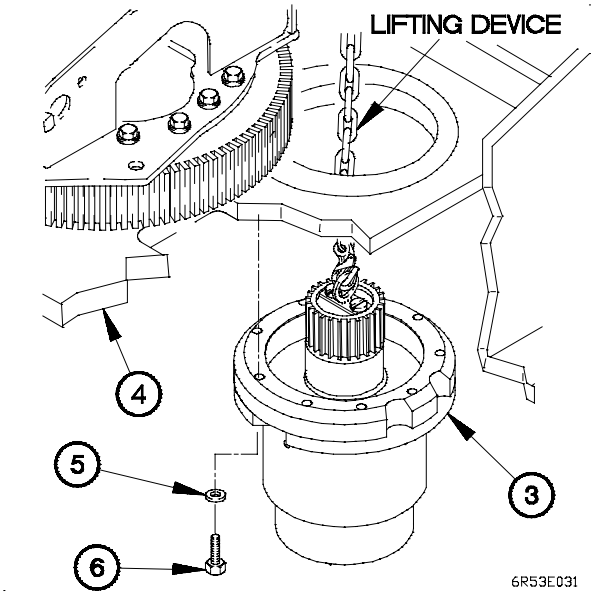
**NOTE**

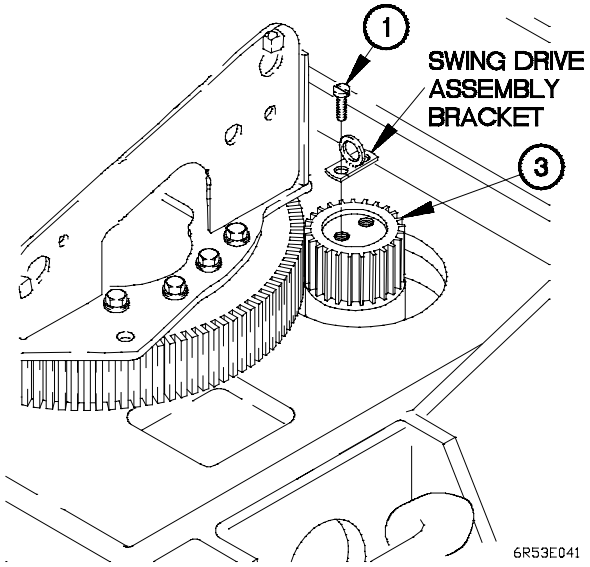
Swing drive gear must be meshed with rotation gear during installation of swing drive assembly.

(3) Lift swing drive assembly (3) in mounting position.

(4) Position swing drive assembly (3) in crane assembly (4) with nine washers (5) and screws (6).

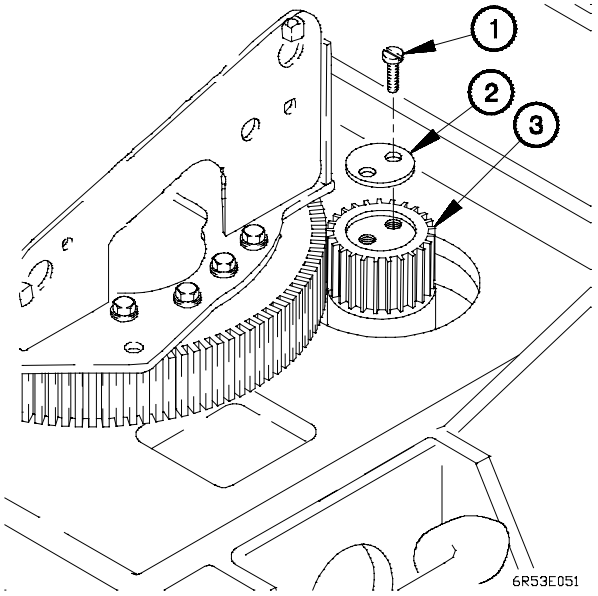
(5) Tighten screws (6) to 90-110 lb-ft (122-149 N•m).

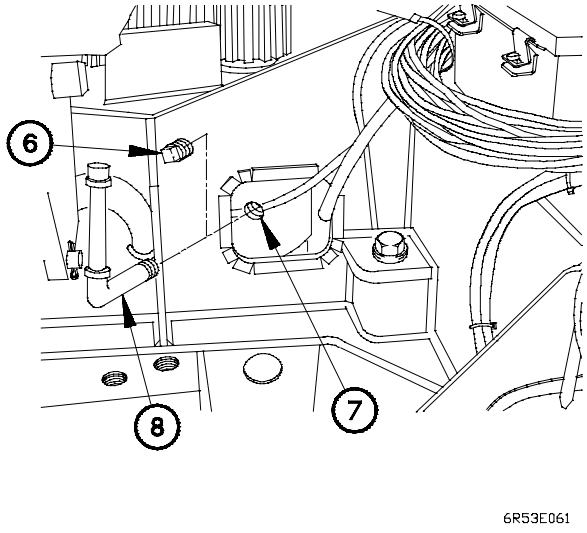



(6) Remove two screws (1) and swing drive assembly bracket from swing drive assembly (3).

(7) Install plate (2) on swing drive assembly (3) with two screws (1).




(8) Remove plug (6) from oil fill pipe hole (7).

(9) Install oil fill pipe (8) in oil fill pipe hole (7).

**f. Follow-On Maintenance.**

(1) Install hydraulic orbit motor (Para 16-55).

(2) Install cross relief valve (Para 16-54).

(3) Hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-2).

(4) Perform crane load test (para 16-62).

**End of Task.**

## 16-54. M1089 CROSS RELIEF VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench, Torque 0-175 lb-ft (Item 92, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)

**Materials/Parts (Cont)**
Lockwasher (4) (Item 139, Appendix F)
Packing, Preformed (3) (Item 262, Appendix F)
Packing, Preformed (3) (Item 236, Appendix F)
Packing, Preformed (2) (Item 263, Appendix F)
Sealing, Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**WARNING**

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

**a. Removal.**

(1) Position drain pan under cross relief valve (1).

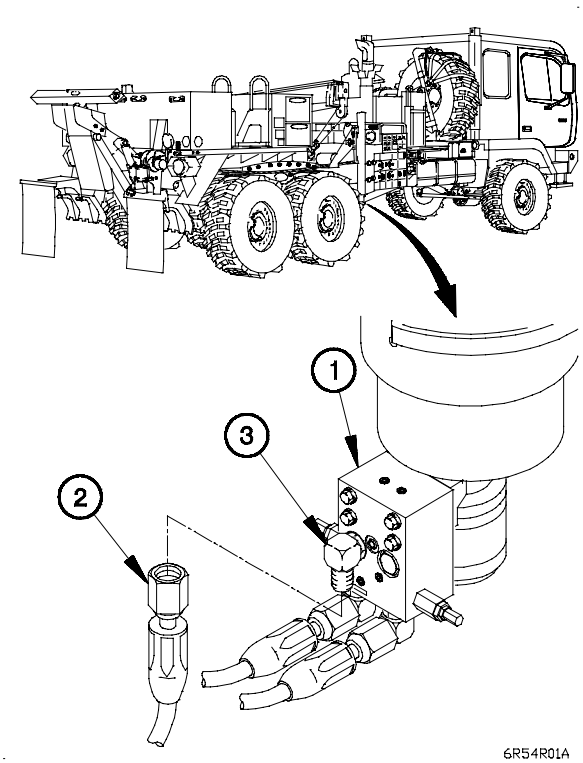
**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect three hoses (2) from 90-degree fittings (3).

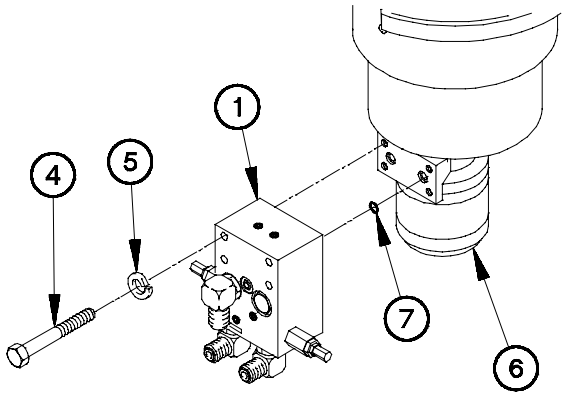


**NOTE**

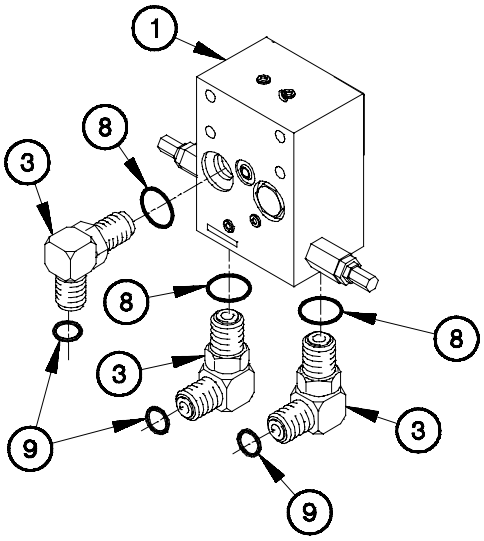
Step (3) requires the aid of an assistant.

(3) Remove four screws (4), lockwashers (5), and cross relief valve (1) from hydraulic motor (6). Discard lockwashers.

(4) Remove two preformed packings (7) from hydraulic motor (6). Discard preformed packings.




6R54R02-




6R54R03-

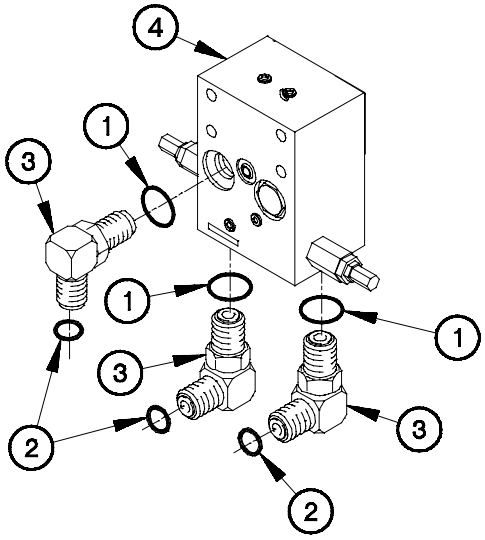
(5) Remove three 90-degree fittings (3) from cross relief valve (1).

(6) Remove three preformed packings (8) and preformed packings (9) from 90-degree fittings (3). Discard preformed packings.

**b. Installation.**

(1) Install three preformed packings (1) and preformed packings (2) on 90-degree fittings (3).

(2) Install three 90-degree fittings (3) in cross relief valve (4).




6R54I01-

## 16-54. M1089 CROSS RELIEF VALVE REPLACEMENT (CONT)

(3) Install two preformed packings (5) on hydraulic motor (6).

**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.**

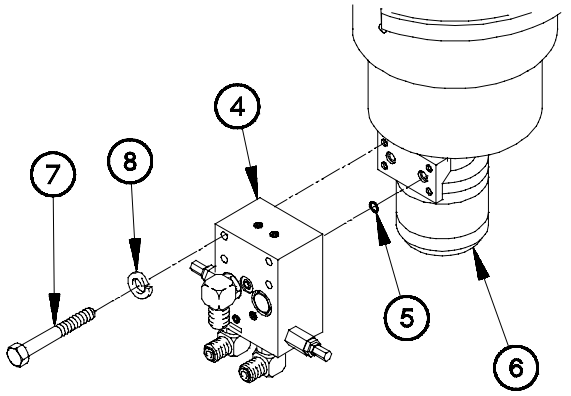
(4) Apply sealing compound to threads of four screws (7).

**NOTE**

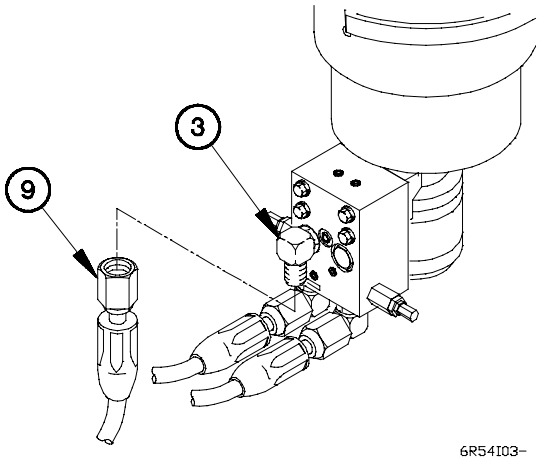
Step (5) requires the aid of an assistant.

(5) Install cross relief valve (4) on hydraulic motor (6) with four lockwashers (8) and screws (7).

(6) Tighten screws (7) to 28-42 lb-ft (38-57 N·m).




6R54I02-




6R54I03-

(7) Connect three hydraulic hoses (9) to 90-degree fittings (3).

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Perform crane load test (para 16-62).

**End of Task.**

## 16-55. M1089 HYDRAULIC ORBIT MOTOR REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Cross relief valve removed (para 16-54).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Tools and Special Tools**
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Packing, Preformed (Item 237, Appendix F)
Packing, Preformed (Item 230, Appendix F)

**WARNING**

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

**a. Removal.**

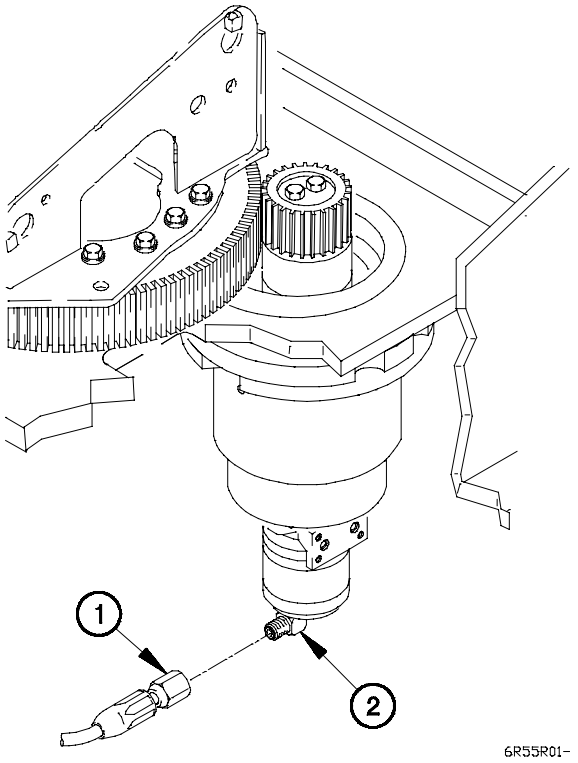
**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to hydraulic system.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

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

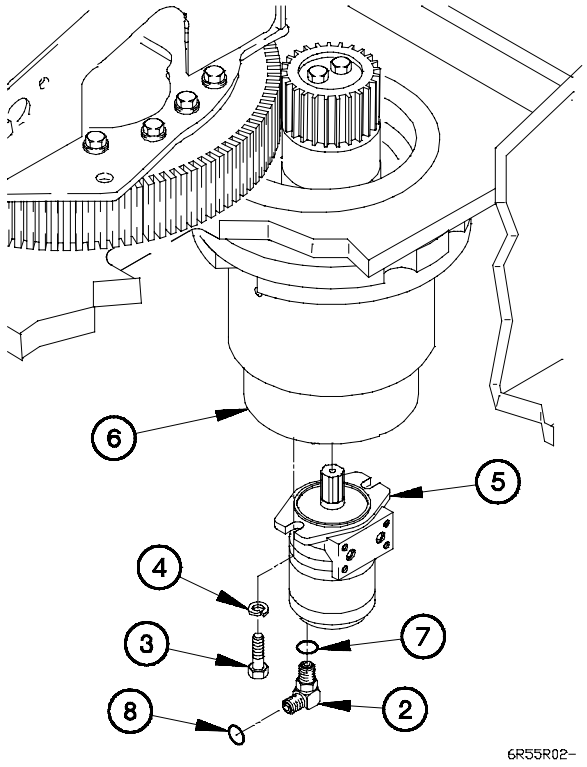


## 16-55. M1089 HYDRAULIC ORBIT MOTOR REPLACEMENT (CONT)

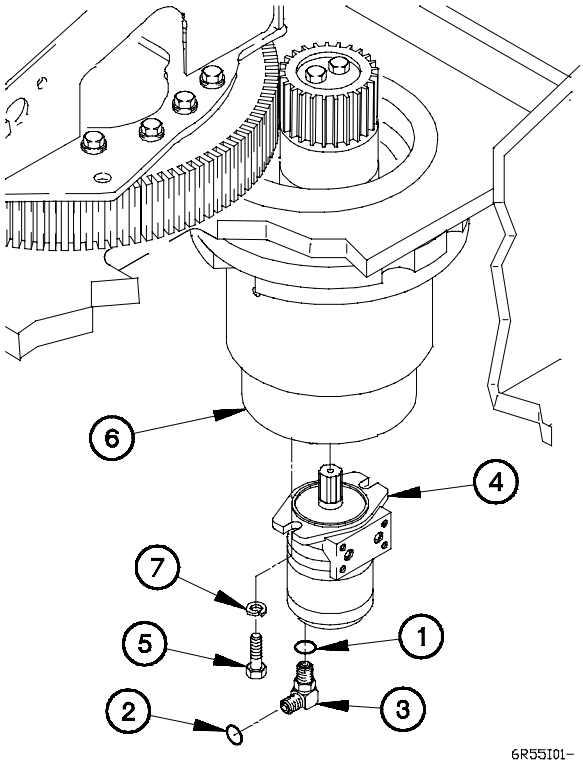
(2) Remove two screws (3), washers (4), and hydraulic orbit motor (5) from swing drive assembly (6).

(3) Remove 90-degree fitting (2) from hydraulic orbit motor (5).

(4) Remove preformed packings (7 and 8) from 90-degree fitting (2). Discard preformed packings.




**b. Installation.**




(1) Install preformed packings (1 and 2) on 90-degree fitting (3).

(2) Install 90-degree fitting (3) in hydraulic orbit motor (4).

**WARNING**

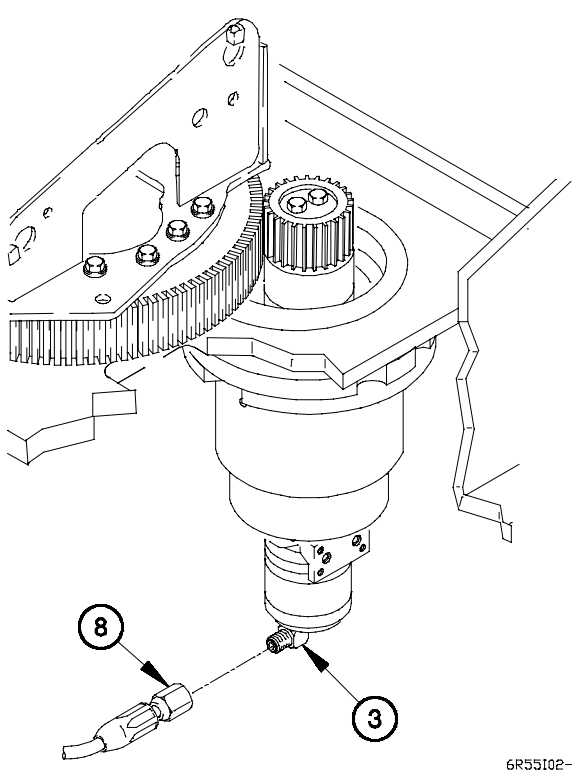
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(3) Apply sealing compound to threads of two screws (5).

(4) Position hydraulic orbit motor (4) on swing drive assembly (6) with two washers (7) and screws (5).

(5) Tighten screws (5) to 40 lb-ft (54 N·m).

(6) Connect hydraulic hose (8) to 90-degree fitting (3).




**c. Follow-On Maintenance.**

(1) Install cross relief valve (para 16-54).

(2) Perform crane load test (para 16-62).

**End of Task.**

## 16-56. M1089 OUTRIGGER JACK CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Jack cylinder lowered approximately 12 inches (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Jack, Dolly Type, Hydraulic (Item 37, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (4) (Item 138, Appendix F)
Pin, Cotter (2) (Item 326, Appendix F)
Packing, Preformed (2) (Item 236, Appendix F)
Packing, Preformed (2) (Item 235, Appendix F)

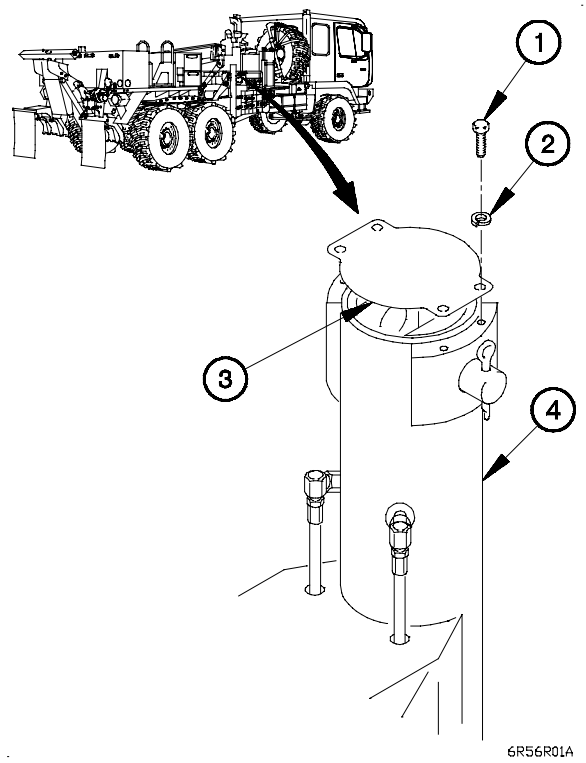
**Personnel Required**
(2)

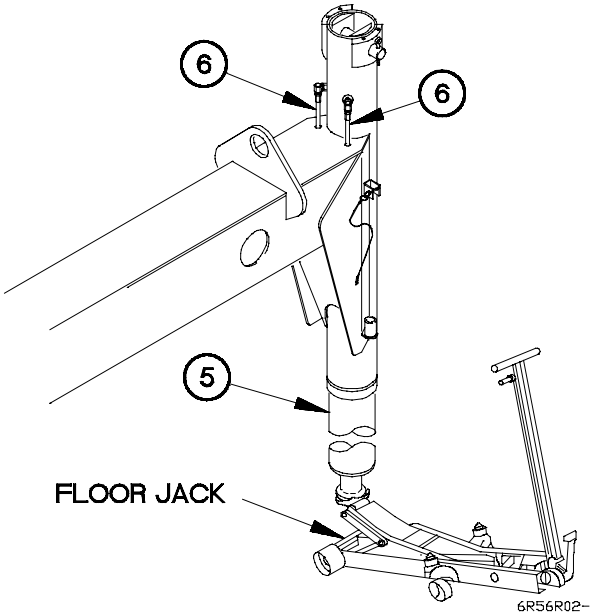
**a. Removal.**

**NOTE**

Left and right outrigger jack cylinders are removed the same way. Right side shown.

(1) Remove four screws (1), lockwashers (2), and cover plate (3) from outrigger (4). Discard lockwashers.




(2) Position floor jack under jack cylinder (5).

(3) Place drain pan under hoses (6).

**CAUTION**

Cap or plug hydraulic openings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

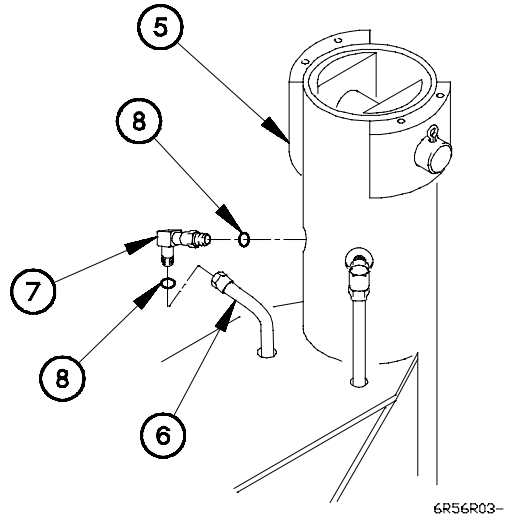
**NOTE**

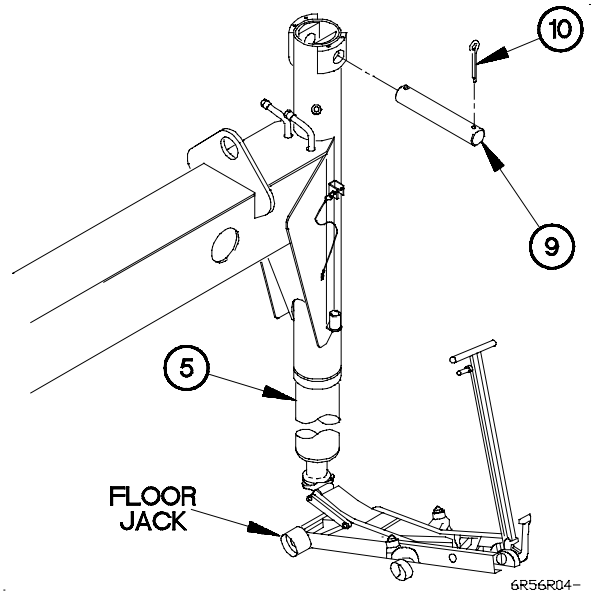
Tag hydraulic hoses and connection points prior to disconnecting.

(4) Disconnect two hoses (6) from adapters (7).

(5) Remove two adapters (7) from jack cylinder (5).

(6) Removed two preformed packings (8) from adapters (7). Discard preformed packings.




(7) Raise jack cylinder (5) enough to take weight off pin (9).

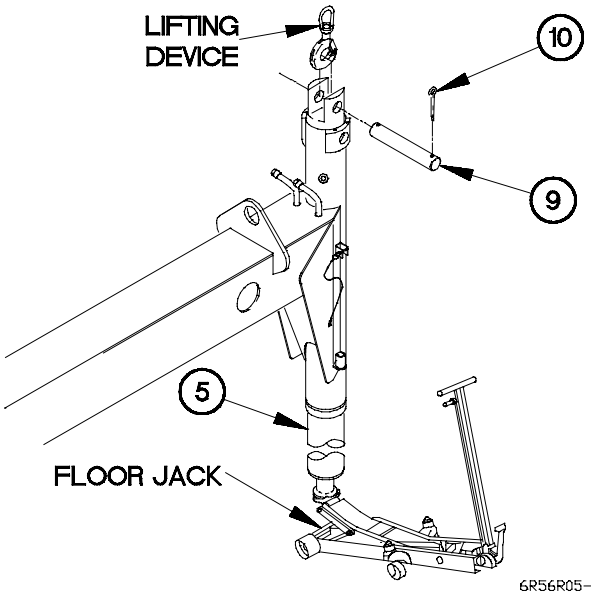
(8) Remove two cotter pins (10) from pin (9). Discard cotter pins.

(9) Remove pin (9) from jack cylinder (5).

(10) Raise jack cylinder (5) up approximately six inches.

(11) Install pin (9) in jack cylinder (5).

(12) Install two cotter pins (10) in pin (9).



## 16-56. M1089 OUTRIGGER JACK CYLINDER REPLACEMENT (CONT)

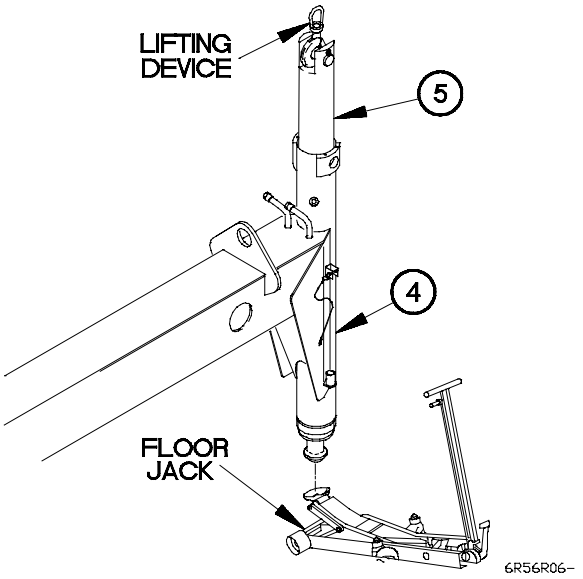
**WARNING**

**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.**

**NOTE**

Step (13) requires the aid of an assistant.

(13) Remove jack cylinder (5) from outrigger (4).

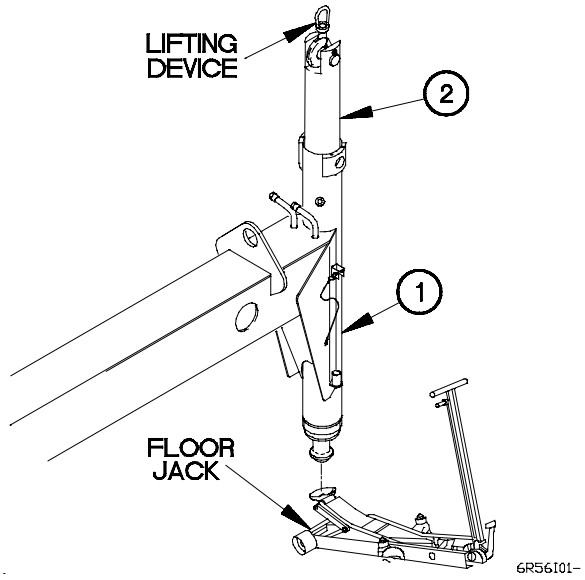



**b. Installation.**

**NOTE**

Left and right side outrigger jack cylinders are installed the same way. Right side shown.

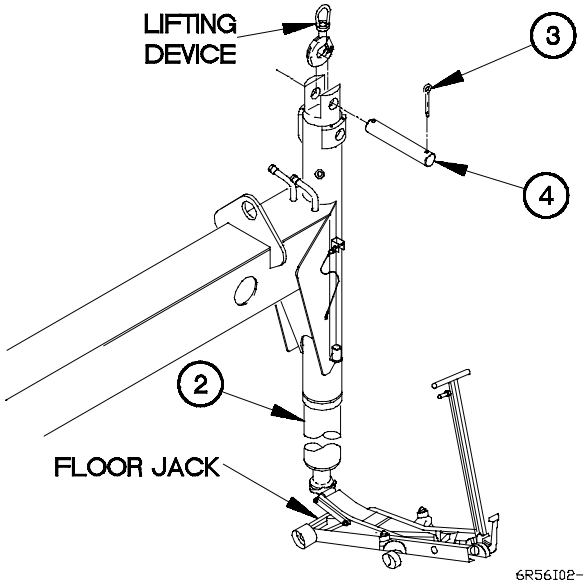
(1) Position floor jack under outrigger (1).




**NOTE**

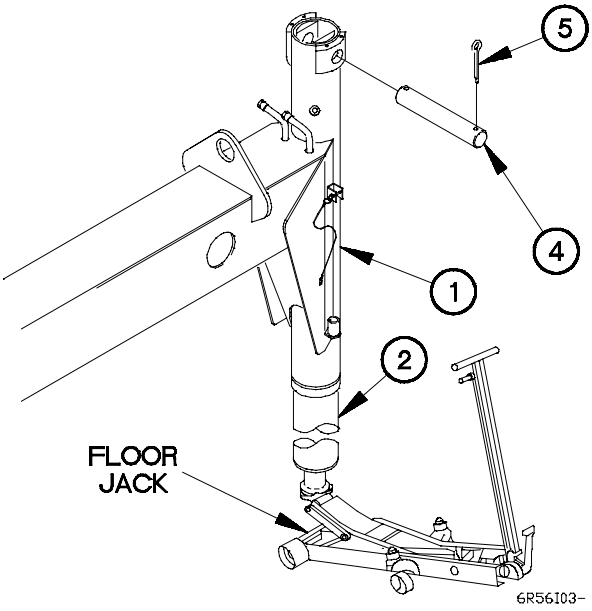
Step (2) requires the aid of an assistant.

(2) Install jack cylinder (2) in outrigger (1) until jack cylinder rests on floor jack. Adjust jack as necessary.



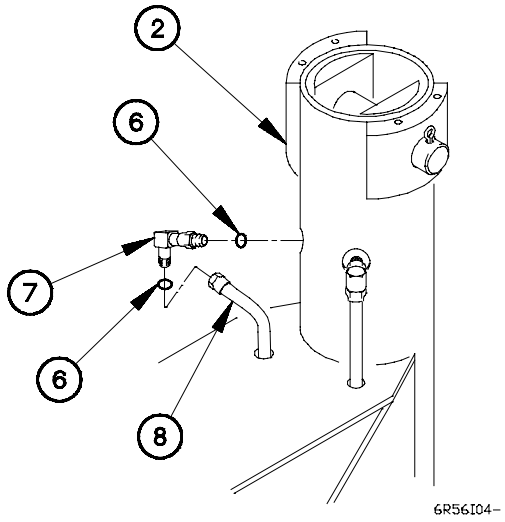

(3) Remove two cotter pins (3) from pin (4). Discard cotter pins.

(4) Remove pin (4) from jack cylinder (2).




(5) Install jack cylinder (2) in outrigger (1) with pin (4).

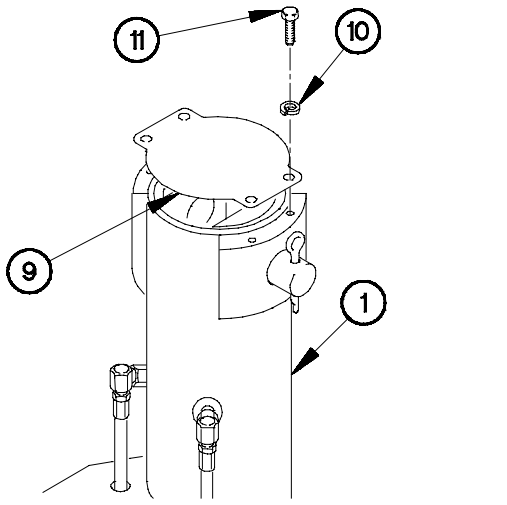
(6) Install two cotter pins (5) in pin (4).




(7) Install two preformed packings (6) on adapters (7).

(8) Install two adapters (7) in jack cylinder (2).

(9) Connect two hoses (8) to adapters (7).




(10) Install cover plate (9) on outrigger (1) with four lockwashers (10) and screws (11).

**c. Follow-On Maintenance.**

Perform crane load test (para 16-62).

**End of Task.**

## 16-57. M1089 OUTRIGGER EXTENSION CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Outrigger beams removed (para 16-58)

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)

**Materials/Parts (Cont)**
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (4) (Item 262, Appendix F)
Packing, Preformed (2) (Item 235, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

**CAUTION**

Cap or plug hydraulic openings to prevent contamination of hydraulic system. Failure to comply may result in damage to the equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

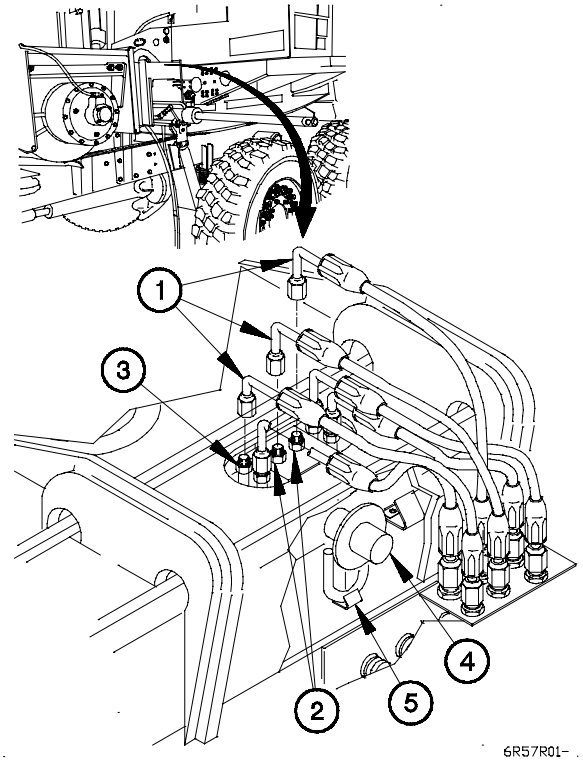
(1) Disconnect two hydraulic hoses (1) from fittings (2).

(2) Disconnect four hydraulic hoses (1) from tubes (3).

**NOTE**

Step (3) requires the aid of an assistant.

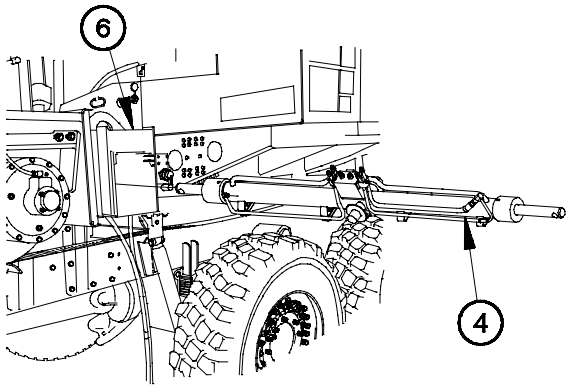
(3) Lift outrigger extension cylinder (4) out of the brackets (5).

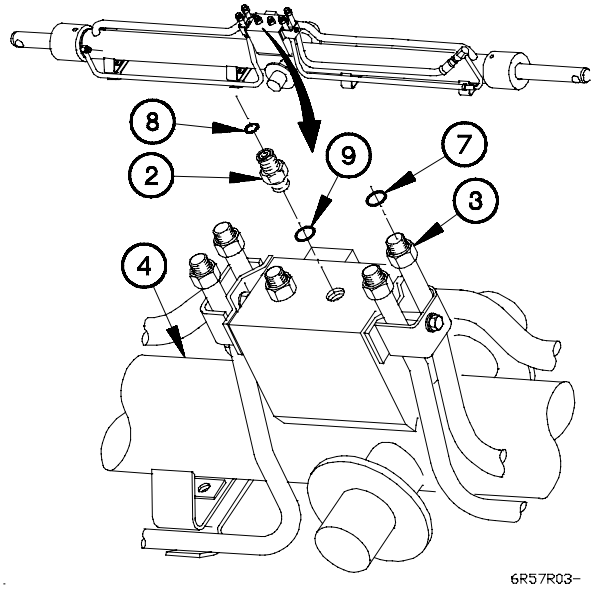


**NOTE**

Step (4) requires the aid of an assistant.

(4) Remove outrigger extension cylinder (4) from extension housing (6).




(5) Remove two fittings (2) from outrigger extension cylinder (4).

(6) Remove four preformed packings (7) from tubes (3). Discard preformed packing.

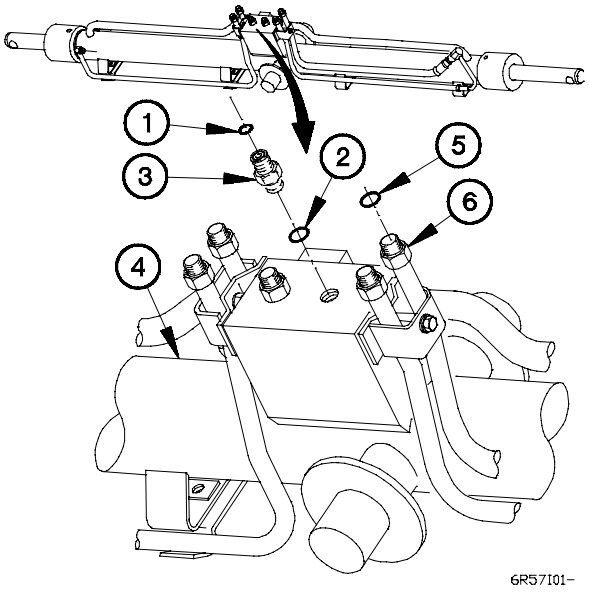
(7) Remove preformed packings (8 and 9) from two fittings (2). Discard preformed packings.

**b. Installation.**

(1) Install preformed packings (1 and 2) on two fittings (3).

(2) Install two fittings (3) in outrigger extension cylinder (4).

(3) Install four preformed packings (5) on tubes (6).

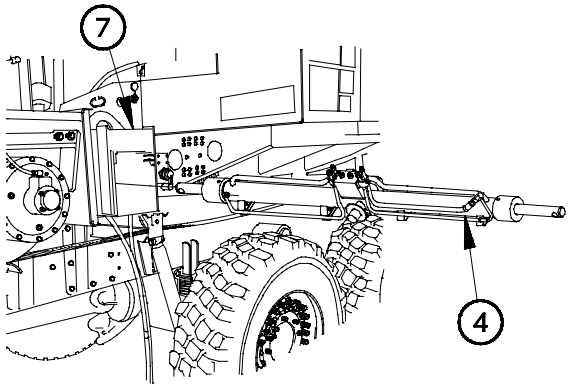


## 16-57. M1089 OUTRIGGER EXTENSION CYLINDER REPLACEMENT (CONT)

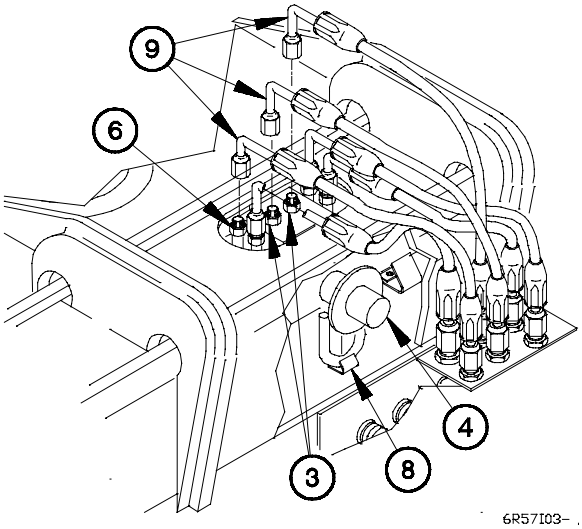
**NOTE**

Steps (4) and (5) require the aid of an assistant.

(4) Position outrigger extension cylinder (4) in extension housing (7).




6R57I02-




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(5) Install outrigger extension cylinder (4) in brackets (8).

(6) Connect four hydraulic hoses (9) to tubes (6).

(7) Connect two hydraulic hoses (9) to fitting (3).

**c. Follow-On Maintenance.**

Install outrigger beams (para 16-58).

**End of Task.**

## 16-58. M1089 OUTRIGGER BEAM REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Outrigger extended (TM 9-2320-366-10-1).
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Outrigger jack cylinder assembly removed (para 16-56).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

**Tool and Special Tools (Cont)**
Chain, Welded (TM 9-2320-366-10)

**Materials/Parts**
Pin, Cotter (2) (Item 332, Appendix F)

**Personnel Required**
(3)

**a. Removal.**

**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.**

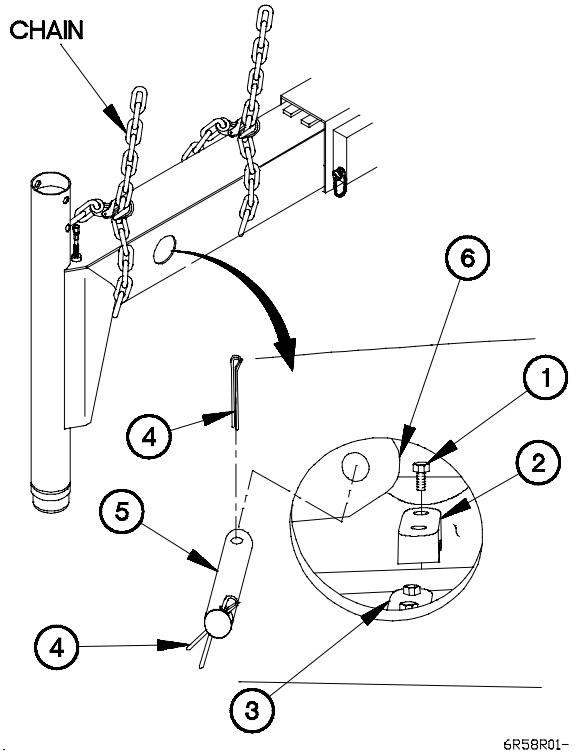
**NOTE**

Left and right outrigger beams are removed the same way. Right side shown.

(1) Remove four bolts (1) and two clamps (2) from two hydraulic clamps (3).

(2) Remove cotter pin (4) from pivot pin (5). Discard cotter pin.

(3) Remove pivot pin (5) from outrigger extension cylinder (6).



## 16-58. M1089 OUTRIGGER BEAM REPLACEMENT (CONT)

**CAUTION**

Ensure hydraulic tubes pass freely through cutouts in outrigger beam. Failure to comply may result in damage to equipment.

**NOTE**

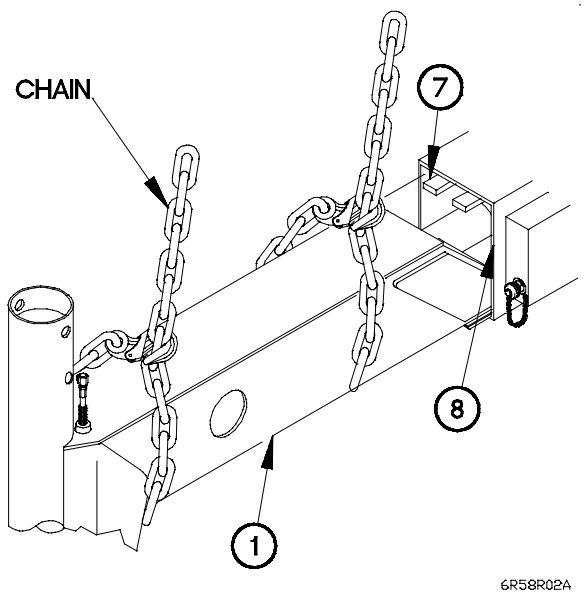
If the outrigger beam cannot be removed with ease, perform Step (4). If the outrigger beam can be removed with ease, perform Step (5).

(4) Cut weld securing mounting pad (7) to support tube (8).

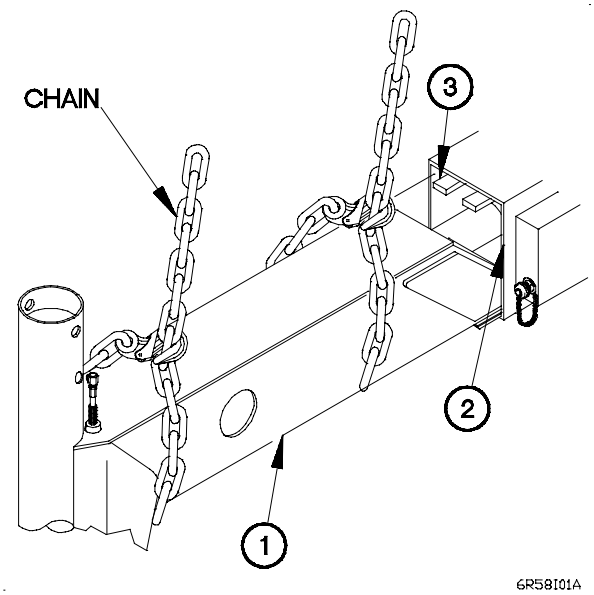
**NOTE**

Step (5) requires the aid of an assistant.

(5) Remove outrigger beam (1) from support tube (8).




**b. Installation.**




**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.**

**CAUTION**

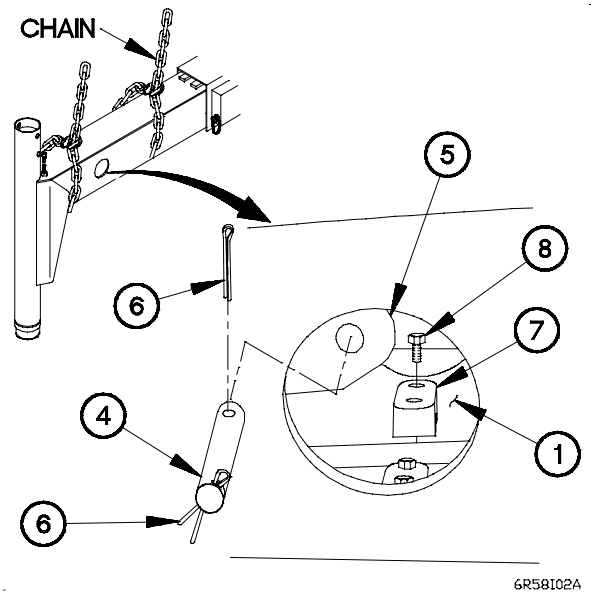
Ensure hydraulic tubes pass freely through cutouts in outrigger beam. Failure to comply may result in damage to equipment.

**NOTE**

- Left and right outrigger beams are installed the same way. Right side shown.
- Step (1) requires the aid of an assistant.

(1) Slide outrigger beam (1) in support tube (2).

(2) Weld mounting pads (3) to support tube (2), if required.




(3) Install pivot pin (4) in outrigger extension cylinder (5) with cotter pin (6).

(4) Install two hydraulic clamps (7) in outrigger beam (1) with four bolts (8).

**c. Follow-On Maintenance.**

(1) Install jack cylinder assembly (para 16-56).

(2) Operate outriggers and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Wrench, Adjustable (Item 86, Appendix B)
Wrench, Torque 0-175 lb-ft (Item 92, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Gear (Item 50, Appendix C)
Adhesive (Item 7, Appendix C)
Sealing Compound (Item 75, Appendix C)
Kit, Seal (Item 121, Appendix F)
Kit, Seal (Item 106, Appendix F)
Kit, Seal (Item 107, Appendix F)
Kit, Seal (Item 108, Appendix F)
Packing, Preformed (8) (Item 225, Appendix F)
Lockwasher (14) (Item 143, Appendix F)
Nut, Self-Locking (6) (Item 175, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

**NOTE**

Tag electrical connectors and connection points prior to disconnecting.

(1) Disconnect 13 solenoid electrical connectors (1) from valve manifold (2).

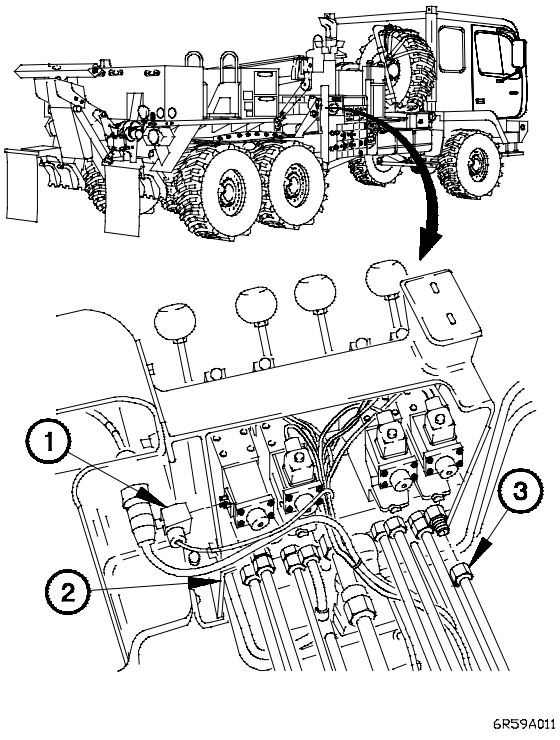
**CAUTION**

Cap or plug hydraulic tubes and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic tubes and connection points prior to disconnecting.

(2) Disconnect 11 hydraulic tubes (3) from valve manifold (2).



(3) Disconnect eight hydraulic tubes (4) from valve manifold (2).

**WARNING**

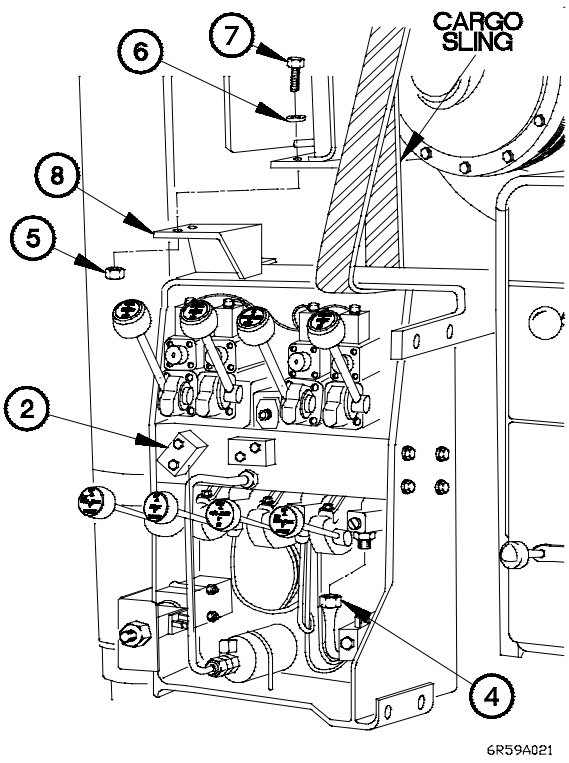
**Crane control panel weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

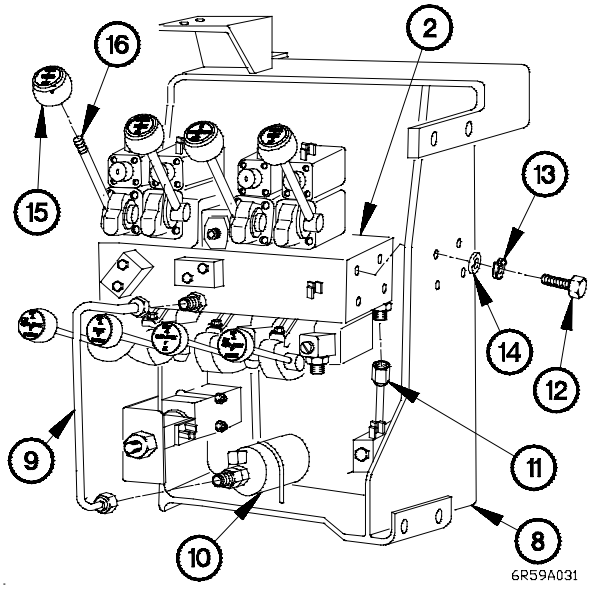
(4) Remove six self-locking nuts (5), washers (6), and bolts (7) from three corners of crane control panel (8). Discard self-locking nuts.

**NOTE**

Step (5) requires the aid of an assistant.

(5) Remove crane control panel (8) from vehicle.




(6) Remove hydraulic tube (9) from valve manifold (2) and accumulator (10).

(7) Remove three hydraulic tubes (11) from back of valve manifold (2).

**NOTE**

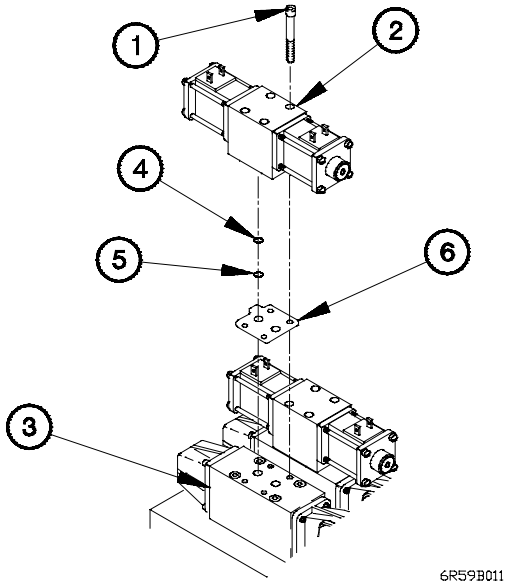
Step (8) requires the aid of an assistant.

(8) Remove eight bolts (12), lockwashers (13), washers (14), and valve manifold (2) from crane control panel (8). Discard lockwashers.

(9) Remove eight knobs (15) from levers (16).

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**b. Disassembly.**

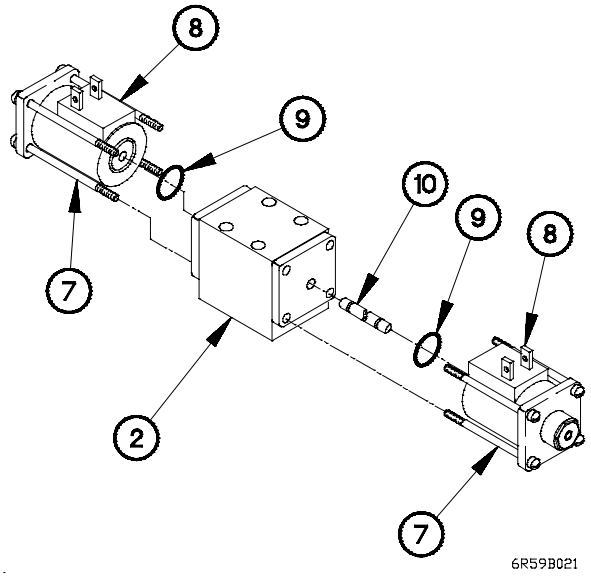



**NOTE**

All pilot valve bodies are disassembled the same way. One pilot valve body shown.

(1) Remove four bolts (1) and pilot valve body (2) from top directional valve body (3).

(2) Remove preformed packing (4), three preformed packings (5), and seal plate (6) from pilot valve body (2). Discard preformed packings.




(3) Loosen eight screws (7) on two solenoids (8).

(4) Remove two solenoids (8) from pilot valve body (2).

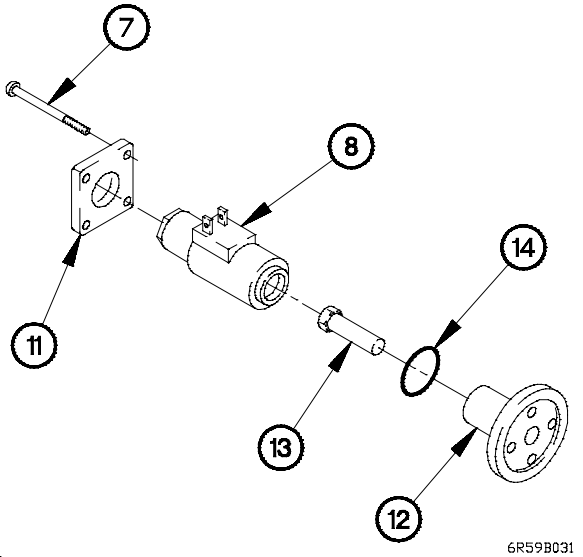
(5) Remove two preformed packings (9) from solenoids (8). Discard preformed packing.

(6) Remove spool (10) from pilot valve body (2).

(7) Perform steps (1) through (6) on remaining three pilot valve bodies.

**NOTE**

All solenoids are disassembled the same way. One solenoid shown.




(8) Remove four screws (7) and access cover (11) from solenoid (8).

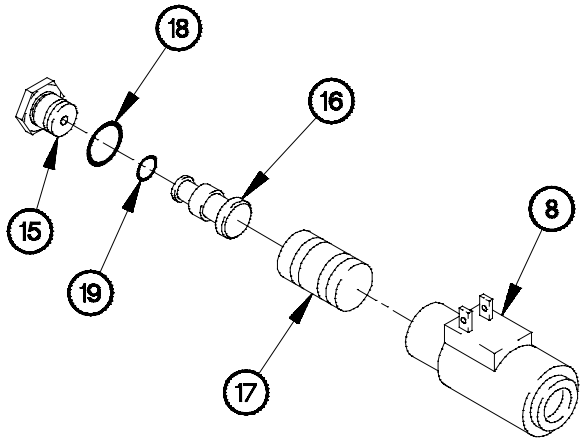
(9) Remove valve body coil (12) and valve body pushbutton (13) from solenoid (8).

(10) Remove performed packing (14) from valve body coil (12). Discard performed packing.

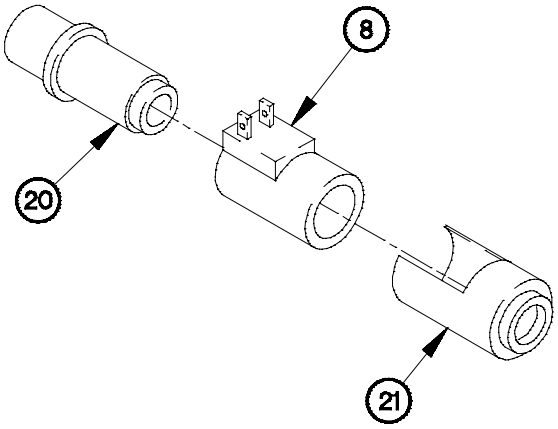
(11) Remove head valve (15), head valve pushbutton (16), and head valve coil (17) from solenoid (8).

(12) Remove performed packing (18) from head valve (15). Discard performed packing.

(13) Remove seal (19) from head valve pushbutton (16). Discard seal.




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(14) Remove solenoid sleeve (20) and solenoid cylinder (21) from solenoid (8).

(15) Perform steps (7) through (14) on remaining seven solenoids.

**NOTE**

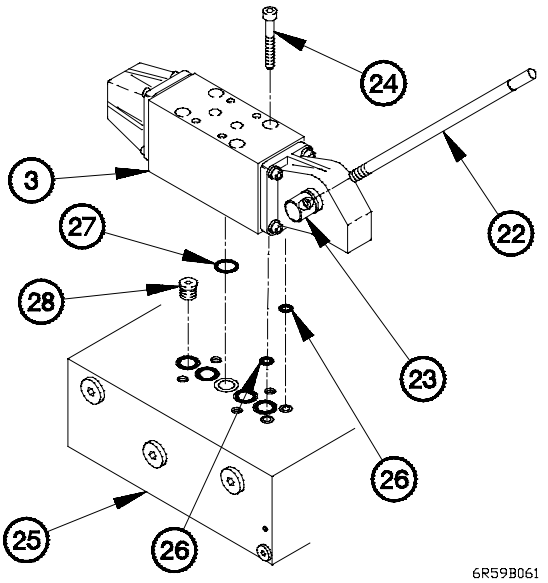
All top directional valve bodies are disassembled the same way. One top directional valve body shown.

(16) Remove lever (22) from pinion seal (23).

(17) Remove four screws (24) and top directional valve body (3) from valve manifold (25).

(18) Remove two preformed packings (26) and five preformed packings (27) from valve manifold (25). Discard preformed packings.

(19) Remove relief valve (28) from valve manifold (25).




6R59B061

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**CAUTION**

Lever cap and carrier nut are a matched set and must be kept together. Failure to comply may result in damage to equipment.

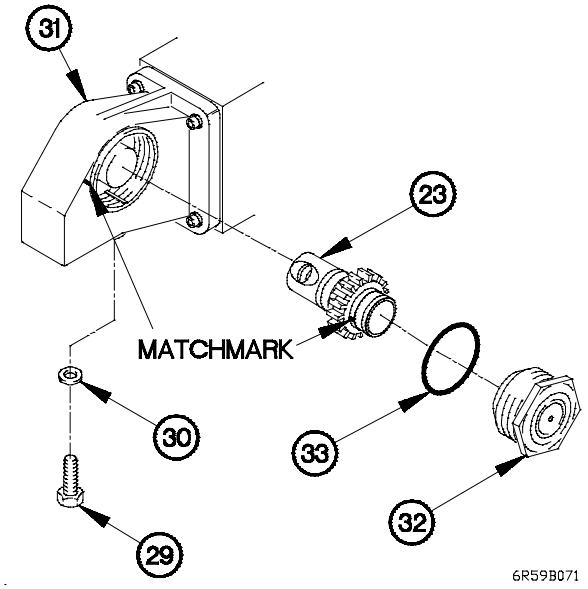
(20) Remove bolt (29) and washer (30) from lever cap (31). Discard washer.

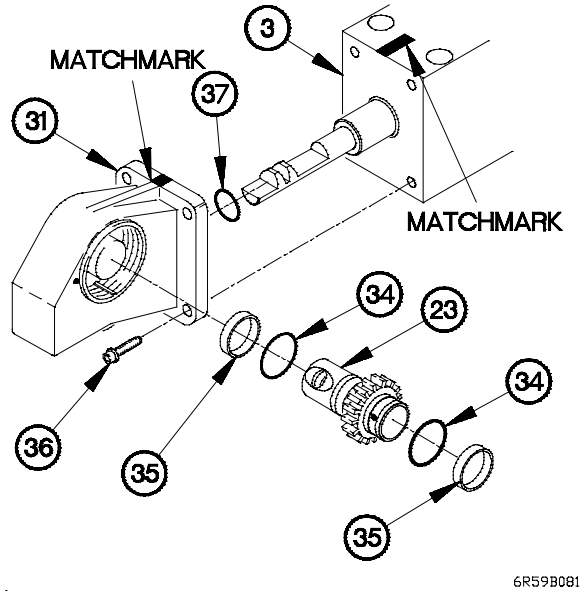
(21) Remove carrier nut (32) from lever cap (31).

(22) Remove preformed packing (33) from carrier nut (32). Discard preformed packing.

(23) Match mark pinion seal (23) to lever cap (31).

(24) Remove pinion seal (23) from lever cap (31).




(25) Remove two backup rings (34) and quad rings (35) from pinion seal (23). Discard backup rings and quad rings.

(26) Match mark lever cap (31) to valve body (3).

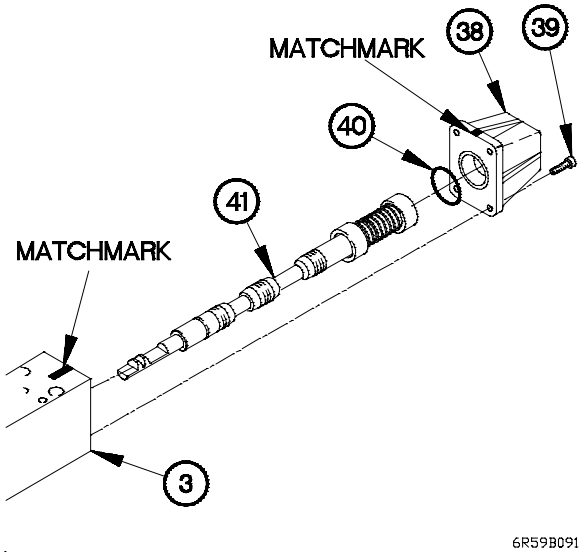
(27) Remove four screws (36), lever cap (31), and preformed packing (37) from top directional valve body (3). Discard preformed packing.

(28) Match mark end cap (38) to top directional valve body (3).

(29) Remove four screws (39), end cap (38), and preformed packing (40) from top directional valve body (3). Discard preformed packing.

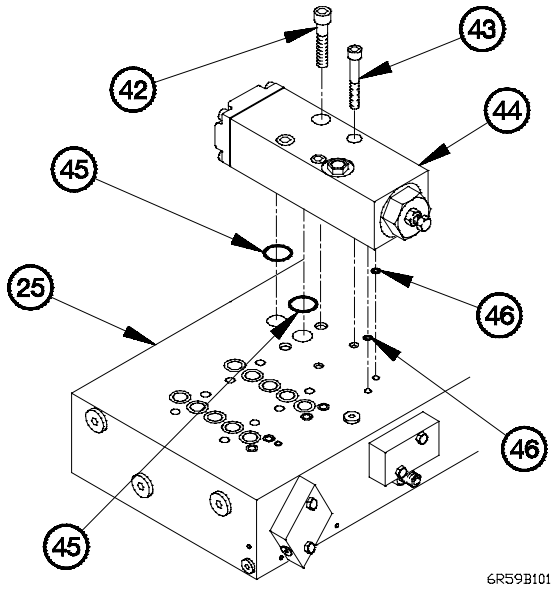
(30) Remove spool (41) from top directional valve body (3).

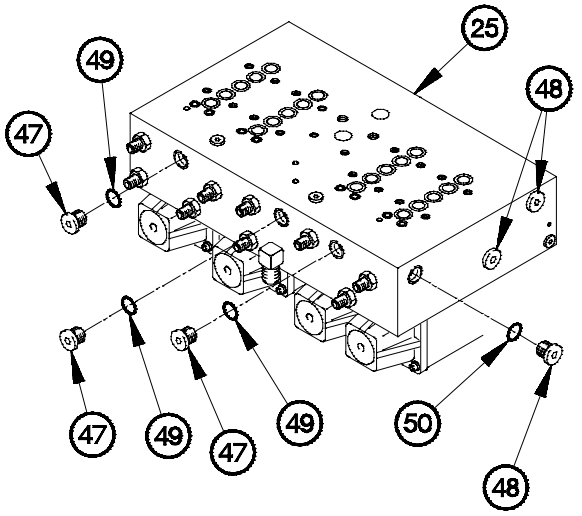
(31) Perform steps (16) through (30) on remaining three top directional valve bodies.



(32) Remove two screws (42), screws (43) and unloader control valve body (44) from valve manifold (14).

(33) Remove two preformed packings (45) and preformed packings (46) from valve manifold (25). Discard preformed packings.




(34) Remove three plugs (47) and six plugs (48) from valve manifold (25).

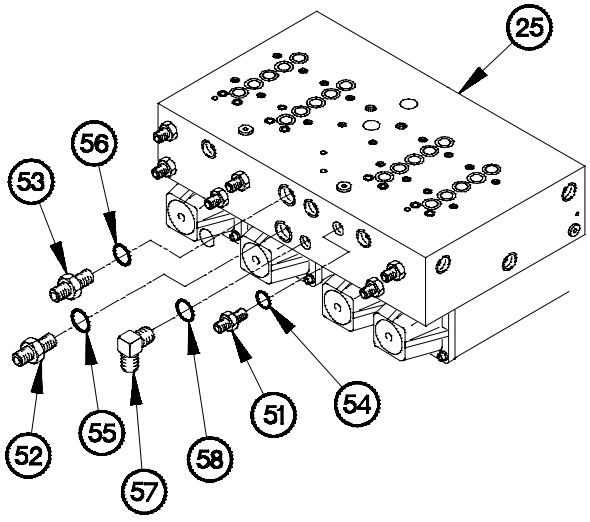
(35) Remove three preformed packings (49) from plugs (47) and six preformed packings (50) from plugs (48). Discard preformed packings.

(36) Remove seven fittings (51) and fittings (52 and 53) from valve manifold (25).

(37) Remove seven preformed packings (54) from fittings (51) and preformed packings (55) from fitting (52) and preformed packing (56) from fitting (53). Discard preformed packings.

(38) Remove 90-degree fitting (57) from valve manifold (25).

(39) Remove preformed packing (58) from 90-degree fitting (57). Discard preformed packing.



## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

All shuttle valves are removed the same way. One shuttle valve shown.

(40) Remove plug (59) from valve manifold (25).

(41) Remove preformed packing (60) from plug (59). Discard preformed packings.

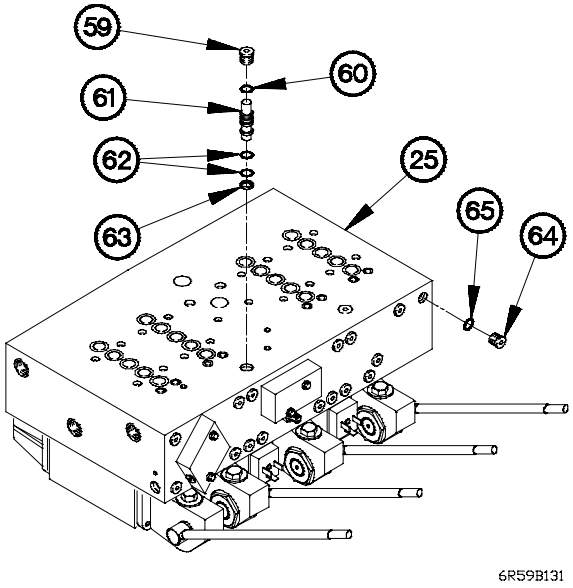
(42) Remove shuttle valve (61) from valve manifold (25).

(43) Remove backup ring (62) and two preformed packings (63) from shuttle valve (61). Discard backup ring and preformed packings.

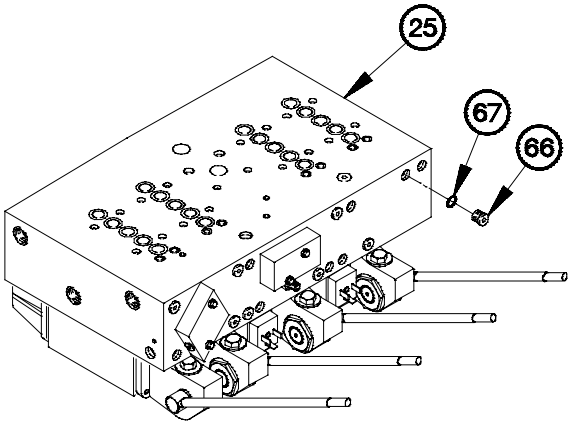
(44) Perform steps (40) through (43) on remaining two shuttle valves.

(45) Remove eight plugs (64) from valve manifold (25).

(46) Remove eight preformed packings (65) from plugs (64).



6R59B131



6R59B141

(47) Remove 14 plugs (66) from valve manifold (25).

(48) Remove 14 preformed packings (67) from plugs (66).

**NOTE**

Both shuttle blocks are disassembled the same way. One shuttle block shown.

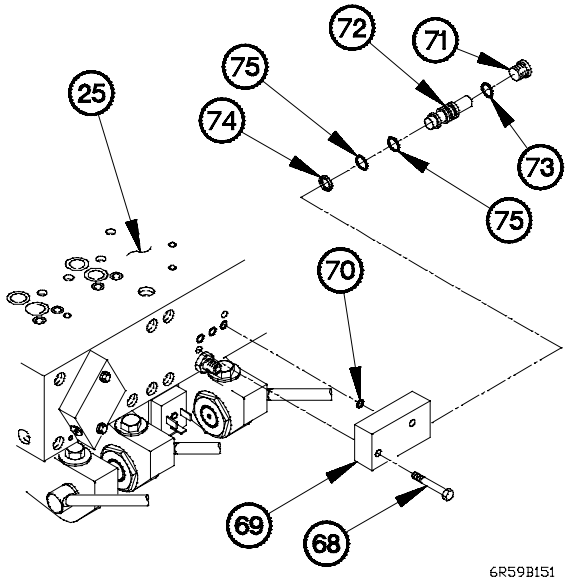
(49) Remove two screws (68), shuttle block (69) and three preformed packings (70) from valve manifold (25). Discard preformed packings.

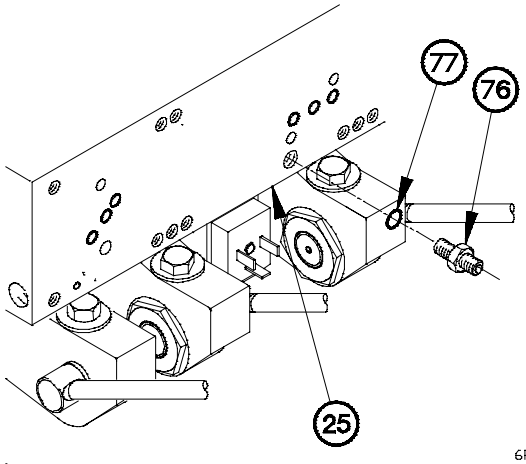
(50) Remove plug (71) and shuttle block valve (72) from shuttle block (69).

(51) Remove preformed packing (73) from plug (71). Discard preformed packing.

(52) Remove backup ring (74) and two preformed packings (75) from shuttle block valve (72). Discard backup ring and preformed packings.

(53) Perform steps (49) through (52) on remaining shuttle block.




(54) Remove fitting (76) from valve manifold (25).

(55) Remove preformed packing (77) from fitting (76). Discard preformed packing.

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

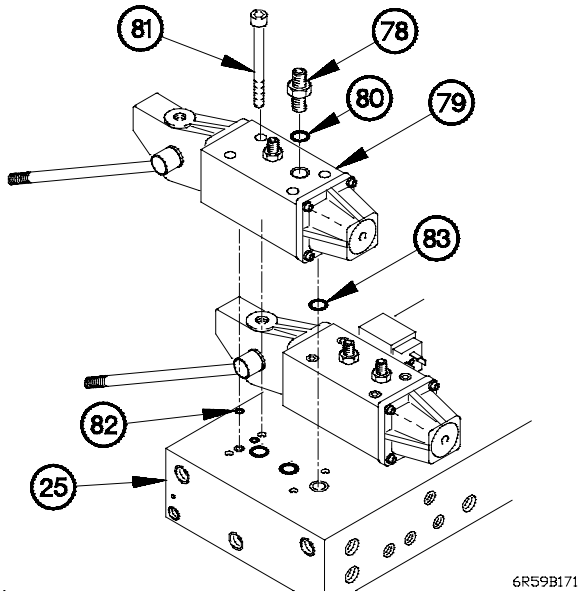
**NOTE**

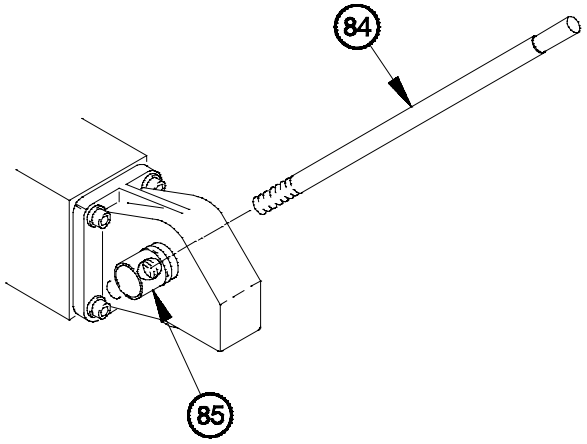
All bottom directional valve bodies are disassembled the same way. One bottom directional valve body shown.

(56) Remove two fittings (78) from bottom directional valve body (79).

(57) Remove two preformed packings (80) from fittings (78). Discard preformed packings.

(58) Remove four screws (81), bottom directional valve body (79), two preformed packings (82), and three preformed packings (83) from valve manifold (25). Discard preformed packings.

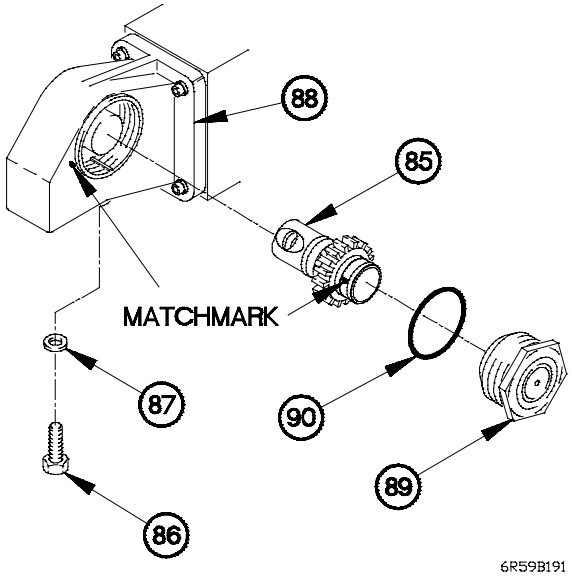



(59) Remove lever (84) from pinion seal (85).

**CAUTION**

Lever cap and carrier nut are a matched set and must be kept together. Failure to comply may result in damage to equipment.




(60) Remove bolt (86) and washer (87) from lever cap (88). Discard washer.

(61) Remove carrier nut (89) from lever cap (88).

(62) Remove preformed packing (90) from carrier nut (89). Discard preformed packing.

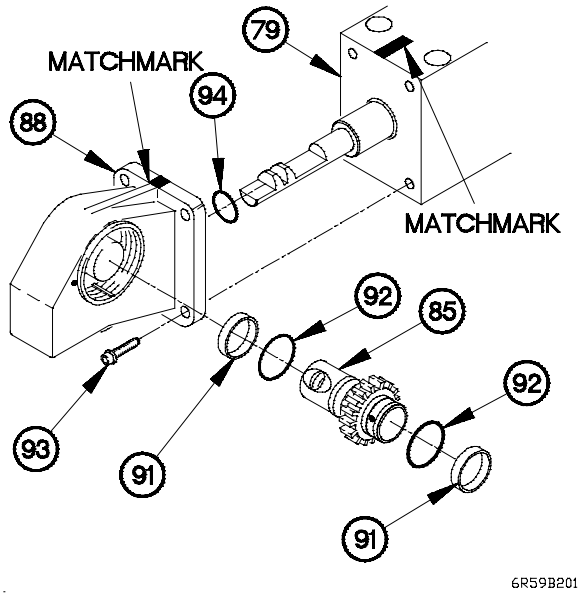
(63) Match mark pinion seal (85) and lever cap (88).

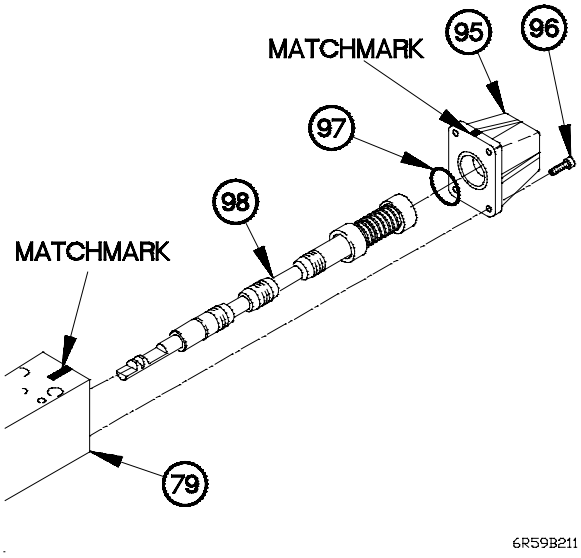
(64) Remove pinion seal (85) from lever cap (88).

(65) Remove two quad rings (91) and backup rings (92) from pinion seal (85). Discard backup rings and quad rings.

(66) Match mark lever cap (88) to bottom directional valve body (79).

(67) Remove four screws (93), lever cap (88), and preformed packing (94) from bottom directional valve body (79). Discard preformed packing.




(68) Match mark end cap (95) to bottom directional valve body (79).

(69) Remove four screws (96), end cap (95), and preformed packing (97) from bottom directional valve body (79). Discard preformed packing.

(70) Remove spool (98) from bottom directional valve body (79).

(71) Perform steps (56) through (70) on remaining three bottom directional valve bodies.

**NOTE**

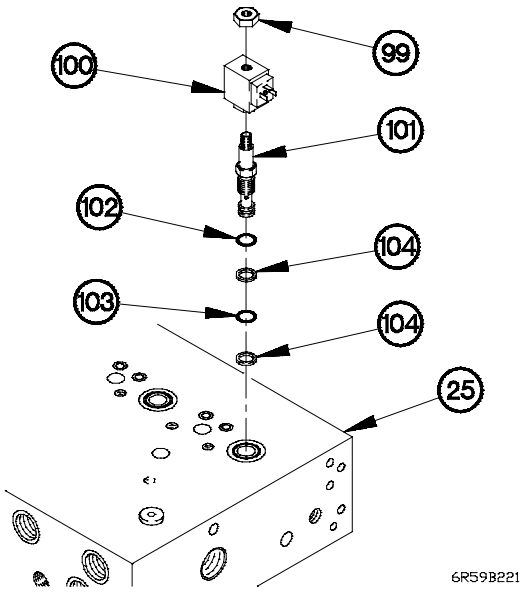
All solenoid valves are disassembled the same way. One solenoid valve shown.

(72) Remove nut (99) and coil (100) from solenoid valve (101).

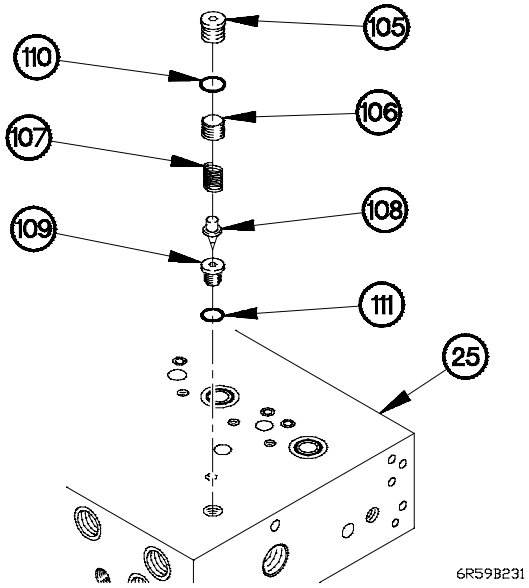
(73) Remove solenoid valve (101) from valve manifold (25).

(74) Remove preformed packings (102 and 103) and two backup rings (104) from solenoid valve (101). Discard preformed packings and backup rings.

(75) Perform steps (72) through (74) on remaining two solenoid valves.



## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




(76) Remove plug (105), setscrew (106), spring (107), poppet (108), and relief valve seat (109) from valve manifold (25).

(77) Remove preformed packing (110) from plug (105). Discard preformed packing.

(78) Remove preformed packing (111) from relief valve seat (109). Discard preformed packing.

**c. Cleaning/Inspection.**

**WARNING**

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

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

(1) Clean all metal parts in dry cleaning solvent.

**NOTE**

Replace any part that fails visual inspection or size requirements.

(2) Inspect all parts for nicks, scratches, burrs, pitting, and cracks.

**d. Assembly.**

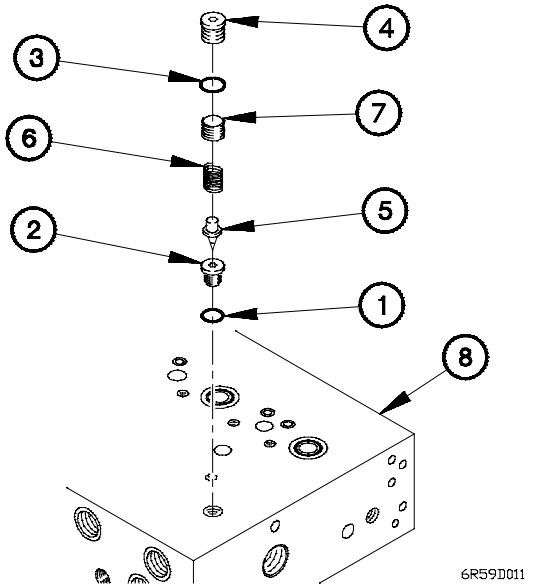
**NOTE**

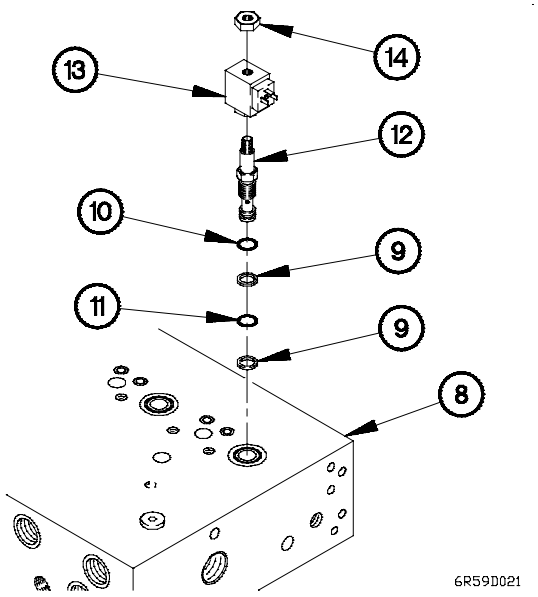
Lubricate all metal parts with lubricating oil during assembly.

(1) Install preformed packing (1) on relief valve seat (2).

(2) Install preformed packing (3) on plug (4).

(3) Install relief valve seat (2), poppet (5), spring (6), setscrew (7), and plug (4) in valve manifold (8).




**NOTE**

All solenoid valves are assembled the same way. One solenoid valve shown.

(4) Install two backup rings (9) and preformed packings (10 and 11) on solenoid valve (12).

(5) Install solenoid valve (12) in valve manifold (8).

(6) Install coil (13) on solenoid valve (12) with nut (14).

(7) Perform steps (4) through (6) on remaining two solenoid valves.

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**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.**

**NOTE**

All bottom directional valve bodies are assembled the same way. One bottom directional valve body shown.

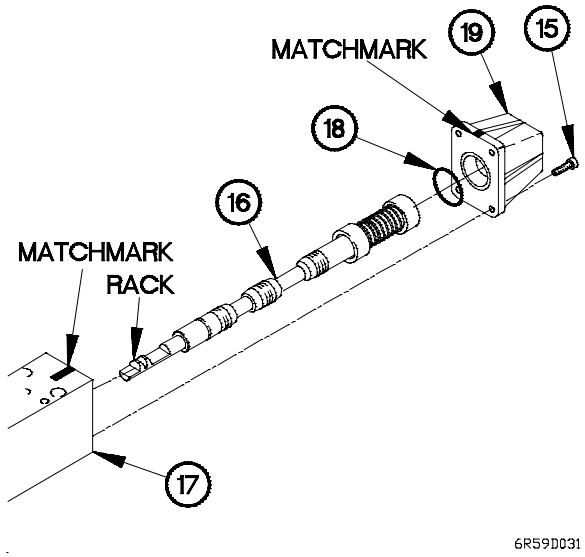
(8) Apply sealing compound to threads of screw (15).

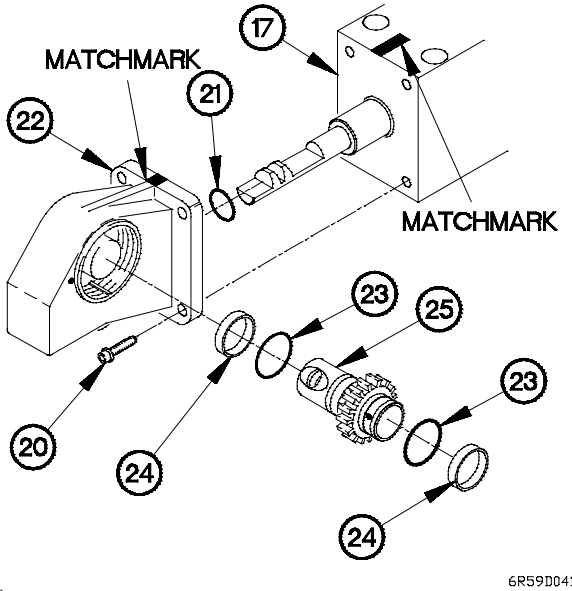
**NOTE**

Spool is installed with rack facing up.

(9) Install spool (16) in bottom directional valve body (17).

(10) Install preformed packing (18), end cap (19), and four screws (15) on bottom directional valve body (17) with matchmarks aligned.




(11) Apply sealing compound to threads of four screws (20).

(12) Install preformed packing (21), lever cap (22), and four screws (20) on bottom directional valve body (17) with matchmarks aligned.

(13) Install two backup rings (23) and quad rings (24) on pinion seal (25).

(14) Install pinion seal (25) in lever cap (22) with match marks aligned.

(15) Install preformed packing (26) on carrier nut (27).

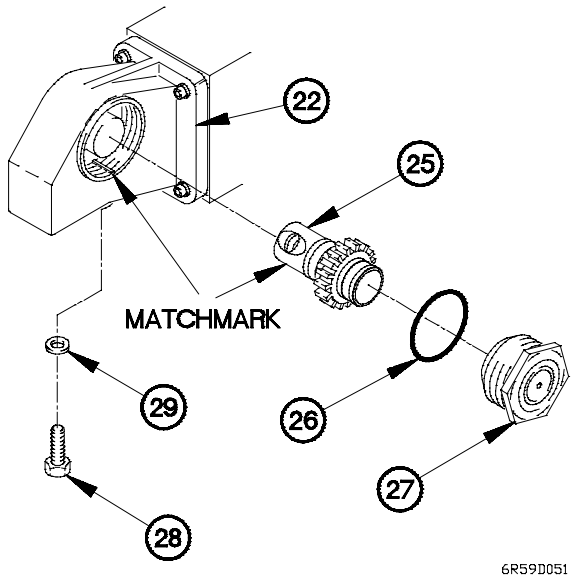
(16) Install carrier nut (27) on lever cap (22).

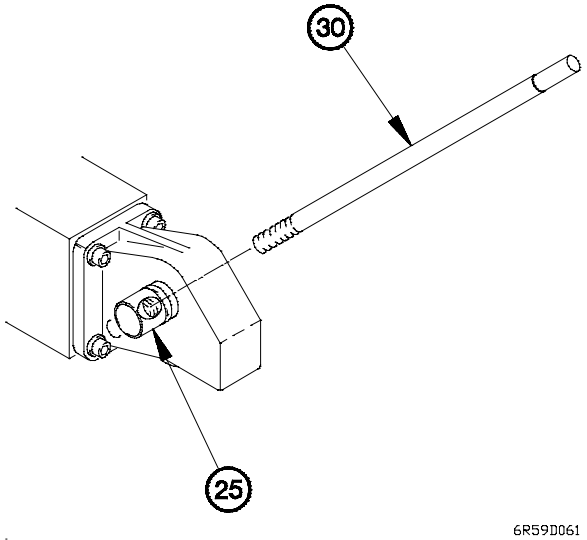
**WARNING**

**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.**

(17) Apply sealing compound to threads of bolt (28).

(18) Install washer (29) and bolt (28) on lever cap (22).




(19) Install lever (30) in pinion seal (25).

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(20) Install three preformed packings (31) and two preformed packings (32) on valve manifold (8).

**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.**

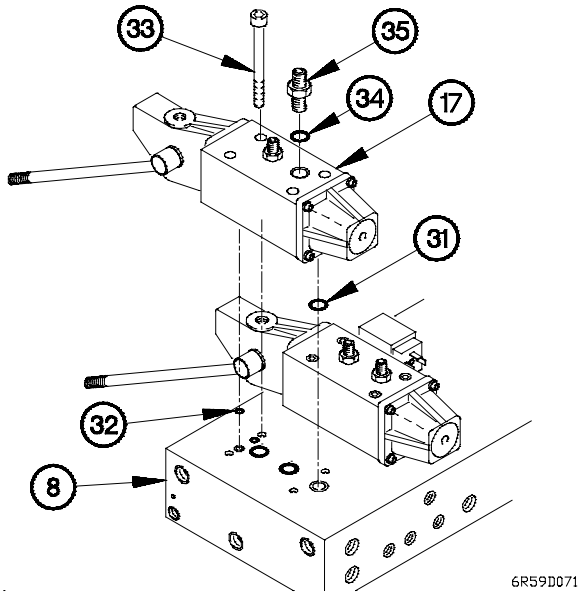
(21) Apply sealing compound to threads of four screws (33).

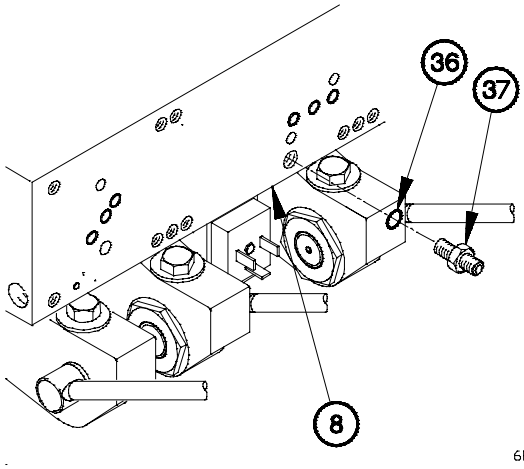
(22) Install bottom directional valve body (17) on valve manifold (8) with four screws (33).

(23) Install two preformed packings (34) on fittings (35).

(24) Install two fittings (35) on bottom directional valve body (17).

(25) Perform steps (8) through (24) on remaining three bottom directional valve bodies.




(26) Install preformed packing (36) on fitting (37).

(27) Install fitting (37) in valve manifold (8).

**NOTE**

Both shuttle blocks are assembled the same way. One shuttle block shown.

(28) Install two preformed packings (38) and backup ring (39) on shuttle block valve (40).

(29) Install preformed packing (41) on plug (42).

(30) Install shuttle block valve (40) and in shuttle block (43) with plug (42).

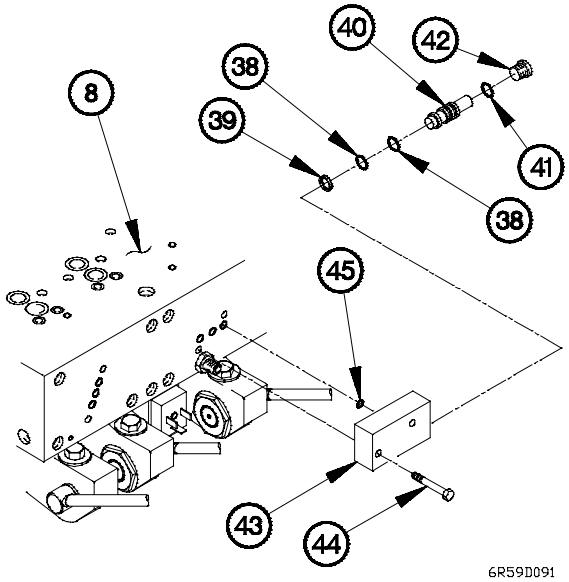
**WARNING**

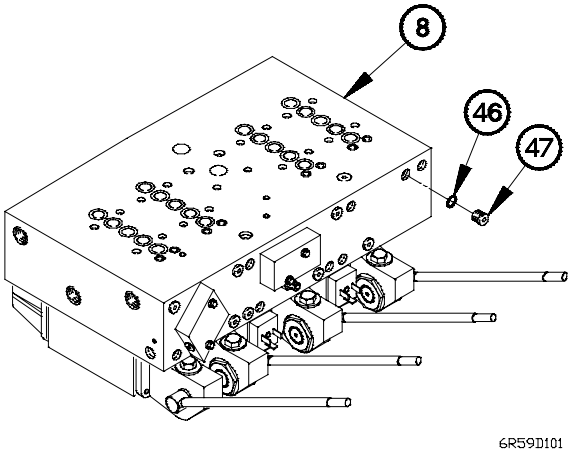
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(31) Apply sealing compound to threads of two screws (44).

(32) Install three preformed packings (45) and shuttle block (43) on valve manifold (8) with two screws (44).

(33) Perform steps (28) through (32) on remaining shuttle block.




(34) Install 14 preformed packings (46) on plugs (47).

(35) Install 14 plugs (47) in valve manifold (8).

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(36) Install eight preformed packings (48) on plugs (49).

(37) Install eight plugs (49) in valve manifold (8).

**NOTE**

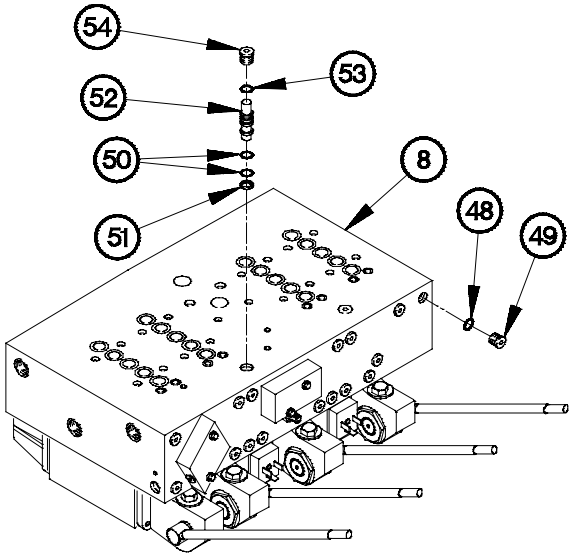
All three shuttle valves are installed the same way. One shuttle valve shown.

(38) Install two preformed packings (50) and backup ring (51) on shuttle valve (52).

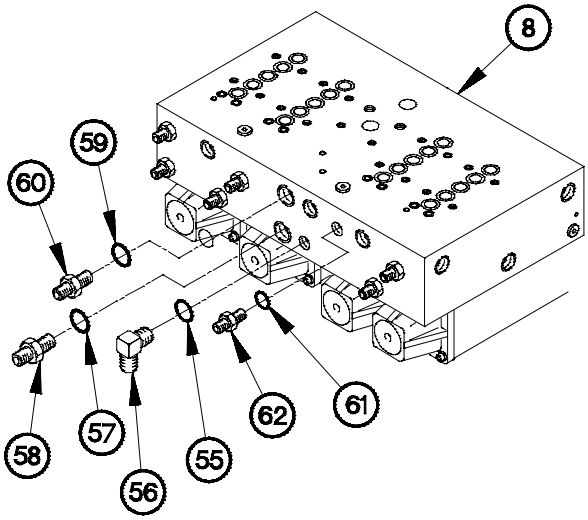
(39) Install preformed packing (53) on plug (54).

(40) Install shuttle valve (52) in valve manifold (8) with plug (54).

(41) Perform steps (38) through (40) on remaining two shuttle valves.




6R59D111




6R59D121

(42) Install preformed packing (55) on 90-degree fitting (56).

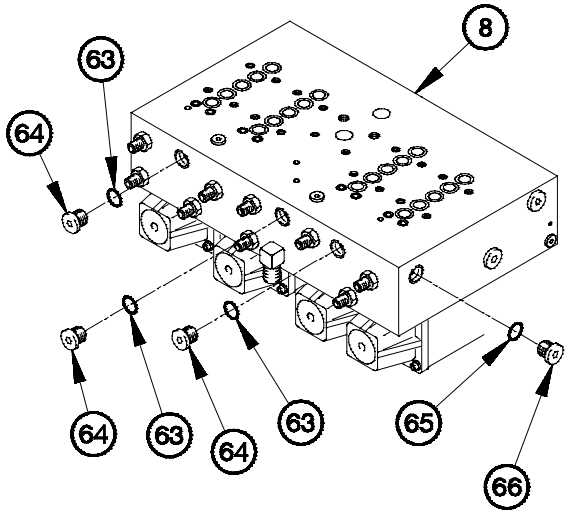
(43) Install 90-degree fitting (56) in valve manifold (8).

(44) Install preformed packing (57) on fitting (58), preformed packing (59) on fitting (60), and seven preformed packings (61) on fittings (62).

(45) Install fittings (58 and 60) and seven fittings (62) in valve manifold (8).

(46) Install three preformed packings (63) on plugs (64) and six preformed packings (65) on plugs (66).

(47) Install three plugs (64) and six plugs (66) in valve manifold (8).




6R59D131

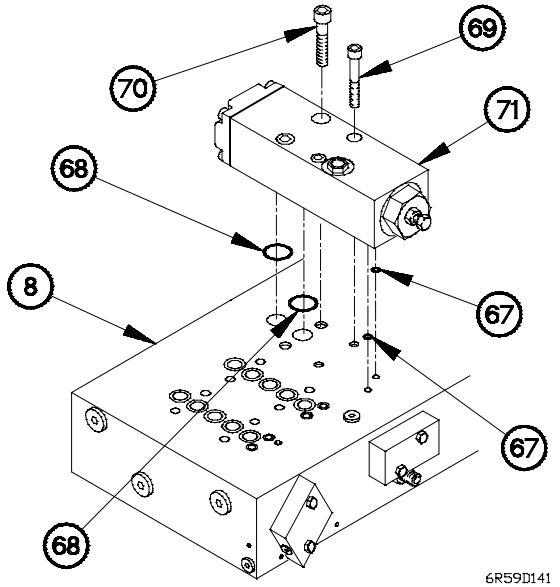
(48) Install two preformed packings (67) and preformed packings (68) on valve manifold (8).

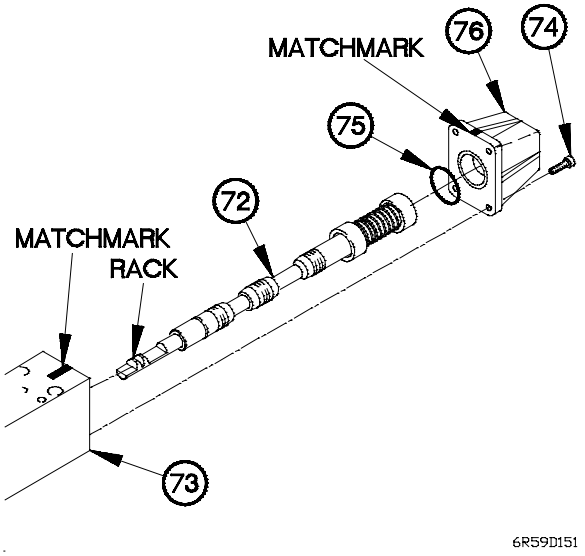
**WARNING**

**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.**

(49) Apply sealing compound to threads of two screws (69 and 70).

(50) Install compensator valve body (71) in valve manifold (8) with two screws (69 and 70).




**NOTE**

- All four top directional valve bodies are assembled in the same way. One top directional valve body shown.
- Spool is installed with rack facing up.

(51) Install spool (72) in top directional valve body (73).

(52) Apply sealing compound to threads of four screws (74).

(53) Install preformed packing (75), end cap (76), and four screws (74) on top directional valve body (73) with matchmarks aligned.

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

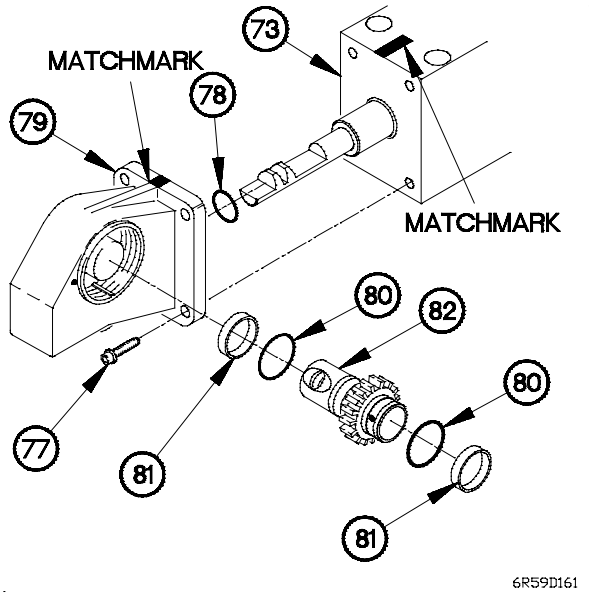
**WARNING**

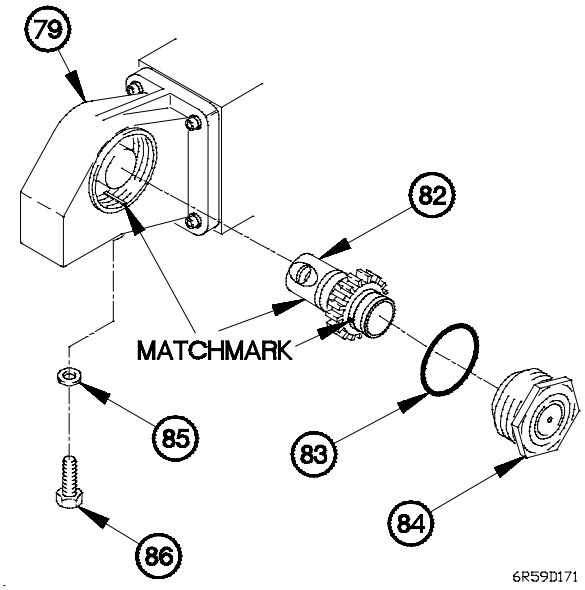
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(54) Apply sealing compound to threads of four screws (77).

(55) Install preformed packing (78), lever cap (79), and four screws (77) on top directional valve body (73) with matchmarks aligned.

(56) Install two backup rings (80) and quad rings (81) on pinion seal (82).




(57) Install pinion seal (82) in lever cap (79) with matchmarks aligned.

(58) Install preformed packing (83) on carrier nut (84).

(59) Install carrier nut (84) on lever cap (79).

(60) Install washer (85) and bolt (86) on lever cap (79).

(61) Install relief valve (87) in valve manifold (8).

(62) Install five preformed packings (88) and two preformed packings (89) on valve manifold (8).

**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.**

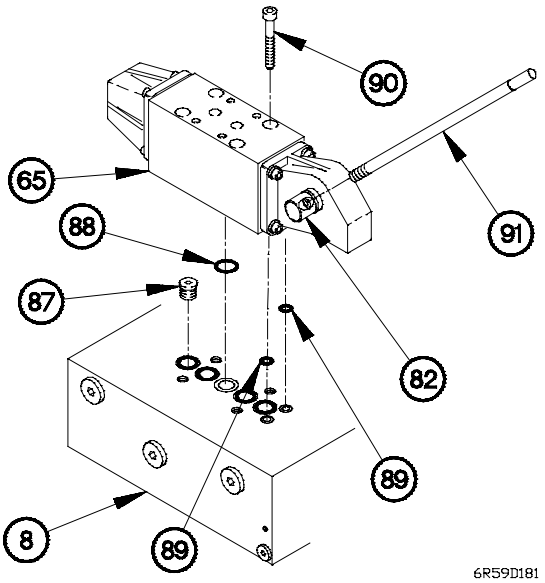
(63) Apply sealing compound to threads of four screws (90).

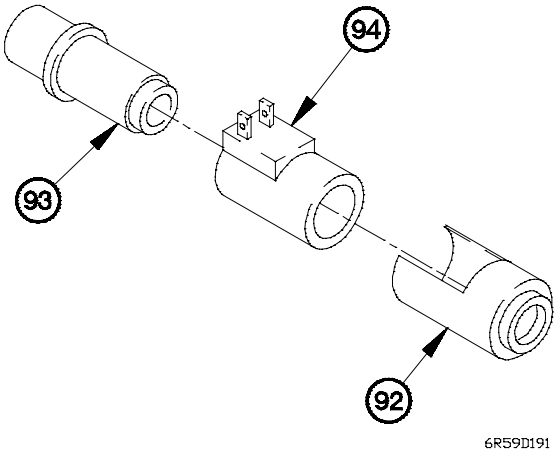
(64) Install top directional valve body (73) on valve body (8) with four screws (90).

(65) Apply sealing compound to threads of lever (91).

(66) Install lever (91) in pinion seal (82).

(67) Perform steps (61) through (66) on remaining three top directional valve bodies.




**NOTE**

All solenoids are assembled the same way. One solenoid shown.

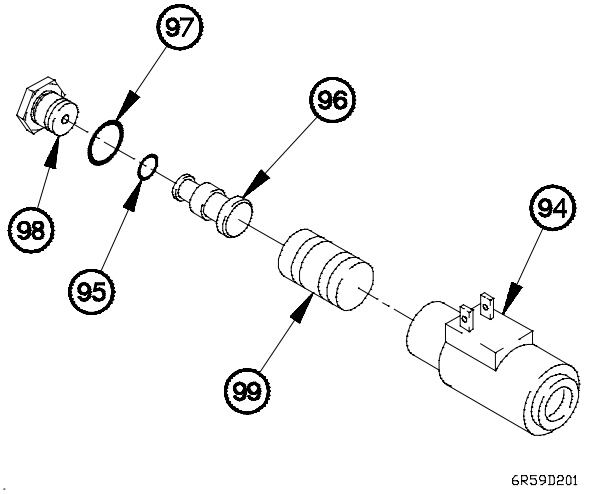
(68) Install solenoid cylinder (92) and solenoid sleeve (93) on solenoid (94).

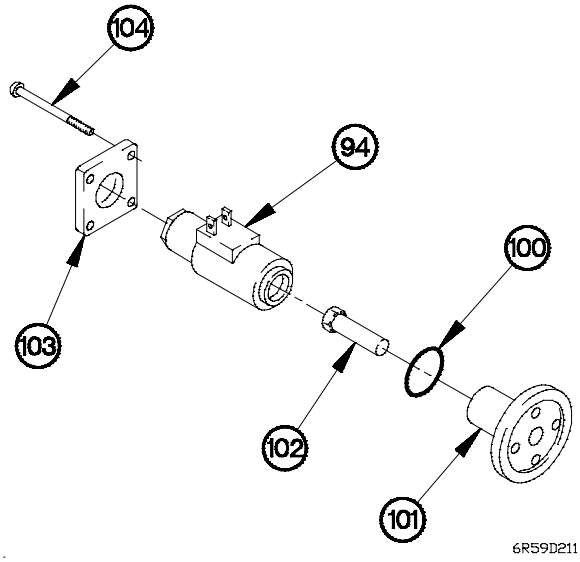
## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(69) Install seal (95) on head valve push button (96).

(70) Install performed packing (97) on head valve (98).

(71) Install head valve coil (99), head valve push button (96), and head valve (98) in solenoid (94).




(72) Install performed packing (100) on valve body coil (101).

(73) Install valve body push button (102) and valve body coil (101) in solenoid (94).

(74) Position access cover (103) on solenoid (94) with four screws (104).

(75) Perform steps (68) through (74) on remaining seven solenoids.

**NOTE**

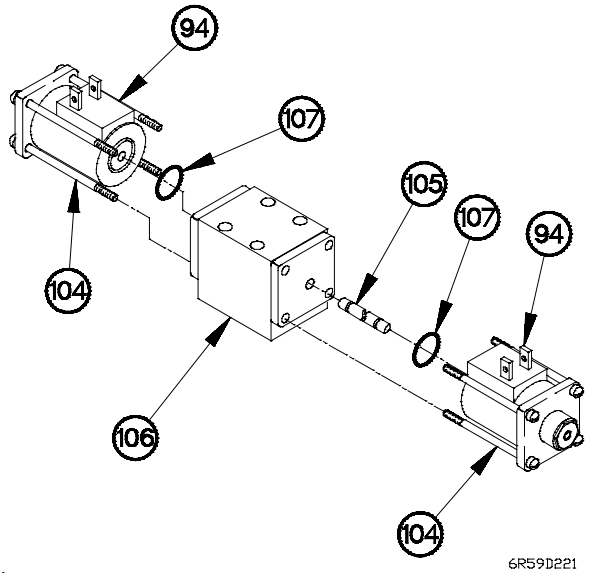
All pilot valves are assembled the same way. One pilot valve shown.

(76) Install spool (105) in pilot valve body (106).

(77) Install two preformed packings (107) in solenoids (94).

**WARNING**

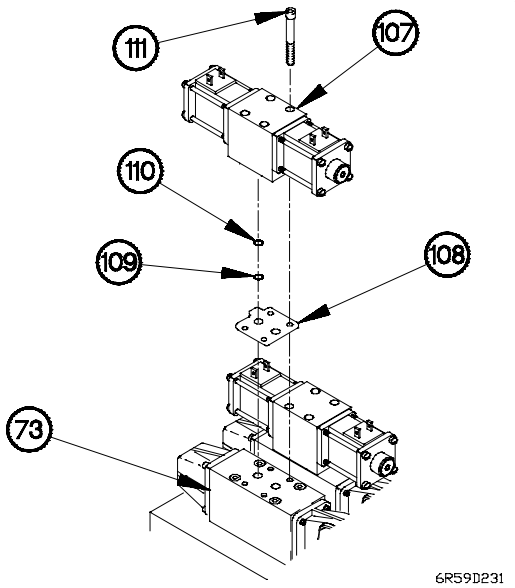
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**




(78) Apply sealing compound to threads of eight screws (104).

(79) Install two solenoids (94) on pilot valve body (106) with eight screws (104).

(80) Install seal plate (108), three preformed packings (109), and preformed packing (110) on top directional valve body (73).




**WARNING**

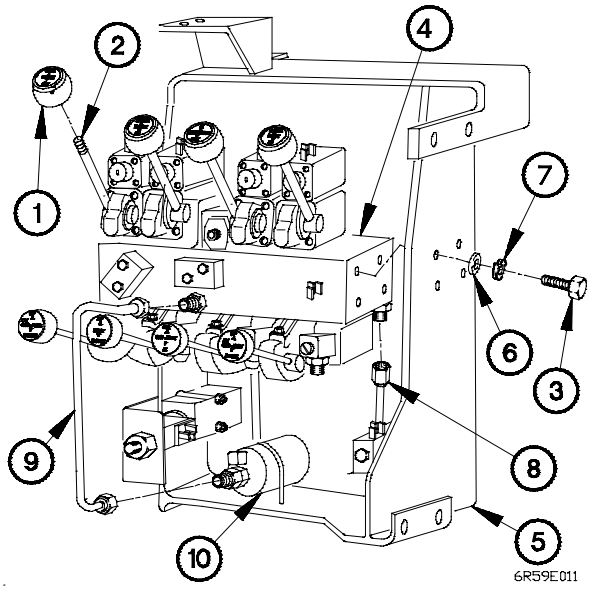
**Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(81) Apply sealing compound to threads of four screws (111).

(82) Install pilot valve body (106) on top directional valve body (73) with four screws (111).

(83) Perform steps (76) through (82) on remaining three pilot valve bodies.

**e. Installation.**




(1) Install eight knobs (1) on levers (2).

(2) Apply sealing compound to threads of eight bolts (3).

**NOTE**

Steps (3) and (4) require the aid of an assistant.

(3) Position valve manifold (4) in crane control panel (5) with eight washers (6), lockwashers (7), and bolts (3).

(4) Tighten bolts (3) to 41-45 lb-ft (55-61 N•m).

(5) Connect three hydraulic tubes (8) to valve manifold (4).

(6) Install hydraulic tube (9) on valve manifold (4) and accumulator (10).

## 16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**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.**
- **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.**

(7) Apply sealing compound to threads of six bolts (11)

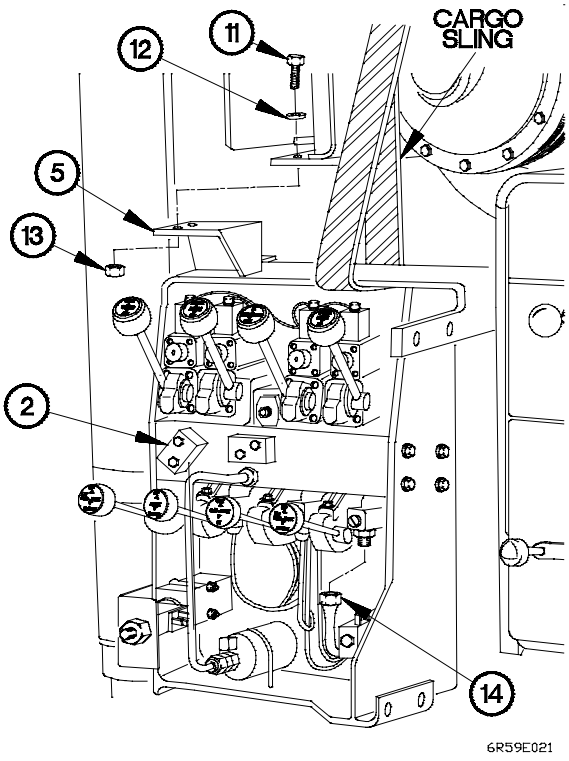
**NOTE**

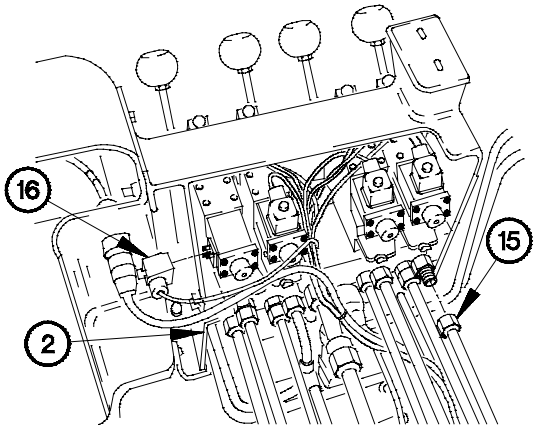
Steps (8) and (9) require the aid of an assistant.

(8) Position crane control panel (5) on vehicle with six washers (12), bolts (11), and self-locking nuts (13).

(9) Tighten six self-locking nuts (13) to 43-47 lb-ft (58-64 N•m).

(10) Connect eight hydraulic tubes (14) to valve manifold (2).




(11) Connect 11 hydraulic tubes (15) to valve manifold (2).

(12) Connect 13 solenoid electrical connectors (16) to valve manifold (2).

**f. Follow-On Maintenance.**

(1) Place hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-2).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Operate MHC at from local control panel and check for hydraulic leaks on valve manifold and check for proper operation (TM 9-2320-366-10-2).

(4) Operate MHC with REMOTE CONTROL UNIT and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-60. M1089 TWO WAY SOLENOID VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (2) (Item 138, Appendix F)
Packing, Preformed (2) (Item 231, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 75, Appendix C)

**a. Removal.**

(1) Disconnect electrical connector (1) from two way solenoid valve (2).

(2) Place drain pan under two way solenoid valve (2).

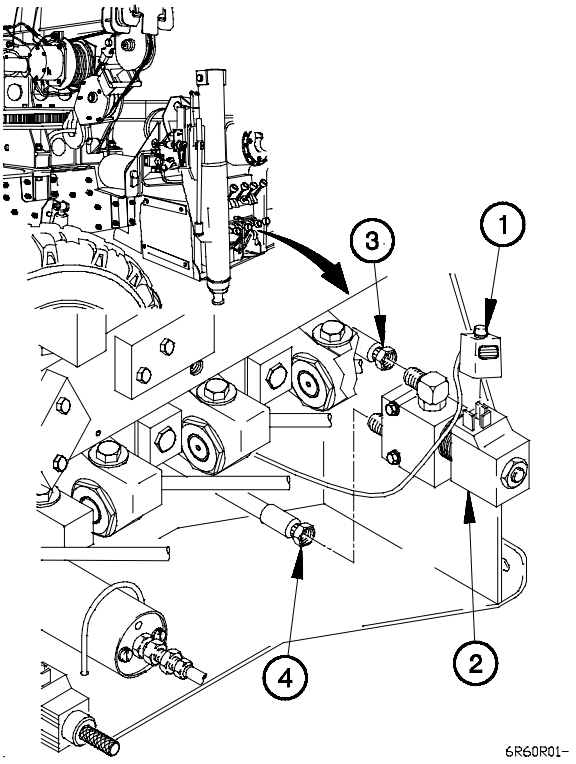
**CAUTION**

Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

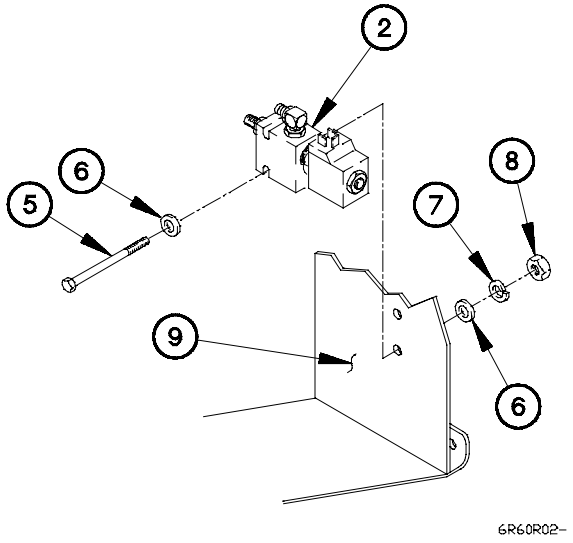
**NOTE**

Tag hydraulic tubes and connection points prior to disconnecting.

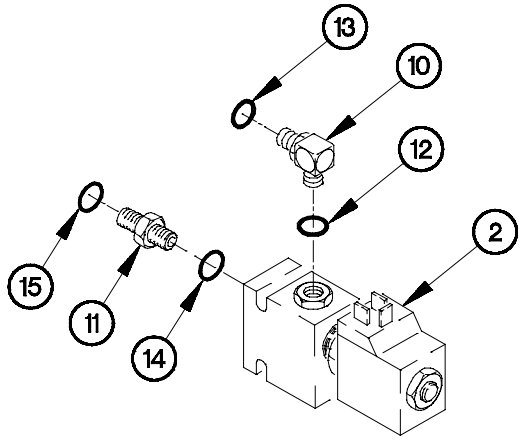
(3) Disconnect hydraulic tubes (3 and 4) from two way solenoid valve (2).



(4) Remove two screws (5), four washers (6), two lockwashers (7), nuts (8), and two way solenoid valve (2) from control panel (9). Discard lockwashers.




6R60R02-




6R60R03-

(5) Remove 90-degree fitting (10) from two way solenoid valve (2).

(6) Remove fitting (11) from two way solenoid valve (2).

(7) Remove preformed packings (12 and 13) from 90-degree fitting (10). Discard preformed packings.

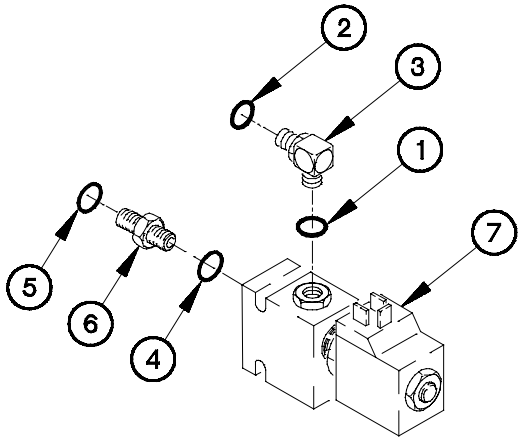
(8) Remove preformed packing (14 and 15) from fitting (11). Discard preformed packings.

**b. Installation.**

(1) Install preformed packings (1 and 2) on 90-degree fitting (3).

(2) Install preformed packings (4 and 5) on fitting (6).

(3) Install 90-degree fitting (3) and fitting (6) on two way solenoid valve (7).




6R60I01-

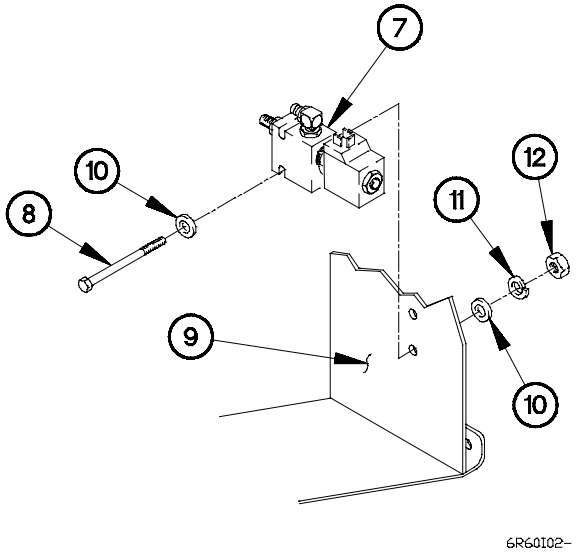
## 16-60. M1089 TWO WAY SOLENOID VALVE REPLACEMENT (CONT)

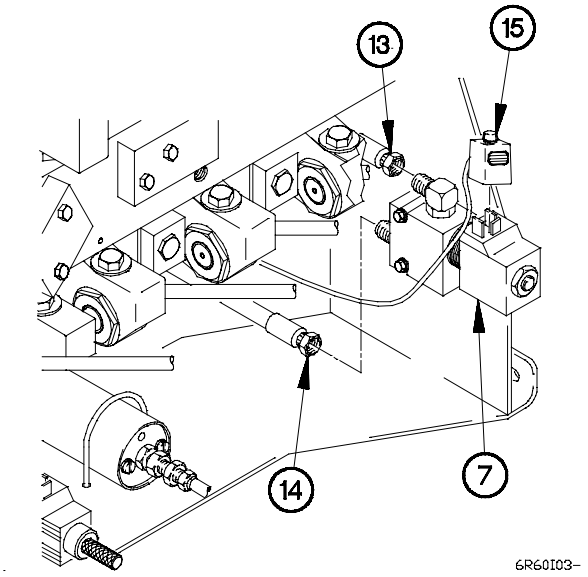
**WARNING**

**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.**

(4) Apply sealing compound on threads of screws (8).

(5) Install two way solenoid valve (7) on control panel (9) with two screws (8), four washers (10), two lockwashers (11), and nuts (12).




(6) Connect hydraulic tubes (13 and 14) to two way solenoid valve (7).

(7) Connect electrical connector (15) to two way solenoid valve (7).

**c. Follow-On Maintenance.**

(1) Place hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-2).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Operate MHC and check for hydraulic leaks at Two Way Solenoid Valve (TM 9-2320-366-10-2).

**End of Task.**

## 16-61. M1089 MANUAL OVERRIDE VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (2) (Item 139, Appendix F)
Packing, Preformed (2) (Item 231, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 76, Appendix C)

**a. Removal.**

(1) Disconnect electrical connector O (1) from manual override valve (2).

(2) Place drain pan under manual override valve (2).

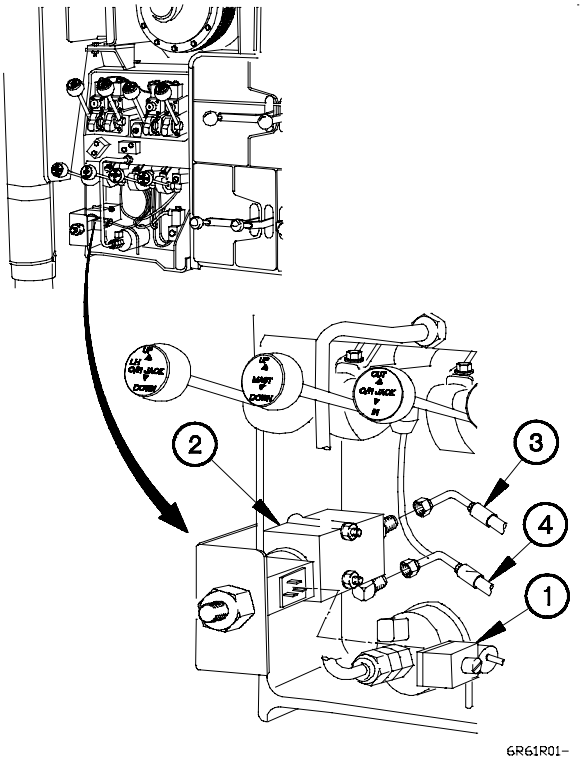
**CAUTION**

Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

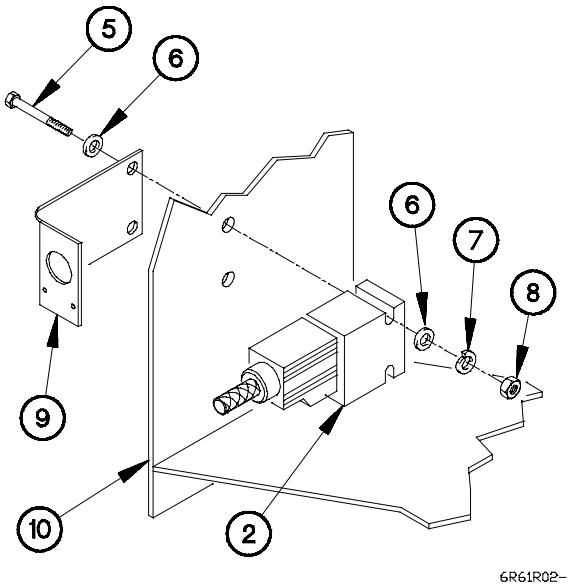
Tag hydraulic hoses and connection points prior to disconnecting.

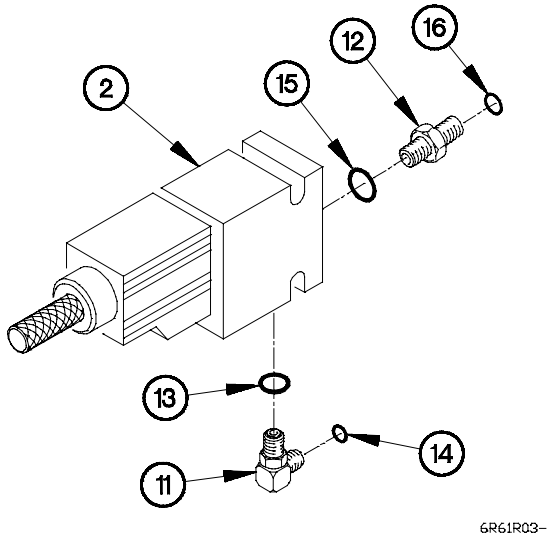
(3) Disconnect hydraulic hoses (3 and 4) from manual override valve (2).



## 16-61. M1089 MANUAL OVERRIDE VALVE REPLACEMENT (CONT)

(4) Remove two screws (5), four washers (6), two lockwashers (7), nuts (8), manual override valve (2), and valve bracket (9) from control panel (10). Discard lockwashers.




(5) Remove 90-degree fitting (11) from manual override valve (2).

(6) Remove fitting (12) from manual override valve (2).

(7) Remove preformed packings (13 and 14) from 90-degree fitting (11). Discard preformed packings.

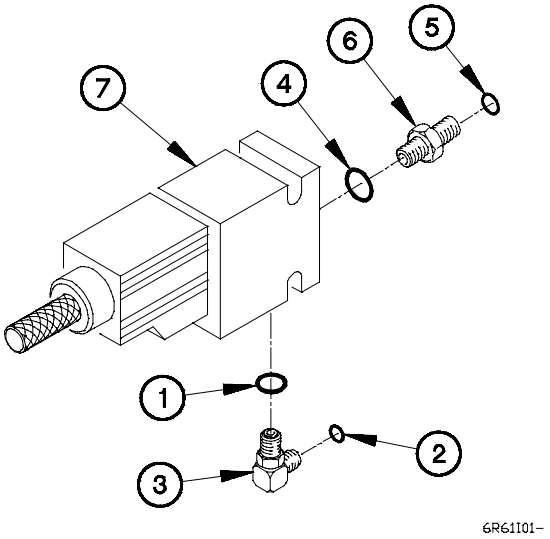
(8) Remove preformed packings (15 and 16) from fitting (12). Discard preformed packings.

**b. Installation.**

(1) Install preformed packings (1 and 2) on 90-degree fitting (3).

(2) Install preformed packings (4 and 5) on fitting (6).

(3) Install 90-degree fitting (3) and fitting (6) in manual override valve (7).

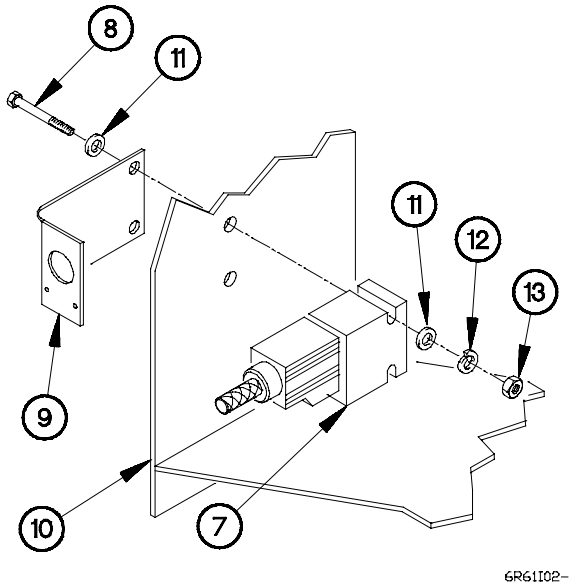


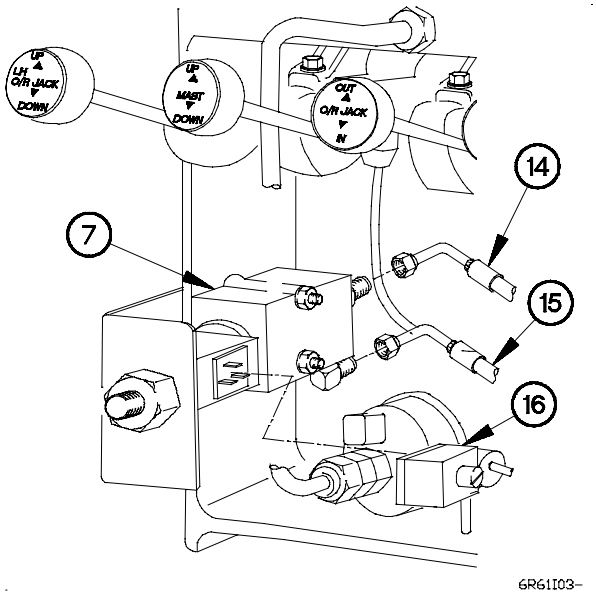
**WARNING**

**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.**

(4) Apply sealing compound to threads of screws (8).

(5) Install manual override valve (7) and valve bracket (9) on control panel (10) with two screws (8), four washers (11) two lockwashers (12), and two nuts (13).




(6) Connect hydraulic hoses (14 and 15) to manual override valve (7).

(7) Connect electrical connector O (16) to manual override valve (7).

**c. Follow-On Maintenance.**

(1) Place hydraulic reservoir supply valve and return valve in open position (TM 9-2320-366-10-2).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Operate MHC and check for hydraulic leaks at manual override valve (TM 9-2320-366-10-2).

**End of Task.**

## 16-62. M1089 CRANE LOAD TEST

This task covers:

a. Static Overload Test
b. Static Overload Proof Test
c. Dynamic Test
d. Follow-on Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Vehicle packed on hard level surface (TM 9-2320-366-10-1).
Exercise all MHC functions to their full extent with REMOTE CONTROL UNIT (TM 9-2320-366-10-1).
Position MHC to rear center line of vehicle (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Gloves, Welders (Item 27, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Materials/Parts**
10000 lb weight
12100 lb weight
13750 lb weight

**Personnel Required**
(3)

**References**
TB43-0142

**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.**
- **Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**
- **Wire rope can become frayed or contain broken wires, wear heavy leather palmed work gloves when handling wire rope. Failure to comply may result in injury to personnel.**

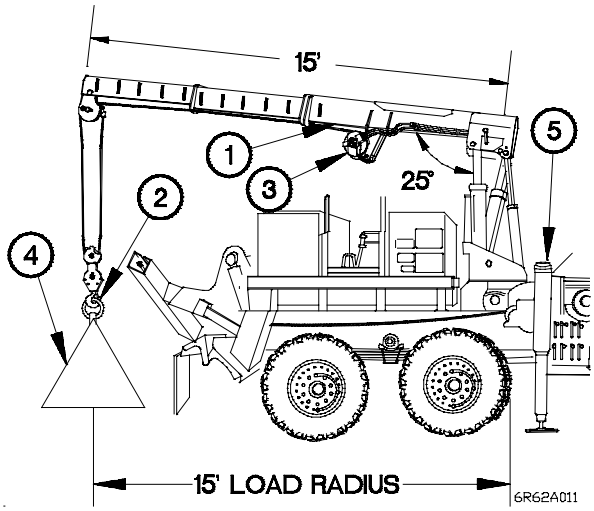
**NOTE**

Load testing shall be performed from crane local control panel.

**a. Static Overload Test.**

**NOTE**

Static overload test is performed with a test load of 110% of crane rated load on Range Diagram for this boom extension and radius. The overload protection system should prevent lifting of this test weight.




(1) Extend boom (1) to 15 feet, 0 inches.

(2) Raise boom (1) approximately 25° for a load radius of 11 feet, 0 inches.

(3) Lower crane hook (2) with hoist (3).

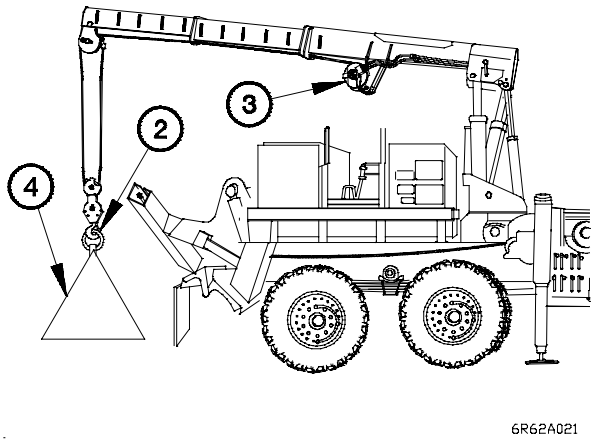
(4) Connect 12100 lb test weight (4) to hook (2).

**NOTE**

If test weight is lifted refer to troubleshooting to determine failure of overload protection system.

(5) Attempt to raise test weight (4) with hoist (3).

(6) Place crane power switch (5) to OFF.




**NOTE**

Hold manual override depressed until test weight is raised.

(7) Depress manual override (6).

(8) Raise test weight (4) approximately six inches with hoist (3).

(9) Release manual override (6).

**NOTE**

Test weight will remain suspended.

(10) Depress manual override (6).

(11) Lower test weight (4) to ground with hoist (3).

(12) Release manual override (6).

(13) Disconnect 12100 lb test weight (4) from hook (2).

## 16-62. M1089 CRANE LOAD TEST (CONT)

**b. Static Overload Proof Test.**

**NOTE**

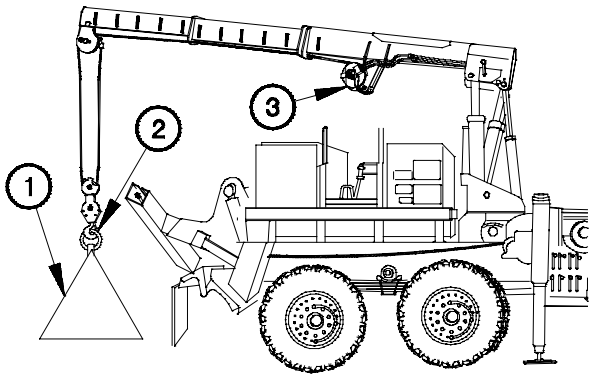
Static overload proof test is performed with a test load of 125% of crane rated load on Range Diagram for this boom extension and radius. The overload protection system should prevent lifting of this test weight.

(1) Connect 13750 lb test weight (1) to hook (2).

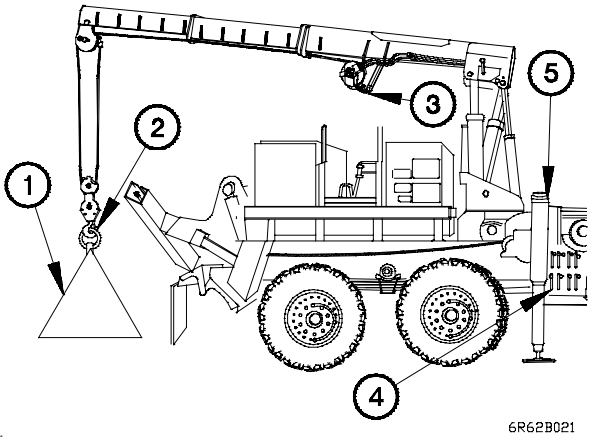
**NOTE**

If test weight is lifted refer to troubleshooting to determine failure of overload protection system.

(2) Attempt to raise test weight (1) with hoist (3).



6R62B011



6R62B021

**NOTE**

Hold manual override depressed until test weight is raised.

(3) Depress manual override (4).

(4) Raise test weight (1) approximately 18 inches with hoist (3).

(5) Release manual override (4).

**NOTE**

Test weight will remain suspended.

(6) Depress manual override (4).

(7) Lower test weight (1) to ground with hoist (3).

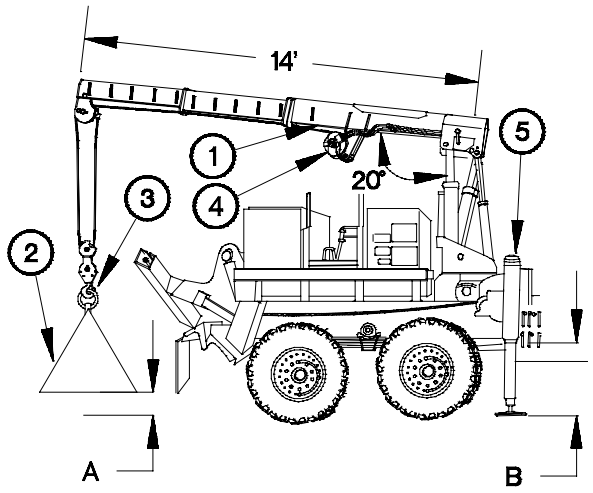
(8) Disconnect 13750 lb test weight (1) from hook (2).

(9) Place crane power switch (5) to off.

**c. Dynamic Test.**

**NOTE**

Dynamic test is performed with a test load of 100% of crane rated load on Range Diagram for this boom extension and radius. The overload protection system should not prevent lifting of this test weight.




(1) Position boom (1) approximately 20° for a load radius of 14 feet, 0 inches.

(2) Connect 10000 lb test weight (2) to crane hook (3).

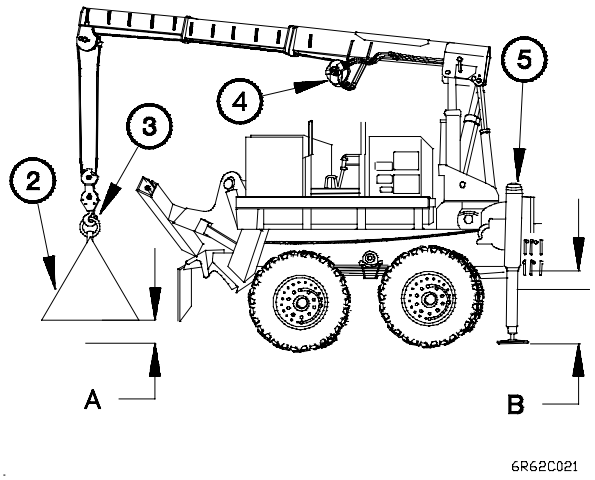
(3) Raise test weight (2) approximately 18 inches with hoist (4).

(4) Record dimension A, distance test weight (2) is from ground.

(5) Record dimension B, extension length of jack cylinders (5).

(6) Shut down engine (TM 9-2320-366-10-1).

(7) Allow crane to remain undisturbed for 30 minutes.




**NOTE**

Maximum allowable drift of jack cylinders and test weight is one inch in 30 minutes.

(8) Measure distance test weight (2) is from ground.

(9) Measure extension length of jack cylinders (5).

(10) Start engine (TM 9-2320-366-10-1).

(11) Rotate test weight (2) to left and right and back to center line.

(12) Lower test weight (2) to ground with hoist (4).

(13) Disconnect 10000 lb test weight (2) from crane hook (3).

**d. Follow-On Maintenance**

Stow MHC (TM 9-2320-366-10-2).

**End of Test.**

## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. 30K Winch Assembly Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. 30K Winch Assembly Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3)
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).
30K winch cables removed (TM 9-2320-366-20-5).
Catwalks removed (TM 9-2320-366-20-4).
Air tanks drained (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Wrench, Torque, 0-60 N·m (Item 96, Appendix B)
Caliper Set, Micrometer, Outside (Item 9, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Gage, Pressure, 0-150 psi (TM 9-2320-366-20)

**Materials/Parts**
Kit, Banding (Item 43, Appendix C)
Cap and Plug Set (Item 17, Appendix C)
Rag, Wiping (Item 60, Appendix C)

**Materials/Parts (Cont)**
Lockwasher (2) (Item 165, Appendix F)
Lockwasher (6) (Item 155, Appendix F)
Lockwasher (12) (Item 156, Appendix F)
Ring (Item 358, Appendix F)
Parts Kit, Winch (Item 321, Appendix F)
Parts Kit, Winch (Item 322, Appendix F)
Parts Kit, Winch (Item 323, Appendix F)
Packing Preformed (2) (Item 283, Appendix F)
Lubricating Oil, Engine (Item 49, Appendix C)
Nut, Self-Locking (5) (Item 179, Appendix F)
Nut, Self-Locking (3) (Item 176, Appendix F)
Nut, Self-Locking (12) (Item 180, Appendix F)
Seal (2) (Item 371, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Insulating Compound, Electrical (Item 41, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Ties, Cable, Plastic (Item 92, Appendix C)
Sealing Compound (Item 76, Appendix C)

**Personnel Required**
(3)

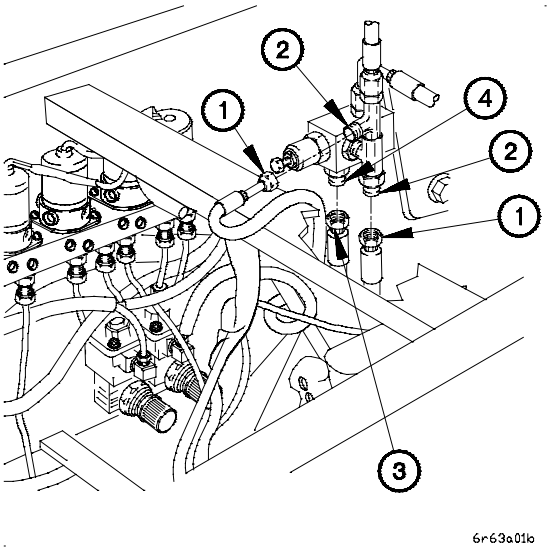
**a. 30K Winch Assembly Removal.**

**CAUTION**

Cap or plug hydraulic connections 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.
- Remove plastic cable ties as required.

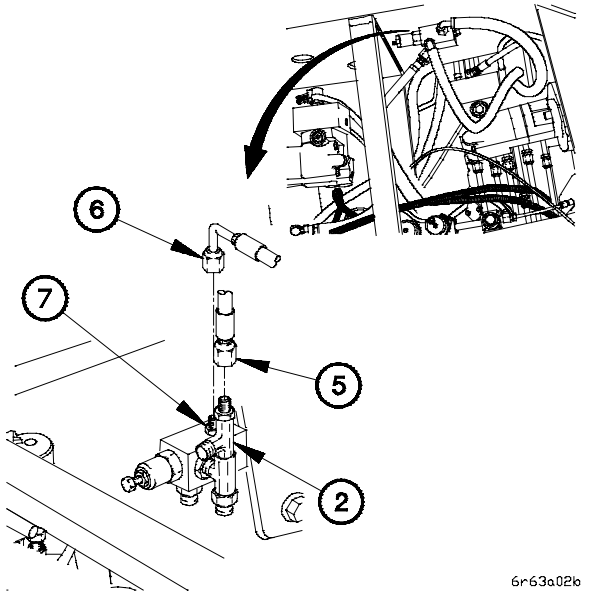


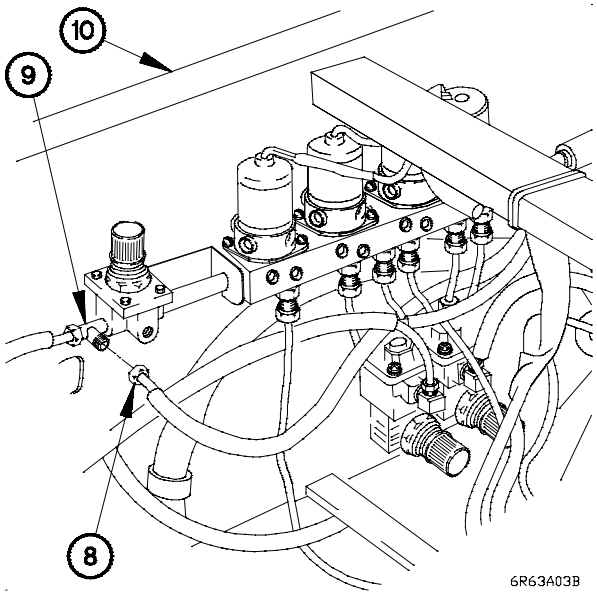

(1) Disconnect two hoses (1) from tee fittings (2).

(2) Disconnect hose (3) from fitting (4).

(3) Disconnect hose (5) from tee fitting (2).

(4) Disconnect hose (6) from fitting (7).



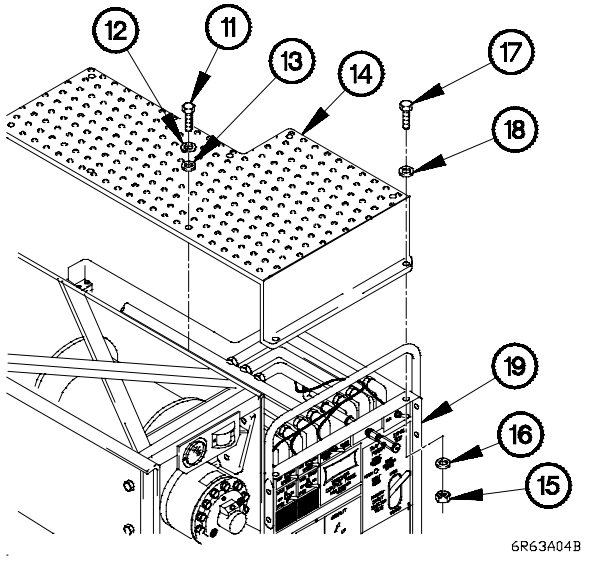




(5) Disconnect air hose (8) from 90-degree fitting (9).

(6) Remove air hose (8) from 30K winch assembly (10).

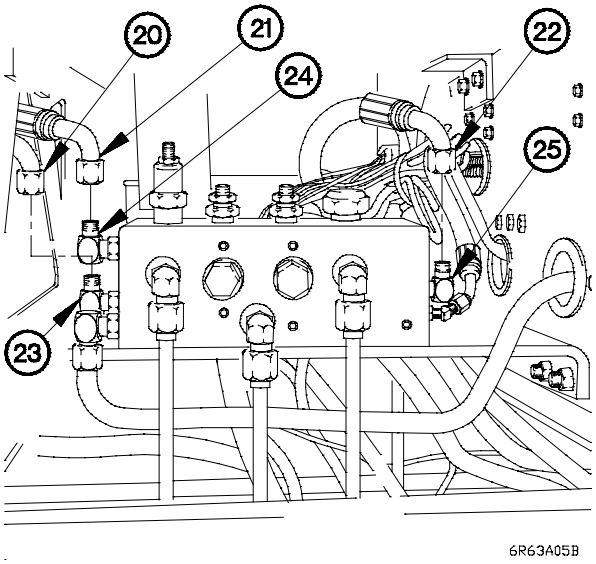
(7) Remove eight screws (11), lockwashers (12), and washers (13) from control panel cover (14). Discard lockwashers.

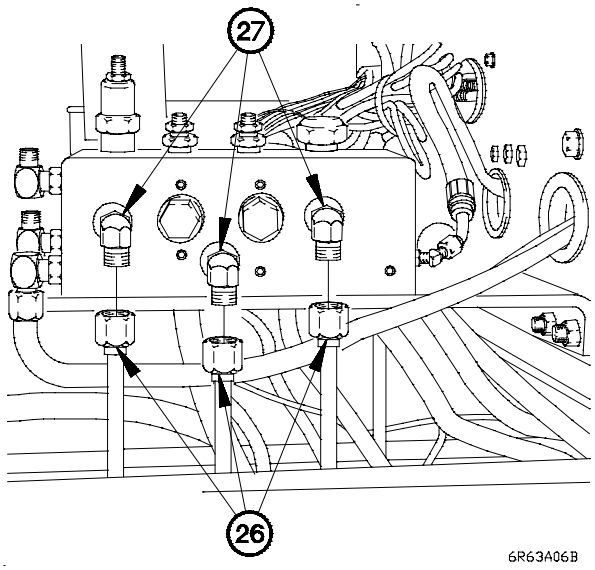
(8) Remove two self-locking nuts (15), washers (16), screws (17), washers (18), and control panel cover (14) from control panel (19). Discard self-locking nuts.



## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

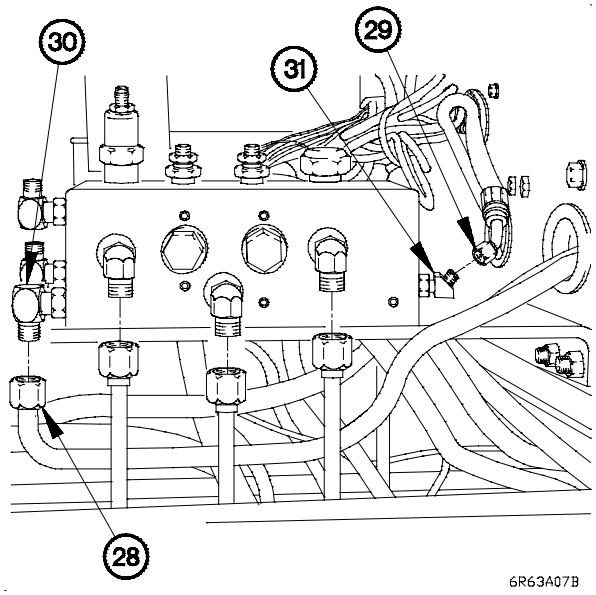
(9) Disconnect hoses (20, 21, and 22) from 90-degree fittings (23, 24, and 25).

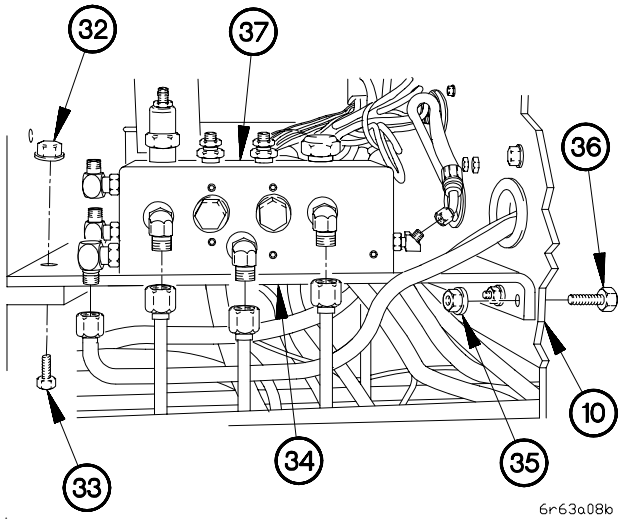



(10) Disconnect three tubes (26) from 90-degree fittings (27).

(11) Disconnect hoses (28 and 29) from 90-degree fitting (30) and 45-degree fitting (31).



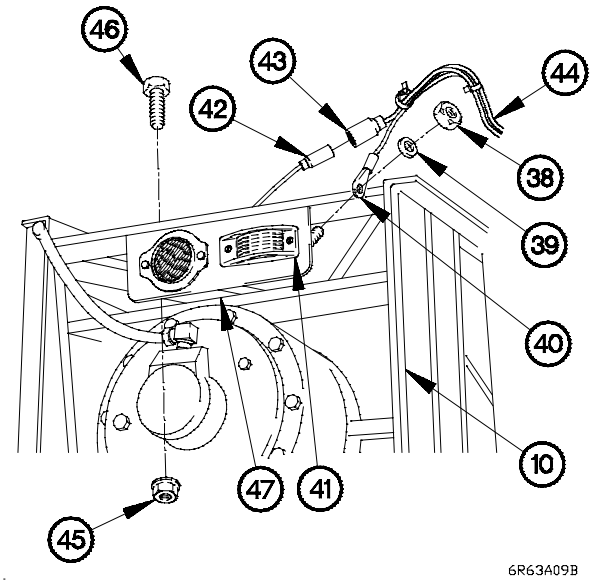



(12) Remove three self-locking nuts (32) and screws (33) from mounting plate (34). Discard self-locking nuts.

(13) Remove two self-locking nuts (35), screws (36), mounting plate (34), and monoblock valve (37) from 30K winch assembly (10). Discard self-locking nuts.

**NOTE**

- Left and right side maker lights are removed the same way. Left side shown.
- Refer to **Table 16-1. Clearance Marker Light Connectors** for combinations of terminal lugs and connections on each marker light.




(14) Remove nut (38), washer (39), and terminal lug (40) from marker light (41).

(15) Disconnect electrical connector 489 (42) from harness connector (43).

(16) Remove electrical harness (44) from 30K winch assembly (10).

(17) Removed three self-locking nuts (45), screws (46), and lamp bracket (47) from 30K winch assembly (10). Discard self-locking nuts.

(18) Perform steps (14) through (17) on right side marker light.

**Table 16-1. Clearance Marker Light Connectors**

| Marker Light Location | Connector | Terminal Lug |
|---|---|---|
| Left Side | P94 | TL88 |
| Right Side | P95 | TL89 |

## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

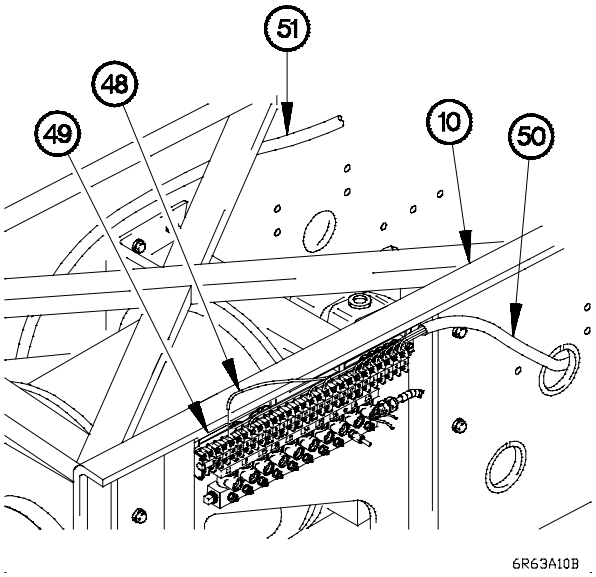
**NOTE**

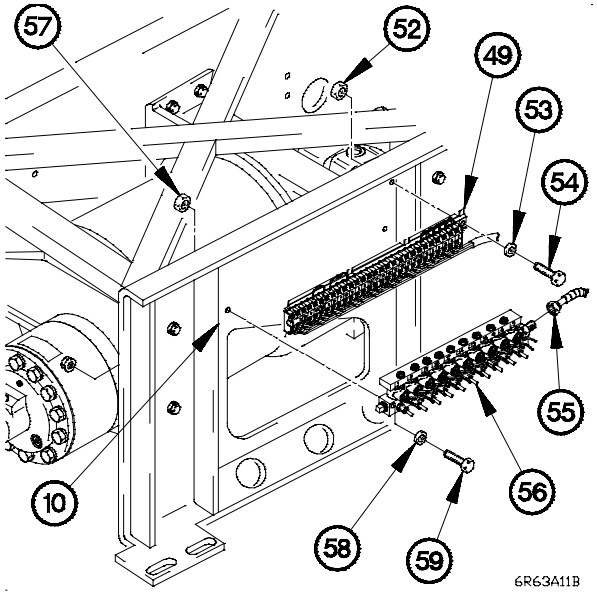
- Jumpers and diodes are not removed when disconnecting wires from terminal board.
- Terminal board uses friction type connections. Screws are not removed when disconnecting wires.
- Tag wires and connection points prior to disconnecting.

(19) Disconnect 10 wires (48) from top of terminal board (49).

(20) Position cable harness (50) on 30K winch assembly (10).

(21) Remove remote control harness (51) from 30K winch assembly (10).




(22) Remove two nuts (52), washers (53), screws (54), and terminal board (49) from 30K winch assembly (10).

(23) Remove air hose (55) from valve manifold assembly (56).

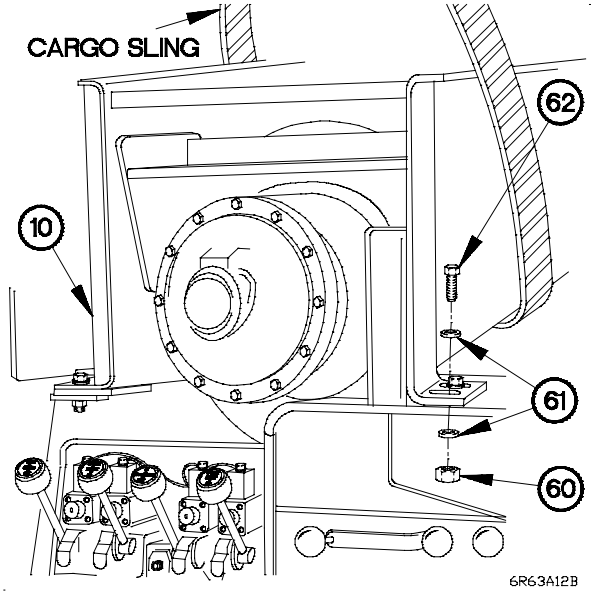
(24) Remove two nuts (57), washers (58), screws (59), and valve manifold assembly (56) from 30K winch assembly (10).

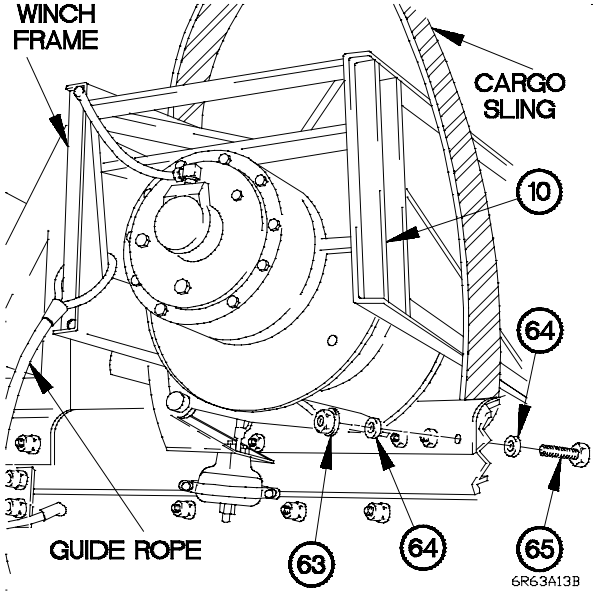
(25) Move terminal board (49) and valve manifold assembly (56) clear of 30K winch assembly (10).

**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.**

(26) Remove four nuts (60), eight washers (61), and four screws (62) from 30K winch assembly (10).




**NOTE**

Left and right side of 30K winch assembly are removed the same way. Left side shown.

(27) Remove six self-locking nuts (63), 12 washers (64), and six screws (65) from 30K winch assembly (10). Discard self-locking nuts.

(28) Perform step (22) on right side of 30K winch assembly (10).

**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.**

**NOTE**

Step (29) requires the aid of two assistants.

(29) Remove 30K winch assembly (10) from vehicle.

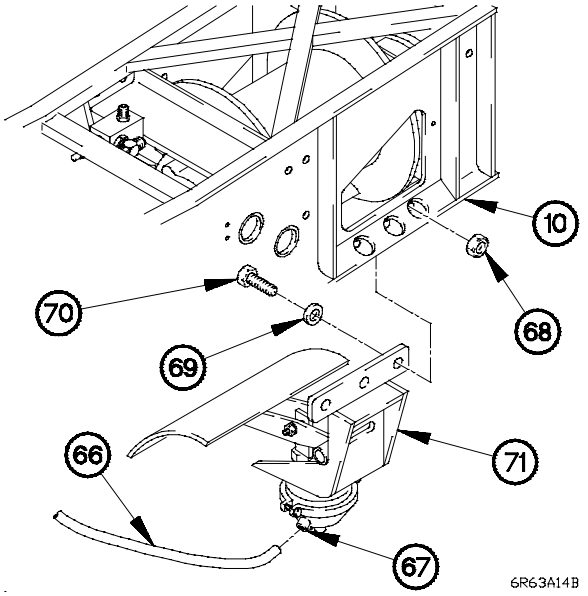
## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

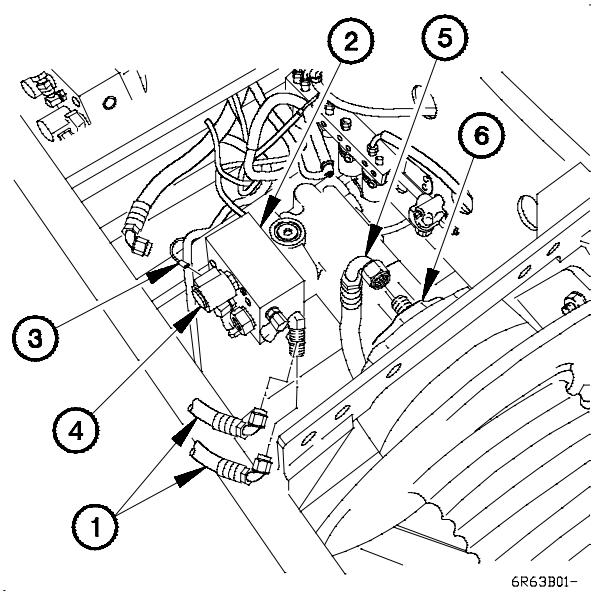
Left and right side cable tensioners are removed the same way. Left side shown.

(30) Disconnect air hose (66) from fitting (67).

(31) Remove three self-locking nuts (68), washers (69), screws (70), and cable tensioner (71) from 30K winch assembly (10). Discard self-locking nuts.




**b. Disassembly.**




**NOTE**

- Left and right side winches are removed the same way. Left side winch shown.
- Tag hydraulic hoses and connection points prior to disconnection.
- Tag wires and connection points prior to disconnecting.
- Remove plastic cable ties as required

(1) Disconnect two hoses (1) from regulating valve (2).

(2) Disconnect cable (3) from solenoid valve (4).

(3) Disconnect air hose (5) from gear end cover (6).

**WARNING**

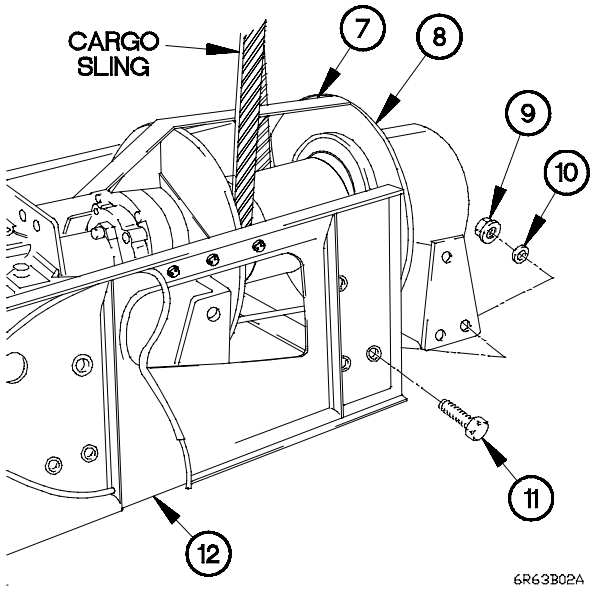
**Ensure banding strap around 30K winch is secured tightly and will not slip off. Failure to comply may result in injury to personnel or damage to equipment.**

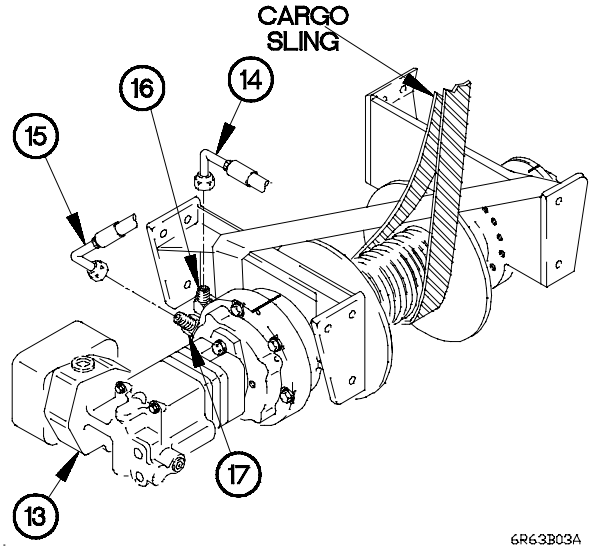
(4) Install banding strap (7) around winch (8).

**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.**

(5) Remove 12 self-locking nuts (9), washers (10), screws (11), and winch (8) from 30K winch assembly (12). Discard self-locking nuts.




(6) Place drain pan under hydraulic motor (13).

(7) Disconnect hydraulic hoses (14 and 15) from 90-degree fitting (16) and 45-degree fitting (17).

## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

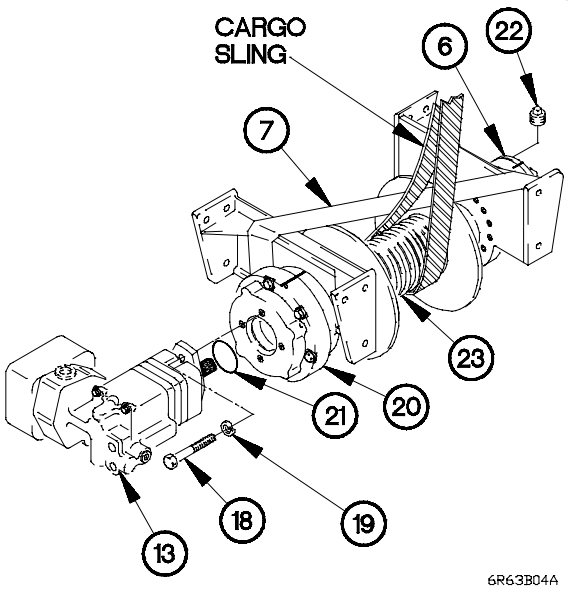
(8) Remove two screws (18), lockwashers (19), and hydraulic motor (13) from brake housing (20). Discard lockwashers.

(9) Remove preformed packing (21) from hydraulic motor (13). Discard preformed packing.

(10) Place drain pan under gear end cover (6).

(11) Remove plug (22) from gear end cover (6).

(12) Position plug (22) in gear end cover (6).




**WARNING**

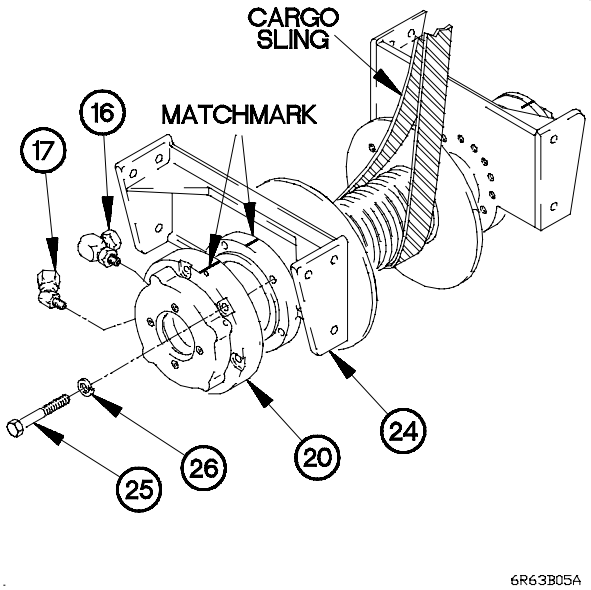
**Drum weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to disassembly. Failure to comply may result in injury to personnel or damage to equipment.**

(13) Position drum (23) on workbench with brake housing (20) facing up.

**WARNING**

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

(14) Remove banding strap (7) from drum (23).




(15) Remove 90-degree fitting (16) and 45-degree fitting (17) from brake housing (20).

(16) Match mark brake housing (20) to motor end support (24).

**CAUTION**

Brake housing is under pressure. Loosen bolts evenly to relieve pressure. Failure to comply may result in damage to equipment.

(17) Loosen six screws (25) in brake housing (20).

(18) Remove six screws (25), lockwashers (26), and brake housing (20) from motor end support (24). Discard lockwashers.

(19) Remove bearing (27) from brake housing (20).

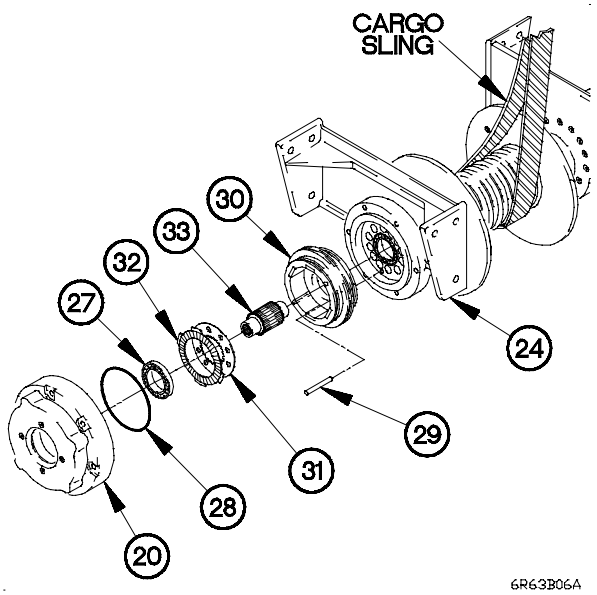
(20) Remove preformed packing (28) from brake housing (20). Discard preformed packing.

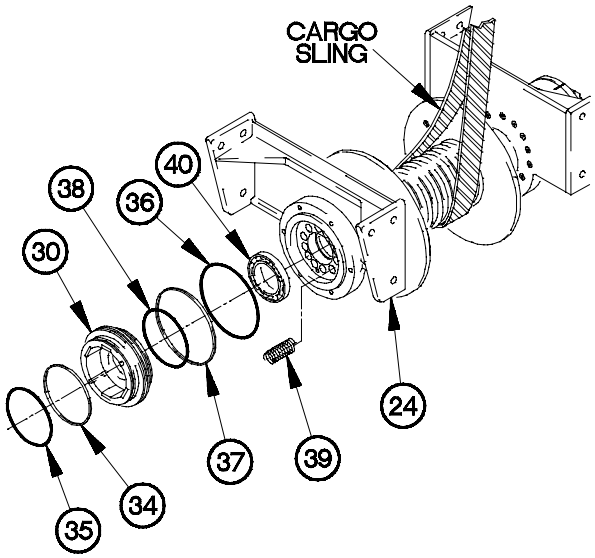
(21) Remove two dowels (29) from plunger (30).

(22) Remove ten friction disc brakes (31) and nine brake drive plates (32) from plunger (30).

(23) Remove brake shaft (33) from plunger (30).

(24) Remove plunger (30) from motor end support (24).




(25) Remove preformed packings (34 and 35) and back-up rings (36 and 37) from plunger (30). Discard preformed packings and back-up rings.

(26) Remove preformed packing (38) from plunger (30). Discard preformed packing.

(27) Remove 12 springs (39) from motor end support (24).

(28) Remove bearing (40) from motor end support (24).

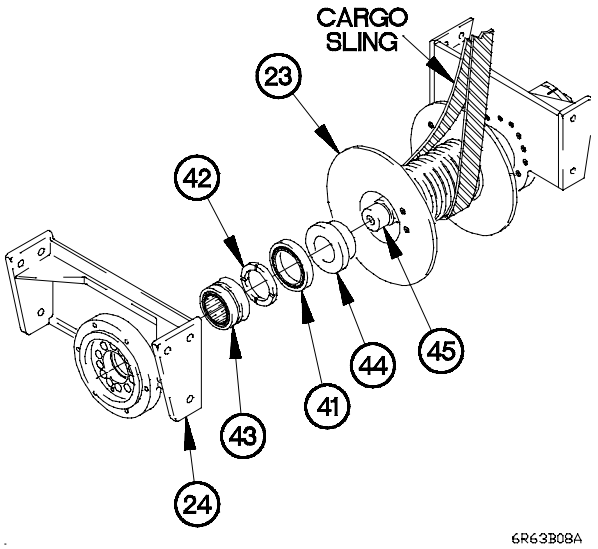
(29) Remove motor end support (24) from drum (23).

(30) Remove seal (41) from motor end support (24). Discard seal.

(31) Remove thrust washer (42) from motor end support (24).

(32) Remove bearing (43) from motor end support (24).

(33) Remove spacer (44) from output shaft (45).



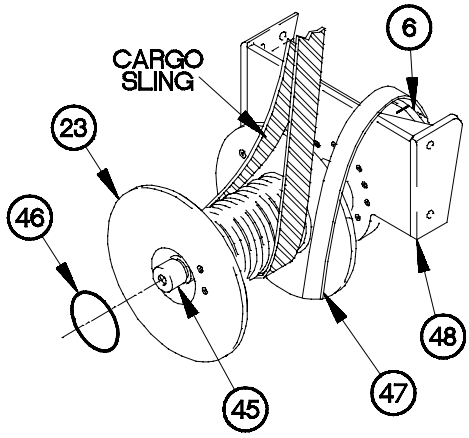
## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

(34) Remove preformed packing (46) from output shaft (45). Discard preformed packing.

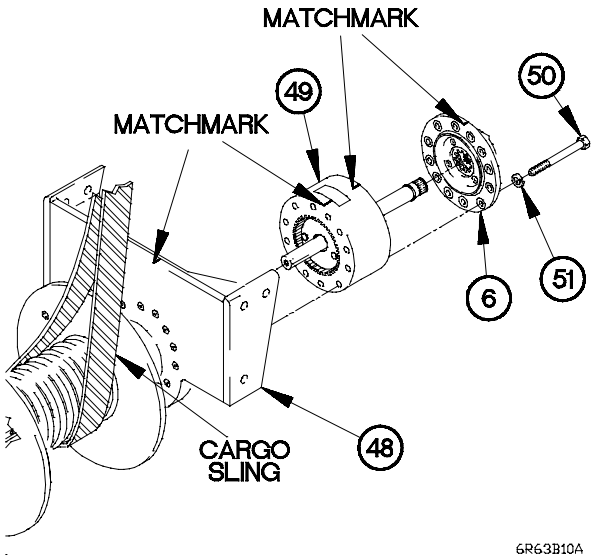
(35) Install banding strap (47) around drum (23) and gear end support (48).

(36) Position drum (23) on work bench with gear end cover (6) facing up.

(37) Remove banding strap (47) from drum (23) and gear end support (48).




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6R63B10A

(38) Match mark gear end cover (6) to ring gear (49).

(39) Match mark ring gear (49) to gear end support (48).

**CAUTION**

Gear end cover is under pressure. Loosen screws evenly to relieve pressure. Failure to comply may result in damage to equipment.

(40) Loosen 12 screws (50) on gear end cover (6).

(41) Remove 12 screws (50), lockwashers (51), and gear end cover (6) from ring gear (49). Discard lockwashers.

**NOTE**

Step (42) requires the aid of an assistant.

(42) Push down and hold coupling (52) and cylinder (53) in gear end cover (6).

**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.**

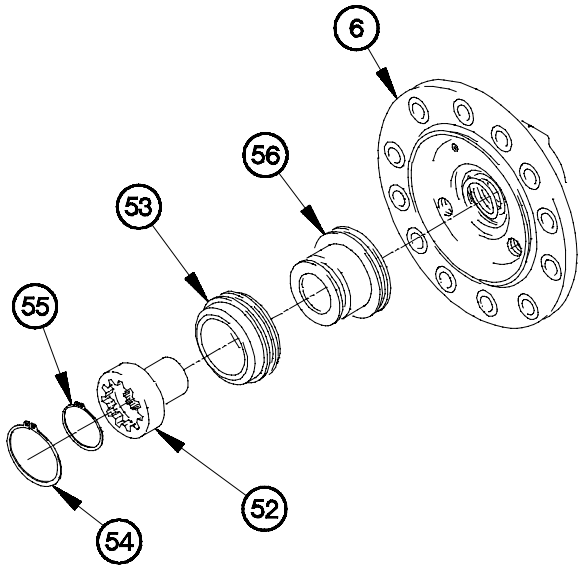
(43) Remove retaining ring (54) from gear end cover (6).

(44) Release coupling (52) and cylinder (53).

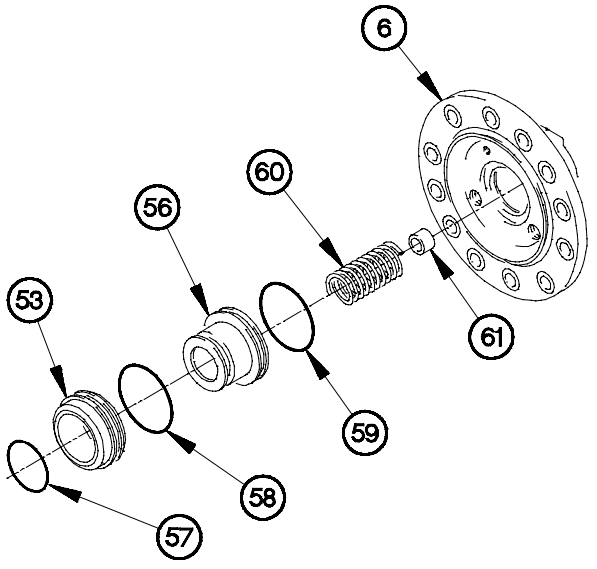
(45) Remove coupling (52) from gear end cover (6).

(46) Remove retaining ring (55) from coupling (52).

(47) Remove coupling (52) and cylinder (53) from piston (56).



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6R63B12A

(48) Remove preformed packings (57 and 58) from cylinder (53). Discard preformed packing.

(49) Remove preformed packing (59) from piston (56). Discard preformed packing.

(50) Remove spring (60) and bearing (61) from gear end cover (6).

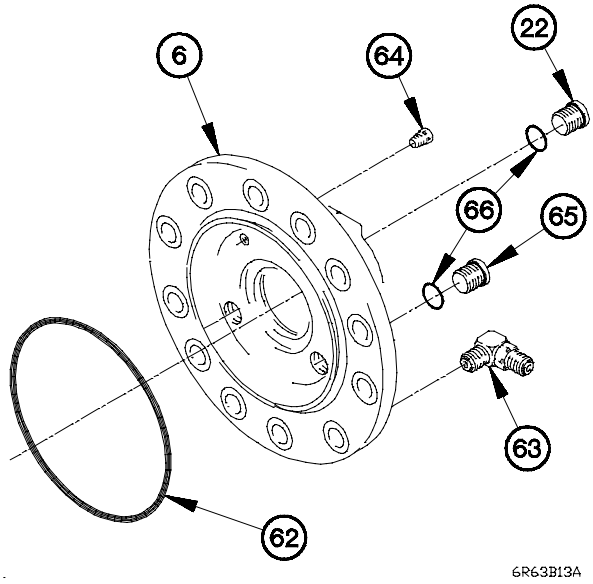
## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

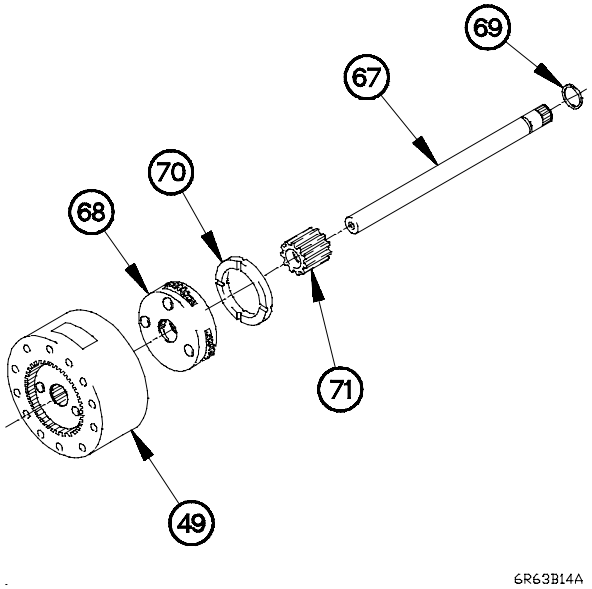
(51) Remove preformed packing (62) from gear end cover (6). Discard preformed packing.

(52) Remove 90-degree fitting (63) and safety valve (64) from gear end cover (6).

(53) Remove plugs (22 and 65) from gear end cover (6).

(54) Remove two preformed packings (66) from plugs (22 and 65). Discard preformed packings.




(55) Remove input shaft (67) from primary gear (68).

**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.**

(56) Remove retaining ring (69) from input shaft (67).

(57) Remove thrust washer (70) from primary gear (68).

(58) Remove sun gear (71) from primary gear (68).

(59) Remove primary gear (68) from ring gear (49).

(60) Remove nylon washer (72) from secondary gear (73).

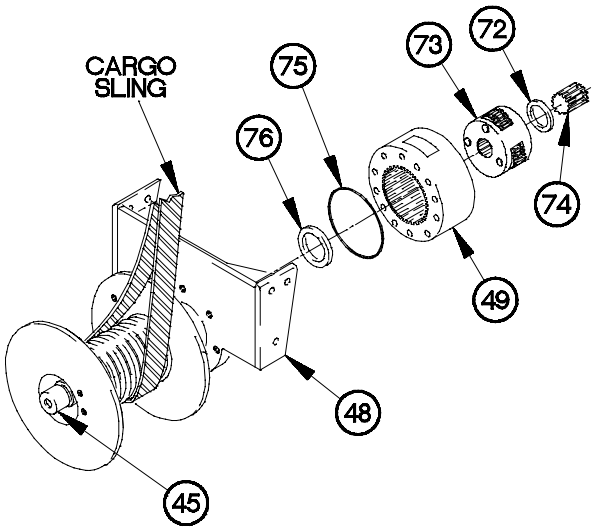
(61) Remove ring gear (49) from secondary gear (73).

(62) Remove sun gear (74) from secondary gear (73).

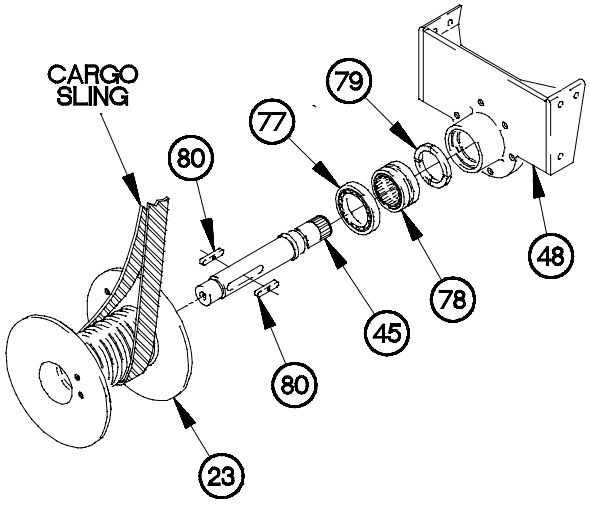
(63) Remove secondary gear (73) from output shaft (45).

(64) Remove preformed packing (75) from gear end support (48). Discard preformed packing.

(65) Remove nylon washer (76) from gear end support (48).




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6R63B16A

(66) Remove gear end support (48) from drum (23).

(67) Remove seal (77), bearing (78), and thrust washer (79) from gear end support (48). Discard seal.

(68) Remove output shaft (45) from drum (23).

(69) Remove two keys (80) from output shaft (45).

## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

**c. Cleaning/Inspection.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

**NOTE**

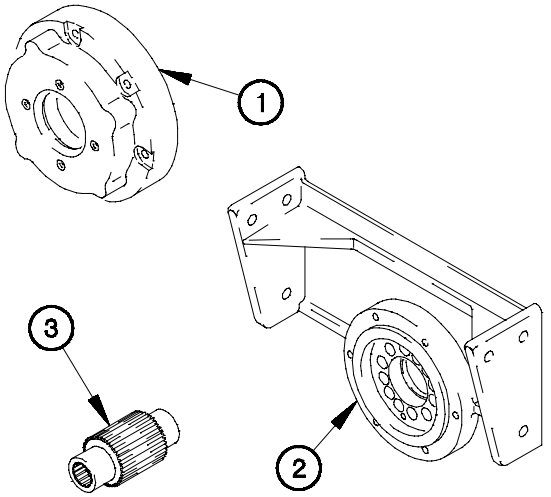
Replace any part that fails visual inspection or size measurement requirements.

(1) Clean all parts with dry cleaning solvent.

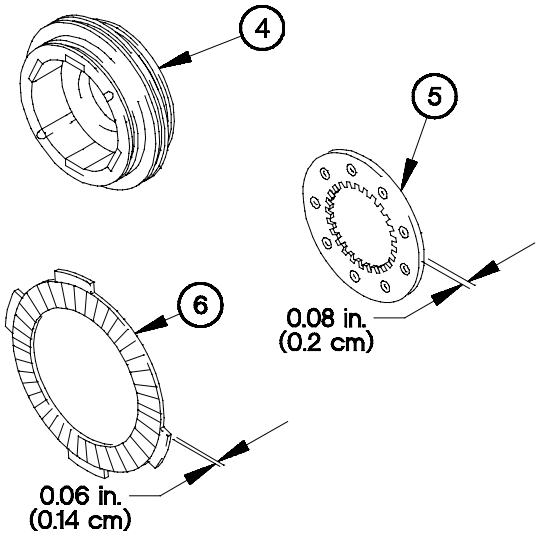
(2) Inspect brake housing (1) seating surface for nicks or scratches.

(3) Inspect motor end support (2) seating surface for nicks or scratches.

(4) Inspect brake shaft (3) inner spline and gear teeth for burrs, pitting, or broken teeth.




6R63C01A




6R63C02A

(5) Inspect brake piston (4) for nicks, scratches or burrs.

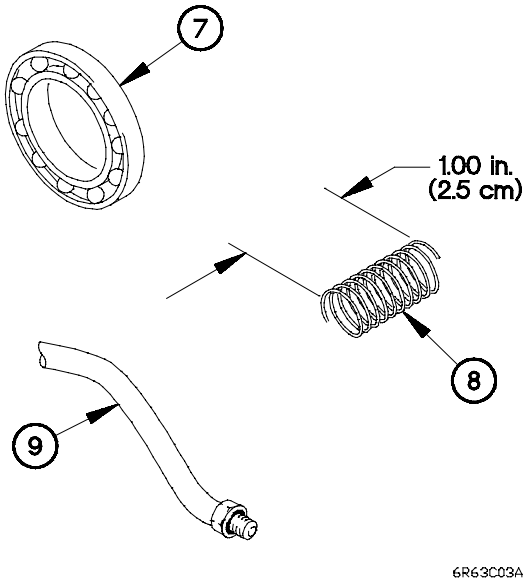
(6) Measure ten friction disc plates (5) for minimum thickness of 0.08 in. (0.2 cm).

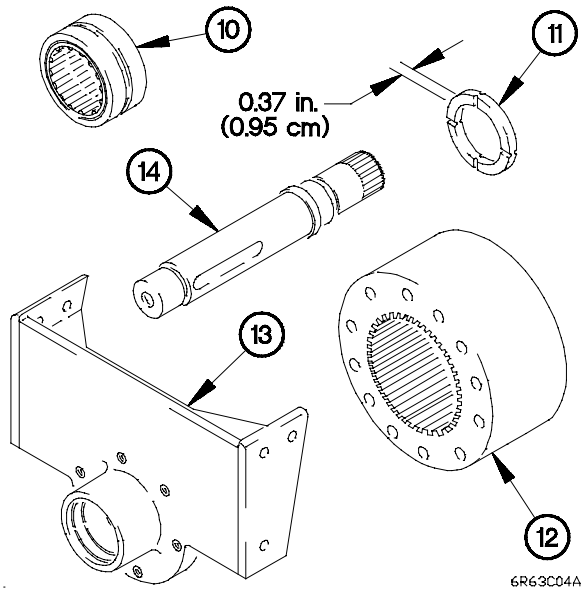
(7) Measure nine brake drive plates (6) for minimum thickness of 0.06 in. (0.14 cm).

(8) Inspect bearing (7) for free movement and pitting, or corrosion.

(9) Measure 12 compression springs (8) for minimum length of 1.00 in. (2.5 cm).

(10) Inspect two hoses (9) for cracks, breaks, or damaged threads.




(11) Inspect two roller bearings (10) for free movement and pitting or corrosion.

(12) Measure two thrust washers (11) for minimum thickness of 0.37 in. (0.95 cm)

(13) Inspect ring gear (12) for pitted or broken gear teeth.

(14) Inspect gear end support (13) seating surface for nicks or scratches.

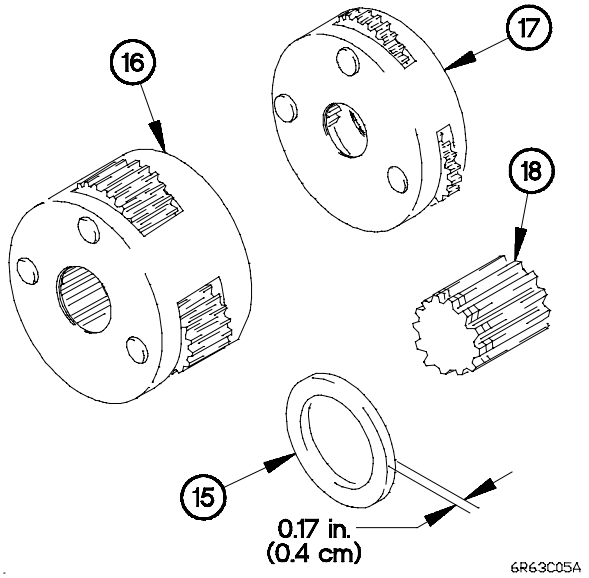
(15) Inspect output shaft (14) for pitted, or broken splines.

(16) Measure two nylon thrust washers (15) for minimum thickness of 0.17 in. (0.4 cm).

(17) Inspect primary carrier assembly (16) for free movement of gears, pitting, or broken teeth.

(18) Inspect secondary carrier assembly (17) for free movement of gears, pitting, or broken teeth.

(19) Inspect sun gear (18) for pitted or broken teeth.



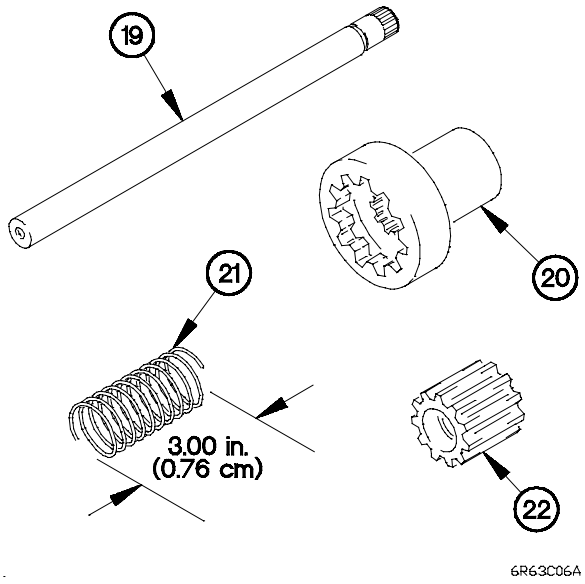
## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

(20) Inspect input shaft (19) for pitted or broken spline teeth.

(21) Inspect drive coupling (20) for pitted or broken spline teeth.

(22) Measure compression spring (21) for minimum length of 3.00 in. (0.76 cm).

(23) Inspect sun gear (22) for pitted or broken teeth.

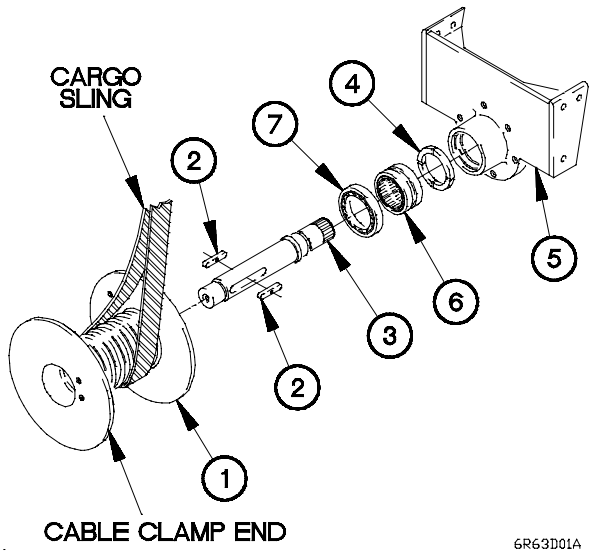



**d. Assembly.**

**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.**

(1) Position drum (1) with cable clamp end down.




**NOTE**

Left and right side 30K winches are assembled the same way. Left side shown.

(2) Install two keys (2) on output shaft (3).

(3) Install output shaft (3) in drum (1).

(4) Install thrust washer (4) in gear end support (5).

(5) Install bearing (6) in gear end support (5).

(6) Install seal (7) in gear end support (5).

(7) Install gear end support (5) on drum (1).

(8) Install nylon washer (8) on gear end support (5).

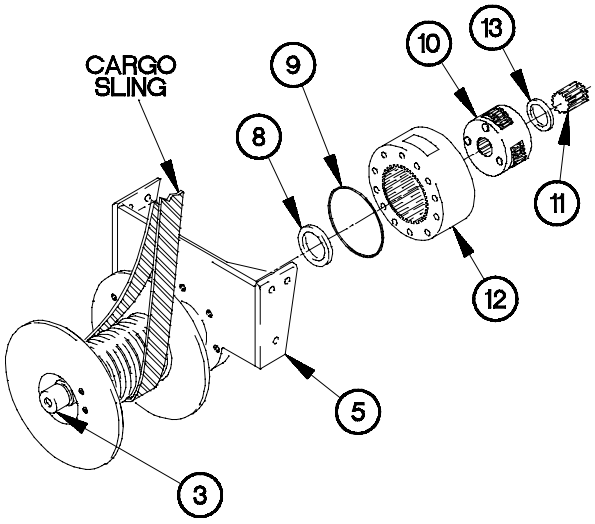
(9) Install preformed packing (9) on gear end support (5).

(10) Install secondary gear (10) on output shaft (3).

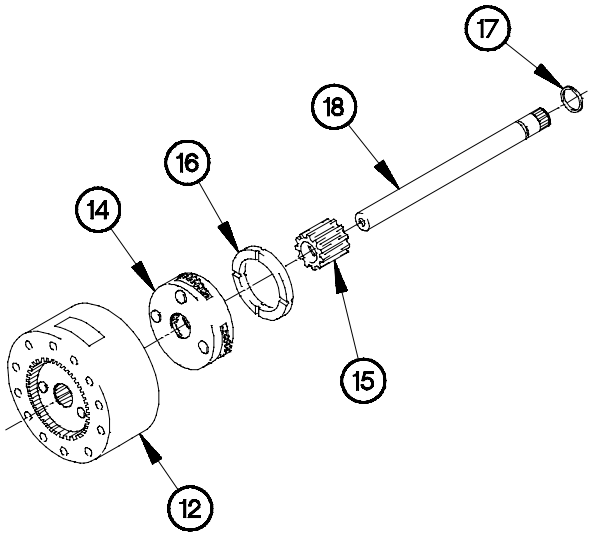
(11) Install sun gear (11) in secondary gear (10).

(12) Install ring gear (12) on secondary gear (10).

(13) Install nylon washer (13) on secondary gear (10).




6R63D02A




6R63D03A

(14) Install primary gear (14) in ring gear (12).

(15) Install sun gear (15) in primary gear (14).

(16) Install thrust washer (16) on primary gear (14).

**WARNING**

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

(17) Install retaining ring (17) on input shaft (18).

(18) Install input shaft (18) in primary gear (14).

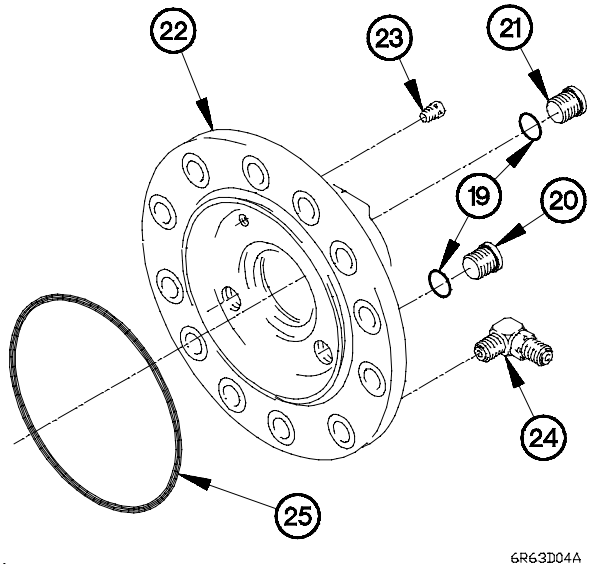
## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

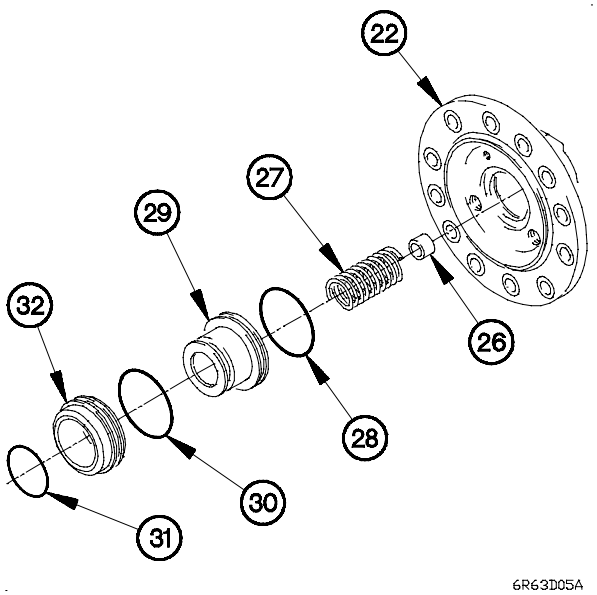
(19) Install two preformed packings (19) on plugs (20 and 21).

(20) Install plugs (20 and 21) in gear end cover (22).

(21) Install safety valve (23) and 90-degree fitting (24) in gear end cover (22).

(22) Install preformed packing (25) on gear end cover (22).




(23) Install bearing (26) and spring (27) in gear end cover (22).

(24) Install preformed packing (28) on piston (29).

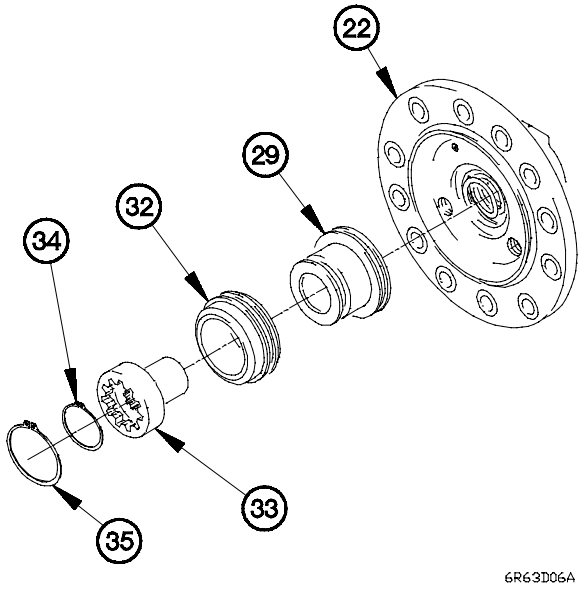
(25) Install preformed packings (30 and 31) on cylinder (32).

(26) Install cylinder (32) on piston (29).

(27) Install coupling (33) in piston (29).

**WARNING**

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




(28) Install retaining ring (34) in coupling (33).

(29) Install coupling (33) in gear end cover (22).

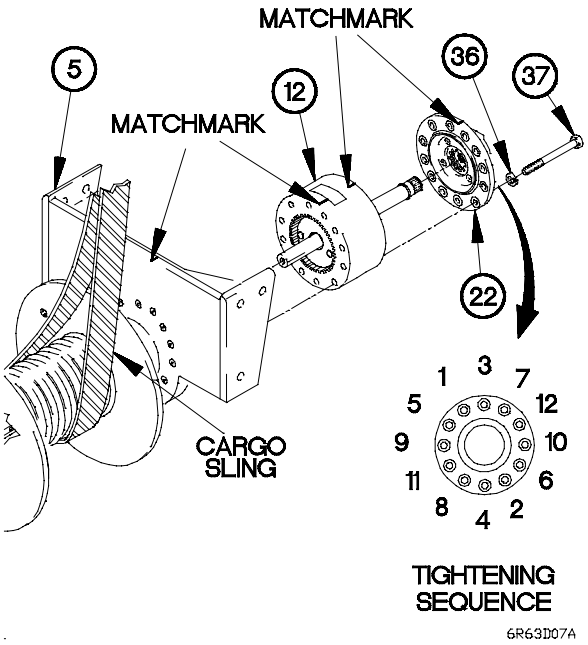
**NOTE**

Step (30) requires the aid of an assistant.

(30) Push down and hold coupling (33) and cylinder (32) in gear end cover (22).

(31) Install retaining ring (35) in gear end cover (22).

(32) Release coupling (33) and cylinder (32).




(33) Position gear end cover (22) on ring gear (12) with matchmarks aligned.

**CAUTION**

Gear end cover is under pressure. Position screws evenly in gear end cover. Failure to comply may result in damage to equipment.

(34) Position 12 lockwashers (36) and screws (37) in gear end cover (22).

(35) Tighten 12 screws (37) to 38-45 lb-ft (52-61 N·m) in sequence shown.

(36) Position ring gear (12) on gear end support (5) with matchmarks aligned.

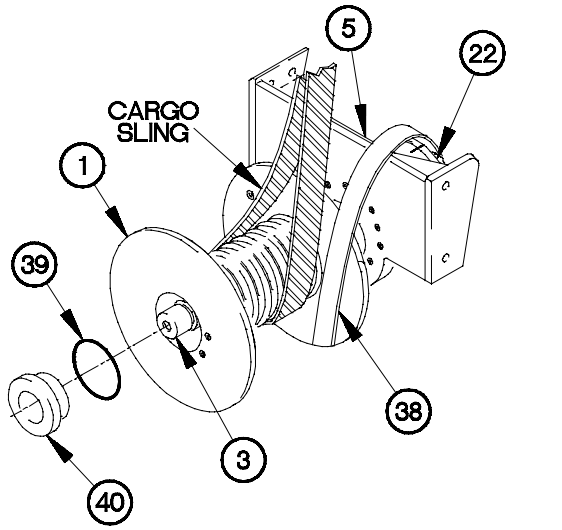
## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

(37) Install banding strap (38) on drum (1) and gear end support (5).

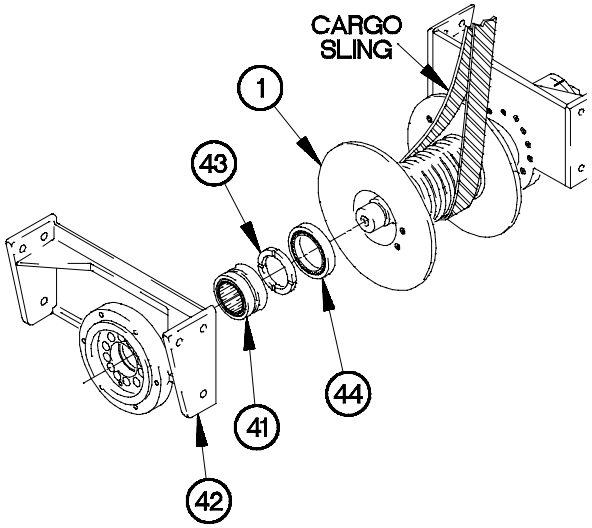
(38) Position drum (1) with gear end cover (22) down.

(39) Remove banding strap (38) from drum (1) and gear end support (5).

(40) Install preformed packing (39) and spacer (40) on output shaft (3).




6R63D08A




6R63D09A

(41) Install bearing (41) in motor end support (42).

(42) Install thrust washer (43) in motor end support (42).

(43) Install seal (44) in motor end support (42).

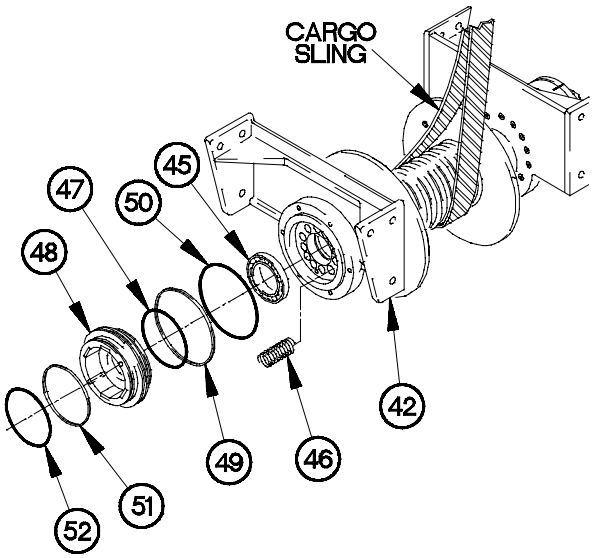
(44) Position motor end support (42) on drum (1).

(45) Install bearing (45) in motor end support (42).

(46) Install 12 springs (46) in motor end support (42).

(47) Install preformed packing (47) on plunger (48)

(48) Install preformed packings (49 and 50) and back-up rings (51 and 52) on plunger (48).




6R63D10A

(49) Install plunger (48) in motor end support (42).

(50) Install brake shaft (53) in plunger (48).

**NOTE**

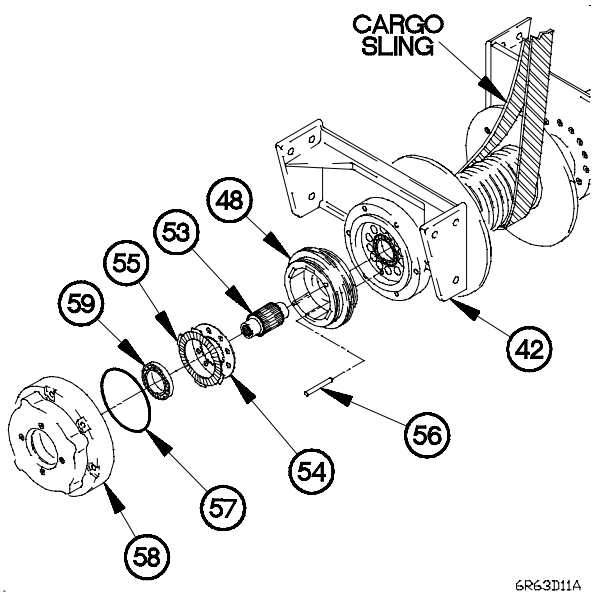
Alternately stack ten friction disc brakes and nine brake drive plates.

(51) Install ten friction disc brakes (54) and nine brake drive plates (55) in plunger (48).

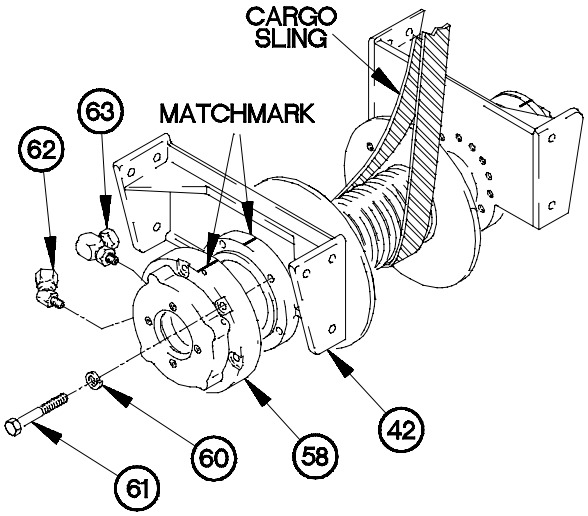
(52) Install two dowels (56) in plunger (48).

(53) Install preformed packing (57) on brake housing (58).

(54) Install bearing (59) in brake housing (58).




6R63D11A




6R63D12A

(55) Position brake housing (58) on motor end support (42) with matchmarks aligned.

(56) Position six lockwashers (60) and screws (61) in brake housing (58).

(57) Tighten six screws (61) to 45-55 lb-ft (61-75 N·m).

(58) Install 45-degree fitting (62) and 90-degree fitting (63) in brake housing (58).

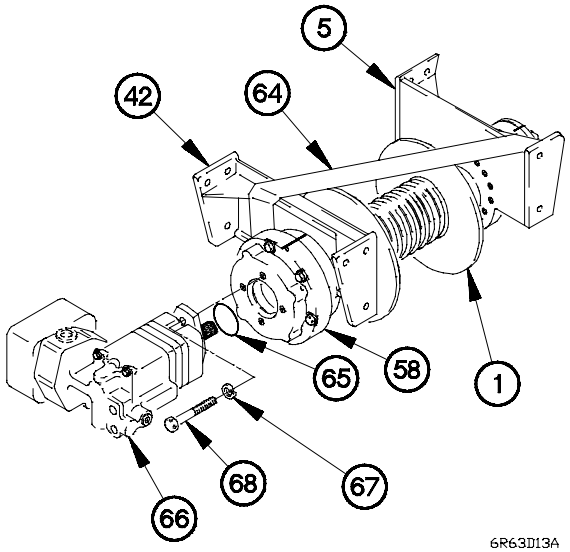
(59) Install banding strap (64) around motor end support (42) and gear end support (5).

(60) Reposition drum (1) with gear end support (5) and motor end support (42) on work bench.

(61) Install preformed packing (65) on hydraulic motor (66).

(62) Position hydraulic motor (66) on brake housing (58) with two lockwashers (67), and screws (68).

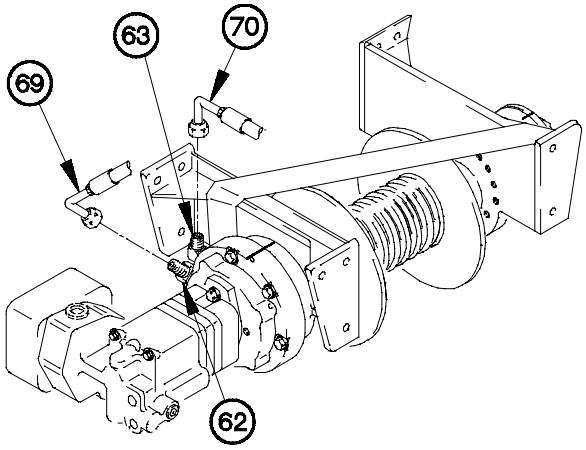
(63) Tighten two screws (68) to 70-95 lb-ft (32-43 N·m).



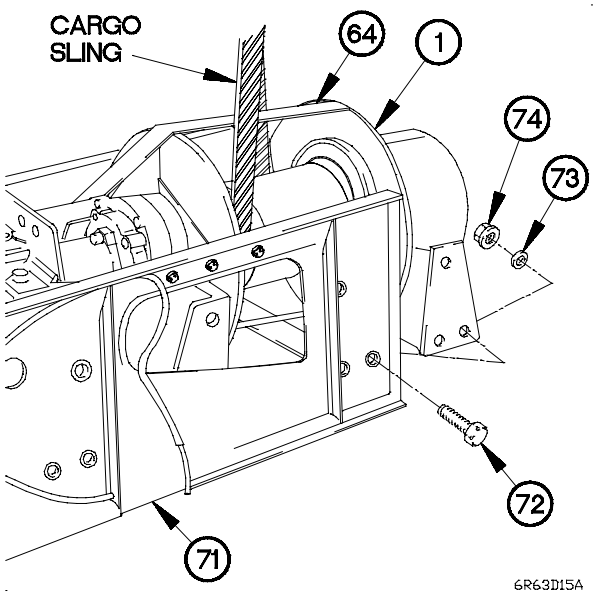

6R63D13A

## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

(64) Connect hydraulic hoses (69 and 70) to 45-degree fitting (62) and 90-degree fitting (63).




6R63D14A




6R63D15A

**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.**

**NOTE**

Position 30K winch assembly to allow winch installation.

(65) Install drum (1) in 30K winch assembly (71) with 12 screws (72), washers (73), and self-locking nuts (74).

**WARNING**

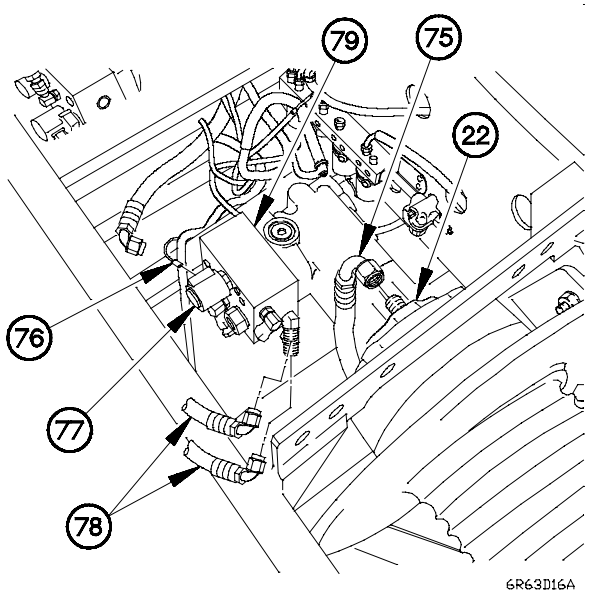
**Ensure banding strap around 30K winch is removed carefully. Failure to comply may result in injury to personnel.**

(66) Remove banding strap (64) from drum (1).

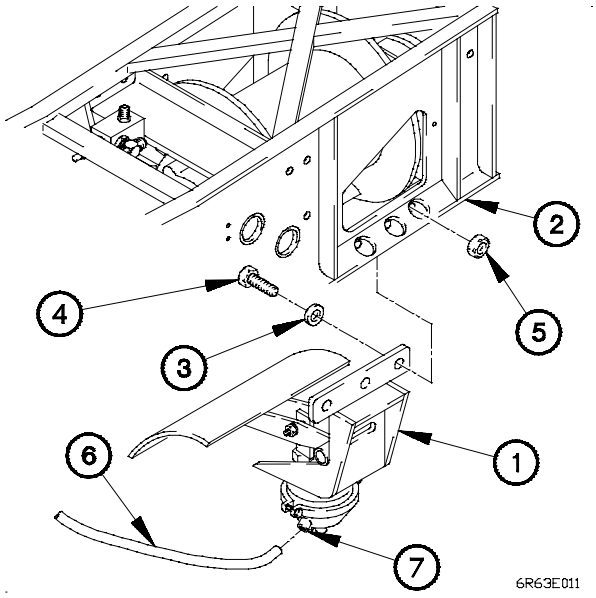
(67) Connect air hose (75) on gear end cover (22).

(68) Connect cable (76) to solenoid valve (77).

(69) Connect two hoses (78) to regulating valve (79).




**e. 30K Winch Assembly Installation.**




**NOTE**

Left and right side cable tensioners are installed the same way. Left side cable tensioner shown.

(1) Position cable tensioner (1) on 30K winch assembly (2) with three washers (3), screws (4), and self-locking nuts (5).

(2) Tighten three self-locking nuts (5) to 76-84 lb-ft (103-114 N·m).

(3) Connect air hose (6) to fitting (7).

## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

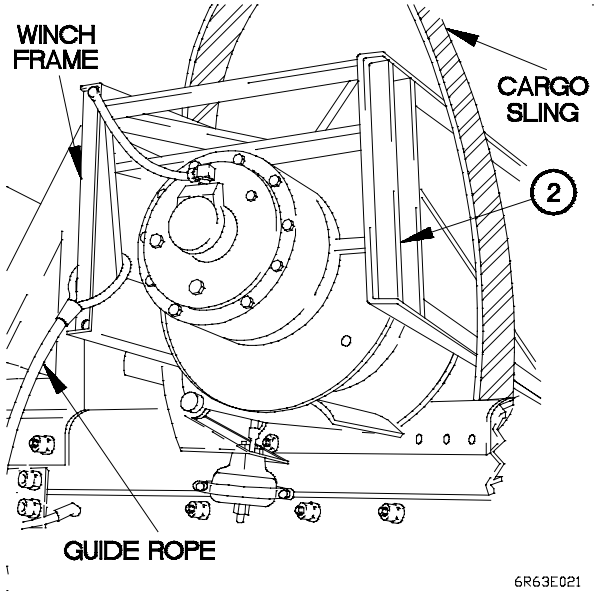
**WARNING**

- **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.**
- **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.**

**NOTE**

Step (4) requires the aid of two assistants.

(4) Position 30K winch assembly (2) on vehicle.




**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.**

(5) Apply sealing compound to threads of six screws (8).

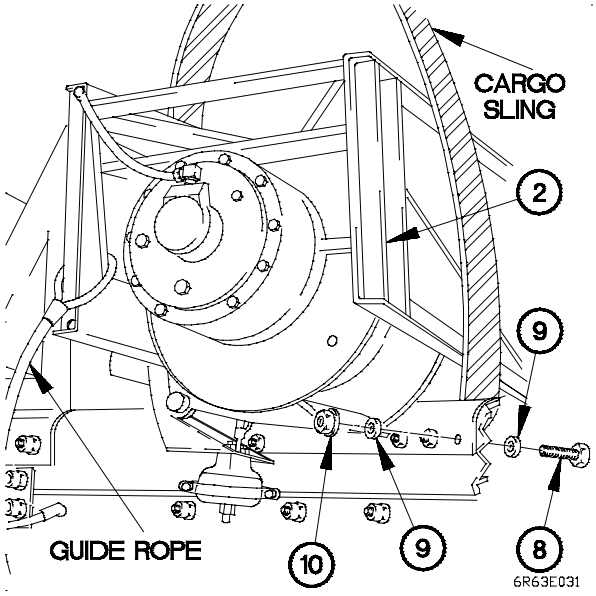
**NOTE**

Left and right side of 30K winch assembly are installed the same way. Left side shown

(6) Position 12 washers (9), six screws (8), and self-locking nuts (10) in 30K winch assembly (2).

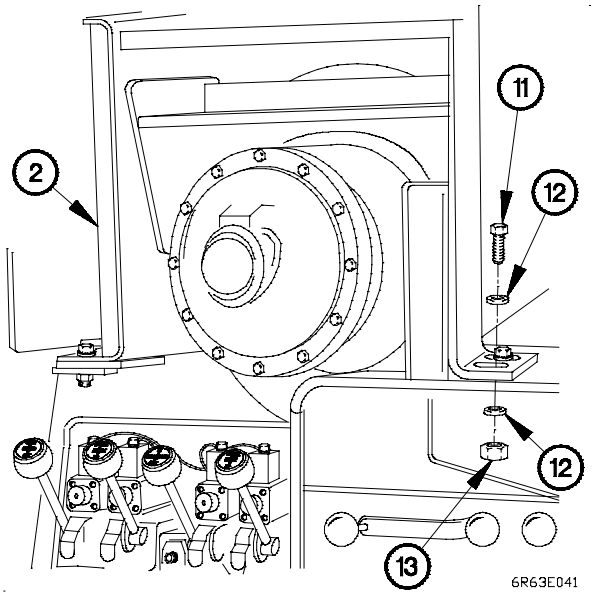
(7) Tighten six self-locking nuts (10) to 152-168 lb-ft (206-227 N·m).

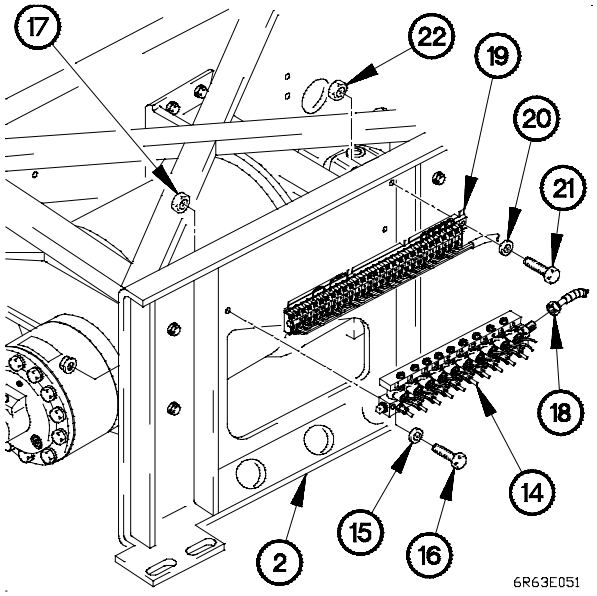
(8) Perform steps (6) and (7) on right side of 30K winch assembly (2).



(9) Position four screws (11), eight washers (12), and four nuts (13) on 30K winch assembly (2).

(10) Tighten four nuts (13) to 76-84 lb-ft (103-114 N·m).




(11) Position valve manifold assembly (14) on 30K winch assembly (2) with two washers (15), screws (16), and nuts (17).

(12) Tighten two nuts (17) to 12-24 lb-in. (1-3 N·m).

(13) Connect air hose (18) to valve manifold assembly (14).

(14) Position terminal board (19) on 30K winch assembly (2) with two washers (20), screws (21), and nuts (22).

(15) Tighten two nuts (22) to 12-24 lb-in. (1-3 N·m).

**NOTE**

Install plastic cable ties as required.

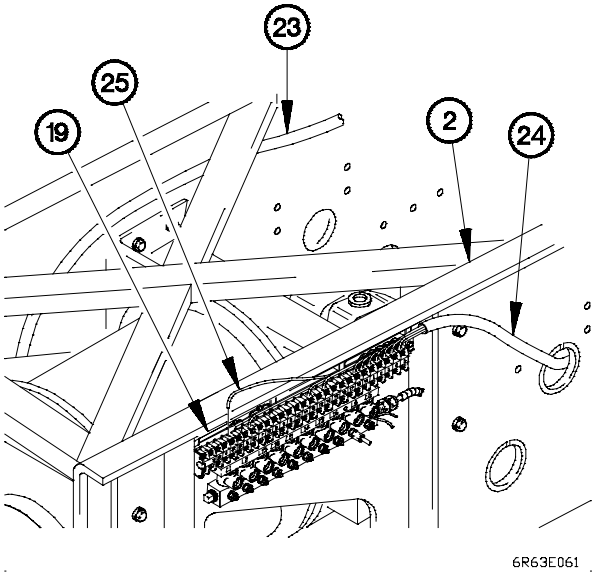
(16) Route remote control harness (23) through 30K winch assembly (2).

(17) Position cable harness (24) by terminal board (19).

**NOTE**

Terminal board uses friction type connections. Screws are not removed.

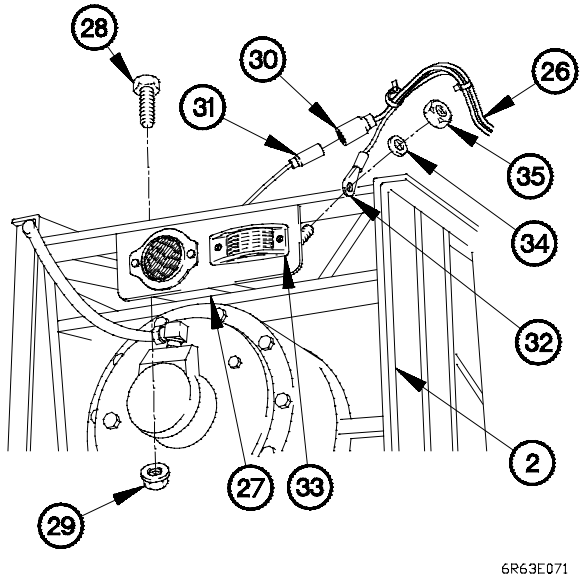
(18) Install 10 wires (25) to top of terminal board (19).



## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

- Left and right side lamp brackets are installed the same way. Left side shown.
- Refer to **Table 16-2. Clearance Marker Light Connector** for combinations of terminal lugs and connectors on each marker light.




(19) Route harness (26) through 30K winch assembly (2).

(20) Install lamp bracket (27) on 30K winch assembly (2) with three screws (28) and self-locking nuts (29).

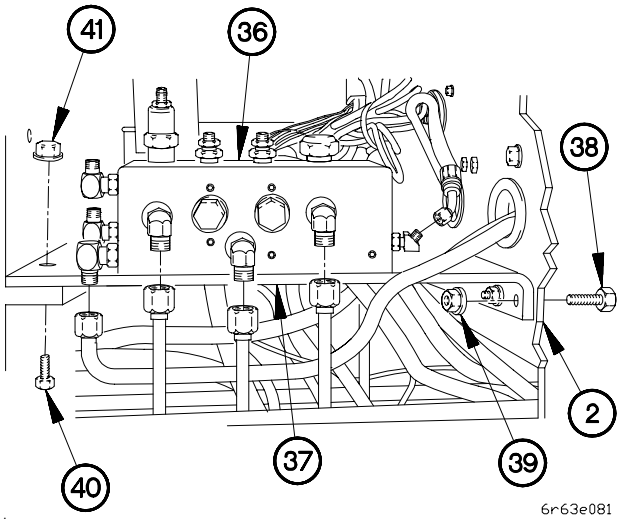
(21) Connect harness connector (30) to electrical connector 489 (31).

(22) Install terminal lug (32) on marker light (33) with washer (34) and nut (35).

(23) Perform steps (21) and (22) on right side lamp bracket.

**Table 16-2. Clearance Marker Light Connectors**

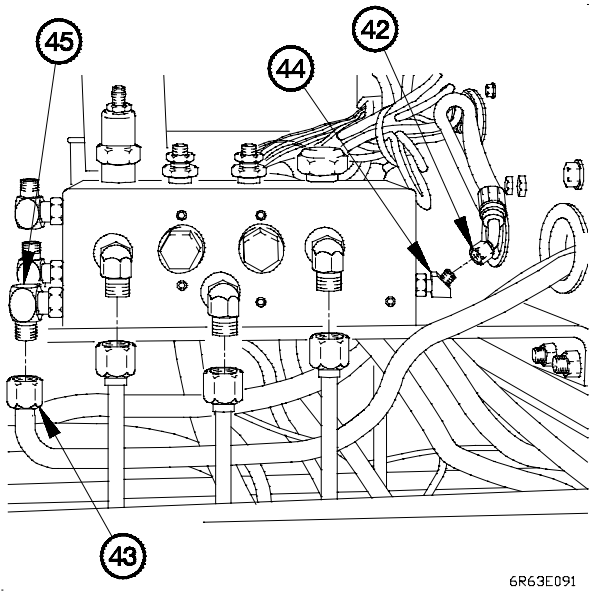
| Marker Light Location | Connector | Terminal Lug |
|---|---|---|
| Left Side | P94 | TL88 |
| Right Side | P95 | TL89 |




(24) Position monoblock valve (36) on 30K winch assembly (2) with mounting plate (37), two screws (38), and self-locking nuts (39).

(25) Position three screws (40) and self-locking nuts (41) in mounting plate (37).

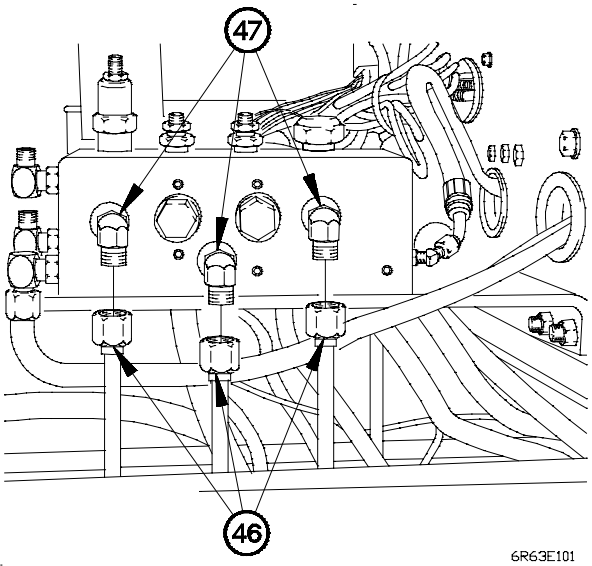
(26) Tighten three self-locking nuts (39 and 41) to 76-84 lb-ft (103-114 N·m).



6R63E091

(27) Position hoses (42 and 43) on 45-degree fitting (44) and 90-degree fitting (45).

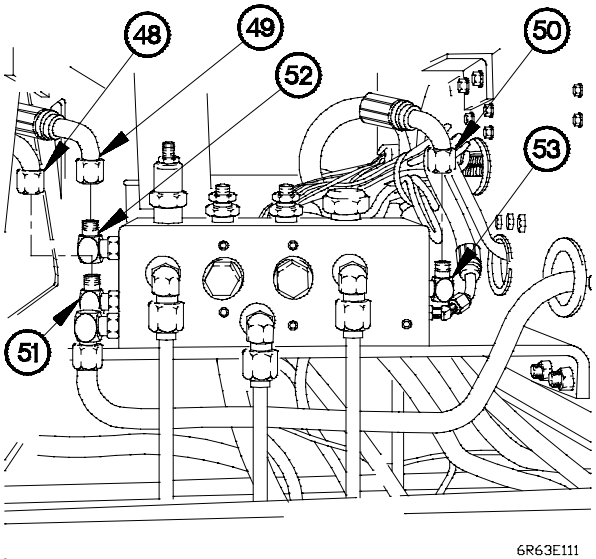
(28) Tighten hoses (42 and 43) to 18-20 lb-ft (24-27 N·m).



6R63E101

(29) Position three tubes (46) on 90-degree fittings (47).

(30) Tighten three tubes (46) to 36-39 lb-ft (49-53 N·m).



6R63E111

(31) Position hoses (48, 49, and 50) on 90-degree fittings (51, 52, and 53).

(32) Tighten hoses (48, 49, and 50) to 79-88 lb-ft (107-119 N·m).

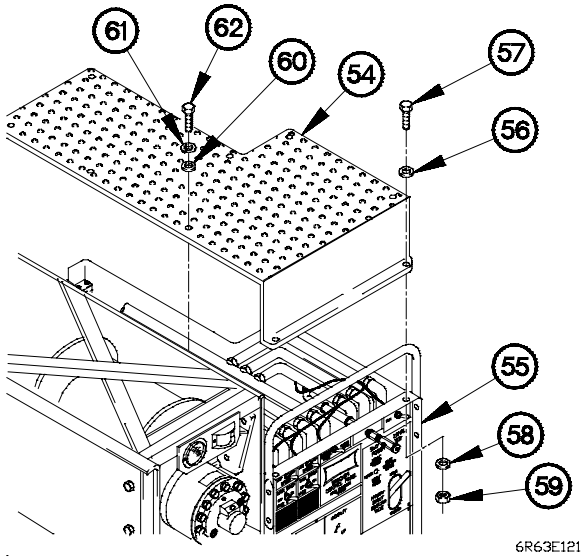
## 16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

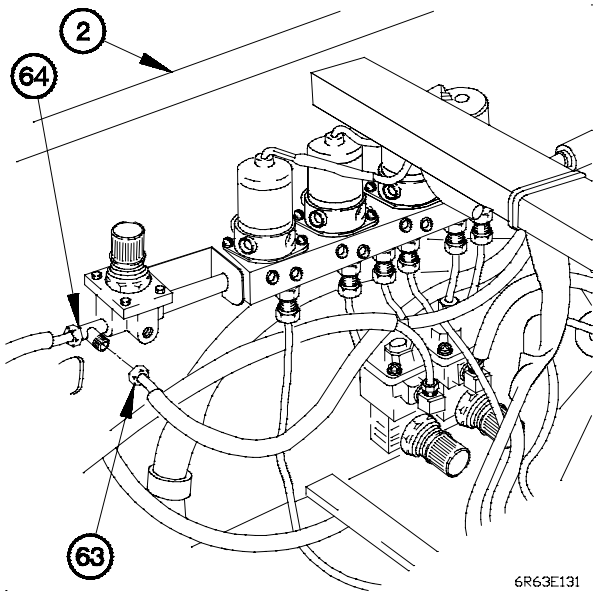
(33) Position control panel cover (54) on control panel (55) with two washers (56), screws (57), washers (58) and nuts (59).

(34) Tighten two nuts (59) to 8-10 lb-ft (11-14 N·m).

(35) Position eight washers (60), lockwashers (61), and screws (62) in control panel cover (54).

(36) Tighten eight screws (62) to 8-10 lb-ft (11-14 N·m).



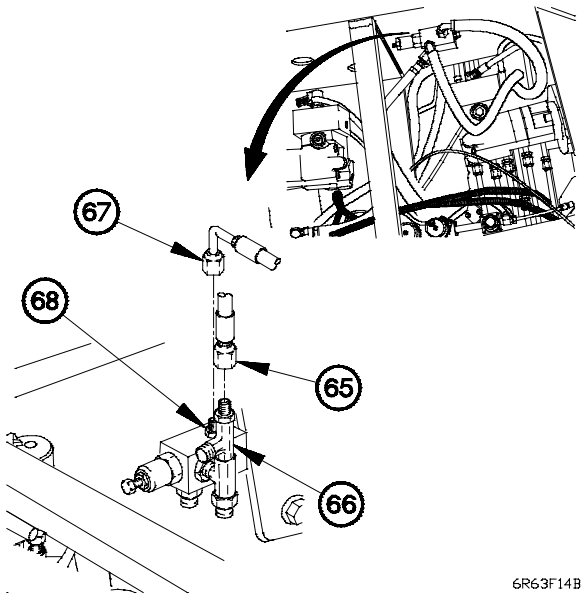



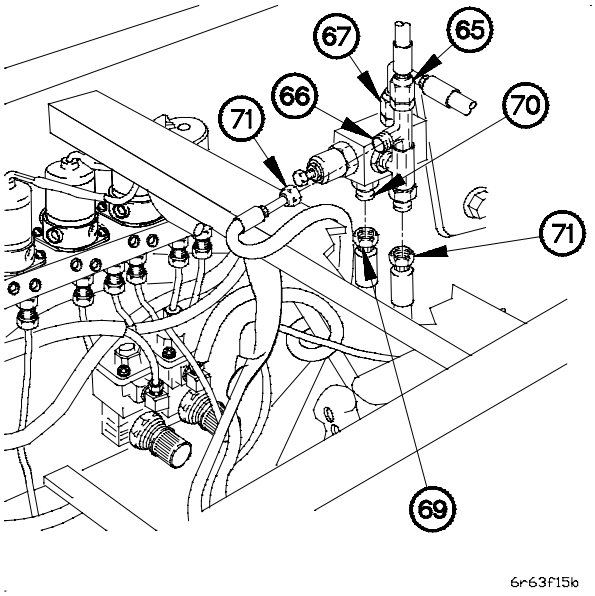

(37) Route air hose (63) through 30K winch assembly (2).

(38) Connect air hose (63) to 90-degree fitting (64).

(39) Position hose (65) on fitting (66).

(40) Position hose (67) on fitting (68).

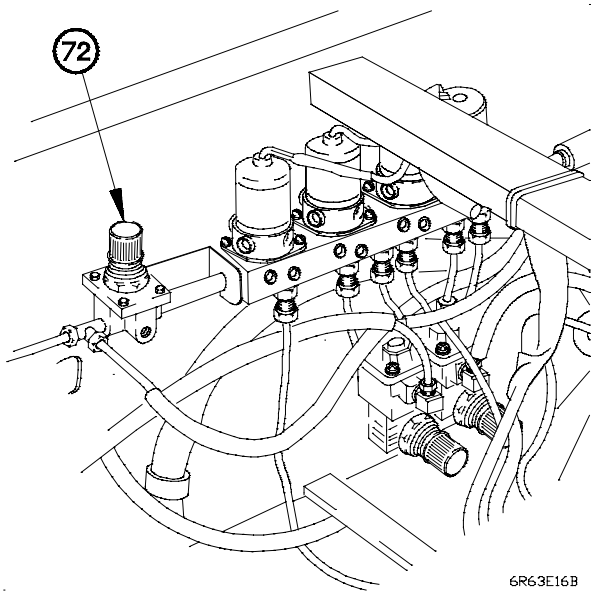





(41) Position hose (69) to fitting (70).

(42) Position two hoses (71) on tee fittings (66).

(43) Tighten hoses (65, 67, 69, and 71) to 38-42 lb-ft (52-57 N·m).




(44) Pull up on regulating valve knob (72) and turn knob fully to the right.

(45) Push in on regulating valve knob (72).

**f. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3)

(2) Install catwalks (TM 9-2320-366-20-3).

(3) Open hydraulic reservoir supply valve and return valve (TM 9-2320-366-10-2).

(4) Install 30K winch cables (TM 9-2320-366-20-5).

(5) Adjust 30K winch tensioner pneumatic valves (para 16-66).

(6) Operate 30K winches and check for proper operation and hydraulic leaks (TM 9-2320-366-10-2).

## 16-64. M1089 30K WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic supply and return valve closed (TM 9-2320-366-10-2).
30K winch counterbalance valve removed (para 16-81).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Adapter, Socket Wrench (Item 3, Appendix B)
Socket Wrench Attachment, Screwdriver (Item 62, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Tools and Special Tools (Cont)**
Socket Wrench, Attachment (TM 9-2320-366-20)
Hammer, Hand, Soft Head (Item 33, Appendix B)

**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Lockwasher (2) (Item 157, Appendix F)
Cloth, Abrasive, Crocus (Item 21, Appendix C)
Parts Kit, Seal Replacement (Item 316, Appendix F)
Insulating Compound, Electrical (Item 41, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**NOTE**

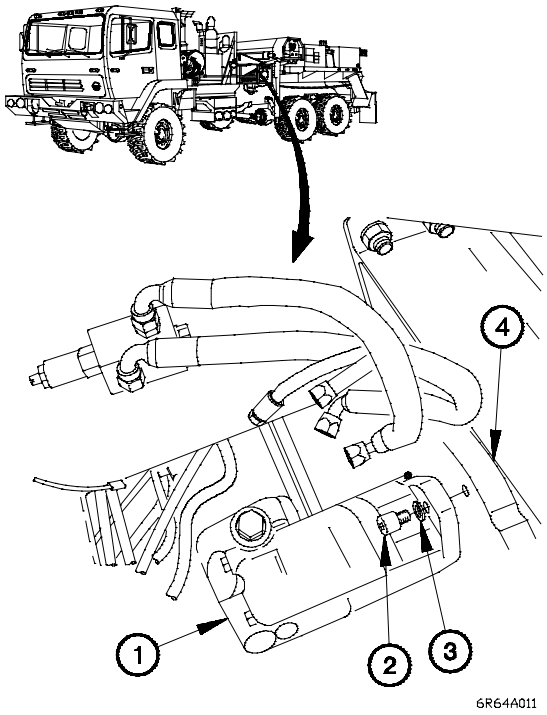
Left and right 30K winch drive motors are replaced/repaired the same. Left 30K winch drive motor assembly shown.

(1) Place drain pan under 30K winch drive motor assembly (1).

**NOTE**

Step (2) requires the aid of an assistant.

(2) Remove two screws (2), lockwashers (3), and 30K winch drive motor assembly (1) from 30K winch assembly (4). Discard lockwashers.



**b. Disassembly.**

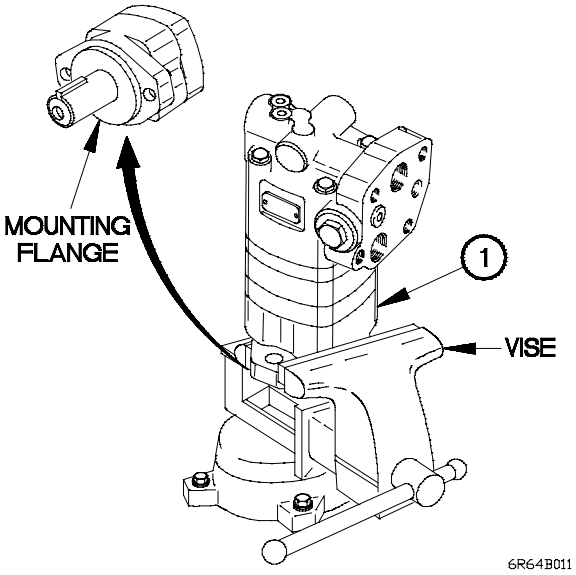
**CAUTION**

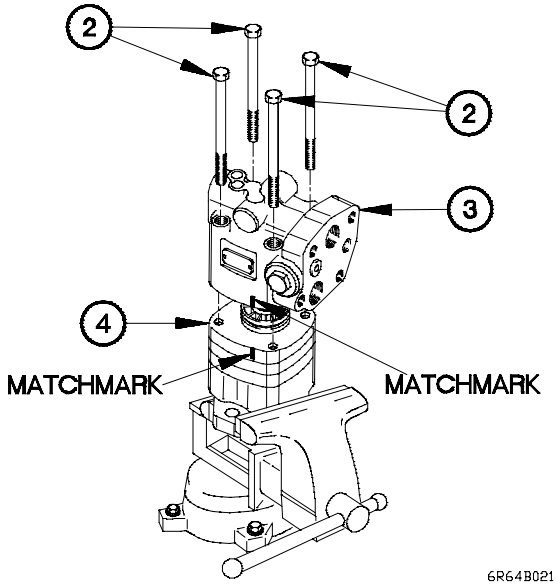
30K winch drive motor assembly must be clamped in vise by mounting flange. Failure to comply may result in damage to 30K winch drive motor assembly.

**NOTE**

Match mark valve housing and bearing housing prior to disassembly.

(1) Position mounting flange of bearing housing (1) in soft-jawed vise.




**NOTE**

Match mark valve housing and valve plate prior to disassembly.

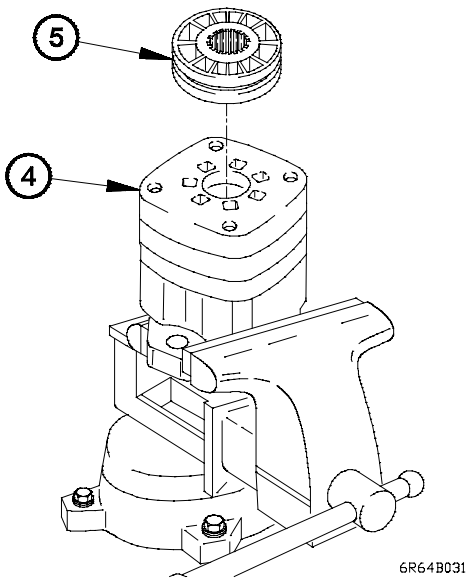
(2) Remove four screws (2) from valve housing (3).

**CAUTION**

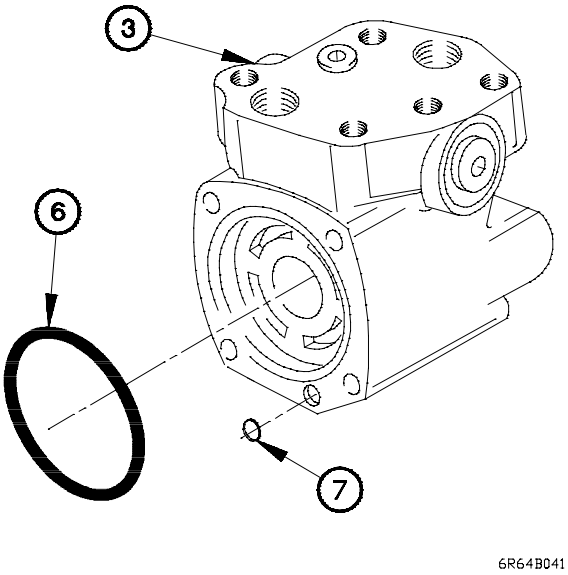
30K winch drive motor is made up of several sections. Ensure that no other section sticks to valve housing when removing. Failure to comply may result in damage to equipment.

(3) Remove valve housing (3) from valve plate (4).

## 16-64. M1089 30K WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR (CONT)




(4) Remove valve (5) from valve plate (4).



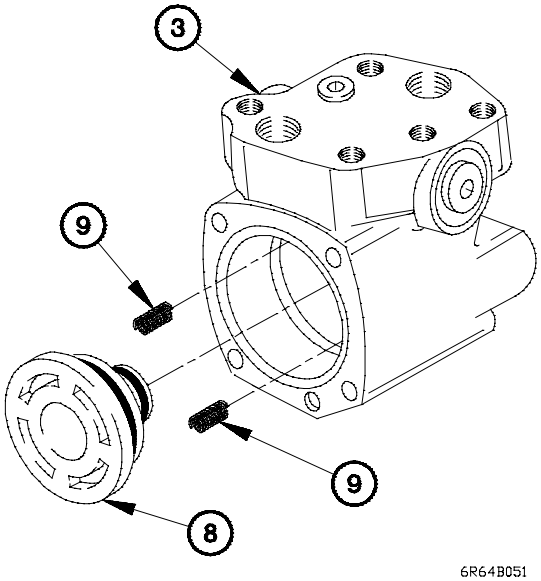

(5) Remove seal (6) and preformed packing (7) from valve housing (3). Discard seal and preformed packing.

**WARNING**

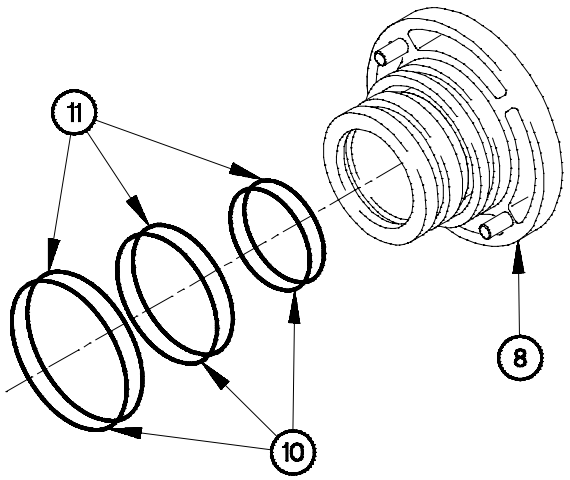
**Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(6) Remove balance ring (8) from valve housing (3).

(7) Remove two balance ring springs (9) from valve housing (3).



(8) Remove three preformed packings (10) and three backup rings (11) from balance rings (8). Discard preformed packings and backup rings.



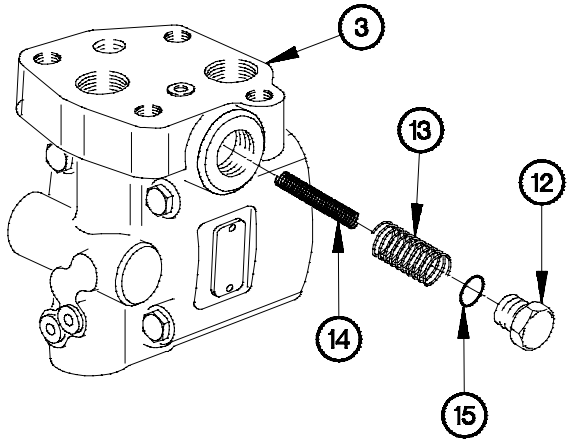

6R64B061

**WARNING**

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

(9) Remove control spool plug (12) and springs (13 and 14) from valve housing (3).

(10) Remove preformed packing (15) from control spool plug (12). Discard preformed packing.




6R64B071

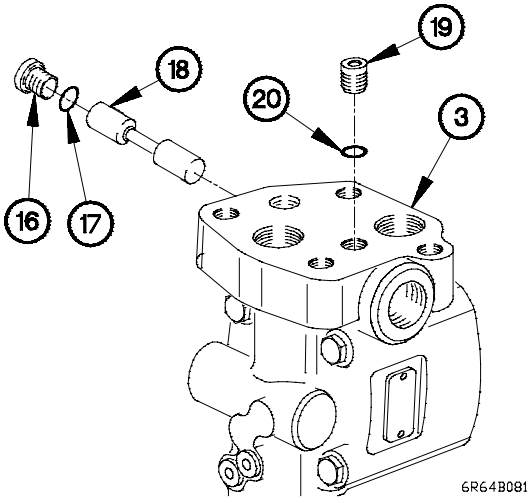
(11) Remove control spool plug (16) from valve housing (3).

(12) Remove preformed packing (17) from control spool plug (16). Discard preformed packing.

(13) Remove control spool (18) from valve housing (3).

(14) Remove case drain plug (19) from valve housing (3).

(15) Remove preformed packing (20) from case drain plug (19). Discard preformed packing.




6R64B081

## 16-64. M1089 30K WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR (CONT)

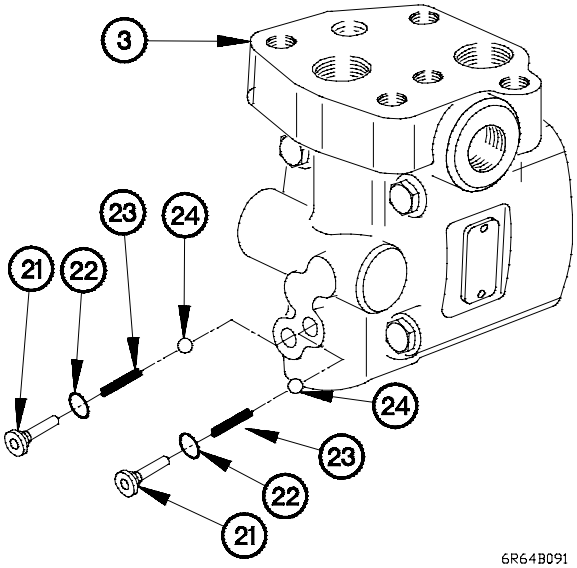
(16) Remove two check ball plugs (21) from valve housing (3).

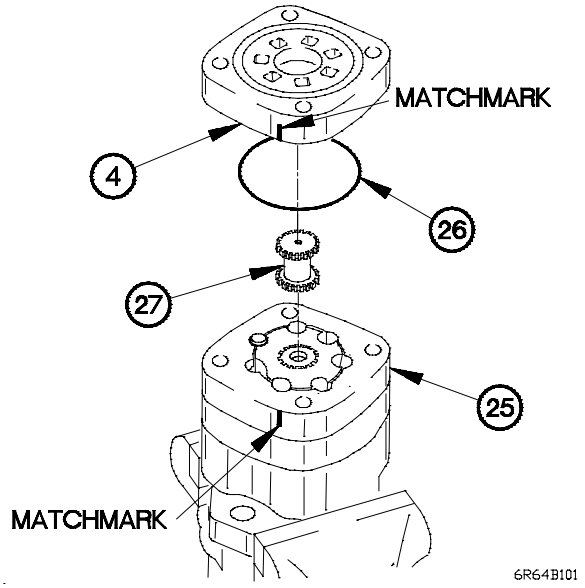
(17) Remove two preformed packings (22) from check ball plugs (21). Discard preformed packings.

**WARNING**

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

(18) Remove two springs (23) and check balls (24) from valve housing (3).




**NOTE**

Match mark geroler and wear plate prior to disassembly.

(22) Remove geroler (25) from wear plate (28).

(23) Remove preformed packing (29) from wear plate (28). Discard preformed packing.

(24) Remove star (30) and seven rollers (31) from geroler (25).

(25) Remove drive (32) from bearing housing (1).

(26) Remove bearing housing (1) from vise.

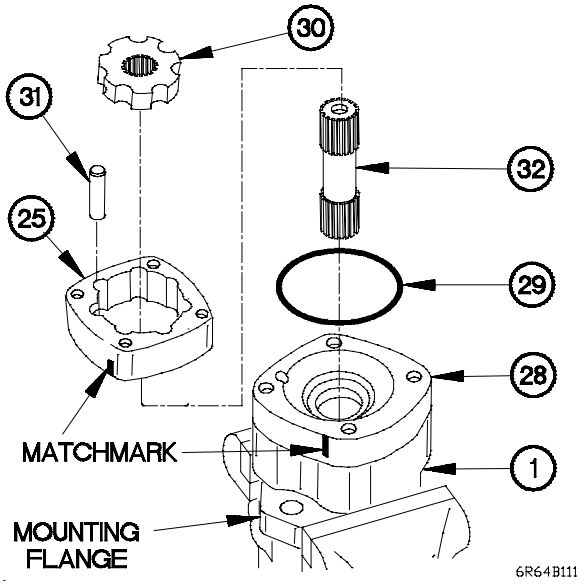
**NOTE**

Match mark valve plate and geroler prior to disassembly.

(19) Remove valve plate (4) from geroler (25).

(20) Remove seal (26) from valve plate (4). Discard seal.

(21) Remove valve drive (27) from geroler (25).



**NOTE**

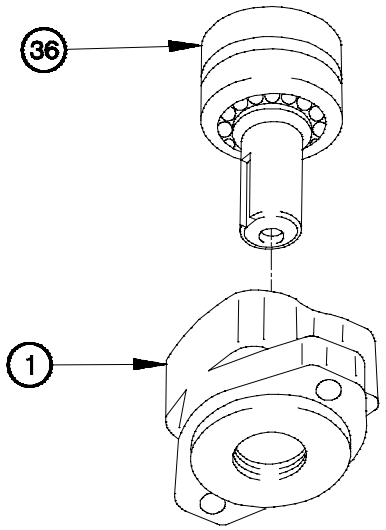
Match mark wear plate and bearing housing prior to disassembly.

(27) Remove wear plate (28) from bearing housing (1).

(28) Remove seal (33) from wear plate (28). Discard seal.

(29) Remove preformed packing (34) from bearing housing (1). Discard preformed packing.

(30) Remove key (35) from shaft and bearing assembly (36).



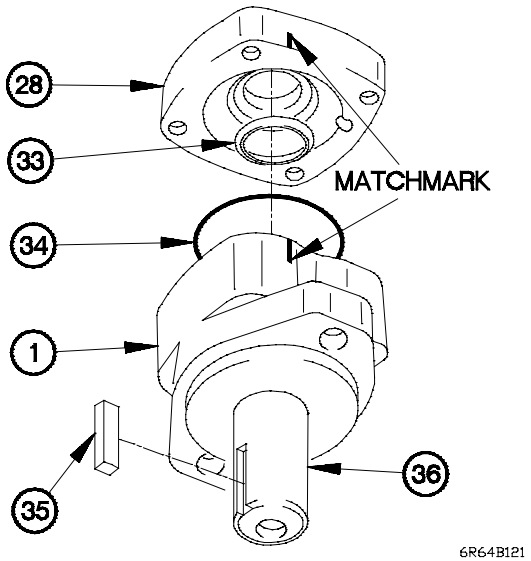

6R64B131

**CAUTION**

Use caution when removing seals. Failure to comply may result in damage to bearing housing.

(32) Remove seal (37) and backup ring (38) from bearing housing (1). Discard seal and backup ring.

(33) Remove seal (39) from bearing housing (1). Discard seal.

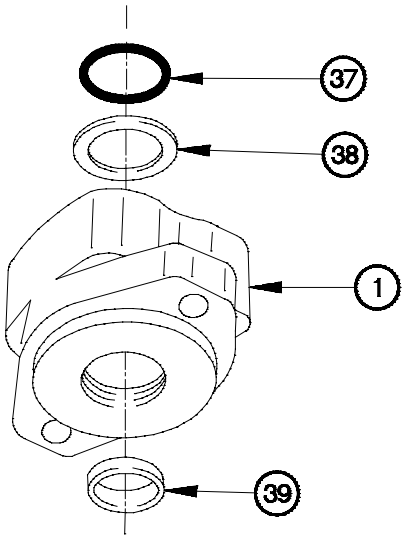



6R64B121

**NOTE**

It may be necessary to wrap bearing housing with a clean rag and tap with a soft face hammer to loosen.

(31) Remove shaft and bearing assembly (36) from bearing housing (1).




6R64B141

## 16-64. M1089 30K WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR (CONT)

**c. Cleaning/Inspection.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in death or injury to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If Dry Cleaning Solvent contacts skin or clothes, flush with cold water. If Dry Cleaning Solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**

(1) Clean all metal parts with dry cleaning solvent.

(2) Inspect chamfered area of output shaft and all parts. Use crocus cloth to remove any nicks, burrs, or sharp edges that could damage shaft during assembly.

**d. Assembly.**

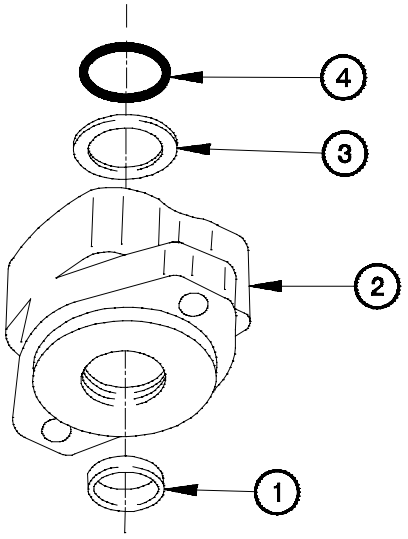
**NOTE**

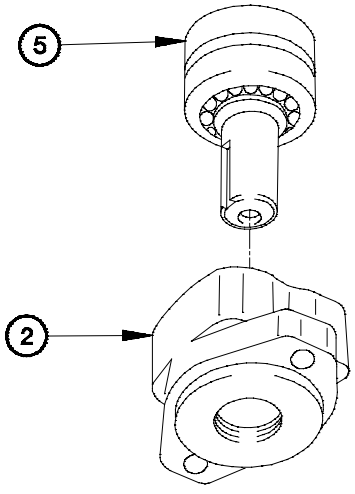
Lubricate all seals and preformed packings with lubricating oil prior to installation.

(1) Install seal (1) in bearing housing (2) with lip facing up.

(2) Install backup ring (3) in bearing housing (2).

(3) Install seal (4) in bearing housing (2) over backup ring (3).




(4) Press shaft and bearing assembly (5) into bearing housing (2).

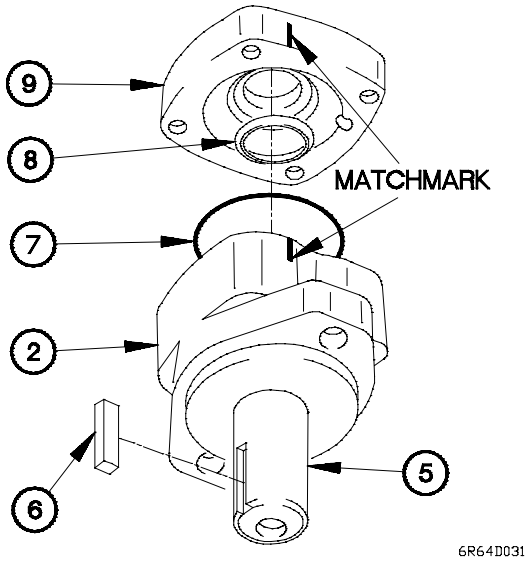
(5) Install key (6) on shaft and bearing assembly (5).

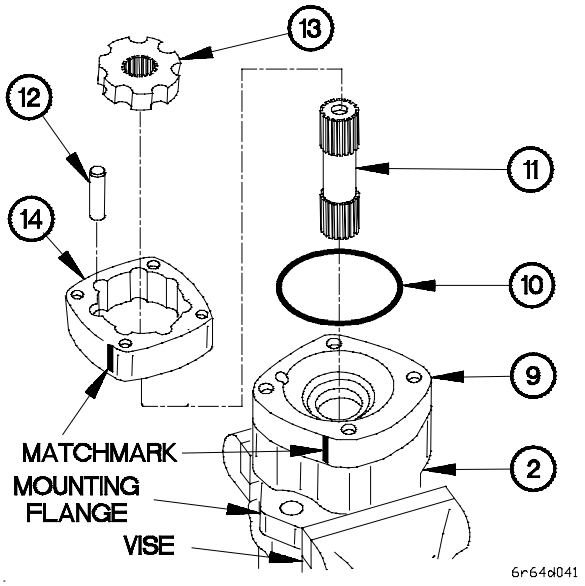
(6) Pour small amount of lubricating oil into bearing housing (2).

(7) Install preformed packing (7) in bearing housing (2).

(8) Install seal (8) in wear plate (9).

(9) Install wear plate (9) on bearing housing (2) with match marks aligned.




(10) Clamp mounting flange of bearing housing (2) in soft-jawed vise.

(11) Install preformed packing (10) on wear plate (9).

(12) Install drive (11) in bearing housing (2).

(13) Install seven rollers (12) and star (13) in geroler (14).

(14) Install geroler (14) on wear plate (9) with match marks aligned.

## 16-64. M1089 30K WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

Largest open pocket can be in any location on geroler.

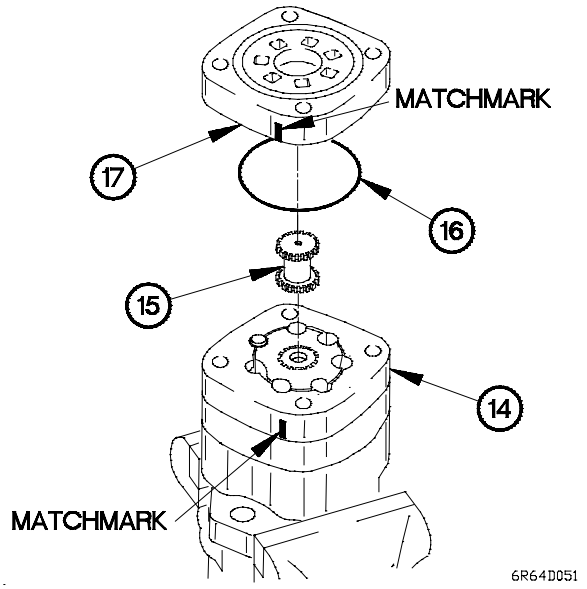
(15) Locate and mark position of largest open pocket in geroler (14).

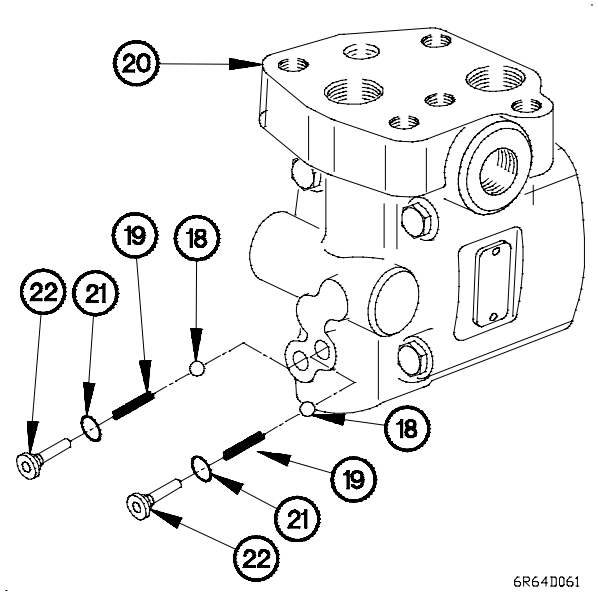
(16) Install valve drive (15) in geroler (14).

(17) Install preformed packing (16) in valve plate (17).

(18) Install valve plate (17) on geroler (14) with match marks aligned.

(19) Align any open slot in valve plate (17) with largest open pocket in geroler (14).




**WARNING**

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

(20) Install two check balls (18) and springs (19) in valve housing (20).

(21) Install two preformed packings (21) on check ball plugs (22).

(22) Install two check plugs (22) in valve housing (20).

(23) Tighten two check ball plugs (22) to 40-60 lbs-in. (5-7 N·m).

(24) Install control spool (23) in valve housing (20).

(25) Install preformed packing (24) on control spool plug (25).

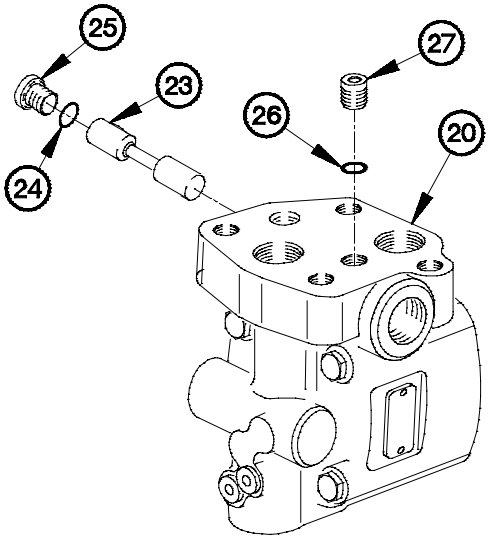
(26) Position control spool plug (25) in valve housing (20).

(27) Tighten control spool plug (25) to 38-46 lb-ft (52-62 N·m).

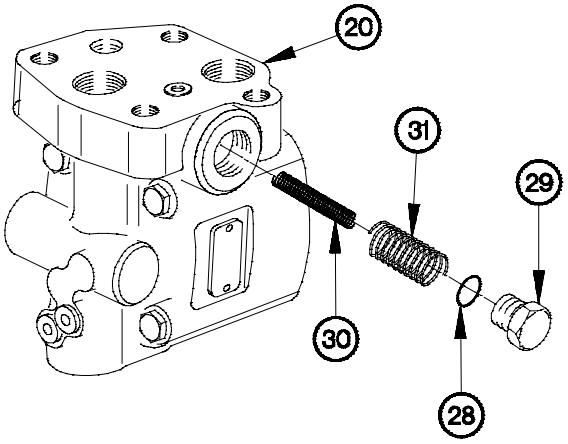
(28) Install preformed packing (26) on case drain plug (27).

(29) Position case drain plug (27) in valve housing (20).

(30) Tighten case drain plug (27) to 40-60 lb-in. (5-7 N·m).




6R64D071




6R64D081

(31) Install preformed packing (28) on control spool plug (29).

**WARNING**

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

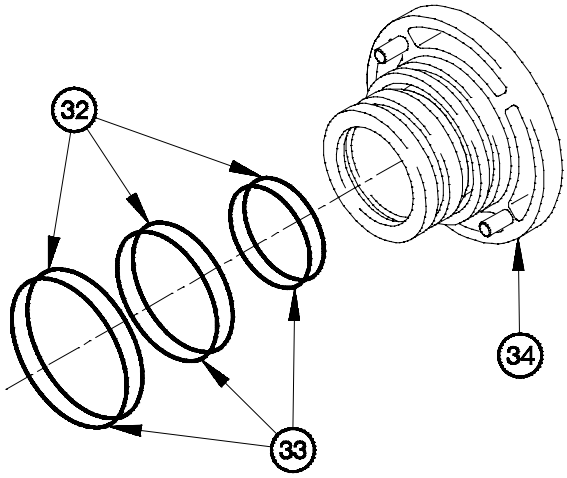
(32) Install springs (30 and 31) in valve housing (20).

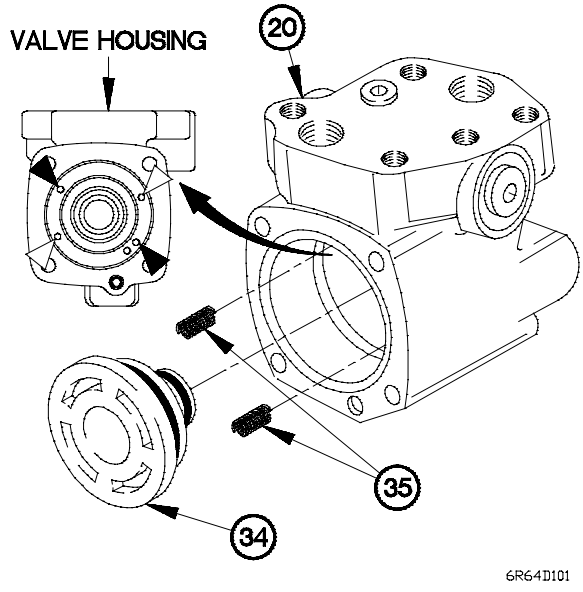
(33) Position control spool plug (29) in valve housing (20).

(34) Tighten control spool plug (29) to 38-46 lb-ft (52-62 N·m).

## 16-64. M1089 30K WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR (CONT)

(35) Install three backup rings (32) and preformed packings (33) on balance ring (34).




**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.**

**NOTE**

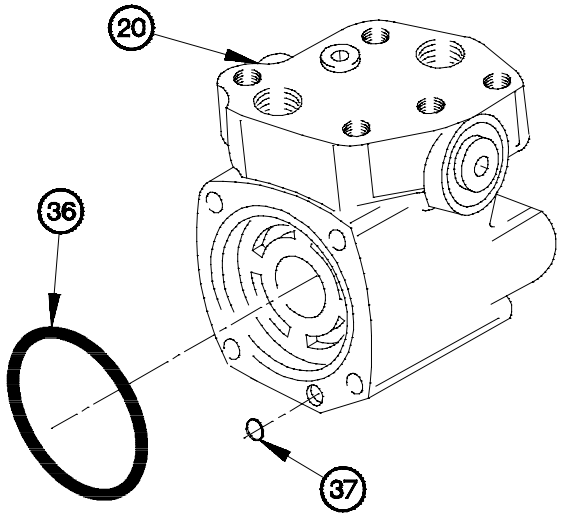
Balance ring springs may be installed in any two holes in valve housing that are directly across from each other.

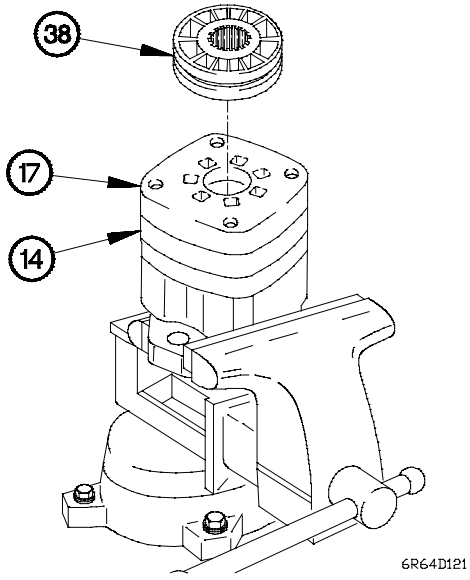
(36) Install two balance ring springs (35) in holes in valve housing (20).

(37) Align two index pins of balance ring (34) with two remaining holes in valve housing (20).

(38) Push balance ring (34) into valve housing (20) until it just touches balance ring springs (35).

(39) Install seal (36) and preformed packing (37) in valve housing (20).



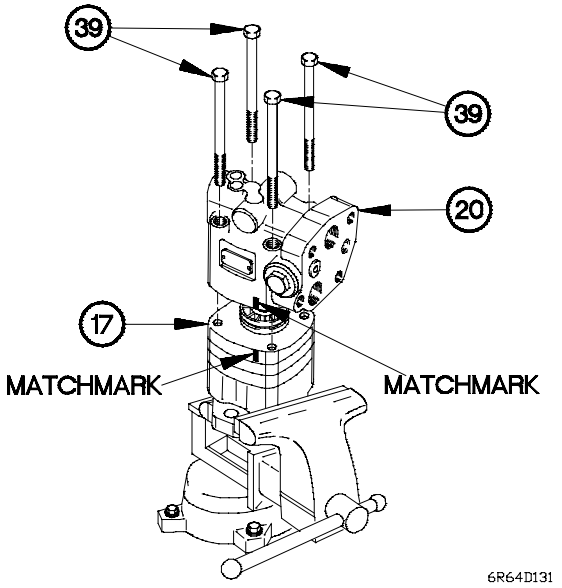




(40) Align any side opening in valve (38) with open slot in valve plate (17) that is over largest open pocket in geroler (14).

(41) Install valve housing (20) on valve plate (17) with match marks aligned.

(42) Position four screws (39) in valve housing (20).

(43) Tighten screws (39) in a crisscross pattern to 38-46 lb-ft (52-62 N·m).



## 16-64. M1089 30K WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR (CONT)

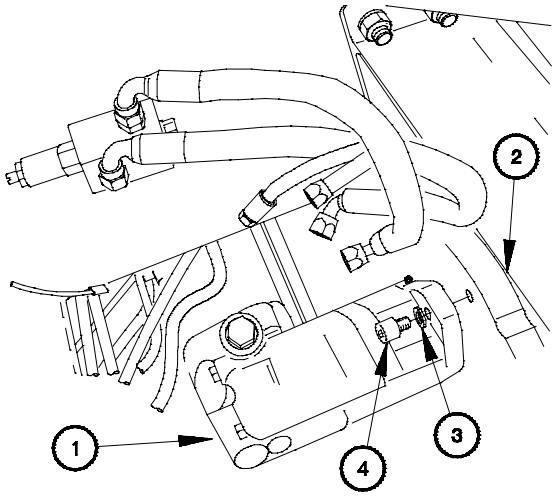
**e. Installation.**

**NOTE**

Step (1) requires the aid of an assistant.

(1) Position 30K winch drive motor assembly (1) on 30K winch assembly (2) with two lockwashers (3) and screws (4).

(2) Tighten screws (4) to 70-95 lb-ft (95-129 N·m).



6R64E011

**f. Follow-On Maintenance.**

(1) Install 30K winch counterbalance valve (para 16-81).

(2) Open hydraulic reservoir supply and return valve (TM 9-2320-366-10-2).

(3) Fill hydraulic reservoir to FULL (TM 9-2320-366-10).

(4) Operate 30K winch assembly and check for hydraulic leaks and proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-65. 30K WINCH RELIEF VALVE REPLACEMENT/REPAIR

**This task covers:**

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Adjustment
g. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Hydraulic tank shut off valve closed (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)
Gloves (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
STE/ICE-R (Item 70, Appendix B)
Transducer (10,000 PSI) (Item 1, Appendix G)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Crowfoot Attachment, Socket Wrench (Item 17, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Cap, Tube (Item 17.1, Appendix C)
Plug, Tube Fitting, Threaded (Item 55.2, Appendix C)
Reducer, Tube (Item 60.2, Appendix C)
Hose Assembly, Nonmetallic (Item 40.1, Appendix C)
Sealant (Item 70, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (Item 237, Appendix F)
Lockwasher (12) (Item 132, Appendix F)

**References**
(TM 9-4910-511-12&P)

**Personnel Required**
(2)

## 16-65. 30K WINCH RELIEF VALVE REPLACEMENT/REPAIR (CONT)

**a. Removal.**

**NOTE**

- Left and right 30K winch relief valves are removed the same way. Left side shown.
- Tag hoses and connection points prior to removal.

(1) Position drain pan under valve (1).

**WARNING**

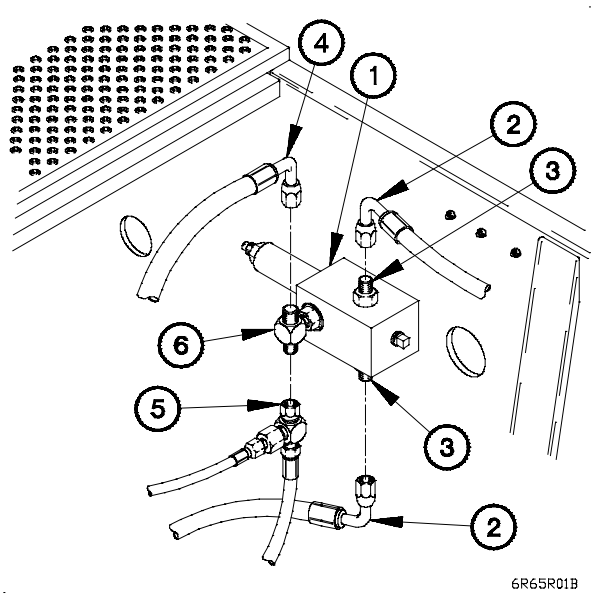
- **Prolonged contact with lubricating oil (MIL-L-2104) may cause a skin rash. Skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be well ventilated to keep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

**CAUTION**

Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

(2) Disconnect two hoses (2) from fittings (3).

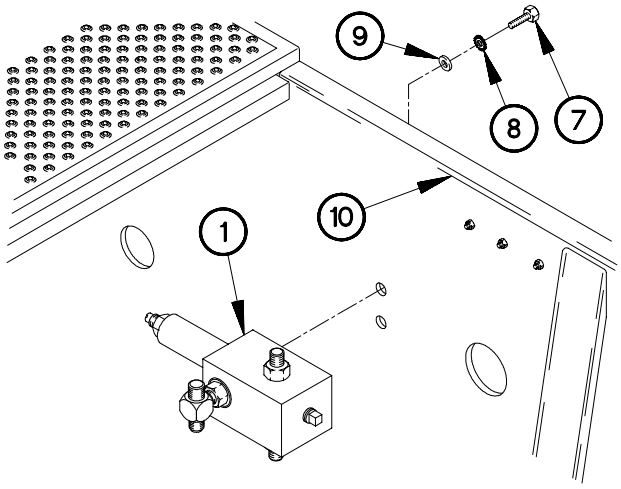
(3) Disconnect hose (4) and swivel tee fitting (5) from tee fitting (6).



**NOTE**

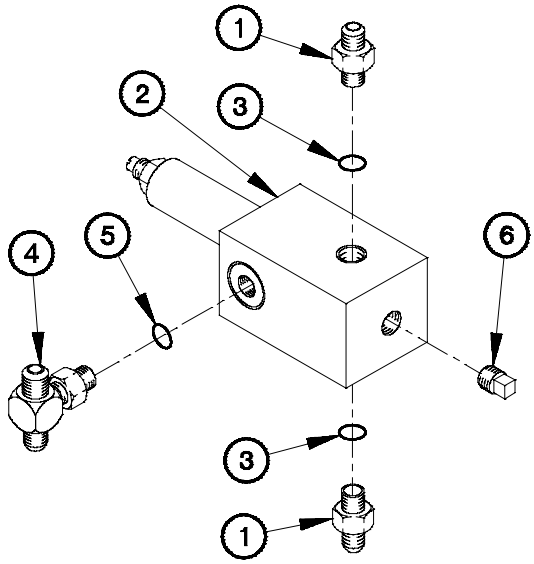
Note position of relief valve on 30K winch frame prior to removal.

(4) Remove two screws (7), lockwashers (8), washers (9), and valve (1) from 30K winch frame (10). Discard lockwashers.




6R65R02B

**b. Disassembly.**




6R65D01B

(1) Remove two fittings (1) from valve (2).

(2) Remove two preformed packings (3) from fittings (1). Discard preformed packings.

**NOTE**

Note position of tee fitting prior to removal.

(3) Remove tee fitting (4) from valve (2).

(4) Remove preformed packing (5) from tee fitting (4). Discard preformed packing.

(5) Remove plug (6) from valve (2).

## 16-65. 30K WINCH RELIEF VALVE REPLACEMENT/REPAIR (CONT)

**c. Cleaning/Inspection.**

**WARNING**

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

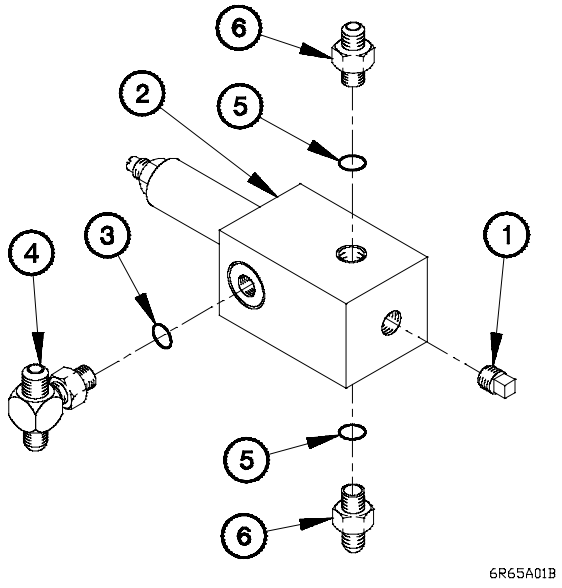
(1) Clean all metal parts with dry cleaning solvent.

(2) Replace any parts that fail visual inspection.

**d. 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 anti-seize compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury to personnel.**




(1) Apply sealant to threads of plug (1).

(2) Install plug (1) in valve (2).

(3) Install preformed packing (3) on tee fitting (4).

(4) Position tee fitting (4) in valve (2).

(5) Install preformed packing (5) on two fittings (6).

(6) Position two fittings (6) in valve (2).

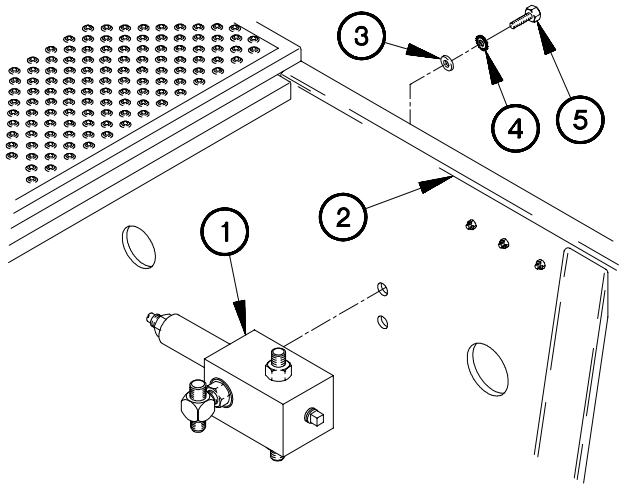
(7) Tighten tee fitting (4) and two fittings (6) to 40-43 lb-ft (54-58 N•m).

**e. Installation.**

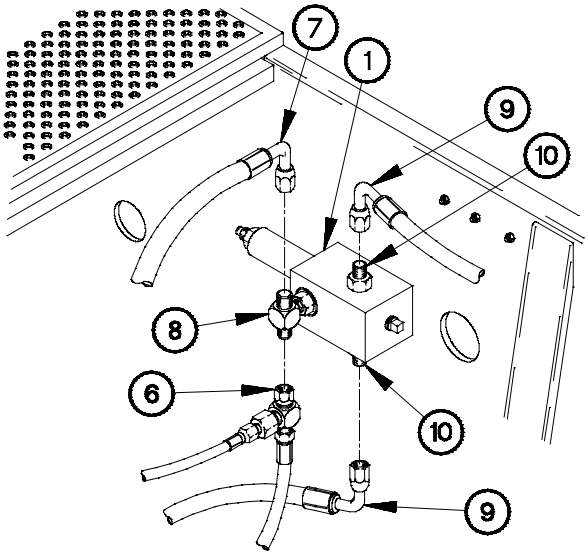
**NOTE**

Left and right 30K winch relief valves are installed the same way. Left side shown.

(1) Install valve (1) on 30K winch frame (2) with two washers (3), lockwashers (4), and screws (5).




6R65I01B




6R65I02B

(2) Position swivel fitting (6) and hose (7) on tee fitting (8).

(3) Position two hoses (9) on fittings (10).

(4) Tighten swivel fitting (6), hose (7), and hose (9) to 38-42 lb-ft (52-57 N·m).

(5) Perform adjustment.

**f. Adjustment.**

**NOTE**

Left and right 30K winch relief valves are adjusted the same way. Left side shown.

(1) Disconnect hose (1) from fitting (2).

(2) Install plug (3) in hose (1).

(3) Install reducer (4) on fitting (2).

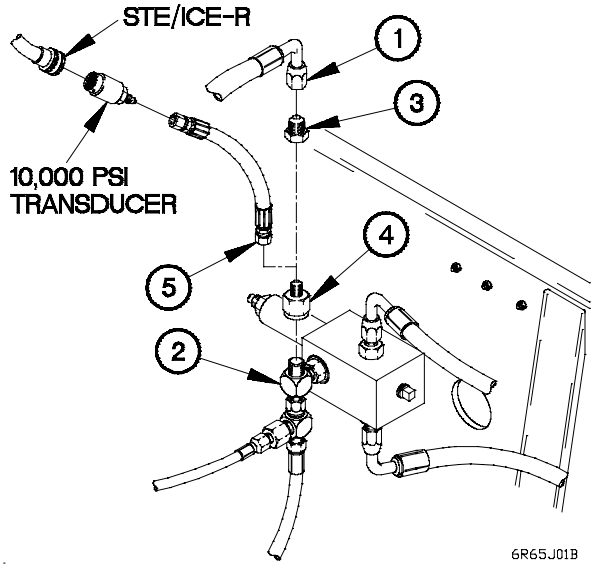
**WARNING**

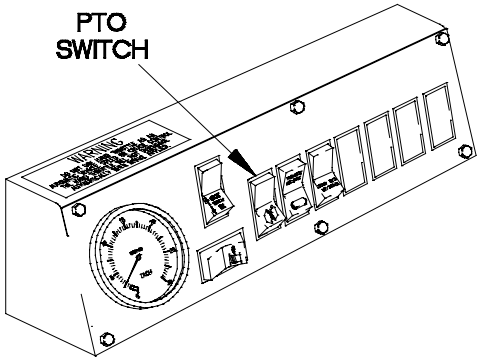
**Use care in placement of STE/ICE-R instruments used to perform these adjustments. Hydraulic system pressures are approximately 3000 PSI. Hoses will move or jump under this pressure. Secure test instruments, as required. Failure to comply may result in injury to personnel or damage to equipment.**

(4) Connect test hose (5) to reducer (4).

(5) Install 10,000 PSI transducer on test hose (5).

(6) Connect 10,000 PSI transducer to STE/ICE-R.




(7) Open hydraulic reservoir supply valve and return valve (TM 9-2320-366-10-2).

(8) Start engine (TM 9-2320-366-10-1).

(9) Position PTO switch to ON (TM 9-2320-366-10-1).

(10) Increase engine speed to 1250-1450 RPM (TM 9-2320-366-10-1).

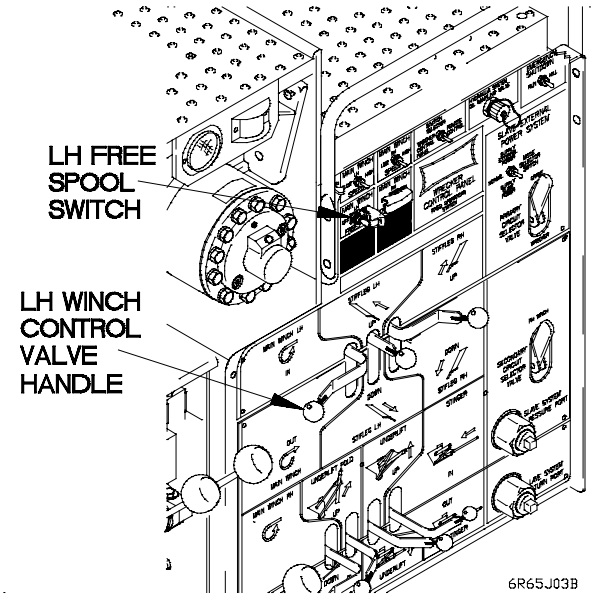
## 16-65. 30K WINCH RELIEF VALVE REPLACEMENT/REPAIR (CONT)

**WARNING**

**Wear appropriate eye protection when performing pressure checks. Failure to comply may result in oil getting into eyes. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.**

**NOTE**

Steps (11) through (18) require the aid of an assistant.

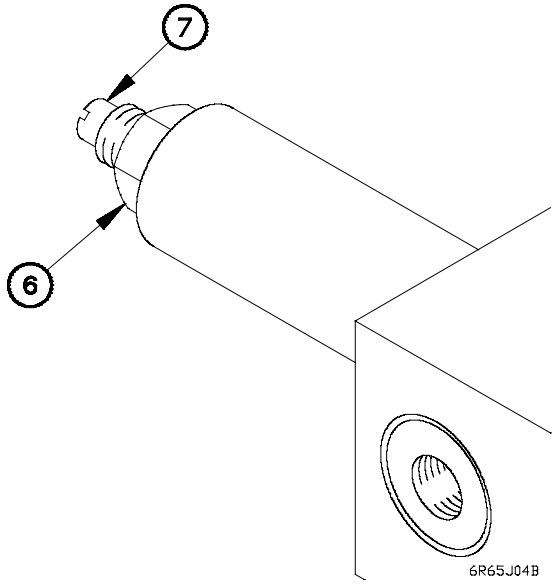



(11) Position LH free spool switch to ON (TM 9-2320-366-10-2).

(12) Position and hold LH winch control valve handle to IN (TM 9-2320-366-10-2).

(13) Perform STE/ICE-R Test #51 (TM 9-4910-571-12&P).

(14) Observe pressure of 2925-2975 PSI (20,168-20,513 kPa).




(15) Loosen lock nut (6) on 30K winch relief valve adjusting screw (7).

(16) If pressure is low, turn 30K winch relief valve adjusting screw (7) clockwise to increase pressure.

(17) If pressure is high, turn 30K winch relief valve adjusting screw (7) counterclockwise to decrease pressure.

(18) Perform steps (12) through (17) as required.

**NOTE**

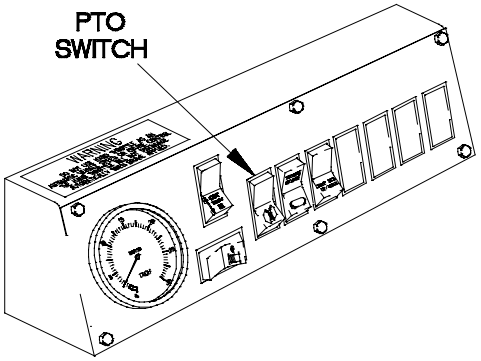
Hold 30K winch relief valve adjusting screw while tightening lock nut.

(19) Tighten lock nut (6) on 30K winch relief valve adjusting screw (7).

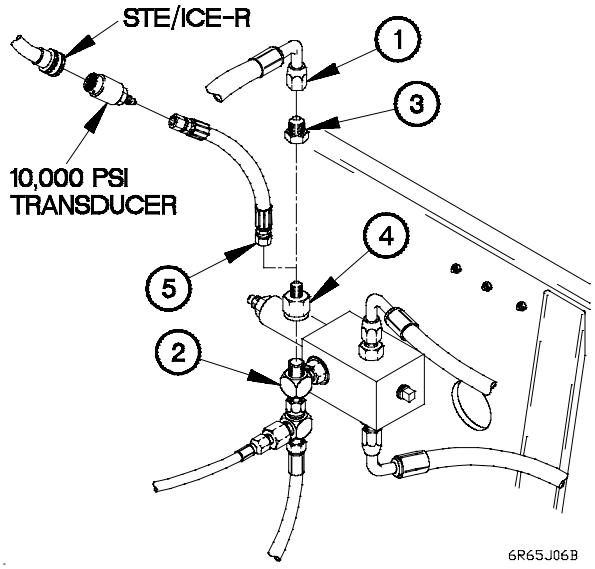
(20) Lower engine speed to idle (TM 9-2320-36-10-1).

(21) Position PTO switch to OFF (TM 9-2320-366-10-1).

(22) Shut down engine (TM 9-2320-366-10-1).




6R65J05B




6R65J06B

(23) Disconnect STE/ICE-R from 10,000 PSI transducer.

(24) Remove 10,000 PSI transducer from test hose (5).

(25) Disconnect test hose (5) from reducer (4).

(26) Remove reducer (4) from fitting (2).

(27) Remove plug (3) from hose (1).

(28) Position hose (1) to fitting (2).

(29) Tighten hose (1) to 38-42 lb-ft (52-57 N·m).

**g. Follow-On Maintenance.**

(1) Service hydraulic system (TM 9-2320-366-10).

(2) Operate main winch, checking for proper operation (TM 9-2320-366-10-2).

**End of task.**

## 16-66. DELETED



All data on pages 16-394 through 16-400, including pages 16-395 through 16-400 deleted.

## 16-67. 30K WINCH VALVE MANIFOLD ASSEMBLY REPLACEMENT/REPAIR

**This task covers:**

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation

**INITIAL SETUP**

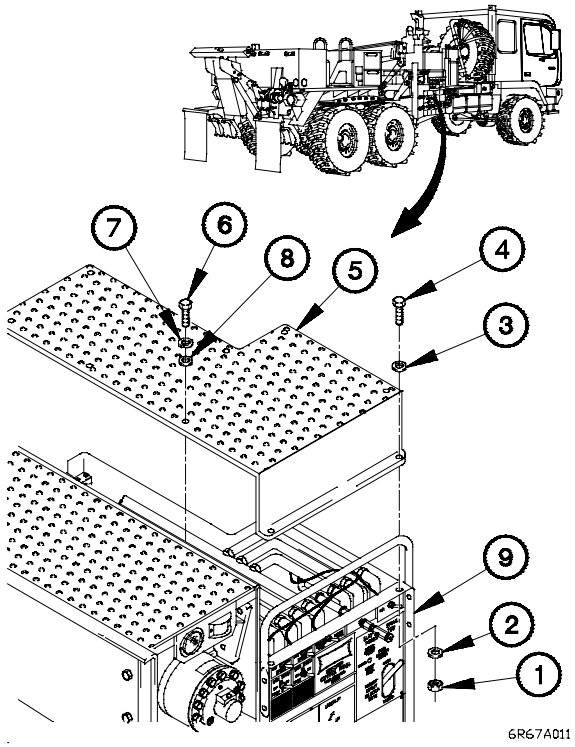
**Equipment Conditions**
Disconnect batteries (TM 9-2320-366-20-3).
Air tanks drained (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Soldering and Brazing Outfit, Resistance Heating (Item 66, Appendix B)
Heater, Gun Type, Electric (Item 34, Appendix B)

**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Solder (Item 82, Appendix C)
Insulation, Sleeving, Electrical (Item 42, Appendix C)
Tape, Antiseizing (Item 85, Appendix C)
Nut, Self-Locking (2) (Item 180, Appendix F)
Nut, Self-Locking (2) (Item 177, Appendix F)
Lockwasher (8) (Item 146, Appendix F)

**Personnel Required**
(2)

**a. Removal.**




(1) Remove two self-locking nuts (1), washers (2), washers (3), and screws (4) from top cover (5). Discard self-locking nuts.

(2) Remove eight screws (6), lockwashers (7), washers (8), and top cover (5) from control panel (9). Discard lockwashers.

## 16-67. 30K WINCH VALVE MANIFOLD ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

- Tag electrical leads and connection points prior to disconnecting.
- Positive electrical leads are yellow. Ground electrical leads are black.

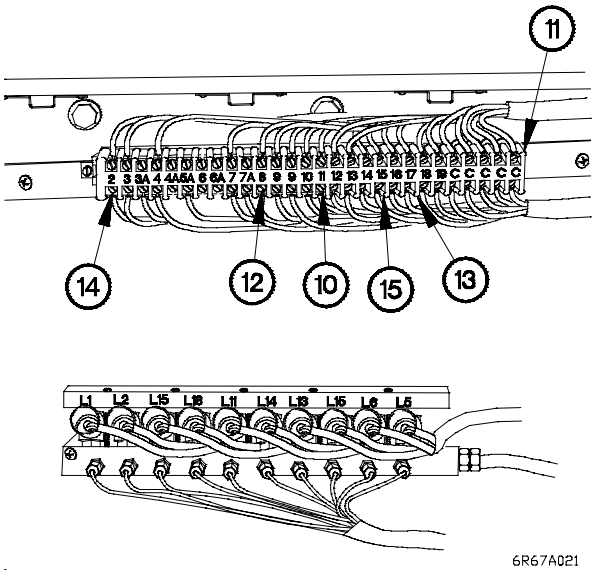
(3) Disconnect electrical lead (10) from terminal block (11) ground terminal lug 11.

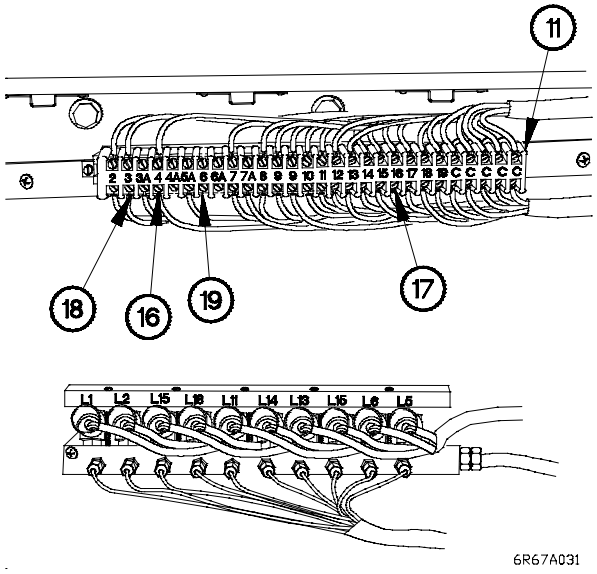
(4) Disconnect electrical lead (12) from terminal block (11) terminal lug 8.

(5) Disconnect electrical lead (13) from terminal block (11) terminal lug 17.

(6) Disconnect electrical lead (14) from terminal block (11) terminal lug 2.

(7) Disconnect electrical lead (15) from terminal block (11) terminal lug 15.



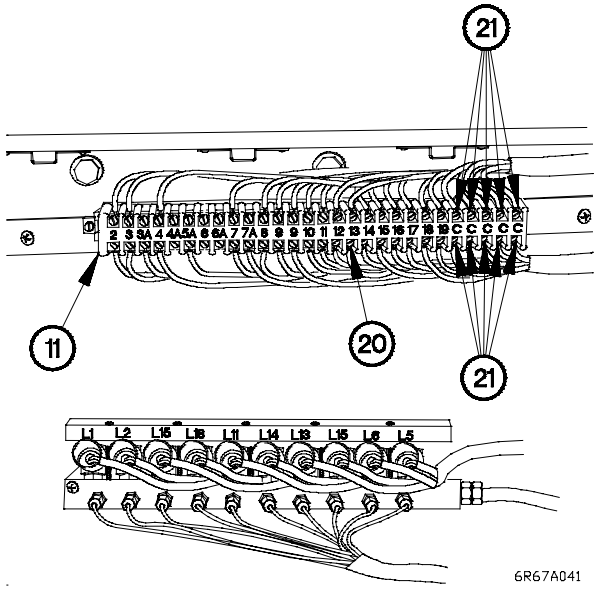




(8) Disconnect electrical lead (16) from terminal block (11) terminal lug 4.

(9) Disconnect electrical lead (17) from terminal block (11) terminal lug 16.

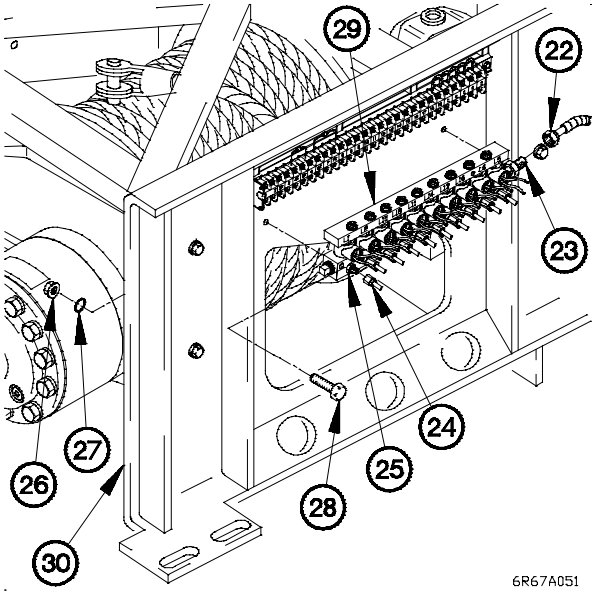
(10) Disconnect electrical lead (18) from terminal block (11) terminal lug 3.

(11) Disconnect electrical lead (19) from terminal block (11) terminal lug 6.




(12) Disconnect electrical lead (20) from terminal block (11) terminal lug 13.

(13) Disconnect thirteen ground wires (21) from terminal block (11) terminal lugs C.




**NOTE**

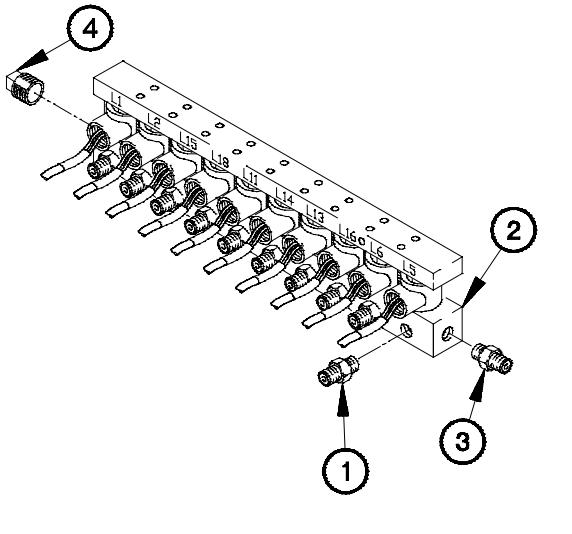
Tag connections and connection points prior to disconnecting.

(14) Disconnect hose (22) from fitting (23).

(15) Disconnect ten hoses (24) from fittings (25).

(16) Remove two self-locking nuts (26), washers (27), screws (28), and valve manifold assembly (29) from 30K winch assembly (30). Discard self-locking nuts.

**b. Disassembly.**




(1) Remove ten fittings (1) from valve manifold assembly (2).

(2) Remove fitting (3) from valve manifold assembly (2).

(3) Remove plug (4) from valve manifold assembly (2).

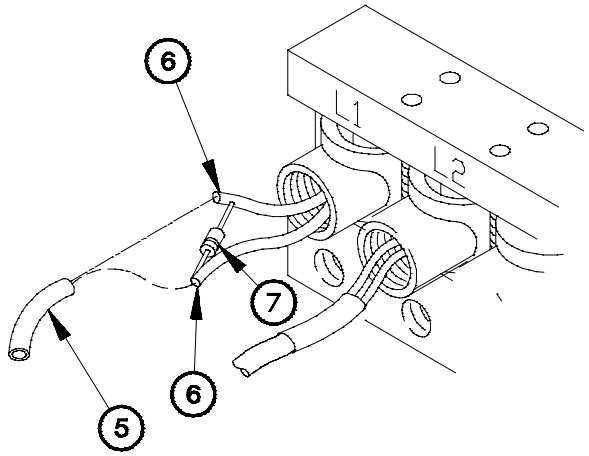
## 16-67. 30K WINCH VALVE MANIFOLD ASSEMBLY REPLACEMENT/REPAIR (CONT)

(4) Remove insulation sleeving (5) from electrical leads (6).

**CAUTION**

Care must be taken when removing rectifiers. Failure to comply may cause damage to electrical leads.

(5) Remove rectifier (7) from electrical leads (6).




6R67B021

**c. Cleaning/Inspection.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

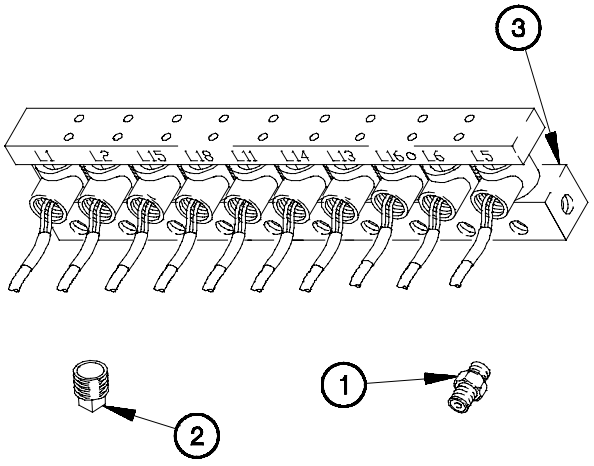
**NOTE**

Replace any part that fails visual inspection.

(2) Check fittings (1) for cracks, corrosion, pitting, damaged or worn threads, and obstruction to parts.

(3) Check plug (2) for cracks, corrosion, pitting, damaged or worn threads.

(4) Check valve manifold (3) for cracks, corrosion, pitting, damaged or worn threads, and obstruction to parts.




6R67C01A

**d. Assembly.**

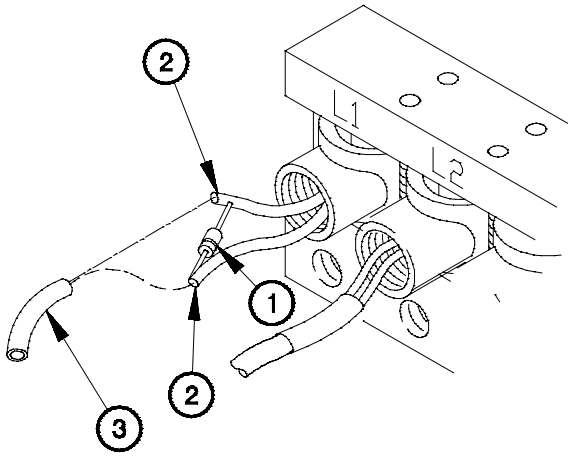
**NOTE**

Cathode side of rectifier (side with band) is positioned toward positive lead (yellow) and the opposite end positioned toward negative ground lead (black).

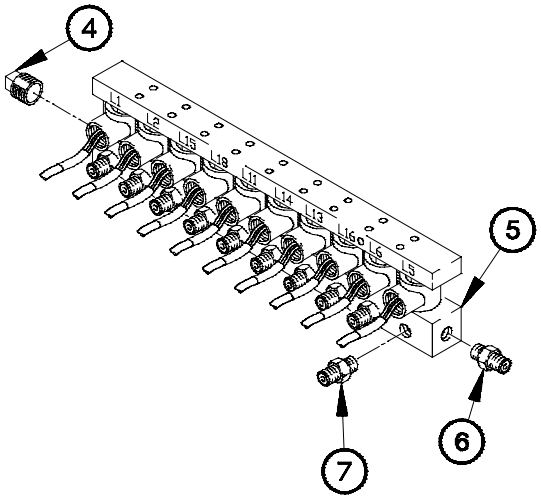
(1) Position rectifier (1) on electrical leads (2).

(2) Solder rectifier (1) to electrical leads (2).

(3) Install insulation sleeving (3) over electrical leads (2) and shrink insulation sleeving.




6R67D011




6R67D021

**NOTE**

Apply antiseizing tape to first two to five threads of fittings and plugs prior to installation.

(4) Install plug (4) in valve manifold assembly (5).

(5) Install fitting (6) in valve manifold assembly (5).

(6) Install ten fittings (7) in valve manifold assembly (5).

## 16-67. 30K WINCH VALVE MANIFOLD ASSEMBLY REPLACEMENT/REPAIR (CONT)

**e. Installation.**

(1) Position valve manifold assembly (1) on 30K winch assembly (2) with two screws (3), washers (4), and self-locking nuts (5).

(2) Tighten two self-locking nuts (5) to 12-24 lb-in. (1-3 N·m).

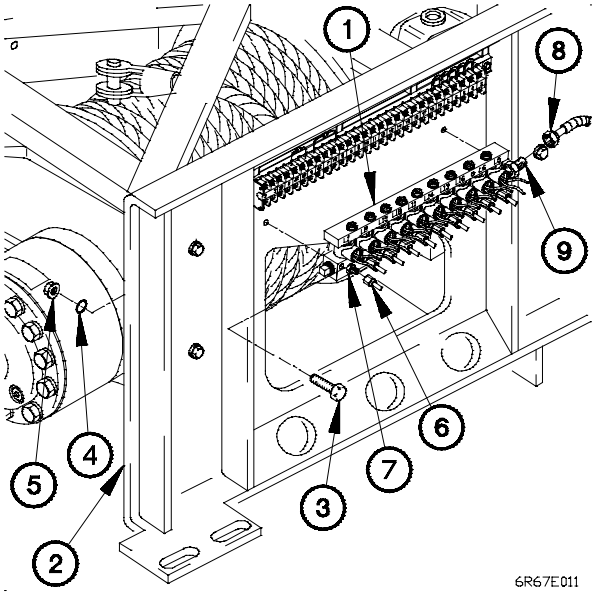
**NOTE**

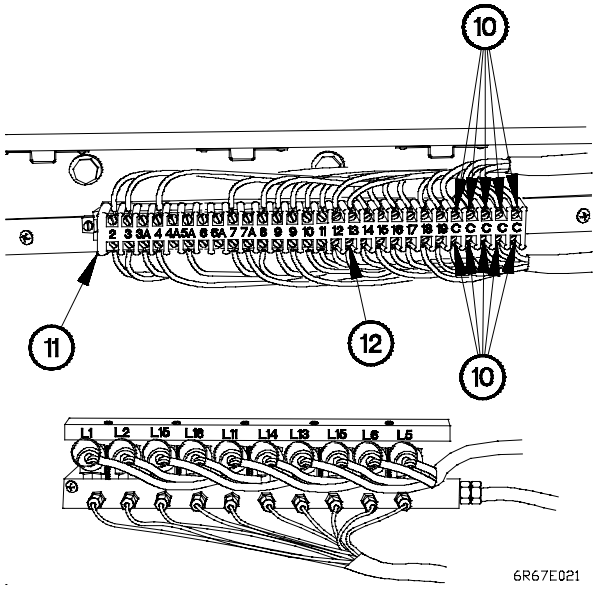
Apply antiseizing tape to first two to five threads of fittings prior to installation of hoses.

(3) Install ten hoses (6) on fittings (7).

(4) Position hose (8) on fitting (9).

(5) Tighten hose (8) approximately 2 1/2 turns past hand tight.



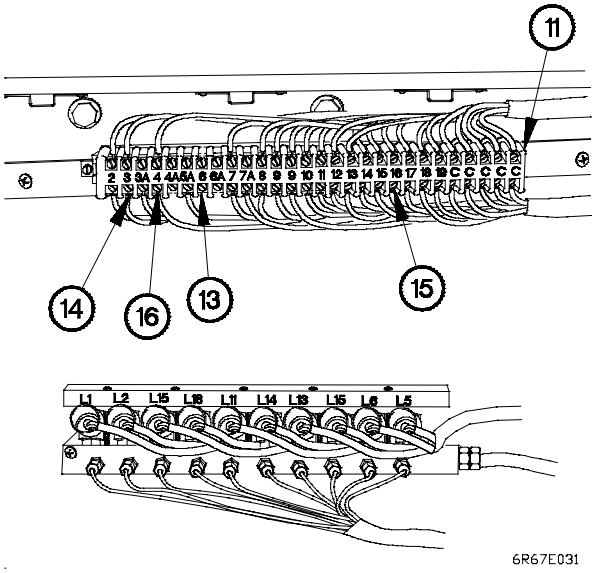




**NOTE**

Positive electrical leads are yellow. Ground electrical leads are black.

(6) Connect thirteen ground leads (10) to terminal block (11) terminal lugs C.

(7) Connect electrical lead (12) to terminal block (11) terminal lug 13.




(8) Connect electrical lead (13) to terminal block (11) terminal lug 6.

(9) Connect electrical lead (14) to terminal block (11) terminal lug 3.

(10) Connect electrical lead (15) to terminal block (11) terminal lug 16.

(11) Connect electrical lead (16) to terminal block (11) terminal lug 4.

(12) Connect electrical lead (17) to terminal block (11) terminal lug 15.

(13) Connect electrical lead (18) to terminal block (11) terminal lug 2.

(14) Connect electrical lead (19) to terminal block (11) terminal lug 17.

(15) Connect electrical lead (20) to terminal block (11) terminal lug 8.

(16) Connect electrical lead (21) to terminal block (11) terminal lug 11.

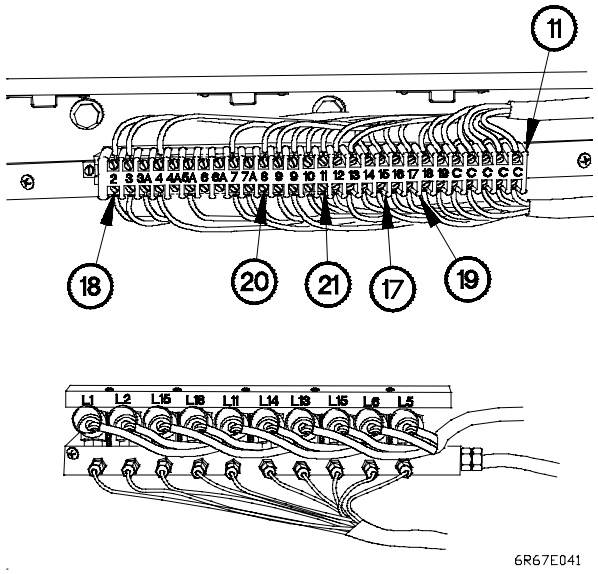
(17) Connect batteries (TM 9-2320-366-20-3).

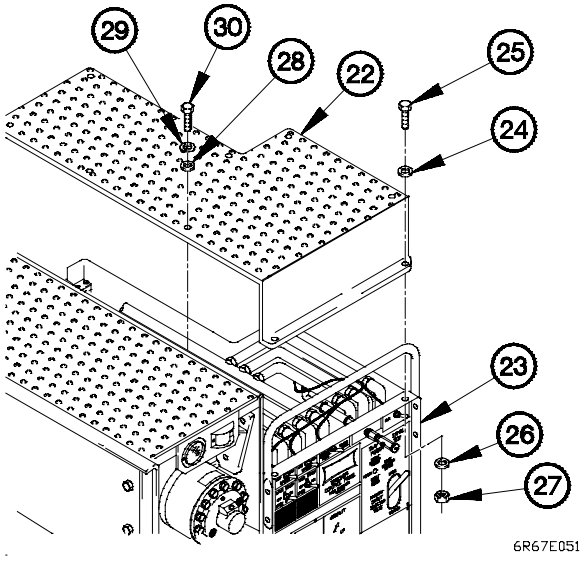
(18) Start engine (TM 9-2320-366-10-1).

(19) Test operate 30K winch and verify proper operation (TM 9-2320-366-10).

(20) Check valve manifold assembly (1) for air leaks.

(21) Shutdown engine (TM 9-2320-366-10-1).




(22) Install top cover (22) on control panel frame (23) with two washers (24), screws (25), washers (26), and self-locking nuts (27).

(23) Install eight washers (28), lockwashers (29), and screws (30) in top cover (22).

**End of Task.**

## 16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT

**This task covers:**

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

**INITIAL SETUP**

**Equipment Conditions**
Underlift and stiffleg assembly unfolded and in down position (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Rear tool box removed (TM 9-2320-366-20-4).
Hydraulic reservoir supply and return valves closed (TM 9-2320-366-10-2).
Rear ladder removed (TM 9-2320-366-20-4).

**Tools and Special Tools**
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Tools and Special Tools (Cont)**
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Shackle (2) (Item 80, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Nut, Self-locking (20) (Item 179, Appendix F)
Nut, Self-locking (2) (Item 176, Appendix F)
Lockwasher (4) (Item 130, Appendix F)
Pin, Cotter (2) (Item 327, Appendix F)
Nut, Self-locking (24) (Item 211, Appendix F)

**Personnel Required**
(3)

**a. Removal.**

**CAUTION**

Cap or plug hydraulic hoses to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

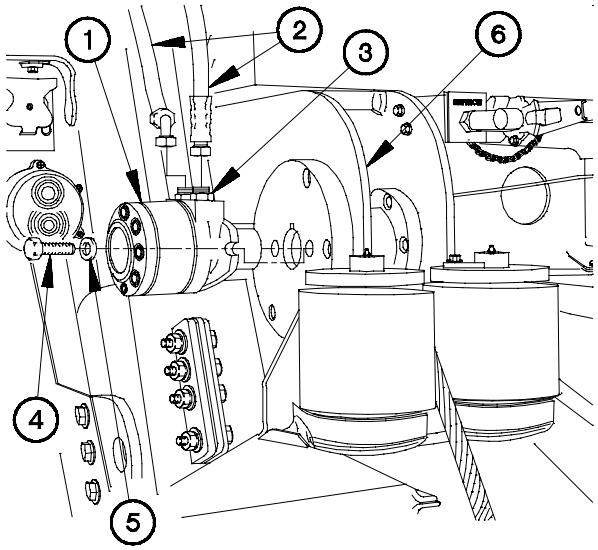
- Left and right pay-out hydraulic motors are removed the same way. Left side shown.
- Tag hydraulic hoses and connection points prior to disconnecting.

(1) Position drain pan under pay-out hydraulic motor (1).

(2) Disconnect two hoses (2) from fittings (3).

(3) Remove two bolts (4), washers (5), and pay-out hydraulic motor (1) from spooler weldment (6).

(4) Perform steps (1) through (3) on right side pay-out hydraulic motor (1).

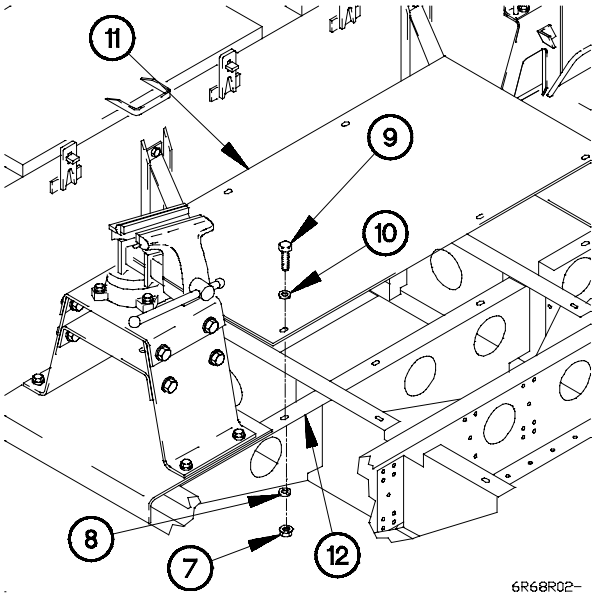


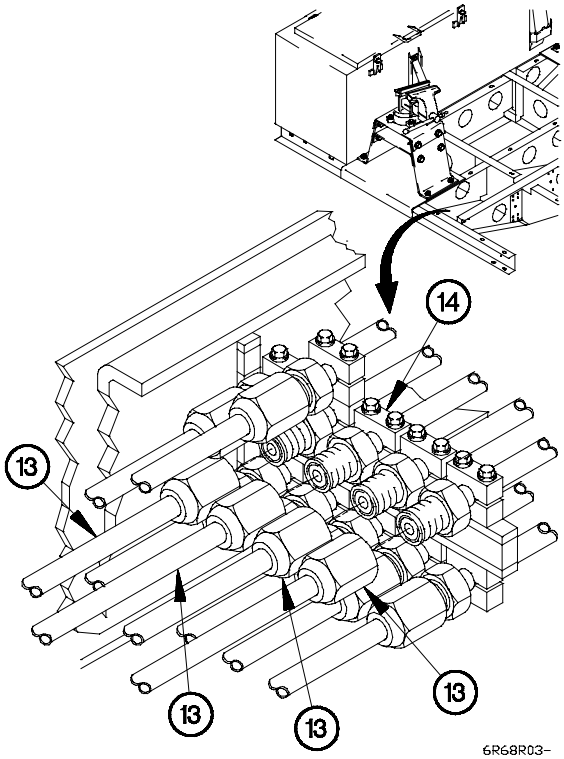
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**NOTE**

Step (5) requires the aid of an assistant.

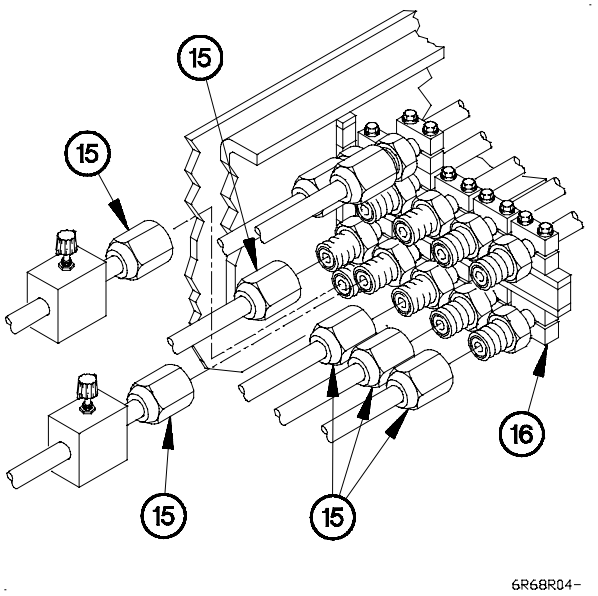
(5) Remove eight self-locking nuts (7), washers (8), screws (9), washers (10) and center deck plate (11) from support structure (12). Discard self-locking nuts.




(6) Disconnect four hoses (13) from upper tubing bank (14).

(7) Disconnect six hoses (15) from lower tubing bank (16).

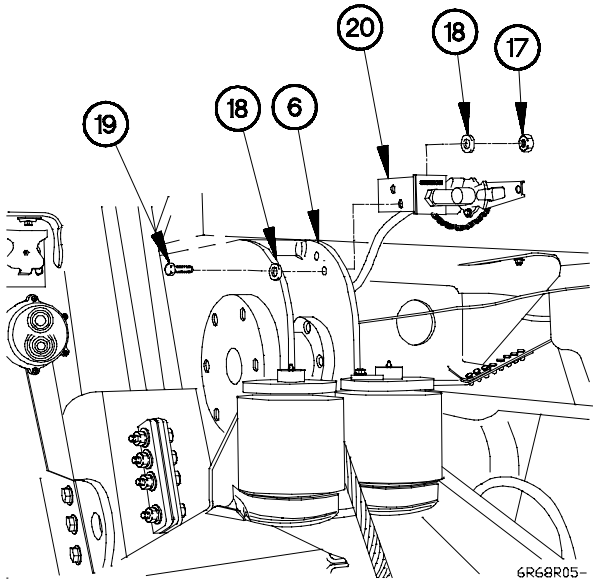


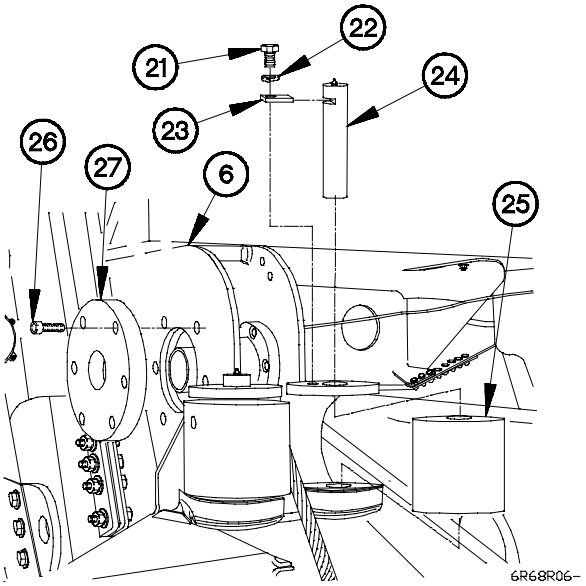
## 16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT (CONT)

**NOTE**

Left and right side gladhand brackets are removed the same way. Left side shown.

(8) Remove two self-locking nuts (17), washers (18), two screws (19) and gladhand bracket (20) from spooler weldment (6).



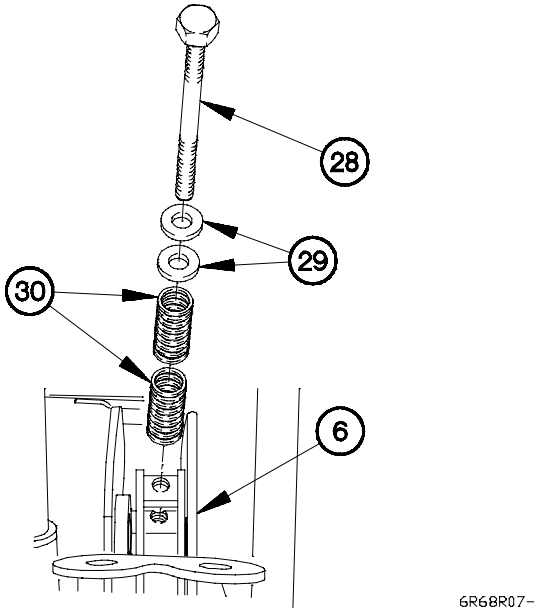

**NOTE**

Left and right side 30K winch cables are removed the same way. Left side shown.

(9) Remove two bolts (21), lockwashers (22), retaining plates (23), roller pins (24), and guide rollers (25) from spooler weldment (6). Discard lockwashers.

(10) Remove six bolts (26) and plate (27) from spooler weldment (6).

(11) Remove bolt (28), two washers (29), and springs (30) from spooler weldment (6).



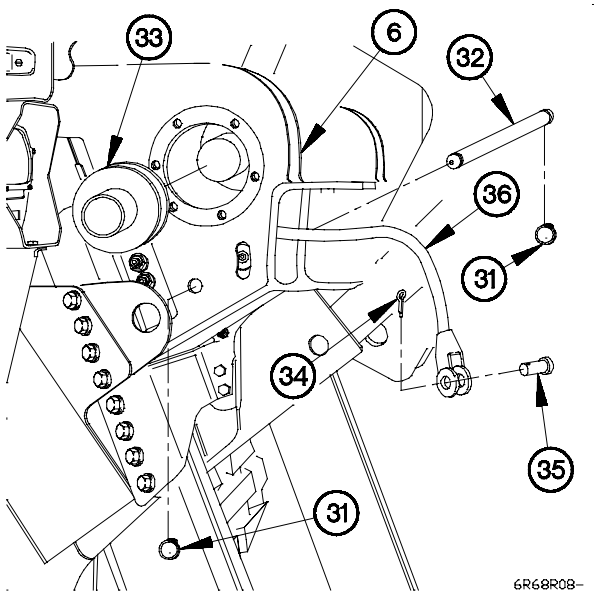
**WARNING**

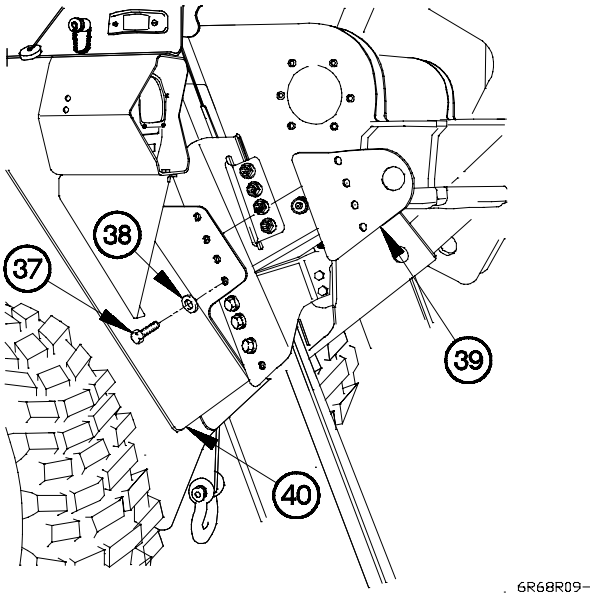
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(12) Remove two retaining rings (31), pin (32), and cable sheave (33) from spooler weldment (6).

(13) Remove cotter pin (34) and pin (35) from 30K winch cable (36). Discard cotter pin.

(14) Pull 30K winch cable (36) back through spooler weldment (6).




**NOTE**

Left and right side tow chain anchors are removed the same way. Left side shown.

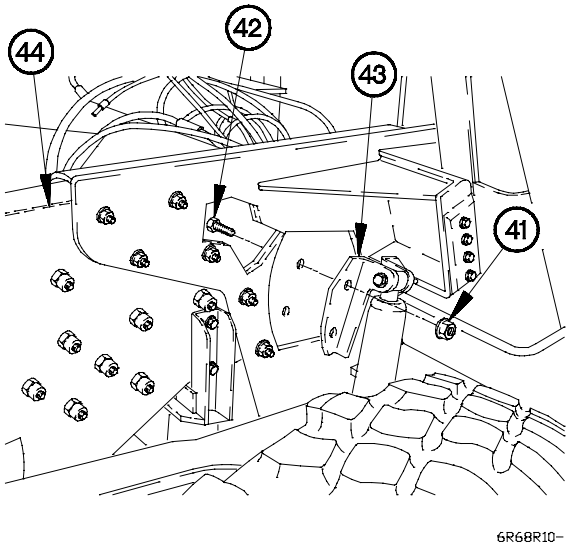
(15) Remove four bolts (37), washers (38), and tow chain anchor (39) from fender (40).

**NOTE**

Left and right side shock absorber brackets are removed the same way. Left side shown.

(16) Remove four self-locking nuts (41) and screws (42) from shock absorber bracket (43). Discard self-locking nuts.

(17) Position shock absorber bracket (43) clear of frame (44).



## 16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT (CONT)

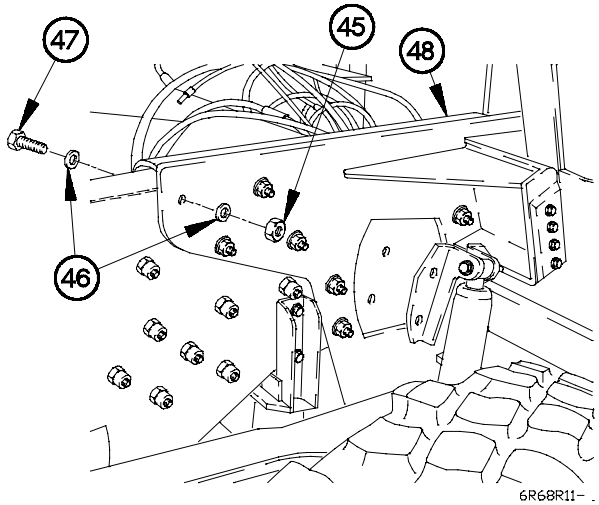
**WARNING**

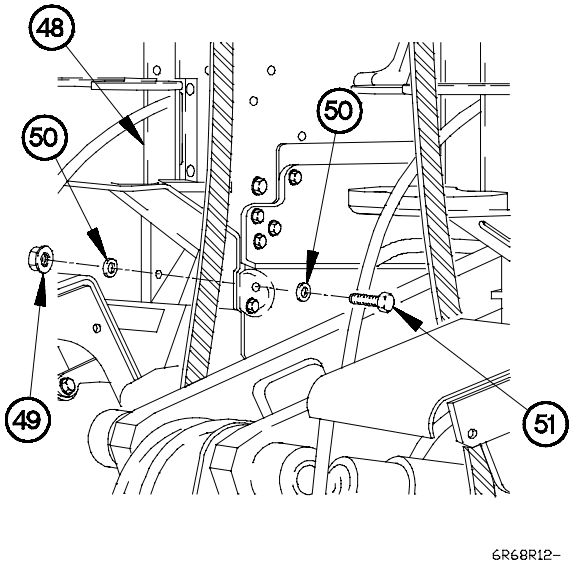
**Underlift and stiffleg assembly weighs approximately 4000 lbs (1816 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Left and right side of underlift and stiffleg assembly is disconnected the same way. Left side shown.

(18) Remove eight self-locking nuts (45), 16 washers (46), and eight bolts (47) from underlift and stiffleg assembly (48). Discard self-locking nuts.




(19) Remove six self-locking nuts (49), 12 washers (50). and six screws (51) from underlift and stiffleg assembly (48). Discard self-locking nuts.

(20) Perform Steps (8) through (19) on right side of vehicle.

(21) Remove underlift and stiffleg assembly (48) from vehicle.

**b. Installation.**

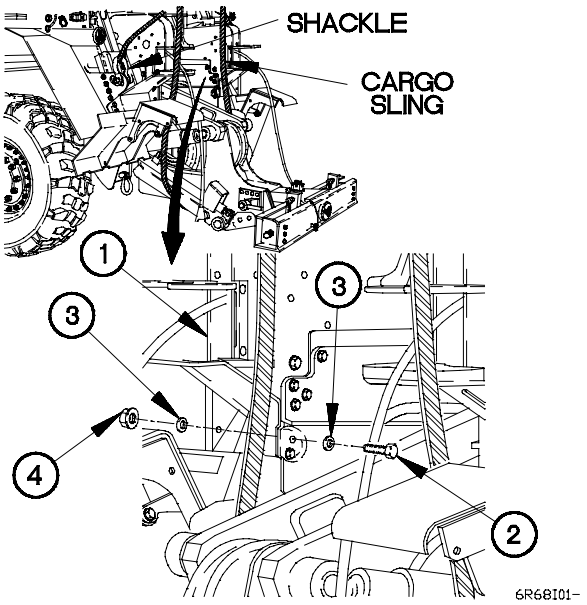
**WARNING**

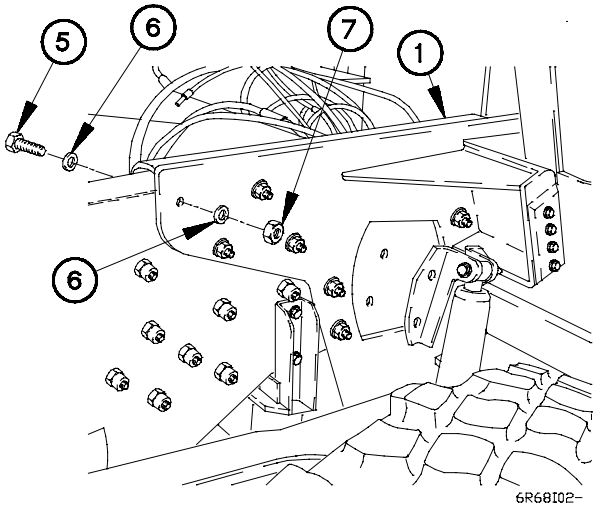
**Underlift and stiffleg assembly weighs approximately 4000 lbs (1816 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Left and right side of underlift and stiffleg assembly is connected the same way. Left side shown.

(1) Position underlift and stiffleg assembly (1) on vehicle with six screws (2), 12 washers (3), and six self-locking nuts (4).




(2) Position eight bolts (5), 16 washers (6), and eight self-locking nuts (7) in underlift and stiffleg assembly (1).

(3) Perform steps (1) and (2) on right side of underlift and stiffleg assembly.

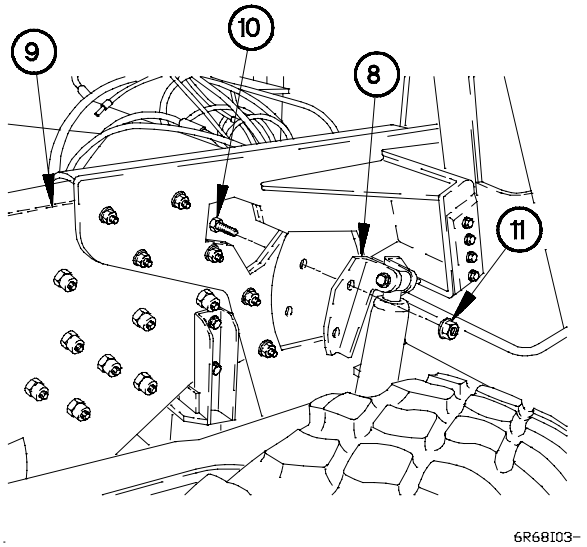
(4) Tighten self-locking nuts (7) and 12 self-locking nuts (4) to 152-168 lb-ft (206-227 N·m).

**NOTE**

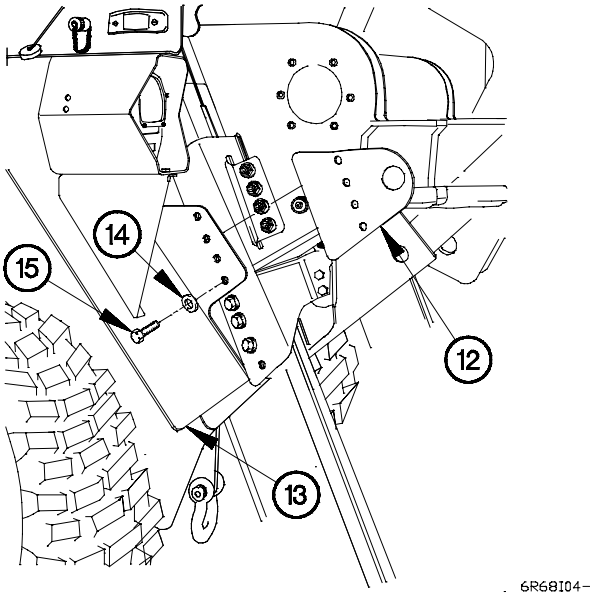
Left and right side shock absorber brackets are installed the same way. Left side shown.

(5) Position shock absorber bracket (8) on frame (9) with four screws (10) and self-locking nuts (11).

(6) Tighten self-locking nuts (11) to 195-240 lb-ft (265-325 N·m).



## 16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT (CONT)

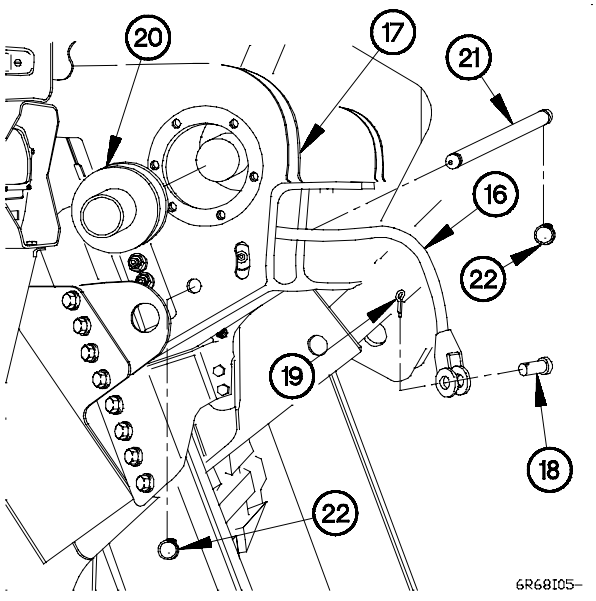



**NOTE**

Left and right side tow chain anchors are installed the same way. Left side shown.

(7) Position tow chain anchor (12) on fender (13) with four washers (14) and bolts (15).

(8) Tighten bolts (15) to 152-168 lb-ft (206-228 N·m).




**NOTE**

Left and right side 30K winch cables are installed the same way. Left side shown.

(9) Route 30K winch cable (16) through spooler weldment (17).

(10) Install pin (18) in 30K winch cable (16) with cotter pin (19).

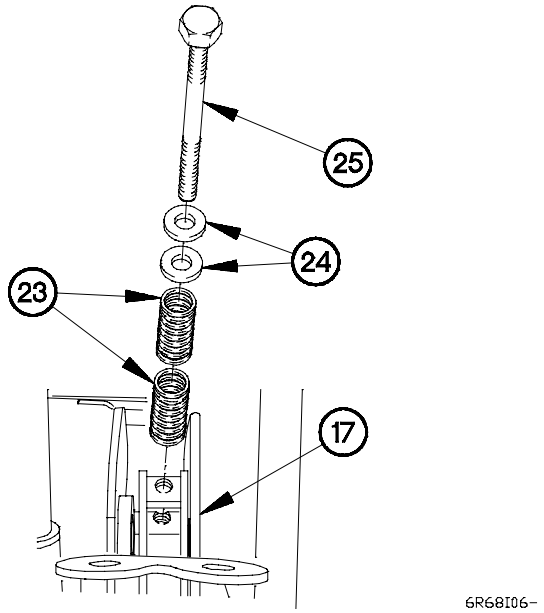
(11) Position cable sheave (20) in spooler weldment (17).

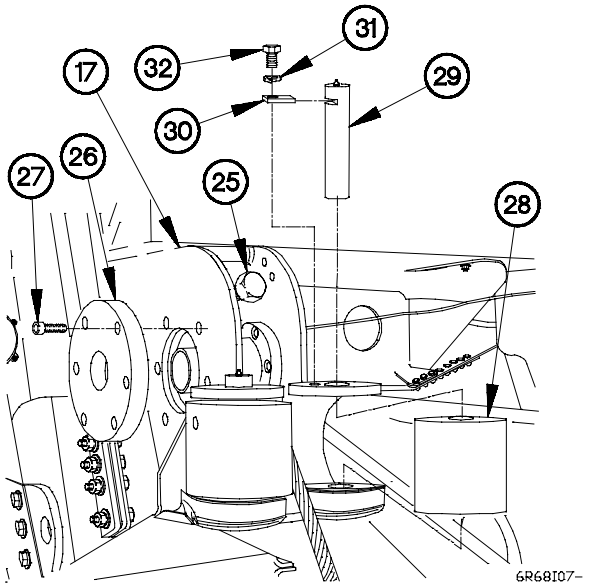
**WARNING**

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

(12) Install pin (21) in spooler weldment (17) with two retaining rings (22).

(13) Position two springs (23), washers (24), and bolt (25) in spooler weldment (17).




(14) Position plate (26) on spooler weldment (17) with six bolts (27).

(15) Tighten bolts (27) to 76-84 lb-ft (103-114 N·m).

(16) Position two guide rollers (28), roller pins (29), retaining plates (30), lockwashers (31), and bolts (32) on spooler weldment (17).

(17) Tighten bolts (32) to 76-84 lb-ft (103-114 N·m).

(18) Tighten bolt (25) eight and one half turns.

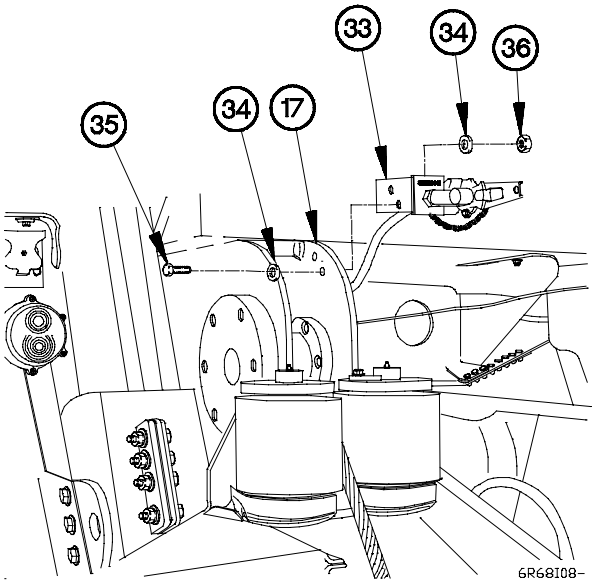
**NOTE**

Left and right side gladhand brackets are installed the same way. Left side shown.

(19) Position gladhand bracket (33) on spooler weldment (17) with four washers (34), bolts (35), and self-locking nuts (36).

(20) Tighten self-locking nuts (36) to 33-37 lb-ft (45-50 N·m).

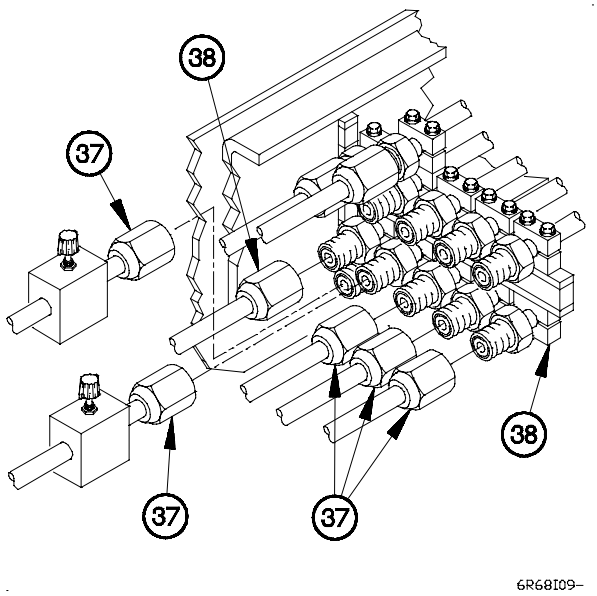
(21) Perform steps (5) through (20) on right side of vehicle.

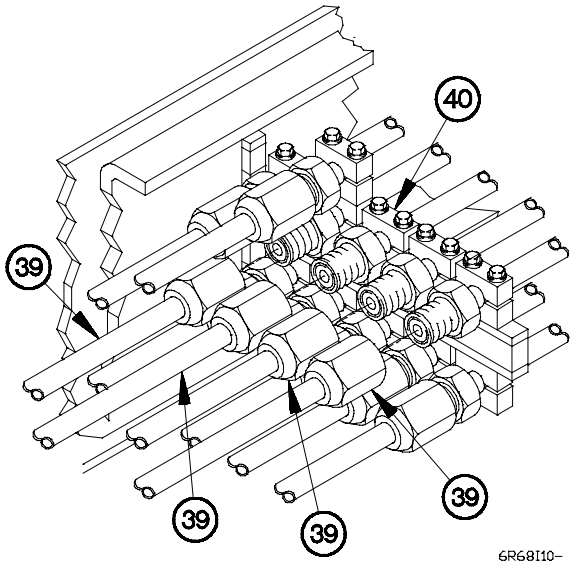


## 16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT (CONT)

(22) Position six hoses (37) to lower tubing bank (38).

(23) Tighten hoses (37) to 36-39 lb-ft (49-53 N·m).




(24) Position four hoses (39) to upper tubing bank (40).

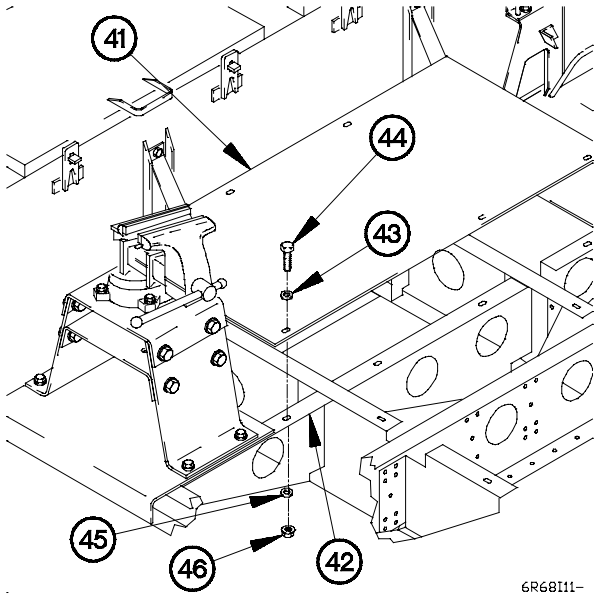
(25) Tighten hoses (39) to 36-39 lb-ft (49-53 N·m).

**NOTE**

Step (26) requires the aid of an assistant.

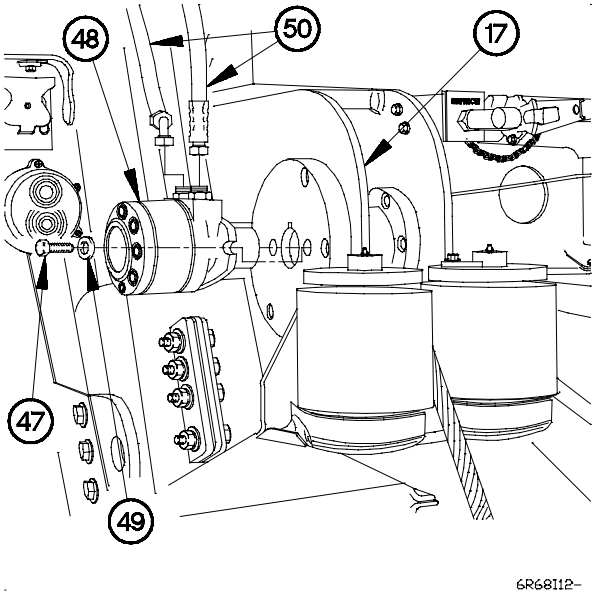
(26) Position center deck plate (41) support structure (42) with eight washers (43), bolts (44), washers (45), and self-locking nuts (46).

(27) Tighten self-locking nuts (46) to 105-115 lb-ft (142-156 N·m).



**WARNING**

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




(28) Apply sealing compound to threads of two bolts (47).

(29) Position pay-out hydraulic motor (48) on spooler weldment (17) with two washers (49) and bolts (47).

(30) Tighten bolts (47) to 76-84 lb-ft (103-114 N·m).

(31) Position two hoses (50) on pay-out hydraulic motor (48).

(32) Tighten hoses (50) to 36-39 lb-ft (49-53 N·m).

(33) Perform steps (28) through (32) on right spooler weldment.

**c. Follow-On Maintenance.**

(1) Install rear ladder (TM 9-2320-366-20-4).

(2) Hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(3) Install rear tool box (TM 9-2320-366-20-4).

(4) Operate underlift and stiffleg assembly checking for proper operation and hydraulic leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-69. M1089 CROSSBAR 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**
Crossbar assembly positioned approximately three feet above ground (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Lifting brackets removed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Sling, Cargo (Item 56, Appendix B)
Wrench, Pipe (Item 89, Appendix B)
Wire, Twister Pliers (TM 9-2320-366-20)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Sealing Compound (Item 76, Appendix C)
Compound, Antiseize (Item 12, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)
Nut, Self-Locking (Item 195, Appendix F)
Pin, Spring (Item 339, Appendix F)
Pin, Spring (4) (Item 338, Appendix F)
Shim (Item 417, Appendix F)
Bushing (Item 24, Appendix F)
Lockwire (Item 44, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**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.**

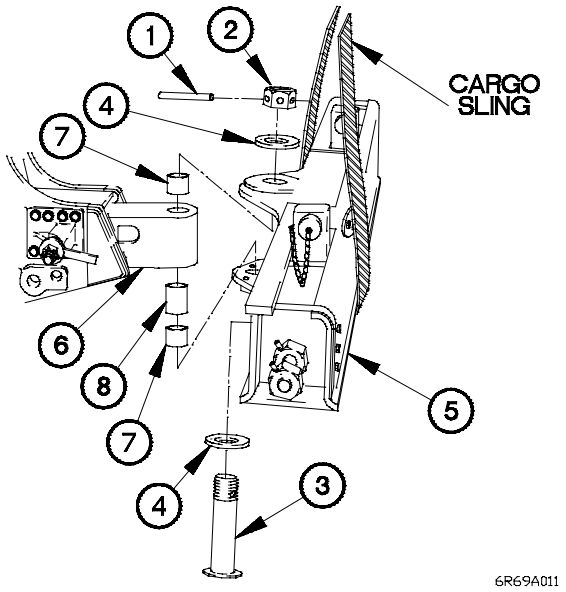
(1) Remove spring pin (1) from self-locking nut (2). Discard spring pin and self-locking nut.

**NOTE**

Step (2) requires the aid of an assistant.

(2) Remove self-locking nut (2) crossbar retaining pin (3), two washers (4), and crossbar assembly (5) from inner boom section (6). Discard self-locking nut.

(3) Remove two bushings (7) and spacer (8) from inner boom section (6).



**b. Disassembly.**

**NOTE**

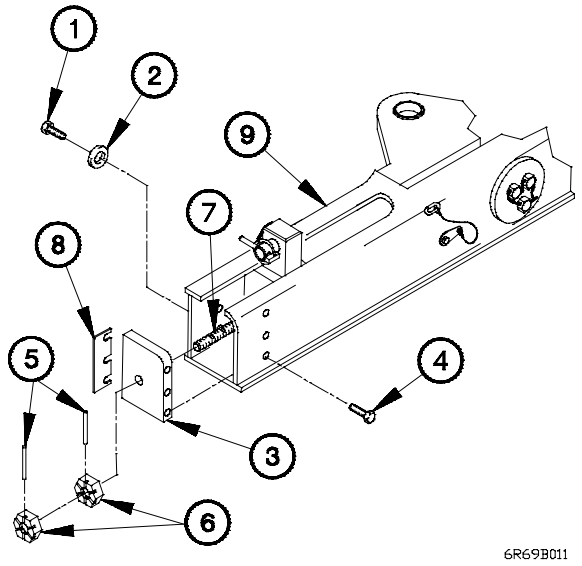
Left and right side of crossbar are disassembled the same way. Left side shown.

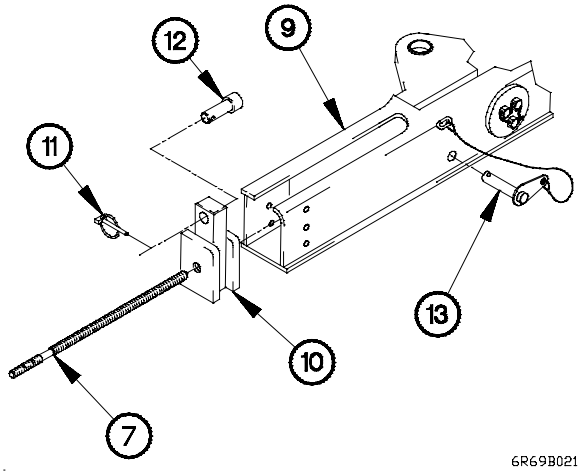
(1) Remove three screws (1) and washers (2) from adjustment block (3).

(2) Remove three screws (4) from adjustment block (3).

(3) Remove two spring pins (5) and nuts (6) from adjusting screw (7). Discard spring pins.

(4) Remove adjustment block (3) and shim pack (8) from crossbar (9).



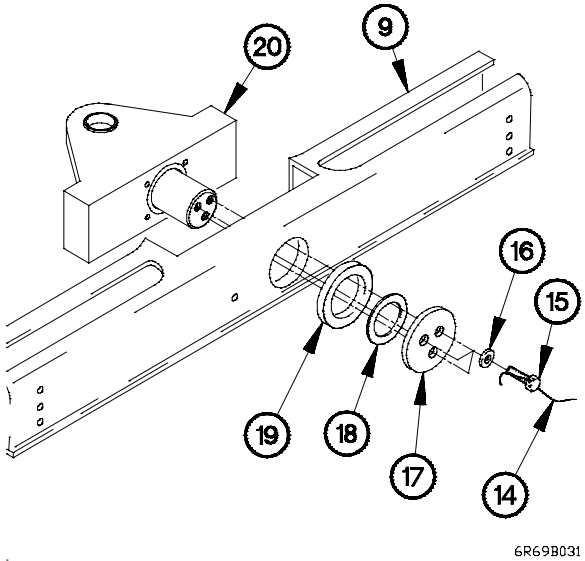

(5) Remove mounting block (10) and adjustment screw (7) from crossbar (9).

(6) Remove adjustment screw (7) from mounting block (10).

(7) Remove latch pin (11) and pin (12) from mounting block (10).

(8) Remove pin (13) from crossbar (9).

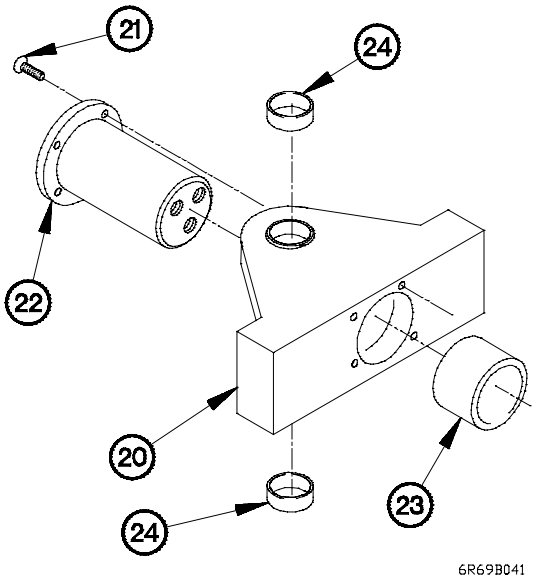
(9) Remove lockwire (14), three screws (15), washers (16), plate (17), shim pack (18), thrust washer (19), and pivot yoke (20) from crossbar (9). Discard shim pack and lockwire.



## 16-69. M1089 CROSSBAR ASSEMBLY REPLACEMENT/REPAIR (CONT)

(10) Remove four screws (21), pivot pin (22), and bushing (23) from pivot yoke (20). Discard bushing.

(11) Remove two pivot yoke bushings (24) from pivot yoke (20).




**c. Cleaning/Inspection.**

**WARNING**

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

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

(1) Clean all parts with dry cleaning solvent.

**NOTE**

Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect retaining pin (1) for pitting, burrs, indications of binding or damaged threads.

(3) Inspect retaining pin (1) for minimum outside diameter 2.49 in. (6.32 cm).

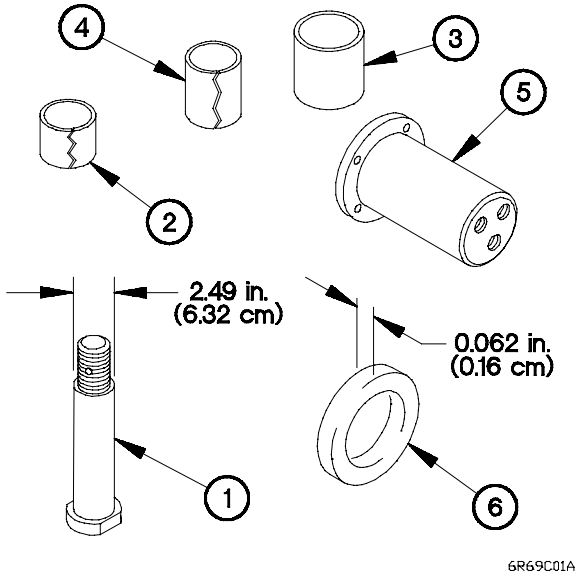
(4) Inspect two bushings (2) for pits, corrosion or burrs.

(5) Inspect spacer (3) for pits, corrosion, or burrs.

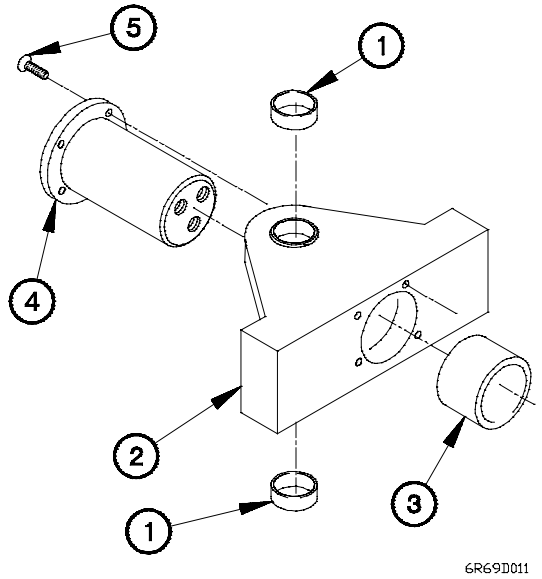
(6) Inspect two pivot yoke bushings (4) for pits, corrosion or burrs.

(7) Inspect pivot pin (5) for pitting, burrs, indications of binding or damaged threads.

(8) Inspect thrust bearing (6) for cracks or excessive grooving. Minimum thickness 0.062 in. (0.16 cm).




**d. Assembly.**




(1) Install two pivot yoke bushings (1) in pivot yoke (2).

(2) Position bushing (3) and pivot pin (4) in pivot yoke (2) with four screws (5).

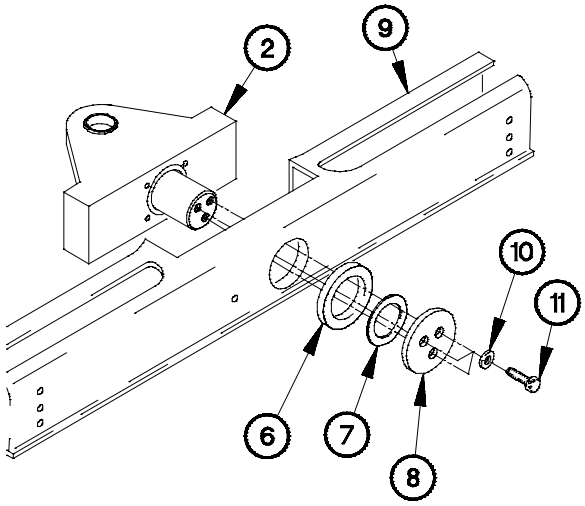
(3) Tighten four screws (5) to 30-33 lb-ft (41-45 N·m)

## 16-69. M1089 CROSSBAR ASSEMBLY REPLACEMENT/REPAIR (CONT)

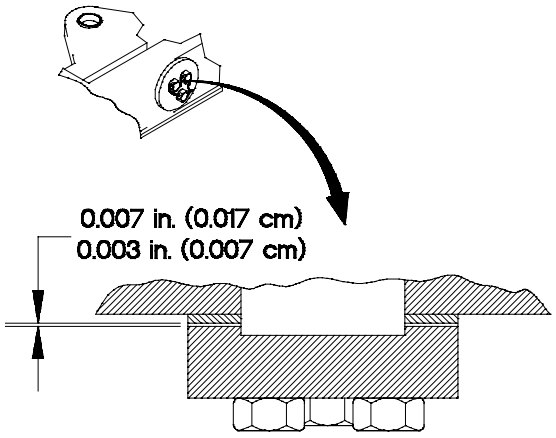
(4) Apply coat of grease to thrust bearing (6).

(5) Position pivot yoke (2), thrust bearing (6), shim pack (7), and plate (8) in crossbar (9) with three washers (10) and screws (11).

(6) Tighten three screws (11) to 230-250 lb-ft (313-339 N·m).




6R69D021



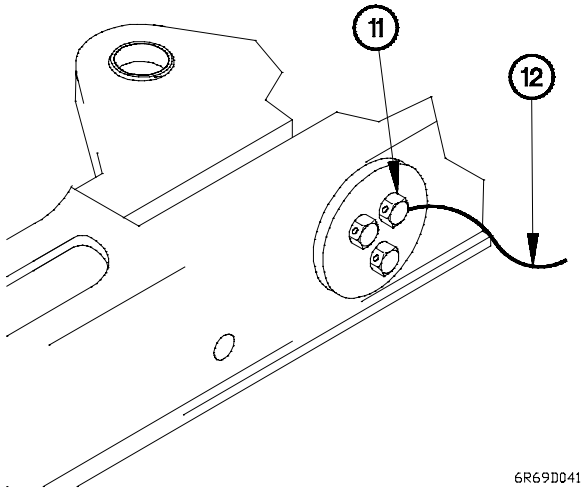

6R69D031

**NOTE**

- Shim pack thickness can be decreased by removing layers. Each layer is equal to 0.002 in. (0.005 cm).
- Repeat steps (5) through (7) to obtain proper gap.

(7) Measure gap between plate (8) and thrust bearing (6), maximum gap 0.007 in. (0.018 cm), minimum gap 0.003 in. (0.007 cm).

(8) Install lockwire (12) on three screws (11).




6R69D041

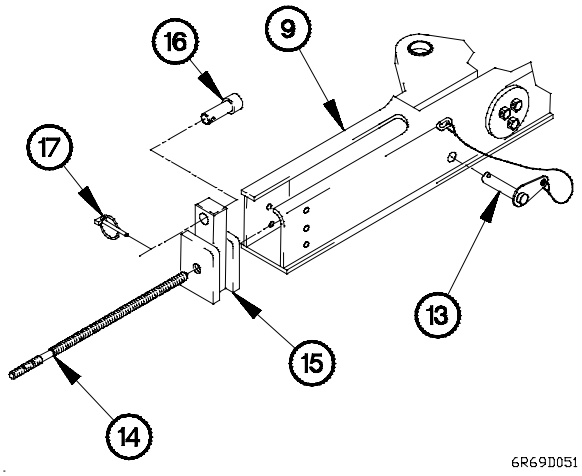
**NOTE**

Left and right side of crossbar are assembled the same way. Left side shown.

(9) Install pin (13) in crossbar (9).

**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.**

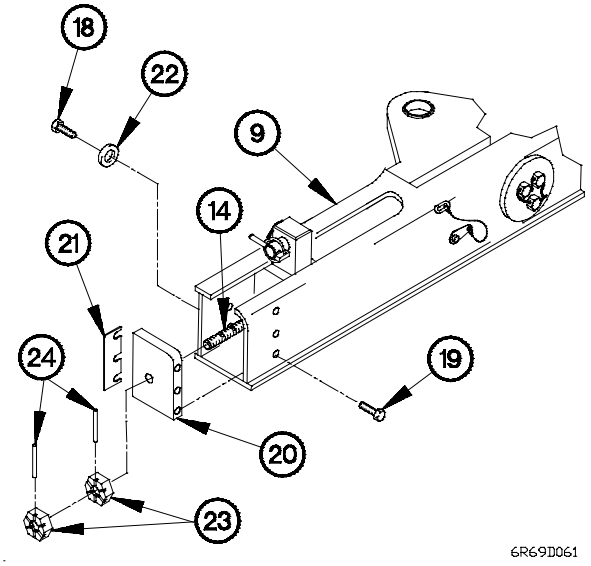



(10) Apply antiseize compound to adjusting screws (14).

(11) Install adjusting screw (14) in mounting block (15).

(12) Position mounting block (15) in crossbar (9).

(13) Install pin (16) and latch pin (17) in mounting block (15).




**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.**

(14) Apply sealing compound to threads of three screws (18 and 19).

(15) Position adjustment block (20) and shim pack (21) in crossbar (9) with three washers (22) and screws (18).

(16) Position three screws (19) in adjusting block (20).

(17) Tighten three screws (18 and 19) to 76-84 lb-ft (103-114 N·m).

(18) Install two nuts (23) on adjusting screw (14) with two spring pins (24).

(19) Perform steps (9) through (18) on right side.

## 16-69. M1089 CROSSBAR ASSEMBLY REPLACEMENT/REPAIR (CONT)

**e. Installation**

**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.**

(1) Install two bushings (1) and spacer (2) in inner boom section (3).

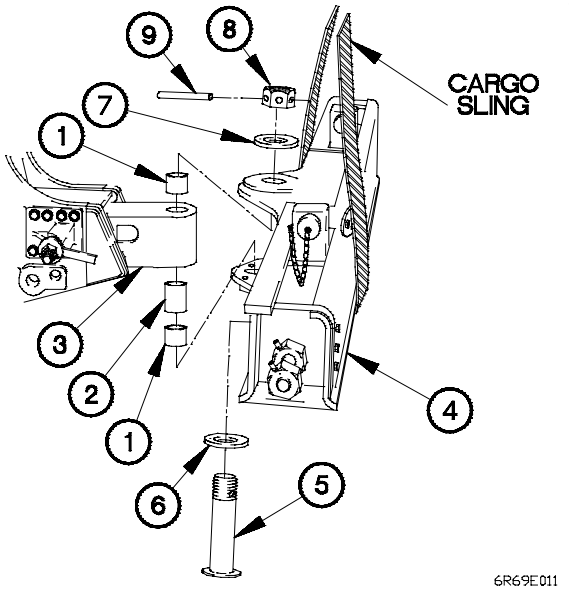
**NOTE**

Step (2) requires the aid of an assistant.

(2) Position crossbar assembly (4) on inner boom section (3) with retaining pin (5) and washer (6).

(3) Position washer (7) and self-locking nut (8) on retaining pin (5).

(4) Install slotted pin (9) in self-locking nut (8).




**f. Follow-On Maintenance.**

(1) Install lifting brackets (TM 9-2320-366-10-2).

(2) Apply grease to grease fittings on folding boom inner section (TM 9-2320-366-20).

(3) Return underlift assembly to stowed position (TM 9-2320-366-10-2).

**End of Task.**

## 16-70. M1089 STINGER CYLINDER REPLACEMENT

**This task covers:**

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

**INITIAL SETUP**

**Equipment Conditions**
Crossbar assembly removed (para 16-69).
Stinger extended with outer end slightly higher than inner end (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).

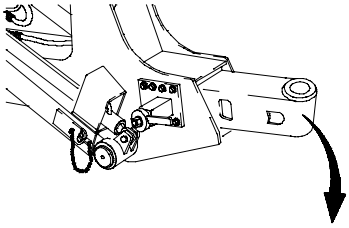
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Tools and Special Tools (Cont)**
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)

**Materials/Parts**
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Preformed Packing (2) (Item 234, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

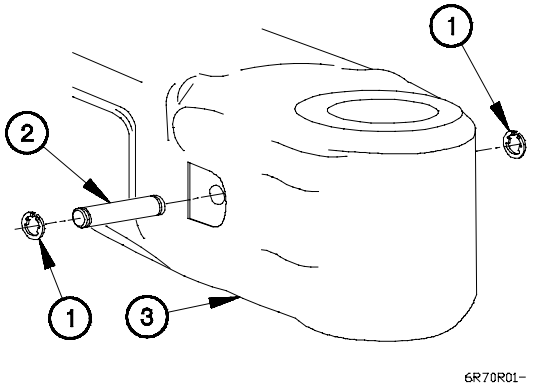


**WARNING**

**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.**

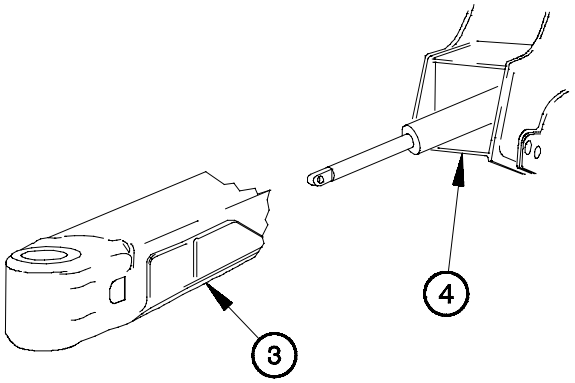
(1) Remove two retaining rings (1) from retaining pin (2).

(2) Remove retaining pin (2) from inner tube (3).

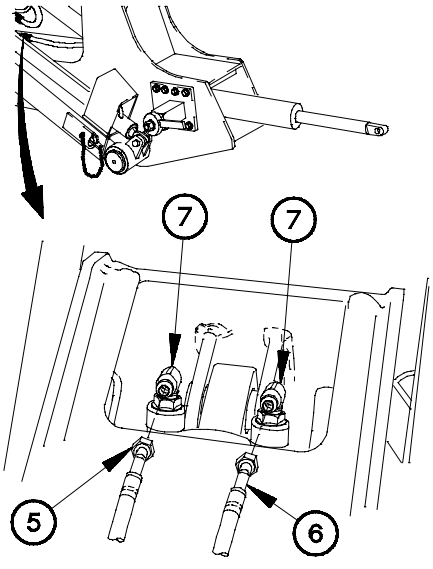


## 16-70. M1089 STINGER CYLINDER REPLACEMENT (CONT)

(3) Remove inner tube (3) from folding boom frame (4).




6R70R02-




6R70R03-

**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.

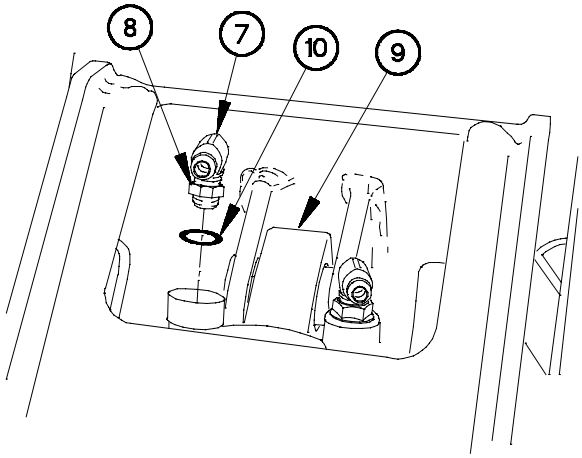
(4) Place drain pan under hoses (5 and 6).

(5) Disconnect hydraulic hoses (5 and 6) from 90-degree fittings (7).

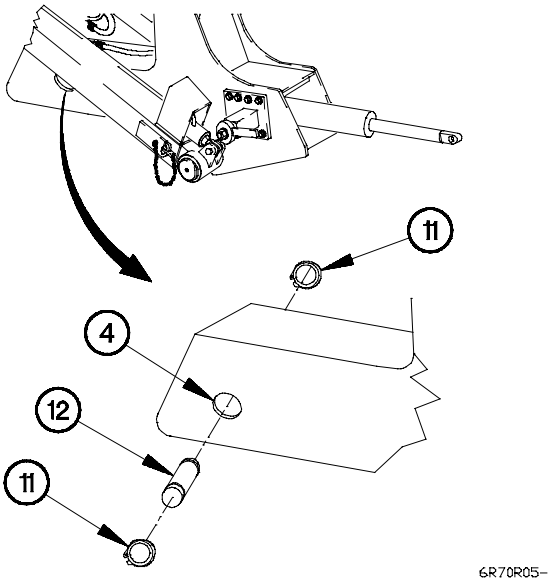
(6) Loosen two jam nuts (8) on 90-degree fittings (7).

(7) Remove two 90-degree fittings (7) from stinger cylinder (9).

(8) Remove two preformed packings (10) from 90-degree fittings (7). Discard preformed packings.




6R70R04-




6R70R05-

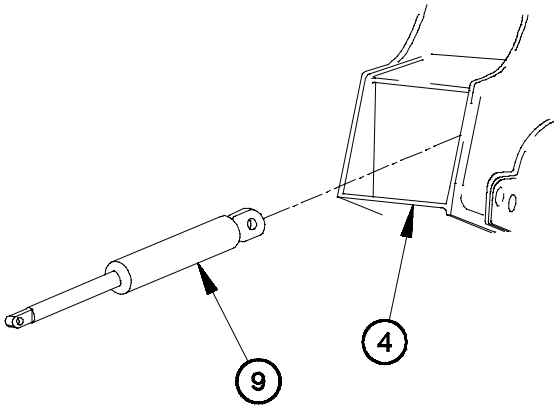
**WARNING**

**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.**

(9) Remove two retaining rings (11) from retaining pin (12).

(10) Remove retaining pin (12) from folding boom frame (4).

(11) Remove stinger cylinder (9) from folding boom frame (4).

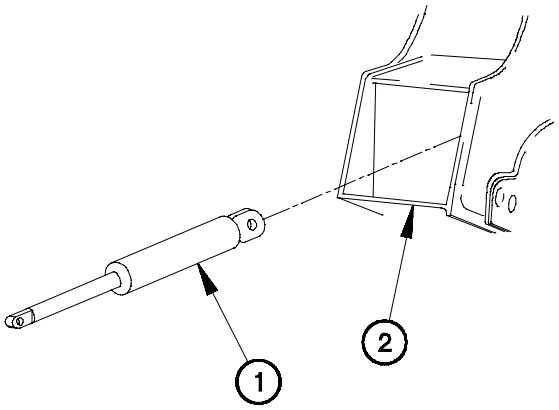



6R70R06-

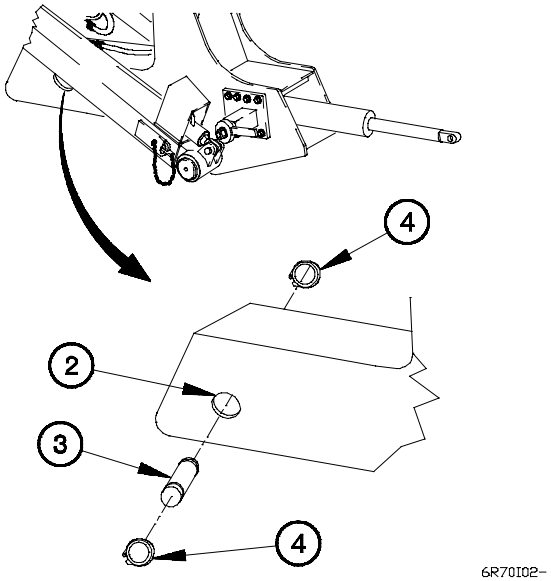
## 16-70. M1089 STINGER CYLINDER REPLACEMENT (CONT)

**b. Installation.**

(1) Install stinger cylinder (1) in folding boom frame (2).




6R70I01-




6R70I02-

(2) Install retaining pin (3) in folding boom frame (2).

**WARNING**

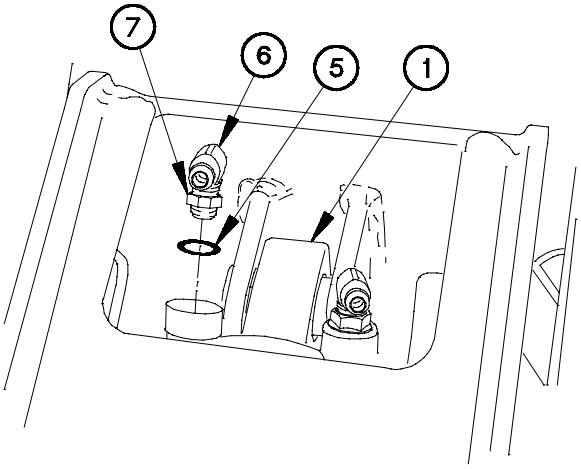
**Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(3) Install two retaining rings (4) on retaining pin (3).

(4) Install two preformed packings (5) on 90-degree fittings (6).

(5) Install two 90-degree fittings (6) in stinger cylinder (1).

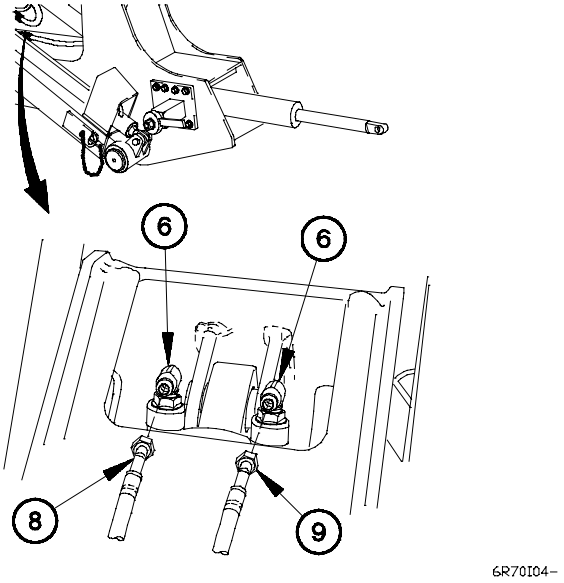
(6) Tighten jam nuts (7) to 18-20 lb-ft (24-27 N·m).

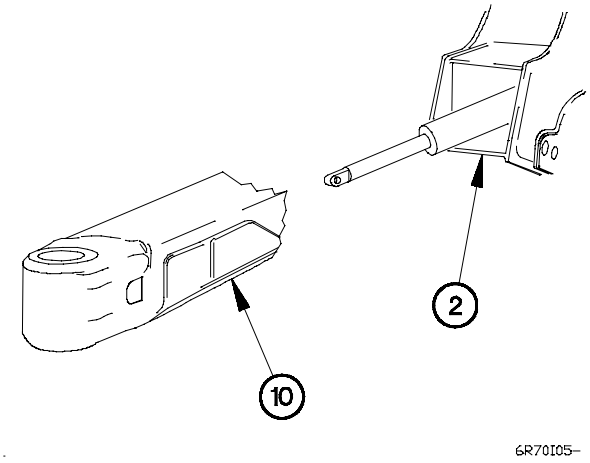



6R70I03-

(7) Position hydraulic hoses (8 and 9) on 90-degree fittings (6).

(8) Tighten hoses (8 and 9) to 18-20 lb-ft (24-27 N·m).



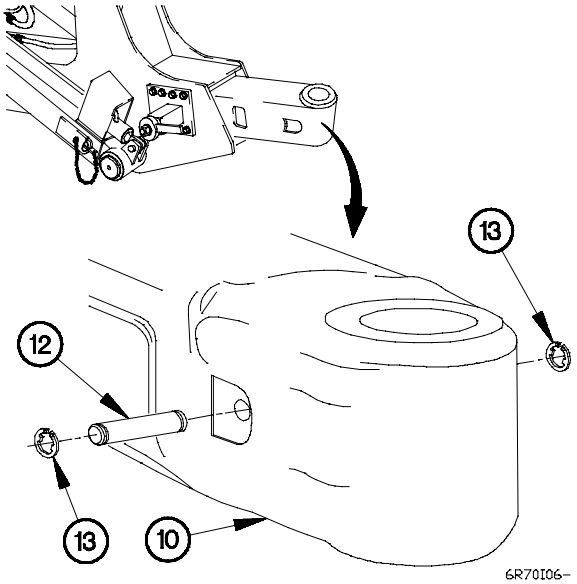

(9) Install inner tube (10) in folding boom frame (2).

(10) Install retaining pin (12) on inner tube (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.**

(11) Install two retaining rings (13) on retaining pin (12).



## 16-70. M1089 STINGER CYLINDER REPLACEMENT (CONT)

**c. Follow-On Maintenance.**

(1) Hydraulic reservoir supply and return valve open (TM 9-2320-366-10-2).

(2) Install crossbar assembly (para 16-69).

(3) Stowed underlift (TM 9-2320-366-10-2).

**End of Task.**

## 16-71. M1089 FOLD CYLINDER REPLACEMENT

**This task covers:**

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

**INITIAL SETUP**

**Equipment Conditions**
Underlift assembly lowered to ground (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).

**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)

**Tools and Special Tools (Cont)**
Wrench Set, Crowfoot Ratcheting (TM 9-2320-366-20)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (2) (Item 236, Appendix F)

**a. Removal.**

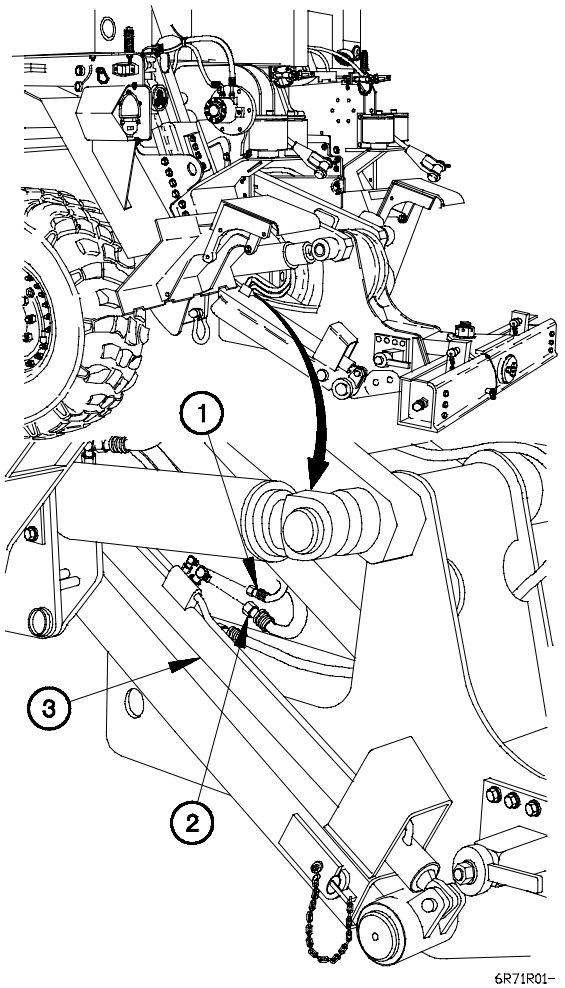
**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(1) Disconnect hoses (1 and 2) from fold cylinder (3).



## 16-71. M1089 FOLD CYLINDER REPLACEMENT (CONT)

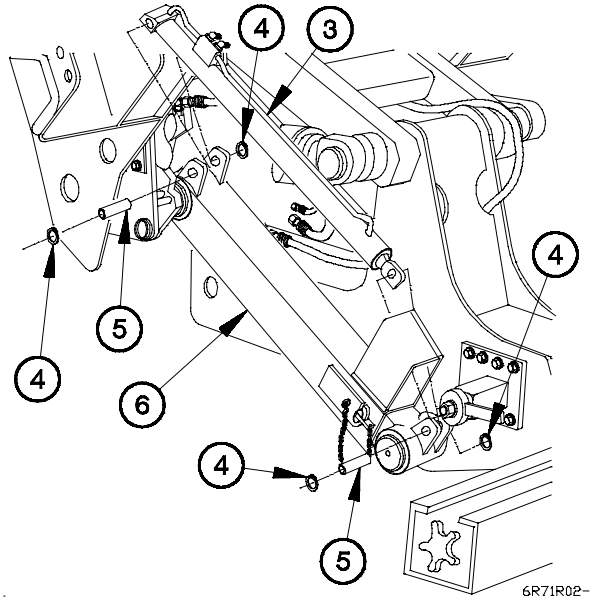
**WARNING**

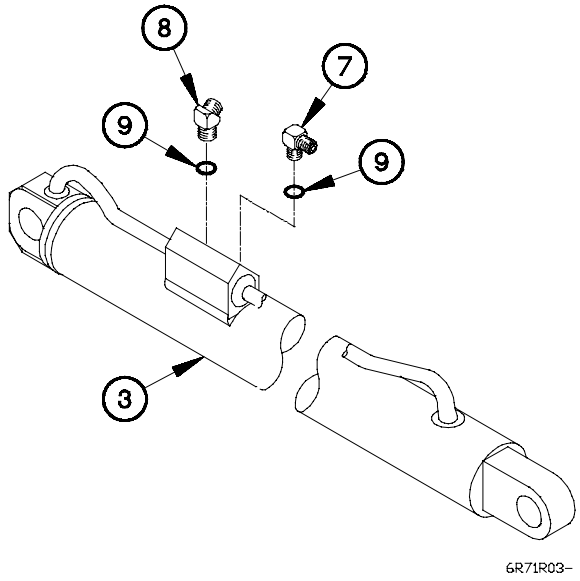
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(2) Remove four retaining rings (4) from two retaining pins (5).

(3) Remove two retaining pins (5) from fold cylinder (3).

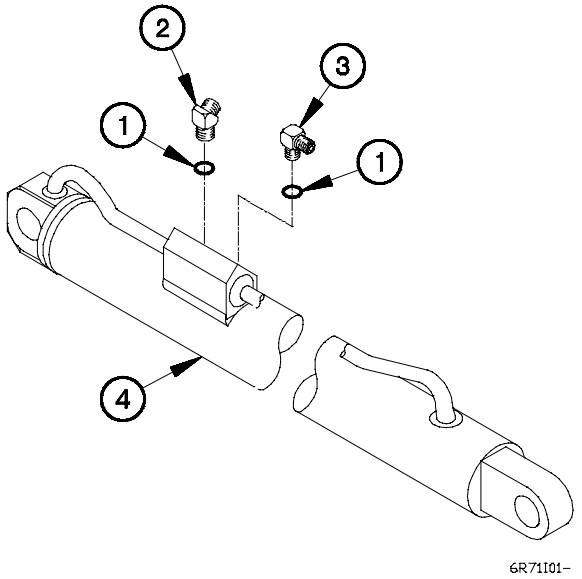
(4) Remove fold cylinder (3) from left lower arm (6).




(5) Remove 90-degree fitting (7) and 45-degree fitting (8) from fold cylinder (3).

(6) Remove two preformed packings (9) from 90-degree fitting (7) and 45-degree fitting (8). Discard preformed packings.




**b. Installation.**

(1) Install two preformed packings (1) on 45-degree fitting (2) and 90-degree fitting (3).

(2) Position 45-degree fitting (2) and 90-degree fitting (3) in fold cylinder (4).

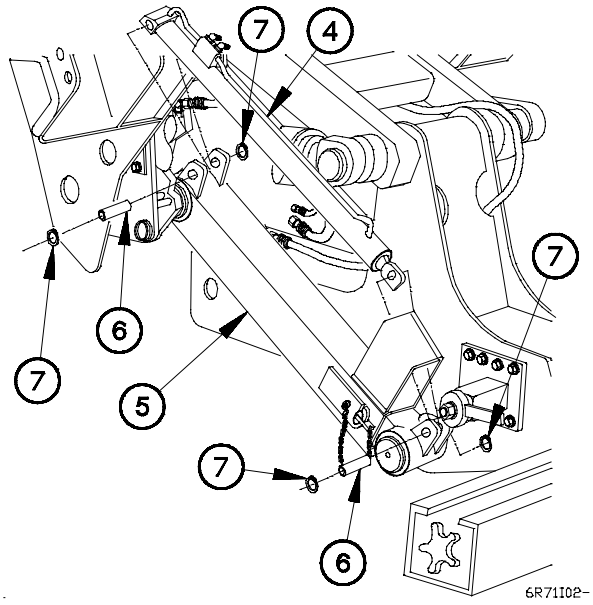
(3) Tighten 45-degree fitting (2) and 90-degree fitting (3) to 23-24 lb-ft (31-33 N·m).

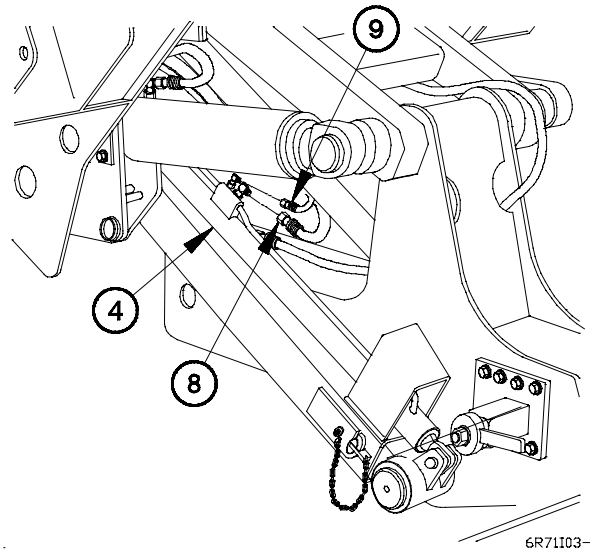
(4) Install fold cylinder (4) in left lower arm (5) with two retaining pins (6).

**WARNING**

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

(5) Install four retaining rings (7) on two retaining pins (6).




(6) Connect hoses (8 and 9) to fold cylinder (4).

**c. Follow-On Maintenance.**

(1) Hydraulic reservoir supply and return valve in open position (TM 9-2320-366-10-2).

(2) Lubricate underlift assembly (TM 9-2320-366-20).

(3) Operate underlift assembly and check for proper operation and for hydraulic leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-72. M1089 TELESCOPIC LIFT CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Underlift assembly unfolded and in down position (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).

**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)

**Tools and Special Tools (Cont)**
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Lockwasher (Item 130, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (Item 237, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

**WARNING**

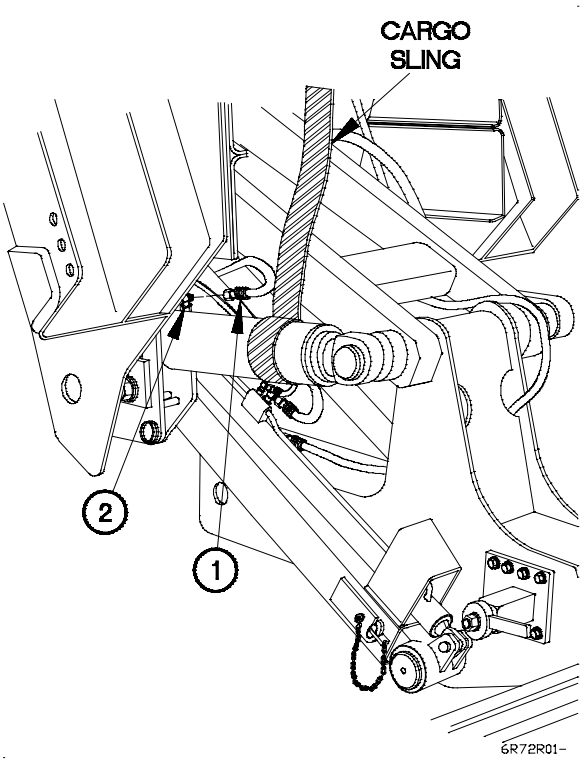
**Telescopic lift cylinder weighs approximately 225 lbs (102 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

**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.
- Left and right side telescopic lift cylinders are removed the same way. Left side shown.




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

(2) Remove screw (3), lockwasher (4), and pin locking plate (5) from under lift assembly (6). Discard lockwasher.

**NOTE**

Step (3) requires the aid of an assistant.

(3) Remove pivot pin (7) and bushing (8) from telescopic lift cylinder (9).

**WARNING**

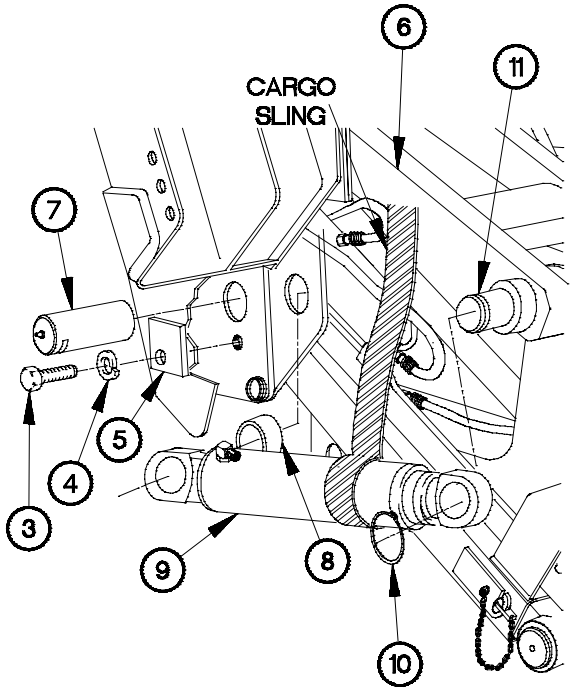
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(4) Remove retaining ring (10) from cylinder end cap (11).

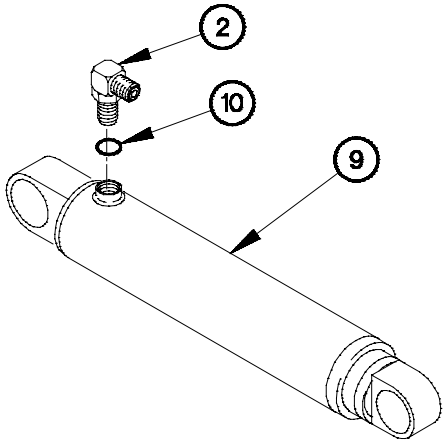
**NOTE**

Step (5) requires the aid of an assistant.

(5) Remove telescopic lift cylinder (9) from underlift assembly (6).




6R72R02-




6R72R03-

(6) Remove 90-degree fitting (2) from telescopic lift cylinder (9).

(7) Remove preformed packing (10) from 90-degree fitting (2). Discard preformed packing.

## 16-72. M1089 TELESCOPIC LIFT CYLINDER REPLACEMENT (CONT)

**b. Installation.**

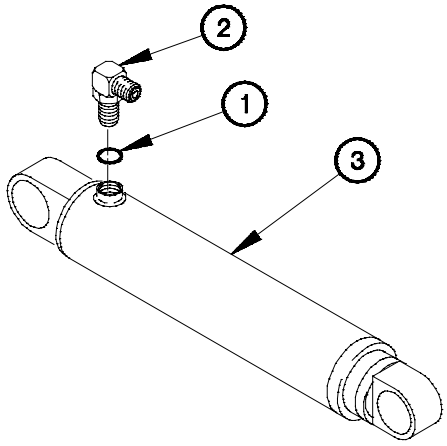
**NOTE**

Left and right side telescopic lift cylinders are removed the same way. Left side shown.

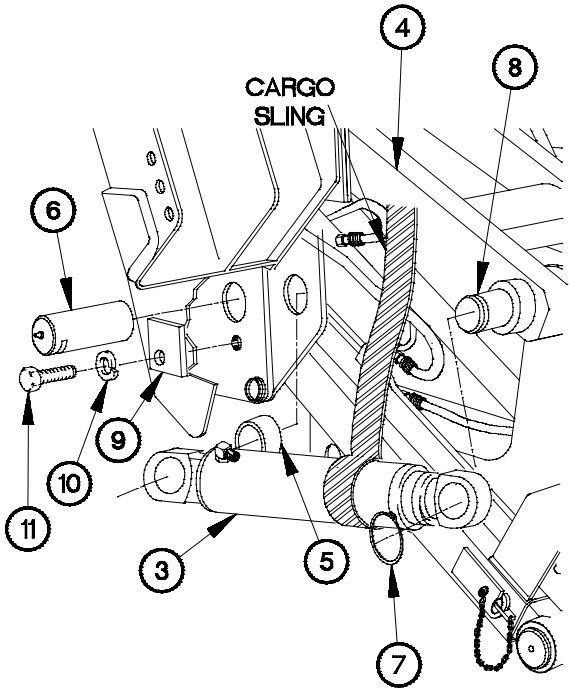
(1) Install preformed packing (1) on 90-degree fitting (2).

(2) Install 90-degree fitting (2) on telescopic lift cylinder (3).

(3) Tighten 90-degree fitting (2) to 40-42 lb-ft (54-57 N•m).




6R72101-




6R72102-

**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.**

**NOTE**

Step (4) requires the aid of an assistant.

(4) Install telescopic lift cylinder (3) on underlift assembly (4) with bushing (5) and pivot pin (6).

**WARNING**

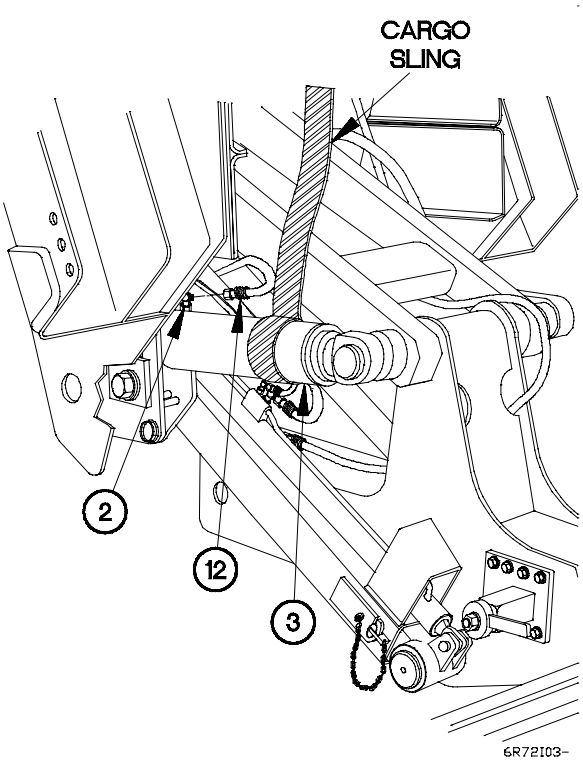
**Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(5) Install retaining ring (7) in cylinder end cap (8).

(6) Position pin locking plate (9) on underlift assembly (4) with lockwasher (10) and screw (11).

(7) Tighten screw (11) to 105-115 lb-ft (142-156 N·m).

(8) Connect hydraulic hose (12) to 90-degree fitting (2).




**c. Follow-On Maintenance.**

(1) Hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(2) Operate underlift assembly and check for hydraulic leaks and for proper operation (TM 9-2320366-10-2).

**End of Task.**

## 16-73. M1089 TELESCOPIC LIFT CYLINDER COUNTERBALANCE VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Underlift crossbar lowered to ground (TM 9-2320-366-10-2).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)
Goggles, Industrial (Item 28, Appendix B)

**Tools and Special Tools (Cont)**
STE/ICE-R (Item 70, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Tee, Pipe to Tube (Item 88, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Nut, Self-locking (2) (Item 181, Appendix F)
Packing, Preformed (Item 237, Appendix F)
Packing, Preformed (Item 229, Appendix F)
Packing, Preformed (Item 236, Appendix F)

**WARNING**

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

**a. Removal.**

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

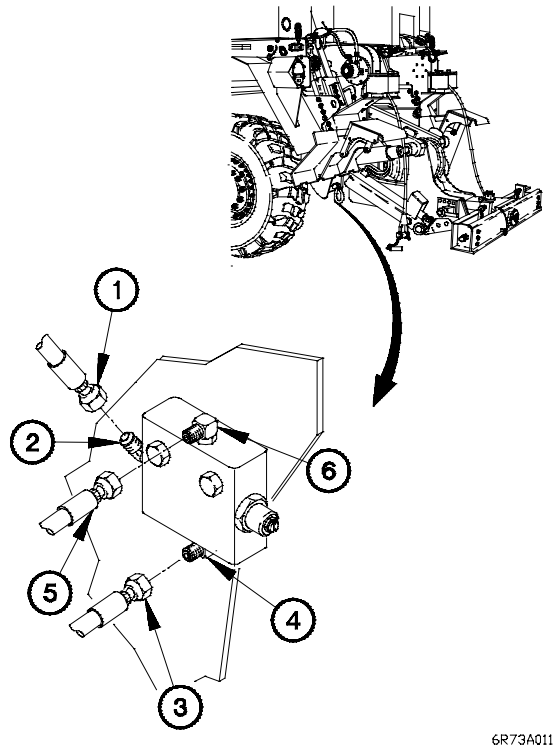
**NOTE**

- Tag hydraulic hoses and connection points prior to disconnecting.
- Left and right side counterbalance valves are removed the same way. Left side shown.

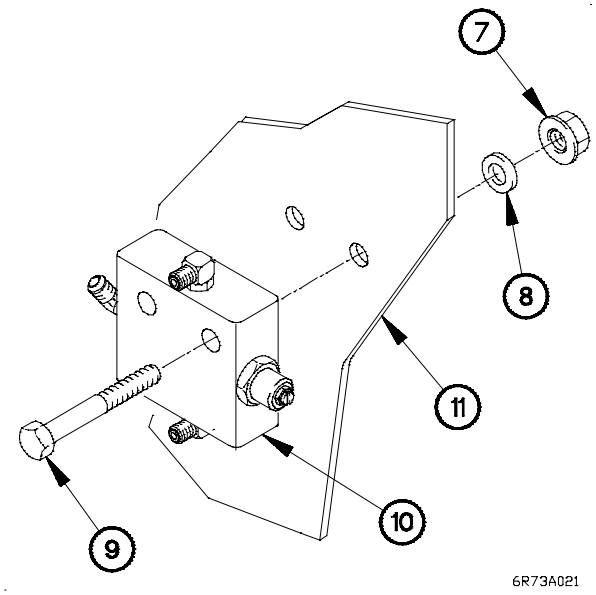
(1) Disconnect hose (1) from 90-degree fitting (2).

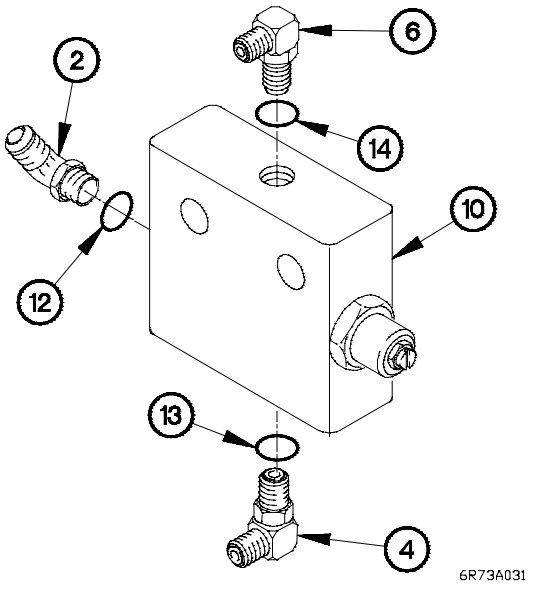
(2) Disconnect hose (3) from 90-degree fitting (4).

(3) Disconnect hose (5) from 90-degree fitting (6).



(4) Remove two self-locking nuts (7), washers (8), screws (9), and counterbalance valve (10) from underlift assembly (11). Discard self-locking nuts.




(5) Remove 90-degree fitting (2) from counterbalance valve (10).

(6) Remove preformed packing (12) from 90-degree fitting (2). Discard preformed packing.

(7) Remove 90-degree fitting (4) from counterbalance valve (10).

(8) Remove preformed packing (13) from 90-degree fitting (4). Discard preformed packing.

(9) Remove 90-degree fitting (6) from counterbalance valve (10).

(10) Remove preformed packing (14) from 90-degree fitting (6). Discard preformed packing.

## 16-73. M1089 TELESCOPIC LIFT CYLINDER COUNTERBALANCE VALVE REPLACEMENT (CONT)

**b. Installation.**

**NOTE**

Left and right side counterbalance valves are installed the same way. Left side shown.

(1) Install preformed packing (1) on 90-degree fitting (2).

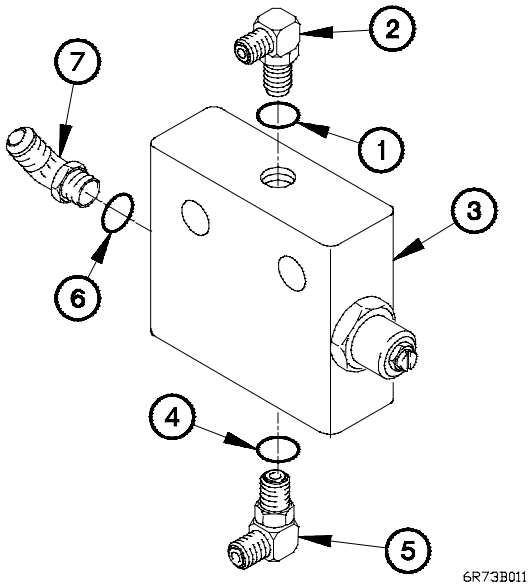
(2) Position 90-degree fitting (2) in counterbalance valve (3).

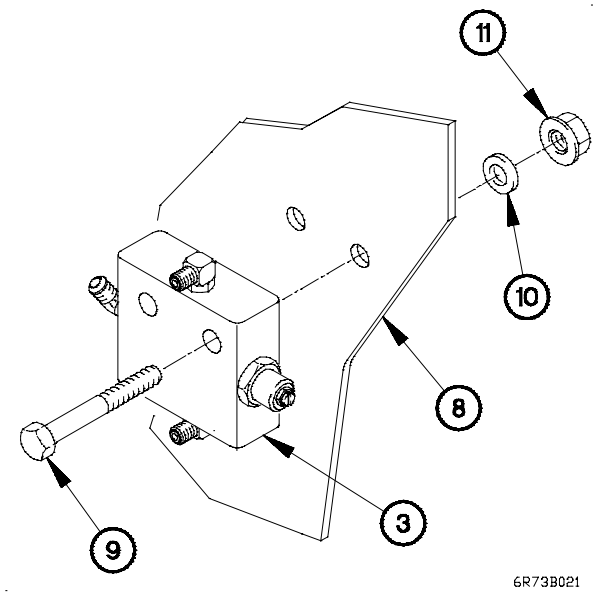
(3) Install preformed packing (4) on 90-degree fitting (5).

(4) Position 90-degree fitting (5) in counterbalance valve (3).

(5) Install preformed packing (6) on 90-degree fitting (7).

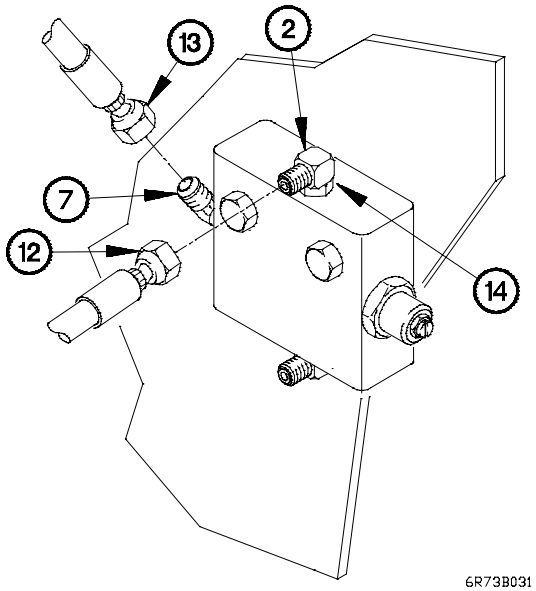
(6) Position 90-degree fitting (7) in counterbalance valve (3).




(7) Position counterbalance valve (3) on underlift assembly (8) with two screws (9), washers (10), and self-locking nuts (11).

(8) Tighten two self-locking nuts (11) to 23-25 lb-ft (31-34 N•m).




(9) Position hose (12) on 90-degree fitting (2).

(10) Position hose (13) on 90-degree fitting (7).

(11) Tighten jamnut (14) on 90-degree fittings (2 and 7).

(12) Tighten hose (12) to 18-20 lb-ft (24-27 N·m).

(13) Tighten hose (13) to 35-39 lb-ft (47-53 N·m).

**c. Adjustment.**

(1) Install tee fitting (1) on 90-degree fitting (2).

(2) Install snubber (3) on tee fitting (1).

(3) Install transducer (4) on snubber (3).

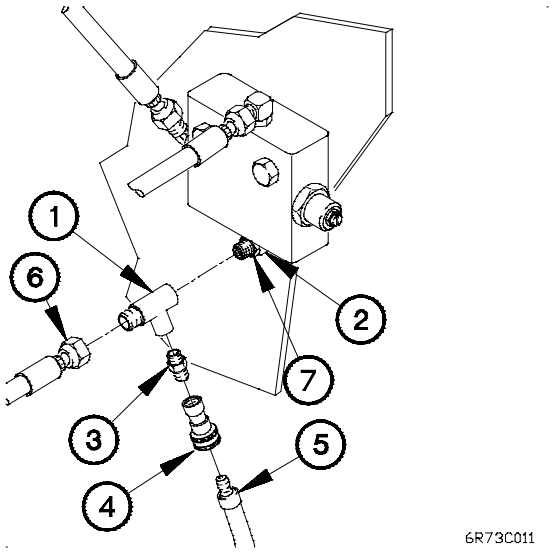
(4) Install cable (5) to transducer (4).

(5) Position hose (6) on tee fitting (1).

(6) Tighten jamnut (7) on 90-degree fitting (2).

(7) Tighten hose (6) to 35-39 lb-ft (47-53 N·m).

(8) Open hydraulic reservoir supply and return valves (TM 9-2320-366-10-2).



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(9) Raise underlift approximately two feet (TM 9-2320-366-10-2).

(10) Verify STE/ICE-R reads 1950 psi (13445 kPa).

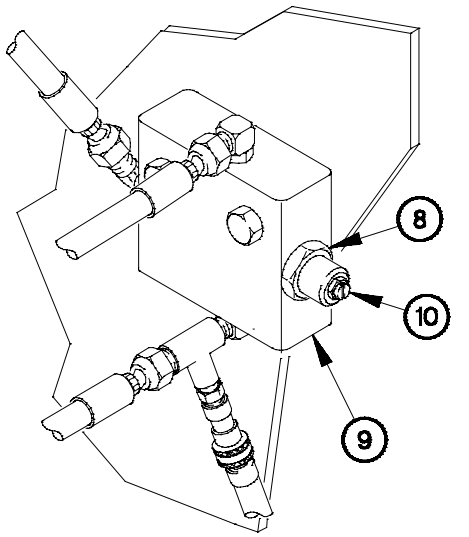
**NOTE**

Perform steps (10) through (13) if pressure reading was not 1950 psi (13445 Kpa).

(10) Loosen jam nut (8) on counterbalance valve (9).

**CAUTION**

Steps (11) and (12) must be preformed at the same time to get a correct reading. Failure to comply may result in damage to equipment.



6R73C021

(11) Operate underlift (TM 9-2320-366-10-2).

**NOTE**

Turn adjustment screw clockwise to increase pressure and counterclockwise to decrease pressure.

(12) Adjust screw (10) until STE/ICE-R reads 1950 psi (1345 Kpa).

(13) Hold adjustment screw (10) and tighten jam nut (8) on counterbalance valve (9).

## 16-73. M1089 TELESCOPIC LIFT CYLINDER COUNTERBALANCE VALVE REPLACEMENT (CONT)

(14) Close hydraulic reservoir supply and return valves (TM 9-2320-366-10-2).

(15) Remove hose (6) from tee fitting (1).

(16) Disconnect cable (5) from transducer (4).

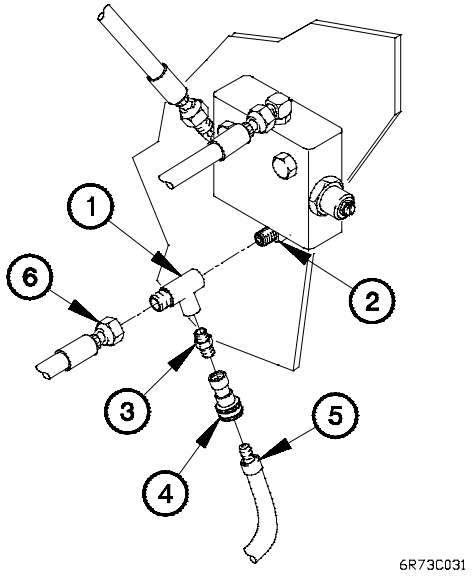
(17) Remove transducer (4) from snubber (3).

(18) Remove snubber (3) from tee fitting (1).

(19) Remove tee fitting (1) from 90-degree fitting (2).

(20) Connect hydraulic hose (6) to 90-degree fitting (2).

(21) Tighten hydraulic hose (6) to 35-39 lb-ft (47-53 N·m).




**d. Follow-On Maintenance.**

(1) Open hydraulic reservoir supply and return valve (TM 9-2320-366-10-2).

(2) Operate underlift and check for hydraulic leaks at counterbalance valve (TM 9-2320-366-10-2).

**End of Task.**

## 16-74. M1089 LEFT LOWER ARM 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**
M1089 Fold cylinder removed (para. 16-71).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot Ratcheting (TM 9-2320-366-20)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)

**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Nut, Self-locking (Item 200, Appendix F)
Lockwasher (Item 145, Appendix F)
Grease, Automotive and Artillery (Item 35, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

(1) Remove pin (1) from pin retainer (2).

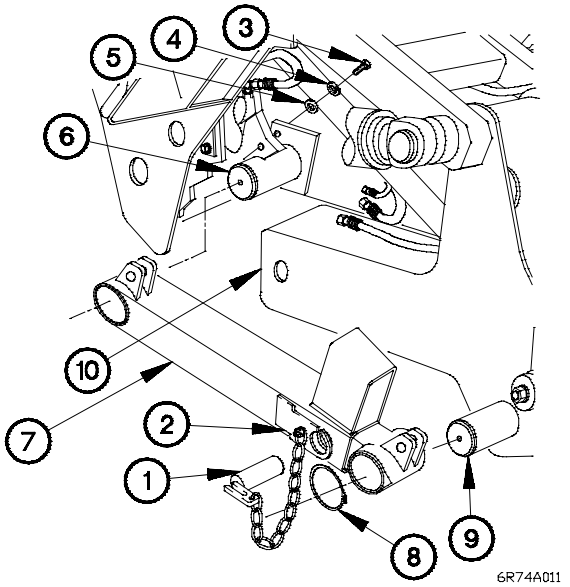
(2) Remove screw (3), lockwasher (4), washer (5), and pin (6) from left lower arm (7). Discard lockwasher.

**WARNING**

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

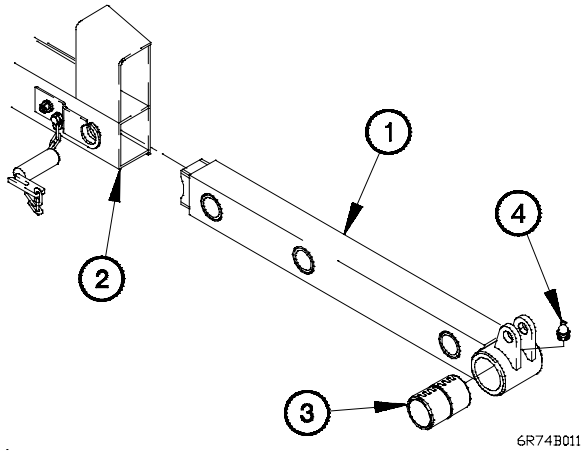
(3) Remove retaining ring (8) from lower arm retaining pin (9).

(4) Remove left lower arm (7) from underlift assembly (10).



## 16-74. M1089 LEFT LOWER ARM ASSEMBLY REPLACEMENT/REPAIR (CONT)

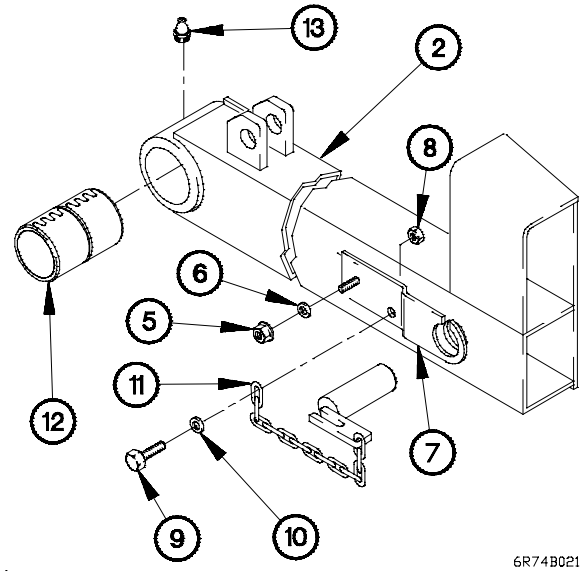
**b. Disassembly.**




(1) Remove inner arm (1) from outer arm (2).

(2) Remove bushing (3) from inner arm (1).

(3) Remove grease fitting (4) from inner arm (1).




(4) Remove self-locking nut (5) and washer (6) from pin retainer (7). Discard self-locking nut.

(5) Remove self-locking nut (8), screw (9), washer (10), and chain (11) from pin retainer (7). Discard self-locking nut.

(6) Remove bushing (12) from outer arm (2).

(7) Remove grease fitting (13) from outer arm (2).

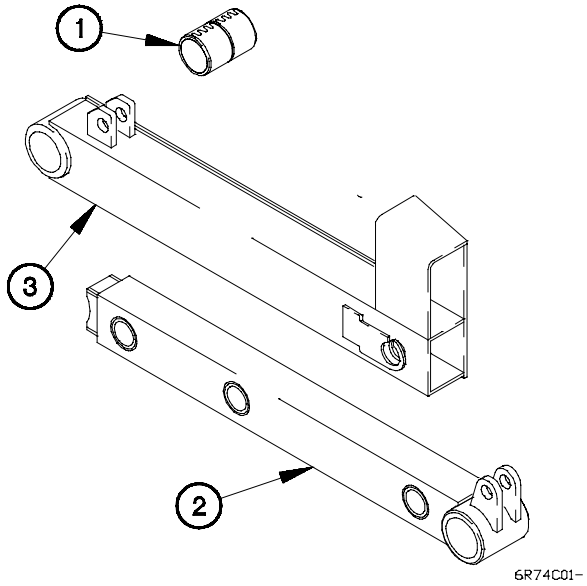
**c. Cleaning/Inspection.**

**NOTE**

Replace any part that fails visual inspection.

(1) Inspect two bushings (1) for burrs, scoring and wear.

(2) Inspect inner arm (2) and outer arm (3) for damage, wear, ease of movement, and/or distortion.



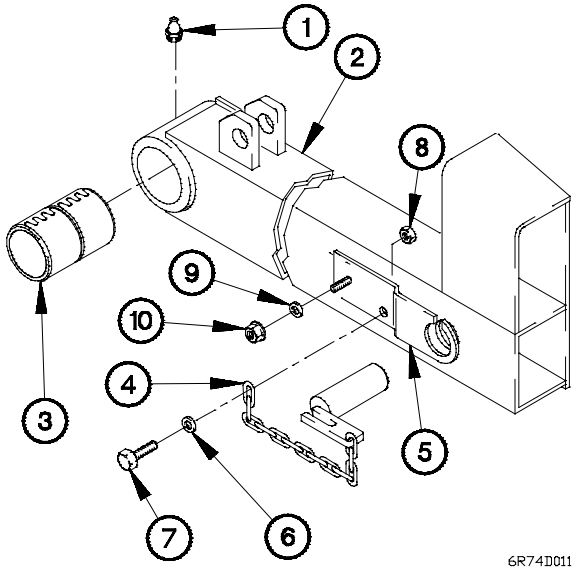
**d. Assembly.**

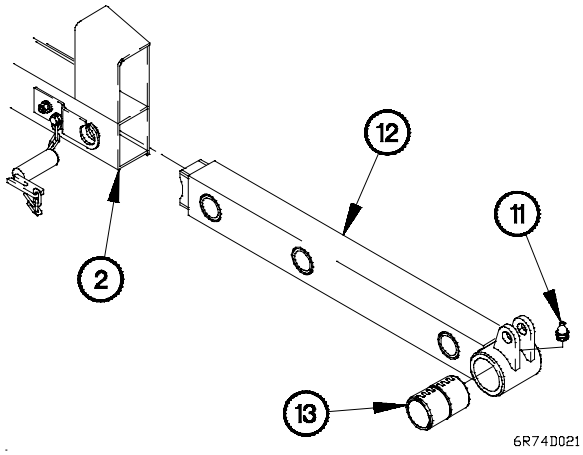
(1) Install grease fitting (1) in outer arm (2).

(2) Install bushing (3) in outer arm (2).

(3) Install chain (4) on pin retainer (5) with washer (6), screw (7), and self-locking nut (8).

(4) Install washer (9) and self-locking nut (10) on pin retainer (5).



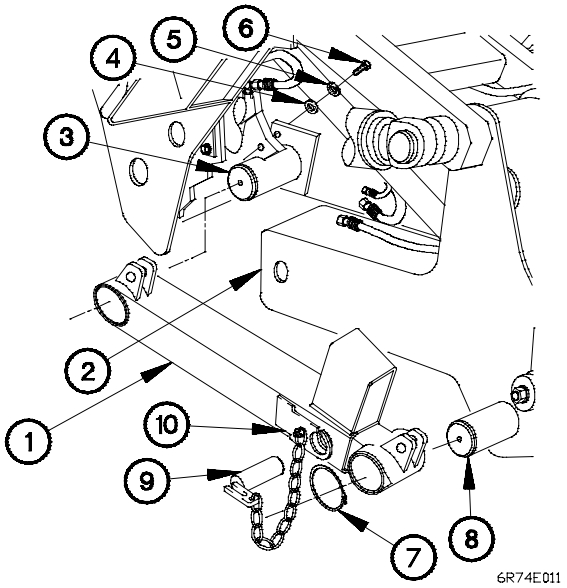

(5) Install grease fitting (11) in inner arm (12).

(6) Install bushing (13) in inner arm (12).

(7) Install inner arm (12) in outer arm (2).

## 16-74. M1089 LEFT LOWER ARM ASSEMBLY REPLACEMENT/REPAIR (CONT)

**e. Installation.**




(1) Position left lower arm (1) on underlift assembly (2).

(2) Position pin (3) in left lower arm (1) with washer (4), lockwasher (5), and screw (6).

(3) Tighten screw (6) to 105-115 lb-ft (142-156 N•m).

**WARNING**

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

(4) Install retaining ring (7) on left lower arm retaining pin (8).

(5) Install pin (9) in pin retainer (10).

**f. Follow-On Maintenance**

(1) Install M1089 Fold cylinder (para. 16-71).

(2) Operate underlift assembly and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-75. M1089 RIGHT LOWER ARM 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**
Underlift folding boom extended (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).

**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)
Wrench Set, Crowfoot Ratcheting (TM 9-2320-366-20)
Press, Arbor Hand Operated (Item 48, Appendix B)
Pliers, Retaining Ring (Item 46, Appendix B)

**Tools and Special Tools (Cont)**
Sling, Cargo (Item 56, Appendix B)
Gloves, Rubber (Item 26, Appendix B)

**Materials/Parts**
Rag, Wiping (Item 60, Appendix C)
Lockwasher (Item 130, Appendix F)
Grease, Automotive and Artillery (Item 35, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

(1) Remove screw (1), lockwasher (2), and washer (3) from pin (4). Discard lockwasher.

**NOTE**

Steps (2) through (4) require the aid of assistant.

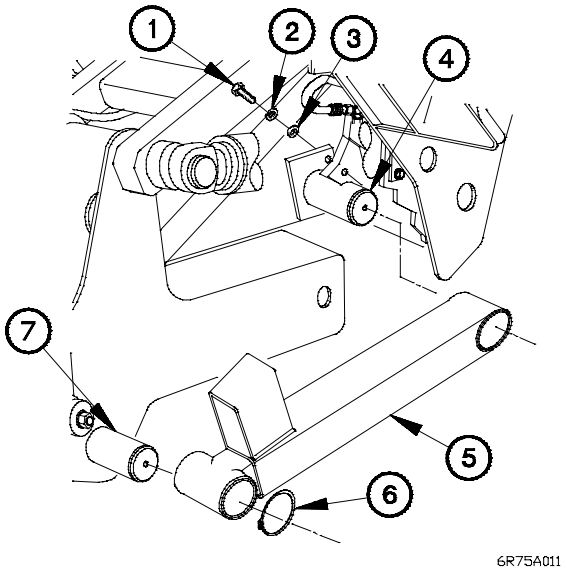
(2) Remove pin (4) from right lower arm (5).

**WARNING**

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

(3) Remove retaining ring (6) from pin (7).

(4) Remove right lower arm (5) from pin (7).



## 16-75. M1089 RIGHT LOWER ARM ASSEMBLY REPLACEMENT/REPAIR (CONT)

**b. Disassembly.**

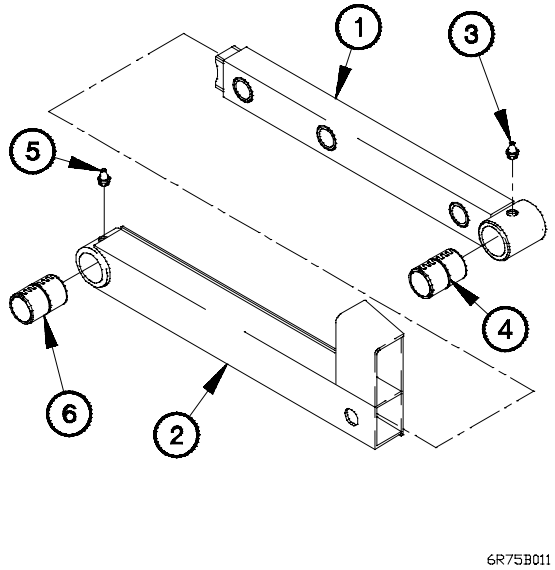
(1) Remove inner arm (1) from outer arm (2).

(2) Remove grease fitting (3) from inner arm (1).

(3) Remove bushing (4) from inner arm (1).

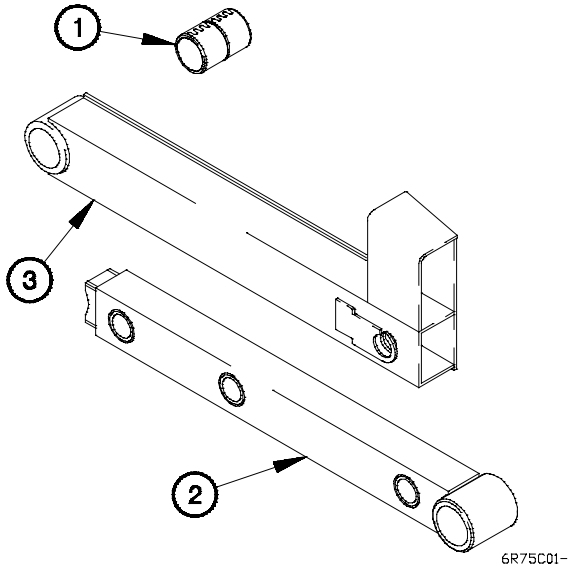
(4) Remove grease fitting (5) from outer arm (2).

(5) Remove bushing (6) from outer arm (2).




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**c. Cleaning/Inspection.**




6R75C01-

**NOTE**

Replace any part that fails visual inspection.

(1) Inspect all parts for corrosion, scoring, and indications of wear.

(2) Inspect two bushings (1) for burrs, scoring, wear, and indicators of binding.

(3) Inspect inner arm (2) and outer arm (3) for damage, wear, ease of movement, and/or distortion.

**d. Assembly.**

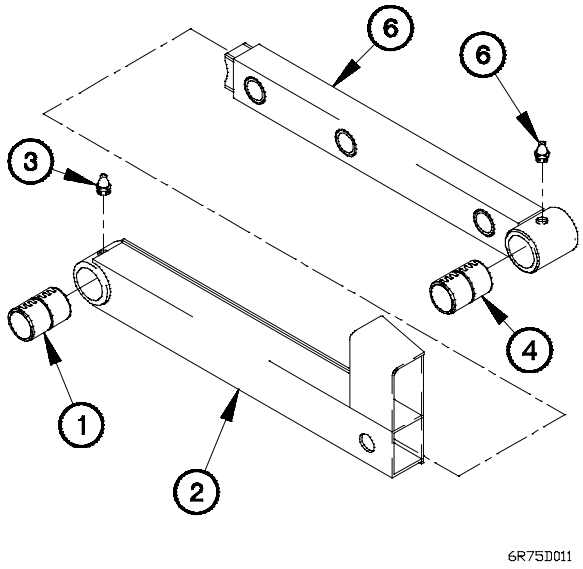
(1) Install bushing (1) in outer arm (2).

(2) Install grease fitting (3) in outer arm (2).

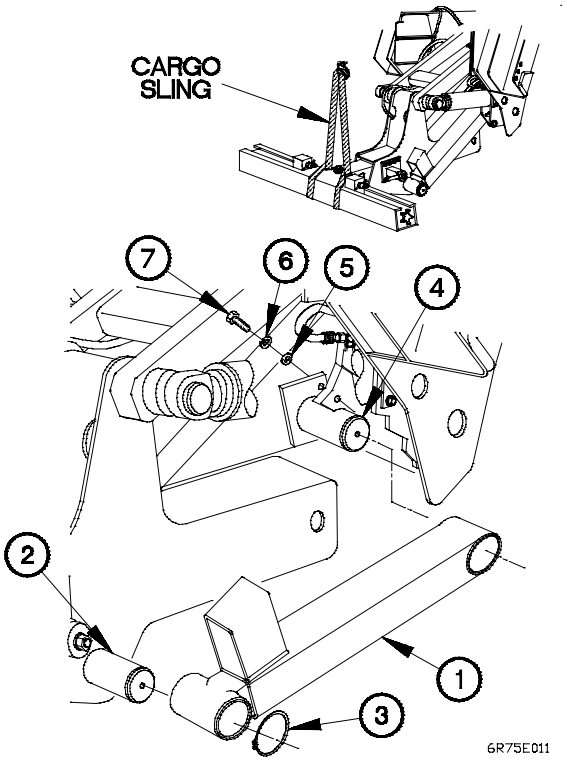
(3) Install bushing (4) in inner arm (5).

(4) Install grease fitting (6) in inner arm (5).

(5) Install inner arm (5) in outer arm (2).




**e. Installation.**




**NOTE**

Steps (1) through (4) require the aid of an assistant.

(1) Position right lower arm (1) on pin (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) on pin (2).

(3) Position pin (4) in right lower arm (1) with washer (5), lockwasher (6), and screw (7).

(4) Tighten screw (7) to 105-115 lb-ft (142-156 N·m).

**f. Follow-On Maintenance.**

(1) Lubricate underlift assembly (TM 9-2320-366-20).

(2) Operate underlift assembly and check for proper operation (TM 9-2320-366-10-2).

## 16-76. M1089 UPPER ARM REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Underlift assembly in folded and down position (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
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**
Rag, Wiping (Item 60, Appendix C)
Lockwasher (2) (Item 144, Appendix F)
Nut, Self-Locking (4) (Item 176, Appendix F)
Grease, Automotive and Artillery (Item 35, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)

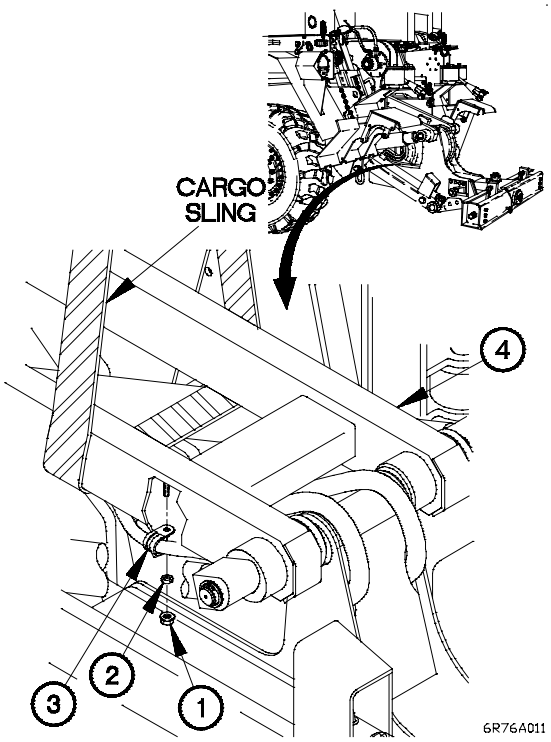
**Personnel Required**
(2)

**a. Removal.**

**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.**

(1) Remove four self-locking nuts (1), washers (2), and hose clamps (3) from upper arm (4).



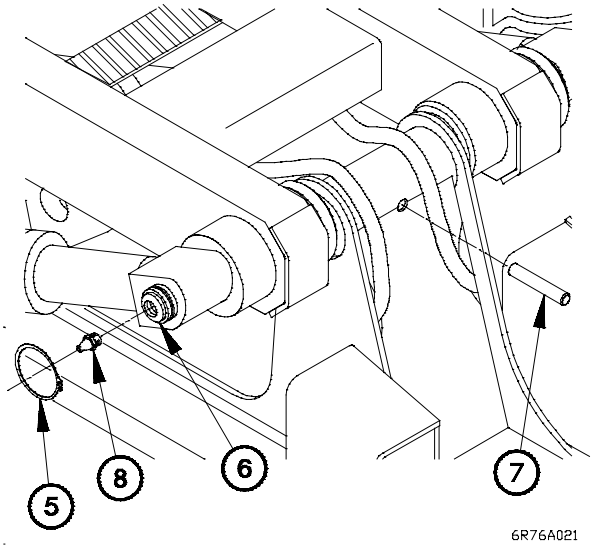
**WARNING**

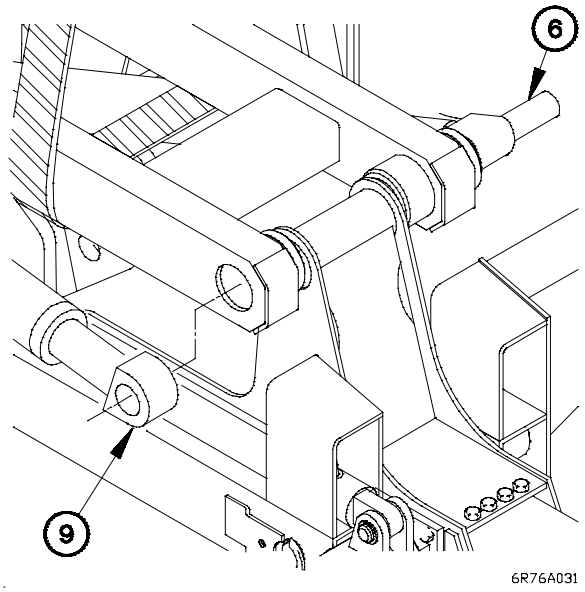
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(2) Remove two retaining rings (5) from retaining pin (6).

(3) Remove slotted pin (7) from retaining pin (6).

(4) Remove two grease fittings (8) from retaining pin (6).




**WARNING**

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

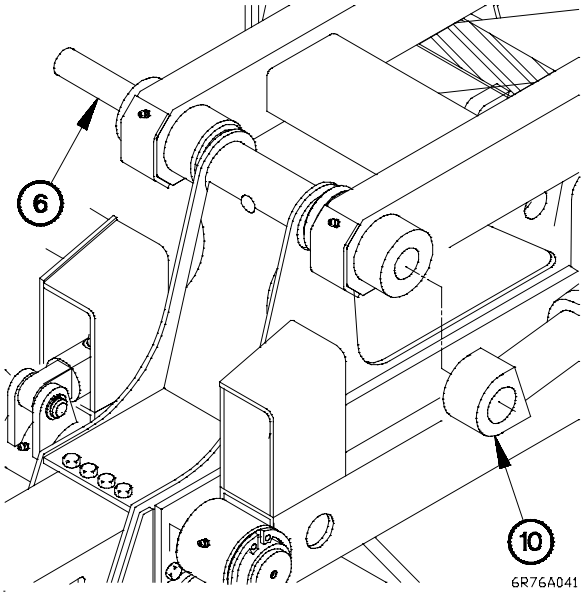
**CAUTION**

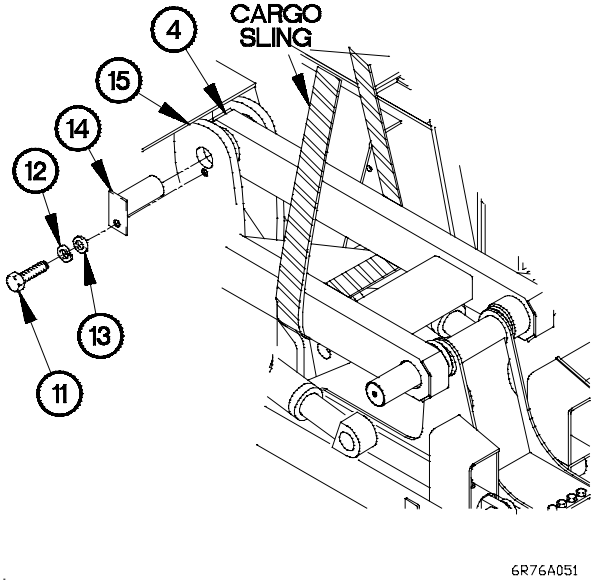
Use care not to damage threaded portion of retaining pin. Failure to comply may result in damage to equipment.

(5) Remove retaining pin (6) from left telescopic cylinder (9).

## 16-76. M1089 UPPER ARM REPAIR (CONT)

(6) Remove retaining pin (6) from right telescopic cylinder (10).




**WARNING**

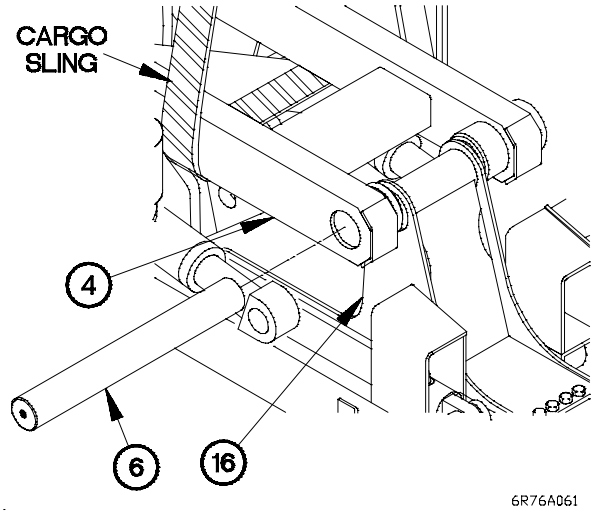
**Prior to removing retaining pin and retaining pin covers, ensure upper arm assembly is properly balanced. Failure to comply may result in injury to personnel.**

(7) Remove two screws (11), lockwashers (12), washers (13), pin retaining covers (14), and upper arm (4) from support (15). Discard lockwashers.

**NOTE**

Step (8) requires the aid of an assistant.

(8) Remove retaining pin (6) and upper arm (4) from folding boom frame (16).

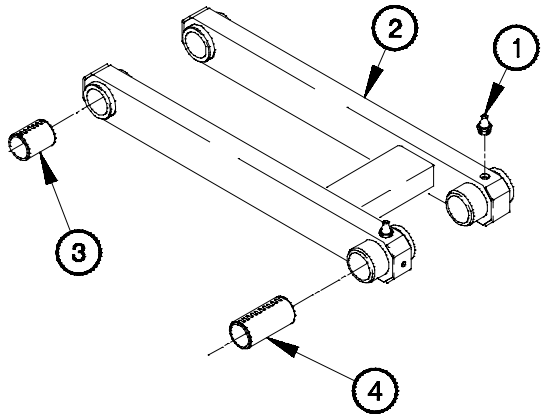


**b. Disassembly.**

(1) Remove two grease fittings (1) from upper arm (2).

(2) Remove two bushings (3) from upper arm (2).

(3) Remove two bushings (4) from upper arm (2).



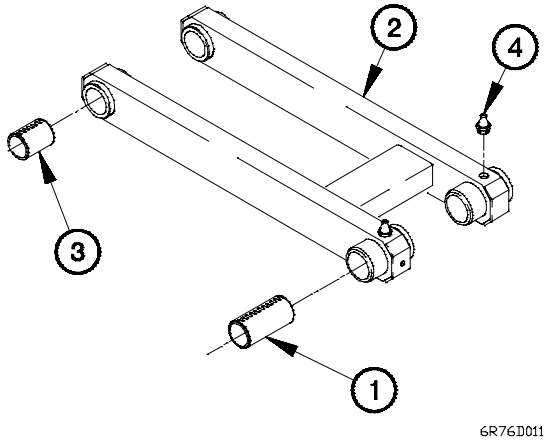

**c. Cleaning/Inspection.**

**NOTE**

Replace any part that fails visual inspection.

Inspect all parts for pitting, corrosion, scoring, broken welds, or indications of binding.

**d. Assembly.**




(1) Install two bushings (1) in upper arm (2).

(2) Install two bushings (3) in upper arm (2).

(3) Install two grease fittings (4) in upper arm (2).

## 16-76. M1089 UPPER ARM REPAIR (CONT)

**e. Installation.**

**WARNING**

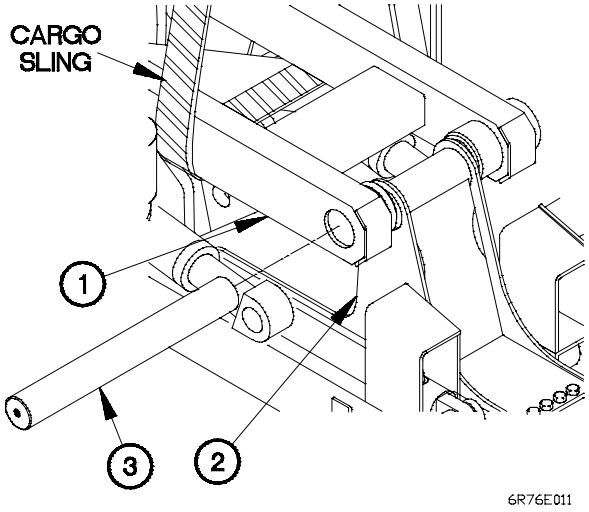
- **Upper arm weighs approximately 190 lbs (86 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**
- **Prior to installing retaining pin and retaining pins covers, ensure upper arm is properly balanced. Failure to comply may result in injury to personnel.**

**CAUTION**

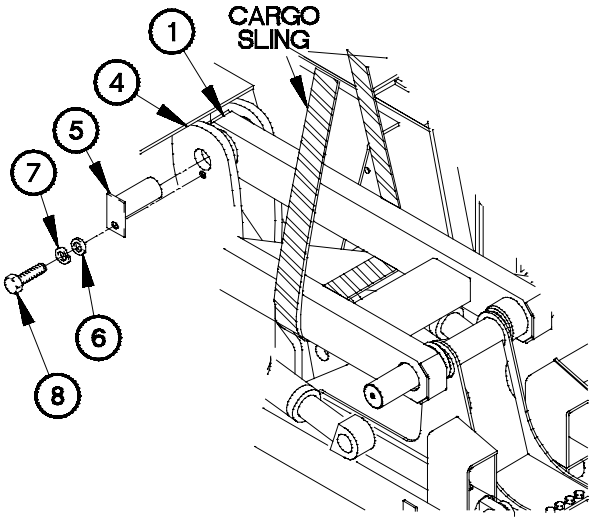
Use care not to damage threaded portion on ends of retaining pin. Failure to comply may result in damage to equipment.

**NOTE**

Step (1) requires the aid of an assistant.




(1) Position upper arm (1) on folding boom frame (2) with retaining pin (3).




(2) Position upper arm (1) on support (4) with two pin retaining covers (5), washers (6), lockwashers (7), and screws (8).

(3) Tighten two screws (8) to 105-115 lb-ft (142-156 N·m).

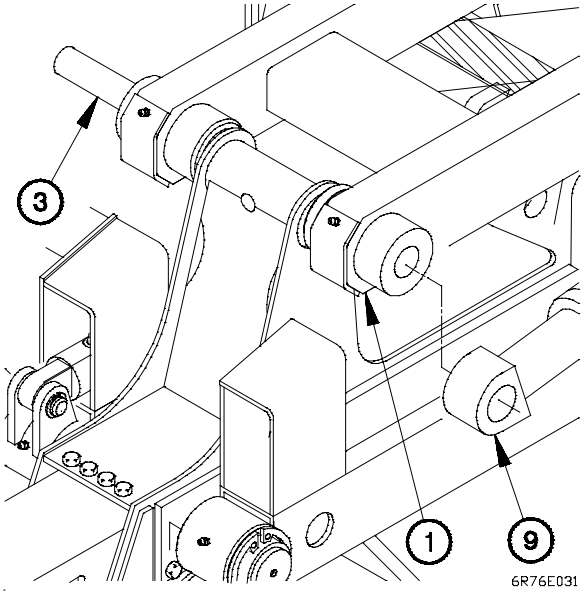
**CAUTION**

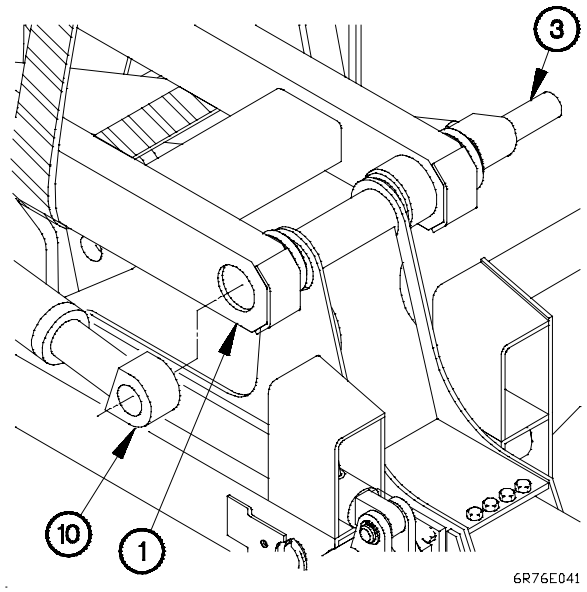
Use care not to damage threaded portion on ends of retaining pin. Failure to comply may result in damage to equipment.

**NOTE**

Steps (4) and (5) require the aid of an assistant.

(4) Position right telescopic cylinder (9) on upper arm (1) with retaining pin (3).




(5) Position left telescopic cylinder (10) on upper arm (1) with retaining pin (3).

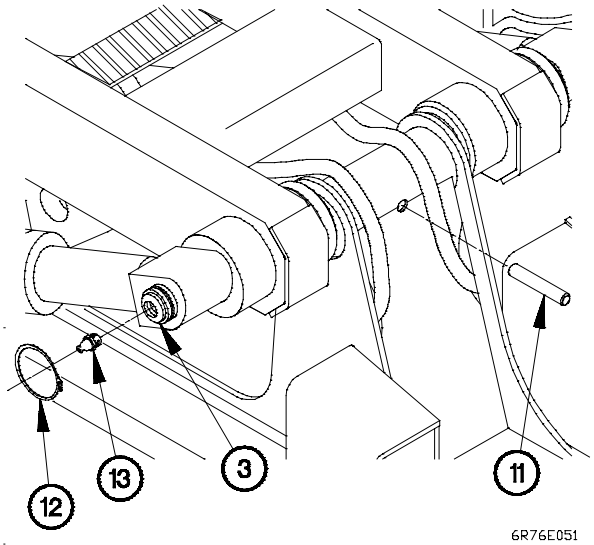
(6) Install slotted pin (11) in retaining pin (3).

**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.**

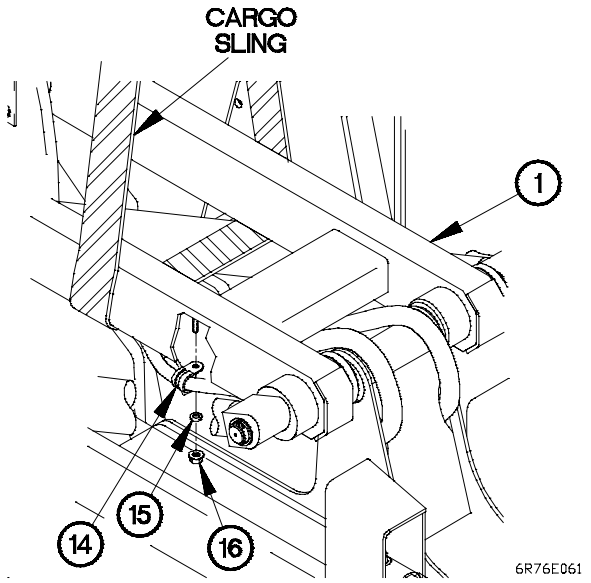
(7) Install two retaining rings (12) on retaining pin (3).

(8) Install two grease fittings (13) in retaining pin (3).



## 16-76. M1089 UPPER ARM REPAIR (CONT)

(9) Install four hose clamps (14) on upper arm (1) with four washers (15), and self-locking nuts (16).




**f. Follow-On Maintenance.**

Operate underlift assembly, checking for proper operation and for hydraulic leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR

This task covers:

a. Disassembly
b. Cleaning/Inspection
c. Assembly
d. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Hydraulic reservoir supply and return valves closed (TM 9-2320-366-10-2).
Stinger cylinder removed (para 16-70).

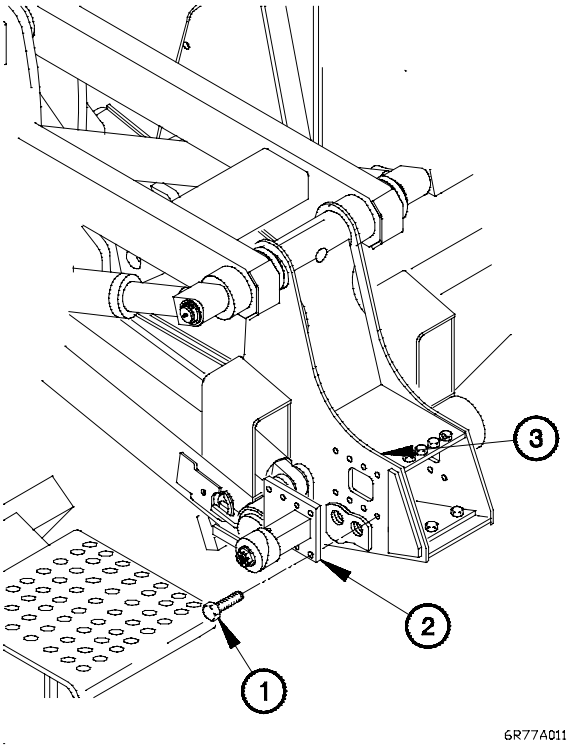
**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)
Sling, Cargo (2) (Item 56, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Pliers, Retaining Ring (Item 44, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Ties, Cable Plastic (Item 92, Appendix C)
Sealing Compound (Item 76, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Nut, Self-locking (2) Item 176, Appendix F)
Adhesive, Silicone Sealant (Item 4, Appendix C)
Grease, Automotive and Artillery (Item 35, Appendix C)

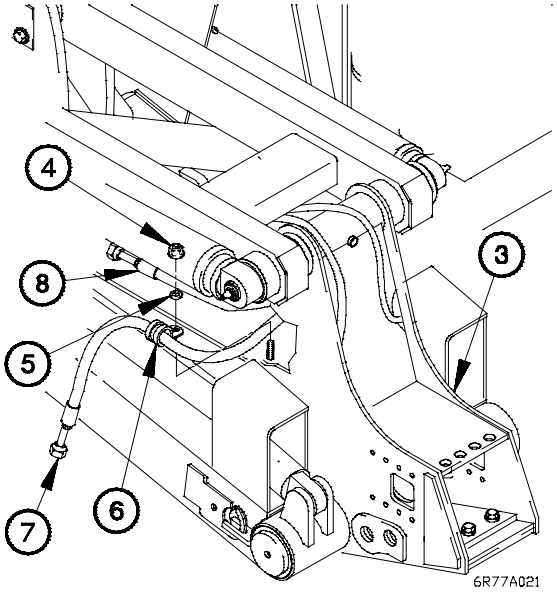
**Personnel Required**
(3)

**a. Disassembly.**

(1) Remove eight screws (1) and camlock (2) from folding boom frame (3).

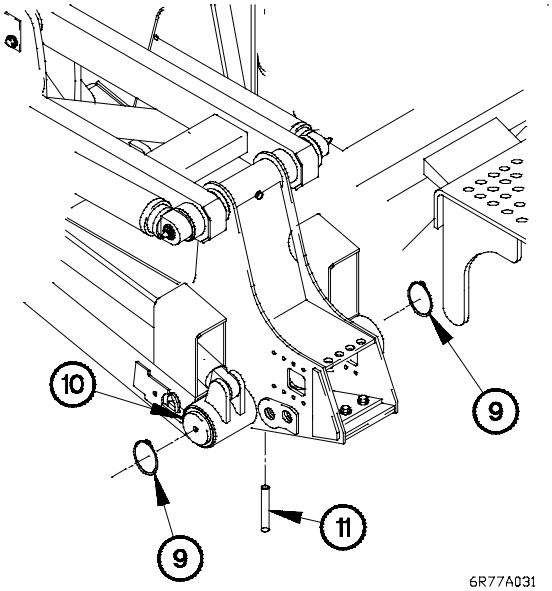


## 16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR (CONT)




(2) Remove two self-locking nuts (4), washers (5), and hose clamps (6) from folding boom frame (3). Discard self-locking nuts.

(3) Remove hydraulic hoses (7 and 8) from folding boom frame (3) and tie clear.




**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.**

(4) Remove two retaining rings (9) from retaining pin (10).

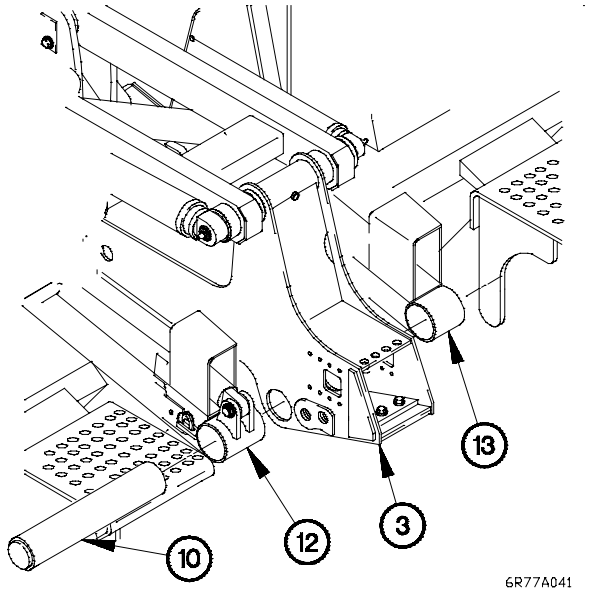
(5) Remove slotted pin (11) from retaining pin (10).

**NOTE**

Steps (6) and (7) require the aid of an assistant.

(6) Remove left lower arm (12) and right lower arm (13) from retaining pin (10).

(7) Remove retaining pin (10) from folding boom frame (3).



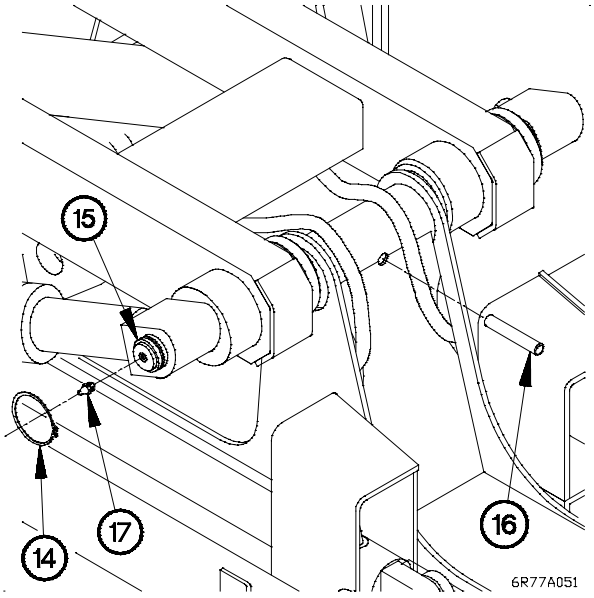
**WARNING**

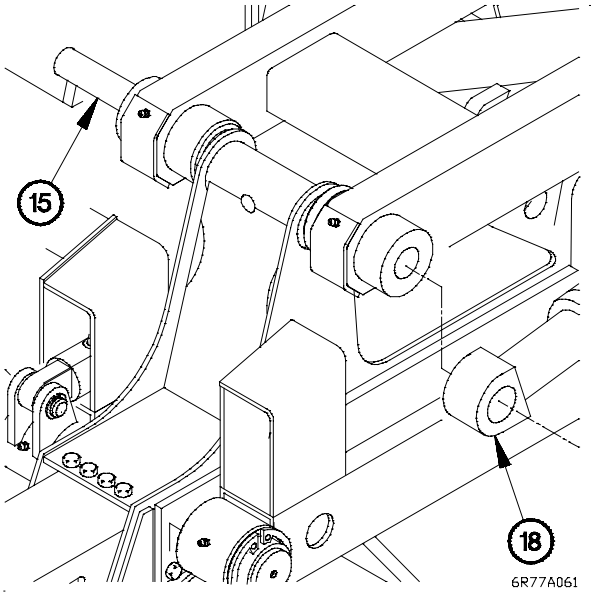
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(8) Remove two retaining rings (14) from retaining pin (15).

(9) Remove slotted pin (16) from retaining pin (15).

(10) Remove two grease fittings (17) from retaining pin (15).




**WARNING**

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

**CAUTION**

Use care not to damage threaded portion of retaining pin. Failure to comply may result in damage to equipment.

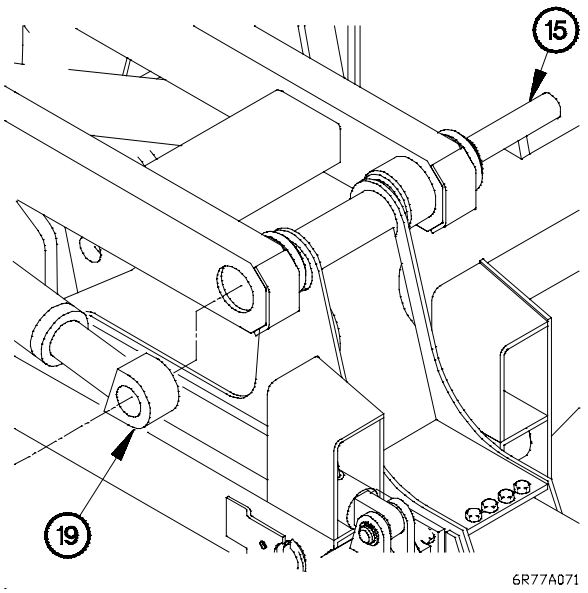
**NOTE**

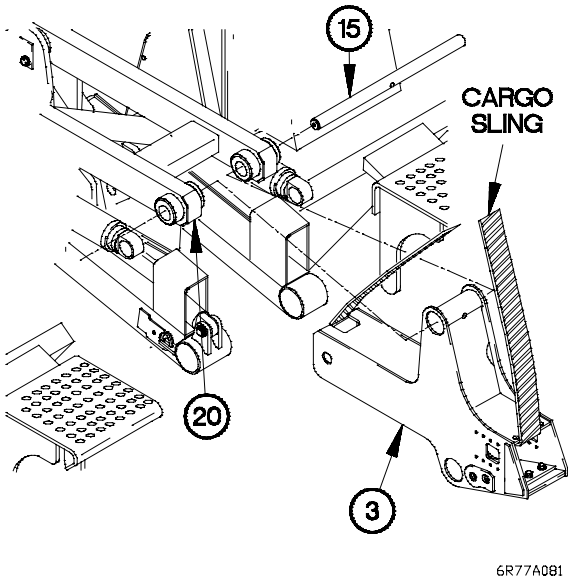
Steps (11) through (13) require the aid of an assistant.

(11) Drive retaining pin (15) from right telescopic cylinder (18).

## 16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR (CONT)

(12) Drive retaining pin (15) from left telescopic cylinder (19).



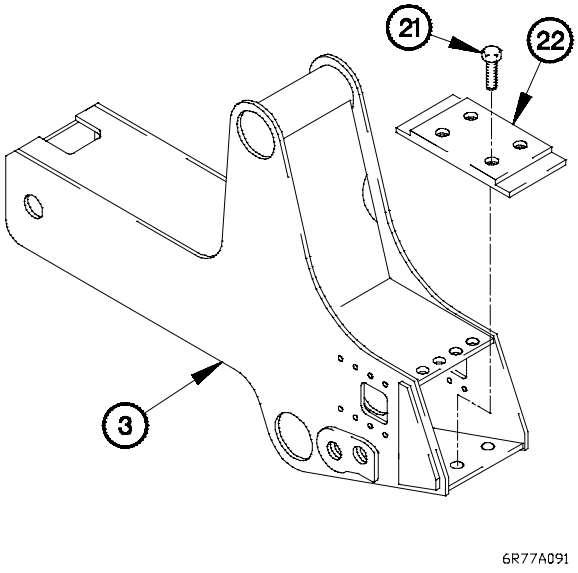




**WARNING**

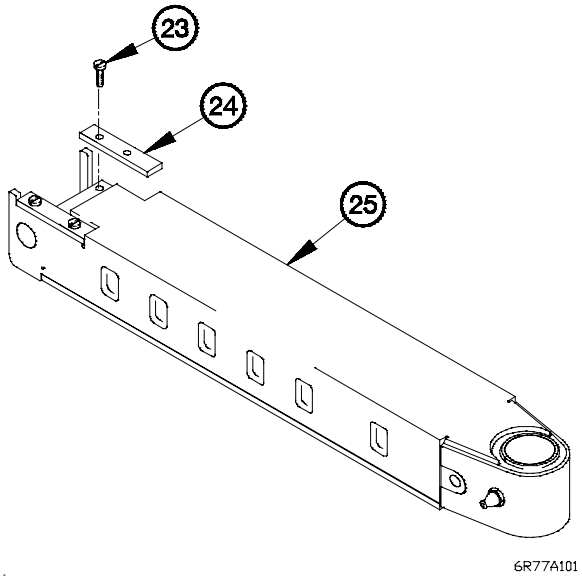
**Boom frame weighs approximately 320 lbs (145 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**

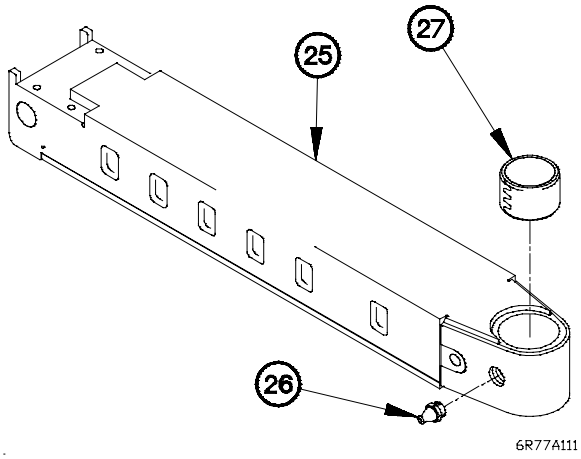
(13) Remove retaining pin (15) and folding boom frame (3) from upper arm (20).

(14) Remove four screws (21) and lower wear plate (22) from folding boom frame (3).



(15) Remove four screws (23) and two upper wear plates (24) from inner tube (25).




(16) Remove grease fitting (26) from inner tube (25).

(17) Remove two bushings (27) from inner tube (25).

## 16-77. M1089 FOLDING BOOM FRAME ASSEMBLY 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 all metal parts with dry cleaning solvent.

**NOTE**

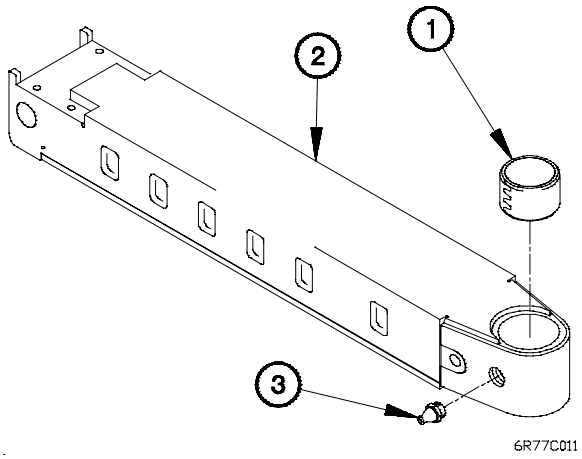
Replace any part that fails visual inspection.

(2) Inspect all parts for pitting, corrosion, scoring, broken welds, or indications of binding.

**c. Assembly.**

(1) Install two bushings (1) in inner tube (2).

(2) Install grease fitting (3) in inner tube (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.**

(3) Apply adhesive sealant on inner tube (2) and two upper wear plates (4).

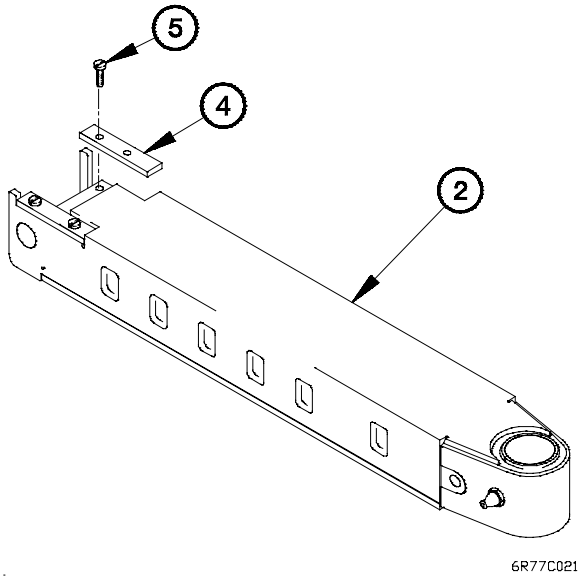
**WARNING**

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

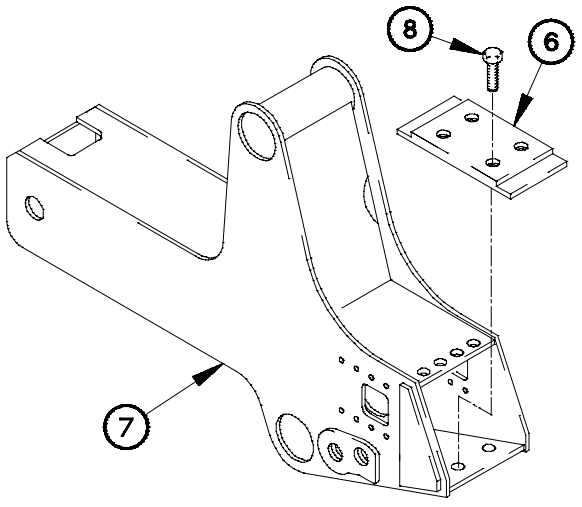
(4) Apply sealing compound to threads of four screws (5).

(5) Position two skids (4) on inner tube (2) with four screws (5).

(6) Tighten four screws (5) to 23-25 lb-ft (31-34 N•m).



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6R77C031

(7) Apply adhesive sealant on wear plate (6).

(8) Apply adhesive sealant on folding boom frame (7).

(9) Apply sealing compound to threads of four screws (8).

(10) Position lower wear plate (6) on folding boom frame (7) with four screws (8).

(11) Tighten four screws (8) to 23-25 lb-ft (31-34 N·m).

## 16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR (CONT)

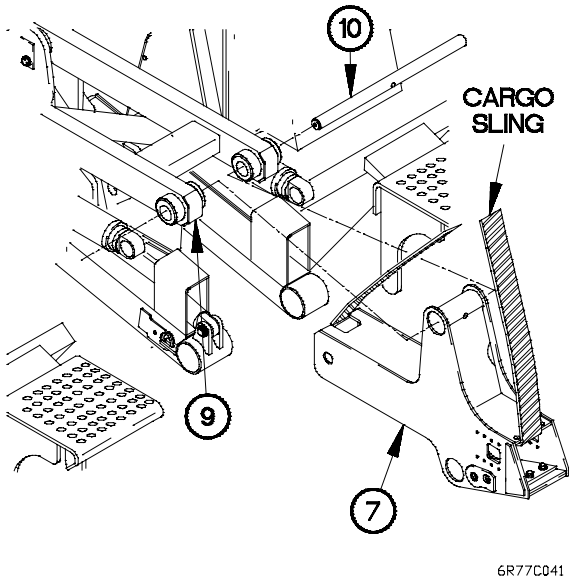
**WARNING**

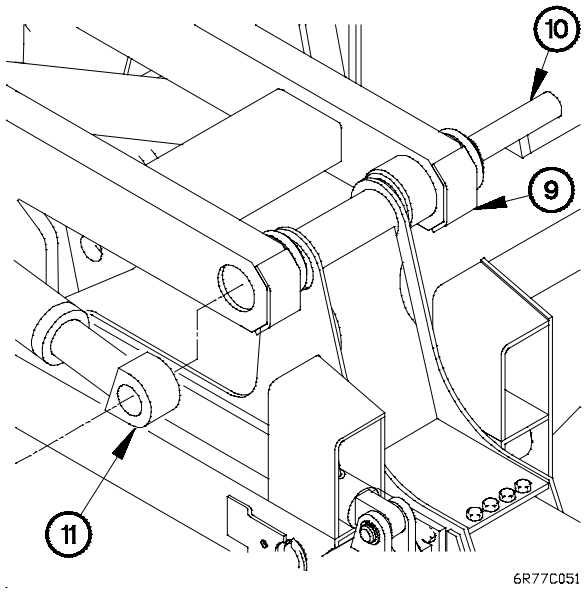
**Boom frame weighs approximately 320 lbs (145 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

Steps (12) through (14) require the aid of an assistant.

(12) Position folding boom frame (7) on upper arm (9) with retaining pin (10).

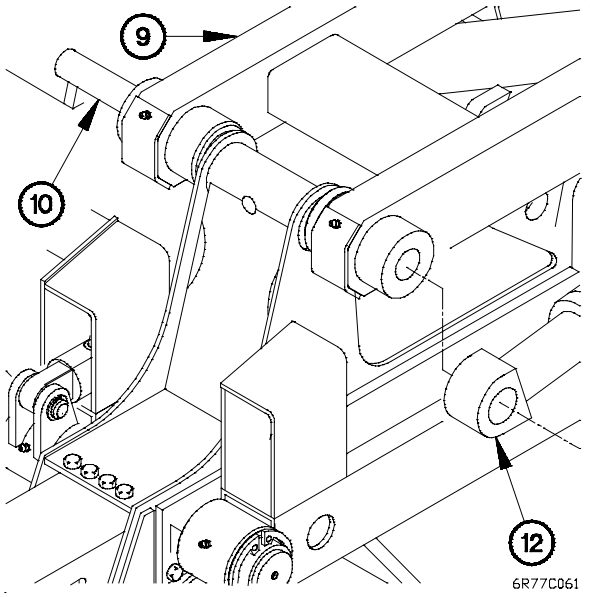



**CAUTION**

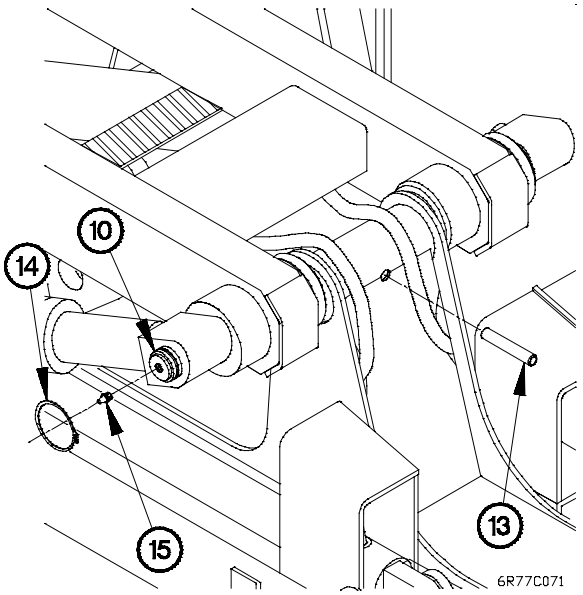
Use care not to damage threaded portion of retaining pin. Failure to comply may result in damage to equipment.

(13) Install left lift cylinder (11) on upper arm (9) with retaining pin (10).




(14) Install right lift cylinder (12) on upper arm (9) with retaining pin (10).

(15) Install slotted pin (13) in retaining pin (10).

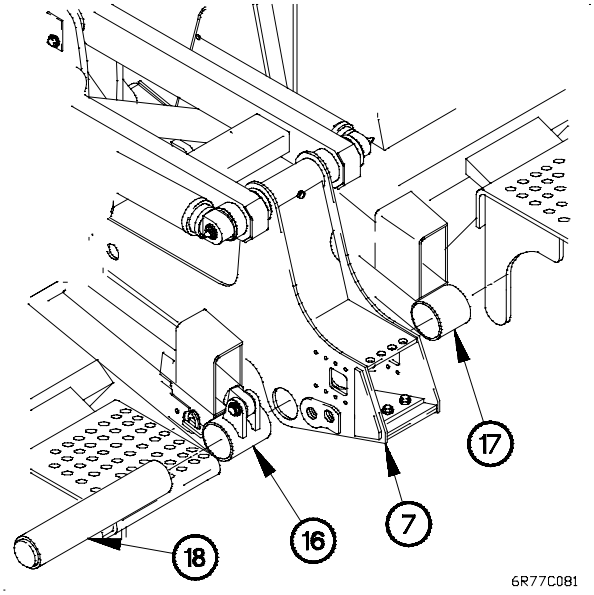



**WARNING**

**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.**

(16) Install two retaining rings (14) on retaining pin (10).

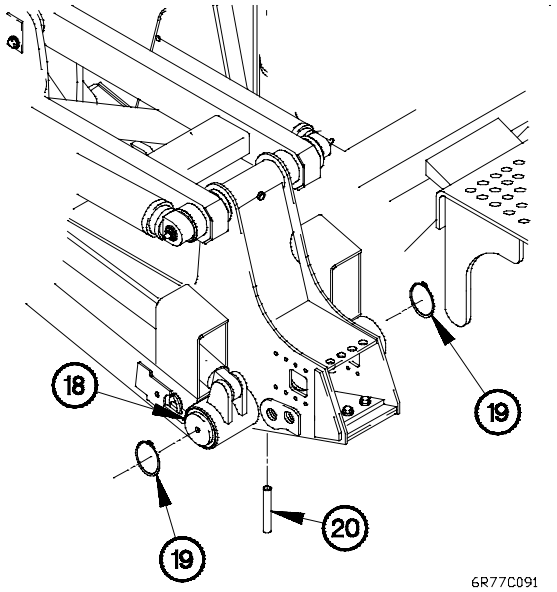
(17) Install two grease fittings (15) on retaining pin (10).




**NOTE**

Steps (18) requires the aid of an assistant.

(18) Install left lower arm (16) and right lower arm (17) on folding boom frame (7) with retaining pin (18).




(19) Install two retaining rings (19) on retaining pin (18).

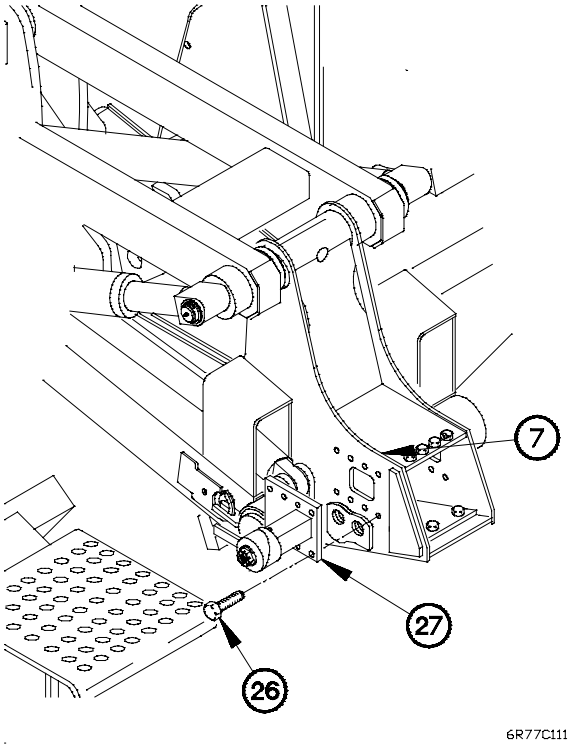
(20) Install slotted pin (20) in retaining pin (18).

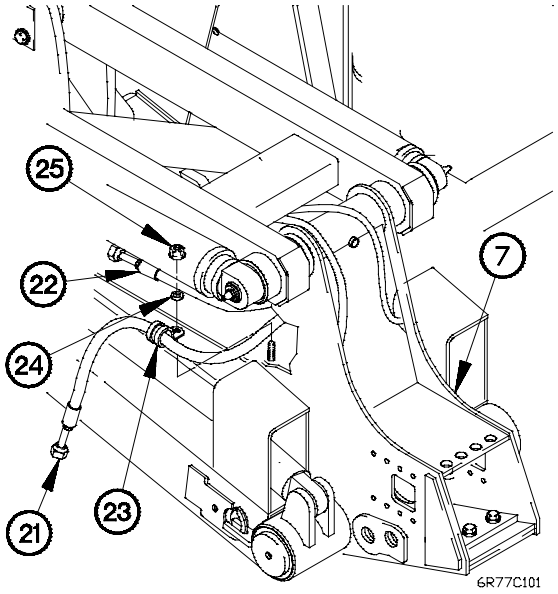
## 16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR (CONT)

(21) Install hydraulic hoses (21 and 22) in hose clamps (23).

(22) Position two hose clamps (23) on folding boom frame (7) with two washers (24) and self-locking nuts (25).

(23) Tighten two self-locking nuts (25) to 43-47 lb-ft (58-63 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.**

(24) Apply sealing compound to threads of eight screws (26).

(25) Position camlock assembly (27) on folding boom frame (7) with eight screws (26).

(26) Tighten eight screws (26) to 114-126 lb-ft (154-170 N•m).

**d. Follow-On Maintenance.**

(1) Install stinger cylinder (para 16-70).

(2) Place hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(3) Operate underlift and check for hydraulic leaks and proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR

This task covers:

a. Disassembly
b. Assembly
c. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Stiffleg extended (TM 9-2320-366-10-2).
Engine shut down (TM 9-2320-366-10-1).
Hydraulic reservoir supply and return valves closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 95, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Welders (Item 26, Appendix B)
Wrench Set, Socket (Item 84, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Tools and Special Tools (cont)**
Pan, Drain (Item 43, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Sealing Compound (Item 75, Appendix C)
Nut, Self-locking (8) (Item 179, Appendix F)
Nut, Self-locking (2) (Item 176, Appendix F)
Nut, Self-locking (Item 177, Appendix F)
Lockwasher (3) (Item 130, Appendix F)
Pin, Cotter (Item 327, Appendix F)
Nut, Self-locking (4) (Item 180, Appendix F)
Solvent, Dry Cleaning (Item 83, Appendix C)

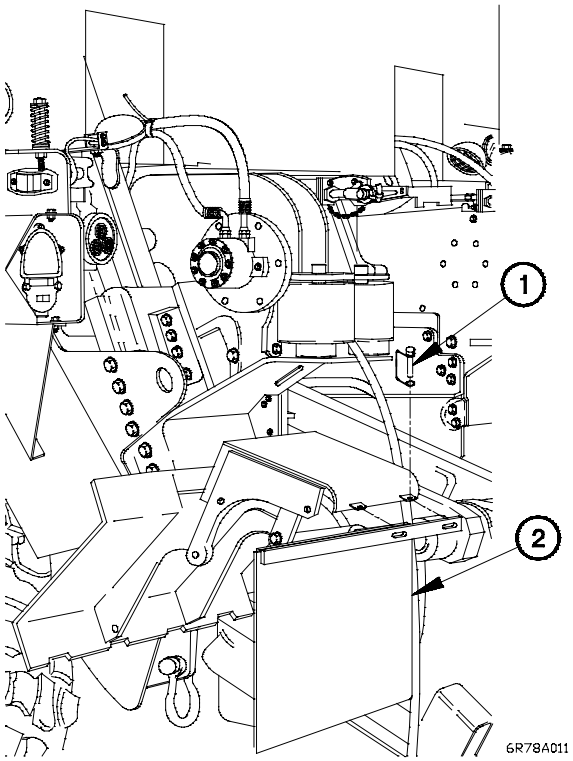
**Personnel Required**
(3)

**a. Disassembly.**

**NOTE**

Left and right side mudflaps are removed the same way. Left side shown.

(1) Remove two lock pins (1) and mudflap (2) from vehicle.



## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

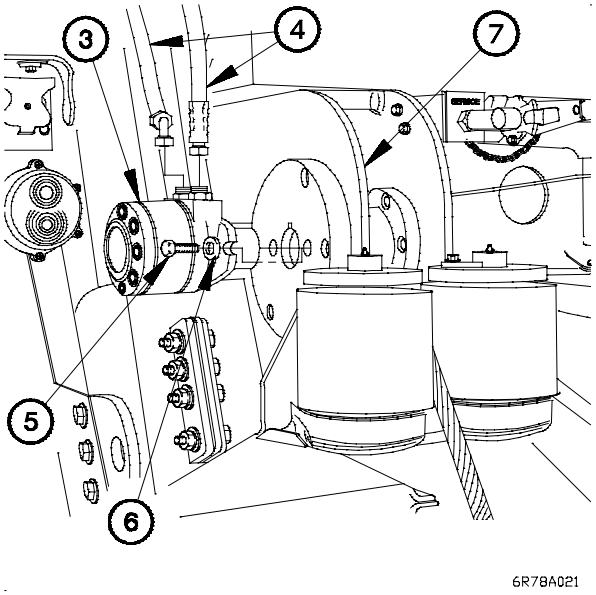
**NOTE**

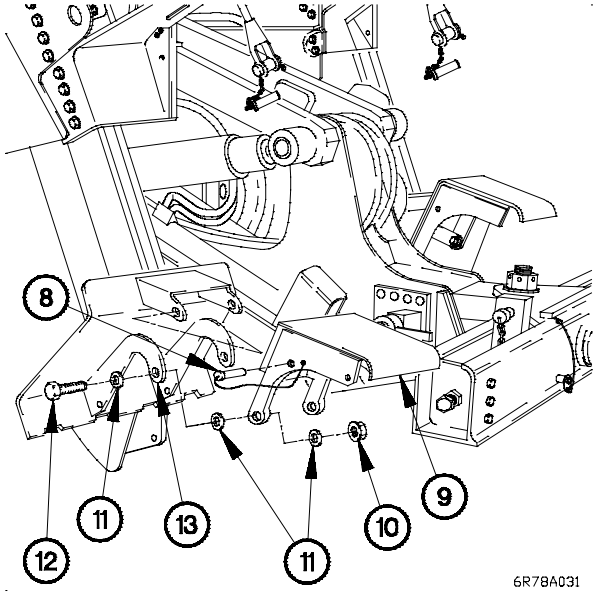
Left and right side pay-out hydraulic motors are removed the same way. Left side shown.

(2) Position drain pan under pay-out hydraulic motor (3).

(3) Disconnect two hoses (4) from pay-out hydraulic motor (3).

(4) Remove two bolts (5), washers (6), and pay-out hydraulic motor (3) from spooler weldment (7).



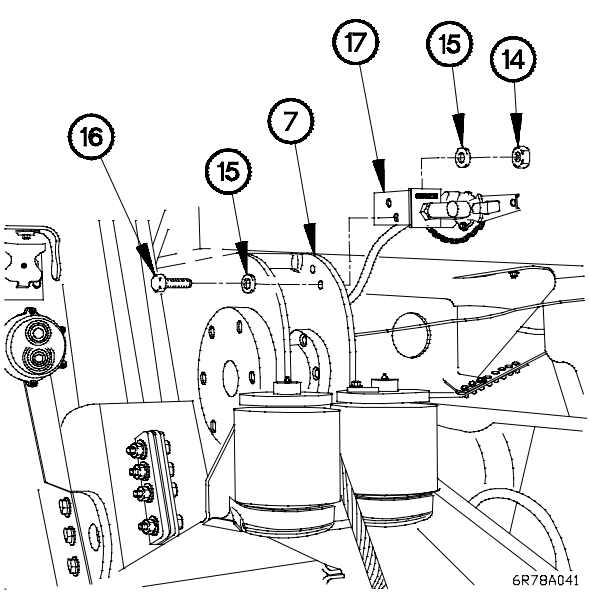

(7) Remove two self-locking nuts (14), four washers (15), two screws (16), and gladhand bracket (17) from spooler weldment (7). Discard self-locking nuts.

**NOTE**

Left and right side stiffleg assemblies are disassembled the same way. Left side shown.

(5) Remove two lock pins (8) from sandshoe (9).

(6) Remove two self-locking nuts (10), six washers (11), two screws (12), and sandshoe (9) from stiffleg (13). Discard self-locking nuts.



(8) Open lid (18) on tool box (19).

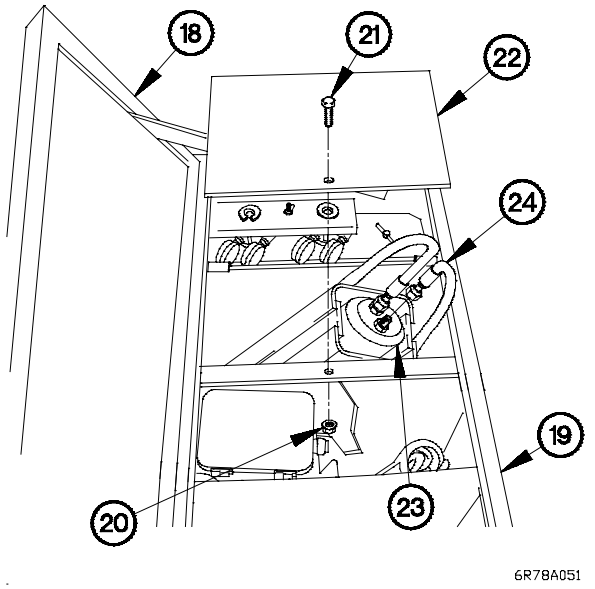
**NOTE**

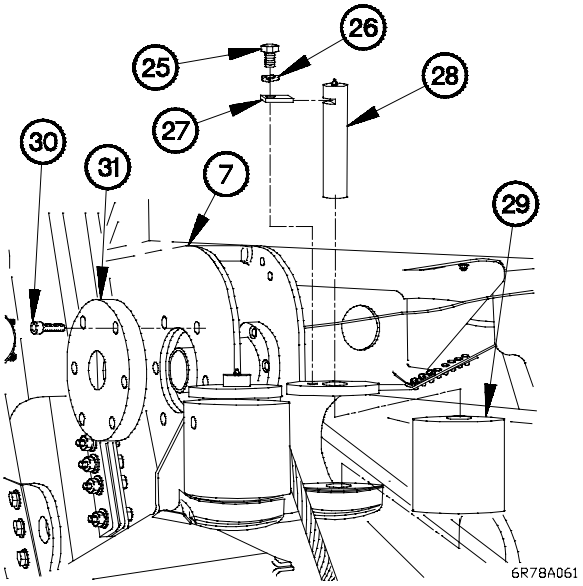
Step (9) requires the aid of an assistant.

(9) Remove self-locking nut (20), screw (21), and cover (22) from tool box (19). Discard self-locking nuts.

(10) Position drain pan under stiffleg cylinder (23).

(11) Disconnect two hoses (24) from stiffleg cylinder (23).

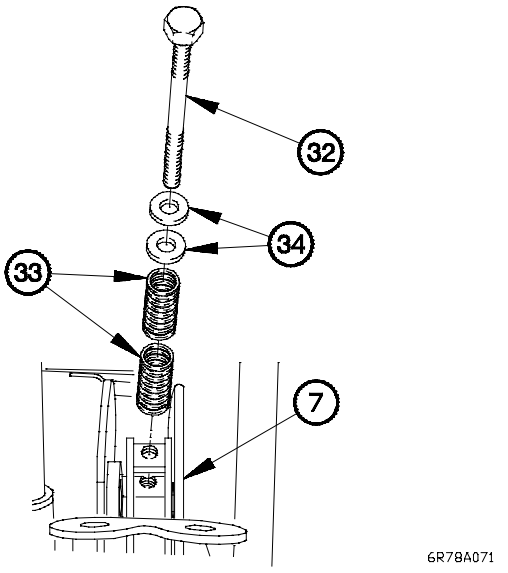



(12) Remove two bolts (25), lockwashers (26), retaining plates (27), roller pins (28), and guide rollers (29) from spooler weldment (7). Discard lockwashers.

(13) Remove six bolts (30) and plate (31) from spooler weldment (7).

(14) Remove bolt (32), two springs (33), and washers (34) from spooler weldment (7).



## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

**WARNING**

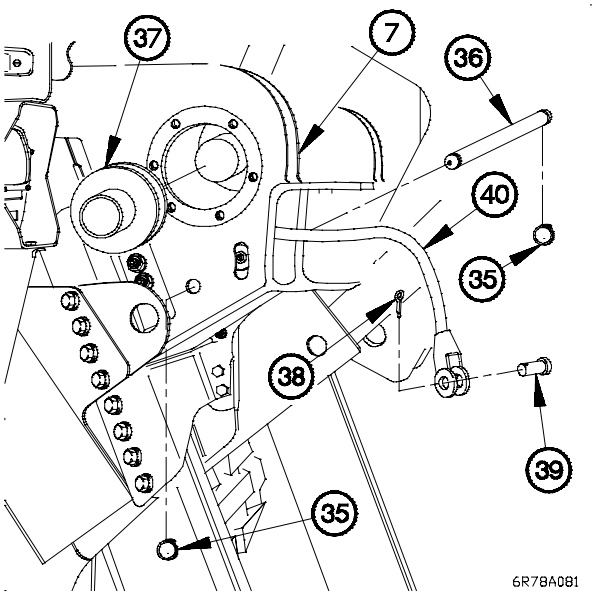
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

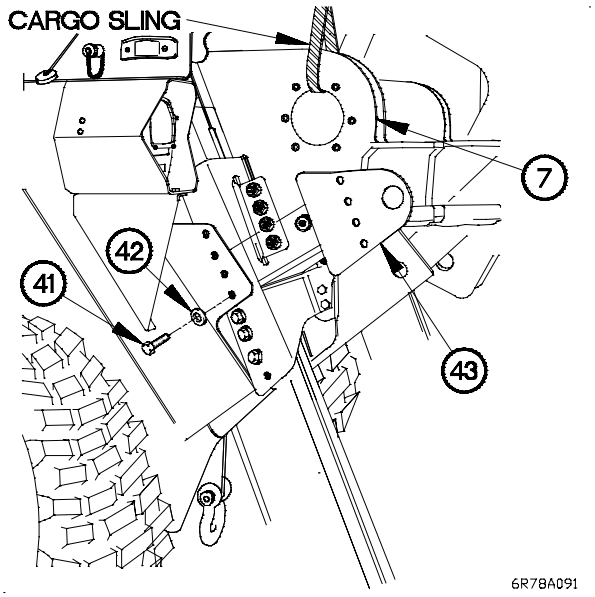
(15) Remove two retaining rings (35) and pin (36) from spooler weldment (7).

(16) Remove cable sheave (37) from spooler weldment (7).

(17) Remove cotter pin (38) and pin (39) from 30K winch cable (40). Discard cotter pin.

(18) Pull 30K winch cable (40) back through spooler weldment (7).

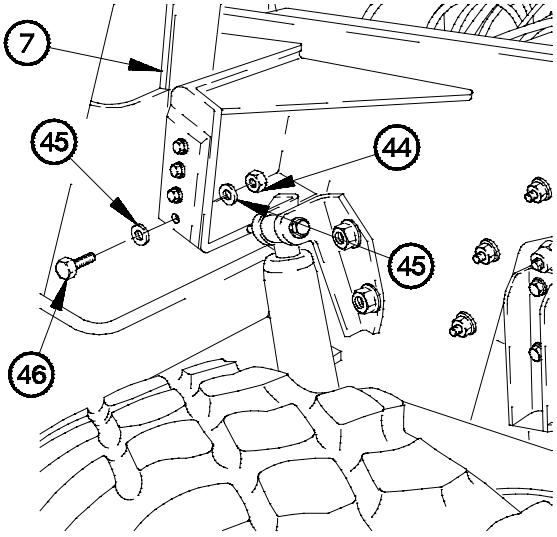



**WARNING**

**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.**

(19) Remove eight bolts (41), washers (42), and tow chain anchor (43) from spooler weldment (7).

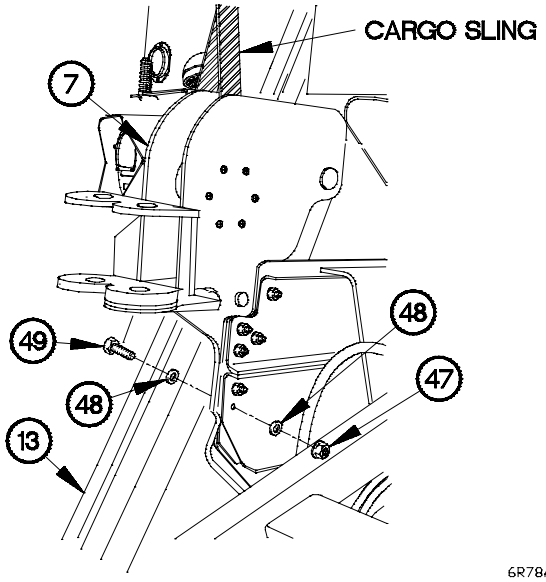



6R78A101

**NOTE**

Steps (20) through (27) require the aid of two assistants.

(20) Remove four self-locking nuts (44), eight washers (45), and four bolts (46) from spooler weldment (7). Discard self-locking nuts.




6R78A111

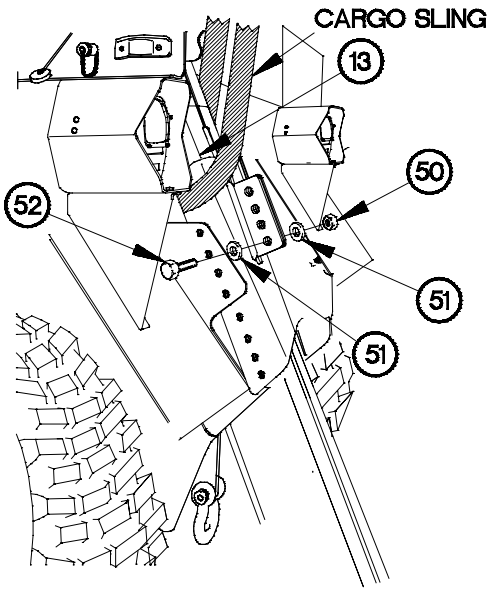
(21) Remove six self-locking nuts (47), 12 washers (48), six screws (49), and spooler weldment (7) from stiffleg (13). Discard self-locking nuts.

**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.**

(22) Remove four nuts (50), eight washers (51), and four bolts (52) from stiffleg (13).

(23) Remove stiffleg (13) from vehicle.




6R78A121

## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

**WARNING**

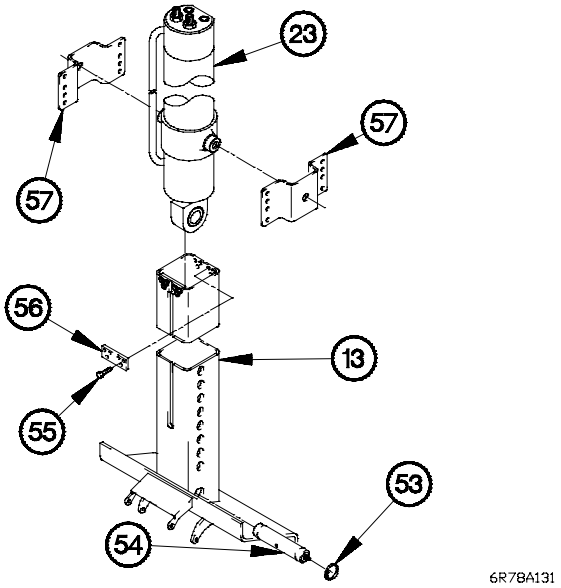
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(24) Remove two retaining rings (53) and retaining pin (54) from stiffleg cylinder (23).

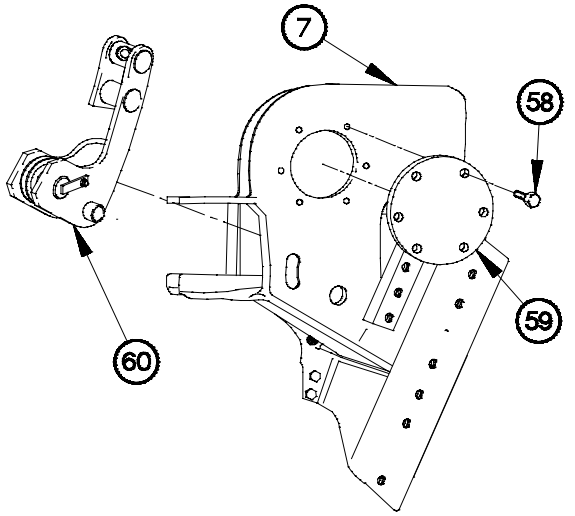
(25) Remove 12 screws (55) and two plates (56) from top of stiffleg (13).

(26) Remove stiffleg cylinder (23) from stiffleg (13).

(27) Remove two stiffleg cylinder brackets (57) from stiffleg cylinder (23).



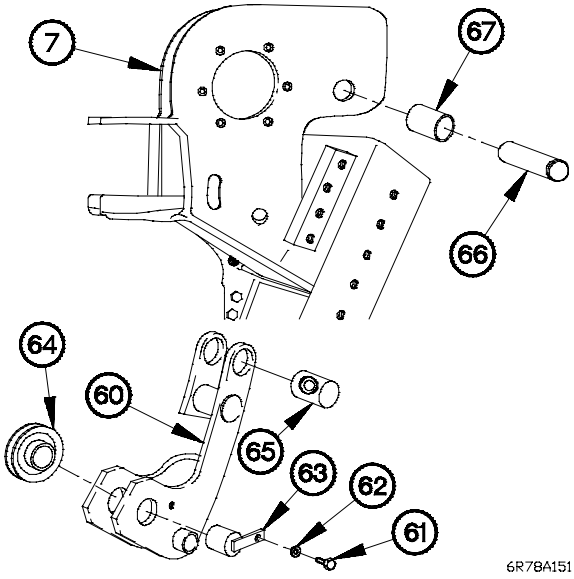
6R78A131



6R78A141

(28) Remove six screws (58) and cable sheave ring (59) from spooler weldment (7).

(29) Remove pivot arm (60) from spooler weldment (7).



6R78A151

(30) Remove bolt (61) and lockwasher (62) from pin (63). Discard lockwasher.

(31) Remove pin (63) and roller (64) from pivot arm (60).

(32) Remove pivot pin (65) from pivot arm (60).

(33) Remove pin (66) and sleeve (67) from spooler weldment (7).

**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.**

Clean all metal parts with dry cleaning solvent.

**c. Assembly.**

**NOTE**

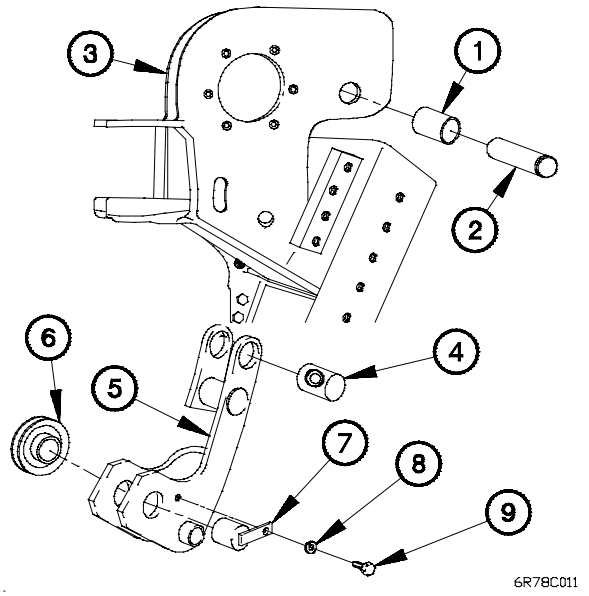
Left and right side stiffleg assemblies are assembled the same way. Left side shown.

(1) Install sleeve (1) and pin (2) in spooler weldment (3).

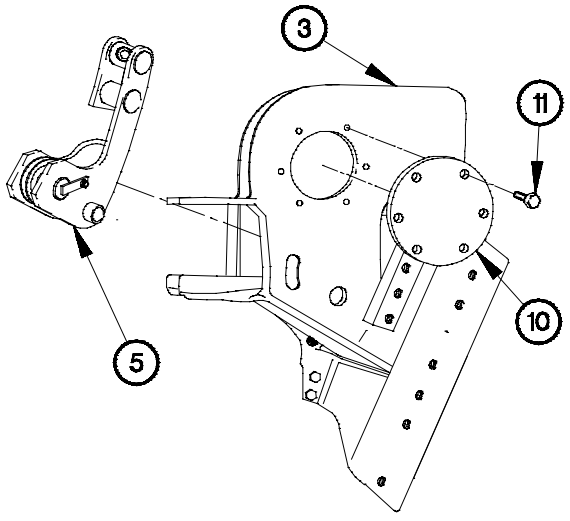
(2) Install pivot pin (4) in pivot arm (5).

(3) Install roller (6) in pivot arm (5) with pin (7).

(4) Install lockwasher (8) and bolt (9) in pin (7).



6R78C011



6R78C021

(5) Install pivot arm (5) in spooler weldment (3).

(6) Position cable sheave ring (10) in spooler weldment (3) with six bolts (11).

(7) Tighten six bolts (11) to 76-84 lb-ft (103-114 N·m).

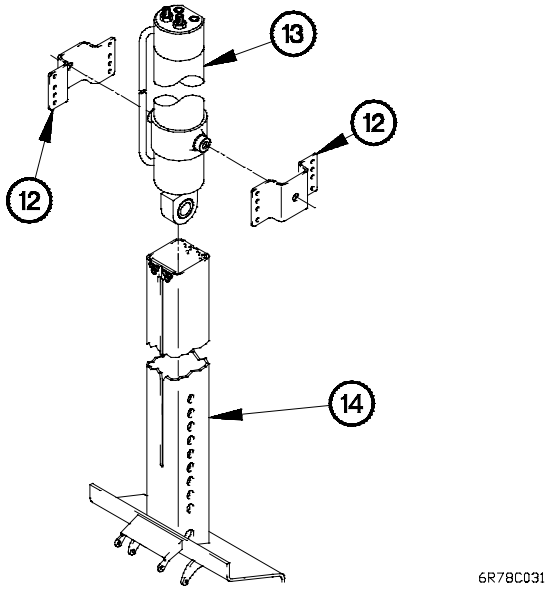
## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

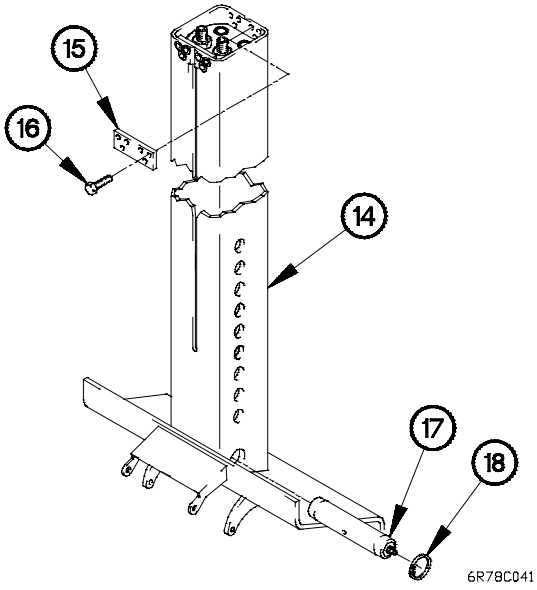
**NOTE**

- Note position of stiffleg bracket holes prior to installation.
- If replacement stiffleg cylinder is being installed, it will be necessary to extend stiffleg cylinder rod prior to installation.
- Steps (8) through (12) require the aid of an assistant.

(8) Install two stiffleg cylinder brackets (12) on stiffleg cylinder (13).

(9) Install stiffleg cylinder (13) in stiffleg (14).




(10) Position two plates (15) on stiffleg (14) with 12 screws (16).

(11) Tighten 12 screws (16) to 105-115 lb-ft (142-156 N·m).

(12) Install cylinder retaining pin (17) in stiffleg (14).

**WARNING**

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

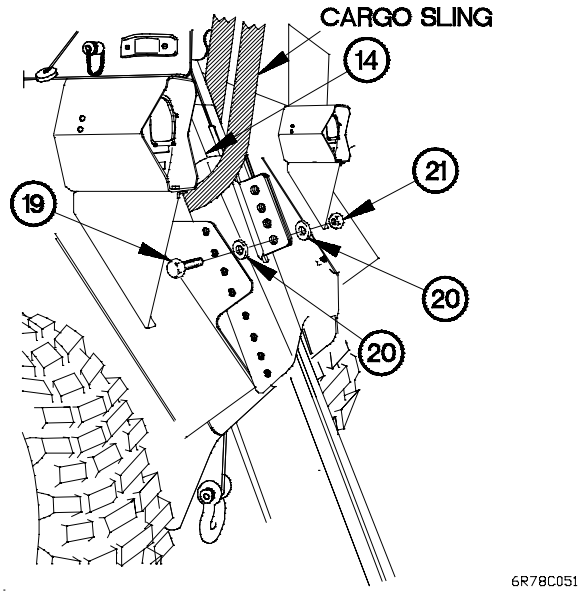
(13) Install two retaining rings (18) on cylinder retaining pin (17).

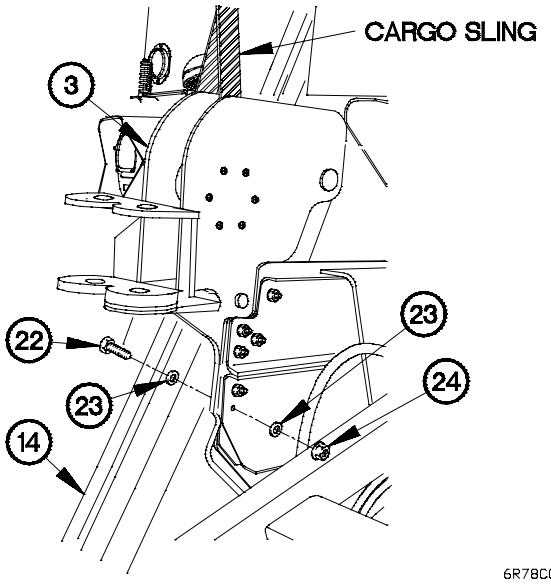
**WARNING**

- **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.**
- **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.**

(14) Apply sealing compound to threads of four bolts (19).

(15) Position stiffleg (14) on vehicle with four bolts (19), eight washers (20), and four self-locking nuts (21).




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

**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.**

(17) Position spooler weldment (3) on stiffleg (14) with six screws (22), 12 washers (23), and six self-locking nuts (24).

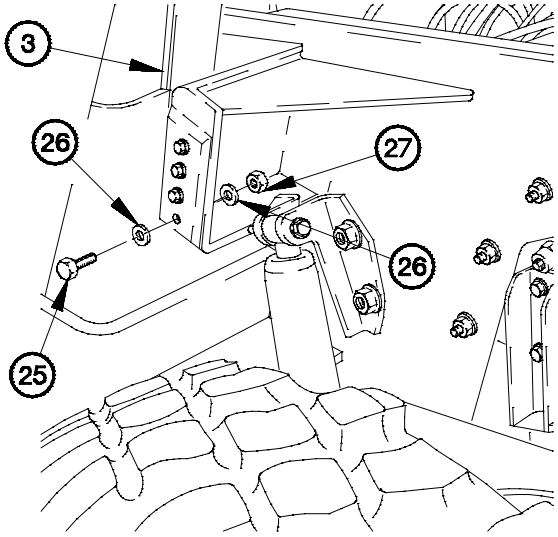
## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

**WARNING**

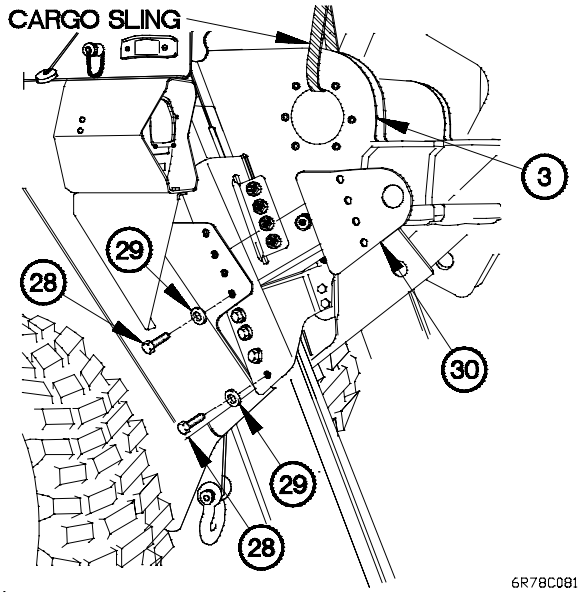
**Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(18) Apply sealing compound to threads four bolts (25).

(19) Position four bolts (25), eight washers (26), and four self-locking nuts (27) in spooler weldment (3).



6R78C071



6R78C081

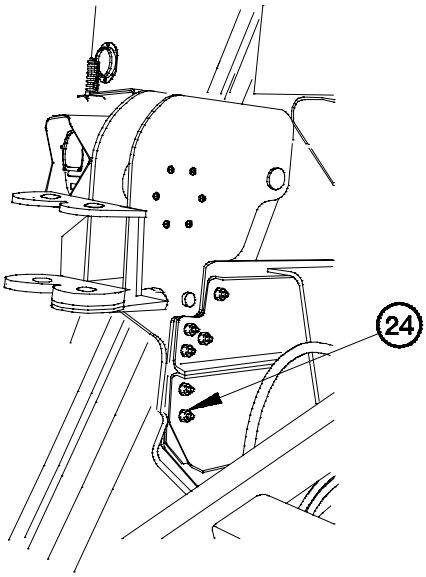
(20) Apply sealing compound to threads of eight bolts (28).

(21) Position four washers (29) and bolts (28) in spooler weldment (3).

(22) Position tow chain anchor (30) on spooler weldment (3) with four washers (29) and bolts (28).

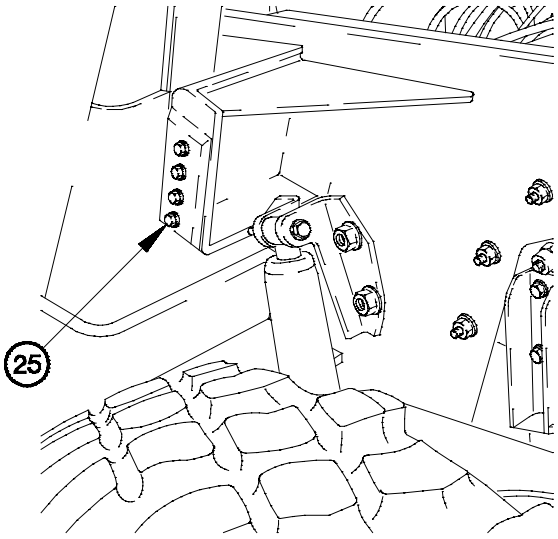
(23) Tighten four bolts (28) to 152-168 lb-ft (206-228 N·m).

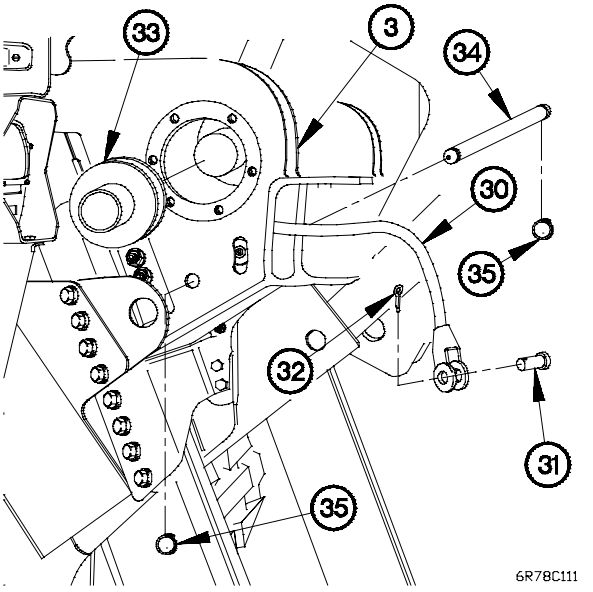
(24) Tighten six self-locking nuts (24) to 152-168 lb-ft (206-228 N·m).



6R78C091

(25) Tighten four bolts (25) to 152-168 lb-ft (206-228 N·m).




(26) Route 30K winch cable (30) through spooler weldment (3).

(27) Install pin (31) in 30K winch cable (30) with cotter pin (32).

(28) Install cable sheave (33) in spooler weldment (3).

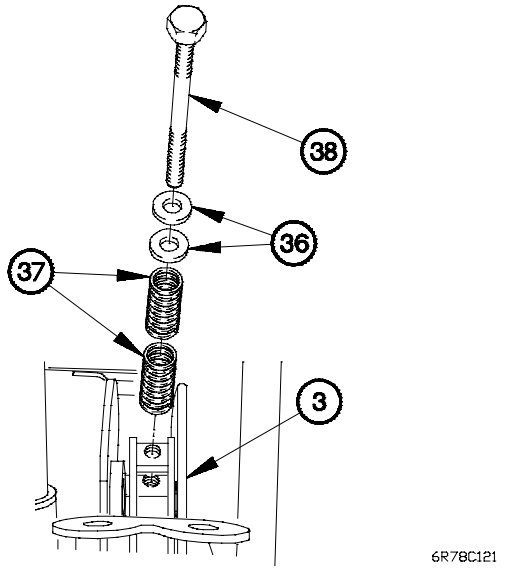
**WARNING**

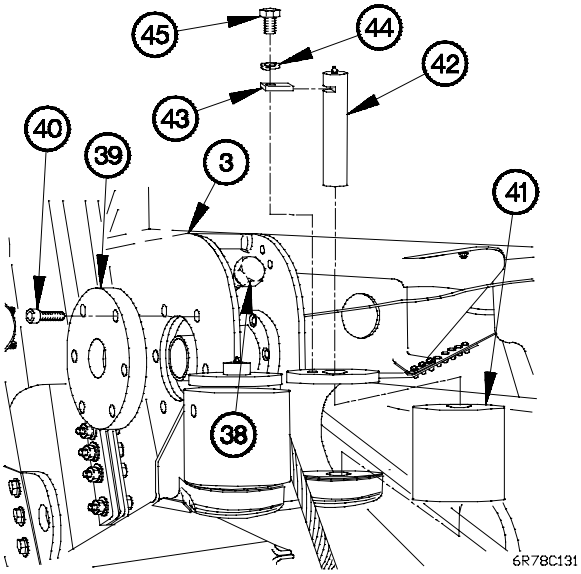
**Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(29) Install pin (34) in spooler weldment (3) with two retaining rings (35).

## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

(30) Position two washers (36), springs (37), and bolt (38) in spooler weldment (3).




(31) Position plate (39) on spooler weldment (3) with six bolts (40).

(32) Tighten six bolts (40) to 76-84 lb-ft (103-114 N·m).

(33) Tighten bolt (38) eight and one half turns.

(34) Position two guide rollers (41) in spooler weldment (3) with two roller pins (42), retaining plates (43), lockwashers (44), and bolts (45).

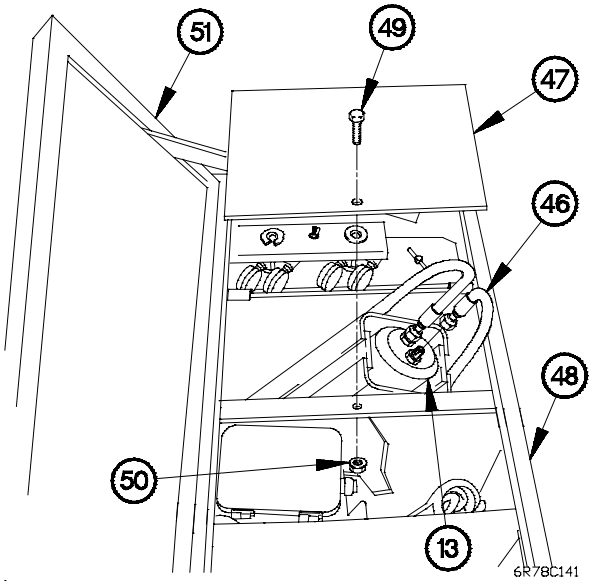
(35) Tighten two bolts (45) to 76-84 lb-ft (103-114 N·m).

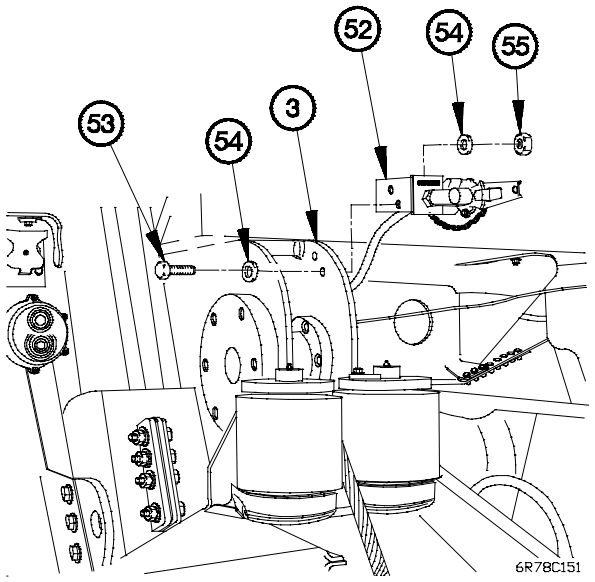
(36) Position two hoses (46) on stiffleg cylinder (13).

(37) Tighten two hoses (46) to 36-39 lb-ft (49-53 N·m).

(38) Install cover (47) on tool box (48) with screw (49) and self-locking nut (50).

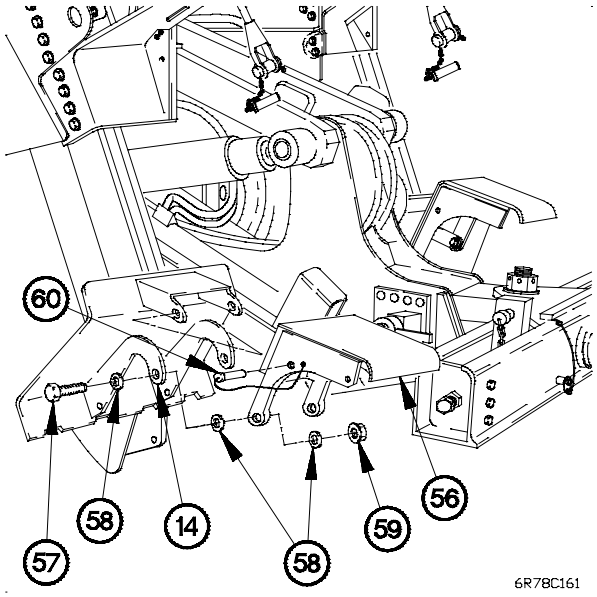
(39) Close lid (51) on tool box (48).






(40) Position gladhand bracket (52) on spooler weldment (3) with two screws (53), four washers (54), and two self-locking nuts (55).

(41) Tighten two self-locking nuts (55) to 76-84 lb-ft (103-114 N·m).

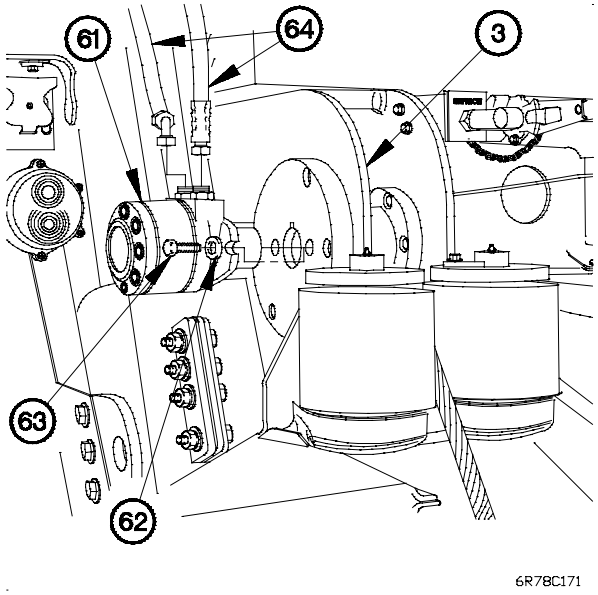



(42) Install sandshoe (56) on stiffleg (14) with two screws (57), six washers (58), and two self-locking nuts (59).

(43) Install tow lock pins (60) in sandshoe (56).

**NOTE**

Left and right side pay-out hydraulic motors are installed the same way. Left side shown.



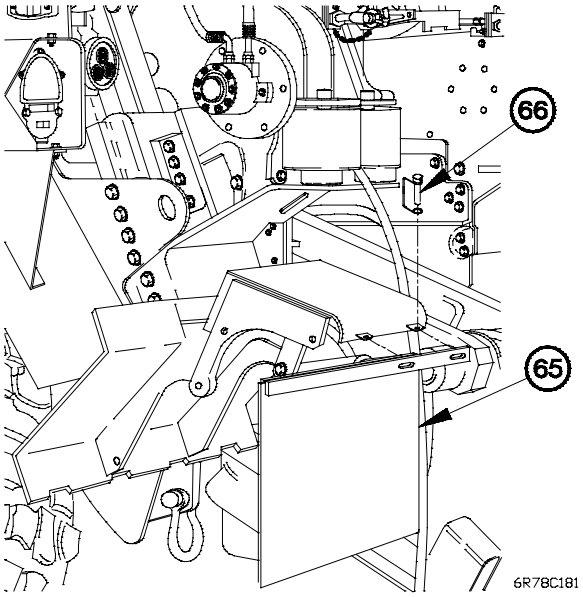

(44) Position pay-out hydraulic motor (61) on spooler weldment (3) with two washers (62) and bolts (63).

(45) Tighten two bolts (63) to 76-84 lb-ft (103-114 N·m).

(46) Position two hoses (64) on pay-out hydraulic motor (61).

(47) Tighten two hoses (64) to 36-39 lb-ft (49-53 N·m).

## 16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)




**NOTE**

Left and right side mudflaps are installed the same way. Left side shown.

(48) Install rear mudflap (65) on vehicle with two lock pins (66).

**d. Follow-on Maintenance**

(1) Hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(2) Operate stiffleg and check for hydraulic leaks and proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-79. M1089 FLOWMETER VALVE ASSEMBLY REPLACEMENT/ADJUSTMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Underlift lowered (TM 9-2320-366-10-2).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).

**Tools/Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Tools/Special Tools (Cont)**
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts**
Nut, Self-Locking (8) (Item 211, Appendix F)
Sealing Compound (Item 75, Appendix C)

**Personnel Required**
(2)

**NOTE**

- This procedure applies to both the upper and lower flowmeter valve assemblies. The upper flowmeter valve assembly is shown.
- The upper flowmeter valve assembly must be removed first.

**a. Removal.**

(1) Remove nut (1) and bracket (2) from tool box (3).

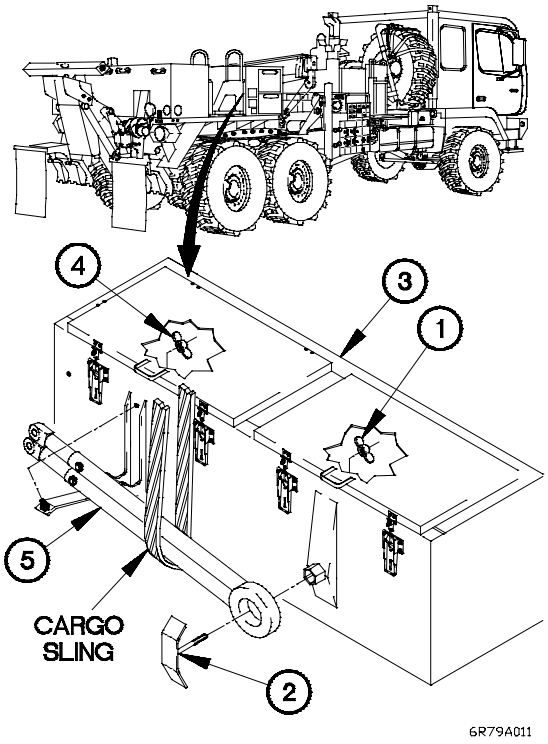
**WARNING**

**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.**

**NOTE**

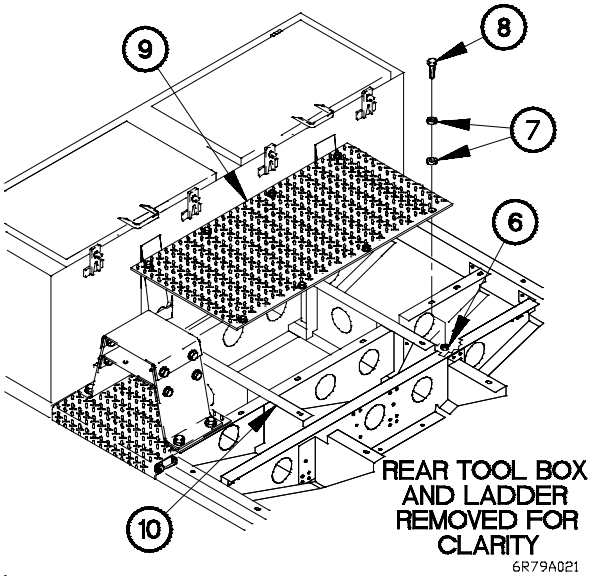
Steps (2) requires the aid of two assistants.

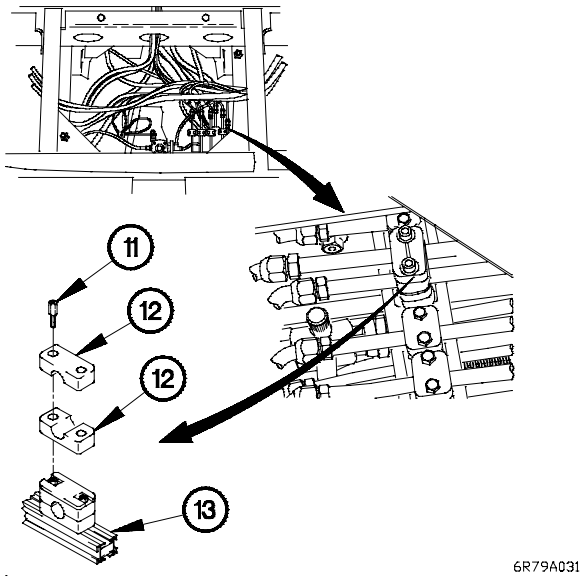
(2) Remove nut (4) and tow bar (5) from tool box (3).



## 16-79. M1089 FLOWMETER VALVE ASSEMBLY REPLACEMENT/ADJUSTMENT (CONT)

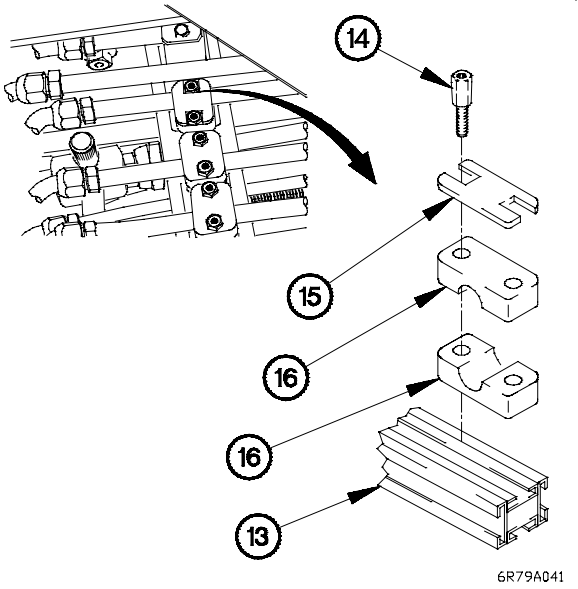
(3) Remove eight self-locking nuts (6), 16 washers (7), eight bolts (8), and floor plate (9) from support platform (10). Discard self-locking nuts.




(4) Remove two studs (11) and caps (12) from support (13).

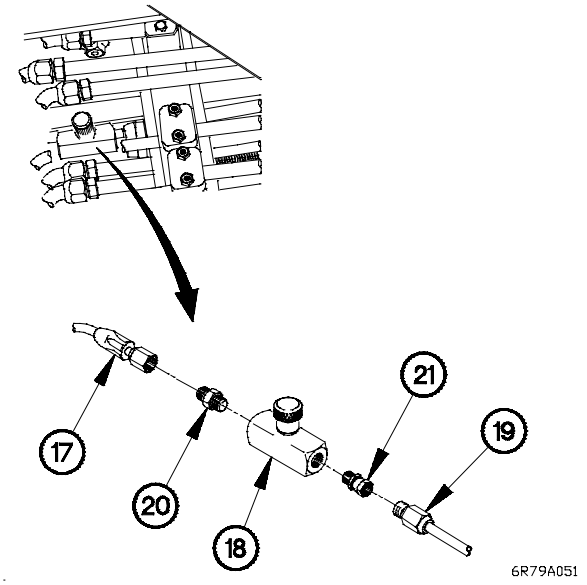
(5) Remove two studs (14), retainer (15), and caps (16) from support (13).



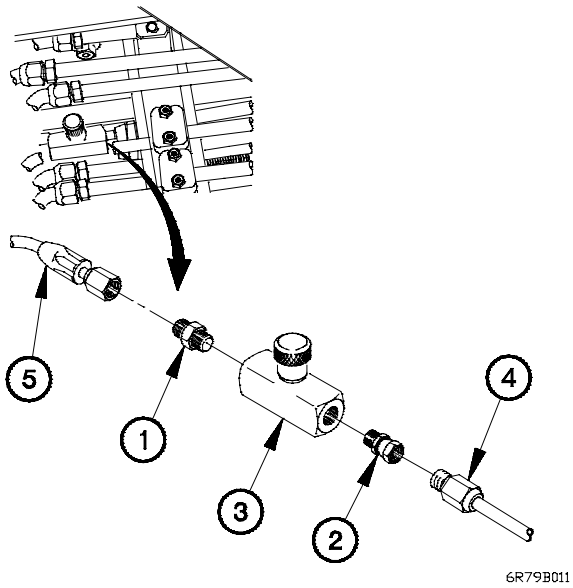
(6) Disconnect hydraulic hose (17) from flowmeter valve assembly (18).

(7) Remove flowmeter valve assembly (18) from hydraulic tube (19).

(8) Remove adapters (20 and 21) from flowmeter valve assembly (18).




**b. Installation.**




**WARNING**

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

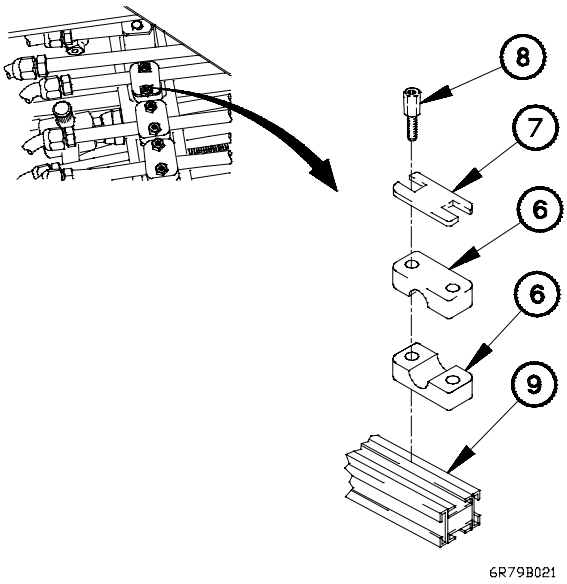
(1) Apply sealing compound to threads of adapters (1 and 2).

(2) Install adapters (1 and 2) on flowmeter valve assembly (3).

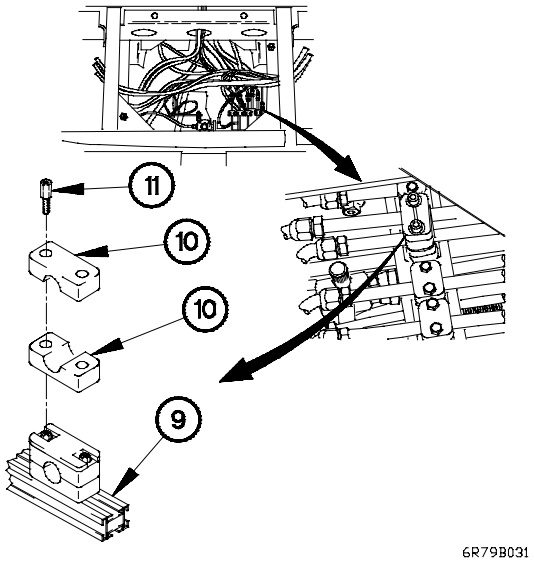
(3) Connect flowmeter valve assembly (3) to hydraulic tube (4).

(4) Connect hydraulic hose (5) to flowmeter valve assembly (3).

## 16-79. M1089 FLOWMETER VALVE ASSEMBLY REPLACEMENT/ADJUSTMENT (CONT)

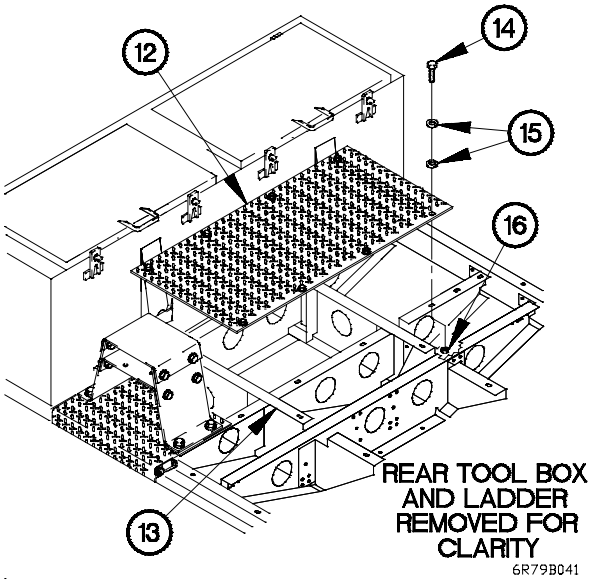



(5) Install two caps (6), retainer (7), and studs (8) on support (9).




(6) Install two caps (10) and studs (11) on support (9).

(7) Install floor plate (12) on support platform (13) with eight bolts (14), sixteen washers (15), and eight self-locking nuts (16).

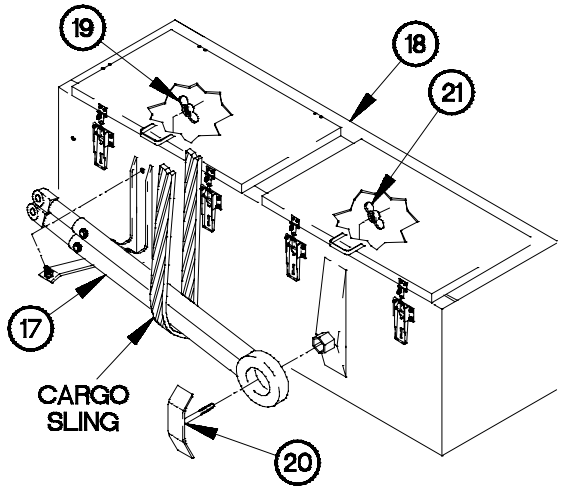


**WARNING**

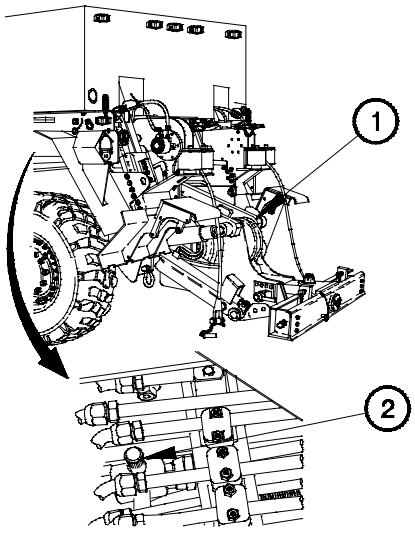
**Tow bar weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**

(8) Install tow bar (17) on tool box (18) with nut (19).

(9) Install bracket (20) on tool box (18) with nut (21).




**c. Adjustment**




(1) Hydraulic reservoir supply and return valves open (TM 9-2320-366-10).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Start engine (TM 9-2320-366-10-1).

(4) Engage PTO (TM 9-2320-366-10-1).

**NOTE**

Steps (5) through (8) require the aid of an assistant.

(5) Unfold underlift (1) (TM 9-2320-366-10-1).

**NOTE**

Underlift should fold in 6-8 seconds.

(6) Record time for underlift (1) to fold.

**NOTE**

Loosen set screw and turn flowmeter valve left to decrease speed and right to increase speed.

(7) Adjust lower flowmeter valve (2), as required.

(8) Repeat Steps (5) through (7), as required.

(9) Tighten setscrew (3)

## 16-79. M1089 FLOWMETER VALVE ASSEMBLY REPLACEMENT/ADJUSTMENT (CONT)

**NOTE**

Steps (10) through (12) require the aid of an assistant.

(10) Extend stinger (4) (TM 9-2320-366-10-1).

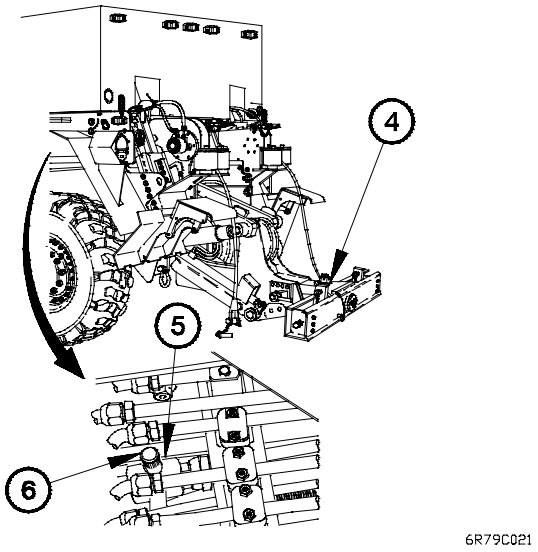
**NOTE**

Stinger should retract in 6-8 seconds.

(11) Record time for stinger (4) to retract.

**NOTE**

Loosen set screw and turn flowmeter valve left to decrease speed and right to increase speed.



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(12) Adjust upper flowmeter valve (5) , as required.

(13) Repeat steps (10) through (12), as required.

(14) Tighten setscrew (6).

**d. Follow-On Maintenance.**

(1) Check hydraulic fluid levels (TM 9-2320-366-10-2).

(2) Stow underlift (TM 9-2320-366-10-2).

**End of Task.**

## 16-80. M1089 SELECTOR VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).
Control panel assembly covers removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Tools and Special Tools (Cont)**
Pan, Drain (Item 43, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Set, Crowfoot, Ratcheting (TM 9-2320-366-20)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Nut, Self-Locking (2) (Item 178, Appendix F)
Packing, Preformed (2) (Item 232, Appendix F)

**CAUTION**

Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

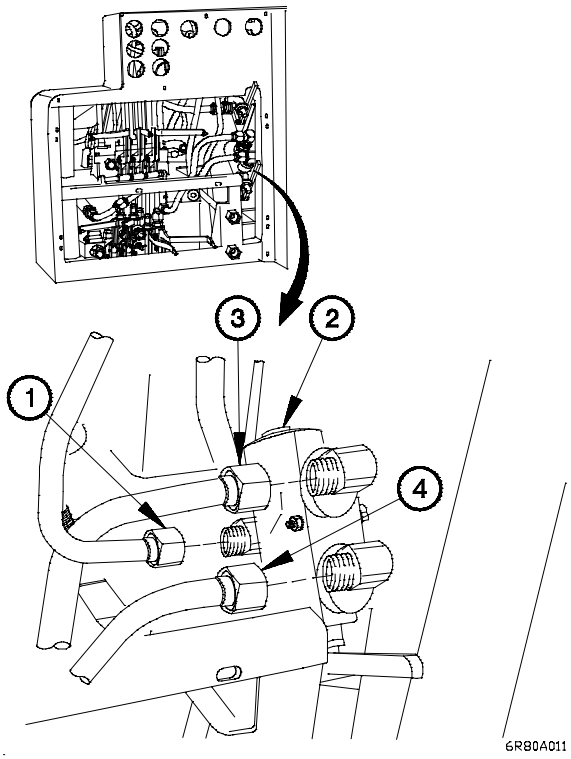
Both SECONDARY CIRCUIT SELECTOR VALVE and PRIMARY CIRCUIT SELECTOR VALVE are removed the same way. SECONDARY CIRCUIT SELECTOR VALVE shown.

**a. Removal.**

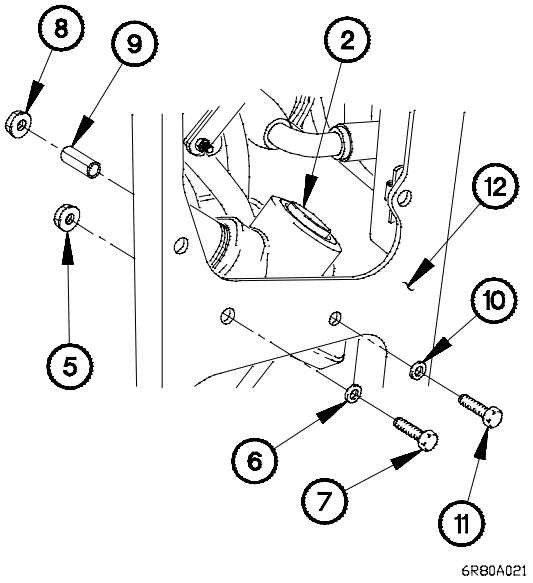
(1) Disconnect rear hydraulic tube (1) from SECONDARY CIRCUIT SELECTOR VALVE (2).

(2) Disconnect upper hydraulic tube (3) from SECONDARY CIRCUIT SELECTOR VALVE (2).

(3) Disconnect lower hydraulic tube (4) from SECONDARY CIRCUIT SELECTOR VALVE (2).



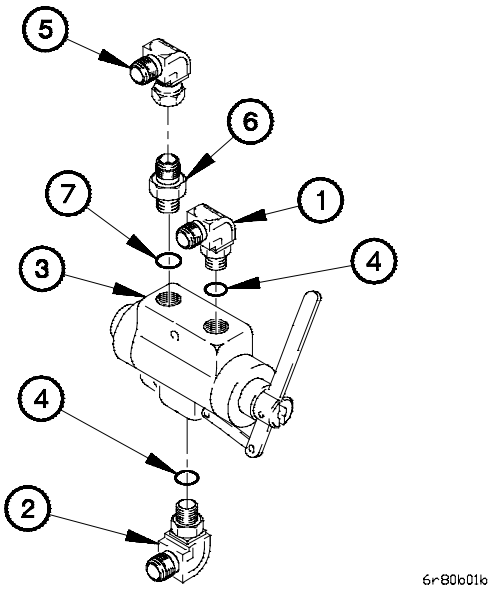
## 16-80. M1089 SELECTOR VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




(4) Remove self-locking nut (5), washer (6), and screw (7) from SECONDARY CIRCUIT SELECTOR VALVE (2). Discard self-locking nut.

(5) Remove self-locking nut (8), spacer (9), washers (10), screw (11), and SECONDARY CIRCUIT SELECTOR VALVE (2) from control panel (12). Discard self-locking nut.

**b. Disassembly.**




**NOTE**

Fittings not equipped with preformed packing as indicated in maintenance steps, are to be discarded and replaced with new item listed in TM 9-2320-366-24P.

(1) Remove 90-degree fittings (1 and 2) from SECONDARY CIRCUIT SELECTOR VALVE (3).

(2) Remove preformed packing (4) from 90-degree fittings (1 and 2). Discard preformed packings.

(3) Remove 90-degree fitting (5) from adapter (6).

(4) Remove adapter (6) from SECONDARY CIRCUIT SELECTOR VALVE (3).

(5) Remove preformed packing (7) from adapter (6). Discard preformed packing.

**c. Assembly.**

(1) Install preformed packing (1) on adapter (2).

(2) Position adapter (2) in SECONDARY CIRCUIT SELECTOR VALVE (3).

(3) Tighten adapter (2) to 125-135 lb-ft (170-183 N·m).

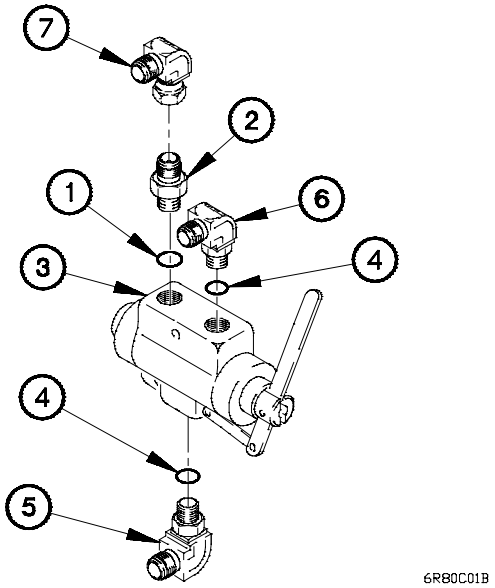
(4) Install preformed packing (4) on 90-degree fittings (5 and 6).

(5) Install 90-degree fittings (5 and 6) in SECONDARY CIRCUIT SELECTOR VALVE (3).

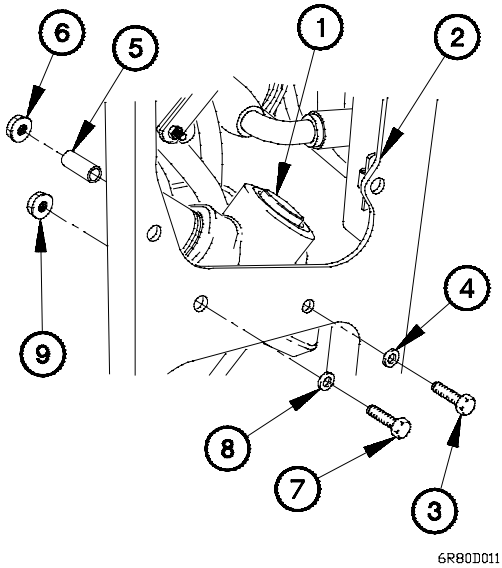
(6) Tighten 90-degree fitting (5 and 6) to 125-135 lb-ft (170-183 N·m).

(7) Position 90-degree fitting (7) on adapter (2).

(8) Tighten 90-degree fitting (7) to 79-87 lb-ft (107-118 N·m).




**d. Installation.**



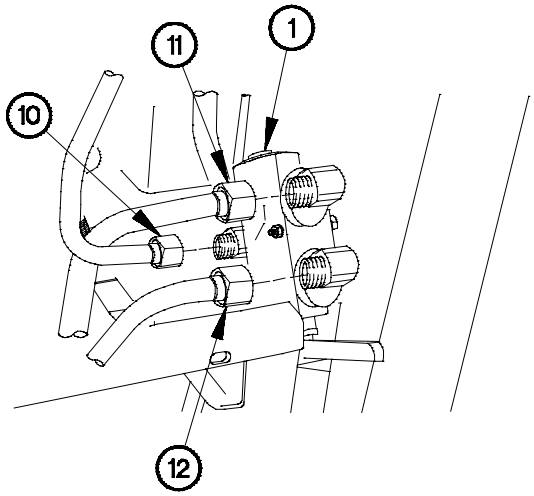

(1) Install SECONDARY CIRCUIT SELECTOR VALVE (1) in control panel (2) with screw (3), washer (4), spacer (5), and self-locking nut (6).

(2) Install screw (7), washer (8), and self-locking nut (9) in SECONDARY CIRCUIT SELECTOR VALVE (1).

(3) Connect rear hydraulic tube (10) to SECONDARY CIRCUIT SELECTOR VALVE (1).

(4) Connect upper hydraulic tube (11) to SECONDARY CIRCUIT SELECTOR VALVE (1).

(5) Connect lower hydraulic tube (12) to SECONDARY CIRCUIT SELECTOR VALVE (1).




**e. Follow-On Maintenance.**

(1) Install control panel assembly covers (TM 9-2320-366-20-5).

(2) Open hydraulic reservoir supply and return valve (TM 9-2320-366-10-2).

(3) Connect batteries (TM 9-2320-366-20-3).

(4) Service hydraulic reservoir (TM 9-2320-366-10-1).

(5) Start engine (TM 9-2320-366-10-1).

(6) Operate wrecker control functions and check for hydraulic leaks (TM 9-2320-366-10-2).

(7) Shut down engine (TM 9-2320-366-10-1).

**End of Task.**

## 16-81. M1089 30K WINCH COUNTERBALANCE/CARTRIDGE/SOLENOID VALVE REPLACEMENT

This task covers:

a. Cartridge Valve Removal
b. Cartridge Valve Installation
c. Solenoid Valve Removal
d. Solenoid Valve Installation
e. Counterbalance Valve Removal
f. Counterbalance Valve Installation
g. Follow-On Maintenance

**INITIAL SETUP**

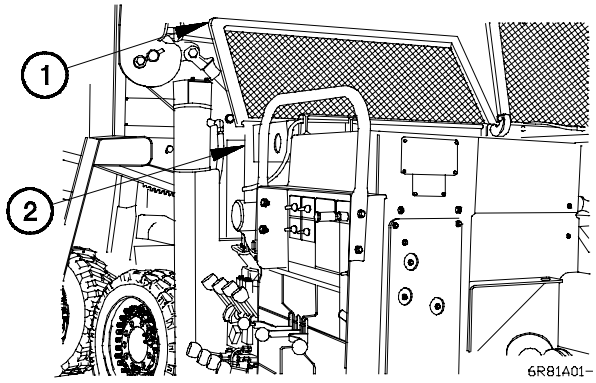
**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Socket Wrench, Attachment Screwdriver (TM 9-2320-366-20)
Cap, Vise Jaw (Item 12, Appendix B)

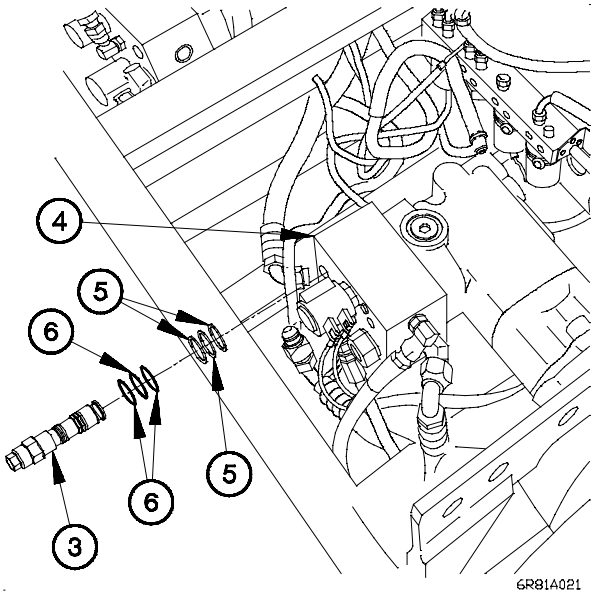
**Tools and Special Tools (Cont)**
Adapter, Socket Wrench, (Item 3, Appendix B)
Pan, Drain (Item 43, Appendix B)
Vise, Machinists (Item 82, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Parts Kit, Winch (Item 323, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Kit, Seal (Item 118, Appendix F)

**a. Cartridge Valve Removal.**




(1) Open catwalk (1) on 30K winch (2).




(2) Position drain pan under cartridge valve (3).

(3) Remove cartridge valve (3) from counterbalance valve (4).

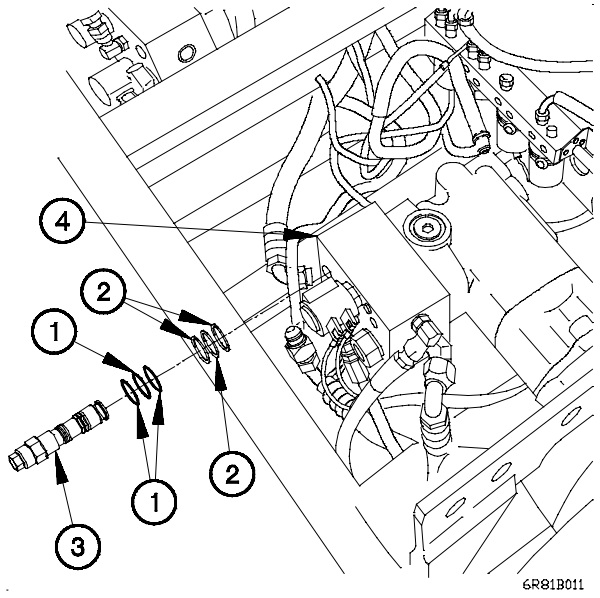
(4) Remove three backup rings (5) and preformed packings (6) from cartridge valve (3). Discard back-up rings and preformed packings.

**b. Cartridge Valve Installation.**

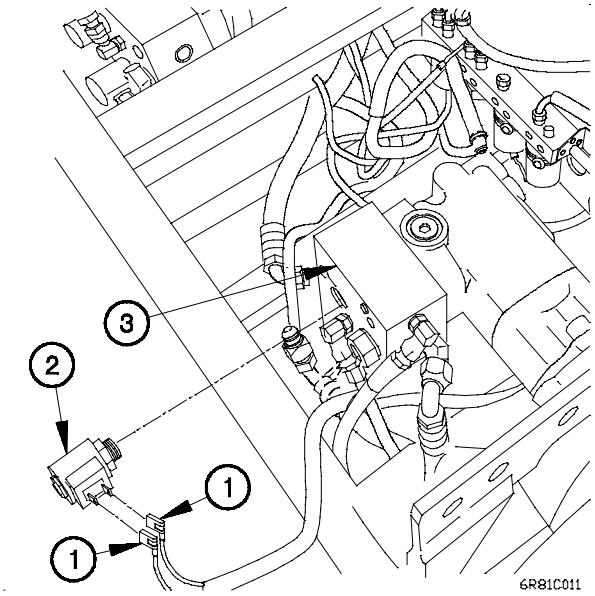
(1) Install three preformed packings (1) and backup rings (2) on cartridge valve (3).

(2) Position cartridge valve (3) in counterbalance valve (4).

(3) Tighten cartridge valve (3) to 30-35 lb-ft (41-48 N·m).




**c. Solenoid Valve Removal.**



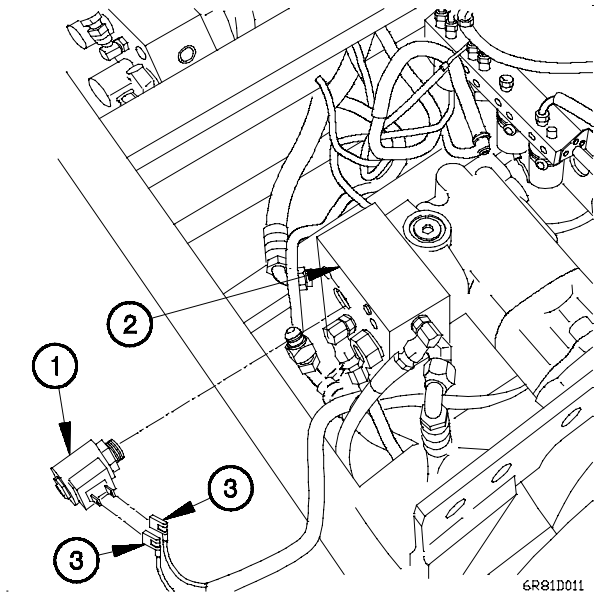

(1) Disconnect two electrical connectors (1) from solenoid valve (2).

(2) Remove solenoid valve (2) from counterbalance valve (3).

**d. Solenoid Valve Installation.**

(1) Install solenoid valve (1) in counterbalance valve (2).

(2) Connect two electrical connectors (3) to solenoid valve (1).



## 16-81. M1089 30K WINCH COUNTERBALANCE/CARTRIDGE/SOLENOID REPLACEMENT (CONT)

**e. Counterbalance Valve Removal.**

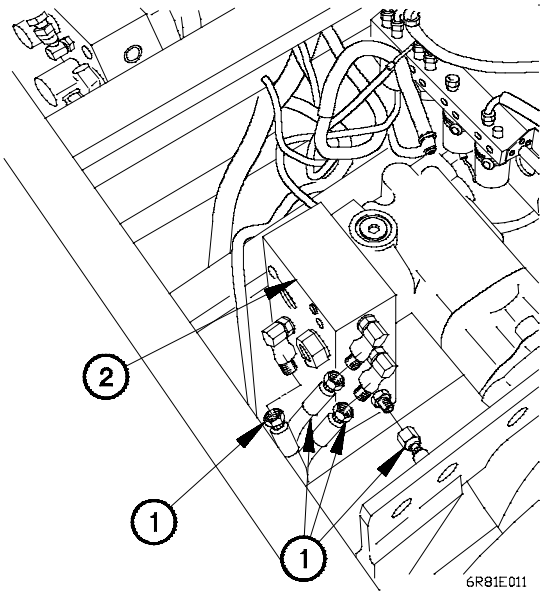
**CAUTION**

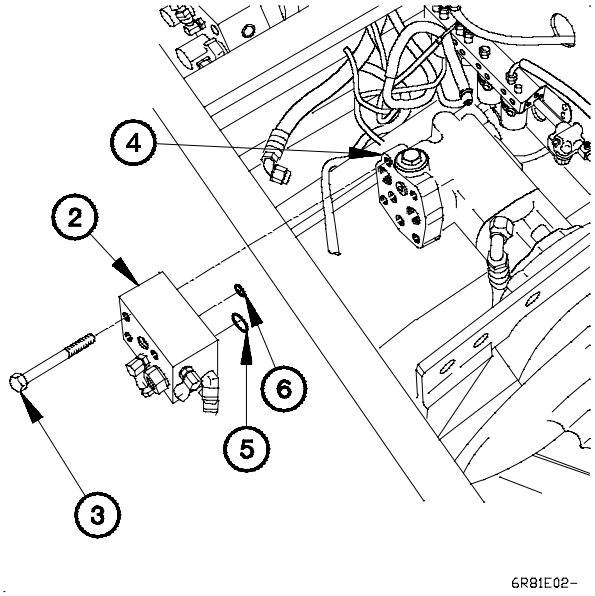
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(1) Disconnect four hydraulic hoses (1) from counterbalance valve (2).




(2) Remove four screws (3) and counterbalance valve (2) from winch drive motor assembly (4).

(3) Remove two preformed packings (5 and 6) from counterbalance valve (2). Discard preformed packings.

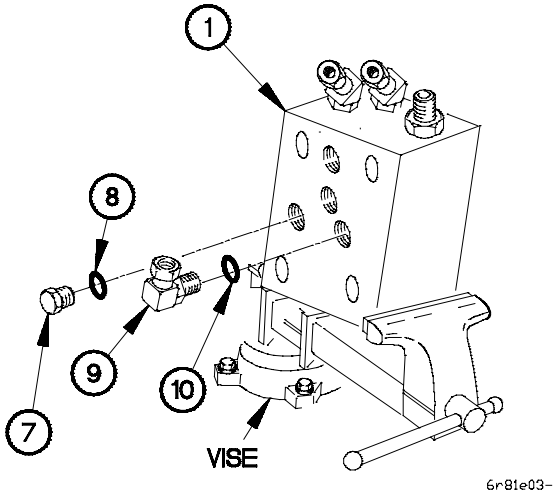
(4) Place counterbalance valve (1) in vise.

(5) Remove valve plug (7) from counterbalance valve (1).

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

(7) Remove 90-degree fitting (9) from counterbalance valve (1).

(8) Remove preformed packing (10) from 90-degree fitting (9). Discard preformed packing.



**NOTE**

Perform steps (9) through (14) on RH 30K winch counterbalance valve.

(9) Remove 45-degree fitting (11) from counterbalance valve (1).

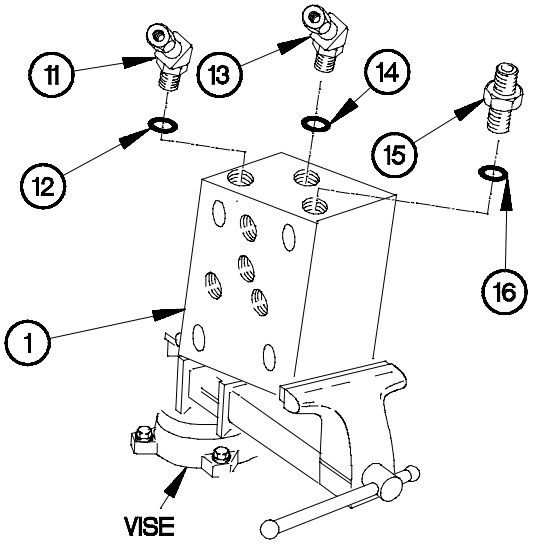
(10) Remove preformed packing (12) from 45-degree fitting (11). Discard preformed packing.

(11) Remove 45-degree fitting (13) from counterbalance valve (1).

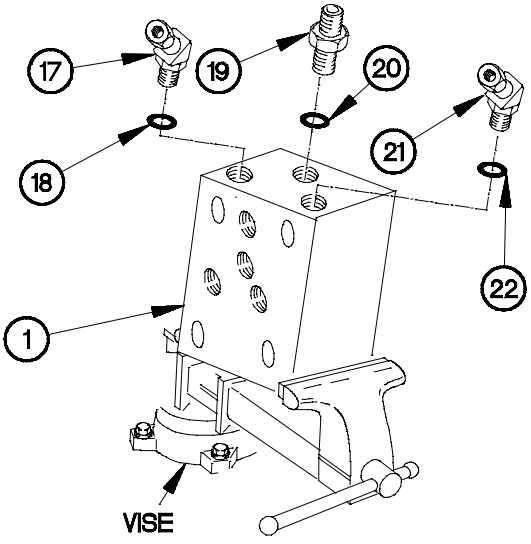
(12) Remove preformed packing (14) from 45-degree fitting (13). Discard preformed packing.

(13) Remove fitting (15) from counterbalance valve (1).

(14) Remove preformed packing (16) from fitting (15). Discard preformed packing.




6R81E04-




6R81E05-

**NOTE**

Perform steps (15) through (20) on LH 30K winch counterbalance valve.

(15) Remove 45-degree fitting (17) from counterbalance valve (1).

(16) Remove preformed packing (18) from 45-degree fitting (17). Discard preformed packing.

(17) Remove fitting (19) from counterbalance valve (10).

(18) Remove preformed packing (20) from fitting (19). Discard preformed packing.

(19) Remove 45-degree fitting (21) from counterbalance valve (1).

(20) Remove preformed packing (22) from 45-degree fitting (21). Discard preformed packing.

## 16-81. M1089 30K WINCH COUNTERBALANCE/CARTRIDGE/SOLENOID REPLACEMENT (CONT)

**f. Counterbalance Valve Installation.**

**NOTE**

Perform steps (1) through (7) on LH 30K winch counterbalance valve.

(1) Install counterbalance valve (1) in vise.

(2) Install preformed packing (2) on 45-degree fitting (3).

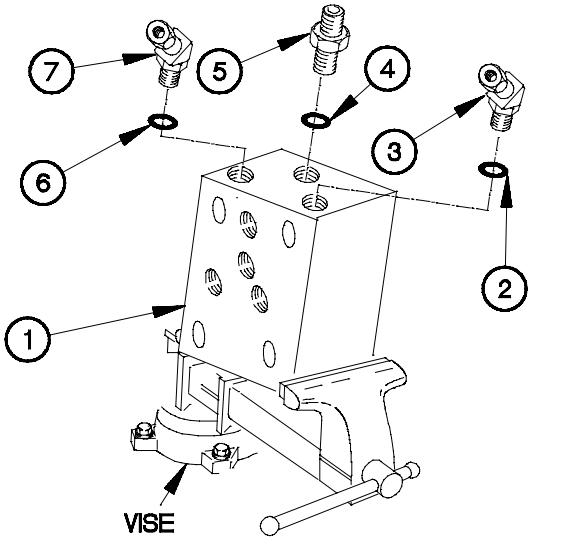
(3) Install 45-degree fitting (3) in counterbalance valve (1).

(4) Install preformed packing (4) on fitting (5).

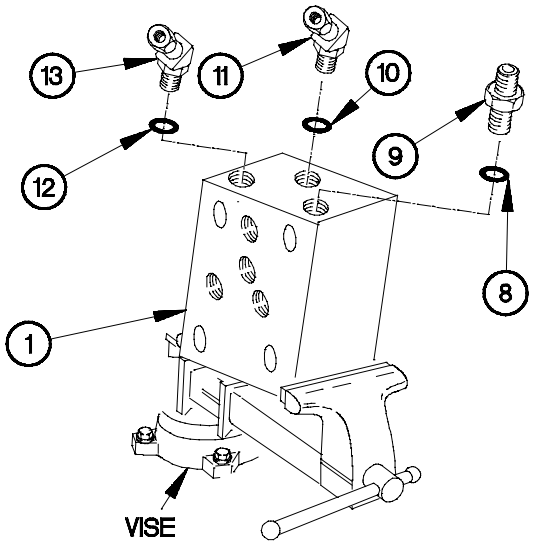
(5) Install fitting (5) in counterbalance valve (1).

(6) Install preformed packing (6) on 45-degree fitting (7).

(7) Install 45-degree fitting (7) in counterbalance valve (1).




6R81F01-




6R81F02-

**NOTE**

Perform steps (8) through (14) on RH 30K winch counterbalance valve.

(8) Install counterbalance valve (1) in vise.

(9) Install preformed packing (8) on fitting (9).

(10) Install fitting (9) in counterbalance valve (1).

(11) Install preformed packing (10) on 45-degree fitting (11).

(12) Install 45-degree fitting (11) in counterbalance valve (1).

(13) Install preformed packing (12) on 45-degree fitting (13).

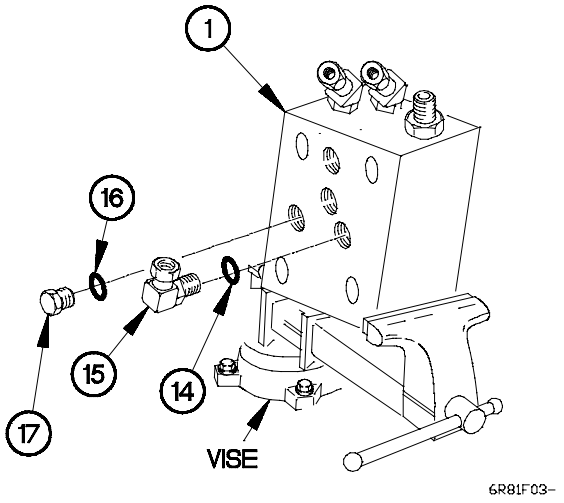
(14) Install 45-degree fitting (13) in counterbalance valve (1).

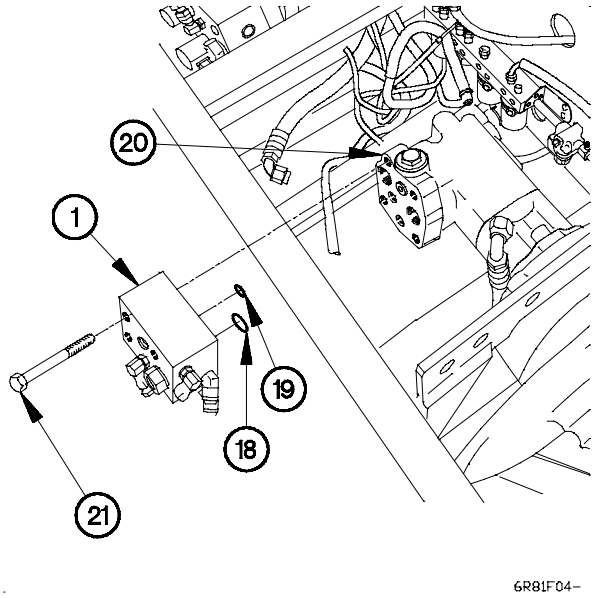
(15) Install preformed packing (14) on 90-degree fitting (15).

(16) Install 90-degree fitting (15) in counterbalance valve (1).

(17) Install preformed packing (16) on valve plug (17).

(18) Install valve plug (17) in counterbalance valve (1).

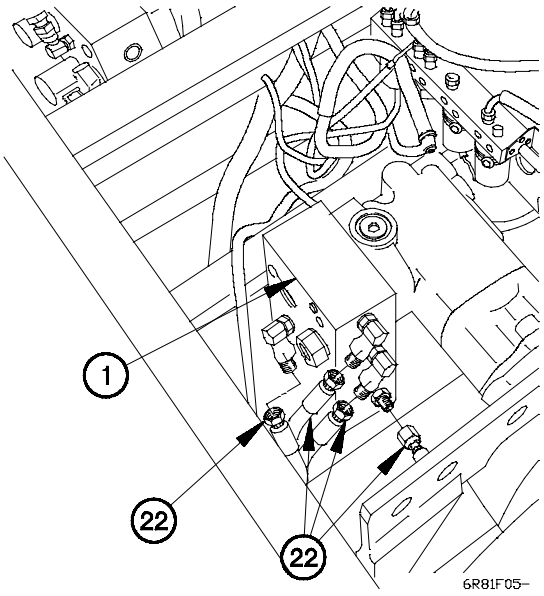



(19) Install two preformed packings (18 and 19) on counterbalance valve (1).

(20) Position counterbalance valve (1) on winch drive motor (20) with four screws (21).

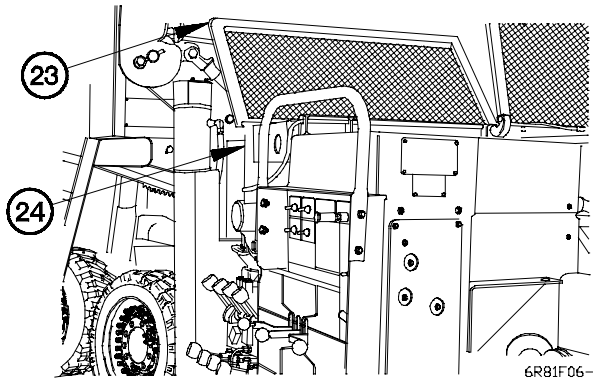
(21) Tighten four screws (21) to 38-45 lb-ft (52-61 N·m).




(22) Connect four hydraulic hoses (22) to counterbalance valve (1).

## 16-81. M1089 30K WINCH COUNTERBALANCE/CARTRIDGE/SOLENOID REPLACEMENT (CONT)

(23) Close catwalk (23) on 30K winch (24).




**g. Follow-On Maintenance**

(1) Hydraulic reservoir supply valve and return valve opened (TM 9-2320-366-10-2).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Fill hydraulic reservoir (TM 9-2320-366-10-1).

(4) Operate 30K winch and check for hydraulic leaks and proper operation of 30K winch (TM 9-2320-366-10-1).

**End of Task.**

## 16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Adjustment
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply and returned valve closed (TM 9-2320-366-10-2).
Control panel assembly covers removed (TM 9-2320-366-20-5).
Selector valve removed (para 16-80).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Tools and Special Tools Cont**
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)

**Materials/Parts**
Nut, Self-locking (3) (Item 181, Appendix F)
Packing, Preformed (2) (Item 229, Appendix F)
Packing, Preformed (3) (Item 230, Appendix F)
Lubricating Oil, Engine (Item 45, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

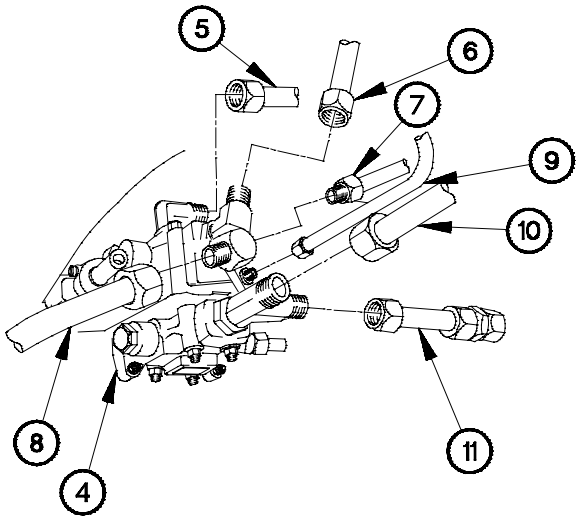
**Personnel Required**
(2)

**a. Removal.**

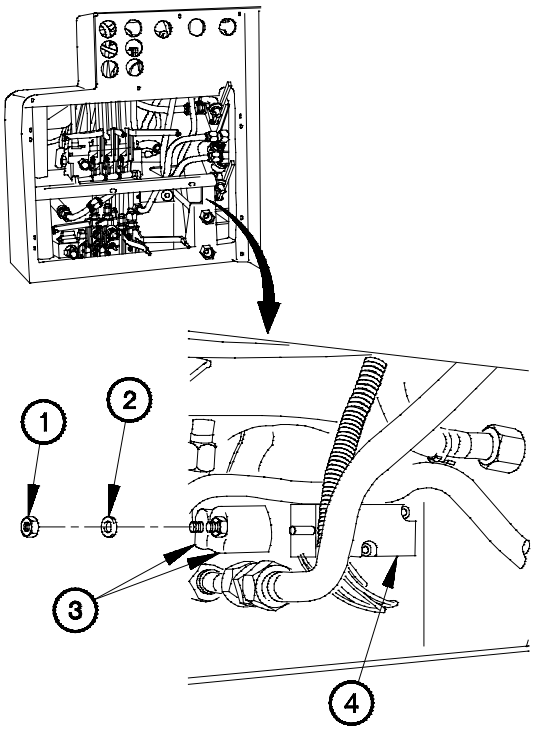
**NOTE**

Tag electrical wires and connection points prior to disconnecting.

(1) Remove two nuts (1), washers (2), and switches (3) from slave external power valve assembly (4).




6R82A021

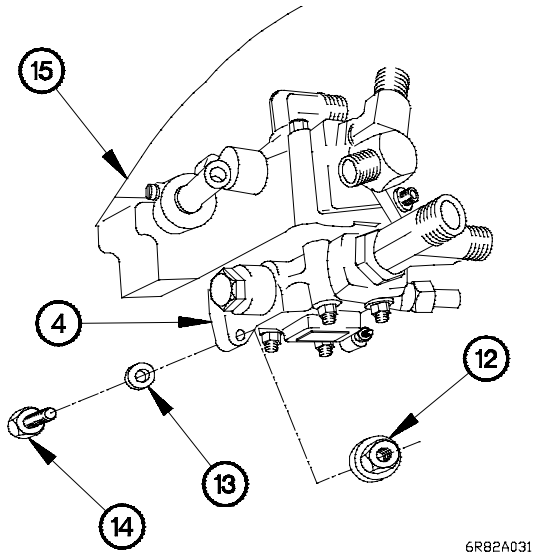



6R82A011

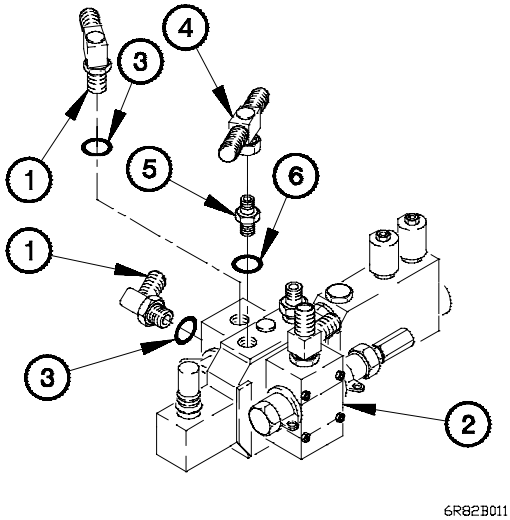
(2) Disconnect hydraulic tubes (5 through 11) from linear directional control valve (4).

## 16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR (CONT)

(3) Remove three self-locking nuts (12), washers (13), bolts (14), and linear directional control valve (4) from frame (15). Discard self-locking nuts.




**b. Disassembly.**




**NOTE**

Mark adapters for correct alignment during installation.

(1) Remove two 90-degree fittings (1) from linear directional control valve (2).

(2) Remove two preformed packings (3) from 90-degree fittings (1). Discard preformed packings.

(3) Remove tee fitting (4) from adapter (5).

(4) Remove adapter (5) from linear directional control valve (2).

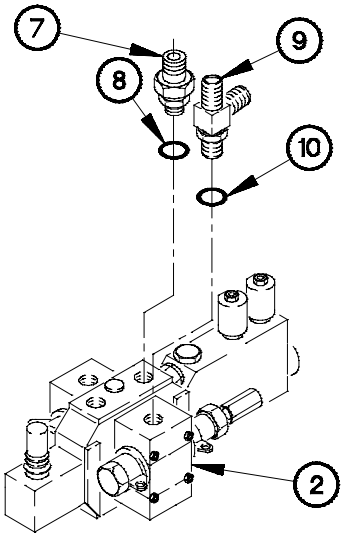
(5) Remove preformed packing (6) from adapter (5). Discard preformed packing.

(6) Remove adapter (7) from linear directional control valve (2).

(7) Remove preformed packing (8) from adapter (7). Discard preformed packing.

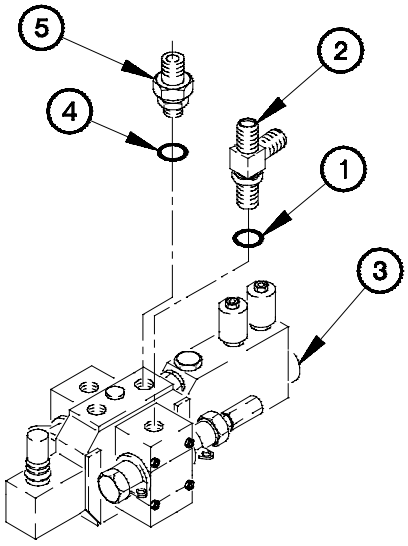
(8) Remove tee fitting (9) from linear directional control valve (2).

(9) Remove preformed packing (10) from tee fitting (9). Discard preformed packing.




6R82B021

**c. Assembly.**




6R82C011

**NOTE**

Apply lubricating oil to preformed packings prior to installing.

(1) Install preformed packing (1) on tee fitting (2).

(2) Position tee fitting (2) on linear directional control valve (3).

(3) Tighten tee fitting (2) to 68-75 lb-ft (92-101 N·m).

(4) Install preformed packing (4) on adapter (5).

(5) Position adapter (5) on linear directional control valve (3).

(6) Tighten adapter (5) to 43-47 lb-ft (58-63 N·m).

## 16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR (CONT)

(7) Install preformed packing (6) on adapter (7).

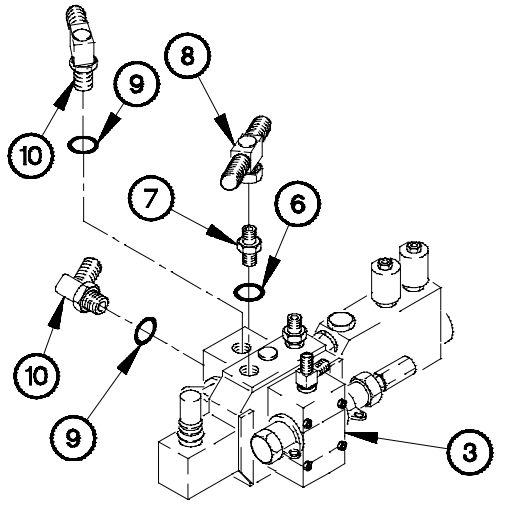
(8) Position adapter (7) on linear directional control valve (3).

(9) Tighten adapter (7) to 43-47 lb-ft (58-63 N·m).

(10) Install tee fitting (8) on adapter (7).

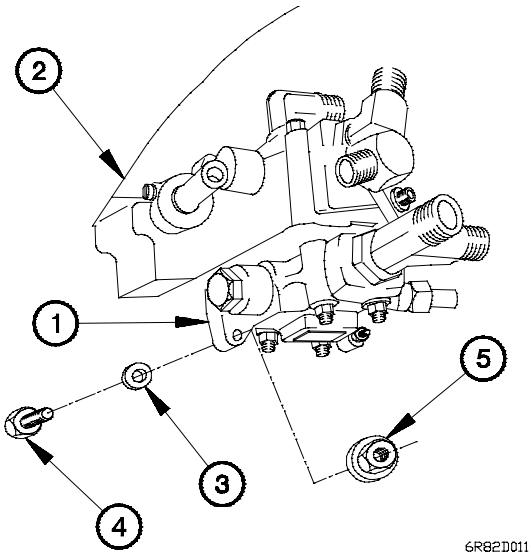
(11) Install two preformed packings (9) on 90-degree fittings (10).

(12) Install two 90-degree fittings (10) on linear directional control valve (3).



6R82C021

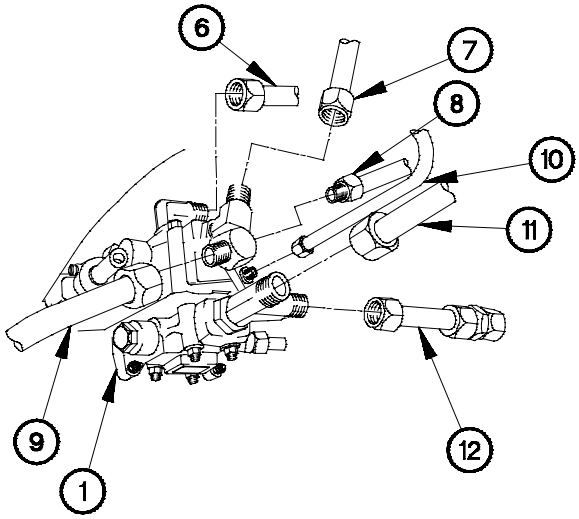
**d. Installation.**



6R82D011

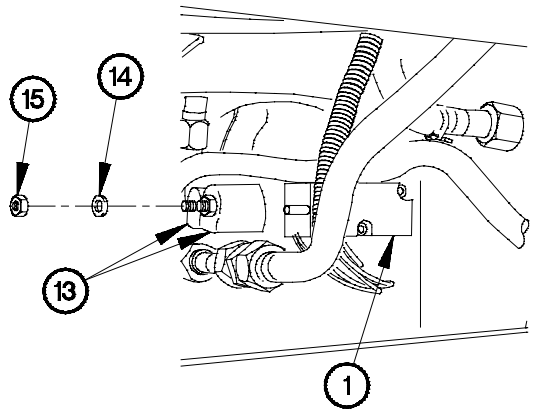
(1) Install linear directional control valve (1) on control panel frame (2) with three washers (3), bolts (4), and self-locking nuts (5).

(2) Connect hydraulic tubes (6 through 12) to linear directional control valve (1).



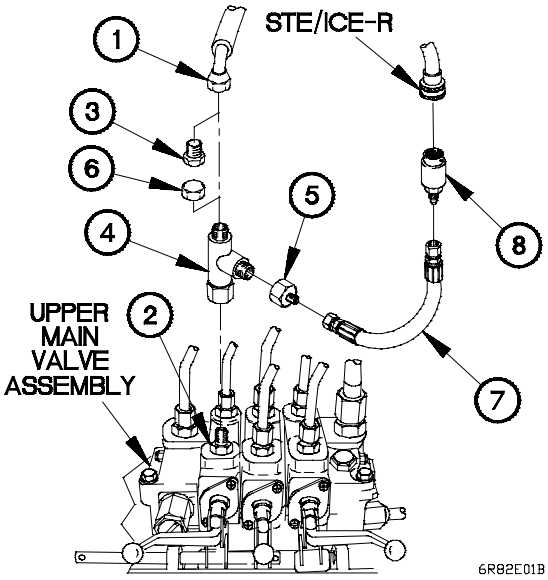
6R82D021

(3) Install two switches (13), washers (14), and nuts (15) on linear directional control valve (1).




6R82D031

**e. Adjustment.**




6R82E01B

(1) Install SECONDARY CIRCUIT SELECTOR VALVE (para 16-80).

(2) Remove hose (1) from upper main valve fitting (2).

(3) Install plug (3) in hose (1).

(4) Install swivel tee (4) on upper main valve fitting (2).

(5) Install reducer (5) and cap (6) on swivel tee (4).

(6) Connect test hose (7) to reducer (5).

(7) Connect 10,000 psi transducer (8) to test hose (7).

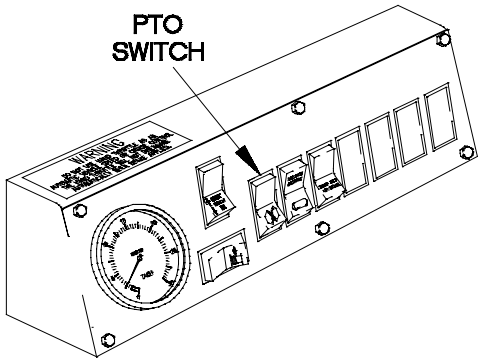
(8) Connect 10,000 psi transducer (8) to STE/ICE-R.

## 16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR (CONT)

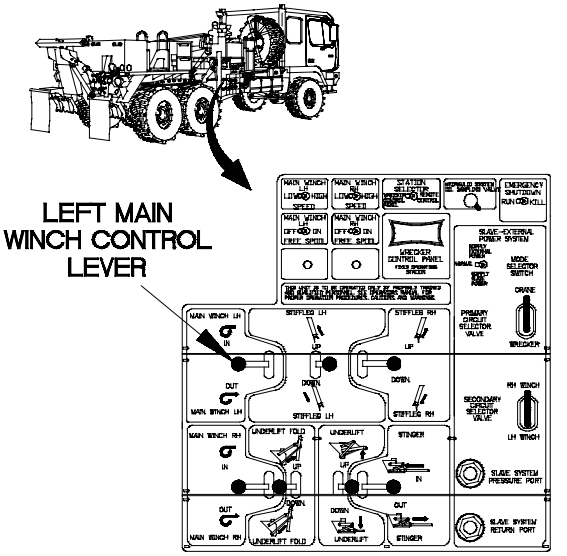
(9) Start engine (TM 9-2320-366-10-1).

(10) Position PTO switch to ON (TM 9-2320-366-10-1).

(11) Set engine speed to 1250-1450 rpm (TM 9-2320-366-10-1).




6R82E02B




6R82E03B

(12) Perform STE/ICE-R test #51 (TM 9-4910-571-12&P).

(13) Position and hold LH main winch control lever to IN (TM 9-2320-366-10-1).

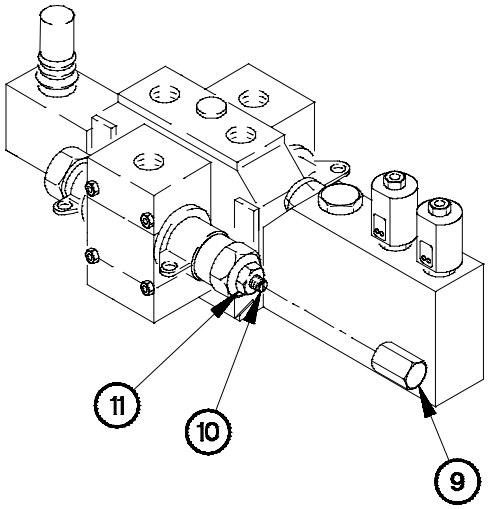
(14) Note reading on STE/ICE-R.

(15) If pressure is not 2950-3050, perform steps (16) through (22).

(16) Remove cap (9) from setscrew (10).

(17) Loosen lock nut (11) on setscrew (10).

(18) Perform steps (9) through (13).




6R82E04B

(19) Turn setscrew clockwise to increase pressure or counter clockwise to decrease pressure.

(20) Perform step (19) until pressure is 2950-3050 psi.

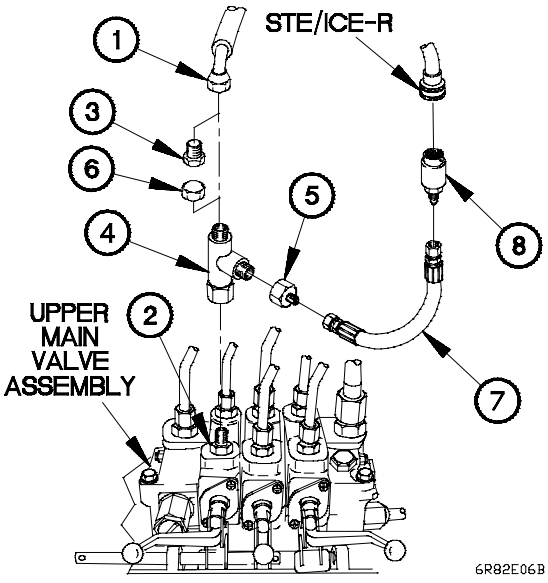
**NOTE**

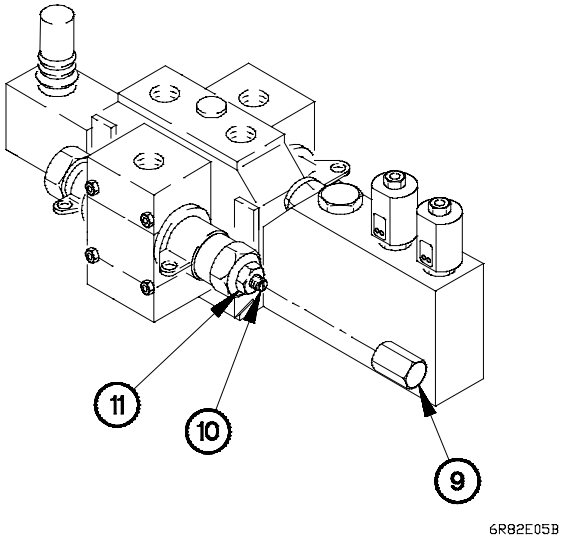
Hold setscrew while tightening lock nut.

(21) Tighten lock nut (11) on setscrew (10).

(22) Perform steps (15) through (22) as required.

(23) Install cap (9) on setscrew (10).




(24) Disconnect STE/ICE-R from 10,000 psi transducer (8).

(25) Disconnect test hose (7) from 10,000 psi transducer (8).

(26) Disconnect test hose (7) from reducer (5).

(27) Remove cap (6) and reducer (5) from swivel tee (4).

(28) Remove swivel tee (4) from upper main valve fitting (2).

(29) Remove plug (3) from hose (1).

(30) Connect hose (1) to upper main valve fitting (2).

**e. Follow-On Maintenance.**

(1) Install control panel assembly covers (TM 9-2320-366-20-5).

(2) Hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(3) Service hydraulic reservoir (TM 9-2320-366-10-1).

(4) Connect batteries (TM 9-2320-366-20-3).

(5) Start engine (TM 9-2320-366-10-1).

(6) Operate wrecker control functions and check for hydraulic leaks (TM 9-2320-366-10-1).

(7) Shut down engine (TM 9-2320-366-10-1).

**End of Task.**

## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

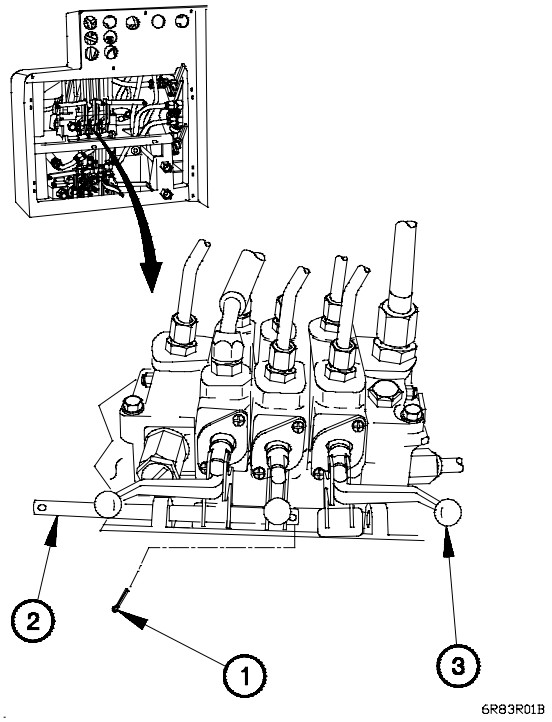
**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).
Control panel assembly covers removed (TM 9-2320-366-20-5).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Vise, Machinist (Item 82, Appendix B)
Caps, Vise Jaw (Item 12, Appendix B)

**Materials/Parts**
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Pin, Cotter (2) (Item 332, Appendix F)
Packing, Preformed (4) (Item 232, Appendix F)
Packing, Preformed (2) (Item 230, Appendix F)
Packing, Preformed (6) (Item 237, Appendix F)
Parts Kit, Seal Replacement (Item 313.3, Appendix F)
Parts Kit, Seal Replacement (Item 313.1, Appendix F)
Parts Kit, Seal Replacement (4) (Item 313.2, Appendix F)
Lubricating Oil, Engine (Item 45, Appendix C)
Tape, Antiseizing (Item 85, Appendix C)
Sealing Compound (Item 76.2, Appendix C)
Sealing Compound (Item 71.1, Appendix C)

**Personnel Required**
(2)

**a. Removal.**



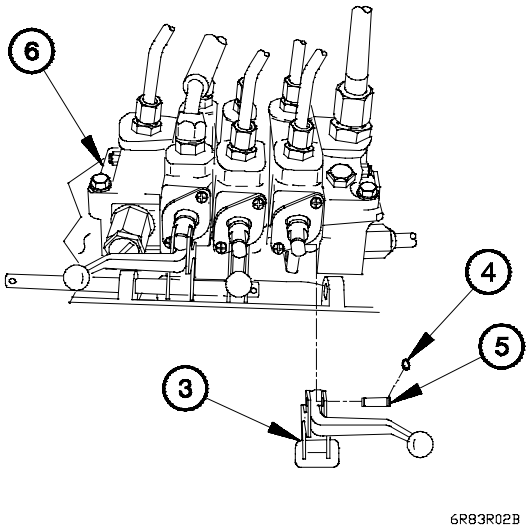

(1) Remove two cotter pins (1) from rod (2). Discard cotter pins.

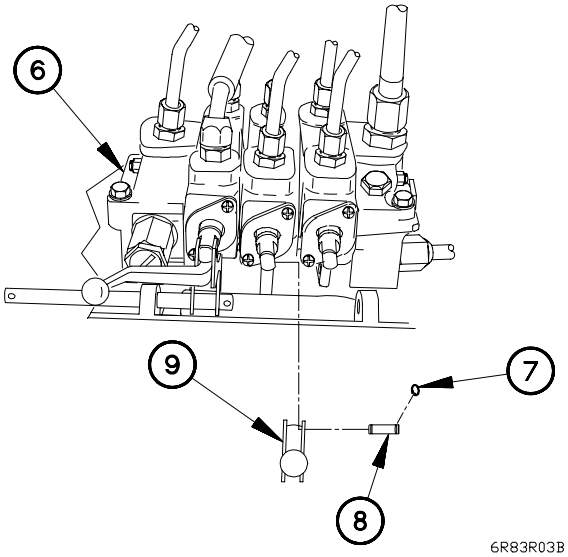
(2) Position rod (2) to the left past handle (3).

**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.**

(3) Remove two retaining rings (4), pin (5), and handle (3) from upper control valve assembly (6).

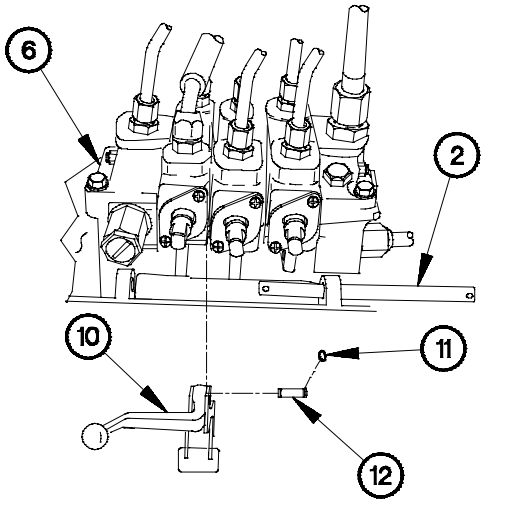



(4) Remove two retaining rings (7), pin (8), and handle (9) from upper control valve assembly (6).

(5) Position rod (2) to the right past handle (10).

(6) Remove two retaining rings (11), pin (12), and handle (10) from upper control valve assembly (6).



## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**CAUTION**

Cap or plug hydraulic tubes, hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

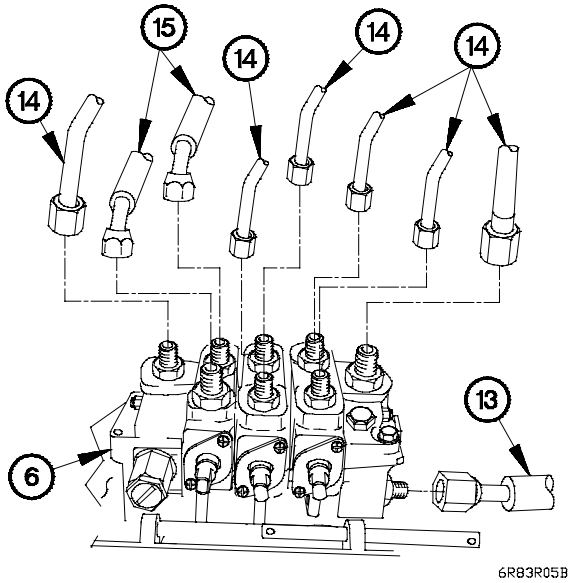
Tag hydraulic tubes and hoses prior to disconnecting.

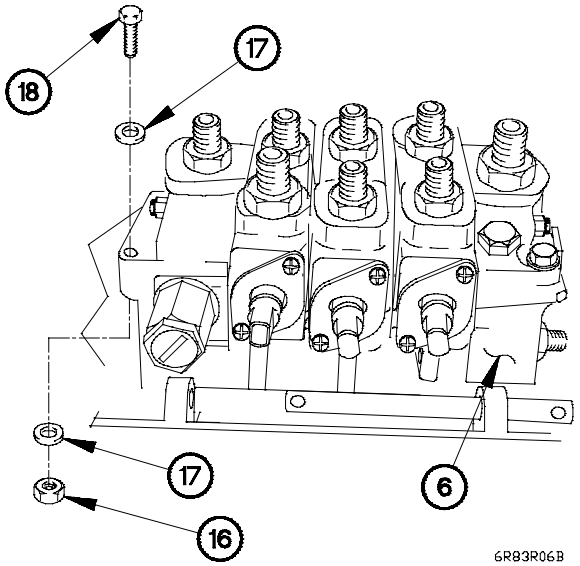
(7) Position drain pan under upper control valve assembly (6).

(8) Remove hydraulic tube (13) from upper control valve assembly (6).

(9) Disconnect six hydraulic tubes (14) from upper control valve assembly (6).

(10) Disconnect two hydraulic hoses (15) from upper control valve assembly (6).




(11) Remove three nuts (16), six washers (17), and three bolts (18) from upper control valve assembly (6).

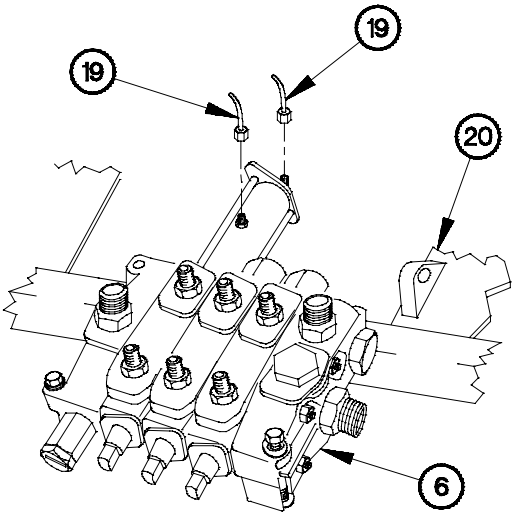
**CAUTION**

Two air tubes are attached to rear of upper control valve assembly. Lift upper main valve to allow removal of air tubes. Failure to comply may result in damage to equipment.

(12) Lift upper control valve assembly (6) outward to gain access to rear of upper control valve assembly.

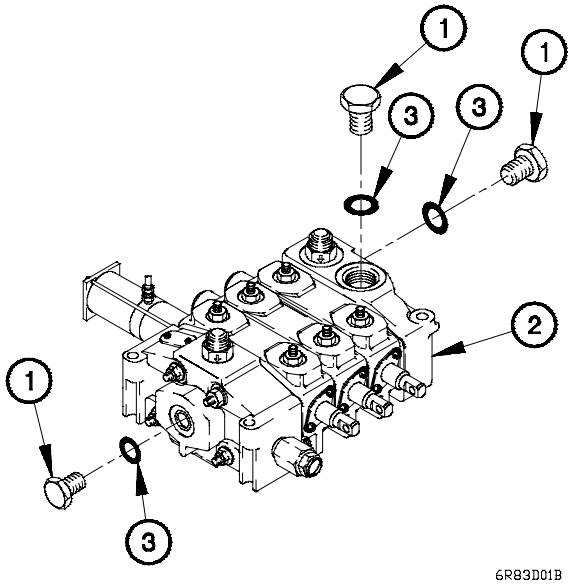
(13) Disconnect two air tubes (19) from rear of upper control valve assembly (6).

(14) Remove upper control valve assembly (6) from control panel (20).



6R83R07B

**b. Disassembly.**



6R83D01B

(1) Remove three plugs (1) from upper control valve assembly (2).

(2) Remove three preformed packings (3) from plugs (1). Discard preformed packings.

(3) Remove three adapters (4) from upper control valve assembly (2).

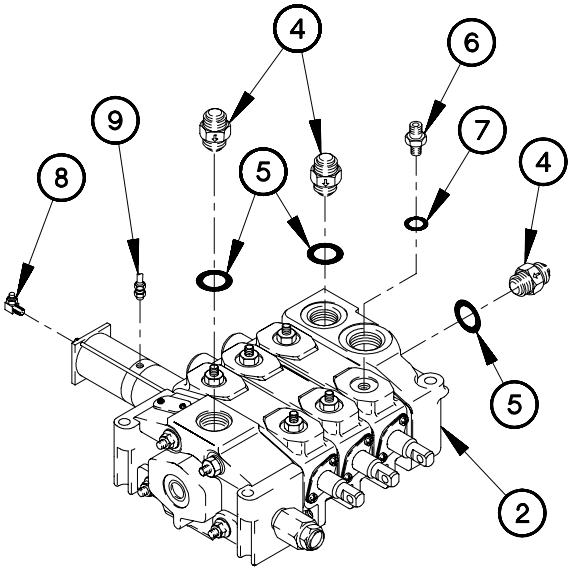
(4) Remove three preformed packings (5) from adapters (4). Discard preformed packings.

(5) Remove six adapters (6) from upper control valve assembly (2).

(6) Remove six preformed packings (7) from adapters (6). Discard preformed packings.

(7) Remove 90-degree fitting (8) from upper control valve assembly (2).

(8) Remove fitting (9) from upper control valve assembly (2).



6R83D02B

## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

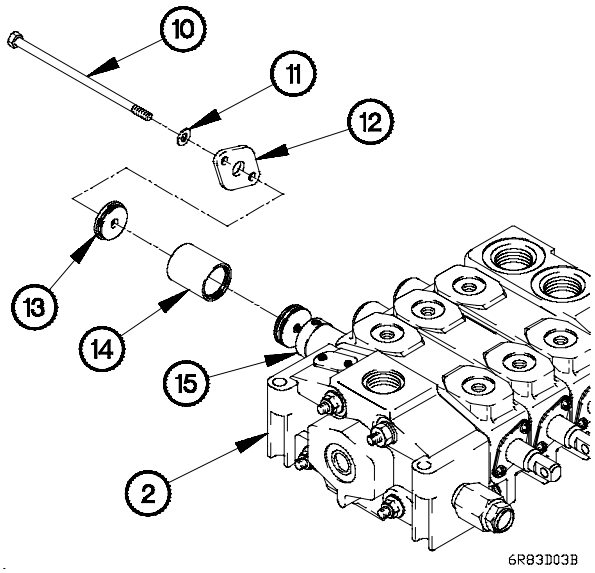
**NOTE**

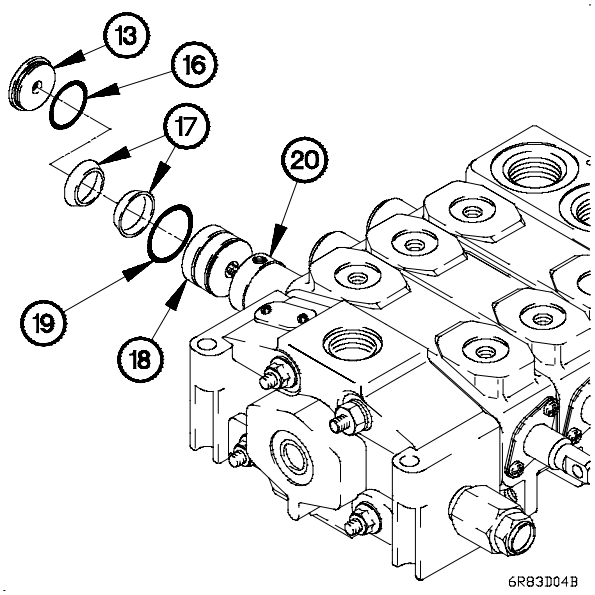
Note position of seals, packings, and retaining plates prior to removal.

(9) Remove two screws (10), washers (11), and retaining plate (12) from upper control valve assembly (2).

(10) Remove seal retainer (13) and pressure tube (14) from solenoid (15).

(11) Remove seal retainer (13) from pressure tube (14).




(12) Remove preformed packing (16) from seal retainer (13). Discard preformed packing.

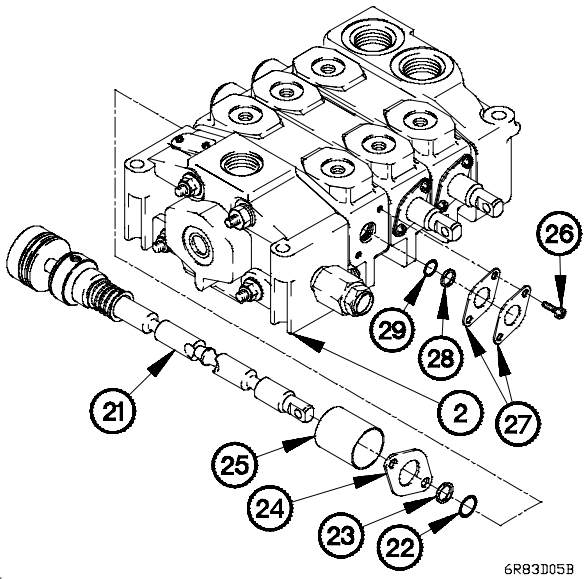
(13) Remove two seals (17) from piston (18). Discard seals.

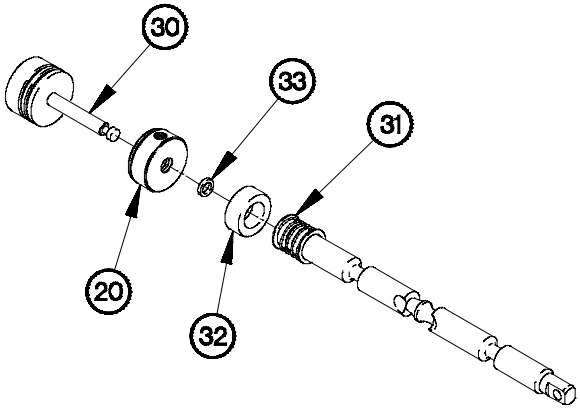
(14) Remove preformed packing (19) from flange (20). Discard preformed packing.

(15) Remove solenoid assembly (21) from upper control valve assembly (2).

(16) Remove seal (22), preformed packing (23), retaining plate (24), and spacer (25) from actuator assembly (21). Discard seal and preformed packing.

(17) Remove two screws (26), retaining plates (27), preformed packing (28), and seal (29) from upper control valve assembly (2). Discard preformed packing and seal.

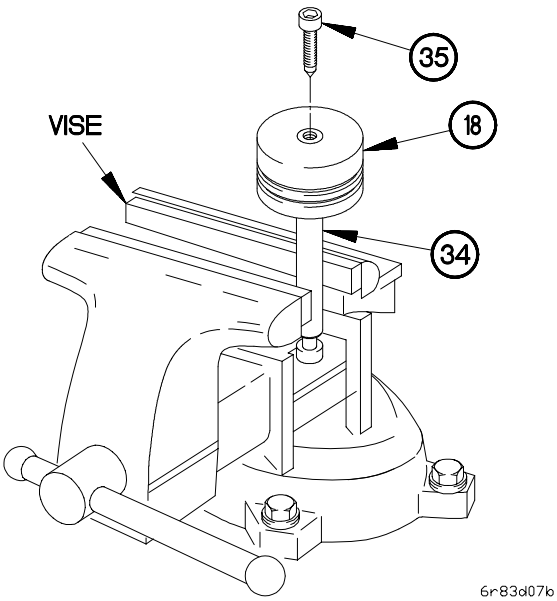



(18) Remove piston assembly (30) from stripper bolt (31).

(19) Remove spacer (32) and flange (20) from piston assembly (30).

(20) Remove inner seal (33) from flange (20). Discard seal.




(21) Position piston rod (34) in vise.

(22) Remove cap screw (35) and piston (18) from piston rod (34).

## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**WARNING**

- **Use extreme care when handling heated linear valve and components. Failure to comply may result in injury to personnel.**
- **Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

**CAUTION**

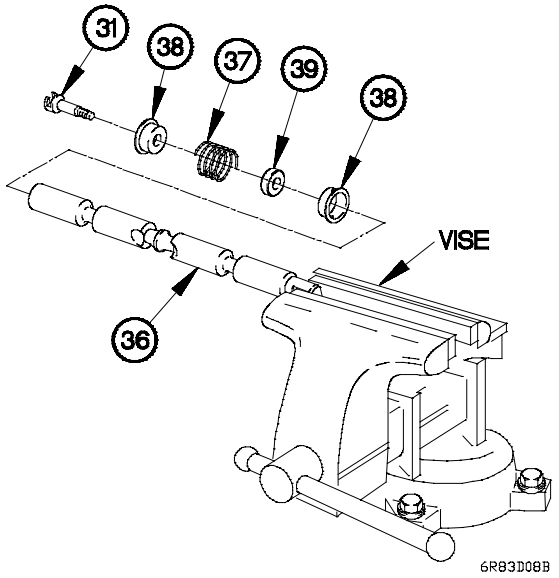
Do not overheat linear valve. If linear valve begins to discolor, remove heat source. Failure to comply may result in damage to equipment.

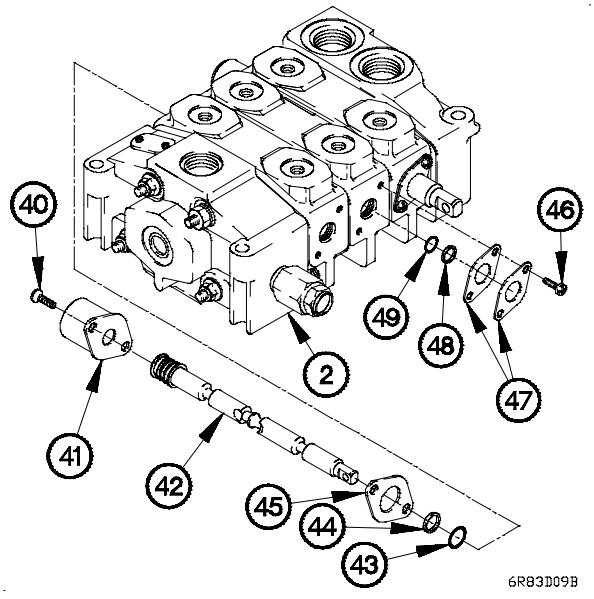
(23) Position linear valve (36) in vise.

(24) Compress spring (37) on linear valve (36).

(25) Heat linear valve (36) at threads of stripper bolt (31).

(26) Remove stripper bolt (31), two spring retainers (38), spring (37), and tube stop (39) from linear valve (36).




**NOTE**

Both actuator assemblies are disassembled the same way. One control valve shown.

(27) Remove two screws (40), valve cap (41), and actuator assembly (42) from upper control valve assembly (2).

(28) Remove seal (43), preformed packing (44), and retaining plate (45) from actuator assembly (42). Discard seal and preformed packing.

(29) Remove two screws (46), retaining plates (47), preformed packing (48), and seal (49) from upper control valve assembly (2). Discard preformed packing and seal.

**WARNING**

- **Use extreme care when handling heated control valve and components. Failure to comply may result in injury to personnel.**
- **Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

**CAUTION**

Do not overheat control valve. If control valve begins to discolor, remove heat source. Failure to comply may result in damage to equipment.

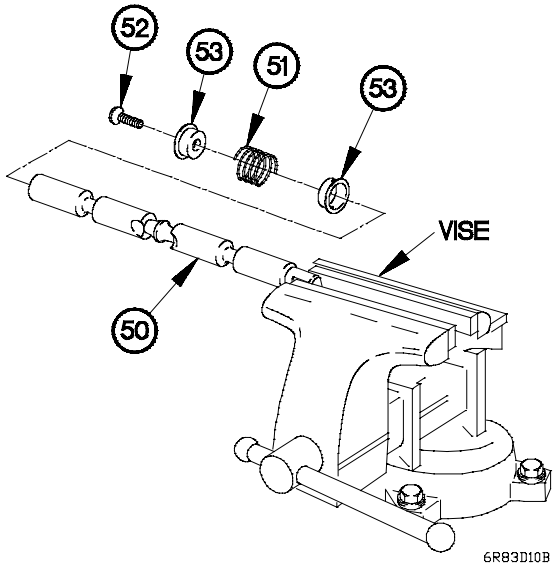
(30) Position control valve (50) in vise.

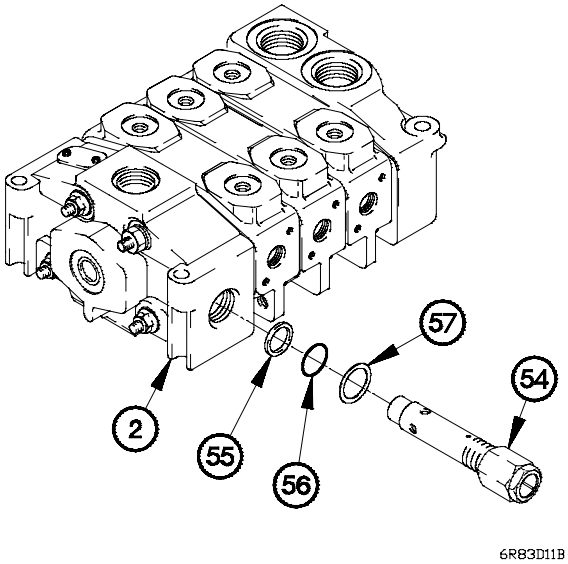
(31) Compress spring (51) on control valve (50).

(32) Apply heat to control valve (50) at threads of bolt (52).

(33) Remove bolt (31), two spring retainers (53), and spring (51) from control valve (50).

(34) Perform steps (27) through (33) on remaining actuator assembly.



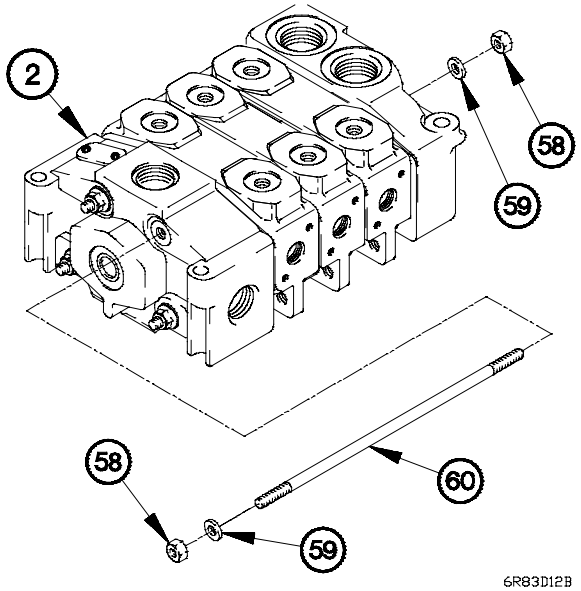




**NOTE**

(35) Remove relief valve (54) from upper control valve assembly (2).

(36) Remove preformed packing (55), backup ring (56), and washer (57) from relief valve (54). Discard preformed packing and backup ring.

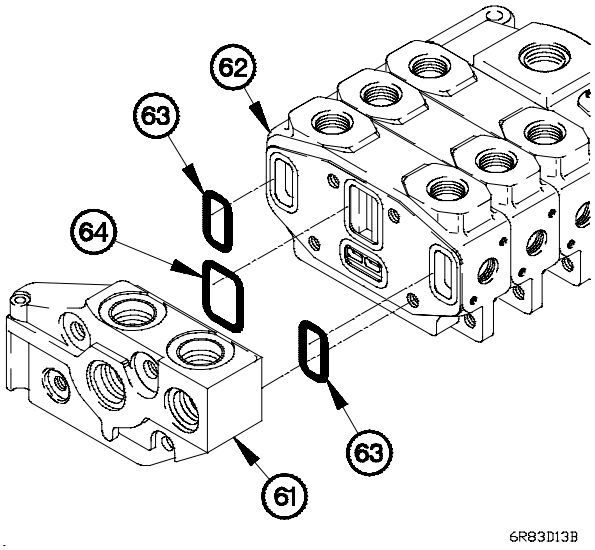
## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




**NOTE**

Tag pump valve and four valves prior to removal.

(37) Remove eight nuts (58), washers (59), and four studs (60) from upper control valve assembly (2).




(38) Separate pump valve (61) from valve (62).

(39) Remove two gaskets (63) from valve (62). Discard gaskets.

(40) Remove gasket (64) from valve (62). Discard gasket.

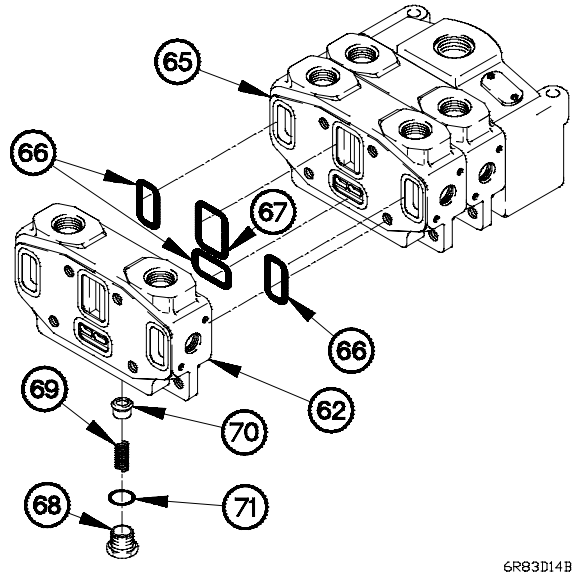
(41) Separate valve (62) from valve (65).

(42) Remove three gaskets (66) from valve (65). Discard gaskets.

(43) Remove gasket (67) from valve (65). Discard gasket.

(44) Remove plug (68), spring (69), and pressure valve (70) from valve (62).

(45) Remove preformed packing (71) from plug (68). Discard preformed packing.



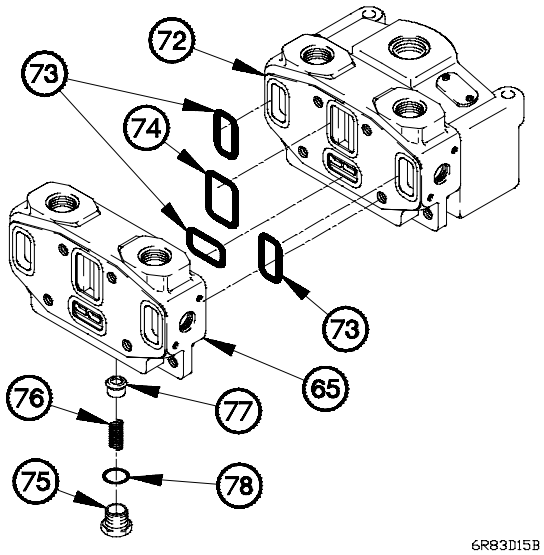
(46) Separate valve (65) from valve (72).

(47) Remove three gaskets (73) from valve (72). Discard gaskets.

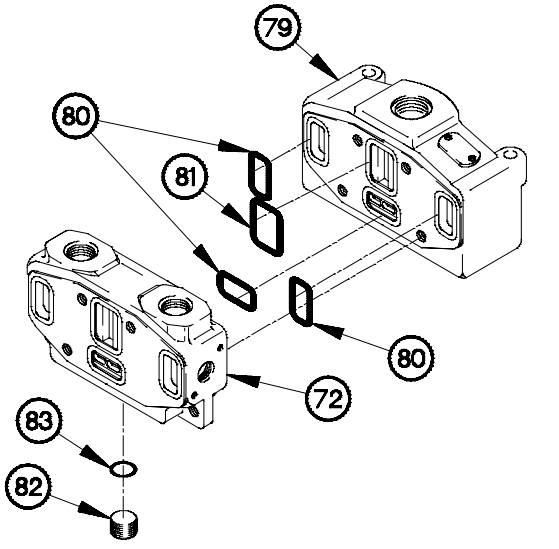
(48) Remove gasket (74) from valve (72). Discard gasket.

(49) Remove plug (75), spring (76), and pressure valve (77) from valve (65).

(50) Remove preformed packing (78) from plug (75). Discard preformed packing.




6R83D15B




6R83D16B

(51) Separate valve (72) from valve (79).

(52) Remove three gaskets (80) from valve (79). Discard gaskets.

(53) Remove gasket (81) from valve (79). Discard gasket.

(54) Remove plug (82) from valve (72).

(55) Remove preformed packing (83) from plug (82). Discard preformed packing.

## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**c. Cleaning/Inspection.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100 ° F (38 ° C) and for Type II is 130 ° F (50 ° C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using Dry Cleaning Solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**
- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

(2) Dry all metal parts with compressed air.

(3) Inspect all metal parts for scratches, gouges, nicks, burrs or excessive wear.

**d. Assembly.**

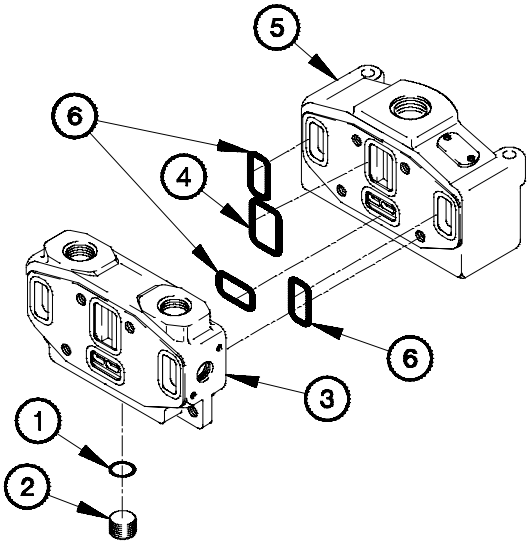
(1) Install preformed packing (1) on plug (2).

(2) Install plug (2) in valve (3).

(3) Install gasket (4) in valve (5).

(4) Install three gaskets (6) in valve (5).

(5) Position valve (3) with valve (5).




6R83A01B

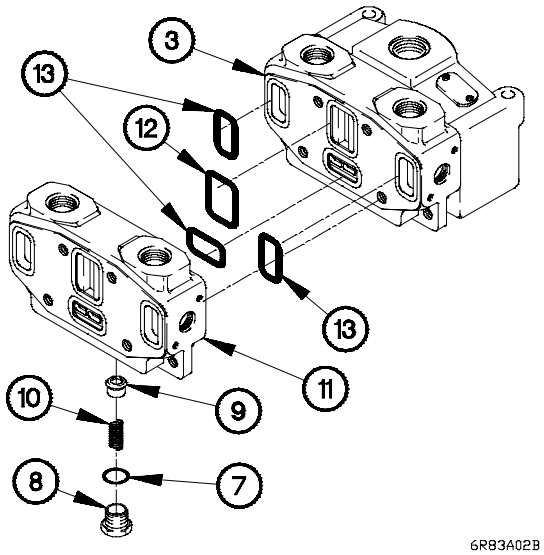
(6) Install preformed packing (7) on plug (8).

(7) Install pressure valve (9), spring (10), and plug (8) in valve (11).

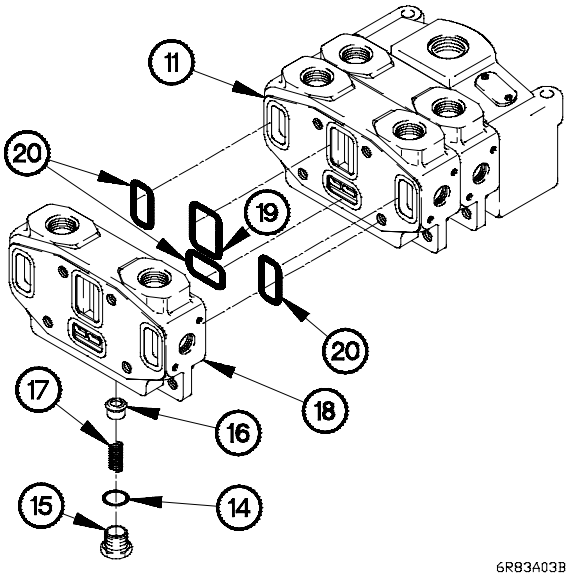
(8) Install gasket (12) in valve (3).

(9) Install three gaskets (13) in valve (3).

(10) Position valve (11) with valve (3).




6R83A02B




6R83A03B

(11) Install preformed packing (14) on plug (15).

(12) Install pressure valve (16), spring (17), and plug (15), in valve (18).

(13) Install gasket (19) in valve (11).

(14) Install three gaskets (20) in valve (11).

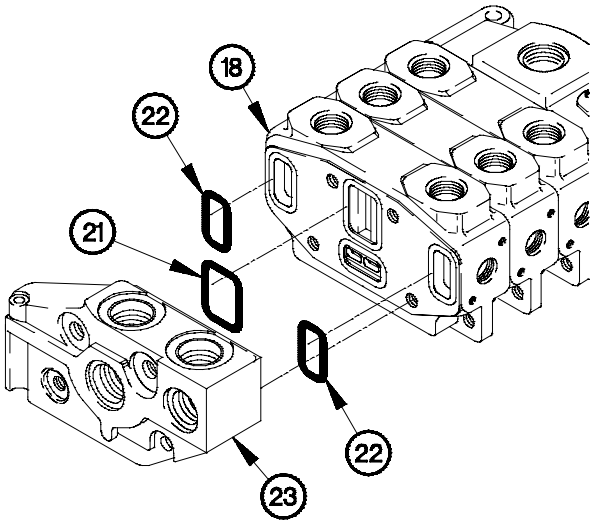
(15) Position valve (18) with valve (11).

## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(16) Install gasket (21) on valve (18).

(17) Install two gaskets (22) on valve (18).

(18) Position valve (23) with valve (18).

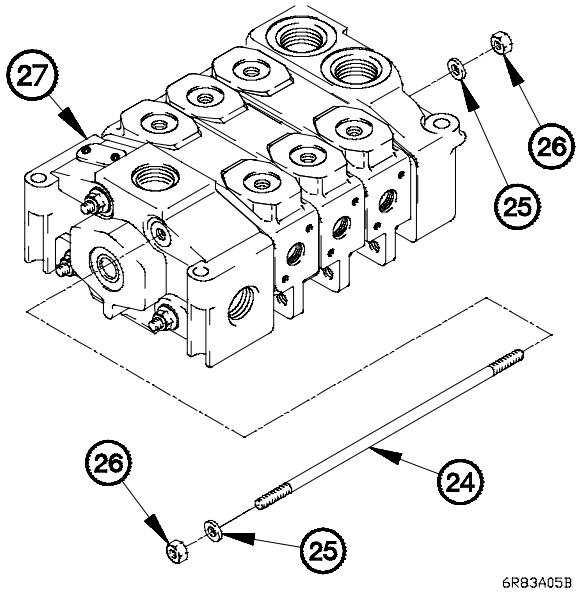



**CAUTION**

When positioning studs, washers and nuts, an even amount of threads must show on either side of stud after applying torque. Failure to comply may result in damage to equipment.

**NOTE**

Apply lubricating oil to all studs prior to installation.




(19) Position four studs (24), eight washers (25), and nuts (26) in upper control valve assembly (27).

(20) Tighten eight nuts (26) to 29 lb-ft (39 N·m).

(21) Re-tighten eight nuts (26) to 42 lb-ft (57 N·m).

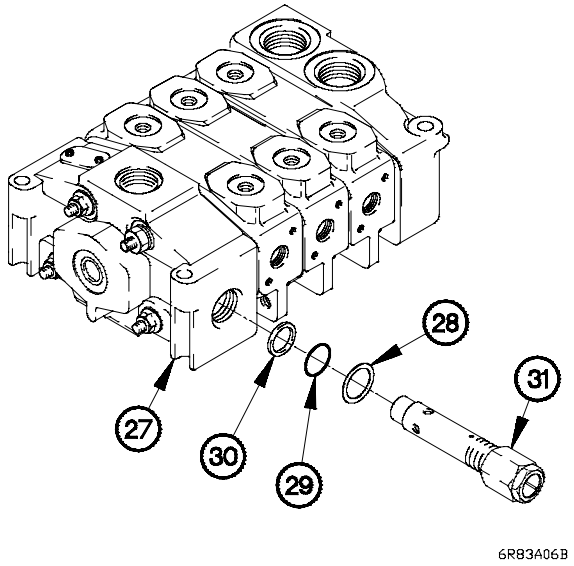
**NOTE**

Apply lubricating oil to all preformed packings and seals prior to assembly.

(22) Install washer (28), backup ring (29), and preformed packing (30) on relief valve (31).

(23) Position relief valve (31) in upper control valve assembly (27).

(24) Tighten relief valve (31) to 80-90 lb-ft (108-122 N·m).




(25) Apply engine lubricating oil to two spring retainers and spring.

**WARNING**

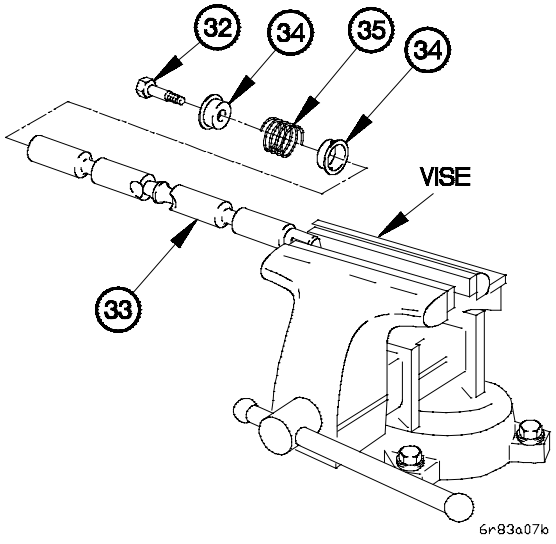
- **Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

- **Use care when installing spring. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(26) Apply sealing compound to threads of bolt (32).

(27) Position control valve (33) in vise.

(28) Install two spring retainers (34) and spring (35) on control valve (33) with bolt (32).



## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

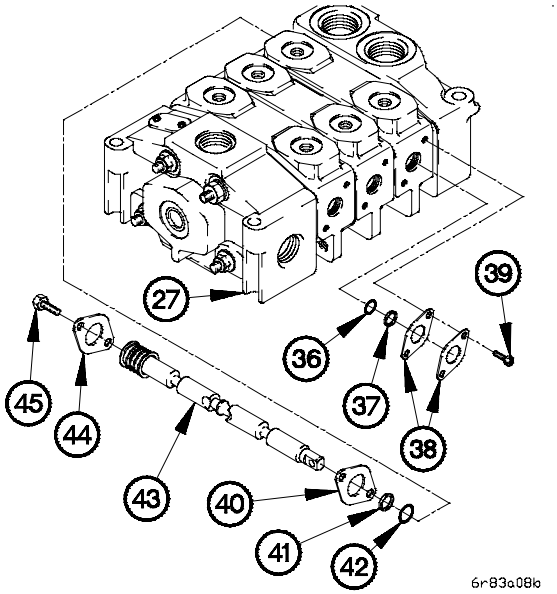
Both actuator assemblies are installed the same way. One shown.

(29) Position seal (36), preformed packing (37), and retaining plates (38) on upper control valve assembly (27) with two screws (39).

(30) Install retaining plate (40), preformed packing (41), and seal (42) on actuator assembly (43).

(31) Install actuator assembly (43) and valve cap (44) in upper control valve assembly (27) with two screws (45).

(32) Perform steps (29) through (31) on remaining actuator assembly.

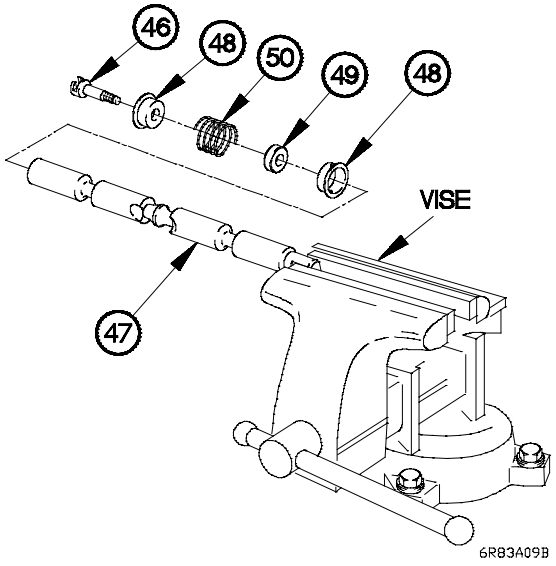



(33) Apply engine lubricating oil to two spring retainers, tube stop, and spring.

**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.**

- **Use care when installing spring. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**



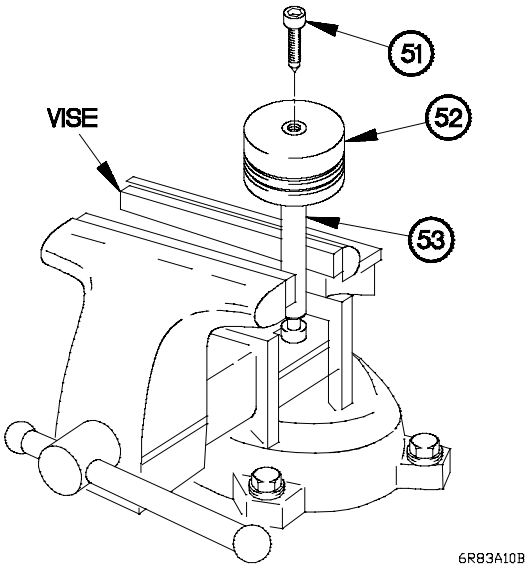

(34) Apply sealing compound to threads of stripper bolt (46).

(35) Position linear valve (47) in vise.

(36) Install two spring retainers (48), tube stop (49), and spring (50) on linear valve (47) with stripper bolt (46).

**WARNING**

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, 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.**

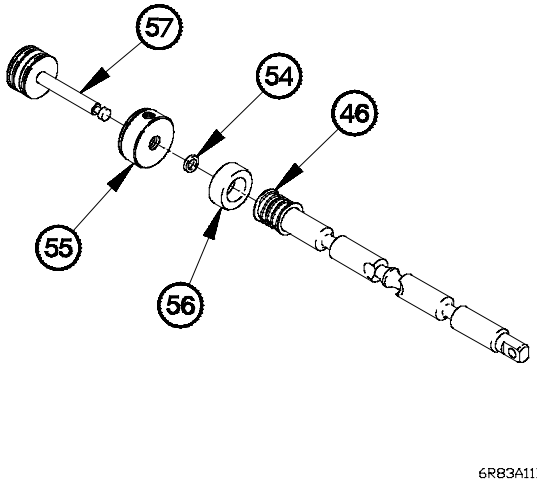



(37) Apply adhesive to threads of cap screw (51).

(38) Position piston (52) on piston rod (53) with cap screw (51).

(39) Position piston rod (53) in vise.

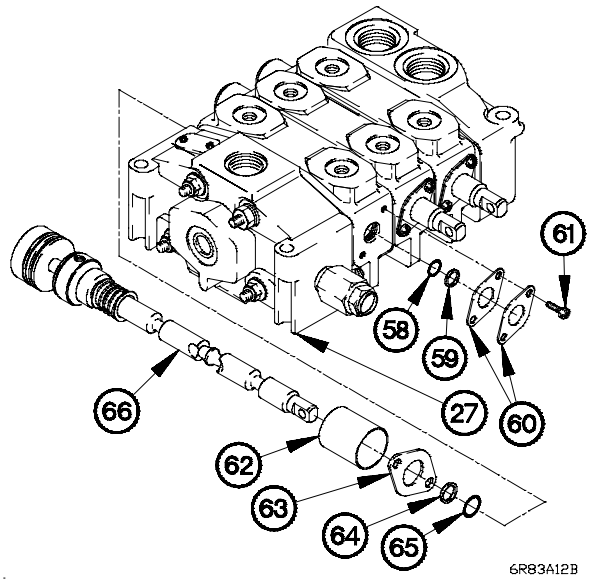
(40) Tighten cap screw (51) to 75 lb-in. (8 N·m).




(41) Install inner seal (54) in flange (55).

(42) Position flange (55) and spacer (56) on piston assembly (57).

(43) Install piston assembly (57) in stripper bolt (46).

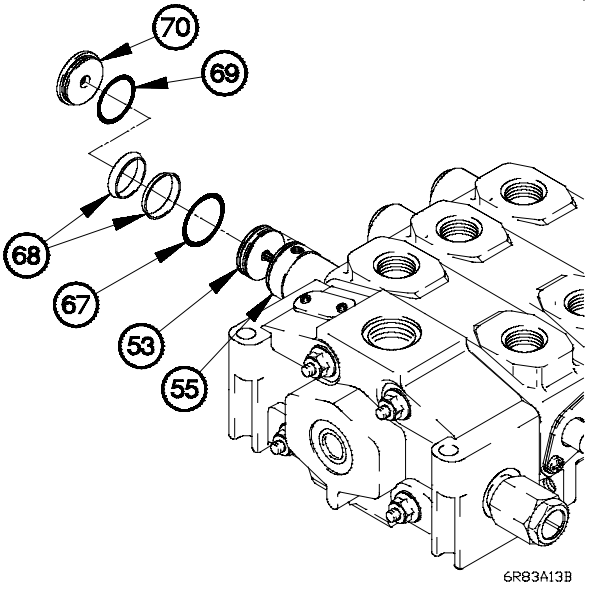



(44) Position seal (58), preformed packing (59), and retaining plates (60) on upper control valve assembly (27) with two screws (61).

(45) Install spacer (62), retaining plate (63), preformed packing (64), and seal (65) on solenoid assembly (66).

(46) Position solenoid assembly (66) in upper control valve assembly (27).

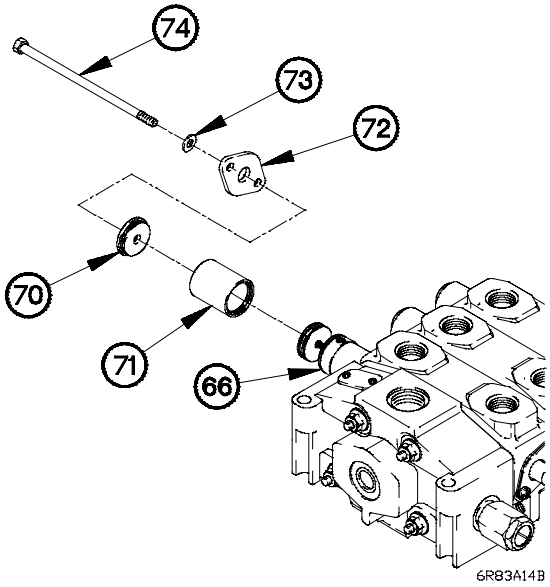
## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




(47) Install preformed packing (67) on flange (55).

(48) Install two seals (68) on piston (53).

(49) Install preformed packing (69) on seal retainer (70).




(50) Install seal retainer (70) in pressure tube (71).

(51) Install pressure tube (71) on solenoid assembly (66).

(52) Position retaining plate (72) on pressure tube (71) with two washers (73) and screws (72).

(53) Tighten two screws (74) to 25-30 lb-in. (2-3 N·m).

(54) Apply antiseizing tape to threads of 90-degree fitting (75) and fitting (76).

(55) Install 90-degree fitting (75) on upper control valve assembly (27).

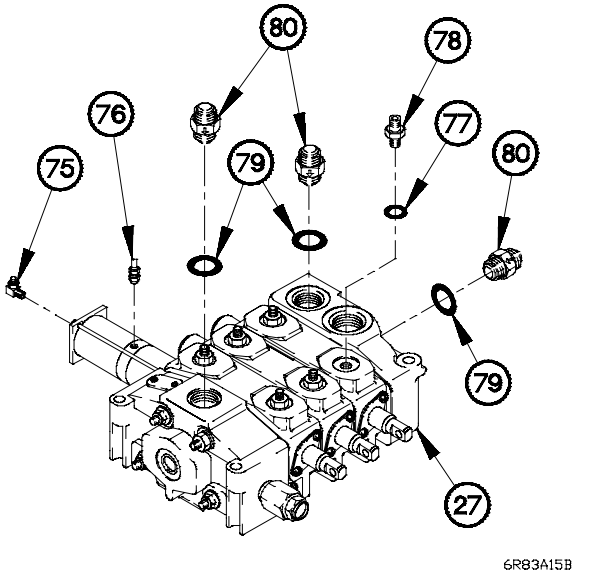
(56) Install fitting (76) on upper control valve assembly (27).

(57) Install six preformed packings (77) on adapters (78).

(58) Install six adapters (78) on upper control valve assembly (27).

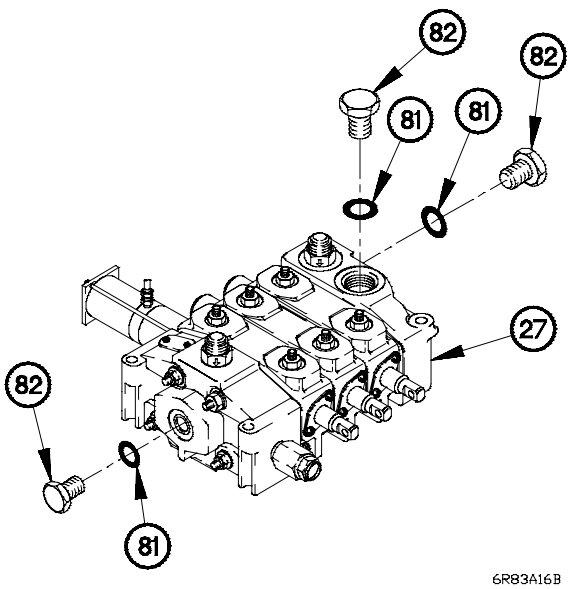
(59) Install three preformed packings (79) on adapters (80).

(60) Install three adapters (80) on upper control valve assembly (27).

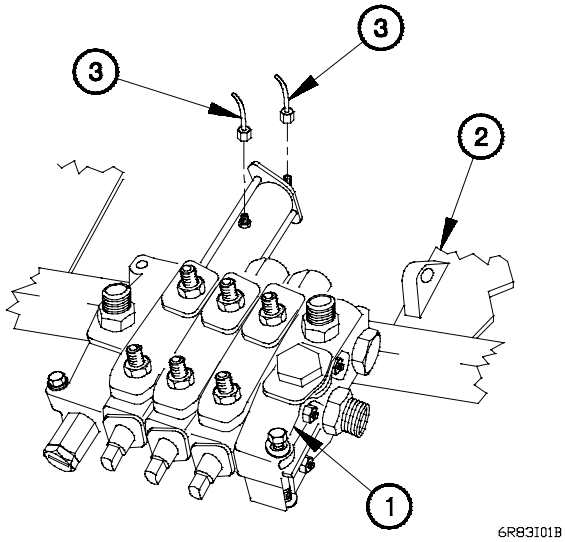


(61) Install three preformed packings (81) on plugs (82).

(62) Install three plugs (82) on upper control valve assembly (27).



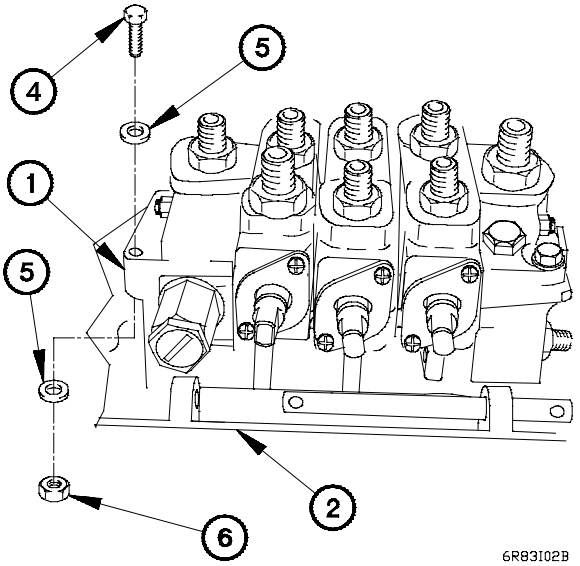

**e. Installation.**




(1) Place upper control valve assembly (1) in control panel (2).

(2) Connect two air tubes (3) to upper control valve assembly (1).

(3) Install upper control valve assembly (1) in control panel (2) with three bolts (4), six washers (5), and three nuts (6).

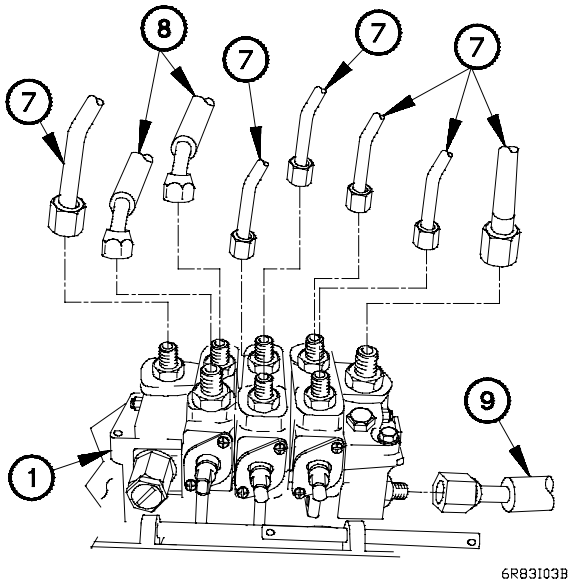


## 16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

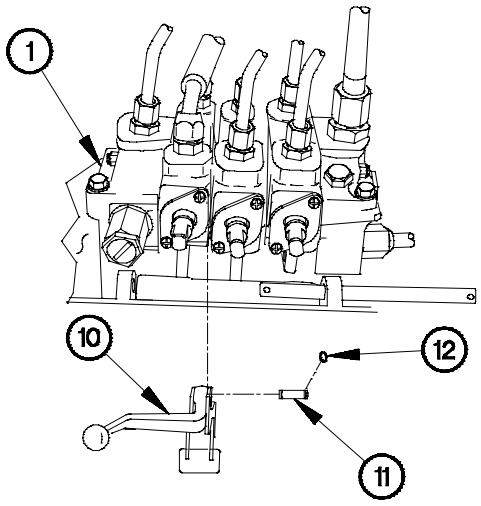
(4) Connect six hydraulic tubes (7) to upper control valve assembly (1).

(5) Connect two hydraulic hoses (8) to upper control valve assembly (1).

(6) Install hydraulic tube (9) on upper control valve assembly (1).



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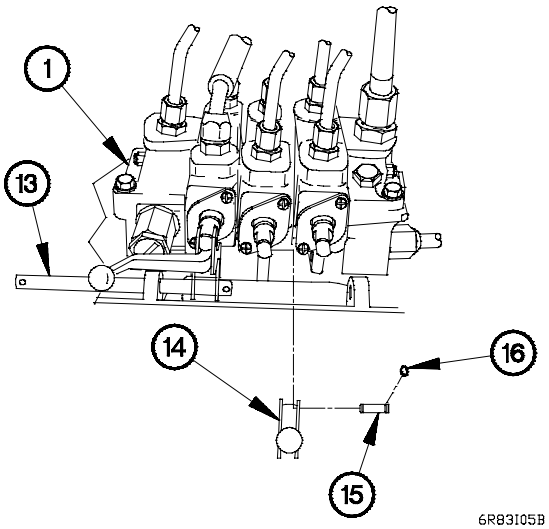


6R83I04B

(7) Install handle (10), pin (11), and retaining rings (12) on upper control valve assembly (1).

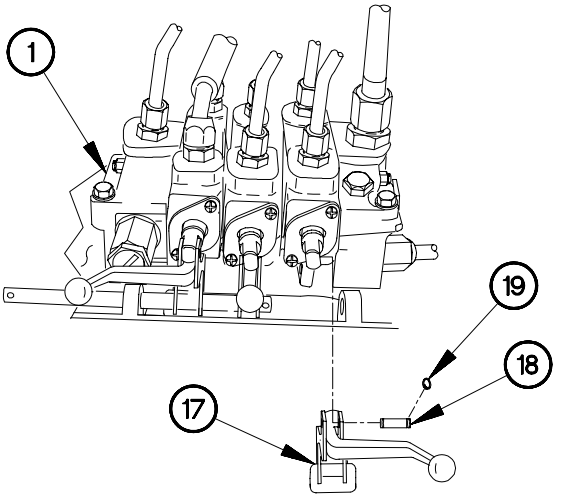
(8) Position rod (13) to left past handle (14).

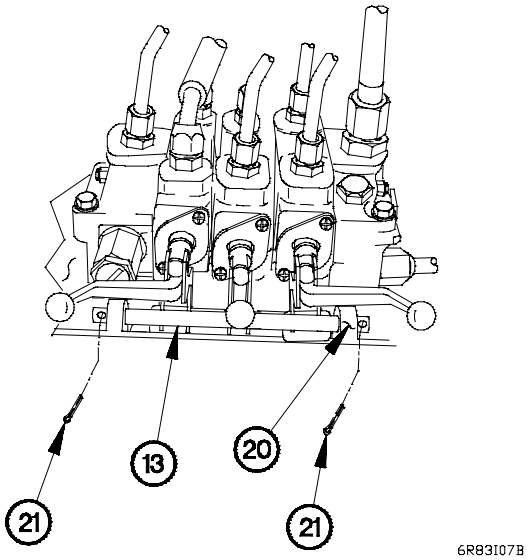
(9) Install handle (14), pin (15), and retaining rings (16) on upper control valve assembly (1).



6R83I05B

(10) Install handle (17), pin (18), and two retaining rings (19) on upper control valve assembly (1).




(11) Position rod (13) to right and through control panel boss (20).

(12) Install two cotter pins (21) on rod (13).

**f. Follow-On Maintenance.**

(1) Hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(2) Install control panel assembly covers (TM 9-2320-366-20-5).

(3) Connect batteries (TM 9-2320-366-20-3).

(4) Service hydraulic reservoir (TM 9-2320-366-10-1).

(5) Start engine (TM 9-2320-366-10-1).

(6) Operate wrecker control functions and check for hydraulic leaks (TM 9-2320-366-10-1).

(7) Shut down engine (TM 9-2320-366-10-1).

**End of Task.**

## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply and return valves closed (TM 9-2320-366-10-2).
Control panel assembly covers removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Pin, Cotter (2) (Item 332, Appendix F)

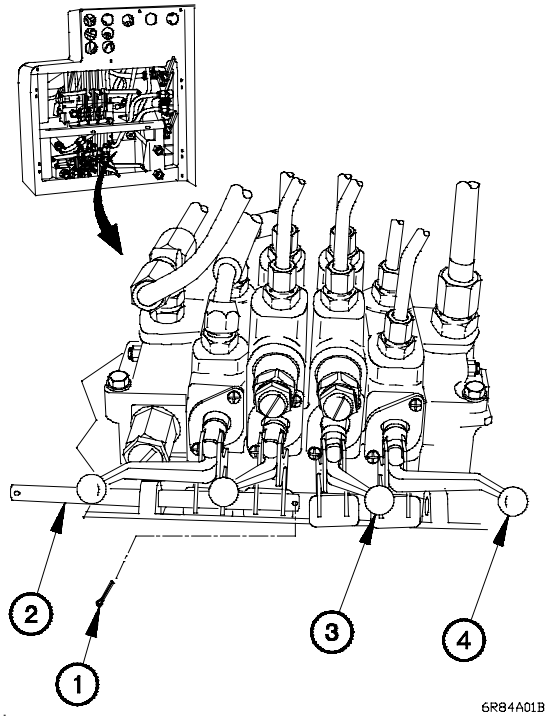
**Materials/Parts**
Packing, Preformed (2) (Item 230, Appendix F)
Packing, Preformed (2) (Item 232, Appendix F)
Packing, Preformed (8) (Item 237, Appendix F)
Lubricating Oil, Engine (Item 45, Appendix C)
Parts Kit, Seal Replacement (Item 313.3, Appendix F)
Parts Kit, Seal Replacement (Item 313.1, Appendix F)
Parts Kit, Seal Replacement (4) (Item 313.2, Appendix F)
Sealing Compound (Item 76.2, Appendix F)
Sealing Compound (Item 71.1, Appendix F)
Tape, Antiseizing (Item 85, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

(1) Remove two cotter pins (1) from rod (2). Discard cotter pins.

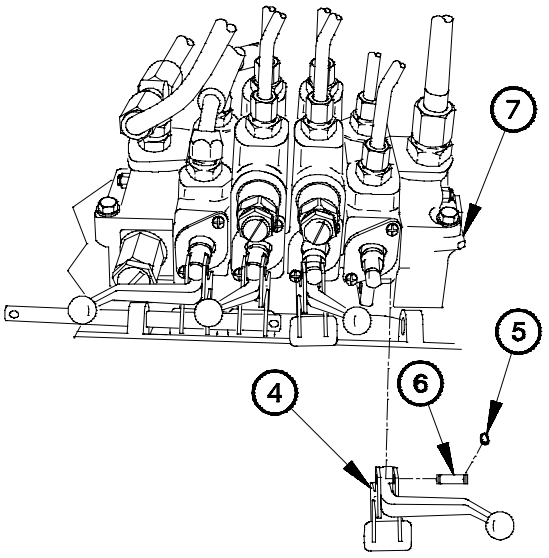
(2) Position rod (2) to the left past handles (3 and 4).

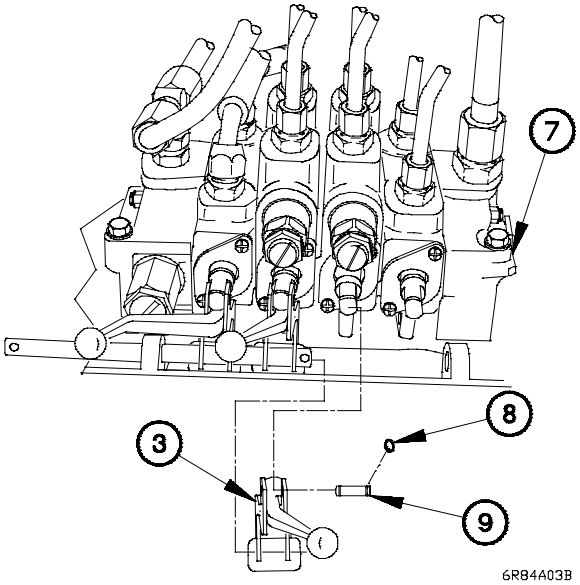


**WARNING**

**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.**

(3) Remove two retaining rings (5), pin (6), and handle (4) from lower control valve assembly (7).

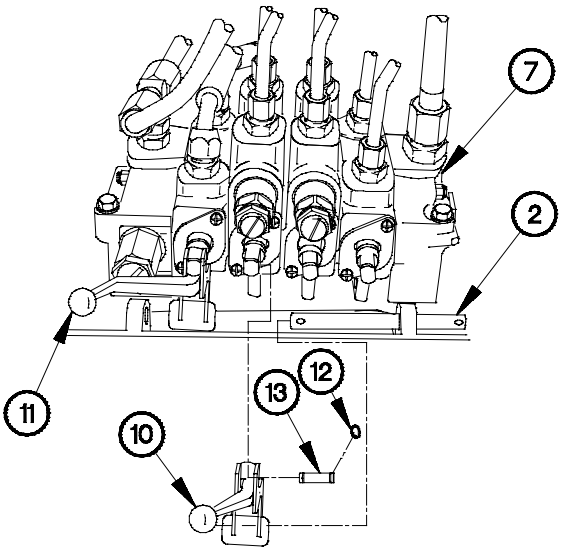



(4) Remove two retaining rings (8), pin (9), and handle (3) from lower control valve assembly (7).

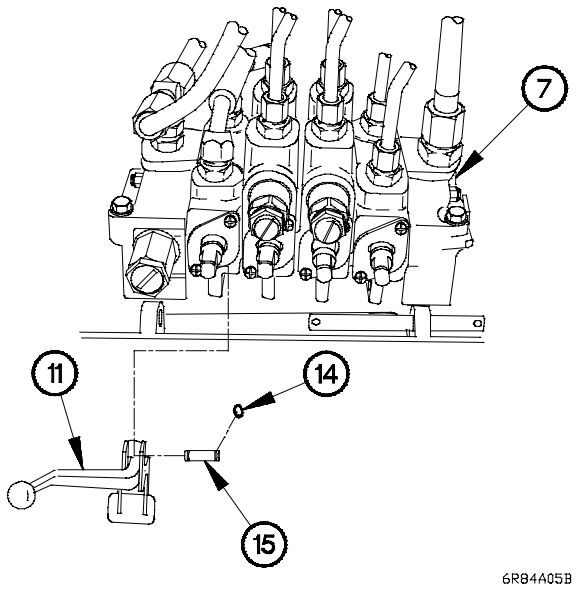
(5) Position rod (2) to the right past handles (10 and 11).

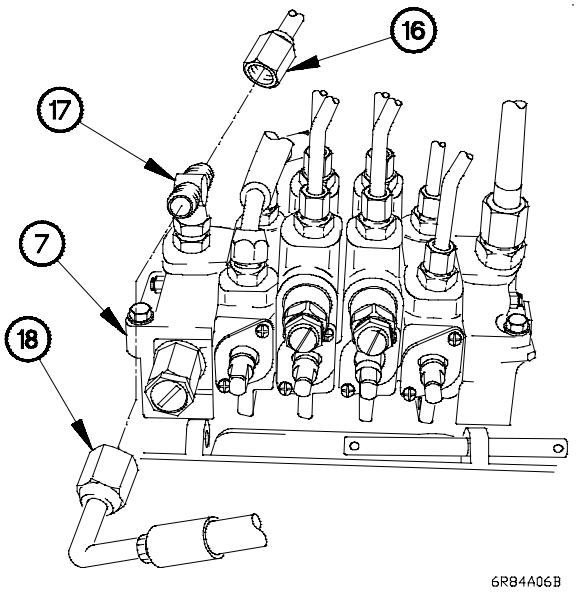
(6) Remove two retaining rings (12), pin (13), and handle (10) from lower control valve assembly (7).



## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(7) Remove two retaining rings (14), pin (15), and handle (11) from lower control valve assembly (7).




**CAUTION**

Cap or plug all hydraulic fittings and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic and air tubes prior to disconnecting.

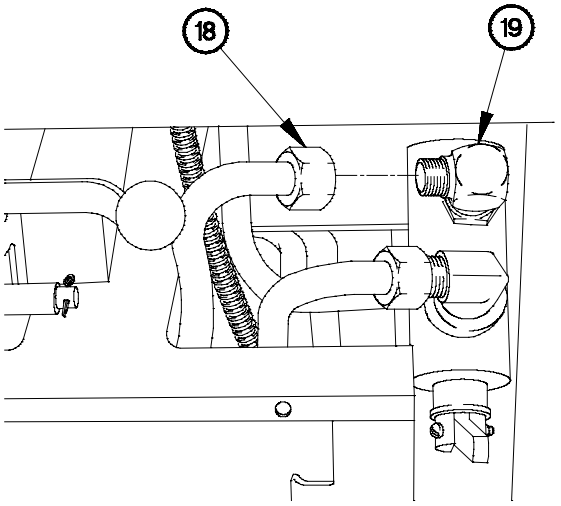
(8) Position drain pan under lower control valve assembly (7).

(9) Disconnect hydraulic tube (16) from tee fitting (17).

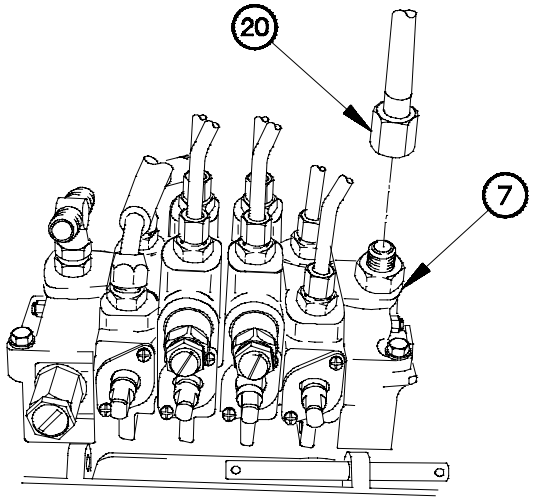
(10) Disconnect hydraulic tube (18) from tee fitting (17).

(11) Remove hydraulic tube (18) from 90-degree fitting (19).

(11.1) Remove hydraulic tube (18) from vehicle.




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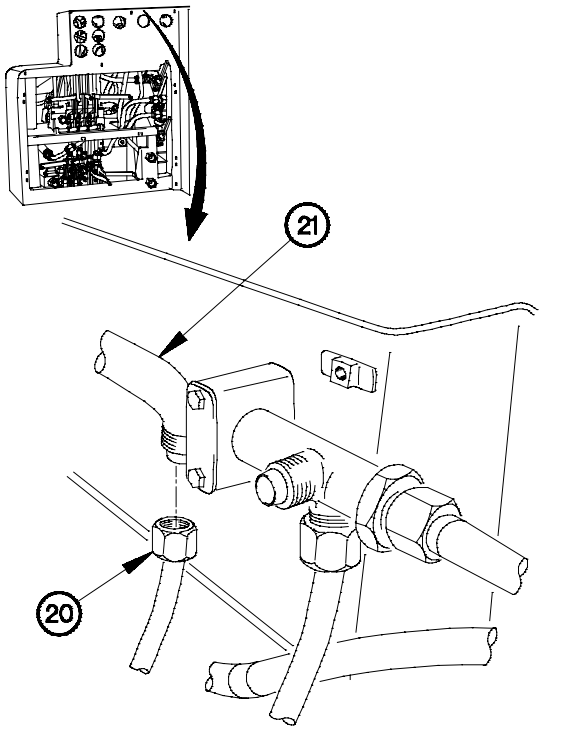



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(12) Disconnect hydraulic tube (20) from lower control valve assembly (7).

(13) Remove hydraulic tube (20) from tee fitting (21).

(13.1) Remove hydraulic tube (20) from vehicle.

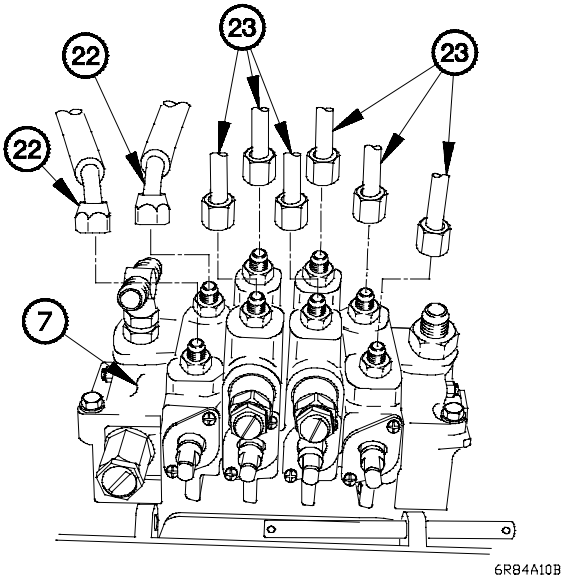


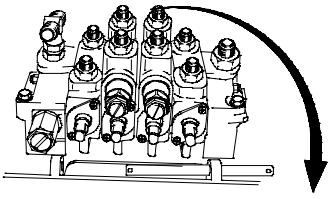

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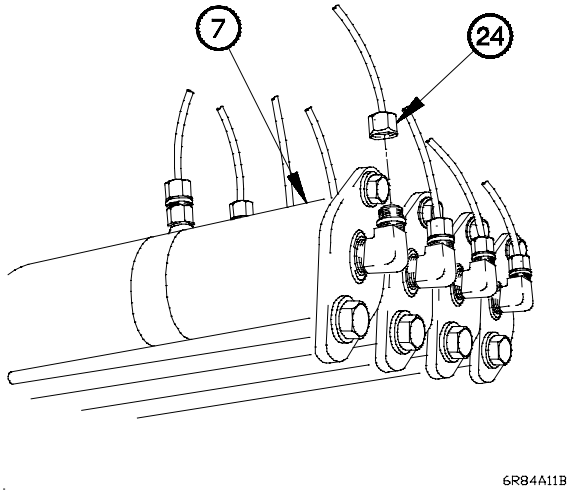
## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(14) Disconnect two hydraulic hoses (22) from lower control valve assembly (7).

(15) Disconnect six hydraulic tubes (23) from lower control valve assembly (7).






**NOTE**

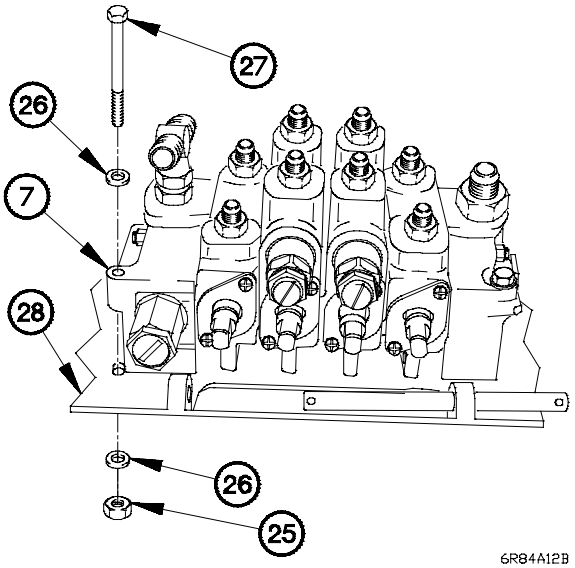
Tag air hoses prior to removal.

(16) Disconnect eight air tubes (24) from lower control valve assembly (7).

**NOTE**

Step (17) requires the aid of an assistant.

(17) Remove three nuts (25), six washers (26), three screws (27), and lower control valve assembly (7) from control panel (28).



**b. Disassembly.**

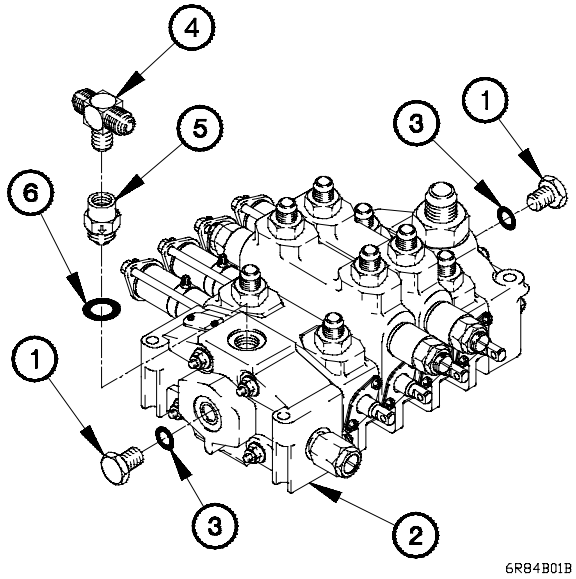
(1) Remove two plugs (1) from lower control valve assembly (2).

(2) Remove two preformed packings (3) from plugs (1). Discard preformed packings.

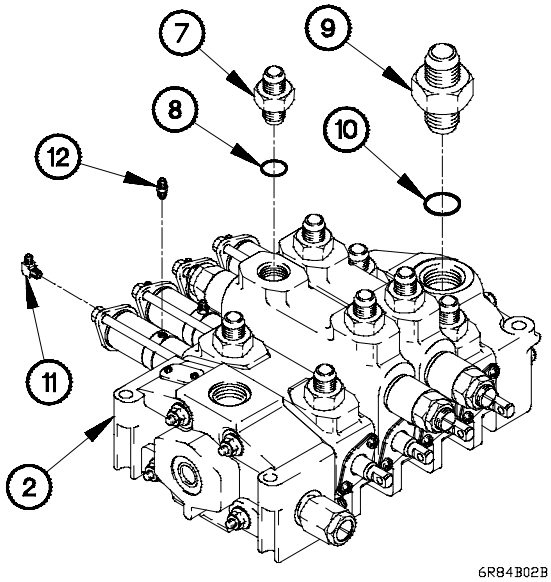
(3) Remove tee fitting (4) from adapter (5).

(4) Remove adapter (5) from lower control valve assembly (2).

(5) Remove preformed packing (6) from adapter (5). Discard preformed packing.



6R84B01B



6R84B02B

(6) Remove eight adapters (7) from lower control valve assembly (2).

(7) Remove eight preformed packings (8) from adapters (7). Discard preformed packings.

**NOTE**

Mark adapter locations for ease during installation.

(8) Remove adapter (9) from lower control valve assembly (2).

(9) Remove preformed packing (10) from adapter (9). Discard preformed packing.

(10) Remove four 90-degree fittings (11) from lower control valve assembly (2).

(11) Remove four fittings (12) from lower control valve assembly (2).

## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

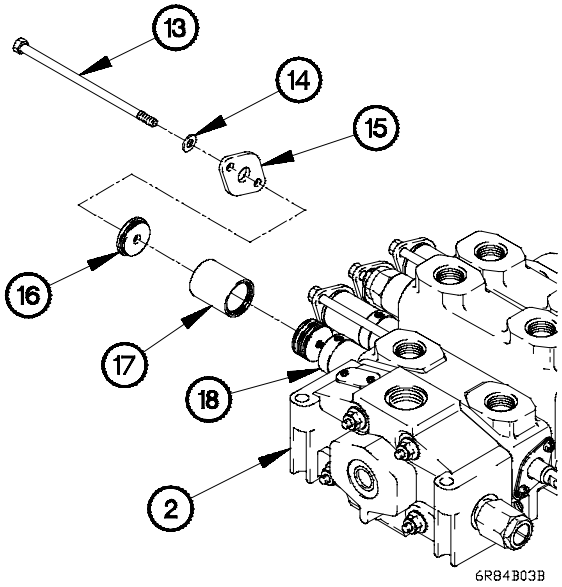
**NOTE**

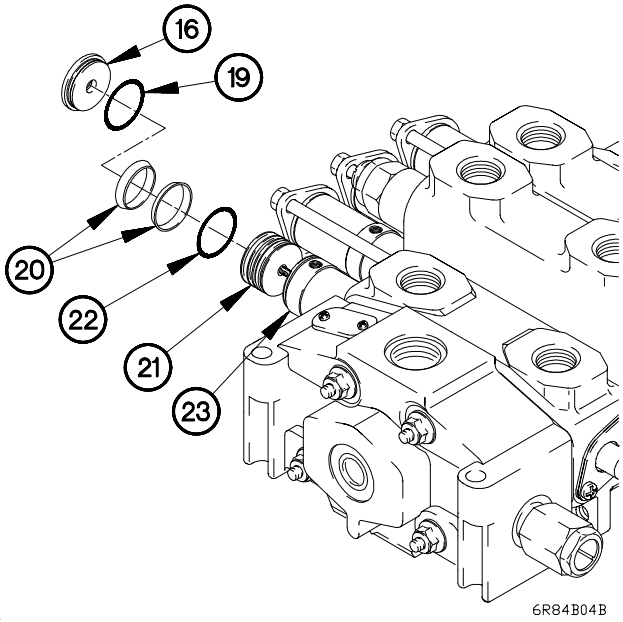
- All four solenoid valves are disassembled the same way. One solenoid valve shown.
- Note position of retaining plates prior to removal.

(12) Remove two screws (13), washers (14), and retaining plate (15) from lower control valve assembly (2).

(13) Remove seal retainer (16) and pressure tube (17) from solenoid (18).

(14) Remove seal retainer (16) from pressure tube (17).




**NOTE**

Note position of seals and packings prior to removal.

(15) Remove preformed packing (19) from seal retainer (16). Discard preformed packing.

(16) Remove two seals (20) from piston (21). Discard two seals.

(17) Remove preformed packing (22) from flange (23). Discard preformed packing.

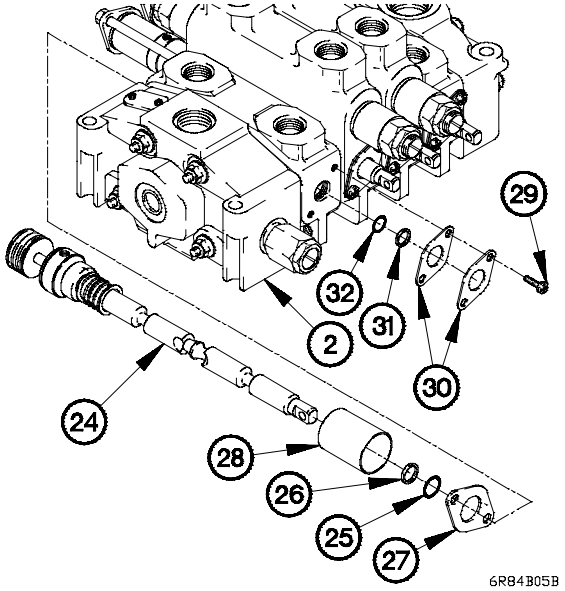
(18) Remove solenoid assembly (24) from lower control valve assembly (2).

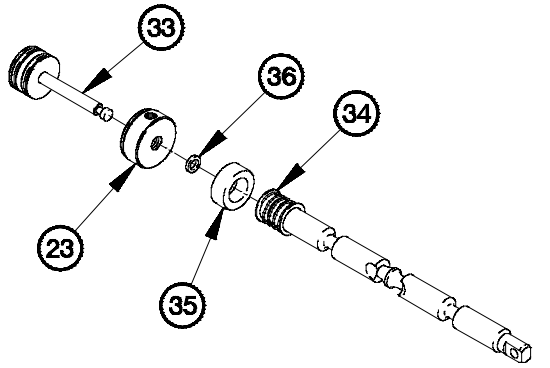
**NOTE**

Note position of seals, packings, and retaining plates prior to removal.

(19) Remove seal (25), preformed packing (26), retaining plate (27) and spacer (28) from solenoid assembly (24). Discard preformed packing and seal.

(20) Remove two screws (29), retaining plates (30), retaining packing (31), and seal (32) from lower control valve assembly (2). Discard retaining packing and seal.




(21) Remove piston rod (33) from stripper bolt (34).

(22) Remove spacer (35) and flange (23) from piston rod (33).

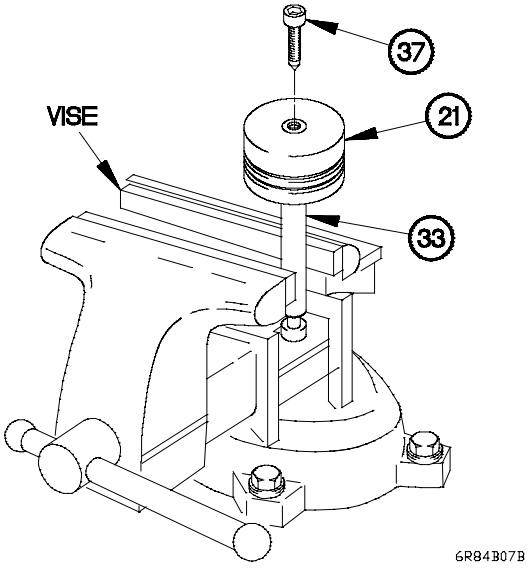
(23) Remove inner seal (36) from flange (23). Discard seal.

**CAUTION**

Piston rod is made of aluminum and can be easily damaged. Failure to comply will result in damage to equipment.

(24) Place piston rod (33) in soft vise.

(25) Remove cap screw (37) and piston (21) from piston rod (33).



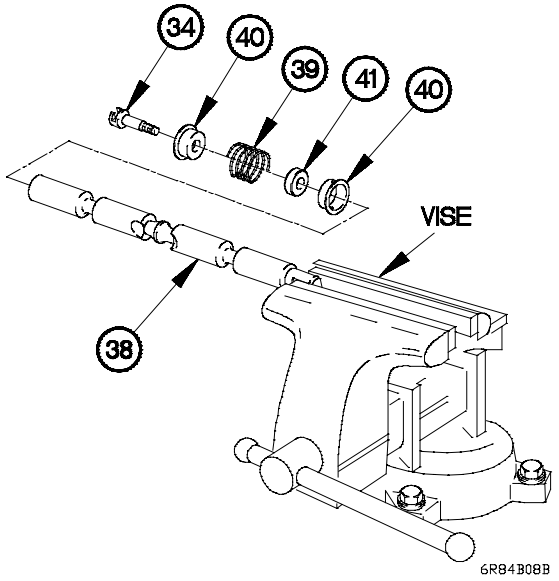
## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**WARNING**

- **Stripper bolt, spring retainers, tube stop, spring, and linear valve will become very hot when applying heat to linear valve. Do not touch these parts with bare hands, or allow body to come in contact with them. Failure to comply may result in injury to personnel.**
- **Use care when removing springs. Springs are under tension and can act as projectiles when being removed. Failure to comply may result in injury to personnel.**

**CAUTION**

- Do not overheat valve. If linear valve begins to discolor, remove heat source. Failure to comply may result in damage to equipment.
- Position linear valve in a vise equipped with vise jaw caps when removing stripper bolt. Failure to comply may result in injury to personnel.




(26) Place linear valve (38) in vise.

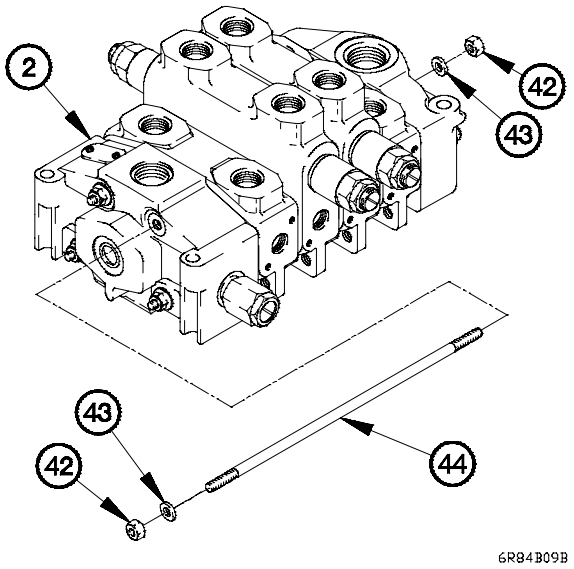
(27) Compress spring (39).

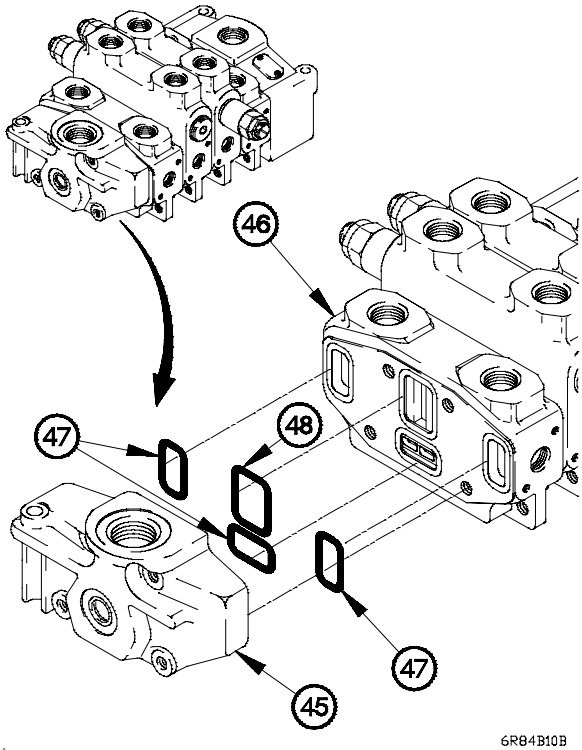
(28) Apply heat to linear valve (38) at threads of stripper bolt (34).

(29) Remove stripper bolt (34), two spring retainers (40), spring (39), and tube stop (41) from linear valve (38).

(30) Perform steps (12) through (29) on remaining solenoid valve assemblies.

(31) Remove eight nuts (42), washers (43) and four studs (44) from lower control valve assembly (2).

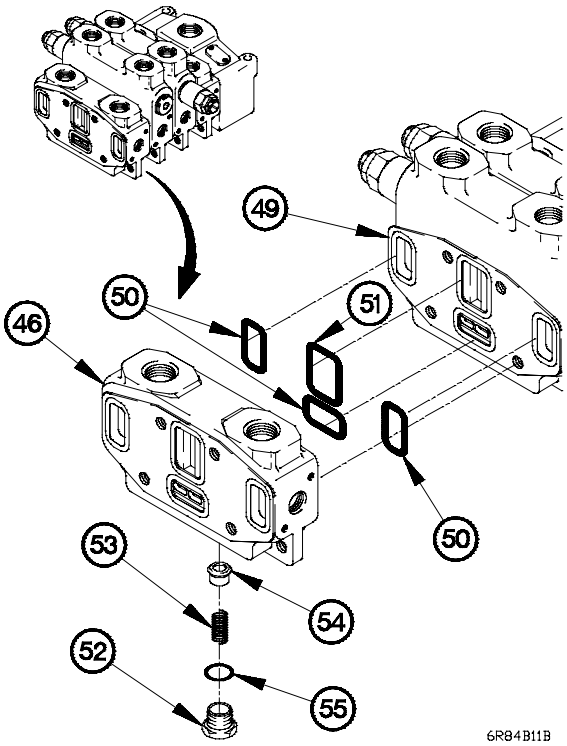



(32) Separate pump valve (45) from valve (46).

(33) Remove three gaskets (47) from valve (46). Discard three gaskets.

(34) Remove gasket (48) from valve (46). Discard gasket.




(35) Separate valve (46) from valve (49).

(36) Remove three gaskets (50) from valve (49). Discard three gaskets.

(37) Remove gasket (51) from valve (49). Discard gasket.

(38) Remove plug (52), spring (53) and pressure valve (54) from valve (49).

(39) Remove preformed packing (55) from plug (52). Discard preformed packing.

## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

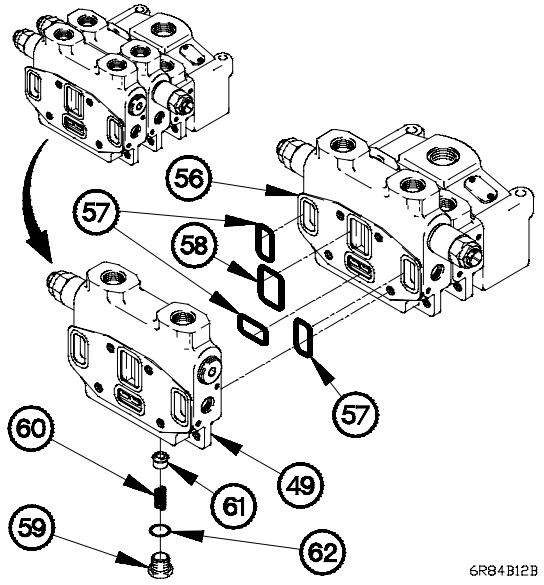
(40) Separate valve (49) from valve (56).

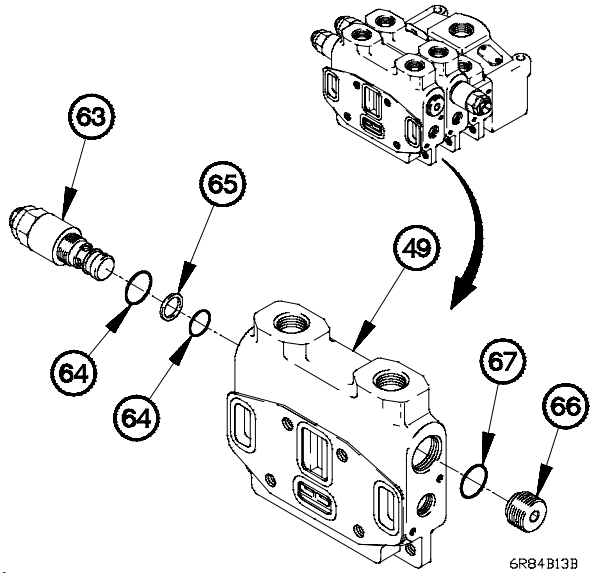
(41) Remove three gaskets (57) from valve (56). Discard three gaskets.

(42) Remove gasket (58) from valve (56). Discard gasket.

(43) Remove plug (59), spring (60) and pressure valve (61) from valve (49).

(44) Remove preformed packing (62) from plug (59). Discard preformed packing.




(45) Remove pressure relief valve (63) from valve (49).

(46) Remove two preformed packings (64) and gasket (65) from pressure relief valve (63). Discard preformed packings and gasket.

(47) Remove plug (66) from valve (49).

(48) Remove preformed packing (67) from plug (66). Discard preformed packing.

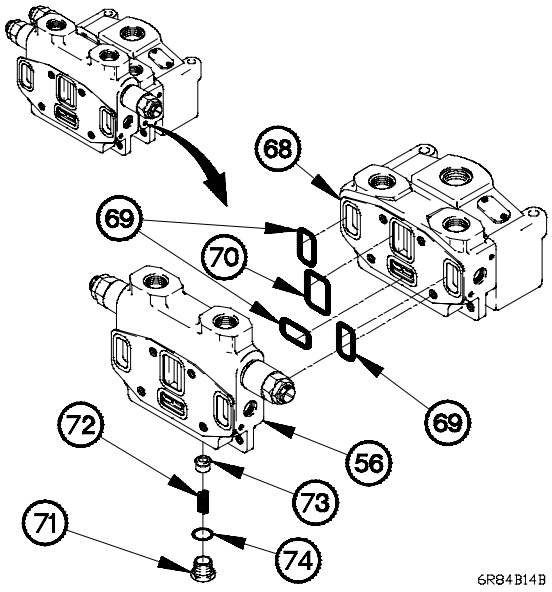
(49) Separate valve (56) from valve (68).

(50) Remove three gaskets (69) from valve (68). Discard three gaskets.

(51) Remove gasket (70) from valve (68). Discard gasket.

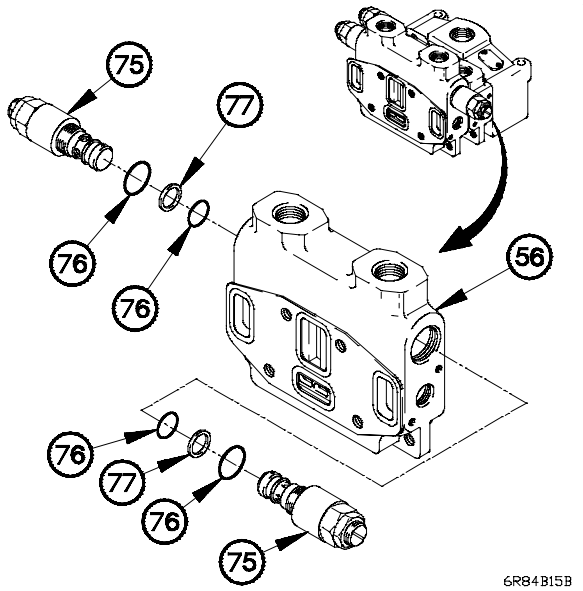
(52) Remove plug (71), spring (72) and pressure valve (73) from valve (68).

(53) Remove preformed packing (74) from plug (71). Discard preformed packing.

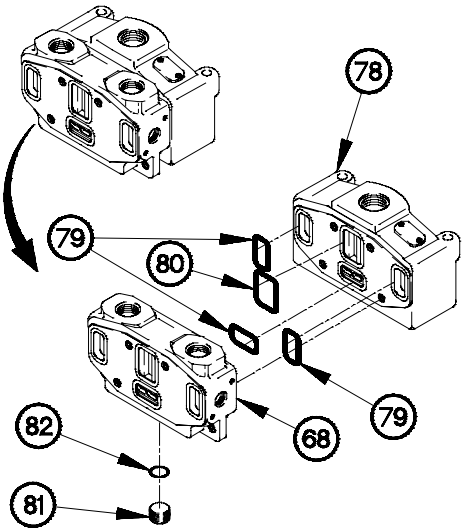


(54) Remove two pressure relief valves (75) from valve (56).

(55) Remove four preformed packings (76) and two gaskets (77) from pressure relief valves (75). Discard preformed packings and gaskets.




6R84B15B




6R84B16B

(56) Separate valve (68) from valve (78).

(57) Remove three gaskets (79) from valve (78). Discard three gaskets.

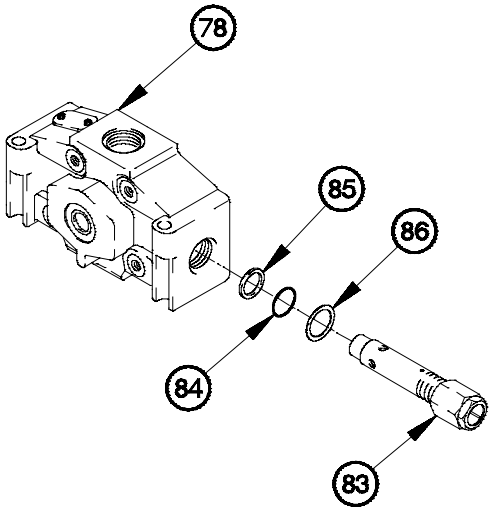
(58) Remove gasket (80) from valve (78). Discard gasket.

(59) Remove plug (81) from valve (68).

(60) Remove preformed packing (82) from plug (81). Discard preformed packing.

(61) Remove relief valve (83) from valve (78).

(62) Remove preformed packing (84), backup ring (85) and washer (86) from relief valve (83). Discard preformed packing and backup ring.




6R84B17B

## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**c. Cleaning/Inspection.**

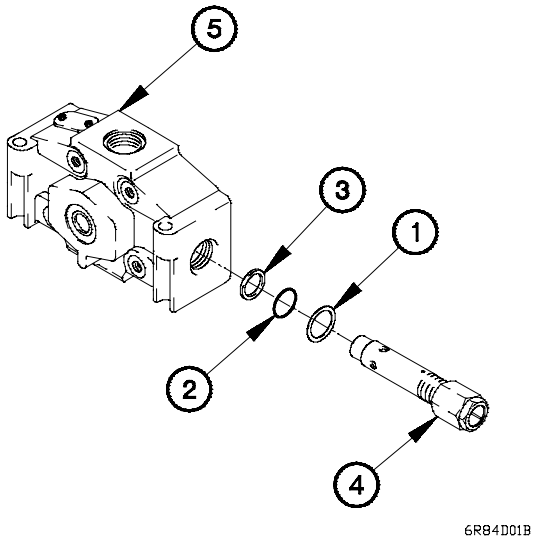
**WARNING**

- **Dry cleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I dry cleaning solvent is 100 ° F (38 ° C) and for Type II is 130 ° F (50 ° C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using dry cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**
- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

(1) Thoroughly clean all metal parts with dry cleaning solvent and dry using compressed air prior to inspection.

(2) Inspect all metal parts for scratches, gouges, nicks, burrs, or excessive wear.

**d. Assembly.**




**NOTE**

Apply lubricating oil to all preformed packings and seals during assembly.

(1) Install washer (1), preformed packing (2), and backup ring (3) on relief valve (4).

(2) Position relief valve (4) in valve (5).

(3) Tighten relief valve (4) to 80-90 lb-ft (108-122 N·m).

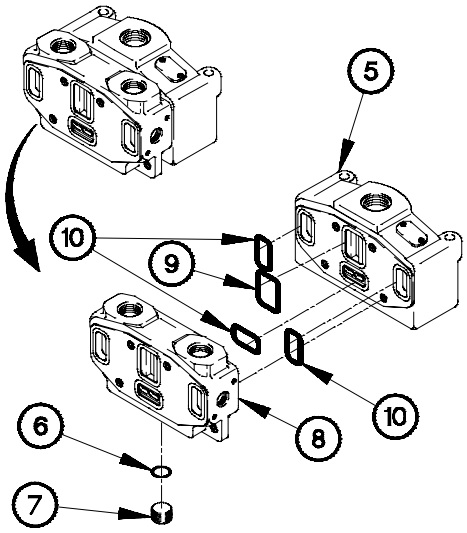
(4) Install preformed packing (6) on plug (7).

(5) Install plug (7) in valve (8).

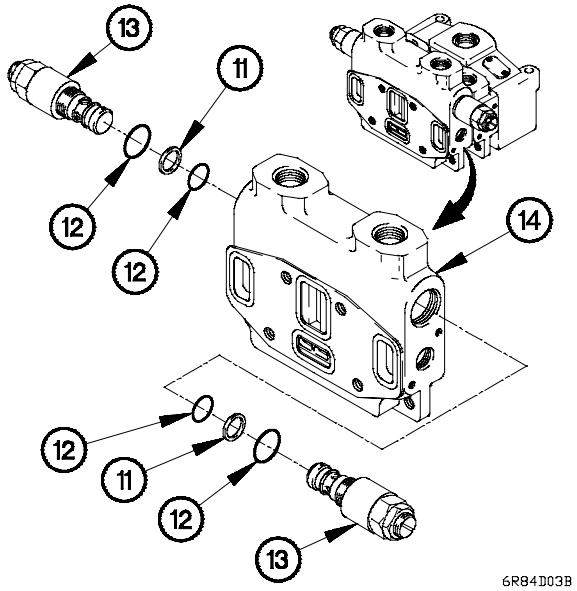
(6) Install gasket (9) in valve (5).

(7) Install three gaskets (10) in valve (5).

(8) Position valve (8) with valve (5).




6R84D02B




6R84D03B

(9) Install two gaskets (11) and four preformed packings (12) on two pressure relief valves (13).

(10) Position two pressure relief valves (13) in valve (14).

(11) Tighten two pressure relief valves (13) to 80-90 lb-ft (108-122 N·m).

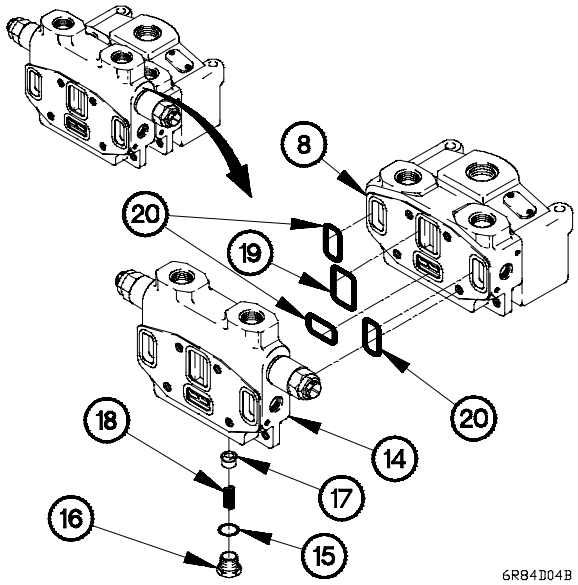
(12) Install preformed packing (15) on plug (16).

(13) Install pressure valve (17), spring (18), and plug (16) in valve (14).

(14) Install gasket (19) in valve (8).

(15) Install three gaskets (20) in valve (8).

(16) Position valve (14) with valve (8).




6R84D04B

## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

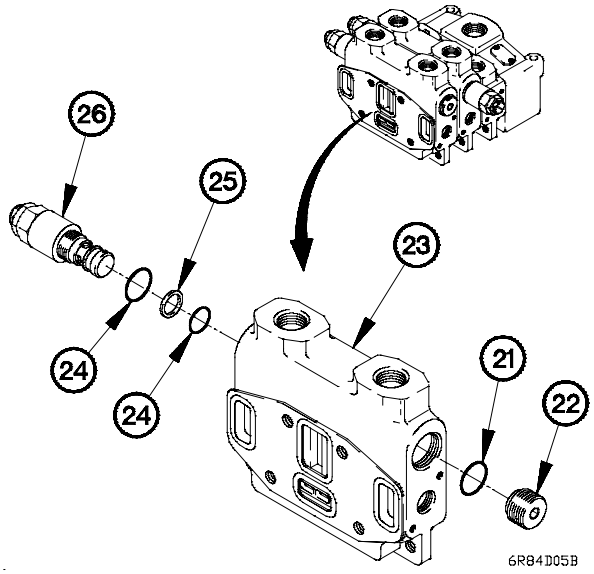
(17) Install preformed packing (21) on plug (22).

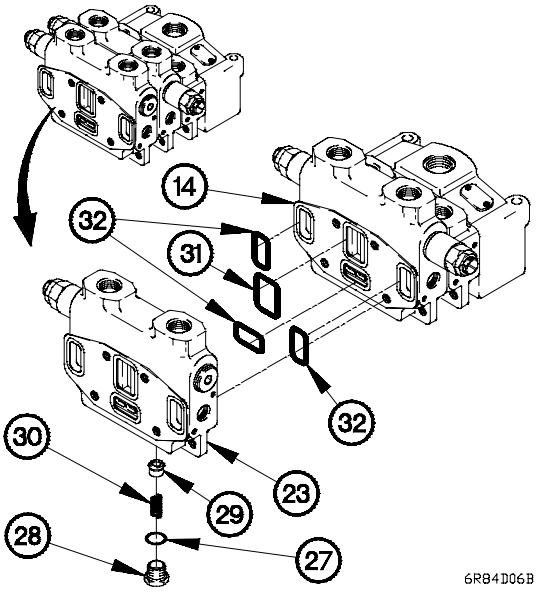
(18) Install plug (22) in valve (23).

(19) Install two preformed packings (24) and gasket (25) on pressure relief valve (26).

(20) Position pressure relief valve (26) in valve (25).

(21) Tighten pressure relief valve (26) to 80-90 lb-ft (108-122 N·m).




(22) Install preformed packing (27) on plug (28).

(23) Install pressure valve (29), spring (30), and plug (28) in valve (23).

(24) Install gasket (31) in valve (14).

(25) Install three gaskets (32) in valve (14).

(26) Position valve (23) with valve (14).

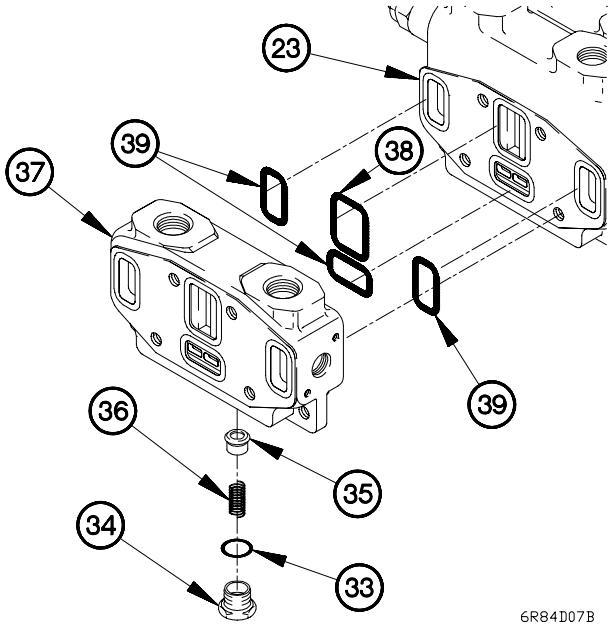
(27) Install preformed packing (33) on plug (34).

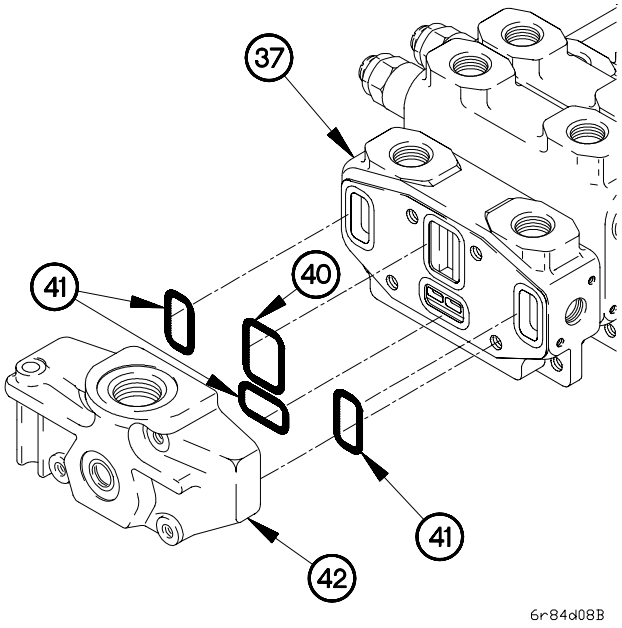
(28) Install pressure valve (35), spring (36), and plug (34) in valve (37).

(29) Install gasket (38) in valve (23).

(30) Install three gaskets (39) in valve (23).

(31) Position valve (37) with valve (23).




(32) Install gasket (40) in valve (37).

(33) Install three gaskets (41) in valve (37).

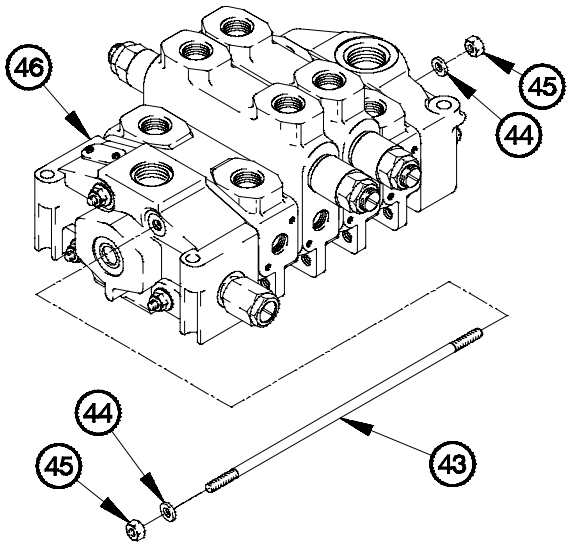
(34) Position valve (42) with valve (37).

**CAUTION**

Verify that valves are returned to their original configuration. Failure to comply may result in damage to equipment.

**NOTE**

- Apply lubricating oil to all studs prior to installation.
- When positioning studs, washers and nuts, an even amount of threads must show on either side of stud after applying torque.




(35) Position four studs (43), eight washers (44), and nuts (45) in lower control valve assembly (46).

(36) Tighten eight nuts (45) to 29 lb-ft (39 N·m).

(37) Re-tighten eight nuts (45) to 42 lb-ft (57 N·m).

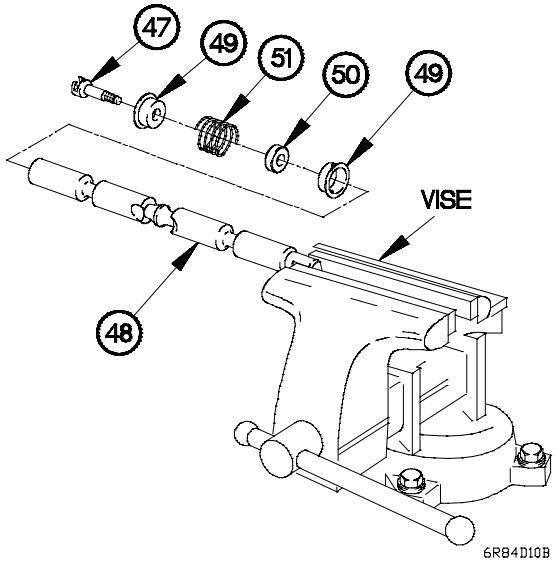
## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**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.**
- **Use care when installing springs. Springs are under tension and can act as projectiles when being installed. Failure to comply can cause injury to personnel.**

**CAUTION**

- Lube two spring retainers, tube stop, and spring with grease prior to installation. Failure to comply may result in damage to equipment.
- Linear valve must be positioned in a vise equipped with vise jaw caps when installing stripper bolt. Failure to comply may result in damage to equipment.




(38) Apply sealing compound to threads of stripper bolt (47).

(39) Place linear valve (48) in vise.

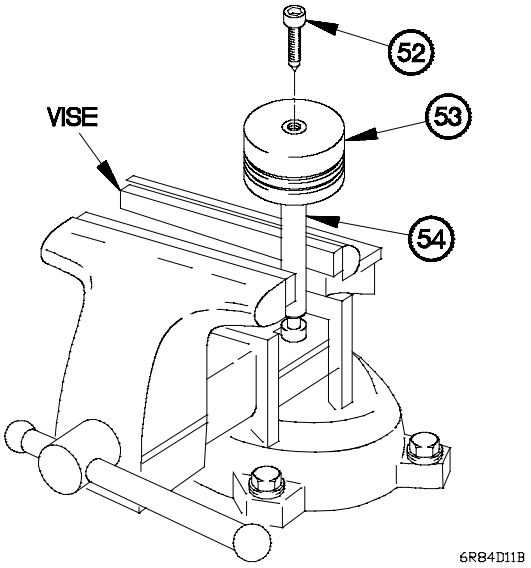
(40) Install two spring retainers (49), tube stop (50), and spring (51) on linear valve (48) with stripper bolt (47).

**WARNING**

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, 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.**

(41) Apply adhesive to threads of cap screw (52).

(42) Position piston (53) on piston rod (54) with cap screw (52).

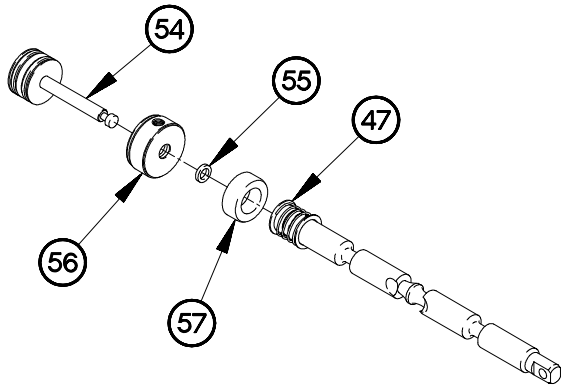



**CAUTION**

Piston rod must be positioned in a vise equipped with vise jaw caps when installing cap screw. Failure to comply may result in damage to equipment.

(43) Position piston rod (54) in vise.

(44) Tighten cap screw (52) to 75 lb-in. (8 N·m).




(45) Install inner seal (55) in flange (56).

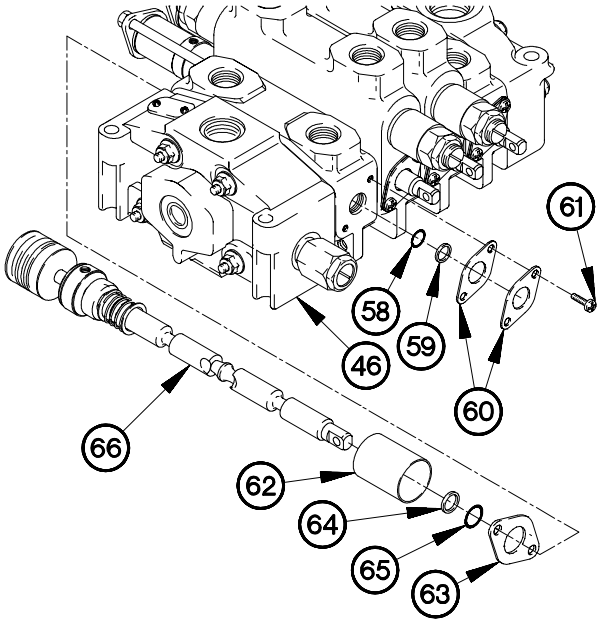
(46) Position flange (56) and spacer (57) on piston rod (54).

(47) Install piston rod (54) in stripper bolt (47).

## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

**NOTE**

All front lower main valve retaining plates and solenoid assemblies are installed the same way. One shown.

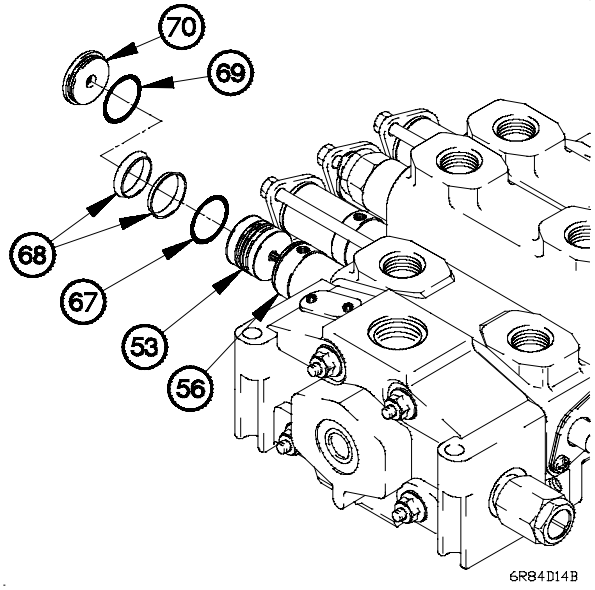



(48) Position seal (58), preformed packing (59), and two retaining plates (60) on lower control assembly valve (46) with two screws (61).

(49) Install spacer (62), retaining plate (63), preformed packing (64), and seal (65) on solenoid assembly (66).

(50) Position solenoid assembly (66) in lower control valve assembly (46).

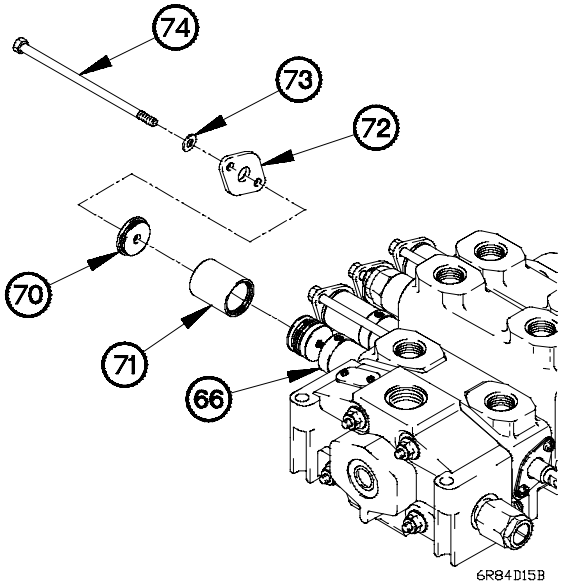
(50.1) Perform steps (38) through (50) on three remaining solenoid assemblies.




(51) Install preformed packing (67) on flange (56).

(52) Install two seals (68) on piston (53).

(53) Install preformed packing (69) on seal retainer (70).




(54) Install seal retainer (70) in pressure tube (71).

(55) Install pressure tube (71) on solenoid assembly (66).

(56) Position retaining plate (72) on pressure tube (71) with two washers (73) and screws (74).

(57) Tighten two screws (74) to 25-30 lb-in. (3 N·m).

**NOTE**

Lightly lubricate all parts prior to installation.

(58) Apply antiseizing tape to threads of four 90-degree fittings (75) and fittings (76).

(59) Install four 90-degree fittings (75) in lower control valve assembly (46).

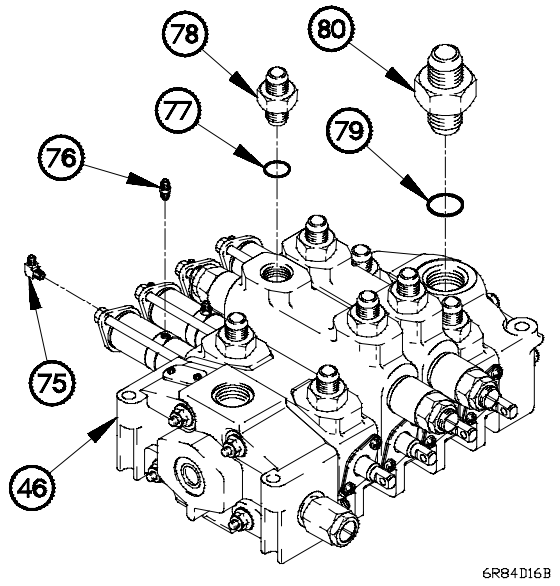
(60) Install four fittings (76) in lower control valve assembly (46).

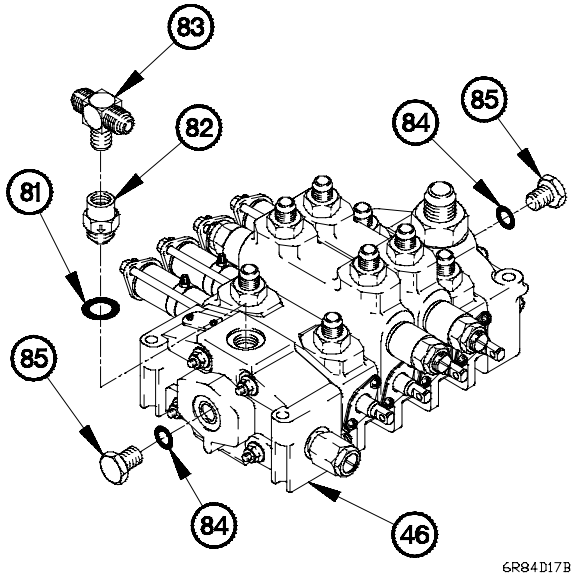
(61) Install preformed packing (77) on adapter (78).

(62) Install adapter (78) in lower control valve assembly (46).

(63) Install eight preformed packings (79) on adapters (80).

(64) Install eight adapters (80) in lower control valve assembly (46).




(65) Install preformed packing (81) on adapter (82).

(66) Install adapter (82) in lower control valve assembly (46).

(67) Install tee fitting (83) in adapter (82).

(68) Install two preformed packings (84) on plugs (85).

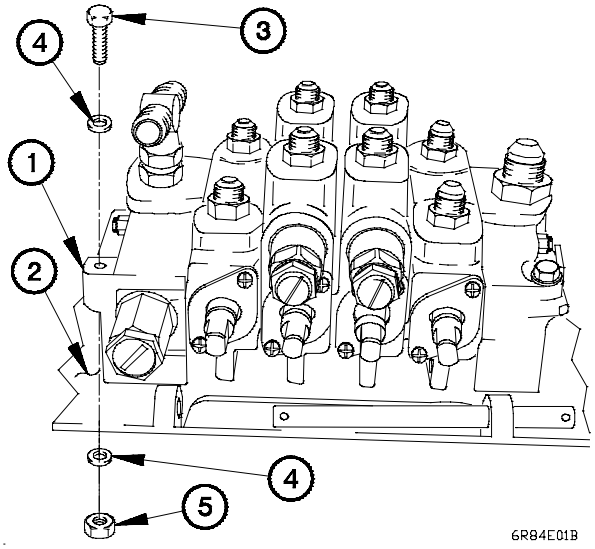
(69) Install two plugs (85) in lower control valve assembly (46).

**e. Installation.**

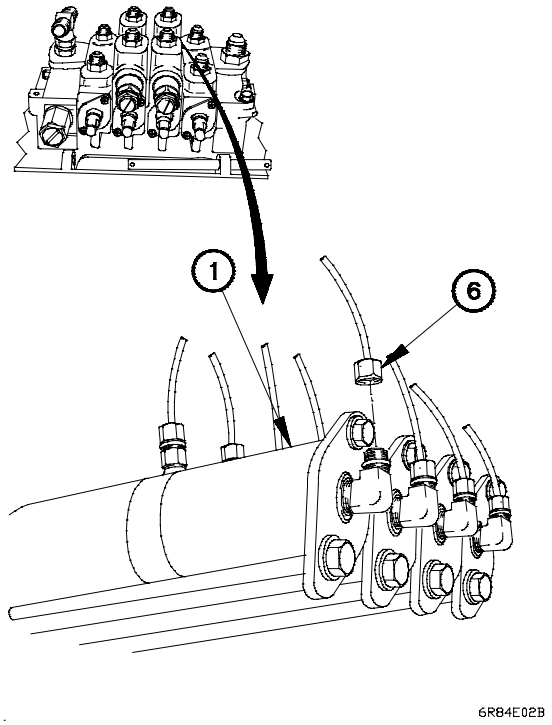
**NOTE**

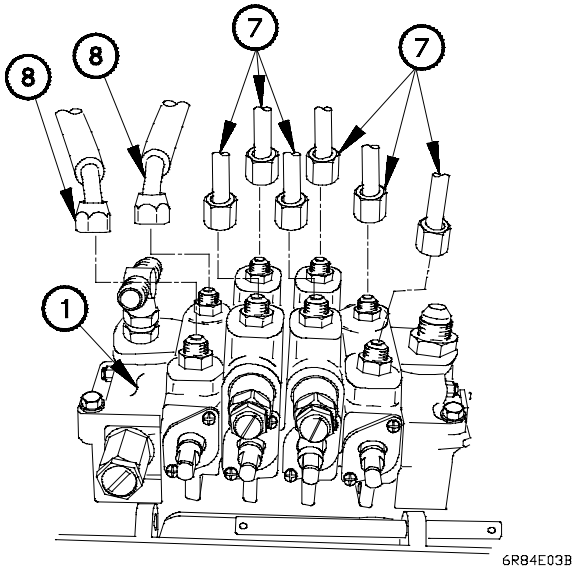
Step (1) requires the aid of an assistant.

(1) Install lower control valve assembly (1) on control panel (2) with three screws (3), six washers (4), and three nuts (5).



(2) Connect eight air tubes (6) to lower control valve assembly (1).

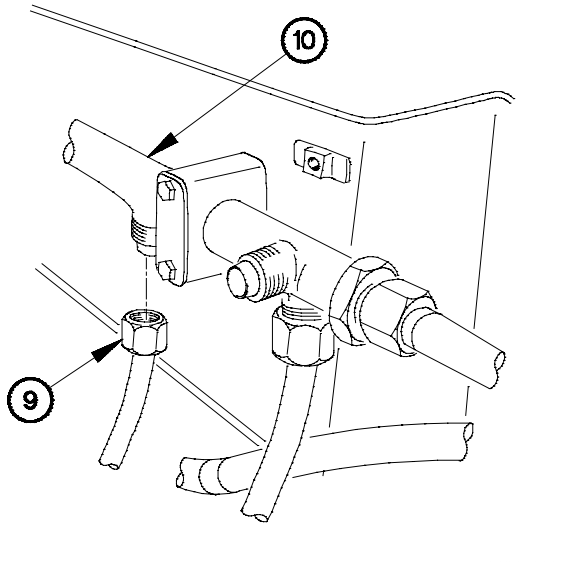


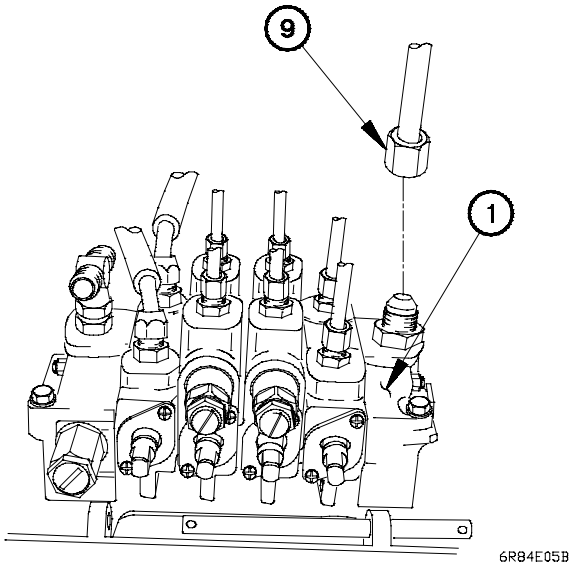

(3) Connect six hydraulic tubes (7) to lower control valve assembly (1).

(4) Connect two hydraulic hoses (8) to lower control valve assembly (1).

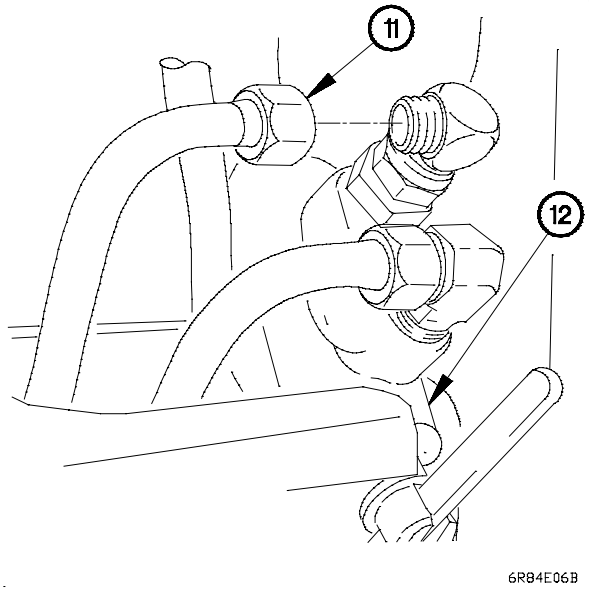
(5) Connect hydraulic tube (9) to tee fitting (10).



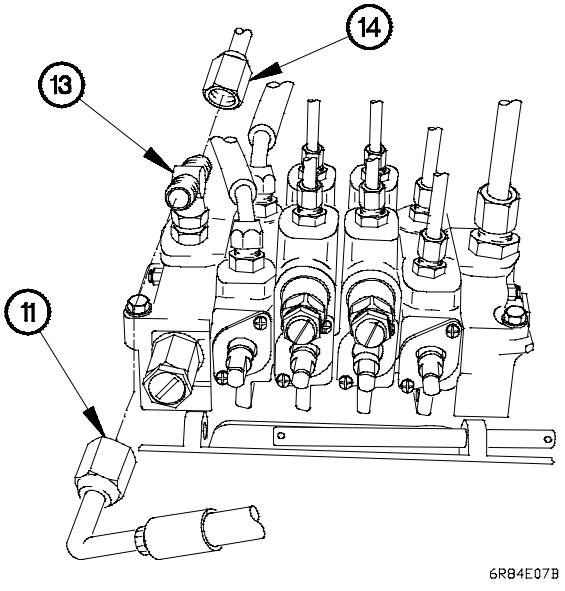
## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




(6) Connect hydraulic tube (9) to lower control valve assembly (1).




(7) Connect hydraulic tube (11) to SECONDARY CIRCUIT SELECTOR VALVE (12).



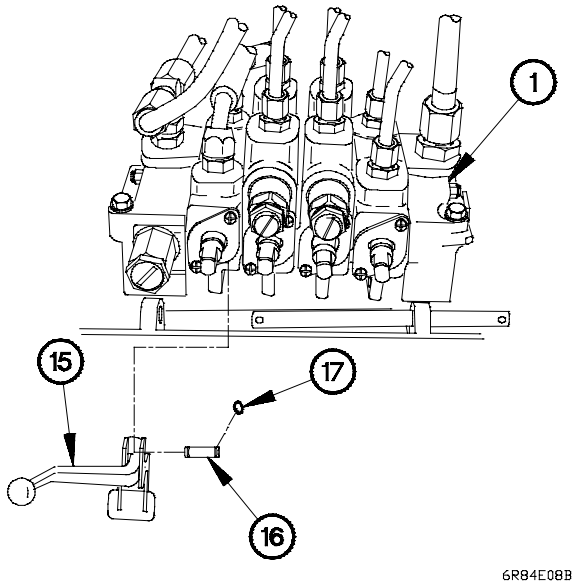

(8) Connect hydraulic tube (11) to tee fitting (13).

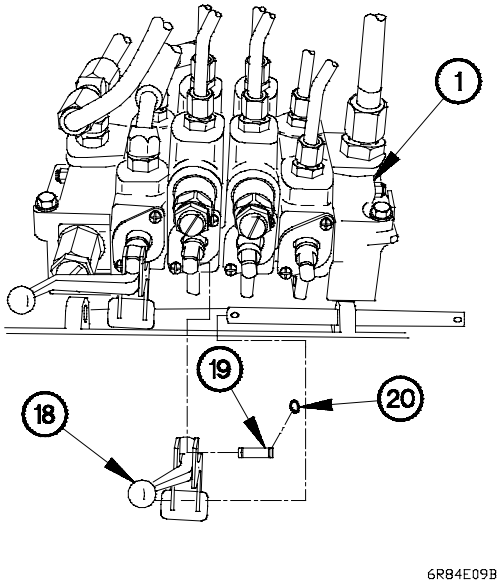
(9) Connect hydraulic tube (14) to tee fitting (13).

**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.**

(10) Install handle (15), pin (16), and two retaining rings (17) on lower control valve assembly (1).

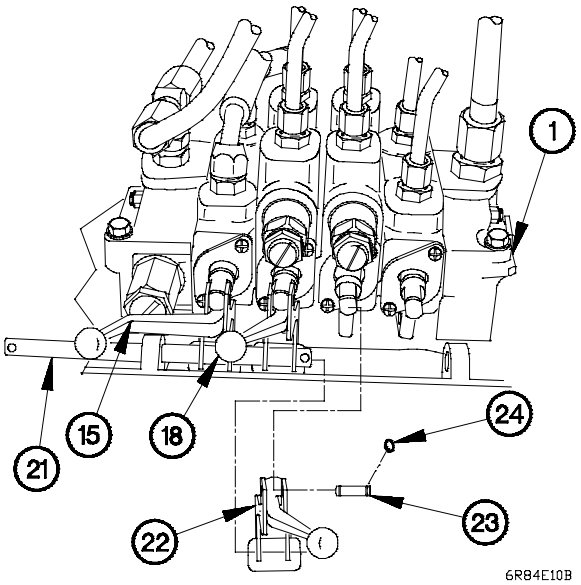


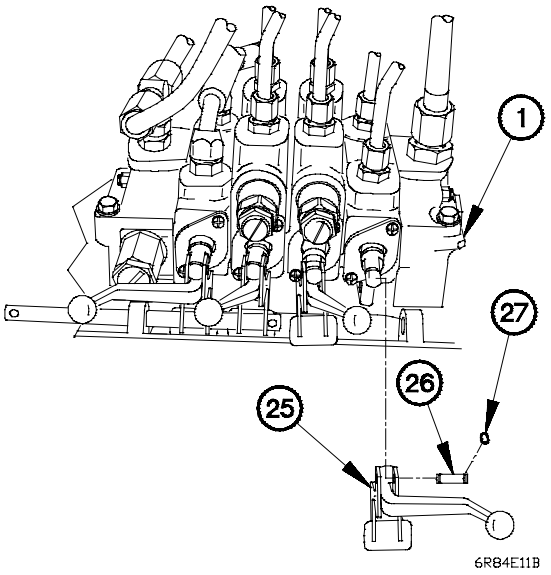

(11) Install handle (18), pin (19), and two retaining rings (20) on lower control valve assembly (1).

(12) Position rod (21) to left through handles (15 and 18).

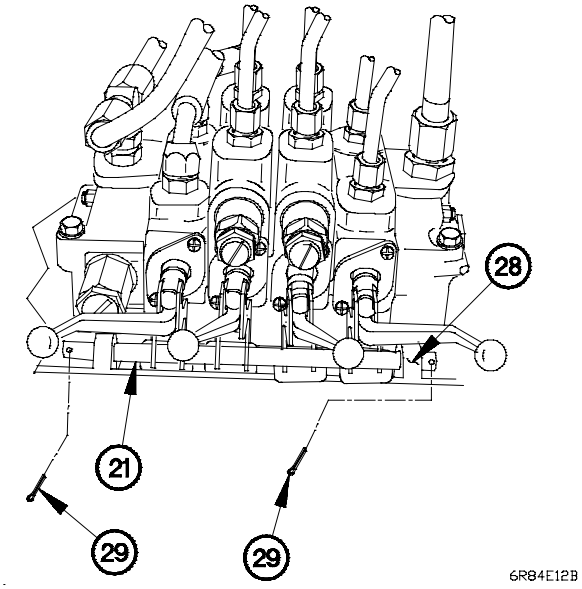
(13) Install handle (22), pin (23), and two retaining rings (24) on lower control valve assembly (1).



## 16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)




(14) Install handle (25), pin (26), and two retaining rings (27) on lower control valve assembly (1).




(15) Position rod (21) to the right through control panel boss (28).

(16) Install two cotter pins (29) on rod (21).

**f. Follow-On Maintenance.**

(1) Install control panel assembly covers (TM 9-2320-366-20-5).

(2) Hydraulic reservoir supply and return valves in open position (TM 9-2320-366-10-2).

(3) Service hydraulic reservoir (TM 9-2320-366-10-1).

(4) Connect batteries (TM 9-2320-366-20-3).

(5) Start engine (TM 9-2320-366-10-1).

(6) Operate wrecker control functions and check for hydraulic leaks (TM 9-2320-366-10-1).

(7) Shut down engine (TM 9-2320-366-10-1).

**End of Task.**

## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Adjustment
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Hydraulic tank supply valve and return valve closed (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)
Keyset, Socket Head Screw (Item 38, Appendix B)
STE/ICE-R (Item 70, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 76, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Materials/Parts (Cont)**
Nut, Self-Locking (4) (Item 176, Appendix F)
Lockwasher (4) (Item 135, Appendix F)
Packing, Preformed (4) (Item 237, Appendix F)
Packing, Preformed (3) (Item 230, Appendix F)
Packing, Preformed (2) (Item 236, Appendix F)
Kit, Seal (Item 112, Appendix F)
Kit, Seal (Item 114, Appendix F)
Kit, Seal (2) (Item 111, Appendix F)
Kit, Seal (Item 115, Appendix F)
Kit, Seal (2) (Item 110, Appendix F)
Kit, Seal (2) (Item 109, Appendix F)

**References**
TM 9-4910-571-12&P

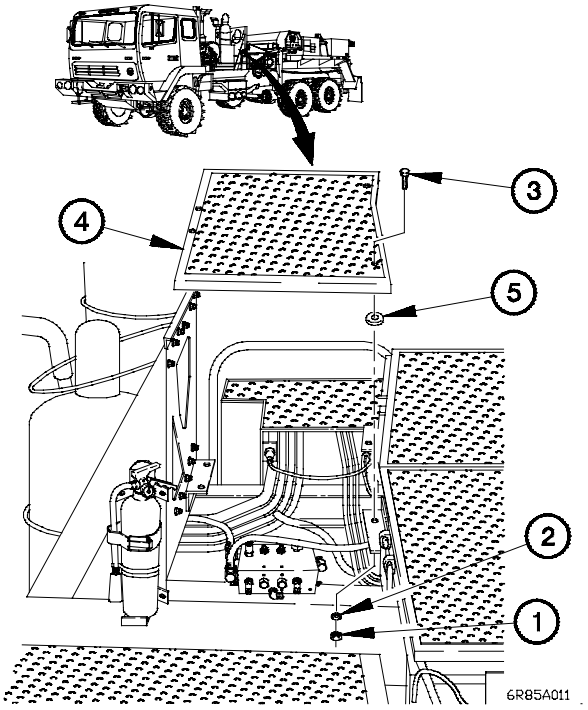
**Personnel Required**
(3)

**WARNING**

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

**a. Removal.**

(1) Remove four self-locking nuts (1), washers (2), screws (3), catwalk (4), and four isolators (5) from vehicle. Discard self-locking nuts.



## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

**CAUTION**

Cap or plug hydraulic connections and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

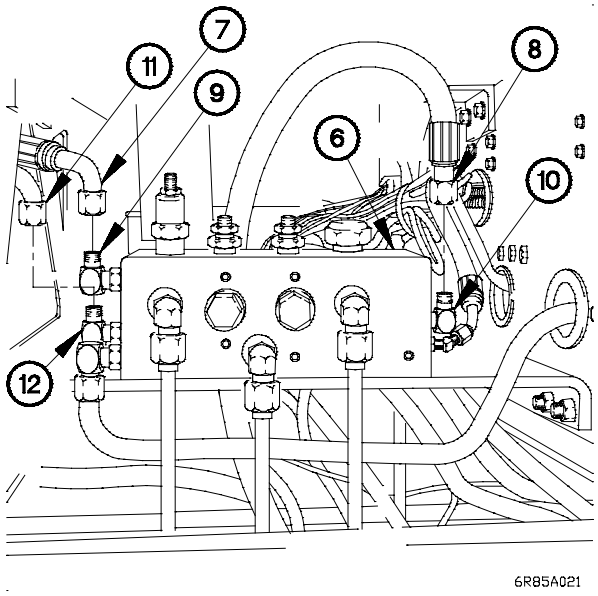
- Note position of fittings prior to removal.
- Tag hydraulic hoses, tubes, and connect-ion points prior to disconnecting.

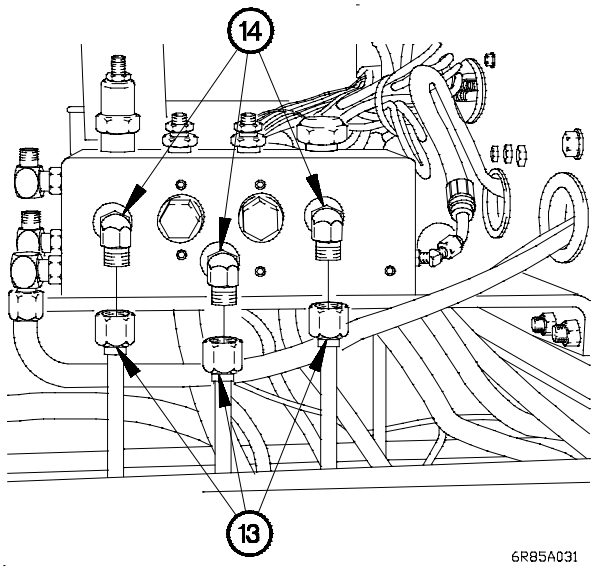
(2) Position drain pan under monoblock valve (6).

(3) Disconnect hoses (7 and 8) from 90-degree fittings (9 and 10).

(4) Loosen 90-degree fitting (9) on monoblock valve (6).

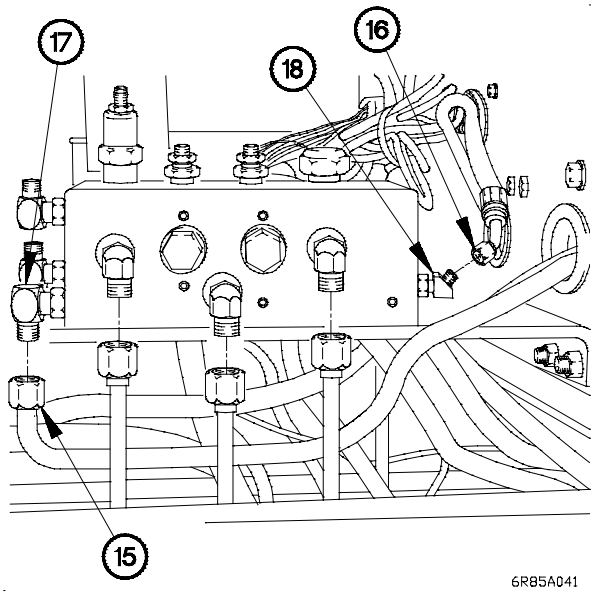
(5) Disconnect hose (11) from 90-degree fitting (12).



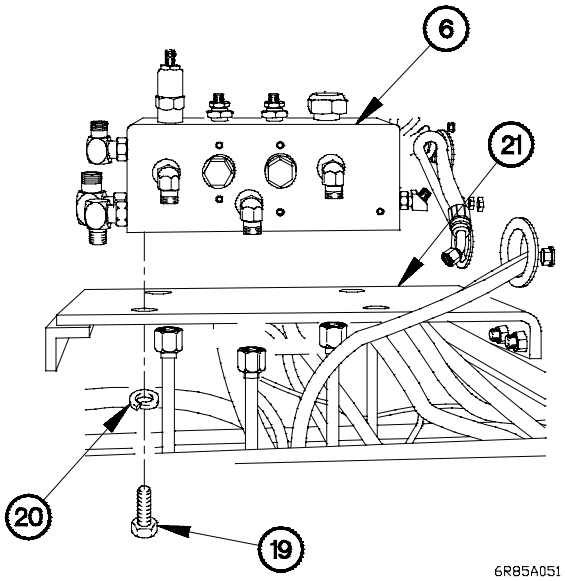




(6) Disconnect three tubes (13) from 90-degree fittings (14).

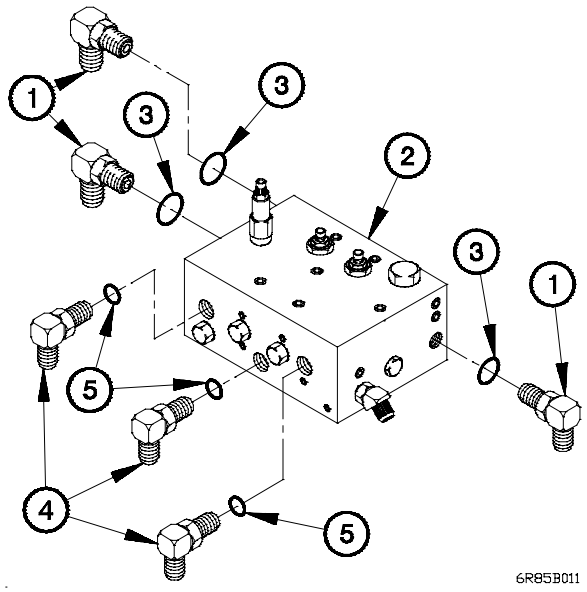
(7) Disconnect hoses (15 and 16) from 90-degree fitting (17) and 45-degree fitting (18).



(8) Remove four screws (19), lockwashers (20), and monoblock valve (6) from mounting plate (21). Discard lockwashers.




**b. Disassembly.**




(1) Remove three 90-degree fittings (1) from monoblock valve (2).

(2) Remove three preformed packings (3) from 90-degree fittings (1). Discard preformed packings.

(3) Remove three 90-degree fittings (4) from monoblock valve (2).

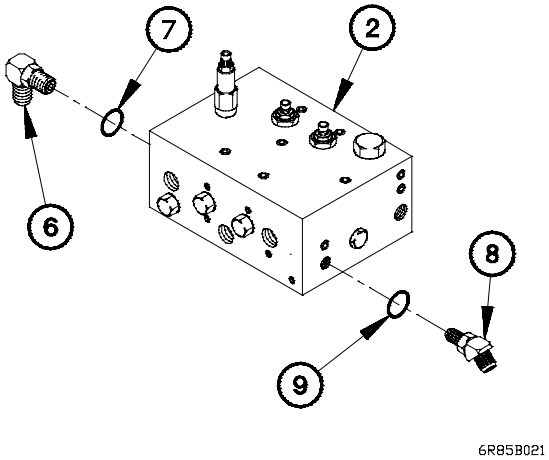
(4) Remove three preformed packings (5) from 90-degree fittings (4). Discard preformed packings.

(5) Remove 90-degree fitting (6) from monoblock valve (2).

(6) Remove preformed packing (7) from 90-degree fitting (6). Discard preformed packing.

(7) Remove 45-degree fitting (8) from monoblock valve (2).

(8) Remove preformed packing (9) from 45-degree fitting (8). Discard preformed packing.

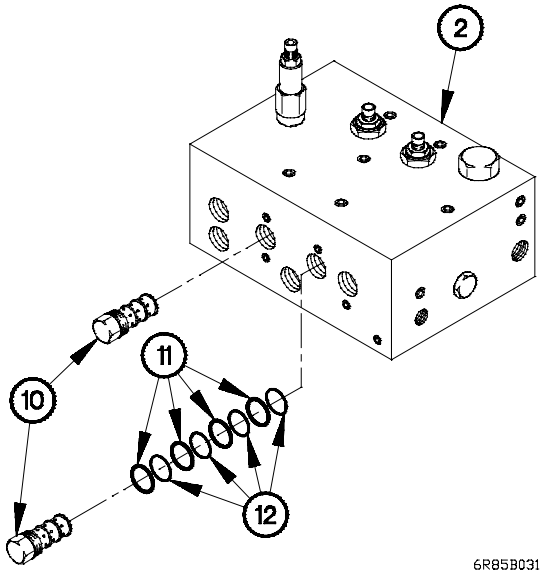


## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

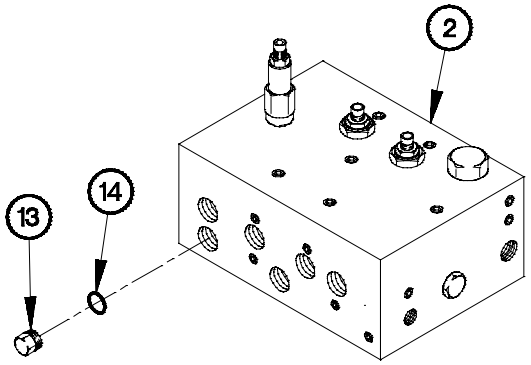
(9) Remove two three-way check valves (10) from monoblock valve (2).

(10) Remove four preformed packings (11) and back-up rings (12) from three-way check valve (10). Discard preformed packings and back-up rings.

(11) Perform step (10) on remaining three-way check valve (10).



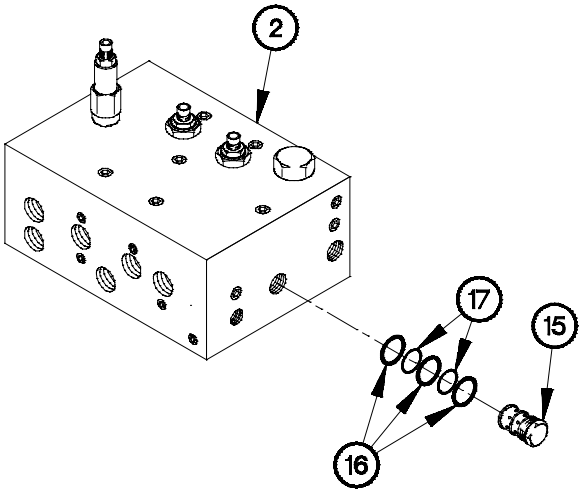

6R85B031




(12) Remove plug (13) from monoblock valve (2).

(13) Remove preformed packing (14) from plug (13). Discard preformed packing.

6R85B041




(14) Remove shuttle valve (15) from monoblock valve (2).

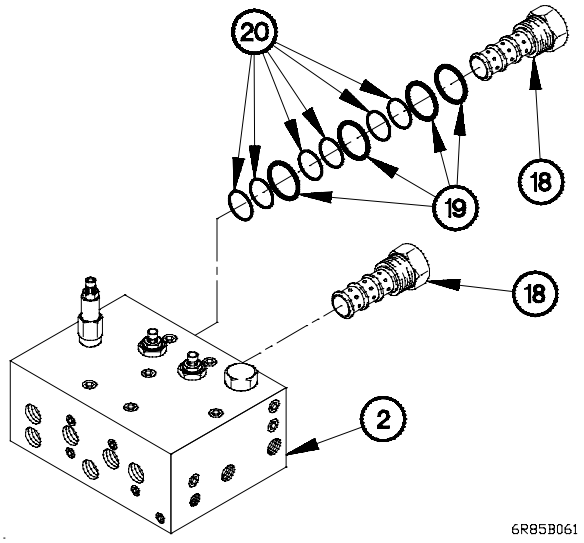
(15) Remove three preformed packings (16) and two back-up rings (17) from shuttle valve (15). Discard preformed packings and back-up rings.

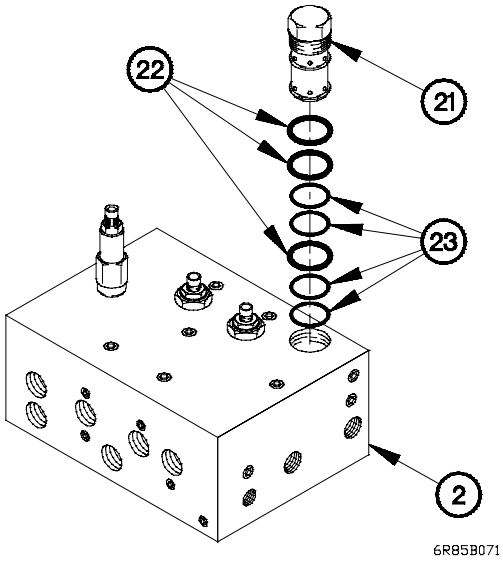
6R85B051

(16) Remove two cartridge valves (18) from monoblock valve (2).

(17) Remove four preformed packings (19) and six back-up rings (20) from cartridge valve (18). Discard preformed packings and back-up rings.

(18) Perform step (17) on remaining cartridge valve (18).



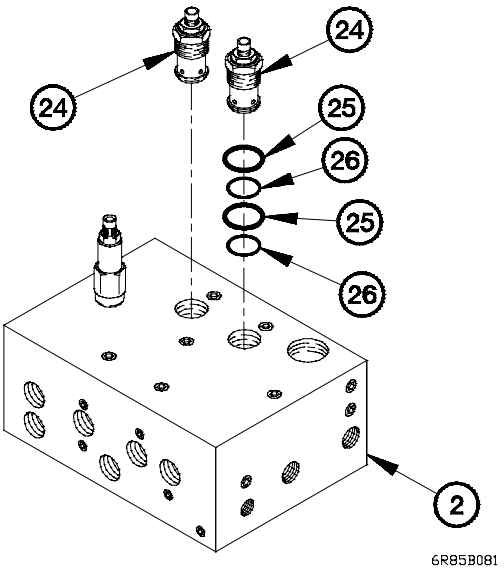

(19) Remove valve (21) from monoblock valve (2).

(20) Remove three preformed packings (22) and four back-up rings (23) from valve (21). Discard preformed packings and back-up rings.

(21) Remove two check valves (24) from monoblock valve (2).

(22) Remove two preformed packings (25) and back-up rings (26) from check valve (24). Discard preformed packings and back-up rings.

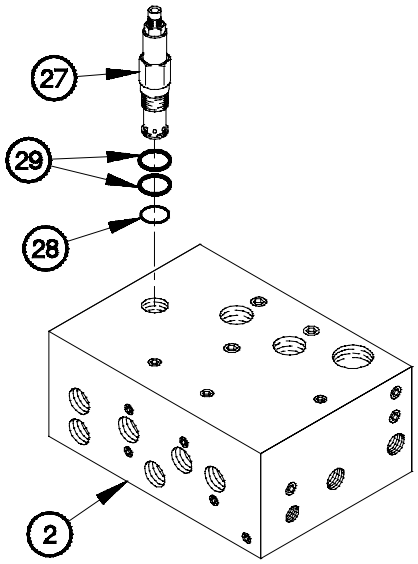
(23) Perform step (22) on remaining check valve (24).



## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

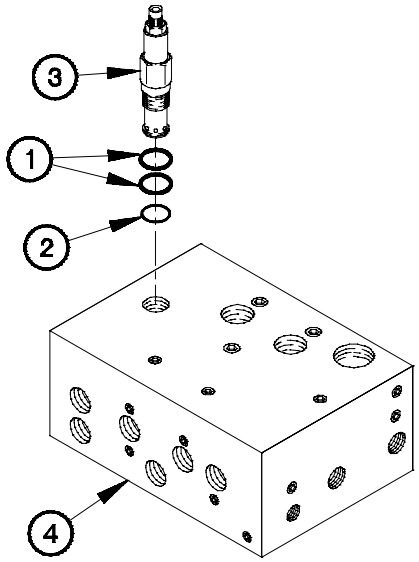
(24) Remove valve (27) from monoblock valve (2).

(25) Remove back-up ring (28) and two preformed packings (29) from valve (27). Discard back-up ring and preformed packings.



6R85B091

**c. Assembly.**



6R85C011

(1) Install two preformed packings (1) and back-up ring (2) on valve (3).

(2) Position valve (3) in monoblock valve (4).

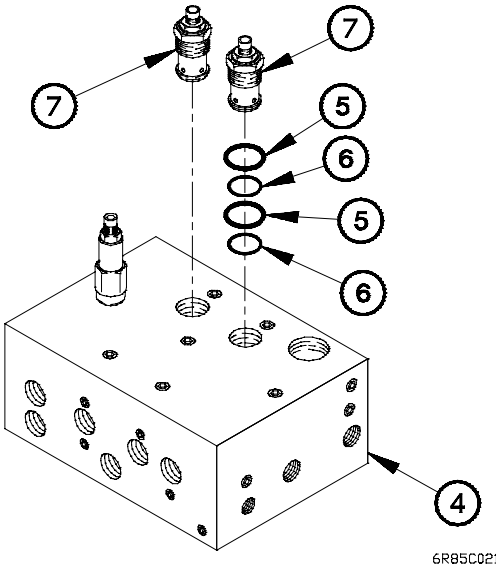
(3) Tighten valve (3) to 35-40 lb-ft (47-54 N·m).

(4) Install two preformed packings (5) and back-up rings (6) on check valve (7).

(5) Perform step (4) on remaining check valve (7).

(6) Position two check valves (7) in monoblock valve (4).

(7) Tighten two check valves (7) to 35-40 lb-ft (47-54 N·m).

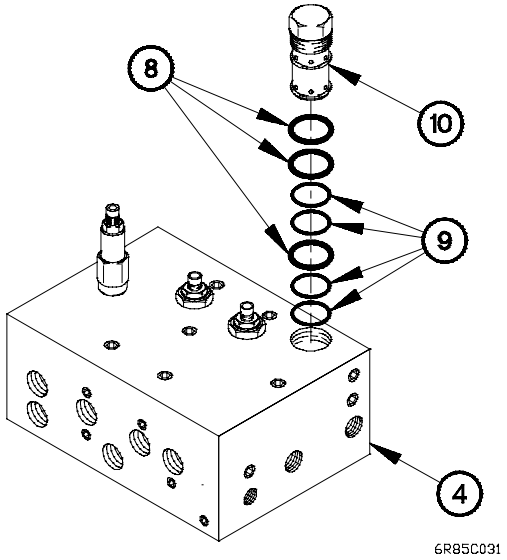


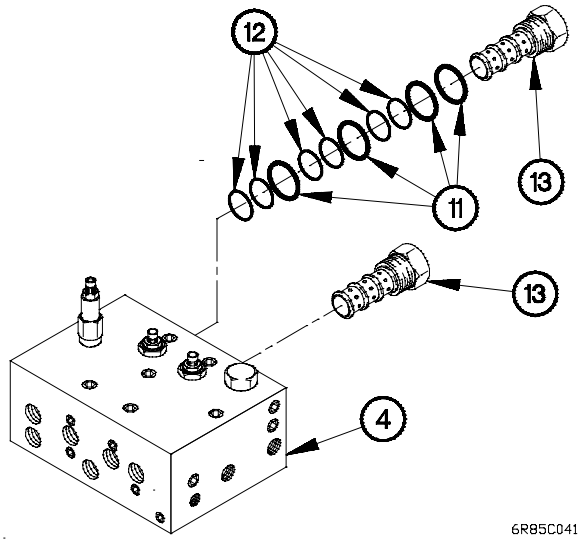
6R85C021

(8) Install three preformed packings (8) and four back-up rings (9) on valve (10).

(9) Position valve (10) in monoblock valve (4).

(10) Tighten valve (10) to 35-40 lb-ft (47-54 N·m).




(11) Install four preformed packings (11) and six back-up rings (12) on cartridge valve (13).

(12) Perform step (11) on remaining cartridge valve (13).

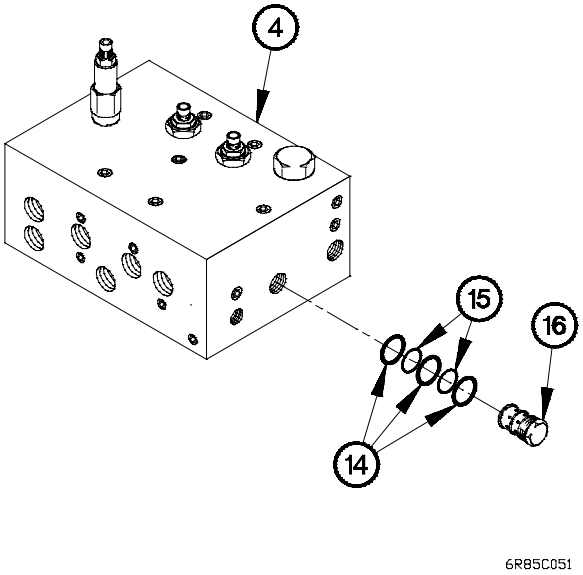
(13) Position two cartridge valves (13) in monoblock valve (4).

(14) Tighten two cartridge valves (13) to 109-114 lb-ft (148-155 N·m).

(15) Install three preformed packings (14) and two back-up rings (15) on shuttle valve (16).

(16) Position shuttle valve (16) in monoblock valve (4).

(17) Tighten shuttle valve (16) to 35-40 lb-ft (47-54 N·m).

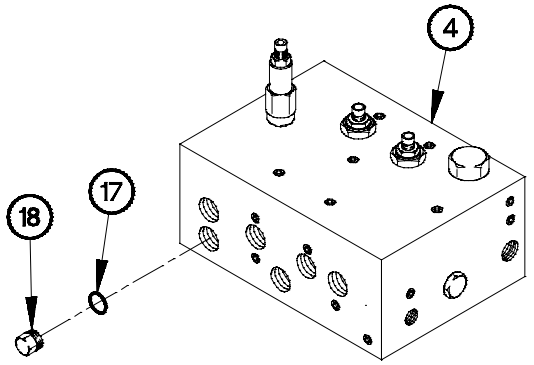


## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

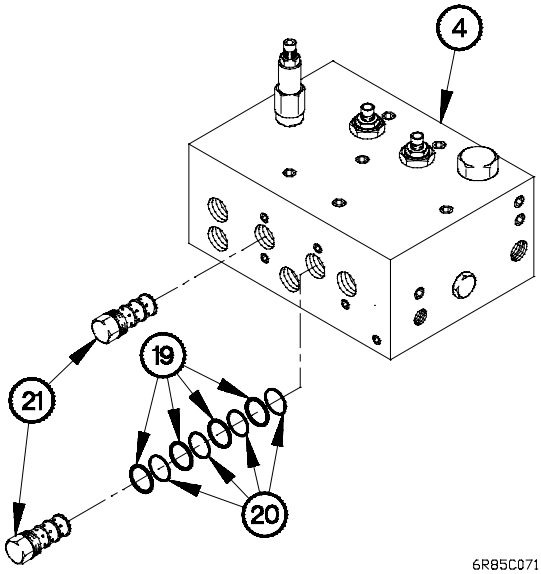
(18) Install preformed packing (17) on plug (18).

(19) Position plug (18) in monoblock valve (4).

(20) Tighten plug (18) to 36-39 lb-ft (49-53 N·m).




6R85C061




6R85C071

(21) Install four preformed packings (19) and four back-up rings (20) on three way check valve (21).

(22) Perform step (20) on remaining three way check valve (21).

(23) Position two three way check valves (21) in monoblock valve (4).

(24) Tighten three way check valves (21) to 35-40 lb-ft (47-54 N·m).

(25) Install preformed packing (22) on 45-degree fitting (23).

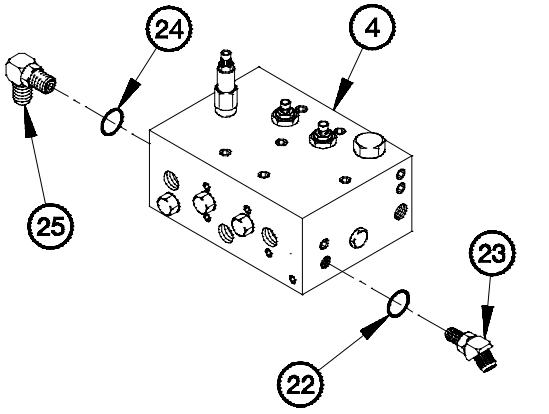
(26) Position 45-degree fitting (23) and in monoblock valve (4).

(27) Tighten 45-degree fitting (23) to 36-39 lb-ft (49-53 N·m).

(28) Install preformed packing (24) on 90-degree fitting (25).

(29) Position 90-degree fitting (25) in monoblock valve (4).

(30) Tighten 90-degree fitting (25) to 18-20 lb-ft (24-27 N·m).




6R85C081

(31) Install three preformed packings (26) on 90-degree fitting (27).

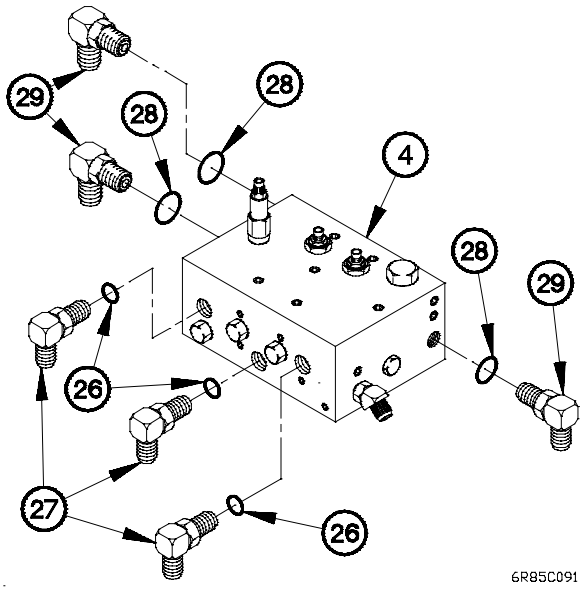
(32) Position 90-degree fitting (27) in monoblock valve (4).

(33) Tighten 90-degree fitting (27) to 36-39 lb-ft (49-53 N·m).

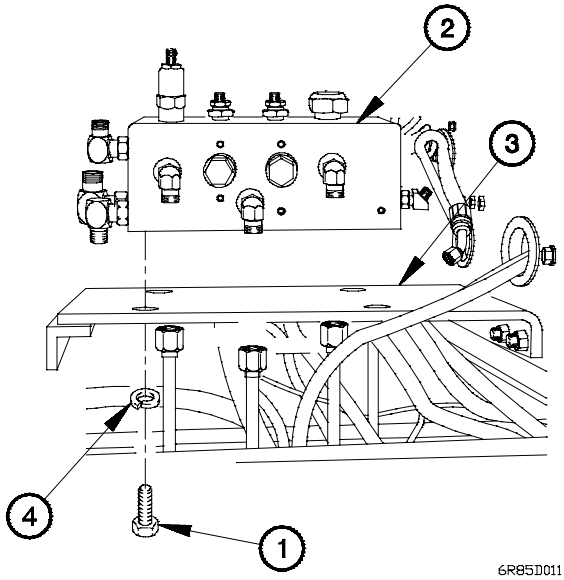
(34) Install three preformed packings (28) on fittings (29).

(35) Position three fittings (29) in monoblock valve (4).

(36) Tighten three fittings (29) to 109-114 lb-ft (148-155 N·m).




**d. Installation.**




**WARNING**

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

(1) Apply sealing compound to threads of four screws (1).

(2) Position monoblock valve (2) on mounting plate (3) with four lockwashers (4) and screws (1).

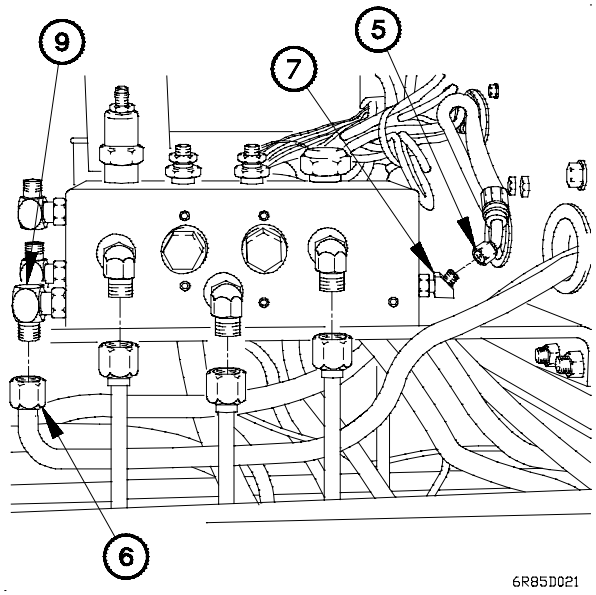
(3) Tighten four screws (1) to 33-37 lb-ft (45-50 N·m).

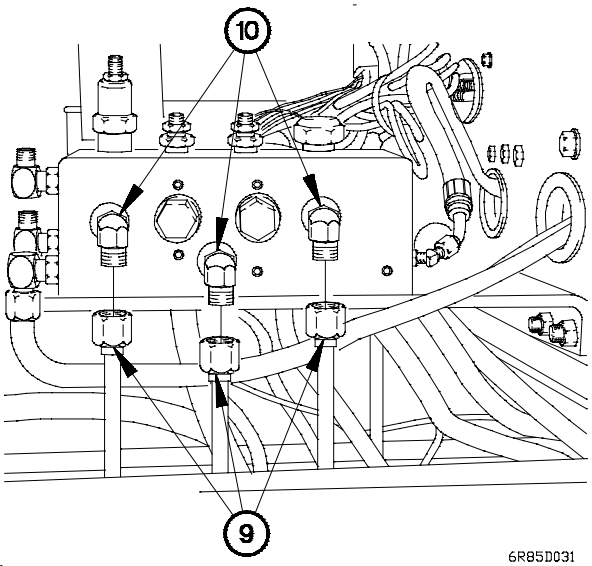
## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

(4) Position hoses (5 and 6) on 45-degree fitting (7) and 90-degree fitting (8).

(5) Tighten 45-degree fitting (7) and 90-degree fitting (8) to 18-20 lb-ft (24-27 N·m).

(6) Tighten hoses (5 and 6) to 18-20 lb-ft (24-27 N·m).




(7) Position three tubes (9) on 90-degree fittings (10).

(8) Tighten three 90-degree fittings (10) to 18-20 lb-ft (24-27 N·m).

(9) Tighten three tubes (9) to 36-39 lb-ft (49-53 N·m).

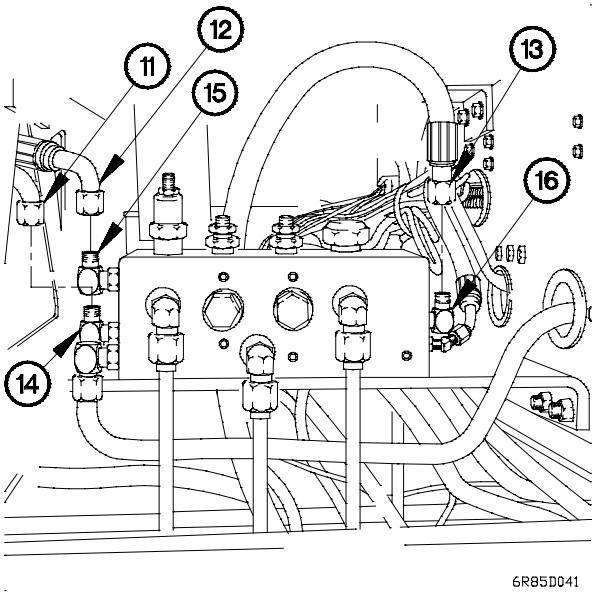
**WARNING**

**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.**

(10) Position hoses (11, 12, and 13) on 90-degree fittings (14, 15, and 16).

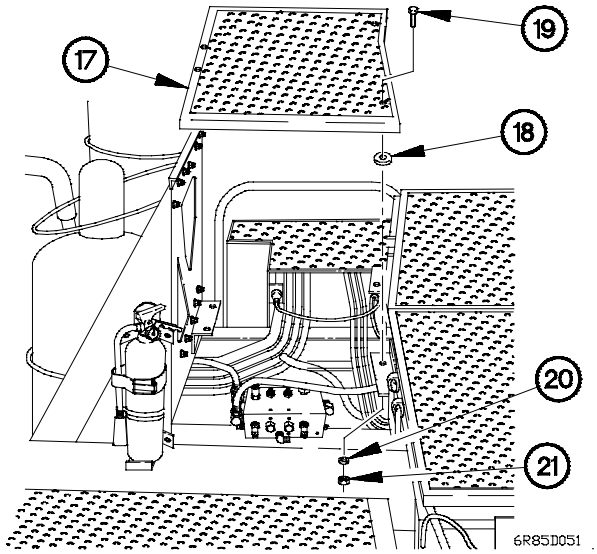
(11) Tighten 90-degree fittings (14, 15, and 16) to 109-114 lb-ft (148-155 N·m).

(12) Tighten hoses (11, 12, and 13) to 79-88 lb-ft (107-119 N·m).

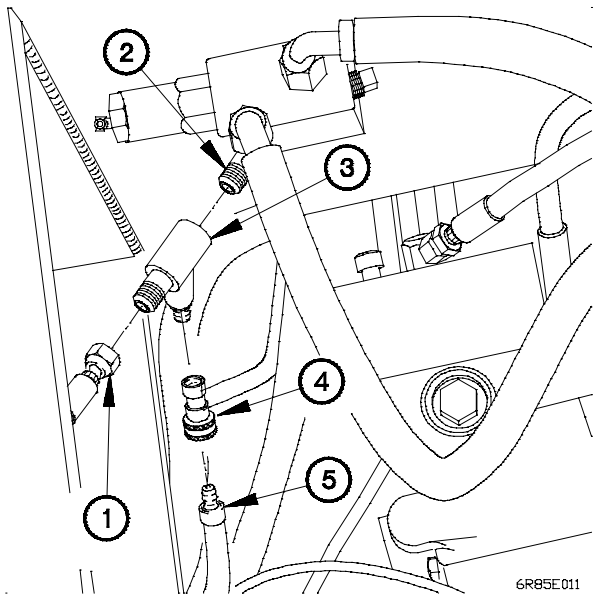


(13) Position catwalk (17) on vehicle with four isolators (18), screws (19), washers (20), and self-locking nuts (21).

(14) Tighten four self-locking nuts (21) to 27-33 lb-ft (37-48 N·m).




**e. Adjustment.**




(1) Open left and right 30K winch catwalks (TM 9-2320-366-10-2).

**NOTE**

Left and right side pilot pressure are adjusted the same way. Pressure readings are read at the 30K winch relief valve. Adjustment of pressure is made at the cartridge valve on the 30K winch hydraulic motor. Left side shown.

(2) Disconnect hose (1) from tee fitting (2).

(3) Install adapter (3) on tee fitting (2).

(4) Connect hose (1) to adapter (3).

(5) Install pressure transducer (4) in adapter (3).

(6) Connect test cable (5) to pressure transducer (4).

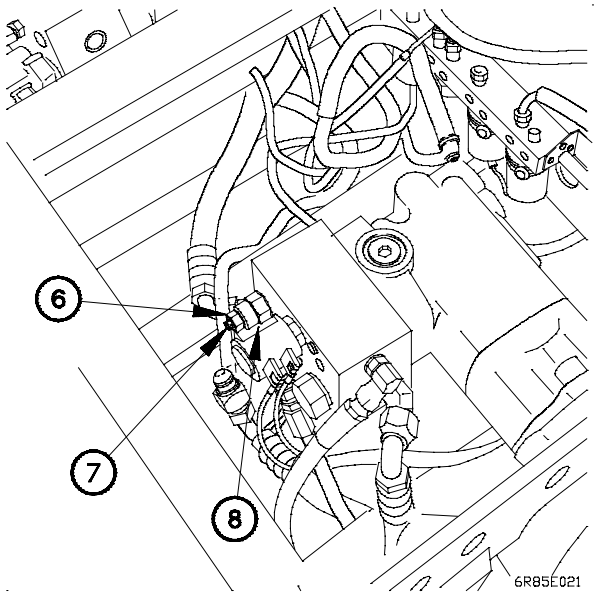
## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

(7) Loosen locking nut (6) on adjusting screw (7).

(8) Loosen adjusting screw (7) on cartridge valve (8).

(9) Open hydraulic tank supply valve and return valve (TM 9-2320-366-10-2).

(10) Position PTO switch to on for 15 minutes (TM 9-2320-366-10-1).



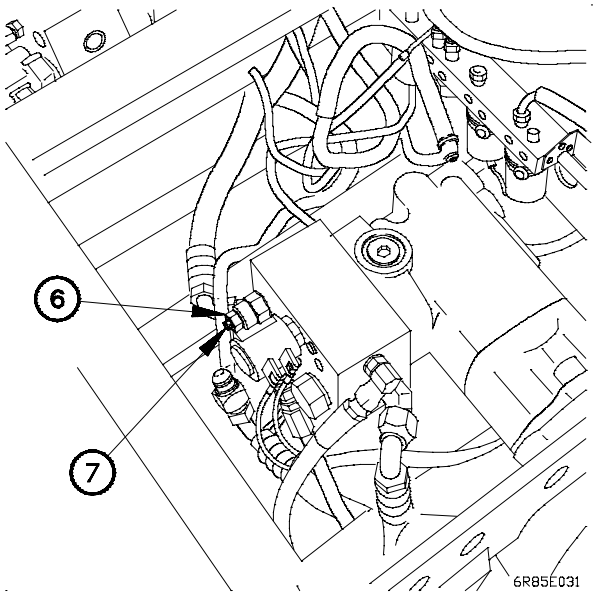

**CAUTION**

Perform step (11) at 1350 RPM. Failure to comply may result in an inaccurate reading.

**NOTE**

- Steps (11) through (15) require the aid of two assistants.
- Perform STE/ICE test 51 (TM 9-4910-571-12&P).

(11) Turn adjusting screw (7) to the right until reading of 1300-1400 psi (8964-9653 kPa) is obtained.




(12) Hold cartridge valve adjusting screw (7) in position.

(13) Tighten locking nut (6) on adjusting screw (7).

(14) Check pressure set in step (11).

(15) Perform steps (7) through (14) until pressure is maintained.

(16) Position PTO switch to off (TM 9-2320-366-10-1).

(17) Disconnect test cable (5) from pressure transducer (4).

(18) Remove pressure transducer (4) from adapter (3).

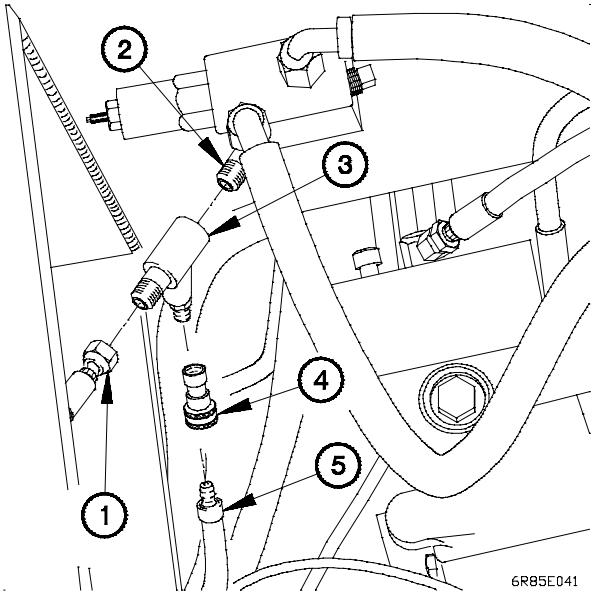
(19) Disconnect hose (1) from adapter (3).

(20) Remove adapter (3) from tee fitting (2).

(21) Connect hose (1) to tee fitting (2).

(22) Tighten hose (1) to 36-39 lb-ft (49-53 N·m).

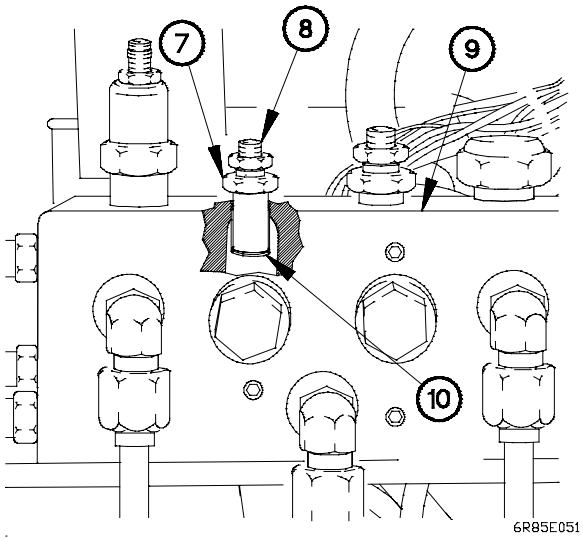
(23) Perform steps (1) through (22) for right side pilot pressure.




**NOTE**

Left and right side monoblock valve flow controls are adjusted the same way. Left side shown.

(24) Loosen locking nut (7) on monoblock valve adjustment screw (8).




**CAUTION**

Do not overtighten monoblock valve adjusting screw. Failure to comply may result in damage to equipment.

(25) Position monoblock valve adjustment screw (8) in monoblock valve (9) until monoblock valve adjusting screw (8) contacts valve seat (10).

(26) Loosen monoblock valve adjustment screw (8) one quarter turn.

(27) Hold monoblock valve adjustment screw (8) in position.

(28) Tighten locking nut (7) on monoblock valve adjustment screw (8).

(29) Perform steps (24) through (28) for monoblock valve right adjustment.

## 16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

**f. Follow-On Maintenance.**

Operate 30K winches and check for hydraulic leaks and proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-86. PAY-OUT HYDRAULIC MOTOR REPLACEMENT

This task covers:

a. Removal
b. Installation
c. 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)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Tools and Special Tools (Cont)**
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Sealing Compound (Item 75, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Preformed Packing (2) (Item 229, Appendix F)

**a. Removal.**

**CAUTION**

Cap or plug hydraulic hoses to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

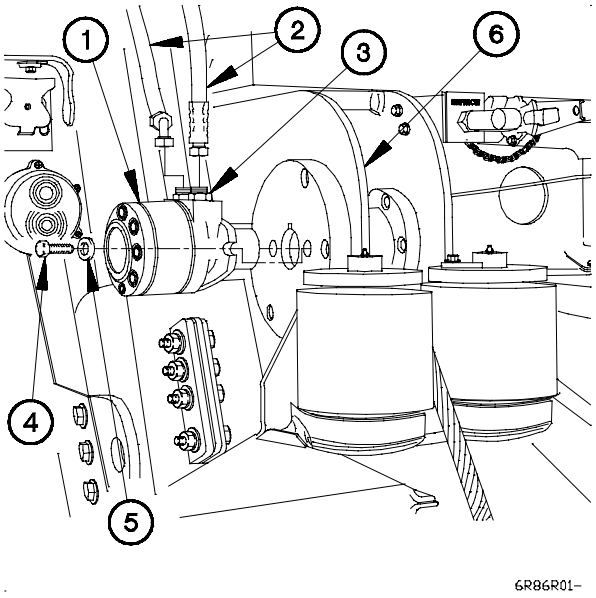
**NOTE**

- Left and right side pay-out hydraulic motors are removed the same way. Left side shown.
- Tag hydraulic hoses and connection points prior to disconnecting.

(1) Position drain pan under pay-out hydraulic motor (1).

(2) Disconnect two hoses (2) from fittings (3).

(3) Remove two bolts (4), washers (5), and pay-out hydraulic motor (1) from spooler weldment (6).



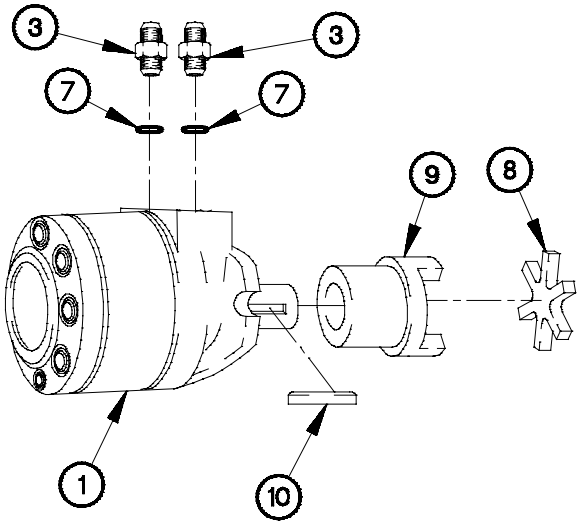
## 16-86. PAY-OUT HYDRAULIC MOTOR REPLACEMENT (CONT)

(4) Remove two fittings (3) from pay-out hydraulic motor (1).

(5) Remove two preformed packings (7) from fittings (3). Discard preformed packings.

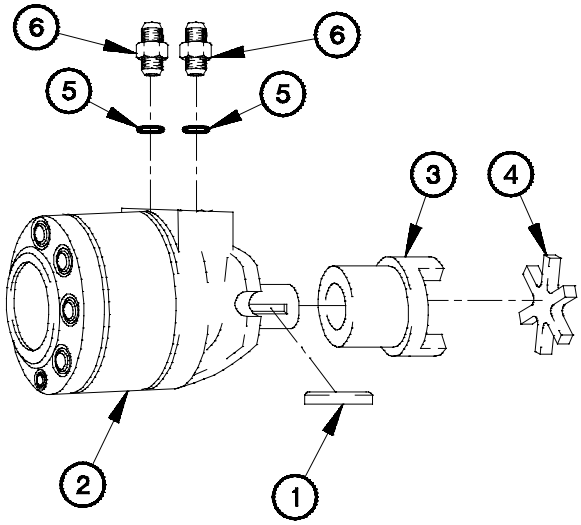
(6) Remove star gear (8) and drive gear (9) from pay-out hydraulic motor (1).

(7) Remove key (10) from pay-out hydraulic motor (1).




6R86R02B

**b. Installation.**




6R86I01B

**NOTE**

Left and right side pay-out hydraulic motors are removed the same way. Left side shown.

(1) Install key (1) in pay-out hydraulic motor (2).

(2) Install drive gear (3) and star gear (4) on pay-out hydraulic motor (2).

(3) Install two preformed packings (5) on fittings (6).

(4) Install two fittings (6) in pay-out hydraulic motor (2).

**WARNING**

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

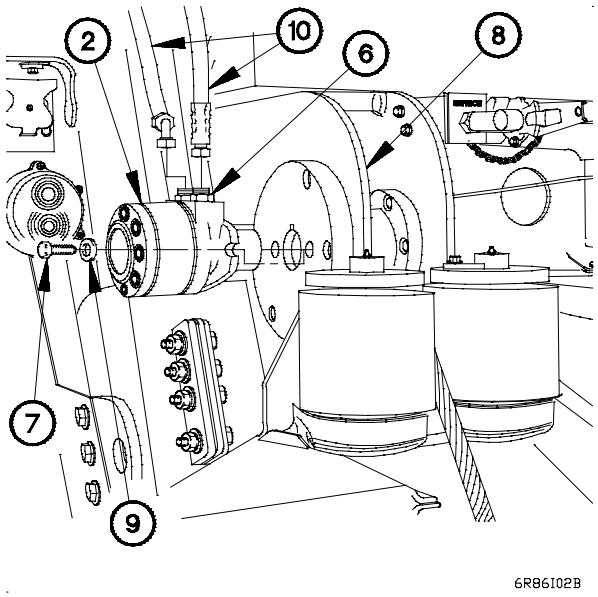
(5) Apply sealing compound to threads of two bolts (7).

(6) Position pay-out hydraulic motor (2) on spooler weldment (8) with two washers (9) and bolts (7).

(7) Tighten two bolts (7) to 76-84 lb-ft (103-114 N·m).

(8) Position two hoses (10) on fittings (6).

(9) Tighten two hoses (10) to 36-39 lb-ft (49-53 N·m).




**c. Follow-On Maintenance.**

Operate 30K winch and check for hydraulic leaks and for proper operation of pay-out hydraulic motor (TM 9-2320-366-10-2).

**End of Task.**

## 16-87. M1089 PAY-OUT HYDRAULIC MOTOR RELIEF VALVE REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).
Stiffleg lowered (TM 9-2320-366-10-2).
Underlift lowered (TM 9-2320-366-10-2).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)
Pan, Drain (Item 43, Appendix B)

**Tools and Special Tools (Cont)**
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot, Ratchet (TM 9-2320-366-20)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Nut, Self-Locking (2) (Item 177, Appendix F)

**Personnel Required**
(2)

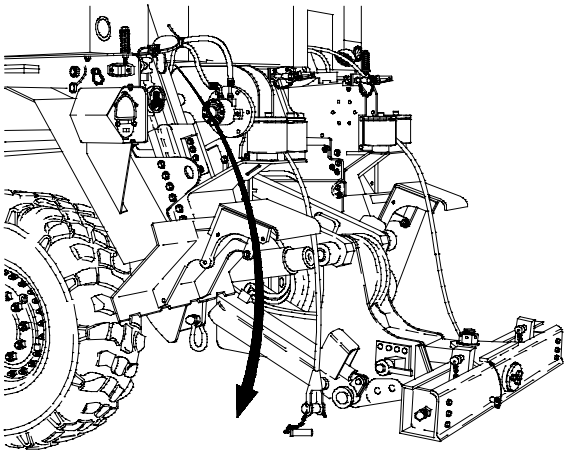
**a. Removal.**

**CAUTION**

Cap or plug hydraulic connections and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

- Tag hydraulic connections and connection points prior to disconnecting.
- Left and right side relief valves are removed the same way. Left side shown.

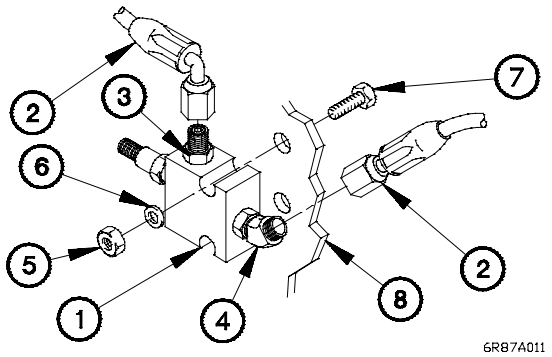


(1) Position drain pan under relief valve (1).

(2) Disconnect two hydraulic hoses (2) from fitting (3) and 45 degree fitting (4).

(3) Remove two self-locking nuts (5), washers (6), and screws (7) from relief valve (1). Discard self-locking nuts.

(4) Remove relief valve (1) from tool box support assembly (8).



**b. Installation.**

**NOTE**

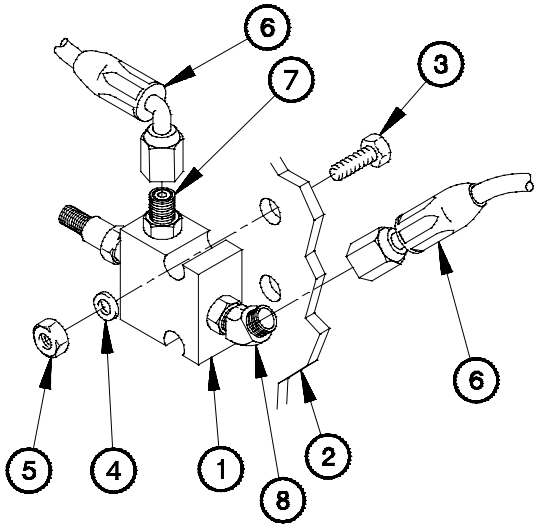
Left and right side relief valves are installed the same way. Left side shown.

(1) Position relief valve (1) on tool box support assembly (2) with two screws (3), washers (4), and self-locking nuts (5).

(2) Tighten two self-locking nuts (5) to 96-120 lb-in. (11-14 N·m).

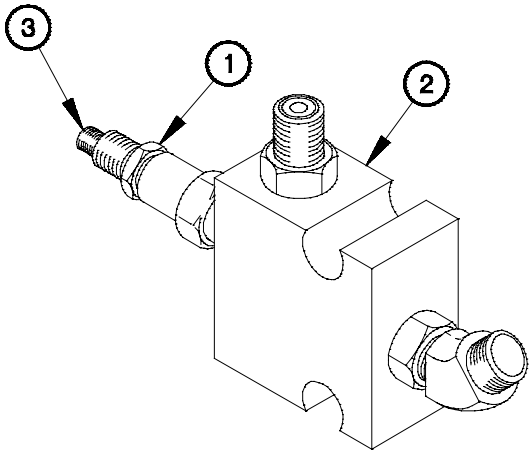
(3) Position two hydraulic hoses (6) on fitting (7) and 45 degree fitting (8).

(4) Tighten two hydraulic hoses (6) to 36-40 lb-ft (49-54 N·m).



6R87B011

**c. Adjustment.**



6R87C011

(1) Loosen locknut (1) on relief valve (2) and back adjusting screw (3) all the way out.

(2) Turn adjusting screw (3) in one half turn.

(3) Tighten locknut (1).

**d. Follow-On Maintenance.**

(1) Open hydraulic reservoir supply valve and return valve (TM 9-2320-366-10-2).

(2) Operate winches and check for hydraulic leaks and proper operation (TM 9-2320-366-10-2).

(3) Operate underlift and stifflegs and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
15K Self-recovery winch (SRW) cable removed (TM 9-2320-366-20-5).
Muffler and heat shields removed (TM 9-2320-366-20-3).
Cartridge/Counterbalance valve removed (para 16-89).
Hydraulic motor removed (para 16-90).
Cargo bed removed, except M1088 and M1089 (para 15-9).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pan, Drain (Item 43, Appendix B)
Wrench, Torque, 0-250 N·m (Item 94, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Sling, Cargo (2) (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)
Lockwasher (6) (Item 155, Appendix F)
Lockwasher (6) (Item 158, Appendix F)
Lockwasher (6) (Item 156, Appendix F)
Parts Kit, Seal (Item 314, Appendix F)
Parts Kit, Disc and Spring (Item 311, Appendix F)
Spring, Compression (Item 426, Appendix F)
Parts Kit, Winch (Item 321, Appendix F)
Nut, Self-Locking (8) (Item 211, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

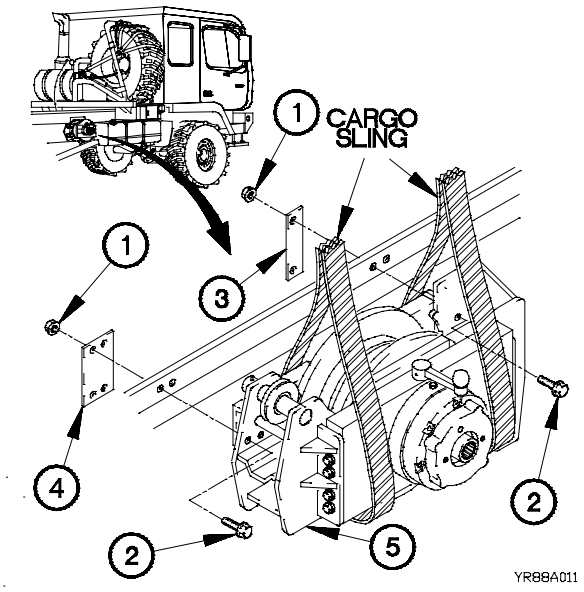
**WARNING**

**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.**

**NOTE**

Step (1) requires the aid of an assistant.

(1) Remove eight self-locking nuts (1), bolts (2), mounting plates (3 and 4), and 15K SRW (5) from vehicle. Discard self-locking nuts.

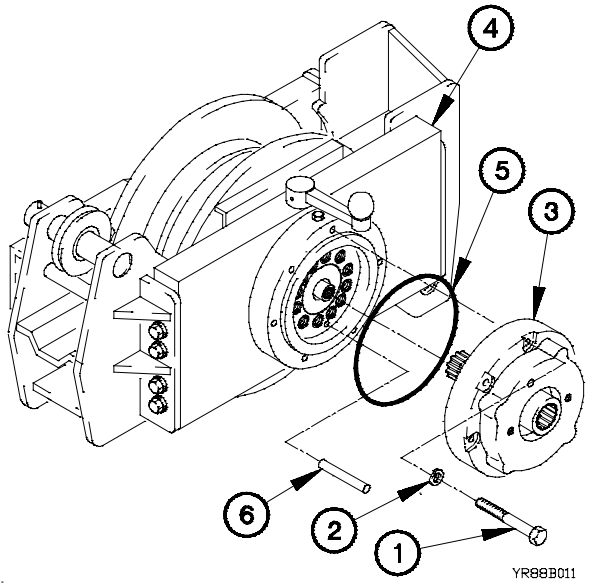


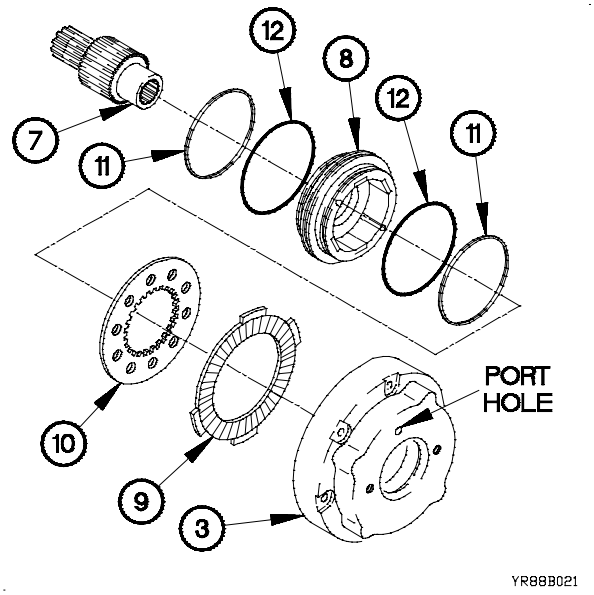
**b. Disassembly.**

(1) Remove six screws (1), lockwashers (2), and outer brake housing (3) from motor end support (4). Discard lockwashers.

(2) Remove preformed packing (5) from motor end support (4). Discard preformed packing.

(3) Remove two dowel pins (6) from motor end support (4).




(4) Remove brake shaft (7) from outer brake housing (3).

(5) Apply low pressure air to port hole on face of outer brake housing (3).

(6) Remove brake piston (8) from outer brake housing (3).

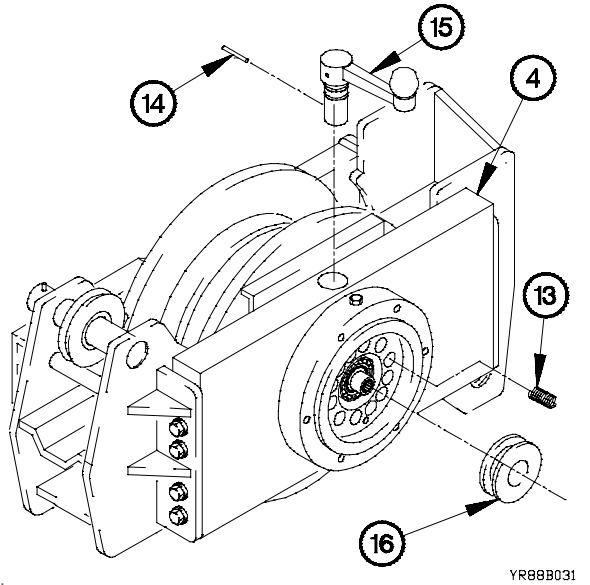
(7) Remove ten friction disc plates (9) and nine brake drive plates (10) from outer brake housing (3).

(8) Remove two back-up rings (11) and preformed packings (12) from brake piston (8). Discard back-up rings and preformed packings.

(9) Remove twelve compression springs (13) from motor end support (4). Discard compression springs.

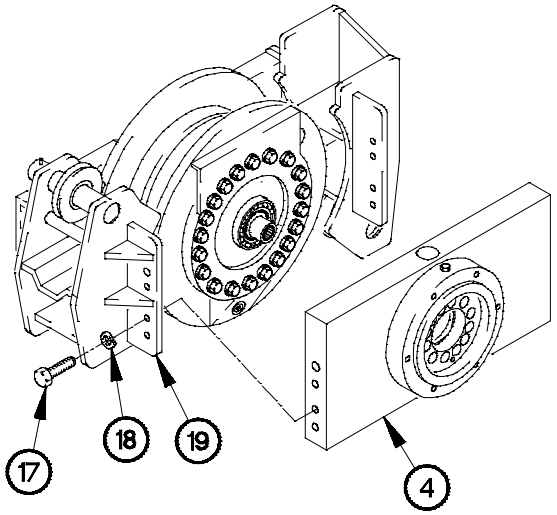
(10) Remove spring pin (14) and arm shifter (15) from motor support end (4). Discard spring pin.

(11) Remove shifter drive gear (16) from motor end support (4).

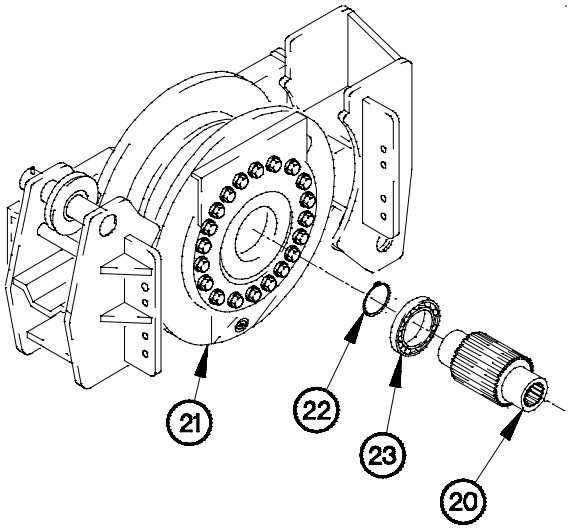


## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(12) Remove eight bolts (17), lockwashers (18), and motor end support (4) from two base mounts (19). Discard lockwashers.



YR88B041



YR88B051

(13) Remove primary sun gear (20) from motor end flange (21).

**WARNING**

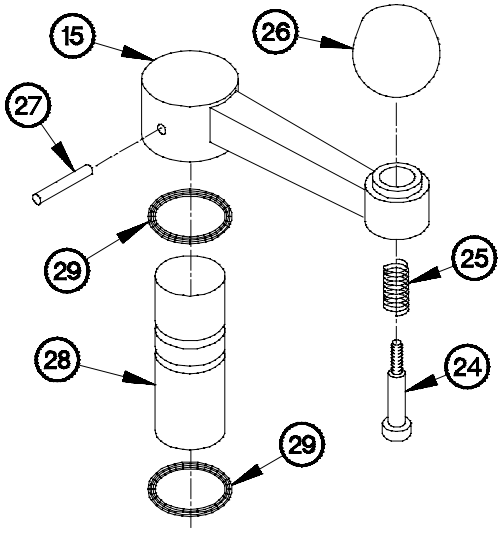
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(14) Remove retaining ring (22) and ball bearing (23) from primary sun gear (20).

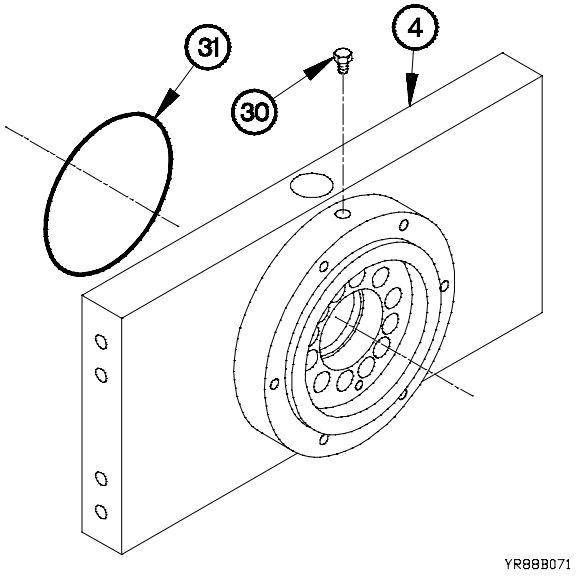
(15) Remove locator pin (24), compression spring (25), and shifter round knob (26) from arm shifter (15). Discard compression spring.

(16) Remove spring pin (27) and arm shifter (15) from shoulder shaft (28). Discard spring pin.

(17) Remove two preformed packings (29) from shoulder shaft (28). Discard preformed packings.

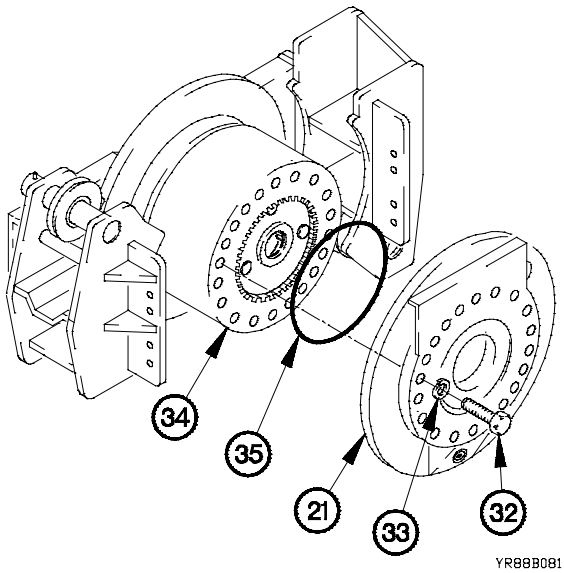


YR88B061



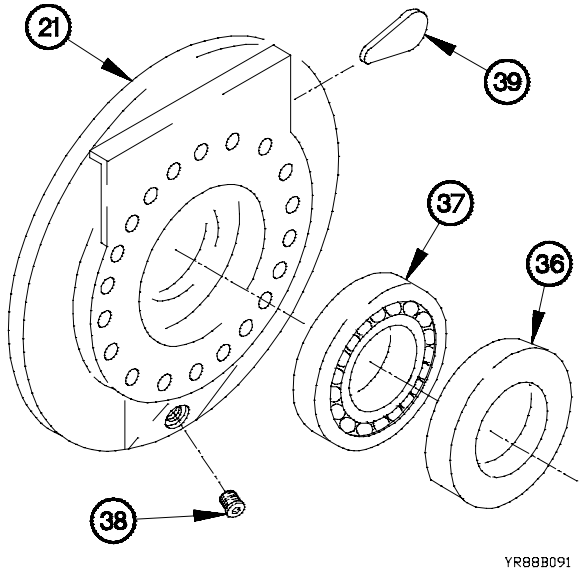

(18) Remove relief vent (30) from motor end support (4).

(19) Remove preformed packing (31) from motor end support (4). Discard preformed packing.




(20) Remove 20 screws (32), lockwashers (33), and motor end flange (21) from ring gear (34). Discard lockwashers.

(21) Remove preformed packing (35) from motor end flange (21). Discard preformed packing.




(22) Remove shaft seal (36) and ball bearing (37) from motor end flange (21). Discard shaft seal.

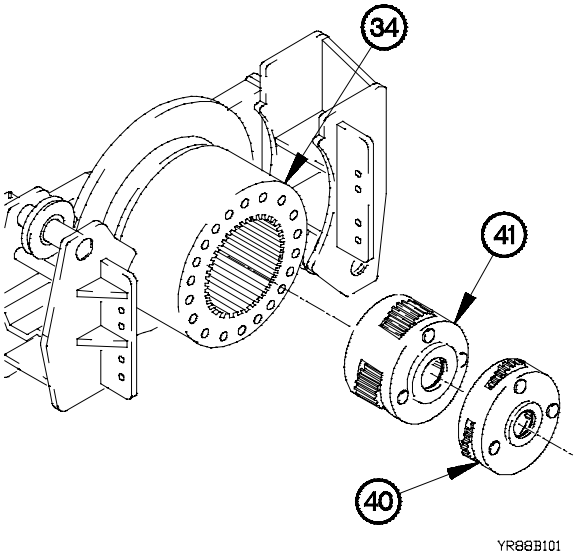
(23) Remove two magnetic plugs (38) from motor end flange (21).

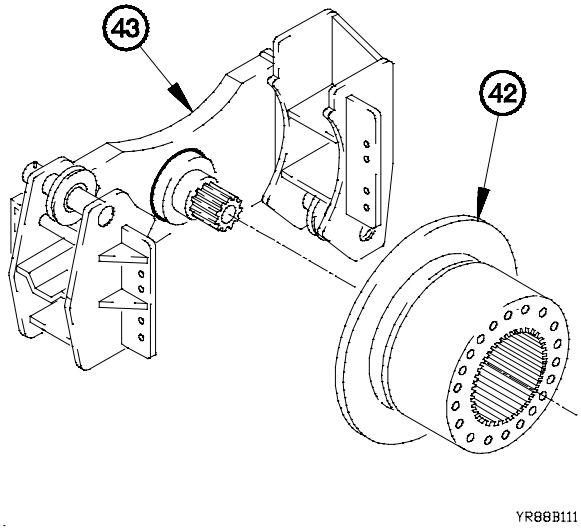
(24) Remove cable wedge (39) from motor end flange (21).

## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(25) Remove primary carrier (40) from ring gear (34).

(26) Remove secondary carrier (41) from ring gear (34).



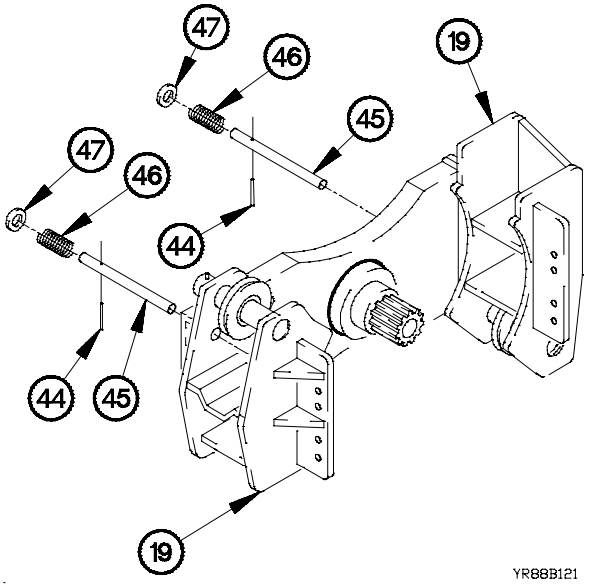




(27) Remove gear end flange (42) from gear end support (43).

**WARNING**

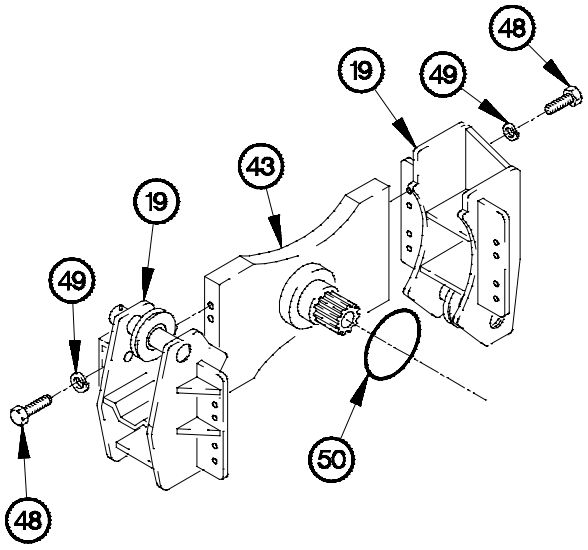
**Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(28) Remove two spring pins (44), cable retainer pins (45), springs (46), and washers (47) from base mounts (19). Discard spring pins.

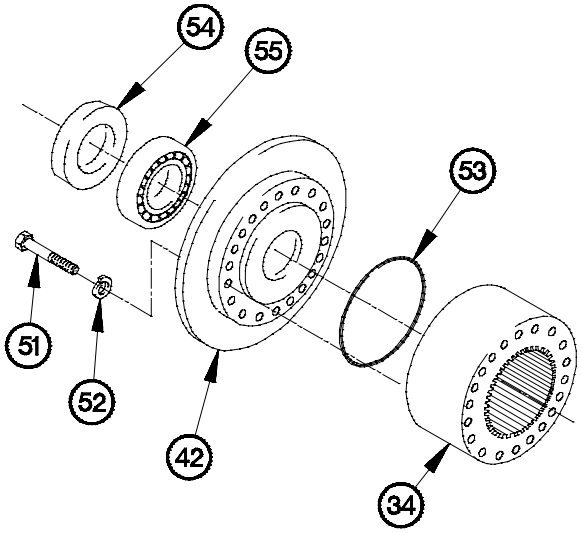


(29) Remove eight screws (48), lockwashers (49), and gear end support (43) from two base mounts (19). Discard lockwashers.

(30) Remove preformed packing (50) from gear end support (43). Discard preformed packing.




YR88B131




YR88B141

(31) Remove 20 screws (51), lockwashers (52), and gear end flange (42) from ring gear (34). Discard lockwashers.

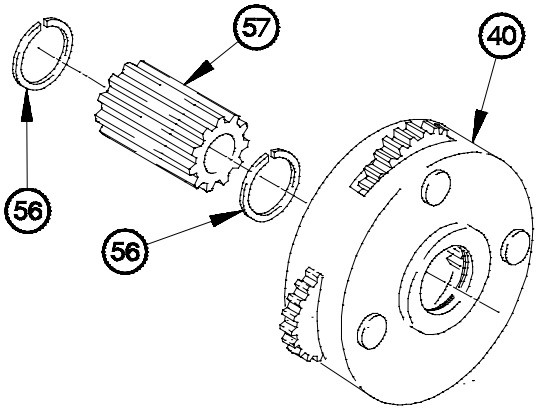
(32) Remove preformed packing (53) from gear end flange (42). Discard preformed packing.

(33) Remove shaft seal (54) and ball bearing (55) from gear end flange (42). Discard shaft seal.

**WARNING**

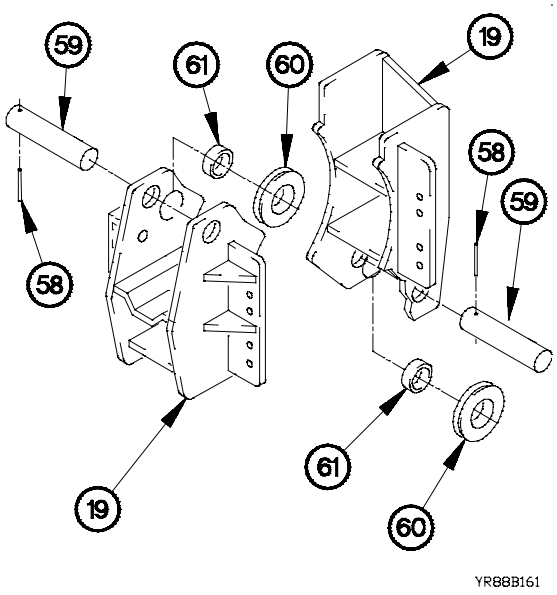
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(34) Remove two retaining rings (56) and secondary sun gear (57) from primary carrier assembly (40).




YR88B151

## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)




(35) Remove two spring pins (58), roller shafts (59), and cable guide sheaves (60) from base mounts (19). Discard spring pins.

(36) Remove two bushing (61) from cable guide sheaves (60).

**c. Cleaning/ Inspection.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.**
- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

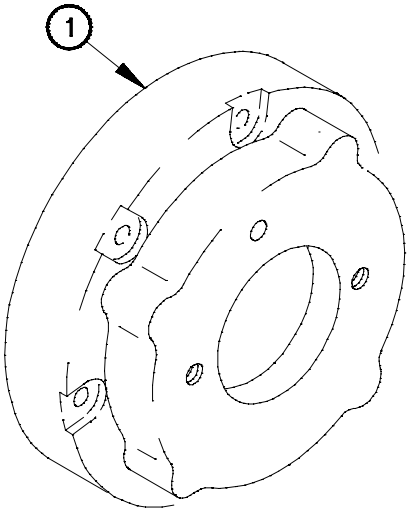
**NOTE**

Replace any part that fails to pass visual inspection or size measurement requirements.

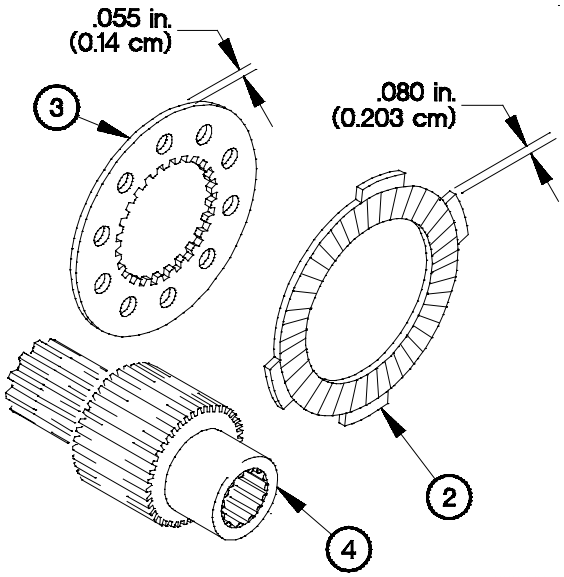
(1) Clean all metal parts with dry cleaning solvent.

(2) Dry metal parts with compressed air.

(3) Inspect outer brake housing (1) for nicks or deep scratches.




YR88C011




YR88C021

(4) Measure thickness of ten friction disc plates (2). Minimum thickness is 0.080 in. (0.203 cm).

(5) Inspect ten friction disc plates (2) for wear marks, pitting, warping, and corrosion.

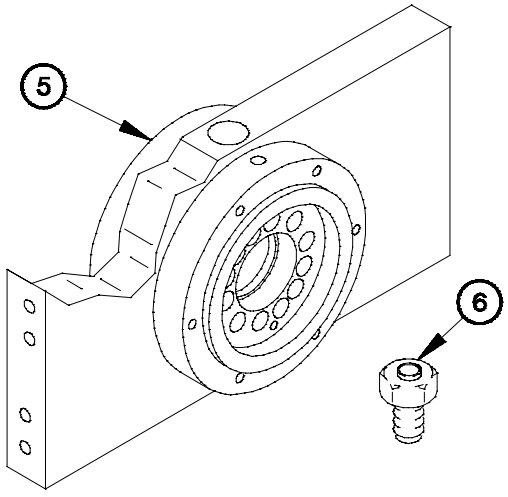
(6) Measure thickness of nine brake drive plates (3). Minimum thickness is 0.055 in. (0.14 cm).

(7) Inspect nine brake drive plates (3) for wear marks, pitting, warping, and corrosion.

(8) Inspect gear teeth on brake shaft (4) wear, pitting, or broken teeth.

(9) Inspect rotary seal surface on motor end support (5) for scratches and pits.

(10) Check that spring loaded poppet on relief vent (6) operates freely.



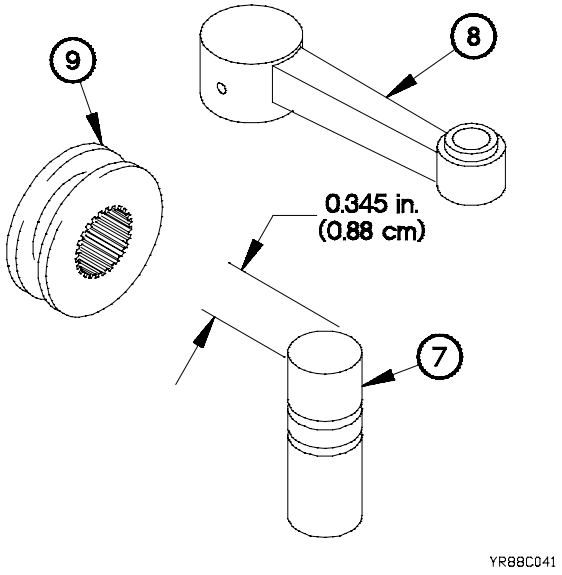

YR88C031

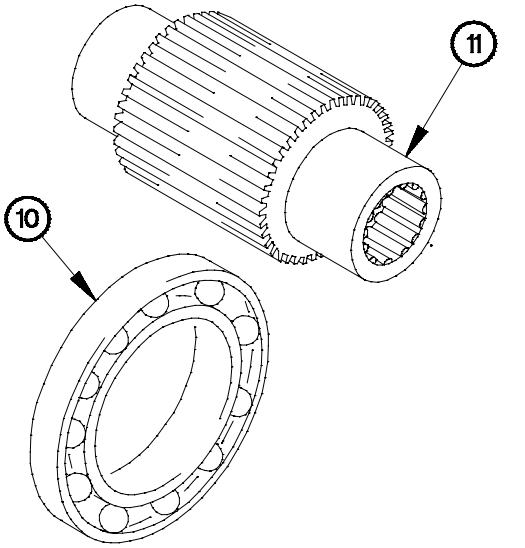
## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(11) Check diameter of shoulder on shoulder shaft (7). Minimum diameter is 0.345 in. (0.88 cm).

(12) Check that shifter arm (8) is not broken or bent.

(13) Inspect shifter drive gear (9) for wear, pitting, or broken teeth.




(14) Check ball bearing (10) for free rotation of inner race to outer race.

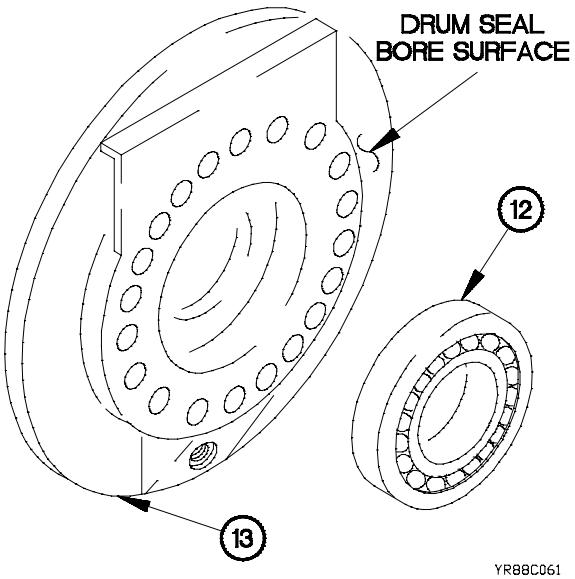
(15) Check ball bearing (10) for pitting and corrosion.

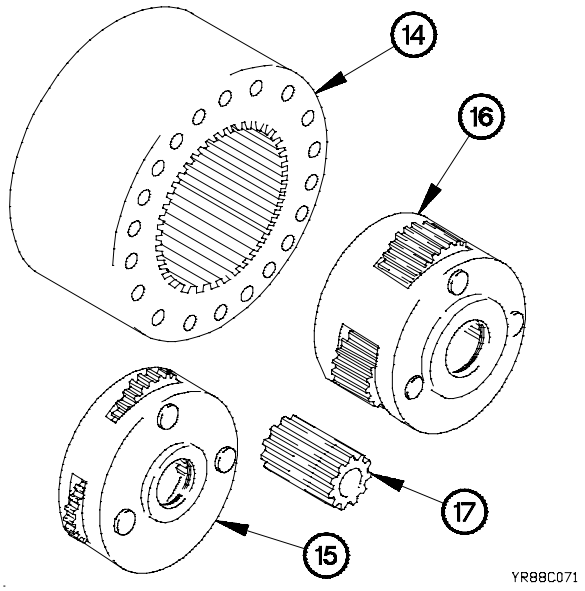
(16) Inspect primary sun gear (11) for wear, pitting, or broken teeth.

(17) Check bearing (12) for free rotation of inner race to outer race.

(18) Check bearing (12) for pitting and corrosion.

(19) Inspect drum seal bore surface on motor end flange (13) for scratches or pits.



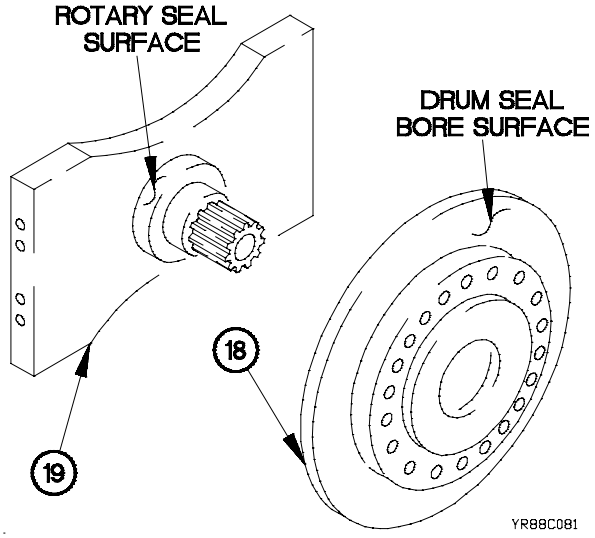



(20) Inspect ring gear (14) for worn or broken teeth.

(21) Inspect gears of primary carrier (15) for free rotation, pits, or broken teeth.

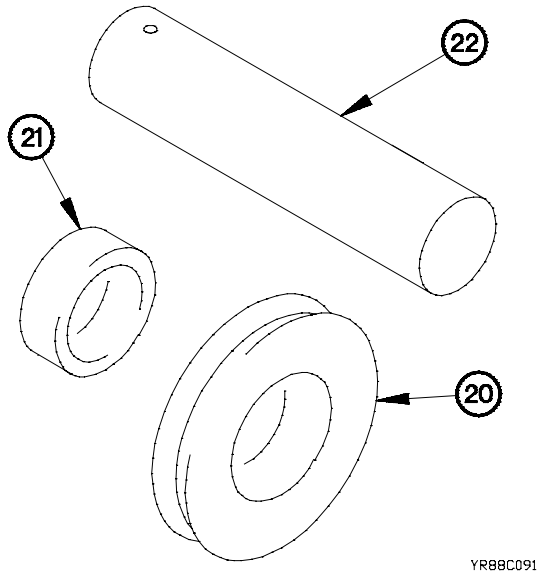
(22) Inspect gears of secondary carrier (16) for free rotation, pits, or broken teeth.

(23) Inspect on secondary sun gear (17) for worn or broken teeth.




(24) Inspect drum seal bore surface on gear end flange (18) for scratches or pits.

(25) Inspect rotary seal surface on gear end support (19) for scratches and pits.

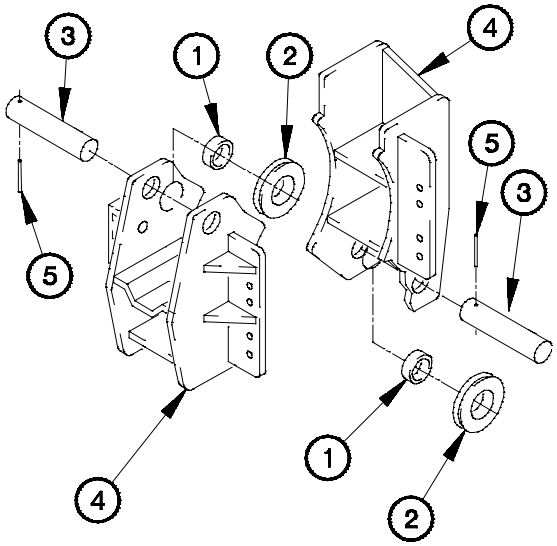



(26) Inspect cable guide sheave (20) and bushing (21) for pitting or corrosion.

(27) Inspect roller shaft (22) for scratches or pits.

## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

**d. Assembly.**



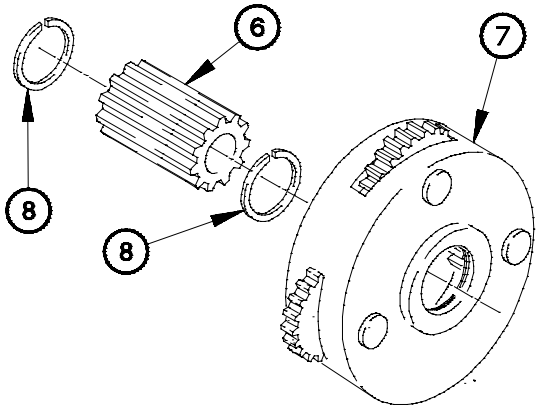

YR88D011

**NOTE**

Apply lubricating oil to parts during assembly.

(1) Install two bushings (1) in cable guide sheaves (2).

(2) Install two cable guide sheaves (2) and roller shafts (3) on base mounts (4) with spring pins (5).




YR88D021

**WARNING**

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

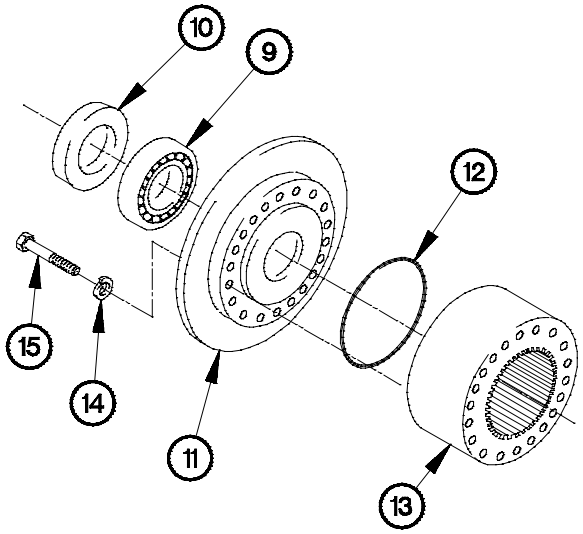
(3) Install secondary sun gear (6) in primary carrier assembly (7) with two retaining rings (8).

(4) Install ball bearing (9) and shaft seal (10) in gear end flange (11).

(5) Install preformed packing (12) on gear end flange (11).

(6) Position gear end flange (11) on ring gear (13) with 20 lockwashers (14) and screws (15).

(7) Tighten 20 screws (15) to 38-45 lb-ft (52-61 N·m).

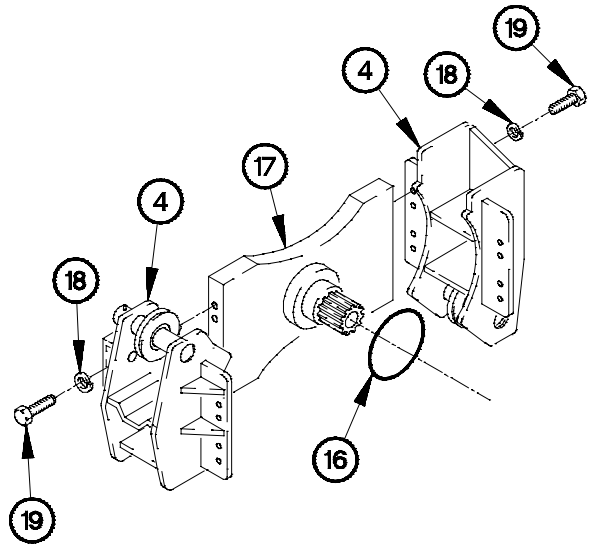



YR88D031

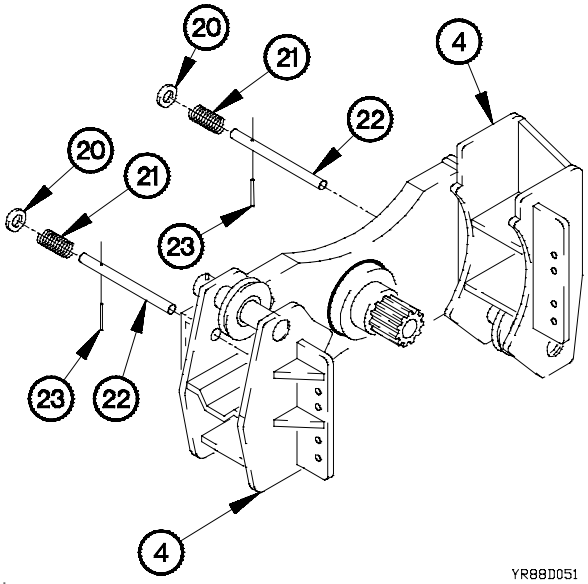
(8) Install preformed packing (16) on gear end support (17).

(9) Position gear end support (17) on two base mounts (4) with eight lockwashers (18) and screws (19).

(10) Tighten eight screws (19) to 70-95 lb-ft (95-129 N·m).




YR88D041



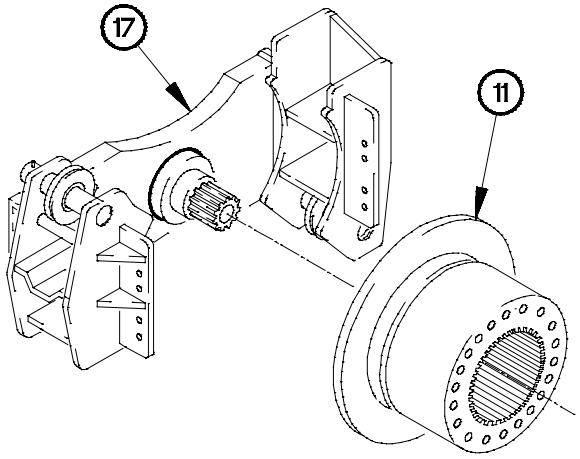

YR88D051

**WARNING**

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

(11) Install two washers (20), springs (21), and cable retainer pins (22) on base mounts (4) with spring pins (23).

(12) Install gear end flange (11) on gear end support (17).



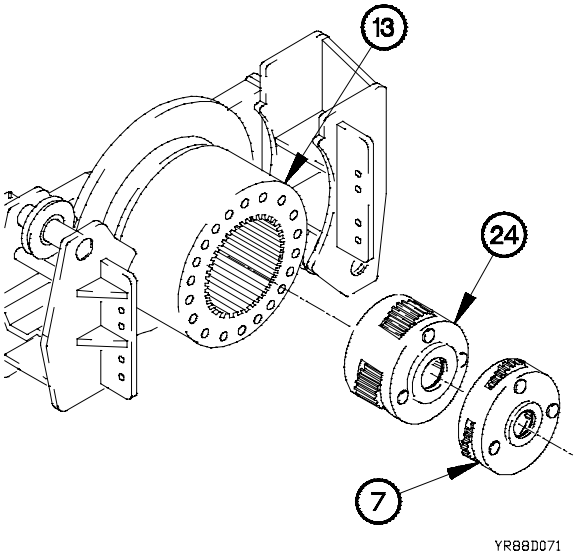

YR88D061

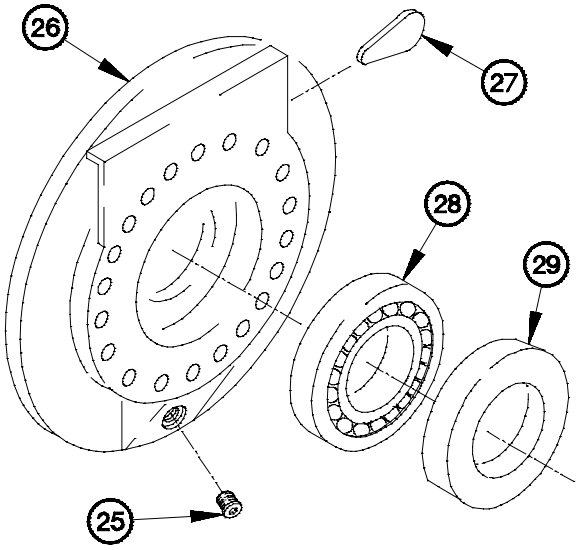
## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(13) Lubricate secondary carrier (24) and primary carrier (7).

(14) Install secondary carrier (24) in ring gear (13).

(15) Install primary carrier (7) in ring gear (13).




(16) Install two magnetic plugs (25) in motor end flange (26).

(17) Install cable wedge (27) in motor end flange (26).

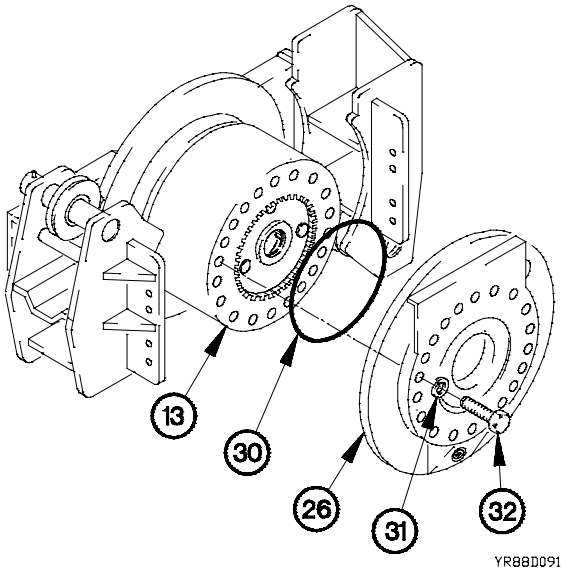
(18) Install ball bearing (28) in motor end flange (26).

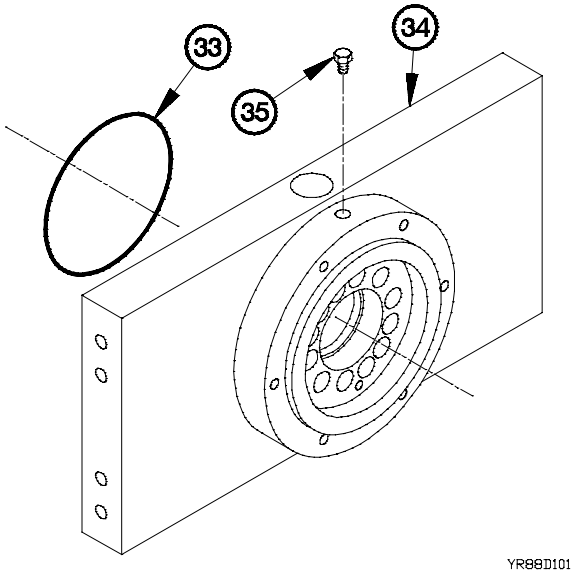
(19) Install shaft seal (29) in motor end flange (26).

(20) Install preformed packing (30) on motor end flange (26).

(21) Position motor end flange (26) on ring gear (13) with 20 lockwashers (31) and screws (32).

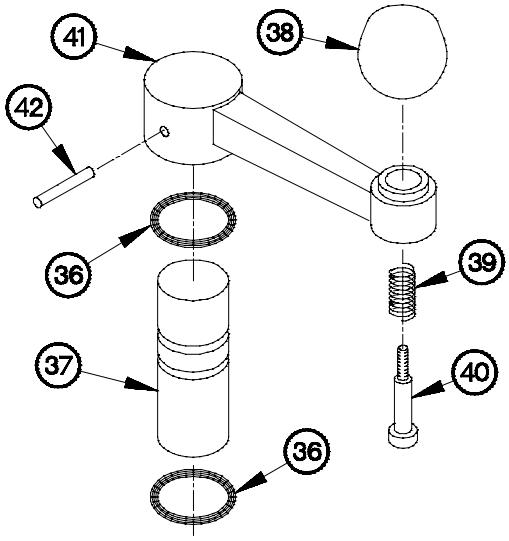
(22) Tighten 20 screws (32) to 38-45 lb-ft (52-61 N·m).






(23) Install preformed packing (33) on motor end support (34).

(24) Install relief vent (35) in motor end support (34).




(25) Install two preformed packings (36) on shoulder shaft (37).

**WARNING**

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

(26) Install round knob (38), compression spring (39), and locator pin (40) on arm shifter (41).

(27) Install arm shifter (41) on shoulder shaft (37) with spring pin (42).

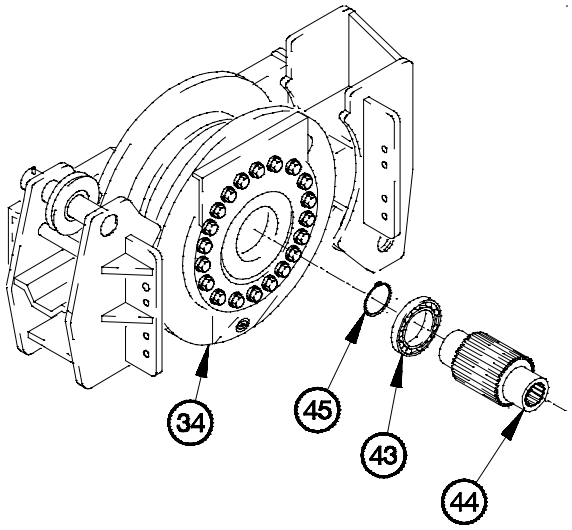
## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

**WARNING**

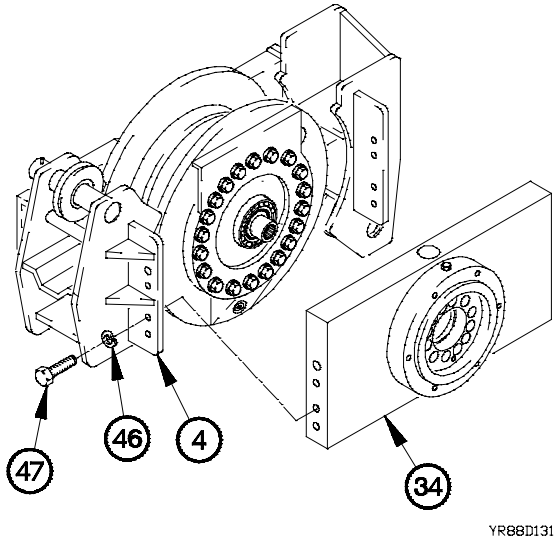
**Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(28) Install ball bearing (43) on primary sun gear (44) with retaining ring (45).

(29) Install primary sun gear (44) in motor end support (34).




YR88D121




YR88D131

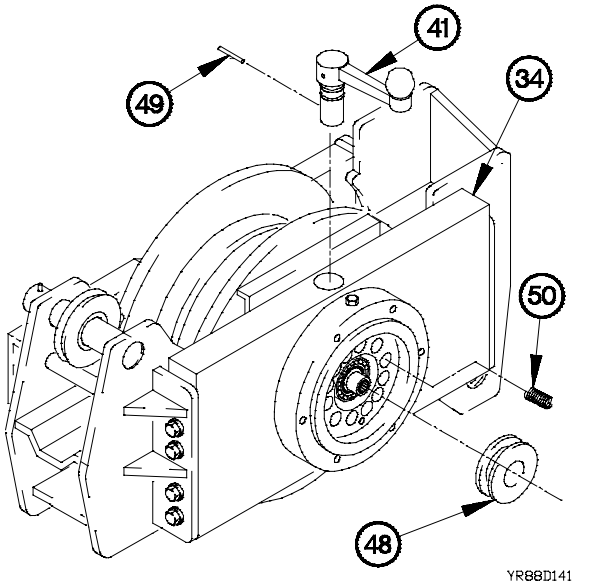
(30) Position motor end support (34) on base mounts (4) with eight lockwashers (46) and bolts (47).

(31) Tighten eight bolts (47) to 70-95 lb-ft (95-129 N·m).

(32) Install shifter drive gear (48) in motor end support (34).

(33) Install arm shifter (41) in motor end support (34) with spring pin (49).

(34) Install 12 compression springs (50) in motor end support (34).



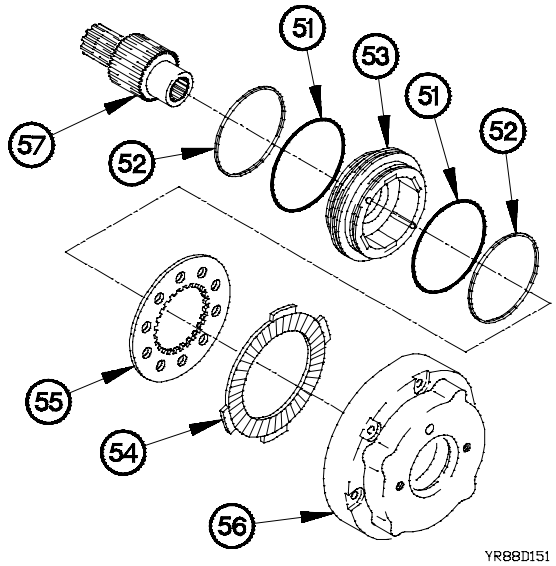

YR88D141

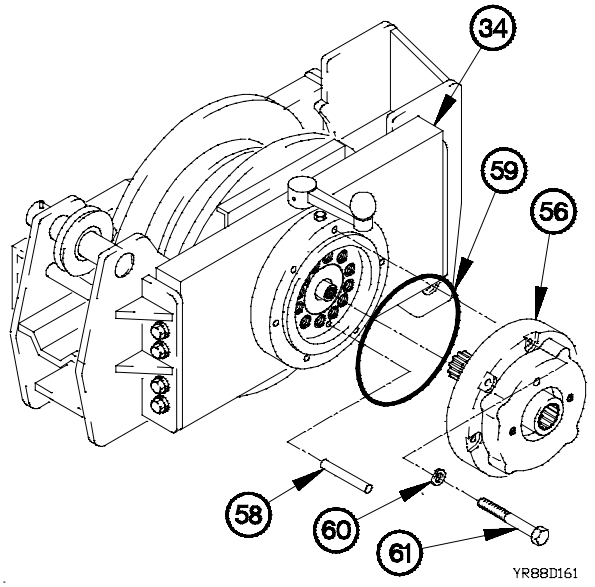
(35) Install two preformed packings (51) and back-up rings (52) on brake piston (53).

(36) Alternately install ten friction disc plates (54) and nine brake drive plates (55) in outer brake housing (56).

(37) Install brake piston (53) in outer brake housing (56).

(38) Install brake shaft (57) in outer brake housing (56).




(39) Install two dowel pins (58) in motor end support (34).

(40) Install preformed packing (59) on motor end support (34).

(41) Position outer brake housing (56) in motor end support (34) with six lockwashers (60) and screws (61).

(42) Tighten six screws (61) to 45-55 lb-ft (61-75 N·m).

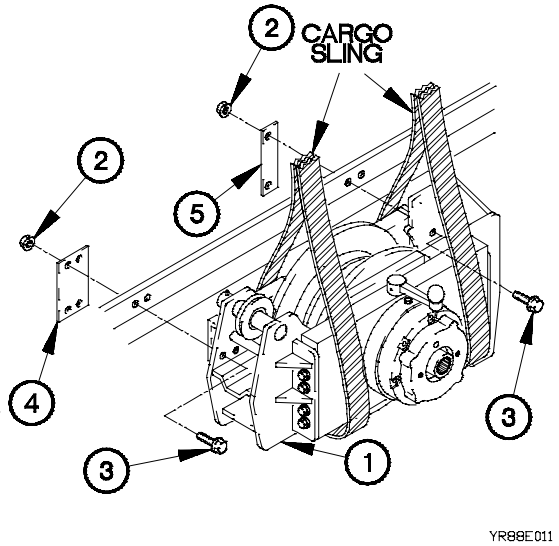
**e. Installation.**

**WARNING**

**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.**

(1) Position 15K SRW (1) on vehicle with eight self-locking nuts (2), bolts (3), and mounting plates (4 and 5).

(2) Tighten eight self-locking nuts (2) to 150-180 lb-ft (203-244 N·m).



## 16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

**f. Follow-On Maintenance.**

(1) Install cargo bed, except models M1088 and M1089 (para 15-9).

(2) Install hydraulic motor (para 16-90).

(3) Install counterbalance/cartridge valve (para 16-89).

(4) Install muffler and heat shields (TM 9-2320-366-20-3).

(5) Fill 15K SRW with gear oil (TM 9-2320-366-20).

(6) Install 15K SRW cable (TM 9-2320-366-20-5).

(7) Operate 15K SRW and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-89. 15K SELF-RECOVERY WINCH (SRW) CARTRIDGE/COUNTERBALANCE VALVE REPLACEMENT

This task covers:

a. Cartridge Valve Removal
b. Cartridge Valve Installation
c. Counterbalance Valve Removal
d. Counterbalance Valve Installation
e. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
15K Self-Recovery Winch (SRW) cable removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 95, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pan, Drain (Item 43, Appendix B)

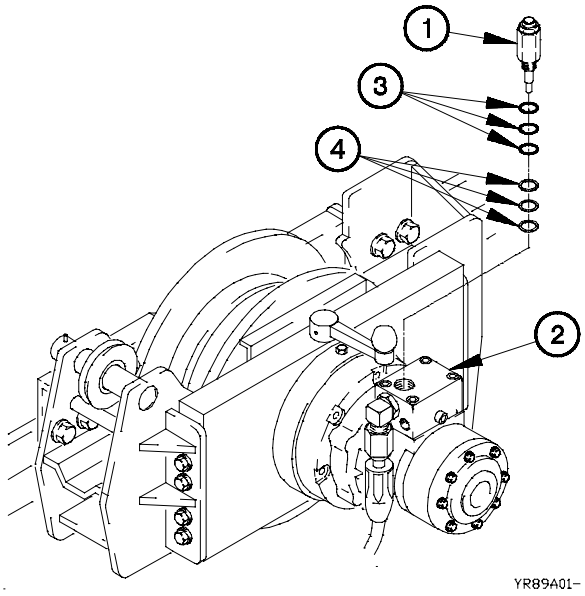
**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Kit, Seal (Item 116, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Packing, Preformed (2) (Item 284, Appendix F)
Packing, Preformed (Item 282, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

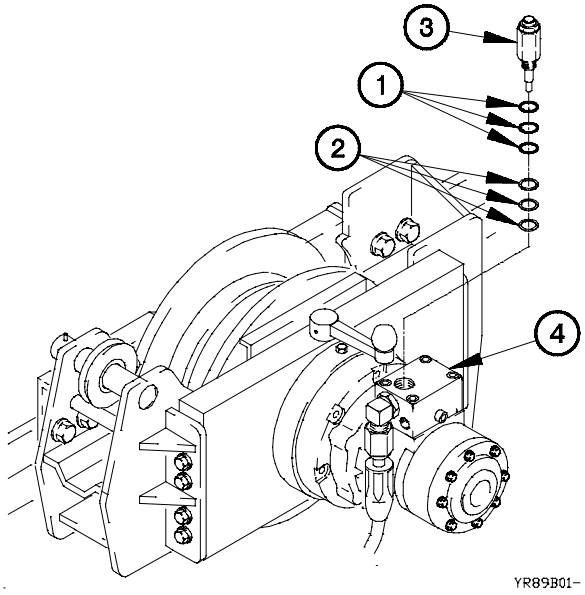
**a. Cartridge Valve Removal.**

(1) Remove cartridge valve (1) from counterbalance valve (2).

(2) Remove three preformed packings (3) and back-up rings (4) from cartridge valve (1). Discard preformed packings and back-up rings.




**b. Cartridge Valve Installation.**




(1) Install three back-up rings (1) and preformed packings (2) on cartridge valve (3).

(2) Position cartridge valve (3) in counterbalance valve (4).

(3) Tighten cartridge valve (3) to 40-45 lb-ft (54-61 N·m).

## 16-89. 15K SELF-RECOVERY WINCH (SRW) CARTRIDGE/COUNTERBALANCE VALVE REPLACEMENT (CONT)

**c. Counterbalance Valve Removal.**

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

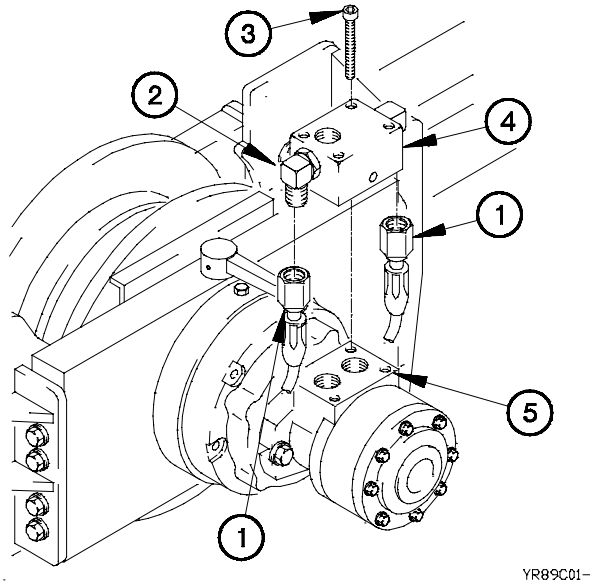
**NOTE**

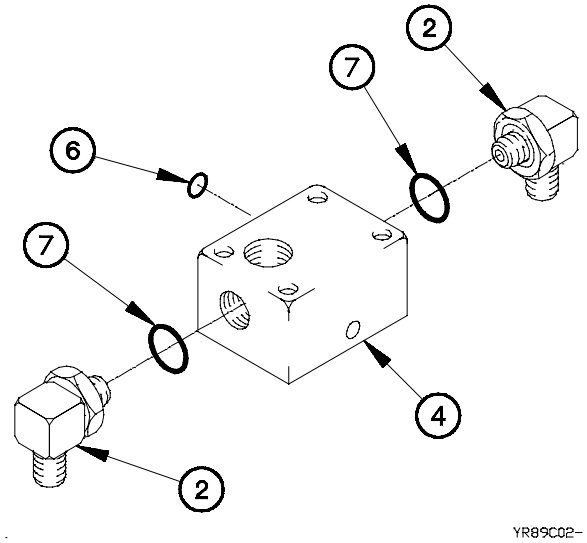
Tag hydraulic hoses and connection points prior to disconnecting.

(1) Disconnect two hydraulic hoses (1) from 90-degree fittings (2).

(2) Remove five screws (3) from counterbalance valve (4).

(3) Remove counterbalance valve (4) from hydraulic motor (5).



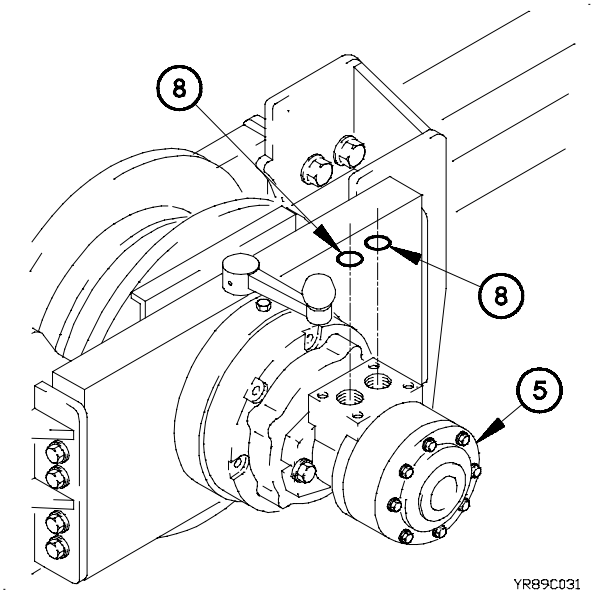




(4) Remove preformed packing (6) from counterbalance valve (4). Discard preformed packing.

(5) Remove two 90-degree fittings (2) from counterbalance valve (4).

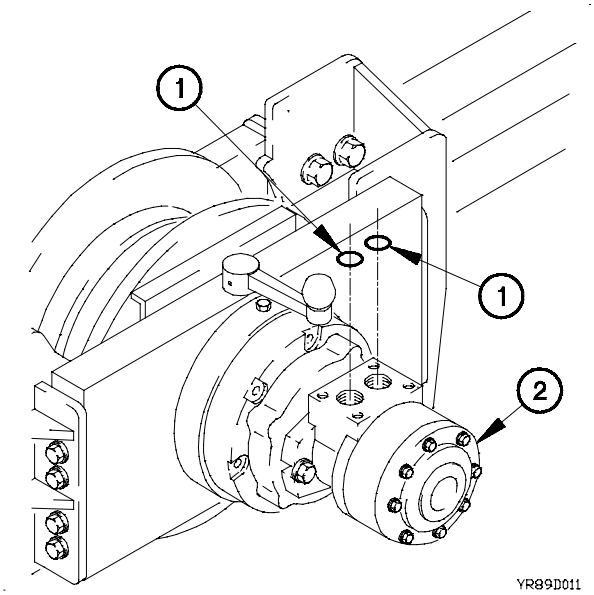
(6) Remove two preformed packings (7) from 90-degree fittings (2). Discard preformed packings.

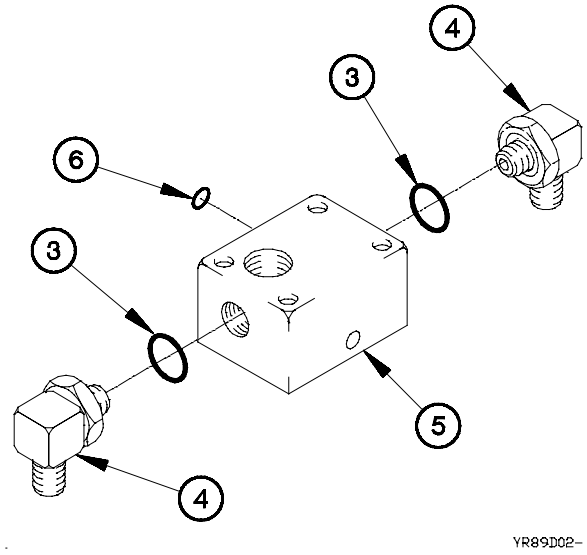
(7) Remove two preformed packings (8) from hydraulic motor (5). Discard preformed packings.



**d. Counterbalance Valve Installation.**

(1) Install two preformed packings (1) in hydraulic motor (2).




(2) Install two preformed packings (3) on 90-degree fittings (4).

(3) Install two 90-degree fittings (4) in counterbalance valve (5).

(4) Install preformed packing (6) in counterbalance valve (5).

(5) Install counterbalance valve (5) on hydraulic motor (2).

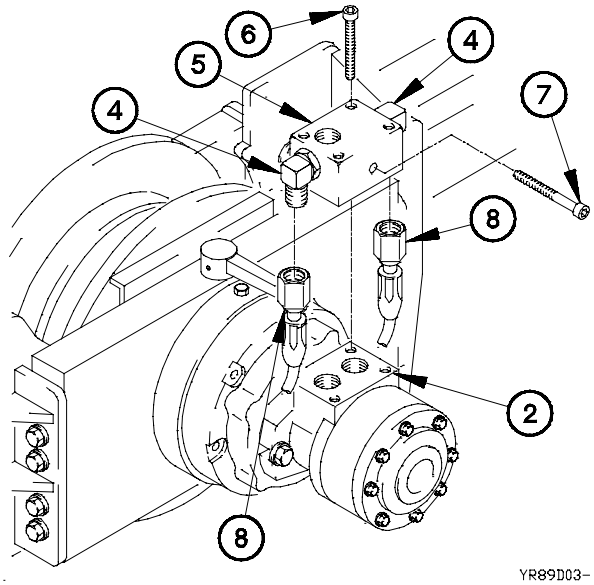
(6) Position four screws (6) in counterbalance valve (5).

(7) Position screw (7) in counterbalance valve (5).

(8) Tighten four screws (6) to 20-25 lb-ft (27-34 N·m).

(9) Tighten screw (7) to 120-180 lb-in. (14-20 N·m).

(10) Connect two hydraulic hoses (8) to 90-degree fittings (4).



## 16-89. 15K SELF-RECOVERY WINCH (SRW) CARTRIDGE/COUNTERBALANCE VALVE REPLACEMENT (CONT)

**e. Follow-On Maintenance.**

(1) Install 15K SRW cable (TM 9-2320-366-20-5).

(2) Operate 15K SRW and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-90. 15K SELF-RECOVERY WINCH (SRW) HYDRAULIC MOTOR REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
15K Self-Recovery Winch (SRW) counterbalance/ cartridge valve removed (para 16-89).

**Tools and Special Tools**
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)

**Tools and Special Tools (Cont)**
Tool Kit, Genl Mech (Item 78, Appendix B)

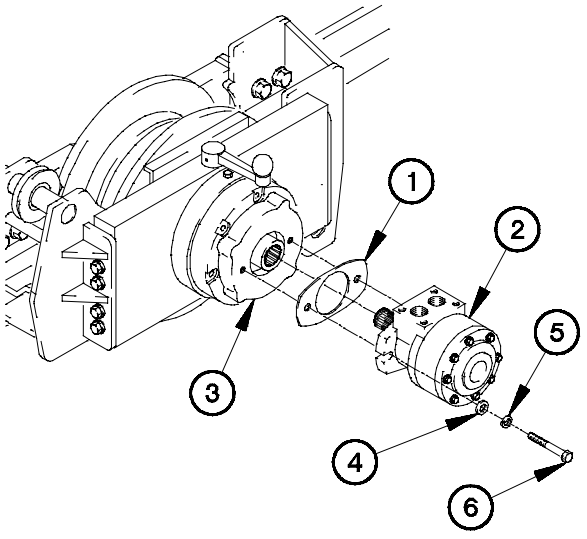
**Materials/Parts**
Gasket (Item 54, Appendix F)
Lockwasher (2) (Item 158, Appendix F)

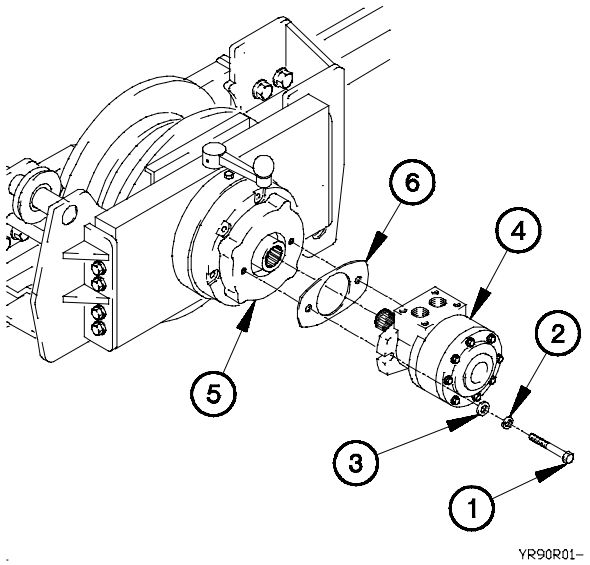
**a. Removal.**

(1) Remove two screws (1), lockwashers (2), washers (3), and hydraulic motor (4) from 15K SRW (5). Discard lockwashers.

(2) Remove gasket (6) from hydraulic motor (4). Discard gasket.

**b. Installation.**




(1) Install gasket (1) on hydraulic motor (2).

(2) Position hydraulic motor (2) on 15K SRW (3) with two washers (4), lockwashers (5), and screws (6).

(3) Tighten two screws (6) to 70-95 lb-ft (95-129 N·m).

**c. Follow-On Maintenance.**

(1) Install counterbalance valve (para 16-89).

(2) Operate 15K Self-Recovery Winch (SRW) and check for hydraulic leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-91. HYDRAULIC ROTARY PUMP REPLACEMENT

**This task covers:**

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

**INITIAL SETUP**

**Equipment Conditions**
Splash guard removed (TM 9-2320-366-20-4).
Air cleaner removed (TM 9-2320-366-20-3)

**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)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Packing, Preformed (Item 230, Appendix F)
Packing, Preformed (Item 233, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**WARNING**

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

**a. Removal.**

**CAUTION**

Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

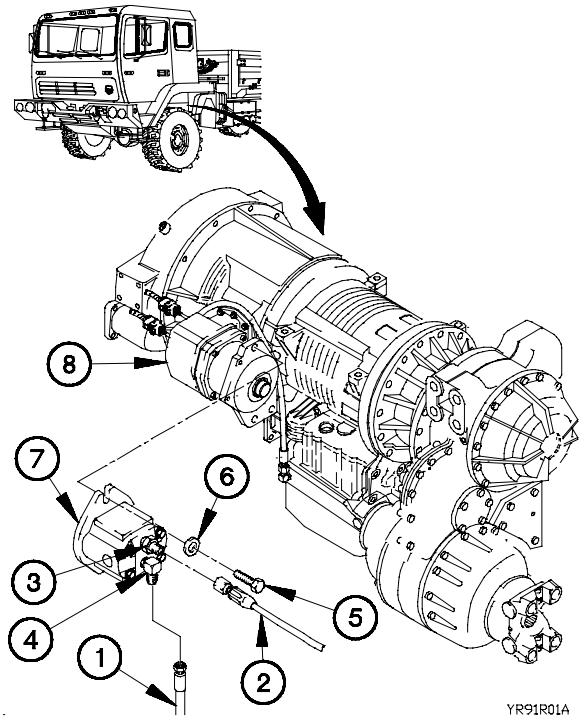
Tag hydraulic hoses and connection points prior to disconnecting.

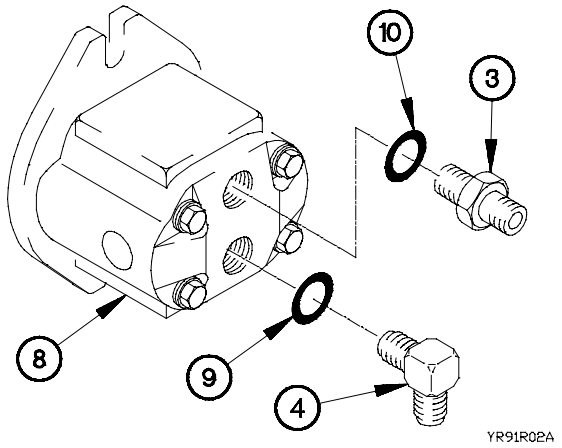
(1) Disconnect hydraulic hoses (1) and (2) from fitting (3) and 90 degree fitting (4).

**NOTE**

Step (2) requires the aid of an assistant.

(2) Remove two screws (5), washers (6), and hydraulic rotary pump (7) from PTO (8).

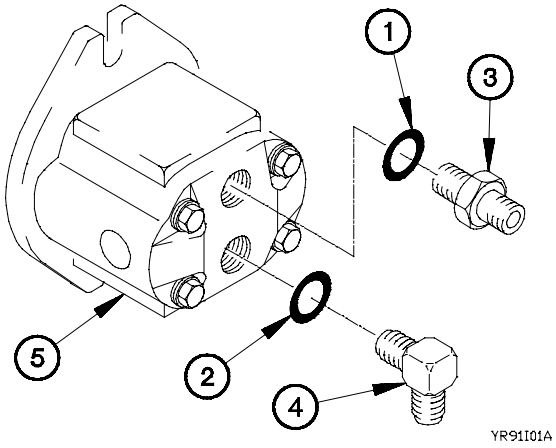





(3) Remove fitting (3) and 90 degree fitting (4) from hydraulic rotary pump (8).

(4) Remove preformed packings (9 and 10) from fitting (3) and 90 degree fitting (4).

**b. Installation.**




(1) Install preformed packings (1 and 2) on fittings (3) and 90 degree fitting (4).

(2) Install fitting (3) and 90 degree fitting (4) in hydraulic rotary pump (5).

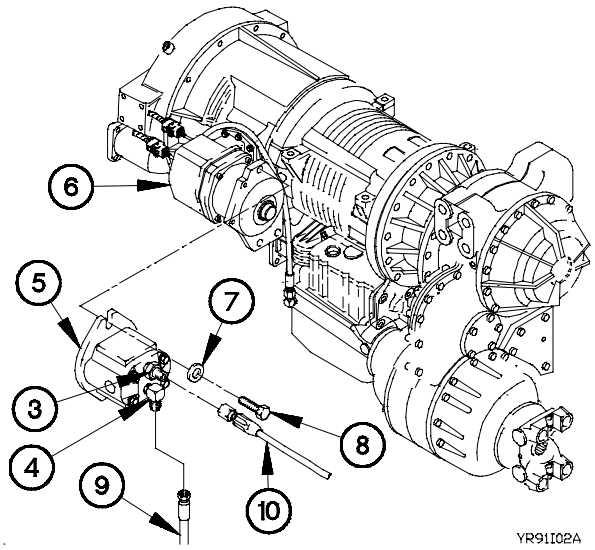
**NOTE**

Step (3) requires the aid of an assistant.

(3) Position hydraulic rotary pump (5) on PTO (6) with two washers (7) and screws (8).

(4) Tighten two screws (8) to 60-90 lb-ft (81-122 N•m).

(5) Connect hydraulic hoses (9 and 10) to fitting (3) and 90 degree fitting (4).



## 16-91. HYDRAULIC ROTARY PUMP REPLACEMENT (CONT)

**c. Follow-On Maintenance.**

(1) Install air cleaner (TM 9-2320-366-20-3).

(2) Install splash guard (TM 9-2320-366-20-4).

(3) Operate 15K Self-Recovery Winch (SRW) and check for hydraulic leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-92. M1089 THREE STAGE HYDRAULIC PUMP REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic tank removed (TM 9-2320-366-20-5).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)
Wrench Set, Socket (Item 84, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (3) (Item 230, Appendix F)
Packing, Preformed (3) (Item 233, Appendix F)
Lubricating Oil, Engine (item 35, Appendix C)

**Personnel Required**
(2)

**WARNING**

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

**a. Removal.**

**CAUTION**

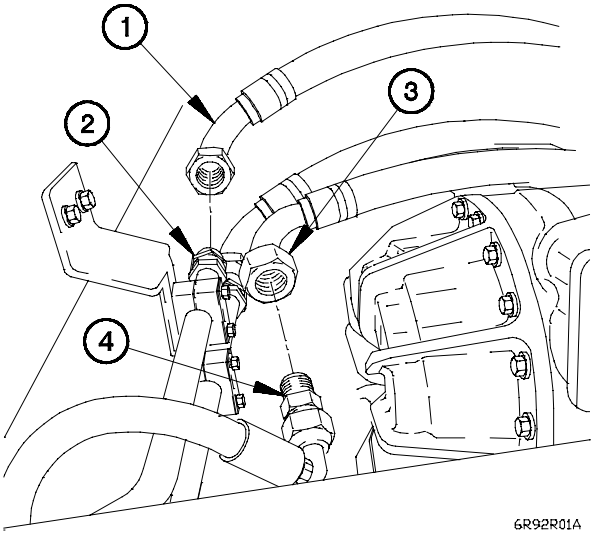
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(1) Disconnect two hoses (1) from tubes (2).

(2) Disconnect hose (3) from adapter (4).

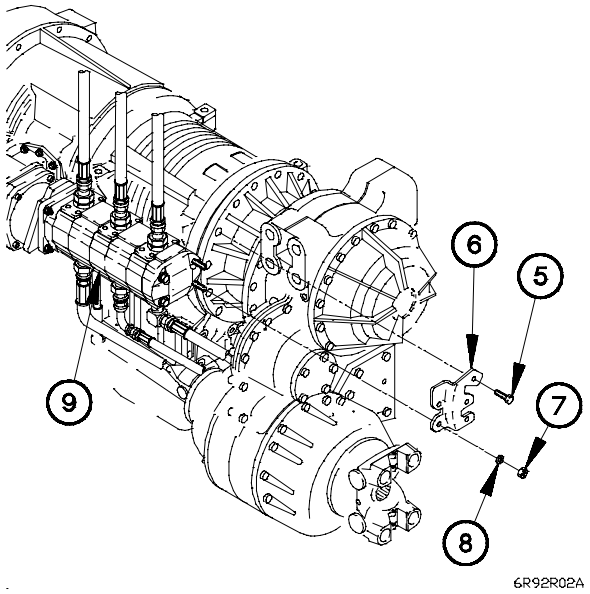


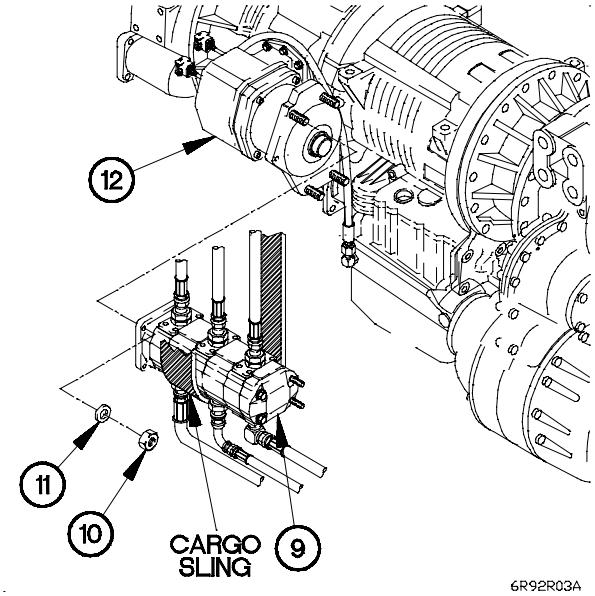
## 16-92. M1089 THREE STAGE HYDRAULIC PUMP REPLACEMENT (CONT)

(3) Remove three bolts (5) from support bracket (6).

(4) Remove two nuts (7), washers (8) and support bracket (6) from three stage hydraulic pump (9).

(5) Install two washers (8) and nuts (7) on three stage hydraulic pump (9).




**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.**

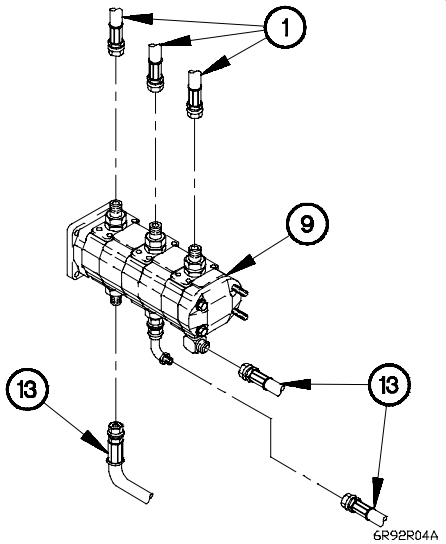
**NOTE**

Step (6) requires the aid of an assistant.

(6) Remove four nuts (10), washers (11), and three stage hydraulic pump (9) from Power Takeoff (PTO) (12).

(7) Remove three hoses (1) from three stage hydraulic pump (9).

(8) Remove three hoses (13) from three stage hydraulic pump (9).

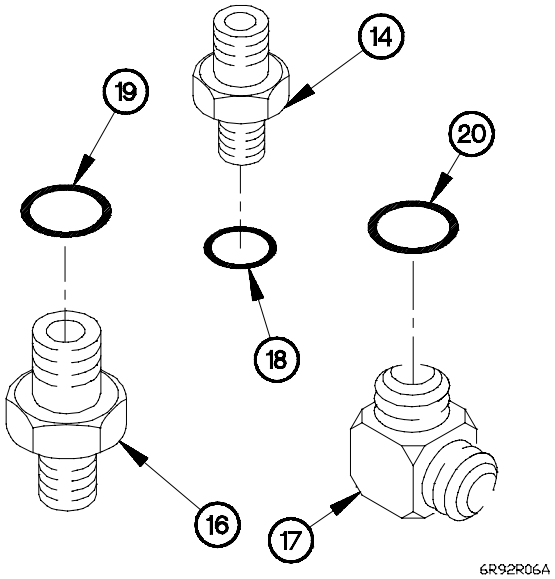


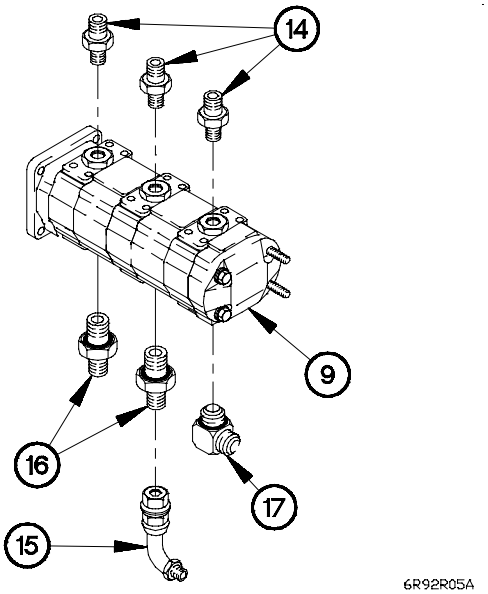
(9) Remove three fittings (14) from three stage hydraulic pump (9).

(10) Remove adapter (15) from fitting (16).

(11) Remove two fittings (16) from three stage hydraulic pump (9).

(12) Remove 90-degree fitting (17) from three stage hydraulic pump (9).




(13) Remove three preformed packing (18) from fittings (14). Discard preformed packings.

(14) Remove two preformed packings (19) from fittings (16). Discard preformed packings.

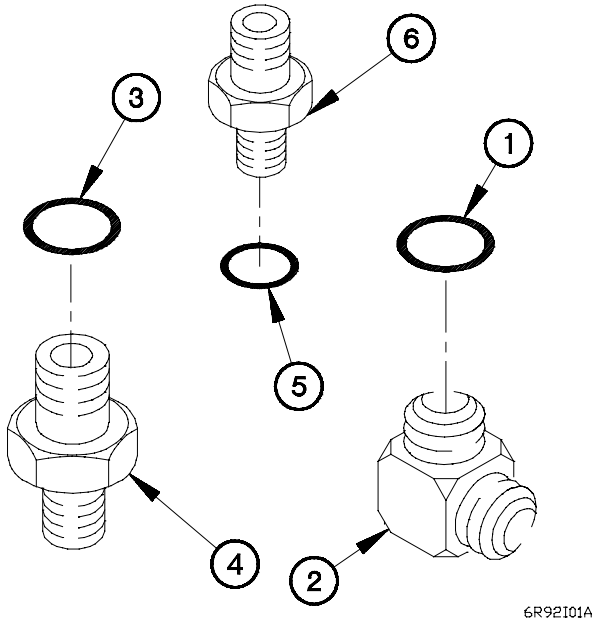
(15) Remove preformed packing (20) from 90-degree fitting (17). Discard preformed packing.

**b. Installation**

(1) Install preformed packing (1) on 90-degree fitting (2).

(2) Install two preformed packings (3) on fittings (4).

(3) Install three preformed packings (5) on fittings (6).



## 16-92. M1089 THREE STAGE HYDRAULIC PUMP REPLACEMENT (CONT)

(4) Position 90-degree fitting (2) in three stage hydraulic pump (7).

(5) Position two fittings (4) in three stage hydraulic pump (7).

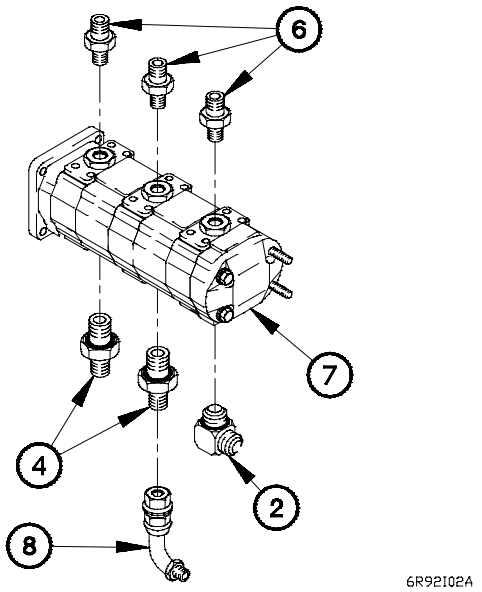
(6) Tighten two fittings (4) and 90-degree fitting (2) to 127-133 lb-ft (172-180 N·m).

(7) Position adapter (8) on fitting (4).

(8) Tighten adapter (8) to 127-133 lb-ft (172-180 N·m).

(9) Position three fittings (6) in three stage hydraulic pump (7).

(10) Tighten three fittings (6) to 68-75 lb-ft (92-102 N·m).



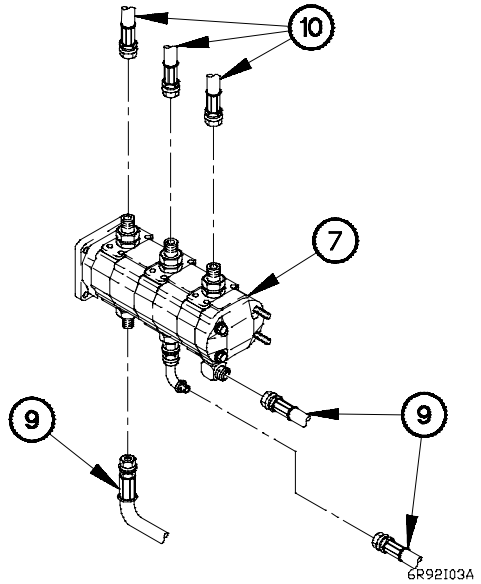
6R92102A

(11) Position three hoses (9) on three stage hydraulic pump (7).

(12) Tighten three hoses (9) to 127-133 lb-ft (172-180 N·m).

(13) Position three hoses (10) on three stage hydraulic pump (7).

(14) Tighten three hoses (10) to 79-88 lb-ft (107-119 N·m).



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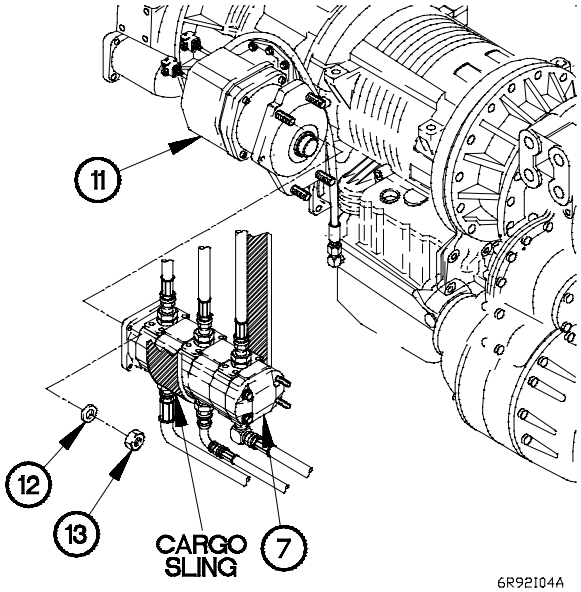
**WARNING**

**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.**

**NOTE**

Step (15) requires the aid of an assistant.

(15) Install three stage hydraulic pump (7) on Power Takeoff (PTO) (11) with four washers (12) and nuts (13).



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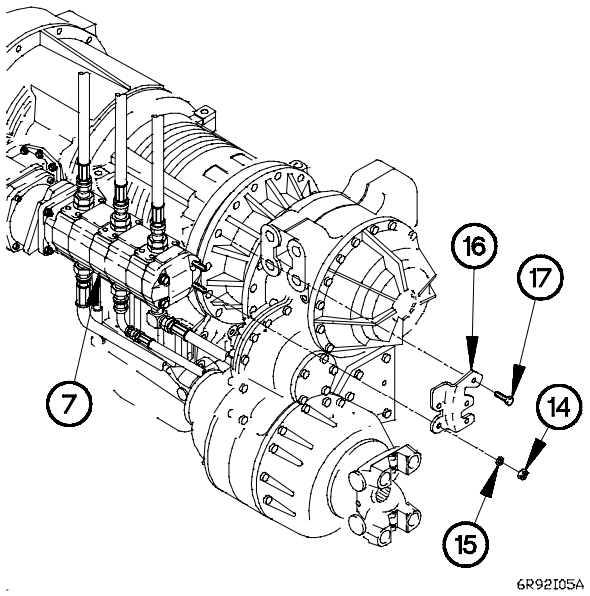
(16) Remove two nuts (14) and washers (15) from hydraulic pump (7).

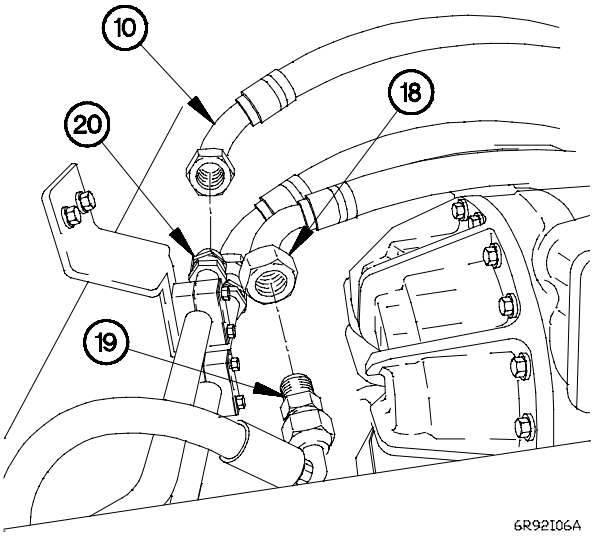
(17) Position support bracket (16) on hydraulic pump (7) with two washers (15) and nuts (14).

(18) Position three bolts (17) in support bracket (16).

(19) Tighten three bolts (17) to 66-81 lb-ft (90-110 N·m).

(20) Tighten two nuts (14) to 180-200 lb-ft (243-297 N·m) in increments of 50 lb-ft (68 N·m).




(21) Position hose (18) on adapter (19).

(22) Tighten hose (18) to 79-88 lb-ft (107-119 N·m).

(23) Position two hoses (10) on tubes (20).

(24) Tighten two hoses (10) to 79-88 lb-ft (107-119 N·m).

**c. Follow-On Maintenance**

(1) Install hydraulic tank (TM 9-2320-366-20-5).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Operate wrecker functions and check for proper operations and hydraulic leaks (TM 9-2320-366-10-2).

**End of Task.**

## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR

**This task covers:**

a. Removal
b. Disassembly
c. Cleaning/Inspection
d. Assembly
e. Installation
f. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic rotary pump removed, if equipped (para 16-91).
M1089 three stage hydraulic pump removed, if equipped (para 16-92).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Pliers, Retaining Ring (Item 45, Appendix B)
Pliers, Retaining Ring (Item 46, Appendix B)
Press, Arbor, Hand Operated (Item 48, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Crowfoot, Attachment, Socket Wrench (Item 12.1, TM 9-2320-366-20, Appendix B)
Sling, Cargo (Item 56, Appendix B)

**Materials/Parts (Cont)**
Cap and Plug Set (Item 17, Appendix C)
Gasket (Item 49, Appendix F)
Ties, Cable Plastic (Item 92, Appendix C)
Sealing Compound (Item 41, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)
Packing, Preformed (2) (Item 250, Appendix F)
Gasket (Item 53, Appendix F)
Seal, Encased (2) (Item 389, Appendix F)
Gasket (Item 52, Appendix F)
Seal, Plain Encased (Item 390, Appendix F)
Packing, Preformed (Item 273, Appendix F)
Packing, Preformed (Item 272, Appendix F)
Packing, Preformed (Item 271, Appendix F)
Packing, Preformed (Item 270, Appendix F)
Packing, Preformed (Item 274, Appendix F)
Packing, Preformed (Item 236, Appendix F)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Lubricating Oil, Engine (Item 46, Appendix C)
Packing, Preformed (2) (Item 224.1, Appendix F)
Screw, Cap (4) (Item 366.1, Appendix F)

**Personnel Required**
(2)

**WARNING**

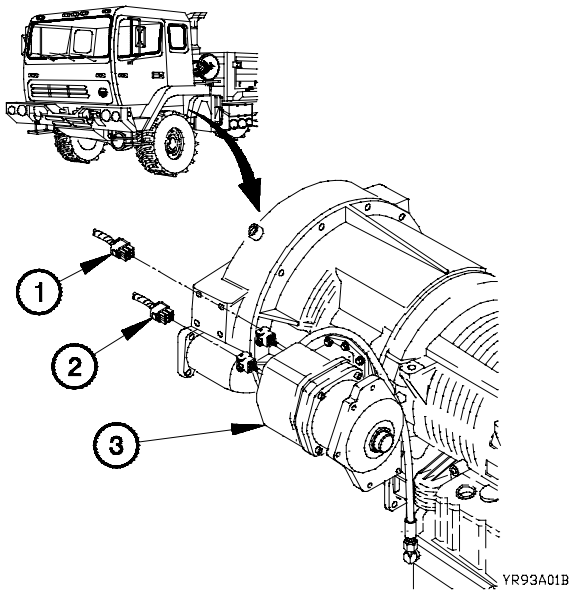
**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**

**a. Removal.**

**NOTE**

- Remove plastic cable ties as required.
- Tag electrical connectors and connection points prior to disconnecting.

(1) Disconnect electrical connectors P216 (1) and P217 (2) from PTO (3).



**CAUTION**

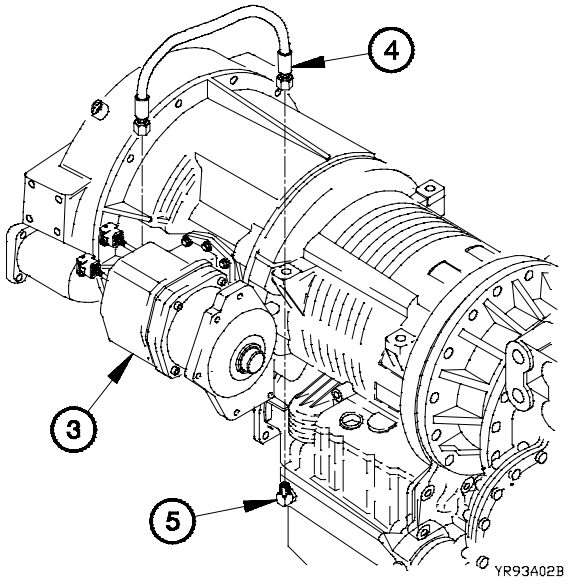
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

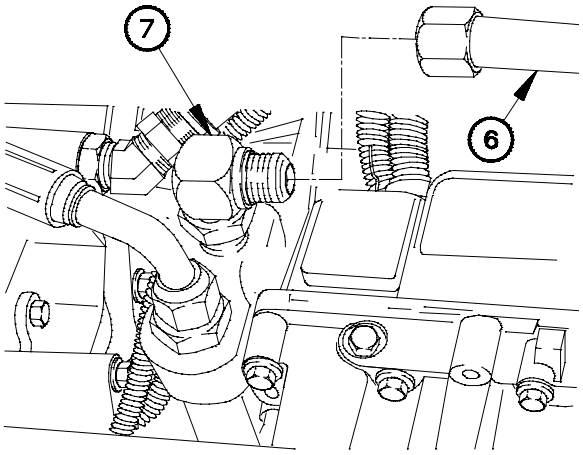
**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect oil hose (4) from PTO (3).

(3) Remove oil hose (4) from 90-degree fitting (5).




**NOTE**

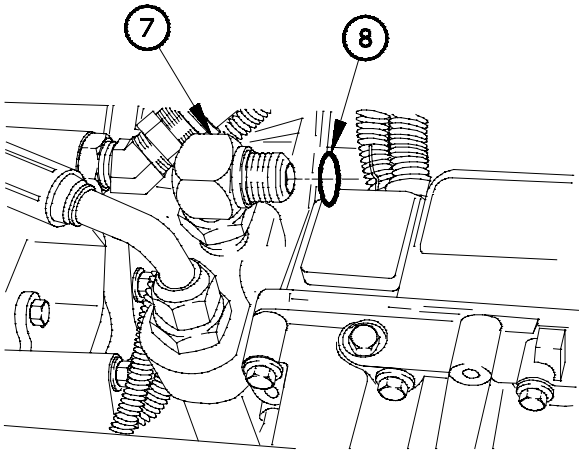
Perform steps (4) through (5.6) on vehicles equipped with transmission oil cooler tubes.

(4) Disconnect transmission oil cooler return tube (6) from 90-degree fitting (7).

**NOTE**

- Vehicles equipped with either non-corrosive enhanced fittings with one preformed packing or corrosive enhanced fittings with two preformed packings. When removing a non-corrosive enhanced fitting replace it with corrosive enhanced fitting.
- Perform step (5) on vehicles equipped with corrosive enhanced fittings.

(5) Remove preformed packing (8) from 90-degree fitting (7). Discard preformed packing.



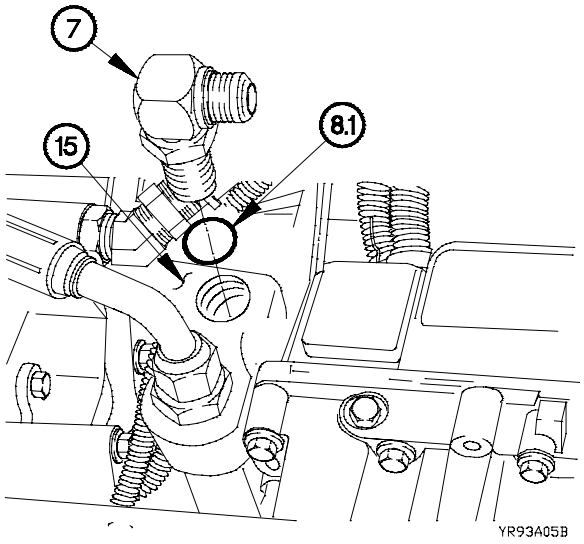
## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

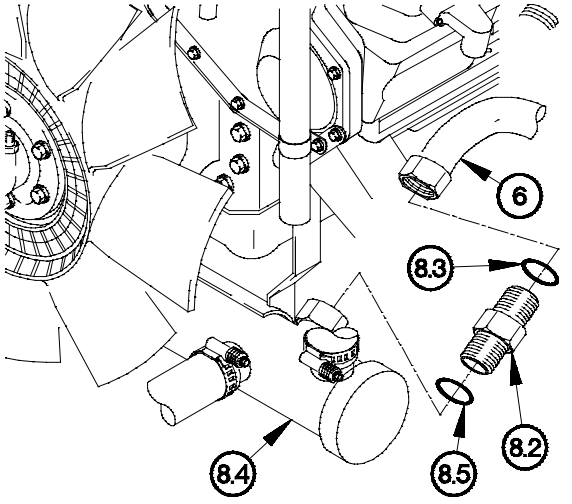
**NOTE**

- Perform steps (5.1) and (5.2) on vehicles not equipped with corrosive enhanced fittings.
- Note orientation of 90-degree fitting prior to removal.

(5.1) Remove 90-degree fitting (7) from transmission (15).

(5.2) Remove preformed packing (8.1) from 90-degree fitting (7). Discard preformed packing.




(5.3) Remove transmission oil cooler return tube (6) from fitting (8.2)

**NOTE**

Perform step (5.4) on vehicles equipped with corrosive enhanced fitting.

(5.4) Remove preformed packing (8.3) from fitting (8.2). Discard preformed packing.

**NOTE**

Perform steps (5.5) and (5.6) on vehicles not equipped with corrosive enhanced fittings.

(5.5) Remove fitting (8.2) from transmission oil cooler (8.4).

(5.6) Remove preformed packing (8.5) from fitting (8.2). Discard preformed packing.

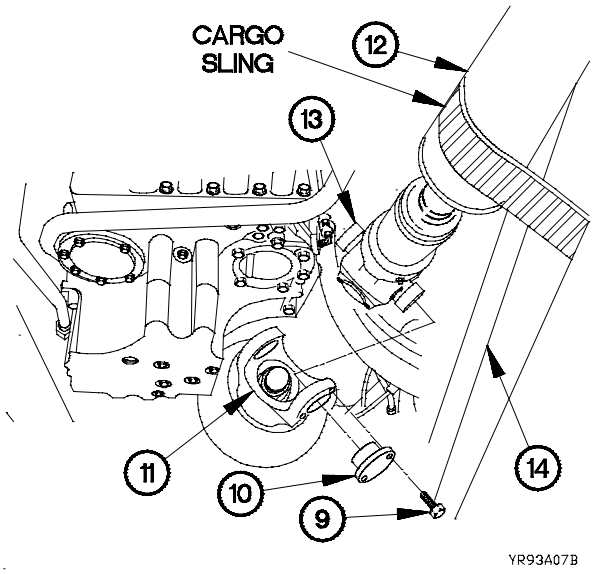
(6) Remove four screws (9) and two bearing cups (10) from drive yoke (11). Discard screws.

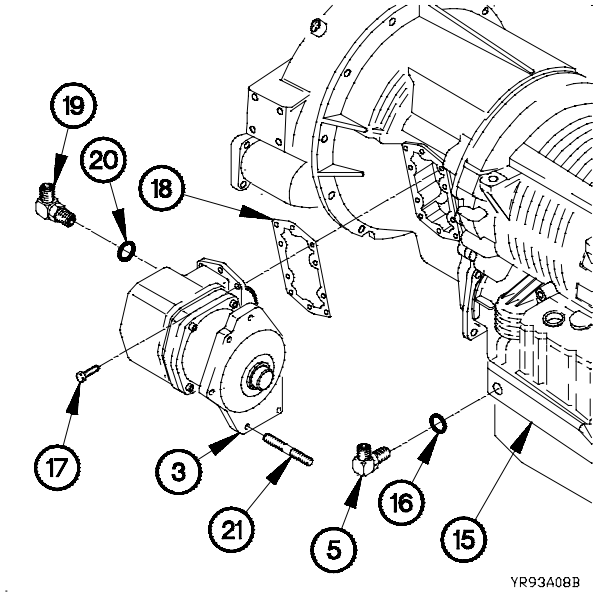
(7) Slide drive shaft (12) from side to side and separate universal joint (13) from drive yoke (11).

**NOTE**

Step (8) requires the aid of an assistant.

(8) Attach drive shaft (12) to frame (14).




(9) Remove 90-degree fitting (5) from transmission (15).

(10) Remove preformed packing (16) from fitting (5). Discard preformed packing.

**NOTE**

Step (11) requires the aid of an assistant.

(11) Remove eight screws (17), PTO (3), and gasket (18) from transmission (15). Discard gasket.

**NOTE**

Perform steps (12) and (13) on PTO Assembly (P/N 276XMF-JX-D5XK).

(12) Remove 90-degree fitting (19) from PTO (3).

(13) Remove preformed packing (20) from fitting (19). Discard preformed packing.

(14) Remove four threaded studs (21) from PTO (3).

## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

**NOTE**

Perform steps (14.1) and (14.2) on PTO Assembly (P/N 12378814-001).

(14.1) Disconnect tube (21.1) from tee fitting (21.2).

(14.2) Remove tube (21.1) from 90-degree fitting (21.3).

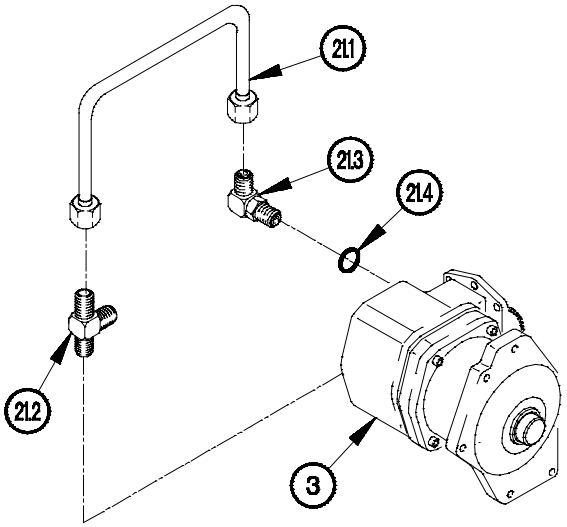
**NOTE**

Note orientation of tee fitting and 90-degree fitting.

(14.3) Remove tee fitting (21.2) from PTO (3).

(14.4) Remove 90-degree fitting (21.3) from PTO (3).

(14.5) Remove preformed packing (21.4) from 90-degree fitting (21.3).




(15) Deleted.

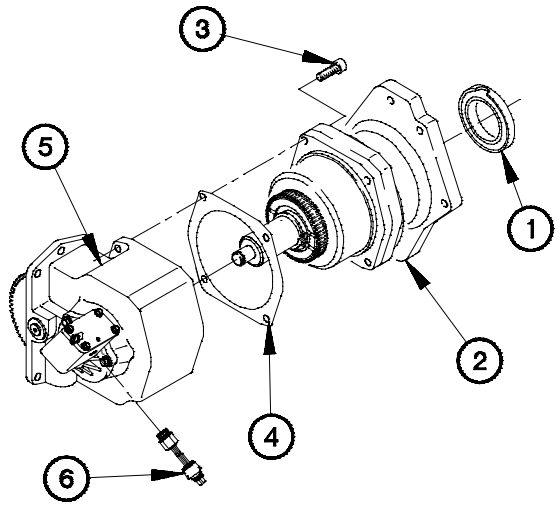
**b. Disassembly.**

(1) Remove oil seal (1) from bearing cap (2). Discard oil seal.

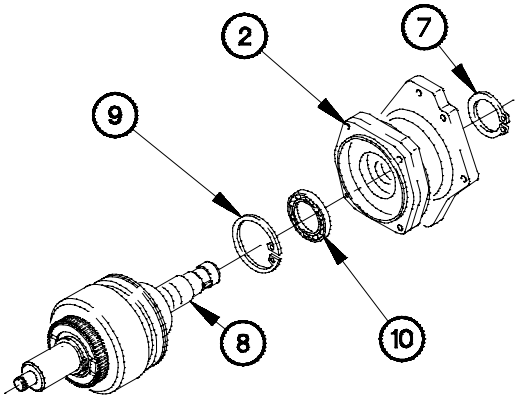
(2) Remove four screws (3) from bearing cap (2).

(3) Remove bearing cap (2) and gasket (4) from housing (5). Discard gasket.

(4) Remove solenoid electrical connector (6) from housing (5).




YR93B01B




YR93B02B

**WARNING**

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

(5) Remove retaining ring (7) from bearing cap (2).

(6) Remove output shaft (8) from bearing cap (2).

(7) Remove retaining ring (9) and bearing (10) from bearing cap (2).

(8) Remove spacer (11) from output shaft (8).

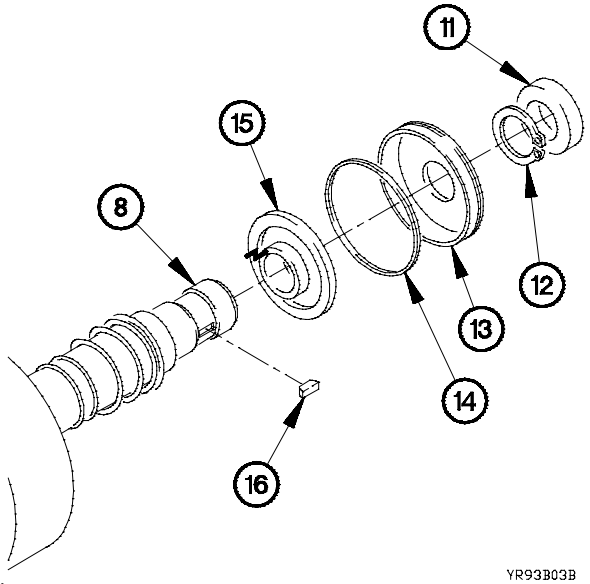
(9) Remove retaining ring (12) from output shaft (8).

(10) Remove clutch back-up cylinder (13), vee ring (14), and piston (15) from output shaft (8).

**NOTE**

Perform step (11) on PTO Assembly (P/N 276XMF-JX-D5XK).

(11) Remove key (16) from output shaft (8).



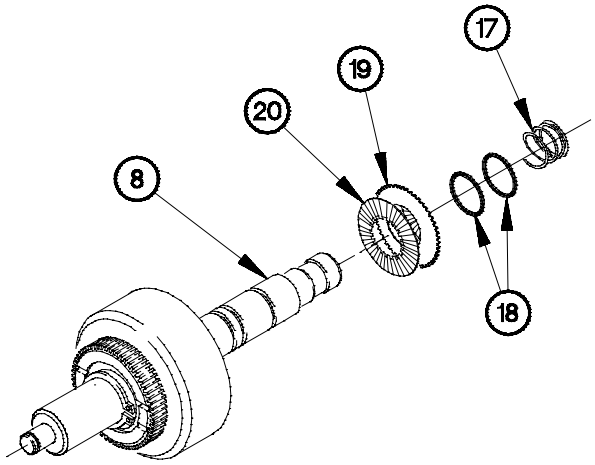

YR93B03B

## 16-93. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

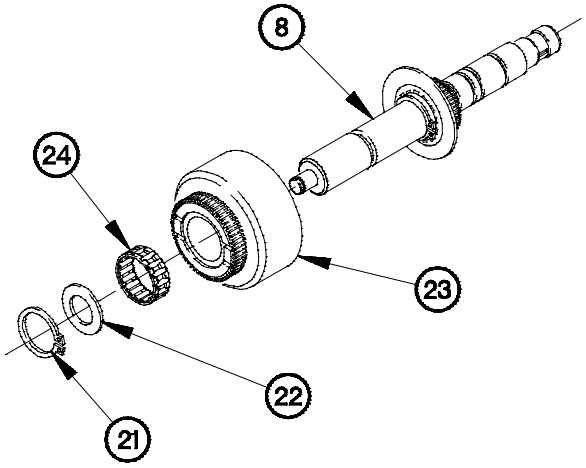
(12) Remove spring (17) from output shaft (8).

(13) Remove two preformed packings (18) from output shaft (8). Discard preformed packings.

(14) Remove seven clutch plates (19) and eight friction plates (20) from output shaft (8).




YR93B041




YR93B051

**WARNING**

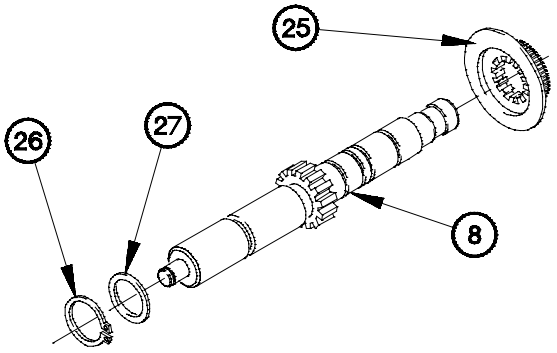
**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.**

(15) Remove retaining ring (21), thrust washer (22), and outer clutch gear (23) from output shaft (8).

(16) Remove needle bearing (24) from outer clutch gear (23).

(17) Remove inner clutch gear (25) from output shaft (8).

(18) Remove retaining ring (26) and back-up ring (27) from output shaft (8).

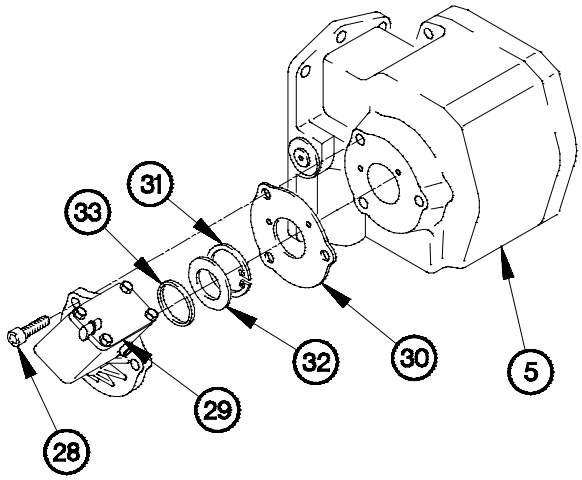



YR93B061

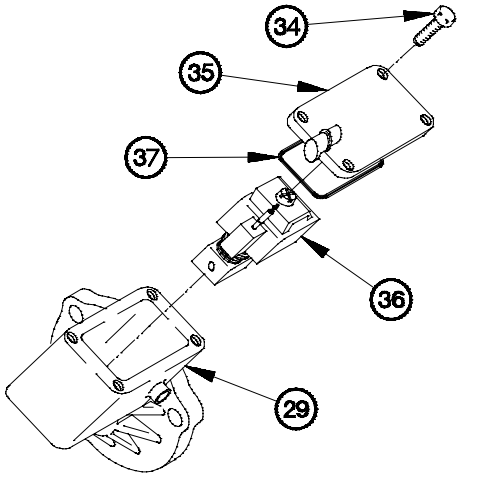
(19) Remove three screws (28), valve body (29), and gasket (30) from housing (5). Discard gasket.

(20) Remove retaining ring (31) and washer (32) from valve body (29).

(21) Remove oil seal (33) from valve body (29). Discard oil seal.




YR93B07B




YR93B08B

(22) Remove four screws (34) from valve cap (35).

(23) Remove valve cap (35) from valve body (29).

(24) Remove solenoid valve (36) from valve body (29).

(25) Remove block ring (37) from valve cap (35). Discard block ring.

**NOTE**

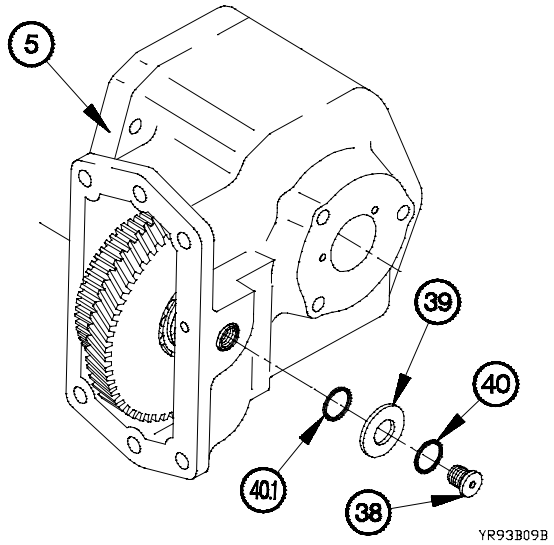
Perform step (26) on PTO Assembly (P/N 276MS-JX-D5XK).

(26) Remove plug (38), washer (39), preformed packing (40) and preformed packing (40.1) from housing (5). Discard preformed packings .

**NOTE**

Perform step (26.1) on PTO Assembly (P/N 12378814-001).

(26.1) Remove plug (38) and preformed packing (40) from housing (5). Discard preformed packing.




YR93B09B

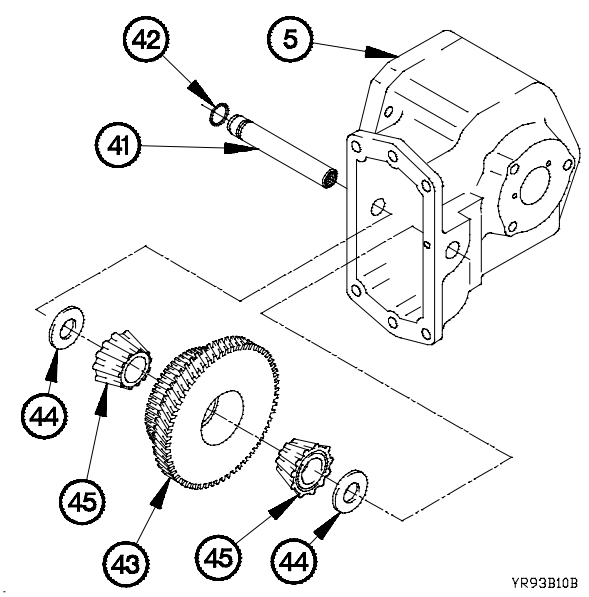
**NOTE**

Perform steps (27) through (29) on PTO Assembly (P/N 276XMF-JX-D5XK).

(27) Remove idler shaft (41) from housing (5).

(28) Remove preformed packing (42) from idler shaft (41). Discard preformed packing.

(29) Remove input gear (43), two thrust washers (44), and bearings (45) from housing (5).



## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

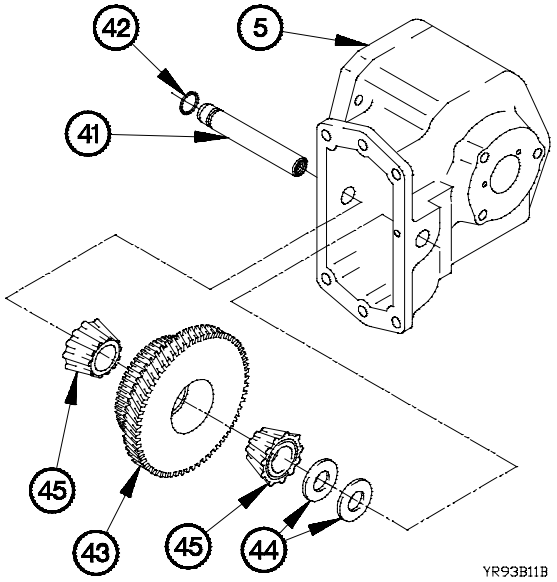
**NOTE**

Perform steps (29.1) through (29.3) on PTO Assembly (P/N 12378814-001).

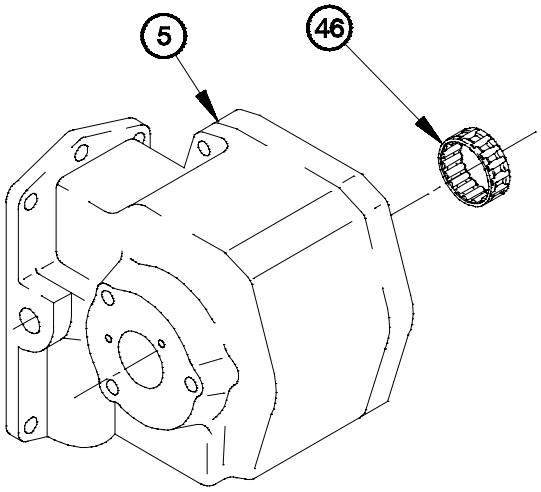
(29.1) Remove idler shaft (41) from housing (5).

(29.2) Remove preformed packing (42) from idler shaft (41). Discard preformed packing.

(29.3) Remove input gear (43), two thrust washers (44), and bearings (45) from housing (5).



YR93B11B



YR93B12B

(30) Remove needle bearing (46) from housing (5).

**c. Cleaning/Inspection.**

**WARNING**

- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I Dry Cleaning Solvent is 100°F (38°C) and for Type II is 130°F (50°C). Failure to comply may result in serious injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If dry cleaning solvent contacts skin or clothes, flush with cold water. If dry cleaning solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.**

(1) Clean all metal parts with dry cleaning solvent.

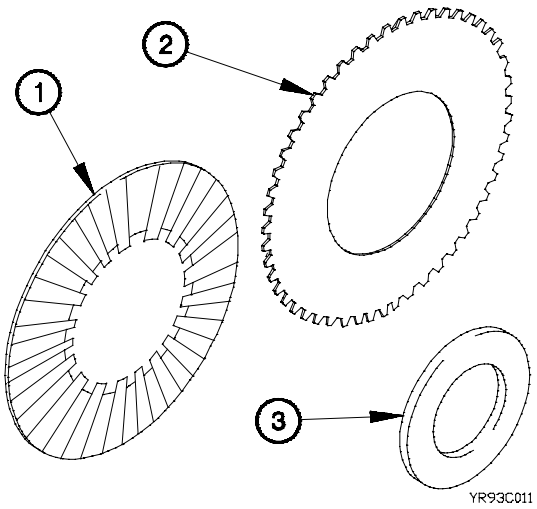
**NOTE**

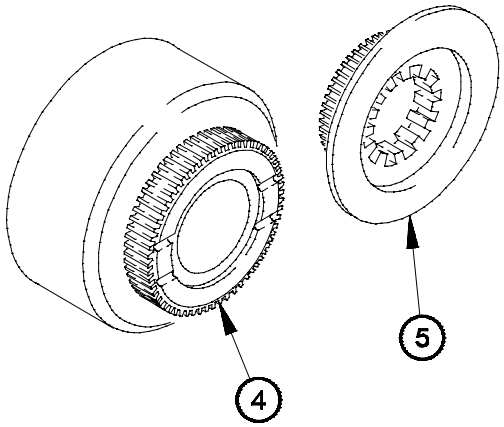
Replace any part that fails visual inspection.

(2) Inspect seven clutch plates (1) for damage or heat damage.

(3) Inspect eight friction plates (2) for damage or heat damage.

(4) Inspect thrust washer (3) for heat damage.

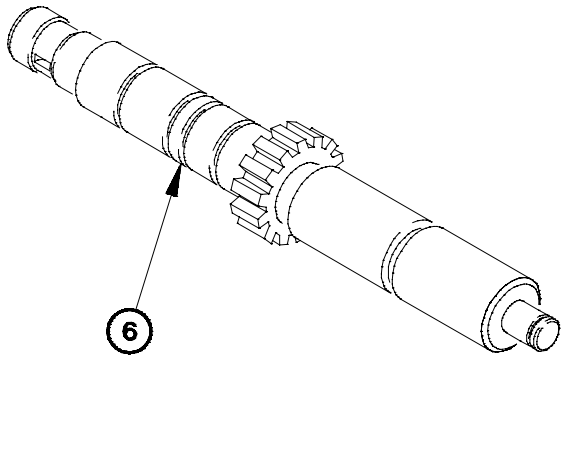



(5) Inspect outer clutch gear (4) for cracks, pitting, or missing gear teeth.

(6) Inspect inner clutch gear (5) for wear or damaged and missing teeth.

(7) Inspect output shaft (6) for nicks, scratches, or other damage.

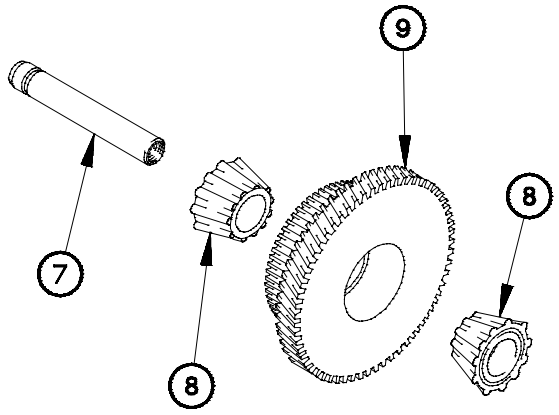


## 16-93. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

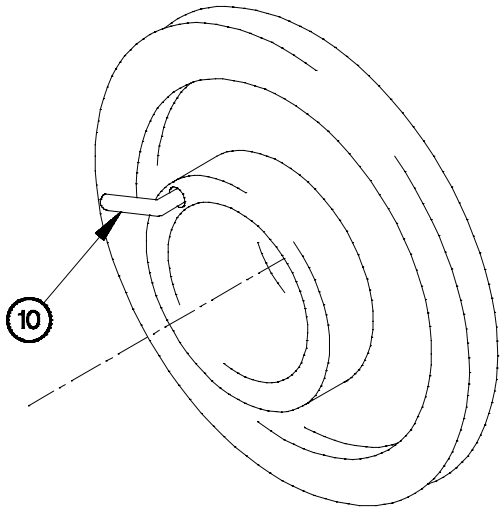
(8) Inspect idler shaft (7) for pitting, corrosion, or binding.

(9) Inspect two bearings (8) for pitting, corrosion, or binding.

(10) Inspect input gear (9) races and teeth for cracks, nicks, heat damage, or missing gear teeth.




YR93C041




YR93C051

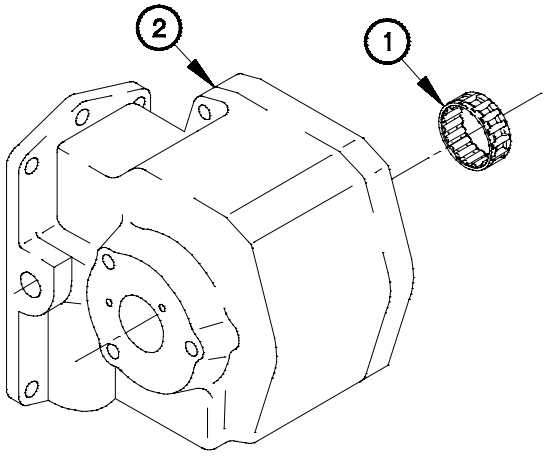
(11) Verify wire (10) is not bent or broken.

**d. Assembly.**

**NOTE**

Apply lubricating oil to all parts during assembly.

(1) Install needle bearing (1) in housing (2).




YR93D011

**NOTE**

Perform steps (1.1) through (1.4) on PTO Assembly (P/N 12378814-001).

(1.1) Install two bearings (3) in input gear (4).

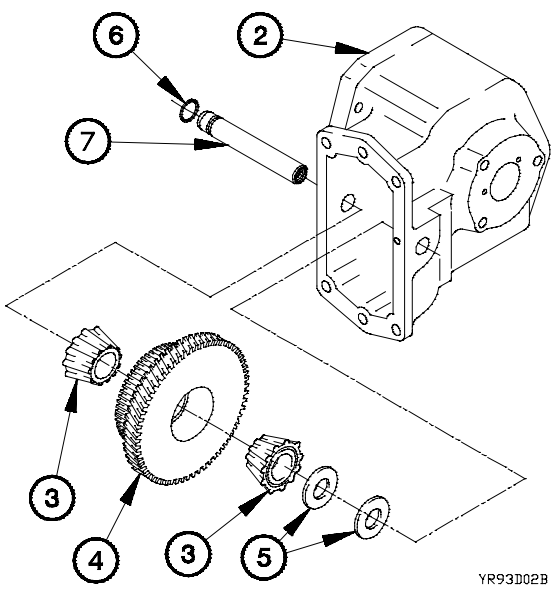
(1.2) Install two thrust washers (5) and input gear (4) in housing (2).

(1.3) Install preformed packing (6) on idler shaft (7).

**CAUTION**

Ensure flat side of shaft is lined up to make proper contact. Failure to comply may result in damage to equipment.

(1.4) Install idler shaft (7) in housing (2).



## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

**NOTE**

Perform steps (2) through (5) on PTO Assembly (P/N 276XMF-JX-D5XK).

(2) Install two bearings (3) in input gear (4).

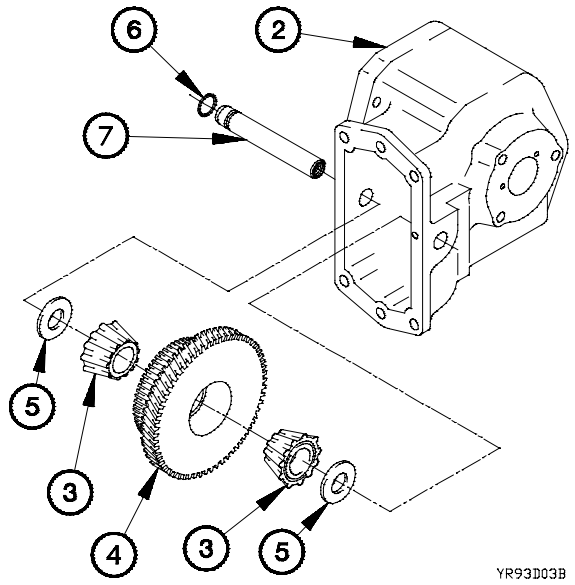
(3) Install two thrust washers (5) and input gear (4) in housing (2).

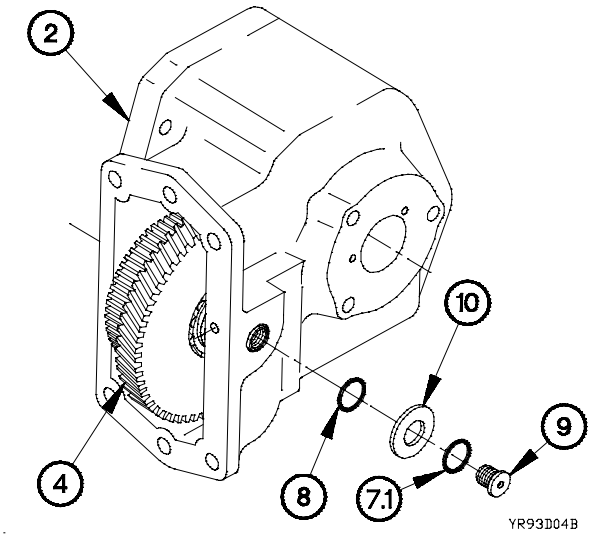
(4) Install preformed packing (6) on idler shaft (7).

**CAUTION**

Ensure flat side of shaft is lined up to make proper contact. Failure to comply may result in damage to equipment.

(5) Install idler shaft (7) in housing (2).




**NOTE**

Perform steps (5.1) and (5.2) on PTO Assembly (P/N 12378814-001).

(5.1) Install preformed packing (7.1) on plug (9).

(5.2) Position plug (9) in housing (2).

**NOTE**

Perform steps (6) and (7) on PTO Assembly (P/N 276XMF-JX-D5XK).

(6) Install two preformed packings (8) on plug (9).

(7) Position washer (10) and plug (9) in housing (2).

(8) Tighten plug (9) to 97-106 lb-in. (11-16 N•m).

**CAUTION**

Input gear should turn freely and have no side-to-side movement. Failure to comply may result in damage to equipment.

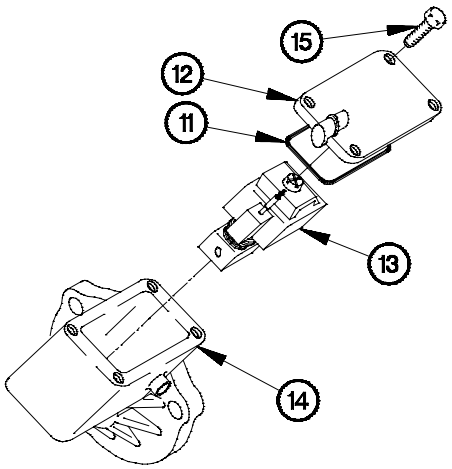
(9) Turn input gear (4) in housing (2).

(10) Install block ring (11) on valve cap (12).

(11) Install solenoid valve (13) in valve body (14).

(12) Position valve cap (12) on valve body (14) with four screws (15).

(13) Tighten four screws (15) to 48-72 lb-in. (5-8 N•m).



## 16-93. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

(14) Install oil seal (16) in valve body (14).

**WARNING**

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

(15) Install washer (17) and retaining ring (18) in valve body (14).

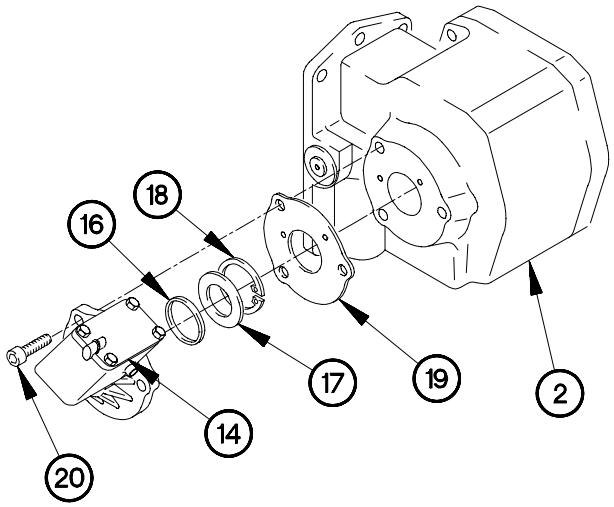
**CAUTION**

Ensure oil ports on valve body and housing are aligned. Failure to comply may result in damage to equipment.

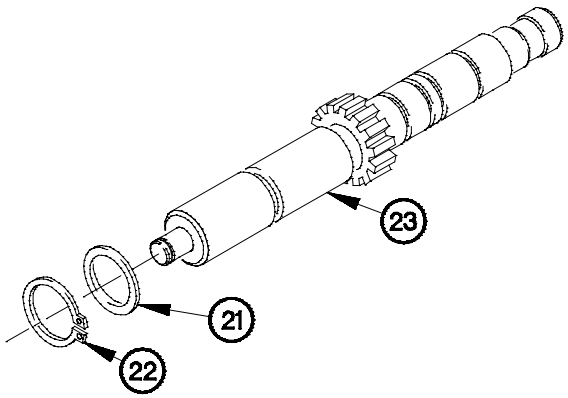
(16) Install gasket (19) and valve body (14) on housing (2).

(17) Position three screws (20) in valve body (14).

(18) Tighten three screws (20) to 16-20 lb-ft (22-27 N•m).

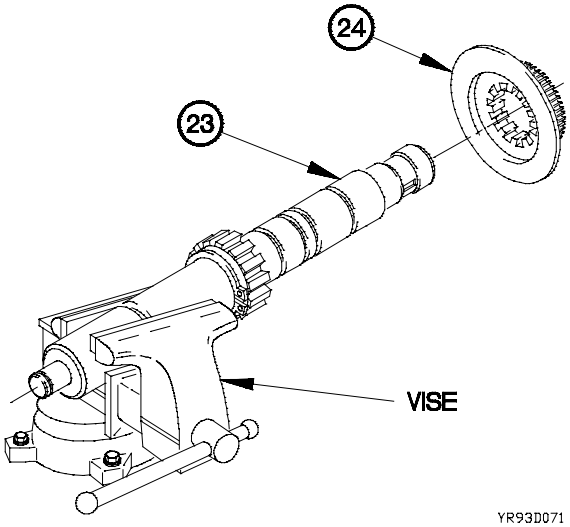



YR93D06B




YR93D061

(19) Install back-up ring (21) and retaining ring (22) on output shaft (23).




YR93D071

(20) Position output shaft (23) in vise.

(21) Install inner clutch gear (24) on output shaft (23).

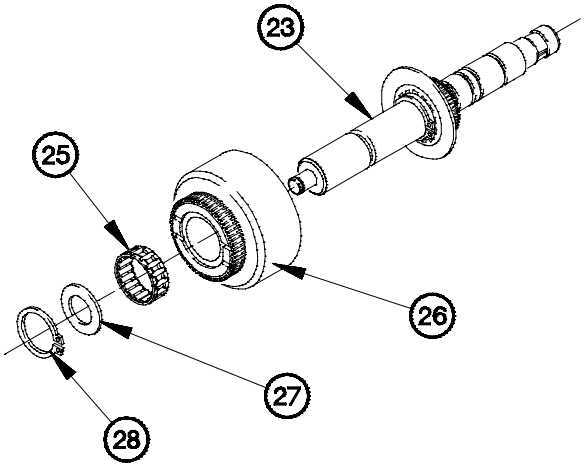
**WARNING**

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

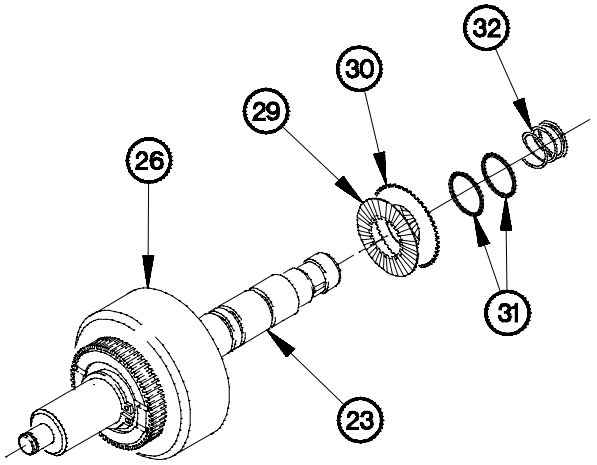
(22) Install needle bearing (25) in outer clutch gear (26).

(23) Install outer clutch gear (26) on output shaft (23).

(24) Install washer (27) and retaining ring (28) on output shaft (23).




YR93D081




YR93D091

**CAUTION**

Alternately stack friction plates and clutch parts. Failure to comply may result in damage to equipment.

**NOTE**

Apply lubricating oil to friction plates and clutch plates during assembly.

(25) Install eight friction plates (29) and seven clutch plates (30) in outer clutch gear (26).

(26) Install two preformed packings (31) on output shaft (23).

(27) Install spring (32) on output shaft (23).

## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

**NOTE**

Perform step (28) on PTO Assembly (P/N 276XMF-JX-D5XK).

(28) Install key (33) in output shaft (23).

**CAUTION**

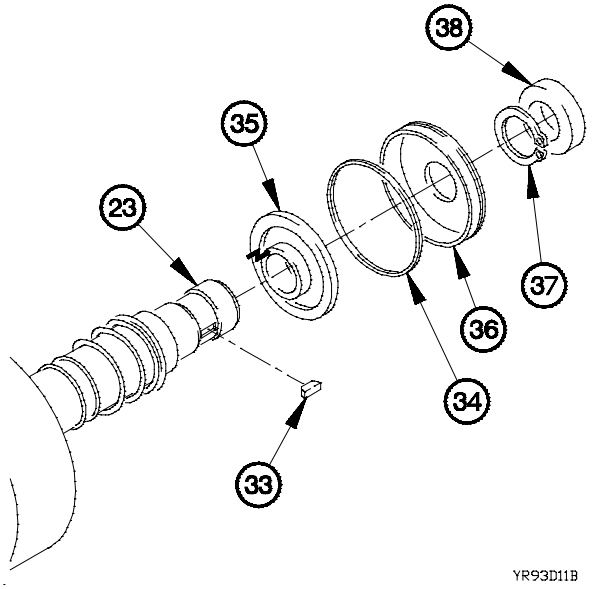
Verify ring installed with open face toward back-up cylinder. Failure to comply may result in damage to equipment.

(29) Install vee ring (34) on piston (35).

(30) Install piston (35) on output shaft (23).

(31) Install back-up cylinder (36) on output shaft (23).

(32) Press down back-up cylinder (36).

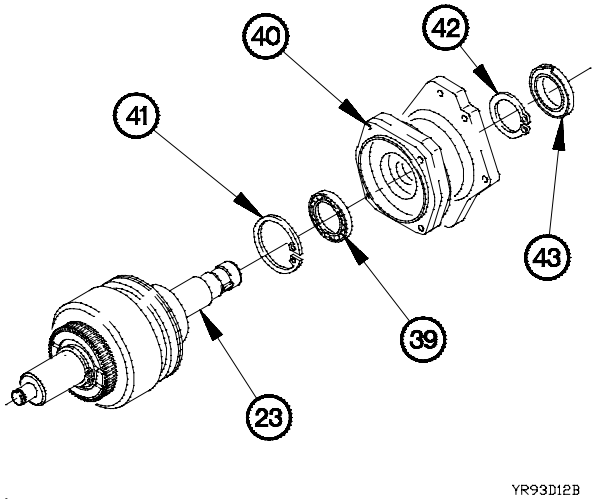



**WARNING**

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

(33) Install retaining ring (37) on output shaft (23).

(34) Install spacer (38) on output shaft (23).




(35) Install bearing (39) in bearing cap (40).

(36) Install retaining ring (41) in bearing cap (40).

(37) Install bearing cap (40) on output shaft (23).

(38) Install retainer ring (42) on output shaft (23).

(39) Press oil seal (43) in bearing cap (40).

(40) Position gasket (44) and bearing cap (40) on housing (2) with four screws (45).

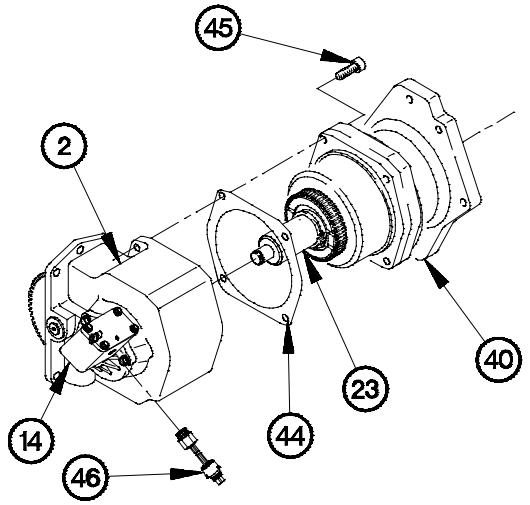
(41) Tighten four screws (45) to 16-20 lb-ft (22-27 N•m).

**CAUTION**

Output shaft should turn freely in bearing cap and have no side-to-side movement. Failure to comply may result in damage to equipment.

(42) Turn output shaft (23) in bearing cap (40).

(43) Install solenoid electrical connector (46) in valve body (14).



## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

**e. Installation.**

**NOTE**

Perform steps (1) through (1.11) on PTO P/N 12378814-001.

(1) Install four threaded studs (1) in PTO (2).

**WARNING**

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

(1.1) Apply sealing compound to threads of 90-degree fittings (3 and 4) and tee fitting (4.1).

(1.2) Install preformed packing (5) on 90-degree fitting (3).

(1.3) Position 90-degree fitting (3) in PTO (2).

(1.4) Install tee fitting (4.1) in PTO (2).

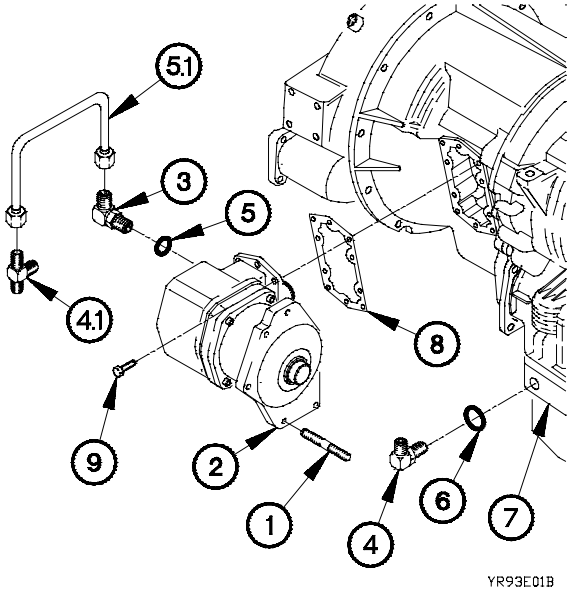
(1.5) Install tube (5.1) on 90-degree fitting (3).

(1.6) Install tube (5.1) on tee fitting (4.1).

(1.7) Install preformed packing (6) on 90-degree fitting (4).

(1.8) Position 90-degree fitting (4) in transmission (7).

(1.9) Tighten 90-degree fittings (3 and 4) to 10-13 lb-ft (14-18 N·m).




**NOTE**

Step (1.10) requires the aid of an assistant.

(1.10) Position gasket (8) and PTO (2) on transmission (7) with eight screws (9).

(1.11) Tighten eight screws (9) to 42-50 lb-ft (57-68 N·m).

**WARNING**

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

**NOTE**

Perform steps (1.12) through (9) on PTO Assembly (P/N 276XMF-JX-D5XK).

(1.12) Install four threaded studs (1) in PTO (2).

(2) Apply sealing compound to 90-degree fittings (3 and 4).

(3) Install preformed packing (5) on 90-degree fitting (3).

(4) Position 90-degree fitting (3) in PTO (2).

(5) Install preformed packing (6) on 90-degree fitting (4).

(6) Position 90-degree fitting (4) in transmission (7).

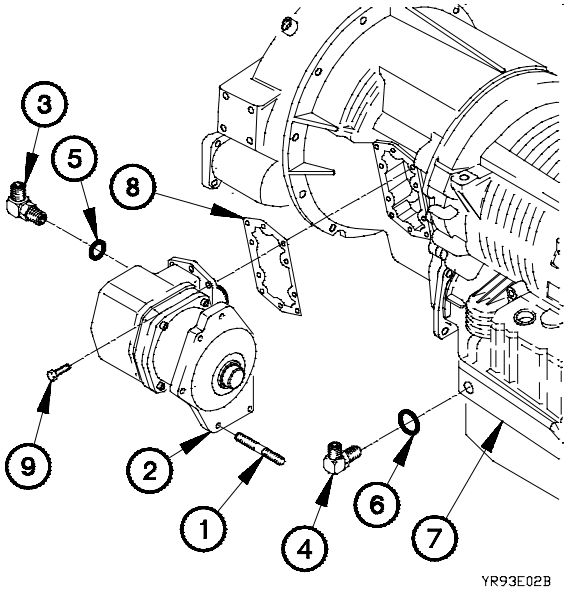
(7) Tighten 90-degree fittings (3 and 4) to 10-13 lb-ft (14-18 N·m).

**NOTE**

Step (8) requires the aid of an assistant.

(8) Position gasket (8) and PTO (2) on transmission (7) with eight screws (9).

(9) Tighten eight screws (9) to 42-50 lb-ft (57-68 N·m).



## 16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

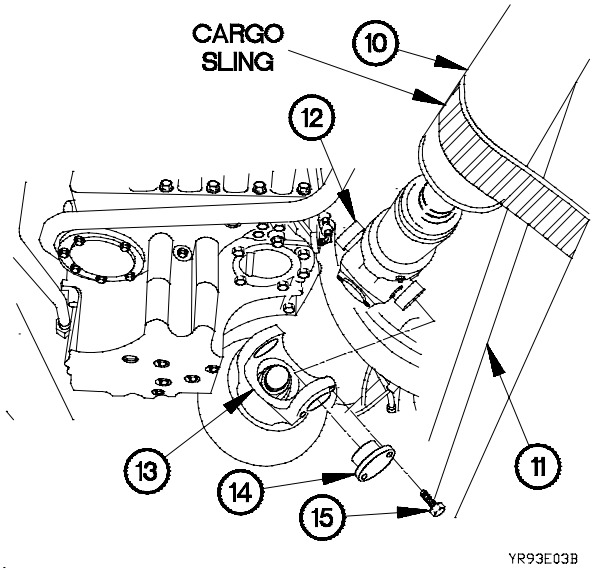
**NOTE**

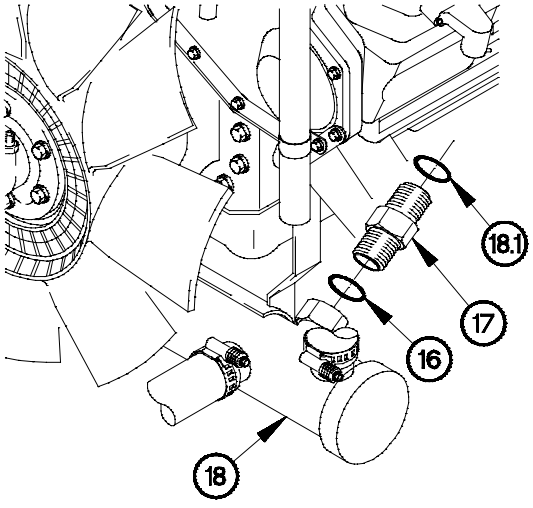
Step (10) requires the aid of an assistant.

(10) Remove drive shaft (10) from frame (11).

(11) Position universal joint (12) on drive yoke (13) with two bearing cups (14) and four screws (15).

(12) Tighten four screws (15) to 26-35 lb-ft (35-47 N·m).




**NOTE**

- Perform steps (13) through (14.9) on vehicles equipped with transmission oil cooler tubes.
- Perform steps (13) and (14) on vehicles not previously equipped with corrosive enhanced fittings.

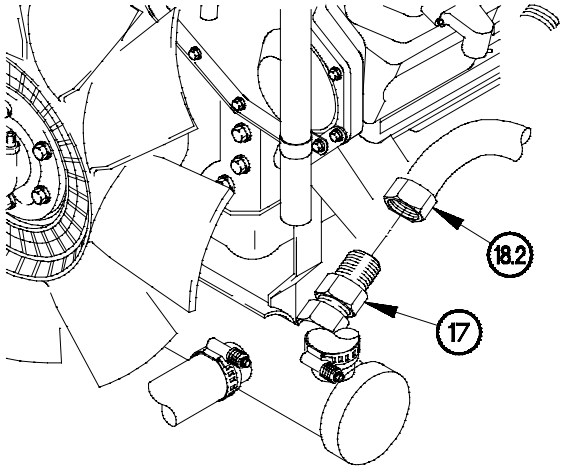
(13) Install preformed packing (16) on fitting (17).

(14) Install fitting (17) on transmission oil cooler (18).

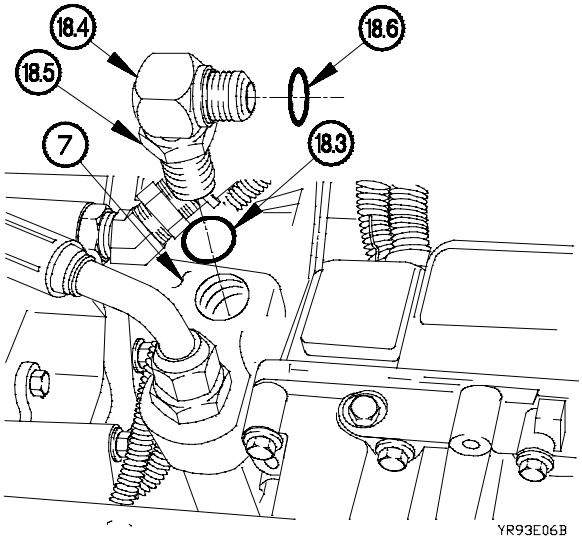
(14.1) Install preformed packing (18.1) on fitting (17).

(14.2) Position transmission oil cooler return tube (18.2) on fitting (17).

(14.3) Tighten transmission oil cooler return tube (18.2) to 94-104 lb-ft (127-141 N·m).




YR93E05B




YR93E06B

**NOTE**

Perform steps (14.4) through (14.7) on vehicles not previously equipped with corrosive enhanced fittings.

(14.4) Install preformed packing (18.3) on 90-degree fitting (18.4).

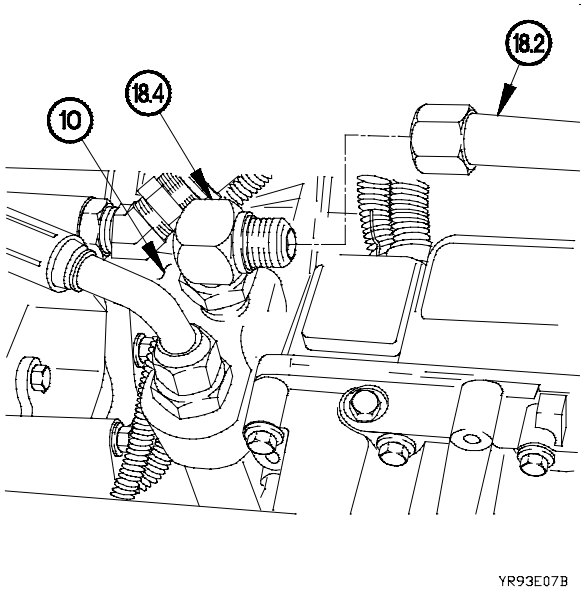
(14.5) Position 90-degree fitting (18.4) on transmission (7).

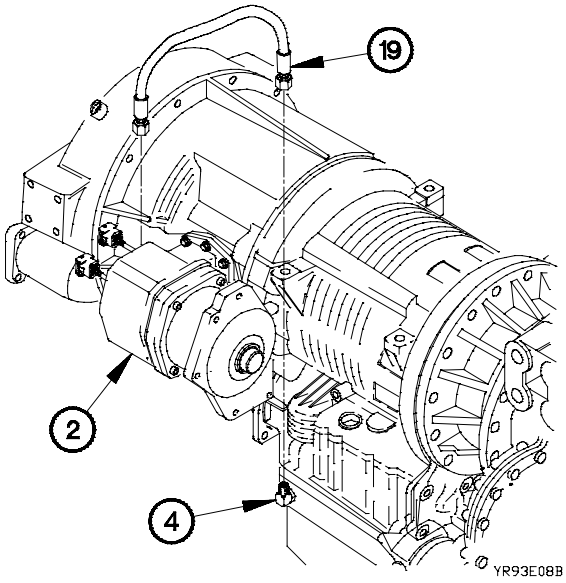
(14.6) Tighten jamb nut (18.5) on 90-degree fitting (18.4).

(14.7) Install preformed packing (18.6) on 90-degree fitting (18.4).

(14.8) Position transmission oil cooler return tube (18.2) on 90-degree fitting (18.4).

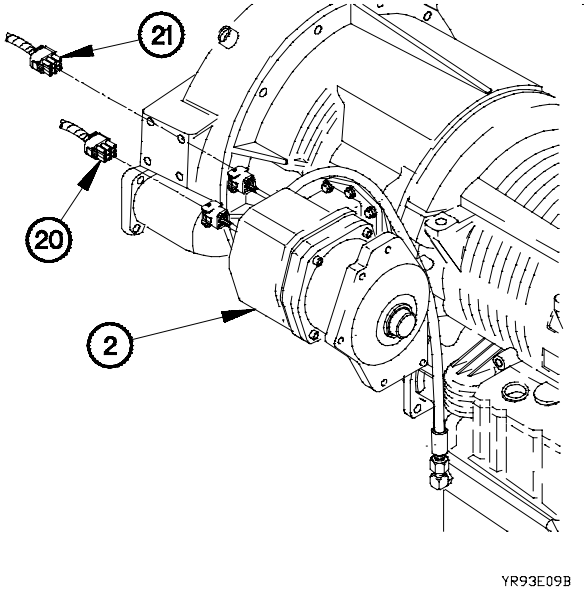
(14.9) Tighten transmission oil cooler return tube (18.2) to 94-104 lb-ft (127-141 N·m).




(15) Connect oil hose (19) to 90-degree fitting (4).

(16) Install oil hose (19) to PTO (2).




(17) Connect electrical connectors P217 (20) and P216 (21) to PTO (2).

**f. Follow-On Maintenance.**

(1) Install hydraulic rotary pump (para 16-88 or para 16-89).

(2) Connect batteries (TM 9-2320-366-20-3).

(3) Operate 15K Self-Recovery Winch (SRW) and check for proper operation (TM 9-2320-366-10-2).

**End of Task.**

## 16-94. M1089 WRECKER CONTROL PANEL REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
WRECKER CONTROL PANEL power cable assembly removed (TM 9-2320-366-20-4).
WRECKER CONTROL PANEL hoses and tubing removed (TM 9-2320-366-20-5).
Upper main valve assembly removed (para 16-83).
Lower valve assembly removed (para 16-84).
Linear directional control valve removed (para 16-83).
Underplate, splash guard, and brackets removed (TM 9-2320-366-20-4).
Eight-bank valve assembly removed (para 16-59).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)

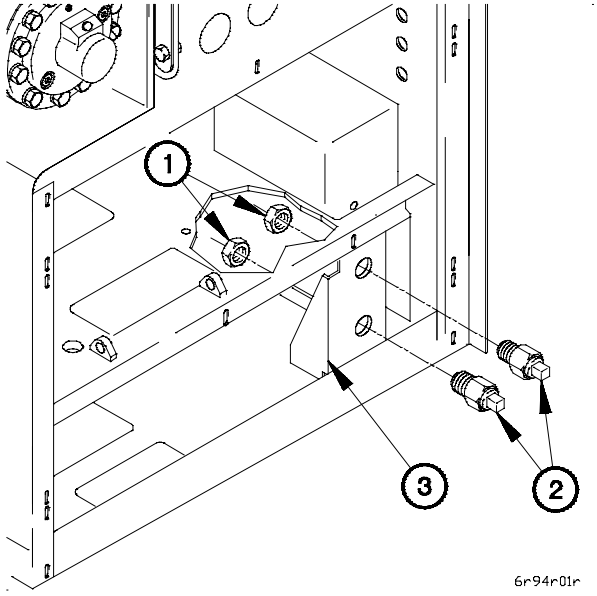
**Tools and Special Tools (Cont)**
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Sling, Cargo (Item 56, Appendix B)

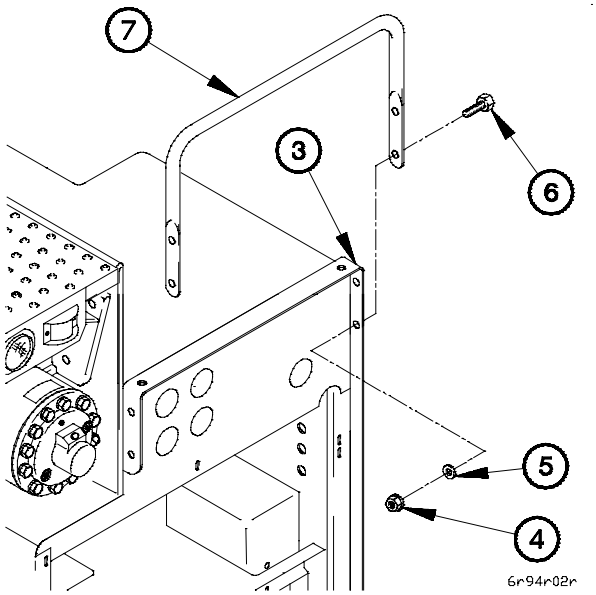
**Materials/Parts**
Nut, Self-Locking (2) (Item 199, Appendix F)
Nut, Self-Locking (3) (Item 199.2, Appendix F)
Nut, Self-Locking (2) (Item 199.1, Appendix F)

**Personnel Required**
(2)

**a. Removal.**

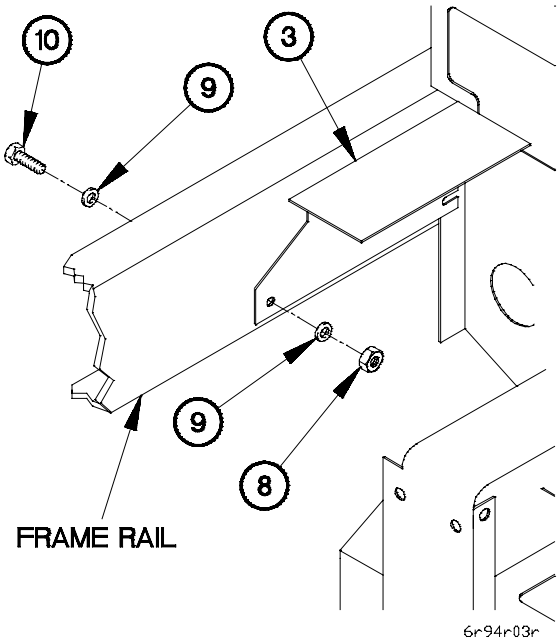
(1) Remove two nuts (1) and adapters (2) from WRECKER CONTROL PANEL (3).

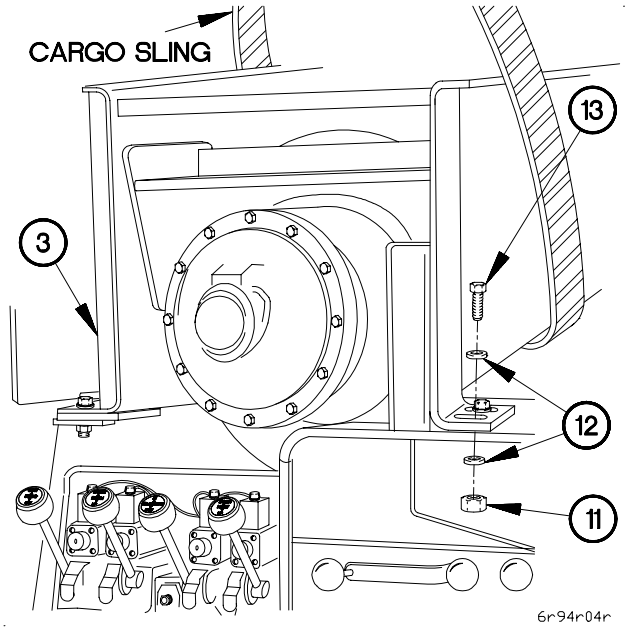



(2) Remove two self-locking nuts (4), washers (5), screws (6), and handle (7) from WRECKER CONTROL PANEL (3). Discard self-locking nuts.

(3) Remove three self-locking nuts (8), washers (9), screws (10), and washers (9) from WRECKER CONTROL PANEL (3). Discard self-locking nuts.




**WARNING**

**WRECKER CONTROL PANEL 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.**

NOTE

Step (4) requires the aid of an assistant.

(4) Remove two self-locking nuts (11), washers (12), screws (13), washers (12), and WRECKER CONTROL PANEL (3) from vehicle. Discard self-locking nuts.

## 16-94. M1089 WRECKER CONTROL PANEL REPLACEMENT (CONT)

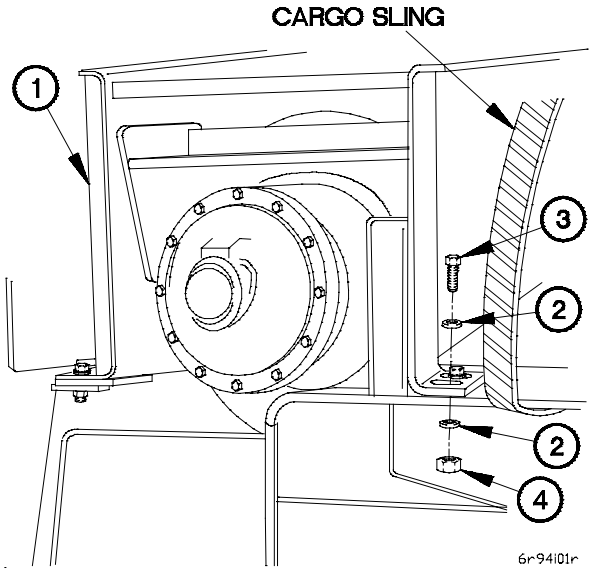
**b. Installation.**

**WARNING**

**WRECKER CONTROL PANEL 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.**

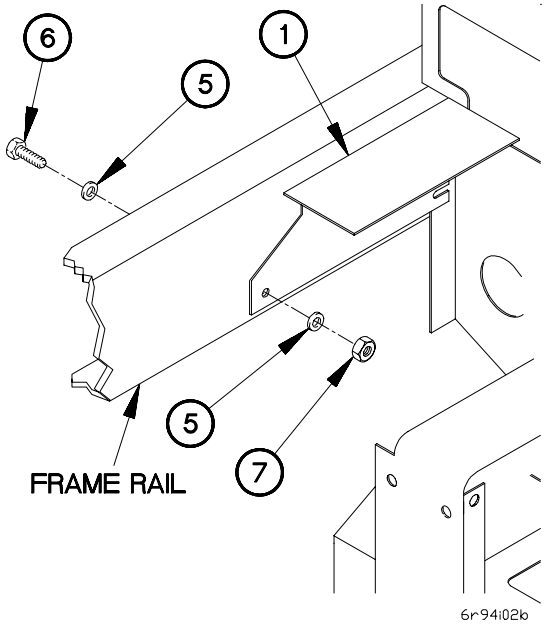
NOTE

Step (1) requires the aid of an assistant.



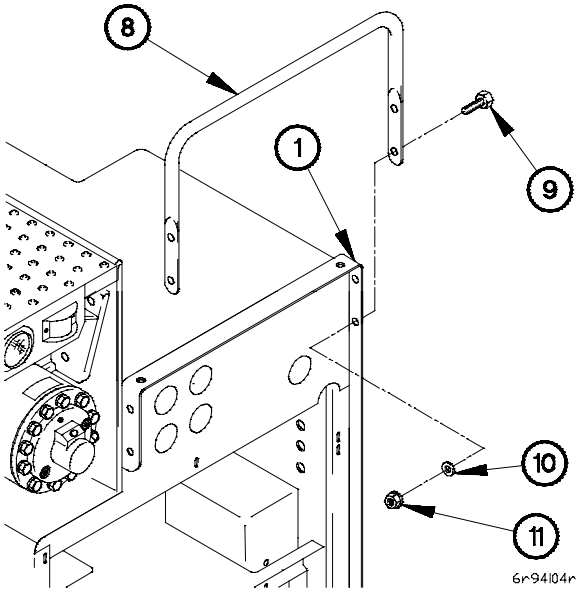

(1) Position WRECKER CONTROL PANEL (1) on vehicle with two washers (2), screws (3), washers (2), and self-locking nuts (4).

(2) Tighten two self-locking nuts (4) to 76-84 lb-ft (103-114 N·m).



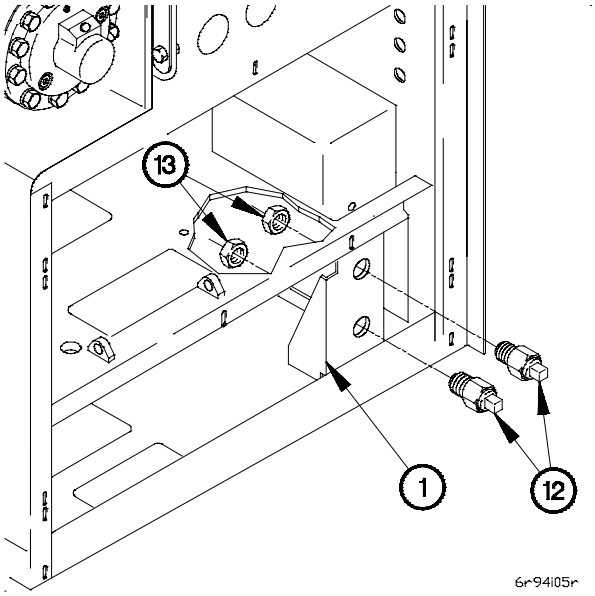

(3) Position three washers (5), screws (6), washers (5), and self-locking nuts (7) in WRECKER CONTROL PANEL (1).

(4) Tighten three self-locking nuts (7) to 152-168 lb-ft (206-228 N·m).




(5) Position handle (8) on WRECKER CONTROL PANEL (1) with two screws (9), washers (10), and self-locking nuts (11).

(6) Tighten two self-locking nuts (11) to 33-37 lb-ft (45-50 N·m).




(7) Position two adapters (12) on WRECKER CONTROL PANEL (1) with two nuts (13).

(8) Tighten two nuts (13) to 79-87 lb-ft (107-118 N·m).

**c. Follow-On Maintenance.**

(1) Install eight-bank valve assembly (para 16-59).

(2) Install underplate, splash guard, and brackets (TM 9-2320-366-20-4).

(3) Install WRECKER CONTROL PANEL hose and tubing (TM 9-2320-366-20-5).

(4) Install linear directional control valve (para 16-83).

(5) Install lower valve assembly (para 16-84).

(6) Install upper main valve assembly (para 16-83).

(7) Install WRECKER CONTROL PANEL power cable assembly (TM 9-2320-366-20-4).

(8) Operate all WRECKER CONTROL PANEL functions, checker for proper operation (TM 9-2320-366-20-2).

**End of Task.**

# CHAPTER 17
# HYDRAULIC SYSTEM MAINTENANCE

Section I. INTRODUCTION . . . . . 17-1
17-1. INTRODUCTION . . . . . 17-1

Section II. MAINTENANCE PROCEDURES . . . . . 17-2
17-2. SUSPENSION CYLINDER REPLACEMENT . . . . . 17-2
17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR . . . . . 17-12
17-4. M1090/M1094 DUMP BODY HOIST CYLINDER REPLACEMENT . . . . . 17-26

## Section I. INTRODUCTION

### 17-1. INTRODUCTION

This chapter contains maintenance instructions for replacing, repairing, and adjusting Hydraulic System Components authorized by the Maintenance Allocation Chart (MAC) at the Direct Support (DS) Maintenance level.

## 17-2. SUSPENSION CYLINDER REPLACEMENT

**This task covers:**

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

**INITIAL SETUP**

**Equipment Conditions**
Engine shut down (TM 9-2320-366-10-1).
Cab raised (TM 9-2320-366-10-1).
Top radiator fan shroud removed (TM 9-2320-366-20-3). (LH side only).
Engine front resilient mounts removed (para (3-4). (LH side only).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench, Torque, 0-600 lb-ft (Item 97, Appendix B)
Wrench, Torque, 0-200 lb-in. (Item 93, Appendix B)

**Tools and Special Tools (Cont)**
Wrench Set, Socket (Item 84, Appendix B)
Socket Set, Socket Wrench (Item 59, Appendix B)

**Materials/Parts**
Cap and Plug Set (Item 17, Appendix D)
Hydraulic Fluid A (Item 40.3, Appendix C)
Packing, Preformed (2) (Item 235, Appendix F)
Nut, Self-Locking (Item 191, Appendix F)
Pin, Cotter (Item 325.1, Appendix F)

**Personnel Required**
(2)

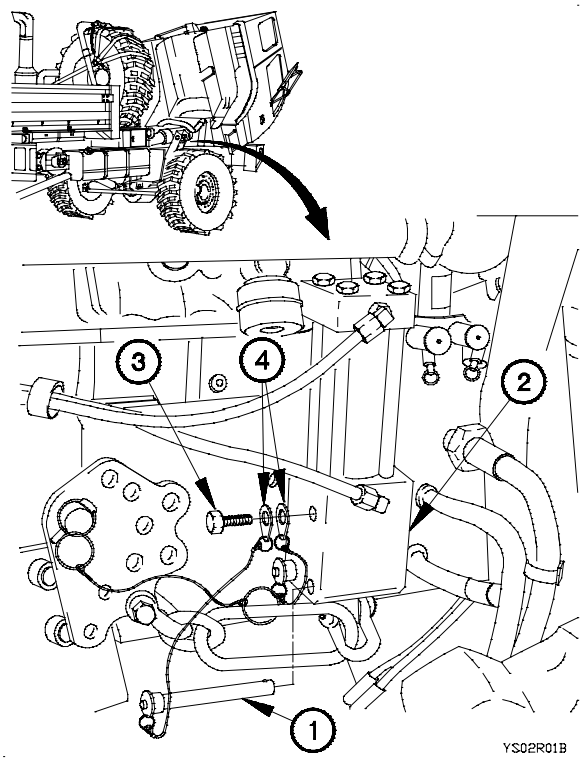
**a. Removal.**

**NOTE**

Left and right suspension cylinders are removed the same way. Right side shown.

(1) Remove two quick release pins (1) from suspension cylinder (2).

(2) Remove screw (3) and two lanyards (4) from suspension cylinder (2).



**WARNING**

**Hydraulic fluid (MIL-H-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 comes in contact with hydraulic oil should be washed immediately. Saturated clothing should be removed immediately. Failure to comply may result in injury to personnel.**

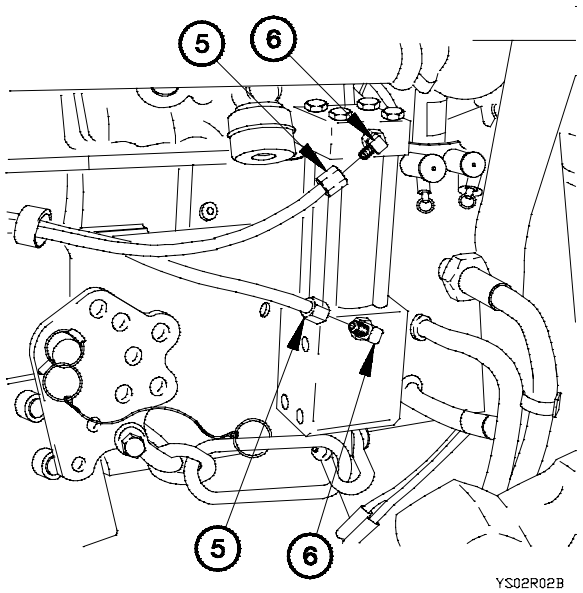
**CAUTION**

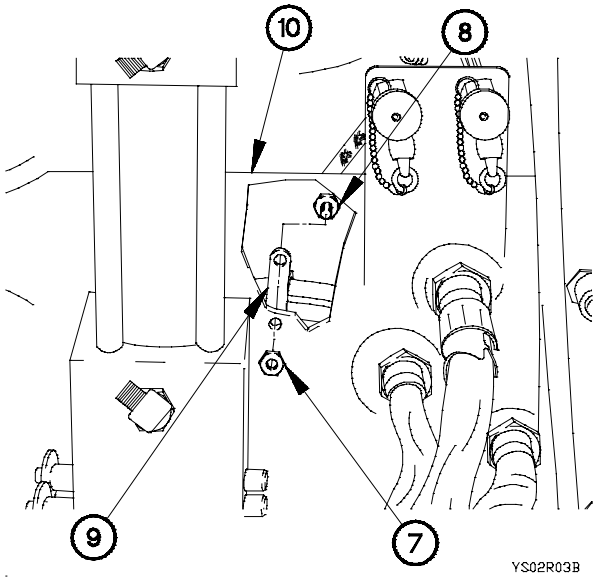
Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(3) Disconnect two hydraulic hoses (5) from 90-degree fittings (6).




**WARNING**

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

**NOTE**

Step (4) requires the aid of an assistant.

(4) Remove self-locking nut (7), screw (8), and clamp (9) from frame rail (10). Discard self-locking nut.

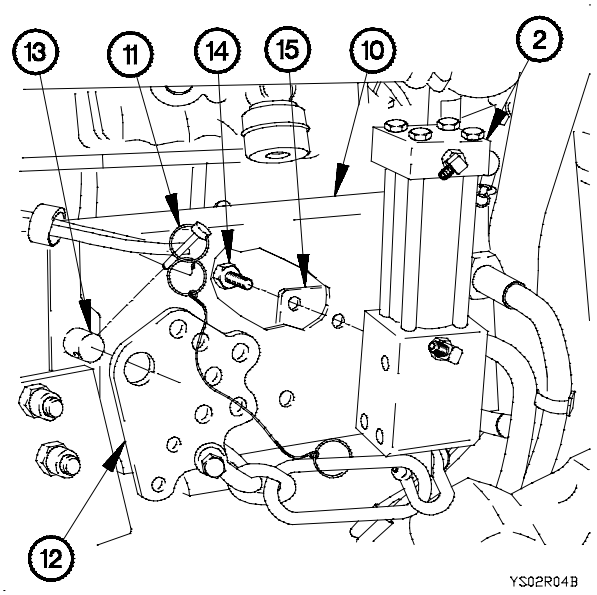
## 17-2. SUSPENSION CYLINDER REPLACEMENT (CONT)

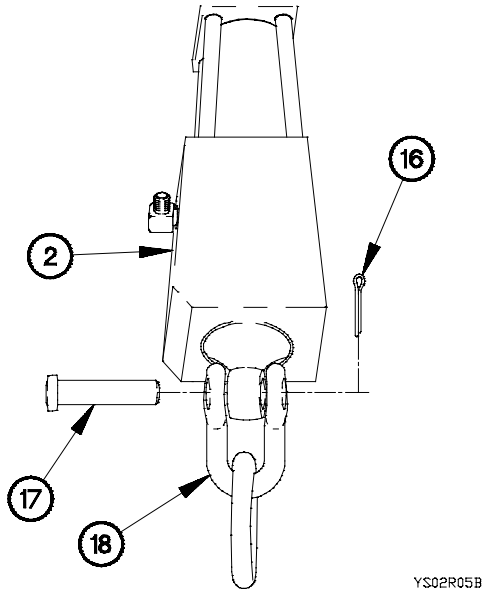
(5) Remove spring pin (11) and suspension compression plate (12) from suspension compression plate stud (13).

**NOTE**

Step (6) requires the aid of an assistant.

(6) Remove three screws (14), plate (15), and suspension cylinder (2) from frame rail (10).



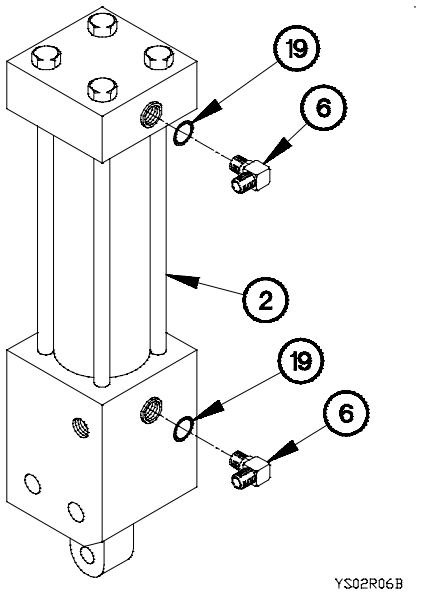

(7) Remove cotter pin (16), pin (17), and shackle (18) from suspension cylinder (2). Discard cotter pin.

**NOTE**

Note orientation of fittings prior to removal.

(8) Remove two 90-degree fittings (6) from suspension cylinder (2).

(9) Remove two preformed packings (19) from 90-degree fittings (6). Discard preformed packings.



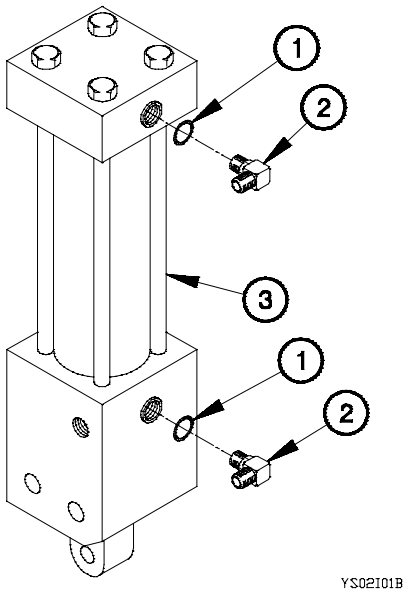
**b. Installation.**

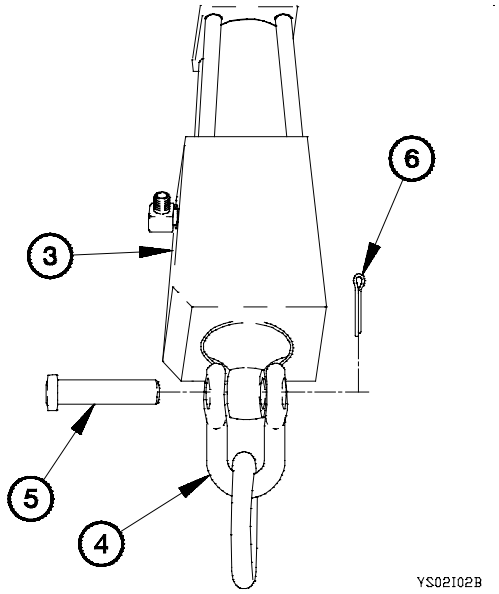
**NOTE**

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

(1) Install two preformed packings (1) on 90-degree fittings (2).

(2) Install two 90-degree fittings (2) in suspension cylinder (3).




(3) Install shackle (4) on suspension cylinder (3) with pin (5) and cotter pin (6).

## 17-2. SUSPENSION CYLINDER REPLACEMENT (CONT)

(4) Install suspension compression plate (7) on suspension compression plate stud (8) with spring pin (9).

**WARNING**

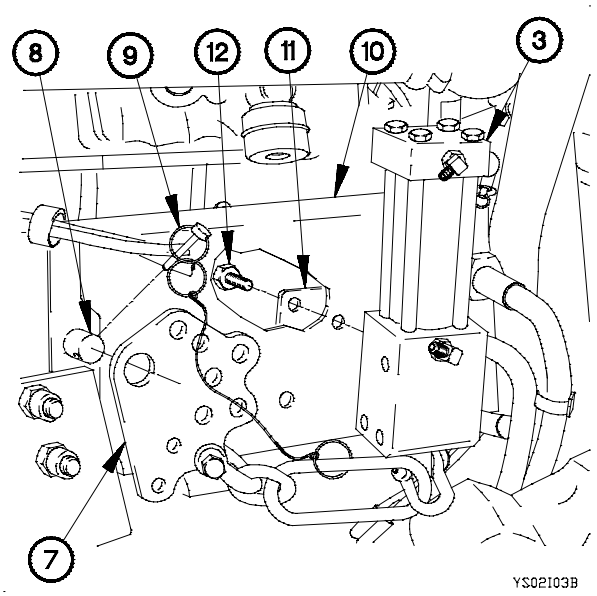
**Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.**

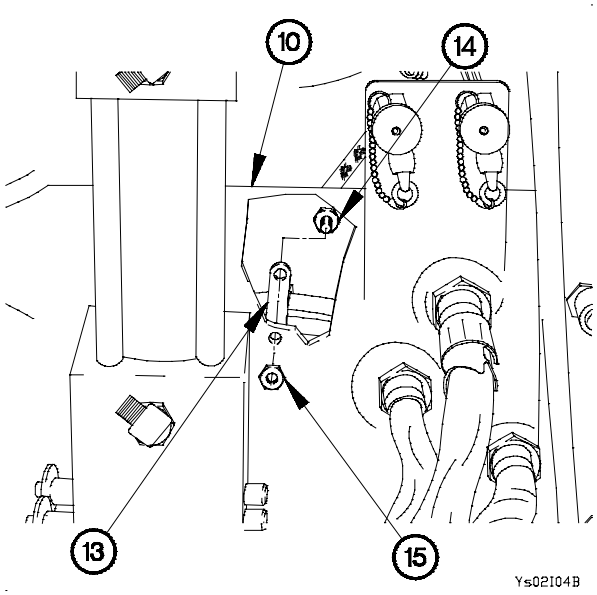
**NOTE**

Steps (5) through (8) require the aid of an assistant.

(5) Position suspension cylinder (3) on frame rail (10) with plate (11) and three screws (12).

(6) Tighten three screws (12) to 149-183 lb-ft (202-248 N·m).

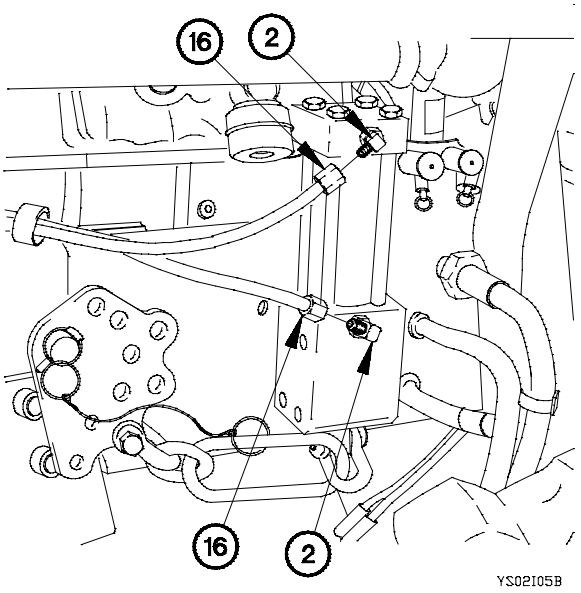


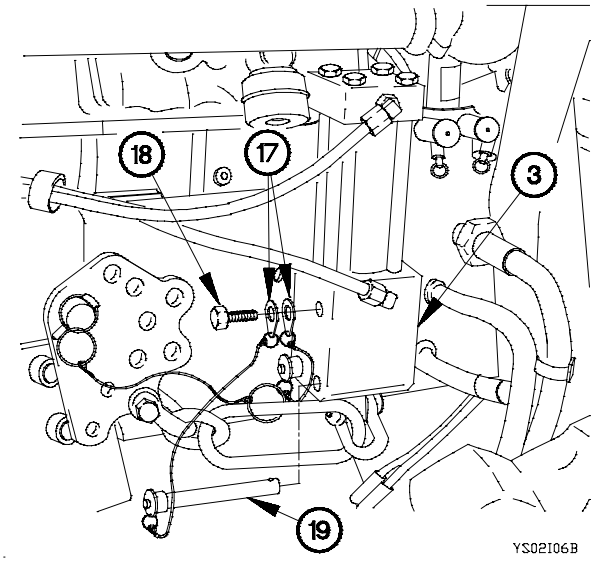




(7) Position clamp (13) on frame rail (10) with screw (14), and self-locking nut (15).

(8) Tighten self-locking nut (15) to 84-108 lb-in. (9-12 N·m).

(9) Connect two hydraulic hoses (16) to 90-degree fittings (2).




(10) Position two lanyards (17) on suspension cylinder (3) with screw (18).

(11) Tighten screw (18) to 18-22 lb-ft (24-30 N·m).

(12) Install two quick release pins (19) in suspension cylinder (3).

**c. Follow-On Maintenance.**

(1) Fill air transportability hydraulic system (TM 9-2320-366-20).

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

**End of Task.**

## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR

This task covers:

a. Removal
b. Disassembly (P/N HFC32585)
c. Disassembly (P/N 6E150110)
d. Cleaning/Inspection
e. Assembly (P/N 6E150110)
f. Assembly (P/N HFC32585)
g. Installation
h. Relief Valve Adjustment
i. Pressure Reducing Valve Adjustment
j. Counterbalance Valve Adjustment
k. Needle Valve Adjustment
l. Follow-On Maintenance

**INITIAL SETUP**

**Equipment Conditions**
Dump body 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).
Pan, Drain (Item 43, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Screwdriver Attachment, Socket Wrench (Item 49.1, TM 9-2320-366-20, Appendix B)
Gloves, Welder's (Item 27, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)
Keyset, Socket Head Screw (Item 38, Appendix B)
STE/ICE-R (Item 70, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Wrench, Torque, 0-150 lb-in. (Item 91, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Dump Body Wooden Brace (2) (Item 6, Appendix D)
Transducer, 10,000 PSI (Item 1, Appendix G)

**Material/Parts**
Cap and Plug, Set (Item 17, Appendix C)
Packing, Preformed (4) (Item 230, Appendix F)
Lockwasher (4) (Item 136, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Material/Parts (Cont)**
Parts Kit (Item 306, Appendix F)
Parts Kit (Item 309, Appendix F)
Parts Kit (Item 310, Appendix F)
Parts Kit (Item 307, Appendix F)
Parts Kit (Item 308, Appendix F)
Rags, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Gasket (2) (Item 36.1, Appendix F)
Seal Kit (Item 376.2, Appendix F)
Seal Kit (Item 376.4, Appendix F)
Seal Kit (Item 376.1, Appendix F)
Seal Kit (Item 376.3, Appendix F)
Seal Kit (2) (Item 376.6, Appendix F)
Seal Kit (Item 376.5, Appendix F)
Hose Assembly, Nonmetallic (Item 40.1, Appendix C)
Tee, Tube (Item 88.2, Appendix C)
Reducer, Tube (Item 60.1, Appendix C)
Cap, Tube (Item 17.3, Appendix C)
Plug (Item 55.3, Appendix C)
Indicator, Temperature, Label (Item 40.4, Appendix C)

**Reference**
TM 9-4910-571-12 & P

**Personnel Required**
(2)

**a. Removal.**

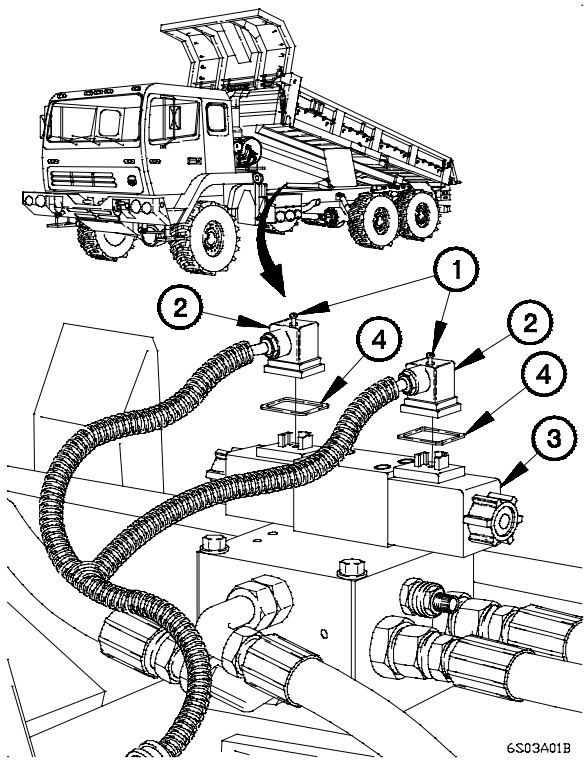
**NOTE**

Tag connectors and connection points prior to disconnecting.

(1) Loosen two screws (1) on connectors L8 and L9 (2).

(2) Disconnect connectors L8 and L9 (2) from solenoid (3).

(3) Remove two gaskets (4) from connectors L8 and L9 (2). Discard gaskets.



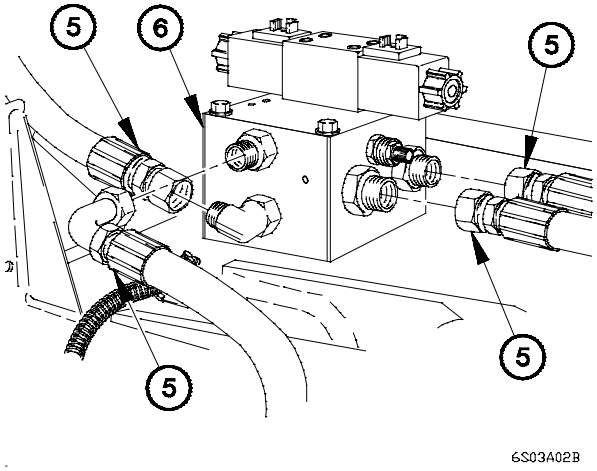

**CAUTION**

Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

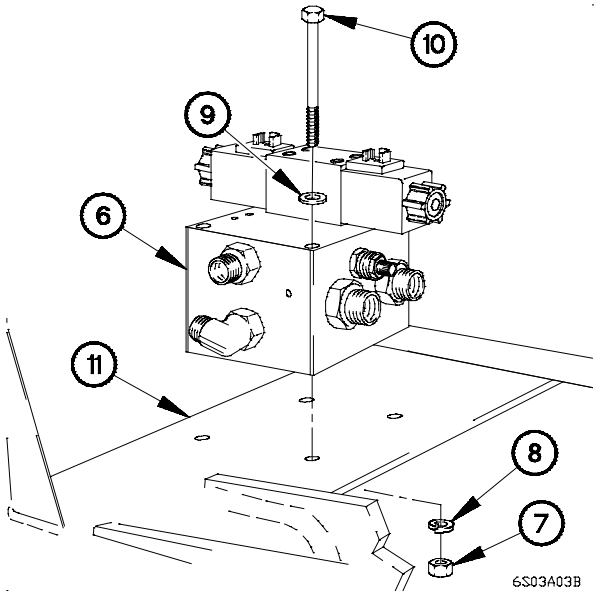
**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(4) Disconnect four hoses (5) from four-way relief valve (6).

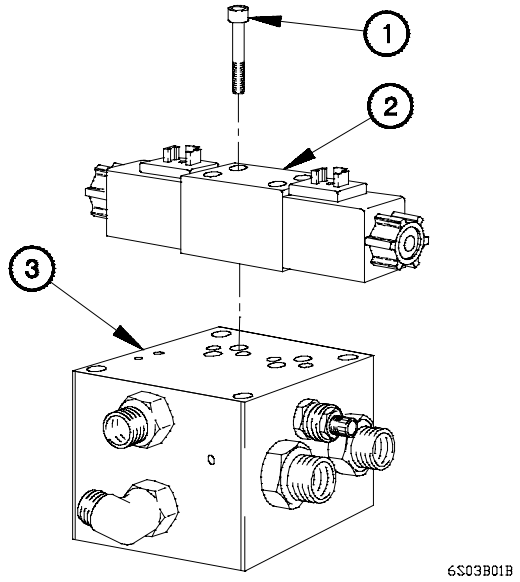


## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)




(5) Remove four nuts (7), lockwashers (8), washers (9), screws (10), and four-way relief valve (6) from subframe (11).

**b. Disassembly (P/N HFC32585).**




(1) Remove four screws (1) and solenoid valve (2) from valve body (3).

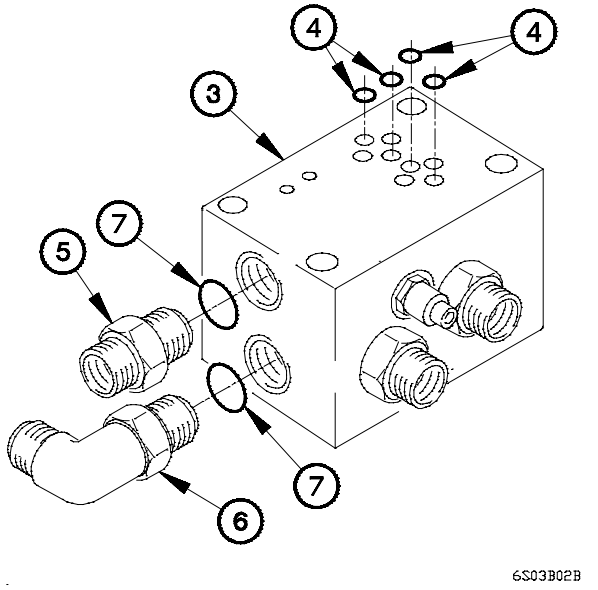
(2) Remove four preformed packings (4) from valve body (3). Discard preformed packing.

**NOTE**

Note orientation of 90-degree fitting prior to removal.

(3) Remove three fittings (5) and 90-degree fitting (6) from valve body (3).

(4) Remove four preformed packings (7) from three fittings (5) and 90-degree fitting (6). Discard preformed packings.

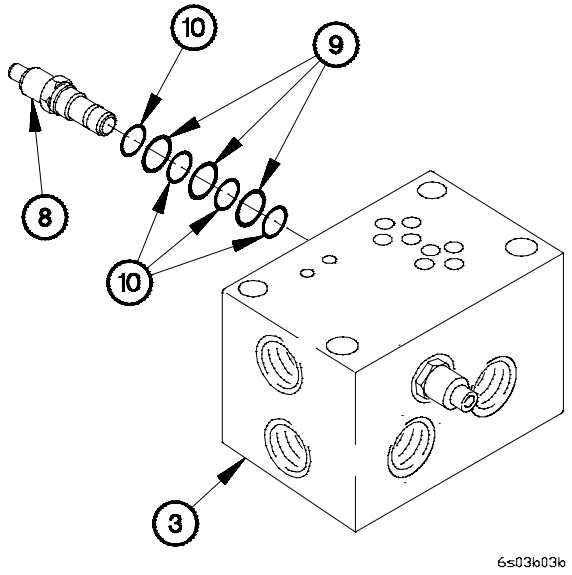


**NOTE**

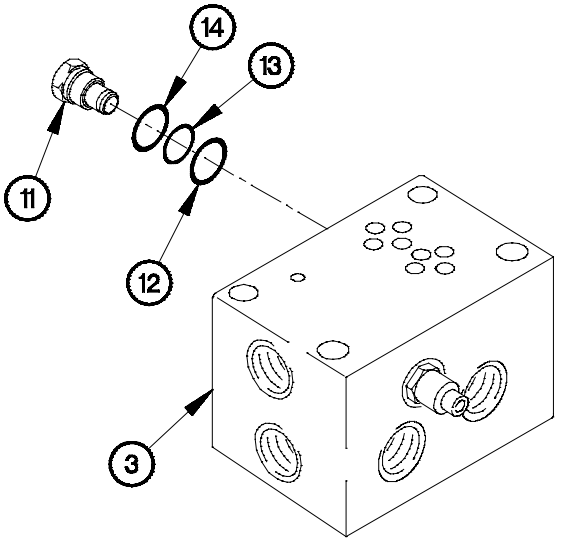
Tag valves and valve body prior to removal.

(5) Remove relief valve (8) from valve body (3).

(6) Remove three preformed packings (9) and four back-up rings (10) from relief valve (8). Discard preformed packings and back-up rings.




6s03b03b



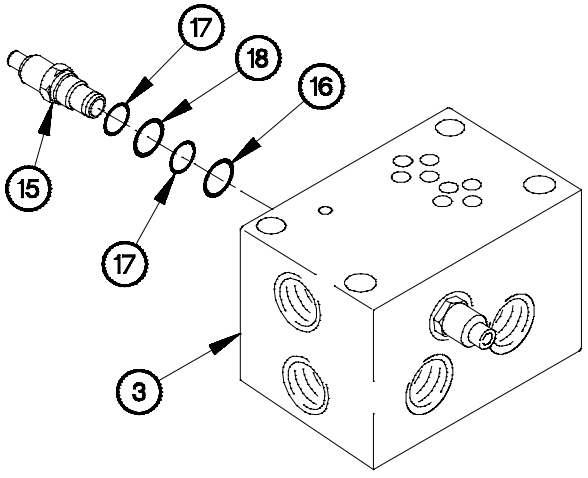

6s03b04b

(7) Remove check valve (11) from valve body (3).

(8) Remove preformed packings (12 and 13) and back-up ring (14) from check valve (11). Discard preformed packings and back-up ring.

(9) Remove pressure reducing valve (15) from valve body (3).

(10) Remove preformed packing (16), back-up ring (17), preformed packing (18), and back-up ring (17) from pressure reducing valve (15). Discard preformed packings and back-up rings.




6s03b05b

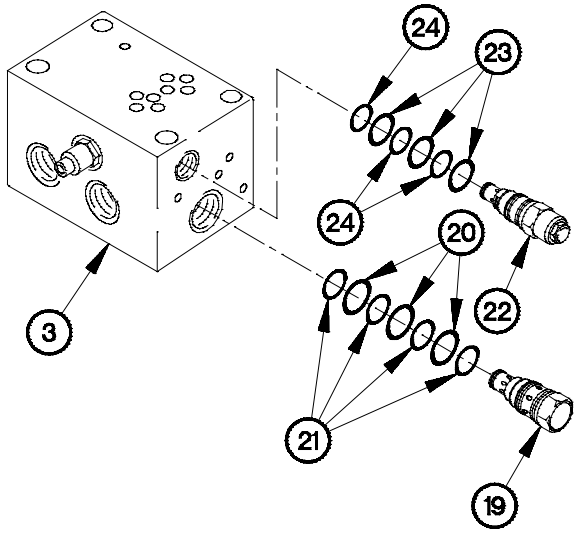
## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(11) Remove flow control valve (19) from valve body (3).

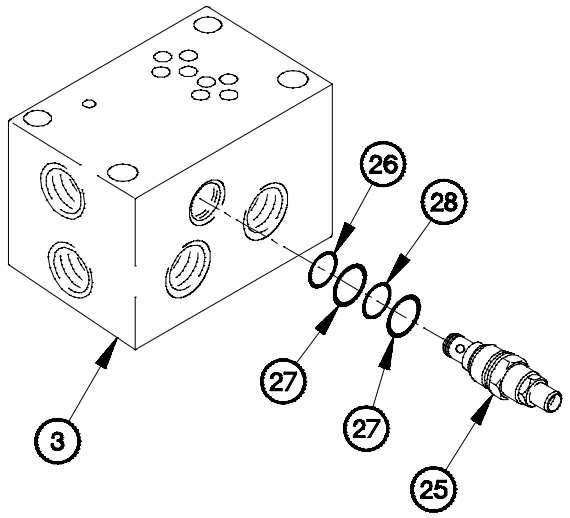
(12) Remove three preformed packings (20) and four back-up rings (21) from flow control valve (19). Discard preformed packings and back-up rings.

(13) Remove counterbalance valve (22) from valve body (3).

(14) Remove three preformed packings (23) and back-up rings (24) from counterbalance valve (22). Discard preformed packings and back-up rings.




6s03b06b



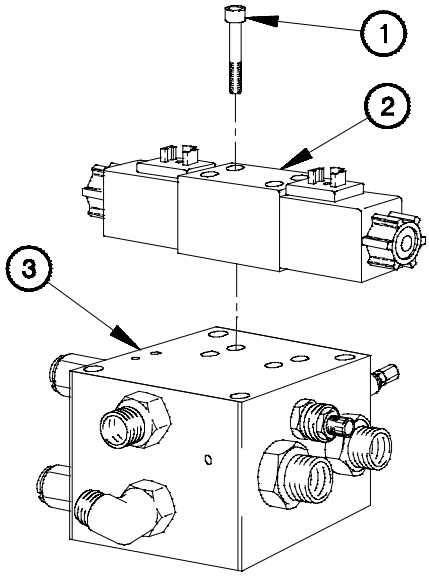

6s03b07b

(15) Remove needle valve (25) from valve body (3).

(16) Remove preformed packing (26), back-up ring (27), preformed packing (28), and back-up ring (27) from needle valve (25). Discard preformed packings and back-up rings.

**c. Disassembly (P/N 6E150110).**

(1) Remove four screws (1) and solenoid valve (2) from valve body (3).




6s03c01b

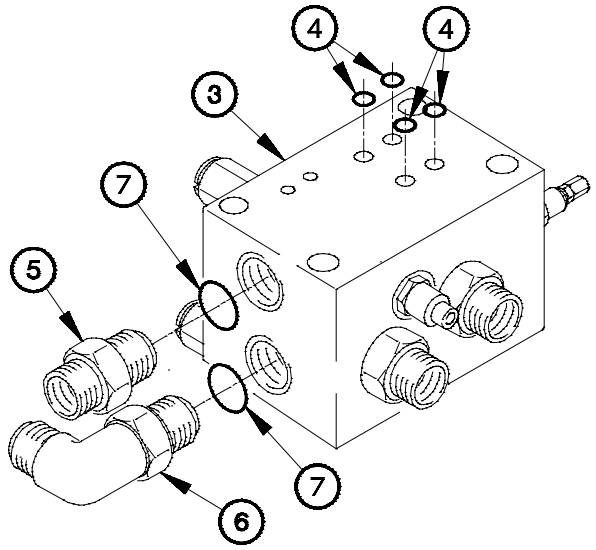
(2) Remove four preformed packings (4) from valve body (3). Discard preformed packings.

**NOTE**

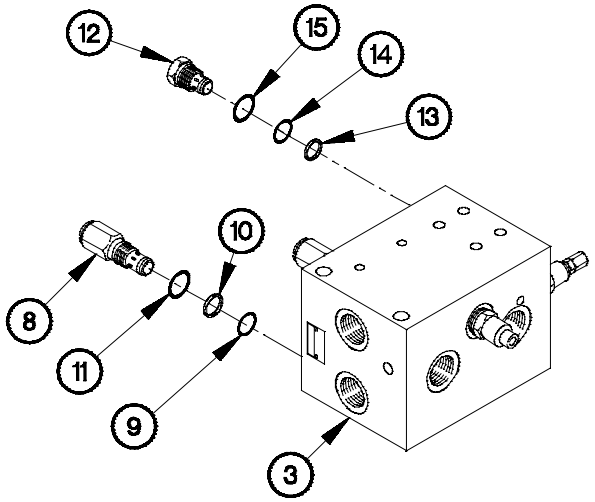
Note orientation of 90-degree fitting prior to removal.

(3) Remove three fittings (5) and 90-degree fitting (6) from valve body (3).

(4) Remove four preformed packings (7) from three fittings (5) and 90-degree fitting (6). Discard preformed packings.




6s03c02b




6S03C03B

**NOTE**

Tag valves and valve body prior to removal.

(5) Remove relief valve (8) from valve body (3).

**NOTE**

Note position and sizes of preformed packings and back-up rings prior to removal.

(6) Remove preformed packing (9), back-up ring (10), and preformed packing (11) from relief valve (8). Discard preformed packings and back-up ring.

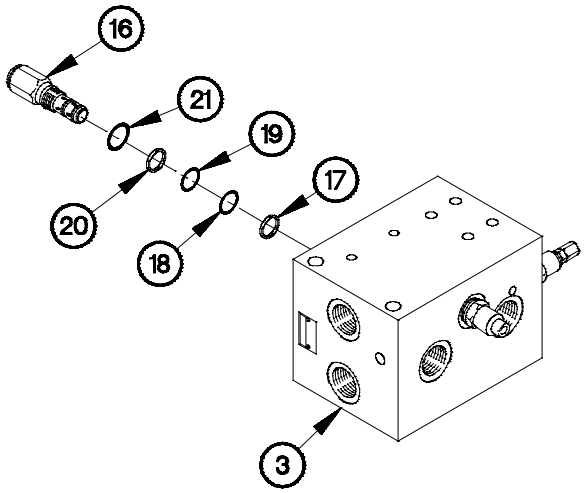
(7) Remove check valve (12) from valve body (3).

(8) Remove back-up ring (13) and preformed packings (14 and 15) from check valve (12). Discard back-up ring and preformed packings.

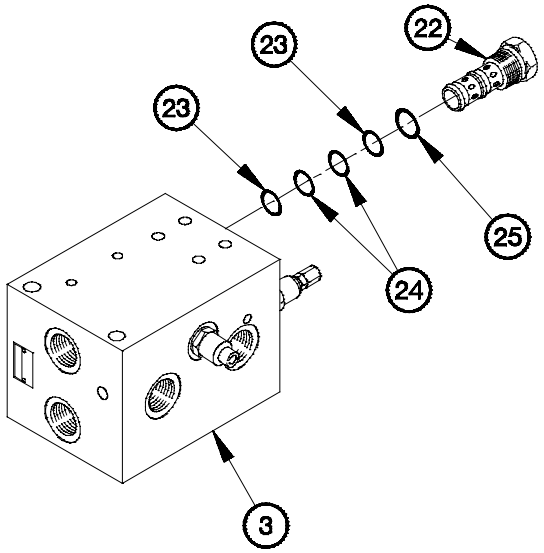
## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(9) Remove pressure reducing valve (16) from valve body (3).

(10) Remove back-up ring (17), preformed packings (18 and 19), back-up ring (20), and preformed packing (21) from pressure reducing valve (16). Discard back-up rings and preformed packings.




6S03C04B



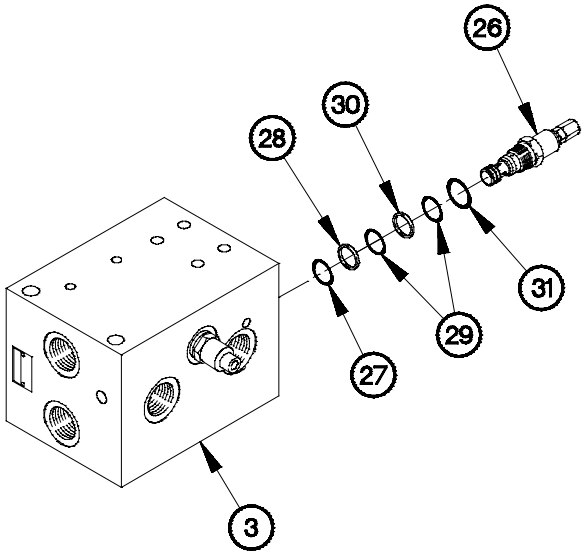

6S03C05B

(11) Remove flow control valve (22) from valve body (3).

(12) Remove two preformed packings (23), back-up rings (24), and preformed packing (25) from flow control valve (22). Discard preformed packings and back-up rings.

(13) Remove counterbalance valve (26) from valve body (3).

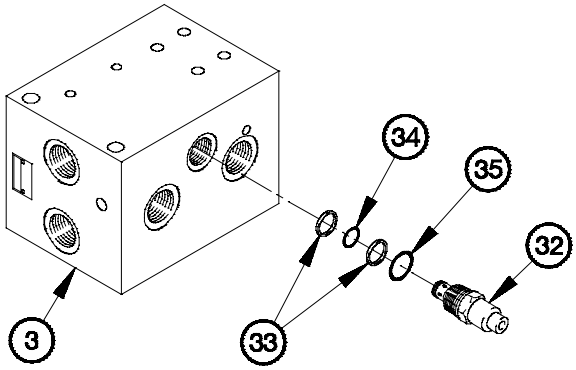
(14) Remove preformed packing (27), back-up ring (28), two back-up rings (29), preformed packing (30), and preformed packing (31) from counterbalance valve (26). Discard preformed packings and back-up rings.




6S03C06B

(15) Remove needle valve (32) from valve body (3).

(16) Remove two back-up rings (33), preformed packing (34), and preformed packing (35) from needle valve (32). Discard back-up rings and preformed packings.




6S03C07B

**d. Cleaning/Inspection.**

**WARNING**

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

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

Clean all metal parts thoroughly with dry cleaning solvent.

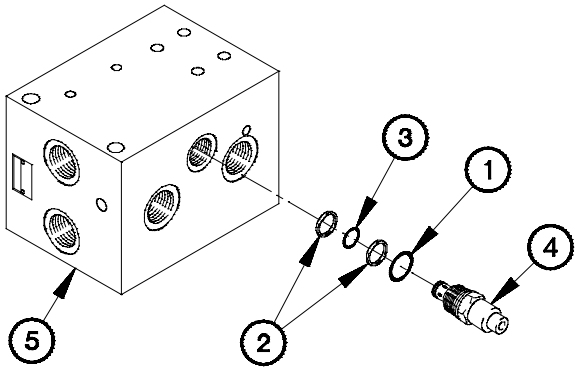
## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

**e. Assembly (P/N 6E150110).**

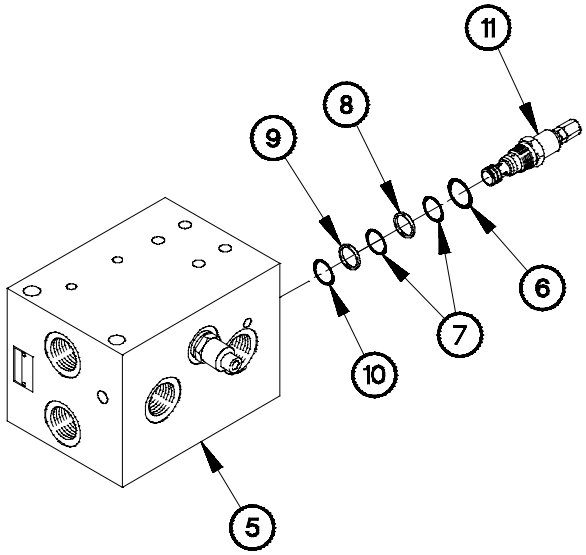
(1) Install preformed packing (1), back-up ring (2), preformed packing (3), and back-up ring (2) on needle valve (4).

(2) Position needle valve (4) in valve body (5).

(3) Tighten needle valve (4) to 35-40 lb-ft (47-54 N·m).




6S03E01B




6S03E02B

(4) Install preformed packing (6), two back-up rings (7), preformed packing (8), back-up ring (9), and preformed packing (10) on counterbalance valve (11).

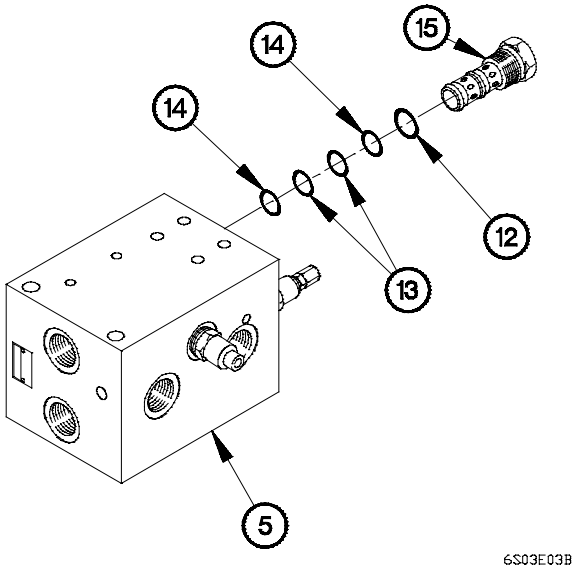
(5) Position counterbalance valve (11) in valve body (5).

(6) Tighten counterbalance valve (11) to 50-55 lb-ft (68-75 N·m).

(7) Install preformed packing (12), two back-up rings (13), and preformed packings (14) on flow control valve (15).

(8) Position flow control valve (15) in valve body (5).

(9) Tighten flow control valve (15) to 80-90 lb-ft (108-122 N·m).

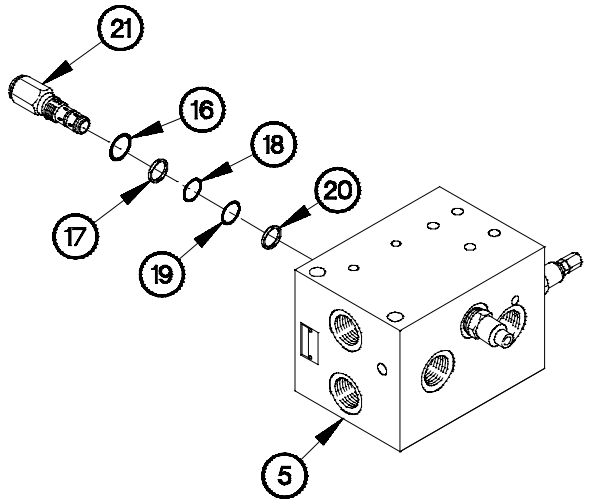



6S03E03B

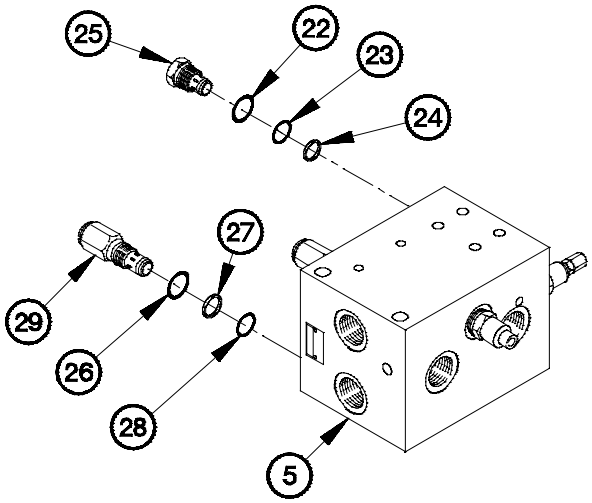
(10) Install preformed packing (16), back-up ring (17), preformed packings (18 and 19), and back-up ring (20) on pressure reducing valve (21).

(11) Position pressure reducing valve (21) in valve body (5).

(12) Tighten pressure reducing valve (21) to 35-40 lb-ft (47-54 N·m).




6S03E04B




6S03E05B

(13) Install preformed packings (22 and 23) and back-up ring (24) on check valve (25).

(14) Position check valve (25) in valve body (5).

(15) Tighten check valve (25) to 35-40 lb-ft (47-54 N·m).

(16) Install preformed packing (26), back-up ring (27), and preformed packing (28) on relief valve (29).

(17) Position relief valve (29) in valve body (5).

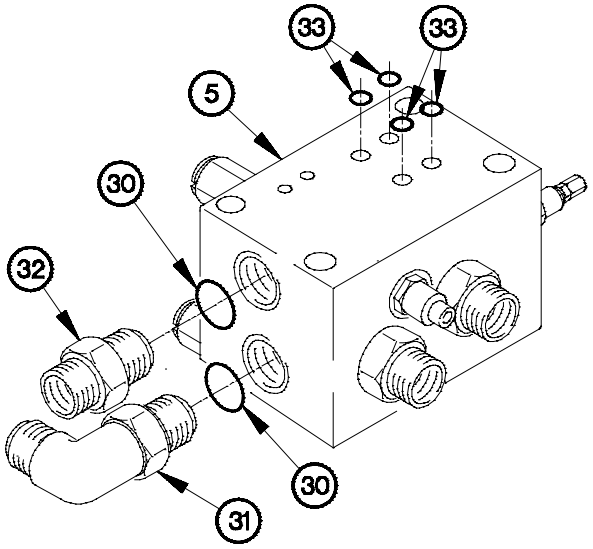
(18) Tighten relief valve (29) to 50-55 lb-ft (68-75 N·m).

(19) Install four preformed packings (30) on 90-degree fitting (31) and three fittings (32).

(20) Position 90-degree fitting (31) and three fittings (32) in valve body (5).

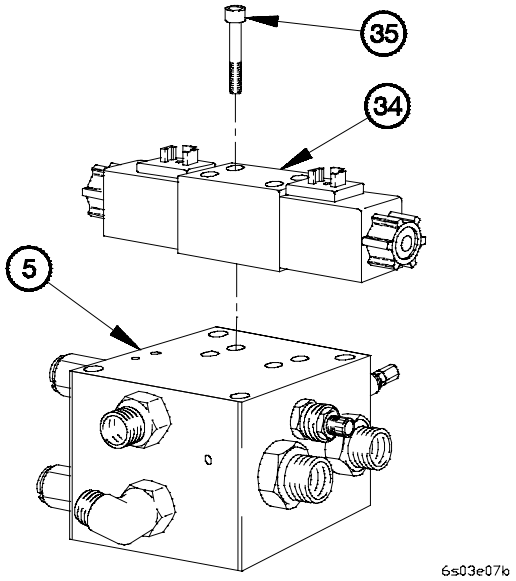
(21) Tighten 90-degree fitting (31) and three fittings (32) to 79-88 lb-ft (107-119 N·m).

(22) Install four preformed packings (33) on valve body (5).




6s03e06b

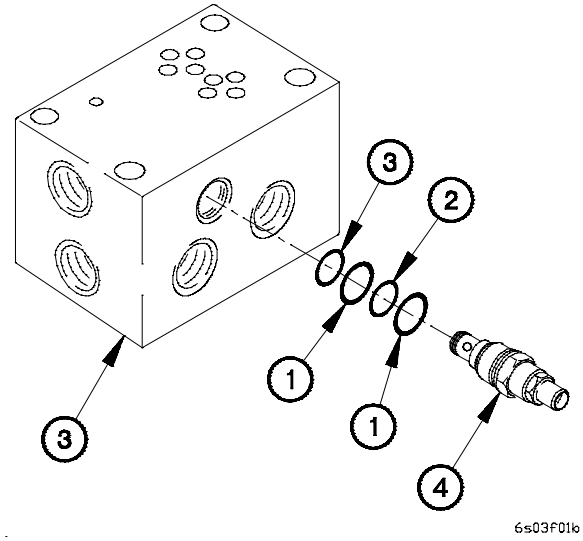
## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)




(23) Position solenoid valve (34) on valve body (5) with four screws (35).

(24) Tighten four screws (35) to 44-62 lb-in. (5-7 N·m).

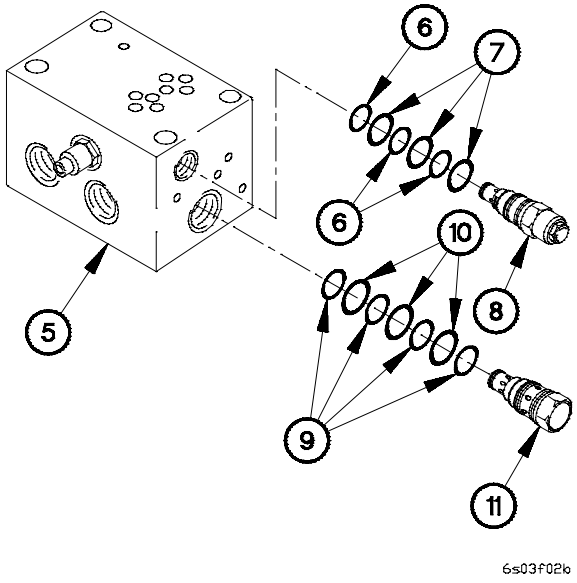
**f. Assembly (P/N HFC32585).**




(1) Install two back-up rings (1) and preformed packings (2 and 3) on needle valve (4).

(2) Position needle valve (4) in valve body (5).

(3) Tighten needle valve (4) to 35-40 lb-ft (47-54 N·m).




(4) Install three back-up rings (6) and preformed packings (7) on counterbalance valve (8).

(5) Position counterbalance valve (8) in valve body (5).

(6) Tighten counterbalance valve (8) to 30-35 lb-ft (41-47 N·m).

(7) Install four back-up rings (9) and three preformed packings (10) on flow control valve (11).

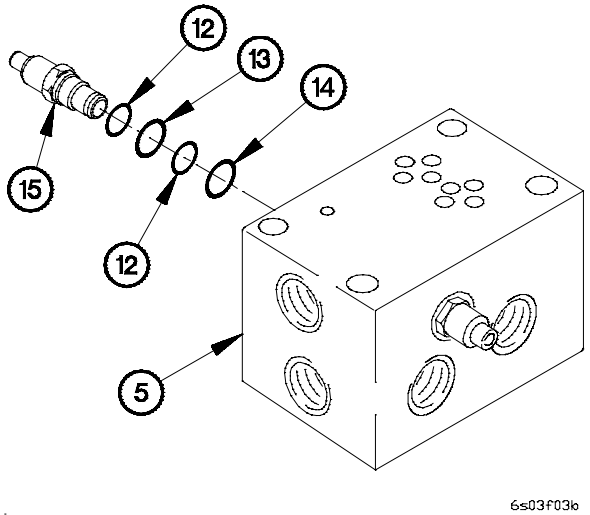
(8) Position flow control valve (11) in valve body (5).

(9) Tighten flow control valve (11) to 45-50 lb-ft (61-68 N·m).

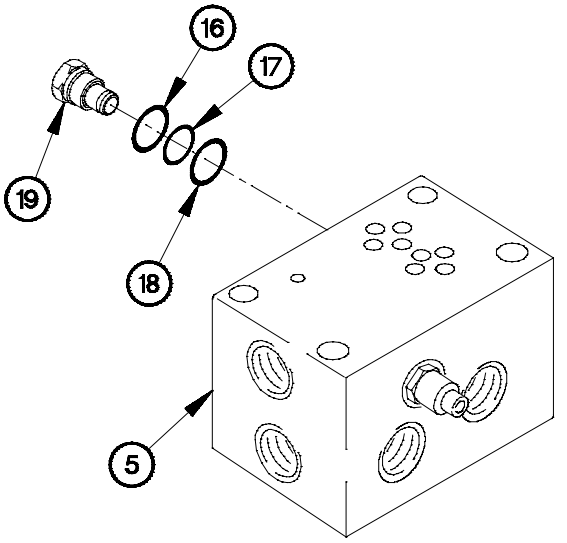
(10) Install two back-up rings (12) and preformed packings (13 and 14) on pressure reducing valve (15).

(11) Position pressure reducing valve (15) in valve body (5).

(12) Tighten pressure reducing valve (15) to 35-40 lb-ft (41-47 N·m).




6s03f03lo




6s03f04lo

(13) Install back-up ring (16) and preformed packings (17 and 18) on check valve (19).

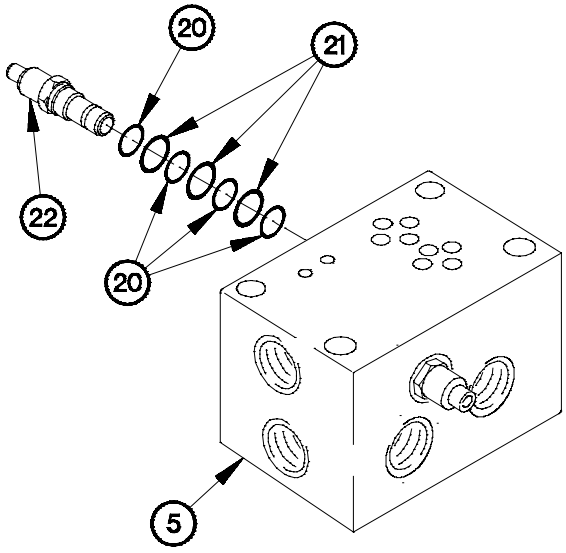
(14) Position check valve (19) in valve body (5).

(15) Tighten check valve (19) to 35-40 lb-ft (41-47 N·m).

(16) Install four back-up rings (20) and three preformed packings (21) on relief valve (22).

(17) Position relief valve (22) in valve body (5).

(18) Tighten relief valve (22) to 35-40 lb-ft (41-47 N·m).




6s03f05lo

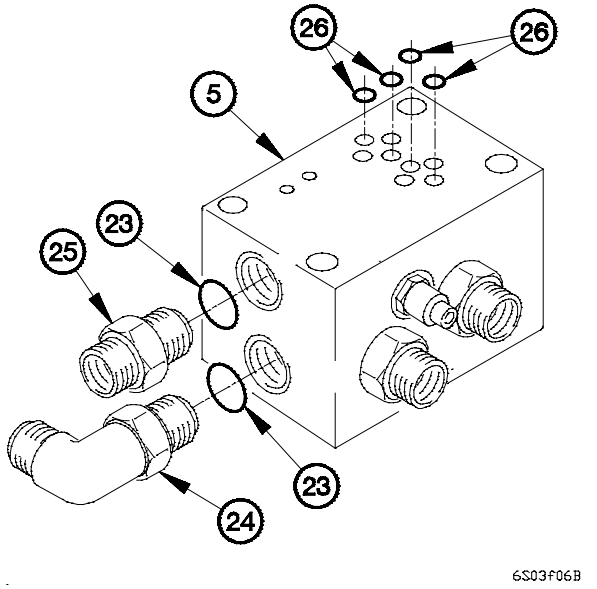
## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(19) Install four preformed packings (23) on 90-degree fitting (24) and three fittings (25).

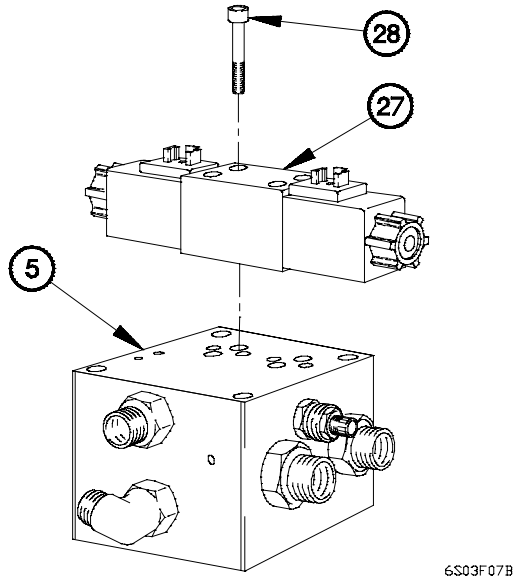
(20) Position 90-degree fitting (24) and three fittings (25) in valve body (5).

(21) Tighten 90-degree fitting (24) and three fittings (25) to 79-88 lb-ft (107-119 N·m).

(22) Install four preformed packings (26) on valve body (5).




6S03F06B



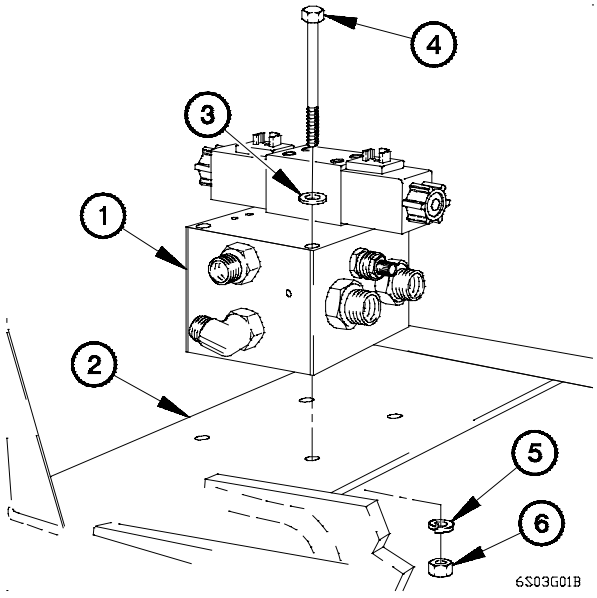

6S03F07B

(23) Position solenoid valve (27) on valve body (5) with four screws (28).

(24) Tighten four screws (28) to 45-55 lb-in. (5-6 N·m).

**g. Installation.**

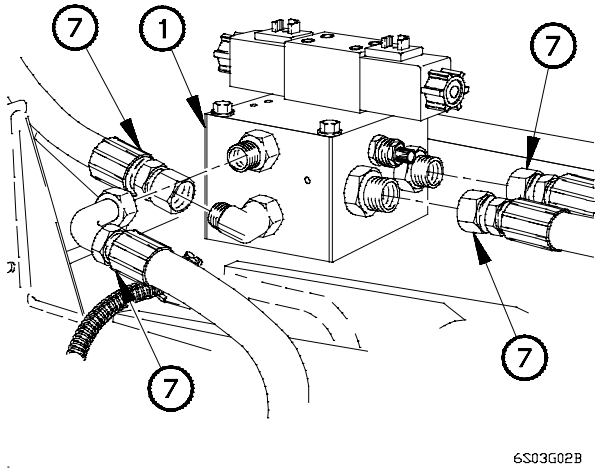
(1) Install four-way relief valve (1) on subframe (2) with four washers (3), screws (4), lockwashers (5), and nuts (6).

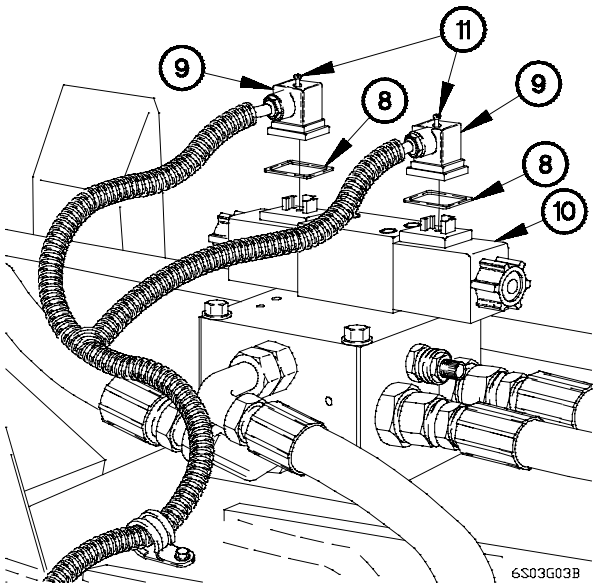



6S03G01B

(2) Position four hoses (7) on four-way relief valve (1).

(3) Tighten four hoses (7) to 79-88 lb-ft (107-119 N·m).




(4) Install two gaskets (8) on connectors L8 and L9 (9).

(5) Connect connectors L8 and L9 (9) on solenoid (10).

(6) Tighten two screws (11) on connectors L8 and L9 (9).

## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

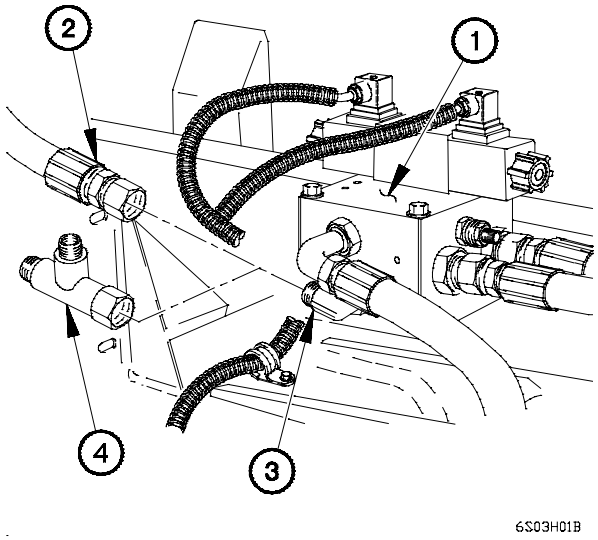
**h. Relief Valve Adjustment.**

(1) Raise dump body to maintenance position (TM 9-2320-366-10-1).

(2) Position drain pan under four-way relief valve (1).

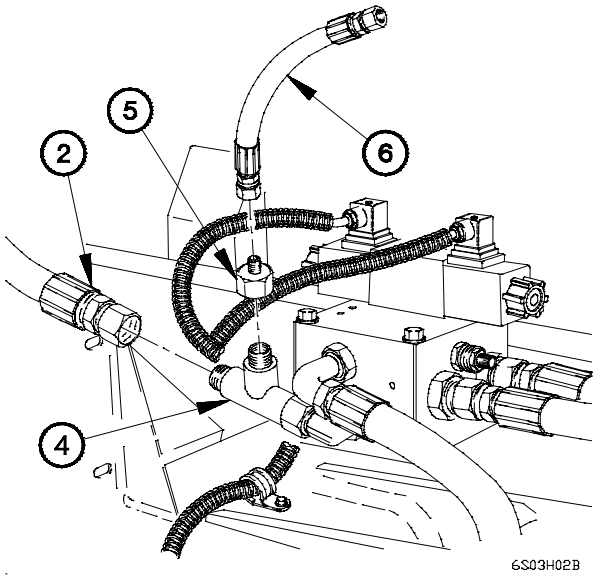
**WARNING**

- **Wear appropriate eye protection when performing pressure checks. Failure to comply may result in oil getting into eyes. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.**
- **Prolonged contact with lubricating oil (MIL-L-2104) may cause a skin rash. Skin and clothing that comes into contact with lubricating oil should be thoroughly washed 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.**
- **Lubricating oil is slippery and can cause falls. Wipe up spilled oil with rags. Failure to comply may result in injury to personnel.**




(3) Disconnect hose P (2) from 90-degree fitting (3).

(4) Install swivel run tee (4) on 90-degree fitting (3).




**NOTE**

Route test hose between frame and exit under vehicle.

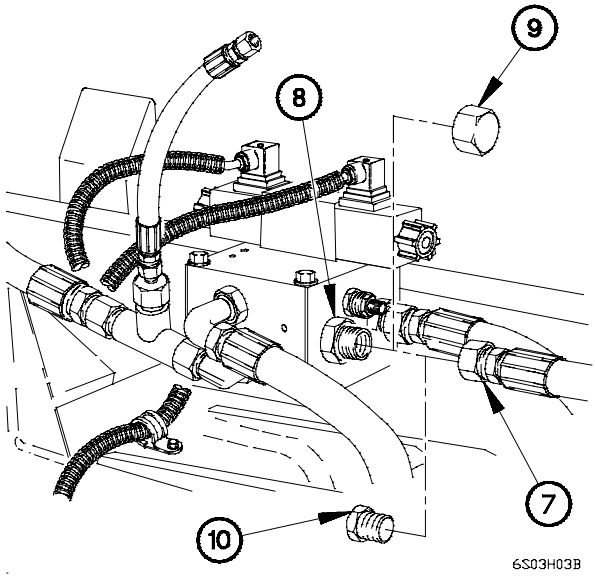
(5) Install adapter (5) and test hose (6) on swivel run tee (4).

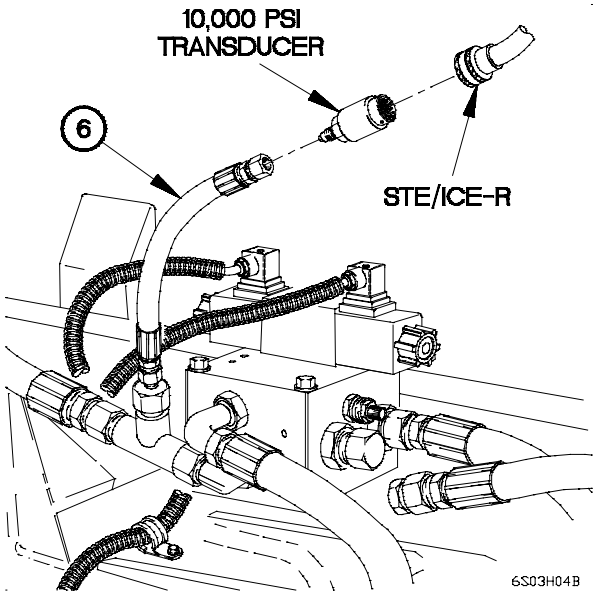
(6) Connect hose P (2) to swivel run tee (4).

(7) Disconnect hose A (7) from fitting (8).

(8) Install cap (9) on fitting (8).

(9) Install plug (10) in hose A (7).




(10) Install 10,000 PSI transducer on test hose (6).

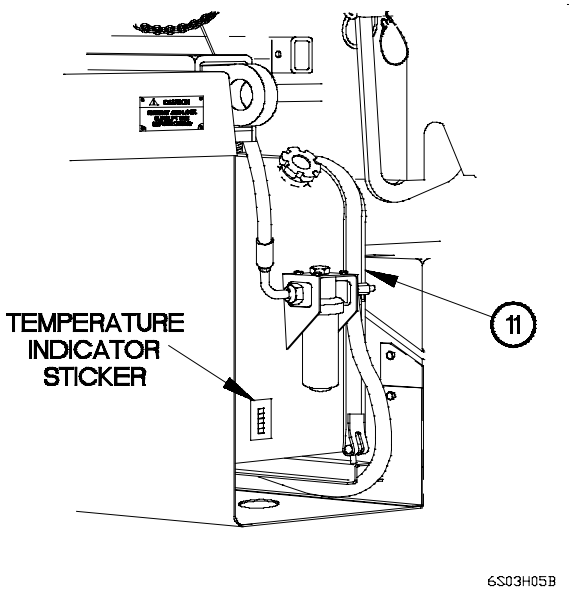
(11) Connect 10,000 PSI transducer to STE/ICE-R.

(12) Start engine (TM 9-2320-366-10-1).

(13) Position PTO switch to on (TM 9-2320-366-10-1).

(14) Increase engine speed to 1250-1450 RPM (TM 9-2320-366-10-1).

(15) Attach temperature indicator label to hydraulic reservoir (11).



## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

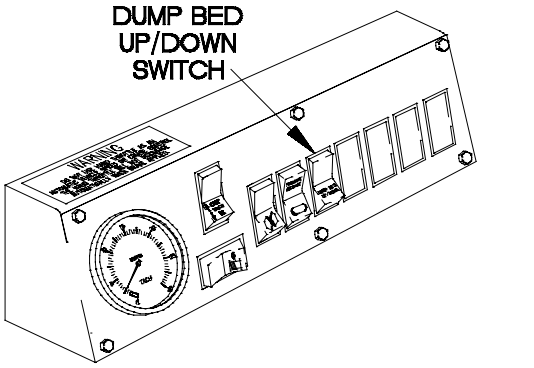
**CAUTION**

Hydraulic oil temperature must be 145-155° F (63-68° C) prior to performing troubleshooting checks. Failure to comply may result in inaccurate test results.

**NOTE**

- Holding DUMP BED UP/DOWN switch in the UP position will force hydraulic oil through relief valve and cause oil temperature to rise.
- Measure hydraulic oil temperature near bottom of hydraulic reservoir.
- Steps (16) through (24) require the aid of an assistant.

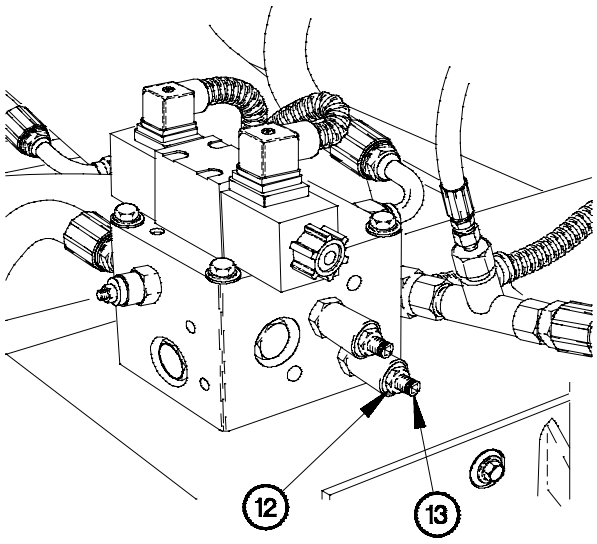
(16) Press and hold DUMP BED UP/DOWN switch in UP position until hydraulic oil temperature reaches 145-155° F (63-68° C).




6S03H06B

**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.**




6S03H07B

(17) Perform STE/ICE-R test #51 (TM 9-4910-571-12&P).

(18) Observe pressure reading of 2475-2525 psi (17065-17410 kPa).

(19) If pressure is incorrect, loosen lock nut (12) on relief valve adjusting screw (13).

(20) Turn relief valve adjusting screw (13) counterclockwise to lower pressure, clockwise to raise pressure.

**NOTE**

Hold relief valve adjusting screw while tightening lock nut.

(21) Tighten lock nut (12) on relief valve adjusting screw (13).

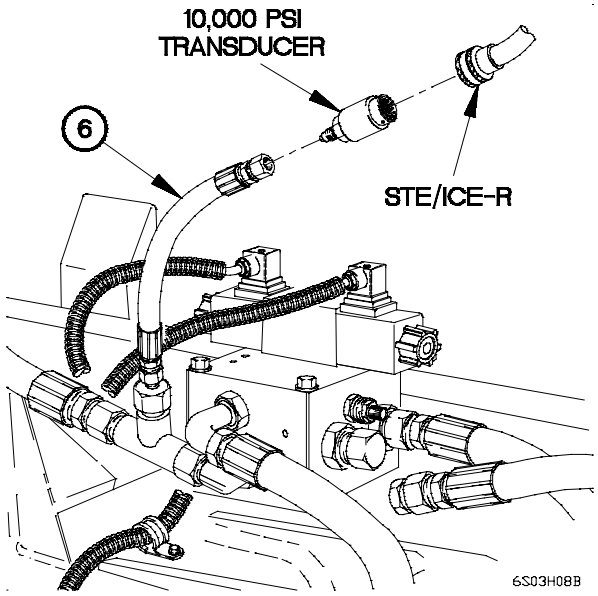
(22) Lower engine speed to idle (TM 9-2320-366-10-1).

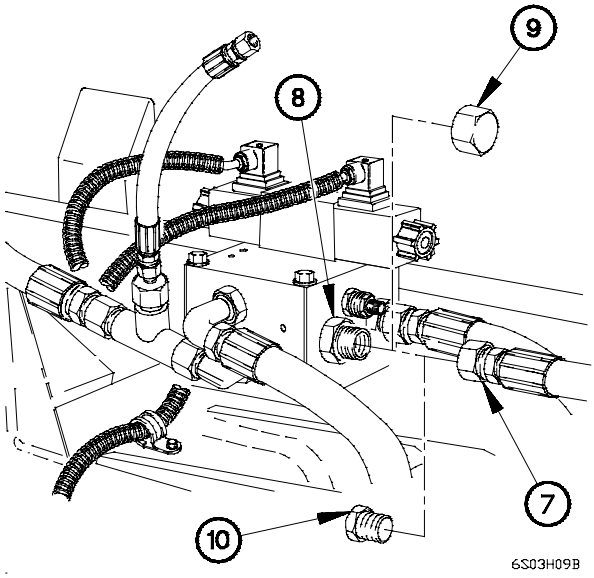
(23) Position PTO switch to off (TM 9-2320-366-10-1).

(24) Shut down engine (TM 9-2320-366-10-1).

(25) Disconnect 10,000 PSI transducer from STE/ICE-R.

(26) Remove 10,000 PSI transducer from test hose (6).



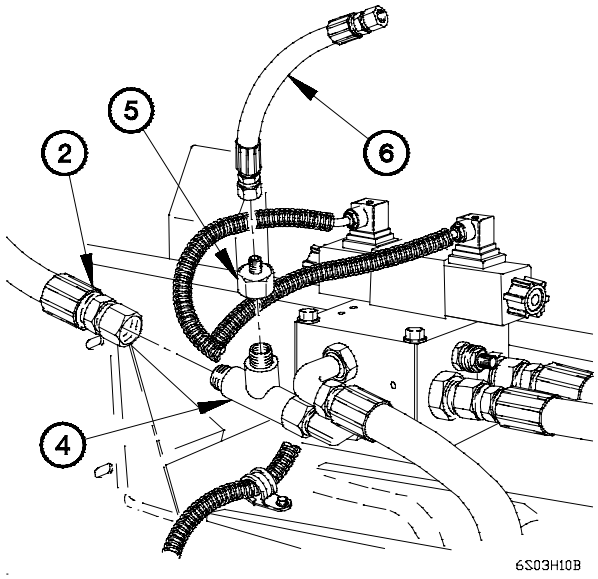

(27) Remove plug (10) from hose A (7).

(28) Remove cap (9) from fitting (8).

(29) Connect hose A (7) to fitting (8).

(30) Disconnect hose P (2) from swivel run tee (4).

(31) Disconnect test hose (6) and adapter (5) from swivel run tee (4).

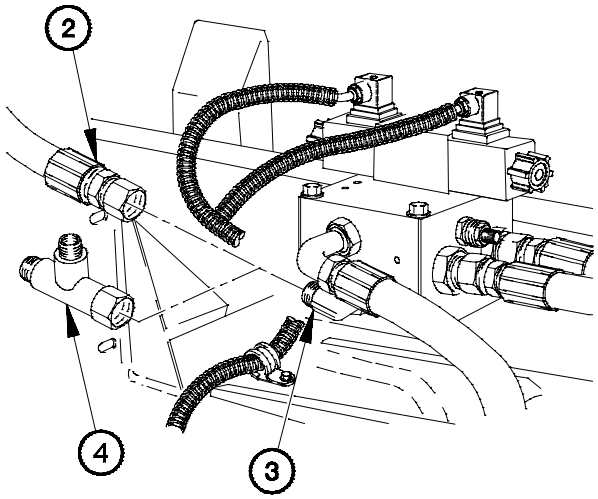


## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(32) Remove swivel run tee (4) from 90-degree fitting (3).

(33) Connect hose P (2) to 90-degree fitting (3).

(34) Lower dump body from maintenance position (TM 9-2320-366-10-1).




6S03H11B

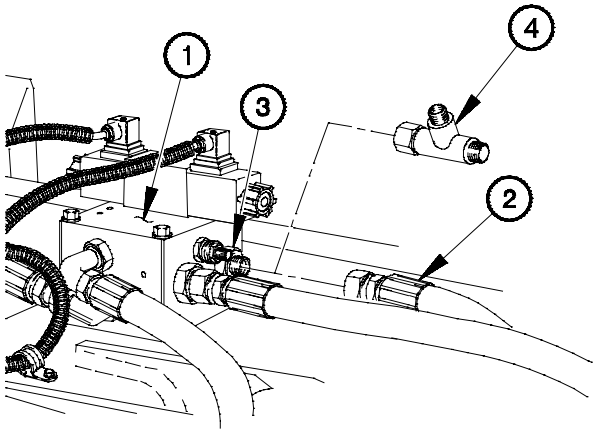
**i. Pressure Reducing Valve Adjustment.**

(1) Raise dump body to maintenance position (TM 9-2320-366-10-1).

(2) Position drain pan under four-way relief valve (1).

**WARNING**

- **Wear appropriate eye protection when performing pressure checks. Failure to comply may result in oil getting into eyes. If oil contacts eyes, seek medical attention immediately. Failure to comply may result in injury to personnel.**
- **Prolonged contact with lubricating oil (MIL-L-2104) may cause a skin rash. Skin and clothing that comes into contact with lubricating oil should be thoroughly washed 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.**
- **Lubricating oil is slippery and can cause falls. Wipe up spilled oil with rags. Failure to comply may result in injury to personnel.**




6S03I01B

(3) Disconnect hose B (2) from fitting (3).

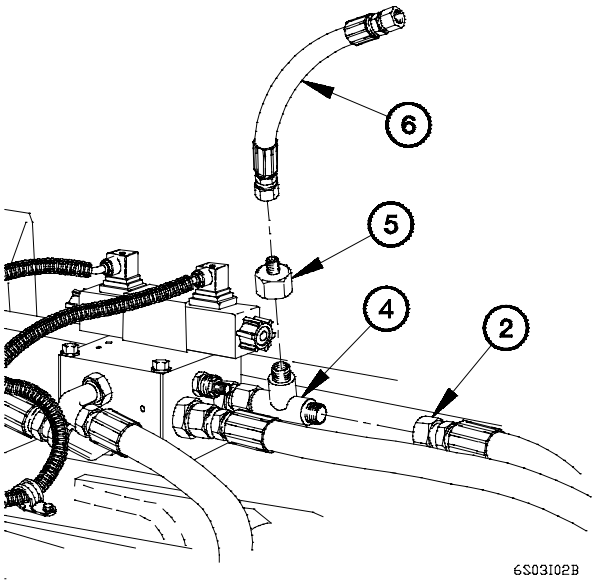
(4) Install swivel run tee (4) on fitting (3).

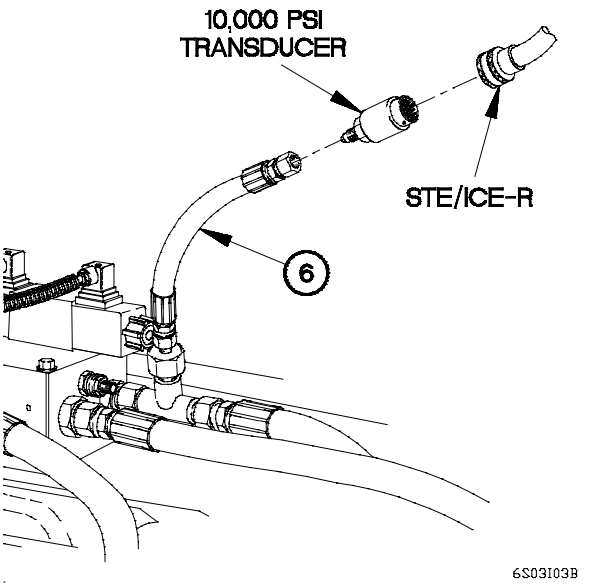
**NOTE**

Route test hose between frame and exit under vehicle.

(5) Install adapter (5) and test hose (6) on swivel run tee (4).

(6) Connect hose B (2) to swivel run tee (4).




(7) Install 10,000 PSI transducer on test hose (6).

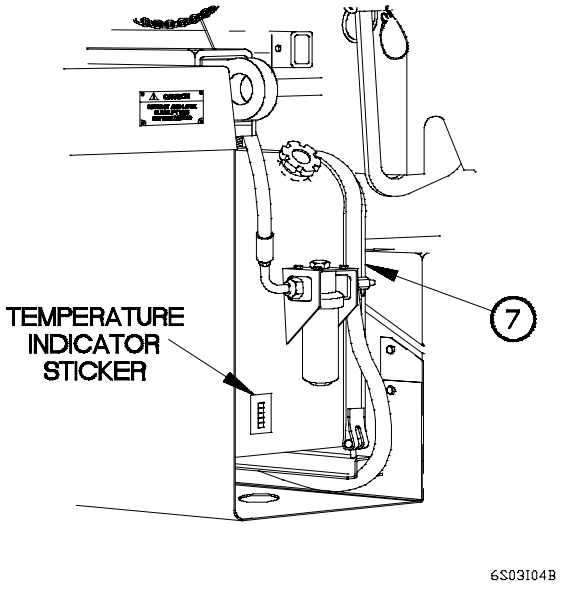
(8) Connect 10,000 PSI transducer to STE/ICE-R.

(9) Start engine (TM 9-2320-366-10-1).

(10) Position PTO switch to on (TM 9-2320-366-10-1).

(11) Increase engine speed to 1250-1450 RPM (TM 9-2320-366-10-1).

(12) Attach temperature indicator label to hydraulic reservoir (7).



## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

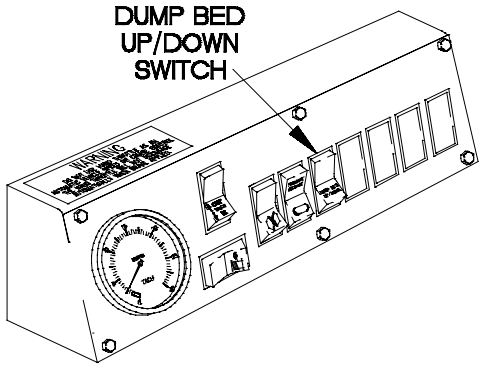
**CAUTION**

Hydraulic oil temperature must be 145-155° F (63-68° C) prior to performing troubleshooting checks. Failure to comply may result in inaccurate test results.

**NOTE**

- Holding DUMP BED UP/DOWN switch in the DOWN position will force hydraulic oil through relief valve and cause oil temperature to rise.
- Measure hydraulic oil temperature near bottom of hydraulic reservoir.
- Steps (13) through (21) require the aid of an assistant.

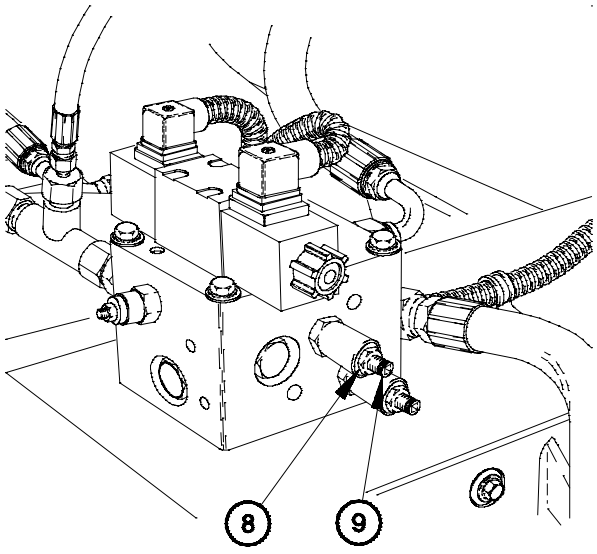
(13) Press and hold DUMP BED UP/DOWN switch to the DOWN position until hydraulic oil temperature reaches 145-155° F (63-68° C).




6S03I05B

**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.**




6S03I06B

(14) Perform STE/ICE-R test #51 (TM 9-4910-571-12&P).

(15) Observe pressure reading of 325-375 psi (2241-2586 kPa).

(16) If pressure is incorrect, loosen lock nut (8) on pressure reducing valve adjusting screw (9).

(17) Turn pressure reducing valve adjusting screw (9) counterclockwise to lower pressure, clockwise to raise pressure.

**NOTE**

Hold pressure reducing valve adjusting screw while tightening lock nut.

(18) Tighten lock nut (8) on pressure reducing valve adjusting screw (9).

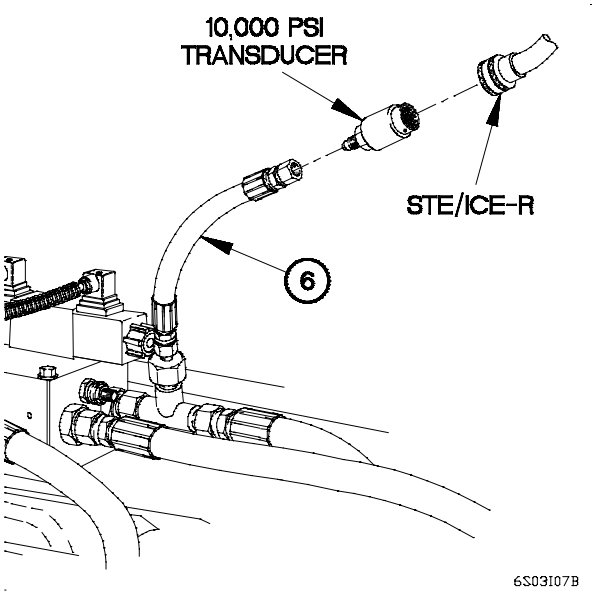
(19) Lower engine speed to idle (TM 9-2320-366-10-1).

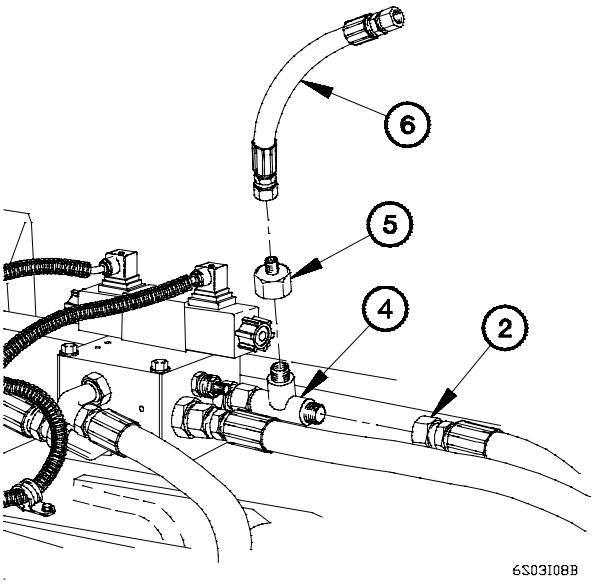
(20) Position PTO switch to off (TM 9-2320-366-10-1).

(21) Shut down engine (TM 9-2320-366-10-1).

(22) Disconnect 10,000 PSI transducer from STE/ICE-R.

(23) Remove 10,000 PSI transducer from test hose (6).



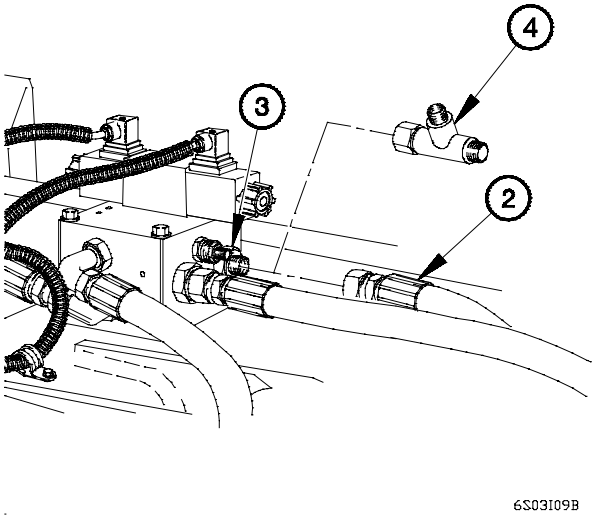

(24) Disconnect hose B (2) from swivel run tee (4).

(25) Disconnect test hose (6) and adapter (5) from swivel run tee (4).

(26) Remove swivel run tee (4) from fitting (3).

(27) Connect hose B (2) to fitting (3).

(28) Lower dump body from maintenance position (TM 9-2320-366-10-1).



## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

**j. Counterbalance Valve Adjustment.**

(1) Raise dump body to maintenance position (TM 9-2320-366-10-1).

(2) Loosen lock nut (1) on counterbalance valve adjusting screw (2).

(3) Turn counterbalance valve adjusting screw (2) clockwise until it bottoms out.

**WARNING**

**Two four-way relief valves are in use (P/N HFC32585 and P/N 6E150110). Ensure correct adjustment procedure is in use for the correct relief valve. Failure to comply may result in injury to personnel or damage to equipment.**

**NOTE**

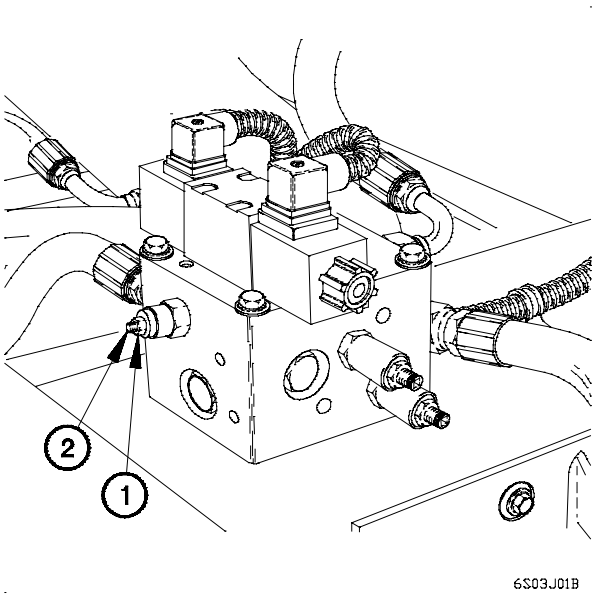
- Steps (4) and (5) establish initial settings.
- Perform step (4) on four-way relief valve P/N HFC32585.

(4) Turn counterbalance valve adjusting screw (2) counterclockwise two turns.

**NOTE**

Perform step (5) on four-way relief valve P/N 6E150110.

(5) Turn counterbalance valve adjusting screw (2) counterclockwise four turns.

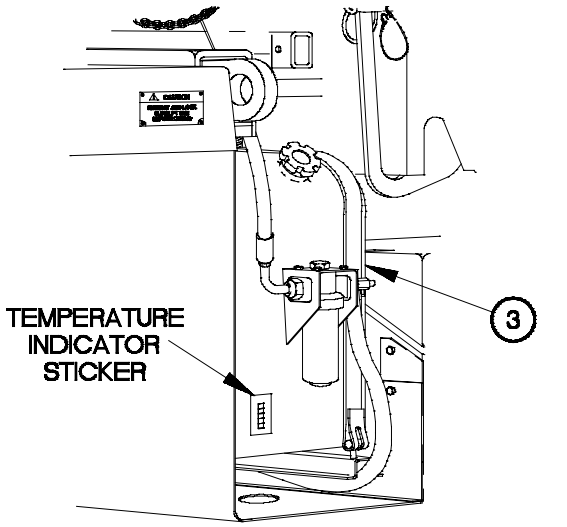


6S03J01B

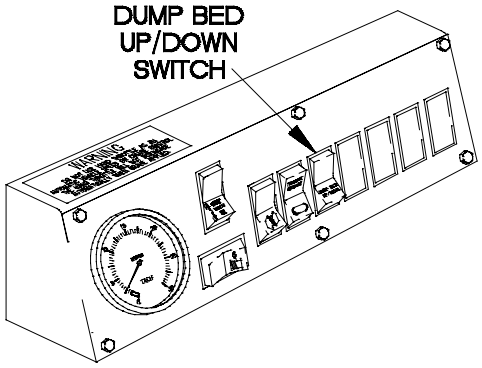
(6) Attach temperature indicator label to hydraulic reservoir (3).

(7) Start engine (TM 9-2320-366-10-1).

(8) Position PTO switch to on (TM 9-2320-366-10-1).




6S03J02B




6S03J03B

**CAUTION**

Hydraulic oil temperature must be 145-155° F (63-68° C) prior to performing troubleshooting checks. Failure to comply may result in inaccurate test results.

**NOTE**

- Holding DUMP BED UP/DOWN switch in the DOWN position will force hydraulic oil through relief valve and cause oil temperature to rise.
- Measure hydraulic oil temperature near bottom of hydraulic reservoir.
- Steps (9) through (15) require the aid of an assistant.

(9) Press and hold DUMP BED UP/DOWN switch to the DOWN position until hydraulic oil temperature reaches 145-155° F (63-68° C).

(10) Press and hold DUMP BED UP/DOWN switch to the UP position until the dump body is approximately 8 in. (200 mm) above maintenance legs.

## 17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(11) Observe if dump body creeps down.

**WARNING**

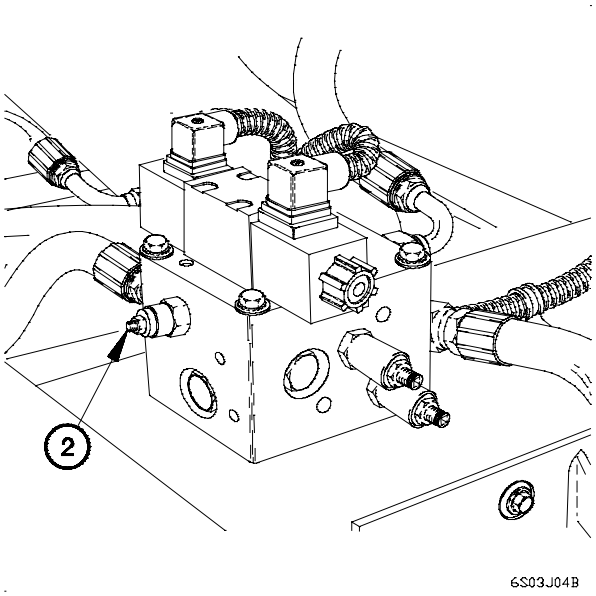
**Hydraulic components are hot when hydraulic oil reaches operating temperature. Use caution when handling hydraulic components. Wear gloves or use rags to hold metal objects. Failure to comply may result in injury to personnel.**

**CAUTION**

Do not exceed 3-1/2 turns counterclockwise for P/N HFC32585 or 5-1/2 turns counterclockwise for P/N 6E150110 four-way relief valves. Failure to comply may result in damage to equipment.

**NOTE**

Adjust counterbalance valve 1/4 turn at a time.




(12) If dump body creeps down, turn counterbalance valve adjusting screw (2) 1/4 turn counterclockwise.

(13) Perform steps (11) and (12) until no creep is observed.

(14) Position dump body approximately 36 in. (9144 mm) above subframe (TM 9-2320-366-10-1).

(15) Observe if dump body creeps down.

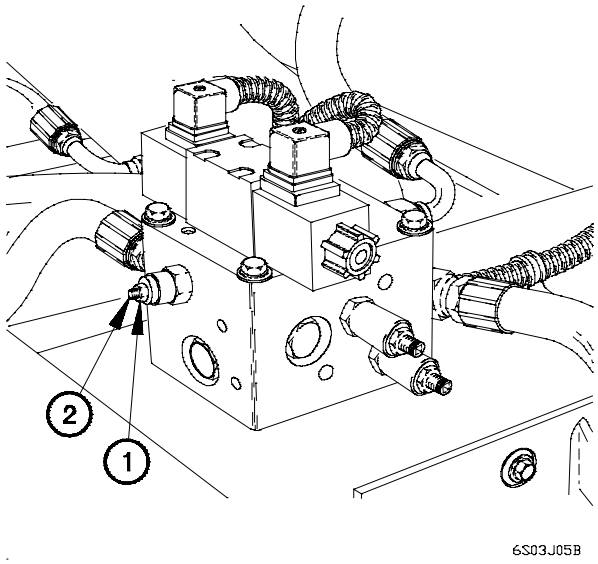
(16) Performs steps (12) through (15) if dump body creeps down.

**NOTE**

Hold counterbalance valve adjusting screw while tightening lock nut.

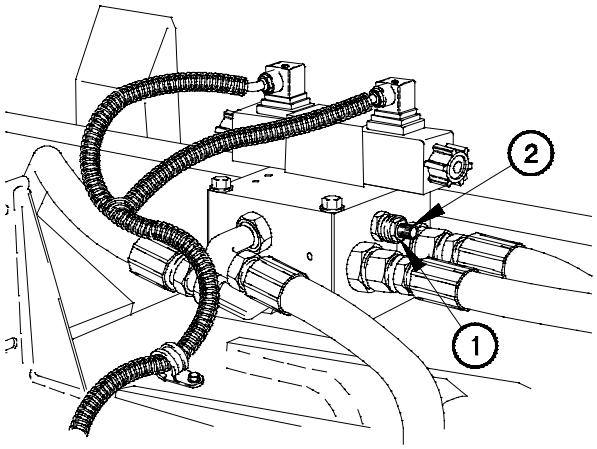
(17) Tighten lock nut (1) on counterbalance valve adjusting screw (2).

(18) Lower dump body from maintenance position (TM 9-2320-366-10-1).




6S03J05B

**k. Needle Valve Adjustment.**




6S03K01B

(1) Raise dump body to maintenance position (TM 9-2320-366-10-1).

(2) Loosen lock nut (1) on needle valve adjusting screw (2).

(3) Turn needle valve adjusting screw (2) clockwise until it bottoms out.

(4) Turn needle valve adjusting screw (2) counterclockwise 2-1/2 turns.

**NOTE**

Hold needle valve adjusting screw while tightening lock nut.

(5) Tighten lock nut (1) on needle valve adjusting screw (2).

(6) Lower dump body from maintenance position (TM 9-2320-366-10-1).

**l. Follow-On Maintenance.**

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

(2) Service hydraulic system, as required (TM 9-2320-366-20).

**End of Task.**

## 17-4. M1090/M1094 DUMP BODY HOIST CYLINDER REPLACEMENT

This task covers:

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

**INITIAL SETUP**

**Equipment Conditions**
Batteries disconnected (TM 9-2320-366-20-3).
Dump body removed (para 15-10).

**Tools and Special Tools**
Tool Kit, Genl Mech (Item 78, Appendix B)
Pliers, Retaining Ring (Item 45, Appendix B)
Pan, Drain (Item 43, Appendix B)
Bar, Wrecking (Item 6, Appendix B)
Sling, Cargo (4) (Item 56, Appendix B)

**Tools and Special Tools (Cont)**
Lifting Brackets, Dump Body (Item 8, Appendix D)

**Materials/Parts**
Shackles (4) (Item 80, Appendix C)
Lubricating Oil, Engine (Item 45, Appendix C)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

**Personnel Required**
(2)

**a. Removal.**

**CAUTION**

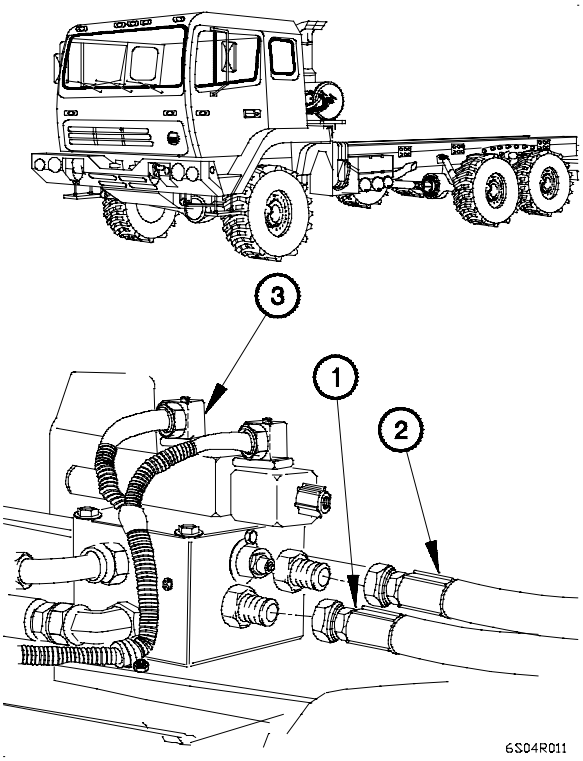
Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

**NOTE**

Tag hydraulic hoses and connection points prior to disconnecting.

(1) Place drain pan under hoses (1 and 2).

(2) Disconnect hydraulic hoses (1 and 2) from control valve (3).



**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.**

**NOTE**

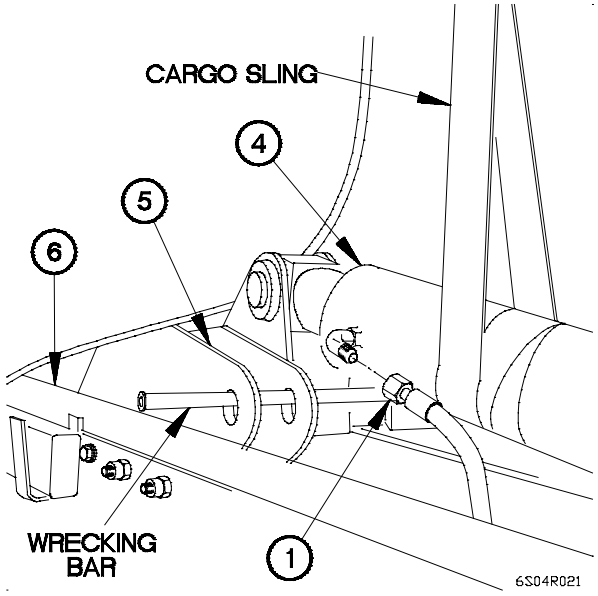
Steps (3) through (12) require the aid of an assistant.

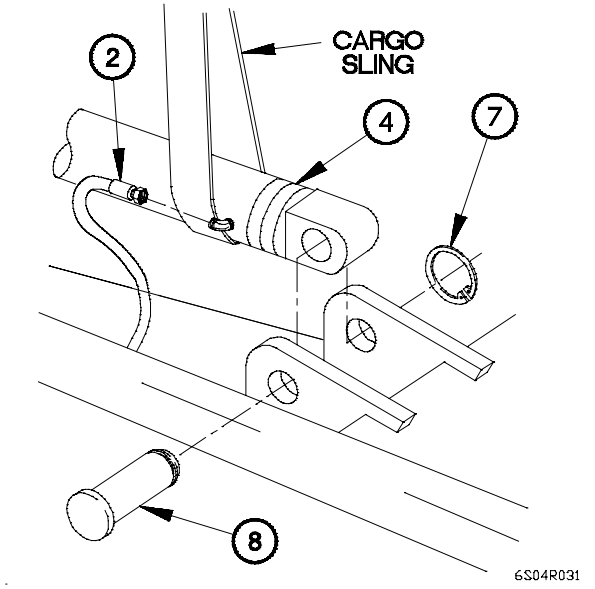
(3) Raise hoist cylinder (4) until holes in subframe assembly (5) are above frame (6).

(4) Install wrecking bar through holes in subframe assembly (5).

(5) Lower hoist cylinder (4) until weight of subframe assembly (5) is supported by wrecking bar.

(6) Remove hydraulic hose (1) from hoist cylinder (4).




(7) Remove hydraulic hose (2) from hoist cylinder (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.**

(8) Remove retaining ring (7) from pin (8).

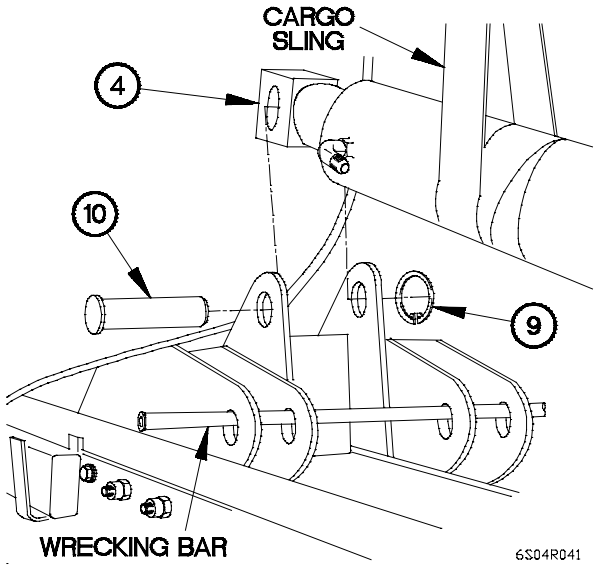
(9) Remove pin (8) from hoist cylinder (4).

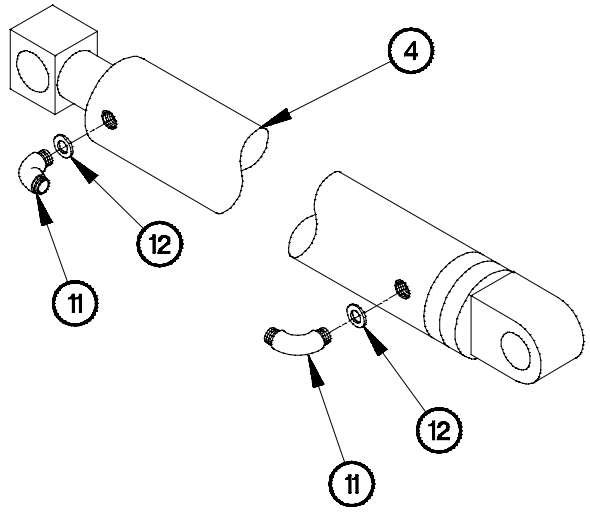
## 17-4. M1090/M1094 DUMP BODY HOIST CYLINDER REPLACEMENT (CONT)

(10) Remove retaining ring (9) from pin (10).

(11) Remove pin (10) from hoist cylinder (4).

(12) Remove hoist cylinder (4) from vehicle.

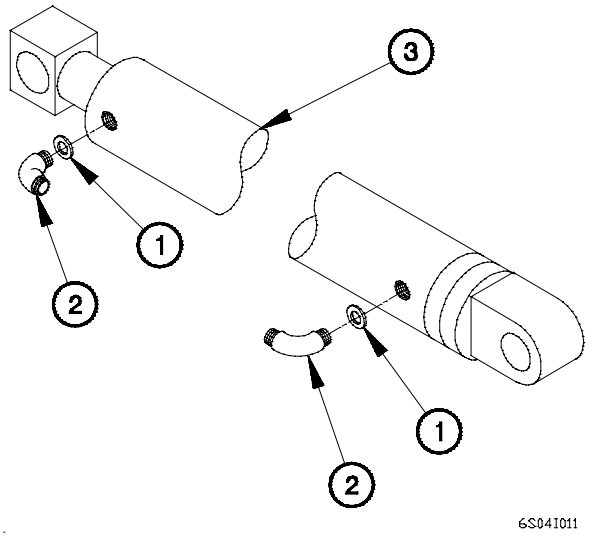



(13) Remove two 90-degree fittings (11) and spacers (12) from hoist cylinder (4).

**b. Installation.**

(1) Install two spacers (1) and 90-degree fittings (2) on hoist cylinder (3).



**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.**

**NOTE**

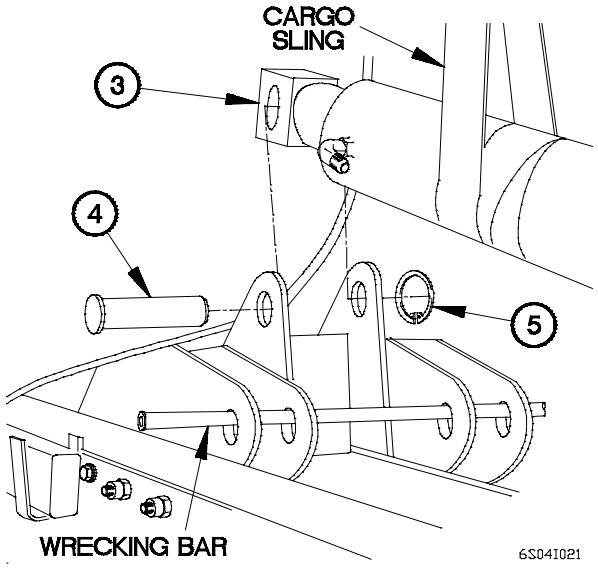
Steps (2) through (10) require the aid of an assistant.

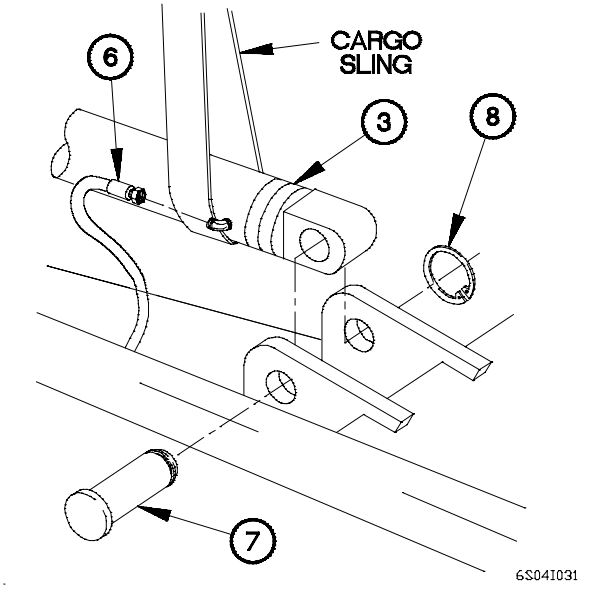
(2) Install hoist cylinder (3) on vehicle with pin (4).

**WARNING**

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

(3) Install retaining ring (5) on pin (4).




(4) Connect hydraulic hose (6) to hoist cylinder (3).

(5) Install pin (7) in hoist cylinder (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.**

(6) Install retaining ring (8) on pin (7).

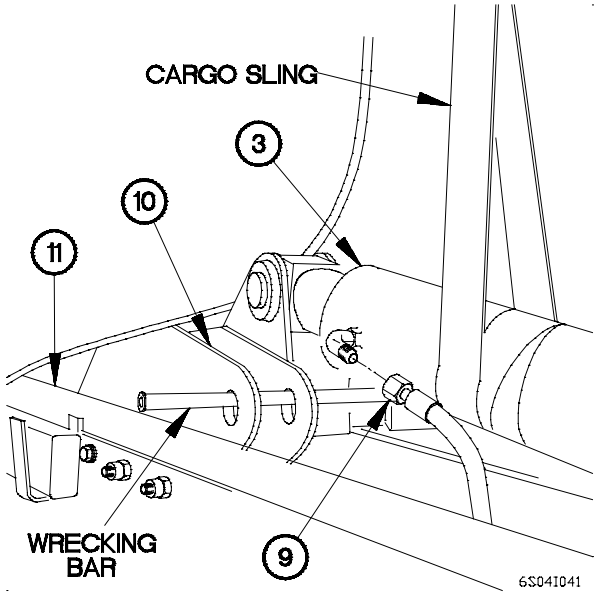
## 17-4. M1090/M1094 DUMP BODY HOIST CYLINDER REPLACEMENT (CONT)

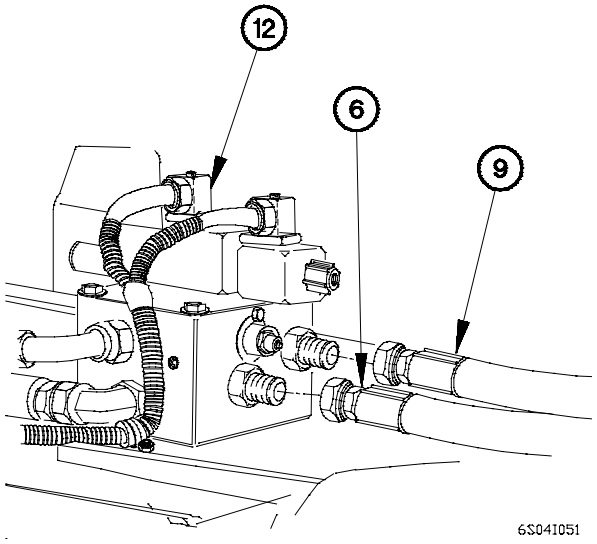
(7) Connect hydraulic hose (9) to hoist cylinder (3).

(8) Raise hoist cylinder (3) until holes in subframe assembly (10) are above frame (11).

(9) Remove wrecking bar from holes in subframe assembly (10).

(10) Lower hoist cylinder (3).




(11) Connect hydraulic hoses (6 and 9) to hydraulic control valve (12).

**c. Follow-On Maintenance.**

(1) Connect batteries (TM 9-2320-366-20-3).

(2) Fill hydraulic reservoir (TM 9-2320-366-10).

(3) Start engine (TM 9-2320-366-10-1).

(4) Engage PTO (TM 9-2320-366-10-1).

(5) Increase engine RPM's to 1250-1450 rpm's (TM 9-2320-366-10-1).

(6) Position DUMP BED UP/DOWN switch to UP and fully extend hoist cylinder (TM 9-2320-366-10-1).

(7) Position DUMP BED UP/DOWN switch to DOWN and fully retract hoist cylinder (TM 9-2320-366-10-1).

(7.1) Repeat steps (6) and (7) to bleed all air from hydraulic system.

(8) Decrease engine RPM to idle speed (TM 9-2320-366-10-1).

(9) Disengage PTO (TM 9-2320-366-10-1).

(10) Shut down engine (TM 9-2320-366-10-1).

(11) Install dump body (para 15-10).

(12) Operate dump body and check for proper operation (TM 9-2320-366-10-1).

**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<br>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<br>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<br>55 gl drum | gl |
| 10 | H | | Adhesive (04963) DP-100<br>1.7 oz tube | tu |
| 10.1 | F | | Adhesive (0FW39) 12421700 | tu |
| 10.2 | O/F | 8040-01-446-7842 | Adhesive (01139) RTV123<br>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)<br>MIL-A-907<br>2-1/2 lb can | lb |
| 13 | F/H | 8415-00-222-8074 | Apron, Plastic, Disposable (32075)<br>E2-2845<br>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)<br>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)<br>09-304147<br>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)<br>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)<br>76-1026<br>7 lb can | lb |
| 55.1 | F | 4730-01-070-9214 | Plug, Tube Fitting, Threaded (81343)<br>8 070109C | ea |
| 55.2 | F | 4730-01-249-9707 | Plug, Tube Fitting, Threaded (96906)<br>MS51518B10 | ea |
| 55.3 | F | 4730-01-270-9651 | Plug, Tube Fitting, Threaded (81343)<br>12 070109C | ea |
| 56 | F/H | 8030-00-043-1688 | Primer, Sealing Compound (81349)<br>MIL-S-224373<br>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<br>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<br>50 lb bale | ea |
| 60.1 | F | 4730-00-719-2789 | Reducer, Tube (81343)<br>12-4 070123SA | ea |
| 60.2 | F | 4730-01-030-5207 | Reducer, Tube (96906)<br>MS51534A10-4 | ea |
| 61 | F/H | 4730-01-113-9251 | Reducer, Tube (81343)<br>2027-8-12S | ea |
| 62 | F/H | 4020-00-593-9584 | Rope, Fibrous (96169)<br>9868-165X4PC50 | ea |
| 63 | F/H | 5210-00-293-3393 | Rule, Multiple, Folding (81348)<br>GGG-R-791 | ea |
| 64 | F/H | 5330-00-003-5427 | Rubber Sheet, Solid (81349)<br>MIL-R-3065 | sh |
| 64.1 | F | 5305-01-157-1391 | Screw, Cap, Hex Hd (56161)<br>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 | F | 8030-00-728-9665 | Sealant (62377) 80017 1 pt can | pt |
| 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<br>8030-01-025-1692 | Sealing Compound (05972) 242<br>10 cc bottle (box contains 10 bottles)<br>250 cc bottle | bx<br>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 |

# 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)<br>29505612 | ea |
| 79 | F/H | 5305-01-374-1087 | Screw, Cap, Hex Hd (19207)<br>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<br>2 lb box | bx |
| 82 | F/H | 3439-01-164-0593 | Solder (61404) 14675<br>5 lb spool | sl |
| 83 | C/OF/H | | Solvent, Dry Cleaning (81348)<br>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)<br>12420927-001 | ea |
| 84 | F/H | 8030-00-060-3167 | Tape, Antiseizing (73165)<br>FEL-PRO 51520<br>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<br>60 yd roll | ro |
| 87 | O/F/H | 5970-00-644-3167 | Tape, Insulation, Electrical (80063)<br>TL83<br>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)<br>12-12-12 070432CA | ea |
| 88.3 | F | 4730-01-024-0915 | Tee, Tube (81343)<br>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)<br>A-A-2904 TY1<br>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<br>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<br>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<br>50 ft | ft |
| 98 | F/H | 9505-00-221-2650 | Wire, Nonelectrical (96906) MS20995C20<br>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 |
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| 12412367-046 | Non-Metallic Flex Conduit | D-35 |
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| 12414690-002 | Pneumatic Tube | D-36 |
| 12414690-003 | Pneumatic Tube | D-36 |
| 12414690-004 | Pneumatic Tube | D-36 |
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| 12414690-006 | Pneumatic Tube | D-36 |
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| 12414690-105 | Pneumatic Tube | D-36 |
| 12414690-106 | Pneumatic Tube | D-36 |
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| 12414690-112 | Pneumatic Tube | D-36 |
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| 12414690-115 | Pneumatic Tube | D-36 |
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| 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 |
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| 12414690-141 | Pneumatic Tube | D-36 |
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| 12414690-149 | Pneumatic Tube | D-36 |
| 12414690-150 | Pneumatic Tube | D-36 |
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| 12414690-152 | Pneumatic Tube | D-36 |
| 12414690-153 | Pneumatic Tube | D-36 |
| 12414690-154 | Pneumatic Tube | D-36 |
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| 12414690-232 | Pneumatic Tube | D-36 |
| 12414690-233 | Pneumatic Tube | D-36 |
| 12414690-234 | Pneumatic Tube | D-36 |
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| 12414690-236 | Pneumatic Tube | D-36 |
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| 12414690-238 | Pneumatic Tube | D-36 |
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| 12414690-249 | Pneumatic Tube | D-36 |
| 12414690-301 | Pneumatic Tube | D-36 |
| 12414690-302 | Pneumatic Tube | D-36 |
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| 12420062-016 | Pneumatic Hose Assembly | D-37 |
| 12420062-017 | Pneumatic Hose Assembly | D-37 |
| 12420063-002 | Pneumatic Hose Assembly | D-37 |
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| 12420064-001 | Pneumatic Hose Assembly | D-37 |
| 12420064-002 | Pneumatic Hose Assembly | D-37 |
| 12420064-003 | Pneumatic Hose Assembly | D-37 |
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| 3256-Q-1057 | Intermediate Input Yoke Seal Driver | D-52 |
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| M1089 30K Winch Pneumatic Test Adapters | | D-58 |
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## 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 |

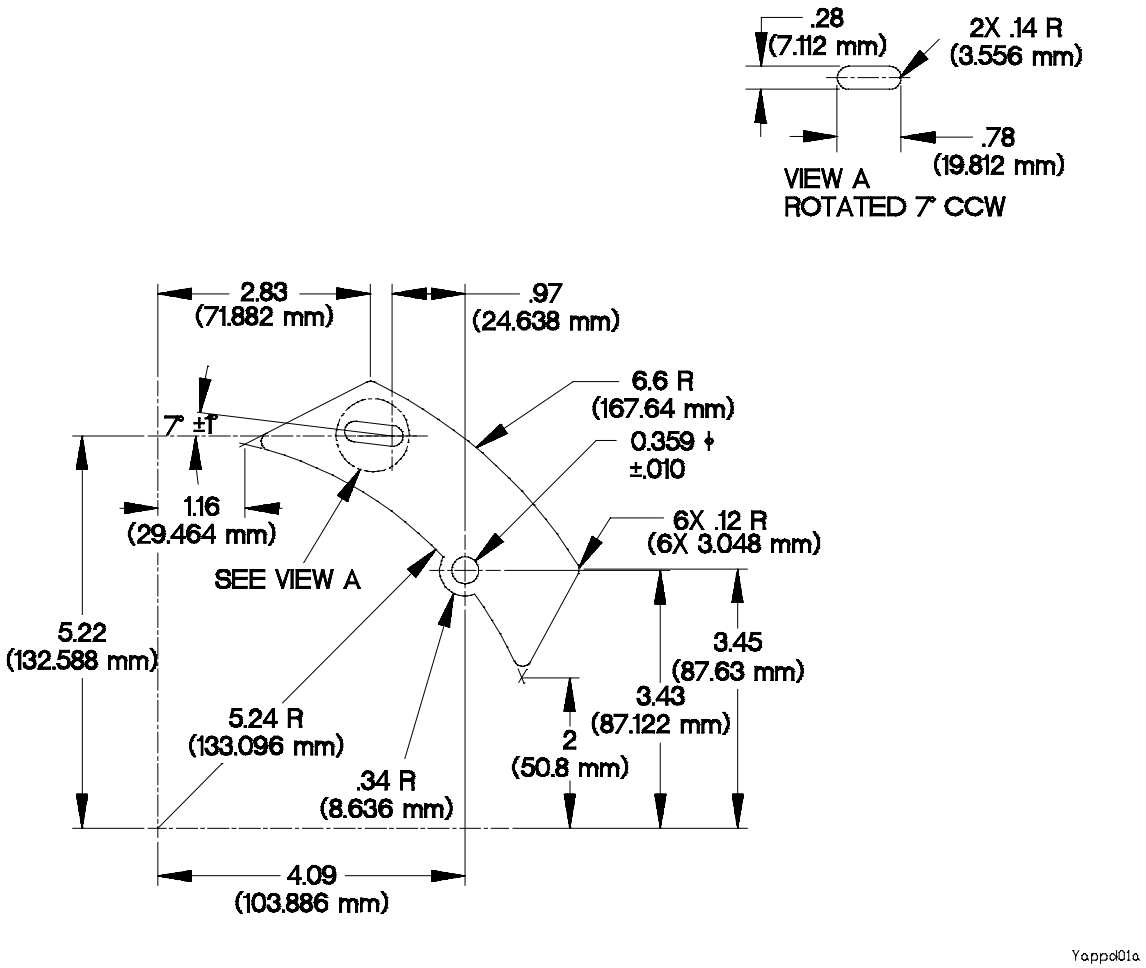



**Figure D-1. Brake Adjusting Tool Support**

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

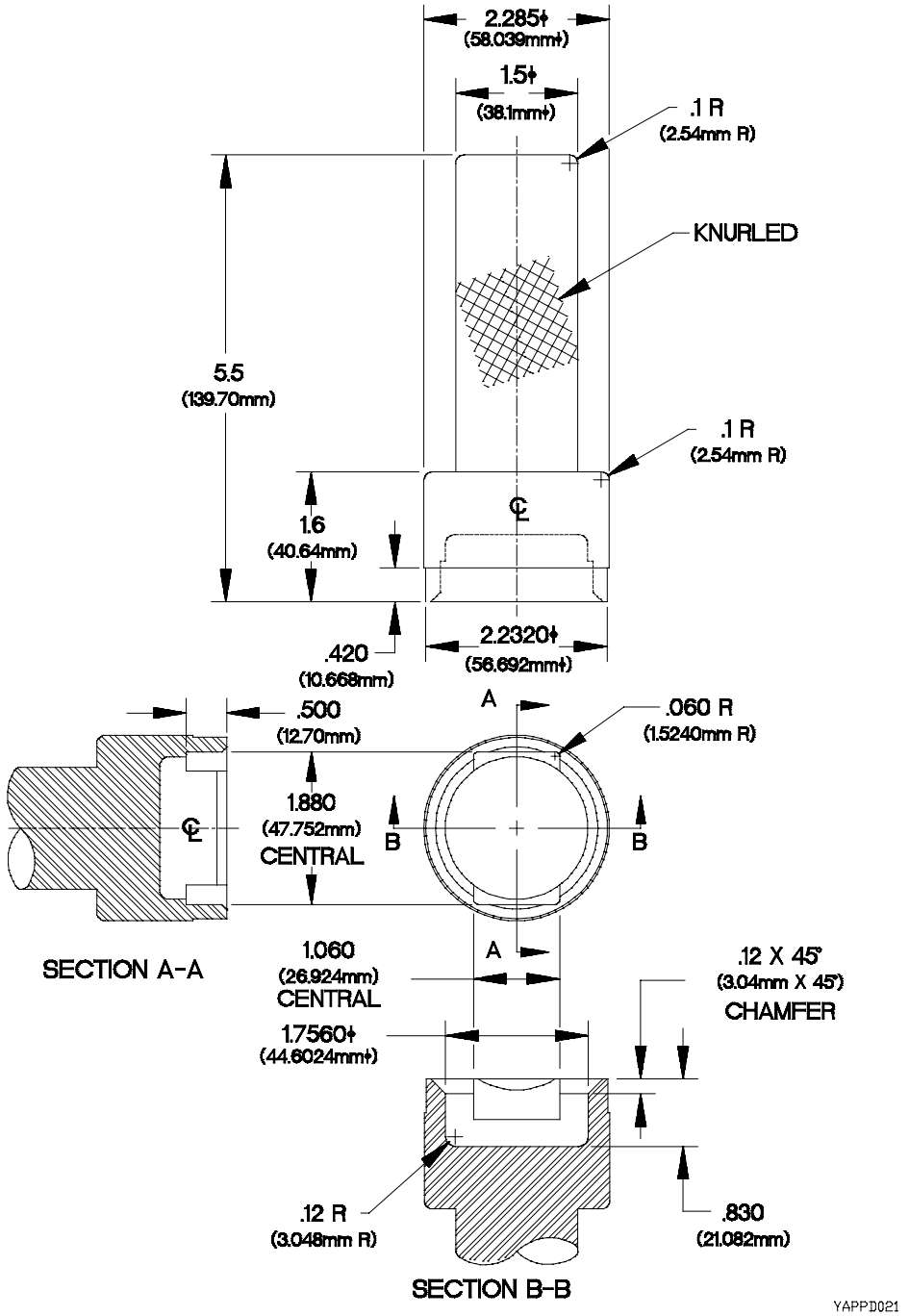



**Figure D-2. Brake Plunger Seal Driver**

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

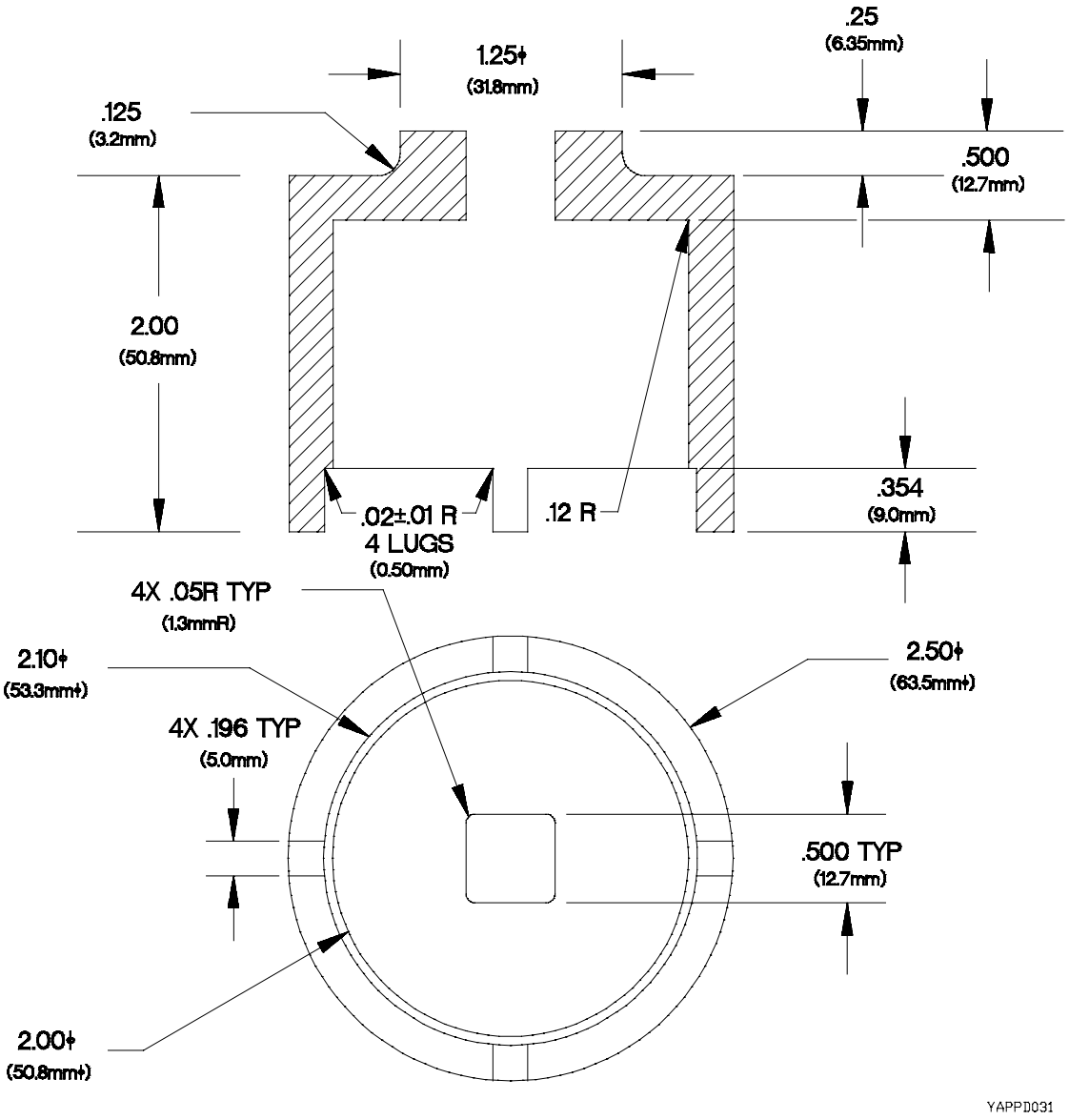



**Figure D-3. Cab Front Support Spanner Socket**

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)

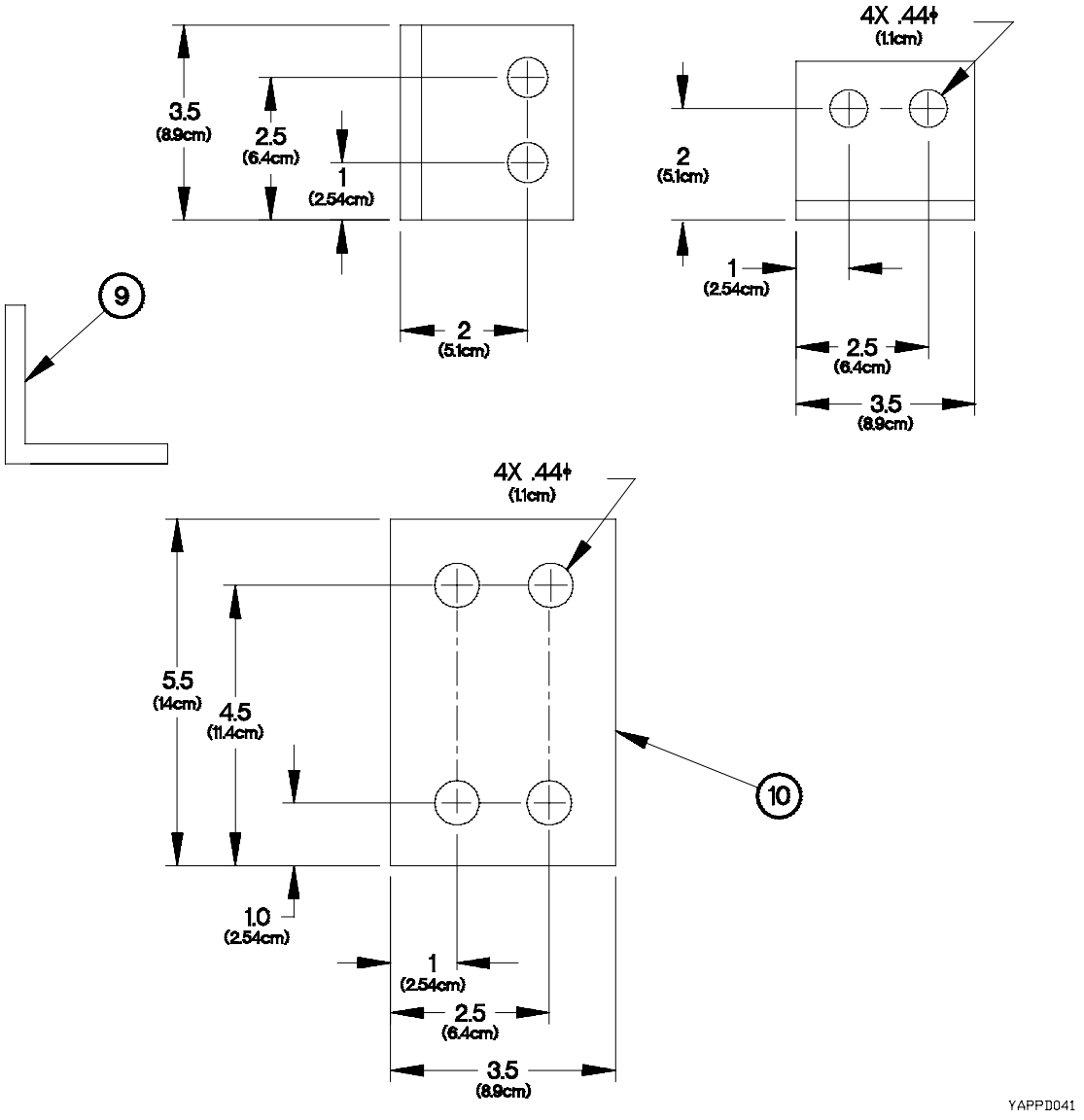



**Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets**

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.

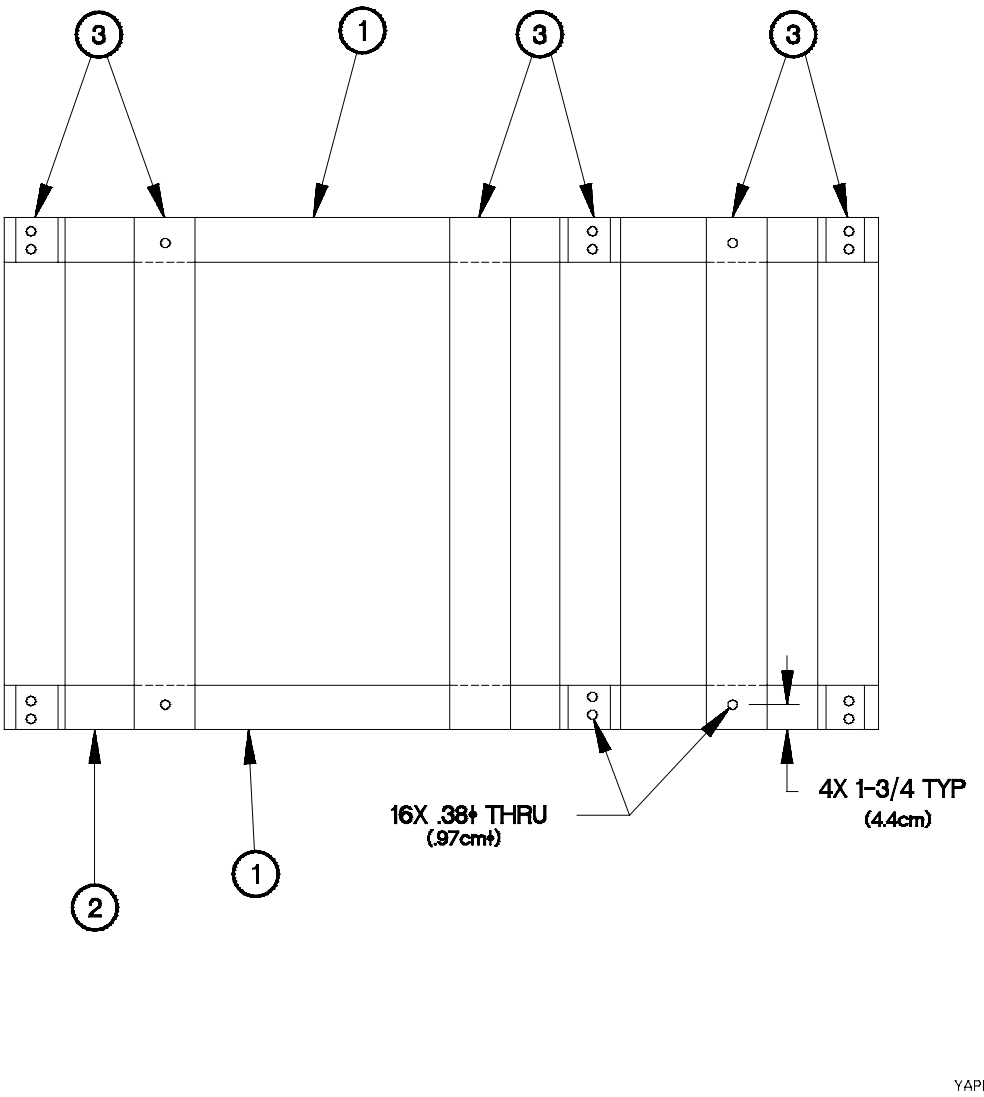



**Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations**

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)

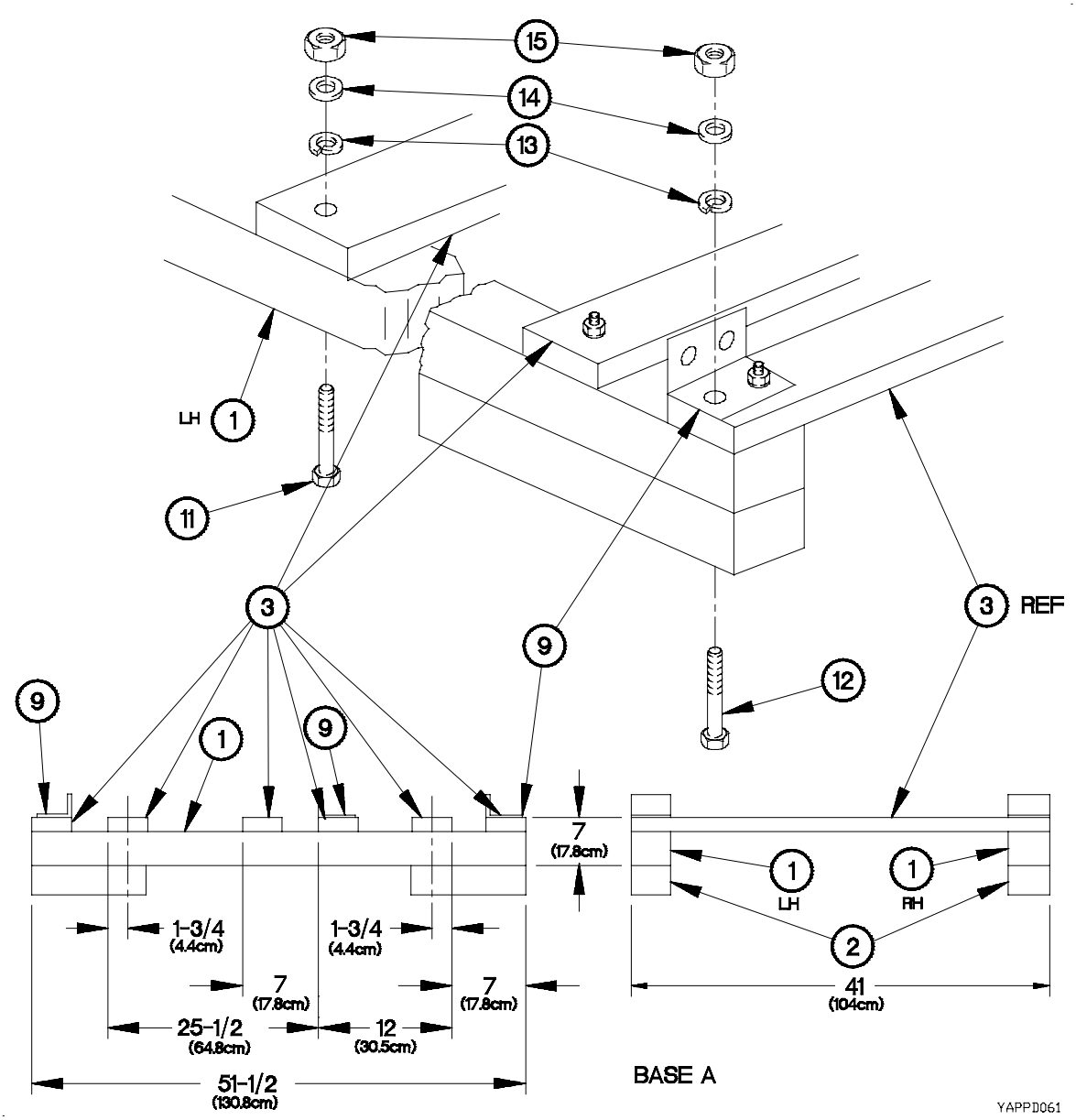



**Figure D-6. Cab Maintenance Stand Base Fabrication**

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**.

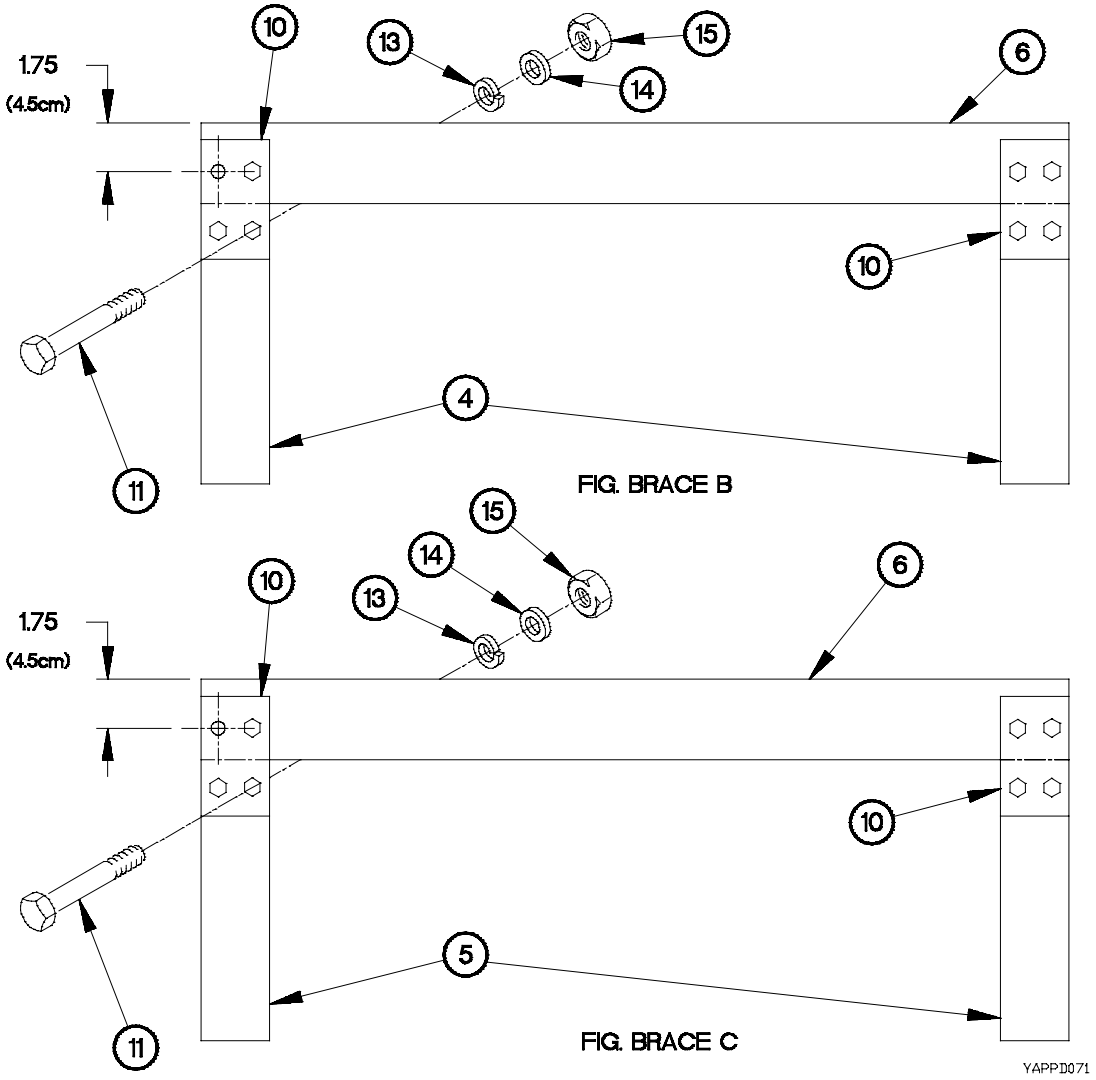



**Figure D-7. Cab Maintenance Stand Brace Bracket Locations**

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)

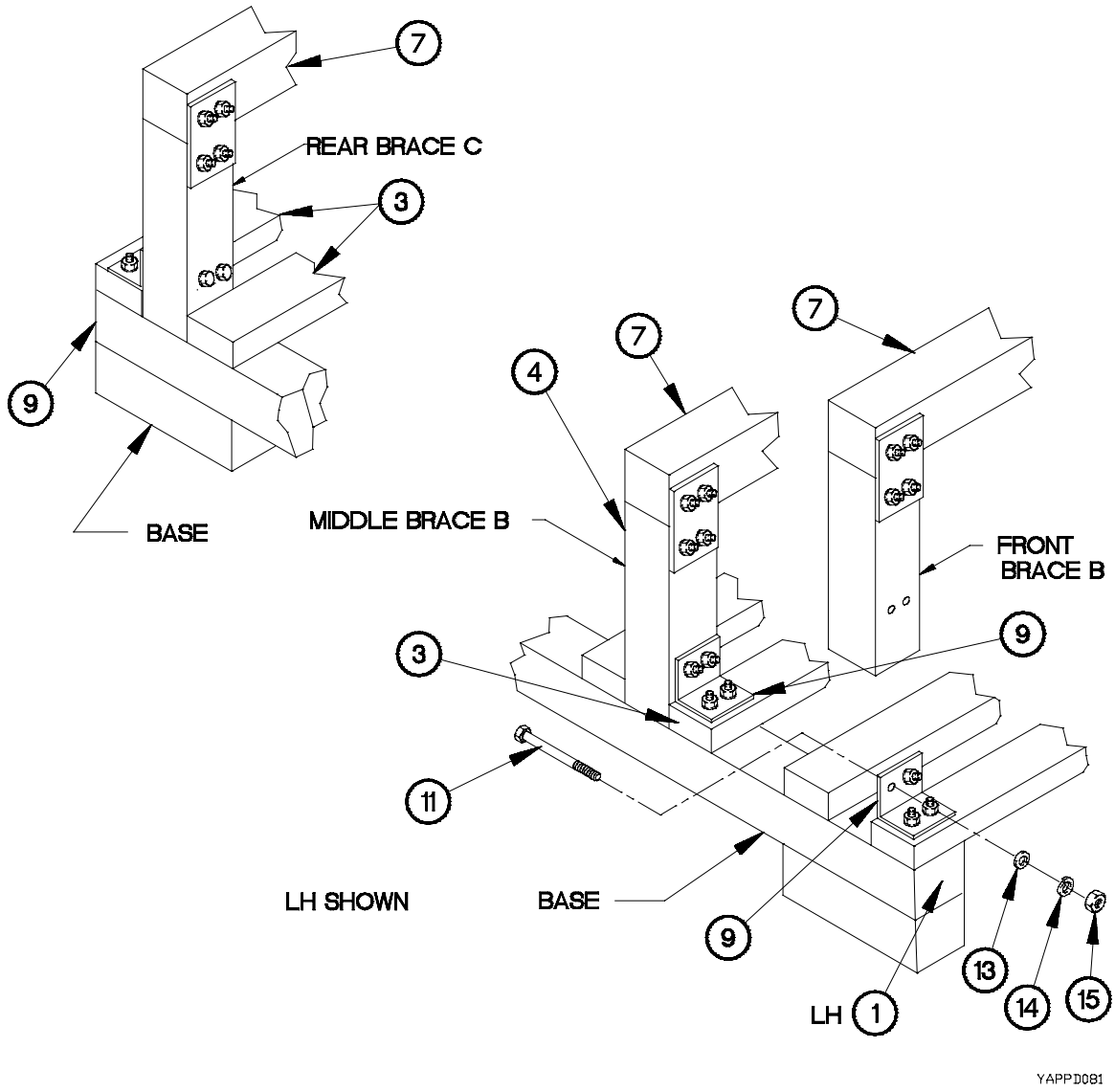



**Figure D-8. Cab Maintenance Stand Brace to Base Assembly**

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.

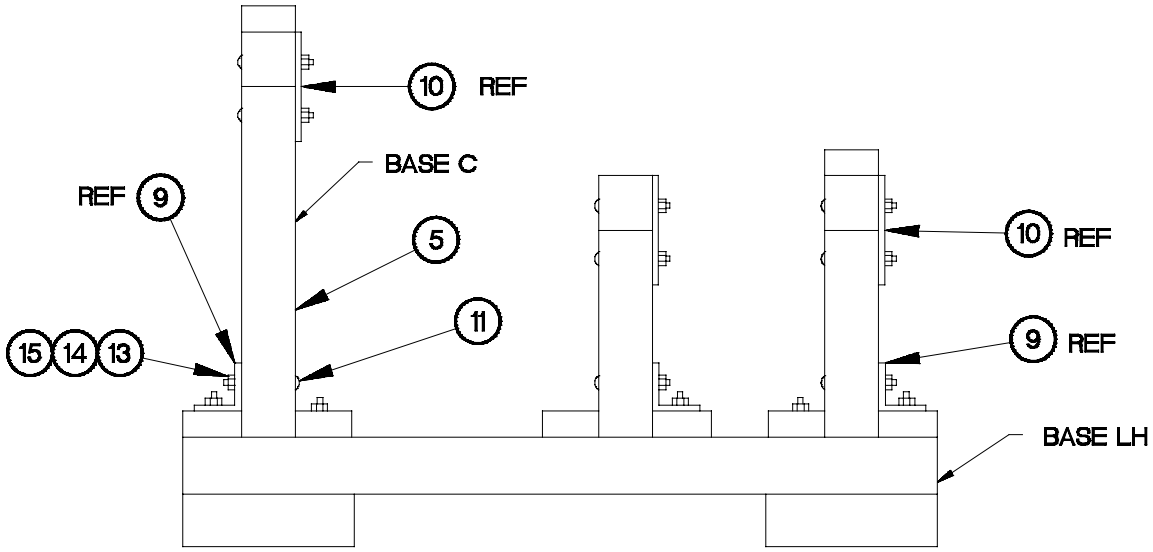



**Figure D-9. Cab Maintenance Stand Side Braces Side View**

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)

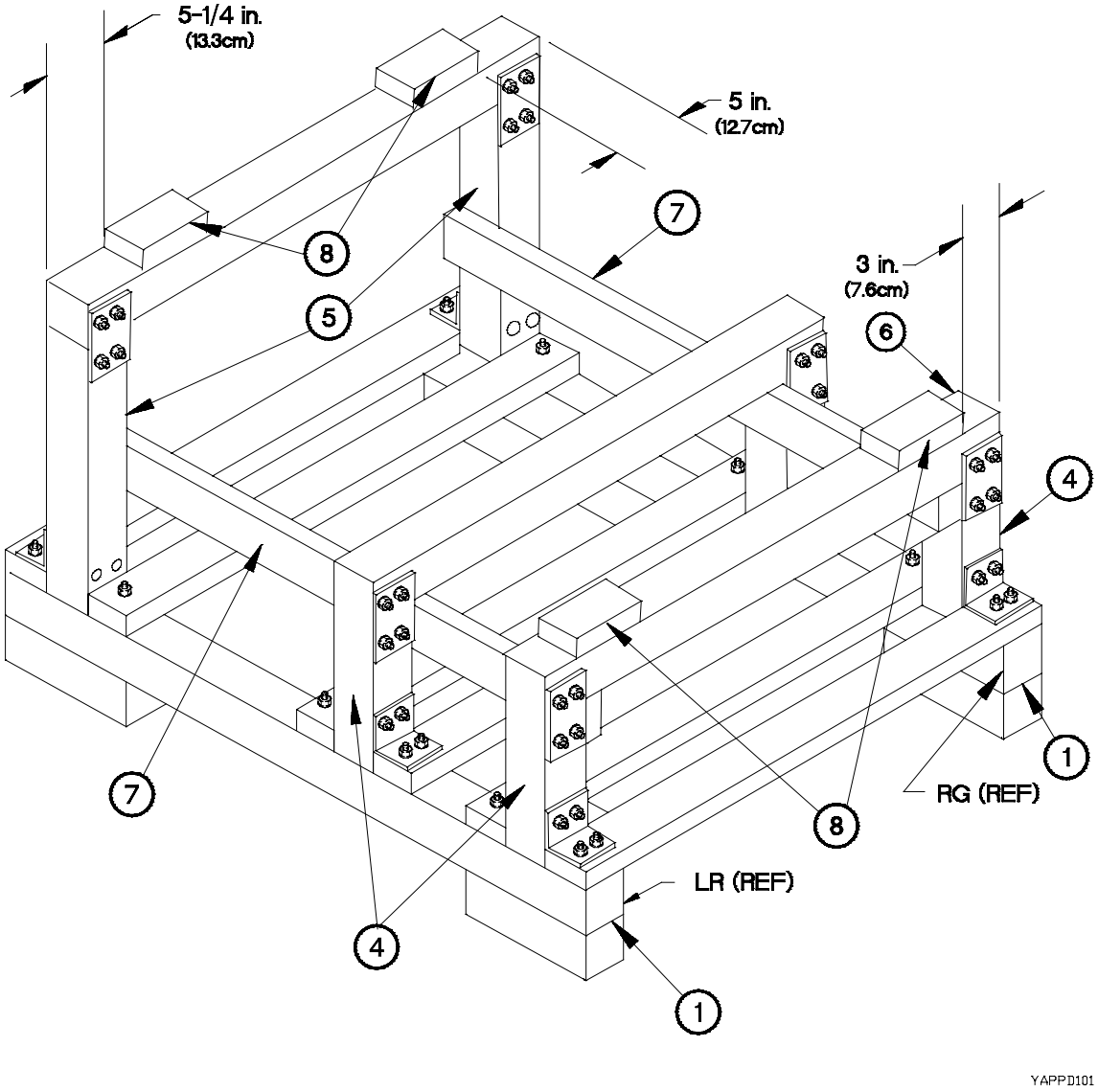



**Figure D-10. Cab Maintenance Stand Assembly**

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 |

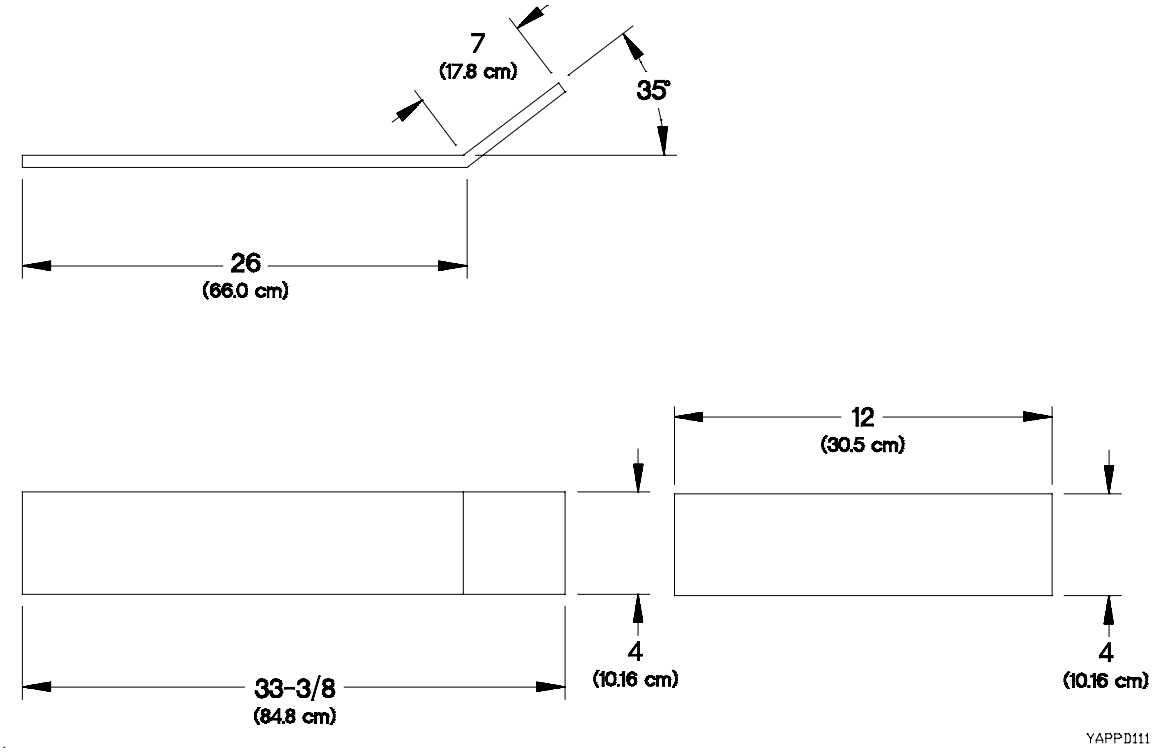



**Figure D-11. Cab Support Tool Strut and Cab Rest**

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)

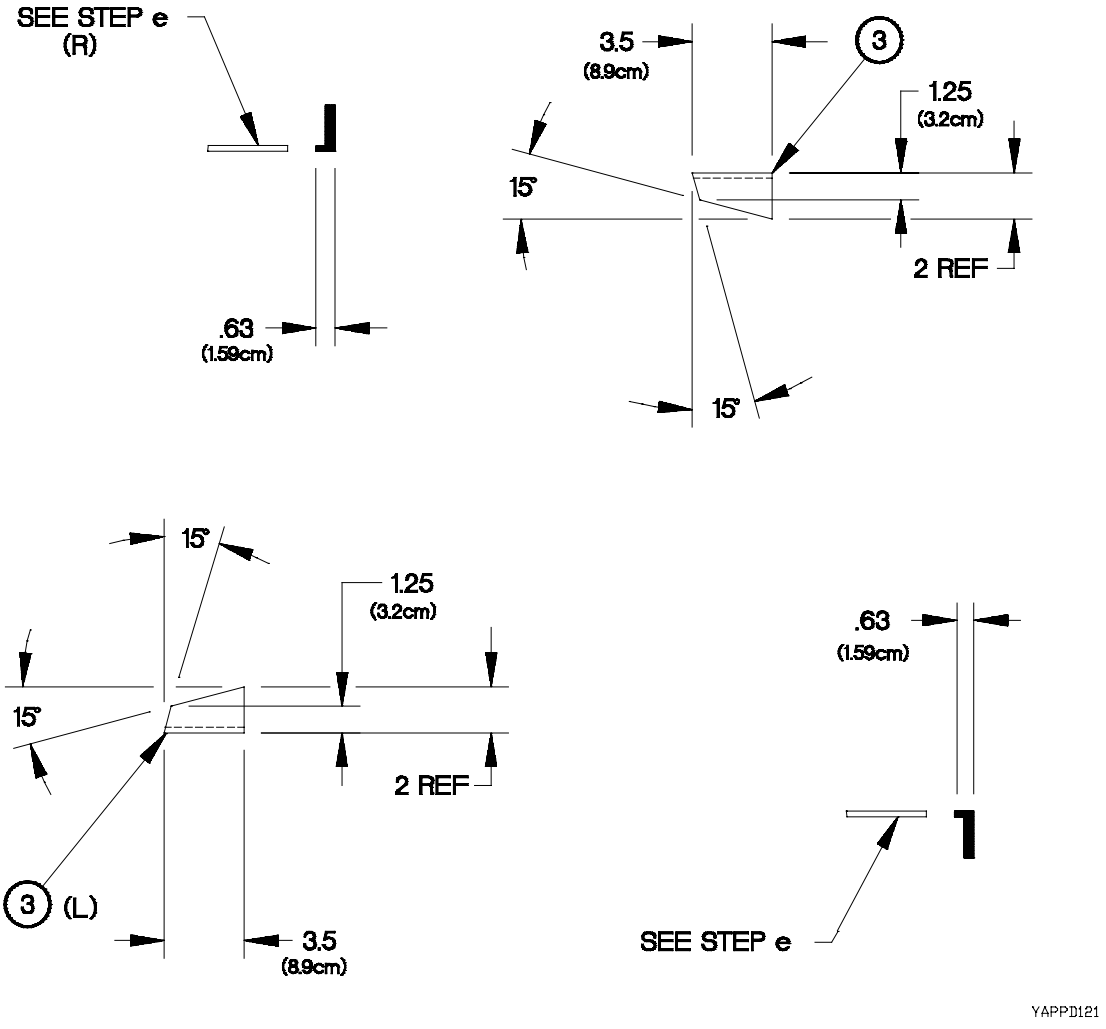



**Figure D-12. Cab Support Tool Seat**

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.

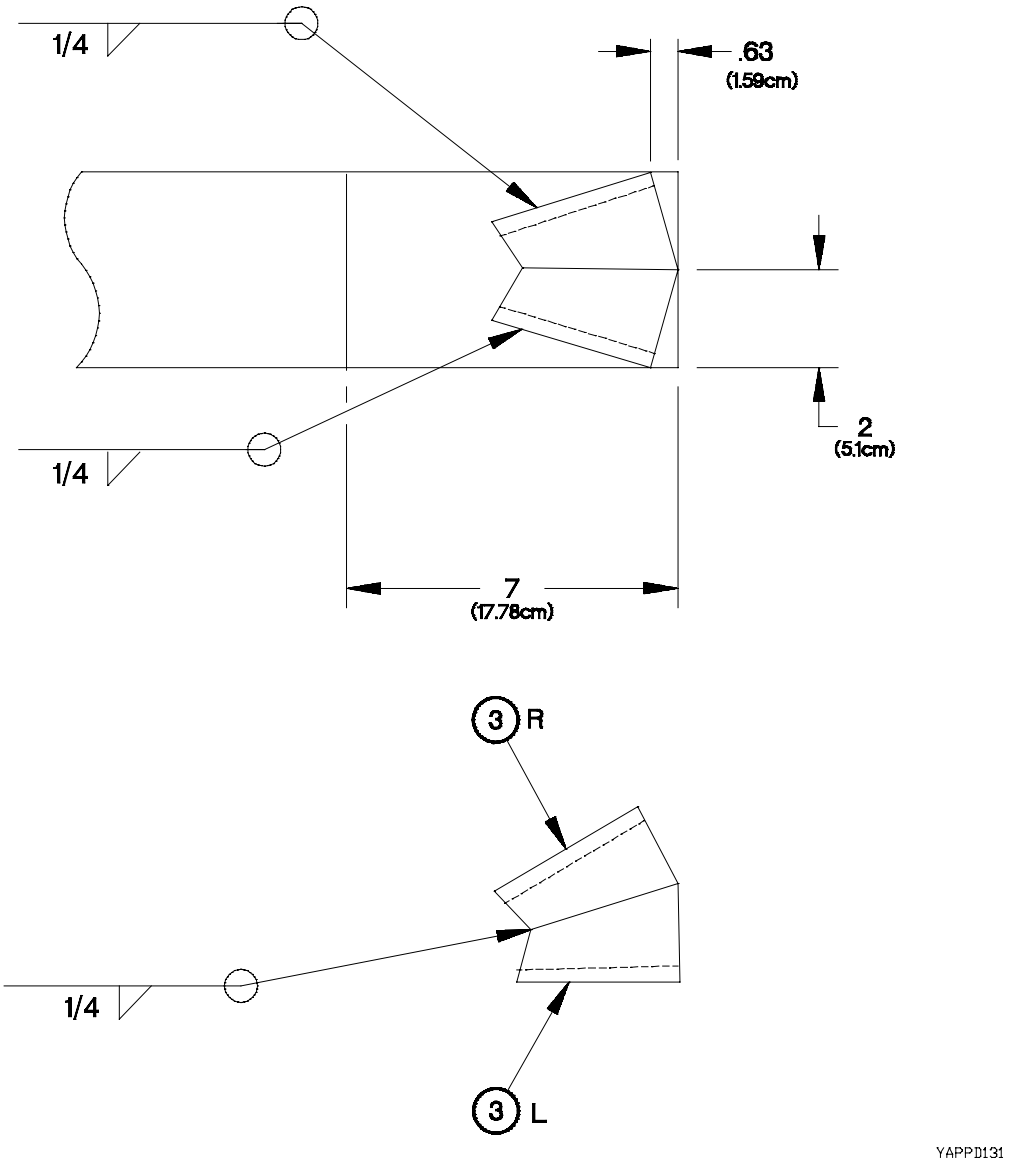



**Figure D-13. Cab Support Tool Seat Layout**

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)

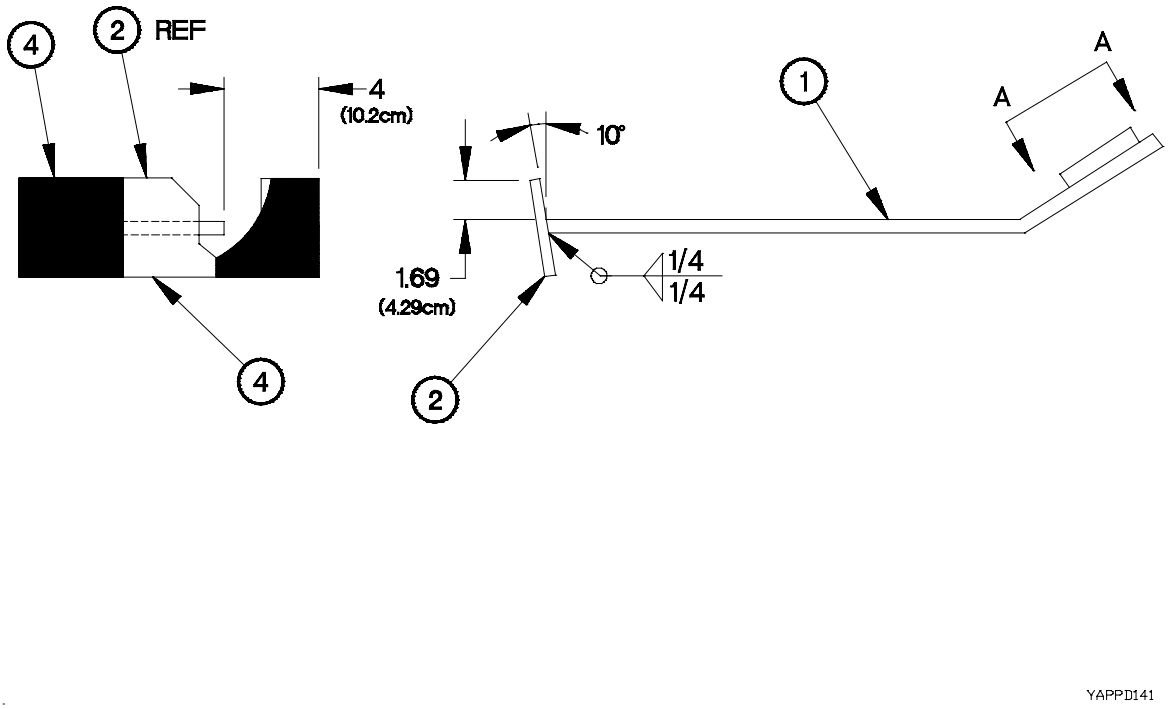



**Figure D-14. Cab Support Tool Assembly**

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 |

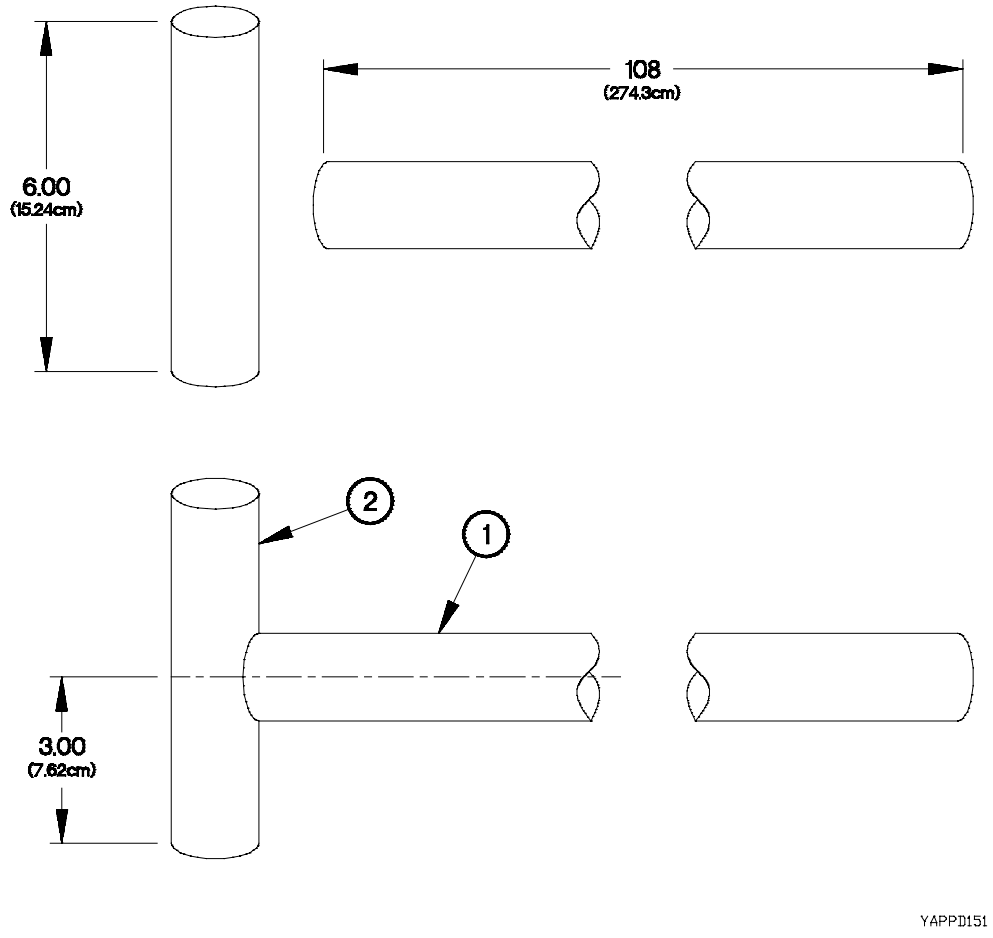



**Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly**

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 |

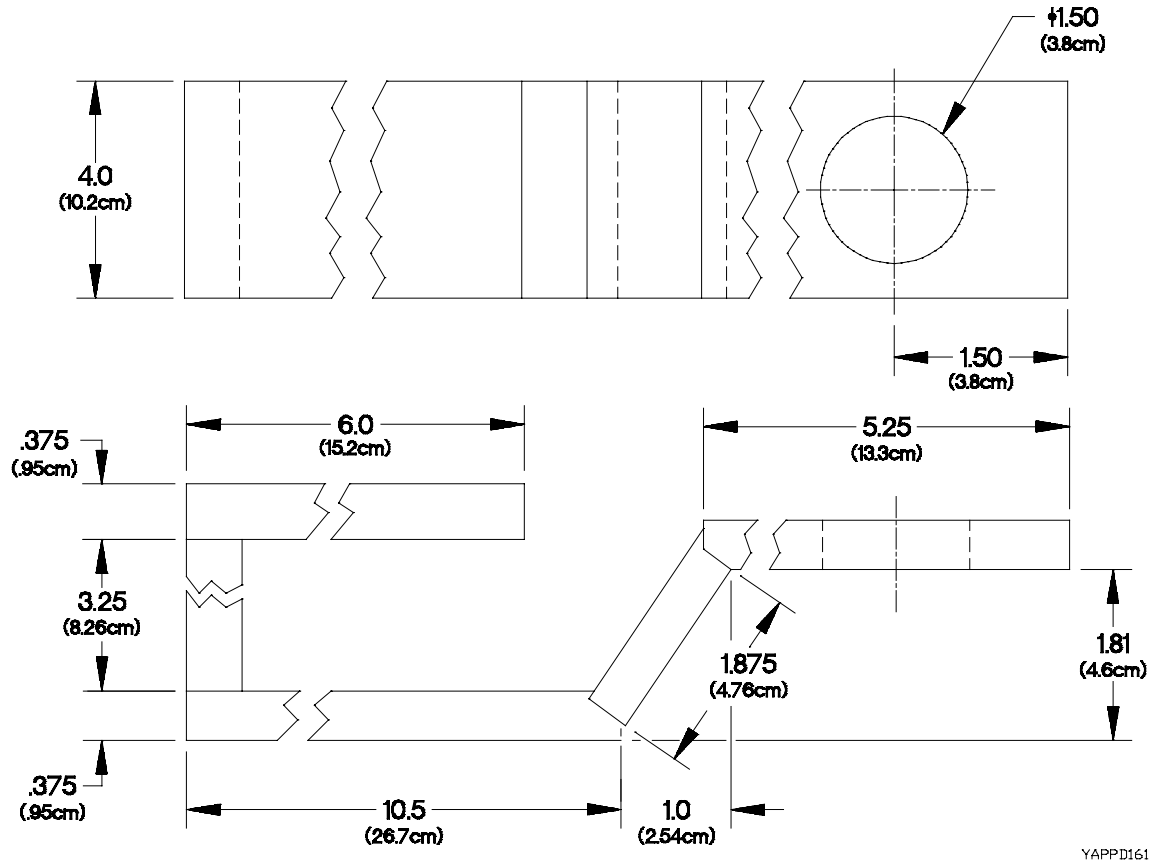



**Figure D-16 Dump Body Lifting Bracket**

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 |

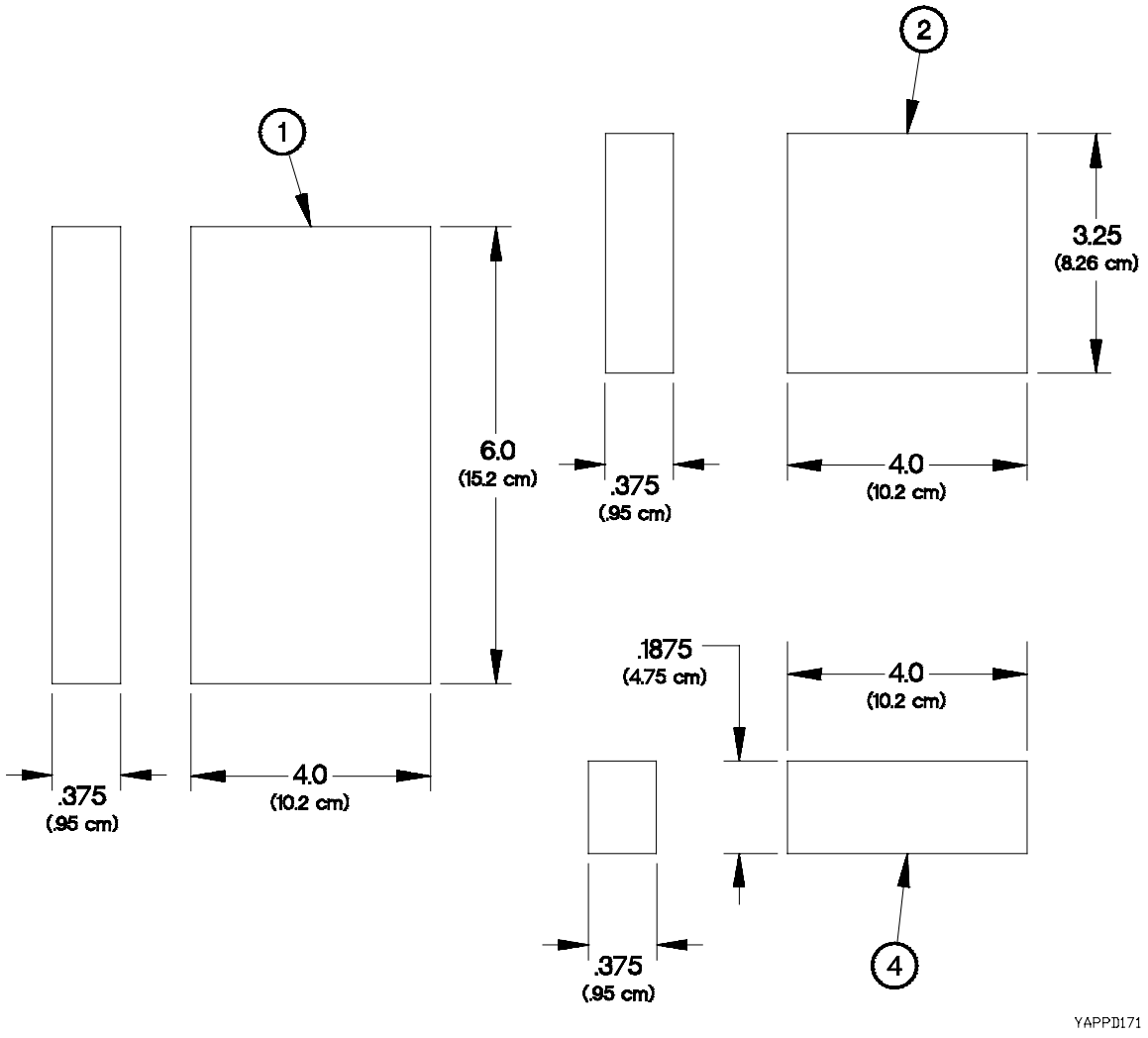



**Figure D-17. Rear, Top, and Guide Plate**

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 |

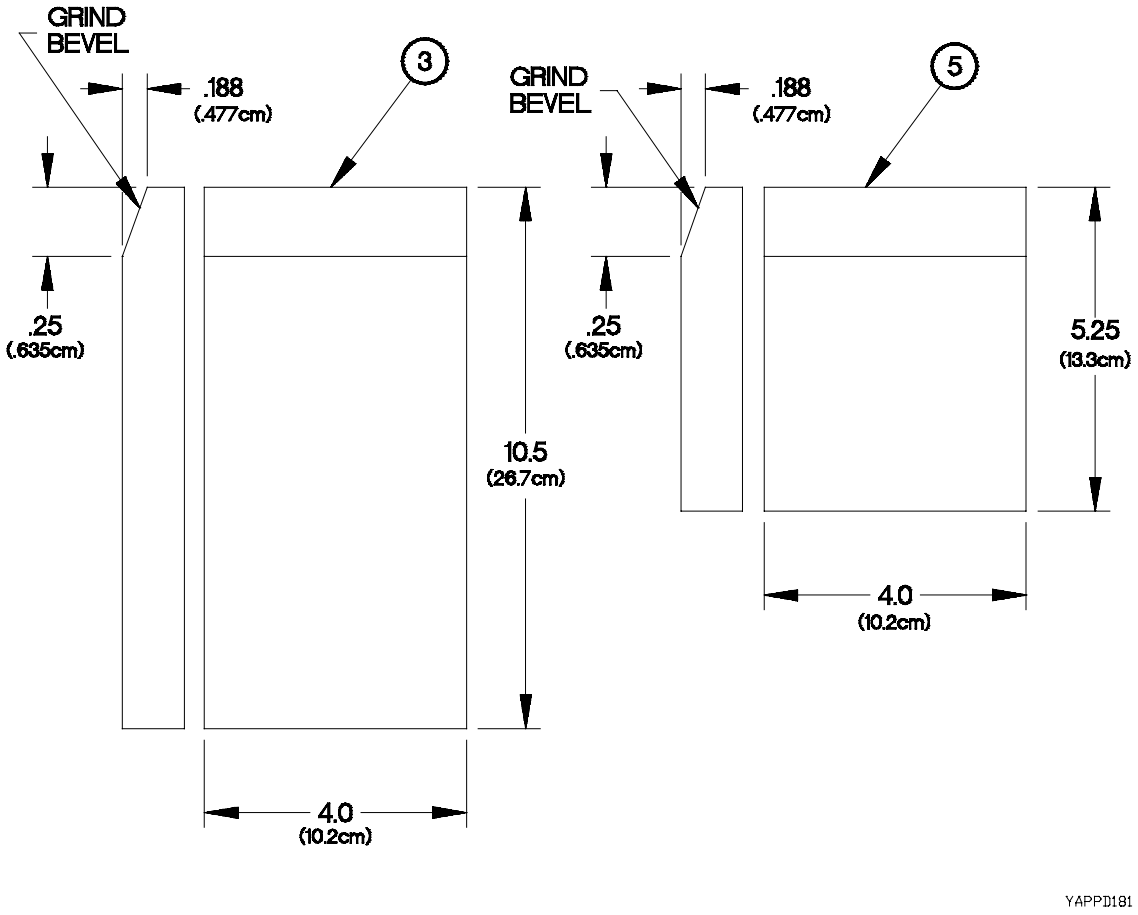



**Figure D-18. Front and Mounting Plate**

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 |

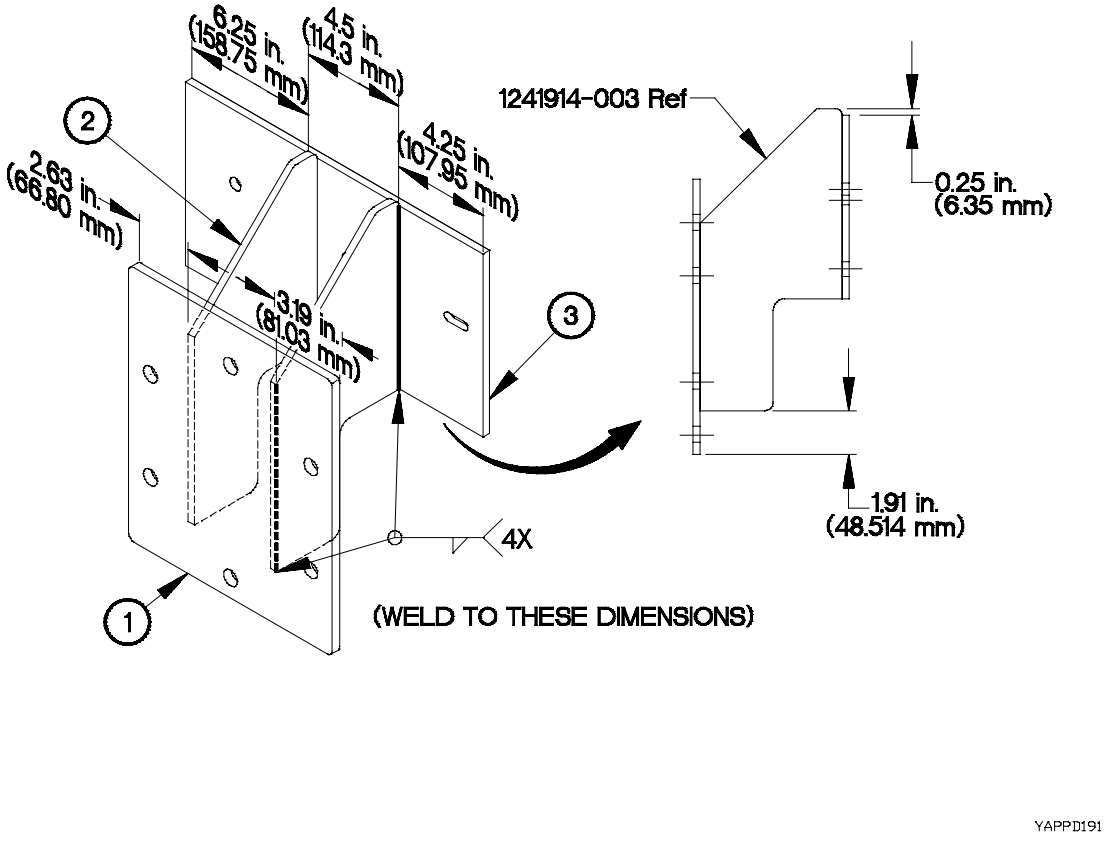



**Figure D-19. Engine Stand Bracket Assembly**

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 |

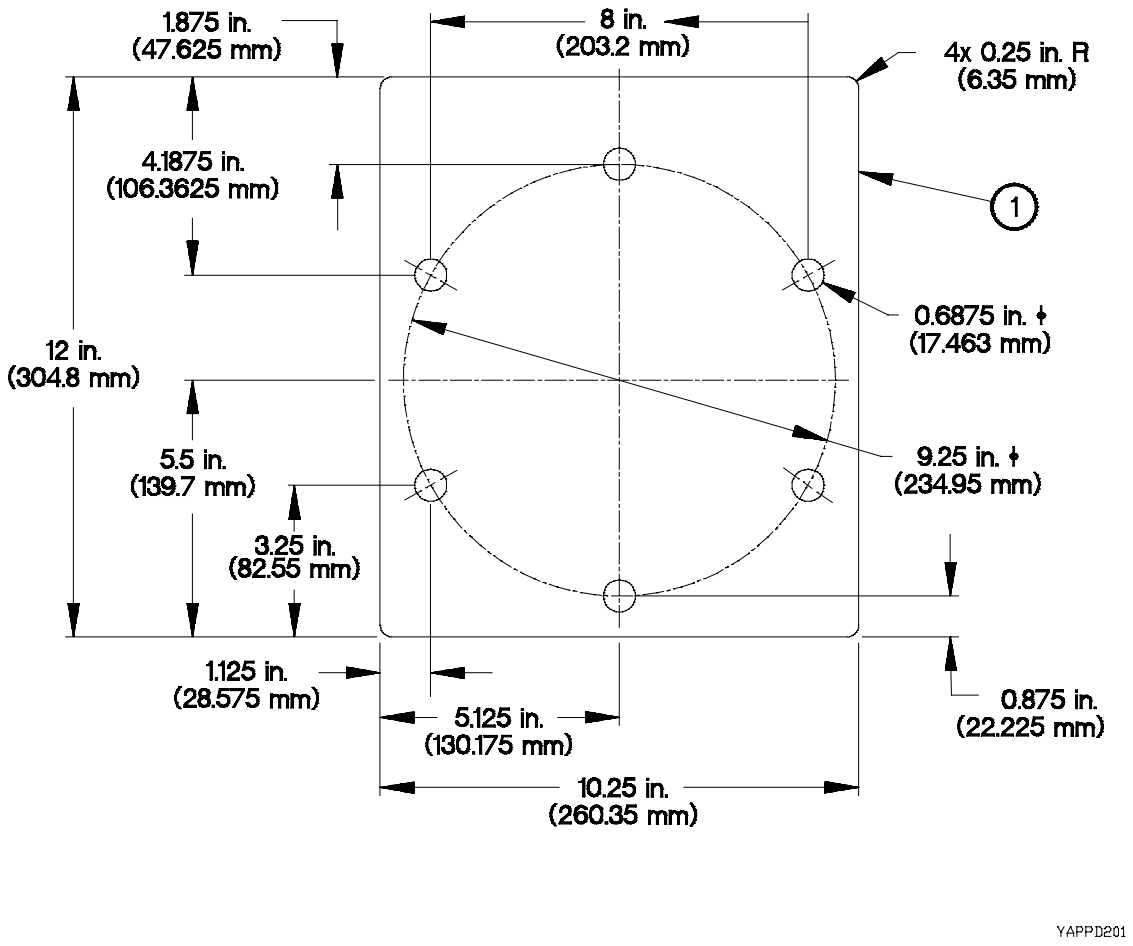



**Figure D-20. Engine Stand Bracket Front Plate**

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 |

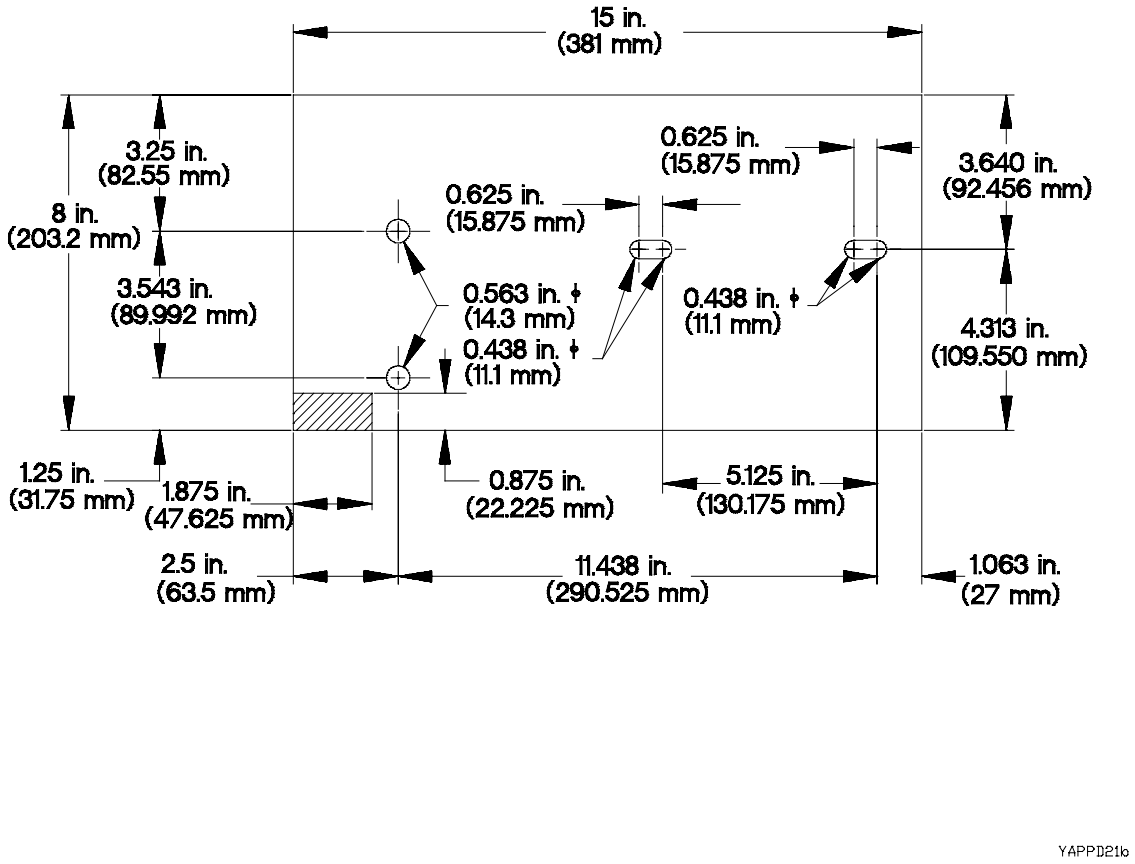



**Figure D-21. Engine Stand Bracket Rear Plate**

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 |

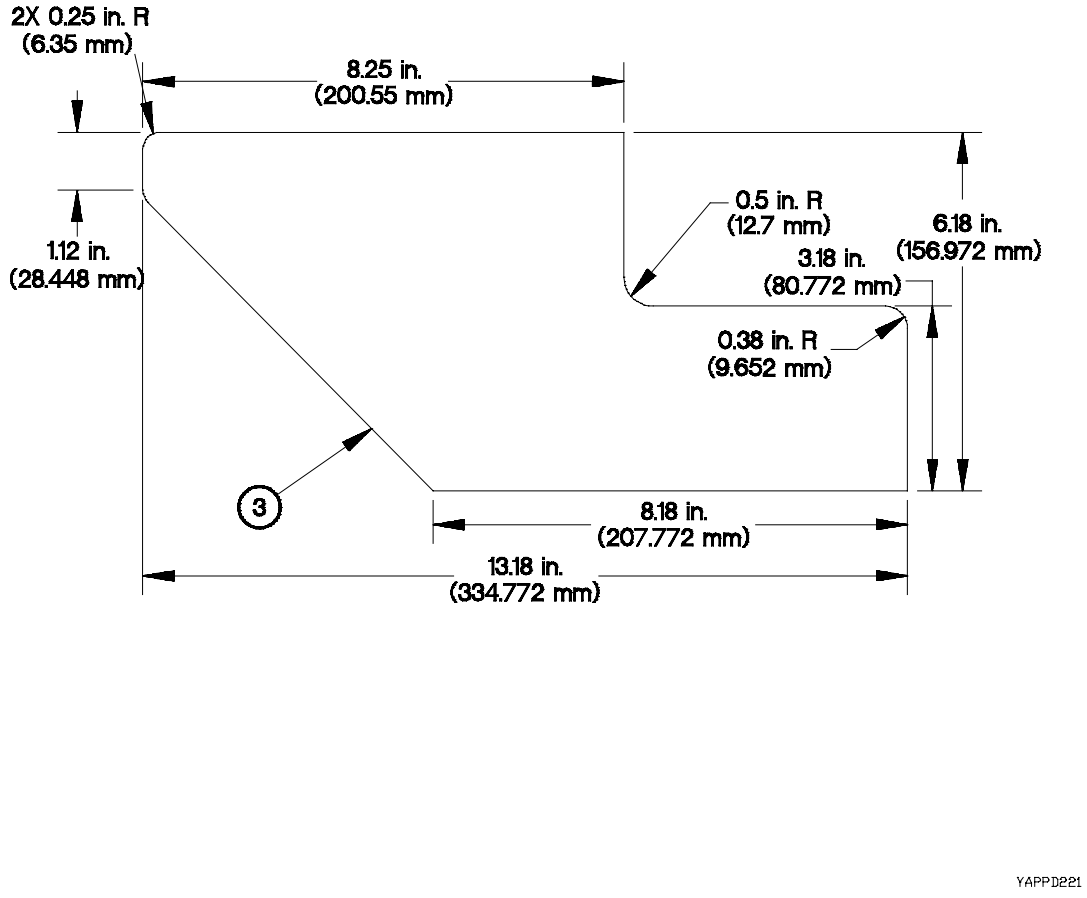



**Figure D-22. Engine Stand Bracket Side Plates**

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).

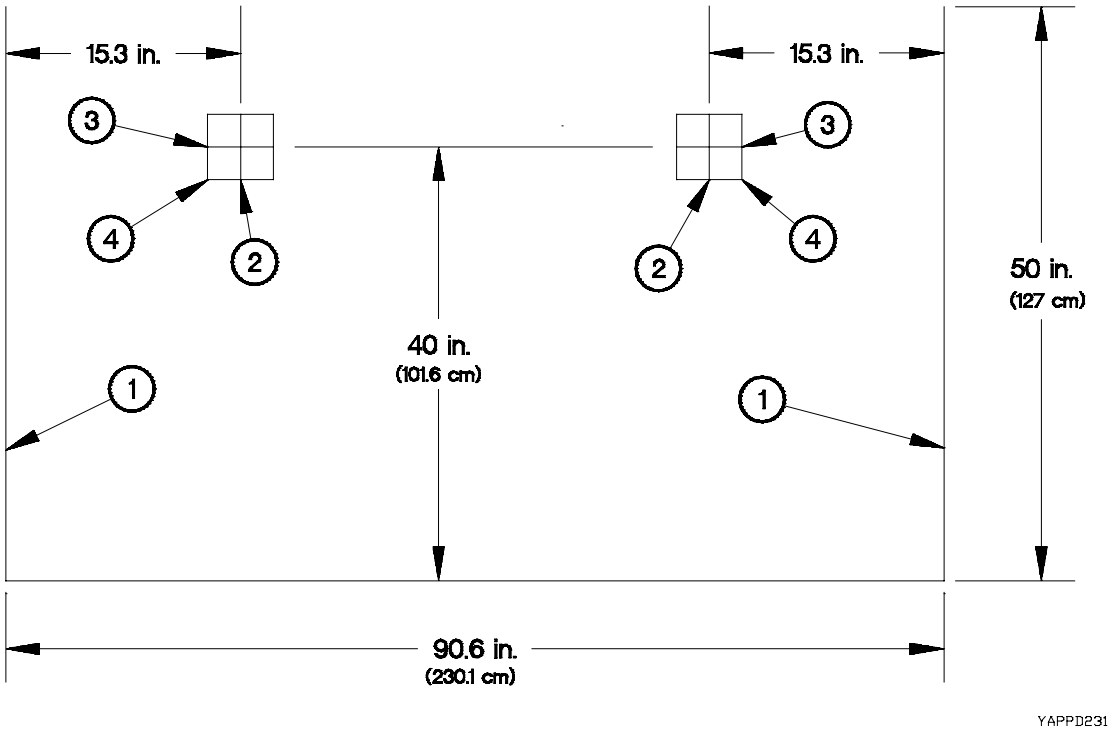



**Figure D-23. Headlight Adjustment Screen**

## 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 |

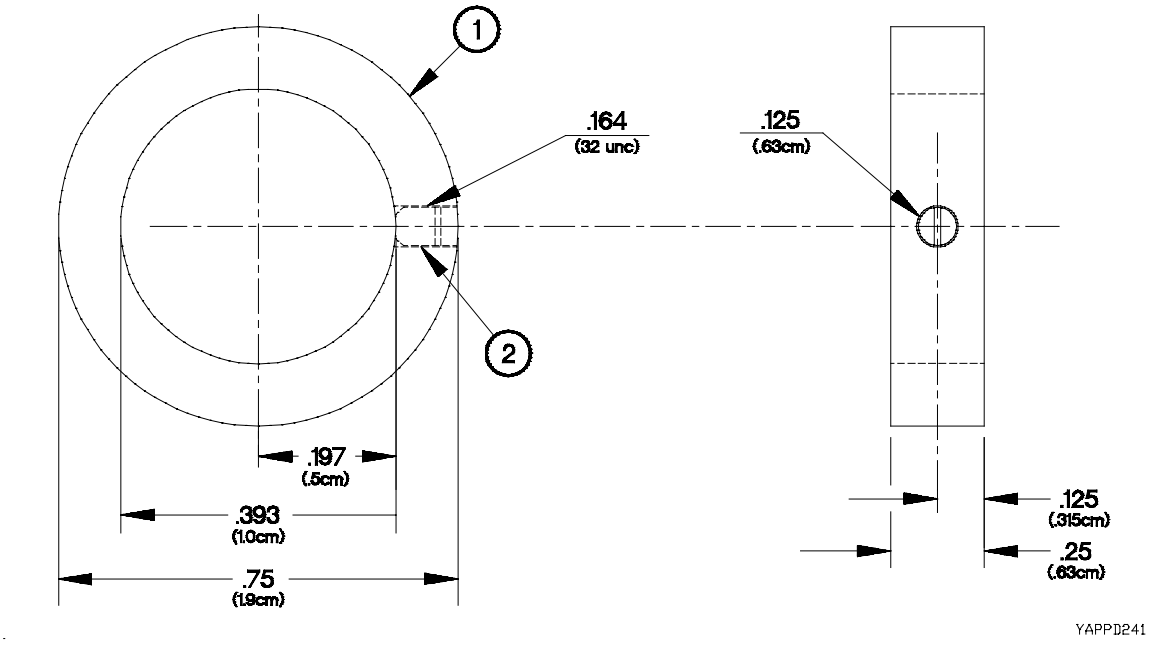



**Figure D-24. Machine Gun Ring Drill Stop**

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 |

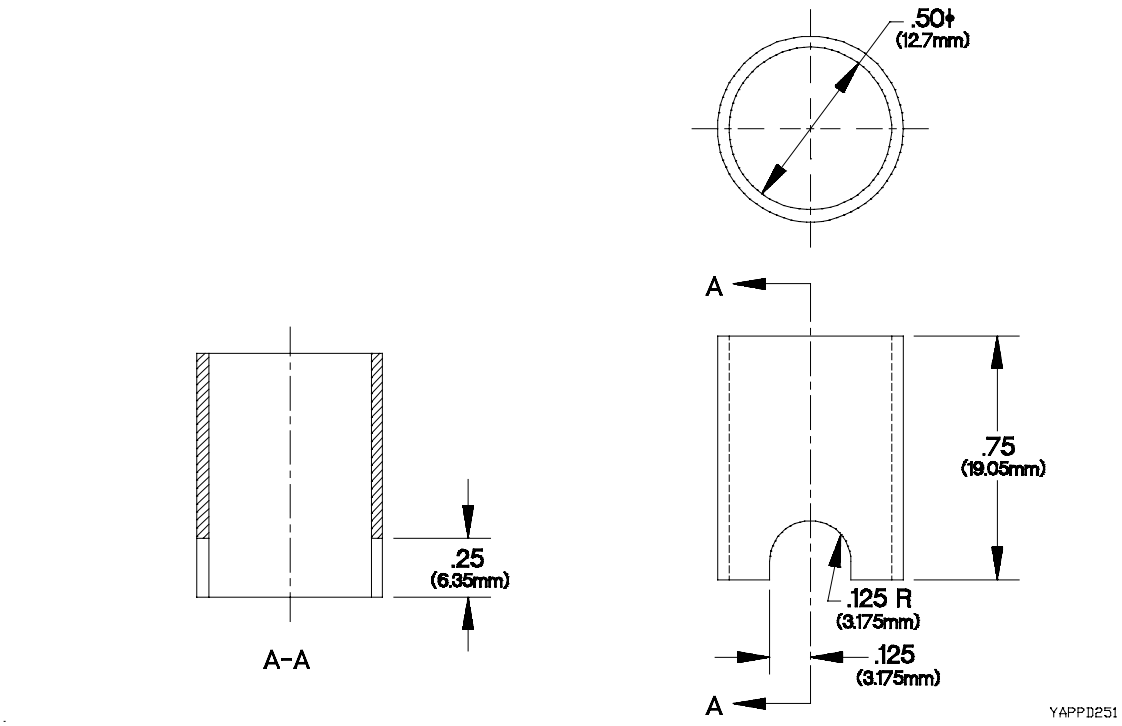



**Figure D-25. Main Valve Body Spring Compression Tool**

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 $\sqrt{\phantom{x}}$ 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 |

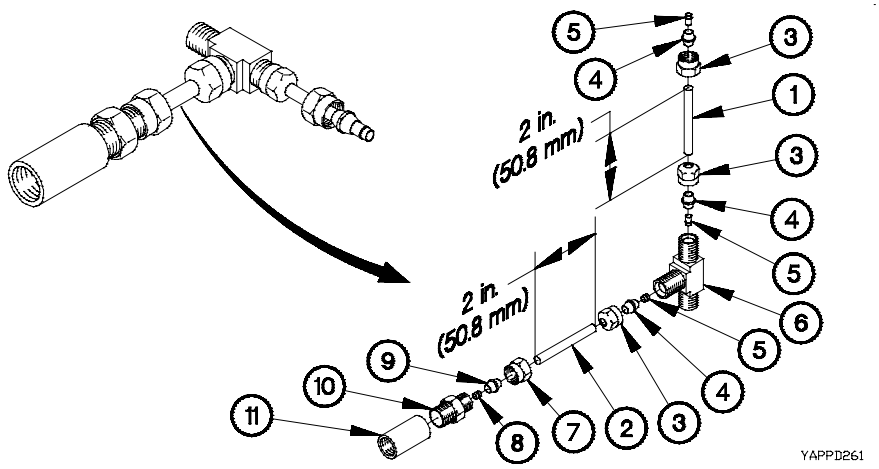



**Figure D-26. M1089 30K Winch Test Adapter**

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. |

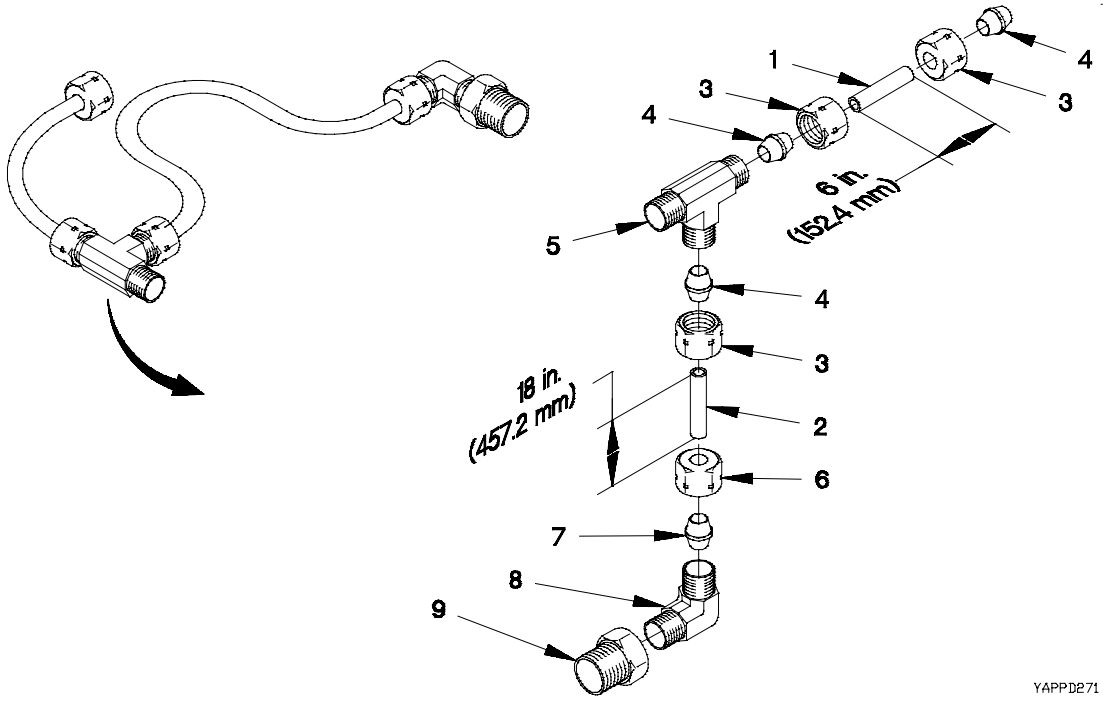



**Figure D-27. M1089 Solenoid Test Adapter**

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.
c. Remove three nuts (3) and ferrule sleeves (4) from tube tee (5).
d. Install two nuts (3) and ferrule sleeves (4) on nonmetallic tubing (1).
e. Install nonmetallic tubing (1) on tube tee (5).
f. Remove nut (6) and ferrule sleeve (7) from pipe to tube elbow (8).
g. Install two nuts (3 and 6) and ferrule sleeves (4 and 7) on nonmetallic tubing (2).
h. Install nonmetallic tubing (2) on tube tee (5).
i. Install nut (6) on pipe to tube elbow (8).
j. 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 |

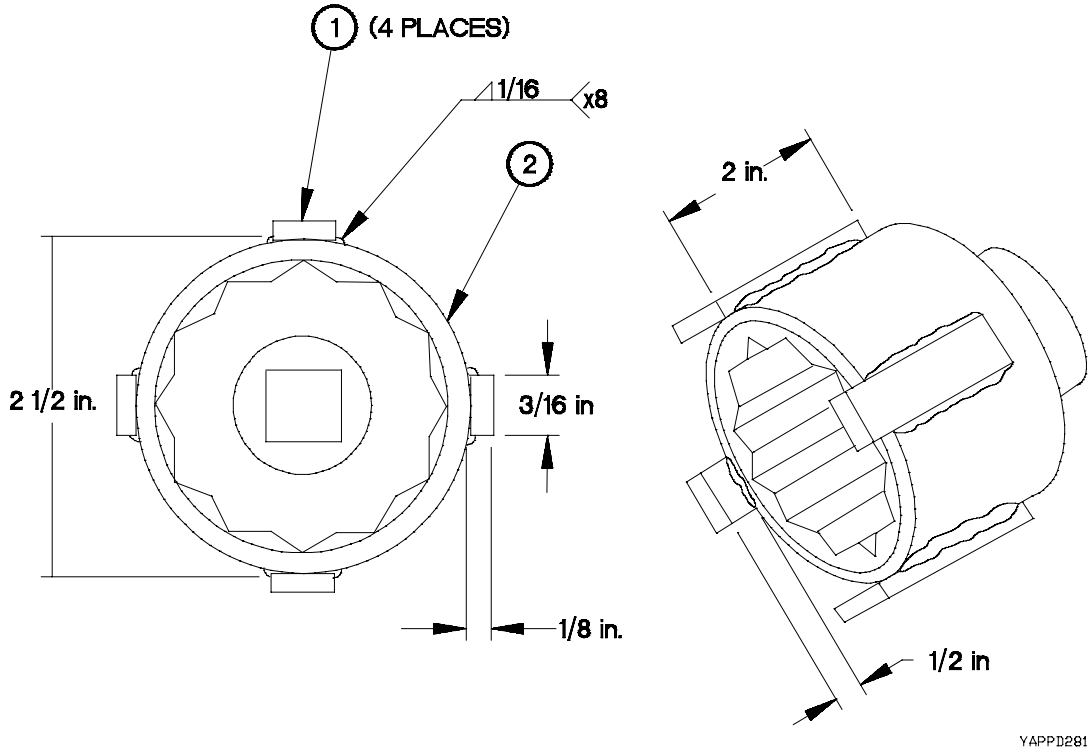



**Figure D-28. Spanner Socket Tool**

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 |

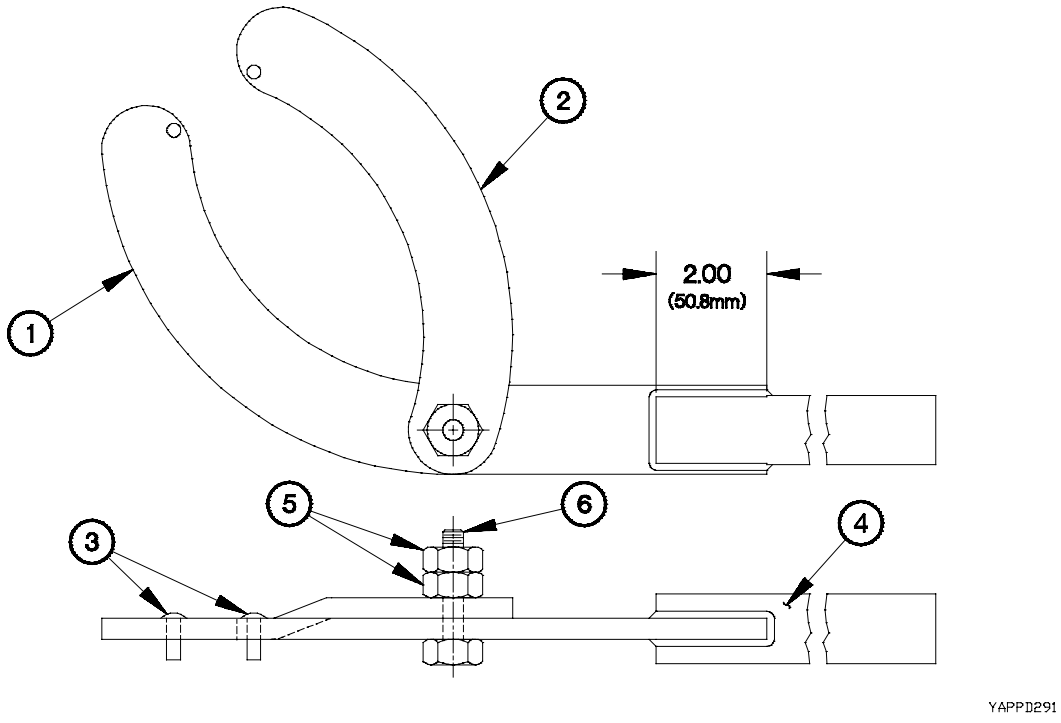



**Figure D-29. Spanner Wrench Tool Assembly**

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)

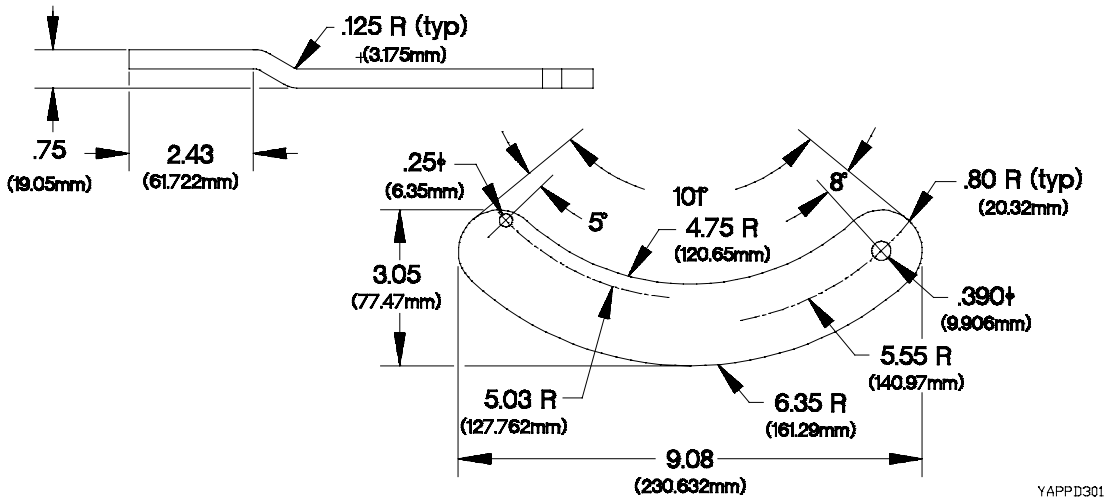



**Figure D-30. Spanner Wrench Jaw**

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.

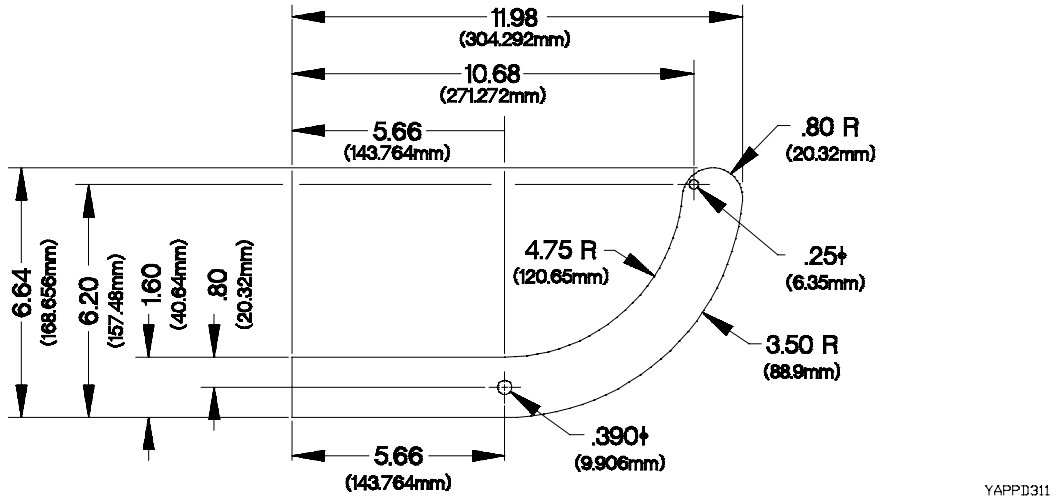



**Figure D-31. Spanner Wrench Handle Piece**

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 |

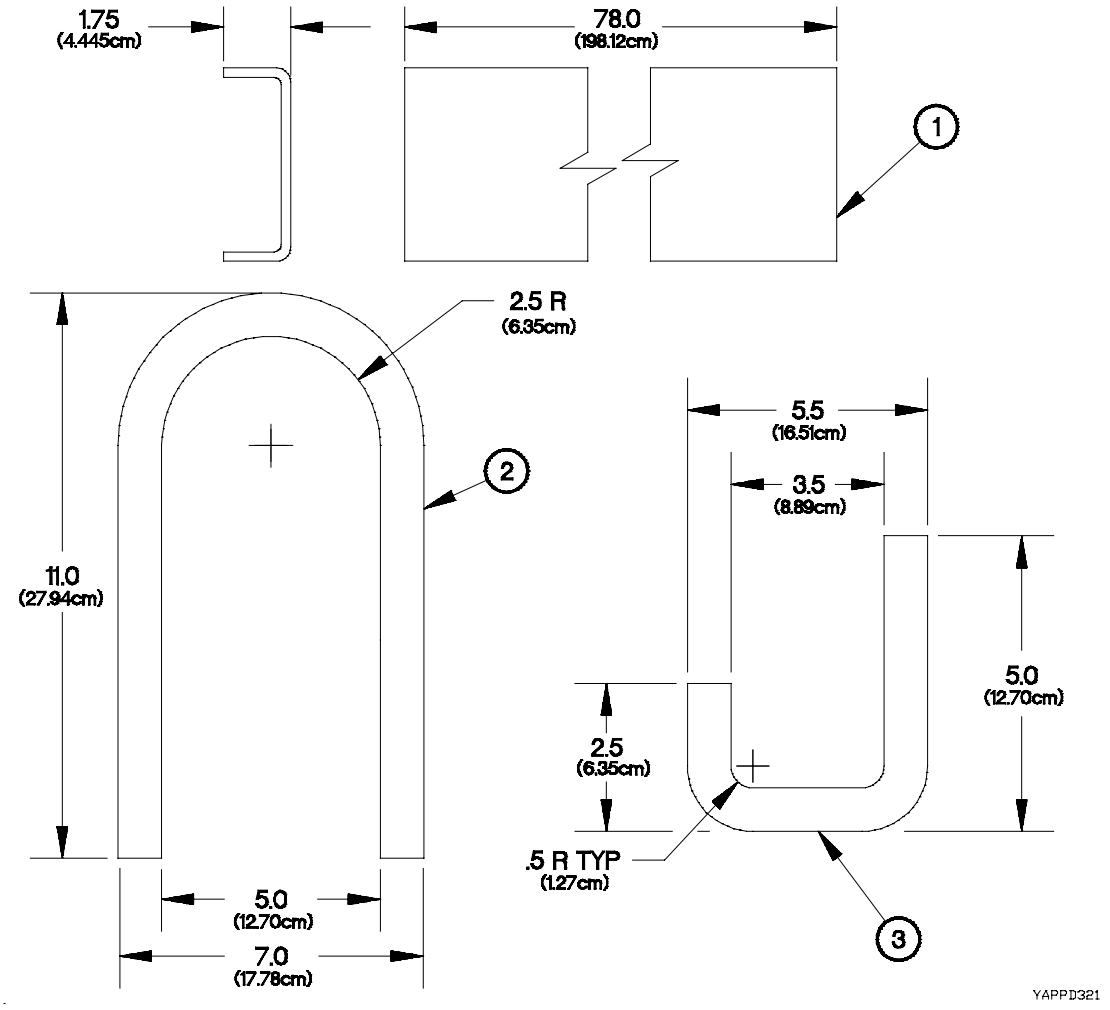



**Figure D-32. Spreader Bar Layout**

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)

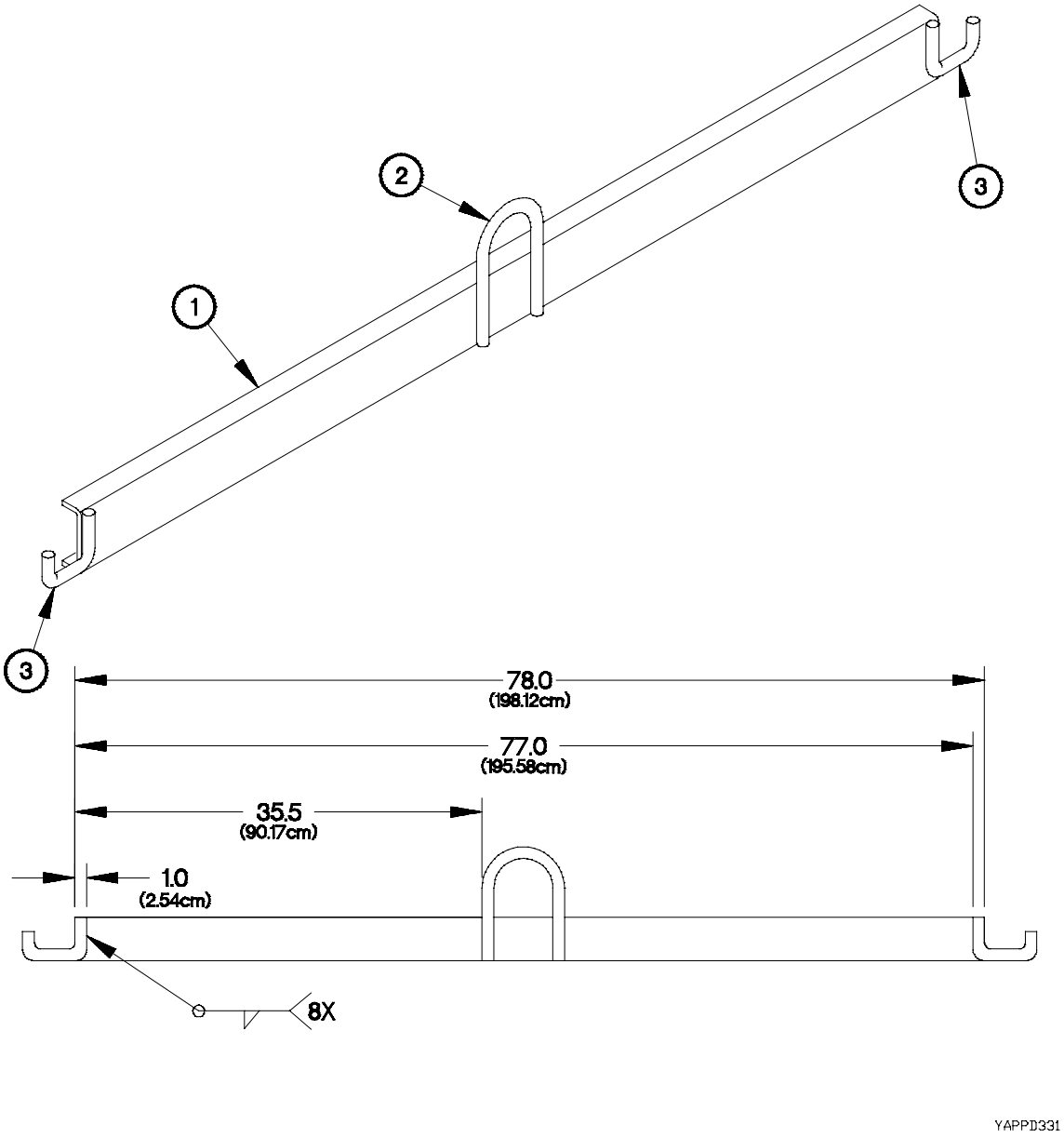



**Figure D-33. Spreader Bar Assembly**

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 |

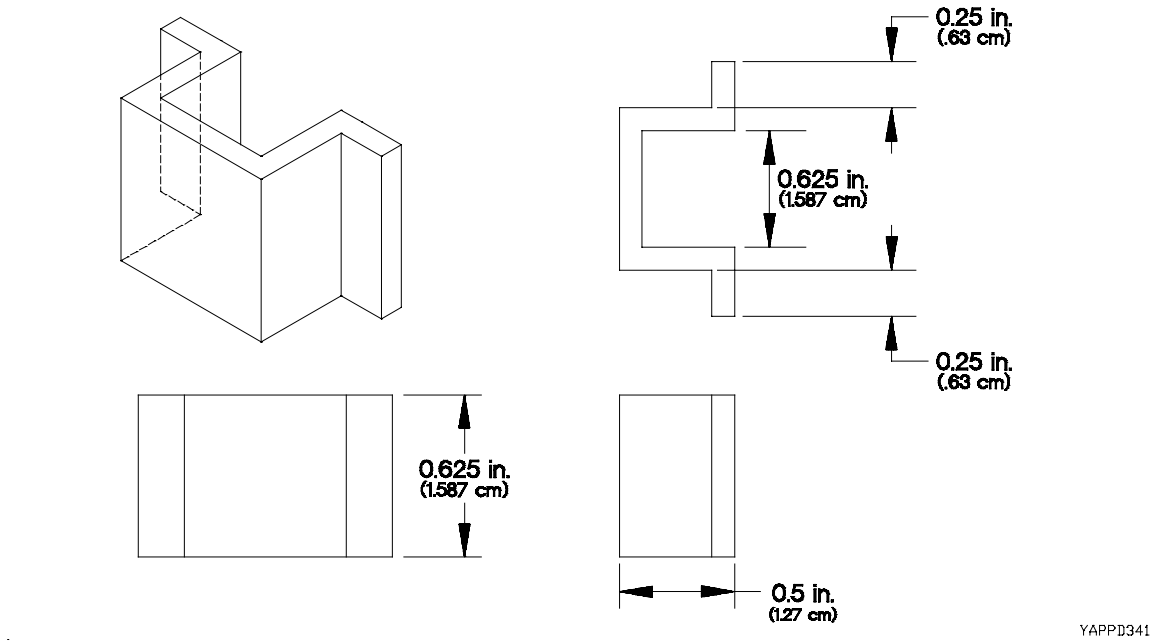



**Figure D-34. Steering Stop Shim Gage**

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 |

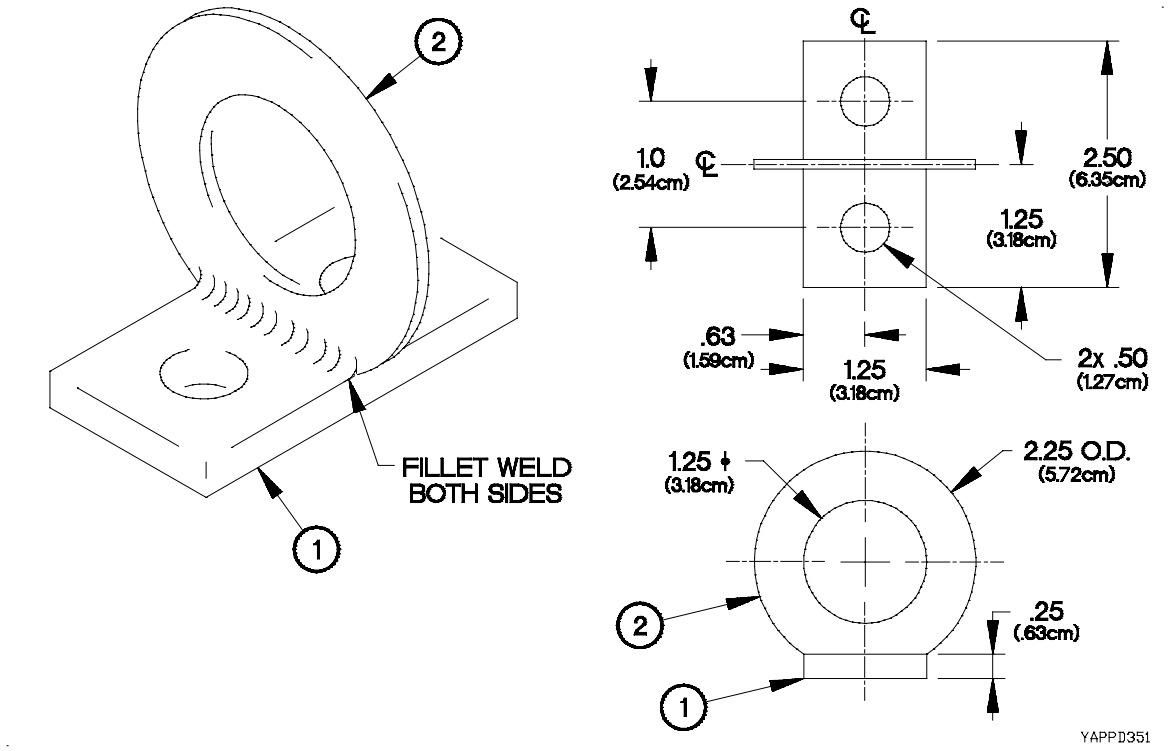



**Figure D-35 Swingdrive Assembly Bracket**

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 |

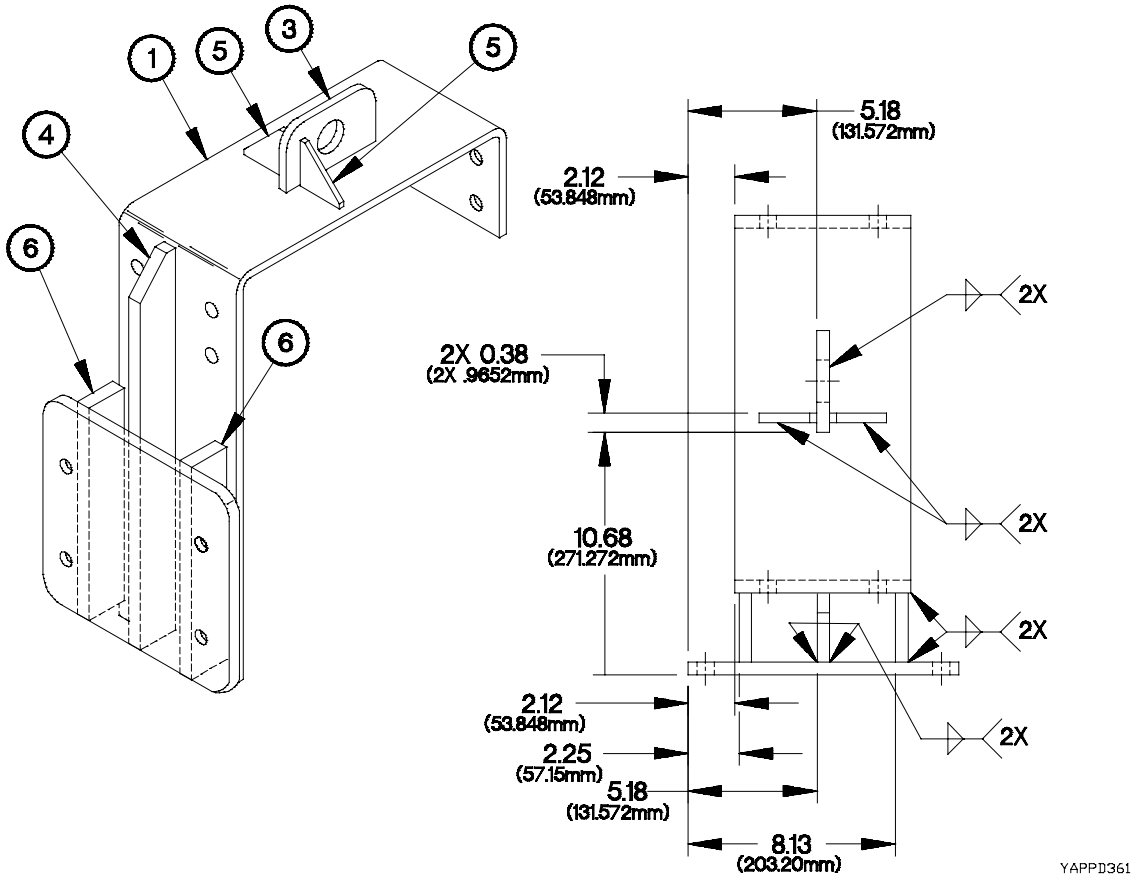



**Figure D-36. Transfer Case Lift Bracket Assembly**

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 |

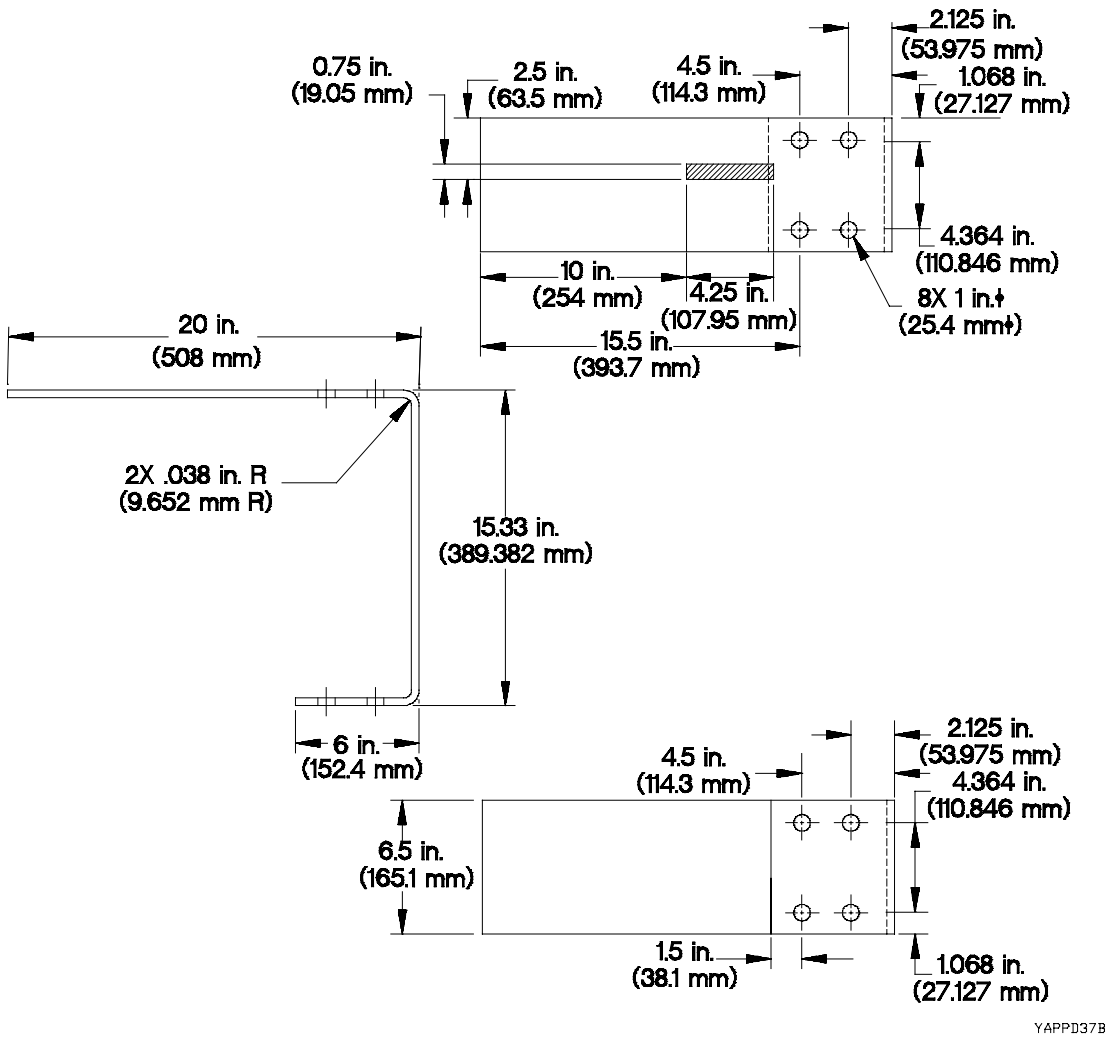



**Figure D-37. Transfer Case Lift Bracket Main Mounting Bracket**

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 |

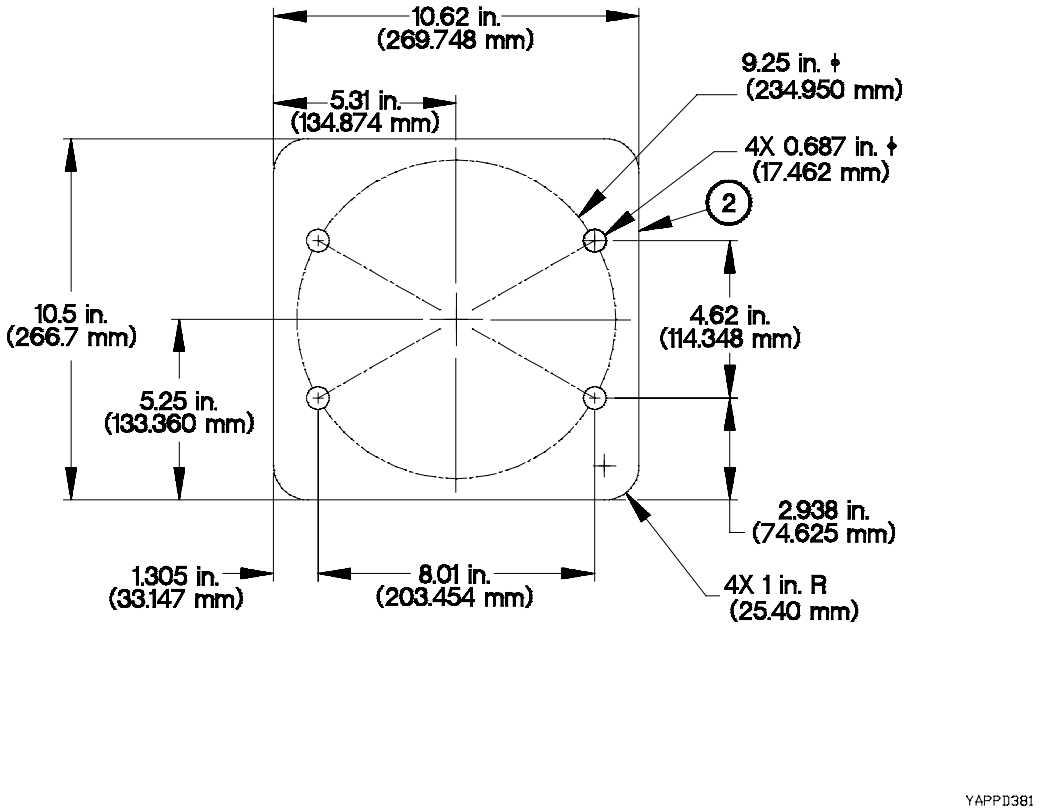



**Figure D-38. Transfer Case Lift Bracket Bolt Mounting Bracket**

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 |

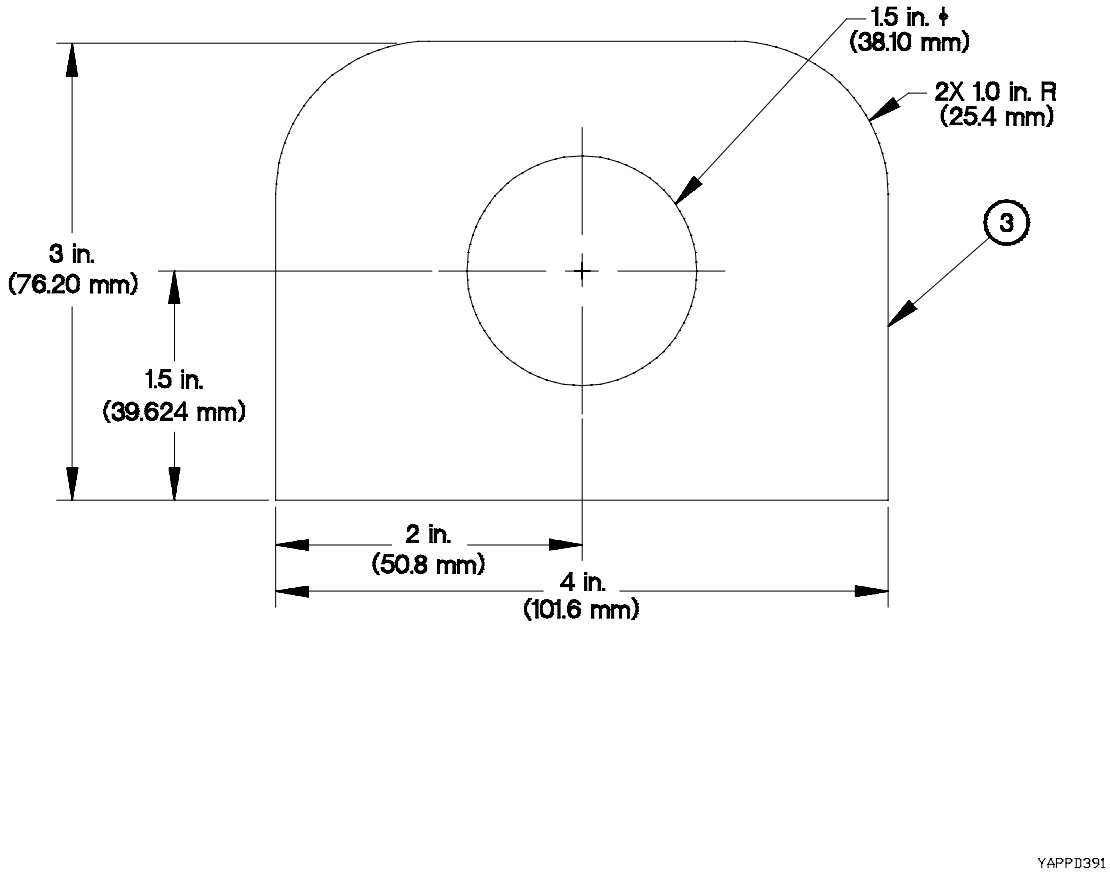



**Figure D-39. Transfer Case Lift Bracket Lifting Plate**

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 |

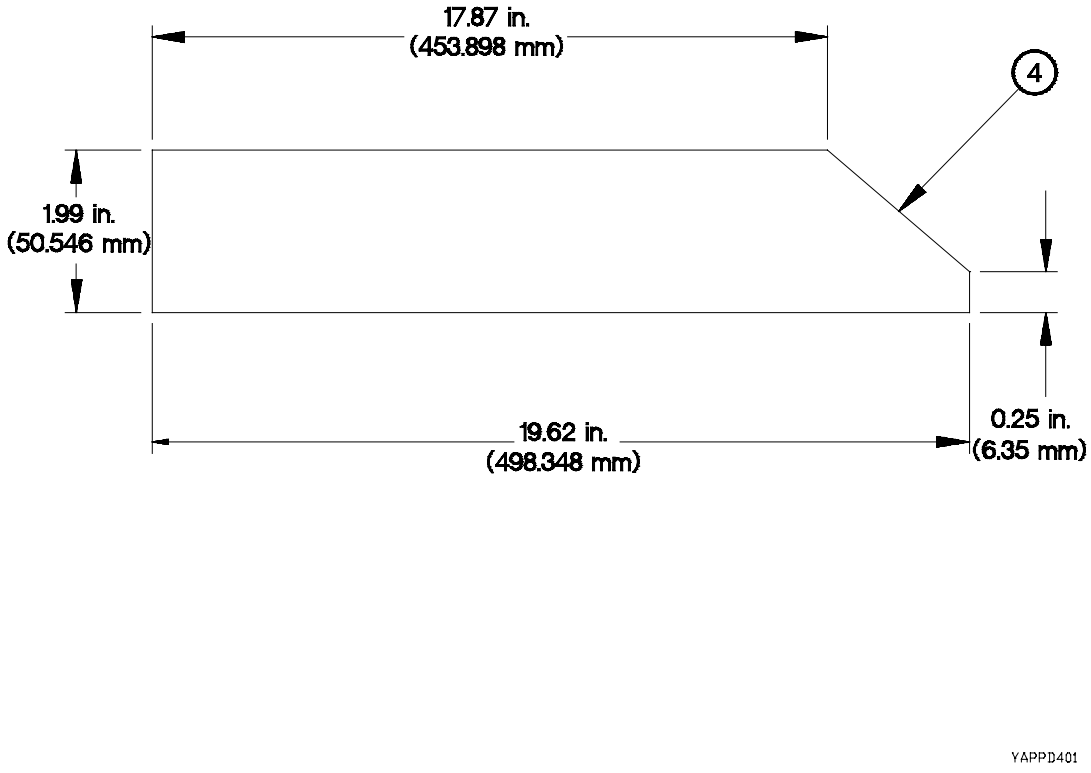



**Figure D-40. Transfer Case Lift Bracket Center Support Plate**

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 |

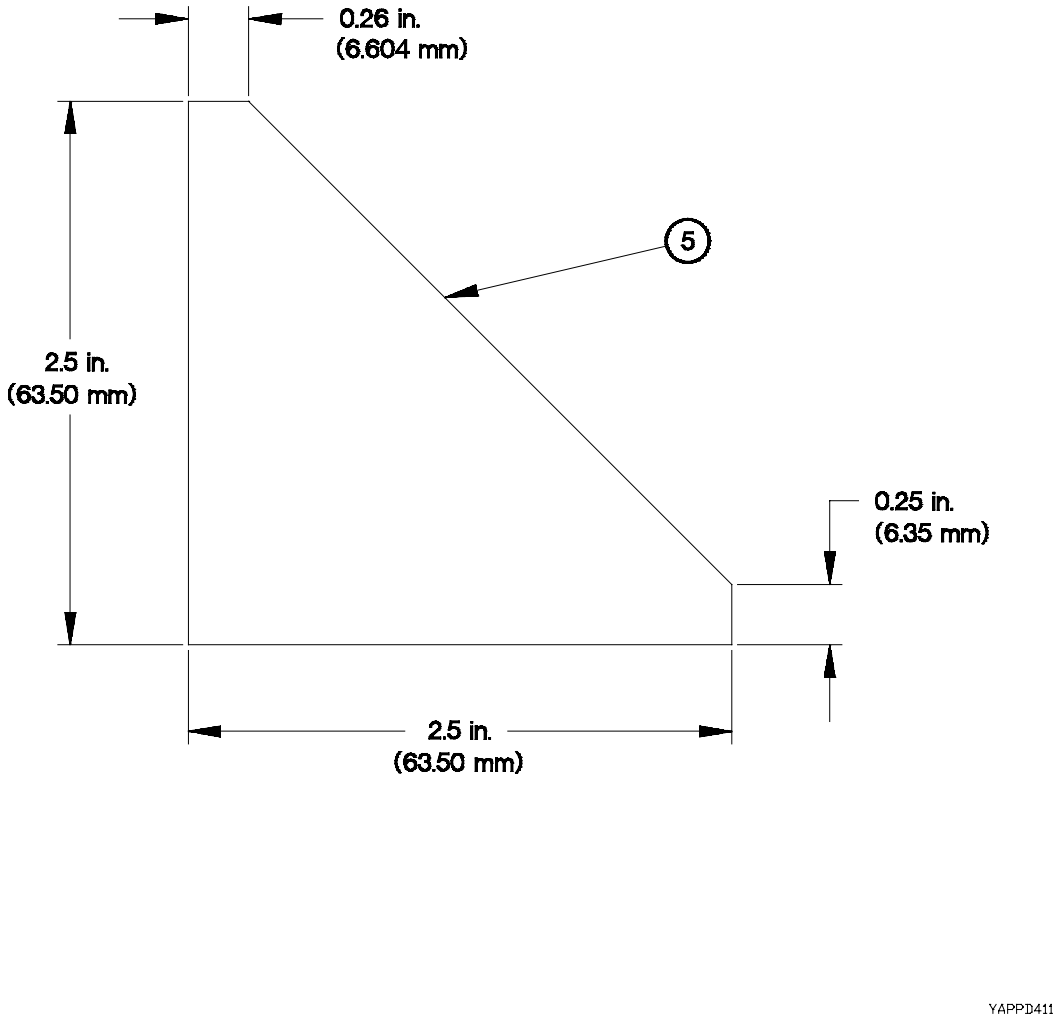



**Figure D-41. Transfer Case Lift Bracket Lifting Plate Braces**

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 |

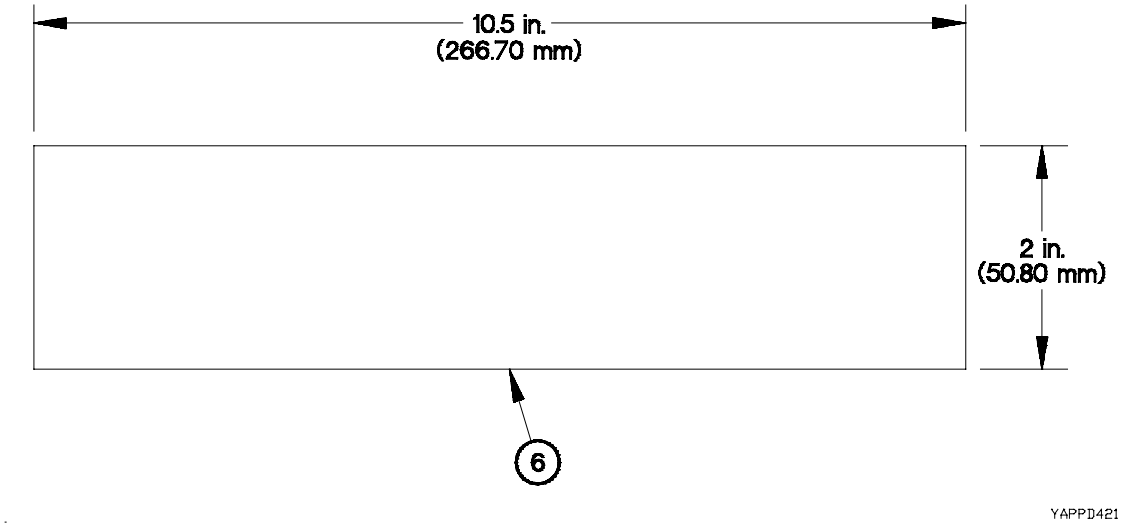



**Figure D-42. Transfer Case Lift Bracket Bolt Mounting Bracket Supports**

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 |

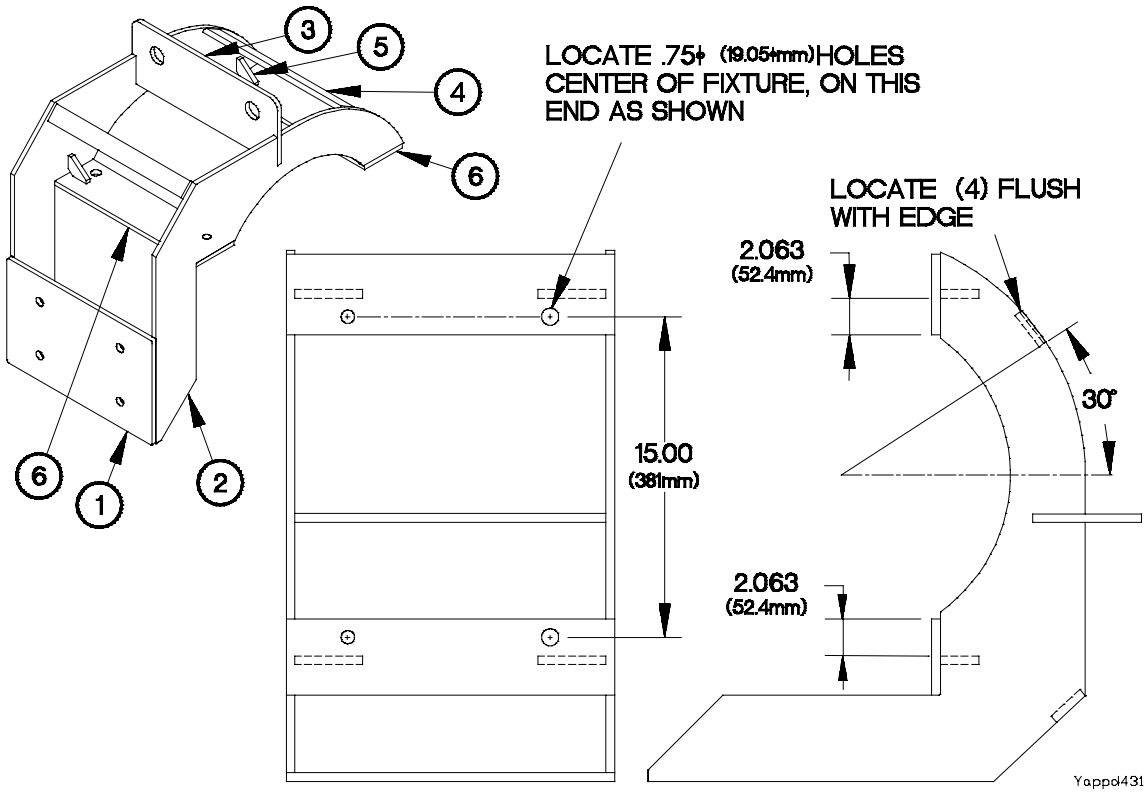



**Figure D-43. Transmission Lift and Mounting Bracket Assembly**

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 |

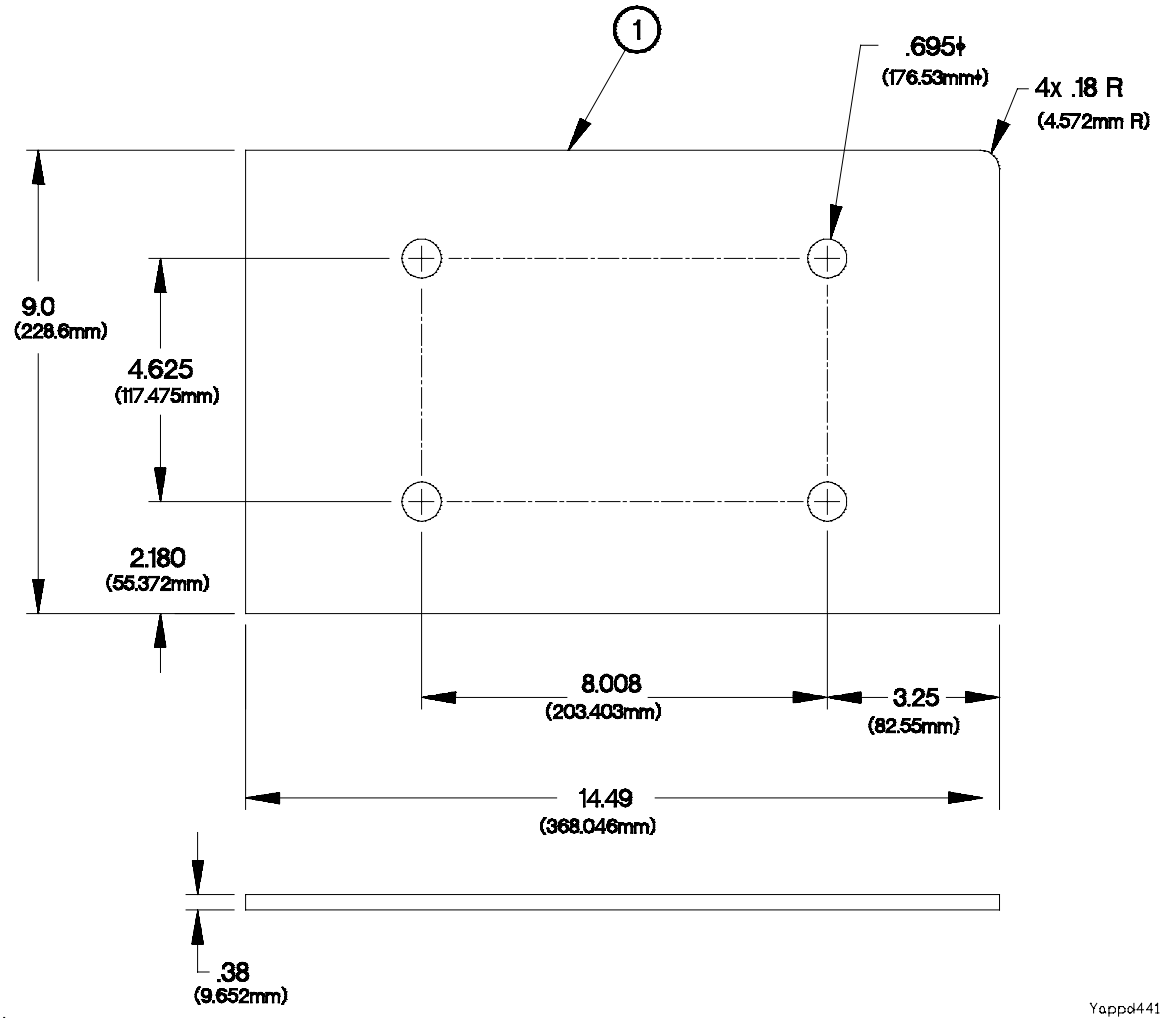



**Figure D-44. Transmission Lift and Mounting Bracket Bottom Plate**

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 |

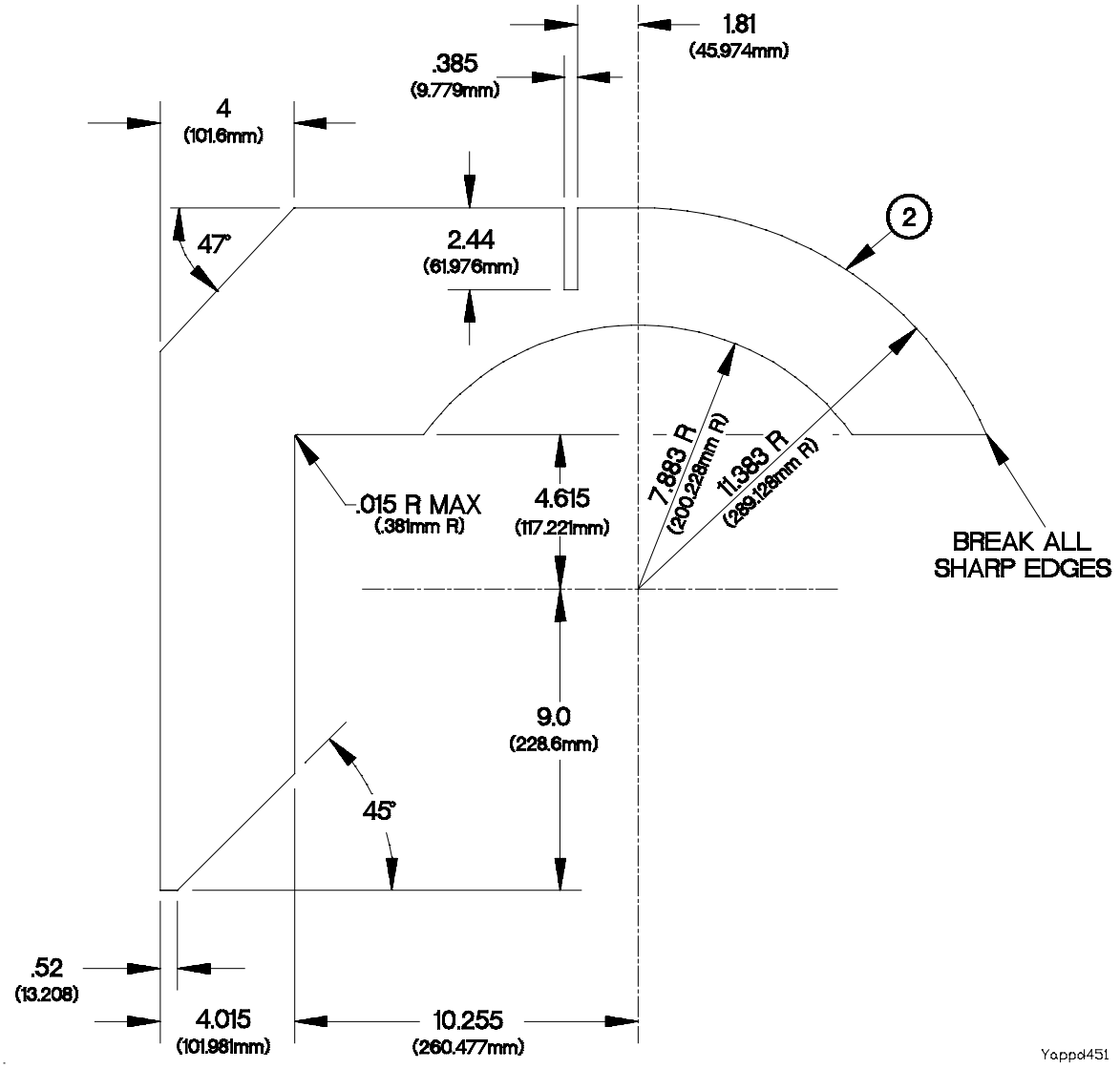



**Figure D-45. Tansmission Lift and Mounting Bracket Side Plates**

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. Tansmission 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 |

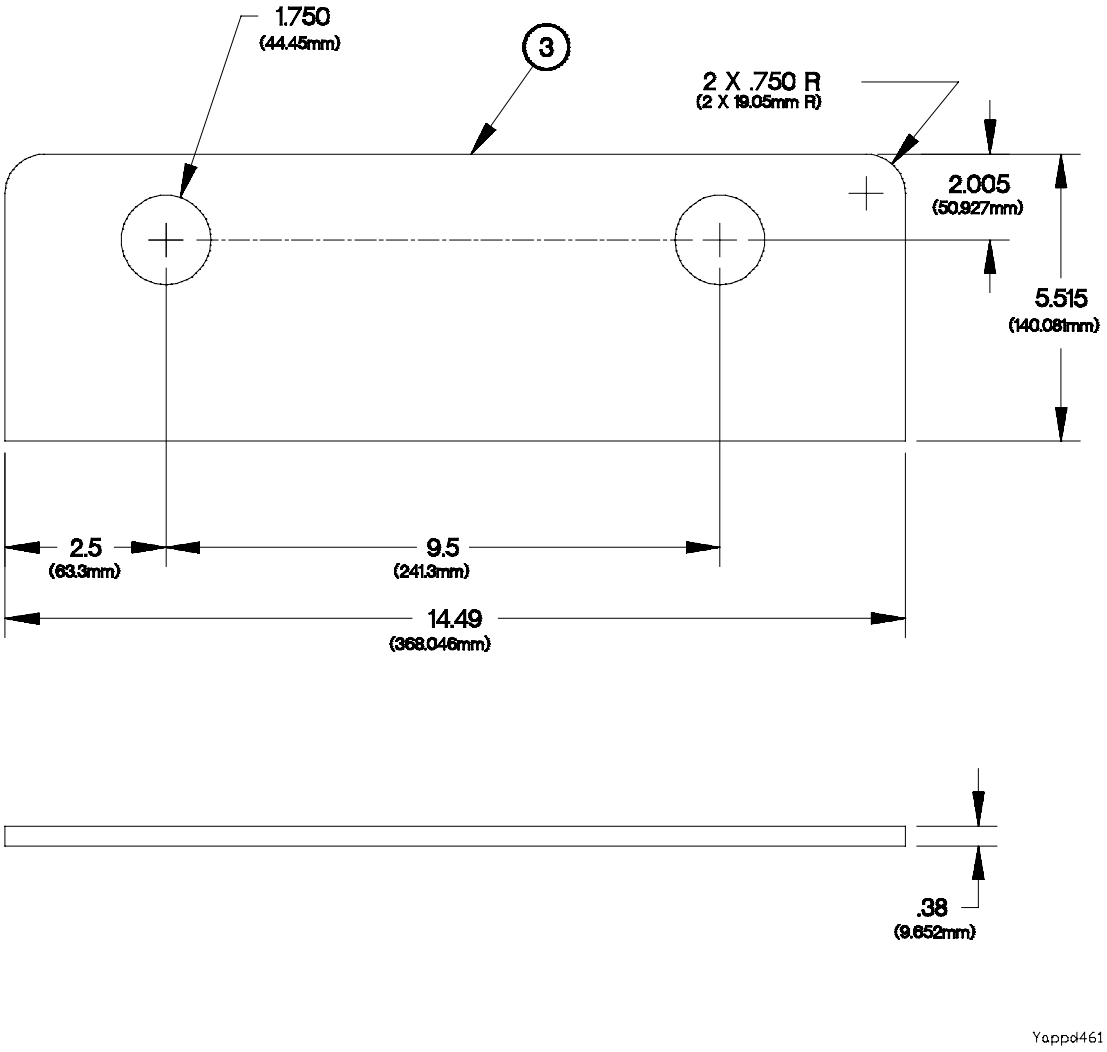



**Figure D-46. Transmission Lift and Mounting Bracket Top Plate**

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. Tansmission Lift and Mounting Bracket Top Plate**.
d. Round two corners to 0.750 in (19 mm) radius as shown in **Figure D-46. Tansmission 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 |

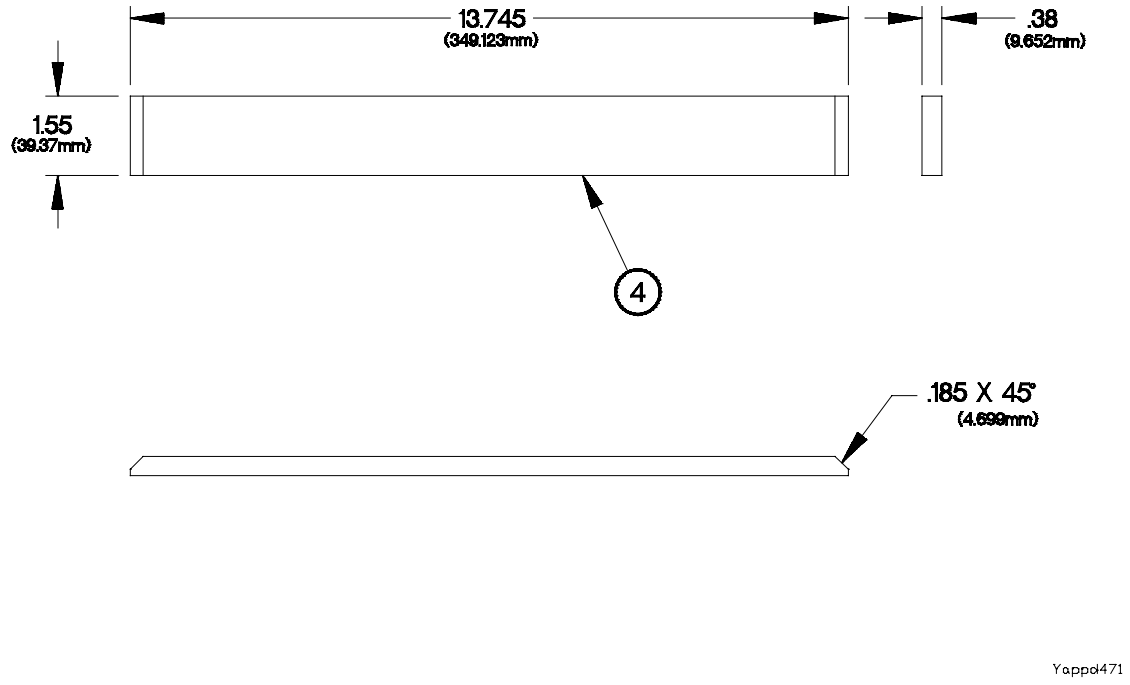



**Figure D-47. Tansmission Lift and Mounting Bracket Top and Bottom Braces**

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. Tansmission 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 |

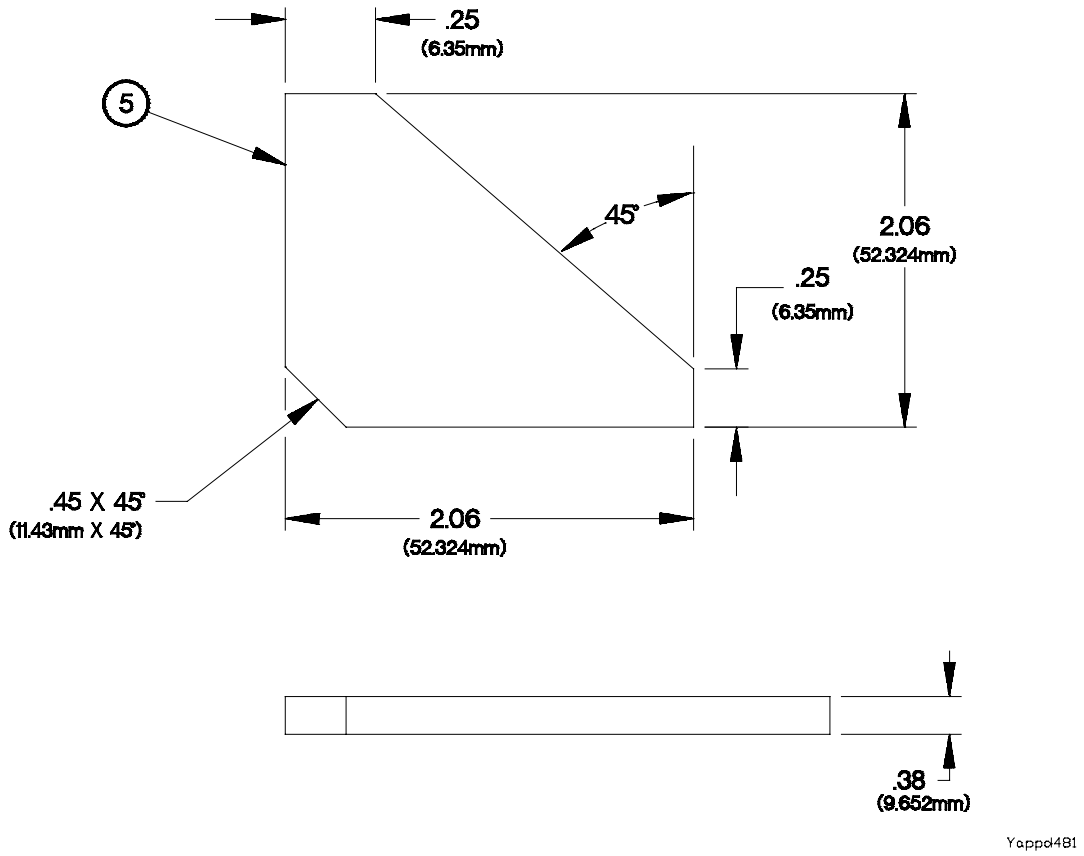



**Figure D-48. Transmission Lift and Mounting Bracket Side Supports**

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 |

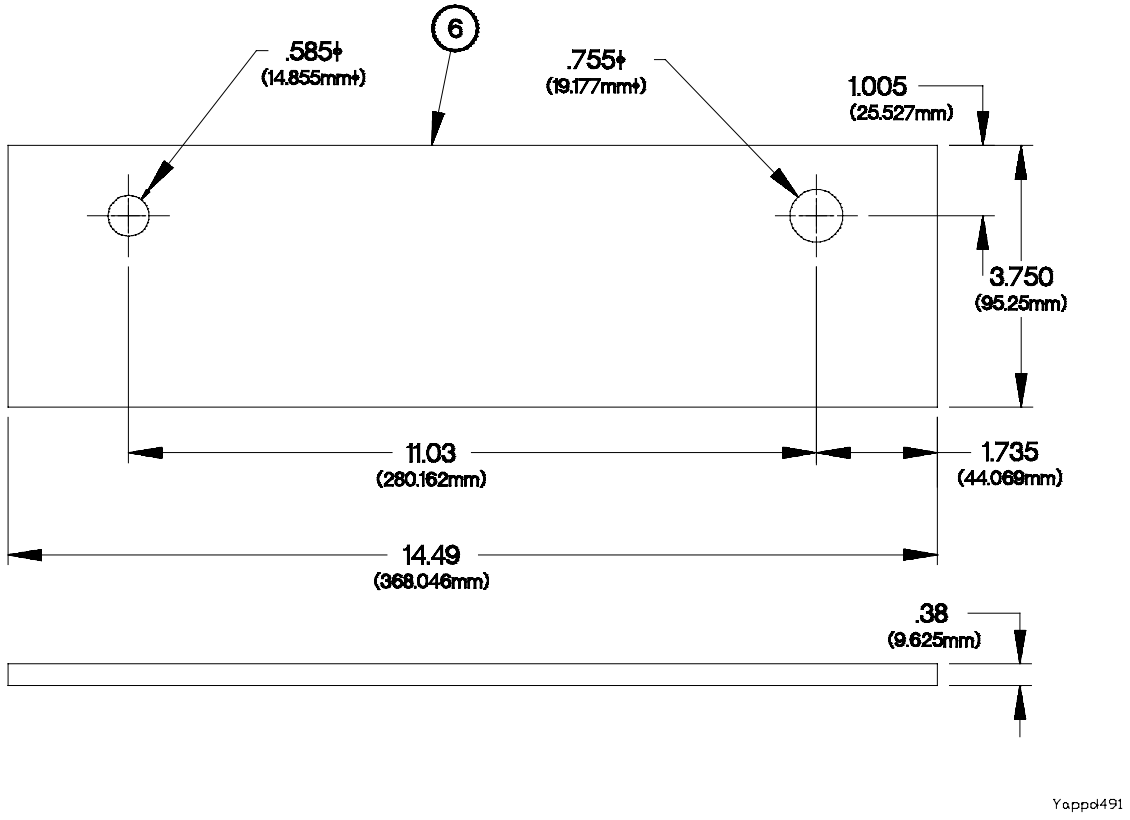



**Figure D-49. Transmission Lift and Mounting Bracket Bolt Mounting Plates**

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 |

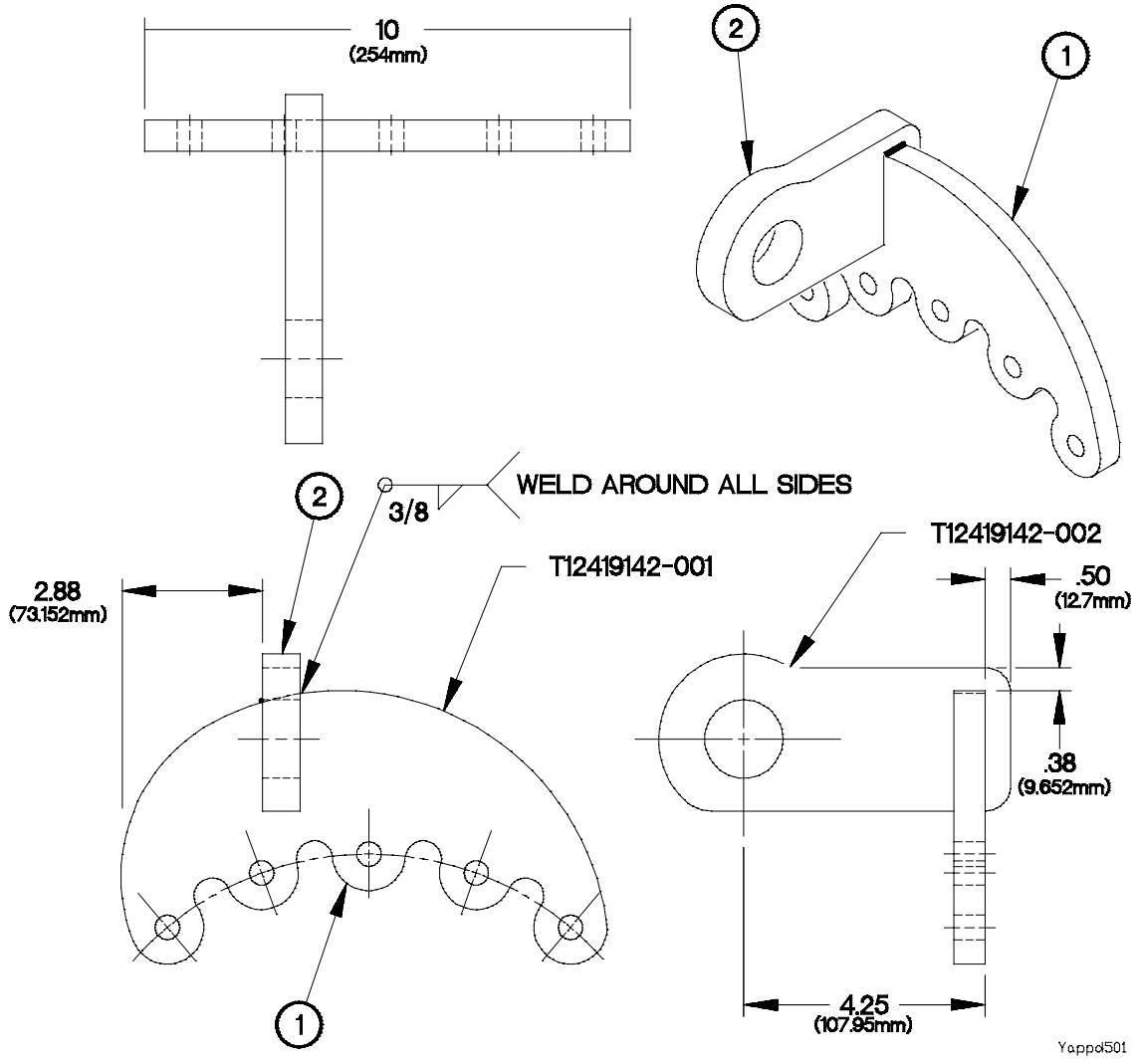



**Figure D-50. Transmission Lift Bracket Assembly**

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 |

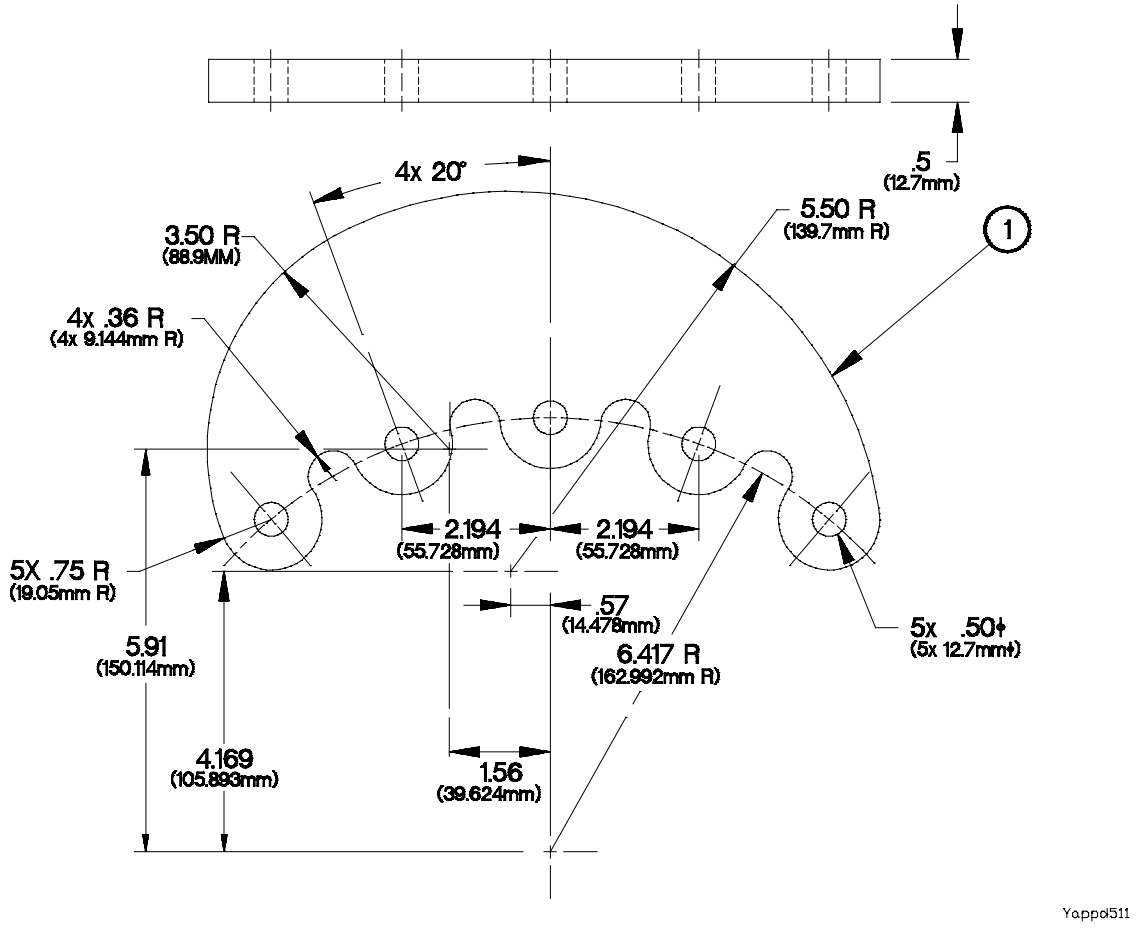



**Figure D-51. Lower Lift Bracket**

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 |

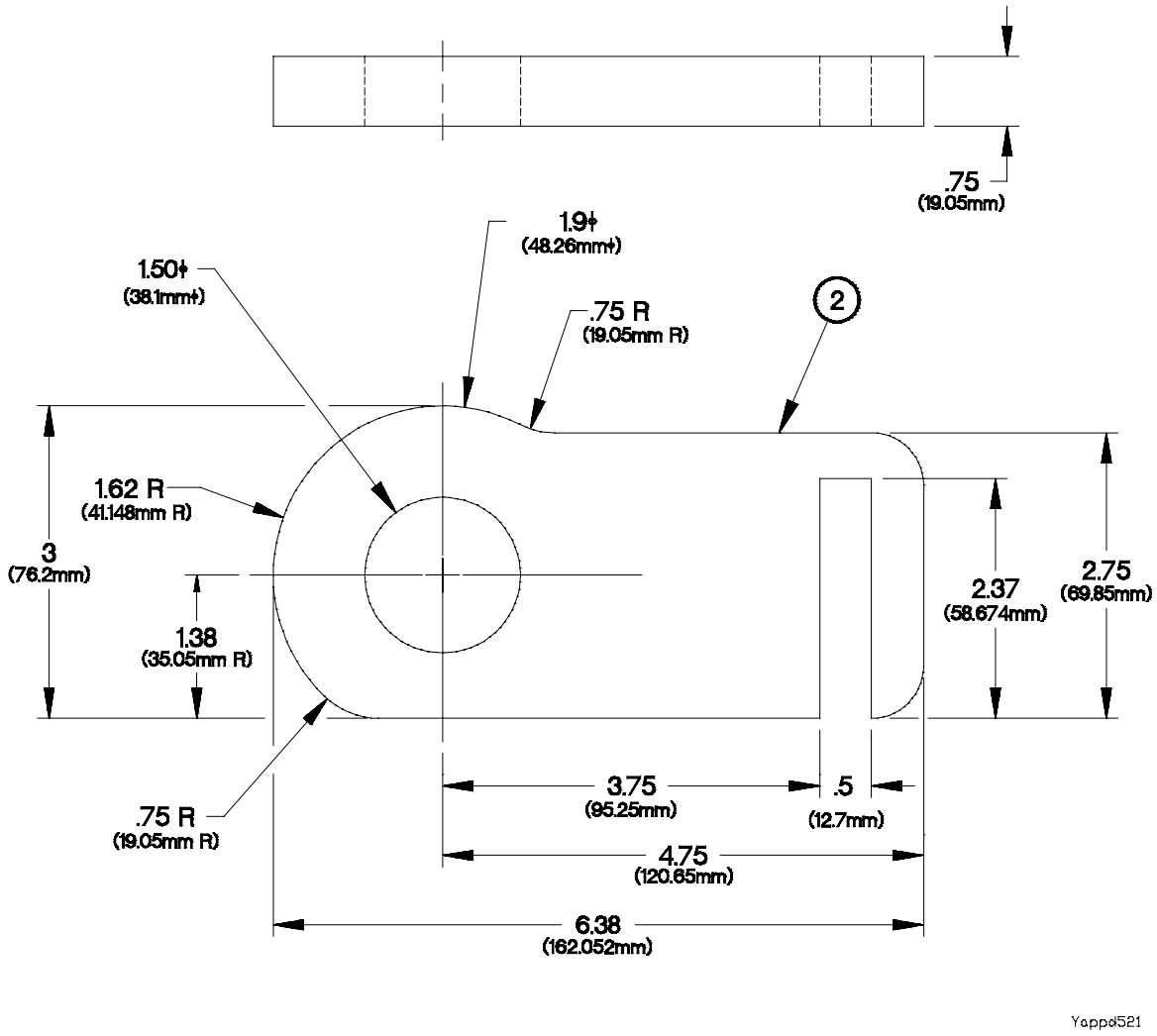



**Figure D-52. Upper Lift Bracket**

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 |

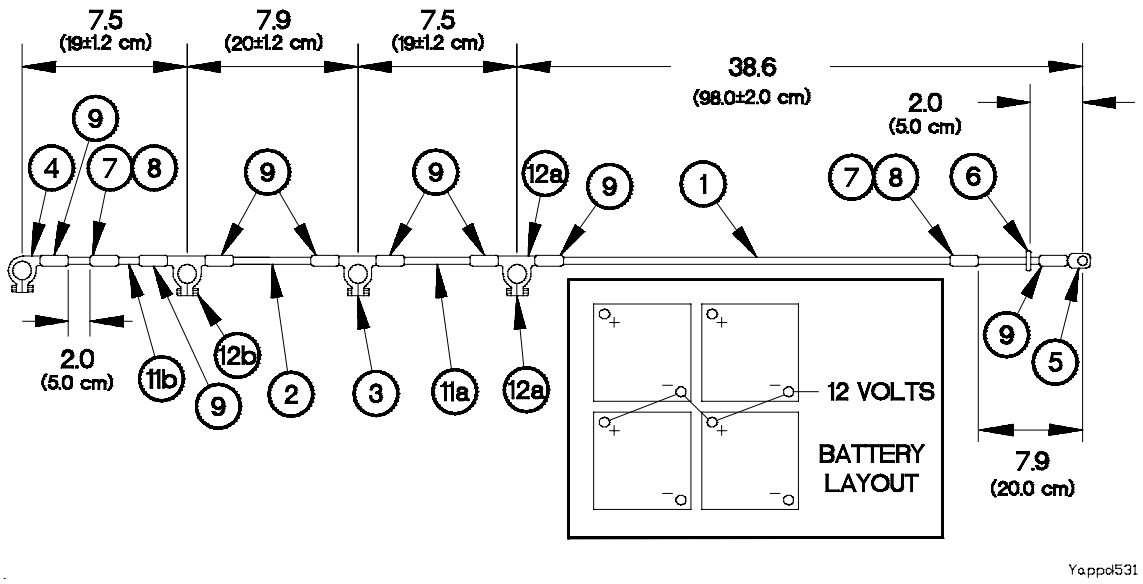



**Figure D-53. Battery 12V Cable Assembly**

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 |

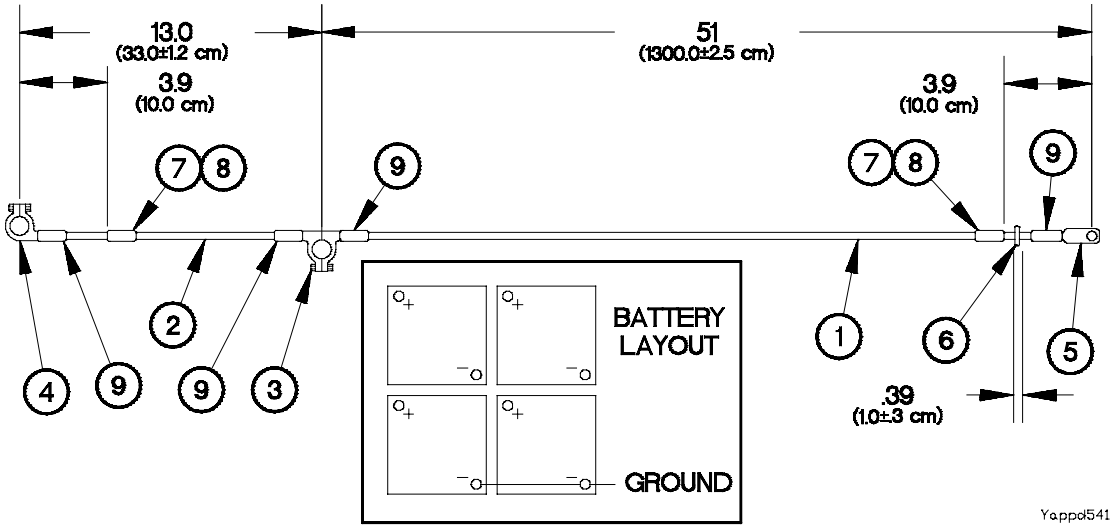



**Figure D-54. Battery Ground Cable Assembly**

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 |

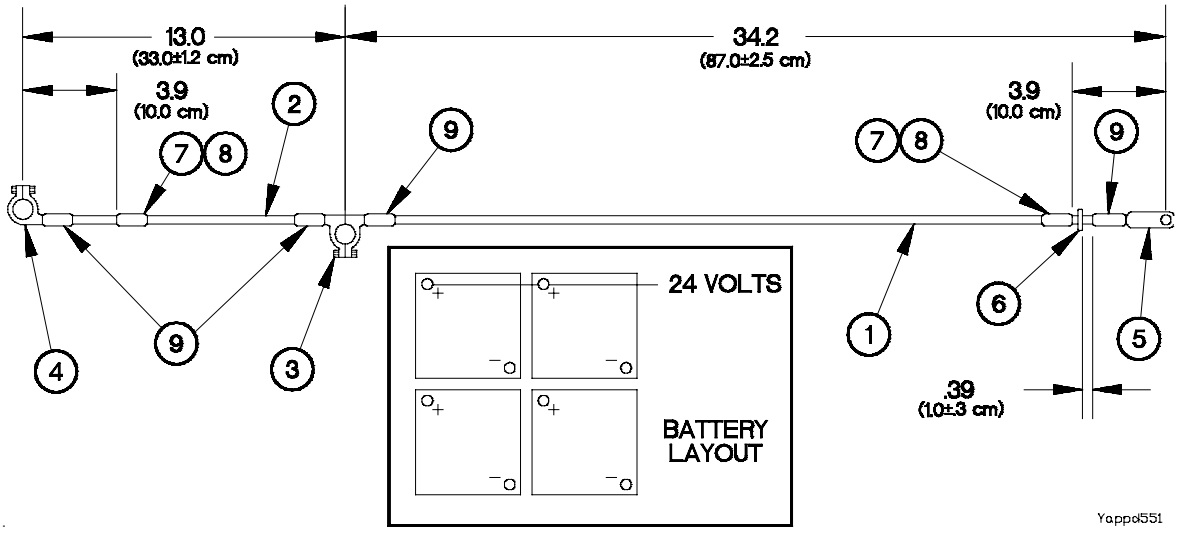



**Figure D-55. Battery 24V Cable Assembly**

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 |

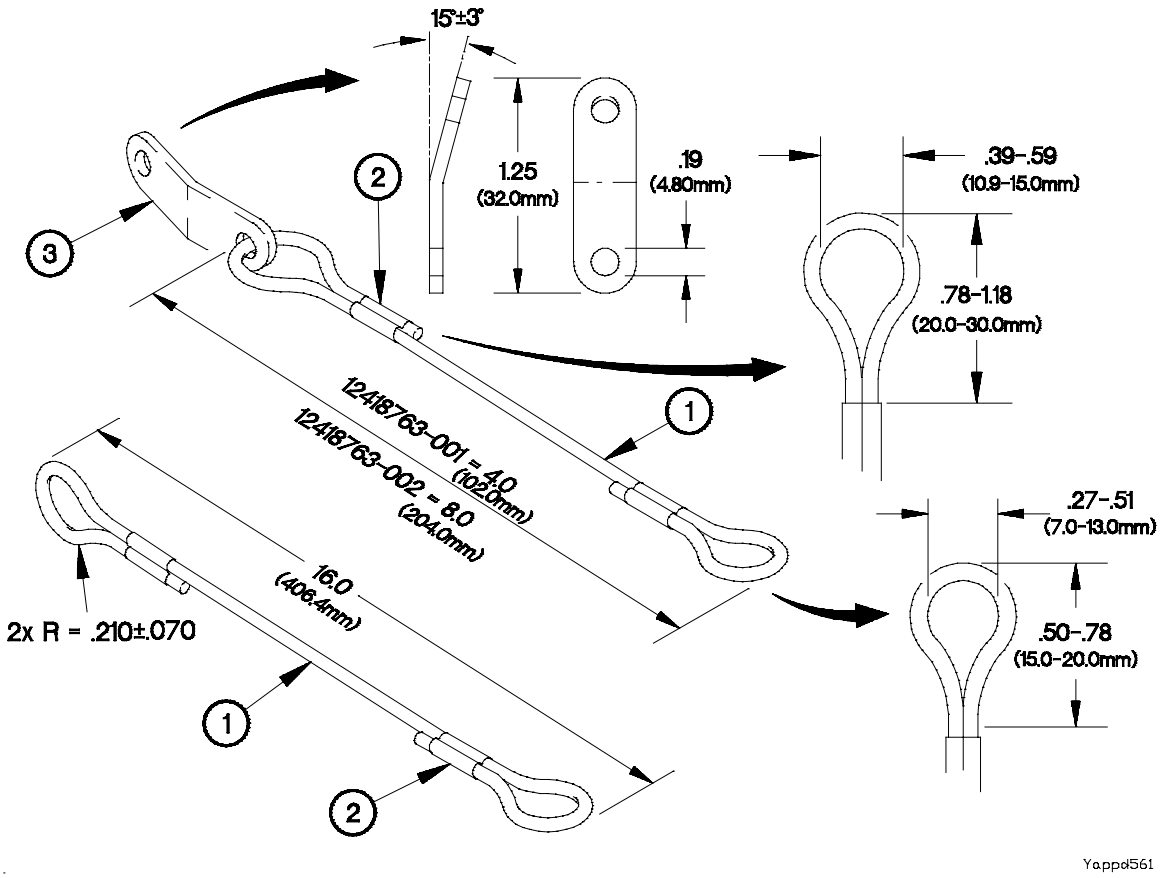



**Figure D-56. Lanyard Assembly**

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.

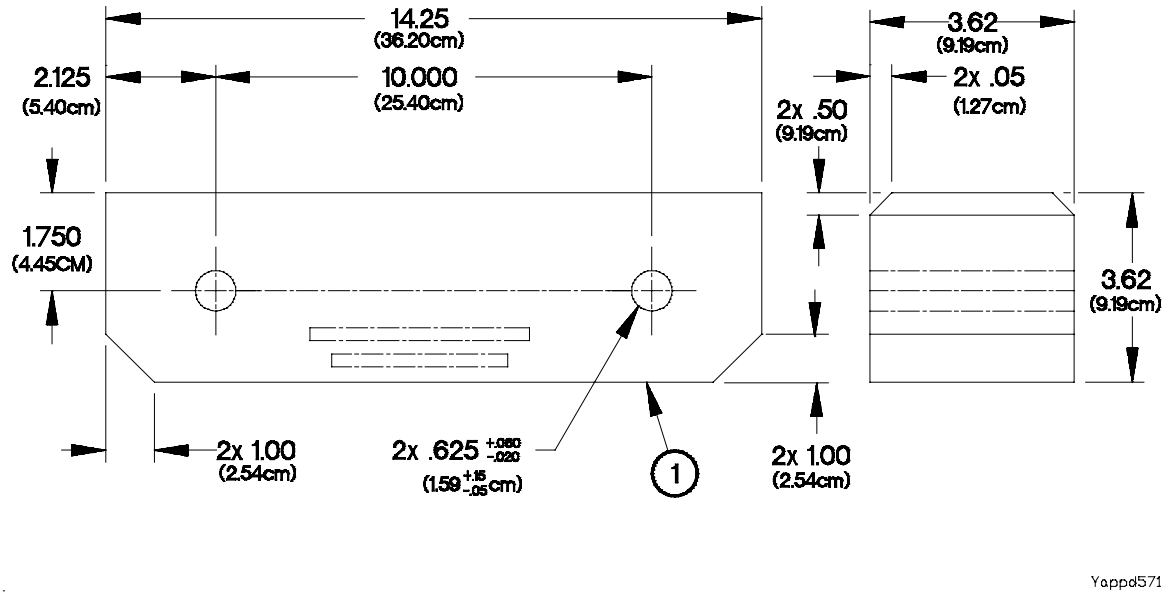



**Figure D-57. Wooden Skid**

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.

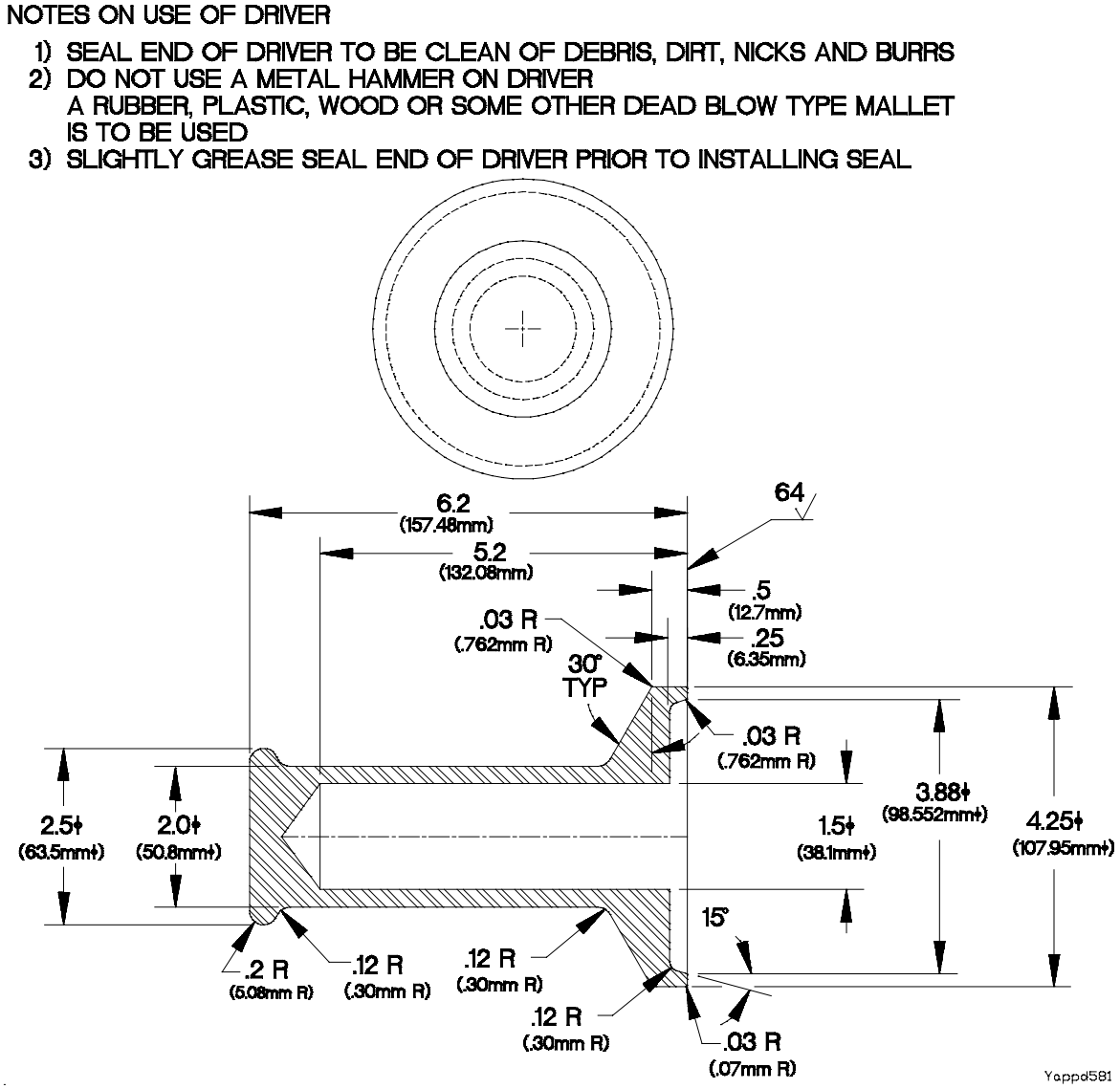



**Figure D-58 CTIS Seal Driver**

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

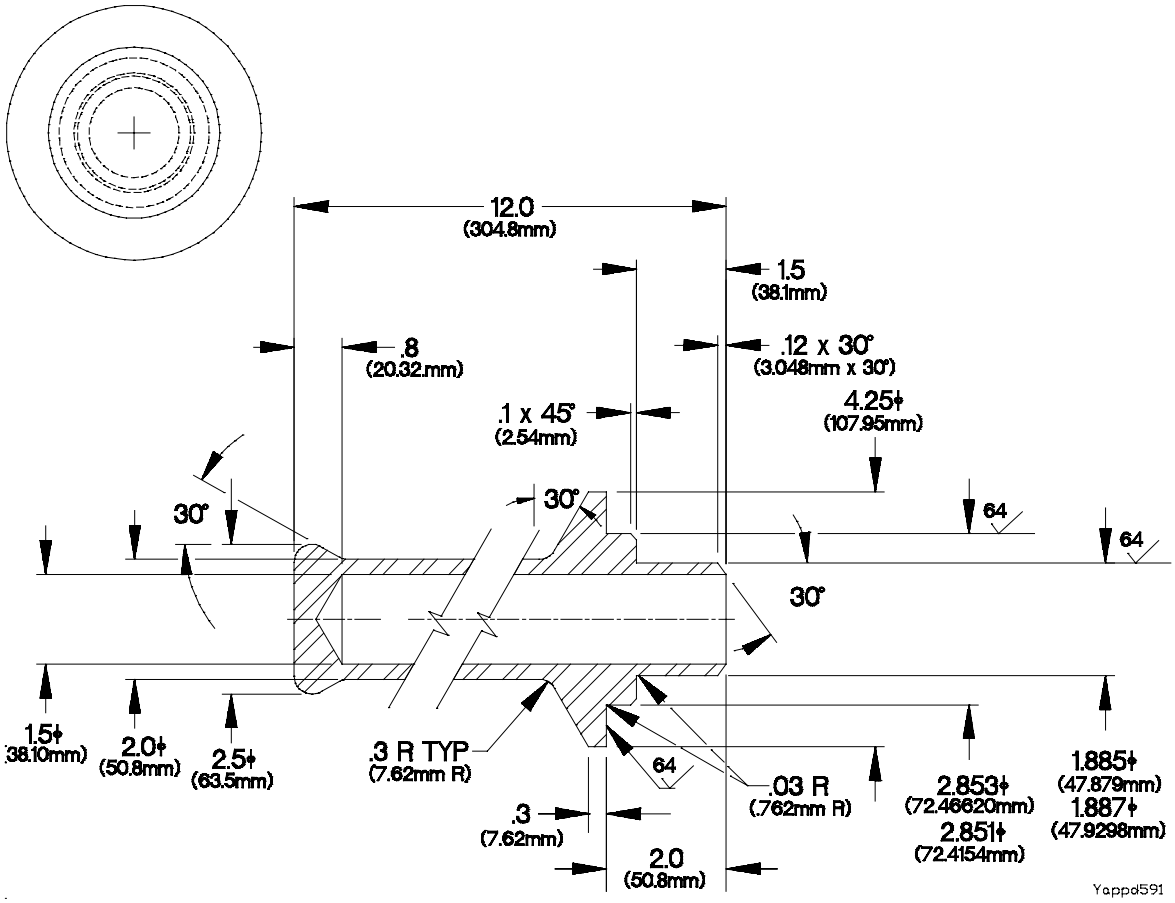



**Figure D-59. Front Axle Shaft Seal Driver**

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

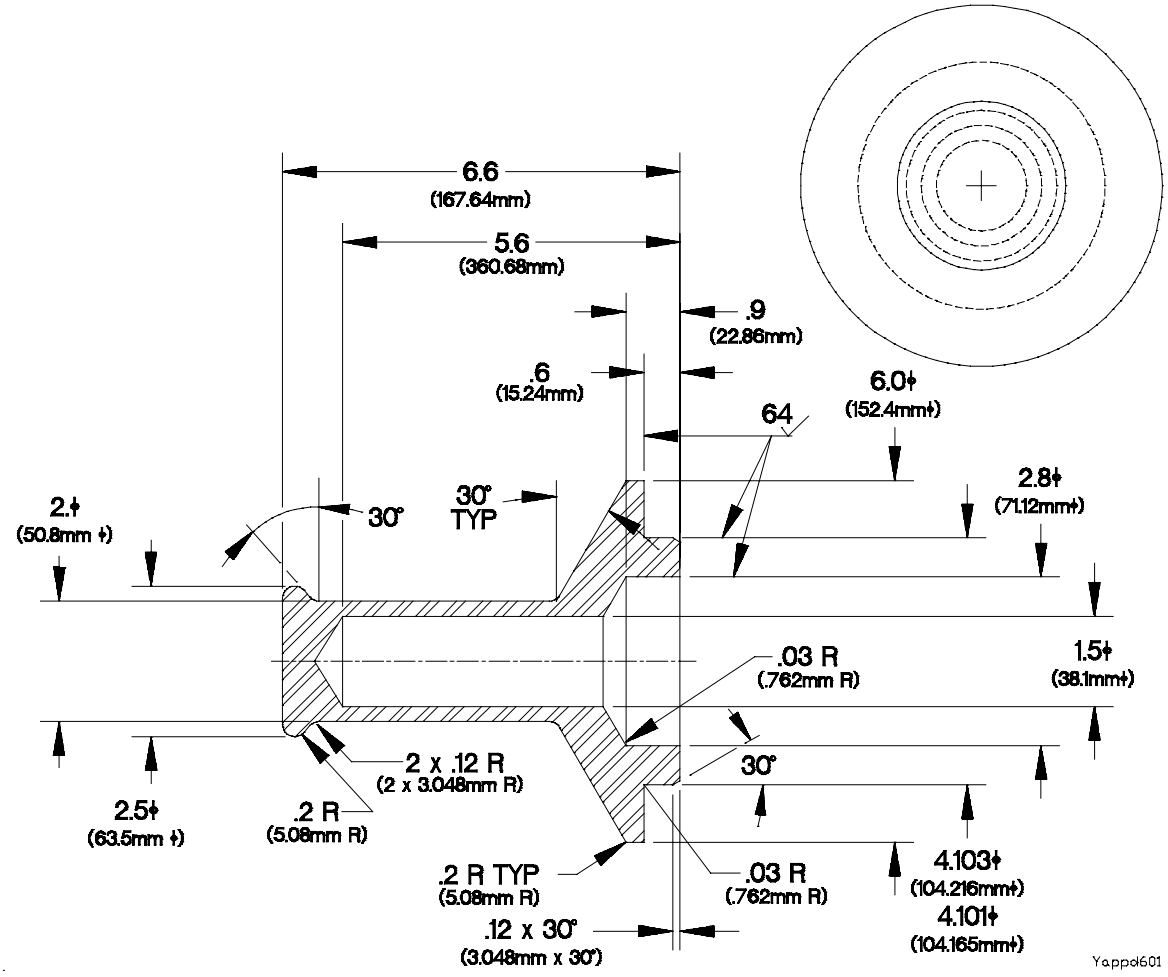



**Figure D-60. Wheel Hub Grease Seal Driver**

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

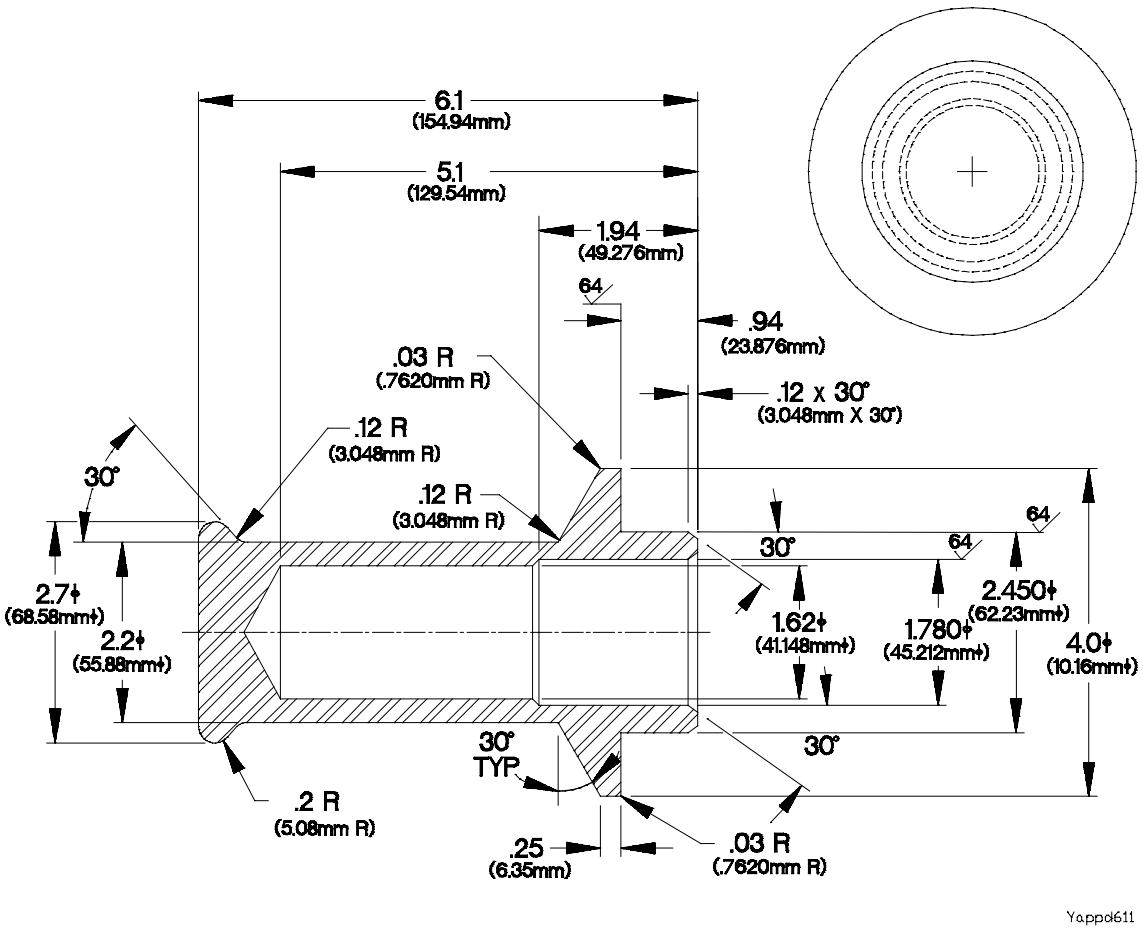



**Figure D-61. Intermediate Differential Output (Rear) Seal Driver**

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.

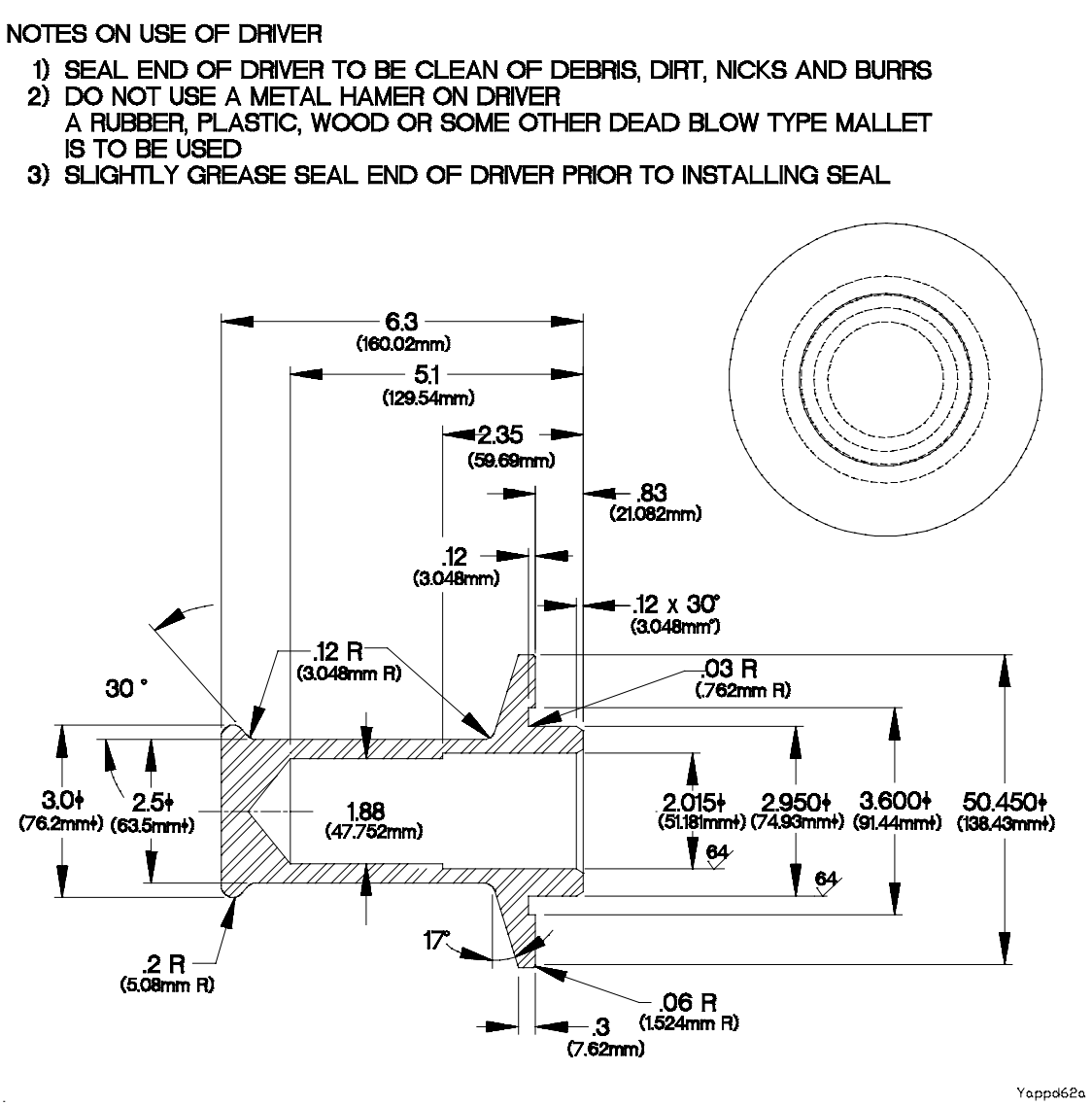



**Figure D-62. Differential Pinion Seal Driver**

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)

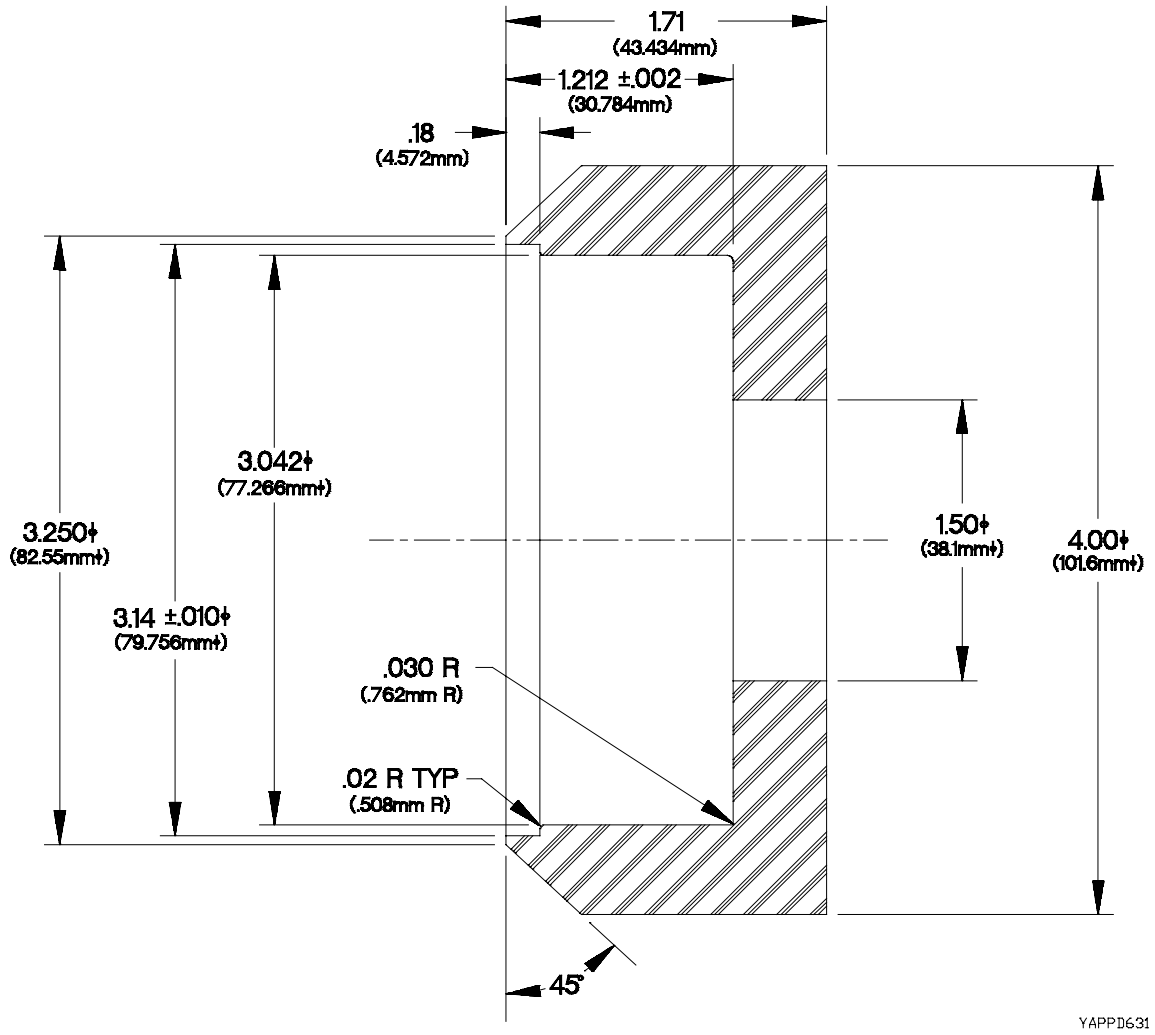



**Figure D-63. Intermediate Input Yoke Seal Driver**

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)

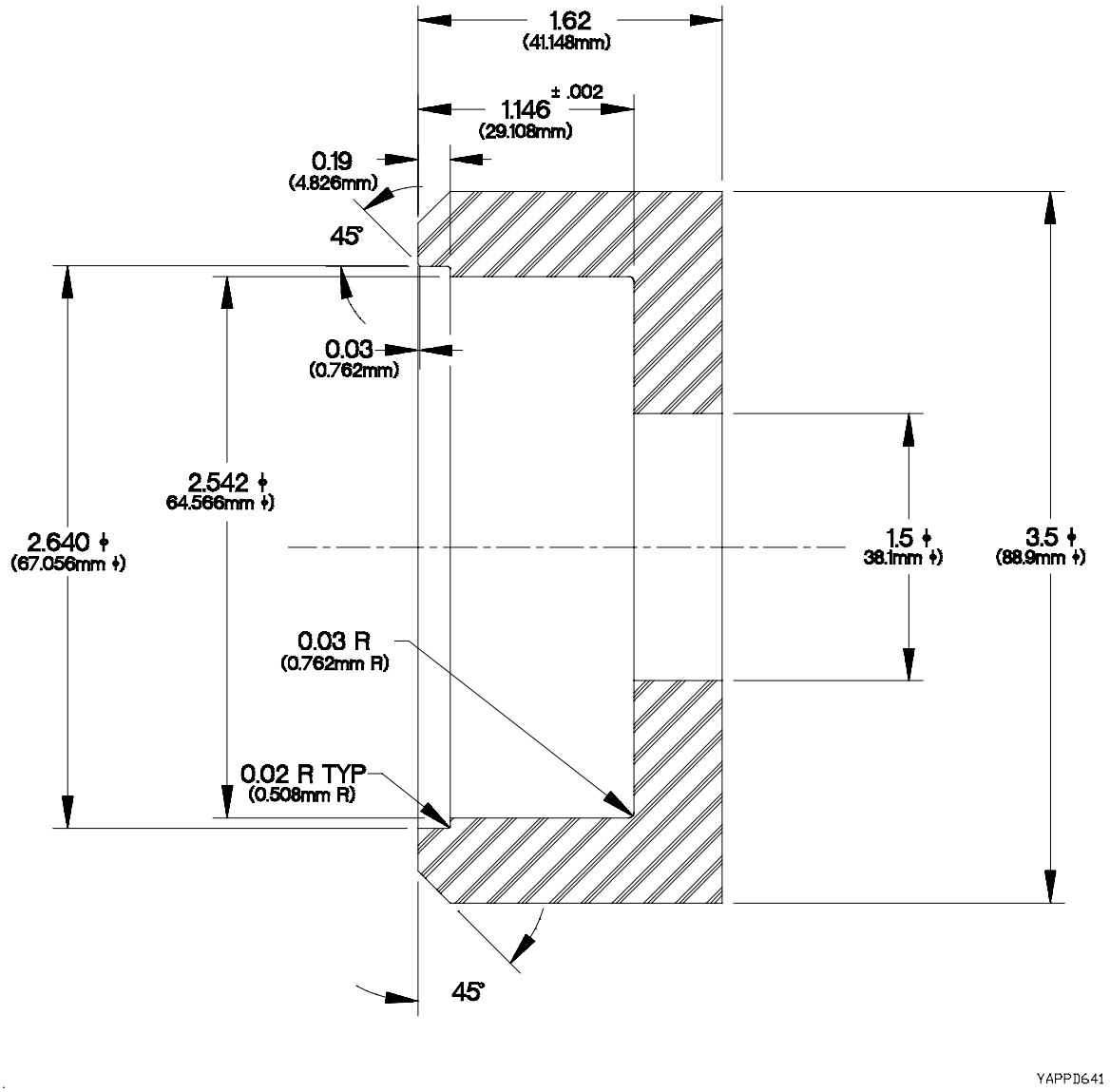



**Figure D-64. Intermediate Output Yoke Seal Driver**

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)

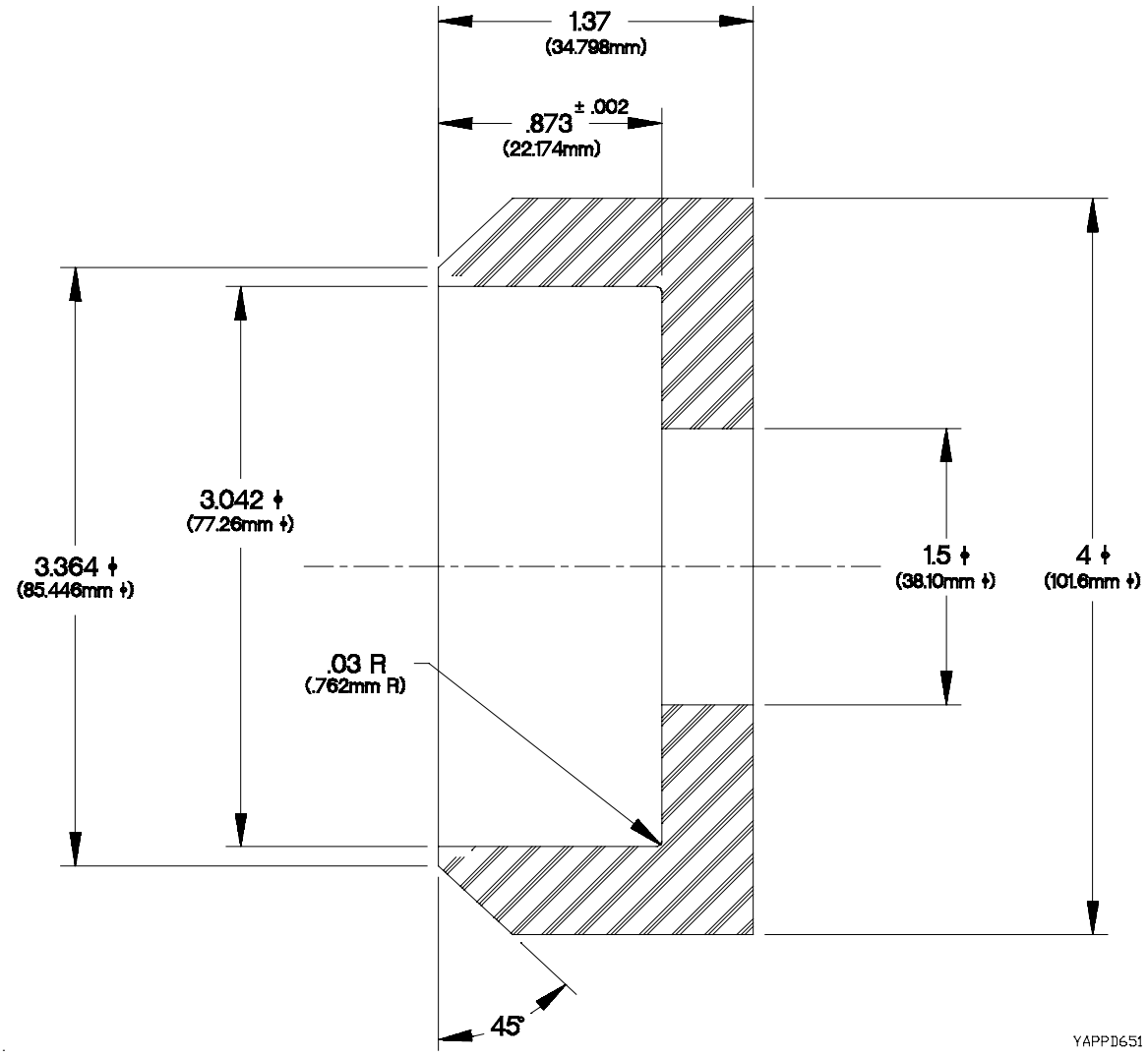



**Figure D-65. Front and Rear Differential Yoke Seal Driver**

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).<br>Finish Black Oxide Coat, Class I, IAW MIL-C-13924. | 14.0 in. (356 mm) | 1 |

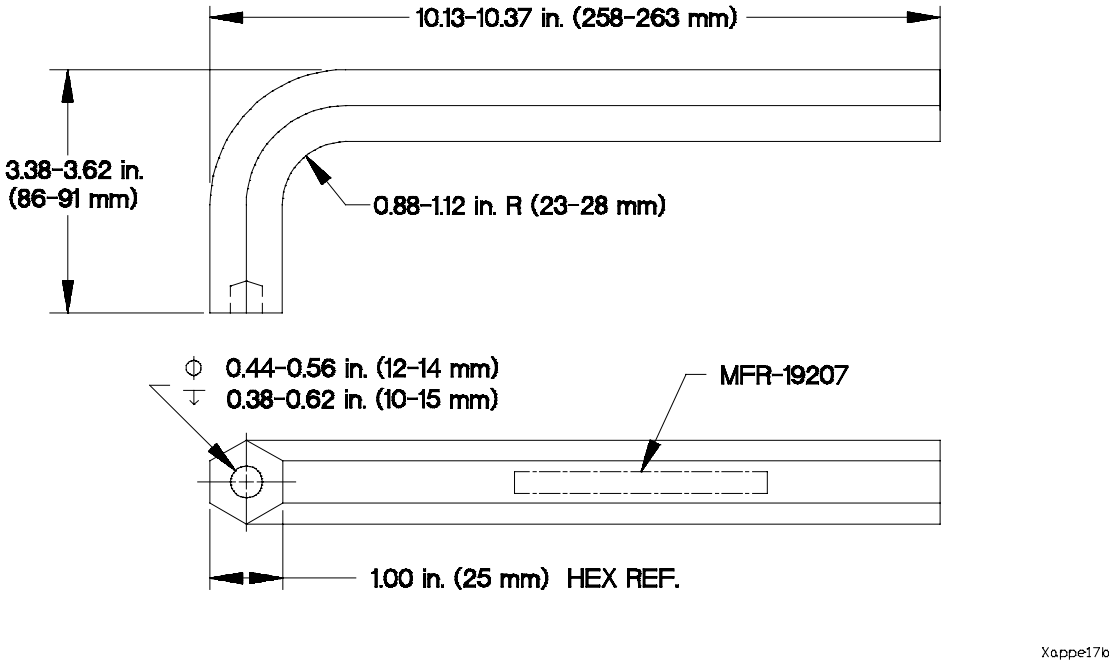



**Figure D-66. Purge Valve Tool**

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<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| Manifold Supply | NB-4-035 | 40.0 | 1016 | 12420924-001 | 38.0 | 965 | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| LH Free Spool | NB-4-035 | 66.0 | 1676 | 12420924-001 | 64.0 | 1626 | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| RH Free Spool | NB-4-035 | 48.0 | 1219 | 12420924-001 | 46.0 | 1168 | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| LH Regulator Input | NB-4-035 | 12.0 | 305 | N/A | N/A | N/A | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| RH Regulator Input | NB-4-035 | 12.0 | 305 | N/A | N/A | N/A | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| LH Check Valve Return | NB-4-035 | 3.0 | 76 | N/A | N/A | N/A | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| RH Check Valve Return | NB-4-035 | 3.0 | 76 | N/A | N/A | N/A | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| Front LH Tension Supply | NB-4-035 | 48.0 | 1219 | 12420924-001 | 46.0 | 1168 | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>2 |
| Front RH Tension Supply | NB-4-035 | 66.0 | 1676 | 12420924-001 | 64.0 | 1626 | 4-100110B<br>4-100115B<br>63NTA-4 | 2<br>2<br>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<br>2-2 100202BA | 1<br>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<br>2-2 100202BA | 1<br>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<br>2-2 100202BA | 1<br>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<br>2-2 100202BA | 1<br>1 |
| LH 30K Winch Supply | NB-2-016 | 40.0 | 1016 | N/A | N/A | N/A | 2-2 100102BA<br>2-2 100202BA | 1<br>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 |

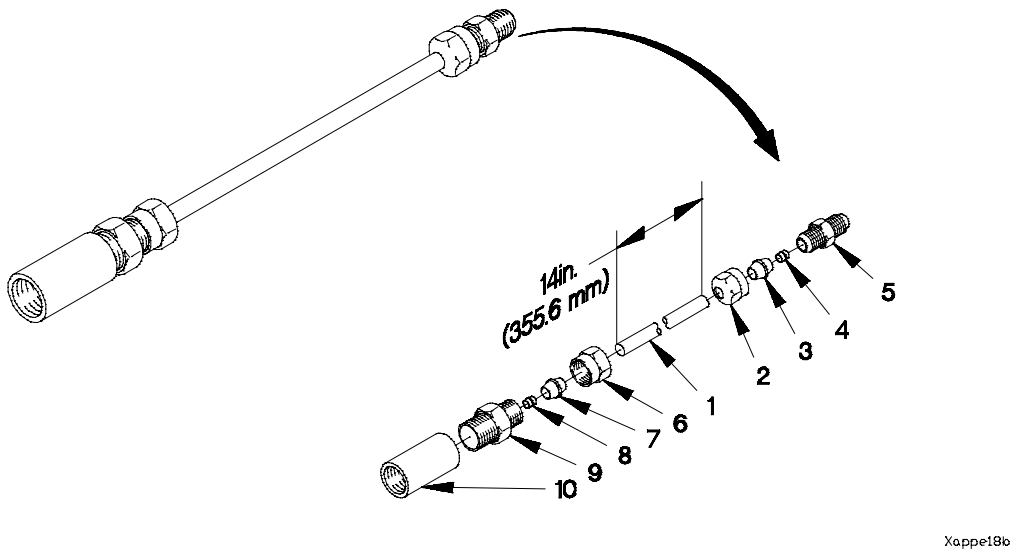



**Figure D-67. M1089 30K Winch Pneumatic Test Adapter**

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.

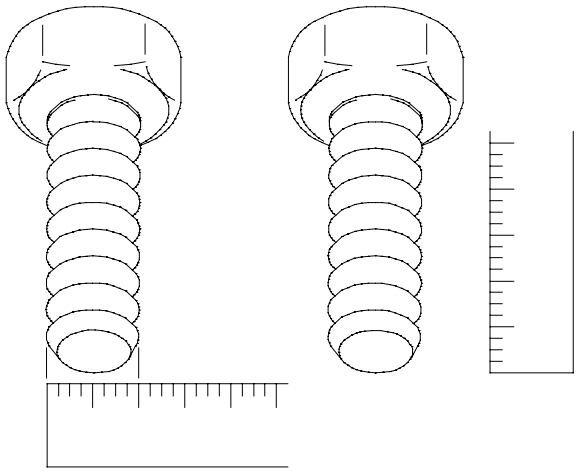
(2) Count the number of threads per inch.

(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.



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# APPENDIX E
# TORQUE LIMITS

**Table E-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts**

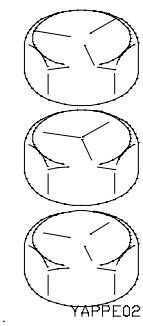
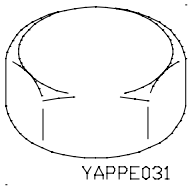
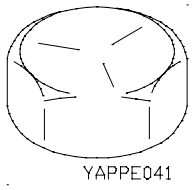
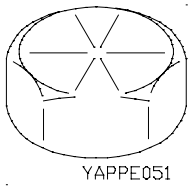
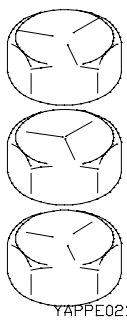
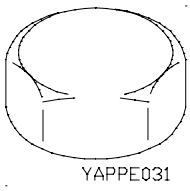
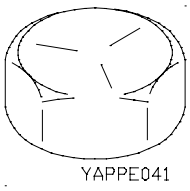
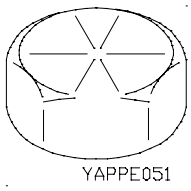
|  YAPPE021 **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.** | | **Material Grade Markings** | | | | | |
|---|---|---|---|---|---|---|---|
| | |  YAPPE031 **SAE Grade 2** | |  YAPPE041 **SAE Grade 5** | |  YAPPE051 **SAE Grade 8** | |
| **Diameter** | **Threads per inch** | **Torque** | | | | | |
| **inch** | | **lb-ft** | **N·m** | **lb-ft** | **N·m** | **lb-ft** | **N·m** |
| 1/4 | 20 | 3-5 | 5-7 | 5-7 | 8-10 | 8-10 | 10-14 |
| 1/4 | 28 | 4-6 | 5-7 | 6-8 | 9-11 | 8-12 | 12-16 |
| 1/4 | 32 | 4-6 | 5-7 | 7-9 | 9-11 | 9-13 | 12-16 |
| 5/16 | 18 | 7-9 | 9-13 | 11-15 | 15-21 | 15-21 | 21-29 |
| 5/16 | 24 | 8-10 | 11-15 | 12-16 | 17-23 | 17-23 | 24-32 |
| 5/16 | 32 | 9-11 | 12-16 | 14-18 | 18-24 | 19-25 | 27-34 |
| 3/8 | 16 | 13-17 | 17-23 | 20-26 | 27-35 | 28-38 | 38-50 |
| 3/8 | 24 | 15-19 | 20-26 | 22-30 | 31-41 | 32-42 | 43-57 |
| 3/8 | 32 | 15-21 | 21-27 | 24-32 | 33-43 | 33-45 | 55-61 |
| 7/16 | 14 | 20-28 | 28-38 | 32-42 | 43-57 | 44-60 | 61-81 |
| 7/16 | 20 | 23-31 | 31-41 | 35-47 | 48-64 | 49-67 | 68-90 |
| 7/16 | 28 | 25-33 | 33-45 | 37-51 | 51-69 | 54-72 | 73-97 |
| 1/2 | 13 | 32-42 | 43-57 | 49-65 | 66-88 | 68-92 | 93-123 |
| 1/2 | 20 | 35-47 | 48-64 | 55-73 | 74-98 | 77-103 | 105-139 |
| 1/2 | 28 | 38-50 | 51-67 | 58-78 | 79-105 | 82-110 | 111-149 |
| 9/16 | 12 | 55-61 | 62-82 | 70-94 | 95-127 | 98-132 | 134-178 |
| 9/16 | 18 | 50-68 | 69-91 | 78-104 | 105-141 | 109-147 | 149-199 |
| 9/16 | 24 | 53-71 | 72-96 | 82-110 | 111-149 | 115-155 | 158-210 |
| 5/8 | 11 | 62-84 | 85-113 | 95-129 | 131-175 | 136-182 | 184-246 |
| 5/8 | 18 | 70-94 | 96-128 | 108-146 | 148-198 | 154-206 | 209-279 |
| 5/8 | 24 | 73-99 | 100-134 | 114-154 | 155-207 | 161-217 | 219-293 |

**Table E-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)**

|  YAPPE021 Manufacturer's marks may vary. These are all SAE Grade 5 | | Material Grade Markings | | | | | |
|---|---|---|---|---|---|---|---|
| | |  YAPPE031 SAE Grade 2 | |  YAPPE041 SAE Grade 5 | |  YAPPE051 SAE Grade 8 | |
| Diameter | Threads per inch | Torque | | | | | |
| inch | | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m |
| 11/16 | 24 | 99-133 | 135-181 | 153-207 | 209-279 | 217-291 | 296-394 |
| 3/4 | 10 | 110-148 | 150-200 | 171-229 | 232-310 | 240-324 | 328-438 |
| 3/4 | 16 | 123-165 | 168-224 | 190-256 | 259-345 | 269-361 | 366-488 |
| 3/4 | 20 | 127-171 | 174-232 | 197-265 | 268-358 | 278-374 | 379-505 |
| 13/16 | 20 | | | 252-340 | 345-459 | 357-481 | 487-649 |
| 7/8 | 9 | | | 275-369 | 374-498 | 387-521 | 528-704 |
| 7/8 | 14 | | | 303-407 | 413-551 | 427-575 | 583-777 |
| 7/8 | 20 | | | 319-429 | 435-579 | 450-606 | 614-818 |
| 15/16 | 20 | | | 395-531 | 538-718 | 558-750 | 760-1014 |
| 1 | 8 | | | 411-553 | 560-748 | 581-781 | 792-1056 |
| 1 | 12 | | | 450-606 | 614-818 | 636-856 | 867-1155 |
| 1 | 20 | | | 483-649 | 658-878 | 681-917 | 929-1239 |
| 1-1/16 | 18 | | | 576-776 | 782-1044 | 813-1095 | 1109-1479 |
| 1-1/8 | 7 | | | 507-683 | 693-923 | 824-1108 | 1123-1497 |
| 1-1/8 | 12 | | | 570-766 | 776-1034 | 923-1241 | 1258-1678 |
| 1-1/8 | 18 | | | 600-806 | 817-1089 | 971-1307 | 1324-1766 |
| 1-3/16 | 18 | | | 709-953 | 966-1288 | 1149-1545 | 1566-2088 |
| 1-1/4 | 7 | | | 716-964 | 976-1302 | 1161-1563 | 1584-2112 |
| 1-1/4 | 12 | | | 793-1067 | 1081-1441 | 1286-1730 | 1754-2338 |
| 1-1/4 | 18 | | | 831-1117 | 1132-1510 | 1346-1812 | 1835-2447 |
| 1-5/16 | 18 | | | 965-1299 | 1316-1754 | 1565-2105 | 2134-2846 |
| 1-3/8 | 6 | | | 939-1263 | 1281-1707 | 1523-2049 | 2076-2768 |

# APPENDIX E
# TORQUE LIMITS

**Table E-2. Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts**

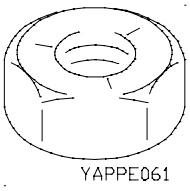
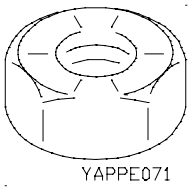
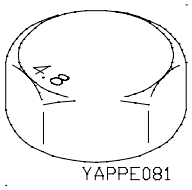
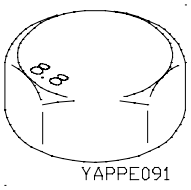
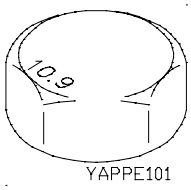
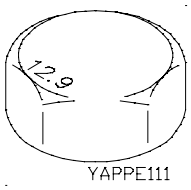
| | | Material Grade Markings | | | |
|---|---|---|---|---|---|
| | |  YAPPE061 | |  YAPPE071 | |
| | | SAE Grade 5 | | SAE Grade 8 | |
| Hole Diameter | Threads per inch | Torque | | | |
| inch | | lb-ft | N·m | lb-ft | N·m |
| 1/4 | 20 | 10-12 | 14-16 | 15-17 | 20-24 |
| 1/4 | 28 | 12-14 | 16-18 | 14-18 | 21-25 |
| 5/16 | 18 | 20-24 | 27-33 | 26-32 | 36-44 |
| 5/16 | 24 | 22-26 | 30-36 | 29-35 | 40-48 |
| 3/8 | 16 | 35-41 | 47-55 | 48-58 | 65-77 |
| 3/8 | 24 | 38-46 | 53-63 | 53-63 | 72-86 |
| 7/16 | 14 | 55-65 | 74-88 | 75-91 | 103-123 |
| 7/16 | 20 | 60-70 | 81-97 | 80-98 | 110-132 |
| 1/2 | 13 | 86-102 | 116-138 | 113-137 | 154-184 |
| 1/2 | 20 | 92-110 | 125-149 | 127-153 | 177-207 |
| 9/16 | 12 | 120-144 | 162-194 | 168-202 | 229-273 |
| 9/16 | 18 | 135-161 | 183-219 | 179-217 | 244-294 |
| 5/8 | 11 | 165-199 | 226-270 | 226-272 | 306-368 |
| 5/8 | 18 | 181-219 | 246-296 | 244-296 | 331-401 |
| 3/4 | 10 | 296-354 | 402-480 | 395-479 | 538-648 |
| 3/4 | 16 | 310-376 | 422-508 | 424-516 | 576-698 |
| 7/8 | 9 | 460-554 | 625-749 | 612-746 | 833-1009 |
| 7/8 | 14 | 503-607 | 684-822 | 652-800 | 888-1082 |
| 1 | 8 | 686-828 | 933-1121 | 941-1141 | 1280-1544 |

**Table E-3. Dry Torque Limits for Metric Screws and Free Spinning Nuts**

| | | Material Grade Markings | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  Metric Grade 4.8 | |  Metric Grade 8.8 | |  Metric Grade 10.9 | |  Metric Grade 12.9 | |
| Diameter | Thread Pitch | Torque | | | | | | | |
| mm | | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m |
| 6 | 1 | 3 | 4-5 | 5-7 | 7-9 | 7-9 | 10-13 | 8-11 | 11-15 |
| 8 | 1.25 | 7-9 | 9-11 | 13-17 | 17-23 | 17-23 | 23-31 | 21-27 | 27-37 |
| 8 | 1 | 7-9 | 9-13 | 14-18 | 18-24 | 19-25 | 25-33 | 21-29 | 29-39 |
| 10 | 1.5 | 13-17 | 17-23 | 25-33 | 33-45 | 34-46 | 46-62 | 40-54 | 54-72 |
| 10 | 1.25 | 14-18 | 18-24 | 26-34 | 35-47 | 36-48 | 49-65 | 42-56 | 57-77 |
| 10 | 0.75 | 15-19 | 21-27 | 29-39 | 39-53 | 40-54 | 54-72 | 47-63 | 63-85 |
| 12 | 1.75 | 22-30 | 30-40 | 43-57 | 58-78 | 60-80 | 81-107 | 69-93 | 94-126 |
| 12 | 1.5 | 23-31 | 32-42 | 46-60 | 61-81 | 63-83 | 85-113 | 73-97 | 99-131 |
| 12 | 1.25 | 24-32 | 33-45 | 47-63 | 65-85 | 65-87 | 88-118 | 76-102 | 104-138 |
| 12 | 1 | 26-34 | 34-46 | 49-65 | 67-89 | 68-90 | 93-123 | 80-106 | 108-144 |
| 14 | 2 | 36-48 | 48-74 | 69-91 | 93-125 | 95-127 | 129-173 | 112-148 | 151-201 |
| 14 | 1.5 | 39-51 | 52-70 | 75-99 | 99-135 | 103-137 | 140-186 | 120-160 | 163-217 |
| 15 | 1 | 51-69 | 69-93 | 100-132 | 135-179 | 137-183 | 187-249 | 160-214 | 218-290 |
| 16 | 2 | 55-73 | 75-99 | 107-143 | 145-193 | 148-198 | 201-267 | 173-231 | 235-313 |
| 16 | 1.5 | 59-79 | 80-106 | 114-152 | 155-207 | 158-210 | 214-286 | 184-246 | 250-334 |
| 18 | 1.5 | | | 166-222 | 225-301 | 230-306 | 311-415 | 268-358 | 364-486 |
| 20 | 2.5 | | | 209-279 | 283-377 | 289-385 | 392-522 | 338-450 | 458-610 |
| 20 | 1.5 | | | 232-308 | 315-419 | 321-427 | 435-579 | 375-499 | 508-678 |
| 20 | 1 | | | 244-324 | 330-440 | 337-449 | 457-609 | 394-524 | 534-712 |
| 22 | 2.5 | | | 285-379 | 387-515 | 394-524 | 534-712 | 461-613 | 624-832 |
| 22 | 1.5 | | | 313-417 | 424-566 | 432-576 | 586-782 | 664-884 | 900-1200 |
| 24 | 3 | | | 361-481 | 489-653 | 499-665 | 677-903 | 584-778 | 791-1055 |
| 24 | 2 | | | 394-524 | 534-712 | 545-725 | 738-984 | 725-965 | 982-1310 |
| 25 | 1.5 | | | 467-621 | 633-843 | 645-859 | 875-1167 | 754-1004 | 1023-1363 |

# APPENDIX E
# TORQUE LIMITS

**Table E-4. Dry Torque Limits for Metric Prevailing Torque Nuts**

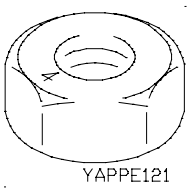
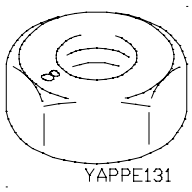
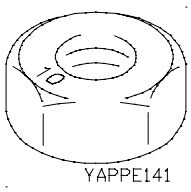
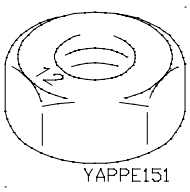
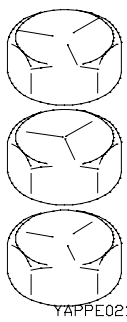
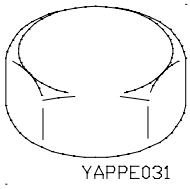
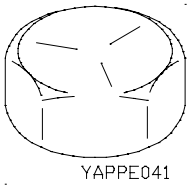
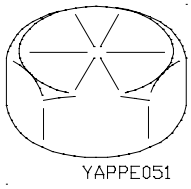
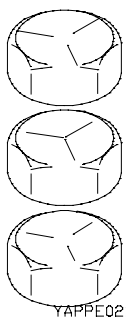
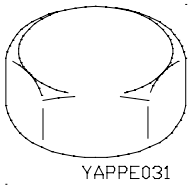
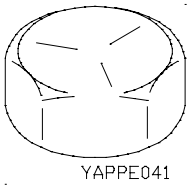
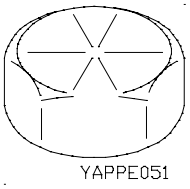
| | | Material Grade Markings | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  Metric Grade 4.8 | |  Metric Grade 8.8 | |  Metric Grade 10.9 | |  Metric Grade 12.9 | |
| Diameter | Thread Pitch | Torque | | | | | | | |
| mm | | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m | lb-ft | N·m |
| 6 | 1 | 5-6 | 7-8 | 7-9 | 10-12 | 10-12 | 14-17 | 11-14 | 15-19 |
| 8 | 1.25 | 12-14 | 16-18 | 18-22 | 24-30 | 24-30 | 32-40 | 27-33 | 36-46 |
| 8 | 1 | 12-14 | 16-20 | 19-23 | 25-31 | 25-31 | 34-42 | 28-36 | 38-48 |
| 10 | 1.5 | 21-25 | 28-34 | 33-41 | 44-56 | 44-56 | 60-76 | 50-64 | 68-86 |
| 10 | 1.25 | 21-25 | 29-35 | 34-42 | 46-58 | 46-58 | 63-79 | 53-67 | 71-91 |
| 10 | 0.75 | 23-27 | 31-37 | 37-47 | 49-63 | 50-64 | 68-86 | 57-73 | 77-99 |
| 12 | 1.75 | 33-41 | 46-56 | 55-69 | 74-94 | 75-95 | 102-128 | 85-109 | 115-147 |
| 12 | 1.5 | 35-43 | 47-57 | 56-72 | 77-97 | 78-98 | 106-134 | 89-113 | 120-152 |
| 12 | 1.25 | 36-44 | 48-60 | 58-74 | 79-101 | 81-103 | 109-139 | 91-117 | 125-159 |
| 12 | 1 | 37-45 | 50-62 | 61-77 | 82-104 | 84-106 | 114-144 | 95-121 | 129-165 |
| 14 | 2 | 53-65 | 72-88 | 87-109 | 117-149 | 118-150 | 160-204 | 134-172 | 182-232 |
| 14 | 1.5 | 57-69 | 76-94 | 92-116 | 125-159 | 126-160 | 171-217 | 143-183 | 194-248 |
| 16 | 2 | 79-97 | 107-131 | 130-166 | 177-225 | 178-228 | 243-309 | 204-262 | 277-355 |
| 16 | 1.5 | 82-102 | 112-138 | 138-176 | 187-239 | 189-241 | 256-328 | 215-277 | 292-376 |
| 18 | 1.5 | | | 197-253 | 267-343 | 271-347 | 367-471 | 309-399 | 420-542 |
| 20 | 2.5 | | | 248-318 | 337-431 | 342-438 | 464-594 | 391-503 | 530-682 |
| 20 | 1.5 | | | 271-349 | 369-473 | 374-480 | 507-651 | 428-552 | 580-750 |
| 20 | 1 | | | 283-365 | 384-494 | 390-502 | 529-681 | 447-577 | 606-784 |
| 22 | 2.5 | | | 335-429 | 455-583 | 460-592 | 624-802 | 526-680 | 714-922 |
| 22 | 1.5 | | | 363-467 | 492-634 | 499-643 | 676-872 | 730-950 | 990-1290 |
| 24 | 3 | | | 420-540 | 569-733 | 577-743 | 783-1009 | 662-856 | 897-1161 |
| 24 | 2 | | | 453-583 | 614-792 | 622-804 | 844-1090 | 803-1043 | 1088-1416 |

**Table E-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts**

|  YAPPE021 **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.** | | **Material Grade Markings** | | | | | |
|---|---|---|---|---|---|---|---|
| | |  YAPPE031 **SAE Grade 2** | |  YAPPE041 **SAE Grade 5** | |  YAPPE051 **SAE Grade 8** | |
| **Diameter** | **Threads per inch** | **Torque** | | | | | |
| **inch** | | **lb-ft** | **N·m** | **lb-ft** | **N·m** | **lb-ft** | **N·m** |
| 1/4 | 20 | 4 | 6 | 6 | 8 | 9 | 12 |
| 1/4 | 28 | 5 | 7 | 7 | 9 | 10 | 14 |
| 5/16 | 18 | 8 | 11 | 13 | 18 | 18 | 24 |
| 5/16 | 24 | 9 | 12 | 14 | 19 | 20 | 27 |
| 3/8 | 16 | 15 | 20 | 23 | 31 | 35 | 47 |
| 3/8 | 24 | 17 | 23 | 25 | 34 | 35 | 47 |
| 7/16 | 14 | 24 | 33 | 35 | 47 | 55 | 75 |
| 7/16 | 20 | 25 | 34 | 40 | 54 | 60 | 81 |
| 1/2 | 13 | 35 | 47 | 55 | 75 | 80 | 108 |
| 1/2 | 20 | 40 | 54 | 65 | 88 | 90 | 122 |
| 9/16 | 12 | 50 | 68 | 80 | 108 | 110 | 149 |
| 9/16 | 18 | 55 | 75 | 90 | 122 | 130 | 176 |
| 5/8 | 11 | 70 | 95 | 110 | 149 | 170 | 231 |
| 5/8 | 18 | 80 | 108 | 130 | 176 | 180 | 244 |
| 3/4 | 10 | 120 | 163 | 200 | 271 | 280 | 380 |
| 3/4 | 16 | 140 | 190 | 220 | 298 | 320 | 434 |
| 7/8 | 9 | 110 | 149 | 300 | 407 | 460 | 624 |
| 7/8 | 14 | 120 | 163 | 320 | 434 | 500 | 678 |
| 1 | 8 | 160 | 217 | 440 | 597 | 680 | 922 |
| 1 | 12 | 170 | 231 | 480 | 651 | 740 | 1003 |
| 1-1/8 | 7 | 220 | 298 | 600 | 814 | 960 | 1302 |
| 1-1/8 | 12 | 260 | 353 | 660 | 895 | 1080 | 1464 |

# APPENDIX E
# TORQUE LIMITS

**Table E-5. Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)**

|  YAPPE021 Manufacturer's marks may vary. These are all SAE Grade 5 | | Material Grade Markings | | | | | |
|---|---|---|---|---|---|---|---|
| | |  YAPPE031 SAE Grade 2 | |  YAPPE041 SAE Grade 5 | |  YAPPE051 SAE Grade 8 | |
| **Diameter** | **Threads per inch** | **Torque** | | | | | |
| **inch** | | **lb-ft** | **N·m** | **lb-ft** | **N·m** | **lb-ft** | **N·m** |
| 1-1/4 | 7 | 320 | 434 | 840 | 1139 | 1360 | 1844 |
| 1-1/4 | 12 | 360 | 488 | 920 | 1248 | 1500 | 2034 |
| 1-3/8 | 6 | 420 | 570 | 1100 | 1492 | 1780 | 2414 |
| 1-3/8 | 12 | 460 | 624 | 1260 | 1709 | 2040 | 2766 |

# APPENDIX F
# MANDATORY REPLACEMENT PARTS

## Section I. INTRODUCTION

### F-1. SCOPE

This appendix lists mandatory replacement parts you will need to maintain the 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 |
| 164 | LOCKWASHER | 12414560-017 | 5310-01-395-0820 |
| 165 | LOCKWASHER | 12414560-018 | 5310-01-381-3281 |
| 166 | LOCKWASHER | 12414560-029 | 5310-01-395-0817 |
| 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 |
| 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 |

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| (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 |
| 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 |
| 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 |
| 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)<br>National Stock<br>Number | (2)<br>Description<br>(CAGE) Part Number | (3)<br><br>U/M | (4)<br>Qty<br>Auth |
|---|---|---|---|
| 6685-01-193-1733 | Transmitter, Pressure (0-10,000 PSI)<br>(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)<br>Installed Controls or<br>Controls Being Installed | (2)<br>Installed Transmission or<br>Transmission Being Installed | (3)<br>Required Modification<br>(Refer to Section III) |
|---|---|---|
| WTEC II<br>(with 24-pin connector) | PRE-ID w/ 24-pin connector<br>(transmission serial number prior to 6510032369) | No modification required. |
| WTEC II<br>(with 24-pin connector) | PRE-ID w/ 31-pin connector<br>(transmission serial number 6510032369 to 6510090785) | Install 31-pin connector. |
| WTEC II<br>(with 24-pin connector) | TID 1<br>(transmission serial number 6510090786 to 6510142171) | Install 31-pin connector. |
| WTEC II<br>(with 24-pin connector) | TID 2<br>(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 to 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 to October 1999) [3] | PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785) | Install ID harness. |
| WTEC III (with ECU manufactured after to 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)<br>Installed Controls or<br>Controls Being Installed | (2)<br>Installed Transmission or<br>Transmission Being Installed | (3)<br>Required Modification<br>(Refer to Section III) |
|---|---|---|
| WTEC III<br>(with ECU manufactured after to October 1999) [3] | TID 2<br>(transmission serial number 6510142172 to 6510262116) | No modification required. |
| WTEC III<br>(with ECU manufactured after to October 1999) [3] | TID 3<br>(transmission serial number 6510262117 and subsequent) | No modification required. |

## Section III.

## MODIFICATION PARTS IDENTIFICATION

| Identification | Part Number | Description |
|---|---|---|
| 31-pin connector | 29519127 | 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 | Converts a TID 2 transmission to a TID 1 configuration to allow WTEC II controls to communicate with the transmission. |
| ID harness | 200100 | Allows WTEC III controls to communicate with a PRE-ID transmission. |
| Adapter cable assembly | 29519210 | 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)

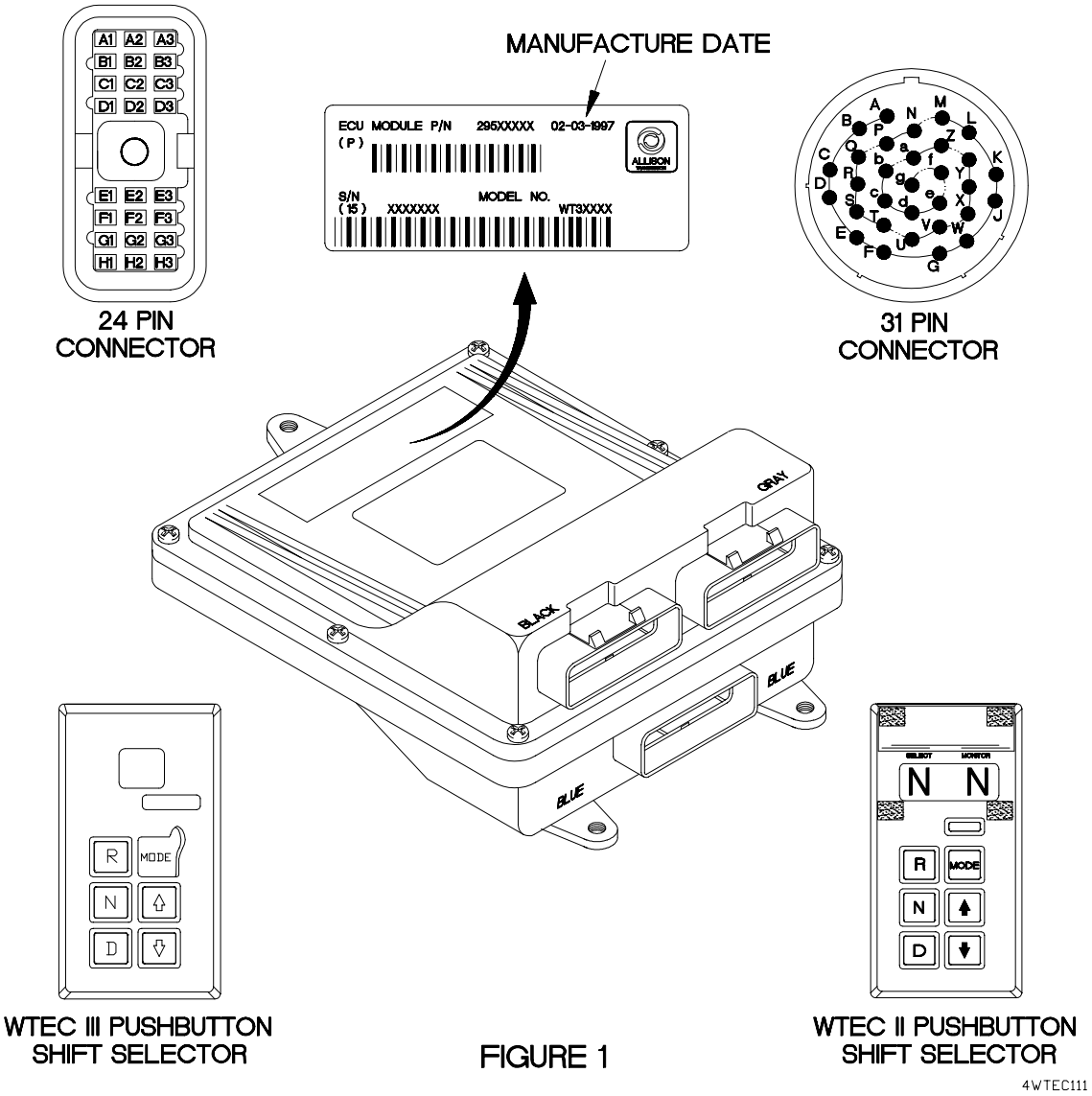



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# GLOSSARY
# ABBREVIATIONS

| | |
|---|---|
| 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) |

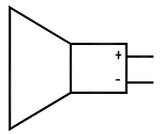
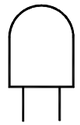
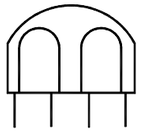
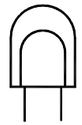
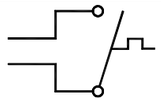
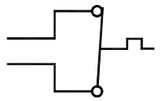
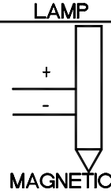
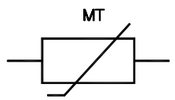
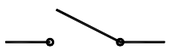
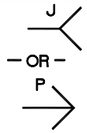
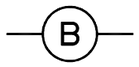
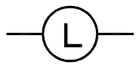
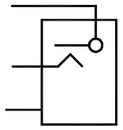
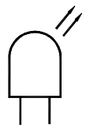
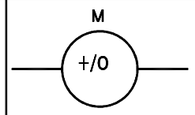
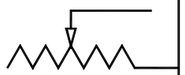
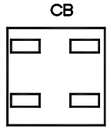
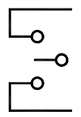
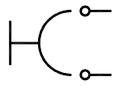
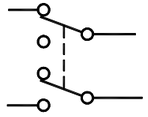
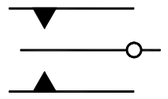
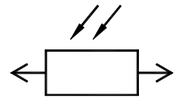
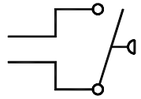
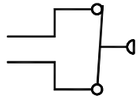
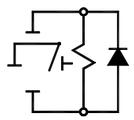
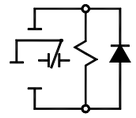
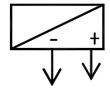
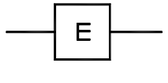
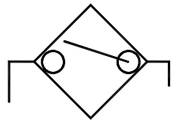
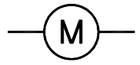
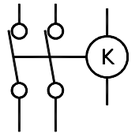
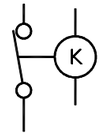
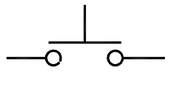
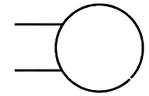
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|---|---|---|---|---|---|---|---|
|  HORN |  BLACKOUT LAMP |  LAMP |  DUALBEAM LAMP |  GROUND |  POWER LAMP |  OPEN CONTACT |  BATTERY |
|  TEMPERATURE SWITCH OPEN |  TEMPERATURE SWITCH CLOSED |  MAGNETIC PICKUP |  SENSOR |  NORMALLY OPEN |  NORMALLY 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)

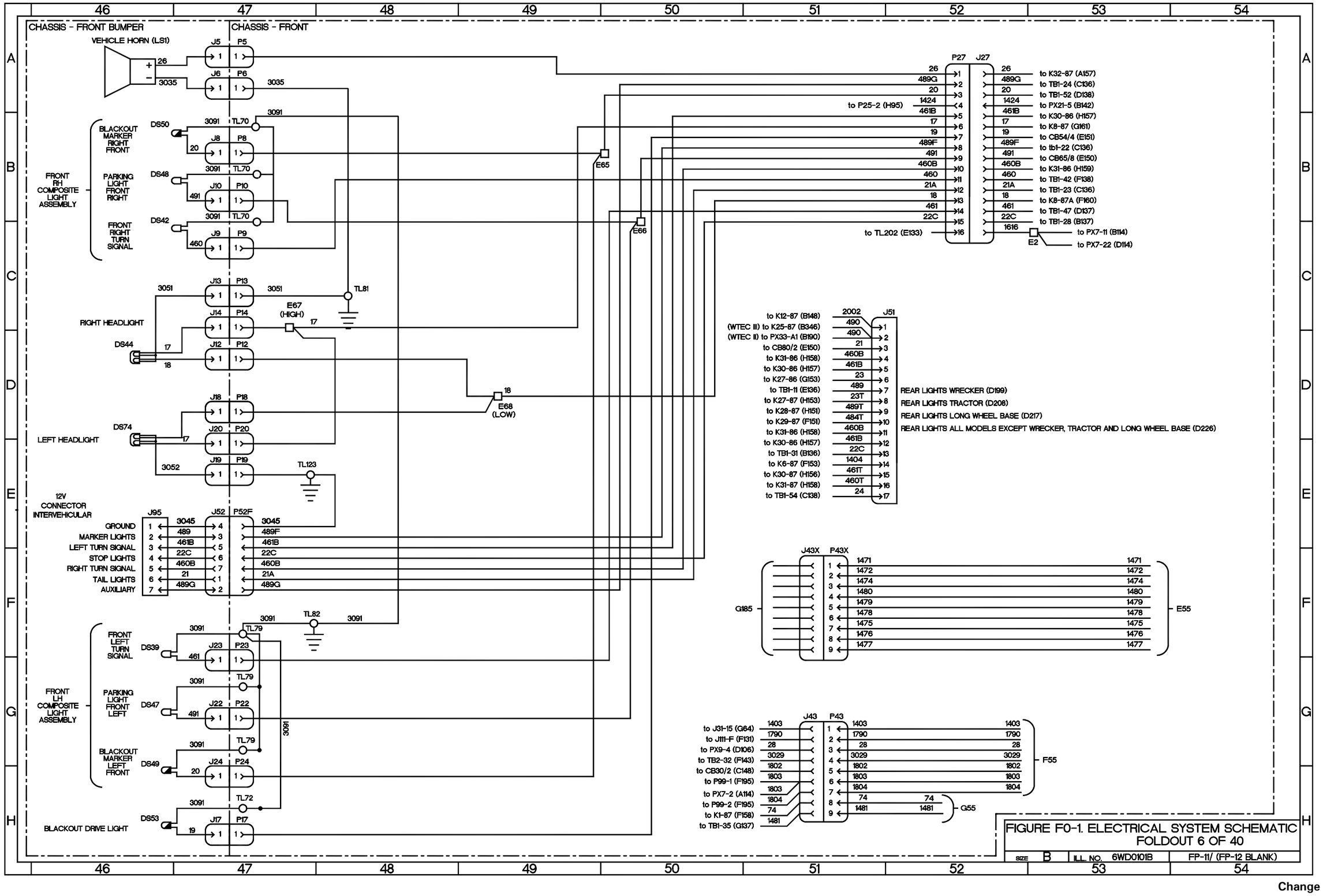



FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 6 OF 40

SIZE B | ILL. NO. 6WD0101B | FP-11/ (FP-12 BLANK)

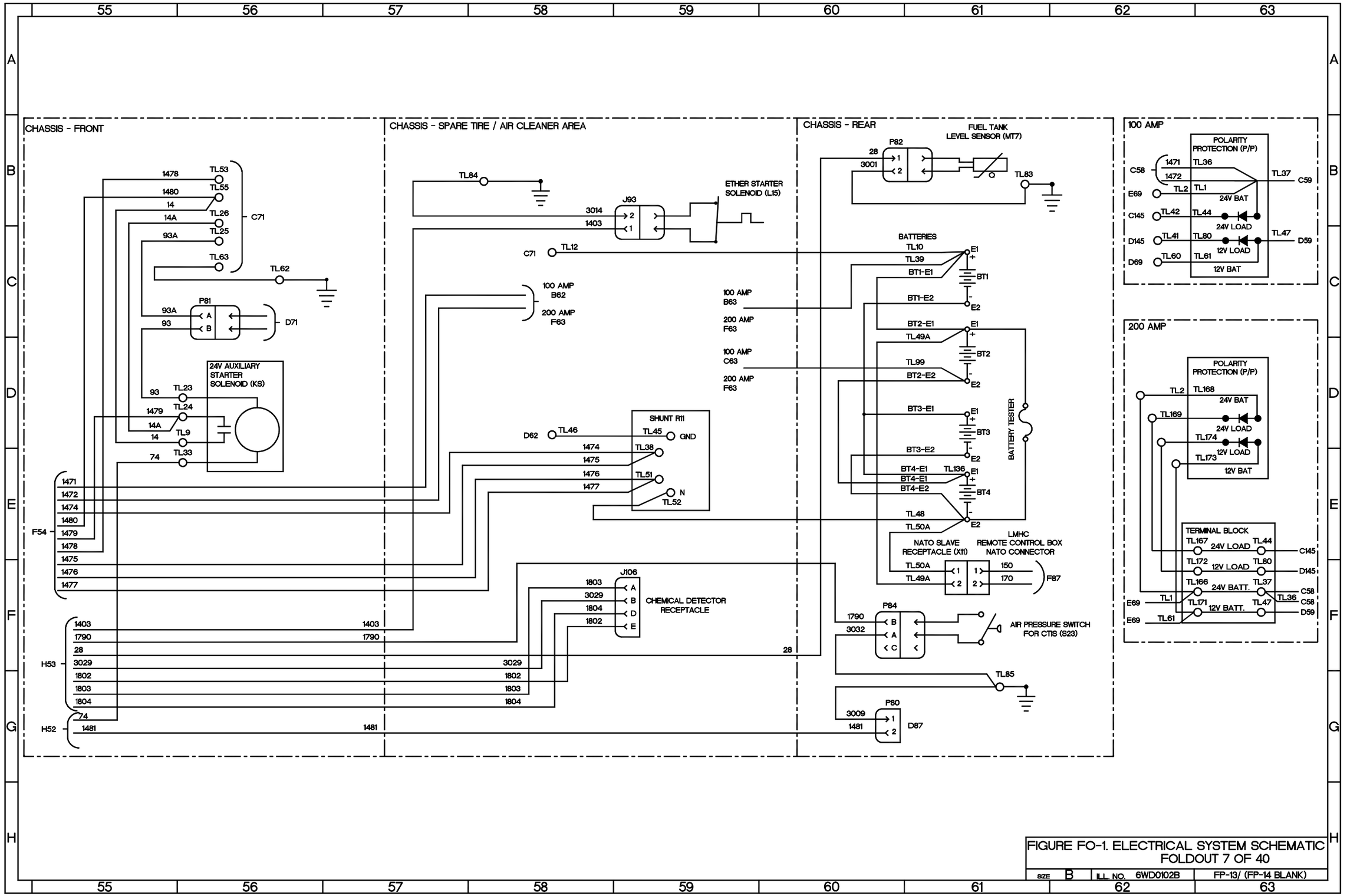



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 7 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0102B | FP-13/ (FP-14 BLANK) |

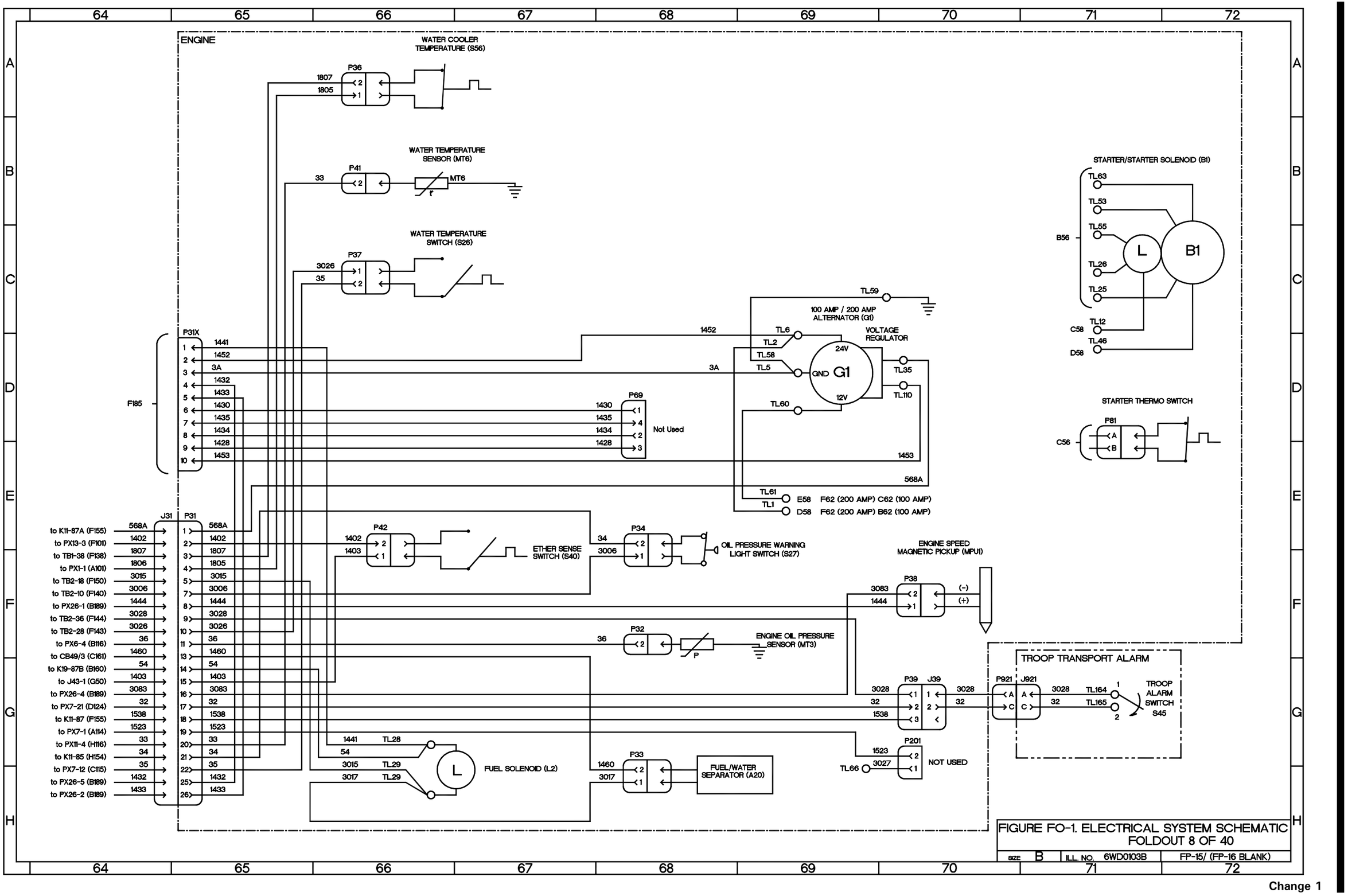


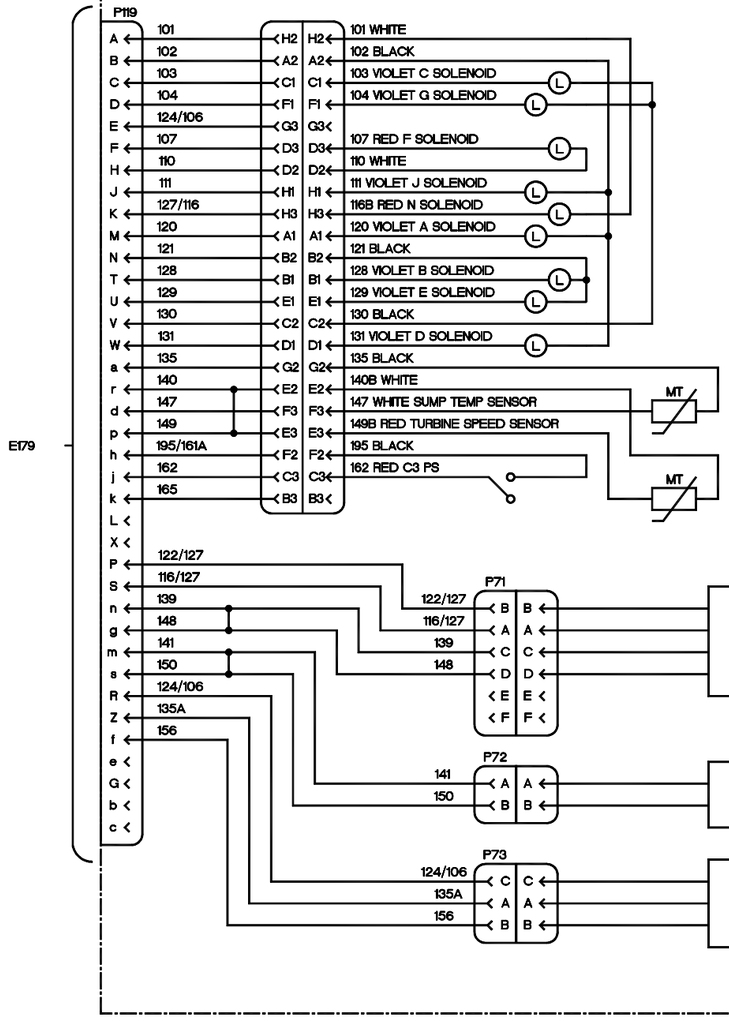

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 40

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

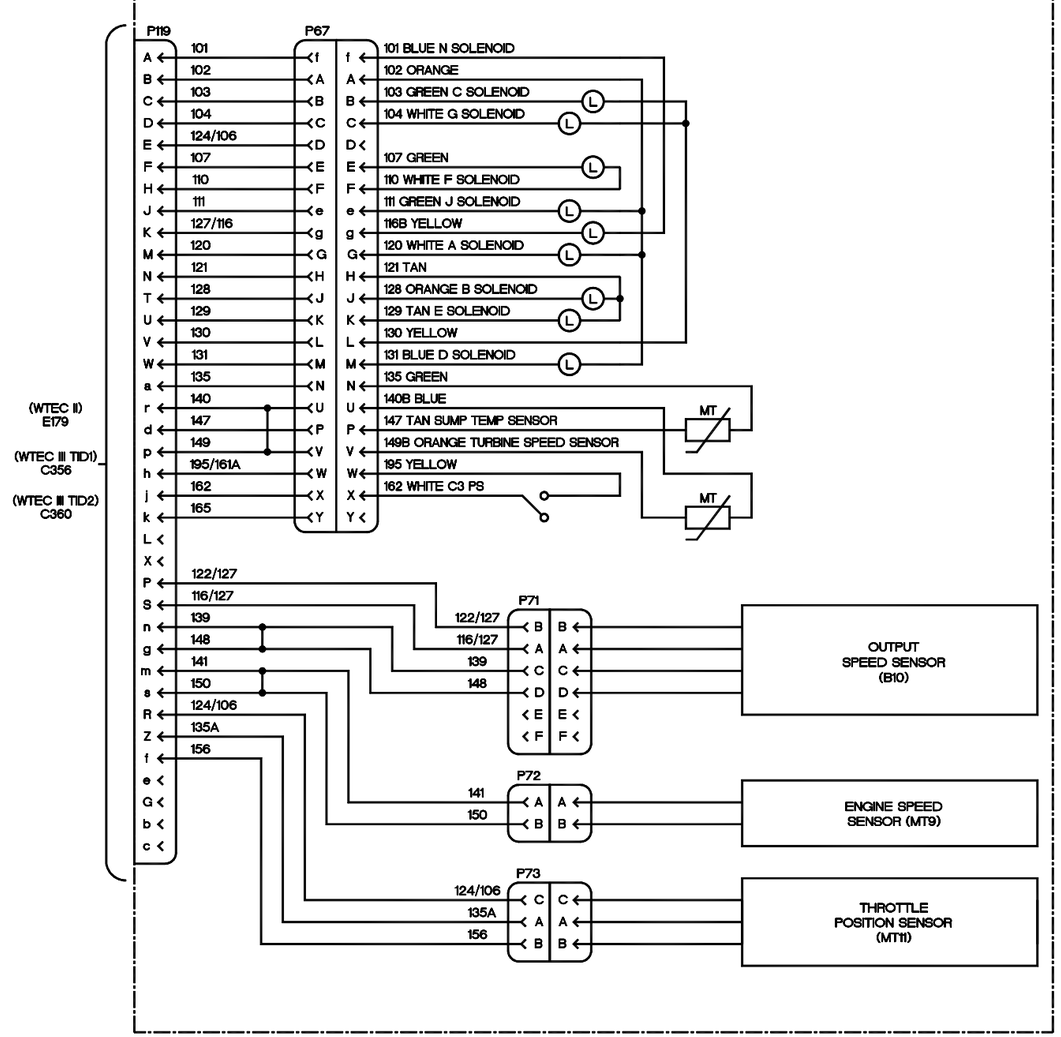
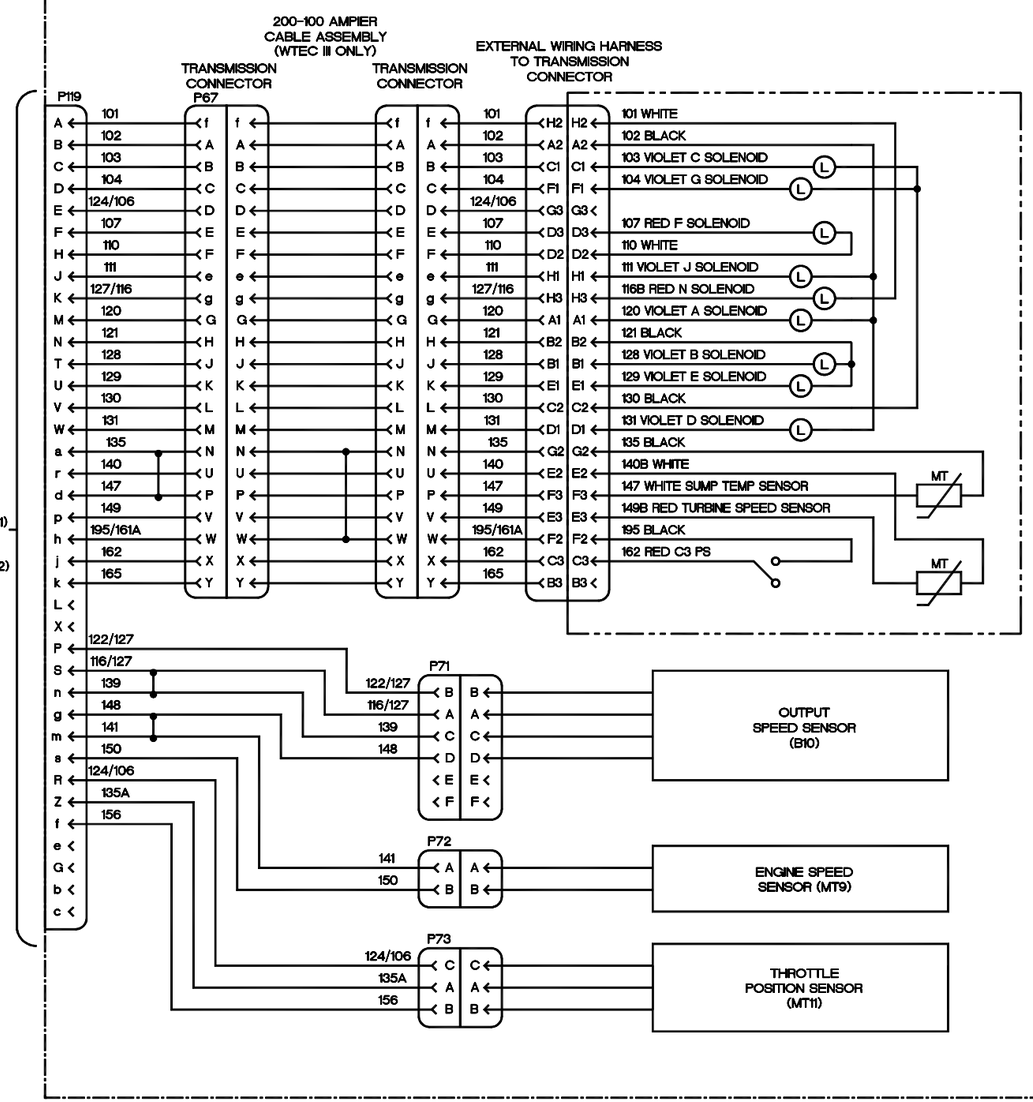


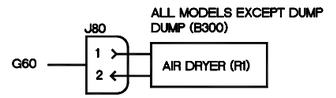

FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 40

| 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)

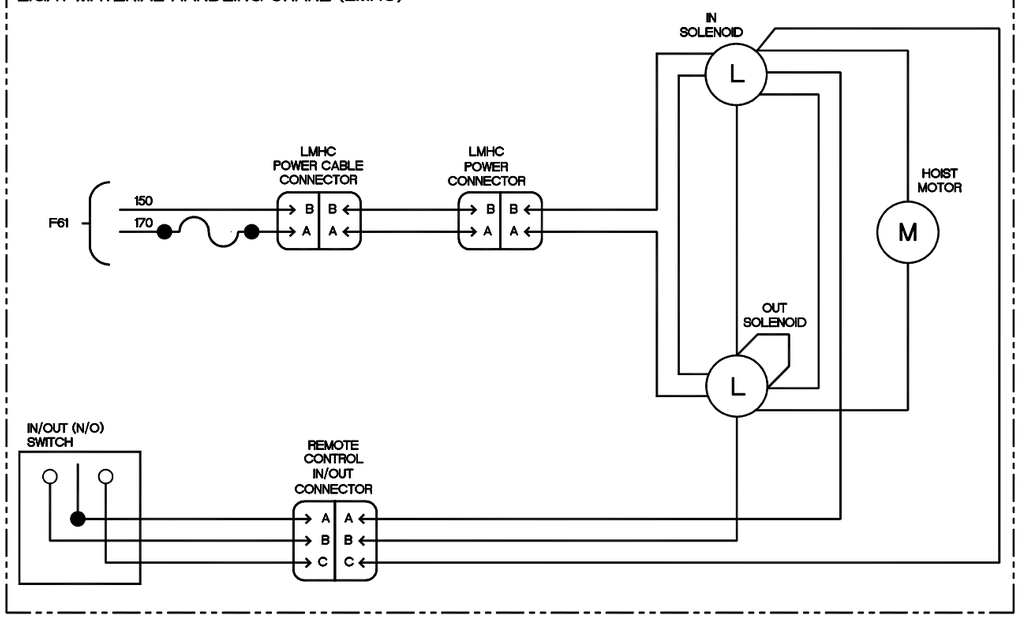



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 10 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0105B | FP-19/ (FP-20 BLANK) |

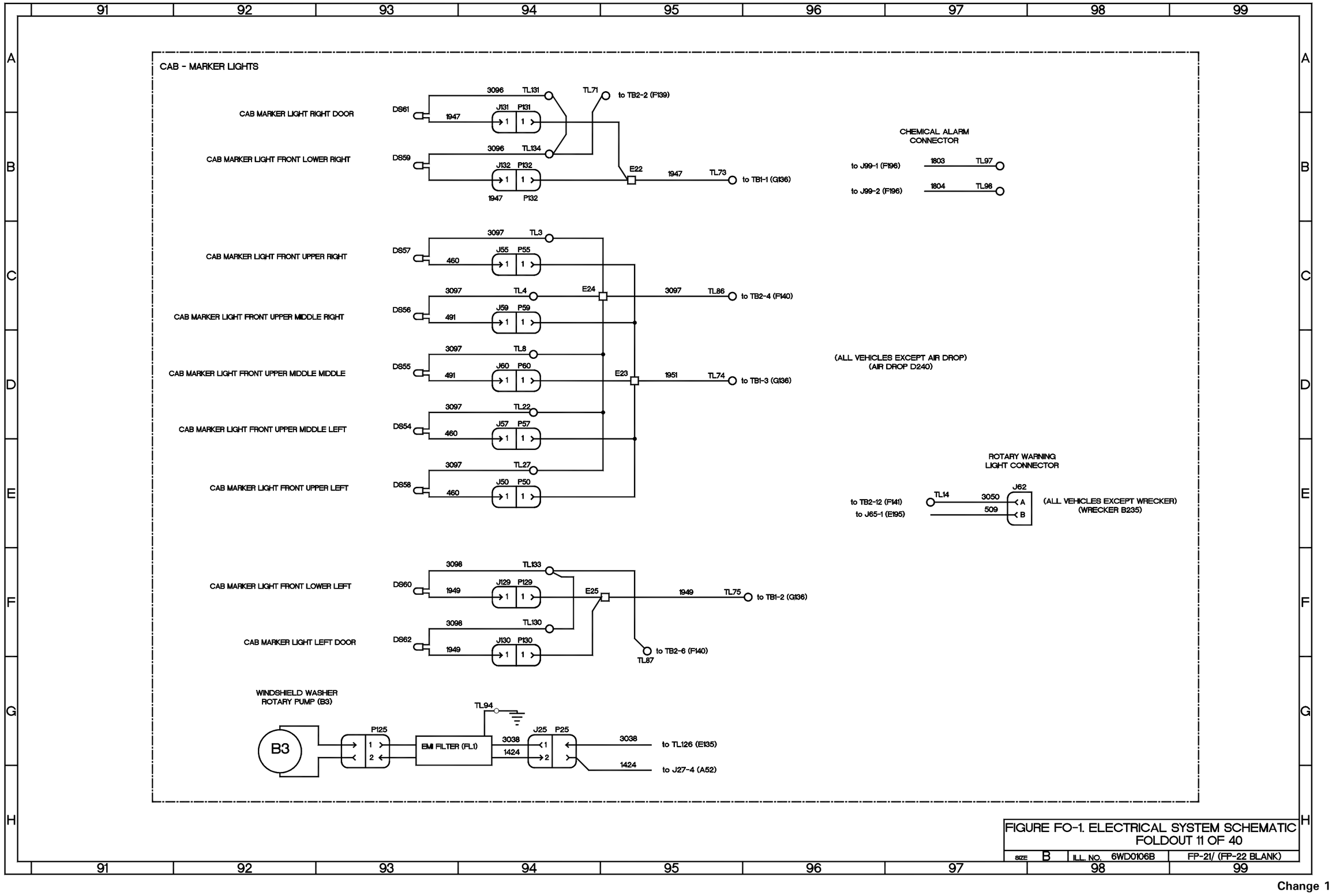



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 11 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0106B | FP-21/ (FP-22 BLANK) |

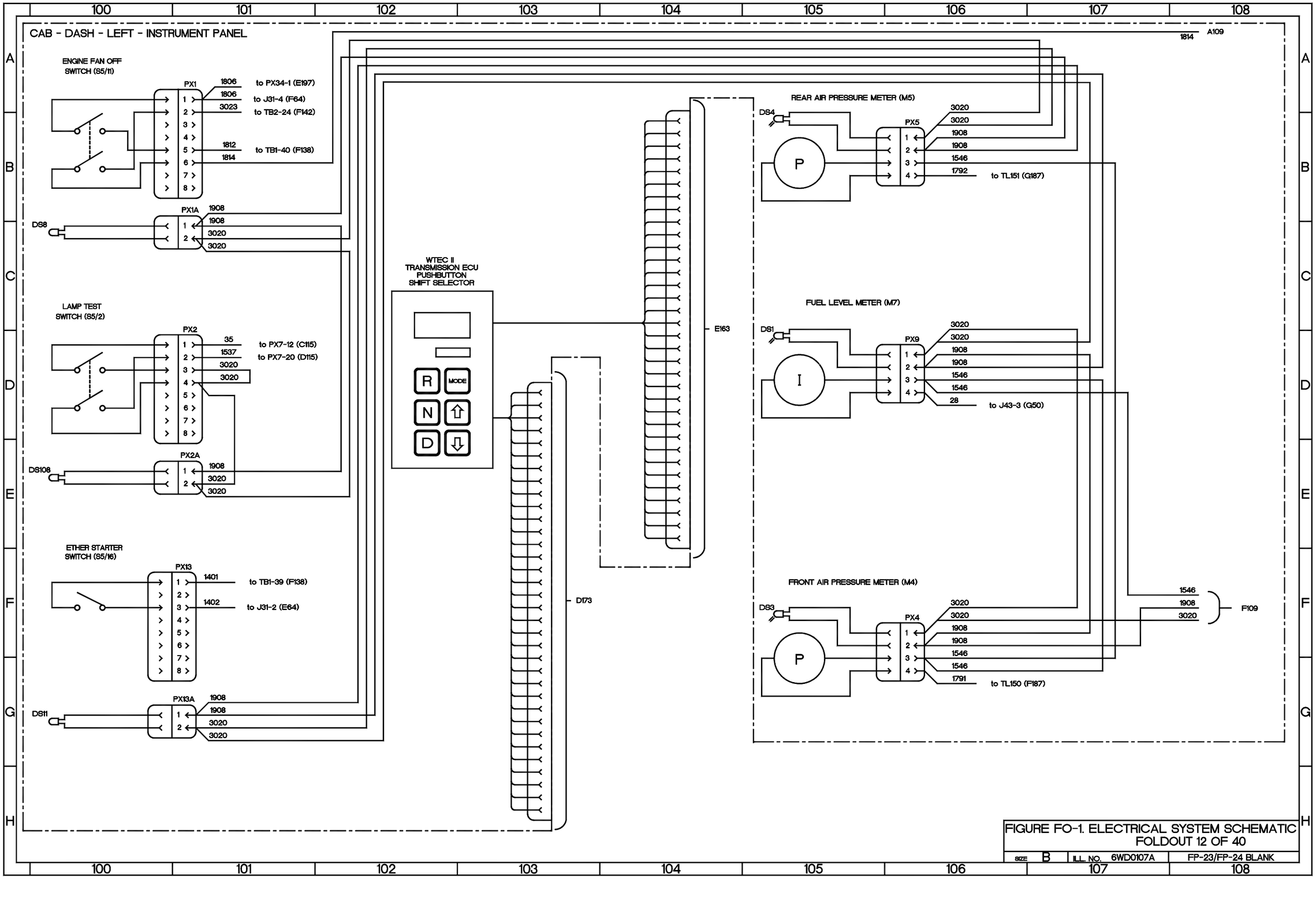



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 40

| 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

1548 to K2-86 (A152)

1586 to CB70/4 (E155)

PX17A

DS13

1908
1908
3020
3020

B117: 3020, 3020, 1908, 1908, 1546, 1546

STARTER PUSHBUTTON (S6)

TL163 — TL162 — 1405 to K24-87 (A161); 3007 to TB2-11 (G140)

ROTATING WARNING LIGHT SWITCH (S5/2)

PX12

1559 to K13-86 (A158)

1575
1575 to K20-86 (G147)

PX12A

DS10

1908
1908
3020
3020

MAIN LIGHT SWITCH (S4)

PX15

A
B 1542
C 22 to D1A-2 (C147)
D 19 to CB54/3 (D151)
E 1572 to CB66/1 (D152)
F 1586 to CB70/4 (D155)
H 1575
J 1577 to CB74/5 (D159)
K 1404 to K6-87 (F152)
L 491 to CB65/7 (D150)
M 16 to P18-3 (B187)
N 23 to K27-86 (G152)

D117: 3020, 3020, 1908, 1908, 1546

E117: 1546

F117: 3020, 1908

G117: 3020, 3020, 1908, 1908, 1546

FULL HAZARD WARNING SWITCH (S5/22)

PX14

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)

PX14A

DS12

1908
1908 to J913-11 (C130)
3020
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

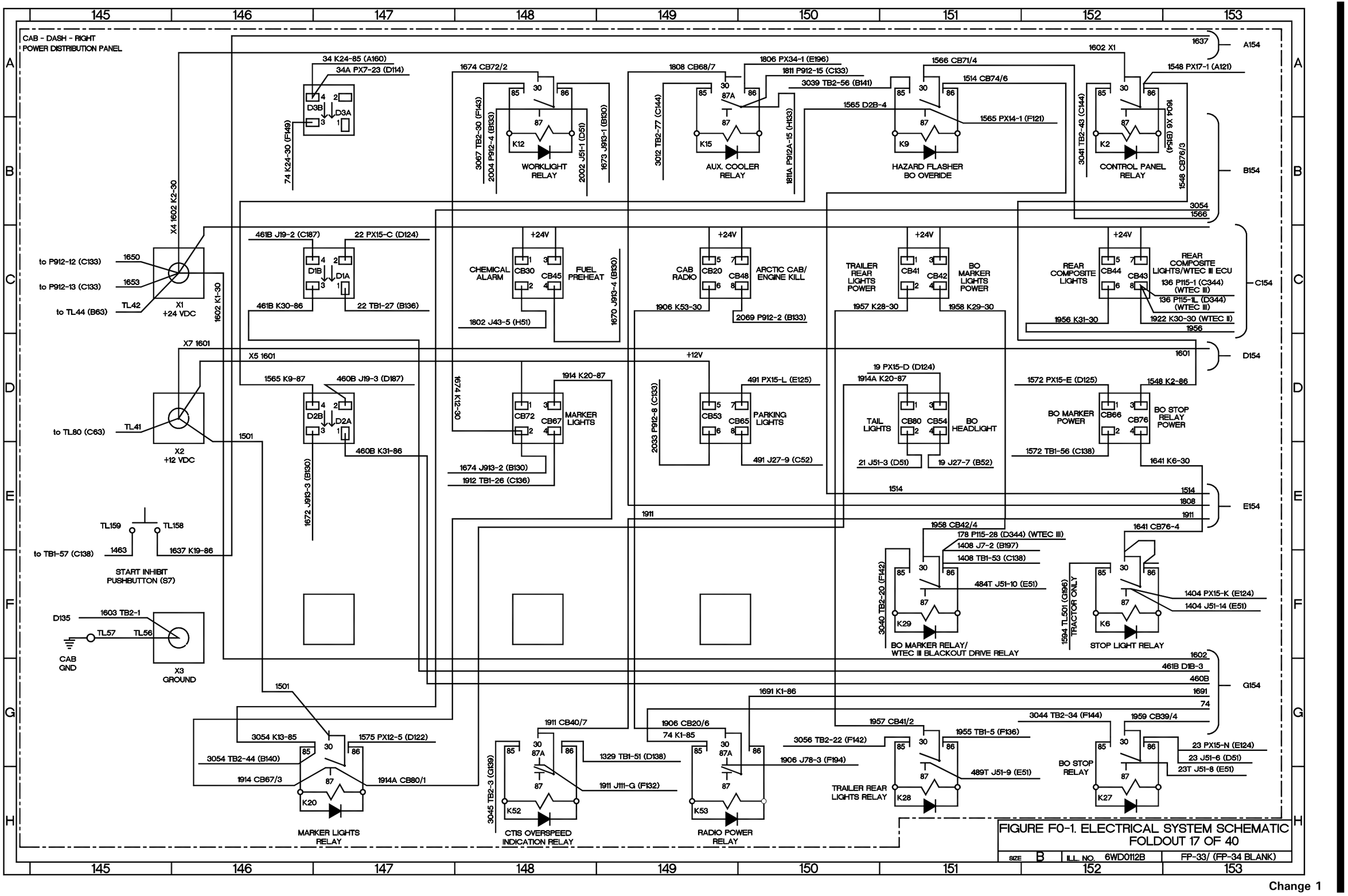
1603 X3

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) |


CAB - DASH - RIGHT
POWER DISTRIBUTION PANEL
34 K24-85 (A160)
34A PX7-23 (D114)
74 K24-30 (F149)
1674 CB72/2
3067 TB2-30 (F143)
2004 P912-4 (B133)
WORKLIGHT RELAY
2002 J51-1 (D51)
1673 J913-1 (B130)
1808 CB68/7
1806 PX34-1 (E196)
1811 P912-15 (C133)
3039 TB2-56 (B141)
3012 TB2-77 (C144)
AUX. COOLER RELAY
181IA P912A-15 (H133)
1566 CB71/4
1514 CB74/6
1565 D2B-4
1565 PX14-1 (F121)
HAZARD FLASHER BO OVERIDE
1602 X1
1637
A154
1548 PX17-1 (A121)
3041 TB2-43 (C144)
CONTROL PANEL RELAY
1604 X6 (B154)
1548 CB76/3
B154
3054
1566
X4 1602 K2-30
to P912-12 (C133)
1650
to P912-13 (C133)
1653
to TL44 (B63)
TL42
X1
+24 VDC
1602 K1-30
461B J19-2 (C187)
22 PX15-C (D124)
461B K30-86
22 TB1-27 (B136)
CHEMICAL ALARM
FUEL PREHEAT
1802 J43-5 (H51)
1670 J913-4 (B130)
CAB RADIO
ARCTIC CAB/ ENGINE KILL
1906 K53-30
2069 P912-2 (B133)
TRAILER REAR LIGHTS POWER
1957 K28-30
BO MARKER LIGHTS POWER
1958 K29-30
REAR COMPOSITE LIGHTS
REAR COMPOSITE LIGHTS/WTEC III ECU
136 P115-1 (C344) (WTEC III)
136 P115-1L (D344) (WTEC III)
1922 K30-30 (WTEC II)
1956 K31-30
1956
C154
X7 1601
X5 1601
1601
D154
to TL80 (C63)
TL41
X2
+12 VDC
1501
1565 K9-87
460B J19-3 (D187)
460B K31-86
1672 J913-3 (B130)
1674 K12-30
1914 K20-87
MARKER LIGHTS
1674 J913-2 (B130)
1912 TB1-26 (C136)
+12V
2033 P912-8 (C133)
491 PX15-L (E125)
PARKING LIGHTS
491 J27-9 (C52)
19 PX15-D (D124)
1914A K20-87
TAIL LIGHTS
BO HEADLIGHT
21 J51-3 (D51)
19 J27-7 (B52)
1572 PX15-E (D125)
1548 K2-86
BO MARKER POWER
BO STOP RELAY POWER
1572 TB1-56 (C138)
1641 K6-30
1514
1808
1911
E154
1911
1958 CB42/4
178 P115-28 (D344) (WTEC III)
1408 J7-2 (B197)
1408 TB1-53 (C138)
484T J51-10 (E51)
3040 TB2-20 (F142)
BO MARKER RELAY/ WTEC III BLACKOUT DRIVE RELAY
K29
1641 CB76-4
1404 PX15-K (E124)
1404 J51-14 (E51)
1594 TL501 (G196) TRACTOR ONLY
STOP LIGHT RELAY
K6
TL159
TL158
1463
1637 K19-86
to TB1-57 (C138)
START INHIBIT PUSHBUTTON (S7)
D135
1603 TB2-1
TL57
TL56
CAB GND
X3
GROUND
1602
461B D1B-3
460B
1691
74
G154
1501
1691 K1-86
3054 K13-85
1575 PX12-5 (D122)
3054 TB2-44 (B140)
1914 CB67/3
1914A CB80/1
K20
MARKER LIGHTS RELAY
1911 CB40/7
1329 TB1-51 (D138)
1911 J111-G (F132)
3045 TB2-3 (G139)
CTIS OVERSPEED INDICATION RELAY
K52
1906 CB20/6
74 K1-85
1906 J78-3 (F194)
RADIO POWER RELAY
K53
1957 CB41/2
3056 TB2-22 (F142)
1955 TB1-5 (F136)
489T J51-9 (E51)
TRAILER REAR LIGHTS RELAY
K28
3044 TB2-34 (F144)
1959 CB39/4
23 PX15-N (E124)
23 J51-6 (D51)
23T J51-8 (E51)
BO STOP RELAY
K27
FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 40
SIZE B
ILL. NO. 6WD0112B
FP-33/ (FP-34 BLANK)

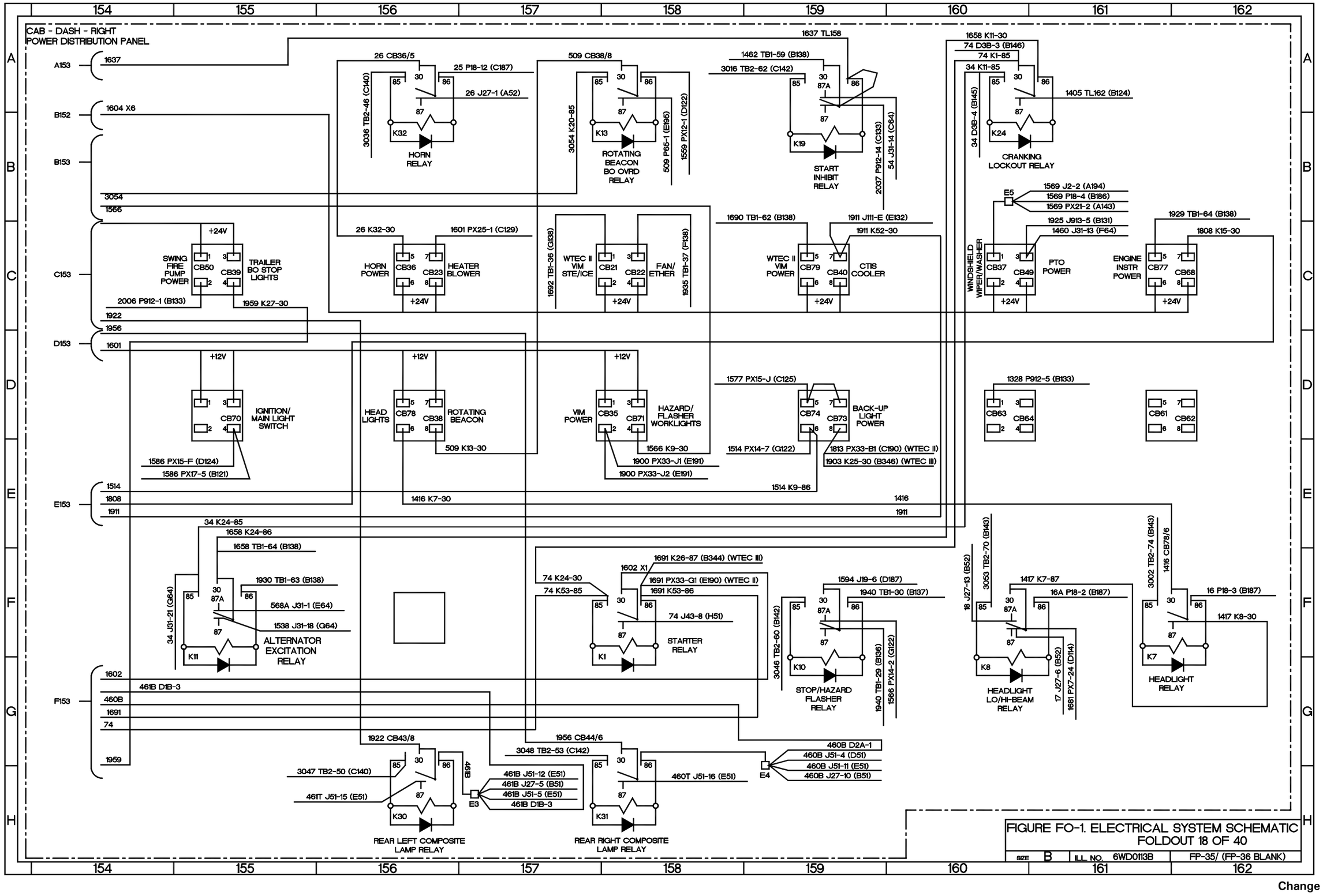



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 40

SIZE B | ILL. NO. 6WD0113B | FP-35/ (FP-36 BLANK)

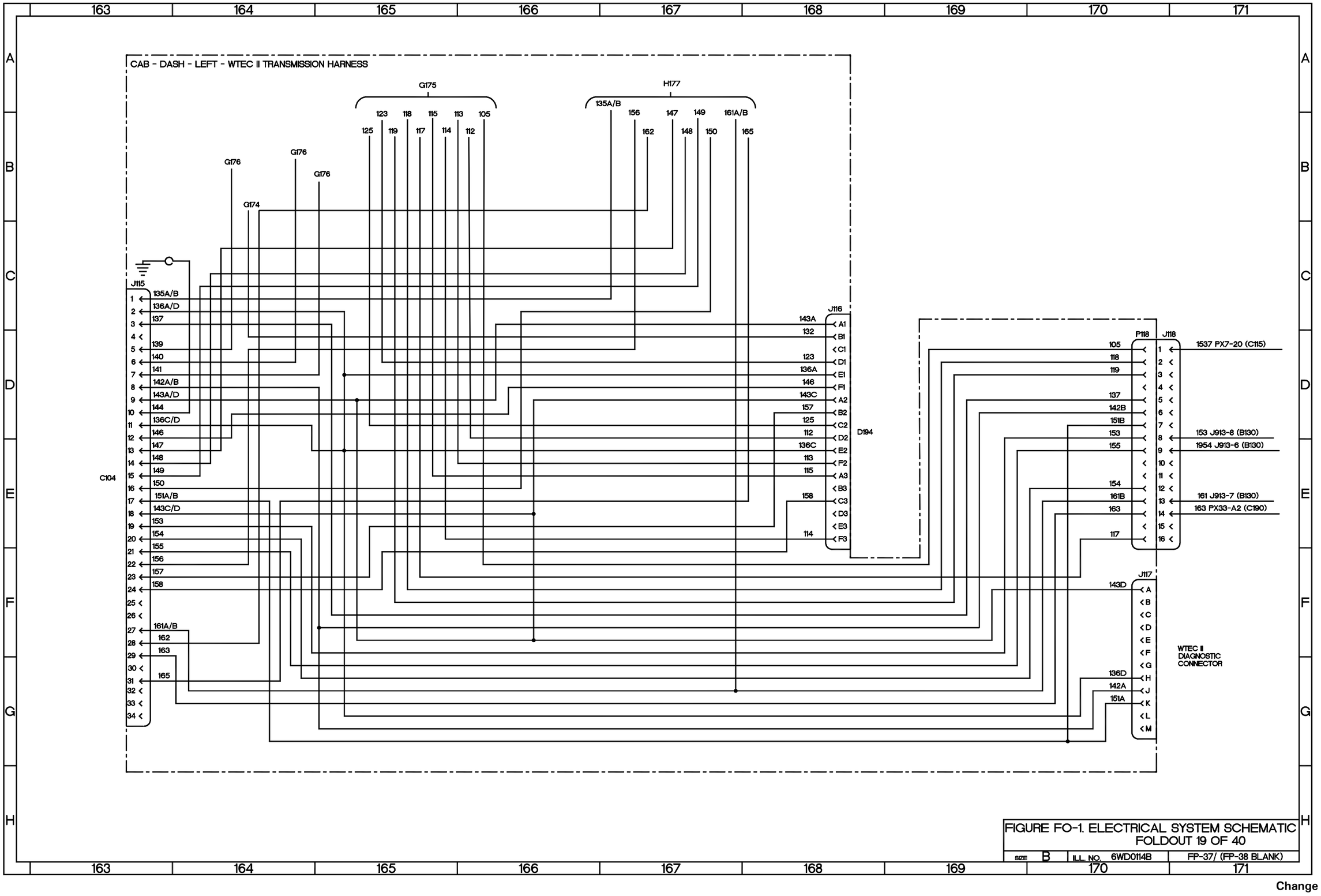



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0114B | FP-37/ (FP-38 BLANK) |

CAB-DASH-LEFT-WTECII TRANSMISSION HARNESS

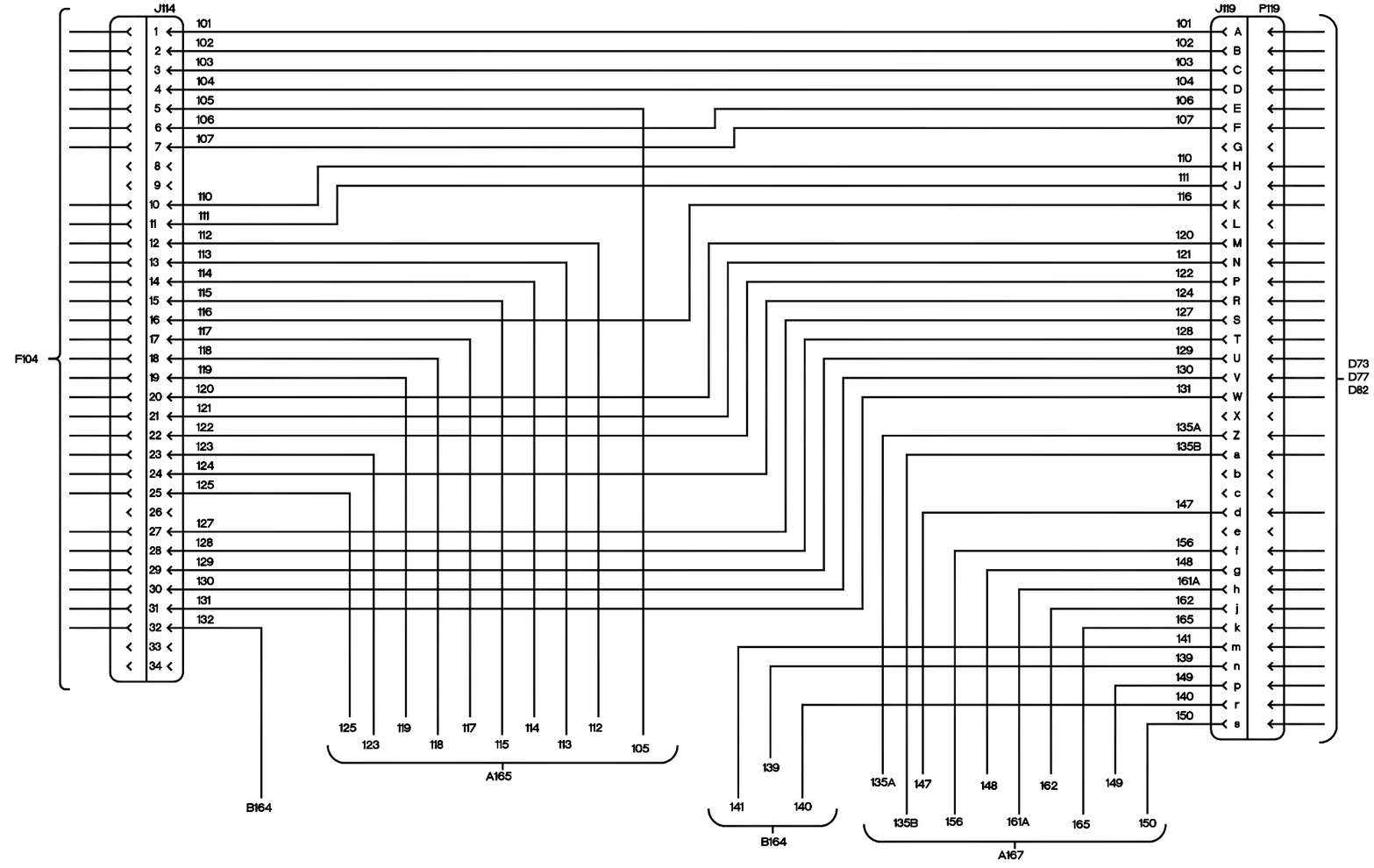



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 40

| 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)

PX26
INPUT (+) 1 1550 — to J913-12 (C130)
OUTPUT (+) 2 1444 — to J31-8 (F64)
+24V POWER 3 1433 — to J31-26 (H64)
INPUT (-) 4 1692 — to TB1-36 (G138)
OUTPUT (-) 5 3083 — to J31-16 (G64)
GROUND 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)

CHEMICAL ALARM CONNECTION

P99 J99

to J43-6 (H51)
to J43-7 (H51)
to TL88 (B97)
to TL98 (B97)

FAN SOLENOID (L1)

PX34

to K15-86 (A149)
to PX1-1 (A101)
to TB2-79 (C144)

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 — P53R (1 3094, 2 489T, 3 3094, 4 1404, 5 460T, 6 23T, 7 484T, 8 461T, 9 484T, 10 484T) — F236

P52R (1 21, 2, 3 489, 4 3045, 5 461B, 6 22C, 7 460B) — B239

E47

E46

E59

E52

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 — DS70 — 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)

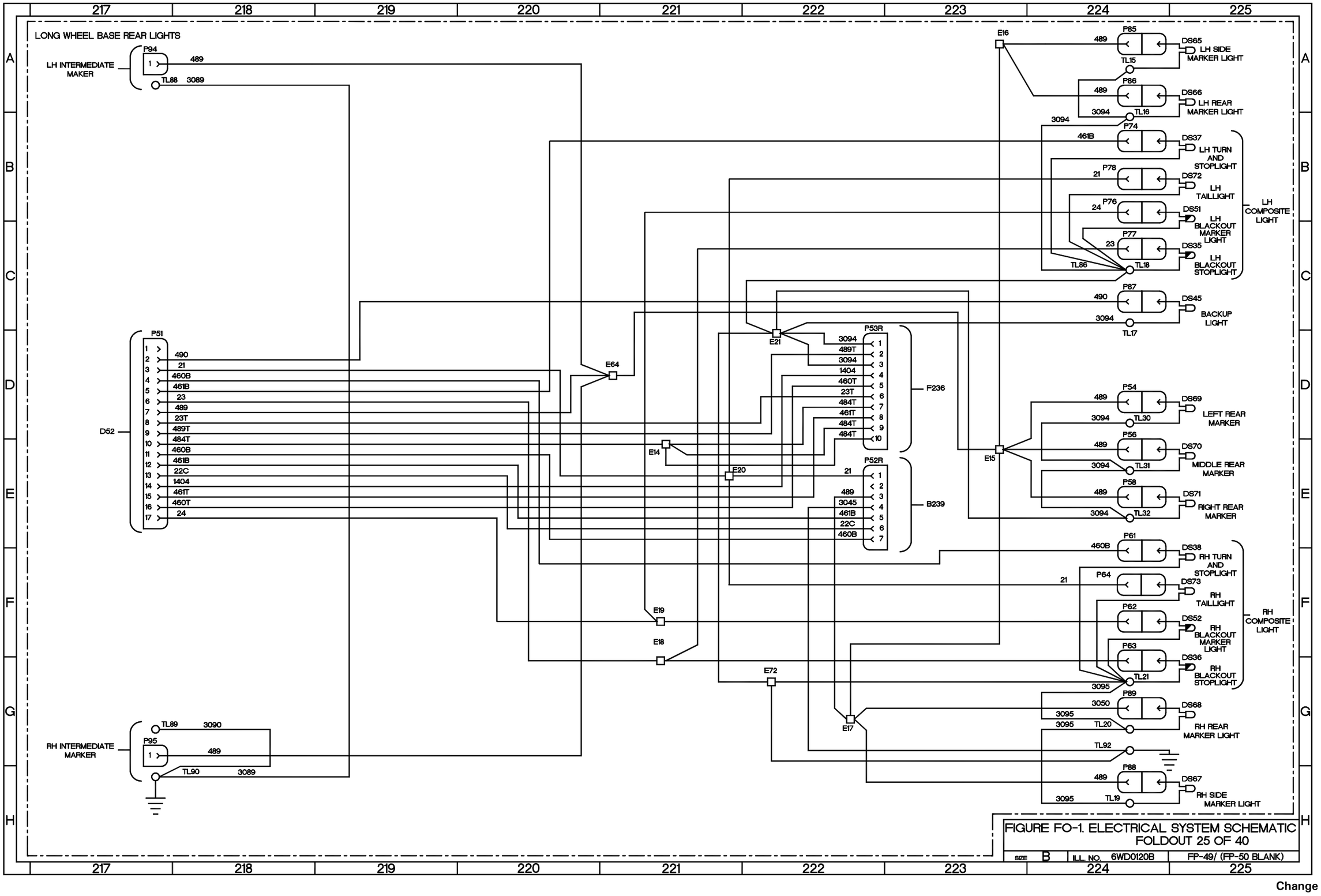



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 25 OF 40

SIZE B | ILL. NO. 6WD0120B | FP-49/ (FP-50 BLANK)

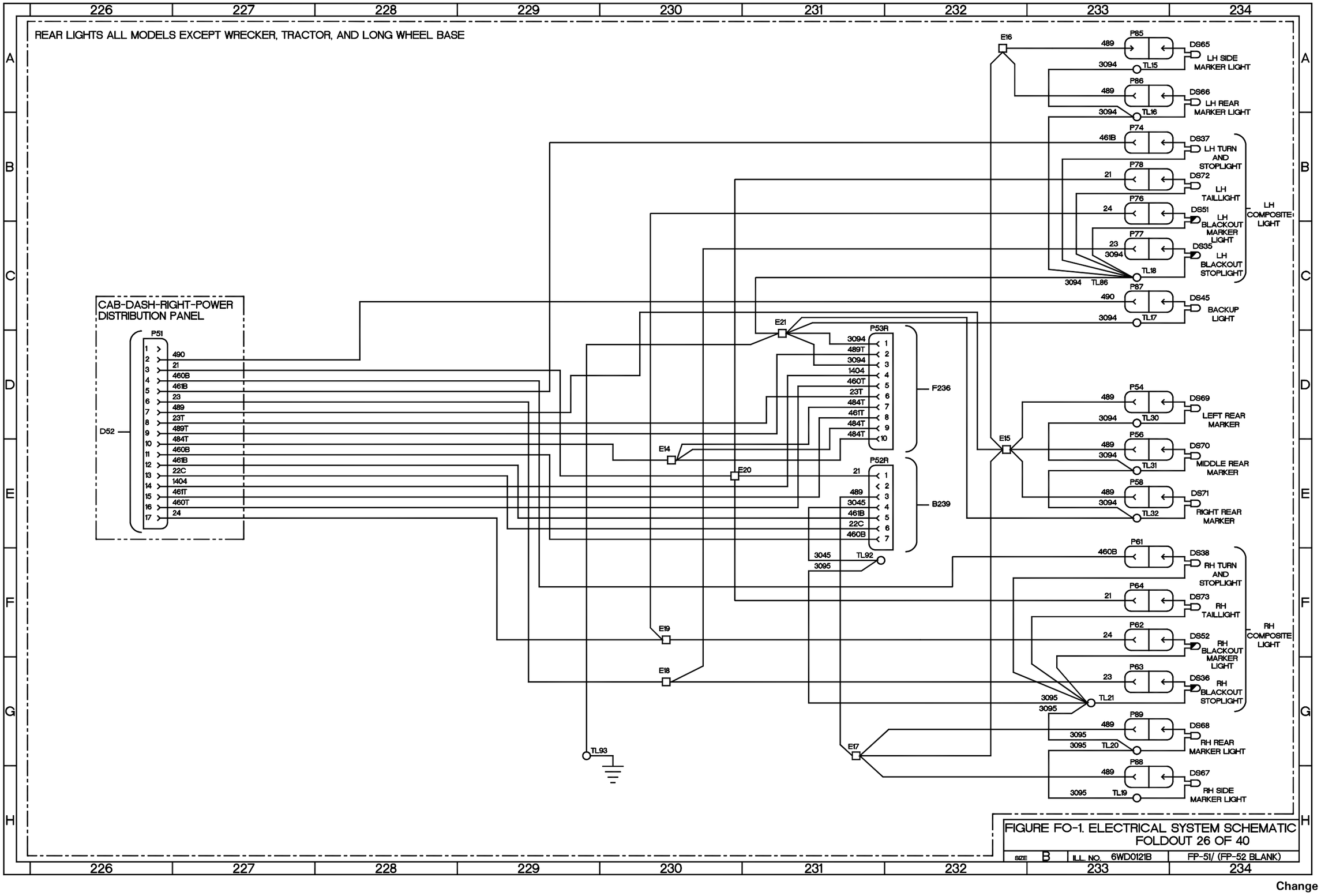



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 26 OF 40

SIZE B | ILL. NO. 6WD0121B | FP-51/ (FP-52 BLANK)

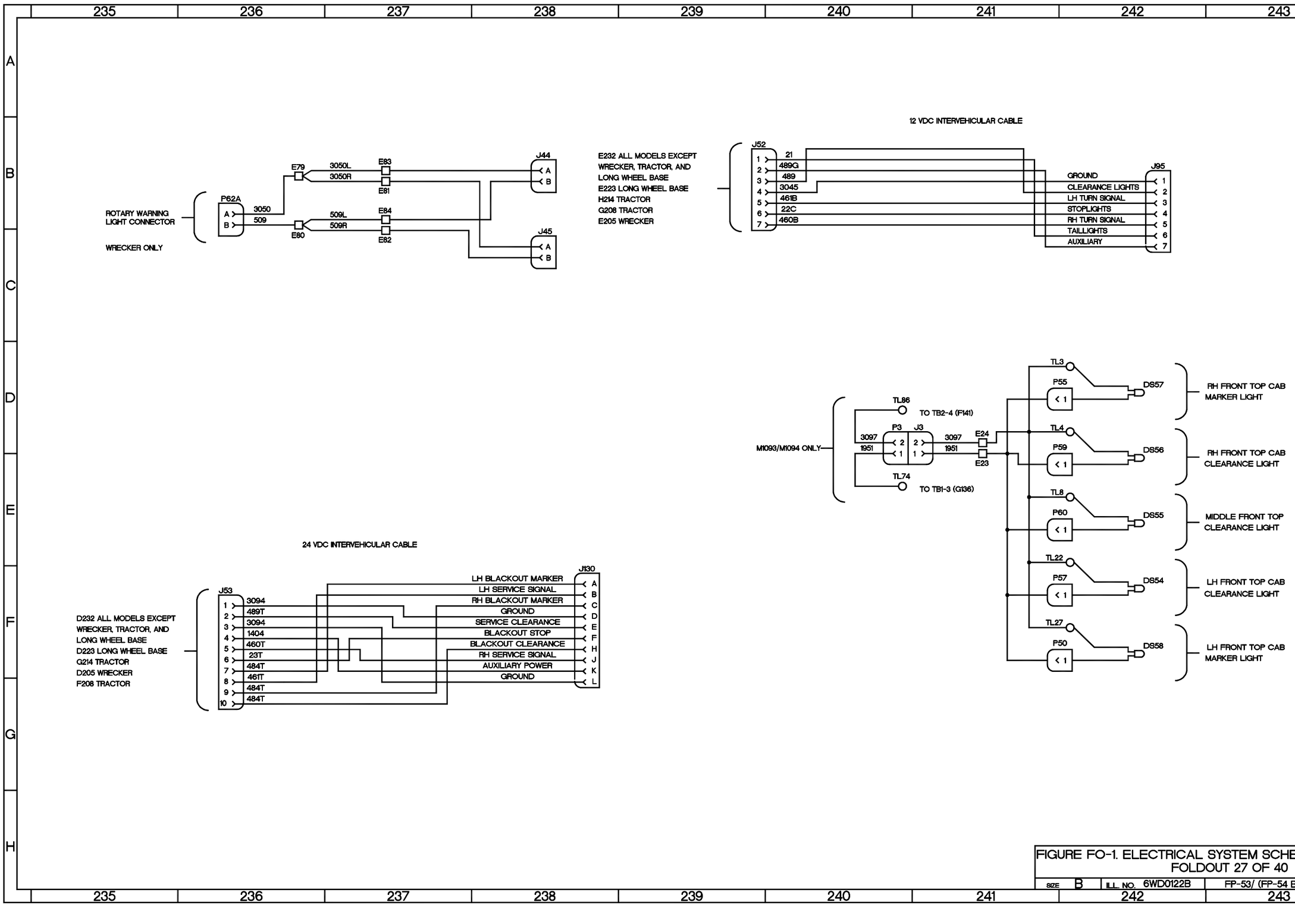



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 27 OF 40

SIZE B | ILL. NO. 6WD0122B | FP-53/ (FP-54 BLANK)

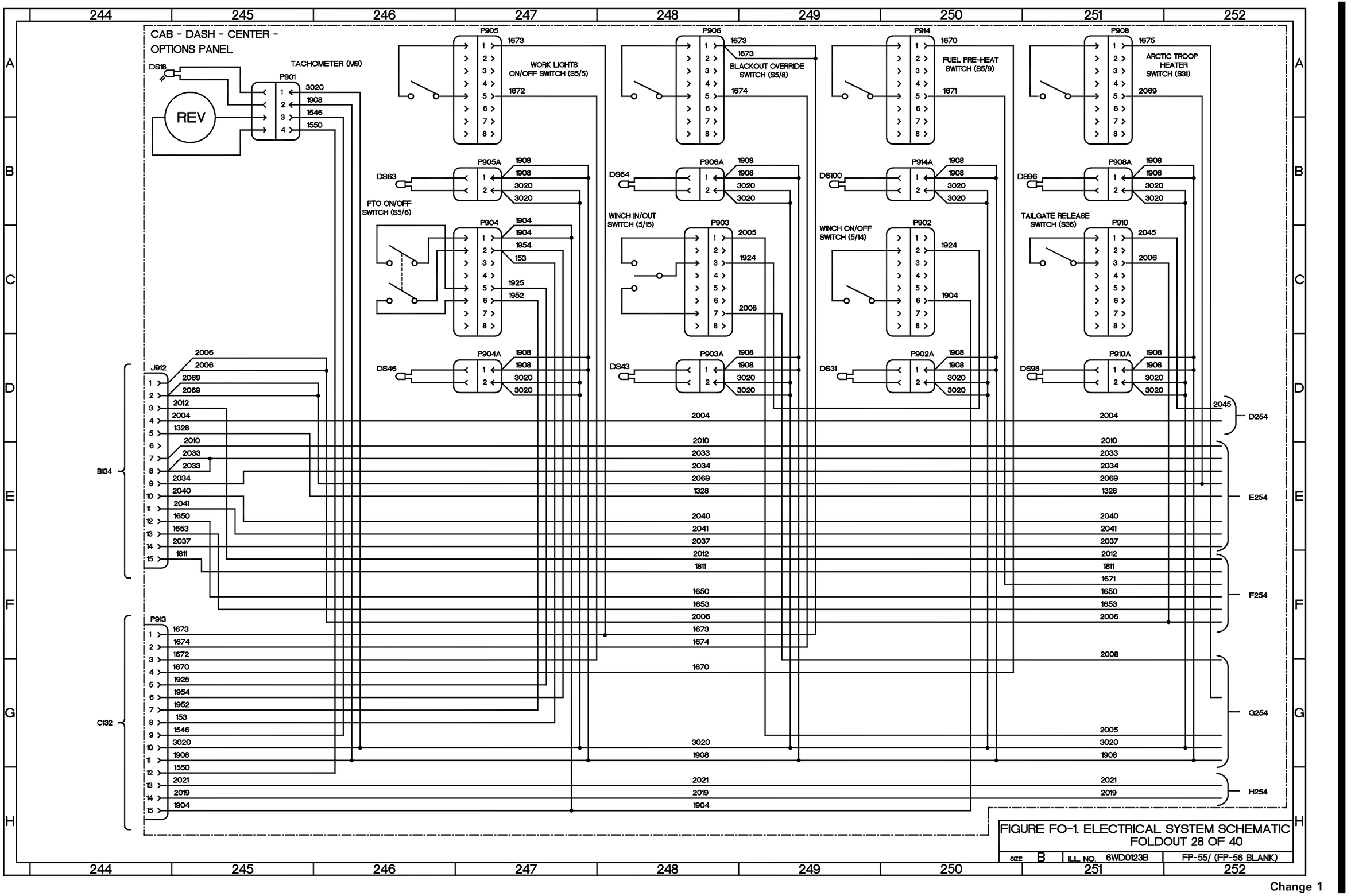



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 28 OF 40

SIZE B | ILL. NO. 6WD0123B | FP-55/ (FP-56 BLANK)

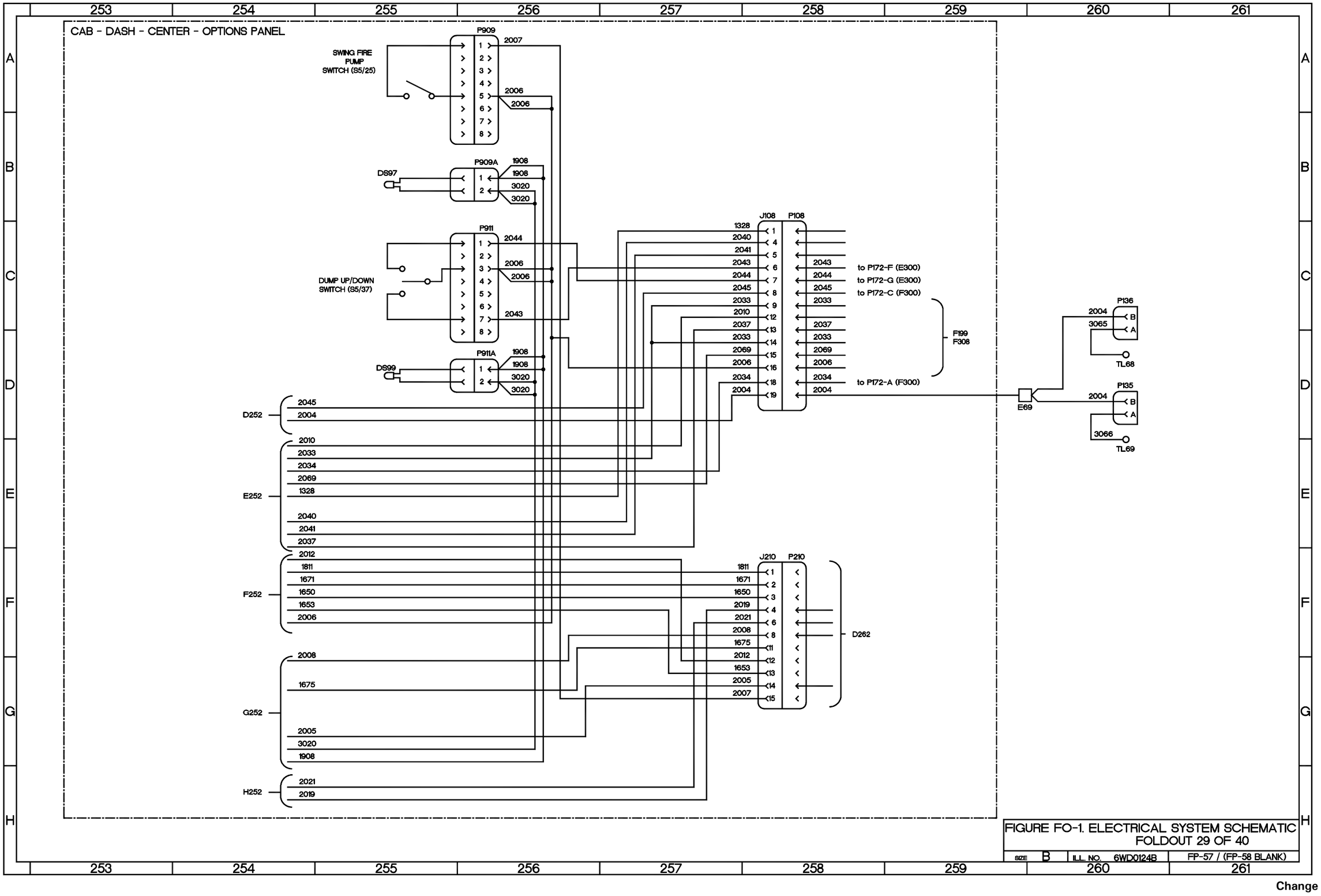



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 29 OF 40

SIZE B | ILL. NO. 6WD0124B | FP-57 / (FP-58 BLANK)

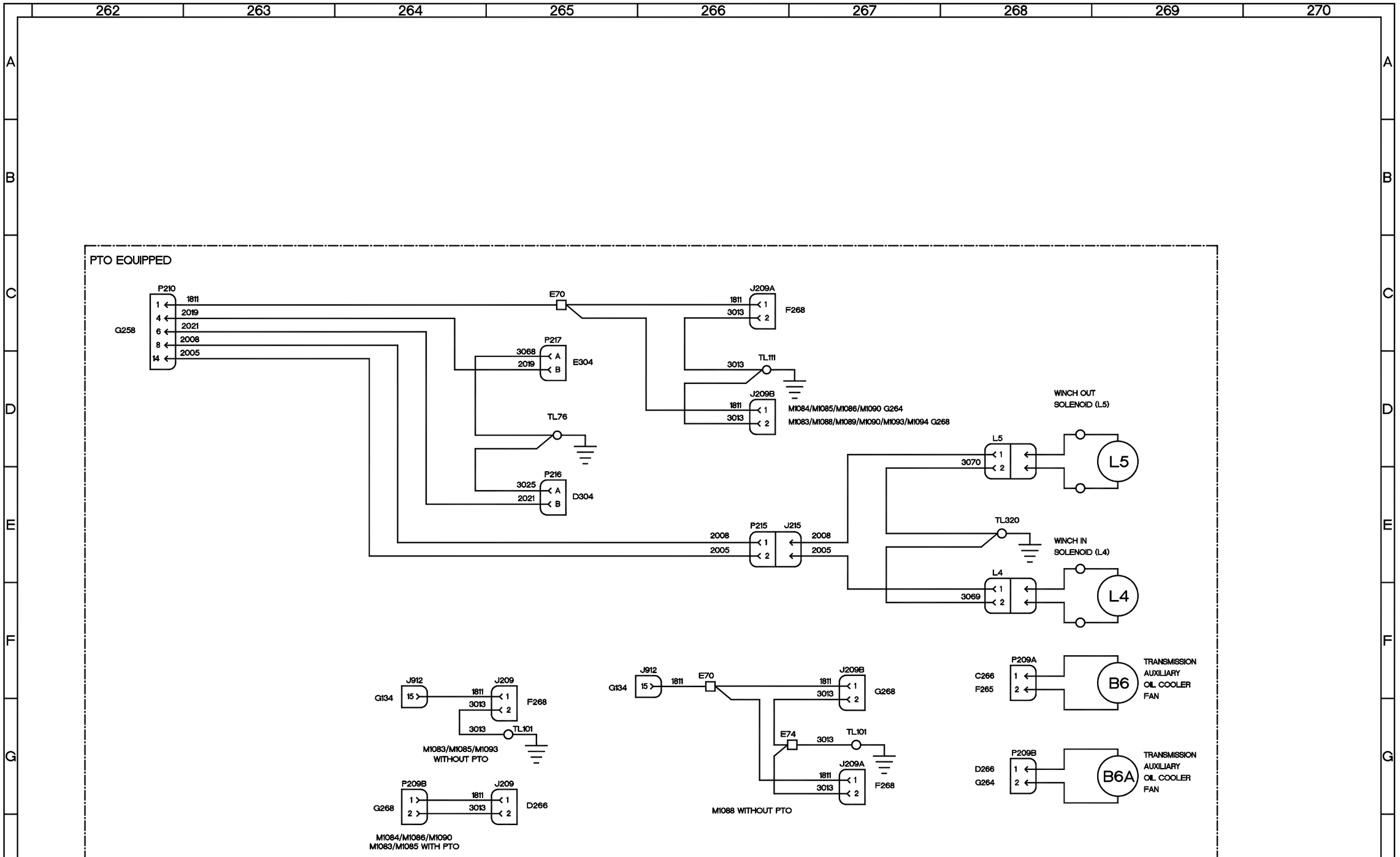



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 30 OF 40

| 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) |

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 32 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0127B | FP-63/ (FP-64 BLANK) |

289 290 291 292 293 294 295 296 297

A B C D E F G H

DELETED

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 33 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0128B | FP-65/ (FP-66 BLANK) |

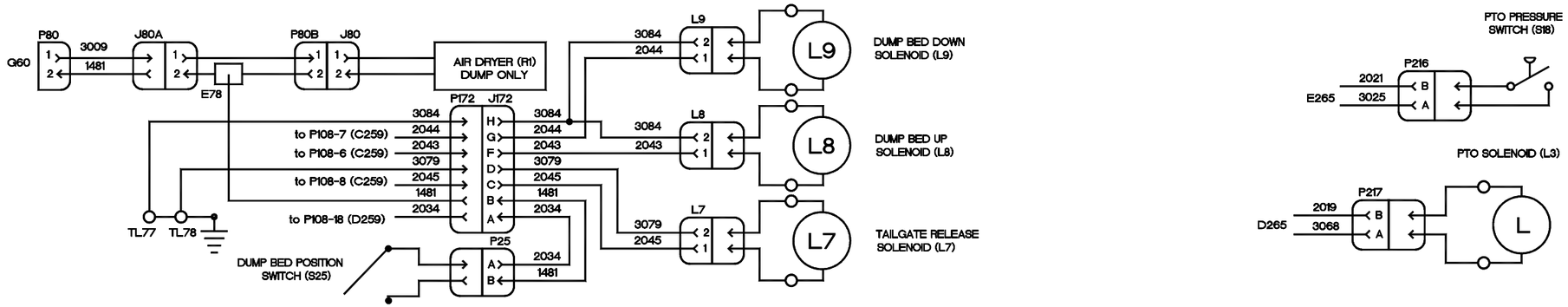



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 34 OF 40

SIZE B | ILL. NO. 6WD0129B | FP-67/ (FP-68 BLANK)

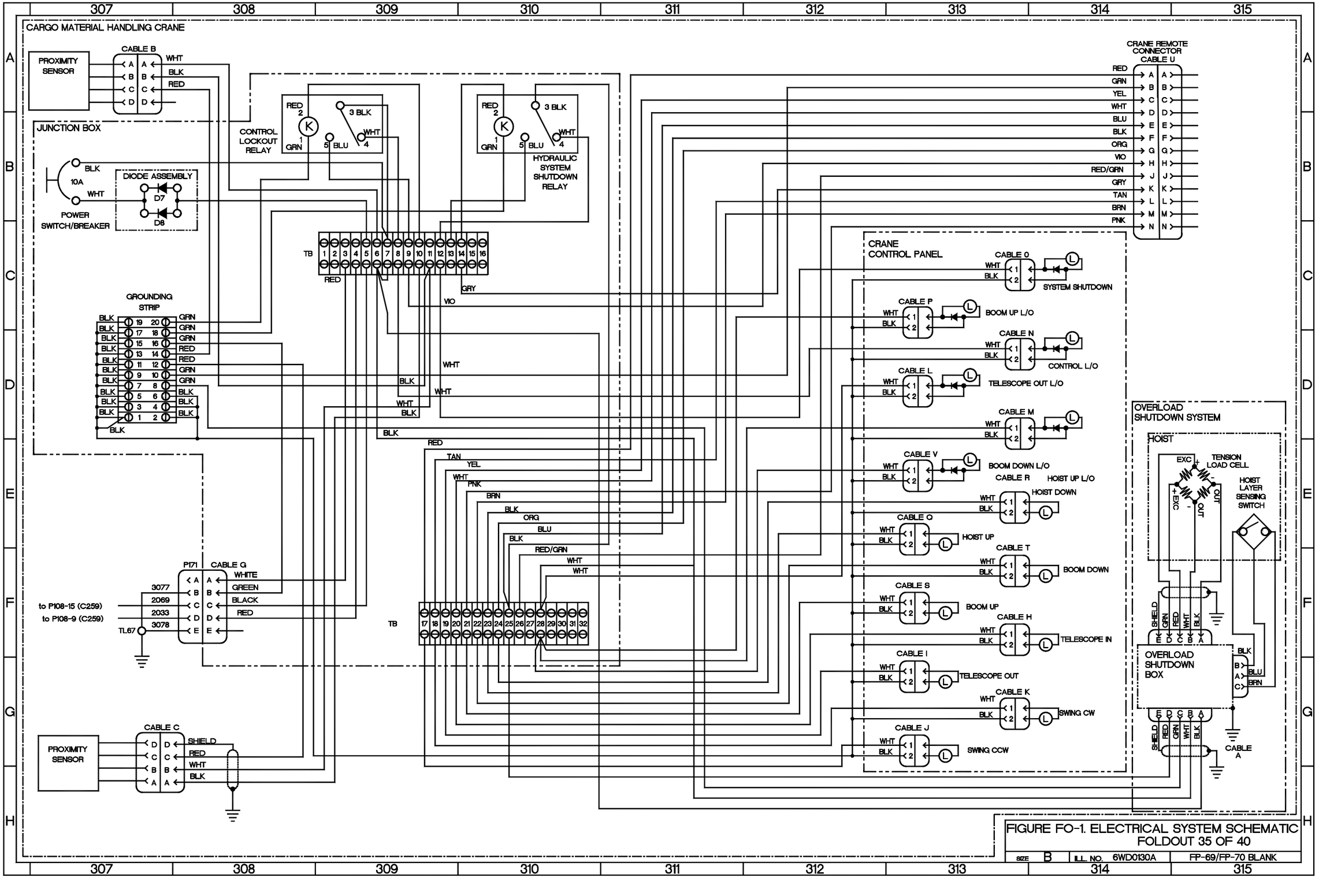



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 35 OF 40

SIZE B | ILL. NO. 6WD0130A | FP-69/FP-70 BLANK

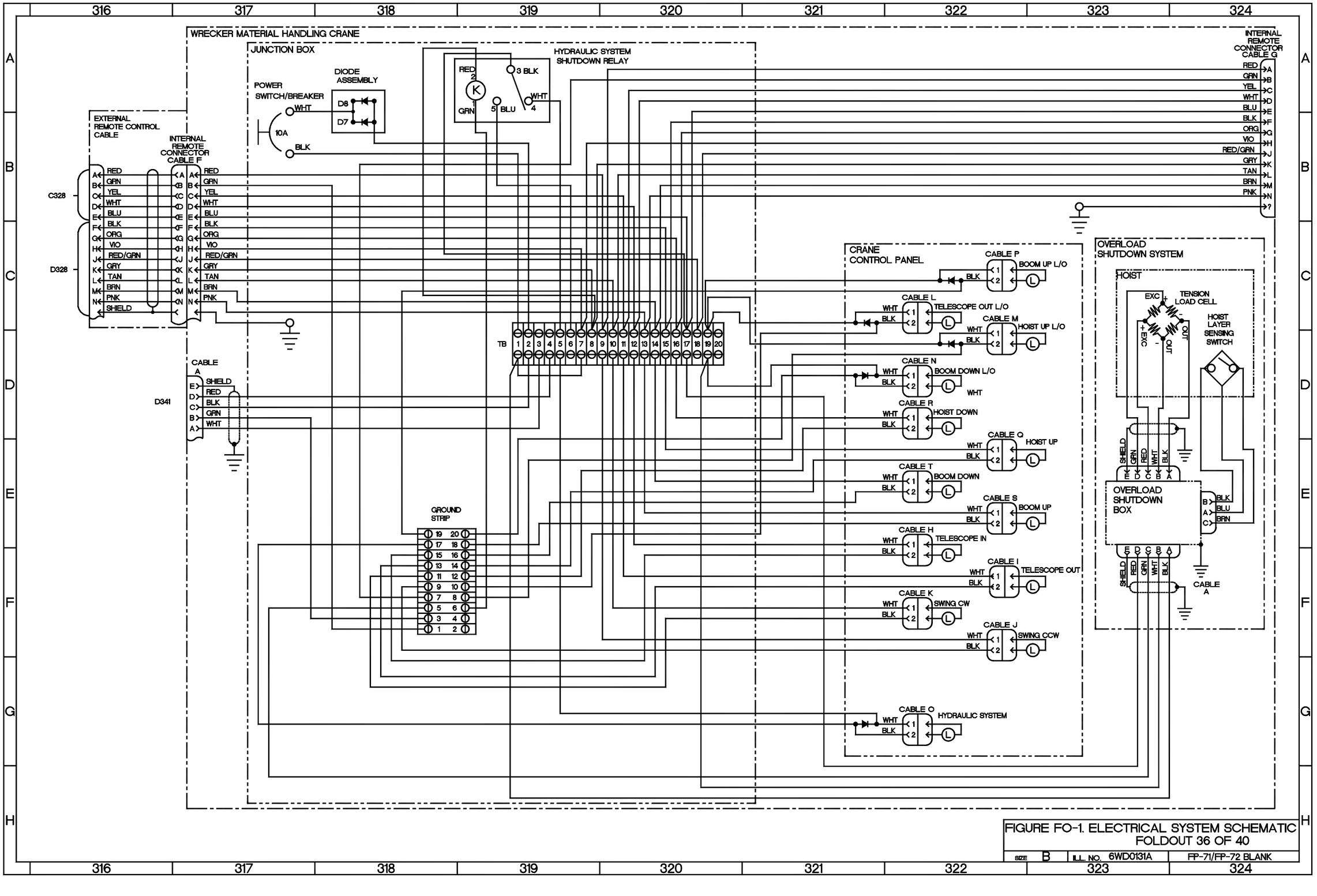



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 36 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0131A | FP-71/FP-72 BLANK |

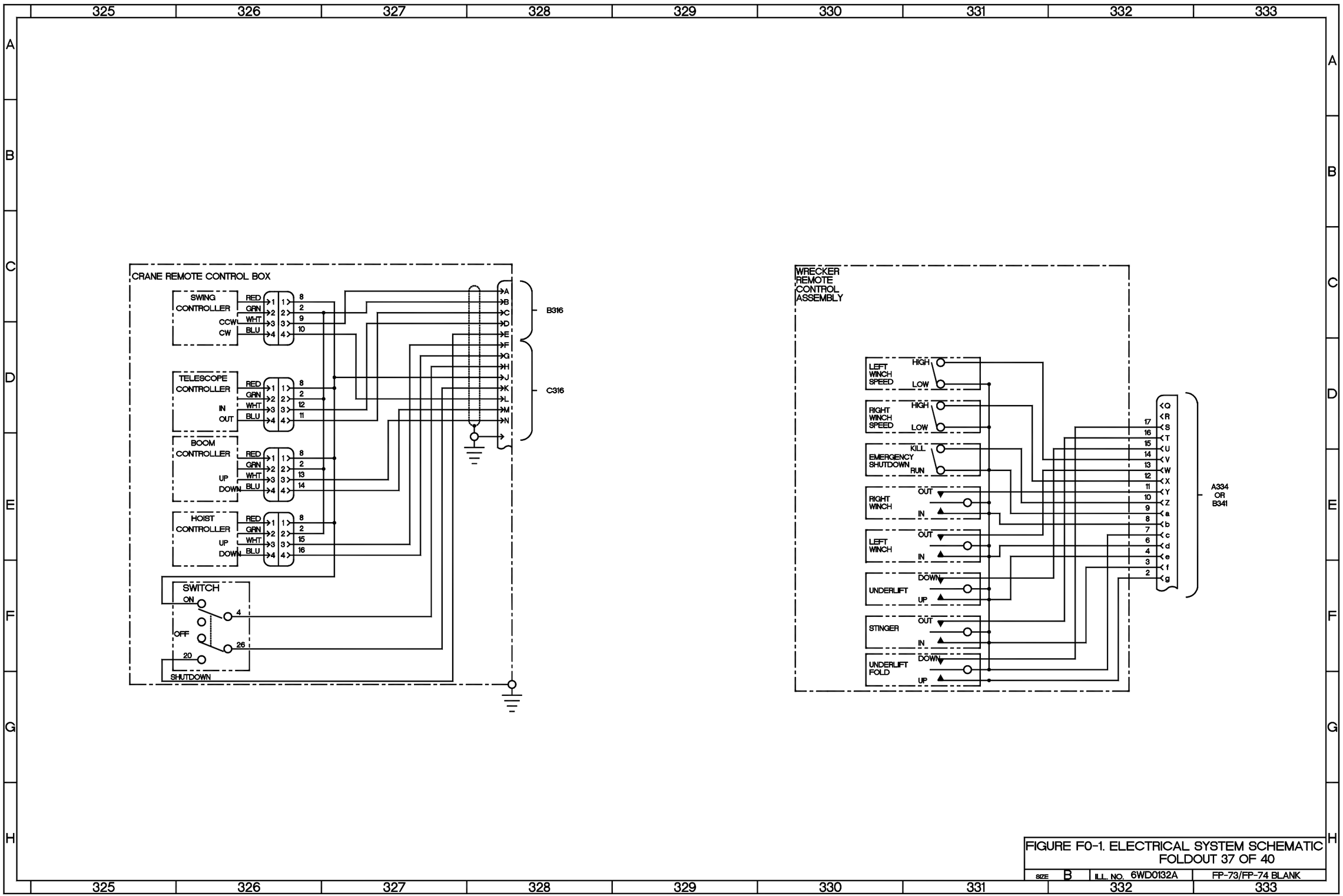



FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 37 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0132A | FP-73/FP-74 BLANK |

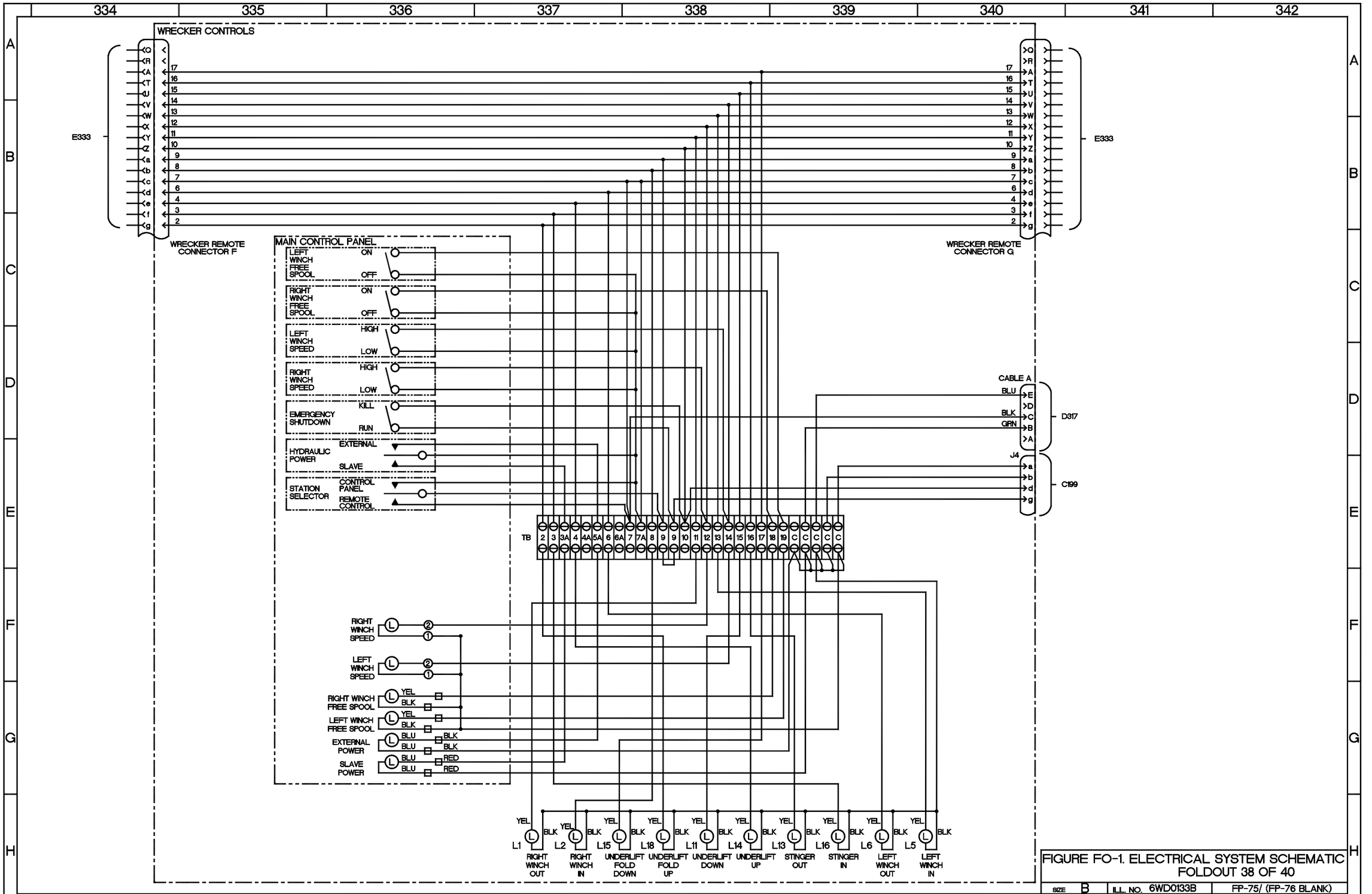



FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 38 OF 40

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6WD0133B | FP-75/ (FP-76 BLANK) |

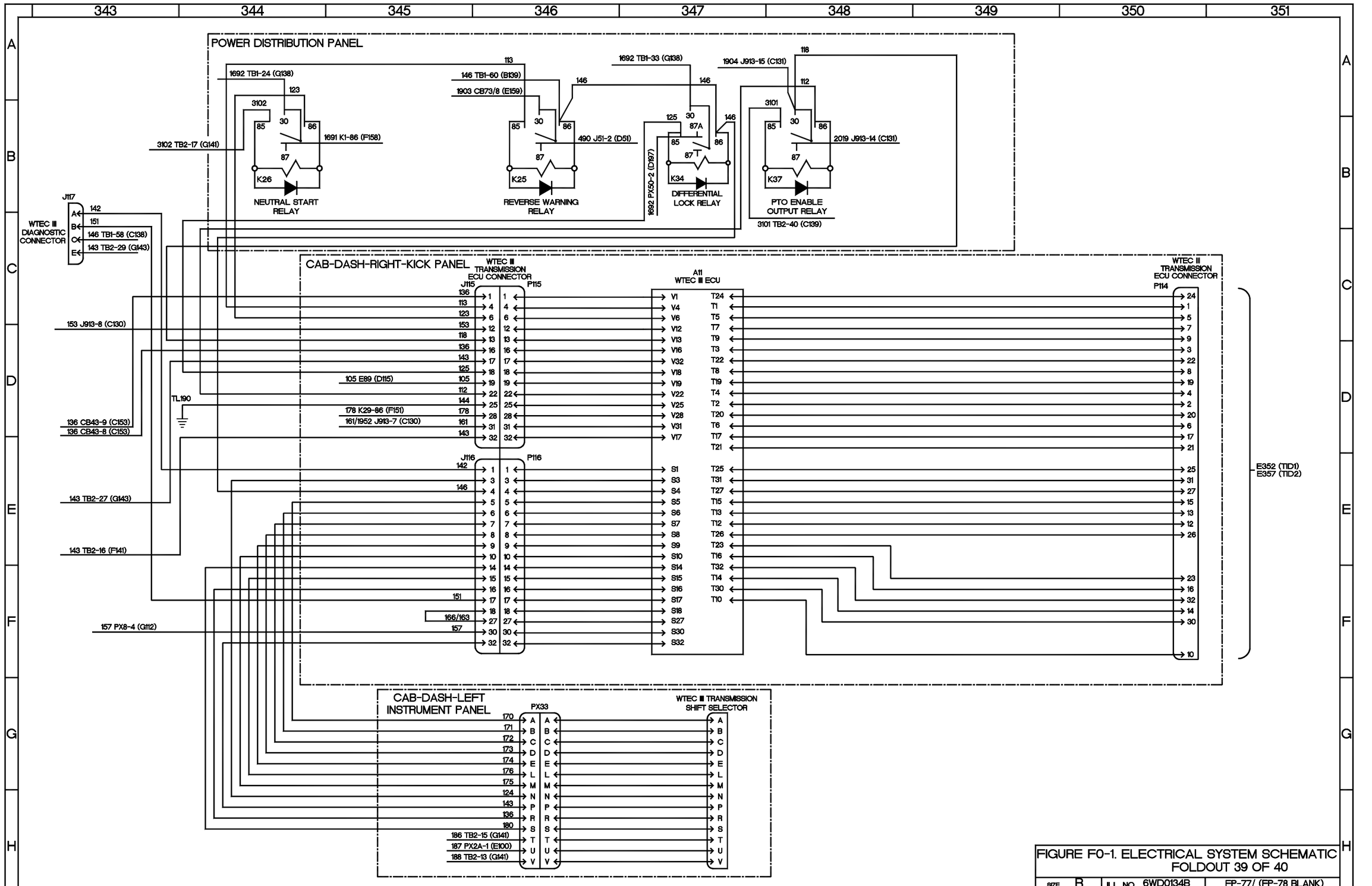
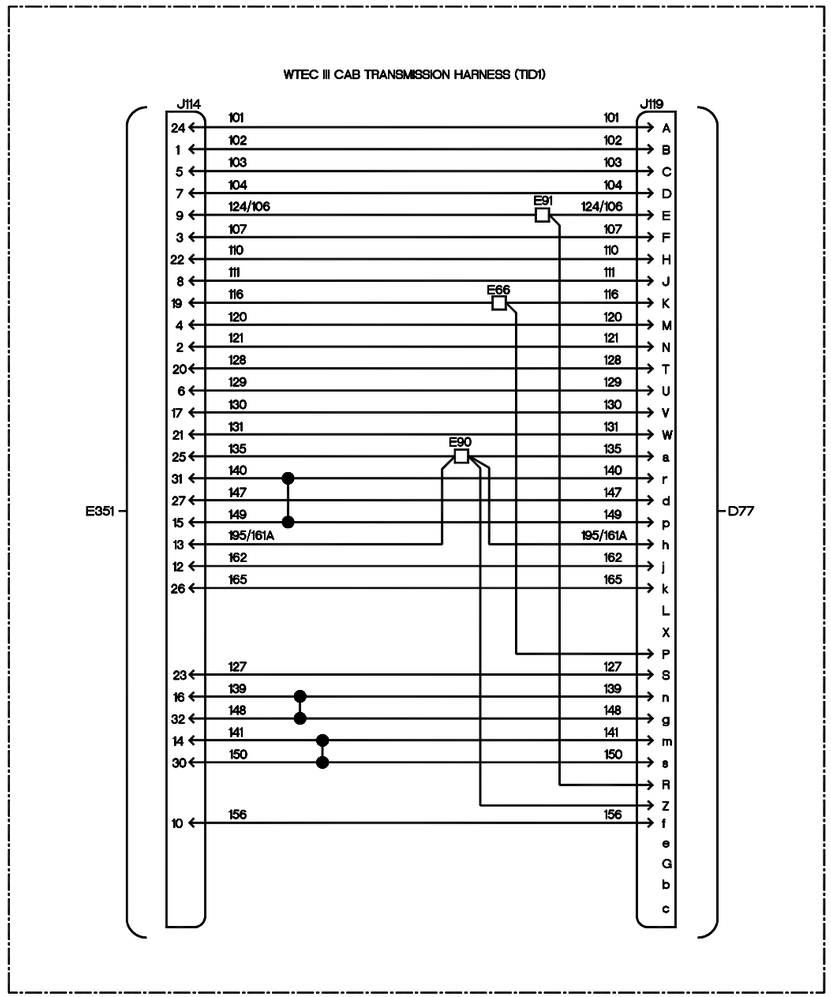



FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 39 OF 40

SIZE B | ILL. NO. 6WD0134B | FP-77/ (FP-78 BLANK)

TRANSMISSION SERIAL #: 6510090785 AND LOWER




TRANSMISSION SERIAL #: 6510090786 AND HIGHER

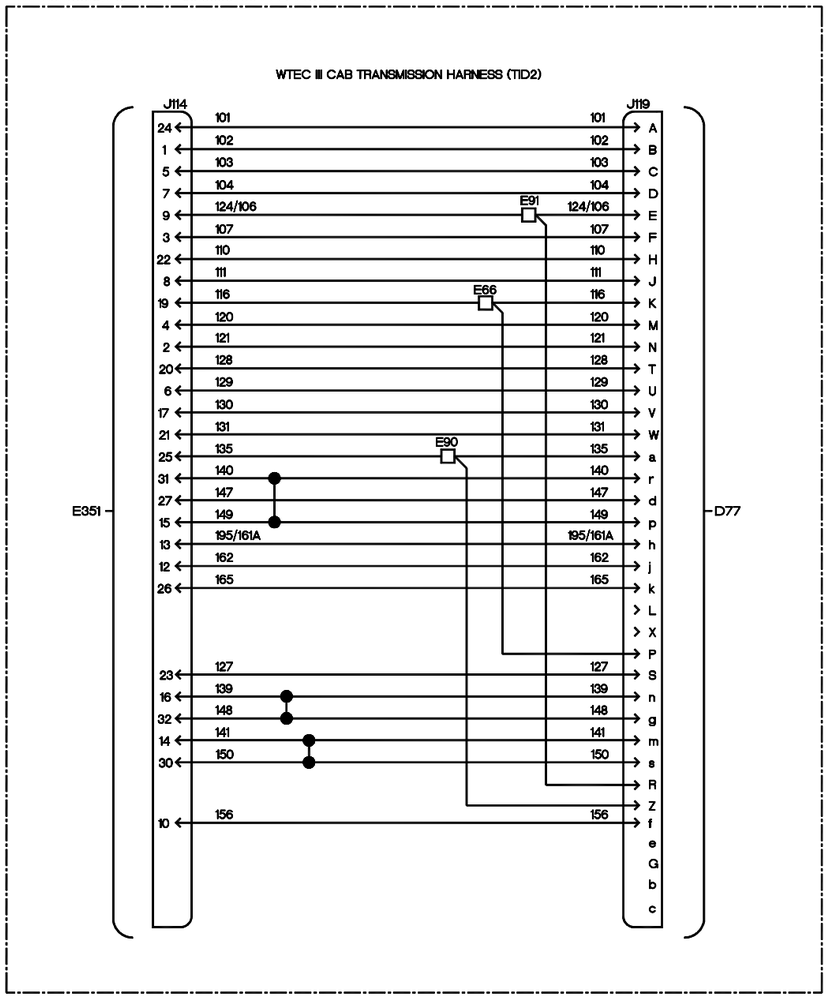



FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 40 OF 40

SIZE B | ILL. NO. 6WD0135B | FP-79/ (FP-80 BLANK)

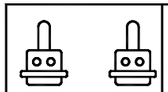
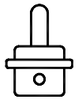
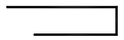
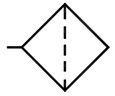
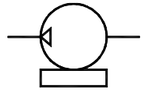
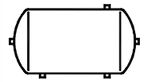
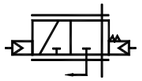
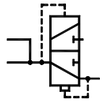
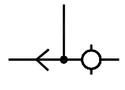
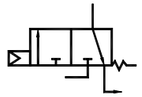
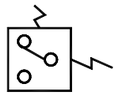
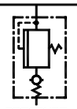
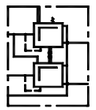
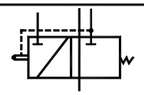
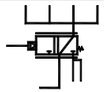
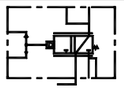
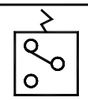
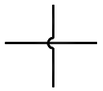
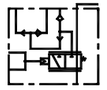
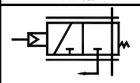
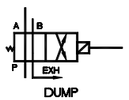
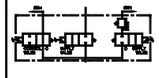
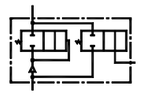
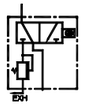
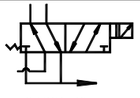
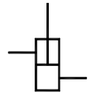
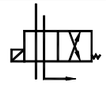
| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  REAR AXLE BRAKE CHAMBER |  FRONT AXLE BRAKE CHAMBER |  COUPLER AIR BRAKE |  AIR DRYER |  AIR CLEANER INTAKE |  AIR COMPRESSOR WITH GOVERNOR |  AIR TANK |  DASH GAUGE |
|  MANUAL VALVE |  ONE WAY CHECK VALVE |  FAN CLUTCH |  MODULATED CONTROL VALVE |  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 |

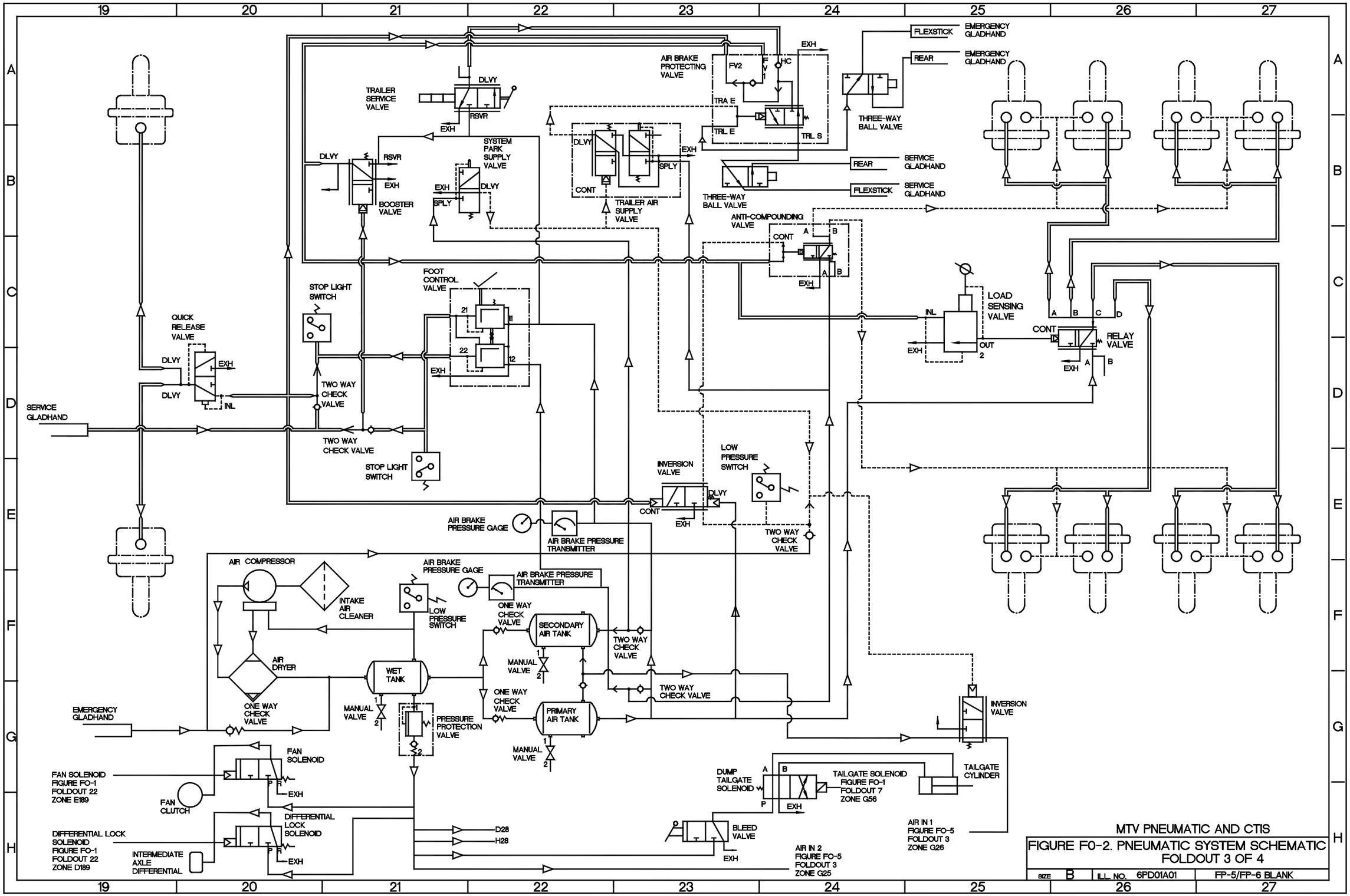
| SH | ZONE | DESCRIPTION |
|---|---|---|
| 3 | E22 | AIR BRAKE PRESSURE TRANSMITTER |
| 3 | F21 | AIR BRAKE PRESSURE TRANSMITTER |
| 3 | A23 | AIR BRAKE PROTECTING VALVE |
| 3 | F20 | AIR COMPRESSOR |
| 3 | F20 | AIR DRYER |
| 3 | B24 | ANTI-COMPOUNDING VALVE |
| 3 | H23 | BLEED VALVE |
| 3 | B21 | 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

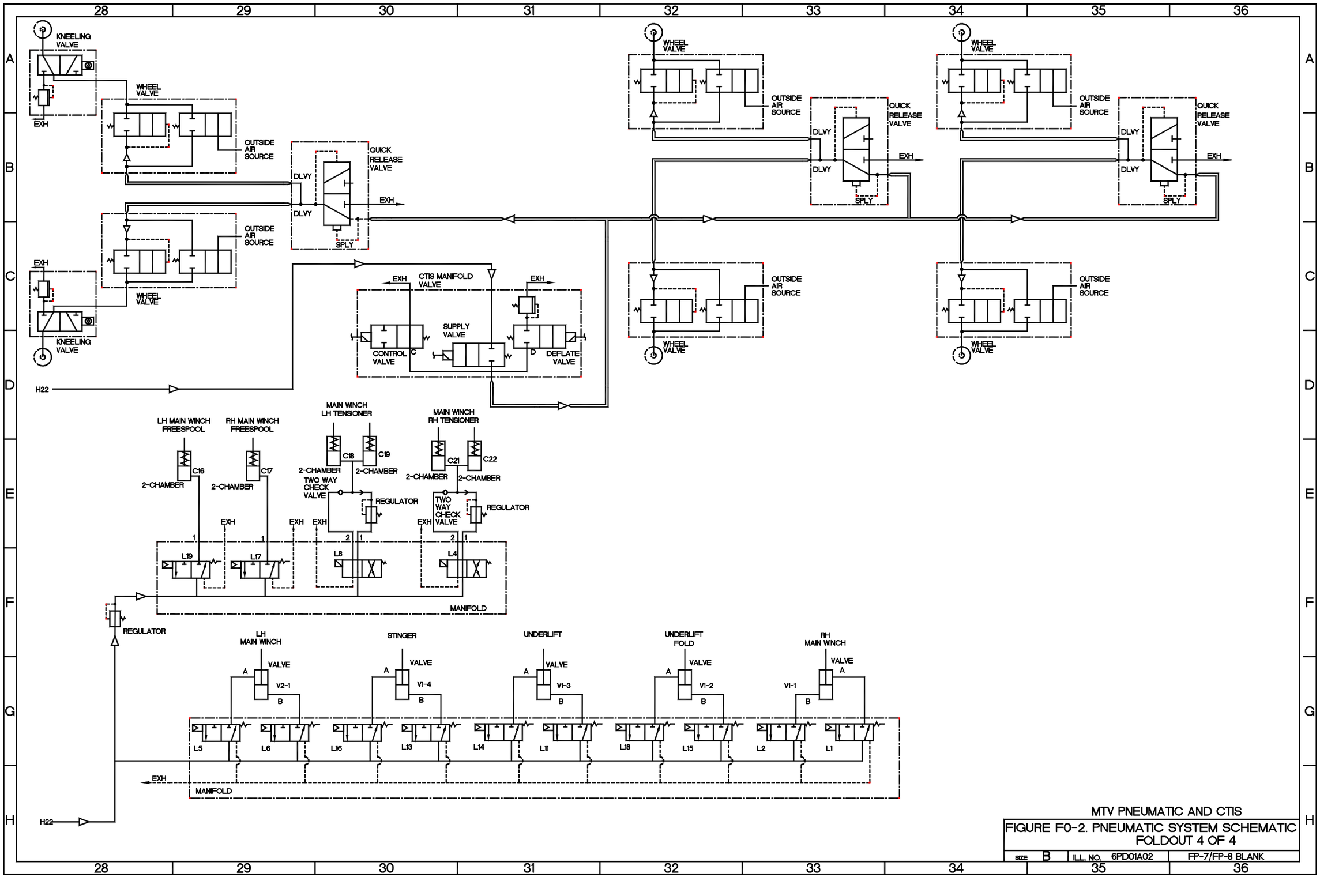
| SIZE | ILL. NO. | |
|---|---|---|
| B | 6PD01AL2 | FP-3/FP-4 BLANK |




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 B | ILL. NO. 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

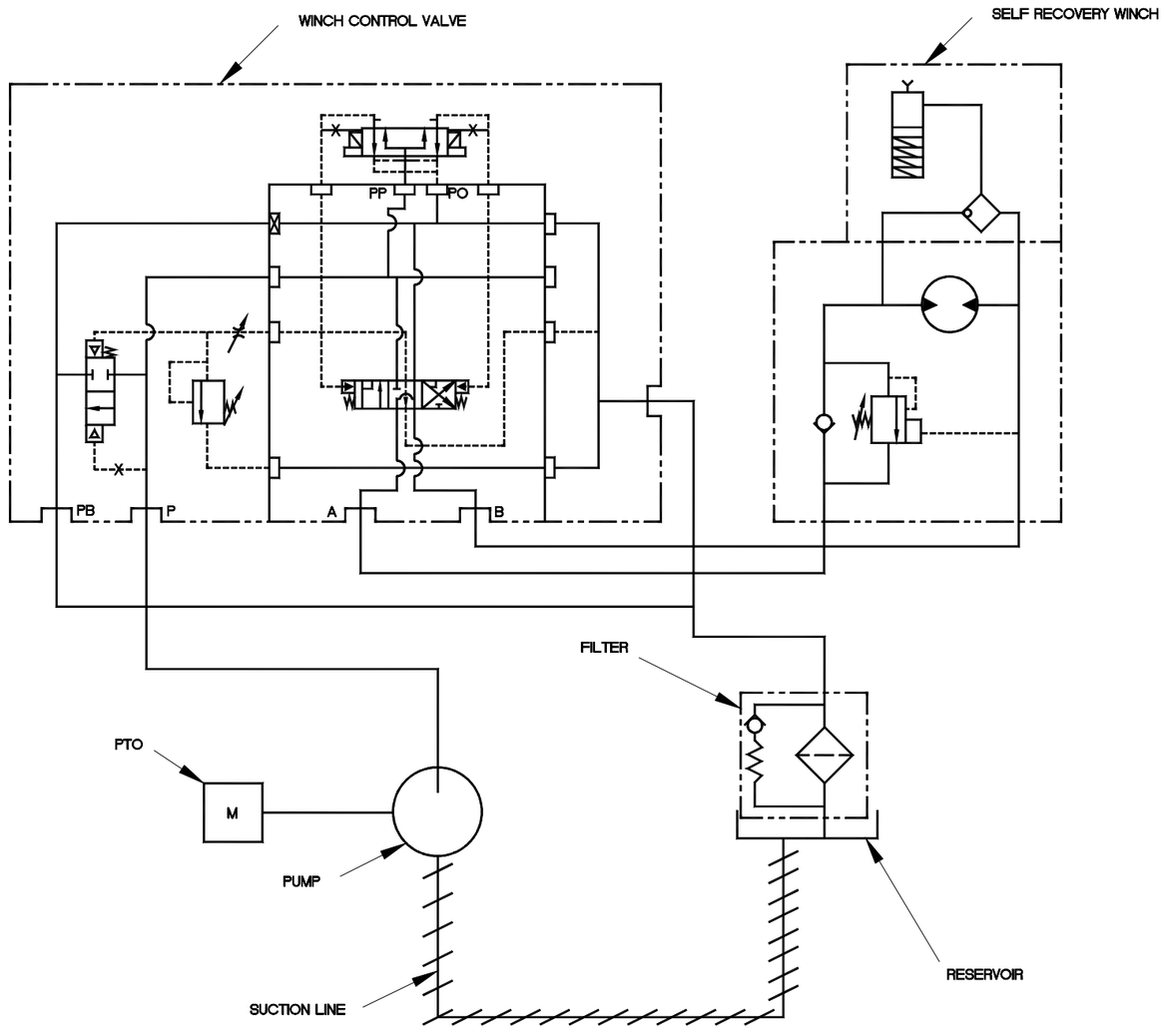
| SH | ZONE | DESCRIPTION |
|---|---|---|
| 6 | D46 | 2 WAY SOLENOID VALVE |
| 7 | D60 | 2 WAY SOLENOID VALVE |
| 7 | D55 | 2 WAY SOLENOID VALVE, OPERATING PRESS |
| 7 | F60 | 3 BANK VALVE ASSEMBLY |
| 7 | C61 | 4 BANK VALVE ASSEMBLY |
| 6 | B52 | BOOM |
| 7 | F55 | BULKHEAD PLATE (SUBFRAME) |
| 7 | 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

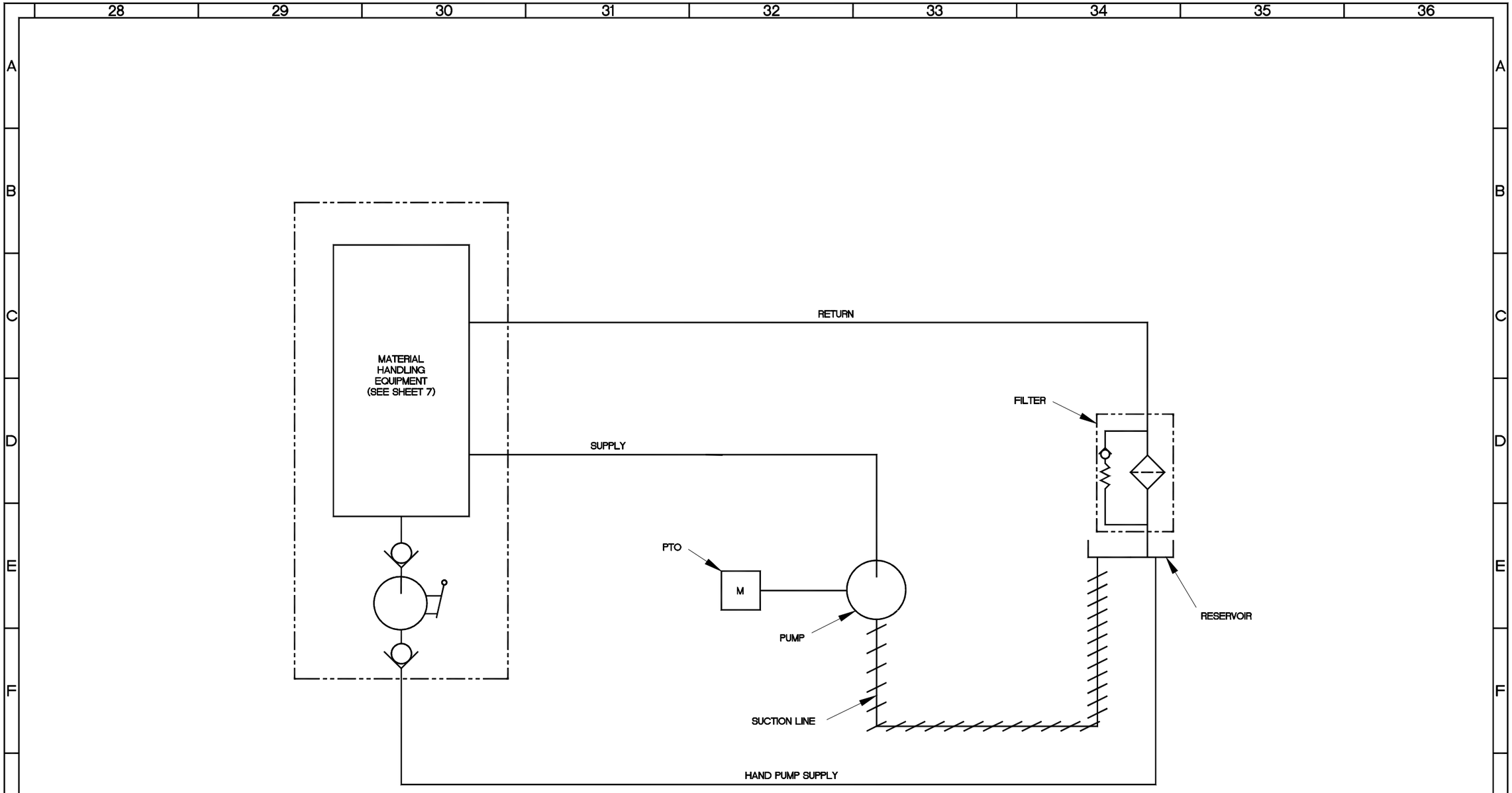
SIZE B | ILL. NO. 6HD01AL2 | FP-3/FP-4 BLANK




MTV TRUCK W/WINCH

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 8

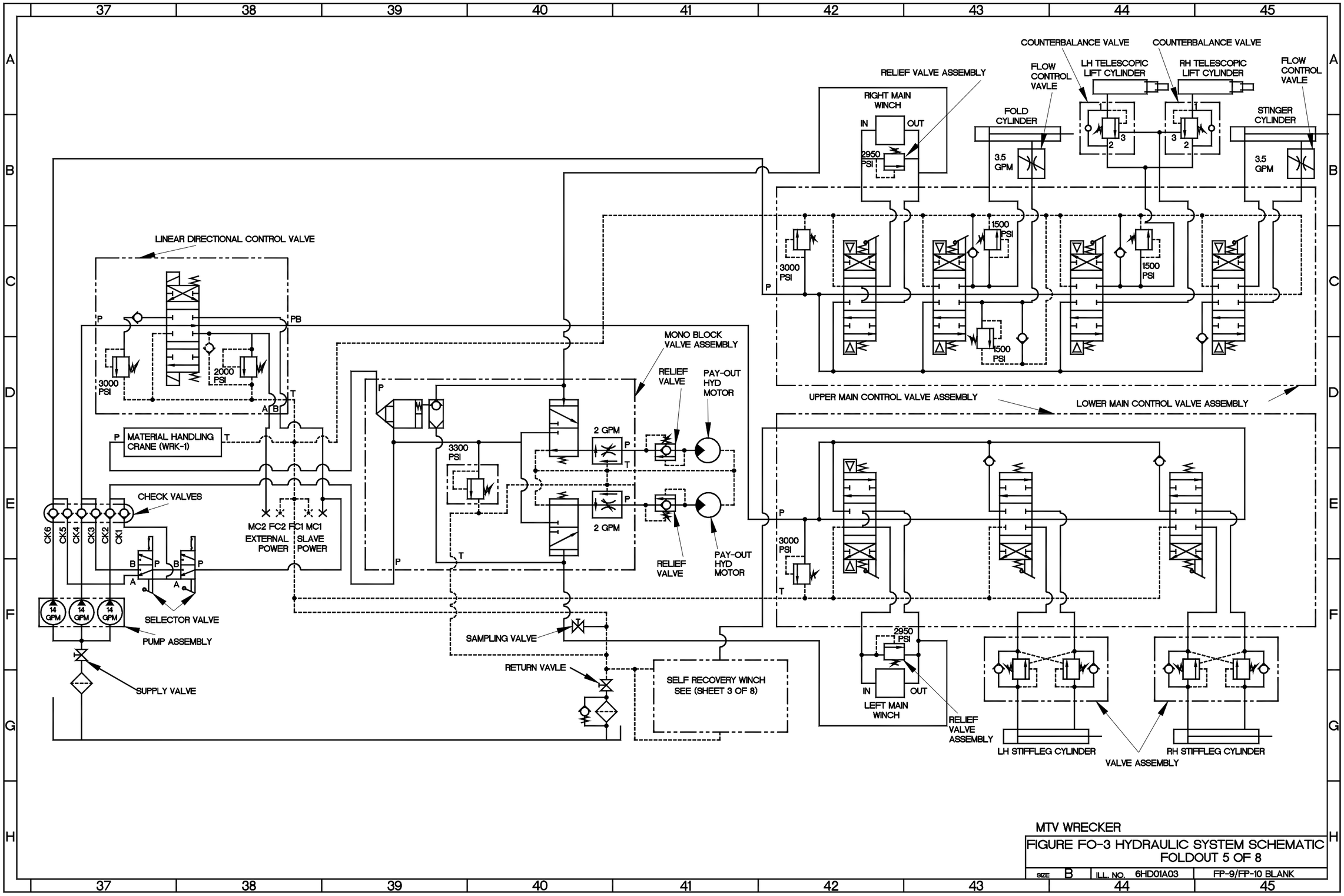
| SIZE | ILL. NO. | |
|---|---|---|
| B | 6HD01A01 | FP-5/FP-6 BLANK |




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 |

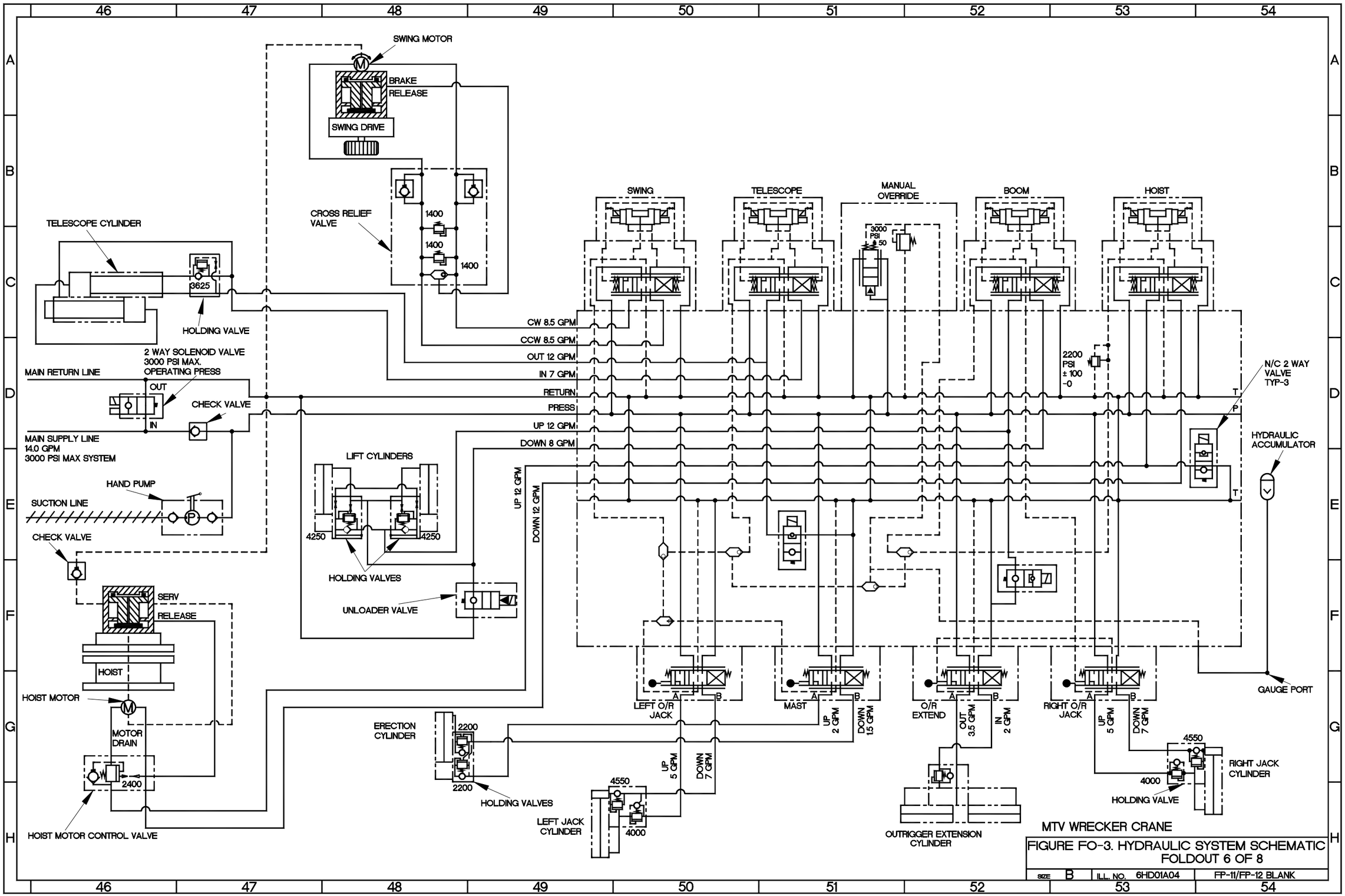
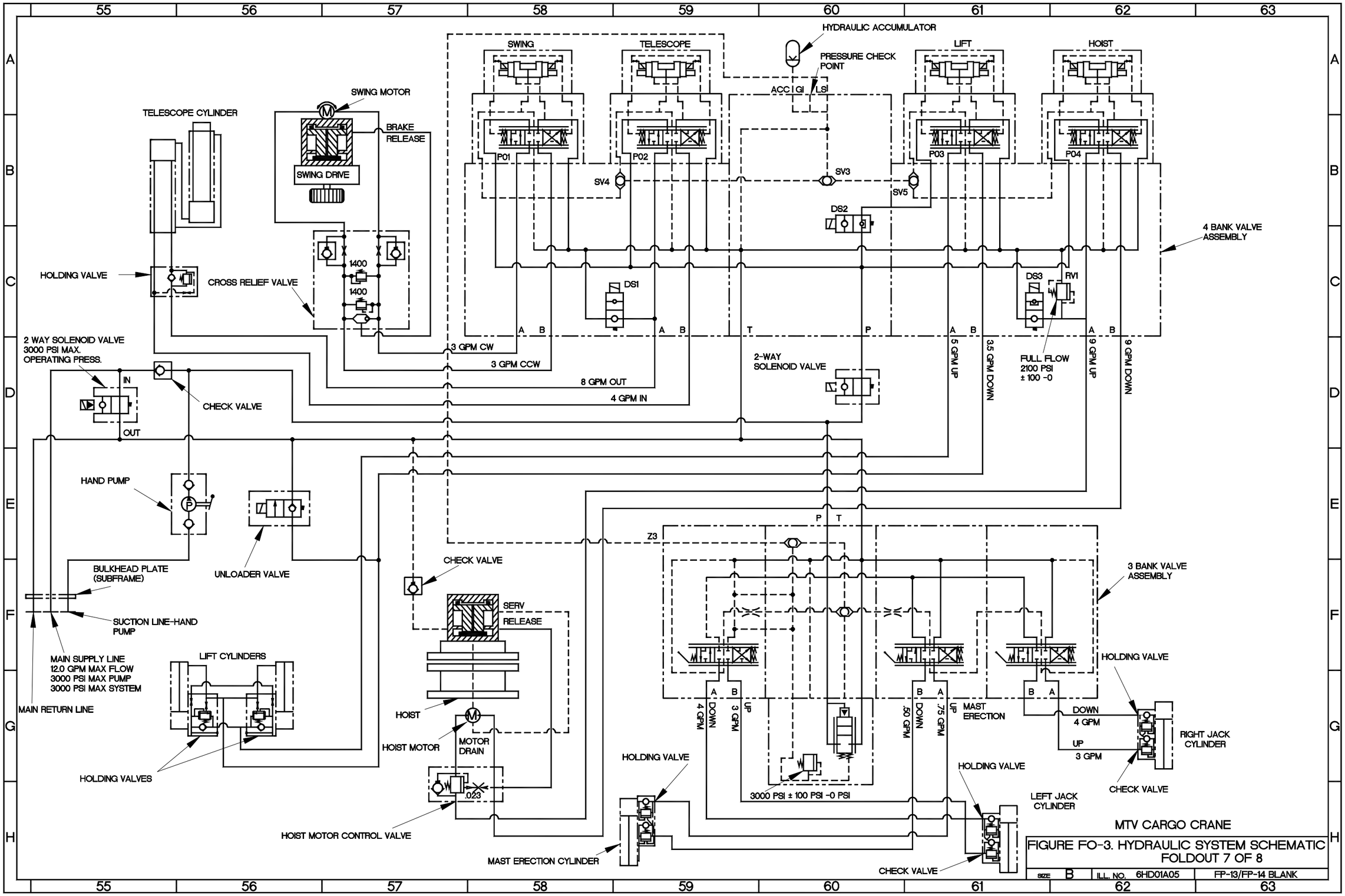
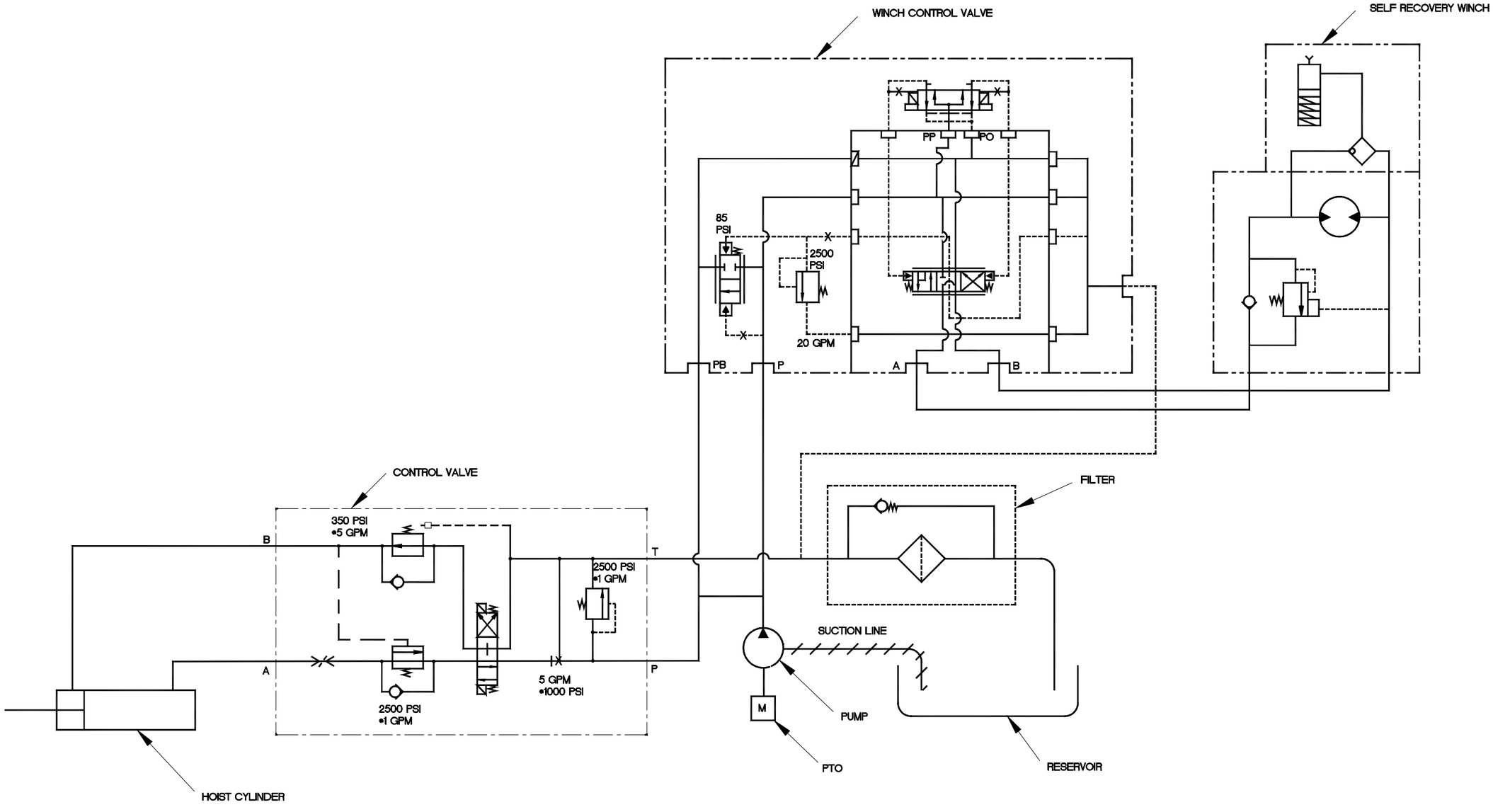



FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 6 OF 8

| SIZE | ILL. NO. | |
|---|---|---|
| B | 6HD01A04 | FP-11/FP-12 BLANK |

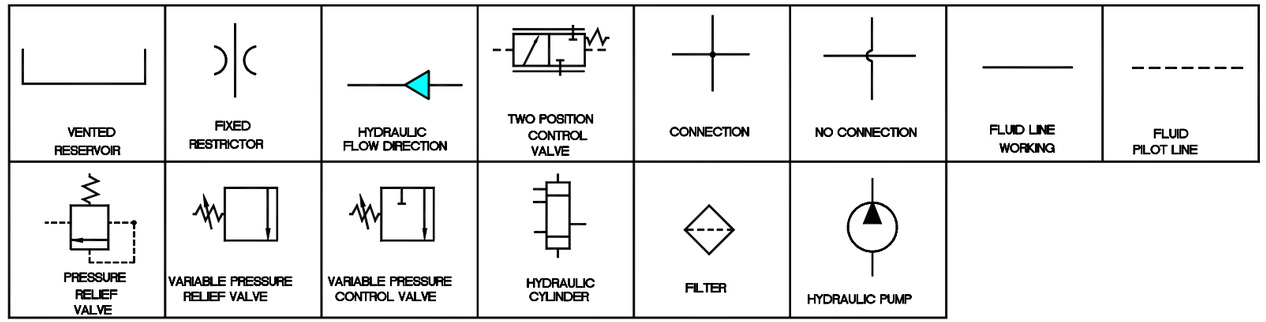

55
56
57
58
59
60
61
62
63
A
B
C
D
E
F
G
H
HYDRAULIC ACCUMULATOR
PRESSURE CHECK POINT
ACC
GI
LSI
SWING
TELESCOPE
LIFT
HOIST
P01
P02
P03
P04
SV3
SV4
SV5
DS1
DS2
DS3
RV1
4 BANK VALVE ASSEMBLY
SWING MOTOR
BRAKE RELEASE
SWING DRIVE
TELESCOPE CYLINDER
HOLDING VALVE
CROSS RELIEF VALVE
1400
1400
2 WAY SOLENOID VALVE
3000 PSI MAX.
OPERATING PRESS.
IN
OUT
CHECK VALVE
3 GPM CW
3 GPM CCW
8 GPM OUT
4 GPM IN
2-WAY SOLENOID VALVE
5 GPM UP
3.5 GPM DOWN
FULL FLOW
2100 PSI
± 100 -0
9 GPM UP
9 GPM DOWN
HAND PUMP
UNLOADER VALVE
BULKHEAD PLATE (SUBFRAME)
SUCTION LINE-HAND PUMP
MAIN SUPPLY LINE
12.0 GPM MAX FLOW
3000 PSI MAX PUMP
3000 PSI MAX SYSTEM
MAIN RETURN LINE
LIFT CYLINDERS
HOLDING VALVES
CHECK VALVE
SERV RELEASE
HOIST
HOIST MOTOR
MOTOR DRAIN
.023
HOIST MOTOR CONTROL VALVE
HOLDING VALVE
MAST ERECTION CYLINDER
P
T
Z3
3 BANK VALVE ASSEMBLY
4 GPM DOWN
3 GPM UP
.50 GPM DOWN
.75 GPM UP
MAST ERECTION
3000 PSI ± 100 PSI -0 PSI
HOLDING VALVE
DOWN 4 GPM
UP 3 GPM
RIGHT JACK CYLINDER
CHECK VALVE
HOLDING VALVE
LEFT JACK CYLINDER
CHECK VALVE
MTV CARGO CRANE
FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 7 OF 8
SIZE B
ILL. NO. 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

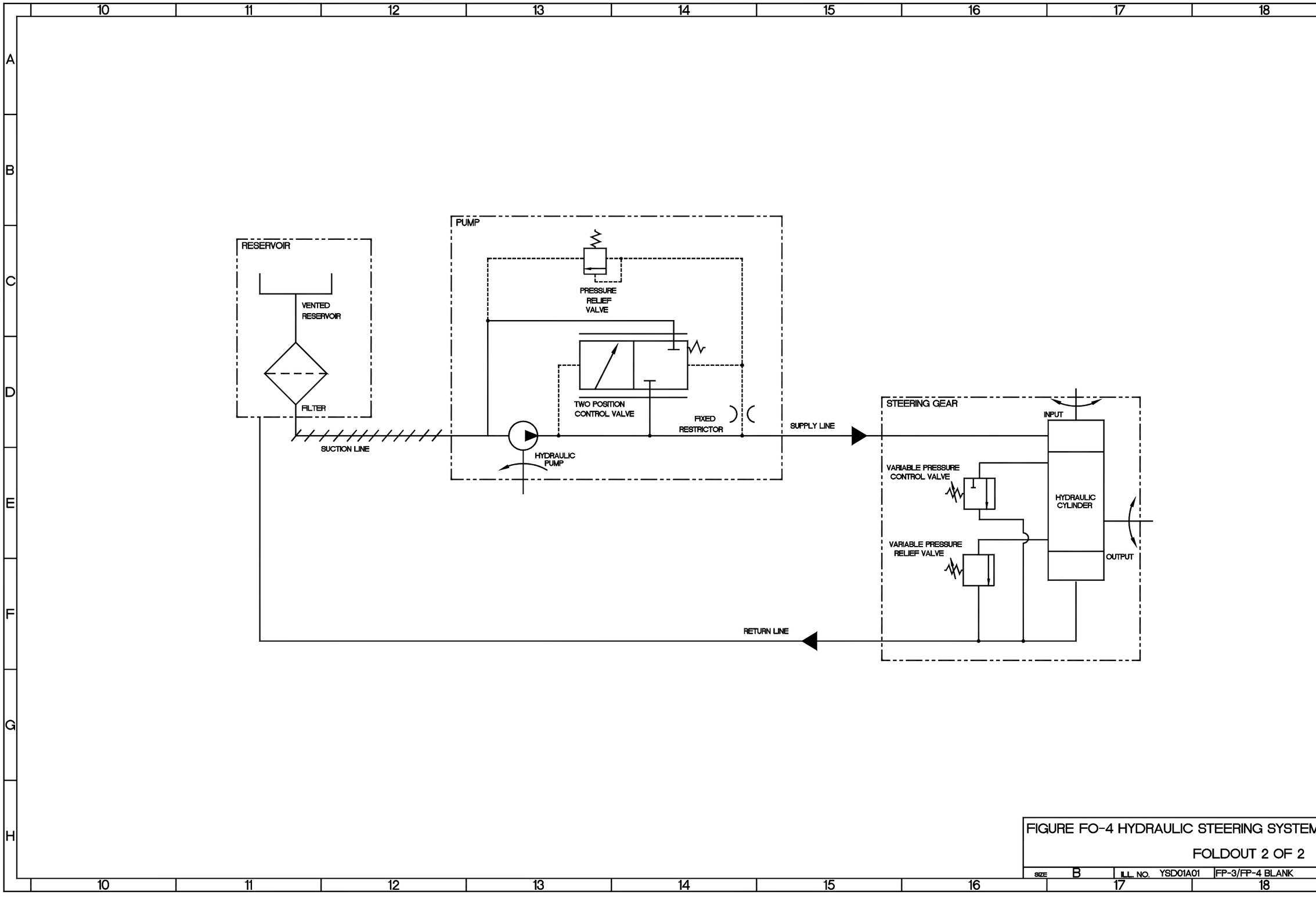



FIGURE FO-4 HYDRAULIC STEERING SYSTEM

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

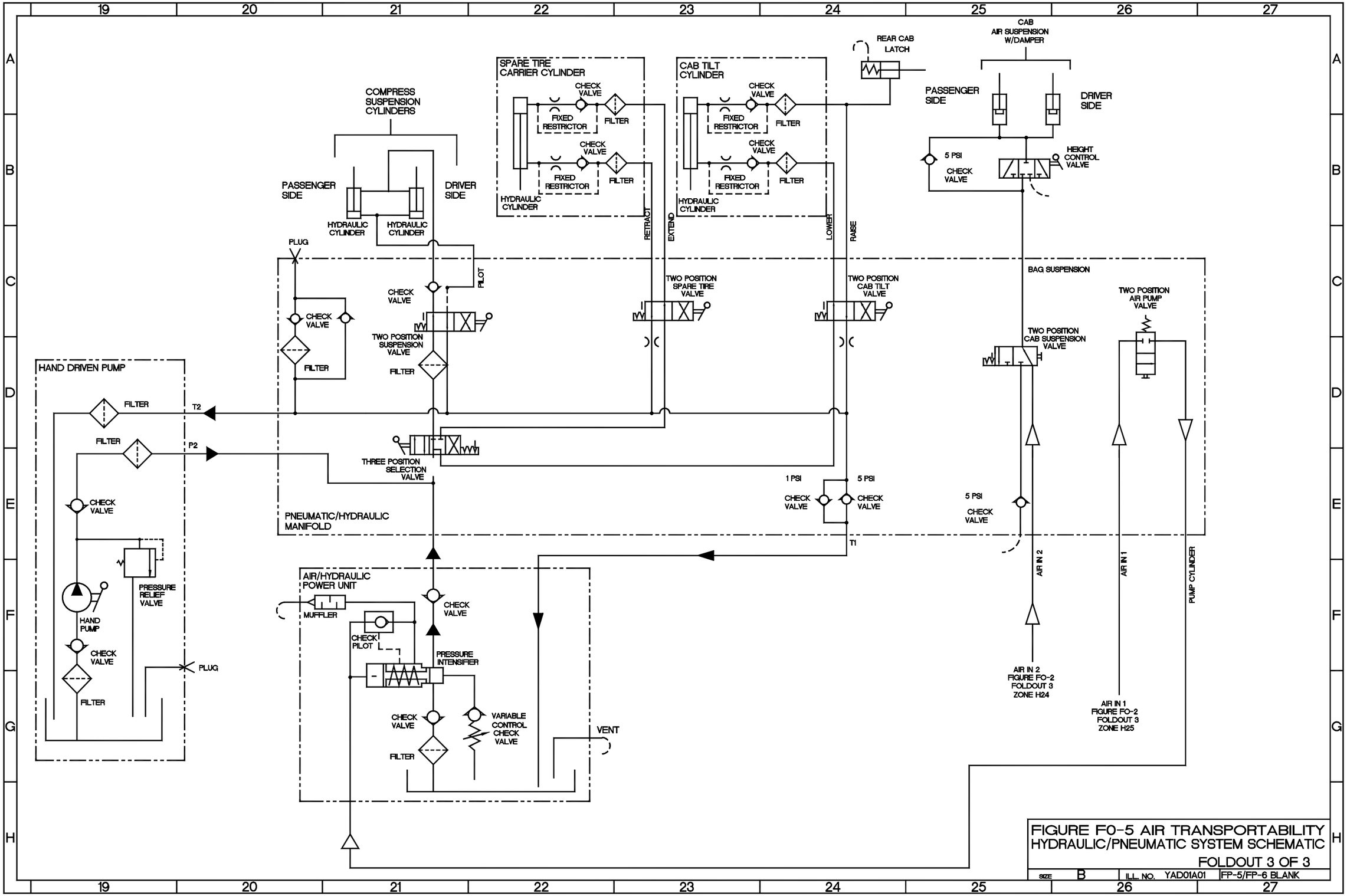



FIGURE FO-5 AIR TRANSPORTABILITY HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 3

SIZE B | ILL NO. YAD01A01 | FP-5/FP-6 BLANK

**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*
05125

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| PUBLICATION/FORM NUMBER | DATE | TITLE |
|---|---|---|
| | Publication Date | Publication Title |

| ITEM | PAGE | PARA-GRAPH | LINE | FIGURE NO. | TABLE | RECOMMENDED CHANGES AND REASON |
|---|---|---|---|---|---|---|
| 10 | 15-33<br><br>19-6 | 15-7<br><br>19-2 | | 4 | | Item 10. Change Illustration. Reason: Text calls out 90-degree fitting. Art shows straight fitting. Text is correct.<br><br>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.*

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|---|---|---|
| Your title | Your telephone number | Your signature |

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| | Enter your mailing address | Date you filled out this form. |

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| 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 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

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|---|---|---|
| Your title | Your telephone number | Your signature |

SAMPLE

| **RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS**<br>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 |
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|---|---|---|
| | | |

| ITEM | PAGE | PARA-GRAPH | LINE | FIGURE NO. | TABLE | RECOMMENDED CHANGES AND REASON |
|---|---|---|---|---|---|---|
| | | | | | | |

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| | | |

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| TYPED NAME, GRADE OR TITLE | TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION | SIGNATURE |
|---|---|---|
| | | |

## 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

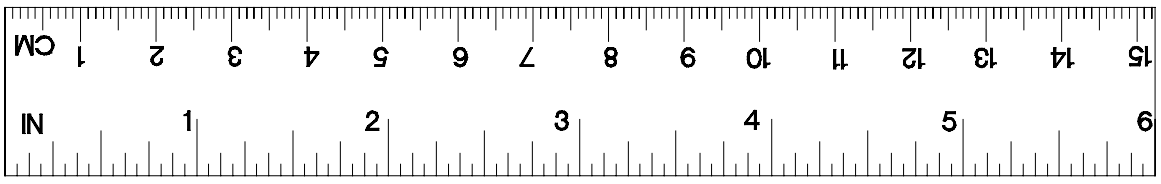
### LIQUID MEASURE
1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

### 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: 076879-001**