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
PAGE iv

CAB AND BODY MAINTENANCE
PAGE 15-1

MATERIAL HANDLING CRANES (MHC), 30K WINCHES, UNDERLIFT, AND 15K SELF-RECOVERY WINCH (SRW) MAINTENANCE
PAGE 16-1

HYDRAULIC SYSTEM MAINTENANCE
PAGE 17-1

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

HEADQUARTERS, DEPARTMENTS OF THE ARMY AND THE AIR FORCE

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. 2

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

TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
M1083 SERIES, 5-TON, 6x6,
MEDIUM TACTICAL VEHICLE
(MTV)

VOLUME NO. 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
A thru C/(D Blank)	A thru C/(D Blank)
None	Change 2 Authentication Sheet
15-3 and 15-4	15-3 and 15-4
15-27 thru 15-30	15-27 thru 15-30
15-123 and 15-124	15-123 and 15-124
none	15-124.1 and 15-124.2
15-125 thru 15-136	15-125 thru 15-136
none	15-136.1 and 15-136.2
15-137 and 15-138	15-137 and 15-138
15-147 and 15-148	15-147 and 15-148
15-155 and 15-156	15-155 and 15-156
16-1 and 16-2	16-1 and 16-2
16-95 thru 16-98	16-95 thru 16-98
16-169 thru 16-174	16-169 thru 16-174
16-261 and 16-262	16-261 and 16-262
16-265 and 16-266	16-265 and 16-266
16-341 thru 16-344	16-341 thru 16-344
16-389 and 16-390	16-389 and 16-390
16-401 and 16-402	16-401 and 16-408
16-403 thru 16-408	none
16-425 and 16-426	16-425/(16-426 Blank)
16-427 thru 16-430	none
none	16-440.1/(16-440.2 Blank)
16-441 and 16-442	16-441 and 16-442
16-481 thru 16-484	16-481 thru 16-484
16-488.1/(16-488.2 Blank)	16-488.1/(16-488.2 Blank)
16-497 thru 16-500.2	16-497 thru 16-500.2
none	16-500.3 and 16-500.4
16-501 and 16-502	16-501 and 16-502
16-505 thru 16-508	16-505 thru 16-508
16-537 and 16-538	16-537 and 16-538
none	16-538.1/(16-538.2 Blank)
16-539 and 16-540	16-539 and 16-540
16-569 and 16-570	16-569 and 16-570
16-571 thru 16-574	16-571 thru 16-574
16-582.1 thru 16-584	16-582.1 thru 16-584
16-584.1/(16-584.2 Blank)	16-584.1 and 16-584.2
17-13 thru 17-26	17-13 thru 17-26
17-29 and 17-30	17-29 and 17-30
C-1 and C-2	C-1 and C-2
C-7 and C-8	C-7 and C-8
F-7 and F-8	F-7 and F-8
F-13 thru F-16	F-13 thru F-16
H-3 and H-4	H-3 and H-4
INDEX-1 and INDEX-2	INDEX-1 and INDEX-2
INDEX-5 and INDEX-6	INDEX-5 and INDEX-6
INDEX-7 and INDEX-8	INDEX-7 and INDEX-8
FO-1 FP-69/(FP-70 Blank)	FO-1 FP-69/(FP-70 Blank)
Metric Conversion Chart	Metric Conversion Chart
/PIN	/PIN

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

By Order of the Secretary of the Army:

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

*O*fficial:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0401519

By Order of the Secretary of the Air Force:

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

*O*fficial:

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

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 380942, requirements for TM 9-2320-366-34-1.

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		
DA Form 2028-2	DA Form 2028		
FO-1 FP-1/(FP-2 Blank)	FO-1 FP-1/(FP-2 Blank)		
thru FP-21/(FP-22 Blank)	thru FP-21/(FP-22 Blank)		
FO-1 FP-25/(FP-26 Blank)	FO-1 FP-25/(FP-26 Blank)		
FO-1 FP-29/(FP-30 Blank)	FO-1 FP-29/(FP-30 Blank)		
thru FP-67/(FP-68 Blank)	thru FP-67/(FP-68 Blank)		
FO-1 FP-75/(FP-76 Blank)	FO-1 FP-75/(FP-76 Blank)		
thru FP-79/(FP-80 Blank)	thru FP-79/(FP-80 Blank)		
BackCover	BackCover		

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

By Order of the Secretary of the Army:

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

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0110116

DISTRIBUTION: To be distributed in accordance with the Initial Distribution Number (IDN) 380942, requirements for TM 9-2320-366-34-3.

LIST OF EFFECTIVE PAGES

Insert latest changed pages. Destroy superseded pages.

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

Dates of issue for original and changed pages are:

Original ..... 0 ..... 15 September 1998
Change ..... 1 ..... 31 July 2001
Change ..... 2 ..... 20 August 2005

THE TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 1164, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover	1
Blank	0
a thru e	0
f thru al	1
A thru C	2
D Blank Added	1
i thru iv	1
v and vi Added	1
15-1	0
15-2	1
15-3	2
15-4 and 15-5	1
15-6 thru 15-11	0
15-12 thru 15-14	1
15-15	0
15-16 thru 15-20	1
15-21	0
15-22 and 15-23	1
15-24 thru 15-26	0
15-27	1
15-28 and 15-29	2
15-30	1
15-30.1 Added	1
15-30.2 Blank Added	1
15-31 thru 15-33	0
15-34 and 15-35	1
15-36	0
15-37 thru 15-44	1
15-45	0
15-46 thru 15-48	1
15-48.1 Added	1
15-48.2 Blank Added	1
15-49	1
15-50 thru 15-53	0
15-54	1
15-54.1 Added	1
15-54.2 Blank Added	1
15-55 thru 15-59	1
15-60	0
15-61	1
15-62 thru 15-65	0
15-66	1
15-67 thru 15-70	0
15-71	1
15-72	0
15-72.1 and 15-72.2 Added	1
15-73	1
15-74 and 15-75	0
15-76	1
15-76.1 Added	1
15-76.2 Blank Added	1
15-77	0
15-78	1
15-79 thru 15-82	0
15-82.1 Added	1
15-82.2 Blank Added	1
15-83	1
15-84 thru 15-86	0
15-87	1
15-88 thru 15-97	0
15-98 thru 15-100	1
15-101	0
15-102 thru 15-107	1
15-108 thru 15-118	0
15-119 and 15-120	1
15-120.1 thru 15-120.5 Added	1
15-120.6 Blank Added	1
15-121 and 15-122	1
15-123 and 15-124	2
15-124.1 and 15-124.2 Added	2
15-125 thru 15-128	2
15-128.1 and 15-128.2	2
15-129	0
15-130 thru 15-136	2
15-136.1 and 15-136.2 Added	2
15-137	2
15-138 thru 15-146	0
15-147	2
15-148 thru 15-154	0
15-155	2
15-156	0
16-1	0
16-2	2
16-3 thru 16-94	0
16-95	2
16-96 and 16-97	0
16-98	2
16-99 thru 16-132	0
16-133	1
16-134 thru 16-169	0
16-170 thru 16-173	2
16-174 thru 16-261	0
16-262	2
16-263 and 16-264	0
16-265	2
16-266 thru 16-341	0
16-342 thru 16-344	2
16-345 thru 16-352	1
16-353 thru 16-373	0
16-374 and 16-375	1
16-376 thru 16-388	0
16-389	2
16-390	1
16-390.1 thru 16-390.3 Added	1
16-390.4 Blank Added	1
16-391 thru 16-394	1
16-395 thru 16-400 Deleted	1
16-401	2
16-402 thru 16-407 Deleted	2
16-408 thru 16-424	0
16-425	2
16-426 Blank	2
16-427 thru 16-430 Deleted	2
16-431 thru 16-434	0
16-435 and 16-436	1
16-437 thru 16-440	0
16-440.1 Added	2
16-440.2 Blank Added	2

* Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

Page No.	*Change No.
16-441	2
16-442 thru 16-444	0
16-445 and 16-446	1
16-447 thru 16-480	0
16-481	2
16-482	0
16-483	2
16-484	0
16-485 and 16-486	0
16-487 and 16-488	1
16-488.1	2
16-488.2 Blank Added	1
16-489	1
16-490 thru 16-496	0
16-497 thru 16-500	2
16-500.1 and 16-500.2	2
16-500.3 and 16-500.4 Added	2
16-501	1
16-502	2
16-502.1 thru 16-502.12 Added	1
16-503 thru 16-505	1
16-506 and 16-507	2
16-508 thru 16-516	1
16-516.1 thru 16-516.13 Added	1
16-516.14 Blank Added	1
16-517 thru 16-520	1
16-521 thru 16-535	0
16-536 and 16-537	1
16-538	2
16-538.1 Added	2
16-538.2 Blank Added	2
16-539	2
16-540 thru 16-567	0
16-568	1
16-569	0
16-570	2
16-570.1 and 16-570.2 Added	1
16-571	2
16-572	1
16-573	2
16-574	0
16-574.1 Added	1
16-574.2 Blank Added	1
16-575 and 16-576	1
16-577 and 16-578	0
16-578.1 and 16-578.2 Added	1
16-579	1
16-580 and 16-581	0
16-582	1
16-582.1 Added	1
16-582.2	2
16-583	1
16-584	2
16-584.1 and 16-584.2	2
16-585 and 16-586	1
16-587 thru 16-589 Added	1
16-590 Blank Added	1
17-1 thru 17-7	1
17-8 Blank	1
17-9 and 17-10 Deleted	1
17-11 Blank	1
17-12	1
17-13 and 17-14	2
17-14.1 thru 17-14.12	2
17-15 thru 17-26	2
17-27 thru 17-29	0
17-30	2
17-31	1
17-32 Blank	0
A-1	0
A-2	1
A-3 and A-4	0
B-1 thru B-6	0
C-1	1
C-2	2
C-3 thru C-6	1
C-7 and C-8	2
C-9 Added	1
C-10 Blank Added	1
D-1	1
D-2 thru D-4	0
D-4.1 Added	1
D-4.2 Blank Added	1
D-5 and D-6	1
D-7 thru D-24	0
D-25 thru D-28	1
D-29 thru D-31	0
D-32	1
D-33 thru D-38	0
D-39	1
D-40 and D-41	0
D-42 thru D-47	1
D-48 thru D-80	0
D-81 thru D-86 Added	1
E-1 thru E-8	0
F-1 thru F-6	1
F-7	2
F-8 thru F-13	1
F-14	2
F-15	1
F-16	2
F-17 Added	1
F-18 Blank Added	1
G-1	1
G-2 Blank	0
H-1 Added	1
H-2 and H-3	2
H-4 Added	1
INDEX-1	2
INDEX-2 thru INDEX-4	1
INDEX-5	2
INDEX-6	1
INDEX-7	2
INDEX-8	1
Glossary-1	0
Glossary-2 Blank	0
FO-1 FP-1	1
FO-1 FP-2 Blank	0
FO-1 FP-3	1
FO-1 FP-4 Blank	0
FO-1 FP-5	1
FO-1 FP-6 Blank	0
FO-1 FP-7	1
FO-1 FP-8 Blank	0
FO-1 FP-9	1
FO-1 FP-10 Blank	0
FO-1 FP-11	1
FO-1 FP-12 Blank	0
FO-1 FP-13	1
FO-1 FP-14 Blank	0
FO-1 FP-15	1
FO-1 FP-16 Blank	0
FO-1 FP-17	1
FO-1 FP-18 Blank	0
FO-1 FP-19	1
FO-1 FP-20 Blank	0
FO-1 FP-21	1
FO-1 FP-22 Blank	0
FO-1 FP-23	0
FO-1 FP-24 Blank	0
FO-1 FP-25	1
FO-1 FP-26 Blank	0
FO-1 FP-27	0
FO-1 FP-28 Blank	0

* Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (CONT)

Insert latest changed pages. Destroy superseded pages.

Page No.	*Change No.
FO-1 FP-29	1
FO-1 FP-30 Blank	0
FO-1 FP-31	1
FO-1 FP-32 Blank	0
FO-1 FP-33	1
FO-1 FP-34 Blank	0
FO-1 FP-35	1
FO-1 FP-36 Blank	0
FO-1 FP-37	1
FO-1 FP-38 Blank	0
FO-1 FP-39	1
FO-1 FP-40 Blank	0
FO-1 FP-41	1
FO-1 FP-42 Blank	0
FO-1 FP-43	1
FO-1 FP-44 Blank	0
FO-1 FP-45	1
FO-1 FP-46 Blank	0
FO-1 FP-47	1
FO-1 FP-48 Blank	0
FO-1 FP-49	1
FO-1 FP-50 Blank	0
FO-1 FP-51	1
FO-1 FP-52 Blank	0
FO-1 FP-53	1
FO-1 FP-54 Blank	0
FO-1 FP-55	1
FO-1 FP-56 Blank	0
FO-1 FP-57	1
FO-1 FP-58 Blank	0
FO-1 FP-59	1
FO-1 FP-60 Blank	0
FO-1 FP-61	1
FO-1 FP-62 Blank	0
FO-1 FP-63	1
FO-1 FP-64 Blank	0
FO-1 FP-65	1
FO-1 FP-66 Blank	0
FO-1 FP-67	1
FO-1 FP-68 Blank	0
FO-1 FP-69	2
FO-1 FP-70 Blank	0
FO-1 FP-71	0
FO-1 FP-72 Blank	0
FO-1 FP-73	0
FO-1 FP-74 Blank	0
FO-1 FP-75	1
FO-1 FP-76 Blank	0
FO-1 FP-77	1
FO-1 FP-78 Blank	0
FO-1 FP-79	1
FO-1 FP-80 Blank	0
FO-2 FP-1	0
FO-2 FP-2 Blank	0
FO-2 FP-3	0
FO-2 FP-4 Blank	0
FO-2 FP-5	0
FO-2 FP-6 Blank	0
FO-2 FP-7	0
FO-2 FP-8 Blank	0
FO-3 FP-1	0
FO-3 FP-2 Blank	0
FO-3 FP-3	0
FO-3 FP-4 Blank	0
FO-3 FP-5	0
FO-3 FP-6 Blank	0
FO-3 FP-7	0
FO-3 FP-8 Blank	0
FO-3 FP-9	0
FO-3 FP-10 Blank	0
FO-3 FP-11	0
FO-3 FP-12 Blank	0
FO-3 FP-13	0
FO-3 FP-14 Blank	0
FO-3 FP-15	0
FO-3 FP-16 Blank	0
FO-4 FP-1	0
FO-4 FP-2 Blank	0
FO-4 FP-3	0
FO-4 FP-4 Blank	0
FO-5 FP-1	0
FO-5 FP-2 Blank	0
FO-5 FP-3	0
FO-5 FP-4 Blank	0
FO-5 FP-5	0
FO-5 FP-6 Blank	0

* Zero in this column indicates an original page.

TECHNICAL MANUAL
NO. 9-2320-366-34-3

TECHNICAL ORDER
NO. 36A12-1C-1092-3

HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE

Washington, D.C., 15 SEPTEMBER 1998

Direct Support and General Support Maintenance Manual

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

VOLUME NO. 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**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

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

TABLE OF CONTENTS

Page

HOW TO USE THIS MANUAL iii

CHAPTER 15 BODY AND CAB MAINTENANCE 15-1

Section I **Introduction** 15-1
Section II **Maintenance Procedures** 15-2

CHAPTER 16 MATERIAL HANDLING CRANES (MHC), 30K WINCHES, UNDERLIFT, AND 15K SELF-RECOVERY WINCH (SRW) MAINTENANCE 16-1

Section I **Introduction** 16-1
Section II **Maintenance Procedures** 16-2

CHAPTER 17 HYDRAULIC SYSTEM MAINTENANCE 17-1

Section I **Introduction** 17-1
Section II **Maintenance Procedures** 17-2

APPENDIXES

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

SUBJECT INDEX Index-1
GLOSSARY Glossary-1

LIST OF ILLUSTRATIONS

Figure **Title** **Page**

D-1 Brake Adjusting Tool Support D-6
D-2 Brake Plunger Seal Driver D-7
D-3 Cab Front Support Spanner Socket D-8
D-4 Cab Maintenance Stand Angle Brackets and Straight Braces D-10
D-5 Cab Maintenance Stand Base Angle Bracket Locations D-11
D-6 Cab Maintenance Stand Base Fabrication D-12
D-7 Cab Maintenance Stand Brace Bracket Locations D-13
D-8 Cab Maintenance Stand Brace to Base Assembly D-14
D-9 Cab Maintenance Stand Side Braces Side View D-15
D-10 Cab Maintenance Stand Assembly D-16
D-11 Cab Support Tool Strut and Cab Rest D-17

LIST OF ILLUSTRATIONS (CONT)

Figure	Title	Page
D-12	Cab Support Tool Seat	D-18
D-13	Cab Support Tool Seat Layout	D-19
D-14	Cab Support Tool Assembly	D-20
D-15	Dump Body Cab Protector Pivot Pin Removal Tool Assembly	D-21
D-16	Dump Body Lifting Bracket	D-22
D-17	Rear, Top, and Guide Plate	D-23
D-18	Front and Mounting Plate	D-24
D-19	Engine Stand Bracket Assembly	D-25
D-20	Engine Stand Bracket Front Plate	D-26
D-21	Engine Stand Bracket Rear Plate	D-27
D-22	Engine Stand Bracket Side Plates	D-28
D-23	Headlight Adjustment Screen	D-29
D-24	Machine Gun Ring Drill Stop	D-30
D-25	Main Valve Body Spring Compression Tool	D-31
D-26	M1089 30K Winch Test Adapter	D-32
D-27	M1089 Solenoid Test Adapter	D-33
D-28	Spanner Socket Tool	D-34
D-29	Spanner Wrench Tool Assembly	D-35
D-30	Spanner Wrench Jaw	D-36
D-31	Spanner Wrench Handle Piece	D-36
D-32	Spreader Bar Layout	D-37
D-33	Spreader Bar Assembly	D-38
D-34	Steering Stop Shim Gage	D-39
D-35	Swingdrive Assembly Bracket	D-40
D-36	Transfer Case Lift Bracket Assembly	D-41
D-37	Transfer Case Lift Bracket Main Mounting Bracket	D-42
D-38	Transfer Case Bracket Bolt Mounting Bracket	D-43
D-39	Transfer Case Lift Bracket Lifting Bracket	D-44
D-40	Transfer Case Lift Bracket Center Support Plate	D-45
D-41	Transfer Case Lift Bracket Lifting Plate Braces	D-46
D-42	Transfer Case Lift Bracket Bolt Mounting Bracket Supports	D-47
D-43	Transmission Lift and Mounting Bracket Assembly	D-48
D-44	Transmission Lift and Mounting Bracket Bottom Plate	D-49
D-45	Transmission Lift and Mounting Bracket Side Plates	D-50
D-46	Transmission Lift and Mounting Bracket Top Plate	D-51
D-47	Transmission Lift and Mounting Bracket Top and Bottom Braces	D-52
D-48	Transmission Lift and Mounting Bracket Side Supports	D-53
D-49	Transmission Lift and Mounting Bracket Bolt Mounting Plates	D-54
D-50	Transmission Lift Bracket Assembly	D-55
D-51	Lower Lift Bracket	D-56
D-52	Upper Lift Bracket	D-57
D-53	Battery 12V Cable Assembly	D-59
D-54	Battery Ground Cable Assembly	D-61
D-55	Battery 24V Cable Assembly	D-62
D-56	Lanyard Assembly	D-70
D-57	Wooden Skid	D-71
D-58	CTIS Seal Driver	D-73
D-59	Front Axle Shaft Seal Driver	D-74
D-60	Wheel Hub Grease Seal Driver	D-75
D-61	Intermediate Differential Output (Rear) Seal Driver	D-76

LIST OF ILLUSTRATIONS (CONT)

Figure	Title	Page
D-62	Differential Pinion Seal Driver	D-77
D-63	Intermediate Input Yoke Seal Driver	D-78
D-64	Intermediate Output Yoke Seal Driver	D-79
D-65	Front and Rear Differential Yoke Seal Driver	D-80
D-66	Purge Valve Tool	D-82
D-67	M1089 30K Winch Pneumatic Test Adapter	D-85

LIST OF TABLES

Number	Title	Page
16-1	Clearance Marker Light Connectors	16-349
16-2	Clearance Marker Light Connectors	16-372
D-1	Pneumatic Tube Lengths	D-64
D-2	Non-Metallic Electrical Cable Conduit Lengths	D-68
D-3	M1089 30K Air Hose Lengths and Fittings	D-83
E-1	Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts	E-2
E-2	Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts	E-4
E-3	Dry Torque Limits for Metric Screws and Free Spinning Nuts	E-5
E-4	Dry Torque Limits for Metric Prevailing Torque Nuts	E-6
E-5	Wet Torque Limits for SAE and ANSI Screws and Free Spinning Nuts	E-7

HOW TO USE THIS MANUAL

OVERVIEW

This Technical Manual (TM) is provided to help you maintain the MTV at the Direct Support (DS) 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

Section I. INTRODUCTION 15-1
15-1. INTRODUCTION 15-1

Section II. MAINTENANCE PROCEDURES 15-2
15-2. CAB REPLACEMENT 15-2
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR 15-59
15-4. M1093/M1094 CAB SIDE WALL REPLACEMENT/REPAIR 15-90
15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR 15-98
15-6. M1093/M1094 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR 15-110
15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT 15-119
15-8. M1090 REAR FENDER MOUNTING BRACKET AND EXTENSION BRACKET REPLACEMENT . 15-123
15-9. CARGO BED REPLACEMENT 15-125
15-10. M1090/M1094 DUMP BODY REPLACEMENT 15-138
15-11. M1090/M1094 DUMP BODY CAB PROTECTOR REPLACEMENT 15-145
15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT 15-147

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)
Washer, Seal (4) (Item 435.1 Appendix F).
Spacer (4) (Item 420.1, Appendix F)

Personnel Required
(2)

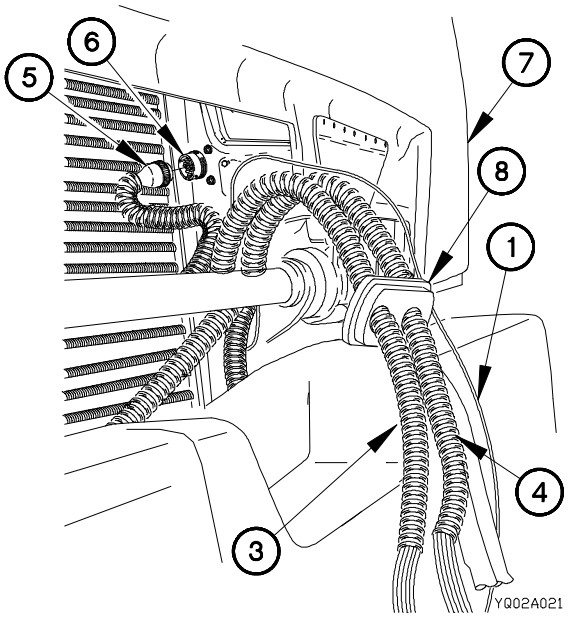
a. Removal.

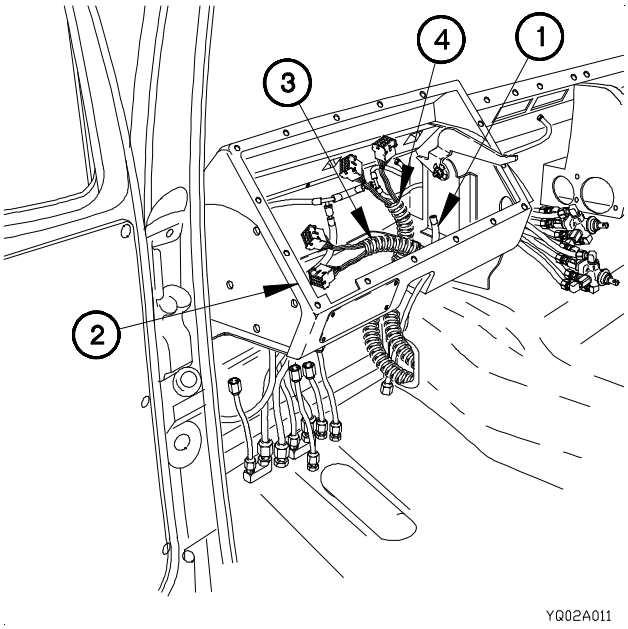
NOTE

Remove plastic cable ties as required.

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

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





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

NOTE

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

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

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

15-2. CAB REPLACEMENT (CONT)

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

NOTE

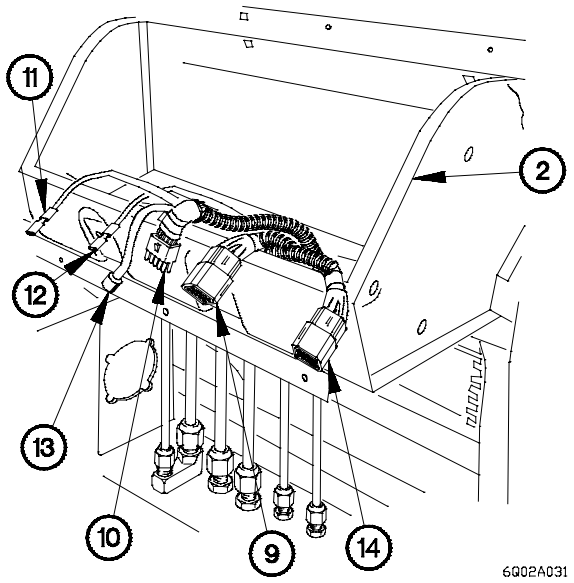
Perform step (7) on vehicles equipped with PTO.

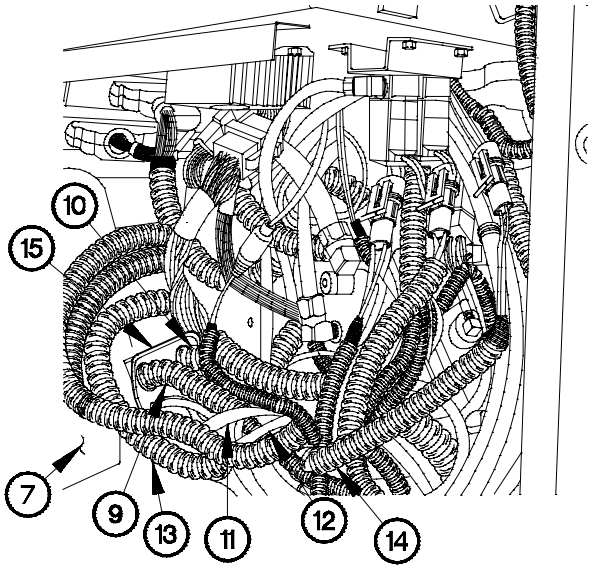
(7) Remove PTO cable assembly (13) from dashboard (2).

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

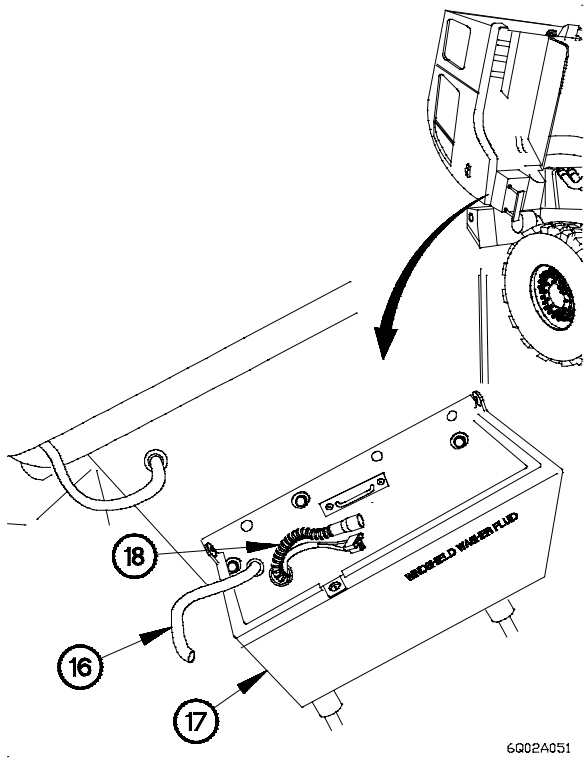
Perform step (11) on M1084, M1086, M1090, and M1094.

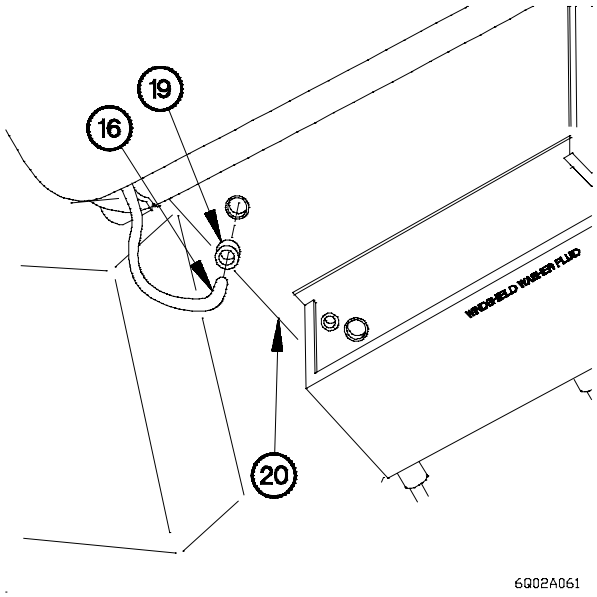
(11) Remove crane/dump power cable assembly (14) from cab (7).

(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

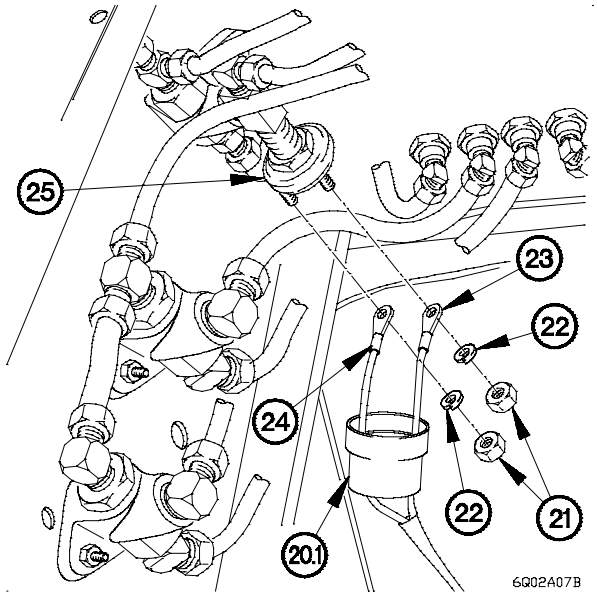
Perform steps (15.1) on vehicle serial number 7448 and higher and vehicle serial numbers 0001 through 7447 that have previously had front lights cable assembly replaced.

(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)

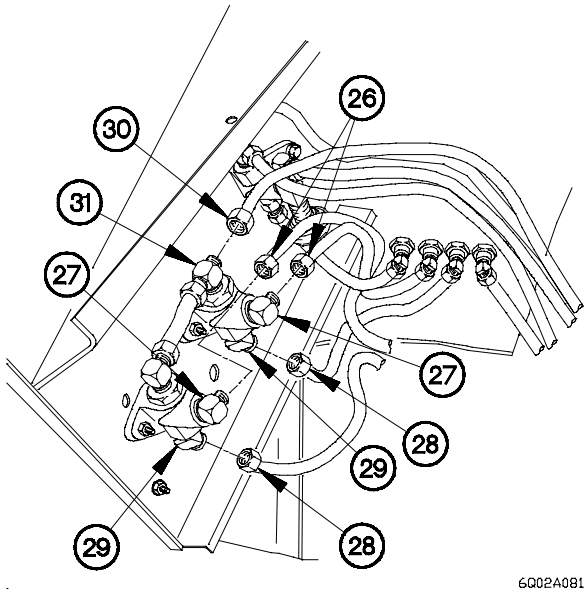
NOTE

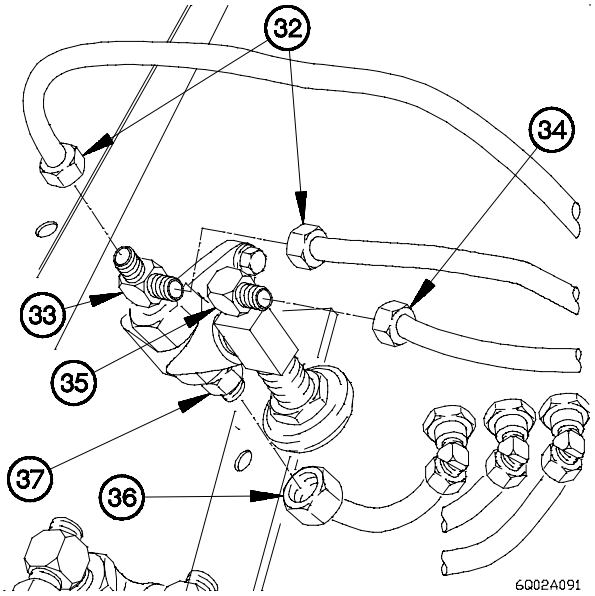
Tag hoses and connection points prior to disconnecting.

(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).



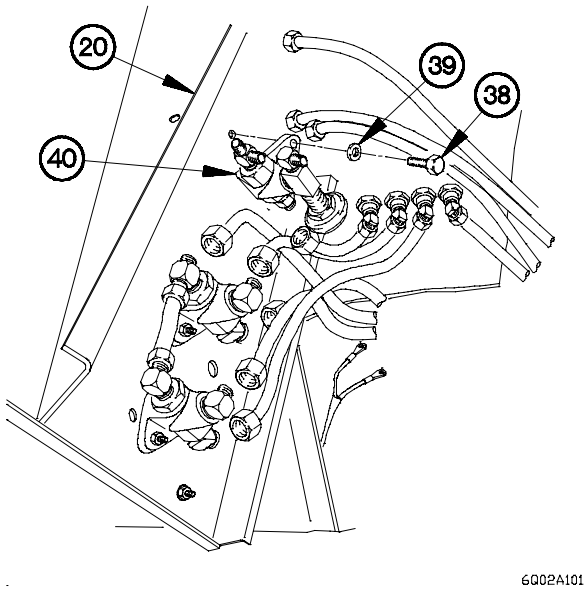


(20) Disconnect two hoses (32) from tee fitting (33).

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

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

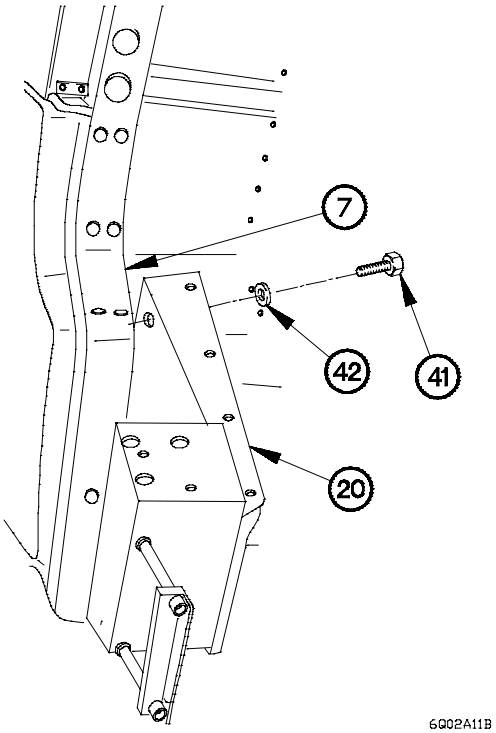
(23) Remove screw (38), washer (39), and valve (40) from step mount (20).

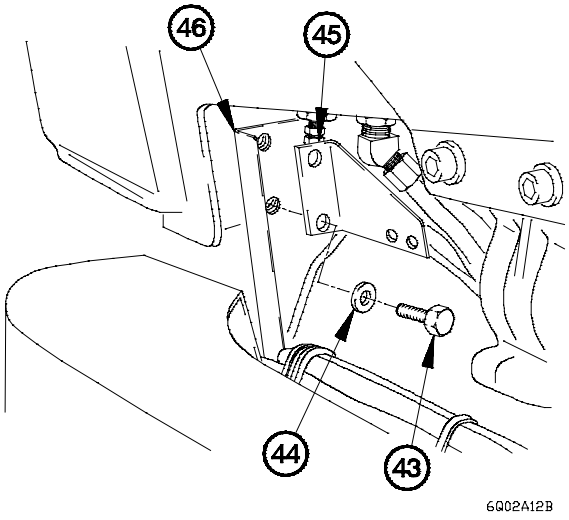


NOTE

Step (24) requires the aid of an assistant.

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



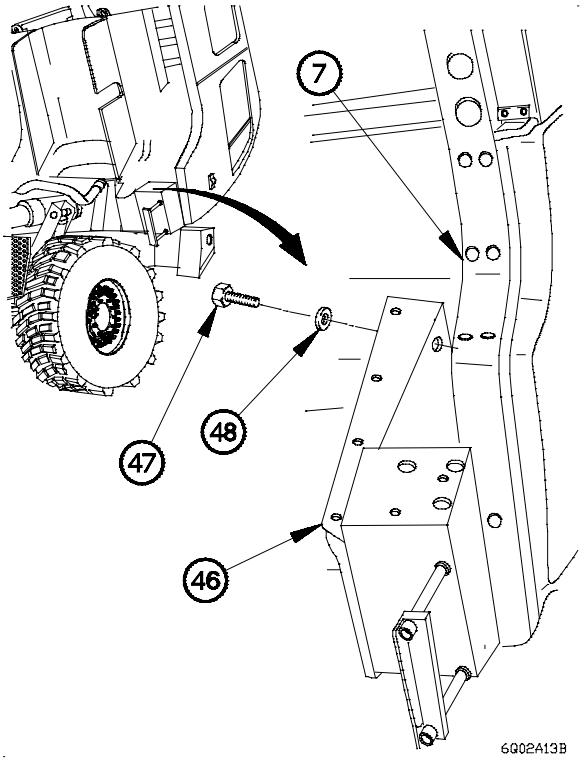


(25) Remove two screws (43), washers (44), and bracket (45) from step mount (46).

NOTE

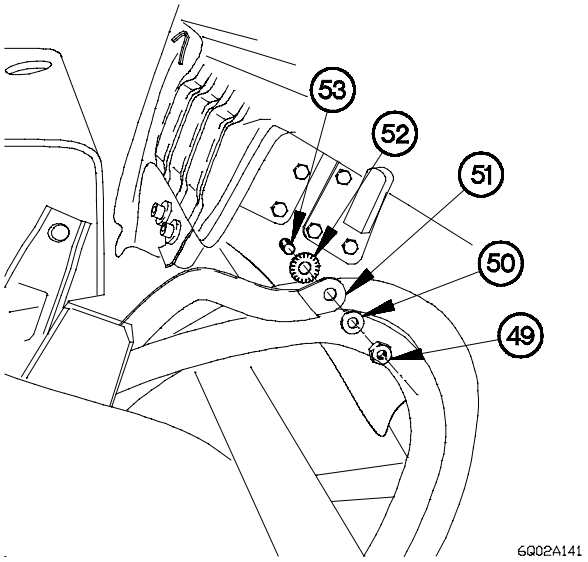
Step (26) requires the aid of an assistant.

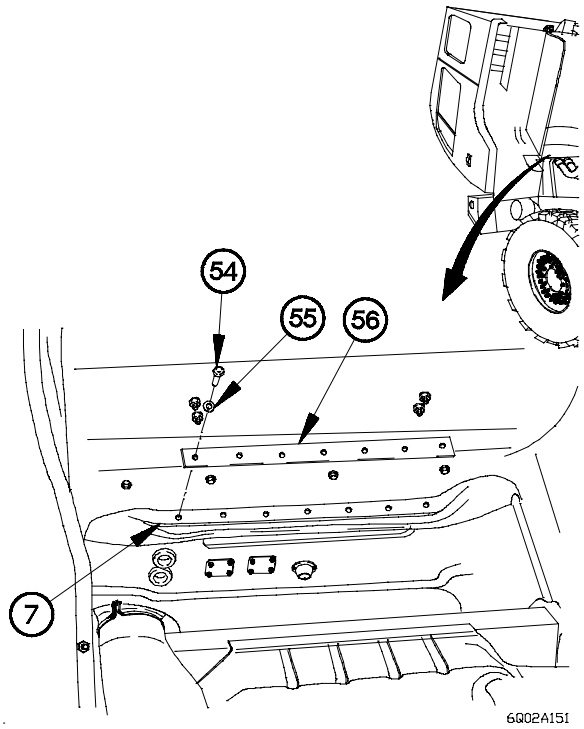
(26) Remove six screws (47), washers (48), and step mount (46) from cab (7).



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.



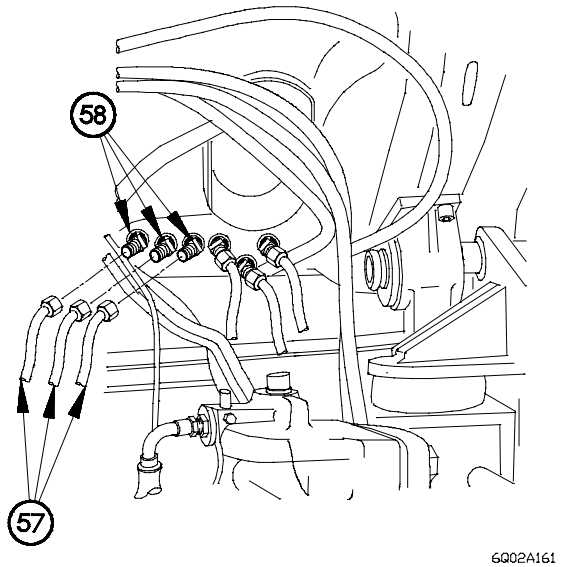


WARNING

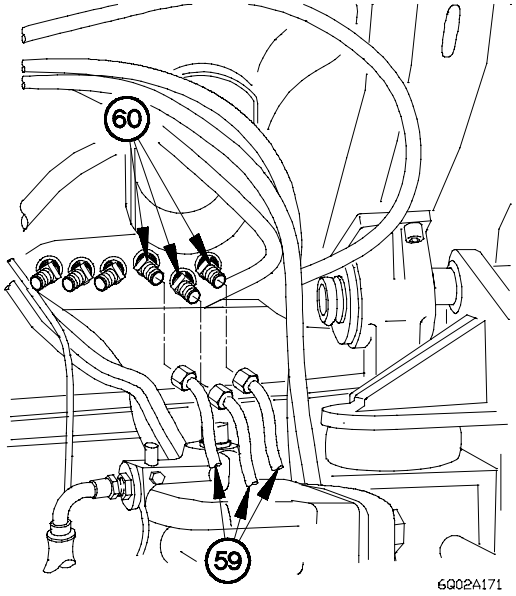
Wear appropriate eye protection when drilling out rivets. Failure to comply may result in injury to personnel.

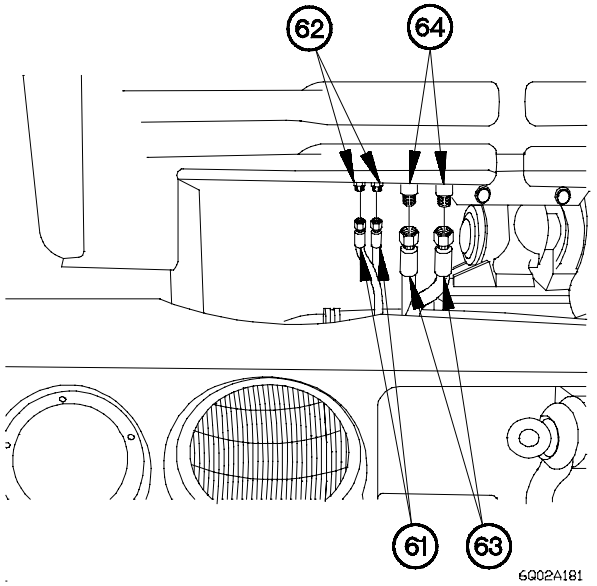
(28) Remove seven rivets (54), washers (55), and baffle (56) from cab (7).

(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.

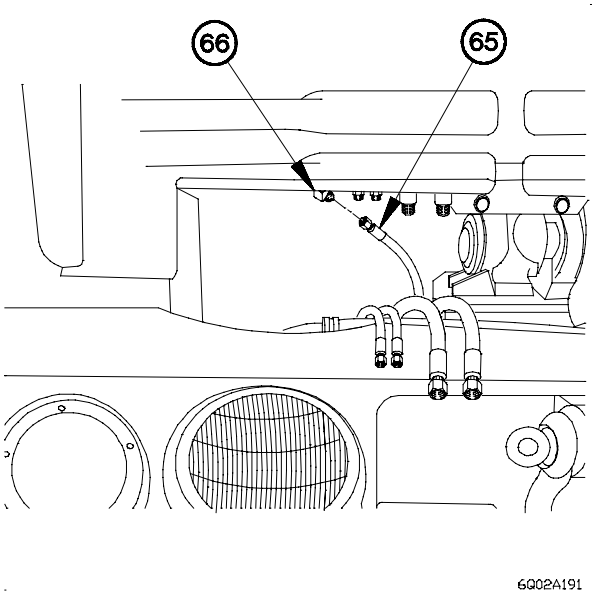
(31) Disconnect two pneumatic hoses (61) from 45-degree fittings (62).

(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).

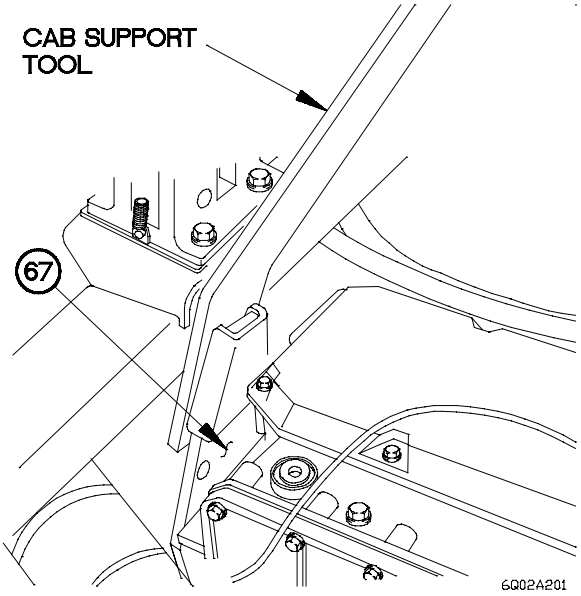


15-2. CAB REPLACEMENT (CONT)

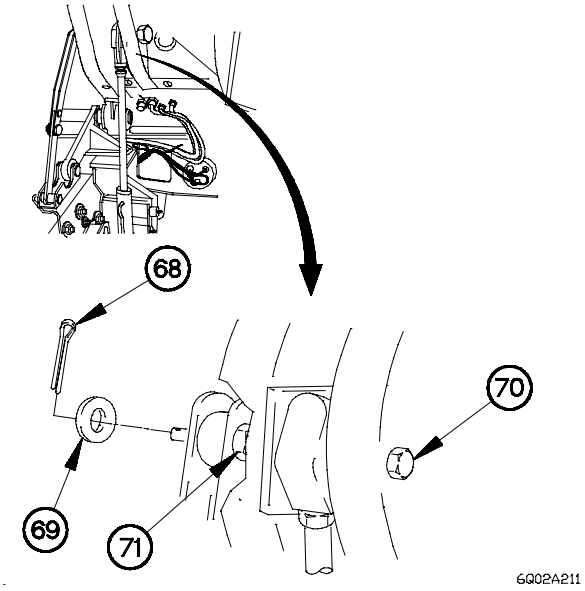
WARNING

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).

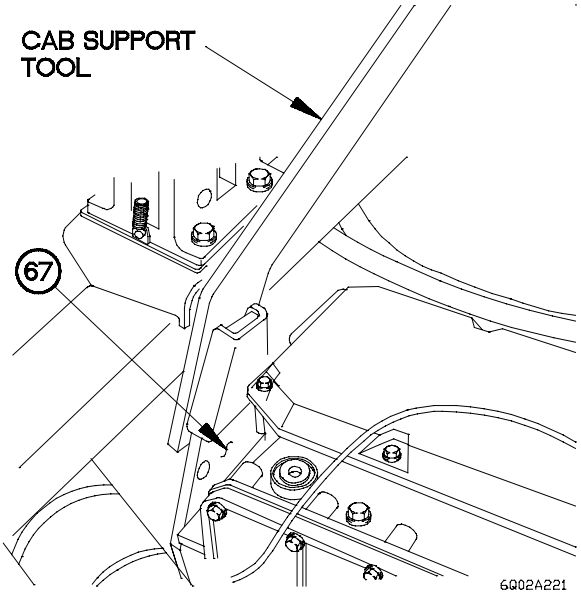


(35) Lower cab until cab rests on cab support tool (TM 9-2320-366-10-1).



(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).

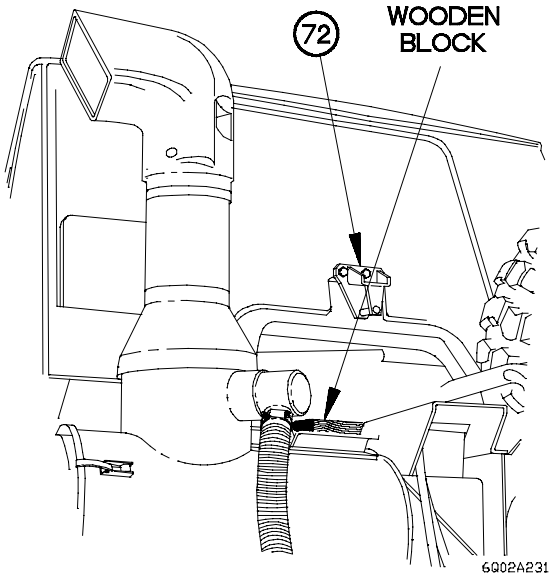


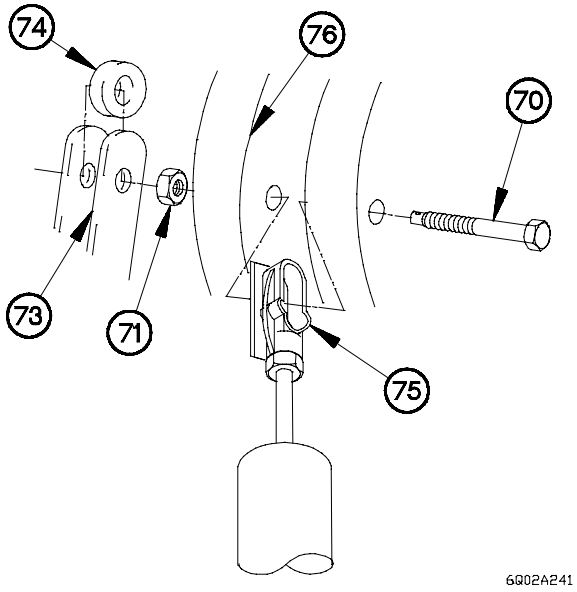
(38) Raise cab slightly and remove cab support tool from engine rear lifting eye (67) (TM 9-2320-366-10-1).

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

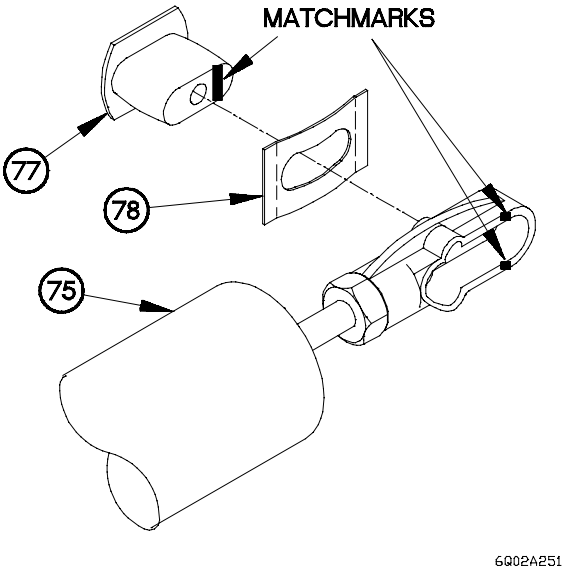
Steps (40) and (41) require the aid of an assistant.

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

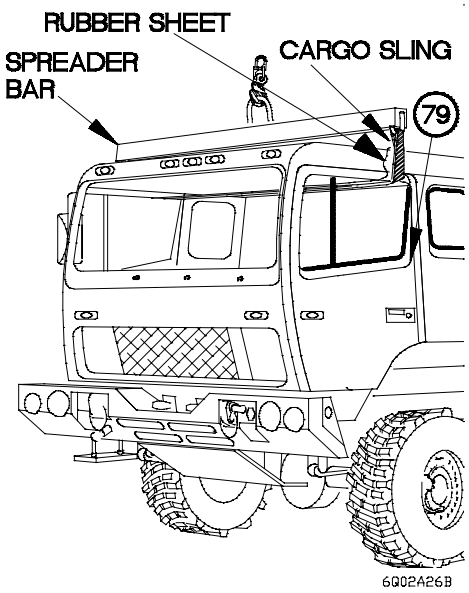
(41) Remove self-locking nut (71), cab tilt cylinder mounting bolt (70), and cab tilt cylinder (75) from bracket (76). Discard self-locking nut.

(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.



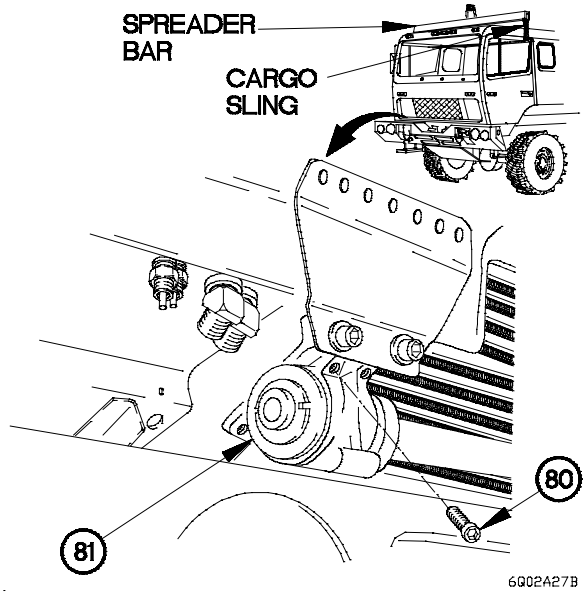
15-2. CAB REPLACEMENT (CONT)



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.**

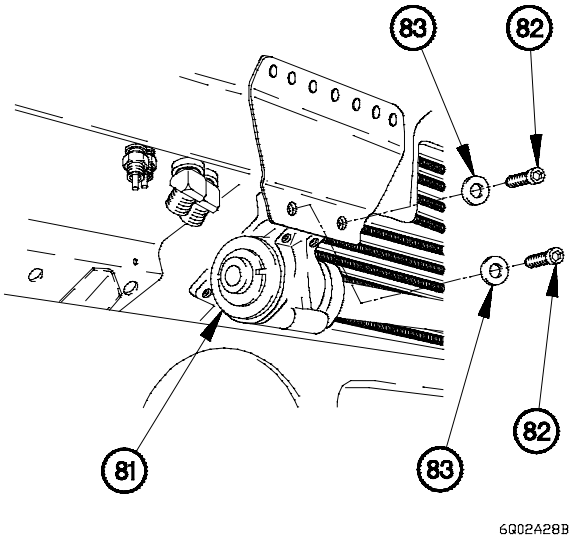
NOTE

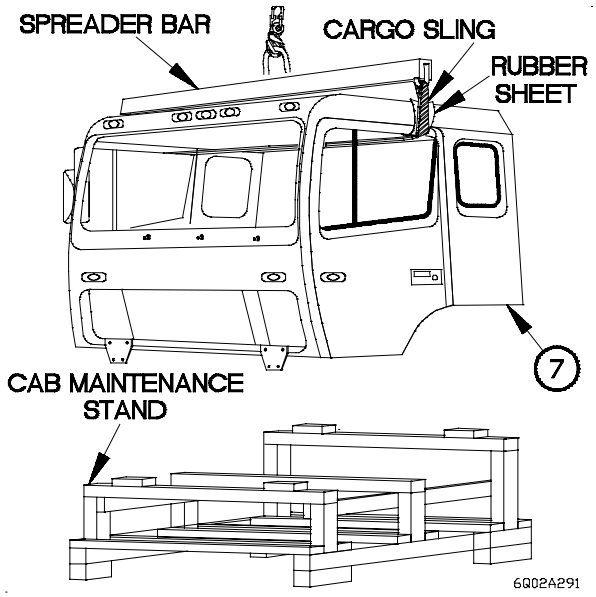
Left and right side cab front support mounts are disconnected the same way. Right side shown.

(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.

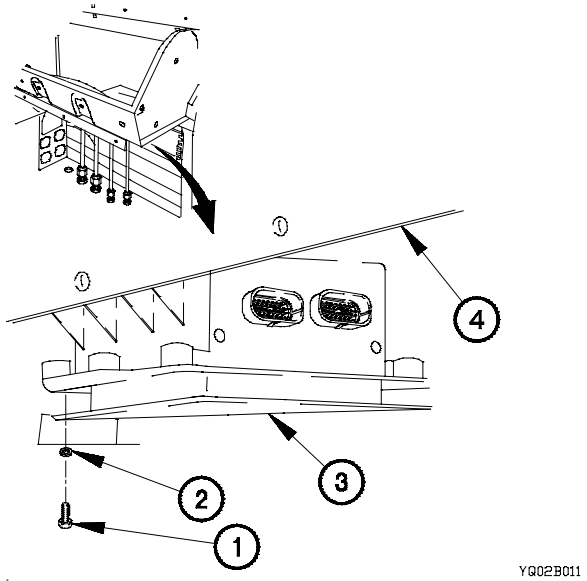
(50) Remove spreader bar, cargo sling, and rubber sheet from cab (7).

b. Disassembly.

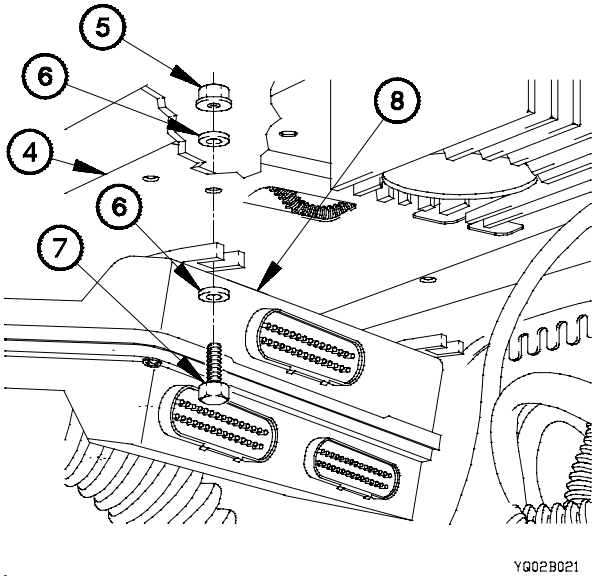
NOTE

Perform step (1) on WTEC II vehicles.

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



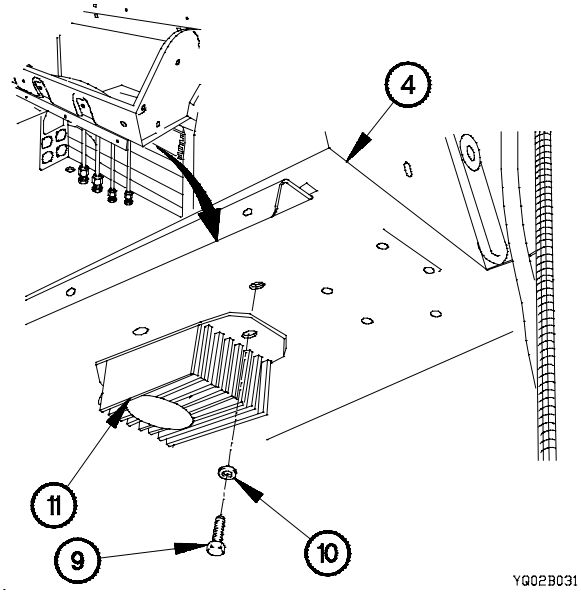
15-2. CAB REPLACEMENT (CONT)



NOTE

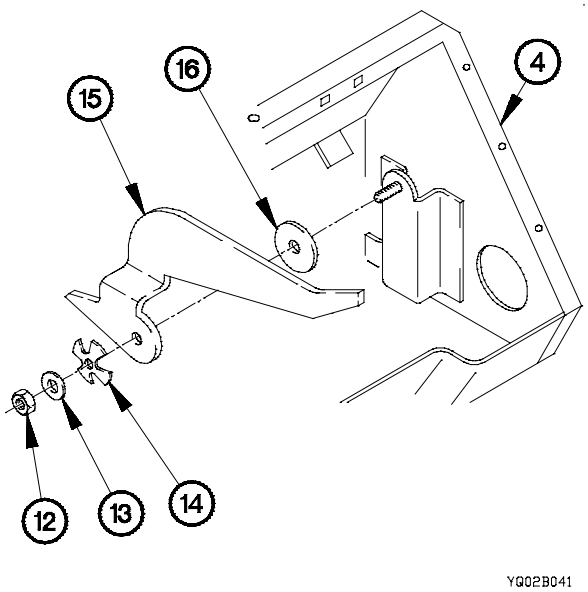
Perform step (2) on WTEC III vehicles.

(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

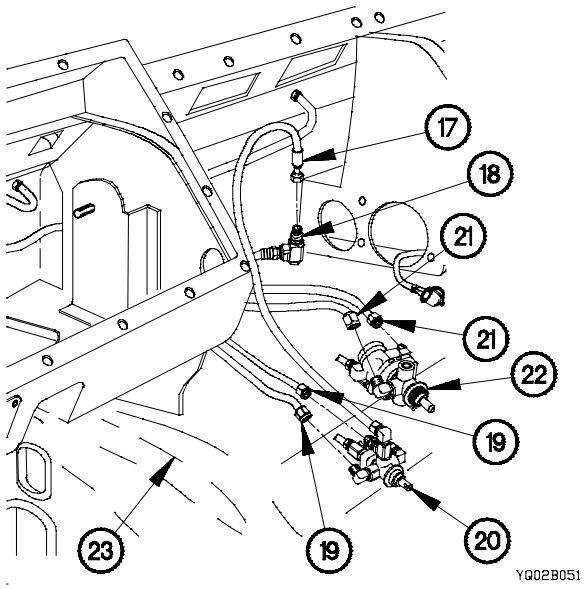
Tag hoses and connection points prior to disconnecting.

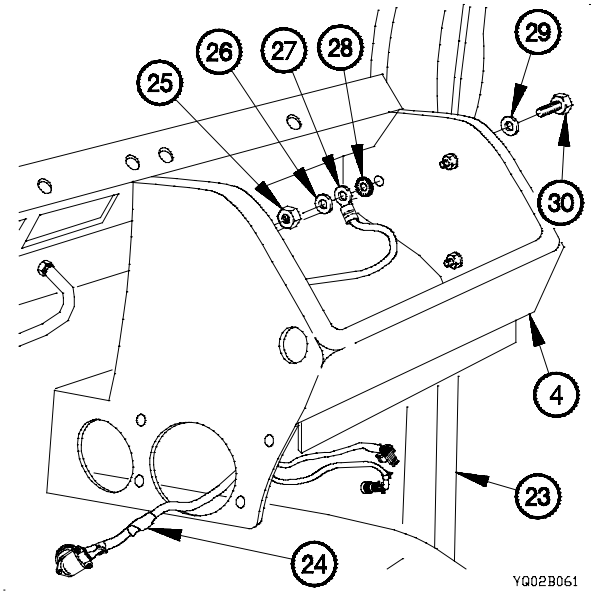
(5) Remove air hose (17) from tee fitting (18).

(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.

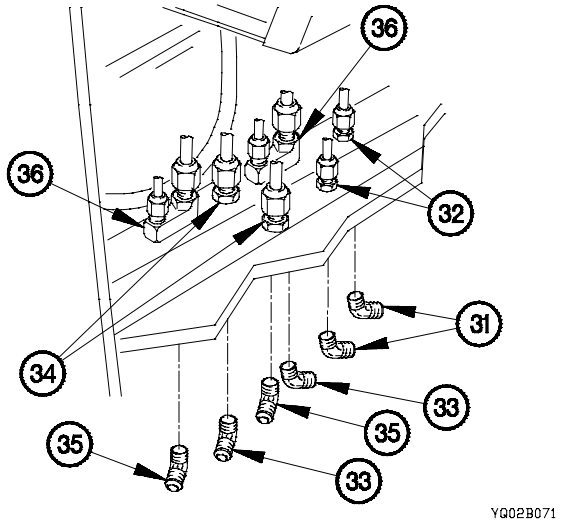
NOTE

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).

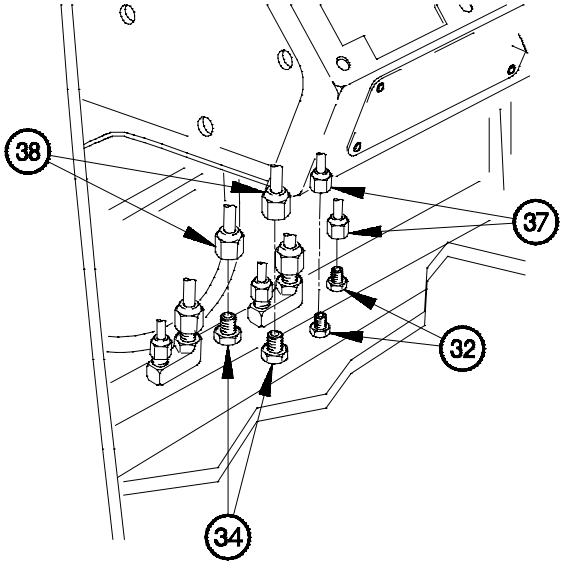
(13) Remove two 45-degree fittings (35) from fittings (36).



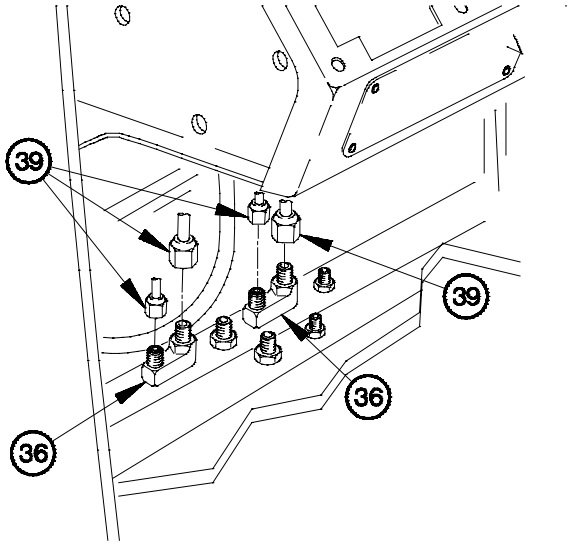
15-2. CAB REPLACEMENT (CONT)

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

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



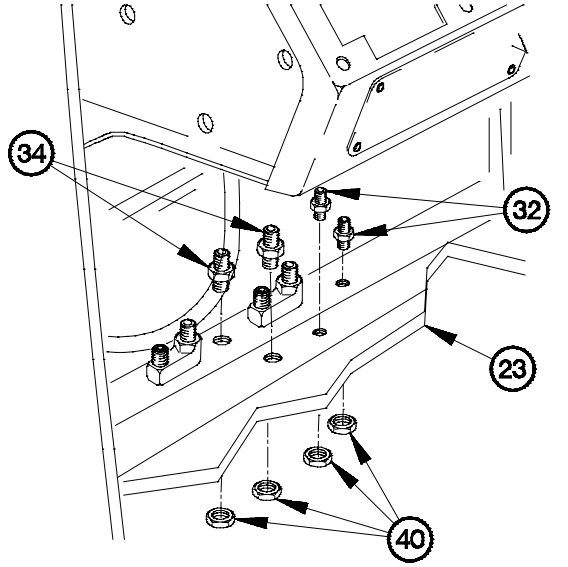
YQ02B081



YQ02B091

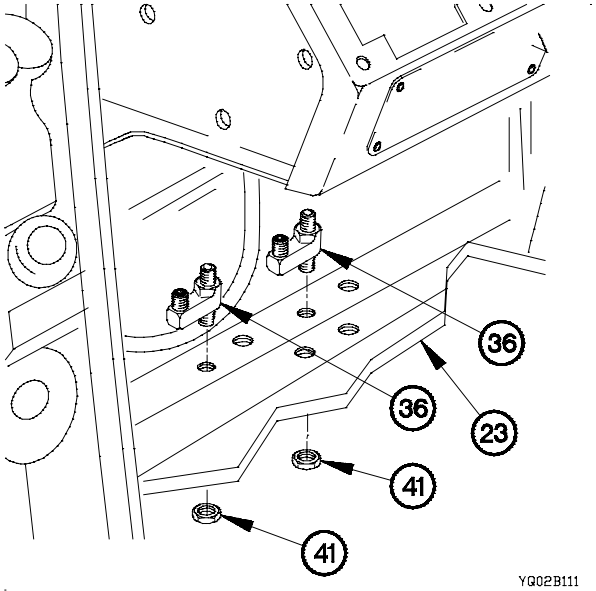
(16) Remove four hoses (39) from two fittings (36).

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

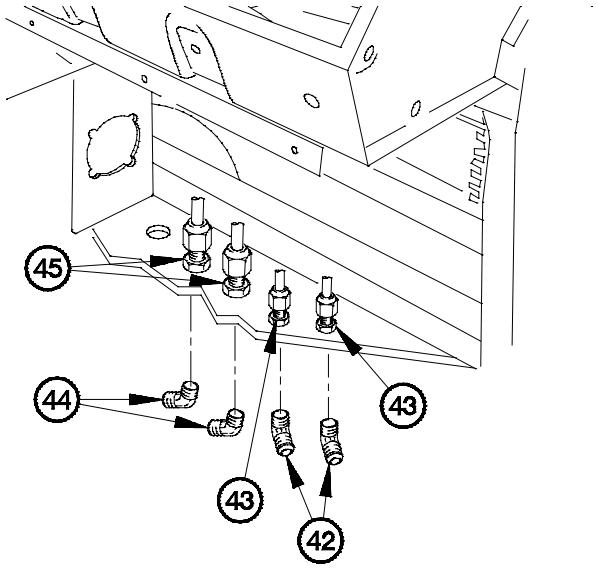


YQ02B101

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



YQ02B111



YQ02B121

NOTE

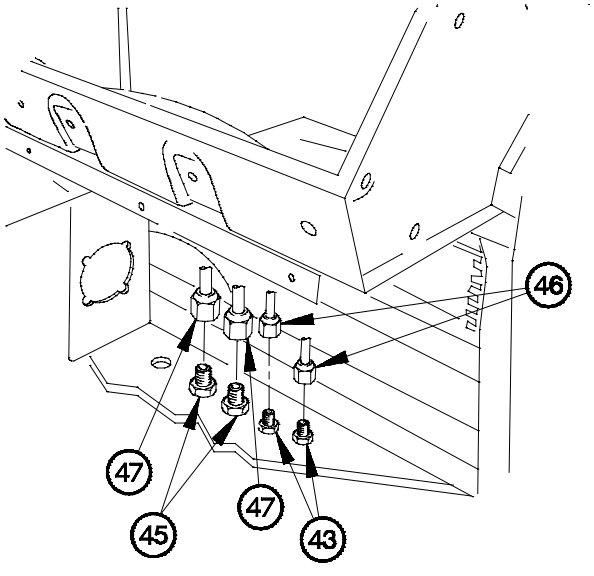
Perform steps (19) through (23) on all models except M1088.

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

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

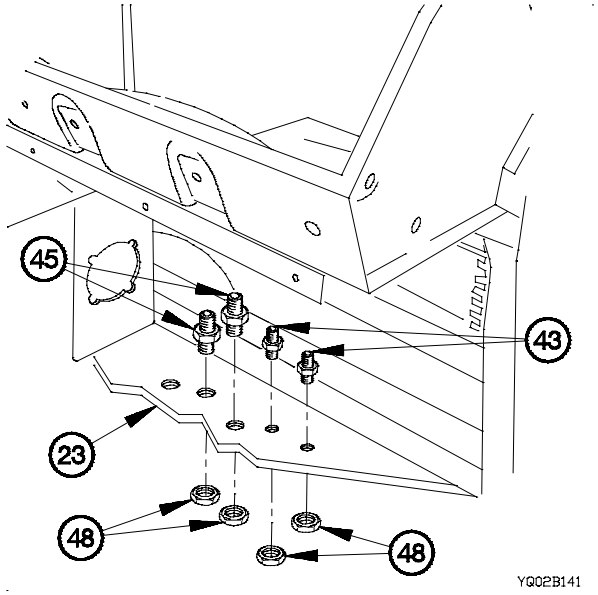
(21) Remove two hoses (46) from fittings (43).

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

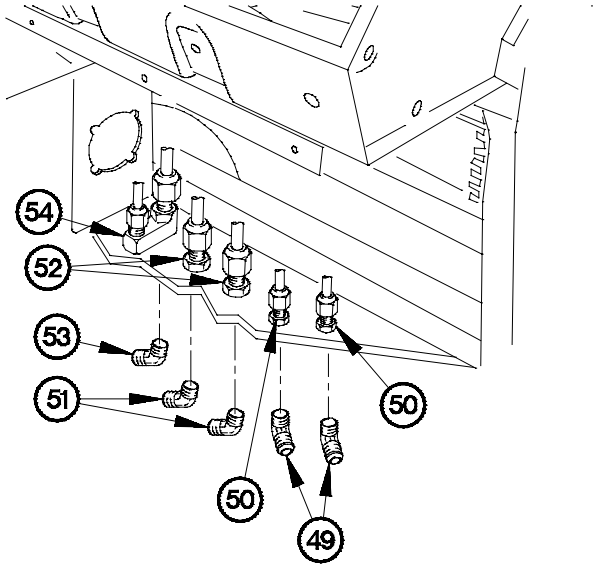


YQ02B131

15-2. CAB REPLACEMENT (CONT)



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



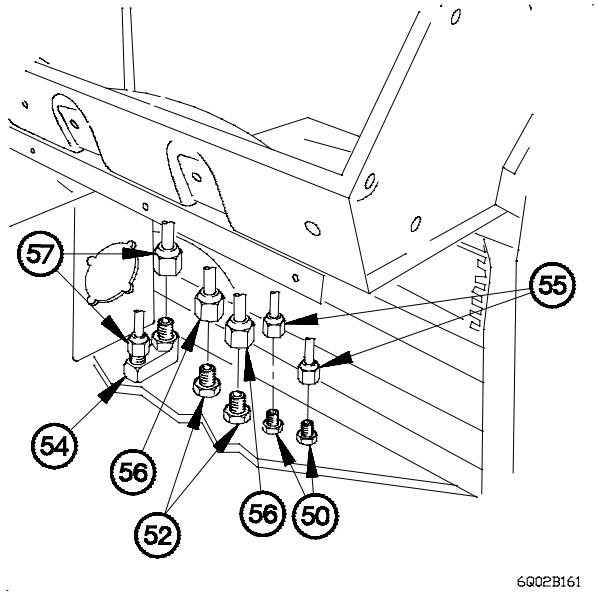
NOTE

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).

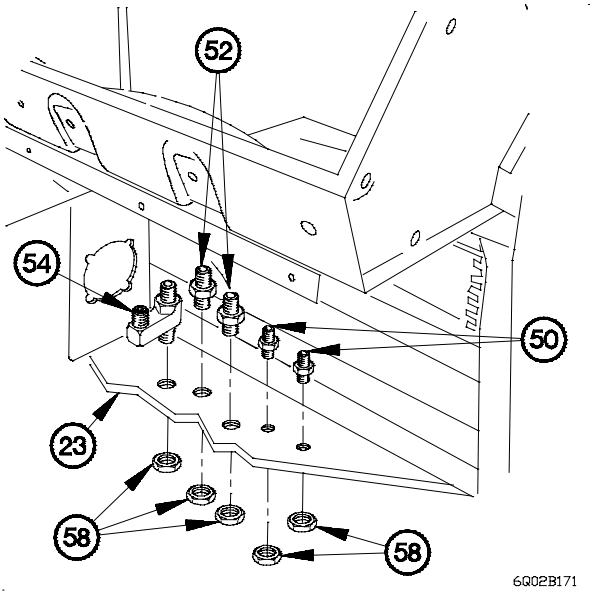


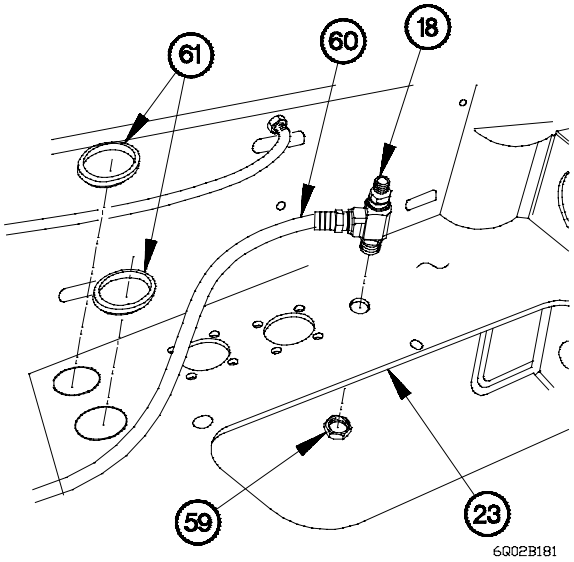
(27) Remove two hoses (55) from fittings (50).

(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).

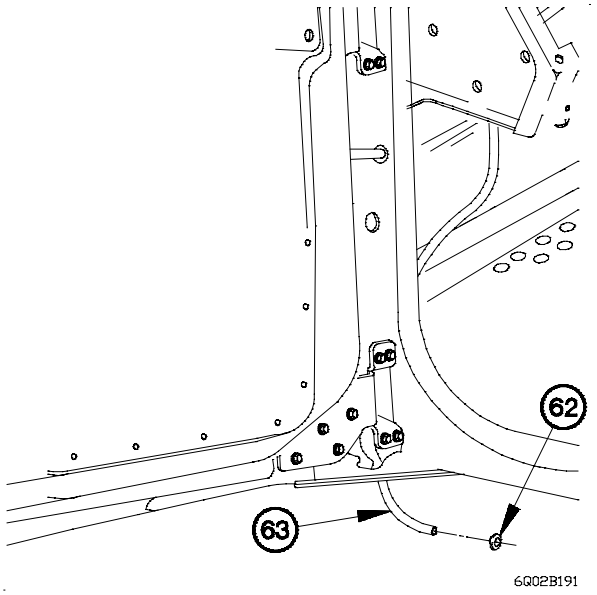




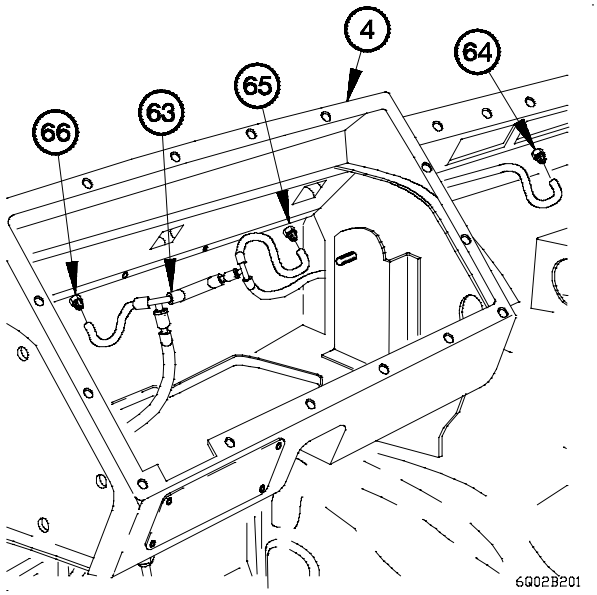
(31) Remove nut (59), tee fitting (18), and hose (60) from cab (23).

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

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



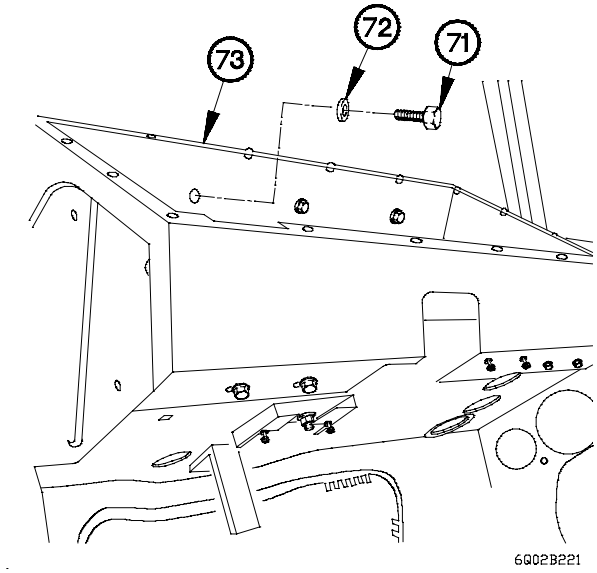
15-2. CAB REPLACEMENT (CONT)



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

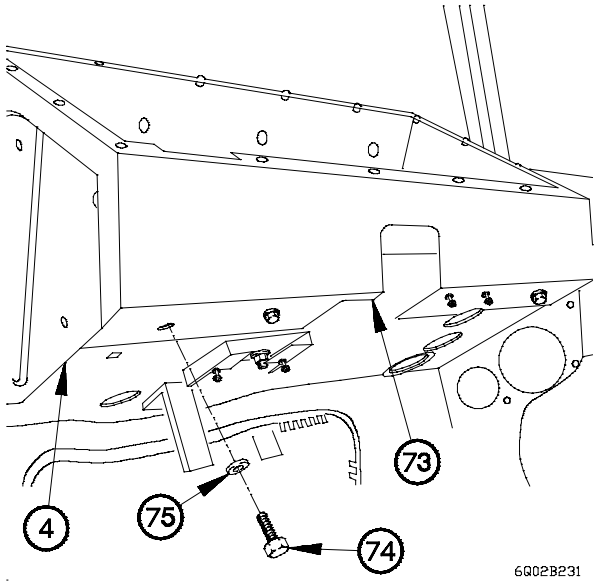
(35) Remove window washer hose (63) from dashboard (4).

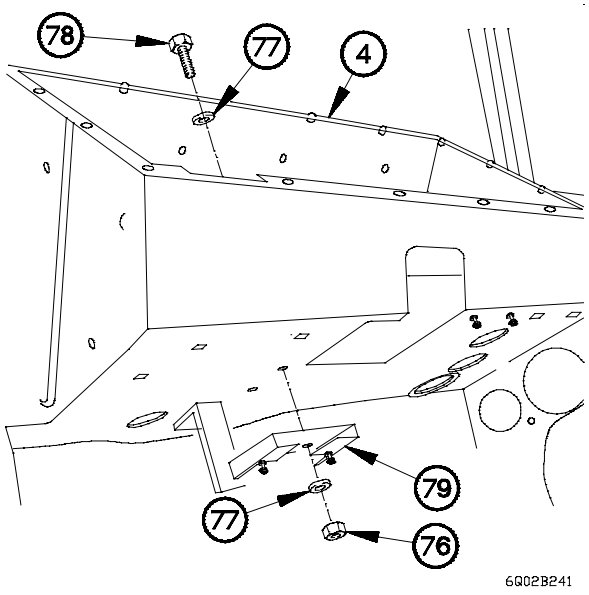
(36) Deleted



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

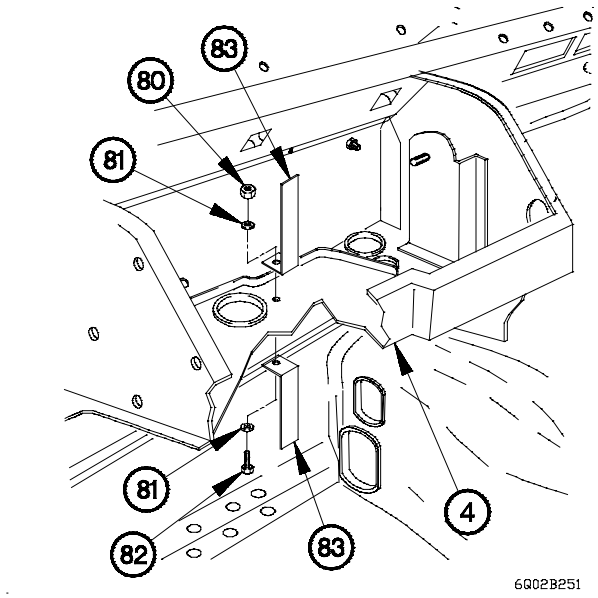
(38) Remove three screws (74), washers (75), and dashboard bezel (73) from dashboard (4).



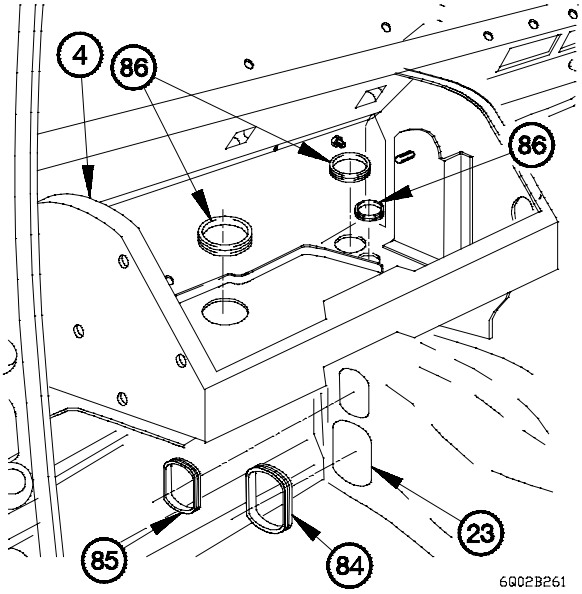


(39) Remove two nuts (76), four washers (77), two screws (78), and bracket (79) from dashboard (4).

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



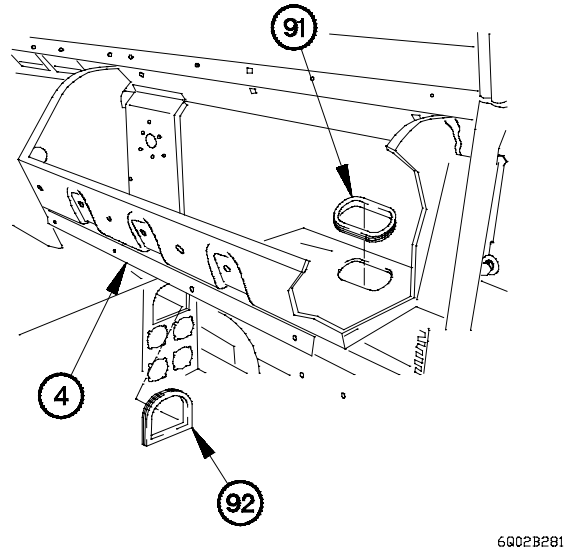
15-2. CAB REPLACEMENT (CONT)



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

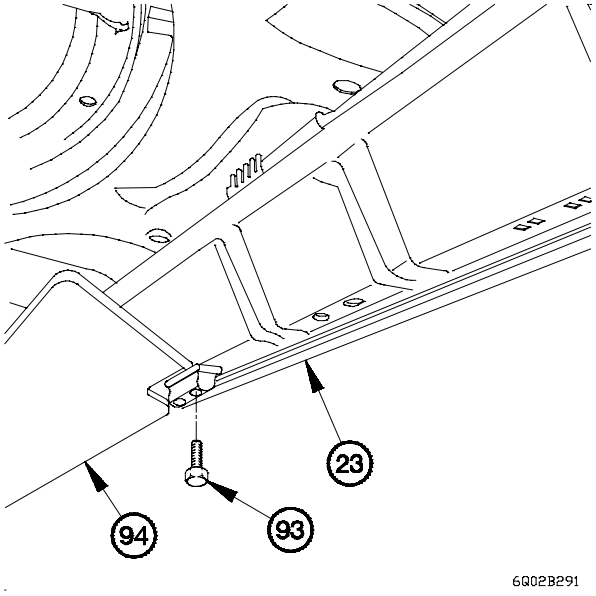
(42) Remove three grommets (86) from dashboard (4).

(43) Deleted.



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

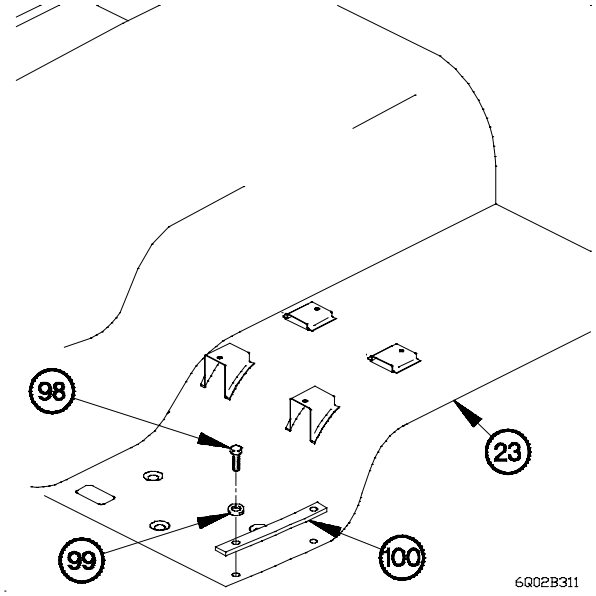
(45) Remove four screws (93) and sunvisor (94) from cab (23).



(46) Deleted.

(47) Deleted.

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

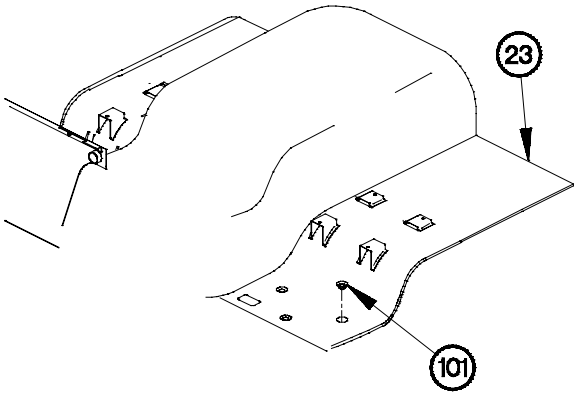


15-2. CAB REPLACEMENT (CONT)

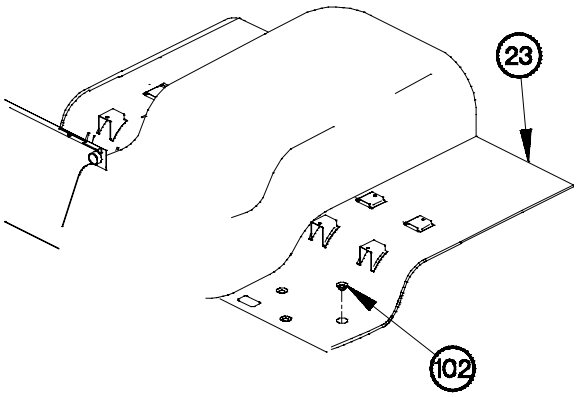
NOTE

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

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



6Q02B321



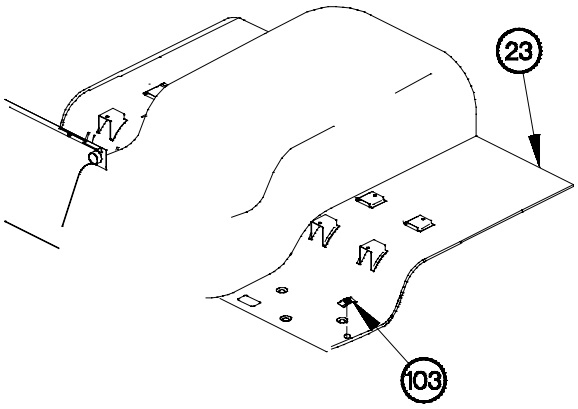
6Q02B331

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).



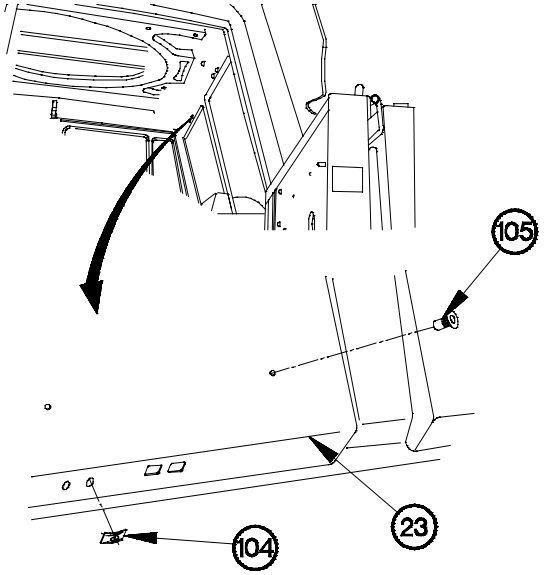
6Q02B341

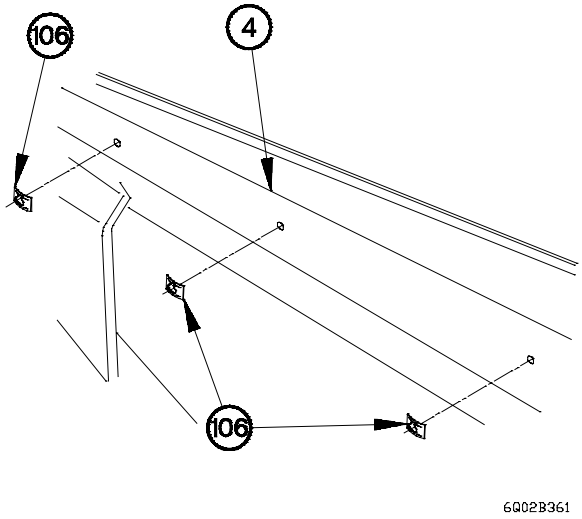
NOTE

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

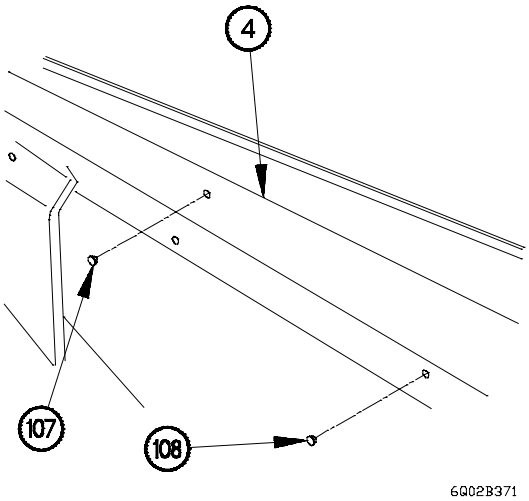
Perform step (55) on all models except M1093 and M1094.

(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

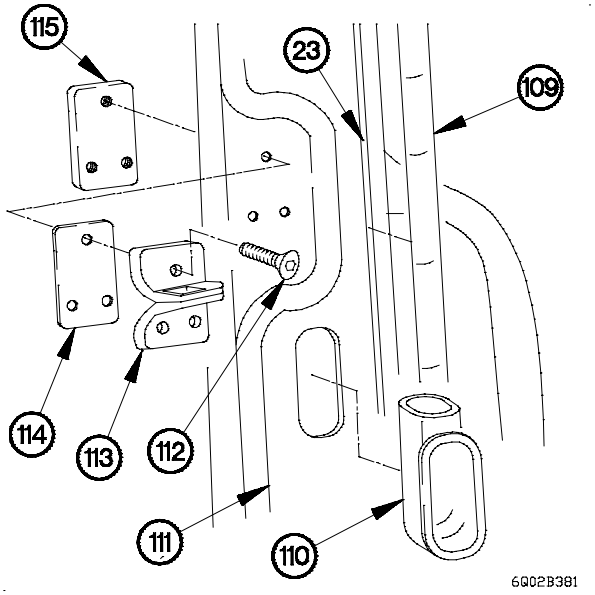
Left and right side door seals, check valve boots, and door strike catch plates are removed the same way. Left side shown.

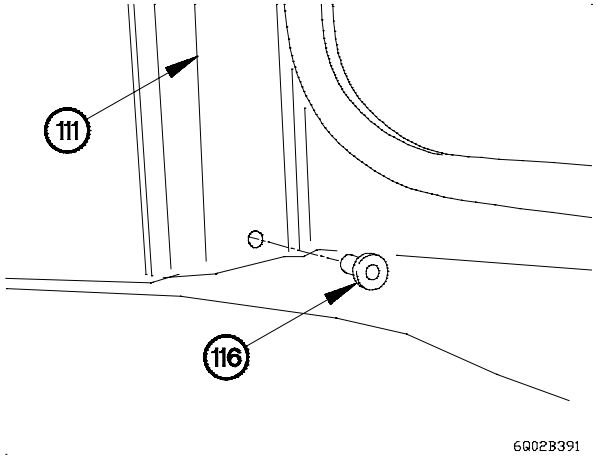
(57) Remove door seal (109) from cab (23). Discard door seal.

(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

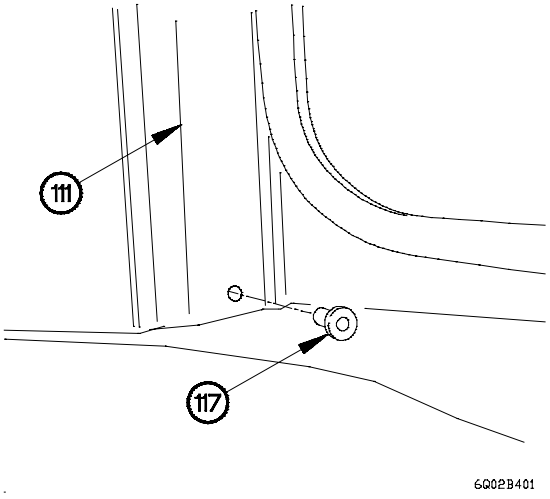
Perform step (61) on all models except M1093 and M1094.

(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

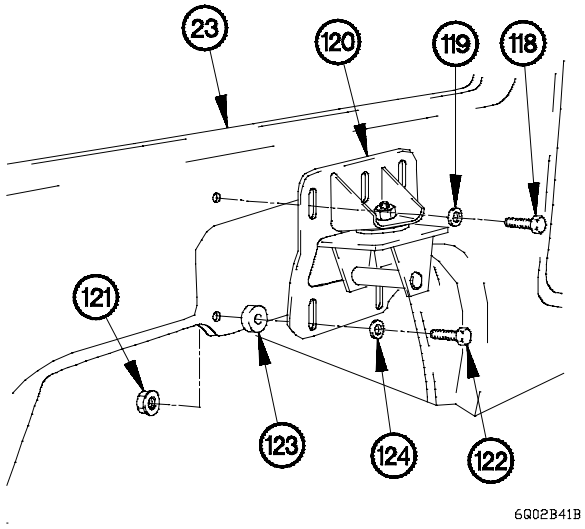
Perform step (64) on vehicles 0001 through 7167.

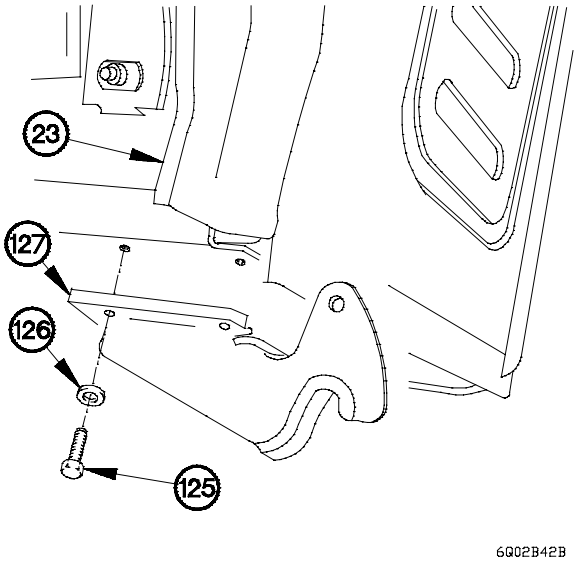
(64) Remove two self-locking nuts (121), screws (122), spacers (123), washers (124), and latch bracket (120) from cab (23). Discard self-locking nuts.

NOTE

Perform step (64.1) on vehicles 7168 and higher.

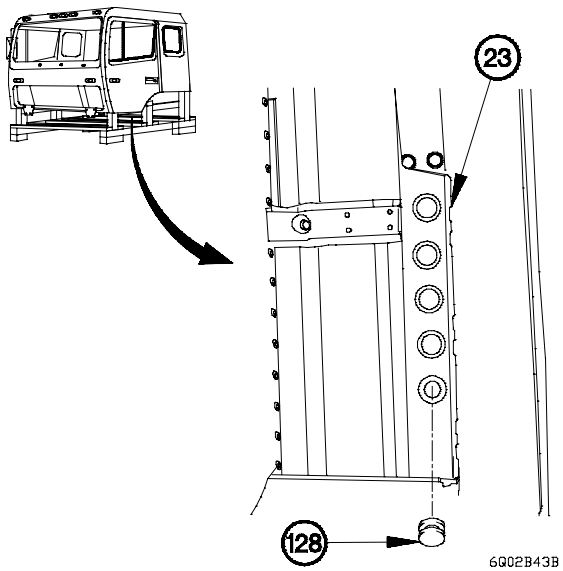
(64.1) Remove two self-locking nuts (121), screws (122), washers (124), and latch bracket (120) from cab (23). Discard self-locking nuts.



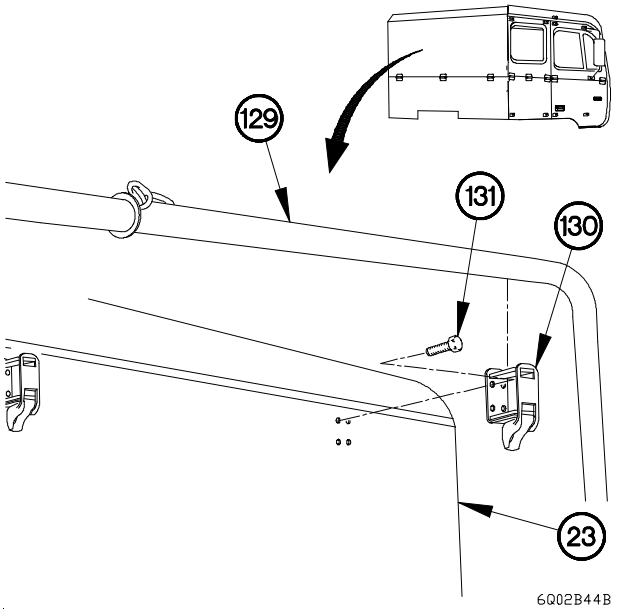


(65) Remove four screws (125), washers (126), and two cab latches (127) from cab (23).

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



15-2. CAB REPLACEMENT (CONT)

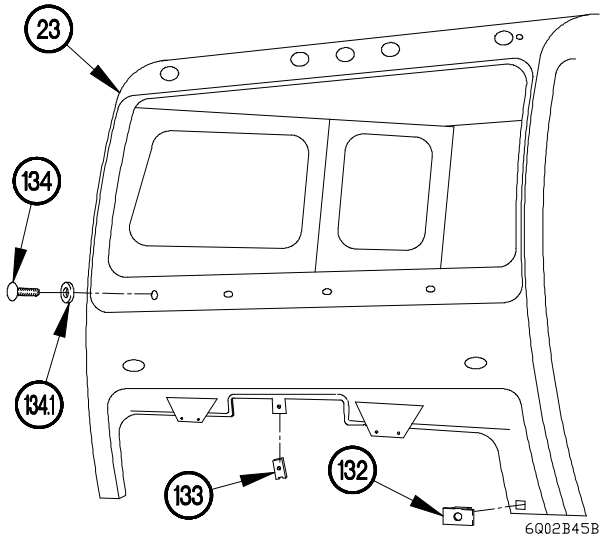


NOTE

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

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

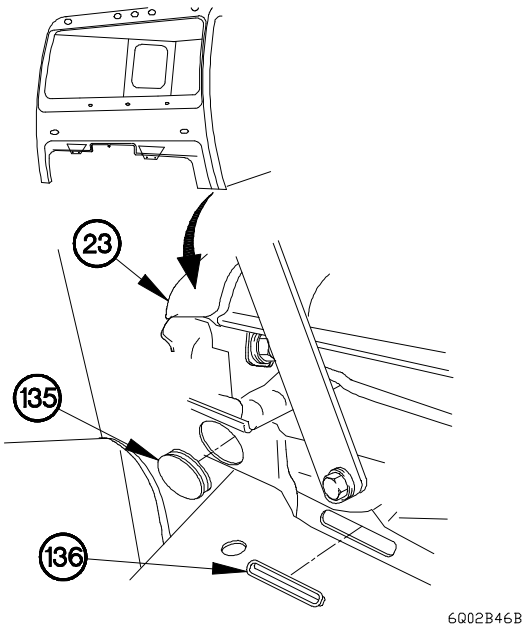
(68) Remove 12 screws (131) and three mounting brackets (130) from cab (23).



(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) and washers (134.1) from cab (23). Discard plastic plugs.



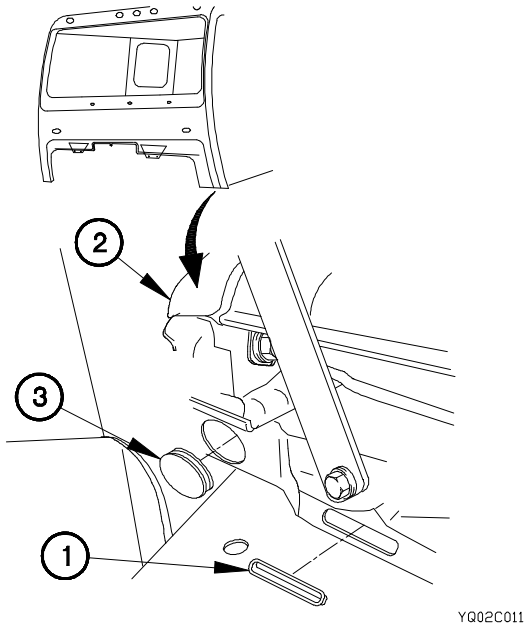
(72) Remove two plastic plugs (135) from cab (23). Discard plastic plugs.

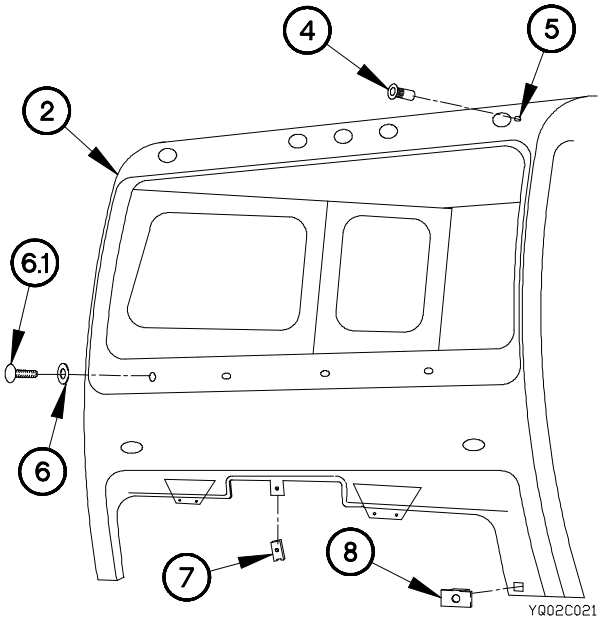
(73) Remove two rubber plugs (136) from cab (23). Discard rubber plugs.

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 washers (6) and plastic plugs (6.1) in cab (2).

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

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

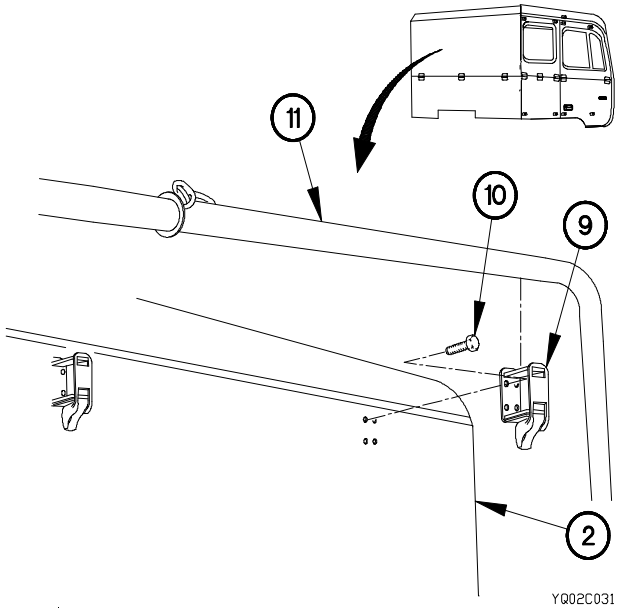
NOTE

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

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

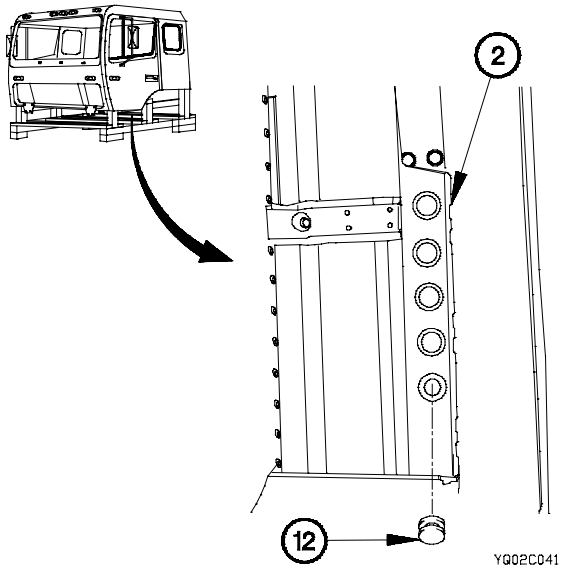
(8) Tighten 12 screws (10) to 36-44 lb-in. (4-5 N•m).

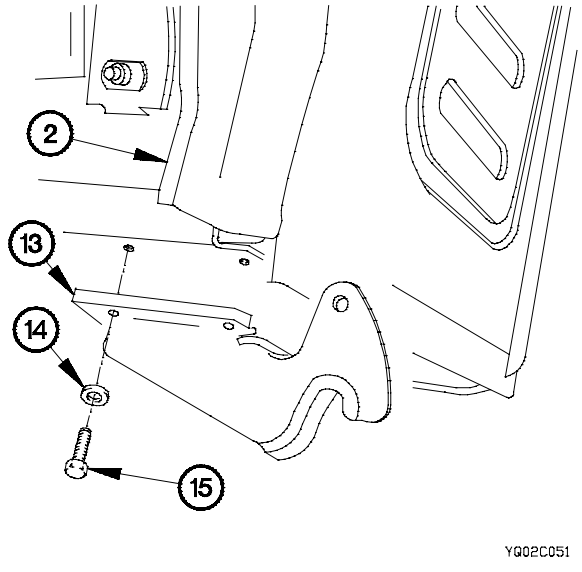
(9) Install davit (11) in mounting brackets (9).



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

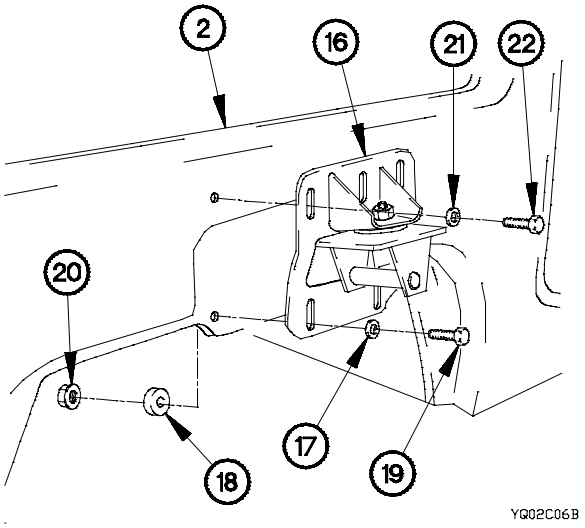
Perform step (13) on vehicles 0001 through 7167.

(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).

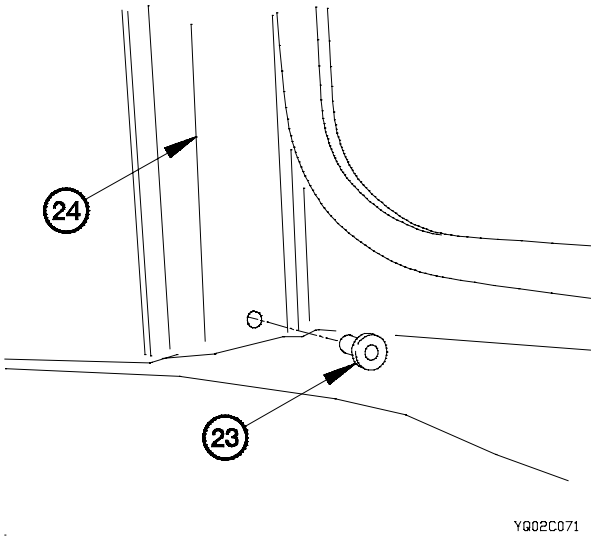
(16) Deleted.

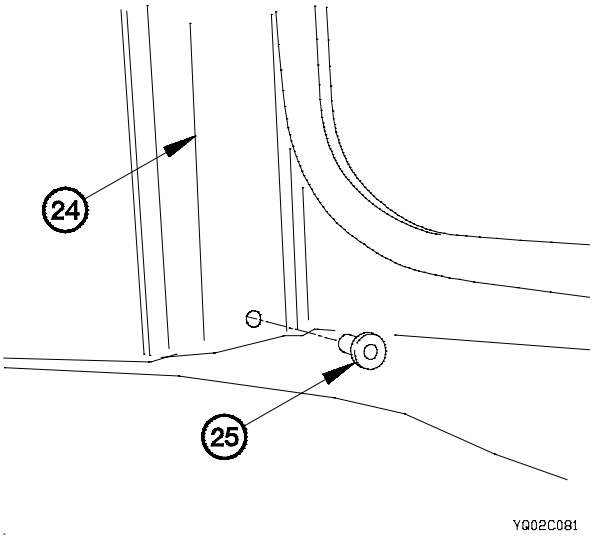


NOTE

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.

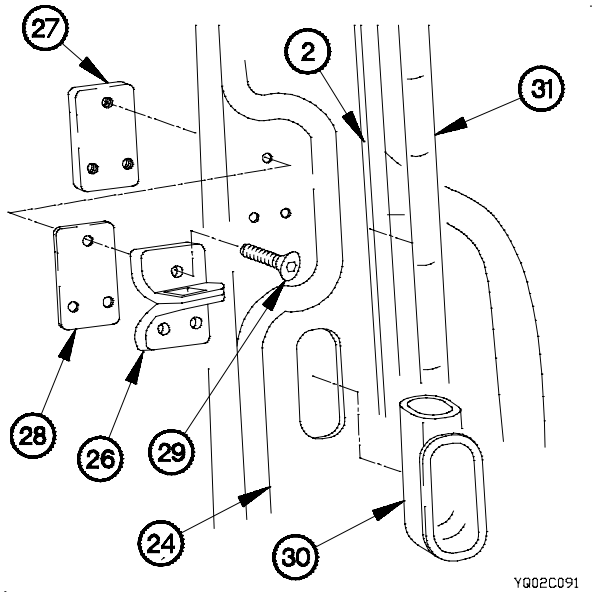
(19) Position catch strike plate (26) on door post (24) with threaded plate (27), shim (28), and three screws (29).

(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.

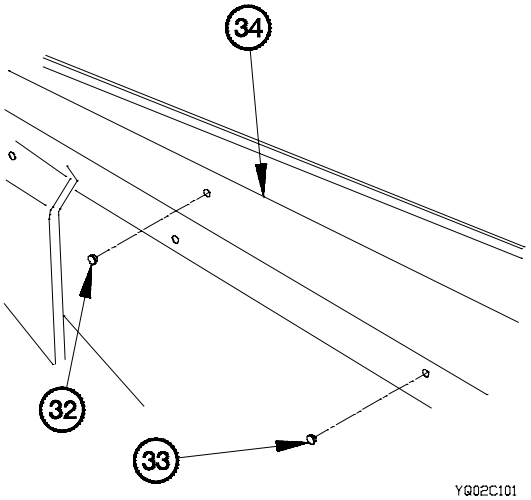


15-2. CAB REPLACEMENT (CONT)

NOTE

Perform step (24) on M1093 and M1094.

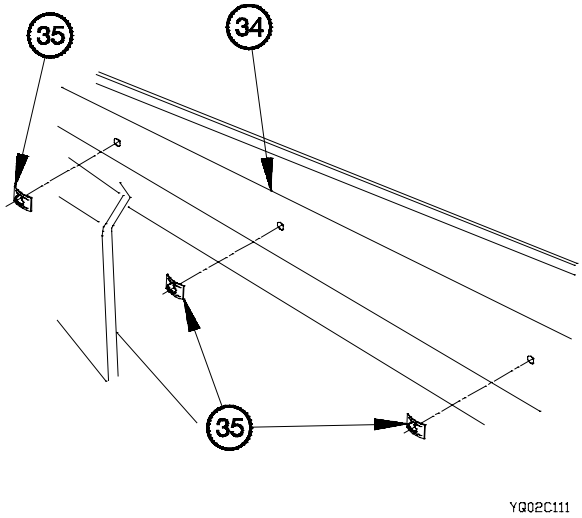
(24) Install 13 plugs (32) and four plugs (33) in dashboard (34).



NOTE

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

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



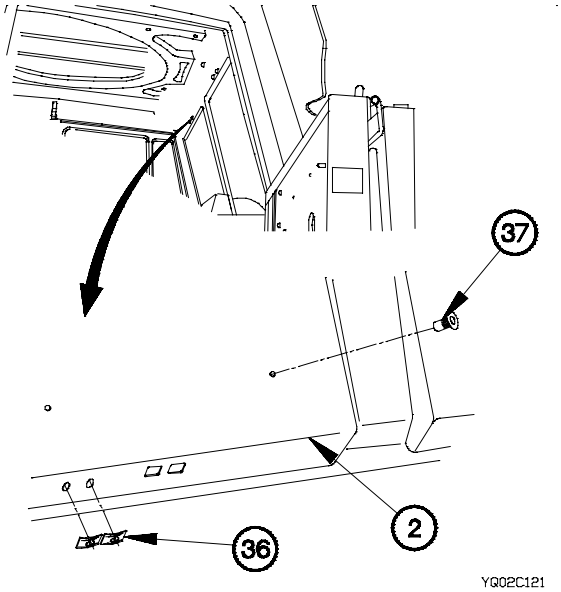
(26) Install 12 expansion nuts (35) in dashboard (34).

NOTE

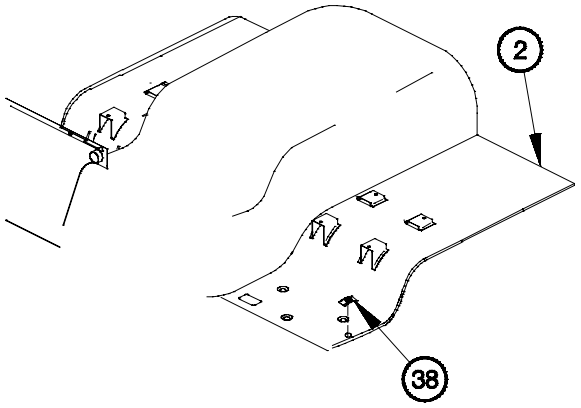
Perform steps (27) and (28) on all models except M1093 and M1094.

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

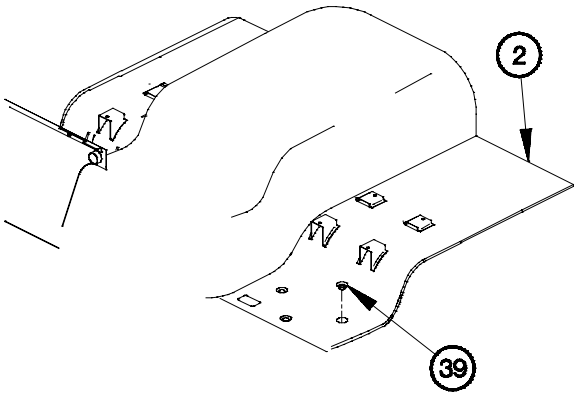
(28) Install five clinch nuts (37) in cab (2).



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



YQ02C131



YQ02C141

NOTE

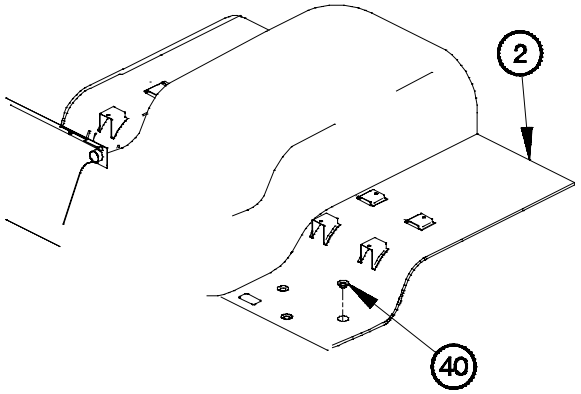
Perform step (30) on M1093 and M1094.

(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).

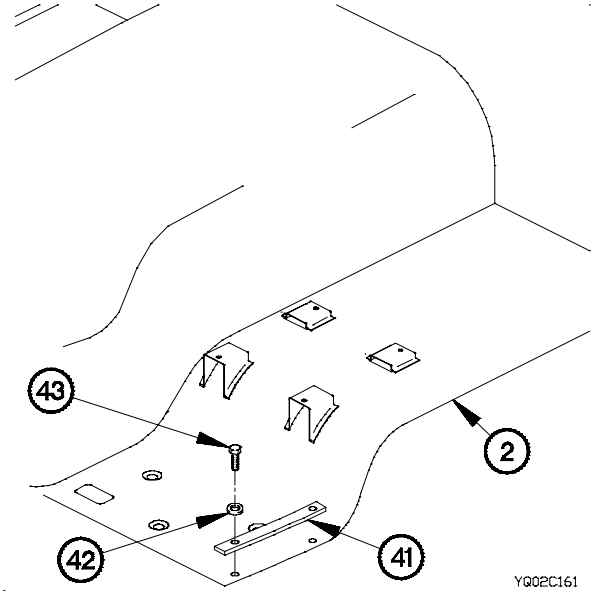


YQ02C151

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).



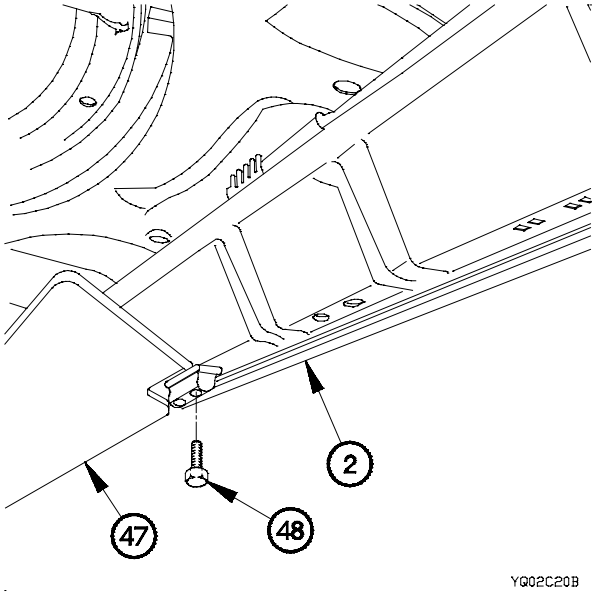
(34) Deleted.

(35) Deleted.

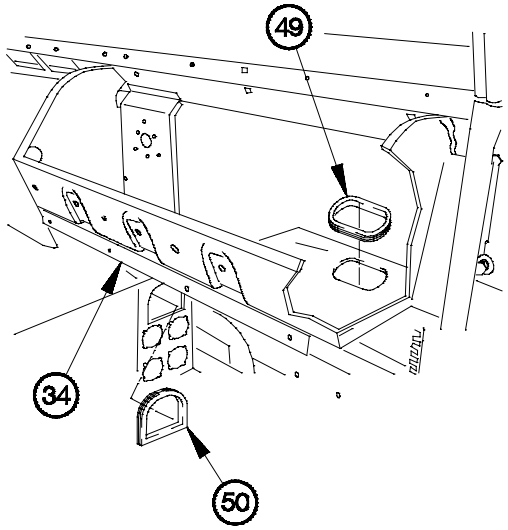
(36) Deleted.

(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.

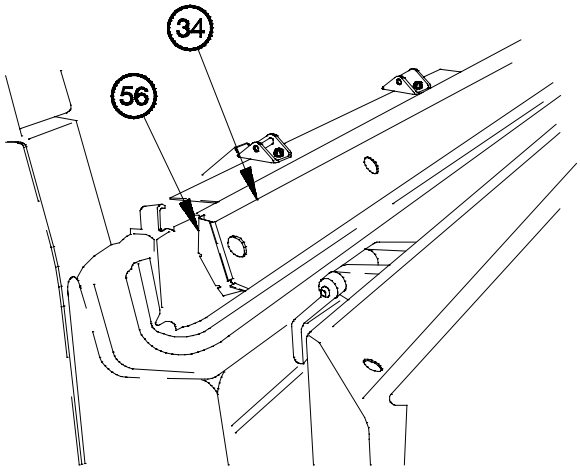
(42) Deleted.

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.



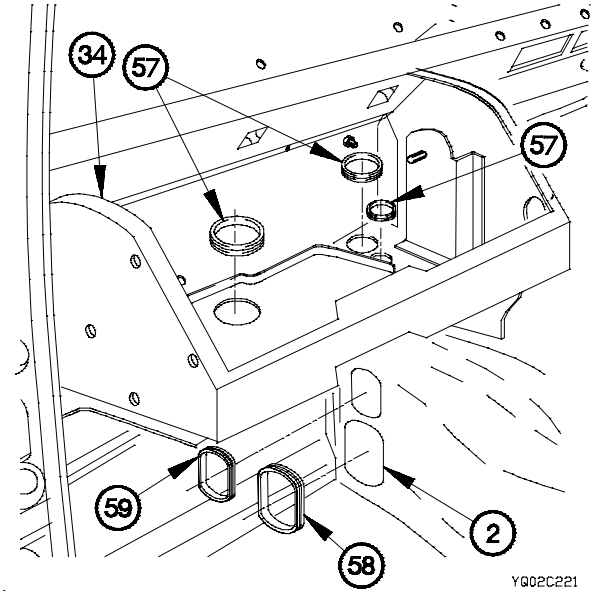
(43) Apply adhesive to two diverters (56).

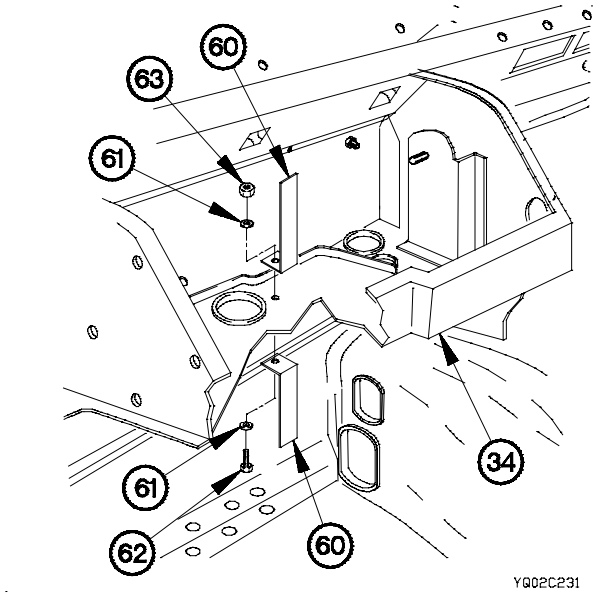
(44) Install two diverters (56) in dashboard (34).

15-2. CAB REPLACEMENT (CONT)

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

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



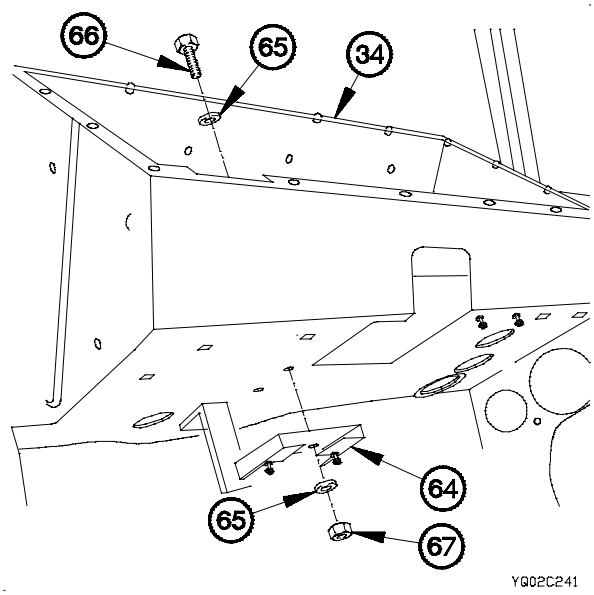


(47) Position two brackets (60) on dashboard (34) with two washers (61), screw (62), and nut (63).

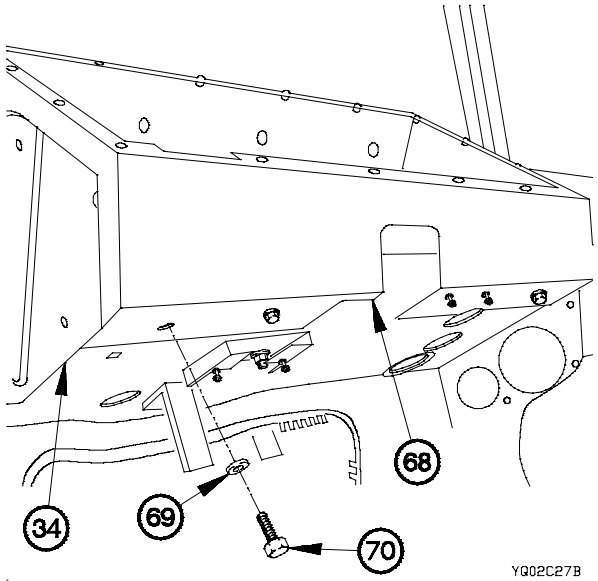
(48) Tighten nut (63) to 62-75 lb-in. (7-8 N·m).

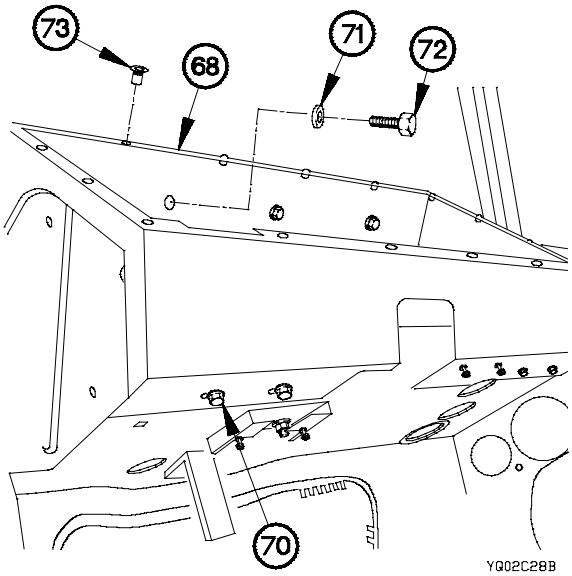
(49) Position bracket (64) on dashboard (34) with four washers (65), two screws (66), and nuts (67).

(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).

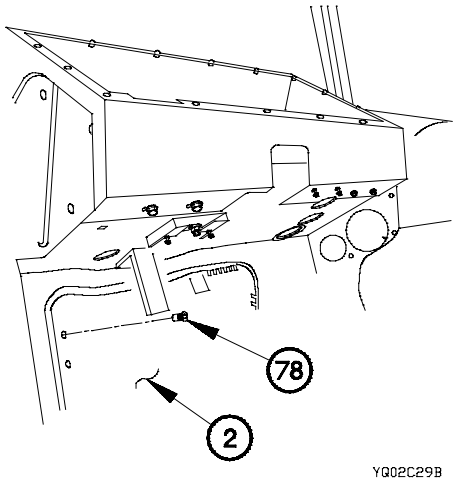
(54) Tighten three screws (70) to 48-60 lb-in. (5-7 N·m).

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

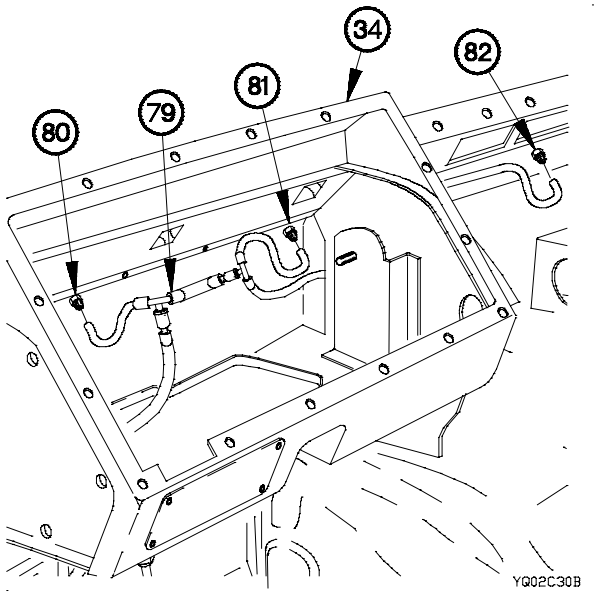
(56) Deleted.

(57) Deleted.

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

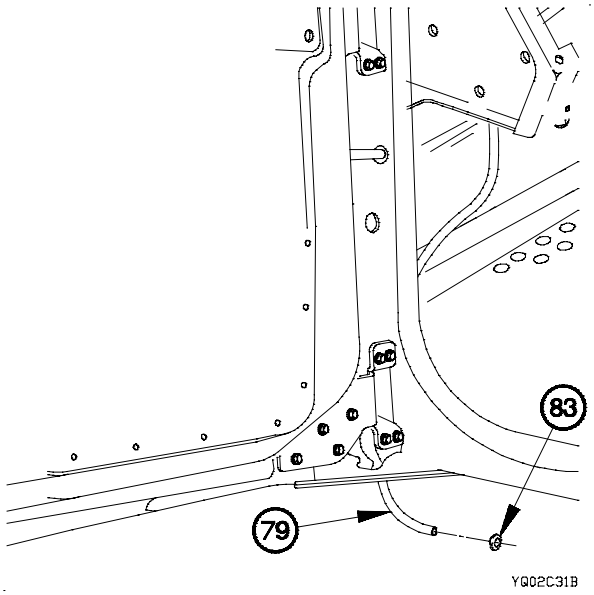


15-2. CAB REPLACEMENT (CONT)

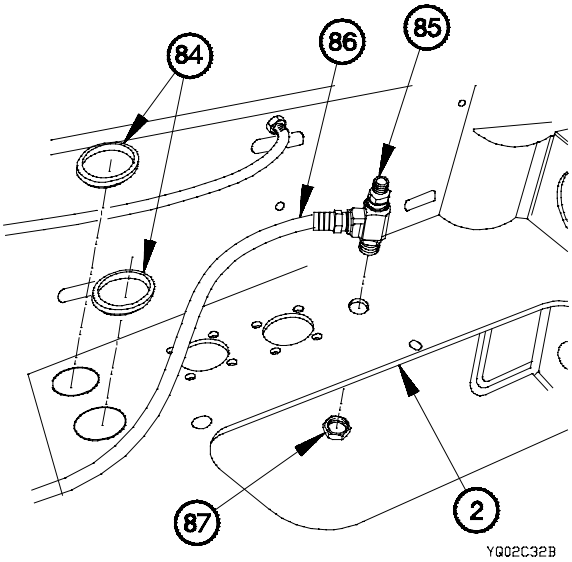


(59) Position window washer hose (79) in dashboard (34).

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



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



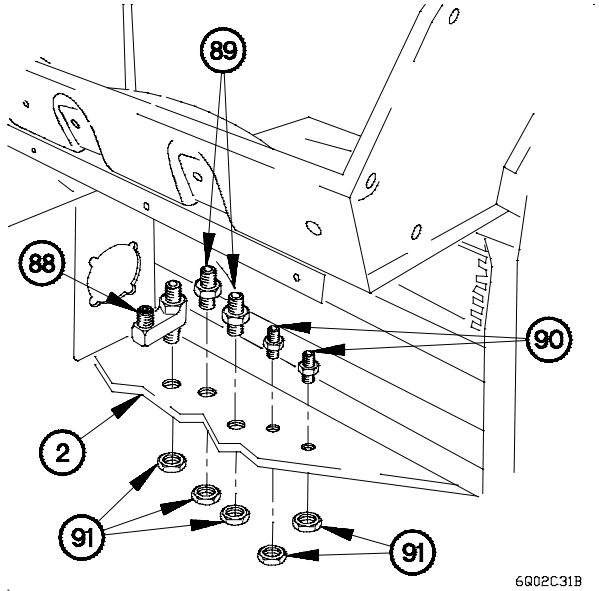
(62) Install two grommets (84) in cab (2).

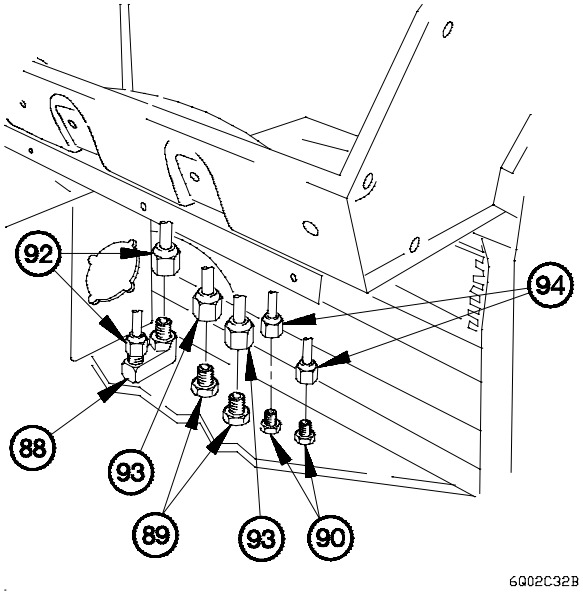
(63) Install tee fitting (85) and hose (86) in cab (2) with nut (87).

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).

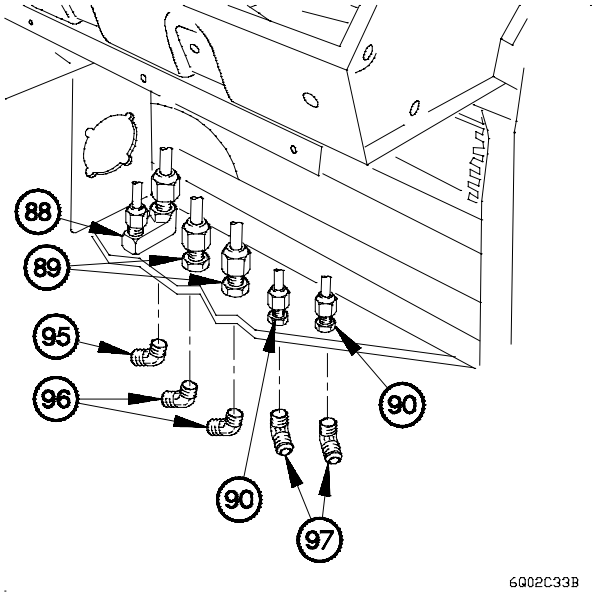
(66) Install two hoses (93) on fittings (89).

(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).

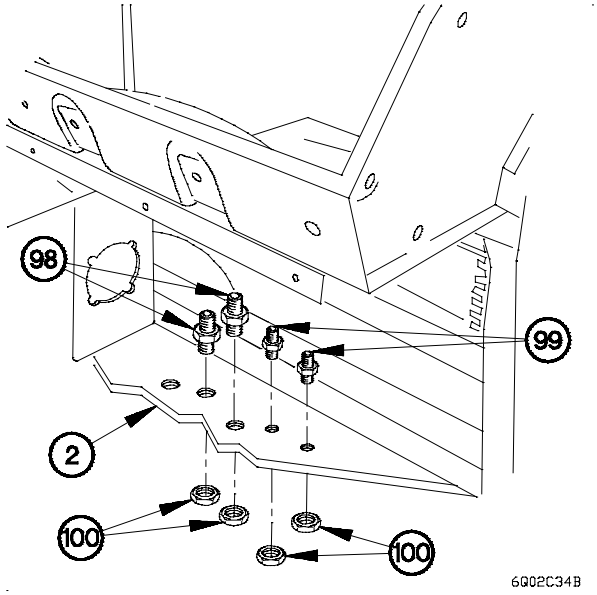


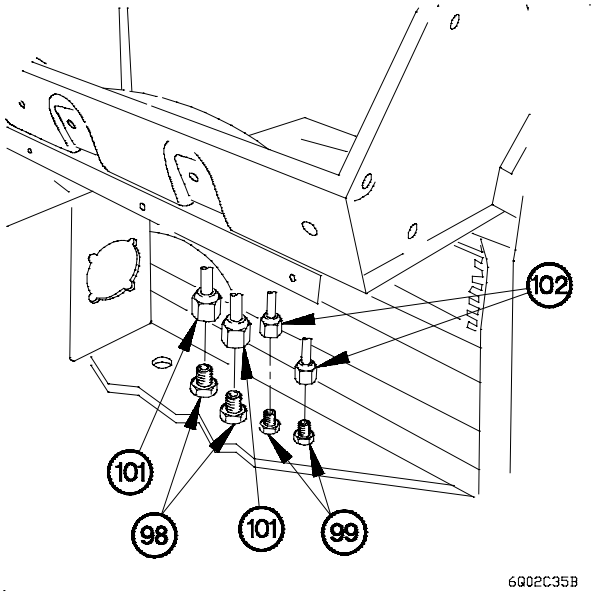
15-2. CAB REPLACEMENT (CONT)

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).



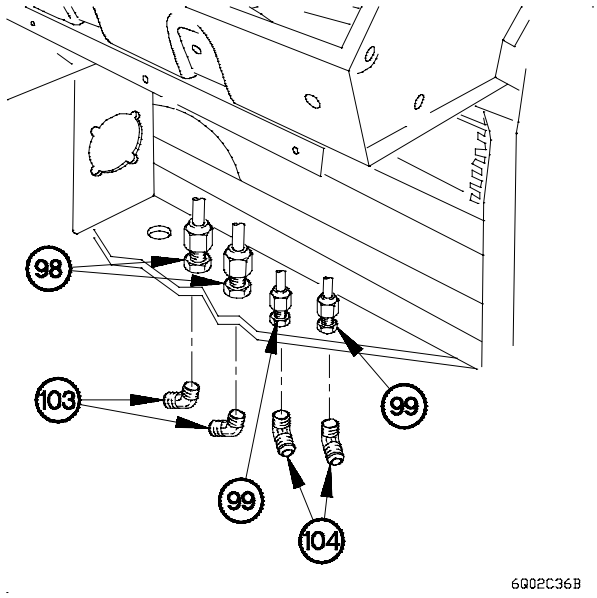


(72) Install two hoses (101) on fittings (98).

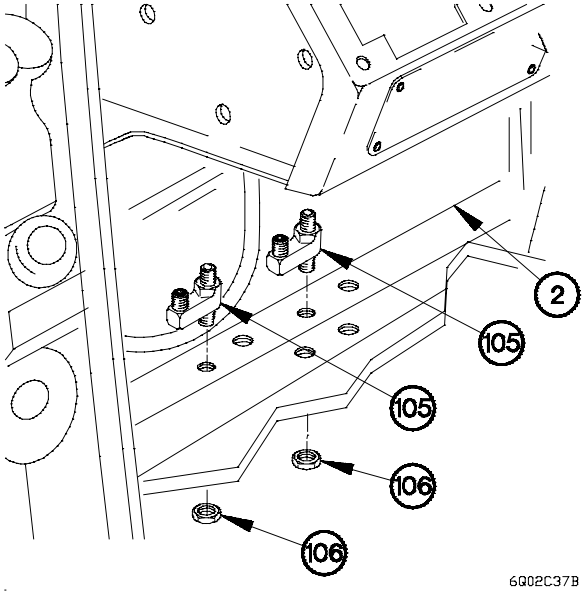
(73) Install two hoses (102) on fittings (99).

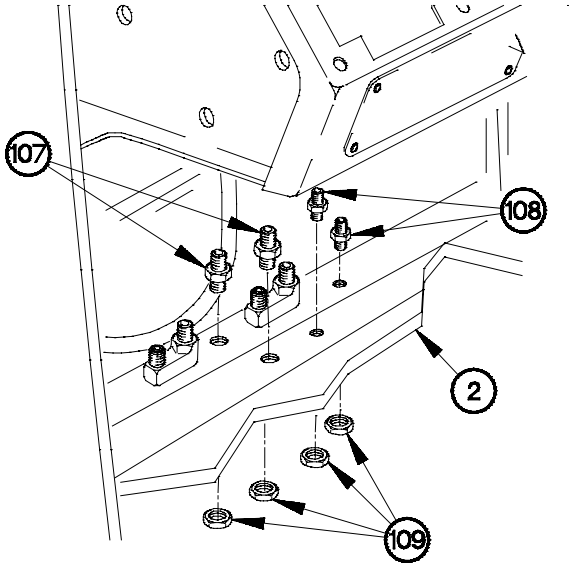
(74) Install two 45-degree fittings (103) in fittings (98).

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



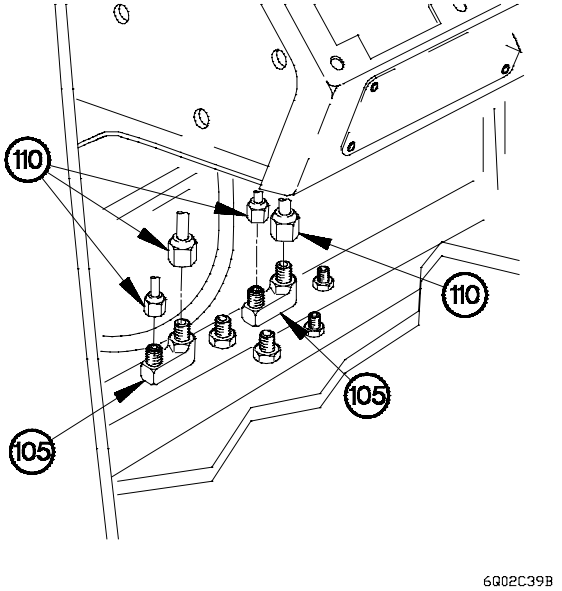
(76) Install two fittings (105) in cab (2) with two nuts (106).





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

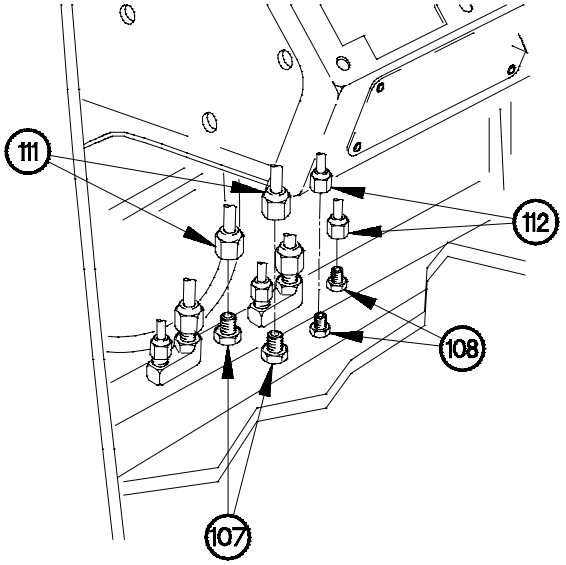
(78) Install four hoses (110) on two fittings (105).



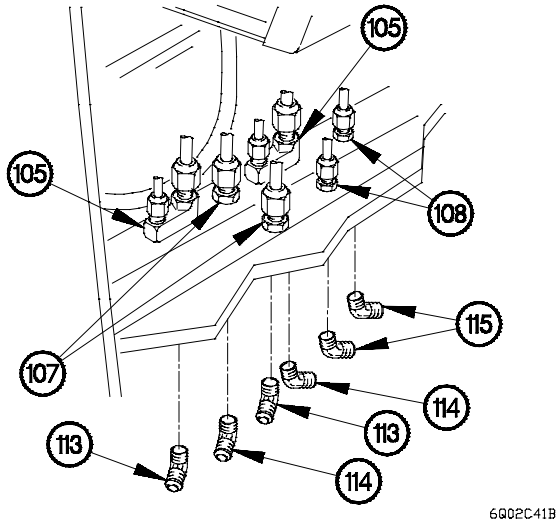
15-2. CAB REPLACEMENT (CONT)

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

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



6Q02C40B



6Q02C41B

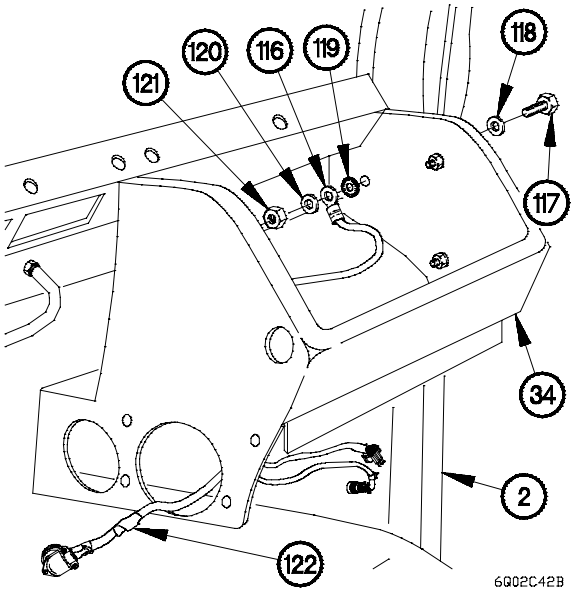
(81) Install two 45-degree fittings (113) in fittings (105).

(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).



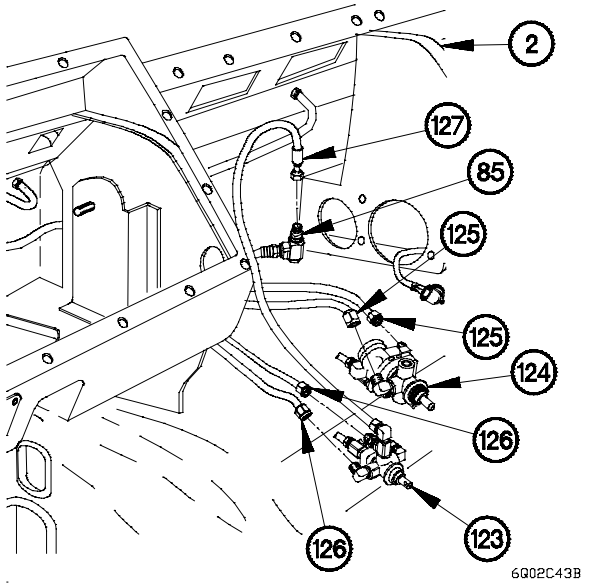
6Q02C42B

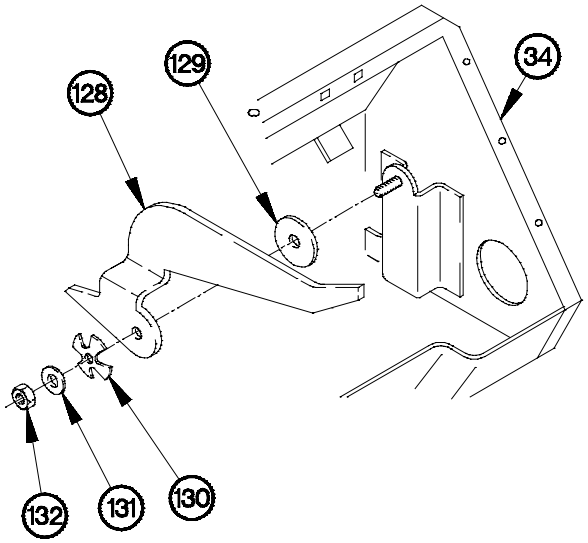
(86) Position trailer air supply valve (123) and system park valve (124) in cab (2).

(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).

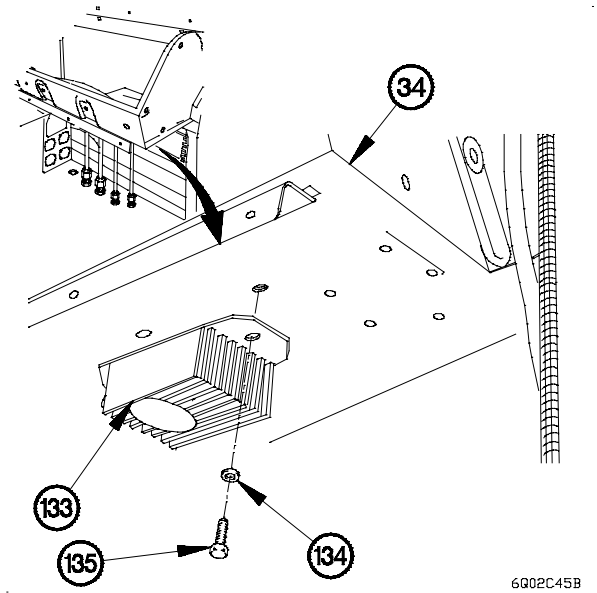




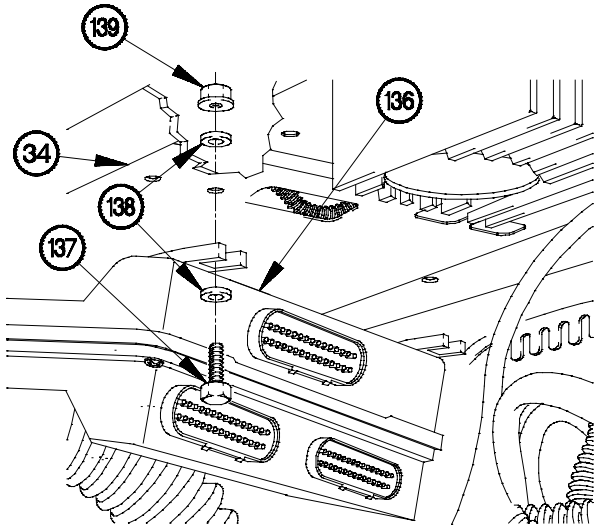
(90) Position manual throttle lever (128) on dashboard (34) with friction disk (129), spring washer (130), washer (131), and self-locking nut (132).

(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)

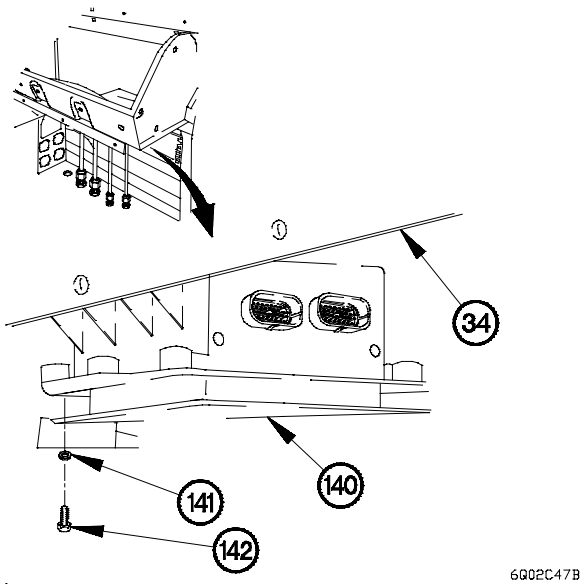


6Q02C46B

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).

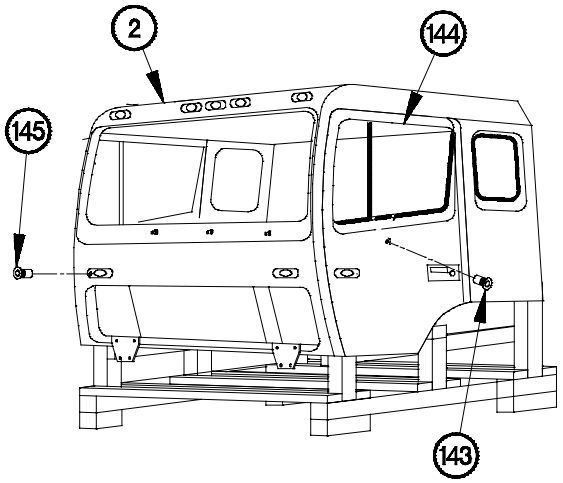


6Q02C47B

NOTE

Perform step (94) on WTEC II vehicles.

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



6Q02C48B

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

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

d. Installation.

WARNING

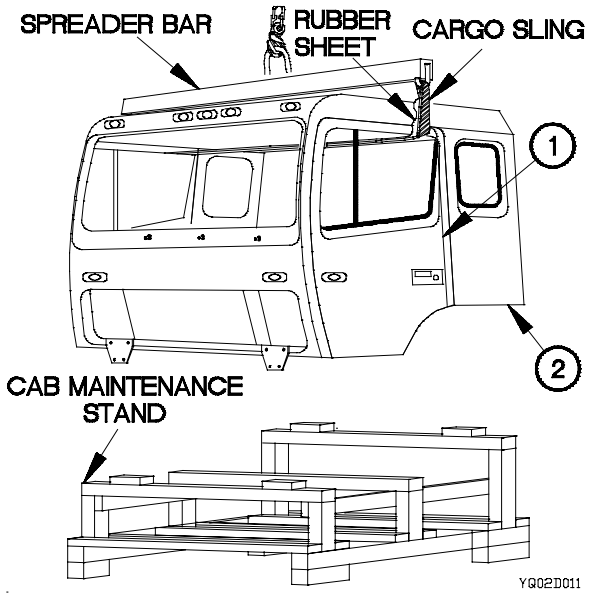
Standard cab weighs approximately 1400 lbs (636 kgs). M1093/M1094 cab weighs approximately 1700 lbs (772 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in serious injury or death to personnel or damage to equipment.

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)

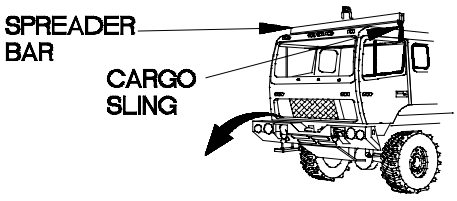
CAUTION

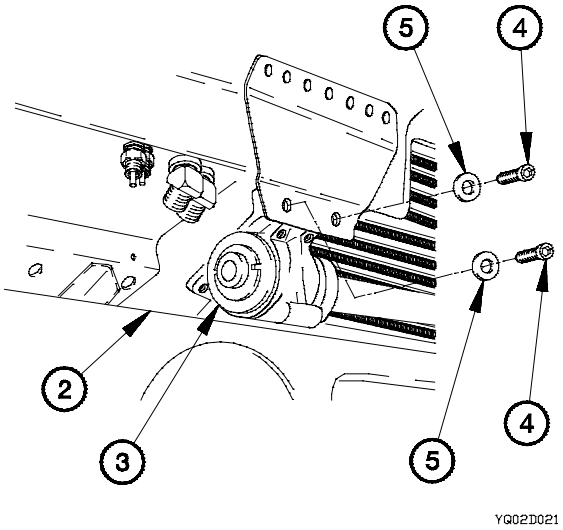
Lower cab straight down to clear radiator. Failure to comply may result in damage to equipment.

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).



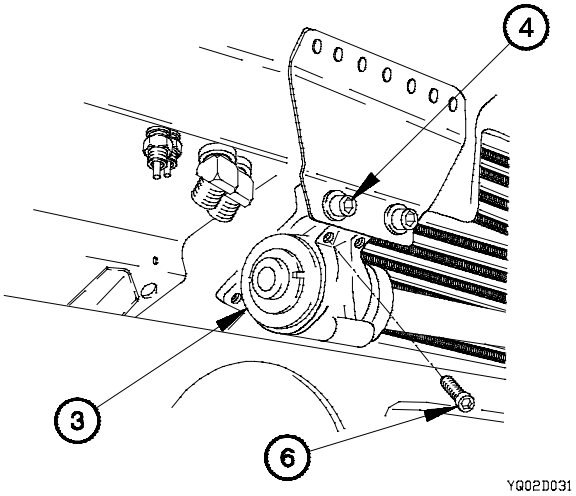


WARNING

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.

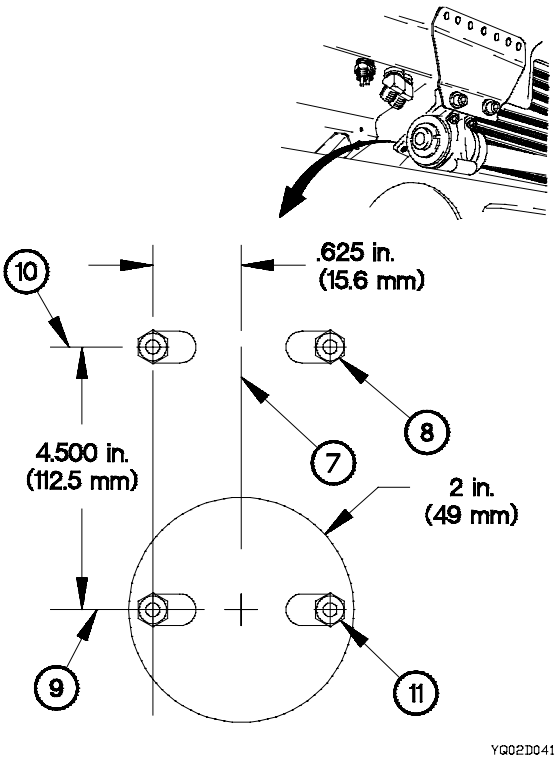
(10) Measure and mark a line (7) half way, 0.625 in. (15.6 mm), between two forward weld nuts (8).

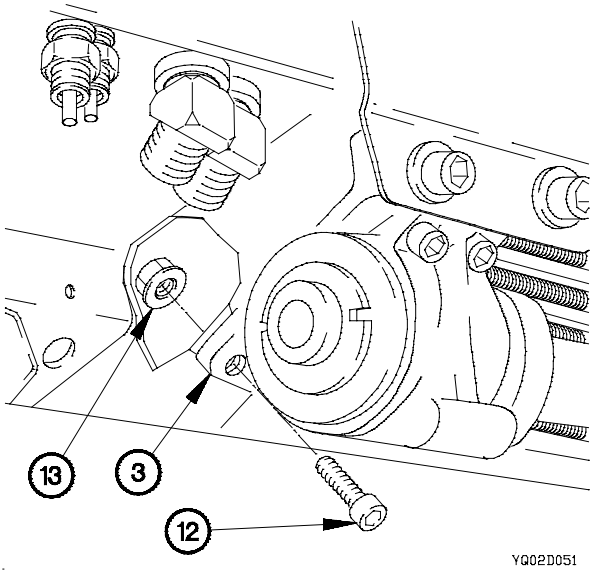
(11) Measure and mark a line (9), 4.500 in. (112.5 mm), in back from front weld nuts (8) on line (10).

(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.





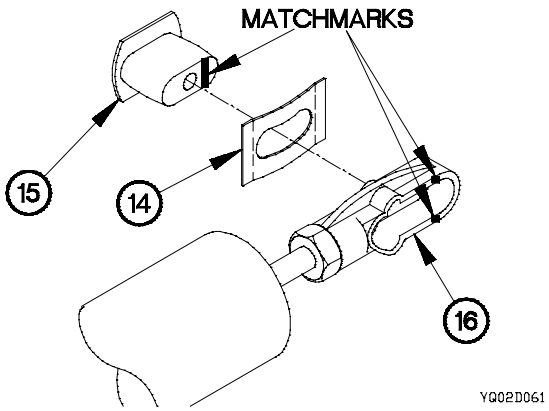
NOTE

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)

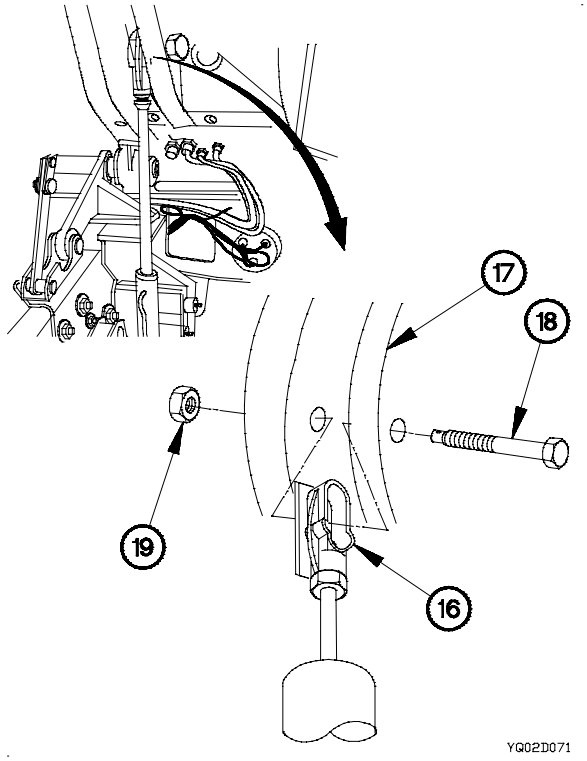
CAUTION

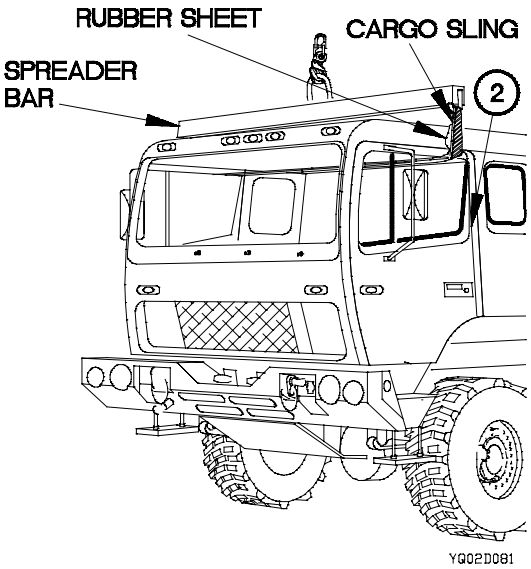
Align arrow on top of tilt cylinder to point toward front of cab. Failure to comply may result in damage to equipment.

(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).



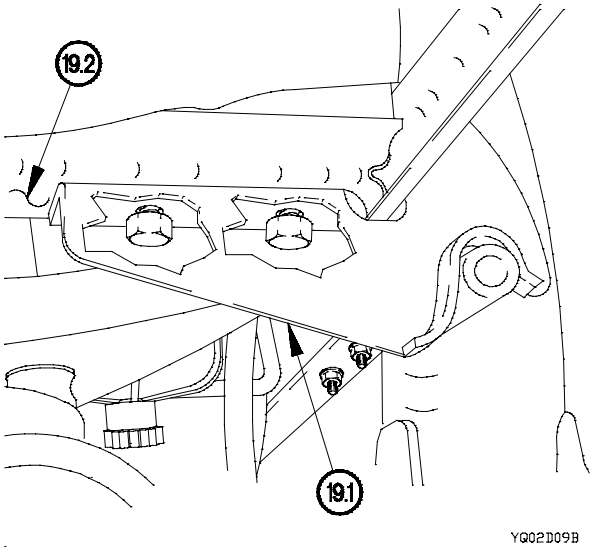


(21) Remove spreader bar, cargo sling and rubber sheet from cab (2).

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.

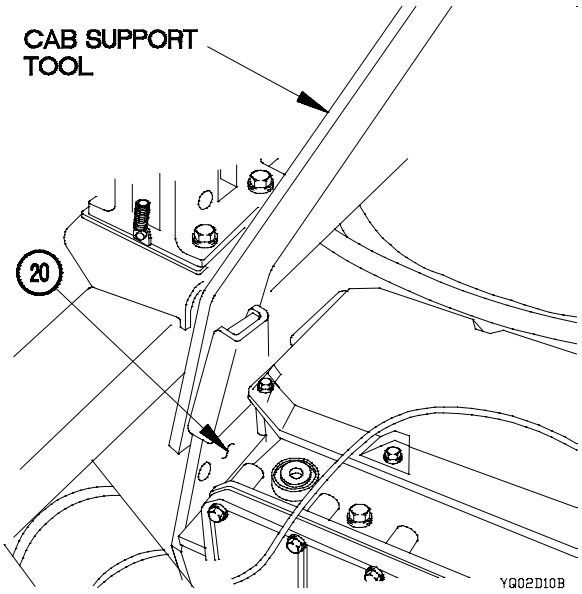
(21.1) Adjust cab latch (19.1) on latch supports (19.2).



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.

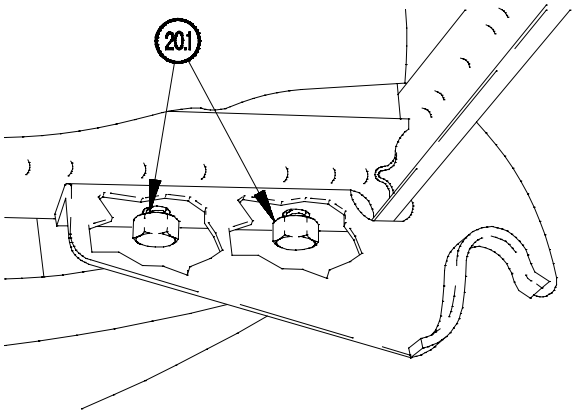
(22) Raise cab enough to install cab support tool on engine rear lifting eye (20) (TM 9-2320-366-10-1).



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.

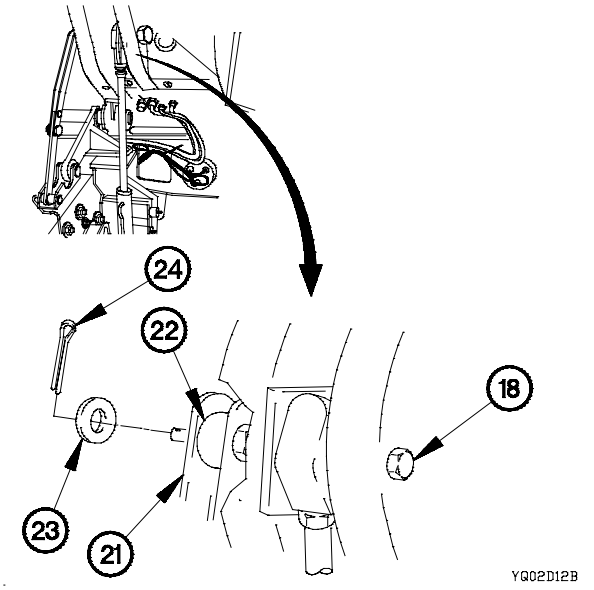
(23) Lower cab on cab support tool (TM 9-2320-366-10-1).



CAUTION

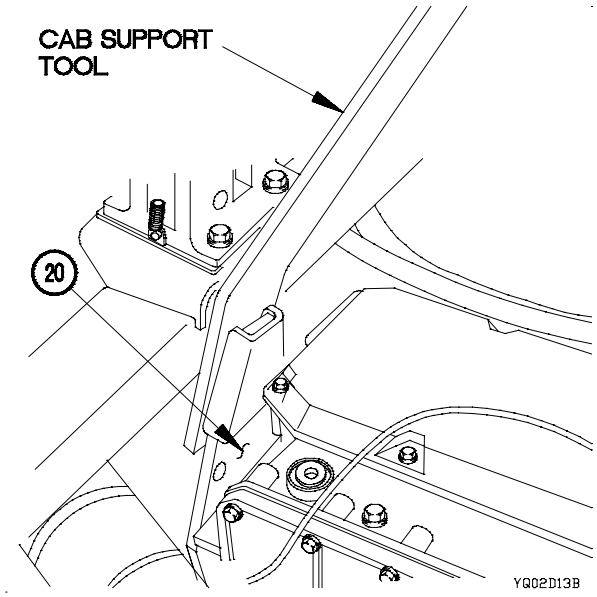
Do not allow cab latch to change position while tightening screws. Failure to comply may result in damage to equipment.

(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).



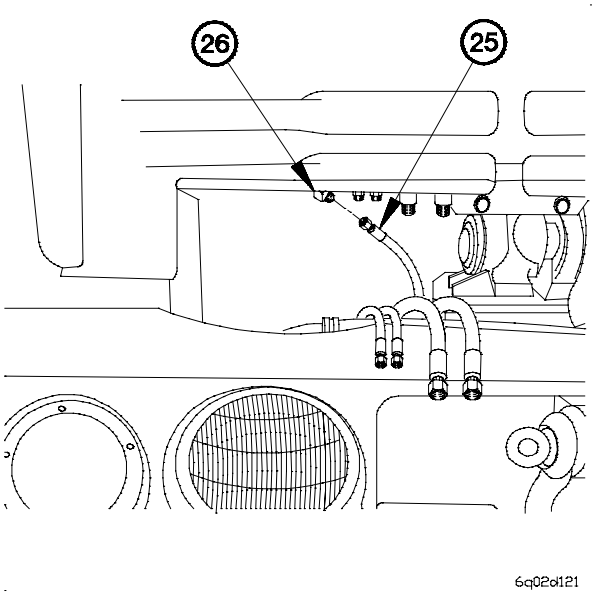
(26) Remove cab support tool from engine rear lifting eye (20).

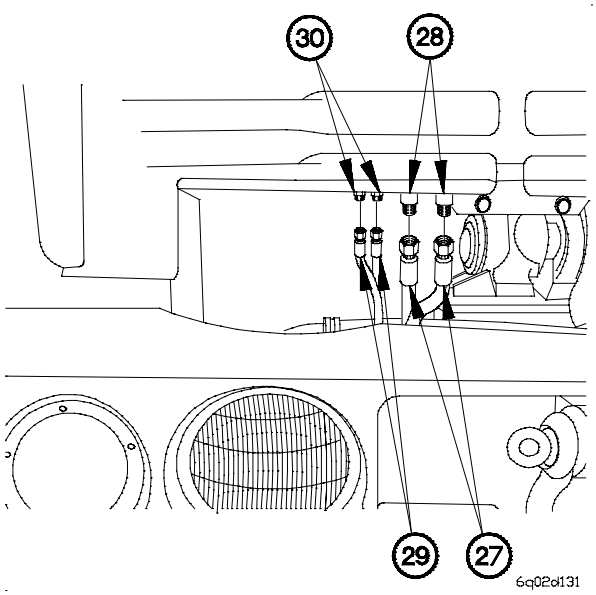
15-2. CAB REPLACEMENT (CONT)

NOTE

Perform step (27) on M1088.

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

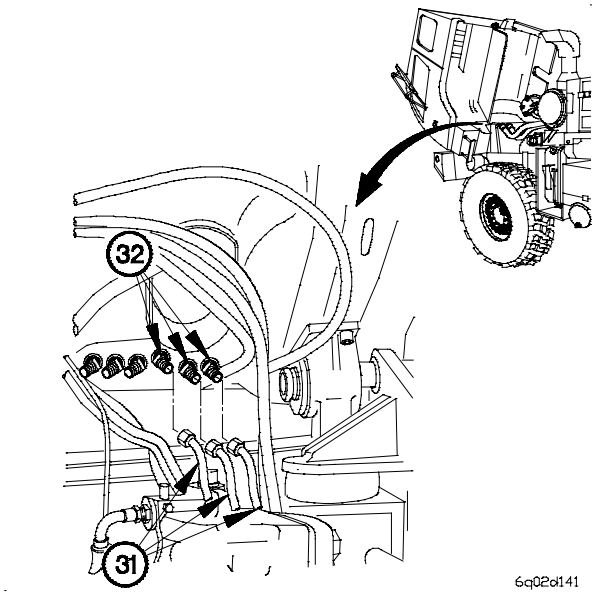




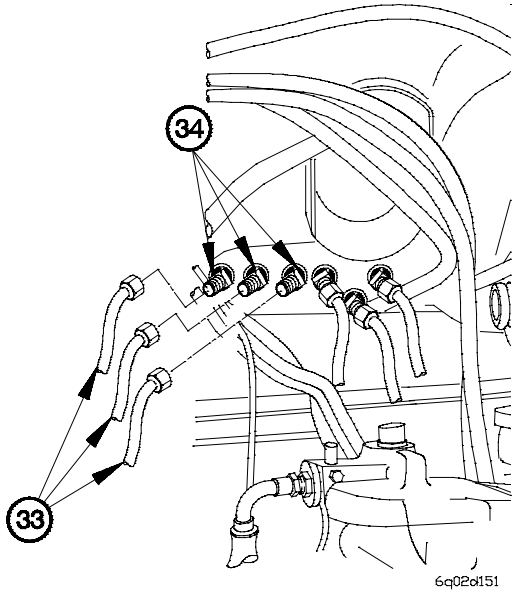
(28) Connect two pneumatic hoses (27) to fittings (28).

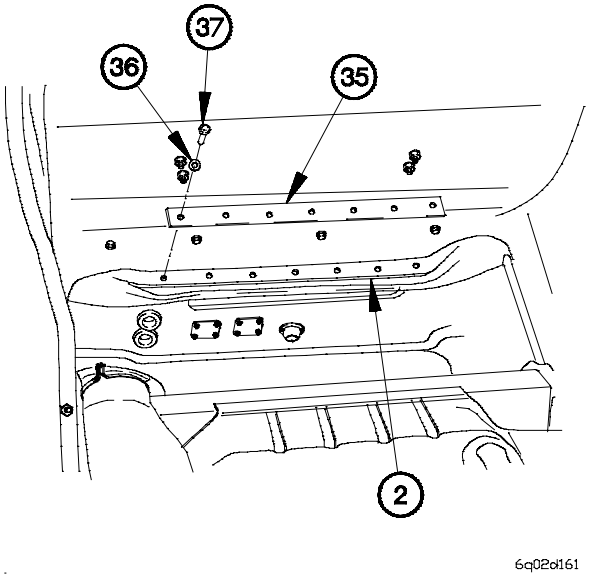
(29) Connect two pneumatic hoses (29) to 45-degree fittings (30).

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



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



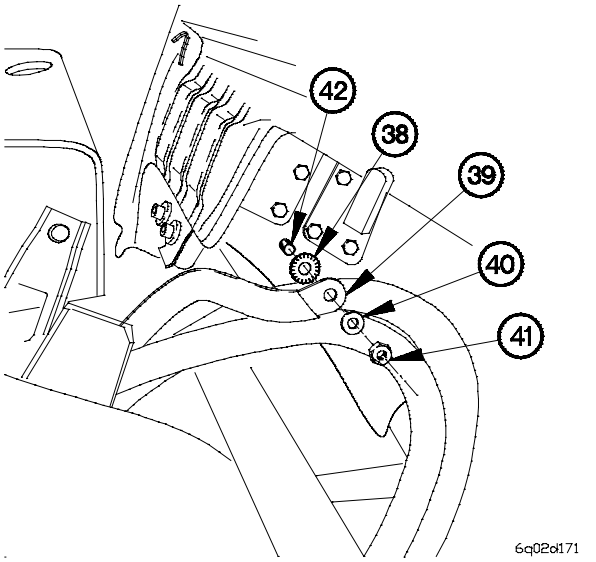


(32) Install baffle (35) on cab (2) with seven washers (36) and rivets (37).

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).

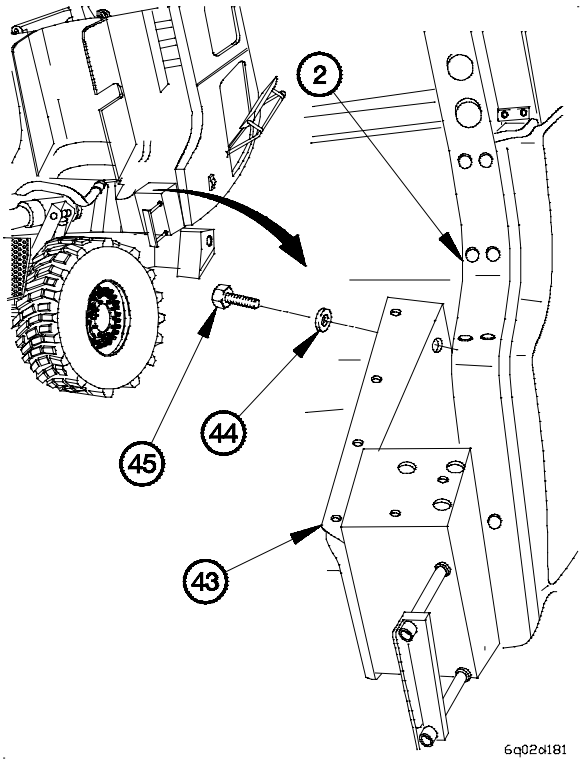


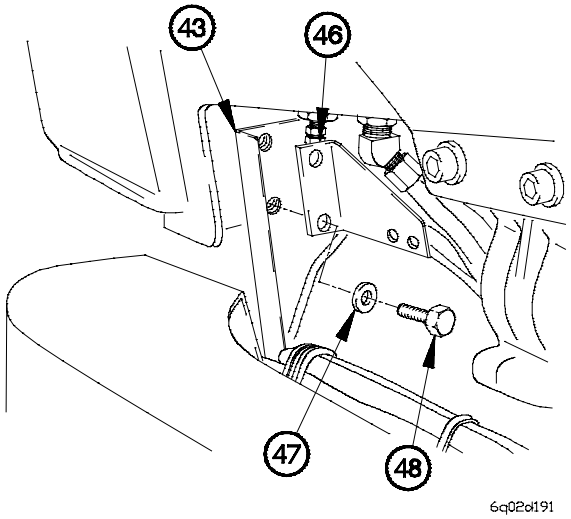
15-2. CAB REPLACEMENT (CONT)

NOTE

Step (34) requires the aid of an assistant.

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



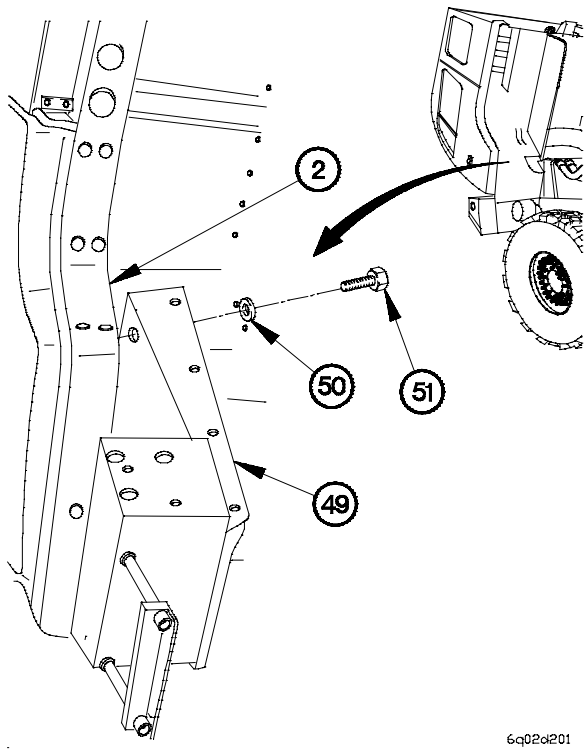


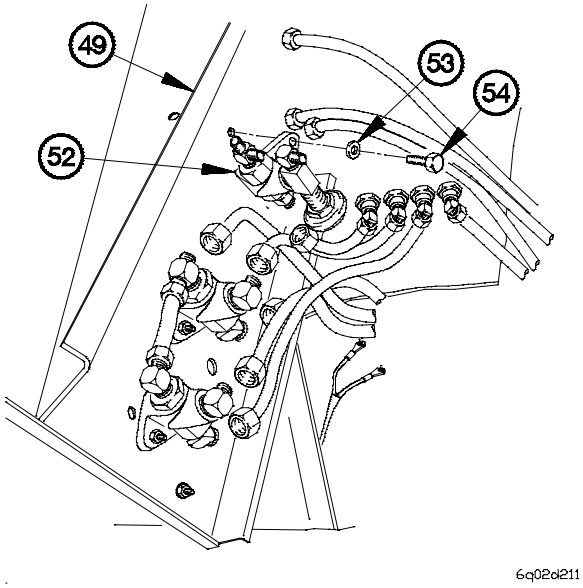
(35) Install bracket (46) on step mount (43) with two washers (47) and screws (48).

NOTE

Step (36) requires the aid of an assistant.

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



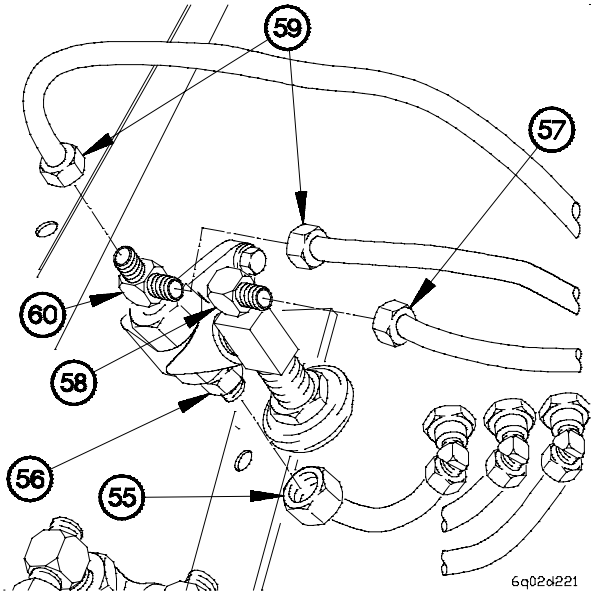


(37) Install valve (52) on step mount (49) with washer (53) and screw (54).

(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).

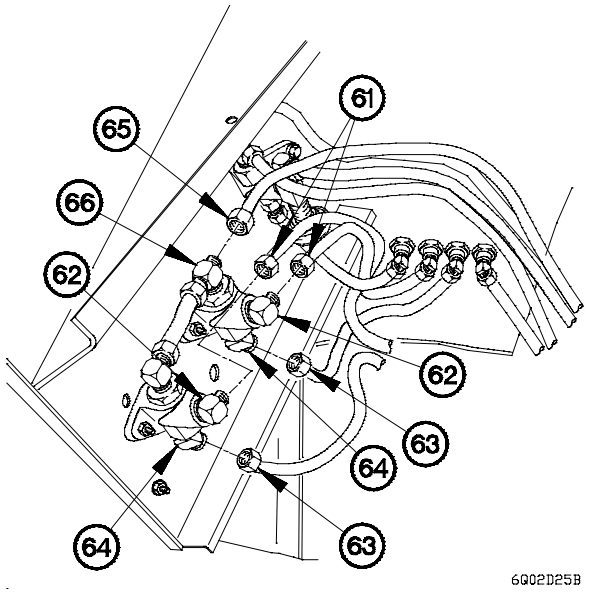


15-2. CAB REPLACEMENT (CONT)

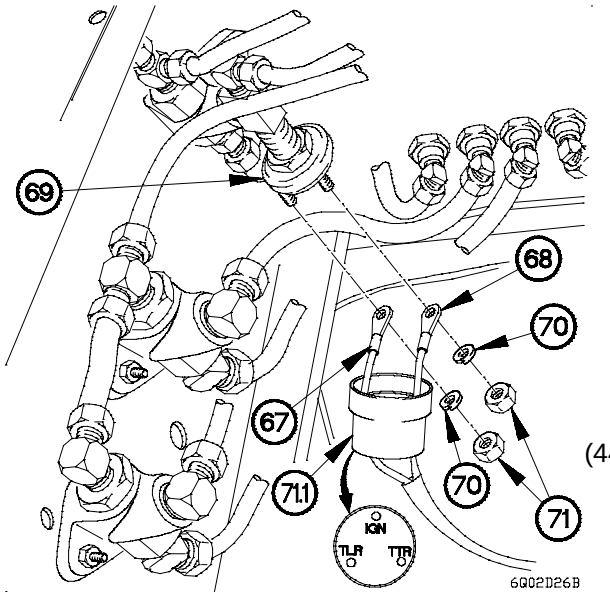
(41) Connect two hoses (61) to 90-degree fittings (62).

(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).

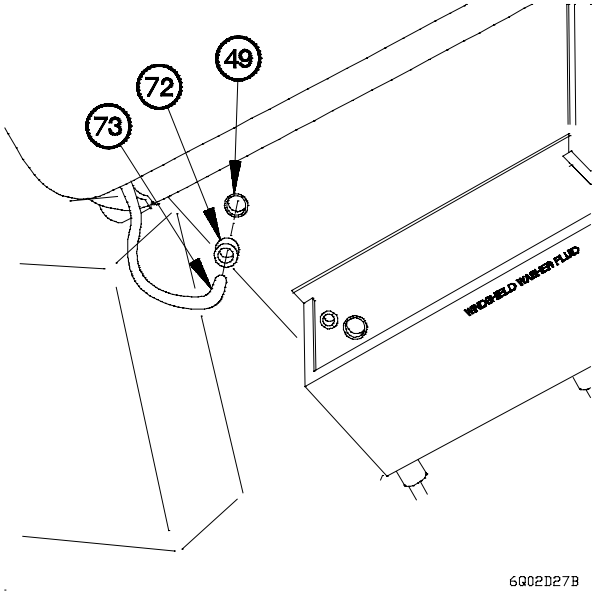
NOTE

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).

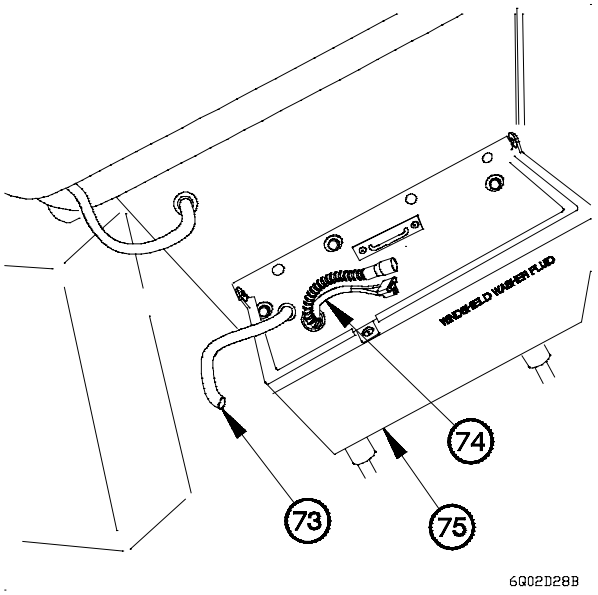
(45) Position grommet (72) and hose (73) in step mount (49).

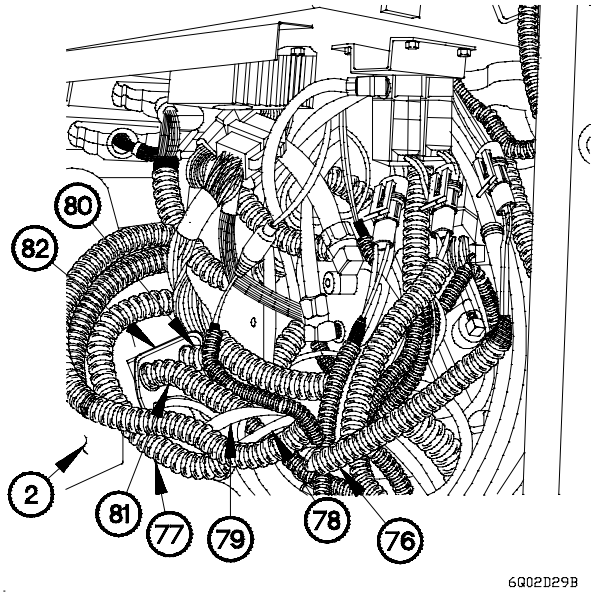


(46) Position windshield washer pump/EMI cable assembly (74) in step (75).

(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.

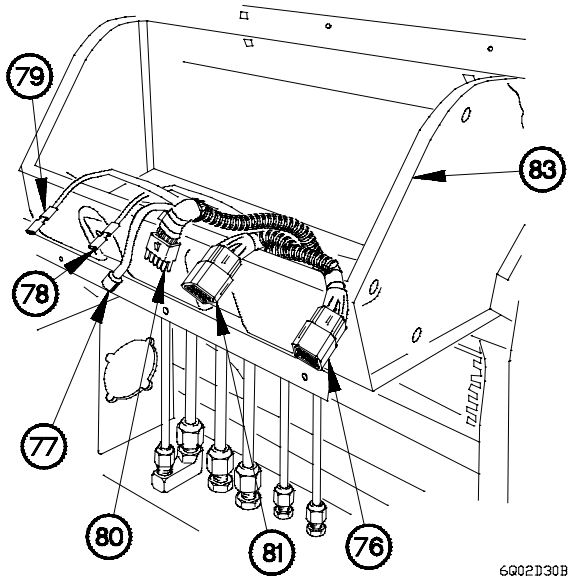
(52) Route crane/dump power cable assembly (76) inside dashboard (83).

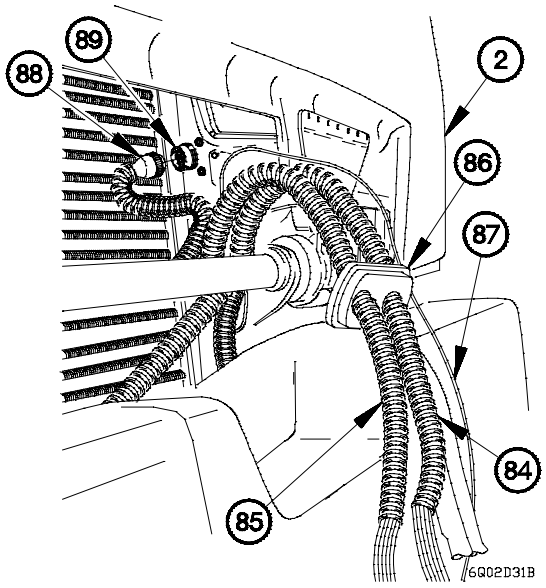
NOTE

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

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).

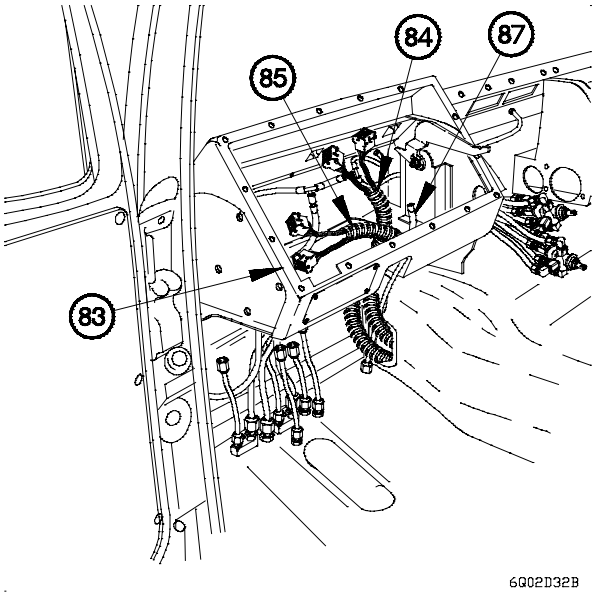
(57) Connect connector P119 (88) to connector J119 (89).

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).



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)

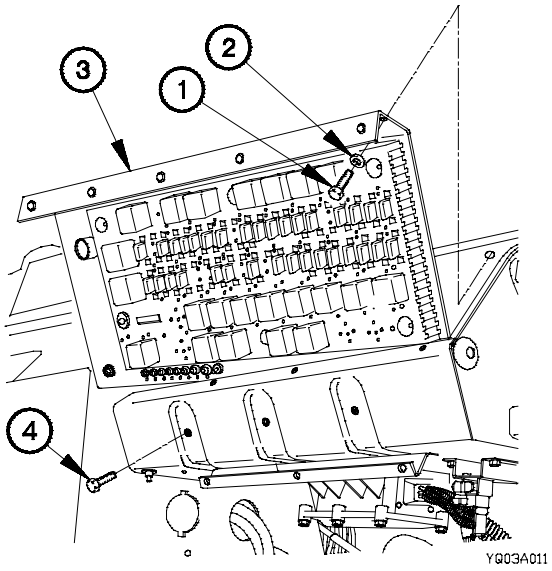
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

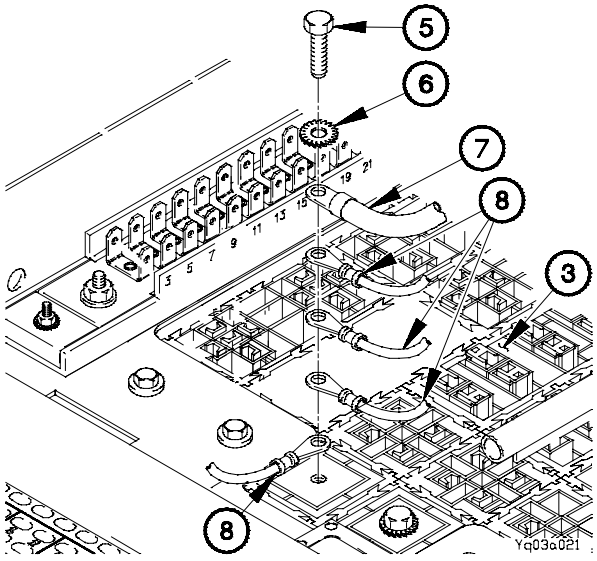
a. Removal.

(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

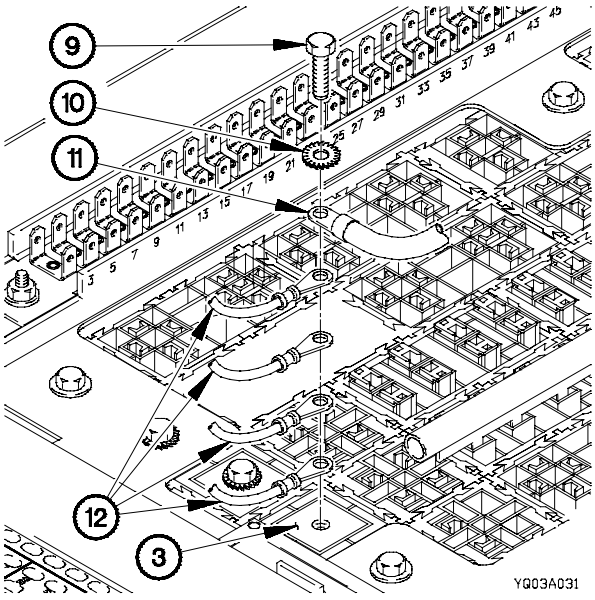
Tag connectors and connection points prior to disconnecting.

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

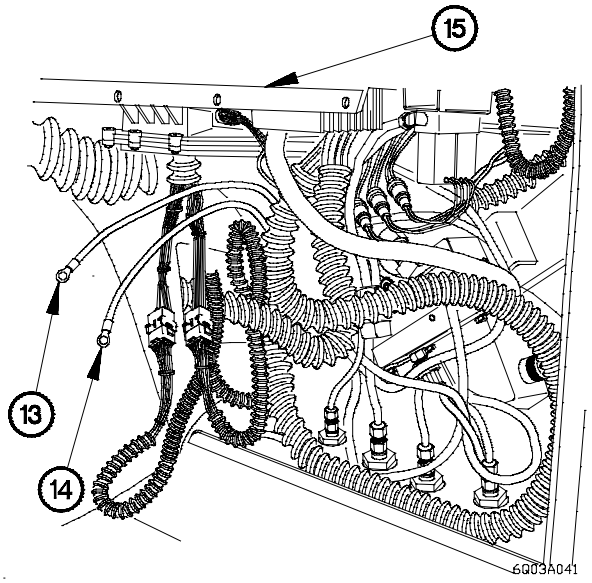
(5) Position four terminal lugs (8) and screw (5) on power distribution panel (3).

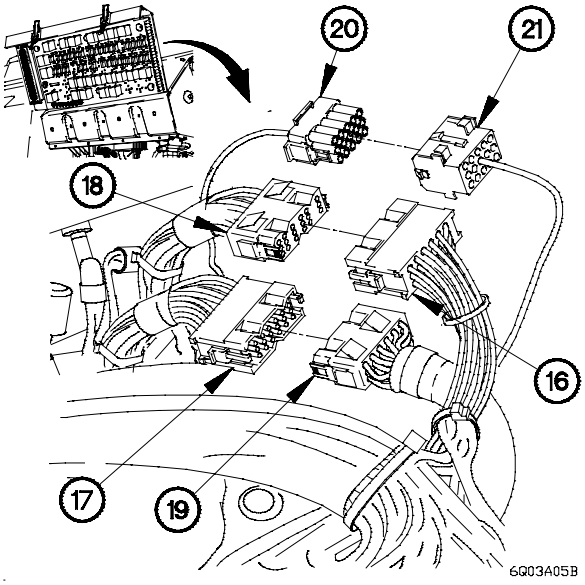
(6) Remove screw (9), lockwasher (10), terminal lug TL42 (11), and four terminal lugs (12) from power distribution panel (3). Discard lockwasher.

(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).

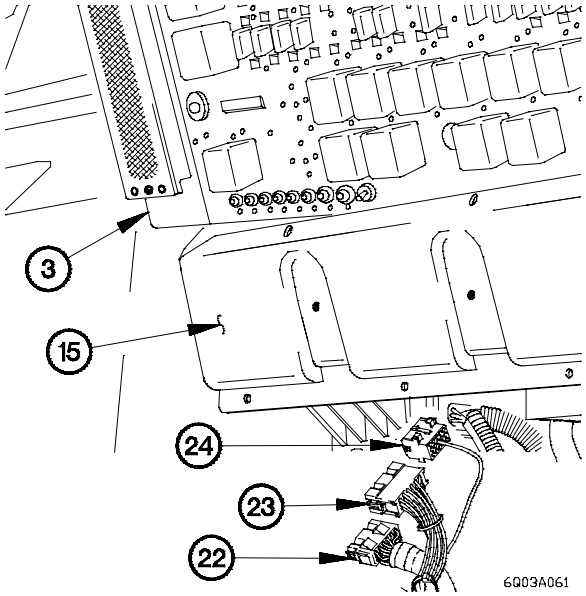
(11) Remove front lights cable assembly (22) and rear lights cable assembly (23) from dashboard (15).

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

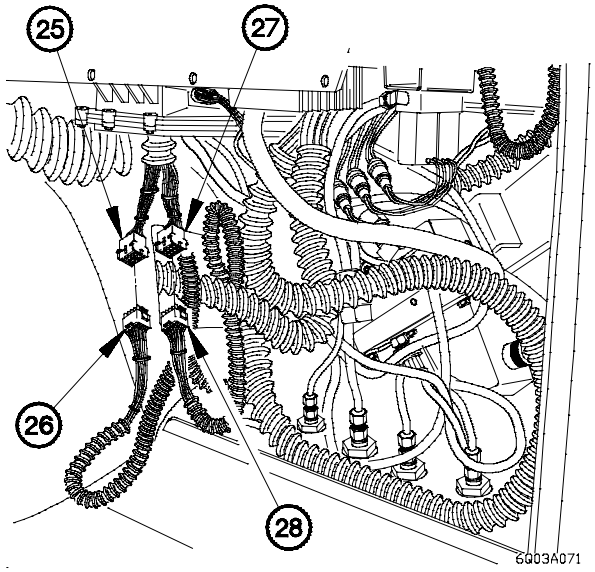
Perform step (14) on vehicles equipped with PTO.

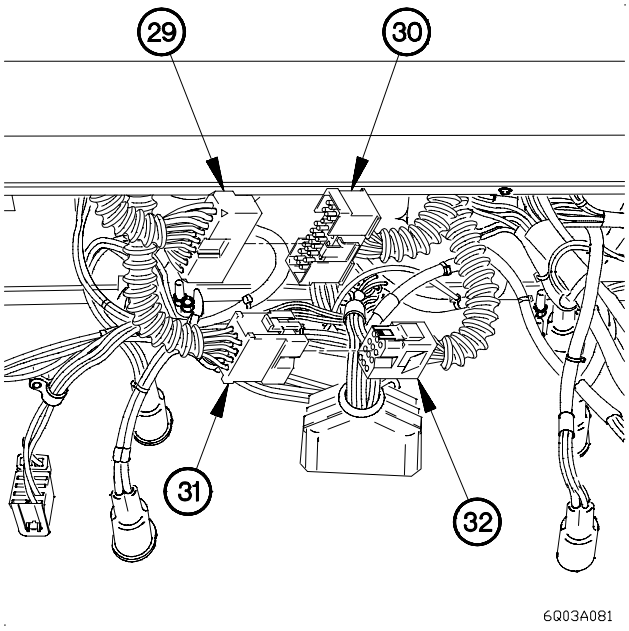
(14) Disconnect connector P210 (25) from connector J210 (26).

NOTE

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

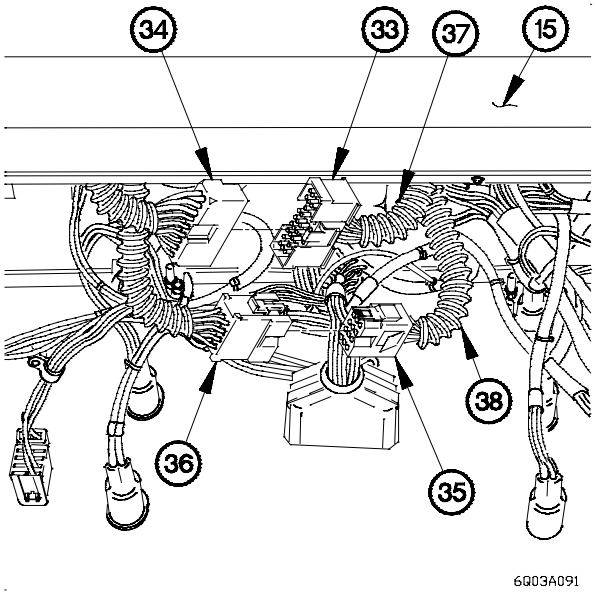
(15) Disconnect connector P108 (27) from connector J108 (28).





(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).

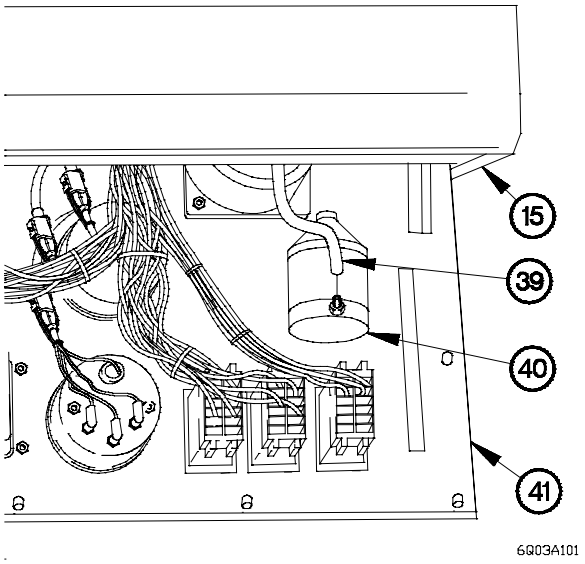
(19) Disconnect P43 (35) from connector J43 (36).

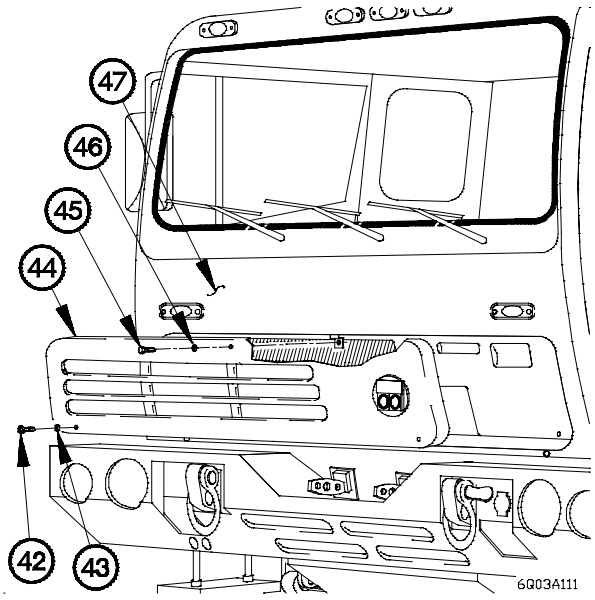
(20) Remove engine control cable assembly (37) and start and charging cable assembly (38) from dashboard (15).

(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).

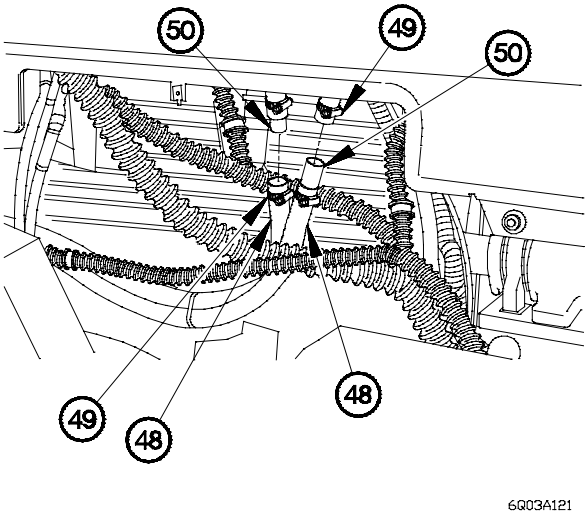
NOTE

Tag hoses and connection points prior to disconnecting.

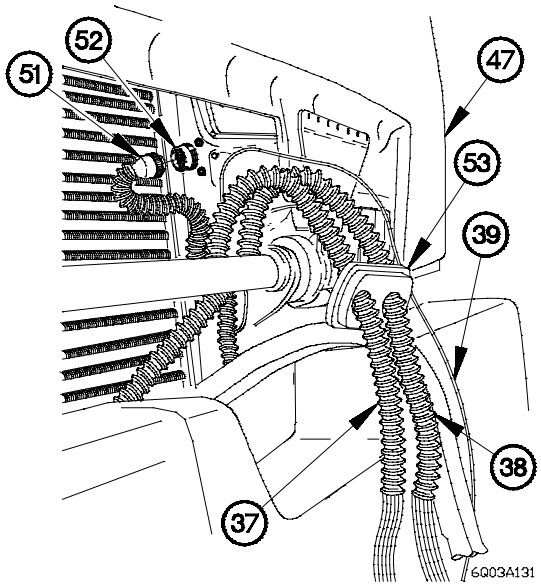
(27) Loosen two hose clamps (49) on heater hoses (48).

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

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



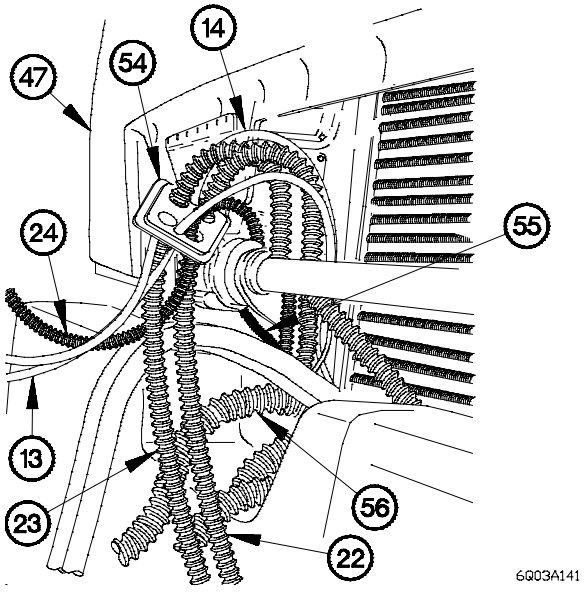
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)



(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.

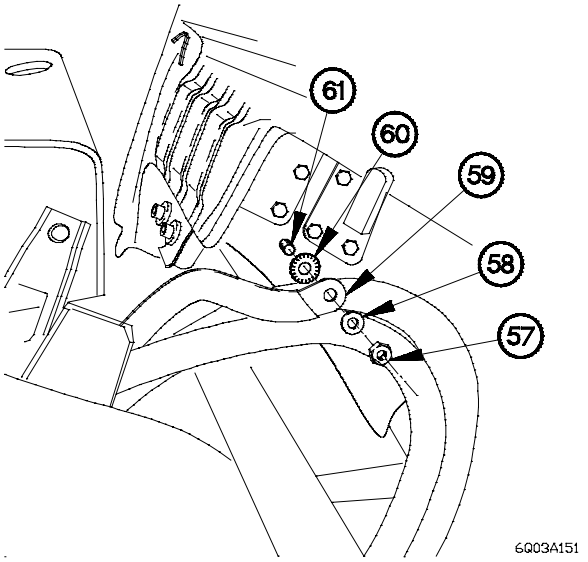
(35) Remove PTO cable assembly (55) from cab (47).

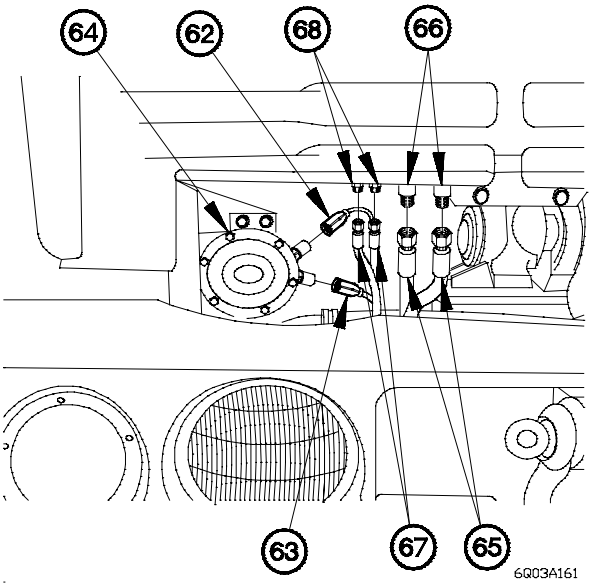
NOTE

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).

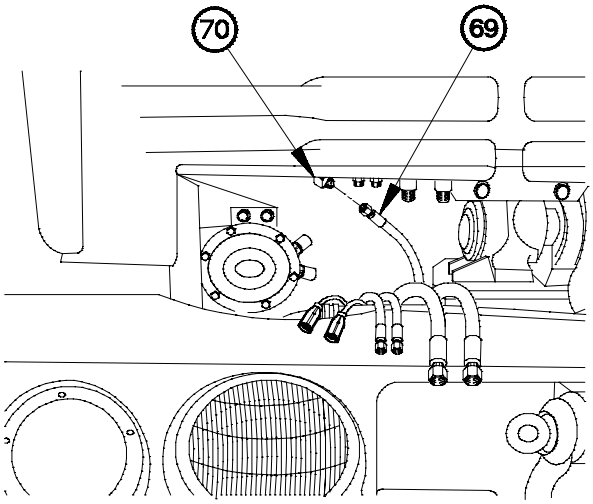
(40) Disconnect two pneumatic hoses (67) from fittings (68).

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

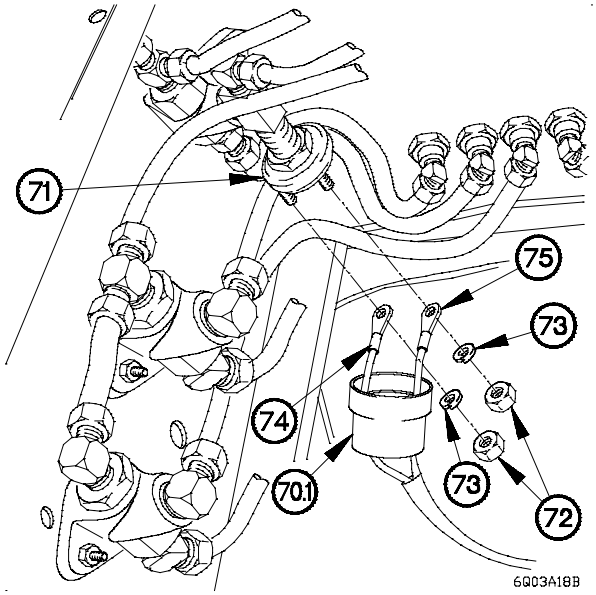
NOTE

Perform step (41) on M1088.

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



6Q03A171



6Q03A18B

(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).

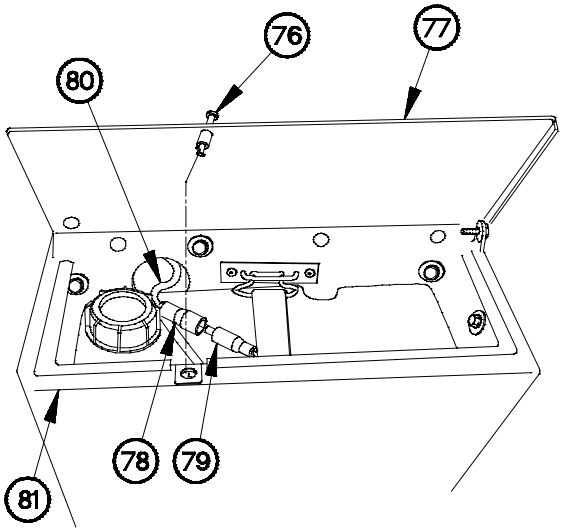
(43) Remove adhesive, two nuts (72), lockwashers (73), and terminal lugs TL201 (74) and TL 202 (75) from low pressure transmitter (71). Discard lockwashers.

(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).

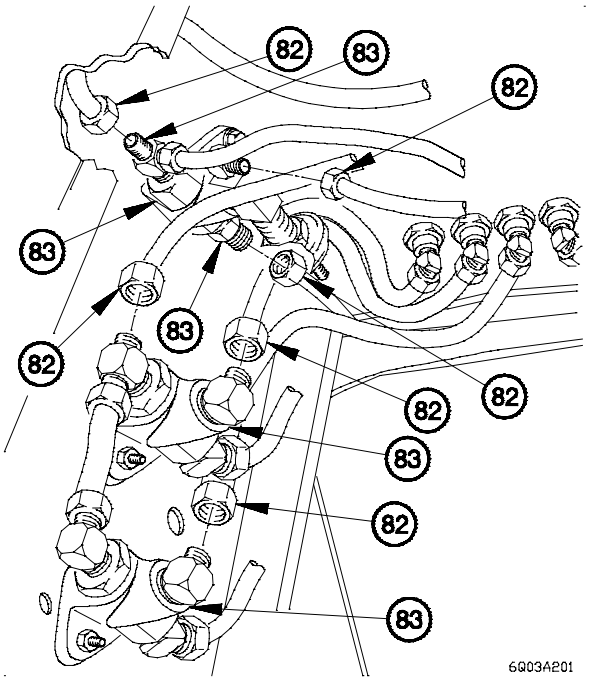


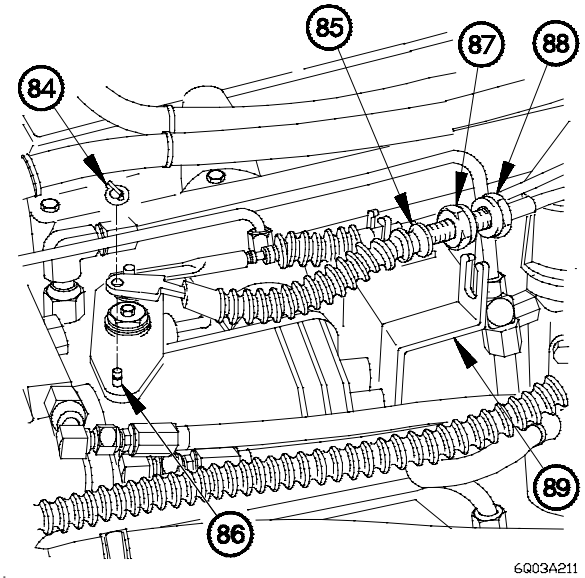
6Q03A191

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)

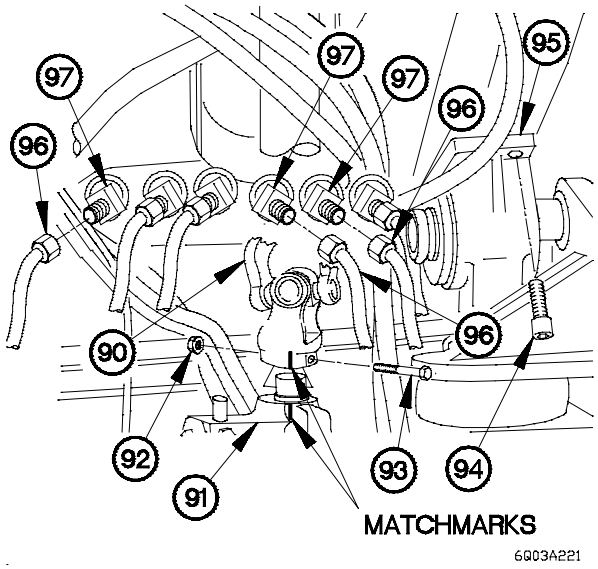
(53) Match mark universal joint (90) to steering gear (91).

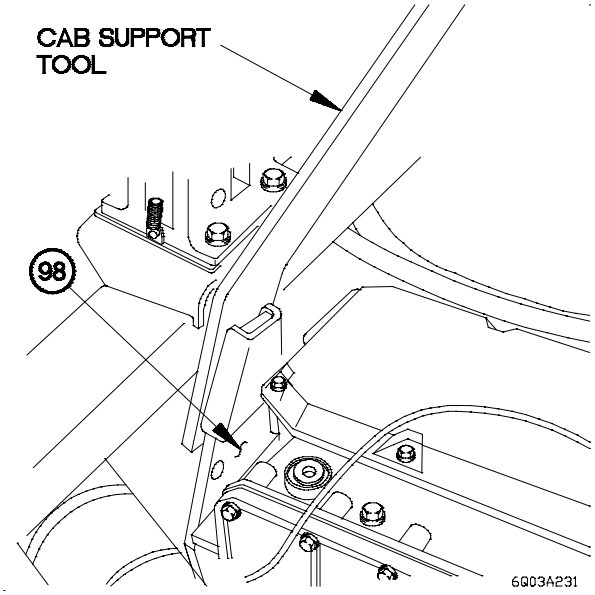
(54) Remove self-locking nut (92) and screw (93) from universal joint (90). Discard self-locking nut.

(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

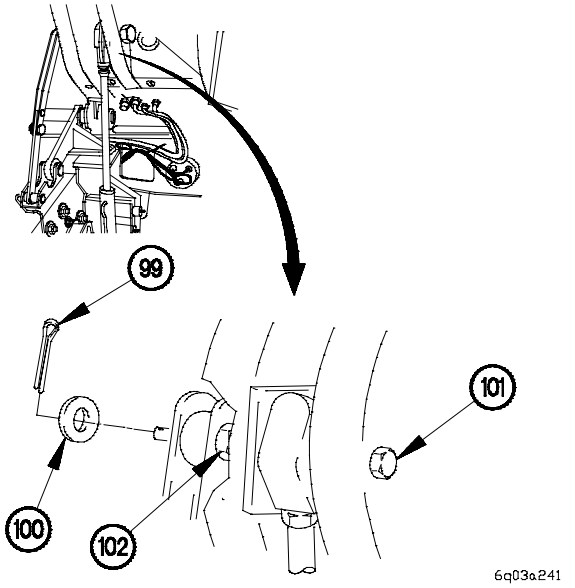
Cab must be braced on cab support tool prior to removal of cotter pin from cab tilt cylinder mounting bolt. Failure to comply may result in injury to personnel or damage to equipment.

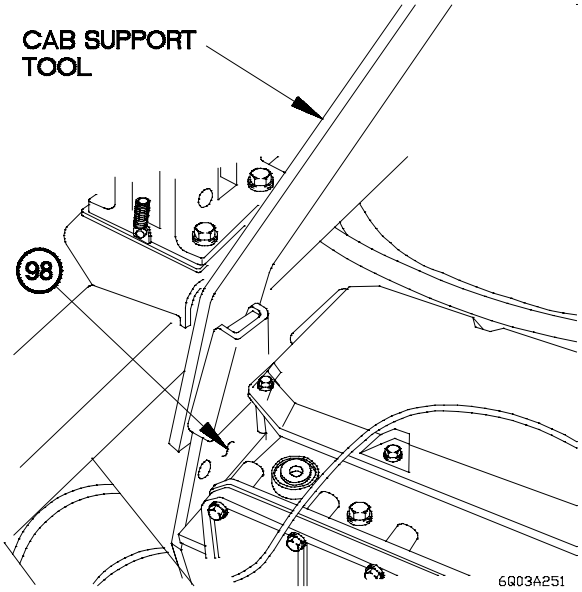
(58) Install cab support tool on engine rear lifting eye (98).

(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).



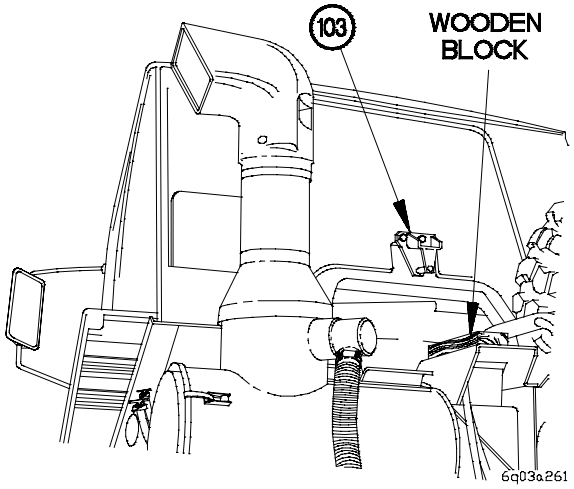


(62) Raise cab slightly and remove cab support tool from engine rear lifting eye (98) (TM 9-2320-366-10-1).

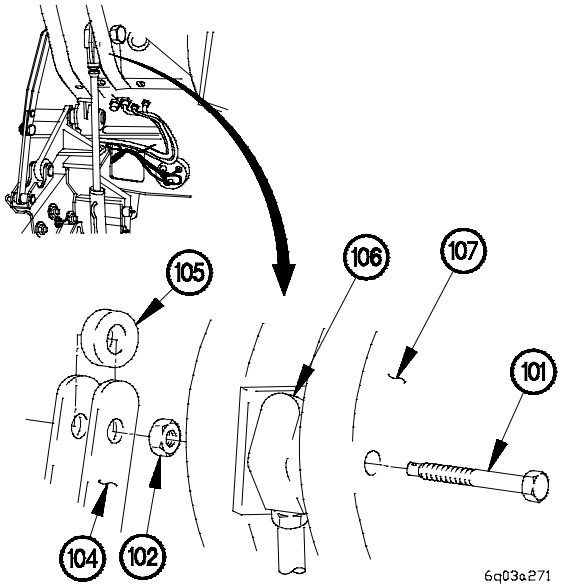
NOTE

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)

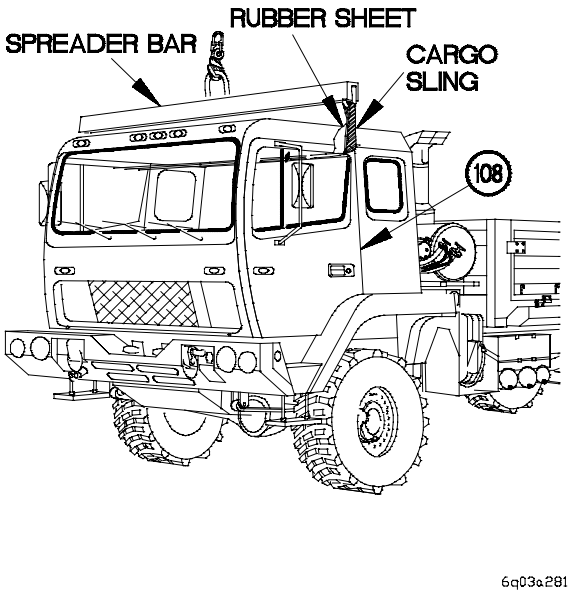


NOTE

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).

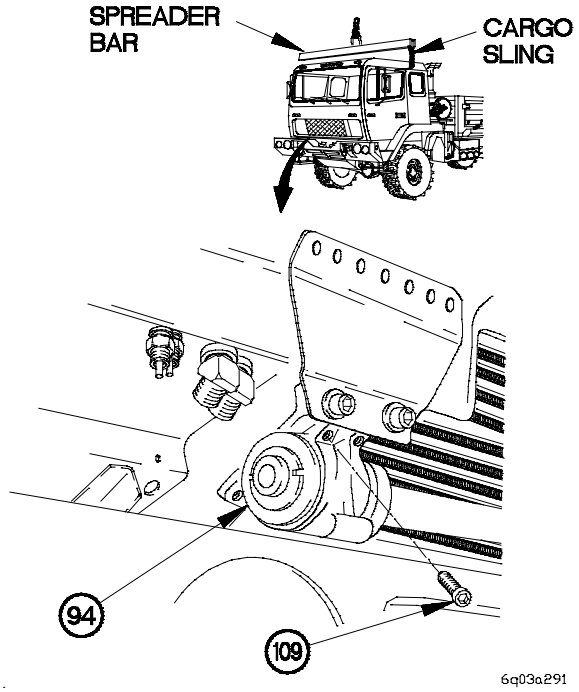
WARNING

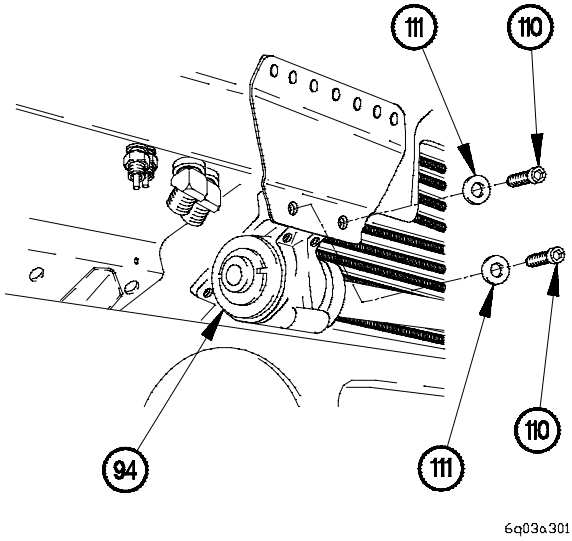
Cab may swing forward slightly when screws are removed. An assistant is required to steady cab. Failure to comply may result in injury to personnel or damage to equipment.

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)

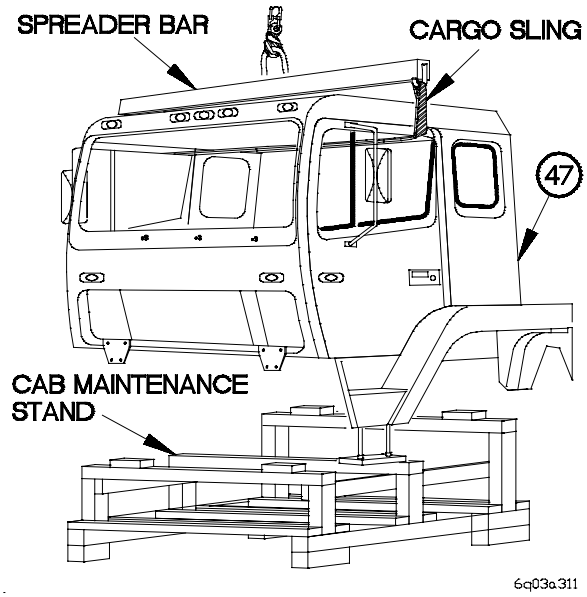
CAUTION

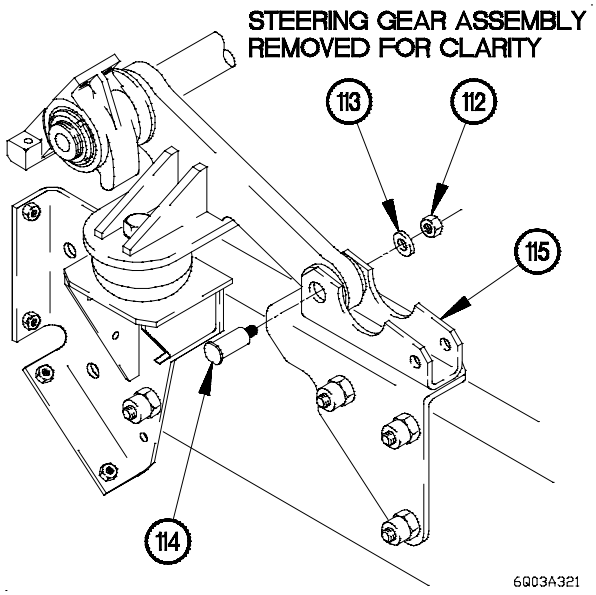
Raise cab straight up to clear radiator. Failure to comply may result in damage to equipment.

(70) Remove cab (47) from vehicle.

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

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



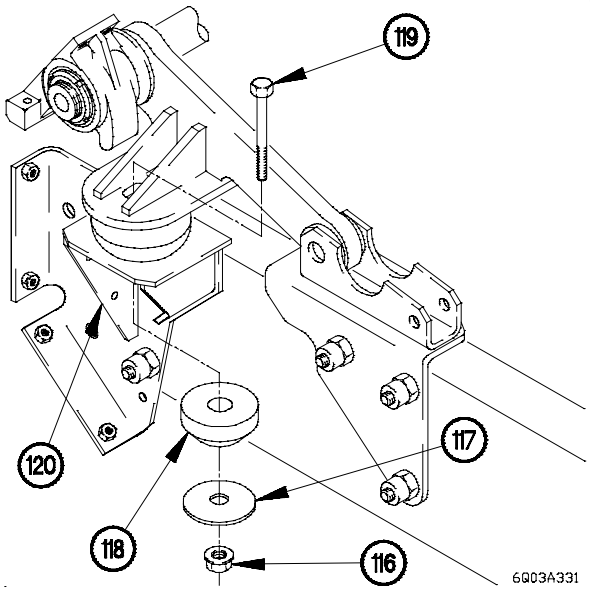


NOTE

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

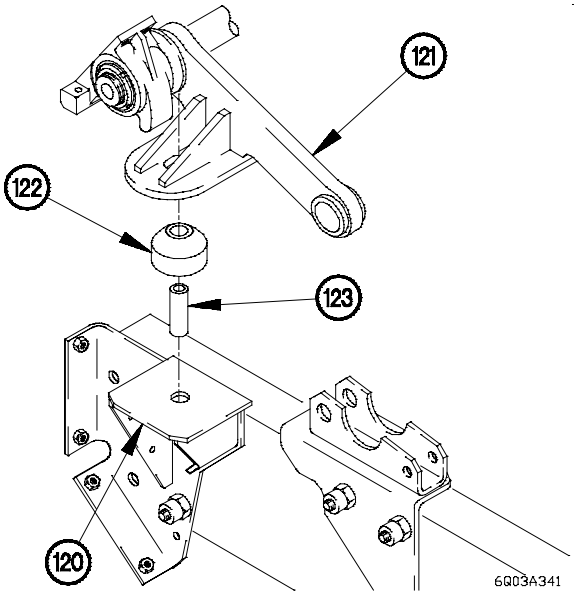
(73) Remove nut (112), washer (113), and shoulder bolt (114) from left side cab mounting bracket (115).

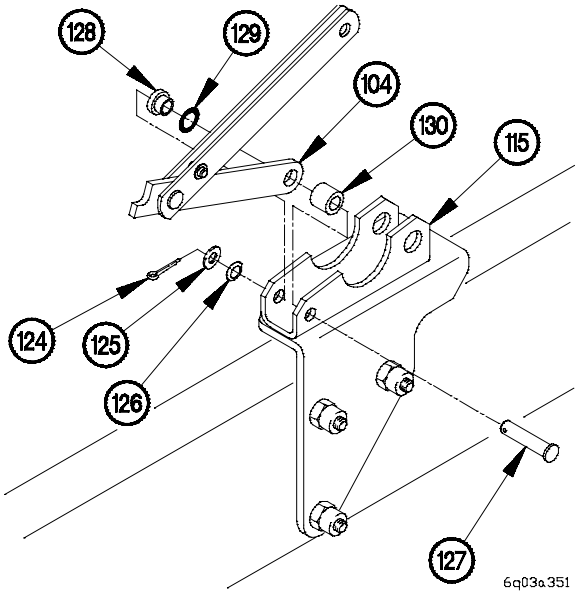
(74) Remove self-locking nut (116), washer (117), lower resilient mount (118) and bolt (119) from left side front bumper mounting bracket (120). Discard self-locking nut.



(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

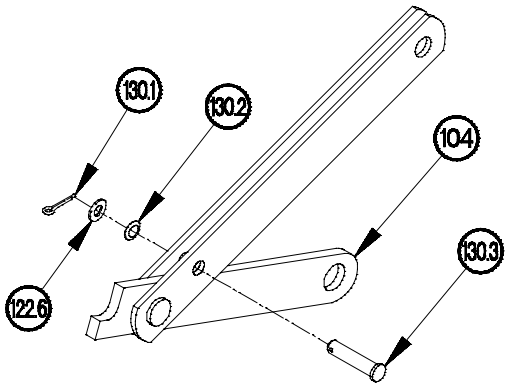
Perform step (77.1) on vehicle serial number 0001 through 7599 that have not previously had pin and spring tension washer replaced.

(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.

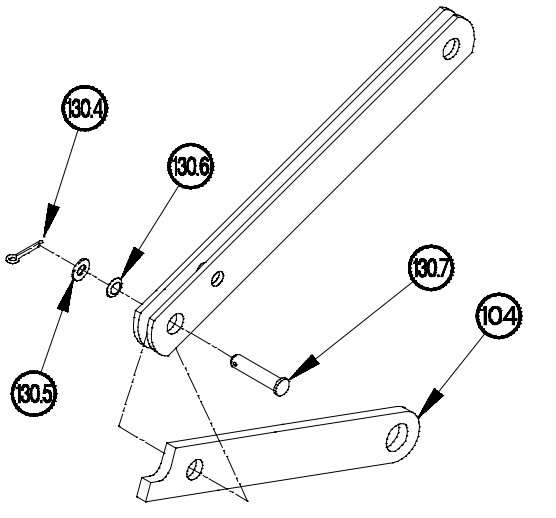


6q03a36b

NOTE

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

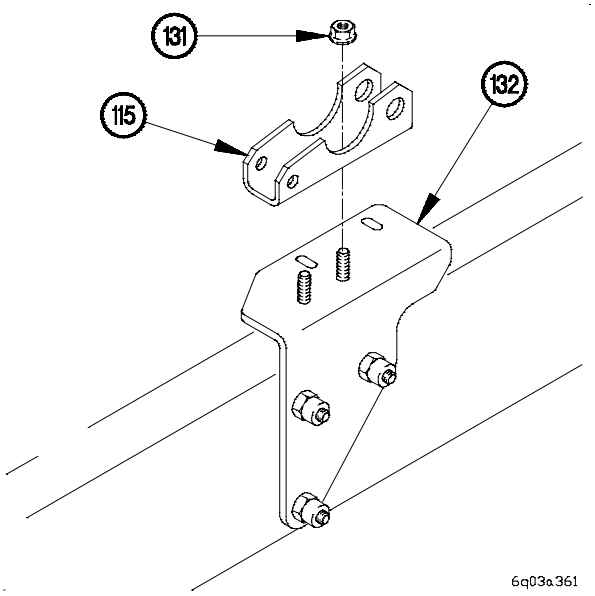
(77.3) Remove cotter pin (130.1), washer (130.2) and pin (130.3) from pivot arm (104). Discard cotter pin.



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.

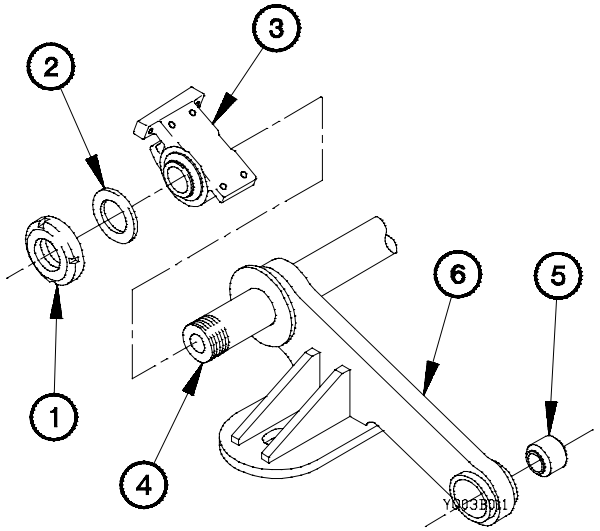


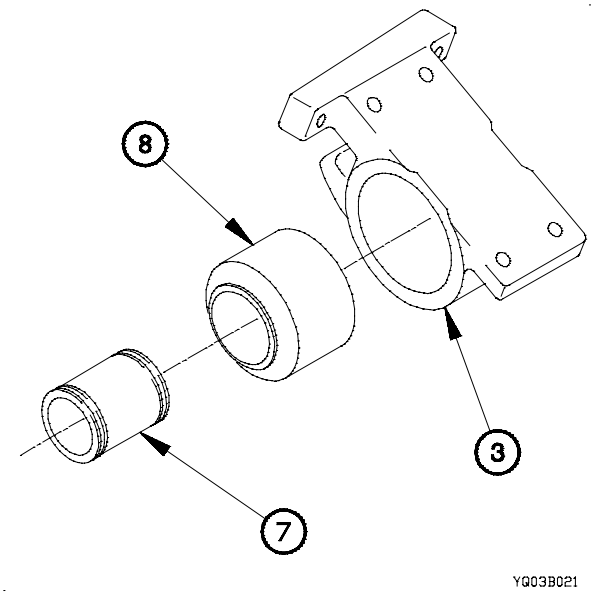
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

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.

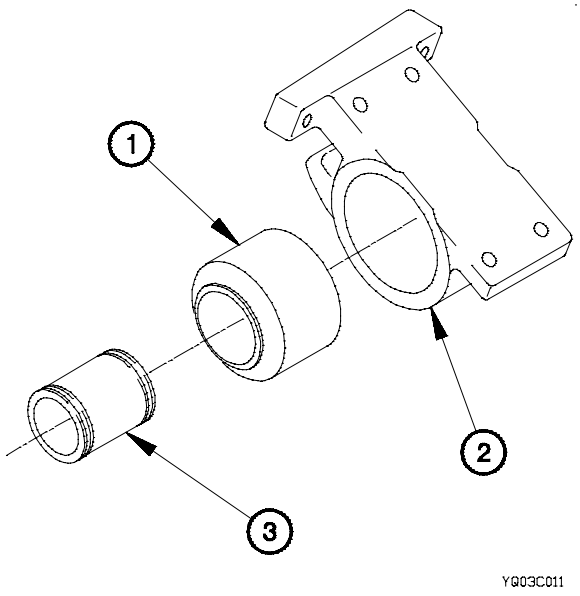
c. Assembly.

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

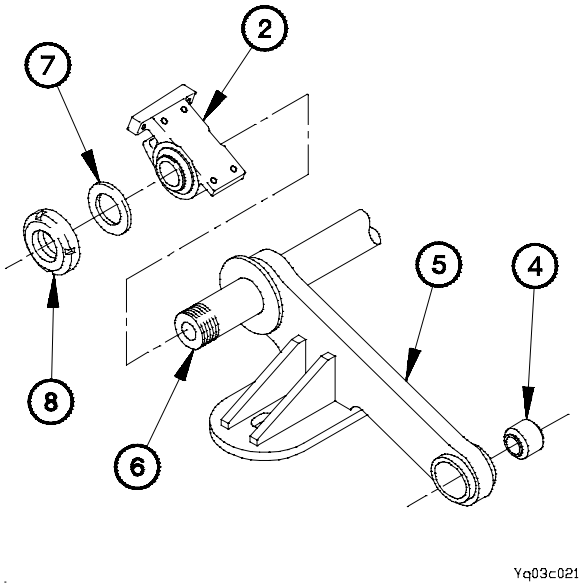
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

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

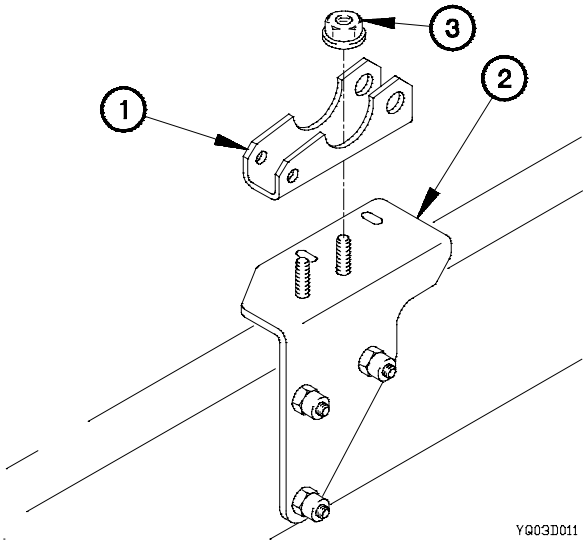
(5) Position left side bearing housing (2), washer (7), and spanner nut (8) on cab front support (6).

(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.



d. Installation.

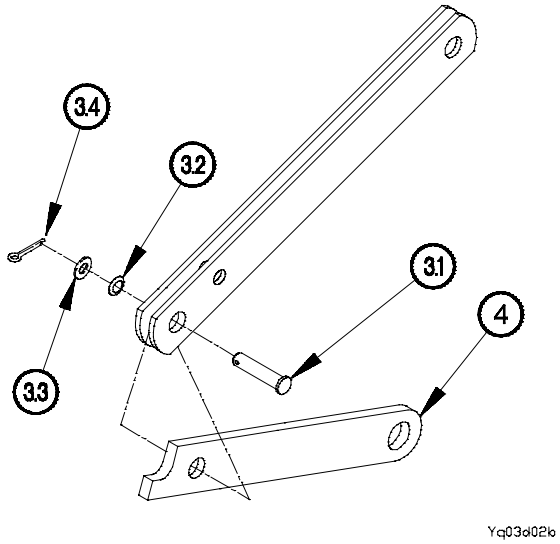


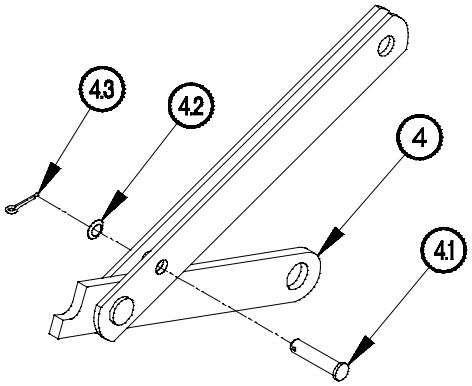
(1) Position cab mounting bracket (1) on radiator mounting bracket (2) with two self-locking nuts (3).

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

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).



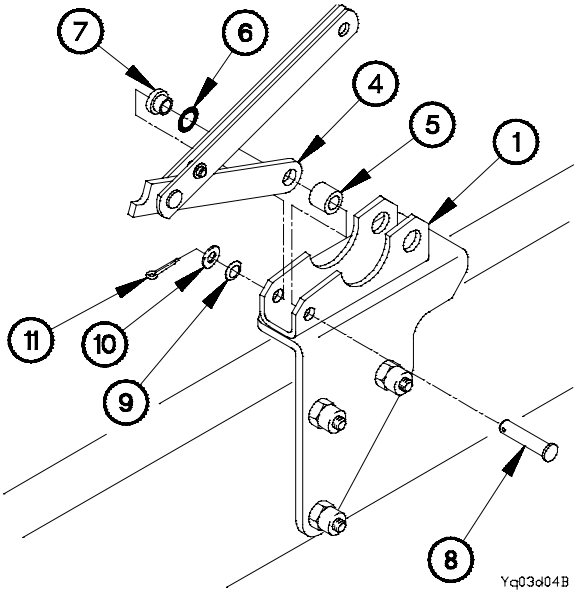


(2.2) Install pin (4.1), washer (4.2), and cotter pin (4.3) in pivot arm (4).

NOTE

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

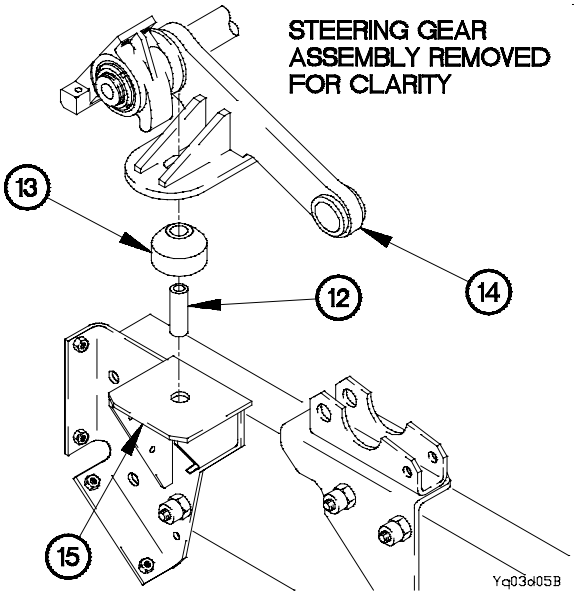
(3) Install pivot arm (4) in cab mounting bracket (1) with spacer (5), preformed packing (6), bushing (7), pin (8), spring tension washer (9), washer (10), and cotter pin (11).

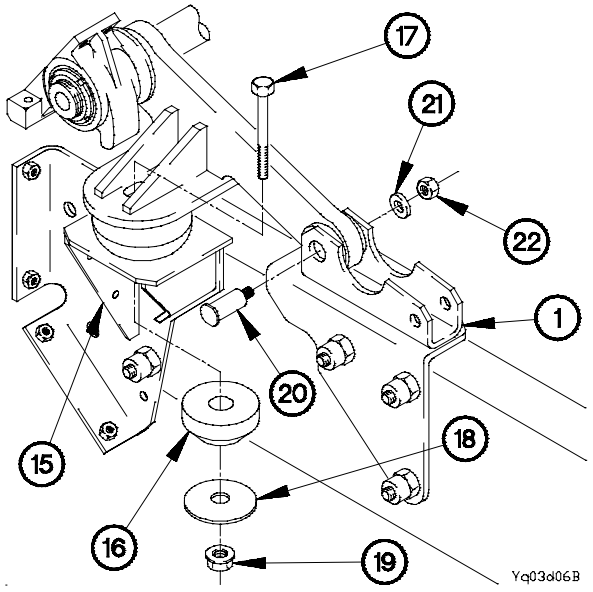


NOTE

- 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.

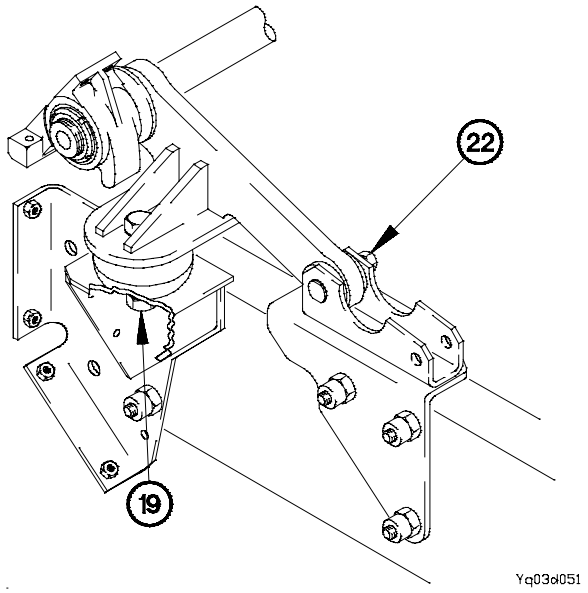
(6) Apply sealing compound to threads of shoulder bolt (20).

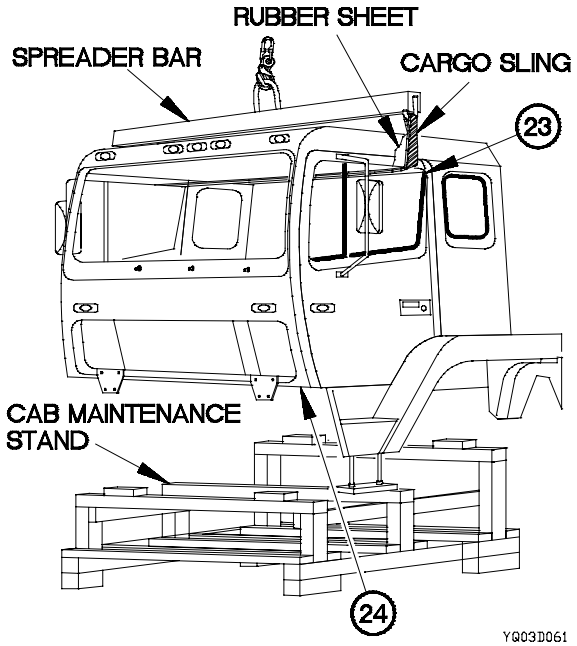
(7) Position shoulder bolt (20), washer (21), and nut (22) in cab mounting bracket (1).

(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).

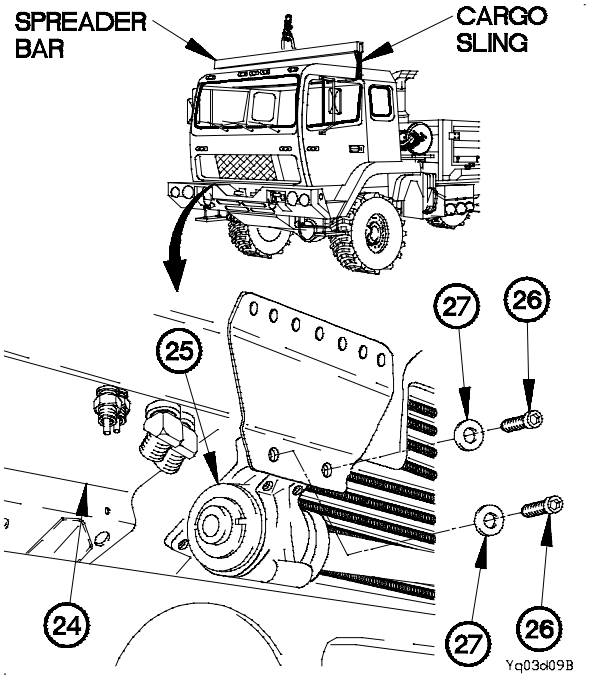
(12) Remove cab (24) from cab maintenance stand.

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

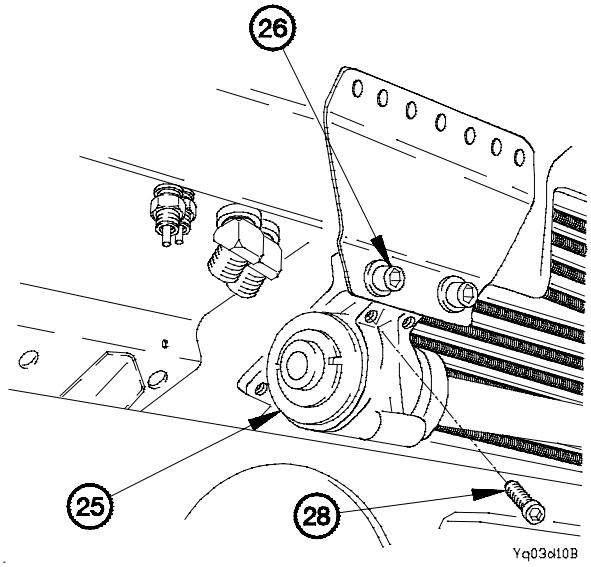
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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.

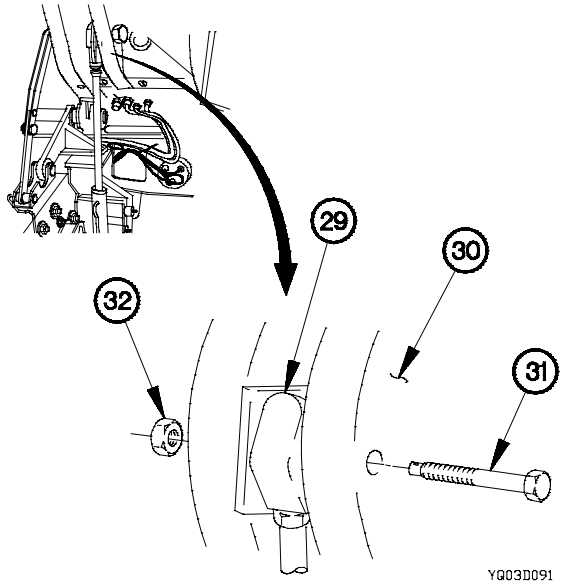
CAUTION

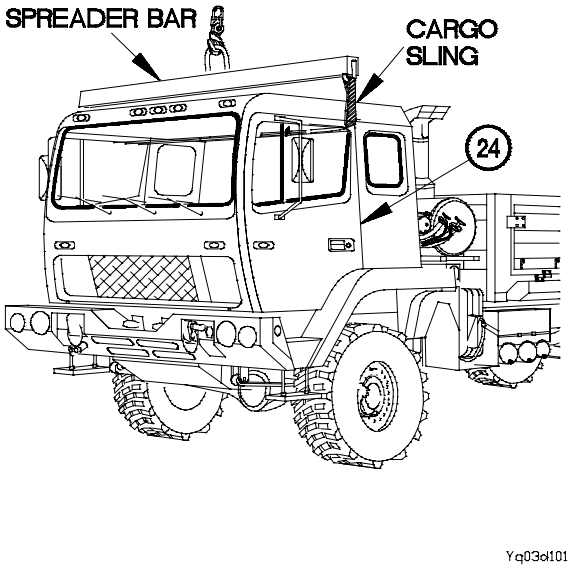
Align arrow on top of tilt cylinder mounting eye to point toward front of cab. Failure to comply may result in damage to equipment.

(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).





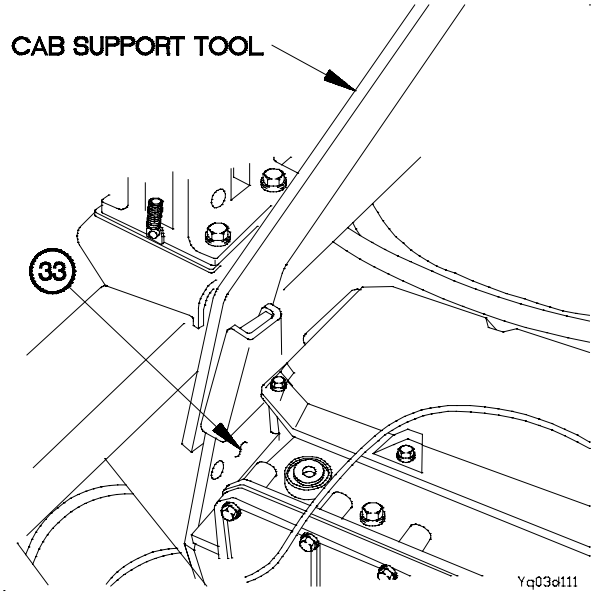
(23) Remove cargo sling from cab (24).

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.

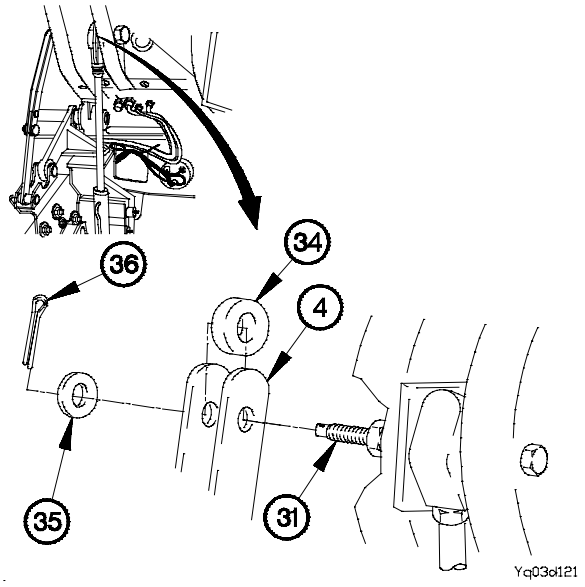
(24) Raise cab enough to install cab support tool on engine rear lifting eye (33) (TM 9-2320-366-10-1).



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).

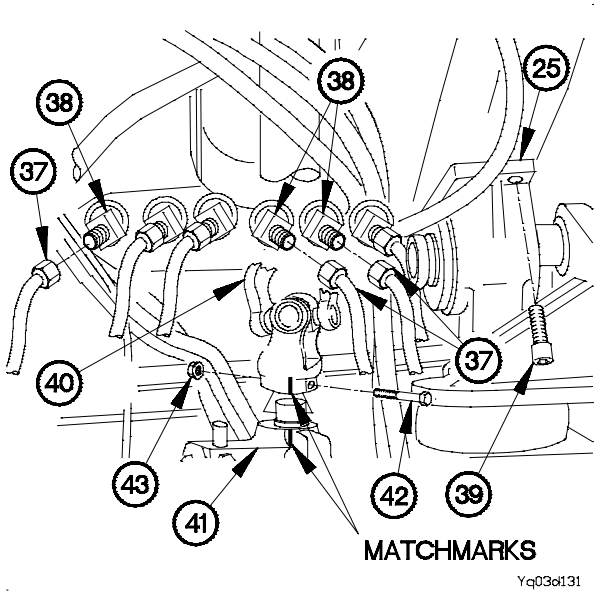
(31) Tighten two screws (39) to 34-42 lb-ft (47-57 N·m).

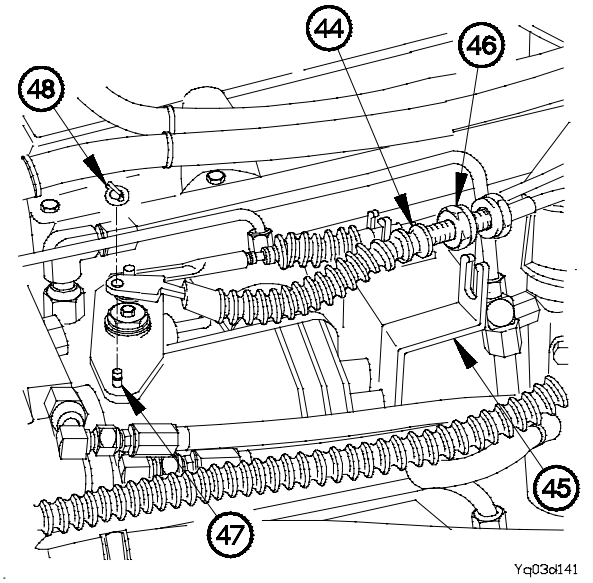
(32) Perform steps (29) through (31) on right side bearing housing.

(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).

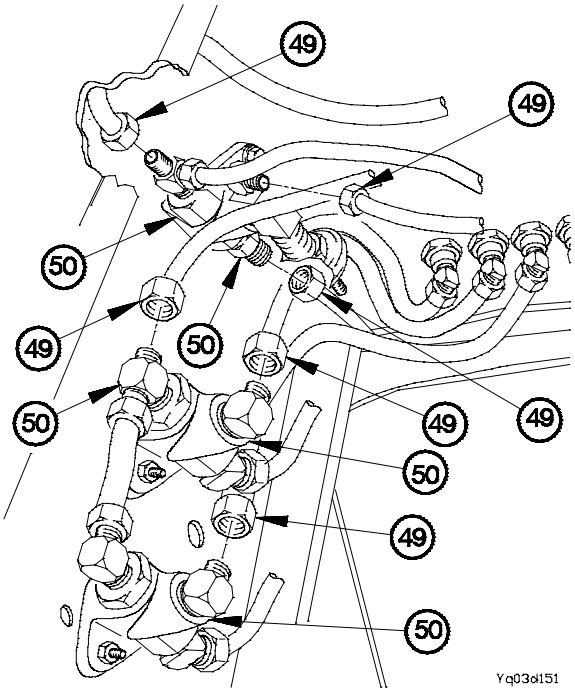
(37) Position throttle control cable (44) in bracket (45) with two nuts (46).

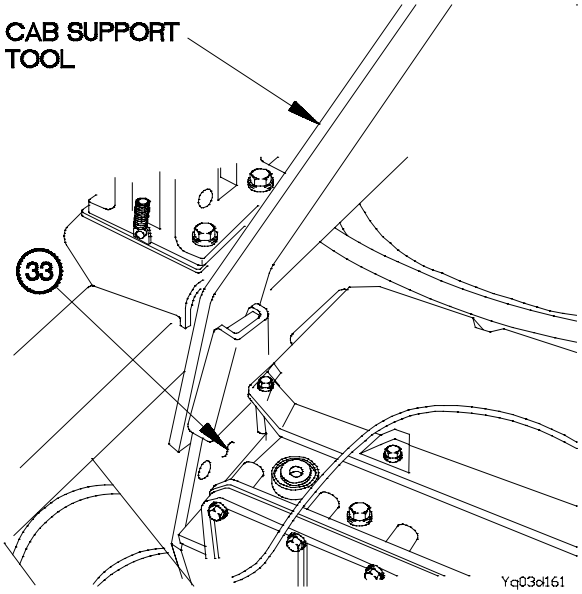
(38) Adjust and tighten nuts (46) to position marked during removal.

(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).

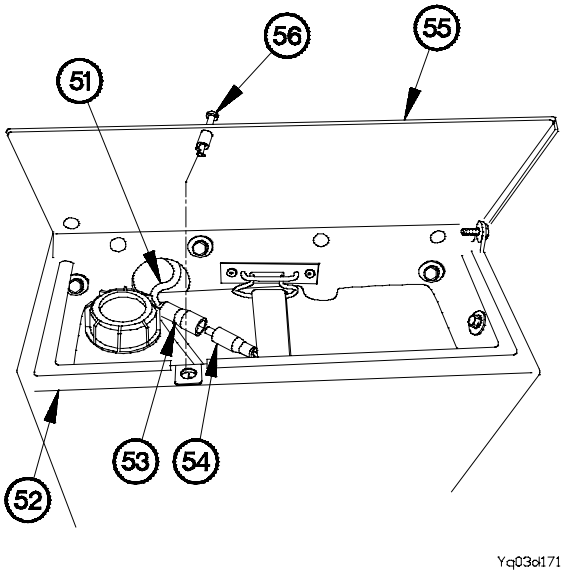
(42) Lower cab (TM 9-2320-366-10-1).

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

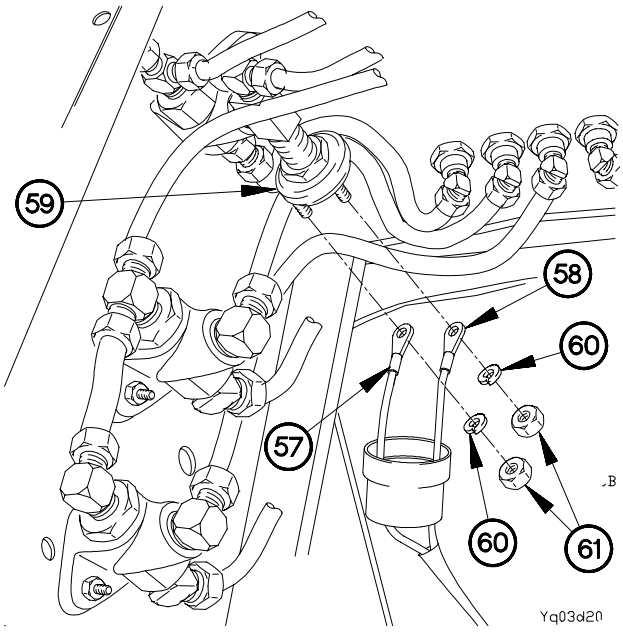
(44) Connect connector P25 (53) to connector J25 (54).

(45) Close step plate (55).

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



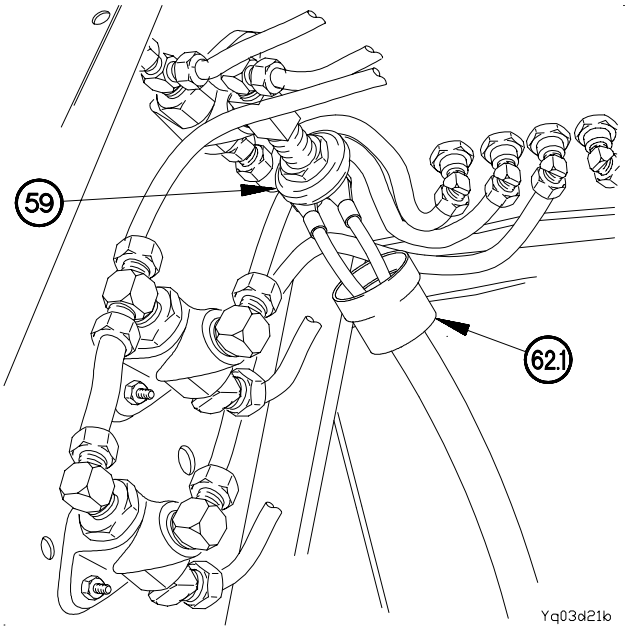
(47) Install terminal lugs TL201 (57) and TL202 (58) on low pressure transmitter (59) with two lockwashers (60) and nuts (61).



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.

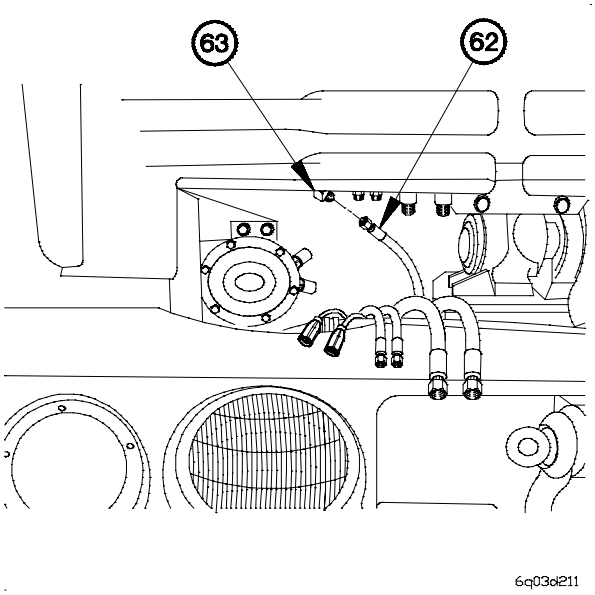
(48.1) Install boot (62.1) on low pressure transmitter (59).

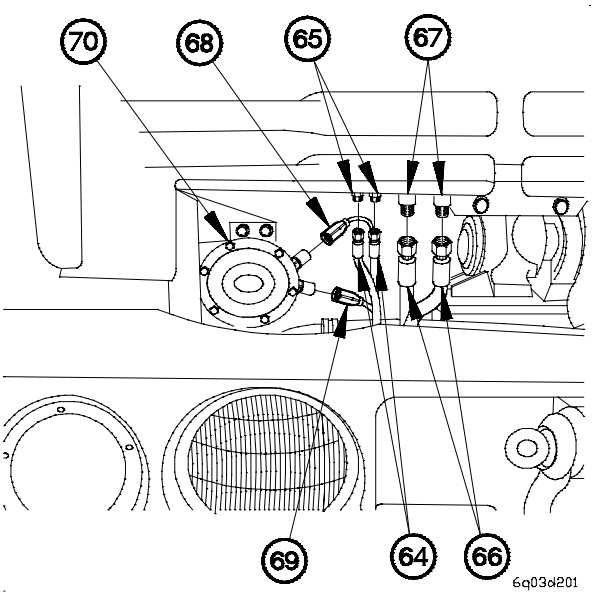
(48.2) Apply antiseize to holes TLR and TTR and around edges of boot (62.1).

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).

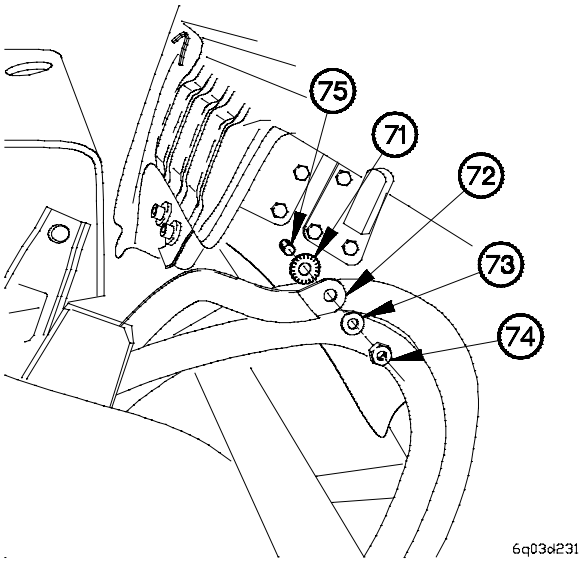
(52) Connect connectors P5 (68) and P6 (69) to horn (70).

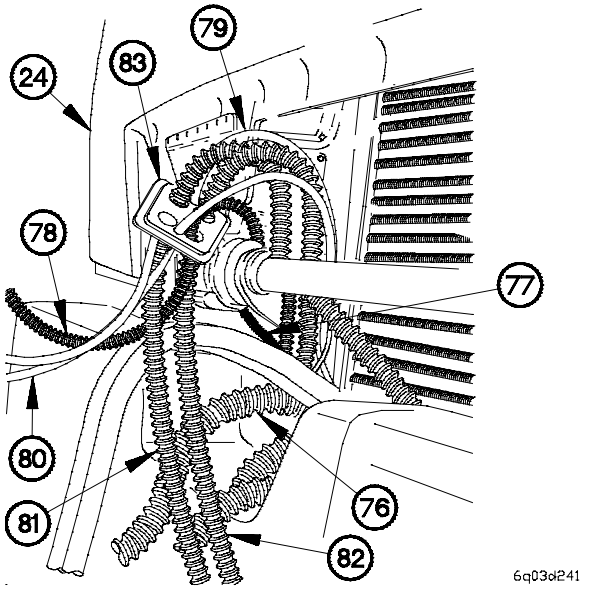
15-3. CAB FRONT SUPPORT REPLACEMENT/REPAIR (CONT)

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.

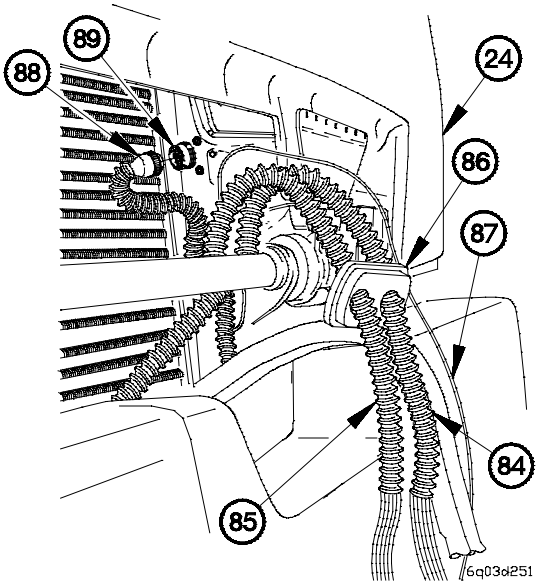
(55) Route PTO cable assembly (77) inside cab (24).

NOTE

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

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

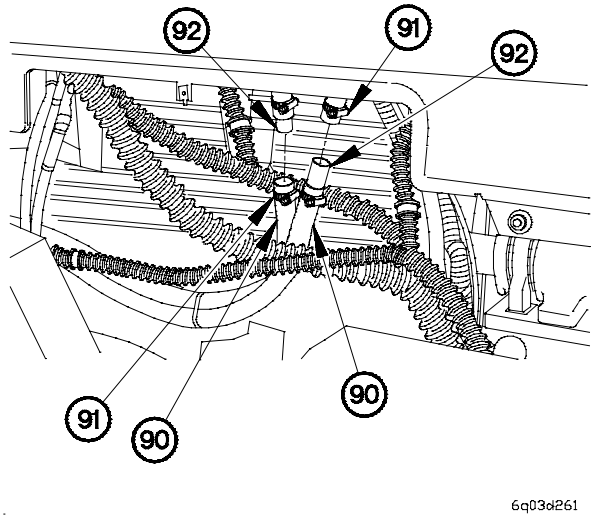
(57) Route power distribution panel 24 vdc cable (79), power distribution panel 12 vdc cable (80), rear lights cable assembly (81), front lights cable assembly (82) and grommet (83) inside cab (24).



(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).

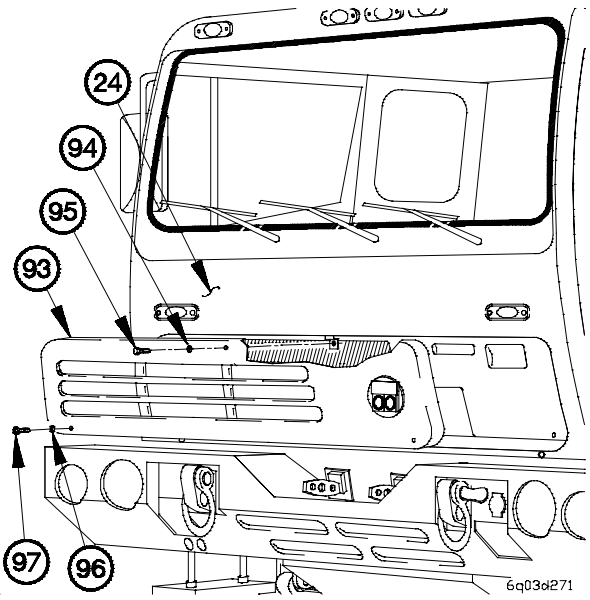
(60) Connect connector P119 (88) to connector J119 (89).



(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).

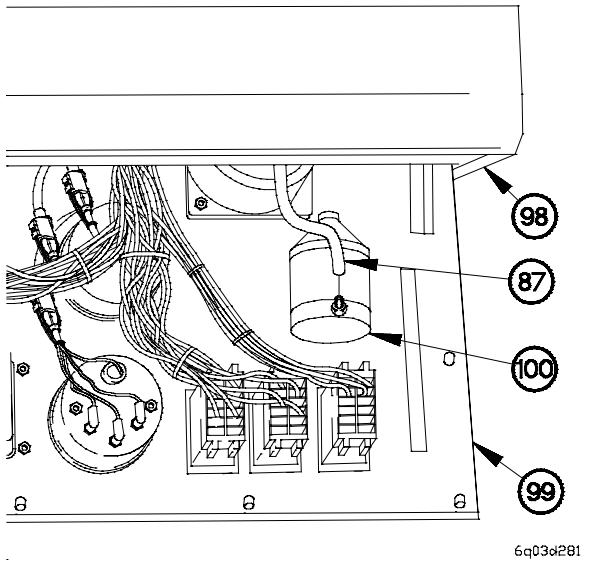
(67) Tighten two screws (97) to 24 lb-in. (3 N·m).

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

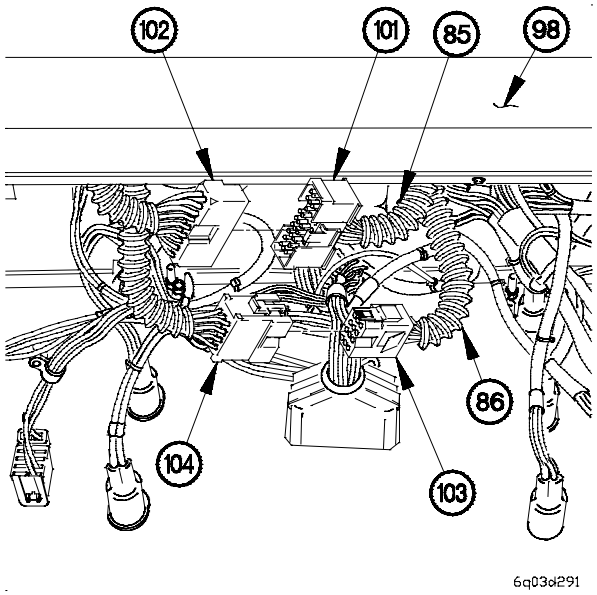
(68) Route vacuum hose (87) inside dashboard (98).

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

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



6q03d281



6q03d291

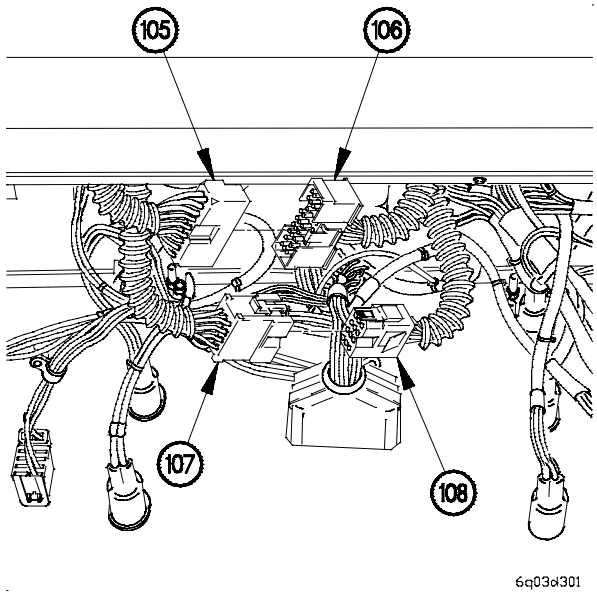
(71) Route start and charging cable assembly (85) and engine control cable assembly (86) inside dashboard (98).

(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

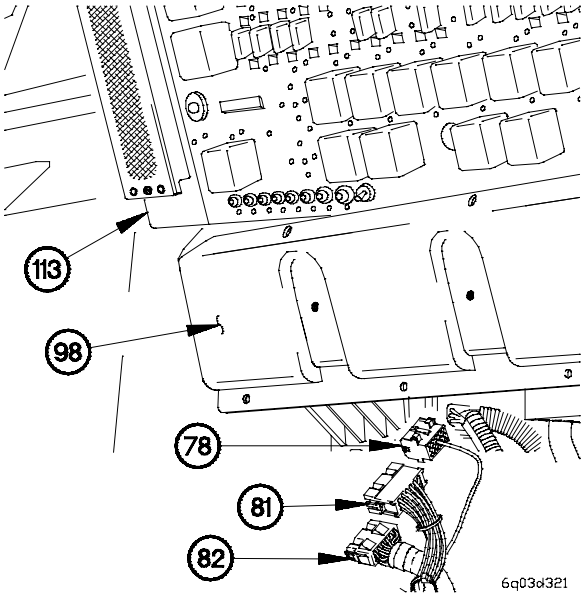
Perform step (76) on M1084, M1086, M1089, M1090, and M1094.

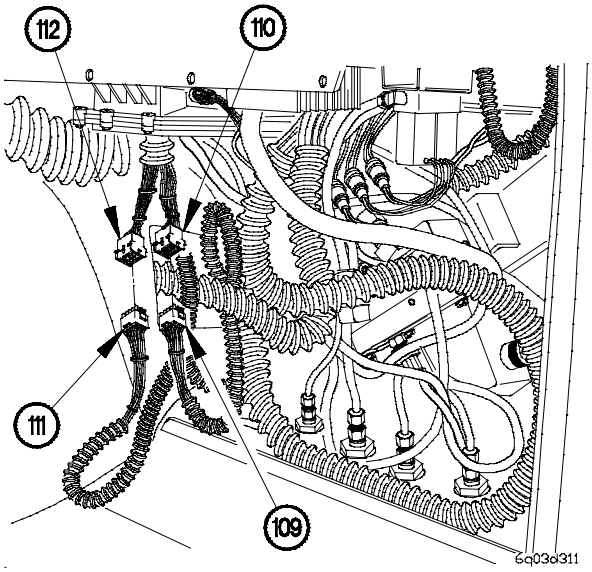
(76) Connect connector P108 (109) to connector J108 (110).

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).

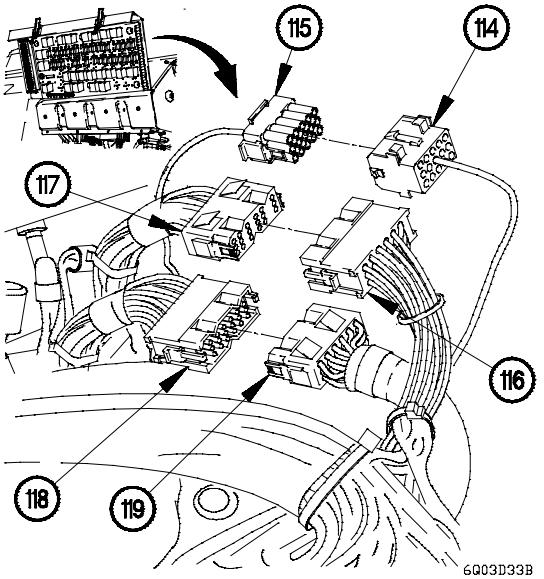
NOTE

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

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

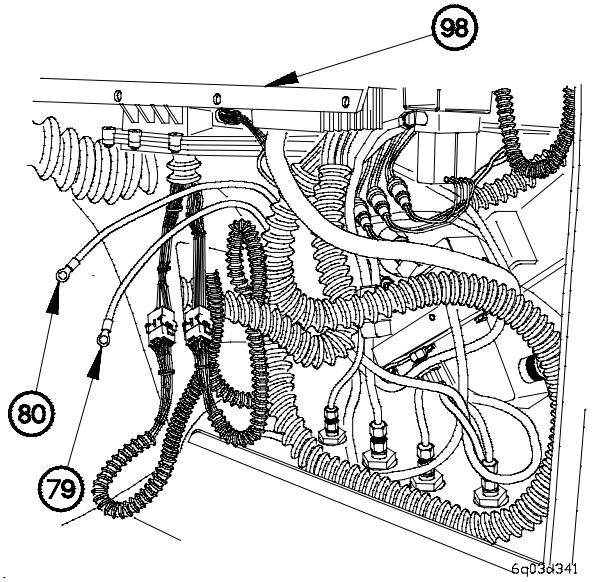
(82) Connect connector J27 (116) to connector P27 (117).

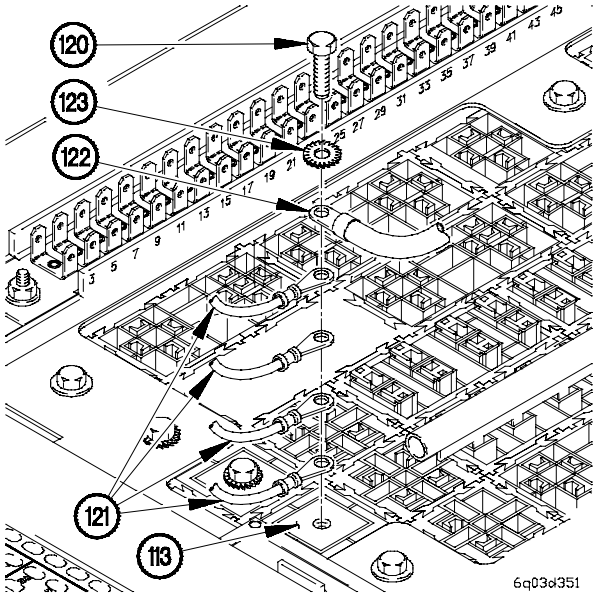
(83) Connect connector J51 (118) to connector P51 (119).



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).

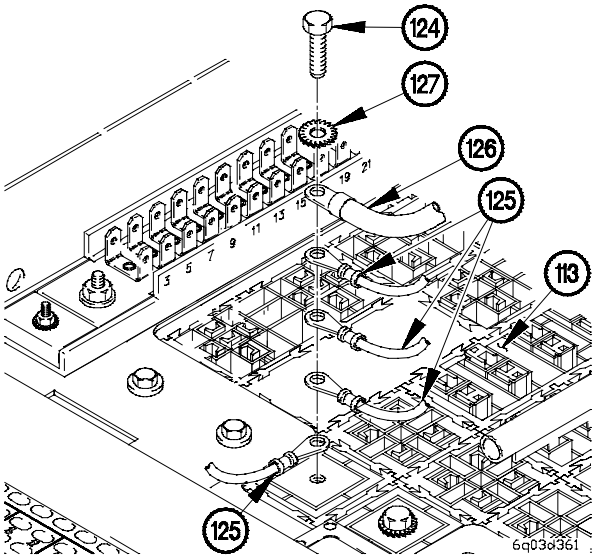
(86) Position four terminal lugs (121), terminal lug TL42 (122), lockwasher (123), and screw (120) on power distribution panel (113).

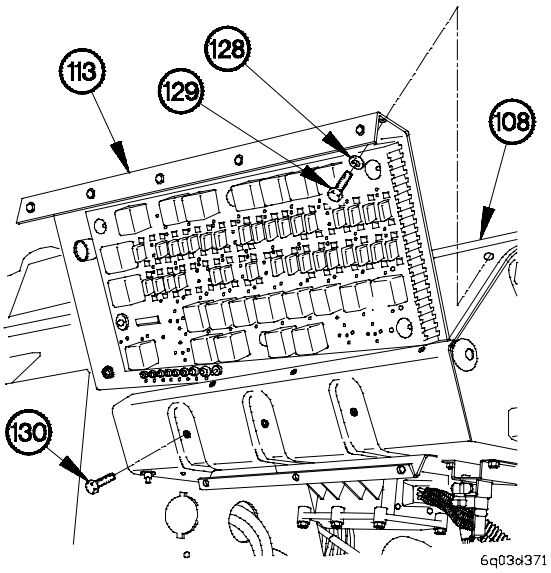
(87) Tighten screw (120) to 35-45 lb-in. (4-5 N·m).

(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)

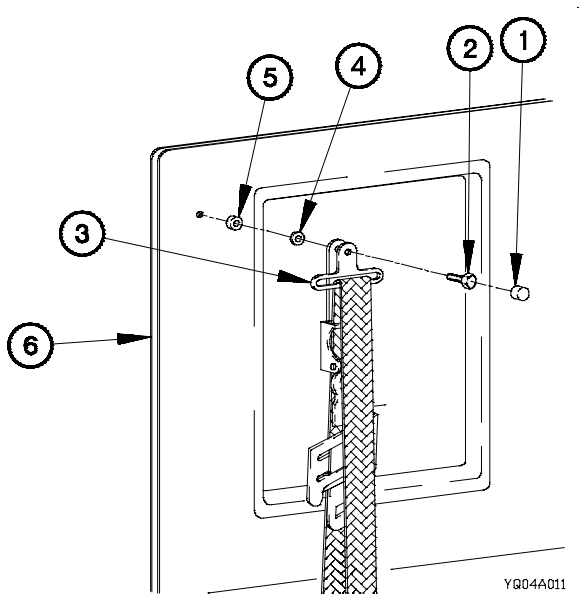
a. Removal.

NOTE

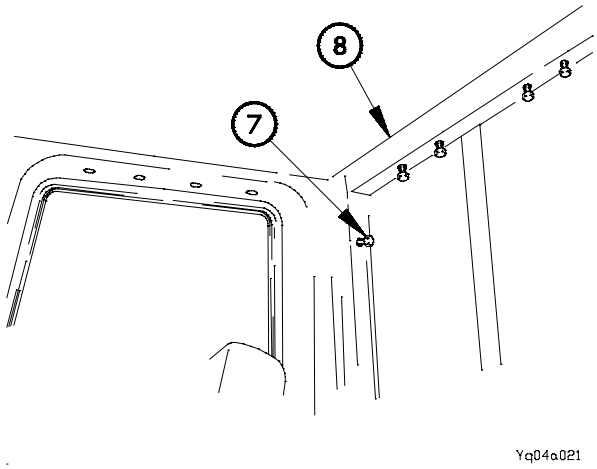
Left and right side cab side walls are removed the same way. Right side shown.

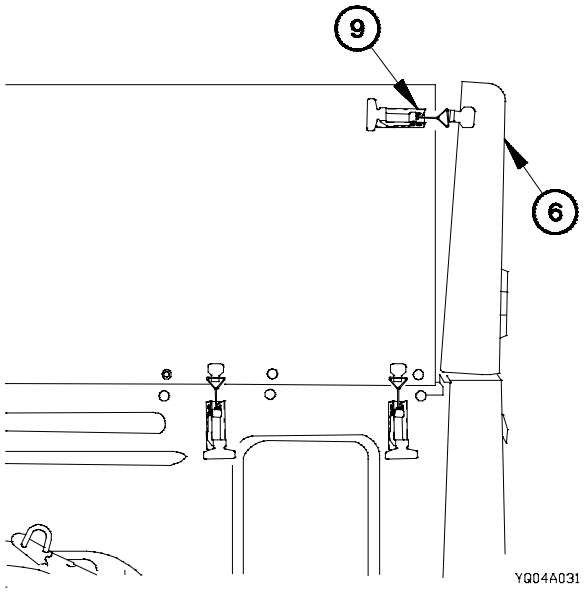
(1) Remove plastic cover (1) from screw (2).

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



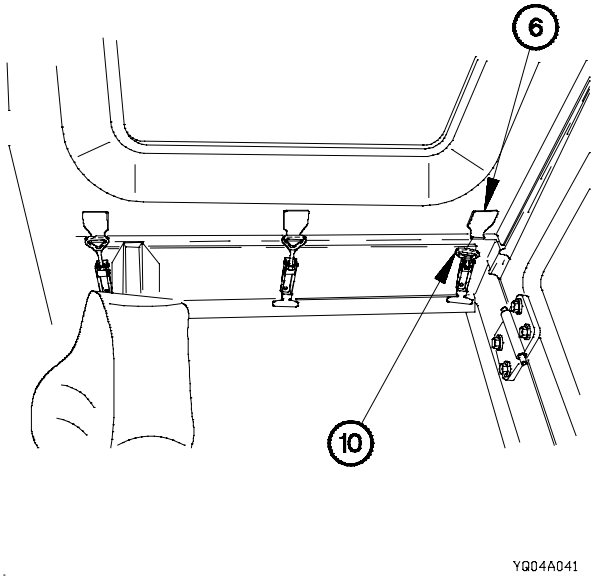
(3) Loosen captive screw (7) in cab rear wall (8).





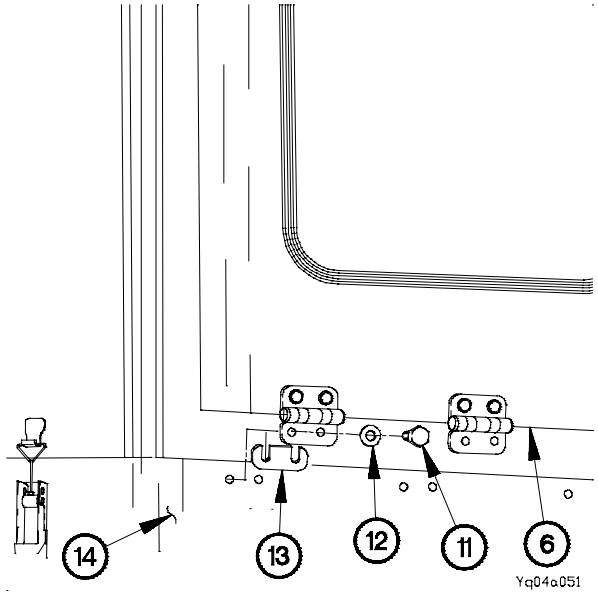
(4) Release latch (9) from cab side wall (6).

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

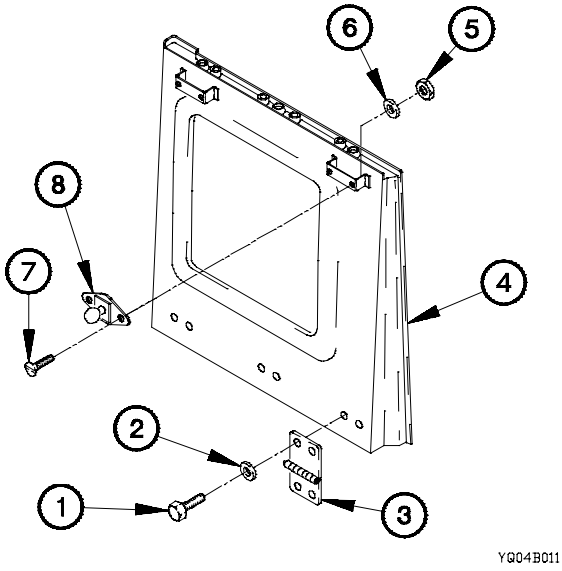


15-4. M1093/M1094 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

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



b. Disassembly.

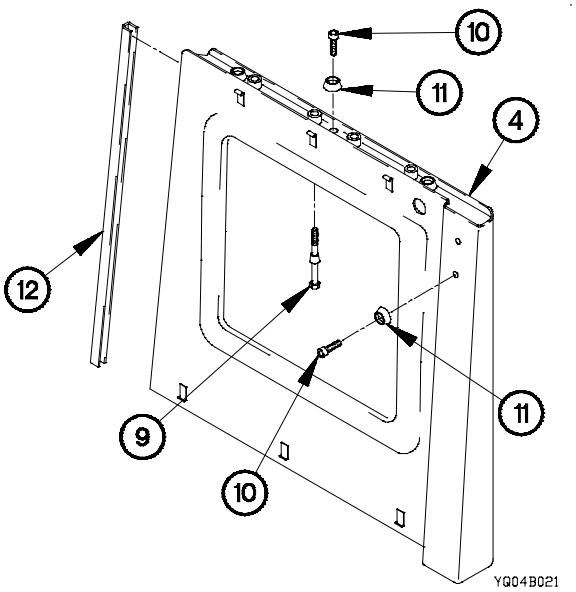


NOTE

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).

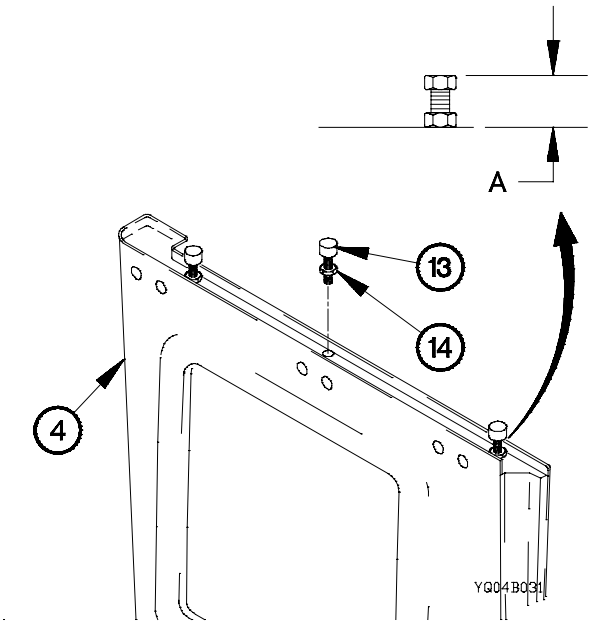
(2) Remove four nuts (5), washers (6), screws (7), and two friction catch studs (8) from cab side wall (4).



(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.

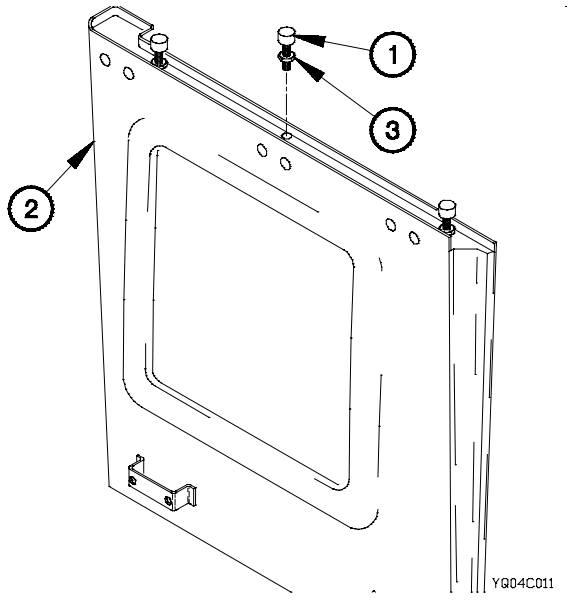


(6) Record distance A on three rubber stoppers (13).

(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.

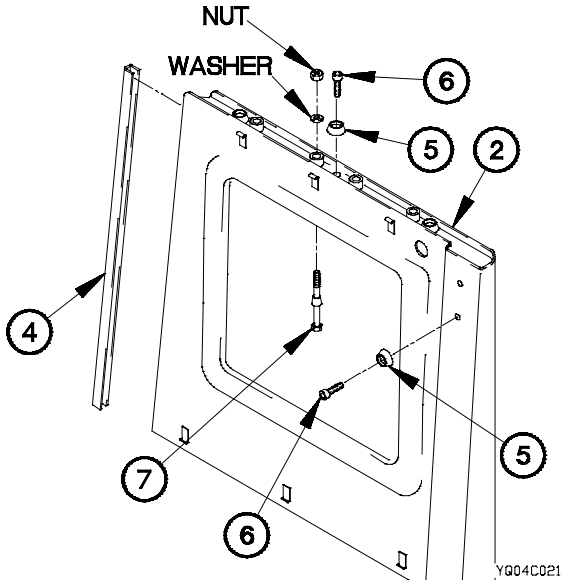
NOTE

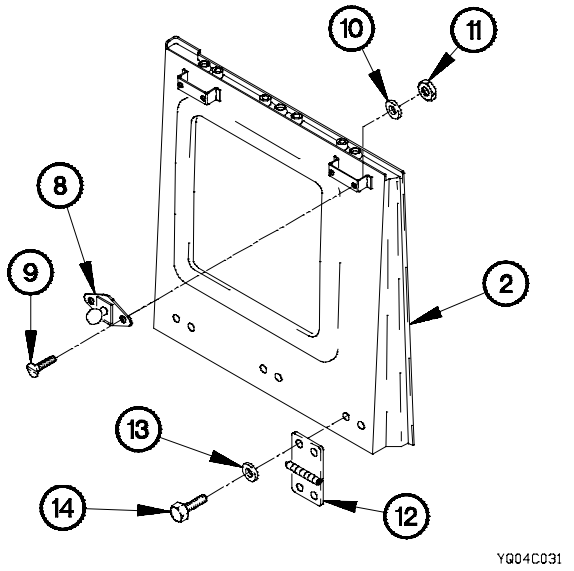
- Lubricate captive screws prior to installation.
- All captive screws are installed the same way. One shown.
- Tighten nut until captive screw is seated.

(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).

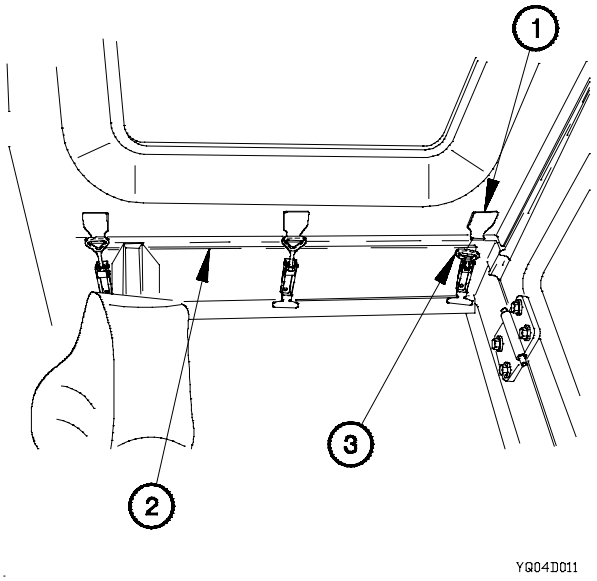
d. Installation.

NOTE

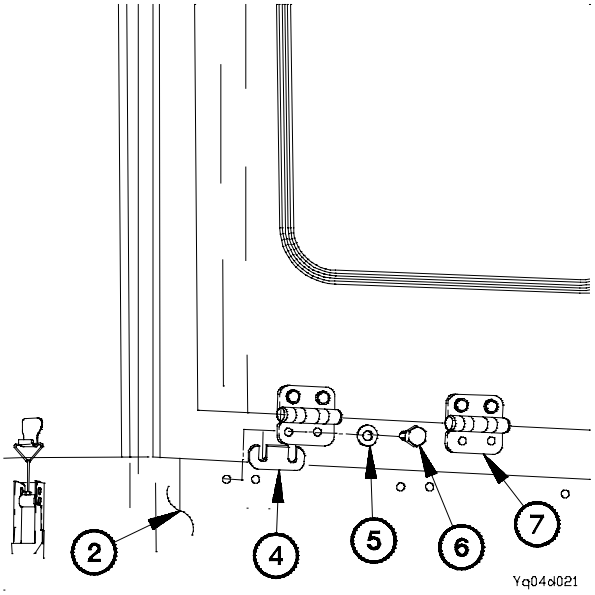
Steps (1) through (7) require the aid of an assistant.

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

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



YQ04D011



Yq04d021

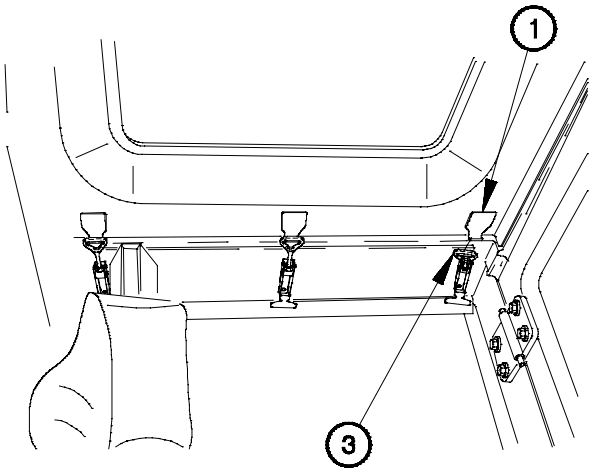
(3) Position three spacers (4), six washers (5), screws (6), and three hinges (7) on cab (2).

(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).

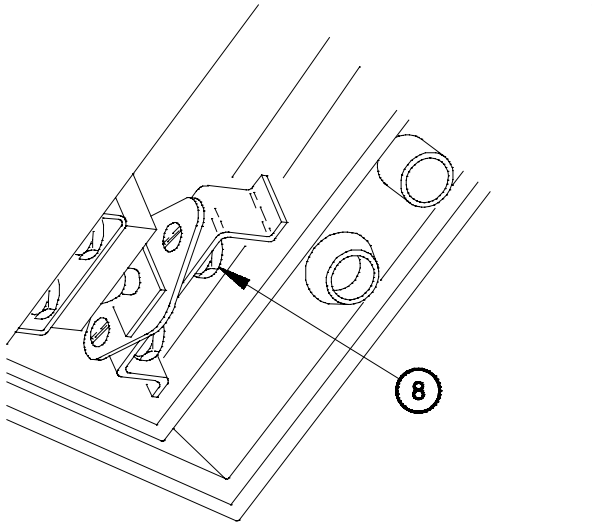


YQ04D031

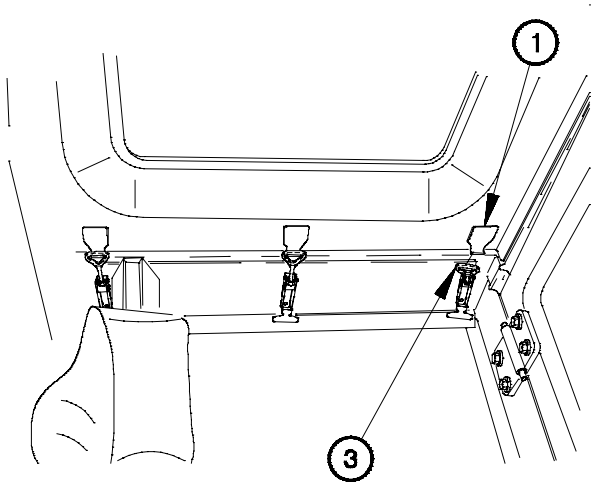
15-4. M1093/M1094 CAB SIDE WALL REPLACEMENT/REPAIR (CONT)

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

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



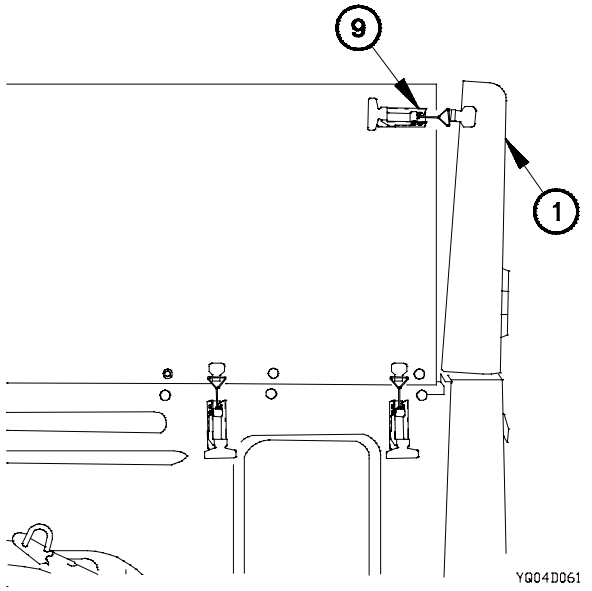
Yq04d041



YQ04D051

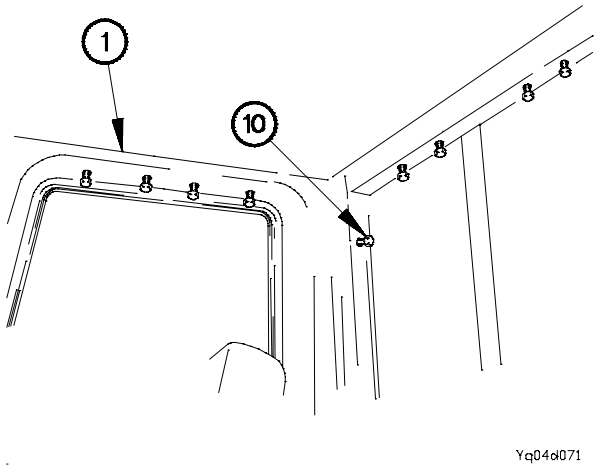
(8) Fold up cab side wall (1) and fasten three latches (3).

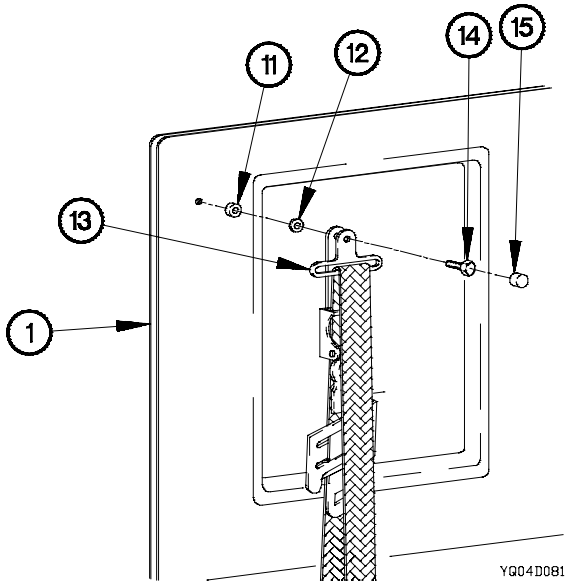
(9) Fasten latch (9) on cab side wall (1).



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)

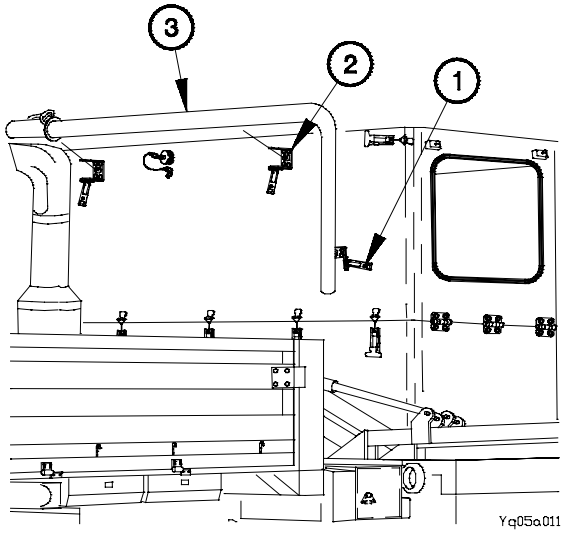
Materials/Parts
Washer, Flat (Item 94, Appendix C)
Nut, Self-locking (Item 53, Appendix C)
Seal (2) (30 in. (750mm)) (Item 366, Appendix F)
Screw, Captive (12) (Item 368, Appendix F)
Insulation Panel (Item 72, Appendix F)
Insulation Panel (Item 73, Appendix F)
Insulation Panel (Item 74, Appendix F)
Insulation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

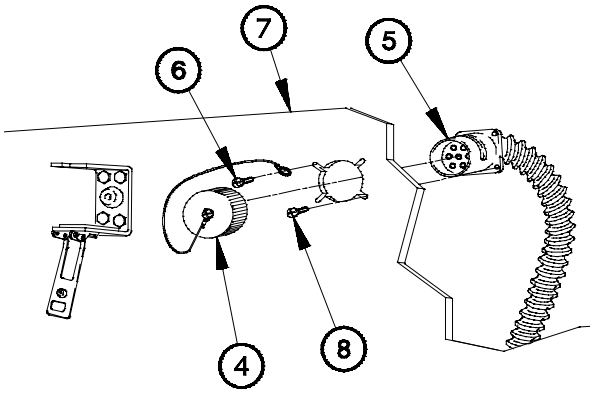
Personnel Required
(2)

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).

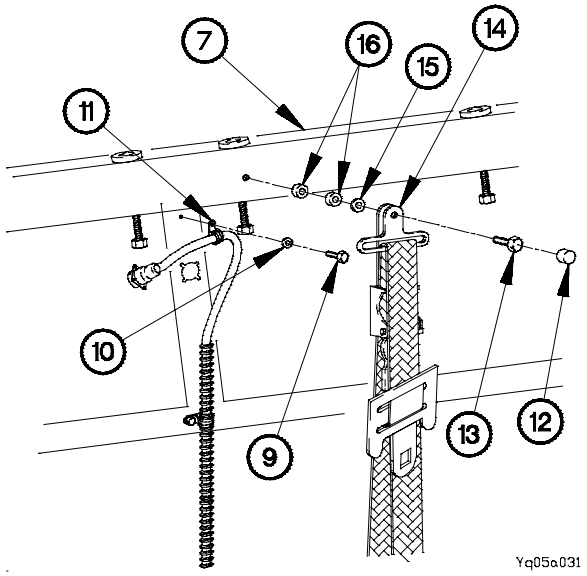
(4) Remove screw (6) and dustcap (4) from cab rear wall (7).

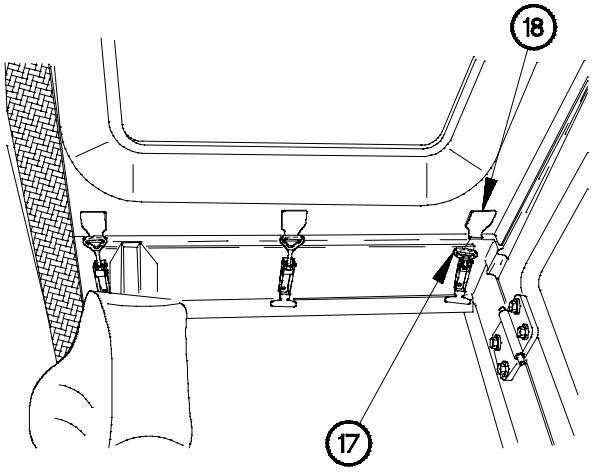
(5) Remove three screws (8) and connector J62 (5) from cab rear wall (7).

(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).



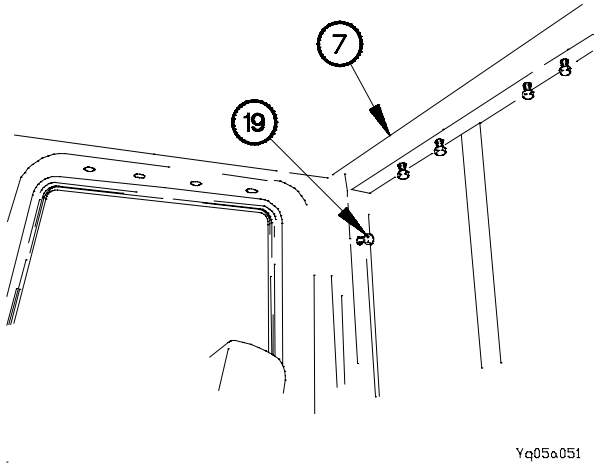


NOTE

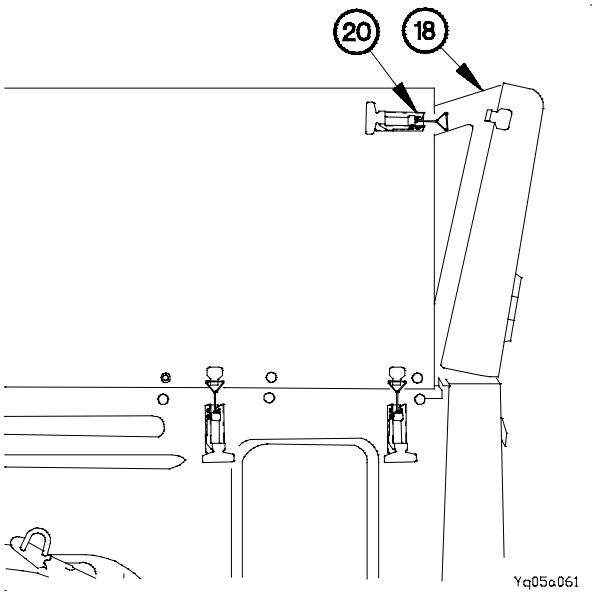
Perform steps (9) and (11) on left and right cab side walls, and step (10) on left and right sides of cab rear wall. Right side shown.

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

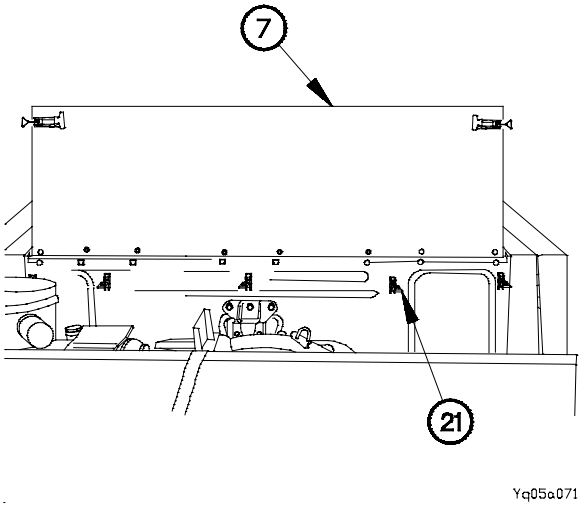
(10) Loosen captive screw (19) in cab rear wall (7).



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



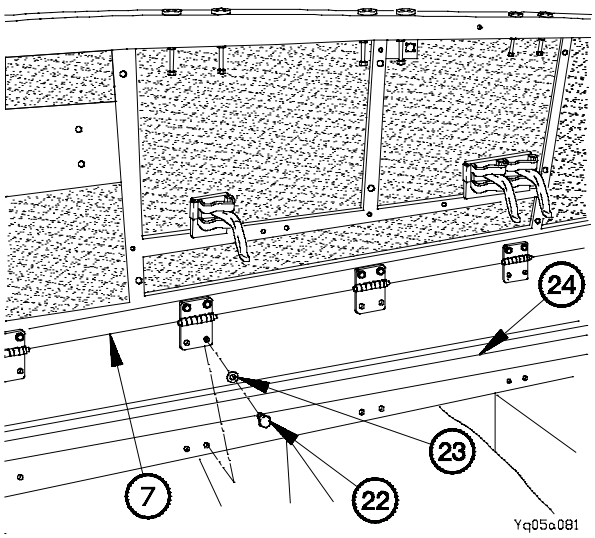
(11) Release latch (20) and fold down cab side wall (18).



NOTE

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

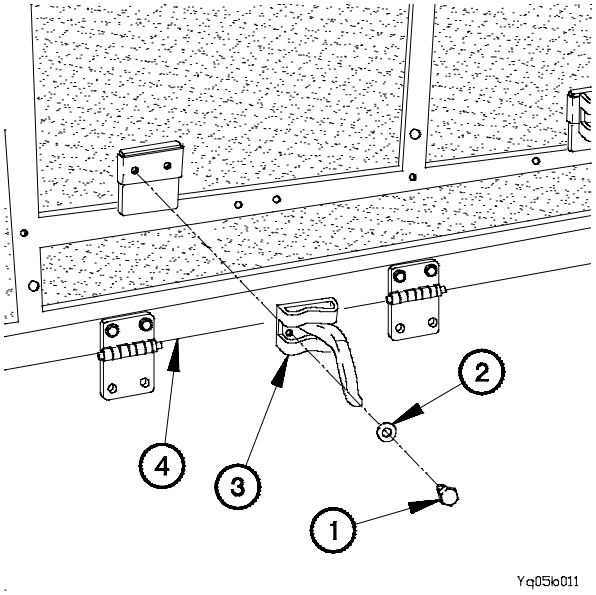
(12) Release five latches (21) on cab rear wall (7).

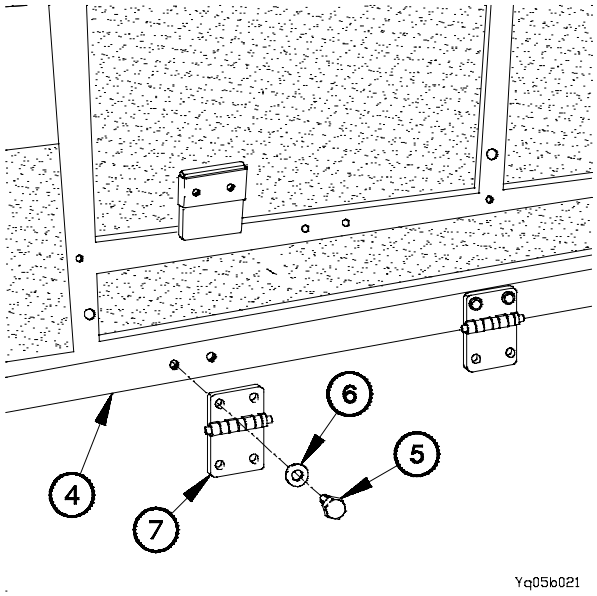


(13) Remove 10 screws (22), washers (23), and cab rear wall (7) from cab (24).

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

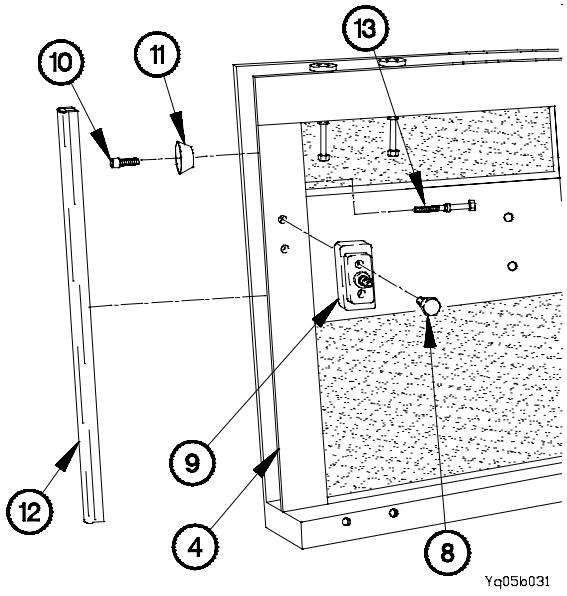
Perform steps (3) through (6) on left and right sides of cab rear wall. Right side shown.

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

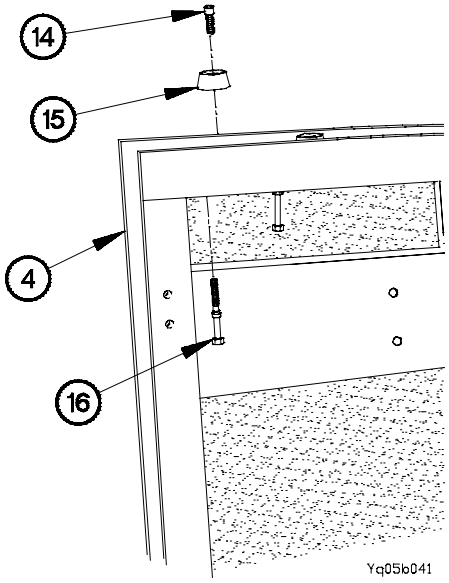
(4) Remove screw (10) and centering cup (11) from cab rear wall (4).

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

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

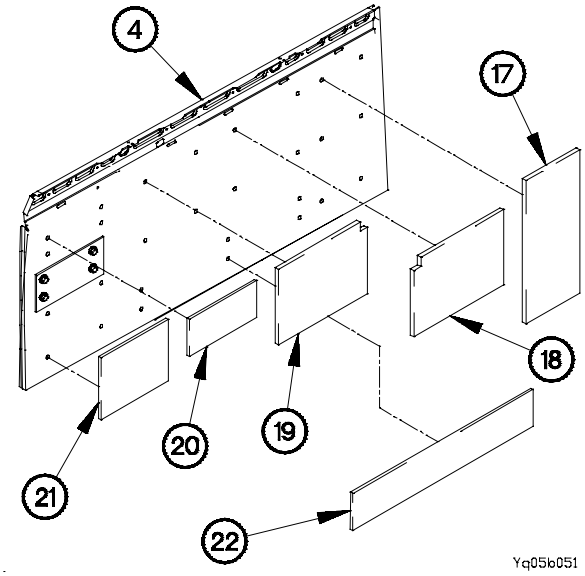


15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

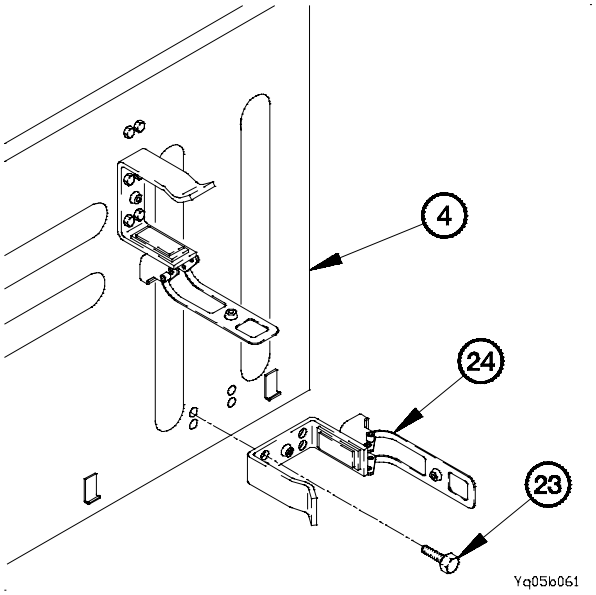


(7) Remove five screws (14) and centering cones (15) from cab rear wall (4).

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



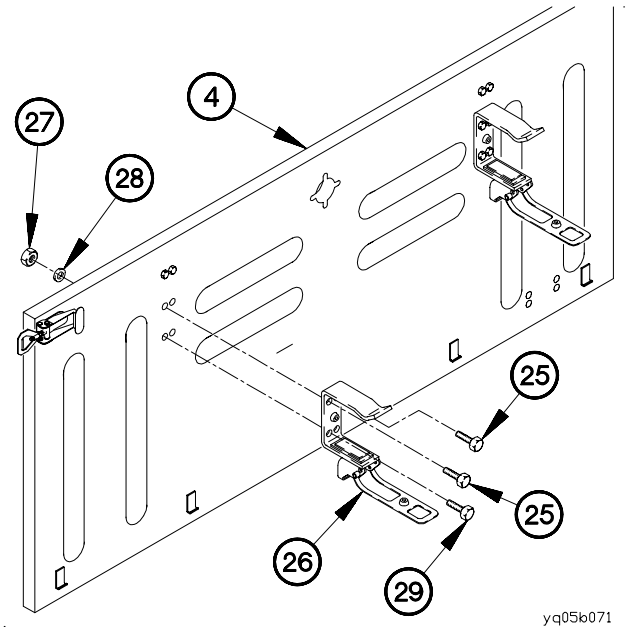
(9) Remove insulation panels (17 through 22) from cab rear wall (4). Discard insulation panels.

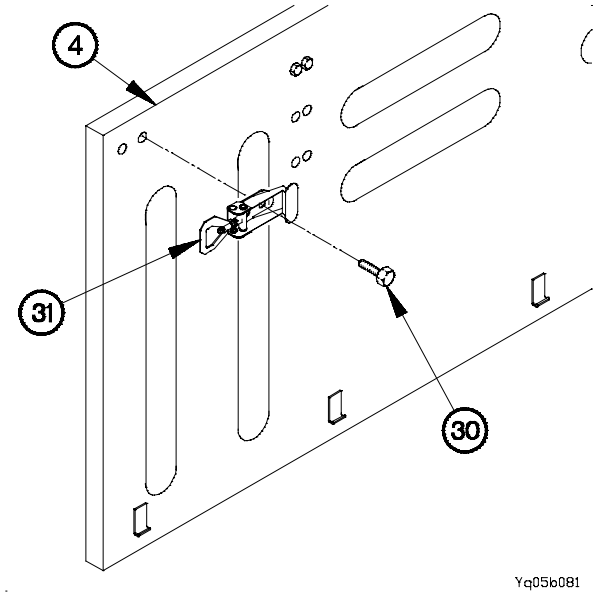


(10) Remove four screws (23) and clamp (24) from cab rear wall (4).

(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).

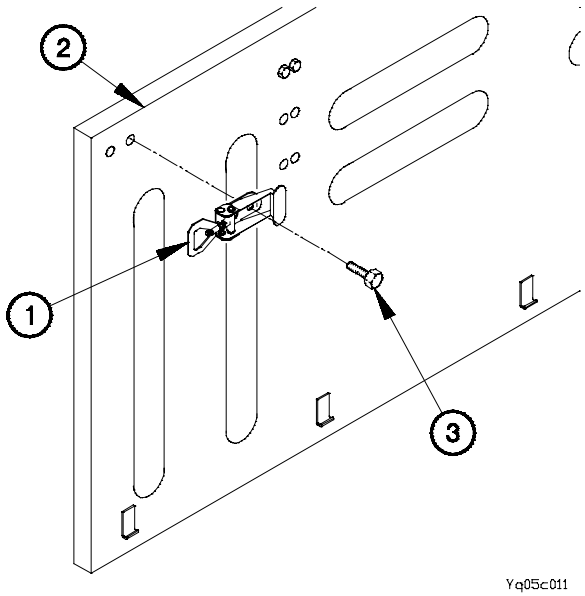
c. Assembly.

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).

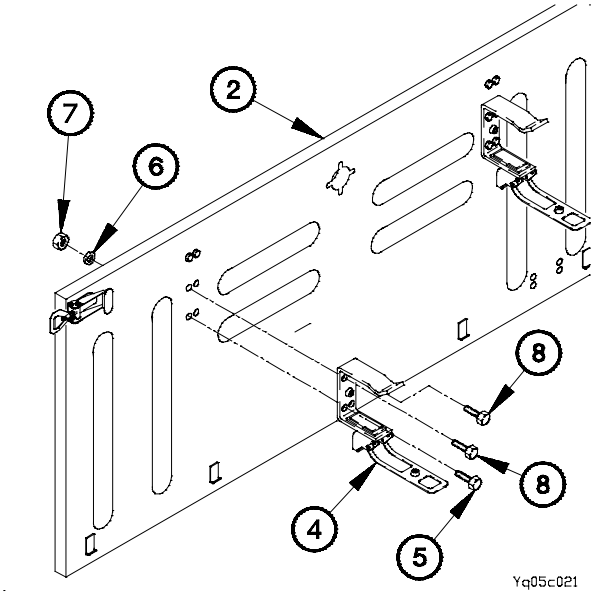


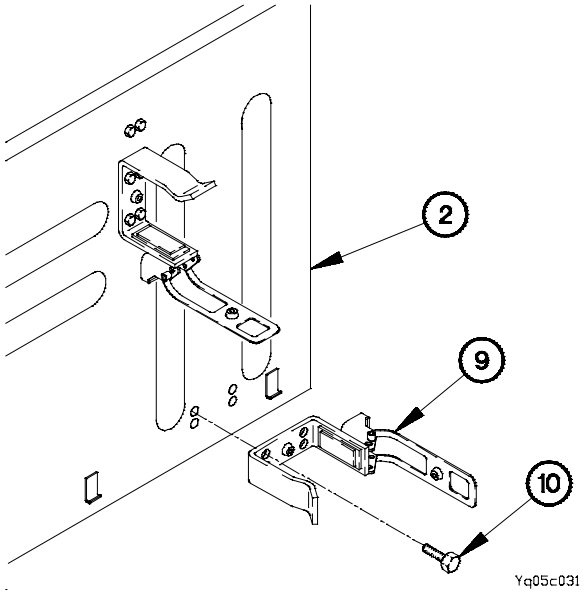
15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

(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).

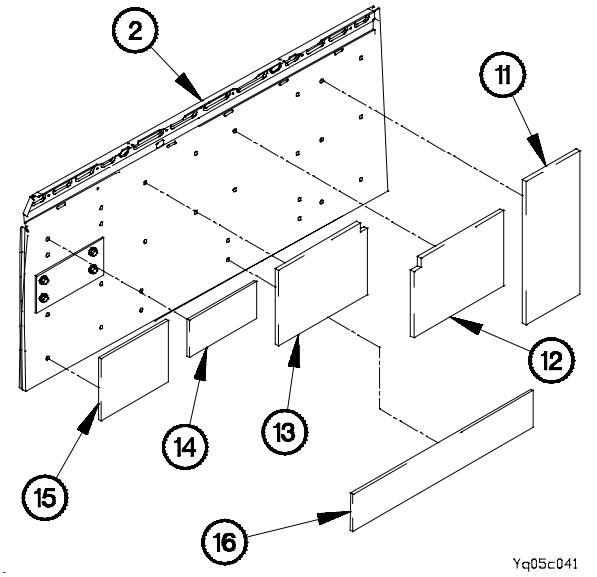




(6) Position clamp (9) on cab rear wall (2) with four screws (10).

(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.

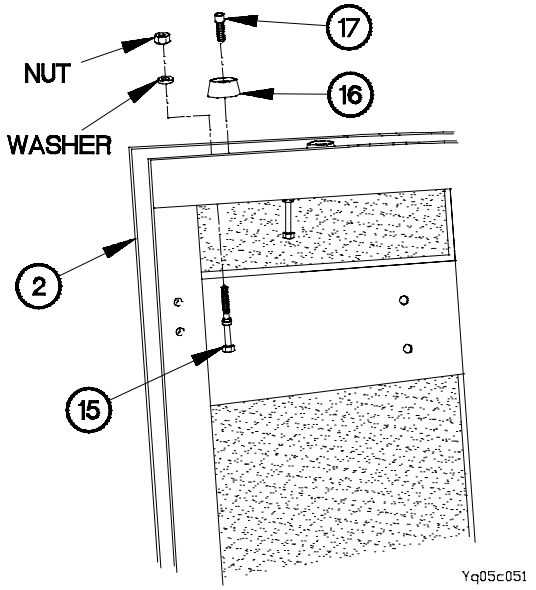
(9) Install captive screw (15) in cab rear wall (2) with washer and nut.

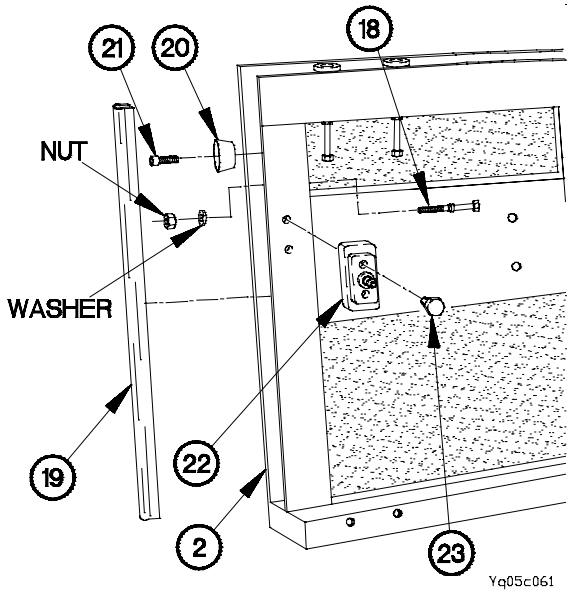
(10) Remove nut and washer from captive screw (15).

(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).

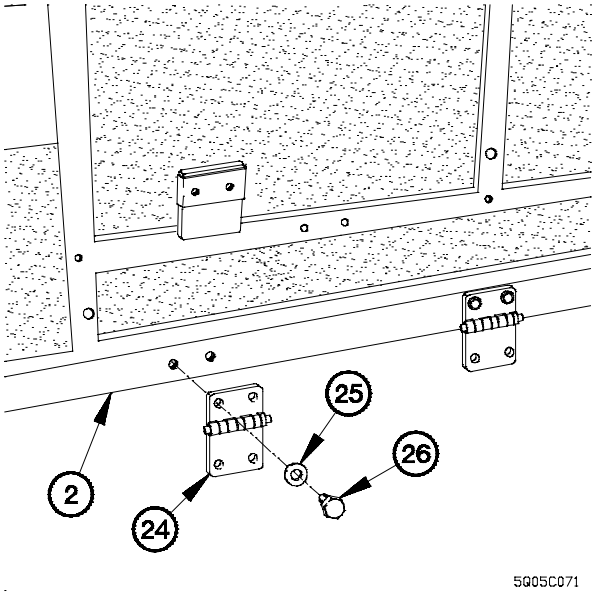
(18) Tighten screw (21) to 62-124 lb-in. (7-14 N·m).

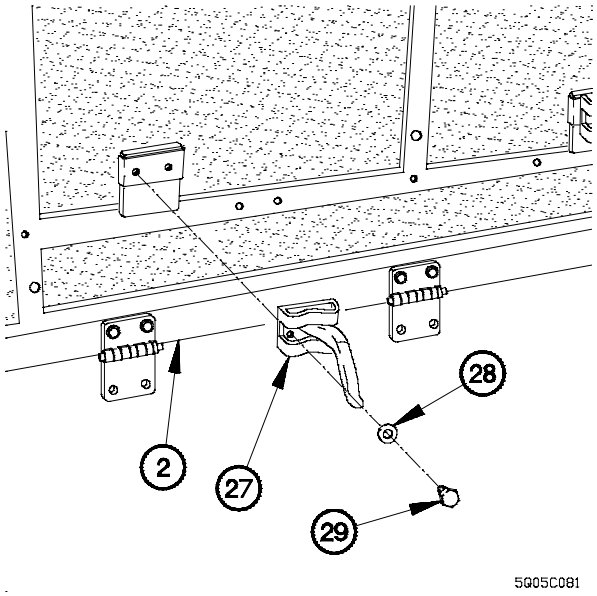
(19) Position friction catch (22) on cab rear wall (2) with two screws (23).

(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).

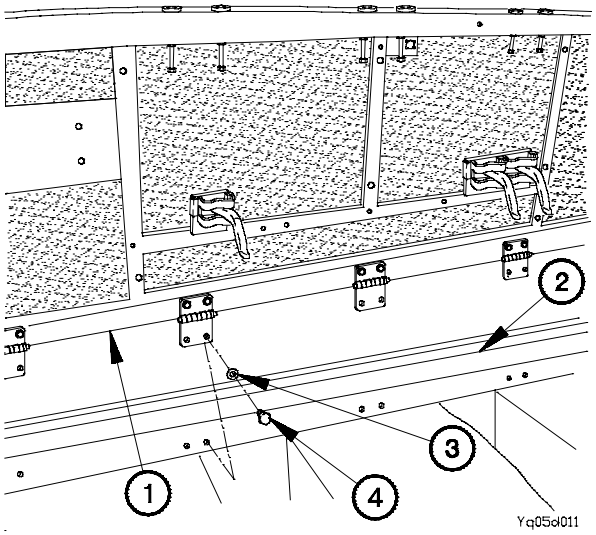
(23) Tighten six screws (29) to 35-44 lb-in. (4-5 N·m).

d. Installation.

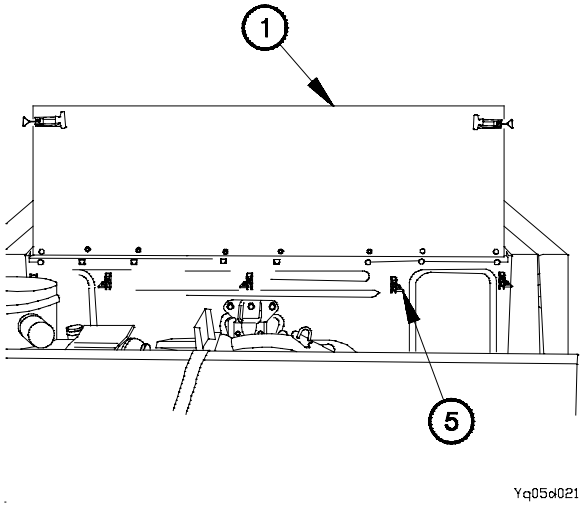
NOTE

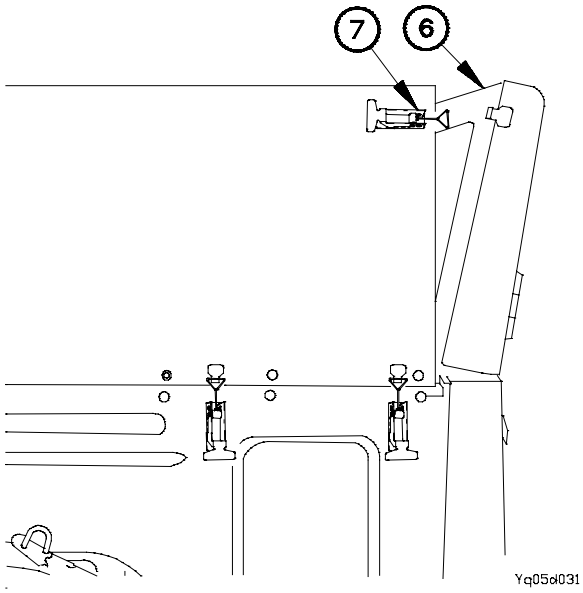
Steps (1) and (2) require the aid of an assistant.

(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).



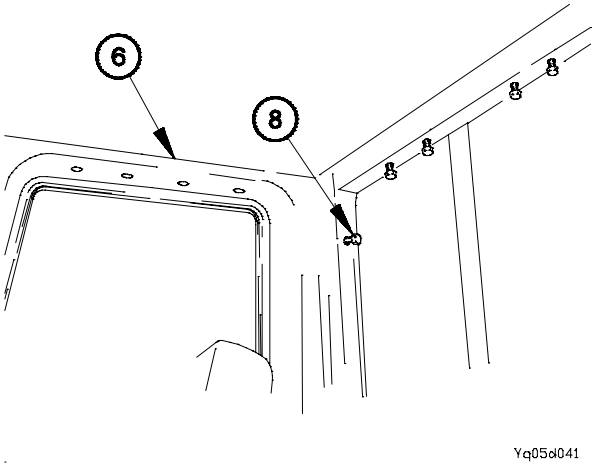


NOTE

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.

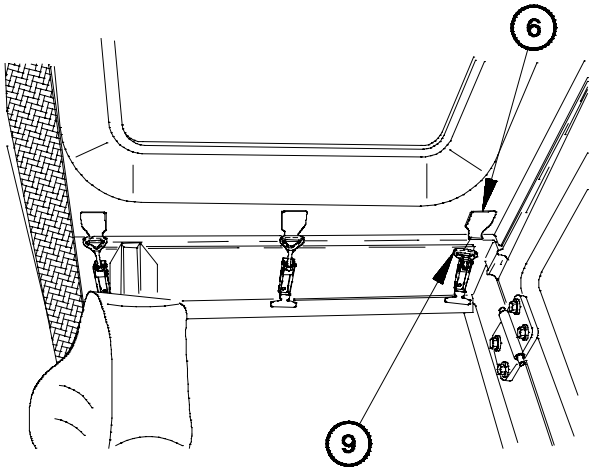
(3) Raise cab side wall (6) and fasten latch (7).

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

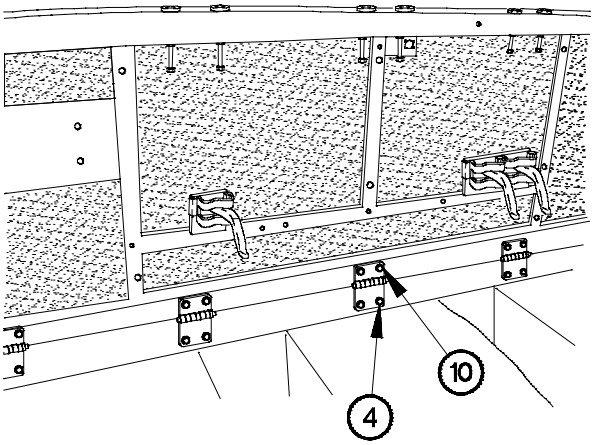


15-5. M1093/M1094 CAB REAR WALL REPLACEMENT/REPAIR (CONT)

(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).

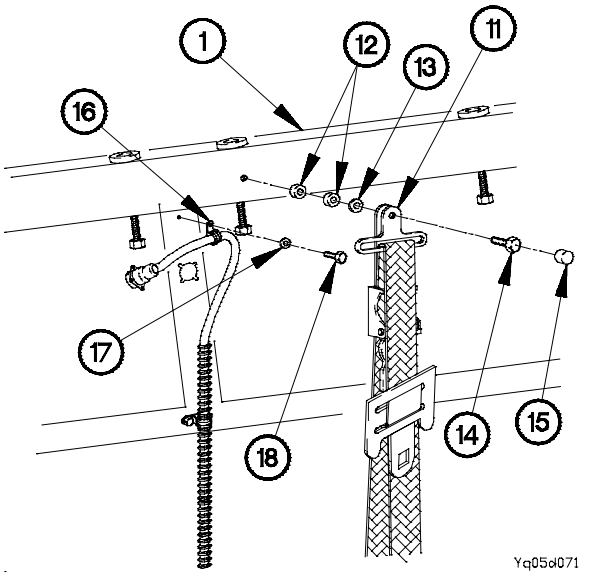
(8) Position center seatbelt mounting bracket (11) on cab rear wall (1) with two spacers (12), washer (13), and screw (14).

(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

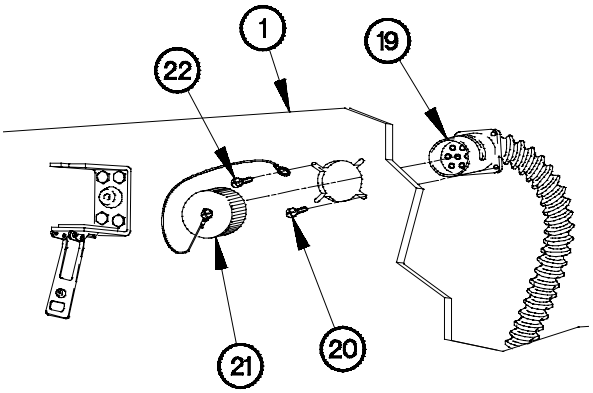
Steps (13) requires the aid of an assistant.

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

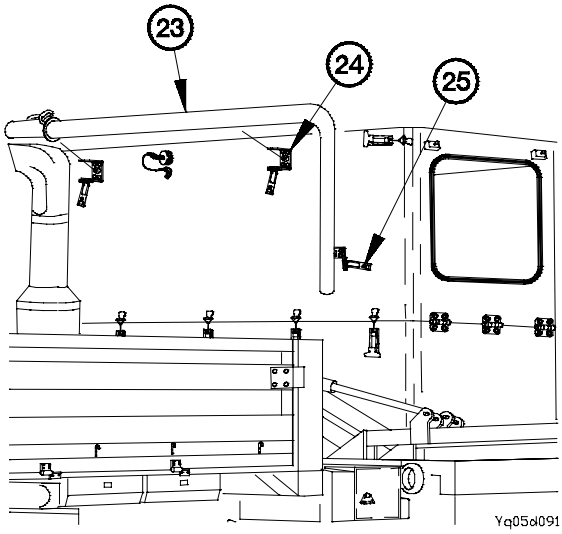
(14) Tighten three screws (20) to 27-35 lb-in. (3-4 N·m).

(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).

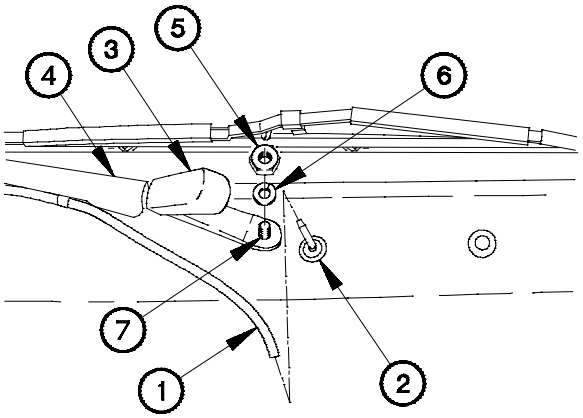
(3) Remove nut (5) and lockwasher (6) from wiper arm shaft (7). Discard lockwasher.

NOTE

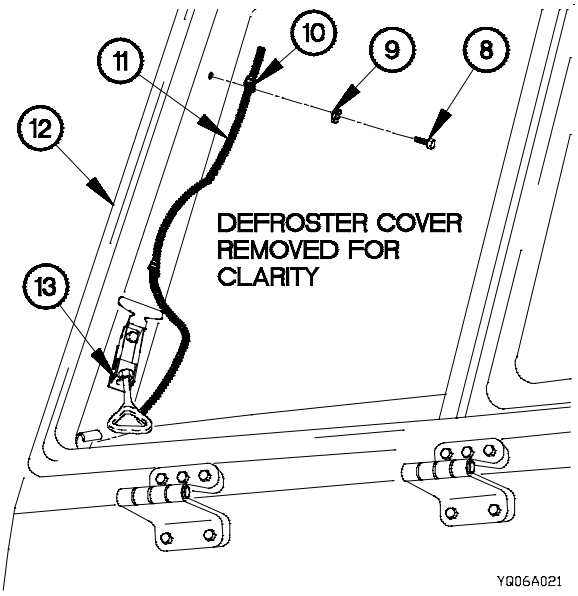
Mark position of wiper arm prior to removal.

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

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

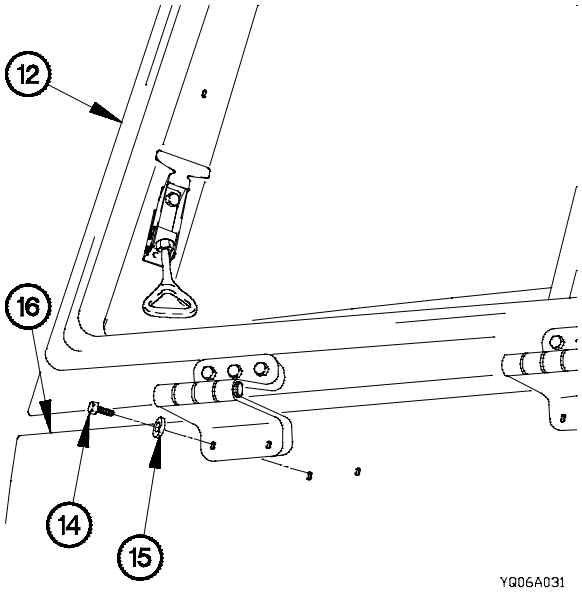


YQ06A011



(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).



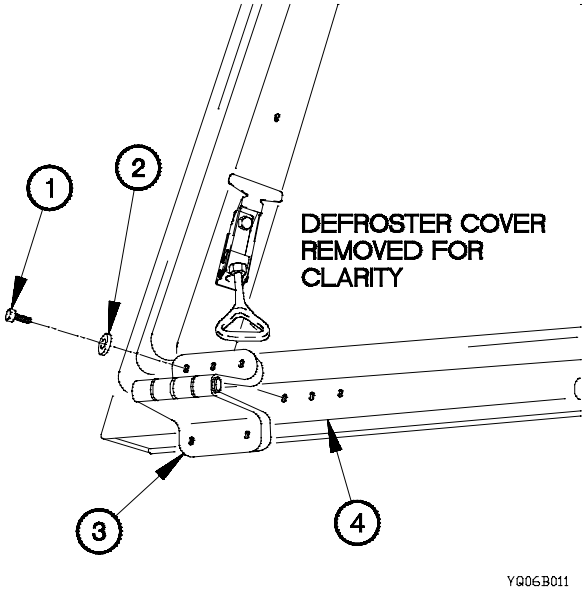
NOTE

Step (8) requires the aid of two assistants.

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

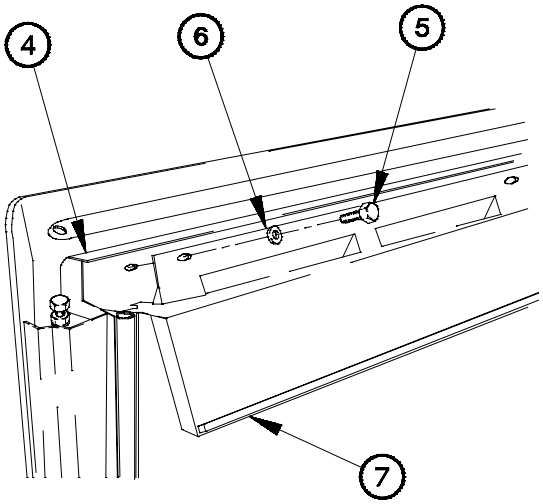
b. Disassembly.

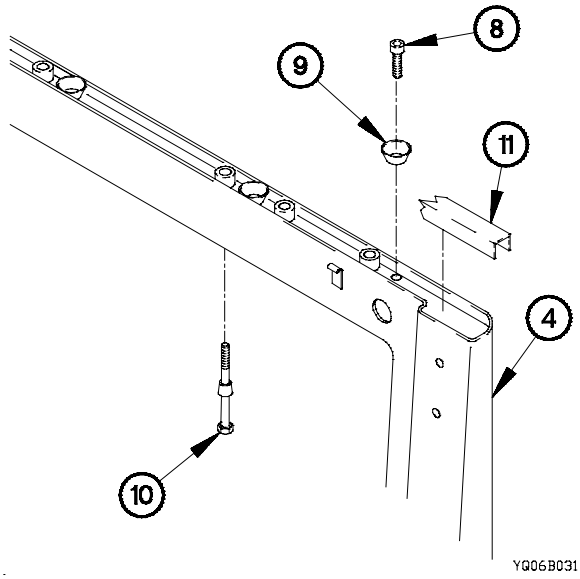
(1) Remove nine screws (1), washers (2), and three hinges (3) from windshield frame (4).



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).



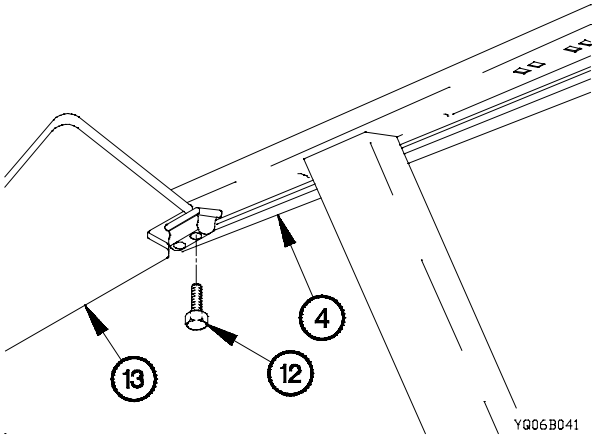


(3) Remove five screws (8) and centering cups (9) from windshield frame (4).

(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).

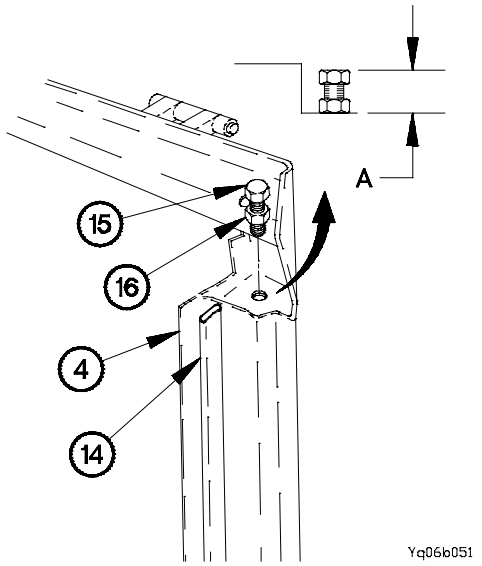


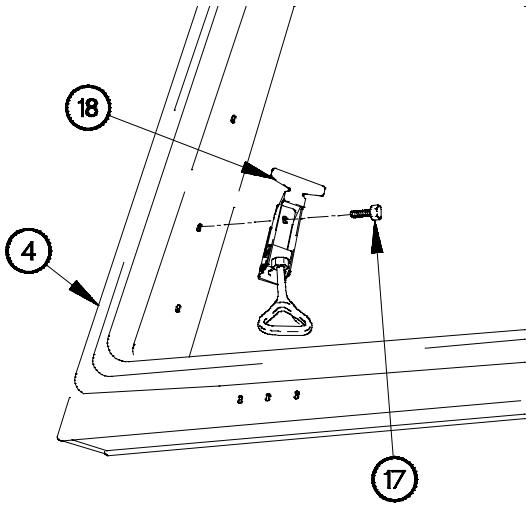
(7) Remove two seals (14) from windshield frame (4). Discard seals

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

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

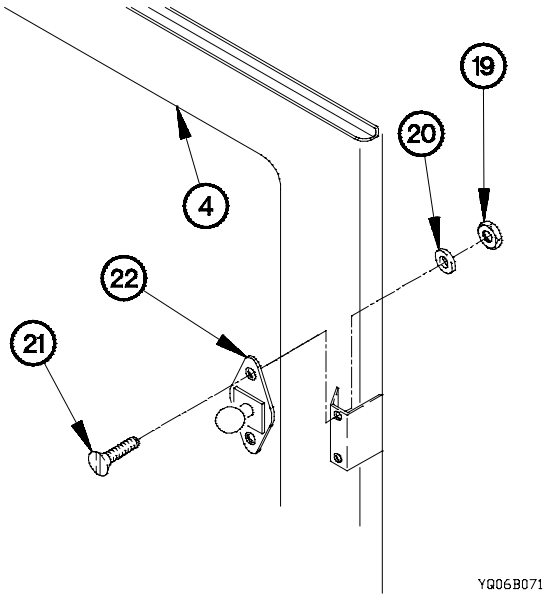
(10) Remove two stoppers (15) from windshield frame (4).





(11) Remove four screws (17) and two latches (18) from windshield frame (4).

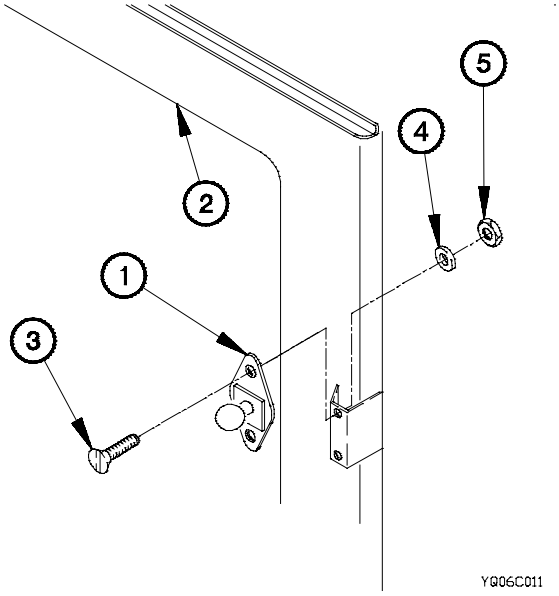
(12) Remove four nuts (19), washers (20), screws (21), and two friction catch studs (22) from windshield frame (4).

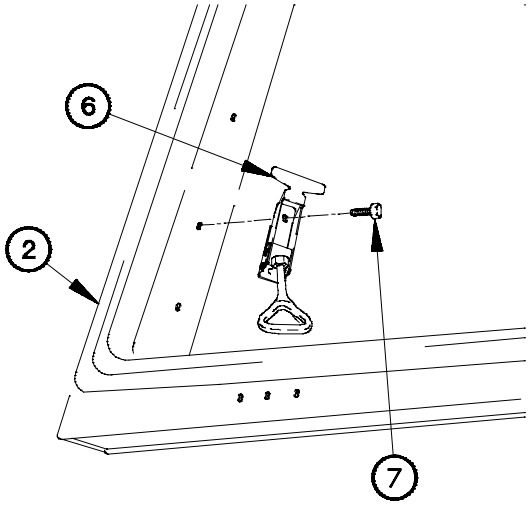


15-6. M1093/M1094 CAB WINDSHIELD FRAME REPLACEMENT/REPAIR (CONT)

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).

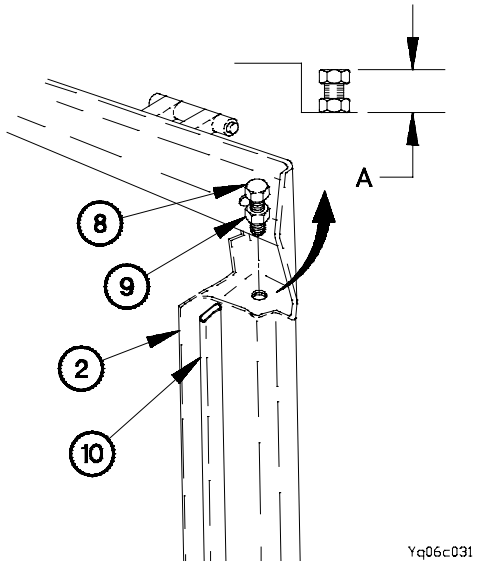
NOTE

Install stoppers using measurement A from disassembly.

(4) Install two stoppers (8) in windshield frame (2).

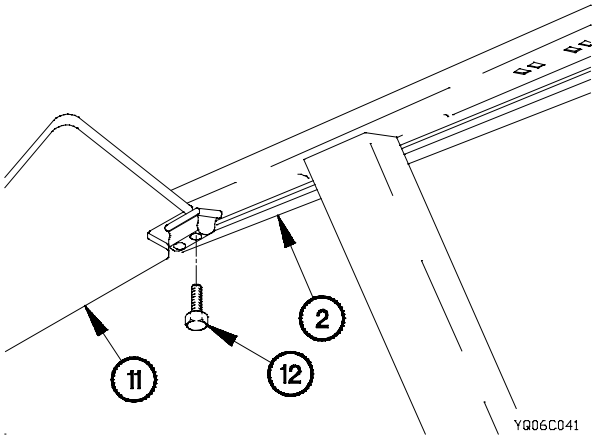
(5) Tighten two nuts (9) on stoppers (8).

(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).



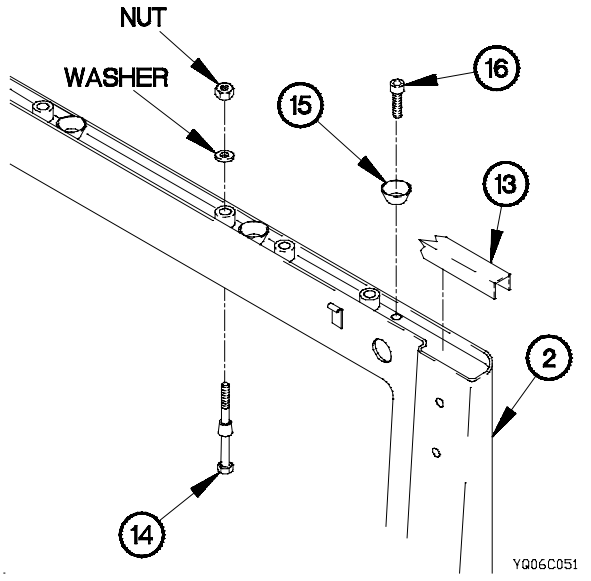
(9) Install seal (13) on windshield frame (2).

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).

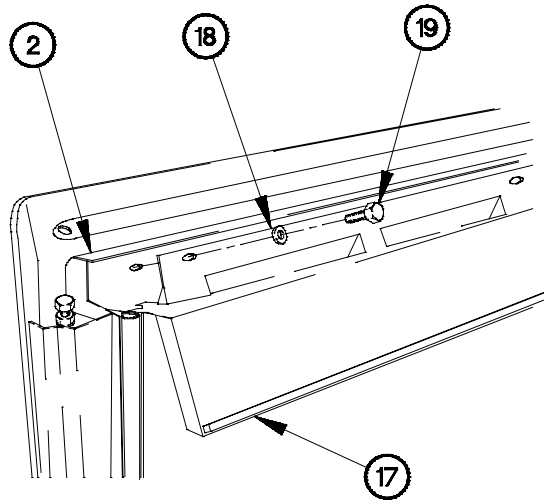
(12) Perform steps (10) and (11) on remaining nine captive screws.

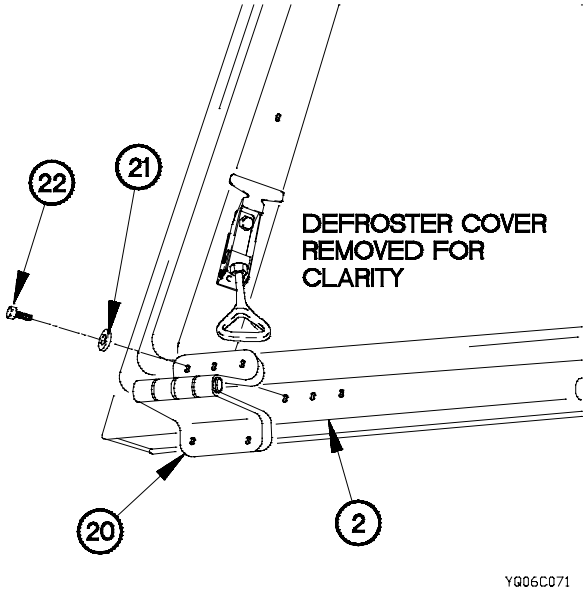
(13) Position five centering cups (15) on windshield frame (2) with five screws (16).

(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

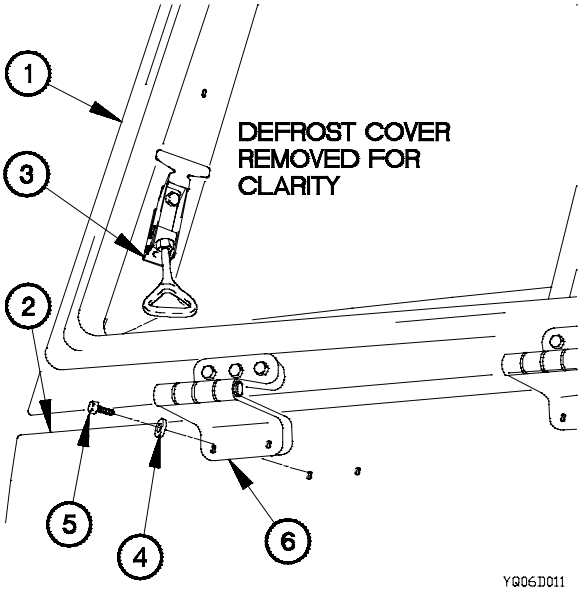
Steps (1) through (7) requires the aid of two assistants.

(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).

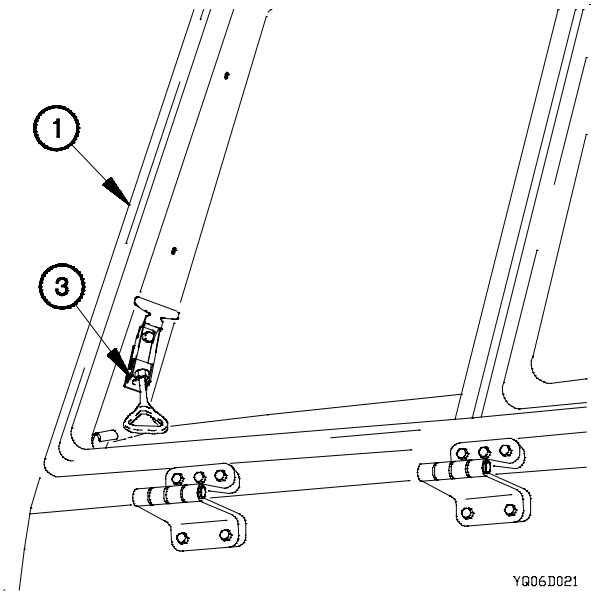
(4) Tighten six bolts (5) to 22-28 lb-ft (30-38 N·m).

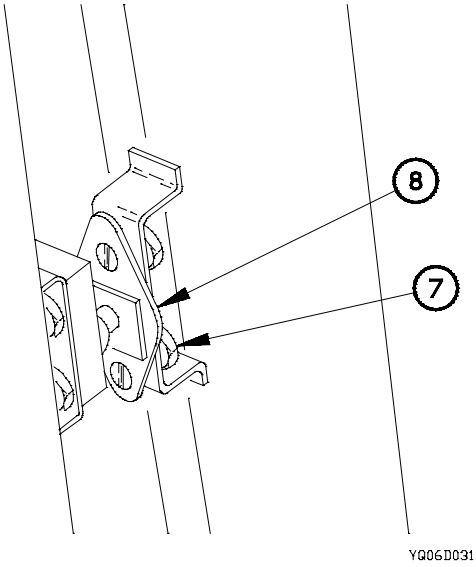


NOTE

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

(5) Release two latches (3) and fold down windshield frame (1).

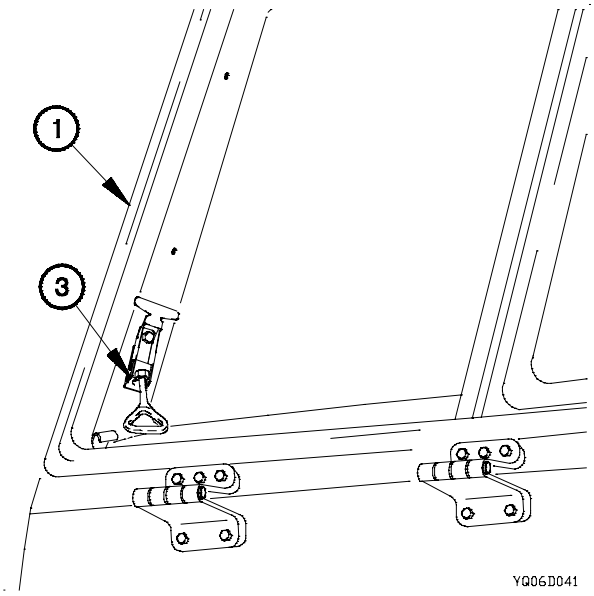




(6) Tighten two nuts (7) to 62-124 lb-in. (7-14 N·m).

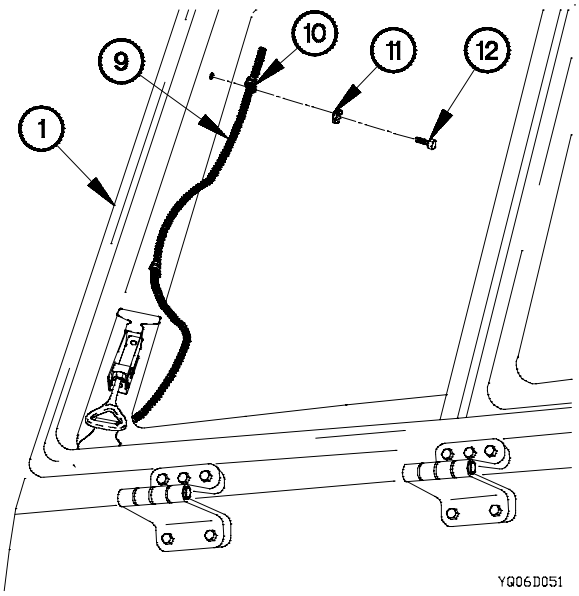
(7) Perform step (6) on remaining friction catch stud (8).

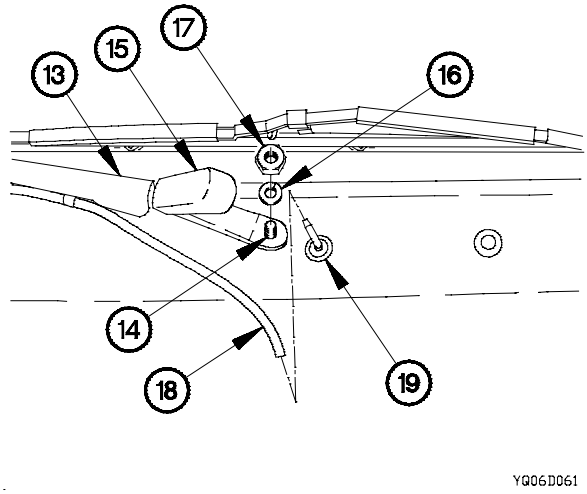
(8) Fold up windshield frame (1) and fasten two latches (3).



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

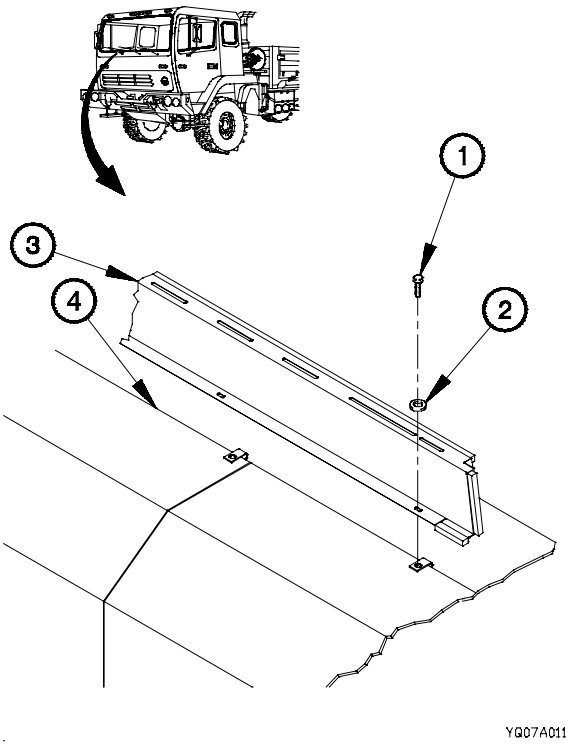
Goggles and gloves must be worn when working with glass. Failure to comply may result in injury to personnel.

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).

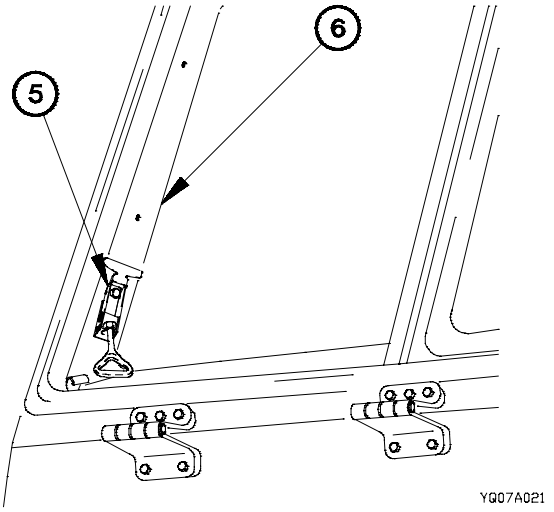


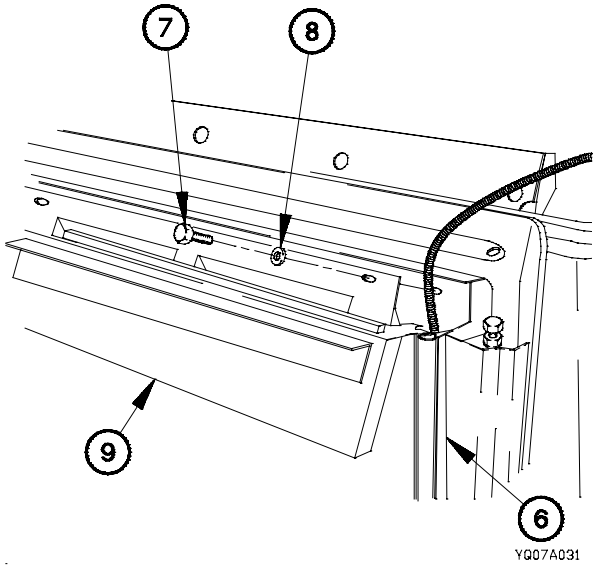
15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

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

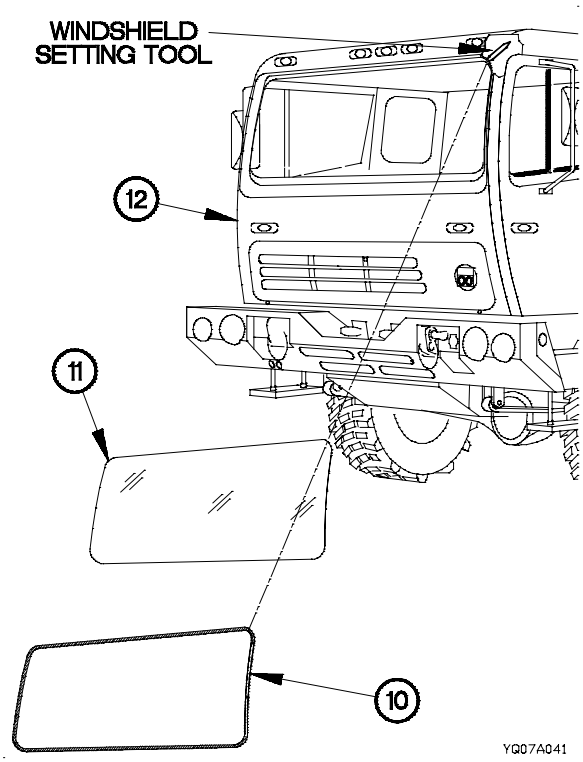
Move windshield setting tool around edge of seal as windshield is removed.

(6) Lift lip of seal (10) around windshield (11).

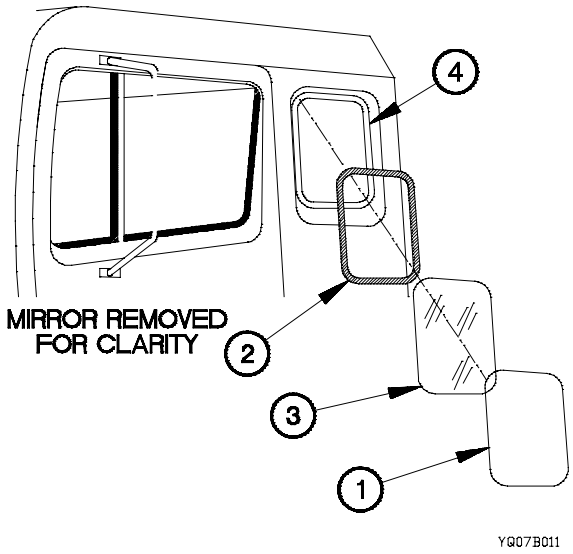
(7) Apply outward pressure to windshield (11).

(8) Remove windshield (11) from cab (12).

(9) Remove seal (10) from windshield (11).



b. Cab Side Window Removal.



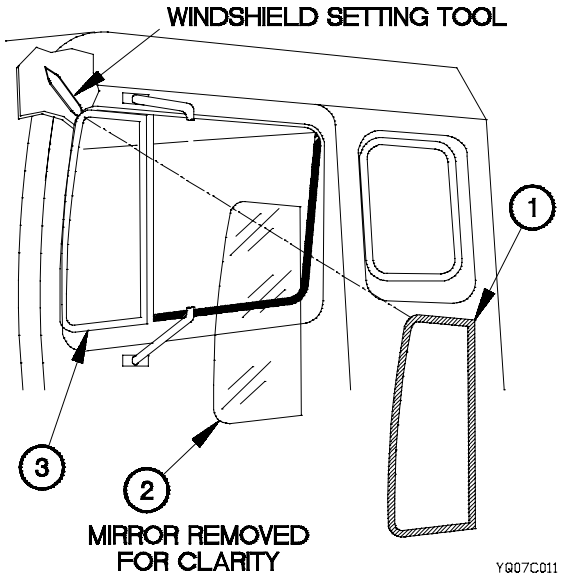
(1) Remove rubber locking strip (1) from seal (2).

(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.

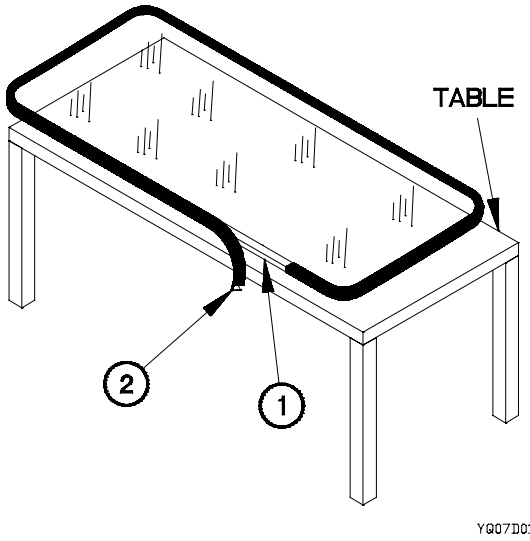
(2) Lift seal (1) around window (2).

(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.

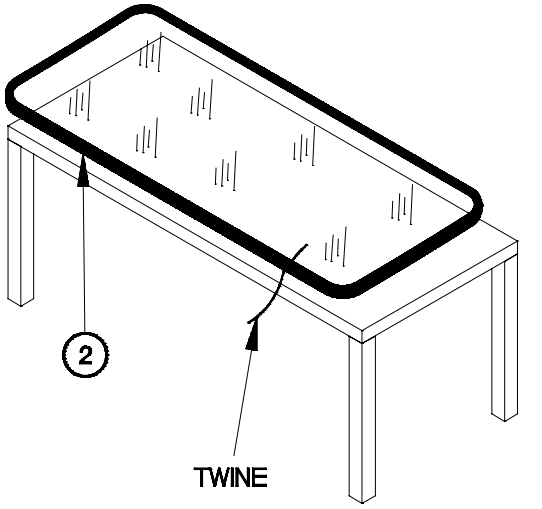
(1) Position windshield (1) on table with cab interior side of windshield facing up.

(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.

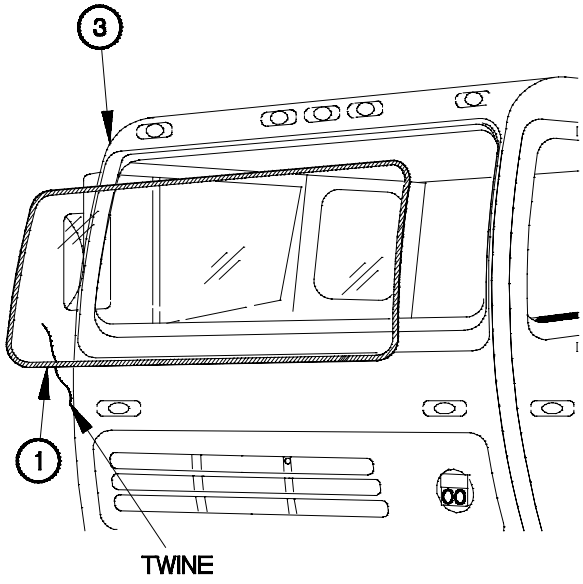


YQ07D021

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).



YQ07D031

NOTE

Steps (5) through (13) require the aid of an assistant.

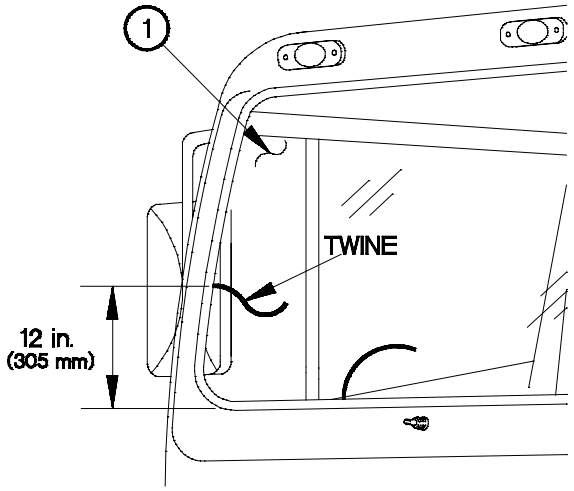
(5) Position windshield (1) in cab (3).

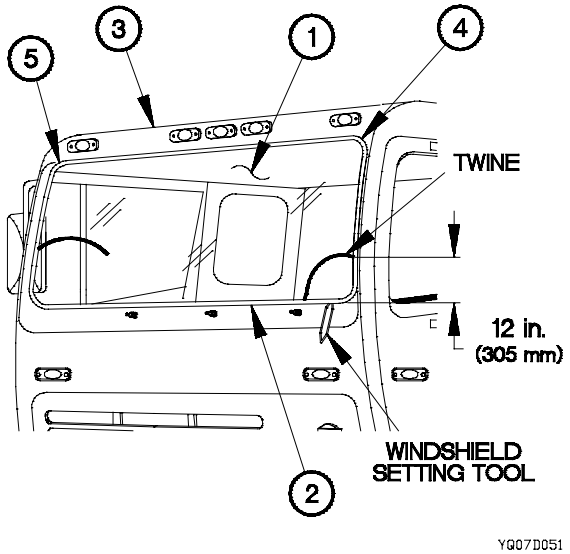
15-7. CAB WINDSHIELD, SIDE WINDOW AND DOOR SIDE WINDOW REPLACEMENT (CONT)

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

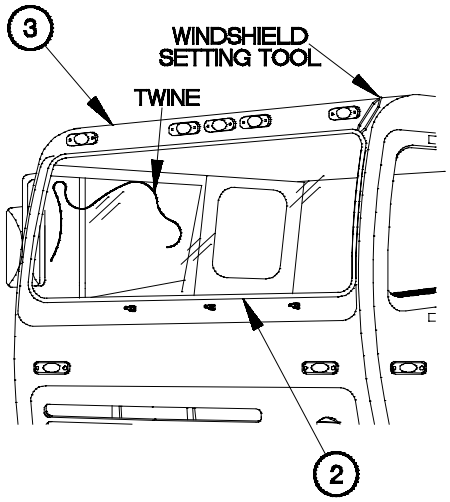
After using windshield setting tool, tap bottom section of seal lightly with soft head hammer to ensure proper fit with cab. Use caution not to hit glass. Failure to comply may result in damage to equipment.

(8) Insert bottom of seal (2) evenly with cab (3) using windshield setting tool and soft head hammer.

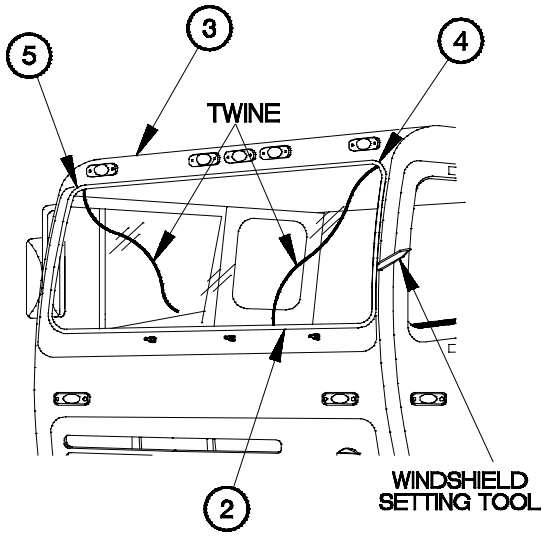
(9) Pull down on LH and RH top corners (4 and 5) of windshield (1).

(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.



YQ07D071



YQ07D061

(12) Pull LH side of twine over to RH side of cab (3) until completely removed from seal (2).

(13) Insert top of seal (2) evenly with cab (3) using windshield setting tool and rubber hammer.

NOTE

Start at lower RH side of windshield

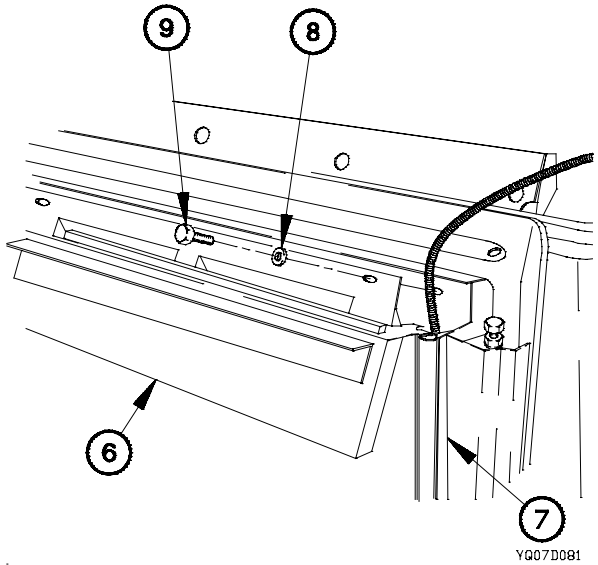
(14) Check seal (2) for proper installation, adjust as required with windshield setting tool and soft head hammer.

NOTE

- Perform steps (15) through (17) on M1093/M1094.
- Left and right defrost covers are installed the same way. Left defrost cover shown.

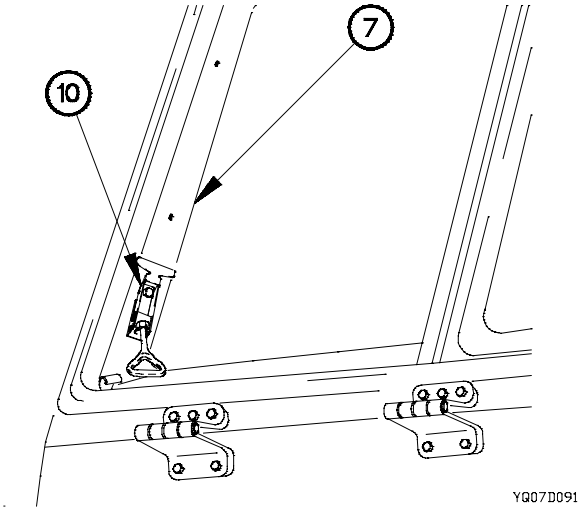
(15) Install defrost cover (6) on windshield frame (7) with four washers (8) and screws (9).

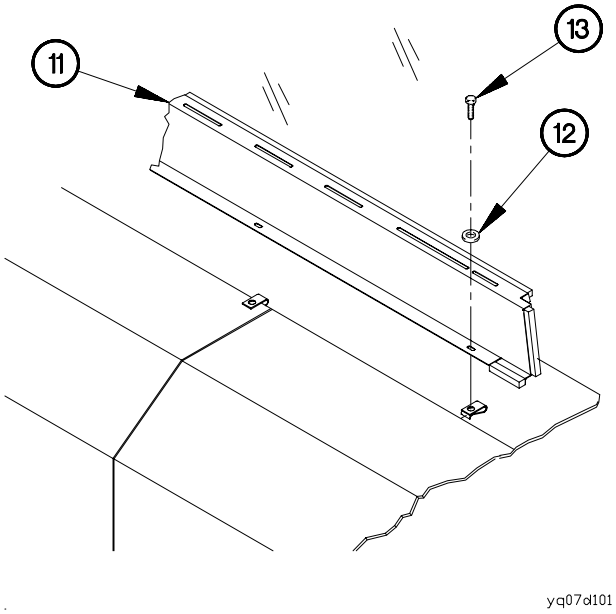
(16) Perform step (15) on right defrost cover.



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)

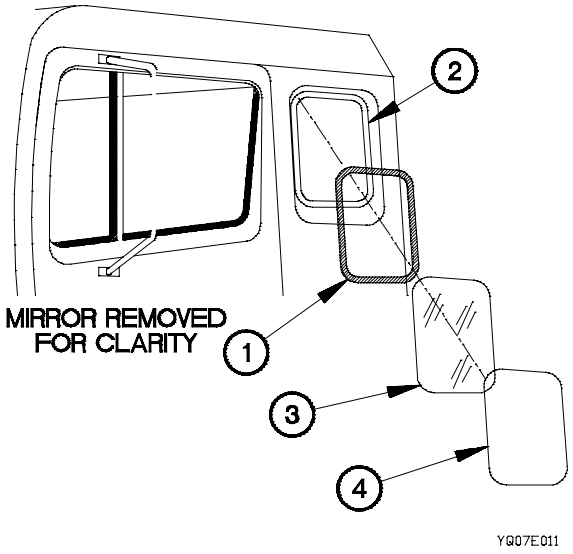
e. Cab Side Window Installation.

(1) Position seal (1) in side window frame (2).

(2) Position glass (3) in seal (1).

WARNING

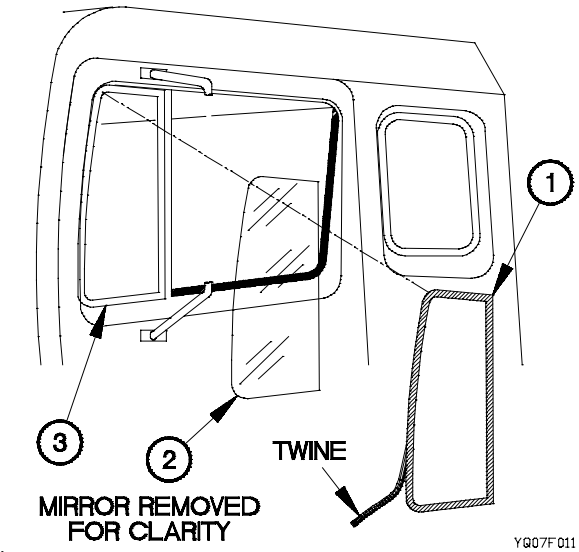
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

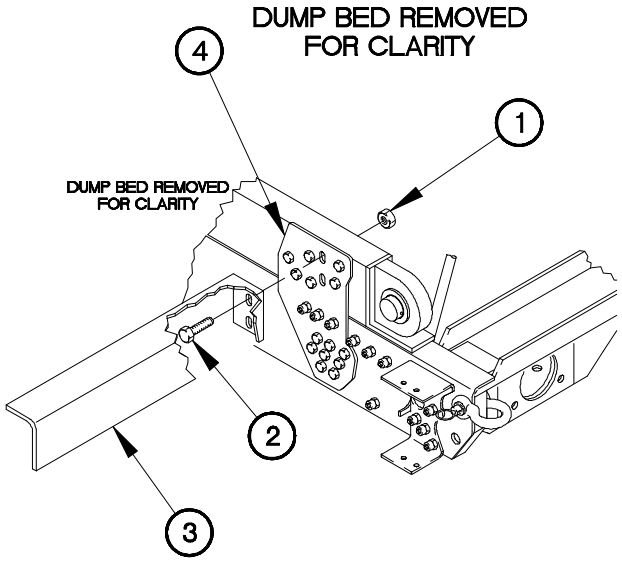
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

a. Removal.

NOTE

- Left and right side rear fender mounting brackets and extension brackets are removed the same way. Left side shown.
- Steps (1) and (5) require the aid of an assistant.

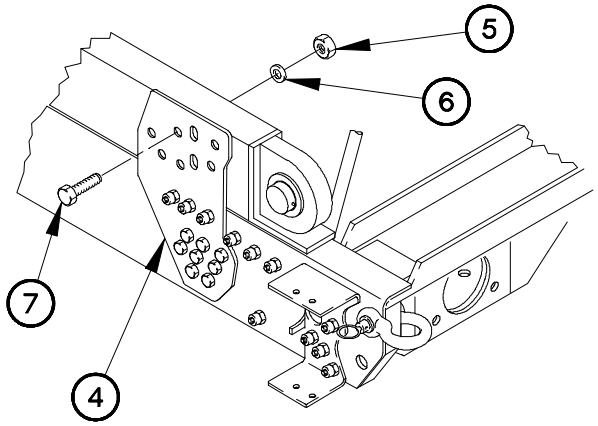
(1) Remove two self-locking nuts (1), bolts (2), and extension bracket (3) from rear fender mounting bracket (4). Discard self-locking nuts.



15-8. M1090 REAR FENDER MOUNTING BRACKET AND EXTENSION BRACKET REPLACEMENT (CONT)

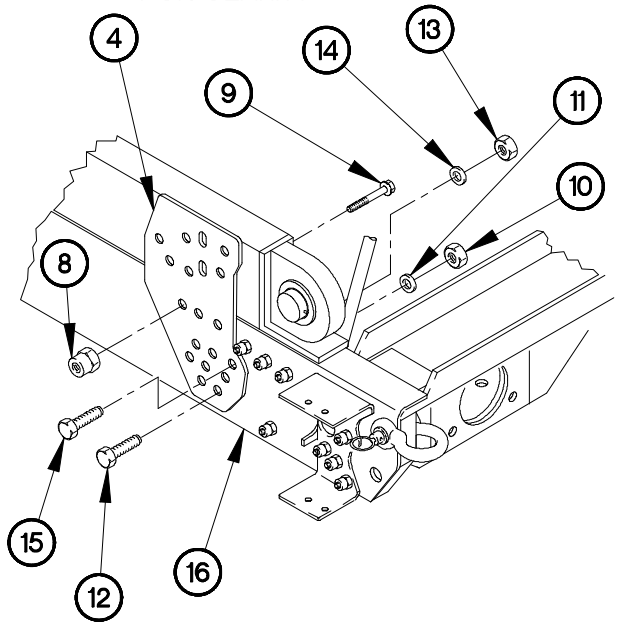
(2) Remove six self-locking nuts (5), washers (6), and bolts (7) from frame plate (4). Discard self-locking nut,

DUMP BED REMOVED FOR CLARITY



6Q08R02

DUMP BED REMOVED FOR CLARITY



6Q08R03

CAUTION

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

(3) Remove three collars (8) and bolts (9) from frame plate (4). Discard collars and bolts.

(4) Remove seven self-locking nuts (10), washers (11), and bolts (12) from frame plate (4). Discard self-locking nuts.

(5) Remove self-locking nut (13), washer (14), bolt (15), and frame plate (4) from frame rail (16). Discard self-locking nut.

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 (9) require the aid of an assistant.

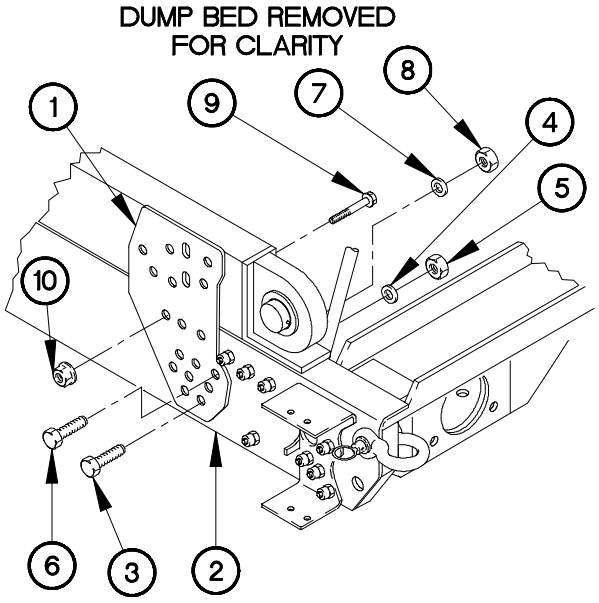
(1) Position frame plate (1) on frame rail (2) with seven bolts (3), washers (4), and self-locking nuts (5).

(2) Position bolt (6) in frame plate (1) with washer (7) and self-locking nuts (8).

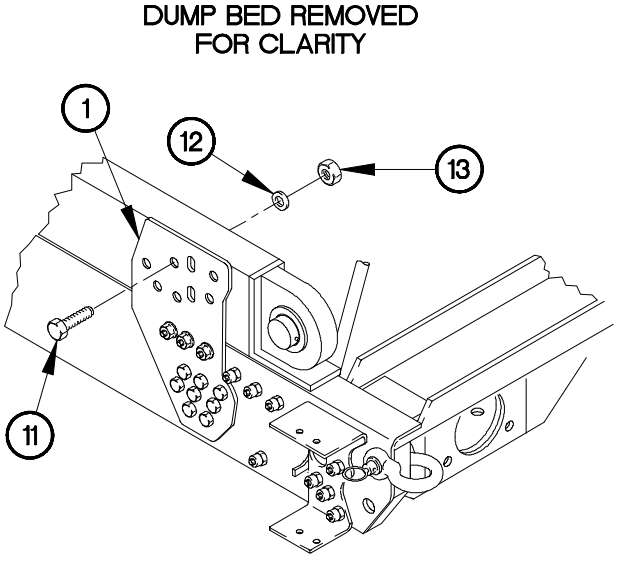
(3) Position three bolts (9) in frame rail (2) with three self-locking nuts (10).

(4) Tighten seven self-locking nuts (5) and self-locking nut (8) to 53-58 lb-ft (72-78 N•m).

(5) Tighten three self-locking nuts (10) to 210-255 lb-ft (285-305 N•m).



6Q08R04



6Q08R05

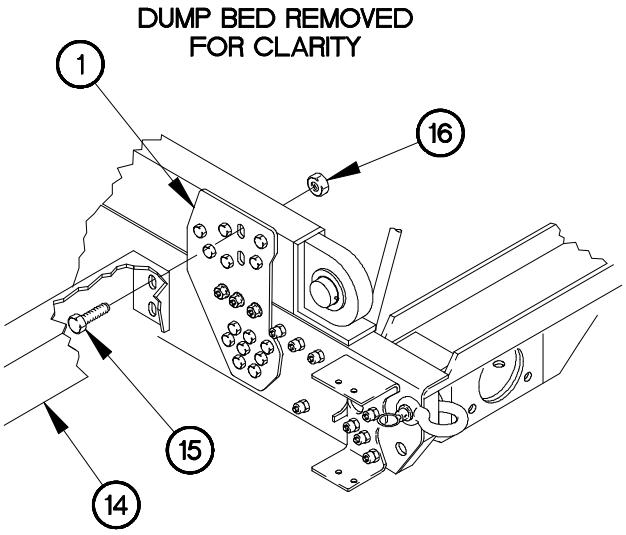
(6) Position six bolts (11) in frame plate (1) with washers (12) and self-locking nuts (13).

(7) Tighten six self-locking nuts (13) to 53-58 lb-ft (72-78 N•m).

15-8. M1090 REAR FENDER MOUNTING BRACKET AND EXTENSION BRACKET REPLACEMENT (CONT)

(8) Position rear fender extension bracket (14) on frame plate (1) with two bolts (15) and self-locking nuts (16).

(9) Tighten two self-locking nuts (16) to 148-163 lb-ft (202-222 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/REPAIR

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. Tie Down Removal
j. Tie Down Installation
k. 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).
Fenders and splash guards 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, 0-600 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 9-2320-366-20-1)

Tools and Special Tools (Cont)
Riveter, Blind Pneumatic (Item 42.1, Appendix B, TM 9-2320-366-20-1)
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)
Lockwasher (24) (Item 166, Appendix F) (M1093)
Nut, Self-Locking (6) (Item 182, Appendix F) (M1093)
Nut, Self-Locking (6) (Item 208, Appendix F)
Rivet, Blind (20) (Item 364.1, Appendix F)

Personnel Required
(4)

References
TM 43-0139

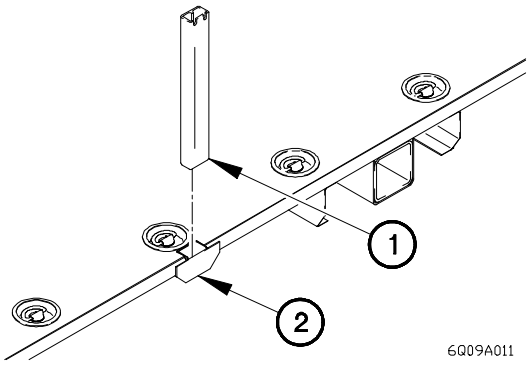
15-9. CARGO BED REPLACEMENT/REPAIR (CONT)

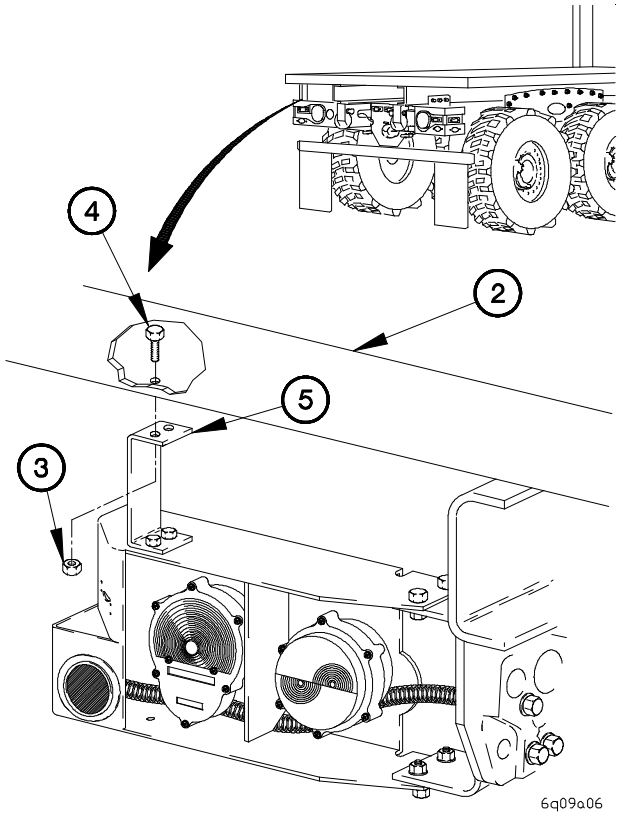
WARNING

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 stakes (1) from cargo bed (2).





NOTE

Left and right braces are removed the same way. Left side brace shown.

(2) Remove self-locking nut (3) and screws (4) from bracket (5) and cargo bed (2). Discard self-locking nut.

(3) Perform step (2) on right side brace.

CAUTION

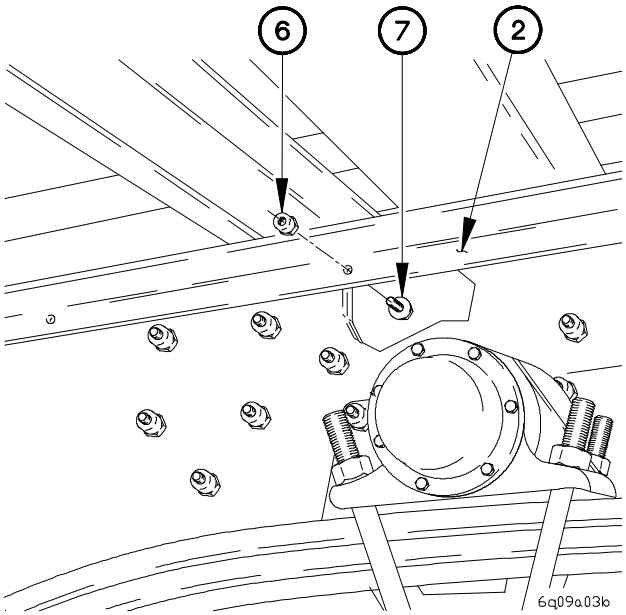
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collars to bolts.

NOTE

- Left and right side of cargo bed is removed the same way. Left side shown.
- Step (4) requires the aid of an assistant.

(4) Remove 10 collars (6) and bolts (7) from cargo bed (2). Discard collars and bolts.

(5) Perform step (4) on right side of cargo bed.



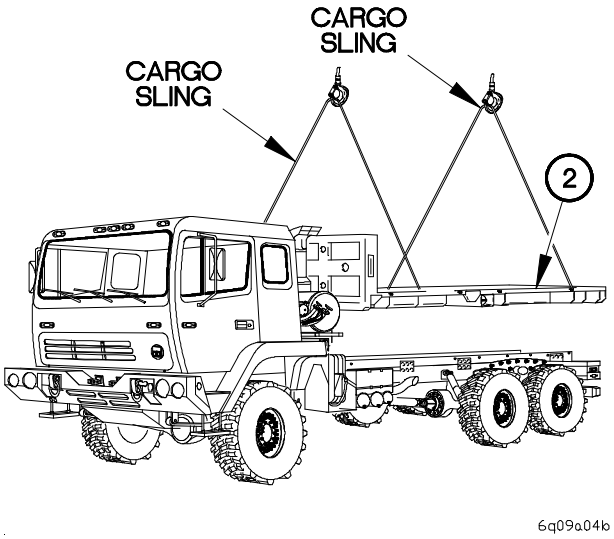
WARNING

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 (6) requires the aid of three assistants.

(6) Remove cargo bed (2) from vehicle.



b. M1083/M1084 Installation.

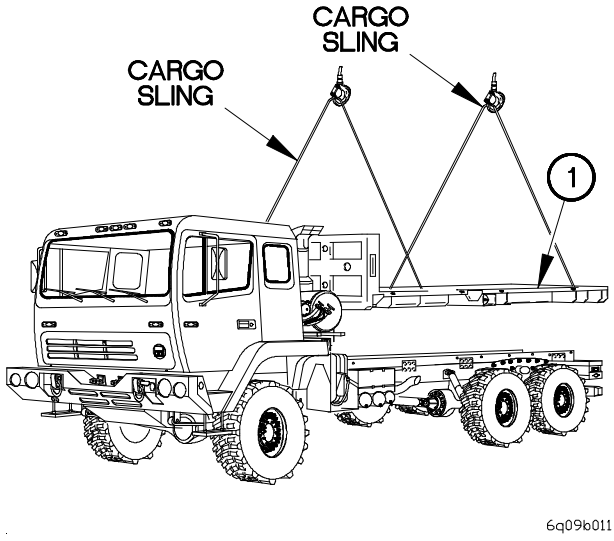
WARNING

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/REPAIR (CONT)

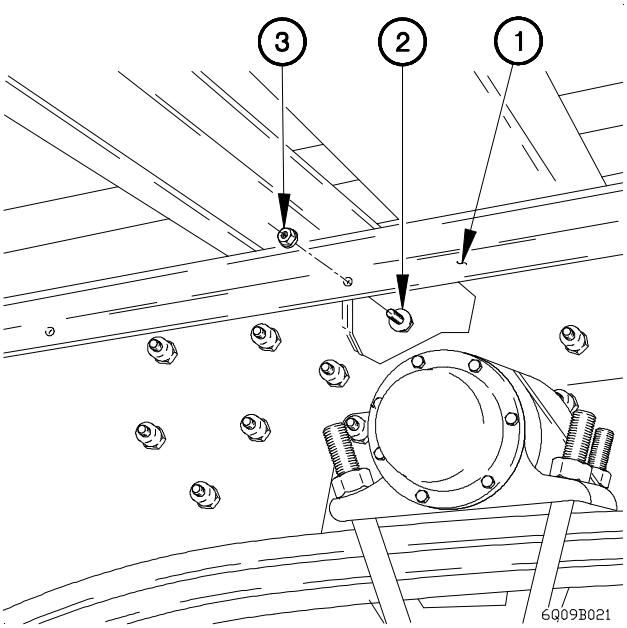
NOTE

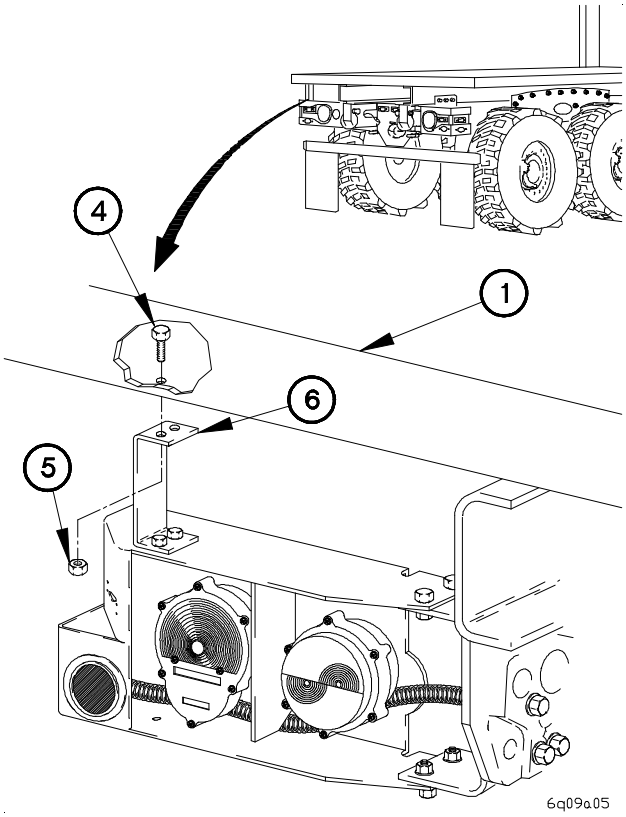
- Left and right side of cargo bed is installed the same way. Left side shown.
- Steps (2) and (3) require the aid of an assistant.

(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.





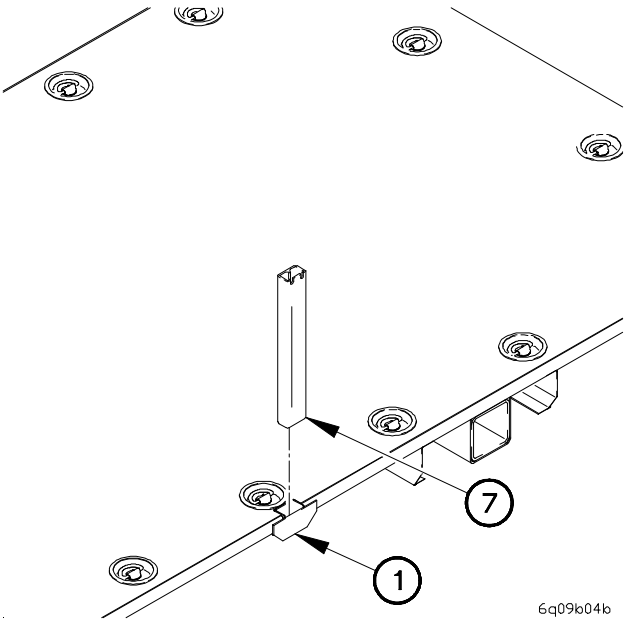
NOTE

Left and right braces are installed the same wav. Left side brace shown.

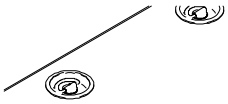
(5) Position screw (4) and self-locking nut (5) on bracket (6) and cargo bed (1).

(6) Tighten self-locking nut (5) to 46 lb-ft (64 N•m).

(7) Perform steps (5) and (6) on right side brace.

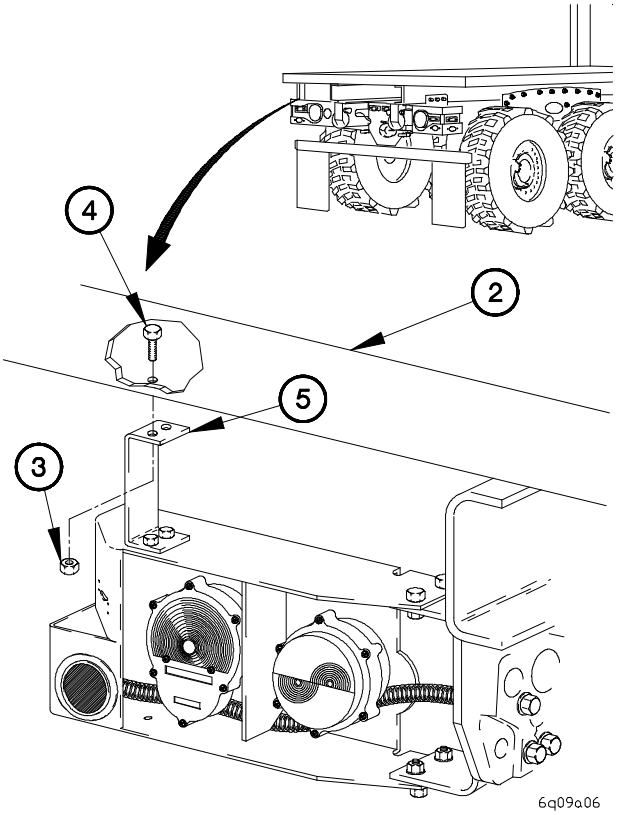


(8) Install four stakes (7) in cargo bed (1).



c. M1085/M1086 Removal.

(1) Remove six stakes (1) from cargo bed (2).



CAUTION

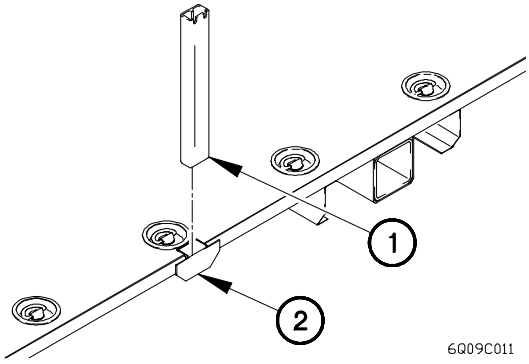
When removing bolts, continuous removal of collars is mandatory. Failure to comply will result in seizing of collars to bolts.

NOTE

- Perform steps (3) and (4) on M1085.
- Left and right sides of cargo bed are removed the same way. Left side shown.
- Step (3) requires the aid of an assistant.

(3) Remove 10 collars (6) and bolts (7) from cargo bed (2).

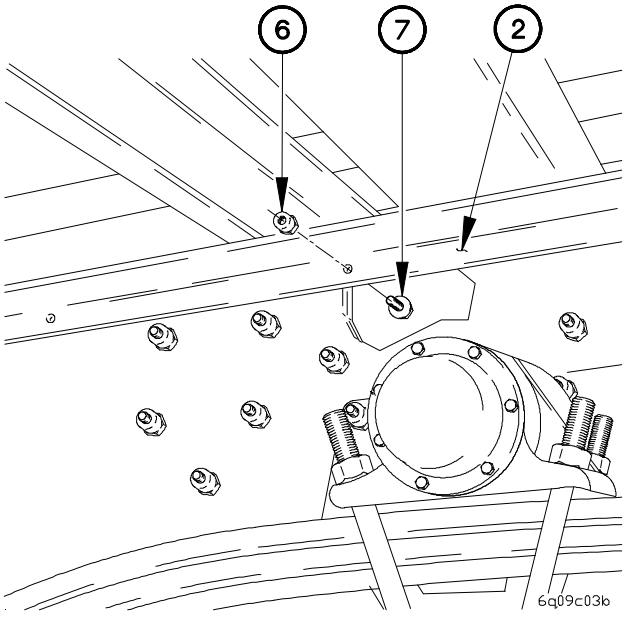
(4) Perform step (3) on right side of cargo bed.



NOTE

Left and right braces are removed the same way. Left side brace shown.

(2) Remove self-locking nut (3) and screw (4) from brace (5) and cargo bed (2). Discard self-locking nut.



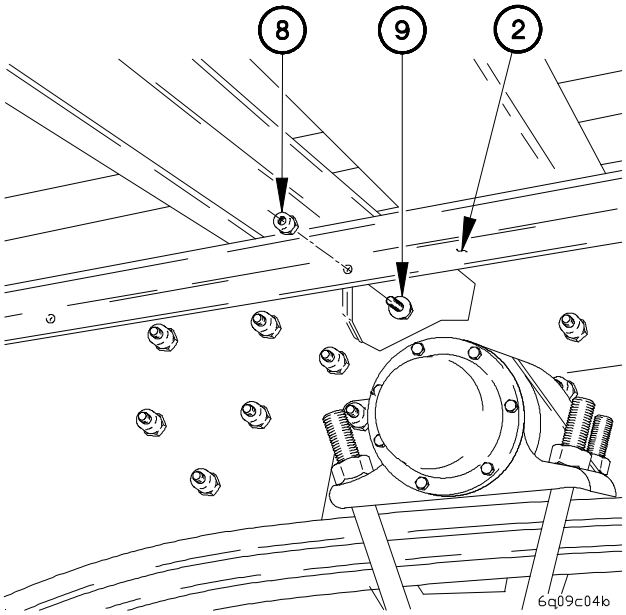
15-9. CARGO BED REPLACEMENT/REPAIR (CONT)

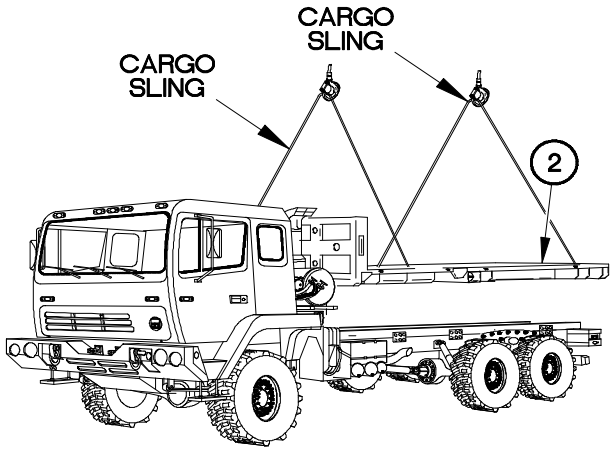
NOTE

- Perform steps (5) and (6) on M1086.
- Left and right sides of cargo bed are removed the same way. Left side shown.
- Step (5) requires the aid of an assistant.

(5) Remove 11 collars (8) and bolts (9) from cargo bed (2).

(6) Perform step (5) 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 (7) requires the aid of three assistants.

(7) Remove cargo bed (2) from vehicle.

d. M1085/M1086 Installation.

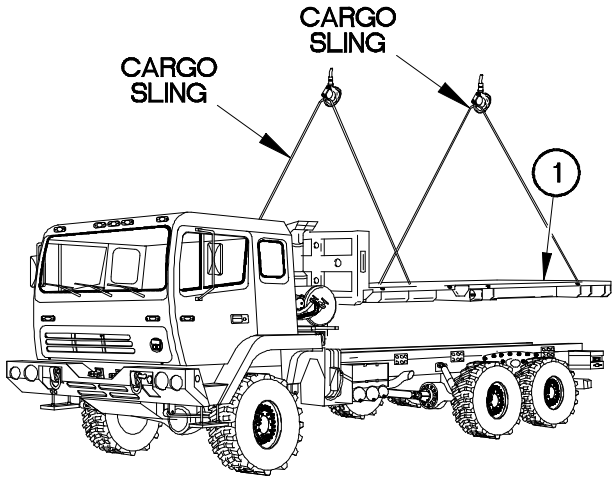
WARNING

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.



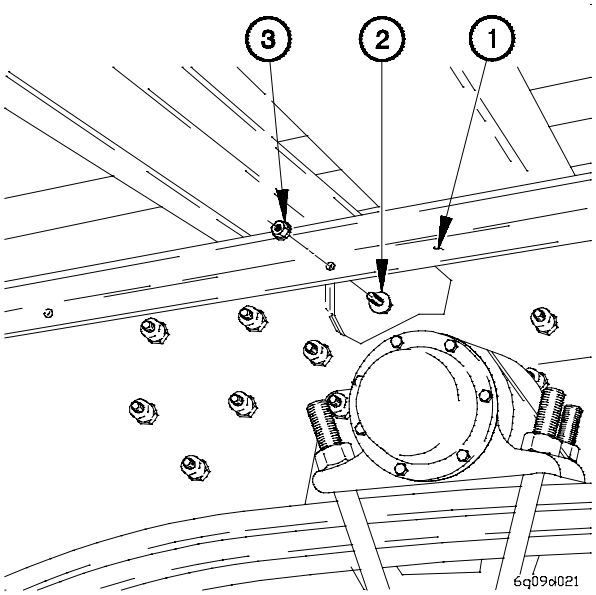
NOTE

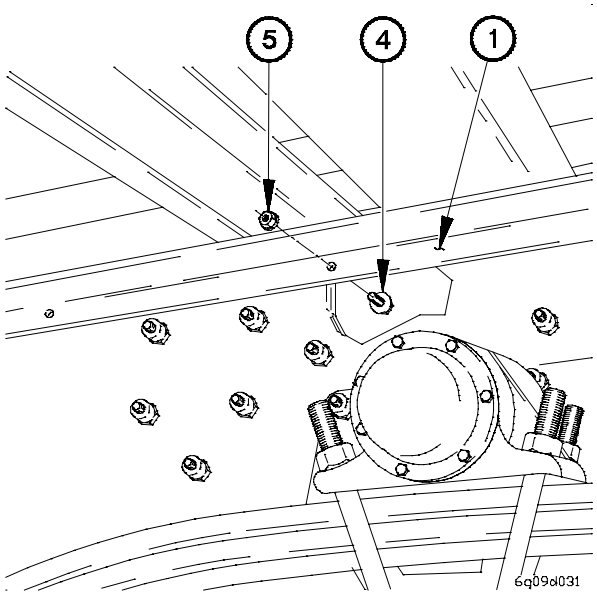
- Perform steps (2) through (4) on M1086.
- Left and right side of cargo bed is installed the same way. Left side shown.
- Steps (2) and (3) require the aid of an assistant.

(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/REPAIR (CONT)

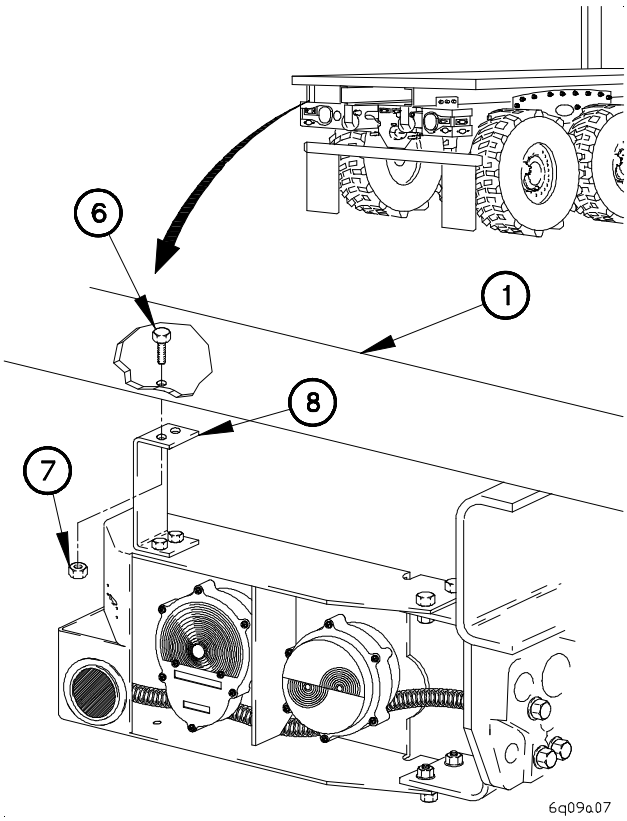
NOTE

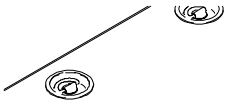
Left and right braces are installed the same way. Left side brace shown.

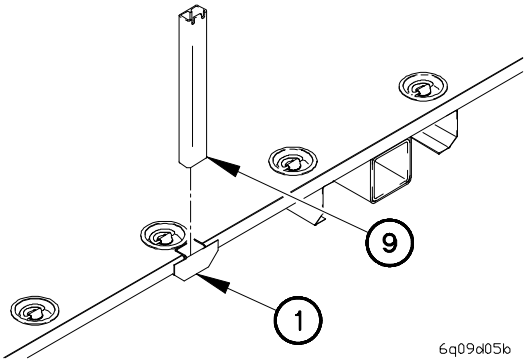
(8) Position screw (6) and self-locking nut (7) on brace (8) and cargo bed (1).

(9) Tighten self-locking nut (7) to 47 lb-ft (64 N•m).

(10) Perform steps (8) and (9) on right side brace.



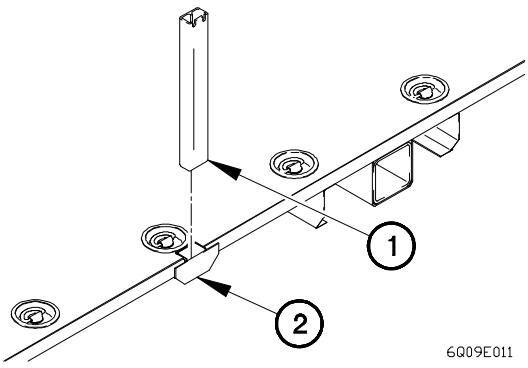




(11) Install six stakes (9) in cargo bed (1).

e. M1093 Removal.

(1) Remove four stakes (1) from cargo bed (2).

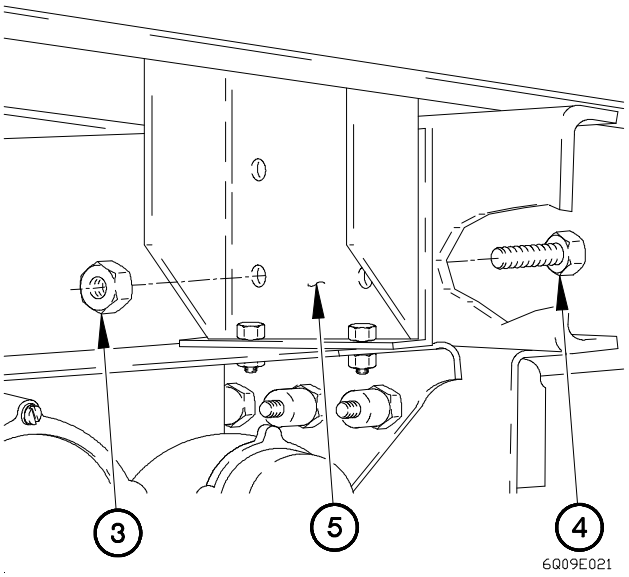


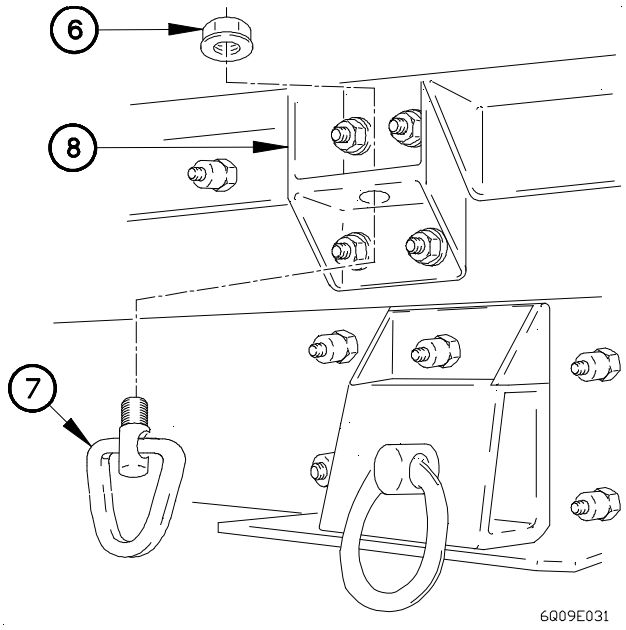
NOTE

- Steps (2) through (9) require the aid of an assistant.
- Left and right side brackets are disassembled the same way. Left side

(2) Remove four nuts (3) and bolts (4) from bracket (5).

(3) Perform step (2) on right side bracket.

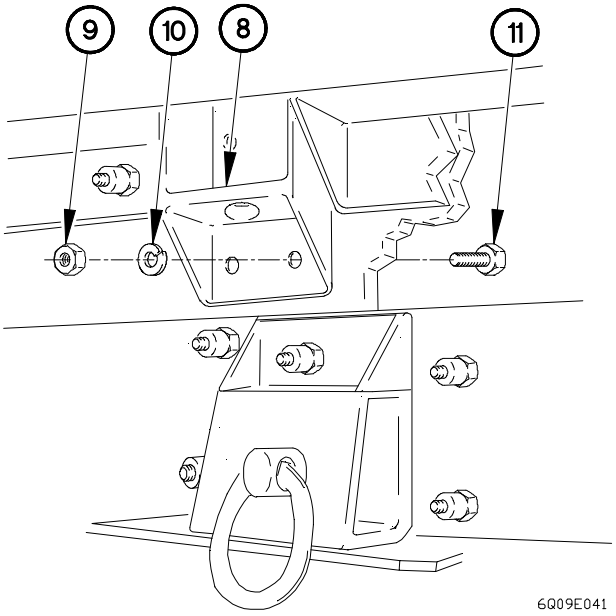




NOTE

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.

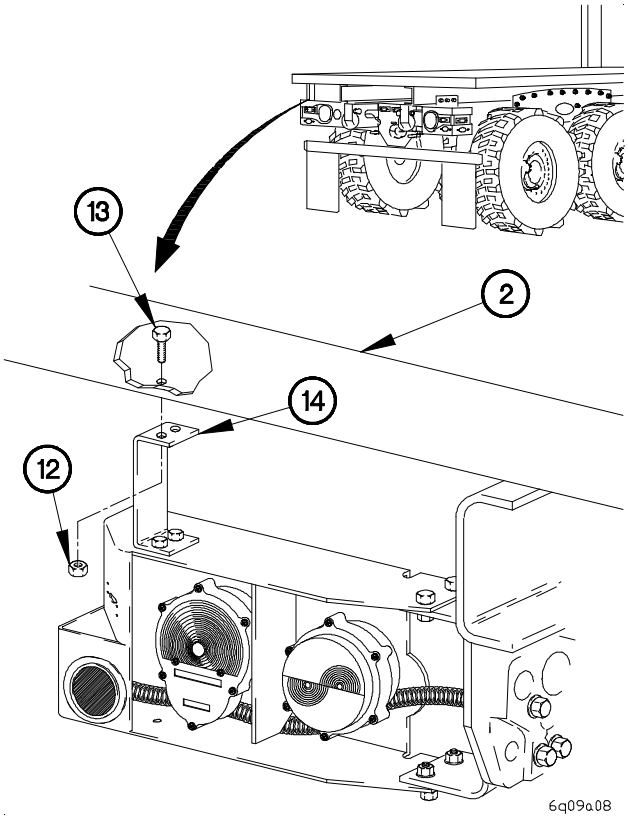
15-9. CARGO BED REPLACEMENT/REPAIR (CONT)

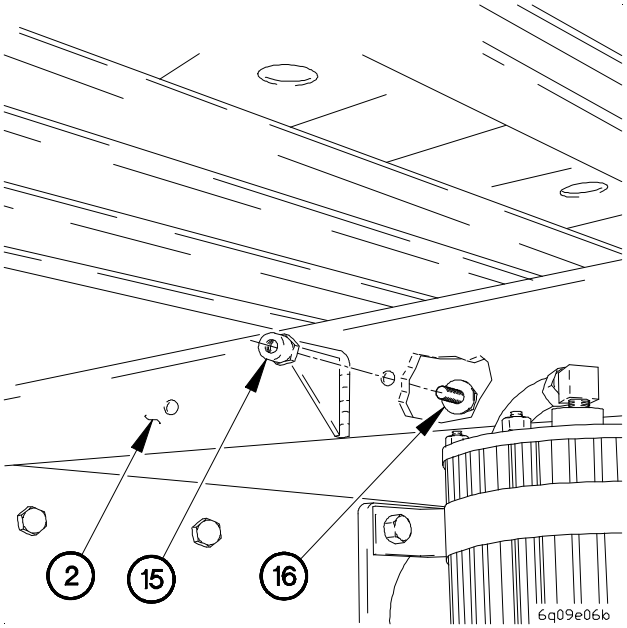
NOTE

Left and right braces are removed the same way. Left side brace shown.

(7) Remove self-locking nut (12) and screw (13) from brace (14) and cargo bed (2). Discard self-locking nut.

(8) Perform step (7) 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.

(9) Remove seven collars (15) and bolts (16) from cargo bed (2).

(10) Perform step (9) on right side of cargo bed.

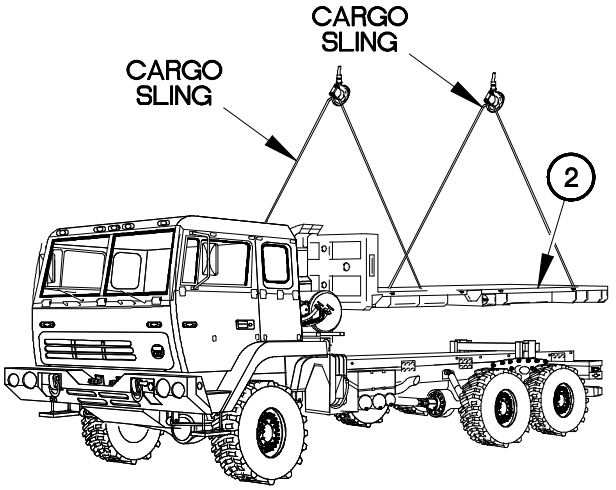
WARNING

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

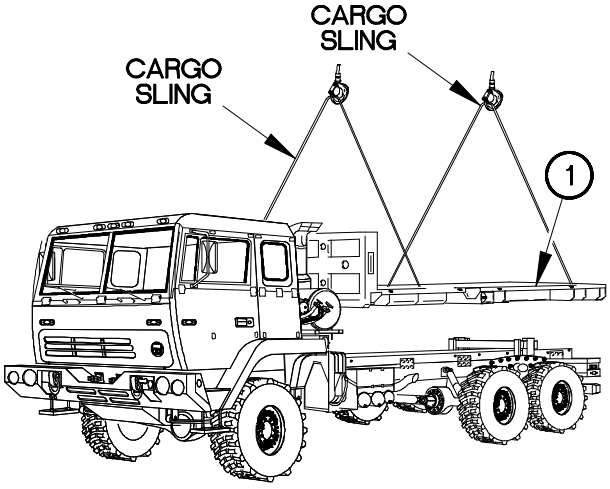
Step (11) requires the aid of three assistants.

(11) 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/REPAIR (CONT)

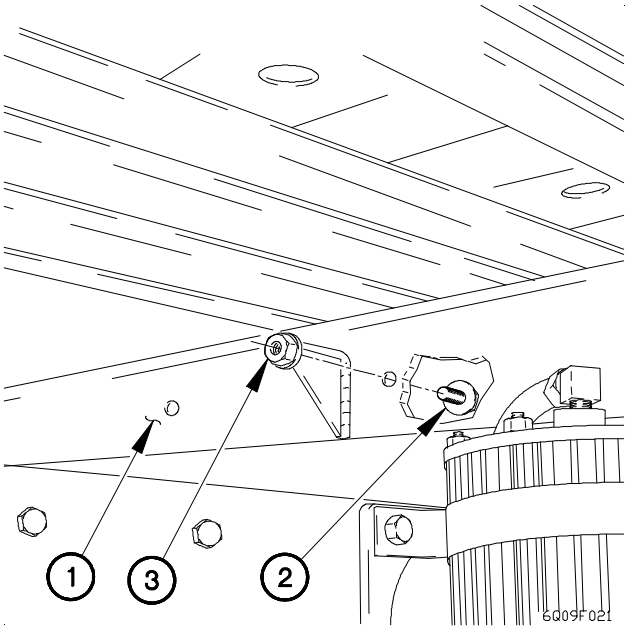
NOTE

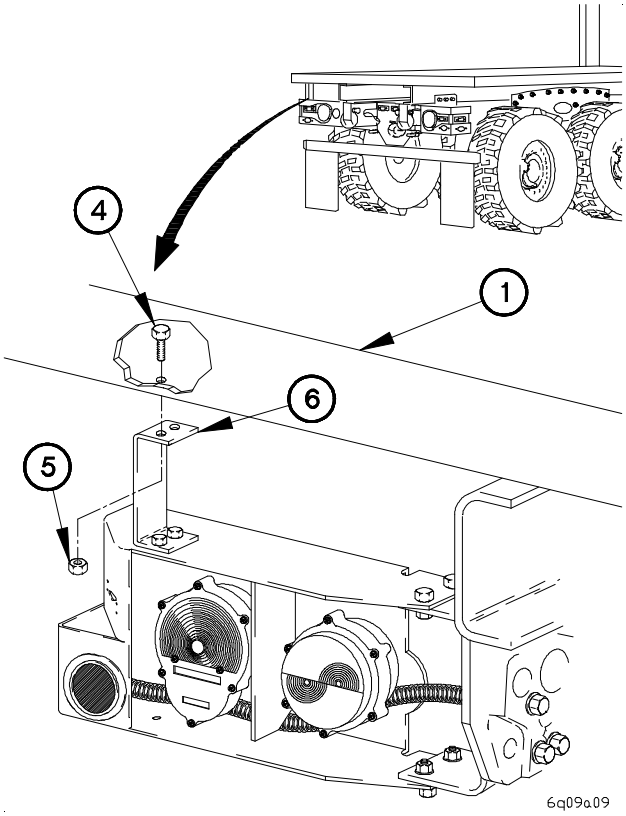
- Left and right side of cargo bed is installed the same way. Left side shown.
- Steps (2) through (14) require the aid of an assistant.

(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

All tiedown rings and brackets are removed the same way. Left rear tiedown ring and bracket shown.

(8) Position four bolts (7), lockwashers (8), and nuts (9) in bracket (10).

(9) Tighten four nuts (9) to 179-219 lb-ft (243-297 N•m).

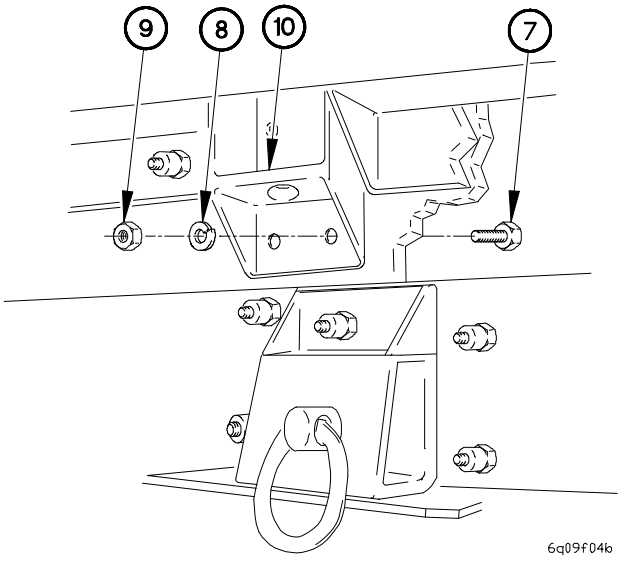
NOTE

Left and right braces are installed the same way. Left side brace shown.

(5) Position screw (4) and self-locking nut (5) on brace (6) and cargo bed (1).

(6) Tighten self-locking nut (5) to 47 lb-ft (64 N•m).

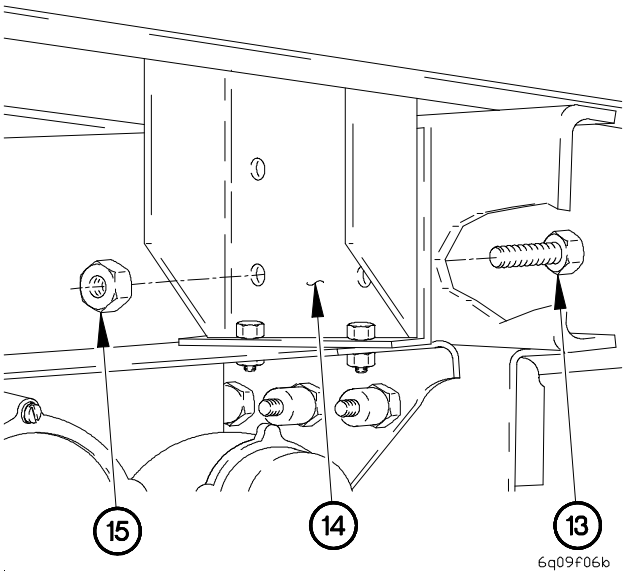
(7) Perform steps (5) and (6) on right side brace.

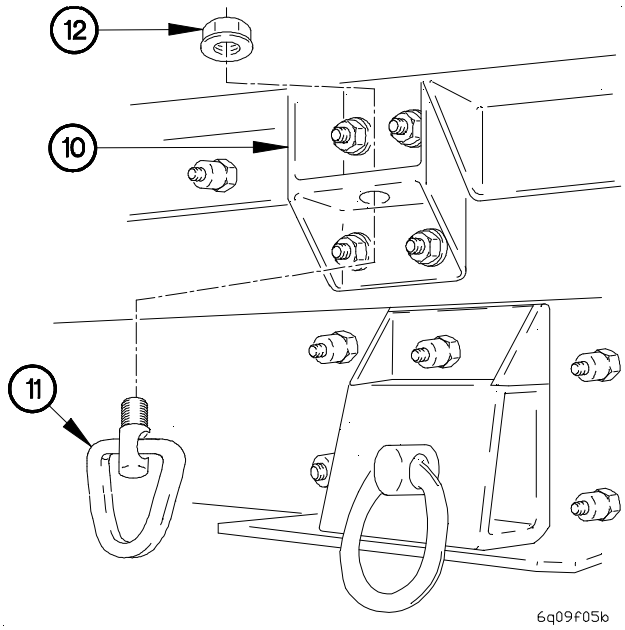


(10) Position tiedown ring (11) in bracket (10) with self-locking nut (12).

(11) Tighten self-locking nut (12) to 113-138 lb-ft (153-187 N•m).

(12) Perform steps (8) through (11) on remaining brackets and tiedown rings.





NOTE

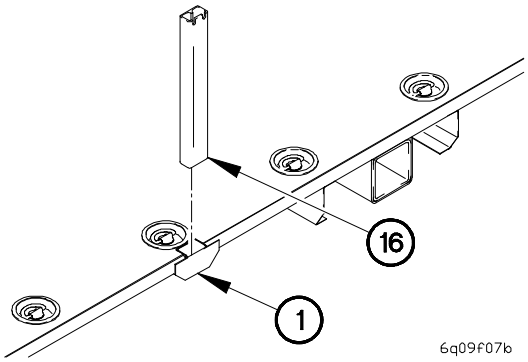
Left and right side brackets are assembled the same way. Left side shown.

(13) Position four bolts (13) in bracket (14) with four self-locking nuts (15).

(14) Tighten four self-locking nuts (15) to 179-219 lb-ft (243-297 N•m).

(15) Perform steps (13) and (14) on right side bracket.

(16) Install four stakes (16) in cargo bed (1).



15-9. CARGO BED REPLACEMENT/REPAIR (CONT)

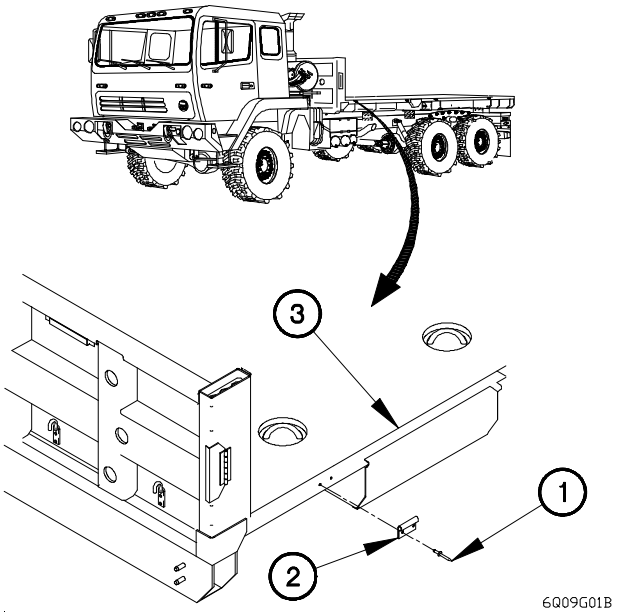
g. Hinge Removal.

NOTE

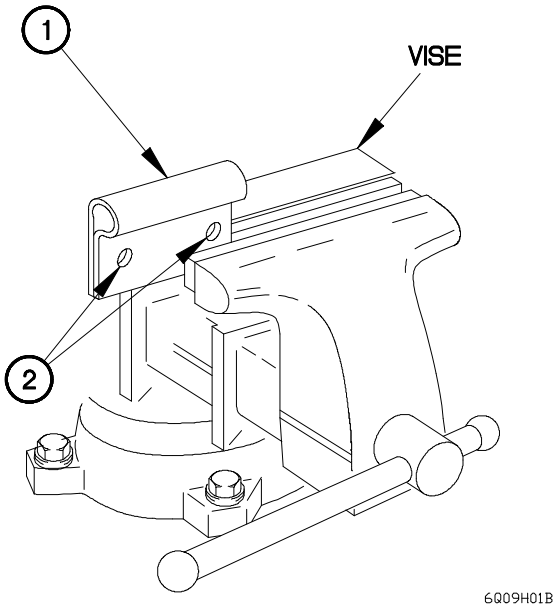
Left, right, and rear hinges are removed the same way. Left side shown.

(1) Remove two rivets (1) from hinge (2).

(2) Remove hinge (2) from cargo bed (3).



h. Hinge Installation.

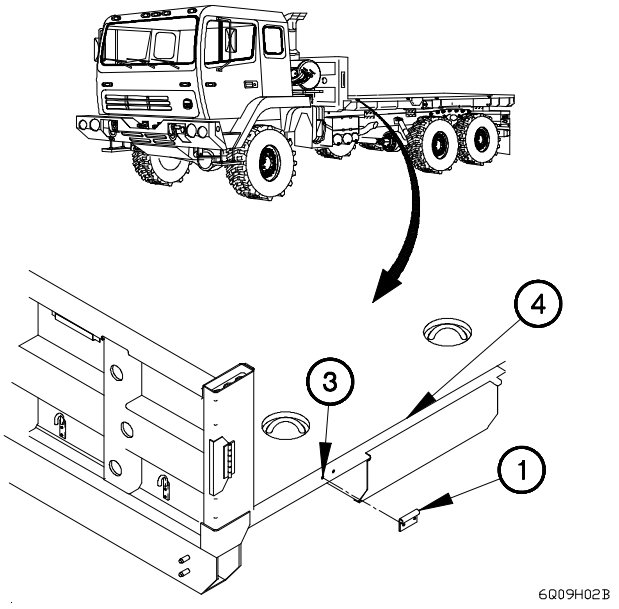


(1) Position hinge (1) in vise.

(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).

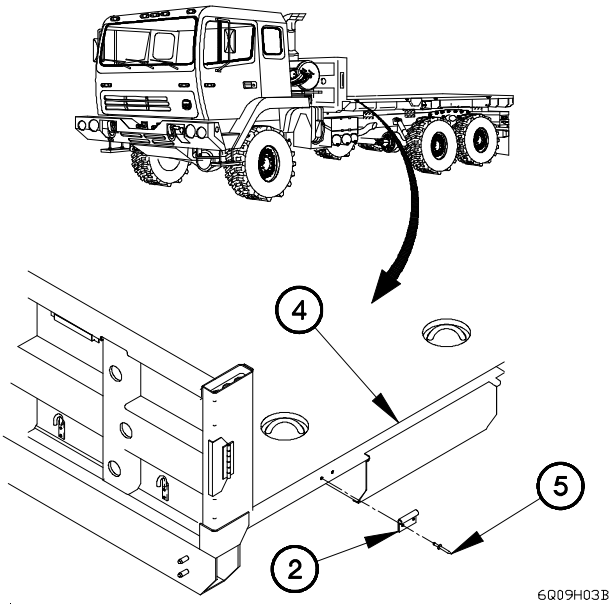
(4) Match drill and enlarge two holes (3) on cargo bed (4) to 0.327-0.340 in. (8.318-8.636 mm).



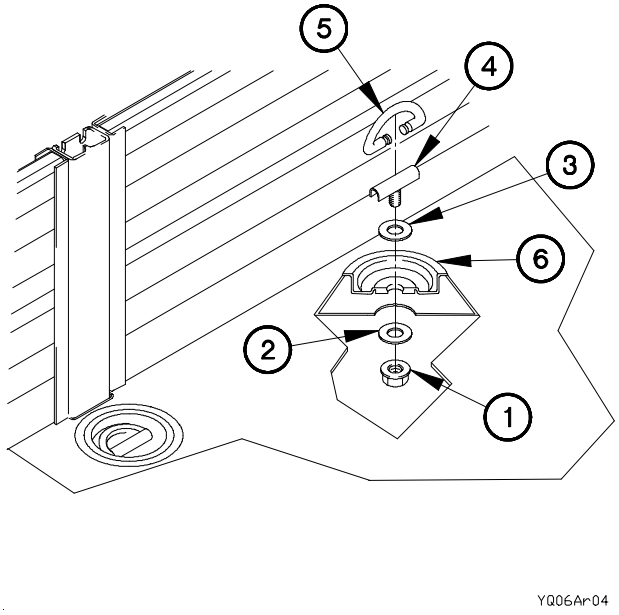
NOTE

Left, right, and rear hinges are installed the same way. Left side shown.

(5) Install hinge (2) on cargo bed (4) with two blind rivets (5).



i. Tie Down Removal



NOTE

- There are two types of tie down cups installed on cargo bed. On the underside, stamped cups have raised center sections and cast cups have flat center sections.
- Step (1) and (2) require the aid of an assistant.
- Perform step (1) on tie down with stamped cups.

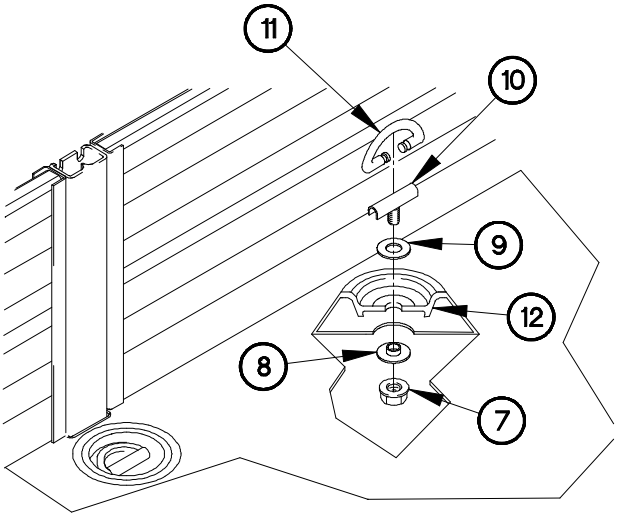
(1) Remove the nut (1), washer (2), telflon washer (3), D-ring retainer (4), and D-ring (5) from stamped tie down cup (6).

15-9. CARGO BED REPLACEMENT/REPAIR (CONT)

NOTE

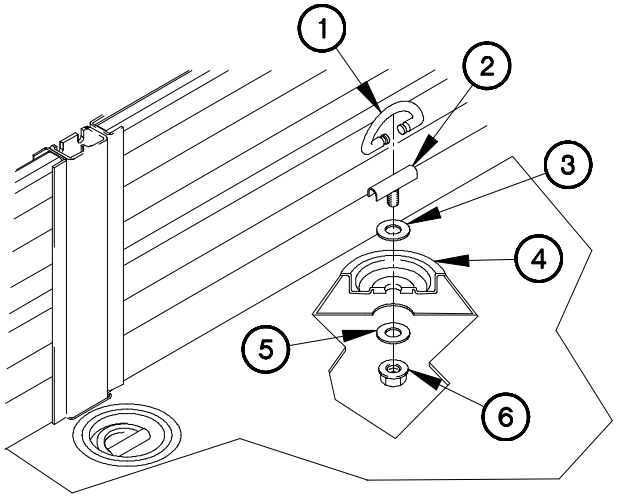
Perform step (2) on tie down with cast cups.

(2) Remove nut (7), spacer (8), teflon washer (9), D-ring (10), and D-ring (11) from cast tie down cup (12).



YQ06Ar05

j. Tie Down Installation



YQ09A10

NOTE

- There are two types of tie down cups installed on cargo beds. On the underside, stamped cups have raised center sections and cast cups have flat center sections.
- Steps (1) through (10) require the aid of an assistant.
- Perform steps (1) through (5) on tie downs with stamped cups.

(1) Position D-ring (1) in D-ring retainer (2).

(2) Position teflon washer (3) on D-ring retainer (2).

(3) Position D-ring retainer (2) in stamped tie down cup (4).

(4) Position washer (5) and nut (6) on D-ring retainer (2).

(5) Tighten nut (6) to 76-94 lb-ft (103-128 N•m).

NOTE

Perform steps (6) through (10) on tie downs with cast cups.

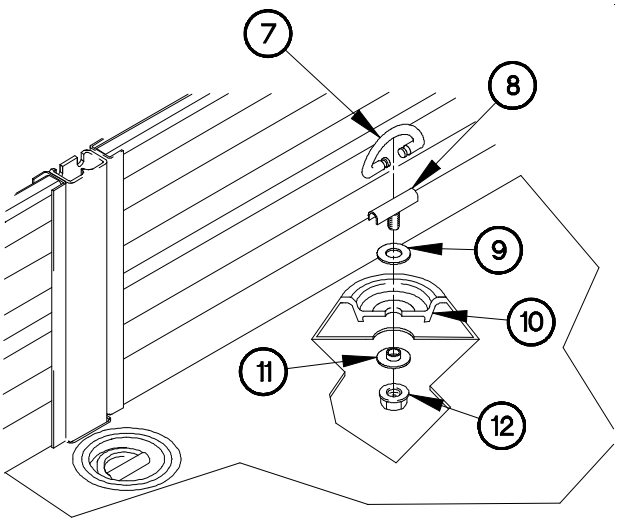
(6) Position D-ring (7) in D-ring retainer (8).

(7) Position teflon washer (9) on D-ring retainer (8).

(8) Position D-ring retainer (8) in cast tie down cup (10).

(9) Position spacer (11) and nut (12) on D-ring retainer (8).

(10) Tighten nut (12) to 76-94 lb-ft (103-128 N•m).



YQ09A11

k. Follow-On Maintenance.

(1) Install light material handling crane (LMHC), if equipped (TM 9-2320-366-10-1).

(2) Install fenders and splash guards, if equipped (TM 9-2320-366-20-4).

(3) Install outrigger pads stowage bracket (M1084/M1086) (TM 9-2320-366-20-5).

(4) Install cargo bed side panels, if equipped (TM 9-2320-366-10-1).

(5) Install cargo cover kit, if equipped (TM 9-2320-366-10-1).

(6) Install troop seats, if equipped (TM 9-2320-366-10-1).

(7) 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.

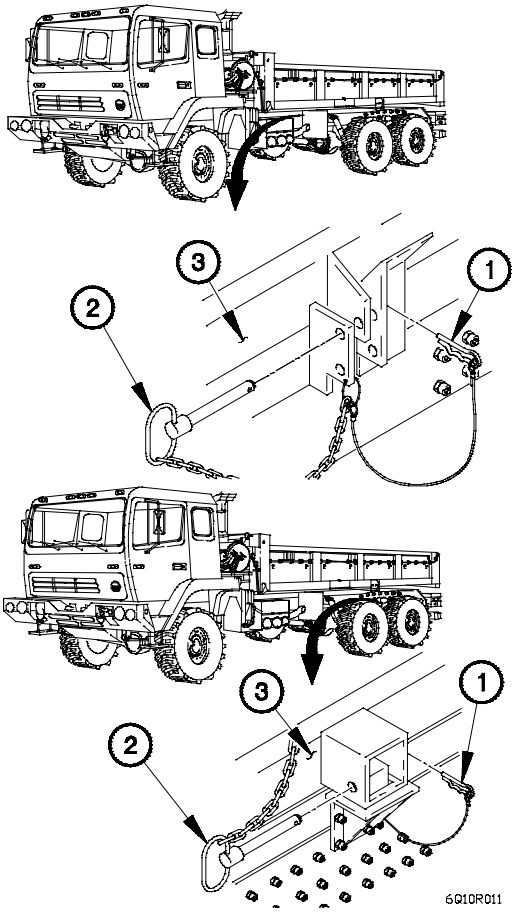
a. Removal.

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).

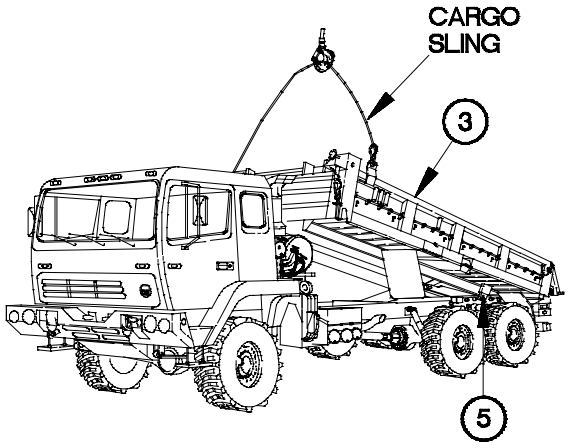


(3) Install two dump body lifting brackets (4) in front slots in dump body (3).

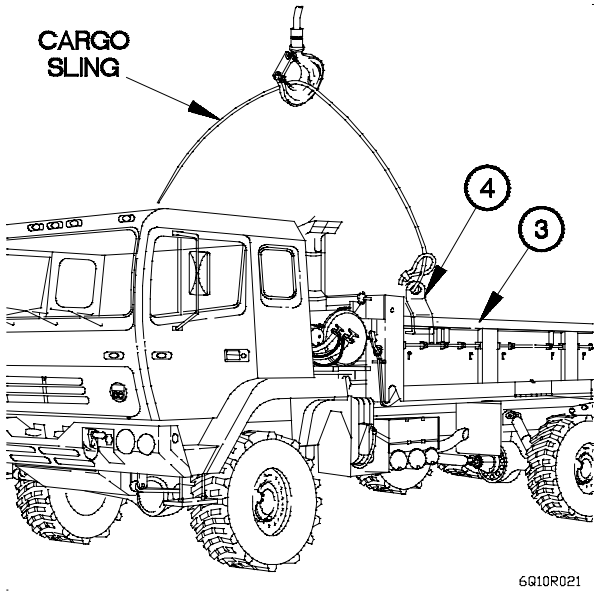
WARNING

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).

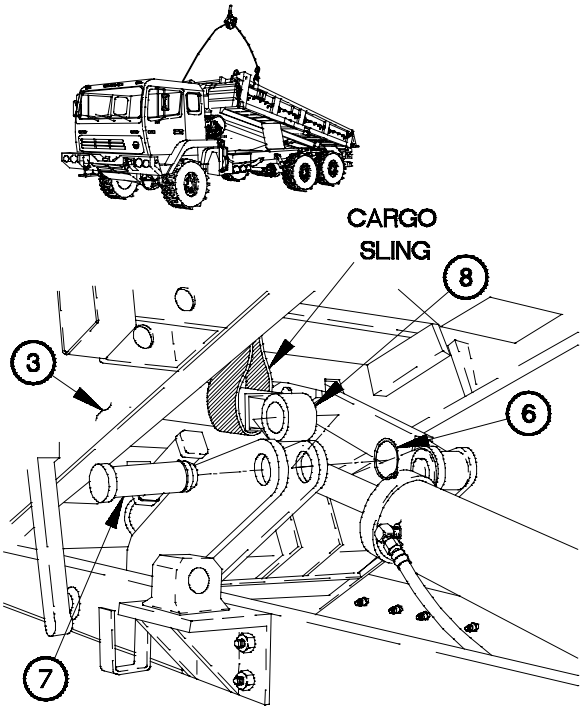
(10) Remove two pins (7) from dump body legs (8).

(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).



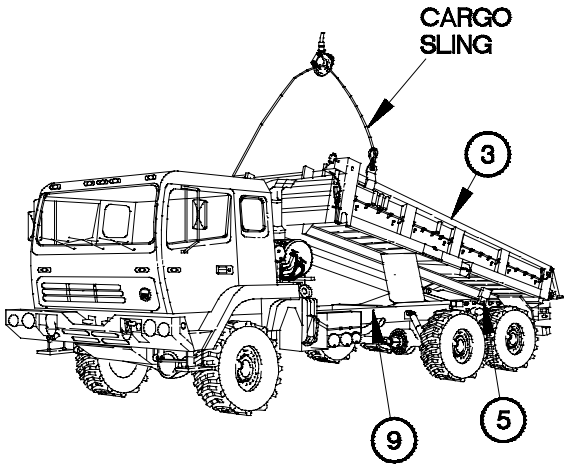
6Q10R041

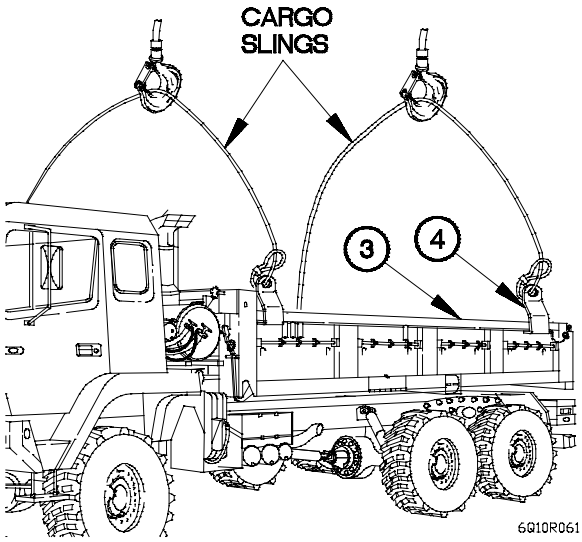
15-10. M1090/M1094 DUMP BODY REPLACEMENT (CONT)

(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

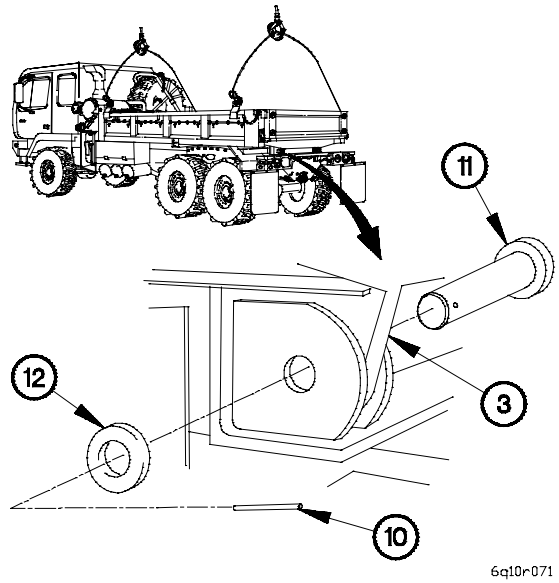
Dump body weighs approximately 3,030 lbs (1,377 kg). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

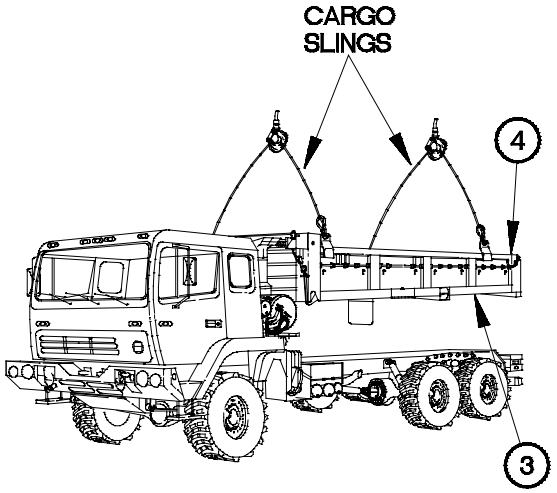
(17) Remove slack from lifting device.

(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).





(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).

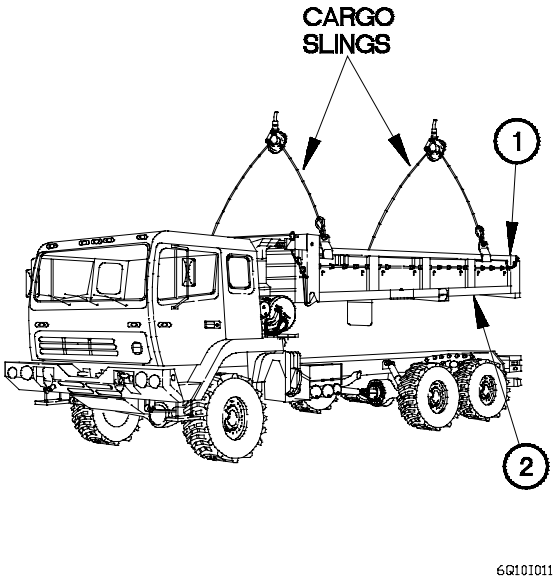
b. Installation.

(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).

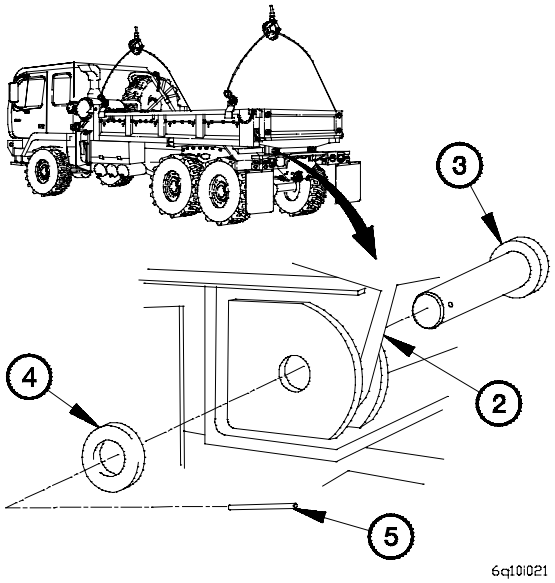
WARNING

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.

15-10. M1090/M1094 DUMP BODY REPLACEMENT (CONT)

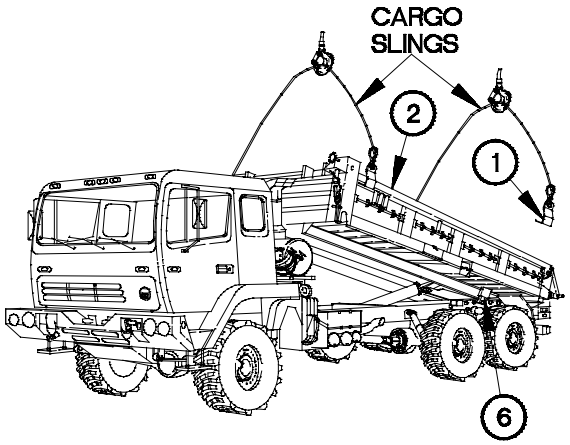


6q10I021

(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).

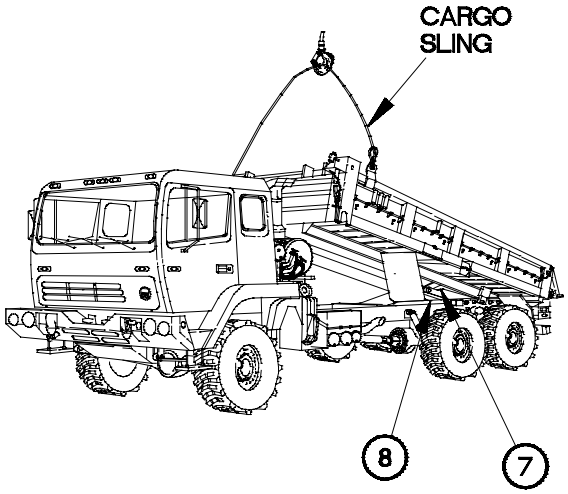
(11) Lower two dump body legs (7).

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).



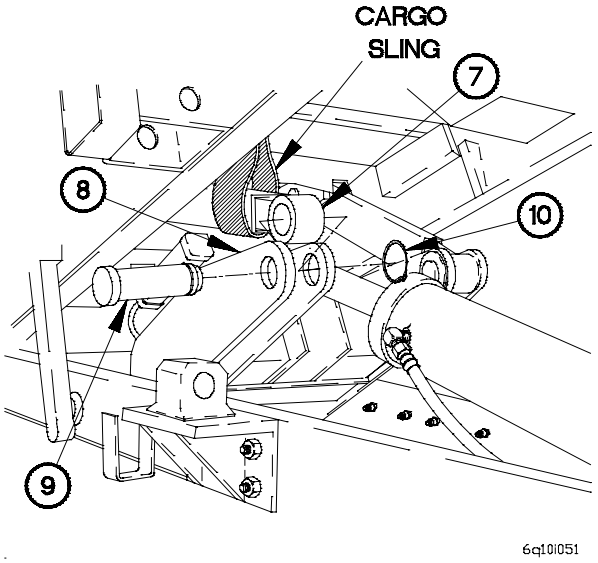
6Q10I041

(14) Install two pins (9) attaching dump body legs (7) to subframe assembly (8).

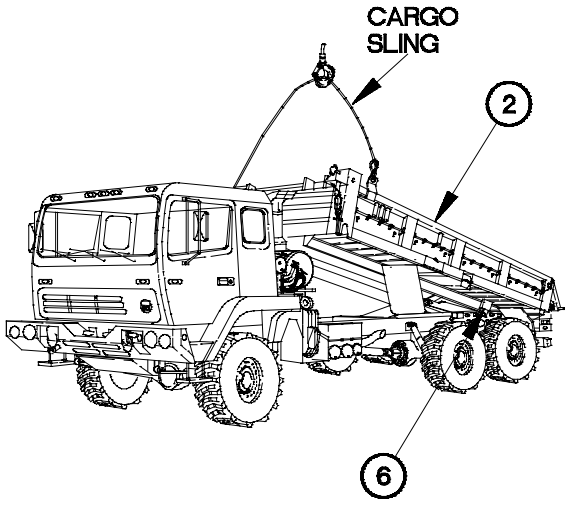
WARNING

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).

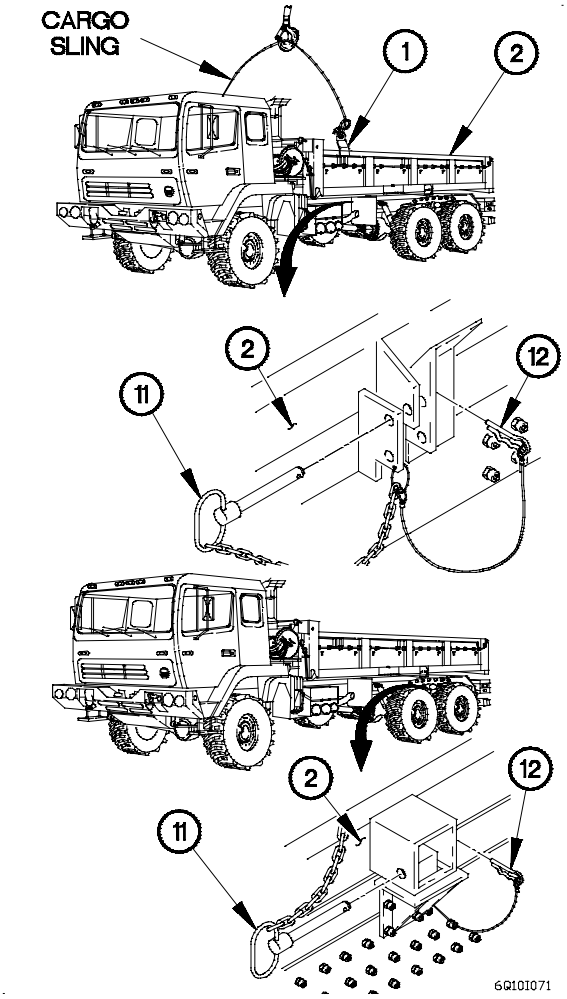
CAUTION

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.

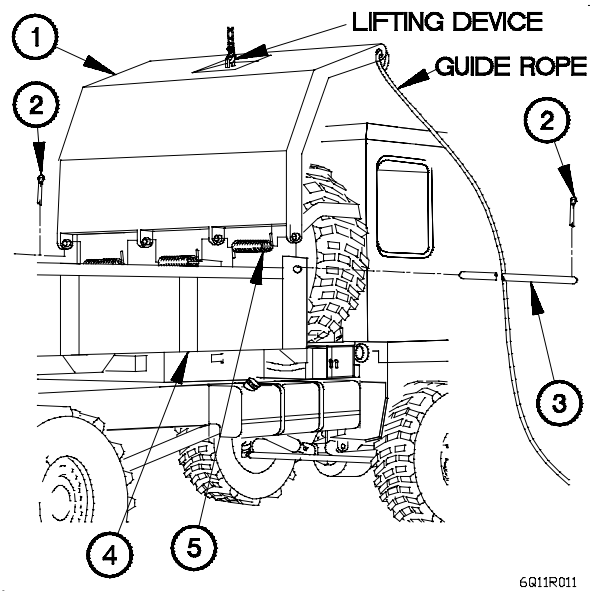
(3) Remove pivot shaft (3) from right side of cab protector (1).

NOTE

Step (4) requires the aid of two assistants.

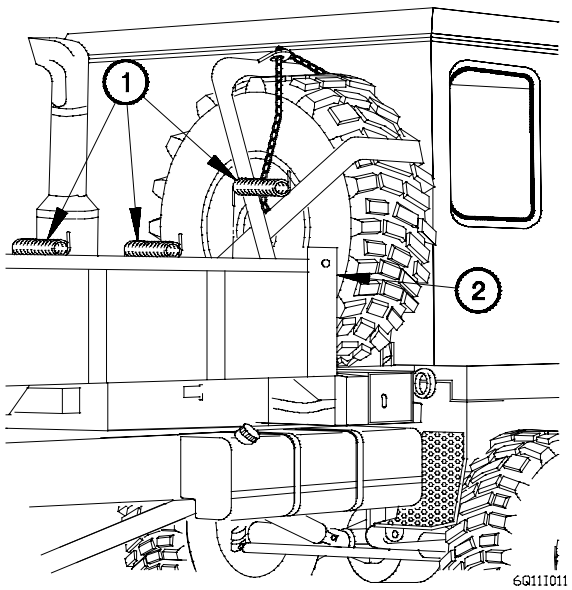
(4) Remove cab protector (1) from dump body (4).

(5) Remove three torsion springs (5) from dump body (4).

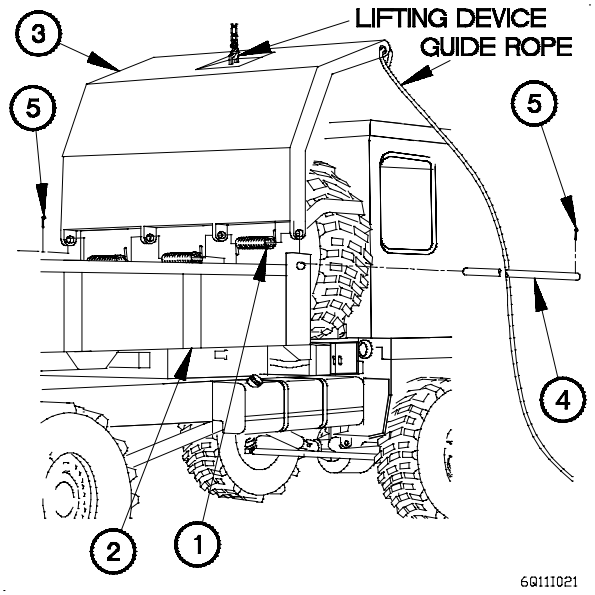


15-11. M1090/M1094 DUMP BODY CAB PROTECTOR REPLACEMENT (CONT)

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)
Wrench Set, Crow Foot Patch Inc-(TM-9-2320-366-20) (Appendix B, item 87)

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

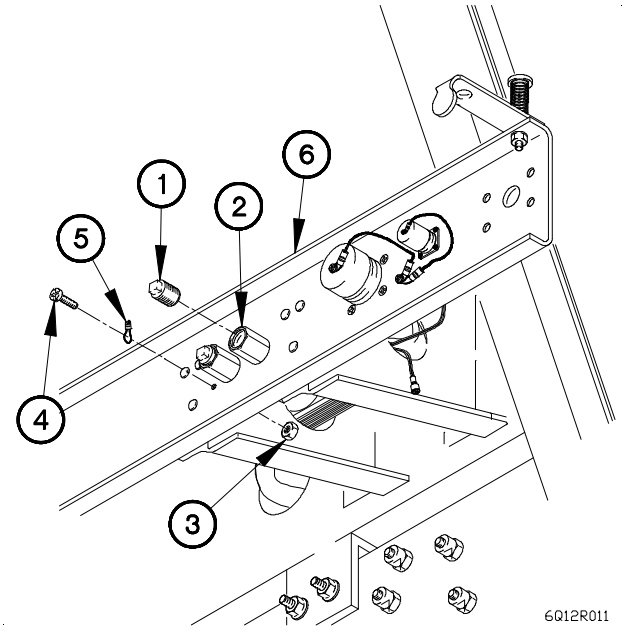
Cap or plug hydraulic hoses to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

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).

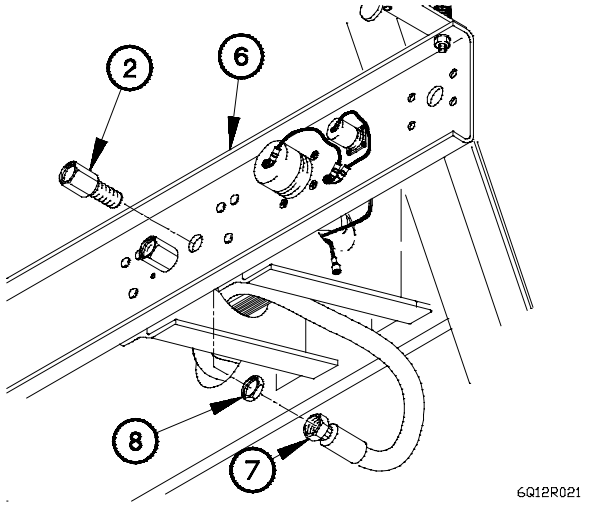


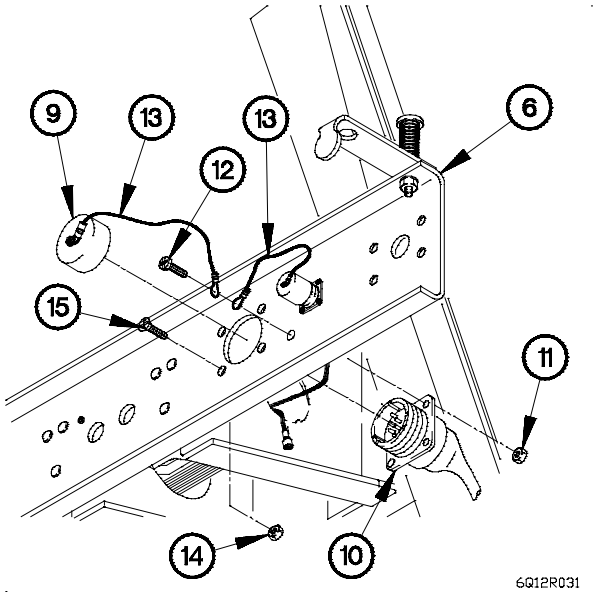
15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT (CONT)

(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.

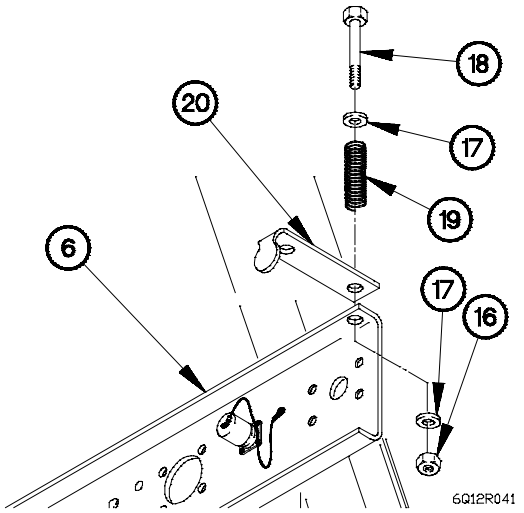
(6) Remove connector cover (9) from remote control cable connector (10).

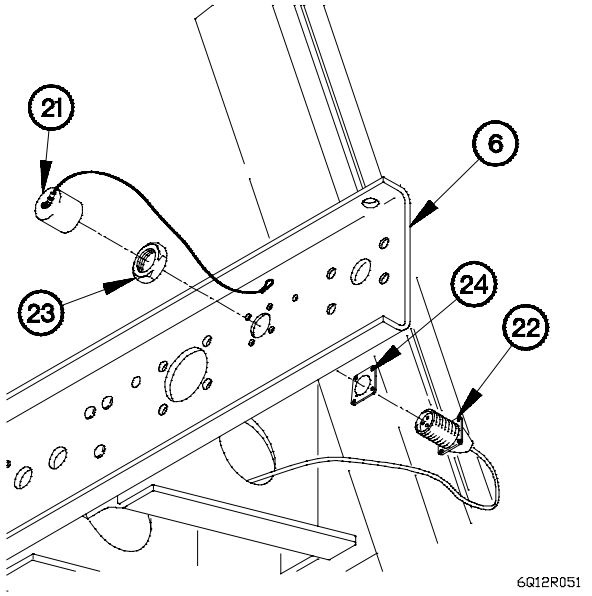
(7) Remove nut (11), screw (12), connector cover (9), and two lanyards (13) from support structure (6).

(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.

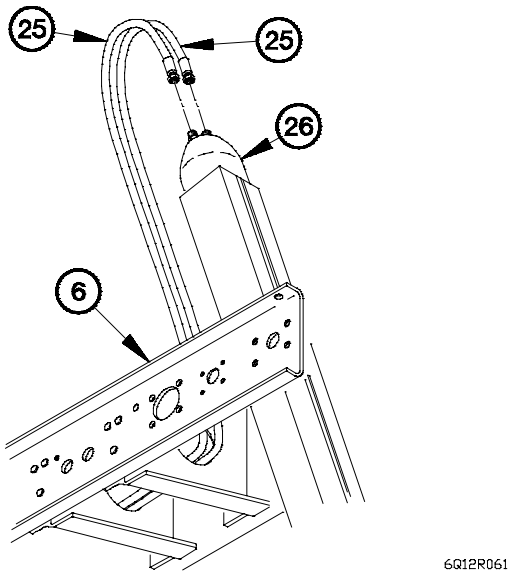




(11) Remove connector cover (21) from portable worklight connector (22).

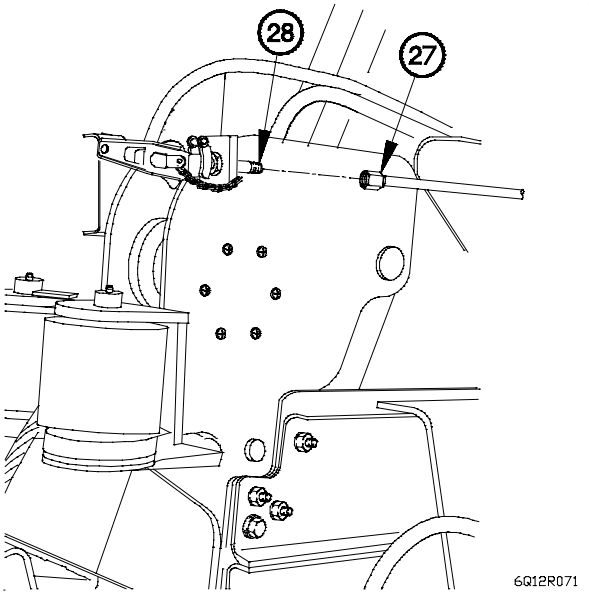
(12) Remove nut (23), retaining plate (24), and portable worklight connector (22) from support structure (6).

(13) Pull portable worklight connector (22) clear of support structure (6).



(14) Disconnect two hydraulic hoses (25) from stiffleg cylinder (26).

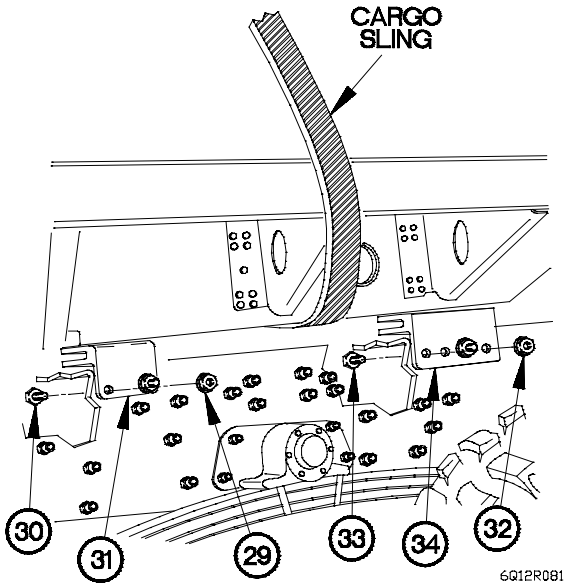
(15) Pull two hydraulic hoses (25) clear of support structure (6).



(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)

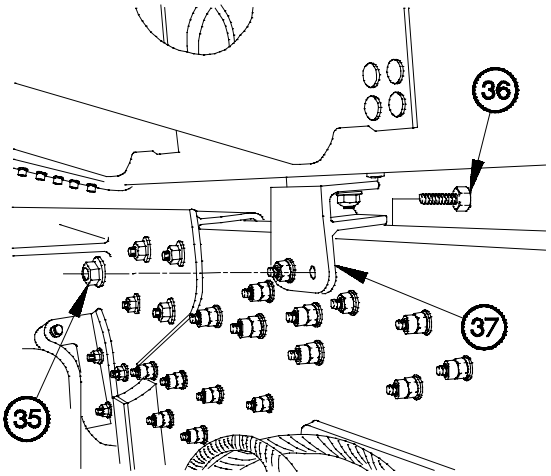


WARNING

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.



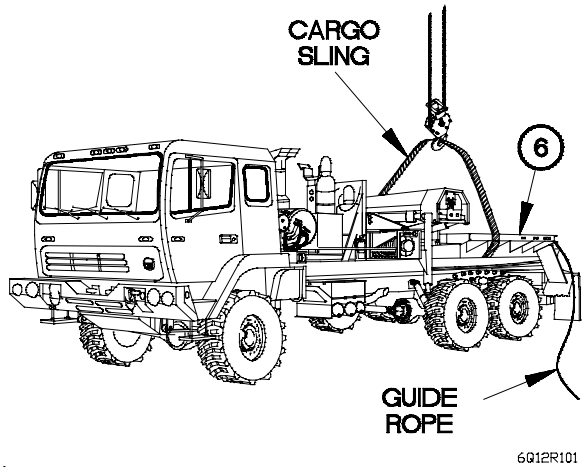
(20) Remove two self-locking nuts (35) and screws (36) from right side mount (37). Discard self-locking nuts.

(21) Attach two guide ropes to support structure (6).

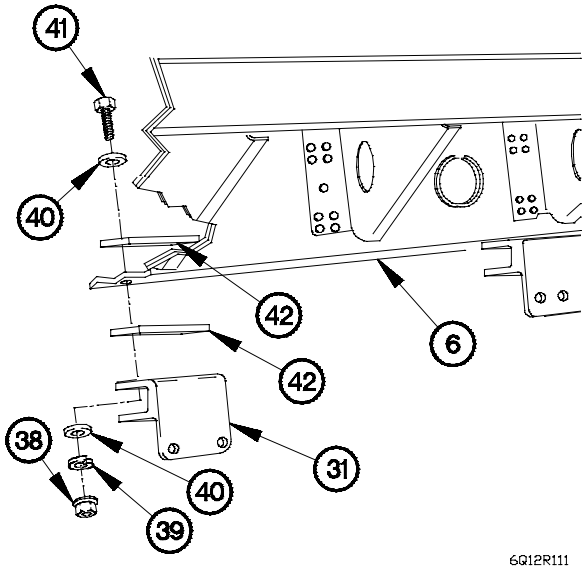
NOTE

Step (22) requires the aid of two assistants.

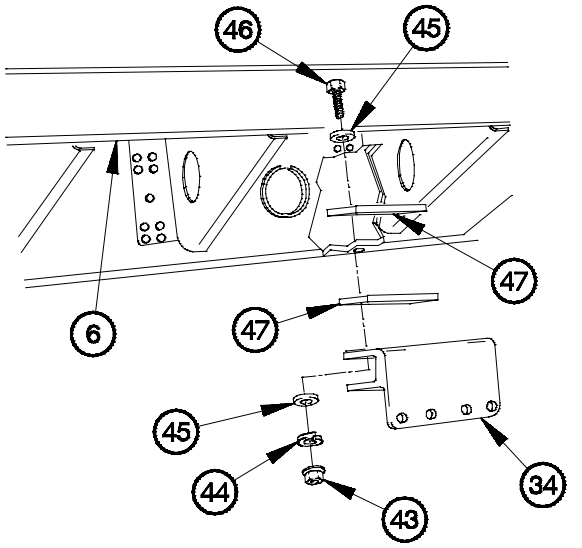
(22) Remove support structure (6) from vehicle.



(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.



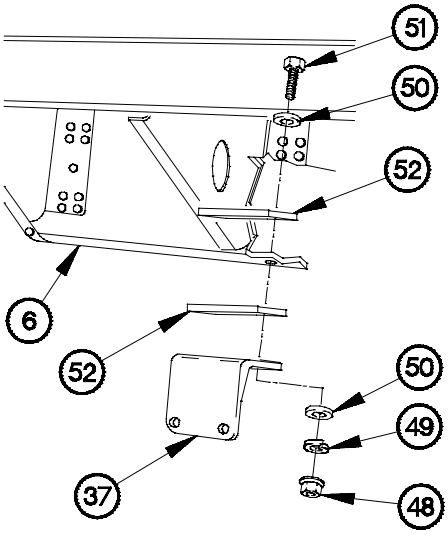
6Q12R111



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)

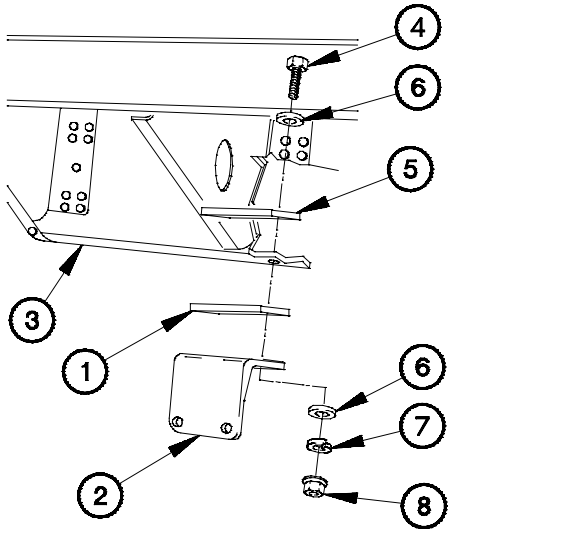
b. Installation.

CAUTION

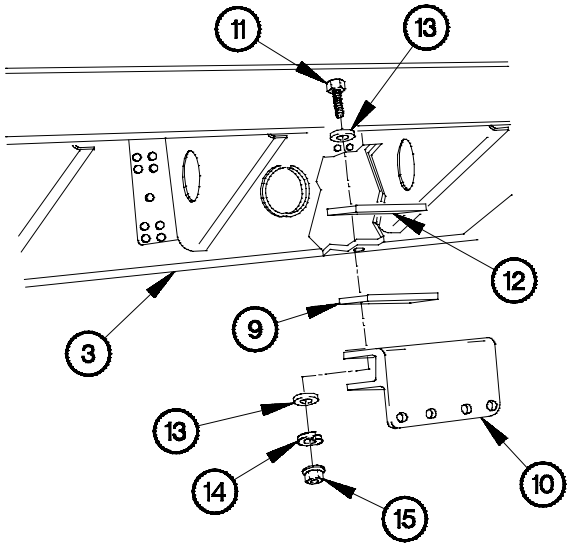
When installing cushions, top cushion must be installed with metal side up and bottom cushion must be installed with metal side down. Failure to comply may result in damage to equipment.

(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



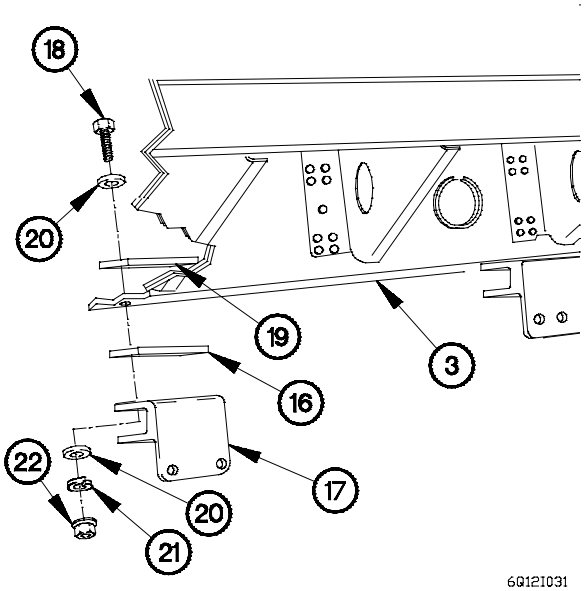
6Q12I021

(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).

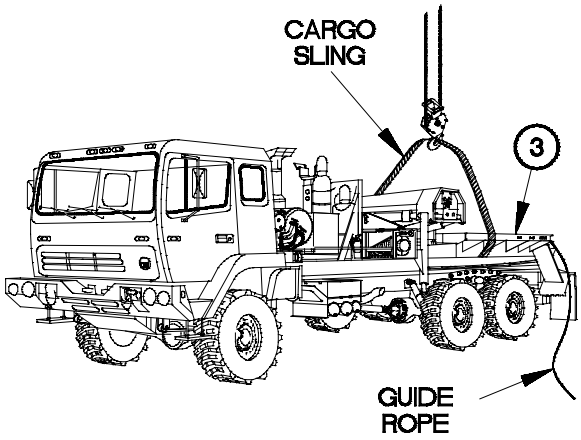
WARNING

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.

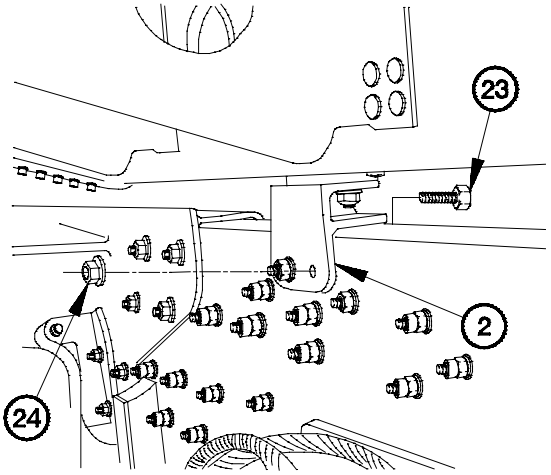
NOTE

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).

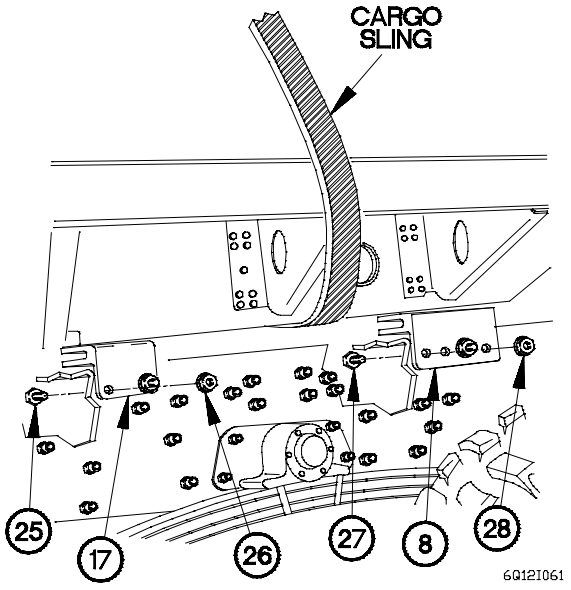
(10) Tighten two self-locking nuts (24) to 285-305 lb-ft (386-414 N·m).

(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).



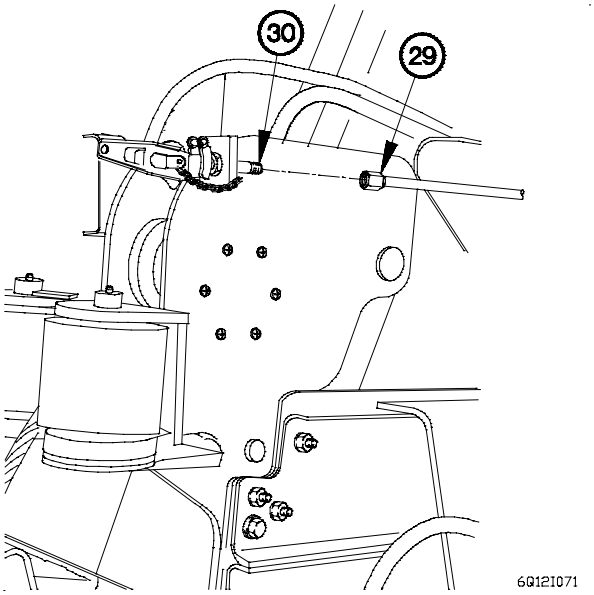
6Q12I061

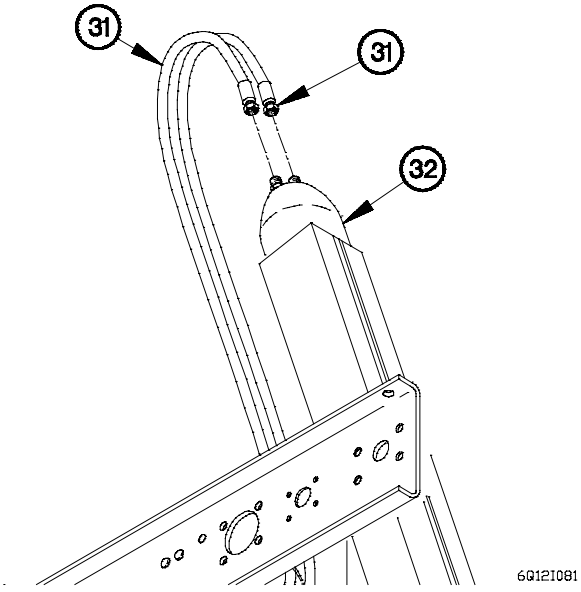
15-12. M1089 TOOL BOX SUPPORT STRUCTURE REPLACEMENT (CONT)

NOTE

Left and right side of support structure are installed the same way. Left side shown.

(15) Connect air tube (29) to gladhand (30).





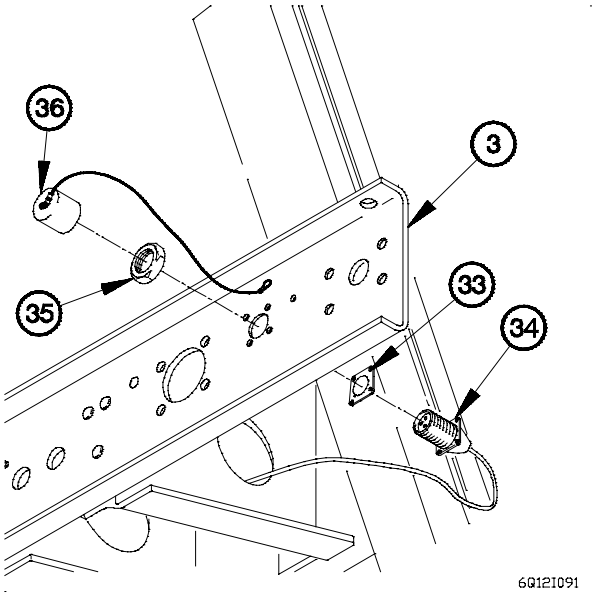
(16) Connect two hydraulic hoses (31) to stiffleg cylinder (32).

NOTE

Install plastic cable ties as necessary.

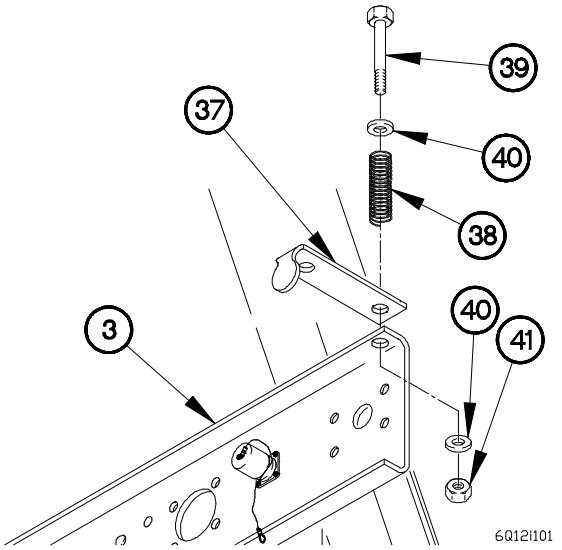
(17) Install retaining plate (33) and portable worklight connector (34) on support structure (3) with nut (35).

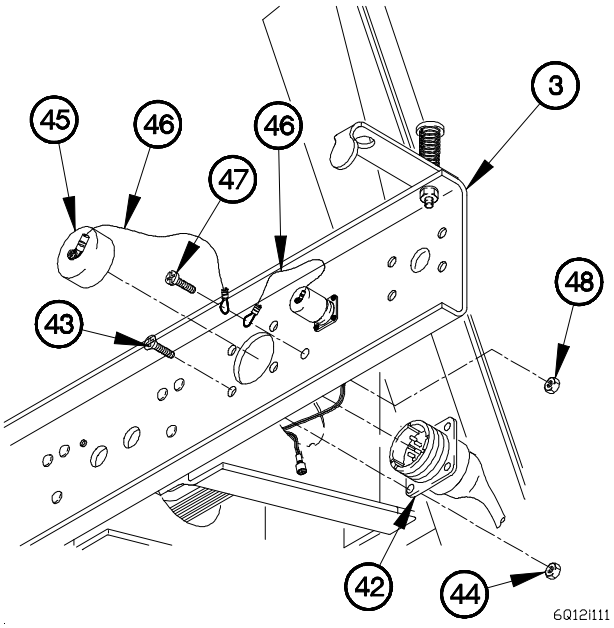
(18) Install connector cover (36) on portable worklight connector (34).



(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.

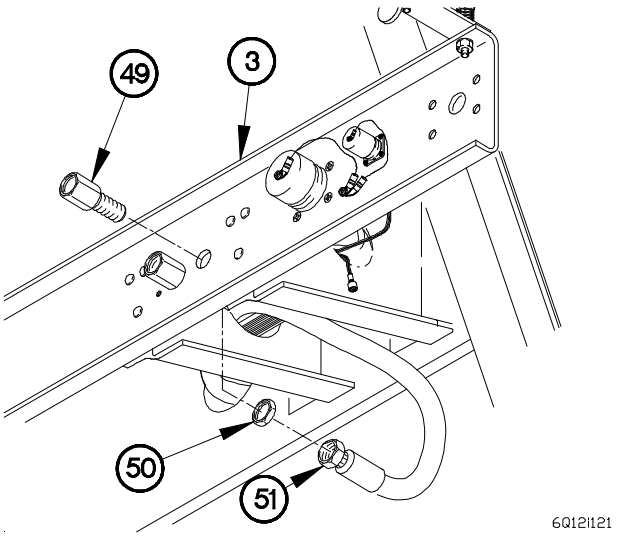
NOTE

Perform steps (25) through (28) on left side of support structure.

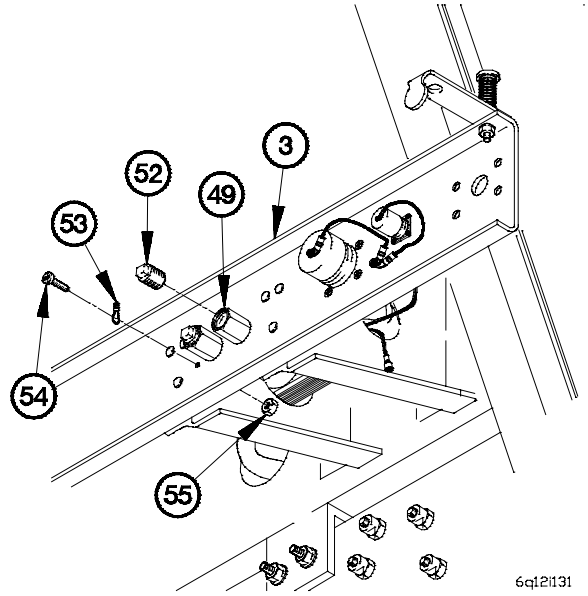
(25) Install two adapters (49) on support structure (3) with two nuts (50).

(26) Position two hydraulic hoses (51) to adapters (49).

(26.1) Tighten hydraulic hoses (7) to 38-47 lb-ft (52-64 N•m).



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

Section I. INTRODUCTION 16-3
16-1. INTRODUCTION 16-3

Section II. MAINTENANCE PROCEDURES 16-4
16-2. M1084/M1086 MATERIAL HANDLING CRANE (MHC) REPLACEMENT 16-4
16-3. M1084/M1086 BOOM ASSEMBLY REPLACEMENT 16-10
16-4. M1084/M1086 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT 16-19
16-5. M1084/M1086 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT 16-26
16-6. M1084/M1086 BOOM BASE SECTION REPLACEMENT 16-35
16-7. M1084/M1086 LIFT CYLINDER REPLACEMENT 16-43
16-8. M1084/M1086 ERECTION CYLINDER REPLACEMENT 16-48
16-9. M1084/M1086 TENSION LINK CYLINDER REPLACEMENT 16-52
16-10. M1084/M1086 MAST REPLACEMENT 16-55
16-11. M1084/M1086 TURNTABLE REPLACEMENT 16-60
16-12. M1084/M1086 TURNTABLE BEARING REPLACEMENT 16-63
16-13. M1084/M1086 HOIST ASSEMBLY REPLACEMENT 16-66
16-14. M1084/M1086 CABLE FOLLOWER REPLACEMENT/REPAIR 16-72
16-15. M1084/M1086 PROXIMITY SENSOR REPLACEMENT 16-76
16-16. M1084/M1086 TENSION LOAD CELL REPLACEMENT 16-80
16-17. M1084/M1086 HYDRAULIC MOTOR CONTROL VALVE REPLACEMENT 16-87
16-18. M1084/M1086 HOLDING VALVE REPLACEMENT 16-90
16-19. M1084/M1086 HOIST HYDRAULIC MOTOR REPLACEMENT 16-92
16-20. M1084/M1086 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT 16-95
16-21. M1084/M1086 GEAR SET REPAIR 16-99
16-22. M1084/M1086 OVERLOAD SHUTDOWN REPLACEMENT 16-107
16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR 16-110
16-24. M1084/M1086 CROSS RELIEF VALVE REPLACEMENT 16-124
16-25. M1084/M1086 HYDRAULIC ORBIT MOTOR REPLACEMENT 16-128
16-26. M1084/M1086 OUTRIGGER JACK CYLINDER REPLACEMENT 16-129
16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR 16-133
16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR 16-145
16-29. M1084/M1086 TWO WAY SOLENOID VALVE REPLACEMENT 16-165
16-30. M1084/M1086 MANUAL OVERRIDE VALVE REPLACEMENT 16-167
16-31. M1084/M1086 CRANE LOAD TEST 16-170
16-32. M1089 MATERIAL HANDLING CRANE (MHC) REPLACEMENT 16-174
16-33. M1089 BOOM ASSEMBLY REPLACEMENT 16-181
16-34. M1089 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT 16-189
16-35. M1089 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT . 16-195
16-36. M1089 BOOM BASE SECTION REPLACEMENT 16-202
16-37. M1089 LIFT CYLINDER REPLACEMENT 16-209
16-38. M1089 ERECTION CYLINDER REPLACEMENT 16-216
16-39. M1089 TENSION LINK CYLINDER REPLACEMENT 16-220
16-40. M1089 MAST REPLACEMENT 16-224
16-41. M1089 CRANE TURNTABLE REPLACEMENT 16-228

16-42. M1089 TURNTABLE BEARING REPLACEMENT 16-230
16-43. M1089 HOIST ASSEMBLY REPLACEMENT 16-233
16-44. M1089 CABLE FOLLOWER REPLACEMENT/REPAIR 16-239
16-45. M1089 PROXIMITY SENSOR REPLACEMENT 16-243
16-46. M1089 TENSION LOAD CELL REPLACEMENT 16-247
16-47. M1089 HYDRAULIC MOTOR CONTROL VALVE REPLACEMENT 16-254
16-48. M1089 HOLDING VALVE REPLACEMENT 16-257
16-49. M1089 HOIST HYDRAULIC MOTOR REPLACEMENT 16-259
16-50. M1089 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT 16-262
16-51. M1089 GEAR SET REPAIR 16-266
16-52. M1089 OVERLOAD SHUTDOWN REPLACEMENT 16-275
16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR 16-278
16-54. M1089 CROSS RELIEF VALVE REPLACEMENT 16-296
16-55. M1089 HYDRAULIC ORBIT MOTOR REPLACEMENT 16-299
16-56. M1089 OUTRIGGER JACK CYLINDER REPLACEMENT 16-302
16-57. M1089 OUTRIGGER EXTENSION CYLINDER REPLACEMENT 16-306
16-58. M1089 OUTRIGGER BEAM REPLACEMENT 16-309
16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR 16-312
16-60. M1089 TWO WAY SOLENOID VALVE REPLACEMENT 16-336
16-61. M1089 MANUAL OVERRIDE VALVE REPLACEMENT 16-339
16-62. M1089 CRANE LOAD TEST 16-342
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR 16-346
16-64. M1089 WINCH DRIVE MOTOR ASSEMBLY REPLACEMENT/REPAIR 16-376
16-65. 30K WINCH RELIEF VALVE REPLACEMENT/REPAIR 16-389
16-66. DELETED 16-394
16-67. DELETED 16-401
16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT 16-408
16-69. M1089 CROSSBAR ASSEMBLY REPLACEMENT/REPAIR 16-418
16-70. DELETED 16-425
16-71. M1089 FOLD CYLINDER REPLACEMENT 16-431
16-72. M1089 TELESCOPIC LIFT CYLINDER REPLACEMENT 16-434
16-73. M1089 TELESCOPIC LIFT CYLINDER COUNTERBALANCE VALVE REPLACEMENT 16-438
16-74. M1089 LEFT LOWER ARM ASSEMBLY REPLACEMENT/REPAIR 16-443
16-75. M1089 RIGHT LOWER ARM ASSEMBLY REPLACEMENT/REPAIR 16-447
16-76. M1089 UPPER ARM REPAIR 16-450
16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR 16-457
16-78. M1089 STIFFLEG ASSEMBLY REPAIR 16-467
16-79. M1089 FLOWMETER VALVE ASSEMBLY REPLACEMENT/ADJUSTMENT 16-481
16-80. M1089 SELECTOR VALVE ASSEMBLY REPLACEMENT/REPAIR 16-487
16-81. M1089 30K WINCH COUNTERBALANCE/CARTRIDGE/SOLENOID VALVE REPLACEMENT 16-490
16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR 16-497
16-83. M1089 UPPER MAIN VALVE ASSEMBLY REPLACEMENT/REPAIR 16-502
16-84. M1089 LOWER VALVE ASSEMBLY REPLACEMENT/REPAIR 16-510
16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT 16-521
16-86. PAY-OUT HYDRAULIC MOTOR REPLACEMENT 16-535
16-87. M1089 PAY-OUT HYDRAULIC MOTOR RELIEF VALVE REPLACEMENT 16-538
16-88. 15K SELF-RECOVERY WINCH REPLACEMENT/REPAIR 16-540
16-89. 15K SELF-RECOVERY WINCH COUNTERBALANCE/CARTRIDGE VALVE REPLACEMENT 16-557
16-90. 15K SELF-RECOVERY WINCH HYDRAULIC MOTOR REPLACEMENT 16-561
16-91. HYDRAULIC ROTARY PUMP REPLACEMENT 16-562
16-92. M1089 THREE STAGE HYDRAULIC PUMP REPLACEMENT 16-565
16-93. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR 16-570
16-94. M1089 WRECKER CONTROL PANEL REPLACEMENT 16-587

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

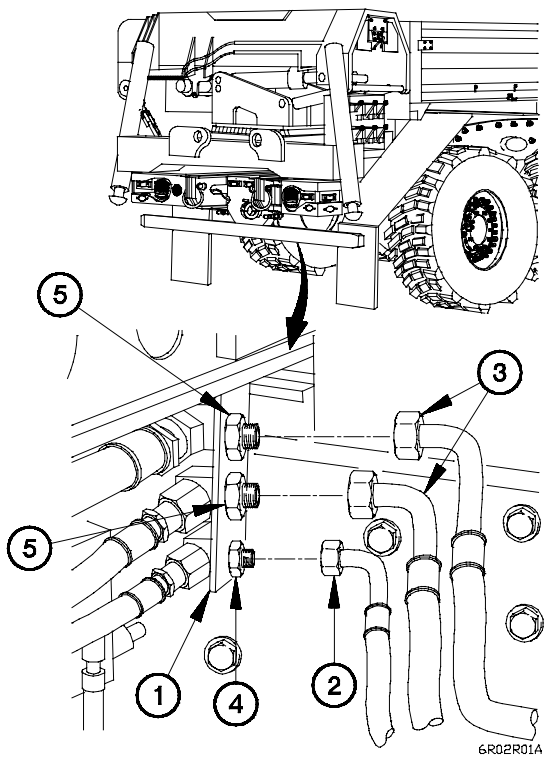
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

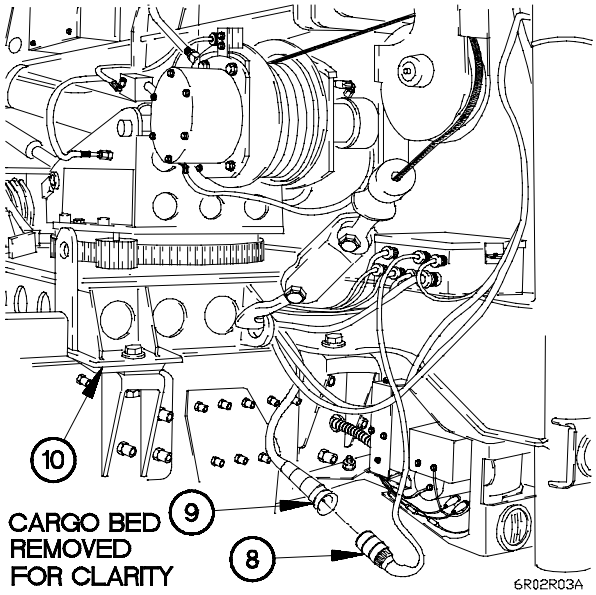
Tag hoses and connection points prior to disconnecting.

(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.



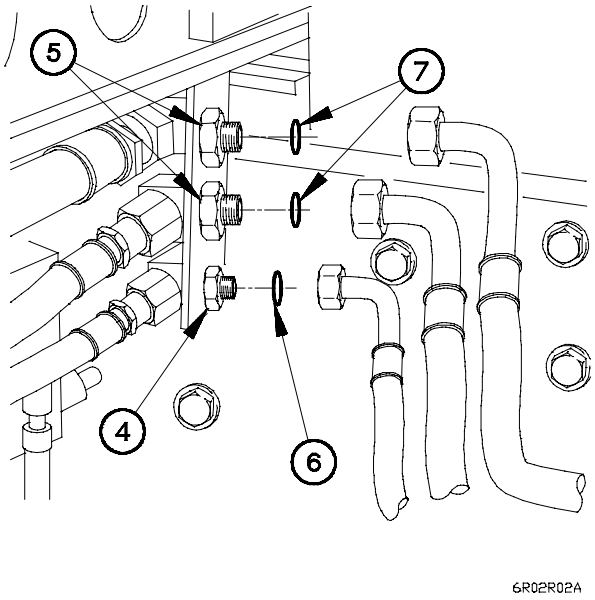
WARNING

- **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).

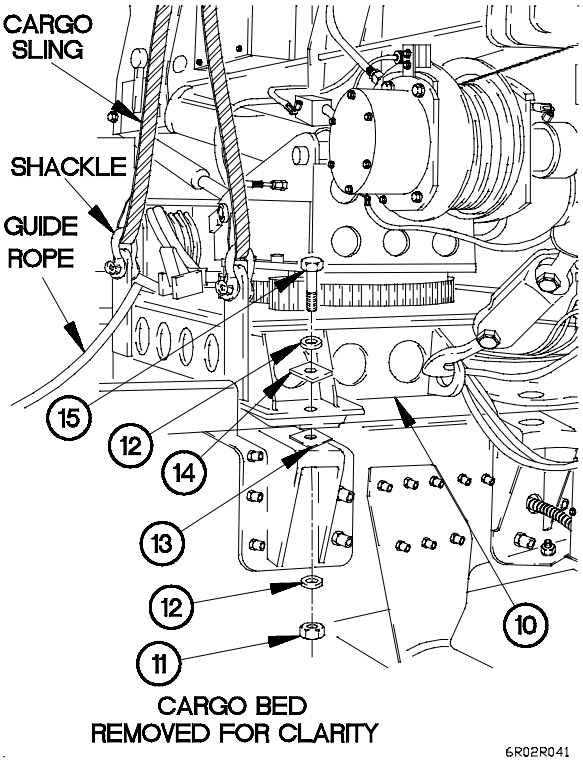


NOTE

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)

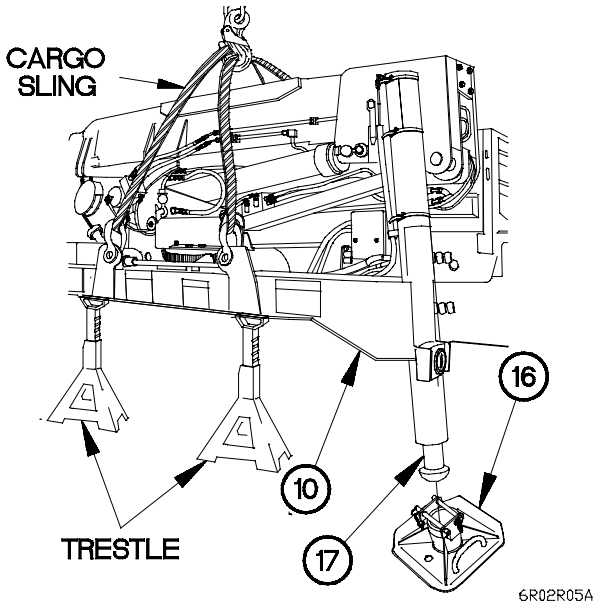
NOTE

Step (7) requires the aid of two assistants.

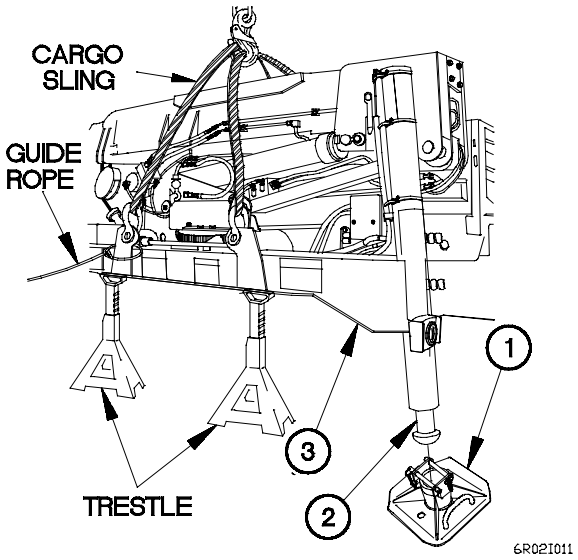
(7) Remove crane (10) from vehicle.

(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

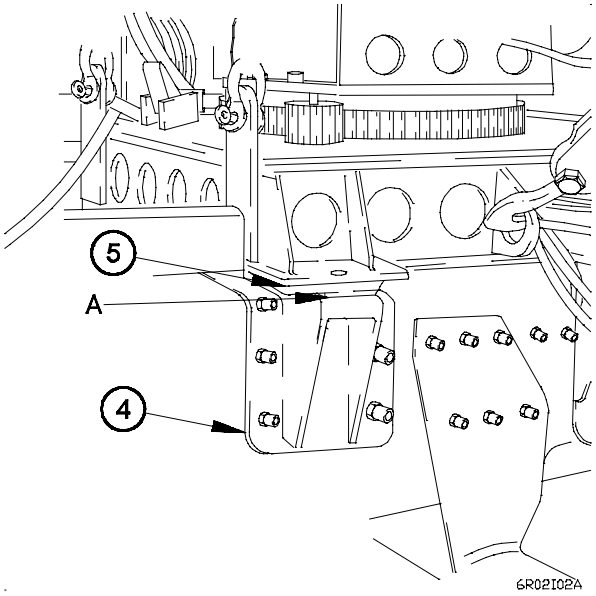
Step (2) requires the aid of two assistants.

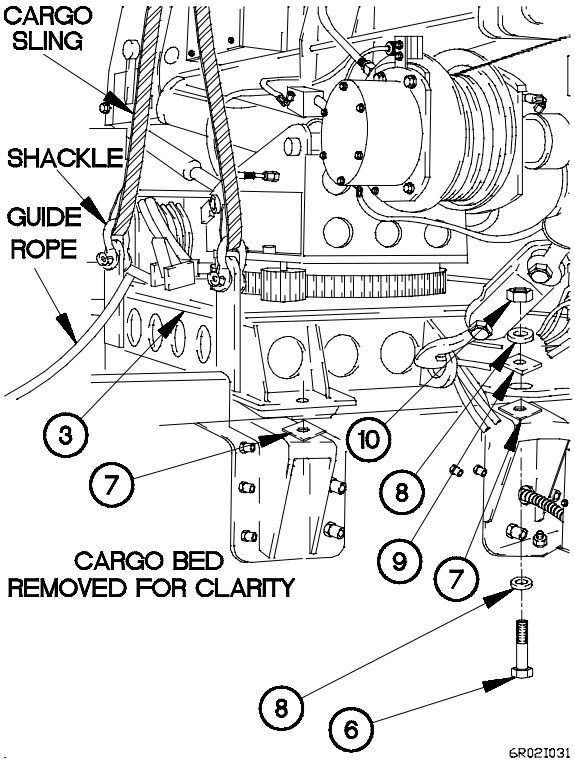
(2) Position MHC (3) on vehicle.

NOTE

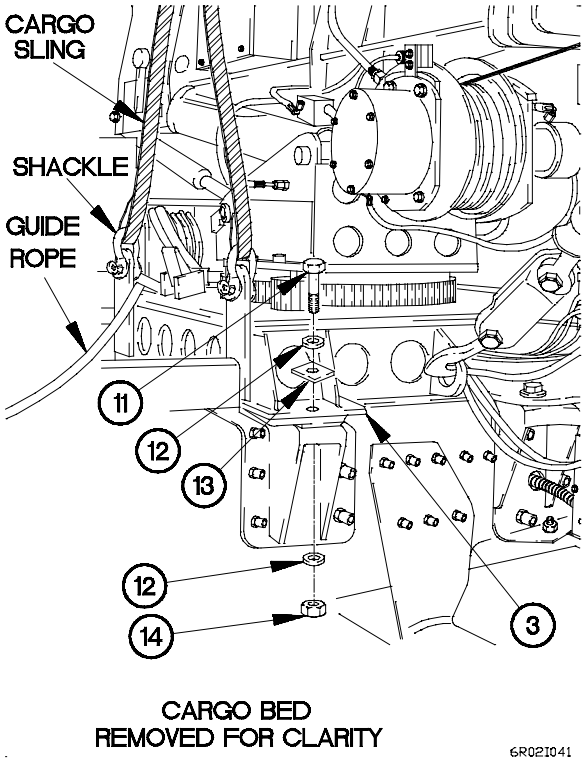
If gap (A) is larger than .005 in. (0.013 cm), install shim(s) as required.

(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).

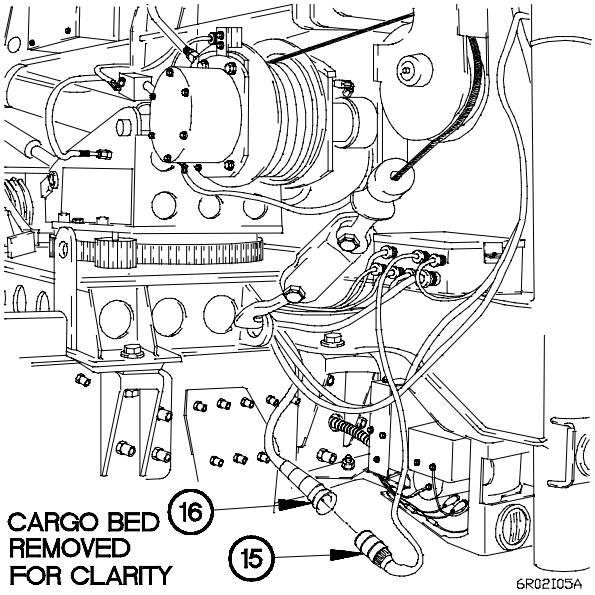
(6) Tighten two nuts (14) to 665-735 lb-ft (900-990 N·m).

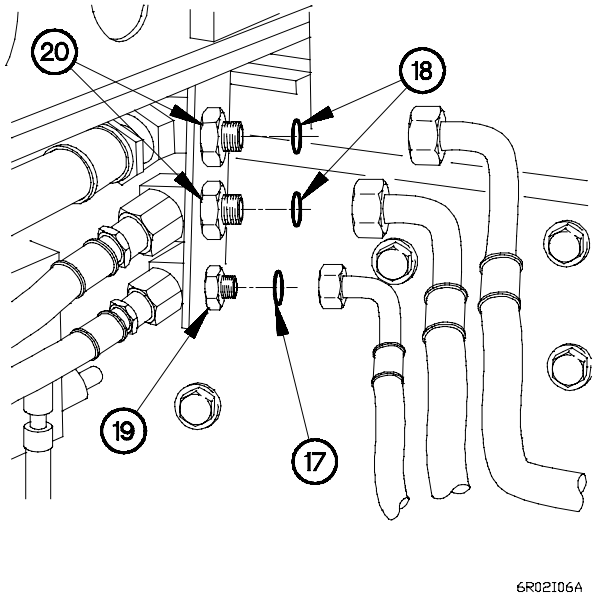
16-2. M1084/M1086 MATERIAL HANDLING CRANE (MHC) REPLACEMENT (CONT)

NOTE

Install plastic cable ties as required.

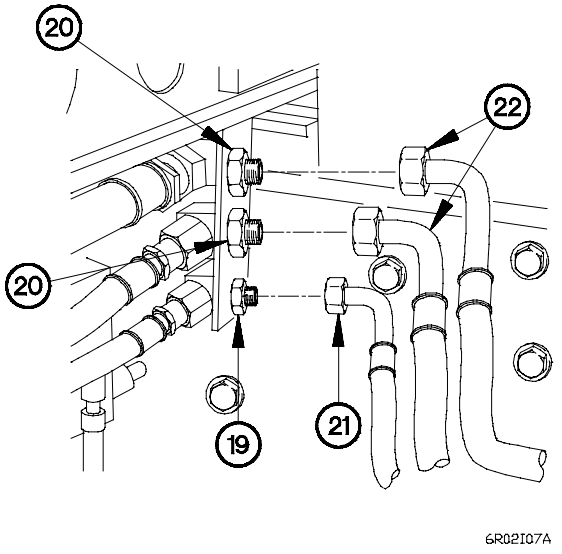
(7) Connect power connector (15) to power cable (16).





(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).



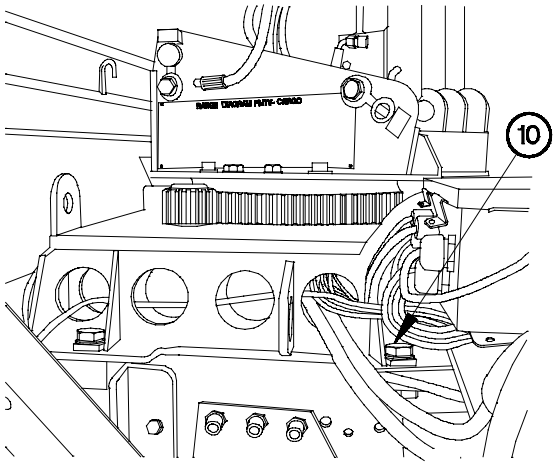
(10) Check fluid level in hydraulic reservoir (TM 9-2320-366-10).

(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).



6R02I08A

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.

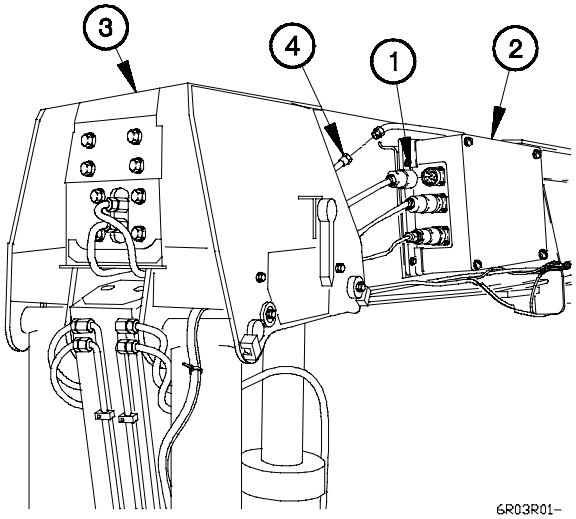
NOTE

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

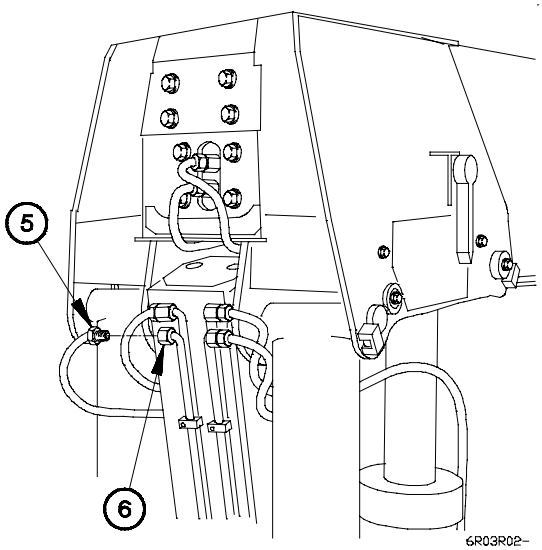
(2) Pull overload lockout connector (1) clear of boom assembly (3).

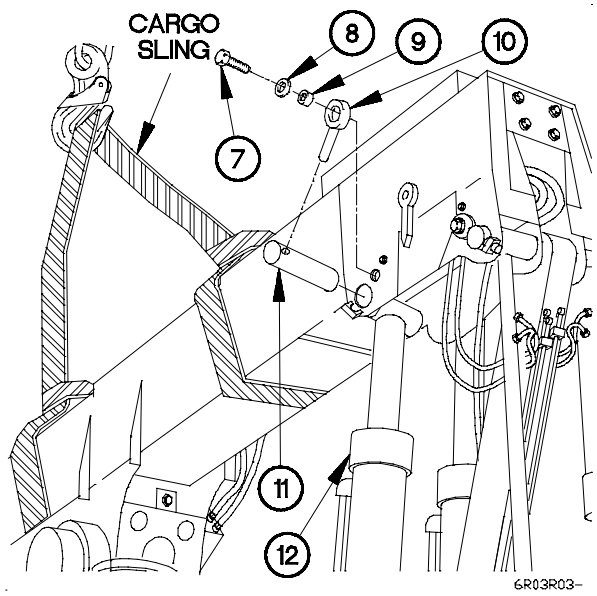
(3) Disconnect hydraulic hose (4) from boom assembly (3).

(4) Pull hydraulic hose (4) clear of boom assembly (3).



(5) Disconnect four hydraulic hoses (5) from fittings (6).





WARNING

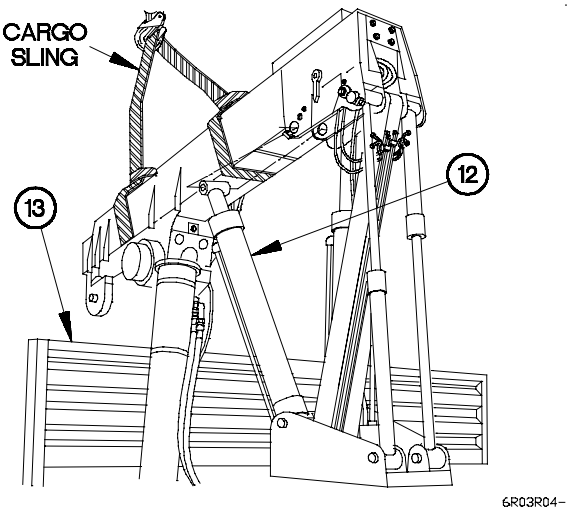
Boom assembly weighs approximately 800 lbs (363 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

(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).

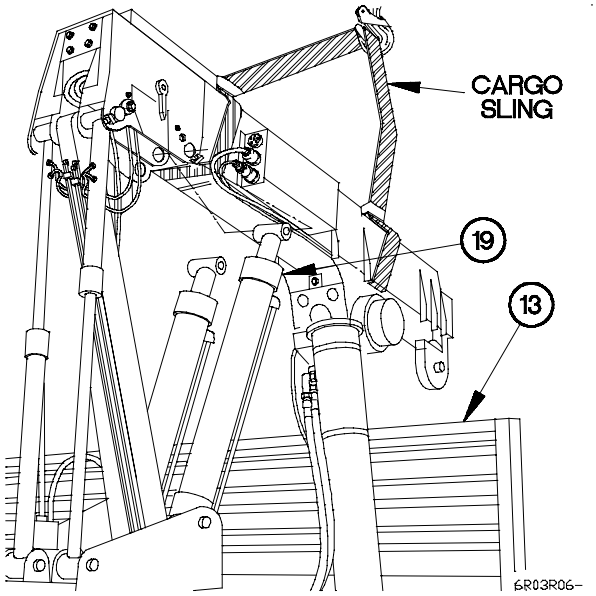


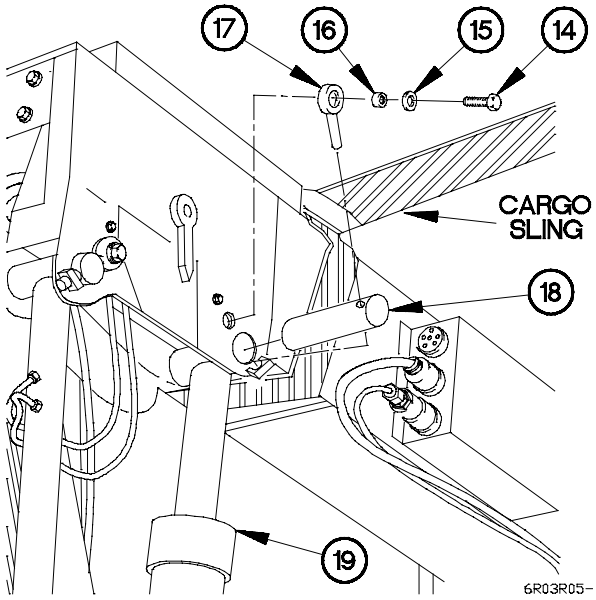
16-3. M1084/M1086 BOOM ASSEMBLY REPLACEMENT (CONT)

(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).

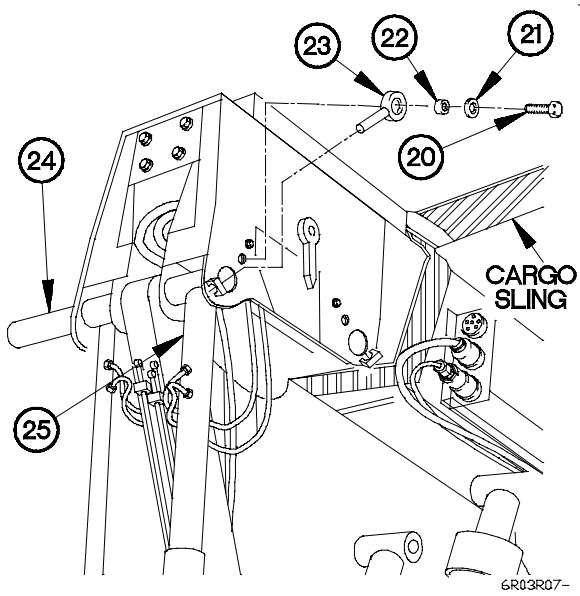
(15) Remove rivet eyebolt (23) from pivot shaft (24).

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).

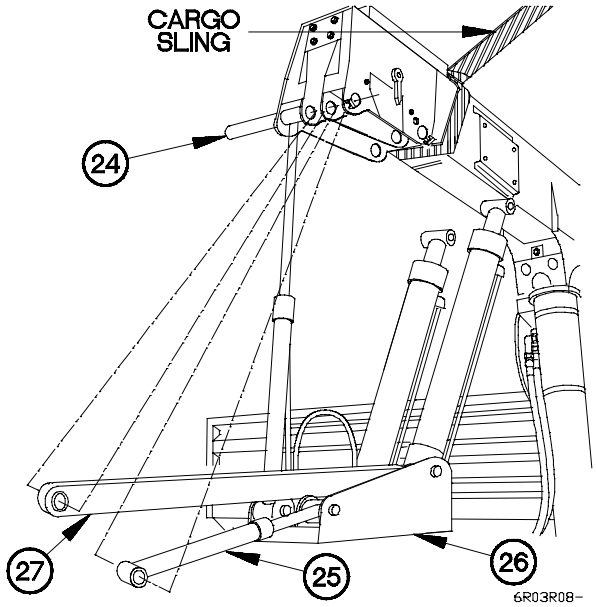
(17) Position tension link cylinder (25) against turntable (26).

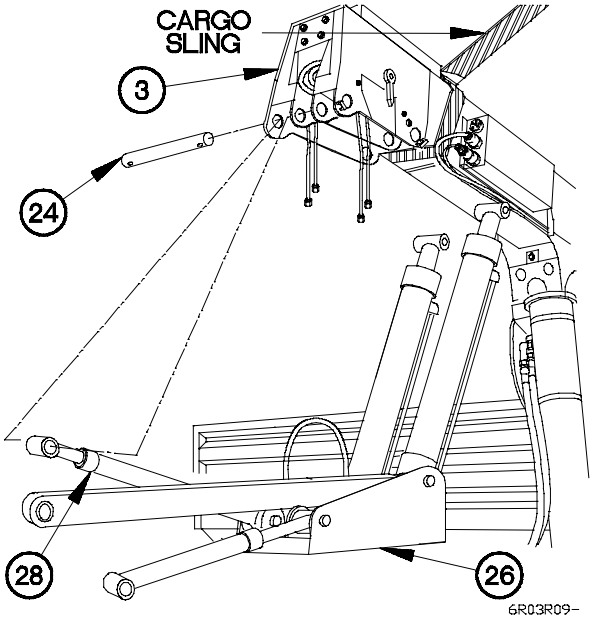
WARNING

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)

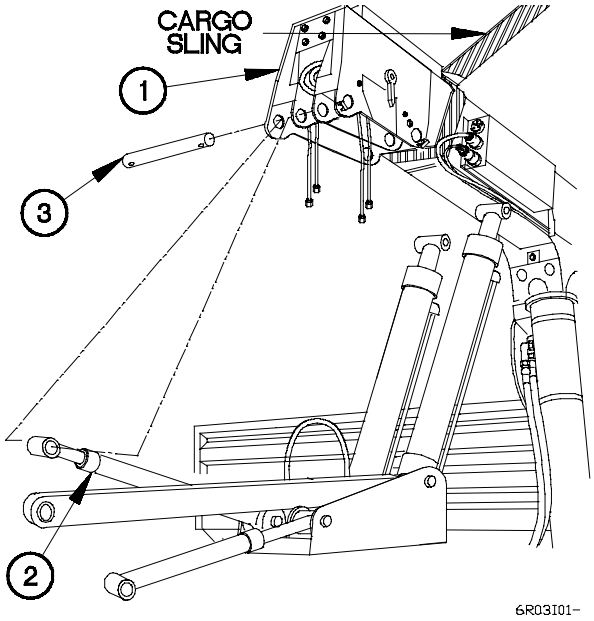
b. Installation.

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.

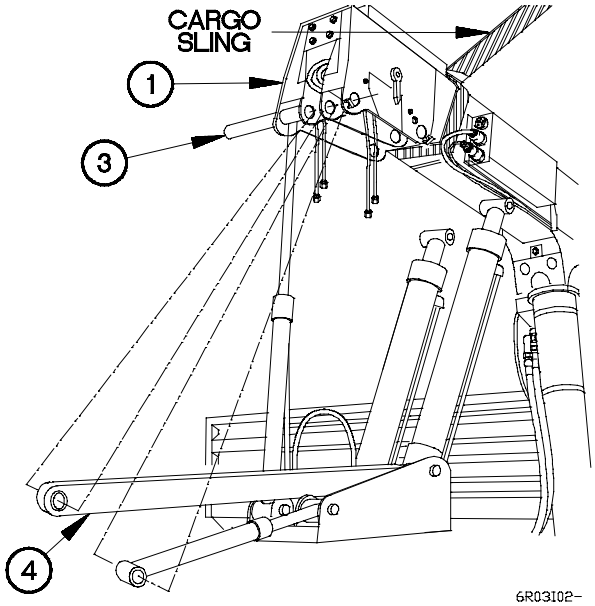
NOTE

Steps (1) through (17) require the aid of assistant.

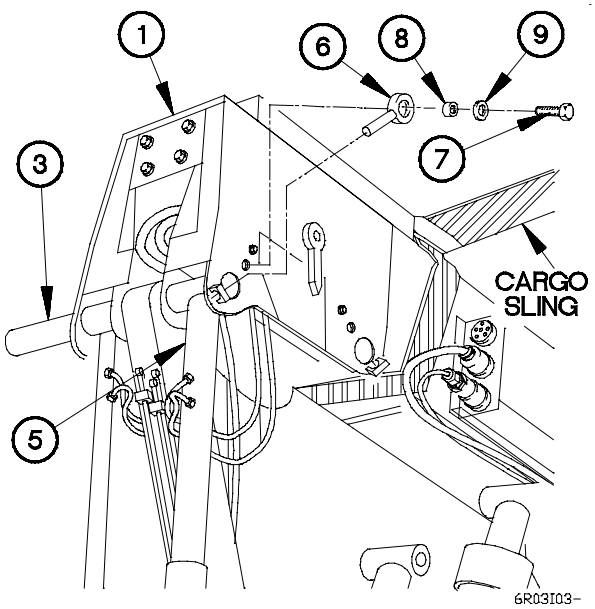


(1) Position boom assembly (1) in mounting position over erection cylinder (2).

(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).

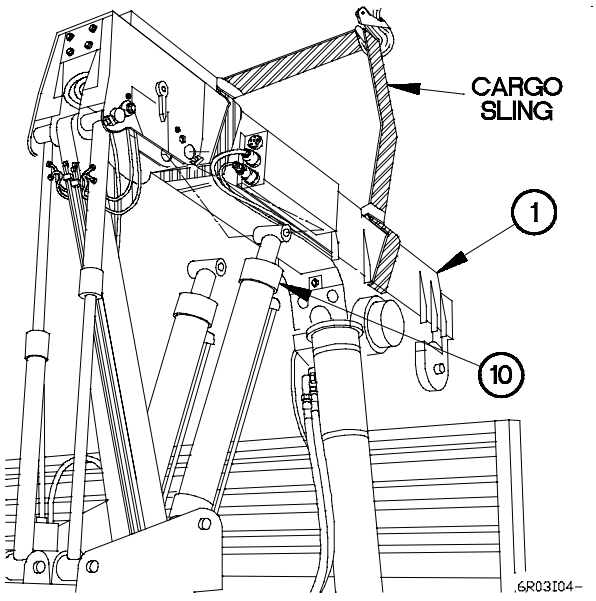
WARNING

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).

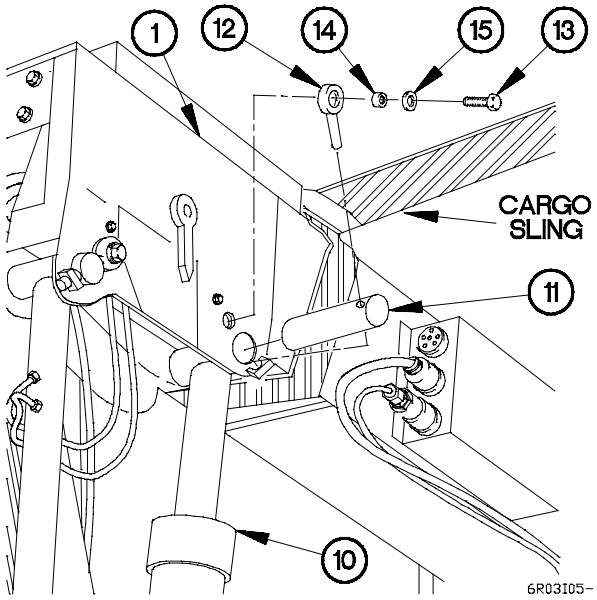
WARNING

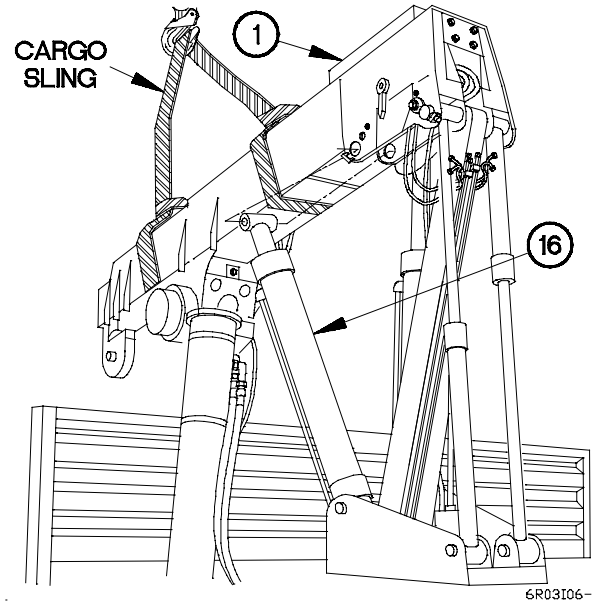
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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).

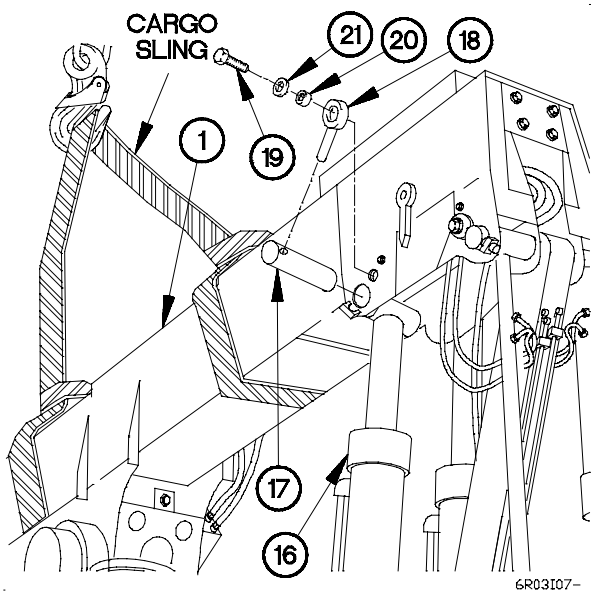
WARNING

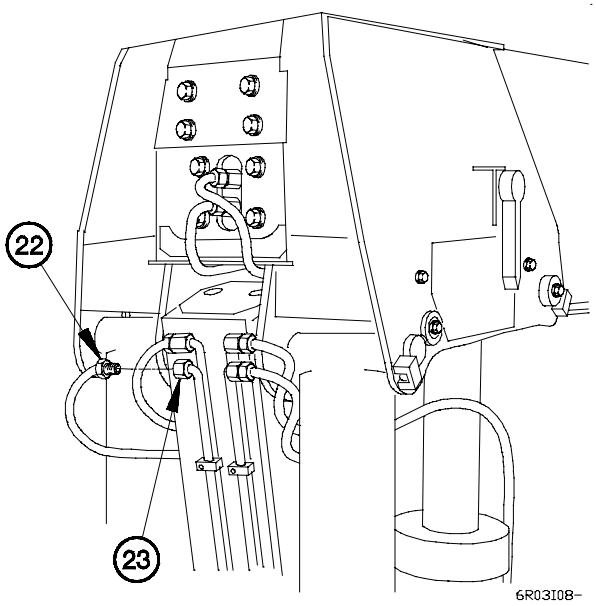
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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).

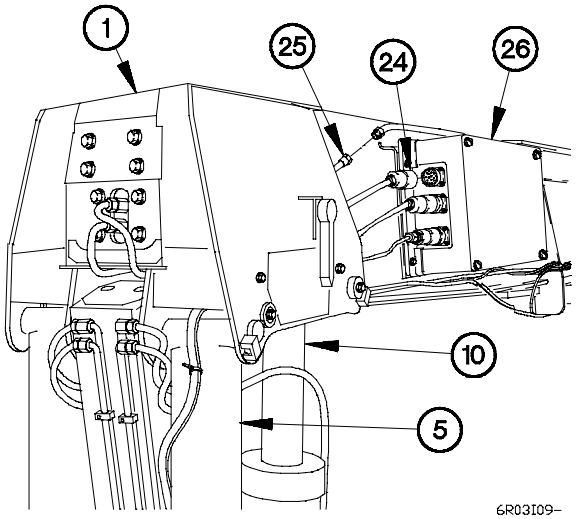
(23) Route hydraulic hose (25) over top of tension link cylinder (5) and RH lift cylinder (10).

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)

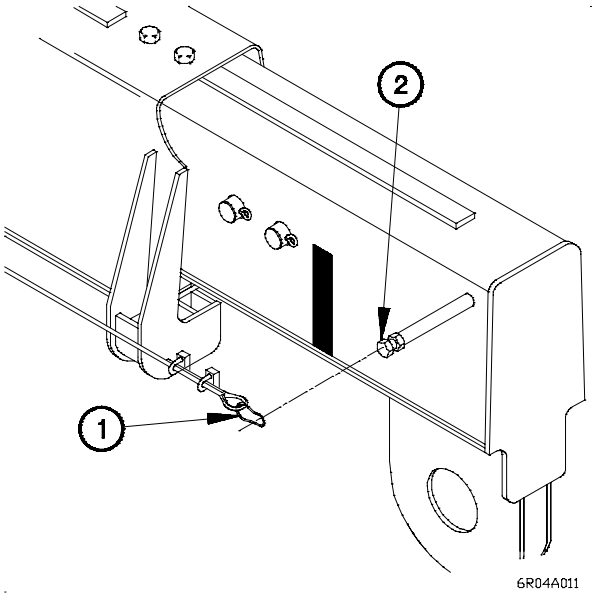
Personnel Required
(2)

a. Removal.

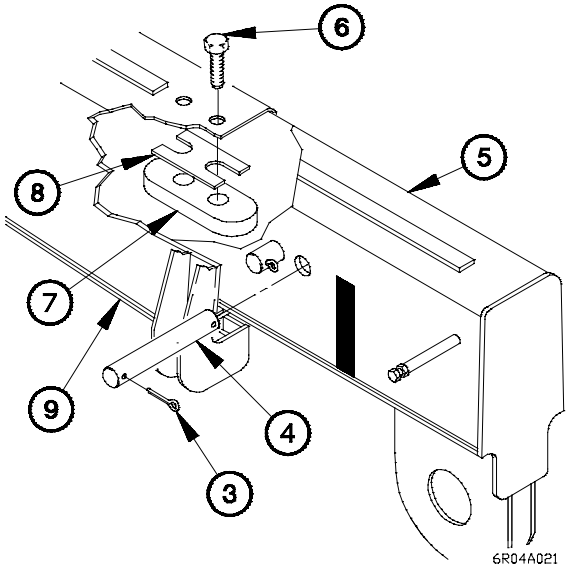
CAUTION

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)



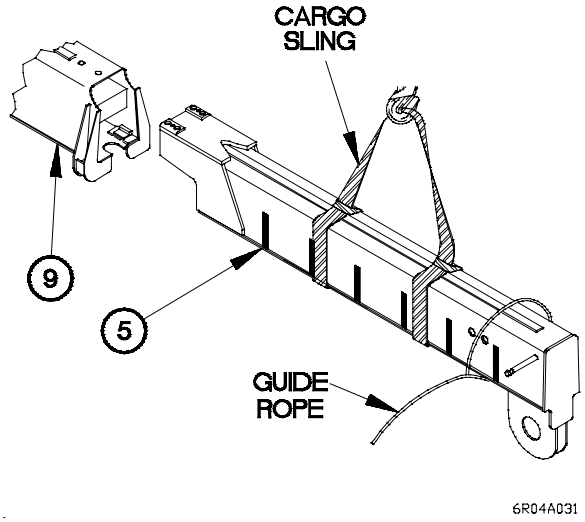
(2) Remove four cotter pins (3) from two shafts (4). Discard cotter pins.

(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.**



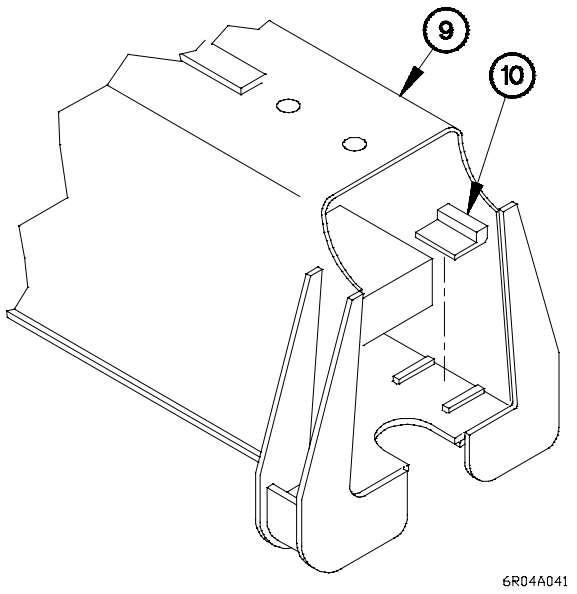
NOTE

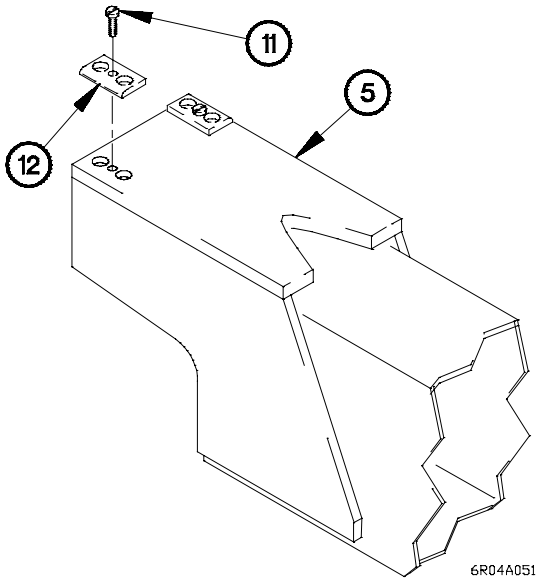
Steps (5) and (6) require the aid of an assistant.

(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

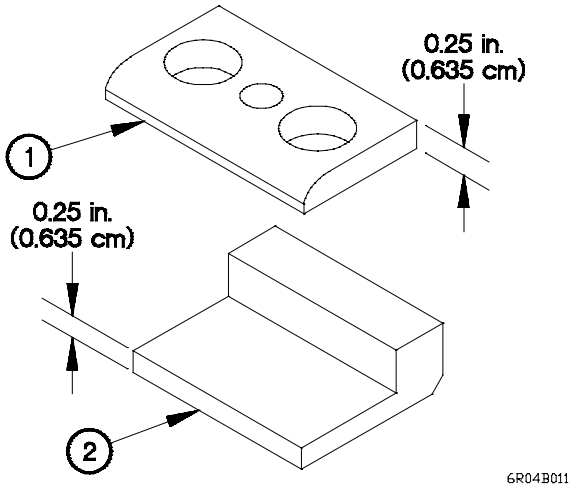
- **Dry Cleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for Type I dry cleaning 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.

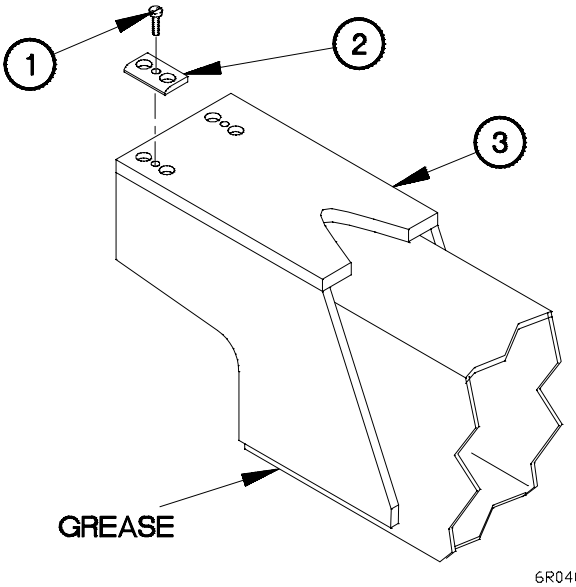
(2) Measure thickness of two upper wear pads (1). Replace wear pad if thickness measures less than 0.25 in. (0.635 cm).

(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

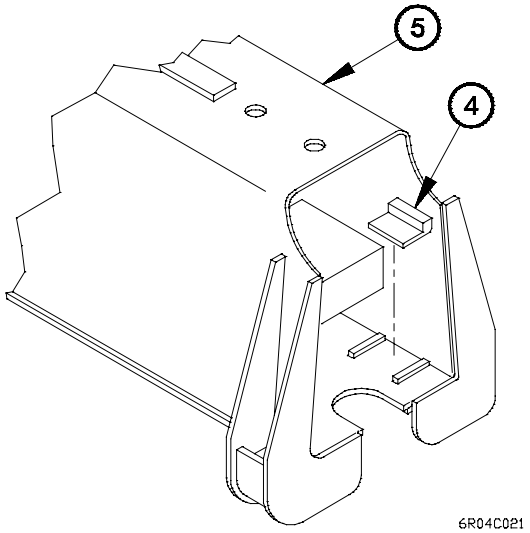
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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).



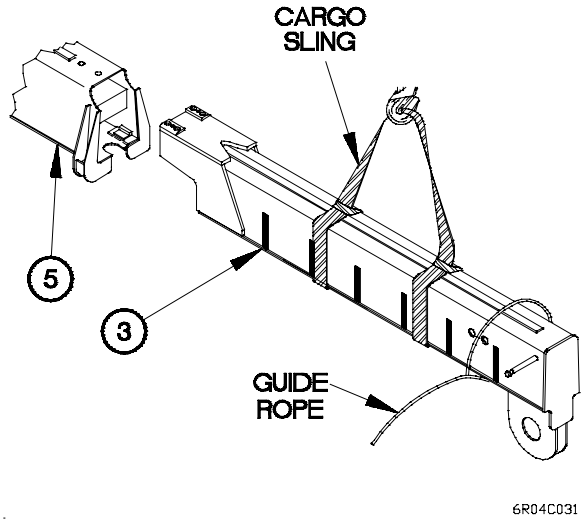
WARNING

- **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.

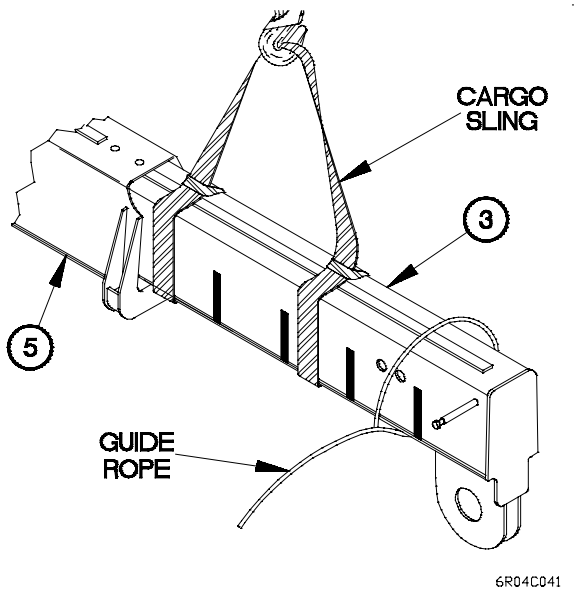
(5) Install boom fly section (3) in boom mid section (5).

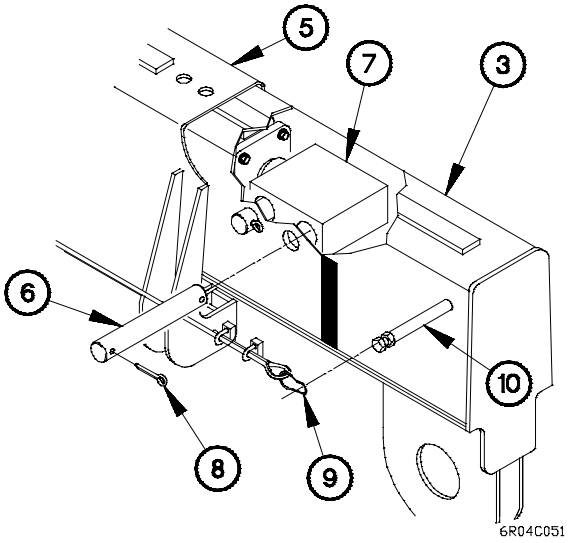


16-4. M1084/M1086 BOOM FLY SECTION REPLACEMENT/ADJUSTMENT (CONT)

(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

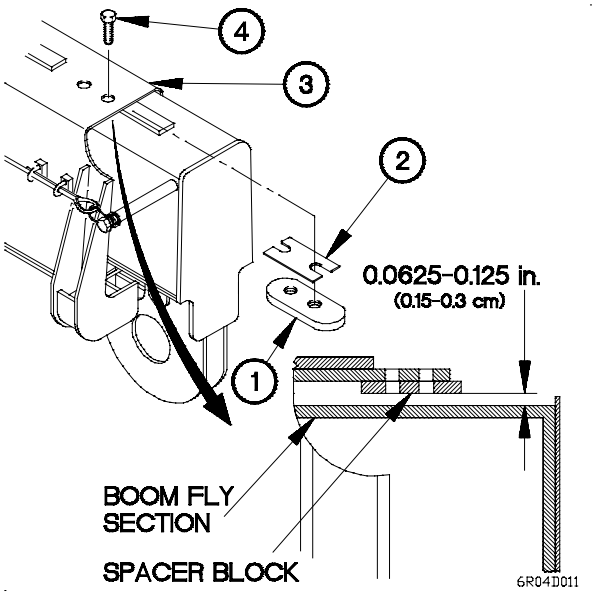
- Average thickness of spacer block is 0.375 in. (0.09 cm). Average thickness of shims is 0.0625 in. (0.15 cm).
- Add shims as required to reach a clearance of 0.0625 - 0.125 in. (0.15 - 0.3 cm) between spacer block and boom fly section.

(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

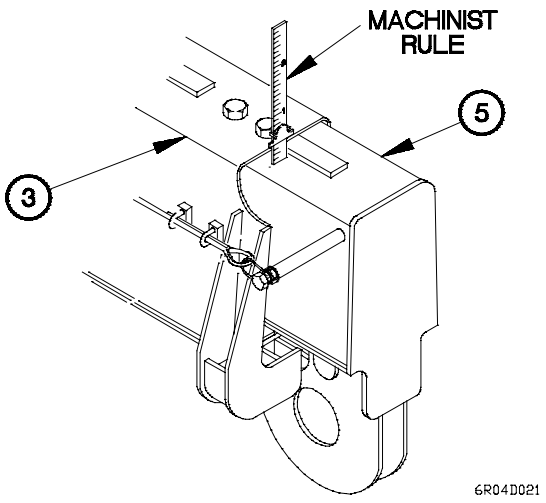
Step (5) requires the aid of an assistant.

(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

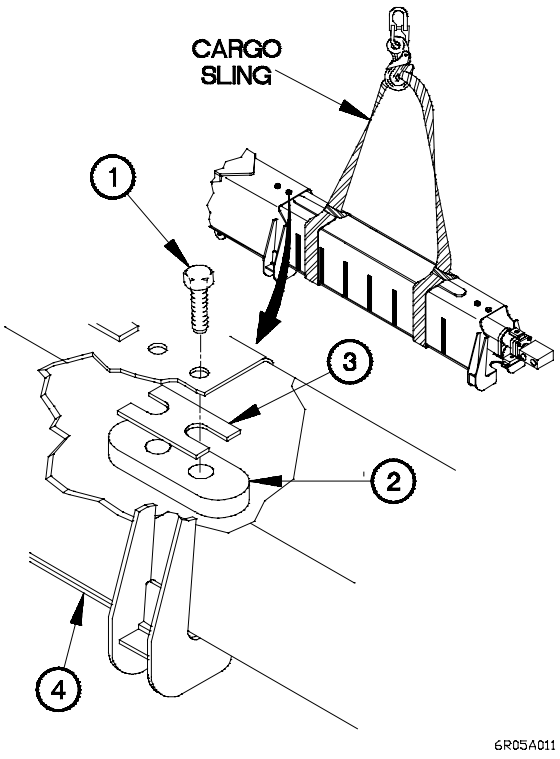
Equipment Conditions
Boom fly section removed (para 16-4).

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

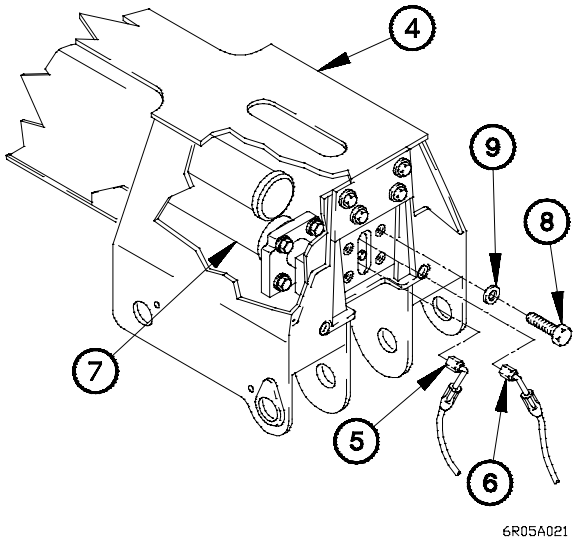
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

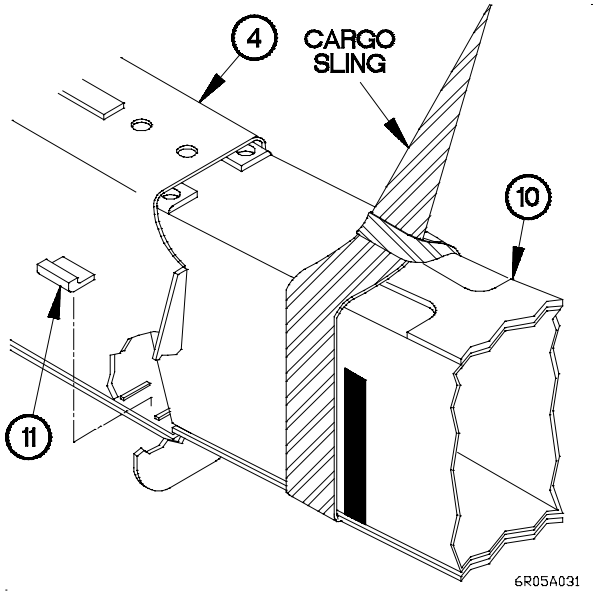
NOTE

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).

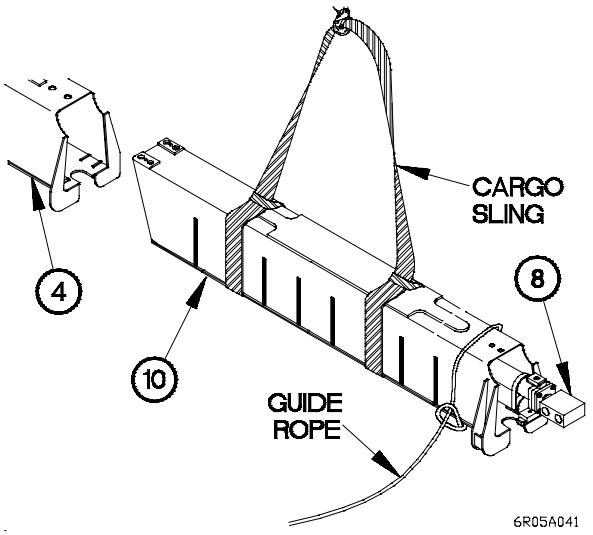
16-5. M1084/M1086 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ADJUSTMENT (CONT)

WARNING

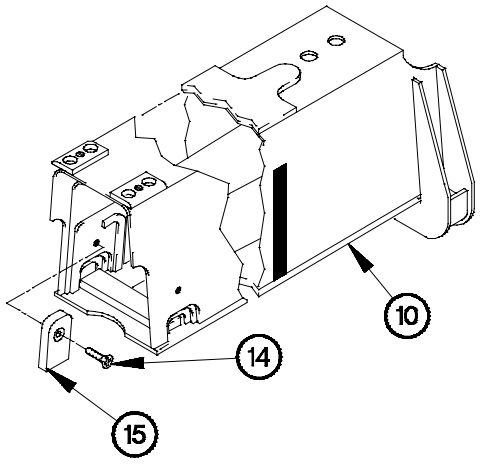
- **Boom mid section and telescopic cylinder combined weigh approximately 320 lbs (145 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**
- **A guide rope must be attached to aid in controlling boom mid section and telescopic 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).

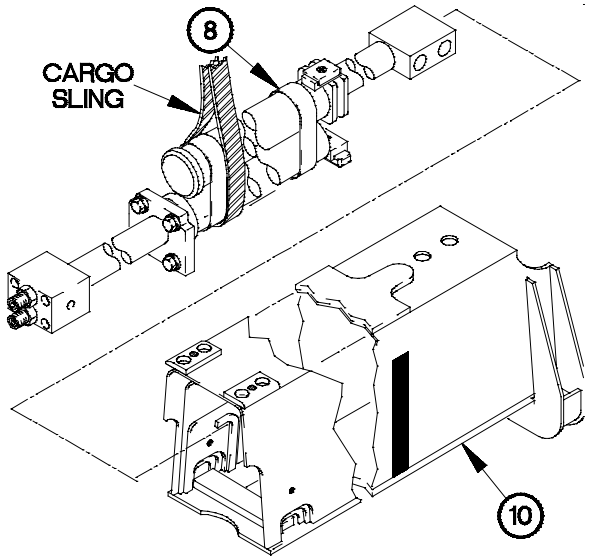
WARNING

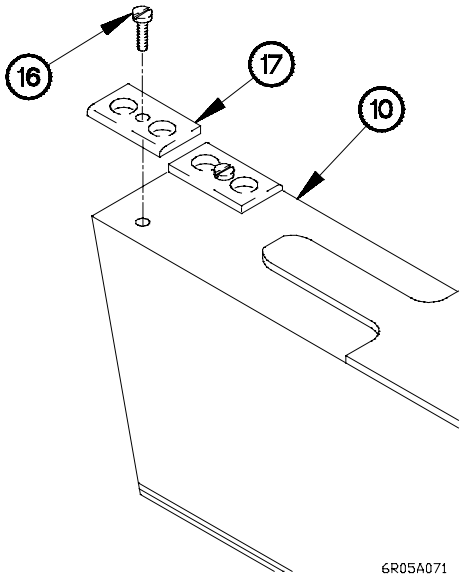
Telescopic cylinder weighs approximately 150 lbs (68 kg). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (8) requires the aid of an assistant.

(8) Remove telescopic cylinder (8) from boom mid section (10).

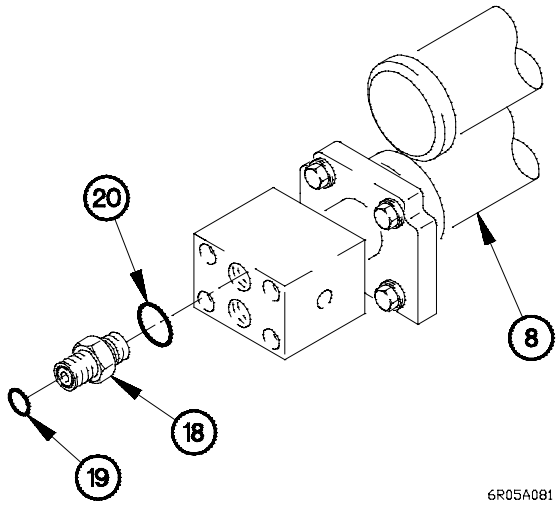




(9) Remove two screws (16) and upper wear pads (17) from top of boom mid section (10).

(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.**

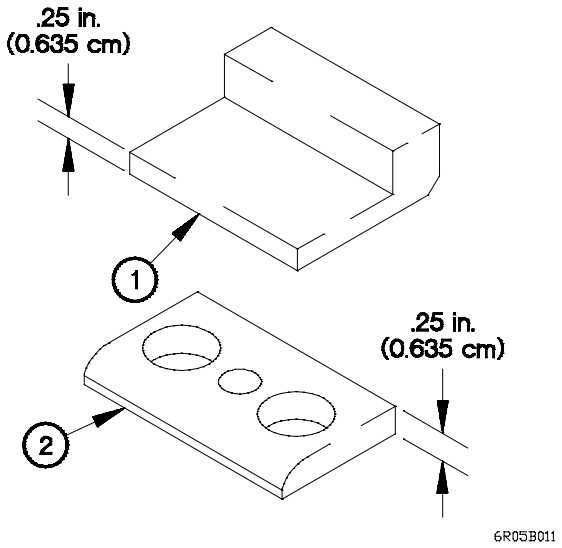
NOTE

Replace any part that fails visual inspection or size measurement requirements.

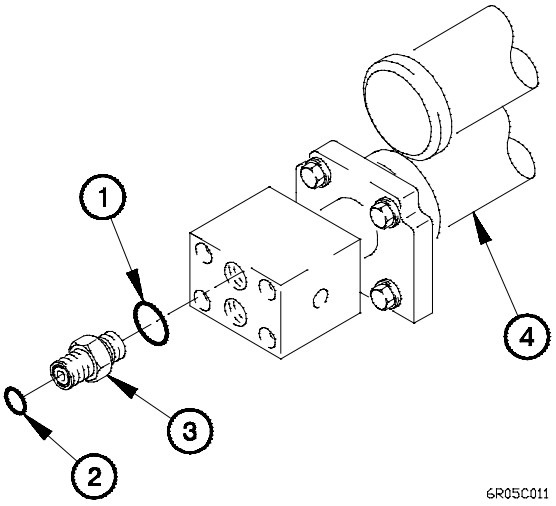
(1) Clean all metal parts with dry cleaning solvent.

(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).

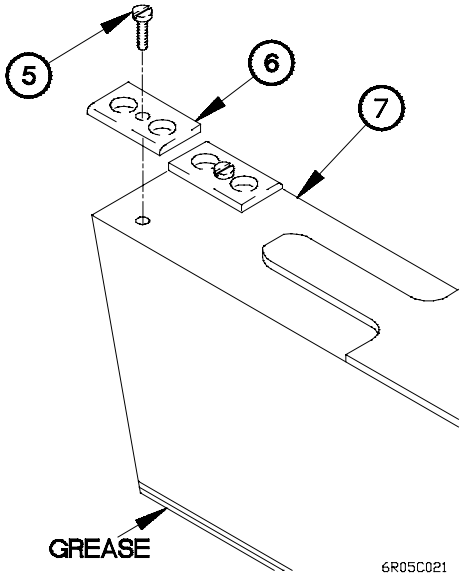
WARNING

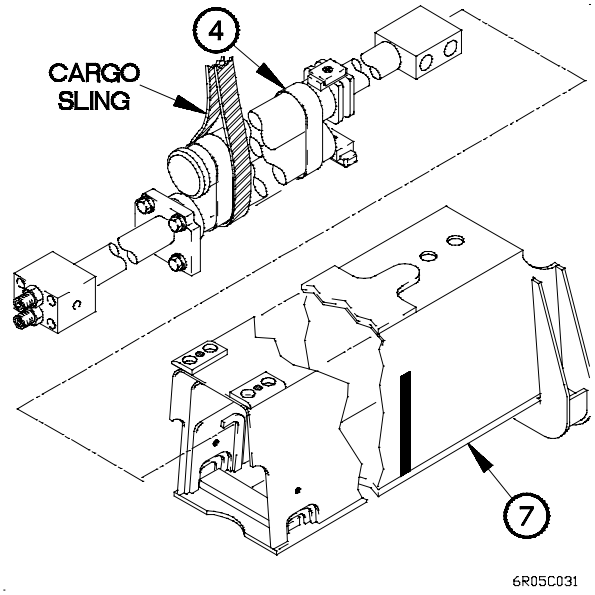
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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)

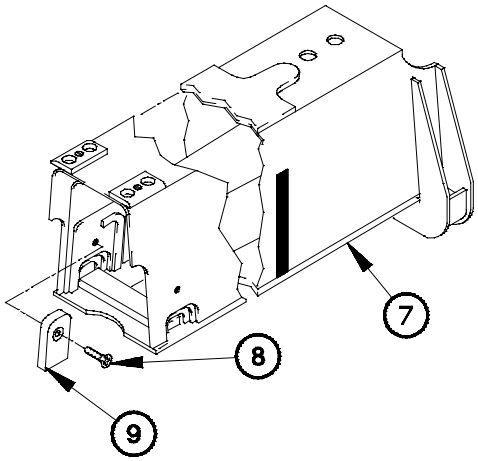
WARNING

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

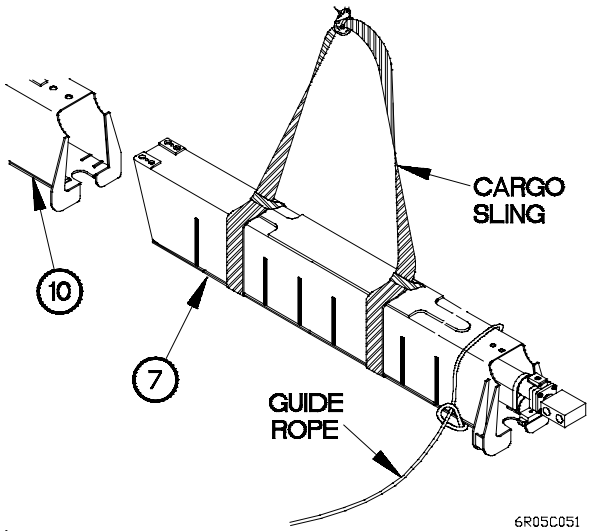
WARNING

- **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.

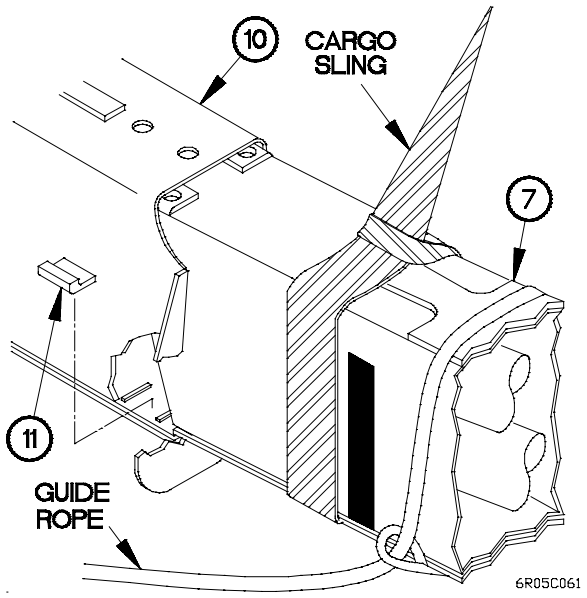
(11) Install boom mid section (7) into boom base section (10).

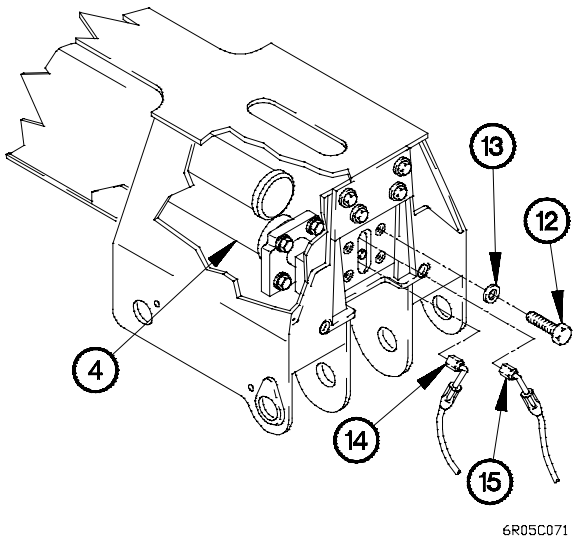


6R05C051

(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

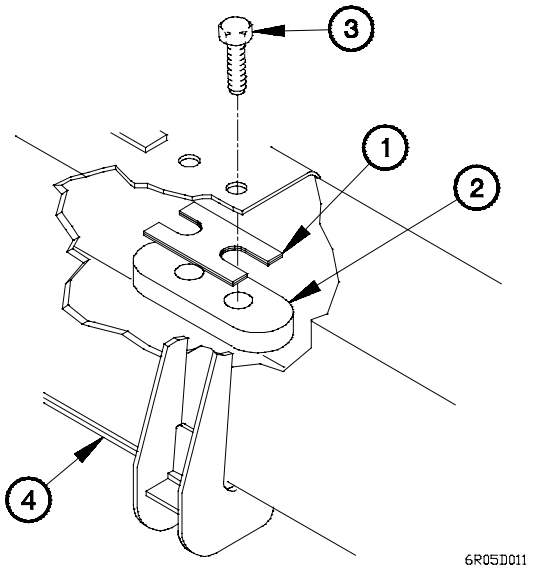
- Nominal thickness of spacer block is 3/8 in. (0.9 cm). Nominal thickness of shims is 1/16 in. (0.15 cm).
- Add shims as required to achieve a clearance of 1/16 - 1/8 in. (0.15 - 0.3 cm) between spacer block and boom fly section.

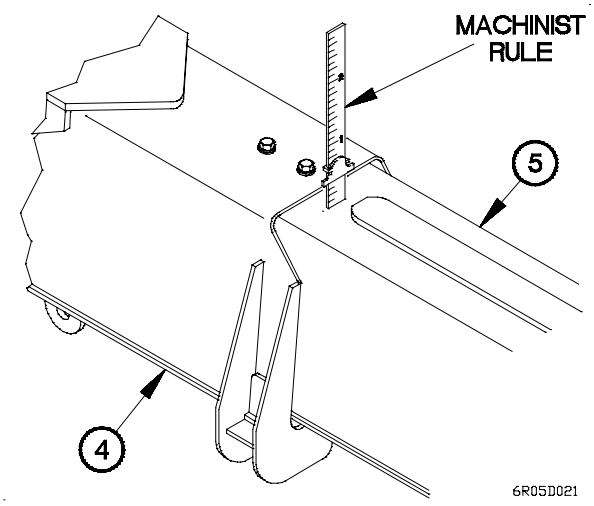
(1) Position shim(s) (1), spacer block (2) and two screws (3) on outer end of boom base section (4).

(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.

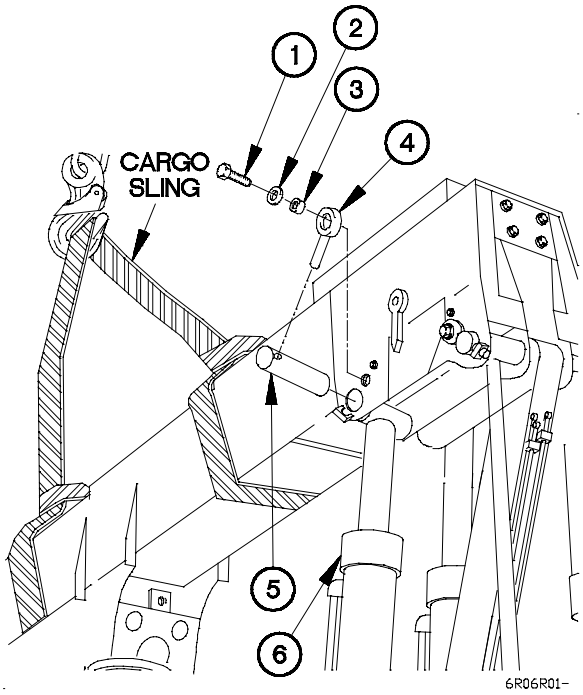
(1) Remove screw (1), washer (2), and bushing (3) from rivet eyebolt (4).

(2) Remove rivet eyebolt (4) from pivot shaft (5).

NOTE

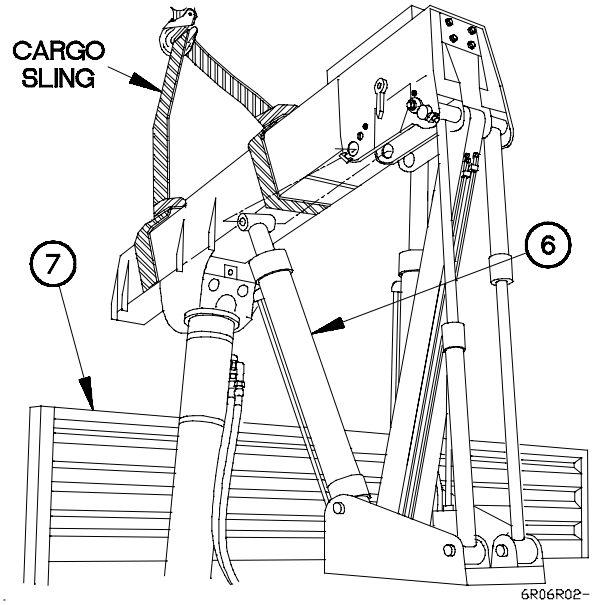
Step (3) requires the aid of an assistant.

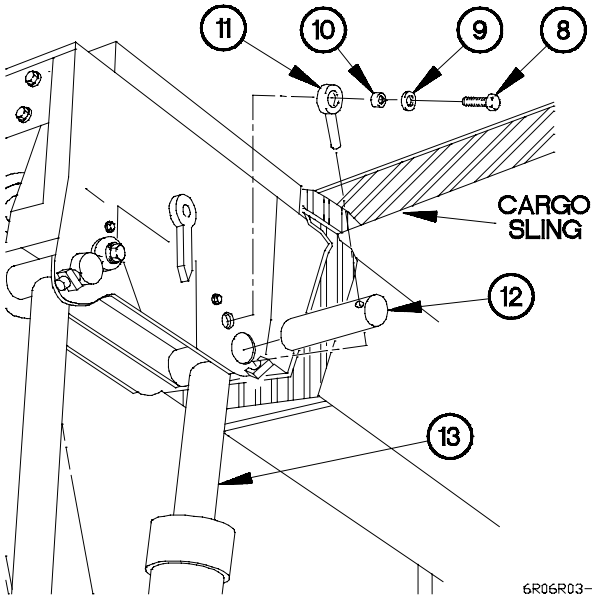
(3) Remove pivot shaft (5) from LH lift cylinder (6).



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).

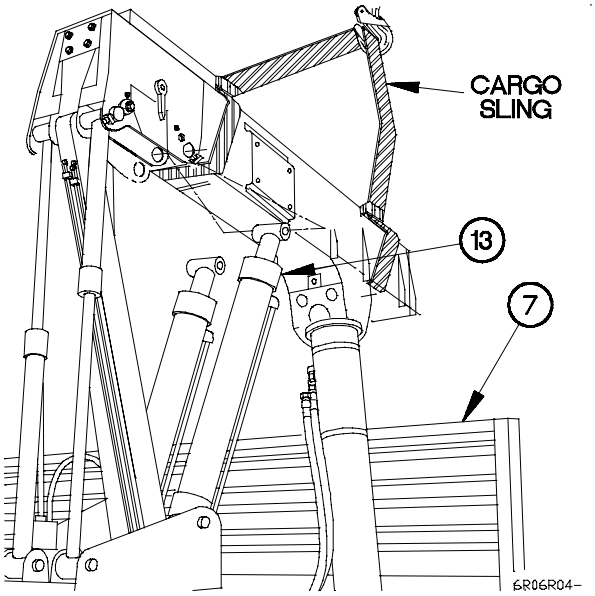
(6) Remove rivet eyebolt (11) from pivot shaft (12).

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).

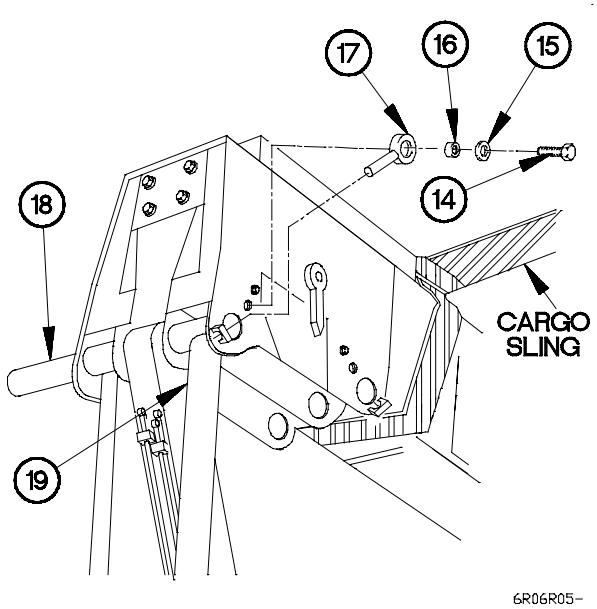
WARNING

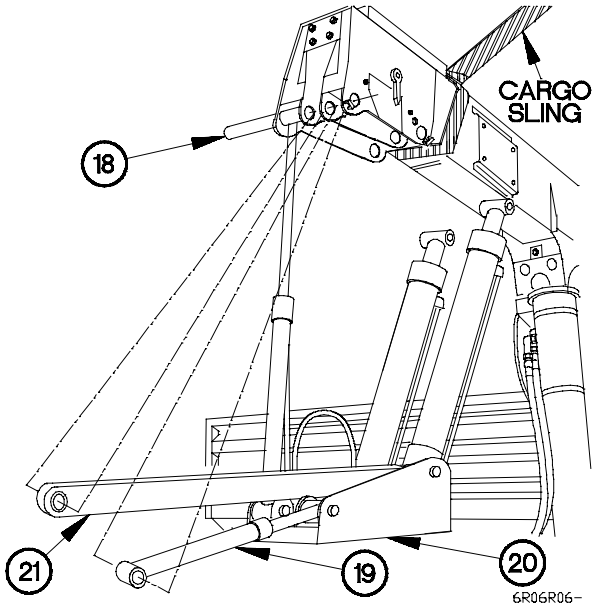
Drive pivot shaft out far enough to release tension link cylinder. Failure to comply may result in injury to personnel or damage to equipment.

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).

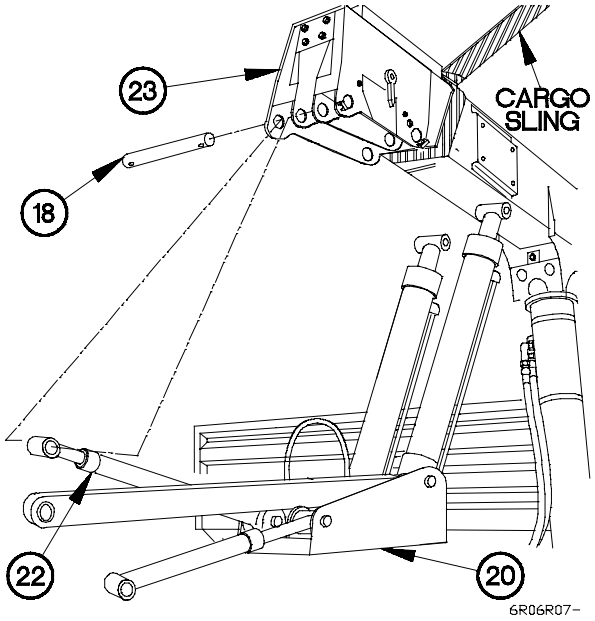
WARNING

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)

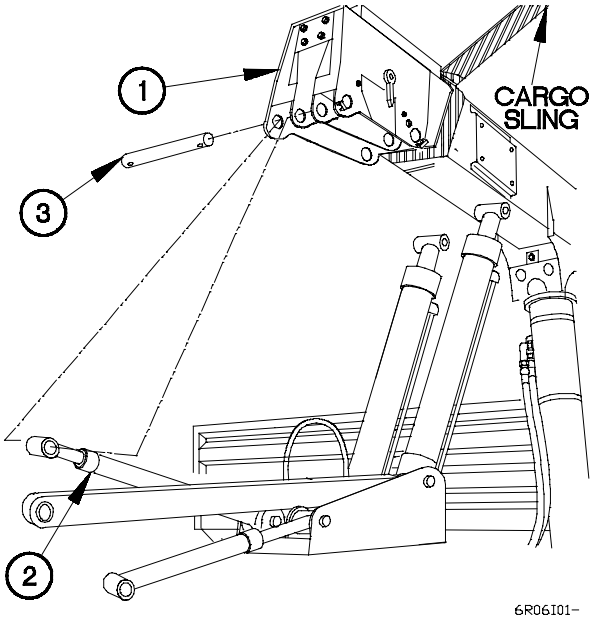


(15) Remove pivot shaft (18) from erection cylinder (22).

(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.

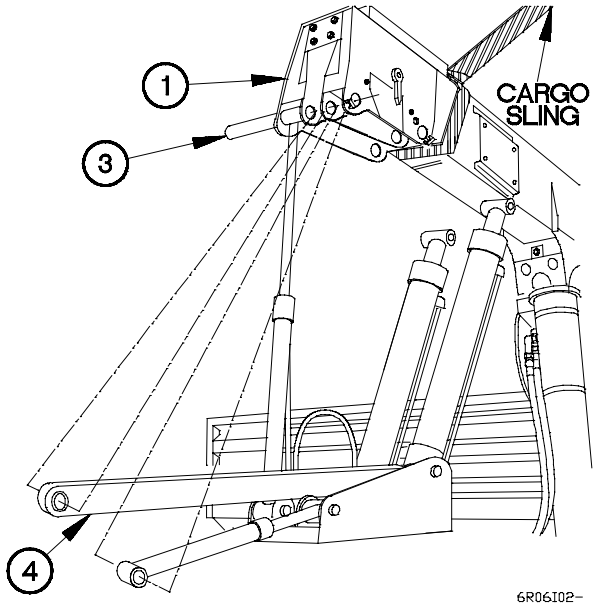
NOTE

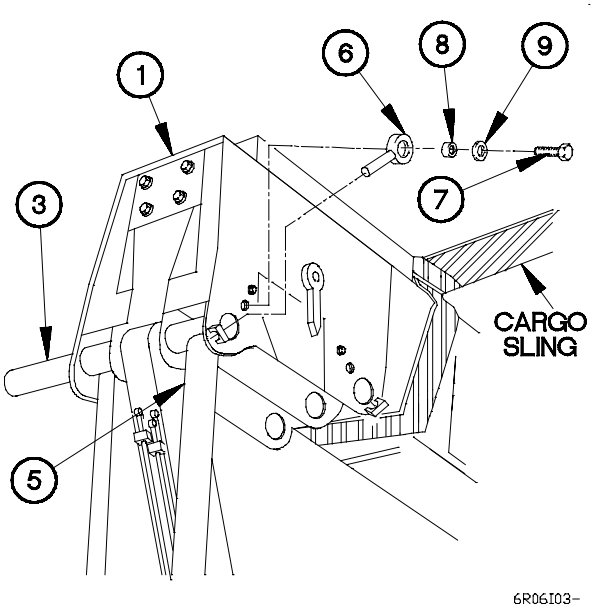
Steps (1) through (4) require the aid of an assistant.

(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).

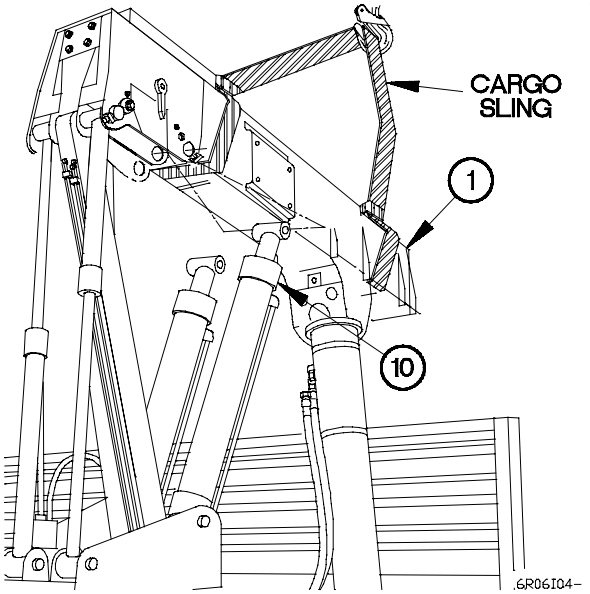
(8) Tighten screw (7) to 190-210 lb-ft (258-285 N·m).

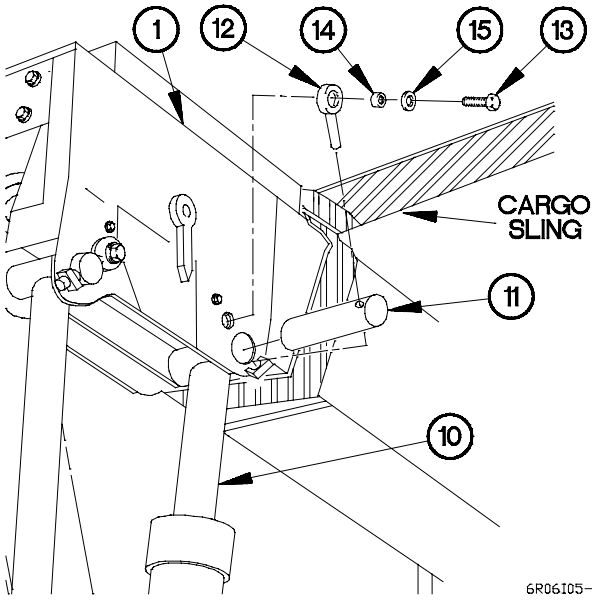
16-6. M1084/M1086 BOOM BASE SECTION REPLACEMENT (CONT)

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).

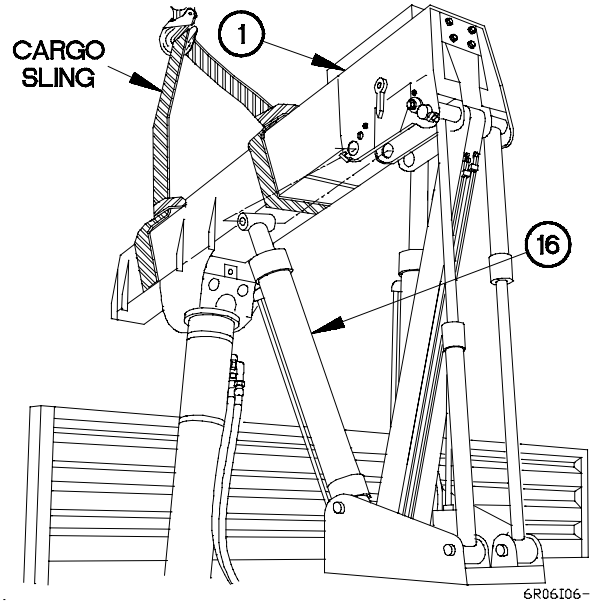
WARNING

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).

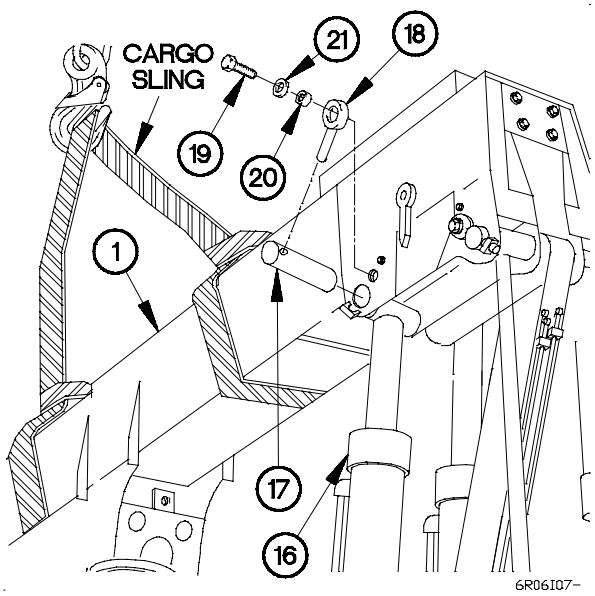
(14) Tighten screw (13) to 190-210 lb-ft (258-285 N·m).



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

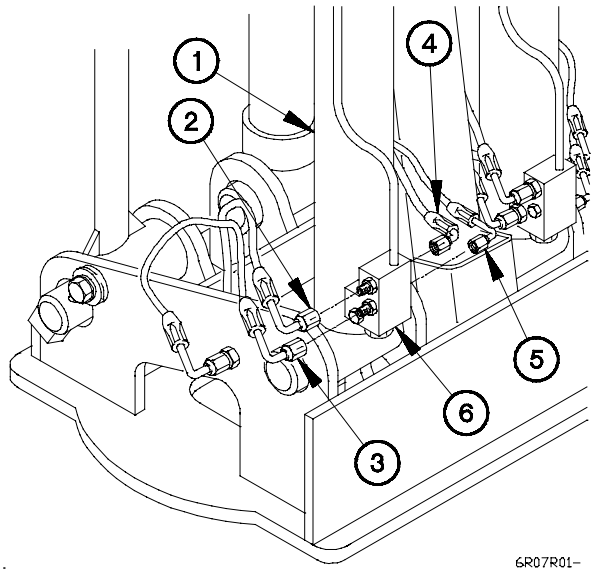
Cap or plug hydraulic connections to prevent contaminating hydraulic system. Failure to comply may result in damage to equipment.

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)

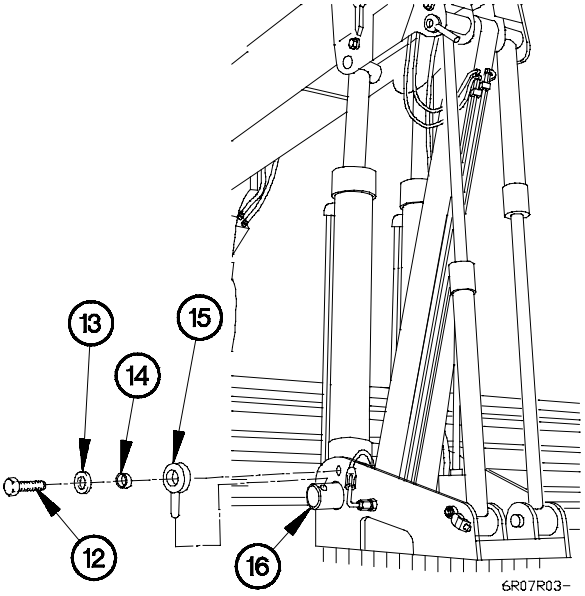
WARNING

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).

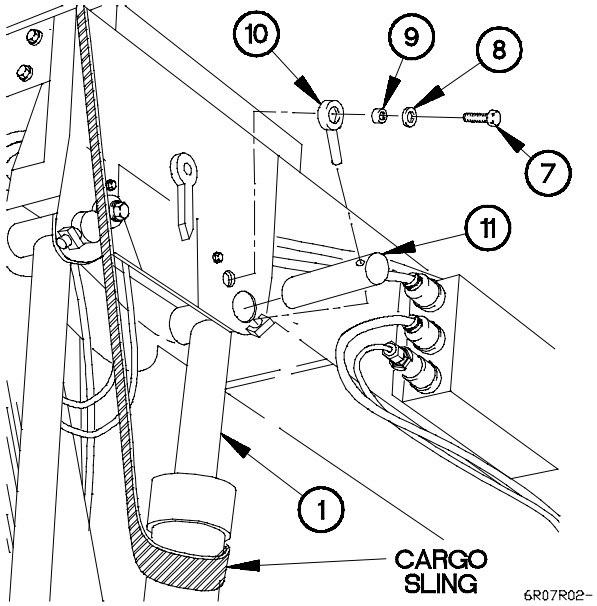


NOTE

- Steps (8) and (9) require the aid of an assistant.
- Drive out pivot shaft enough to free RH lift cylinder.

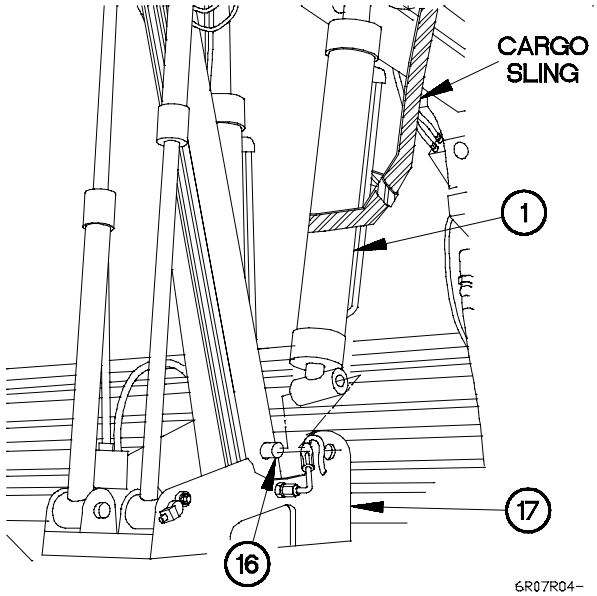
(8) Drive pivot shaft (16) out of RH lift cylinder (1).

(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.

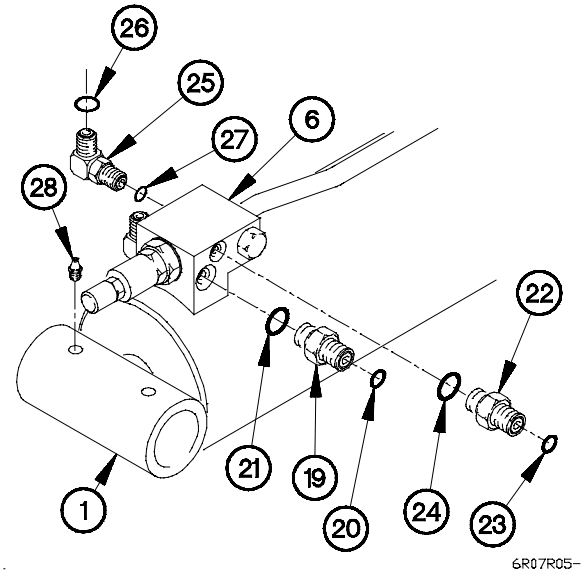
(12) Remove fitting (22) from counterbalance valve (6).

(13) Remove preformed packings (23 and 24) from fitting (22). Discard preformed packings.

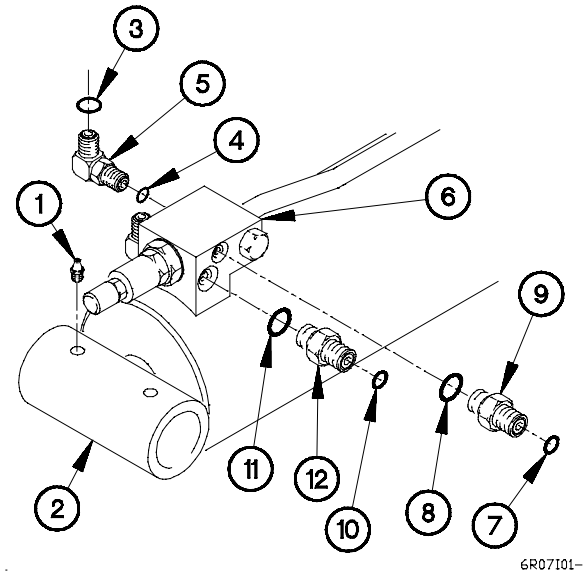
(14) Remove two 90-degree fittings (25) from counterbalance valve (6).

(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)

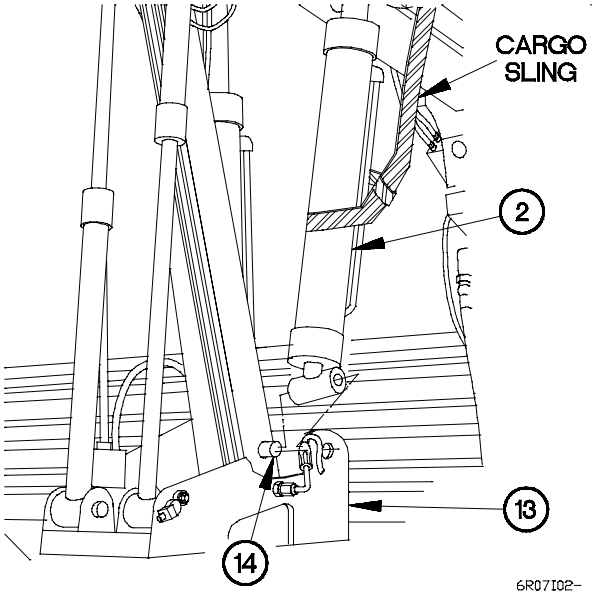
WARNING

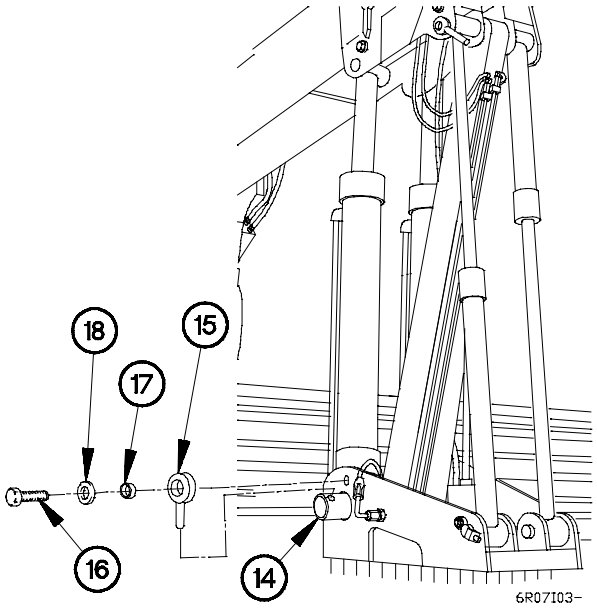
Lift cylinder assembly weighs approximately 100 lbs (45 kg). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

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).

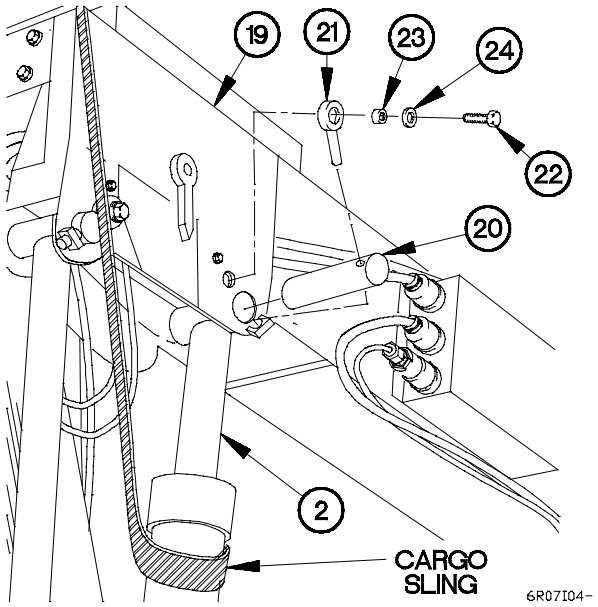
WARNING

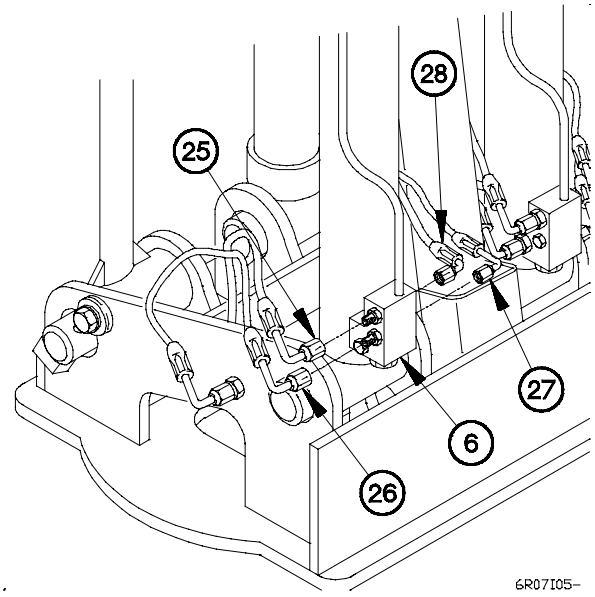
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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.

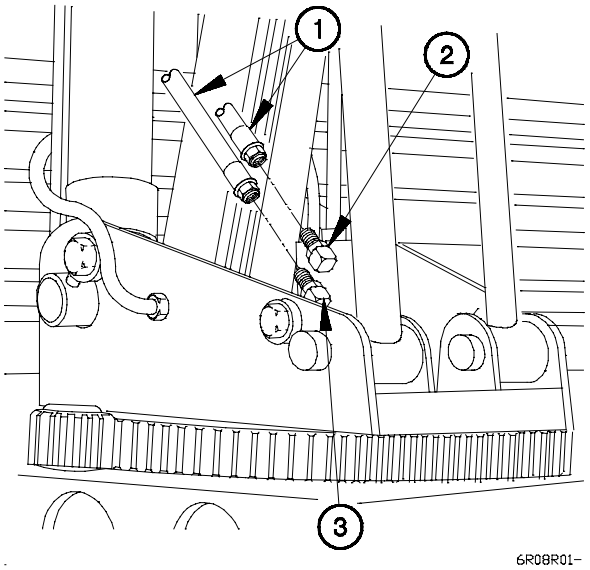
CAUTION

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).



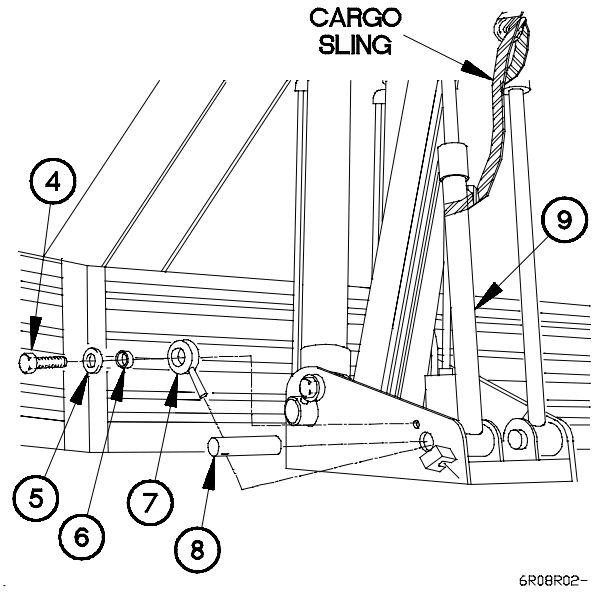
(2) Remove screw (4), washer (5), and bushing (6) from rivet eyebolt (7).

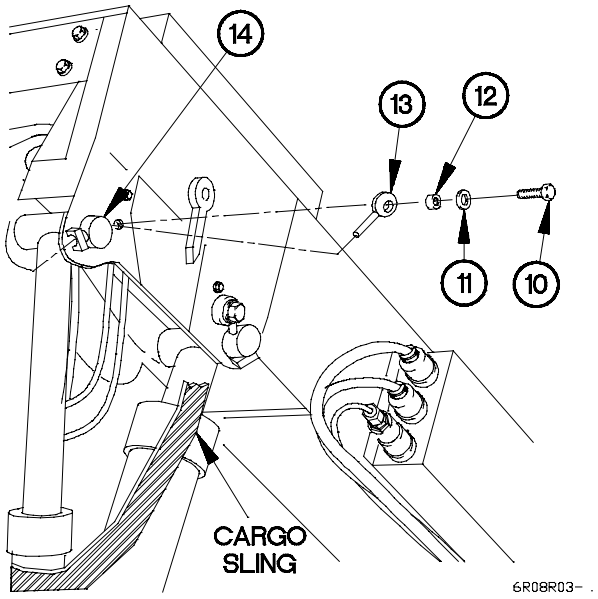
WARNING

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).

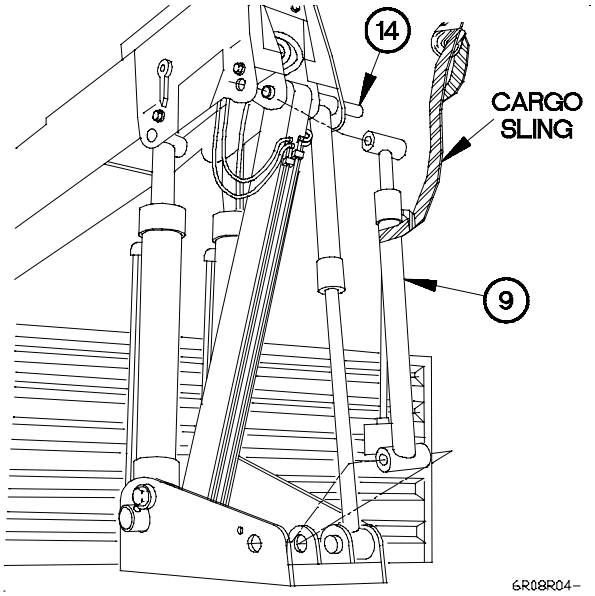
(6) Remove rivet eyebolt (13) from upper pivot shaft (14).

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.



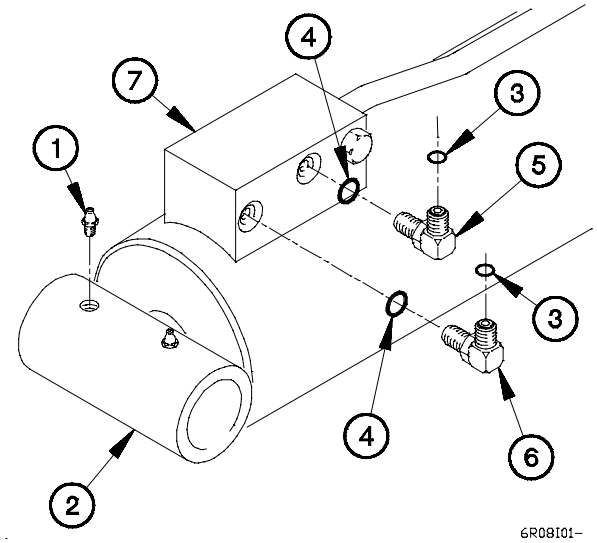
16-8. M1084/M1086 ERECTION CYLINDER REPLACEMENT (CONT)

(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.

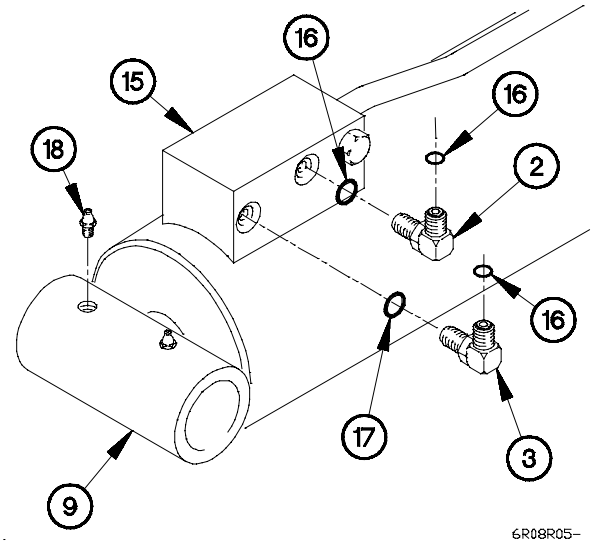


WARNING

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)

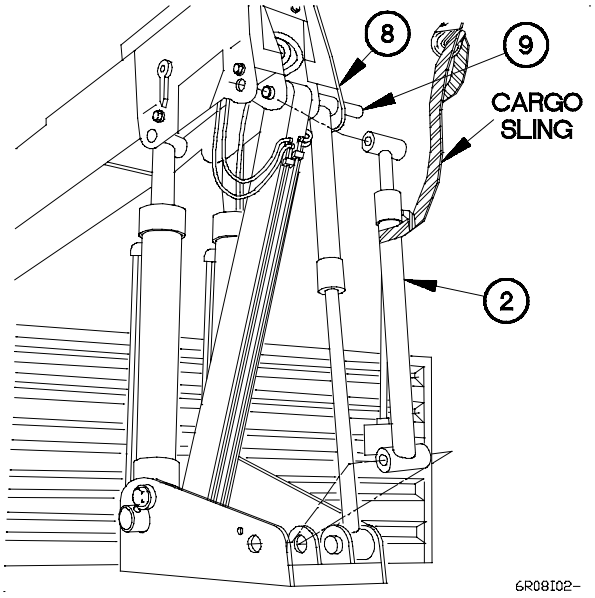
(5) Install upper pivot shaft (9) in erection cylinder (2).



(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).



(6) Install rivet eyebolt (10) in upper pivot shaft (9).

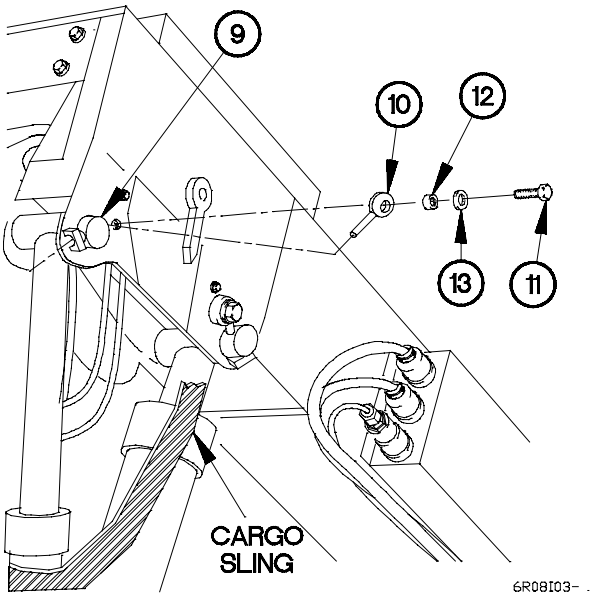
WARNING

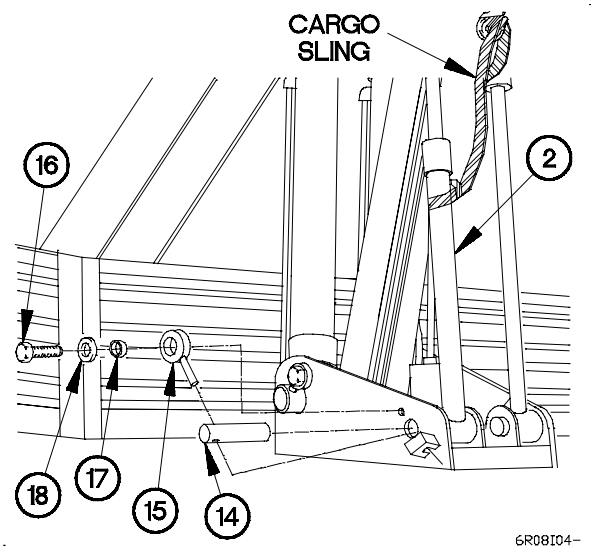
Adhesive-sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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).

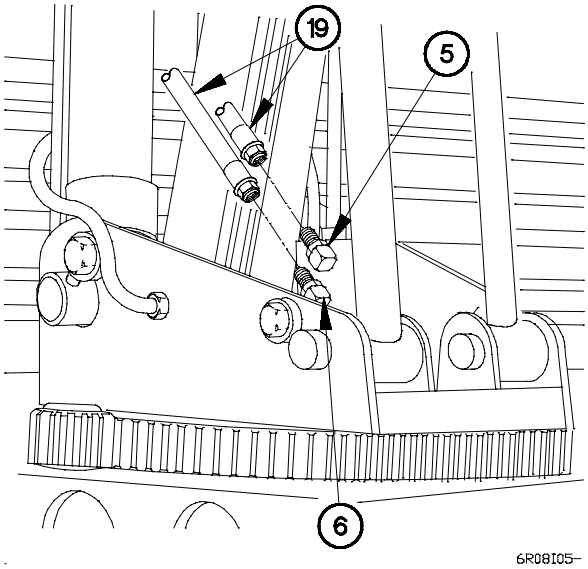
(11) Install rivet eyebolt (15) in lower pivot shaft (14).

(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)

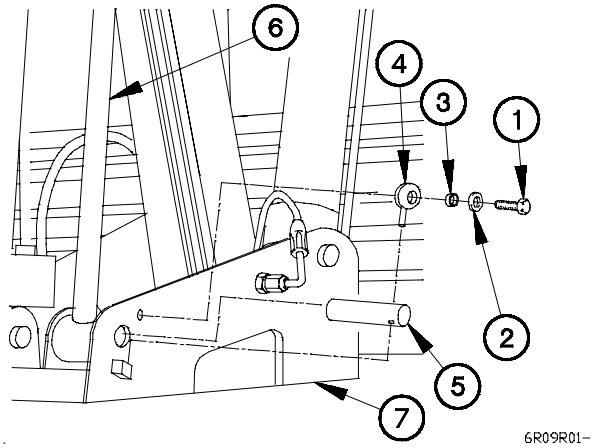
Personnel Required
(2)

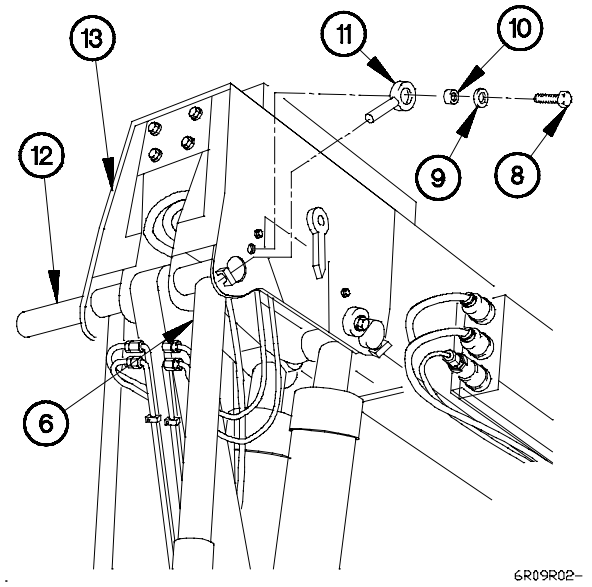
a. Removal.

(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.

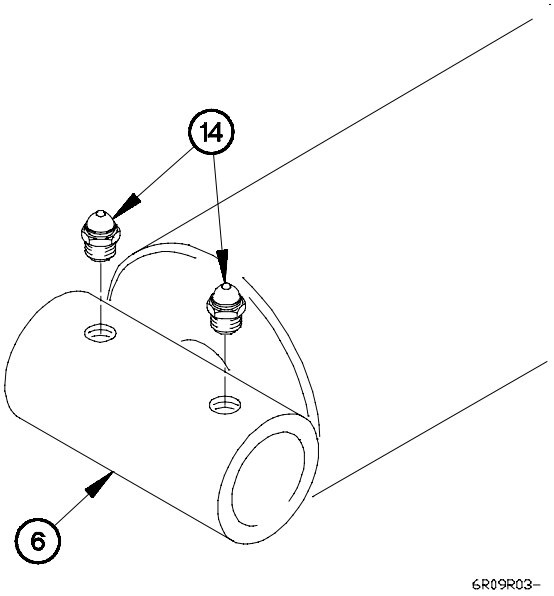
NOTE

Steps (5) and (6) require the aid of an assistant.

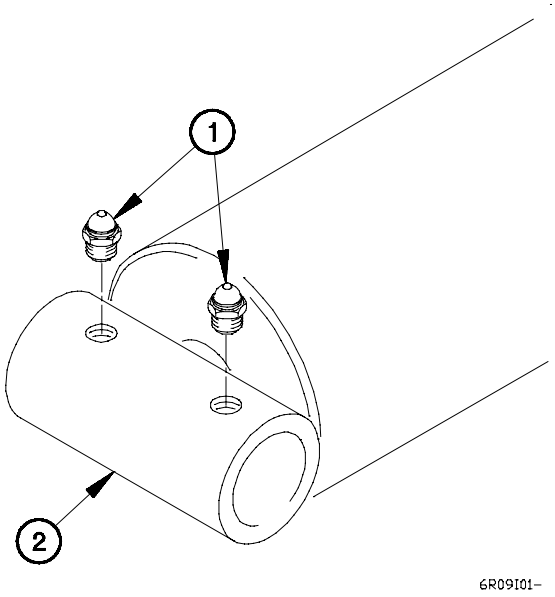
(5) Drive pivot shaft (12) and tension link cylinder (6) from boom assembly (13).

(6) Remove tension link cylinder (6) from boom assembly (13).

(7) Remove four grease fittings (14) from tension link cylinder (6).



b. Installation.

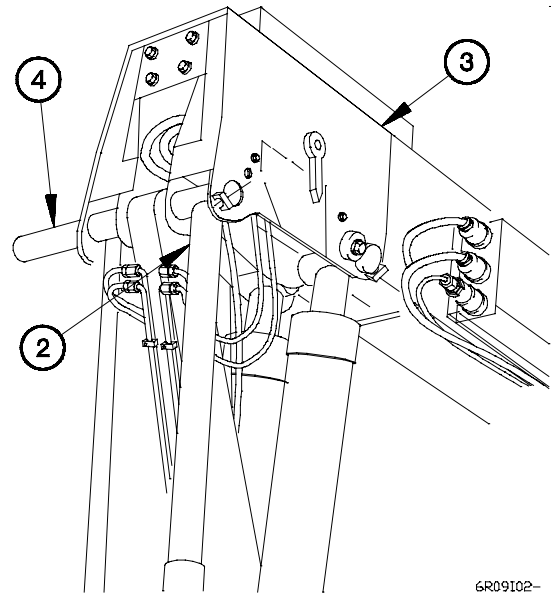


(1) Install four grease fittings (1) in tension link cylinder (2).

NOTE

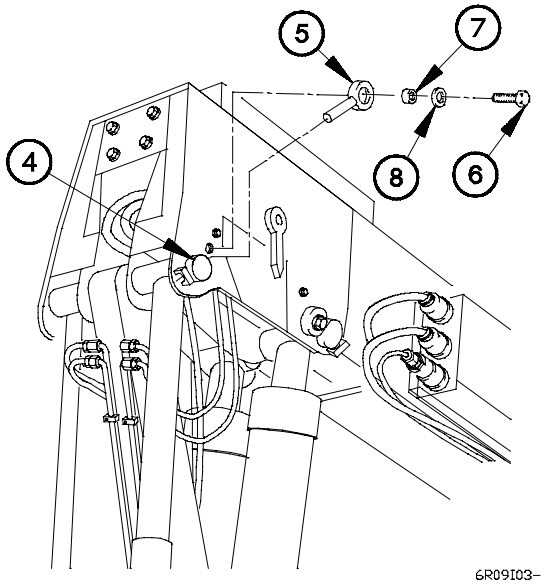
Large end of tension link cylinder goes on boom assembly.

(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).



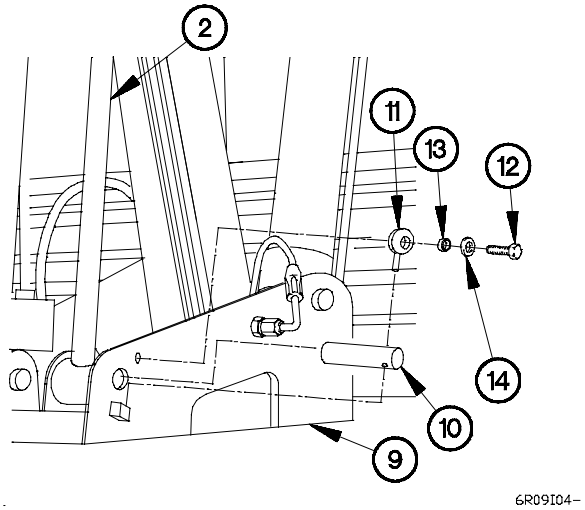
WARNING

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.

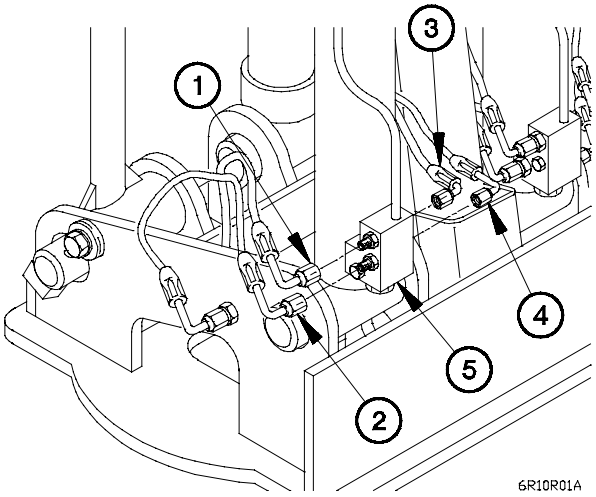
CAUTION

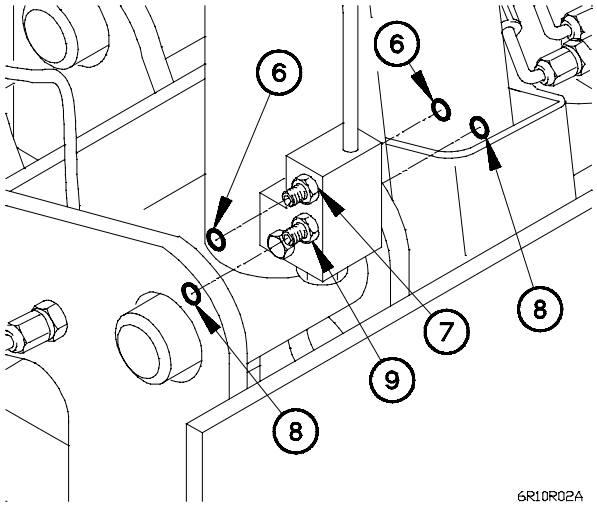
Cap or plug hydraulic hoses to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

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

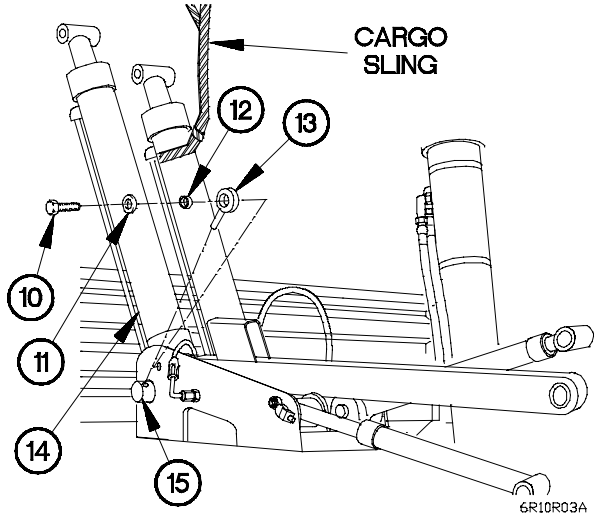
RH lift cylinder assembly weighs approximately 100 lbs (45 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

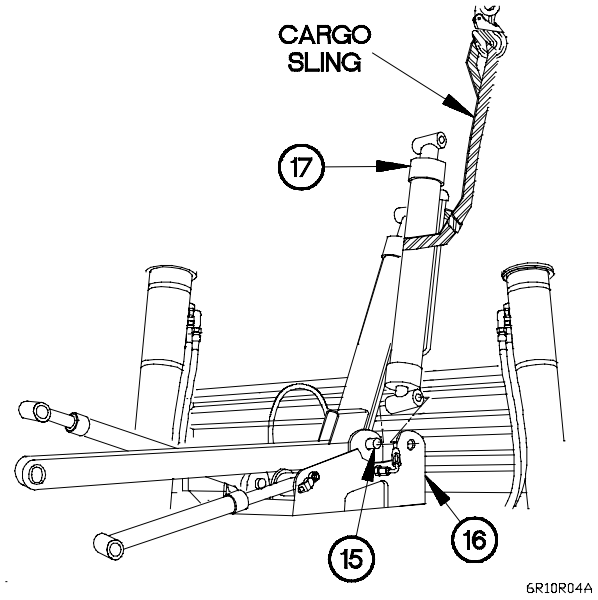
NOTE

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).

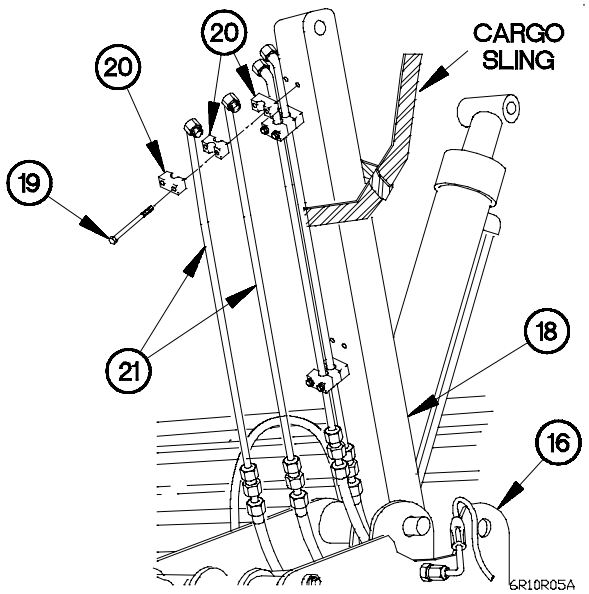
(7) Remove RH lift cylinder (17) from turntable (16).

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

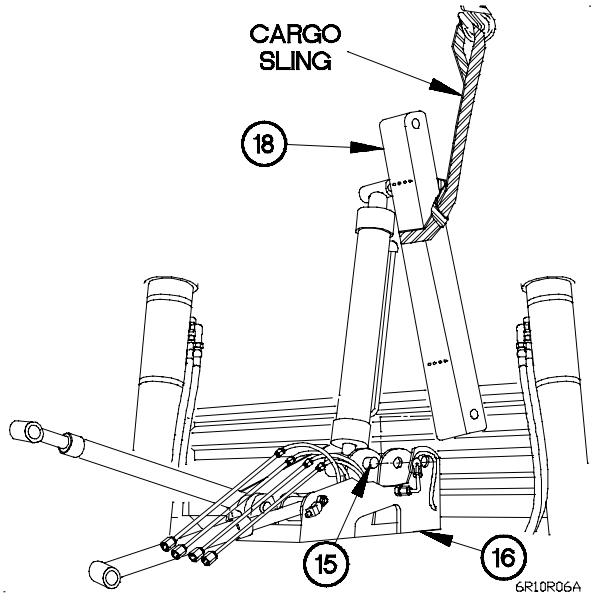
Drive pivot shaft out far enough to release mast. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

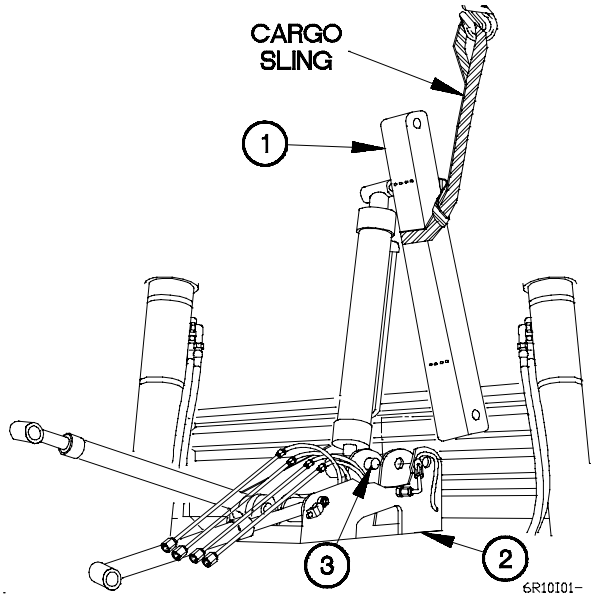
Steps (10) and (11) require the aid of an assistant.

(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).

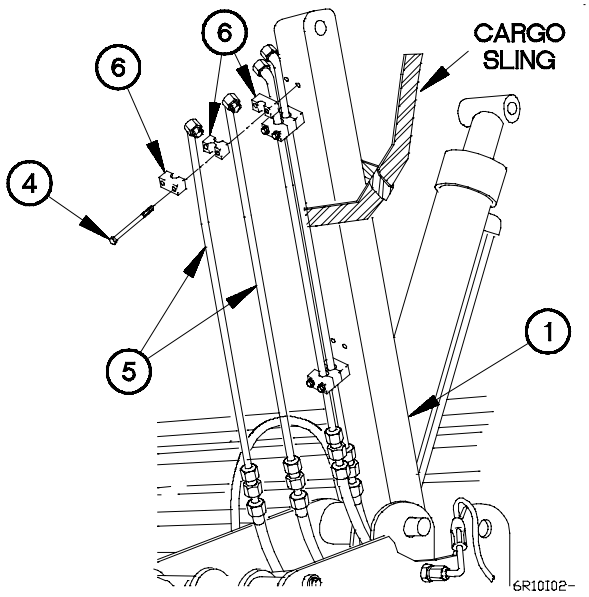
16-10. M1084/M1086 MAST REPLACEMENT (CONT)

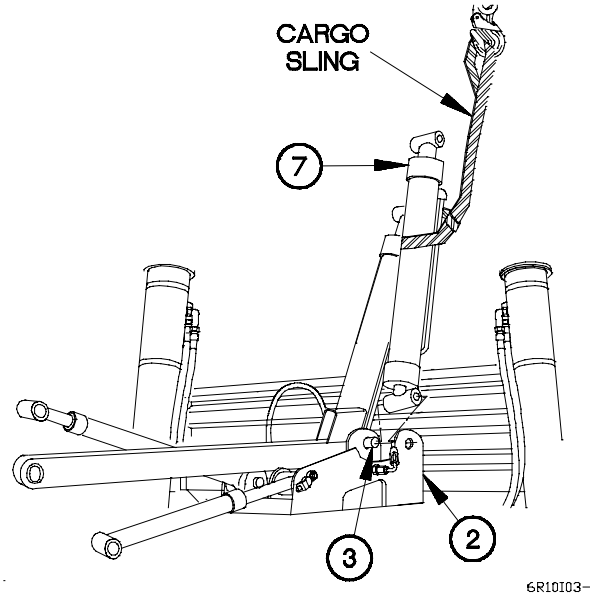
WARNING

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).

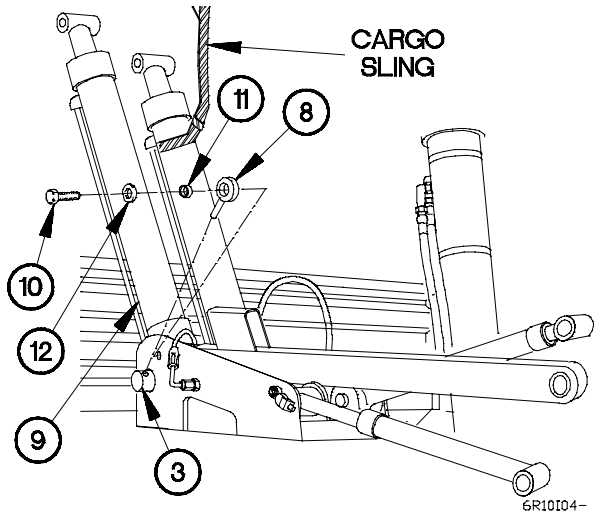
(6) Drive pivot shaft (3) through RH lift cylinder (7).

(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).

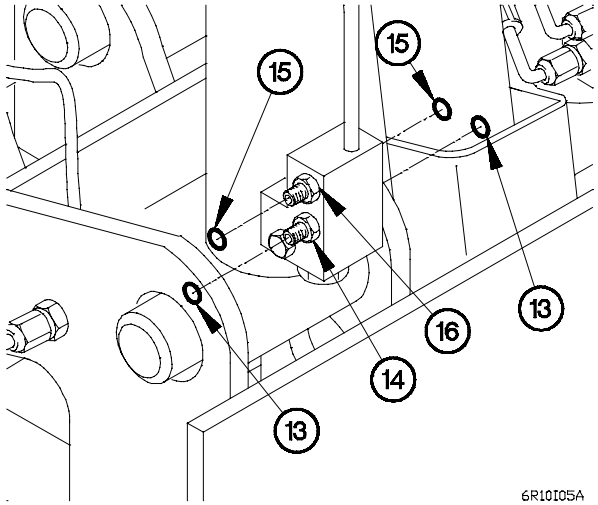
(9) Position bushing (11), washer (12), and screw (10) in rivet eyebolt (8).

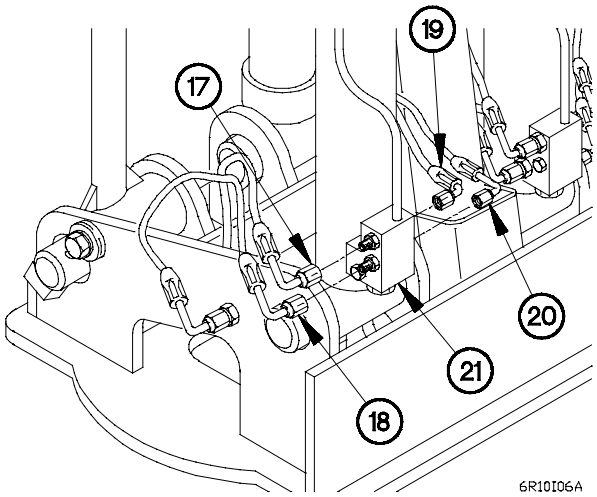
(10) Tighten screw (10) to 190-210 lb-ft (258-285 N·m).



(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.

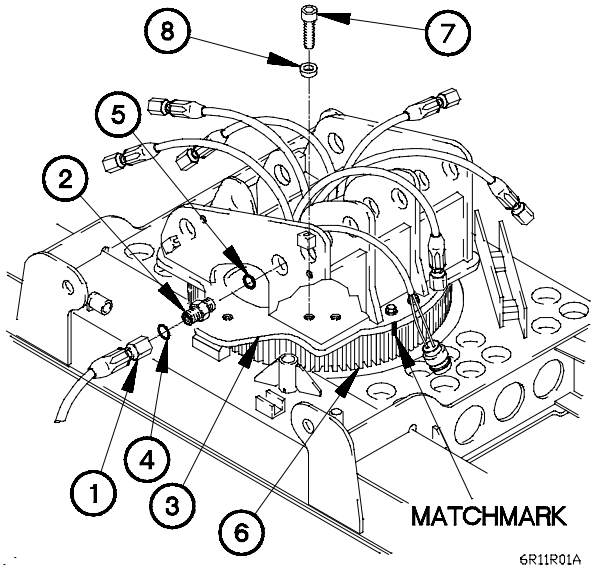
(1) Disconnect two hoses (1) from fittings (2).

(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).

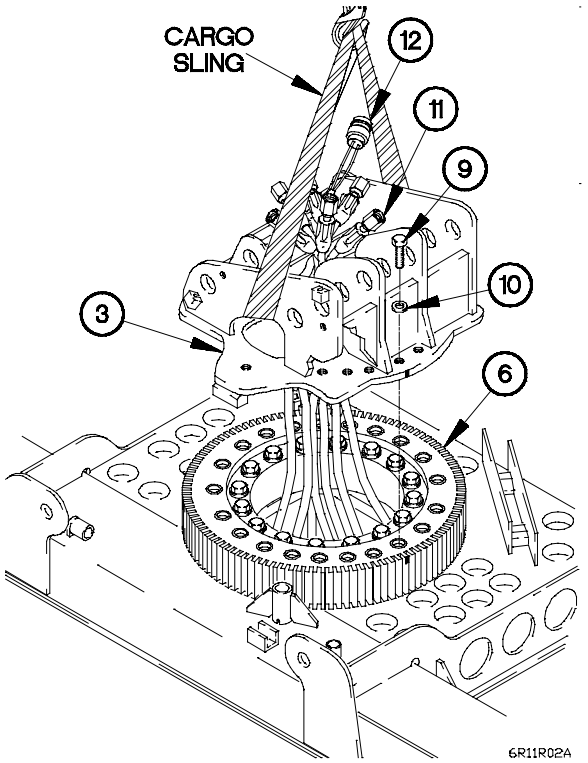
WARNING

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.

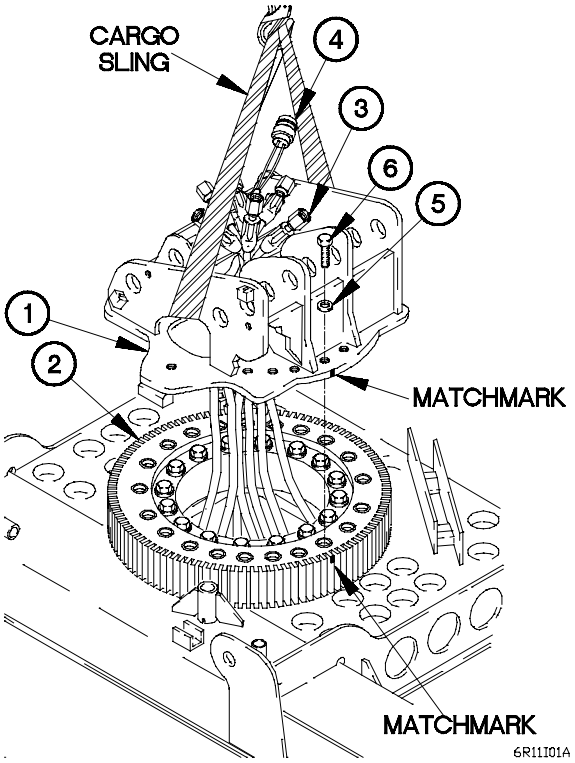
NOTE

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

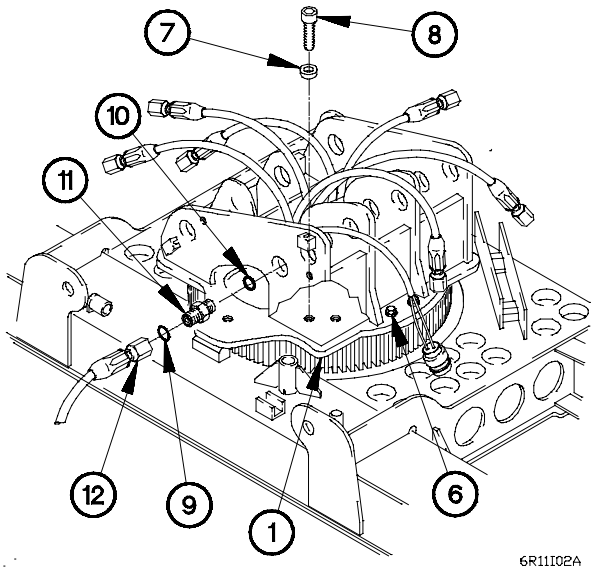
Step (1) requires the aid of an assistant.

(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)

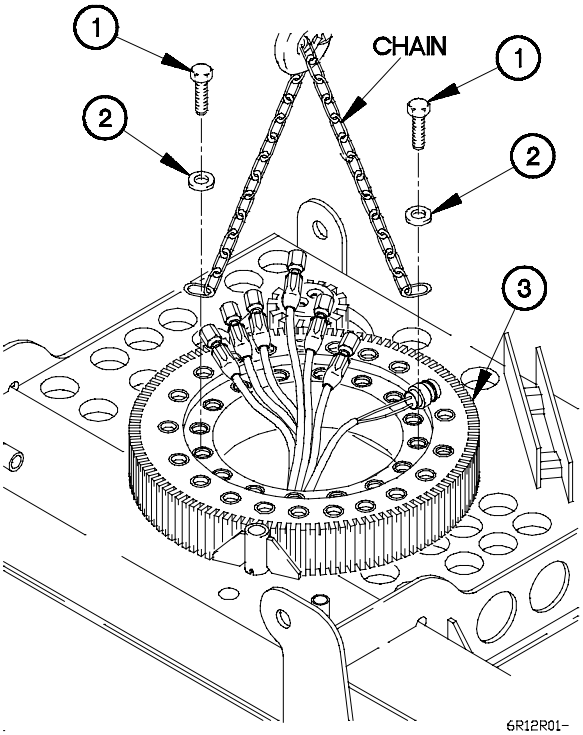
a. Removal.

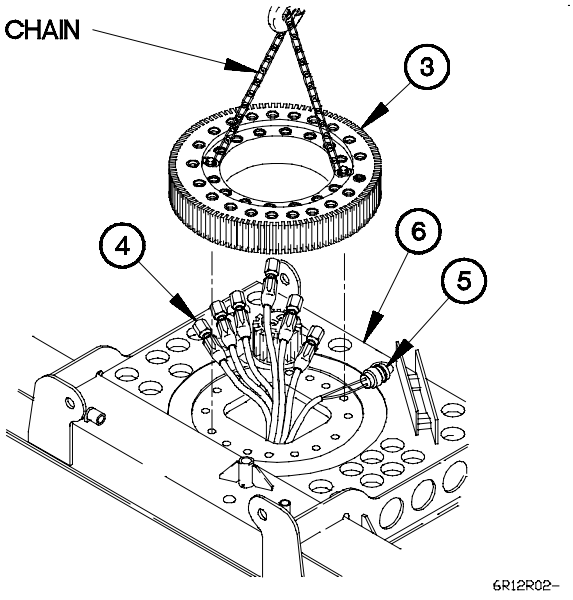
WARNING

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.

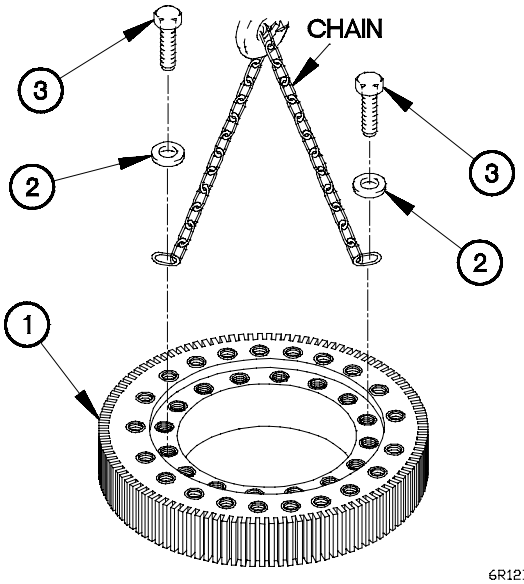
(3) Guide hoses (4) and electrical connector (5) through turntable bearing (3).

(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

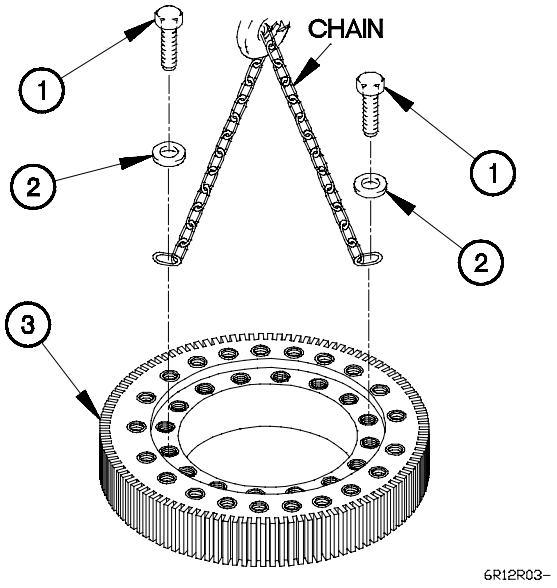
Turntable bearing weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

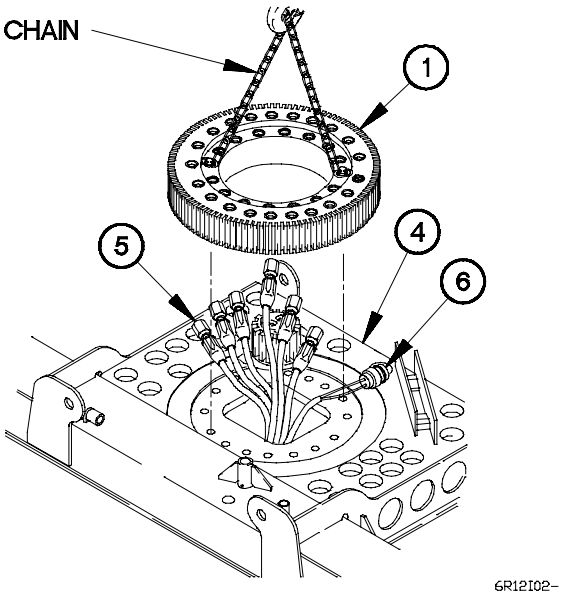
Steps (2) and (3) require the aid of an assistant.

(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).

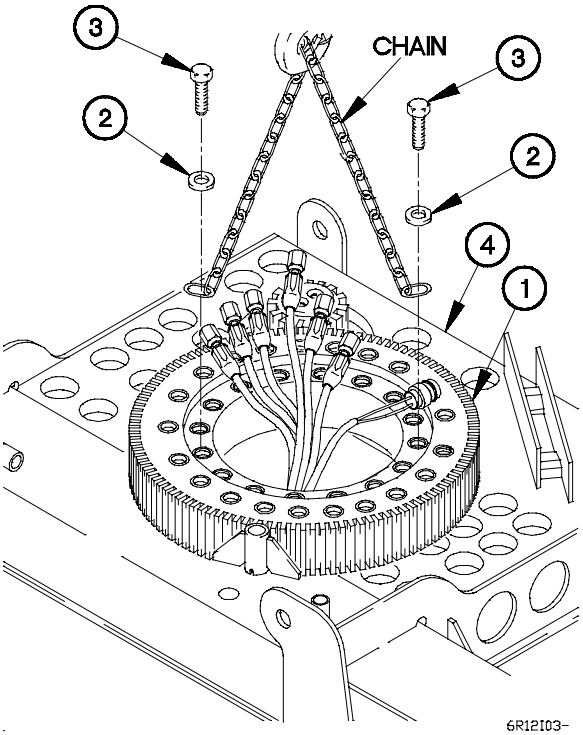


(4) Position turntable bearing (1) on subframe (4) with screw holes aligned.

(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.

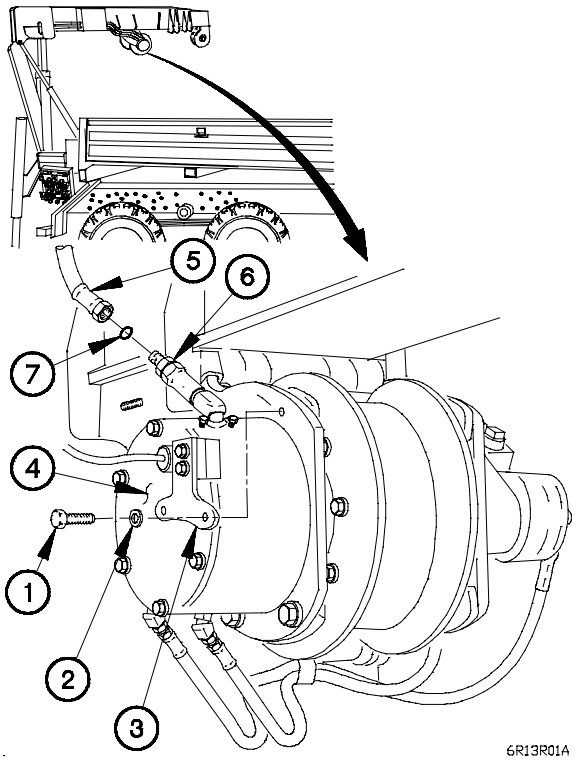
NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

(3) Disconnect hydraulic hose (5) from check valve (6).

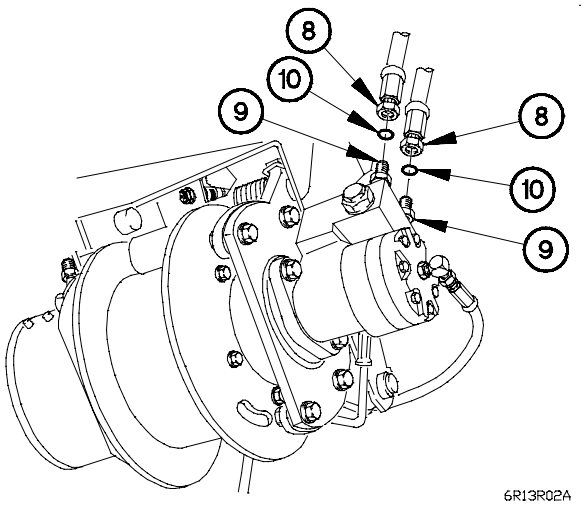
(4) Remove preformed packing (7) from check valve (6). Discard preformed packing.

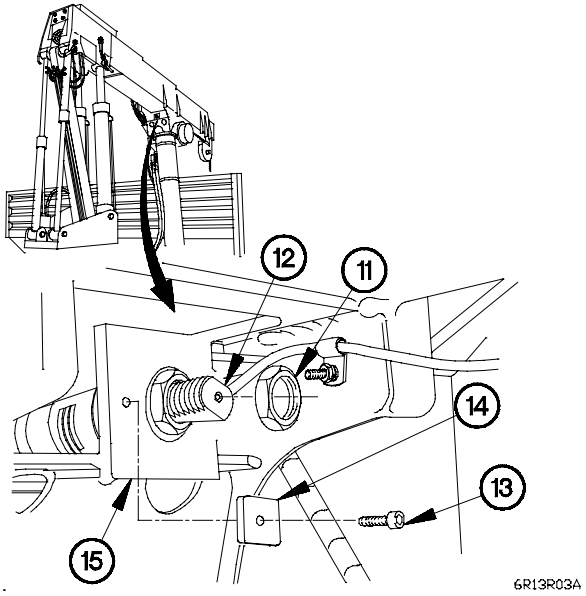
(5) Position hydraulic hose (5) and bracket (3) clear of hoist assembly (4).



(6) Disconnect two hydraulic hoses (8) from fittings (9).

(7) Remove two preformed packings (10) from fittings (9). Discard preformed packings.





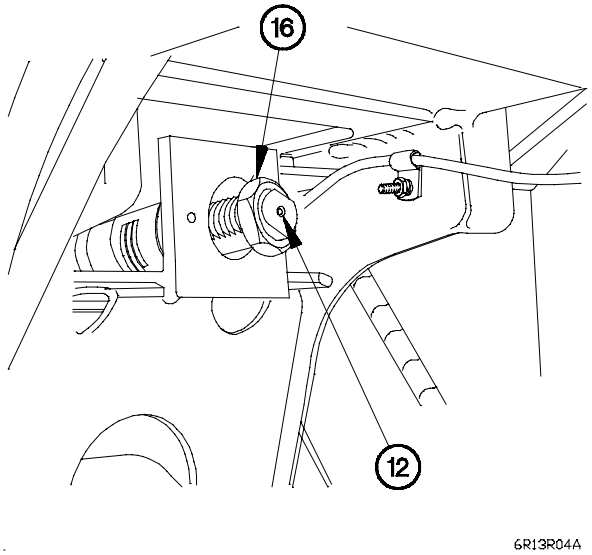
(8) Remove jamnut (11) from backside of tension load cell (12).

(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.

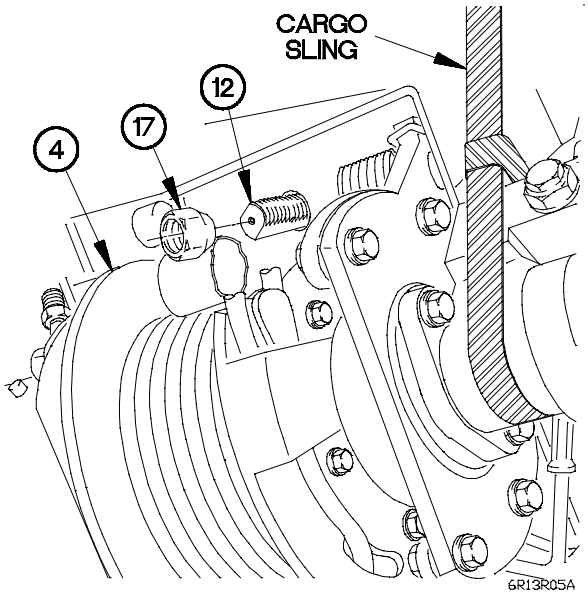
NOTE

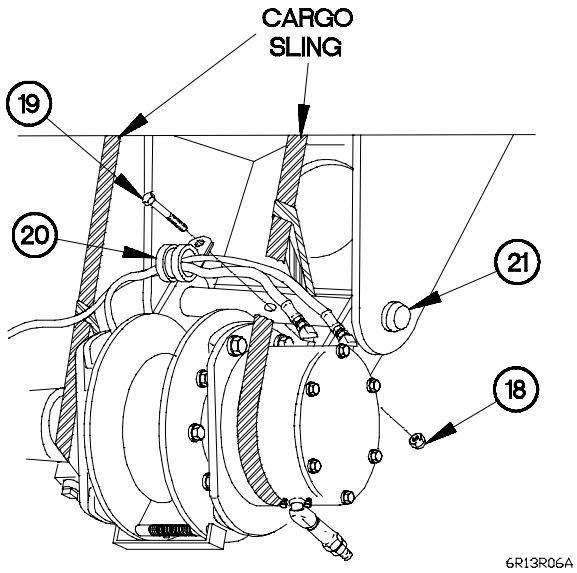
Steps (11) through (13) require the aid of an assistant.

(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).



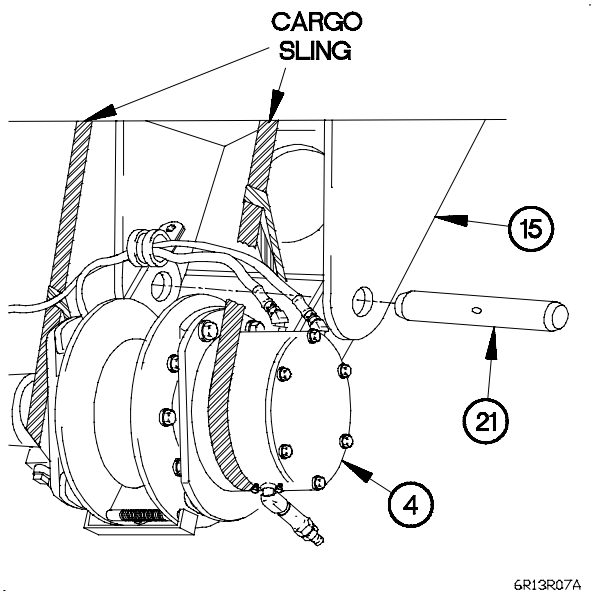


(14) Remove self-locking nut (18), screw (19), and clamp (20) from shaft (21). Discard self-locking nut.

NOTE

Step (15) requires the aid of an assistant.

(15) Remove shaft (21) and hoist assembly (4) from boom brace (15).



b. Installation.

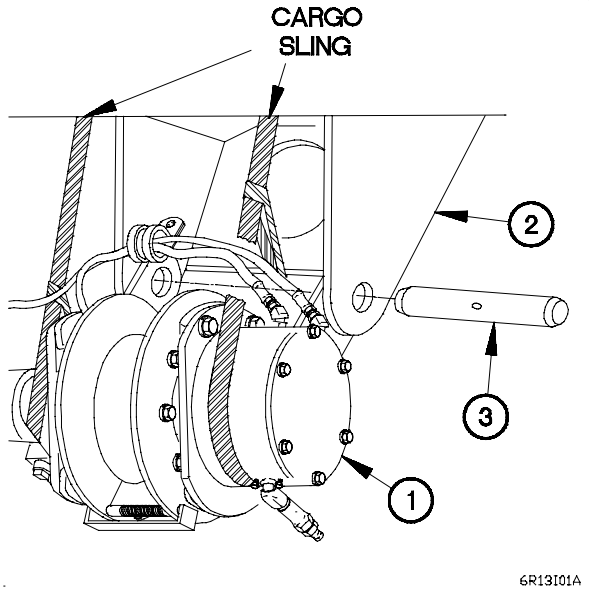
WARNING

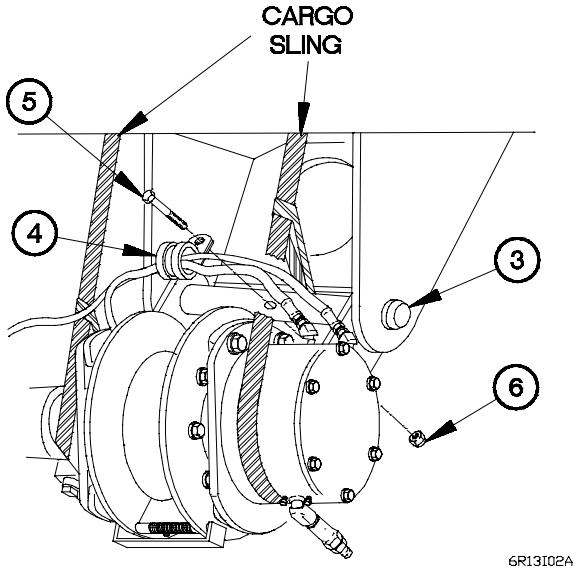
Hoist assembly weighs approximately 210 lbs (95 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of an assistant.

(1) Install hoist assembly (1) in boom brace (2) with shaft (3).



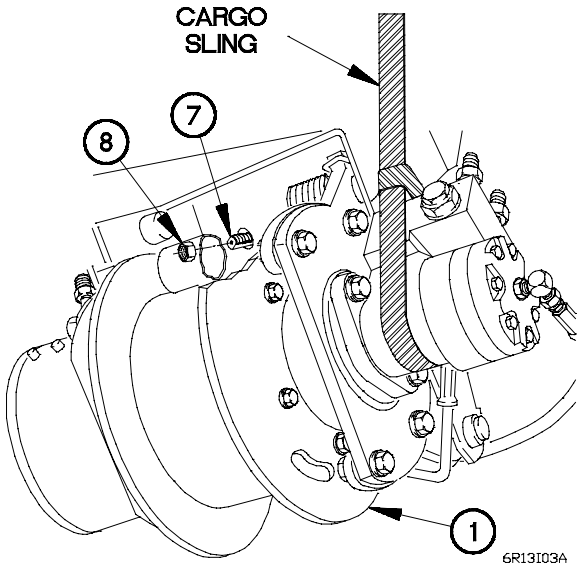


(2) Install clamp (4), screw (5), and self-locking nut (6) on shaft (3).

NOTE

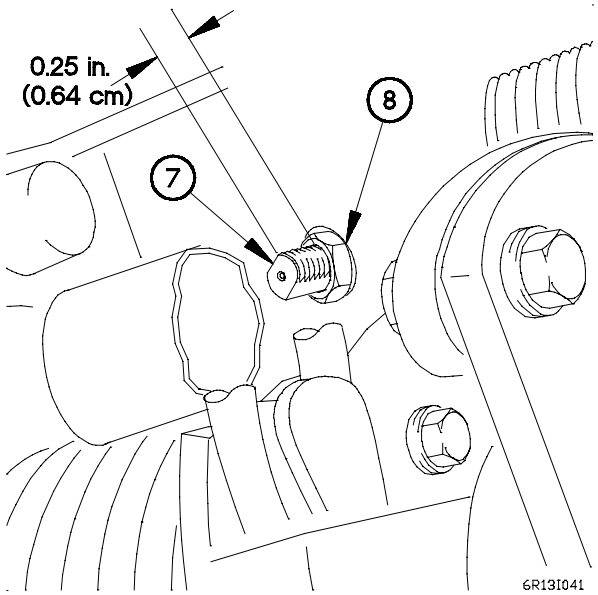
Step (3) requires the aid of an assistant.

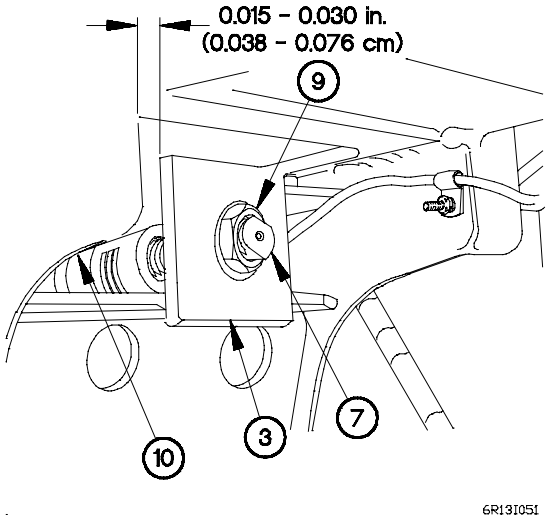
(3) Position hoist assembly (1) on front of tension load cell (7) with front swivel nut (8).



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

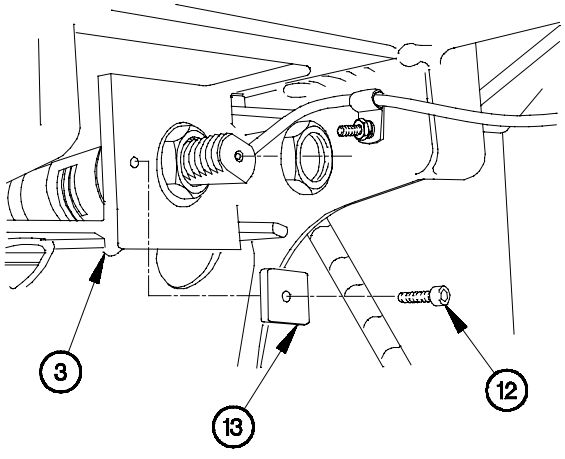
Step (5) requires the aid of an assistant.

(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.

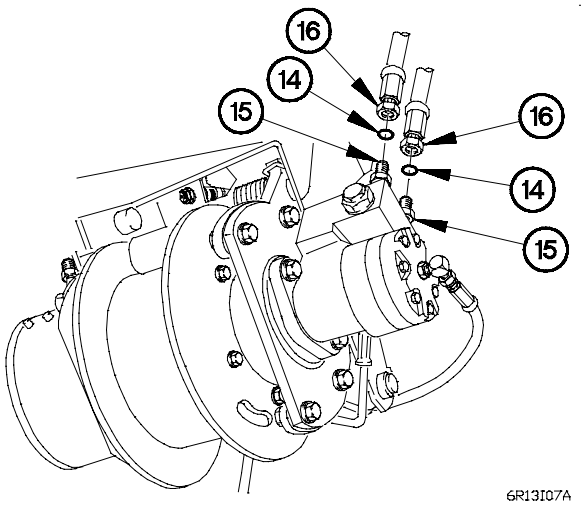


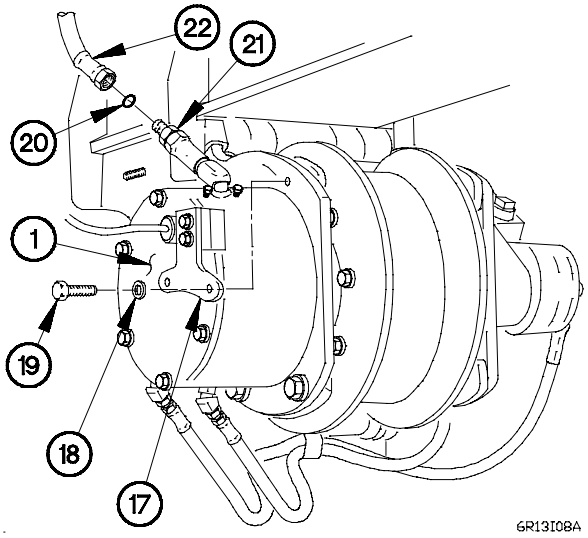
(7) Apply sealing compound to threads of screw (12).

(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)

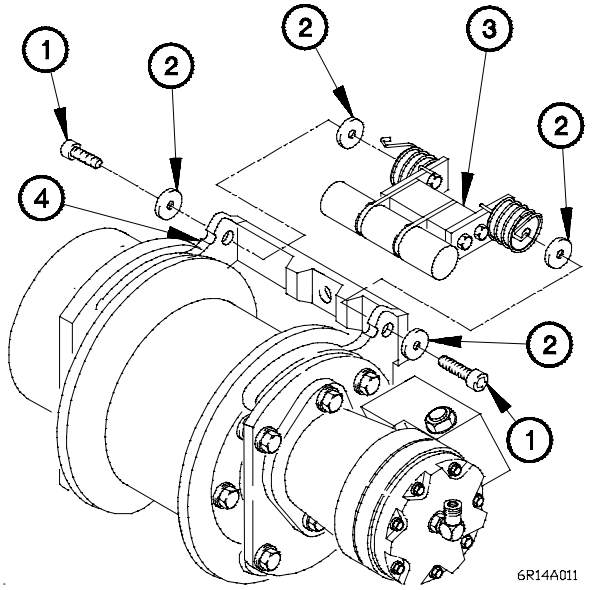
Materials/Parts
Sealing Compound (Item 76, Appendix C)

a. Removal.

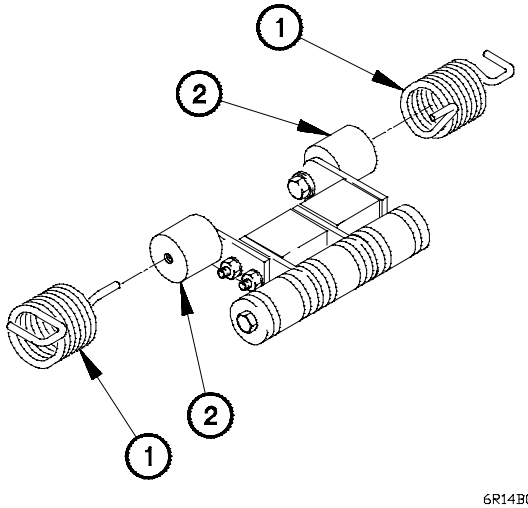
WARNING

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).



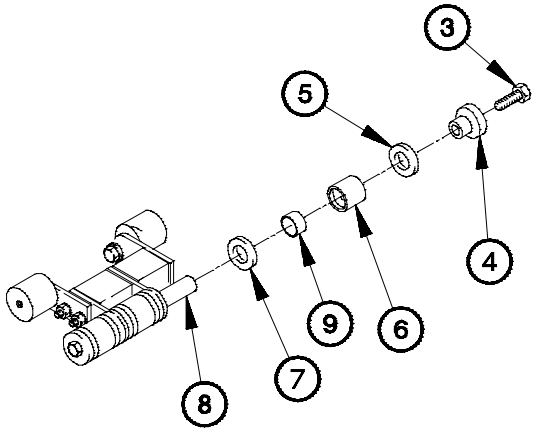
b. Disassembly.



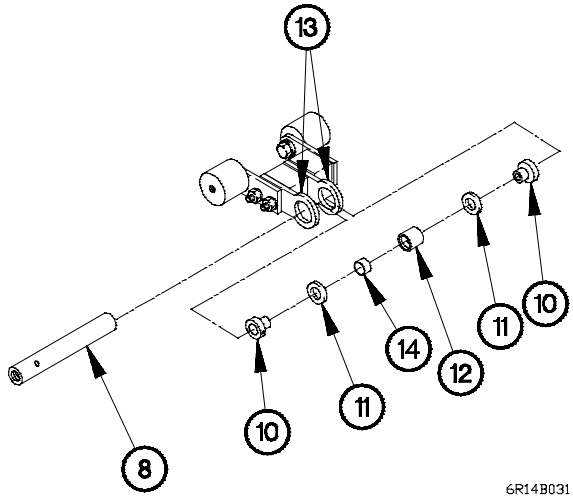
(1) Remove two springs (1) from posts (2).

(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



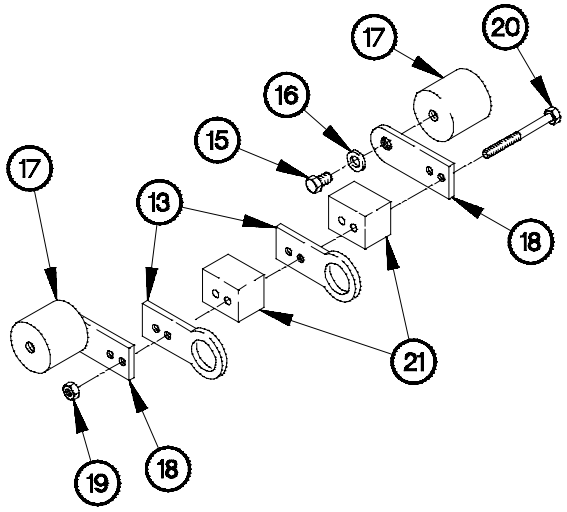
6R14B031

(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).

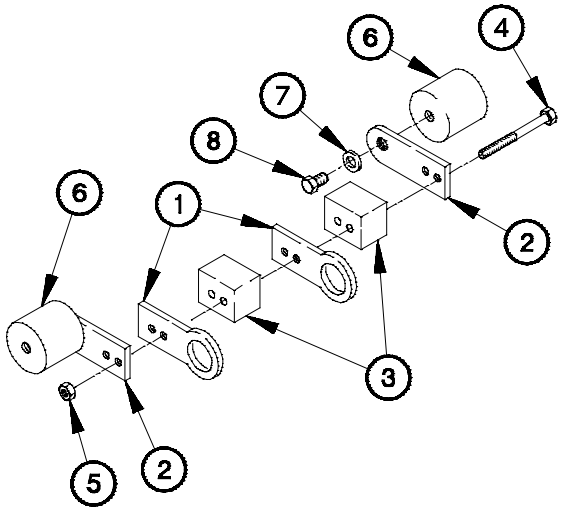
(7) Remove two nuts (19), screws (20), control levers (13), and manual levers (18) from spacers (21).



6R14B041

16-14. M1084/M1086 CABLE FOLLOWER REPLACEMENT/REPAIR (CONT)

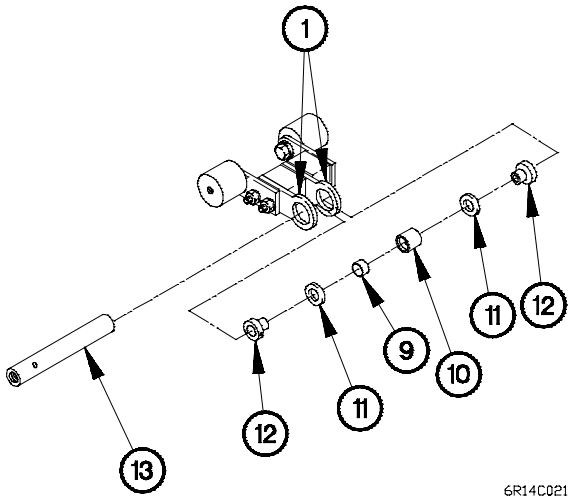
c. Assembly.



6R14C011

(1) Install two control levers (1) and manual levers (2) on spacers (3) with two screws (4) and nuts (5).

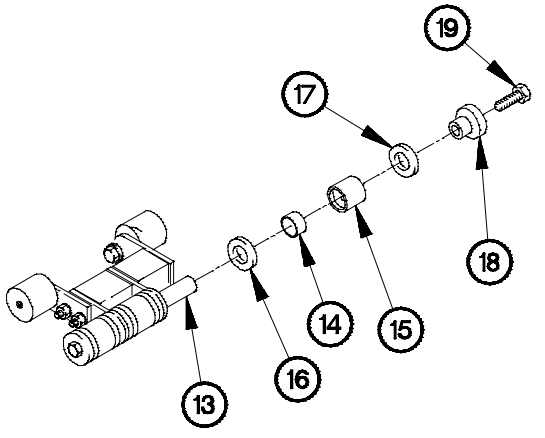
(2) Install two posts (6) on manual levers (2) with two washers (7) and screws (8).



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).

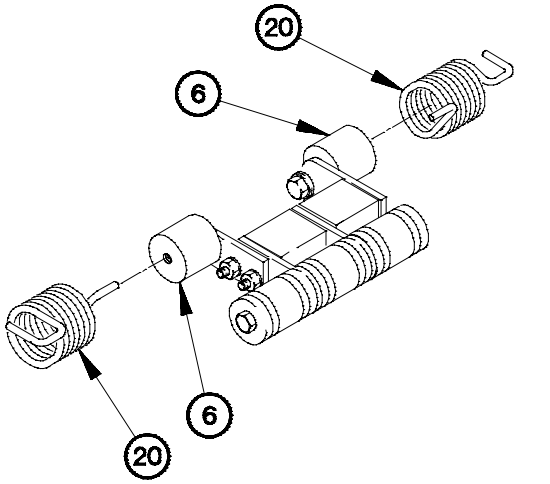


6R14C031

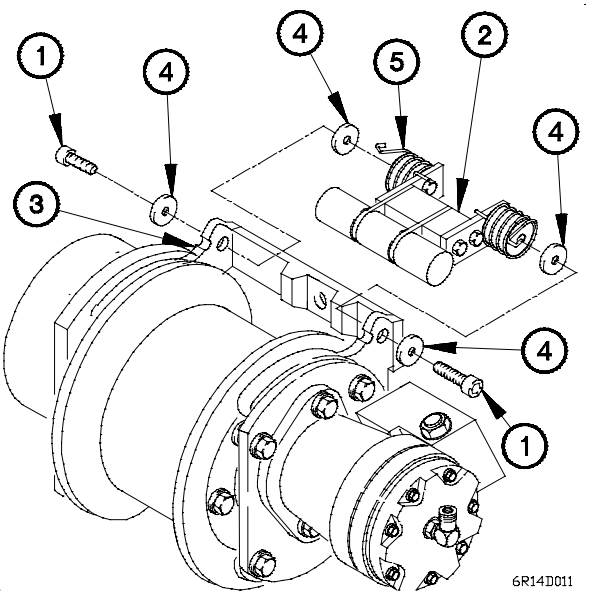
(5) Install two bearings (14) in rollers (15).

(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

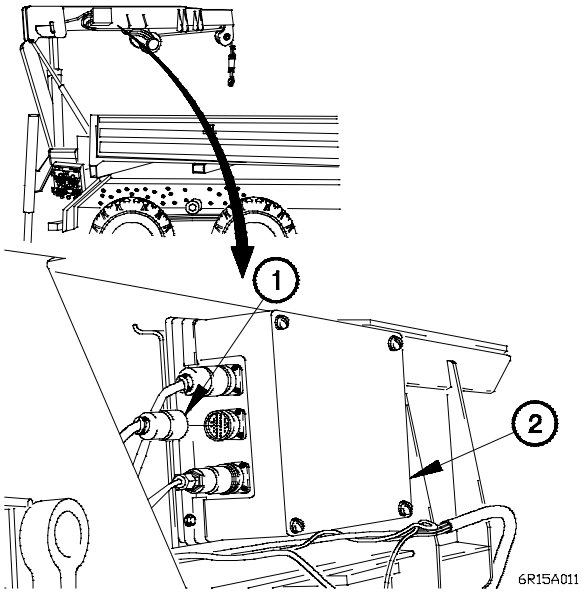
INITIAL SETUP

Equipment Conditions
Boom positioned over cargo bed (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).

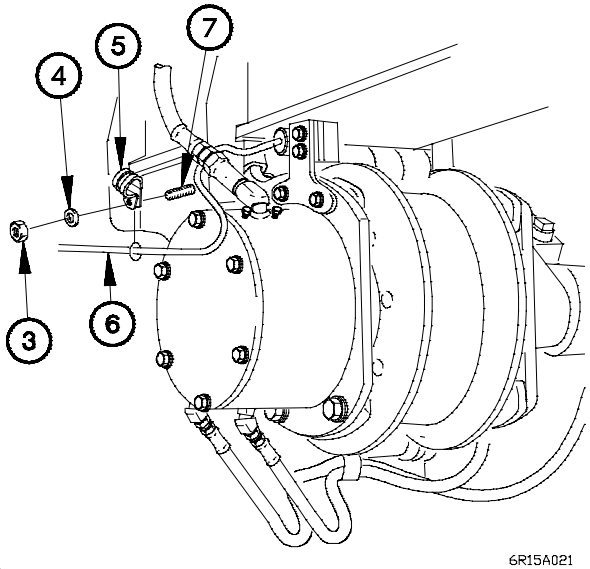
Materials/Parts
Lockwasher (2) (Item 139, Appendix F)
Ties, Cable Plastic (Item 92, Appendix C)
Sealing Compound (Item 76, Appendix C)

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).



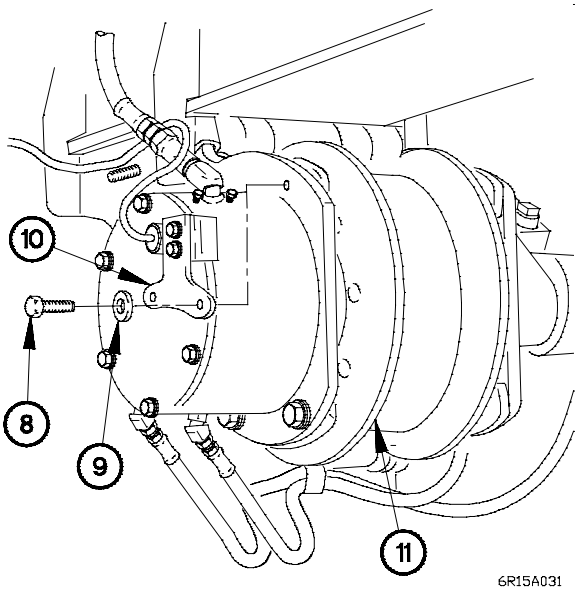
NOTE

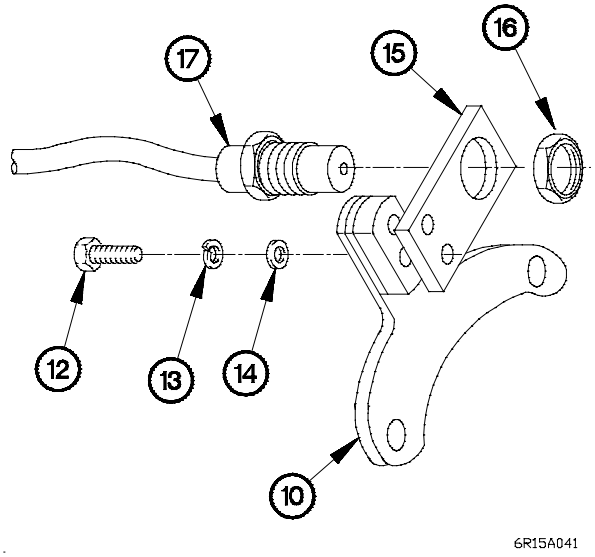
Remove plastic cable ties as required.

(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.

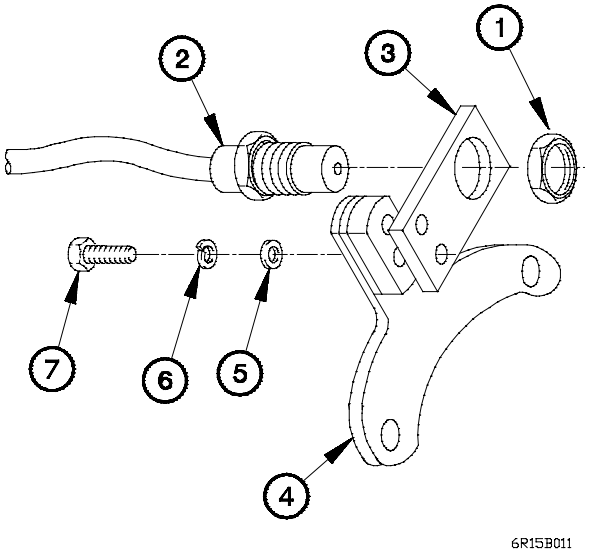
(6) Remove nut (16) and proximity sensor (17) from plate (15).

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)

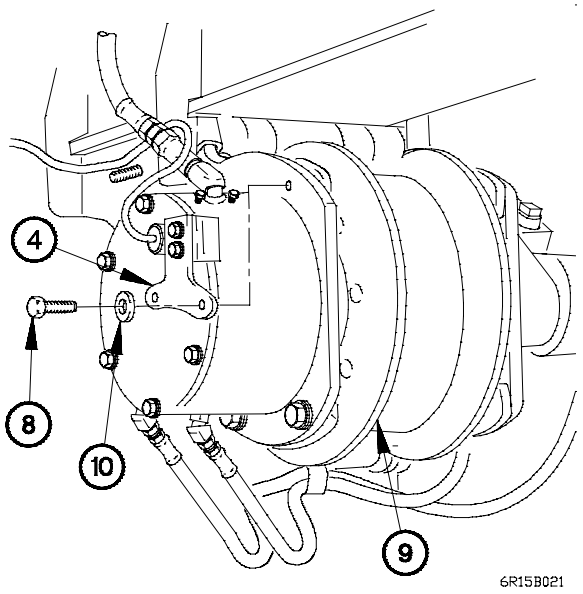
WARNING

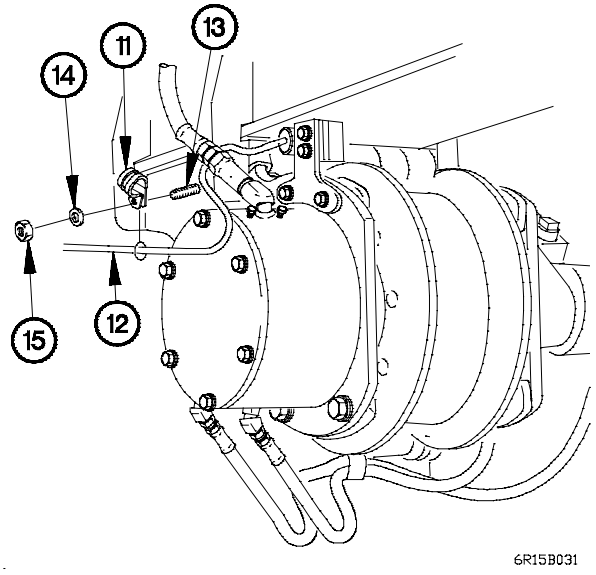
Adhesive-sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If adhesive-sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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).





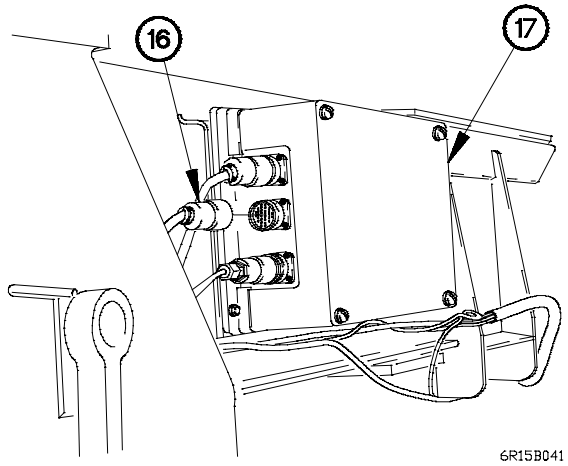
NOTE

Install plastic cable ties as required.

(7) Install clamp (11) on cable (12).

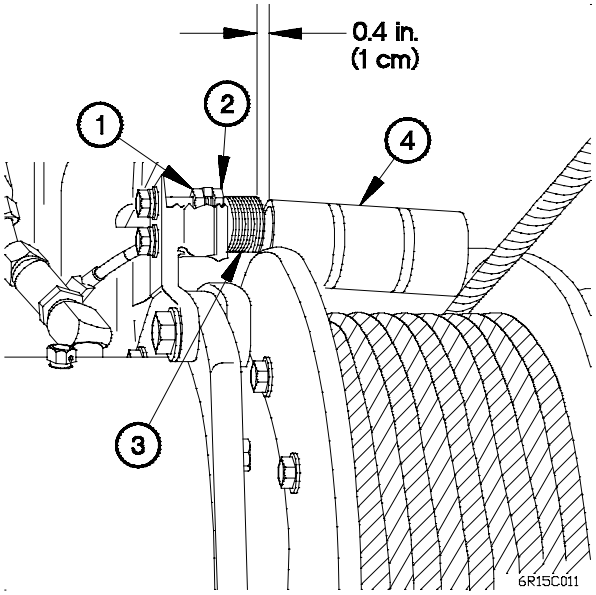
(8) Install clamp (11) on boom stud (13) with washer (14) and nut (15).

(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)

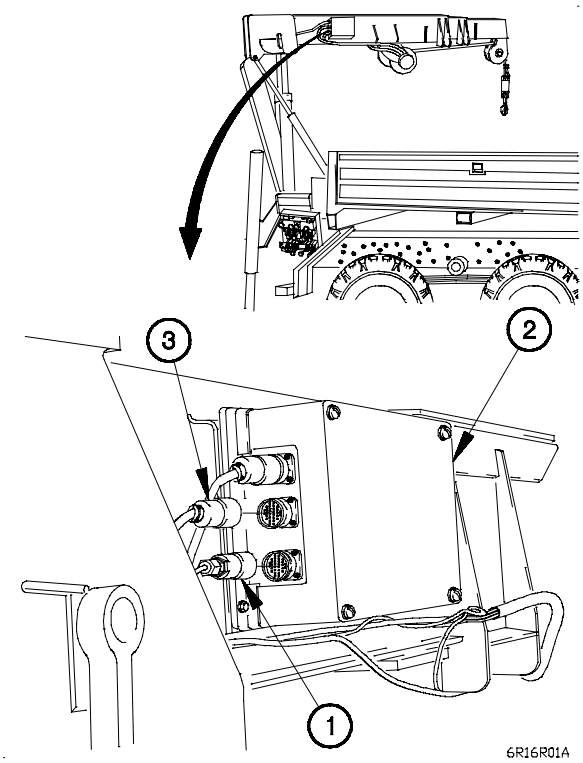
a. Removal.

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

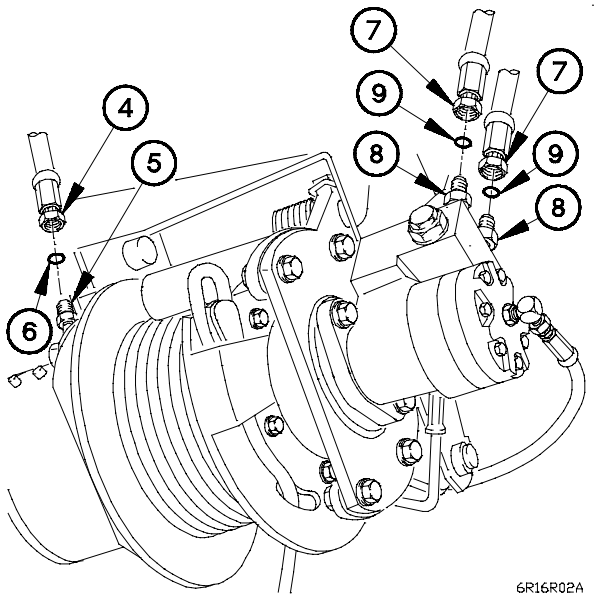
Tag hydraulic hoses and connection points prior to disconnecting.

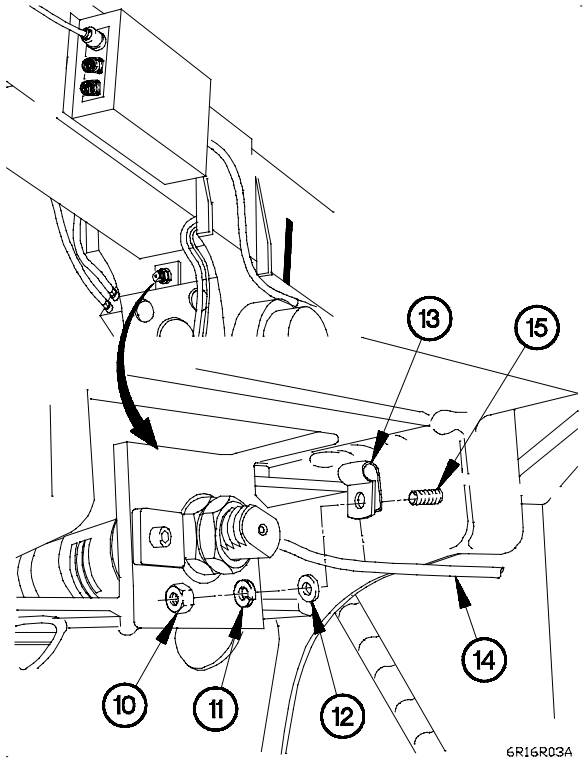
(3) Disconnect hydraulic hose (4) from check valve (5).

(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.



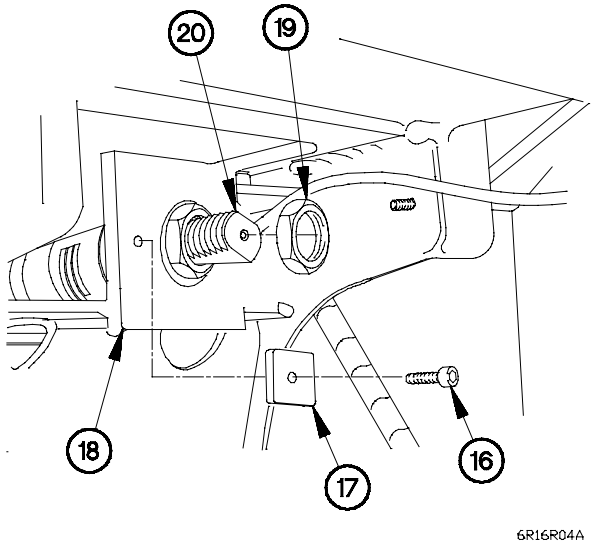


(7) Remove nut (10), lockwasher (11), washer (12), clamp (13), and tension load cell cable (14) from boom stud (15). Discard lockwasher.

(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).

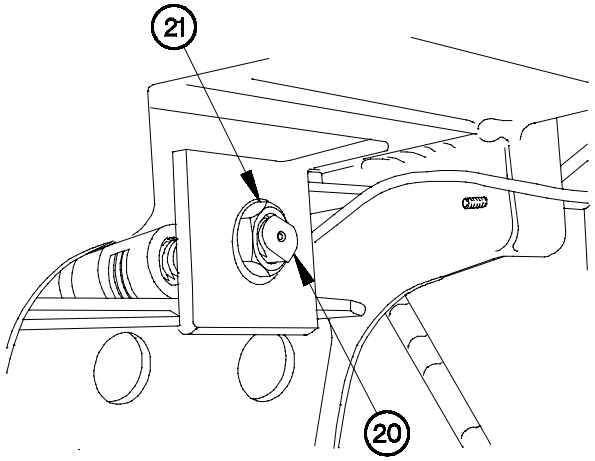


16-16. M1084/M1086 TENSION LOAD CELL REPLACEMENT (CONT)

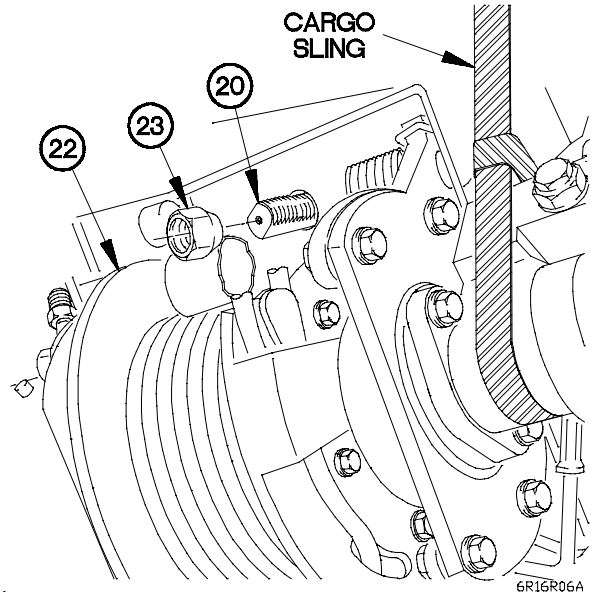
WARNING

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.

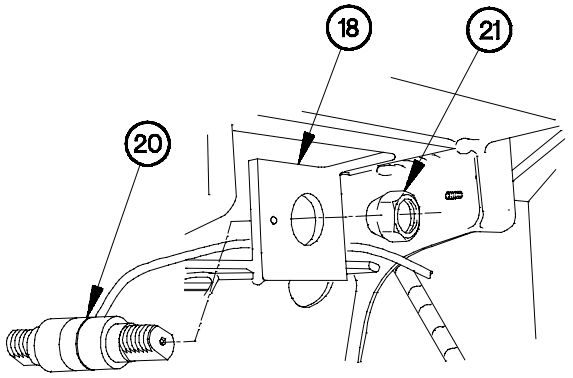
(12) Lift up on hoist assembly (22).

(13) Remove front swivel nut (23) from front of tension load cell (20).

(14) Remove hoist assembly (22) from tension load cell (20).

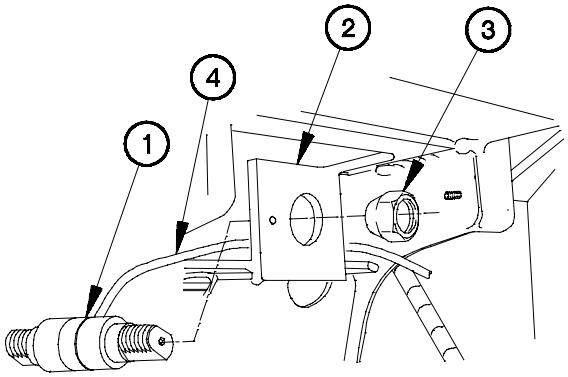
(15) Remove rear swivel nut (21) from tension load cell (20).

(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).

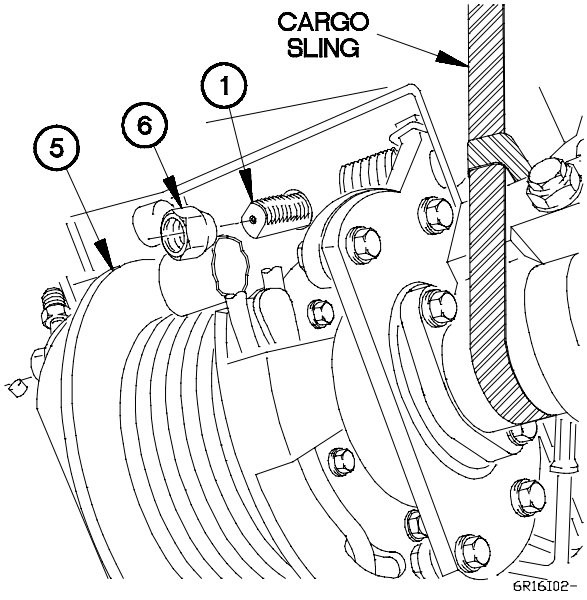
WARNING

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.

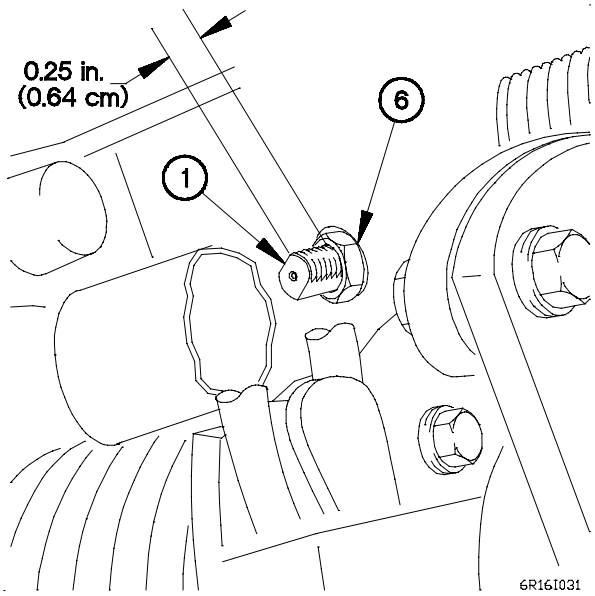
(4) Position hoist assembly (5) on front of tension load cell (1) with front swivel nut (6).

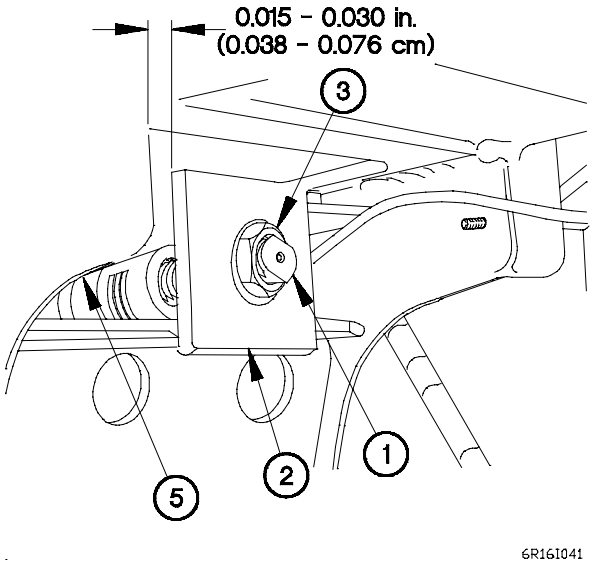


6R16I02-

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).

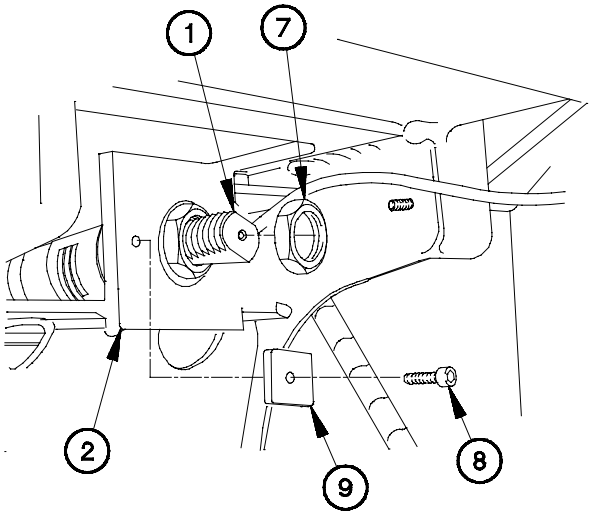
(7) Install jam nut (7) on tension load cell (1).

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.

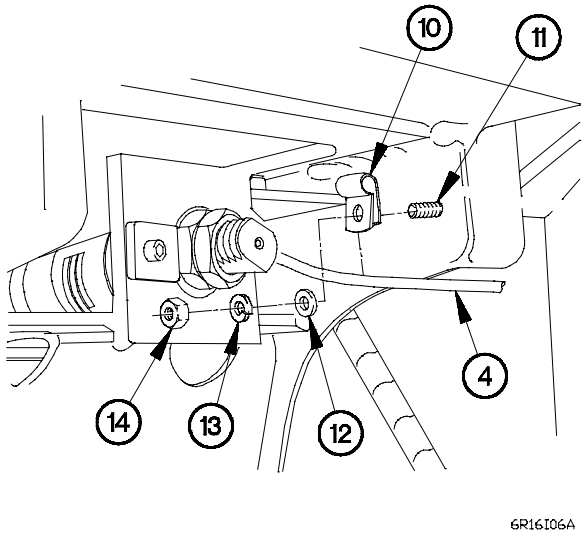
(8) Apply sealing compound to threads of screw (8).

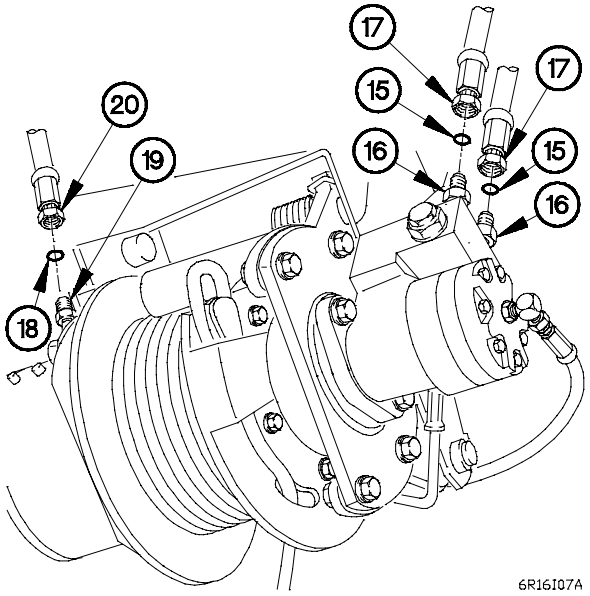
(9) Install stop block (9) on boom brace (2) with screw (8).



(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).

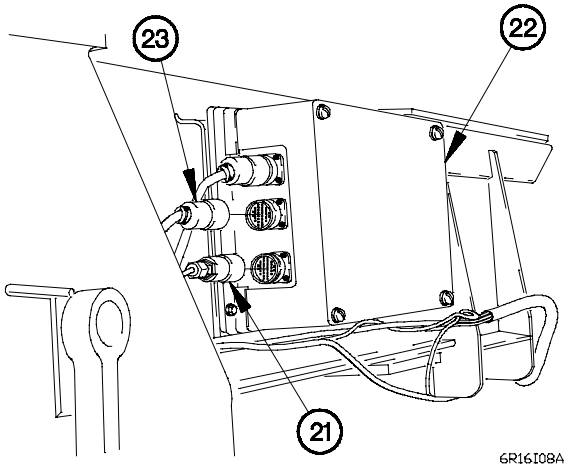
(15) Connect hydraulic hose (20) to check valve (19).

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.

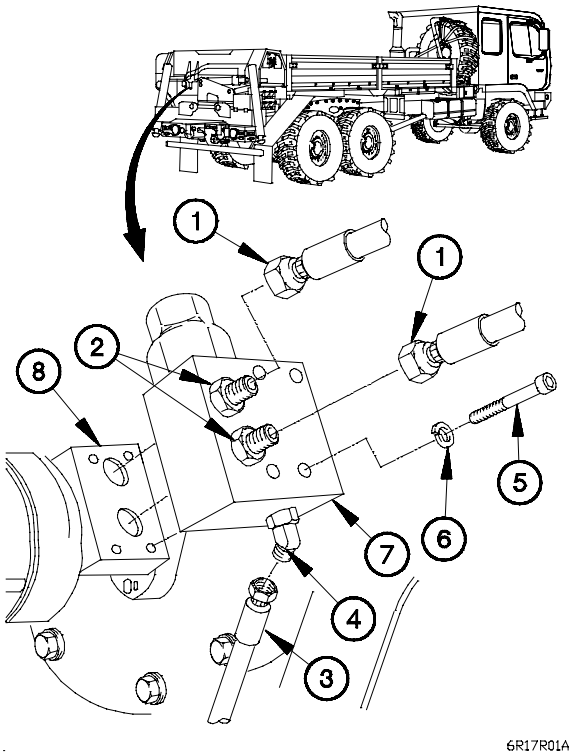
NOTE

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)

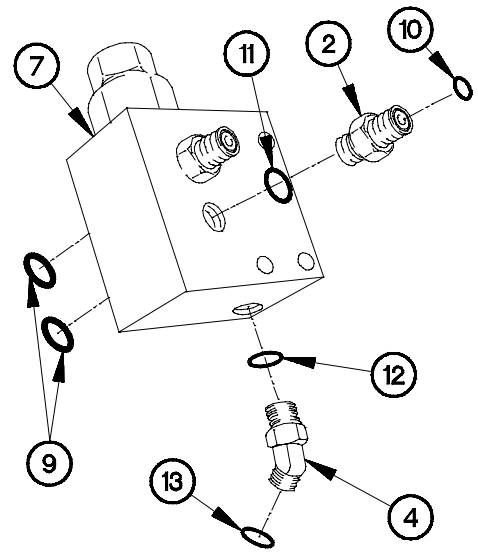
(4) Remove two preformed packings (9) from hydraulic motor control valve (7). Discard preformed packings.

(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.

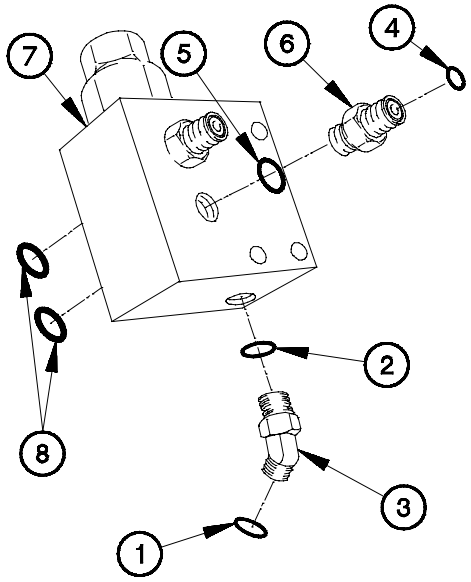
(7) Remove 45-degree fitting (4) from hydraulic motor control valve (7).

(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).

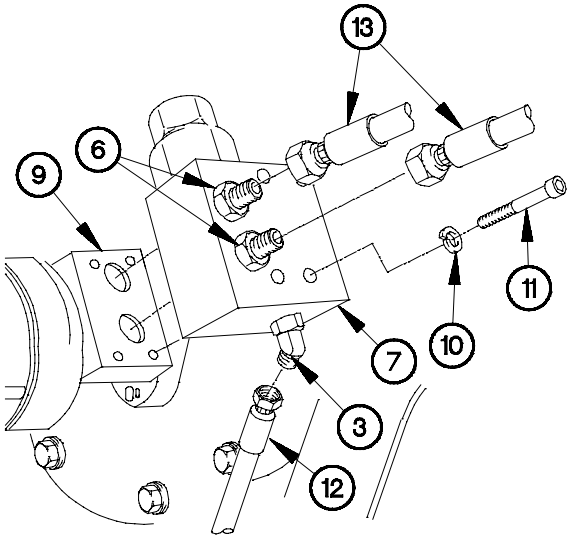
(3) Install 45-degree fitting (3) and two fittings (6) in hydraulic motor control valve (7).

(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

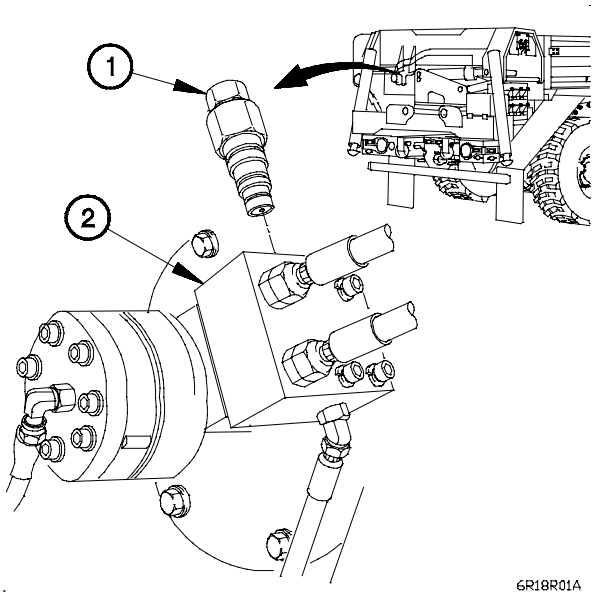
INITIAL SETUP

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

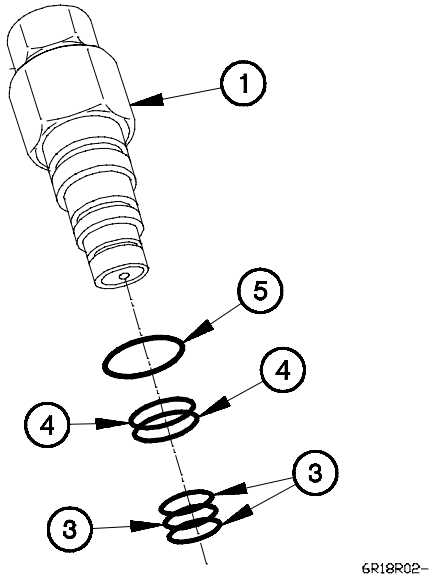
Materials/Parts
Kit, Seal (Item 107, Appendix F)

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.

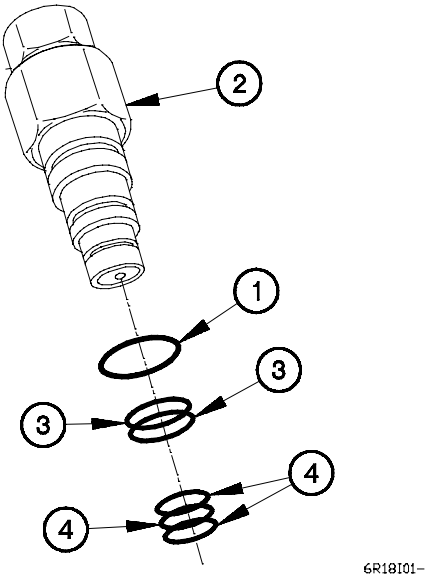
(4) Remove preformed packing (5) from holding valve (1). Discard preformed packing.

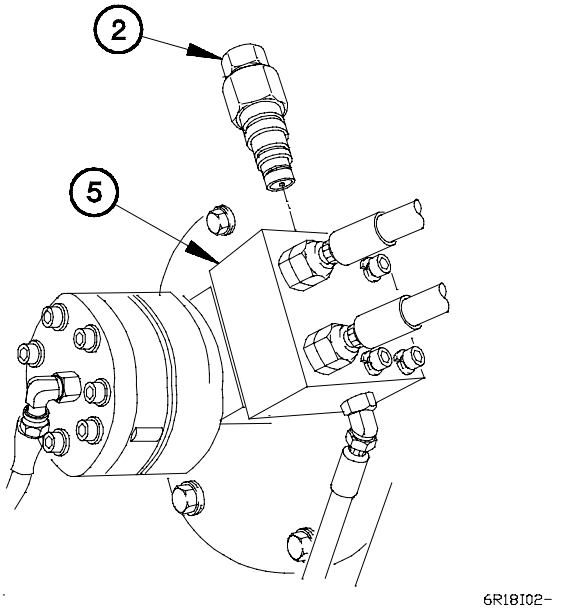
b. Installation.

(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)

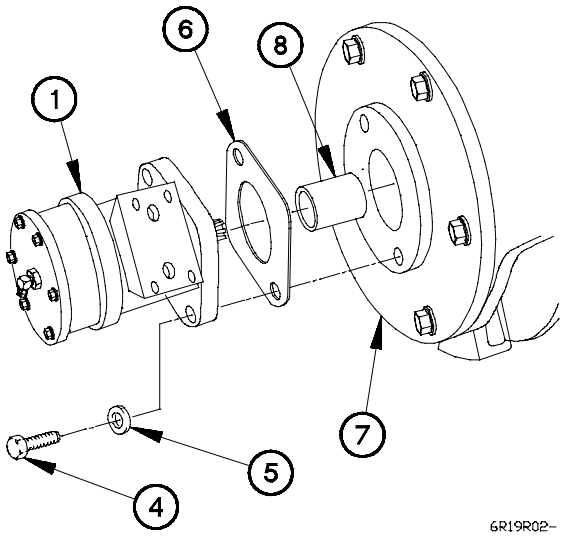
a. Removal.

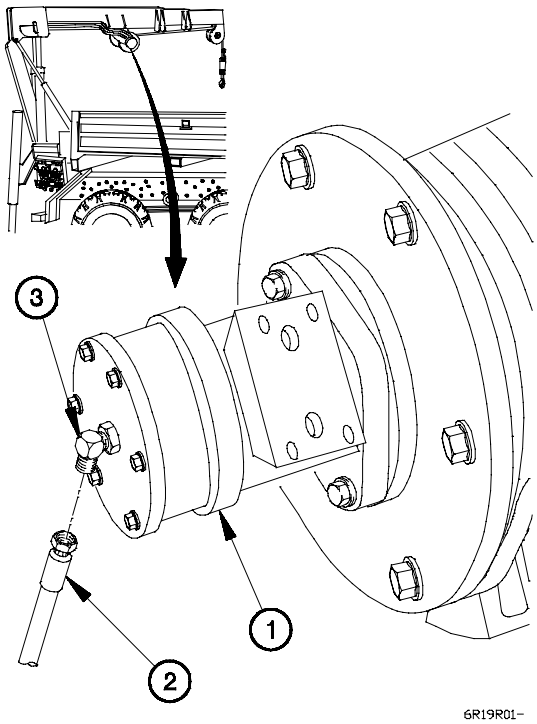
CAUTION

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

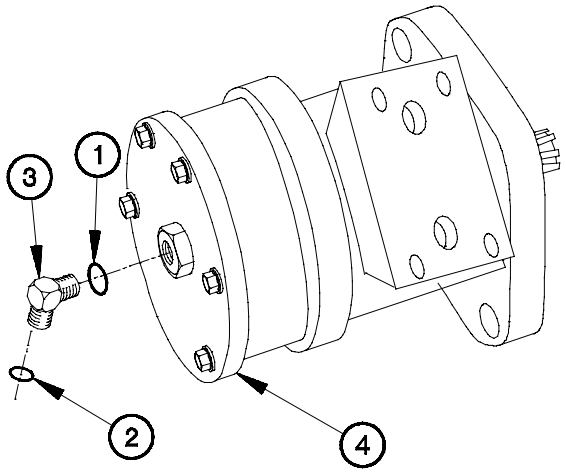
Observe orientation of boss coupling prior to removal.

(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.

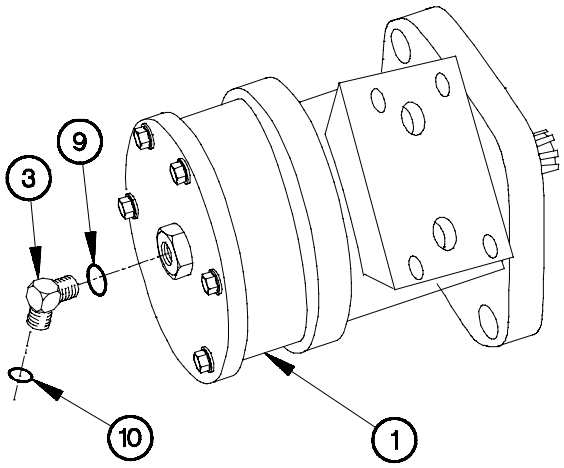
b. Installation.



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).

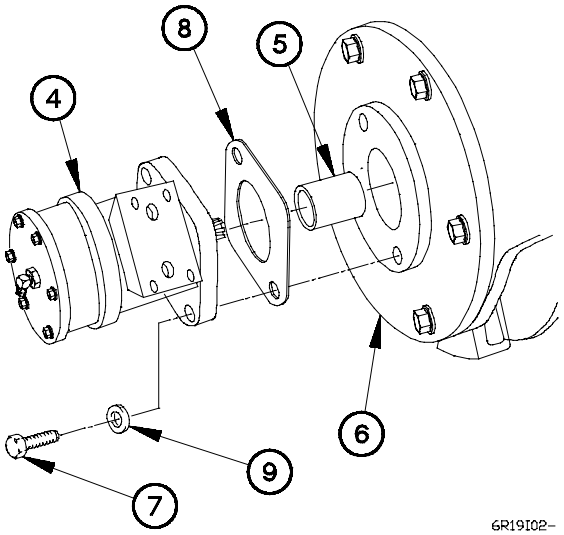
WARNING

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).

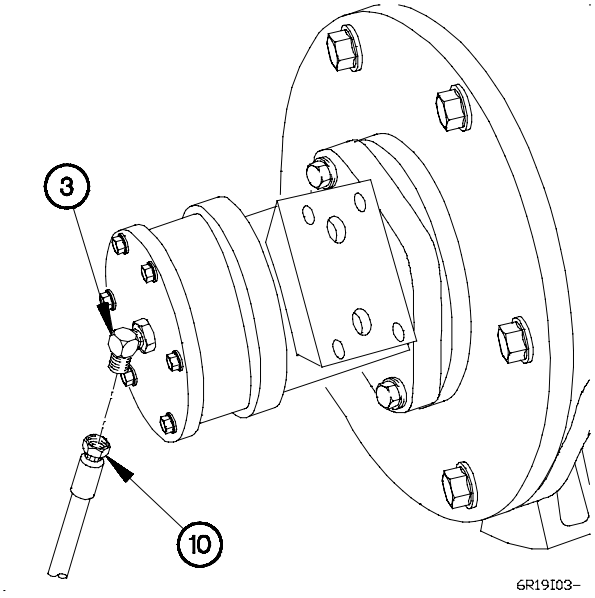
(6) Tighten screws (7) to 60-90 lb-ft (81-122 N·m).



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).
Hoist hydraulic motor removed (Para 16-19).

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

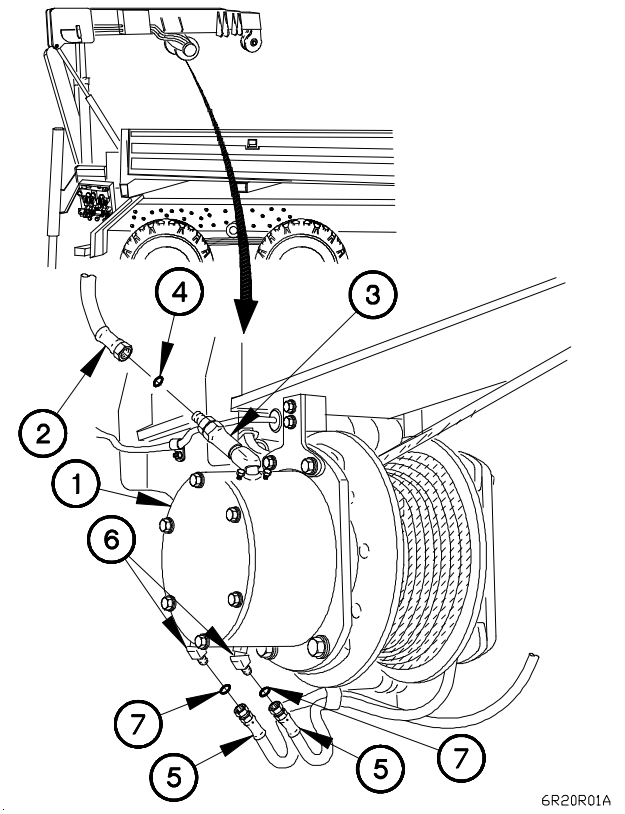
Tag all hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect hose (2) from check valve (3).

(3) Remove preformed packing (4) from check valve (3). Discard preformed packing.

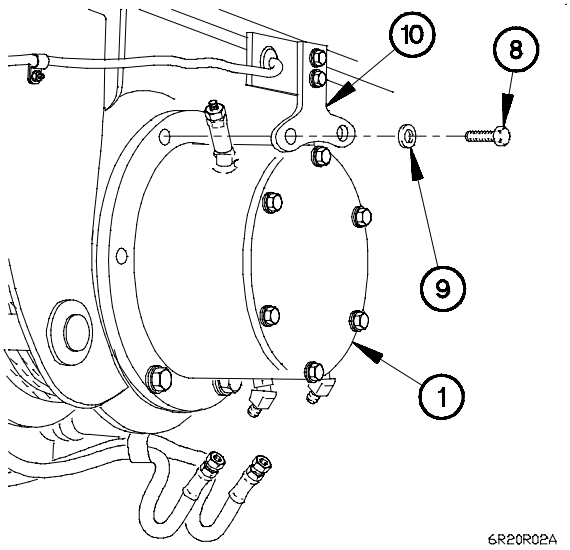
(4) Disconnect two hoses (5) from 45-degree fittings (6).

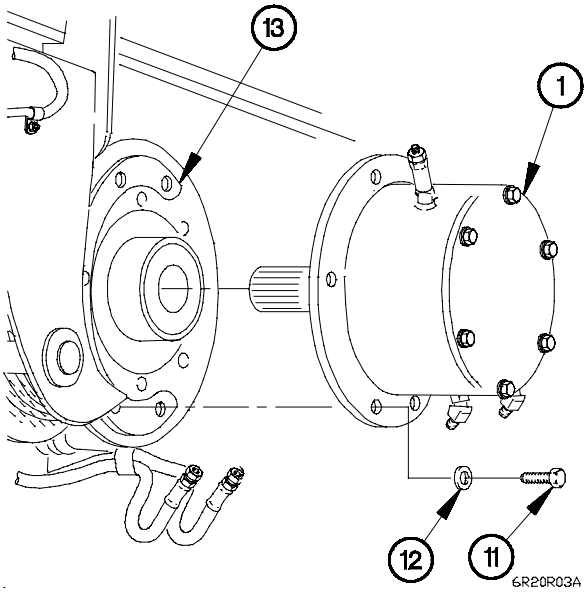
(5) Remove two preformed packings (7) from 45-degree fittings (6). Discard preformed packings.



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).





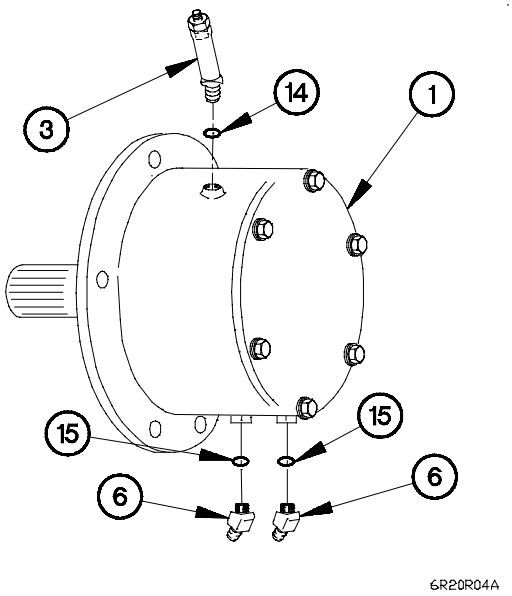
(7) Remove three screws (11), washers (12), and oil filled disc brake assembly (1) from hoist assembly (13).

(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.



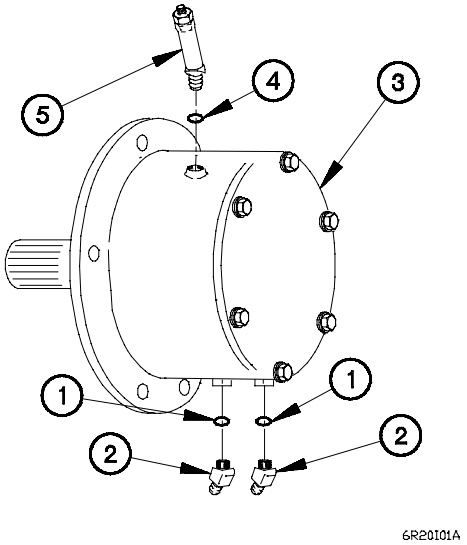
b. Installation.

(1) Install two preformed packings (1) on 45-degree fittings (2).

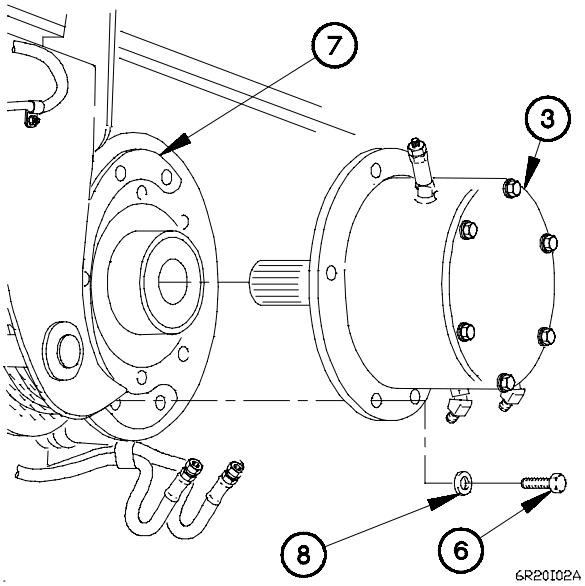
(2) Install two 45-degree fittings (2) on oil filled disc brake assembly (3).

(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.

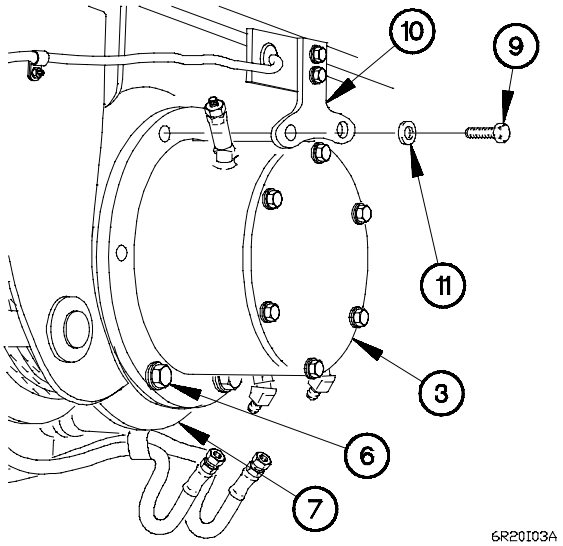
(5) Apply sealing compound to threads of three screws (6).

(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

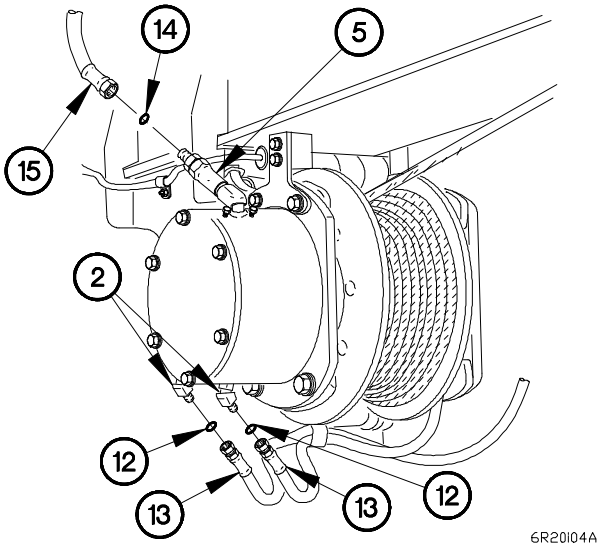
16-20. M1084/M1086 OIL FILLED DISC BRAKE ASSEMBLY REPLACEMENT (CONT)

(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) Install hoist hydraulic motor (para 16-19).

(3) 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)

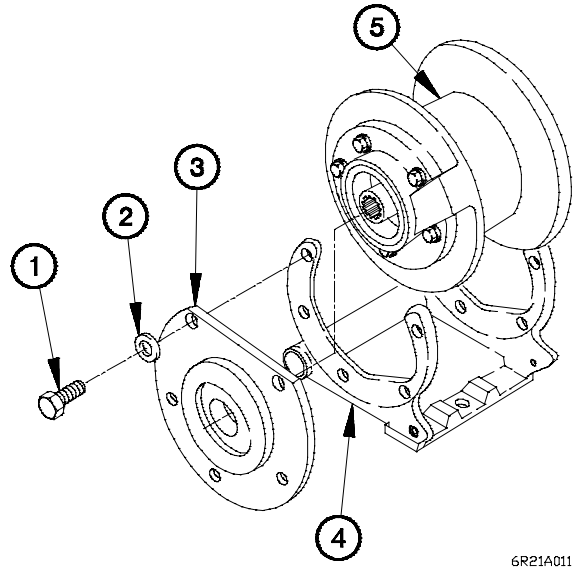
Tools and Special Tools (Cont)
Gloves, Rubber (Item 26, Appendix B)
Wrench, Torque, 0-300 lb-in. (Item 95, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

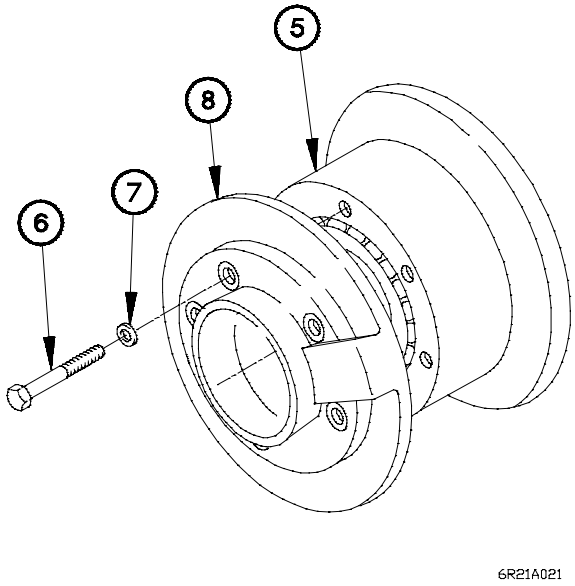
Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Sealing Compound (Item 76, Appendix C)
Parts Kit, Seal Replacement (Item 319, Appendix F)

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.

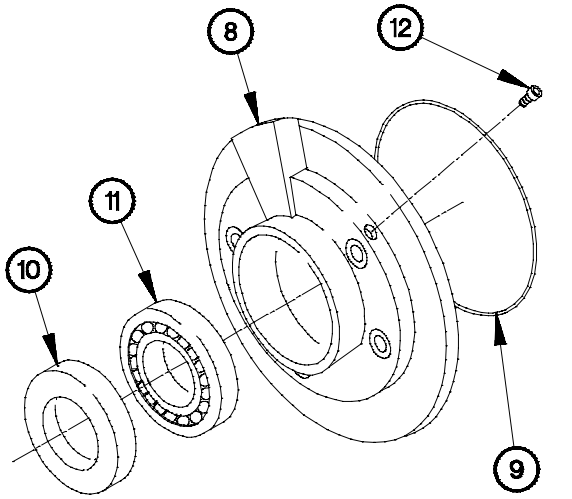
(6) Remove seal (10) from RH drum end (8). Discard seal.

NOTE

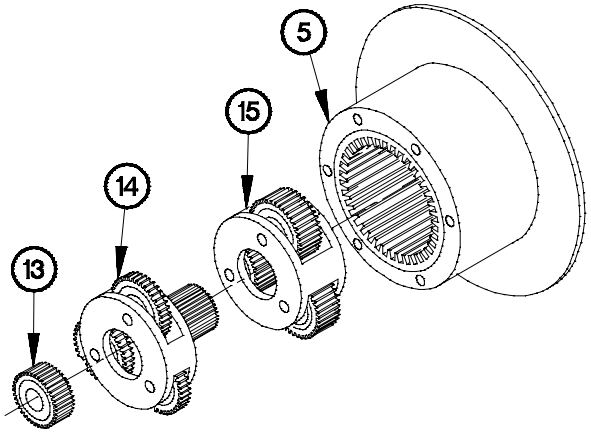
Note position of bearing prior to removal.

(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.

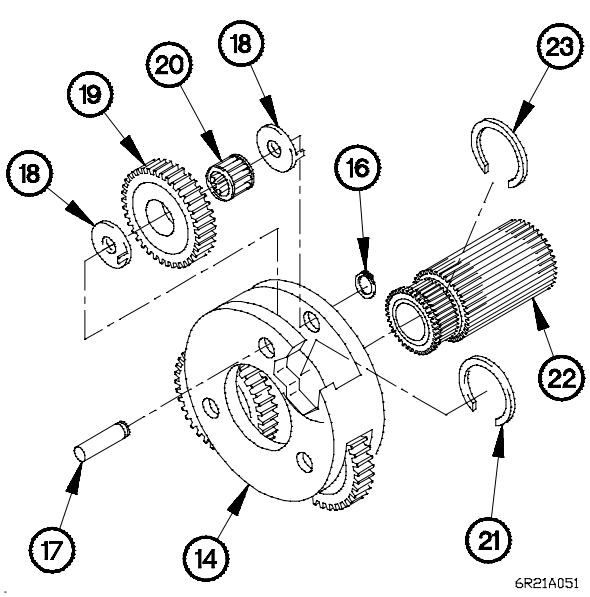
(12) Remove retaining ring (16), pin (17), two washers (18), gear (19), and roller set (20) from carrier (14).

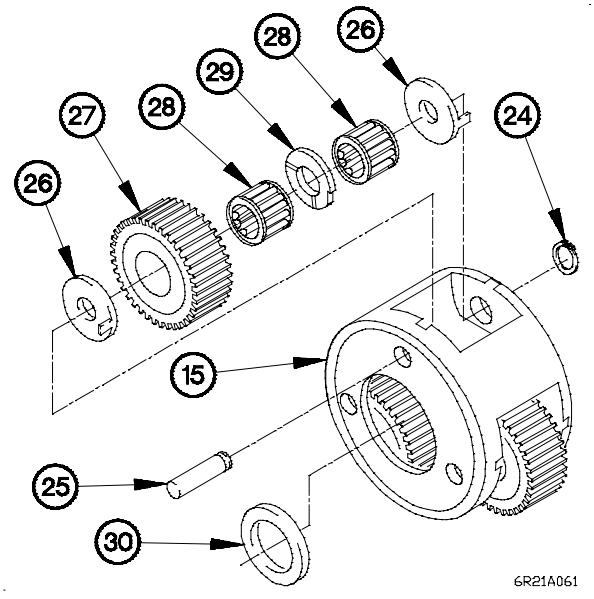
(13) Perform step (12) on two remaining gears (19).

(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).

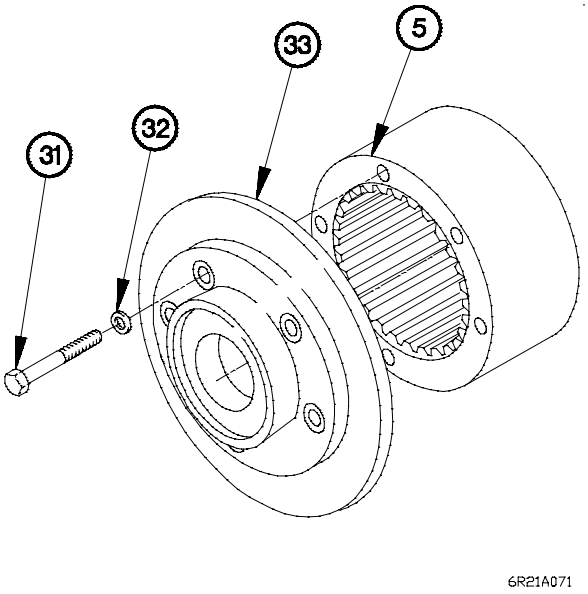
(18) Remove pin (25), two washers (26), and gear (27) from carrier (15).

(19) Remove two roller sets (28) and separator (29) from gear (27).

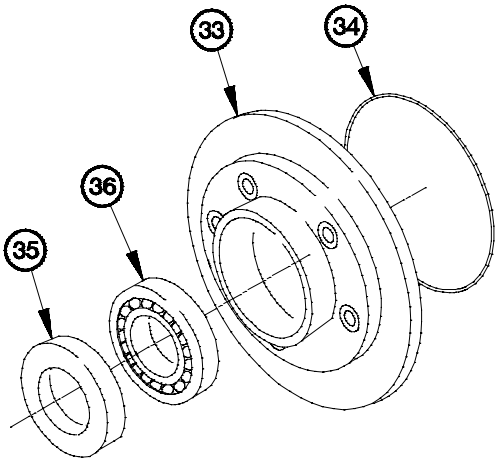
(20) Perform steps (17) through (19) on two remaining gears (27).

(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.

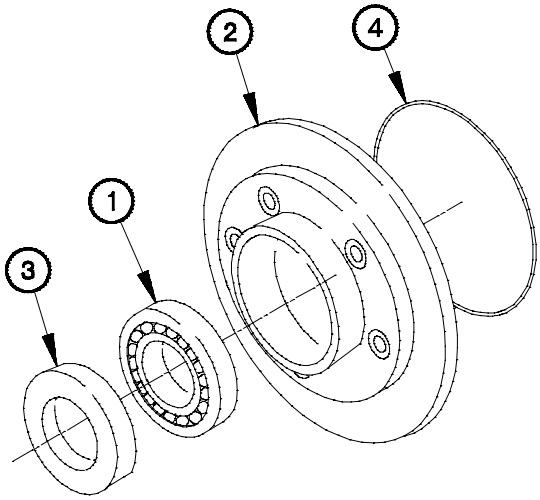
(2) Inspect all parts for pitting, corrosion, or signs of binding.

c. Assembly.

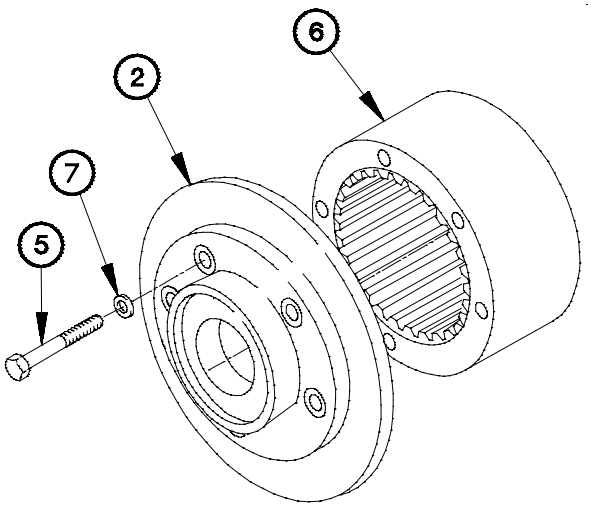
(1) Install bearing (1) in LH drum end (2).

(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).

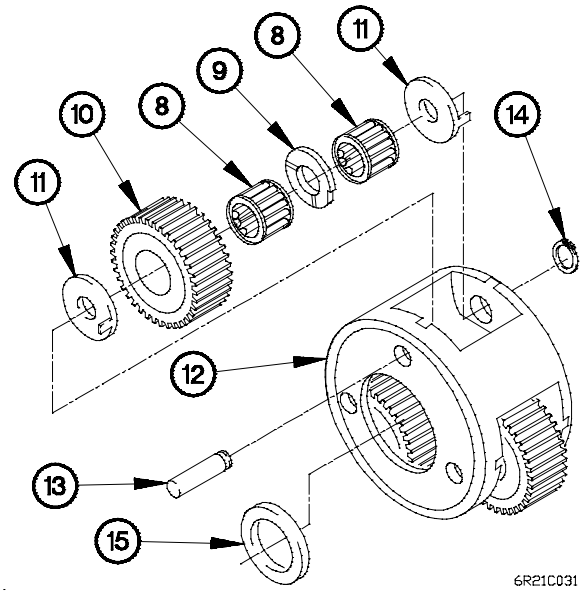
WARNING

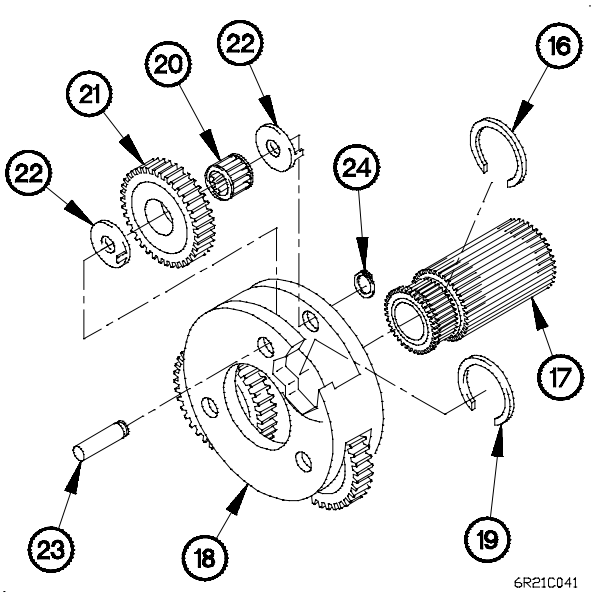
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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).

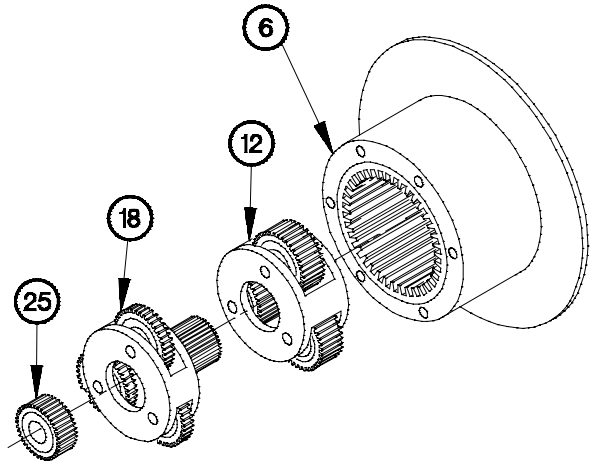
(17) Install retaining ring (24) on pin (23).

(18) Perform steps (12) through (17) on two remaining gears (21).

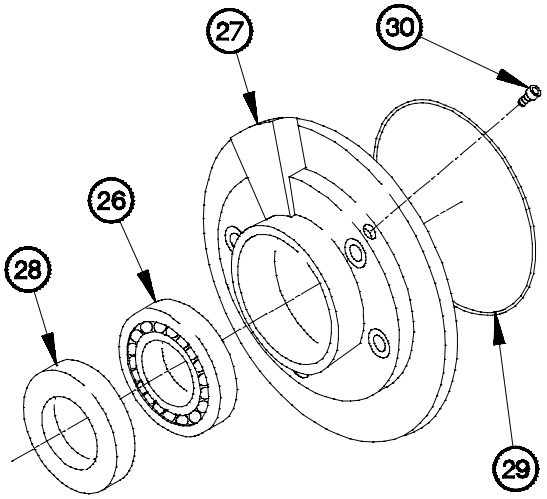
(19) Install carrier (12) in ring gear (6).

(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).

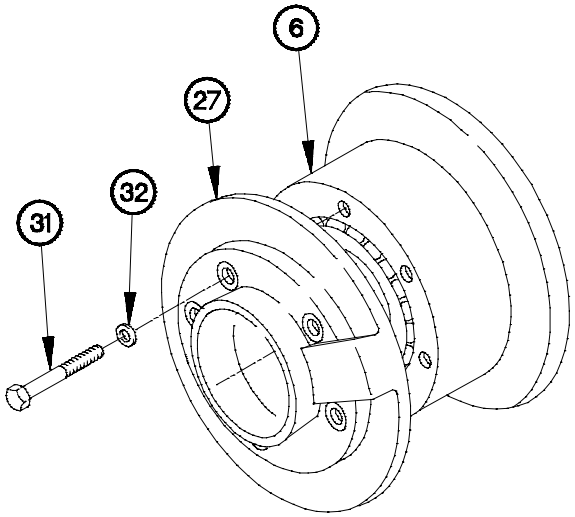
WARNING

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).



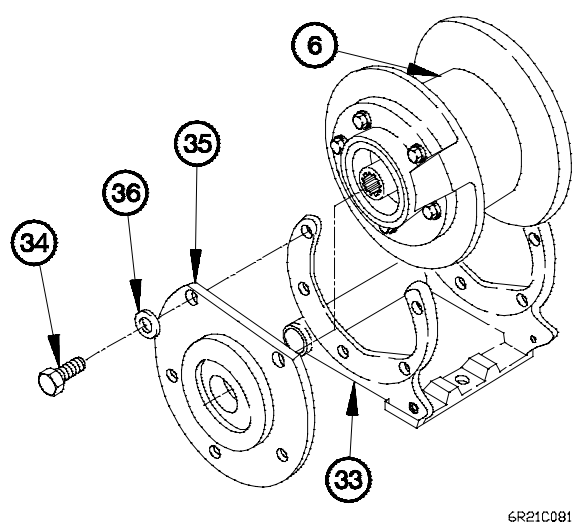
6R21C071

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

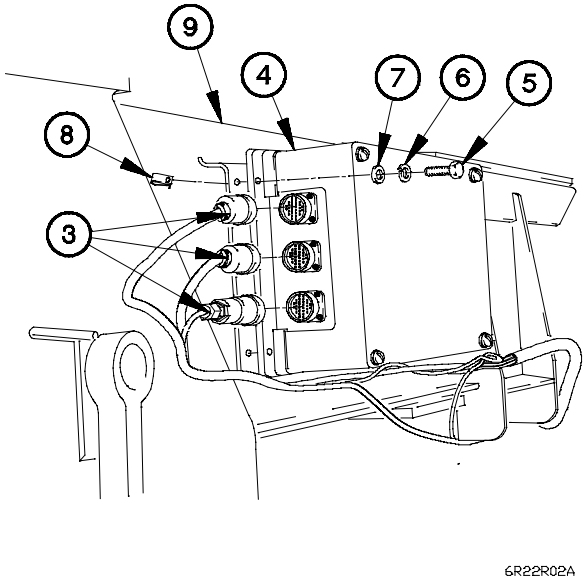
Use serial number of MHC when ordering replacement overload shutdown.

a. Removal.

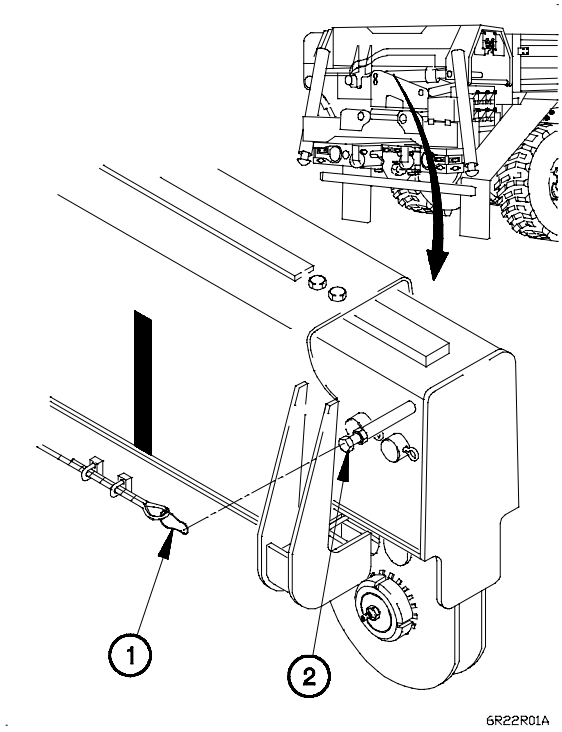
CAUTION

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

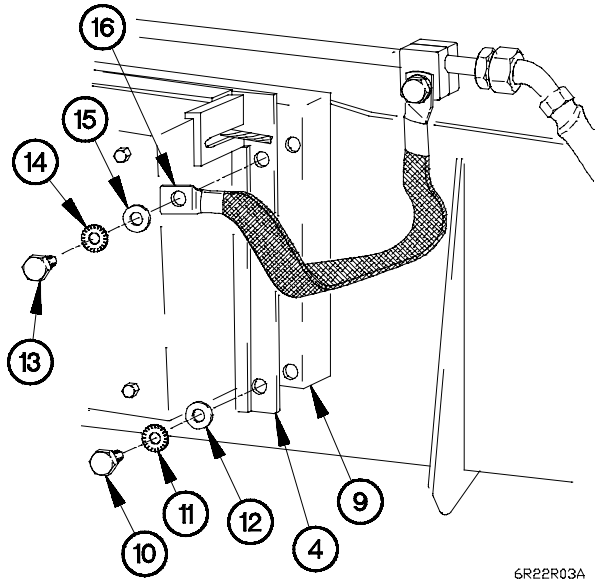
Step (3) requires the aid of an assistant.

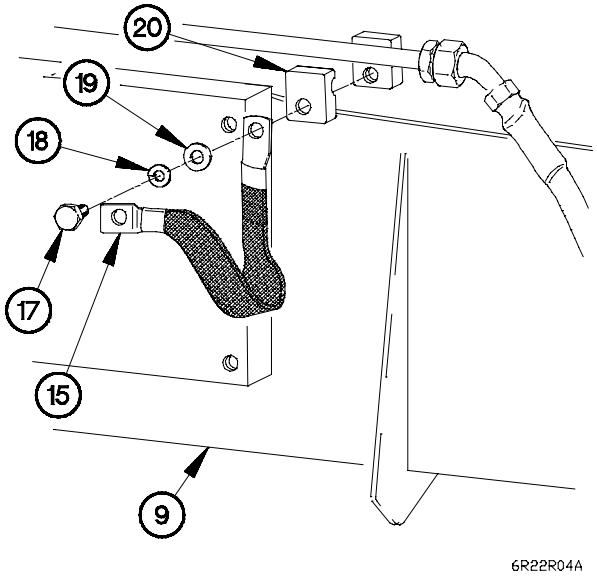
(3) Remove two bolts (5), lockwashers (6), washers (7), and clipnuts (8) from boom assembly (9). Discard lockwashers.

16-22. M1084/M1086 OVERLOAD SHUTDOWN REPLACEMENT (CONT)

(4) Remove bolt (10), lockwasher (11), and washer (12) from overload shutdown (4). Discard lockwasher.

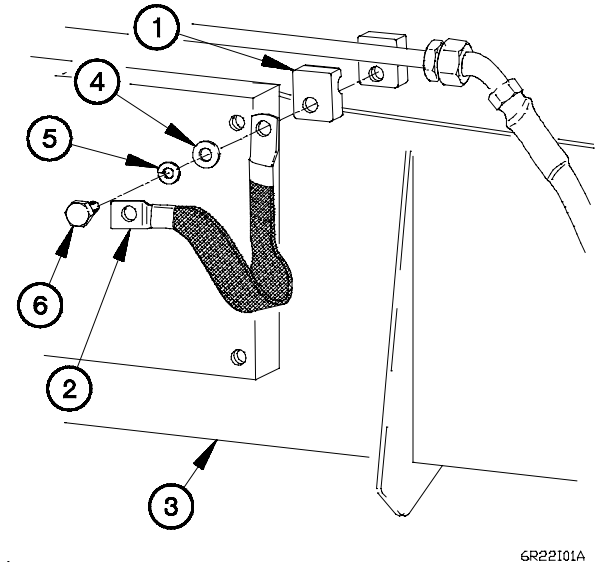
(5) Remove bolt (13), lockwasher (14), washer (15), ground strap (16), and overload shutdown (4) from boom assembly (9). Discard lockwasher.





(6) Remove bolt (17), lockwasher (18), washer (19), ground strap (15), and clamp (20) from boom assembly (9). Discard lockwasher.

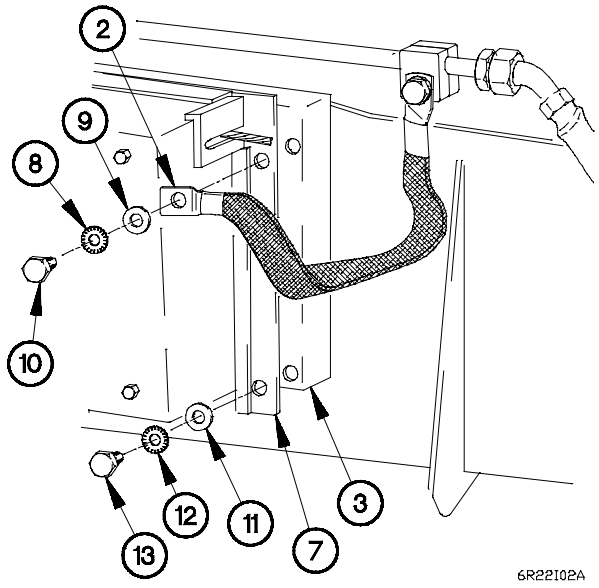
b. Installation.

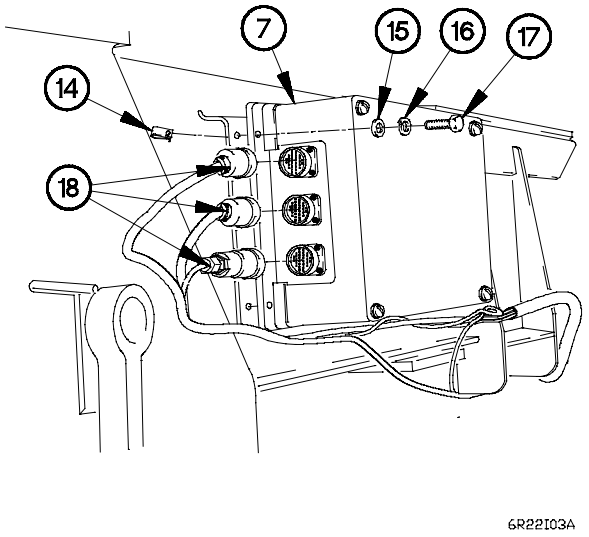


(1) Install clamp (1) and ground strap (2) on boom assembly (3) with washer (4), lockwasher (5), and bolt (6).

(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).



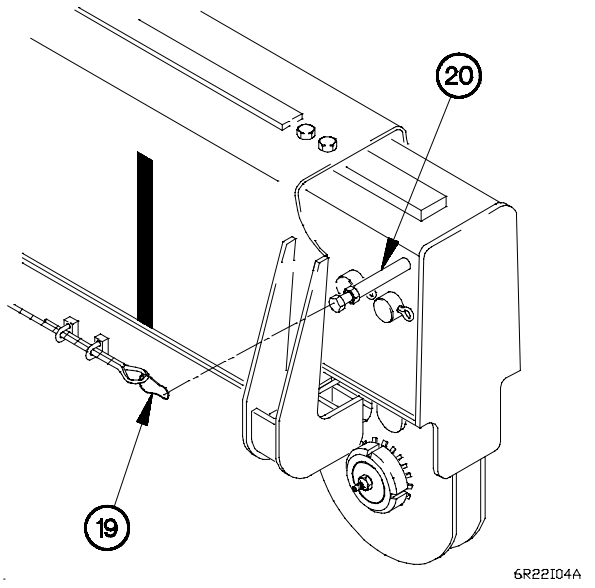


NOTE

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)

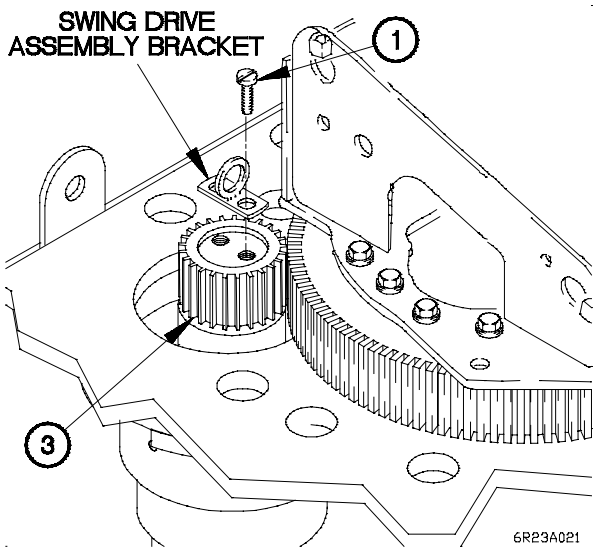
Tools and Special Tools (Cont)
Pan, Drain (Item 43, Appendix B)

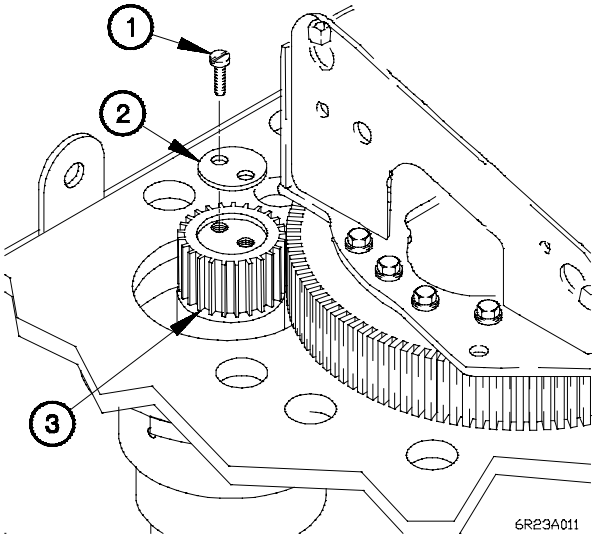
Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Lubricating Oil, Gear (Item 52, Appendix C)
Packing, Preformed (Item 236, Appendix F)
Retainer, Packing (2) (Item 352, Appendix F)
Packing, Preformed (2) (Item 226, Appendix F)
Packing, Preformed (Item 267, Appendix F)
Retainer, Packing (Item 353, Appendix 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).

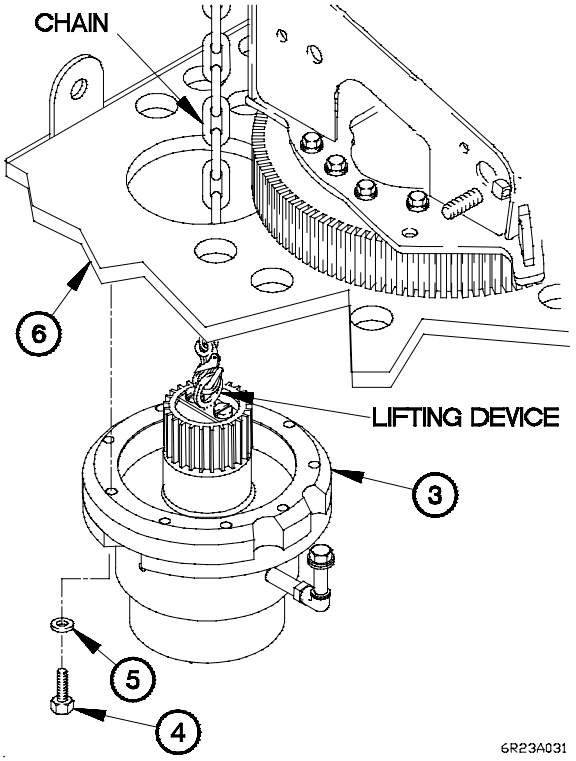
WARNING

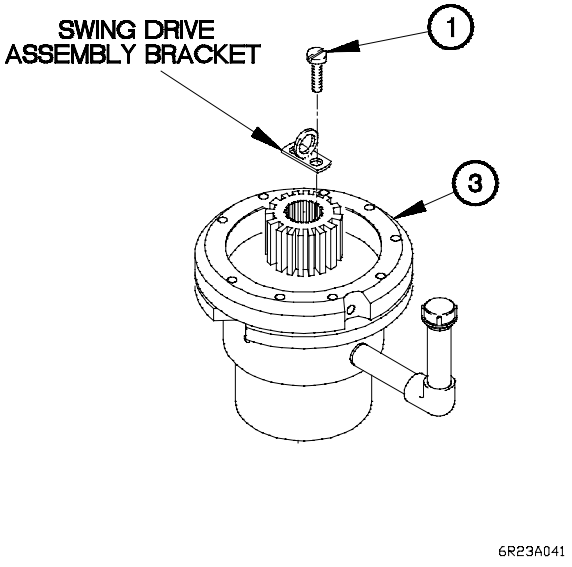
- **Swing drive assembly weighs approximately 70 lbs (32 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.**
- **Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure 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).

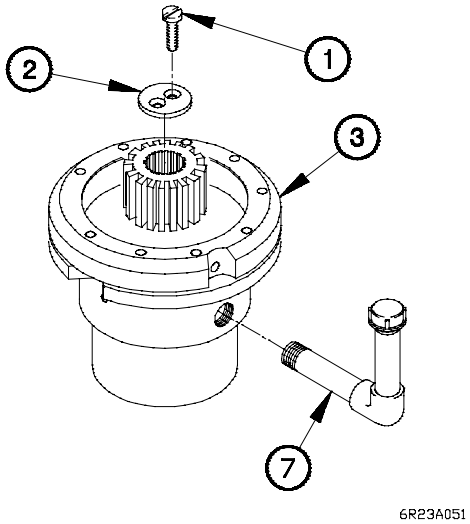




(4) Remove two screws (1) and swing drive assembly bracket from swing drive assembly (3).

(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).

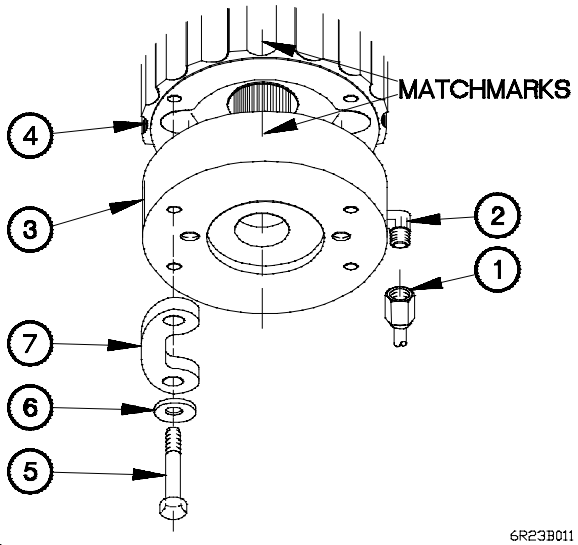
WARNING

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

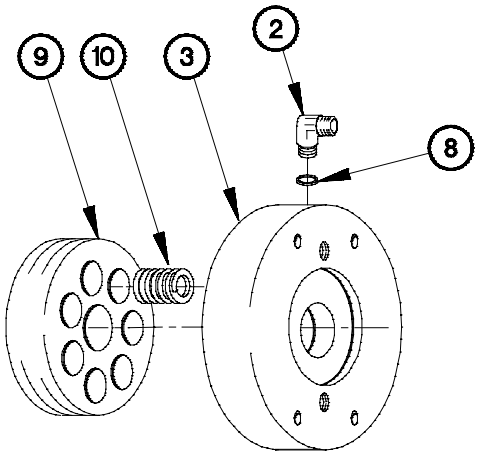
(2) Match mark cylinder housing (3) to end cover (4).

(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.

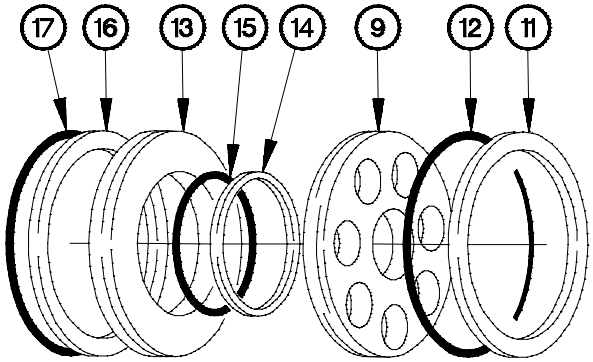
(7) Remove piston (9) and seven springs (10) from cylinder housing (3).

(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).

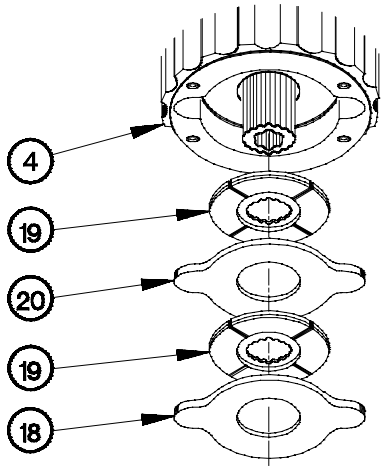
(10) Remove packing retainer (14) and preformed packing (15) from cylinder head (13). Discard packing retainer and preformed packing.

(11) Remove packing retainer (16) and preformed packing (17) from cylinder head (13). Discard packing retainer and preformed packing.

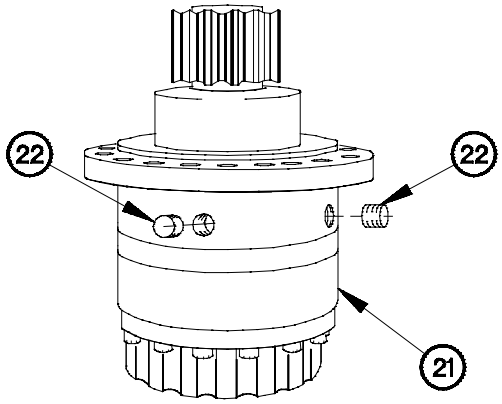


6R23B031

(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).

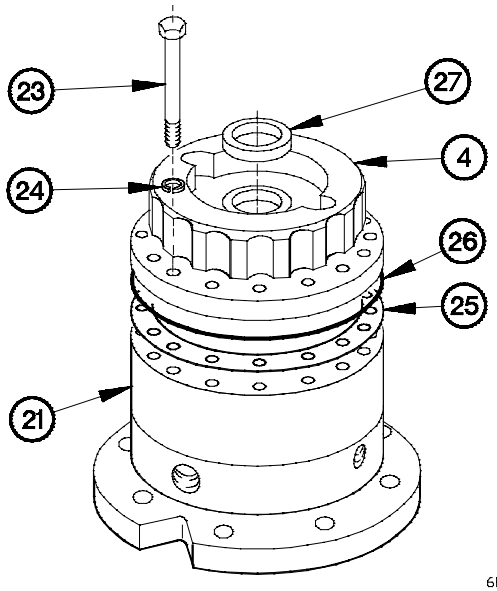
(14) Remove two plugs (22) from swing drive (21).

(15) Remove 16 bolts (23) and lockwashers (24) from swing drive (21). Discard lockwashers.

(16) Remove end cover (4) from swing drive (21).

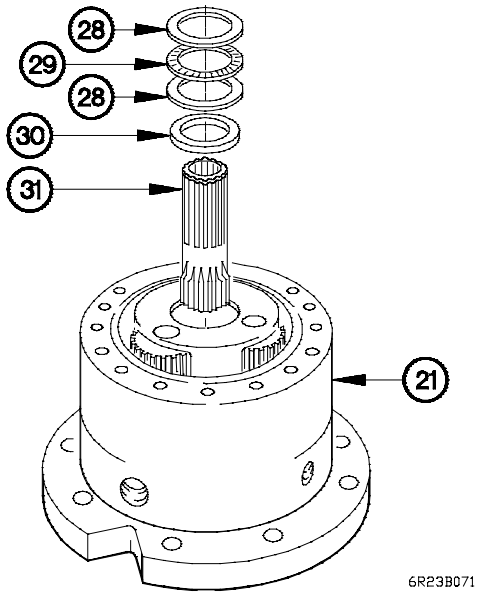
(17) Remove shim (25) and preformed packing (26) from end cover (4). Discard preformed packing.

(18) Remove oil seal (27) from end cover (4). Discard oil seal.



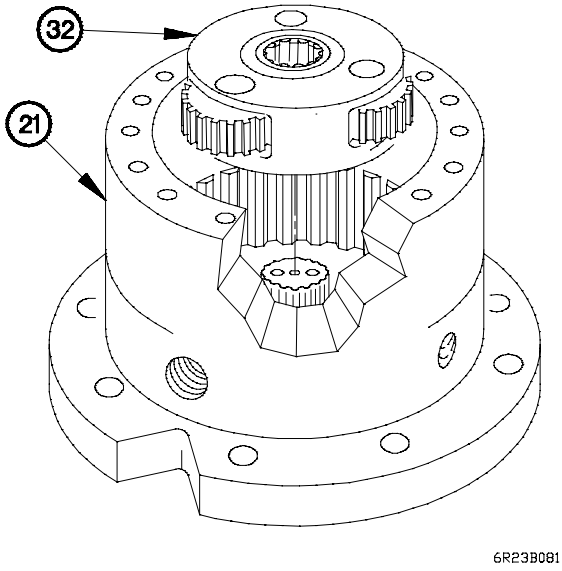
6R23B061

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).

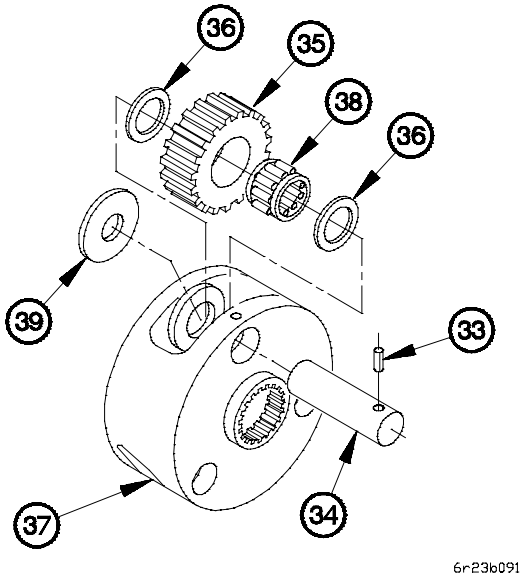
(20) Remove sun gear (31) from swing drive (21).



(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).

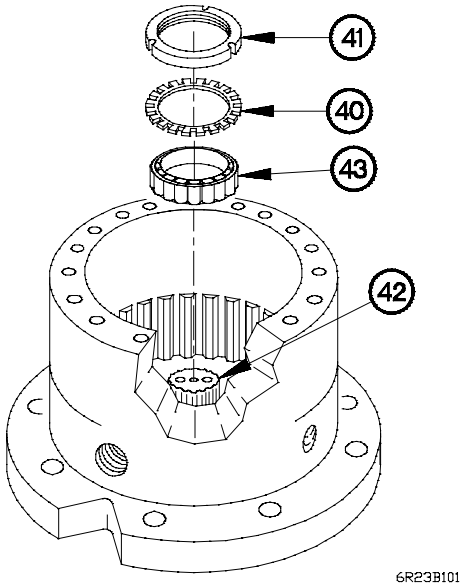
(23) Remove pin (34), gear (35), and two spacers (36) from carrier (37).

(24) Remove roll pin (33) from pin (34).

(25) Remove bearing (38) from gear (35).

(26) Remove center spacer (39) from carrier (37).

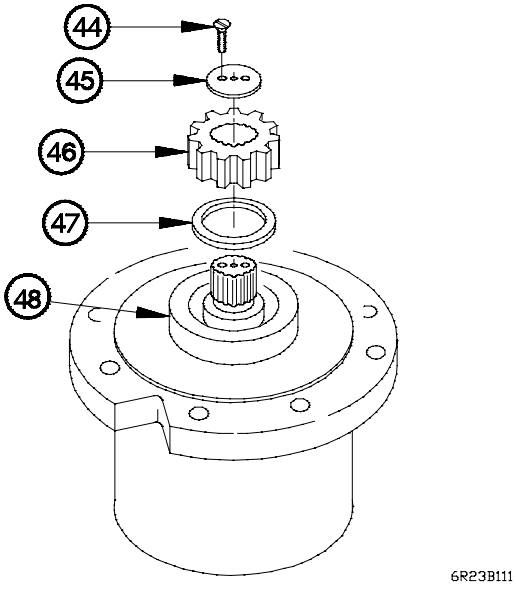
(27) Perform steps (21) through (26) on two remaining gears.



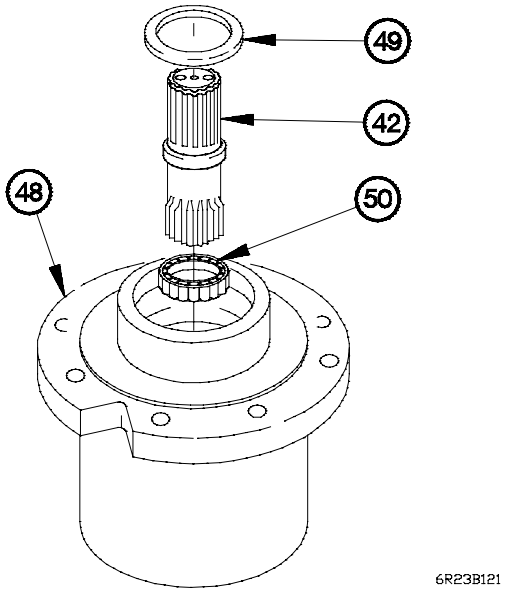
(28) Bend down tab of lockwasher (40).

(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).

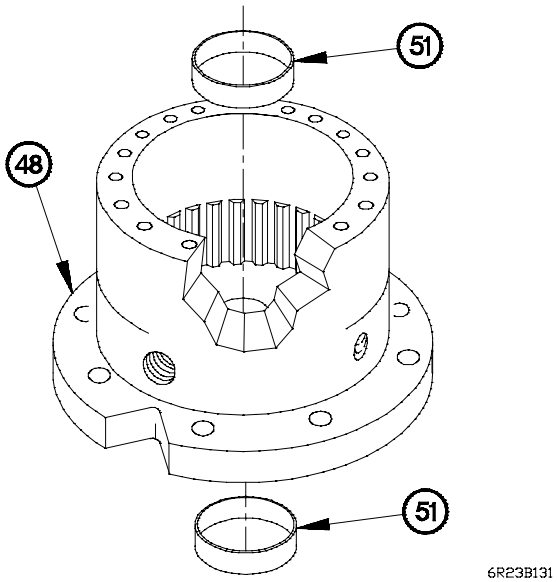


(32) Remove seal (49) and shaft (42) from hub (48).

(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

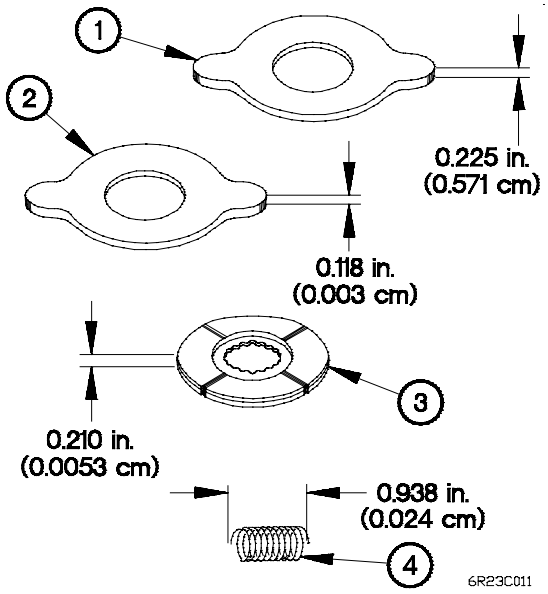
Replace any part that fails visual inspection or size measurement requirements.

(2) Inspect inner stator (1) for pitting, corrosion, scoring, and indication of binding. Minimum thickness is 0.225 in. (0.571 cm).

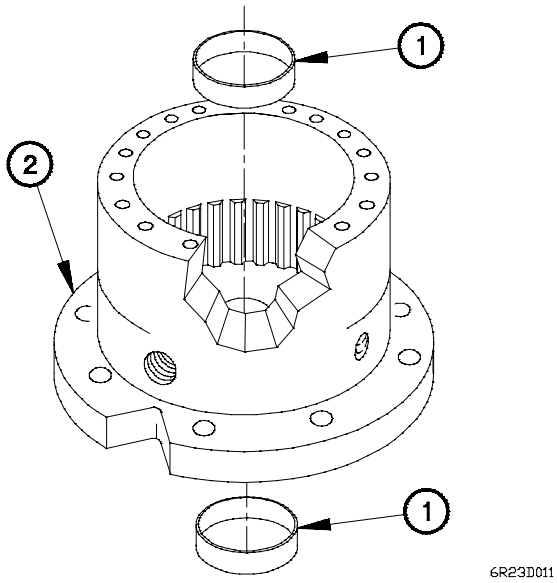
(3) Inspect outer stator (2) for pitting, corrosion, scoring, and indication of binding. Minimum thickness is 0.118 in. (0.003 cm).

(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.

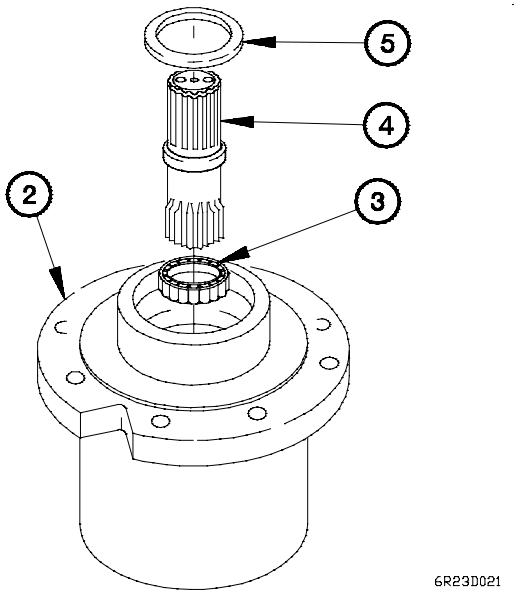


(1) Install two races (1) in hub (2).

(2) Install bearing (3) on shaft (4).

(3) Install shaft (4) in hub (2).

(4) Install seal (5) on shaft (4).

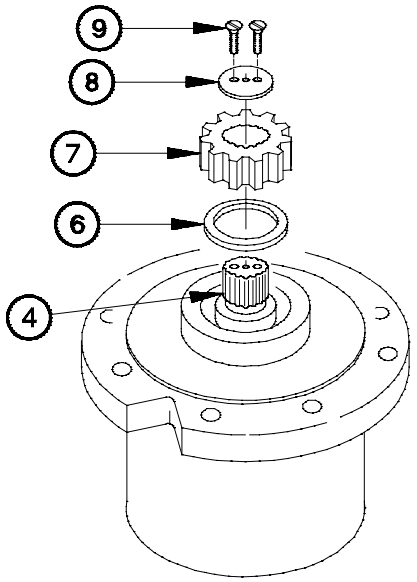


16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

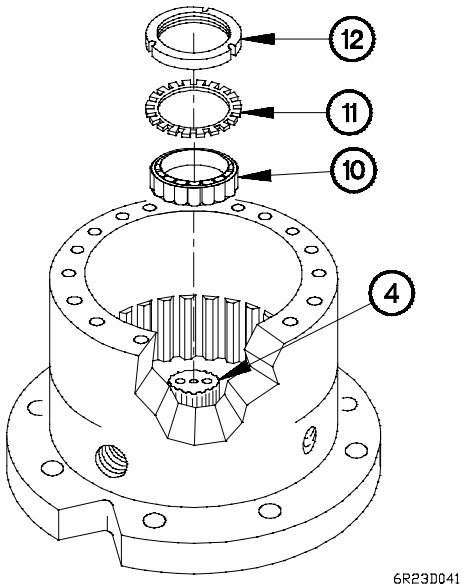
(5) Install spacer (6) on shaft (4).

(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.

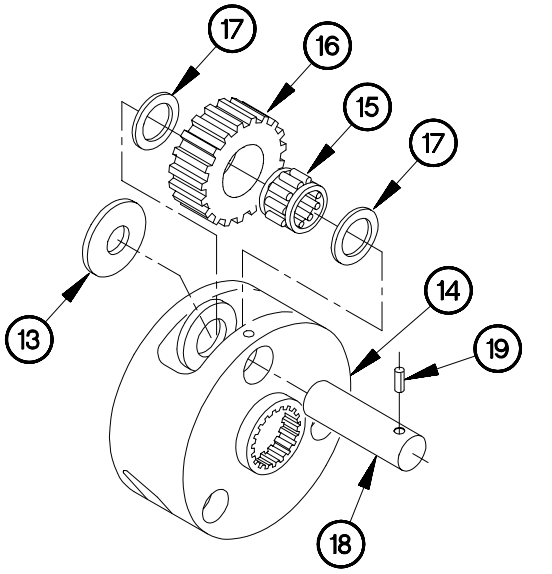
(11) Install center spacer (13) in carrier (14).

(12) Install bearing (15) in gear (16).

(13) Install gear (16), two spacers (17), and pin (18) in carrier (14).

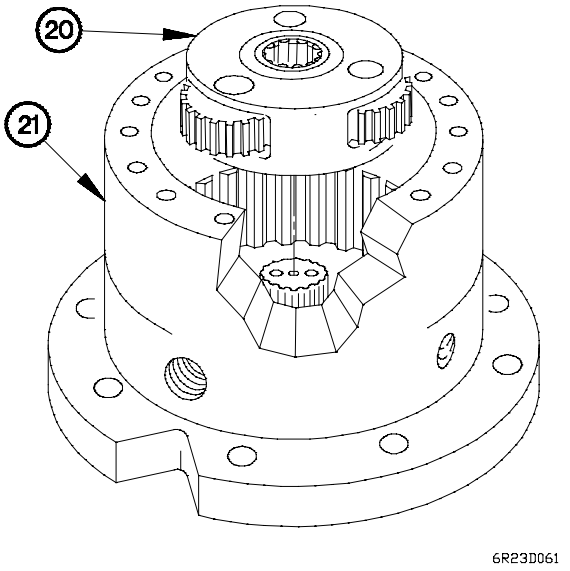
(14) Install roll pin (19) in pin (18).

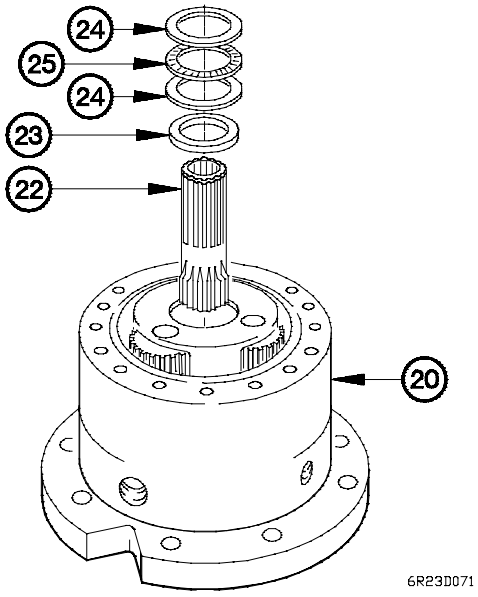
(15) Perform steps (11) through (14) on two remaining gears.



6r23d051

(16) Install planetary gear (20) in swing drive (21).





(17) Install sun gear (22) in planetary gear (20).

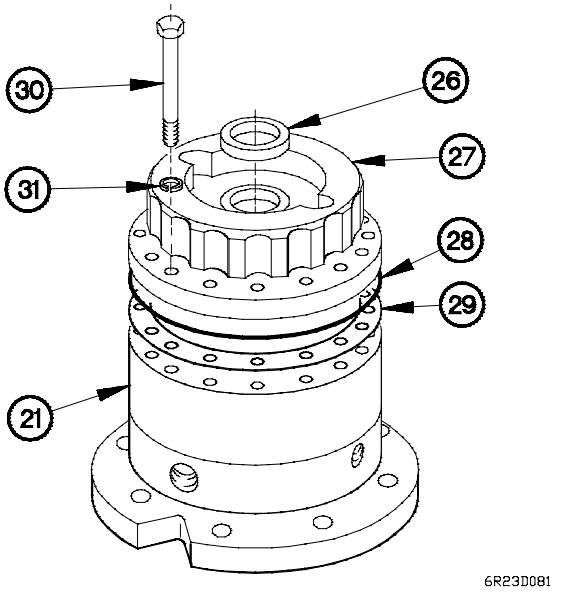
(18) Install spacer (23), race (24), bearing (25), and race (24) on sun gear (22).

(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).

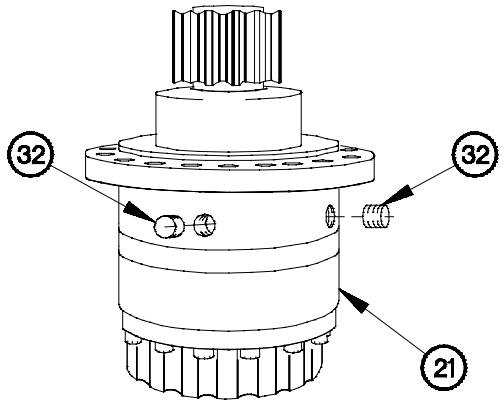
NOTE

Use a crisscross pattern to tighten screws.

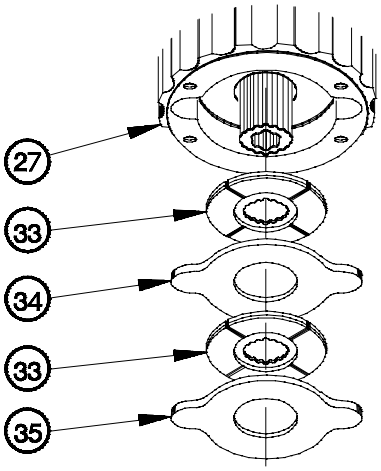
(23) Tighten screws (30) to 35 lb-ft (47 N·m).

16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(24) Install two plugs (32) in swing drive (21).



6R23D091



6R23D101

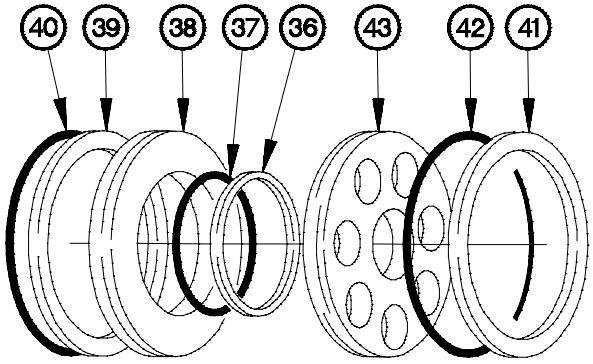
(25) Install disc (33), inner stator (34), disc (33), and outer stator (35) in end cover (27).

(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).



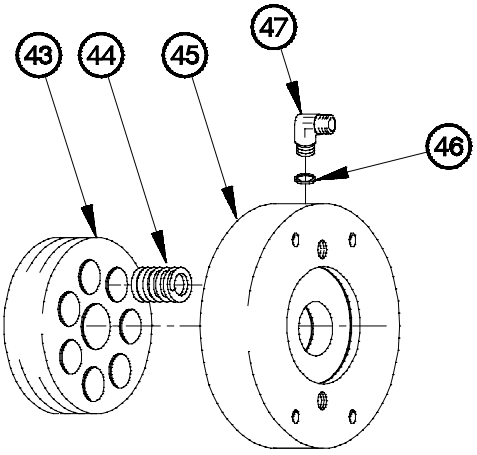
6R23D111

(30) Install seven springs (44) in piston (43).

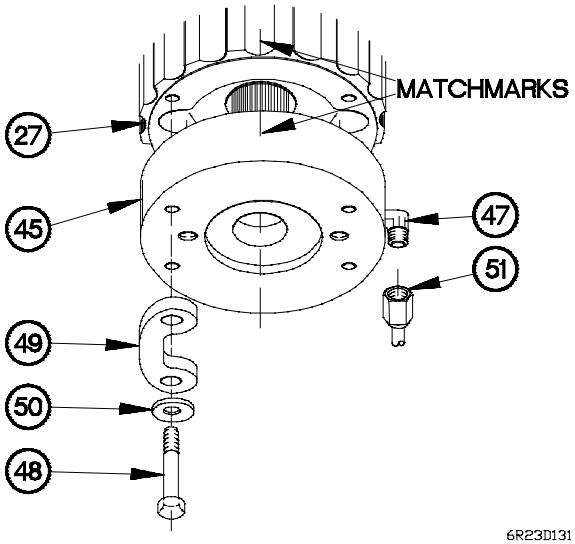
(31) Install piston (43) in cylinder housing (45).

(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).

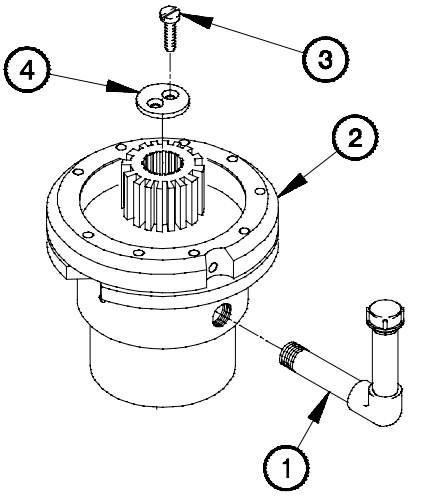
16-23. M1084/M1086 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

e. Installation.

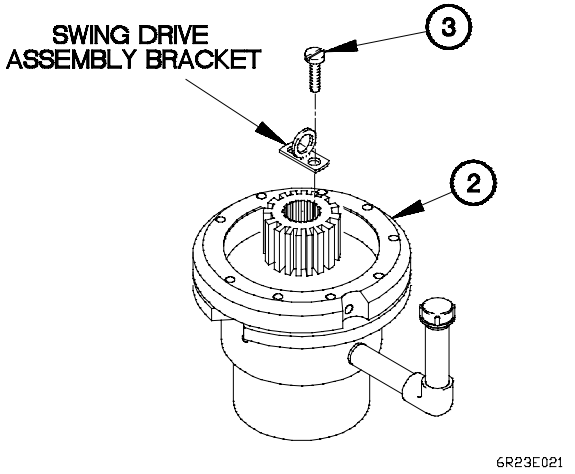
(1) Install oil fill pipe (1) in swing drive assembly (2).

(2) Fill swing drive assembly (2) with oil.

(3) Remove two screws (3) and plate (4) from swing drive assembly (2).



6R23E011



6R23E021

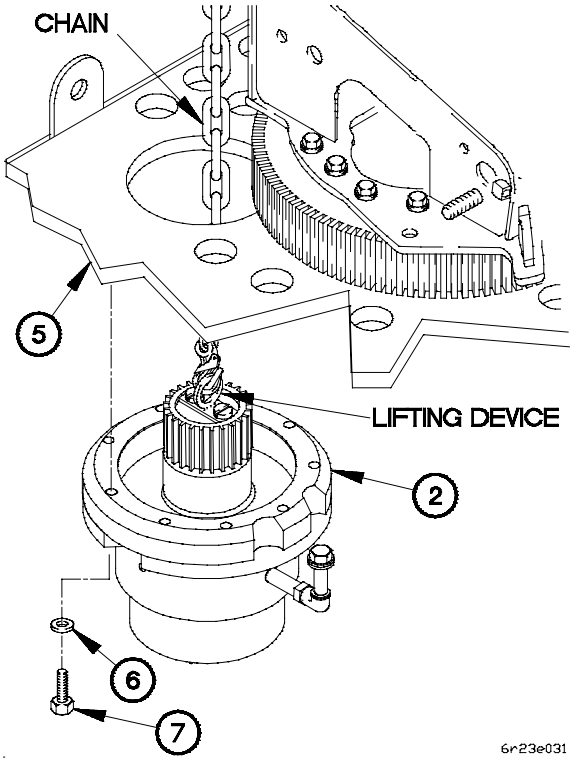
(4) Install swing drive lifting bracket on swing drive assembly (2) with two screws (3).

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.

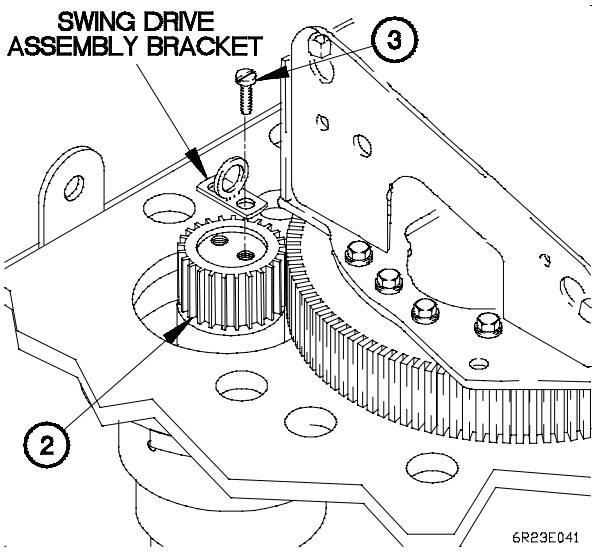


6r23e031

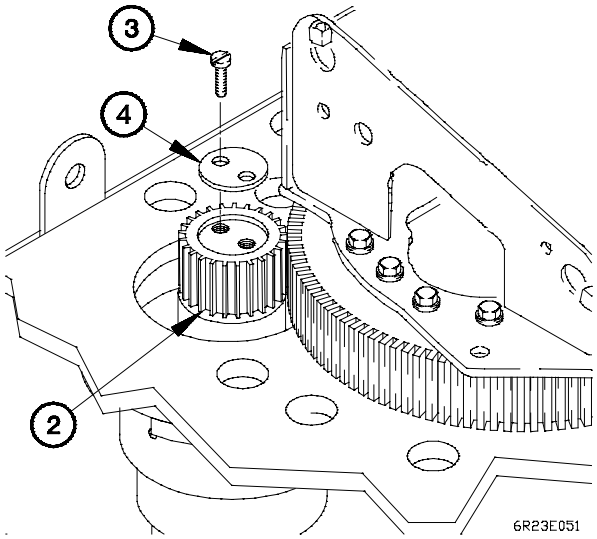
(5) Lift swing drive assembly (2) in mounting position.

(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.

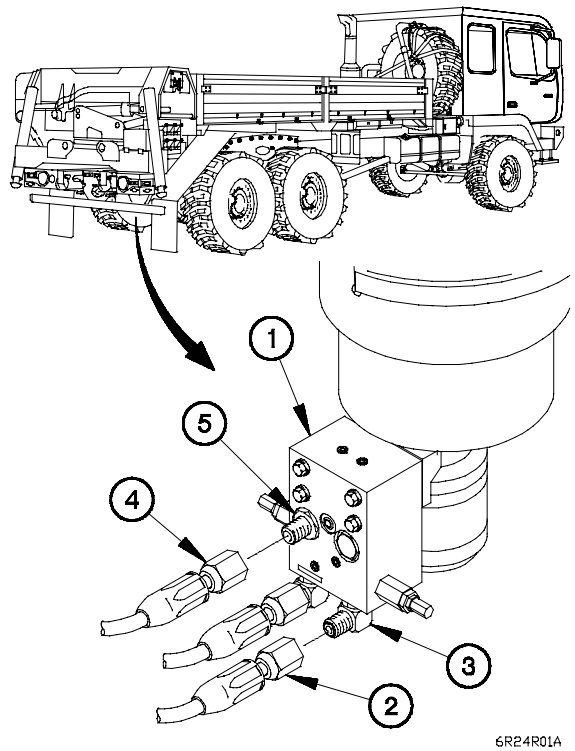
(1) Position drain pan under cross relief valve (1).

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).

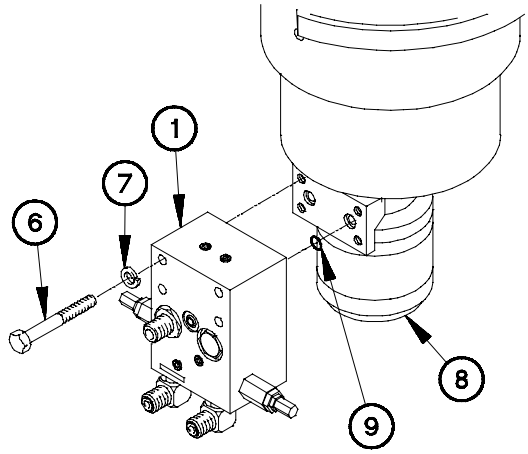
(3) Disconnect hose (4) from fitting (5).

NOTE

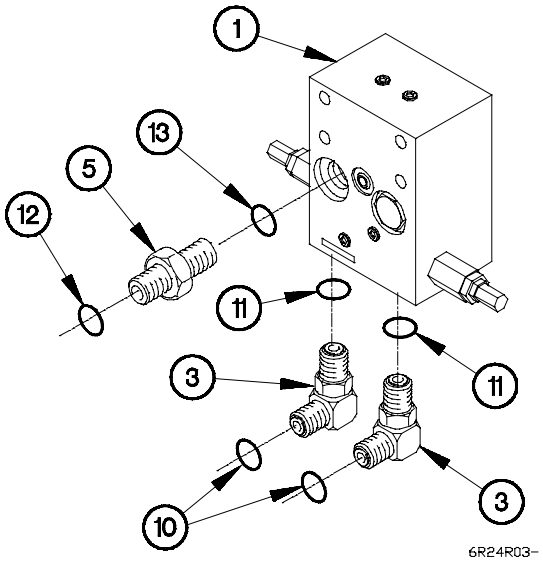
Step (4) requires the aid of an assistant.

(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.

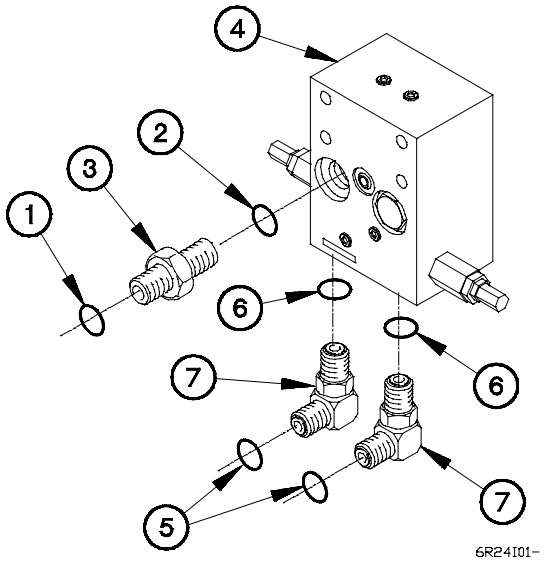
b. Installation.

(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.

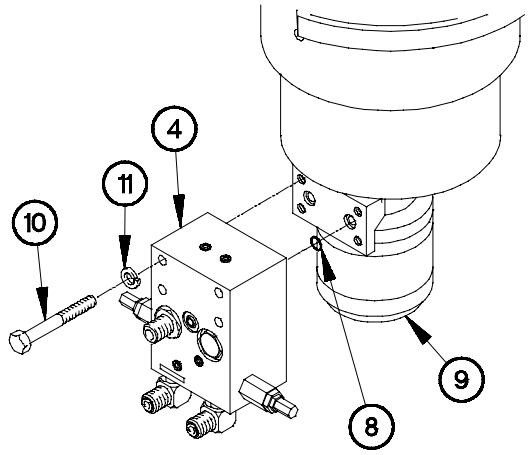
(6) Apply sealing compound to threads of four screws (10).

NOTE

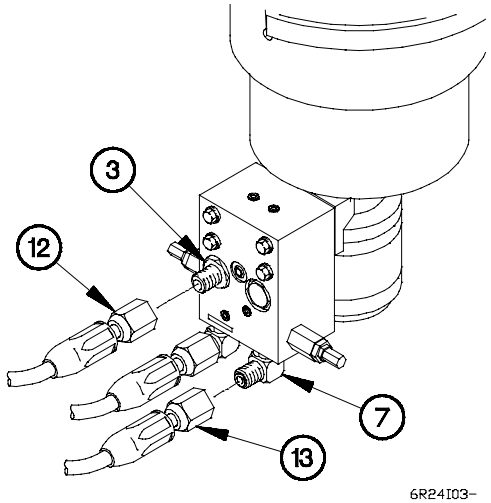
Step (7) requires the aid of an assistant.

(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.

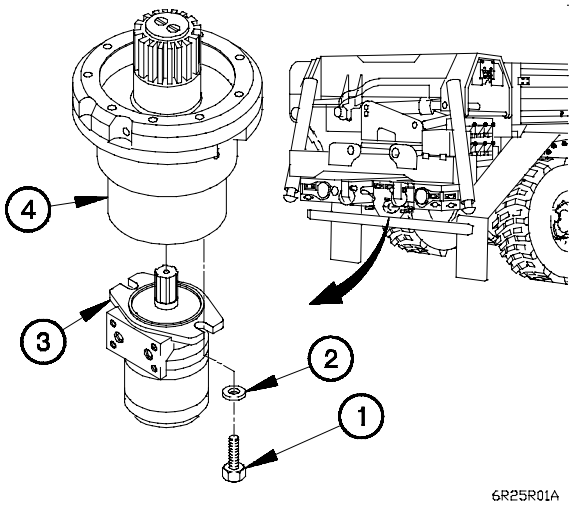
WARNING

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)

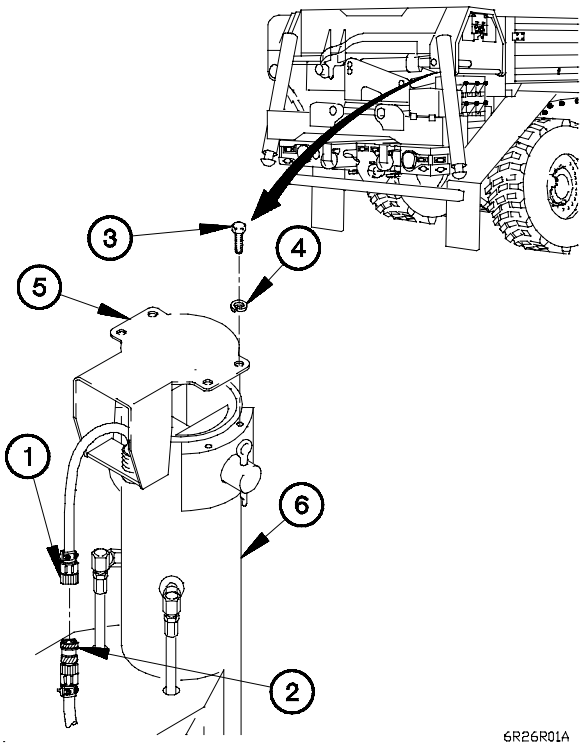
a. Removal.

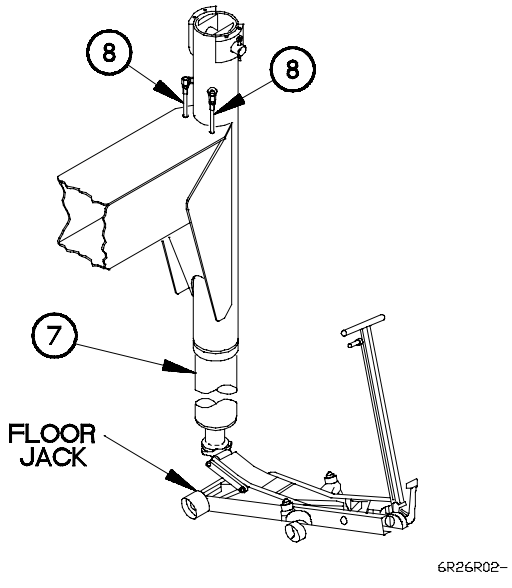
NOTE

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).

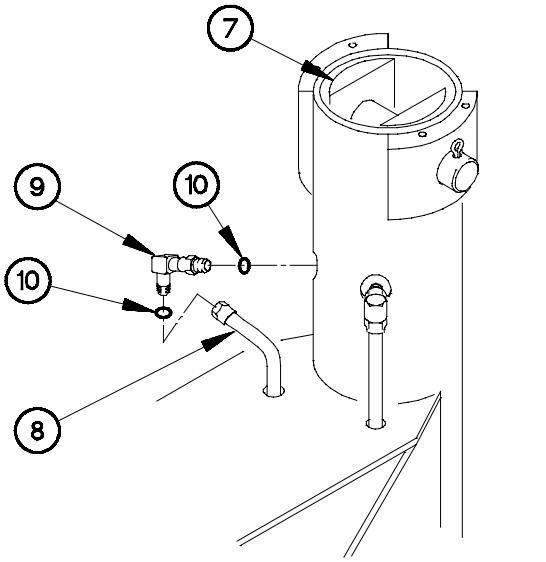
16-26. M1084/M1086 OUTRIGGER JACK CYLINDER REPLACEMENT (CONT)

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.

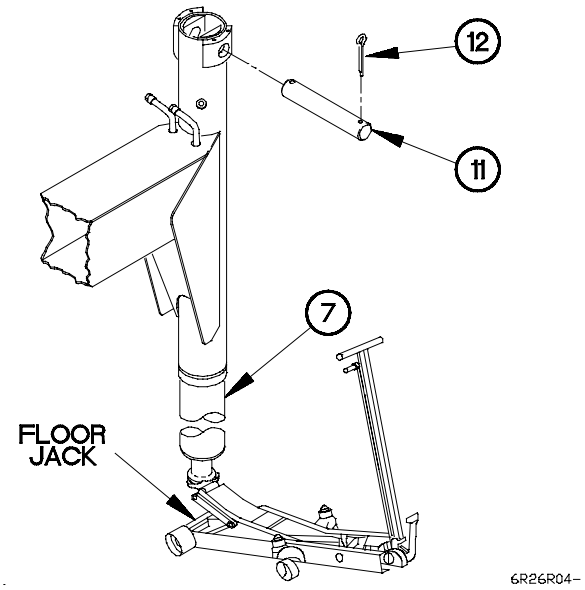


6R26R03-

(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.

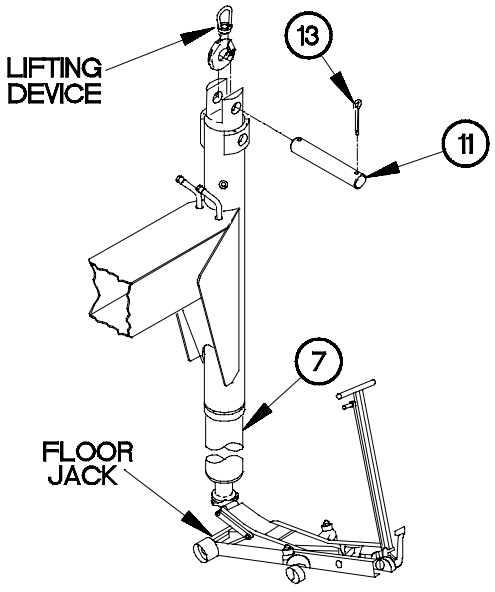


6R26R04-

(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).

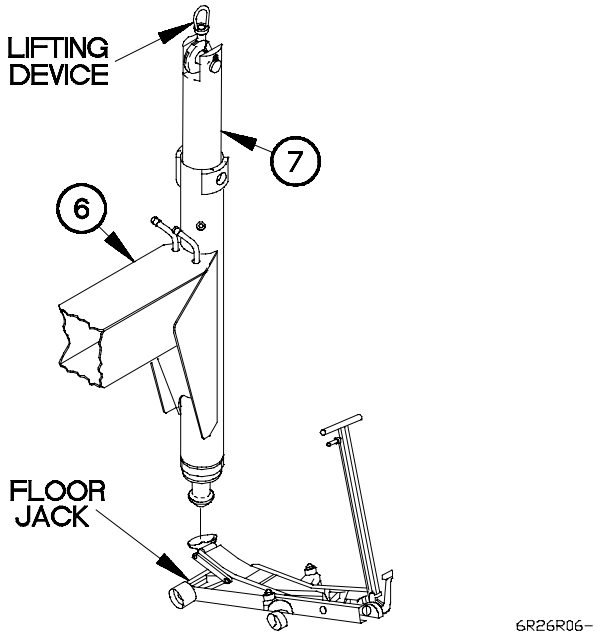
WARNING

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.

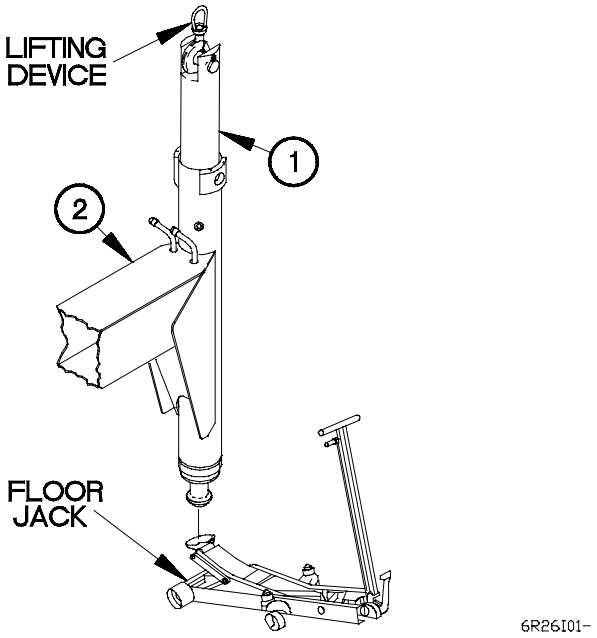
NOTE

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).

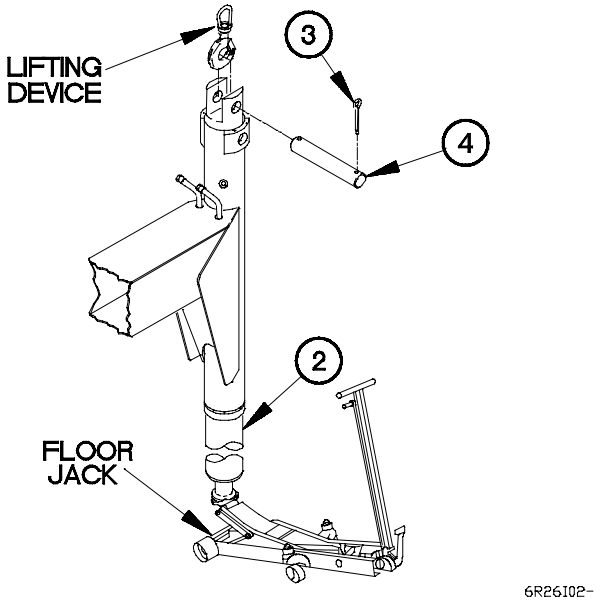
NOTE

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.

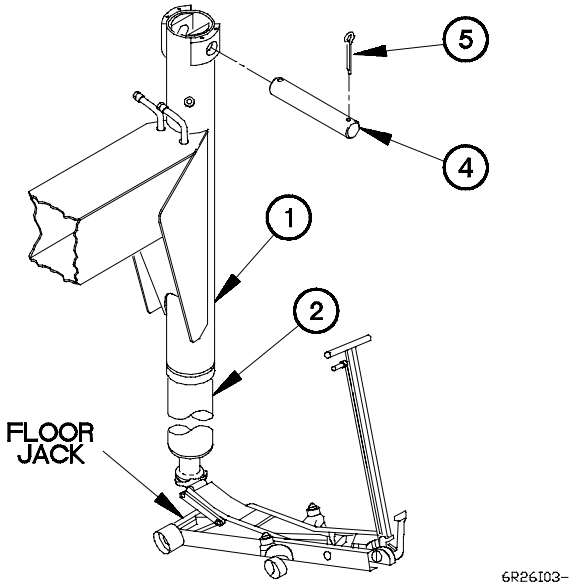
(4) Remove pin (4) from jack cylinder (2).

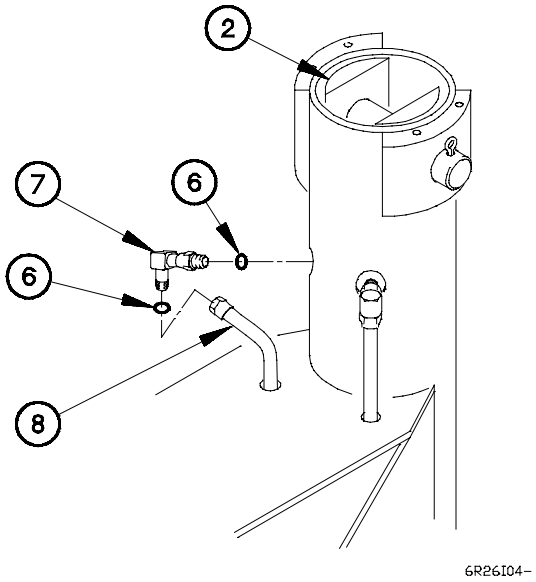


16-26. M1084/M1086 OUTRIGGER JACK CYLINDER REPLACEMENT (CONT)

(5) Install jack cylinder (2) in outrigger (1) with pin (4).

(6) Install two cotter pins (5) in pin (4).





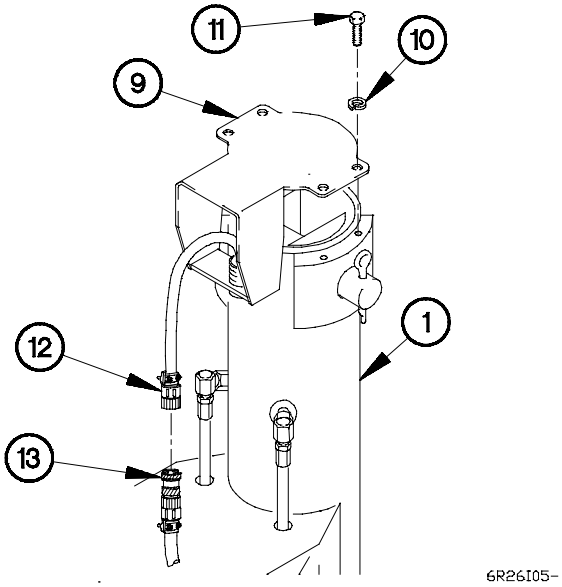
(7) Install two preformed packings (6) on adapters (7).

(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.

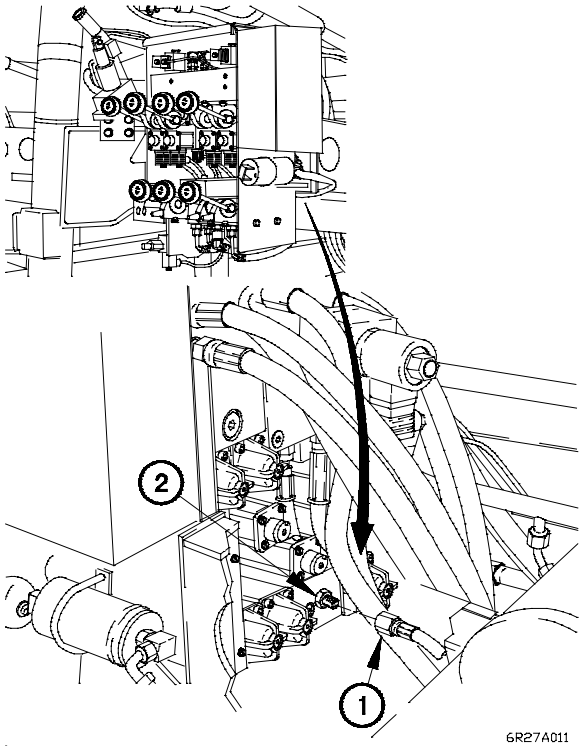
CAUTION

Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

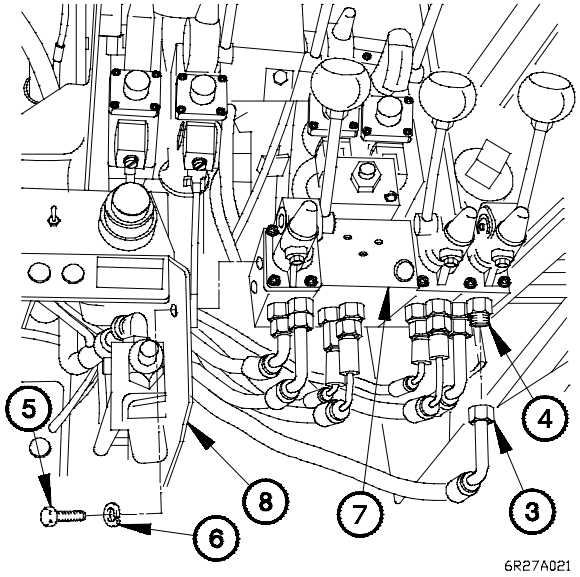
NOTE

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)



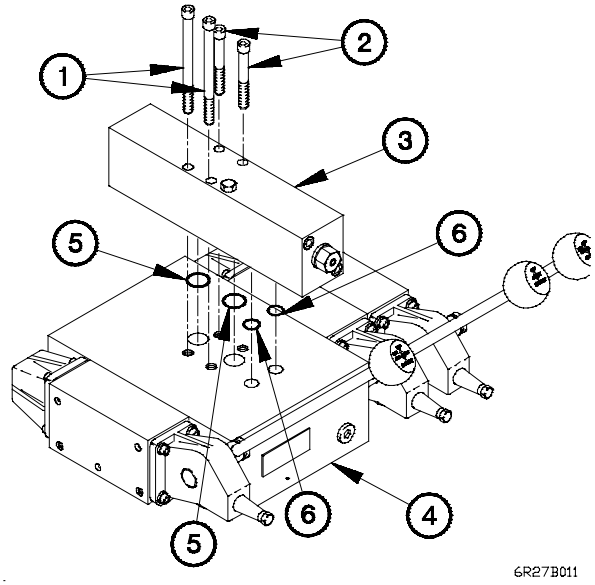
(2) Disconnect eight hydraulic tubes (3) from fittings (4).

NOTE

Step (3) requires the aid of an assistant.

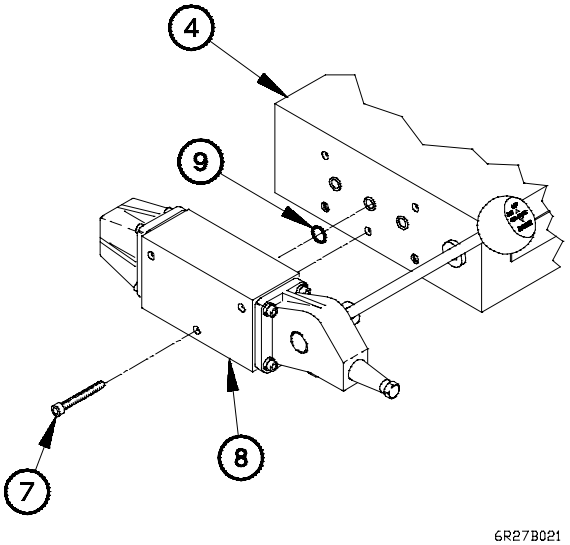
(3) Remove four screws (5), lockwashers (6), and three way control valve assembly (7) from control panel (8). Discard lockwashers.

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.

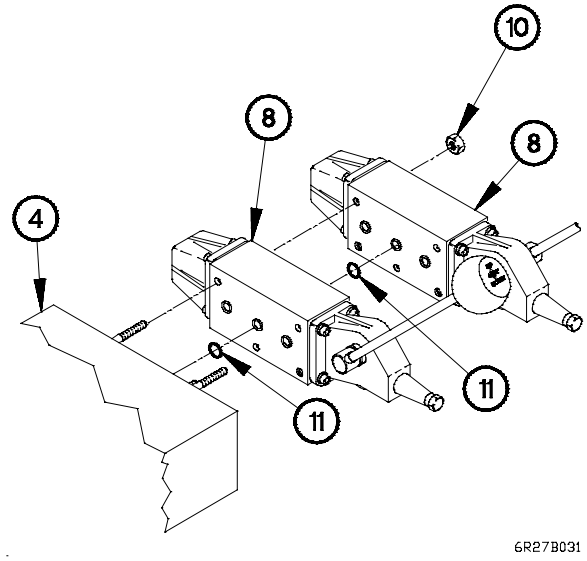


(3) Remove three screws (7) and valve body (8) from inlet body(4).

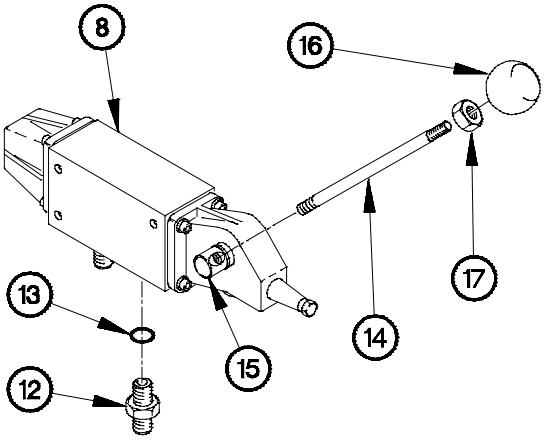
(4) Remove three preformed packings (9) from inlet body (4). Discard preformed packings.

(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



6R27B041

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).

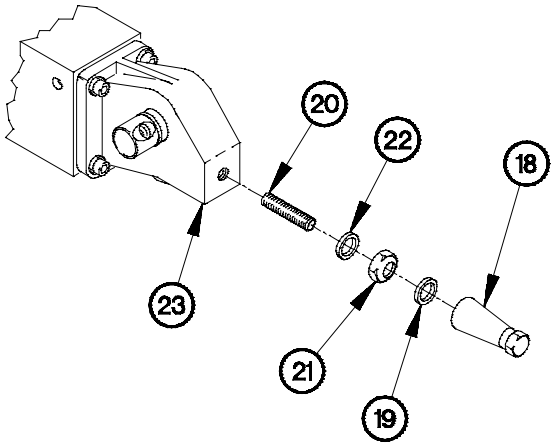
(11) Remove dust cap (18) and sealing washer (19) from setscrew (20). Discard sealing washer and dust cap.

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

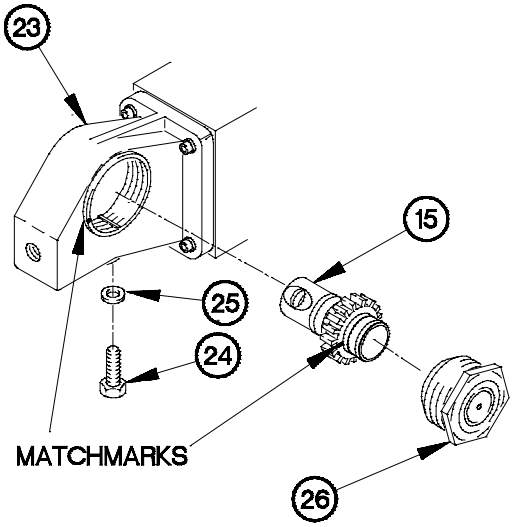
16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

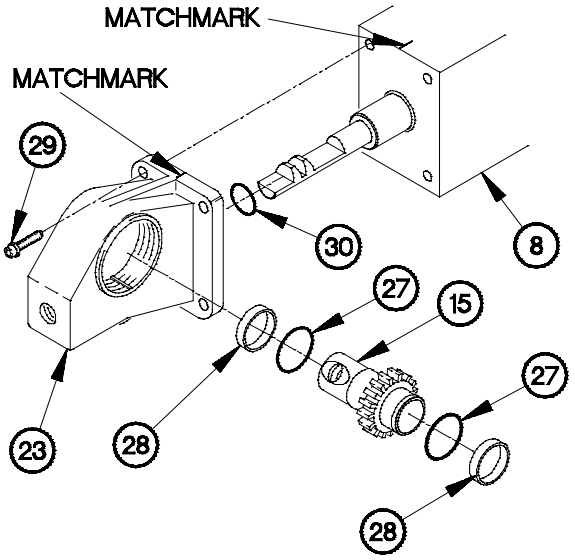
(14) Remove rack support bolt (24) and seal washer (25) from lever cap (23). Discard seal washer.

(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).

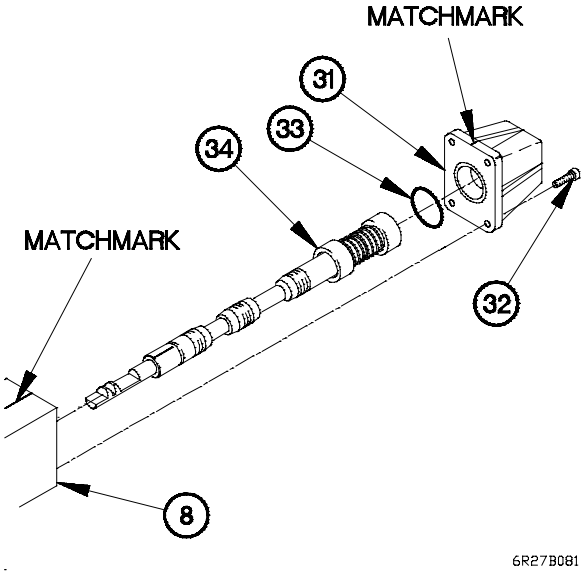
(20) Remove four screws (29), lever cap (23), and preformed packing (30) from valve body (8). Discard preformed packing.

(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.

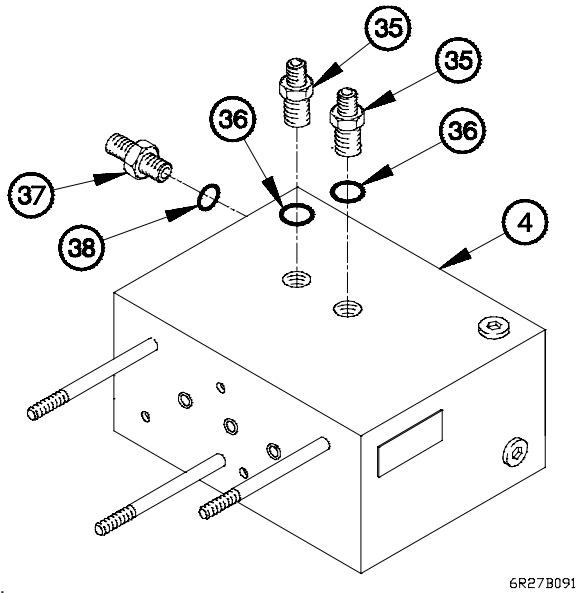


(25) Remove two fittings (35) from inlet body (4).

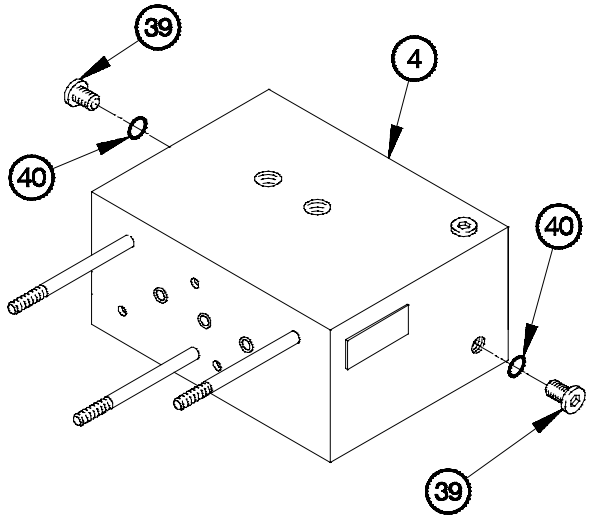
(26) Remove two preformed packings (36) from fittings (35). Discard preformed packings.

(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).

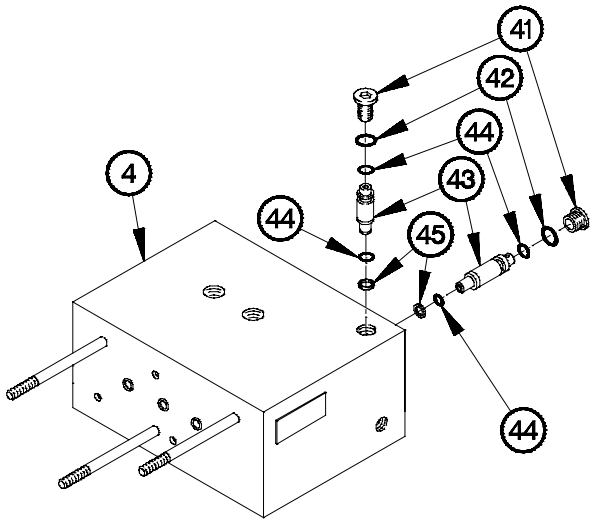
(30) Remove two preformed packings (40) from plugs (39). Discard preformed packings.

(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

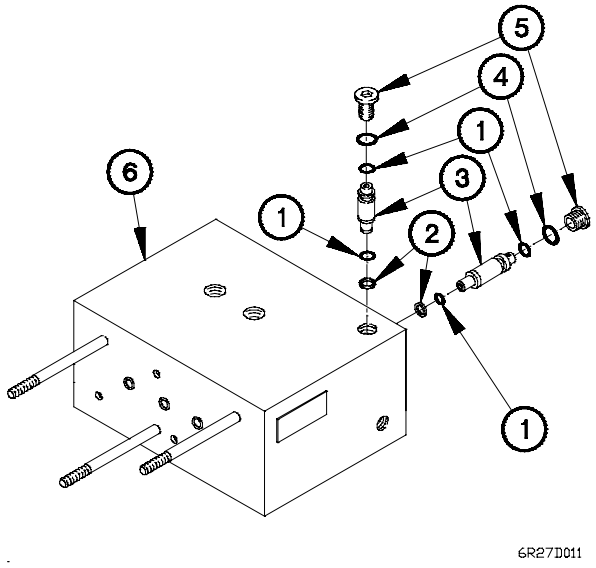
(2) Inspect each part for nicks, scratches, burrs, pitting, and cracks.

d. Assembly.

(1) Install four preformed packings (1) and two backup rings (2) on two shuttle valves (3).

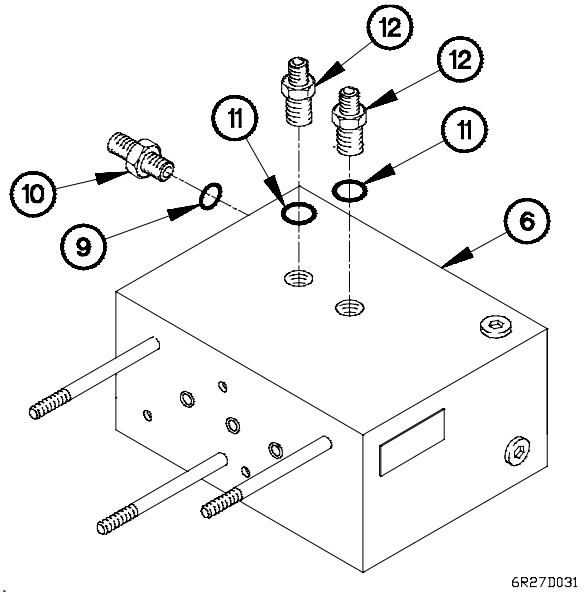
(2) Install two preformed packings (4) on plugs (5).

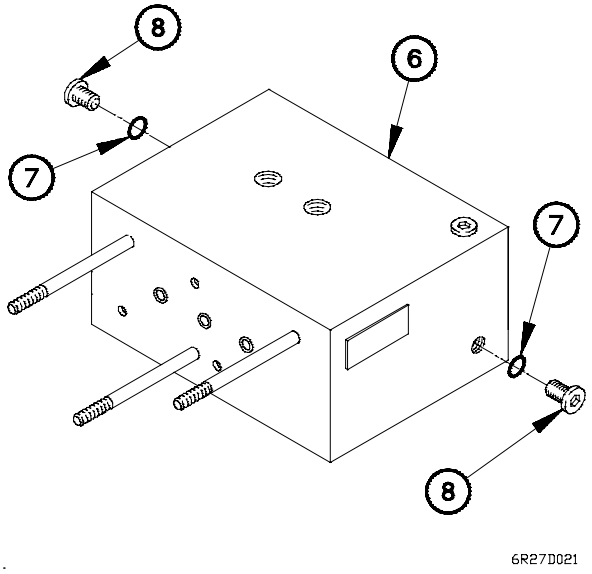
(3) Install two shuttle valves (3) in inlet body (6) with two plugs (5).



(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).

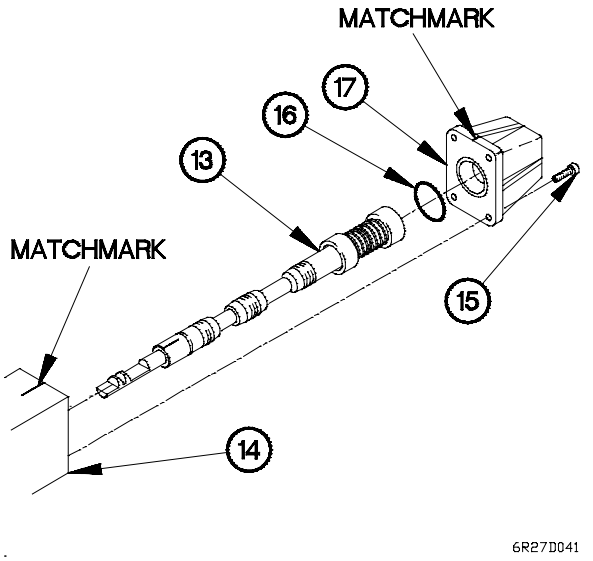
NOTE

- 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)

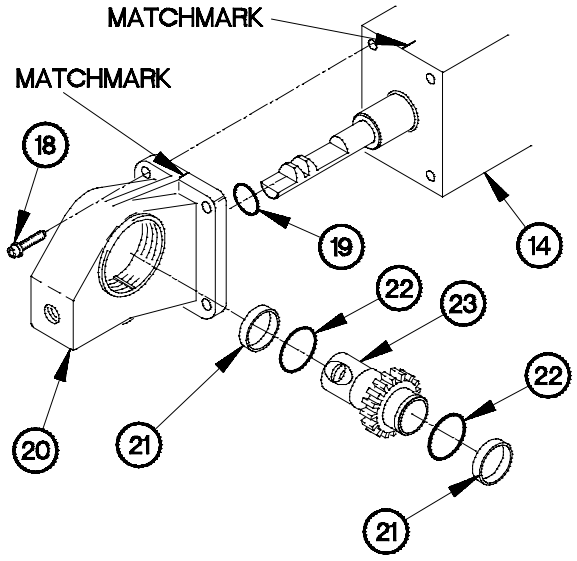
WARNING

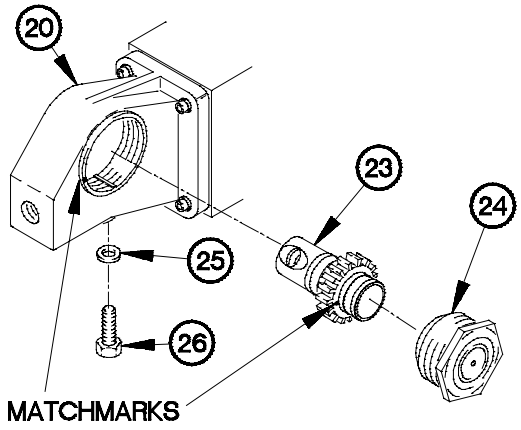
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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).

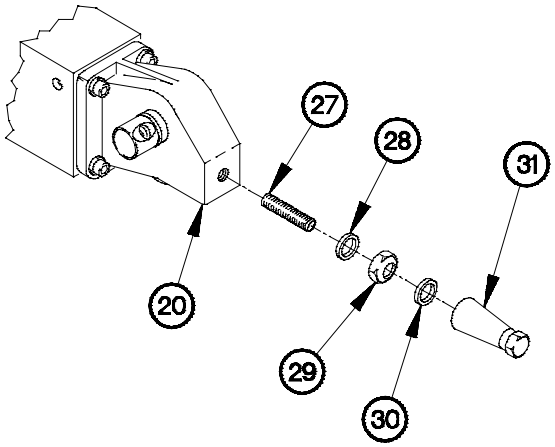
(21) Tighten nut to position noted during removal.

(22) Position washer (30) and dust cap (31) on setscrew (27).

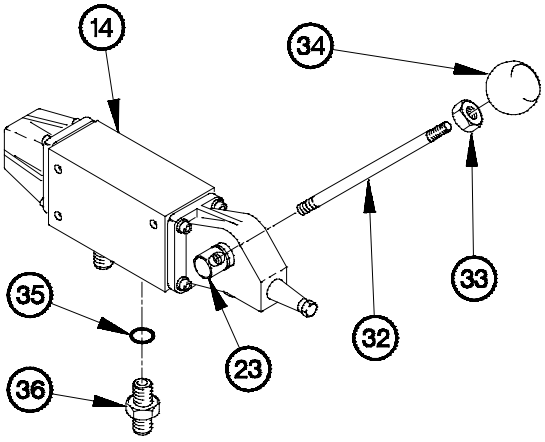
NOTE

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).

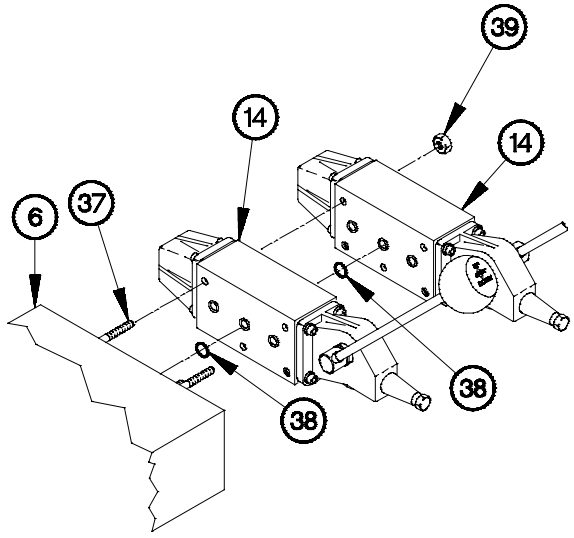
(28) Perform steps (7) through (24) on remaining valve bodies.

16-27. M1084/M1086 THREE WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

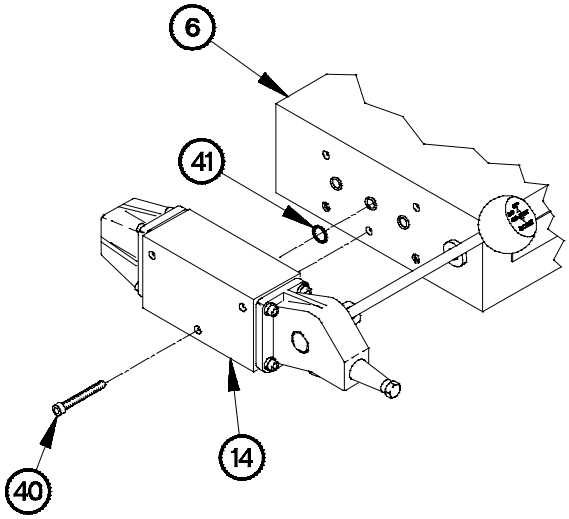
(29) Apply sealing compound to threads of three inlet body studs (37).

(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.

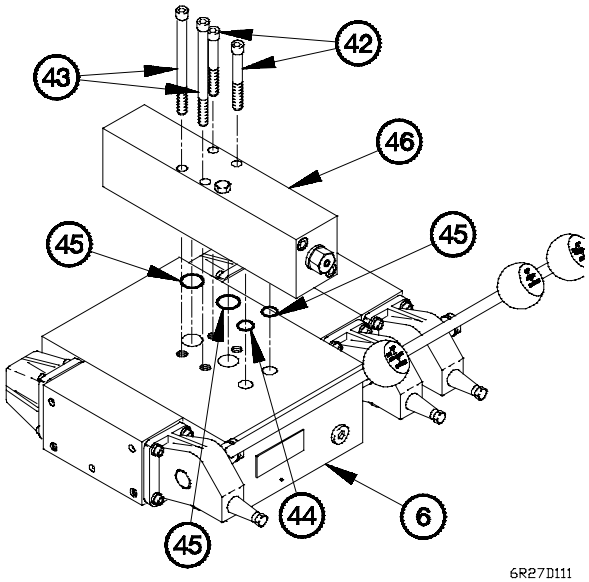
(32) Apply sealing compound to threads of three screws (40).

(33) Position three preformed packings (41) and valve body (14) on inlet body (6) with three screws (40).

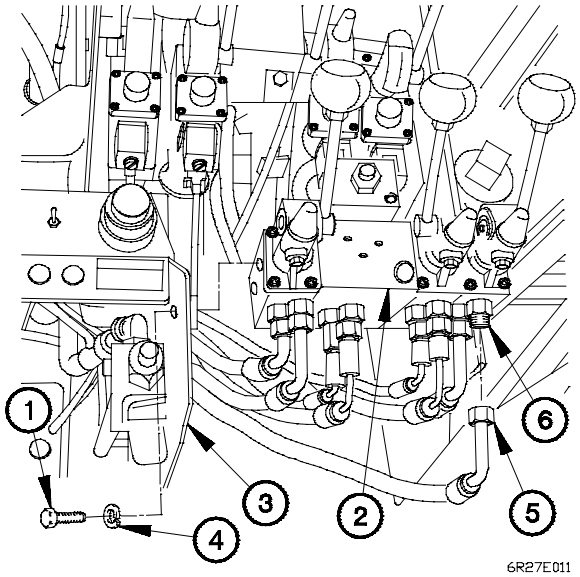
(34) Tighten three screws (40) to 132 lb-in. (15 N•m).

(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.

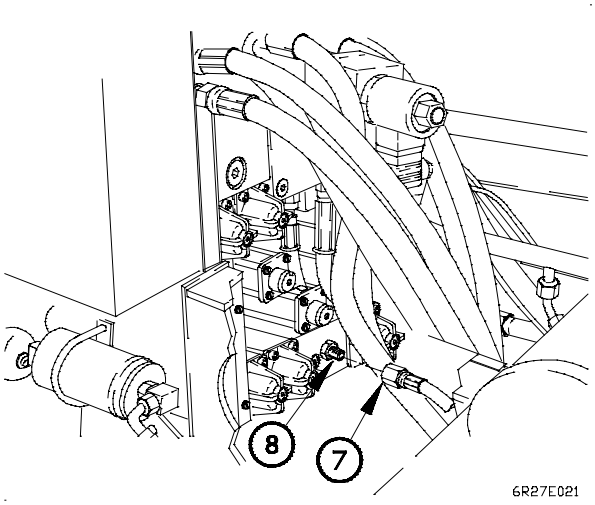
(2) Position three way control valve assembly (2) in crane control panel (3) with four lockwashers (4) and screws (1).

(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)

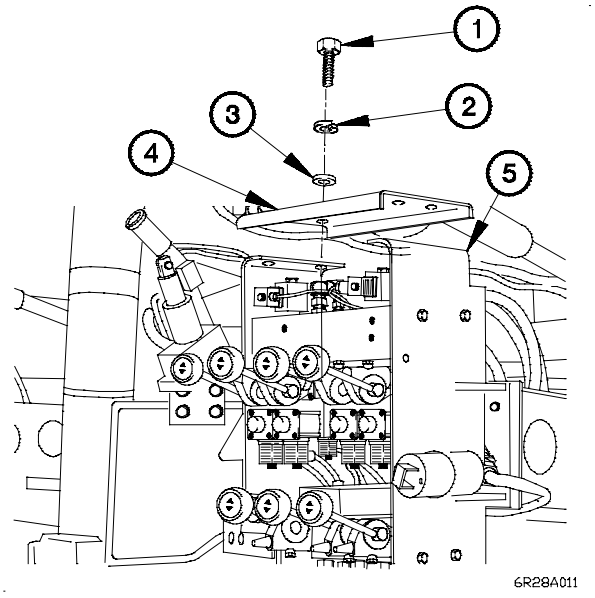
Materials/Parts
Cap and Plug Set (Item 17, Appendix C)
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)

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.

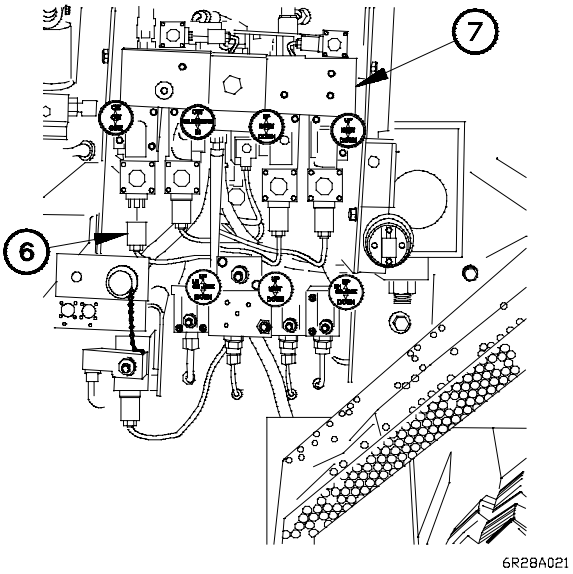


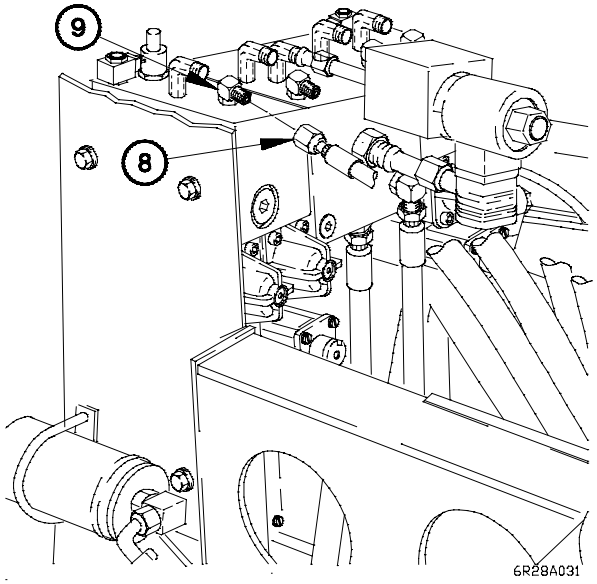
16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

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

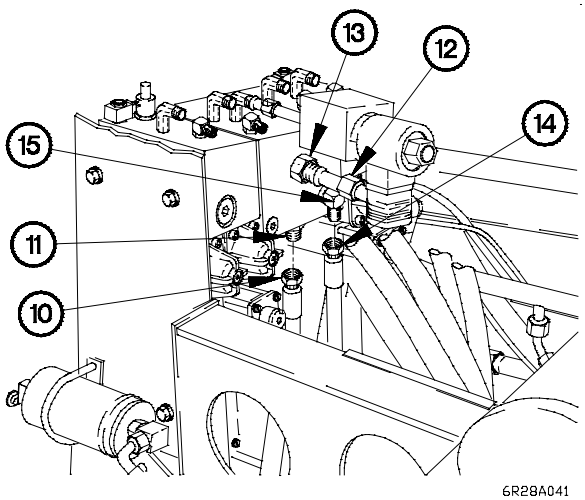
Tag hydraulic hoses, tubes, and connection points prior to disconnecting.

(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)

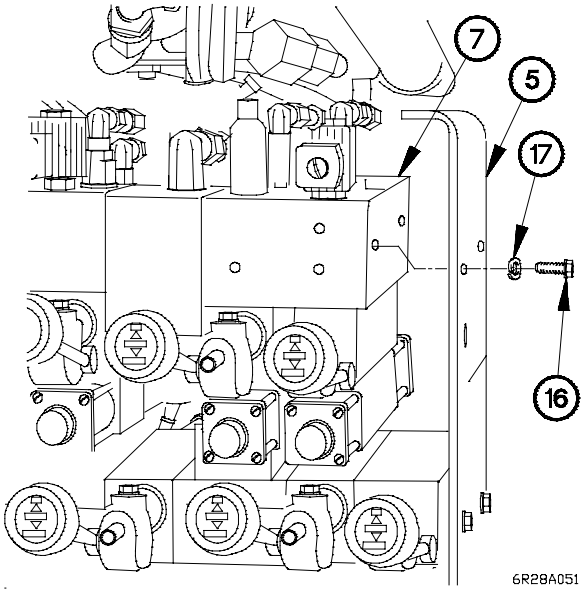
(6) Disconnect hydraulic hose (14) from 90-degree fitting (15).



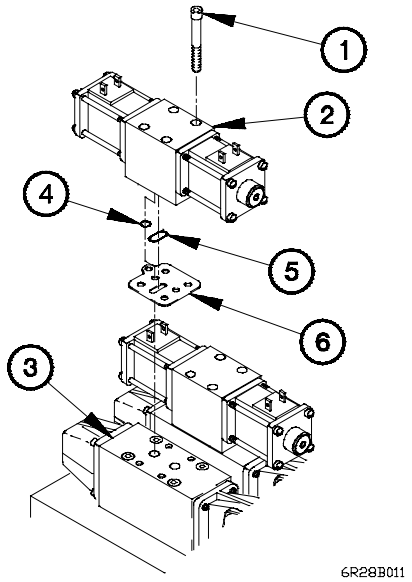
NOTE

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.

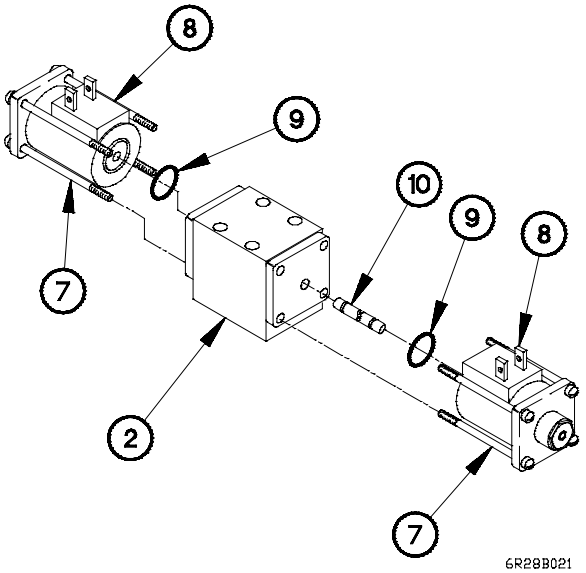
(1) Remove four bolts (1) and pilot valve body (2) from valve body (3).

(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)

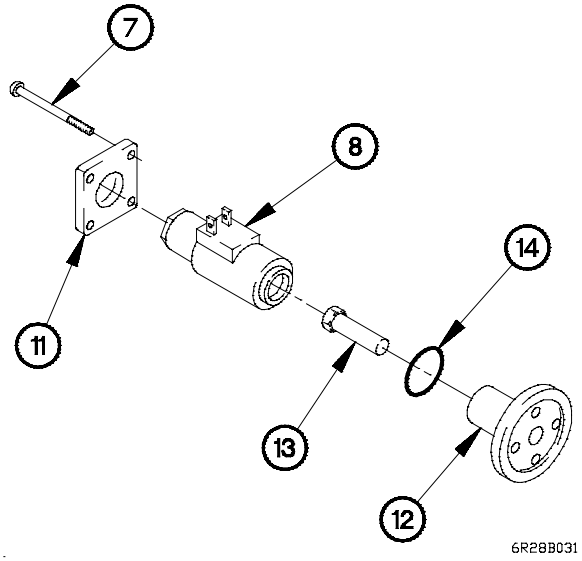
NOTE

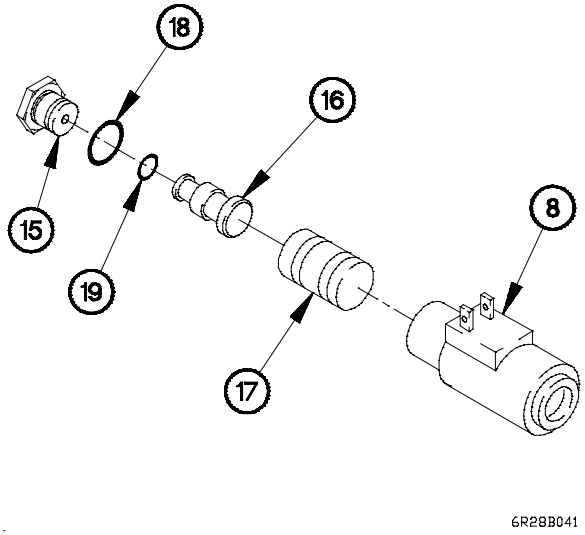
All solenoids are disassembled the same way. One solenoid shown.

(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.



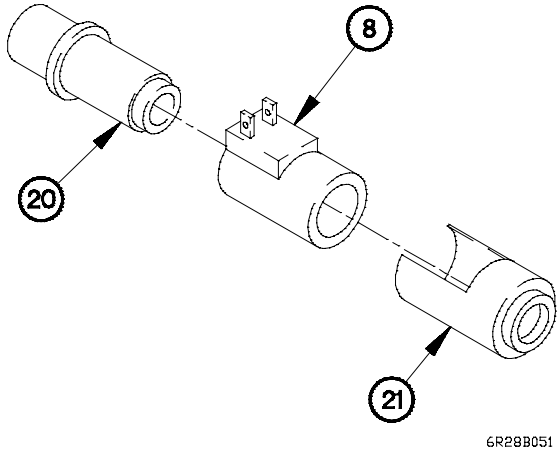


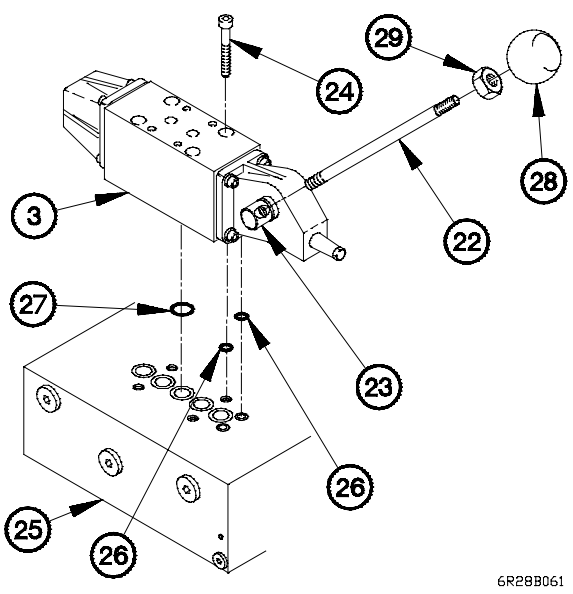
(9) Remove head valve (15), head valve push button (16), and head valve coil (17) from solenoid (8).

(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

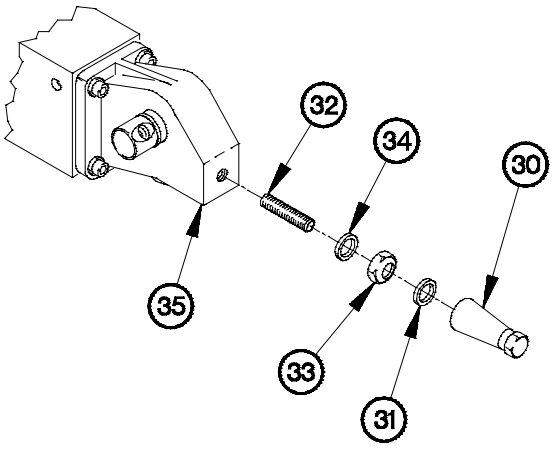
All control valve bodies are disassembled the same way. Lift Control valve body shown.

(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.

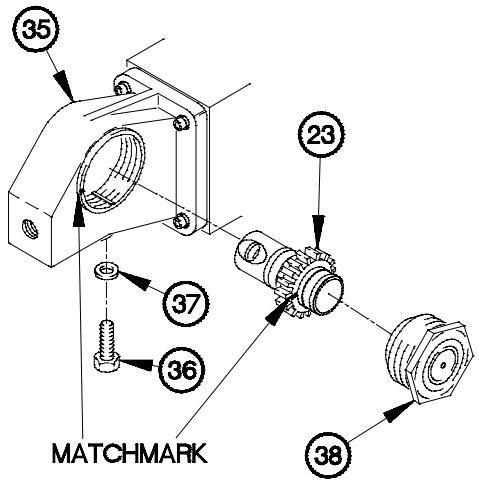
CAUTION

Lever cap and carrier nut are a matched set and must be kept together. Failure to comply may result in damage to equipment.

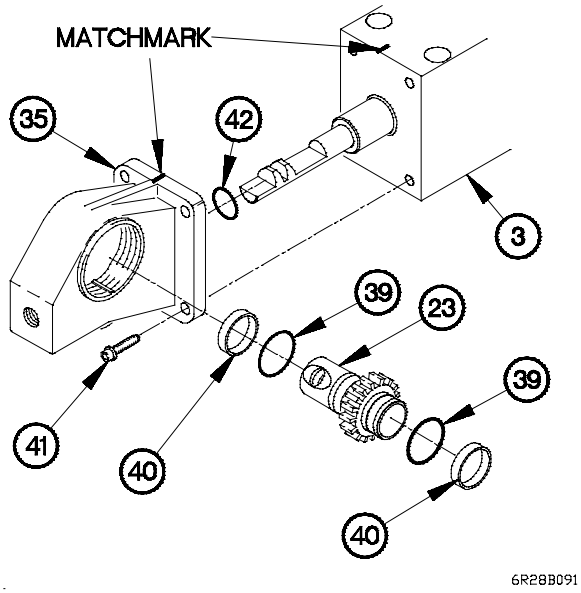
(21) Remove carrier nut (38) from lever cap (35).

(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).

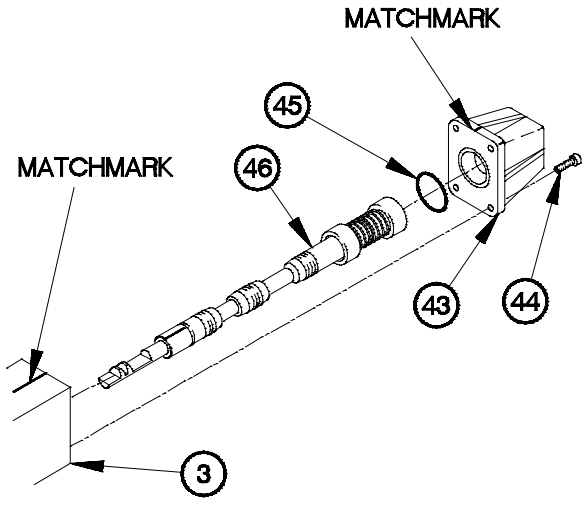
(26) Remove four screws (41), lever cap (35), and preformed packing (42) from valve body (3). Discard preformed packing.

(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

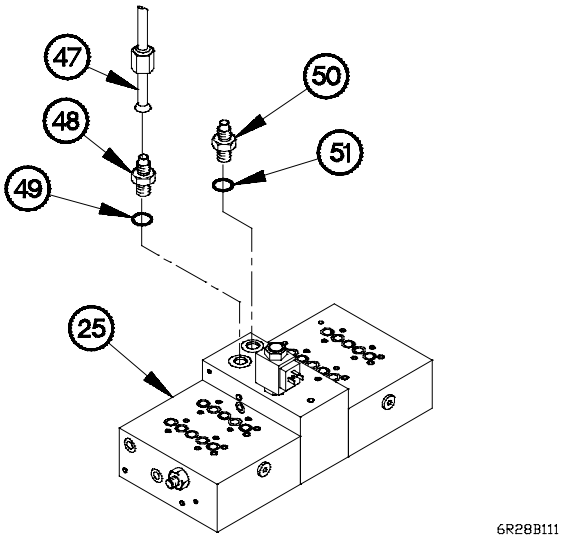
(31) Remove hydraulic tube (47) from fitting (48).

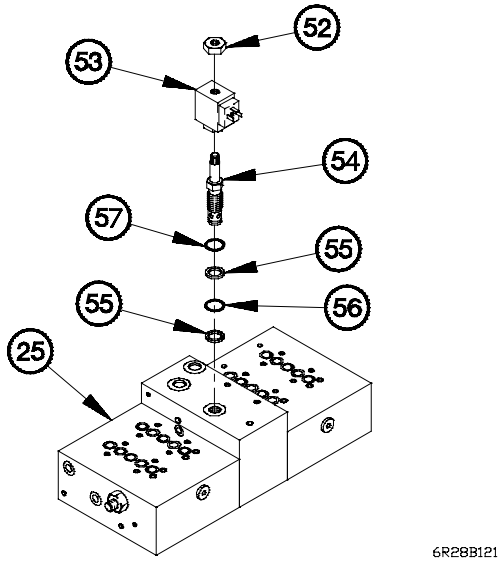
(32) Remove fitting (48) from valve manifold (25).

(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).

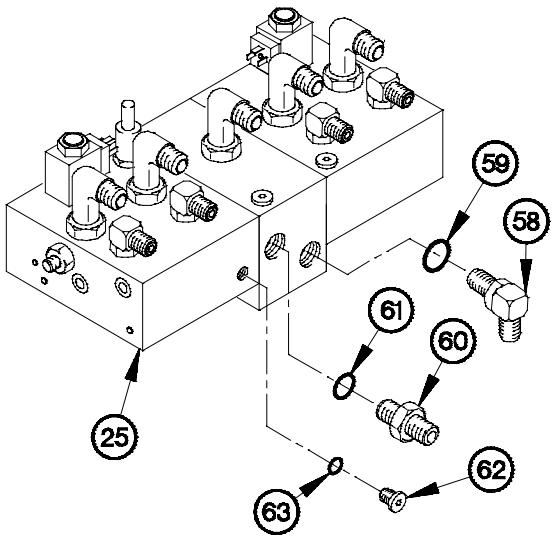
(40) Remove preformed packing (59) from 90-degree fitting (58). Discard preformed packing.

(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).

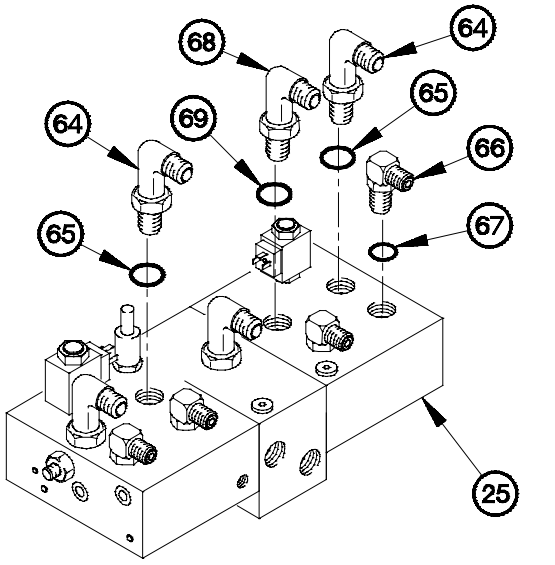
(46) Remove two preformed packings (65) from 90-degree fittings (64). Discard preformed packings.

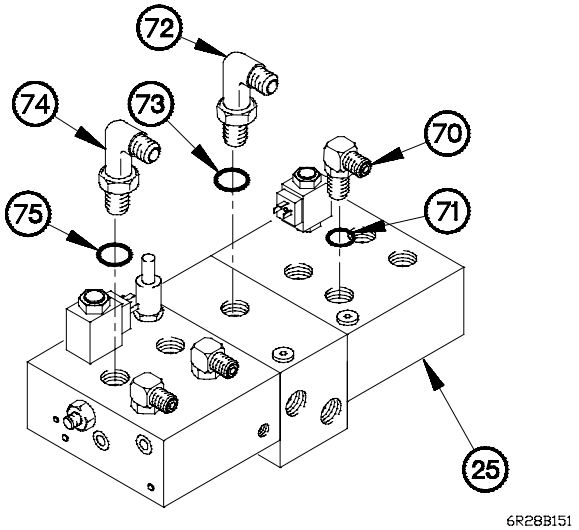
(47) Remove 90-degree fitting (66) from valve manifold (25).

(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).

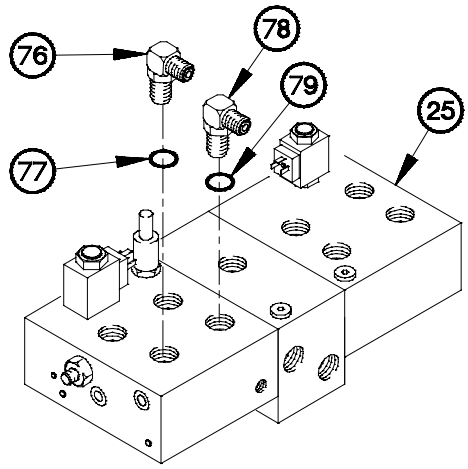
(56) Remove preformed packing (75) from 90-degree fitting (74). Discard preformed packing.

(57) Remove 90-degree fitting (76) from valve manifold (25).

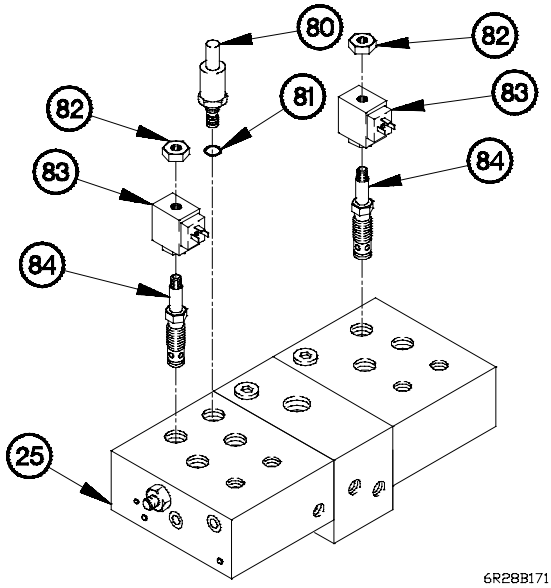
(58) Remove preformed packing (77) from 90-degree fitting (76). Discard preformed packing.

(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.

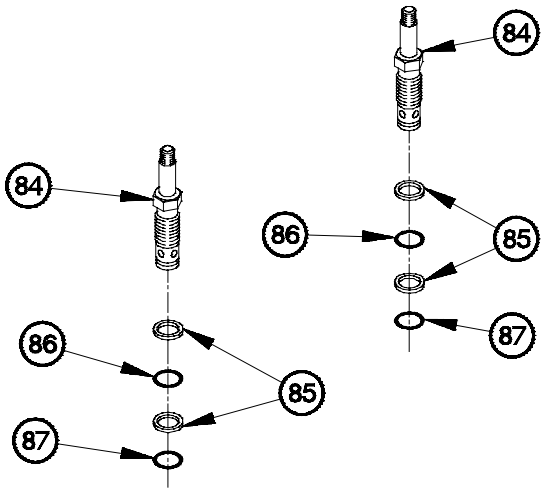
NOTE

Mark position of coils for correct alignment during assembly.

(63) Remove two nuts (82) and coils (83) from solenoids (84).

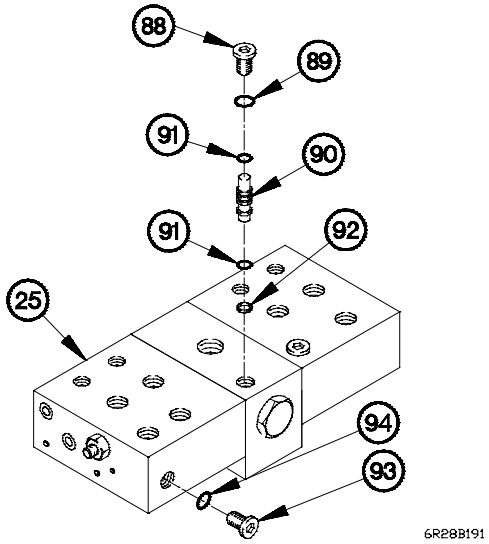
(64) Remove two solenoids (84) from valve manifold (25).

(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).

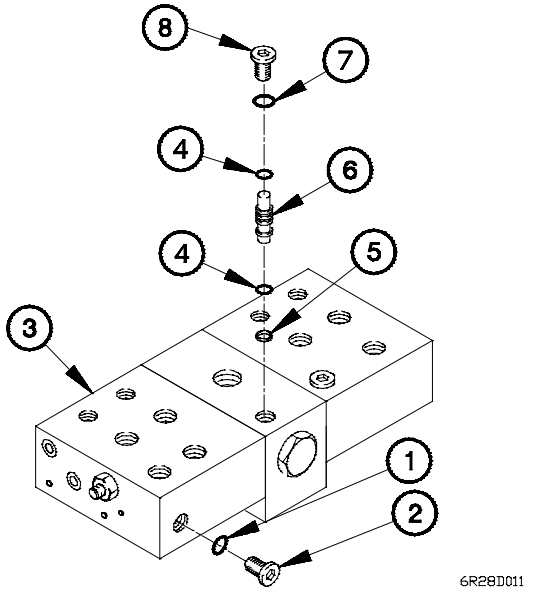
(2) Install plug (2) on valve manifold (3).

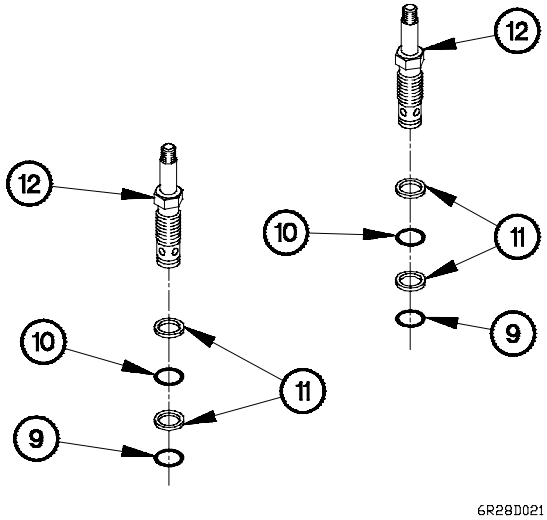
(3) Install four preformed packings (4) and two backup rings (5) on shuttle valves (6).

(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).





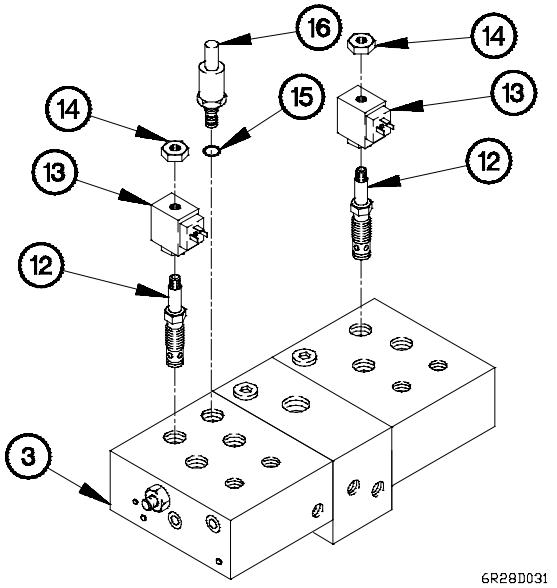
(7) Install two preformed packings (9 and 10) and four retainers (11) on two solenoids (12).

(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).



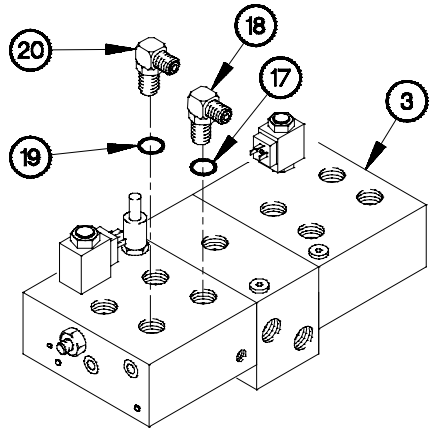
16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(12) Install preformed packing (17) on 90-degree fitting (18).

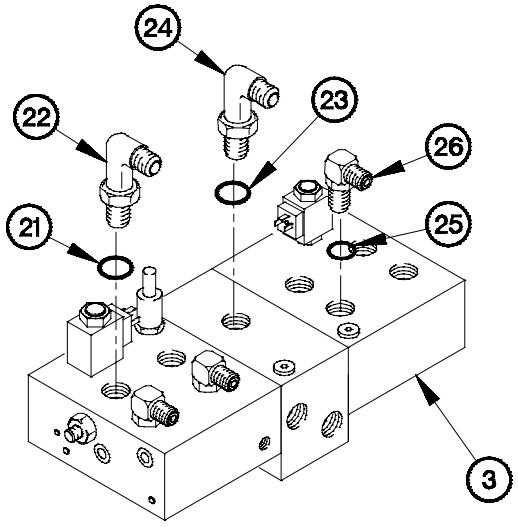
(13) Install 90-degree fitting (18) on valve manifold (3).

(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).

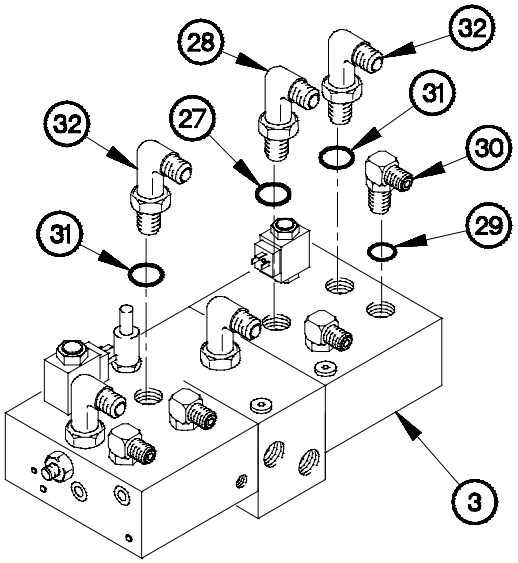
(23) Install 90-degree fitting (28) on valve manifold (3).

(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).

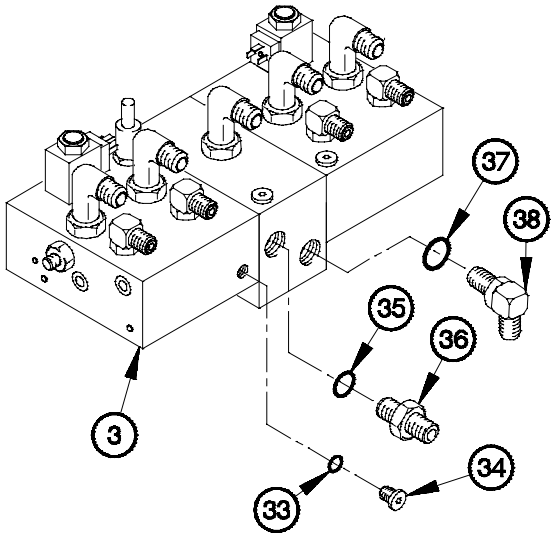
(29) Install plug (34) in valve manifold (3).

(30) Install preformed packing (35) on fitting (36).

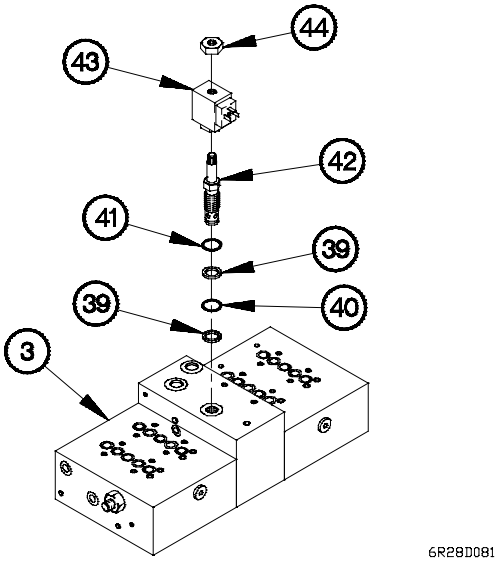
(31) Install fitting (36) in valve manifold (3).

(32) Install preformed packing (37) on 90-degree fitting (38).

(33) Install 90-degree fitting (38) in valve manifold (3).



6R28D071



6R28D081

(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).

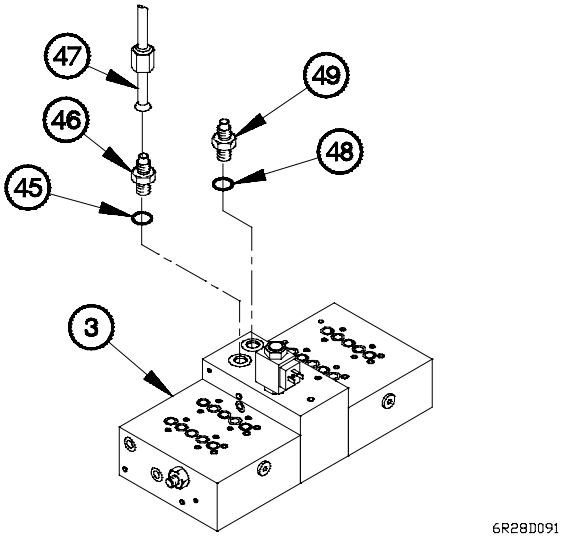
(37) Install preformed packing (45) on fitting (46).

(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).



6R28D091

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.

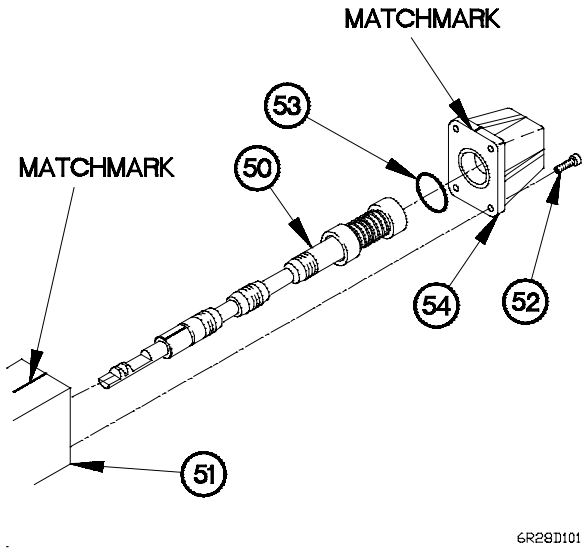
(42) Install spool (50) in valve body (51).

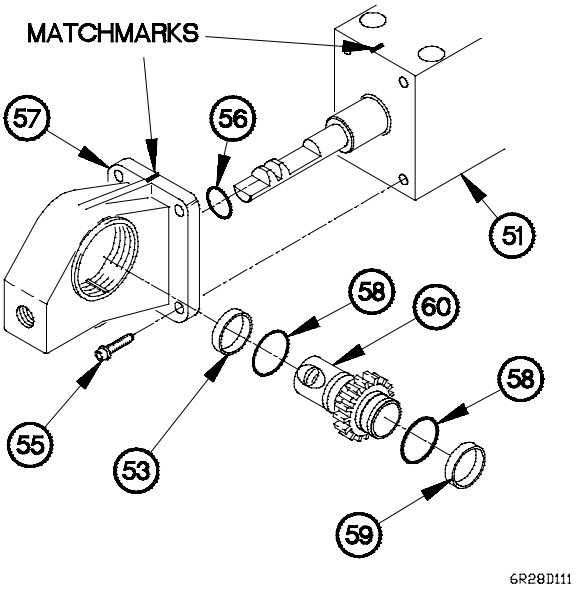
WARNING

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.

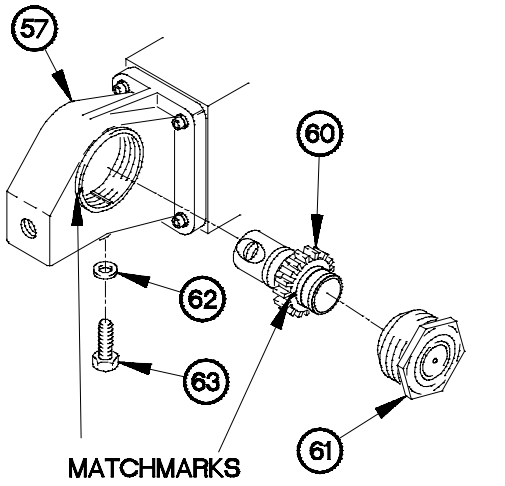




(45) Apply sealing compound to threads of four screws (55).

(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).

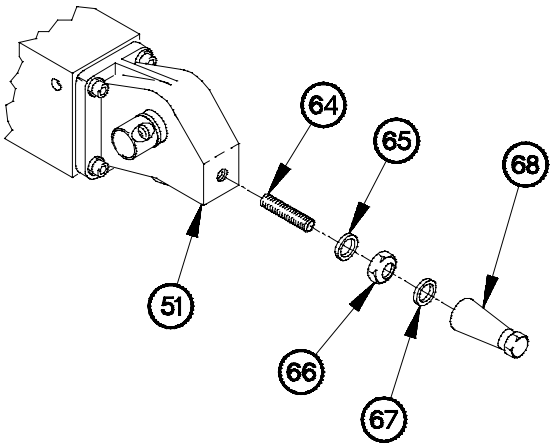


6R28D121

(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).



6R28D131

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).

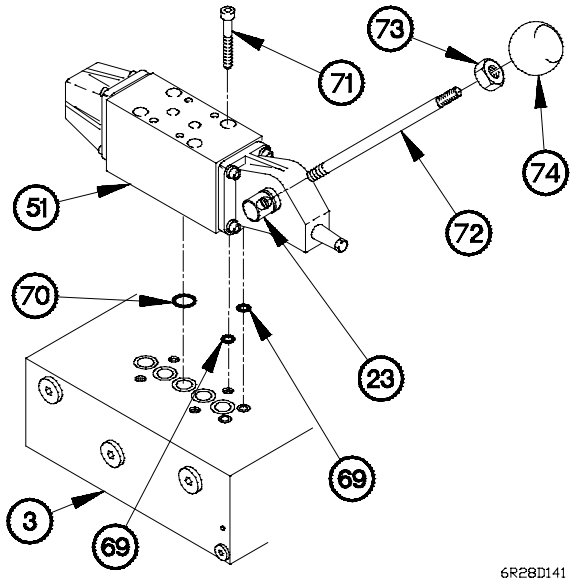
(58) Install valve body (51) on valve manifold (3) with four screws (71).

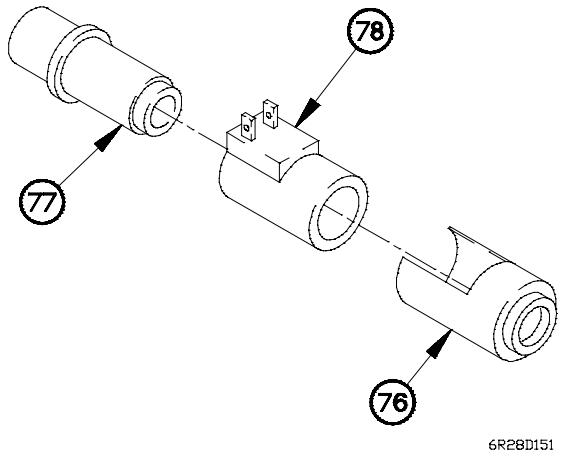
(59) Apply sealing compound to threads of lever (72).

(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

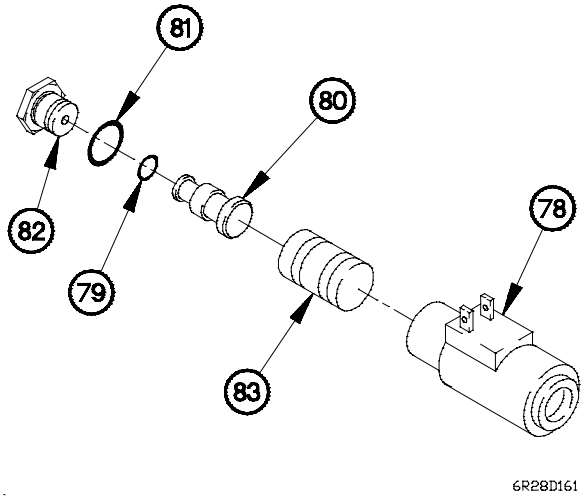
All solenoids are assembled the same way. One solenoid shown.

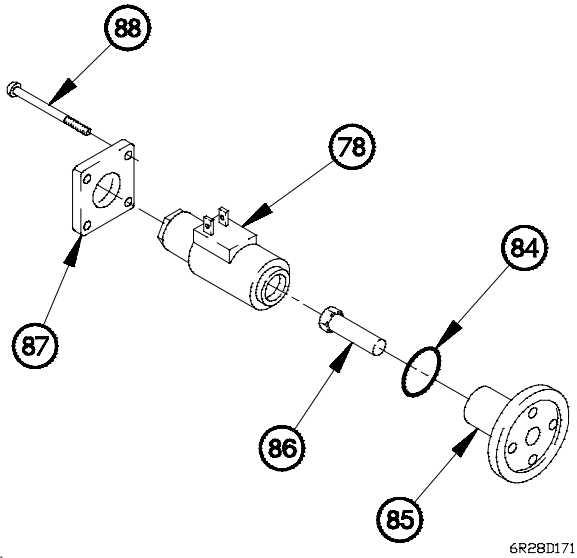
(63) Install solenoid cylinder (76) and solenoid sleeve (77) on solenoid (78).

(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.

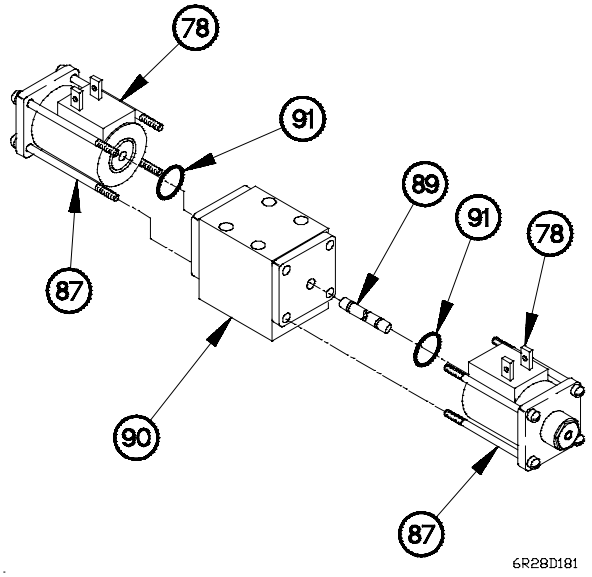
NOTE

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).

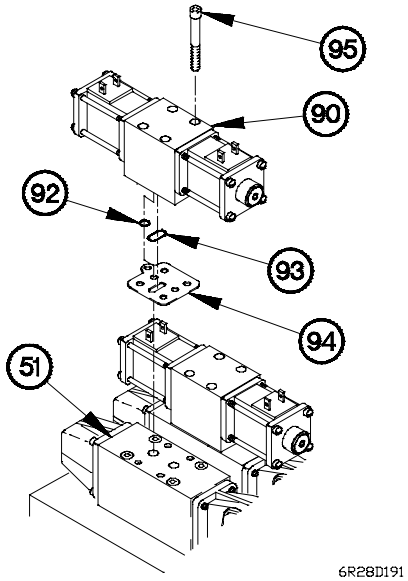
(74) Tighten eight screws (87) to 30-45 lb-in. (3-5 N·m).

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.

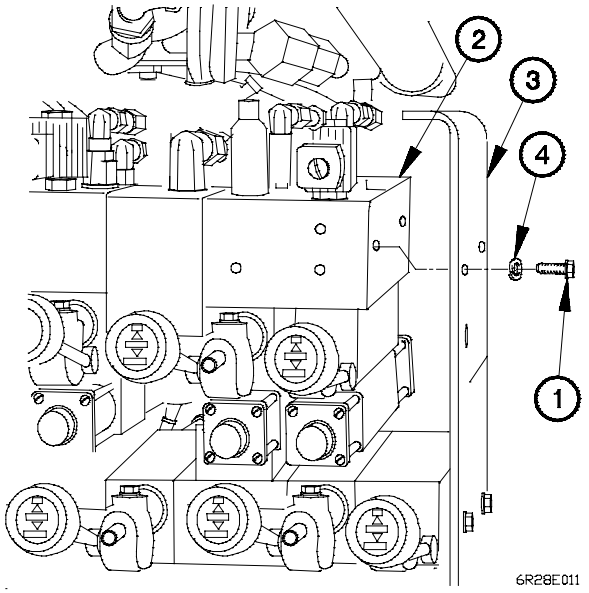


(76) Apply sealing compound to thread of four bolts (95).

(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.

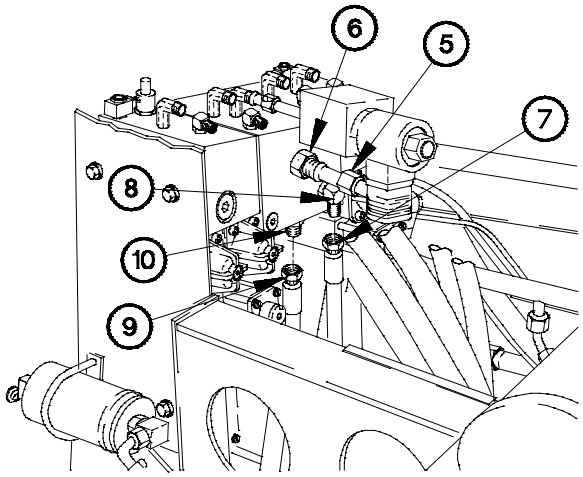
(2) Position valve manifold assembly (2) in crane control panel (3) with four lockwashers (4) and bolts (1).

(3) Tighten four bolts (1) to 41-45 lb-ft (56-61 N•m).

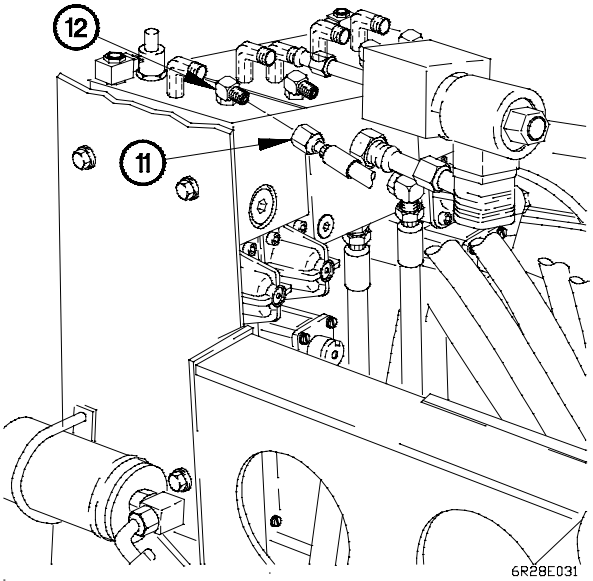
(4) Connect hydraulic tube (5) to fitting (6).

(5) Connect hydraulic hose (7) to 90-degree fitting (8).

(6) Connect hydraulic hose (9) to fitting (10).



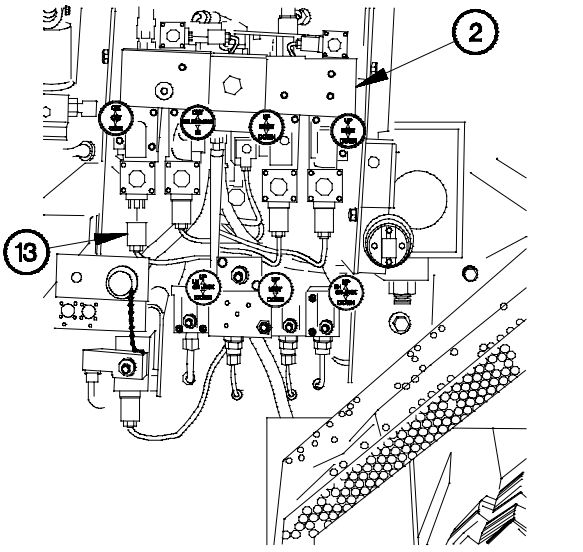
6R28E021



6R28E031

(7) Connect nine hydraulic hoses (11) to 90-degree fittings (12).

(8) Connect 11 solenoid electrical connectors (13) to valve manifold (2).



6R28E041

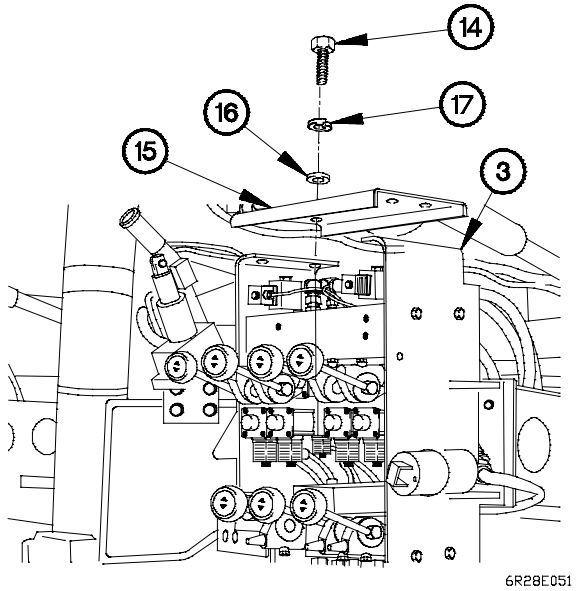
16-28. M1084/M1086 FOUR WAY CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

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

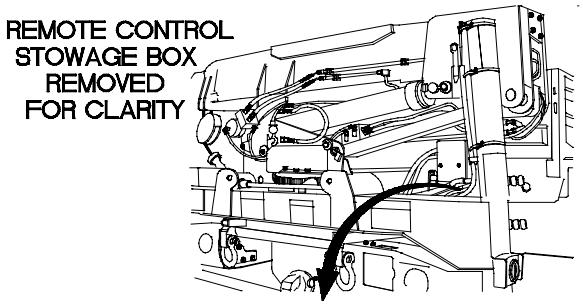
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

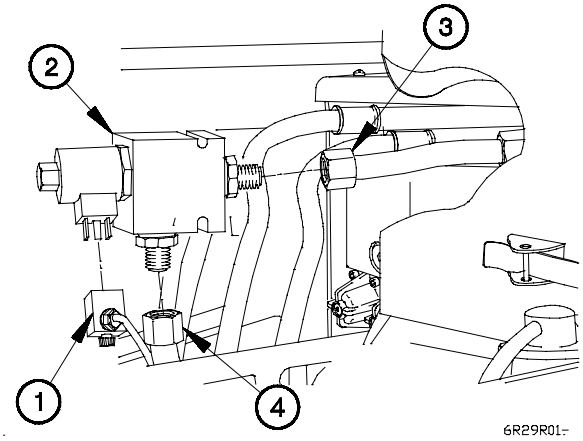
NOTE

Tag hydraulic tubes and connection points prior to disconnecting.

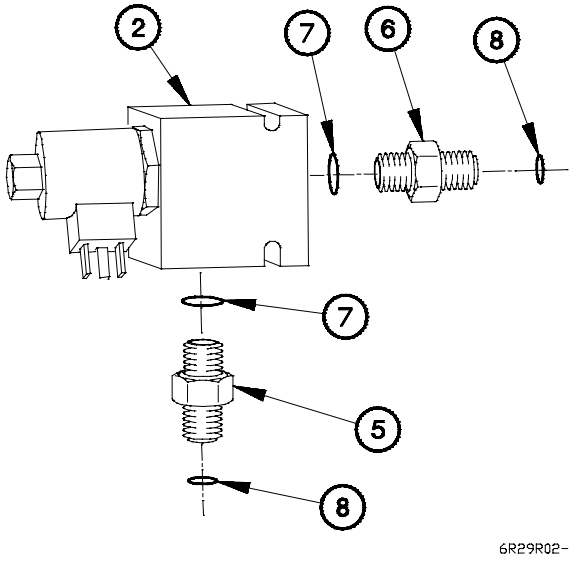
(3) Disconnect hydraulic tube (3) from two way solenoid valve (2).

(4) Remove two way solenoid valve (2) from hydraulic tube (4).





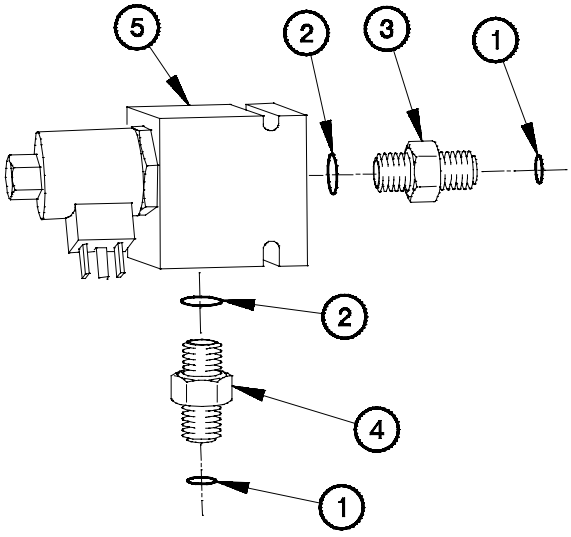
16-29. M1084/M1086 TWO WAY SOLENOID VALVE REPLACEMENT (CONT)



(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.



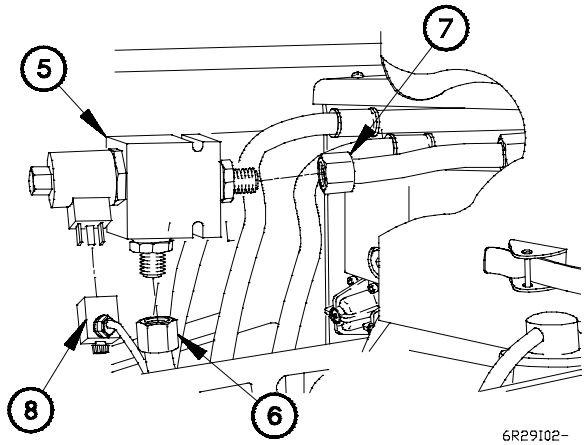
(1) Install preformed packings (1 and 2) on fittings (3 and 4).

(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.

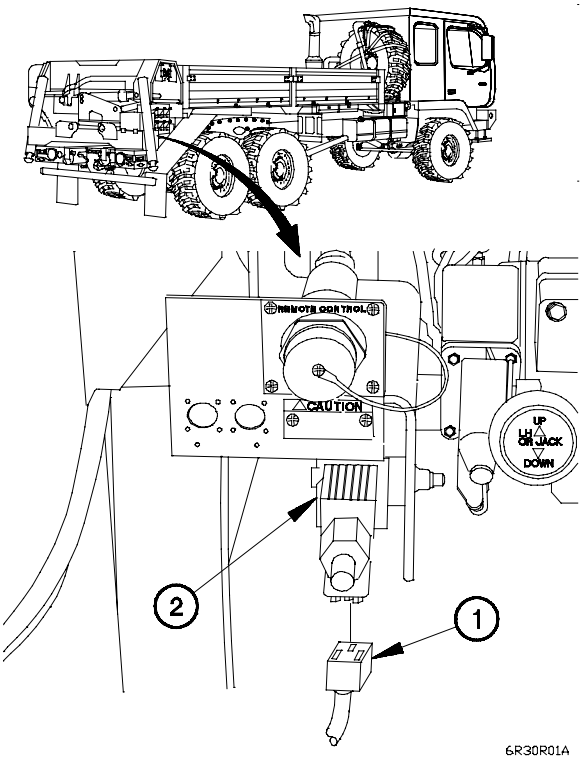
CAUTION

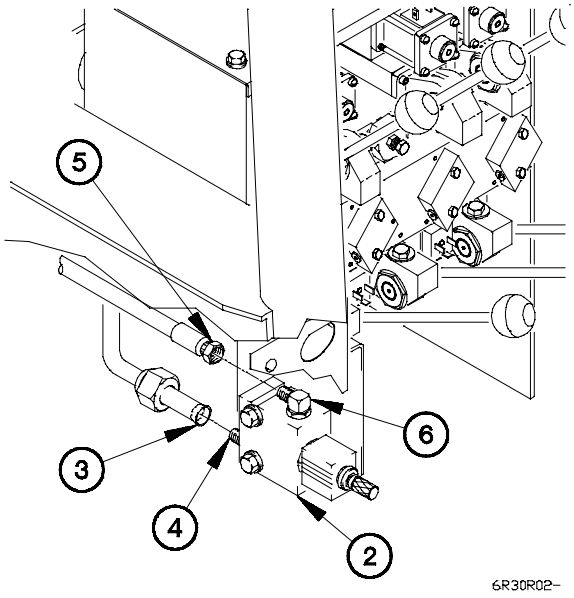
Cap or plug hydraulic connections prior to disconnecting to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

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.

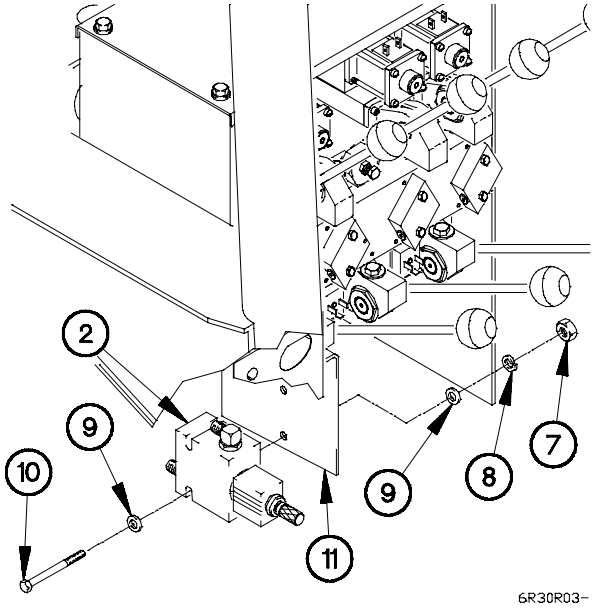
(2) Position drain pan under manual override valve (2).

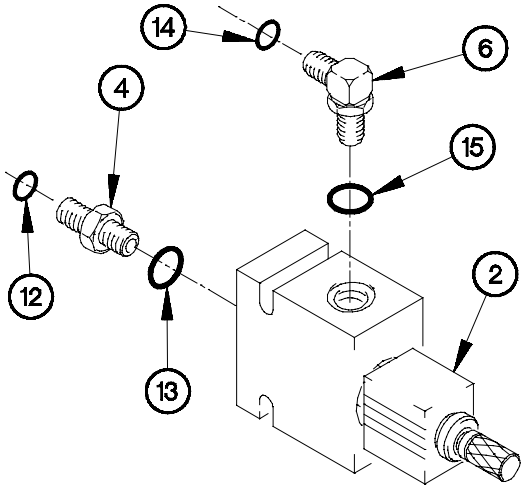
(3) Disconnect tube (3) from fitting (4).

(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.

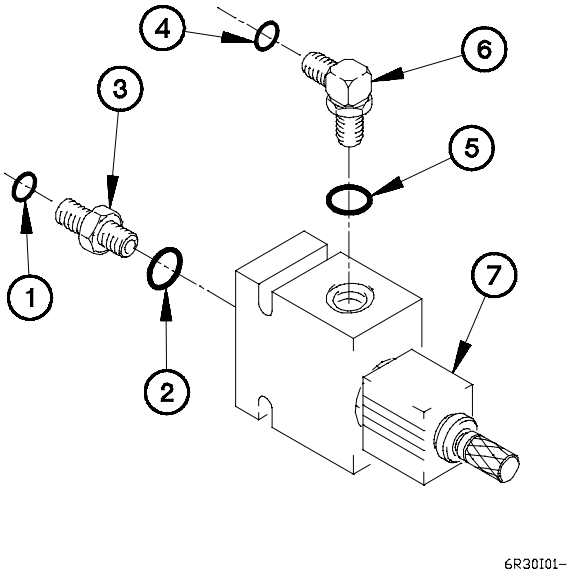
b. Installation.

(1) Install preformed packings (1 and 2) on fitting (3).

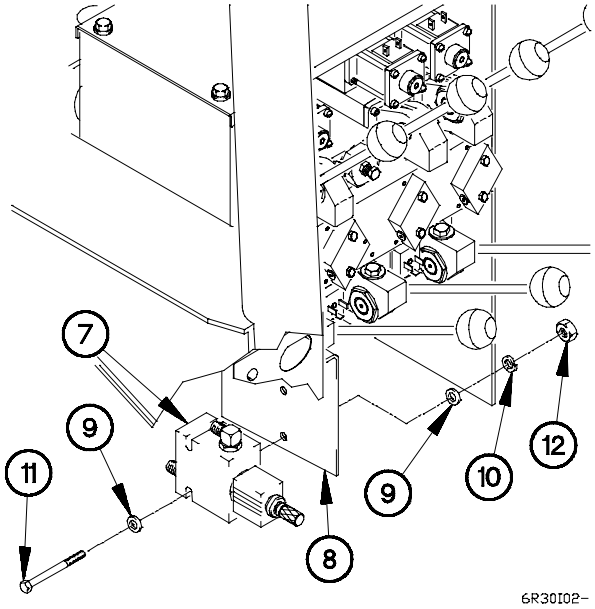
(2) Install preformed packings (4 and 5) on 90-degree fitting (6).

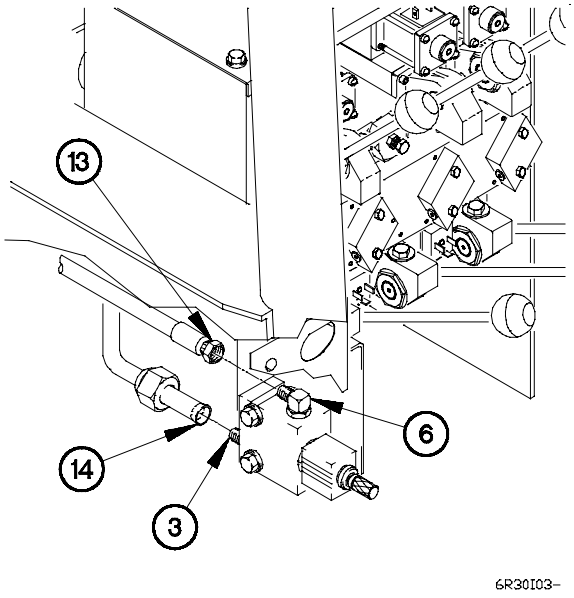
(3) Install fitting (3) on manual override valve (7).

(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).

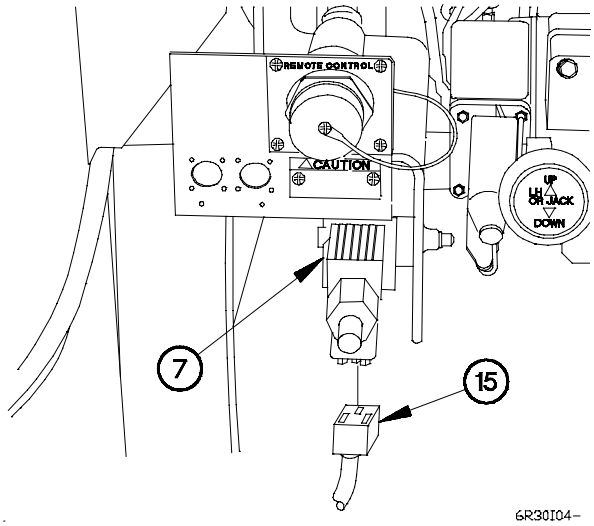




(6) Connect hose (13) to 90-degree fitting (6).

(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. Deleted
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
5500 lb weight
2200 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.**
- **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).

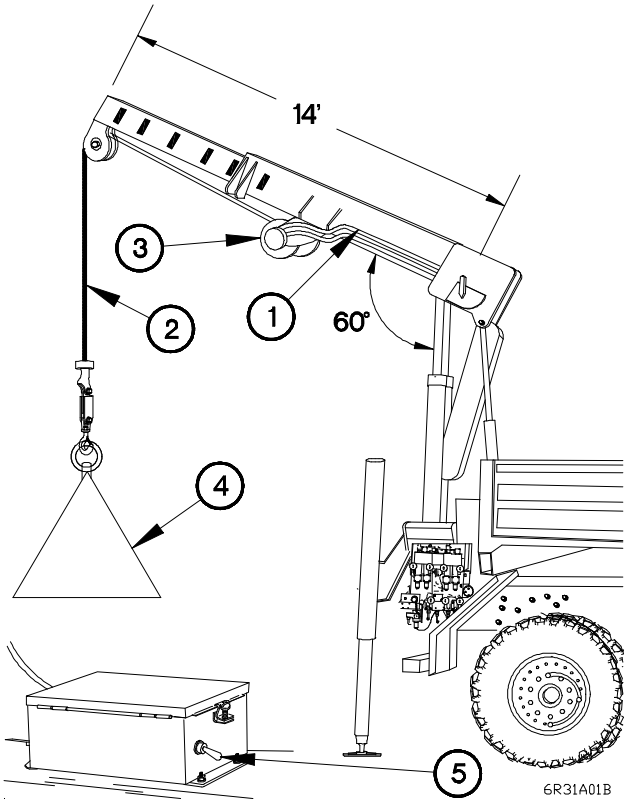
(4) Connect 5500 lb test weight (4) to hook (2).

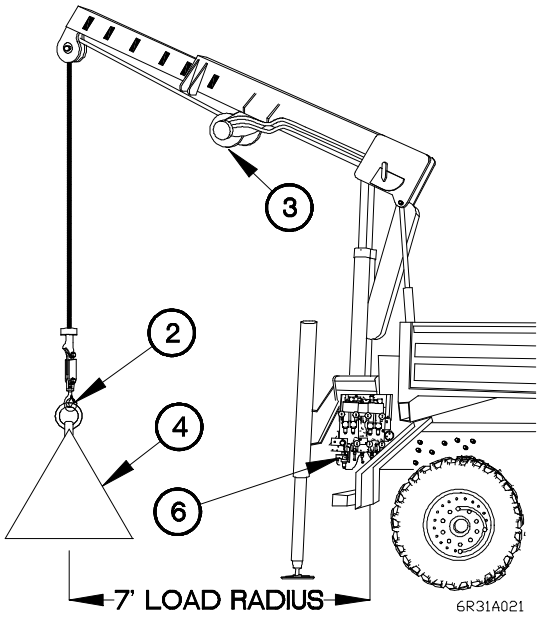
NOTE

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).

All data on page 16-172 deleted.

16-31. M1084/M1086 CRANE LOAD TEST (CONT)

b. Deleted.

b 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).

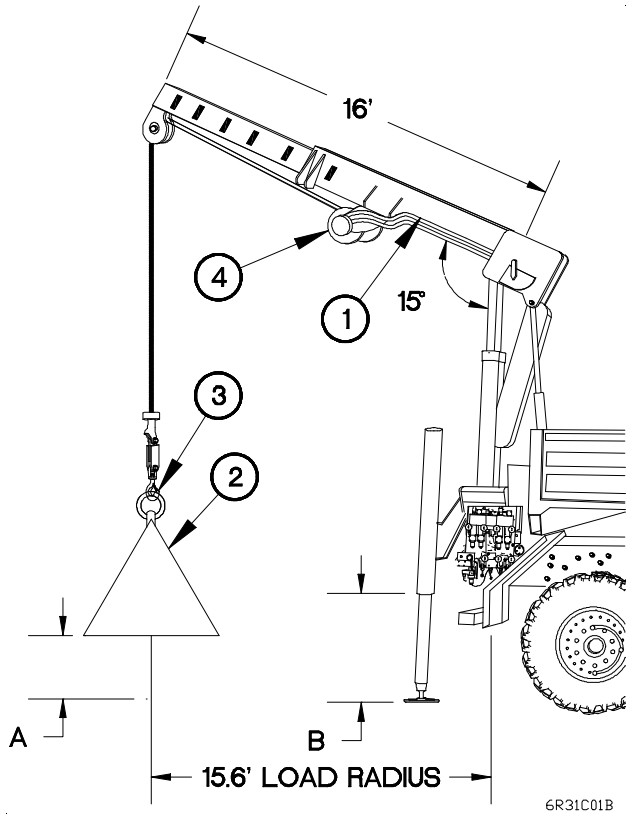
(4) Raise test weight (2) approximately 18 inches with hoist (4).

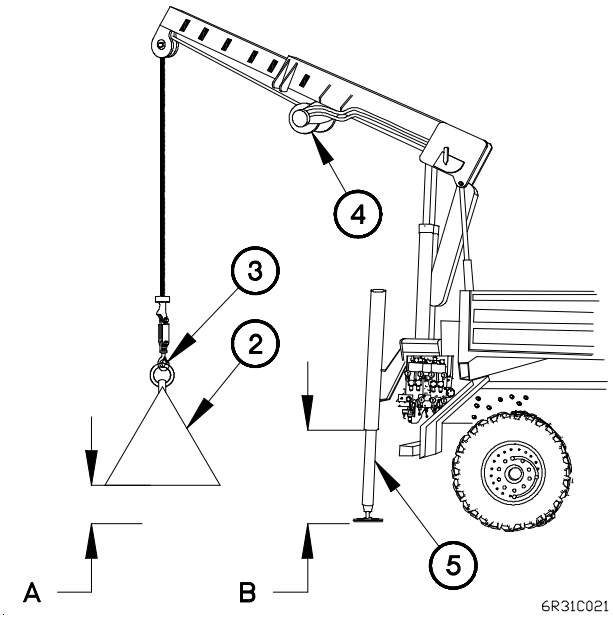
(5) Record dimension A, distance test weight (2) is from ground.

(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).

c 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.

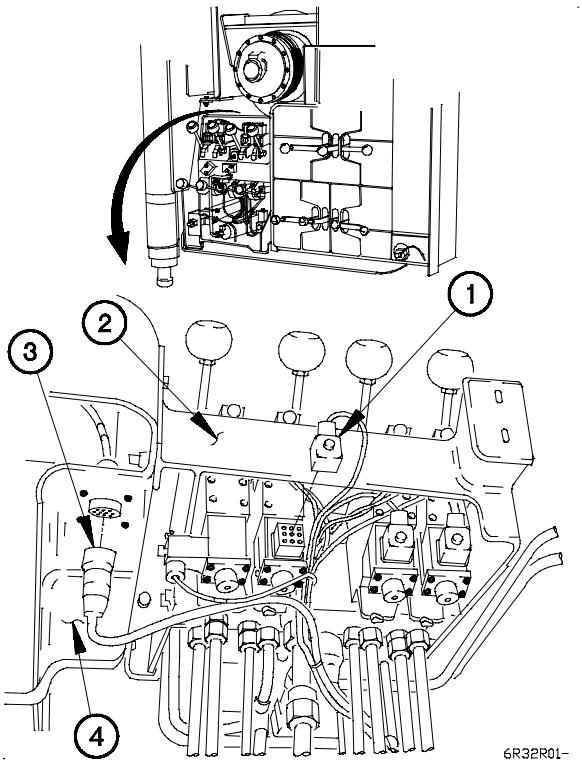
a. Removal.

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

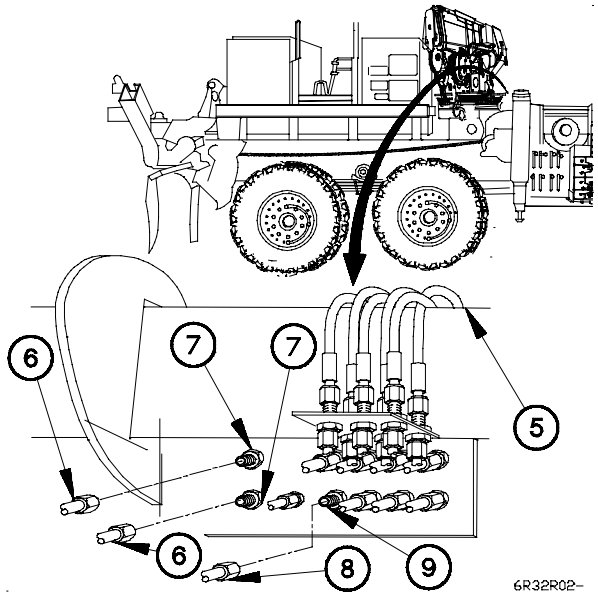
Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

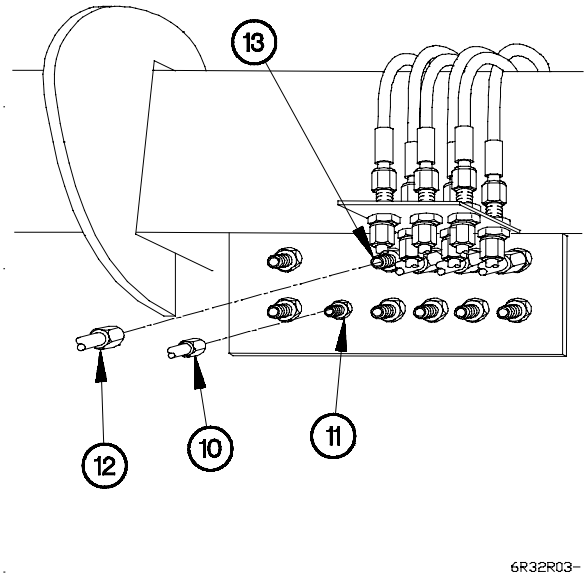
NOTE

Tag hydraulic tubes and connection points prior to disconnecting.

(4) Disconnect two tubes (6) from fittings (7).

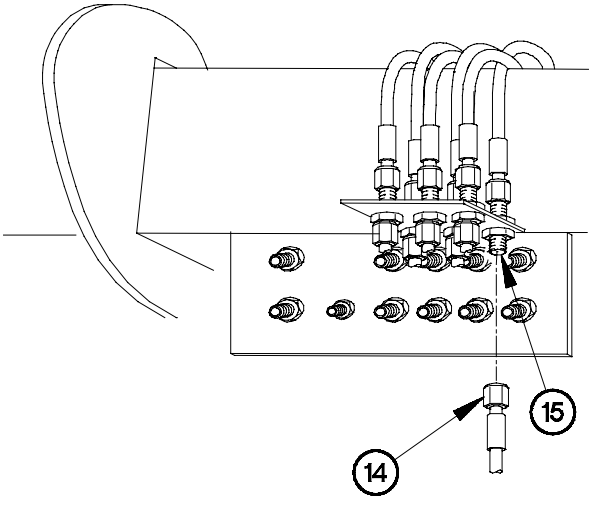
(5) Disconnect four tubes (8) from fittings (9).





(6) Disconnect tube (10) from fitting (11).

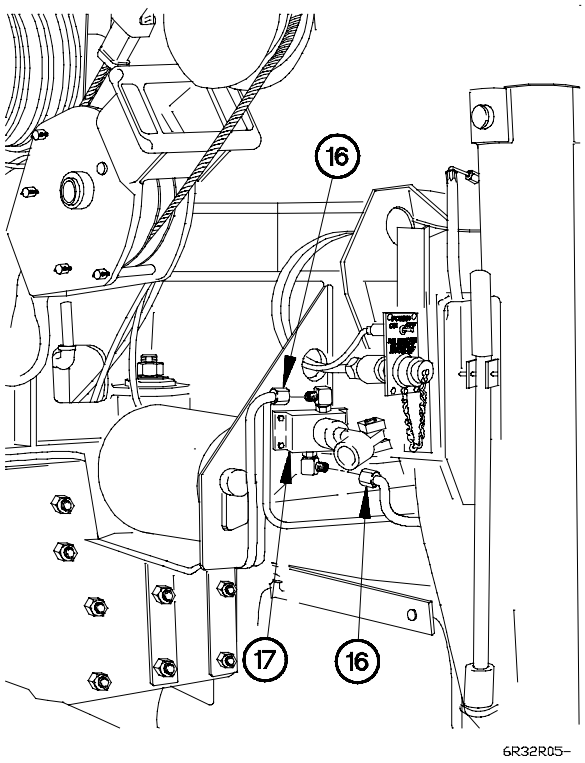
(7) Disconnect four tubes (12) from fittings (13).

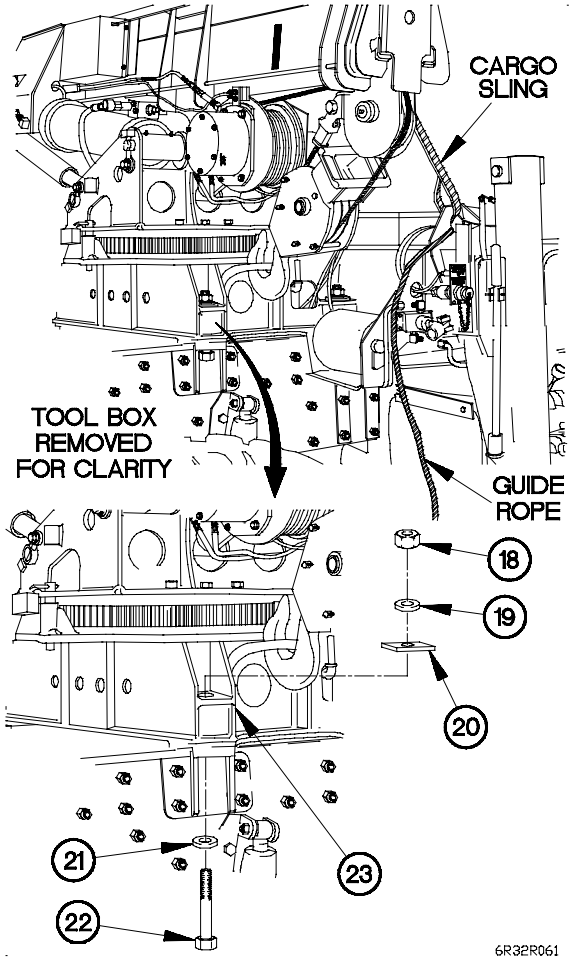


(8) Disconnect six tubes (14) from fittings (15).

16-32. M1089 MATERIAL HANDLING CRANE (MHC) REPLACEMENT (CONT)

(9) Disconnect two tubes (16) from hand pump (17).

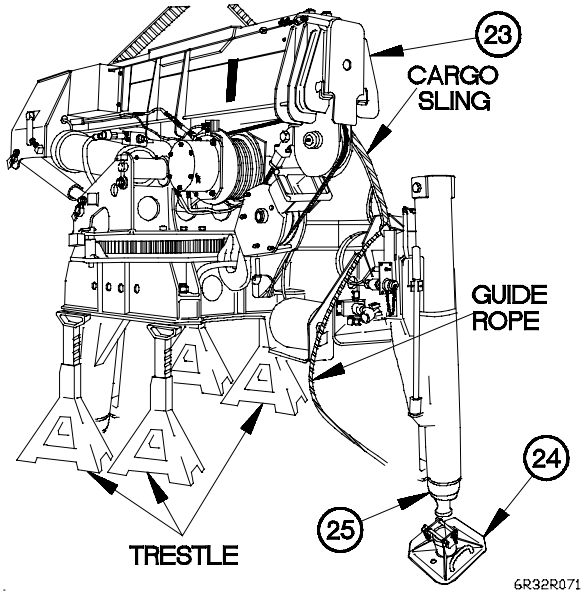




WARNING

- **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

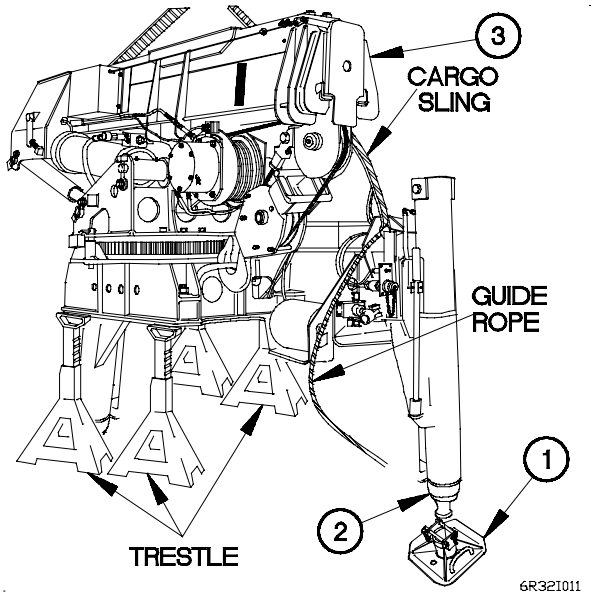
Step (11) requires the aid of two assistants.

(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)

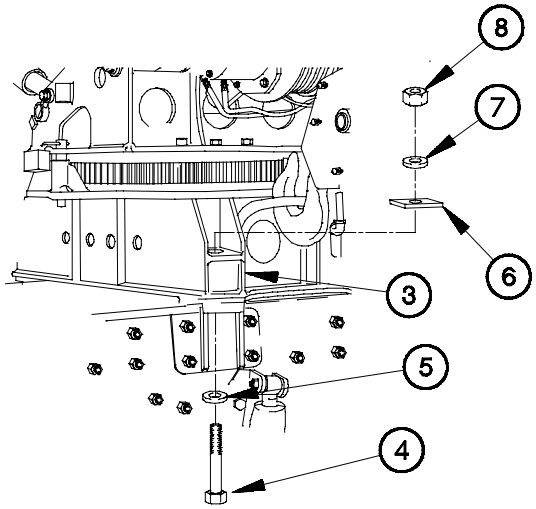
WARNING

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.

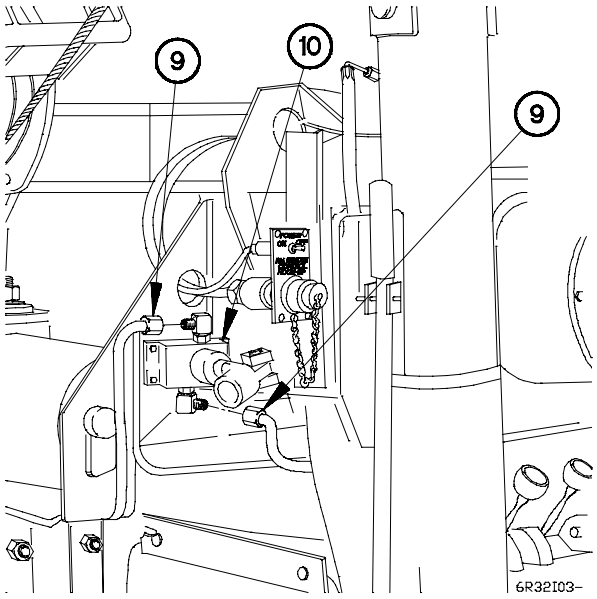
(3) Apply sealing compound to threads of six mounting bolts (4).

(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-



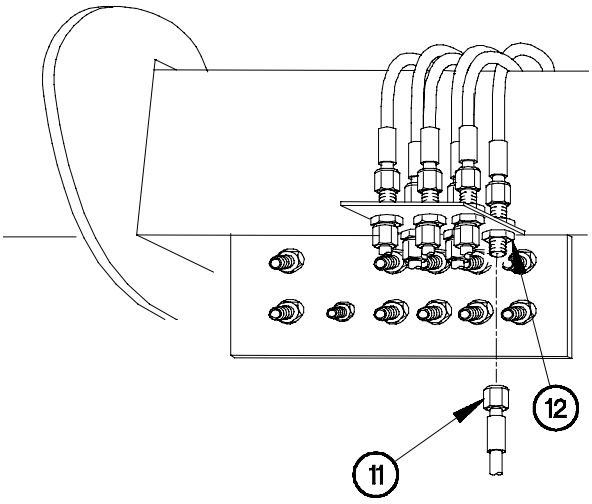
6R32I03-

(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).



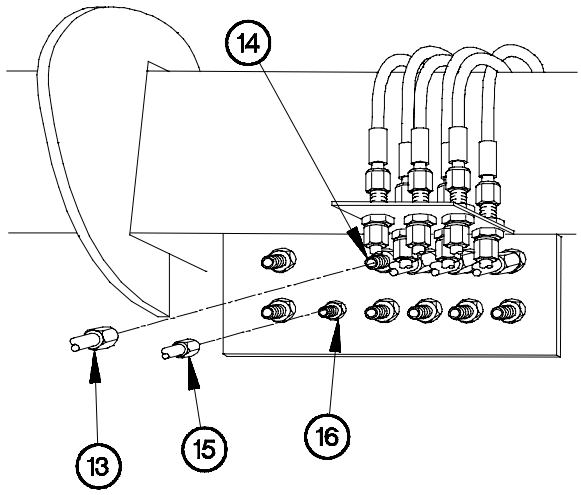
6R32I04-

(10) Position four tubes (13) on fittings (14).

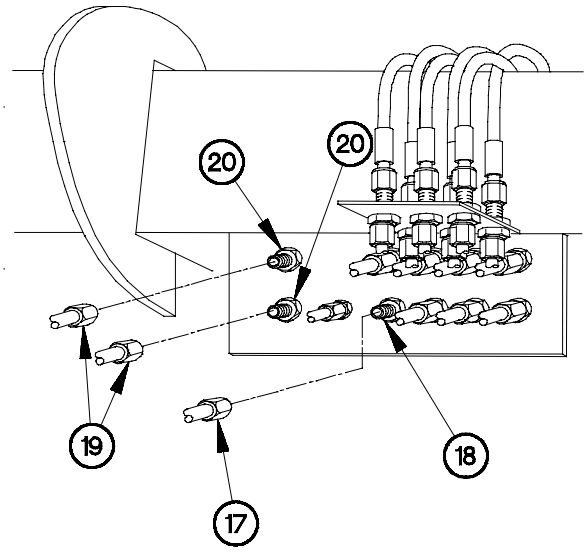
(11) Tighten four tubes (13) to 18-20 lb-ft (24-27 N•m).

(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).

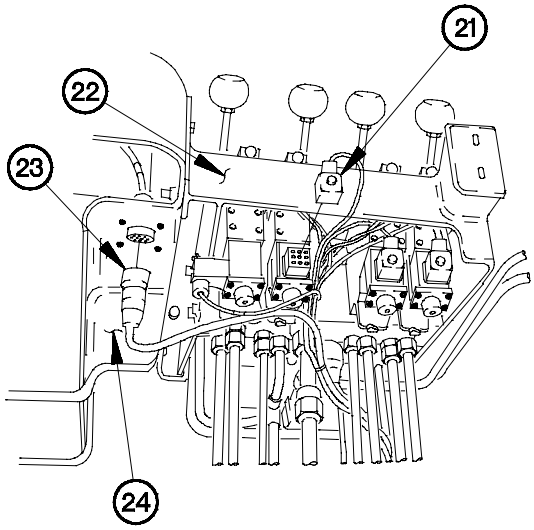
(15) Tighten four tubes (17) to 18-20 lb-ft (24-27 N•m).

(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)

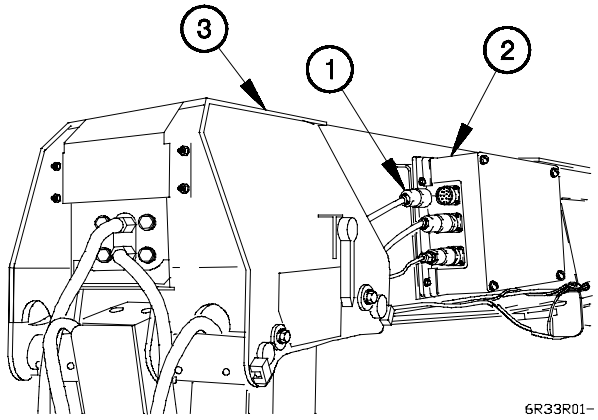
a. Removal.

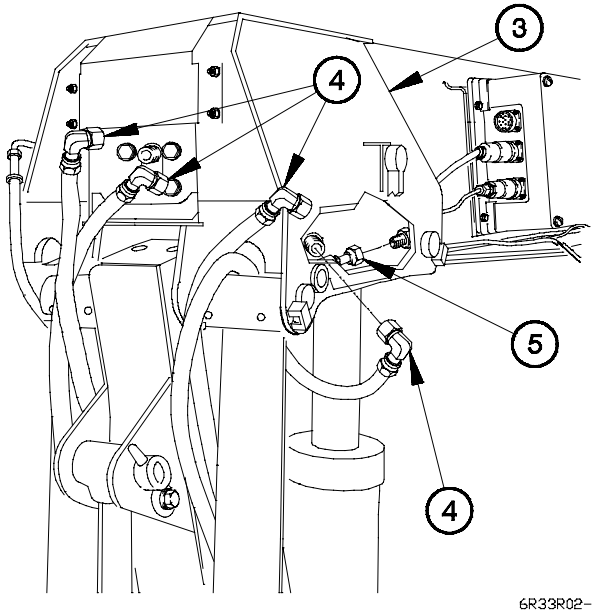
(1) Disconnect overload lockout connector (1) from overload shut down box (2).

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.**

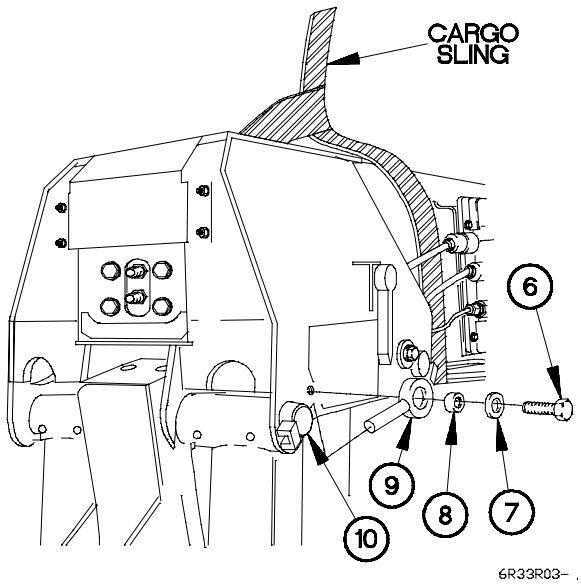
NOTE

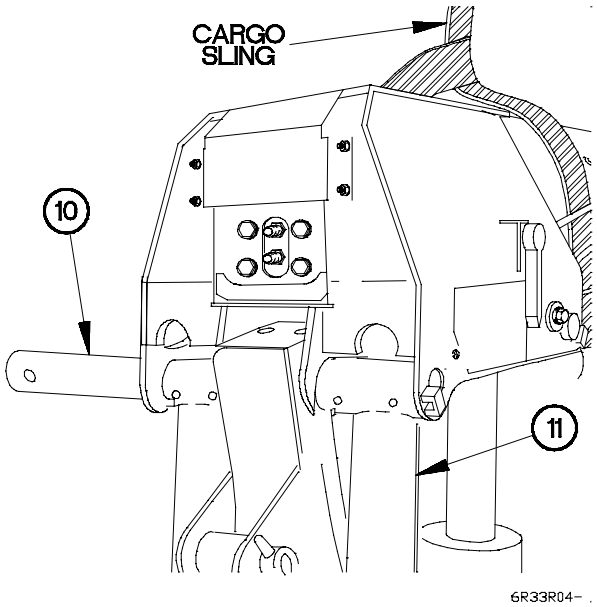
Left and right rivet eyebolts are removed the same way. Right rivet eyebolt shown.

(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

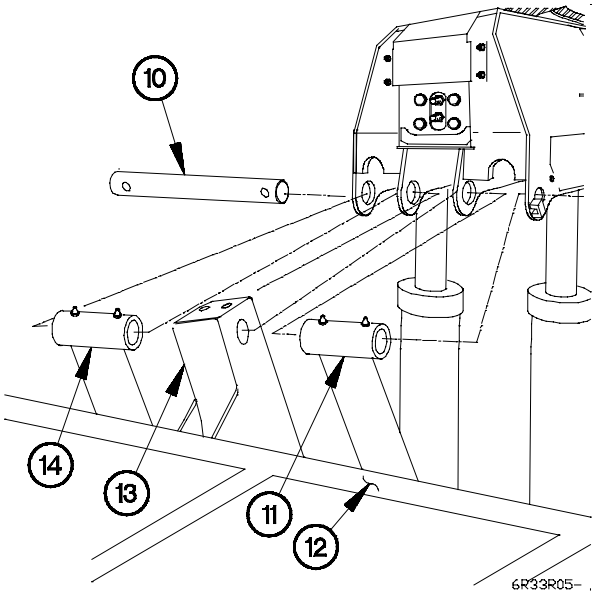
Remove pivot shaft far enough to release mast. Failure to comply may result in injury to personnel or damage to equipment.

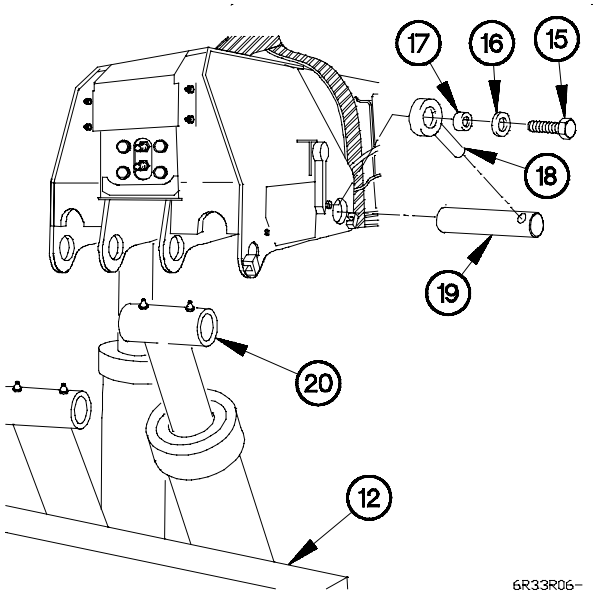
(10) Remove pivot shaft (10) from mast (13).

(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

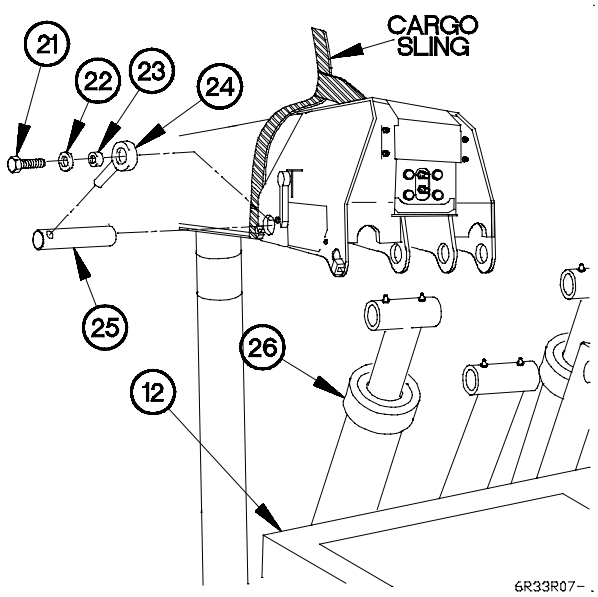
Lift cylinders must be supported to remove pivot shafts. Failure to comply may result in injury to personnel or damage to equipment.

(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).



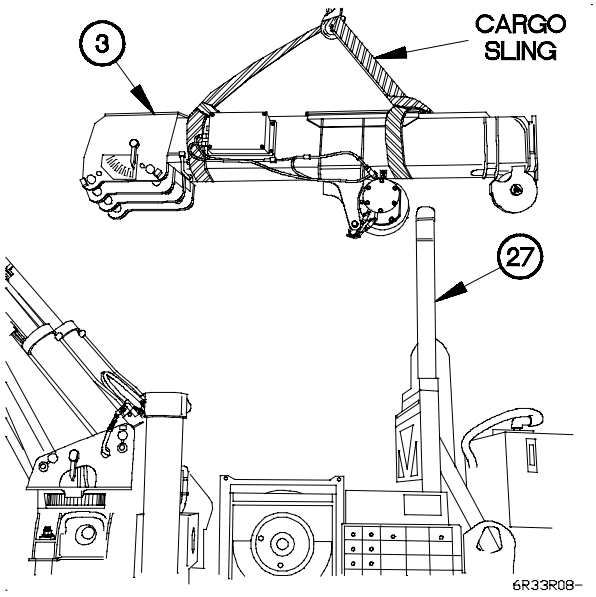
WARNING

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).



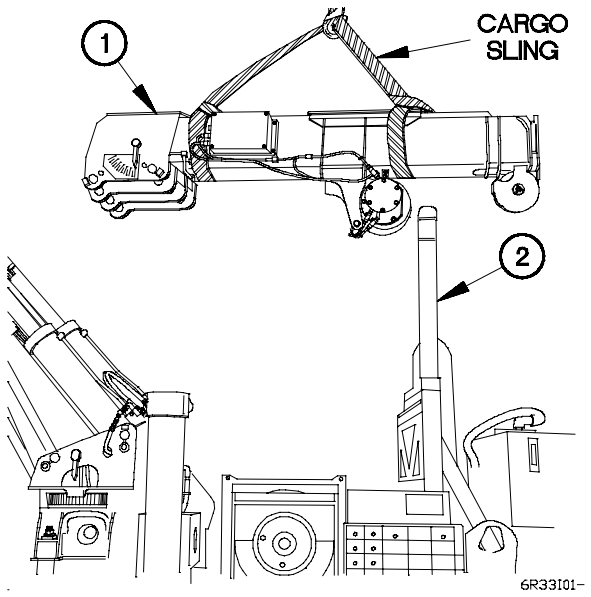
(22) Remove boom assembly (3) from boom rest (27).

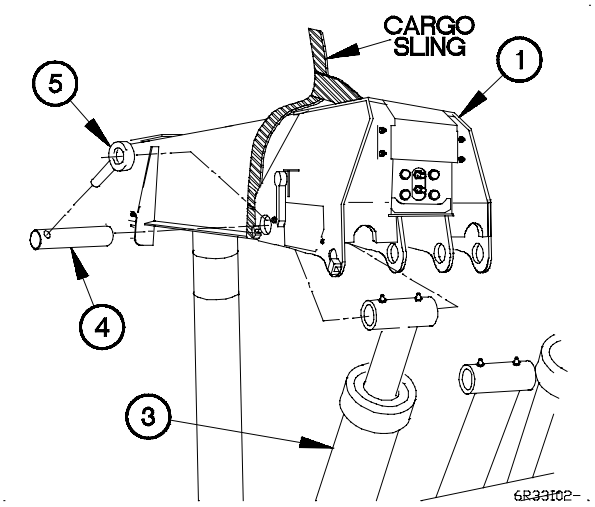
b. Installation.

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).

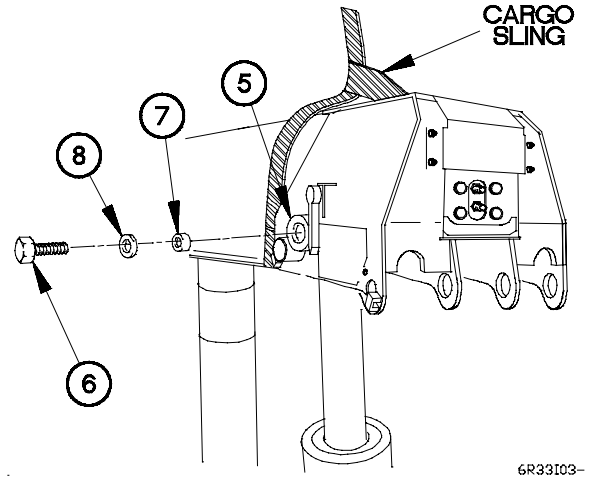
WARNING

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

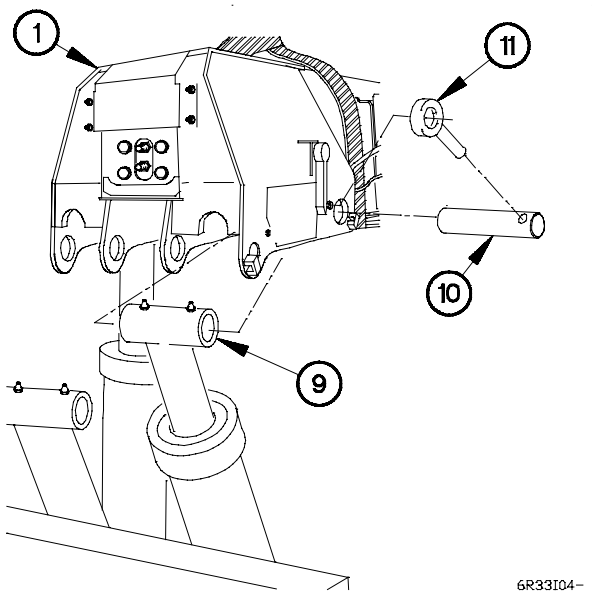
Lift cylinders must be supported to install pivot shafts. Failure to comply may result in serious injury or death to personnel and damage to equipment.

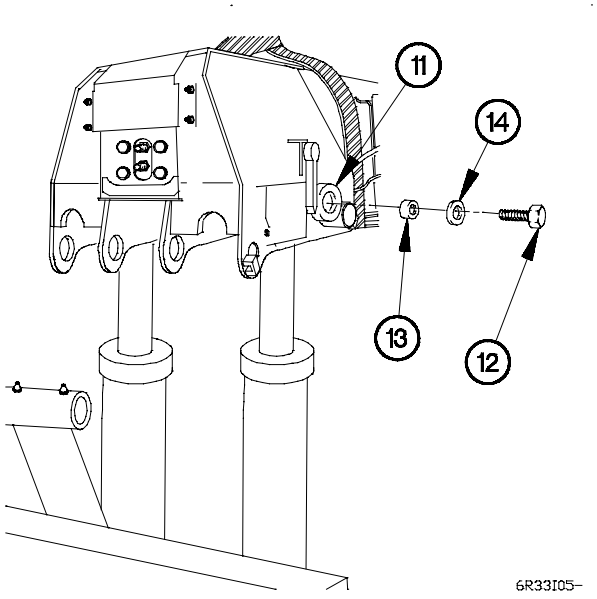
NOTE

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).

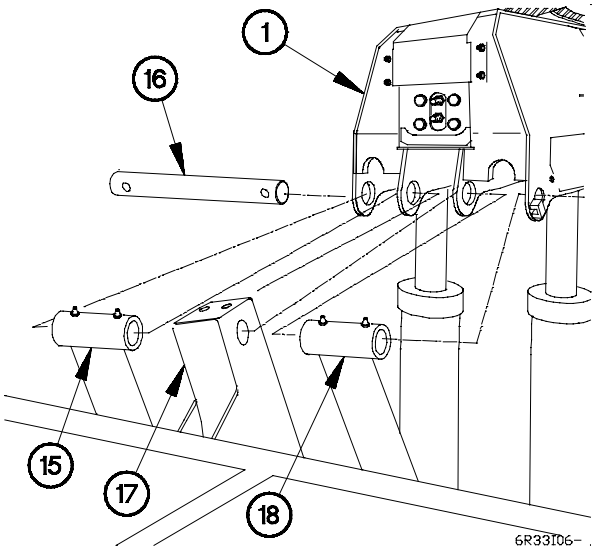
NOTE

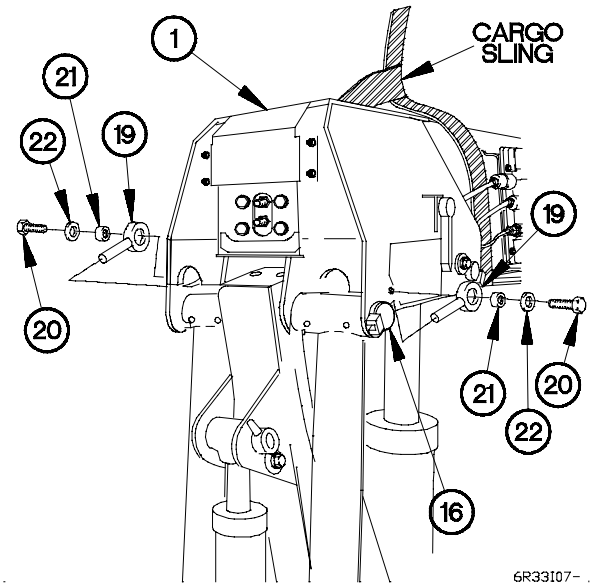
Steps (12) through (14) require the aid of an assistant.

(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

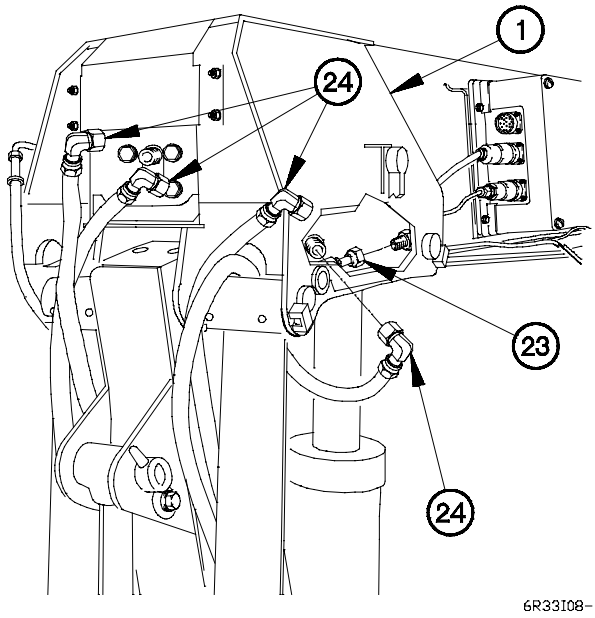
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(16) Apply sealing compound to threads of two screws (20).

(17) Position two bushings (21), washers (22), and screws (20) in rivet eyebolts (19).

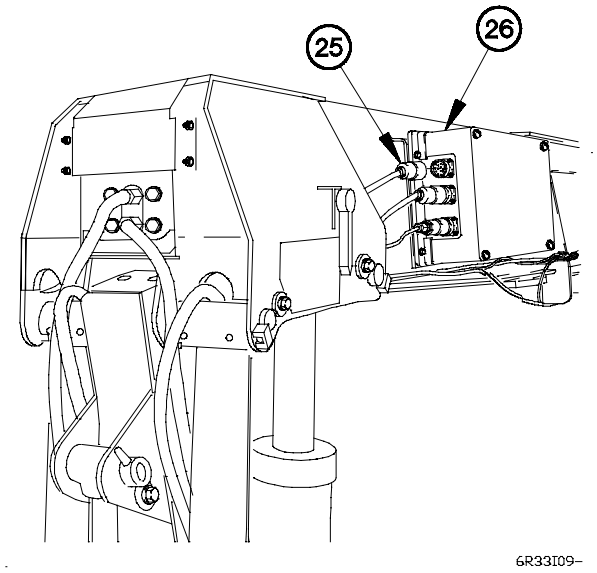
(18) Tighten screws (20) to 240-260 lb-ft (325-353 N·m).

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)

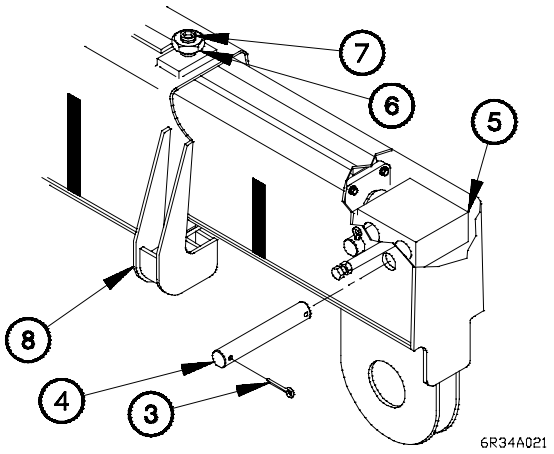
Personnel Required
(2)

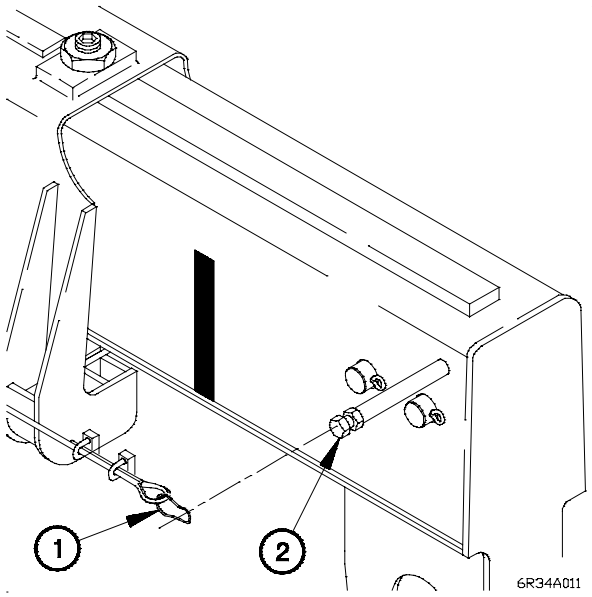
a. Removal.

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).

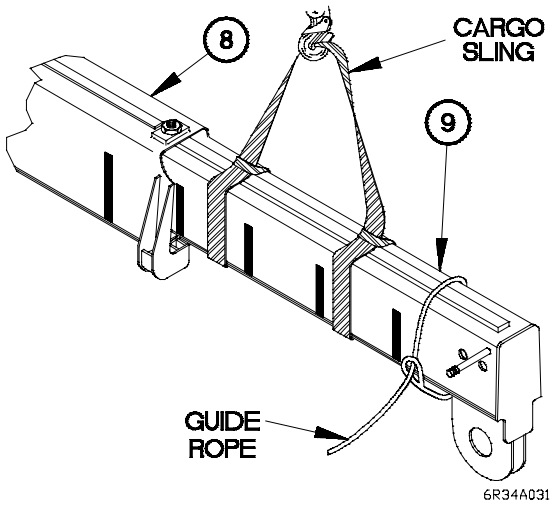
(4) Loosen jam nut (6) on setscrew (7).

(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.**

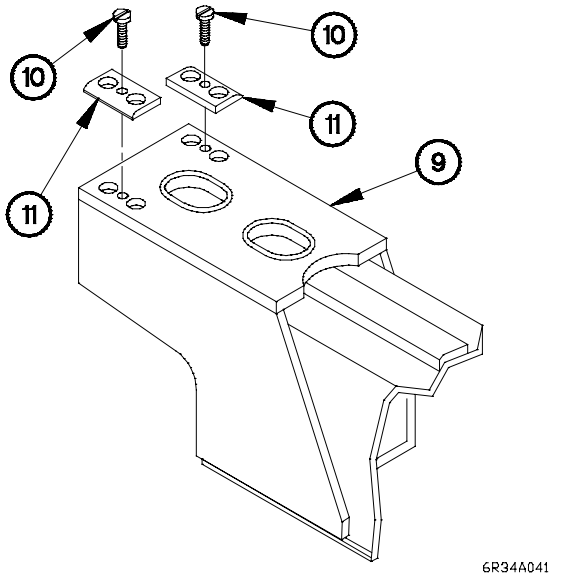


(6) Adjust cargo sling to balance boom fly section (9).

NOTE

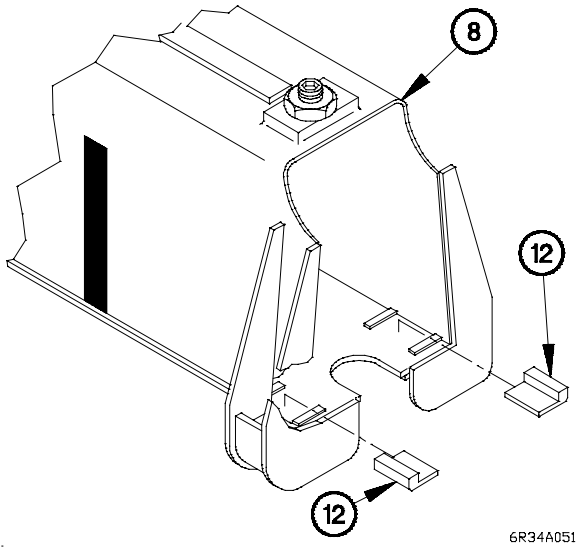
Step (7) requires the aid of an assistant.

(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.**

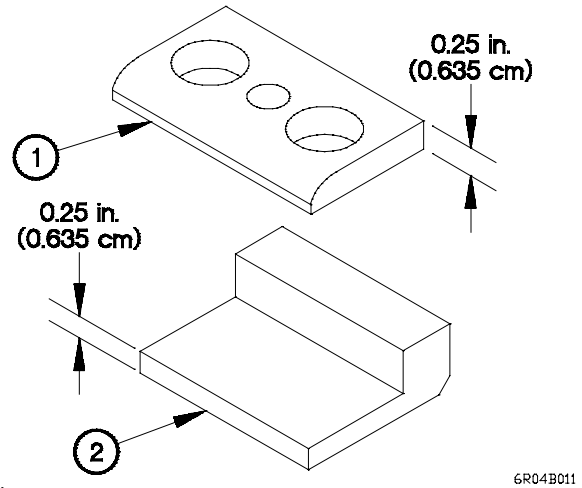
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention. Failure to comply may result in serious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

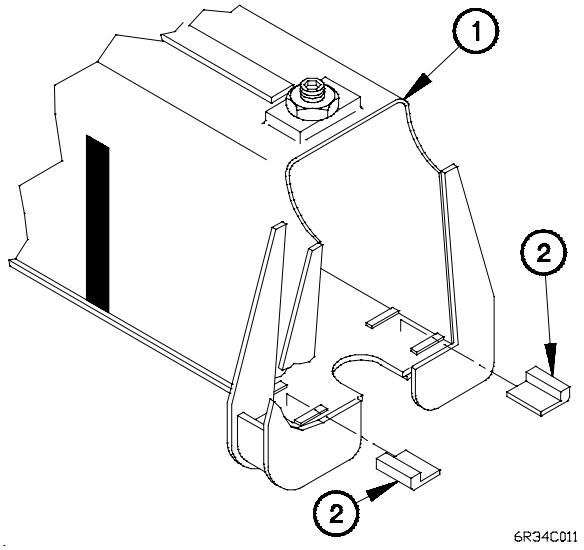
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.

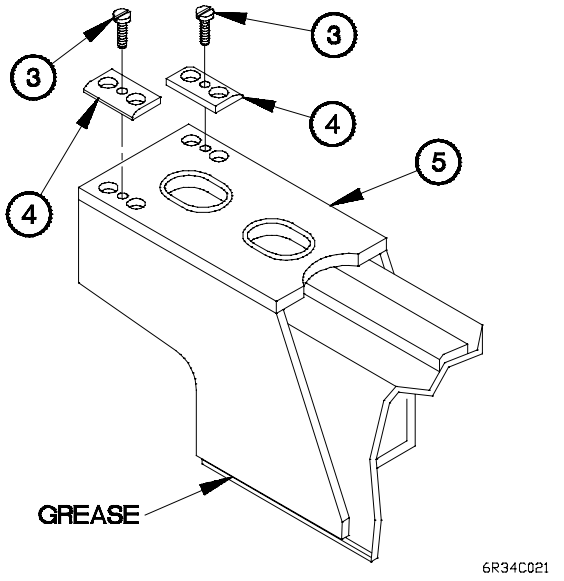
(1) Apply sealing compound to both wear pad mounting locations in outer end of boom mid section (1).

(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).





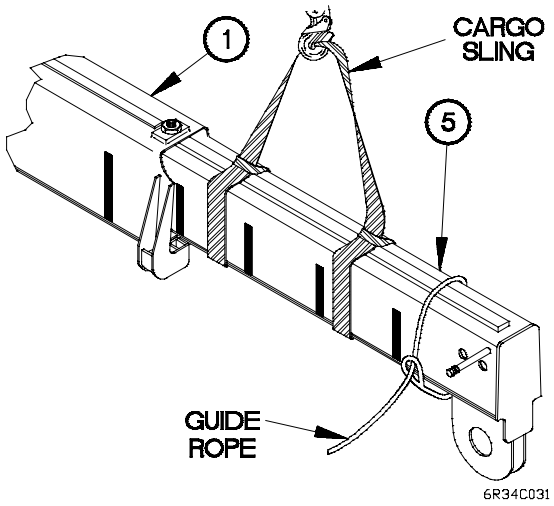
(5) Apply sealing compound to threads of two screws (3).

(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

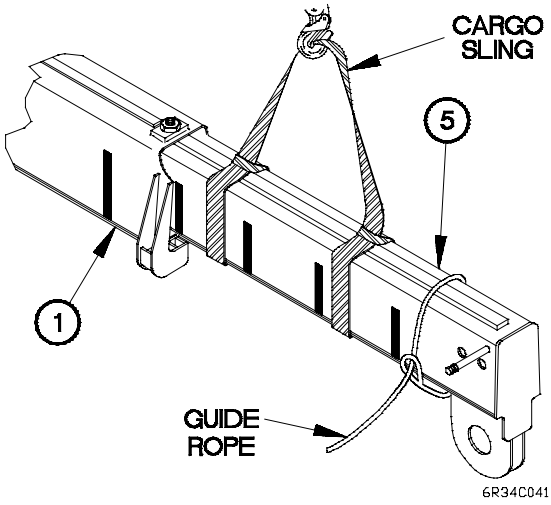
- **Boom fly section weighs approximately 210 lbs (95 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**
- **Personnel must stand clear during lifting operation. Snapped cable or shifted load could cause serious 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

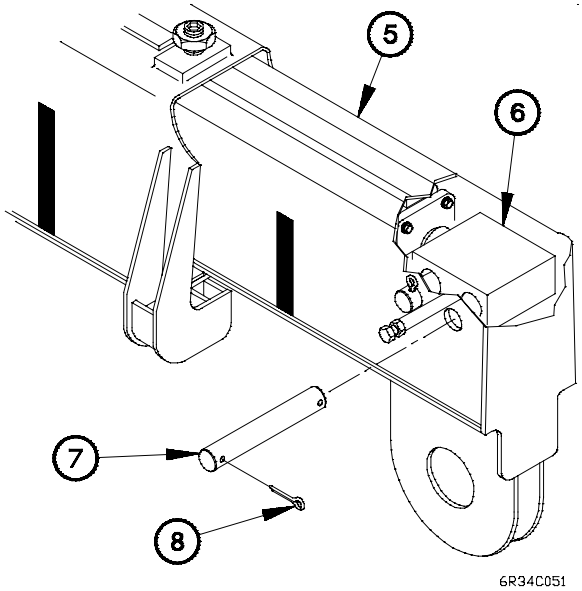
Step (8) requires the aid of an assistant.

(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).

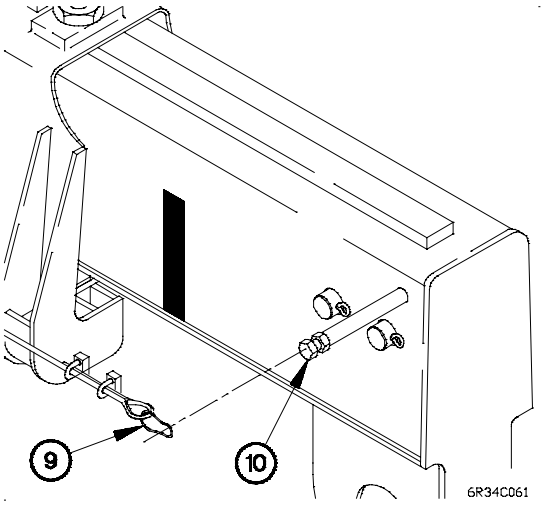


(11) Install boom fly section (5) on telescopic cylinder (6) with two shafts (7).

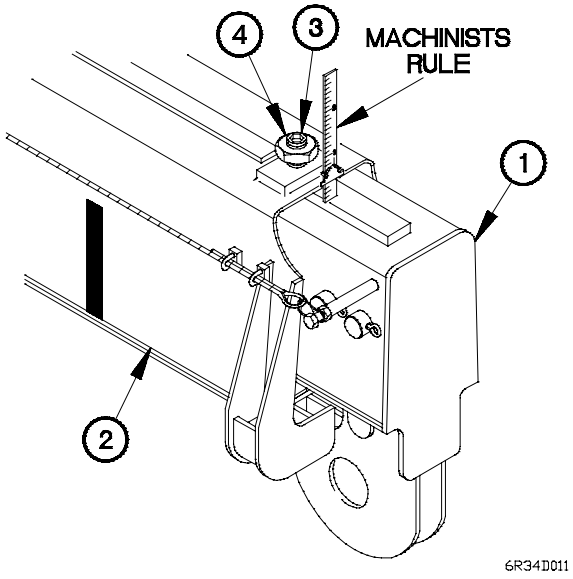
(12) Install four cotter pins (8) in two shafts (7).

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

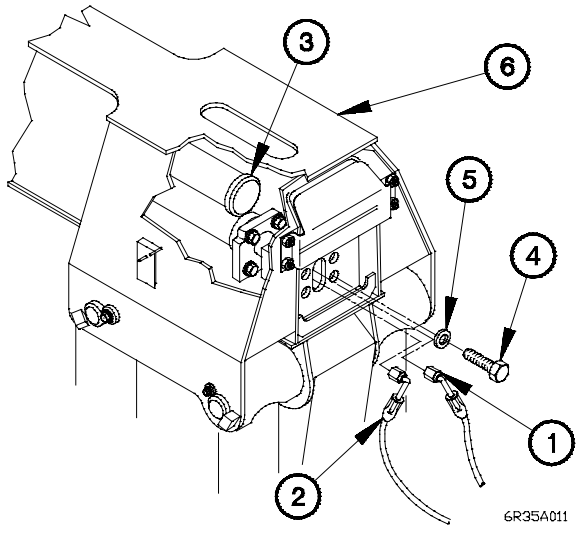
Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

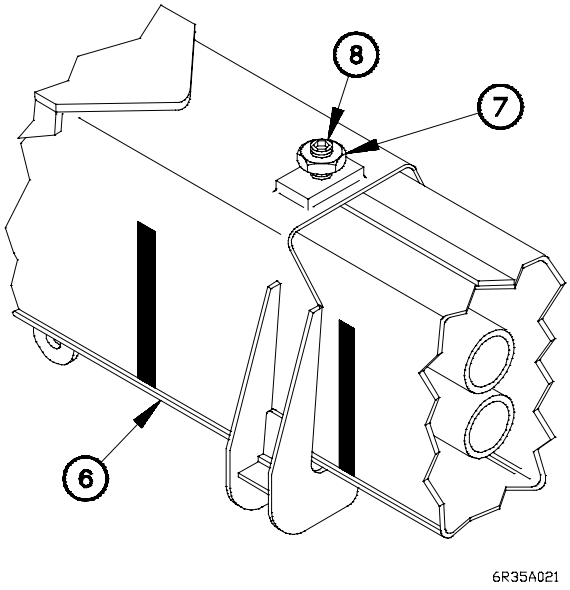
Tag hydraulic hoses and connection points prior to disconnecting.

(1) Disconnect hoses (1 and 2) from telescopic cylinder (3).

(2) Remove four screws (4) and washers (5) from boom base section (6).

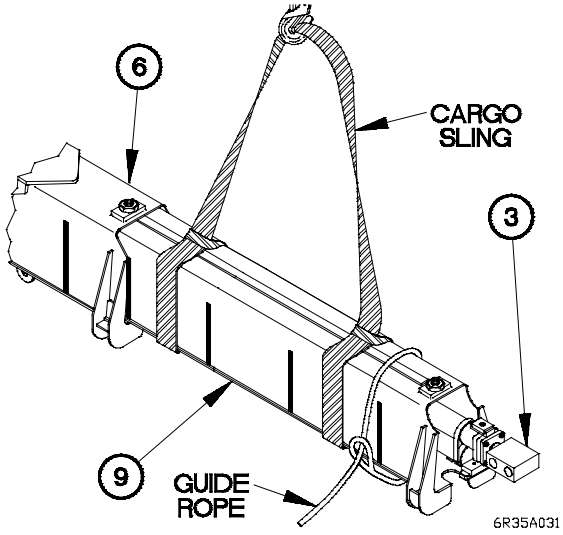


16-35. M1089 BOOM MID SECTION AND TELESCOPIC CYLINDER REPLACEMENT/ ADJUSTMENT (CONT)



(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.

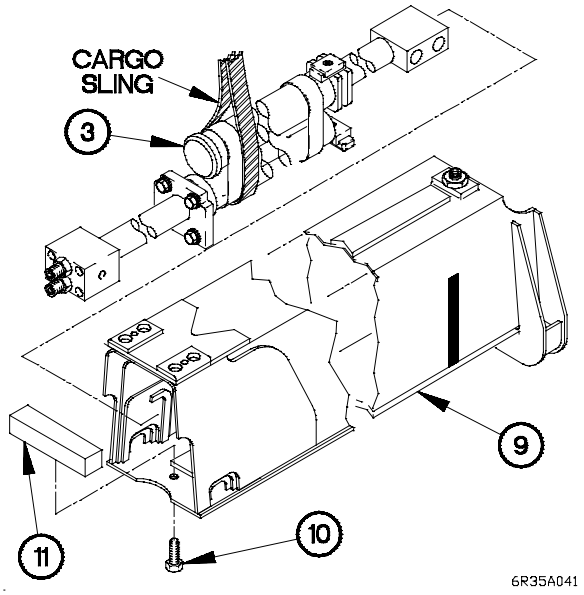
(5) Remove boom mid section (9) and telescopic cylinder (3) from boom base section (6).

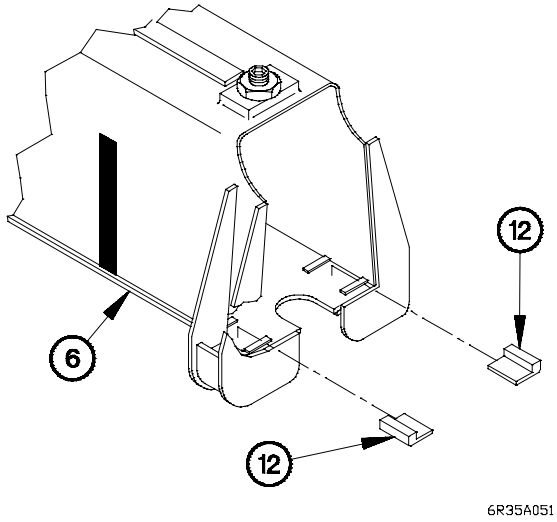
(6) Remove screw (10) and cylinder retainer bar (11) from boom mid section (9).

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.

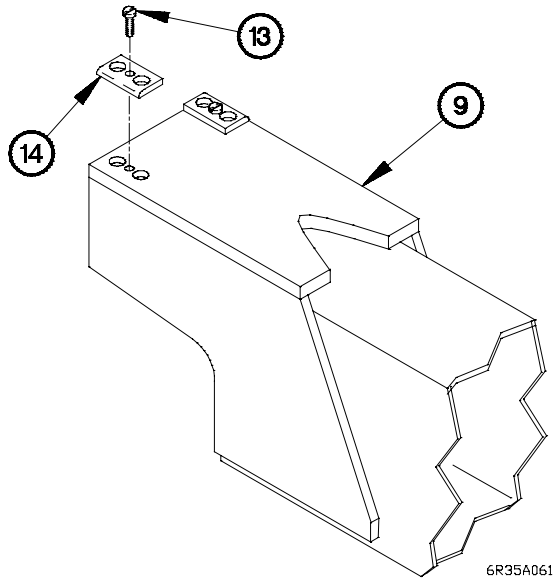
(7) Remove telescopic cylinder (3) from boom mid section (9).



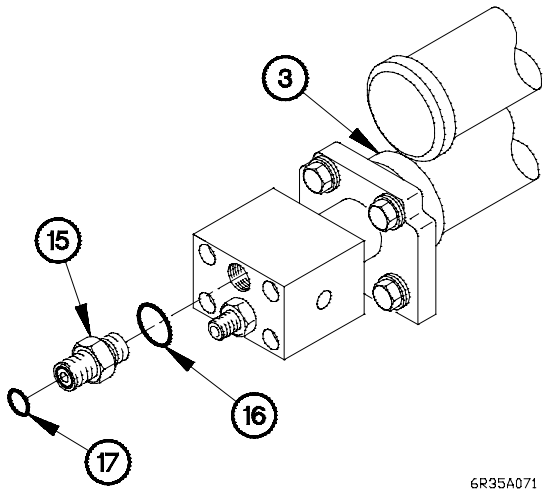


(8) Remove two wear pads (12) from outer end of boom base section (6).

(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).

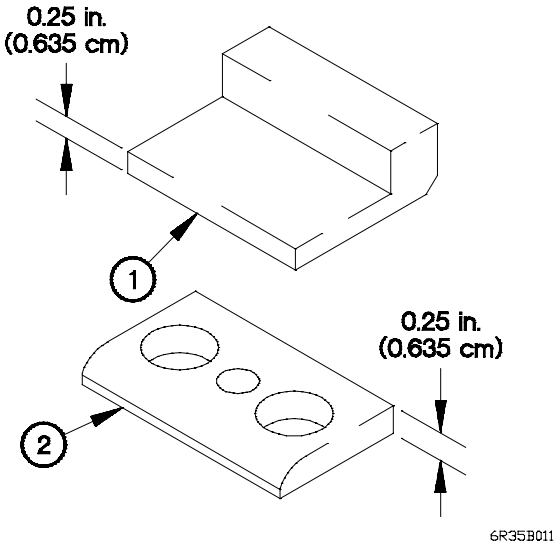
(11) Remove two preformed packings (16) and preformed packings (17) from fittings (15). Discard preformed packings.

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.

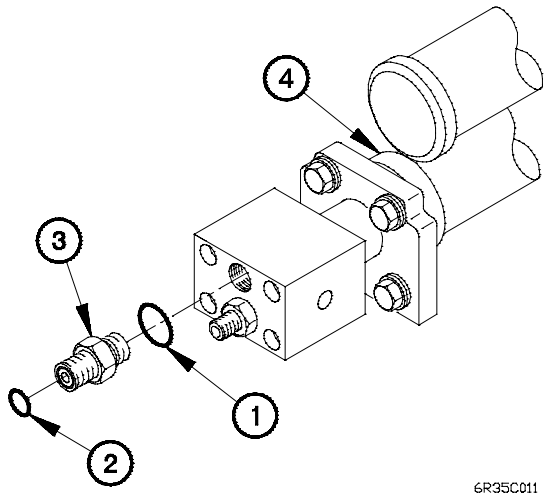
(2) Measure thickness of two body wear pads (1), replace body wear pad if thickness measures less than 0.25 in. (0.635 cm).

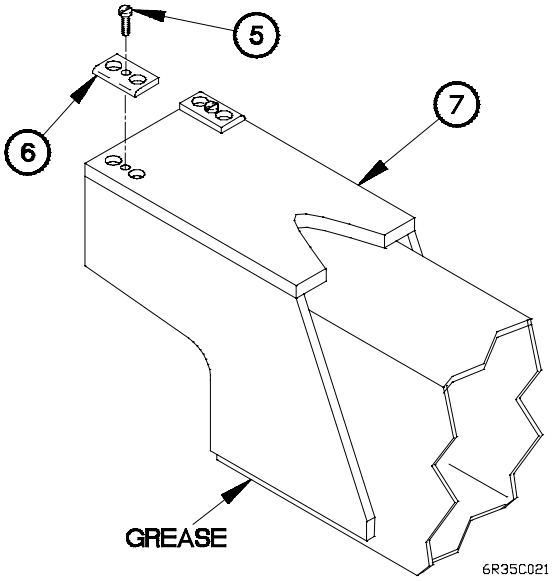
(3) Measure thickness of two upper wear pads (2), replace upper wear pad if thickness measures less than 0.25 in. (0.635 cm).

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).

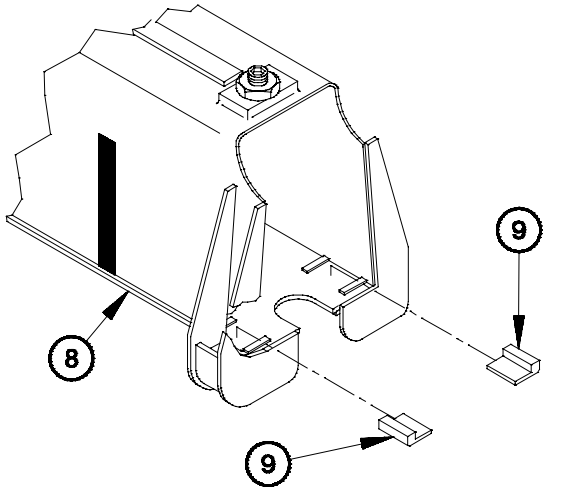
(5) Apply grease to wear pads (6) and bottom edges of boom mid section (7).

(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).

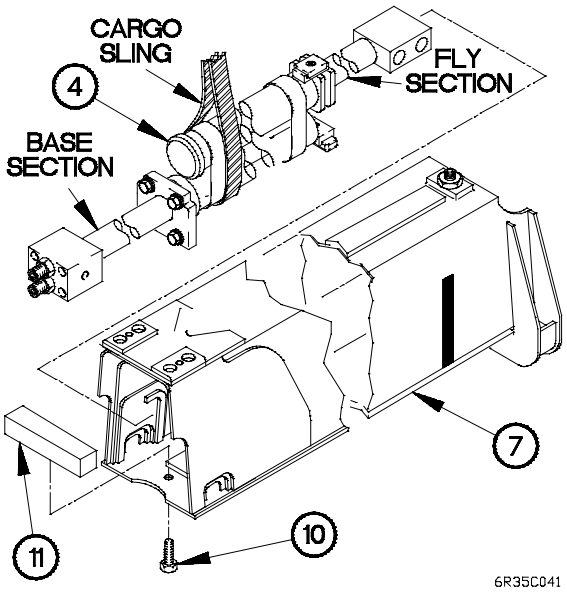
(8) Install two body wear pads (9) in outer end of boom base section (8).

(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

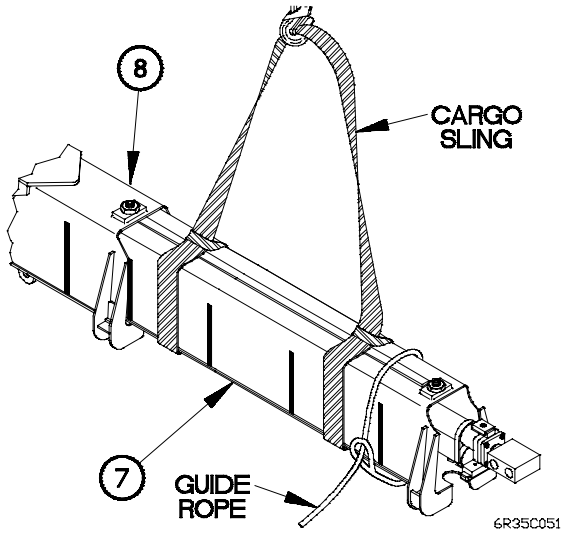
Step (11) requires the aid of an assistant.

(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

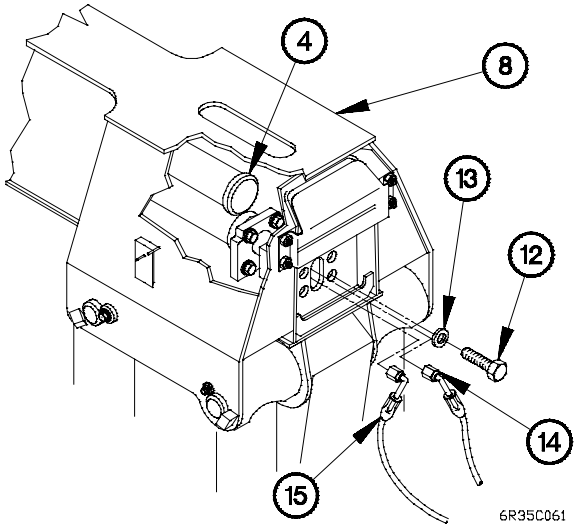
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention.

(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).

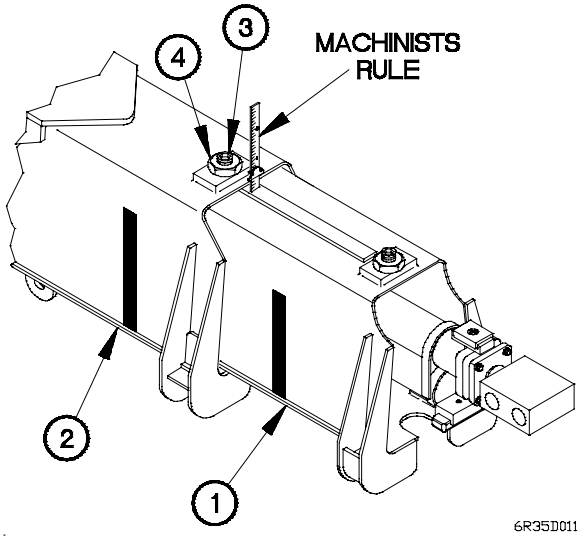
(19) Tighten screws (12) to 151-175 lb-ft (205-237 N·m).

(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.**

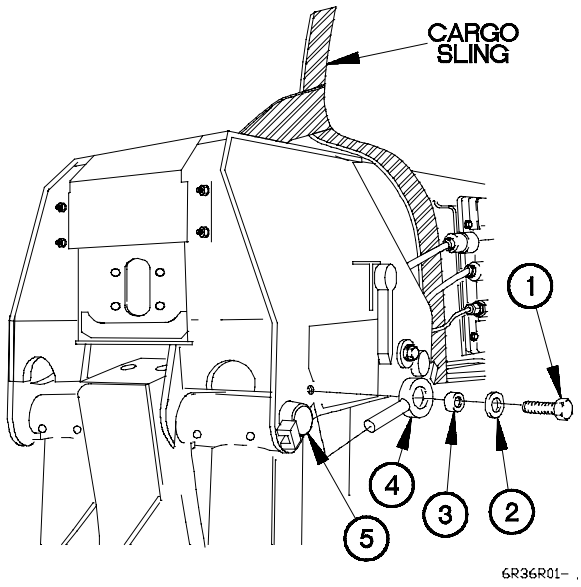
NOTE

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.



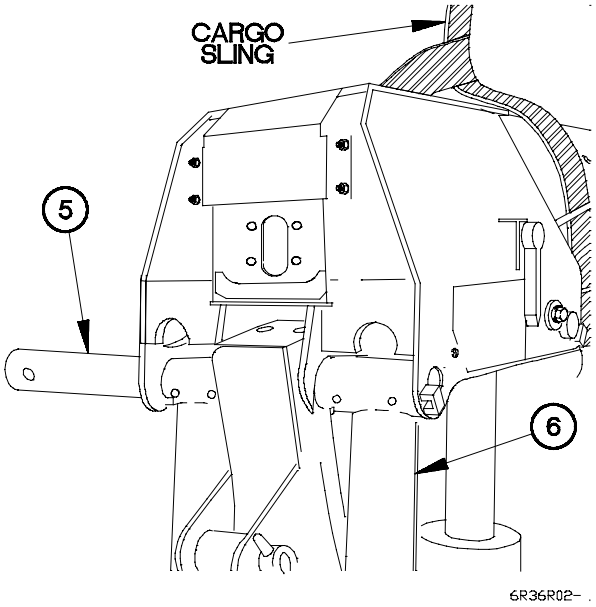
WARNING

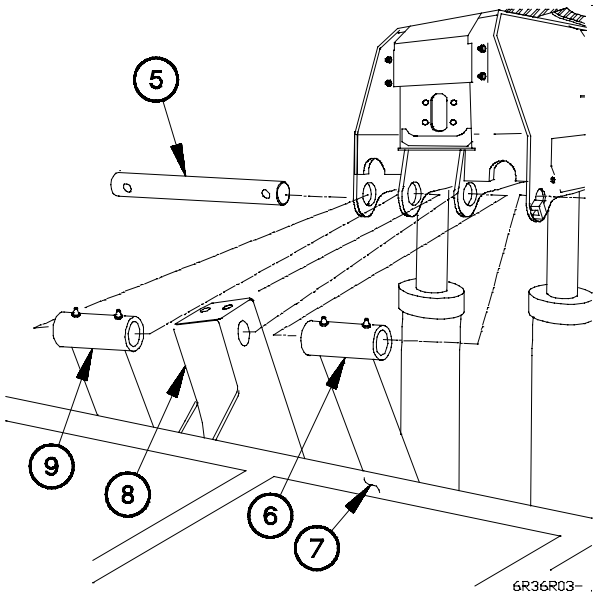
Remove pivot shaft far enough to release tension link cylinder. Failure to comply may result in injury to personnel or damage to equipment.

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).

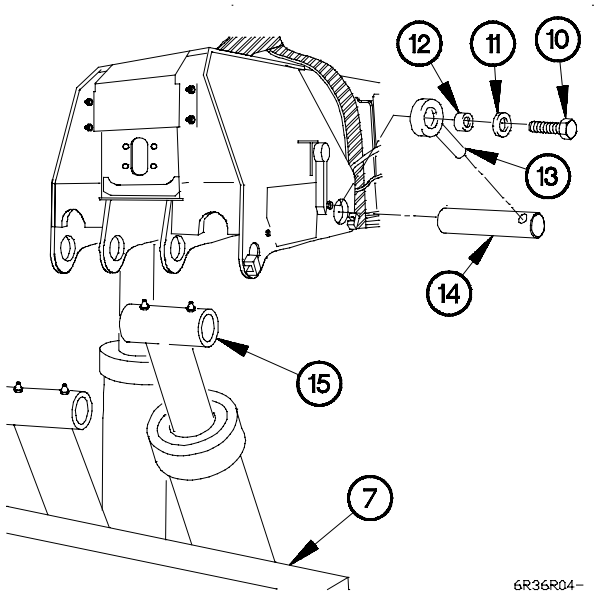
(11) Remove rivet eyebolt (13) from pivot shaft (14).

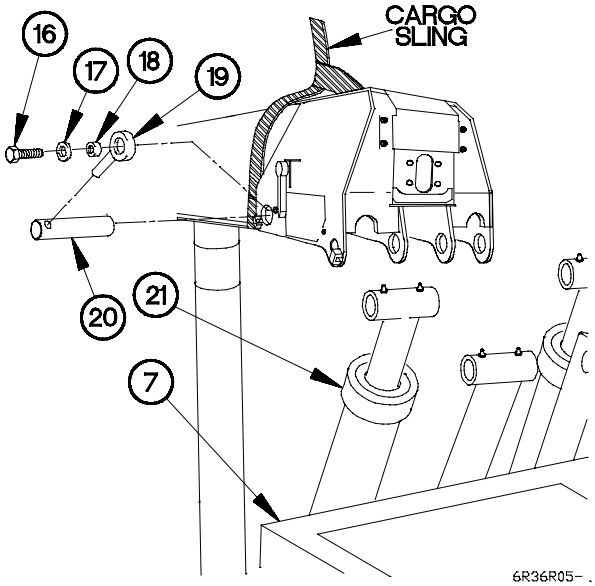
WARNING

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).





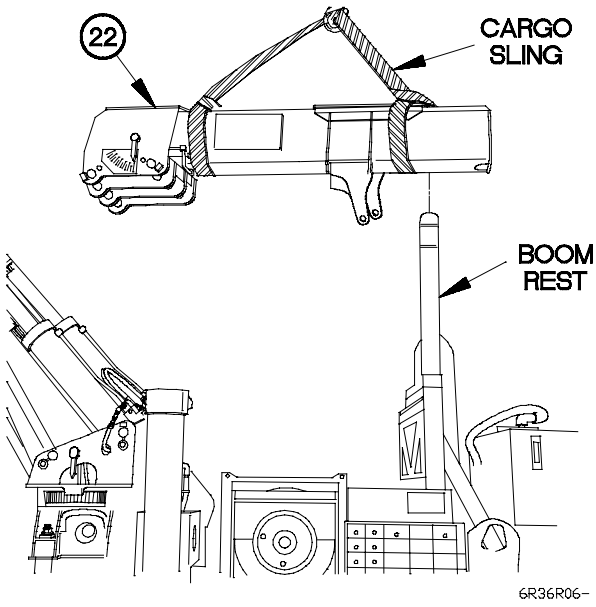
(14) Remove screw (16), washer (17), and bushing (18) from rivet eyebolt (19).

(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.

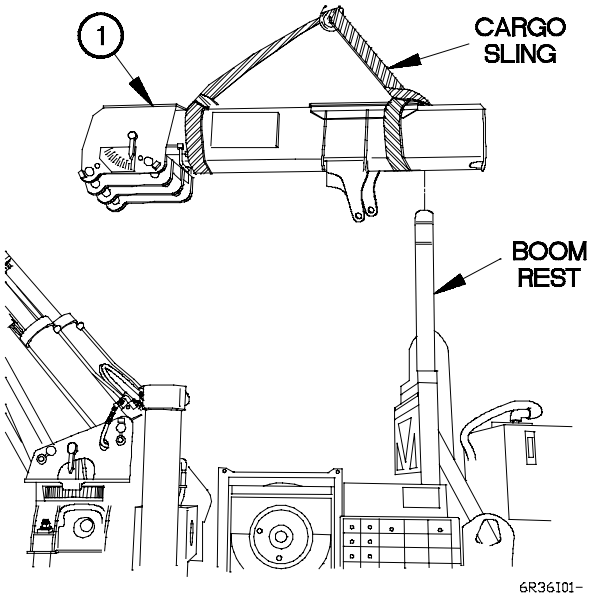


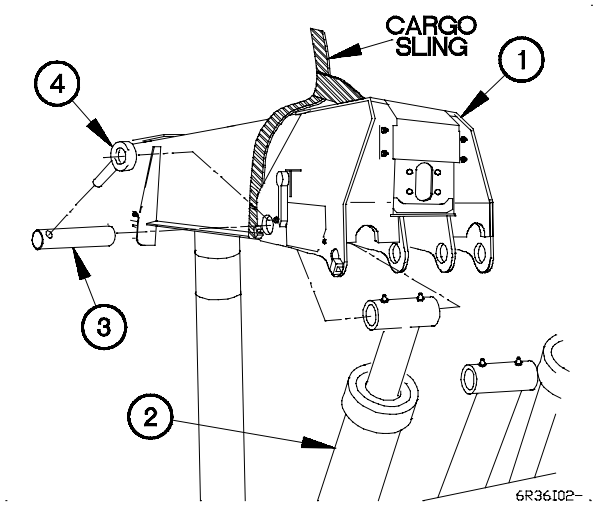
c. Installation.

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)

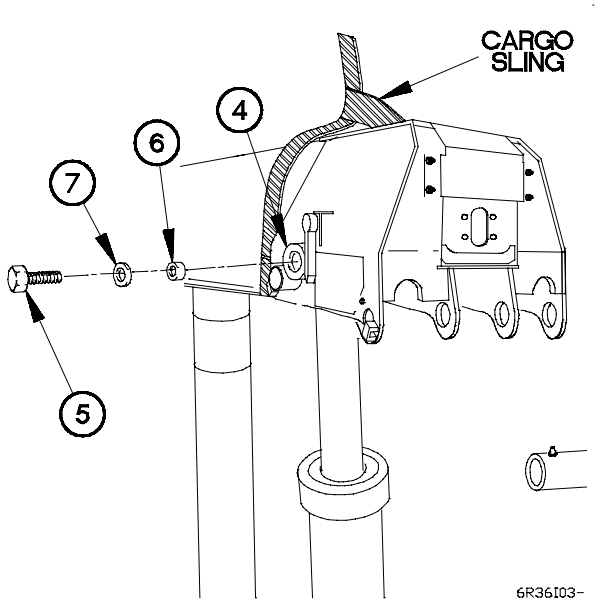
WARNING

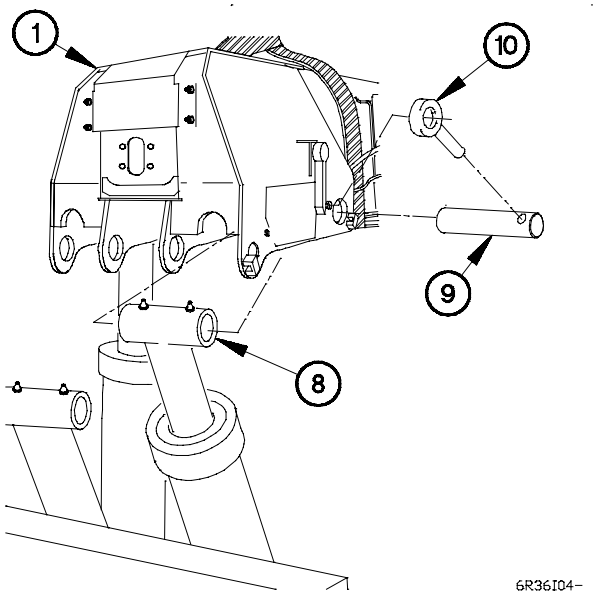
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.

(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).

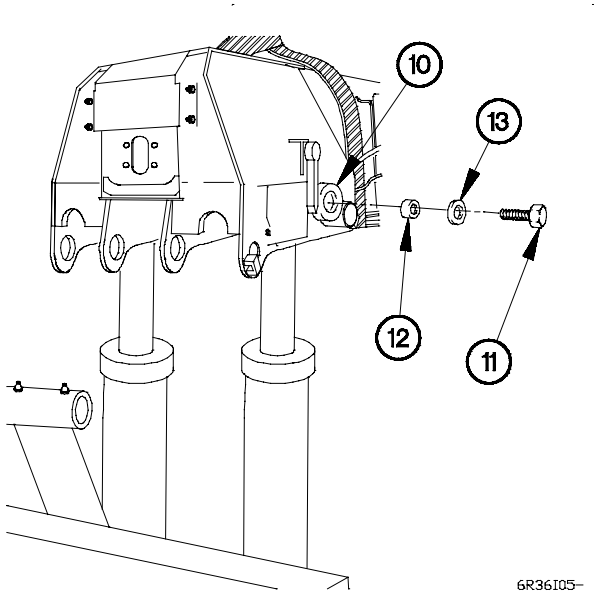
WARNING

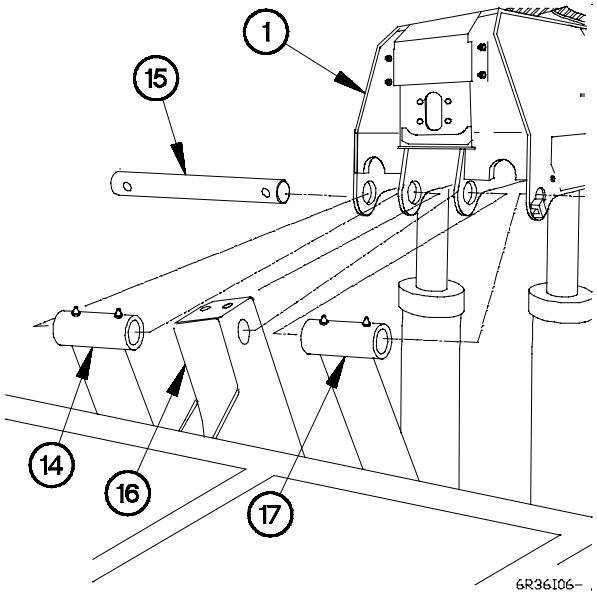
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death to personnel.

(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).



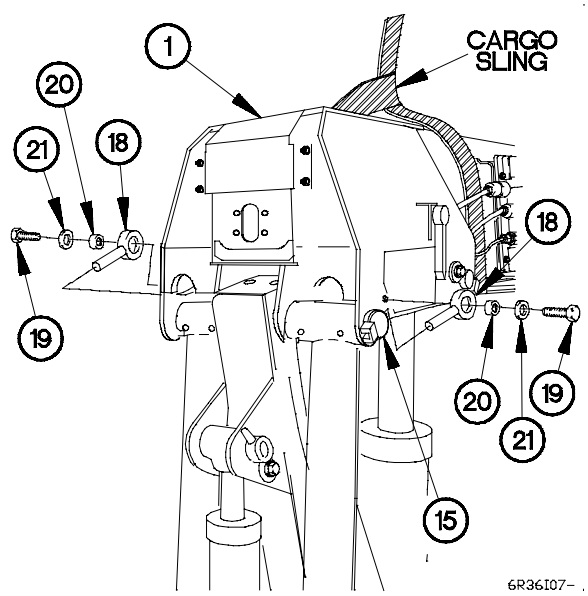


(12) Position LH tension link cylinder (14) in boom assembly (1) with pivot shaft (15).

(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)

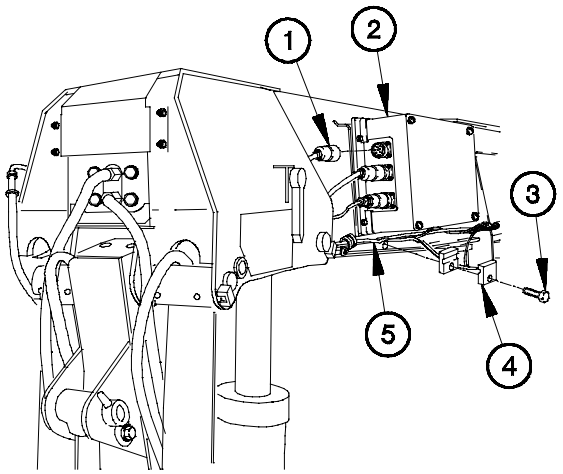
a. Removal.

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).



6R37R01-

16-37. M1089 LIFT CYLINDER REPLACEMENT (CONT)

CAUTION

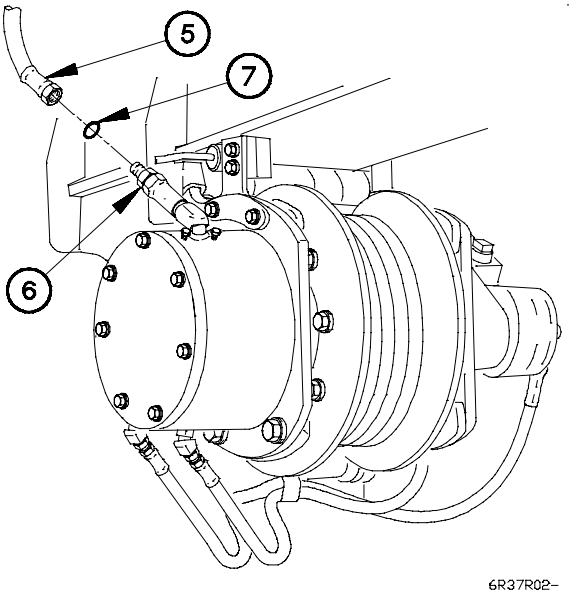
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

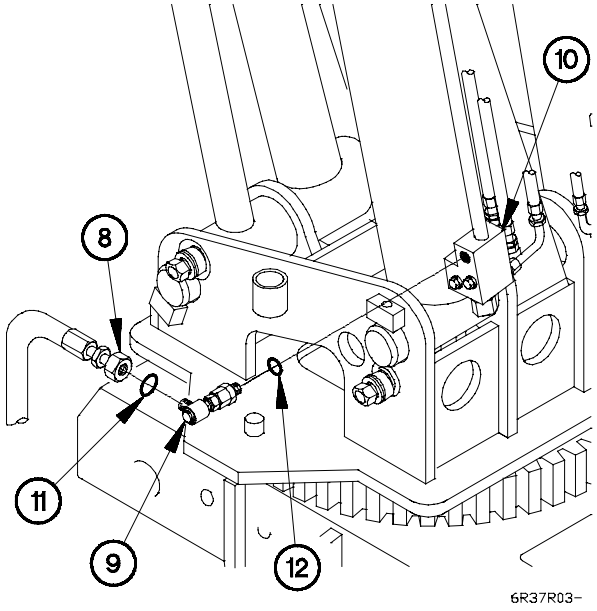
NOTE

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).

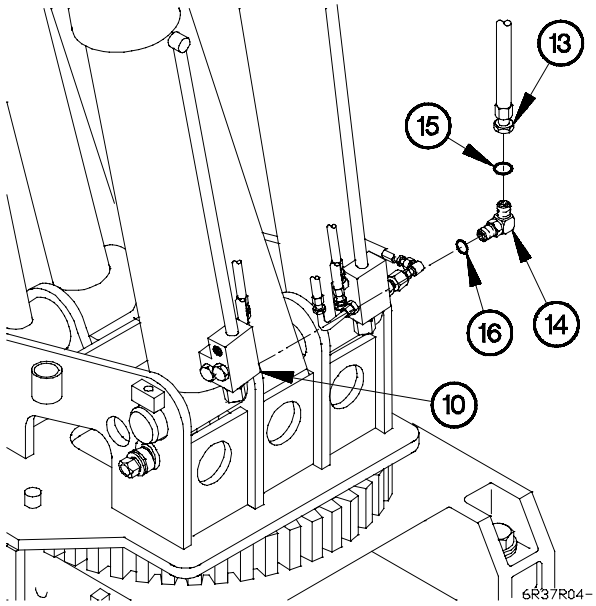
(6) Remove 90-degree fitting (9) from counterbalance valve (10).

(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).

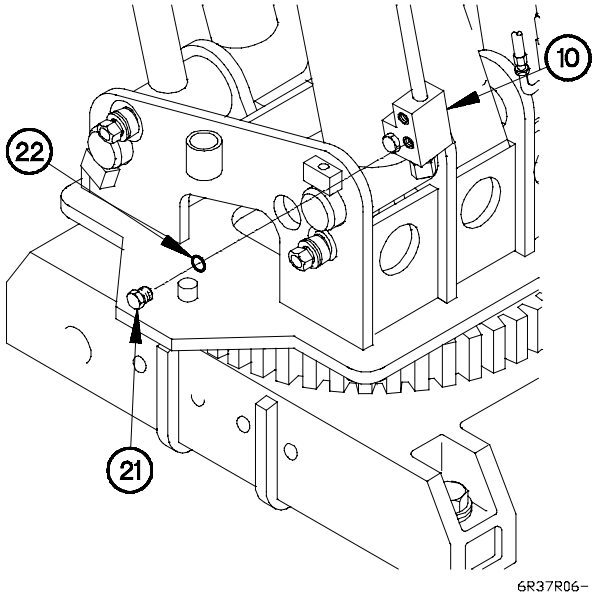
(10) Remove two preformed packings (15) and preformed packings (16) from 90-degree fittings (14). Discard preformed packings.

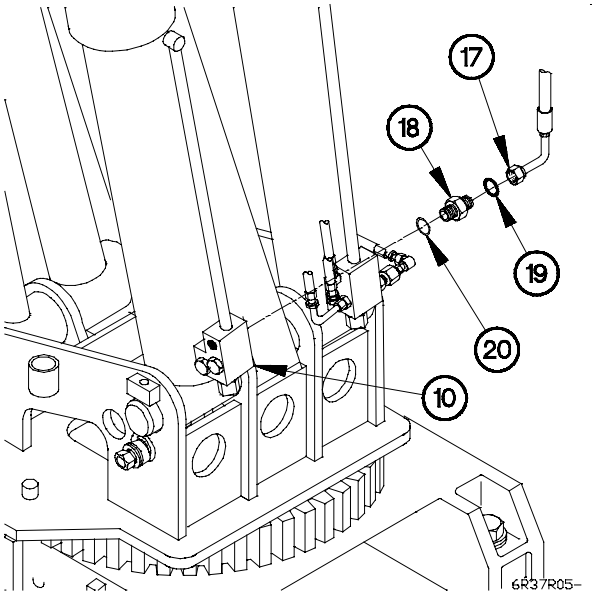


(11) Disconnect hose (17) from fitting (18).

(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.

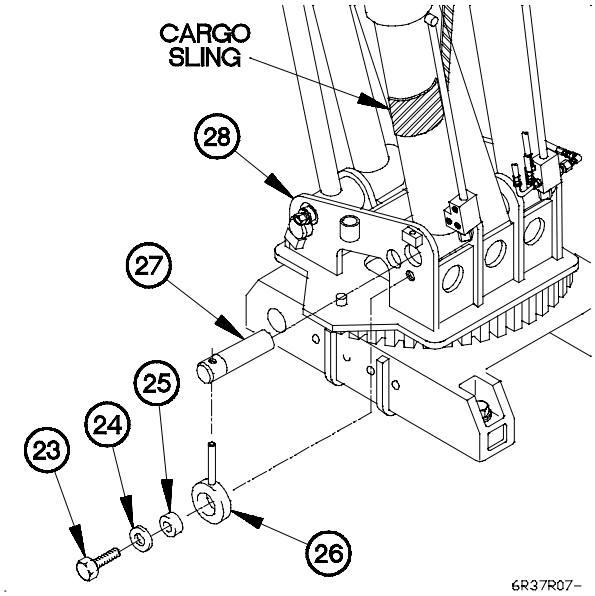
NOTE

Steps (16) through (22) require the aid of an assistant.

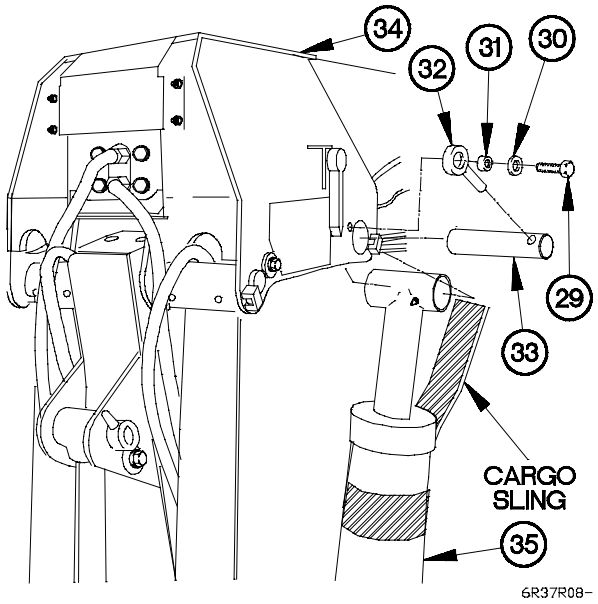
(16) Remove screw (23), washer (24), and bushing (25) from rivet eyebolt (26).

(17) Remove rivet eyebolt (26) from pivot shaft (27).

(18) Remove pivot shaft (27) from turntable (28).



16-37. M1089 LIFT CYLINDER REPLACEMENT (CONT)



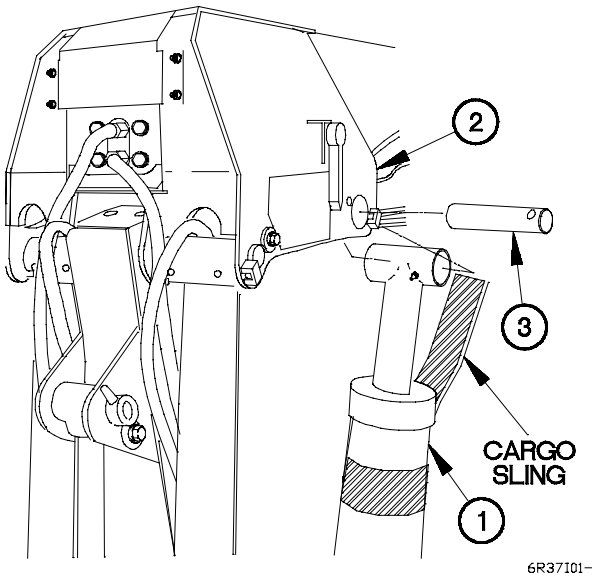
(19) Remove screw (29), washer (30), and bushing (31) from rivet eyebolt (32).

(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).

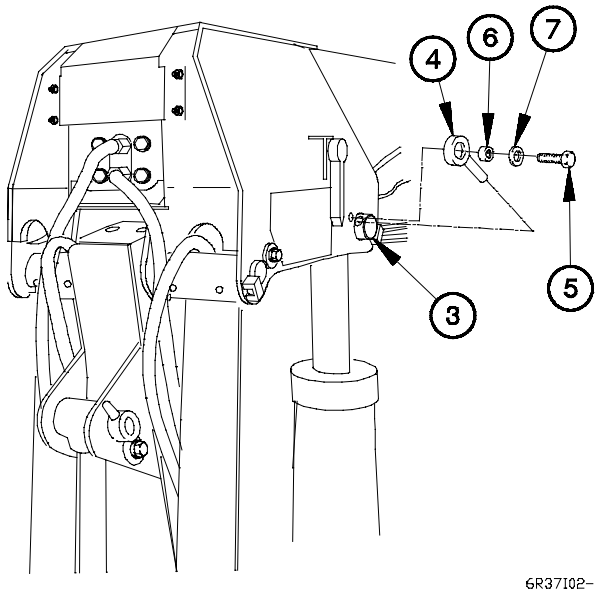
WARNING

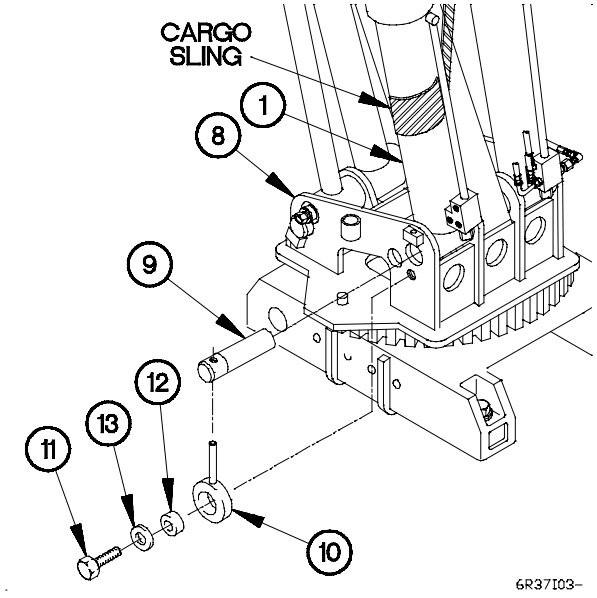
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. Failure to comply may result in injury to personnel. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in serious injury or death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





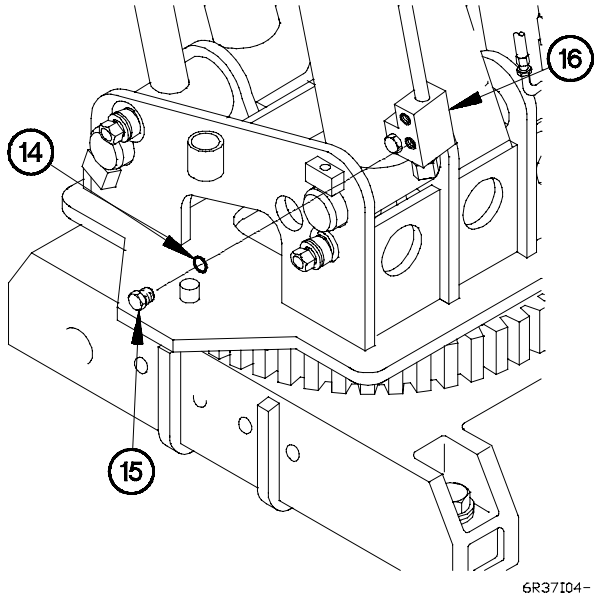
(6) Install lift cylinder (1) in turntable (8) with pivot shaft (9).

(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).

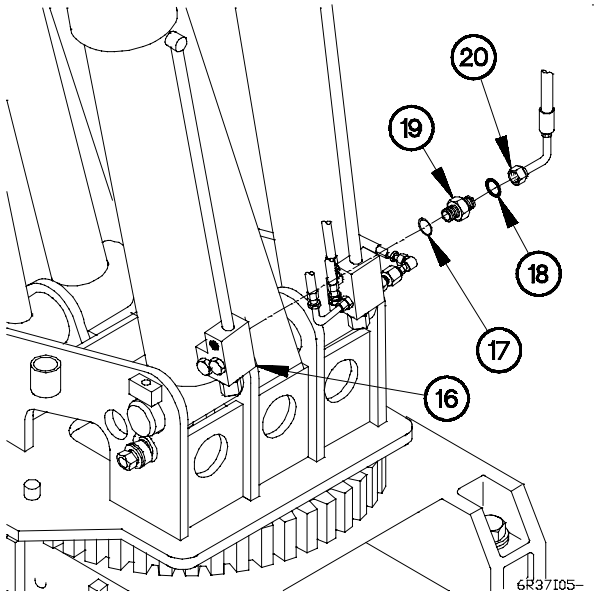
(12) Install two plugs (15) in counterbalance valve (16).

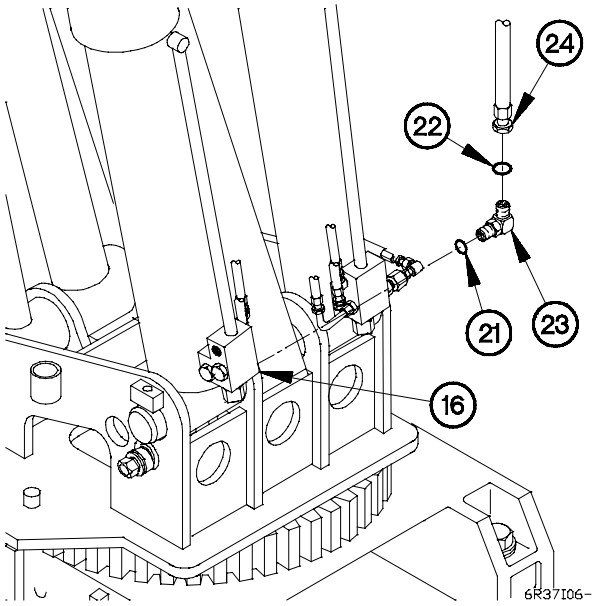
16-37. M1089 LIFT CYLINDER REPLACEMENT (CONT)

(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).

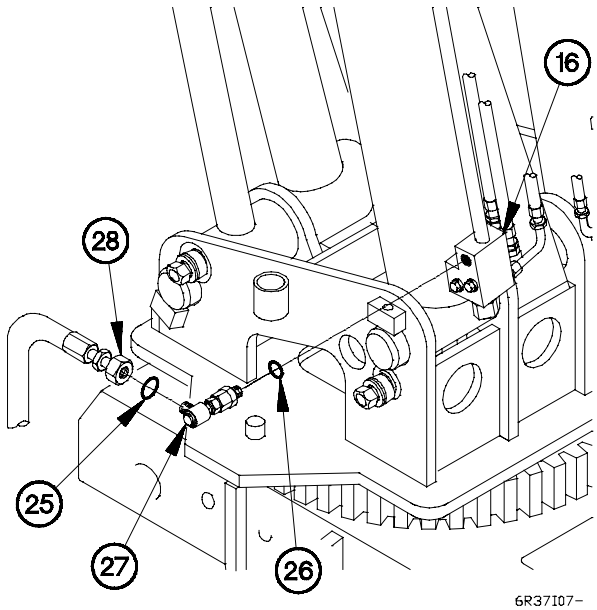
(17) Install 90-degree fittings (23) in counterbalance valve (16).

(18) Connect two hoses (24) to 90-degree fittings (23).

(19) Install preformed packings (25 and 26) on 90-degree fitting (27).

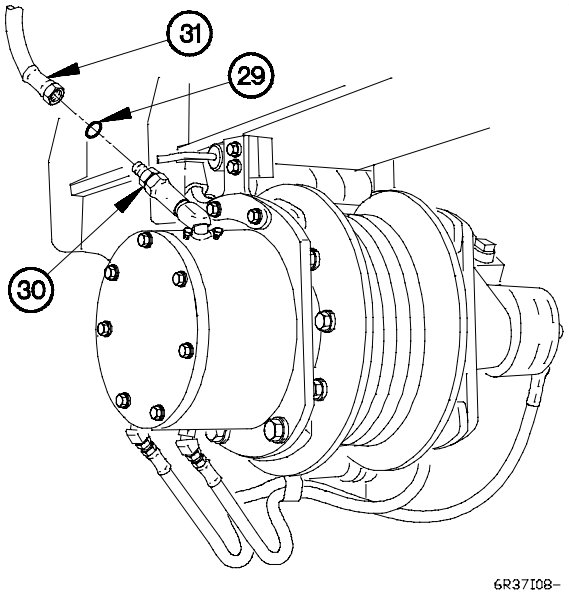
(20) Install 90-degree fitting (27) on counterbalance valve (16).

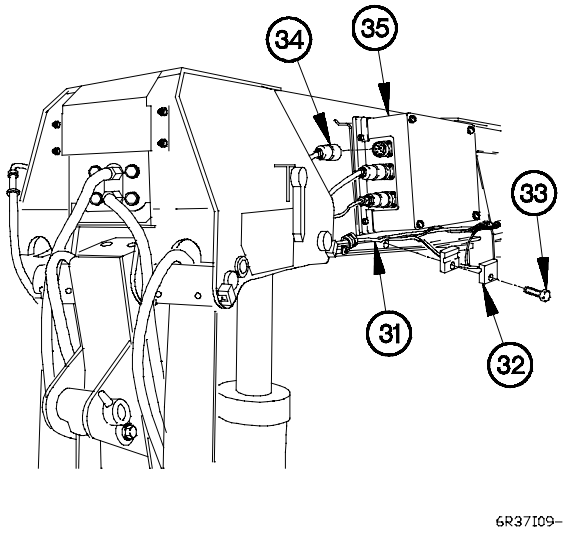
(21) Connect hose (28) to 90-degree fitting (27).



(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).

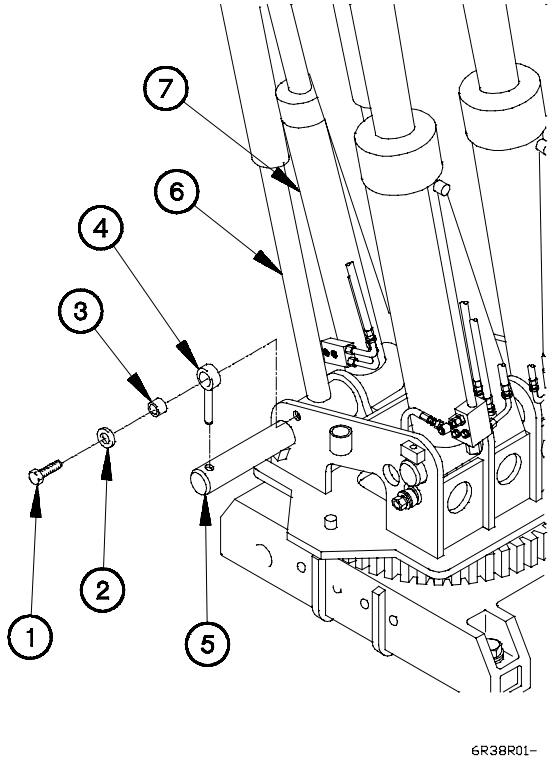
WARNING

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).

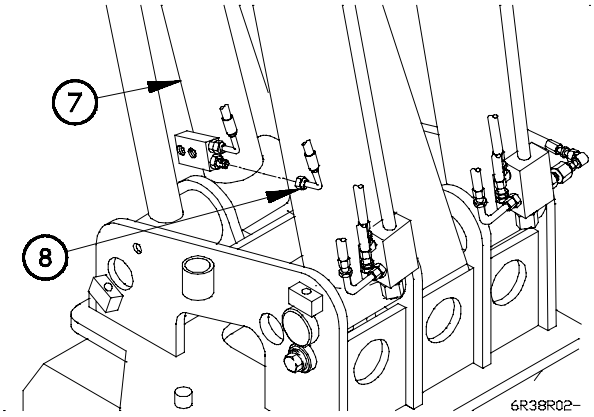
CAUTION

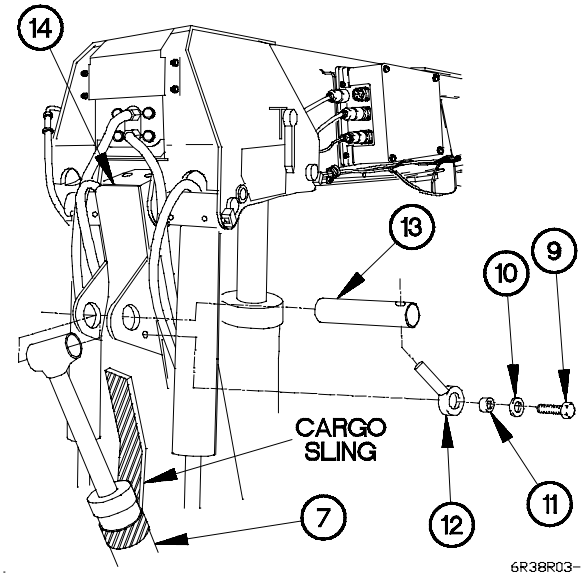
Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

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.

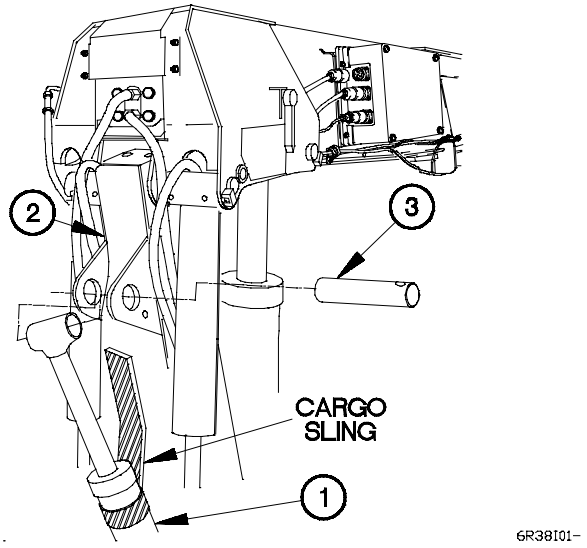
WARNING

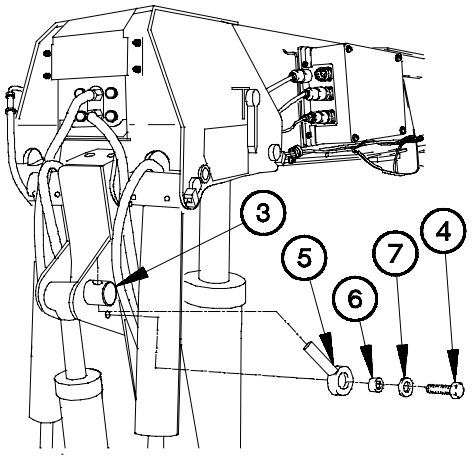
Erection cylinder weighs approximately 70 lbs (32 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

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).

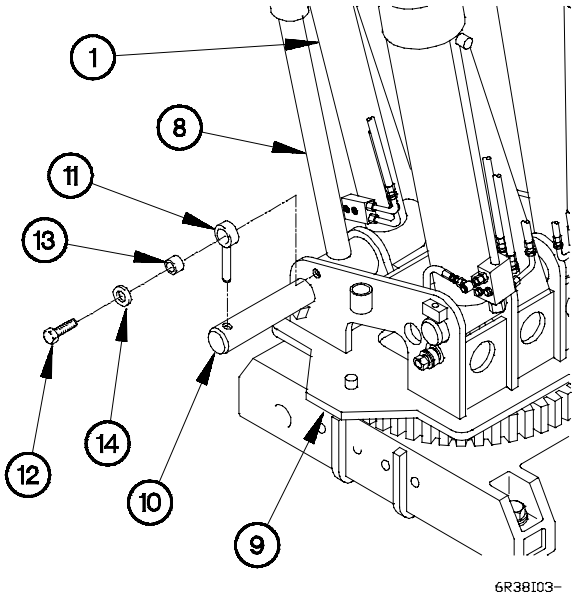
(7) Install two rivet eyebolts (11) in pivot shaft (10).

WARNING

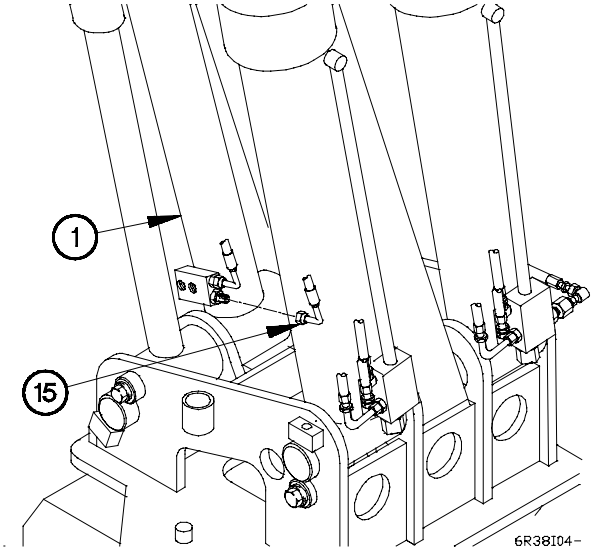
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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)

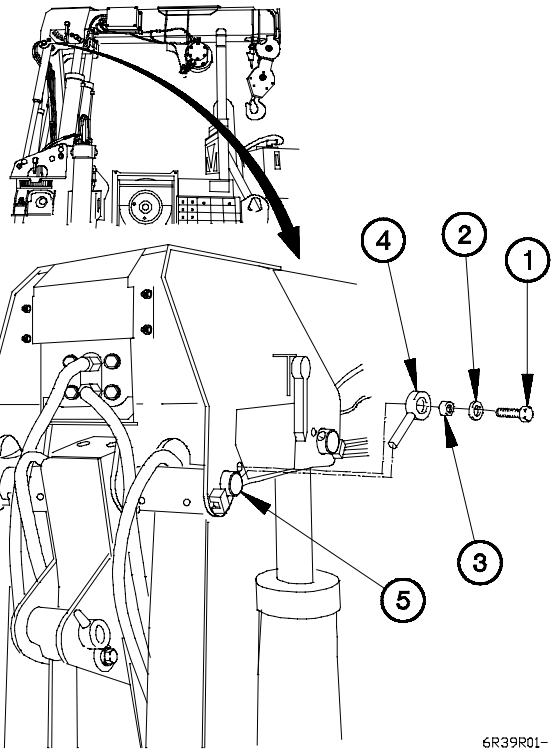
a. Removal.

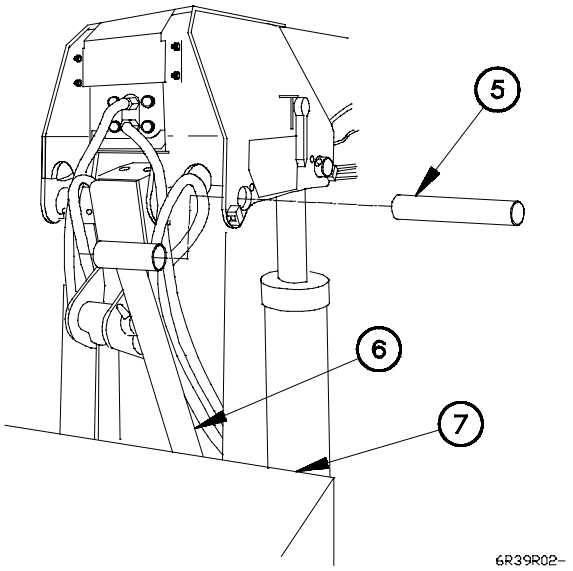
NOTE

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

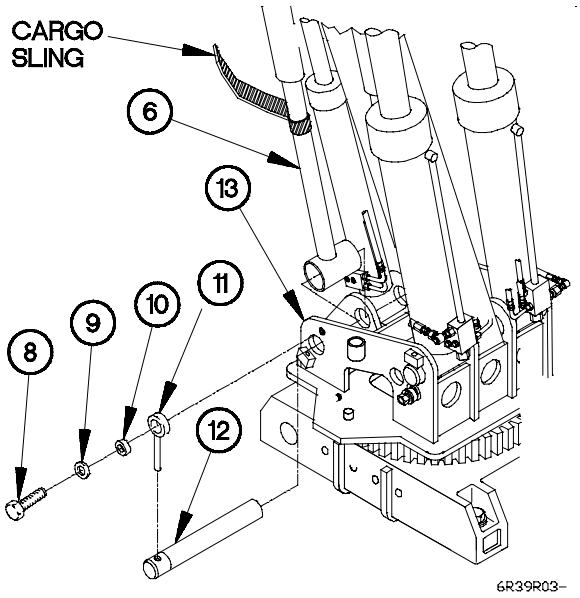
- Steps (3) through (9) require the aid of an assistant.
- Drive out pivot shaft far enough to free tension link cylinder.

(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

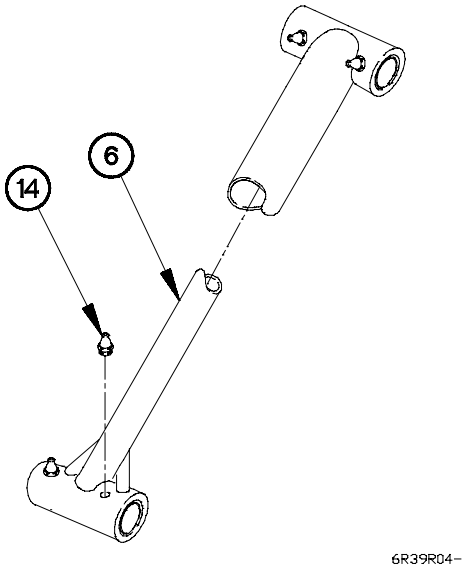
Tension link cylinder weighs approximately 60 lbs (27 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Drive out pivot shaft far enough to free tension link cylinder.

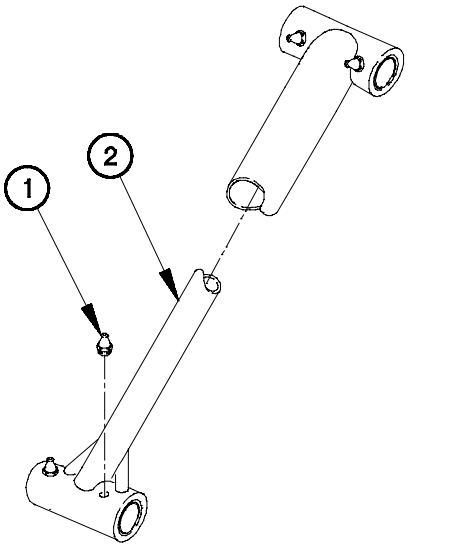
(7) Drive pivot shaft (12) out of tension link cylinder (6).

(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

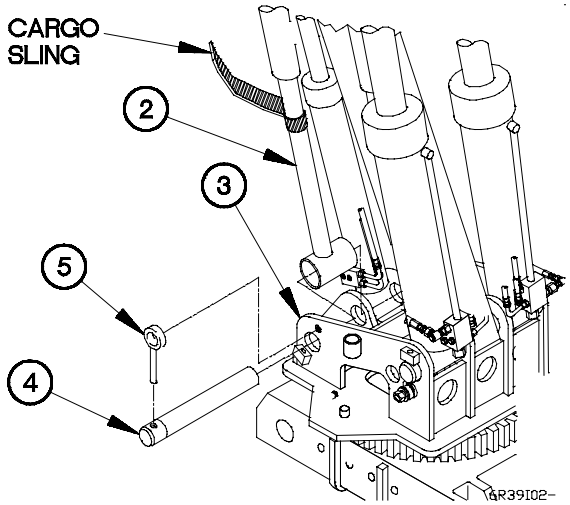
Tension link cylinder weighs approximately 60 lbs (27 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

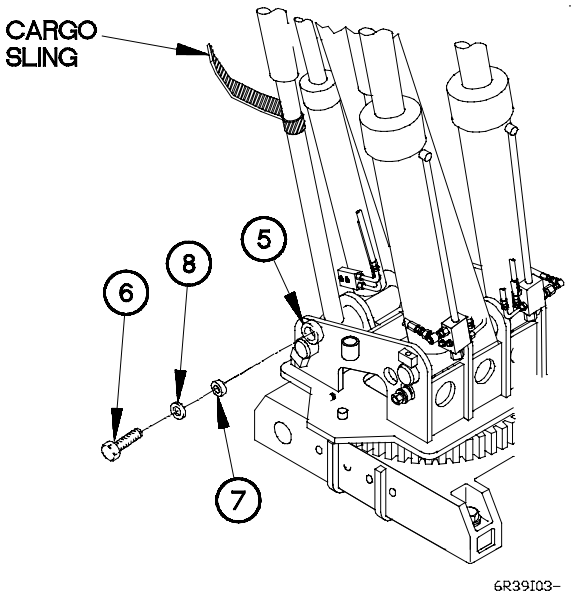
NOTE

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

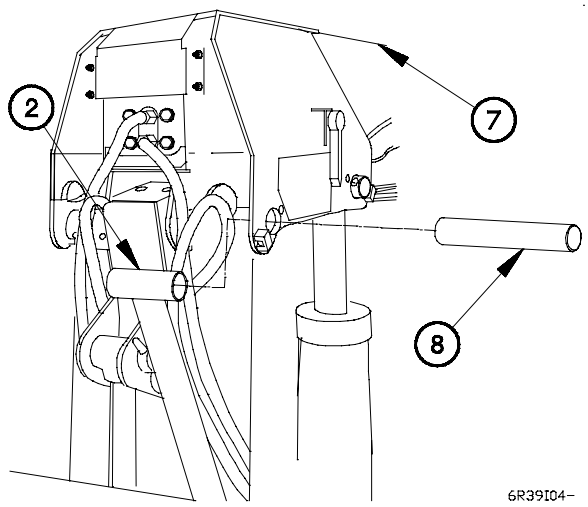
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

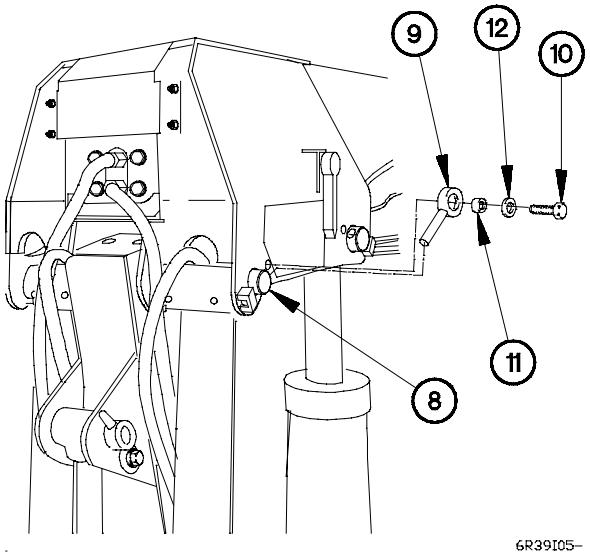
(4) Apply sealing compound to threads of two screws (6).

(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.

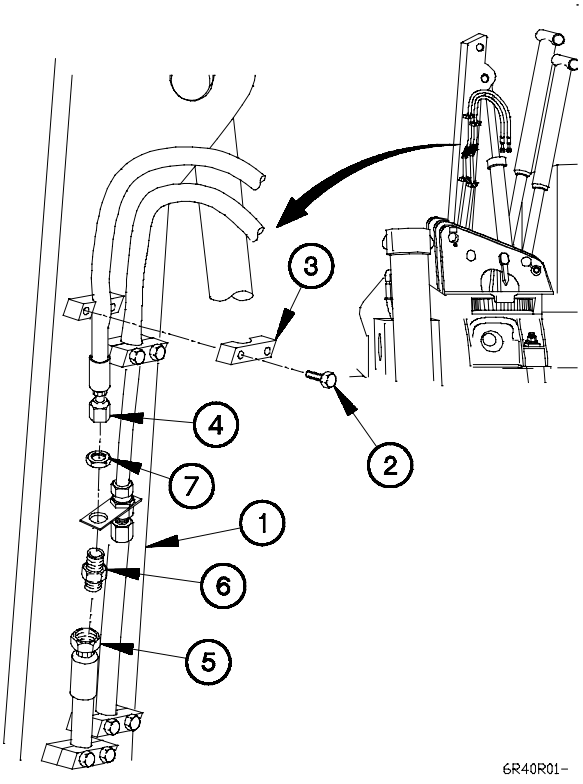
NOTE

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

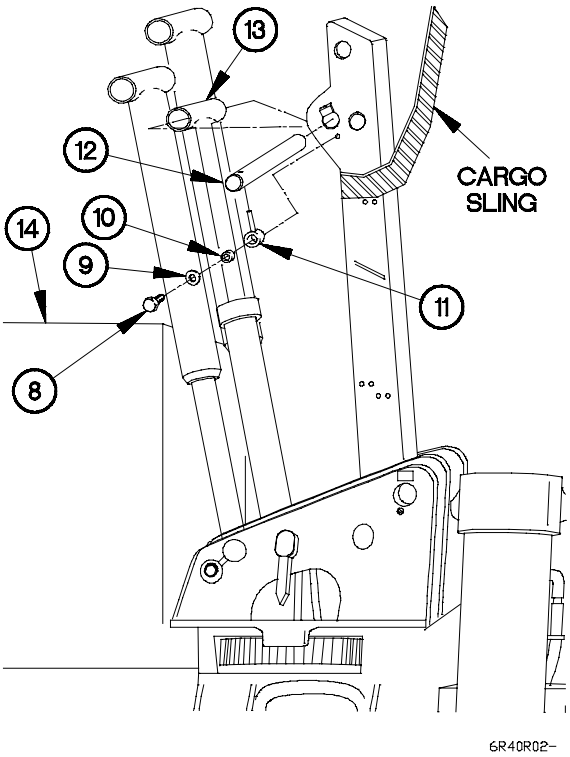
Steps (6) through (13) require the aid of an assistant.

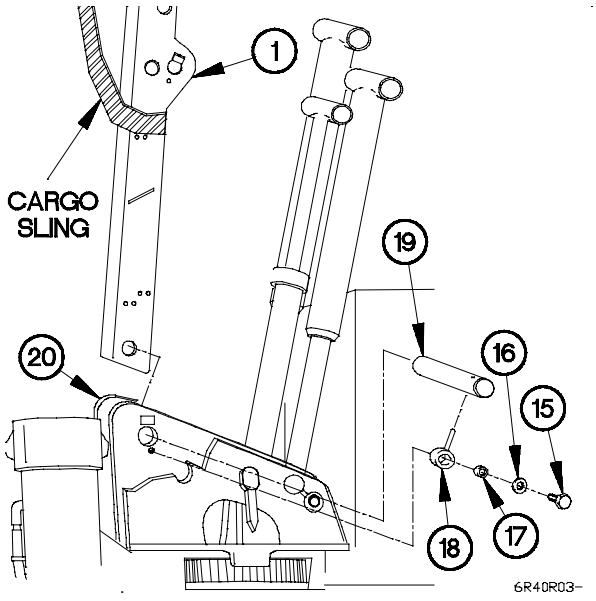
(6) Remove screw (8), washer (9), and bushing (10) from rivet eyebolt (11).

(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).

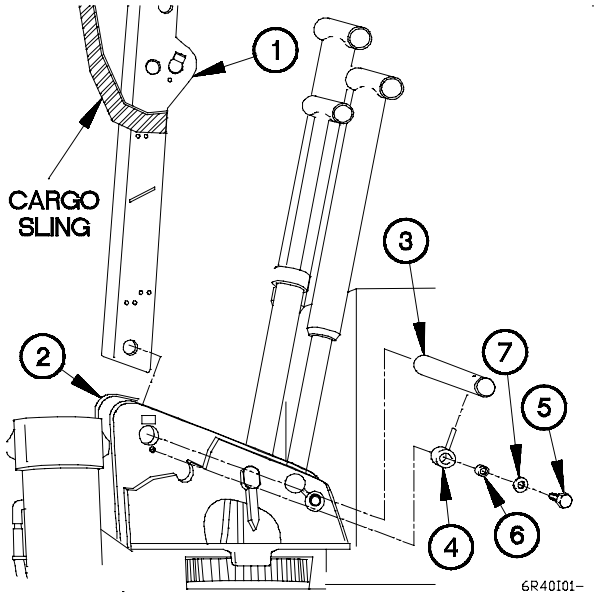
(13) Remove mast (1) from turntable (20).

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).

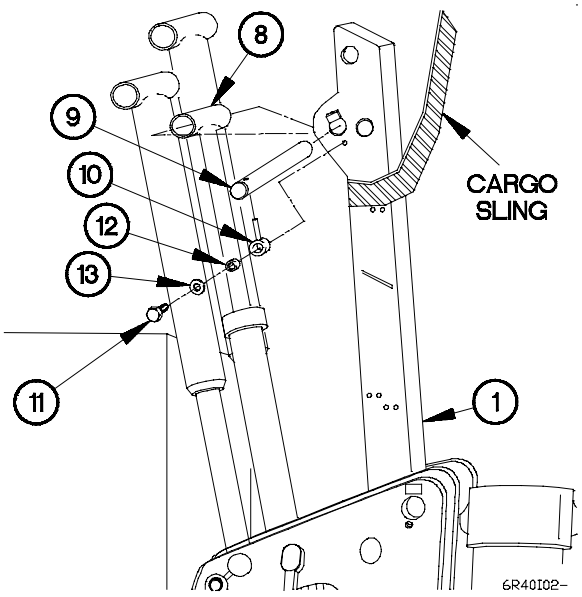
WARNING

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

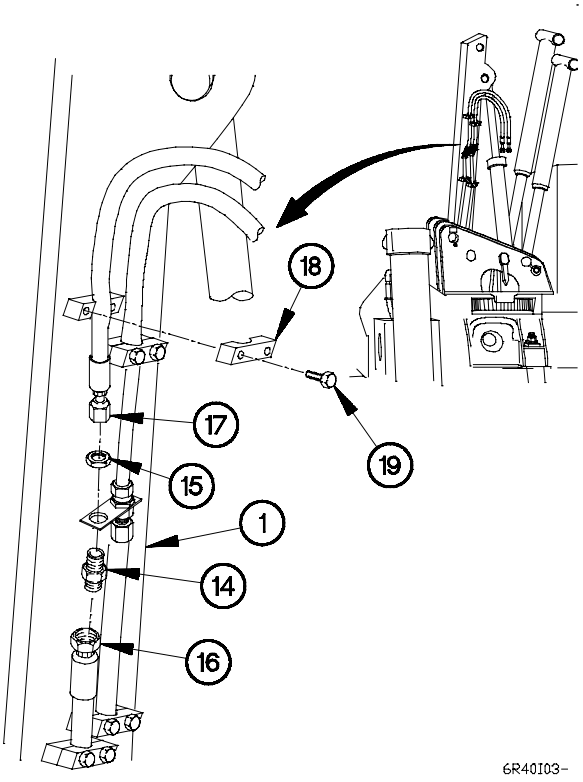
Left and right side hydraulic hoses are installed the same way. Left side shown.

(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

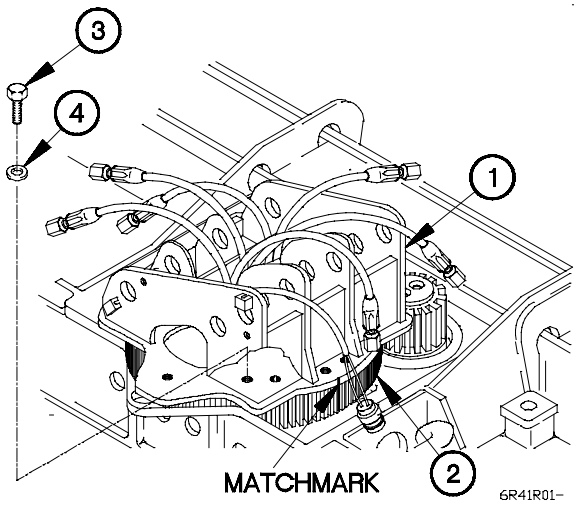
Equipment Conditions
Mast removed (para 16-40).
Tension link assembly removed (para 16-39).
Erection cylinder removed (para 16-38).

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)

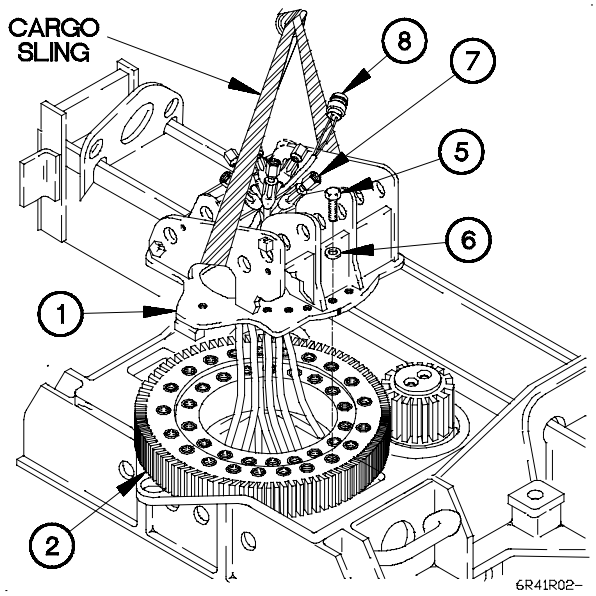
Personnel Required
(2)

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

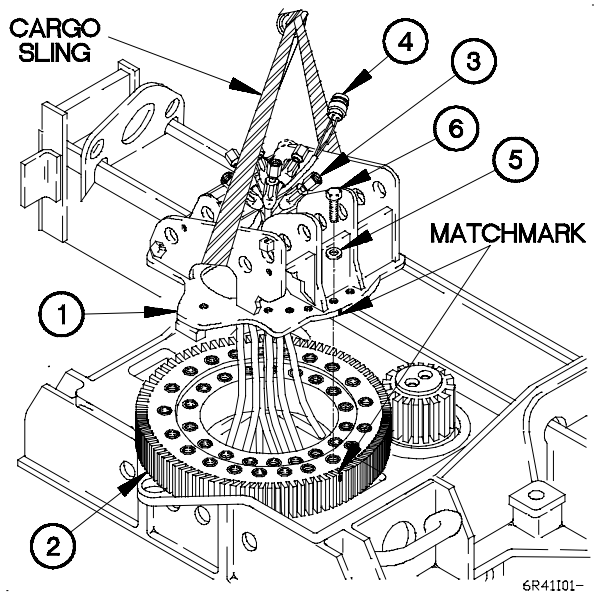
Step (1) requires the aid of an assistant.

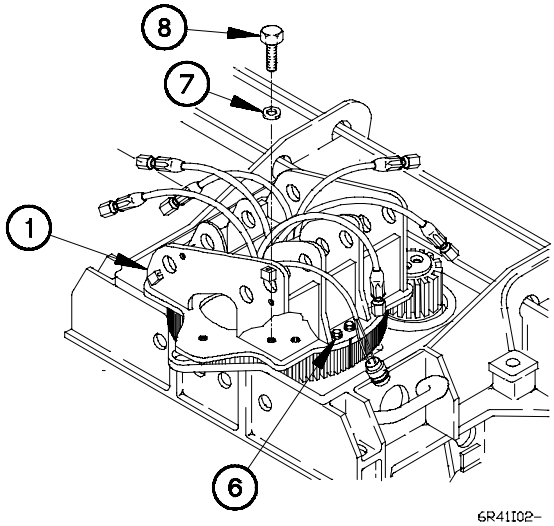
(1) Position turntable (1) over ring gear (2).

(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)

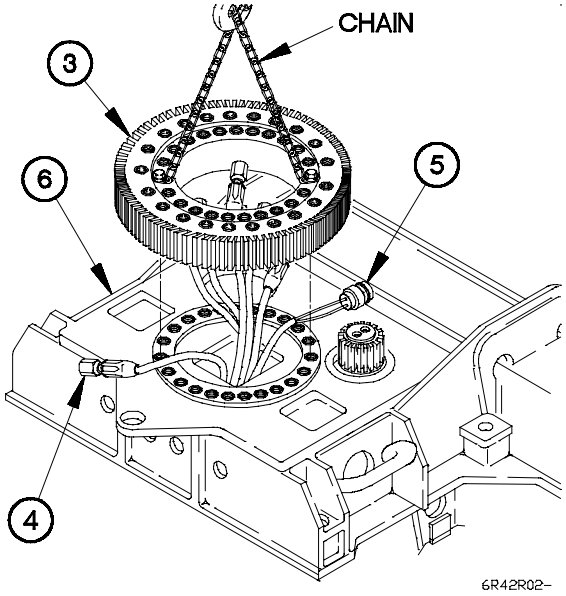
a. Removal.

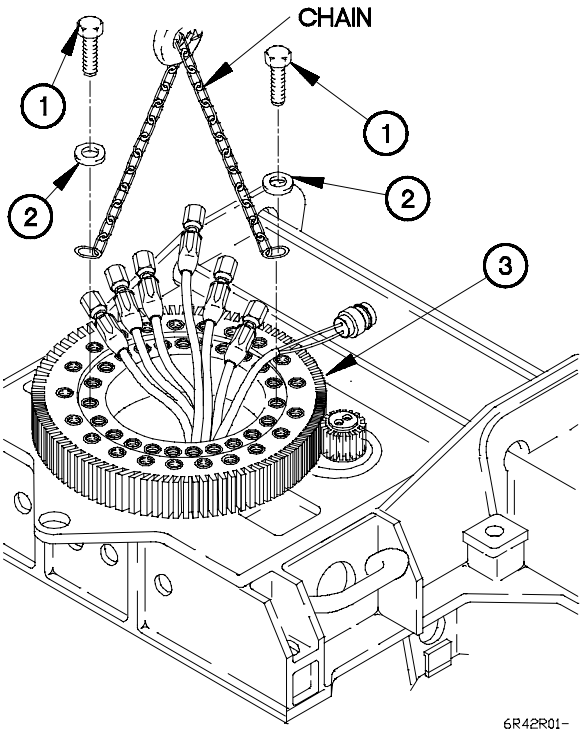
WARNING

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).





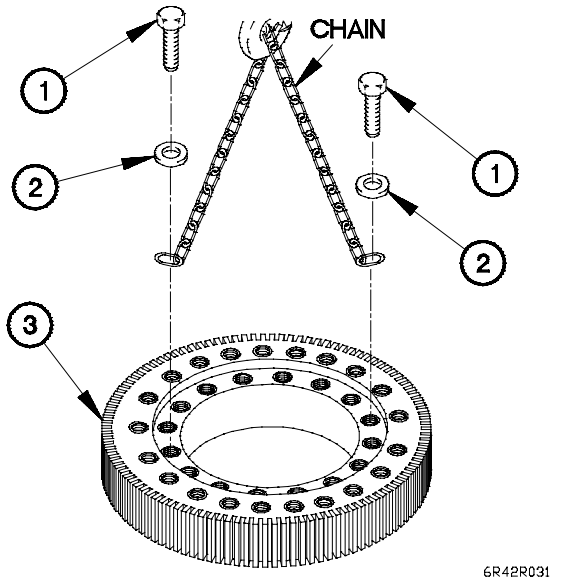
NOTE

Step (3) requires the aid of an assistant.

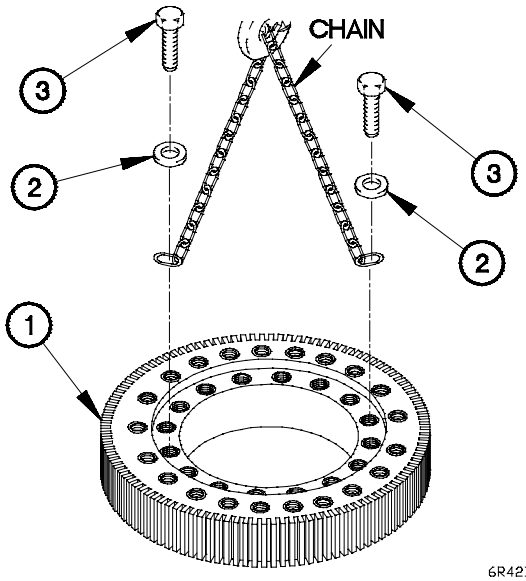
(3) Guide hoses (4) and electrical connector (5) through turntable bearing (3).

(4) Remove turntable bearing (3) from subframe (6).

(5) Remove two screws (1), washers (2), and chain from turntable bearing (3).



b. Installation.



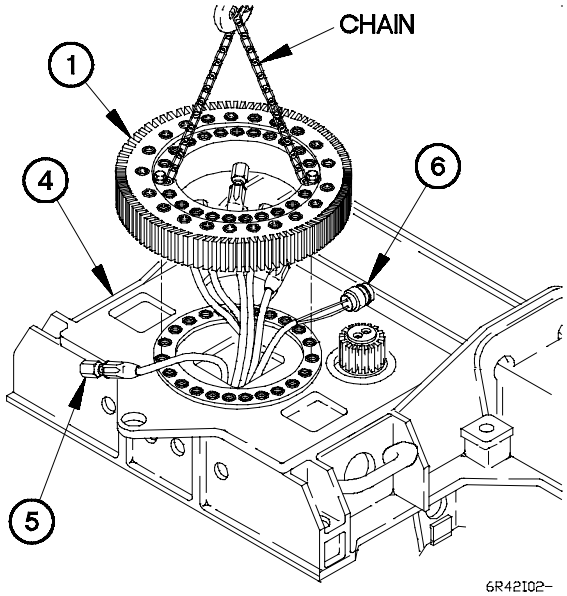
(1) Install chain on turntable bearing (1) with two washers (2) and screws (3).

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).

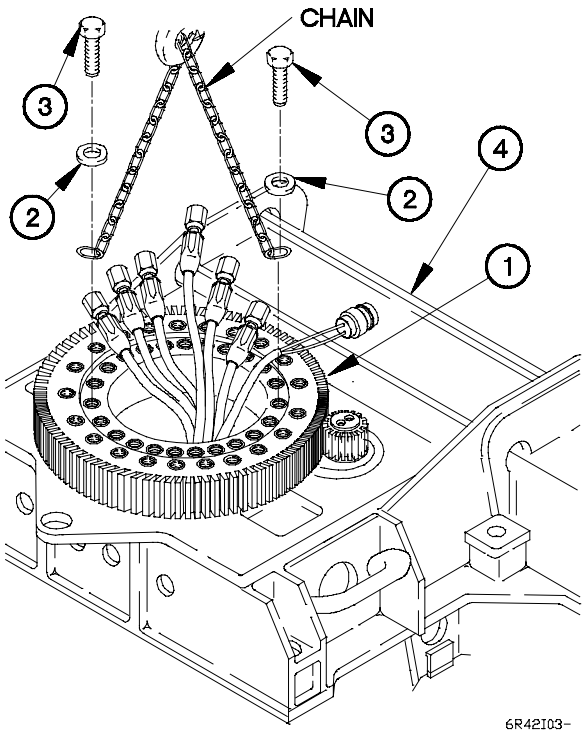
16-42. M1089 TURNTABLE BEARING REPLACEMENT (CONT)

(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.

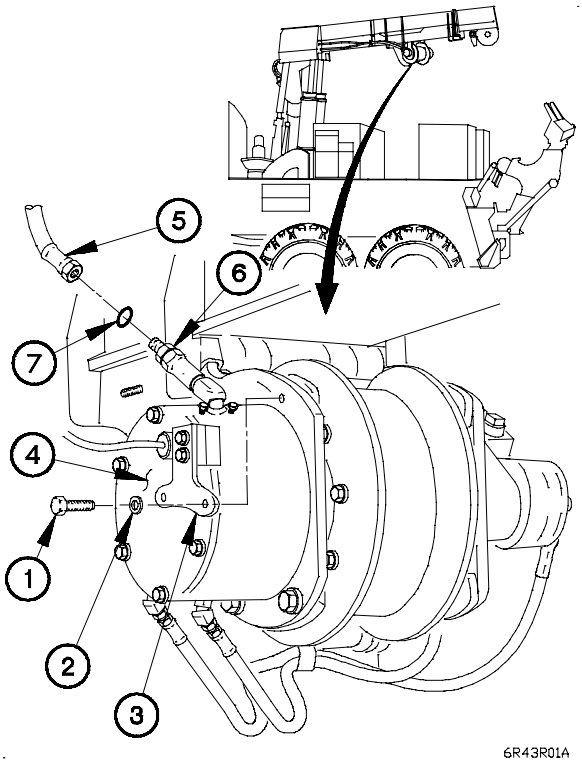
NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

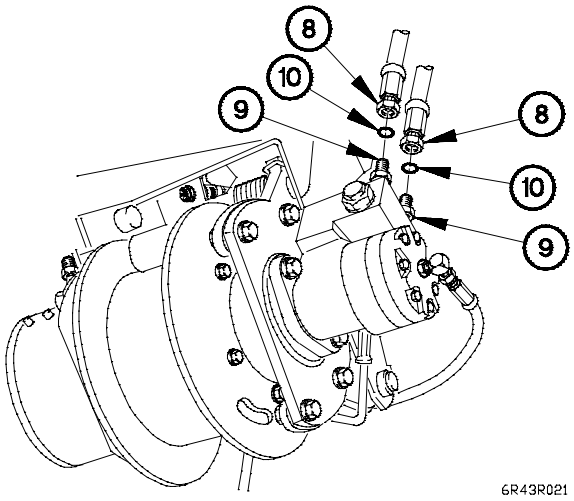
(3) Disconnect hydraulic hose (5) from check valve (6).

(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).

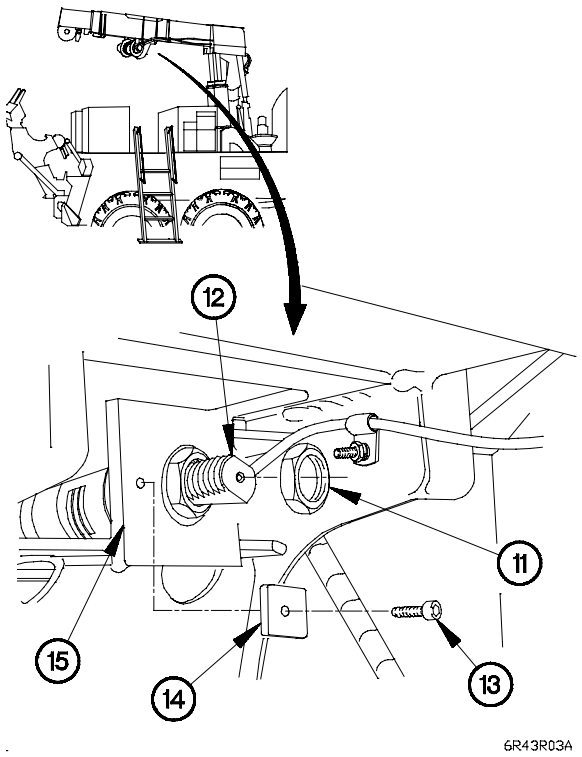


16-43. M1089 HOIST ASSEMBLY REPLACEMENT (CONT)



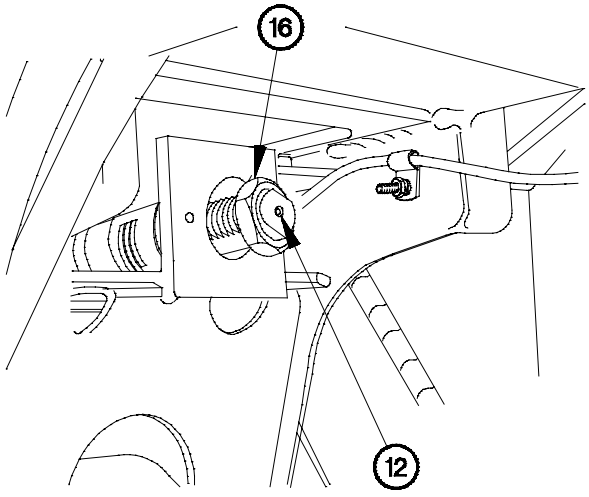
(6) Disconnect two hydraulic hoses (8) from fittings (9).

(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.

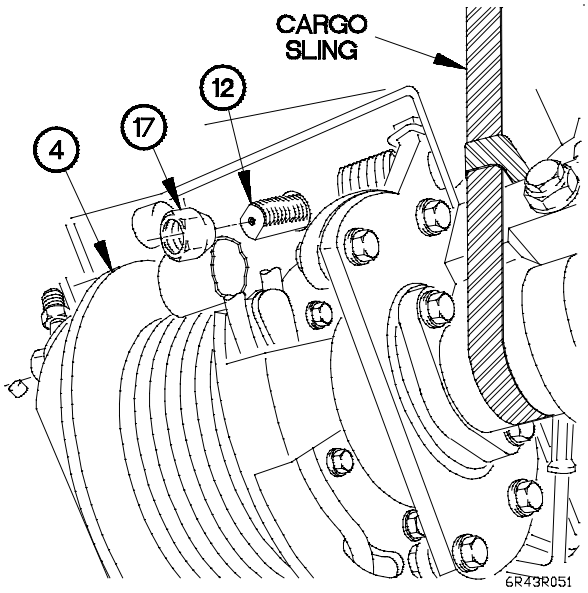
NOTE

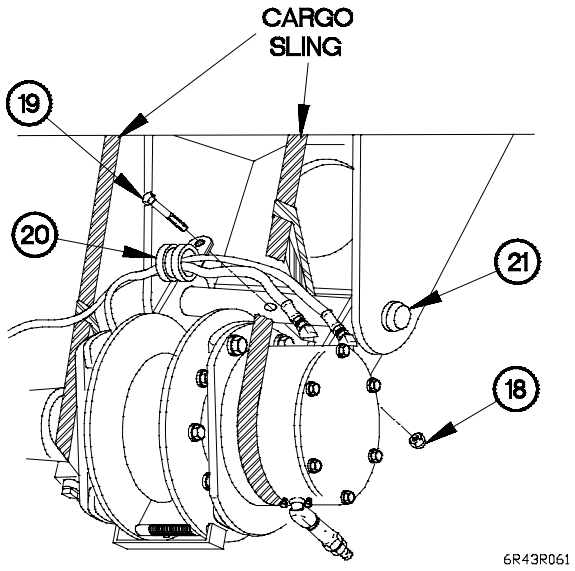
Steps (11) through (13) require the aid of an assistant.

(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).



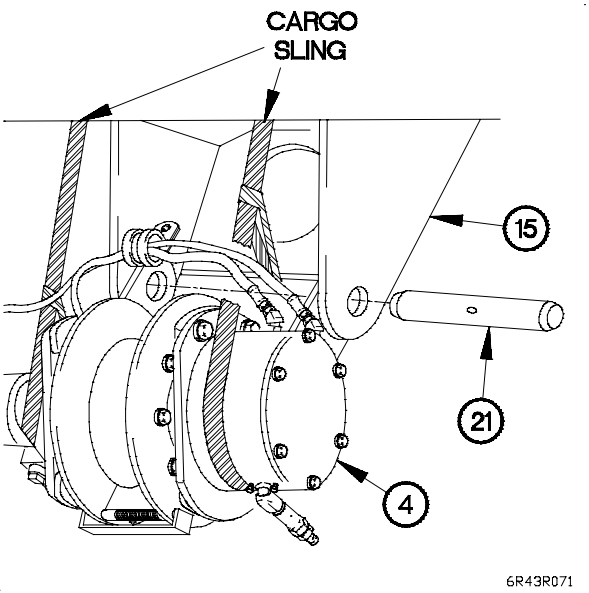


(14) Remove self-locking nut (18), screw (19), and clamp (20) from shaft (21). Discard self-locking nut.

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.

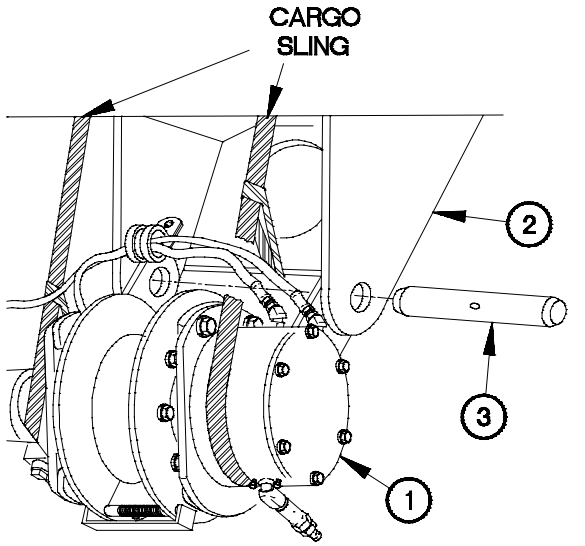
WARNING

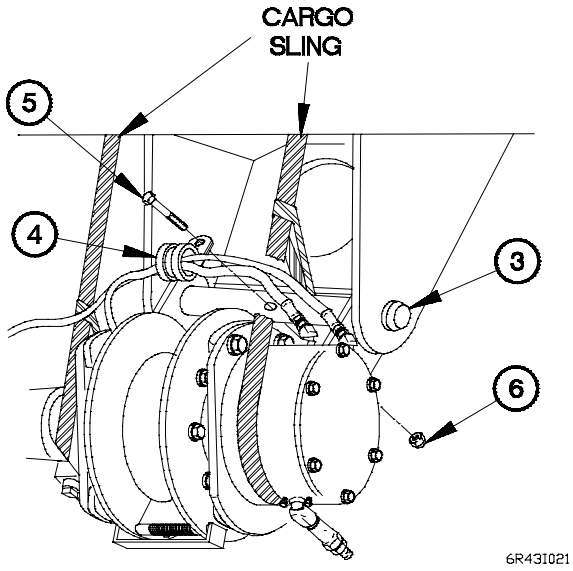
Hoist assembly weighs approximately 210 lbs (95 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Step (1) requires the aid of an assistant.

(1) Install hoist assembly (1) in boom brace (2) with shaft (3).



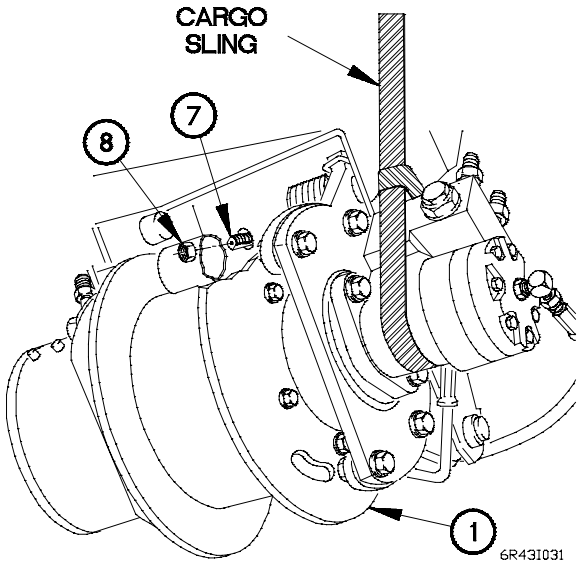


(2) Install clamp (4), screw (5), and self-locking nut (6) on shaft (3).

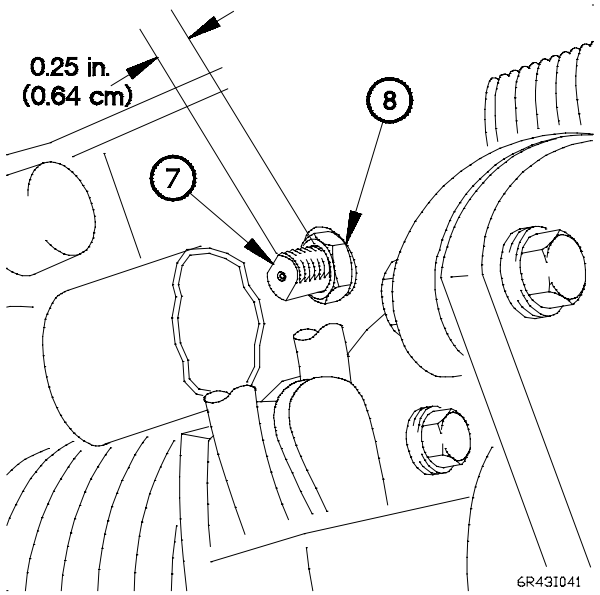
NOTE

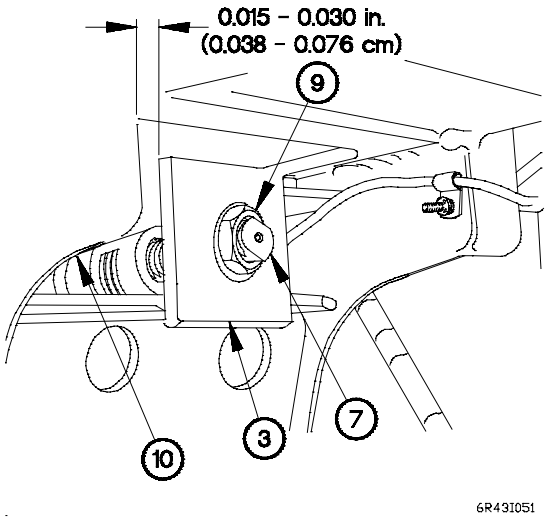
Step (3) requires the aid of an assistant.

(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

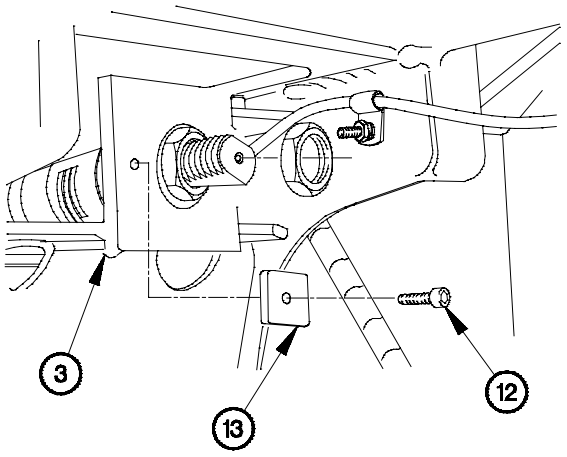
Step (5) requires the aid of an assistant.

(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

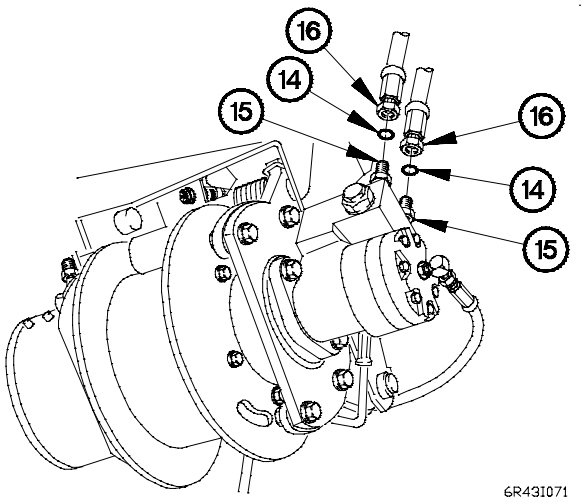
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.



(7) Apply sealing compound to threads of screw (12).

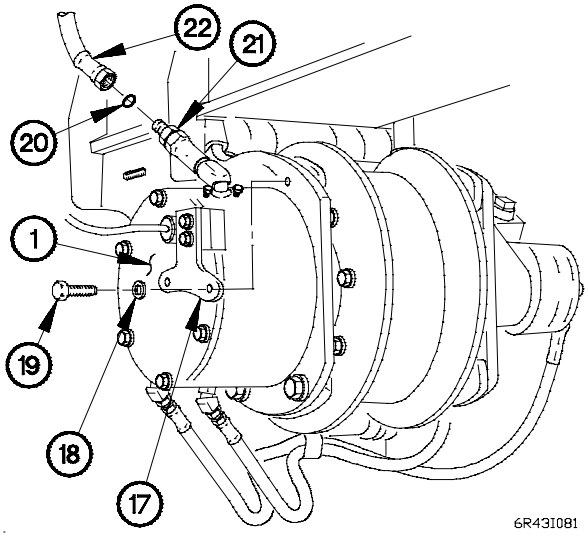
(8) Install stop block (13) and screw (12) on boom brace (3).

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)

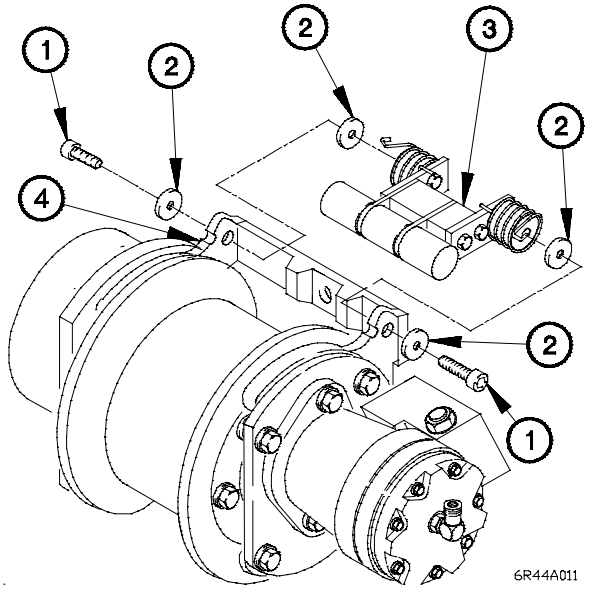
Materials/Parts
Sealing Compound (Item 76, Appendix C)

a. Removal.

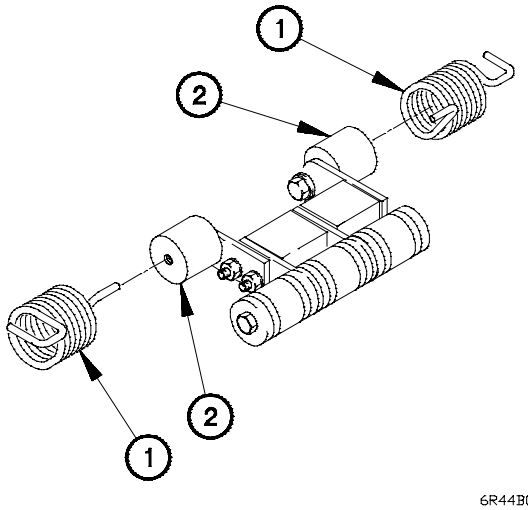
WARNING

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.

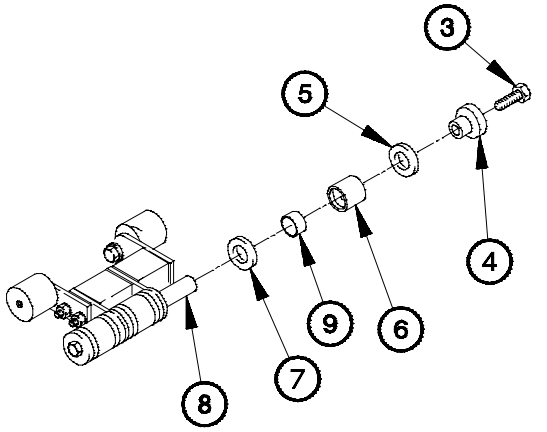


(1) Remove two springs (1) from posts (2).

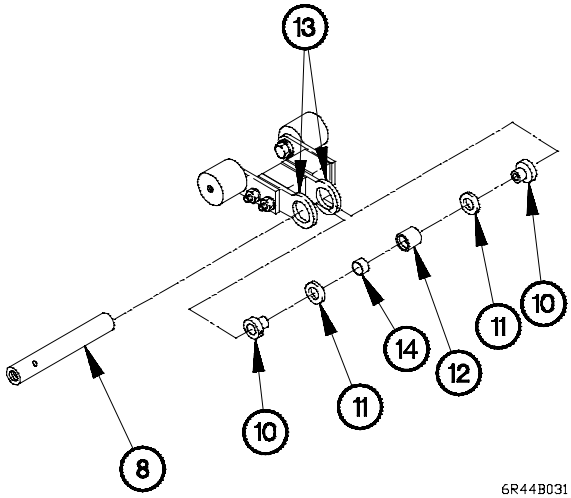
16-44. M1089 CABLE FOLLOWER REPLACEMENT/REPAIR (CONT)

(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



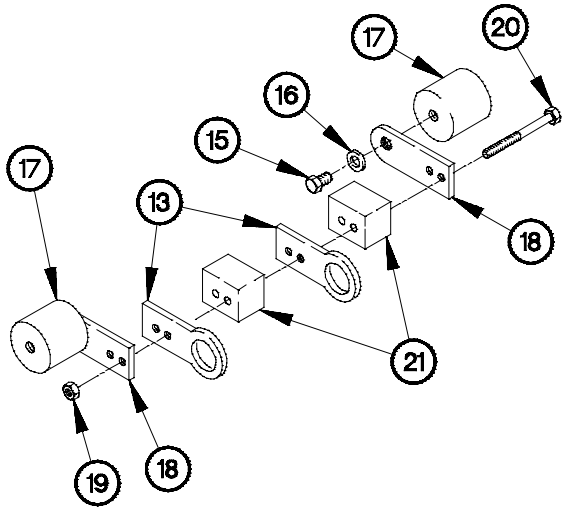
6R44B031

(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).

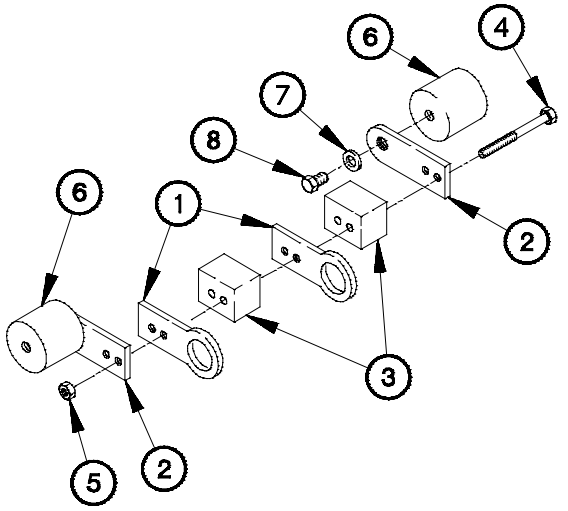


6R44B041

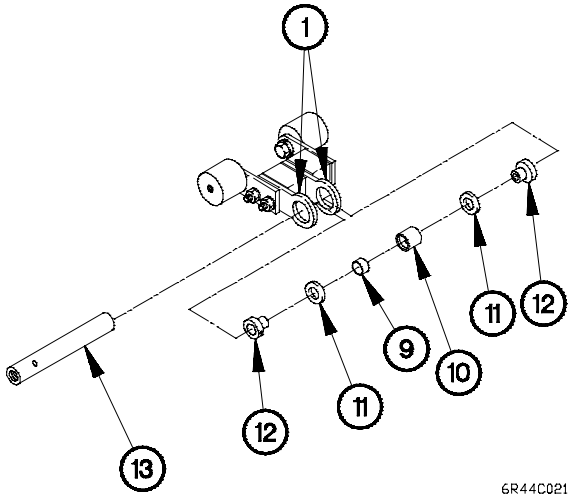
c. Assembly.

(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



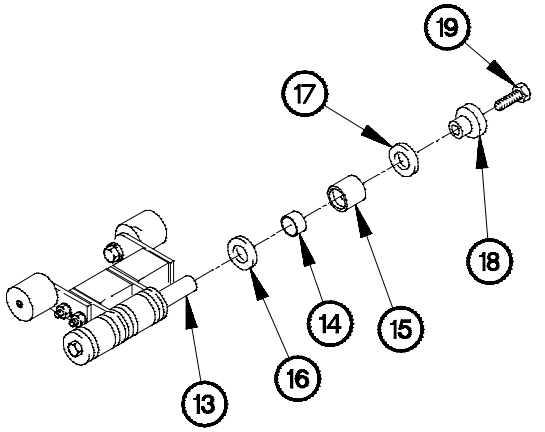
6R44C021

(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).

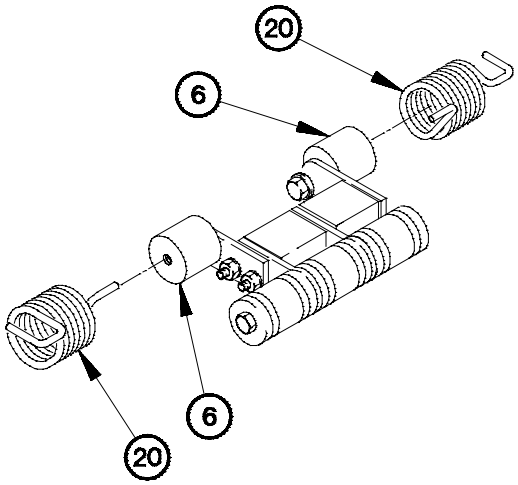
(6) Install two washers (16), rollers (15), washers (17), and washers (18) on shaft (13) with screws (19).



6R44C031

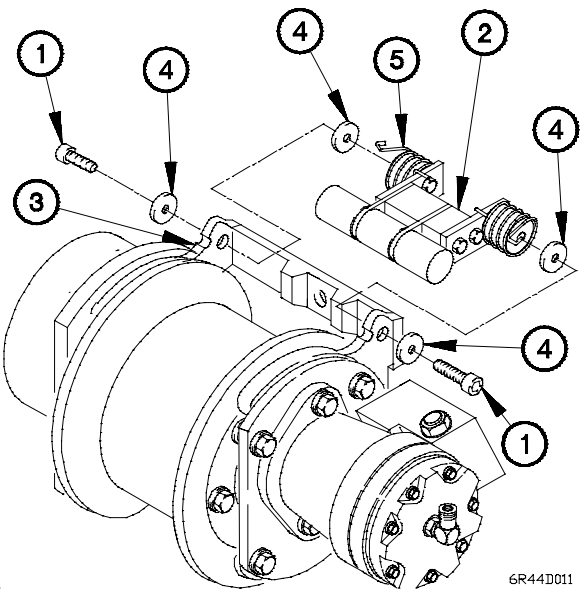
16-44. M1089 CABLE FOLLOWER REPLACEMENT/REPAIR (CONT)

(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

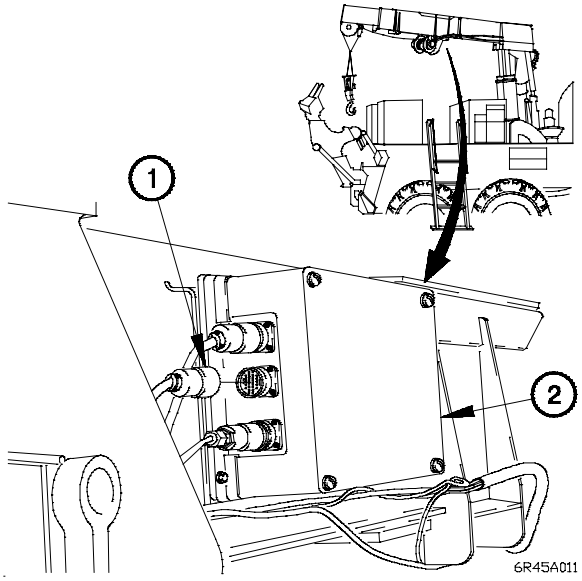
INITIAL SETUP

Equipment Conditions
Boom positioned over tool boxes (TM 9-2320-366-10-2).
Batteries disconnected (TM 9-2320-366-20-3).

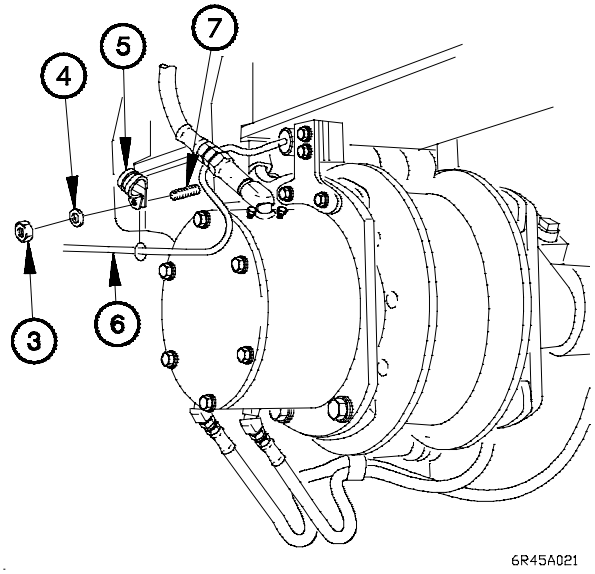
Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 ft-lb (Item 92, Appendix B)
Goggles, Industrial (Item 28, Appendix B)

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

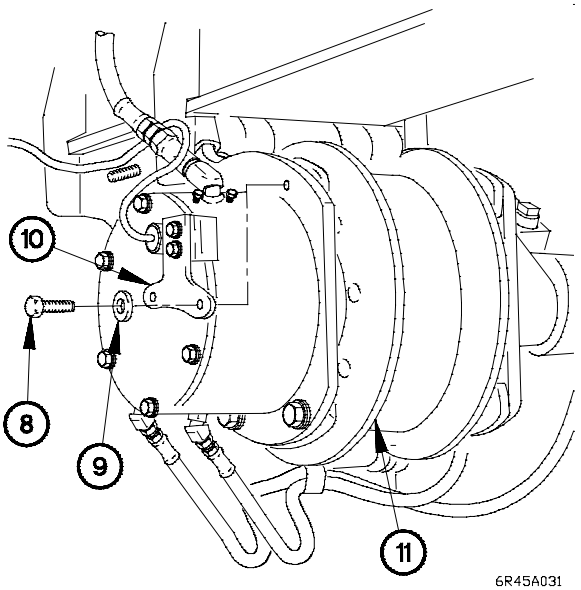
Remove plastic cable ties as required.

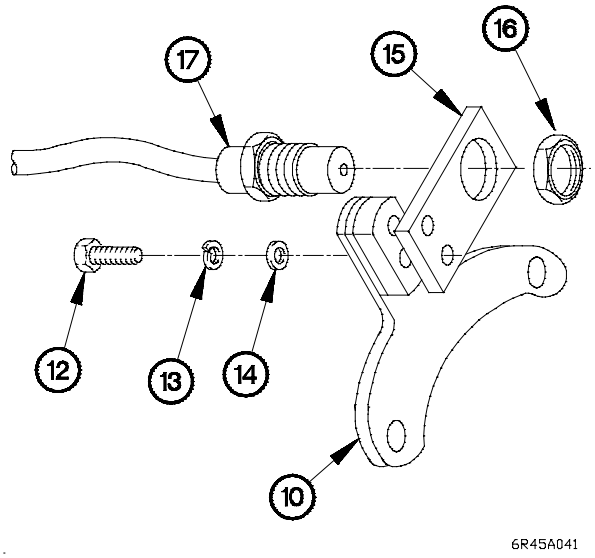
(2) Remove nut (3), washer (4), clamp (5), and cable (6) from boom stud (7).

(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.

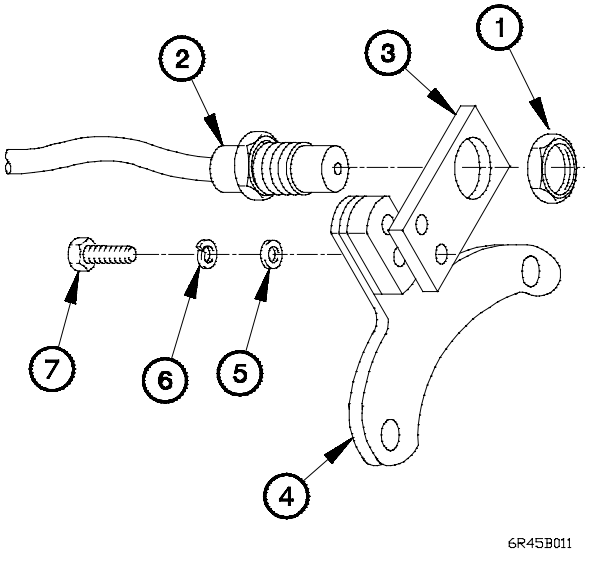
(6) Remove nut (16) and proximity sensor (17) from plate (15).

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).



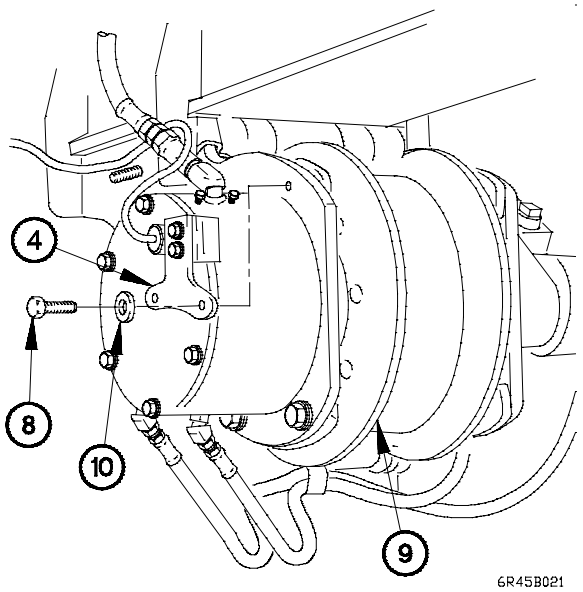
WARNING

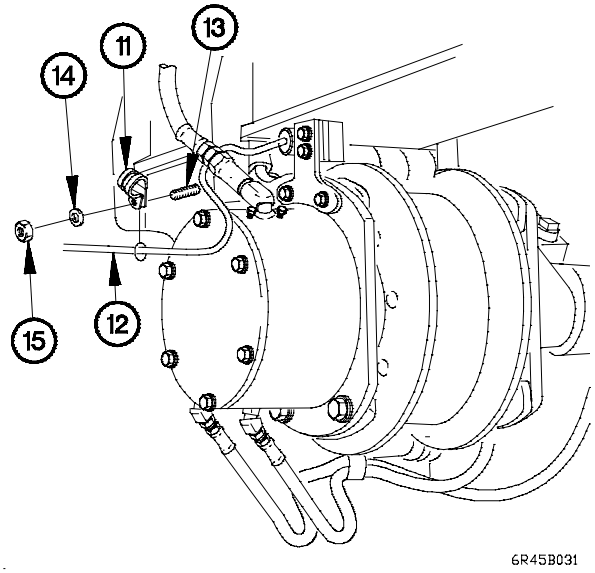
Adhesive-sealant MIL-S-46163 can damage your eyes. Wear safety goggles when using; avoid contact with eyes. If adhesive-sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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).





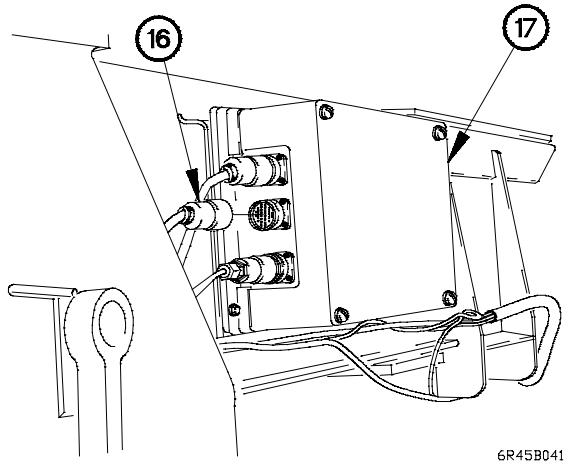
NOTE

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).

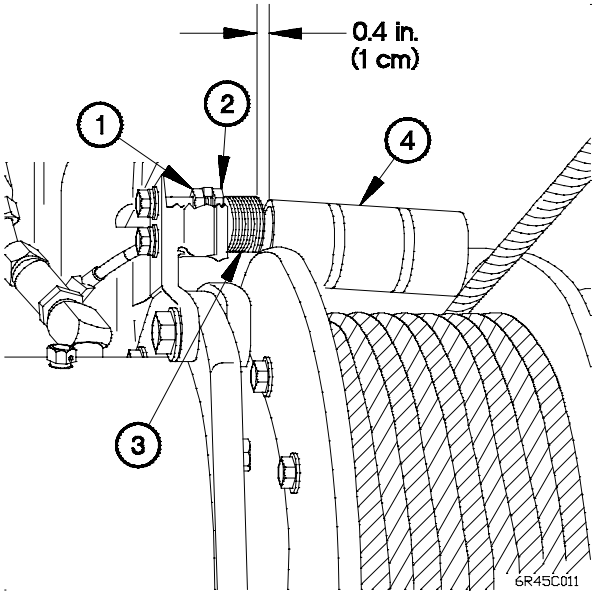
(9) Connect connector (16) to overload shutdown box (17).



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)

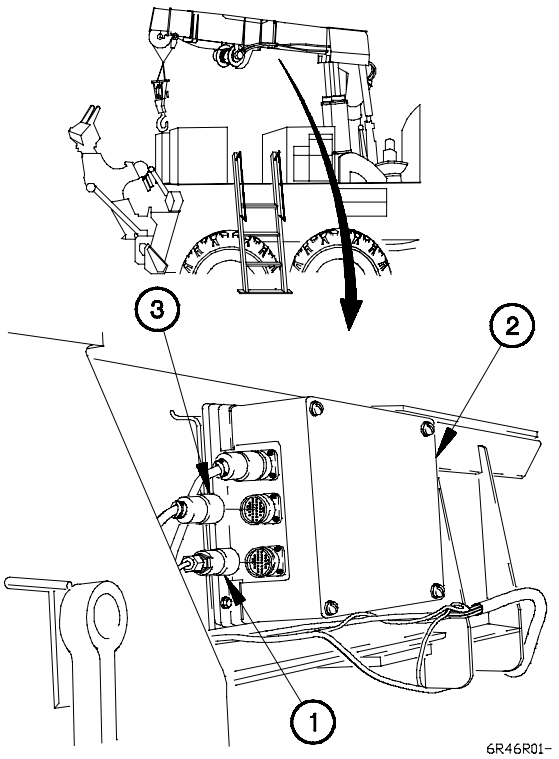
a. Removal.

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).



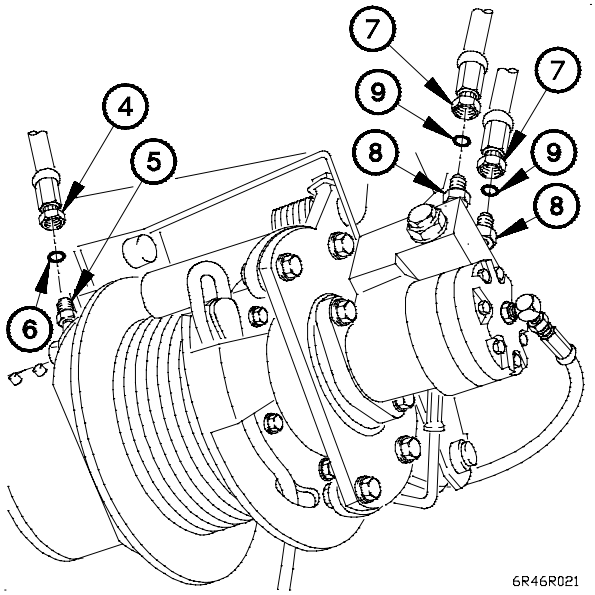
16-46. M1089 TENSION LOAD CELL REPLACEMENT (CONT)

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.

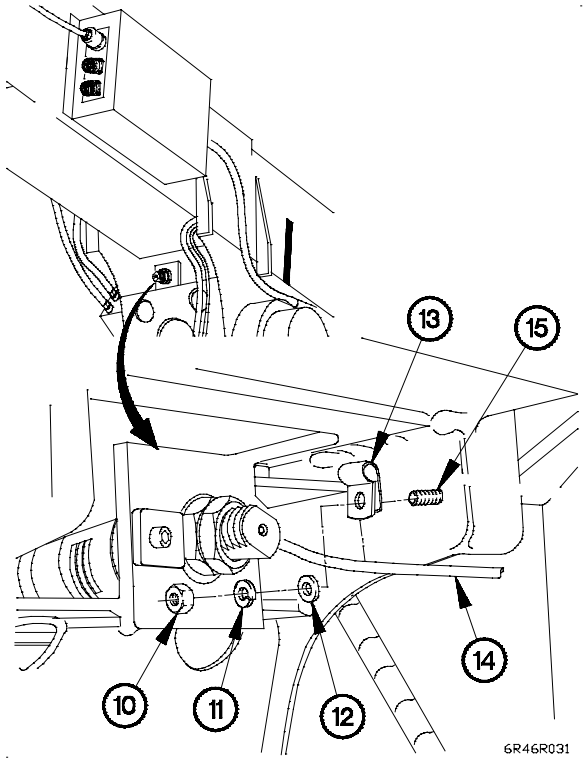


(3) Disconnect hydraulic hose (4) from check valve (5).

(4) Remove preformed packing (6) from check valve (5). Discard preformed packing.

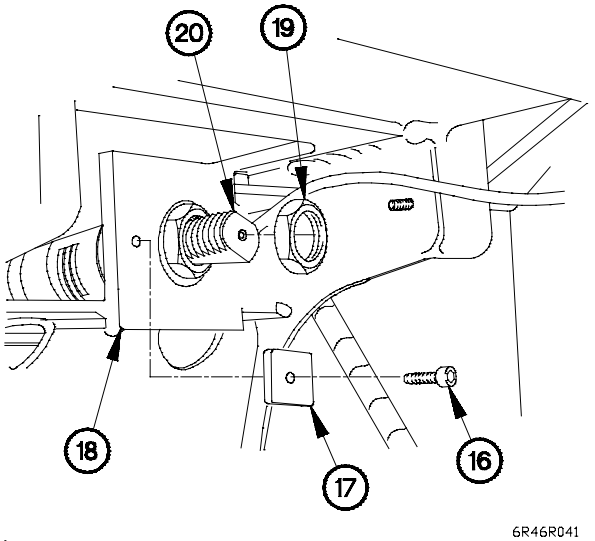
(5) Disconnect two hydraulic hoses (7) from fittings (8).

(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).



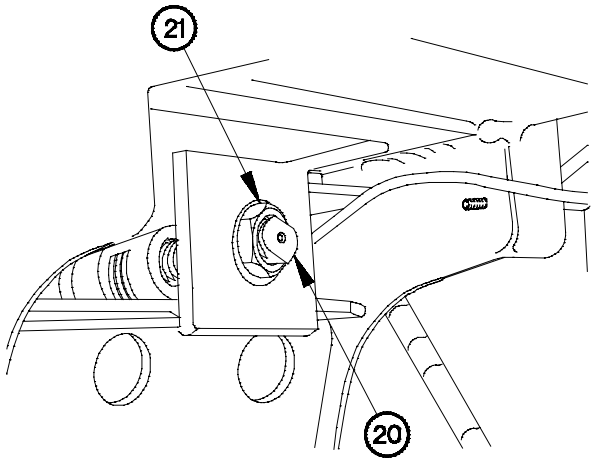
(9) Remove screw (16) and stop block (17) from boom brace (18).

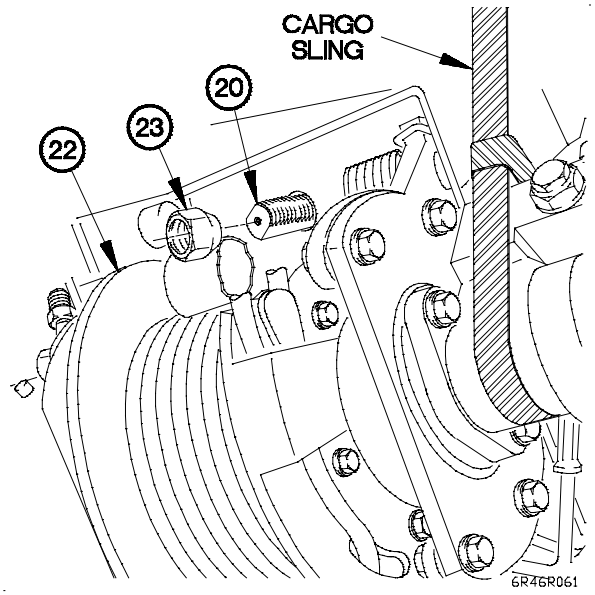
(10) Remove jam nut (19) from tension load cell (20).

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).

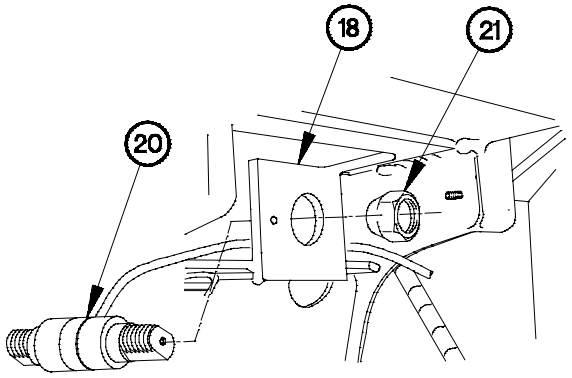
(13) Remove front swivel nut (23) from front of tension load cell (20).

(14) Remove hoist assembly (22) from tension load cell (20).

16-46. M1089 TENSION LOAD CELL REPLACEMENT (CONT)

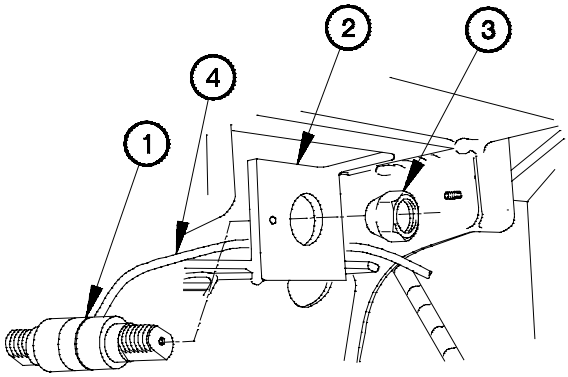
(15) Remove rear swivel nut (21) from tension load cell (20).

(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).

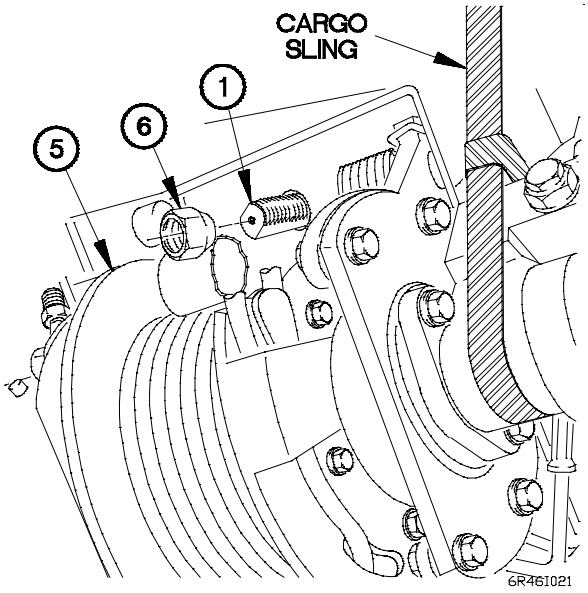
WARNING

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

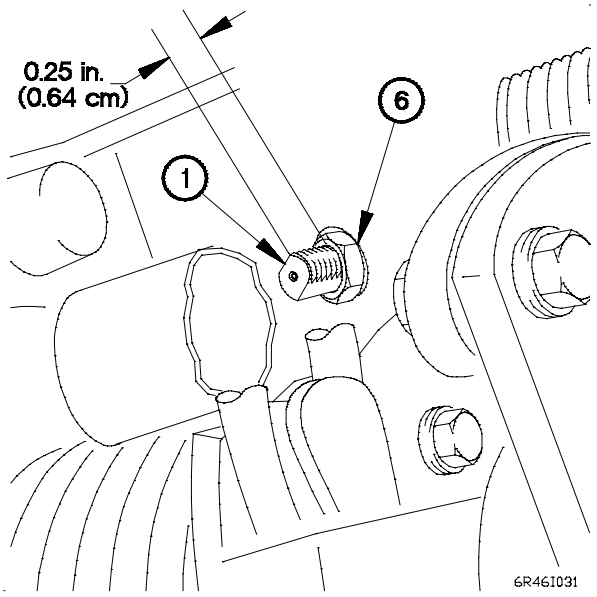
Step (4) requires the aid of an assistant.

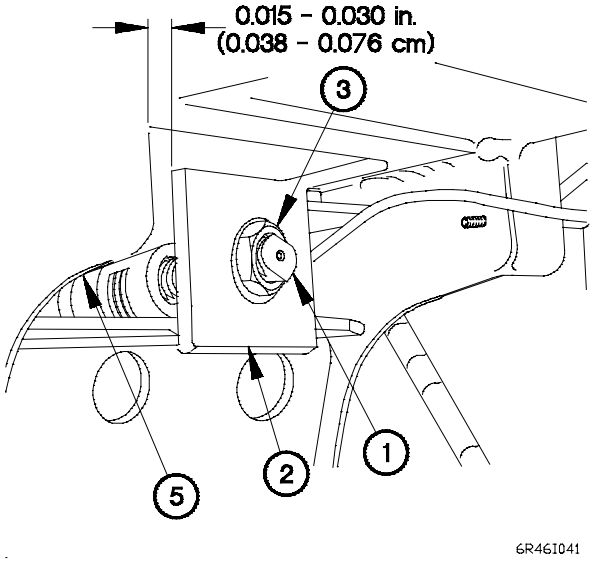
(4) Position hoist assembly (5) on front of tension load cell (1) with front swivel nut (6).



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).

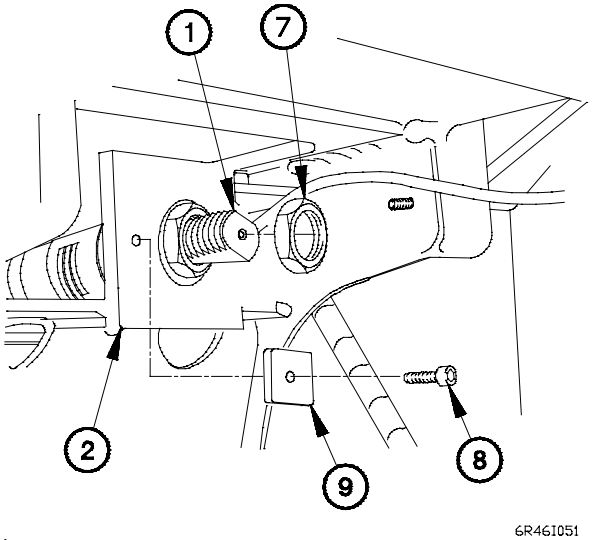
(7) Install jam nut (7) on tension load cell (1).

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).

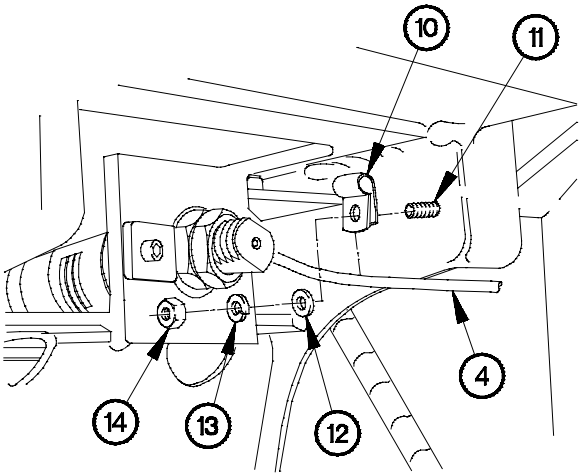
(9) Install stop block (9) on boom brace (2) with screw (8).



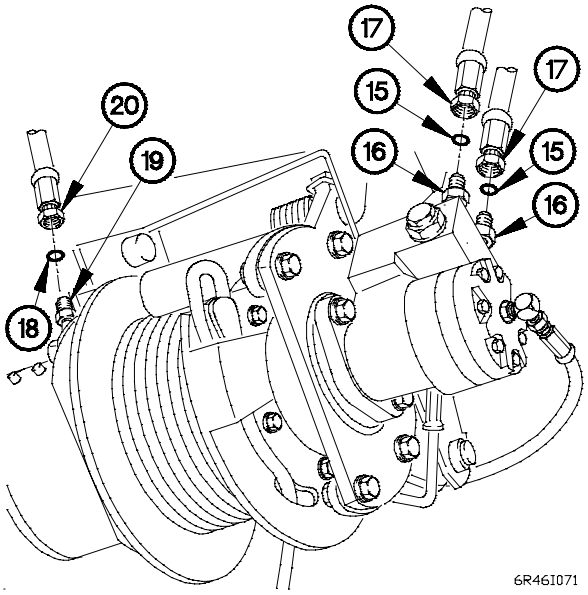
16-46. M1089 TENSION LOAD CELL REPLACEMENT (CONT)

(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).

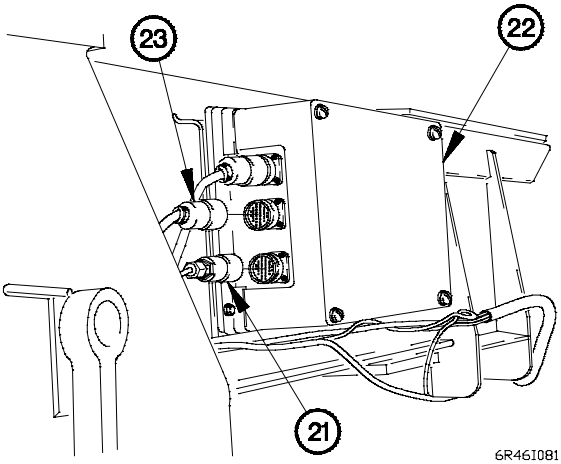
(15) Connect hydraulic hose (20) to check valve (19).

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.

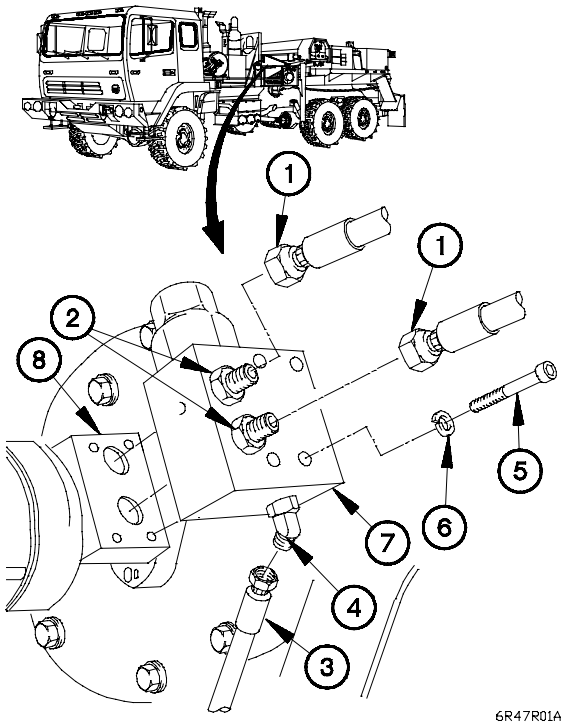
NOTE

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.



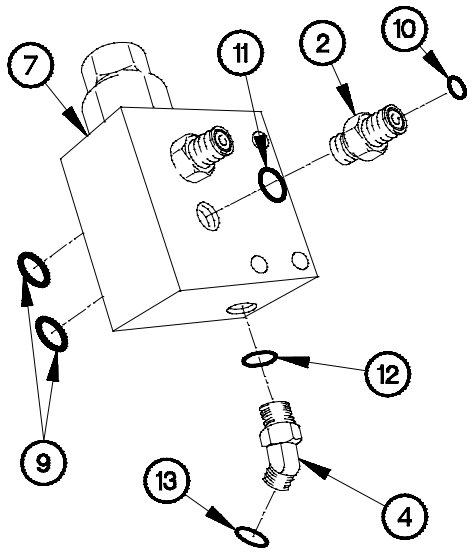
(4) Remove two preformed packings (9) from hydraulic motor control valve (7). Discard preformed packings.

(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.

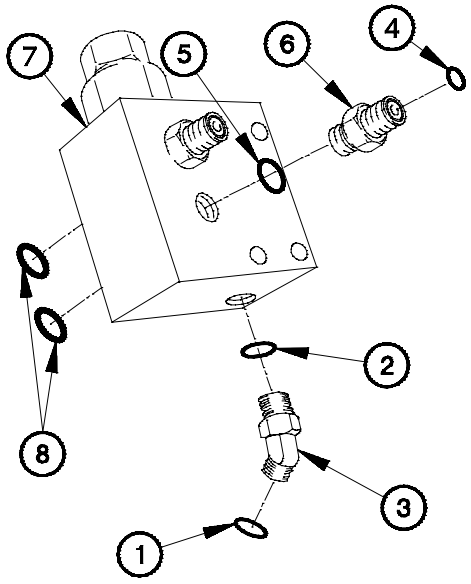
(7) Remove 45-degree fitting (4) from hydraulic motor control valve (7).

(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).

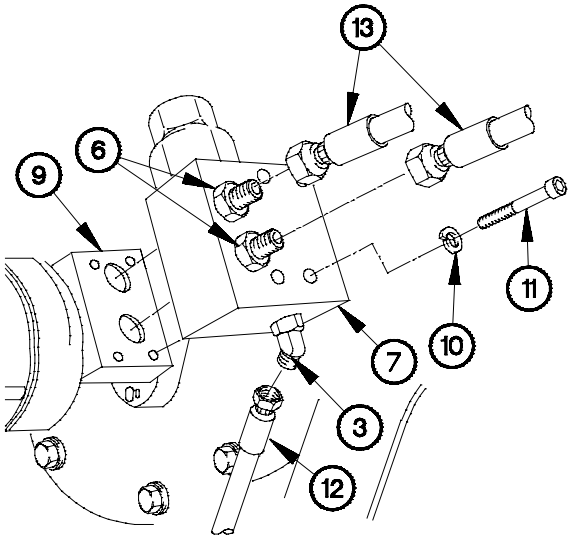
(3) Install 45-degree fitting (3) and two fittings (6) in hydraulic motor control valve (7).

(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

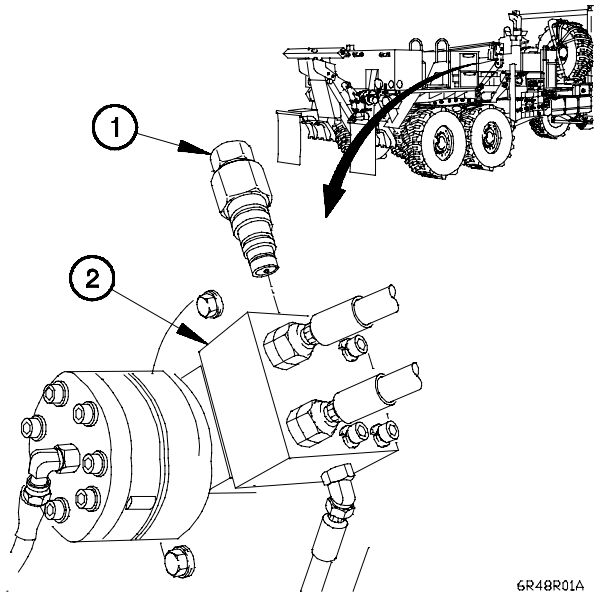
INITIAL SETUP

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

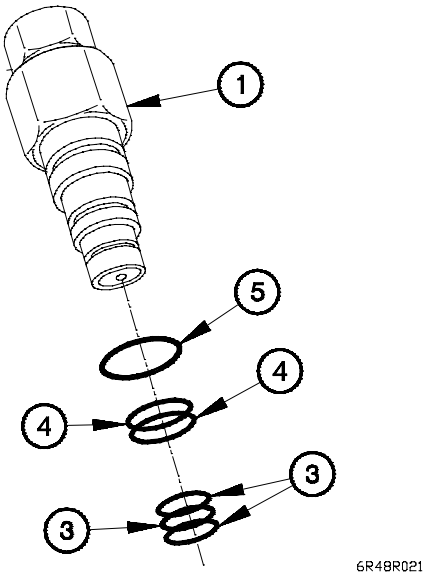
Materials/Parts
Kit, Seal (Item 107, Appendix F)

Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)

a. Removal.



(1) Remove holding valve (1) from motor control valve (2).



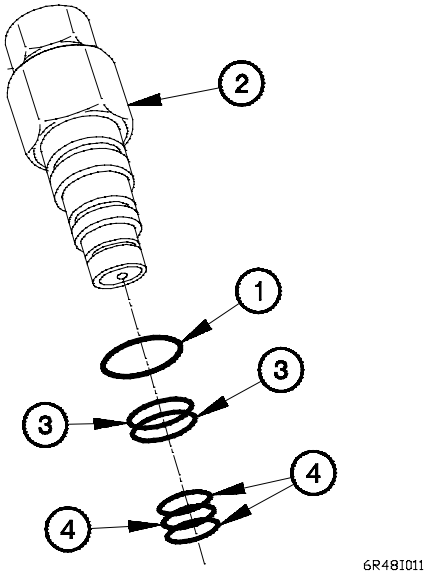
(2) Remove three preformed packings (3) from holding valve (1). Discard preformed packings.

(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)

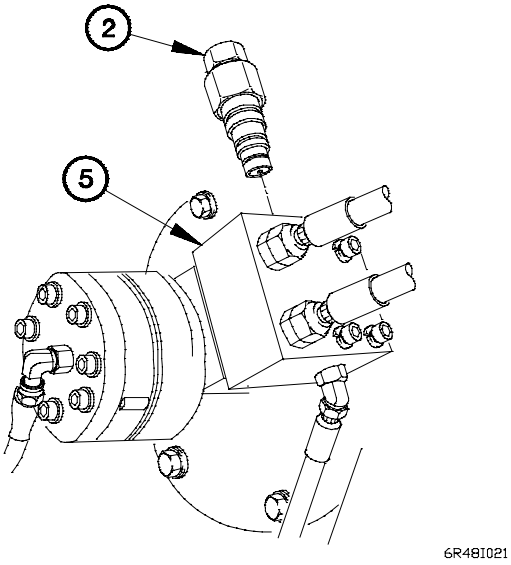
b. Installation.



(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)

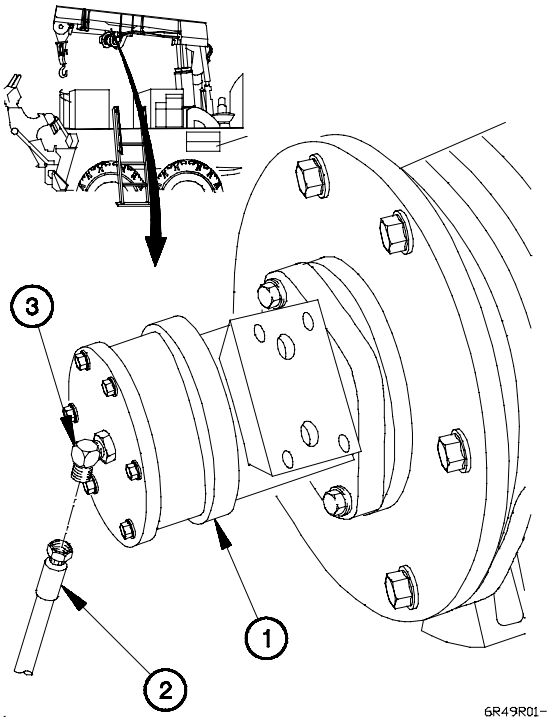
a. Removal.

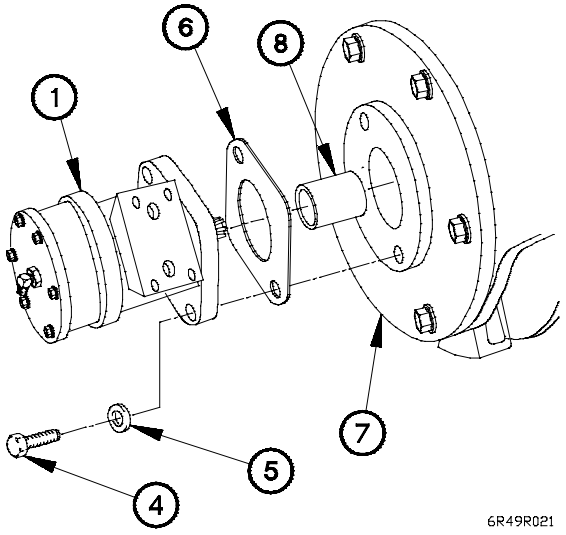
CAUTION

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

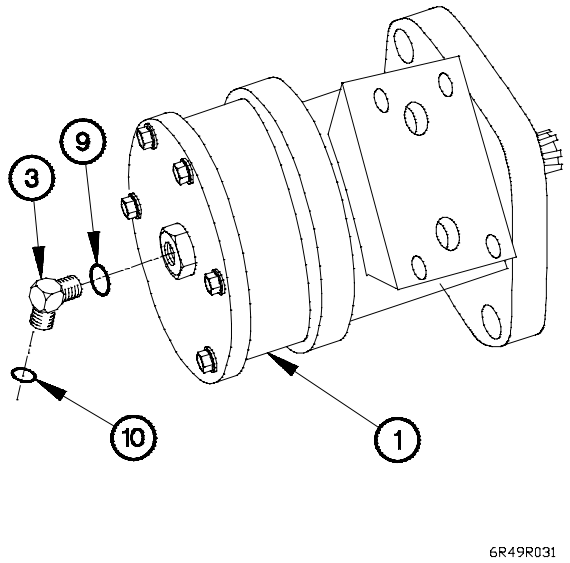
Observe orientation of boss coupling prior to removal.

(4) Remove boss coupling (8) from hoist assembly (7).

16-49. M1089 HOIST HYDRAULIC MOTOR REPLACEMENT (CONT)

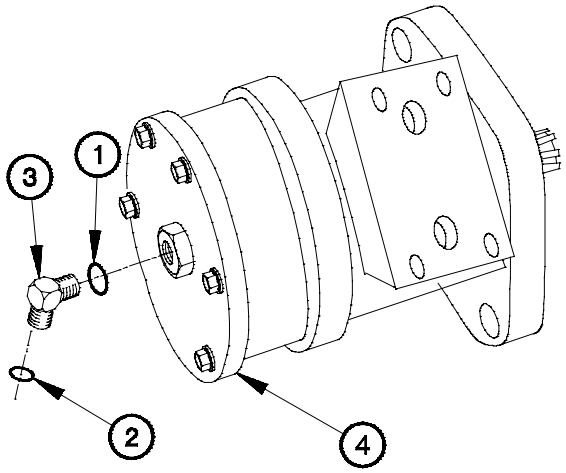
(5) Remove 90-degree fitting (3) from hoist hydraulic motor (1).

(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).

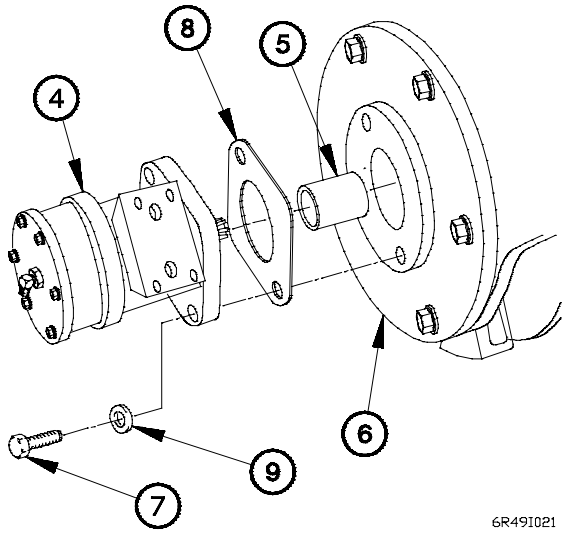
WARNING

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).

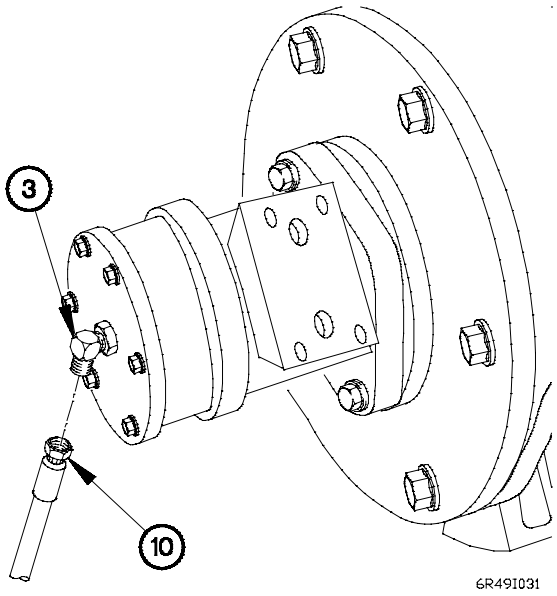
(5) Position gasket (8) and hoist hydraulic motor (4) on hoist assembly (6) with two washers (9) and screws (7).

(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).
Hoist hydraulic motor removed (para 16-49).

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

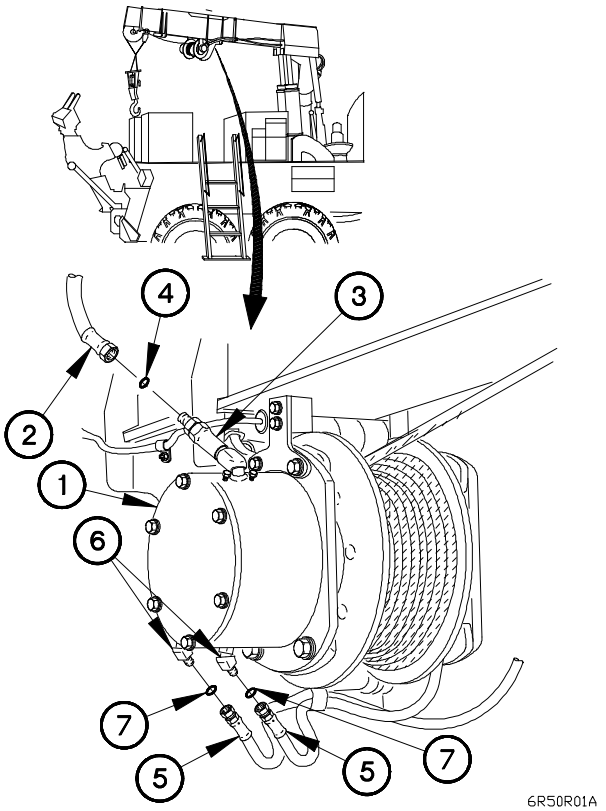
Tag all hydraulic hoses and connection points prior to disconnecting.

(2) Disconnect hose (2) from check valve (3).

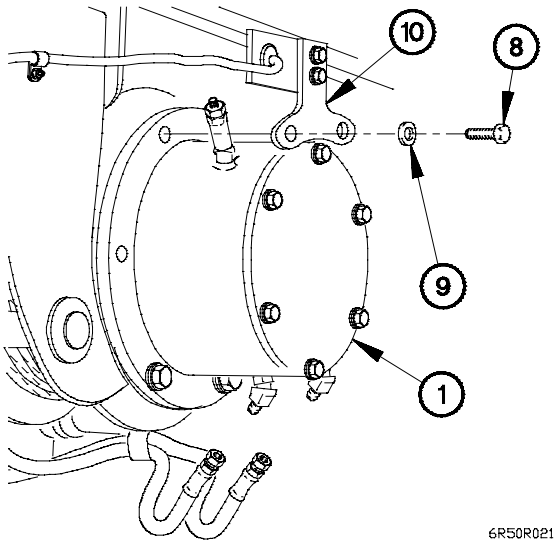
(3) Remove preformed packing (4) from check valve (3). Discard preformed packing.

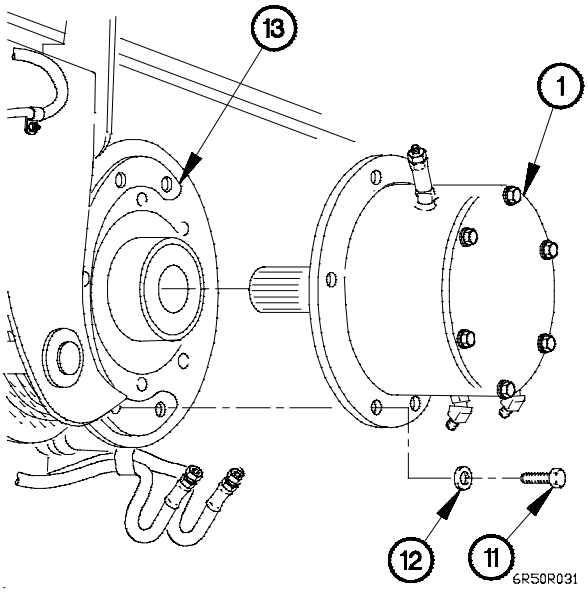
(4) Disconnect two hoses (5) from 45-degree fittings (6).

(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).





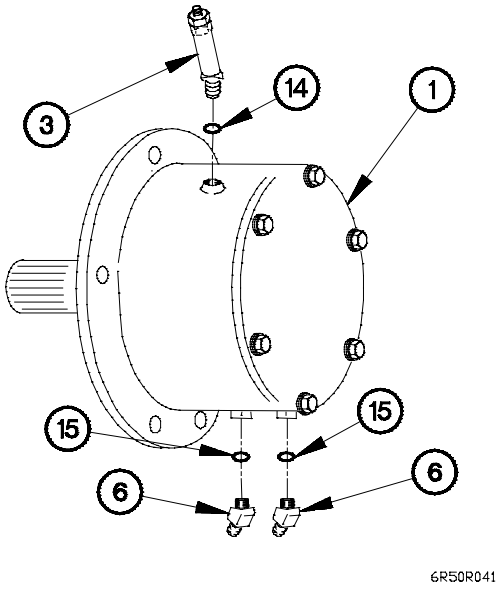
(7) Remove three screws (11), washers (12), and oil filled disc brake assembly (1) from hoist (13).

(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)

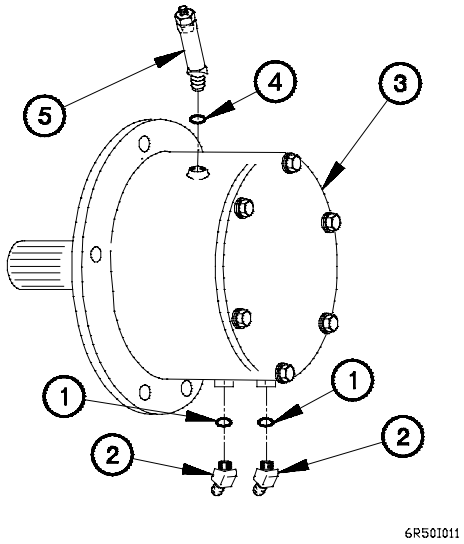
b. Installation.

(1) Install two preformed packings (1) on 45-degree fittings (2).

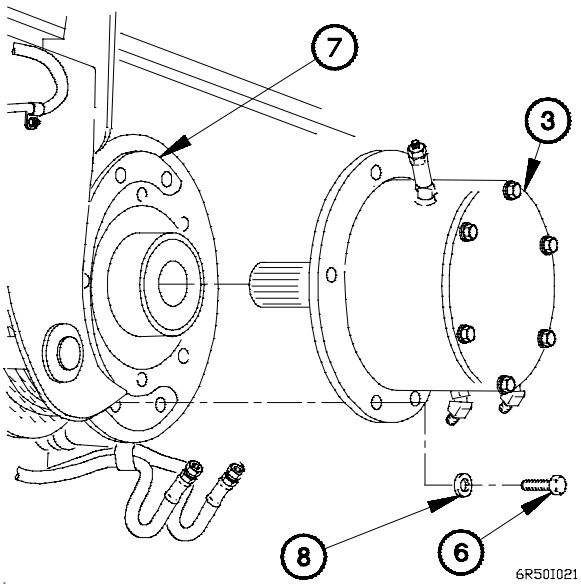
(2) Install two 45-degree fittings (2) on oil filled disc brake assembly (3).

(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.

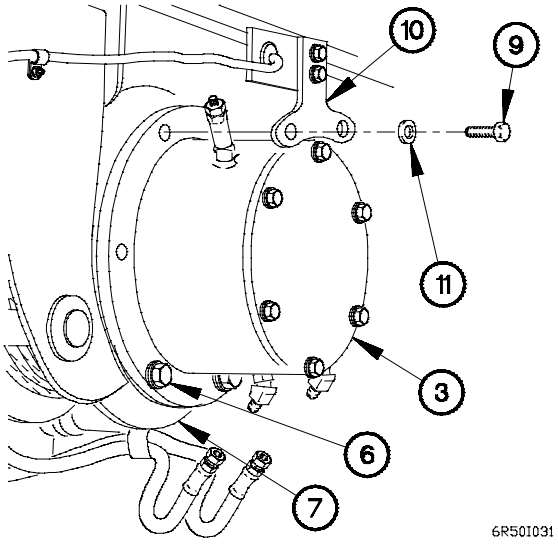
(5) Apply sealing compound to threads of three screws (6).

(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).



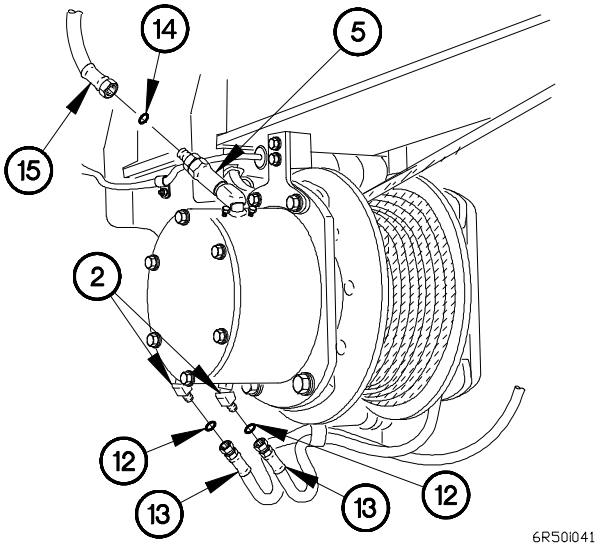
6R50I031

(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) Install hoist hydraulic motor (para 16-49).

(3) 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

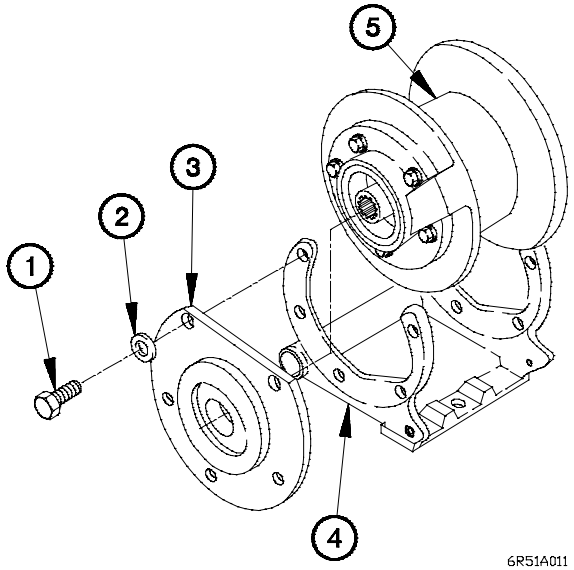
Equipment Conditions
Hydraulic motor control valve assembly removed (para 16-47).
Hoist hydraulic motor removed (para 16-49).
Oil filled disc brake assembly removed (para 16-50).
Hoist assembly removed (para 16-43).
Cable follower removed (para 16-44).

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)

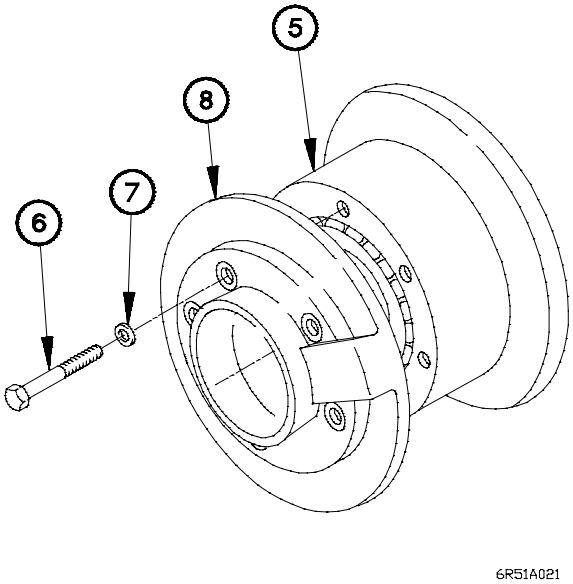
Materials/Parts
Rag, Wiping (Item 60, Appendix C)
Solvent, Dry Cleaning (Item 83, Appendix C)
Sealing Compound (Item 76, Appendix C)
Parts Kit, Seal Replacement (Item 319, Appendix F)

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.

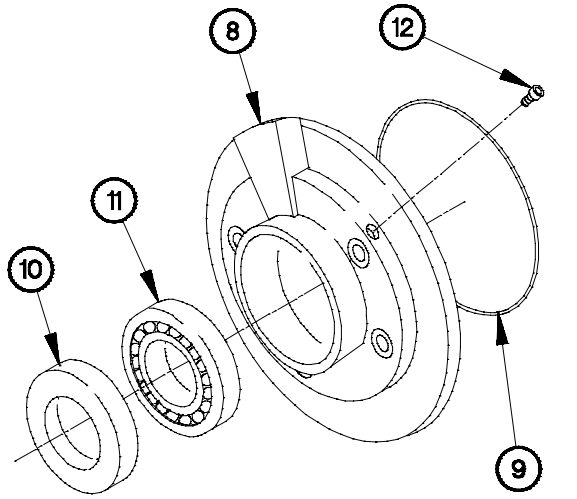
(6) Remove seal (10) from RH drum end (8). Discard seal.

NOTE

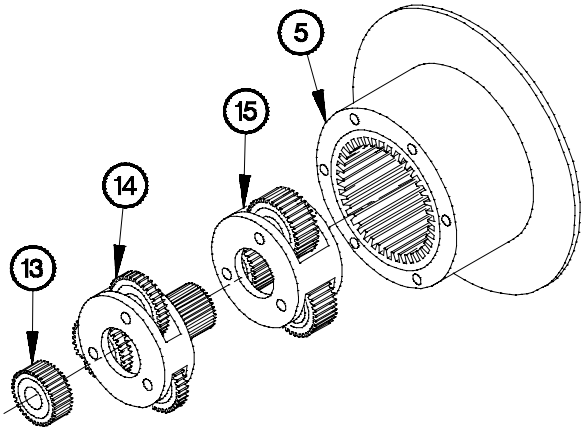
Note position of bearing prior to removal.

(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.

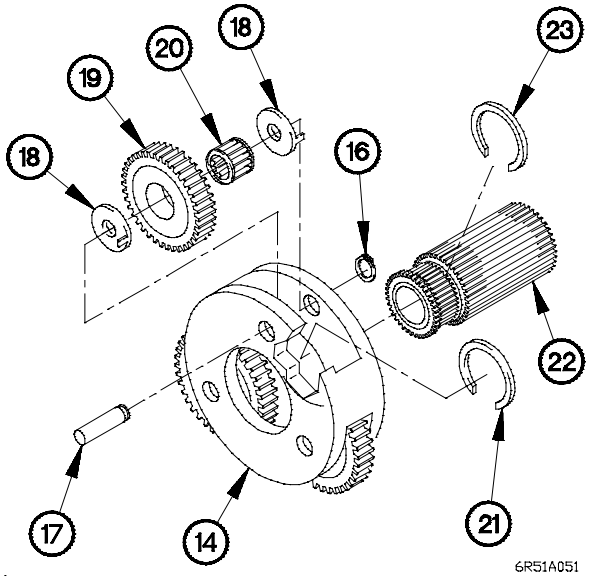
(12) Remove retaining ring (16), pin (17), two washers (18), gear (19), and roller set (20) from carrier (14).

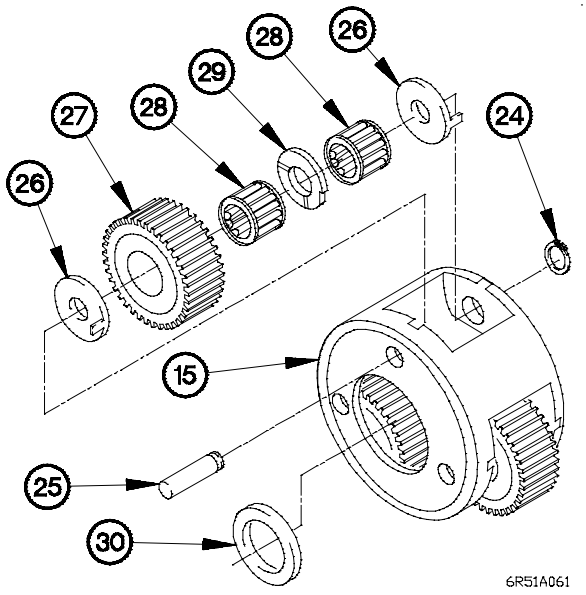
(13) Perform step (12) on two remaining gears (19).

(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).

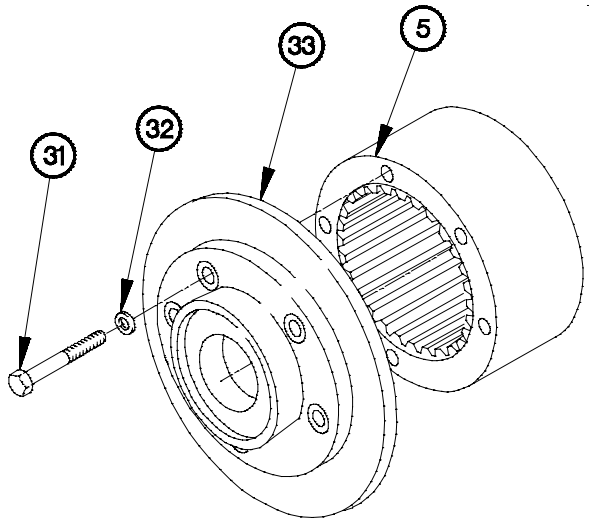
(18) Remove pin (25), two washers (26), and gear (27) from carrier (15).

(19) Remove two roller sets (28) and separator (29) from gear (27).

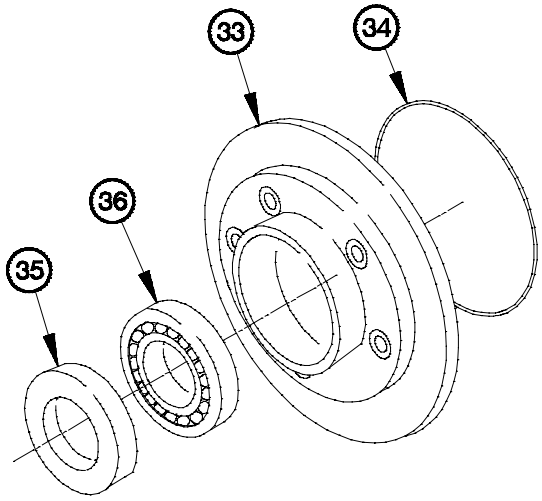
(20) Perform steps (17) through (19) on two remaining gears (27).

(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.**

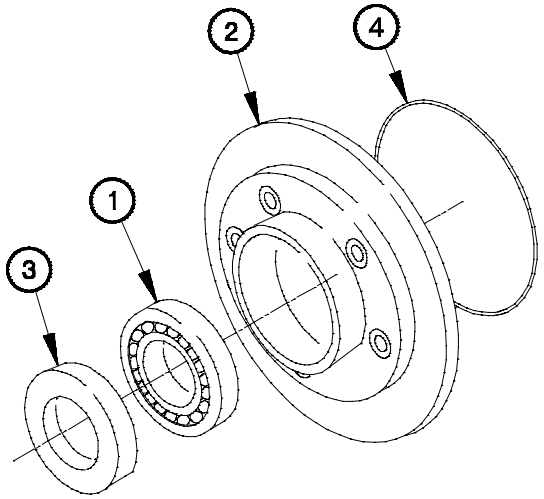
(1) Clean all metal parts with dry cleaning solvent.

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).

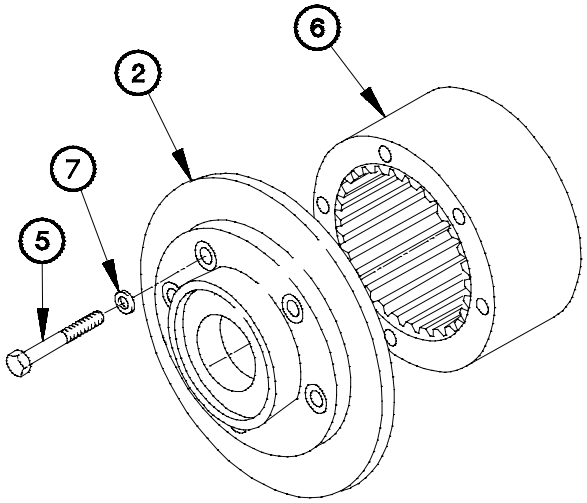
WARNING

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.

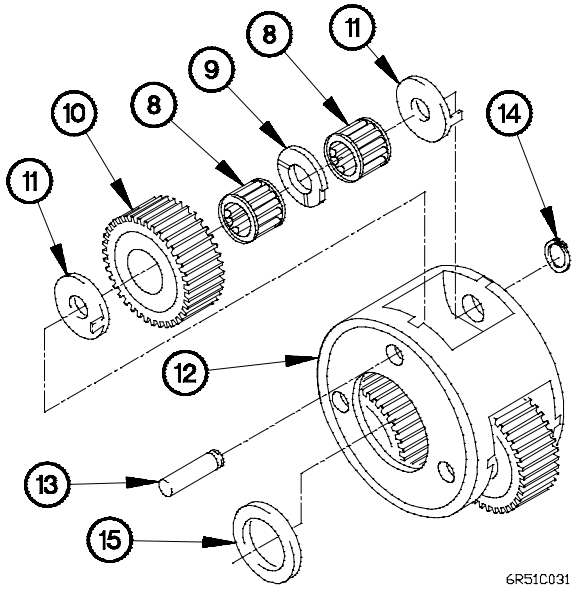
(4) Apply sealing compound to threads of eight screws (5).

(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).

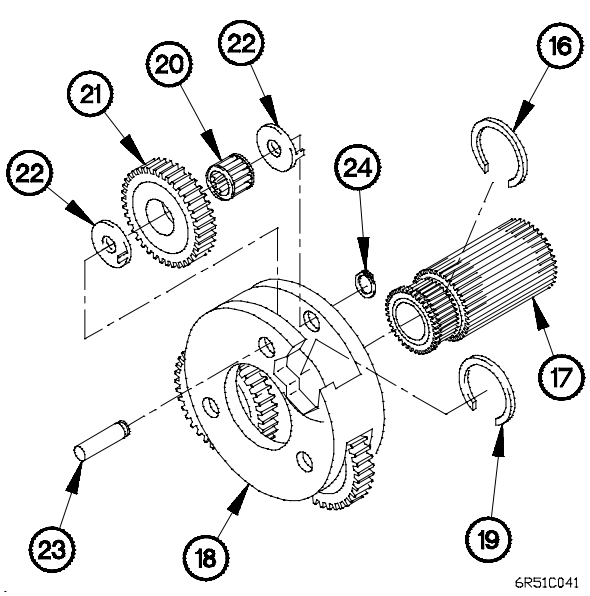
16-51. M1089 GEAR SET REPAIR (CONT)

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).

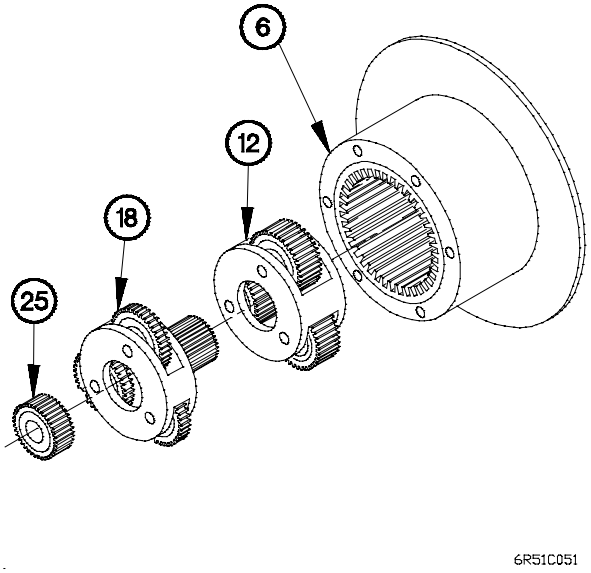
(14) Install retaining ring (19) on drive gear (17).

(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).

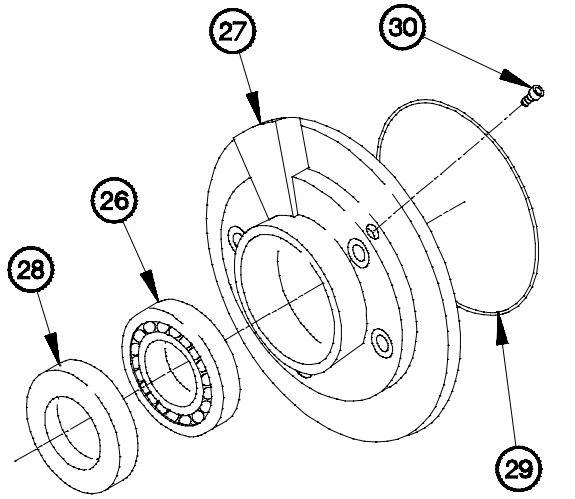
(21) Install sun gear (25) in carrier (18).

(22) Install bearing (26) in RH drum end (27).

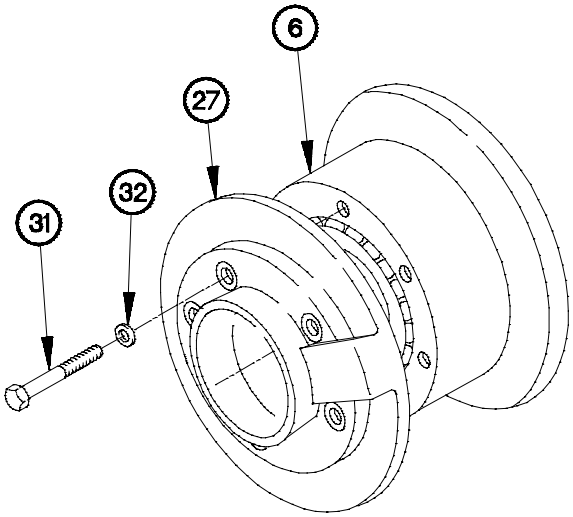
(23) Install seal (28) in RH drum end (27).

(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).

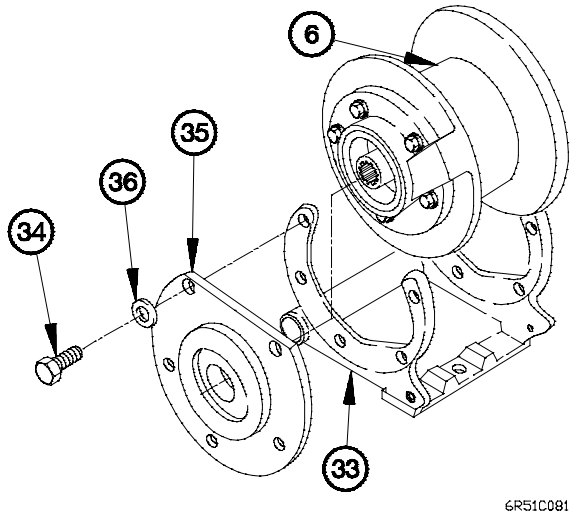
WARNING

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

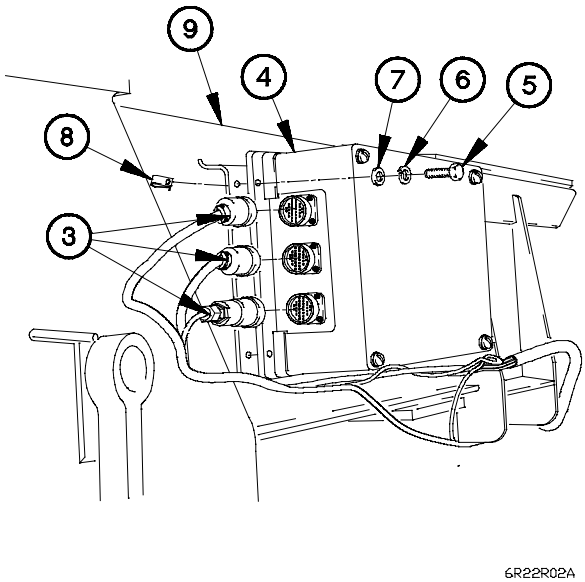
Use serial number of MHC when ordering replacement overload shutdown.

a. Removal.

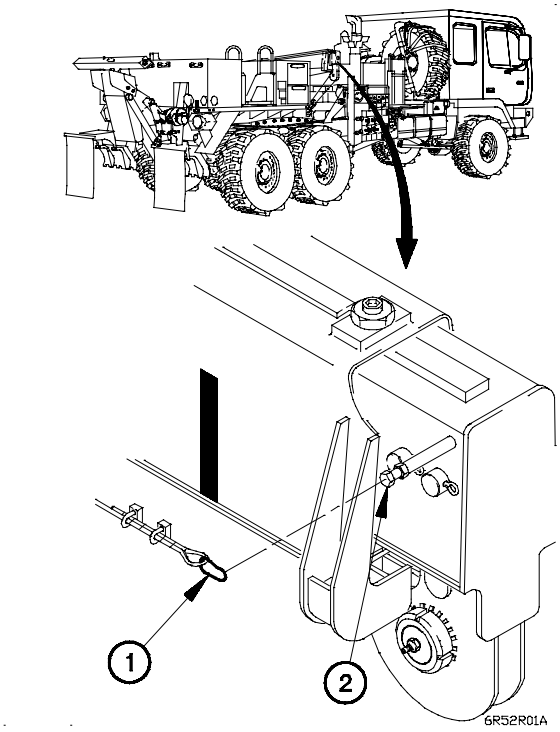
CAUTION

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).



6R22R02A



6R52R01A

NOTE

Tag connectors and connection points prior to disconnecting.

(2) Disconnect three connectors (3) from overload shutdown (4).

NOTE

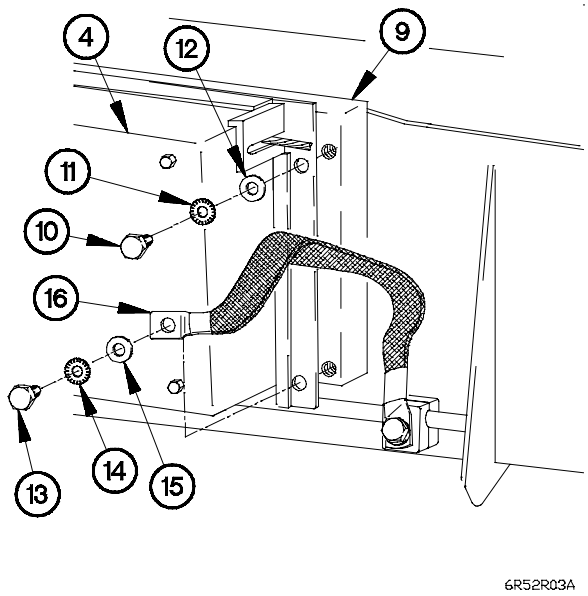
Step (3) requires the aid of an assistant.

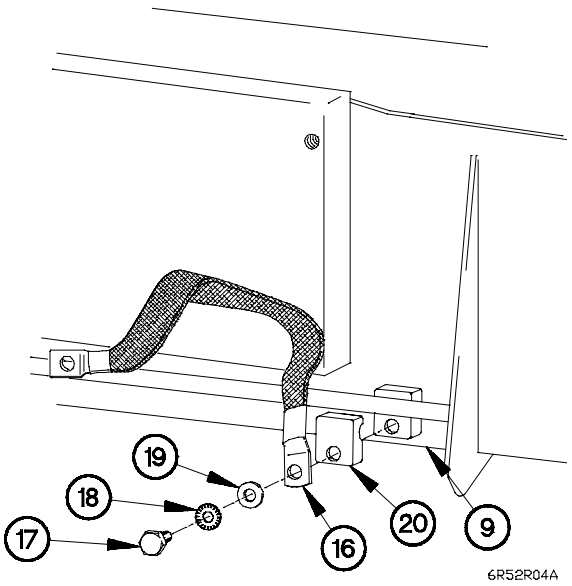
(3) Remove two bolts (5), lockwashers (6), washers (7), and clipnuts (8) from boom assembly (9). Discard lockwashers.

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.

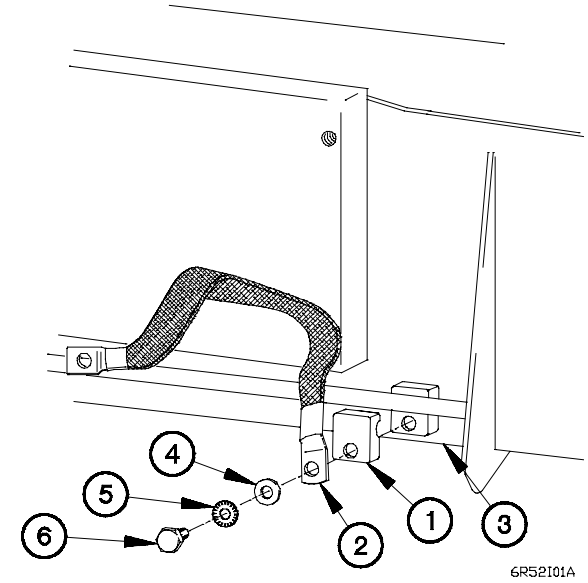




(6) Remove bolt (17), lockwasher (18), washer (19), ground strap (16), and clamp (20) from boom assembly (9). Discard lockwasher.

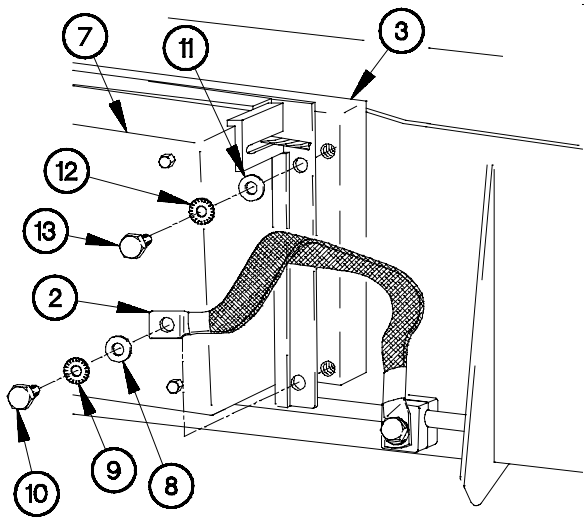
b. Installation.

(1) Install clamp (1) and ground strap (2) on boom assembly (3) with washer (4), lockwasher (5), and bolt (6).

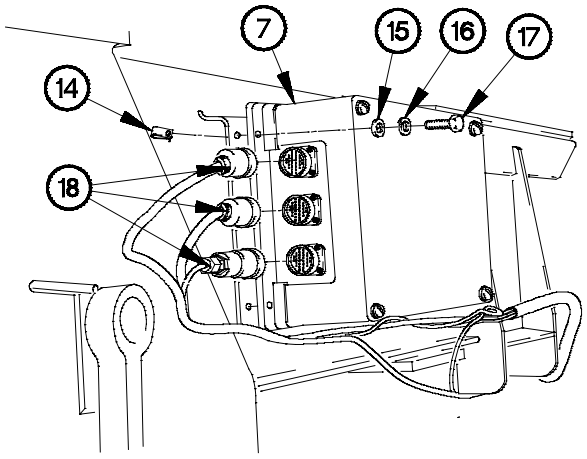


(2) Install overload shutdown (7) and ground strap (2) on boom assembly (3) with washer (8), lockwasher (9), and bolt (10).

(3) Install washer (11), lockwasher (12) and bolt (13) in overload shutdown (7).



6R52102A



6R52I031

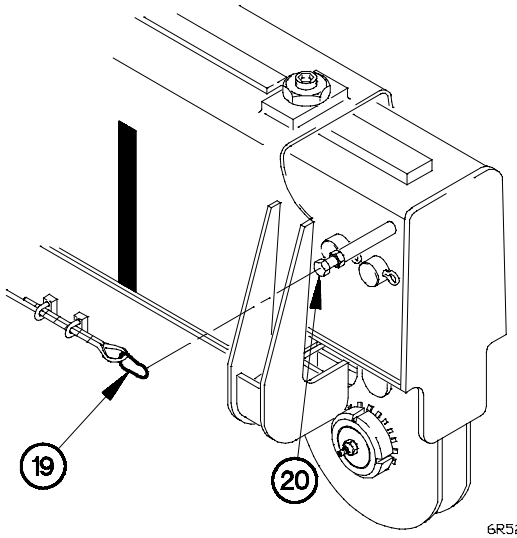
NOTE

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).



6R52I04A

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.

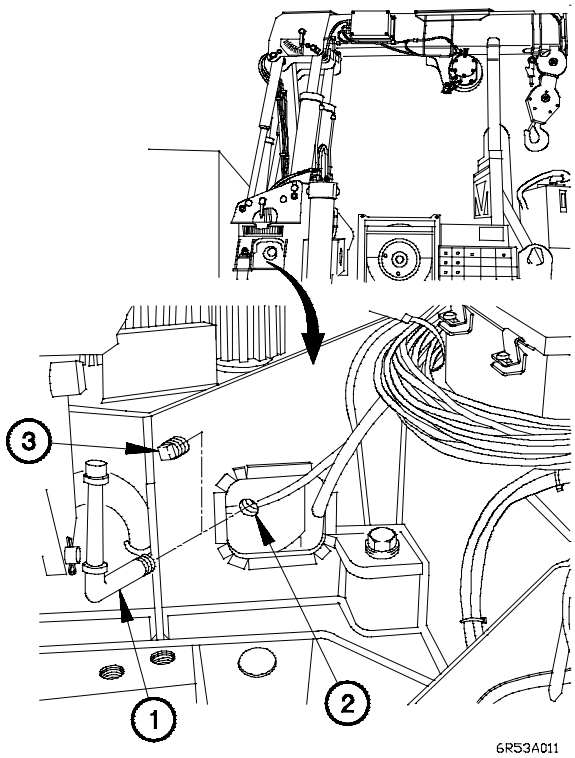
a. Removal.

CAUTION

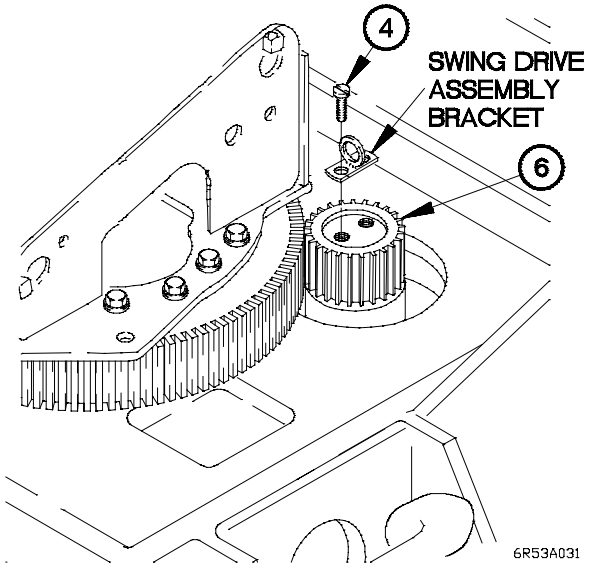
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

(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).



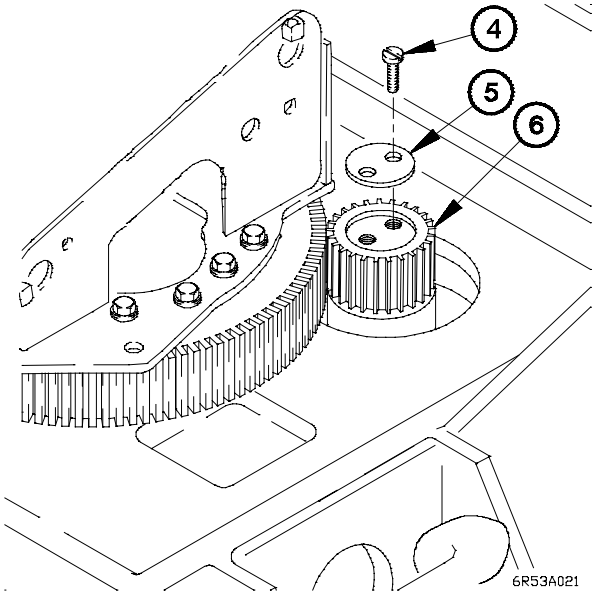
WARNING

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.

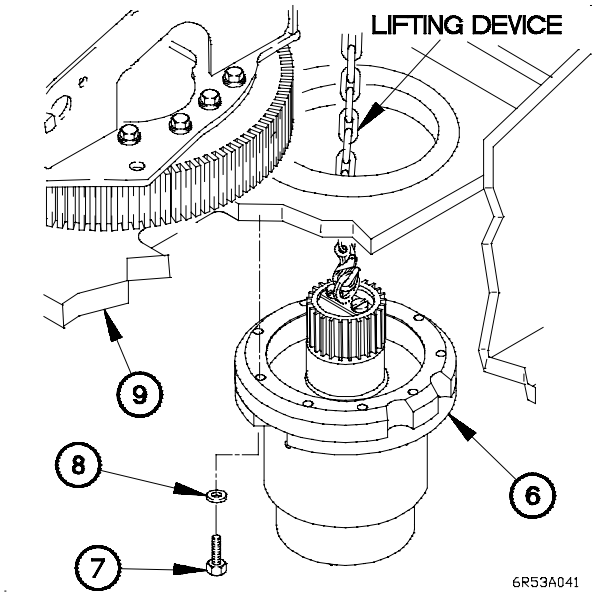
CAUTION

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).

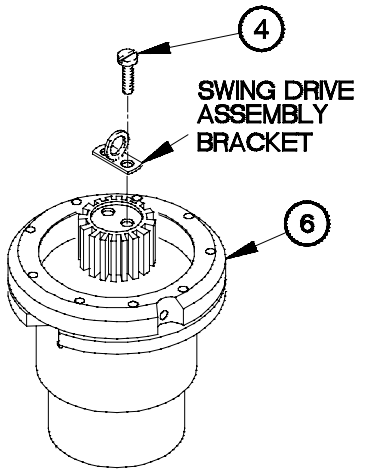


(4) Install swing drive assembly bracket on swing drive assembly (6) with two screws (4).

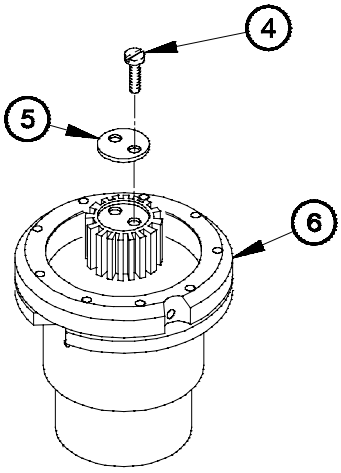


16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(6) Remove two screws (4) and swing drive assembly bracket from swing drive assembly (6).



6R53A051



6R53A061

(7) Install plate (5) in swing drive assembly (6) with two screws (4).

b. Disassembly.

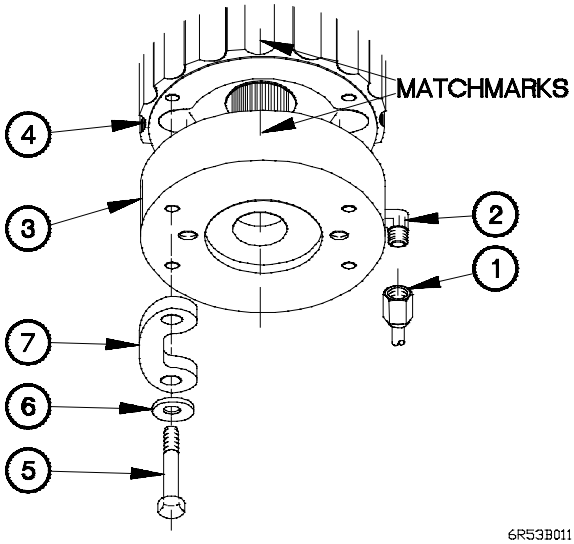
(1) Remove hydraulic hose (1) from 90-degree fitting (2).

(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.



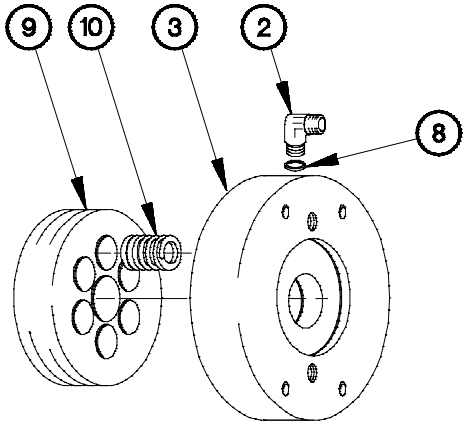
6R53B011

(4) Remove cylinder housing (3) from end cover (4).

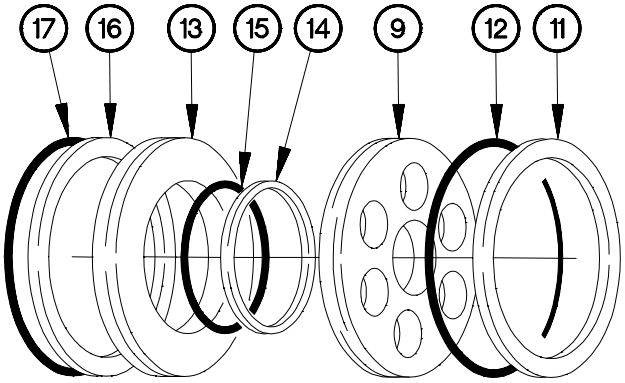
(5) Remove 90-degree fitting (2) from cylinder housing (3).

(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

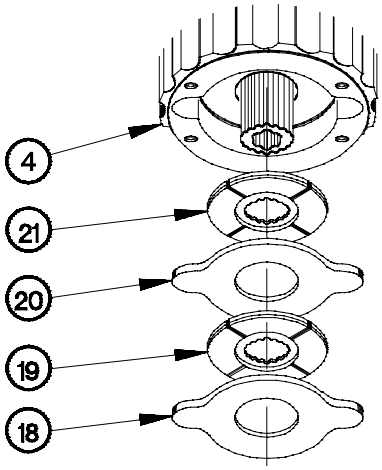
(8) Remove packing retainer (11) and preformed packing (12) from piston (9). Discard packing retainer and preformed packing.

(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).

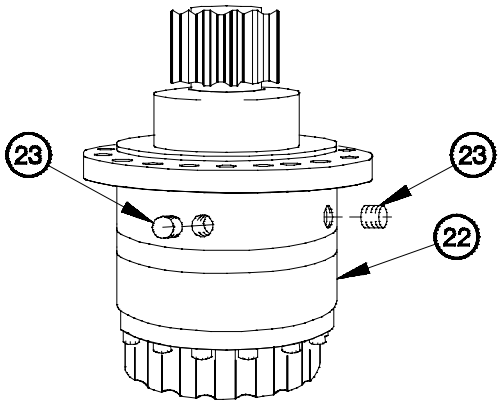


6R53B041

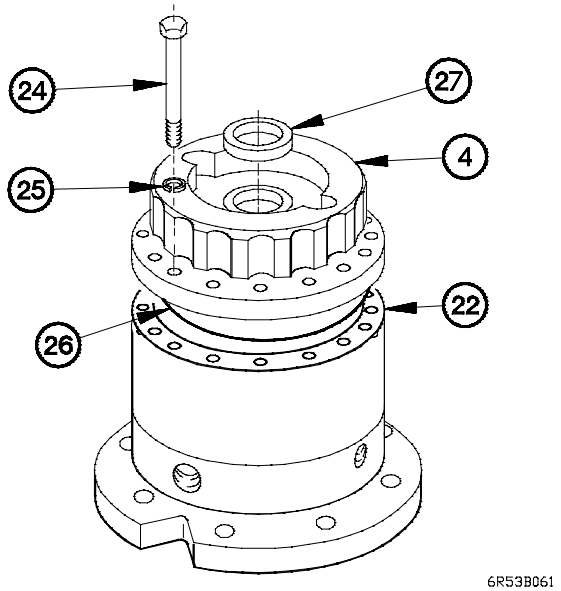
16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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).

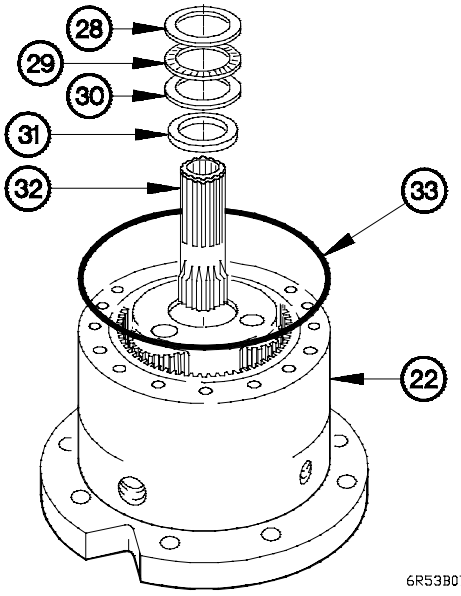
(17) Remove preformed packing (26) from end cover (4). Discard preformed packing.

(18) Remove oil seal (27) from end cover (4). Discard oil seal.

(19) Remove race (28), bearing (29), race (30), and spacer (31) from sun gear (32).

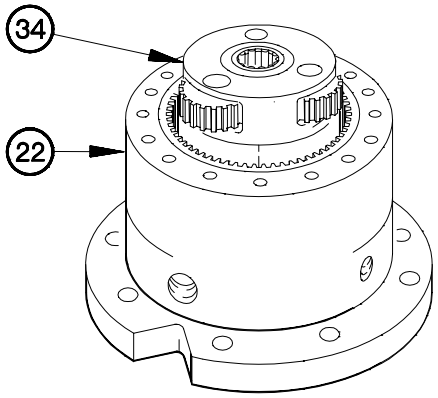
(20) Remove sun gear (32) from swing drive (22).

(21) Remove preformed packing (33) from swing drive (22). Discard preformed packing.

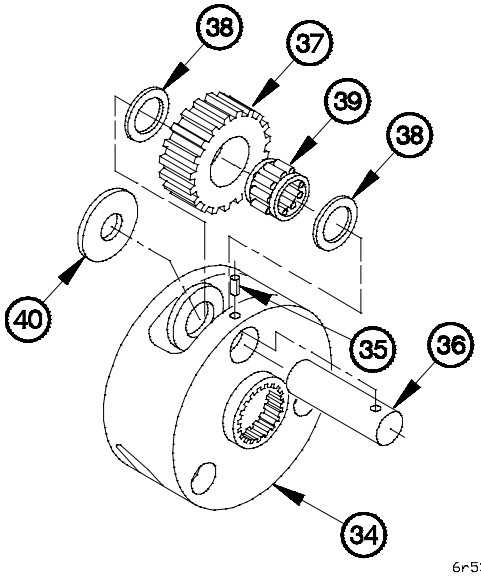


6R53B071

(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).

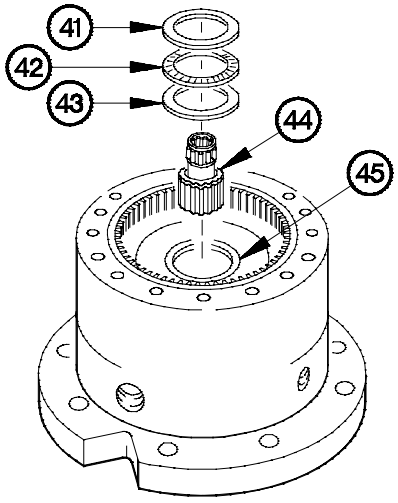
(26) Remove bearing (39) from gear (37).

(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).

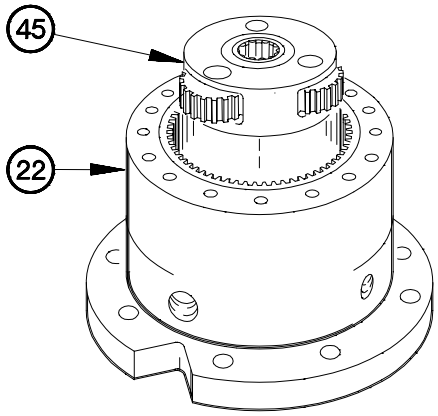
(30) Remove secondary sun gear (44) from planetary carrier (45).



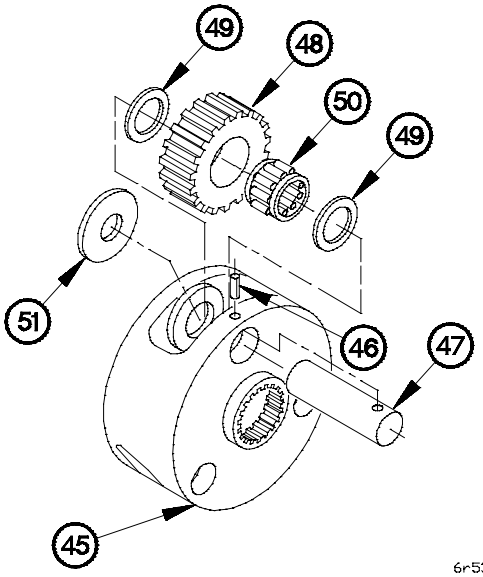
6r53b101

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).

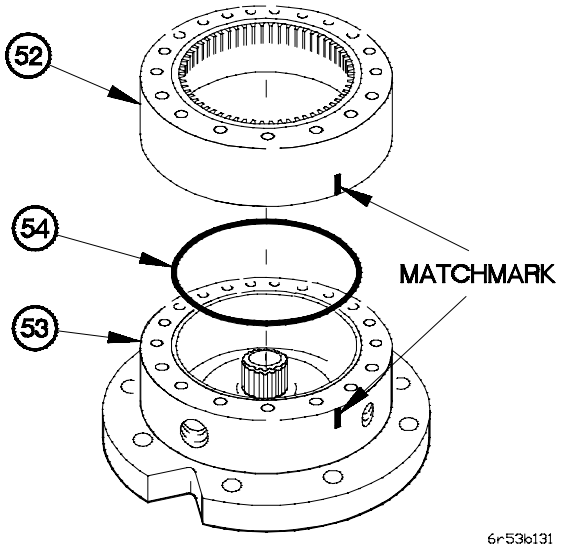
(36) Perform Steps (32) through (35) for other two gears (48).

(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).

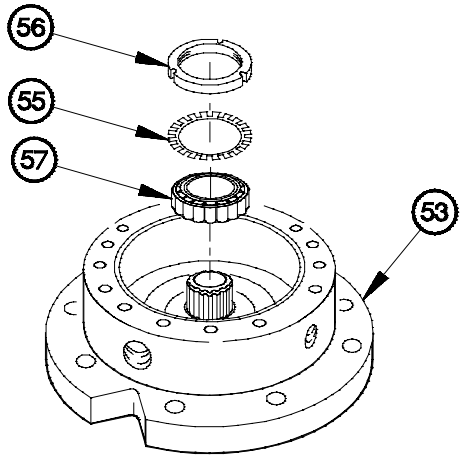
(40) Remove preformed packing (54) from hub (53). Discard preformed packing.



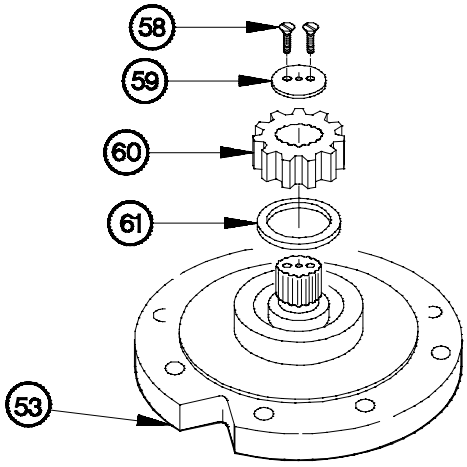
6r53b131

(41) Bend down tang of lockwasher (55).

(42) Remove nut (56), lockwasher (55), and bearing (57) from hub (53). Discard lockwasher.



6r53b141

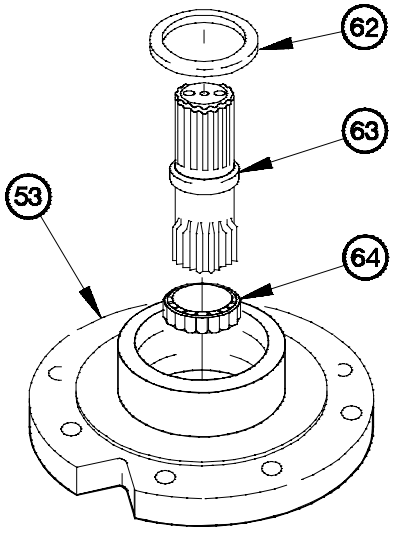


6R53B151

(43) Remove two screws (58), plate (59), gear (60), and spacer (61) from hub (53).

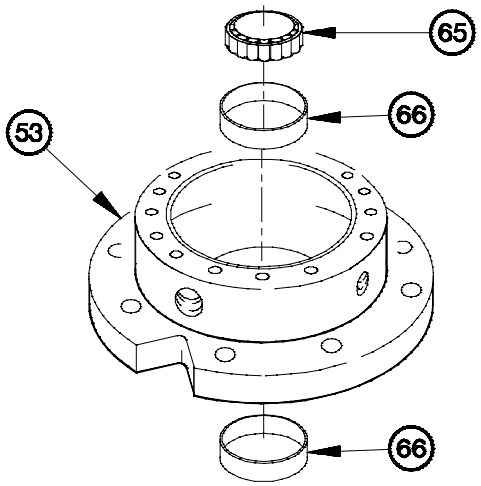
(44) Remove seal (62) and shaft (63) from hub (53).

(45) Remove bearing (64) from shaft (63).



6r53b161

16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)



6R53B171

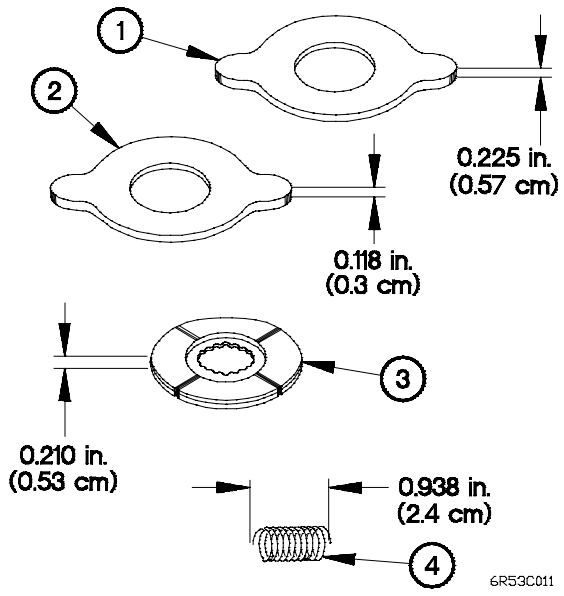
(46) Remove bearing (65) from hub (53).

(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).

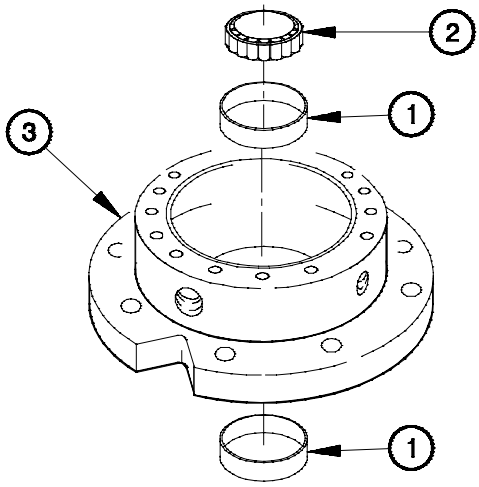
(6) Inspect six springs (4) for length, minimum length 0.938 in. (2.4 cm).

d. Assembly.

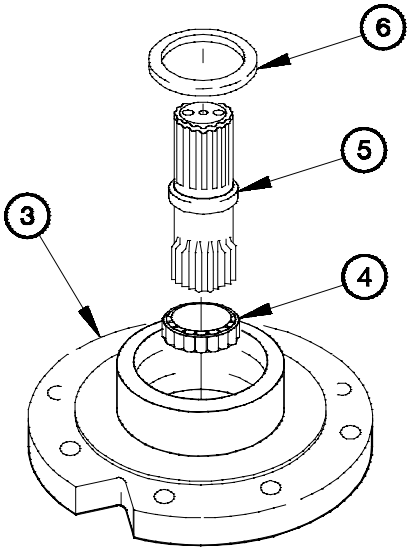
NOTE

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).

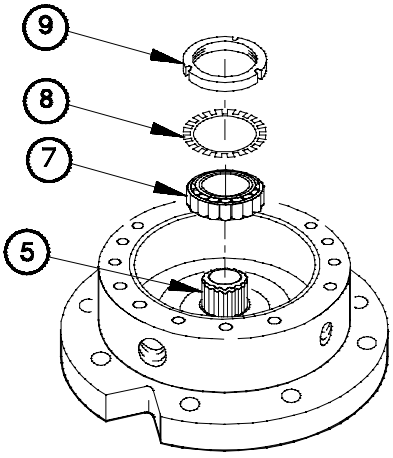
(5) Install bearing (7) on shaft (5).

(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).

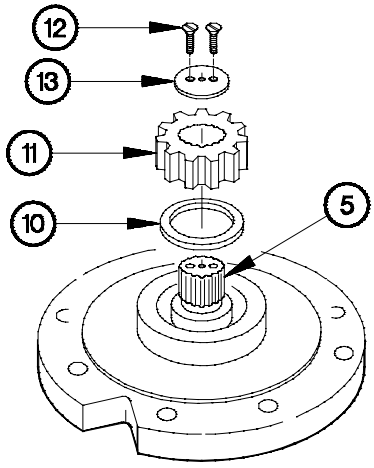
(11) Install gear (11) on shaft (5).

WARNING

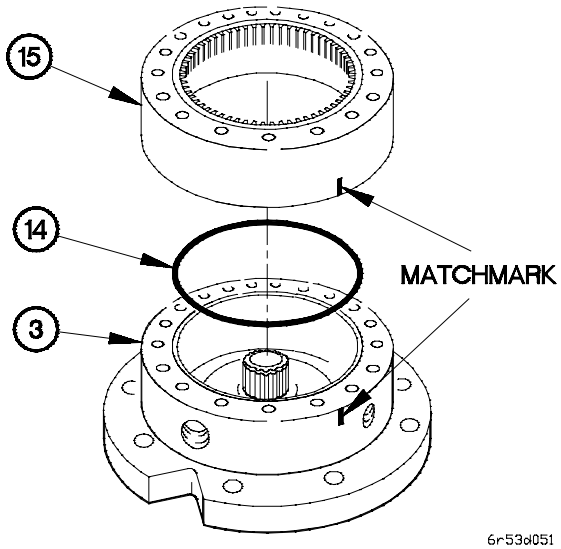
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(12) Apply sealing compound to threads of two screws (12).

(13) Install plate (13) on shaft (5) with two screws (12).



6R53D041

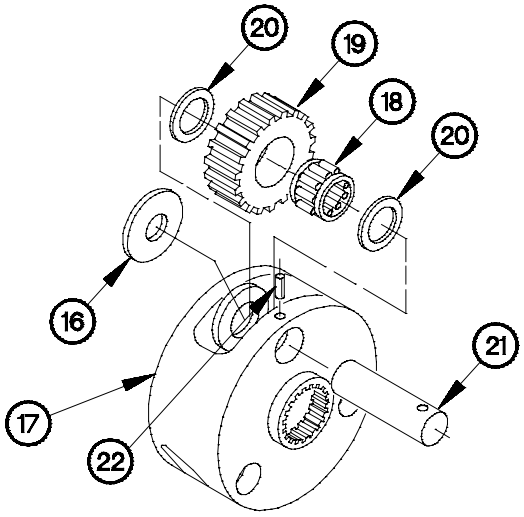


6r53d051

(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).

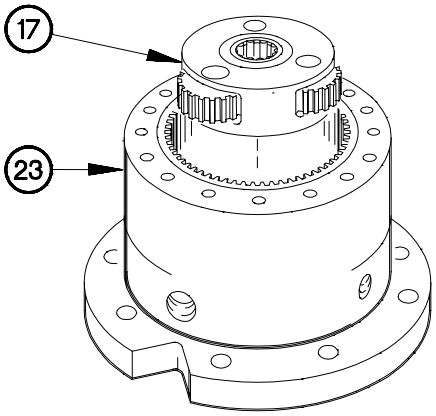
(18) Install bearing (18) in gear (19).

(19) Install gear (19), two spacers (20), and pin (21) in planetary carrier (17).

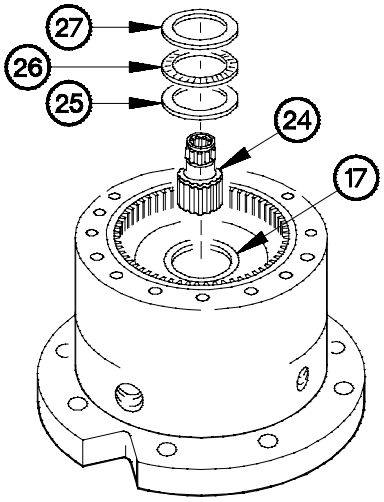
(20) Install roll pin (22) in pin (21).

(21) Perform steps (17) through (20) on two remaining gears (19).

(22) Install planetary carrier (17) in swing drive (23).



6r53d071



6r53d081

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).

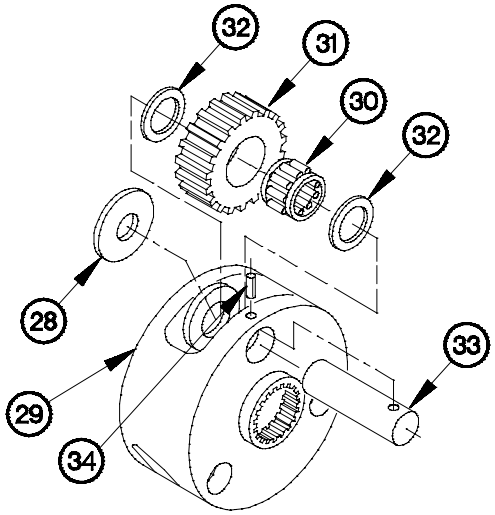
(27) Install gear (31), two spacers (32), and pin (33) in planetary carrier (29).

(28) Install roll pin (34) in pin (33).

(29) Perform steps (25) through (28) on two remaining gears (31).

(23) Install secondary sun gear (24) in planetary carrier (17).

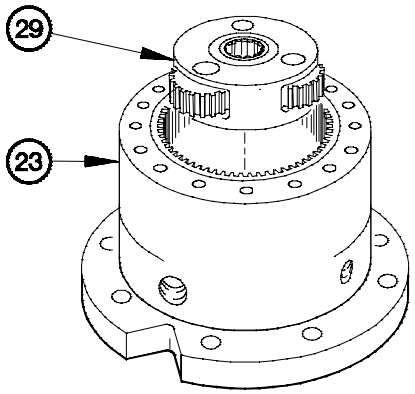
(24) Install race (25), bearing (26), and race (27) on planetary carrier (17).



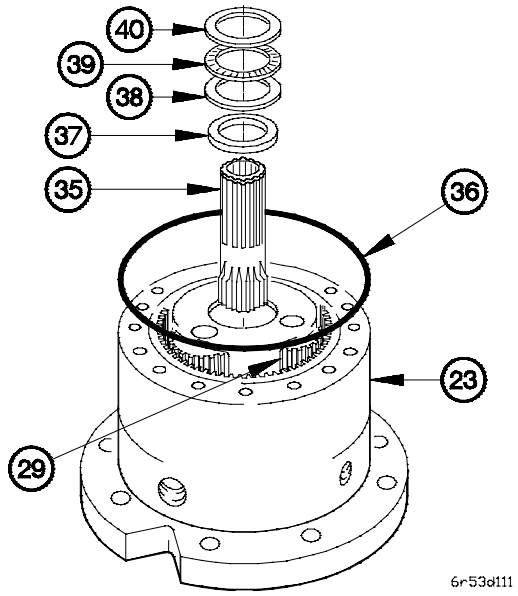
6R53D091

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).

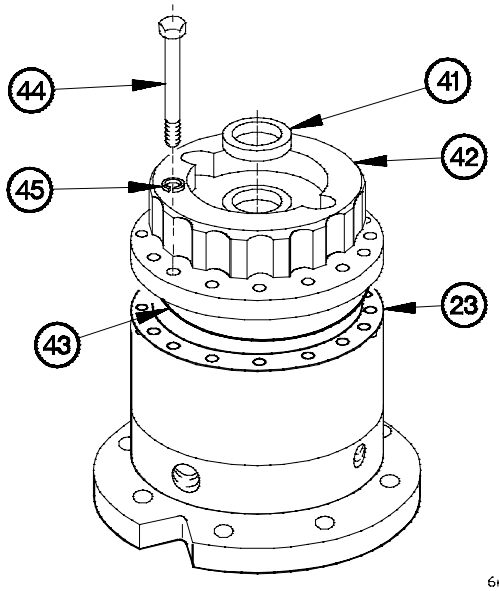
(36) Install preformed packing (43) on end cover (42).

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).



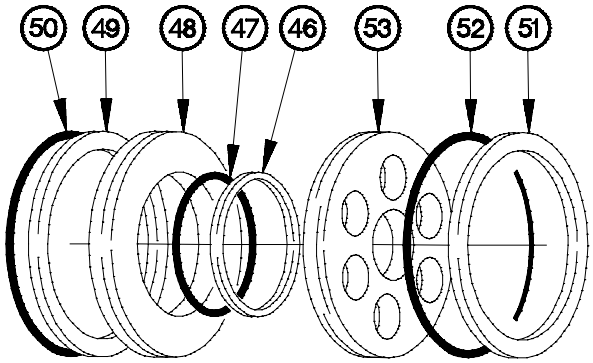
6r53d121

(39) Install packing retainer (46) and preformed packing (47) on cylinder head (48).

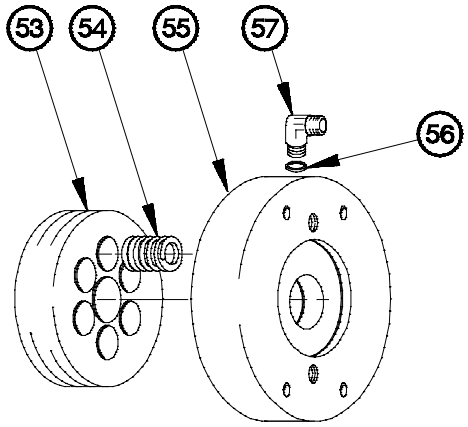
(40) Install packing retainer (49) and preformed packing (50) on cylinder head (48).

(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).

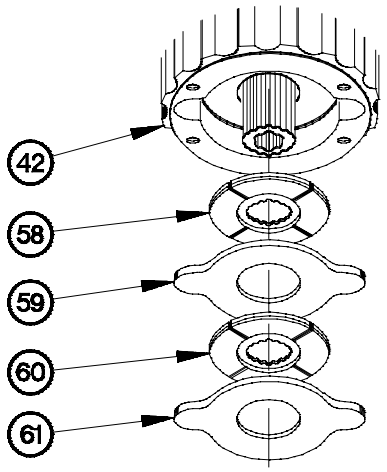
(47) Install 90-degree fitting (57) in cylinder housing (55).

16-53. M1089 SWING DRIVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

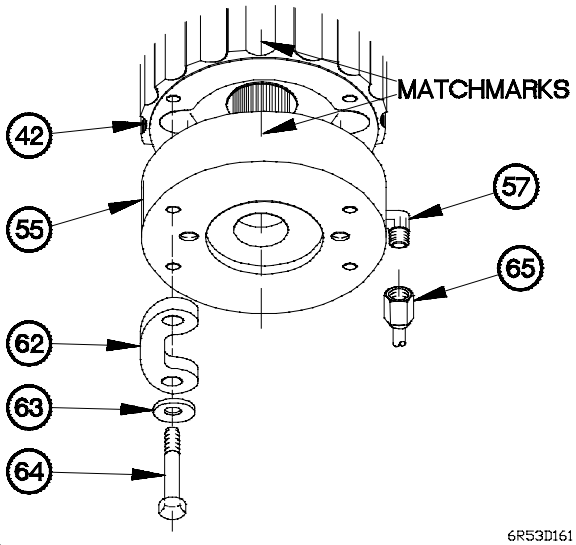
CAUTION

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).

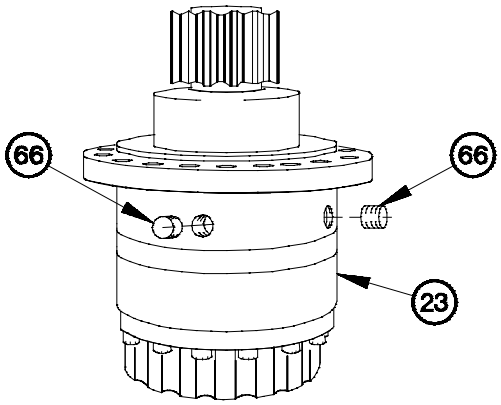
(50) Install cylinder housing (55) on end cover (42) with match marks aligned.

(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).

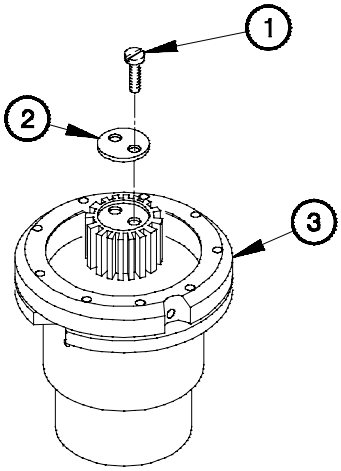
(53) Fill swing drive (23) with oil.

(54) Install two plugs (66) in swing drive (23).



6R53D171

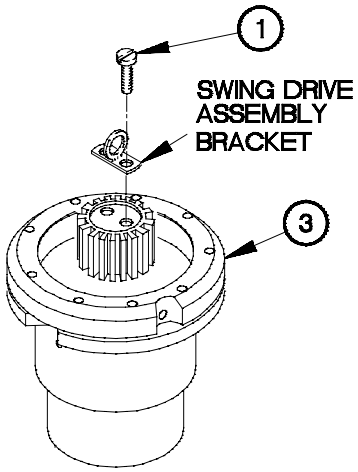
e. Installation.



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.

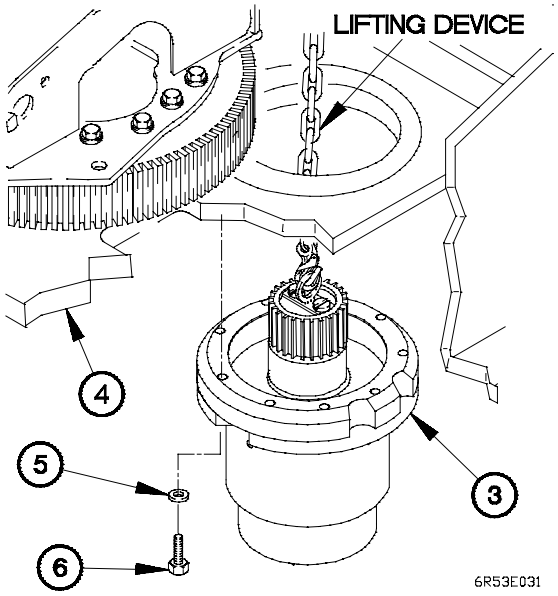
NOTE

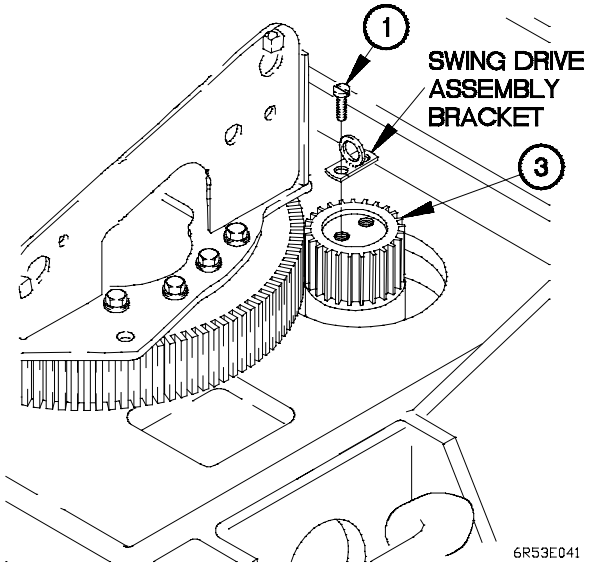
Swing drive gear must be meshed with rotation gear during installation of swing drive assembly.

(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).

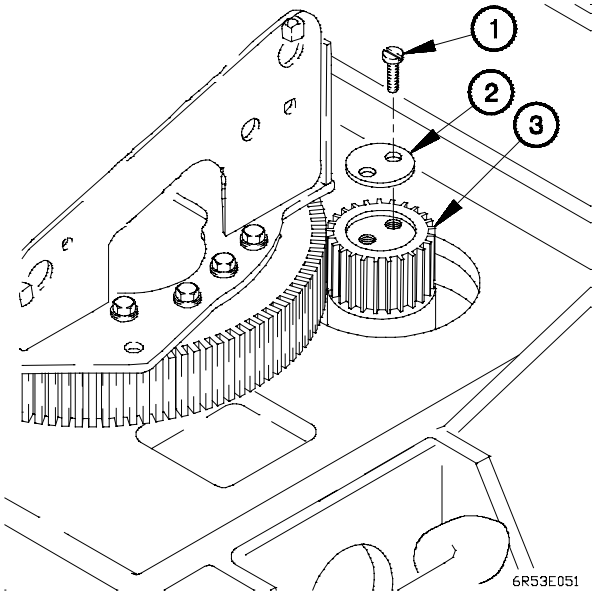
(5) Tighten screws (6) to 90-110 lb-ft (122-149 N•m).

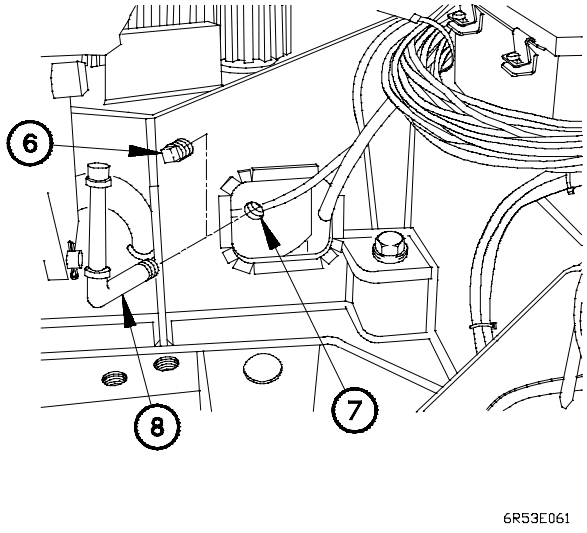




(6) Remove two screws (1) and swing drive assembly bracket from swing drive assembly (3).

(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).

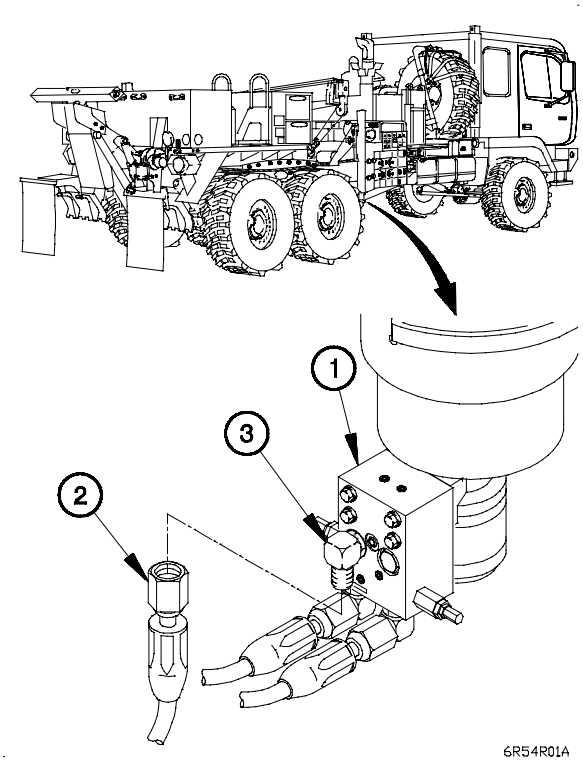
CAUTION

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).

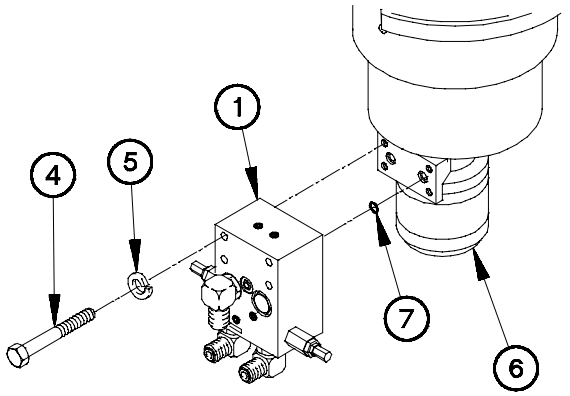


NOTE

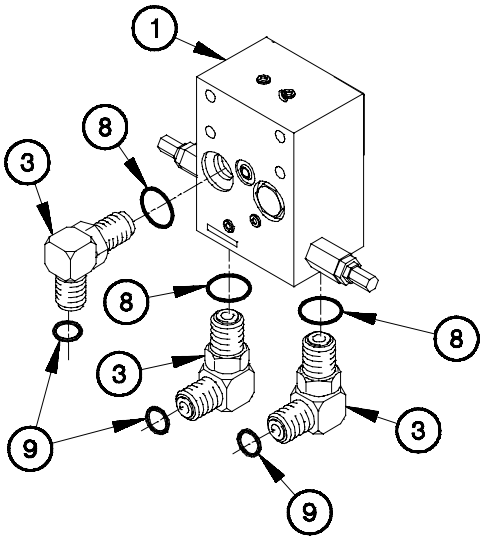
Step (3) requires the aid of an assistant.

(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-

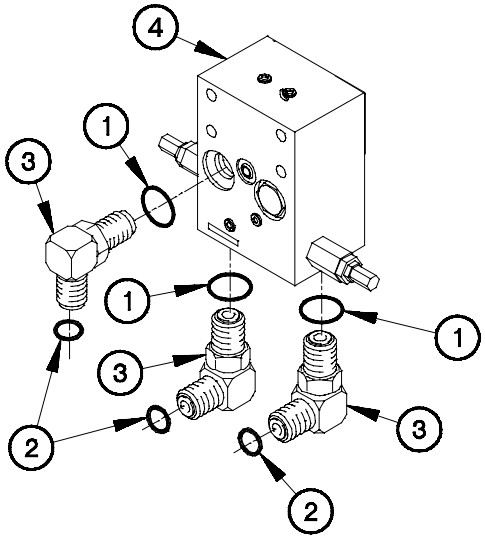
(5) Remove three 90-degree fittings (3) from cross relief valve (1).

(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.

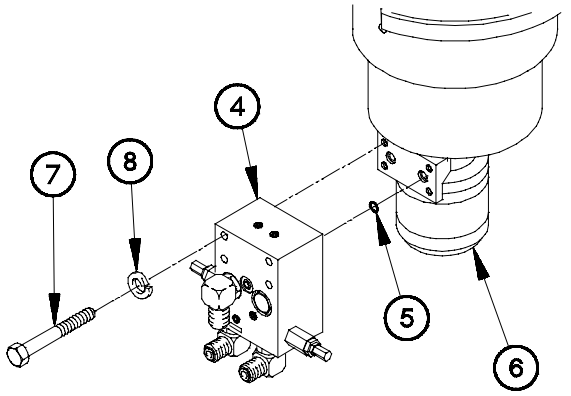
(4) Apply sealing compound to threads of four screws (7).

NOTE

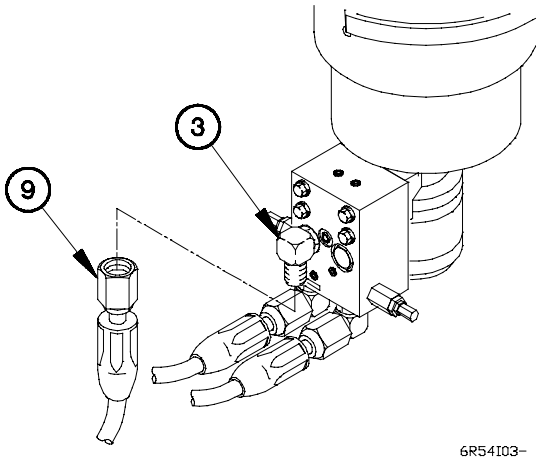
Step (5) requires the aid of an assistant.

(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.

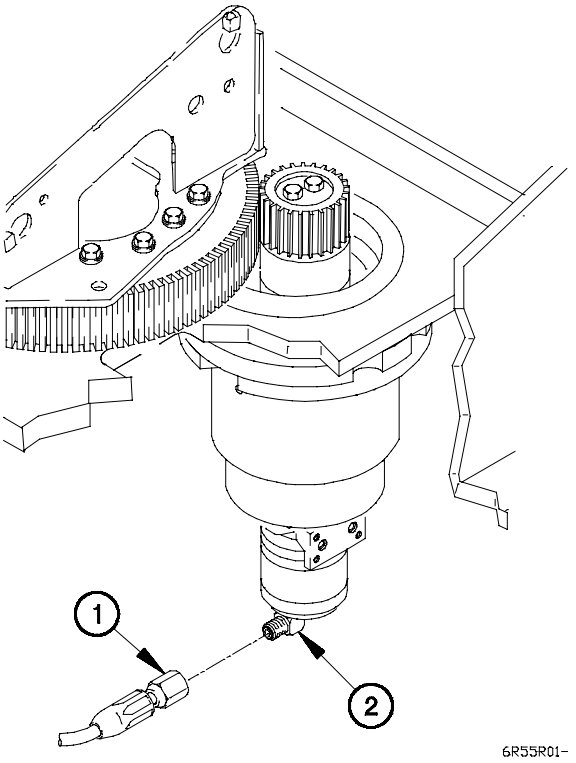
CAUTION

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).

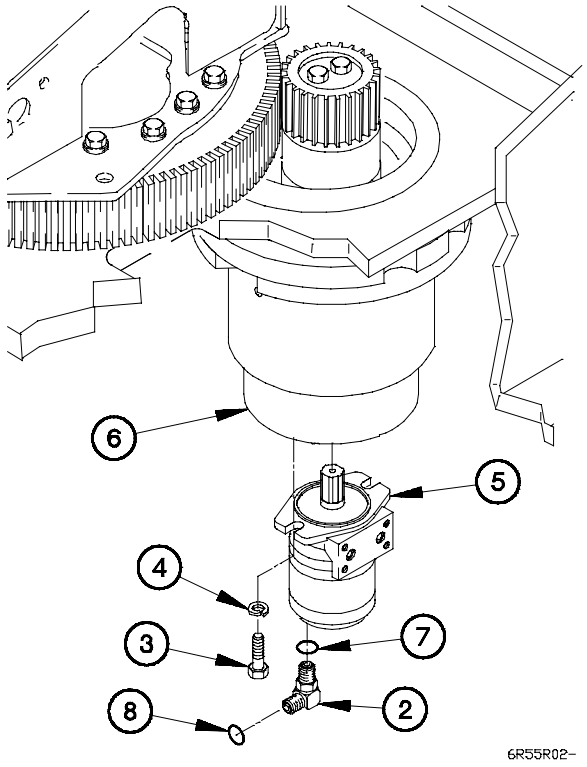


16-55. M1089 HYDRAULIC ORBIT MOTOR REPLACEMENT (CONT)

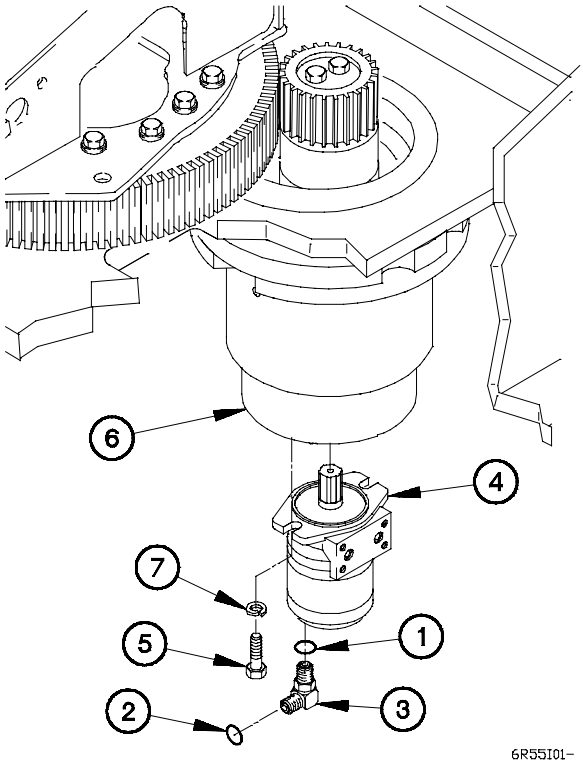
(2) Remove two screws (3), washers (4), and hydraulic orbit motor (5) from swing drive assembly (6).

(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

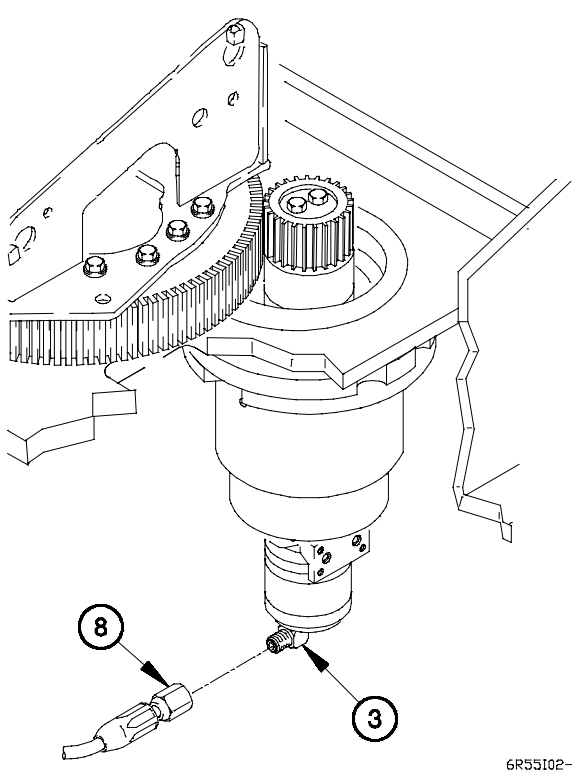
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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)

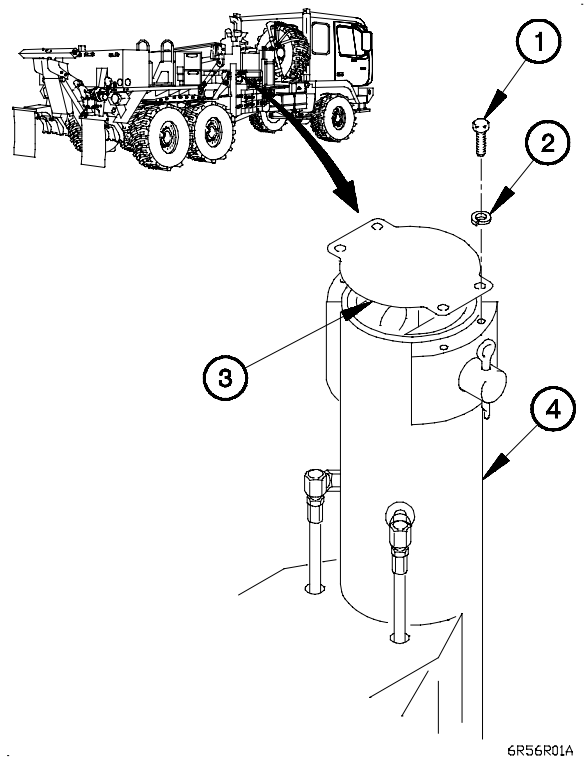
Personnel Required
(2)

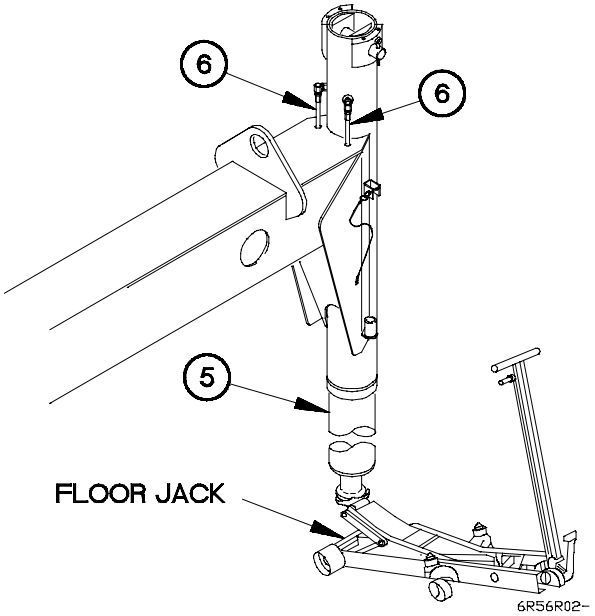
a. Removal.

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.

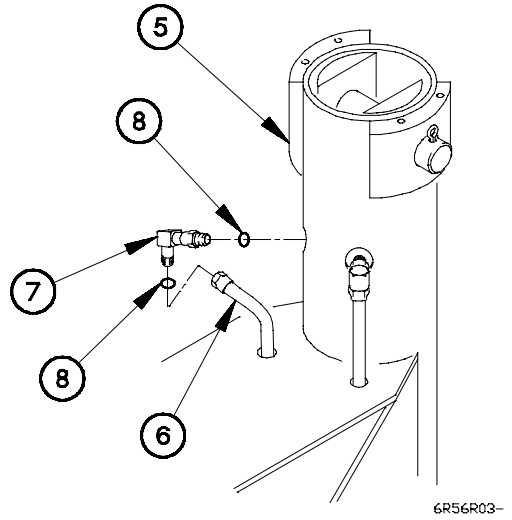
NOTE

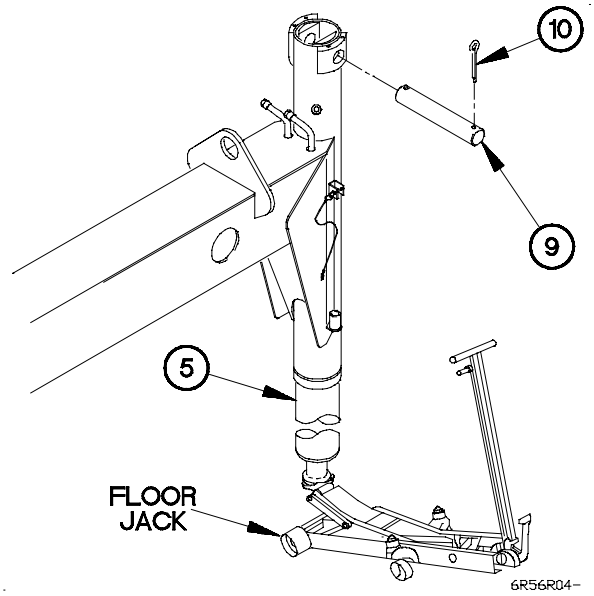
Tag hydraulic hoses and connection points prior to disconnecting.

(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).

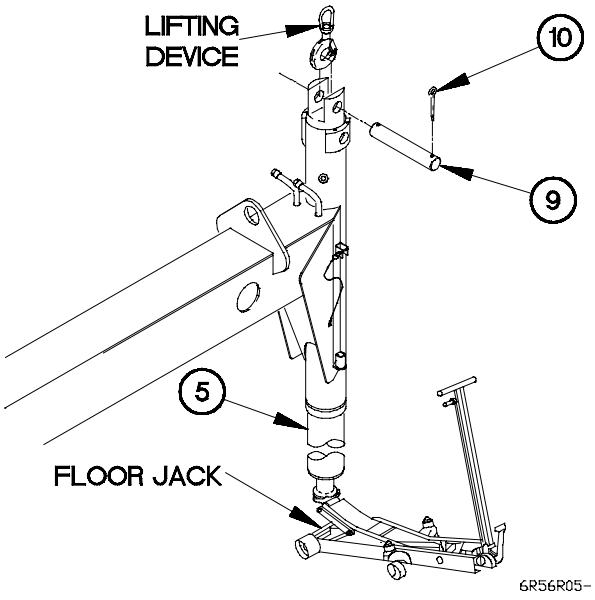
(8) Remove two cotter pins (10) from pin (9). Discard cotter pins.

(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)

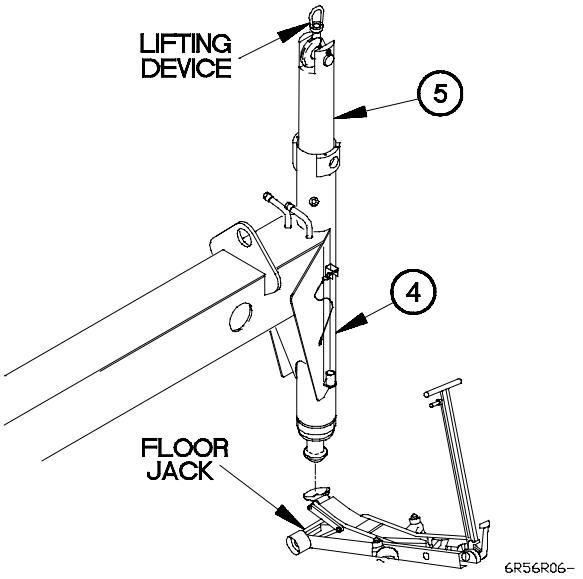
WARNING

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).

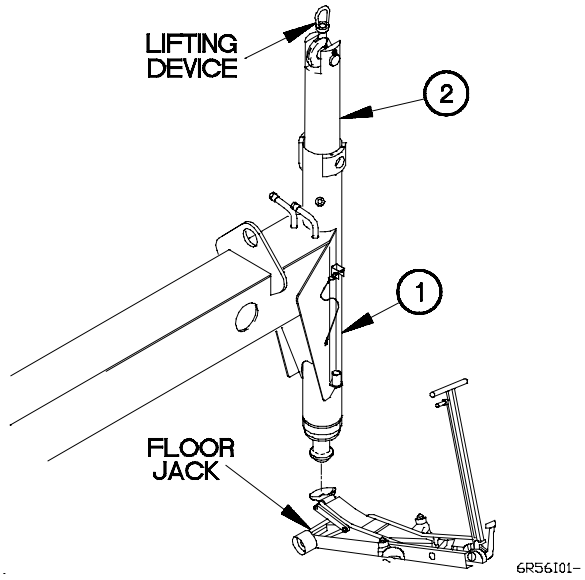


b. Installation.

NOTE

Left and right side outrigger jack cylinders are installed the same way. Right side shown.

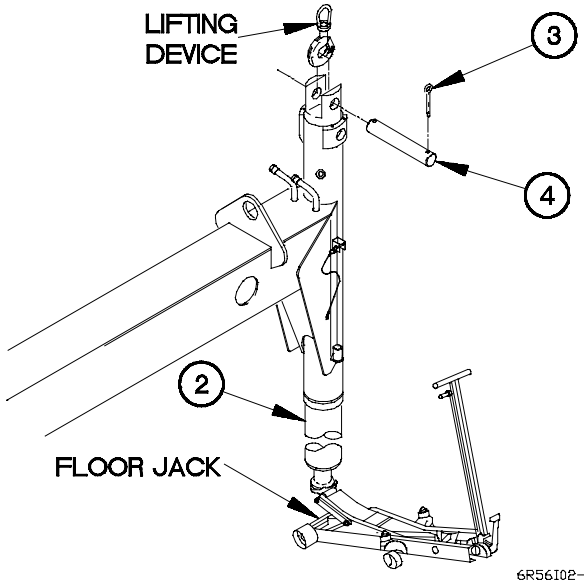
(1) Position floor jack under outrigger (1).



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.

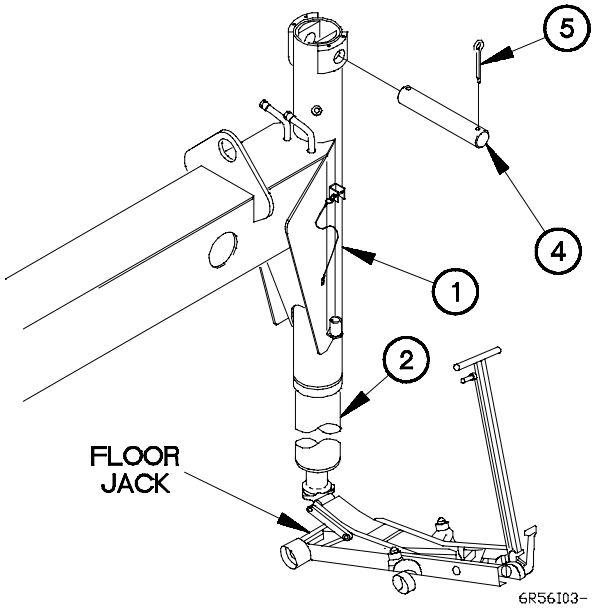


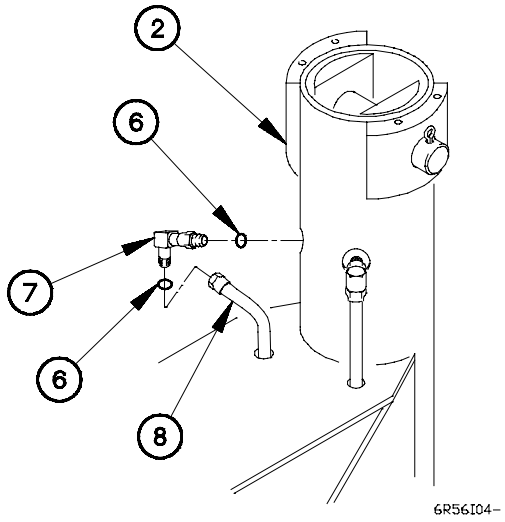
(3) Remove two cotter pins (3) from pin (4). Discard cotter pins.

(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).



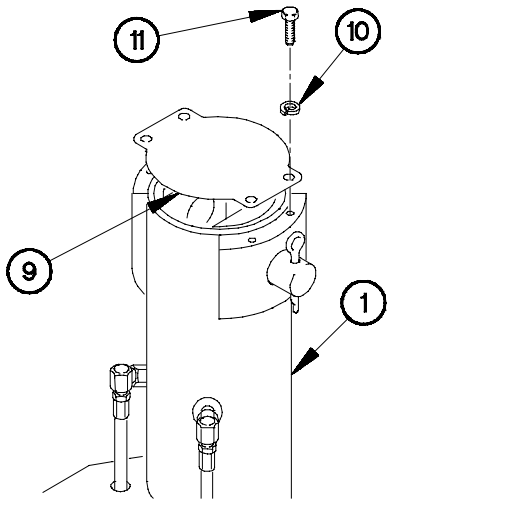


(7) Install two preformed packings (6) on adapters (7).

(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.

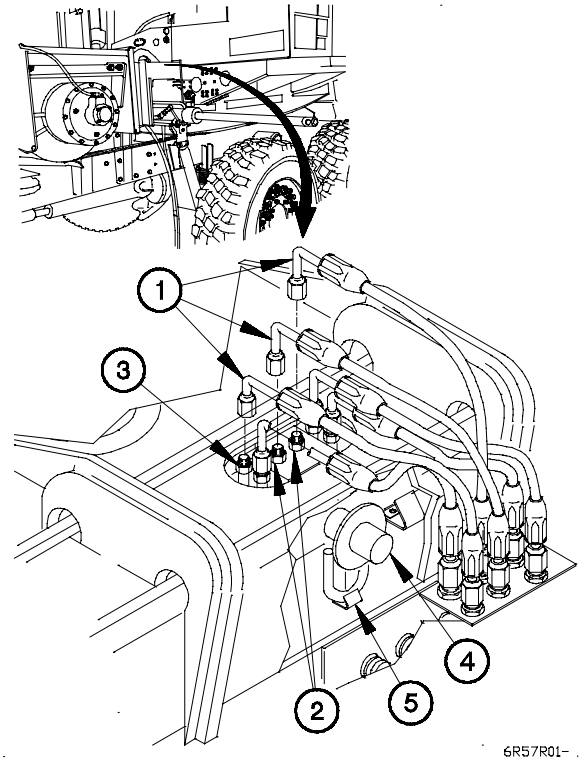
(1) Disconnect two hydraulic hoses (1) from fittings (2).

(2) Disconnect four hydraulic hoses (1) from tubes (3).

NOTE

Step (3) requires the aid of an assistant.

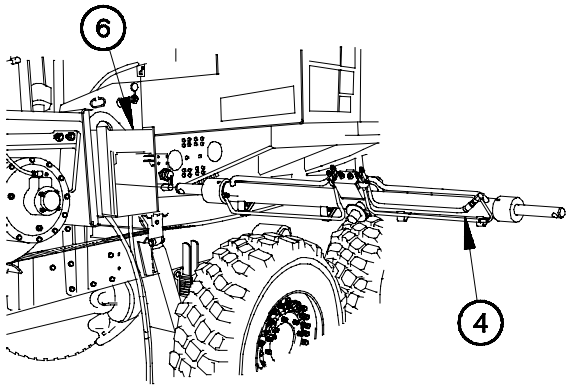
(3) Lift outrigger extension cylinder (4) out of the brackets (5).

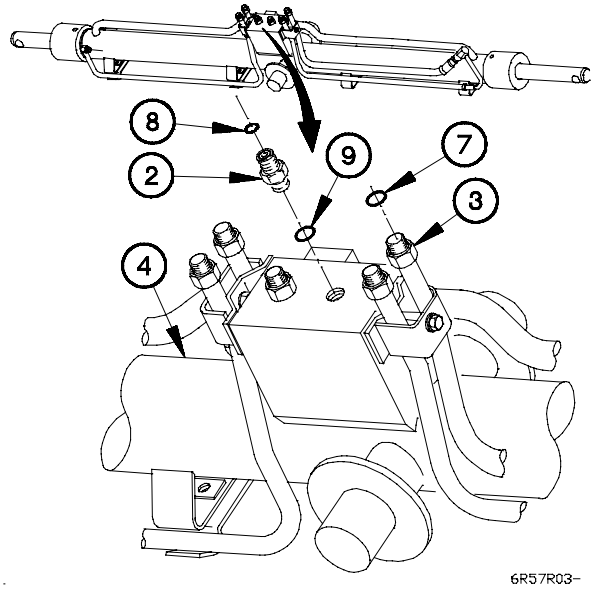


NOTE

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.

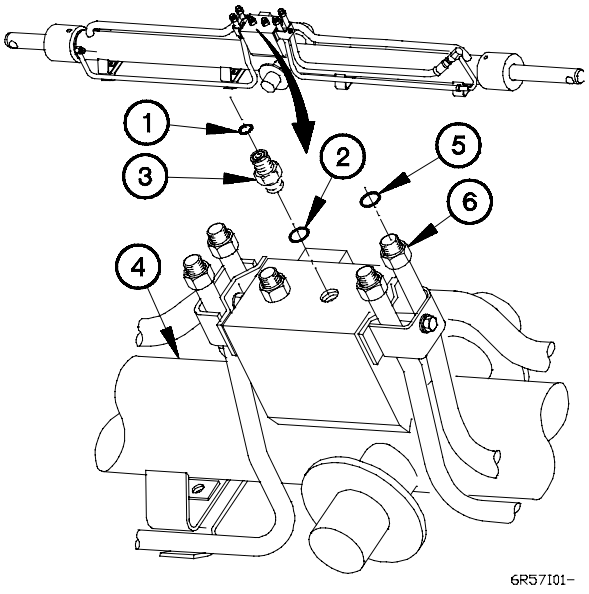
(7) Remove preformed packings (8 and 9) from two fittings (2). Discard preformed packings.

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).

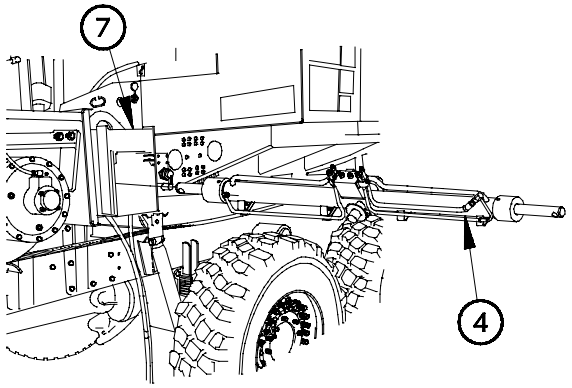


16-57. M1089 OUTRIGGER EXTENSION CYLINDER REPLACEMENT (CONT)

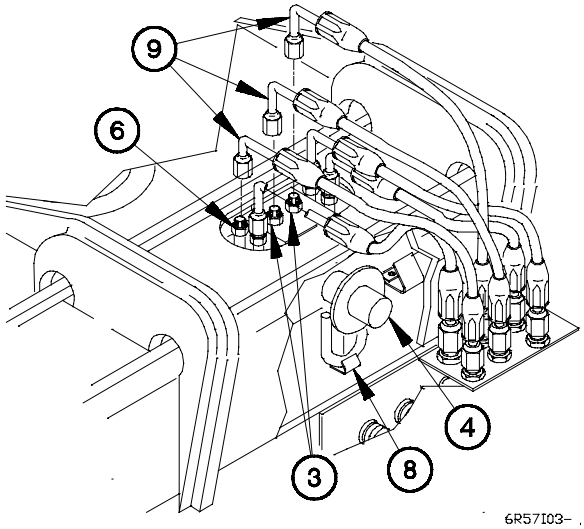
NOTE

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

(4) Position outrigger extension cylinder (4) in extension housing (7).



6R57I02-



6R57I03-

(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.

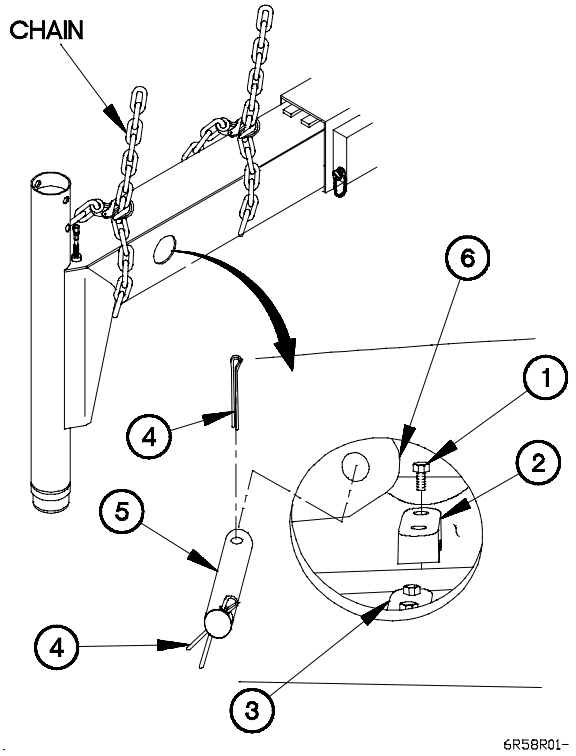
NOTE

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

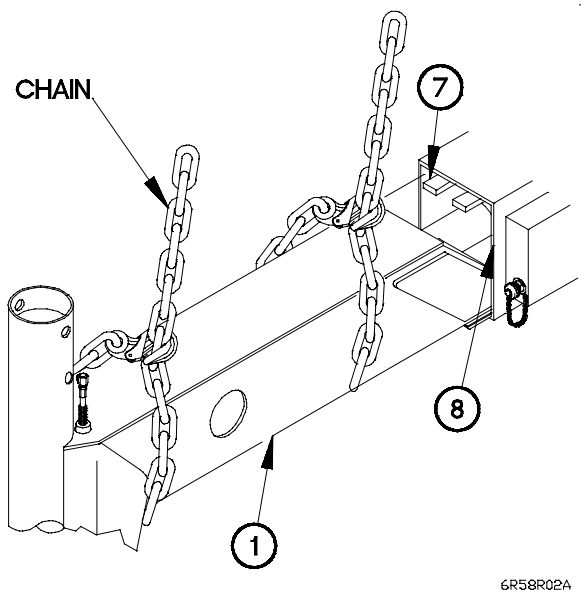
If the outrigger beam cannot be removed with ease, perform Step (4). If the outrigger beam can be removed with ease, perform Step (5).

(4) Cut weld securing mounting pad (7) to support tube (8).

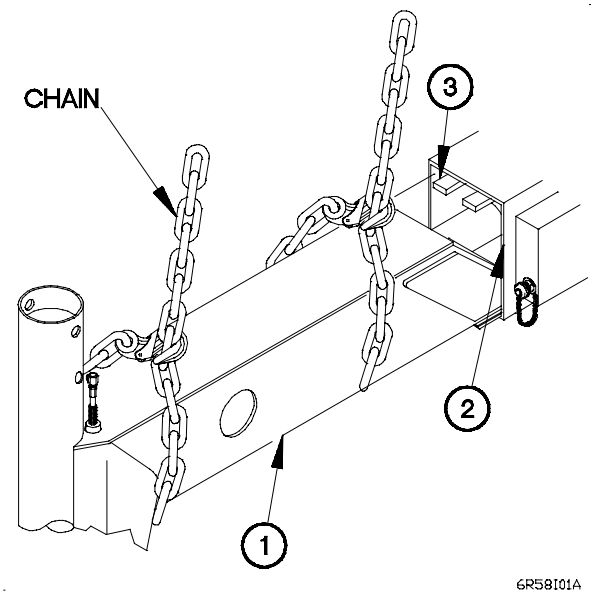
NOTE

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

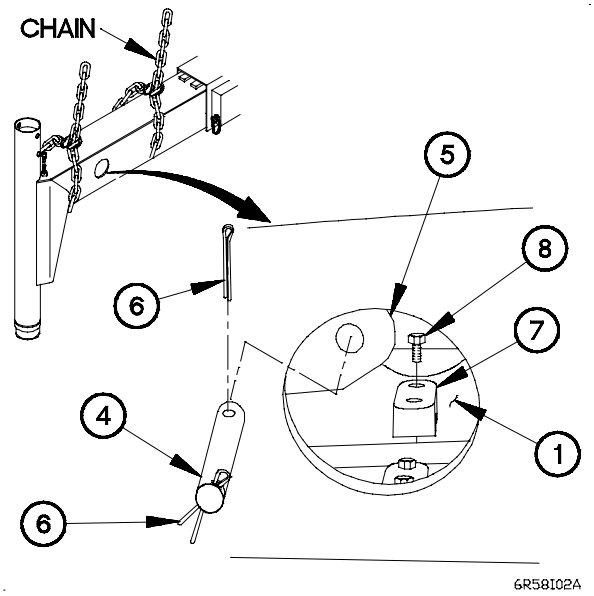
Ensure hydraulic tubes pass freely through cutouts in outrigger beam. Failure to comply may result in damage to equipment.

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).

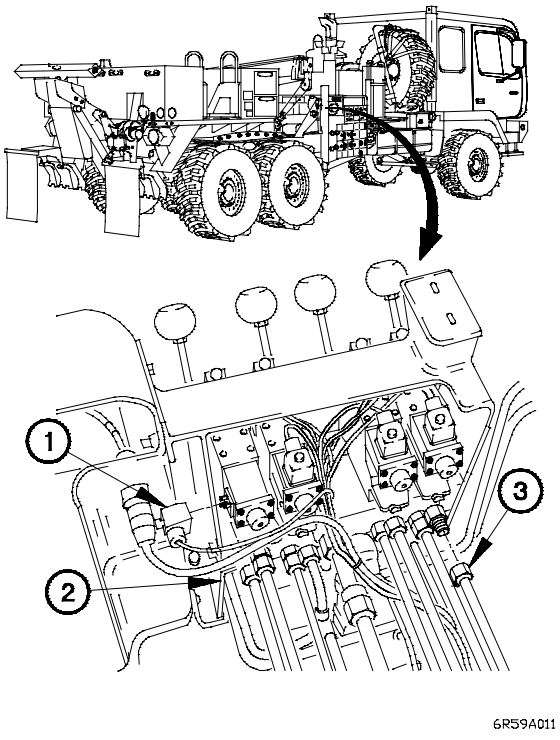
CAUTION

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

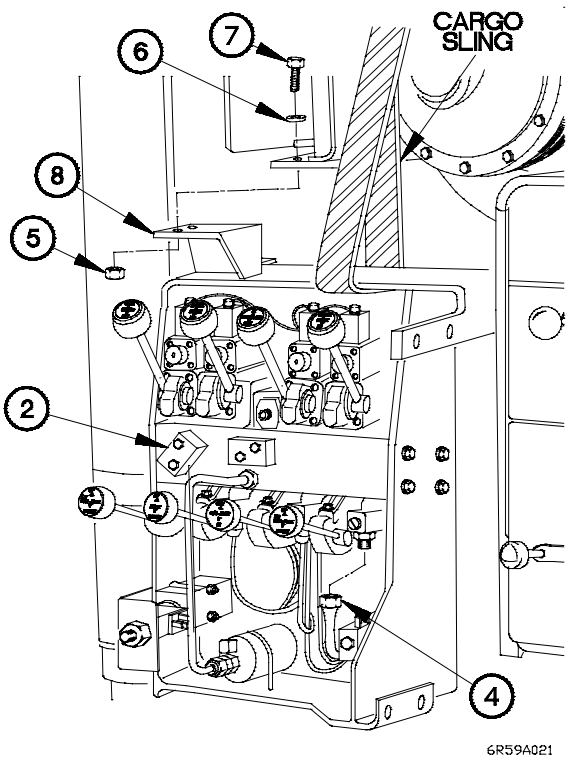
Crane control panel weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

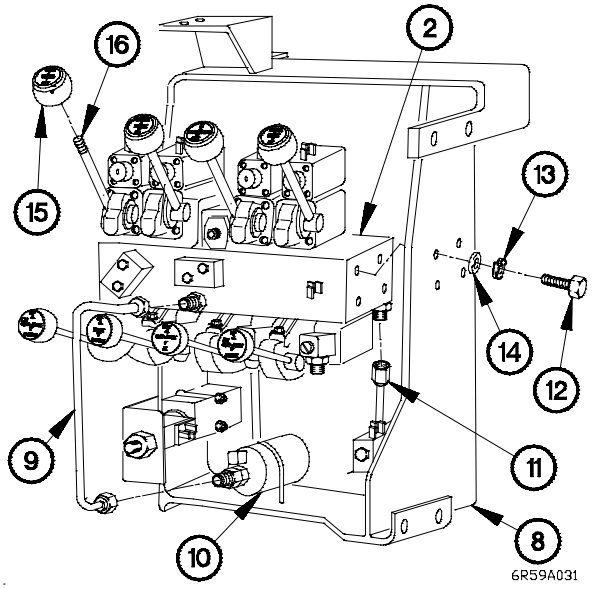
(4) Remove six self-locking nuts (5), washers (6), and bolts (7) from three corners of crane control panel (8). Discard self-locking nuts.

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

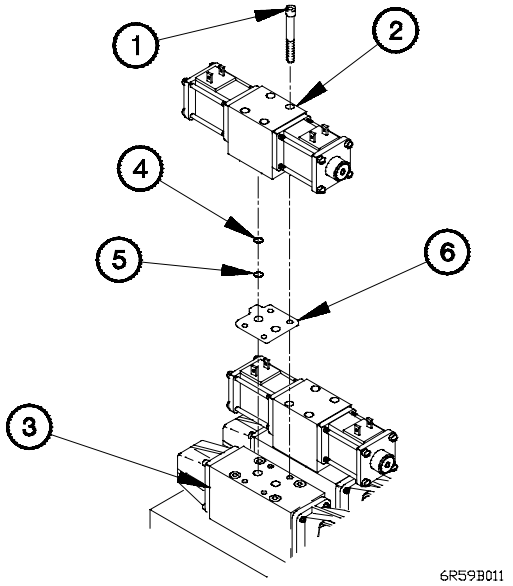
Step (8) requires the aid of an assistant.

(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.

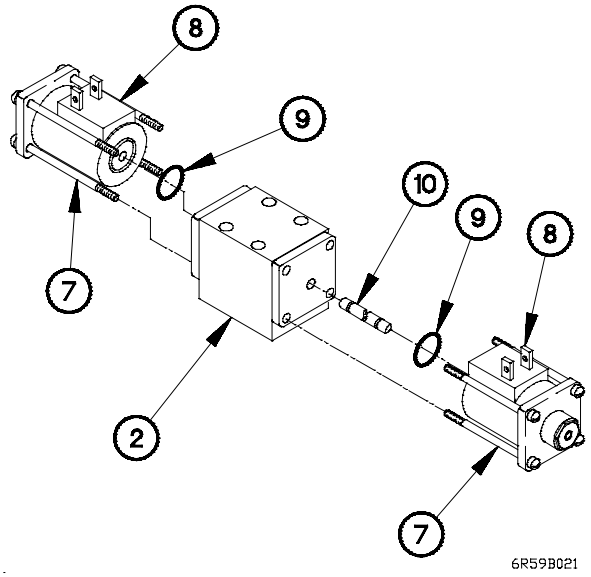


NOTE

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.

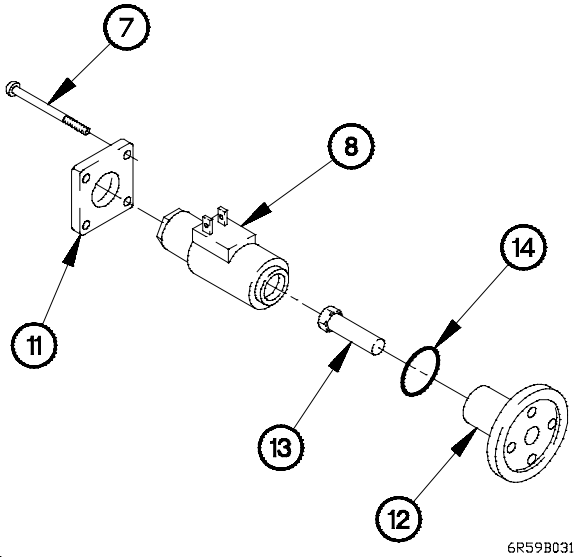
NOTE

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).

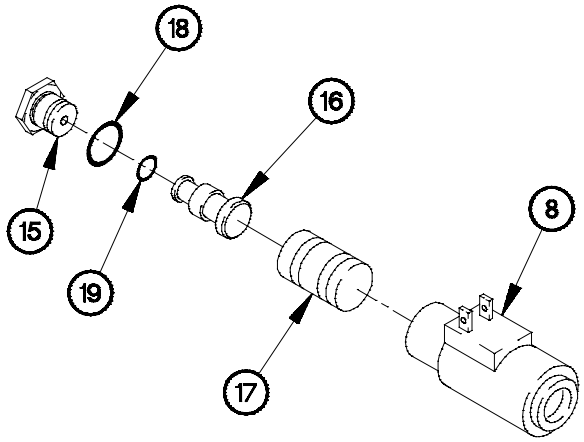
(10) Remove performed packing (14) from valve body coil (12). Discard performed packing.



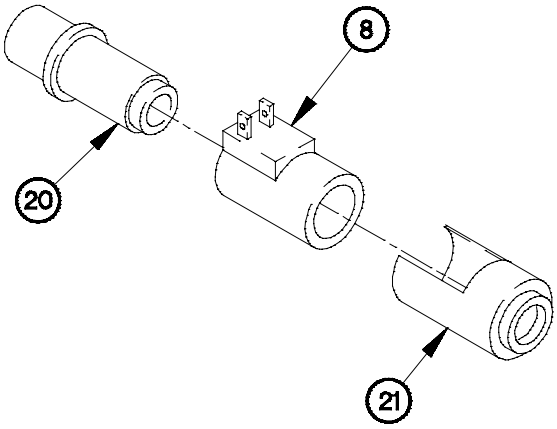
(11) Remove head valve (15), head valve pushbutton (16), and head valve coil (17) from solenoid (8).

(12) Remove performed packing (18) from head valve (15). Discard performed packing.

(13) Remove seal (19) from head valve pushbutton (16). Discard seal.



6R59B041



6R59B051

(14) Remove solenoid sleeve (20) and solenoid cylinder (21) from solenoid (8).

(15) Perform steps (7) through (14) on remaining seven solenoids.

NOTE

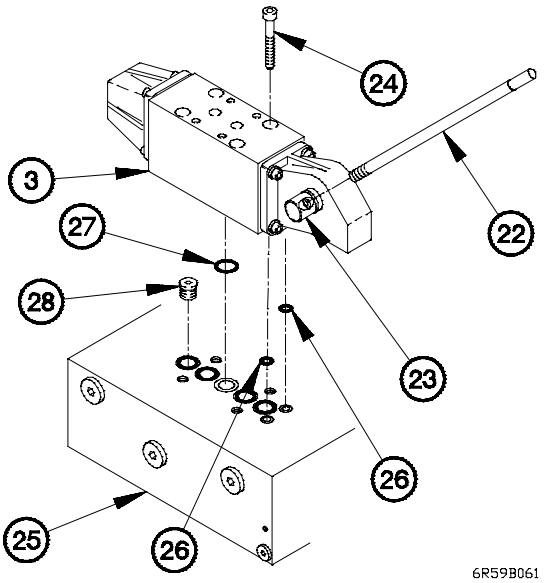
All top directional valve bodies are disassembled the same way. One top directional valve body shown.

(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.

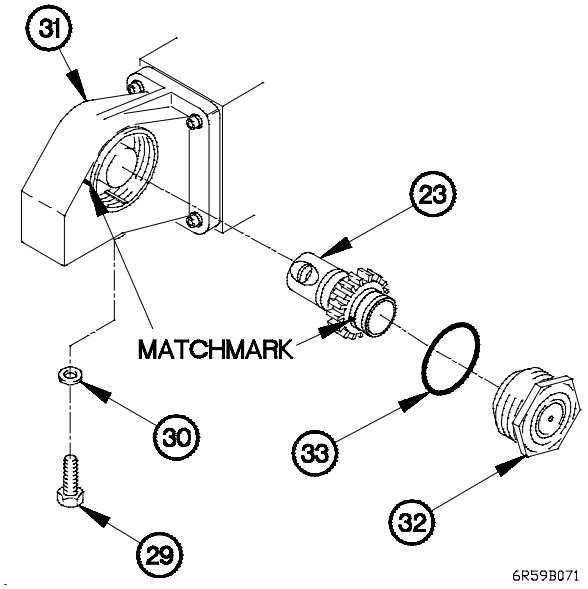
(20) Remove bolt (29) and washer (30) from lever cap (31). Discard washer.

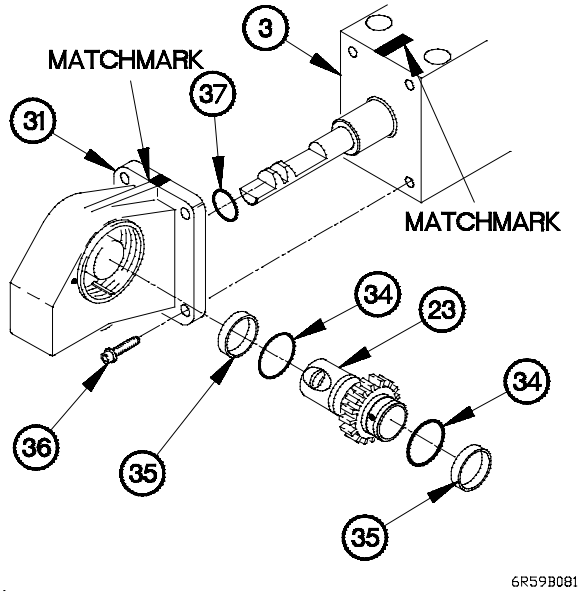
(21) Remove carrier nut (32) from lever cap (31).

(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).

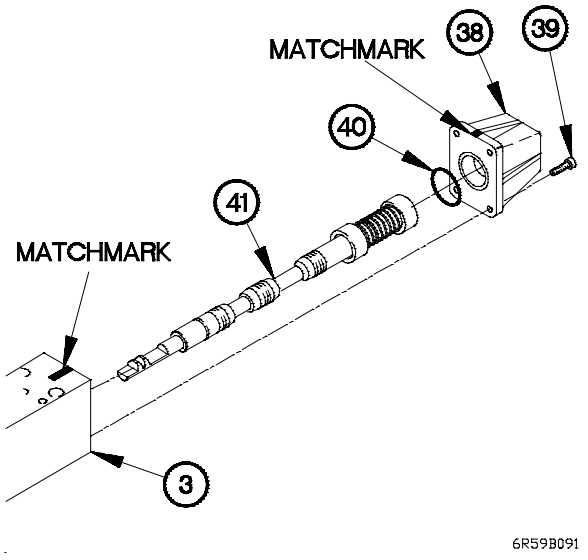
(27) Remove four screws (36), lever cap (31), and preformed packing (37) from top directional valve body (3). Discard preformed packing.

(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.

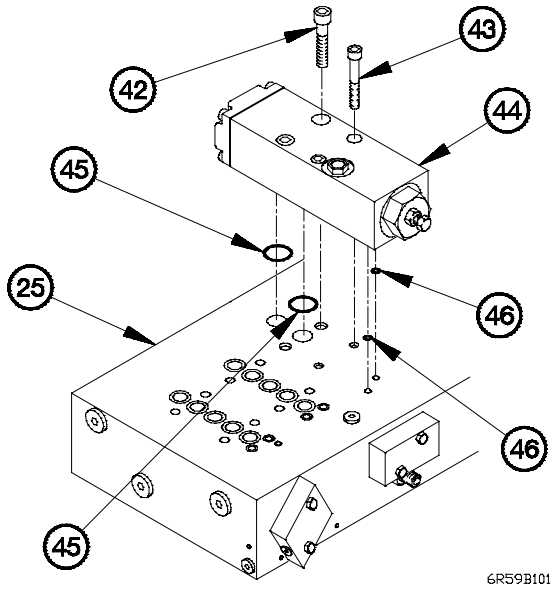
(30) Remove spool (41) from top directional valve body (3).

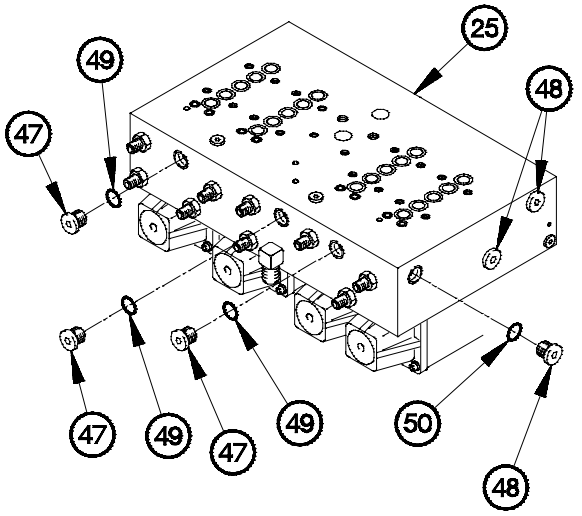
(31) Perform steps (16) through (30) on remaining three top directional valve bodies.



(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).

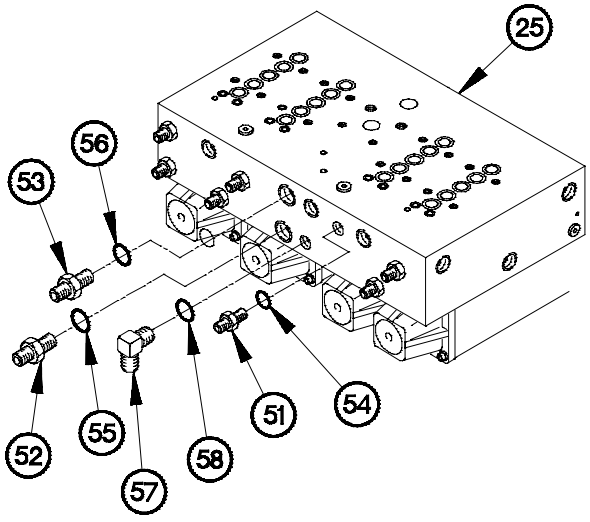
(35) Remove three preformed packings (49) from plugs (47) and six preformed packings (50) from plugs (48). Discard preformed packings.

(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.

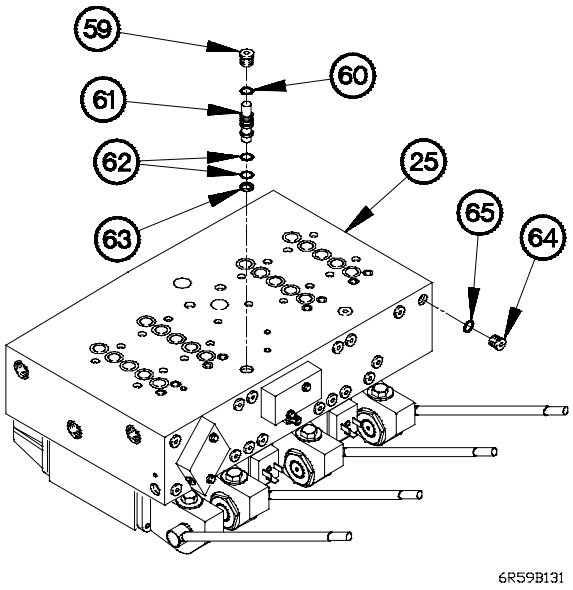
(42) Remove shuttle valve (61) from valve manifold (25).

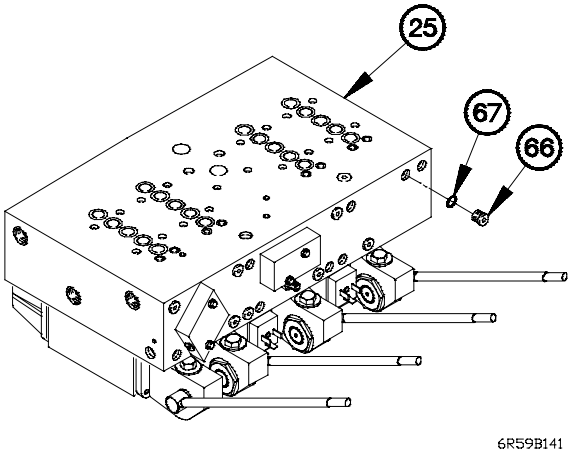
(43) Remove backup ring (62) and two preformed packings (63) from shuttle valve (61). Discard backup ring and preformed packings.

(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).





(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.

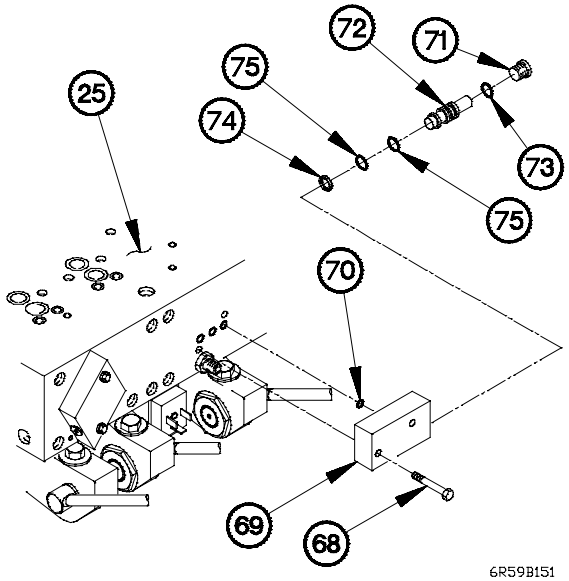
(49) Remove two screws (68), shuttle block (69) and three preformed packings (70) from valve manifold (25). Discard preformed packings.

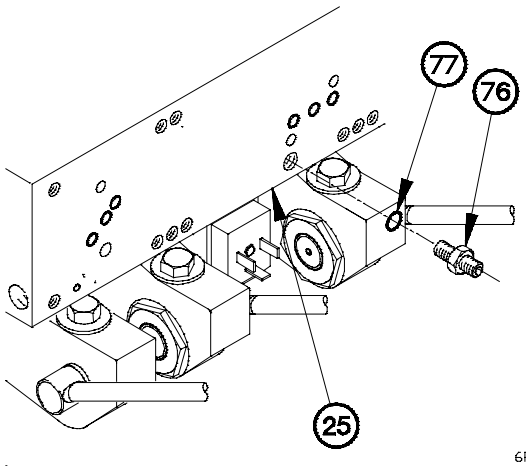
(50) Remove plug (71) and shuttle block valve (72) from shuttle block (69).

(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)

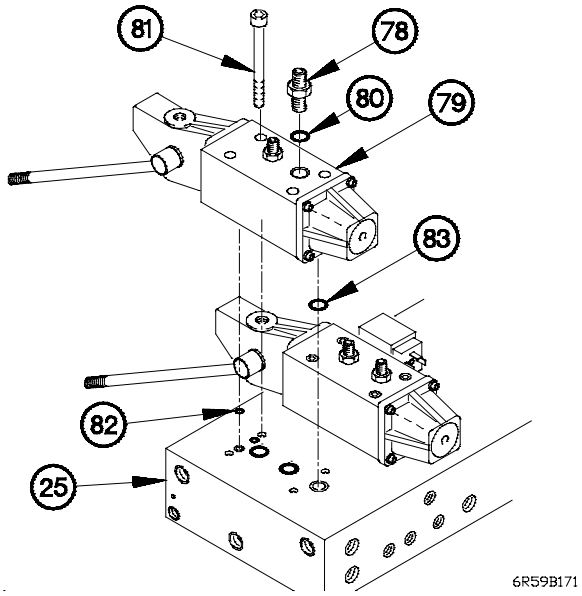
NOTE

All bottom directional valve bodies are disassembled the same way. One bottom directional valve body shown.

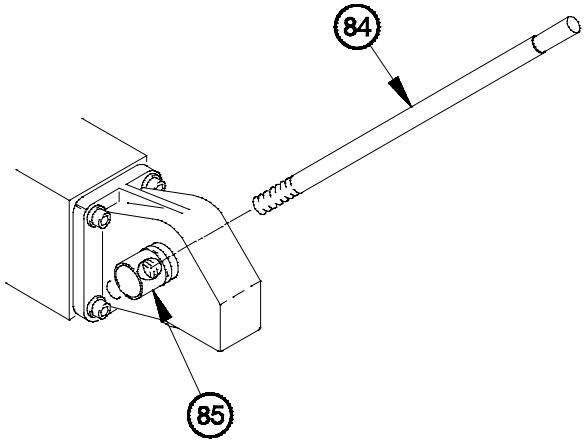
(56) Remove two fittings (78) from bottom directional valve body (79).

(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.



6R59B171

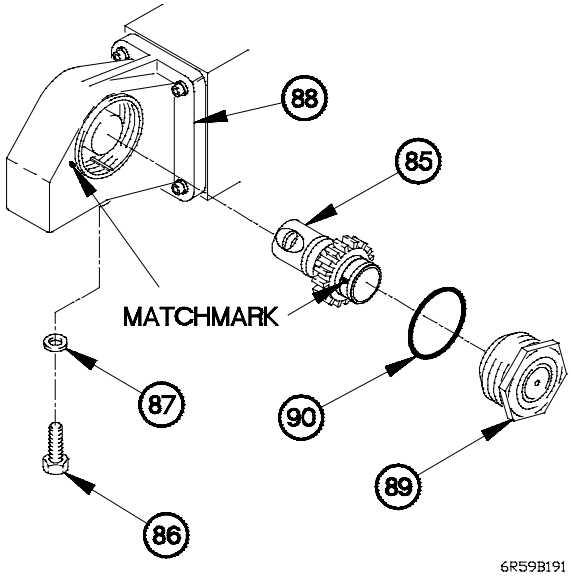


6R59B181

(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.



6R59B191

(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.

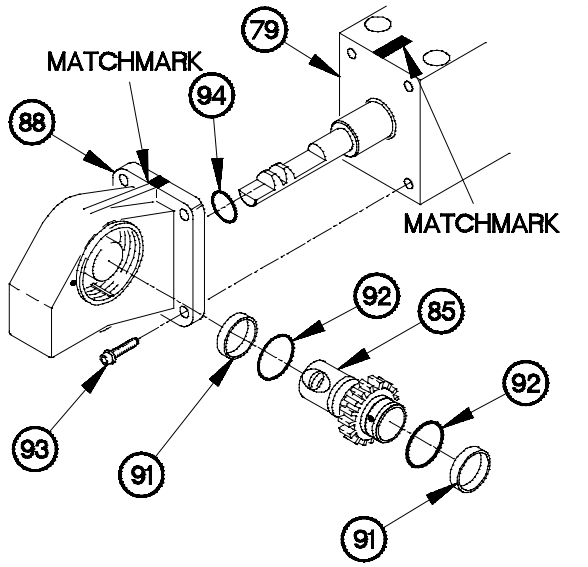
(63) Match mark pinion seal (85) and lever cap (88).

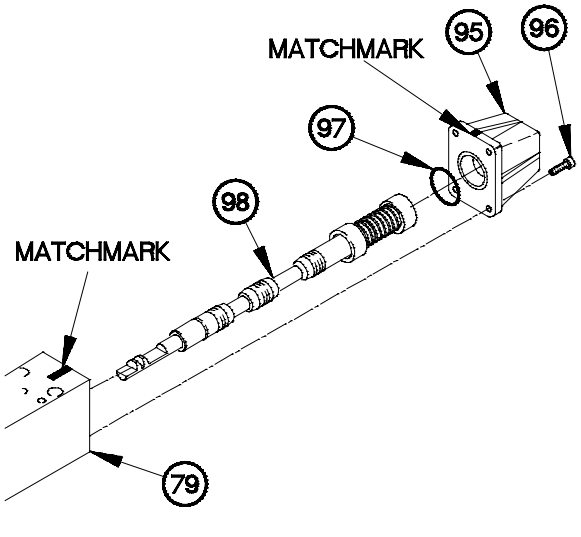
(64) Remove pinion seal (85) from lever cap (88).

(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

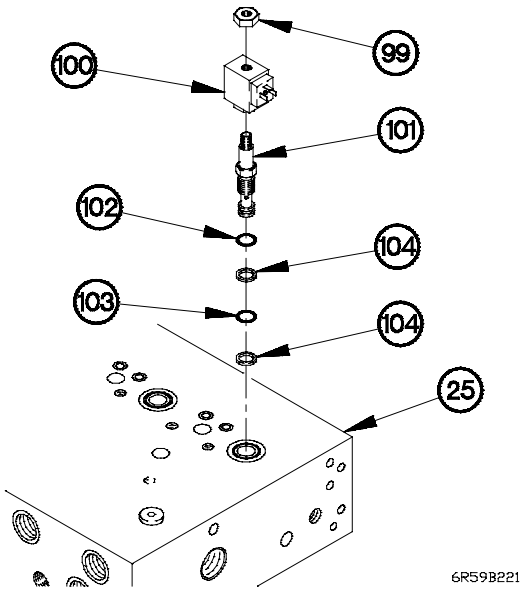
All solenoid valves are disassembled the same way. One solenoid valve shown.

(72) Remove nut (99) and coil (100) from solenoid valve (101).

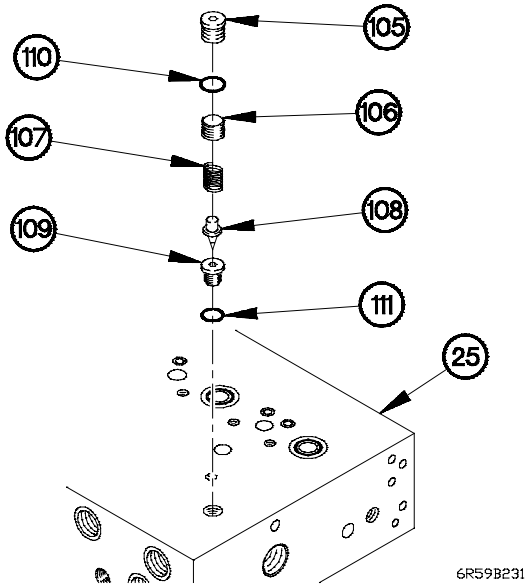
(73) Remove solenoid valve (101) from valve manifold (25).

(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.

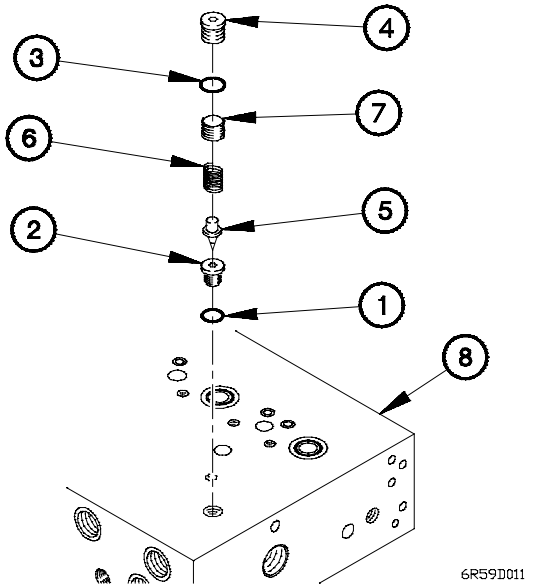
NOTE

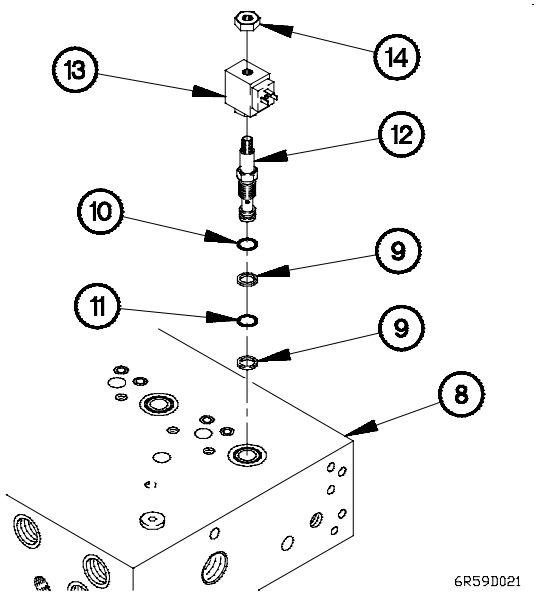
Lubricate all metal parts with lubricating oil during assembly.

(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.

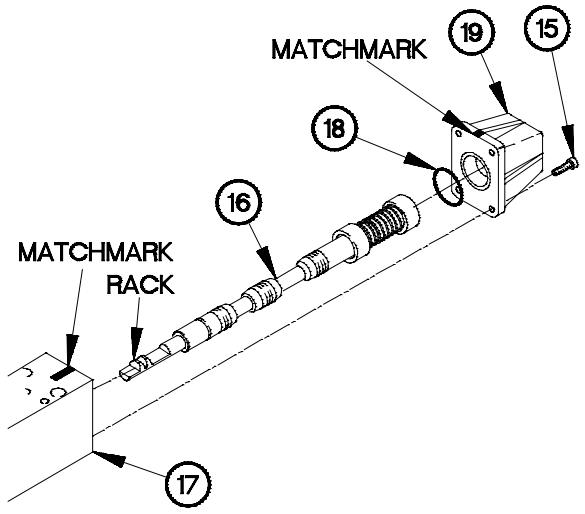
(8) Apply sealing compound to threads of screw (15).

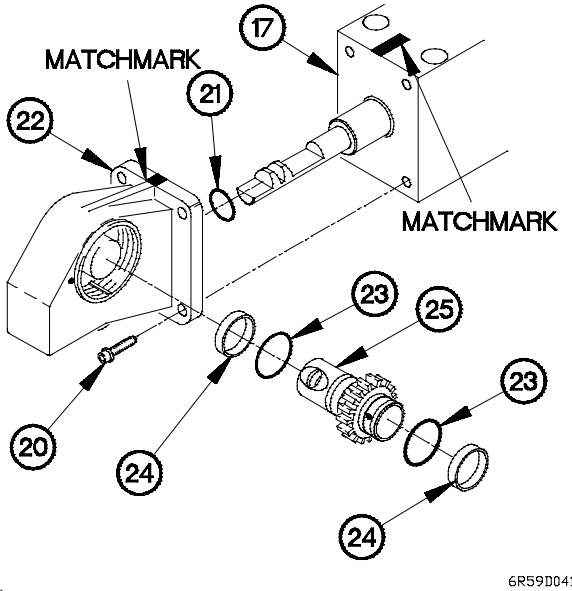
NOTE

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).

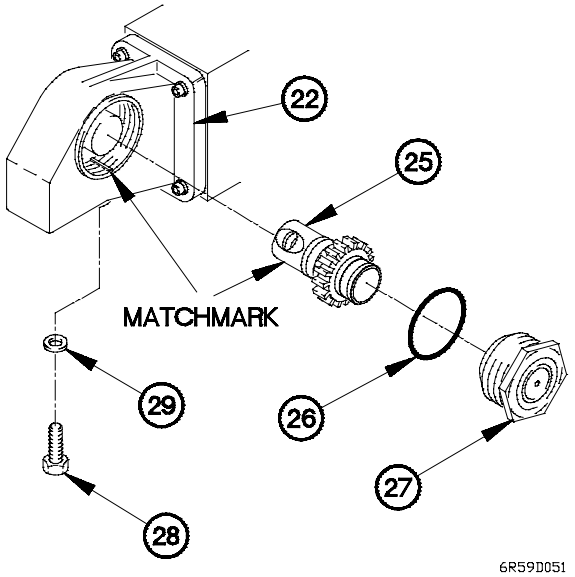
(16) Install carrier nut (27) on lever cap (22).

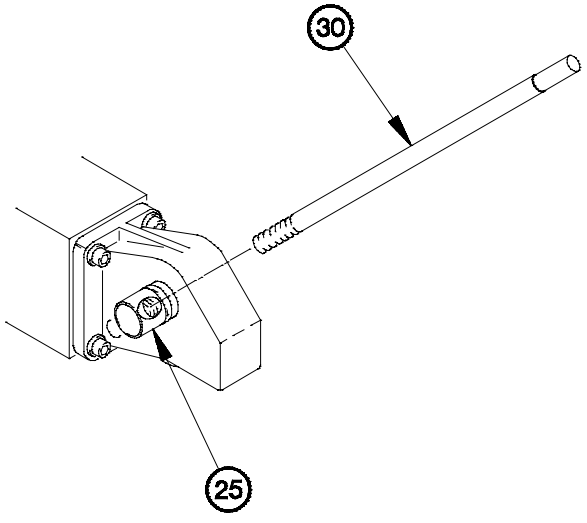
WARNING

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.

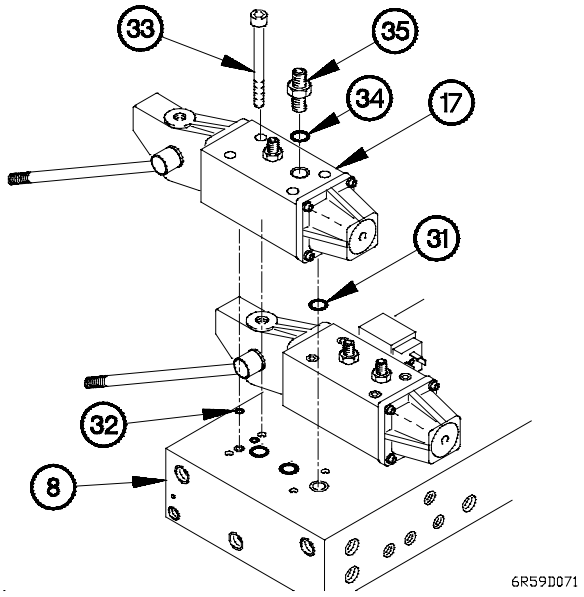
(21) Apply sealing compound to threads of four screws (33).

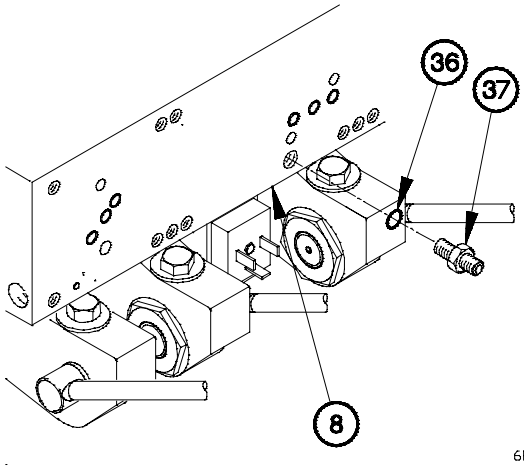
(22) Install bottom directional valve body (17) on valve manifold (8) with four screws (33).

(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).

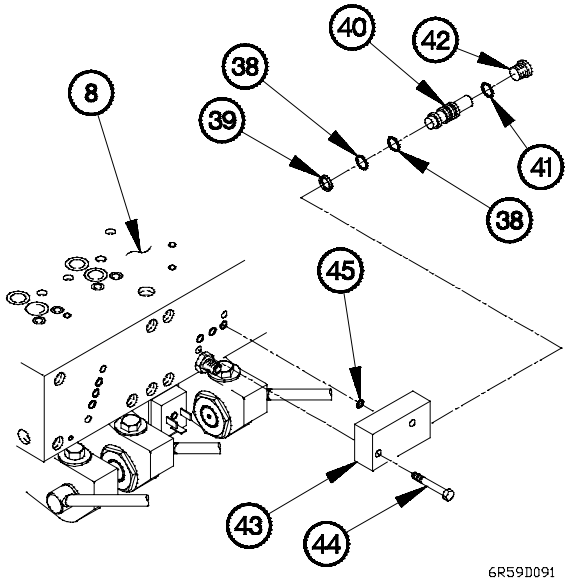
WARNING

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.

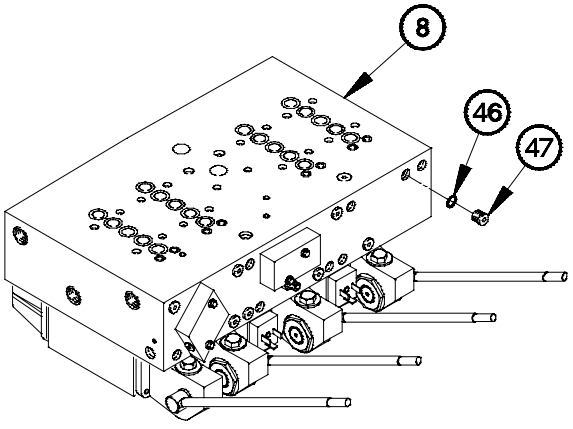
(31) Apply sealing compound to threads of two screws (44).

(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.



6R59D091



6R59D101

(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

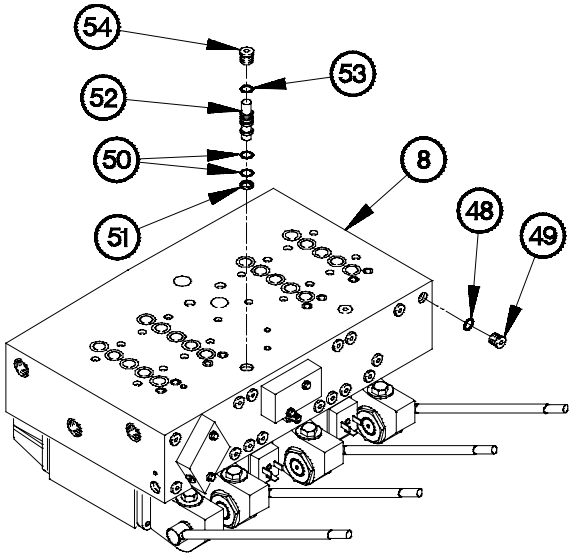
All three shuttle valves are installed the same way. One shuttle valve shown.

(38) Install two preformed packings (50) and backup ring (51) on shuttle valve (52).

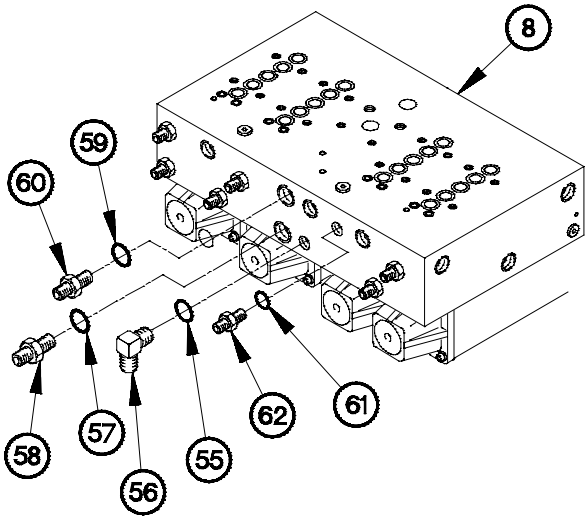
(39) Install preformed packing (53) on plug (54).

(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).

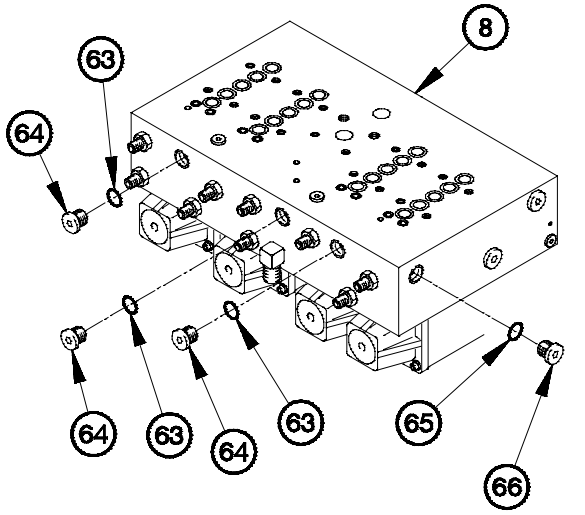
(43) Install 90-degree fitting (56) in valve manifold (8).

(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

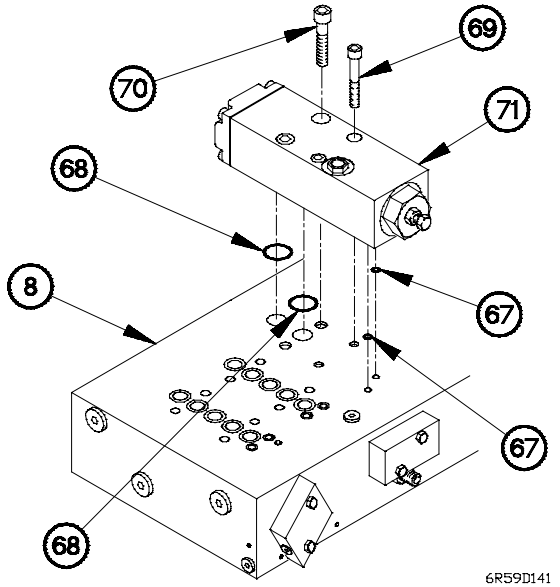
(48) Install two preformed packings (67) and preformed packings (68) on valve manifold (8).

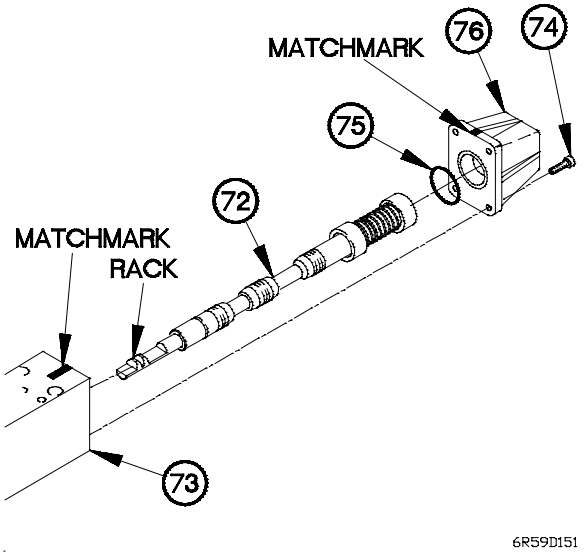
WARNING

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)

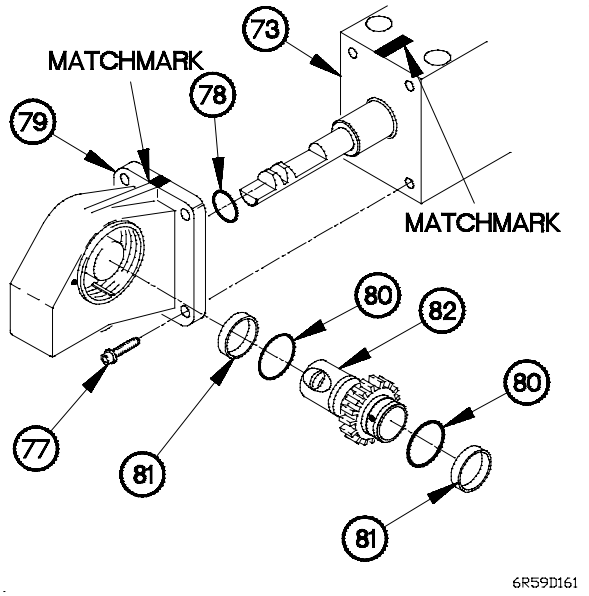
WARNING

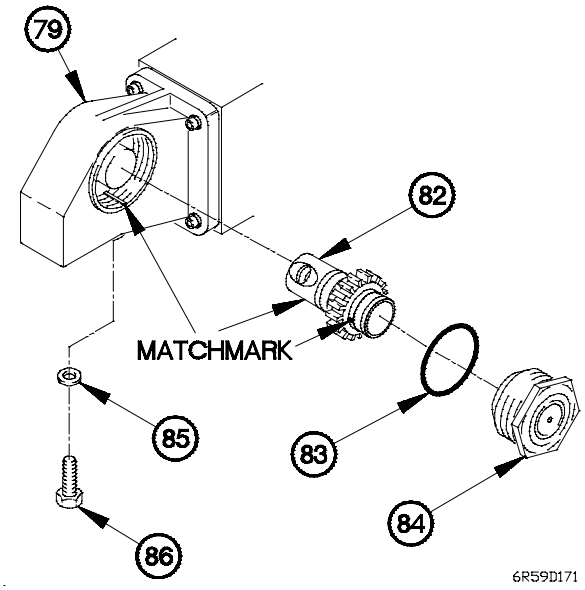
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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.

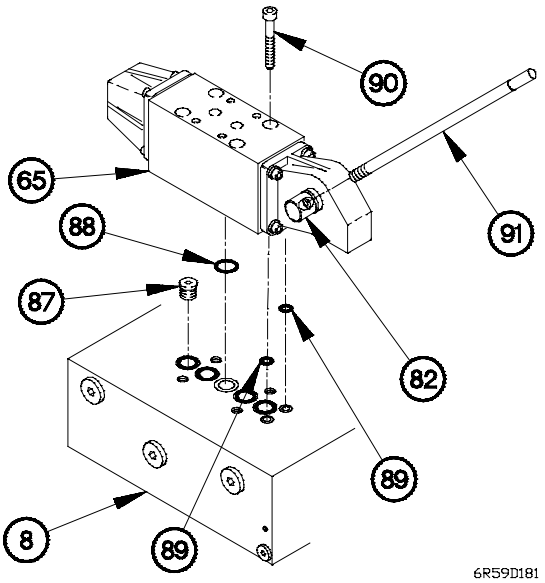
(63) Apply sealing compound to threads of four screws (90).

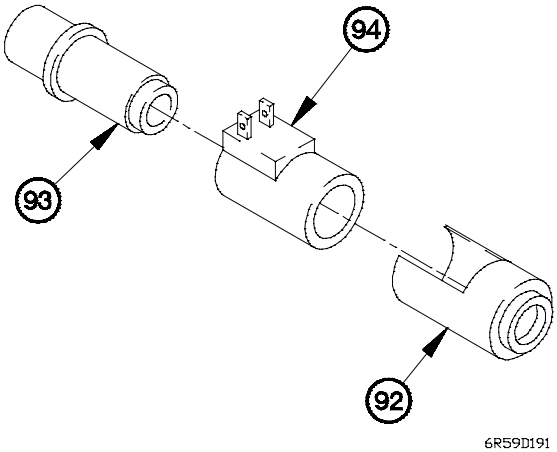
(64) Install top directional valve body (73) on valve body (8) with four screws (90).

(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.

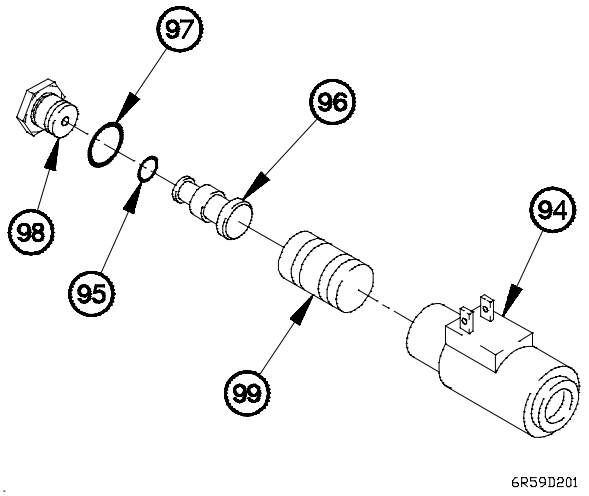
(68) Install solenoid cylinder (92) and solenoid sleeve (93) on solenoid (94).

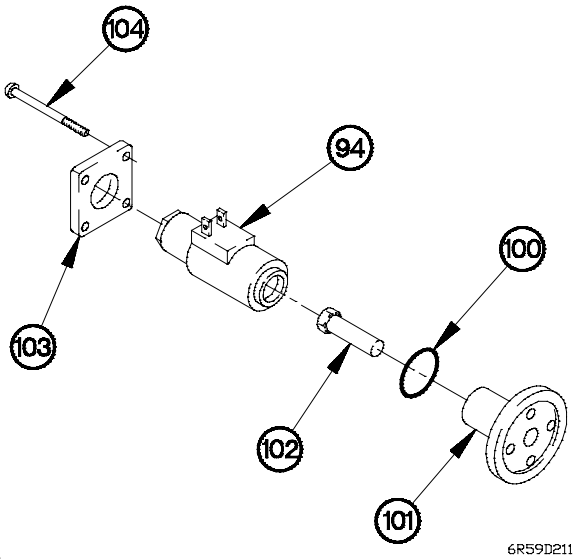
16-59. M1089 EIGHT-BANK VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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

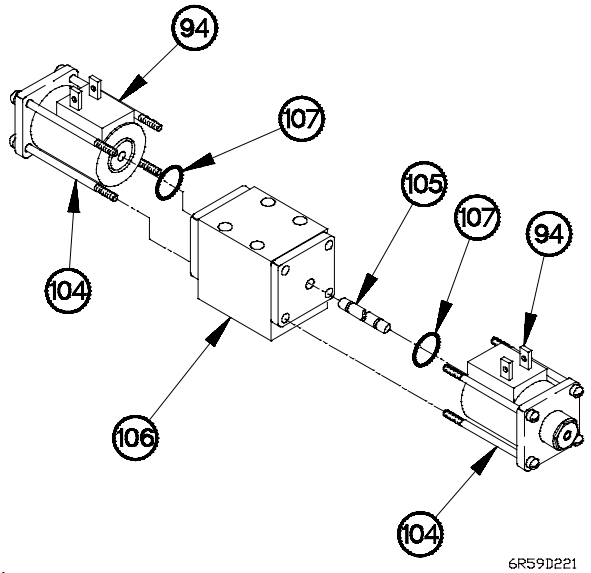
All pilot valves are assembled the same way. One pilot valve shown.

(76) Install spool (105) in pilot valve body (106).

(77) Install two preformed packings (107) in solenoids (94).

WARNING

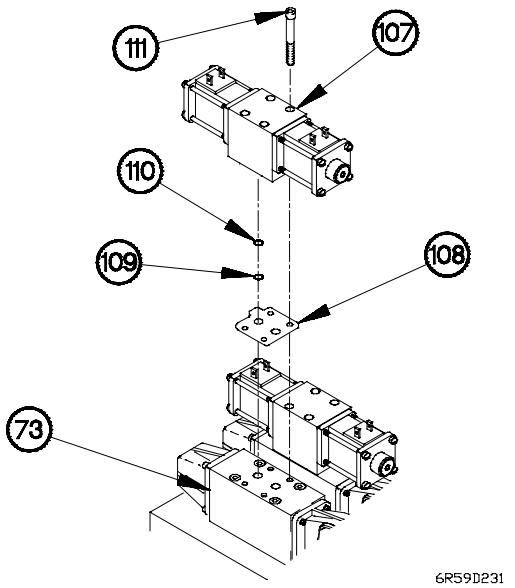
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.



(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

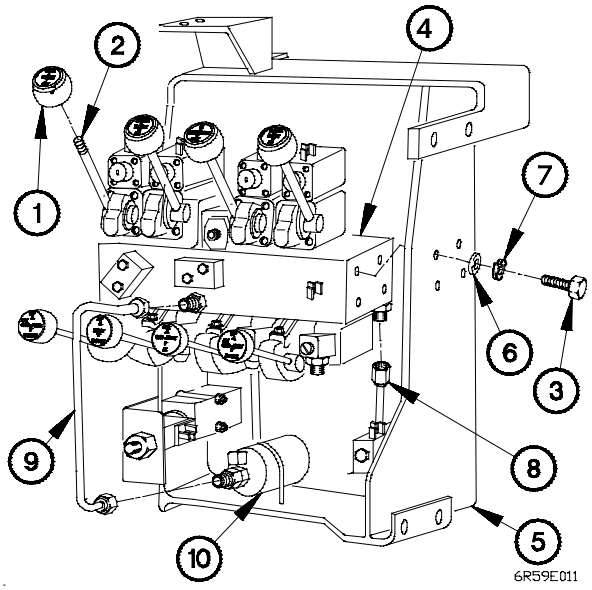
Adhesive Sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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)

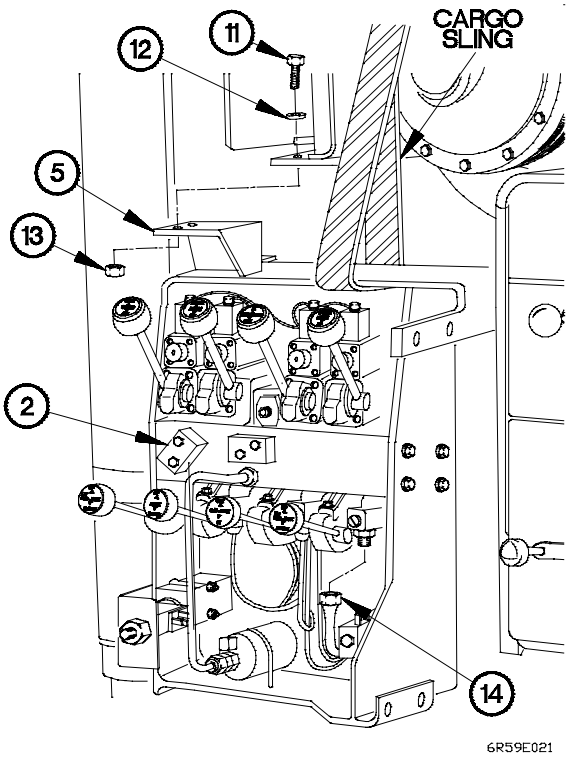
NOTE

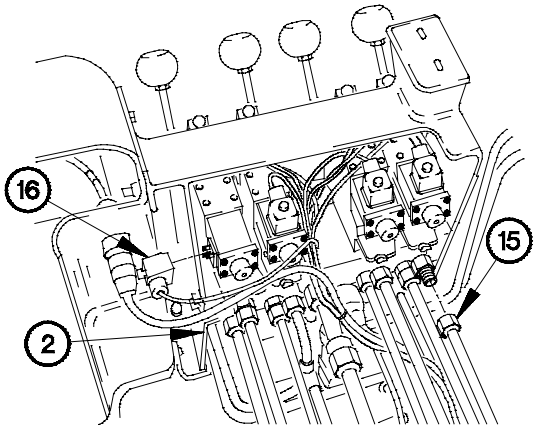
Steps (8) and (9) require the aid of an assistant.

(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).

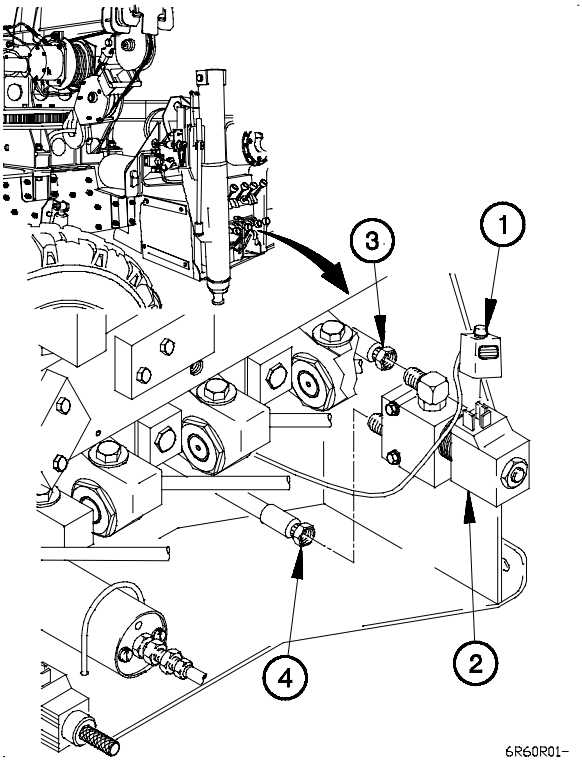
CAUTION

Cap or plug hydraulic connections and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

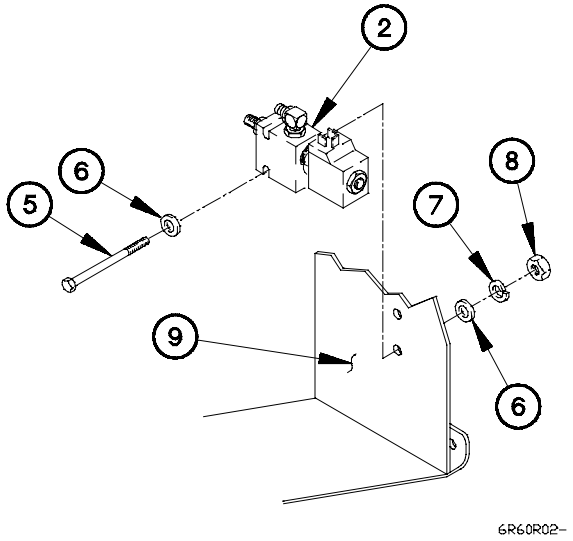
NOTE

Tag hydraulic tubes and connection points prior to disconnecting.

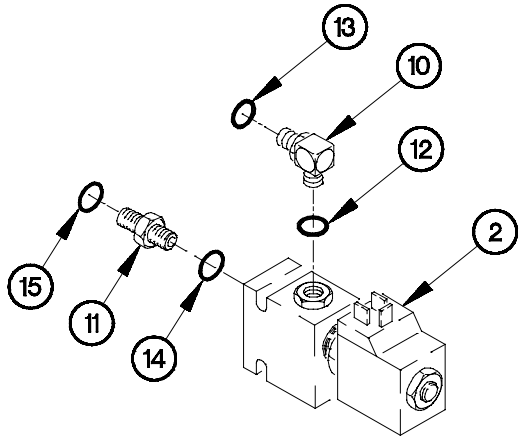
(3) Disconnect hydraulic tubes (3 and 4) from two way solenoid valve (2).



(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.

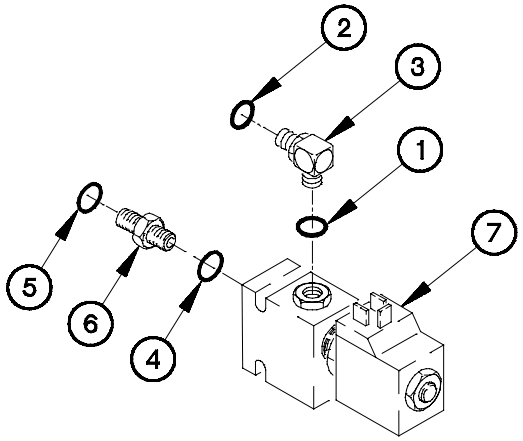
(8) Remove preformed packing (14 and 15) from fitting (11). Discard preformed packings.

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-

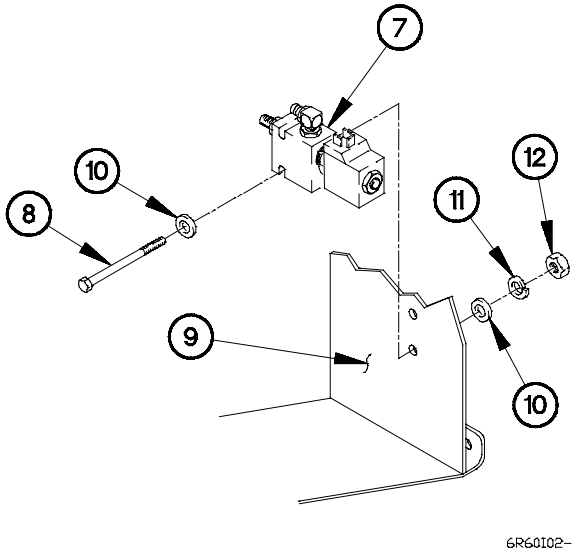
16-60. M1089 TWO WAY SOLENOID VALVE REPLACEMENT (CONT)

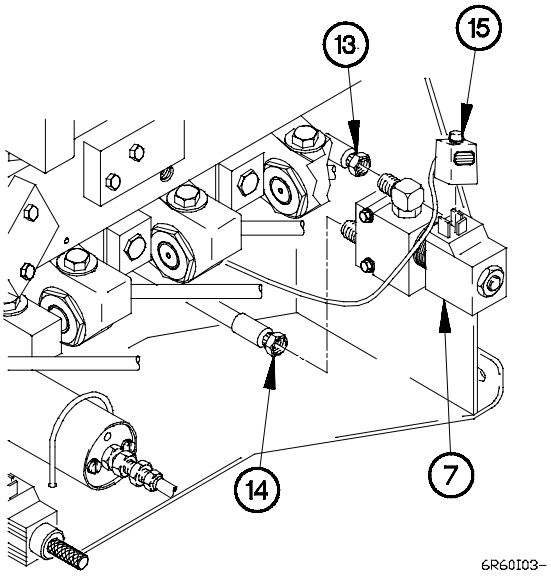
WARNING

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).

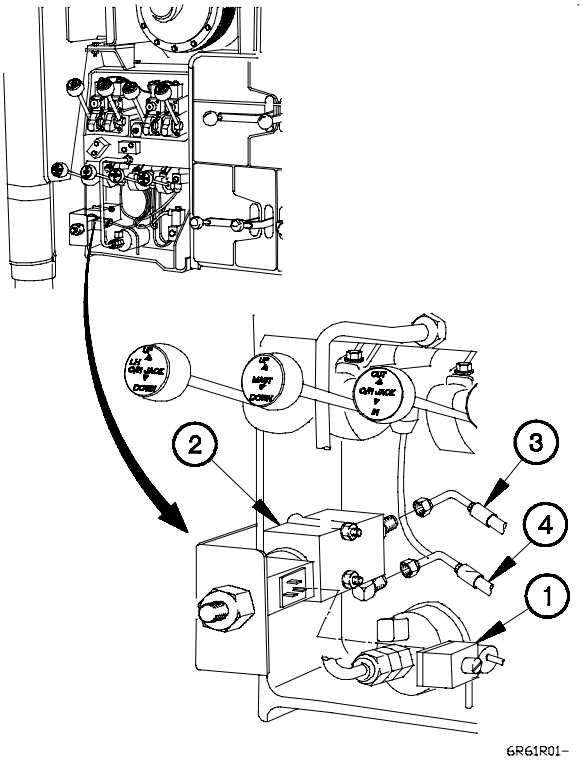
CAUTION

Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

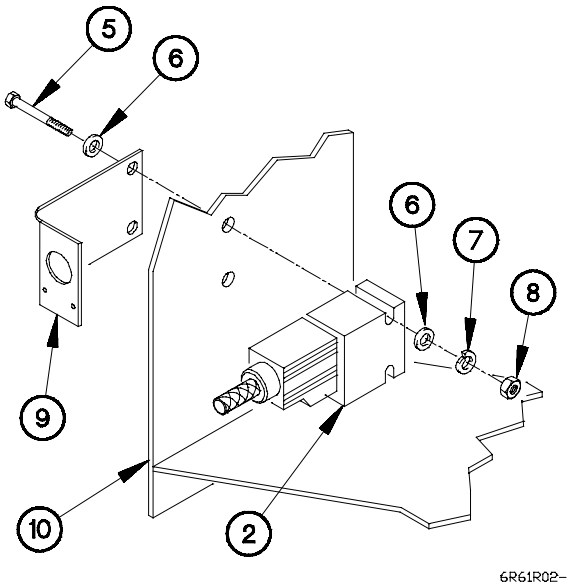
Tag hydraulic hoses and connection points prior to disconnecting.

(3) Disconnect hydraulic hoses (3 and 4) from manual override valve (2).

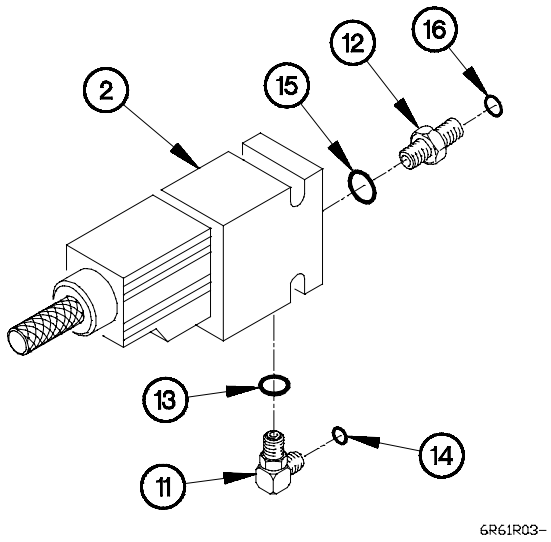


16-61. M1089 MANUAL OVERRIDE VALVE REPLACEMENT (CONT)

(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.



6R61R02-



6R61R03-

(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.

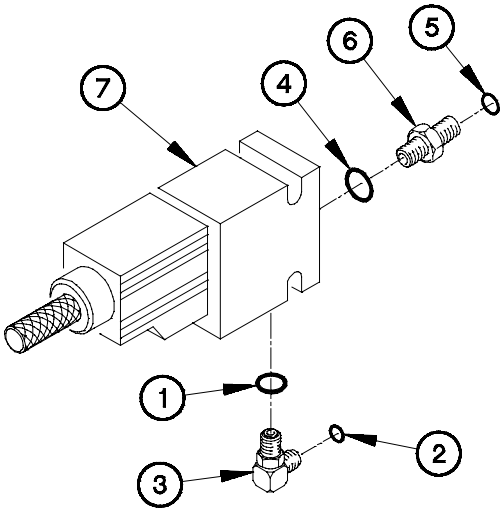
(8) Remove preformed packings (15 and 16) from fitting (12). Discard preformed packings.

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).



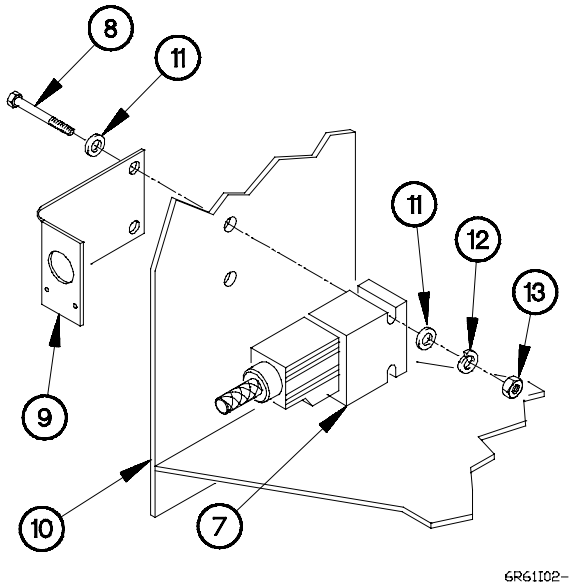
6R61I01-

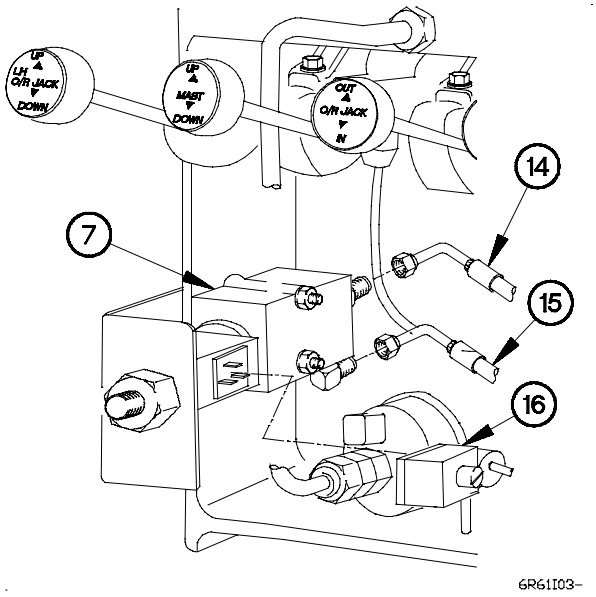
WARNING

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. Deleted
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

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

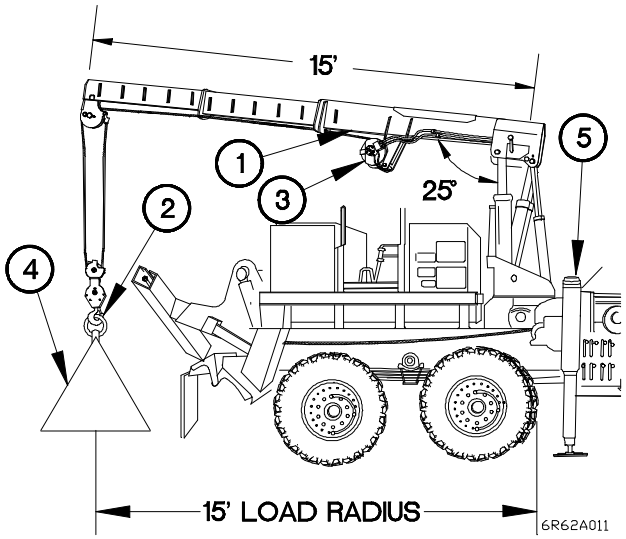
Static overload test is performed with a test load of 110% of crane rated load on Range Diagram for this boom extension and radius. The overload protection system should prevent lifting of this test weight.

(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).

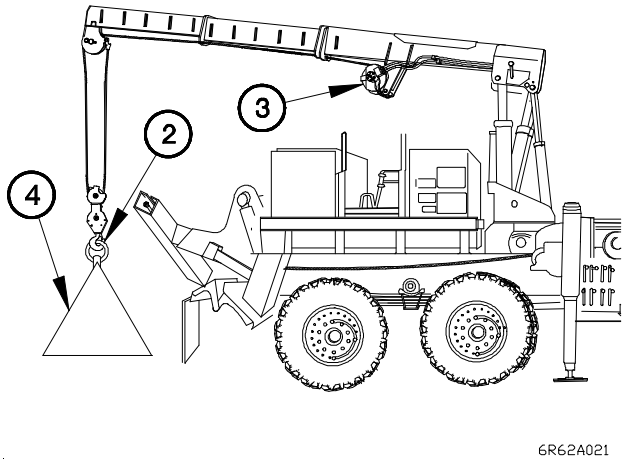


NOTE

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).

All data on page 16-344 deleted

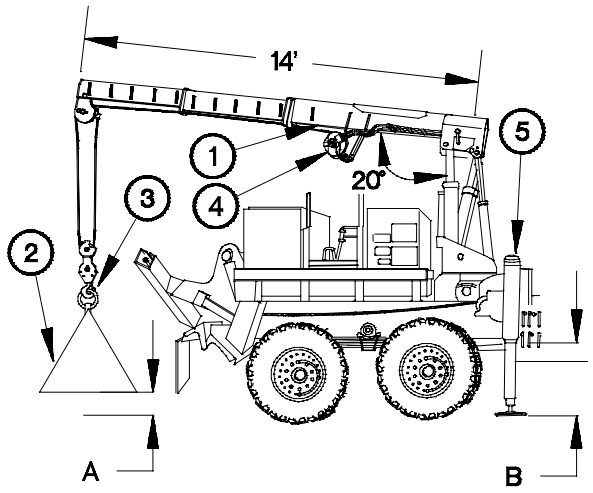
16-62. M1089 CRANE LOAD TEST (CONT)

b. Deleted

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).

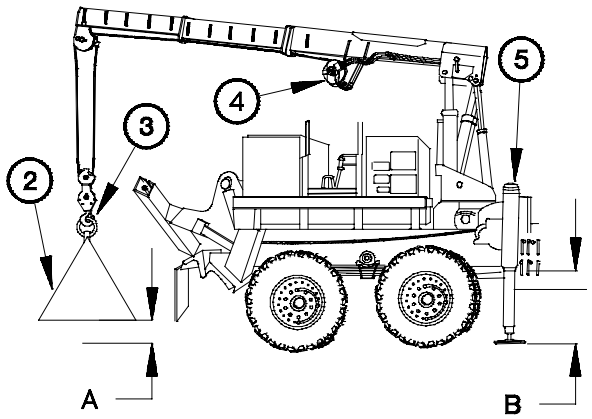
(3) Raise test weight (2) approximately 18 inches with hoist (4).

(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)

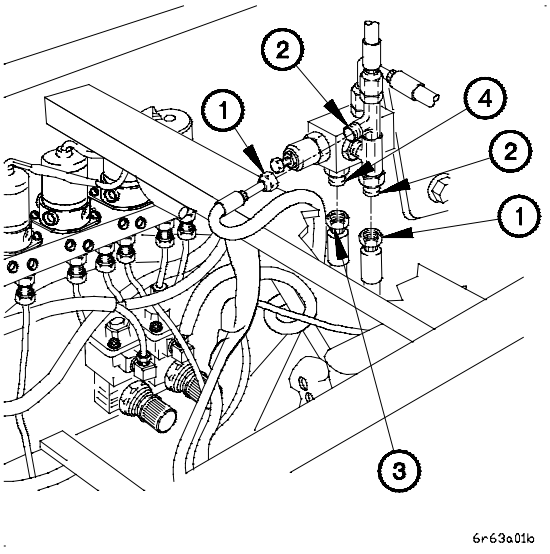
a. 30K Winch Assembly Removal.

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.

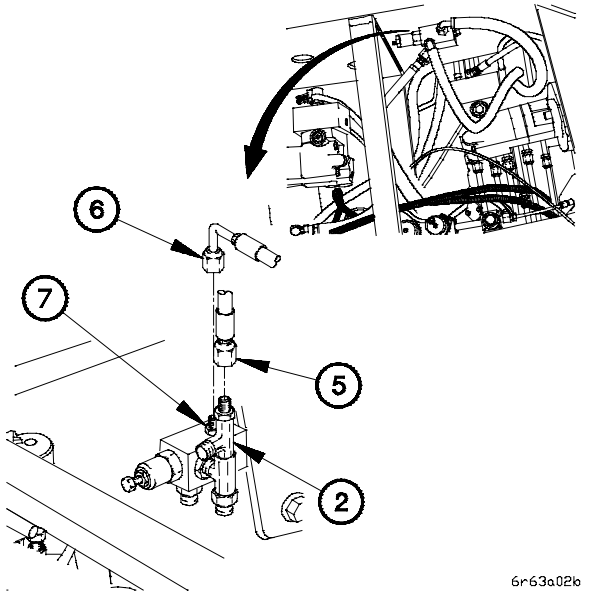


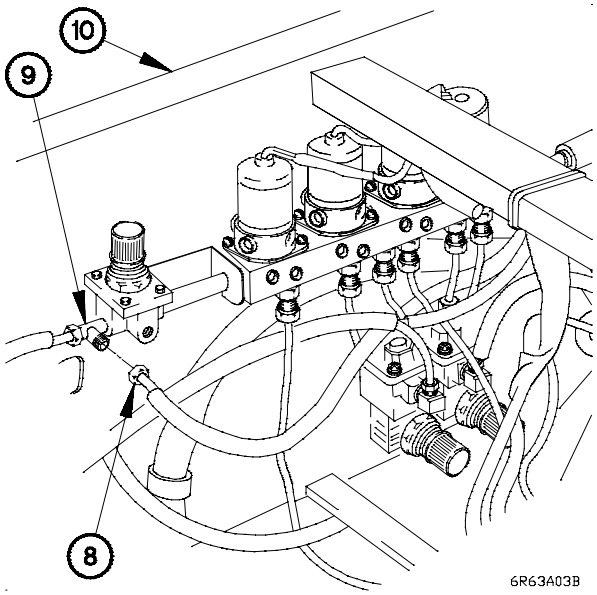
(1) Disconnect two hoses (1) from tee fittings (2).

(2) Disconnect hose (3) from fitting (4).

(3) Disconnect hose (5) from tee fitting (2).

(4) Disconnect hose (6) from fitting (7).



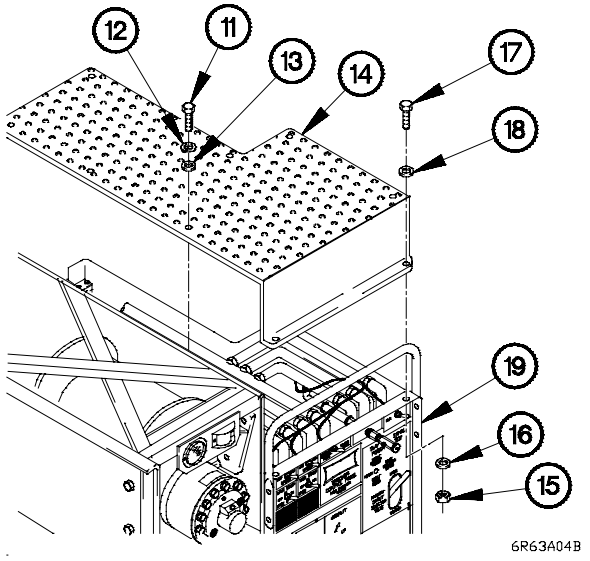


(5) Disconnect air hose (8) from 90-degree fitting (9).

(6) Remove air hose (8) from 30K winch assembly (10).

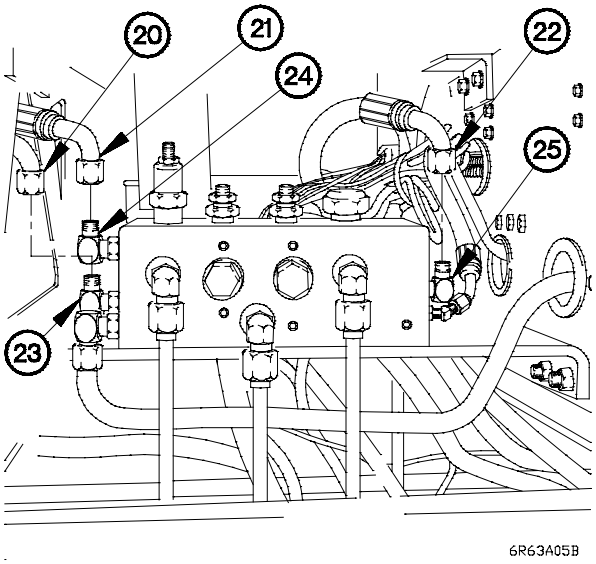
(7) Remove eight screws (11), lockwashers (12), and washers (13) from control panel cover (14). Discard lockwashers.

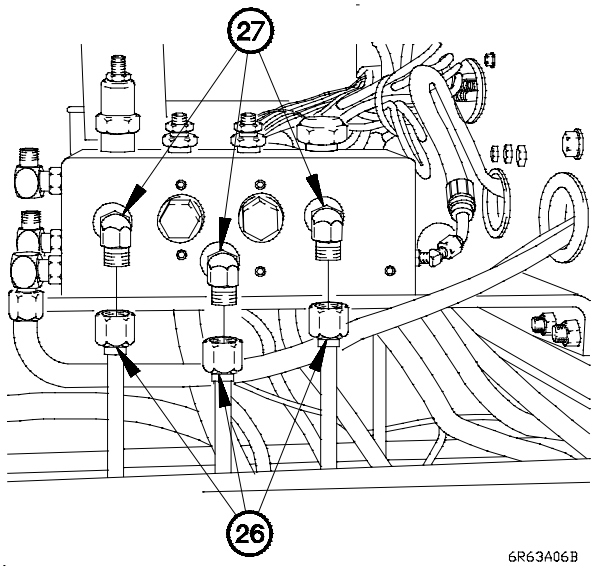
(8) Remove two self-locking nuts (15), washers (16), screws (17), washers (18), and control panel cover (14) from control panel (19). Discard self-locking nuts.



16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

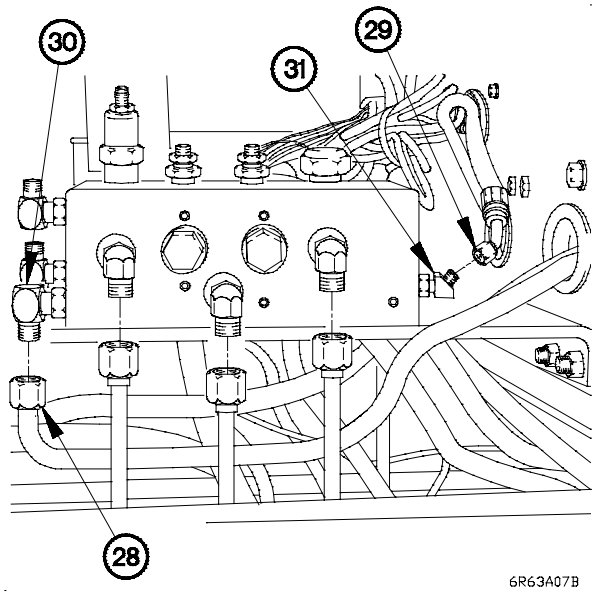
(9) Disconnect hoses (20, 21, and 22) from 90-degree fittings (23, 24, and 25).

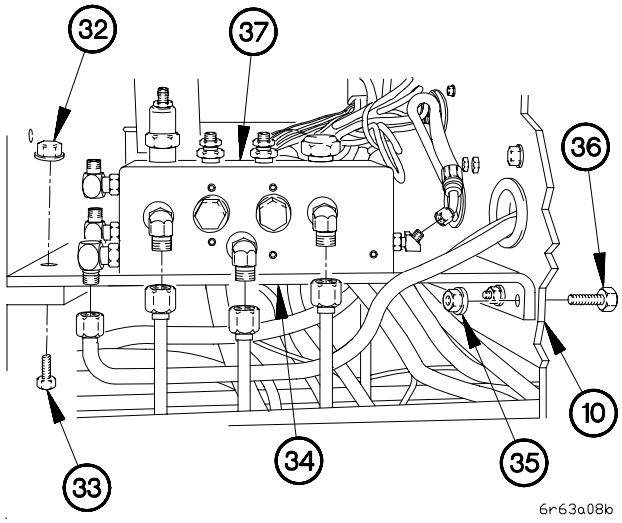




(10) Disconnect three tubes (26) from 90-degree fittings (27).

(11) Disconnect hoses (28 and 29) from 90-degree fitting (30) and 45-degree fitting (31).



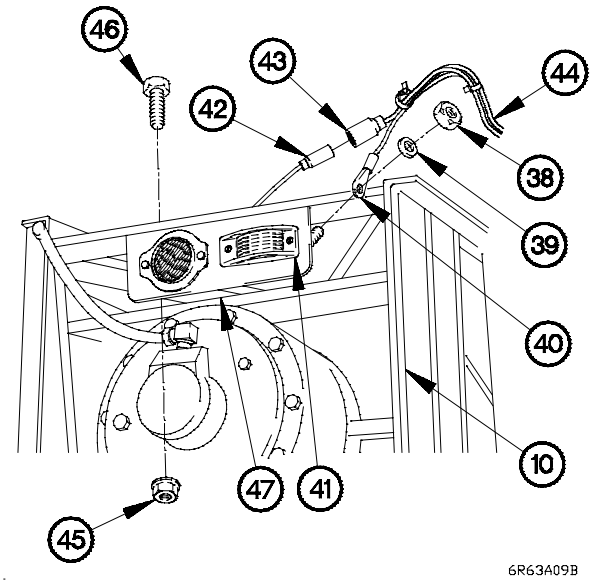


(12) Remove three self-locking nuts (32) and screws (33) from mounting plate (34). Discard self-locking nuts.

(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)

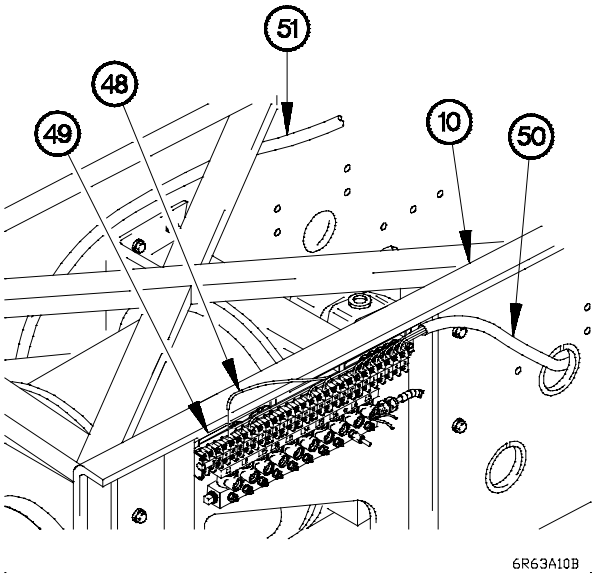
NOTE

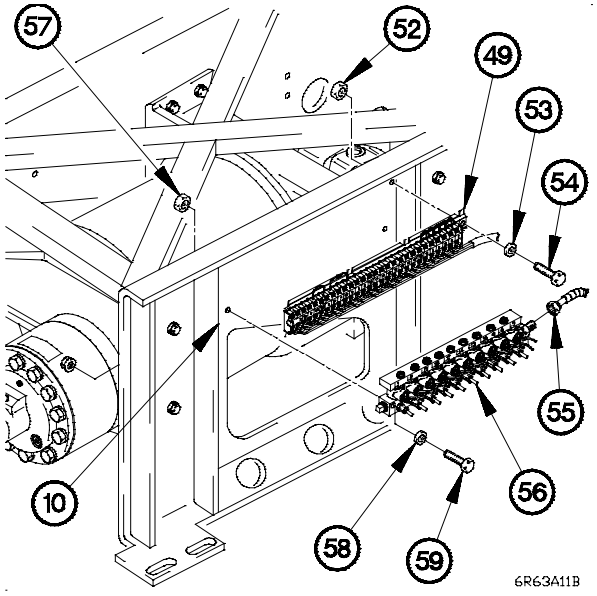
- Jumpers and diodes are not removed when disconnecting wires from terminal board.
- Terminal board uses friction type connections. Screws are not removed when disconnecting wires.
- Tag wires and connection points prior to disconnecting.

(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).

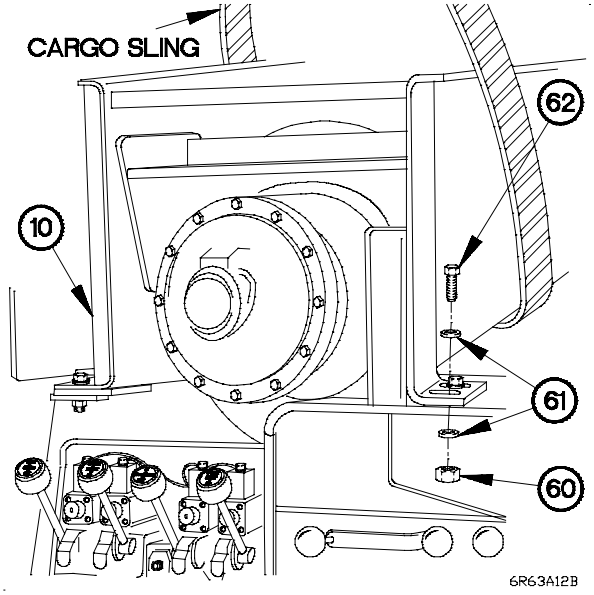
(24) Remove two nuts (57), washers (58), screws (59), and valve manifold assembly (56) from 30K winch assembly (10).

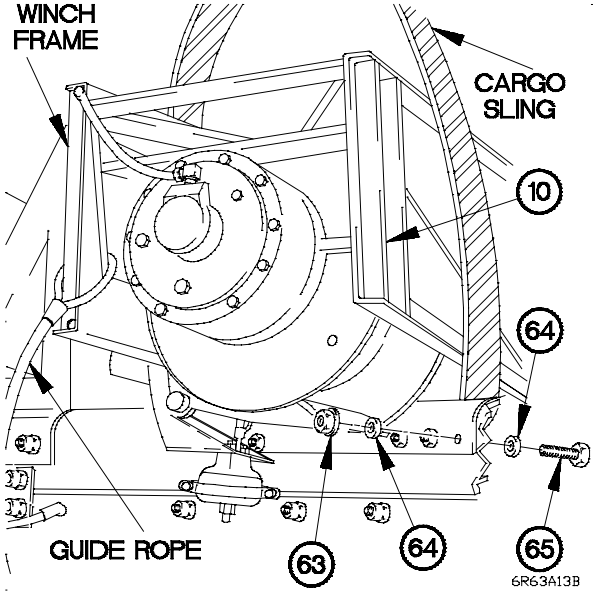
(25) Move terminal board (49) and valve manifold assembly (56) clear of 30K winch assembly (10).

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.

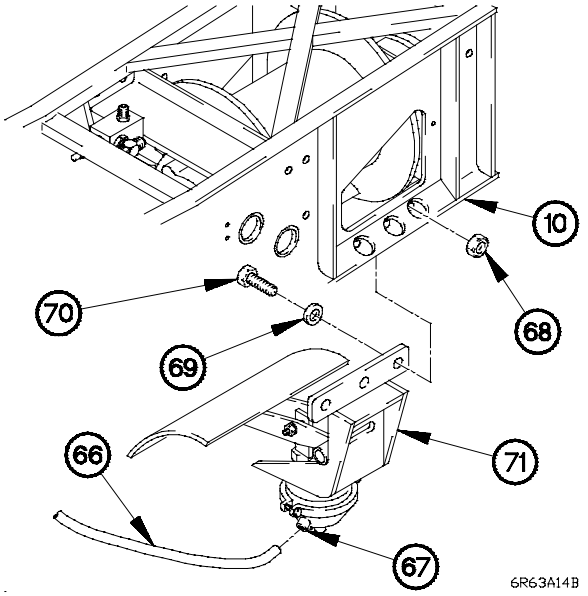
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

NOTE

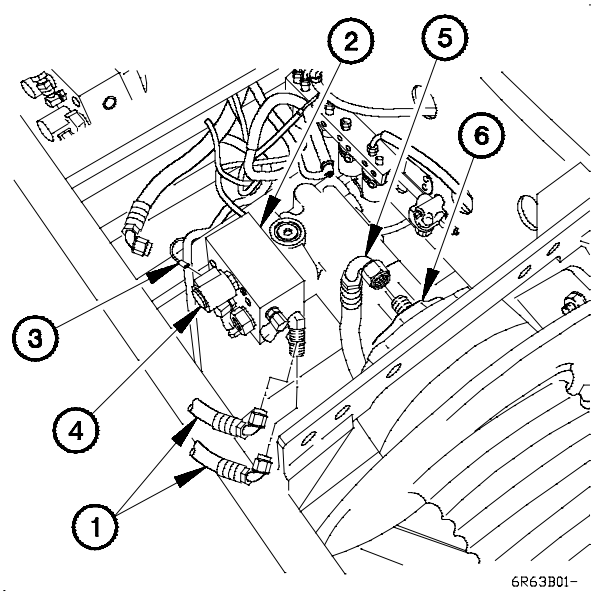
Left and right side cable tensioners are removed the same way. Left side shown.

(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

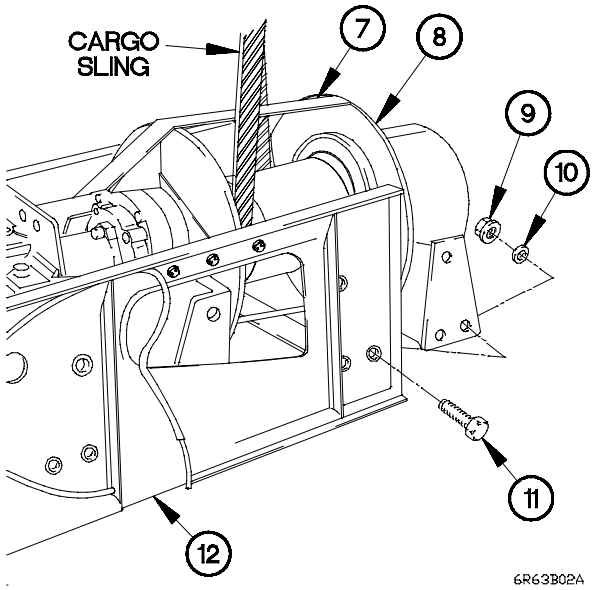
Ensure banding strap around 30K winch is secured tightly and will not slip off. Failure to comply may result in injury to personnel or damage to equipment.

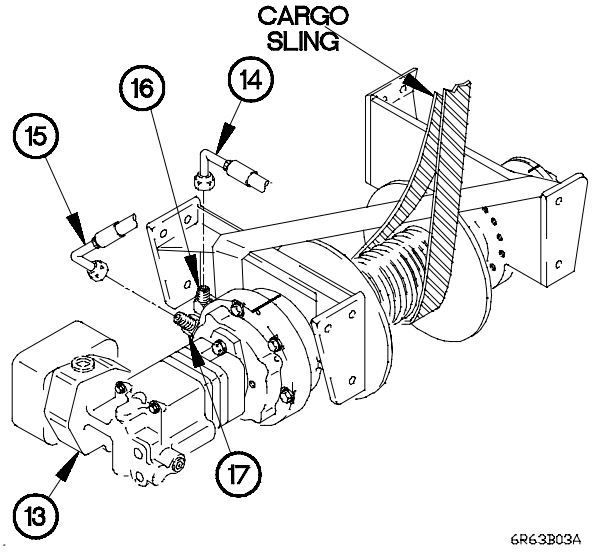
(4) Install banding strap (7) around winch (8).

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)

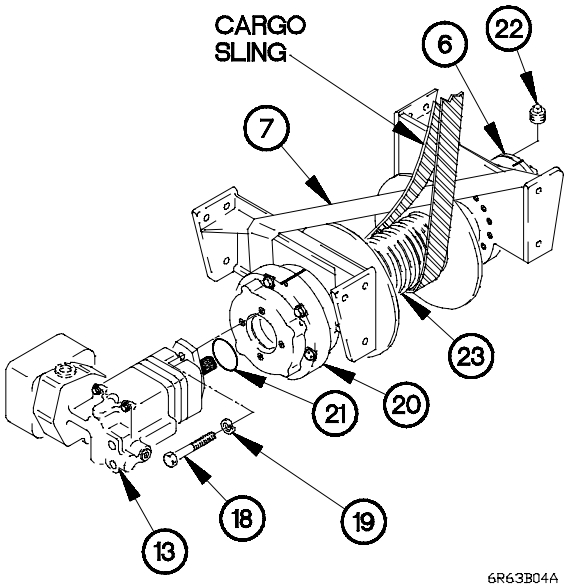
(8) Remove two screws (18), lockwashers (19), and hydraulic motor (13) from brake housing (20). Discard lockwashers.

(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

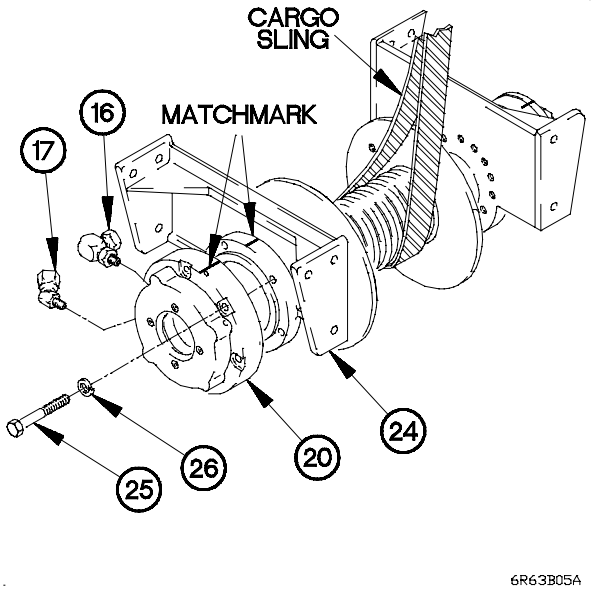
Drum weighs approximately 350 lbs (159 kgs). Attach a suitable lifting device prior to disassembly. Failure to comply may result in injury to personnel or damage to equipment.

(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).

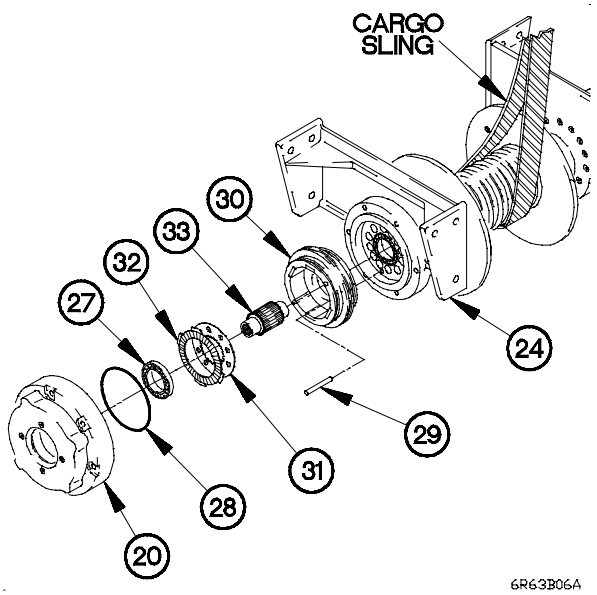
(20) Remove preformed packing (28) from brake housing (20). Discard preformed packing.

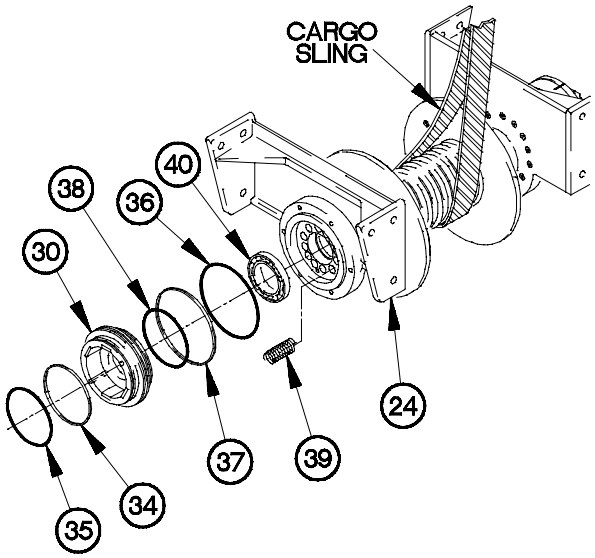
(21) Remove two dowels (29) from plunger (30).

(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).

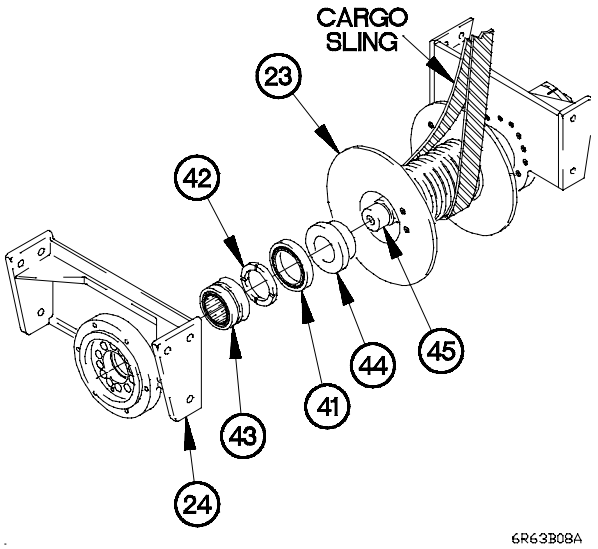
(29) Remove motor end support (24) from drum (23).

(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).



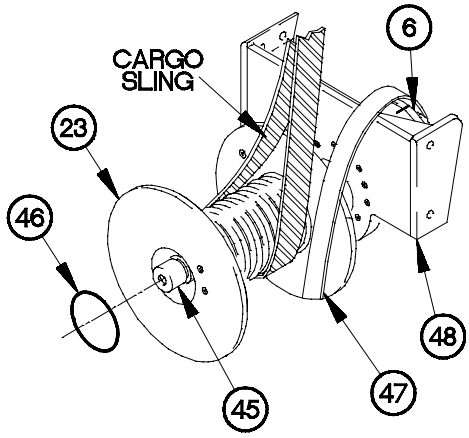
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

(34) Remove preformed packing (46) from output shaft (45). Discard preformed packing.

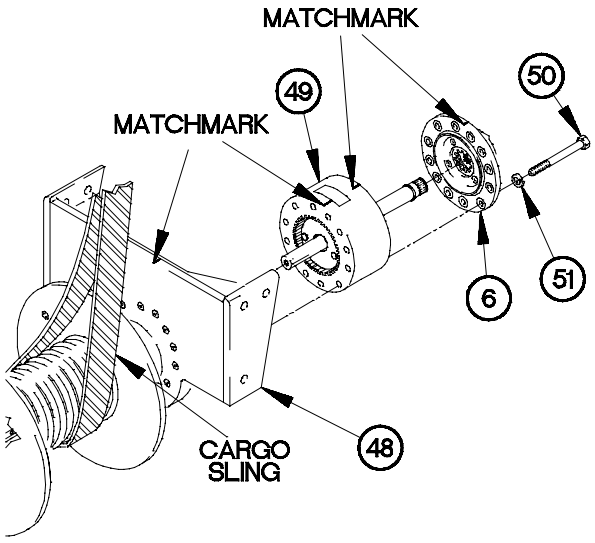
(35) Install banding strap (47) around drum (23) and gear end support (48).

(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).



6R63B09A



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.

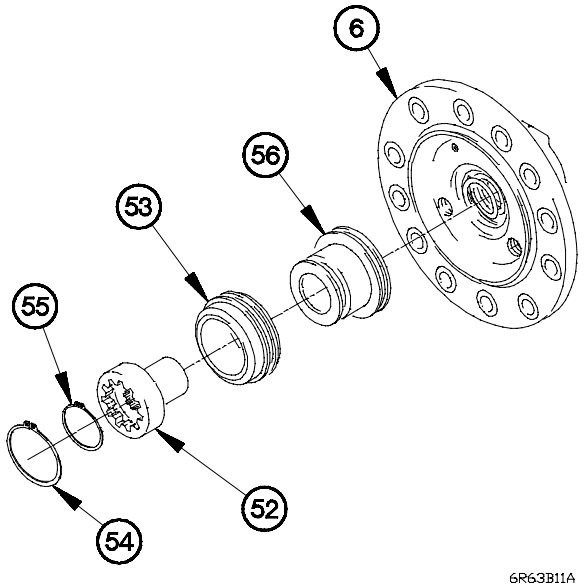
(43) Remove retaining ring (54) from gear end cover (6).

(44) Release coupling (52) and cylinder (53).

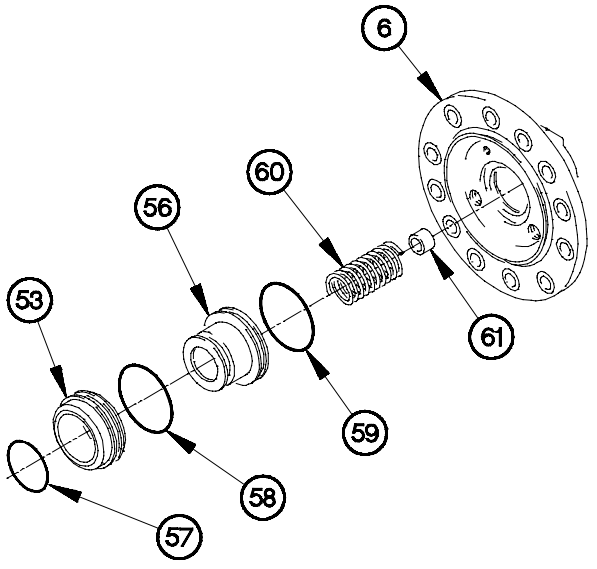
(45) Remove coupling (52) from gear end cover (6).

(46) Remove retaining ring (55) from coupling (52).

(47) Remove coupling (52) and cylinder (53) from piston (56).



6R63B11A



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).

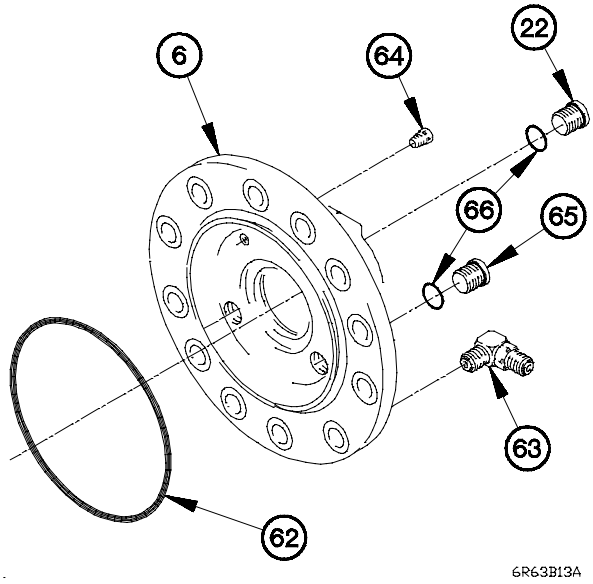
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

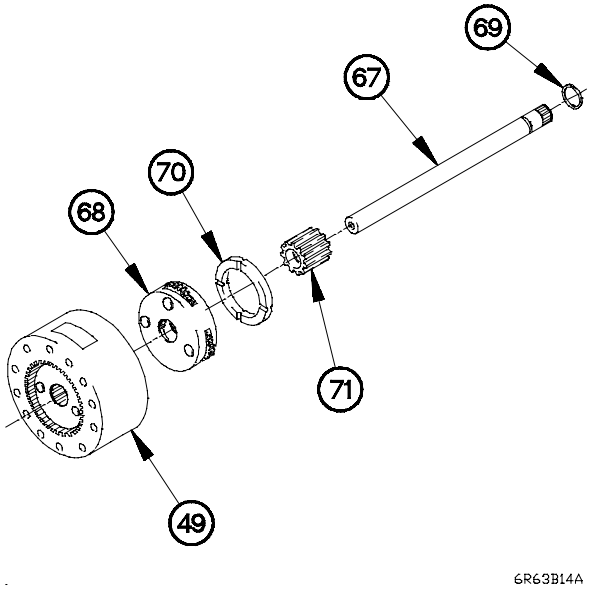
(51) Remove preformed packing (62) from gear end cover (6). Discard preformed packing.

(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).

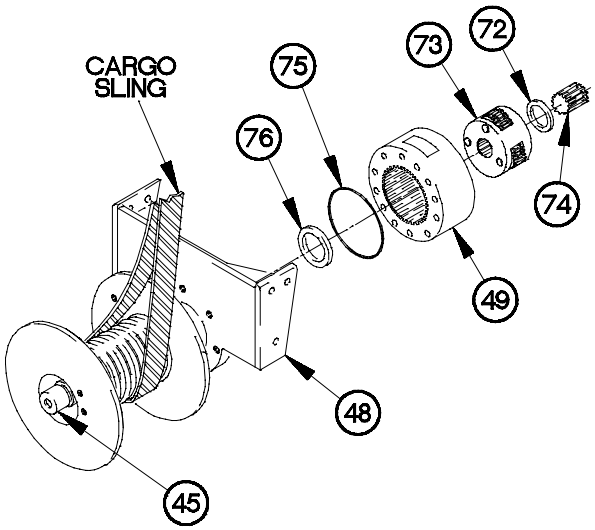
(61) Remove ring gear (49) from secondary gear (73).

(62) Remove sun gear (74) from secondary gear (73).

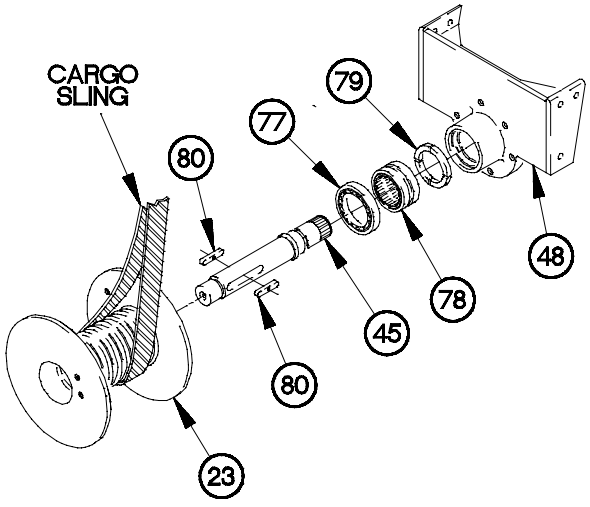
(63) Remove secondary gear (73) from output shaft (45).

(64) Remove preformed packing (75) from gear end support (48). Discard preformed packing.

(65) Remove nylon washer (76) from gear end support (48).



6R63B15A



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

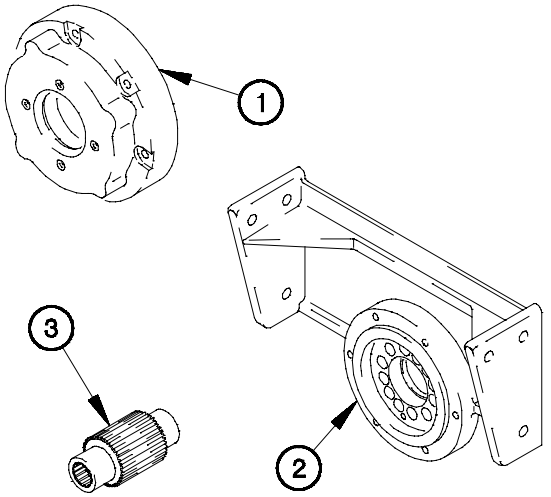
Replace any part that fails visual inspection or size measurement requirements.

(1) Clean all parts with dry cleaning solvent.

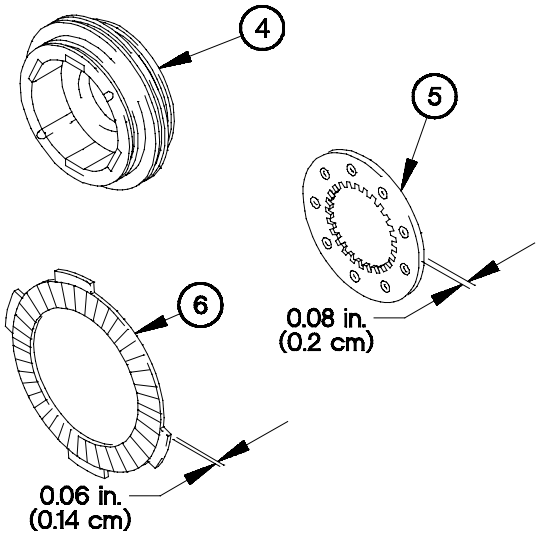
(2) Inspect brake housing (1) seating surface for nicks or scratches.

(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

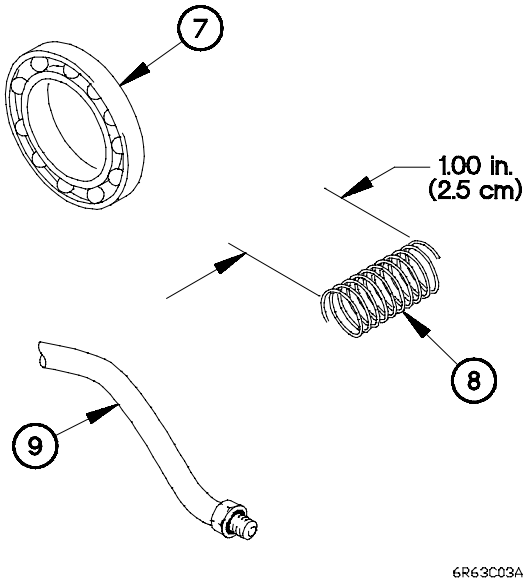


6R63C02A

(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).

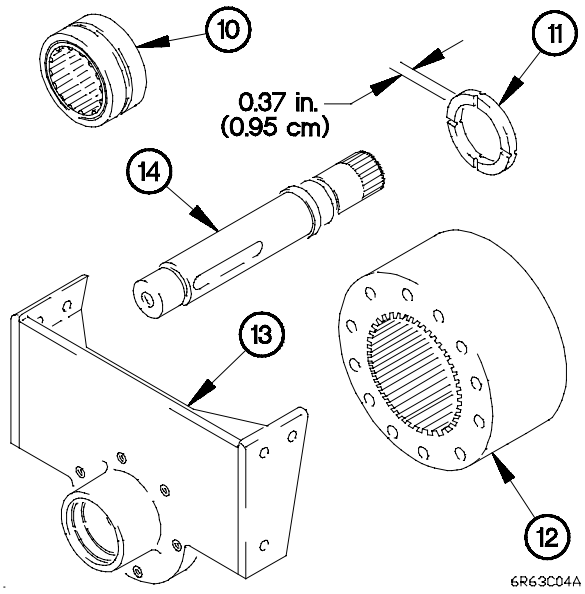
(7) Measure nine brake drive plates (6) for minimum thickness of 0.06 in. (0.14 cm).



(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.

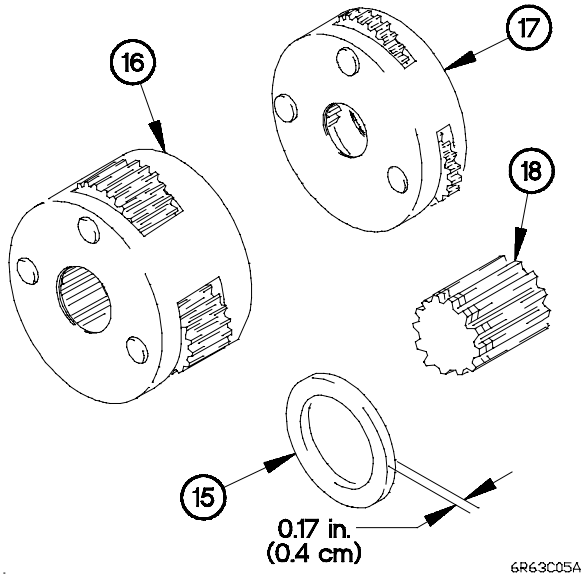
(15) Inspect output shaft (14) for pitted, or broken splines.

(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.



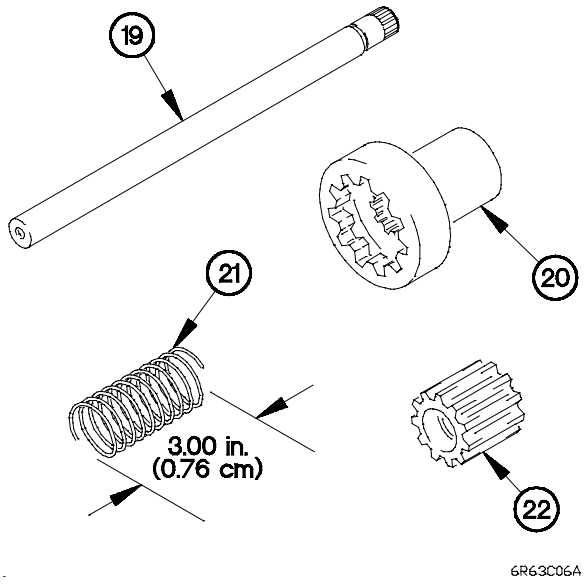
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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.

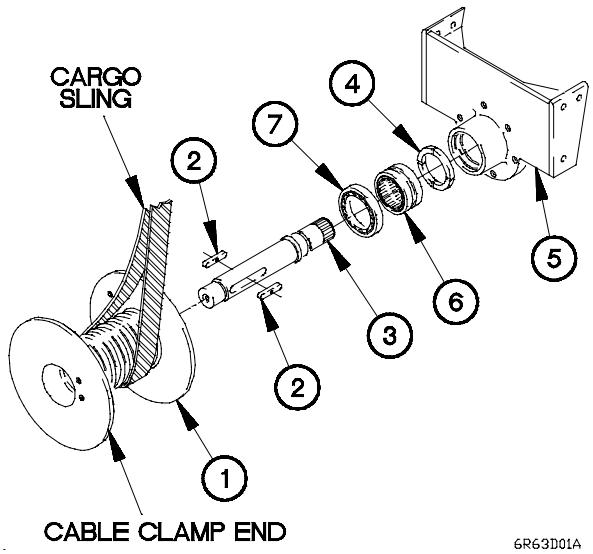


d. Assembly.

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).

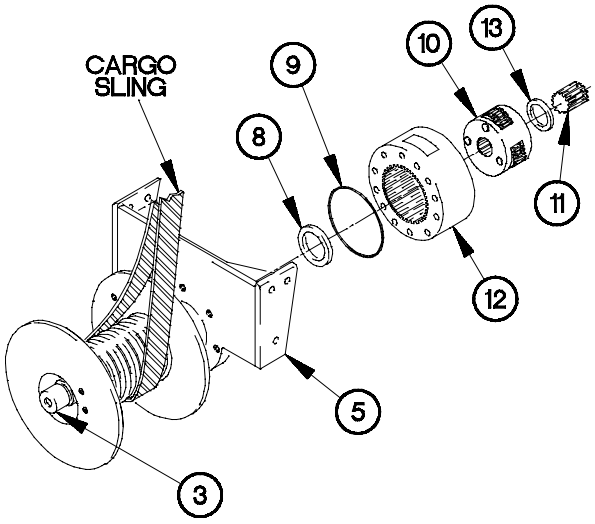
(9) Install preformed packing (9) on gear end support (5).

(10) Install secondary gear (10) on output shaft (3).

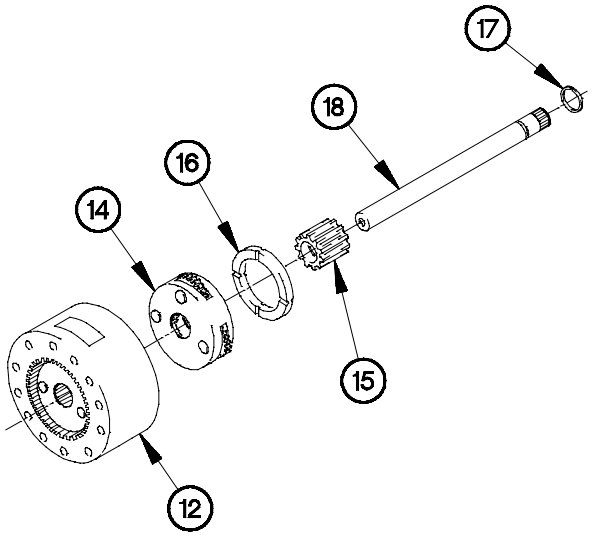
(11) Install sun gear (11) in secondary gear (10).

(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).

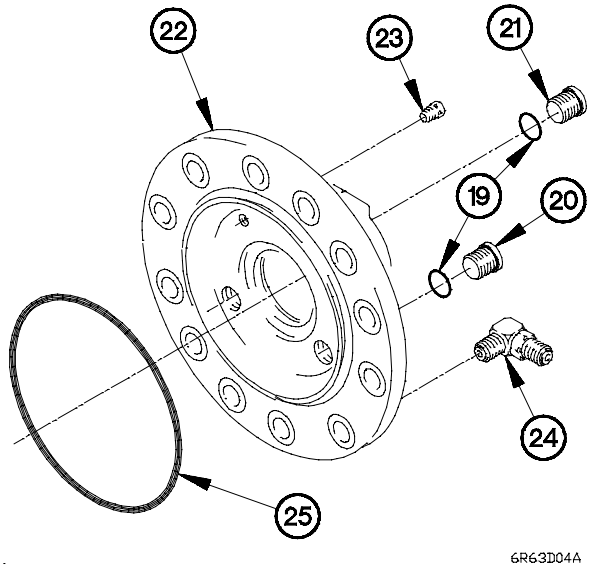
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

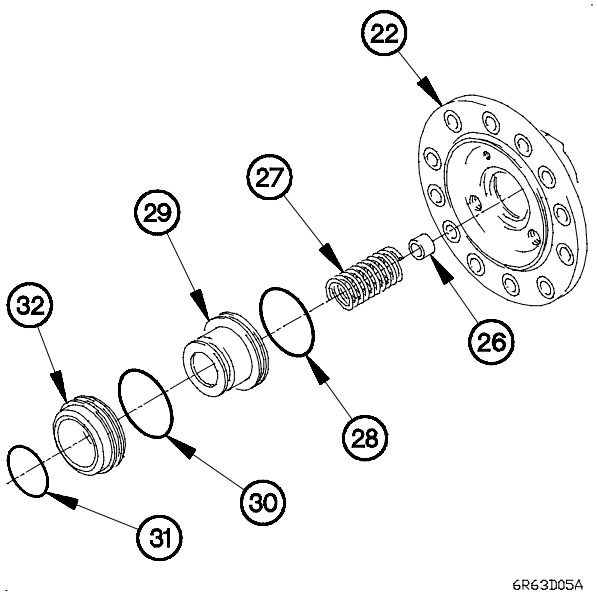
(19) Install two preformed packings (19) on plugs (20 and 21).

(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.

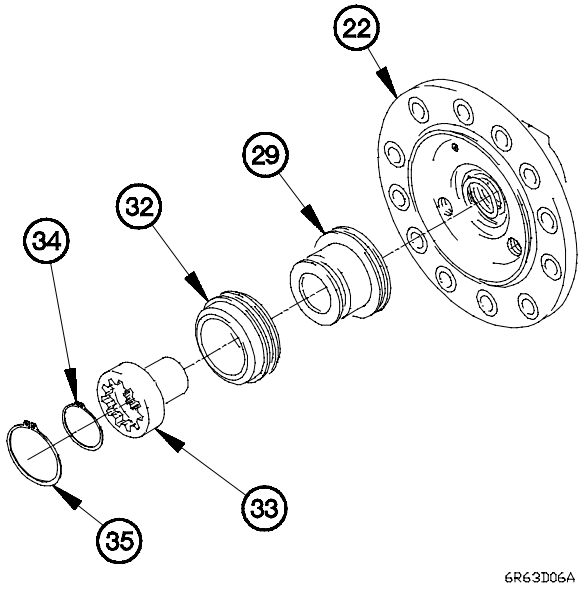
(28) Install retaining ring (34) in coupling (33).

(29) Install coupling (33) in gear end cover (22).

NOTE

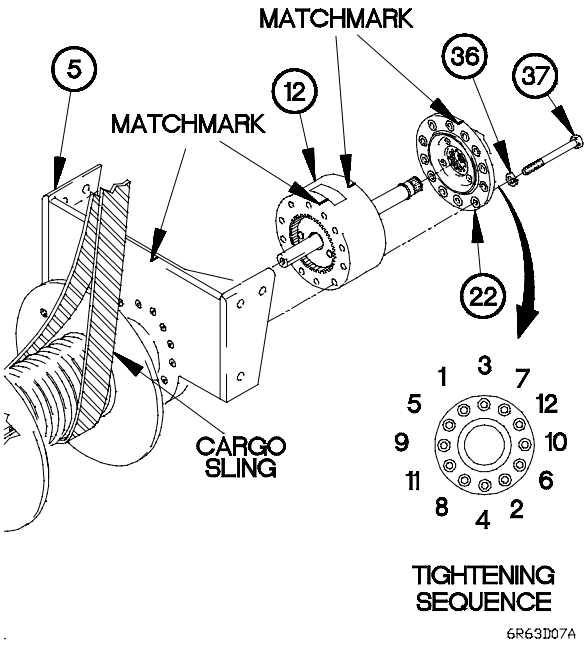
Step (30) requires the aid of an assistant.

(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.

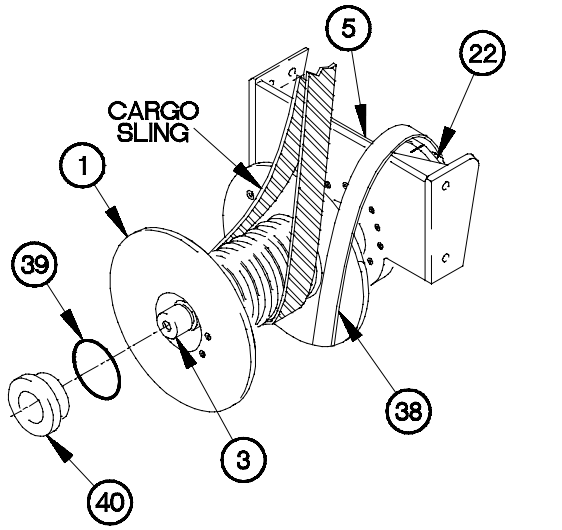
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

(37) Install banding strap (38) on drum (1) and gear end support (5).

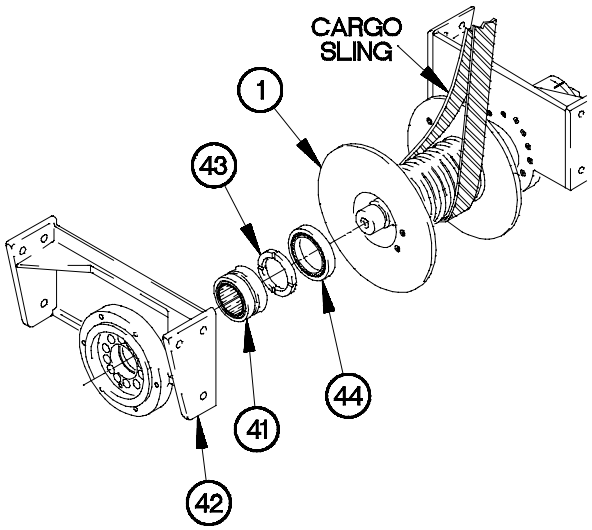
(38) Position drum (1) with gear end cover (22) down.

(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).

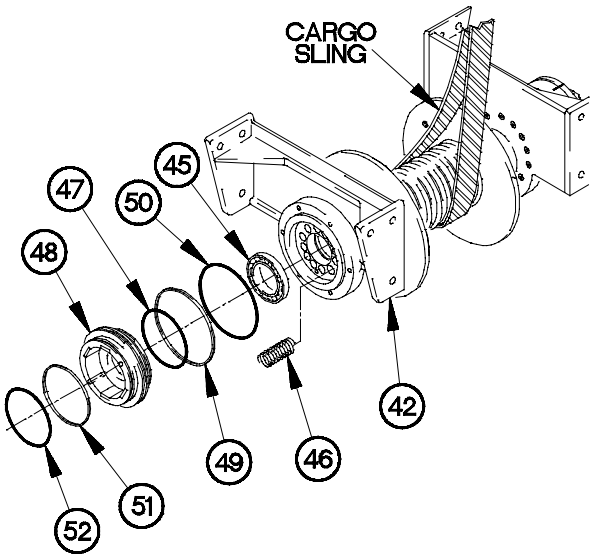
(44) Position motor end support (42) on drum (1).

(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

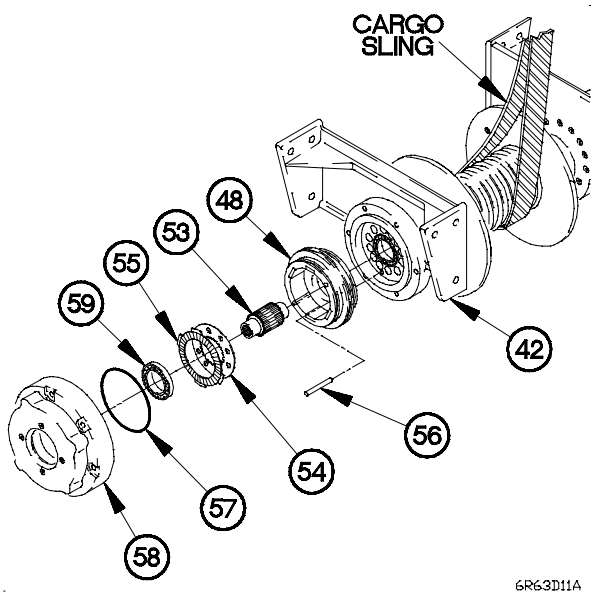
Alternately stack ten friction disc brakes and nine brake drive plates.

(51) Install ten friction disc brakes (54) and nine brake drive plates (55) in plunger (48).

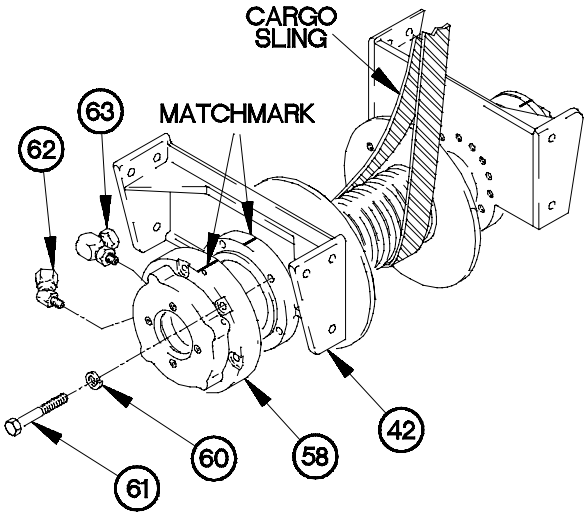
(52) Install two dowels (56) in plunger (48).

(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).

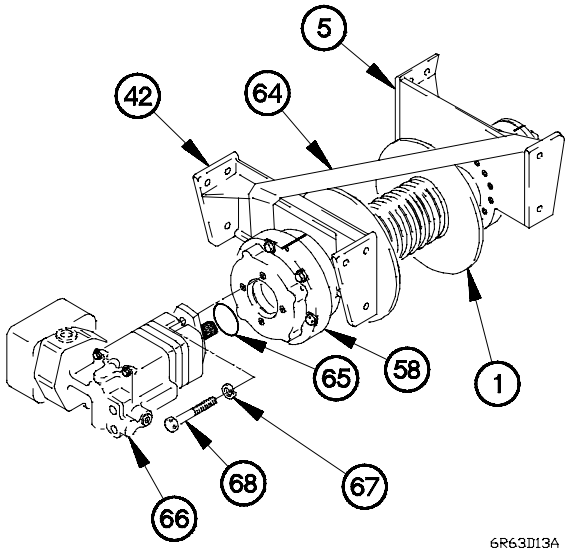
(59) Install banding strap (64) around motor end support (42) and gear end support (5).

(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).

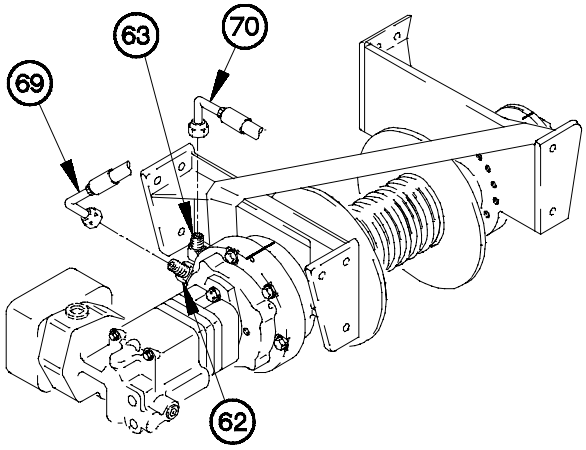
(63) Tighten two screws (68) to 70-95 lb-ft (32-43 N·m).



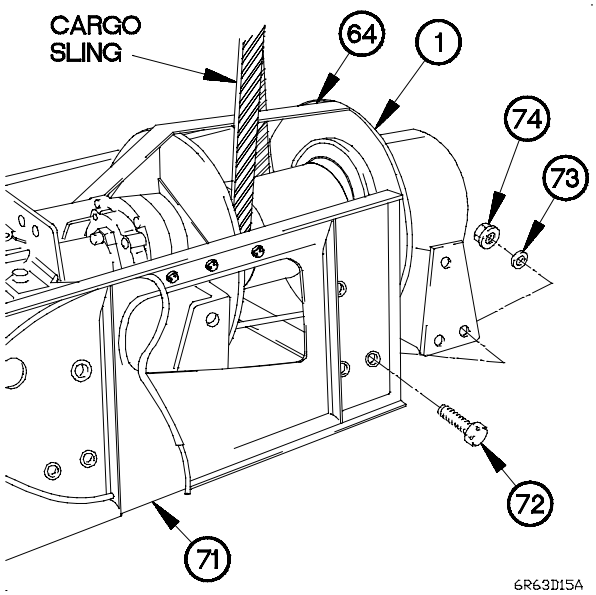
6R63D13A

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

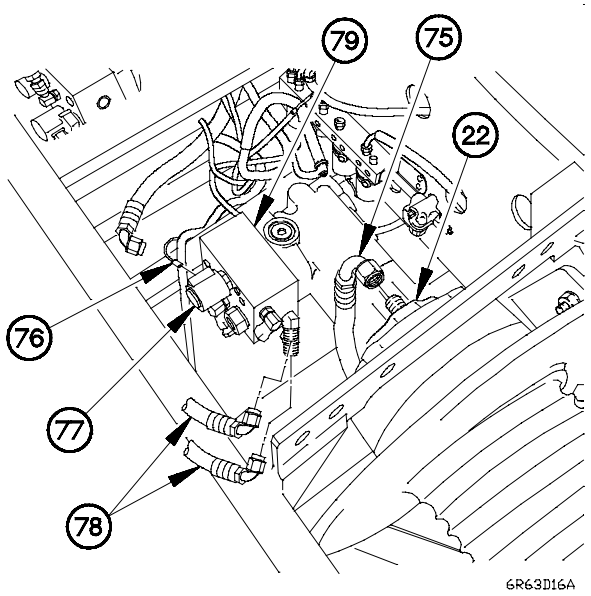
Ensure banding strap around 30K winch is removed carefully. Failure to comply may result in injury to personnel.

(66) Remove banding strap (64) from drum (1).

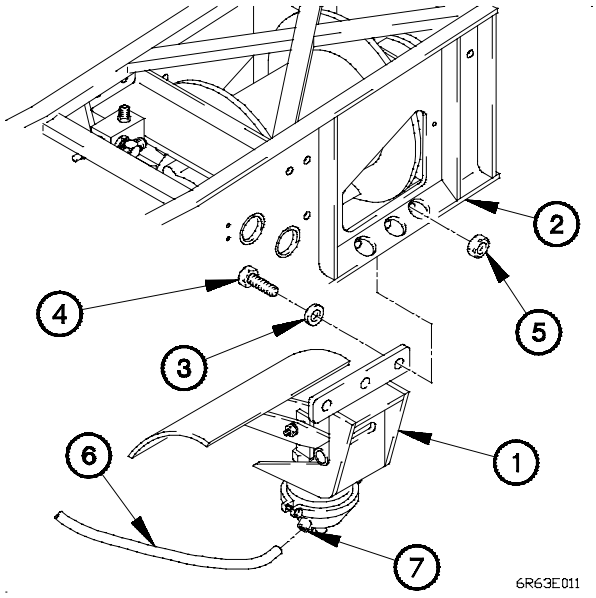
(67) Connect air hose (75) on gear end cover (22).

(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)

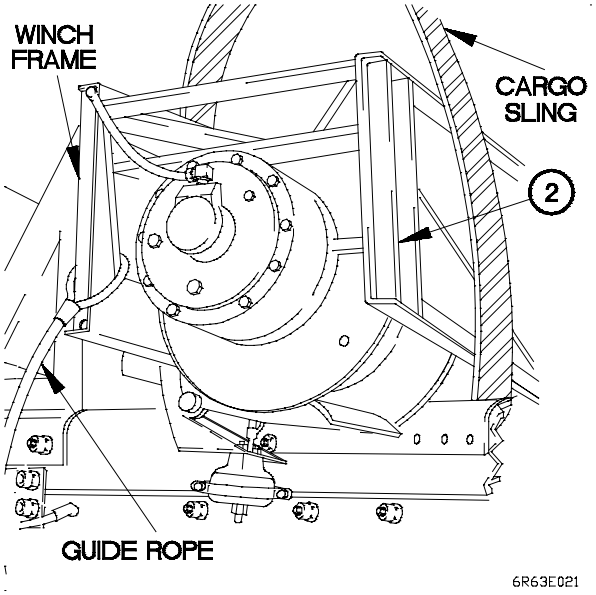
WARNING

- **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).

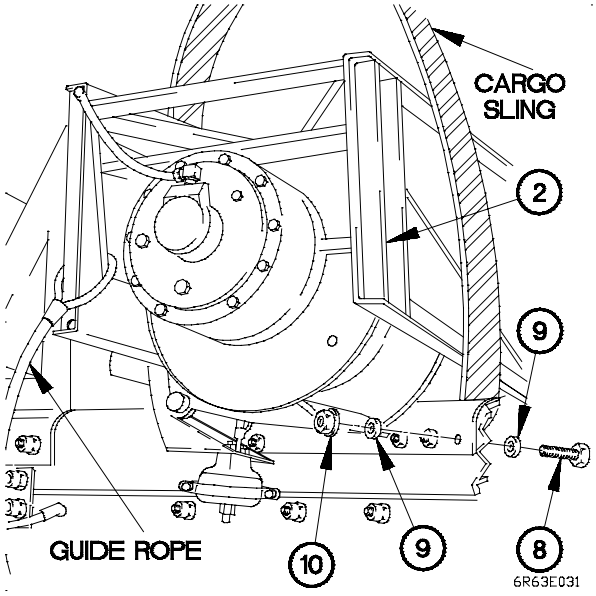
NOTE

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).

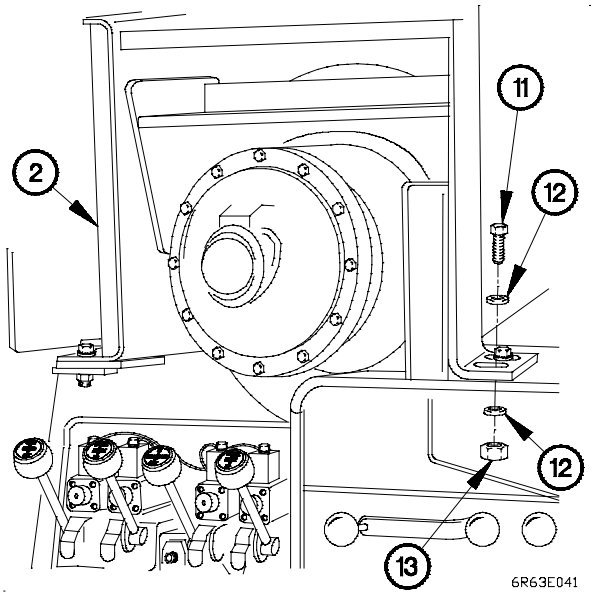
(7) Tighten six self-locking nuts (10) to 152-168 lb-ft (206-227 N·m).

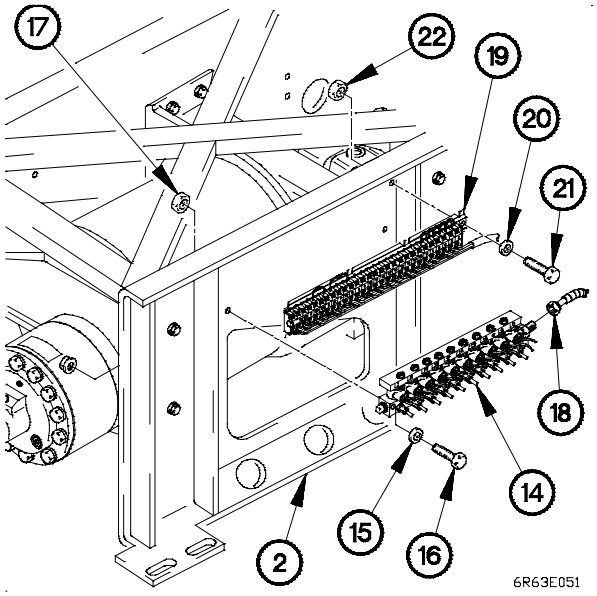
(8) Perform steps (6) and (7) on right side of 30K winch assembly (2).



(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.

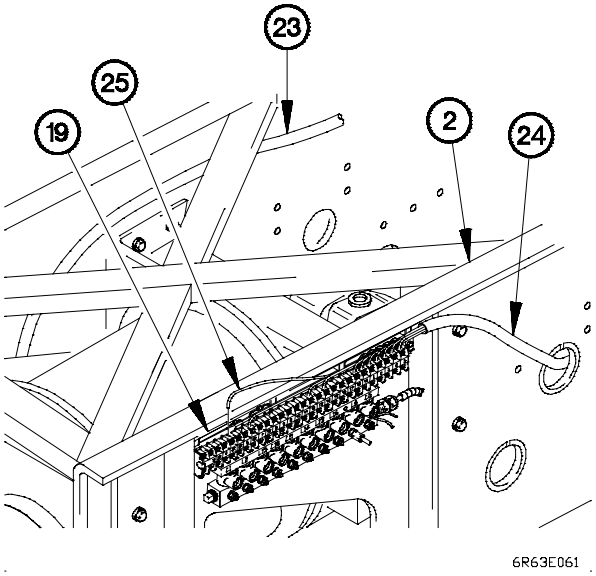
(16) Route remote control harness (23) through 30K winch assembly (2).

(17) Position cable harness (24) by terminal board (19).

NOTE

Terminal board uses friction type connections. Screws are not removed.

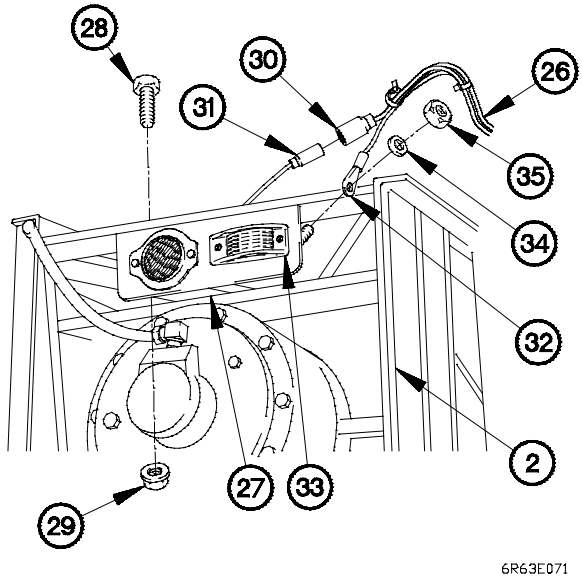
(18) Install 10 wires (25) to top of terminal board (19).



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).

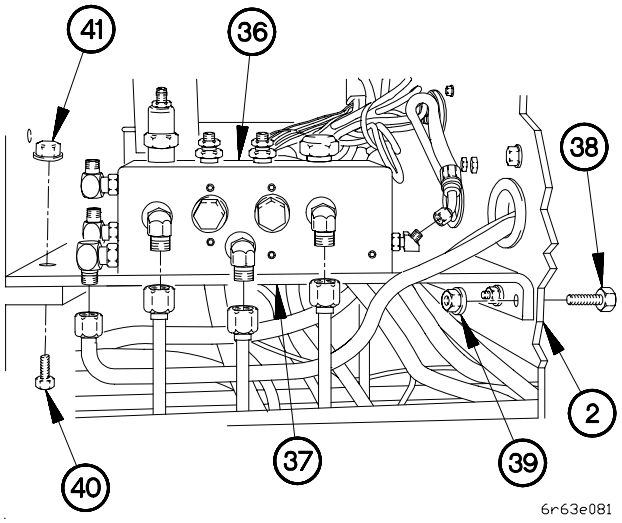
(21) Connect harness connector (30) to electrical connector 489 (31).

(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

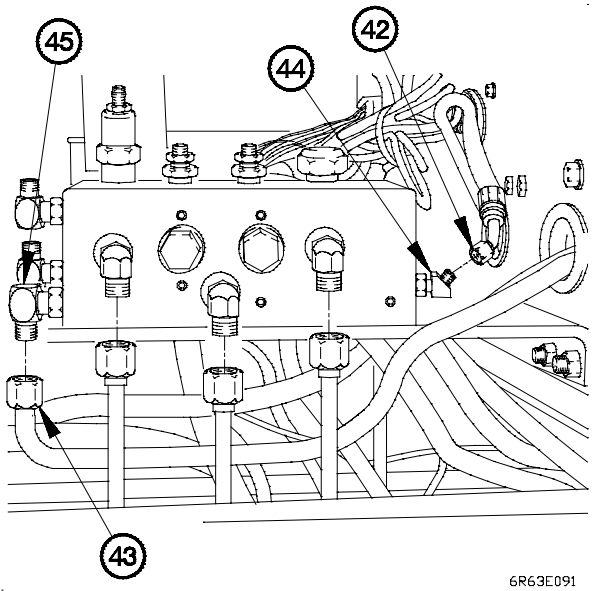
Marker Light Location	Connector	Terminal Lug
Left Side	P94	TL88
Right Side	P95	TL89



(24) Position monoblock valve (36) on 30K winch assembly (2) with mounting plate (37), two screws (38), and self-locking nuts (39).

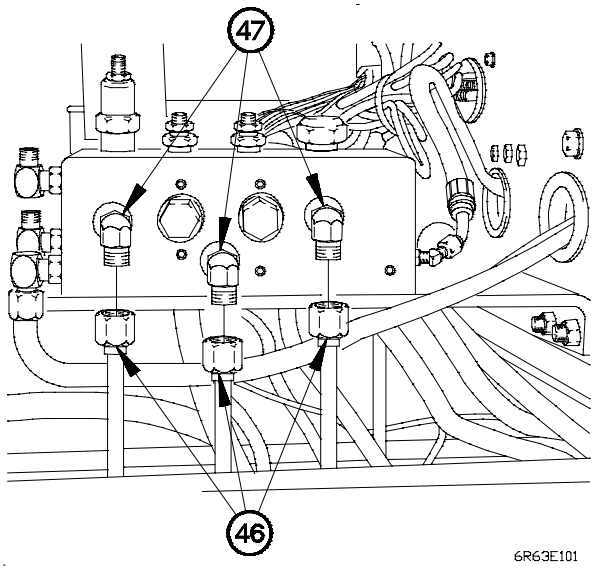
(25) Position three screws (40) and self-locking nuts (41) in mounting plate (37).

(26) Tighten three self-locking nuts (39 and 41) to 76-84 lb-ft (103-114 N·m).



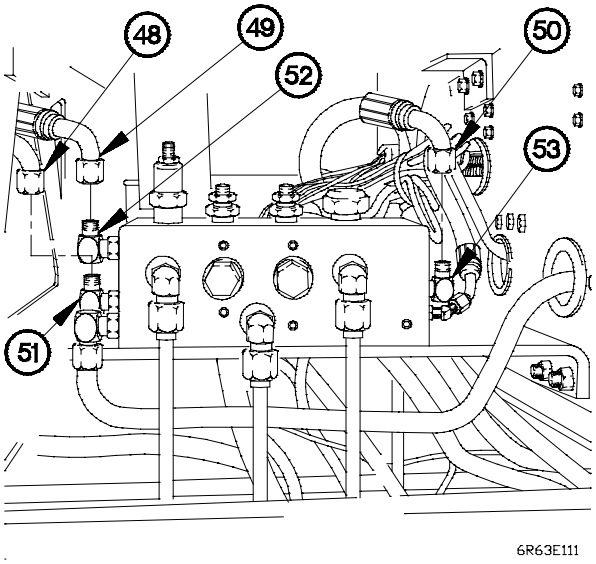
(27) Position hoses (42 and 43) on 45-degree fitting (44) and 90-degree fitting (45).

(28) Tighten hoses (42 and 43) to 18-20 lb-ft (24-27 N·m).



(29) Position three tubes (46) on 90-degree fittings (47).

(30) Tighten three tubes (46) to 36-39 lb-ft (49-53 N·m).



(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).

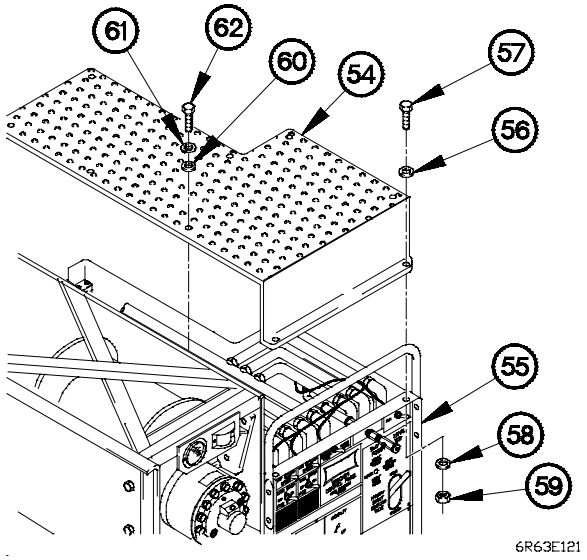
16-63. 30K WINCH ASSEMBLY REPLACEMENT/REPAIR (CONT)

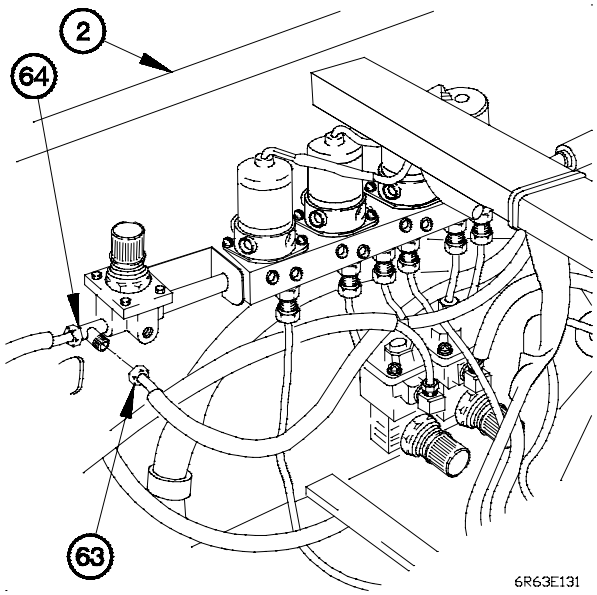
(33) Position control panel cover (54) on control panel (55) with two washers (56), screws (57), washers (58) and nuts (59).

(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).



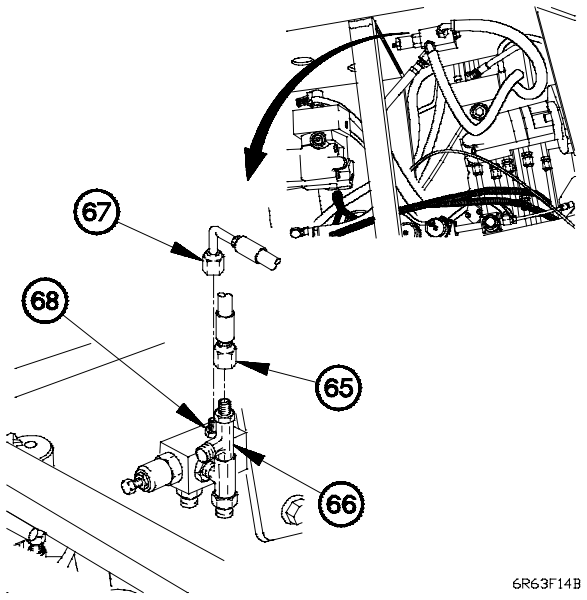


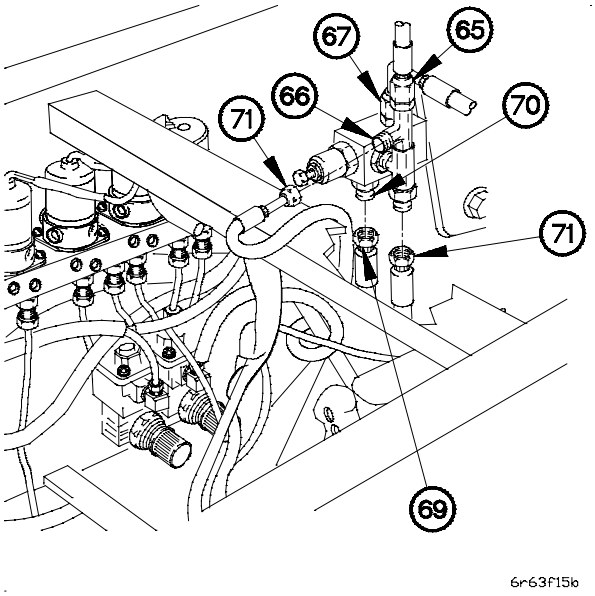
(37) Route air hose (63) through 30K winch assembly (2).

(38) Connect air hose (63) to 90-degree fitting (64).

(39) Position hose (65) on fitting (66).

(40) Position hose (67) on fitting (68).

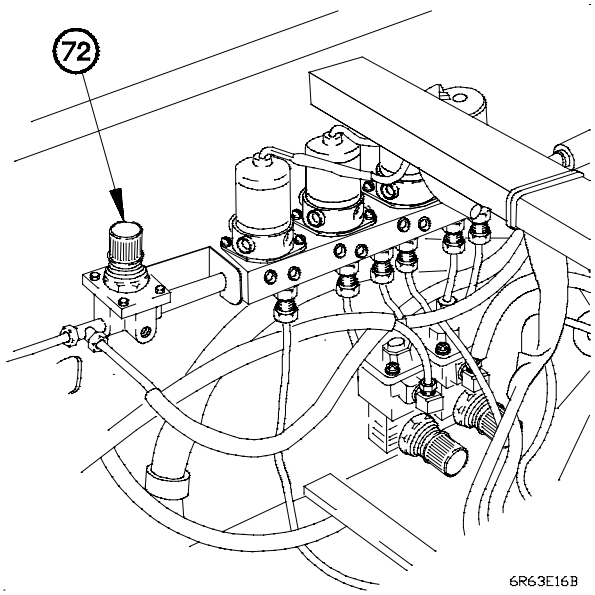




(41) Position hose (69) to fitting (70).

(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

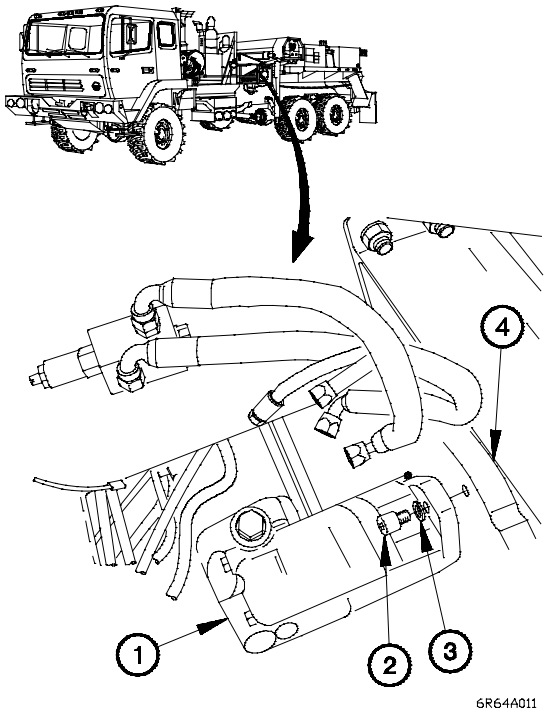
Left and right 30K winch drive motors are replaced/repaired the same. Left 30K winch drive motor assembly shown.

(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.

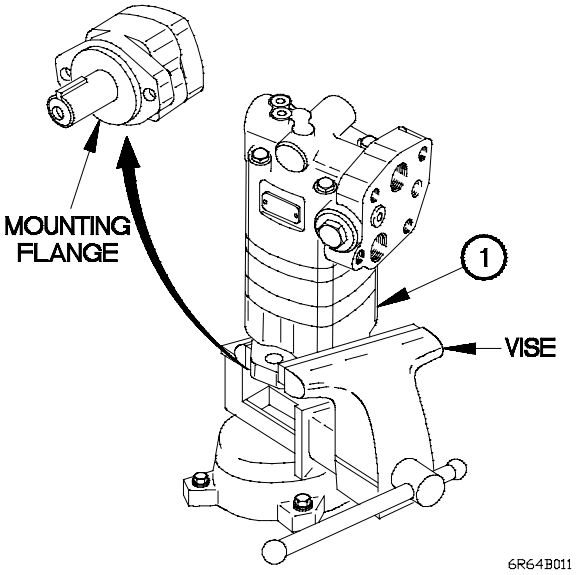
CAUTION

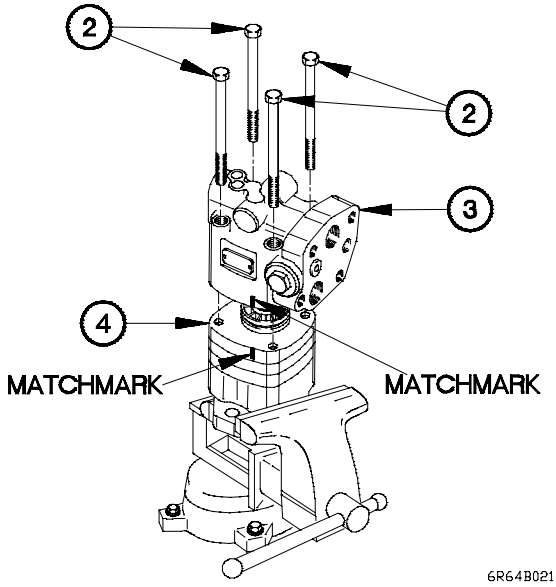
30K winch drive motor assembly must be clamped in vise by mounting flange. Failure to comply may result in damage to 30K winch drive motor assembly.

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.

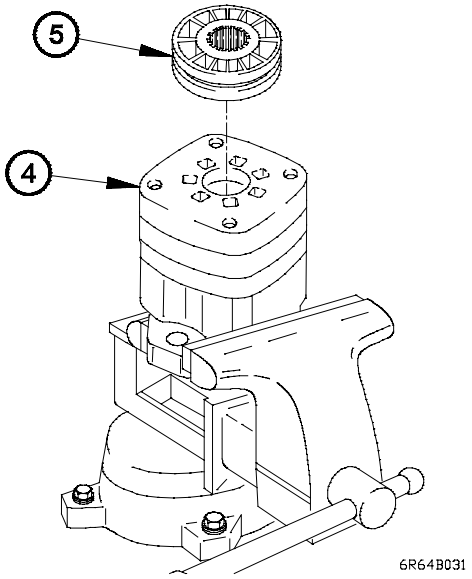
(2) Remove four screws (2) from valve housing (3).

CAUTION

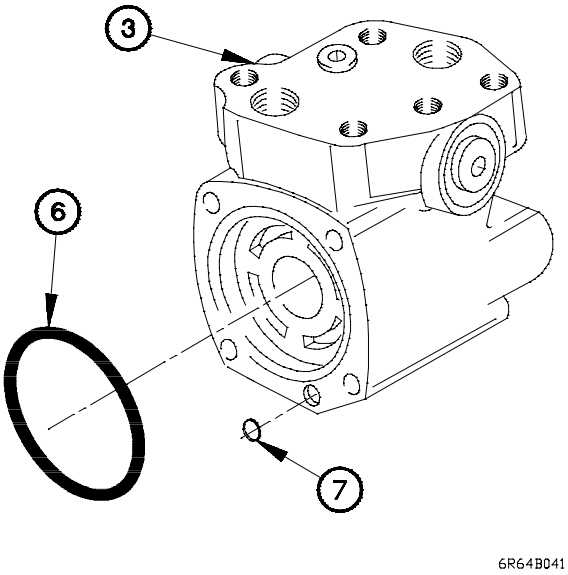
30K winch drive motor is made up of several sections. Ensure that no other section sticks to valve housing when removing. Failure to comply may result in damage to equipment.

(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).



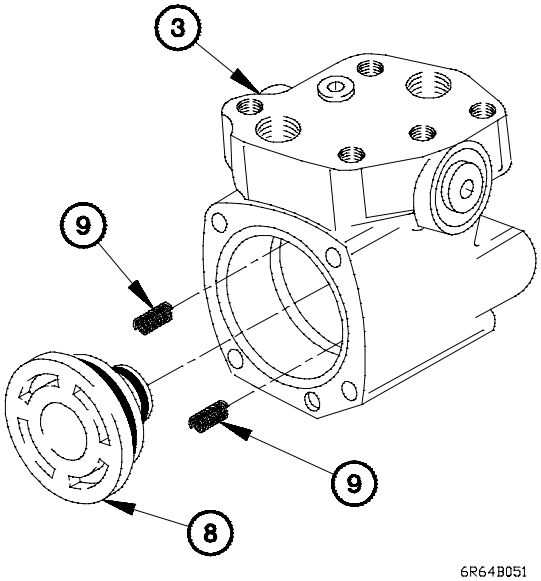
(5) Remove seal (6) and preformed packing (7) from valve housing (3). Discard seal and preformed packing.

WARNING

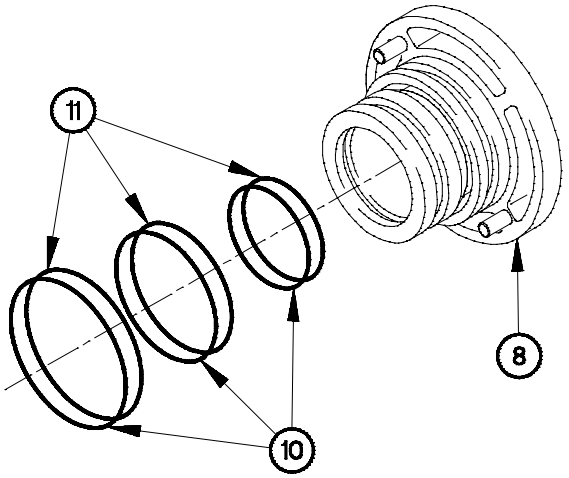
Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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.



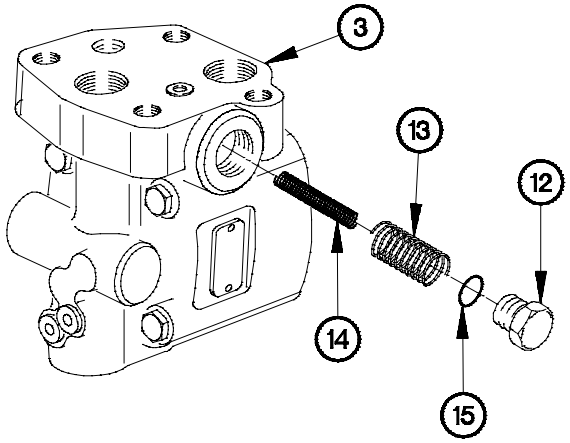
6R64B061

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

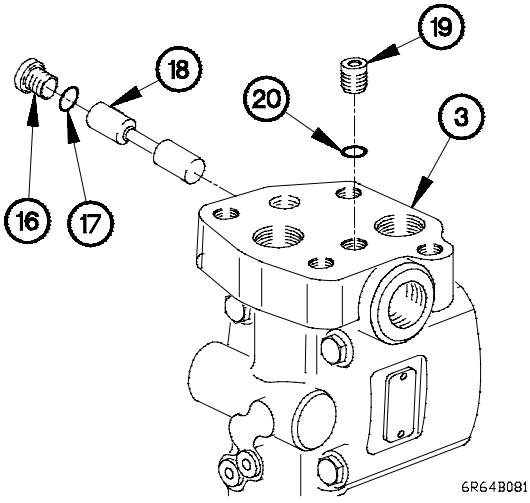
(11) Remove control spool plug (16) from valve housing (3).

(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)

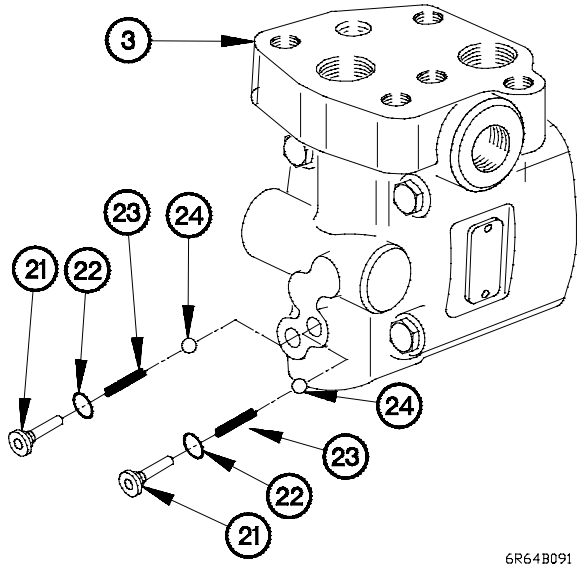
(16) Remove two check ball plugs (21) from valve housing (3).

(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).



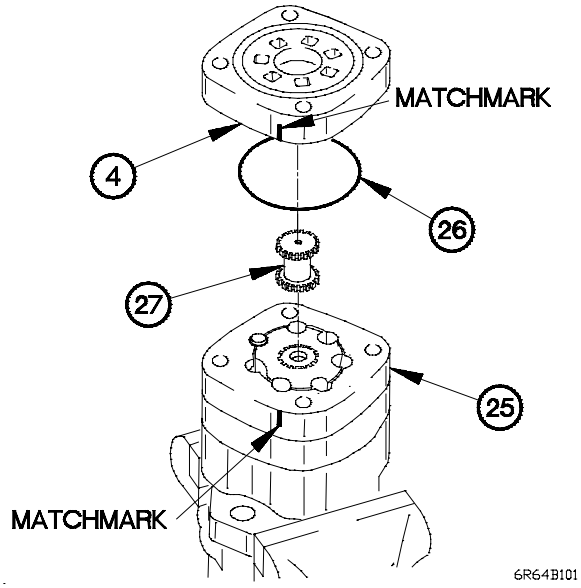
NOTE

Match mark 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 geroler and wear plate prior to disassembly.

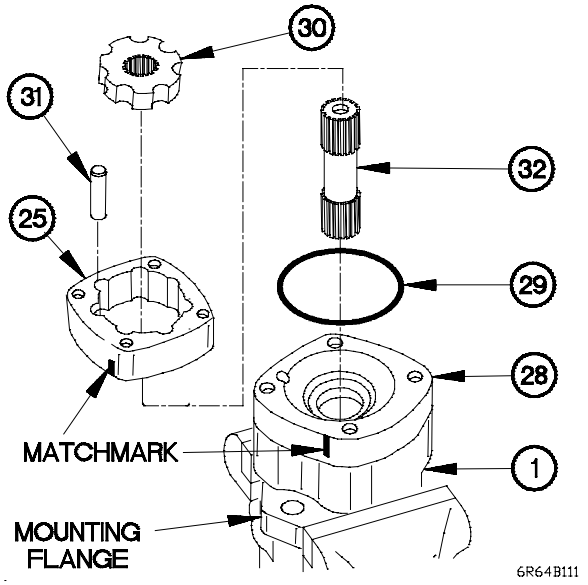
(22) Remove geroler (25) from wear plate (28).

(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

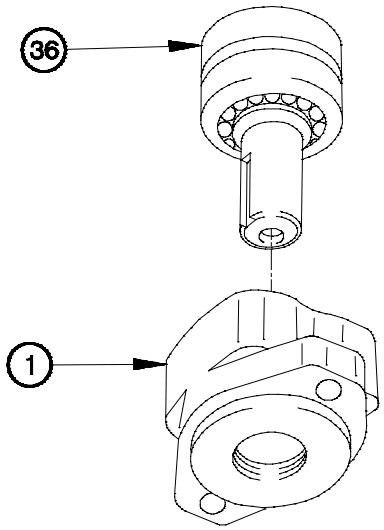
Match mark wear plate and bearing housing prior to disassembly.

(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).



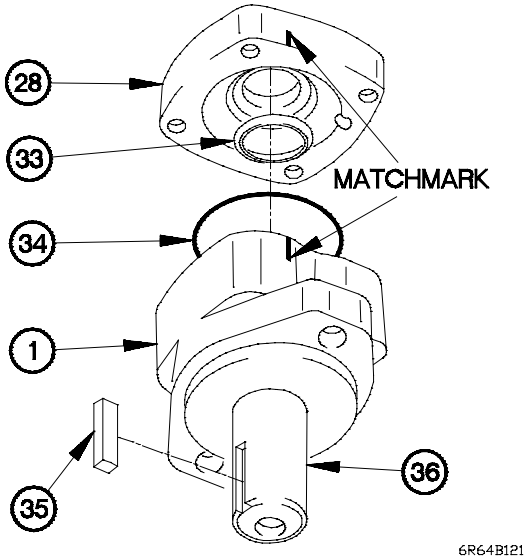
6R64B131

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.

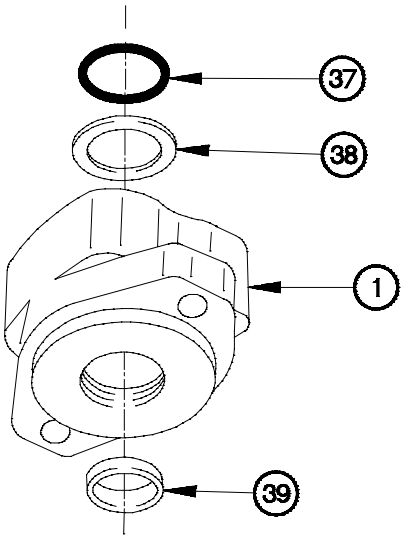


6R64B121

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.

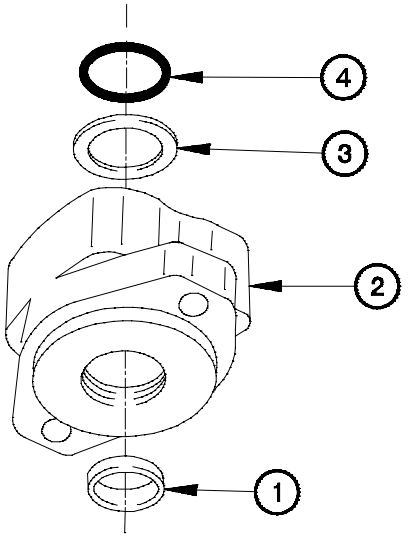
NOTE

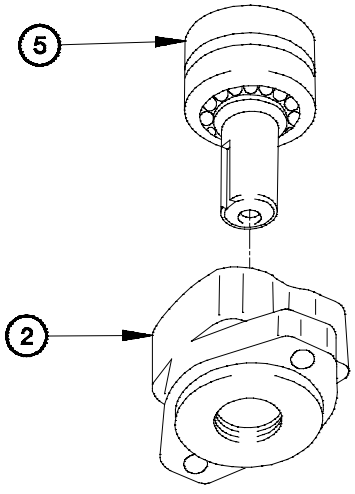
Lubricate all seals and preformed packings with lubricating oil prior to installation.

(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).

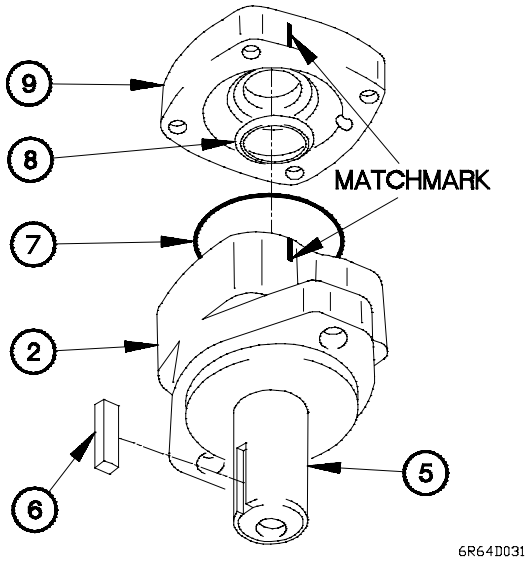
(5) Install key (6) on shaft and bearing assembly (5).

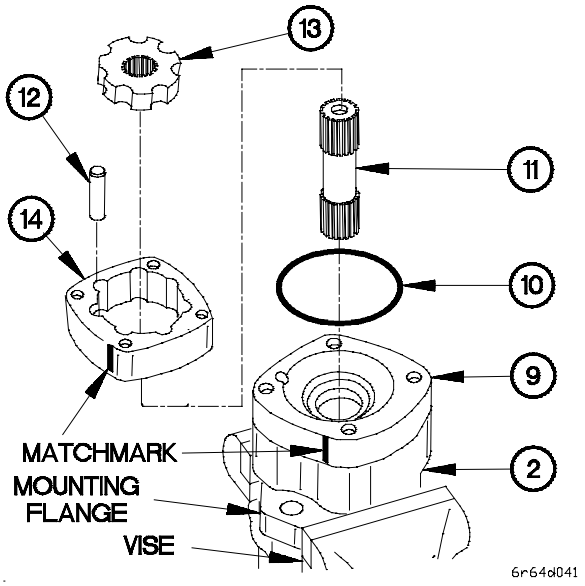
(6) Pour small amount of lubricating oil into bearing housing (2).

(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.

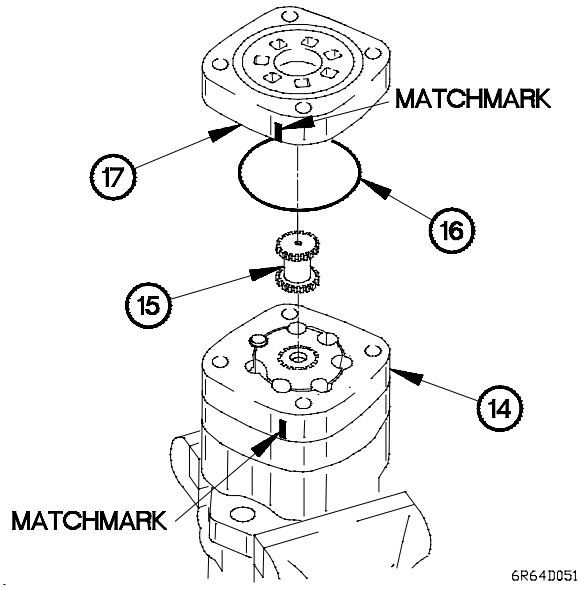
(15) Locate and mark position of largest open pocket in geroler (14).

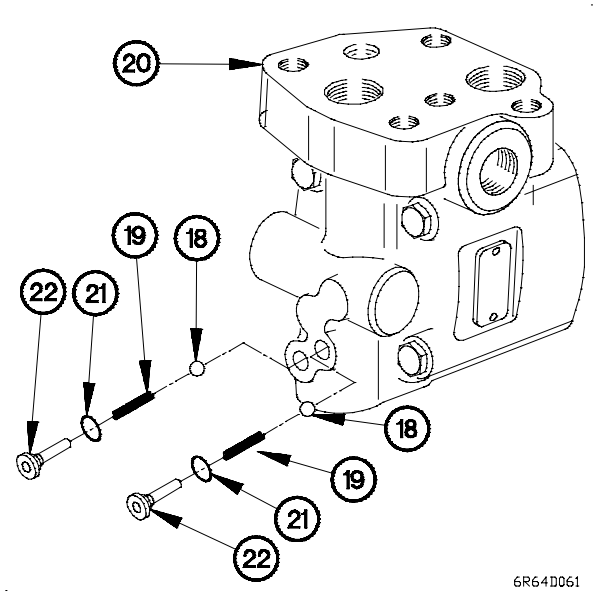
(16) Install valve drive (15) in geroler (14).

(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).

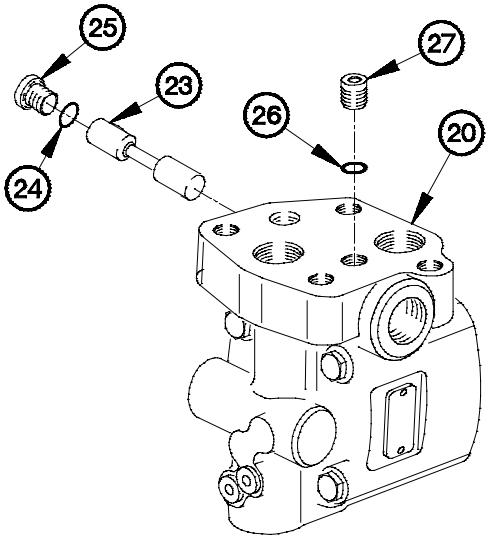
(26) Position control spool plug (25) in valve housing (20).

(27) Tighten control spool plug (25) to 38-46 lb-ft (52-62 N·m).

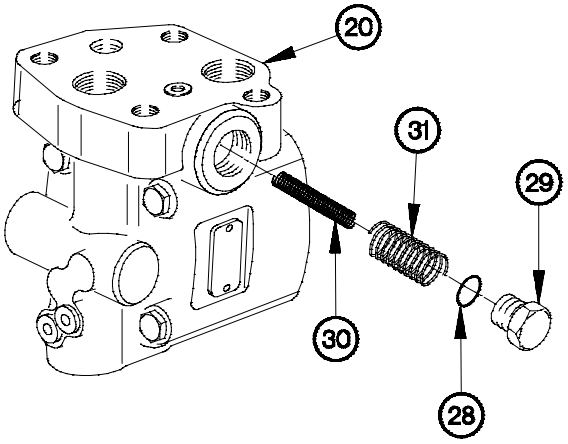
(28) Install preformed packing (26) on case drain plug (27).

(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.

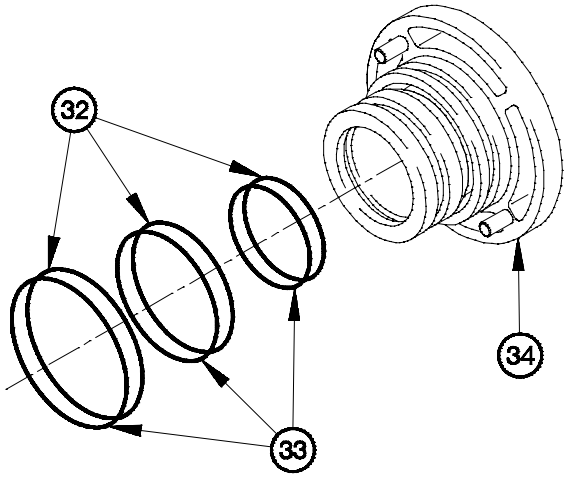
(32) Install springs (30 and 31) in valve housing (20).

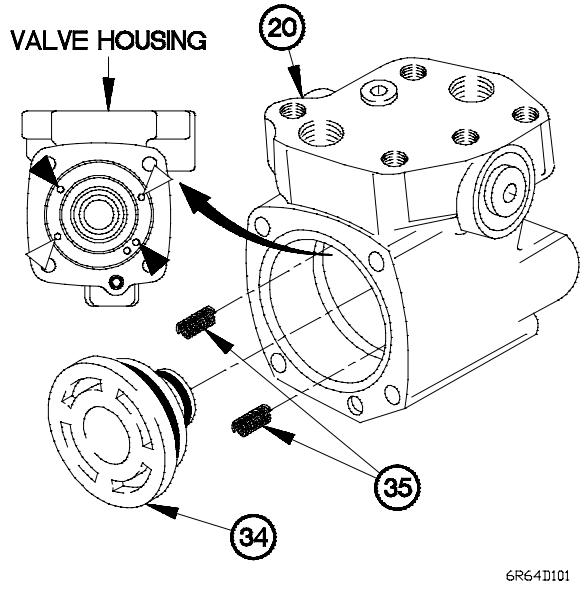
(33) Position control spool plug (29) in valve housing (20).

(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

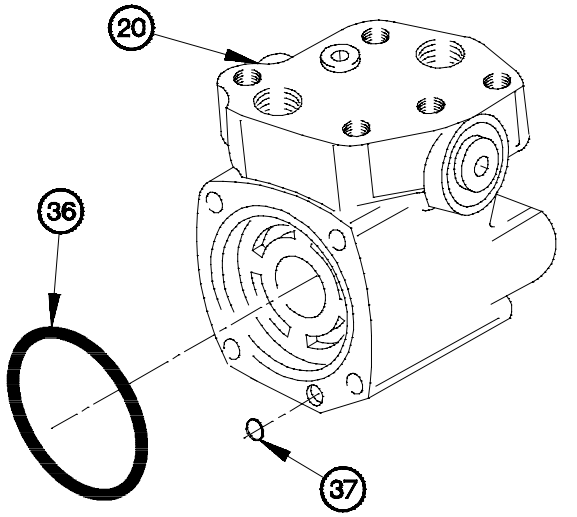
Balance ring springs may be installed in any two holes in valve housing that are directly across from each other.

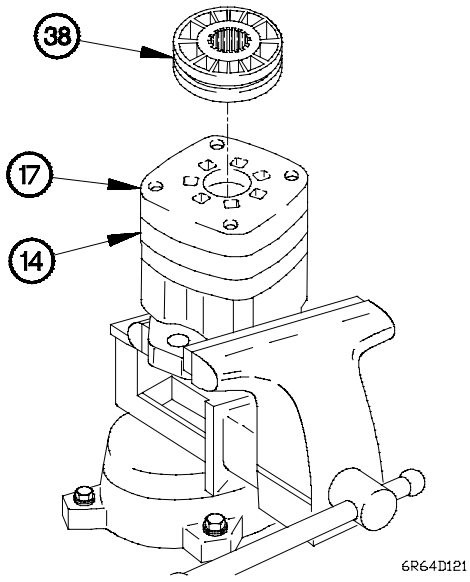
(36) Install two balance ring springs (35) in holes in valve housing (20).

(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).



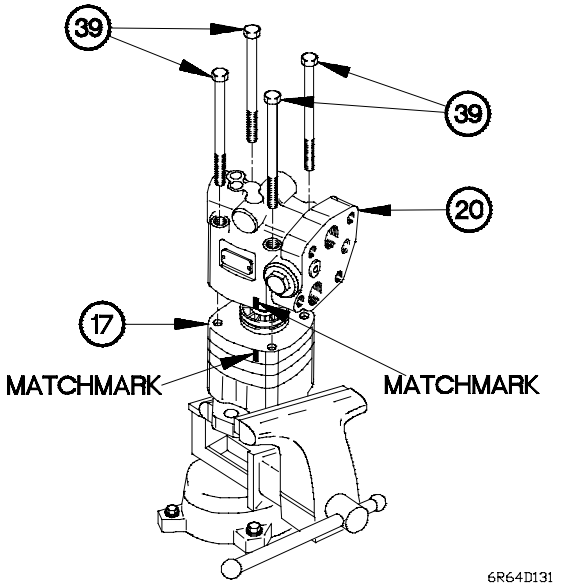


(40) Align any side opening in valve (38) with open slot in valve plate (17) that is over largest open pocket in geroler (14).

(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)

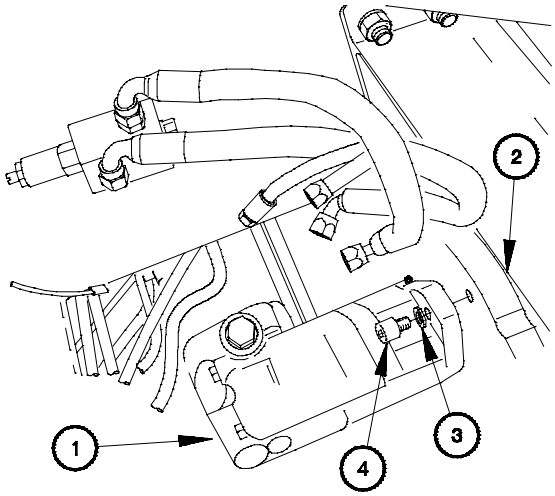
e. Installation.

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)
Preformed Packing (Item 237, Appendix F)
Lockwasher (12) (Item 132, Appendix F)
Sealant (Item 65.1, Appendix C)

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

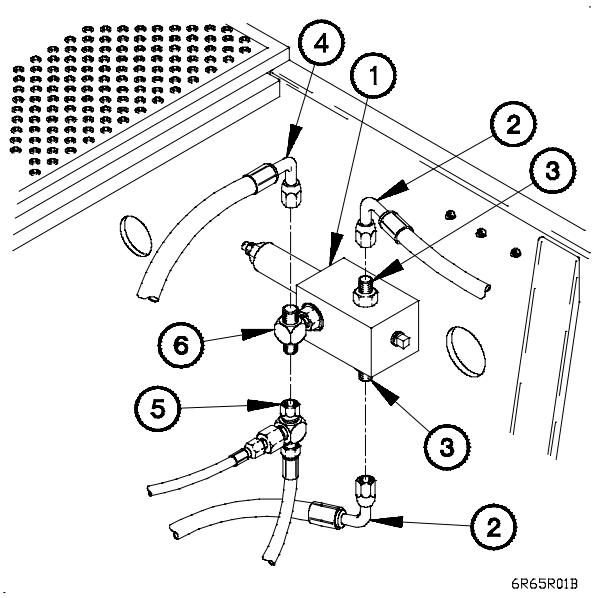
- **Prolonged contact with lubricating oil (MIL-L-2104) may cause a skin rash. Skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be well ventilated to keep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

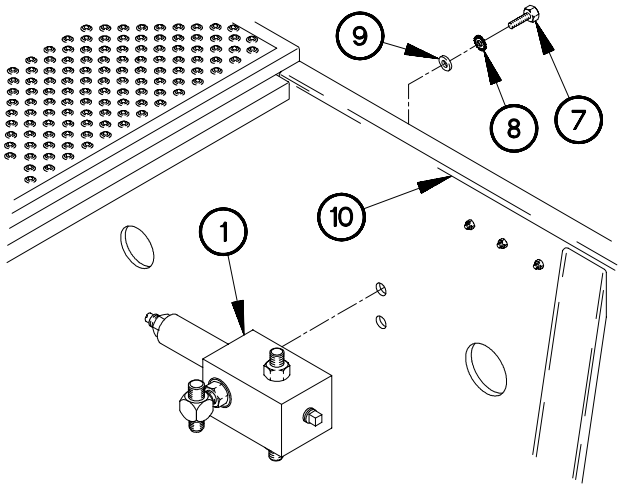
(3) Disconnect hose (4) and swivel tee fitting (5) from tee fitting (6).



NOTE

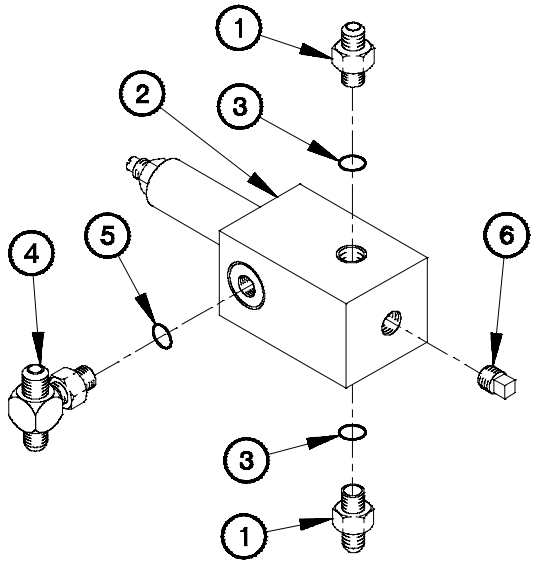
Note position of relief valve on 30K winch frame prior to removal.

(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.**

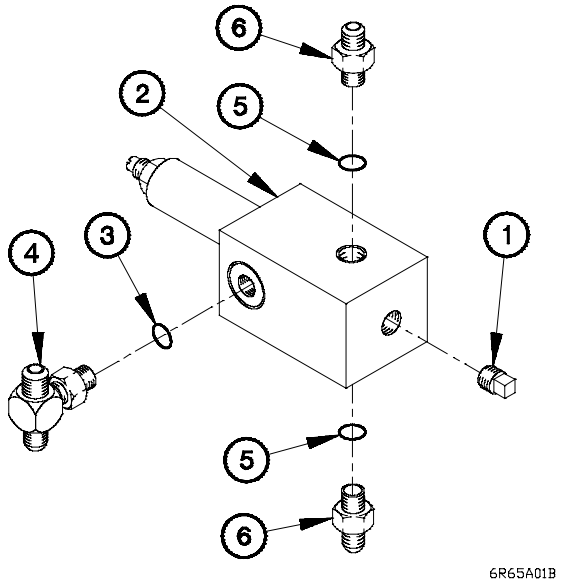
(1) Clean all metal parts with dry cleaning solvent.

(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).

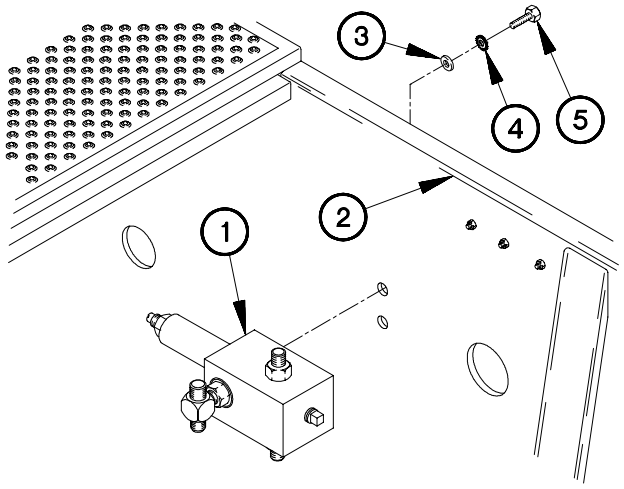
(7) Tighten tee fitting (4) and two fittings (6) to 40-43 lb-ft (54-58 N•m).

e. Installation.

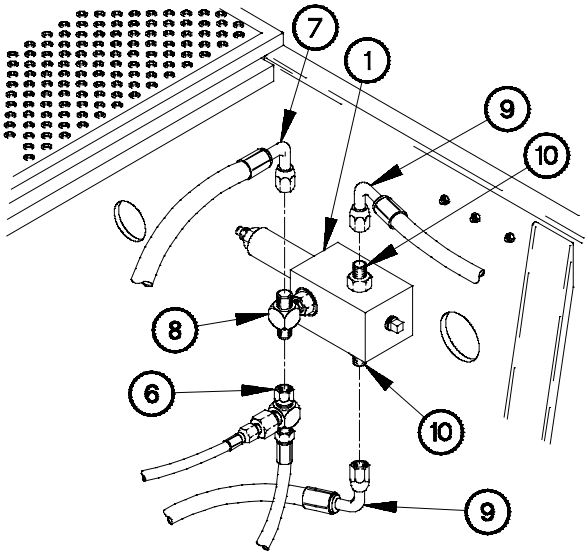
NOTE

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).

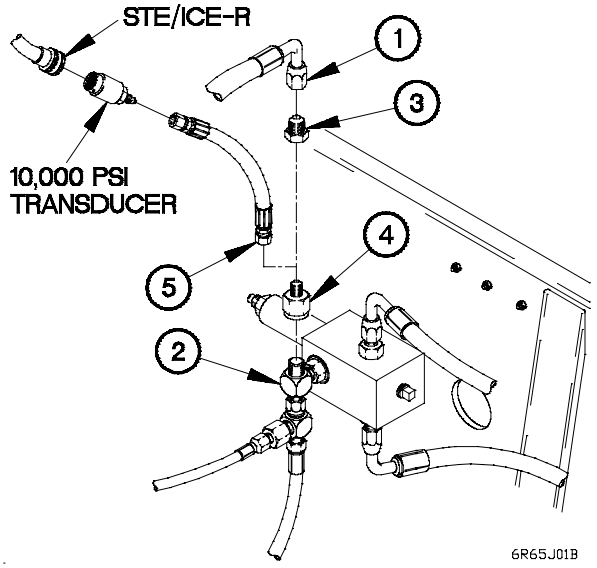
WARNING

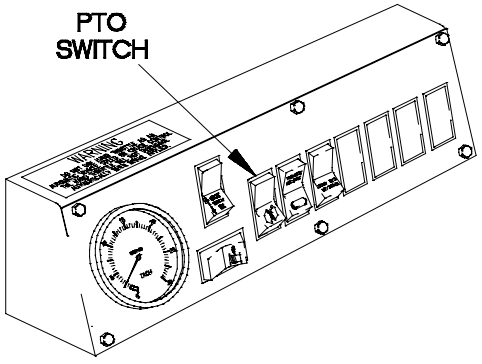
Use care in placement of STE/ICE-R instruments used to perform these adjustments. Hydraulic system pressures are approximately 3000 PSI. Hoses will move or jump under this pressure. Secure test instruments, as required. Failure to comply may result in injury to personnel or damage to equipment.

(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).

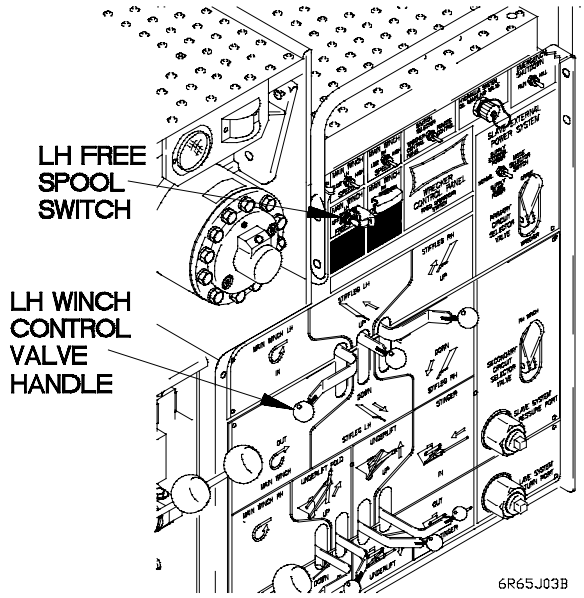
16-65. 30K WINCH RELIEF VALVE REPLACEMENT/REPAIR (CONT)

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.

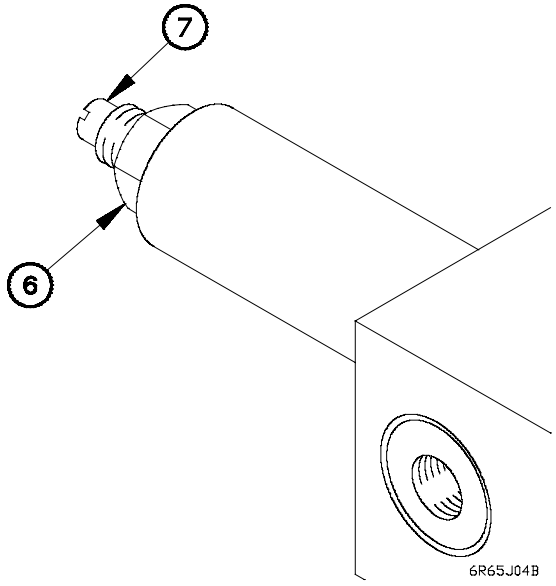


(11) Position LH free spool switch to ON (TM 9-2320-366-10-2).

(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

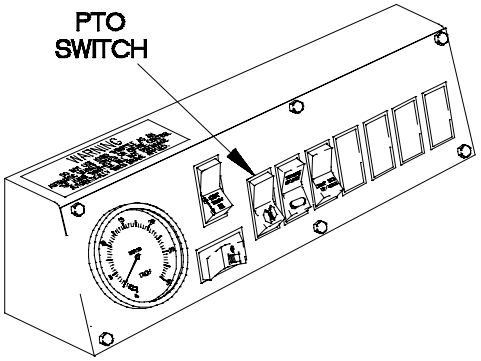
Hold 30K winch relief valve adjusting screw while tightening lock nut.

(19) Tighten lock nut (6) on 30K winch relief valve adjusting screw (7).

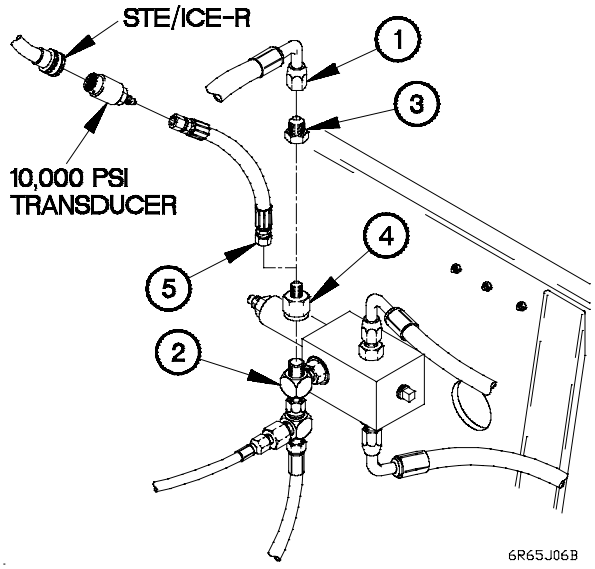
(20) Lower engine speed to idle (TM 9-2320-36-10-1).

(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. DELETED

All data on pages 16-401 through 16-407, including pages 16-402 through 16-407 deleted.

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

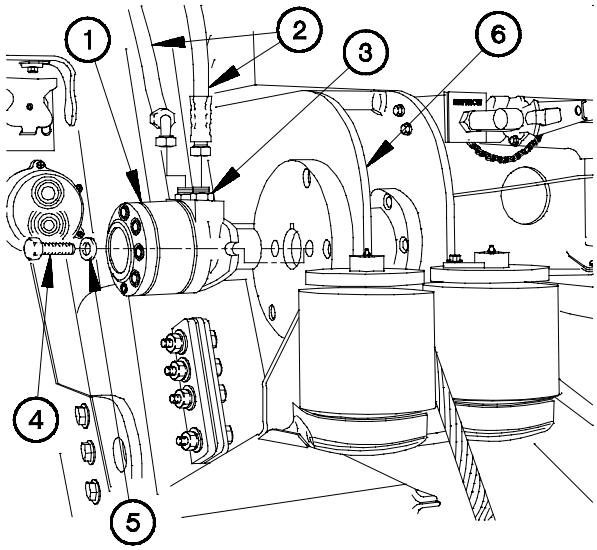
- Left and right pay-out hydraulic motors are removed the same way. Left side shown.
- Tag hydraulic hoses and connection points prior to disconnecting.

(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).

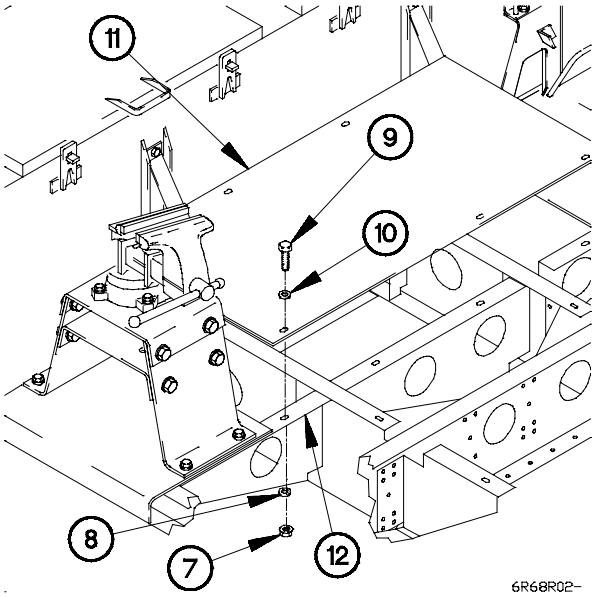


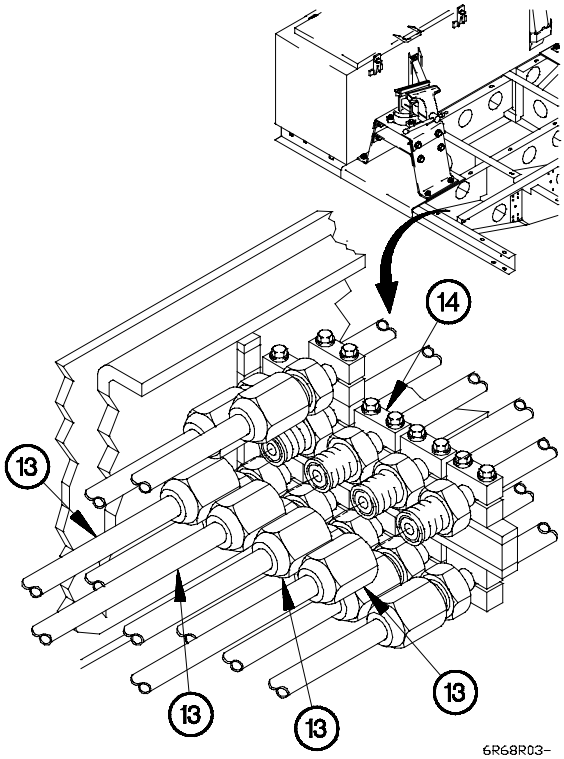
6R68R011

NOTE

Step (5) requires the aid of an assistant.

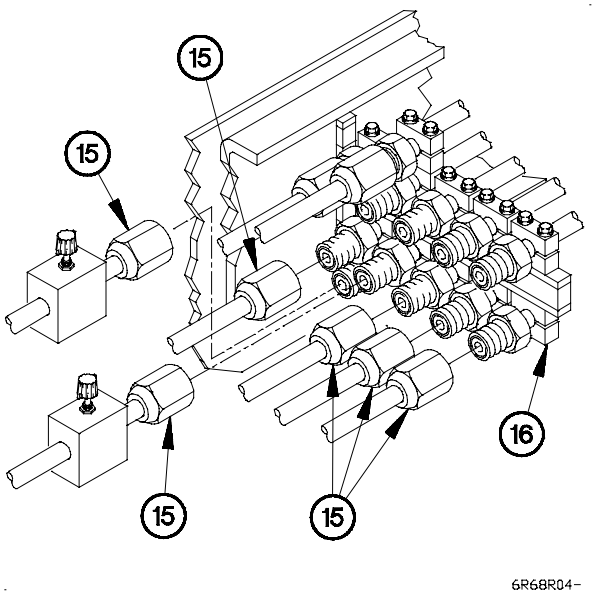
(5) Remove eight self-locking nuts (7), washers (8), screws (9), washers (10) and center deck plate (11) from support structure (12). Discard self-locking nuts.





(6) Disconnect four hoses (13) from upper tubing bank (14).

(7) Disconnect six hoses (15) from lower tubing bank (16).

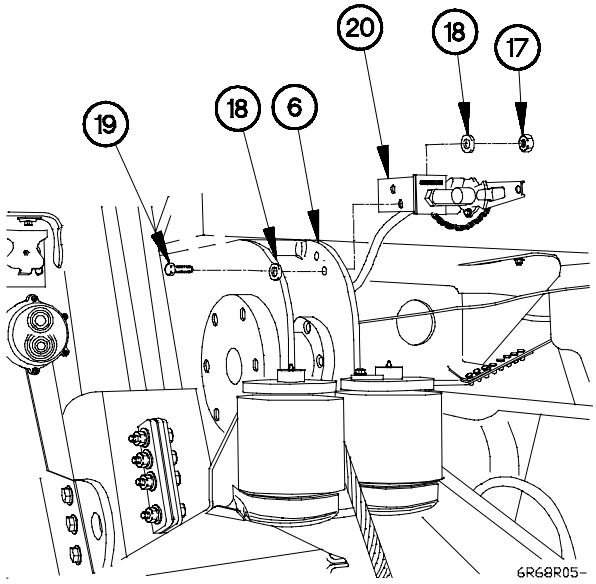


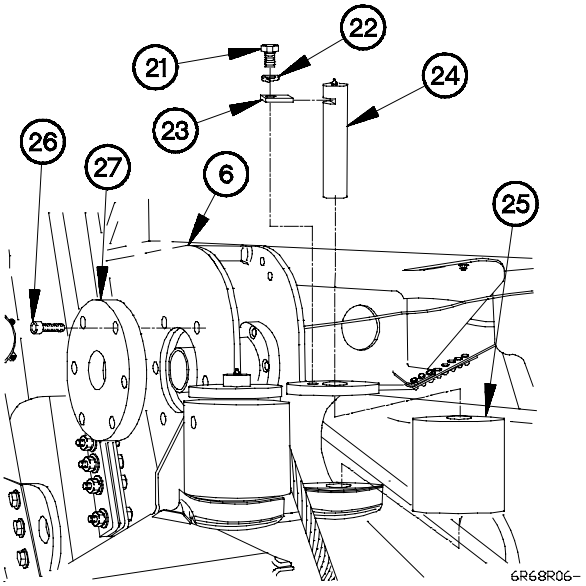
16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT (CONT)

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).





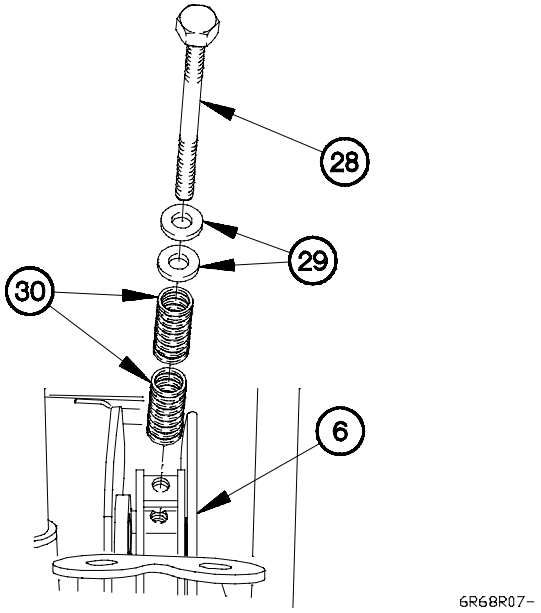
NOTE

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).



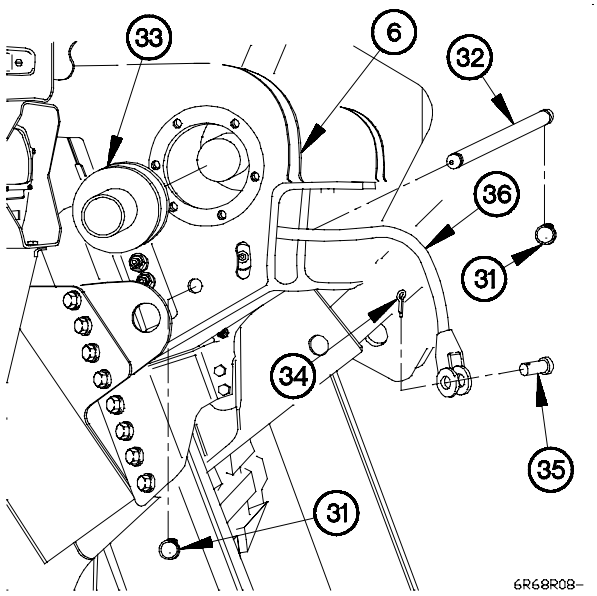
WARNING

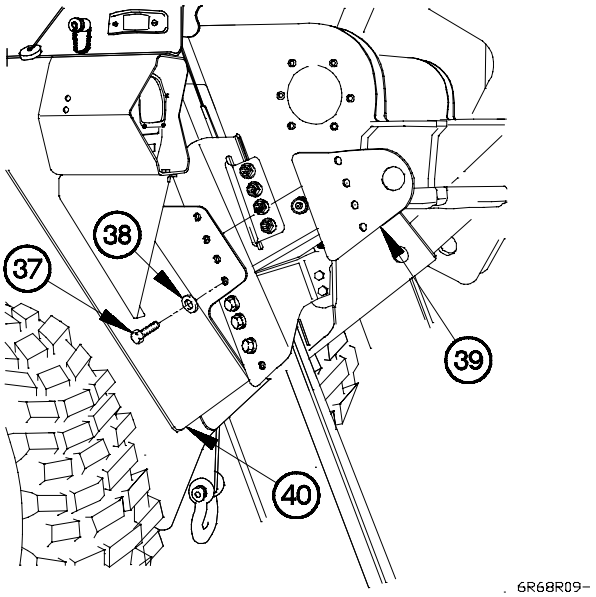
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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.

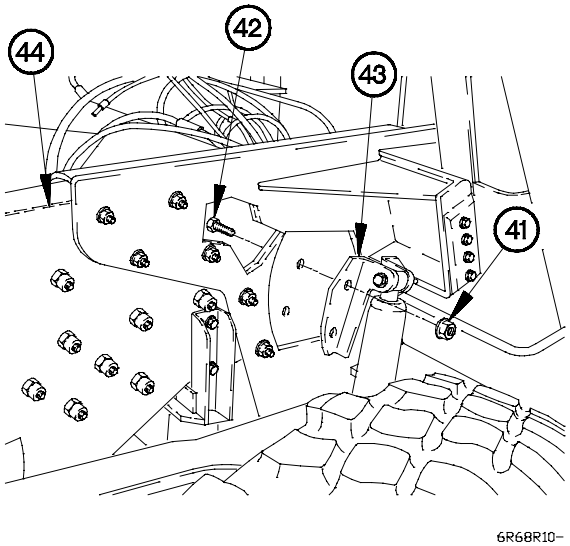
(15) Remove four bolts (37), washers (38), and tow chain anchor (39) from fender (40).

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)

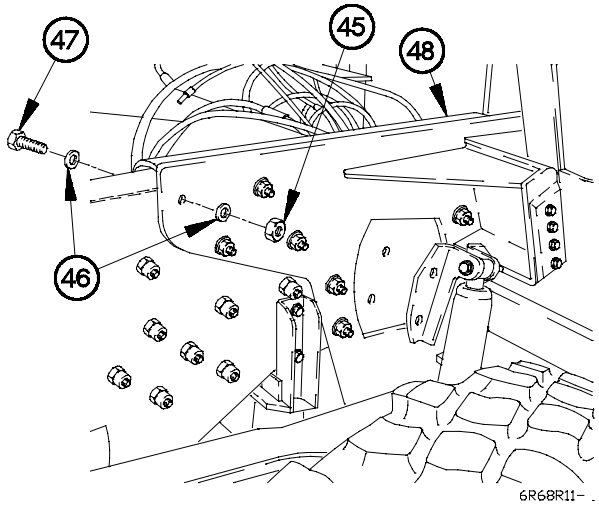
WARNING

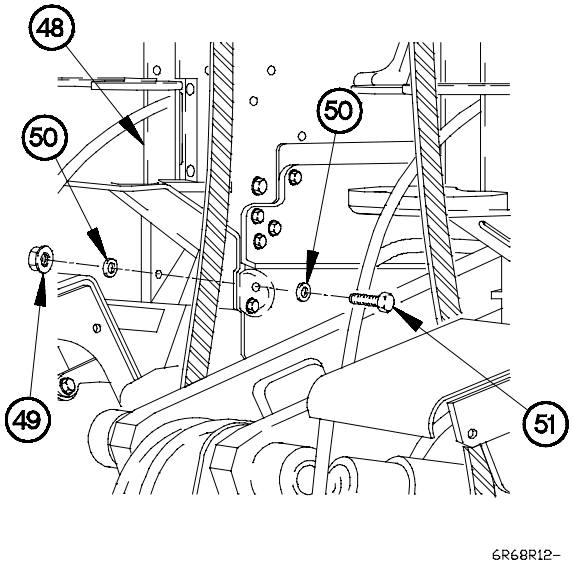
Underlift and stiffleg assembly weighs approximately 4000 lbs (1816 kgs). Attach suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

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.

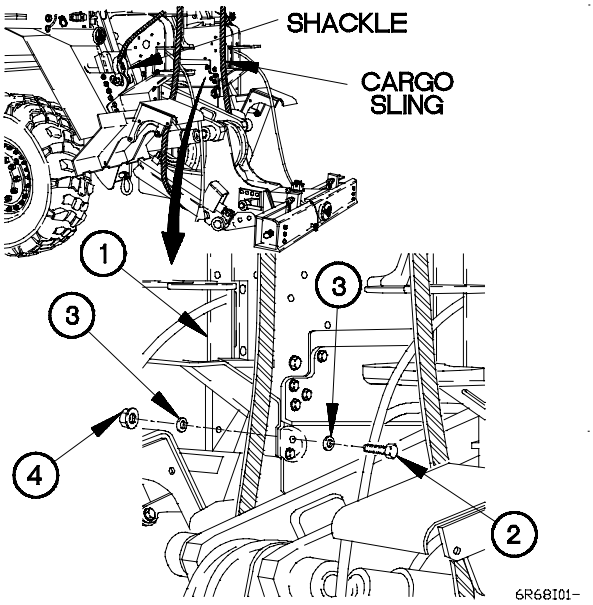
WARNING

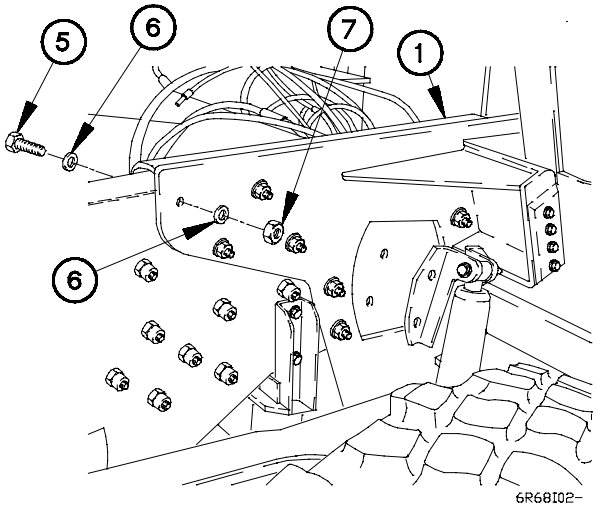
Underlift and stiffleg assembly weighs approximately 4000 lbs (1816 kgs). Attach suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

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.

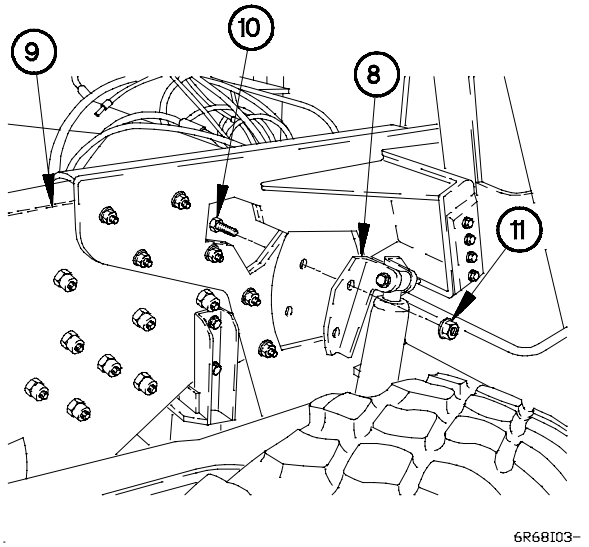
(4) Tighten self-locking nuts (7) and 12 self-locking nuts (4) to 152-168 lb-ft (206-227 N·m).

NOTE

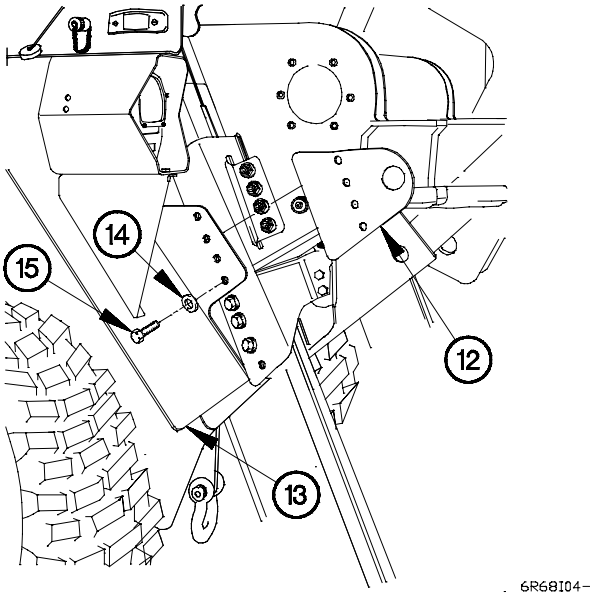
Left and right side shock absorber brackets are installed the same way. Left side shown.

(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)

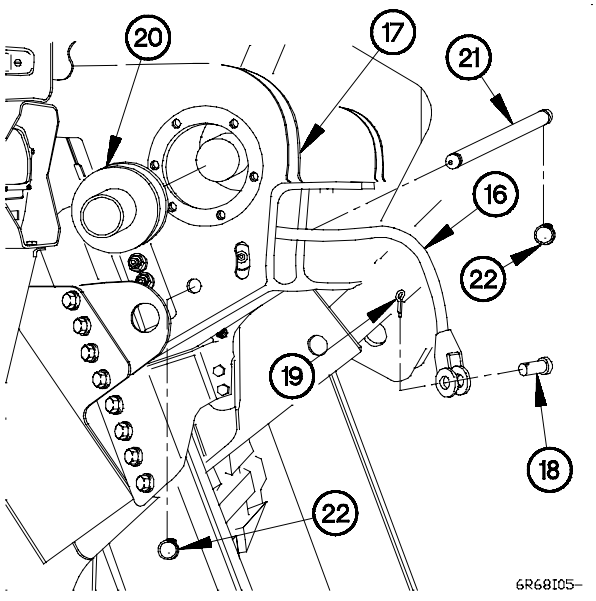


NOTE

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).

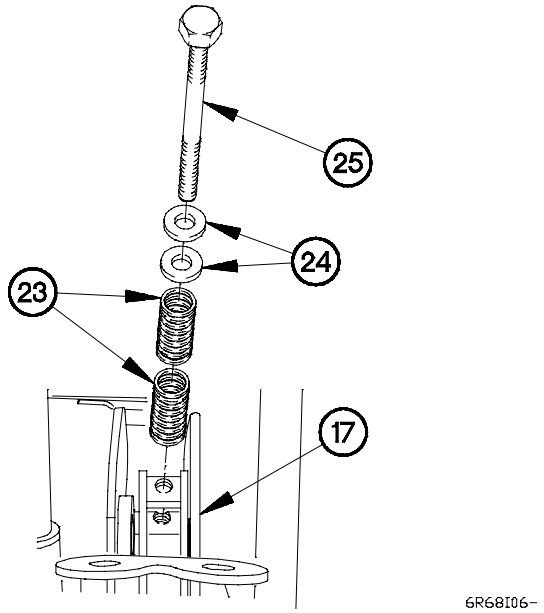
(11) Position cable sheave (20) in spooler weldment (17).

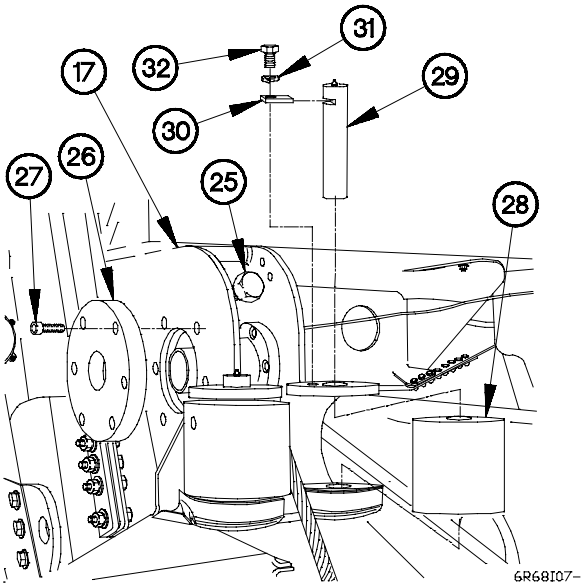
WARNING

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.

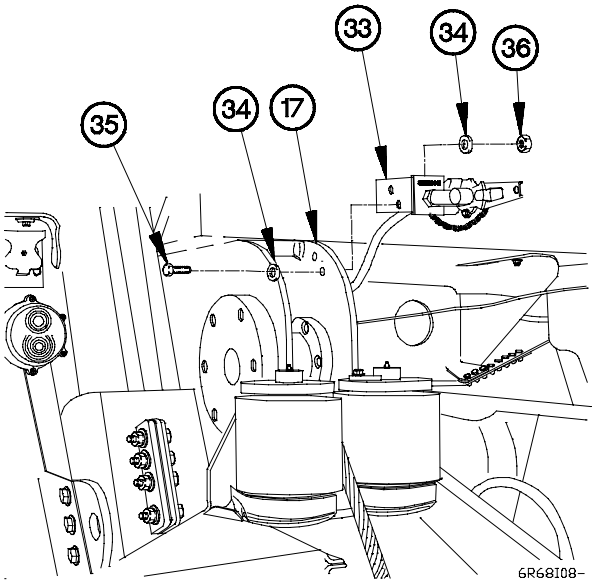
NOTE

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).

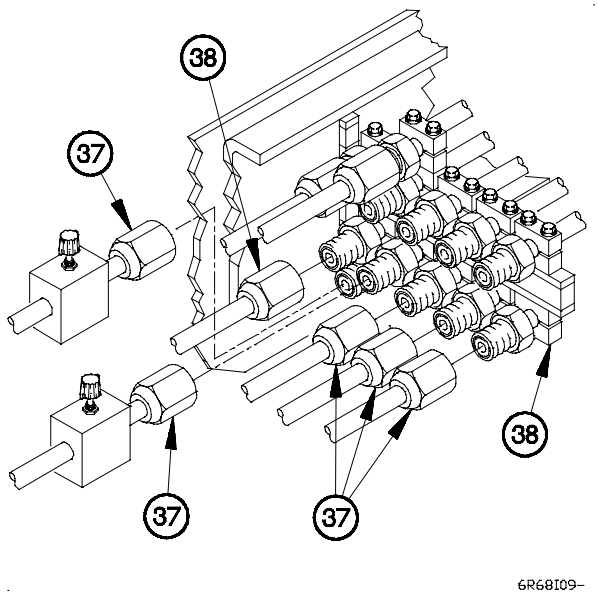
(21) Perform steps (5) through (20) on right side of vehicle.

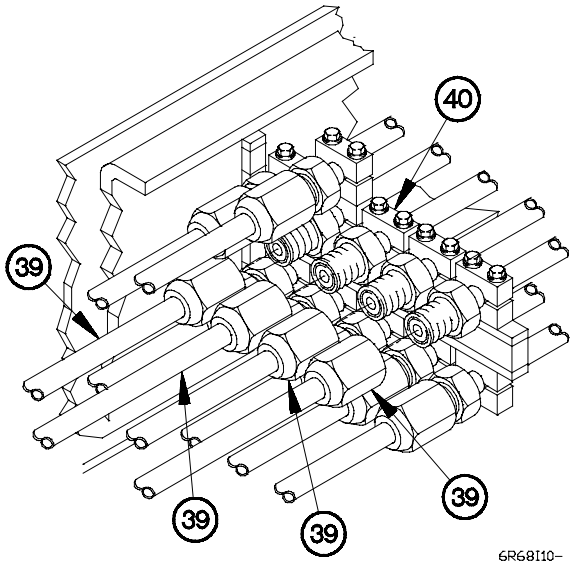


16-68. M1089 UNDERLIFT AND STIFFLEG ASSEMBLY REPLACEMENT (CONT)

(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).

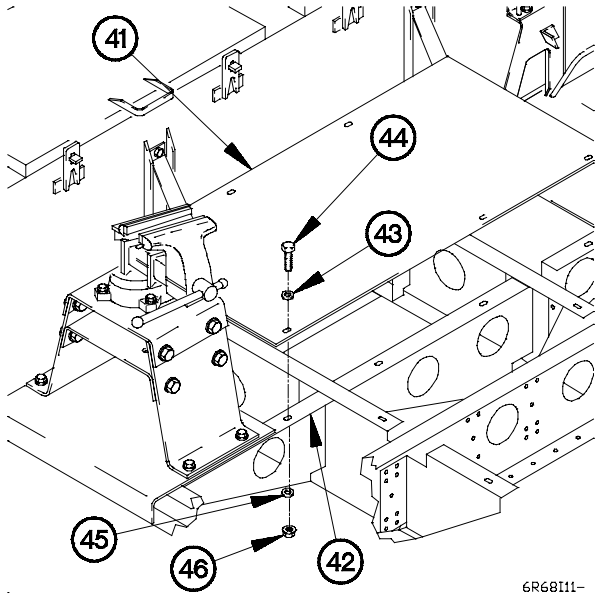
(25) Tighten hoses (39) to 36-39 lb-ft (49-53 N·m).

NOTE

Step (26) requires the aid of an assistant.

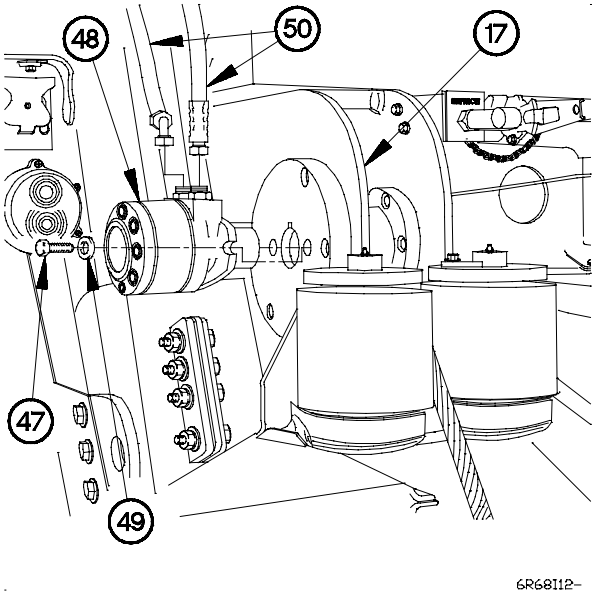
(26) Position center deck plate (41) support structure (42) with eight washers (43), bolts (44), washers (45), and self-locking nuts (46).

(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.

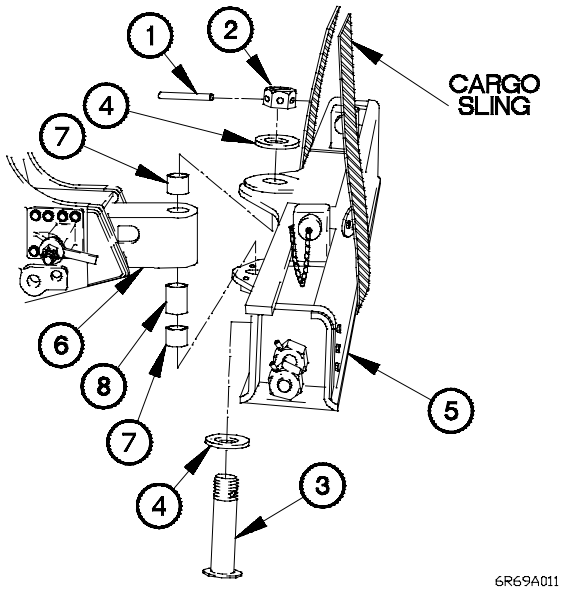
(1) Remove spring pin (1) from self-locking nut (2). Discard spring pin and self-locking nut.

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

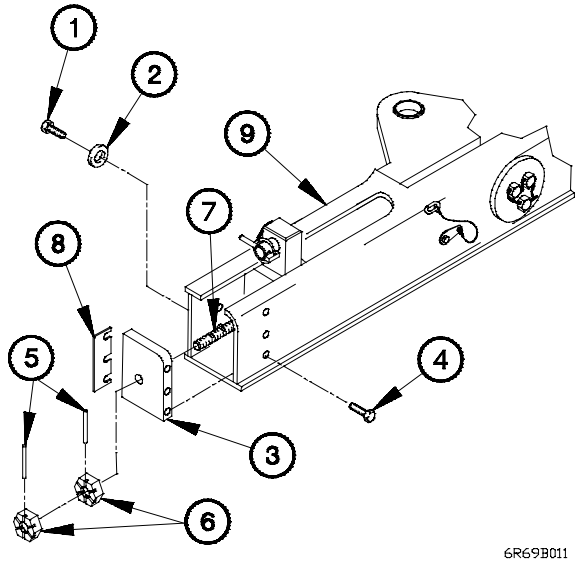
Left and right side of crossbar are disassembled the same way. Left side shown.

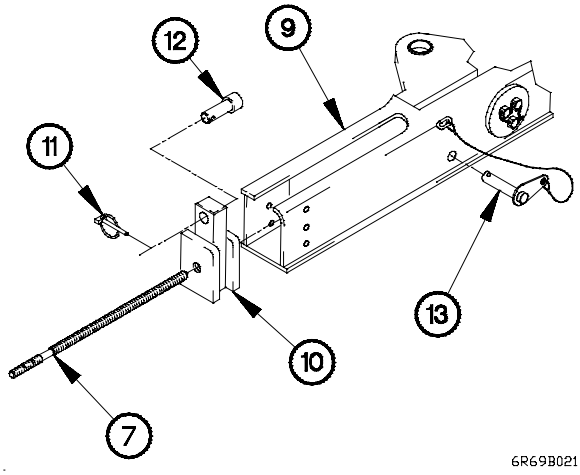
(1) Remove three screws (1) and washers (2) from adjustment block (3).

(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).





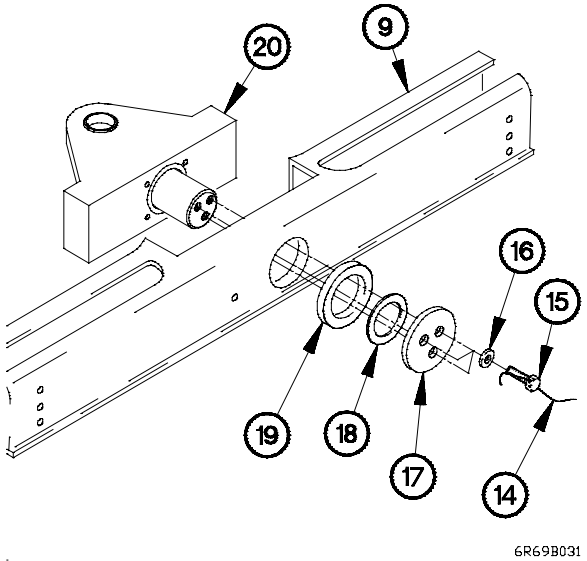
(5) Remove mounting block (10) and adjustment screw (7) from crossbar (9).

(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).

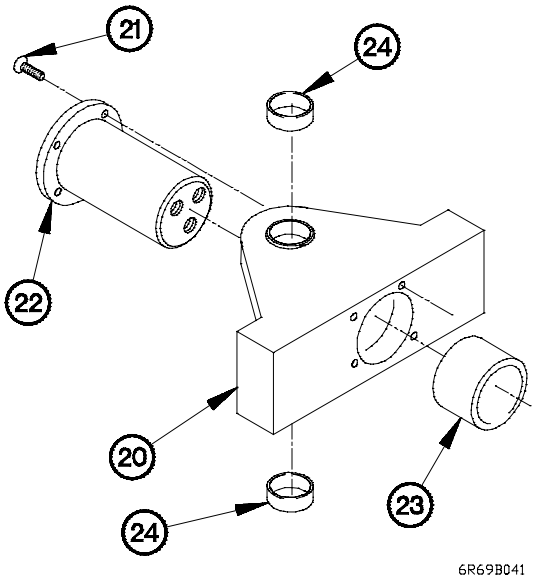
(9) Remove lockwire (14), three screws (15), washers (16), plate (17), shim pack (18), thrust washer (19), and pivot yoke (20) from crossbar (9). Discard shim pack and lockwire.



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).

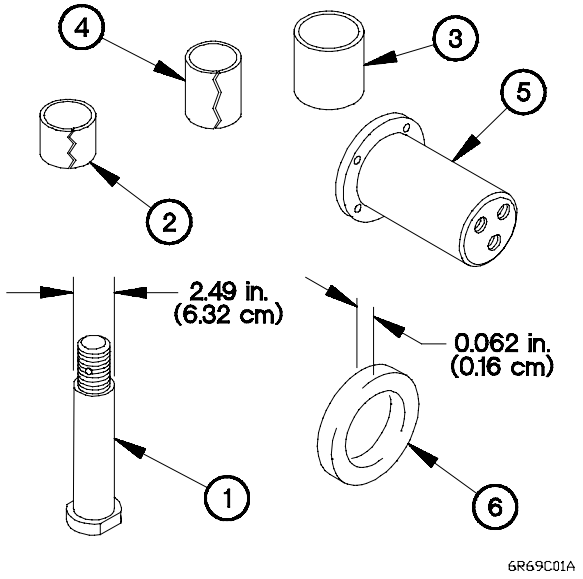
(4) Inspect two bushings (2) for pits, corrosion or burrs.

(5) Inspect spacer (3) for pits, corrosion, or burrs.

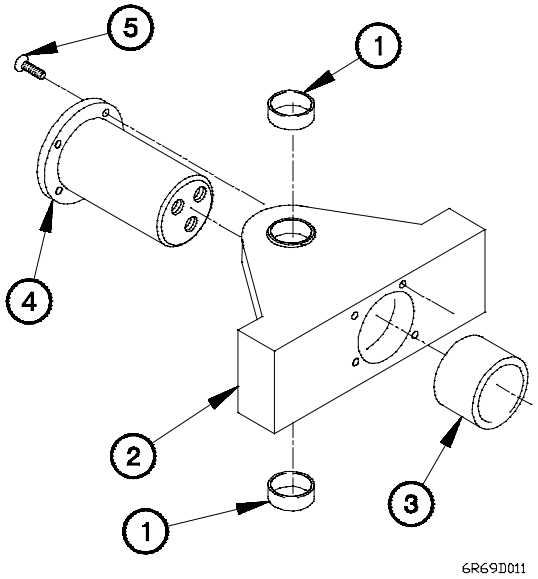
(6) Inspect two pivot yoke bushings (4) for pits, corrosion or burrs.

(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).

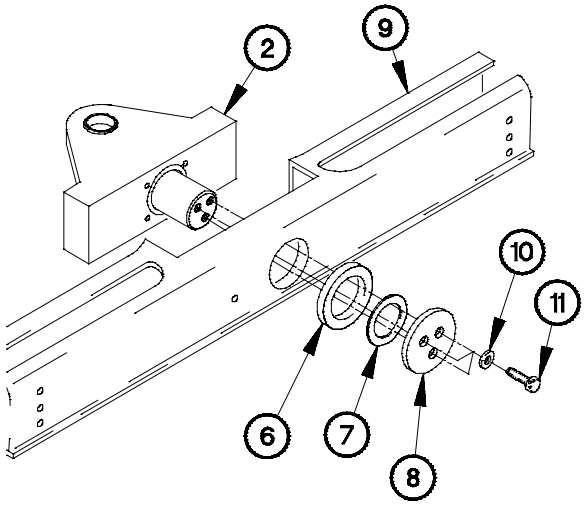
(3) Tighten four screws (5) to 30-33 lb-ft (41-45 N·m)

16-69. M1089 CROSSBAR ASSEMBLY REPLACEMENT/REPAIR (CONT)

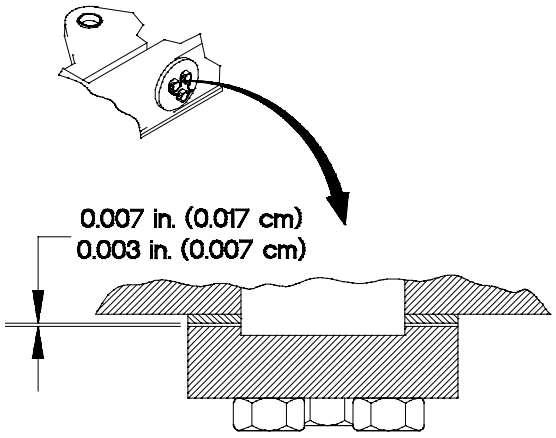
(4) Apply coat of grease to thrust bearing (6).

(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



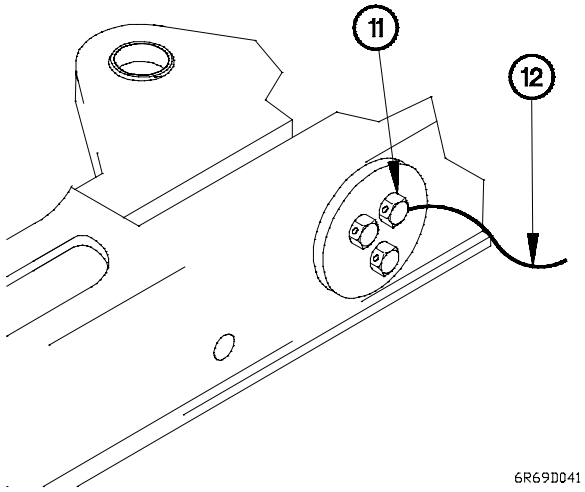
6R69D031

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

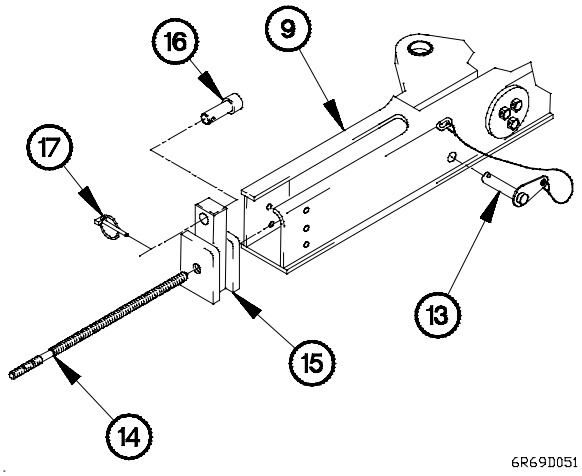
NOTE

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.

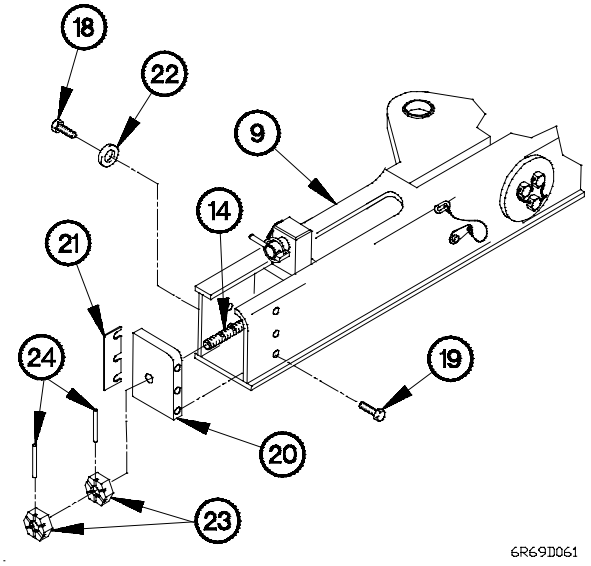


(10) Apply antiseize compound to adjusting screws (14).

(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).

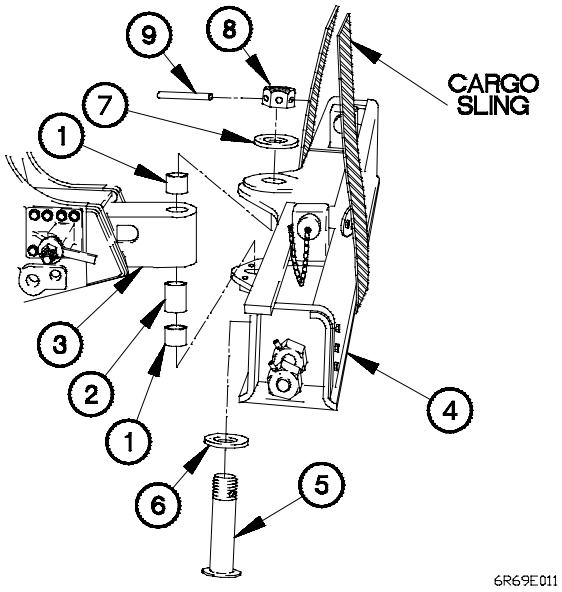
NOTE

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. DELETED

All data on pages 16-425 through 16-430, including pages 16-427 thru 16-430 deleted.

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.

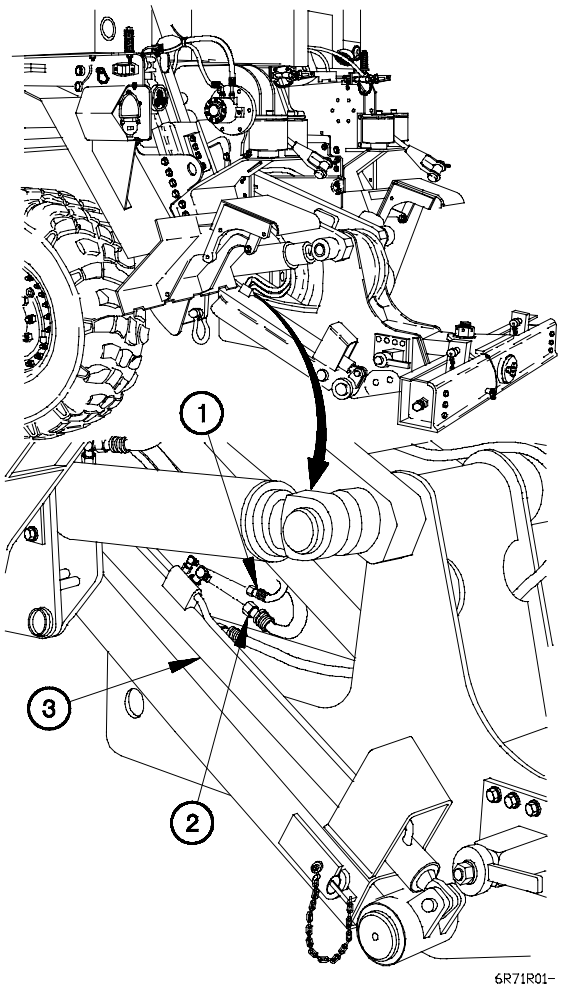
CAUTION

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)

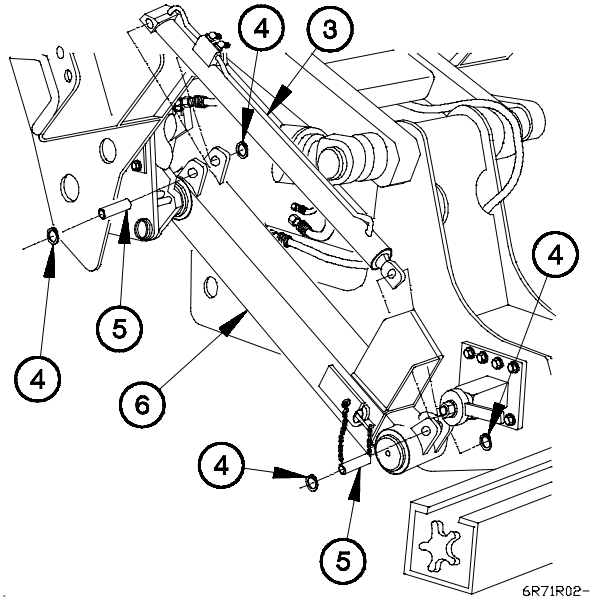
WARNING

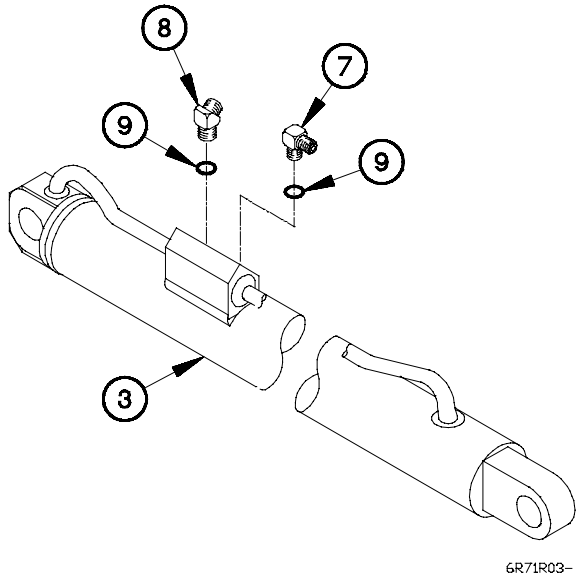
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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).

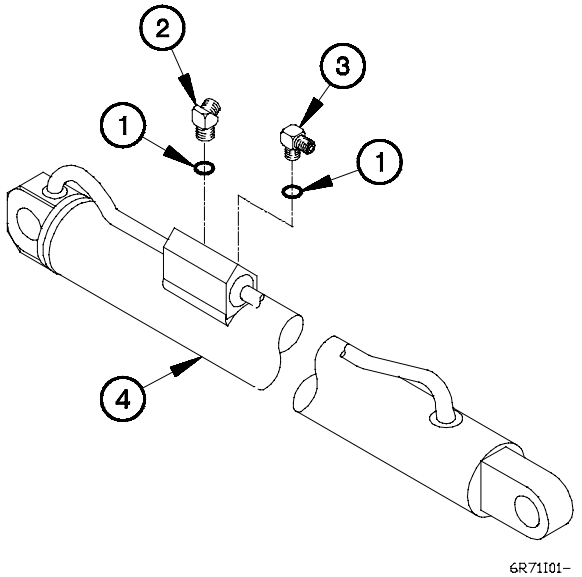
(6) Remove two preformed packings (9) from 90-degree fitting (7) and 45-degree fitting (8). Discard preformed packings.

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).

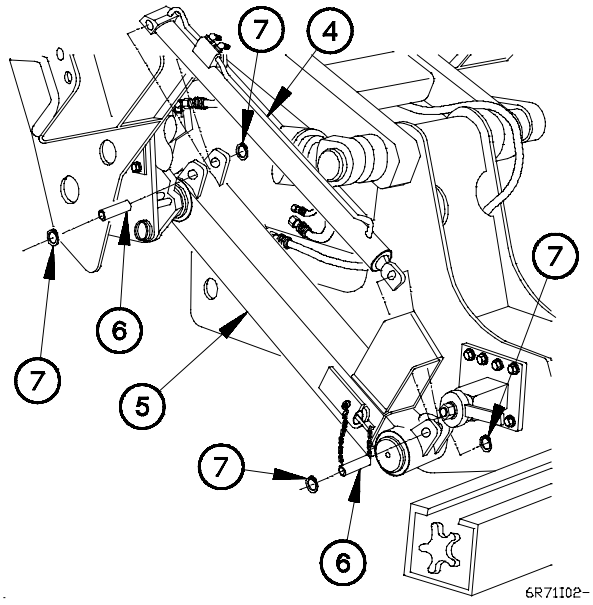


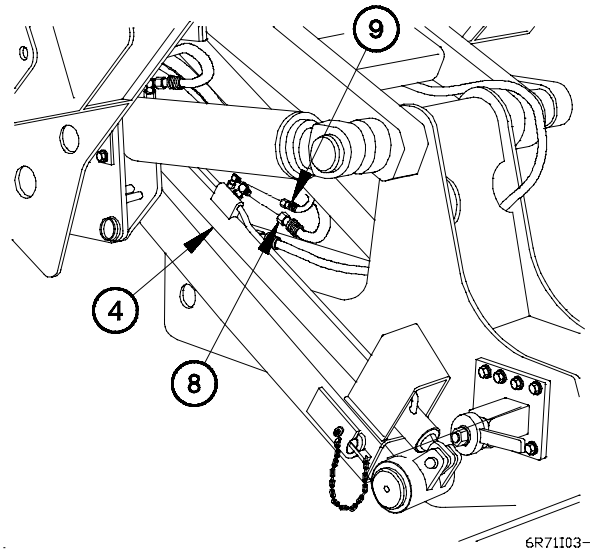
(4) Install fold cylinder (4) in left lower arm (5) with two retaining pins (6).

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

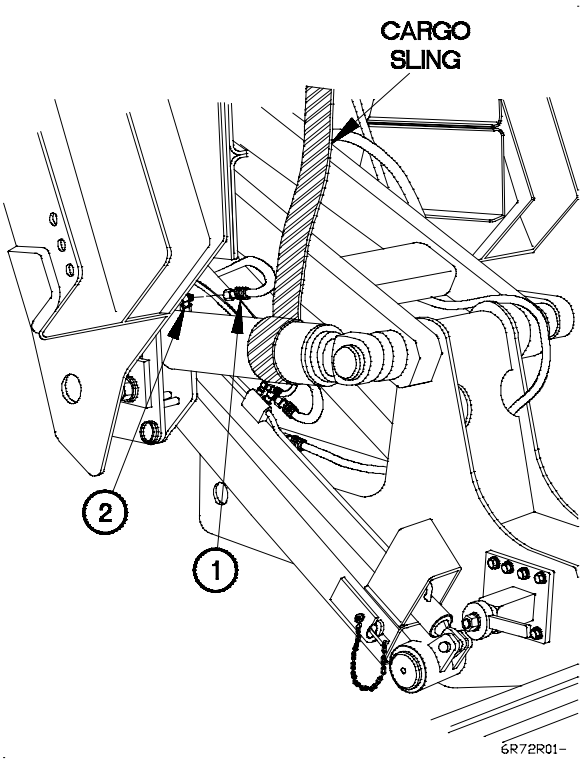
Telescopic lift cylinder weighs approximately 225 lbs (102 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

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

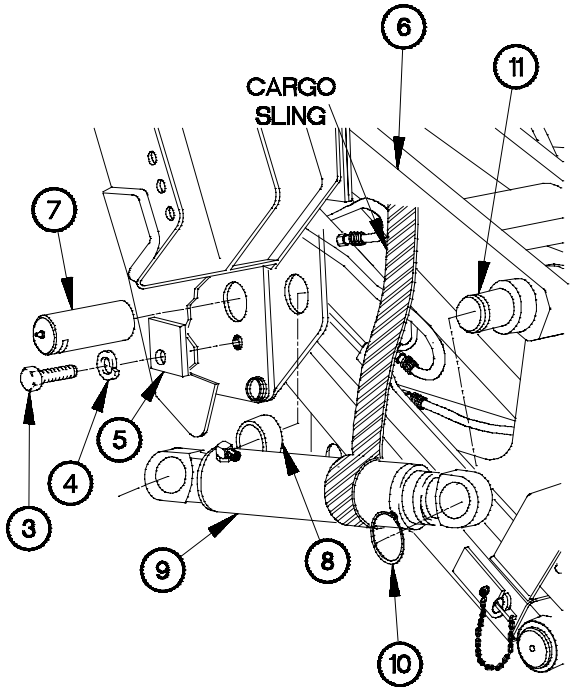
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(4) Remove retaining ring (10) from cylinder end cap (11).

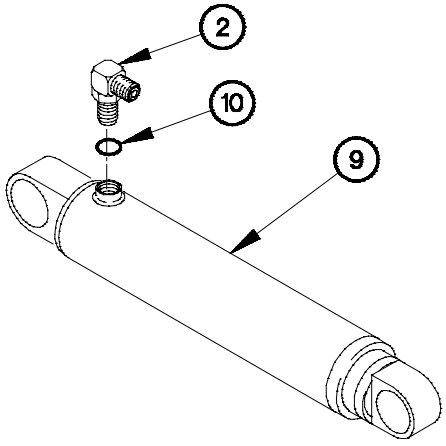
NOTE

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.

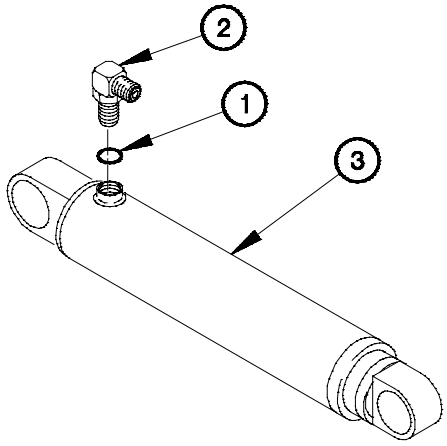
NOTE

Left and right side telescopic lift cylinders are removed the same way. Left side shown.

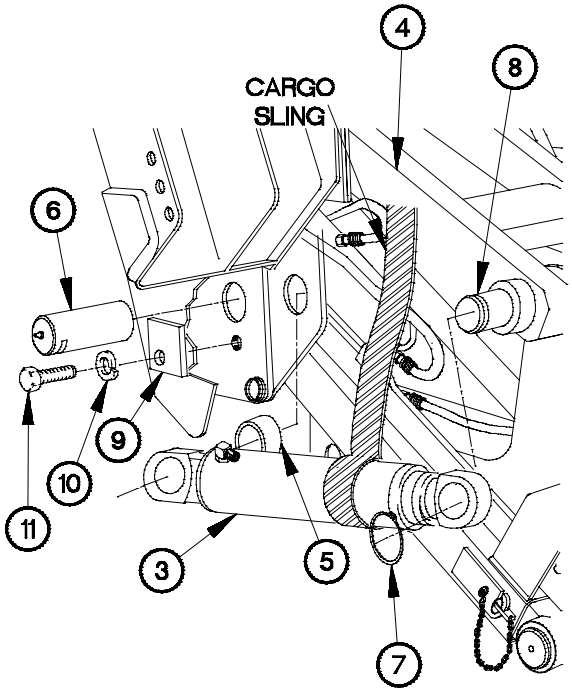
(1) Install preformed packing (1) on 90-degree fitting (2).

(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

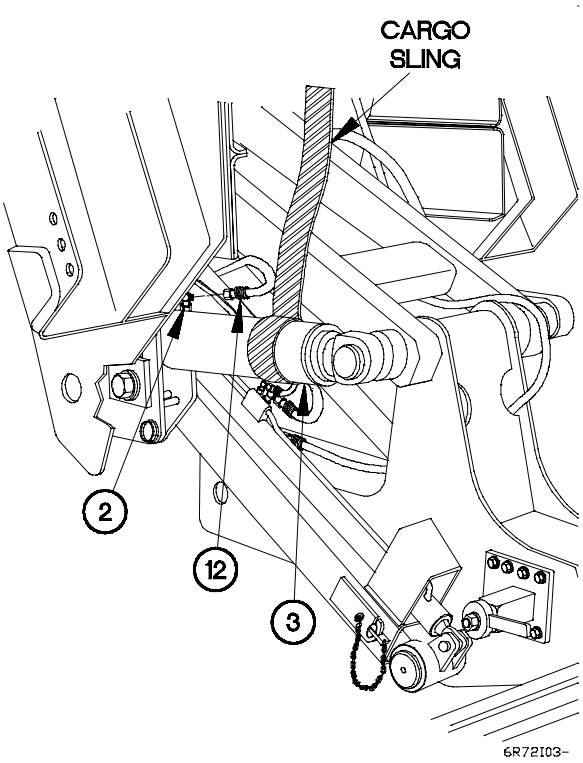
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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.

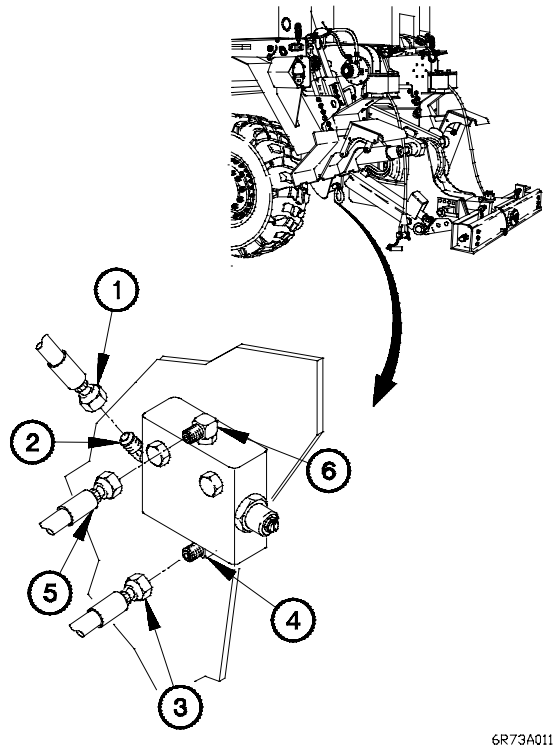
NOTE

- Tag hydraulic hoses and connection points prior to disconnecting.
- Left and right side counterbalance valves are removed the same way. Left side shown.

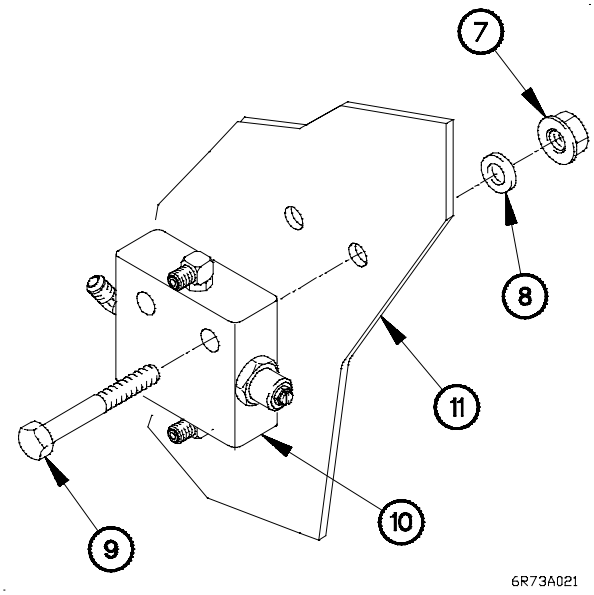
(1) Disconnect hose (1) from 90-degree fitting (2).

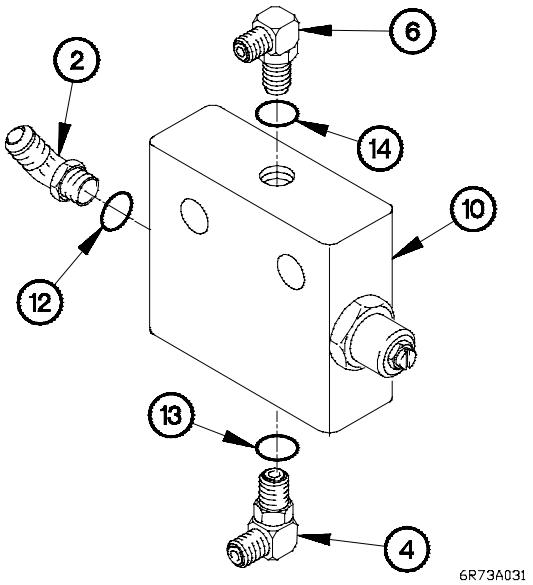
(2) Disconnect hose (3) from 90-degree fitting (4).

(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).

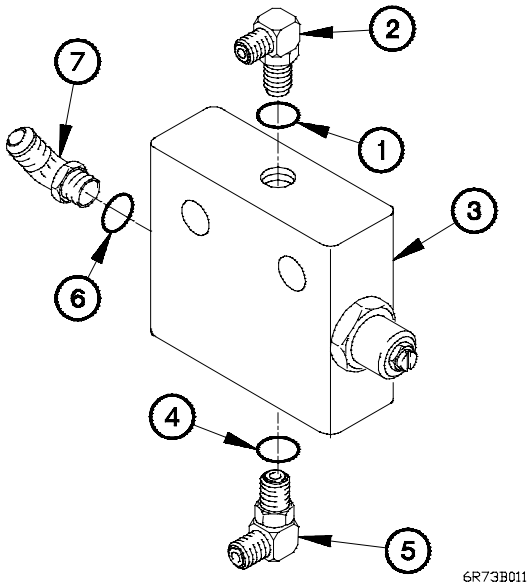
(2) Position 90-degree fitting (2) in counterbalance valve (3).

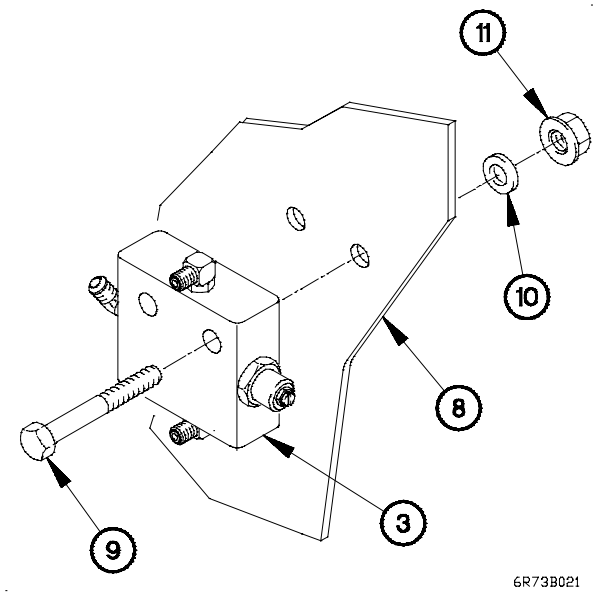
(3) Install preformed packing (4) on 90-degree fitting (5).

(4) Position 90-degree fitting (5) in counterbalance valve (3).

(5) Install preformed packing (6) on 90-degree fitting (7).

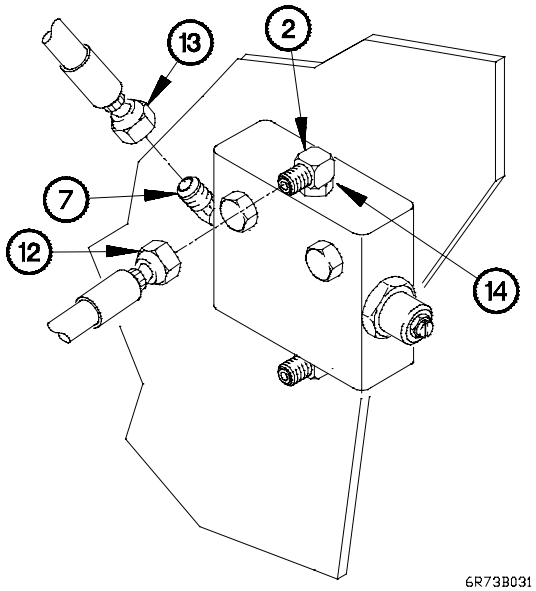
(6) Position 90-degree fitting (7) in counterbalance valve (3).





(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).

(9) Position hose (12) on 90-degree fitting (2).

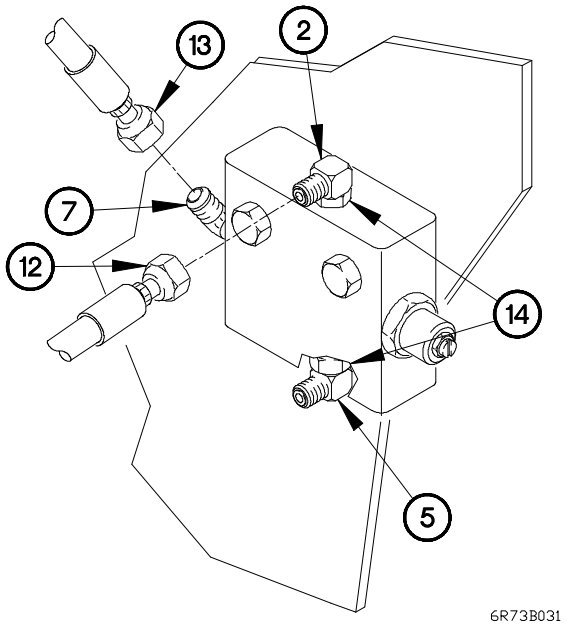
(10) Position hose (13) on 90-degree fitting (7).

(11) Tighten jamnut (14) on 90-degree fittings (2 and 7) to 40-43 lb-ft (54-58 N•m).

(11.1) Tighten jamnut (14) on 90-degree fitting (5) to 20-24 lb-ft (27-33 N•m).

(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).

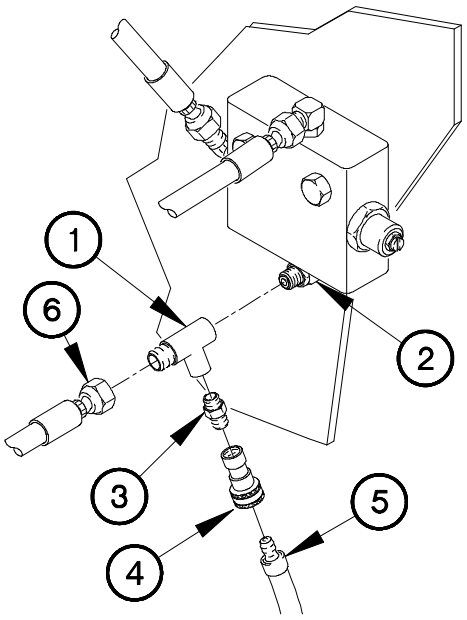
(4) Install cable (5) to transducer (4).

(5) Position hose (6) on tee fitting (1).

(6) Deleted.

(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).



6r73c011

(9) Raise underlift approximately two feet (TM 9-2320-366-10-2).

(10) Verify STE/ICE-R reads 1950 psi (13445 Kpa).

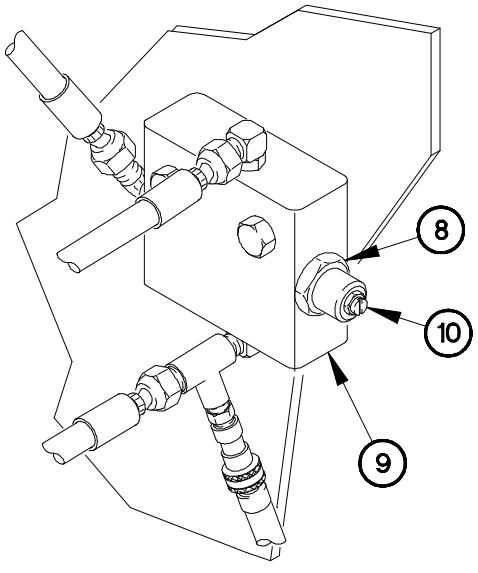
NOTE

Perform steps (11) through (14) if pressure reading was not 1950 psi (13445 Kpa).

(11) Loosen jam nut (8) on counterbalance valve (9).

CAUTION

Steps (12) and (13) must be preformed at the same time to get a correct reading. Failure to comply may result in damage to



6R73C021

(12) Operate underlift (TM 9-2320-366-10-2).

NOTE

Turn adjustment screw clockwise to increase pressure and counterclock-wise to decrease pressure.

(13) Adjust screw (10) until STE/ICE-R reads 1950 psi (1345 Kpa).

(14) 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).

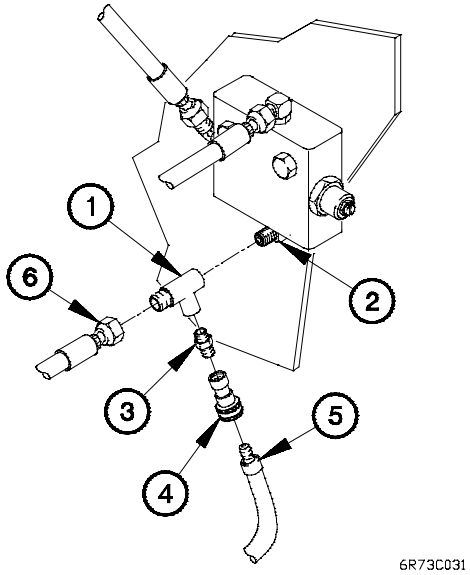
(17) Remove transducer (4) from snubber (3).

(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).

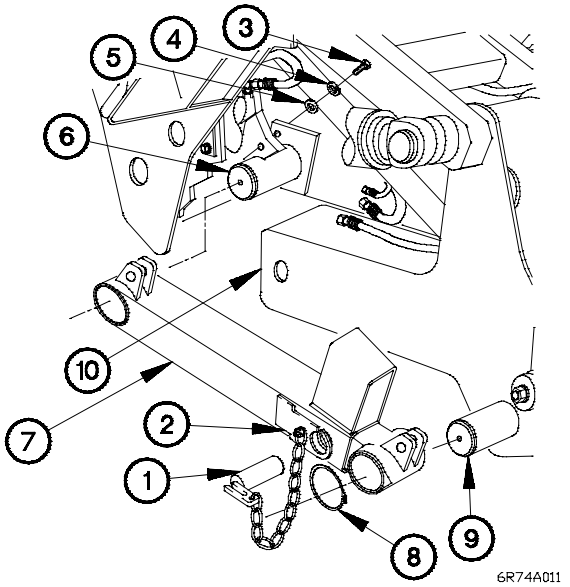
(2) Remove screw (3), lockwasher (4), washer (5), and pin (6) from left lower arm (7). Discard lockwasher.

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.

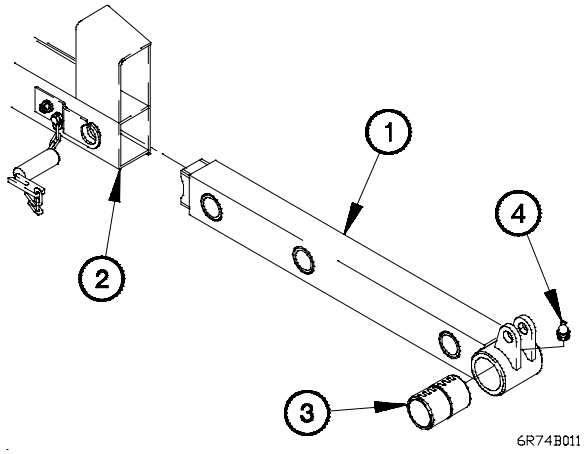
(3) Remove retaining ring (8) from lower arm retaining pin (9).

(4) Remove left lower arm (7) from underlift assembly (10).



16-74. M1089 LEFT LOWER ARM ASSEMBLY REPLACEMENT/REPAIR (CONT)

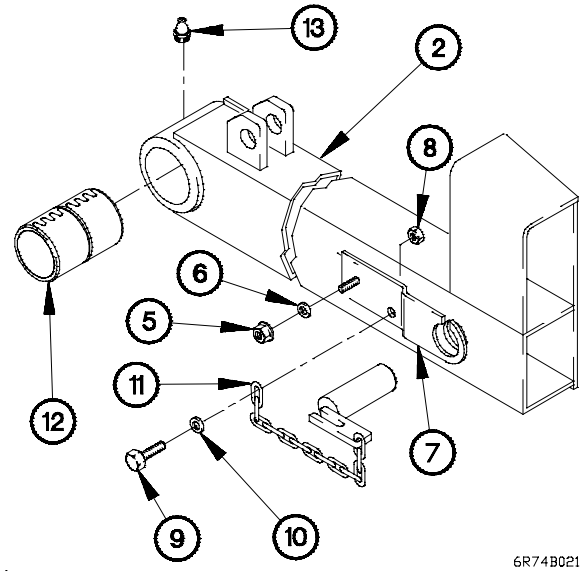
b. Disassembly.



(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).

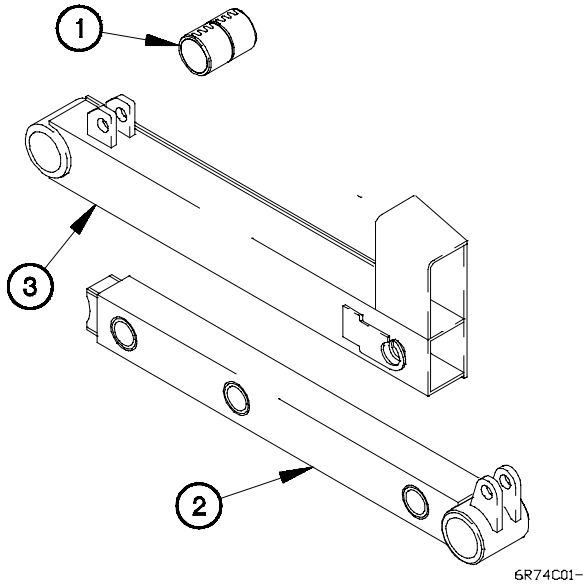
c. Cleaning/Inspection.

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.



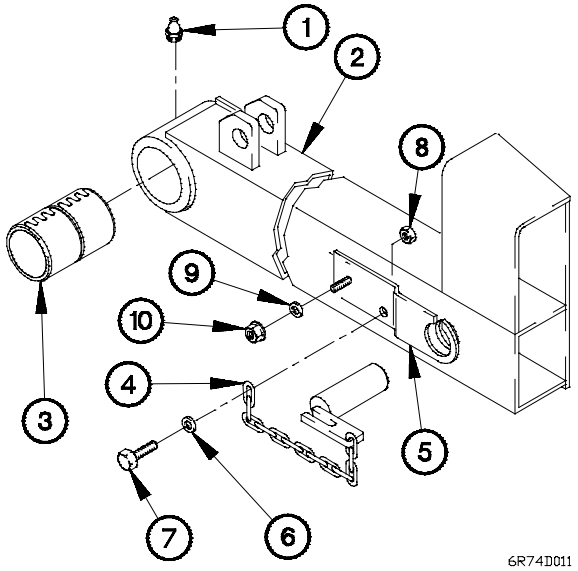
d. Assembly.

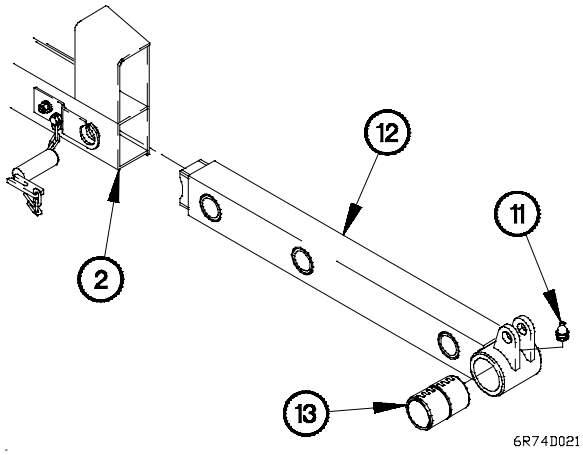
(1) Install grease fitting (1) in outer arm (2).

(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).





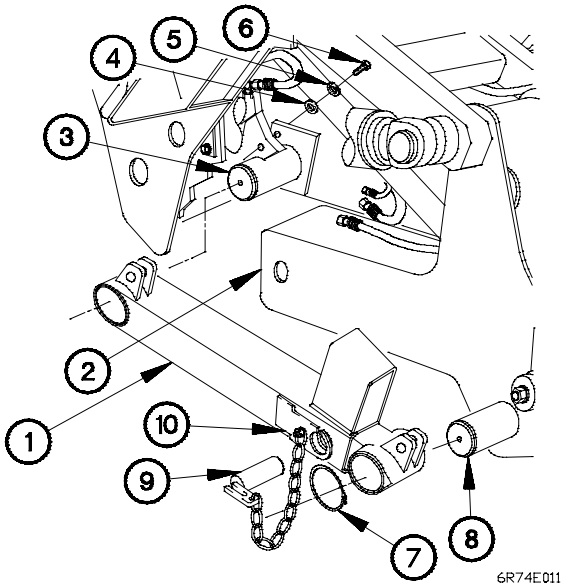
(5) Install grease fitting (11) in inner arm (12).

(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.

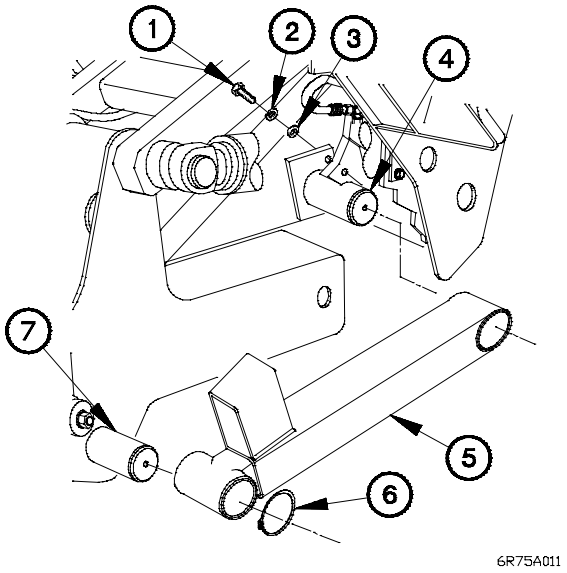
(2) Remove pin (4) from right lower arm (5).

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.

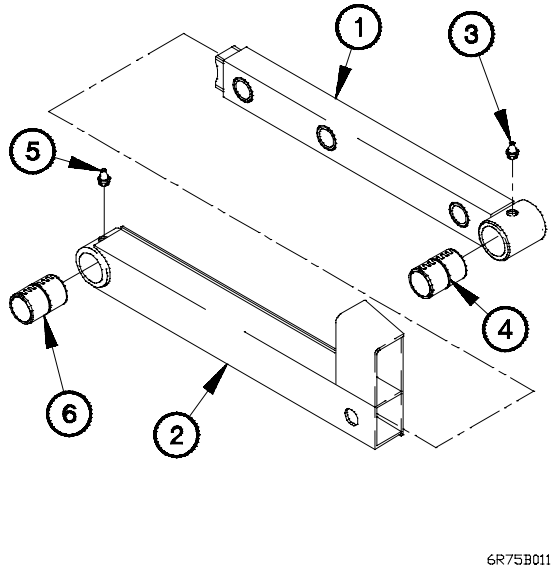
(1) Remove inner arm (1) from outer arm (2).

(2) Remove grease fitting (3) from inner arm (1).

(3) Remove bushing (4) from inner arm (1).

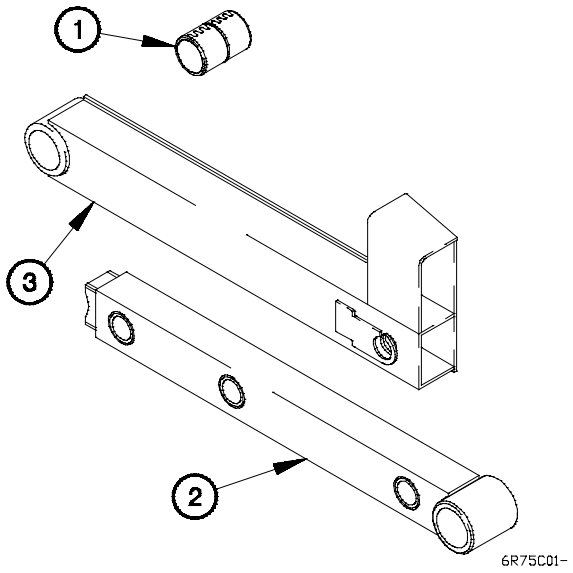
(4) Remove grease fitting (5) from outer arm (2).

(5) Remove bushing (6) from outer arm (2).



6R75B011

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.

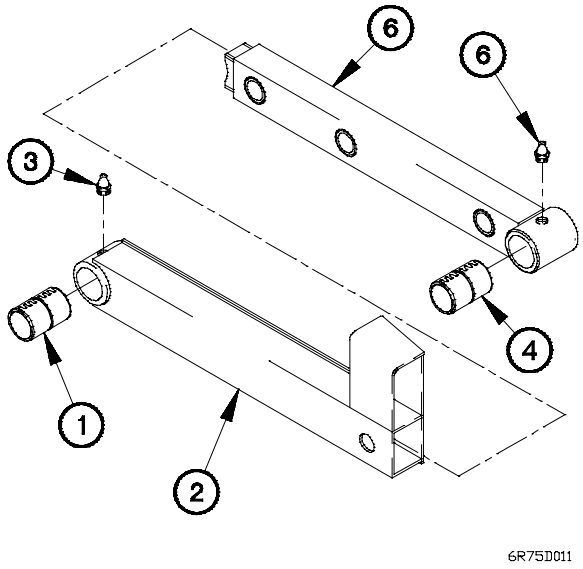
(1) Install bushing (1) in outer arm (2).

(2) Install grease fitting (3) in outer arm (2).

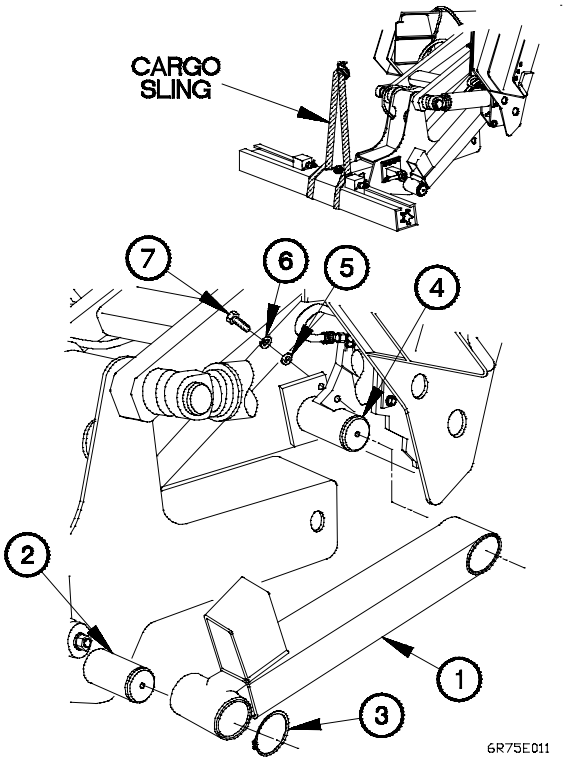
(3) Install bushing (4) in inner arm (5).

(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)

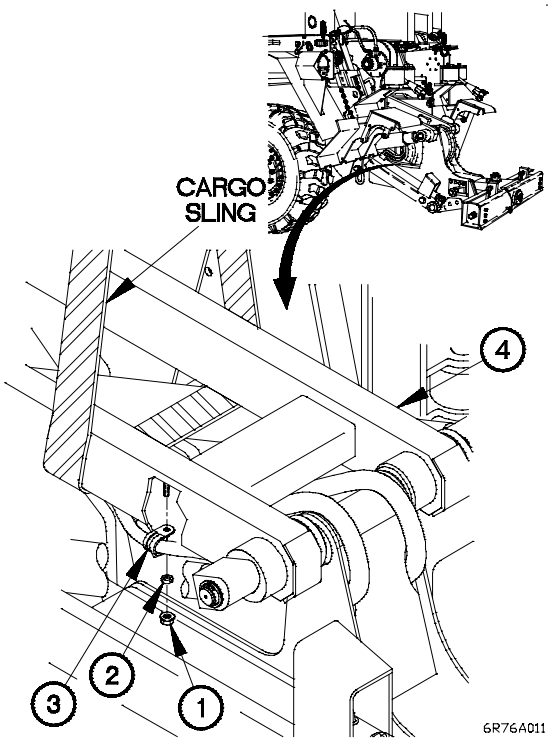
Personnel Required
(2)

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).



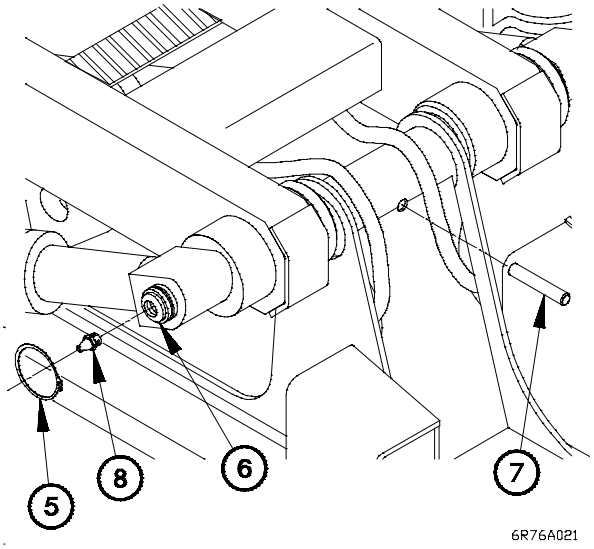
WARNING

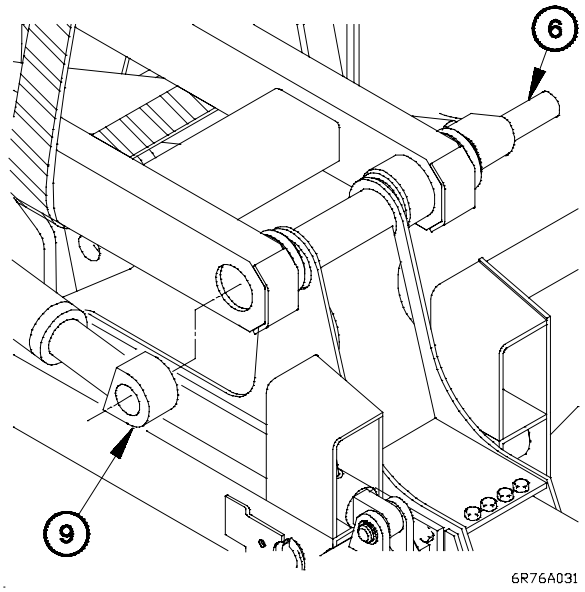
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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.

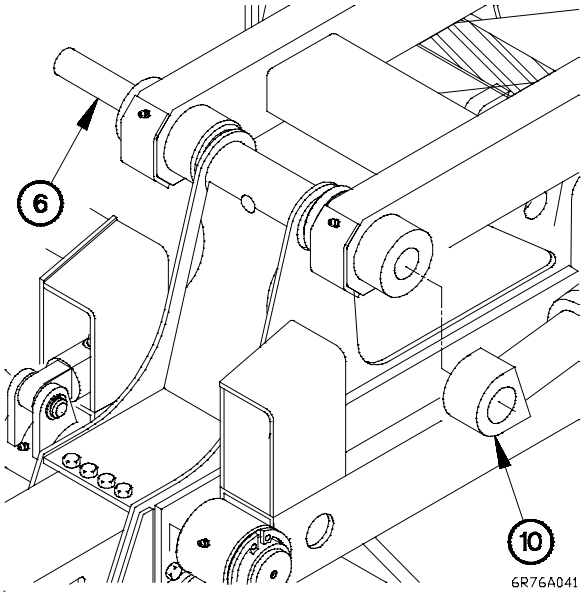
CAUTION

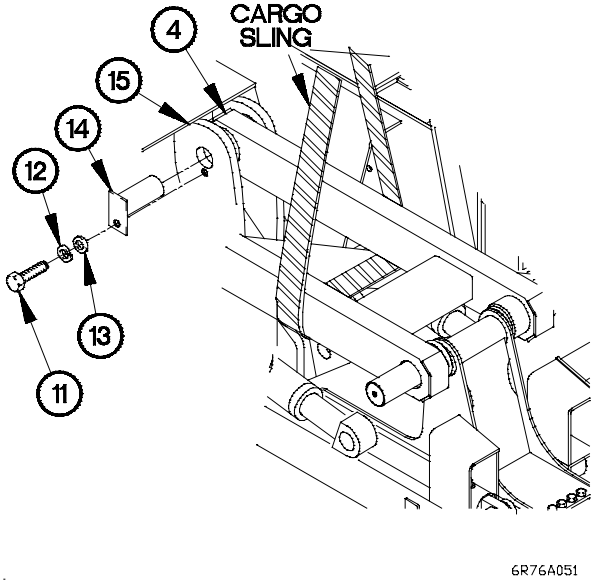
Use care not to damage threaded portion of retaining pin. Failure to comply may result in damage to equipment.

(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

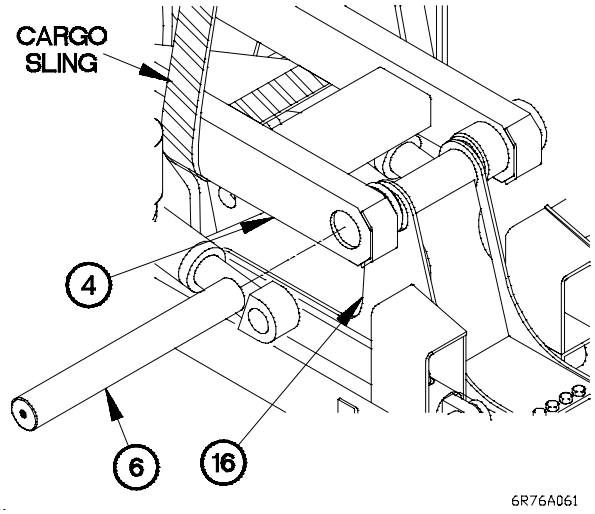
Prior to removing retaining pin and retaining pin covers, ensure upper arm assembly is properly balanced. Failure to comply may result in injury to personnel.

(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).

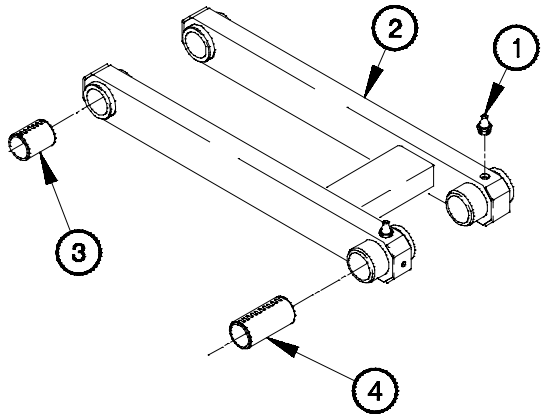


b. Disassembly.

(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).



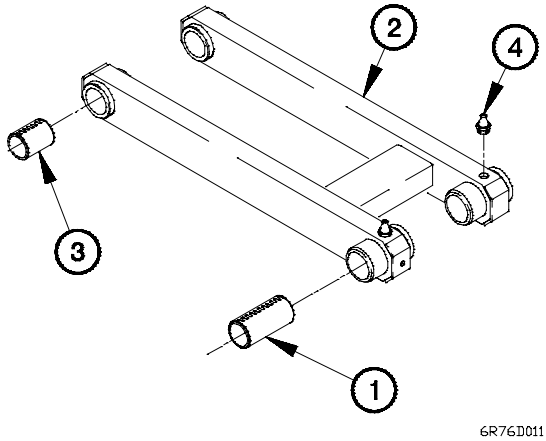
c. Cleaning/Inspection.

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

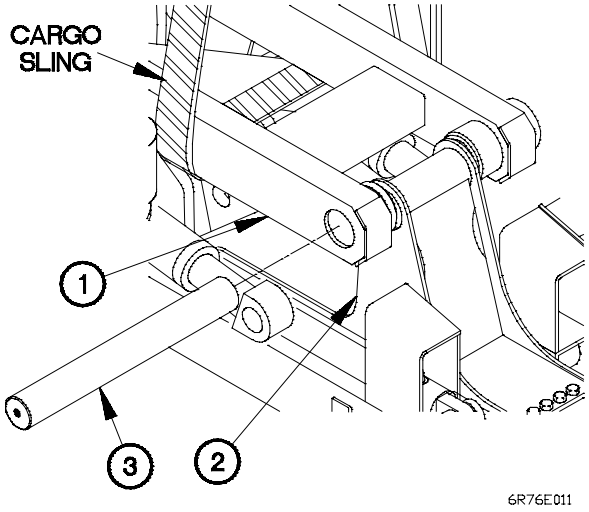
- **Upper arm weighs approximately 190 lbs (86 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.**
- **Prior to installing retaining pin and retaining pins covers, ensure upper arm is properly balanced. Failure to comply may result in injury to personnel.**

CAUTION

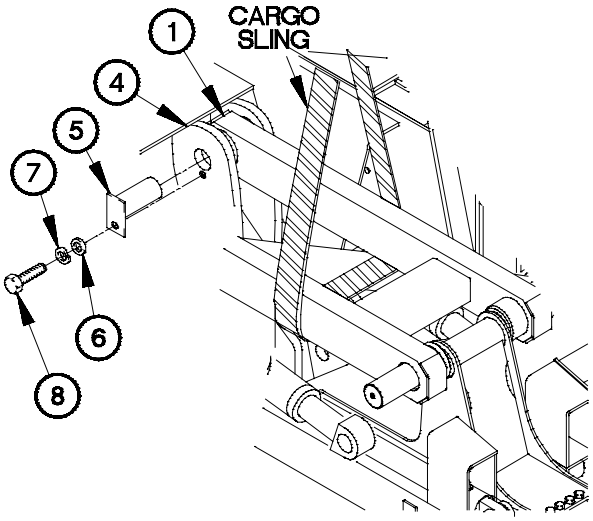
Use care not to damage threaded portion on ends of retaining pin. Failure to comply may result in damage to equipment.

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).

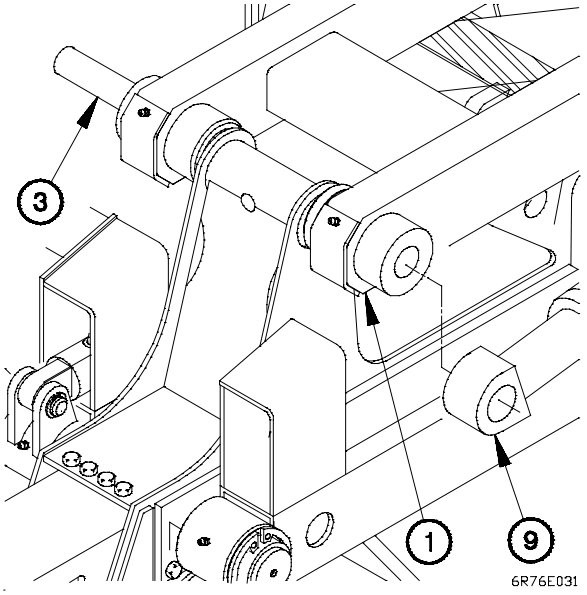
CAUTION

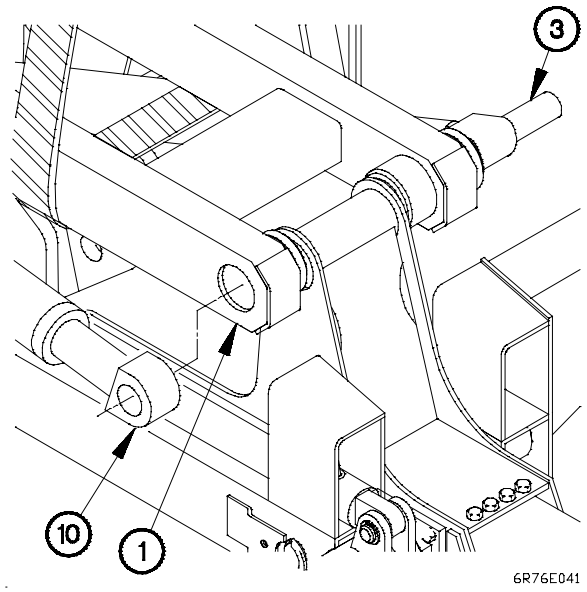
Use care not to damage threaded portion on ends of retaining pin. Failure to comply may result in damage to equipment.

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).

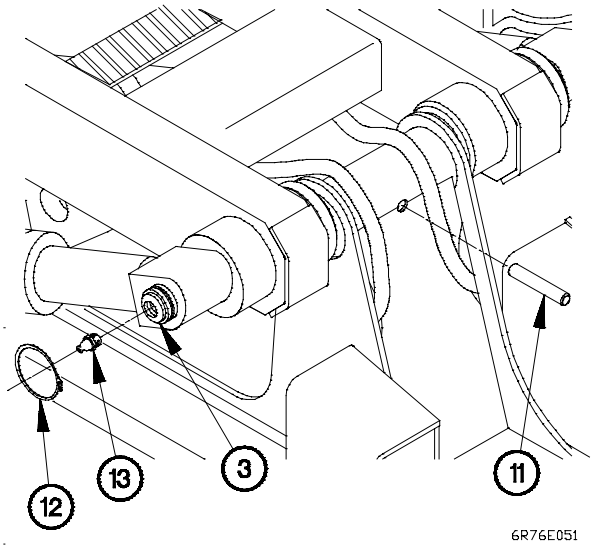
(6) Install slotted pin (11) in retaining pin (3).

WARNING

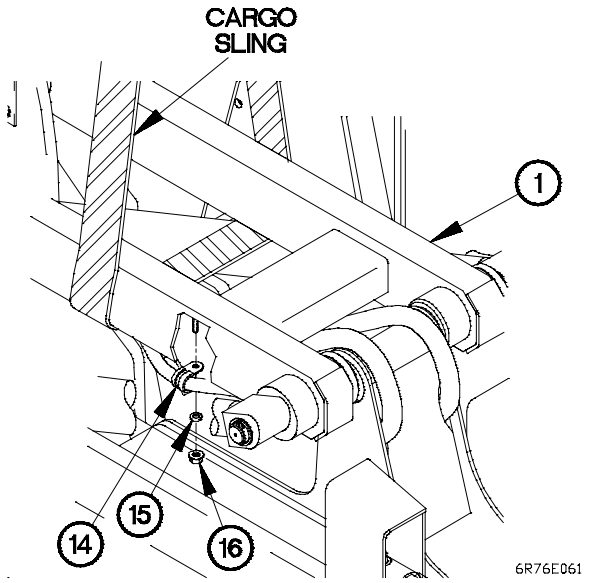
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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).

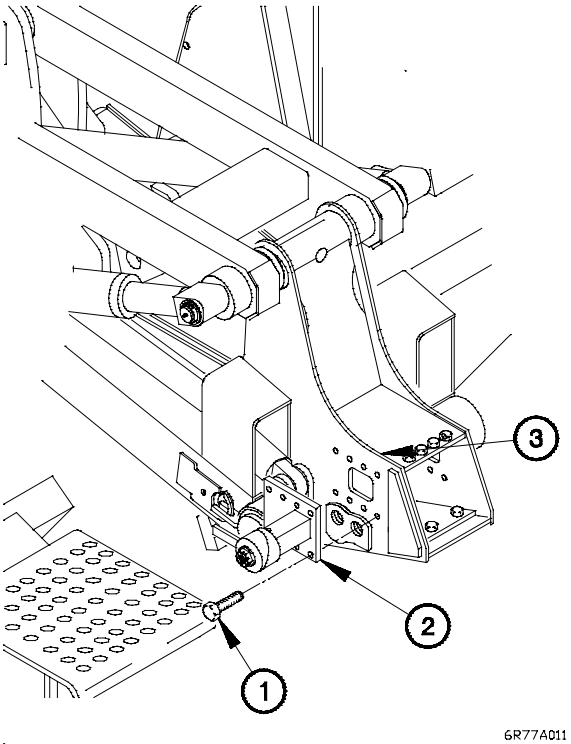
Tools and Special Tools
Tool Kit, Genl Mech (Item 78, Appendix B)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)
Sling, Cargo (2) (Item 56, Appendix B)
Goggles, Industrial (Item 28, Appendix B)
Gloves, Rubber (Item 26, Appendix B)
Pliers, Retaining 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)

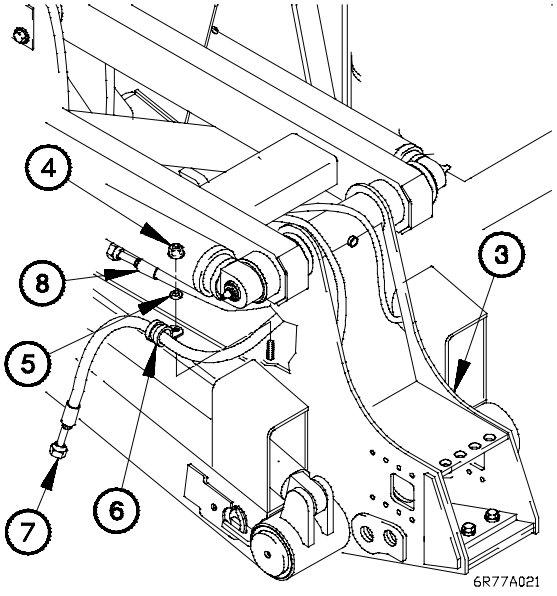
Personnel Required
(3)

a. Disassembly.

(1) Remove eight screws (1) and camlock (2) from folding boom frame (3).

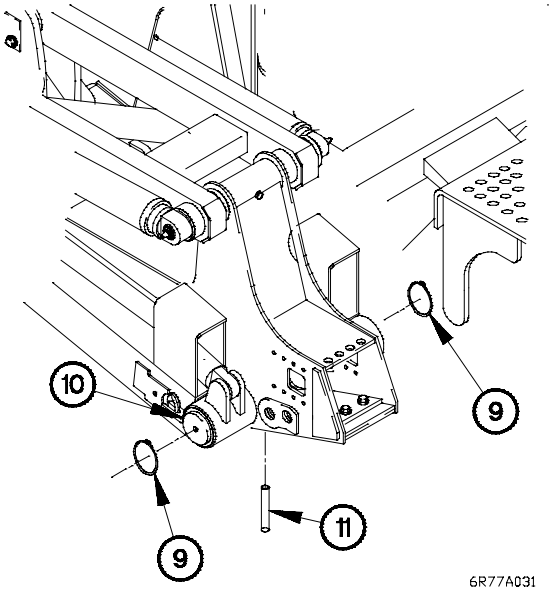


16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR (CONT)



(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.



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).

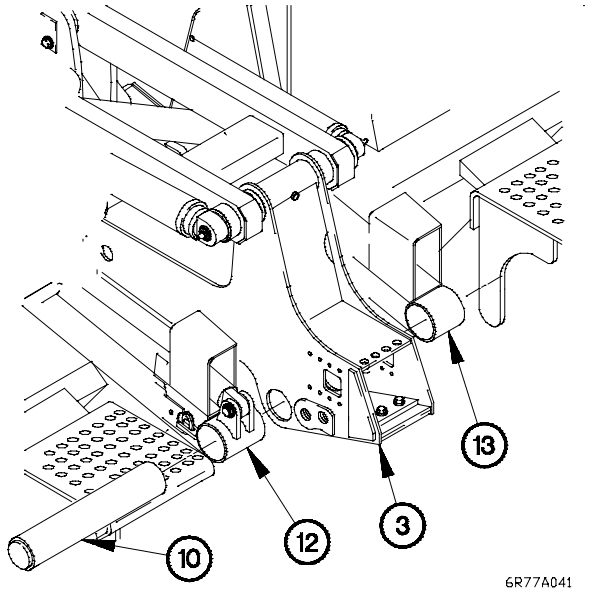
(7) Remove retaining pin (10) from folding boom frame (3).

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.

(4) Remove two retaining rings (9) from retaining pin (10).

(5) Remove slotted pin (11) from retaining pin (10).



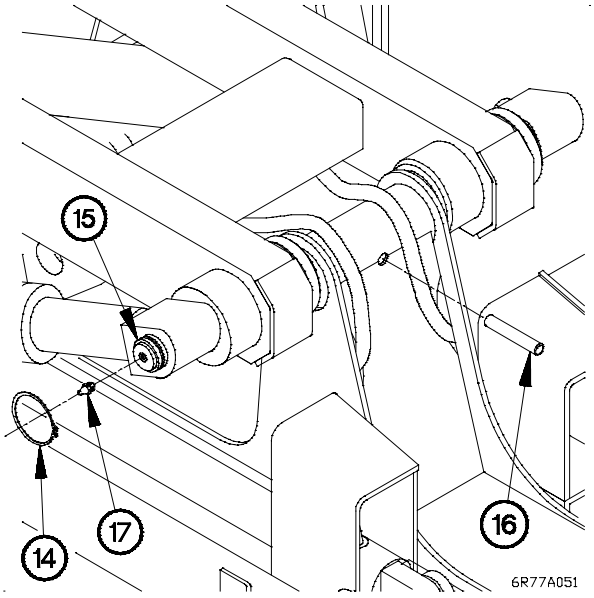
WARNING

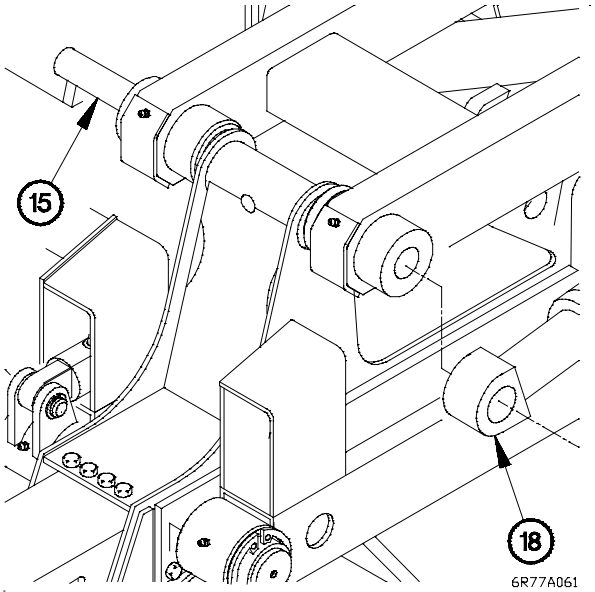
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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.

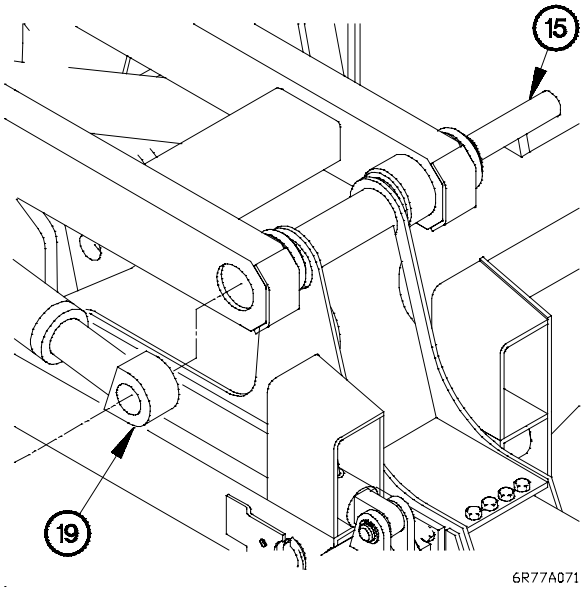
NOTE

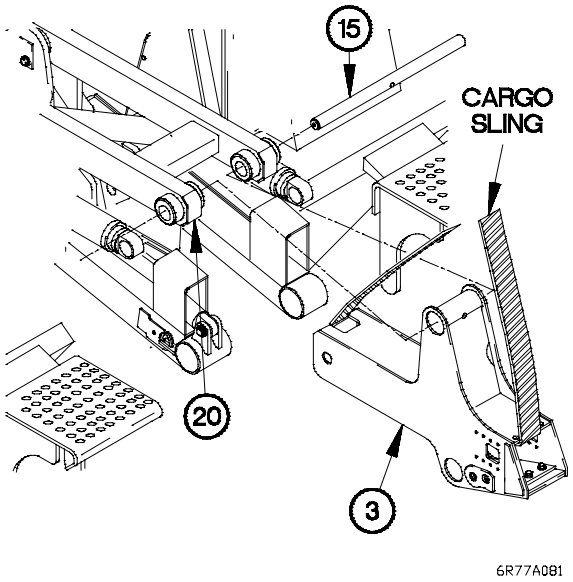
Steps (11) through (13) require the aid of an assistant.

(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).



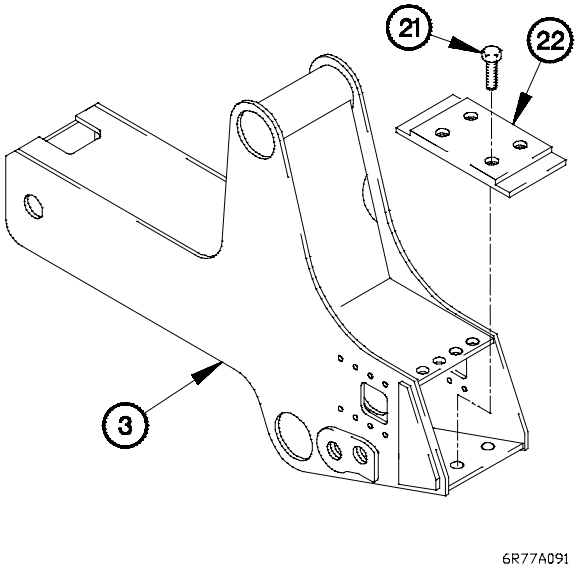


WARNING

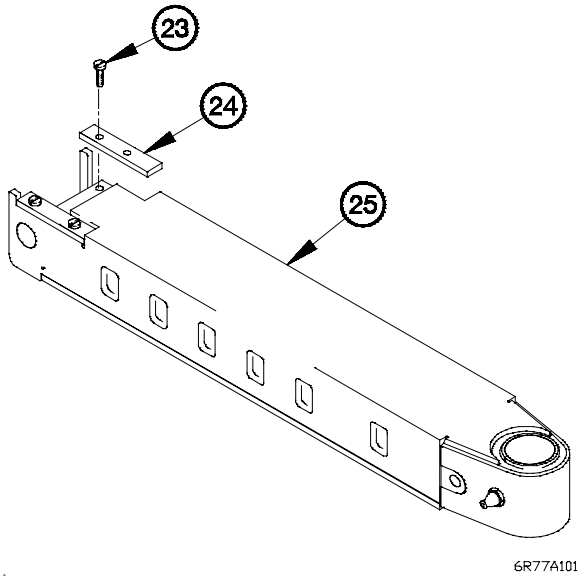
Boom frame weighs approximately 320 lbs (145 kgs). Attach a suitable lifting device prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

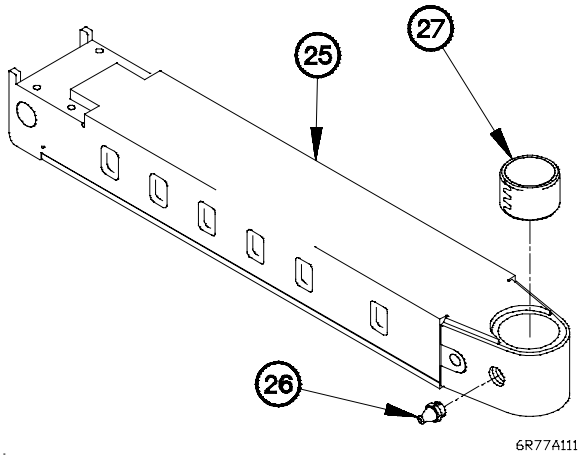
(13) Remove retaining pin (15) and folding boom frame (3) from upper arm (20).

(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

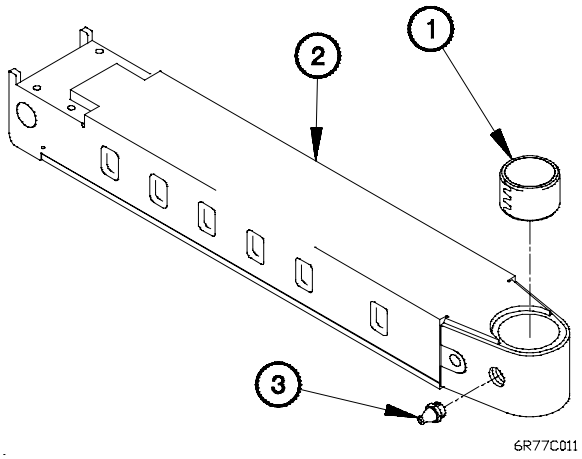
Replace any part that fails visual inspection.

(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).

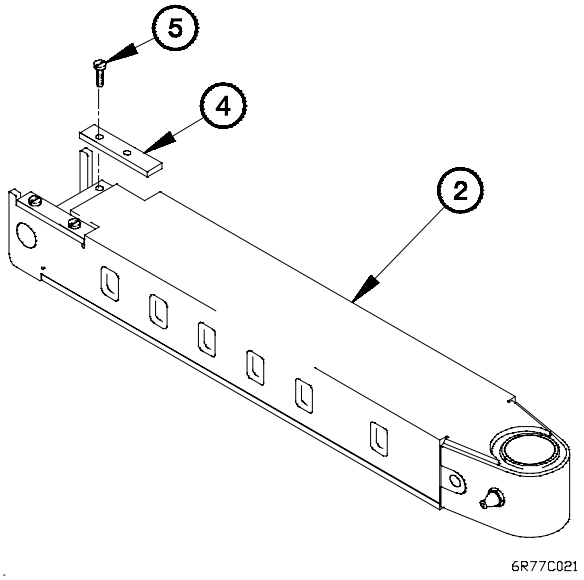
WARNING

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.

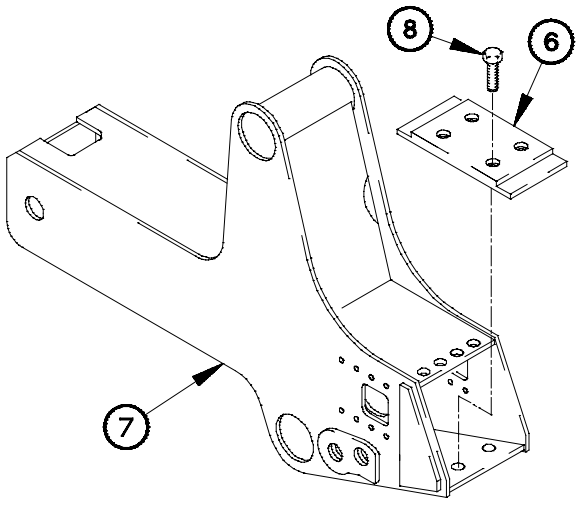
(4) Apply sealing compound to threads of four screws (5).

(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).



6R77C021



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)

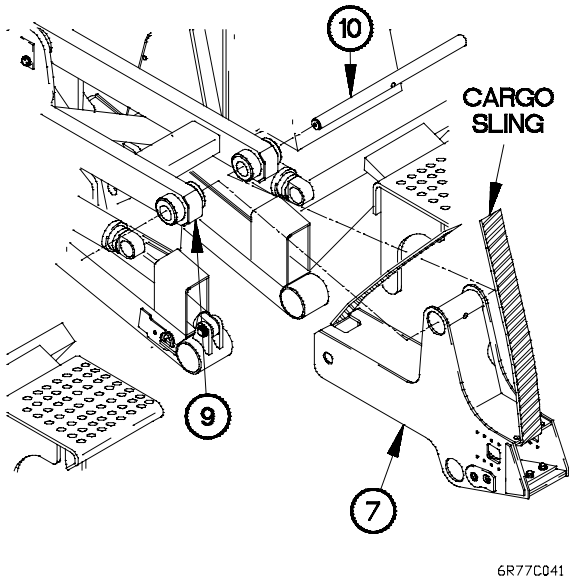
WARNING

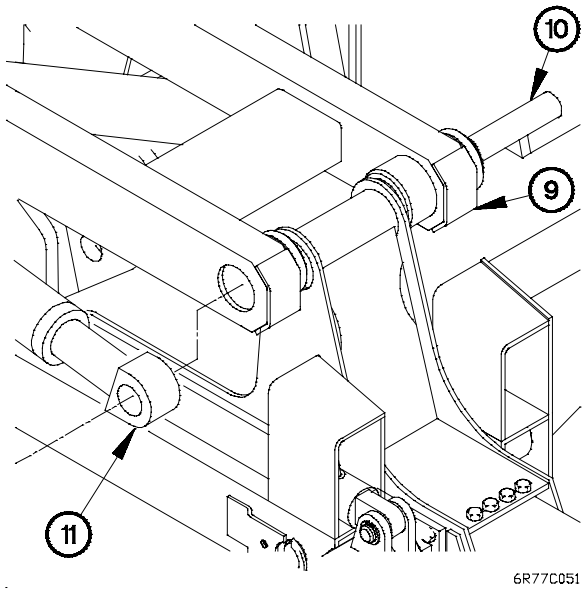
Boom frame weighs approximately 320 lbs (145 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

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).



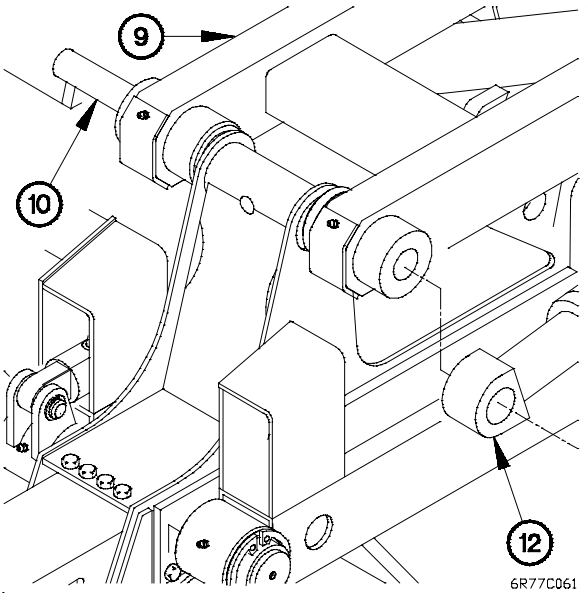


(14) Install right lift cylinder (12) on upper arm (9) with retaining pin (10).

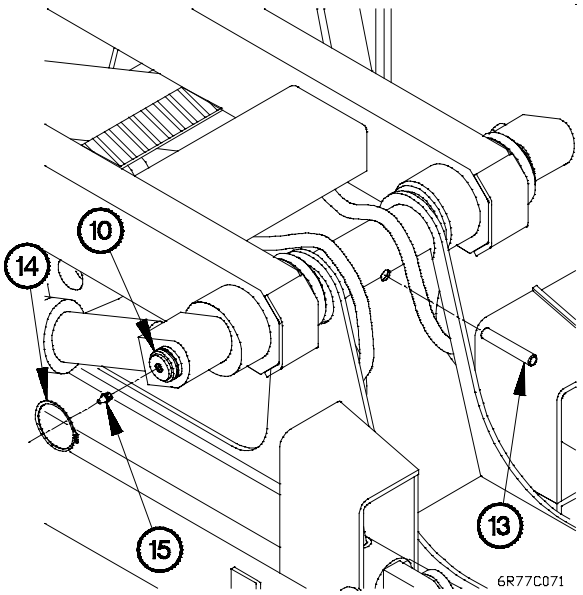
CAUTION

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).



(15) Install slotted pin (13) in retaining pin (10).

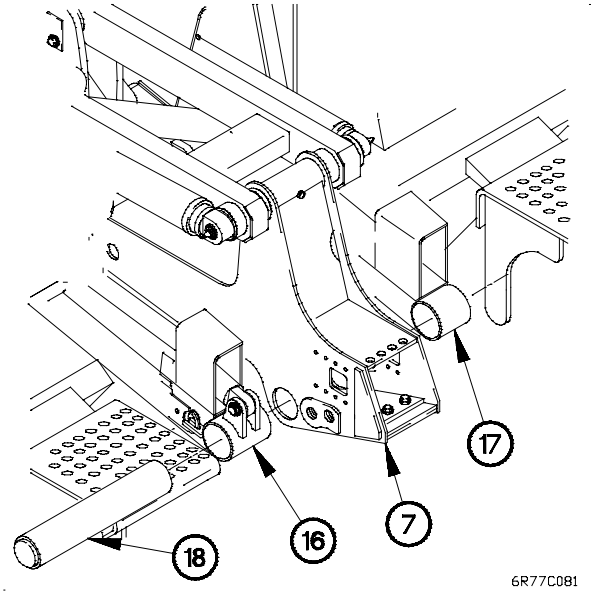


WARNING

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).

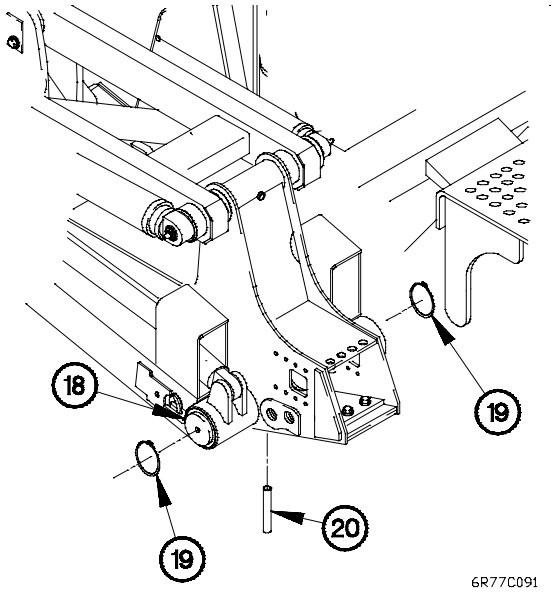
(17) Install two grease fittings (15) on retaining pin (10).



NOTE

Steps (18) requires the aid of an assistant.

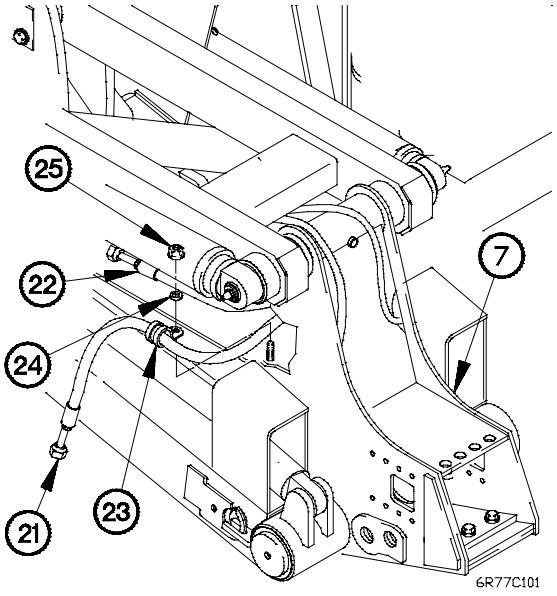
(18) Install left lower arm (16) and right lower arm (17) on folding boom frame (7) with retaining pin (18).



(19) Install two retaining rings (19) on retaining pin (18).

(20) Install slotted pin (20) in retaining pin (18).

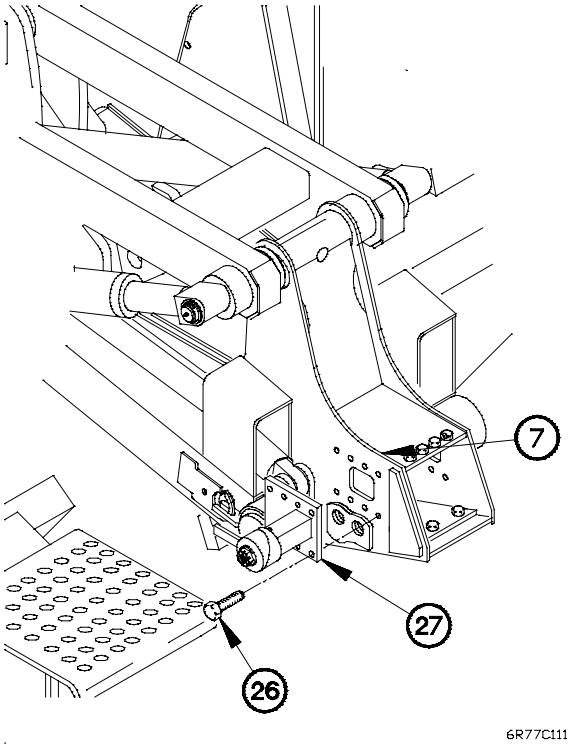
16-77. M1089 FOLDING BOOM FRAME ASSEMBLY REPAIR (CONT)



(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)

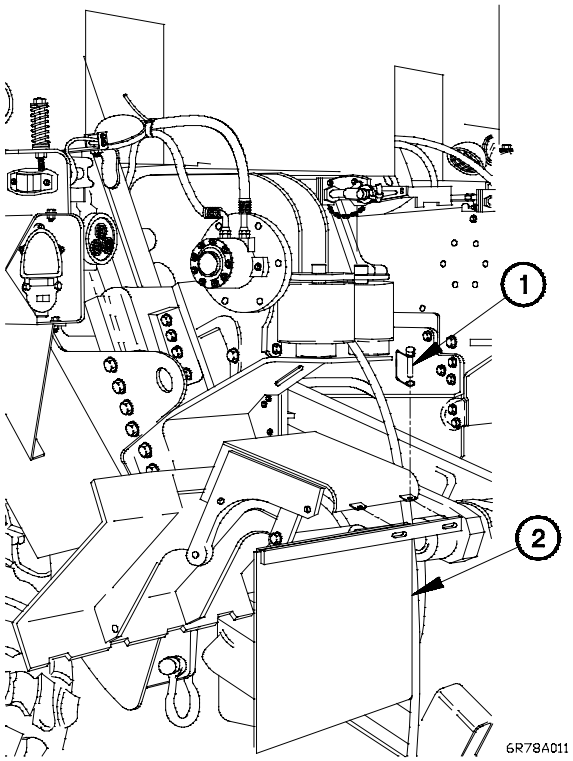
Personnel Required
(3)

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.

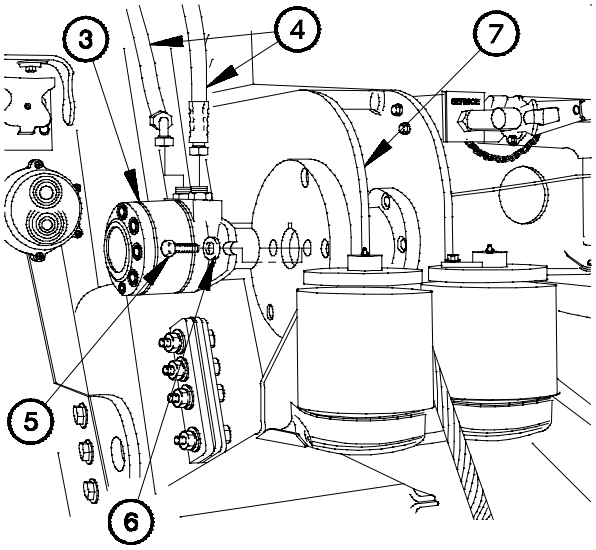
NOTE

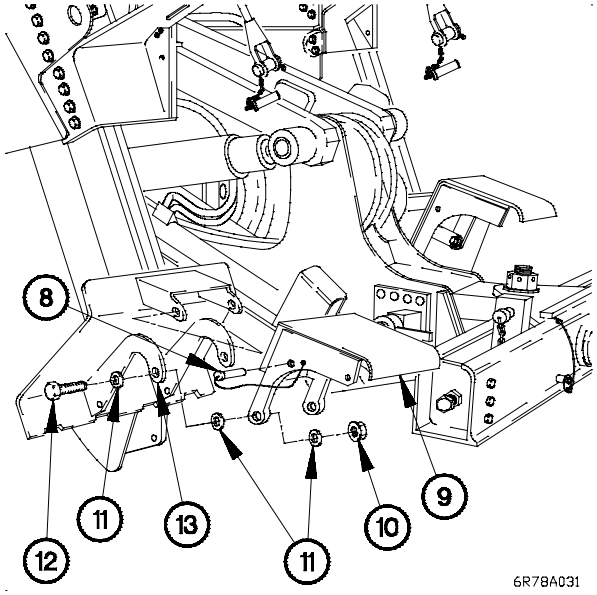
Left and right side pay-out hydraulic motors are removed the same way. Left side shown.

(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).





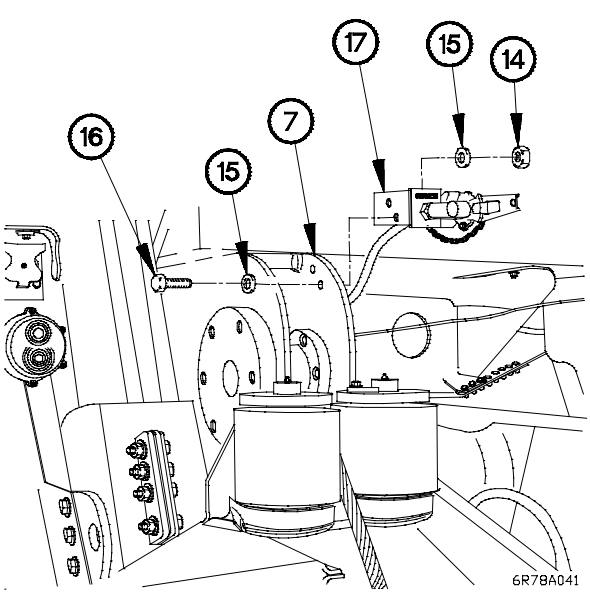
(7) Remove two self-locking nuts (14), four washers (15), two screws (16), and gladhand bracket (17) from spooler weldment (7). Discard self-locking nuts.

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).

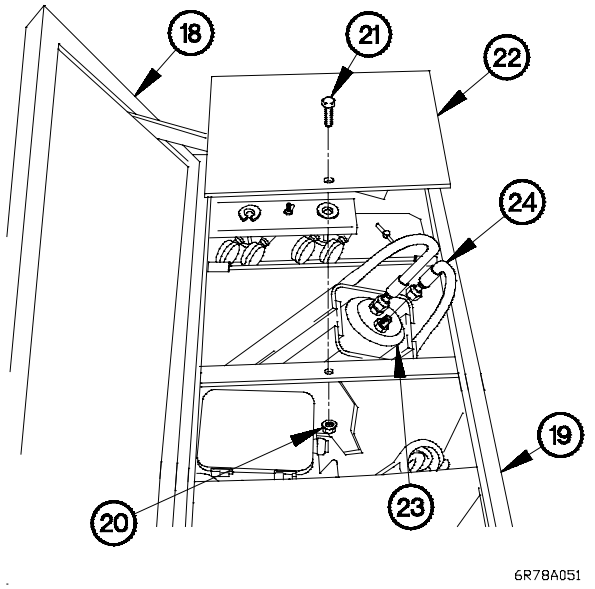
NOTE

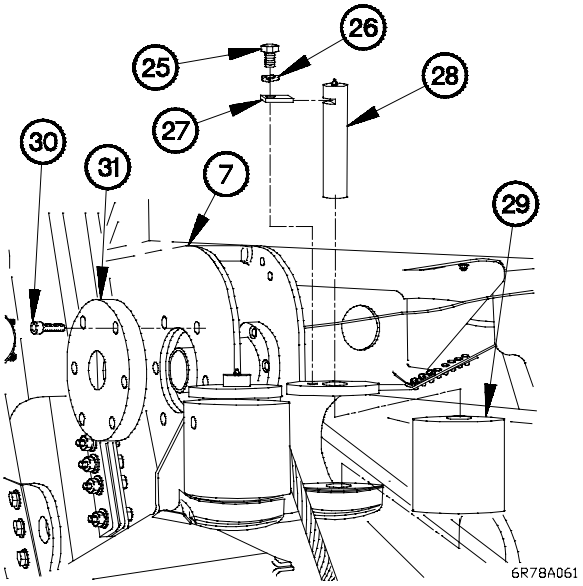
Step (9) requires the aid of an assistant.

(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).

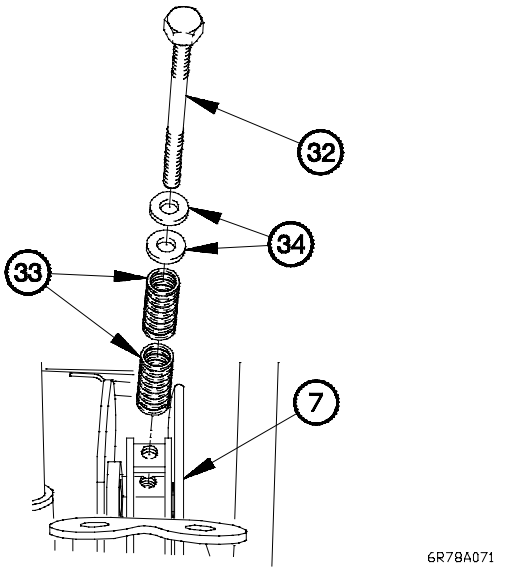




(12) Remove two bolts (25), lockwashers (26), retaining plates (27), roller pins (28), and guide rollers (29) from spooler weldment (7). Discard lockwashers.

(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

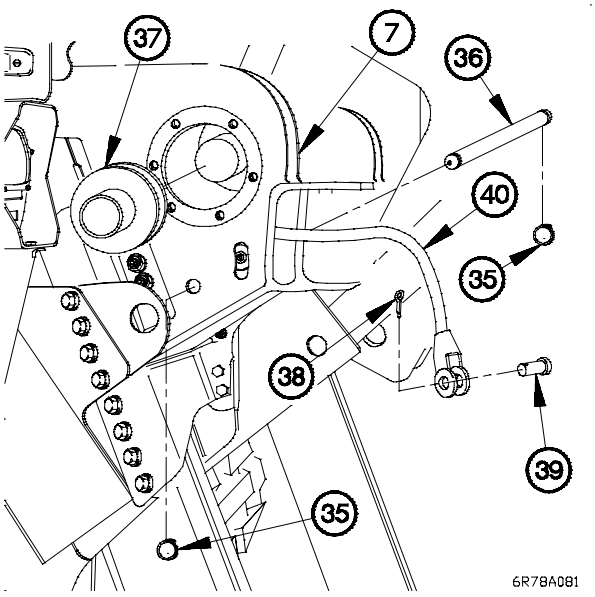
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

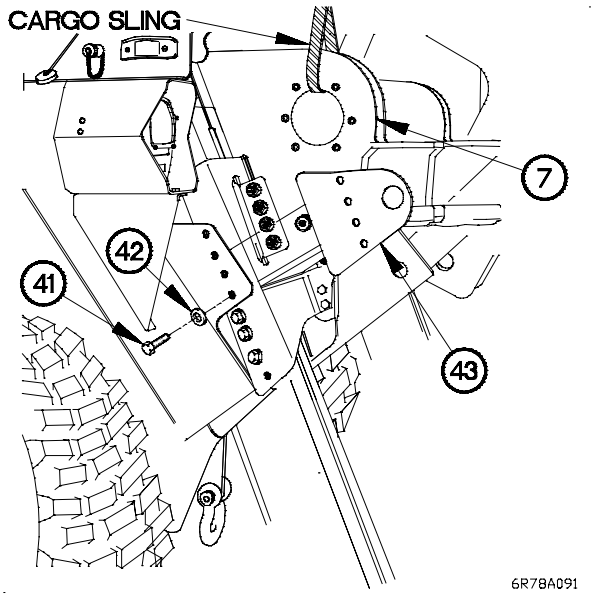
(15) Remove two retaining rings (35) and pin (36) from spooler weldment (7).

(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).

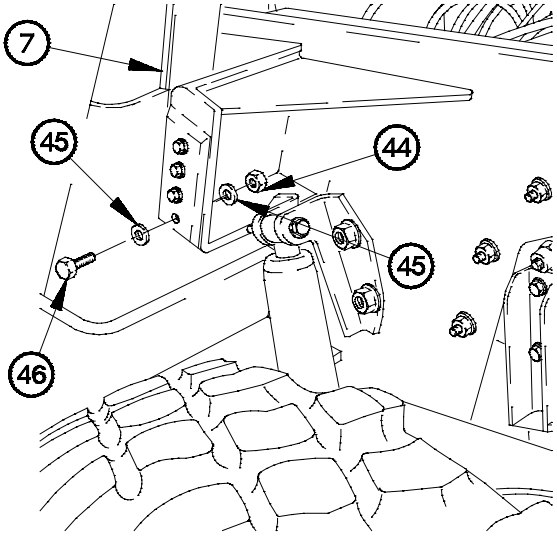




WARNING

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).

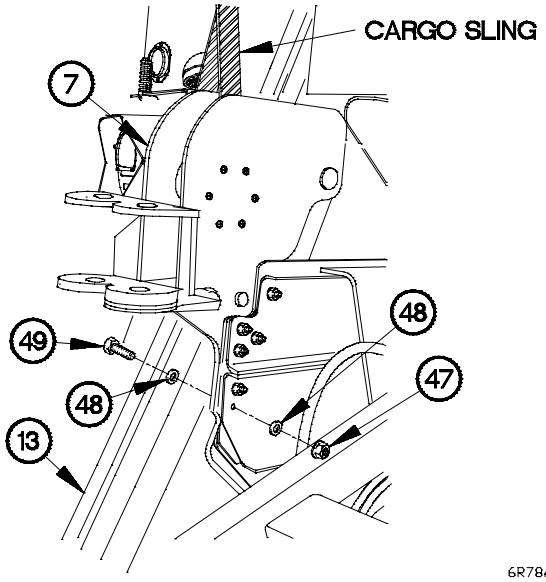


6R78A101

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

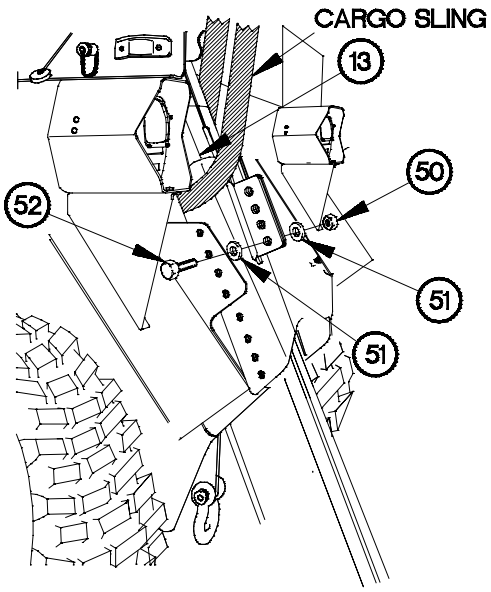
(21) Remove six self-locking nuts (47), 12 washers (48), six screws (49), and spooler weldment (7) from stiffleg (13). Discard self-locking nuts.

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

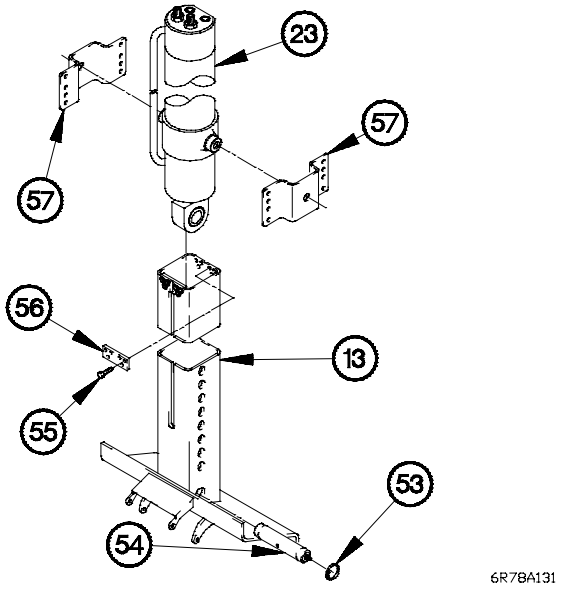
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(24) Remove two retaining rings (53) and retaining pin (54) from stiffleg cylinder (23).

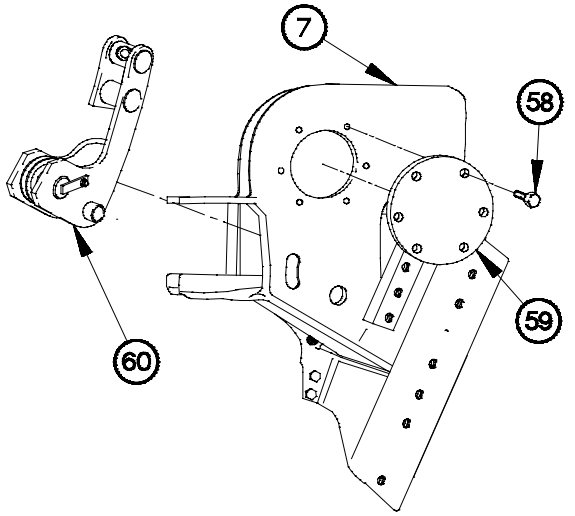
(25) Remove 12 screws (55) and two plates (56) from top of stiffleg (13).

(26) Remove stiffleg cylinder (23) from stiffleg (13).

(27) Remove two stiffleg cylinder brackets (57) from stiffleg cylinder (23).



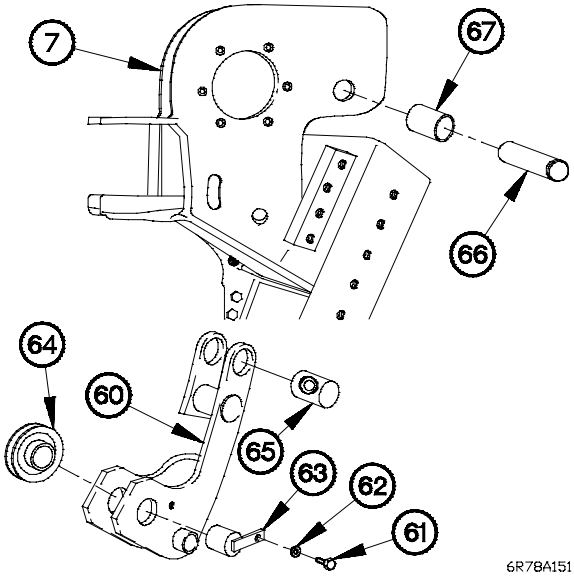
6R78A131



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

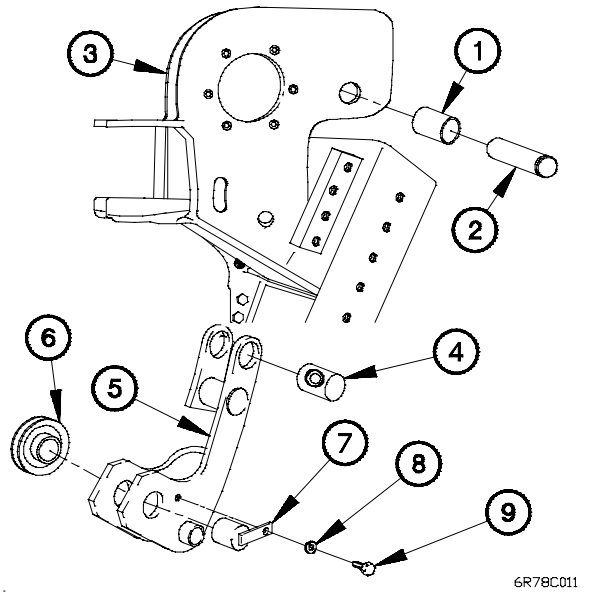
Left and right side stiffleg assemblies are assembled the same way. Left side shown.

(1) Install sleeve (1) and pin (2) in spooler weldment (3).

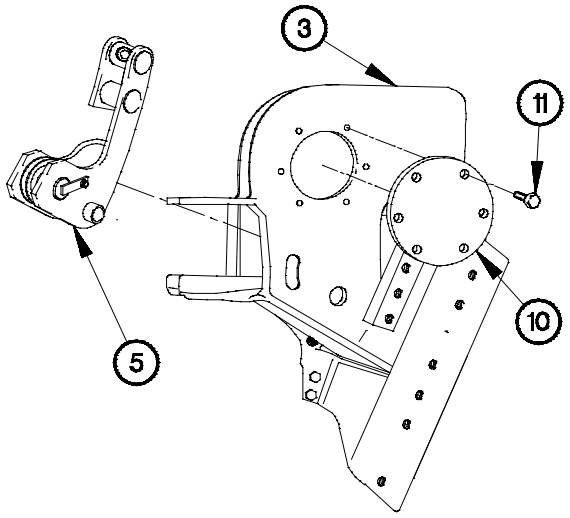
(2) Install pivot pin (4) in pivot arm (5).

(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).

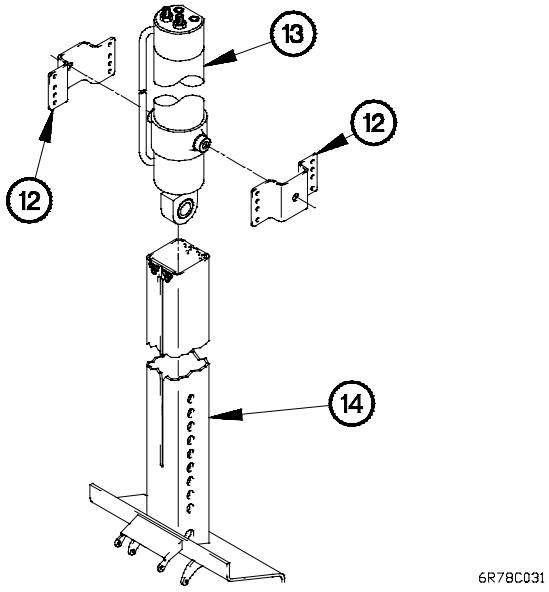
16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

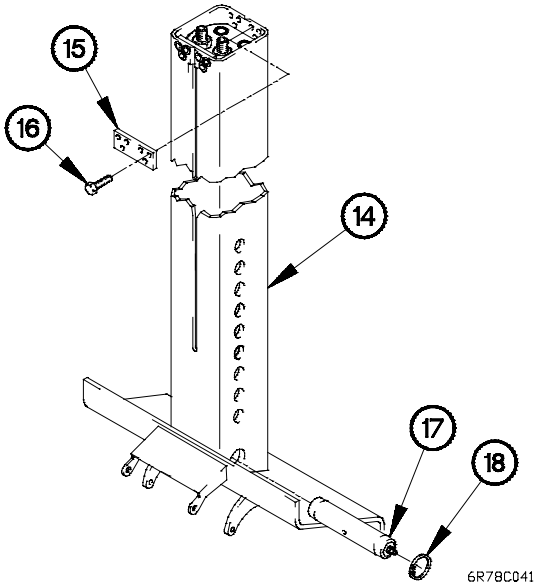
NOTE

- 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.

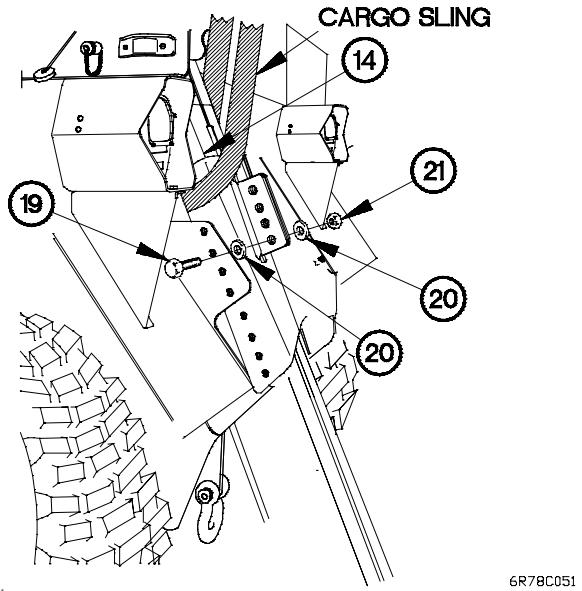
(13) Install two retaining rings (18) on cylinder retaining pin (17).

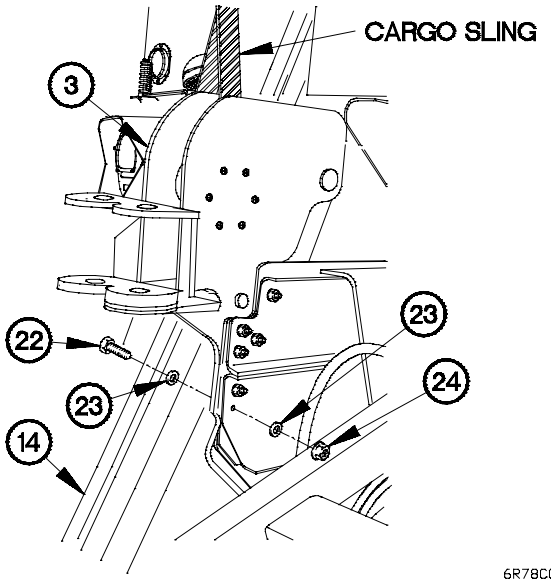
WARNING

- **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).

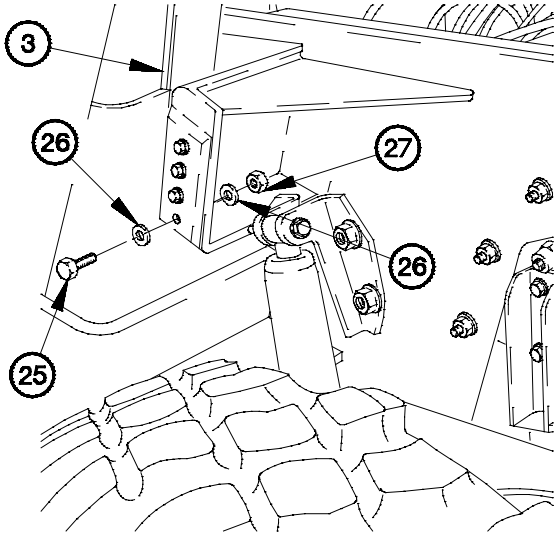
16-78. M1089 STIFFLEG ASSEMBLY REPAIR (CONT)

WARNING

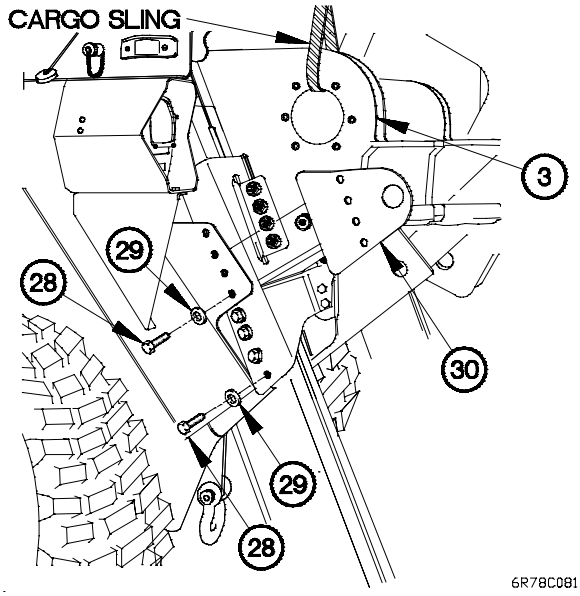
Adhesive sealant MIL-S-46163 can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. If sealant contacts eyes, flush eyes with water and get immediate medical attention. Failure to comply may result in injury to personnel.

(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

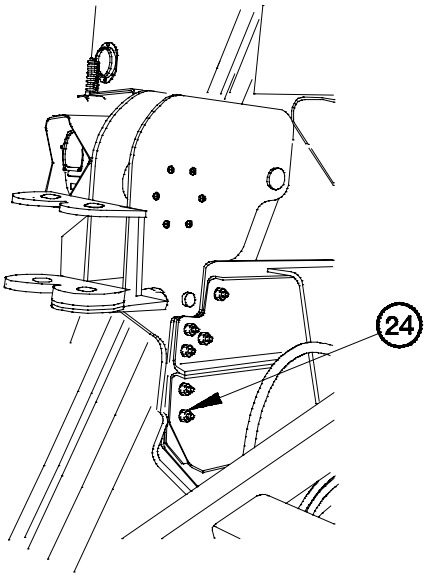
(20) Apply sealing compound to threads of eight bolts (28).

(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).

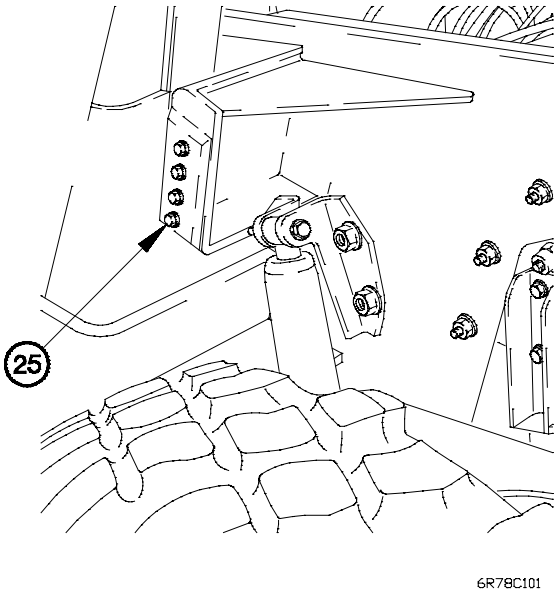
(23) Tighten four bolts (28) to 152-168 lb-ft (206-228 N·m).

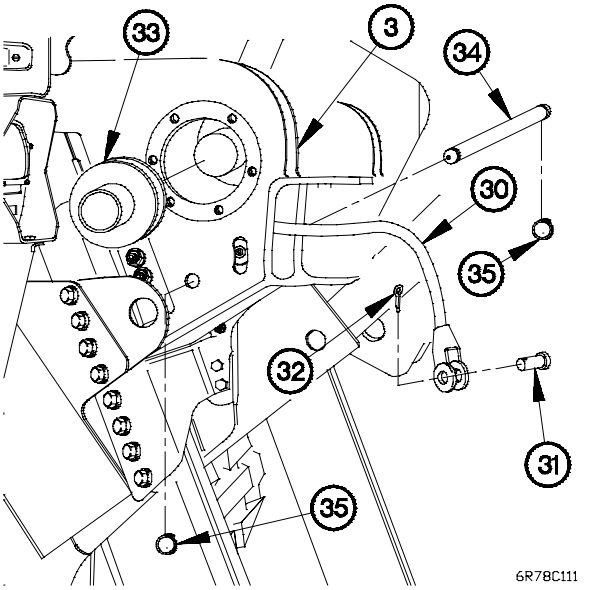
(24) Tighten six self-locking nuts (24) to 152-168 lb-ft (206-228 N·m).



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).

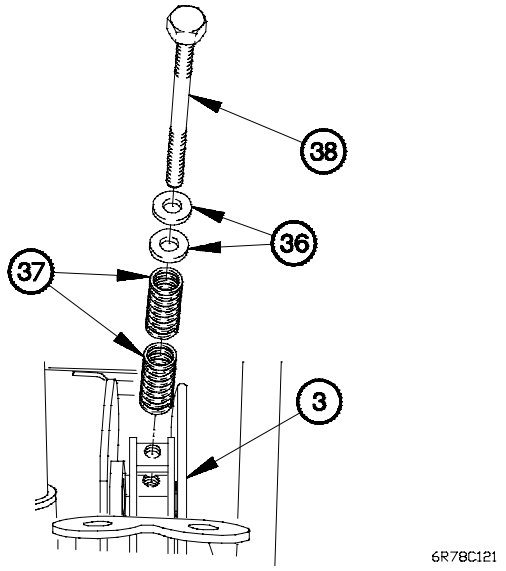
WARNING

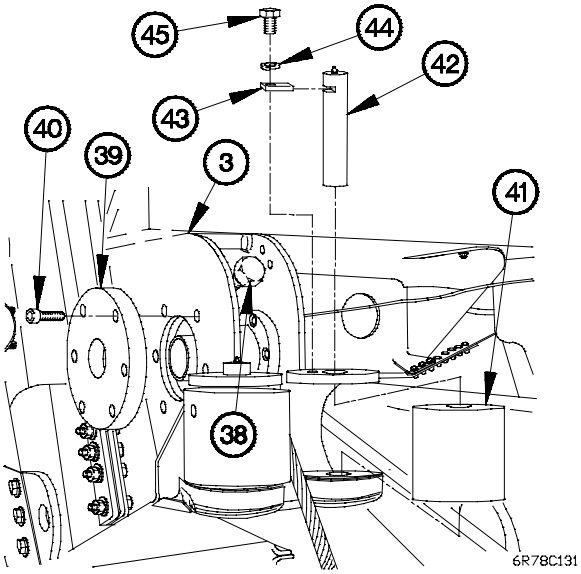
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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).

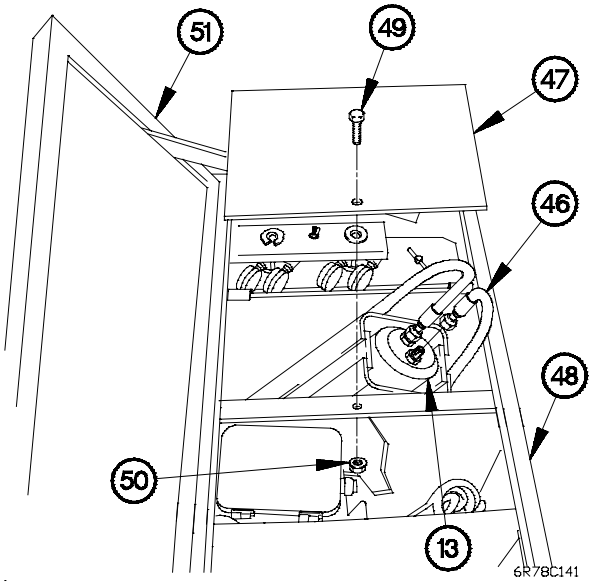
(35) Tighten two bolts (45) to 76-84 lb-ft (103-114 N·m).

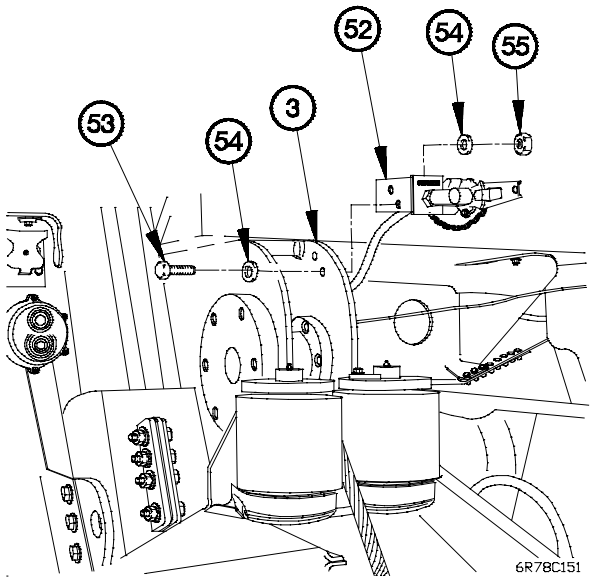
(36) Position two hoses (46) on stiffleg cylinder (13).

(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).

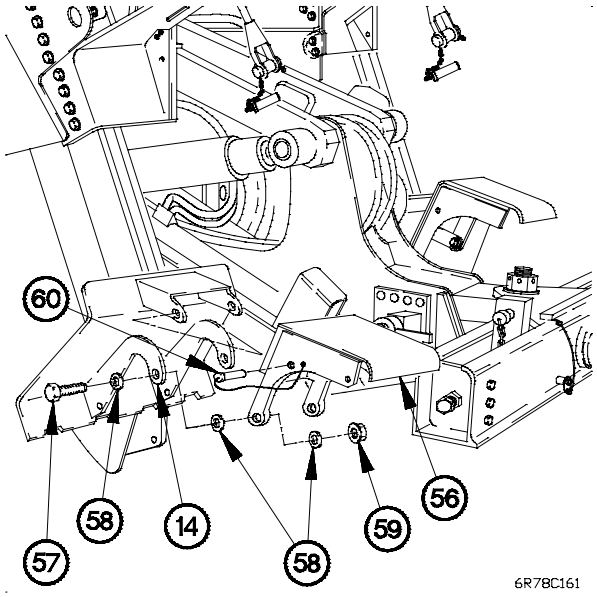
(39) Close lid (51) on tool box (48).





(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).

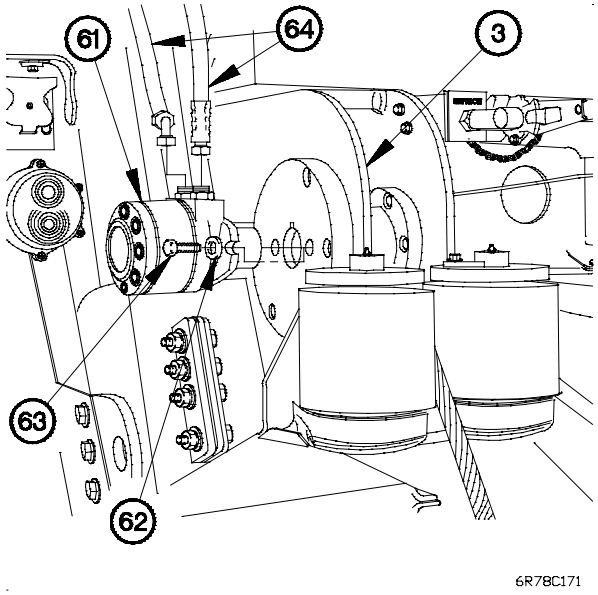


(42) Install sandshoe (56) on stiffleg (14) with two screws (57), six washers (58), and two self-locking nuts (59).

(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.



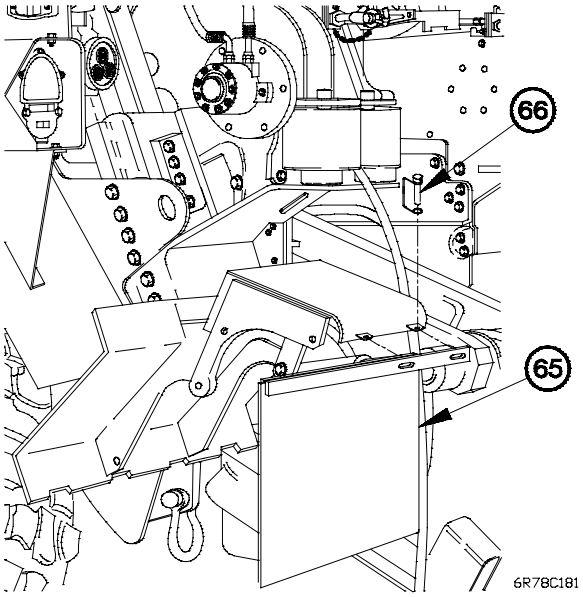
(44) Position pay-out hydraulic motor (61) on spooler weldment (3) with two washers (62) and bolts (63).

(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)
Packing, Preformed (2) (Item 237, Appendix F)

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).

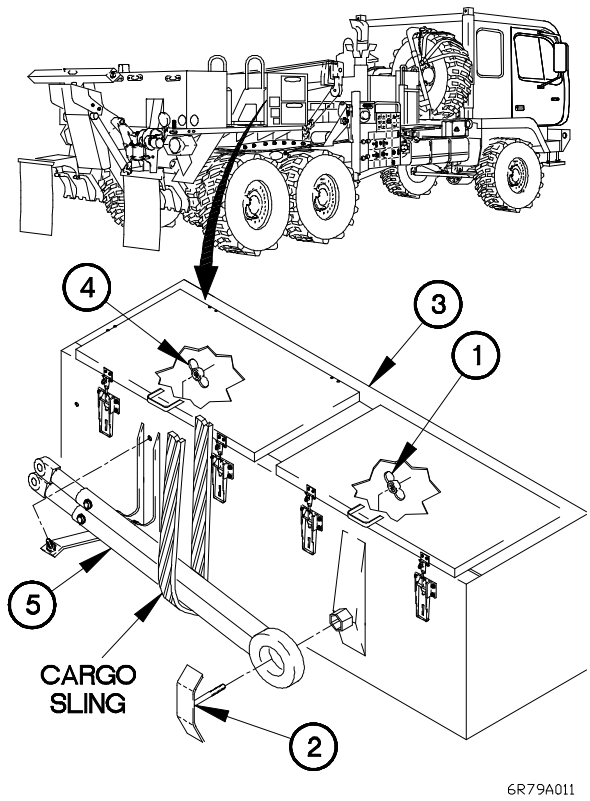
WARNING

Towbar 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

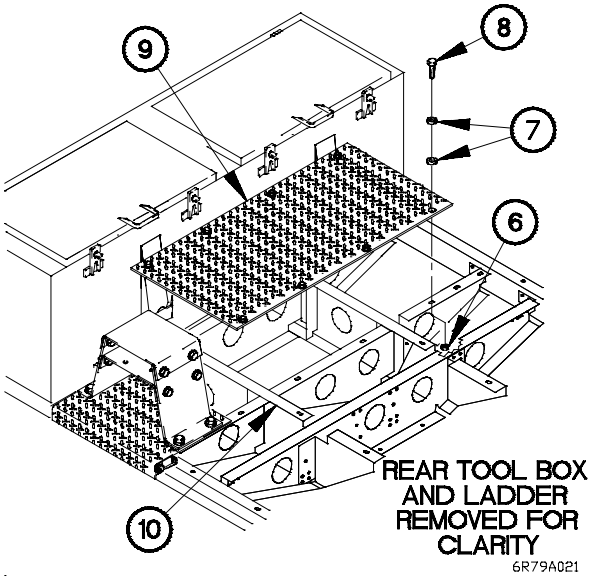
Steps (2) requires the aid of two assistants.

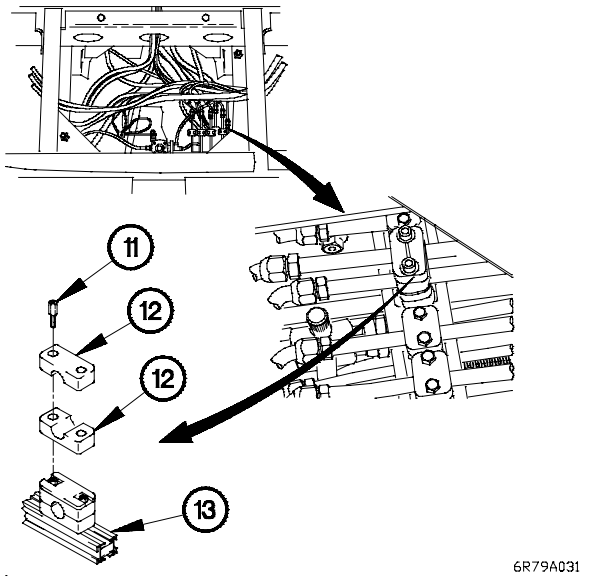
(2) Remove nut (4) and towbar (5) from tool box (3).



16-79. M1089 FLOWMETER VALVE ASSEMBLY REPLACEMENT/ADJUSTMENT (CONT)

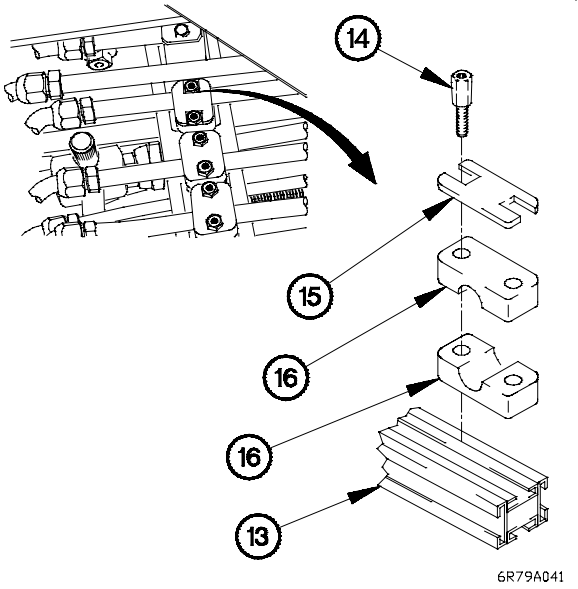
(3) Remove eight self-locking nuts (6), 16 washers (7), eight bolts (8), and floor plate (9) from support platform (10). Discard self-locking nuts.





(4) Remove two studs (11) and caps (12) from support (13).

(5) Remove two studs (14), retainer (15), and caps (16) from support (13).

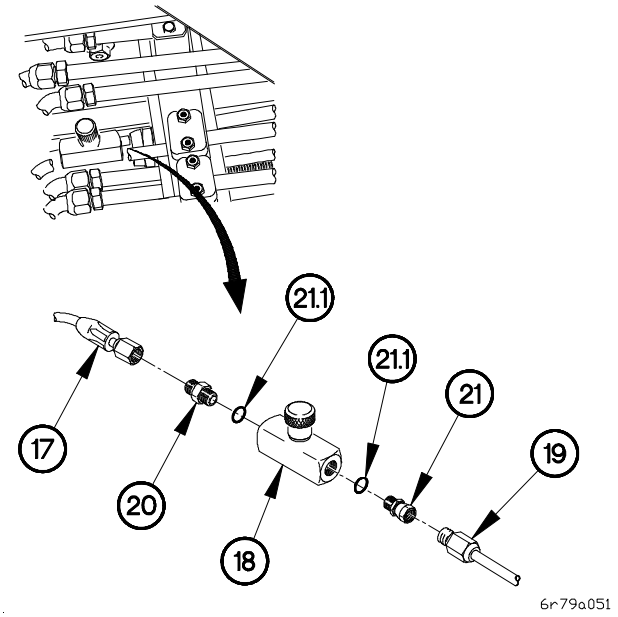


(6) Disconnect hydraulic hose (17) from flowmeter valve assembly (18).

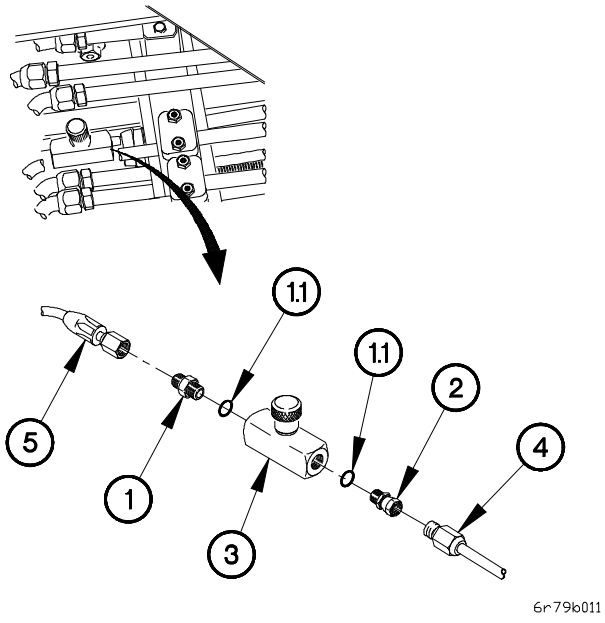
(7) Remove flowmeter valve assembly (18) from hydraulic tube (19).

(8) Remove adapters (20 and 21) from flowmeter valve assembly (18).

(9) Remove preformed packings (21.1) from adapters (20 and 21). Discard preformed packings.



b. Installation.



(1) Position preformed packings (1.1) on adapters (1 and 2).

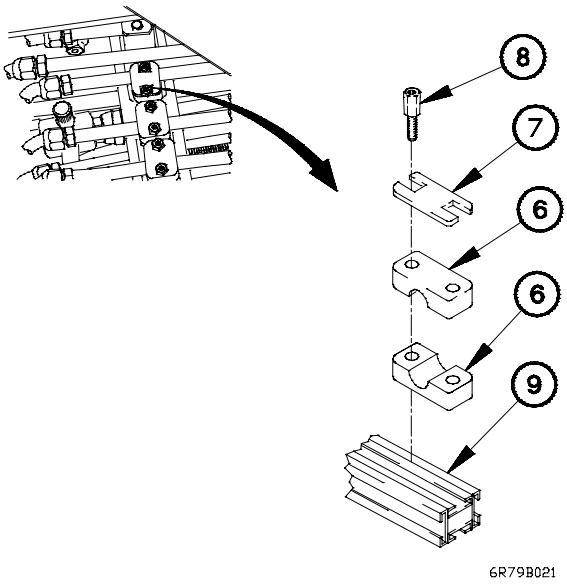
(2) Position adapters (1 and 2) on flowmeter valve assembly (3).

(2.1) Tighten adapters (1 and 2) to 22-24 lb-ft (30-33 N•m).

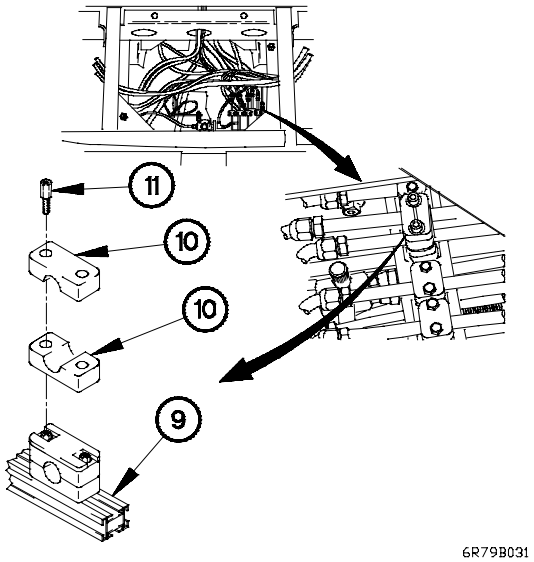
(3) Connect flowmeter valve assembly (3) to hydraulic tube (4).

(4) Connect hydraulic hose (5) to flowmeter valve assembly (3).

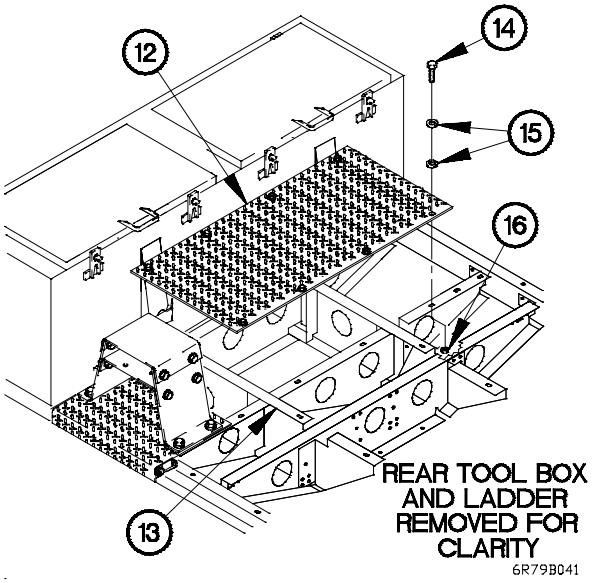
16-79. M1089 FLOWMETER VALVE ASSEMBLY REPLACEMENT/ADJUSTMENT (CONT)



(5) Install two caps (6), retainer (7), and studs (8) on support (9).



(6) Install two caps (10) and studs (11) on support (9).



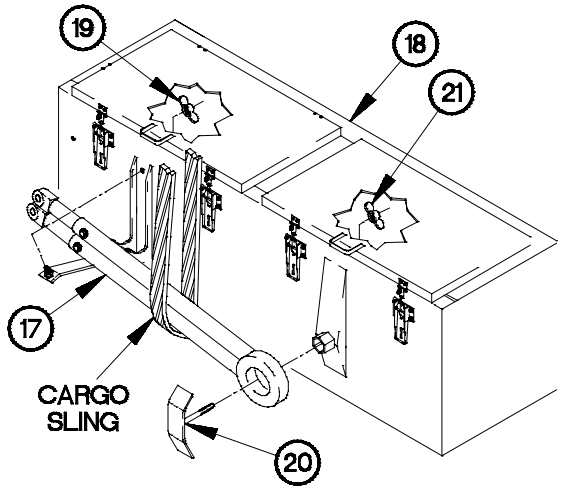
(7) Install floor plate (12) on support platform (13) with eight bolts (14), sixteen washers (15), and eight self-locking nuts (16).

WARNING

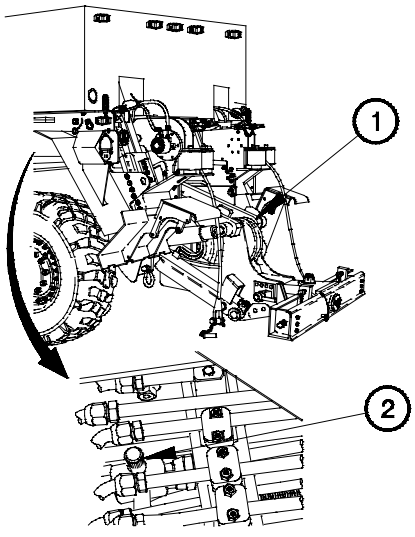
Tow bar weighs approximately 150 lbs (68 kgs). Attach a suitable lifting device prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

(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).

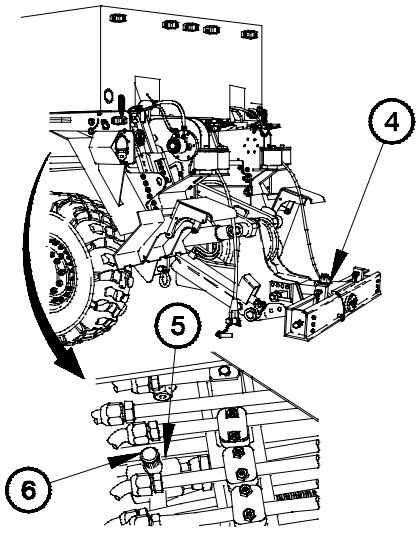
NOTE

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.



6R79C021

(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)

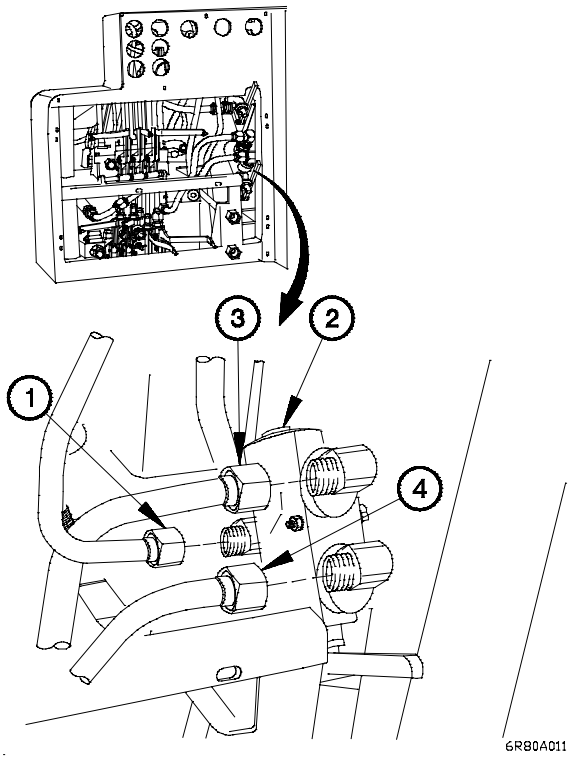
Materials/Parts
Cap and Plug Set (Item 17, Appendix C)
Nut, Self-Locking (2) (Item 178, Appendix F)
Packing, Preformed (2) (Item 232, Appendix F)

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.



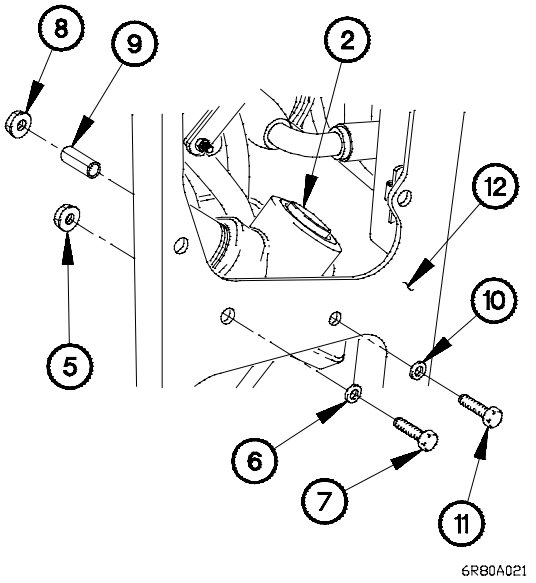
a. Removal.

(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).

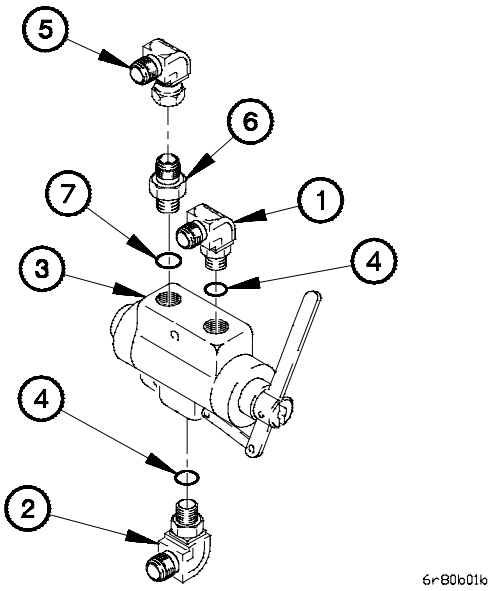
16-80. M1089 SELECTOR VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)



(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 112-123 lb-ft (152-167 N•m).

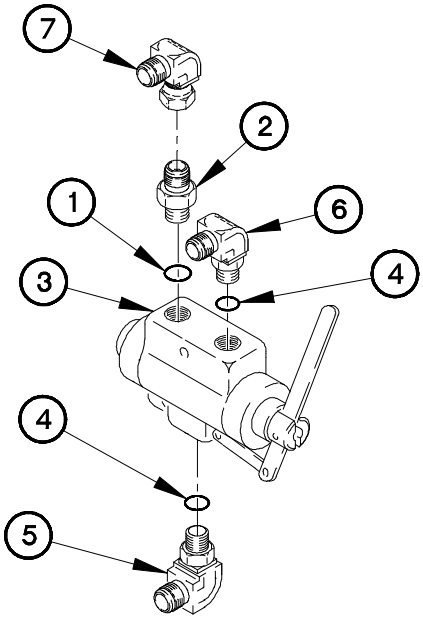
(4) Install preformed packing (4) on 90-degree fittings (5 and 6).

(5) Install 90-degree fittings (5 and 6) in SECONDARY CIRCUIT SELECTOR VALVE (3).

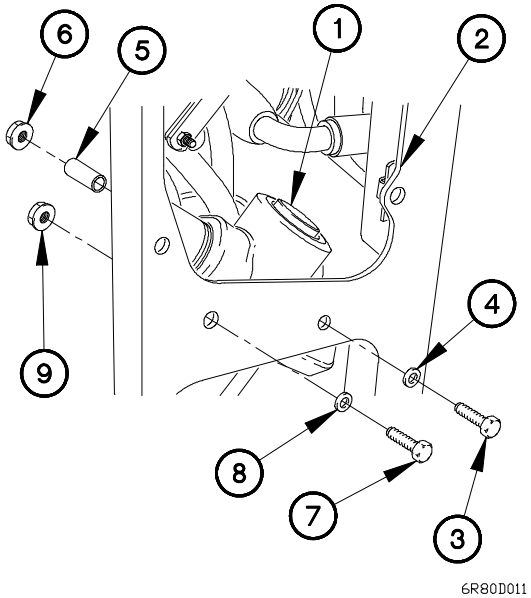
(6) Tighten 90-degree fitting (5 and 6) to 112-123 lb-ft (152-167 N•m).

(7) Position 90-degree fitting (7) on adapter (2).

(8) Tighten 90-degree fitting (7) to 68-75 lb-ft (92-101 N•m).



d. Installation.



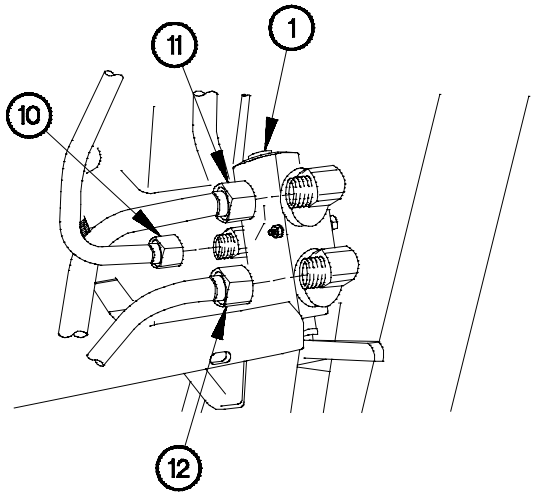
(1) Install SECONDARY CIRCUIT SELECTOR VALVE (1) in control panel (2) with screw (3), washer (4), spacer (5), and self-locking nut (6).

(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

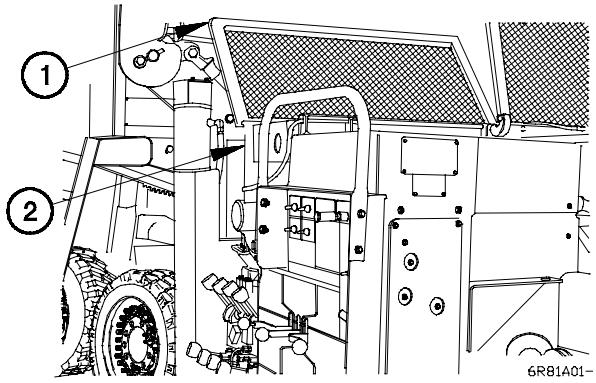
Equipment Conditions
Engine shut down (TM 9-2320-366-10-1).
Batteries disconnected (TM 9-2320-366-20-3).
Hydraulic reservoir supply valve and return valve closed (TM 9-2320-366-10-2).

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)

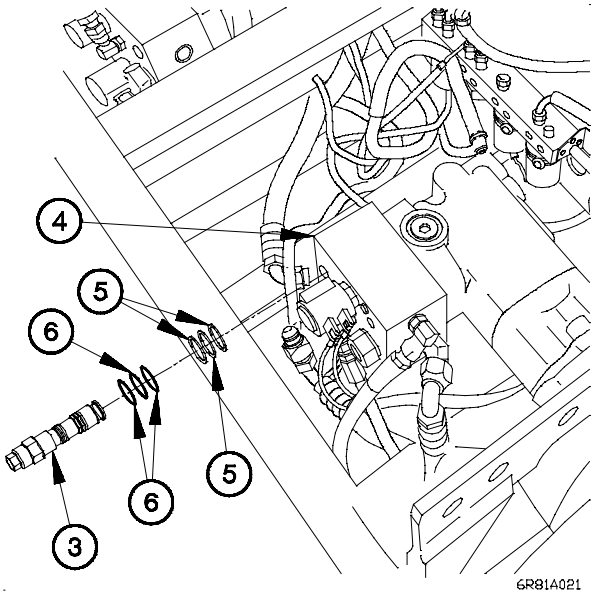
Tools and Special Tools (Cont)
Adapter, Socket Wrench, (Item 3, Appendix B)
Pan, Drain (Item 43, Appendix B)
Vise, Machinists (Item 82, Appendix B)

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).

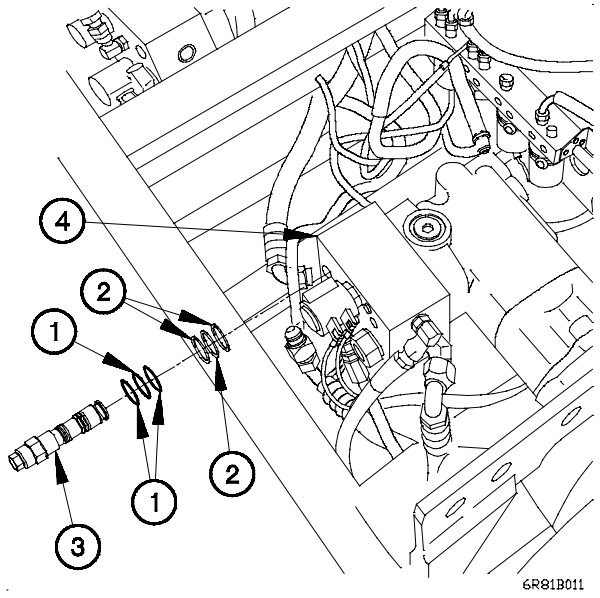
(4) Remove three backup rings (5) and preformed packings (6) from cartridge valve (3). Discard back-up rings and preformed packings.

b. Cartridge Valve Installation.

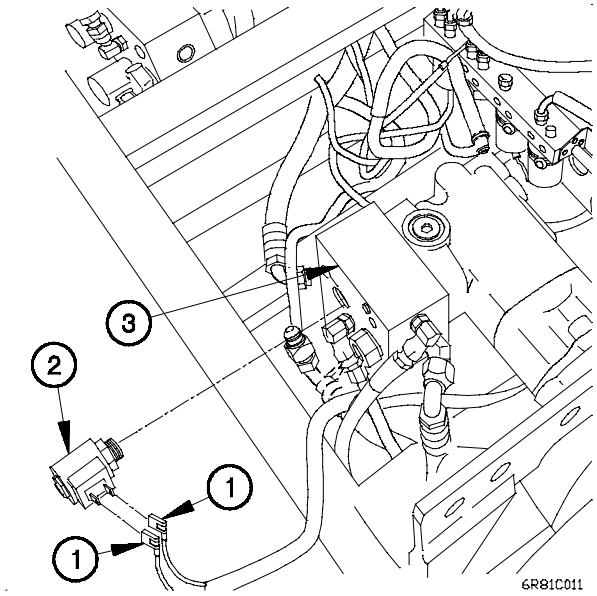
(1) Install three preformed packings (1) and backup rings (2) on cartridge valve (3).

(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.



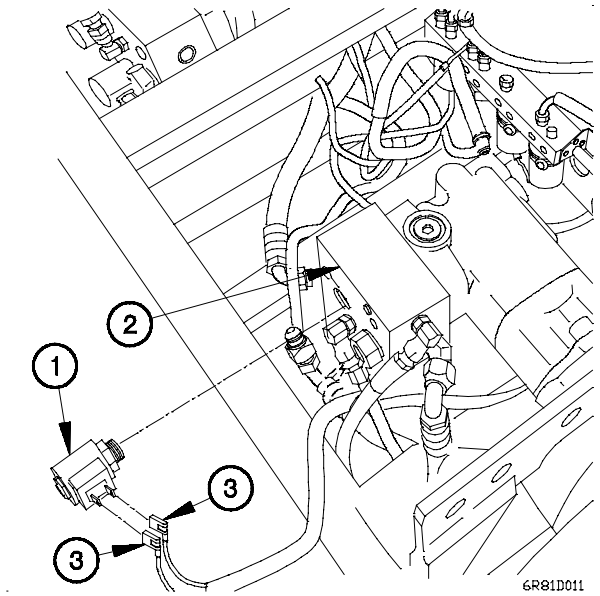
(1) Disconnect two electrical connectors (1) from solenoid valve (2).

(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.

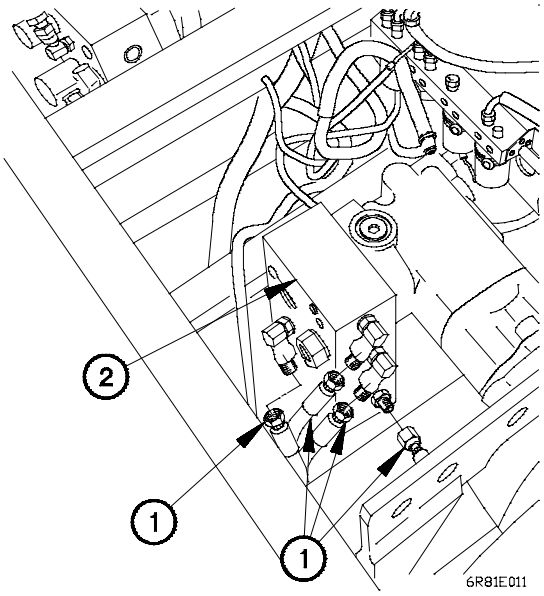
CAUTION

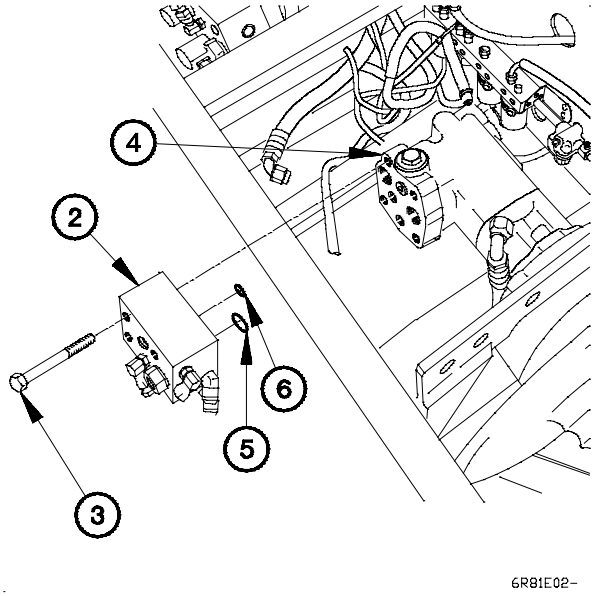
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

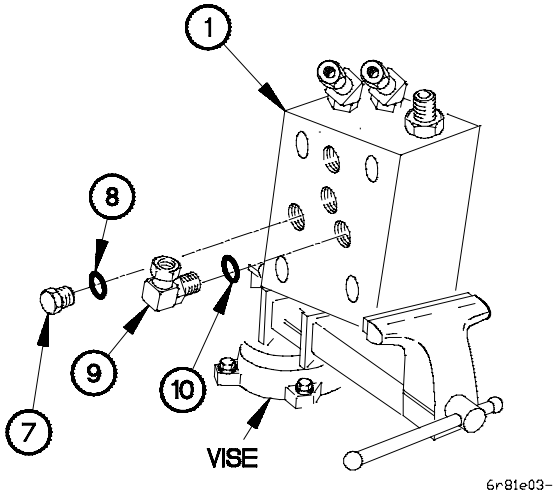
(1) Disconnect four hydraulic hoses (1) from counterbalance valve (2).





(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).

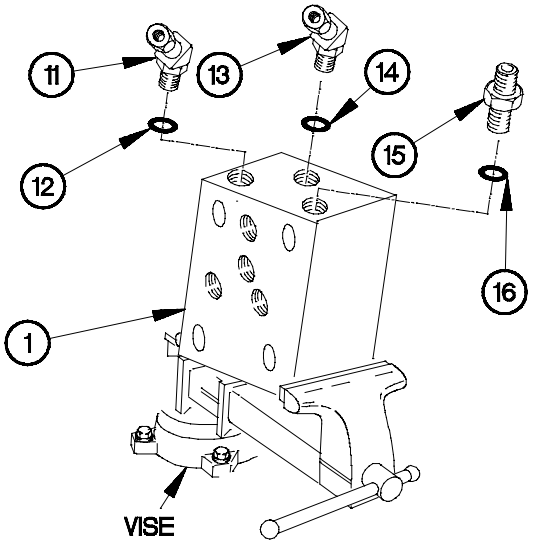
(10) Remove preformed packing (12) from 45-degree fitting (11). Discard preformed packing.

(11) Remove 45-degree fitting (13) from counterbalance valve (1).

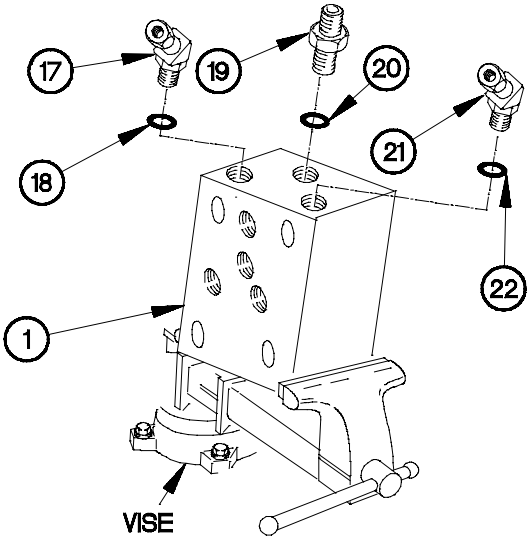
(12) Remove preformed packing (14) from 45-degree fitting (13). Discard preformed packing.

(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).

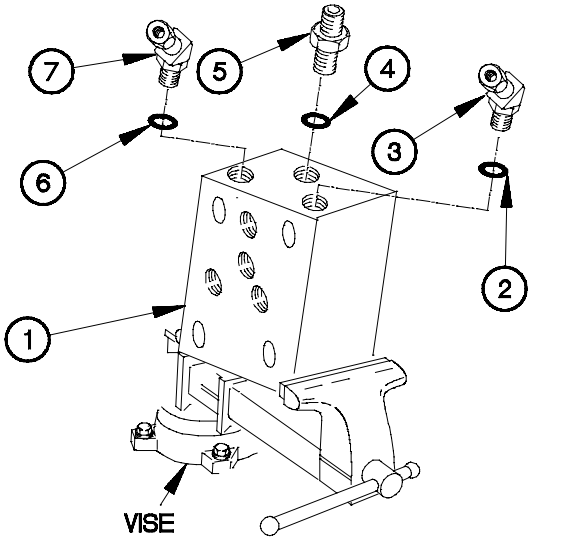
(3) Install 45-degree fitting (3) in counterbalance valve (1).

(4) Install preformed packing (4) on fitting (5).

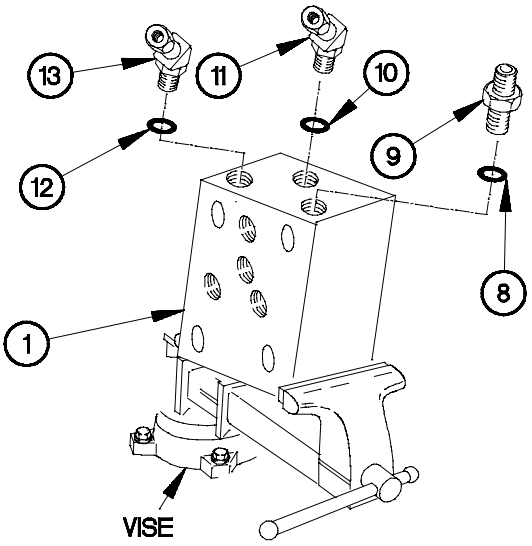
(5) Install fitting (5) in counterbalance valve (1).

(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).

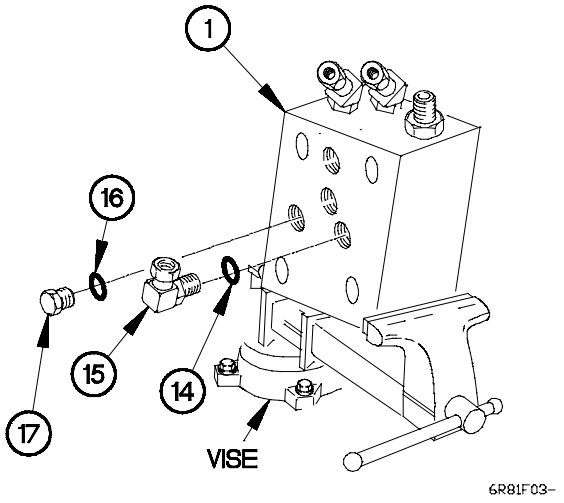
(14) Install 45-degree fitting (13) in counterbalance valve (1).

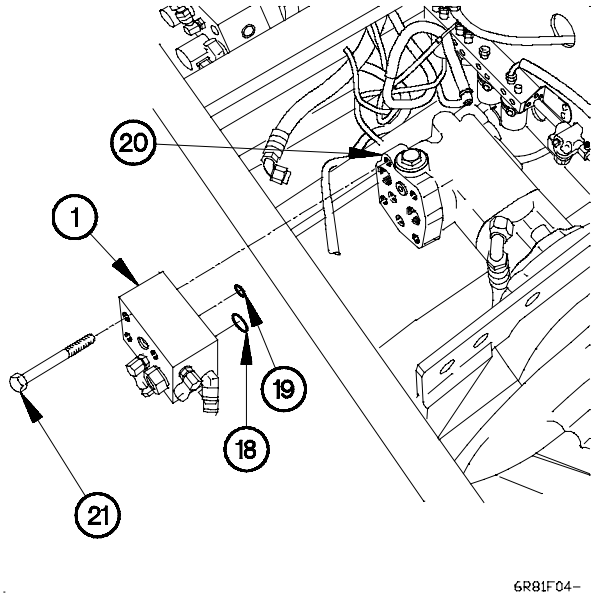
(15) Install preformed packing (14) on 90-degree fitting (15).

(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).

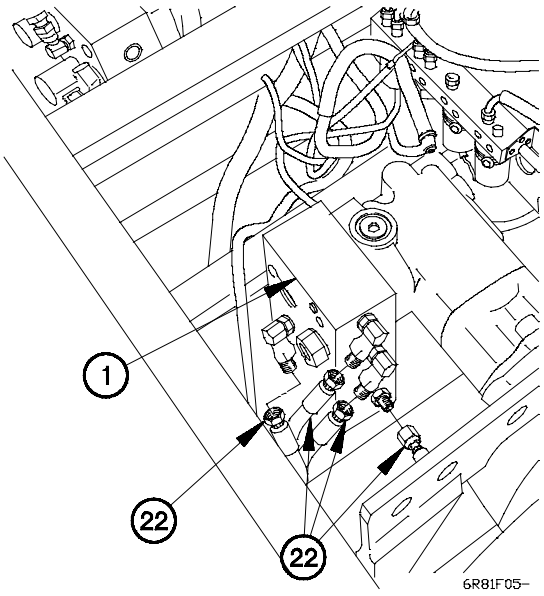




(19) Install two preformed packings (18 and 19) on counterbalance valve (1).

(20) Position counterbalance valve (1) on winch drive motor (20) with four screws (21).

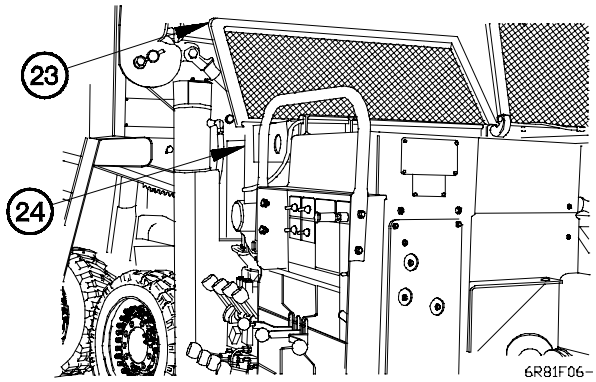
(21) Tighten four screws (21) to 38-45 lb-ft (52-61 N·m).



(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)
Wrench Set, Crowfoot, Ratcheting (TM 9-2320-366-20)

Tools and Special Tools Cont
Gun, Air Blow (Item 30 Appendx-B).

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)
Splice (4) (Item423.1 Appendix F)
Insulation Sleeving, Electrical (Item 42.1 Appendix C)

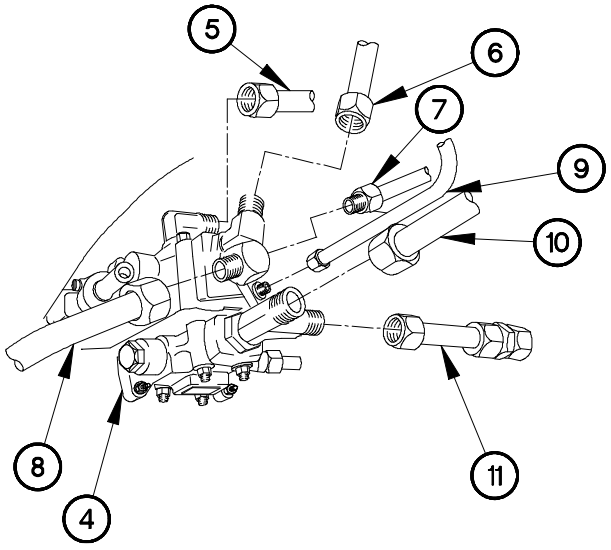
Personnel Required
(2)

a. Removal.

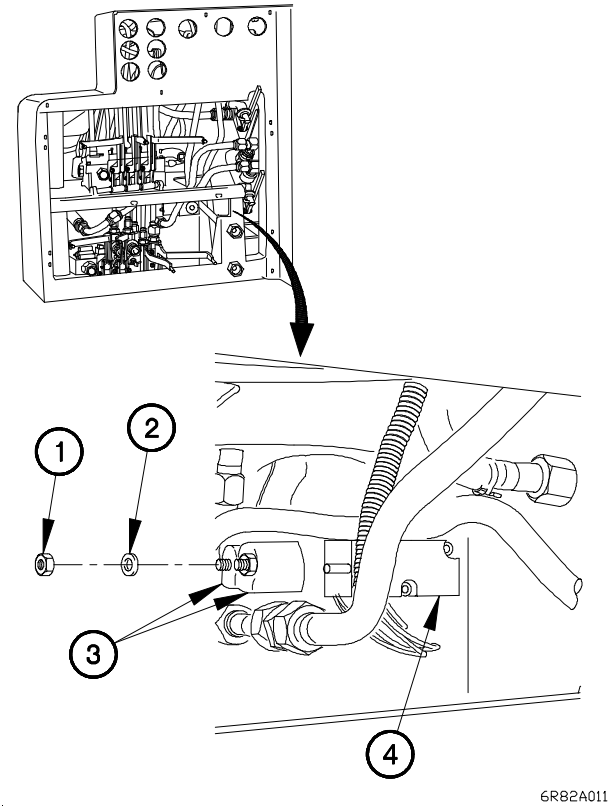
NOTE

Tag electrical wires and connection points prior to disconnecting.

(1) Remove two nuts (1), washers (2), and solenoids (3) from lineal directional control valve (4).



6R82A021

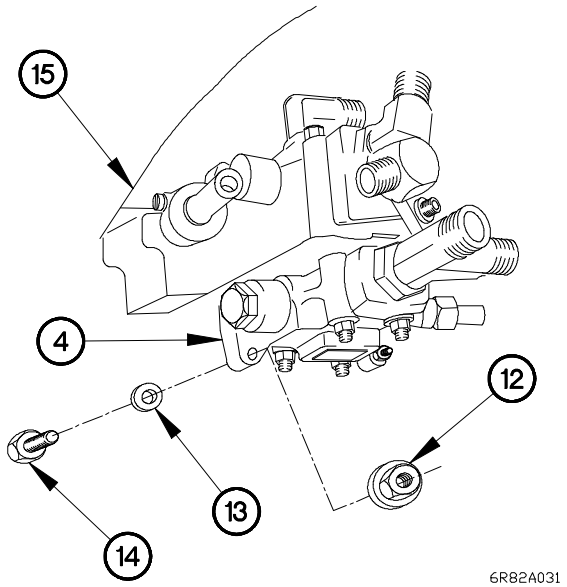


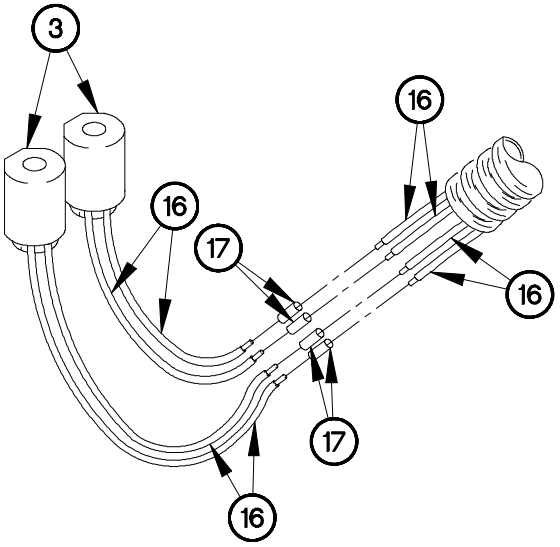
6R82A011

(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.





NOTE

- Cut wires as close to splices as possible.
- Tag connectors and connection points prior to disconnection

(4) Cut four wires (16) on two solenoid (3) and from four spices (17) discard splices.

b. Disassembly.

NOTE

Mark adapters for correct alignment during installation.

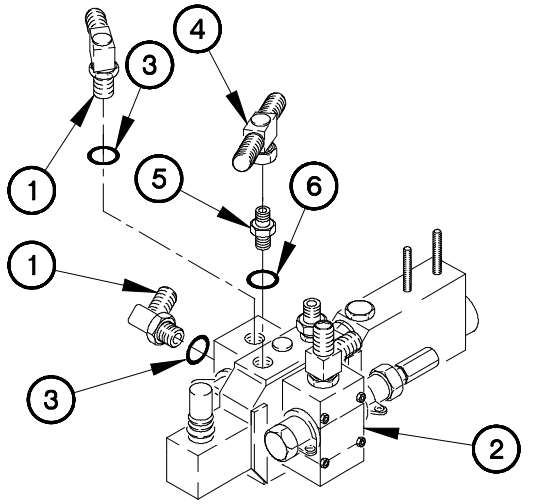
(1) Remove two 90-degree fittings (1) from linear directional control valve (2).

(2) Remove two preformed packings (3) from 90-degree fittings (1). Discard preformed packings.

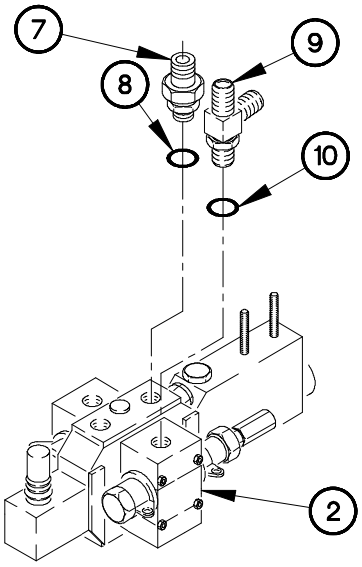
(3) Remove tee fitting (4) from adapter (5).

(4) Remove adapter (5) from linear directional control valve (2).

(5) Remove preformed packing (6) from adapter (5). Discard preformed packing.



6r82b011



6r82b021

(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.

16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR (CONT)

c. Assembly.

NOTE

Apply lubricating oil to preformed packings prior to installing.

(1) Install preformed packing (1) on tee fitting (2).

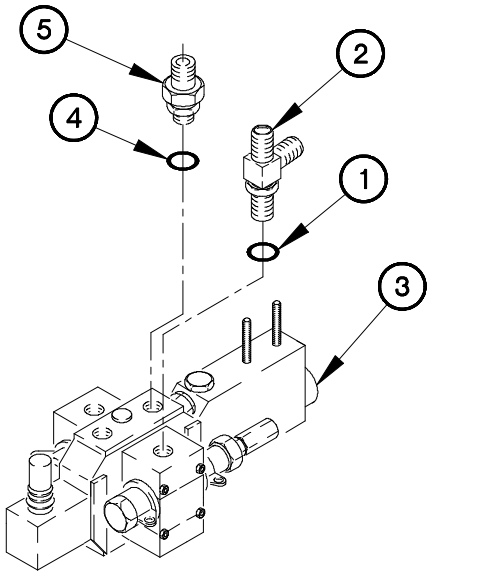
(2) Position tee fitting (2) on linear directional control valve (3).

(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).



6r82c011

(7) Install preformed packing (6) on adapter (7).

(8) Position adapter (7) on linear directional control valve (3).

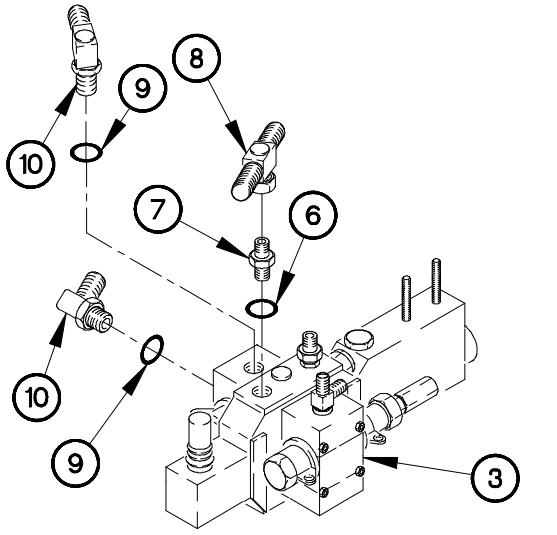
(9) Tighten adapter (7) to 43-47 lb-ft (58-63 N•m).

(10) Install tee fitting (8) on adapter (7).

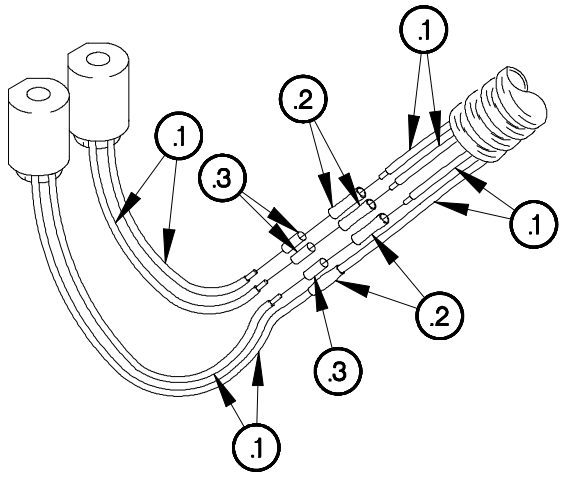
(11) Install two preformed packings (9) on 90-degree fittings (10).

(12) Install two 90-degree fittings (10) on linear directional control valve (3).

d. Installation.



6r82c021



6R82D041

CAUTION

Removal of insulation from electrical wires conductors shall be performed so that there is no evidence of physical damage to individual strands. Failure to comply may result in damage to equipment.

NOTE

Remove ¼" of insulation from wires.

(1) Remove insulation on four wires (.1).

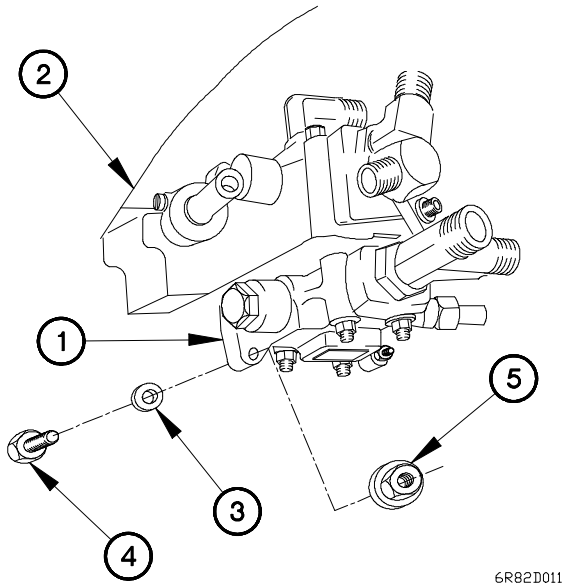
(2) Position sleeving (.2) on four wires (.1)

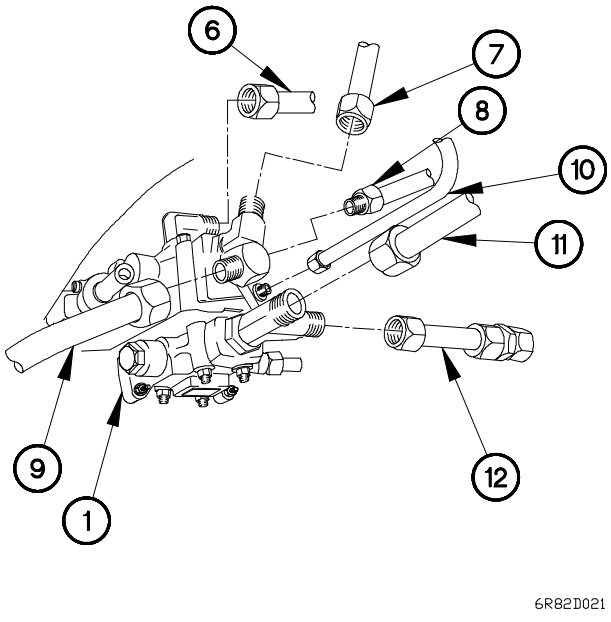
(3) Install splices (.3) between wires (.1)

(4) Install sleeving (.2) on four wires (.1)

16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR (CONT)

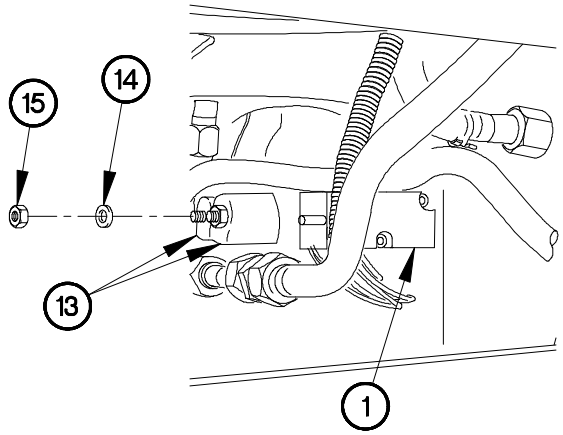
(5) Install linear directional control valve (1) on control panel frame (2) with three washers (3), bolts (4), and self-locking nuts (5).





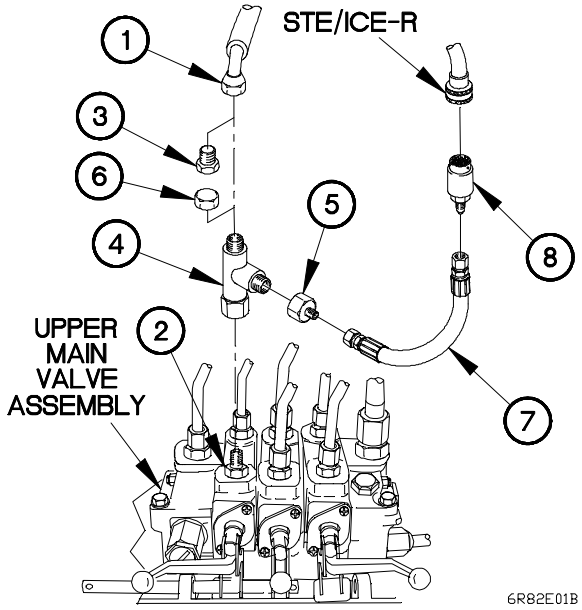
(6) Connect hydraulic tubes (6 through 12) to linear directional control valve (1).

(7) Install two solenoids 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).

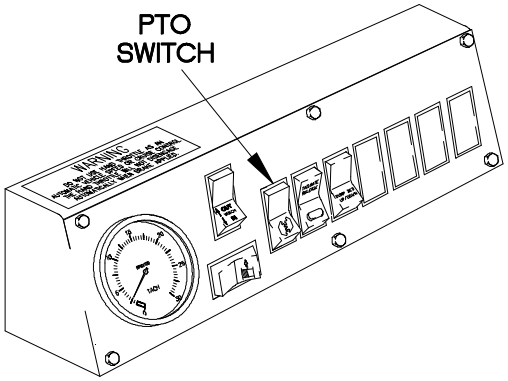
(8) Connect 10,000 psi transducer (8) to STE/ICE-R.

16-82. M1089 LINEAR DIRECTIONAL CONTROL VALVE REPLACEMENT/REPAIR (CONT)

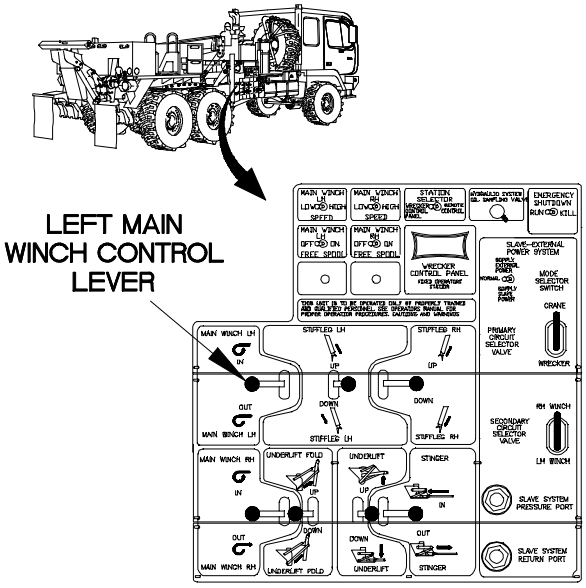
(9) Start engine (TM 9-2320-366-10-1).

(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).

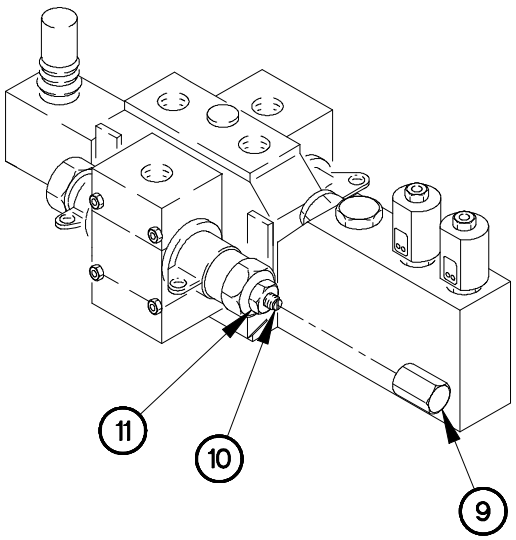
(14) Note reading on STE/ICE-R.

(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.

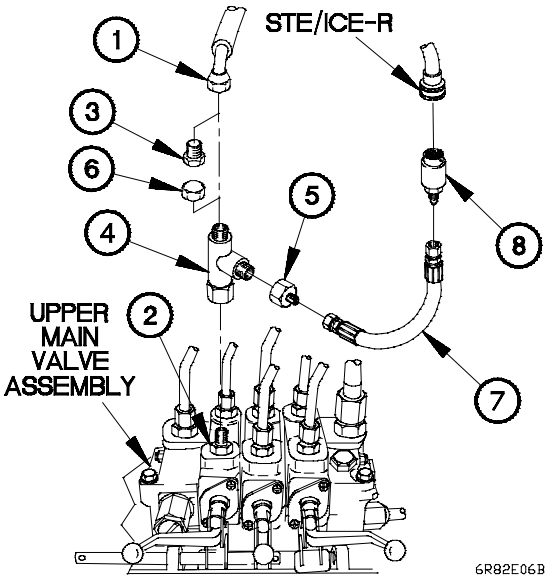
NOTE

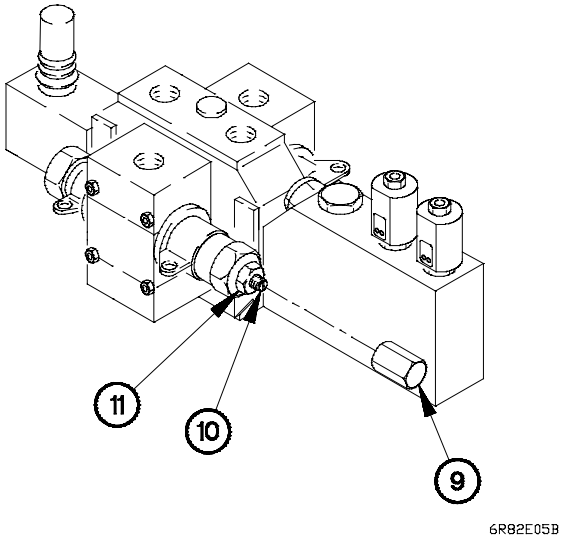
Hold setscrew while tightening lock nut.

(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

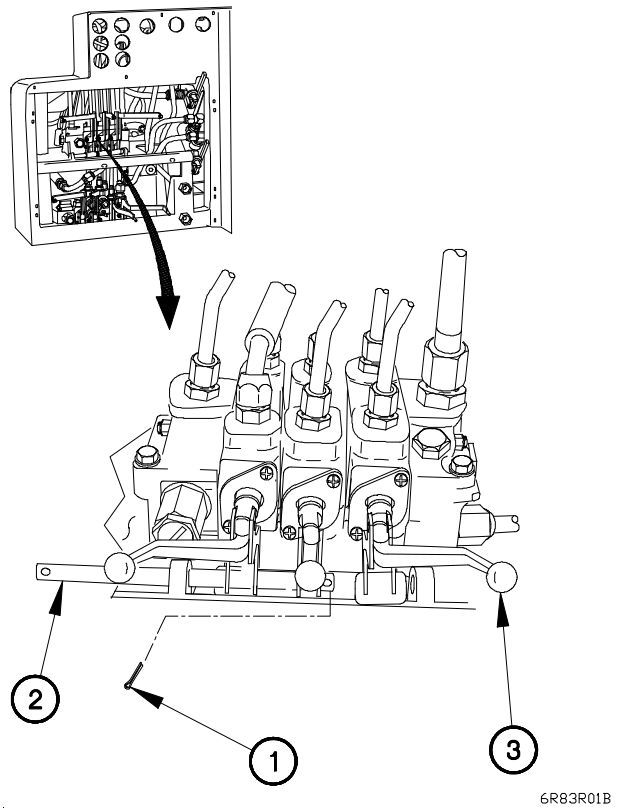
Equipment Conditions
Batteries disconnected (TM 9-2320-366-20-3).
Control panel assembly covers removed (TM 9-2320-366-20-5).
Hydraulic reservoir supply and return valve closed (TM 9-2320-366-10-2).

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)
Wrench, Torque 0-175 lb-ft (Item 84, Appendix B)
Wrench Set, Crowfoot Ratcheting (Item 87, Appendix B) (TM 9-2320-366-20)

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)
Sealing Compound (Item 76.2, Appendix C)
Sealing Compound (Item 71.1, Appendix C)
Sealant (Item 65.2 Appendix-C)

Personnel Required
(2)

a. Removal.



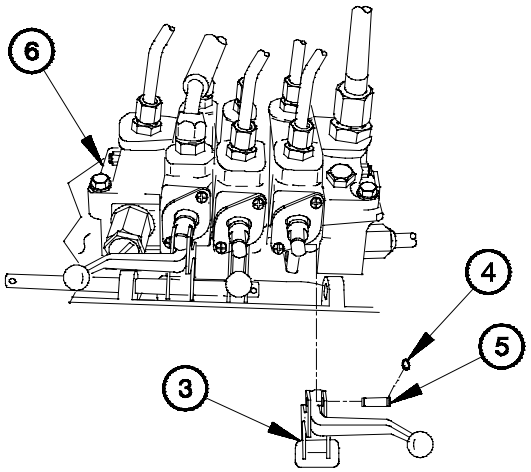
(1) Remove two cotter pins (1) from rod (2). Discard cotter pins.

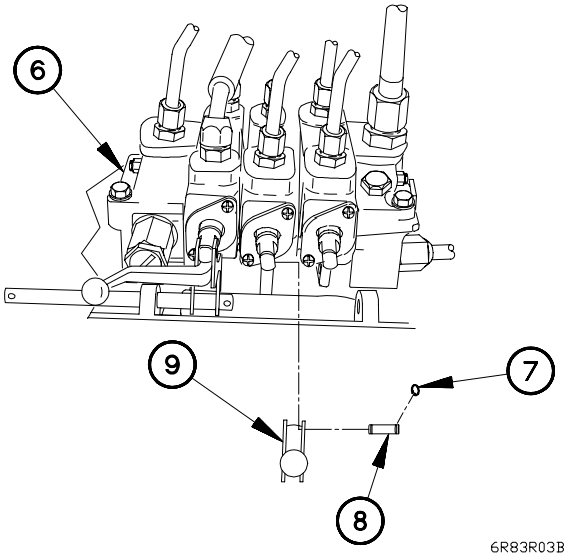
(2) Position rod (2) to the left past handle (3).

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).

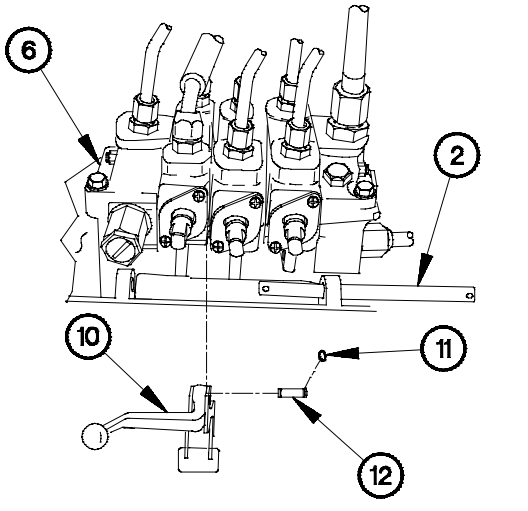




(4) Remove two retaining rings (7), pin (8), and handle (9) from upper control valve assembly (6).

(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

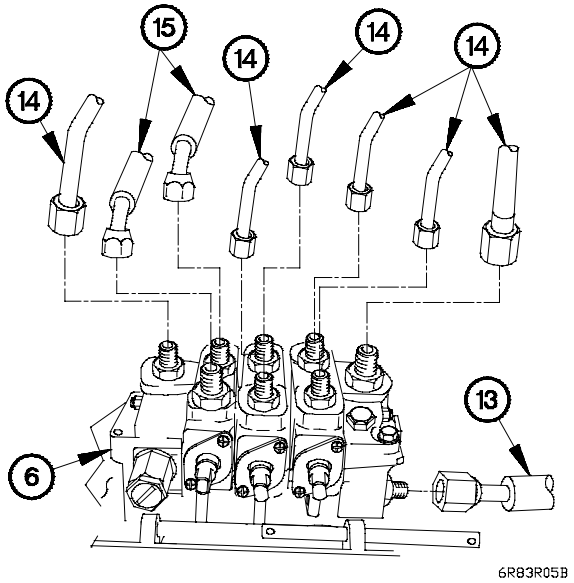
Tag hydraulic tubes and hoses prior to disconnecting.

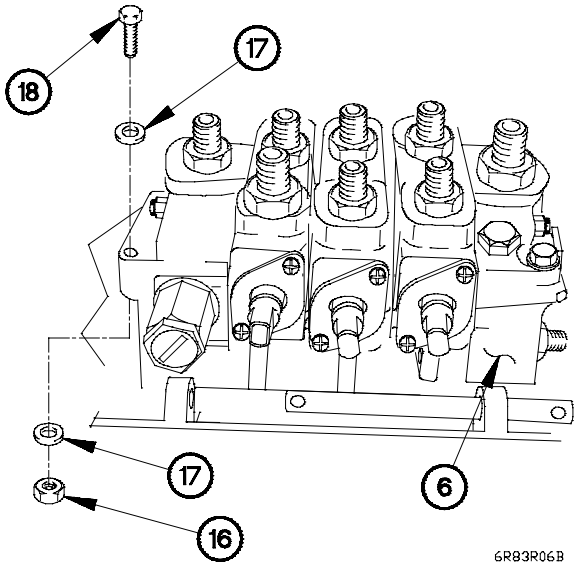
(7) Position drain pan under upper control valve assembly (6).

(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).

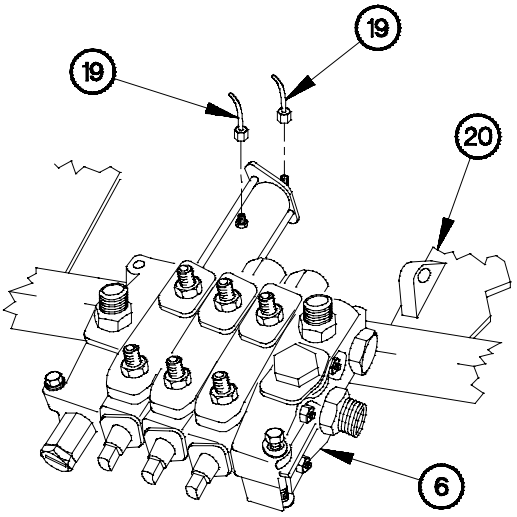
CAUTION

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.

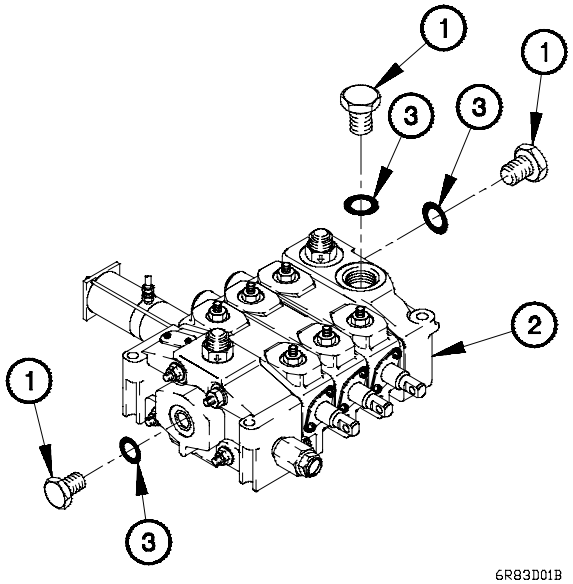
(13) Disconnect two air tubes (19) from rear of upper control valve assembly (6).

(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).

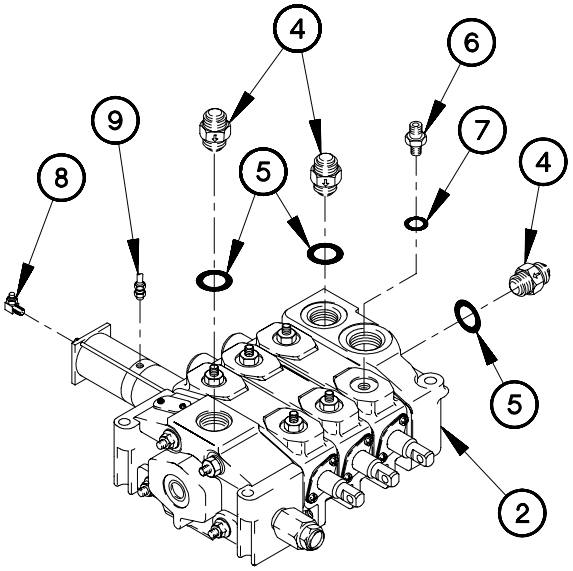
(4) Remove three preformed packings (5) from adapters (4). Discard preformed packings.

(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)

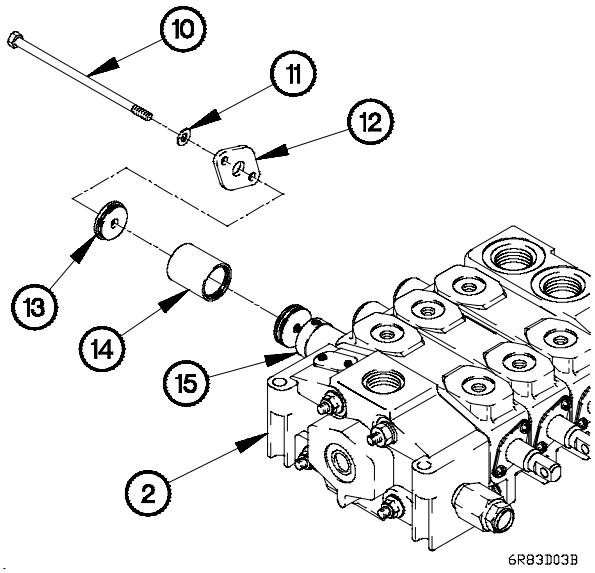
NOTE

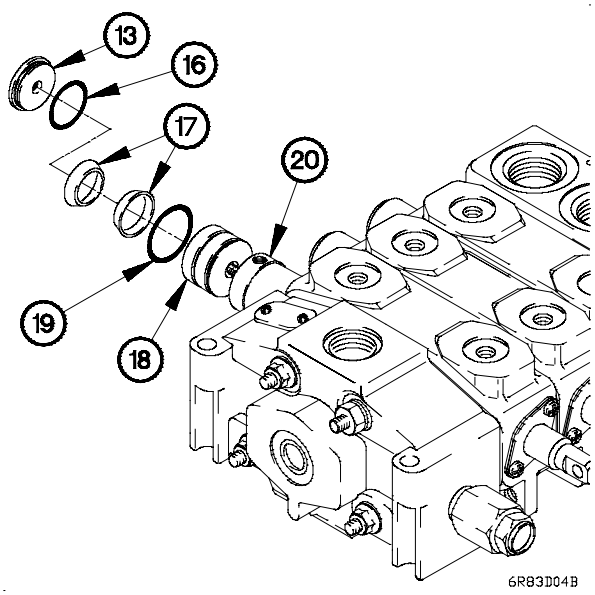
Note position of seals, packings, and retaining plates prior to removal.

(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.

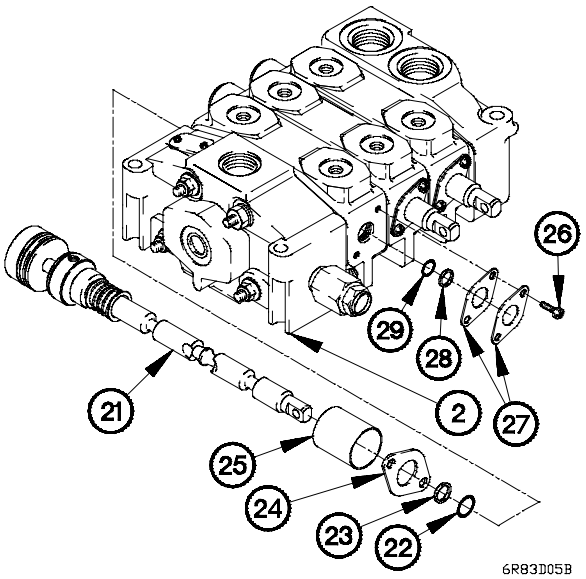
(13) Remove two seals (17) from piston (18). Discard seals.

(14) Remove preformed packing (19) from flange (20). Discard preformed packing.

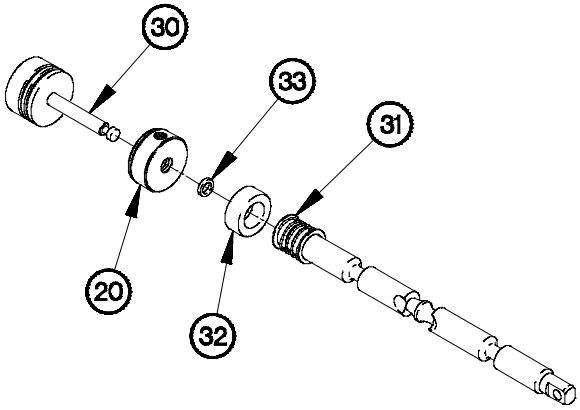
(15) Remove solenoid assembly (21) from upper control valve assembly (2).

(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.



6R83D05B

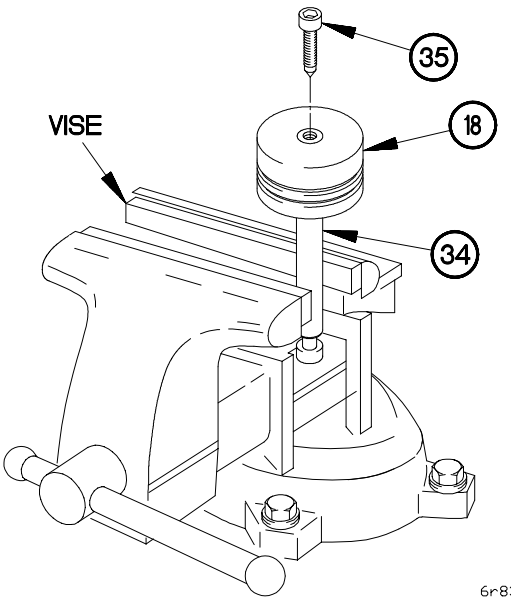


6R83D06B

(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.



6r83d07b

(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

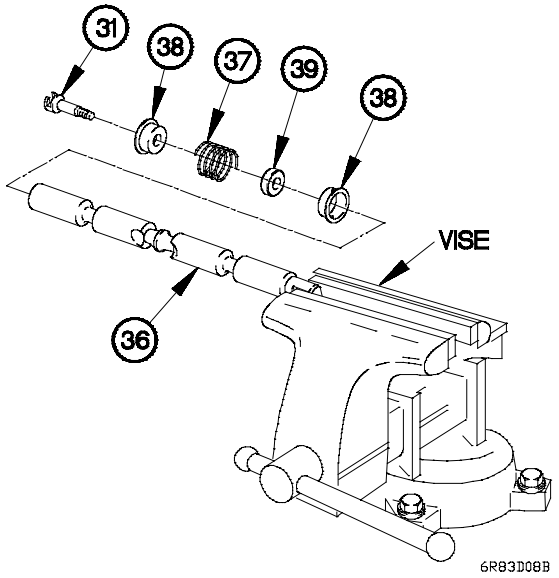
Do not overheat linear valve. If linear valve begins to discolor, remove heat source. Failure to comply may result in damage to equipment.

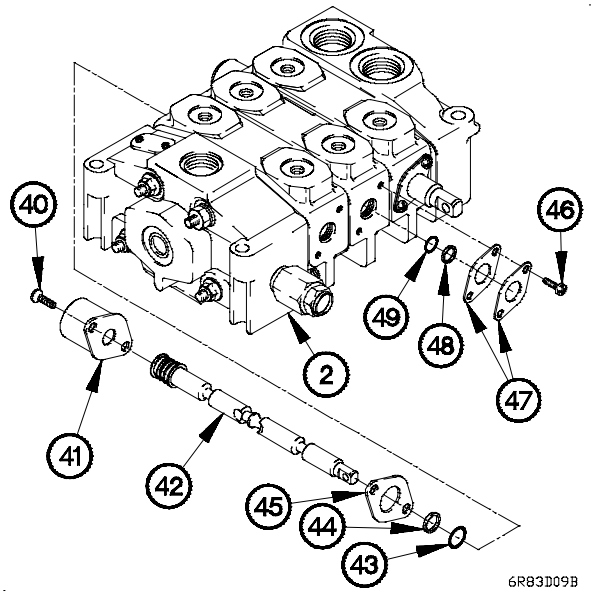
(23) Position linear valve (36) in vise.

(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.

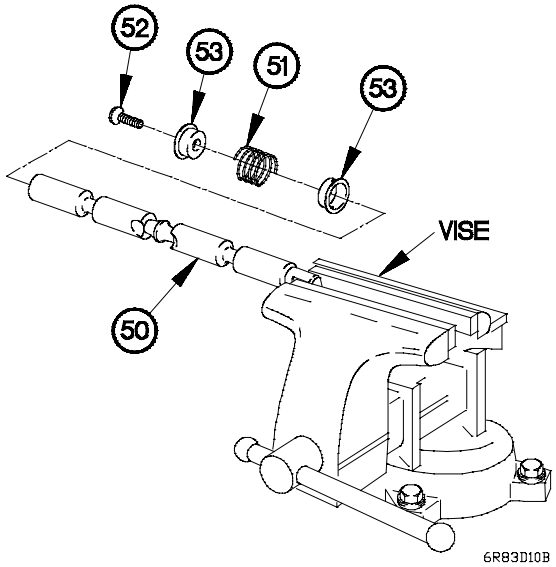
(30) Position control valve (50) in vise.

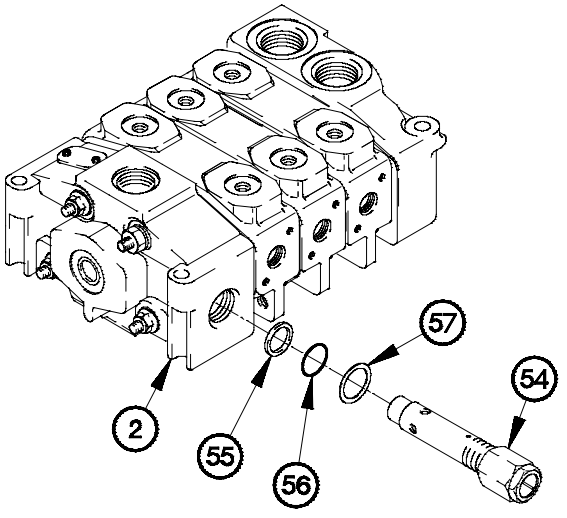
(31) Compress spring (51) on control valve (50).

(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.



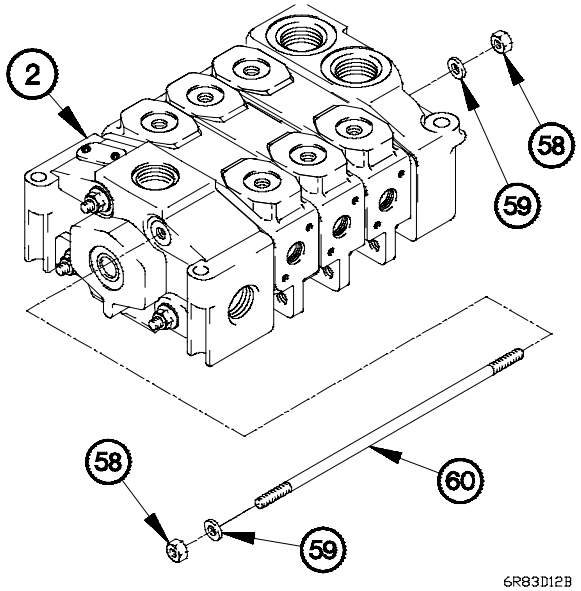


NOTE

(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.

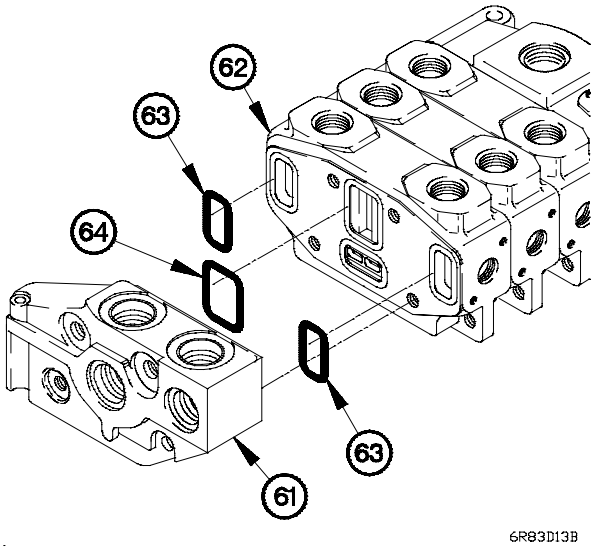
16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)



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.

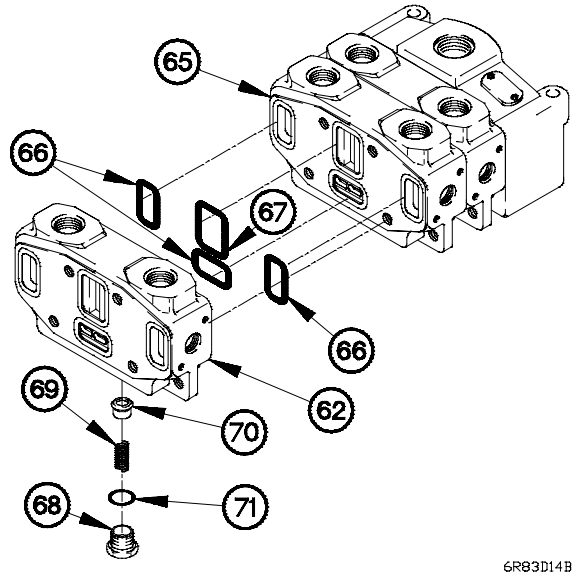
(41) Separate valve (62) from valve (65).

(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.



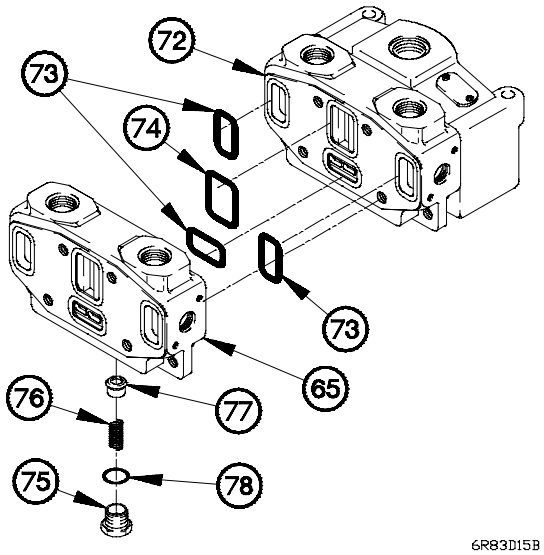
(46) Separate valve (65) from valve (72).

(47) Remove three gaskets (73) from valve (72). Discard gaskets.

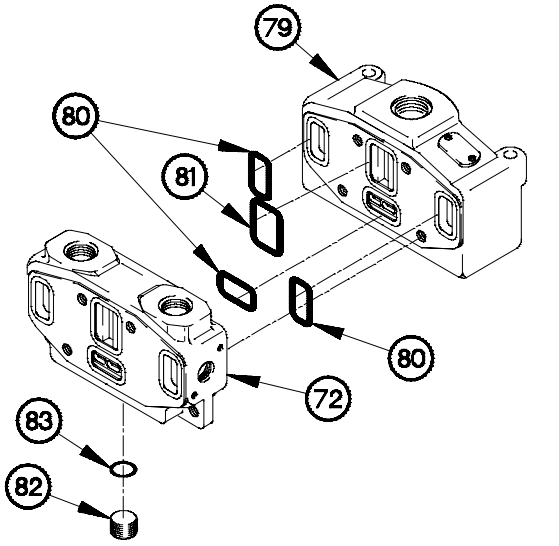
(48) Remove gasket (74) from valve (72). Discard gasket.

(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.

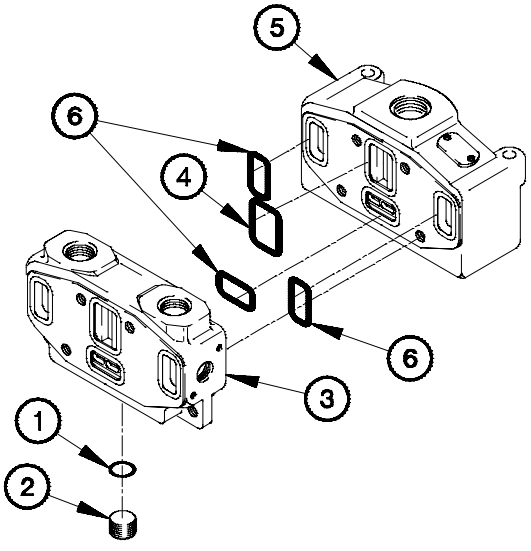
(1) Install preformed packing (1) on plug (2).

(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

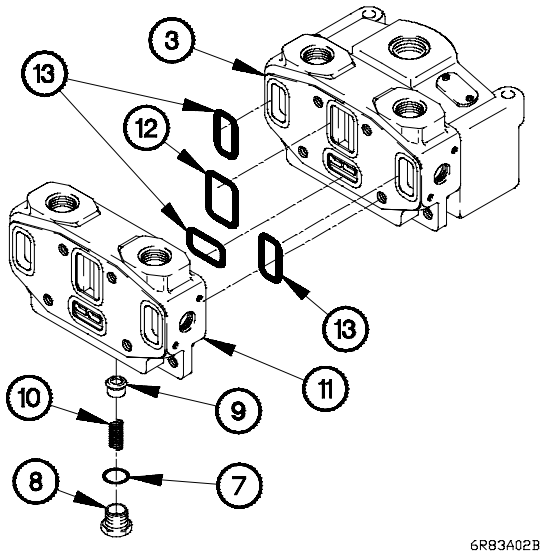
(6) Install preformed packing (7) on plug (8).

(7) Install pressure valve (9), spring (10), and plug (8) in valve (11).

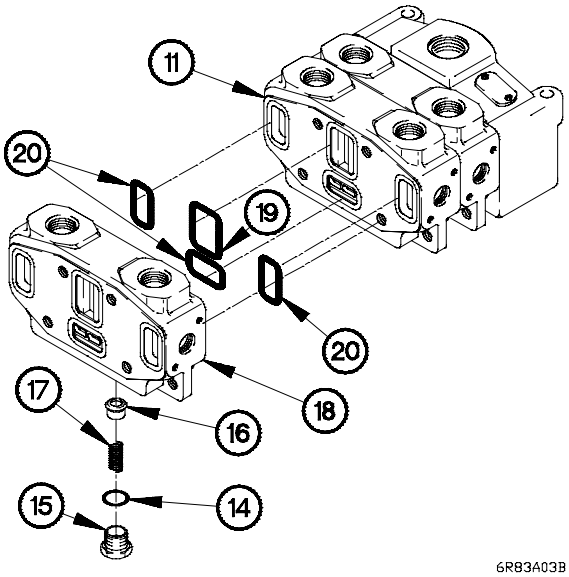
(8) Install gasket (12) in valve (3).

(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).

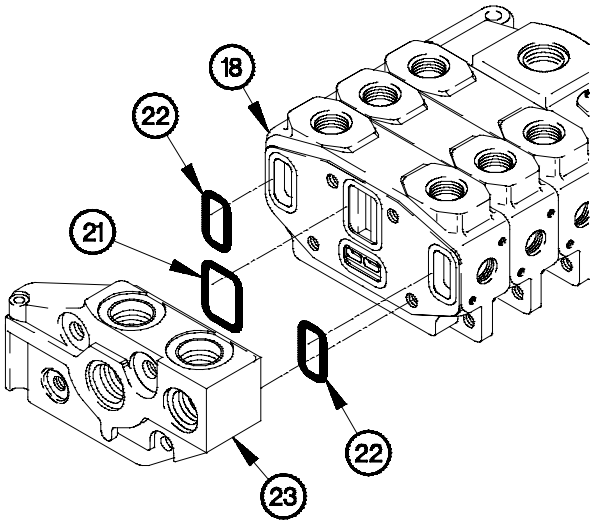
(15) Position valve (18) with valve (11).

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).



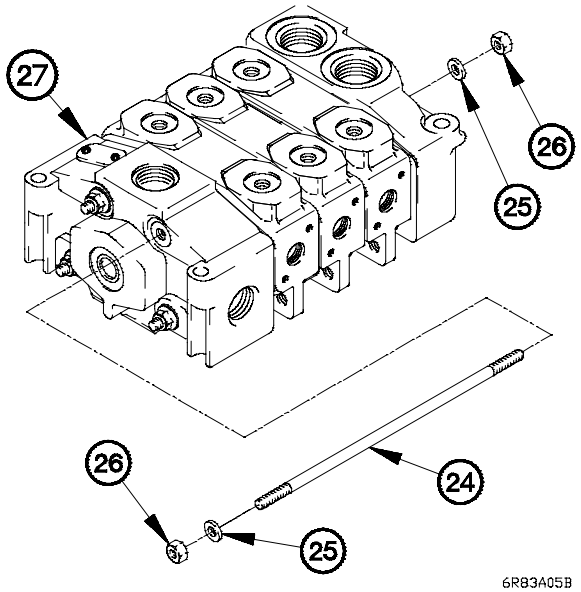
6R83A04B

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.



6R83A05B

(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).

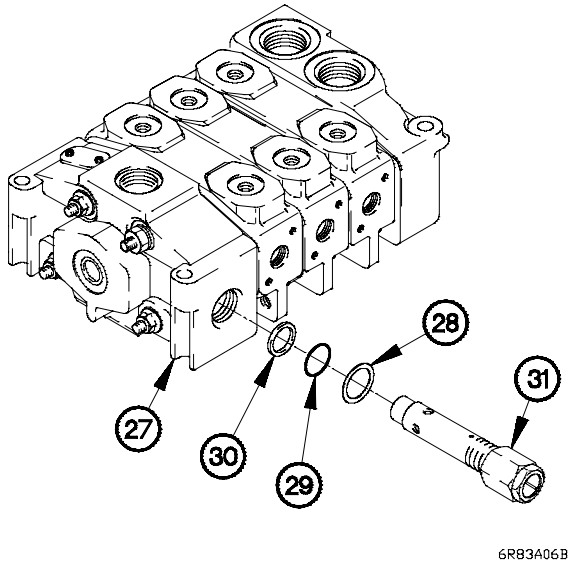
NOTE

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

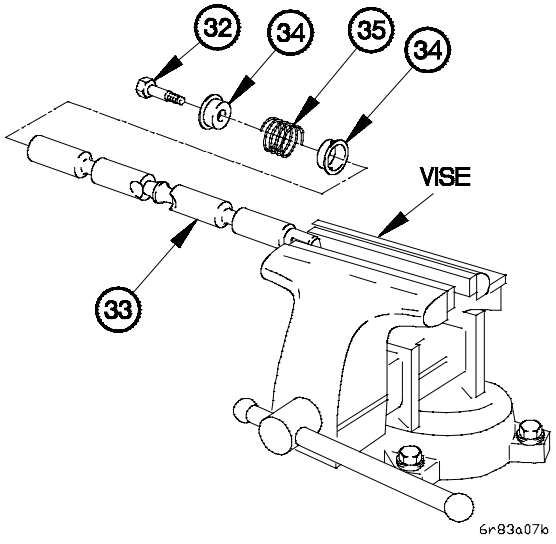
- **Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure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

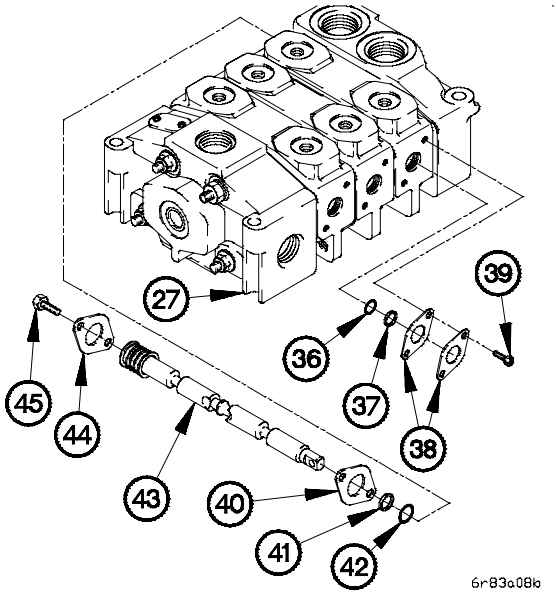
Both actuator assemblies are installed the same way. One shown.

(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.

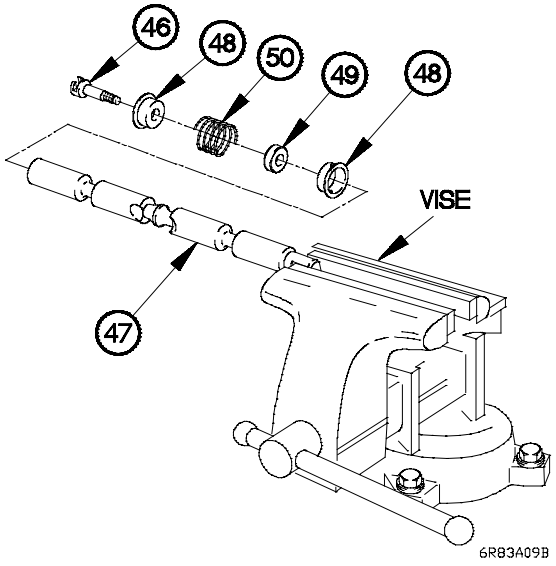


(33) Apply engine lubricating oil to two spring retainers, tube stop, and spring.

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.**



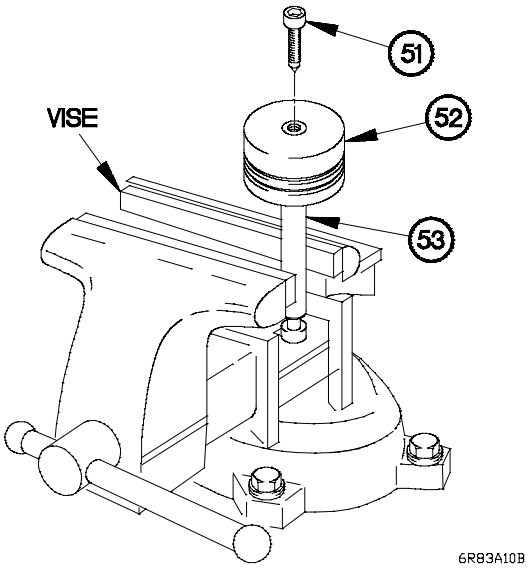
(34) Apply sealing compound to threads of stripper bolt (46).

(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.

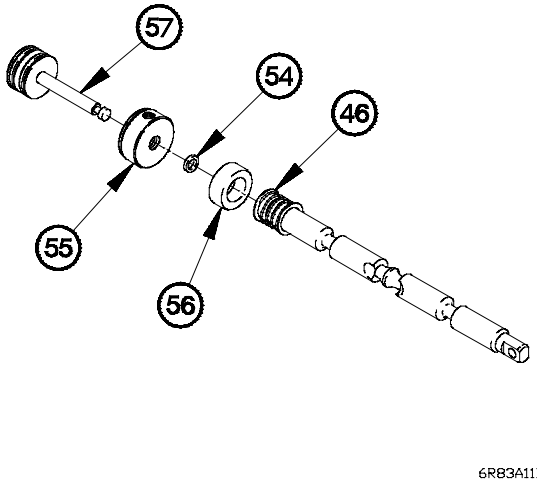


(37) Apply adhesive to threads of cap screw (51).

(38) Position piston (52) on piston rod (53) with cap screw (51).

(39) Position piston rod (53) in vise.

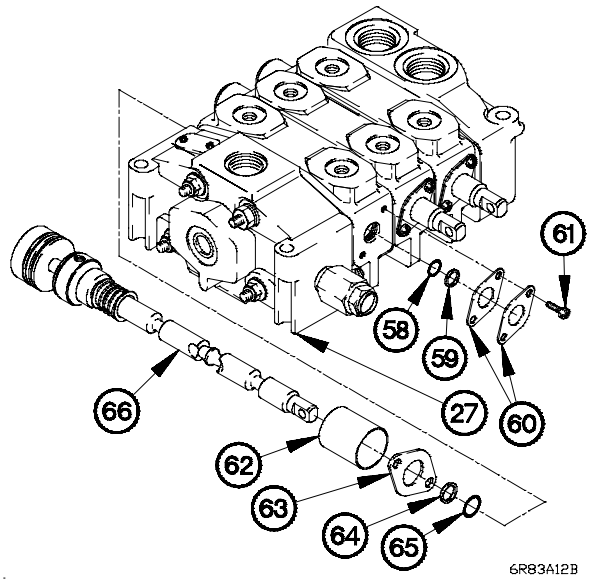
(40) Tighten cap screw (51) to 75 lb-in. (8 N·m).



(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).

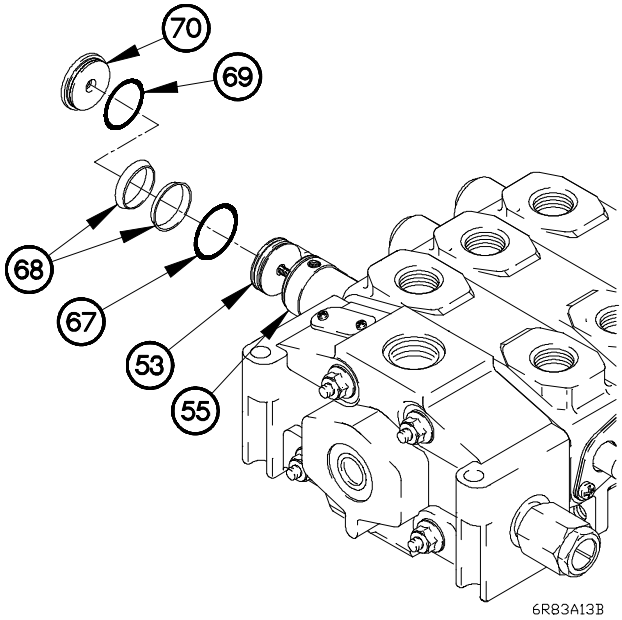
(46) Position solenoid assembly (66) in upper control valve assembly (27).

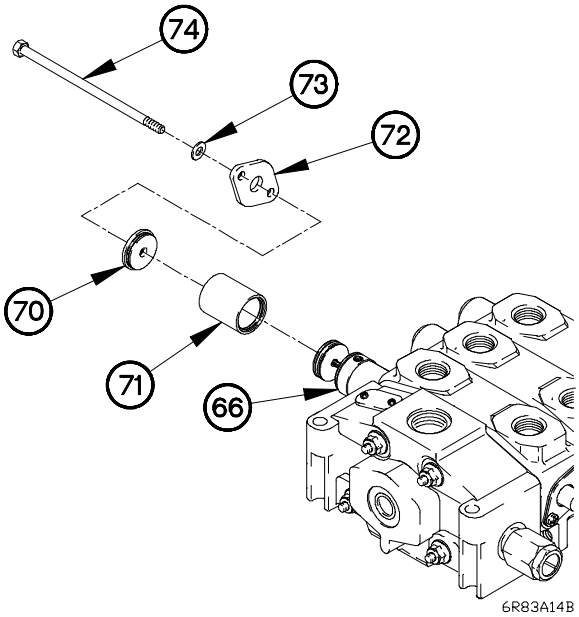
16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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 sealant to threads of 90-degree fitting (75) and fitting (76).

(55) Position 90-degree fitting (75) on upper control valve assembly (27), finger tight.

(55.1) Tighten fitting (75) 2-3 turns with wrench.

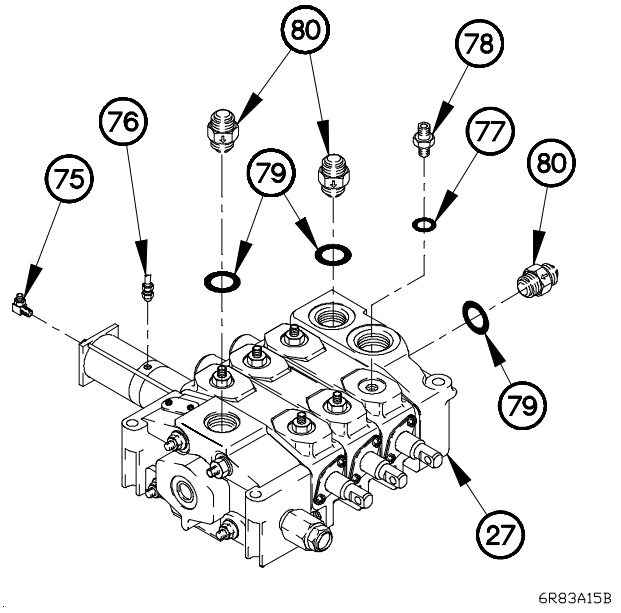
(56) Position fitting (76) on upper control valve assembly (27), finger tight.

(56.1) Tighten fitting (76) 2-3 turns, with wrench.

(57) Install six preformed packings (77) on adapters (78).

(58) Position six adapters (78) on upper control valve assembly (27).

(58.1) Tighten six adapters (78) to 40-43 lb-ft (54-50 N•m).



(59) Install three preformed packings (79) on adapters (80).

(60) Position three adapters (80) on upper control valve assembly (27).

(60.1) Tighten three adapters (80) to 68-75 lb-ft (92-102 N•m).

(61) Install two preformed packings (81) on plugs (82).

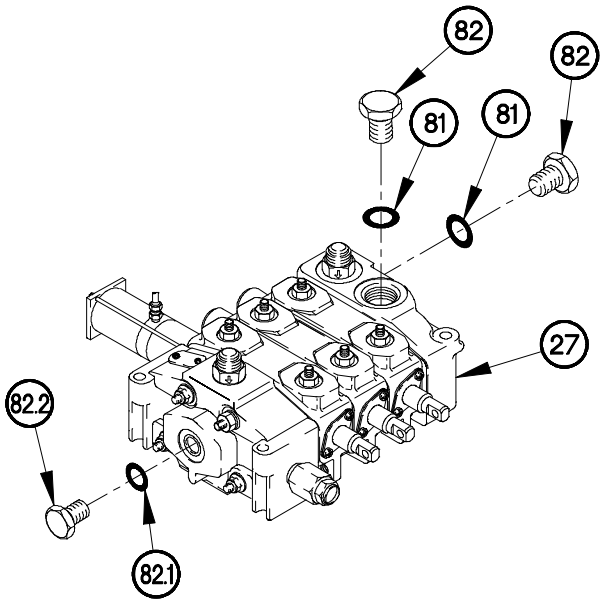
(62) Position two plugs (82) on upper control valve assembly (27).

(62.1) Tighten two plugs (82) to 112-123 lb-ft (152-167 N•m)

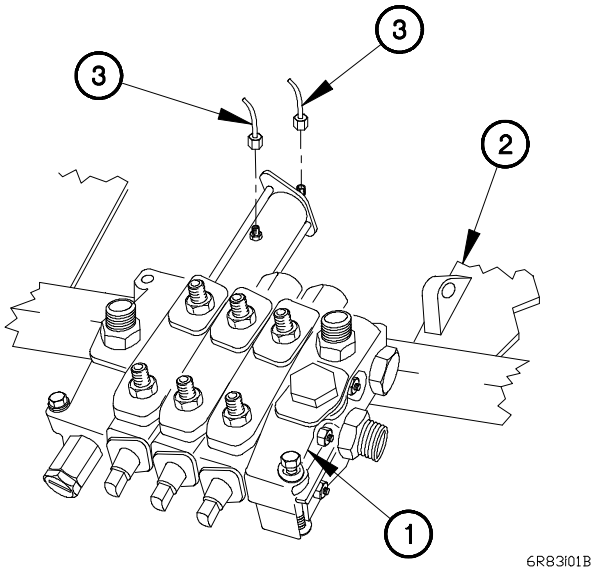
(62.2) Install preformed packing (82.1) on plug (82.2).

(62.3) Position plug (82.2) in upper control valve assembly (27).

(62.4) Tighten plug (82.2) to 68-75 lb-ft (92-102 N•m).



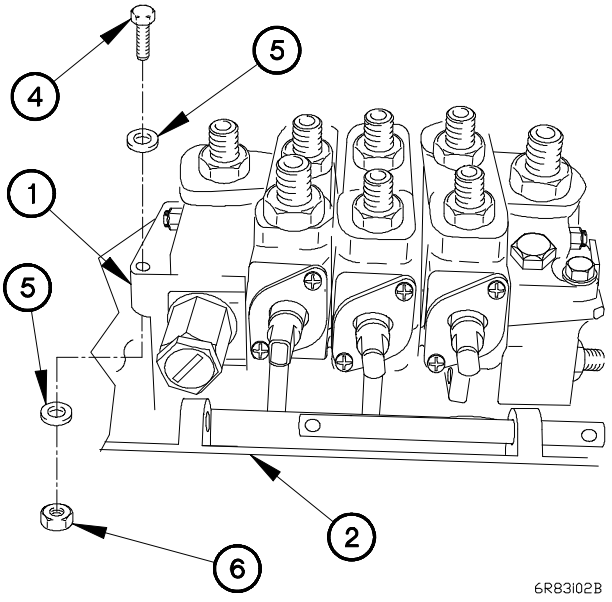
e. Installation.



(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).

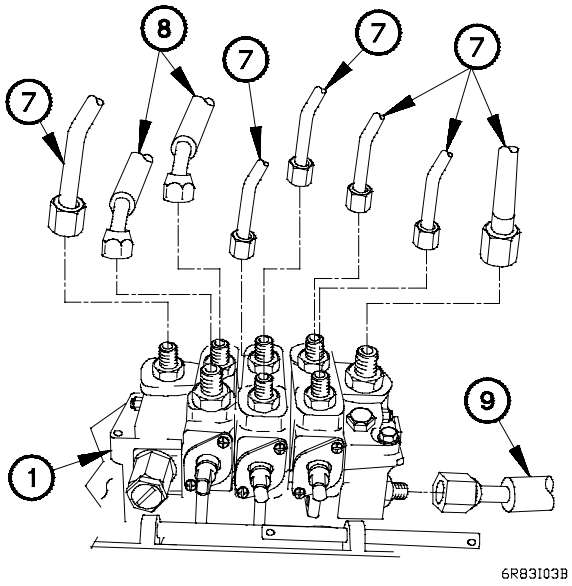


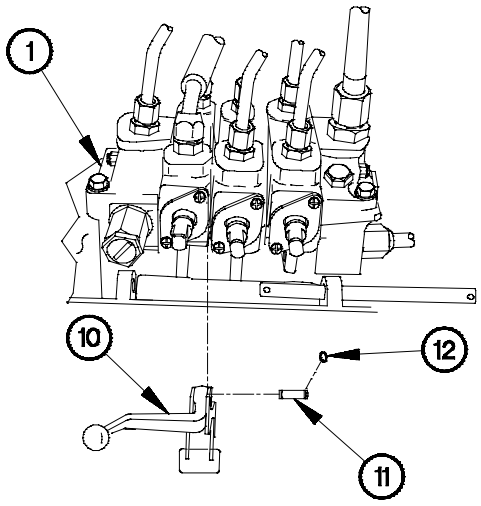
16-83. M1089 UPPER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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).

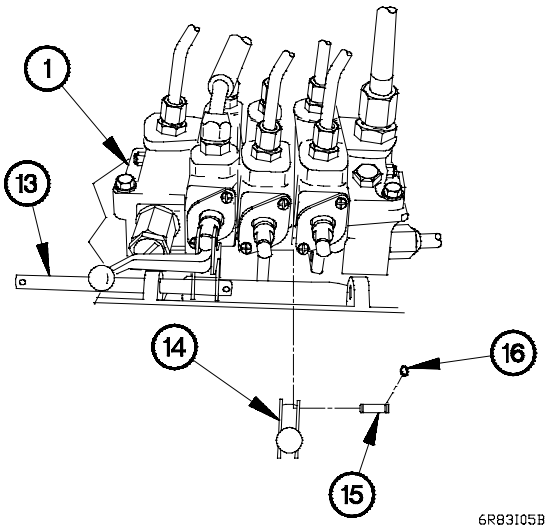




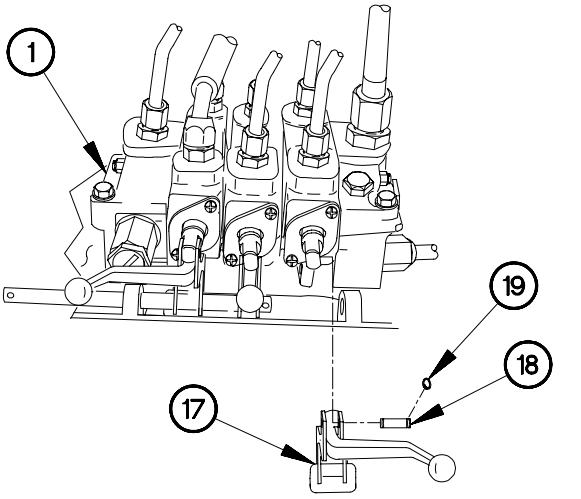
(7) Install handle (10), pin (11), and retaining rings (12) on upper control valve assembly (1).

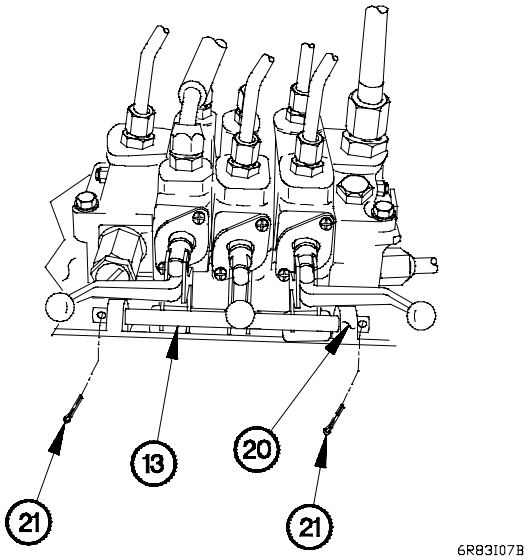
(8) Position rod (13) to left past handle (14).

(9) Install handle (14), pin (15), and retaining rings (16) on upper control valve assembly (1).



(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)

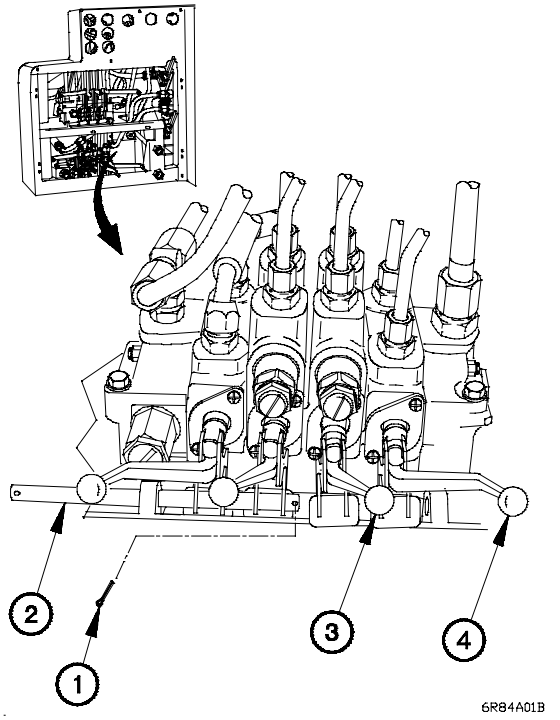
Materials/Parts
Packing, Preformed (2) (Item 230, Appendix F)
Packing, Preformed (2) (Item 232, Appendix F)
Packing, Preformed (8) (Item 237, Appendix F)
Lubricating Oil, Engine (Item 45, Appendix C)
Parts Kit, Seal Replacement (Item 313.3, Appendix F)
Parts Kit, Seal Replacement (Item 313.1, Appendix 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.

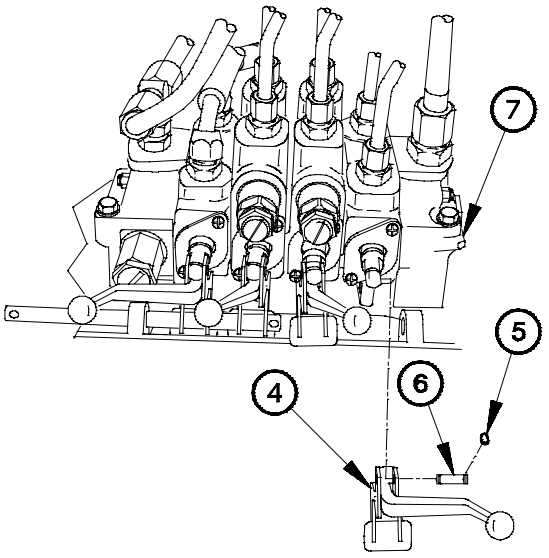
(2) Position rod (2) to the left past handles (3 and 4).

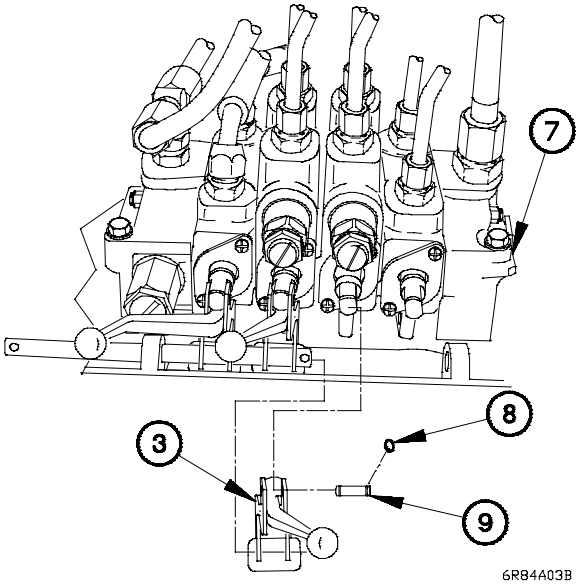


WARNING

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).

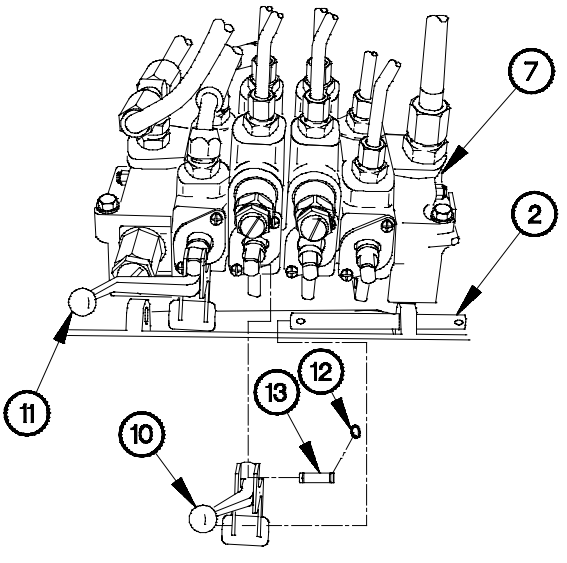




(4) Remove two retaining rings (8), pin (9), and handle (3) from lower control valve assembly (7).

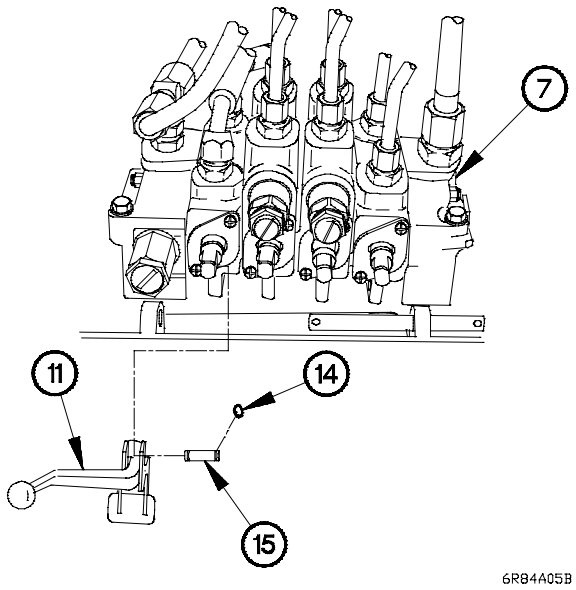
(5) Position rod (2) to the right past handles (10 and 11).

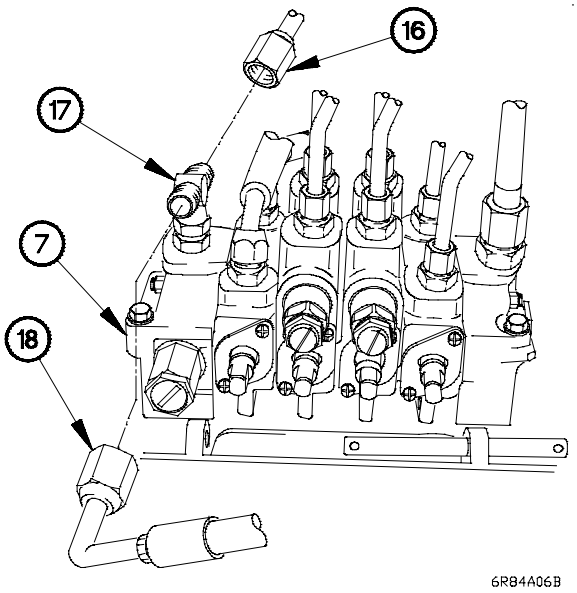
(6) Remove two retaining rings (12), pin (13), and handle (10) from lower control valve assembly (7).



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.

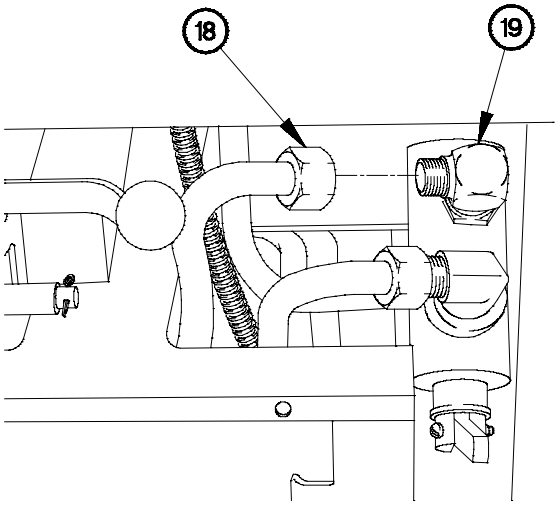
(8) Position drain pan under lower control valve assembly (7).

(9) Disconnect hydraulic tube (16) from tee fitting (17).

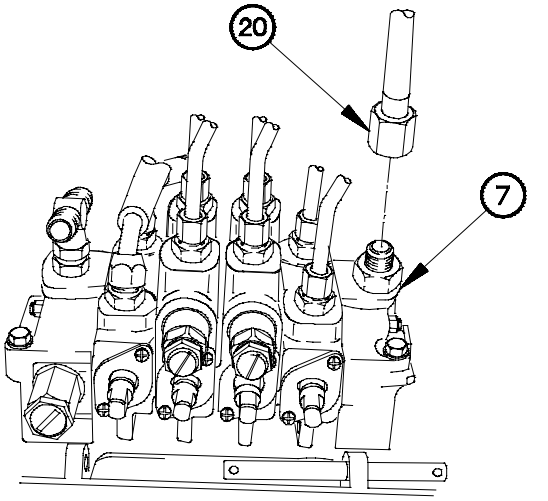
(10) Disconnect hydraulic tube (18) from tee fitting (17).

(11) Remove hydraulic tube (18) from 90-degree fitting (19).

(11.1) Remove hydraulic tube (18) from vehicle.



6R84A07B

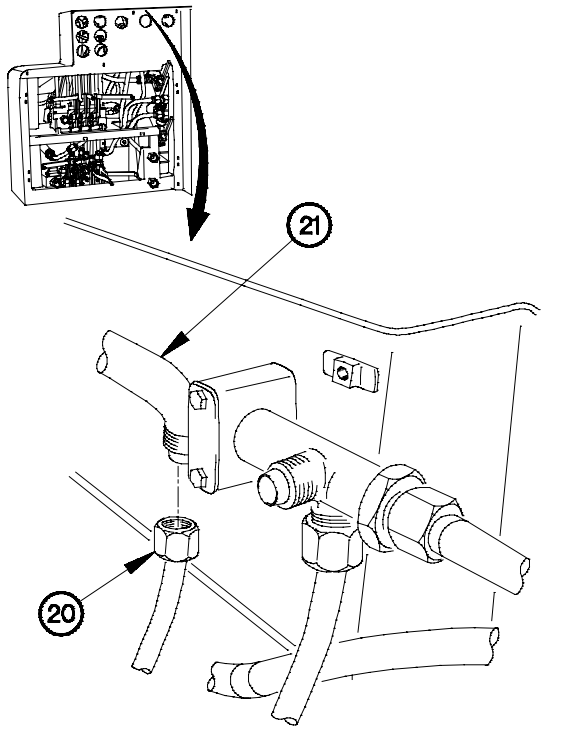


6R84A08B

(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.

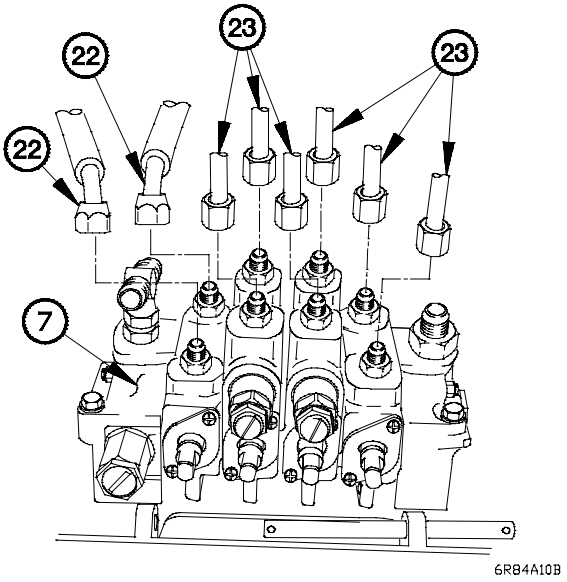


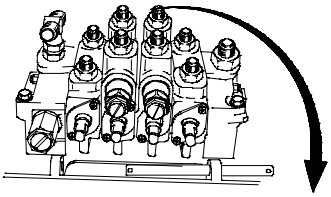
6R84A09B

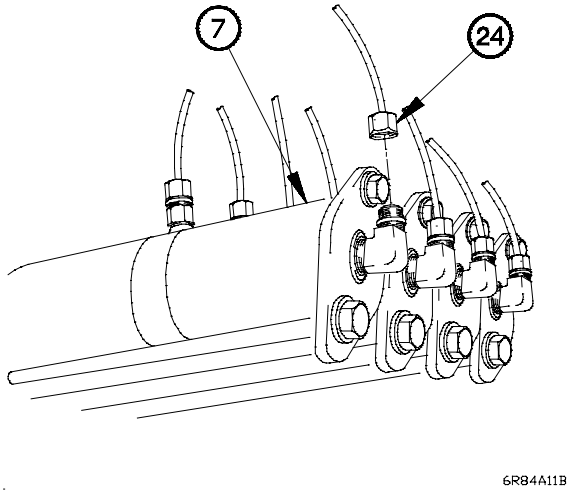
16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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

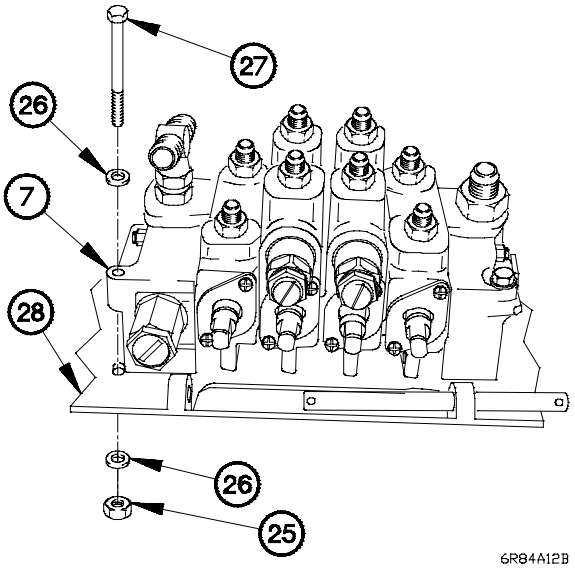
Tag air hoses prior to removal.

(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.

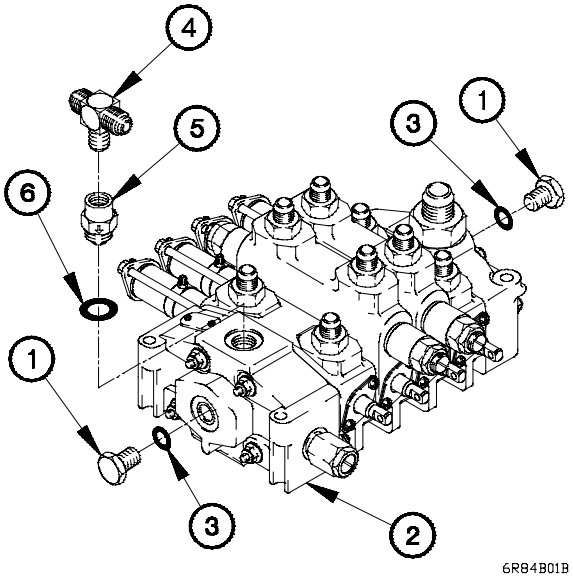
(1) Remove two plugs (1) from lower control valve assembly (2).

(2) Remove two preformed packings (3) from plugs (1). Discard preformed packings.

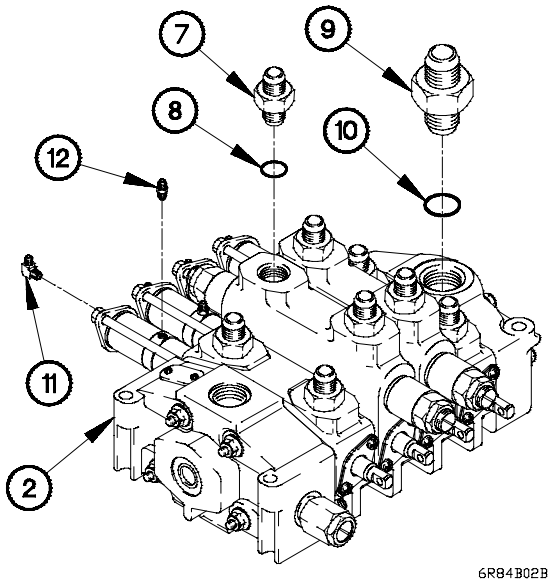
(3) Remove tee fitting (4) from adapter (5).

(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)

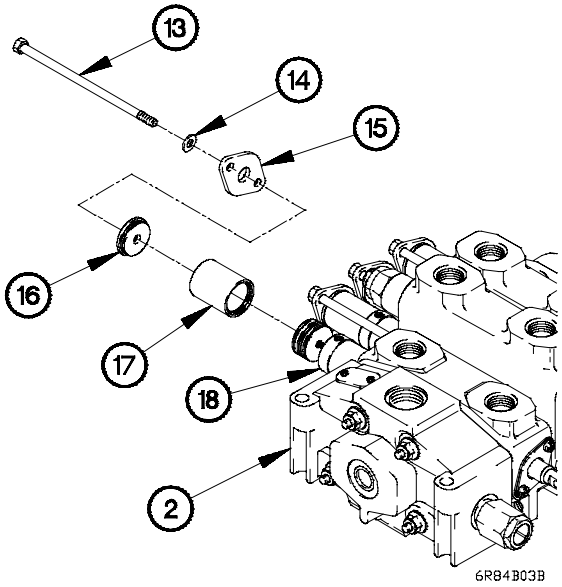
NOTE

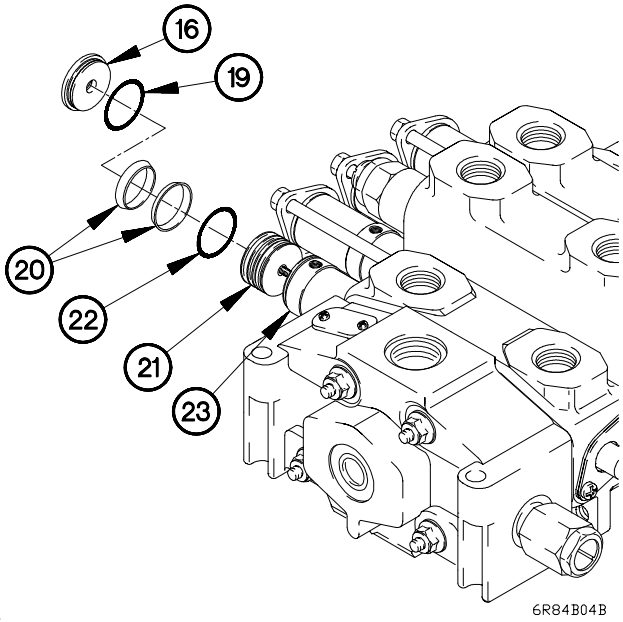
- All four solenoid valves are disassembled the same way. One solenoid valve shown.
- Note position of retaining plates prior to removal.

(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.

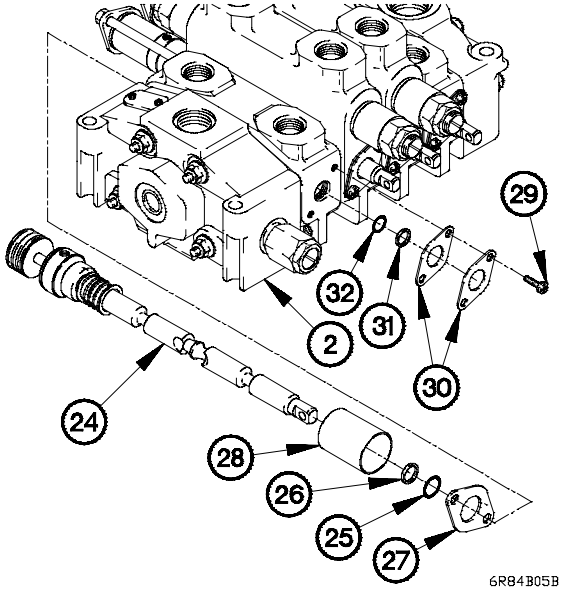
(18) Remove solenoid assembly (24) from lower control valve assembly (2).

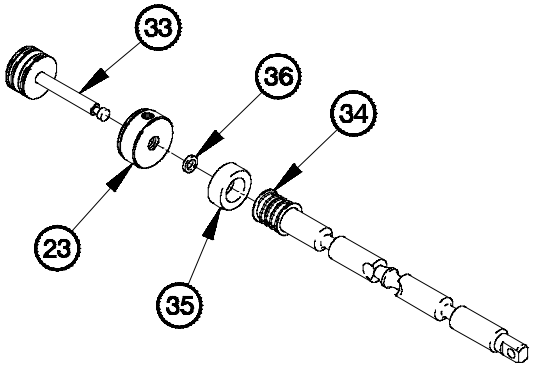
NOTE

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).

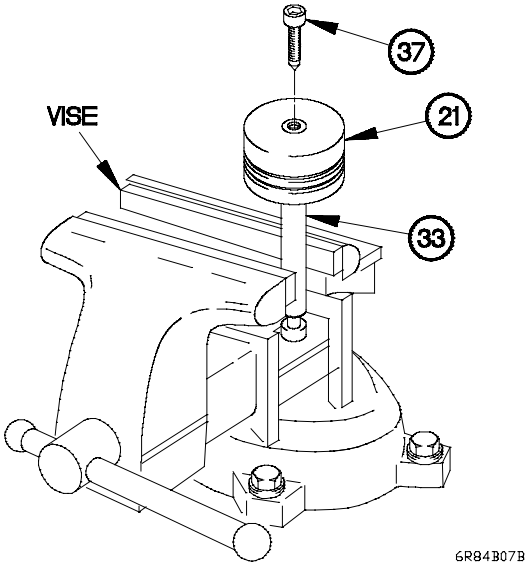
(23) Remove inner seal (36) from flange (23). Discard seal.

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).



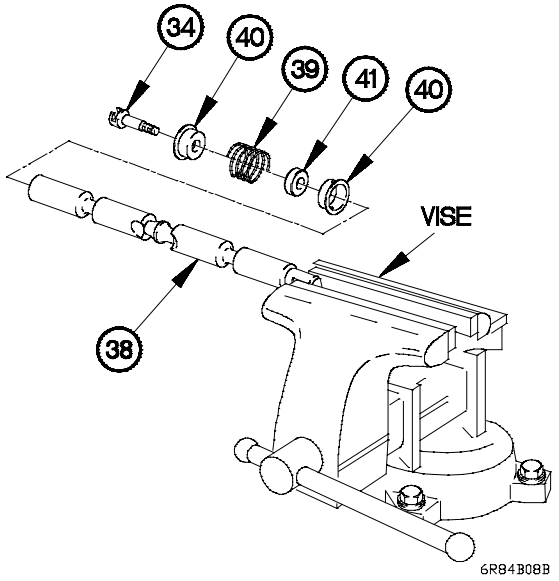
16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

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.

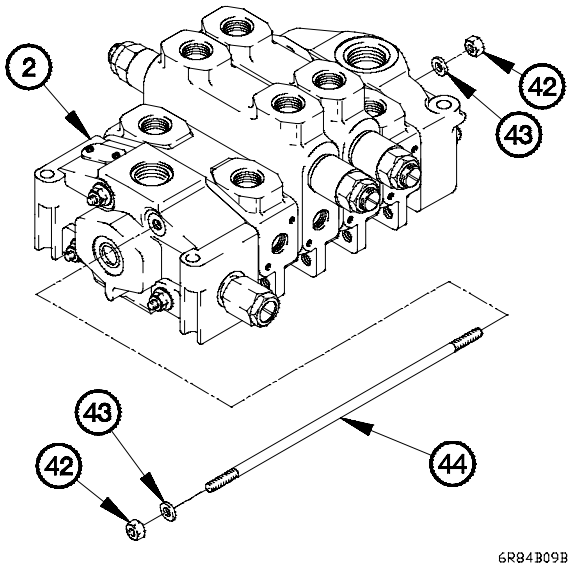
(27) Compress spring (39).

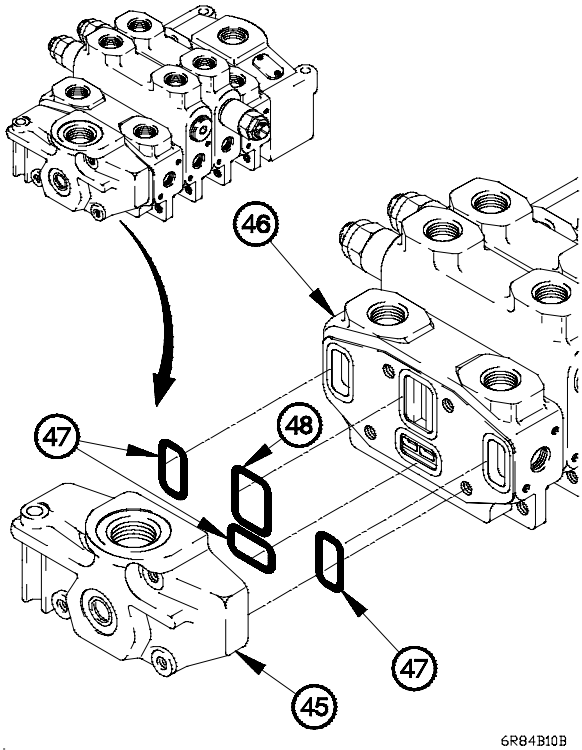
(28) Apply heat to linear valve (38) at threads of stripper bolt (34).

(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).

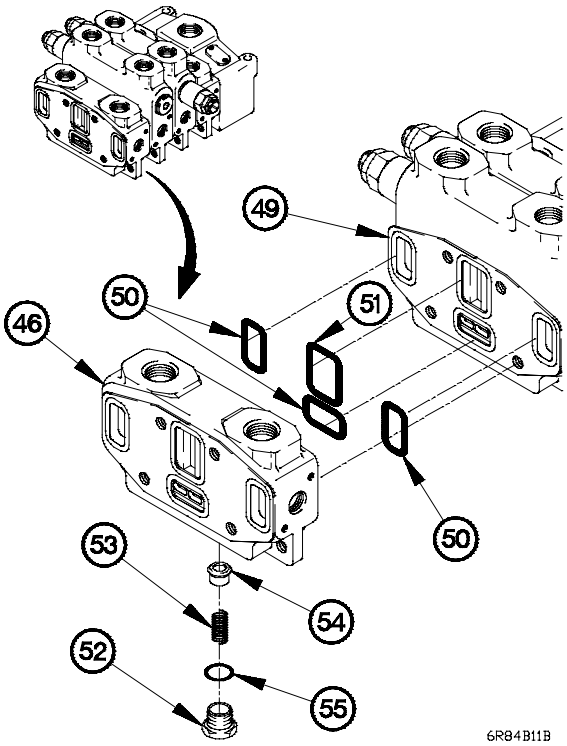




(32) Separate pump valve (45) from valve (46).

(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)

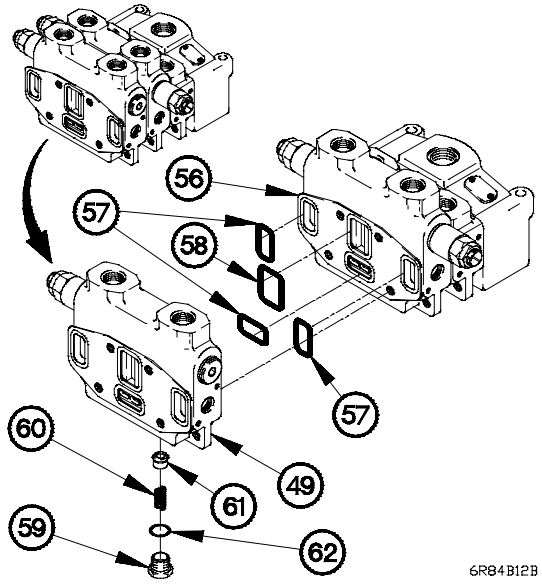
(40) Separate valve (49) from valve (56).

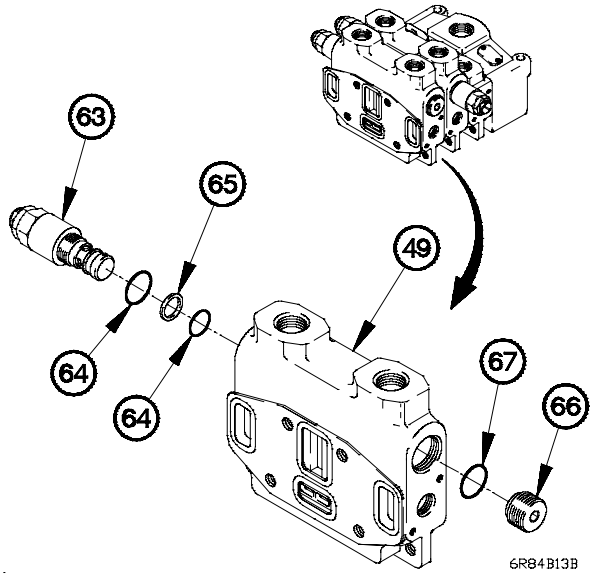
(41) Remove three gaskets (57) from valve (56). Discard three gaskets.

(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.

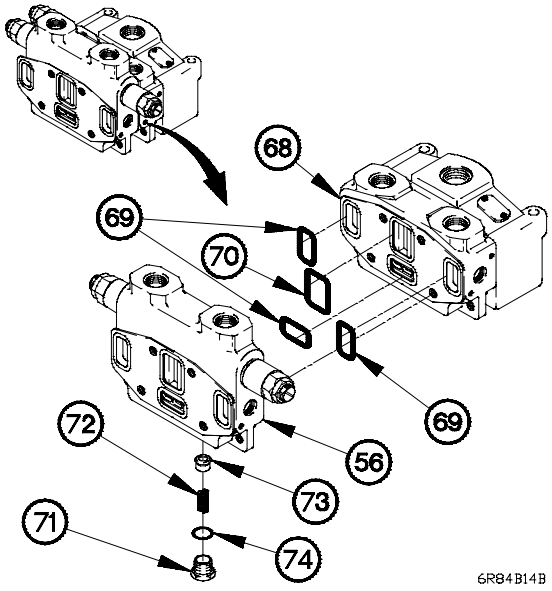
(49) Separate valve (56) from valve (68).

(50) Remove three gaskets (69) from valve (68). Discard three gaskets.

(51) Remove gasket (70) from valve (68). Discard gasket.

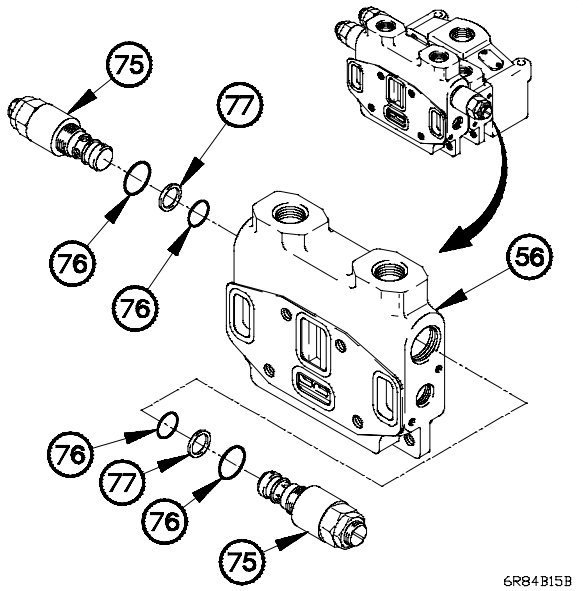
(52) Remove plug (71), spring (72) and pressure valve (73) from valve (68).

(53) Remove preformed packing (74) from plug (71). Discard preformed packing.

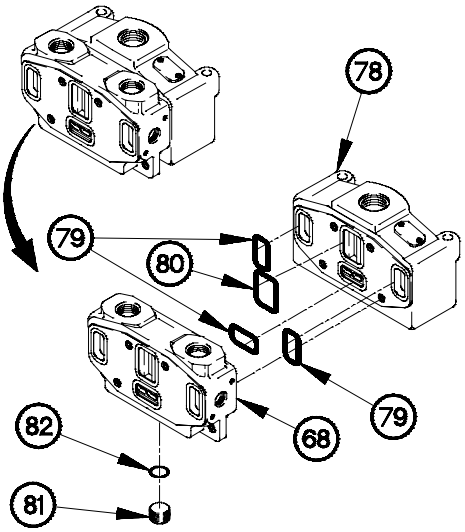


(54) Remove two pressure relief valves (75) from valve (56).

(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.

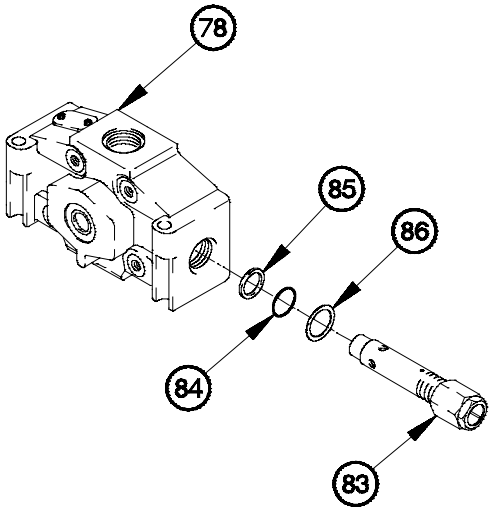
(58) Remove gasket (80) from valve (78). Discard gasket.

(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.

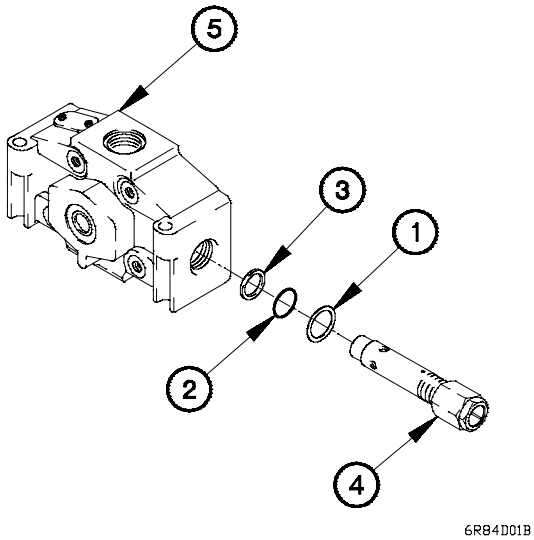
WARNING

- **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).

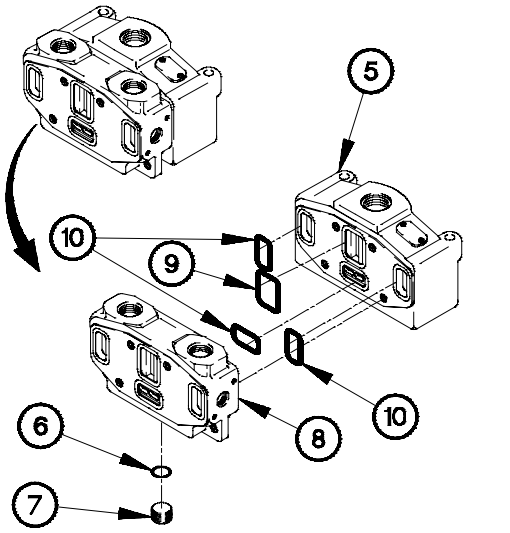
(4) Install preformed packing (6) on plug (7).

(5) Install plug (7) in valve (8).

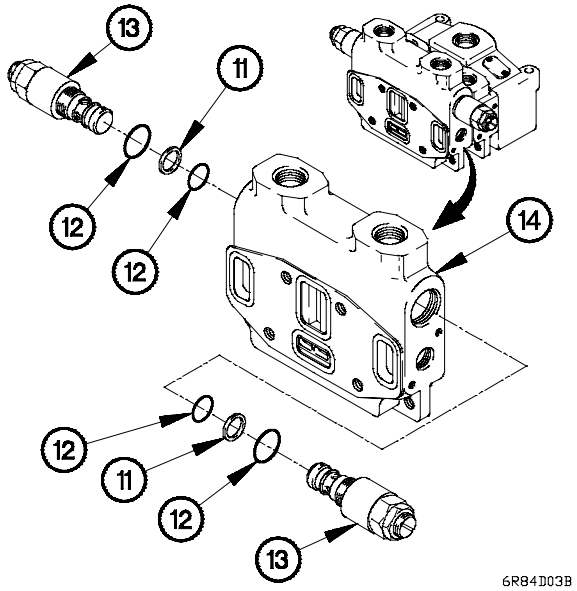
(6) Install gasket (9) in valve (5).

(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).

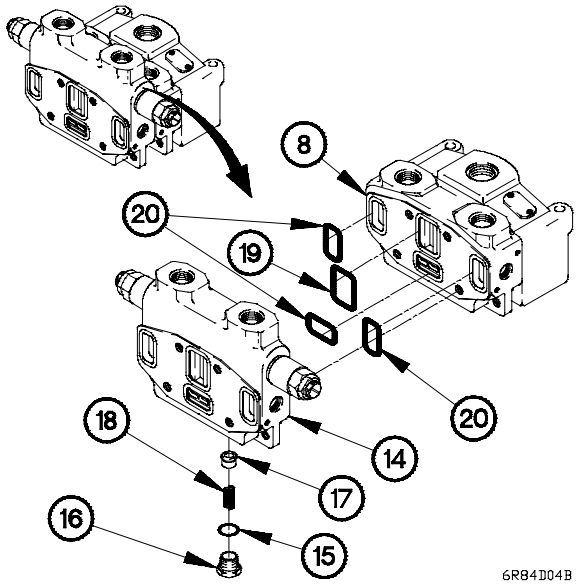
(12) Install preformed packing (15) on plug (16).

(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)

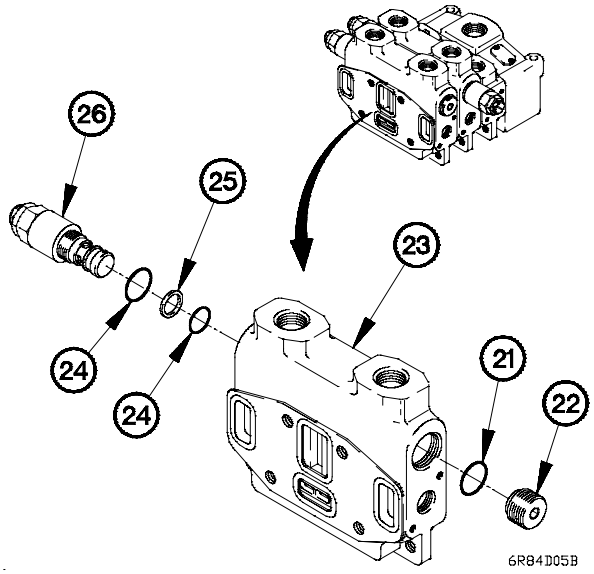
(17) Install preformed packing (21) on plug (22).

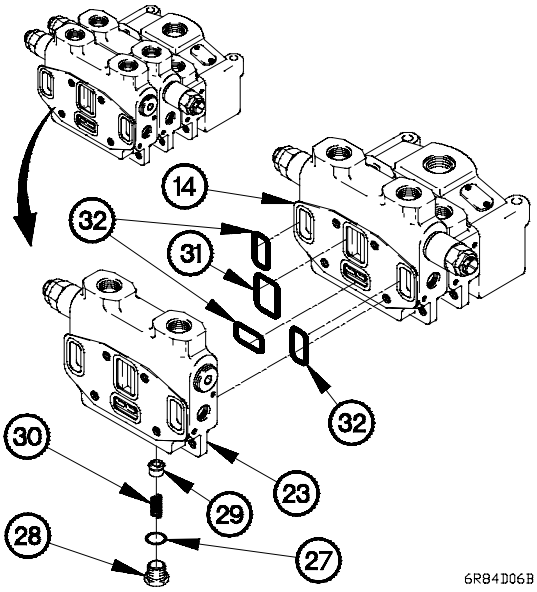
(18) Install plug (22) in valve (23).

(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).

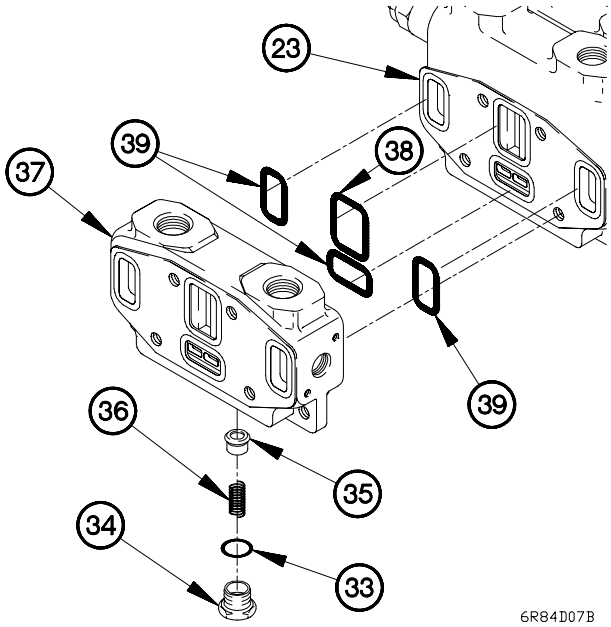
(27) Install preformed packing (33) on plug (34).

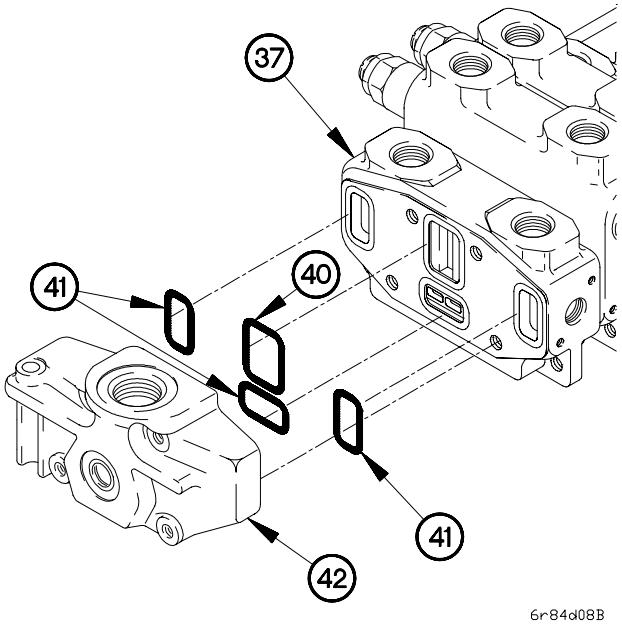
(28) Install pressure valve (35), spring (36), and plug (34) in valve (37).

(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).

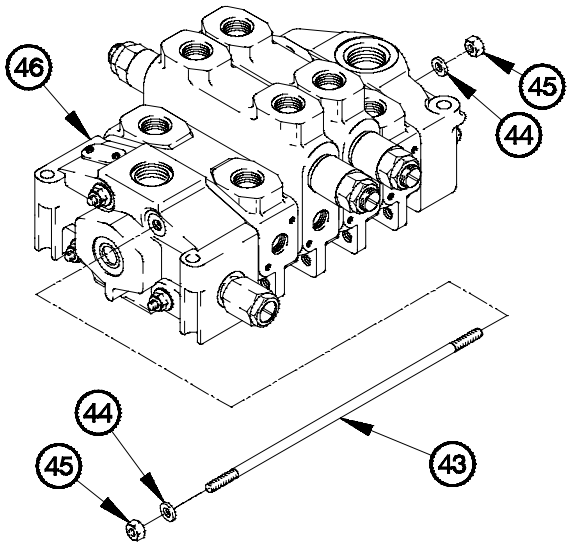
(34) Position valve (42) with valve (37).

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).

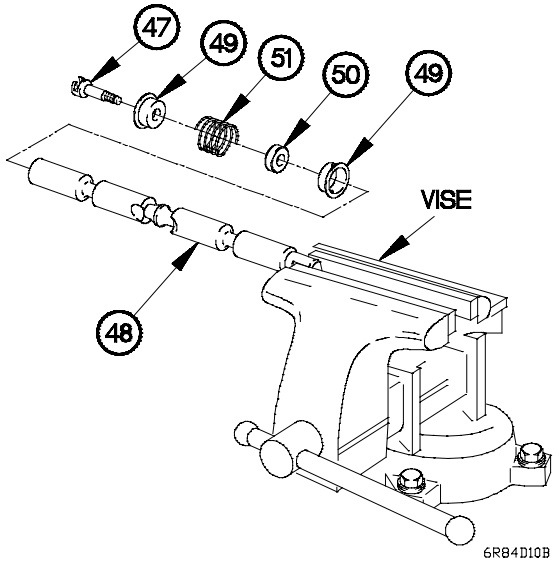
16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

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.

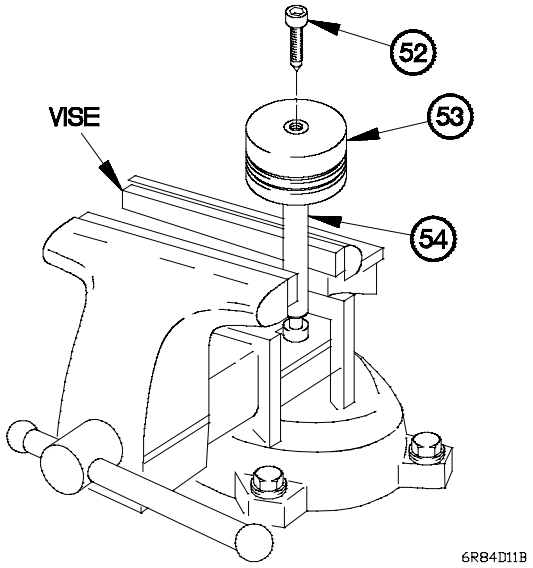
(40) Install two spring retainers (49), tube stop (50), and spring (51) on linear valve (48) with stripper bolt (47).

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).

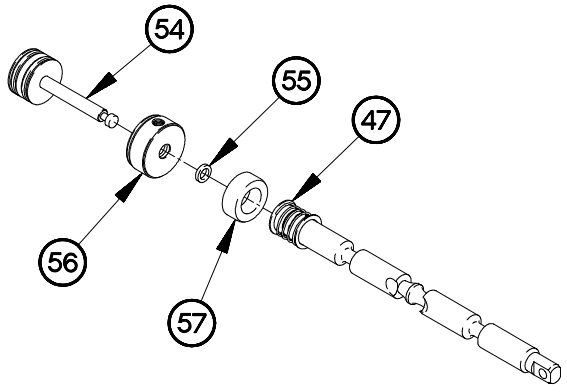


CAUTION

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).

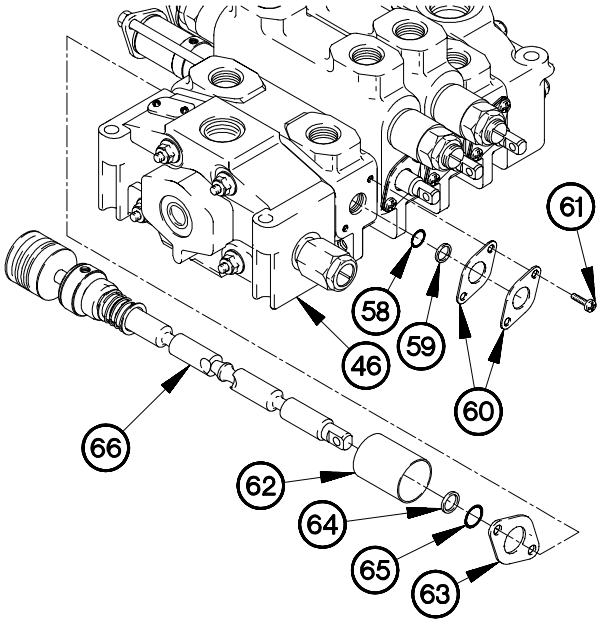
(46) Position flange (56) and spacer (57) on piston rod (54).

(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.

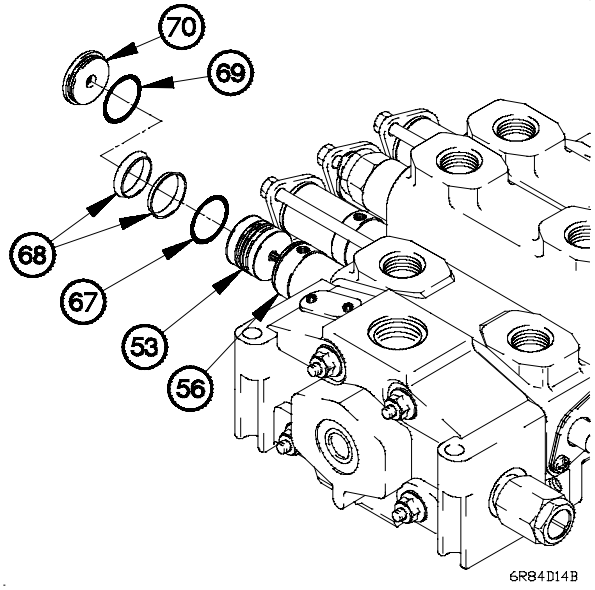


(48) Position seal (58), preformed packing (59), and two retaining plates (60) on lower control assembly valve (46) with two screws (61).

(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).

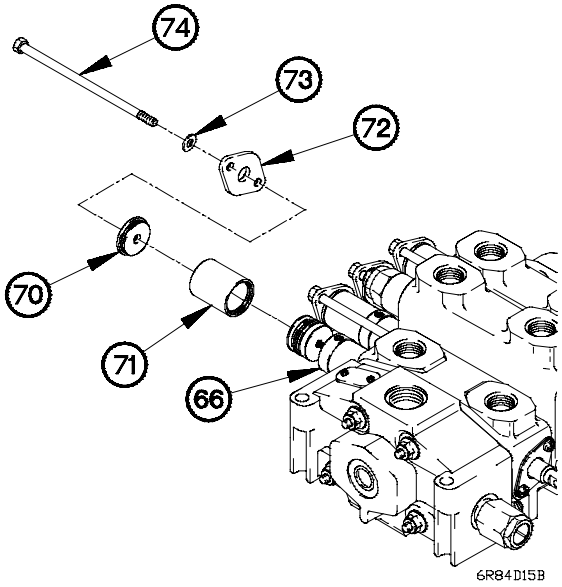
(50.1) Perform steps (38) through (50) on three remaining solenoid assemblies.



(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).

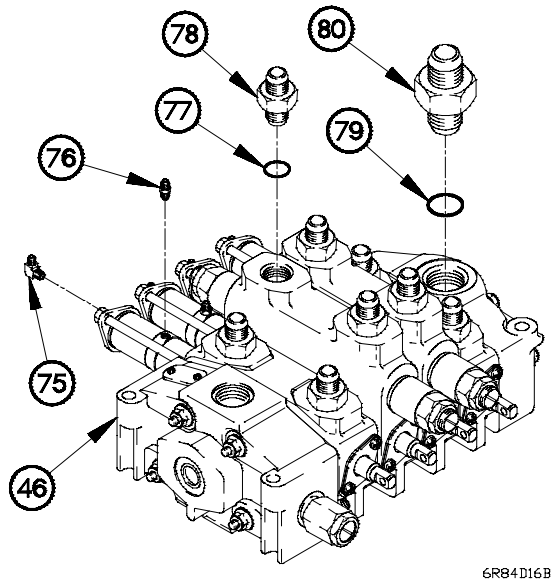
(60) Install four fittings (76) in lower control valve assembly (46).

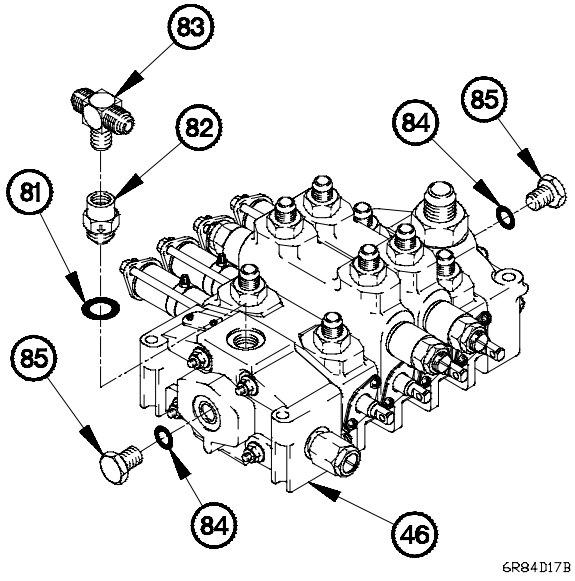
(61) Install preformed packing (77) on adapter (78).

(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).

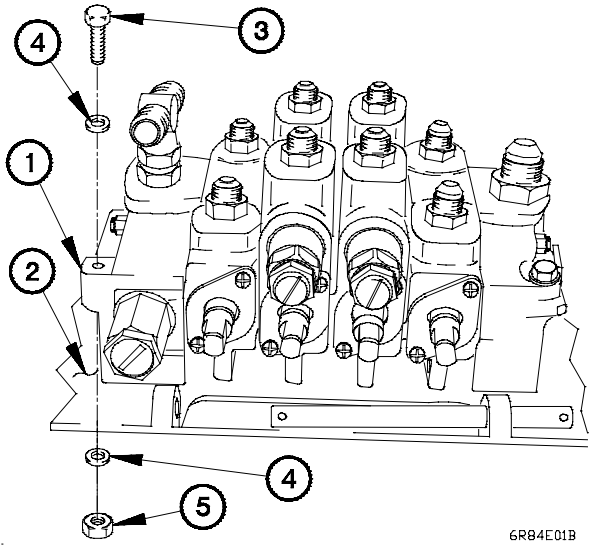
(69) Install two plugs (85) in lower control valve assembly (46).

e. Installation.

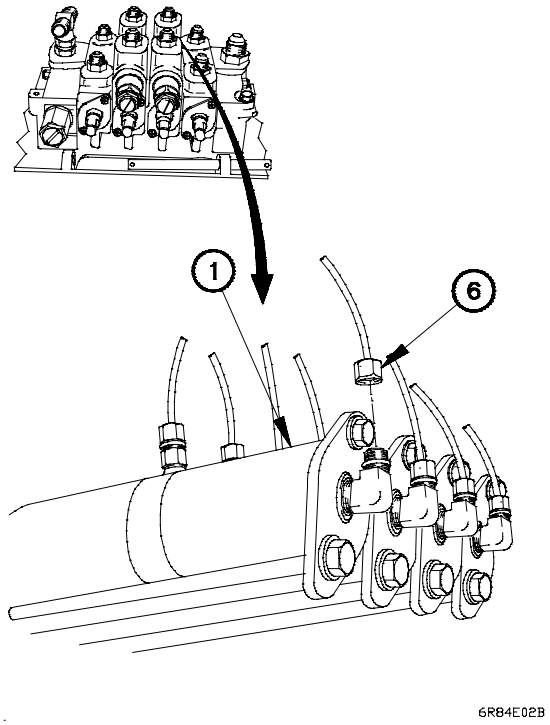
NOTE

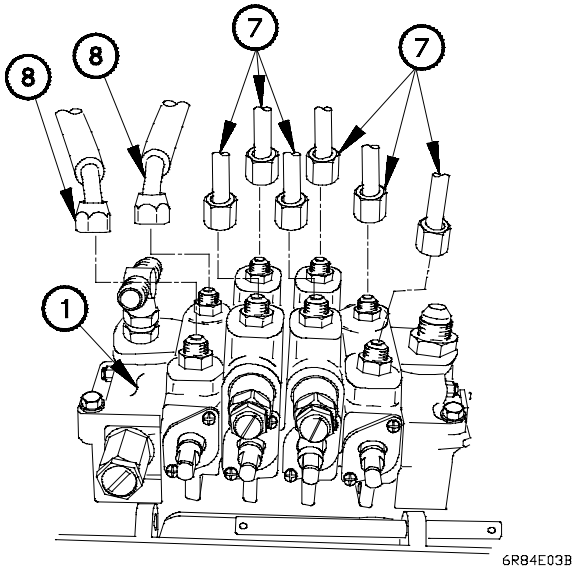
Step (1) requires the aid of an assistant.

(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).

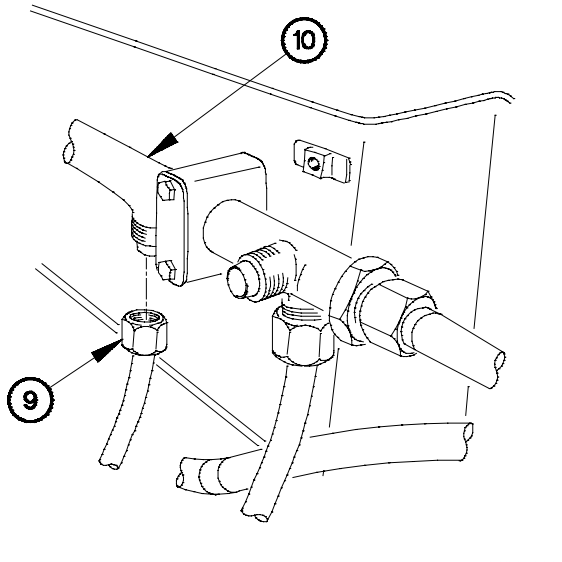




(3) Connect six hydraulic tubes (7) to lower control valve assembly (1).

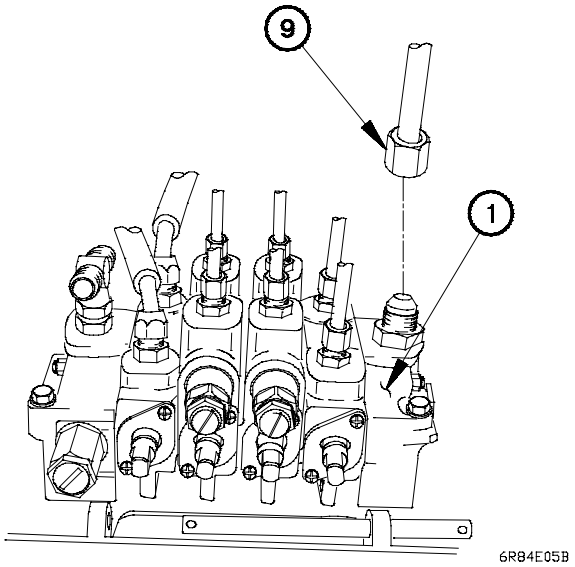
(4) Connect two hydraulic hoses (8) to lower control valve assembly (1).

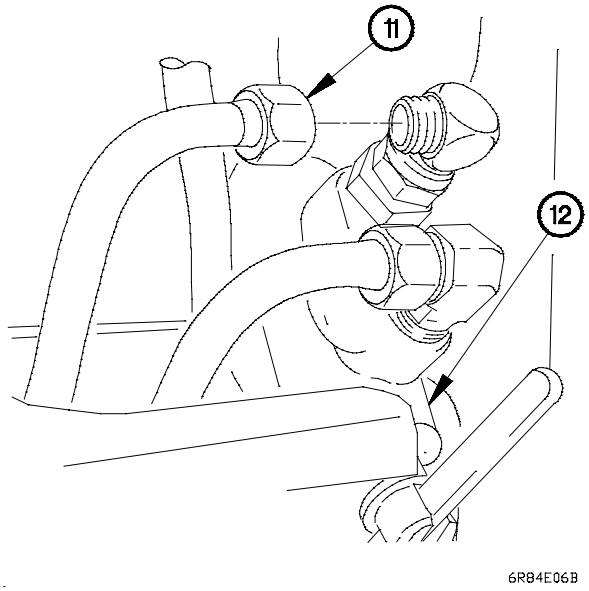
(5) Connect hydraulic tube (9) to tee fitting (10).



16-84. M1089 LOWER CONTROL VALVE ASSEMBLY REPLACEMENT/REPAIR (CONT)

(6) Connect hydraulic tube (9) to lower control valve assembly (1).

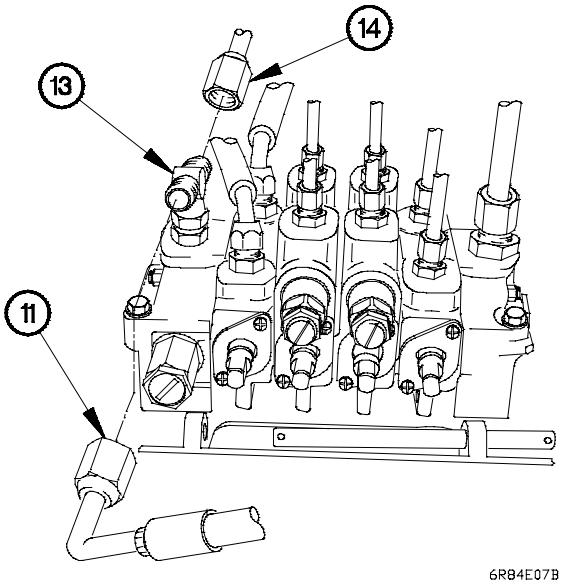




(7) Connect hydraulic tube (11) to SECONDARY CIRCUIT SELECTOR VALVE (12).

(8) Connect hydraulic tube (11) to tee fitting (13).

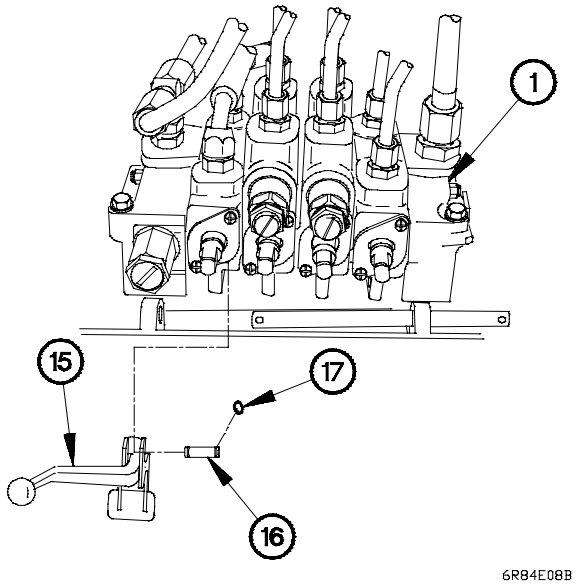
(9) Connect hydraulic tube (14) to tee fitting (13).

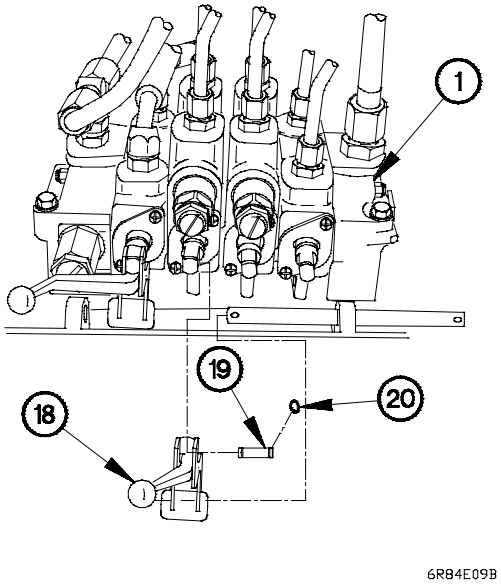


WARNING

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).

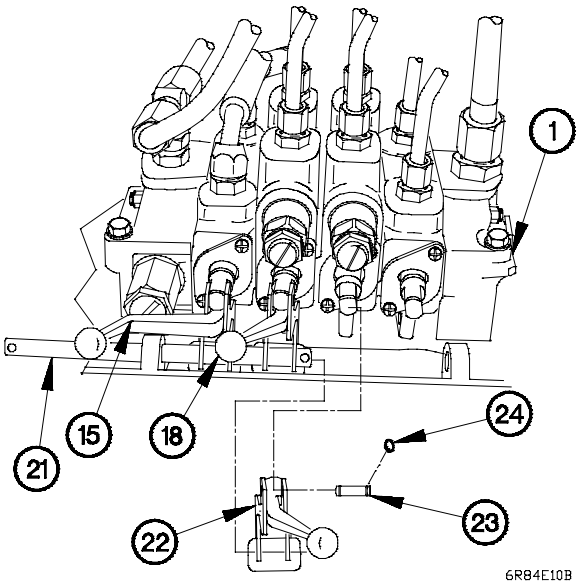




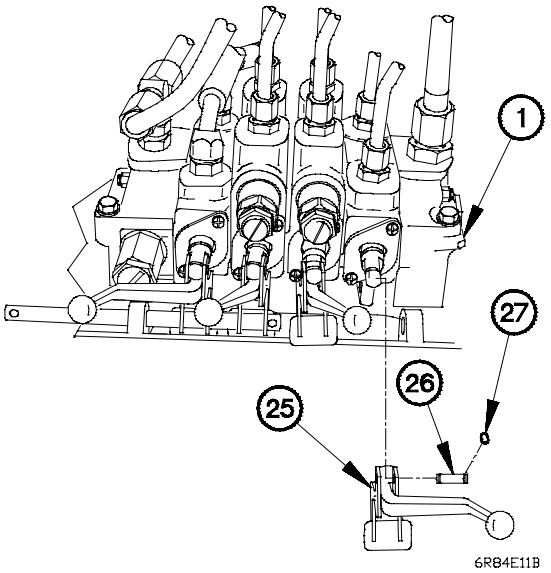
(11) Install handle (18), pin (19), and two retaining rings (20) on lower control valve assembly (1).

(12) Position rod (21) to left through handles (15 and 18).

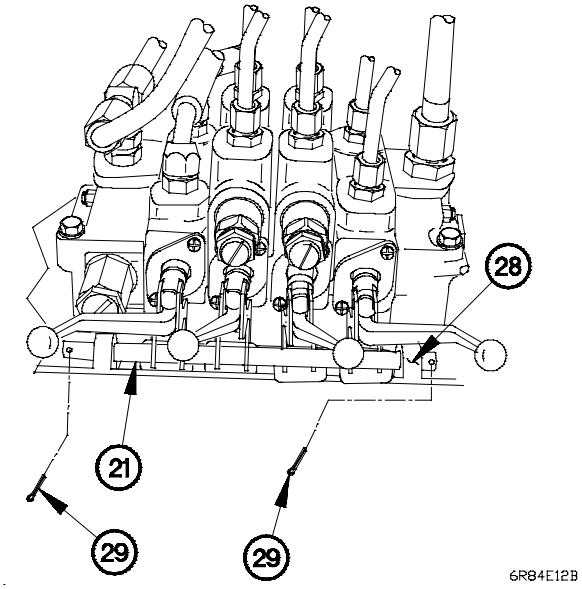
(13) Install handle (22), pin (23), and two retaining rings (24) on lower control valve assembly (1).



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

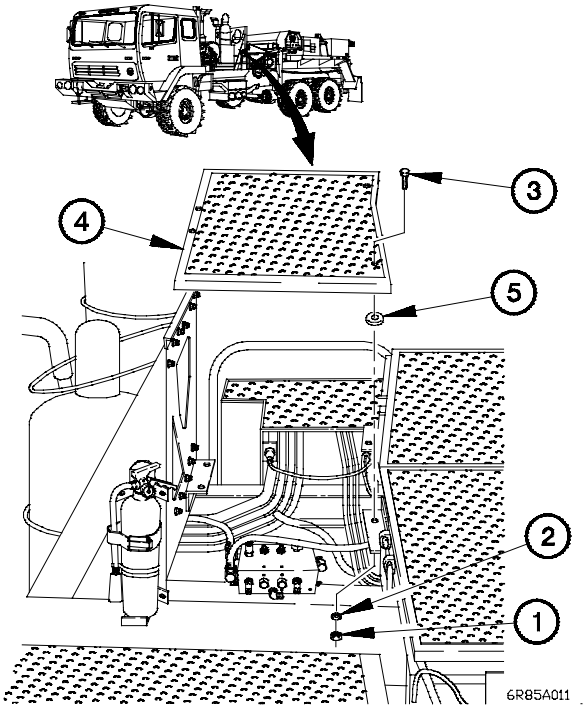
Personnel Required
(3)

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

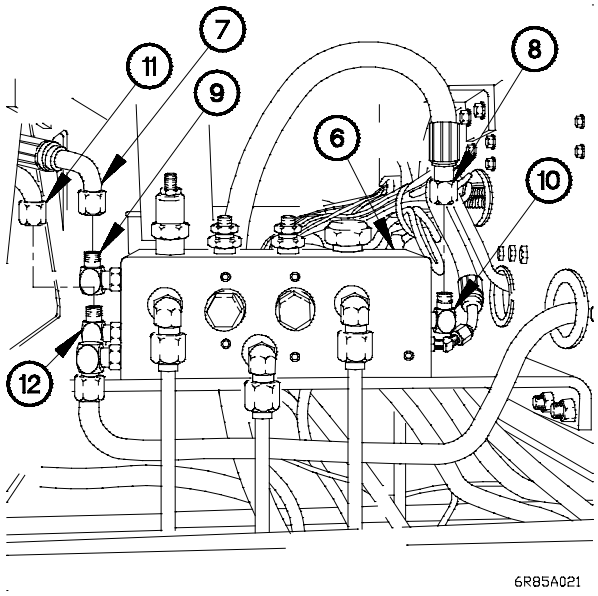
- Note position of fittings prior to removal.
- Tag hydraulic hoses, tubes, and connect-ion points prior to disconnecting.

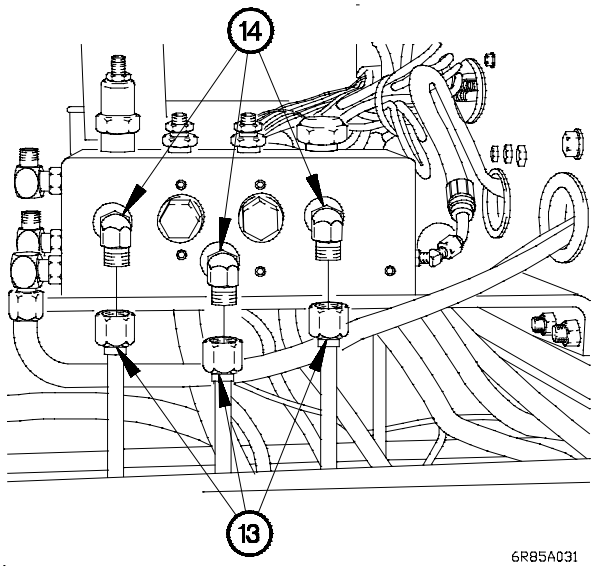
(2) Position drain pan under monoblock valve (6).

(3) Disconnect hoses (7 and 8) from 90-degree fittings (9 and 10).

(4) Loosen 90-degree fitting (9) on monoblock valve (6).

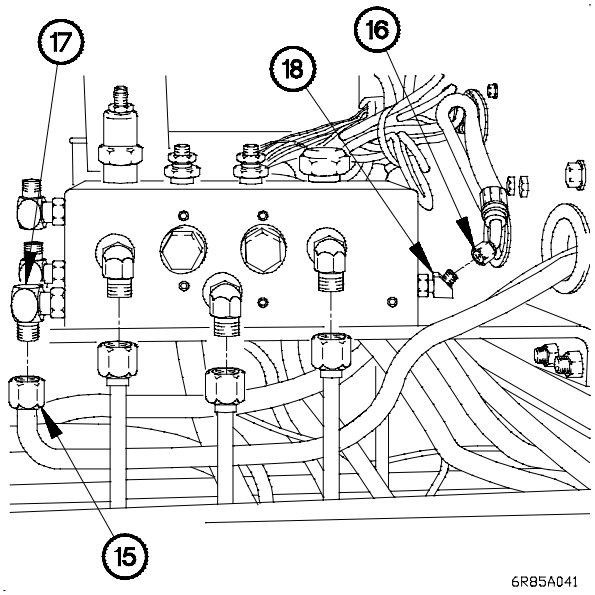
(5) Disconnect hose (11) from 90-degree fitting (12).



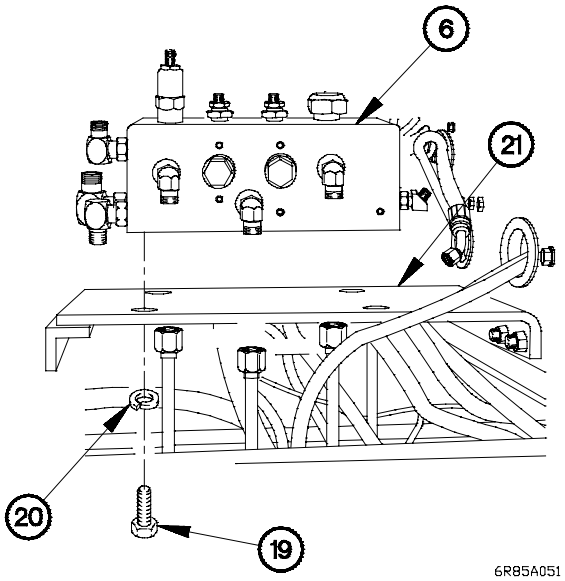


(6) Disconnect three tubes (13) from 90-degree fittings (14).

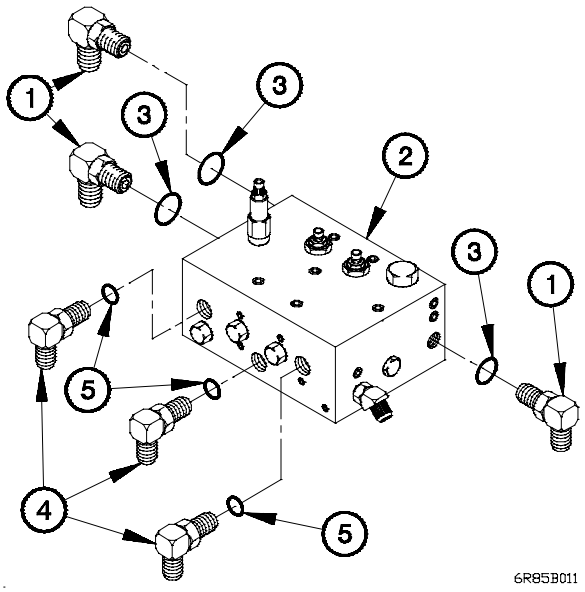
(7) Disconnect hoses (15 and 16) from 90-degree fitting (17) and 45-degree fitting (18).



(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).

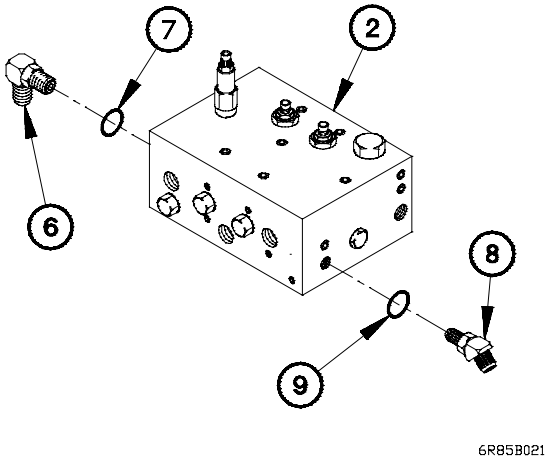
(4) Remove three preformed packings (5) from 90-degree fittings (4). Discard preformed packings.

(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.

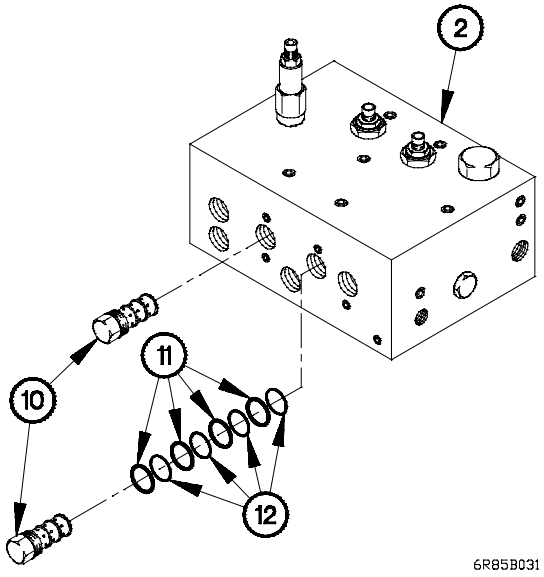


16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

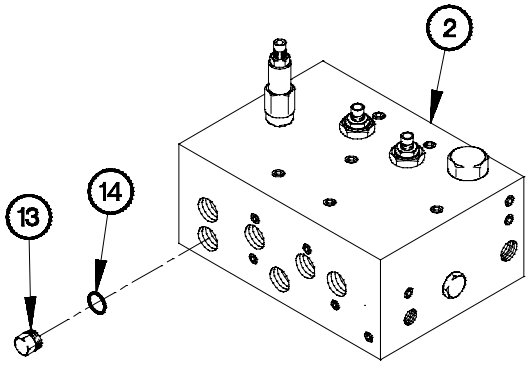
(9) Remove two three-way check valves (10) from monoblock valve (2).

(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).



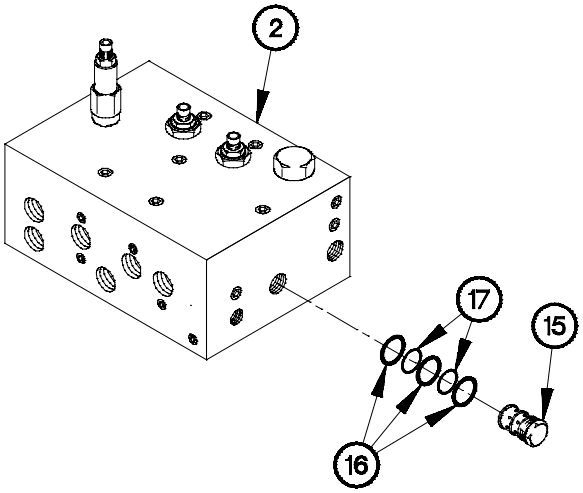
6R85B031



(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).

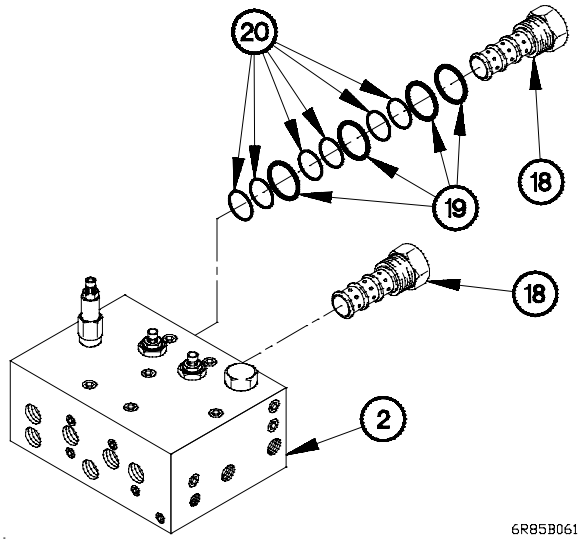
(15) Remove three preformed packings (16) and two back-up rings (17) from shuttle valve (15). Discard preformed packings and back-up rings.

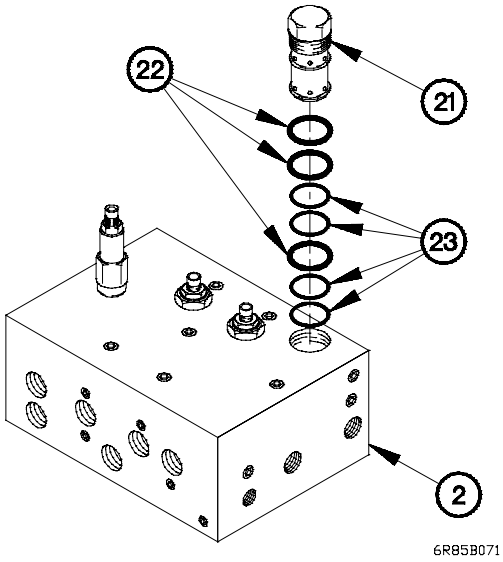
6R85B051

(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).





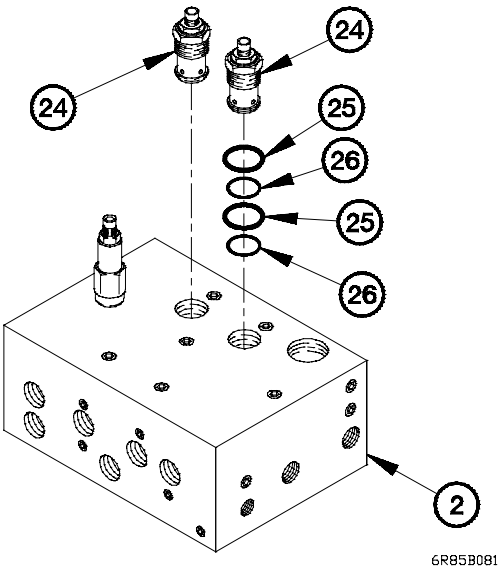
(19) Remove valve (21) from monoblock valve (2).

(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.

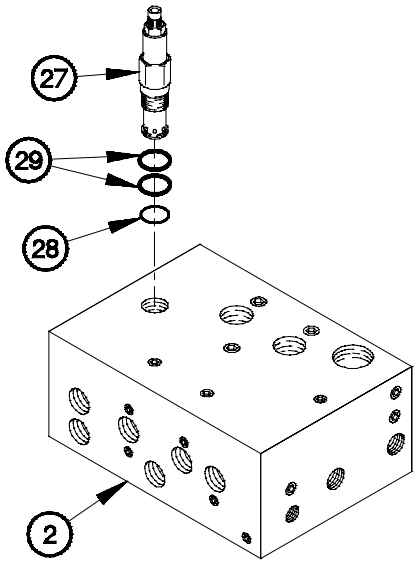
(23) Perform step (22) on remaining check valve (24).



16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

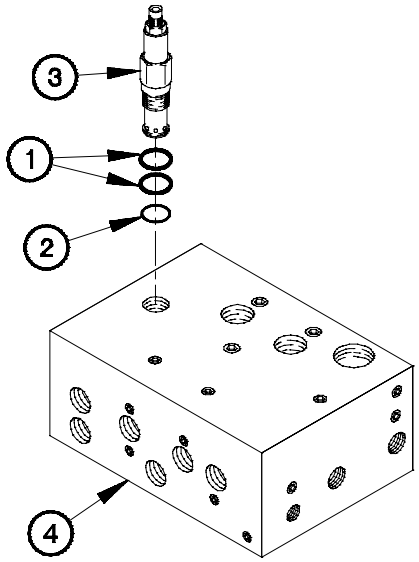
(24) Remove valve (27) from monoblock valve (2).

(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).

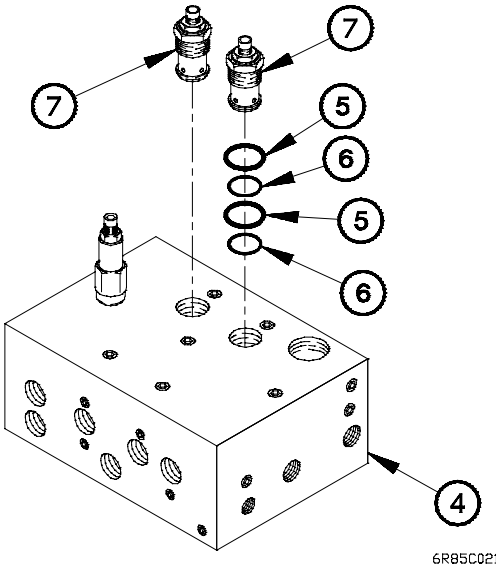
(3) Tighten valve (3) to 35-40 lb-ft (47-54 N·m).

(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).

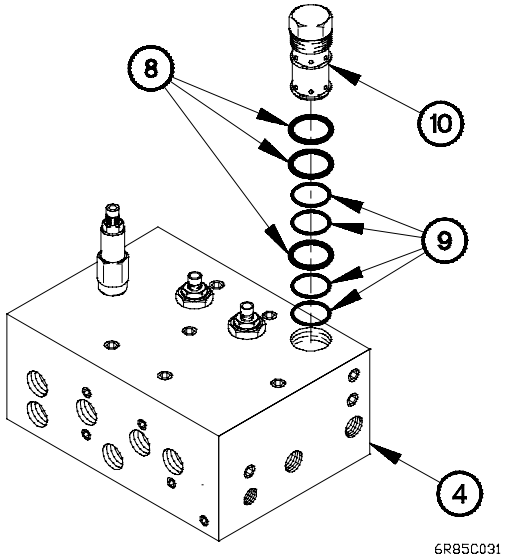


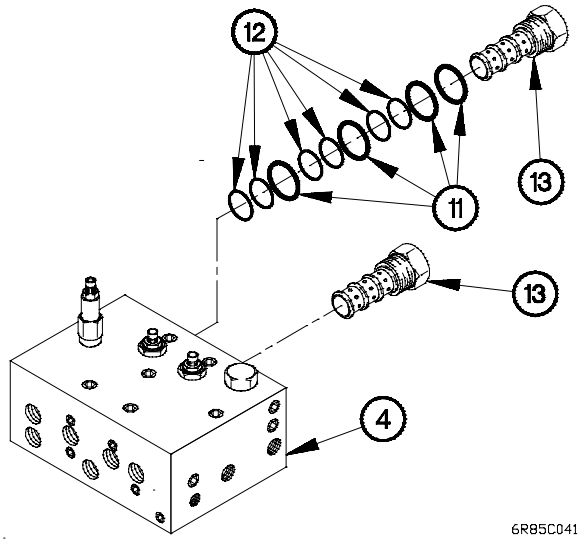
6R85C021

(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).

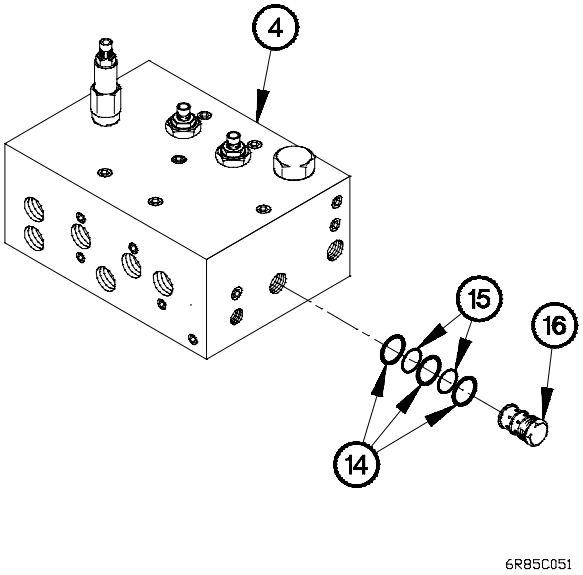
(13) Position two cartridge valves (13) in monoblock valve (4).

(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).

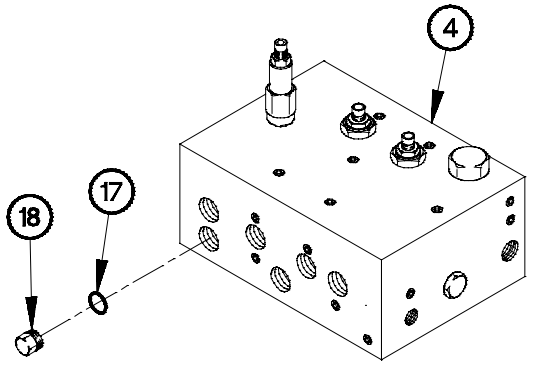


16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

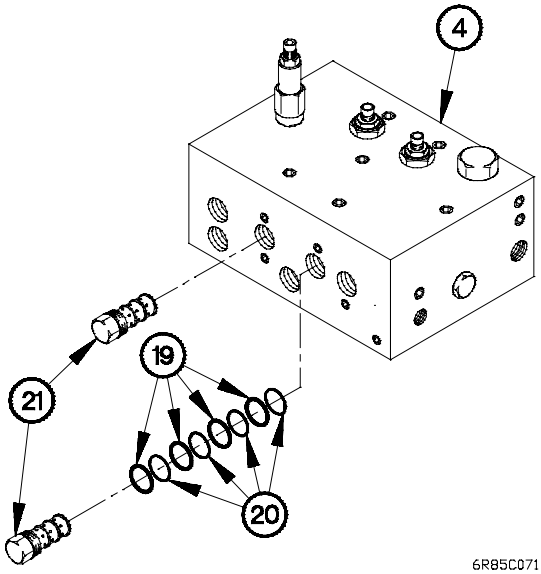
(18) Install preformed packing (17) on plug (18).

(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).

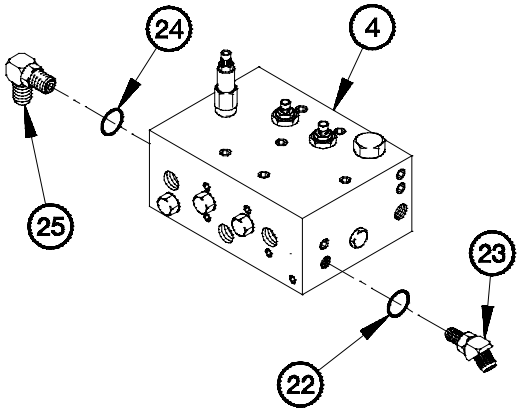
(26) Position 45-degree fitting (23) and in monoblock valve (4).

(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).

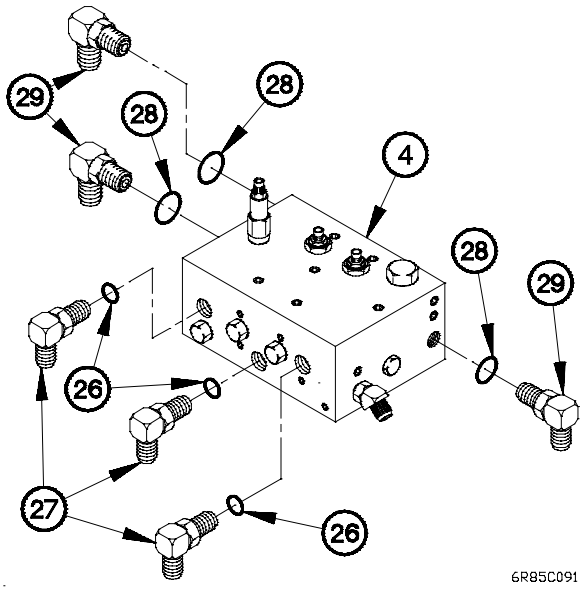
(32) Position 90-degree fitting (27) in monoblock valve (4).

(33) Tighten 90-degree fitting (27) to 36-39 lb-ft (49-53 N·m).

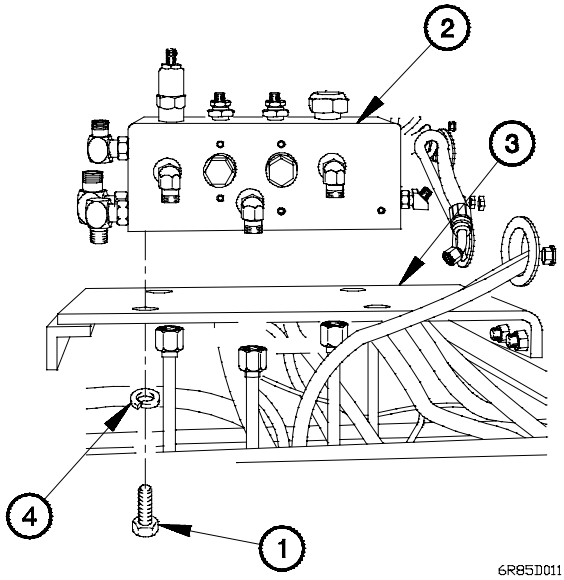
(34) Install three preformed packings (28) on fittings (29).

(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).

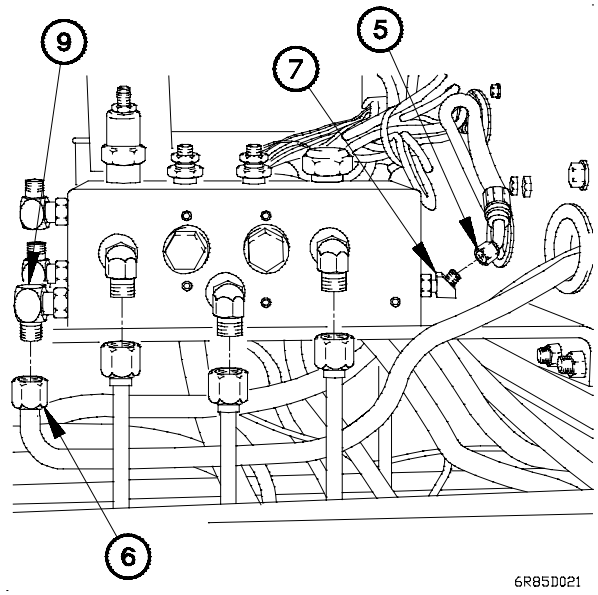
(3) Tighten four screws (1) to 33-37 lb-ft (45-50 N·m).

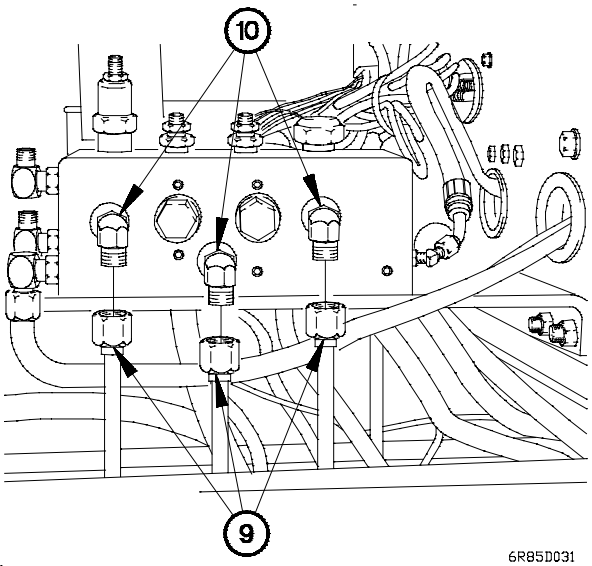
16-85. M1089 MONOBLOCK VALVE REPLACEMENT/ADJUSTMENT (CONT)

(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).

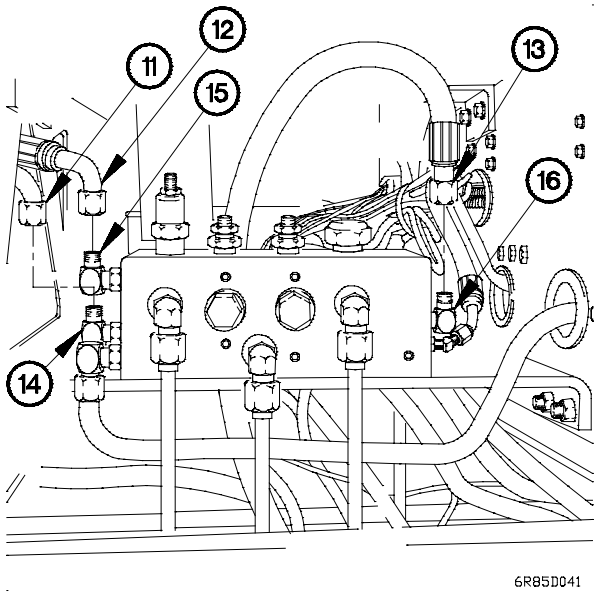
WARNING

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).

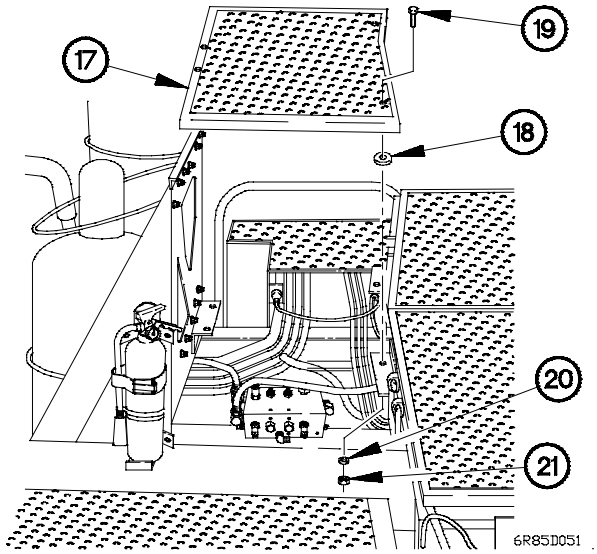
(11) Tighten 90-degree fittings (14, 15, and 16) to 109-114 lb-ft (148-155 N·m).

(12) Tighten hoses (11, 12, and 13) to 79-88 lb-ft (107-119 N·m).

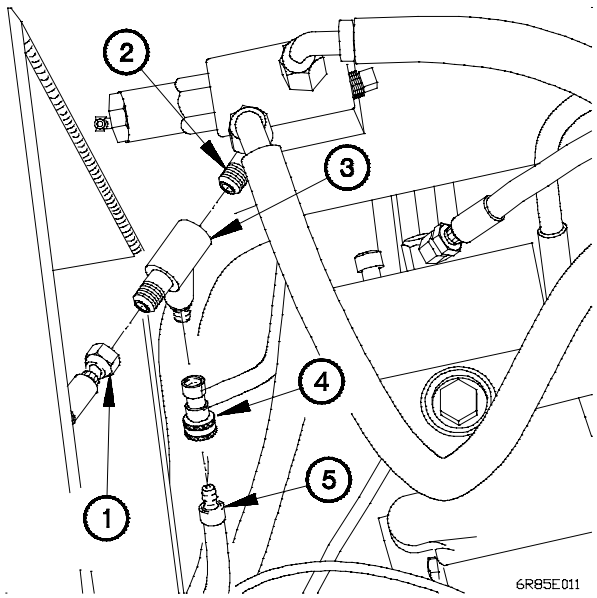


(13) Position catwalk (17) on vehicle with four isolators (18), screws (19), washers (20), and self-locking nuts (21).

(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).

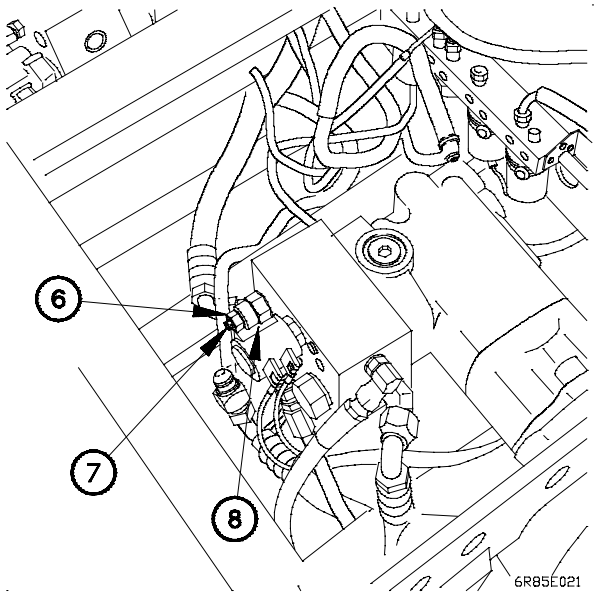
CAUTION

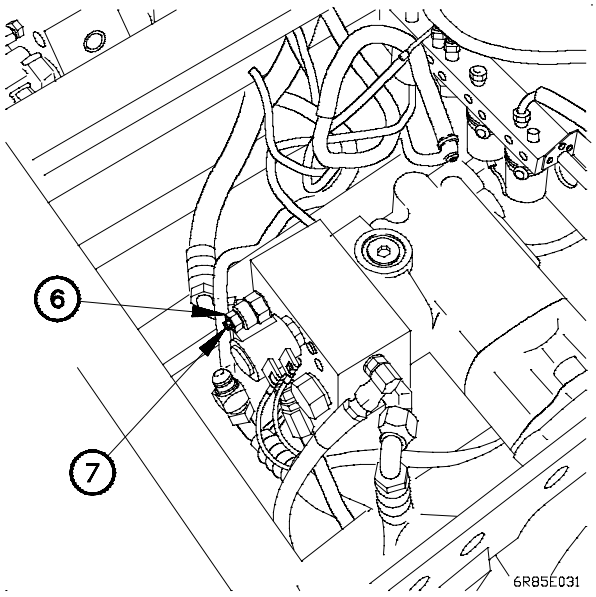
Perform step (11) at 1350 RPM. Failure to comply may result in an inaccurate reading.

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).

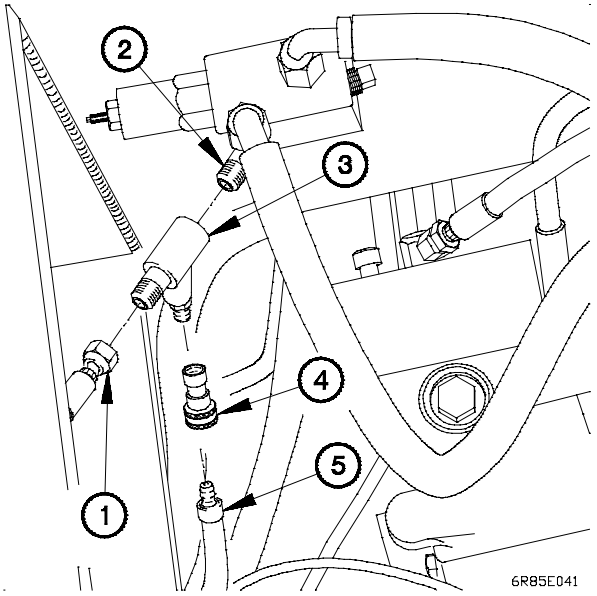
(19) Disconnect hose (1) from adapter (3).

(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).

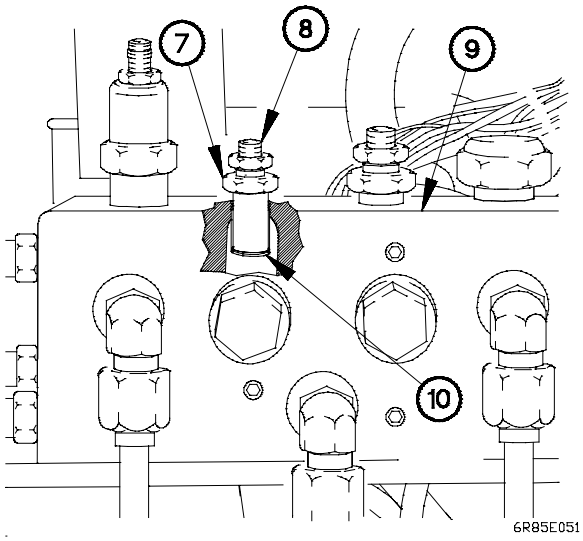
(23) Perform steps (1) through (22) for right side pilot pressure.



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.

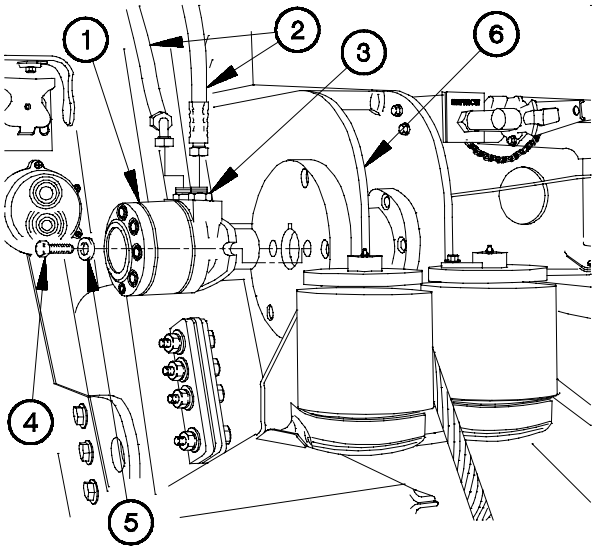
NOTE

- 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).



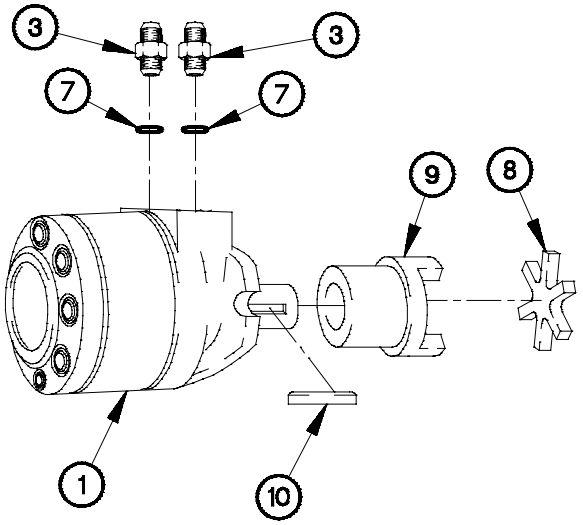
16-86. PAY-OUT HYDRAULIC MOTOR REPLACEMENT (CONT)

(4) Remove two fittings (3) from pay-out hydraulic motor (1).

(5) Remove two preformed packings (7) from fittings (3). Discard preformed packings.

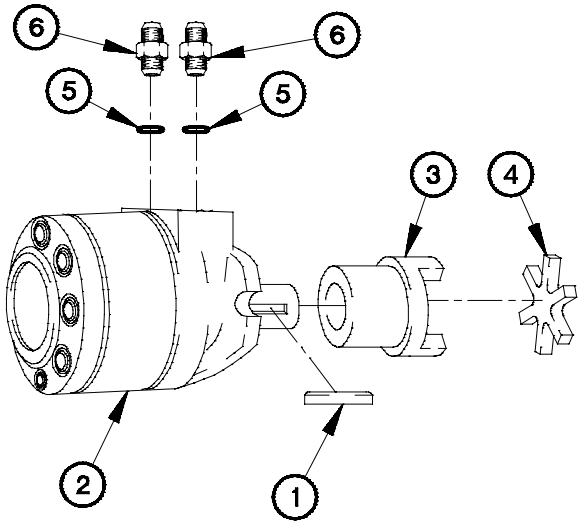
(6) Remove star gear (8) and drive gear (9) from pay-out hydraulic motor (1).

(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.

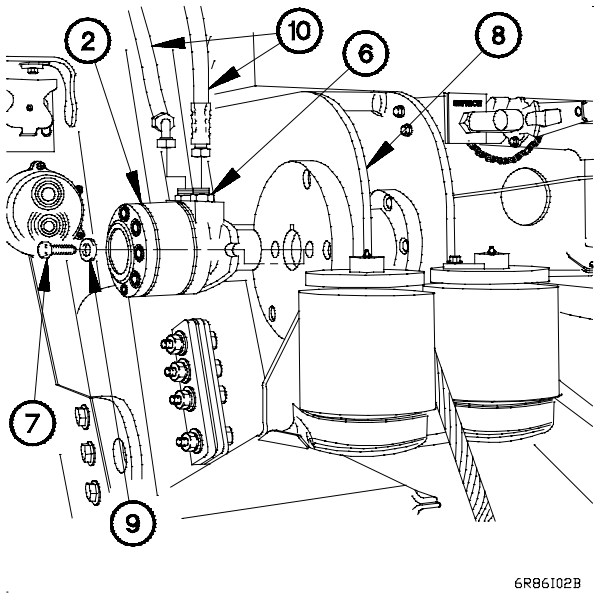
(5) Apply sealing compound to threads of two bolts (7).

(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. Disassembly
c. Assembly
d. Installation
e. Adjustment
f. 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
Preformed Packings (2) (Item 237 Appendix F
Cap and Plug Set (Item 17, Appendix C)
Nut, Self-Locking (2) (Item 177, Appendix F)
Sealant (Item 65.1 Appendix C).

Personnel Required
(2)

a. Removal.

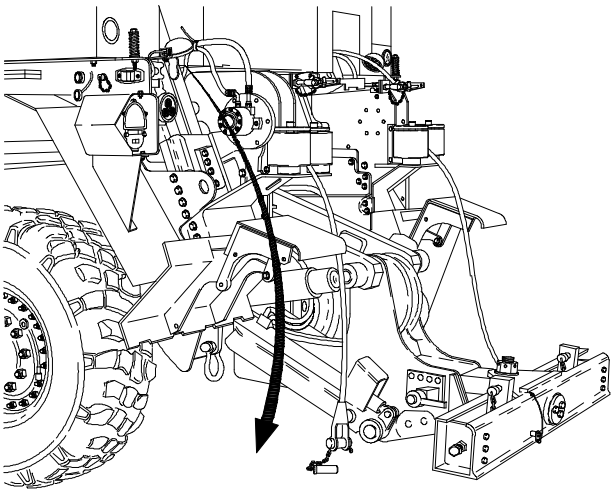
CAUTION

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.

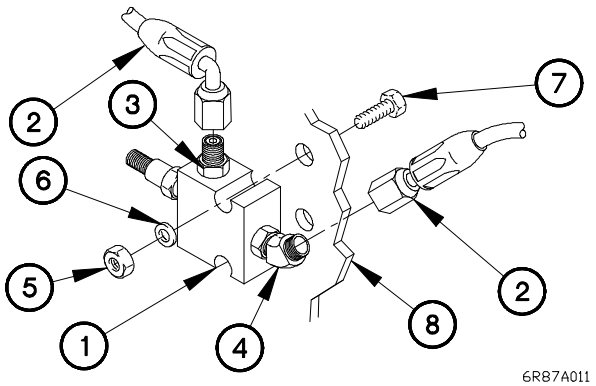


(1) Position drain pan under relief valve (1).

(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. Disassembly

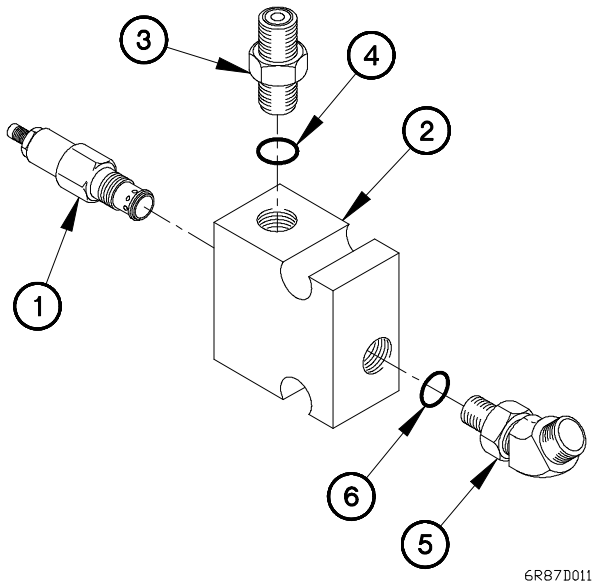
(1) Remove valve (1) from relief valve (2).

(2) Remove fitting (3) from relief valve (2).

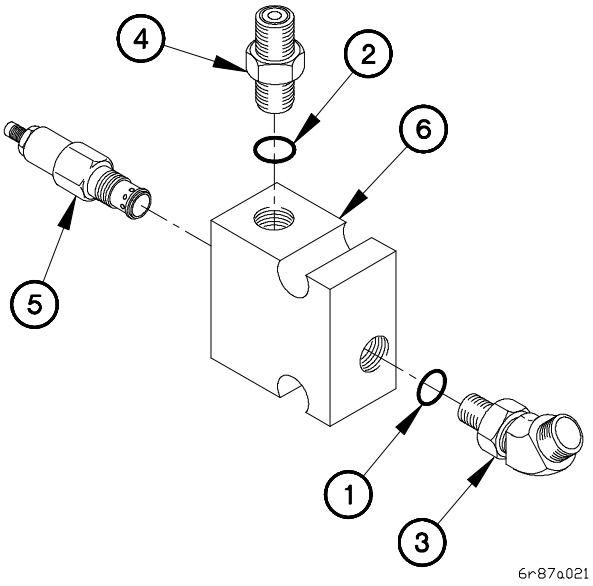
(3) Remove preformed packing (4) from fitting (3). Discard preformed packing.

(4) Remove 45-degree fitting (5) from relief valve (2).

(5) Remove preformed packing (6) from 45-degree fitting (5). Discard preform packings.



c. Assembly



(1) Install preformed packings (1 and 2) on 45-degree fitting (3) and fitting (4).

WARNING

Adhesives, solvents and sealing compound 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 or sealing compound gets on skin or clothing immediately with soap and water. Failure to comply may result in injury to personnel.

(2) Apply sealant to threads of valve (5), 45-degree fitting (3), and fitting (4).

(3) Position 45-degree fitting (3) in relief valve (6).

(4) Position fitting (4) in relief valve.

(5) Tighten 45 degree fitting (3) and fitting (4) to 40-43 lb-ft (54-58 N•m).

(6) Install valve (6) in relief valve (5).

d. Installation.

NOTE

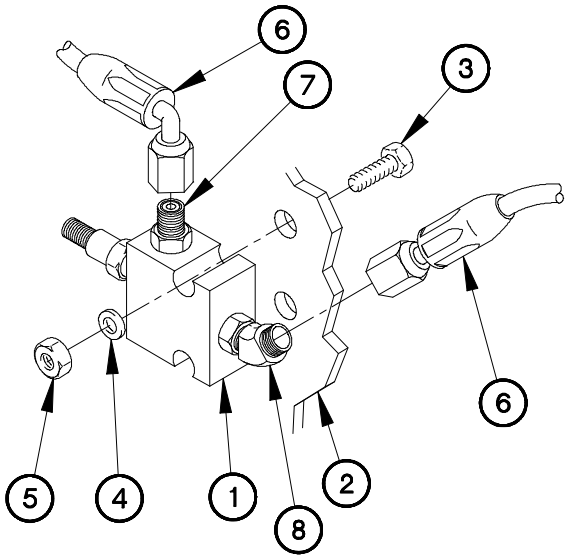
Left and right side relief valves are installed the same way. Left side shown.

(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).

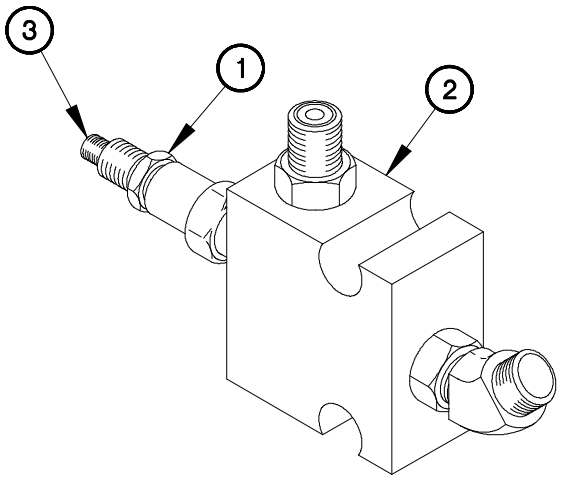
(3) Position two hydraulic hoses (6) on fitting (7) and 45 degree fitting (8).

(4) Tighten two hydraulic hoses (6) to 36-40 lb-ft (49-54 N•m).



6R87B011

e. 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).

f. 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.

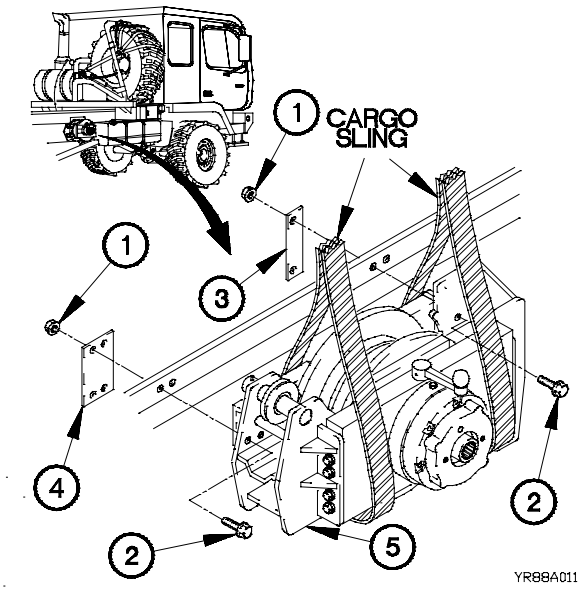
WARNING

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.

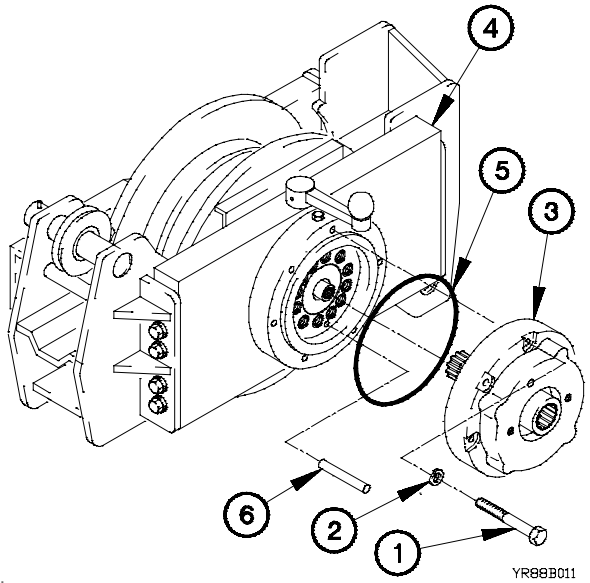


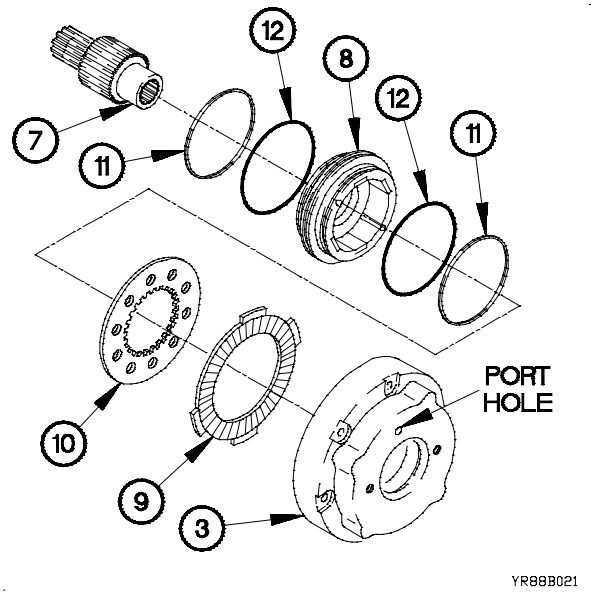
b. Disassembly.

(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).

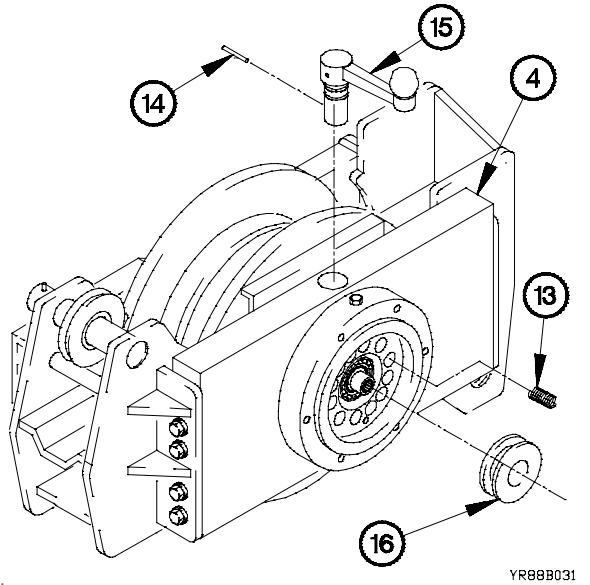
(7) Remove ten friction disc plates (9) and nine brake drive plates (10) from outer brake housing (3).

(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.

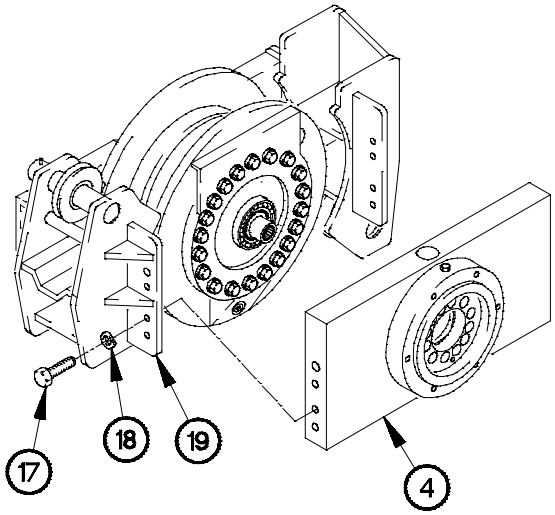
(10) Remove spring pin (14) and arm shifter (15) from motor support end (4). Discard spring pin.

(11) Remove shifter drive gear (16) from motor end support (4).

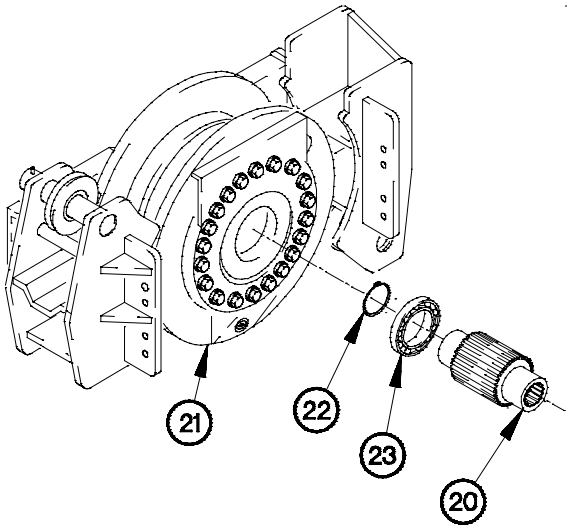


16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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

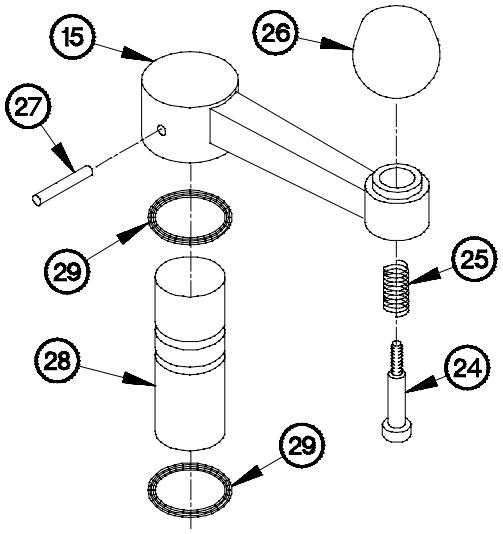
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(14) Remove retaining ring (22) and ball bearing (23) from primary sun gear (20).

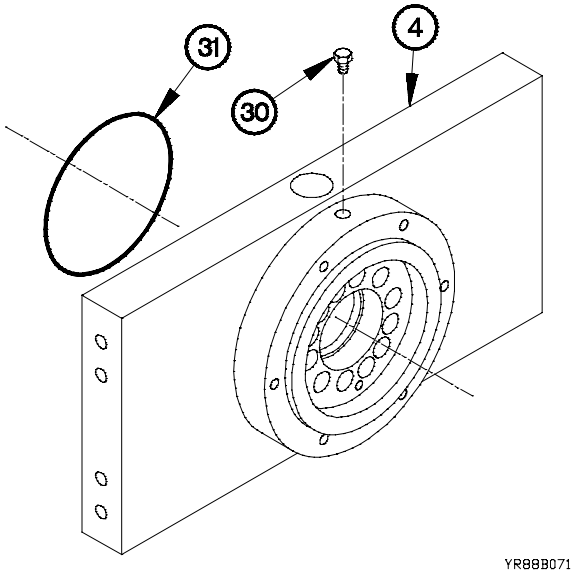
(15) Remove locator pin (24), compression spring (25), and shifter round knob (26) from arm shifter (15). Discard compression spring.

(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.

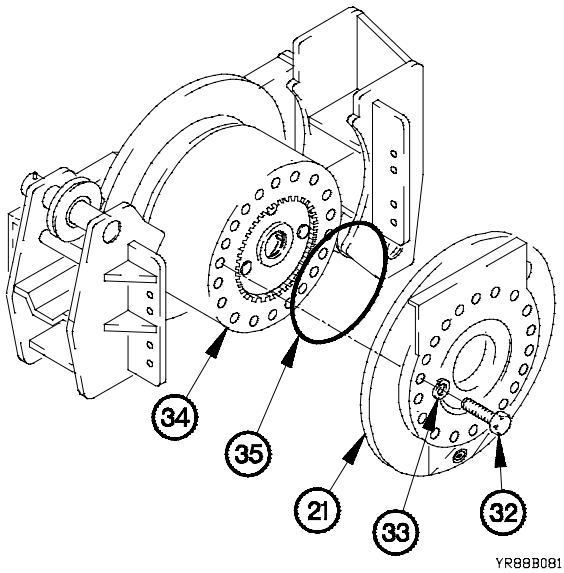


YR88B061



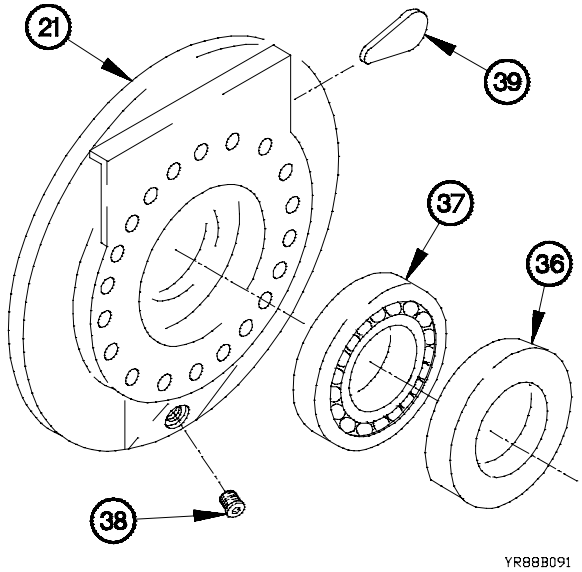
(18) Remove relief vent (30) from motor end support (4).

(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.

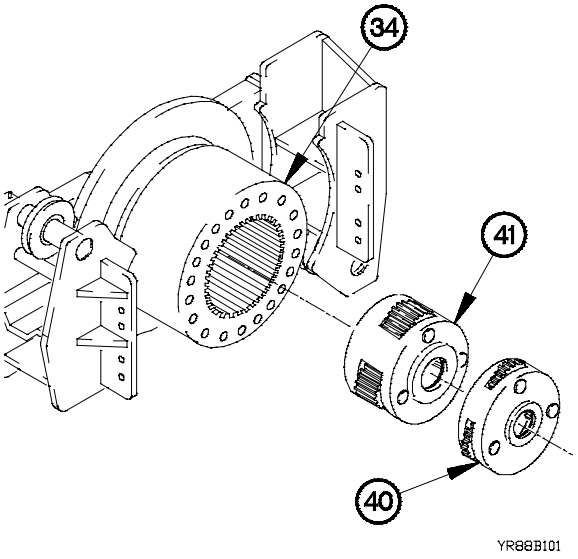
(23) Remove two magnetic plugs (38) from motor end flange (21).

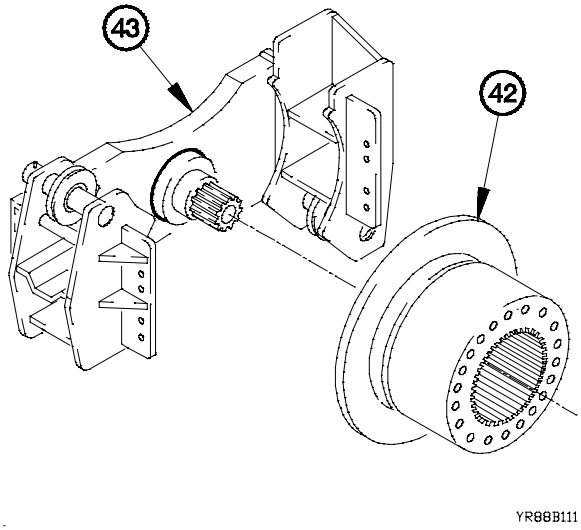
(24) Remove cable wedge (39) from motor end flange (21).

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).



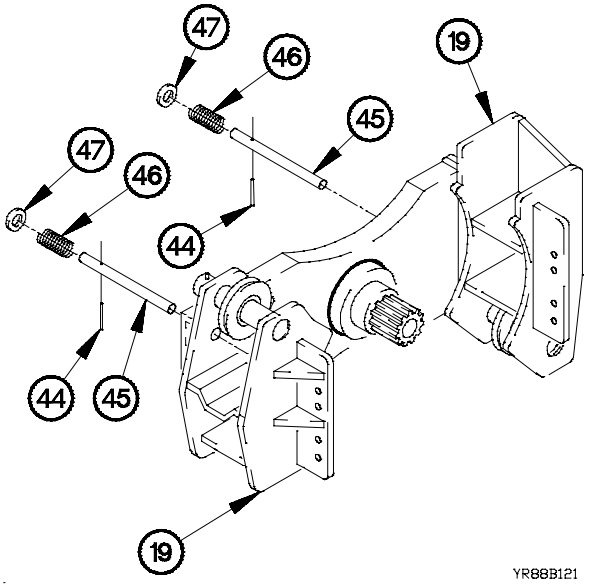


(27) Remove gear end flange (42) from gear end support (43).

WARNING

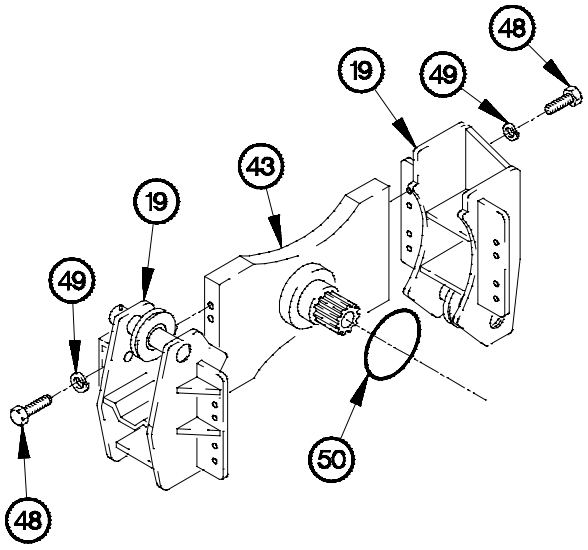
Use care when removing springs. Springs are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(28) Remove two spring pins (44), cable retainer pins (45), springs (46), and washers (47) from base mounts (19). Discard spring pins.

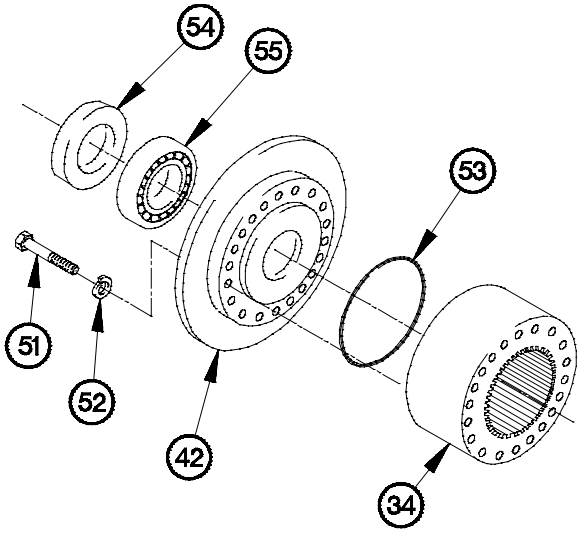


(29) Remove eight screws (48), lockwashers (49), and gear end support (43) from two base mounts (19). Discard lockwashers.

(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.

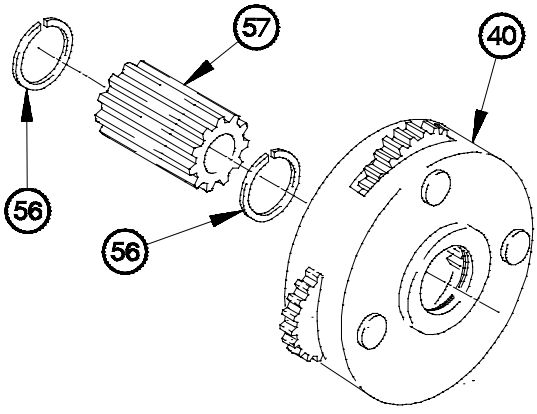
(32) Remove preformed packing (53) from gear end flange (42). Discard preformed packing.

(33) Remove shaft seal (54) and ball bearing (55) from gear end flange (42). Discard shaft seal.

WARNING

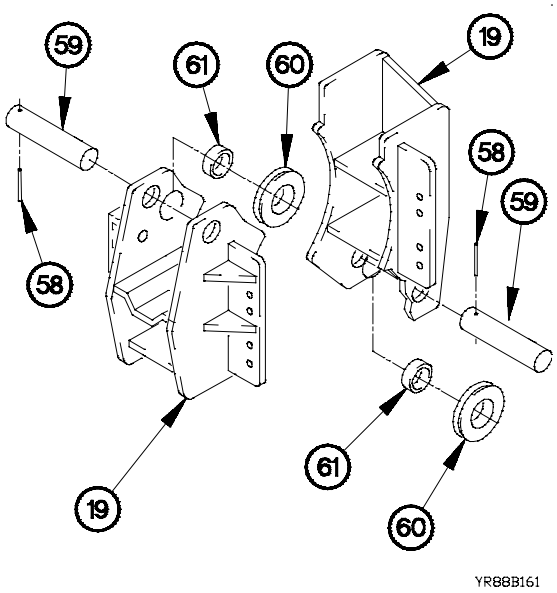
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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.**

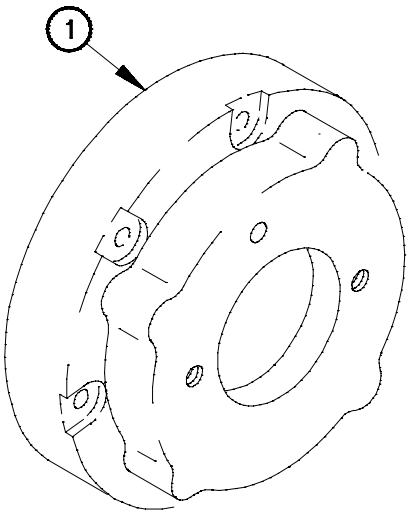
NOTE

Replace any part that fails to pass visual inspection or size measurement requirements.

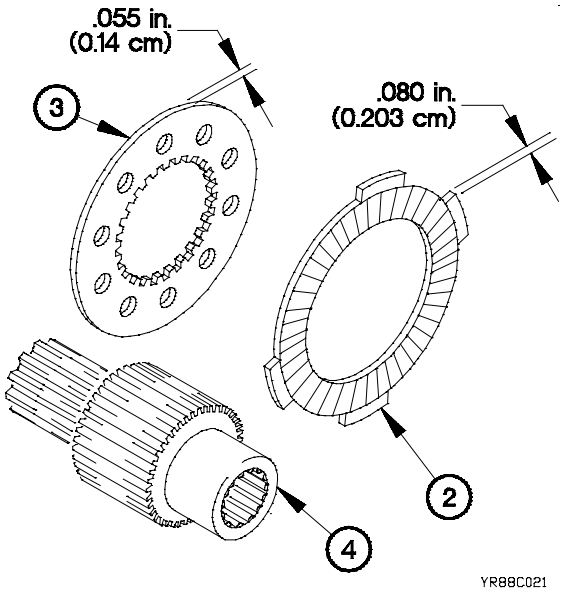
(1) Clean all metal parts with dry cleaning solvent.

(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.

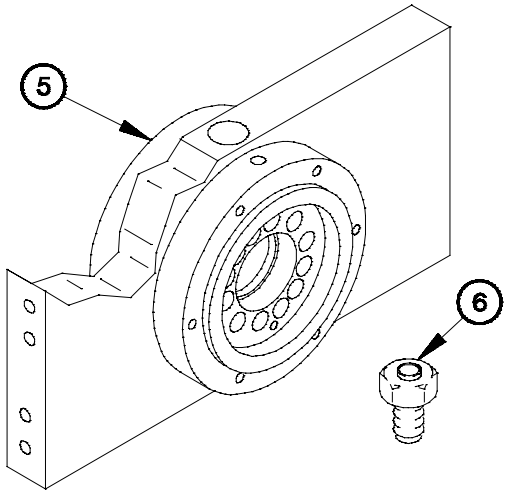
(6) Measure thickness of nine brake drive plates (3). Minimum thickness is 0.055 in. (0.14 cm).

(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.



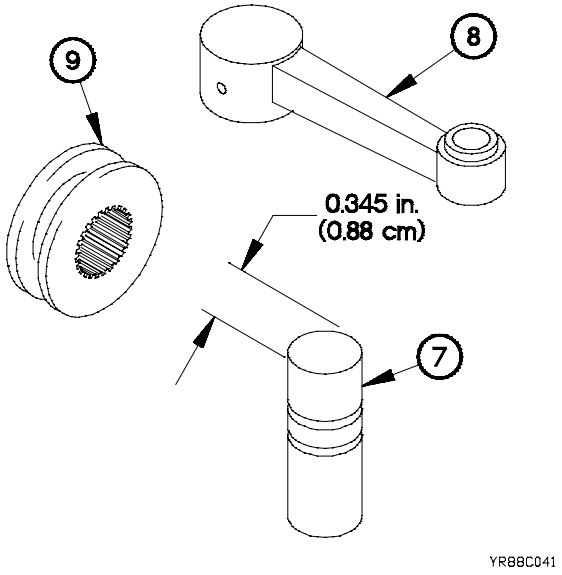
YR88C031

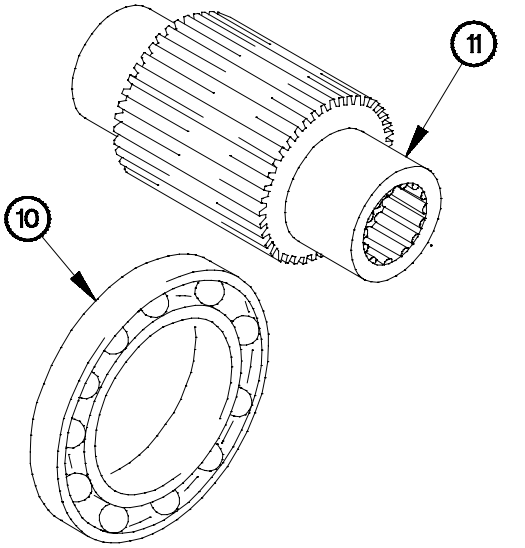
16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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.

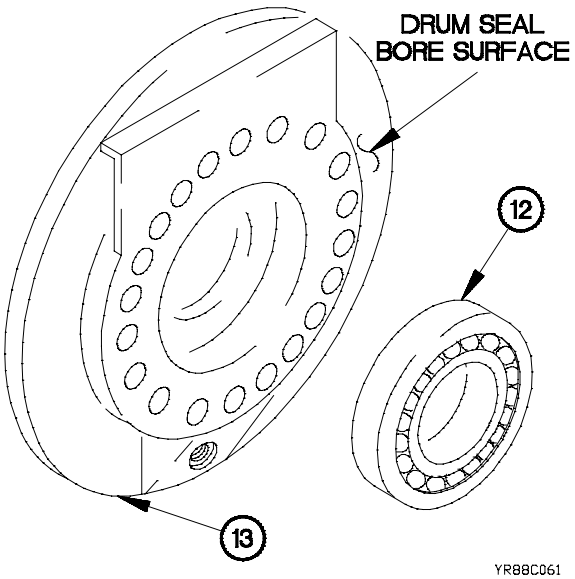
(15) Check ball bearing (10) for pitting and corrosion.

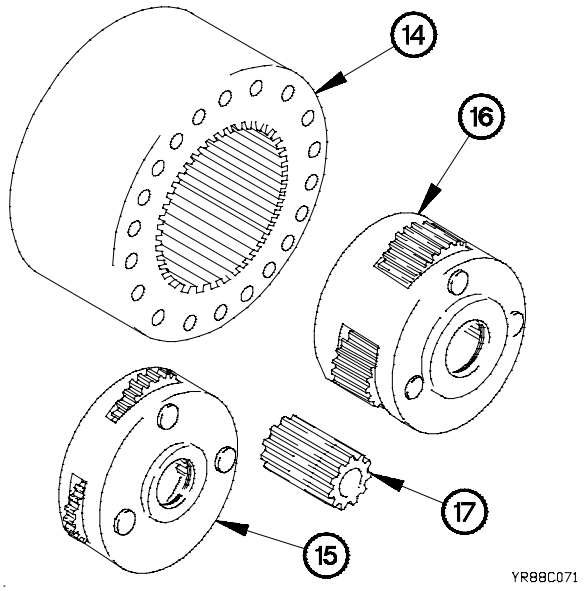
(16) Inspect primary sun gear (11) for wear, pitting, or broken teeth.

(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.



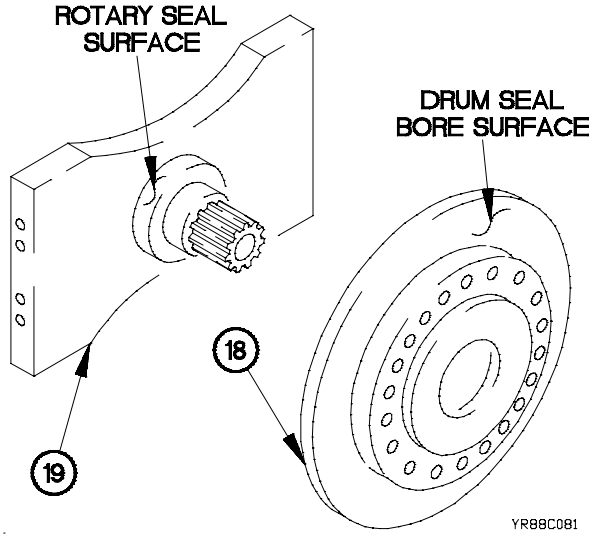


(20) Inspect ring gear (14) for worn or broken teeth.

(21) Inspect gears of primary carrier (15) for free rotation, pits, or broken teeth.

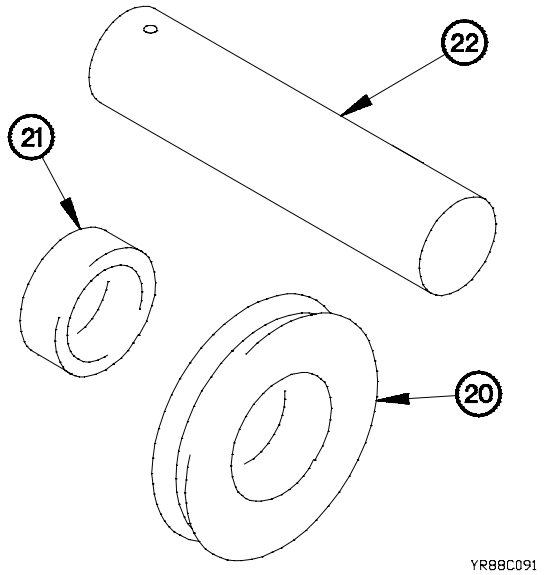
(22) Inspect gears of secondary carrier (16) for free rotation, pits, or broken teeth.

(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.

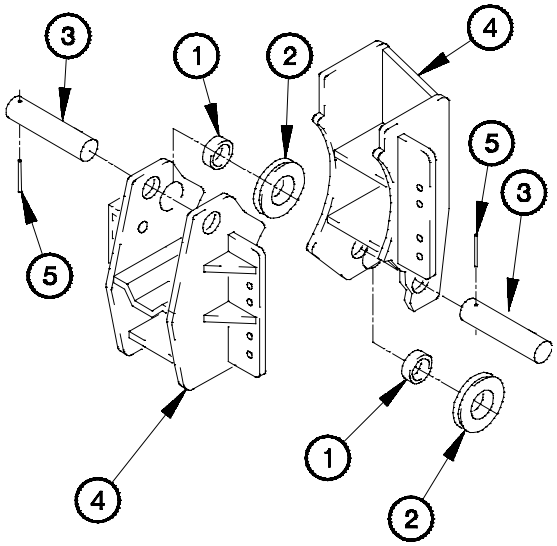


(26) Inspect cable guide sheave (20) and bushing (21) for pitting or corrosion.

(27) Inspect roller shaft (22) for scratches or pits.

16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

d. Assembly.



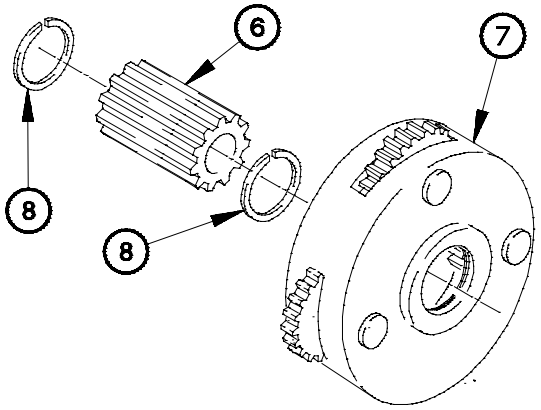
YR88D011

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.

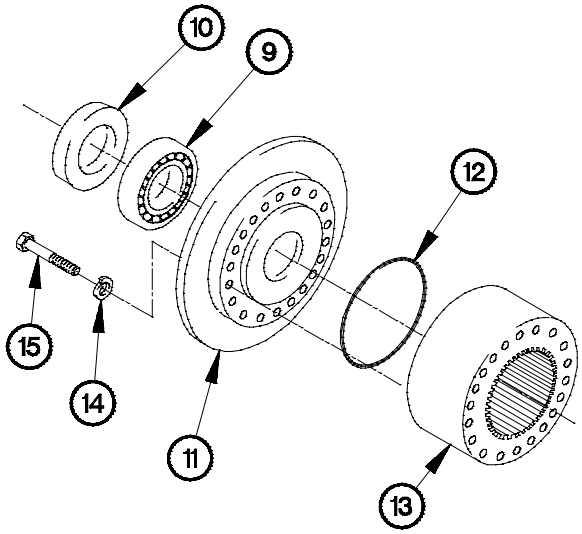
(3) Install secondary sun gear (6) in primary carrier assembly (7) with two retaining rings (8).

(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).

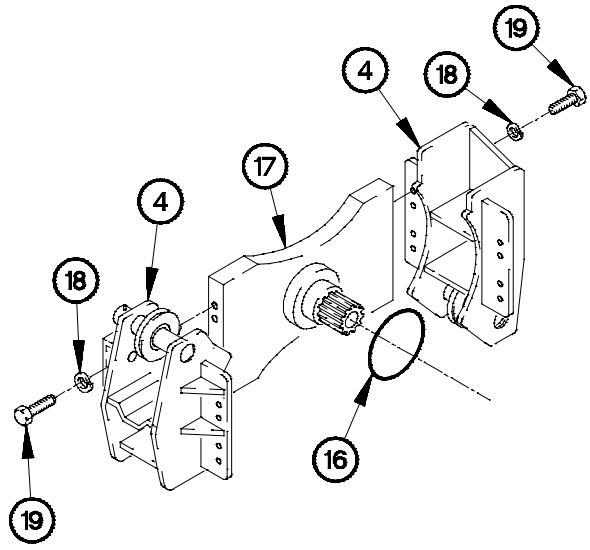


YR88D031

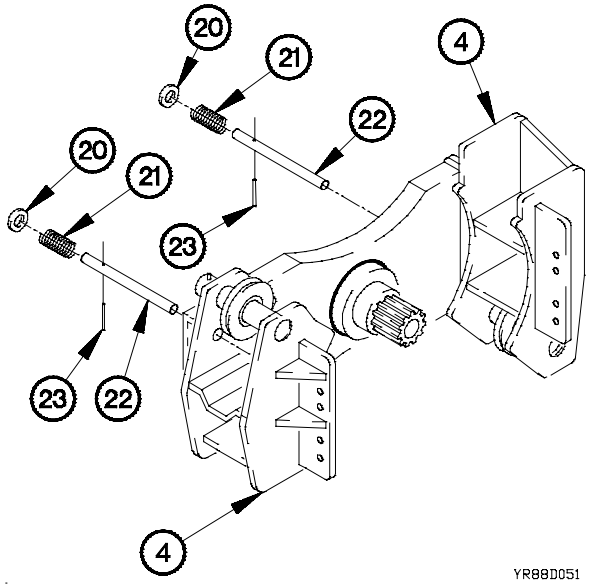
(8) Install preformed packing (16) on gear end support (17).

(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



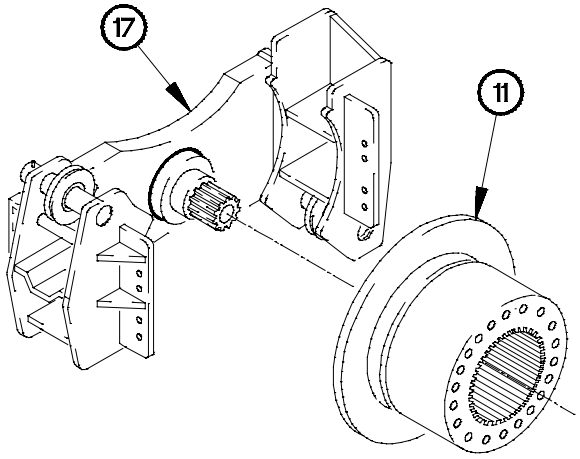
YR88D051

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).



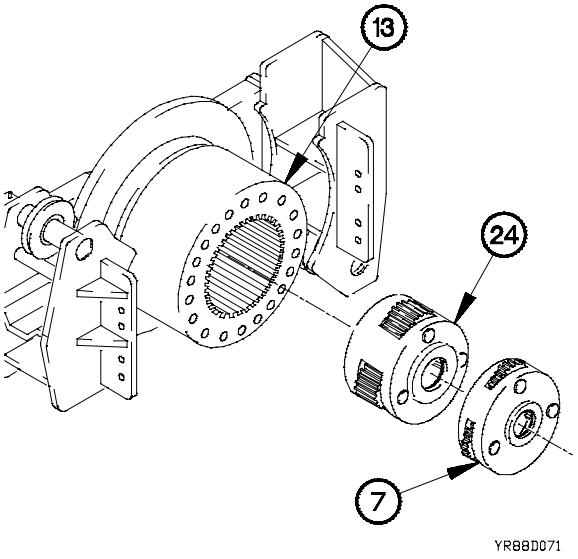
YR88D061

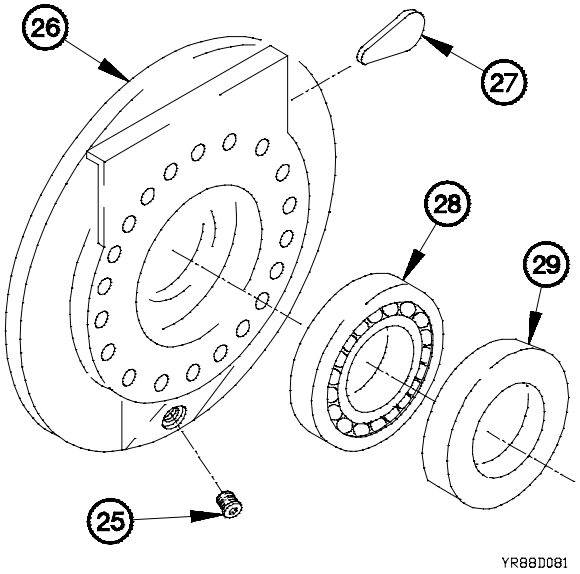
16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

(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).

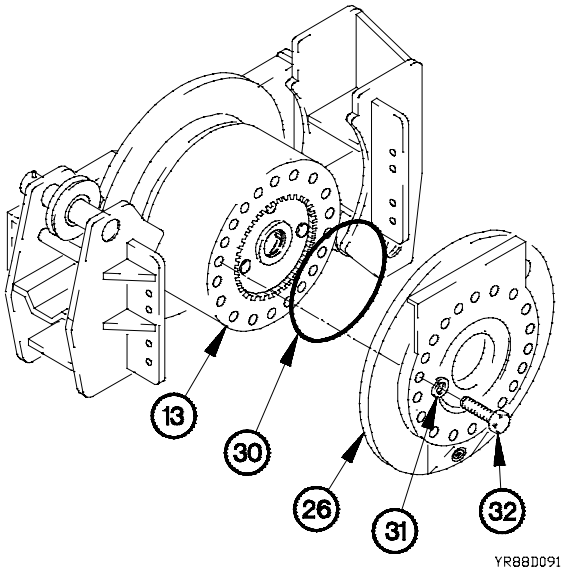
(18) Install ball bearing (28) in motor end flange (26).

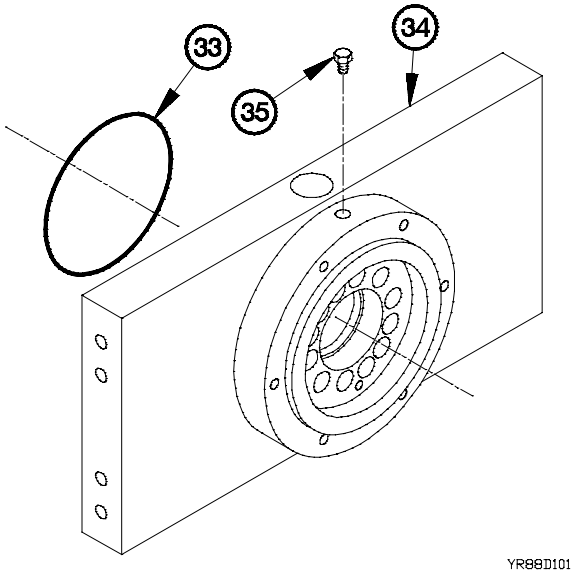
(19) Install shaft seal (29) in motor end flange (26).

(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).

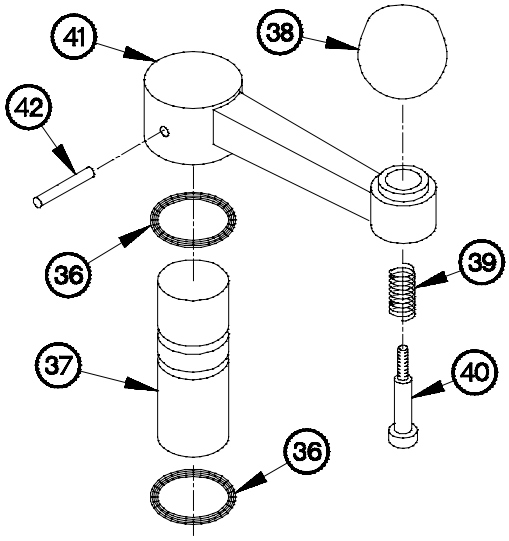
(22) Tighten 20 screws (32) to 38-45 lb-ft (52-61 N·m).





(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).

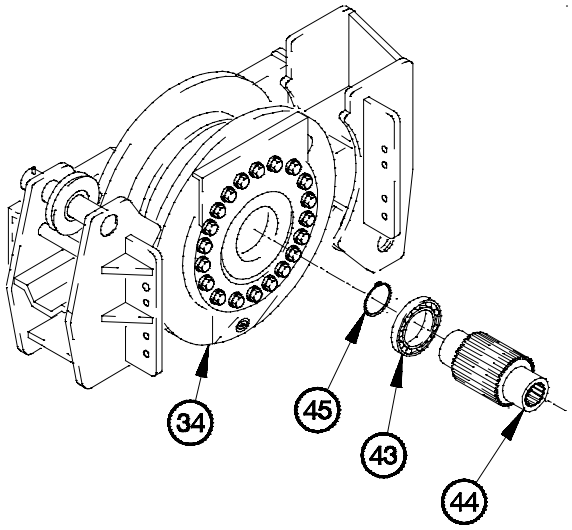
16-88. 15K SELF-RECOVERY WINCH (SRW) ASSEMBLY REPLACEMENT/REPAIR (CONT)

WARNING

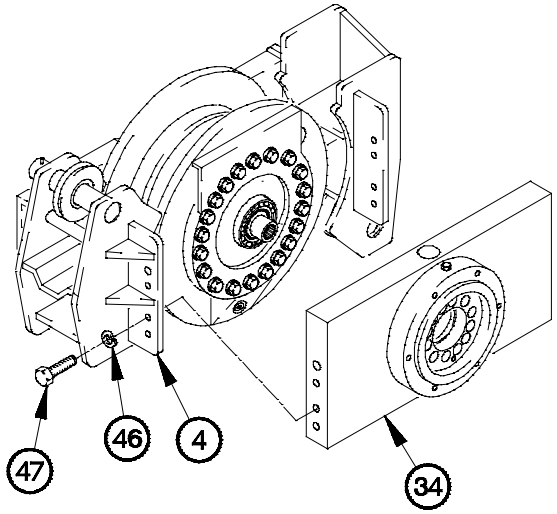
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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

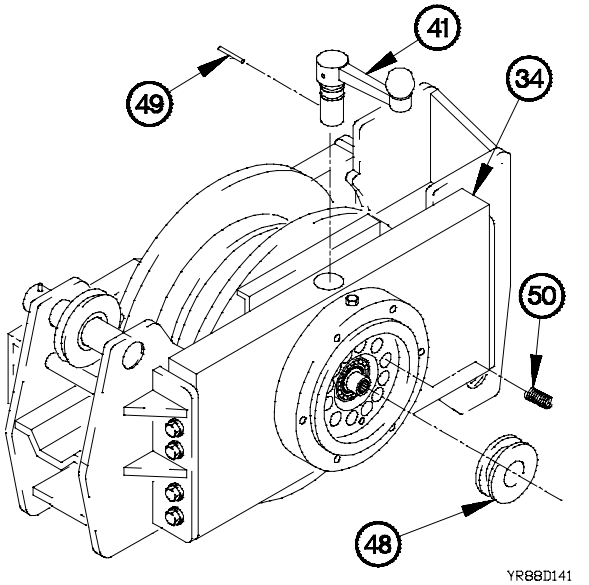
(30) Position motor end support (34) on base mounts (4) with eight lockwashers (46) and bolts (47).

(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).



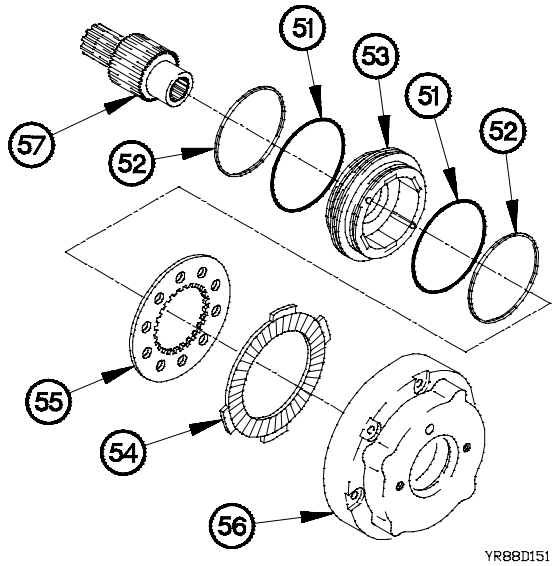
YR88D141

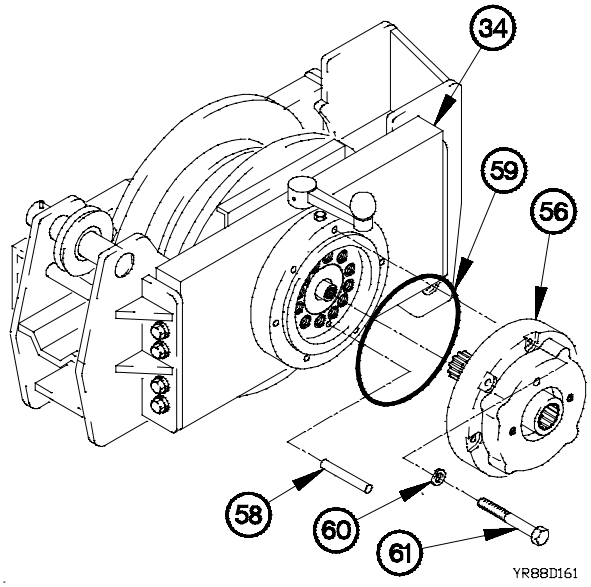
(35) Install two preformed packings (51) and back-up rings (52) on brake piston (53).

(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).

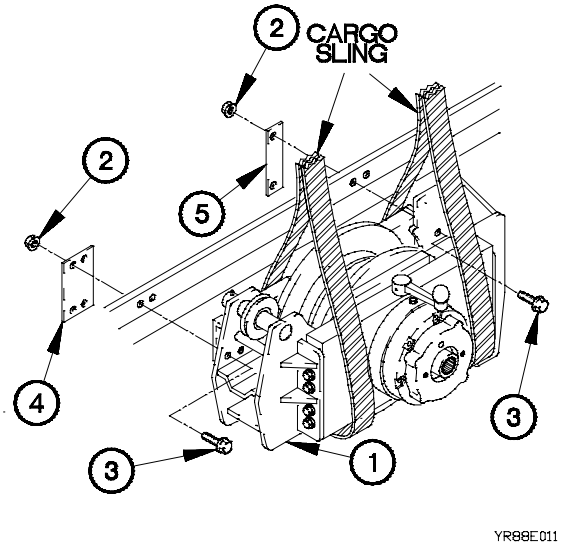
e. Installation.

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)

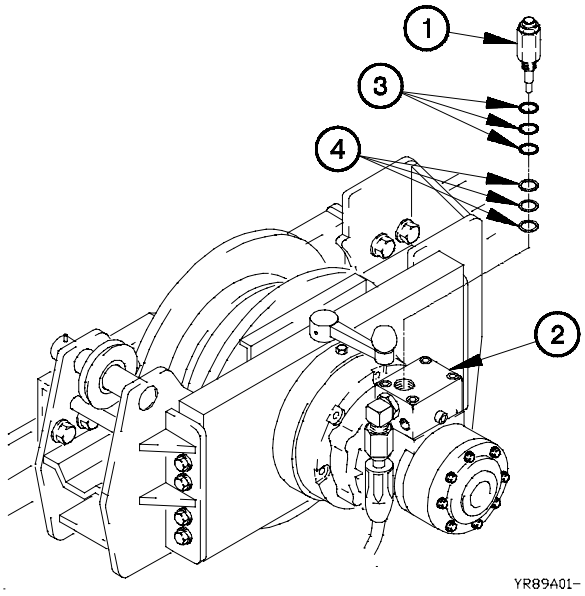
Materials/Parts
Cap and Plug Set (Item 17, Appendix C)
Kit, Seal (Item 116, Appendix F)
Packing, Preformed (2) (Item 237, Appendix F)
Packing, Preformed (2) (Item 284, Appendix F)
Packing, Preformed (Item 282, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

Personnel Required
(2)

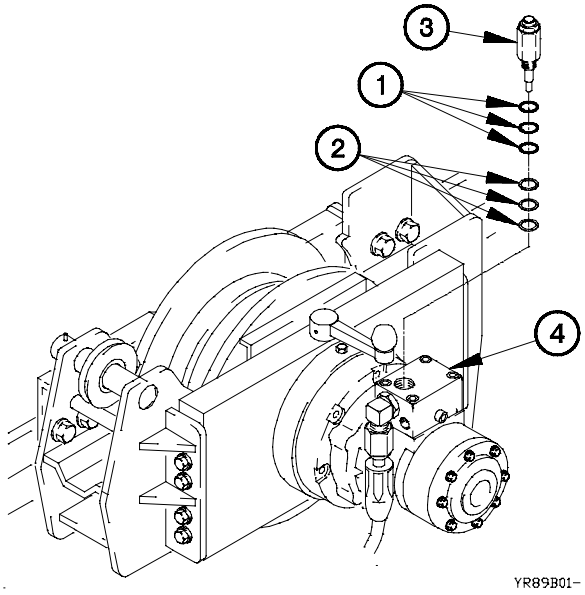
a. Cartridge Valve Removal.

(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.

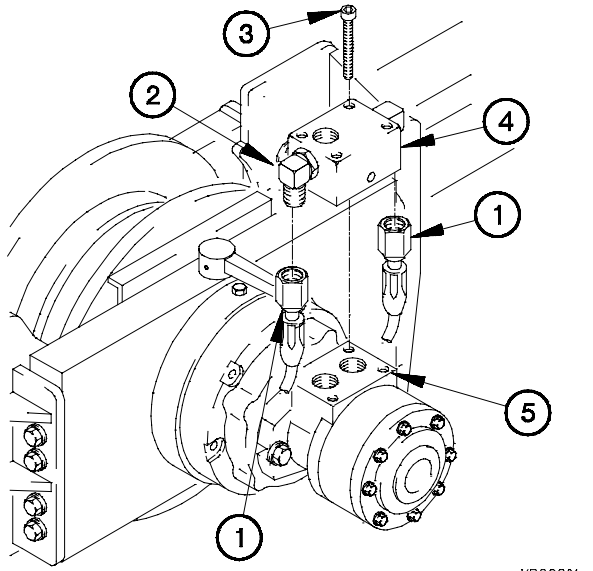
NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

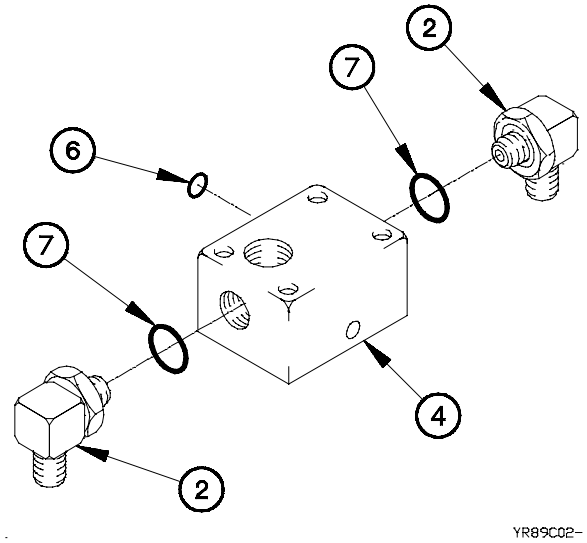
(1) Disconnect two hydraulic hoses (1) from 90-degree fittings (2).

(2) Remove five screws (3) from counterbalance valve (4).

(3) Remove counterbalance valve (4) from hydraulic motor (5).



YR89C01-



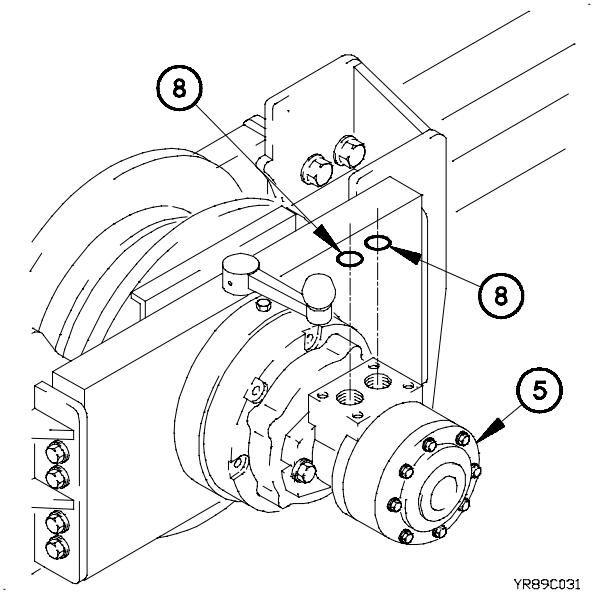
YR89C02-

(7) Remove two preformed packings (8) from hydraulic motor (5). Discard preformed packings.

(4) Remove preformed packing (6) from counterbalance valve (4). Discard preformed packing.

(5) Remove two 90-degree fittings (2) from counterbalance valve (4).

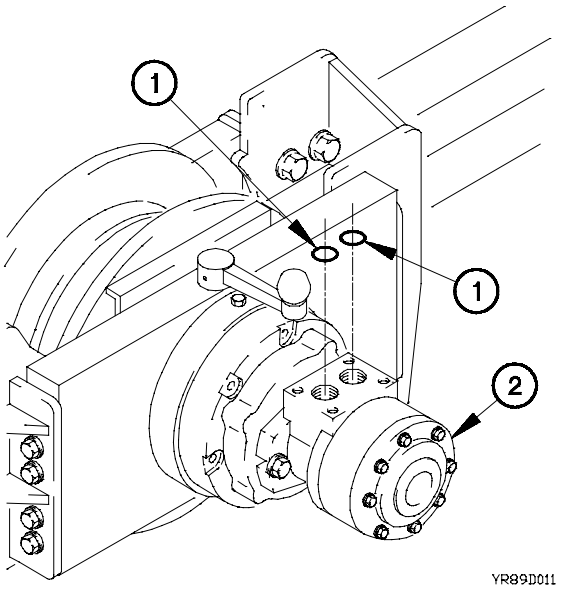
(6) Remove two preformed packings (7) from 90-degree fittings (2). Discard preformed packings.

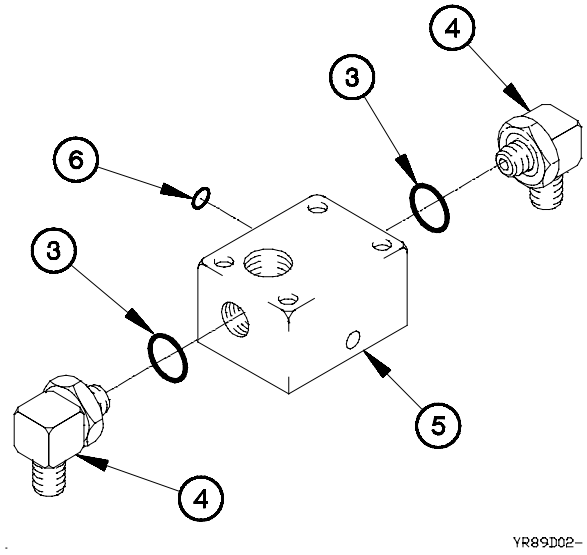


YR89C031

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).

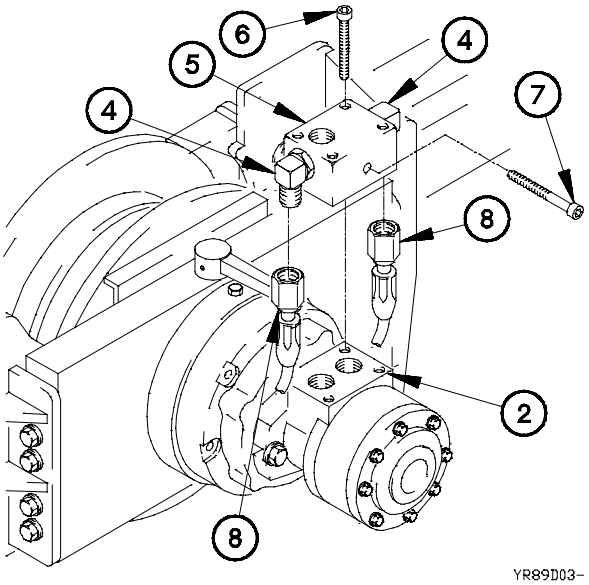
(6) Position four screws (6) in counterbalance valve (5).

(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)

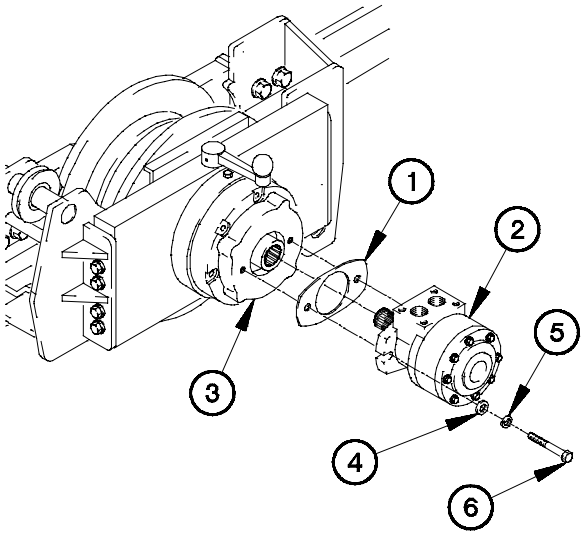
Materials/Parts
Gasket (Item 54, Appendix F)
Lockwasher (2) (Item 158, Appendix F)

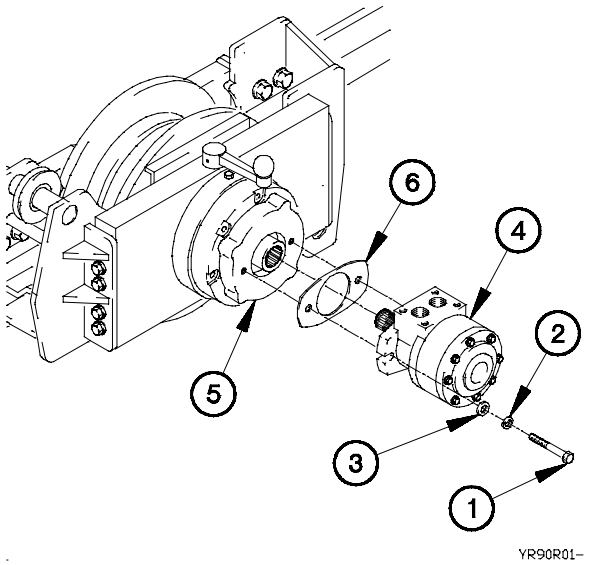
a. Removal.

(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

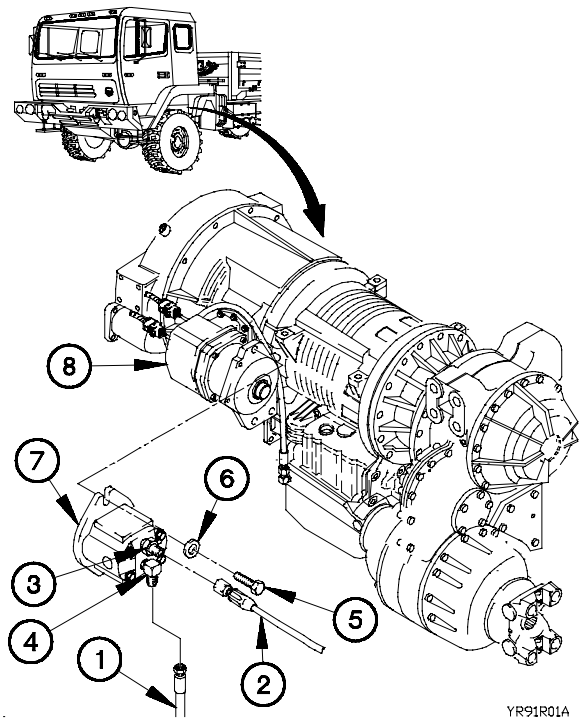
Tag hydraulic hoses and connection points prior to disconnecting.

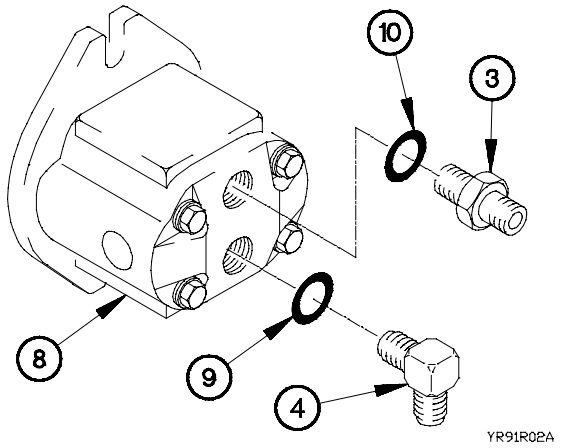
(1) Disconnect hydraulic hoses (1) and (2) from fitting (3) and 90 degree fitting (4).

NOTE

Step (2) requires the aid of an assistant.

(2) Remove two screws (5), washers (6), and hydraulic rotary pump (7) from PTO (8).

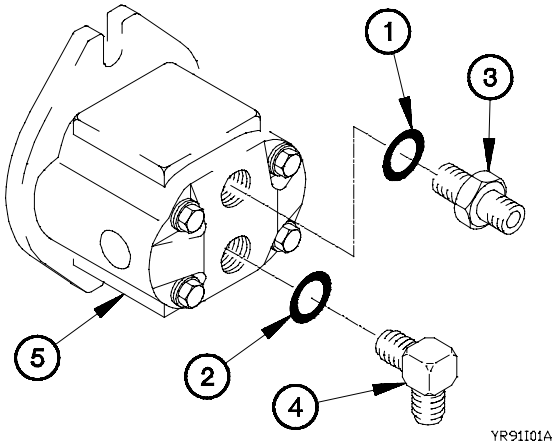




(3) Remove fitting (3) and 90 degree fitting (4) from hydraulic rotary pump (8).

(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).

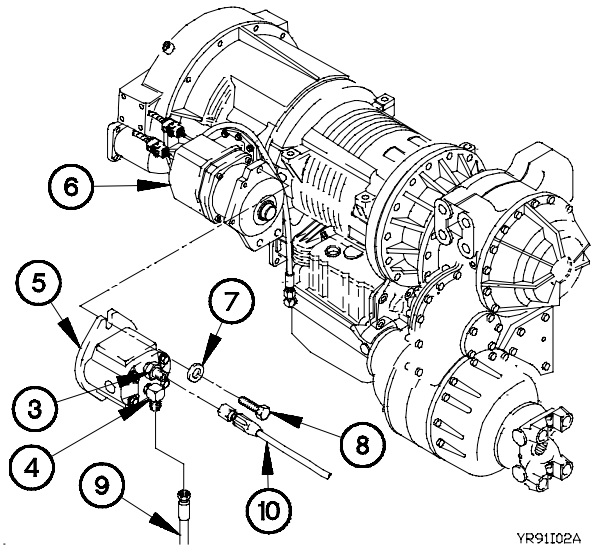
NOTE

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

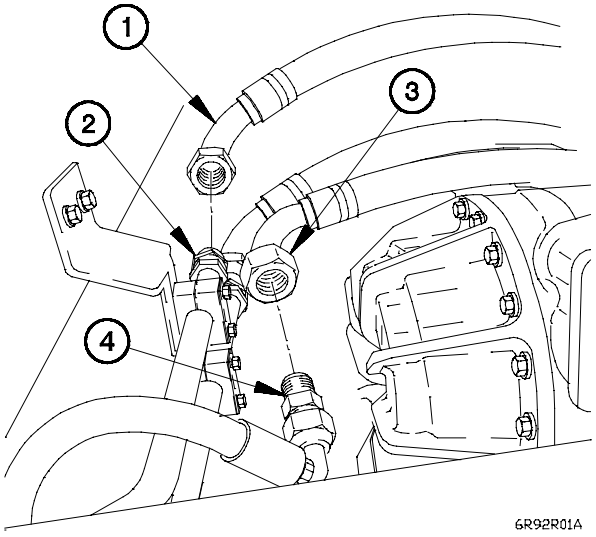
Cap or plug hydraulic connections to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

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).

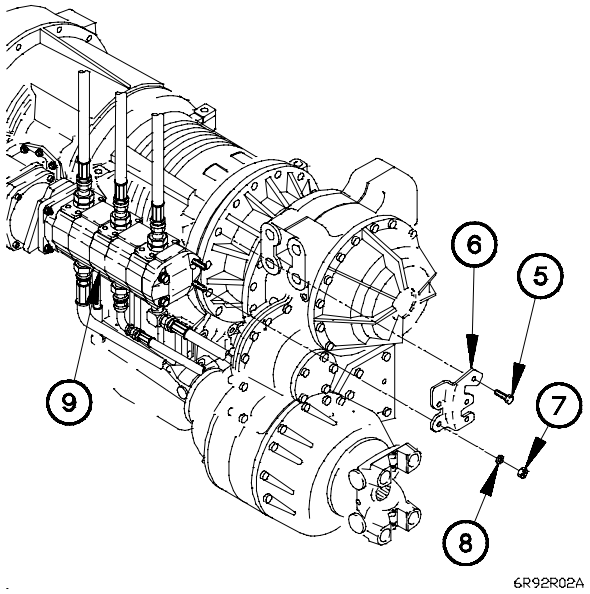


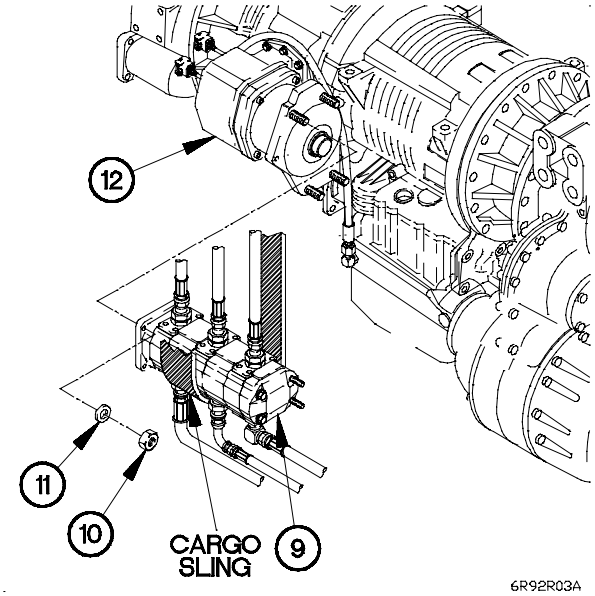
16-92. M1089 THREE STAGE HYDRAULIC PUMP REPLACEMENT (CONT)

(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.

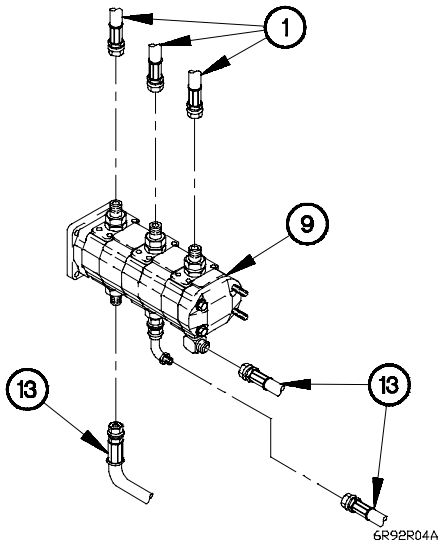
NOTE

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).

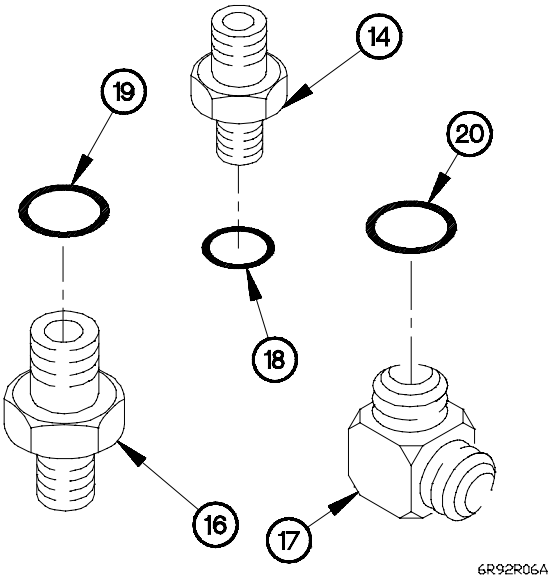


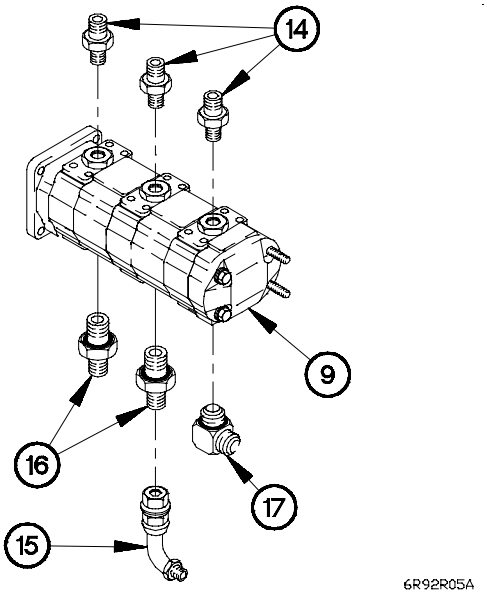
(9) Remove three fittings (14) from three stage hydraulic pump (9).

(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.

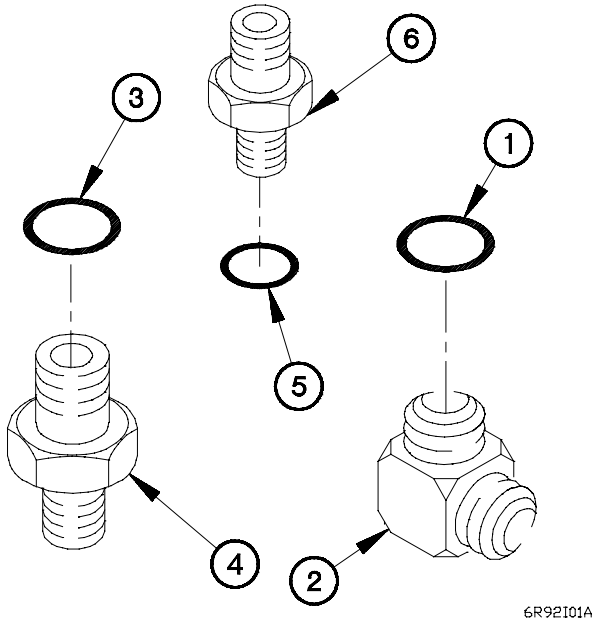
(15) Remove preformed packing (20) from 90-degree fitting (17). Discard preformed packing.

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).

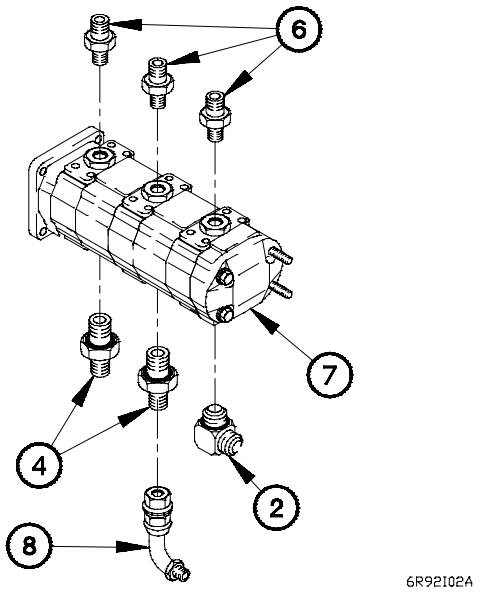
(6) Tighten two fittings (4) and 90-degree fitting (2) to 127-133 lb-ft (172-180 N·m).

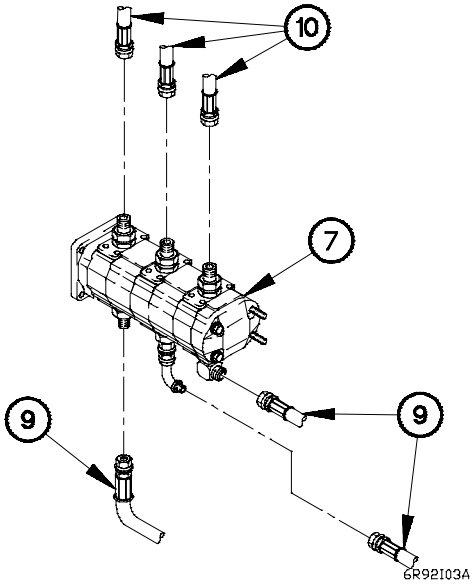
(7) Position adapter (8) on fitting (4).

(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).





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.

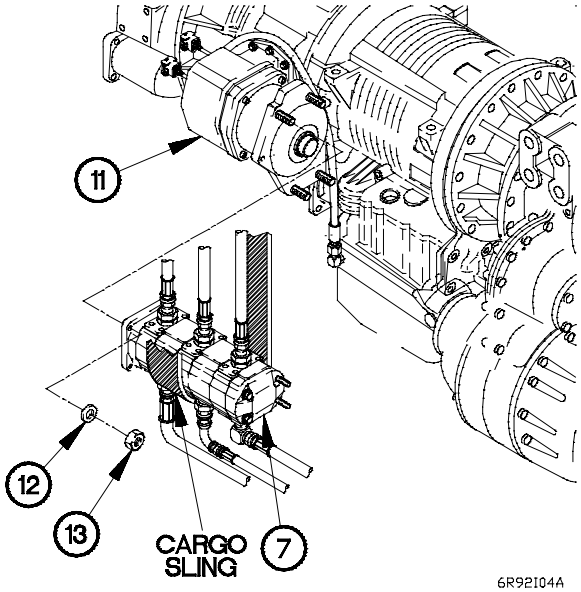
(15) Install three stage hydraulic pump (7) on Power Takeoff (PTO) (11) with four washers (12) and nuts (13).

(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).



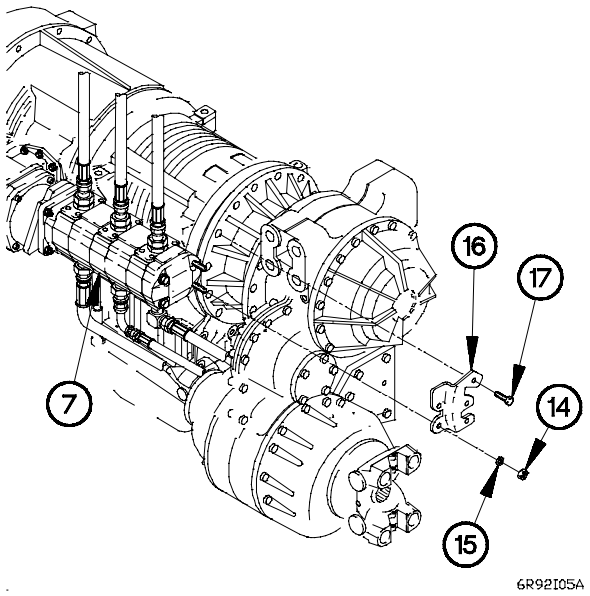
(16) Remove two nuts (14) and washers (15) from hydraulic pump (7).

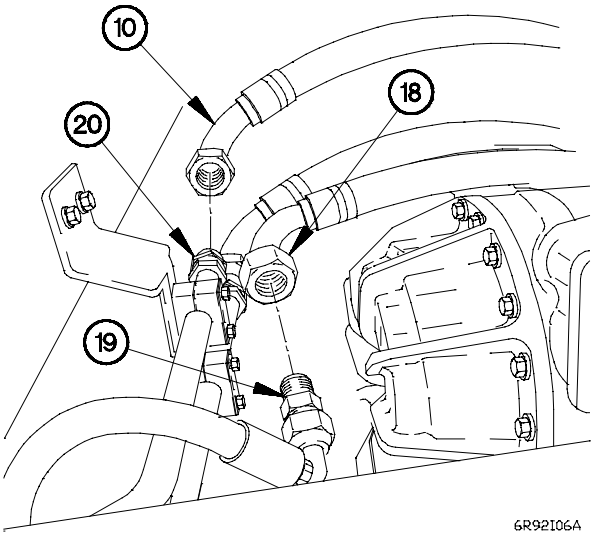
(17) Position support bracket (16) on hydraulic pump (7) with two washers (15) and nuts (14).

(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
Spindle Compound #2 (Item 83.2 Appendix C)
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

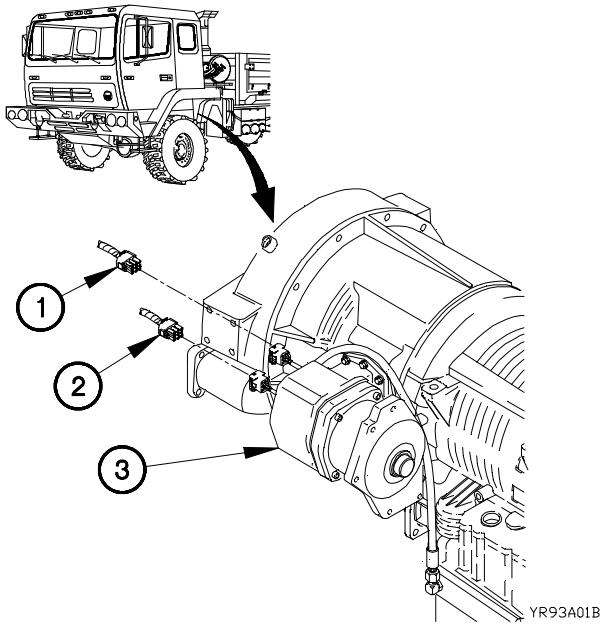
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

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

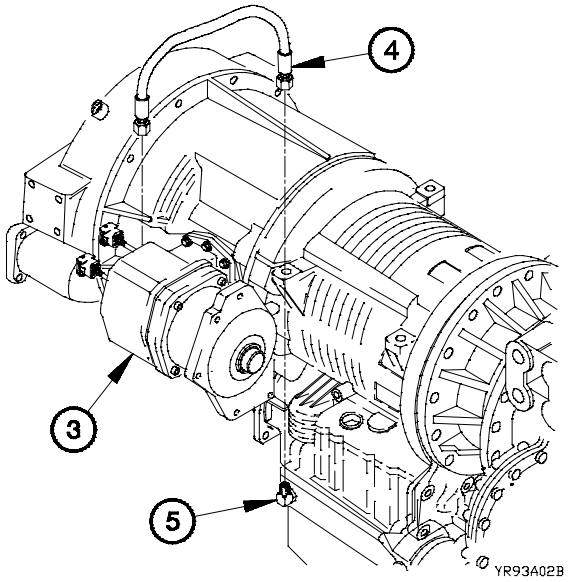
Cap or plug hydraulic hoses and fittings to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

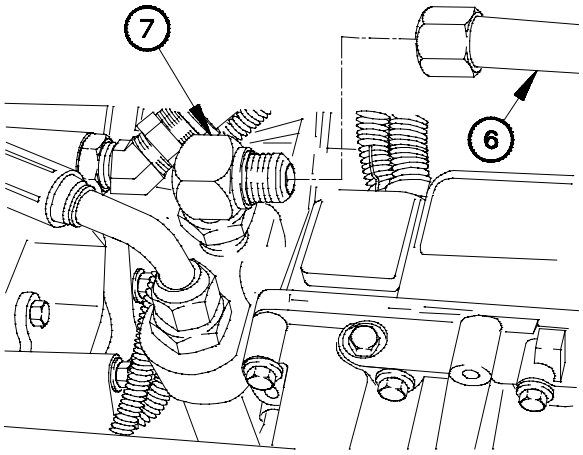
NOTE

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

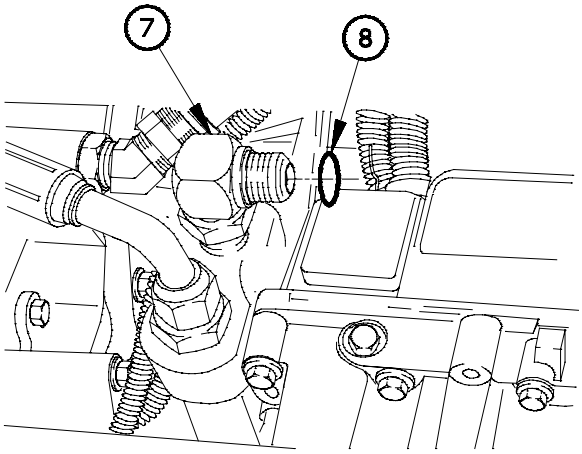
Perform steps (4) through (5.6) on vehicles equipped with transmission oil cooler tubes.

(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.



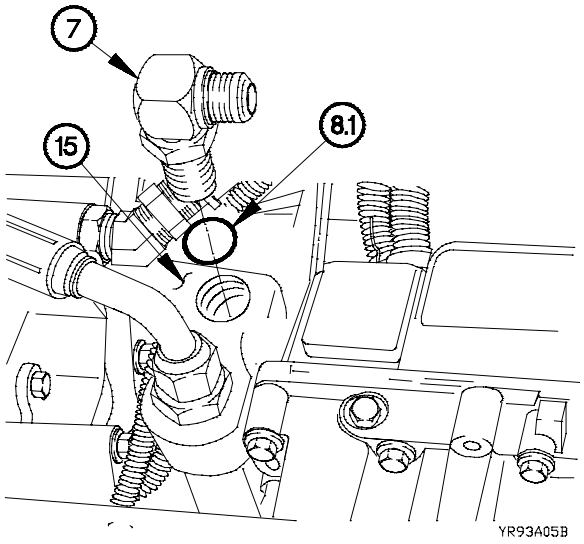
16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

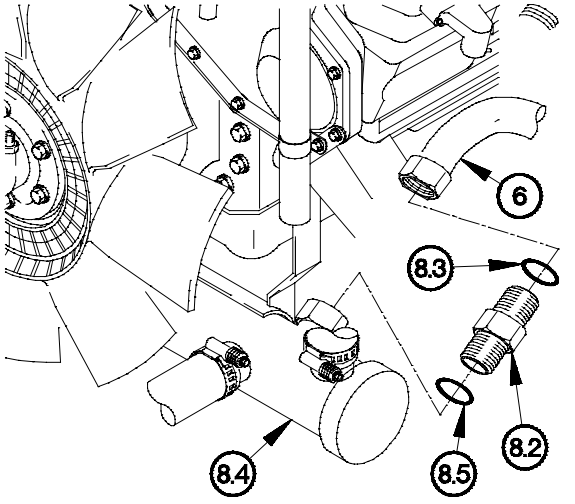
NOTE

- 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.

NOTE

There are two types of bearing cups those with tabs and those without. Perform step (6) on bearing cups with tabs.

(6) Lift tabs from two bearing cups (9).

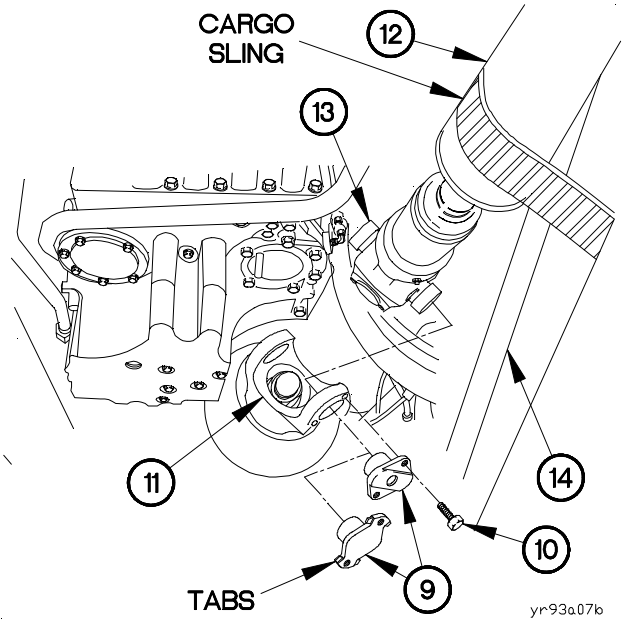
(6.1) Remove four screws (10) and two bearing cups (9) from drive yoke (11). Discard screws.

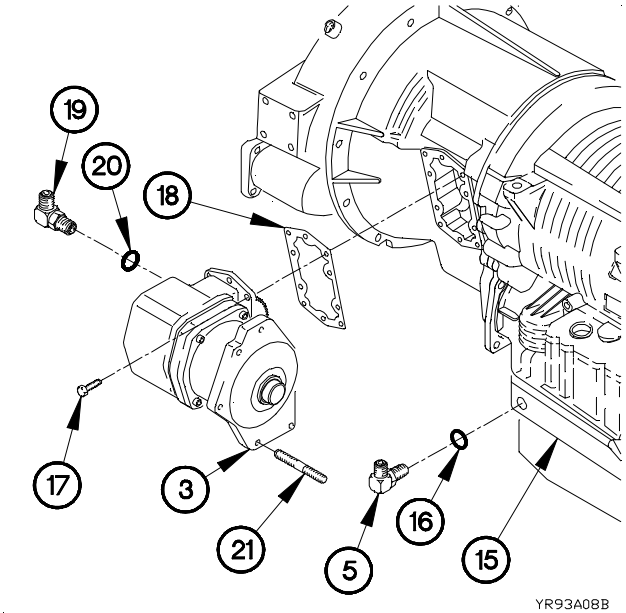
(7) Slide drive shaft (12) from side to side and separate universal joint (13) from drive yoke (11).

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).

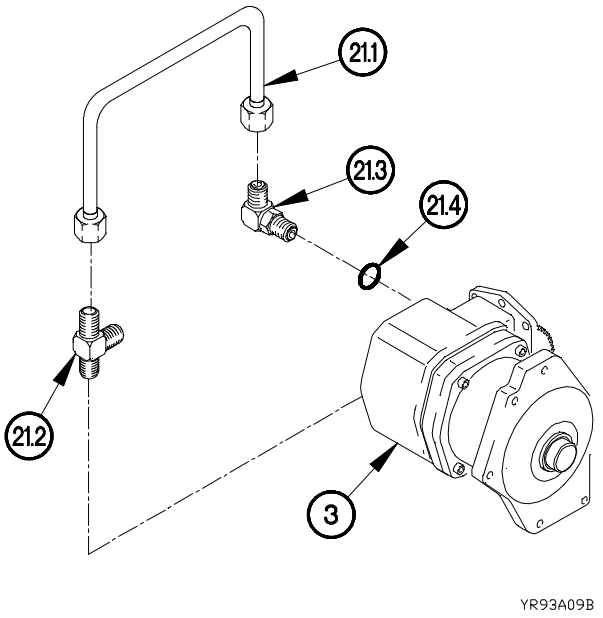
NOTE

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.

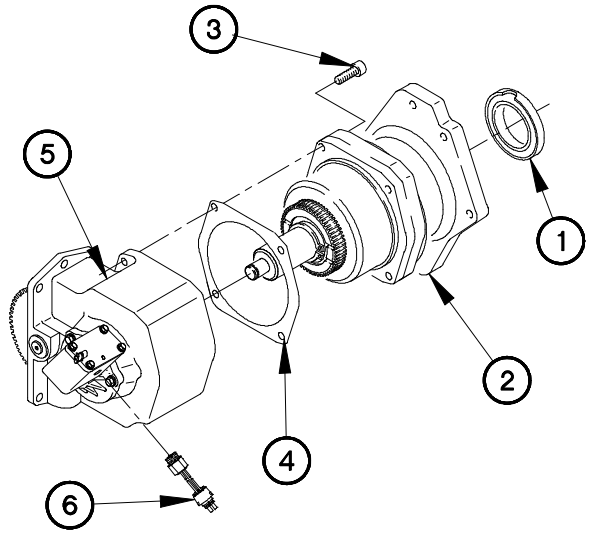
b. Disassembly.

(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.

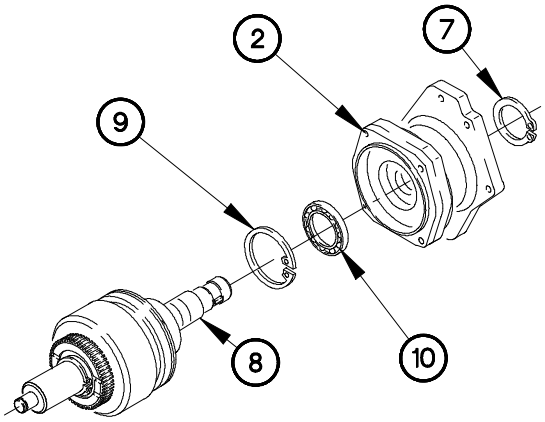
(4) Remove solenoid electrical connector (6) from housing (5).



YR93B01B

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.



YR93B02B

(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).

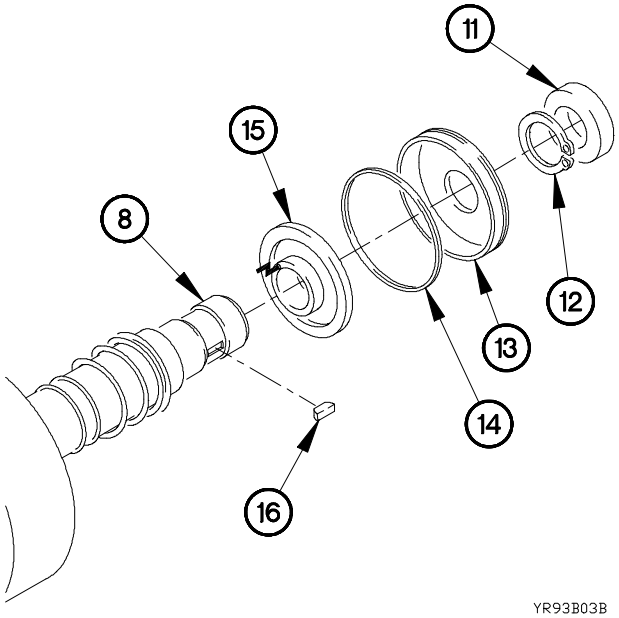
(9) Remove retaining ring (12) from output shaft (8).

(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).



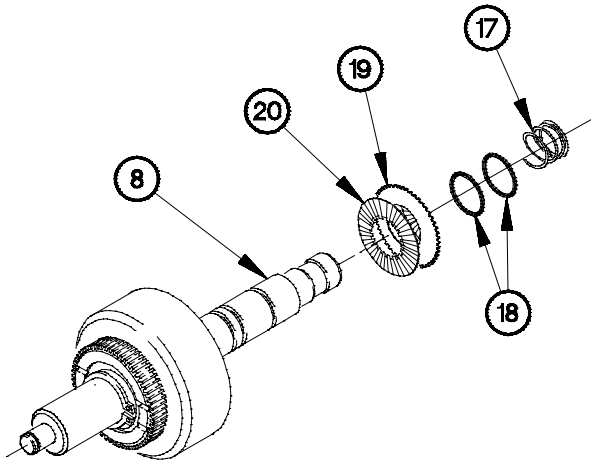
YR93B03B

16-93. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

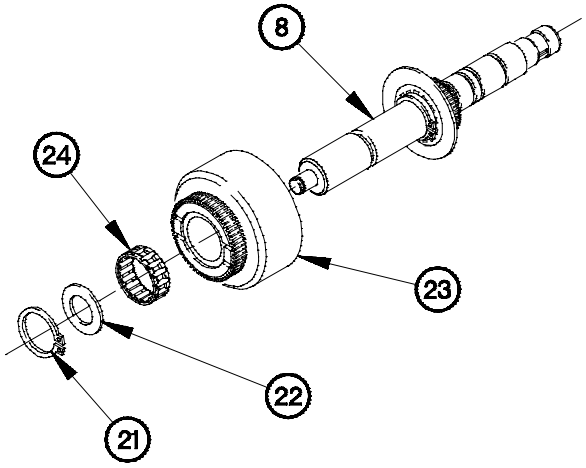
(12) Remove spring (17) from output shaft (8).

(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

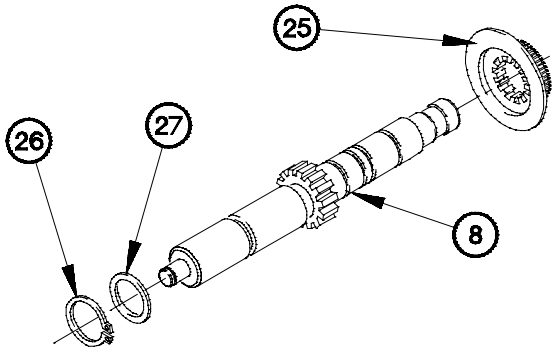
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released. Failure to comply may result in injury to personnel.

(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).

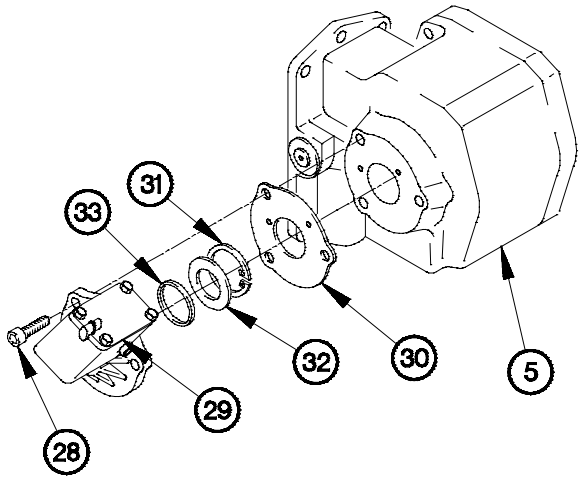


YR93B061

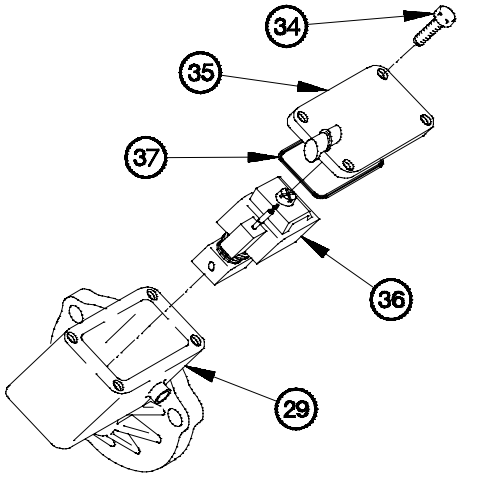
(19) Remove three screws (28), valve body (29), and gasket (30) from housing (5). Discard gasket.

(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

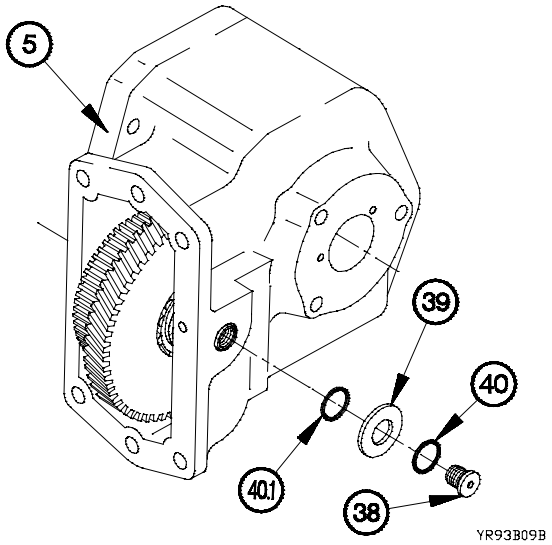
Perform step (26) on PTO Assembly (P/N 276MS-JX-D5XK).

(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

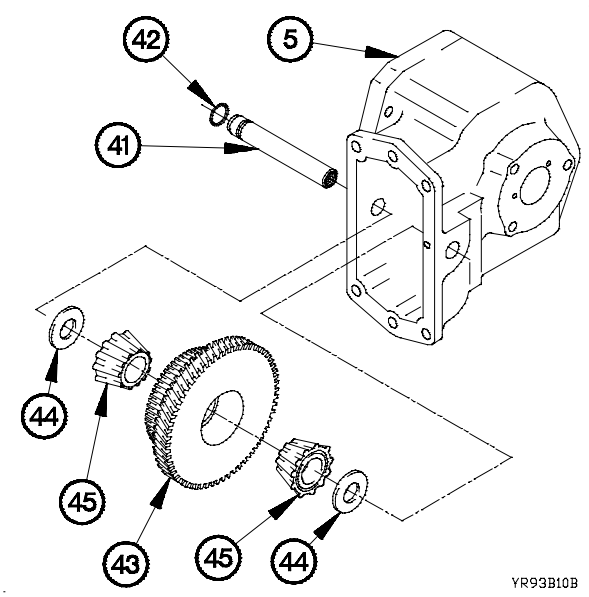
NOTE

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)

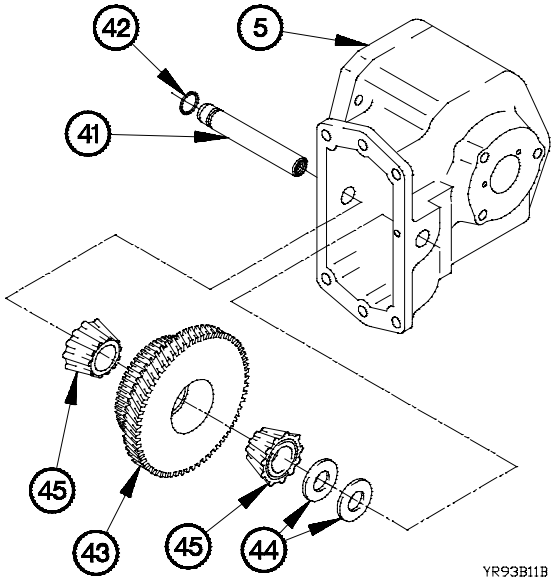
NOTE

Perform steps (29.1) through (29.3) on PTO Assembly (P/N 12378814-001).

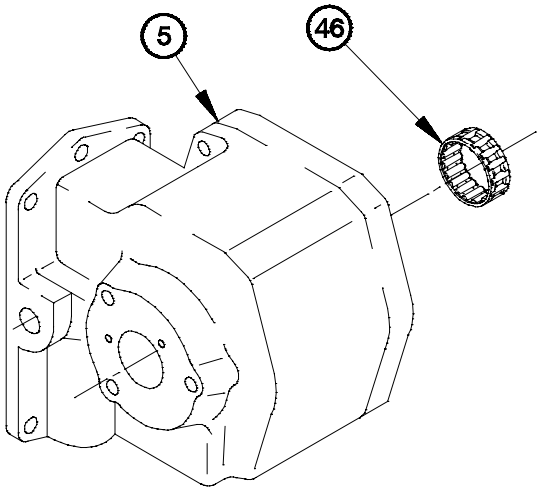
(29.1) Remove idler shaft (41) from housing (5).

(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.

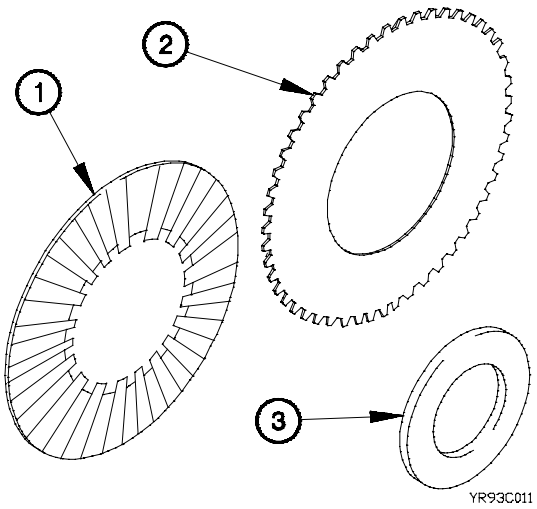
NOTE

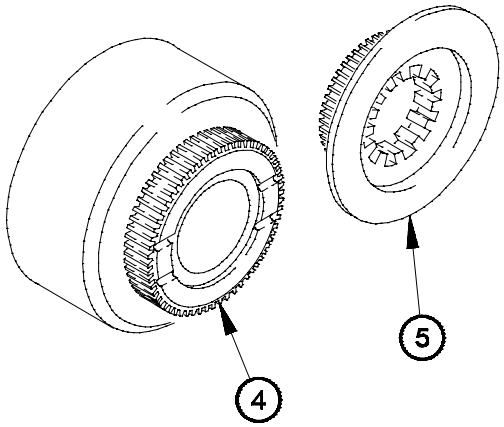
Replace any part that fails visual inspection.

(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.

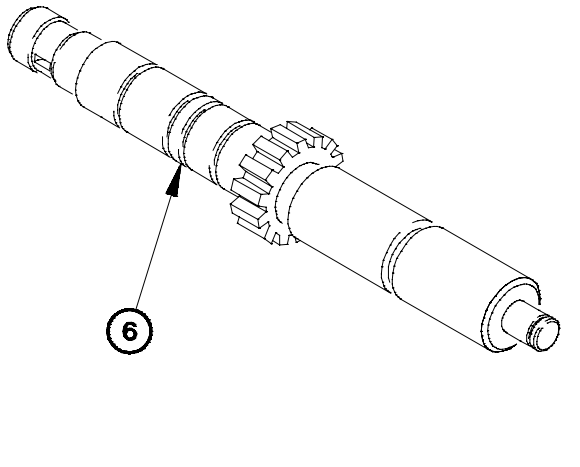




(5) Inspect outer clutch gear (4) for cracks, pitting, or missing gear teeth.

(6) Inspect inner clutch gear (5) for wear or damaged and missing teeth.

(7) Inspect output shaft (6) for nicks, scratches, or other damage.

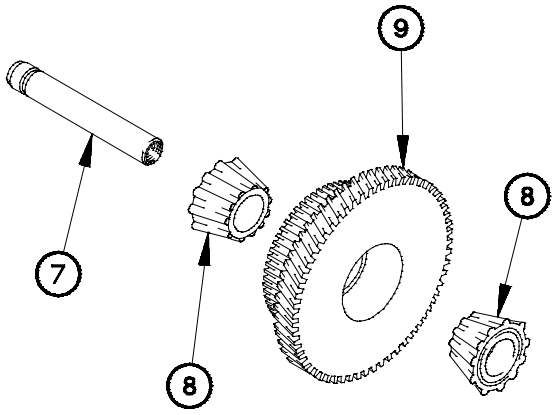


16-93. POWER TAKEOFF (PTO) REPLACEMENT/REPAIR (CONT)

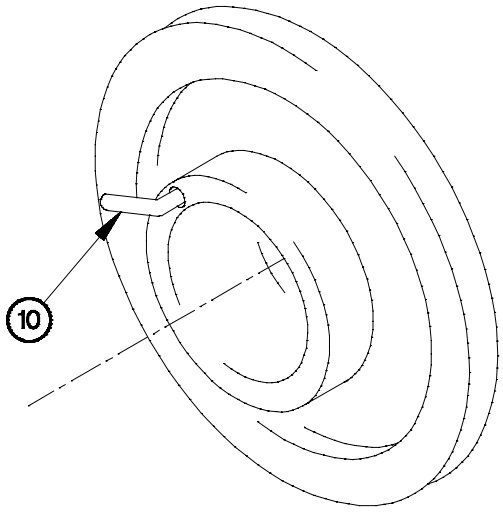
(8) Inspect idler shaft (7) for pitting, corrosion, or binding.

(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

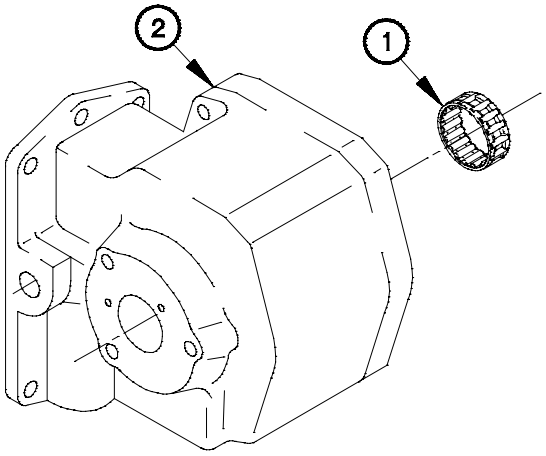
(11) Verify wire (10) is not bent or broken.

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).

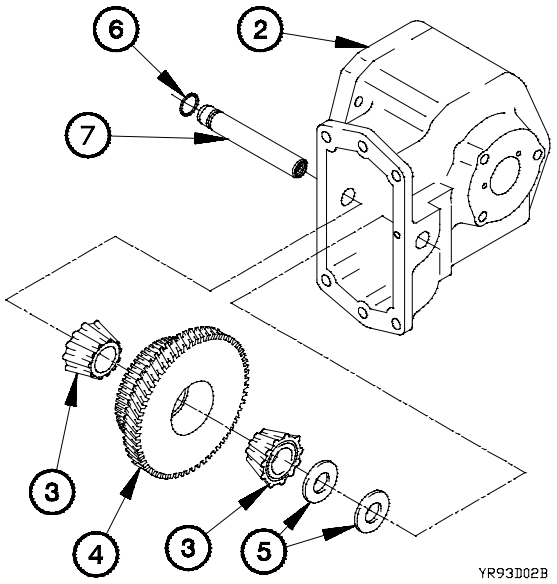
(1.2) Install two thrust washers (5) and input gear (4) in housing (2).

(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).

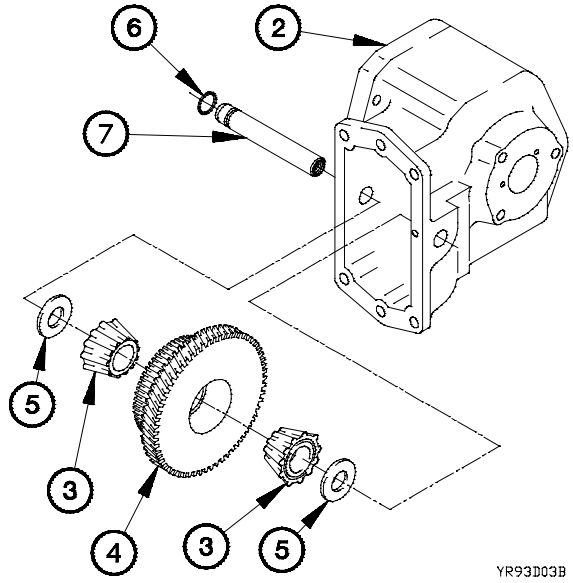
(3) Install two thrust washers (5) and input gear (4) in housing (2).

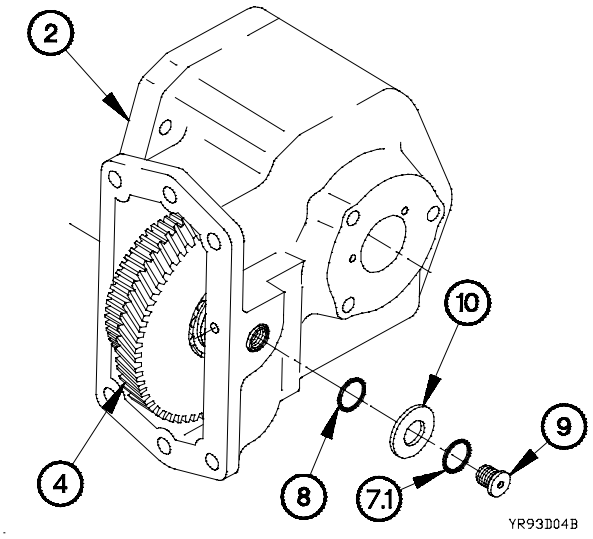
(4) Install preformed packing (6) on idler shaft (7).

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.

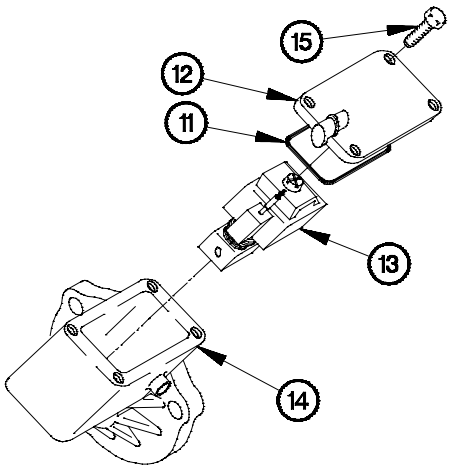
(9) Turn input gear (4) in housing (2).

(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).

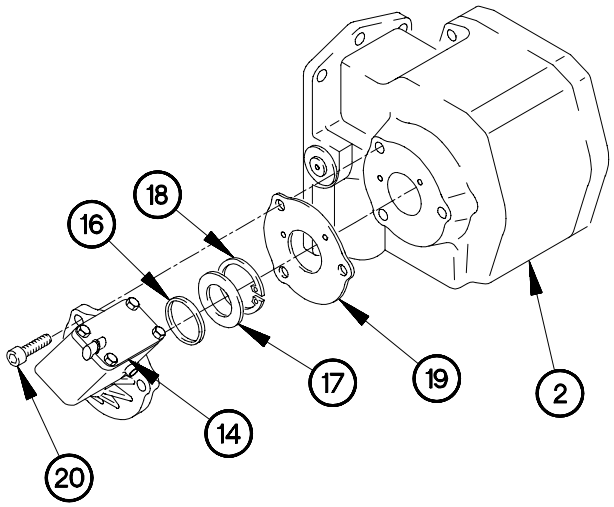
CAUTION

Ensure oil ports on valve body and housing are aligned. Failure to comply may result in damage to equipment.

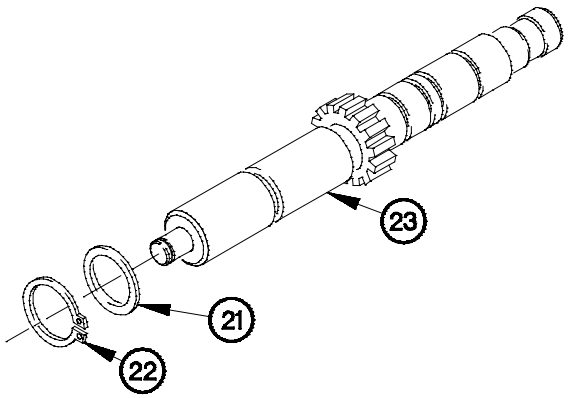
(16) Install gasket (19) and valve body (14) on housing (2).

(17) Position three screws (20) in valve body (14).

(18) Tighten three screws (20) to 16-20 lb-ft (22-27 N•m).

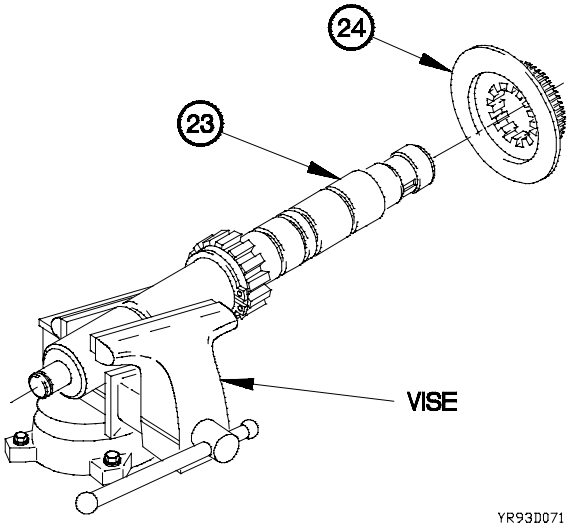


YR93D06B



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).

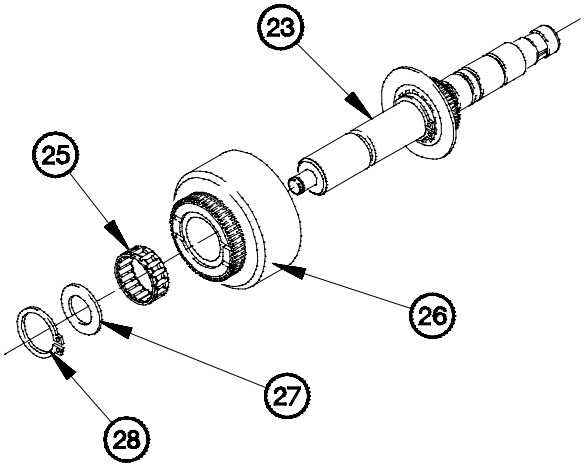
WARNING

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.

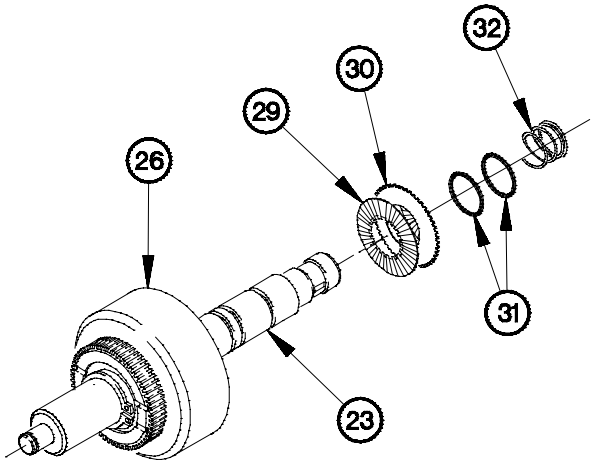
(22) Install needle bearing (25) in outer clutch gear (26).

(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).

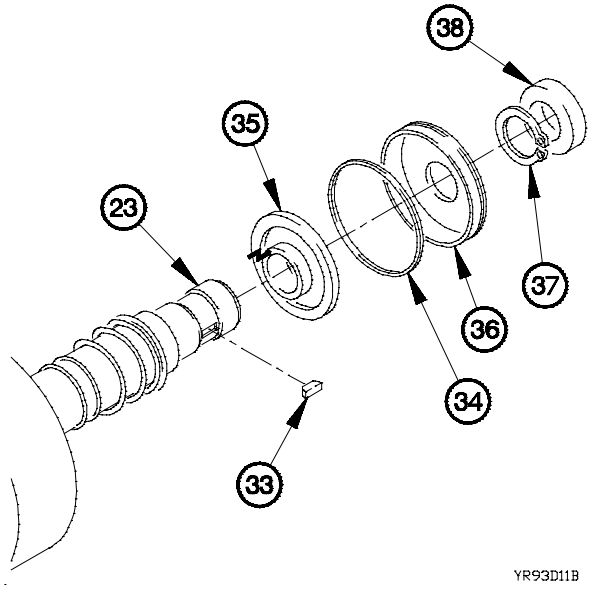
(32) Press down back-up cylinder (36).

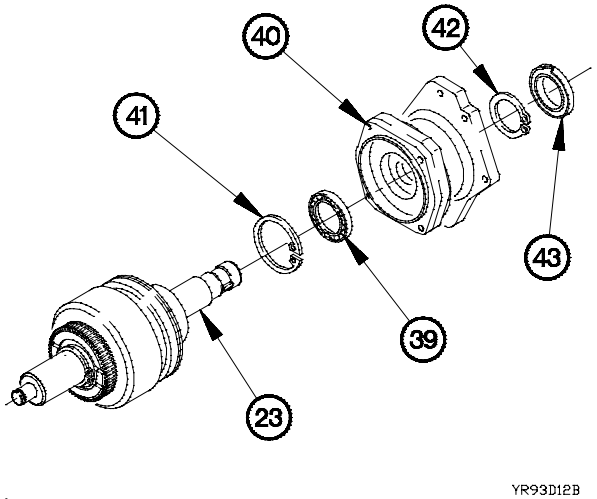
WARNING

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).

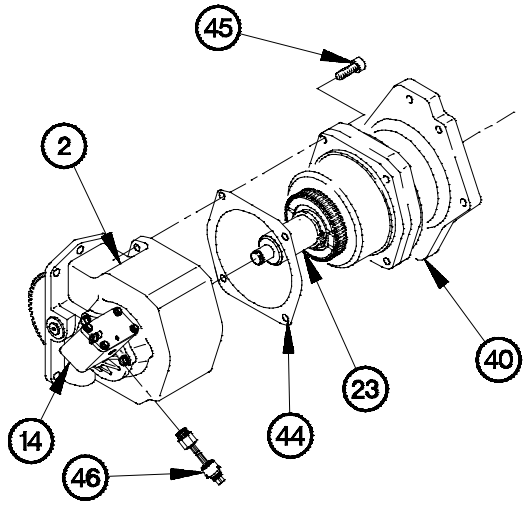
(41) Tighten four screws (45) to 16-20 lb-ft (22-27 N•m).

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).

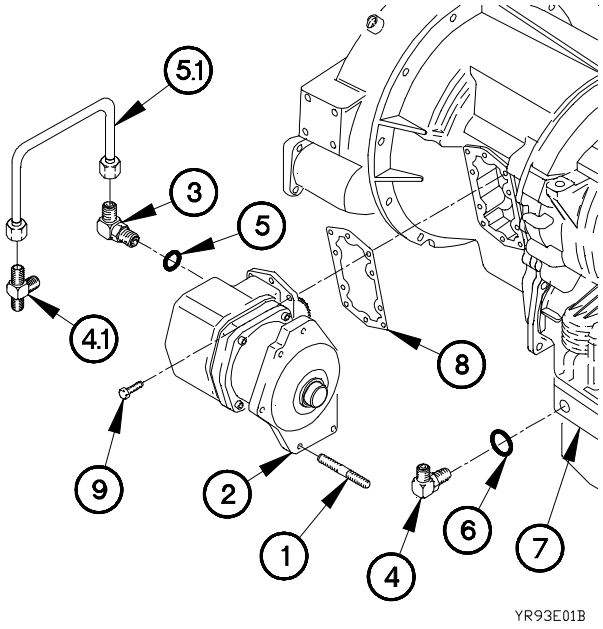
(1.5) Install tube (5.1) on 90-degree fitting (3).

(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.
- Apply spindle compound to input gear prior to installation.

(1.10) Position gasket (8) and PTO (2) on transmission (7) with eight screws (9).

(1.11) Tighten eight screws (9) to 42-50 lb-ft (57-68 N•m).

WARNING

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

NOTE

Perform steps (1.12) through (9) on PTO Assembly (P/N 276XMF-JX-D5XK).

(1.12) Install four threaded studs (1) in PTO (2).

(2) Apply sealing compound to 90-degree fittings (3 and 4).

(3) Install preformed packing (5) on 90-degree fitting (3).

(4) Position 90-degree fitting (3) in PTO (2).

(5) Install preformed packing (6) on 90-degree fitting (4).

(6) Position 90-degree fitting (4) in transmission (7).

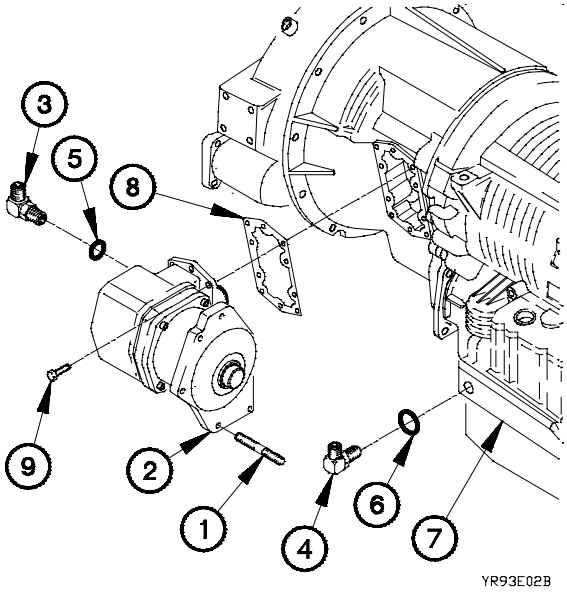
(7) Tighten 90-degree fittings (3 and 4) to 10-13 lb-ft (14-18 N·m).

NOTE

Step (8) requires the aid of an assistant.

(8) Position gasket (8) and PTO (2) on transmission (7) with eight screws (9).

(9) Tighten eight screws (9) to 42-50 lb-ft (57-68 N·m).



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).

WARNING

Do not use steel hammers to seat bearing cups in drive yokes. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check bearing cups to ensure all needle bearing are in place prior to installation. Replace bearing cups if needle bearings are missing or out of place. Failure to comply may result in damage to equipment.

NOTE

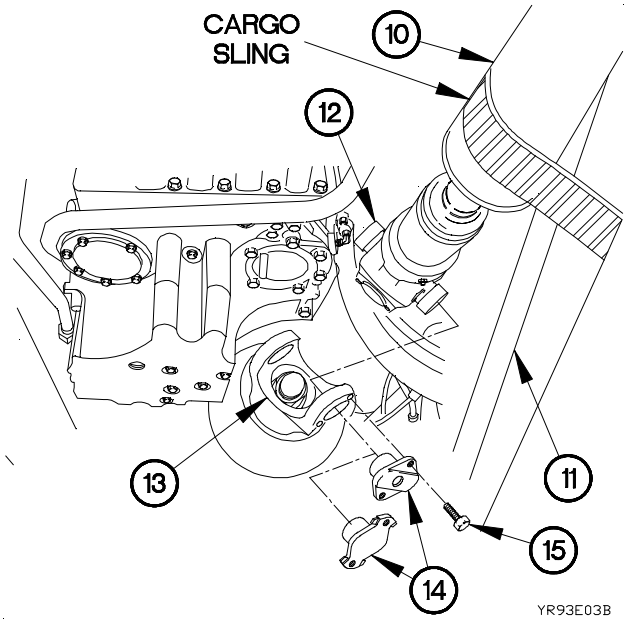
- Wipe end of yoke bearing bores prior to installation.
- There are two types of bearing cups, those with tabs and those without. Perform step (11) on bearing cups not equipped with tabs.

(11) Position universal joint (12) on drive yoke (13) with two bearing cups (14) and four screws (15).

NOTE

Perform step (12) on kits equipped with screws P/N C5 H5 24-39.

(12) Tighten four screws (15) to 26-35 lb-ft (35-47 N•m).



NOTE

- Perform step (12.1) on kits equipped with shearhead screws.
- Alternately tighten screw.
- When correct torque is reached, bearing cup small screw hex head will break off.

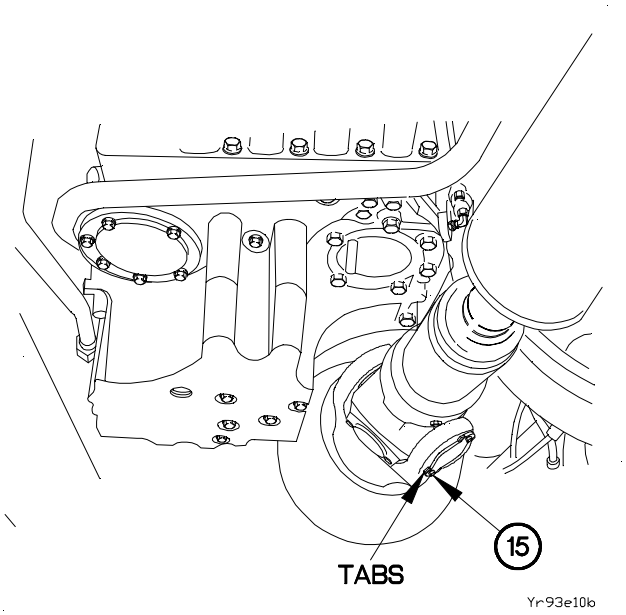
(12.1) Tighten four screw (15).

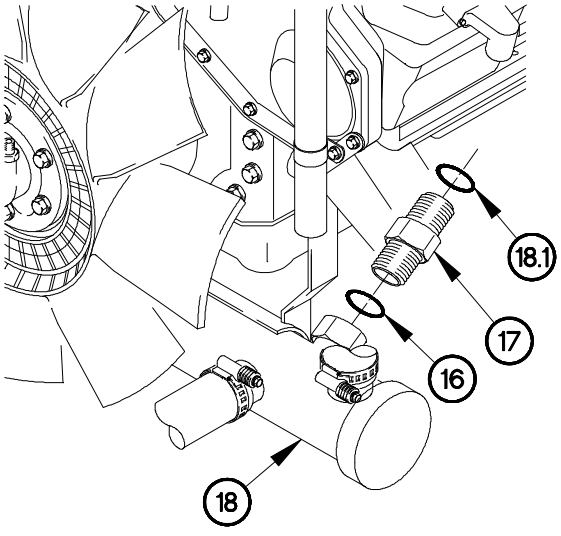
NOTE

Perform steps (12.2) and (12.3) on bearing cups equipped with tabs.

(12.2) Tighten four screws (15) to 26-35 lb-ft (35-47 N•m).

(12.3) Fold tabs on four screws (15).





NOTE

- Perform steps (13) through (14.9) on vehicles equipped with transmission oil cooler tubes.
- Perform steps (13) and (14) on vehicles not previously equipped with corrosive enhanced fittings.

(13) Install preformed packing (16) on fitting (17).

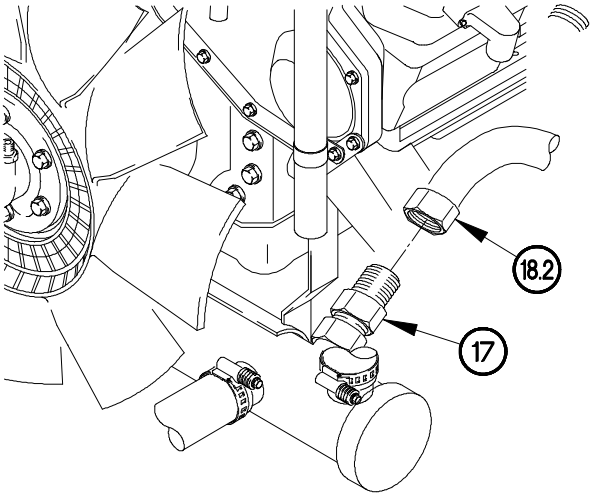
(14) Install fitting (17) on transmission oil cooler (18).

(14.1) Install preformed packing (18.1) on fitting (17).

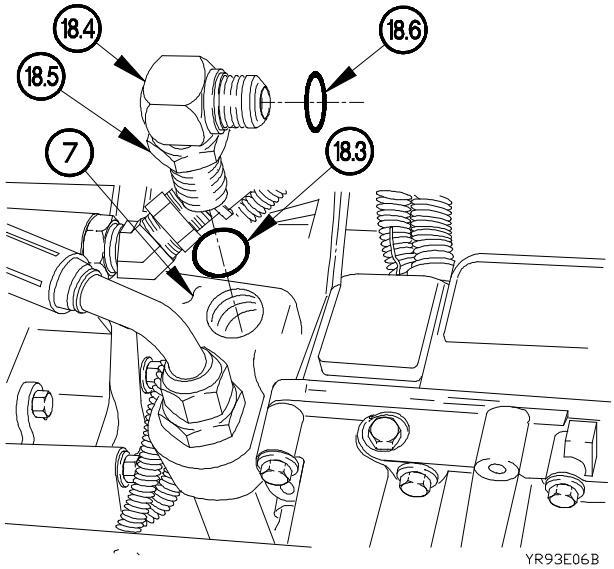
16-93. POWER TAKE-OFF (PTO) REPLACEMENT/REPAIR (CONT)

(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).

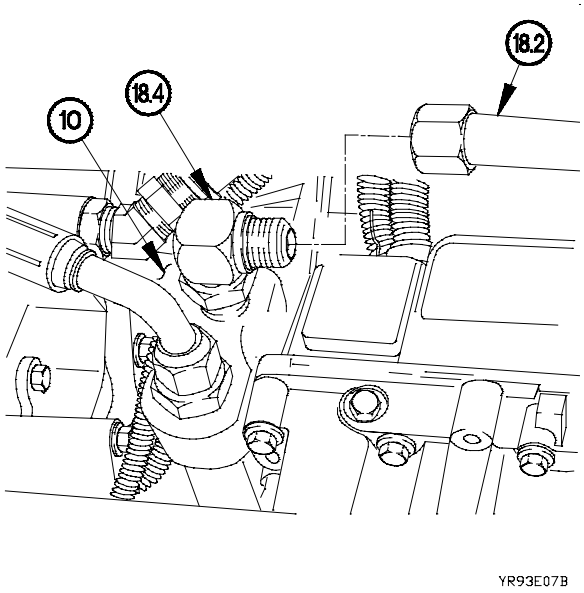
(14.5) Position 90-degree fitting (18.4) on transmission (7).

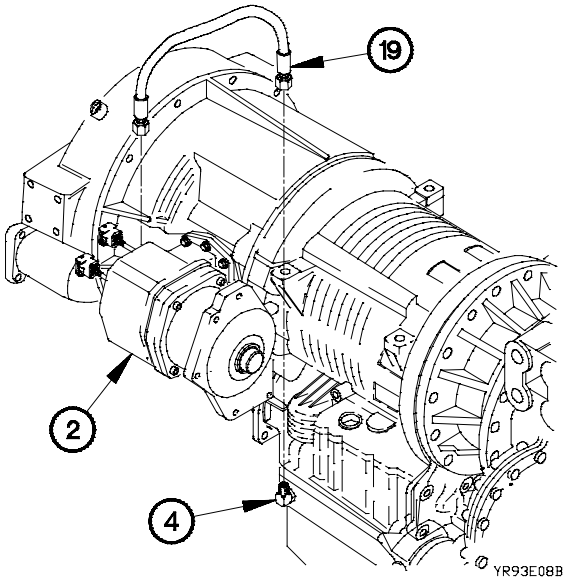
(14.6) Tighten jamb nut (18.5) on 90-degree fitting (18.4).

(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).

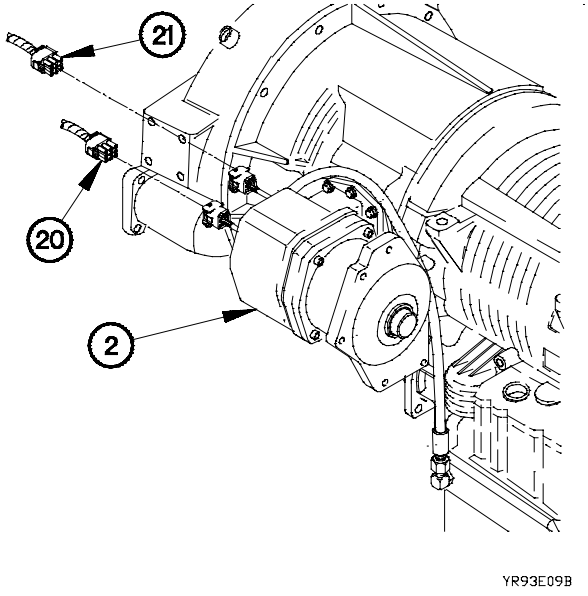




(15) Connect oil hose (19) to 90-degree fitting (4).

(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)

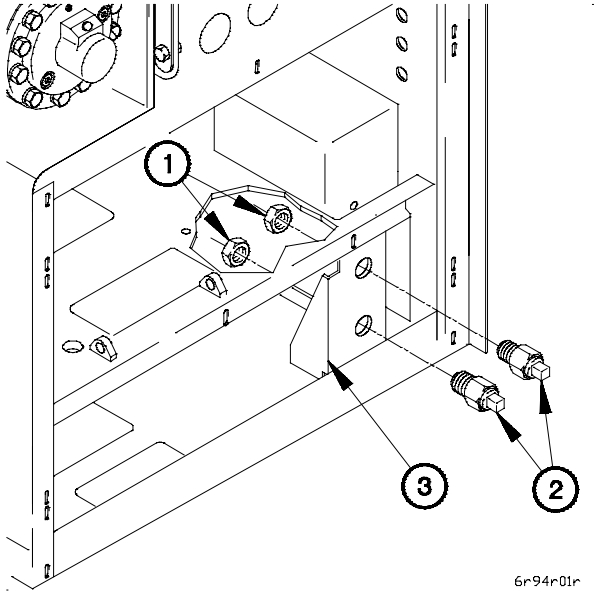
Tools and Special Tools (Cont)
Wrench, Torque, 0-175 lb-ft (Item 92, Appendix B)
Wrench Set, Socket (Item 85, Appendix B)
Sling, Cargo (Item 56, Appendix B)

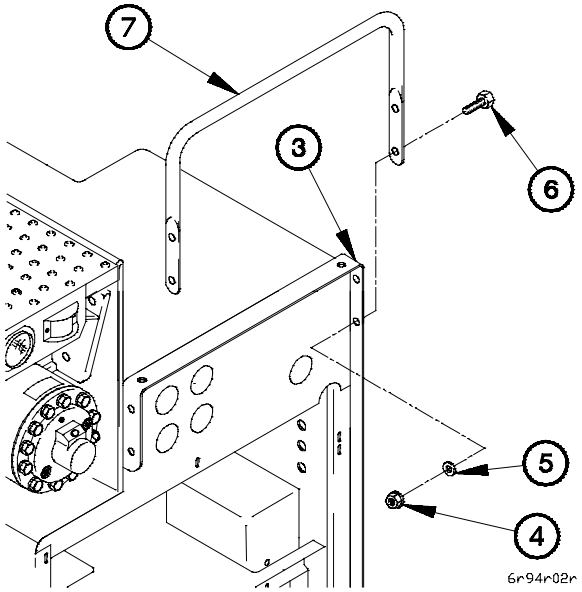
Materials/Parts
Nut, Self-Locking (2) (Item 199, Appendix F)
Nut, Self-Locking (3) (Item 199.2, Appendix F)
Nut, Self-Locking (2) (Item 199.1, Appendix F)

Personnel Required
(2)

a. Removal.

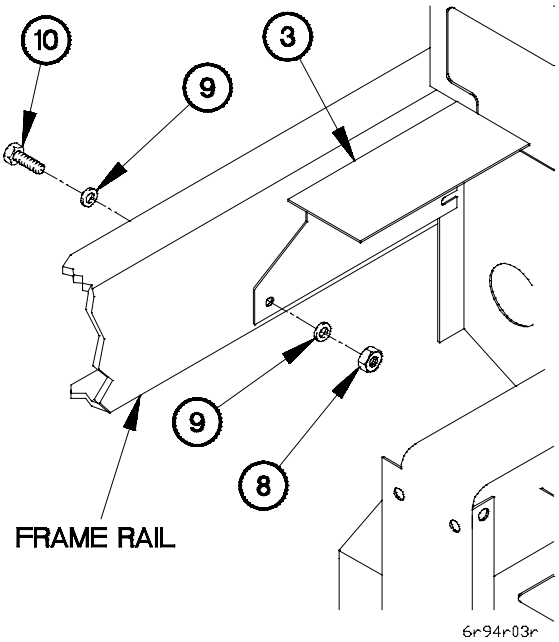
(1) Remove two nuts (1) and adapters (2) from WRECKER CONTROL PANEL (3).

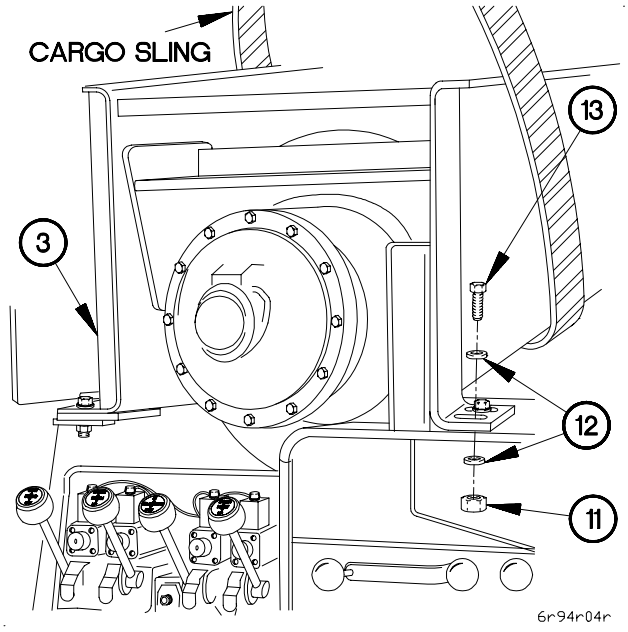




(2) Remove two self-locking nuts (4), washers (5), screws (6), and handle (7) from WRECKER CONTROL PANEL (3). Discard self-locking nuts.

(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)

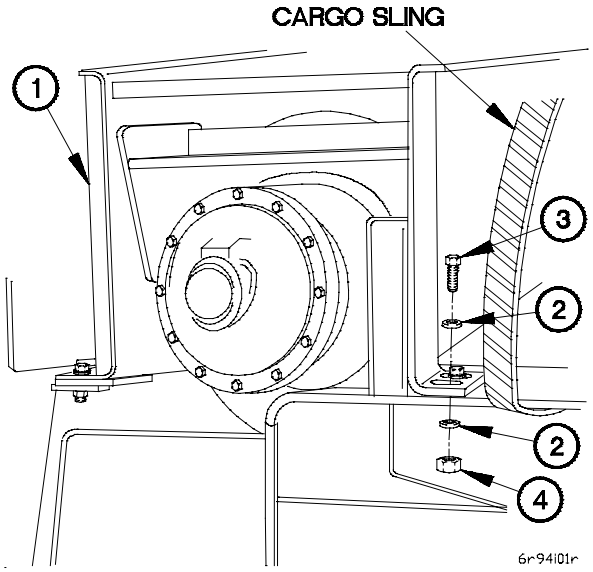
b. Installation.

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.

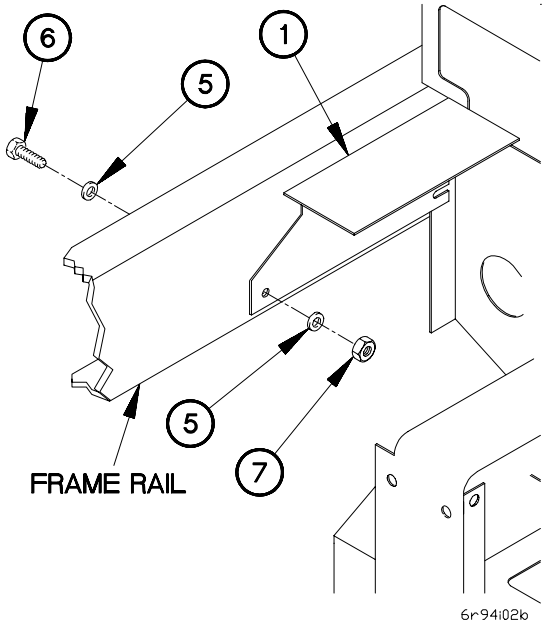
NOTE

Step (1) requires the aid of an assistant.



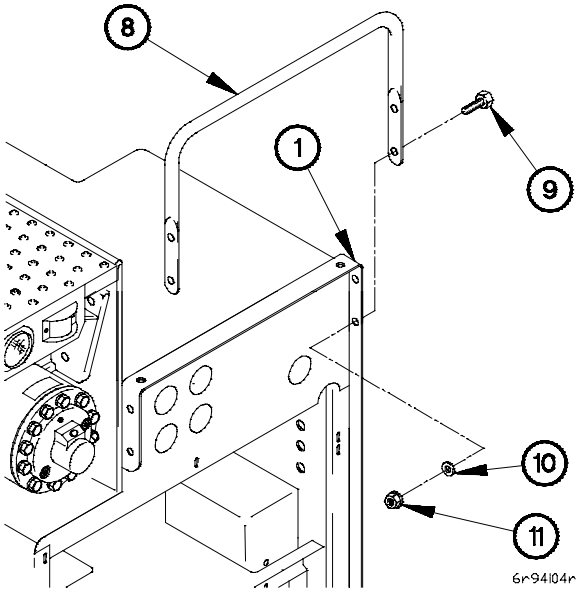
(1) Position WRECKER CONTROL PANEL (1) on vehicle with two washers (2), screws (3), washers (2), and self-locking nuts (4).

(2) Tighten two self-locking nuts (4) to 76-84 lb-ft (103-114 N·m).



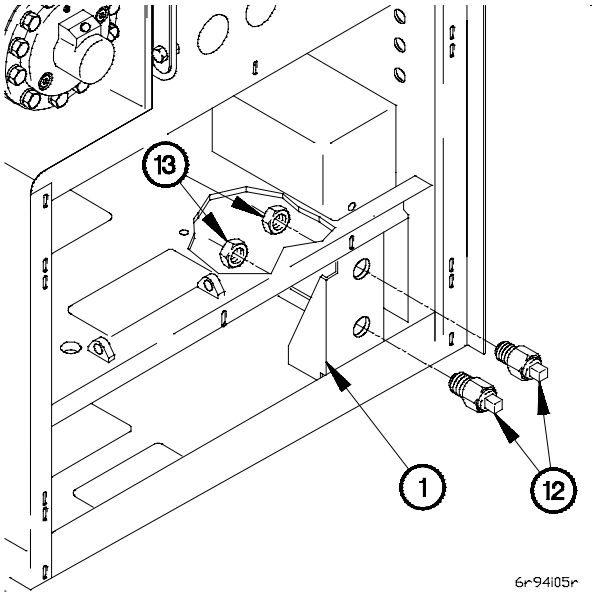
(3) Position three washers (5), screws (6), washers (5), and self-locking nuts (7) in WRECKER CONTROL PANEL (1).

(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)

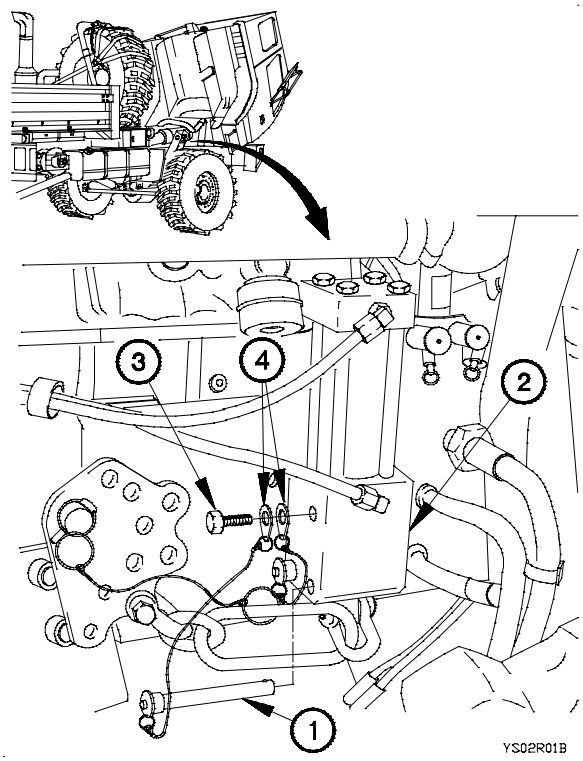
a. Removal.

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.

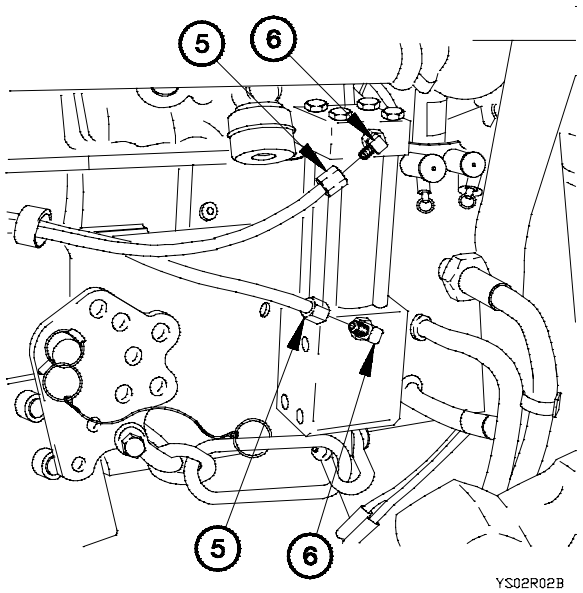
CAUTION

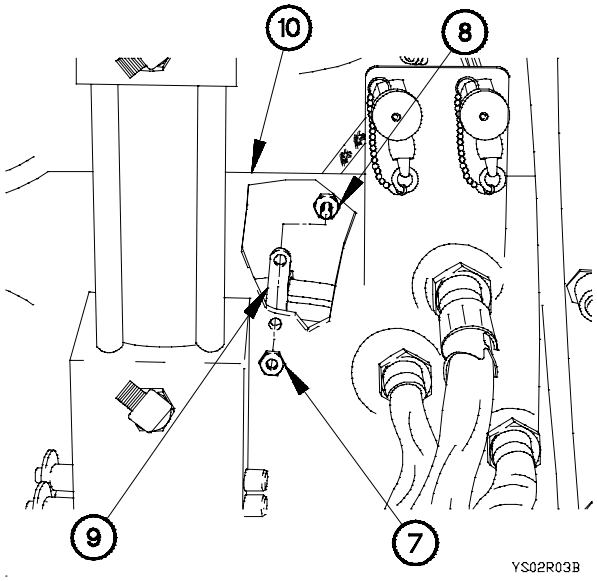
Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

(3) Disconnect two hydraulic hoses (5) from 90-degree fittings (6).





WARNING

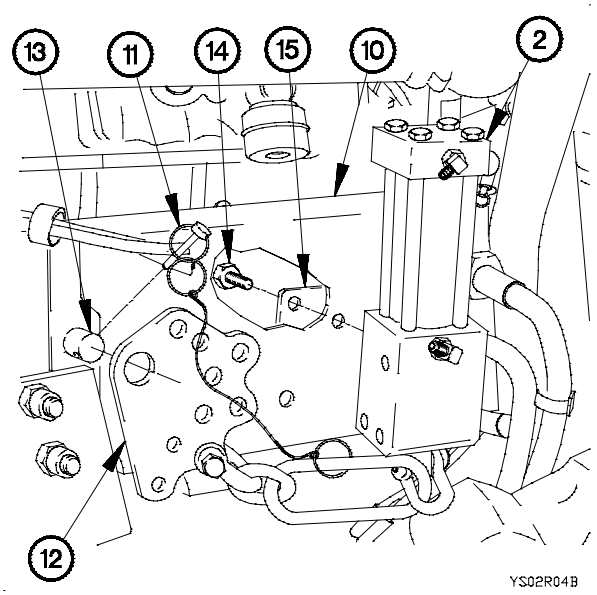
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

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)

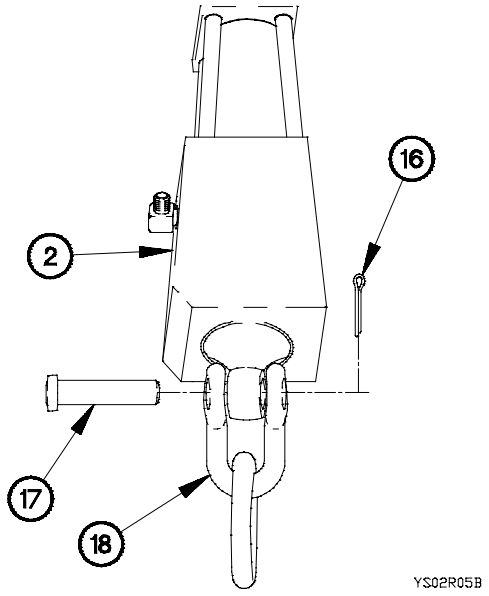


(5) Remove spring pin (11) and suspension compression plate (12) from suspension compression plate stud (13).

NOTE

Step (6) requires the aid of an assistant.

(6) Remove three screws (14), plate (15), and suspension cylinder (2) from frame rail (10).



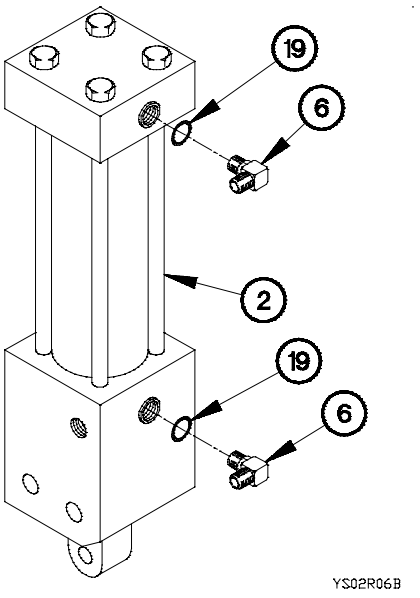
(7) Remove cotter pin (16), pin (17), and shackle (18) from suspension cylinder (2). Discard cotter pin.

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.



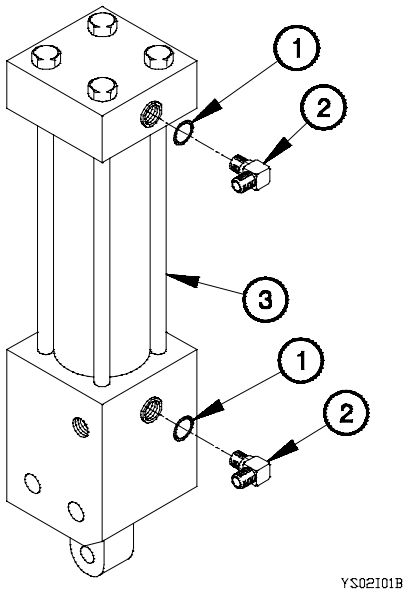
b. Installation.

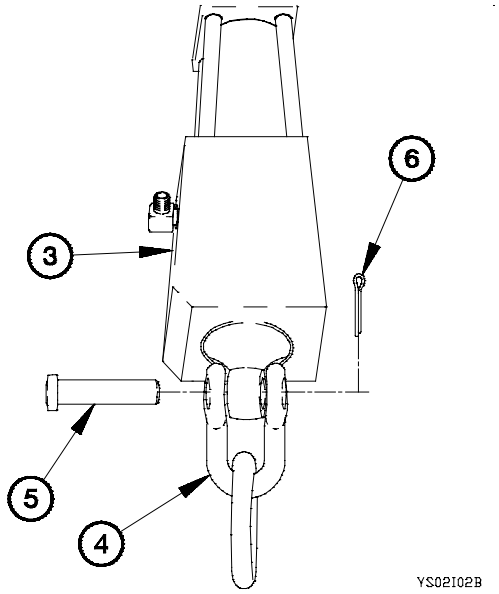
NOTE

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

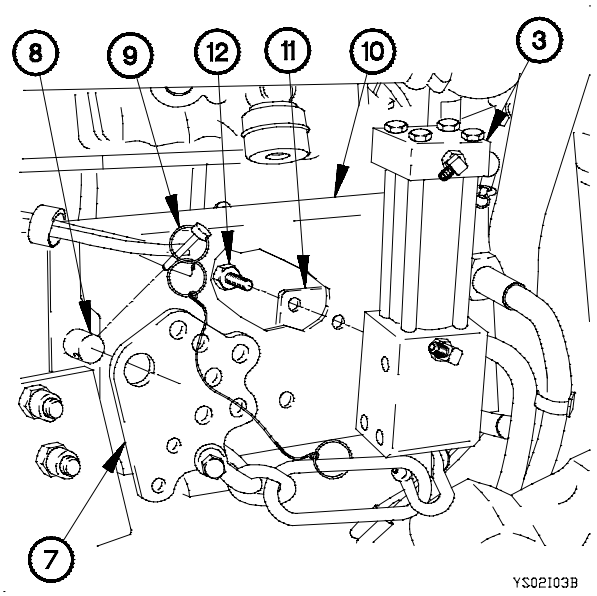
Wear appropriate eye protection when working under vehicle due to the possibility of falling debris. Failure to comply may result in injury to personnel.

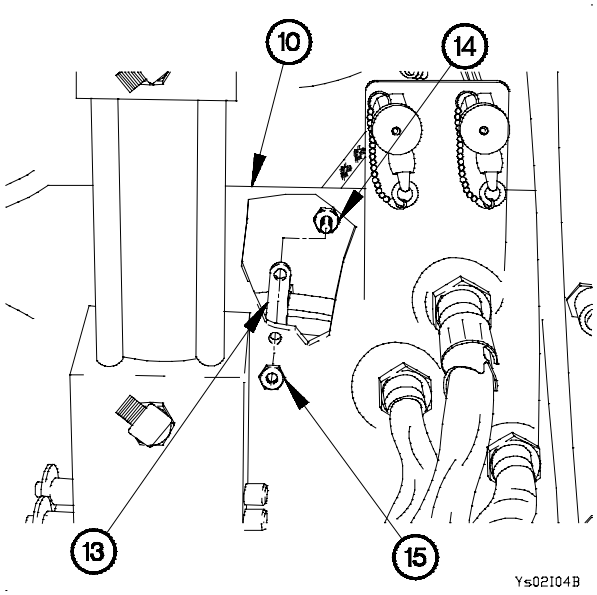
NOTE

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).

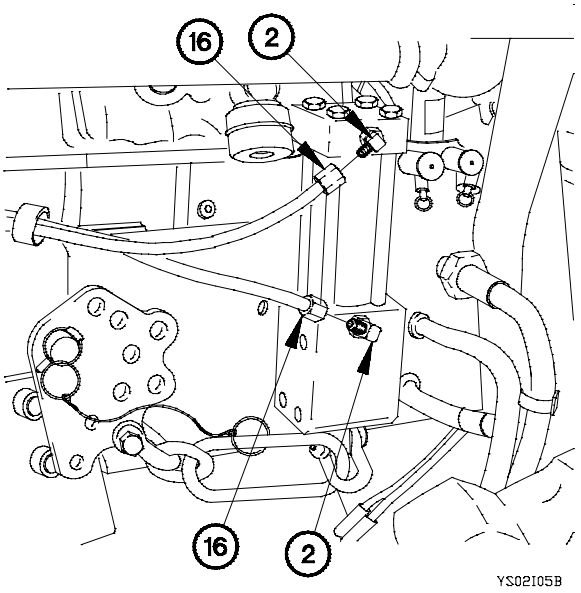


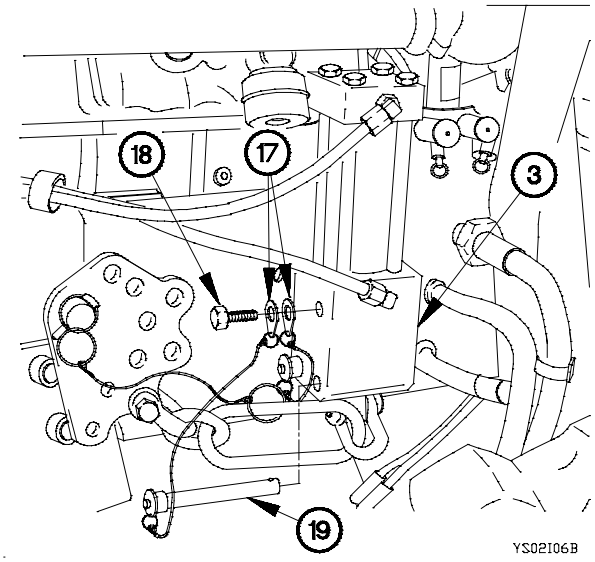


(7) Position clamp (13) on frame rail (10) with screw (14), and self-locking nut (15).

(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.

All data on pages 17-8 through 17-11, including pages 17-9 and 17-10, deleted.

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)

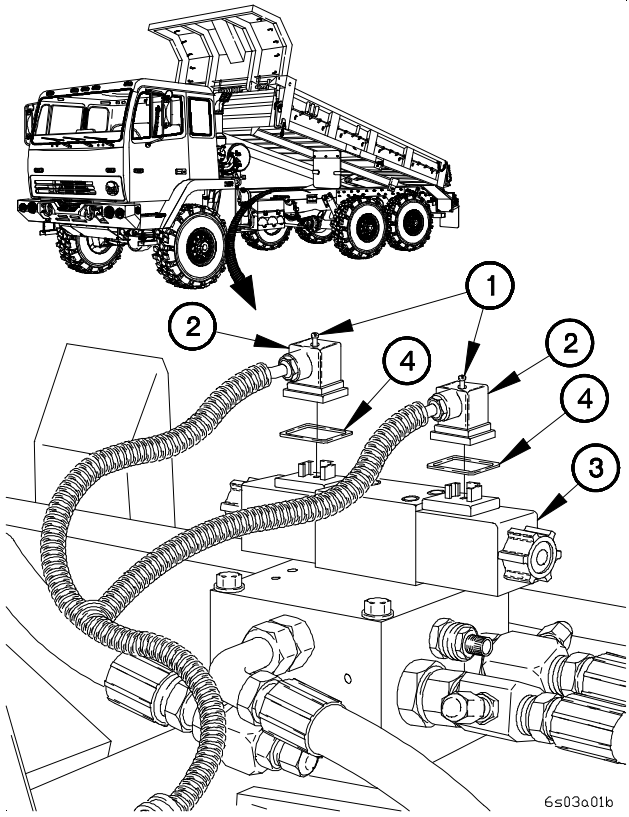
Material/Parts
Cap and Plug, Set (Item 17, Appendix C)
Packing, Preformed (4) (Item 230, Appendix F)
Lockwasher (4) (Item 136, Appendix F)
Dispenser, Pressure Sensitive Adhesive Tape (Item 30, Appendix C)

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.



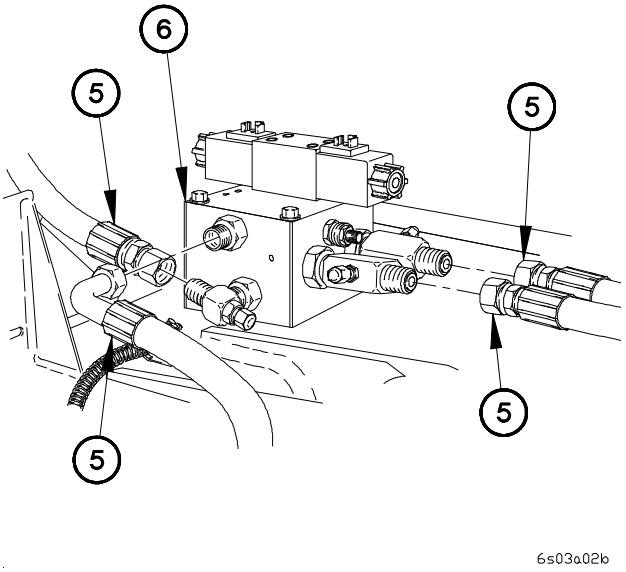
NOTE

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.

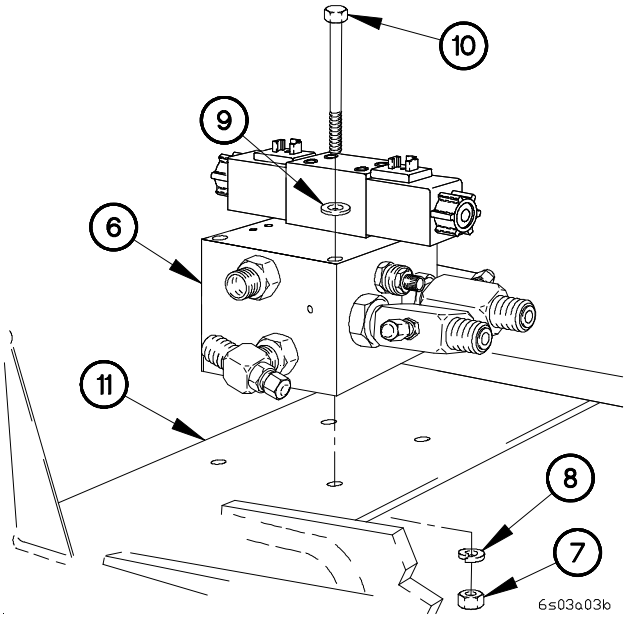
NOTE

Tag hydraulic hoses and connection points prior to disconnecting.

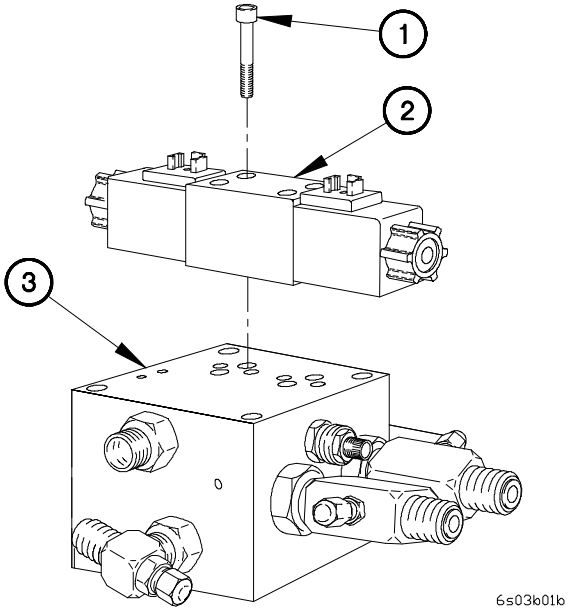
(4) Disconnect four hoses (5) from four-way relief valve (6).

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). Discard lockwashers.



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 packings.

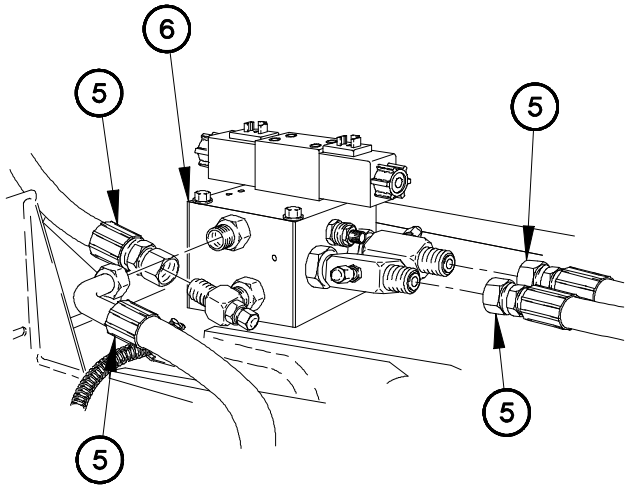
NOTE

Note orientation of tee fittings prior to removal.

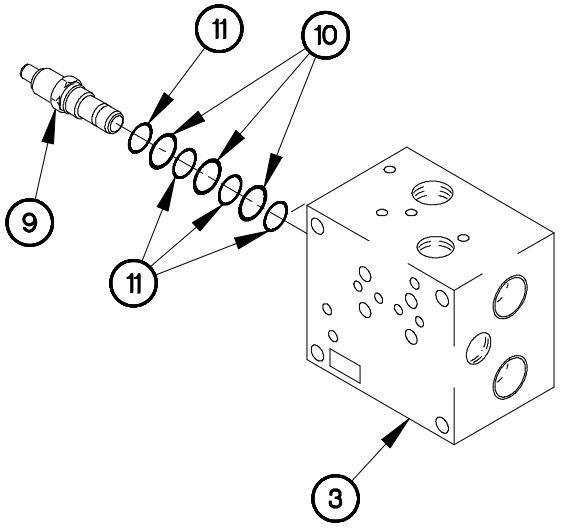
(3) Remove three caps (5) from tee fittings (6).

(4) Remove three tee fittings (6) and fitting (7) from valve body (3).

(5) Remove four preformed packings (8) from three tee fittings (6) and fitting (7). Discard preformed packings.



6s03a02b



6s03b03b

NOTE

Tag valves and valve body prior to removal.

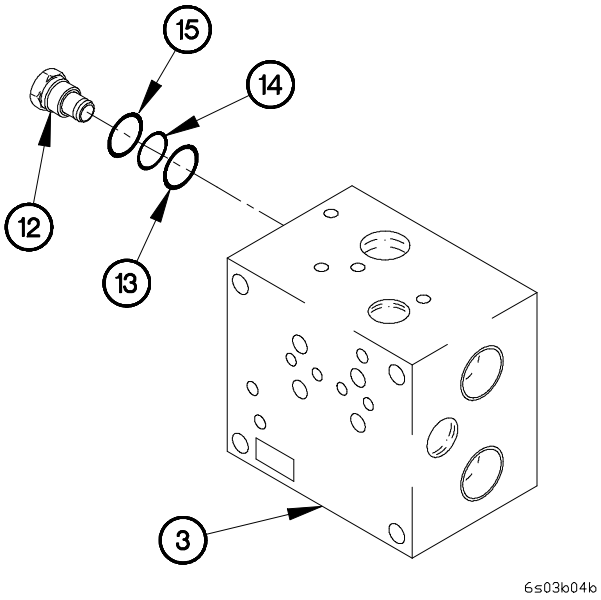
(6) Remove relief valve (9) from valve body (3).

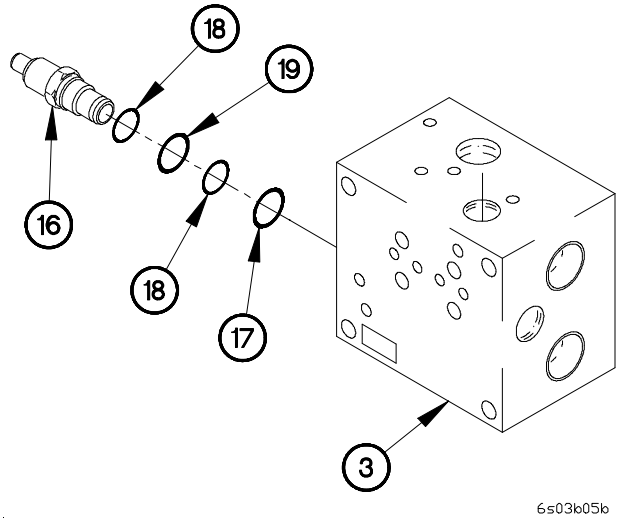
(7) Remove three preformed packings (10) and four back-up rings (11) from relief valve (9). Discard preformed packings and back-up rings.

17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(8) Remove check valve (12) from valve body (3).

(9) Remove preformed packings (13 and 14) and back-up ring (15) from check valve (12). Discard preformed packings and back-up ring.





(10) Remove pressure reducing valve (16) from valve body (3).

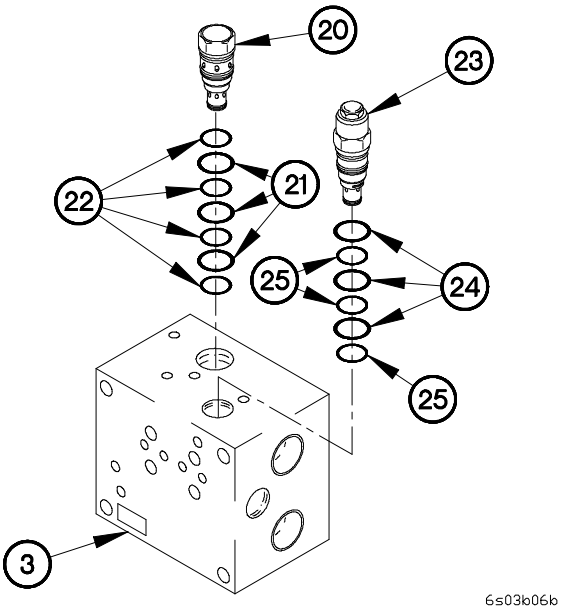
(11) Remove preformed packing (17), back-up ring (18), preformed packing (19), and back-up ring (18) from pressure reducing valve (16). Discard preformed packings and back-up rings.

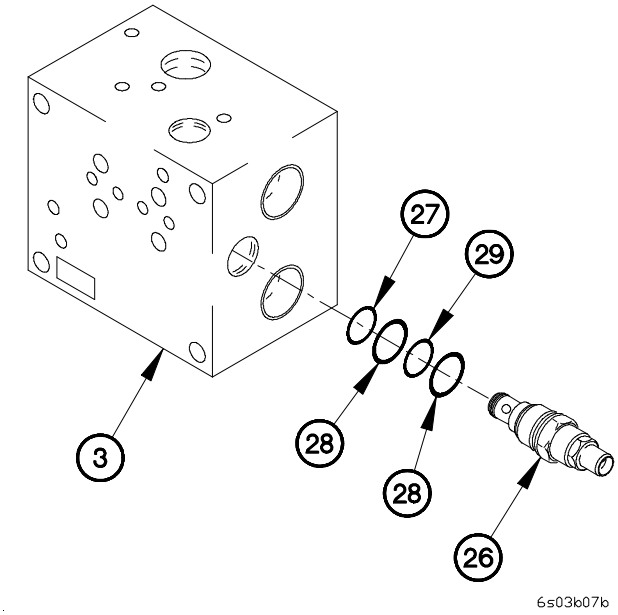
(12) Remove flow control valve (20) from valve body (3).

(13) Remove three preformed packings (21) and four back-up rings (22) from flow control valve (20). Discard preformed packings and back-up rings.

(14) Remove counterbalance valve (23) from valve body (3).

(15) Remove three preformed packings (24) and back-up rings (25) from counterbalance valve (23). Discard preformed packings and back-up rings.

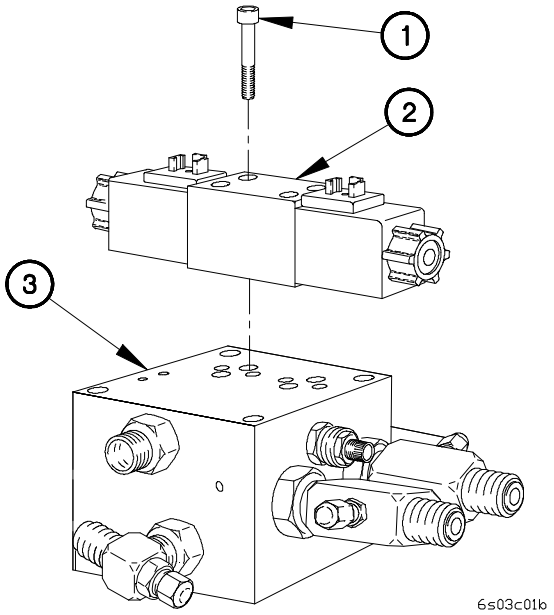




(16) Remove needle valve (26) from valve body (3).

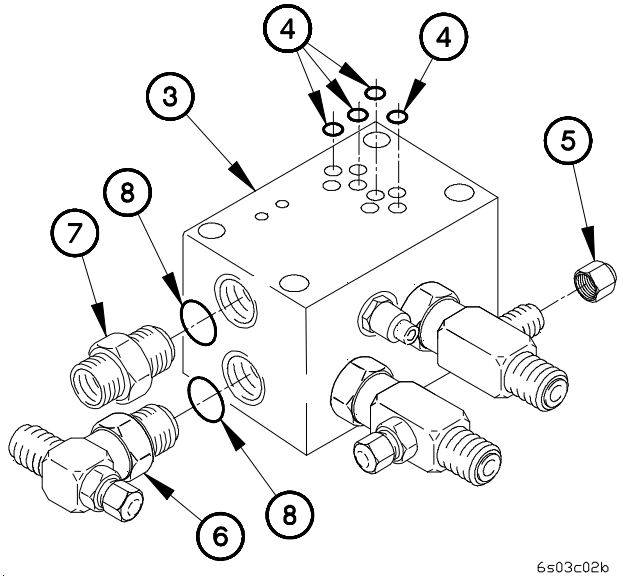
(17) Remove preformed packing (27), back-up ring (28), preformed packing (29), and back-up ring (28) from needle valve (26). Discard preformed packings and back-up rings.

17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)



c. Disassembly (P/N 6E150110).

(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 packings.

NOTE

Note orientation of tee fittings prior to removal.

(3) Remove three caps (5) from tee fitting (6).

(4) Remove three tee fittings (6) and fitting (7) from valve body (3).

(5) Remove four preformed packings (8) from three tee fittings (6) and fittings (7). Discard preformed packings.

NOTE

Tag valves and valve body prior to removal.

(6) Remove relief valve (9) from valve body (3).

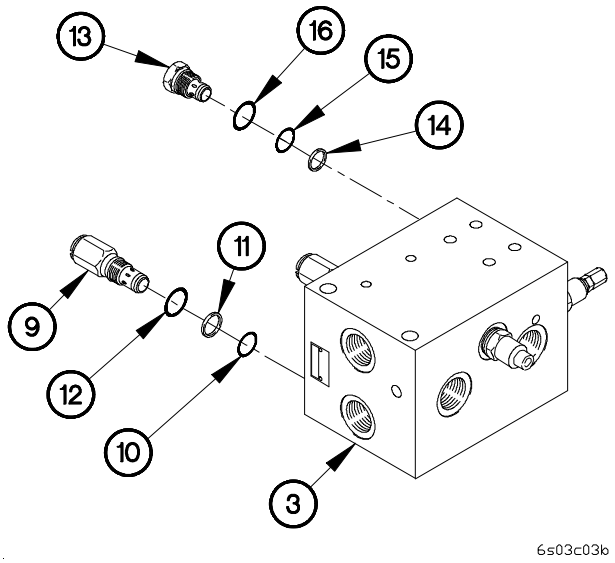
NOTE

Note position and sizes of preformed packings and back up rings prior to removal.

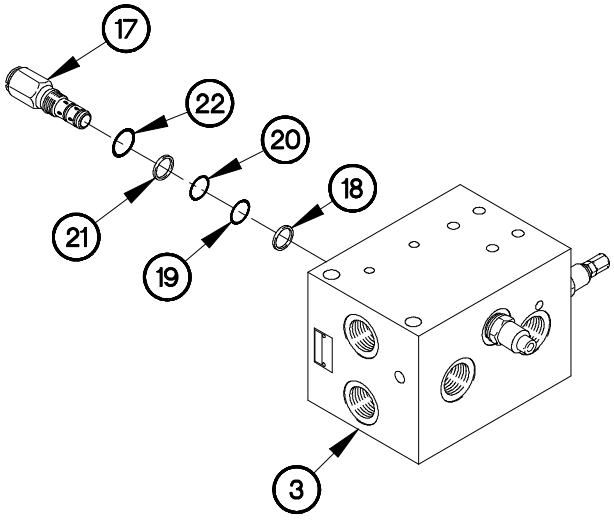
(7) Remove preformed packing (10), back-up ring (11), and preformed packing (12) from relief valve (9). Discard preformed packings and back-up ring.

(8) Remove check valve (13) from valve body (3).

(9) Remove back-up ring (14) and preformed packings (15 and 16) from check valve (13). Discard back-up ring and preformed packings.



6s03c03b



6s03c04b

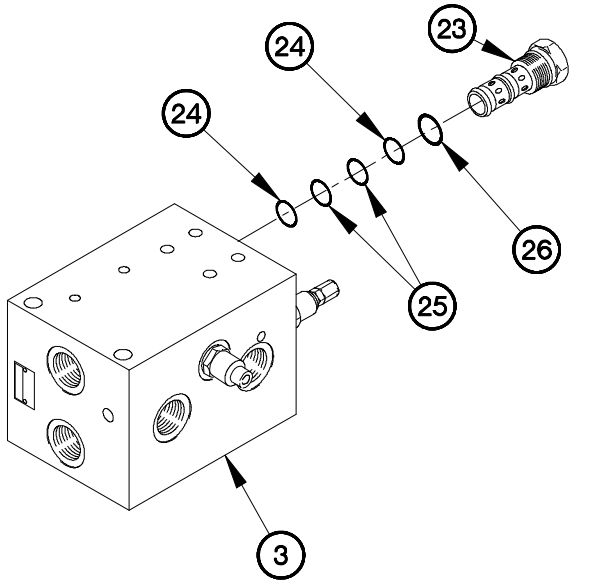
(10) Remove pressure reducing valve (17) from valve body (3).

(11) Remove back-up ring (18), preformed packings (19 and 20), back up ring (21) and preformed packing (22) from pressure reducing valve (17). Discard back-up rings and preformed packings.

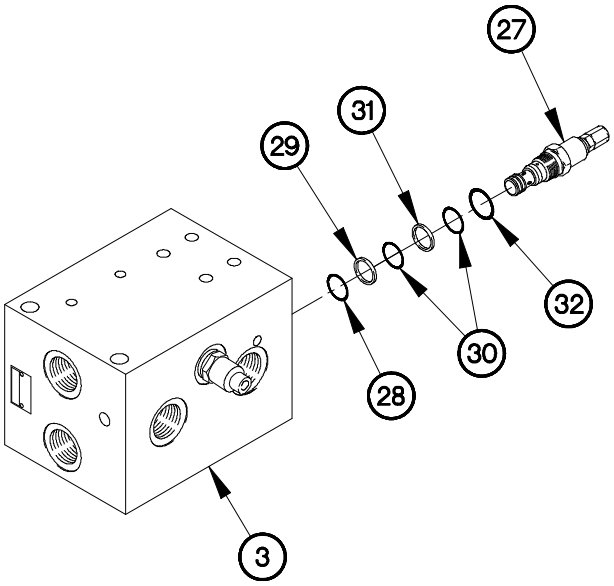
17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(12) Remove flow control valve (23) from valve body (3).

(13) Remove two preformed packings (24), back-up rings (25), and preformed packing (26) from flow control valve (23). Discard preformed packings and back-up rings.



6s03c05b



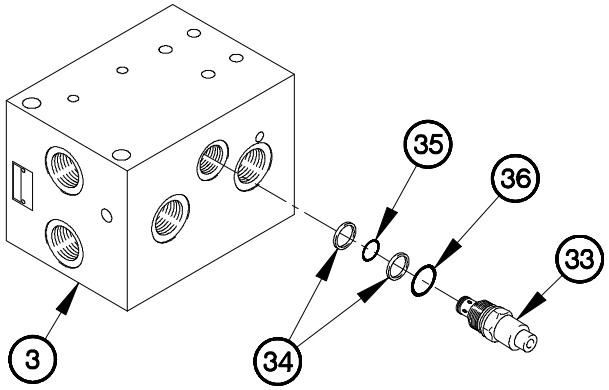
6s03c06b

(14) Remove counterbalance valve (27) from valve body (3).

(15) Remove preformed packing (28), back up ring (29), two back-up rings (30), preformed packing (31), and preformed packing (32) from counterbalance valve (27). Discard preformed packings and back-up rings.

(16) Remove needle valve (33) from valve body (3).

(17) Remove two back-up rings (34), preformed packing (35), and preformed packing (36) from needle valve (33). 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.

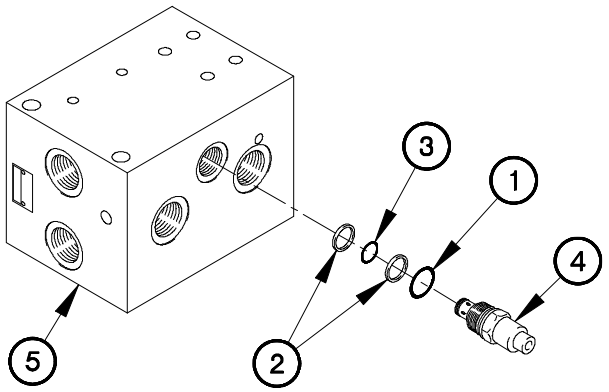
Clean all metal parts thoroughly with dry cleaning solvent.

e. Assembly (P/N 6E150110).

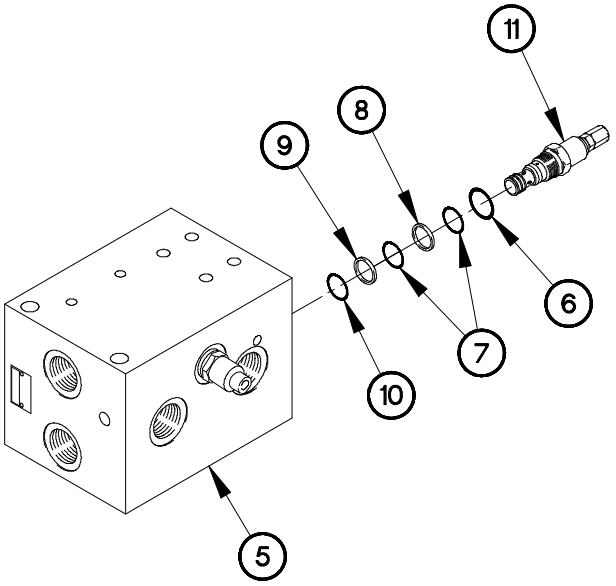
(1) Install preformed packing (1), back-up ring (2), and preformed packing (3) on needle valve (4).

(2) Position needle valve (4) in valve body (5).

(3) Tighten needle valve (4) to 35-40 lb-ft (47-54 N•m).



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).

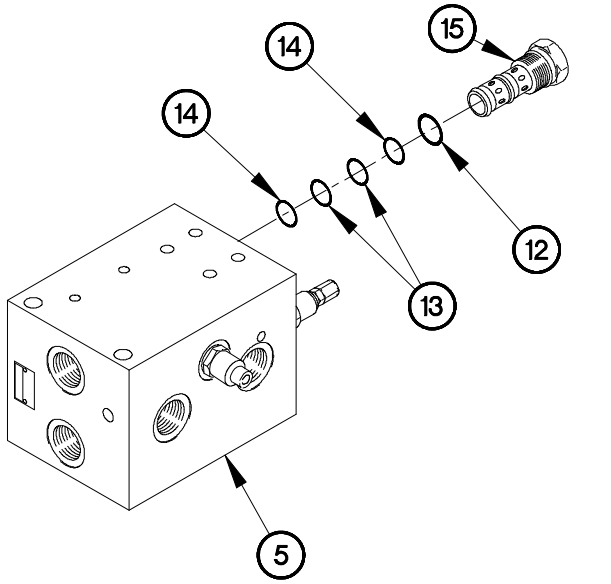
(6) Tighten counterbalance valve (11) to 50-55 lb-ft (68-75 N•m).

17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

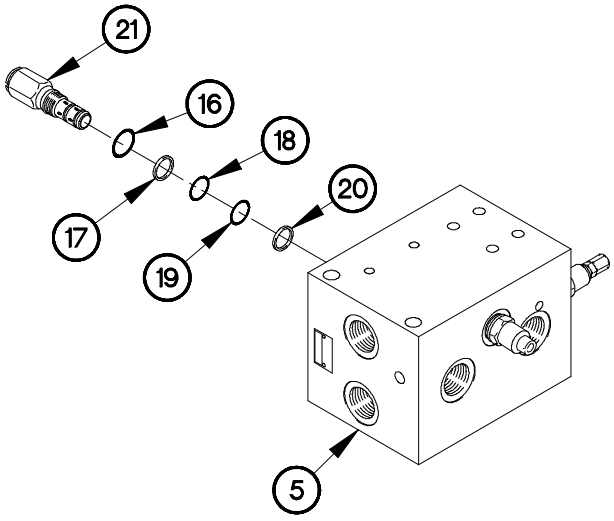
(7) Install preformed packing (12), two back up rings (13), and preformed packings (14) on flow control valve (15).

(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



6s03e04b

(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).

(13) Install preformed packings (22 and 23) and back-up ring (24) on check valve (25).

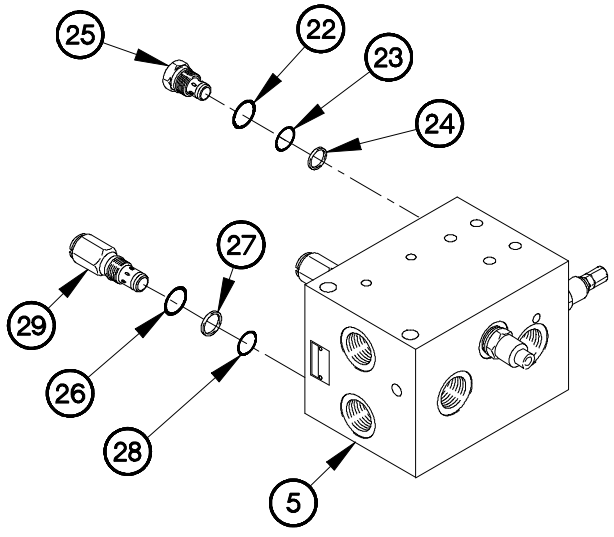
(14) Position check valve (25) in valve body (5).

(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).



6s03e05b

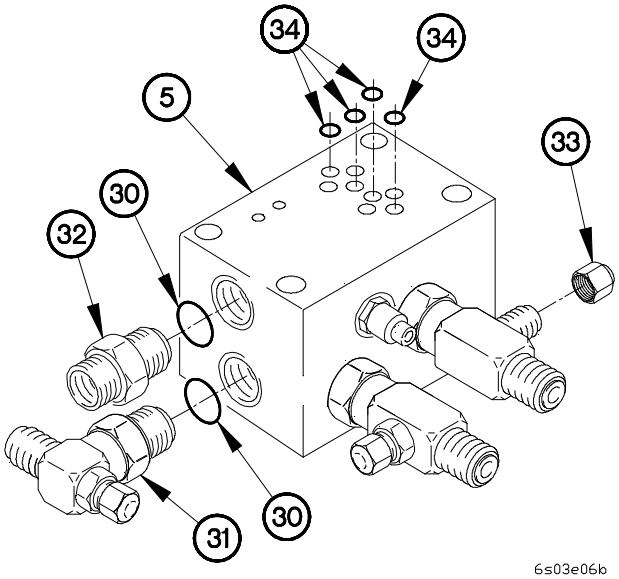
(19) Install four preformed packings (30) on three tee fittings (31) and fitting (32).

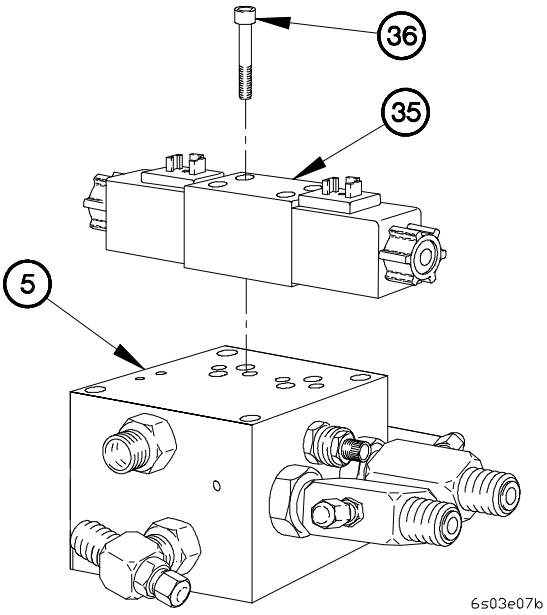
(20) Position three tee fittings (31) and fittings (32) in valve body (5).

(21) Tighten three tee fittings (31) and fitting (32) to 79-88 lb-ft (107-119 N•m).

(22) Install three caps (33) on tee fittings (31).

(23) Install four preformed packings (34) on valve body (5).





(24) Position solenoid valve (35) on valve body (5) with four screws (36).

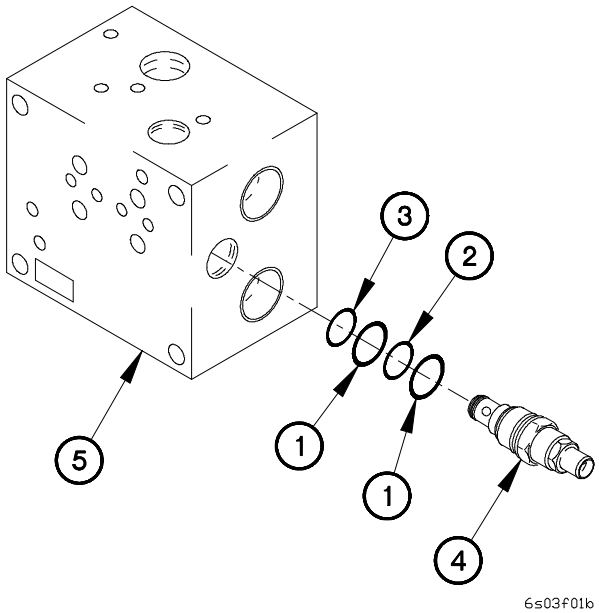
(25) Tighten four screws (36) to 44-62 lb-in. (5-7 N•m).

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).



17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(4) Install three back up rings (6) and preformed packings (7) on counterbalance valve (8).

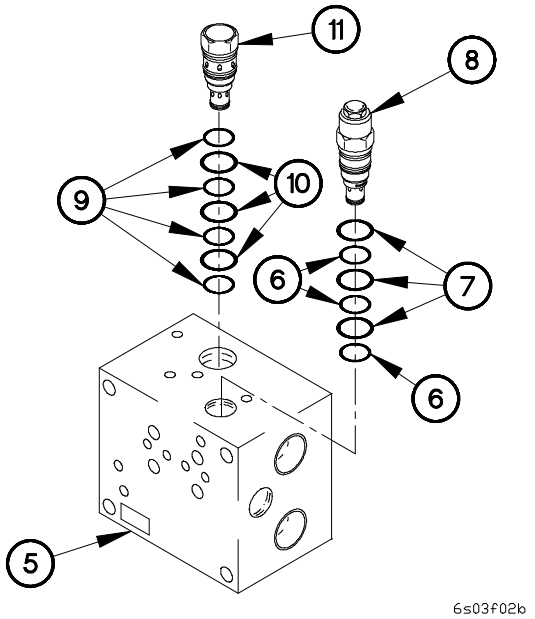
(5) Position counterbalance valve (8) in valve body (5).

(6) Tighten counterbalance valve (8) to 30-35 lb-ft (41-47 N•m).

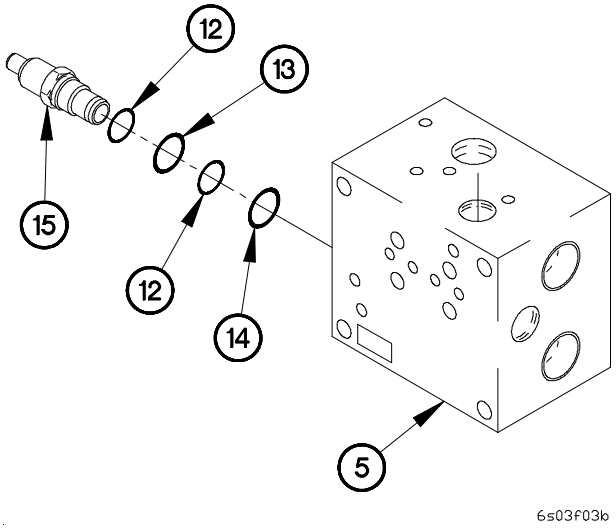
(7) Install four back-up rings (9) and three preformed packings (10) on flow control valve (11).

(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).



6s03f02b

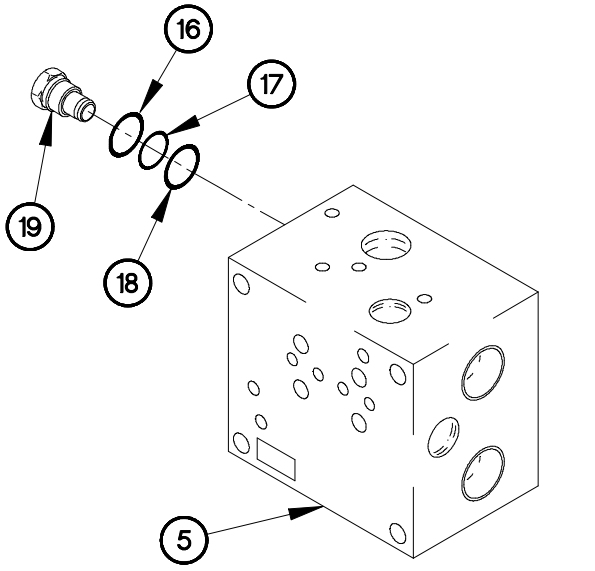


6s03f03b

(10) Install two back up rings (12) and preformed packings (13 and 14) on pressure reducing valve (15).

(12) Position pressure reducing valve (15) in valve body (5).

(12) Tighten pressure reducing valve (15) to 35-40 lb-ft (41-47 N•m).



6s03f04b

(13) Install back-up ring (16) and preformed packings (17 and 18) on check valve (19).

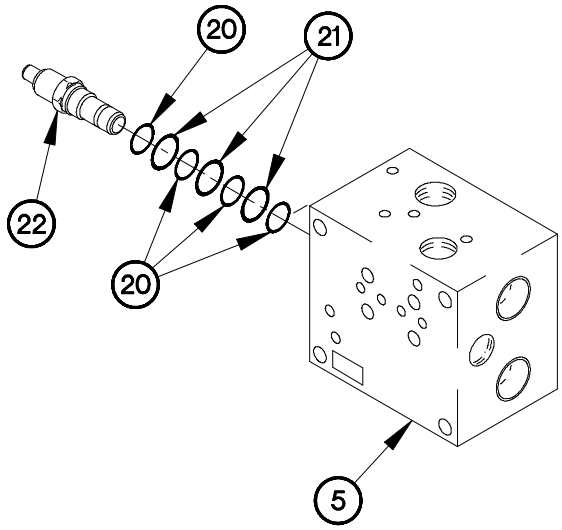
(14) Position check valve (19) in valve body (5).

(15) Tighten check valve (19) to 35-40 lb-ft (41-47 N•m).

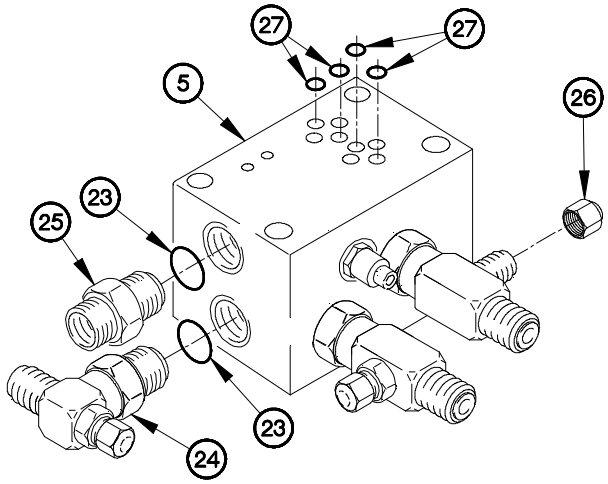
(16) Install four back-up rings (20) and three preformed packings (21) on relief valve (22).

(17) Position relief valve (22) in valve body (5).

(18) Tighten relief valve (22) to 35-40 lb-ft (41-47 N•m).



6s03f05b



6S03f06B

(19) Install four preformed packings (23) on three tee fitting (24) and fittings (25).

(20) Position three tee fitting (24) and fittings (25) in valve body (5).

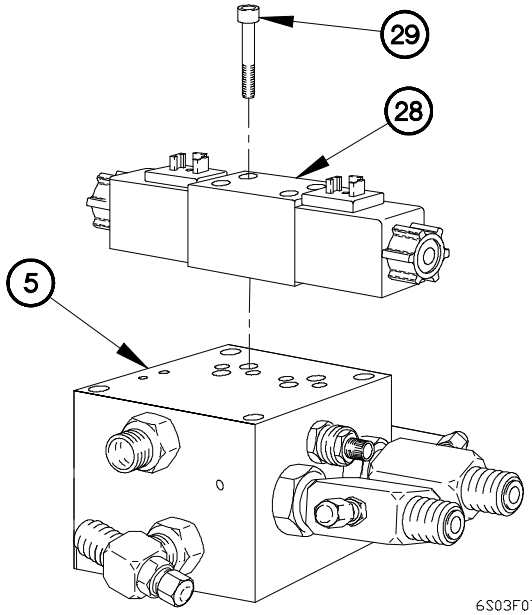
(21) Tighten three tee fitting (24) and fittings (25) to 79-88 lb-ft (107-119 N•m).

(22) Install caps (26) on three tee fittings (24).

(23) Install four preformed packings (27) on valve body (5).

(24) Position solenoid valve (28) on valve body (5) with four screws (29).

(25) Tighten four screws (29) to 45-55 lb-in. (5-6 N•m).

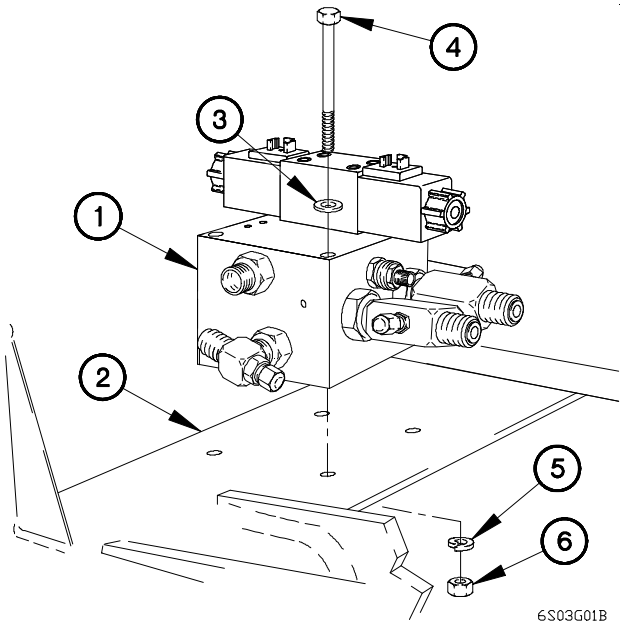


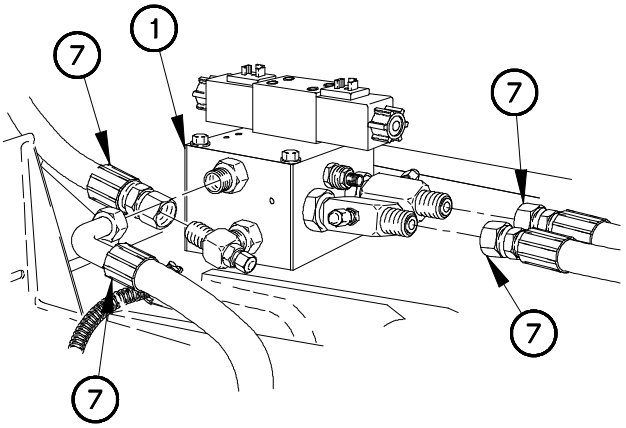
6S03F07B

17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

g. Installation.

(1) Install four-way relief valve (1) on subframe (2) with four washers (3), screws (4), lockwashers (5), and nuts (6).





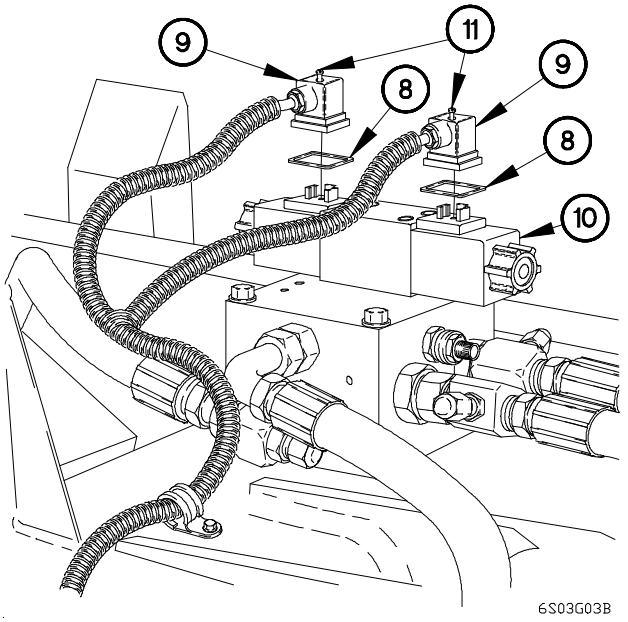
(2) Position four hoses (7) on four-way relief valve (1).

(3) Tighten four hoses (7) to 79-88 lb-ft (107-119 N•m).

(4) Install two gaskets (8) on connector's L8 and L9 (9).

(5) Connect connector's L8 and L9 (9) on solenoid (10).

(6) Tighten two screws (11) on connector's L8 and L9 (9).



h. Relief Valve Adjustment.

(1) Raise dump body to maintenance position (TM 9-2320-366-10-1).

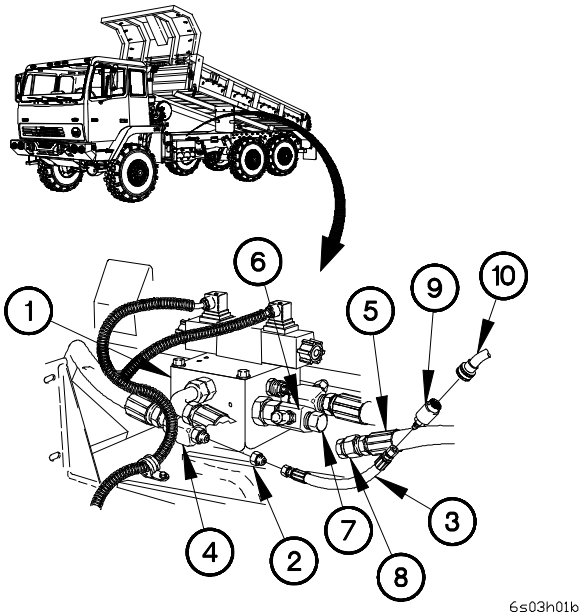
(2) Position drain pan under four way relief valve (1).

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.**

NOTE

Route test hose between frame and exit under vehicle.



(3) Install adapter (2) and test hose (3) on tee fitting (4).

(4) Disconnect hose A (5) from tee fitting (6).

(5) Install cap (7) on tee fitting.

(6) Install plug (8) in hose A (5).

(7) Install high pressure transducer (9) (0-10,000 psi [0-68,965 kPa]) on test hose (3).

(8) Connect pressure test cable (10) to pressure transducer (9) and to STE/ICE.

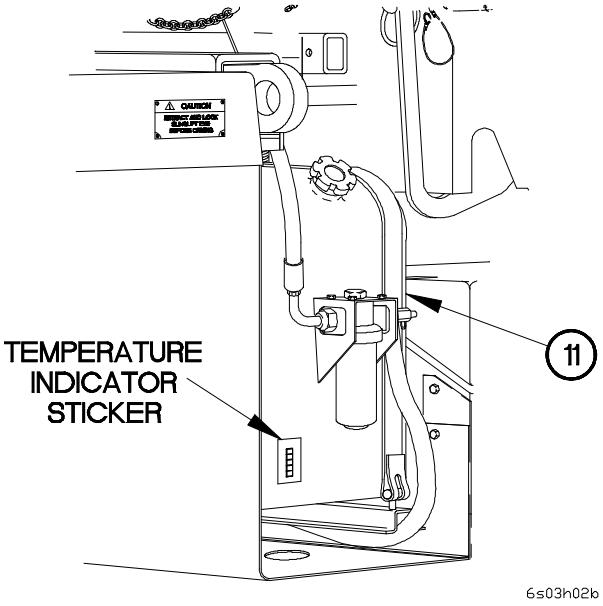
17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

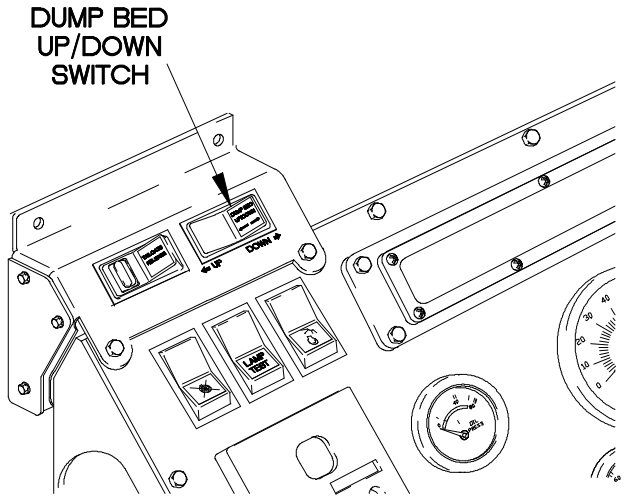
(9) Start engine (TM 9-2320-366-10-1).

(10) Position PTO switch to ON (TM 9-2320-366-10-1).

(11) Increase engine speed to 1250-1450 RPM (TM 9-2320-366-10-1).

(12) Attach a temperature indicator label to hydraulic reservoir (11).





CAUTION

Hydraulic oil temperature must be 140-160 F (60-70 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.

(13) Press and hold DUMP BED UP/DOWN switch to the UP position until hydraulic oil temperature reaches 140-160 F (60-70 C).

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.

(14) Perform STE/ICE-R test #51 (TM 9-4910-571-12&P).

(15) Observe pressure reading of 2825-2875 psi (19478-19822 kPa).

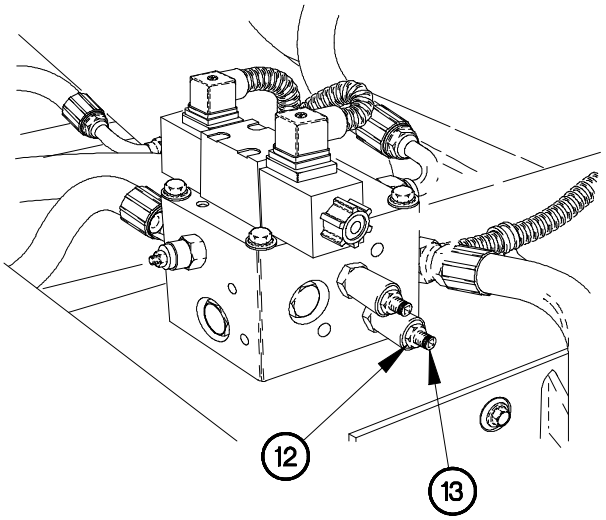
(16) If pressure is incorrect, loosen lock nut (12) on relief valve adjusting screw (13).

(17) Turn relief valve adjusting screw (13) counter clockwise to lower pressure, clockwise to raise pressure.

NOTE

Hold relief valve adjusting screw while tightening lock nut.

(18) Tighten lock nut (12) on relief valve adjusting screw (13).



6S03H04B

17-3. M1090/M1094 FOUR-WAY 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.**
- **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.**

(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 pressure test cable (10) from pressure transducer (9) and to STE/ICE.

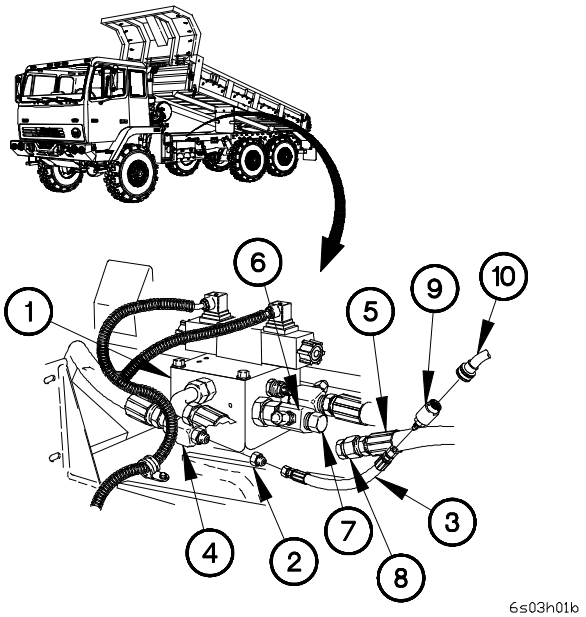
(23) Remove 10,000-PSI transducer (9) from test hose (3).

(24) Remove plug (8) from hose A (5).

(25) Remove cap (7) from tee fitting (6).

(26) Connect hose A (5 to tee fitting (6).

(27) Disconnect test hose (3) and adapter (2) from tee fitting (4).



6s03h01b

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).

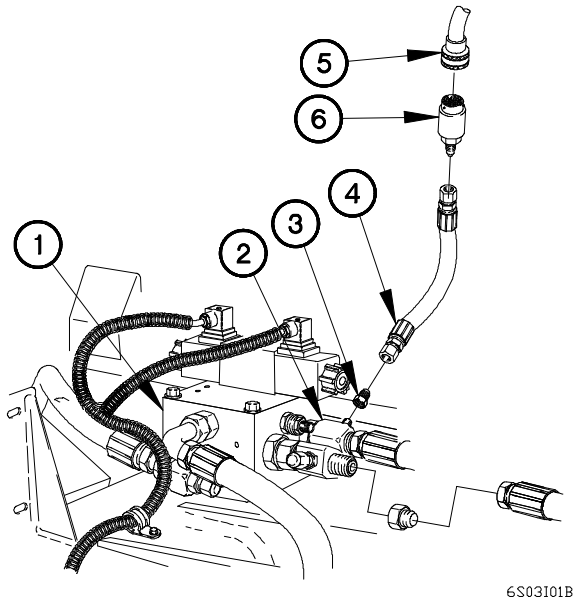
WARNING

- **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.**

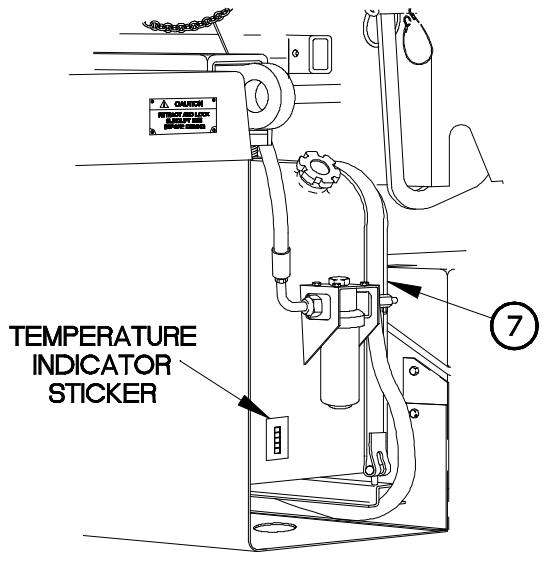
(3) Remove cap from tee fitting (2) on port B.

(4) Install adapter (3) and test hose (4) on tee fitting (2) at port B.

(5) Connect pressure teat cable (5) to transducer (6) and to STE/ICE.



6S03I01B



6S03I02B

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

(7) Position PTO switch to ON (TM 9-2320-366-10-1).

(8) Attach a temperature indicator sticker to hydraulic oil hydraulic tank (7).

(9) Increase engine RPM to 1250-1450 (TM 9-2320-366-10-1).

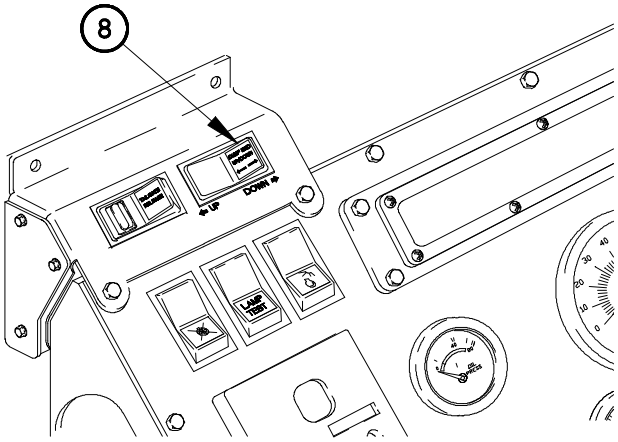
17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

CAUTION

Hydraulic oil temperature must be 140-160 F (60-70 C) prior to performing adjustment. Failure to comply may result in inaccurate test results.

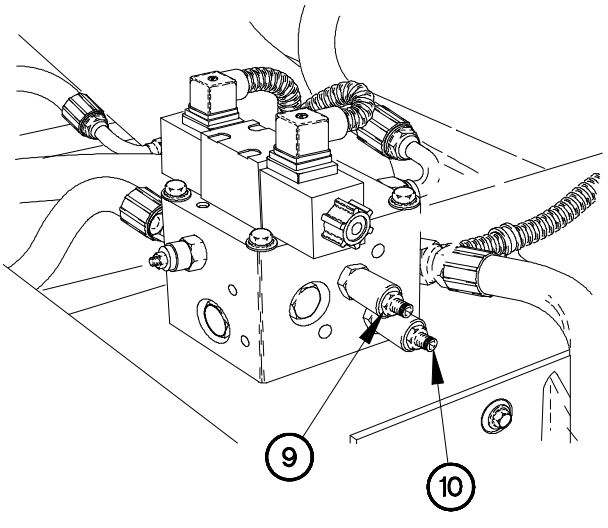
NOTE

- 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 (10) through (14) require the aid of an assistant.



6S03I03B

(10) Press and hold DUMP BED UP/DOWN switch (8) in UP position until hydraulic oil temperature reaches 140-160º F (60-70º C).



6S03I04B

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.

(11) Perform STE/ICE-R test #51 (TM 9-4910-571-12&P).

(12) Observe pressure reading of 2825-2875 psi (19478-19822 kPa).

(13) If pressure is incorrect, loosen lock nut (9) on pressure reducing valve adjusting screw (10).

NOTE

Hold pressure-reducing valve adjusting screw while tightening lock nut.

(14) Turn pressure reducing valve adjusting screw (10) counter clockwise to lower pressure, clockwise to raise pressure.

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.**

(15) Lower engine speed to idle (TM 9-2320-366-10-1).

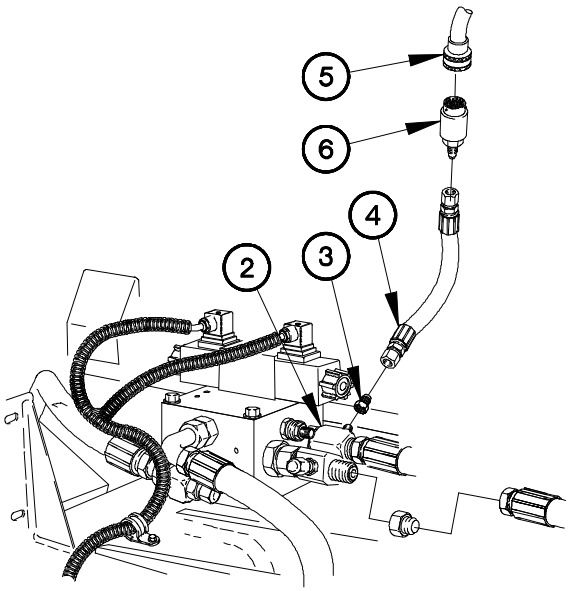
(16) Position PTO switch to OFF (TM 9-2320-366-10-1).

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

(18) Disconnect pressure test cable (5) from pressure transducer (6) and to STE/ICE.

(19) Remove 10,000-PSI transducer (6) from test hose (4).

(20) Disconnect test hose (4) and adapter (3) from tee fitting (2).



17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

j. Counterbalance Valve Adjustment.

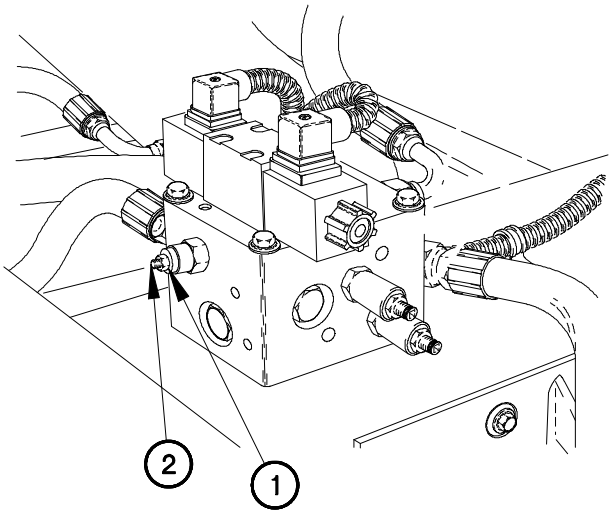
(1) Raise dump body in maintenance position (TM 9-2320-366-10-1).

(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.



6S03J01B

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) counter clockwise two turns.

NOTE

Perform step (5) on four way relief valve P/N 6E150110.

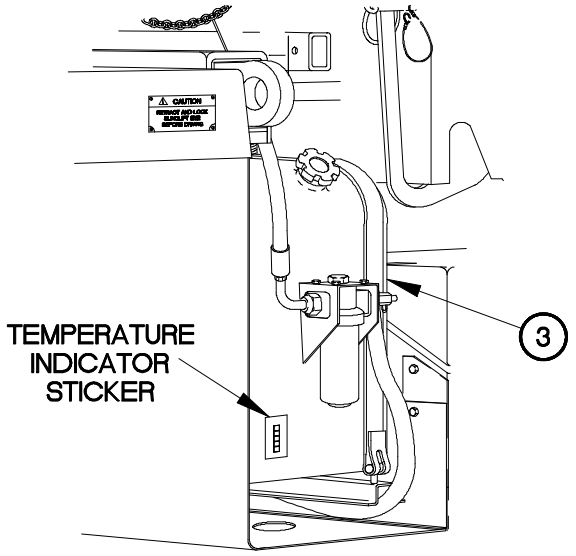
(5) Turn counterbalance valve adjusting screw (2) counter clockwise four turns.

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

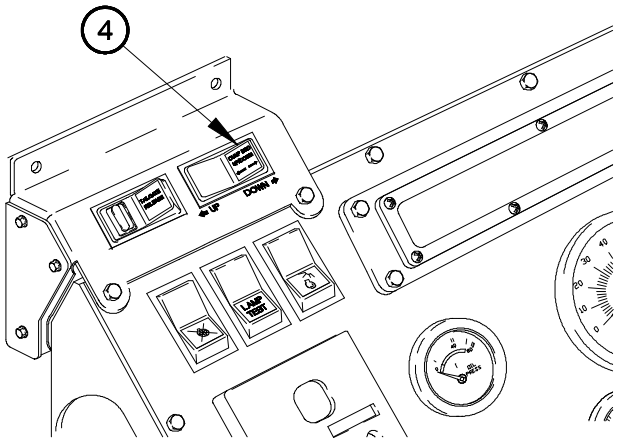
(7) Position PTO switch to ON (TM 9-2320-366-10-1).

(8) Attach a temperature indicator sticker to hydraulic oil tank (3).

(9) Increase engine RPM to 1250-1450 (TM 9-2320-366-10-1).



6S03J02B



6S03J03B

CAUTION

Hydraulic oil temperature must be 140-160º F (60-70º C) prior to performing adjustment. 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 (10) through (16) require the aid of an assistant.

(10) Press and hold DUMP BED UP/DOWN switch (4) in down position until hydraulic oil temperature reaches 140-160º F (60-70ºC).

(11) Press and hold DUMP BED UP/DOWN switch to the UP position until the dump body is approximately 8 in. (200 mm) above the maintenance legs.

17-3. M1090/M1094 FOUR-WAY RELIEF VALVE REPLACEMENT/REPAIR (CONT)

(12) Observe if dump body creeps down.

WARNING

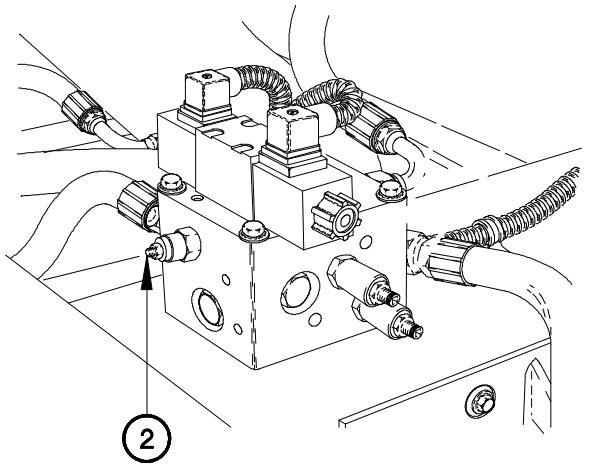
Hydraulic components are hot when hydraulic oil reaches operating temperature. Use caution when handling hydraulic components. Wear gloves or use rags to hold metal objects. Failure to comply may result in injury to personnel.

CAUTION

Do not exceed 3-1/2 turns counter clockwise for P/N HFC32585 or 5-1/2 turns counter clockwise for P/N 6E150110 four way relief valves. Failure to comply may result in damage to equipment.

NOTE

Adjustment counterbalance valve 1/4 turn at a time.



6S03J04B

(13) If dump body creeps down, turn counterbalance valve adjusting screw (2) 1/4 turn counter clockwise.

(14) Perform steps (12) and (13) until no creep is observed.

(15) Position dump body approximately 36 in. (9144 mm) above subframe rails (TM 9-2320-366-10-1).

(16) Observe if dump body creeps down.

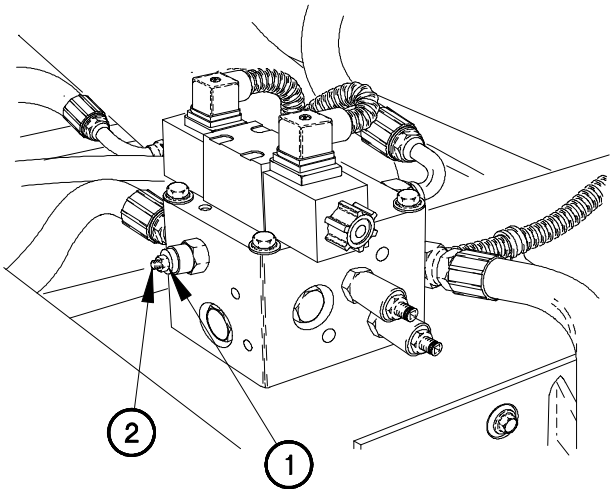
(17) Performs steps (12) through (15) if dump body creeps down.

NOTE

Hold counterbalance valve adjusting screw while tightening lock nut.

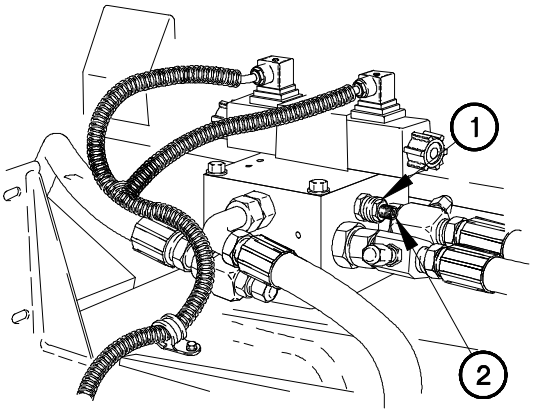
(18) Tighten lock nut (1) on counterbalance valve adjusting screw (2).

(19) Lower dump body from maintenance position (TM 9-2320-366-10-1).



6S03J05B

k. Needle Valve Adjustment.



6S03K01B

(1) Position dump body in 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) counter clockwise 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 9-320-66-10-1).

l. Follow-On Maintenance.

(1) Dump body in stowed position (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

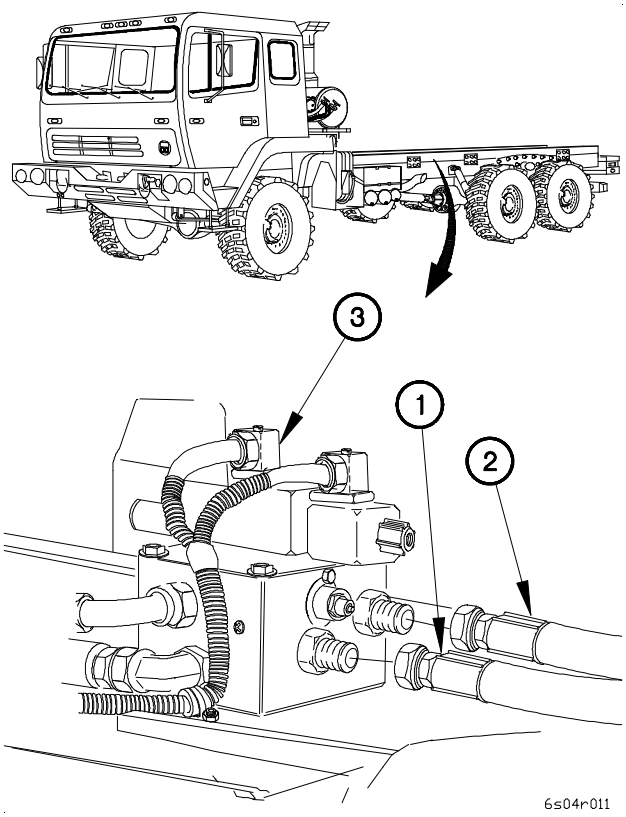
Cap or plug hydraulic hoses and connection points to prevent contamination of hydraulic system. Failure to comply may result in damage to equipment.

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

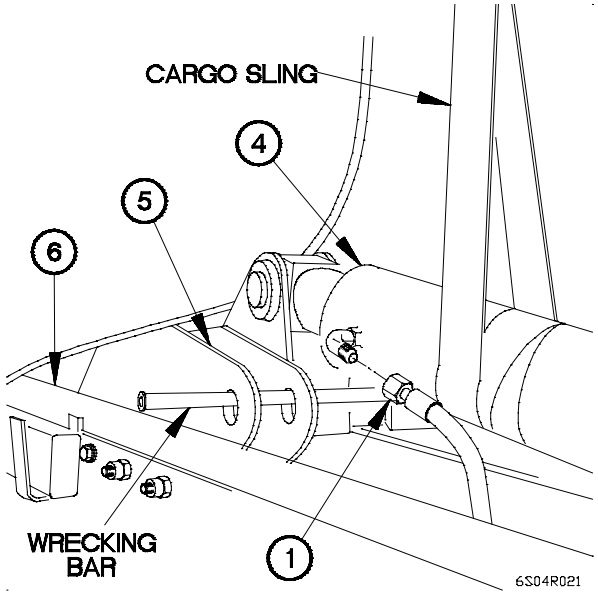
Steps (3) through (12) require the aid of an assistant.

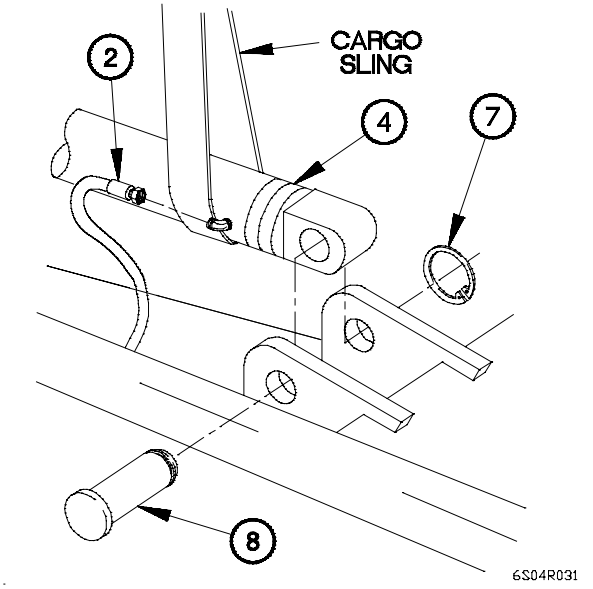
(3) Raise hoist cylinder (4) until holes in subframe assembly (5) are above frame (6).

(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).

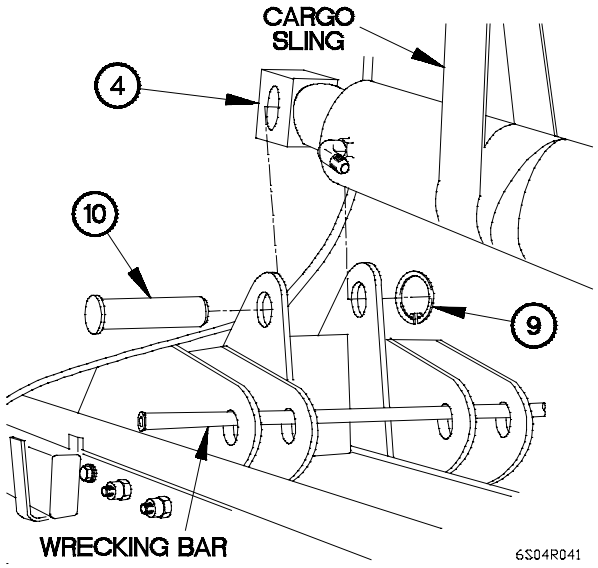
(9) Remove pin (8) from hoist cylinder (4).

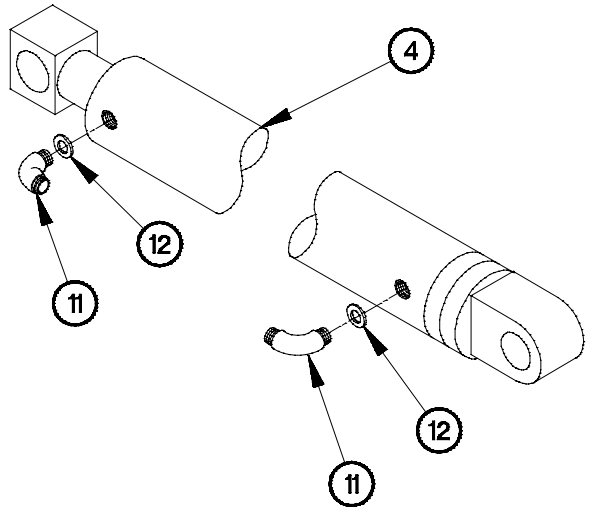
17-4. M1090/M1094 DUMP BODY HOIST CYLINDER REPLACEMENT (CONT)

(10) Remove retaining ring (9) from pin (10).

(11) Remove pin (10) from hoist cylinder (4).

(12) Remove hoist cylinder (4) from vehicle.

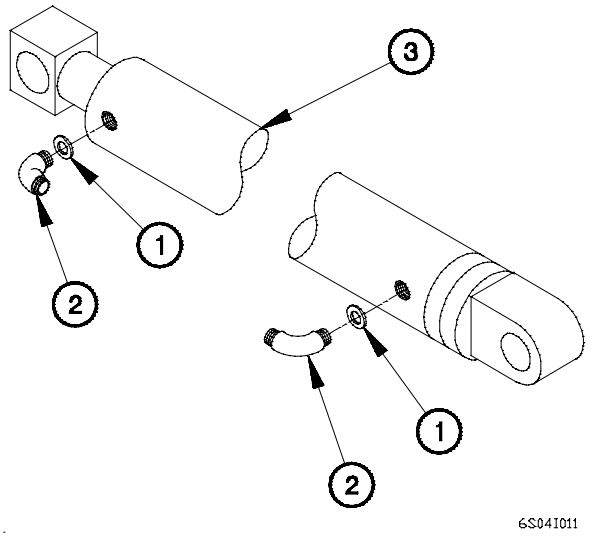




(13) Remove two 90-degree fittings (11) and spacers (12) from hoist cylinder (4).

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

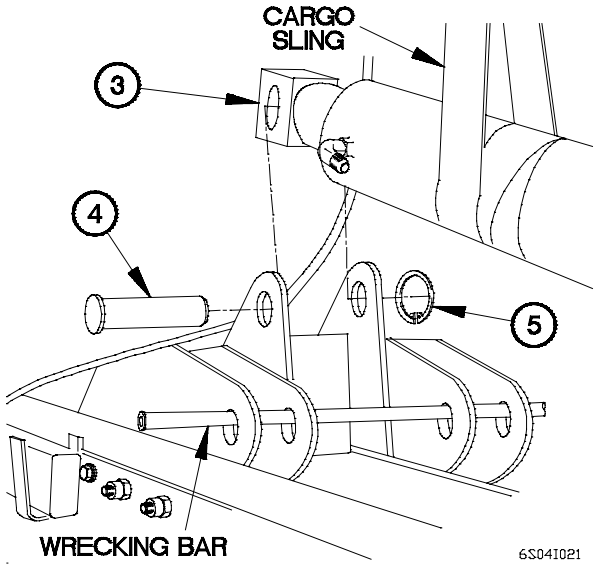
Steps (2) through (10) require the aid of an assistant.

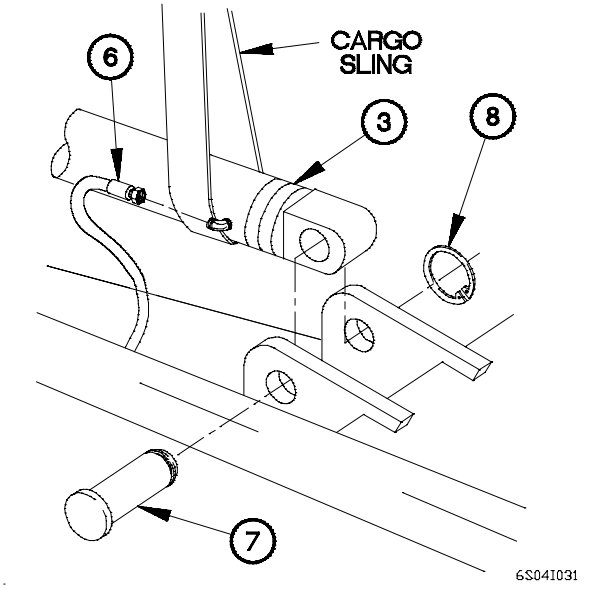
(2) Install hoist cylinder (3) on vehicle with pin (4).

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).

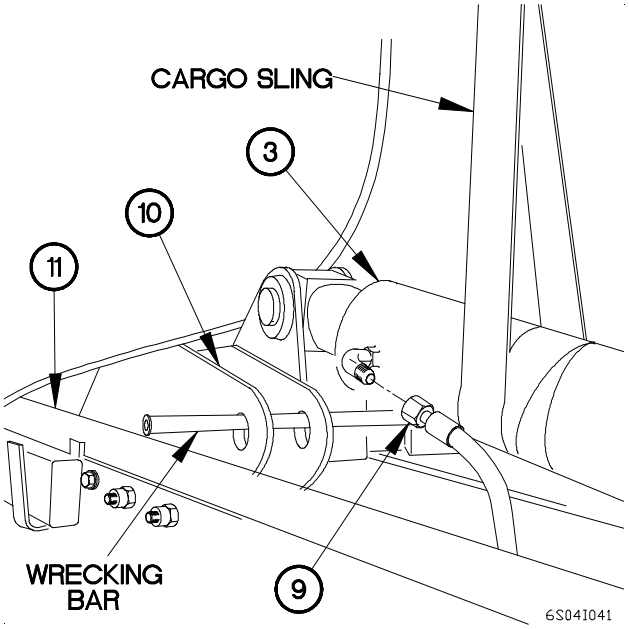
17-4. M1090/M1094 DUMP BODY HOIST CYLINDER REPLACEMENT (CONT)

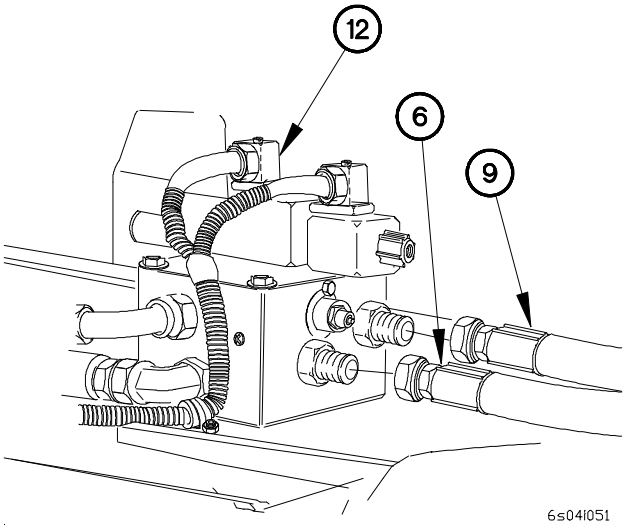
(7) Connect hydraulic hose (9) to hoist cylinder (3).

(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 6 oz kit	kt
6	O/F/H	8040-01-250-3969	Adhesive (05972) 242	ea
7	F/H	8040-01-331-7470	Adhesive (81349) MIL-A-46106 5 oz tube	tu
8	F/H	8040-01-126-1422	Adhesive (52152) 1099	qt
9	O/F/H	6850-00-174-1806	Antifreeze (81349) MIL-A-11755 55 gl drum	gl
10	H		Adhesive (04963) DP-100 1.7 oz tube	tu
10.1	F		Adhesive (0FW39) 12421700	tu
10.2	O/F	8040-01-446-7842	Adhesive (01139) RTV123 10 oz	ca
11	O/F/H		Antifreeze (81349) MIL-A-46153	
		6850-00-181-7929	1 gl can	gl
		6850-00-181-7940	55 gl drum	gl
12	F/H	8030-00-597-5367	Antiseize Compound (81349) MIL-A-907 2-1/2 lb can	lb
12.1	O/F/H	8030-00-292-1102	Antiseize 12Z31001-1	tu
13	F/H	8415-00-222-8074	Apron, Plastic, Disposable (32075) E2-2845 Box of 100	ea
14	F/H	5306-00-174-4150	Bolt, Machine (11083) 3B4772	ea
15	F/H	5306-00-381-9928	Bolt, Machine (19207) 12414307-080	ea
15.1	F/H		Bolt, Machine (19207) 12414307-075	ea
16	F/H	7920-00-926-5243	Bucket, Mop (88001) C1122F	ea
17	F/H	5340-00-450-5718	Cap and Plug Set (19207) 10935405	ea
17.1	F	4730-00-542-5911	Cap, Tube (96906) MS51532B10	ea
17.2	F	4730-00-585-6565	Cap, Tube (22031) 304C8	ea
17.3	F	4730-00-647-3311	Cap, Tube (96906) MS51532B12	ea
18	H		Carbon Removing Compound (81349) MIL-C-19853 TY II	
		6850-00-543-7801	5 gl can	gl
		6850-00-550-7453	55 gl drum	gl
19	F/H	7510-00-162-2910	Chalk Line, Marking Powder (89942) 09-304147 8 oz can	cn

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
20	O/F/H	6850-01-347-0073	Cleaning Compound, Windshield (81349) O-C-1901	
			1 gl can	gl
21	F/H	5350-00-221-0872	Cloth Abrasive Crocus Cloth (81348) P-C-458	
			50 sheet package	sh
22	F/H	5350-00-174-0985	Cloth, Abrasive, 600 Grit (81348) GGG-C-520	
			Box of 100	sh
23	F/H		Corrosive Preventive Compound (81349) MIL-C-16173	
		8030-00-062-6950	Grade 1 - 1 quart can,	qt
			Grade 2 - 1 quart can,	qt
		8030-01-149-1731	Grade 3 - 1 pint can,	pt
			Grade 4 - 1 pint can	pt
24	F/H	4730-00-881-1161	Coupling, Pipe (81343) 207P-6	ea
25	F/H	6850-00-856-7955	Desiccant, Activated (81349) MIL-D-3464	
			Eighteen, 5 gl bags	bg
26		DELETED		
27	C/O/F/H		Diesel Fuel (Arctic) (81348) VVF800FRADEDDFA	
		9140-00-286-5282	5 gl can	cn
		9140-00-286-5283	Bulk	gl
		9140-00-286-5284	55 gl drum	gl
		9140-00-286-5285	55 gl drum	gl
28	C/O/F/H		Diesel Fuel (81348) VVF800GRADEDF1WI	
		9140-00-286-5286	Bulk	gl
		9140-00-286-5287	5 gl can	gl
		9140-00-286-5288	55 gl drum	gl
		9140-00-286-5289	55 gl drum	gl
29	C/O/F/H		Diesel Fuel (81348) VVF800GRADEDF2RE	
		9140-00-286-5294	Bulk	gl
		9140-00-286-5295	5 gl can	gl
		9140-00-286-5296	55 gl drum	gl
		9140-00-286-5297	55 gl drum	gl
30	C/O/F/H	7520-01-209-1152	Dispenser, Pressure Sensitive Adhesive Tape (55203) 5006-0-9	ea
31	F/H		Fitting (81343) 190923-02S	ea
32	F/H		Fitting (81343) 2027-8-4S	ea

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
33	F/H	5210-00-640-6176	Gage, Bearing Clearance (77220) PLASTIGAGEPB1 Box of 12	ea
34	F/H	8040-01-038-5043	Gasket Cement (11083) 5H2471 8 oz can	oz
34.1	F/H	8040-01-437-6864	Gasket Cement (11083) 1U-8846	
34.2	F/H	8145-00-274-2433	Gloves, Mens (81348) KK-G-476	pr
35	F/H		Grease, Automotive and Artillery (GAA) (81349) MIL-G-10924	
		9150-00-065-0029	2-1/4 oz tube	oz
		9150-00-190-0904	1-3/4 lb can	lb
		9150-00-190-0905	6-1/2 lb can	lb
		9150-00-190-0907	35 lb can	lb
36	F/H	9150-00-180-6382	Grease, General Purpose (81349) MIL-T-24139 6-1/2 lb can	lb
37	F/H	9150-00-223-4004	Grease, Molybdenum Disulfide (81349) MIL-G-21164 6-1/2 lb can	lb
38	F/H	9150-00-664-0050	Grease, Ordnance, Extreme Pressure (12474) Molylube 80 1 pt can	pt
39	F/H	5345-01-356-8913	Honing Stone Assembly (10133) R150761-SA	ea
40	F/H		Hose FC 324-12	ea
40.1	F		Hose Assembly, Nonmetallic 4C2T-FJX-FJX-90-120	ea
40.2	F	4720-00-988-3842	Hose Assembly, Nonmetallic (50599) R25679-1	ea
40.3	O/F		Hydraulic Fluid (81349) MIL-H-5606	
		9150-00-252-6383	1 qt can	qt
		9150-00-223-4134	1 gal can	gl
40.4	F	6685-01-095-4182	Indicator, Temperature, Label (82682) 6MA-130/54	ea
41	O/F/H	5970-01-100-4464	Insulating Compound, Electrical (08800) RTV-102 White 2.8 oz tube	ea
42	O/F/H	5970-00-767-0524	Insulation Sleeving, Electrical (81349) MIL-I-23053/5 4 in.	ea

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
42.1	F	5970-01-378-3018	Insulation Sleeving, Electrical (06090) ATUM-1/4-0-4FT	lg
43	F/H	8135-01-015-4040	Kit, Banding (02563) GS-10012	kt
44	F/H	1650-00-166-4834	Lockwire (90166) 68A33 210 in. package	ea
45	C/O/F/H		Lubricating Oil, Engine (81349) MIL-L-2104OE/HDO-10	
		9150-00-183-7807	Bulk	gl
		9150-00-189-6727	1 qt can	qt
		9150-00-186-6668	5 gl can	gl
		9150-00-191-2772	55 gl drum	gl
46	F/H		Lubricating Oil, Engine (81349) MIL-L-2104 0E/HDO-30	
		9150-00-186-6681	1 qt can	qt
		9150-00-188-9858	5 gl can	gl
		9150-00-189-6729	55 gl drum	gl
47	F/H		Lubricating Oil, Engine (81349) MIL-L-46167	
		9150-00-402-4478	1 qt can	qt
		9150-00-402-2372	5 gl can	gl
		9150-00-491-7197	55 gl drum	gl
48	F/H		Lubricating Oil, Engine (81349) MIL-L-2104 OE/HDO-40	
		9150-00-405-2987	Bulk	gl
		9150-00-189-6730	1 qt can	qt
		9150-00-188-9862	55 gl drum	gl
49	O/F/H	9150-01-152-4117	Lubricating Oil, Engine (81349) MIL-L-2104 OE/HDO 15W-40 1 qt can	qt
50	O/F/H		Lubricating Oil, Gear (81349) MIL-L-2105 60-75W	
		9150-01-035-5390	1 qt can	qt
		9150-01-035-5391	5 gl can	gl
51	O/F/H		Lubricating Oil, Gear (81349) MIL-L-2105 80W-90	
		9150-01-035-5392	1 qt can	qt
		9150-01-035-5393	5 gl can	gl
		9150-01-035-5394	55 gl drum	gl
52	O/F/H	9150-01-035-5395	Lubricating Oil, Gear (81349) MIL-L-2105 85W-140 5 gl can	gl
52.1	F		Lubrication, Rubber Emulsion 5391-06 1 pt bottle	bt

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
53	F/H	5310-01-369-6073	Nut, Self-Locking (19207) 12414308-007	ea
54	F/H	5310-01-362-6171	Nut, Self-Locking (76761) N9406	ea
54.1	F		Paper, Abrasive 2347	pk
55	O/F/H	6530-01-283-6227	Paraffin and Mineral Oil (25973) 76-1026 7 lb can	lb
55.1	F	4730-01-070-9214	Plug, Tube Fitting, Threaded (81343) 8 070109C	ea
55.2	F	4730-01-249-9707	Plug, Tube Fitting, Threaded (96906) MS51518B10	ea
55.3	F	4730-01-270-9651	Plug, Tube Fitting, Threaded (81343) 12 070109C	ea
56	F/H	8030-00-043-1688	Primer, Sealing Compound (81349) MIL-S-224373 1 gl can	gl
57	F/H	4204-00-759-3290	Protector, Hearing (71483) 19A	ea
58	F/H	8010-00-652-3626	Prussian Blue, Paste, Bearing Surface (81349) MIL-P-30501 1 oz tube	oz
59	F/H		Pulley, Groove (19207) 12421165	ea
60	C/O/F/H	7920-00-205-1711	Rag, Wiping (58536) A-A-531 50 lb bale	ea
60.1	F	4730-00-719-2789	Reducer, Tube (81343) 12-4 070123SA	ea
60.2	F	4730-01-030-5207	Reducer, Tube (96906) MS51534A10-4	ea
61	F/H	4730-01-113-9251	Reducer, Tube (81343) 2027-8-12S	ea
62	F/H	4020-00-593-9584	Rope, Fibrous (96169) 9868-165X4PC50	ea
63	F/H	5210-00-293-3393	Rule, Multiple, Folding (81348) GGG-R-791	ea
64	F/H	5330-00-003-5427	Rubber Sheet, Solid (81349) MIL-R-3065	sh
64.1	F	5305-01-157-1391	Screw, Cap, Hex Hd (56161) 10501611	ea

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
64.2	F	5305-01-377-0696	Screw, Cap, Hex Hd (19207) 12414419-075	ea
65	F/H		Sealant (11083) 2P2333	ea
65.1	O/F	8030-00-728-9665	Sealant (62377) 80017 1 pt can	pt
65.2	F/H	8030-01-255-4144	Sealant (P/N 12297953)	ea
66	F/H	8030-00-981-7005	Sealant, Adhesive (05972) AA15-1	ea
67	F/H		Sealant, Adhesive (78500) 1199-E-3931	ea
68	F/H		Sealant, Adhesive (78500) 2297-B-5436	ea
68.1	F	1015-01-255-4144	Sealant, Pipe (19207) 12297953 50 ml tube	tu
68.2	F	8030-00-111-6404	Sealing Compound (05972) 640-31 50 cc bottle	bt
69	O/F/H	8030-00-204-9149	Sealing Compound (05972) 592-41 250 cc tube	tu
70	F/H	8030-00-656-1426	Sealing Compound (81349) MIL-S-45180 1 pt can	pt
71	O/F/H	8030-01-104-5392 8030-01-025-1692	Sealing Compound (05972) 242 10 cc bottle (box contains 10 bottles) 250 cc bottle	bx bt
71.1	F	8030-01-142-9830	Sealing Compound (05972) 262-31 50 cc bottle	bt
72	O/F/H	8030-01-155-3238	Sealing Compound (11083) 6V6640 50 ml tube (box contains 6 tubes)	bx
73	F/H	8030-00-220-6973	Sealing Compound (81349) MIL-S-45180 4 oz can	cn
74	F/H		Sealing Compound (IN 8846)	
75	F/H	8030-01-171-7628	Sealing Compound (05972) 272-40 50 cc bottle	bt
76	O/F/H	8030-00-148-9833	Sealing Compound (05972) 271 10 cc bottle (box contains 10 bottles)	bx
76.1	F	8030-01-371-8405	Sealing Compound (83574) PR-1422 B-1/2 6 oz cartridge (case contains 36 cartridges)	ca
76.2	F	8030-01-396-3362	Sealing Compound (05972) RC-680 50 cc bottle	bt
76.3	F/H	8030-01-374-3504	Sealing Compound (51831) 50 cc tube	tu

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
77	F/H	5305-00-152-0533	Screw, Cap, Hex Hd (77873) 2-0B113	ea
78	F/H	5305-01-359-8004	Screw, Cap, Hex Hd (73342) 29505612	ea
79	F/H	5305-01-374-1087	Screw, Cap, Hex Hd (19207) 12414307-194	ea
80	F/H	4030-00-066-0184	Shackle (90202) XB178	ea
81	C/O/F/H	7930-00-082-0584	Soap, Laundry (81348) P-S-1792 2 lb box	bx
82	F/H	3439-01-164-0593	Solder (61404) 14675 5 lb spool	sl
83	C/OF/H		Solvent, Dry Cleaning (81348) P-D-680	
		6850-00-664-5685	1 qt can	qt
		6850-00-281-1985	1 gl can	gl
83.1	F	5940-01-456-1319	Splice, Conductor (0FW39) 12420927-001	ea
83.2	F/H		Spindle Compound #2 (ODUG2) #279	ea
84	F/H	8030-00-060-3167	Tape, Antiseizing (73165) FEL-PRO 51520 520 in. roll	ro
85	O/F/H	8030-00-889-3534	Tape, Antiseizing (81349) MIL-T-27730	ea
86	O/F/H	5640-00-103-2254	Tape, Duct (39428) 1791K70 60 yd roll	ro
87	O/F/H	5970-00-644-3167	Tape, Insulation, Electrical (80063) TL83 85 ft roll	ro
88	F/H	4730-01-146-4113	Tee, Pipe to Tube (96906) MS51514A6	ea
88.1	F	4730-00-074-0713	Tee, Tube (81343) 8-8-8 070432CA	ea
88.2	F	4730-00-738-7558	Tee, Tube (81343) 12-12-12 070432CA	ea
88.3	F	4730-01-024-0915	Tee, Tube (81343) 10-10-10 070432CA	ea
89	F/H		Tee, Swivel R6X/063T12R6X	ea
90	F/H		Tee, Union JTX/003T12JTX	ea
91	F/H	8010-00-242-2089	Thinner, Paint Products (80244) A-A-2904 TY1 1 gl can	gl

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
92	O/F/H	5935-01-379-4997	Ties, Cable, Plastic (06383) PLT3S-C-0 box of 100	bx
92.1	C		Turbine Fuel, Aviation, Kerosene Type (MIL-T-83133), Grade JP-8	
92.2	C		Turbine Fuel, (MIL-F-16884), (NATO Code No. F75 or F-72)	
		9140-00-255-7764	5 gl can	cn
		9140-00-273-2378	55 gl drum	dr
		9140-00-273-2377	1 gl can	cn
92.3	C		Turbine Fuel, (MIL-F-5624), Grade JP-4 (NATO Code No. F40)	
		9130-00-273-2380	Drum, 16 gage	dr
92.4	C		Turbine Fuel, (MIL-T-5624), Grade JP-5 (NATO Code No. F-44)	
		9130-01-305-5596	Bulk	gl
		9130-01-250-6353	Drum, 16 gage	dr
93	F/H	4020-00-241-8893	Twine, Fibrous (80063) 6Z8827 860 ft ball	ea
94	F/H	5310-00-110-8978	Washer, Flat (05606) 133B6663-6	ea
95	F/H	5310-01-267-1686	Washer, Flat (96906) MS51412-3	ea
96	F/H	5130-00-289-9586	Wheel, Abrasive (81348) GGG-W-290	ea
97	F/H	6145-01-148-2263	Wire, Electrical (80009) 175-0825-00 50 ft	ft
98	F/H	9505-00-221-2650	Wire, Nonelectrical (96906) MS20995C20 1 lb roll	lb

APPENDIX D
ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

D-1. INTRODUCTION

This appendix includes complete instructions for manufacturing or fabricating authorized items locally. All bulk materials needed to manufacture an item are listed by part number or specification number. Figures are provided as needed. See standards and specifications DoD-Std-00100D(AR) and ANSI Y14.5M1982 for required details.

Section II. MANUFACTURED ITEMS INDEX

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
Brake Adjusting Tool Support		D-1
Brake Plunger Seal Driver		D-2
Cab Front Support Spanner Socket		D-3
Cab Maintenance Stand		D-4
Cab Support Tool		D-5
Dump Bed Wooden Brace		D-6
Dump Body Cab Protector Pivot Pin Removal Tool		D-7
Dump Body Lifting Bracket		D-8
Engine Stand Bracket Assembly		D-9
Headlight Adjustment Screen		D-10
Left Front Leaf Spring U-Bolt Socket		D-11
Machine Gun Ring Drill Stop		D-12
Machine Gun Ring Wooden Support		D-13
Main Valve Body Spring Compression Tool		D-14
Marking Sleeve		D-15
M1089 30K Winch Test Adapter		D-16
M1089 Solenoid Test Adapter		D-17
Relay Test Wire		D-18
Spanner Socket Tool		D-19
Spanner Wrench Tool		D-20
Spreader Bar		D-21
Steering Stop Shim Gage		D-22
Swingdrive Assembly Bracket		D-23
Transfer Case Lift Bracket Assembly		D-24
Transmission Auxiliary Oil Cooler Rubber Seal		D-25
Transmission Lift and Mounting Bracket Assembly		D-26
Transmission Lifting Bracket		D-27
Wheel Bearing Shim Tool Rest		D-28
12378512	Battery 12V Cable Assembly	D-29
12378575	Battery Ground Cable Assembly	D-30
12378576	Battery 24V Cable Assembly	D-31
12420265	Double-Sided Tape	D-32

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12420489	Block Seal	D-33
12412332-003	Air Duct Hose	D-34
12412332-012	Air Duct Hose	D-34
12412332-040	Air Duct Hose	D-34
12412332-048	Air Duct Hose	D-34
12412332-066	Air Duct Hose	D-34
12412332-096	Air Duct Hose	D-34
12412332-180	Air Duct Hose	D-34
12412367-038	Non-Metallic Flex Conduit	D-35
12412367-046	Non-Metallic Flex Conduit	D-35
12412367-064	Non-Metallic Flex Conduit	D-35
12412367-094	Non-Metallic Flex Conduit	D-35
12412367-178	Non-Metallic Flex Conduit	D-35
12414690-001	Pneumatic Tube	D-36
12414690-002	Pneumatic Tube	D-36
12414690-003	Pneumatic Tube	D-36
12414690-004	Pneumatic Tube	D-36
12414690-005	Pneumatic Tube	D-36
12414690-006	Pneumatic Tube	D-36
12414690-007	Pneumatic Tube	D-36
12414690-008	Pneumatic Tube	D-36
12414690-009	Pneumatic Tube	D-36
12414690-010	Pneumatic Tube	D-36
12414690-101	Pneumatic Tube	D-36
12414690-102	Pneumatic Tube	D-36
12414690-103	Pneumatic Tube	D-36
12414690-104	Pneumatic Tube	D-36
12414690-105	Pneumatic Tube	D-36
12414690-106	Pneumatic Tube	D-36
12414690-107	Pneumatic Tube	D-36
12414690-108	Pneumatic Tube	D-36
12414690-109	Pneumatic Tube	D-36
12414690-112	Pneumatic Tube	D-36
12414690-113	Pneumatic Tube	D-36
12414690-115	Pneumatic Tube	D-36
12414690-118	Pneumatic Tube	D-36
12414690-120	Pneumatic Tube	D-36
12414690-125	Pneumatic Tube	D-36
12414690-128	Pneumatic Tube	D-36
12414690-129	Pneumatic Tube	D-36
12414690-130	Pneumatic Tube	D-36
12414690-131	Pneumatic Tube	D-36
12414690-132	Pneumatic Tube	D-36
12414690-133	Pneumatic Tube	D-36
12414690-134	Pneumatic Tube	D-36
12414690-135	Pneumatic Tube	D-36
12414690-136	Pneumatic Tube	D-36
12414690-137	Pneumatic Tube	D-36
12414690-138	Pneumatic Tube	D-36
12414690-139	Pneumatic Tube	D-36
12414690-140	Pneumatic Tube	D-36
12414690-141	Pneumatic Tube	D-36
12414690-142	Pneumatic Tube	D-36

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12414690-143	Pneumatic Tube	D-36
12414690-144	Pneumatic Tube	D-36
12414690-145	Pneumatic Tube	D-36
12414690-146	Pneumatic Tube	D-36
12414690-147	Pneumatic Tube	D-36
12414690-148	Pneumatic Tube	D-36
12414690-149	Pneumatic Tube	D-36
12414690-150	Pneumatic Tube	D-36
12414690-151	Pneumatic Tube	D-36
12414690-152	Pneumatic Tube	D-36
12414690-153	Pneumatic Tube	D-36
12414690-154	Pneumatic Tube	D-36
12414690-155	Pneumatic Tube	D-36
12414690-156	Pneumatic Tube	D-36
12414690-157	Pneumatic Tube	D-36
12414690-158	Pneumatic Tube	D-36
12414690-159	Pneumatic Tube	D-36
12414690-160	Pneumatic Tube	D-36
12414690-161	Pneumatic Tube	D-36
12414690-162	Pneumatic Tube	D-36
12414690-163	Pneumatic Tube	D-36
12414690-164	Pneumatic Tube	D-36
12414690-165	Pneumatic Tube	D-36
12414690-166	Pneumatic Tube	D-36
12414690-167	Pneumatic Tube	D-36
12414690-168	Pneumatic Tube	D-36
12414690-169	Pneumatic Tube	D-36
12414690-201	Pneumatic Tube	D-36
12414690-202	Pneumatic Tube	D-36
12414690-203	Pneumatic Tube	D-36
12414690-205	Pneumatic Tube	D-36
12414690-206	Pneumatic Tube	D-36
12414690-207	Pneumatic Tube	D-36
12414690-208	Pneumatic Tube	D-36
12414690-209	Pneumatic Tube	D-36
12414690-210	Pneumatic Tube	D-36
12414690-211	Pneumatic Tube	D-36
12414690-212	Pneumatic Tube	D-36
12414690-215	Pneumatic Tube	D-36
12414690-216	Pneumatic Tube	D-36
12414690-217	Pneumatic Tube	D-36
12414690-218	Pneumatic Tube	D-36
12414690-219	Pneumatic Tube	D-36
12414690-220	Pneumatic Tube	D-36
12414690-221	Pneumatic Tube	D-36
12414690-222	Pneumatic Tube	D-36
12414690-223	Pneumatic Tube	D-36
12414690-224	Pneumatic Tube	D-36
12414690-225	Pneumatic Tube	D-36
12414690-228	Pneumatic Tube	D-36

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12414690-229	Pneumatic Tube	D-36
12414690-230	Pneumatic Tube	D-36
12414690-231	Pneumatic Tube	D-36
12414690-232	Pneumatic Tube	D-36
12414690-233	Pneumatic Tube	D-36
12414690-234	Pneumatic Tube	D-36
12414690-235	Pneumatic Tube	D-36
12414690-236	Pneumatic Tube	D-36
12414690-237	Pneumatic Tube	D-36
12414690-238	Pneumatic Tube	D-36
12414690-239	Pneumatic Tube	D-36
12414690-240	Pneumatic Tube	D-36
12414690-241	Pneumatic Tube	D-36
12414690-242	Pneumatic Tube	D-36
12414690-243	Pneumatic Tube	D-36
12414690-244	Pneumatic Tube	D-36
12414690-245	Pneumatic Tube	D-36
12414690-246	Pneumatic Tube	D-36
12414690-247	Pneumatic Tube	D-36
12414690-248	Pneumatic Tube	D-36
12414690-249	Pneumatic Tube	D-36
12414690-301	Pneumatic Tube	D-36
12414690-302	Pneumatic Tube	D-36
12414690-303	Pneumatic Tube	D-36
12414694-X508	Pneumatic Hose Assembly	D-37
12414694-X558	Pneumatic Hose Assembly	D-37
12416381P1	Non-Metallic Electrical Cable Conduit	D-38
12416381P10	Non-Metallic Electrical Cable Conduit	D-38
12416381P11	Non-Metallic Electrical Cable Conduit	D-38
12416381P12	Non-Metallic Electrical Cable Conduit	D-38
12416381P13	Non-Metallic Electrical Cable Conduit	D-38
12416381P14	Non-Metallic Electrical Cable Conduit	D-38
12416381P15	Non-Metallic Electrical Cable Conduit	D-38
12416381P16	Non-Metallic Electrical Cable Conduit	D-38
12416381P17	Non-Metallic Electrical Cable Conduit	D-38
12416381P2	Non-Metallic Electrical Cable Conduit	D-38
12416381P20	Non-Metallic Electrical Cable Conduit	D-38
12416381P21	Non-Metallic Electrical Cable Conduit	D-38
12416381P22	Non-Metallic Electrical Cable Conduit	D-38
12416381P23	Non-Metallic Electrical Cable Conduit	D-38
12416381P26	Non-Metallic Electrical Cable Conduit	D-38
12416381P3	Non-Metallic Electrical Cable Conduit	D-38
12416381P30	Non-Metallic Electrical Cable Conduit	D-38
12416381P32	Non-Metallic Electrical Cable Conduit	D-38
12416381P34	Non-Metallic Electrical Cable Conduit	D-38
12416381P35	Non-Metallic Electrical Cable Conduit	D-38
12416381P36	Non-Metallic Electrical Cable Conduit	D-38
12416381P37	Non-Metallic Electrical Cable Conduit	D-38
12416381P38	Non-Metallic Electrical Cable Conduit	D-38
12416381P4	Non-Metallic Electrical Cable Conduit	D-38
12416381P5	Non-Metallic Electrical Cable Conduit	D-38

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
12416381P6	Non-Metallic Electrical Cable Conduit	D-38
12416381P8	Non-Metallic Electrical Cable Conduit	D-38
12416381P9	Non-Metallic Electrical Cable Conduit	D-38
12417926-001	Compressor Hose	D-39
12417926-002	Compressor Hose	D-39
12417926-004	Compressor Hose	D-39
12418037	Steering Gear Return Hose	D-40
12418460-001	Transmission Oil Cooler Hose	D-40
12418460-002	Transmission Oil Cooler Hose	D-40
12418763	Lanyard Assembly	D-41
12420036	Wooden Skid	D-42
12420062-008	Pneumatic Hose Assembly	D-37
12420062-009	Pneumatic Hose Assembly	D-37
12420062-010	Pneumatic Hose Assembly	D-37
12420062-011	Pneumatic Hose Assembly	D-37
12420062-012	Pneumatic Hose Assembly	D-37
12420062-013	Pneumatic Hose Assembly	D-37
12420062-014	Pneumatic Hose Assembly	D-37
12420062-016	Pneumatic Hose Assembly	D-37
12420062-017	Pneumatic Hose Assembly	D-37
12420063-002	Pneumatic Hose Assembly	D-37
12420063-004	Pneumatic Hose Assembly	D-37
12420064-001	Pneumatic Hose Assembly	D-37
12420064-002	Pneumatic Hose Assembly	D-37
12420064-003	Pneumatic Hose Assembly	D-37
12420064-004	Pneumatic Hose Assembly	D-37
12420064-006	Pneumatic Hose Assembly	D-37
12420064-007	Pneumatic Hose Assembly	D-37
12420064-008	Pneumatic Hose Assembly	D-37
12420196	Lanyard Assembly	D-41
12420197-001	Non-Metallic Vent Air Hose	D-43
12420197-002	Non-Metallic Vent Air Hose	D-43
12420197-003	Non-Metallic Vent Air Hose	D-43
12420197-004	Non-Metallic Vent Air Hose	D-43
12420197-005	Non-Metallic Vent Air Hose	D-43
12420197-006	Non-Metallic Vent Air Hose	D-43
12420198-001	Non-Metallic Vent Air Hose	D-43
12420198-002	Non-Metallic Vent Air Hose	D-43
12420308-457	Personnel Heater Air Duct Hose	D-44
12420308-760	Personnel Heater Air Duct Hose	D-44
12420398	CTIS Quick Release Valve Spacer	D-45
12420419-001	CTIS Vent Hose	D-46
12420419-002	CTIS Vent Hose	D-46
3256-H-1048	CTIS Seal Driver	D-47
3256-J-1050	Front Axle Shaft Seal Driver	D-48
3256-K-1051	Wheel Hub Grease Seal Driver	D-49
3256-L-1052	Intermediate Differential Output Pinion Seal Driver	D-50
3256-M-1053	Differential Pinion Seal Driver	D-51
3256-Q-1057	Intermediate Input Yoke Seal Driver	D-52
3256-R-1058	Intermediate Output Yoke Seal Driver	D-53
3256-S-1059	Front and Rear Differential Yoke Seal Driver	D-54

Section II. MANUFACTURED ITEMS INDEX (CONT)

ITEM NAME/PART NUMBER	ITEM DESCRIPTION	PARA NO.
Dimmer Switch Test Wire		D-55
Purge Valve Tool		D-56
M1089 30K Winch Air Hoses		D-57
M1089 30K Winch Pneumatic Test Adapters		D-58
Block Seal 12420489 Fabrication		D-59

Section III. MANUFACTURED ITEMS

D-1. BRAKE ADJUSTING TOOL SUPPORT

Make the brake adjusting tool support from .134 inch (.34 cm) flat steel stock according to the following instructions. Refer to the parts list and **Figure D-13. Brake Adjusting Tool Support** for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, ASTM A569 Sheet, Hot Rolled	6.0 in. (152.4 mm) X 6.0 in. X (152.4 mm) X 0.134 in. (3.4 mm)	2

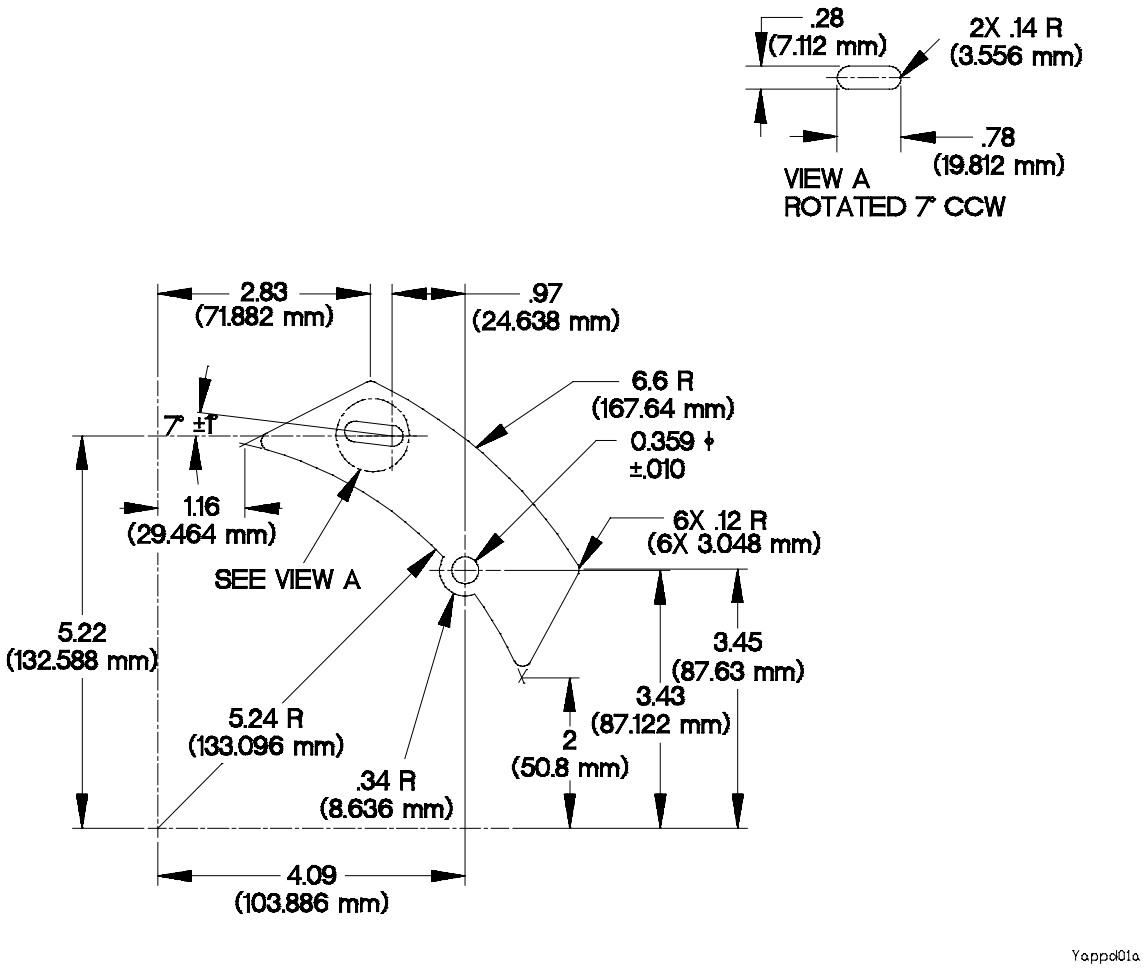


Figure D-1. Brake Adjusting Tool Support

a. All dimensions are in inches (millimeters).
b. Cut steel sheet as shown by dimensions in **Figure D-1. Brake Adjusting Tool Support**.
c. De-burr and remove sharp edges.

D-2. BRAKE PLUNGER SEAL DRIVER

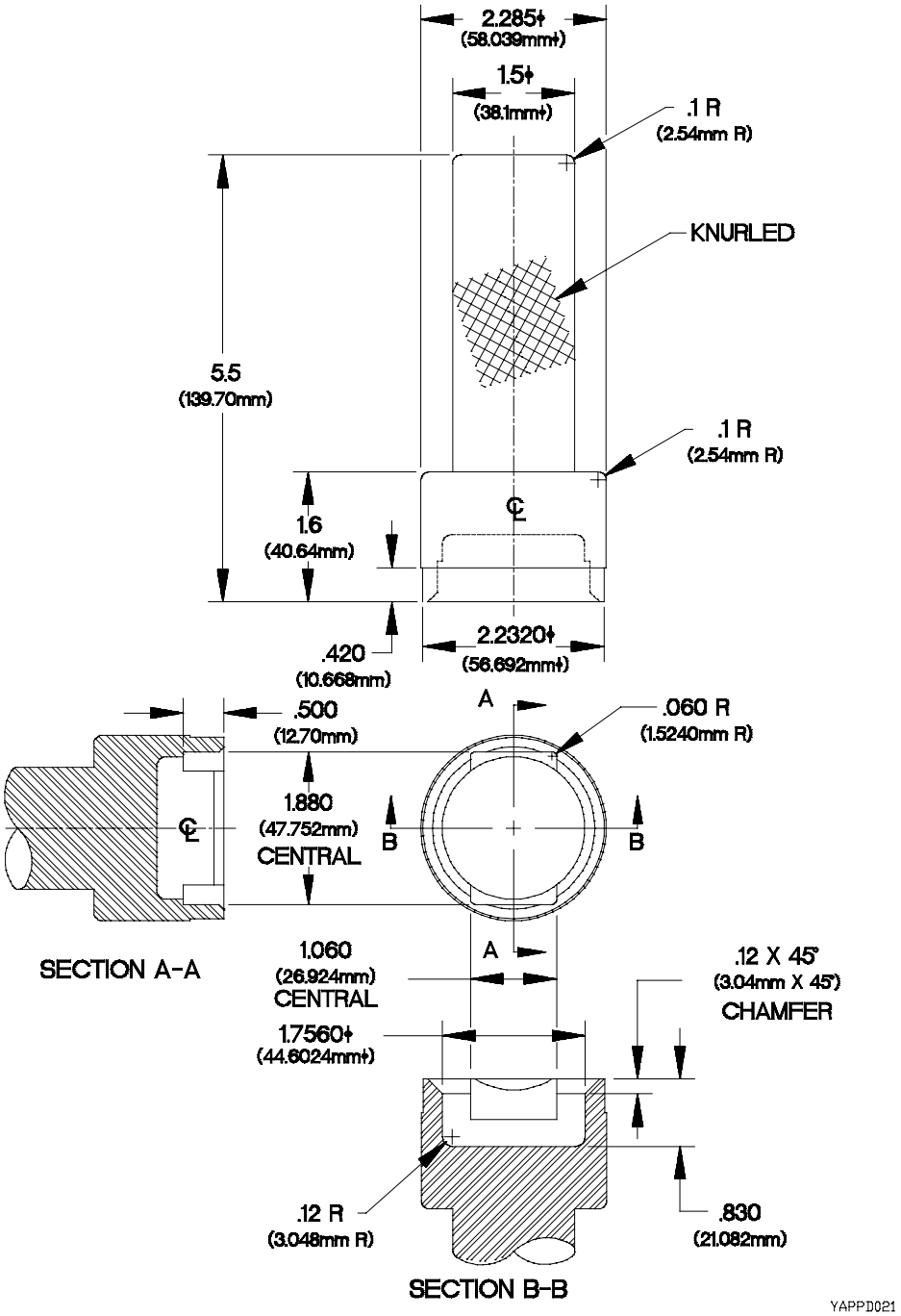


Figure D-2. Brake Plunger Seal Driver

a. All dimensions are in inches (millimeters).
b. Manufacture from round steel stock.
c. De-burr and remove sharp edges.

D-3. CAB FRONT SUPPORT SPANNER SOCKET

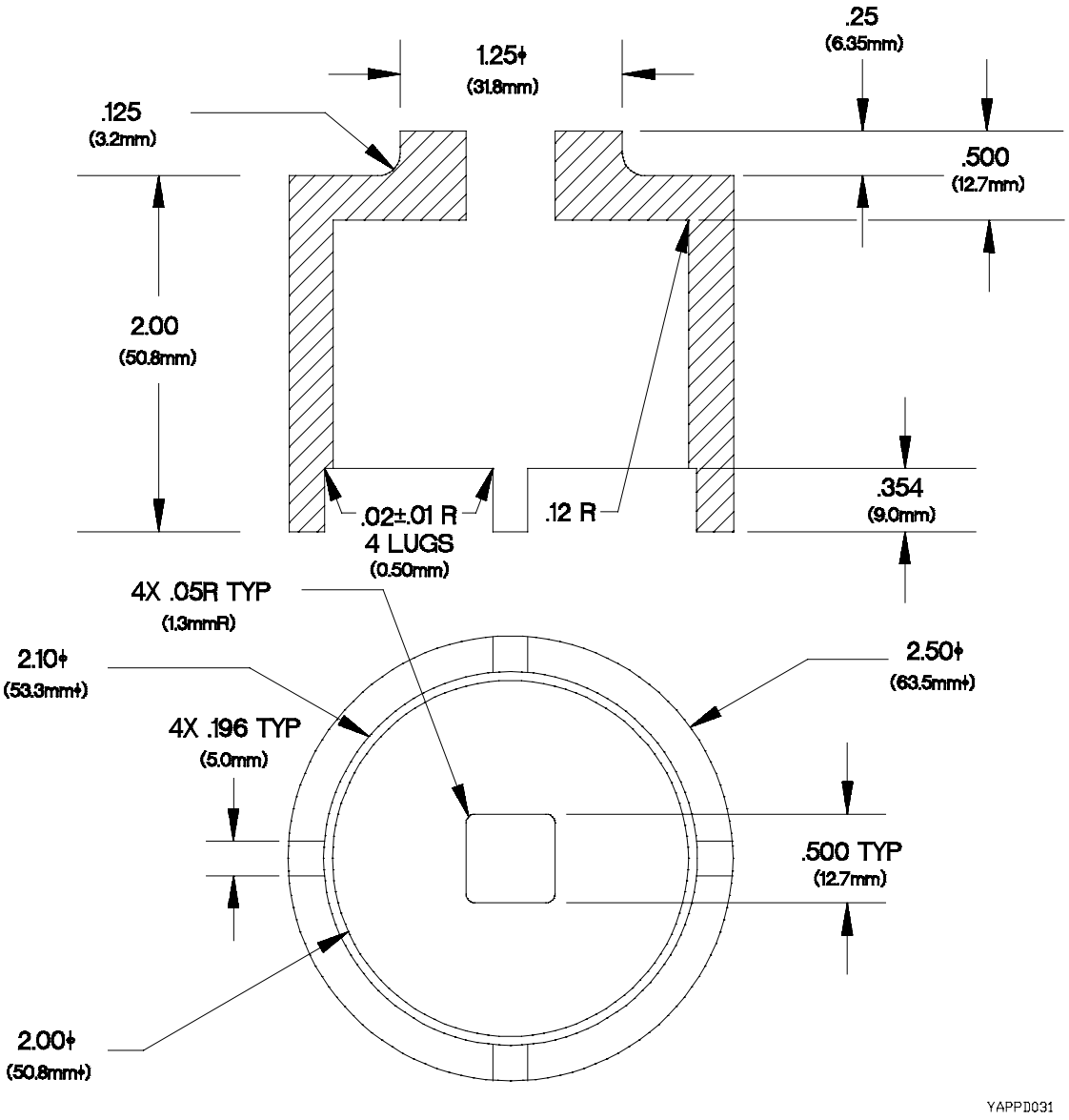


Figure D-3. Cab Front Support Spanner Socket

a. All dimensions are in inches (millimeters).
b. Fabricate from 2-1/2 inch diameter SAE 4130 bar stock conforming to MIL-T-6736 Type I Condition N (NSN 4710-00-278-0478 or equivalent).
c. Tolerance:
   1 place +/- .06
   2 place +/- .03
   3 place +/- .005
   angles +/- 2° unless otherwise specified.
d. Surface texture: 125 $\sqrt{.}$ unless otherwise specified.

D-4. CAB MAINTENANCE STAND

Make the cab maintenance stand from steel plate, 2 inch by 4 inch and 4 inch by 4 inch lumber, and bolts, nuts and washers according to the following instructions. Refer to the parts list tables and figures **Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets**, **Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations**, **Figure D-6. Cab Maintenance Stand Base Fabrication, Figure D-7. Cab Maintenance Stand Brace Bracket Locations**, **Figure D-8. Cab Maintenance Stand Brace to Base Assembly**, **Figure D-9. Cab Maintenance Stand Brace to Base Assembly**, and **Figure D-10. Cab Maintenance Stand Assembly** for details.

Item No.	Item Description	Size or Dimension	Material Description	Qty
1	Base, LH, RH	51½ x 3½ x 3½	4X4 in. Lumber (MIL-STD-731)	2
2	Base Feet	10½ x 3½ x 3½	4x4 in. Lumber	4
3	Base Spreaders	41 x 3½ x 1½	2x4 in. Lumber	6
4	Brace, Mid, and Front Supports	15½ x 3½ x 3½	4x4 in. Lumber	4
5	Brace, Rear Support	25 x 3½ x 3½	4x4 in. Lumber	2
6	Support, Rear, Front, Middle	41 x 3½ x 3½	4x4 in. Lumber	3
7	Brace Spreaders	44½ x 3½ x 1½	2x4 in. Lumber	2
8	Pads	6 x 3½ x 1½	2x4 in. Lumber	4
9	Bracket, Angle	3½ x 3½ x 1/8	1/8 in. Steel Angle Stock	6
10	Bracket, Straight	5½ x 3½ x 1/8	1/8 in. Steel Plate Stock	6
11	Bolt, 3/8 X 4 in. Carriage, NC			24
12	Bolt, 3/8 X 10 in. Carriage, NC			24
13	Washer, Flat, 3/8 in.			48
14	Lockwasher, 3/8 in.			48
15	Nut, Hex, 3/8 in.			48

D-4. CAB MAINTENANCE STAND (CONT)

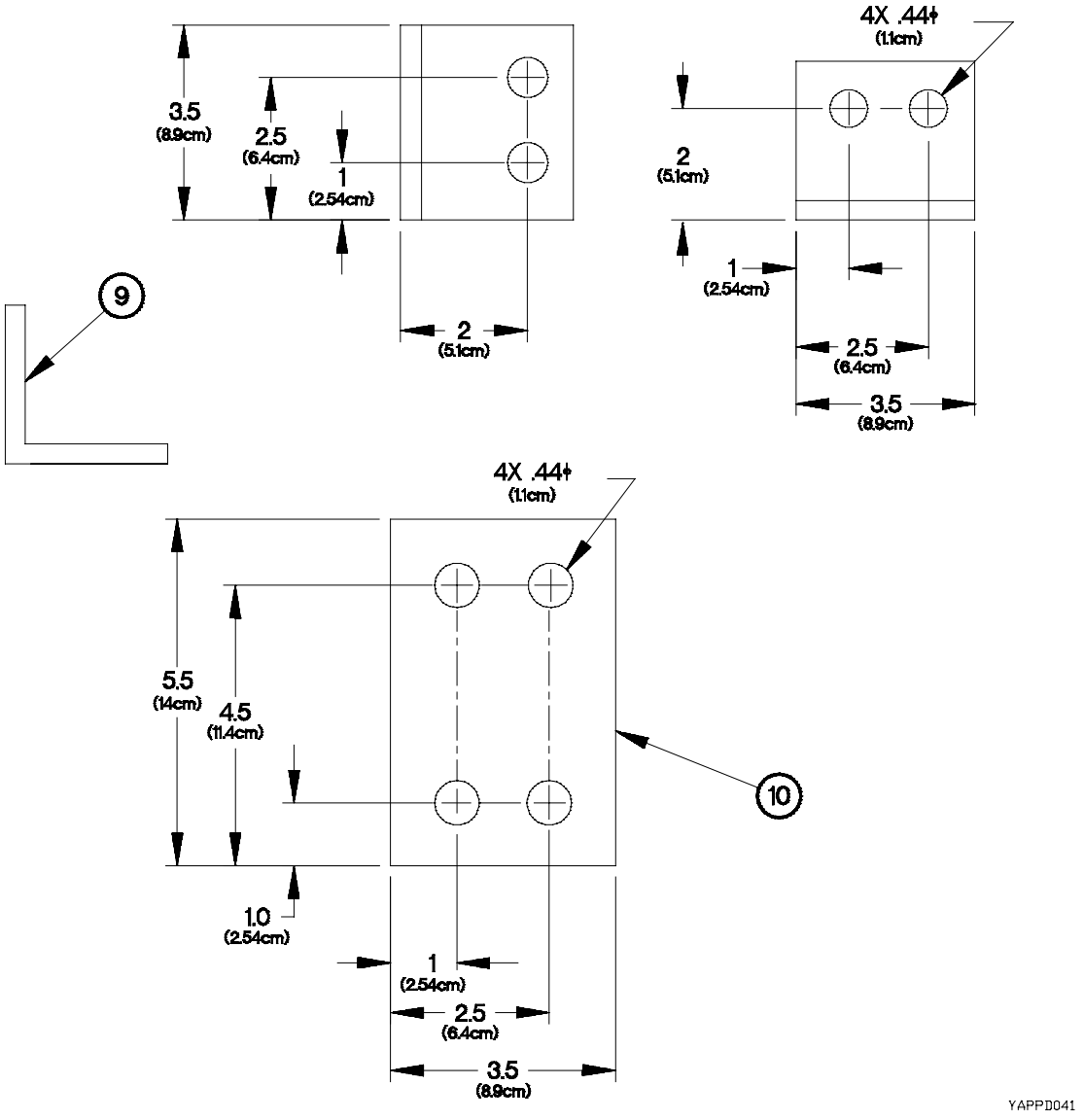


Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets

a. All dimensions are in inches (centimeters).
b. Cut 6 pieces of angle steel stock for angle brackets (9) and 6 pieces of steel plate stock for straight brackets (10).
c. Drill 0.44 in. (11.1 mm) diameter hole through 4 places in each angle bracket (9) and straight bracket (10) as shown in **Figure D-4. Cab Maintenance Stand Angle Brackets and Straight Brackets**.
d. De-burr and remove sharp edges.

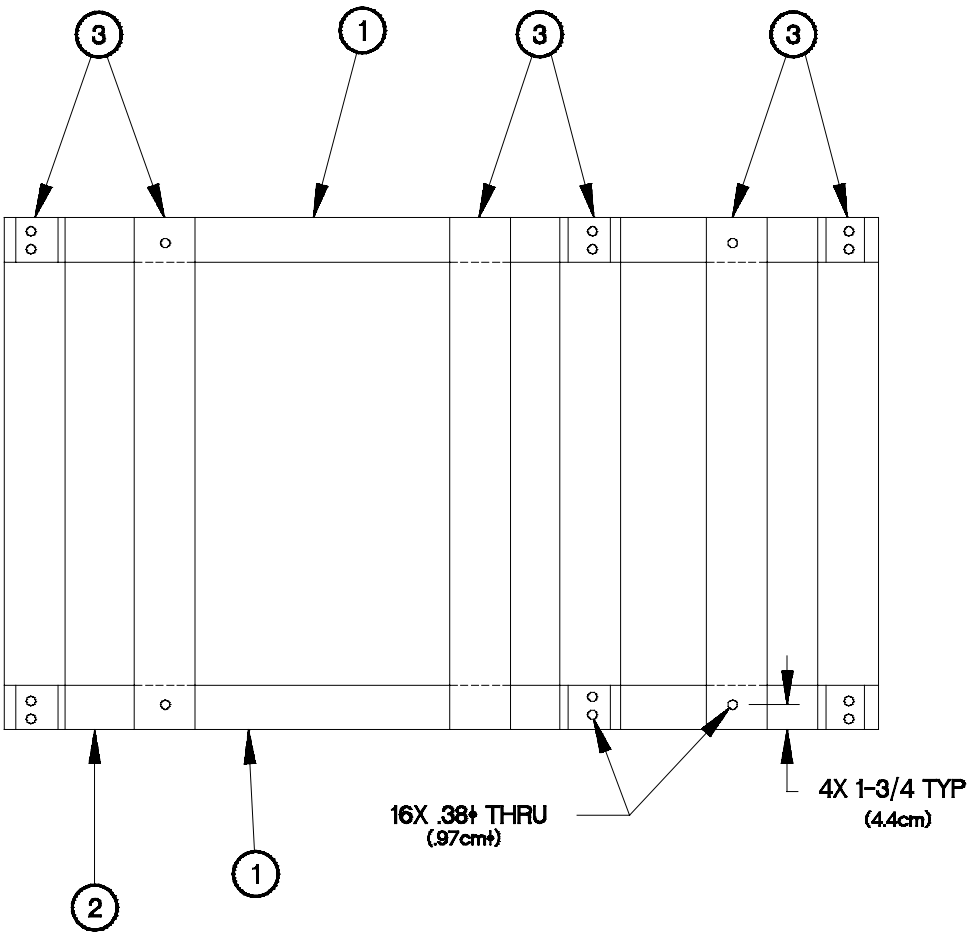


Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations

e. Using angle bracket (9) as a template, mark holes and match drill .38 in (0.96 cm) holes through left side base (1), left side base feet (2), and base spreaders (3) as shown in **Figure D-5. Cab Maintenance Stand Base Angle Bracket Locations**.

f. Repeat step e. marking holes using bracket (9) for match drilling holes through right side base (1) RH, right side base feet and the base spreaders.

D-4. CAB MAINTENANCE STAND (CONT)

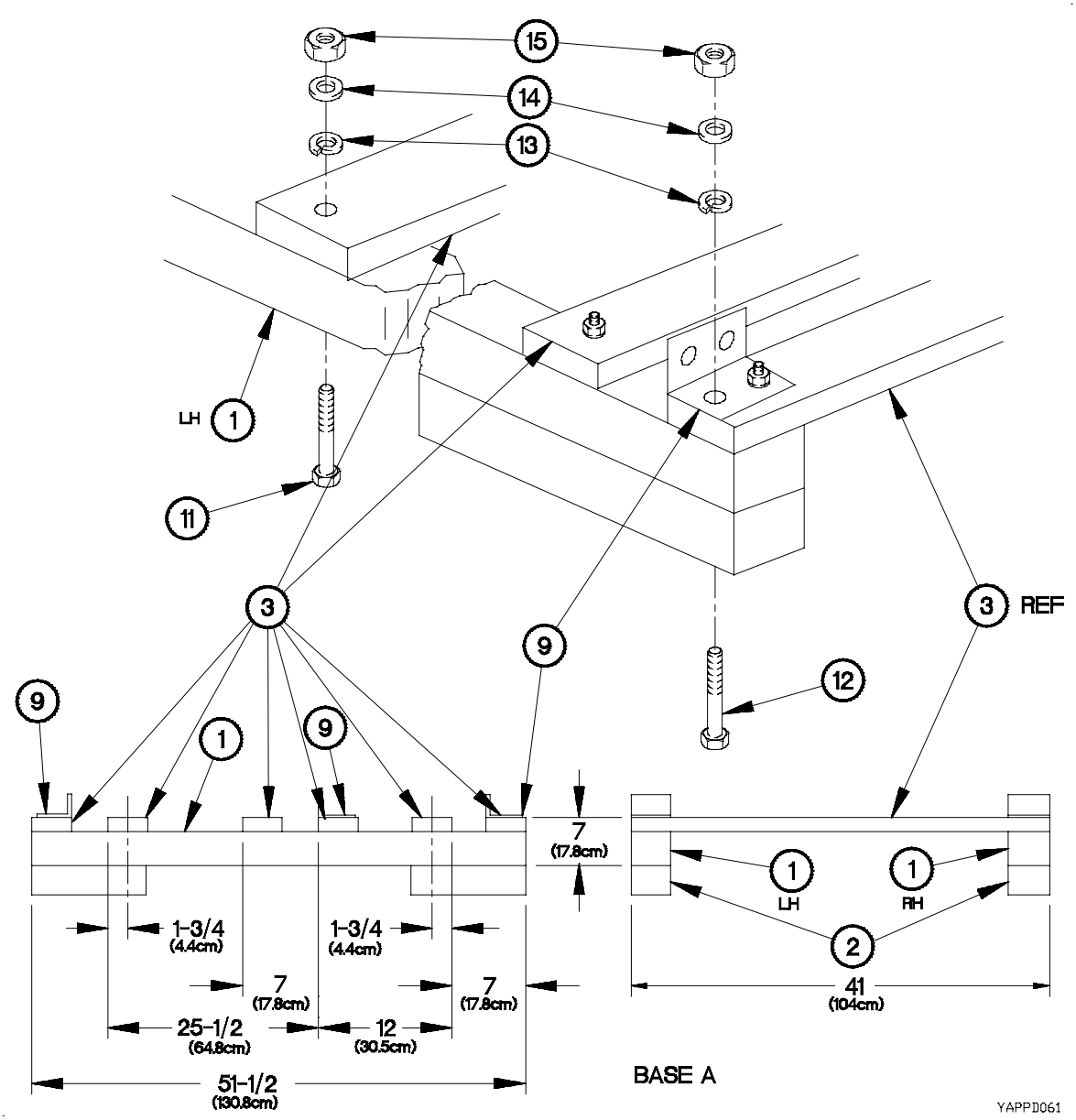


Figure D-6. Cab Maintenance Stand Base Fabrication

g. Make base of cab maintenance stand by securing to the left and to the right base (1); 2 base feet (2), 6 base spreaders (3) and 6 angle brackets (9) using 12 bolts (12), 6 bolts (11), 18 flat washers (13), lockwashers (14) and hex nuts (15) as shown in **Figure D-6. Cab Maintenance Stand Base Fabrication**.

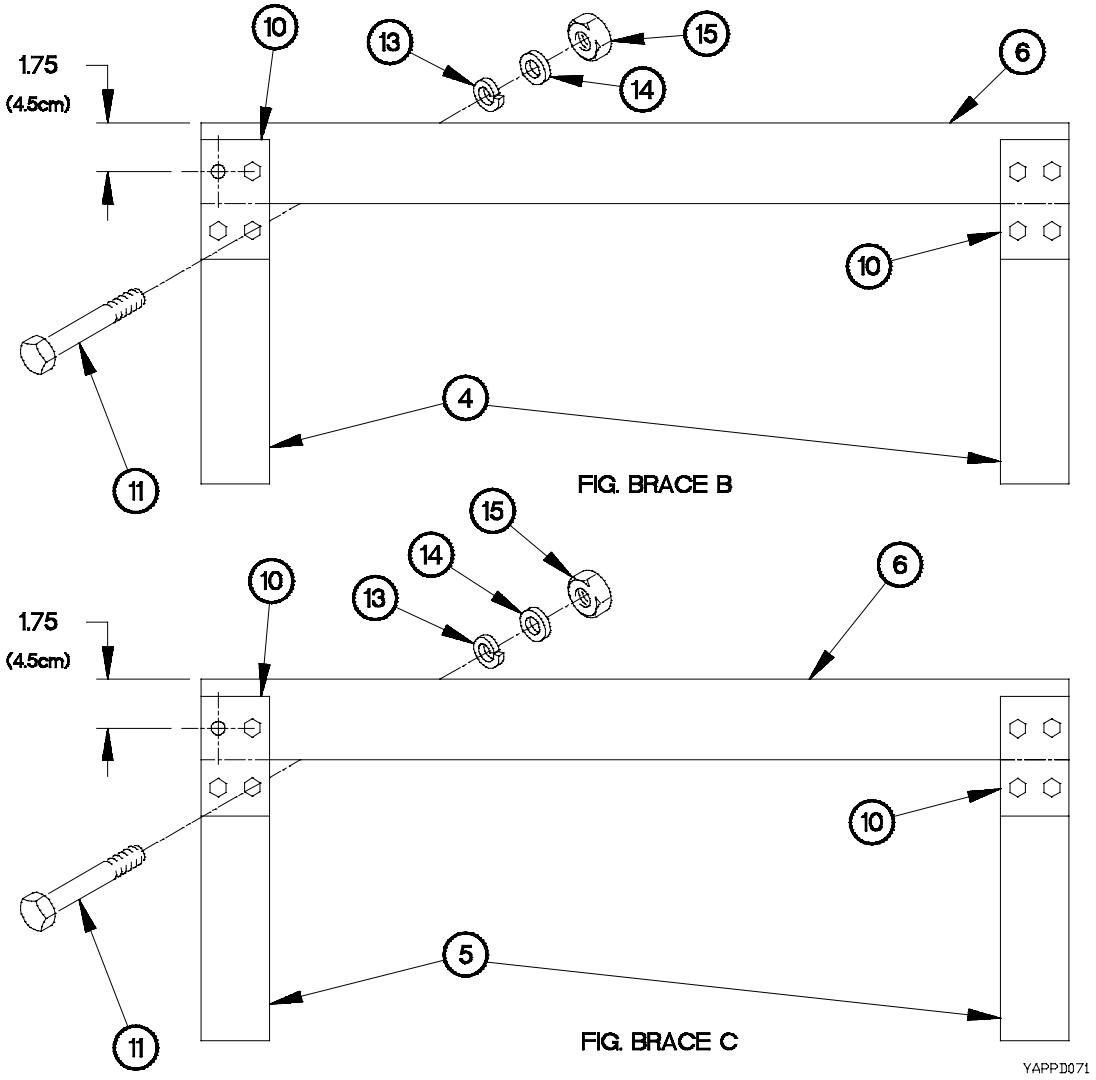


Figure D-7. Cab Maintenance Stand Brace Bracket Locations

h. Using straight bracket (10) as a template, mark holes and match drill 0.38 in. (0.96 cm) holes through 4 support braces (4) and through 2 supports (6) as shown in **Figure D-7. Cab Maintenance Stand Brace Bracket Locations**.

i. Make 2 B braces by securing to each end of support (6), braces (4) and straight brackets (10) using 16 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15).

j. Using straight bracket (10) as a template, mark holes and match drill 0.38 in. (0.96 cm) holes through 2 support braces (5) and through 1 support (6) as shown in **Figure D-7. Cab Maintenance Stand Brace Bracket Locations**.

k. Make C brace by securing to each end of support (6), brace (5) and straight brackets (10) using 8 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15).

D-4. CAB MAINTENANCE STAND (CONT)

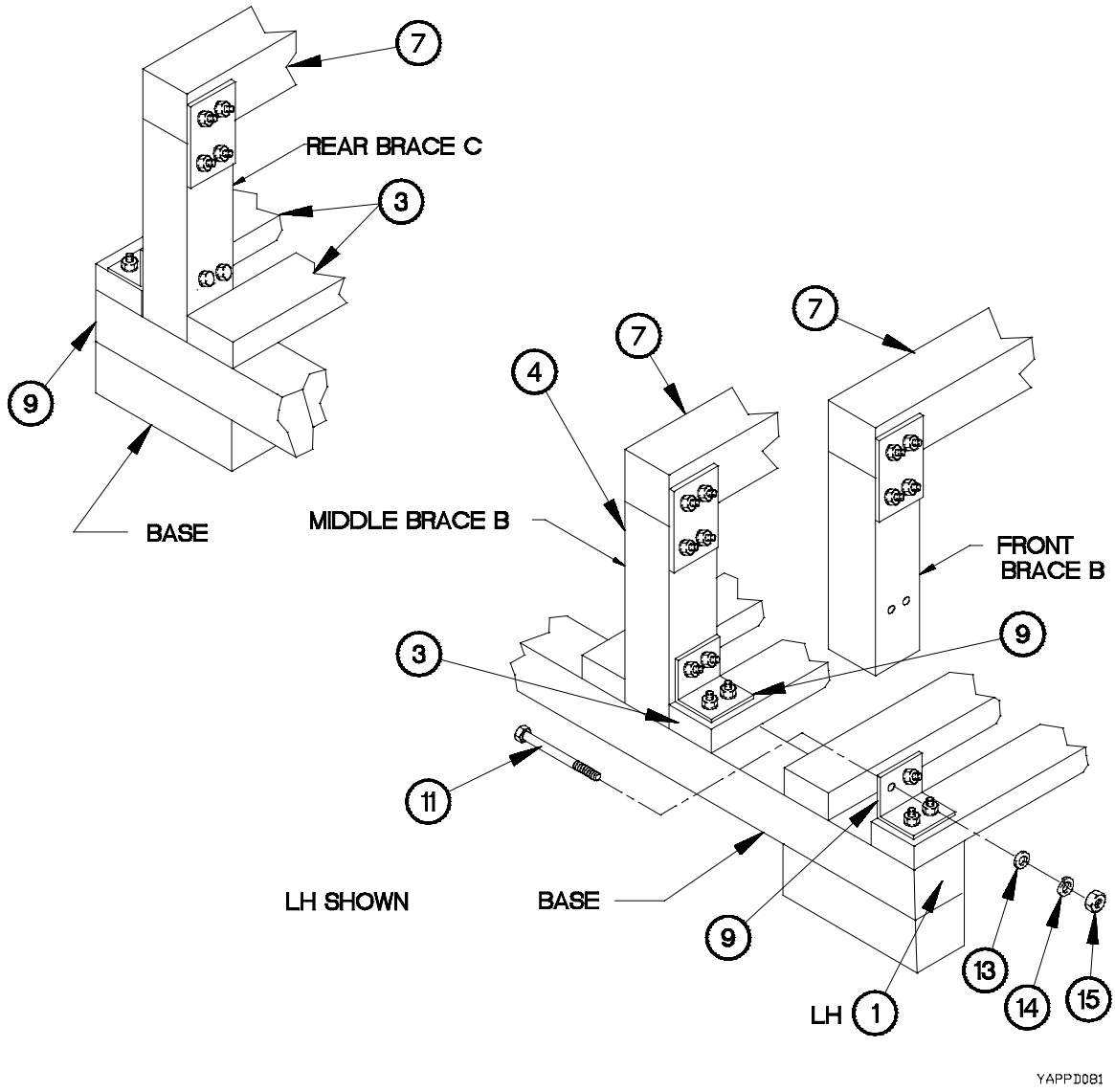


Figure D-8. Cab Maintenance Stand Brace to Base Assembly

l. At left side of base (1) LH, place middle Brace B on the base as shown in **Figure D-8. Cab Maintenance Stand Brace to Base Assembly**.
m. Using angle bracket (9) on base as a template, mark holes on Brace B and match drill 0.38 in. (0.96 cm) hole through Brace B brace (4) as shown in **Figure D-8. Cab Maintenance Stand Brace to Base Assembly**.
n. Secure Brace B to base spreader (3) using 2 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15).
o. Repeat steps m-n for front Brace B.

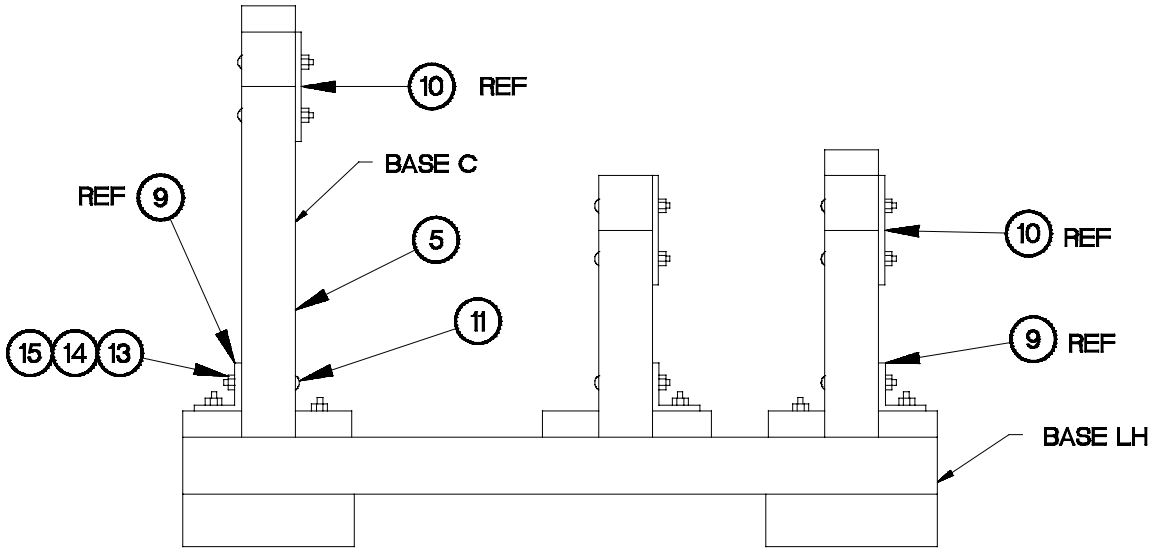


Figure D-9. Cab Maintenance Stand Side Braces Side View

p. Place Brace C on the base as shown in **Figure D-9. Cab Maintenance Stand Side Braces Side View**.
q. Using angle bracket (9) on base as a template, mark holes on Brace C and match drill 0.38 in. (0.96 cm) holes through Brace C brace (5).
r. Secure Brace C to base spreader (3) using 2 bolts (11), flat washers (13), lockwashers (14), and hex nuts (15) as shown in **Figure D-9. Cab Maintenance Stand Brace to Base Assembly**.
s. Repeat steps m-r at right side base (1) RH.

D-4. CAB MAINTENANCE STAND (CONT)

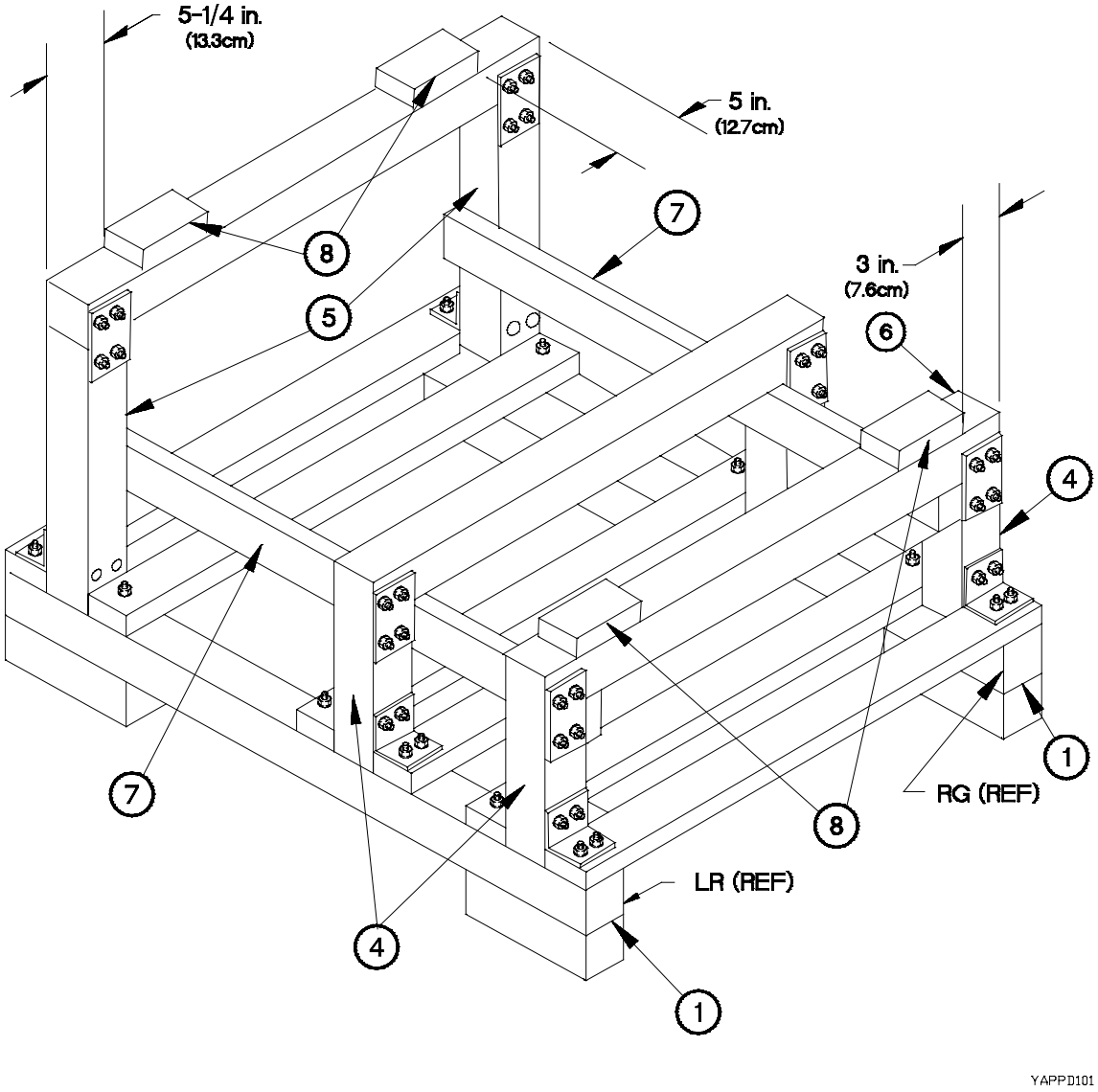


Figure D-10. Cab Maintenance Stand Assembly

t. Nail 1 pad (8) to support (6) at rear of stand 5-1/4 in. (13.3 cm) from left hand rear brace (5). Nail 1 pad (8) to support (6) at rear of stand 5 in. (12.7 cm) from right hand rear brace (5) using number 16 nails.
u. Nail 2 pads (8) to support (6) at front of stand 3 in. (7.6 cm) from each end of front brace (4) using number 16 nails.
v. Nail a left side brace spreader (7) to rear brace support (5) and middle and front brace supports (4) at position shown in **Figure D-10. Cab Maintenance Stand Assembly** using number 16 nails.
w. Nail a right side brace spreader (7) to rear brace (5) and middle and front brace supports (4) at positions shown in **Figure D-10. Cab Maintenance Stand Assembly** using number 16 nails.

D-5. CAB SUPPORT TOOL

Make the cab support tool from 0.38 inch (0.96 cm) flat steel stock and angle iron stock according to the following instructions. Refer to the parts list and **Figure D-11. Cab Support Tool Strut and Cab Rest** for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, Flat Bar	4.0 in. (10.2 cm) X 33.38 in. X (84.8 cm) X 0.38 in. (0.96 cm)	1
2	N/A	Steel, Flat Bar	4.0 in. (10.2 cm) X 12.0 in. (30.5 cm) X 0.38 in. (0.96 cm)	1
3	N/A	Angle Iron	2.0 in. (5.1 cm) X 2.0 in. (5.1 cm) X 3.5 in. (8.9 cm)	2
4	H.S.105VW-1	Omsi;gro[. CSA 105 C		
5	IC 551	Coating, Compound, Plastisol	NA	1

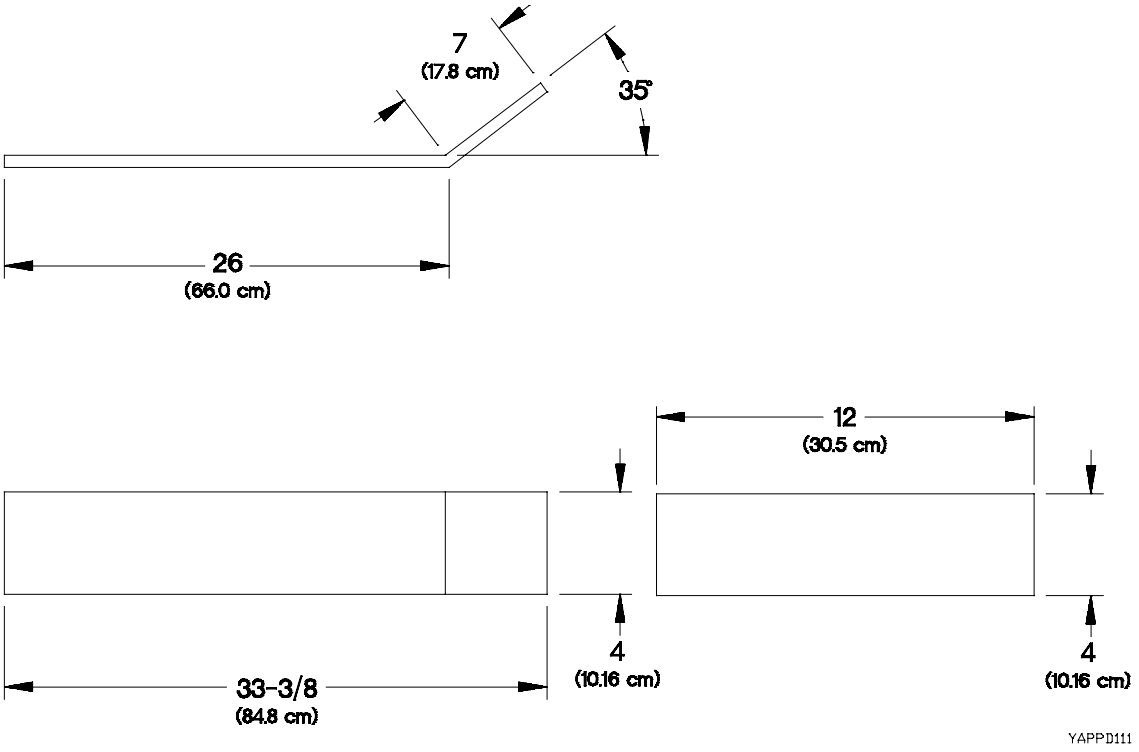


Figure D-11. Cab Support Tool Strut and Cab Rest

a. All dimensions are in inches (centimeters).
b. Cut cab support tool strut (1) from steel flat bar and bend to shape as shown in **Figure D-11. Cab Support Tool Strut and Cab Rest**.
c. Cut cab support tool cab rest (2) from steel flat bar.
d. De-burr and remove sharp edges.

D-5. CAB SUPPORT TOOL (CONT)

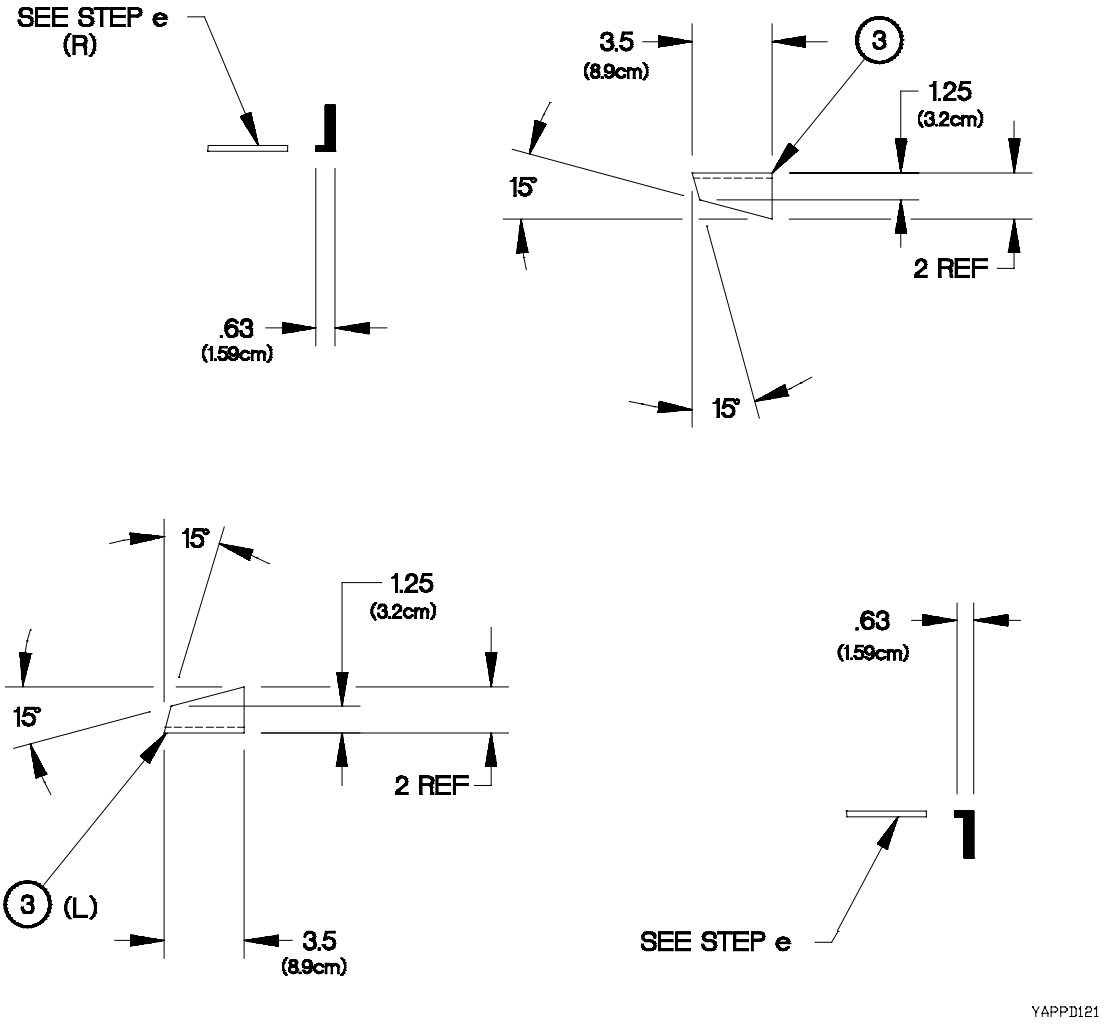


Figure D-12. Cab Support Tool Seat

e. Remove flange side of cab support tool seats (3) as shown in **Figure D-12. Cab Support Tool Seat**.
f. Cut cab support tool seats (3) L and (3) R according to dimensions and left\right orientation shown in **Figure D-12. Cab Support Tool Seat**.
g. De-burr and remove sharp edges.

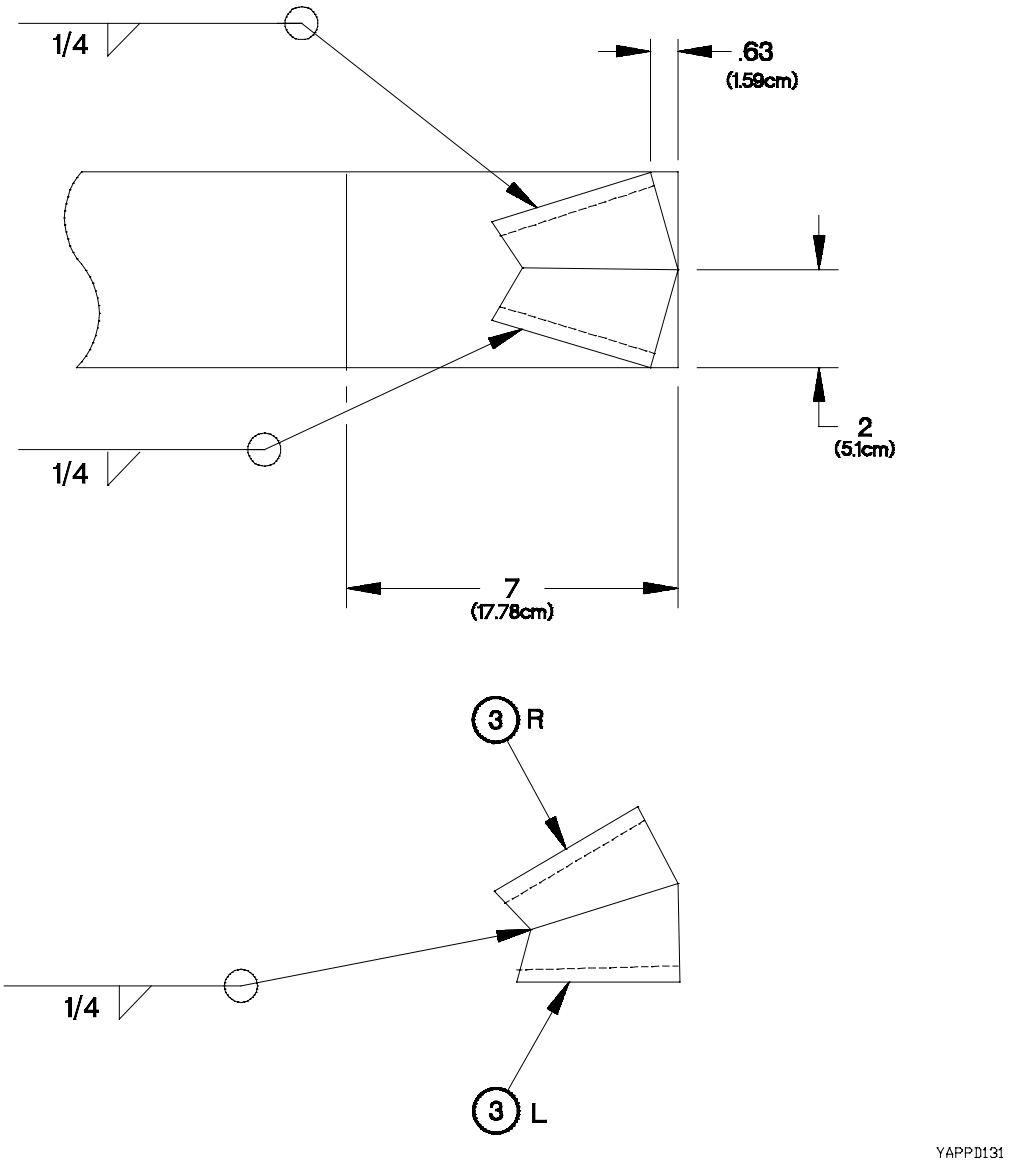


Figure D-13. Cab Support Tool Seat Layout

h. Position and clamp cab support tool seats (3) L and (3) R together as shown by dimensions in **Figure D-13. Cab Support Tool Seat Layout**.
i. Weld cab support tool seat (3) L to cab support tool seat (3) R as identified in assembly table and **Figure D-13. Cab Support Tool Seat Layout**.
j. Position and clamp cab support tool seats (3) L and (3) R to cab support tool strut (1) as shown by dimensions in **Figure D-4. Cab Support Tool Seat Layout**.
k. Weld items clamped in step (j) as shown in **Figure D-4. Cab Support Tool Seat Layout**.
l. De-burr and remove sharp edges.

D-5. CAB SUPPORT TOOL (CONT)

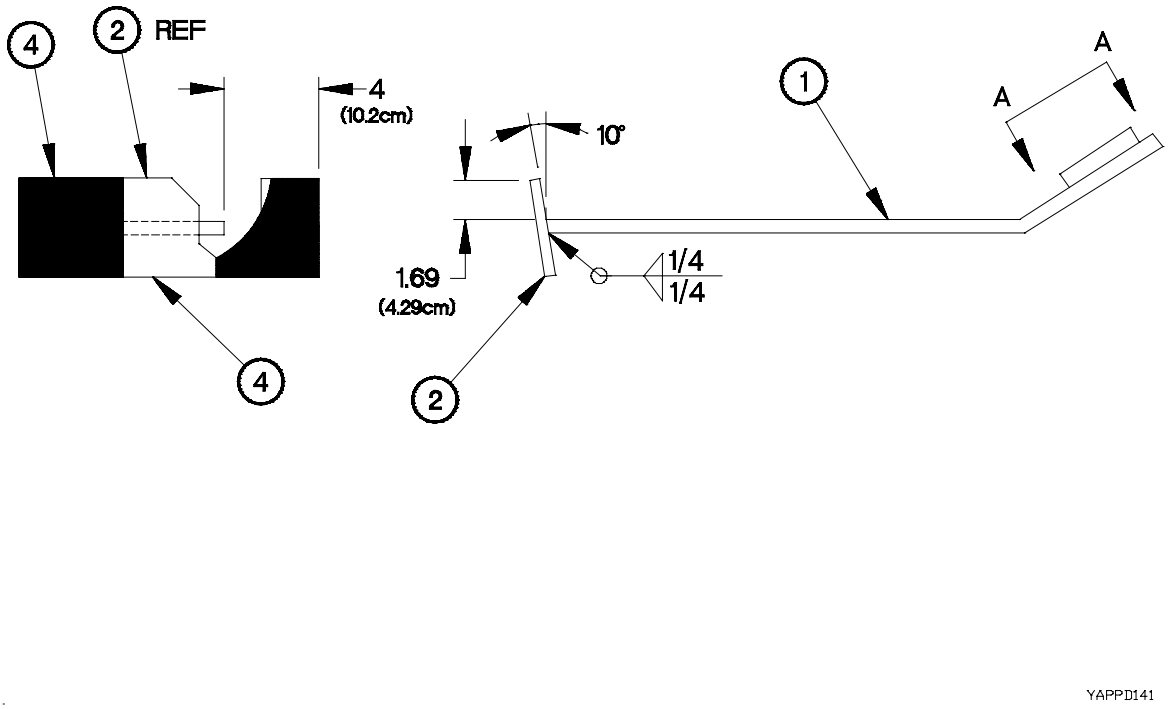


Figure D-14. Cab Support Tool Assembly

m. Position and clamp cab support tool strut (1) to cab support tool cab rest (2) as shown by dimensions in **Figure D-14. Cab Support Tool Assembly**, before insulgrip (4) is applied.
n. Weld cab support tool strut (1) to cab support tool cab rest (2).
o. Apply Insulgrip (4) to cab support tool cab rest (2) as described on material container.

D-6. DUMP BED WOODEN BRACE FABRICATION

Cut the wooden braces from bulk wood stock according to the information in the table. Finish as described in the following steps.

Item Description	Size or Dimension	Material Description	Qty
Braces	4 X 4 X 48 in. (10.1 X 10.1 X 121.9 cm)	4 X 4 in. Lumber (MIL-STD-731)	2

a. All dimensions are in inches (centimeters).
b. Cut 2 of item 1 from MIL-STD 736 Group IV untreated bulk wood stock as indicated in table.
c. Sand and remove sharp edges.

D-7. DUMP BODY CAB PROTECTOR PIVOT PIN REMOVAL TOOL

Make the dump body cab protector pivot pin removal tool from 0.50 inch (1.3 cm) round steel stock according to the following figures. Refer to the parts list and figure for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Steel, Round Bar	108.0 in. (274.3 cm) x 0.50 in. (1.3 cm) OD	1
2	N/A	Steel, Round Bar	5.00 in. (13 cm) x 0.50 in. (1.3 cm) OD	1

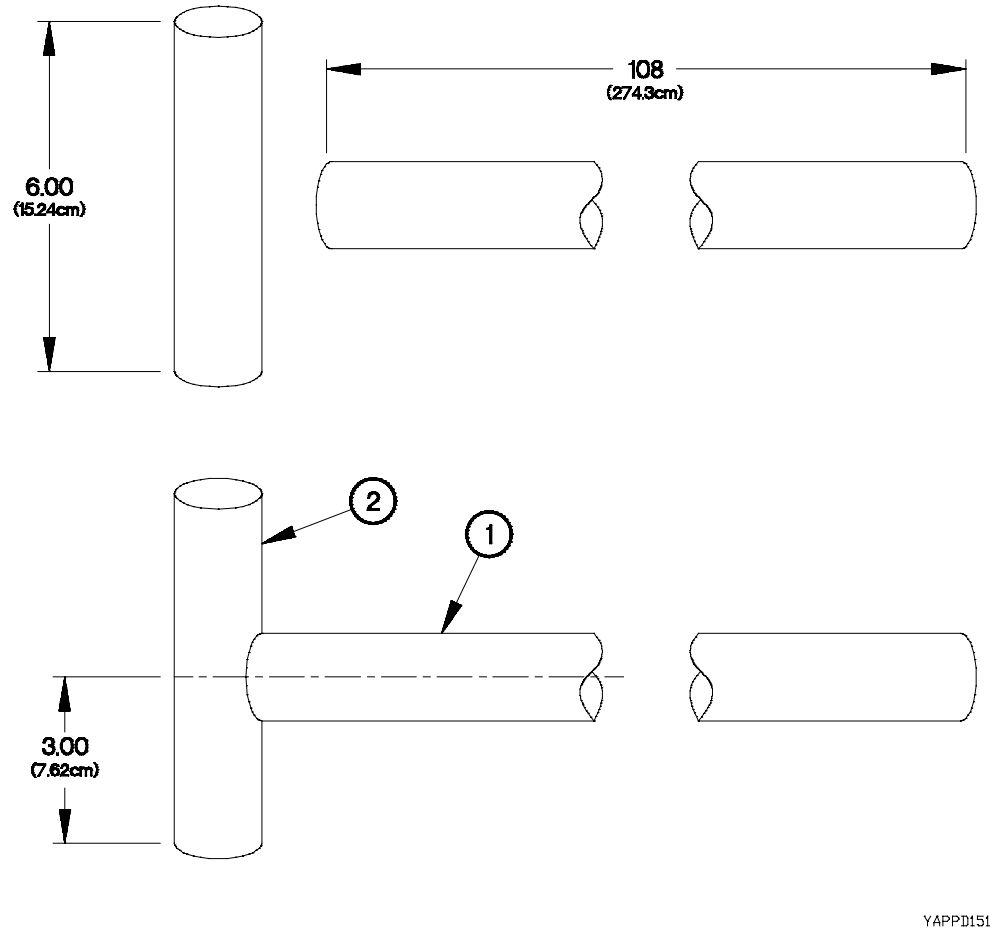


Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly

a. All dimensions are in inches (centimeters).
b. Position and clamp (1) and (2) pieces together as shown by dimensions in **Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly**.
c. Weld (1) to (2) as identified on assembly table and shown in **Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly**.
d. Weld both sides indicated in **Figure D-15. Dump Body Cab Protector Pivot Pin Removal Tool Assembly**.
e. De-burr and remove sharp edges.

D-8. DUMP BODY LIFTING BRACKET

Make the dump body lifting bracket assembly from the front, rear, top, guide, and mount plates according to the following instructions. Refer to the parts list tables and accompanying figures for details.

Item	Part Number	Name/Description	Qty
1	N/A	Rear Plate	1
2	N/A	Top Plate	1
3	N/A	Front Plate	1
4	N/A	Guide Brace	1
5	N/A	Plate, Mounting	1

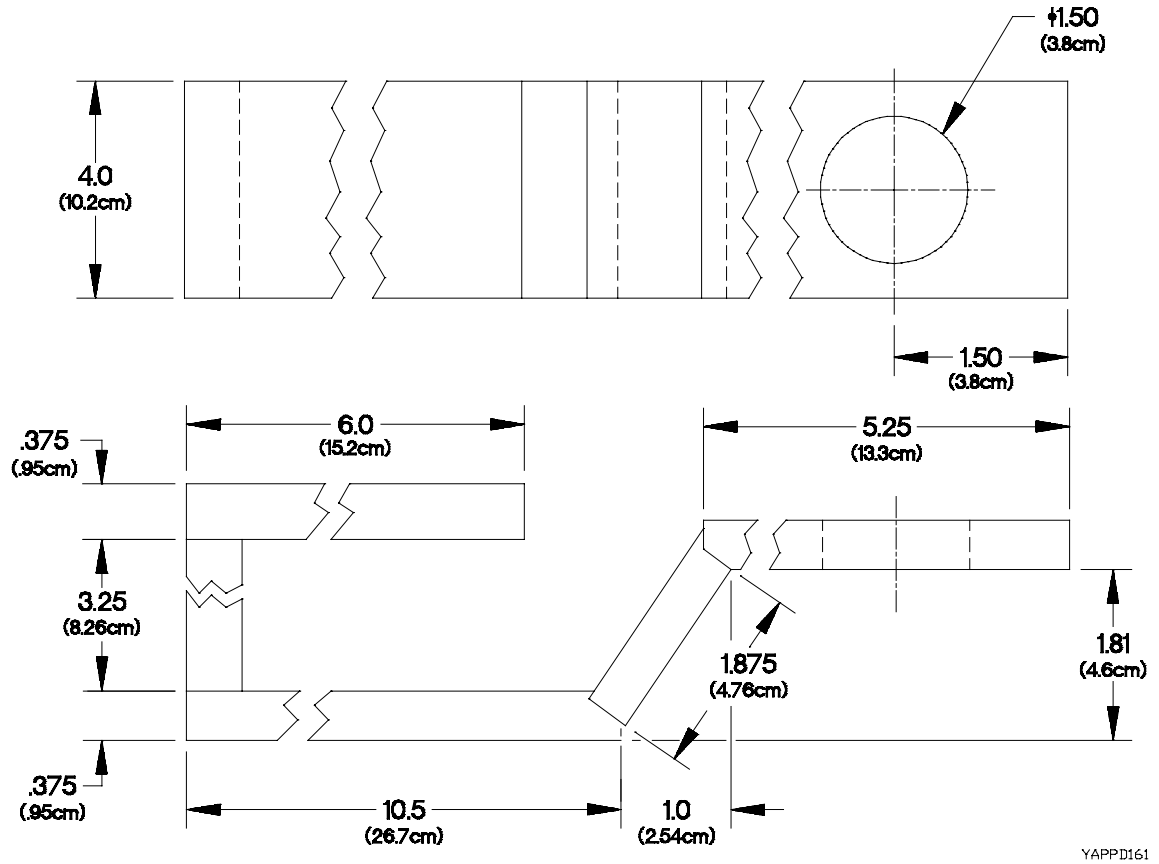


Figure D-16 Dump Body Lifting Bracket

a. All dimensions are in inches (centimeters).
b. Position and clamp pieces (1 through 5) together as shown by dimensions in Figure Dump Body Lifting Bracket.
c. Weld pieces together as shown in **Figure D-16. Dump Body Lifting Bracket**.
d. Coat all surfaces with Plastisol (6).
e. Maximum lifting capacity of Dump Body Lifting Bracket is 900 lbs (409 kgs).

Item	Part Number	Material Description	Size	Qty
1	N/A	Plate, steel, ASTM A-36	6.0 in. (15.2 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1
2	N/A	Plate, steel, ASTM A-36	3.25 in. (8.26 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1
4	N/A	Plate, steel, ASTM A-36	1.875 in. (10.2 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1

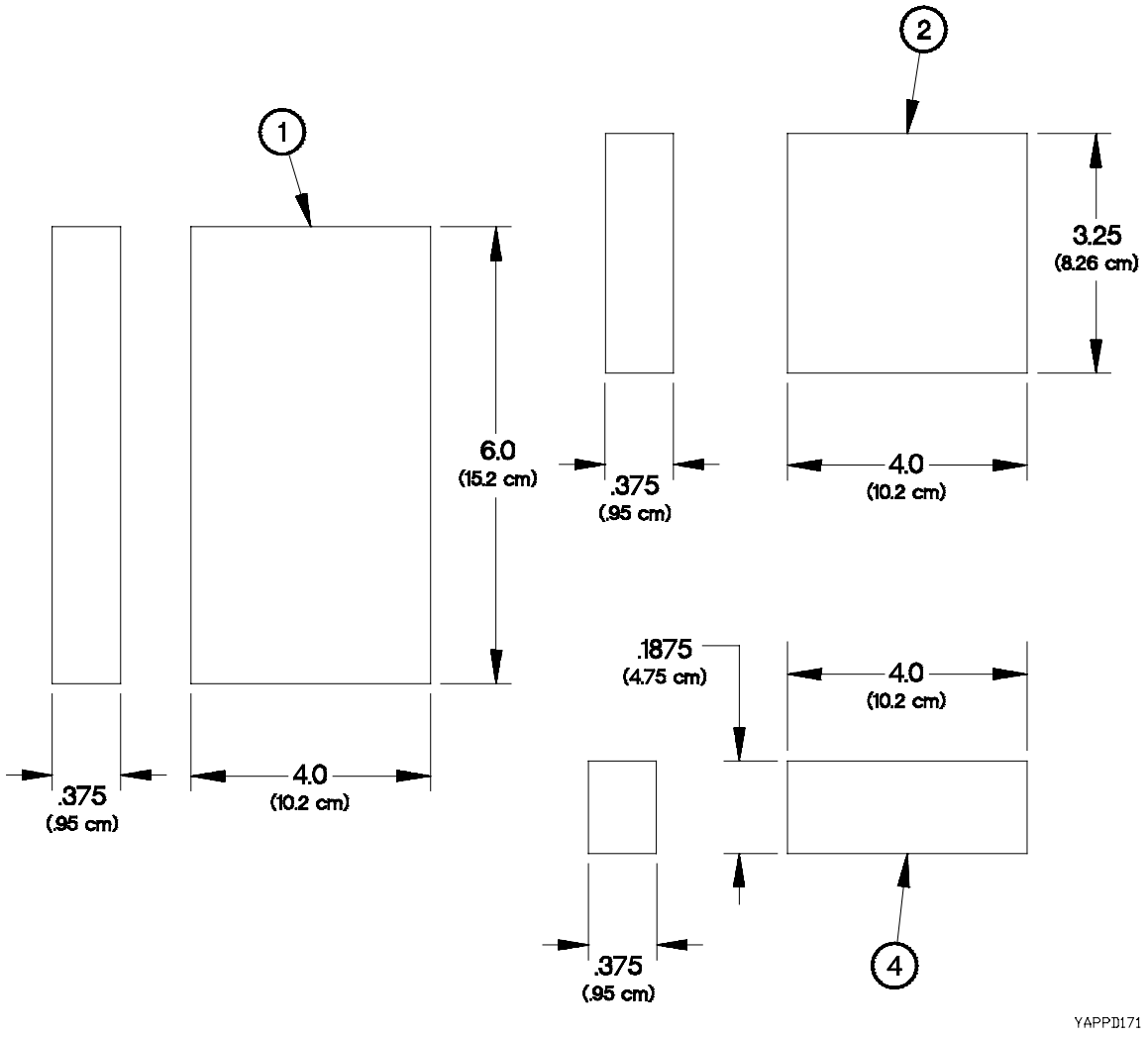


Figure D-17. Rear, Top, and Guide Plate

a. All dimensions are in inches (centimeters).
b. Fabricate (1),(2), and (4) from ASTM A-36 steel plate as shown in **Figure D-17. Rear, Top, and Guide Plate**.
c. De-burr and remove sharp edges.

D-8. DUMP BODY LIFTING BRACKET (CONT)

Item	Part Number	Material Description	Size	Qty
3	N/A	Plate steel, ASTM A36	10.5 in. (26.7 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1
5	N/A	Plate steel, ASTM A36	5.25 in. (13.3 cm) X 4.0 in. (10.2 cm) X 0.375 in. (0.95 cm)	1

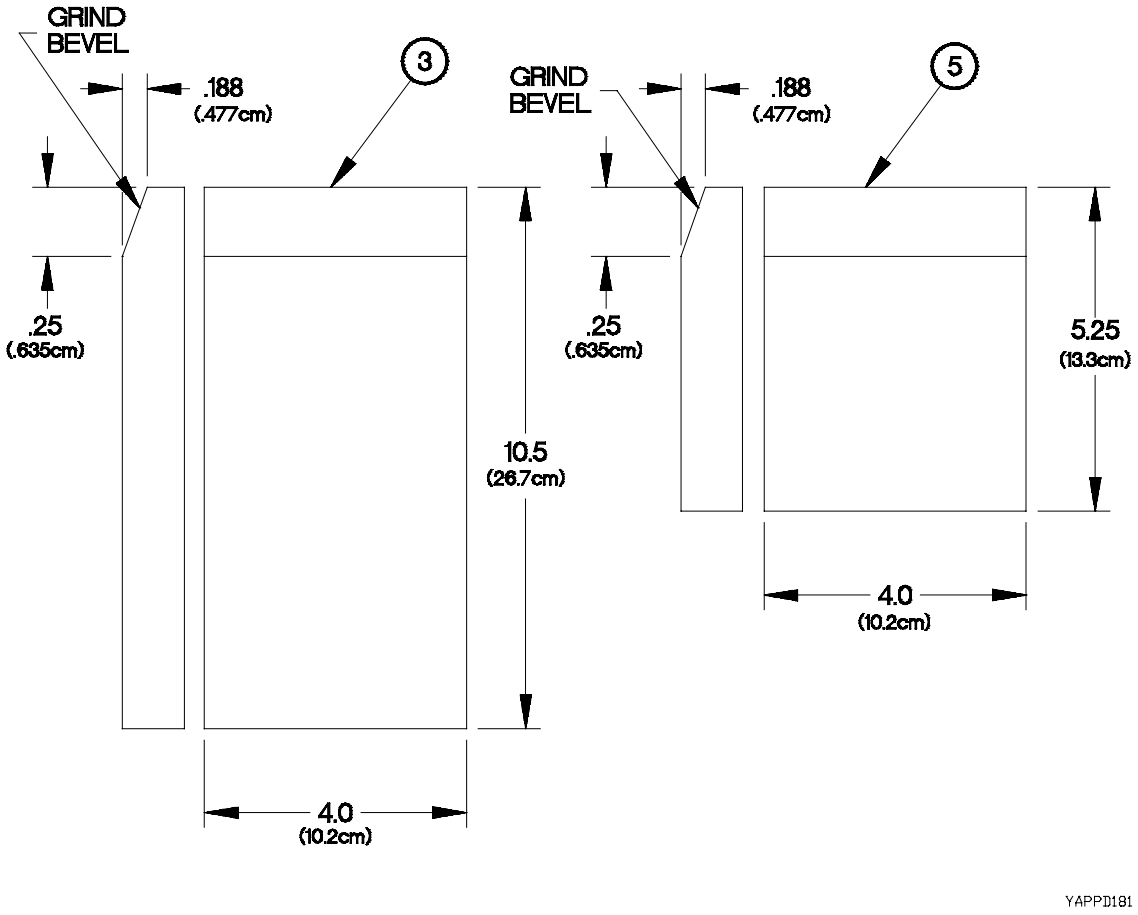


Figure D-18. Front and Mounting Plate

a. All dimensions are in inches (centimeters).
b. Fabricate (3) and (5) from ASTM A-36 steel plate.
c. Drill 1-1/2 inch (3.84 cm) diameter hole in plate (5) as shown in **Figure D-18. Front and Mounting Plate**.
d. Grind bevel on edge of each plate for weld surface as shown in **Figure D-18. Front and Mounting Plate**.
e. De-burr and remove sharp edges.

D-9. ENGINE STAND BRACKET ASSEMBLY

Make the engine stand bracket assembly from the front, rear, and side plates according to the following instructions. Refer to the parts list tables and accompanying figures for details.

Item	Part Number	Name/Description	Qty
1	12419144-001	Plate, Front	1
2	12419144-002	Plate, Rear	1
3	12419144-003	Plate, Side	2

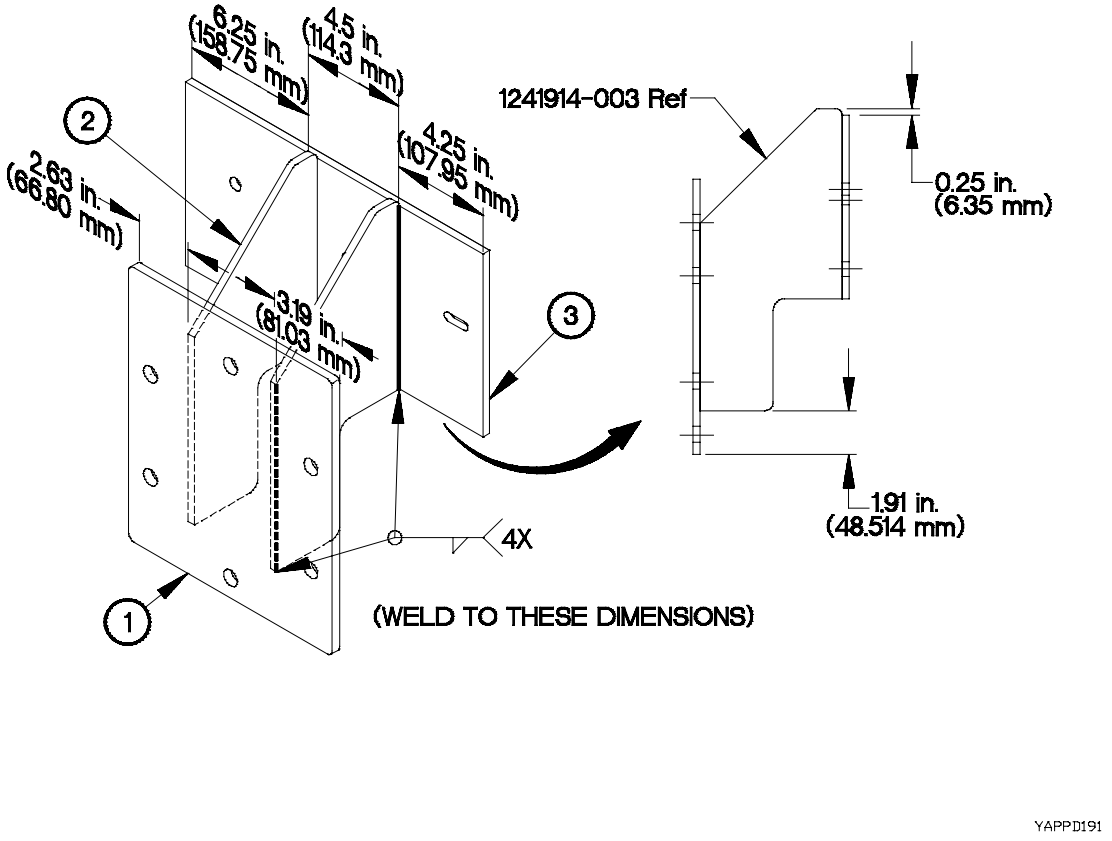


Figure D-19. Engine Stand Bracket Assembly

a. All dimensions are in inches (millimeters).
b. Weld (1), (2) and (3) together as shown by dimensions in **Figure D-19. Engine Stand Bracket Assembly**.

D-9. ENGINE STAND BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
1	12419142-001	Plate, Steel, ASTM A-36	12.0 in. (304.8 mm) x 10.25 in. (260.3 mm) x 0.312 in. (7.9 mm) thick	1

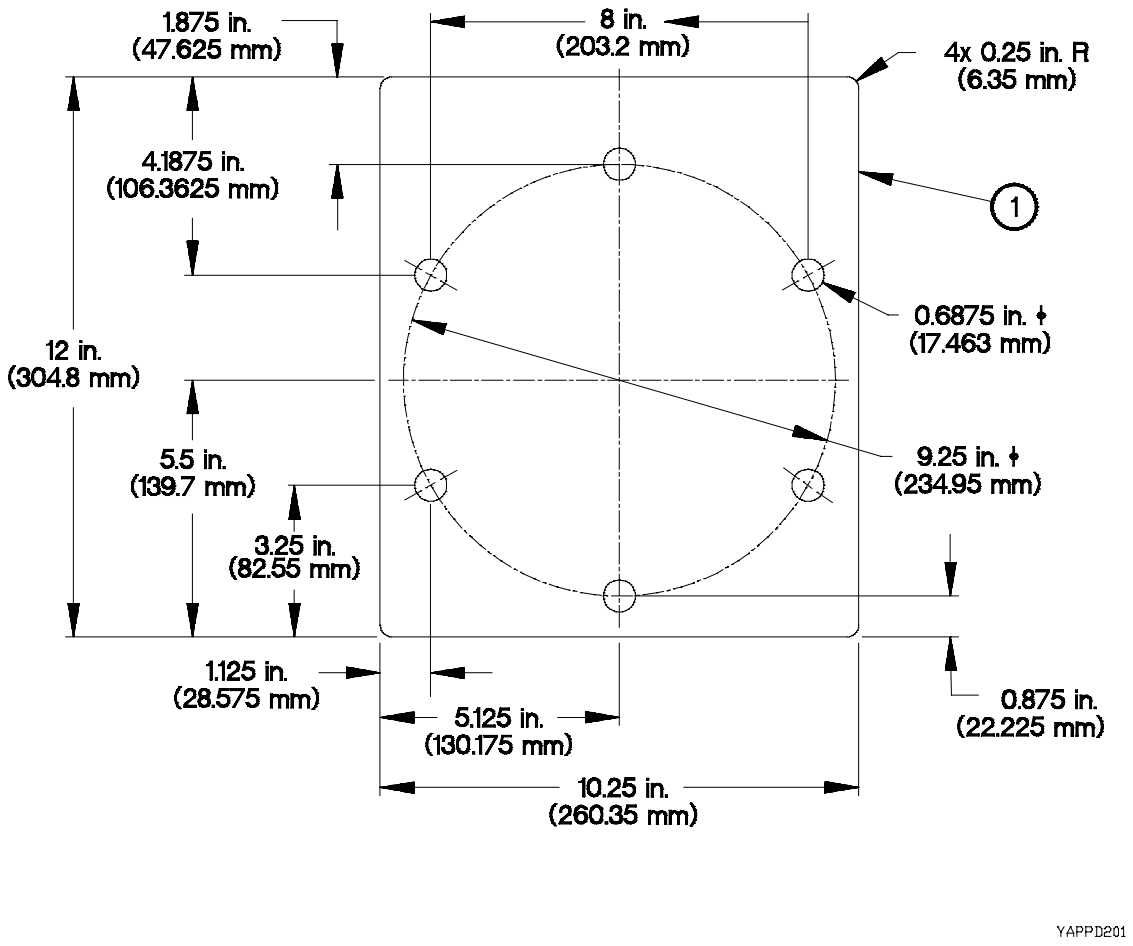


Figure D-20. Engine Stand Bracket Front Plate

a. All dimensions are in inches (millimeters).
b. Fabricate (1) from ASTM A-36 steel plate.
c. Drill 0.6875 in. (17.5 mm) diameter hole through 6 places on a 9.25 in. (234.9 mm) radius equally spaced at 60° as shown in **Figure D-20. Engine Stand Bracket Front Plate**.
d. Round four corners to 0.25 in. (6.35 mm) radius as shown in **Figure D-20. Engine Stand Bracket Front Plate**.

Item	Part Number	Material Description	Size	Qty
2	12419144-002	Plate, Steel, ASTM A-36	20.62 in. (523.7 mm) x 7.25 in. (184.1 mm) x 0.312 in. (7.9 mm) thick	1

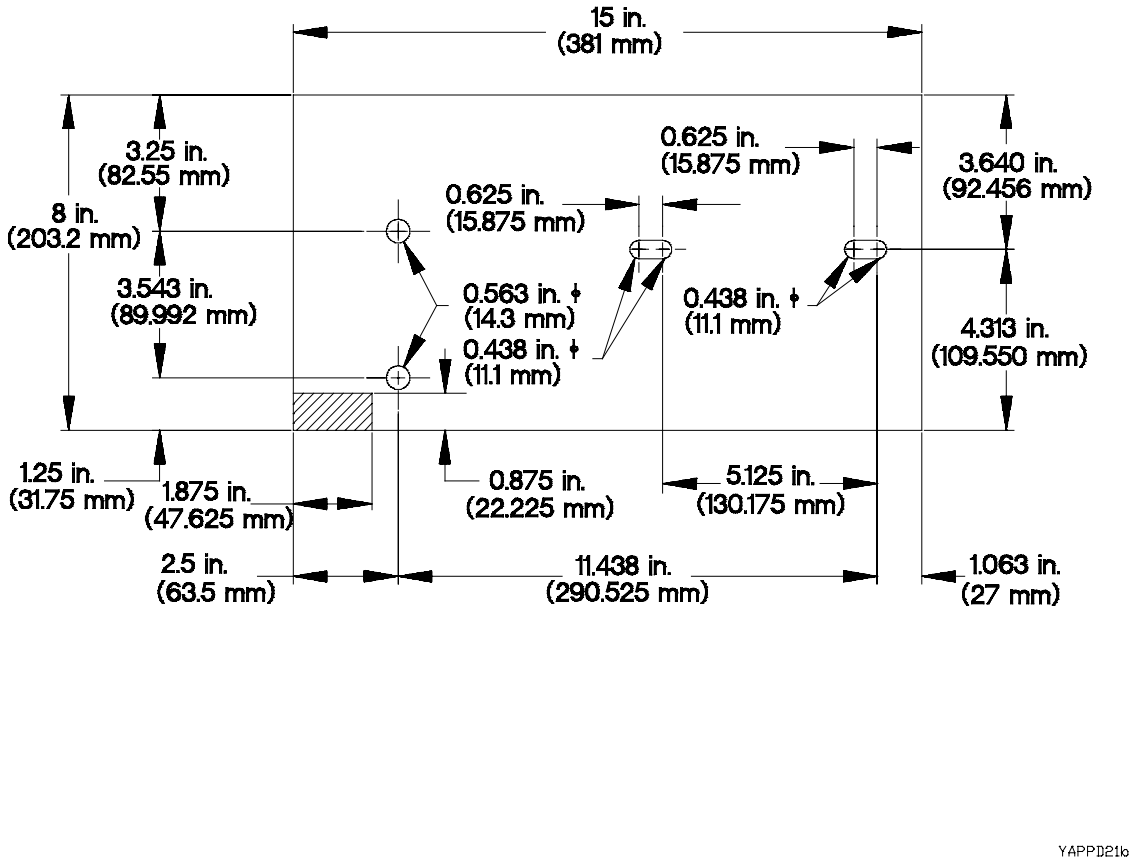


Figure D-21. Engine Stand Bracket Rear Plate

a. All dimensions are in inches (millimeters).
b. Fabricate (2) from ASTM A-36 steel plate.
c. Drill 0.563 in. (14.3 mm) diameter hole through 2 places in rear plate as shown in **Figure D-21. Engine Stand Bracket Rear Plate**.
d. Drill 0.438 in. (11.1 mm) diameter hole through 4 places in rear plate as shown in **Figure D-21. Engine Stand Bracket Rear Plate**.
e. Cut or mill between 0.438 in. (11.1 mm) diameter holes as shown in **Figure D-21. Engine Stand Bracket Rear Plate**.
f. De-burr and remove all sharp edges.

D-9. ENGINE STAND BRACKET ASSEMBLY (CONT)

Item	Part Number	Material Description	Size	Qty
3	124191442-003	Plate, Steel, ASTM A-36	6.18 in. (157 mm) x 13.18 in. (334.8 mm) x 0.312 in. (7.9 mm) thick	2

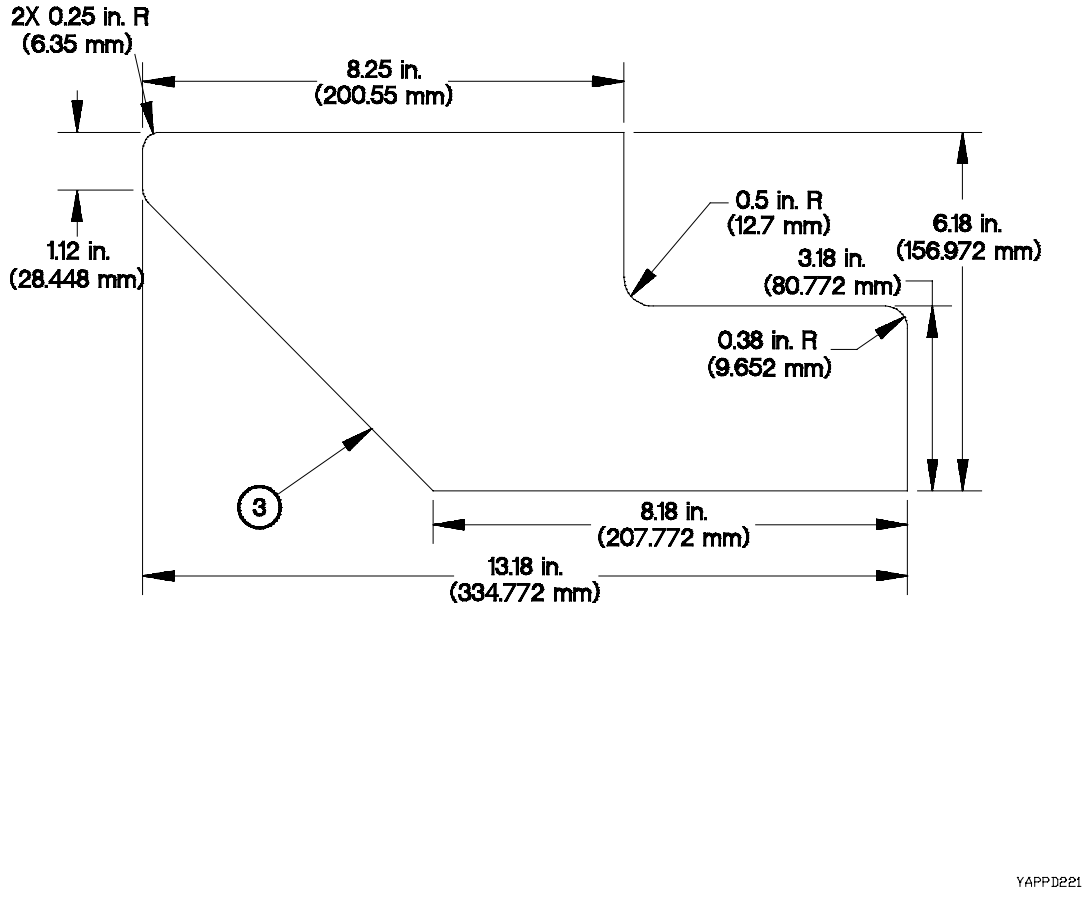


Figure D-22. Engine Stand Bracket Side Plates

a. All dimensions are in inches (millimeters).
b. Fabricate (3) from ASTM A-36 steel plate.
c. Deleted.
d. Round two corners to 0.25 in. (6.35 mm) radius as shown in **Figure D-22. Engine Stand Bracket Side Plates**.
e. Round corner to 0.38 in. (9.65 mm) radius as shown in **Figure D-22. Engine Stand Bracket Side Plates**.
f. De-burr and remove all sharp edges.

D-10. HEADLIGHT ADJUSTMENT SCREEN

The headlight adjustment screen may be drawn on any vertical surface at least 50 in. (127 cm) high and 100 in. (254 cm) wide.

a. Draw two vertical lines (1) 50 in. (127 cm) high and 90.6 in. (230 cm) apart (centered on headlight adjustment screen).

b. Locate two points 40 in. (101.6 cm) from floor and 15.3 in. (38.9 cm) toward the center from each vertical line (1).

c. Draw vertical line (2) about 3-5 in. (8-13 cm) centered on each of the two points.

d. Draw horizontal line (3) about 3-5 in. (8-13 cm) centered on each of the two points.

e. Measure out 4 in. (10 cm) along each vertical line (2) and horizontal line (3) from each of the two points to make 8 in. (20 cm) squares (4).

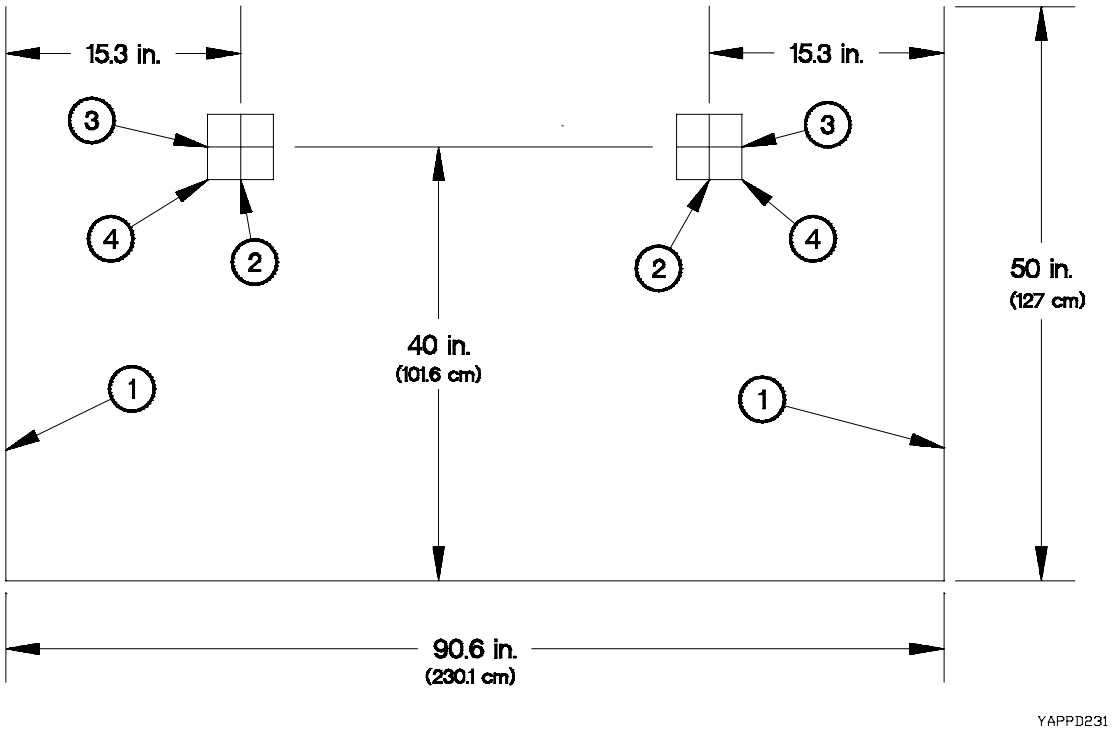


Figure D-23. Headlight Adjustment Screen

D-11. LEFT FRONT LEAF SPRING U-BOLT SOCKET

Use a 6-point 1-1/16 inch or 27 mm 3/4 inch drive impact socket. Grind down wrenching end to a maximum OD of 1.5 inches (38.3 mm) to fit rear inboard U-bolt nut on left front leaf spring. No modification is required if a 6-point, thin wall, deep 27mm impact socket can be obtained.

D-12. MACHINE GUN RING DRILL STOP

Make the Machine Gun Ring Drill Stop from round aluminum stock and setscrew according to the following instructions. Refer to the parts list and figure for details.

Item	Part Number	Material Description	Size	Qty
1	N/A	Rod, aluminum	0.75 in. OD (1.9 cm) X 0.25 in. (0.63 cm) long	1
2	5305-00-404-8272	Setscrew	0.164 in. OD (0.41 cm) x 0.125 in. length (0.32 cm) 32 UNC	1

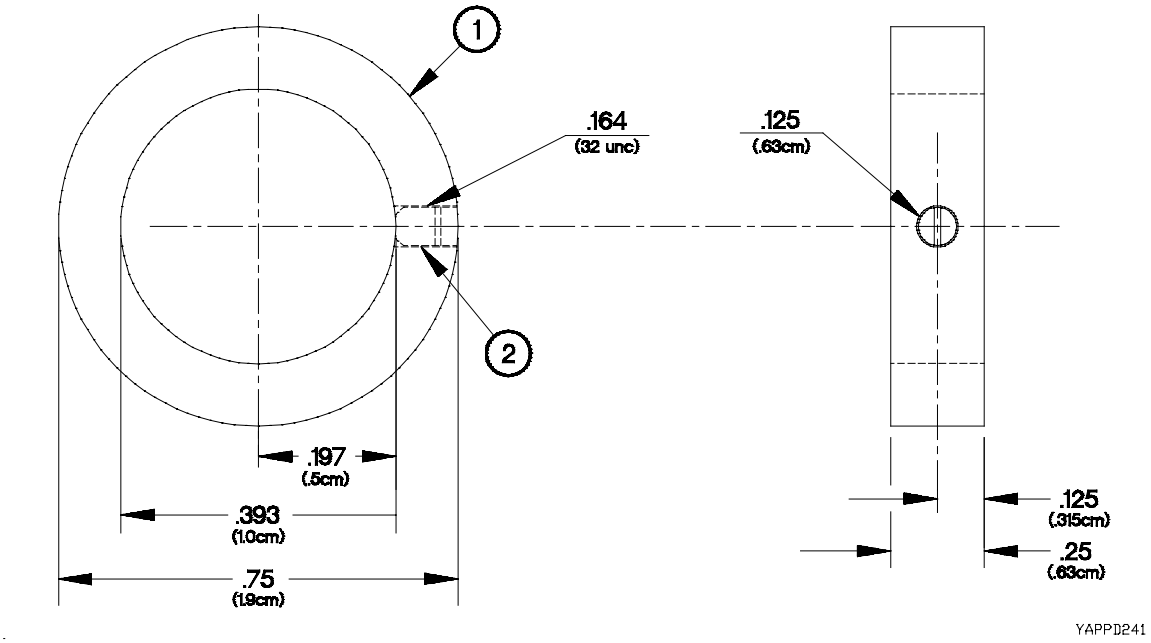


Figure D-24. Machine Gun Ring Drill Stop

a. All dimensions are in inches (centimeters).
b. Drill 0.393 in. (1.0 cm) diameter hole through as shown in **Figure D-24. Machine Gun Ring Drill Stop**.
c. Drill 0.125 in (0.32 cm) diameter hole through for setscrew as shown in **Figure D-24. Machine Gun Ring Drill Stop**.
d. Thread setscrew hole 0.164-32 UNC.
e. De-burr and remove sharp edges.
f. Insert setscrew (2) into Machine Gun Ring Drill Stop (1).

D-13. MACHINE GUN RING WOODEN SUPPORT FABRICATION

Cut from bulk wood stock according to the following information.

a. Fabricate from MIL-STD 736 Group IV untreated bulk wood stock.
b. Cut three (3) lengths of 2 X 4 inch stock 8 inches (20.3 cm) long.
d. Sand and remove sharp edges.

D-14. MAIN VALVE BODY SPRING COMPRESSION TOOL

Make the main valve body spring compression tool from steel pipe according to the following instructions. Refer to the parts list and figure for details.

Material Description	Size	Qty
Pipe, Steel, 1/2 inch ID	1/2 in. (1.27 cm) ID X 1.50 in. (3.8 cm)	1

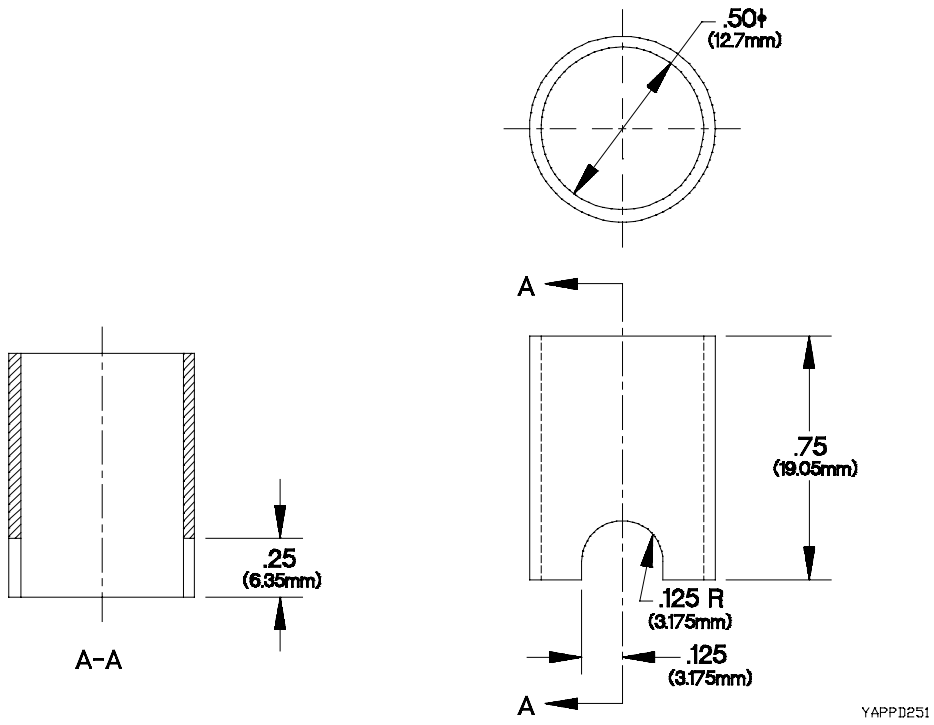


Figure D-25. Main Valve Body Spring Compression Tool

a. All dimensions are in inches (millimeters).
b. De-burr and remove sharp edges inside and outside compression tool surface.
c. Tolerance:
   1 place +/- .06
   2 place +/- .03
   3 place +/- .005
   angles +/- 2° unless otherwise specified.
h. Surface texture: 125 $\sqrt{}$ unless otherwise specified.

D-15. MARKING SLEEVE FABRICATION

Fabricate marking sleeves according to the following information.

a. Cut from bulk sleeve material 12414663 FP-301-12.7, 2 inches (5.2 cm).
b. All dimensions are in inches (centimeters).
c. Identify by applying the following applicable numbers to the sleeve according to MIL-STD 130.

CAGE CODE PART NUMBER

D-16. M1089 30K WINCH TEST ADAPTER

Assemble the M1089 30K winch test adapter according to the following steps. Refer to the following parts list and **Figure D-26. M1089 30K Winch Test Adapter** for details.

Part Number	Material Description	National Stock Number	Qty
4-4-4 100401BA	Tee, Tube	4730-01-095-3430	1
4-6 100102BA	Adapter, Straight, Pipe to Tube	4730-01-096-9398	1
207P-4	Coupling, Pipe	4730-00-881-1161	1
NB-4-035	Tubing, Nonmetallic	4720-01-071-4042	4 in.
MIL-T-27730	Tape, Antiseizing	8030-00-889-3534	1 roll

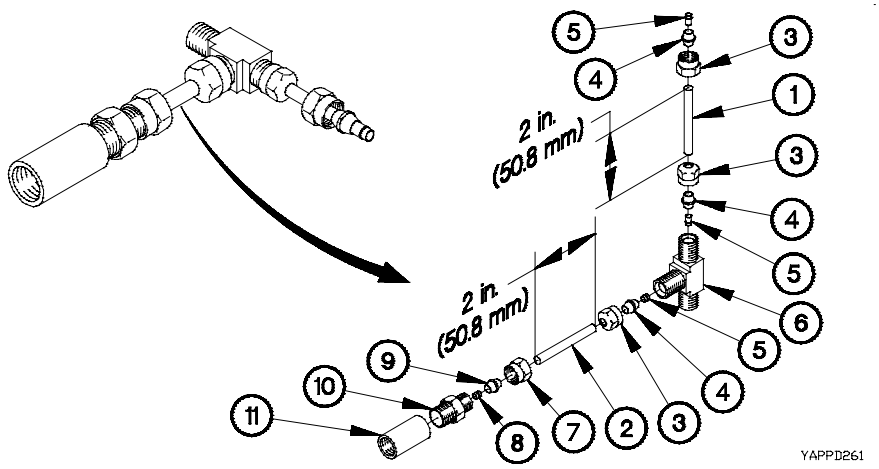


Figure D-26. M1089 30K Winch Test Adapter

a. All dimensions are in inches (millimeters).
b. Cut two pieces of nonmetallic tubing (1 and 2) to 2.0 in. (50.8 mm) long.
c. Remove three nuts (3), sleeves (4), and ferrules (5) from tube tee (6).
d. Install two nuts (3), sleeves (4), and ferrules (5) on nonmetallic tubing (1).
e. Install nonmetallic tubing (1) on tube tee (6).
f. Remove nut (7), sleeve (8), and ferrule (9) from straight adapter (10).
g. Install two nuts (3 and 7), sleeves (4 and 8), and ferrules (5 and 9) on nonmetallic tubing (2).
h. Install nonmetallic tubing (2) on tube tee (6).
i. Install nut (9) on straight adapter (10).
j. Apply one wrap of antiseizing tape to threads of straight adapter (10).
k. Install pipe coupling (11) on straight adapter (10).

D-17. M1089 SOLENOID TEST ADAPTER

Assemble the M1089 solenoid test adapter according to the following steps. Refer to the following parts list and **Figure D-27. M1089 Solenoid Test Adapter** for details.

Part Number	Material Description	National Stock Number	Qty
2-2-2 080401CA	Tee, Tube	4730-01-214-6990	1
2-2 080202CA	Elbow, Pipe to Tube	4730-00-845-5345	1
4-2 130140B	Bushing, Pipe	4730-00-828-0171	1
NB-2-031	Tubing, Nonmetallic	4720-01-287-4499	24 in.

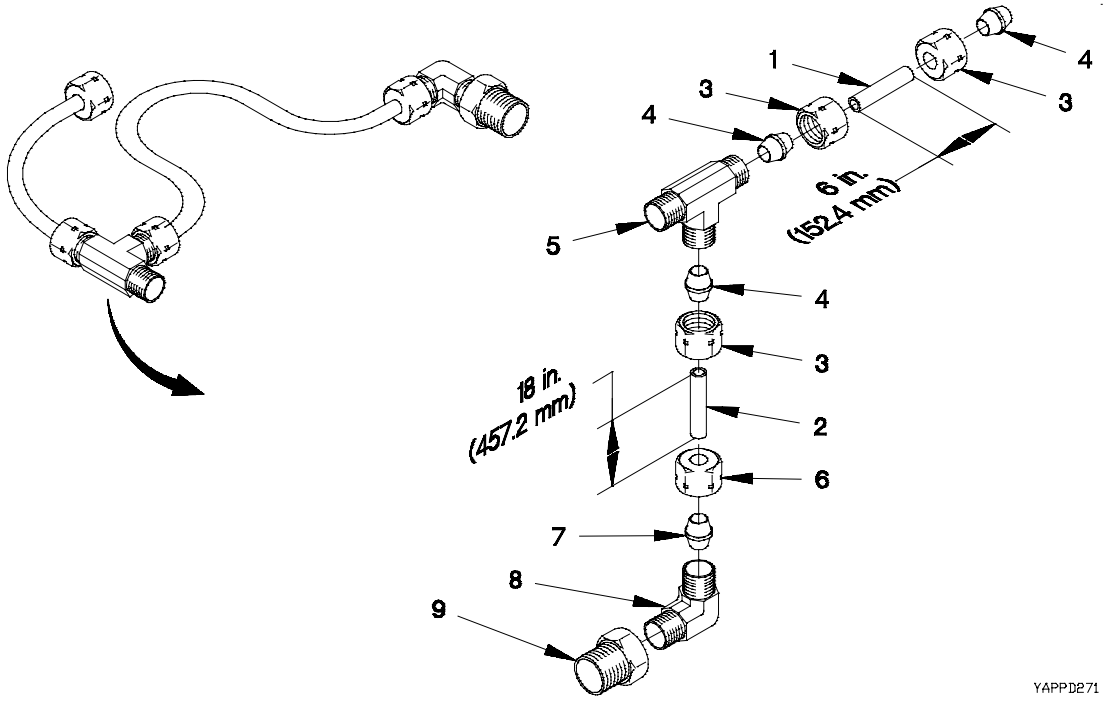


Figure D-27. M1089 Solenoid Test Adapter

a. All dimensions are in inches (millimeters).
b. Cut one piece of nonmetallic tubing (1) to 6.0 in. (152.4 mm) long.
c. Cut one piece of nonmetallic tubing (2) to 18.0 in. (457.2 mm) long.
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

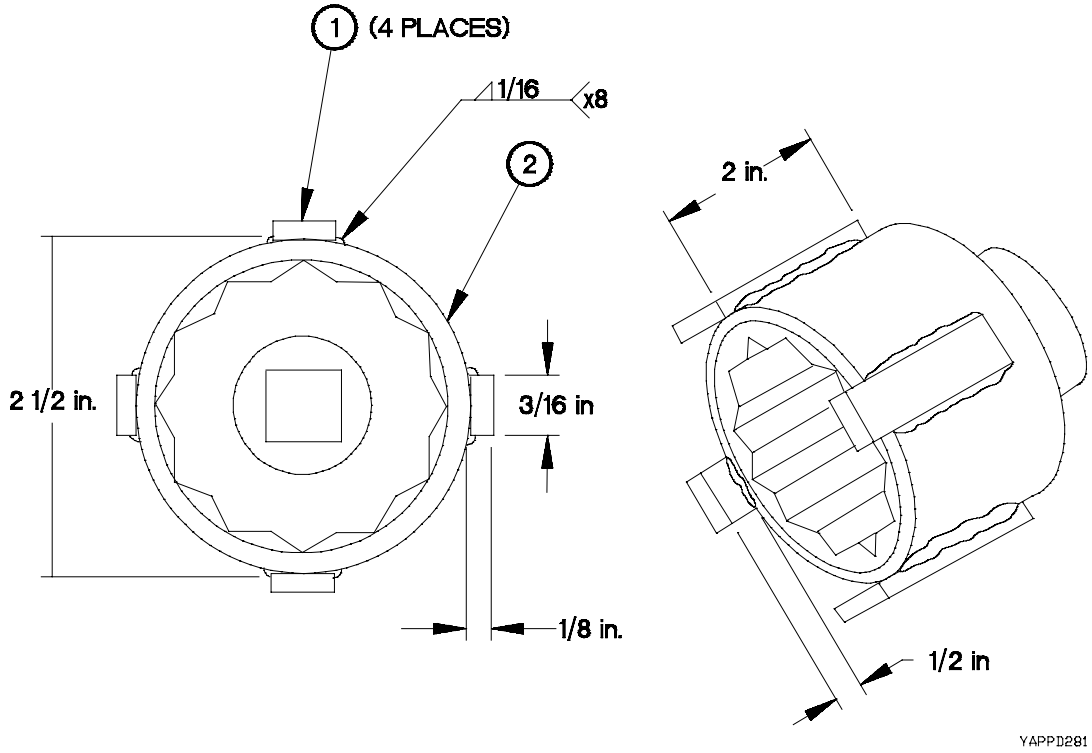


Figure D-28. Spanner Socket Tool

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

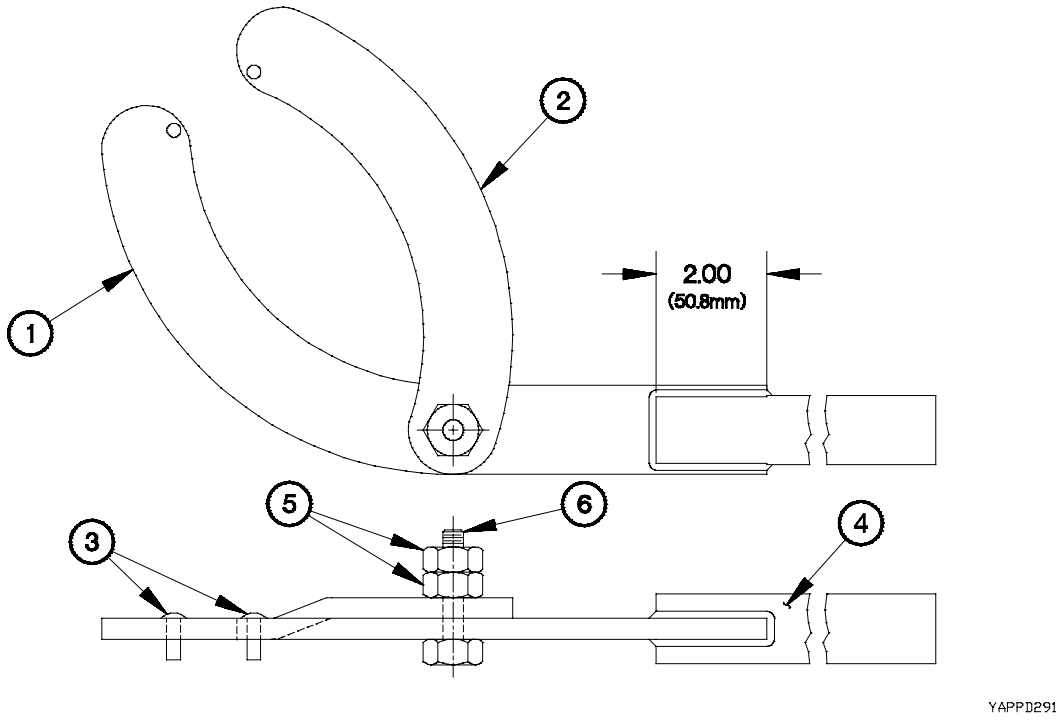


Figure D-29. Spanner Wrench Tool Assembly

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)

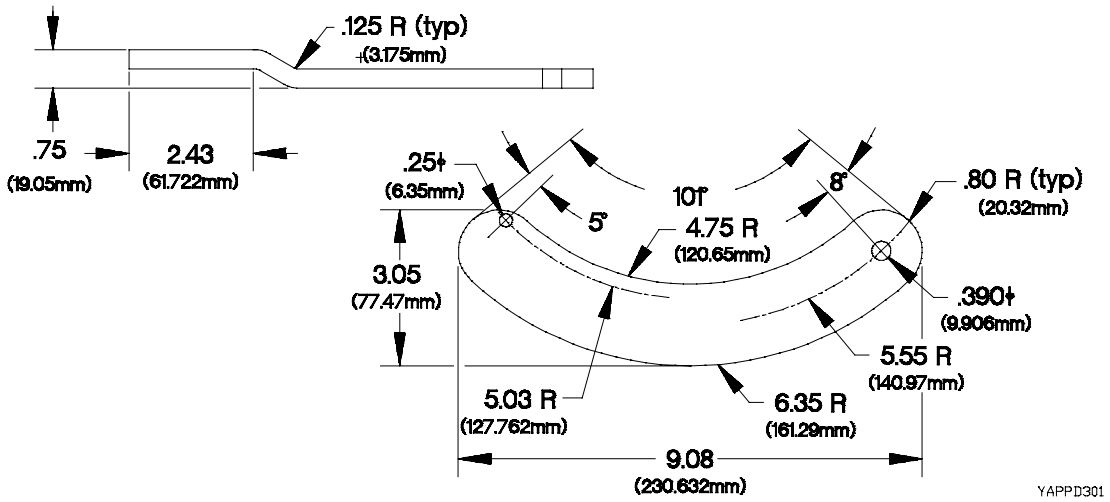


Figure D-30. Spanner Wrench Jaw

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.

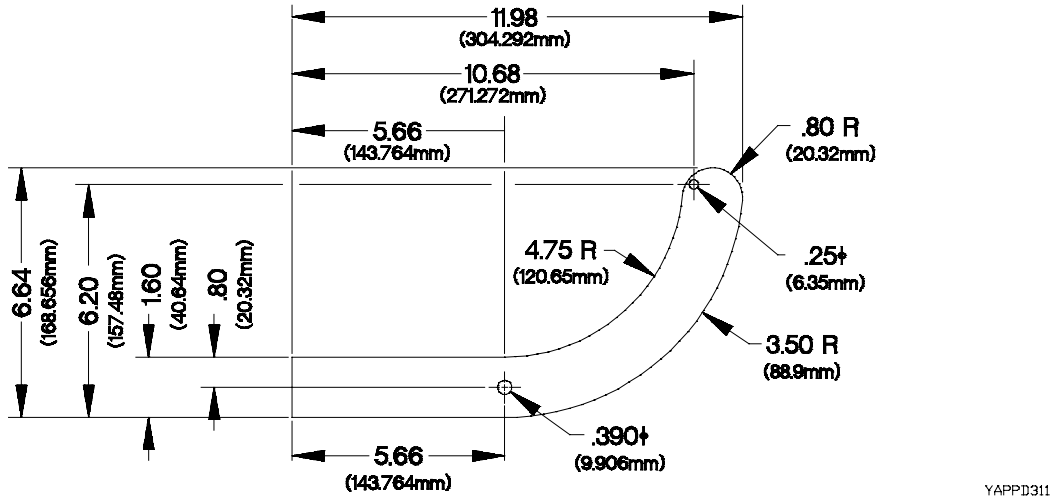


Figure D-31. Spanner Wrench Handle Piece

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

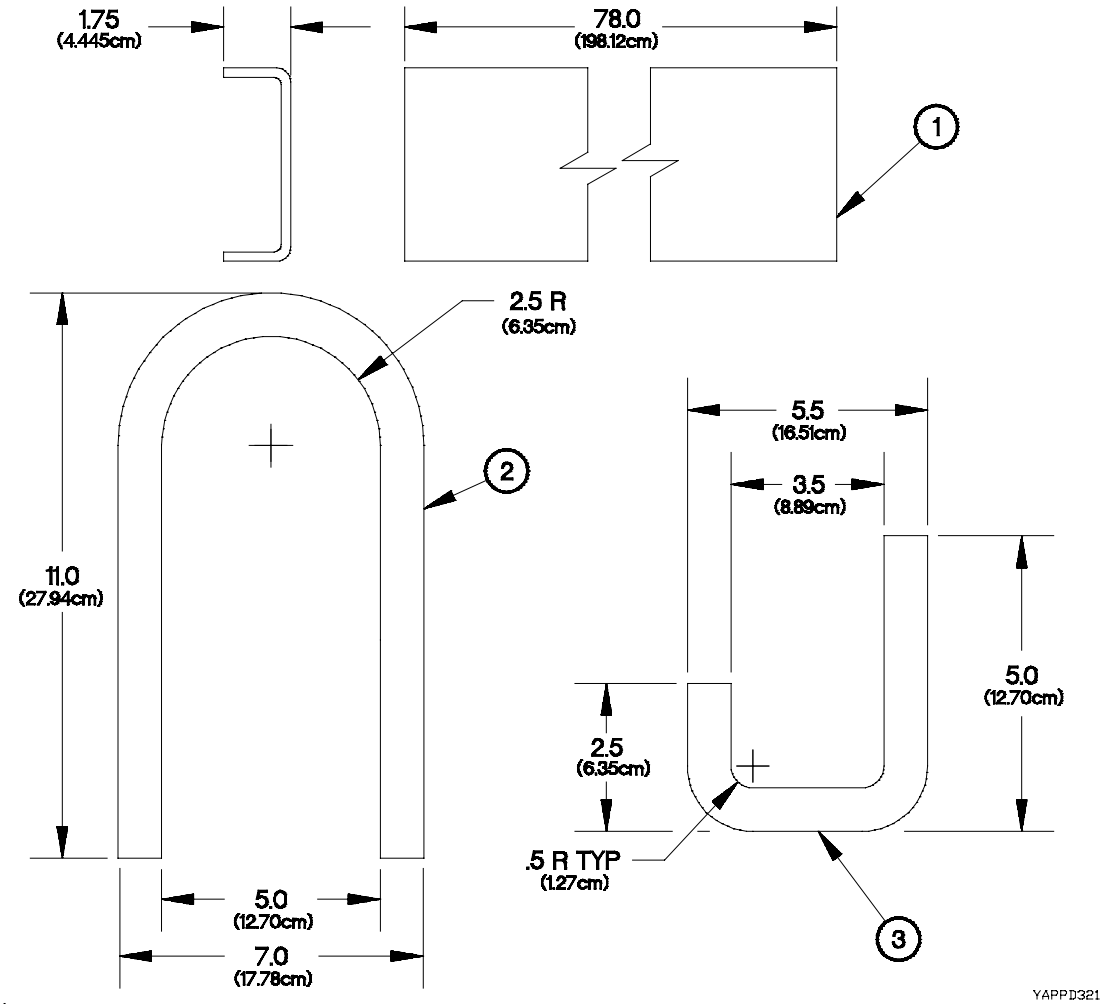


Figure D-32. Spreader Bar Layout

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)

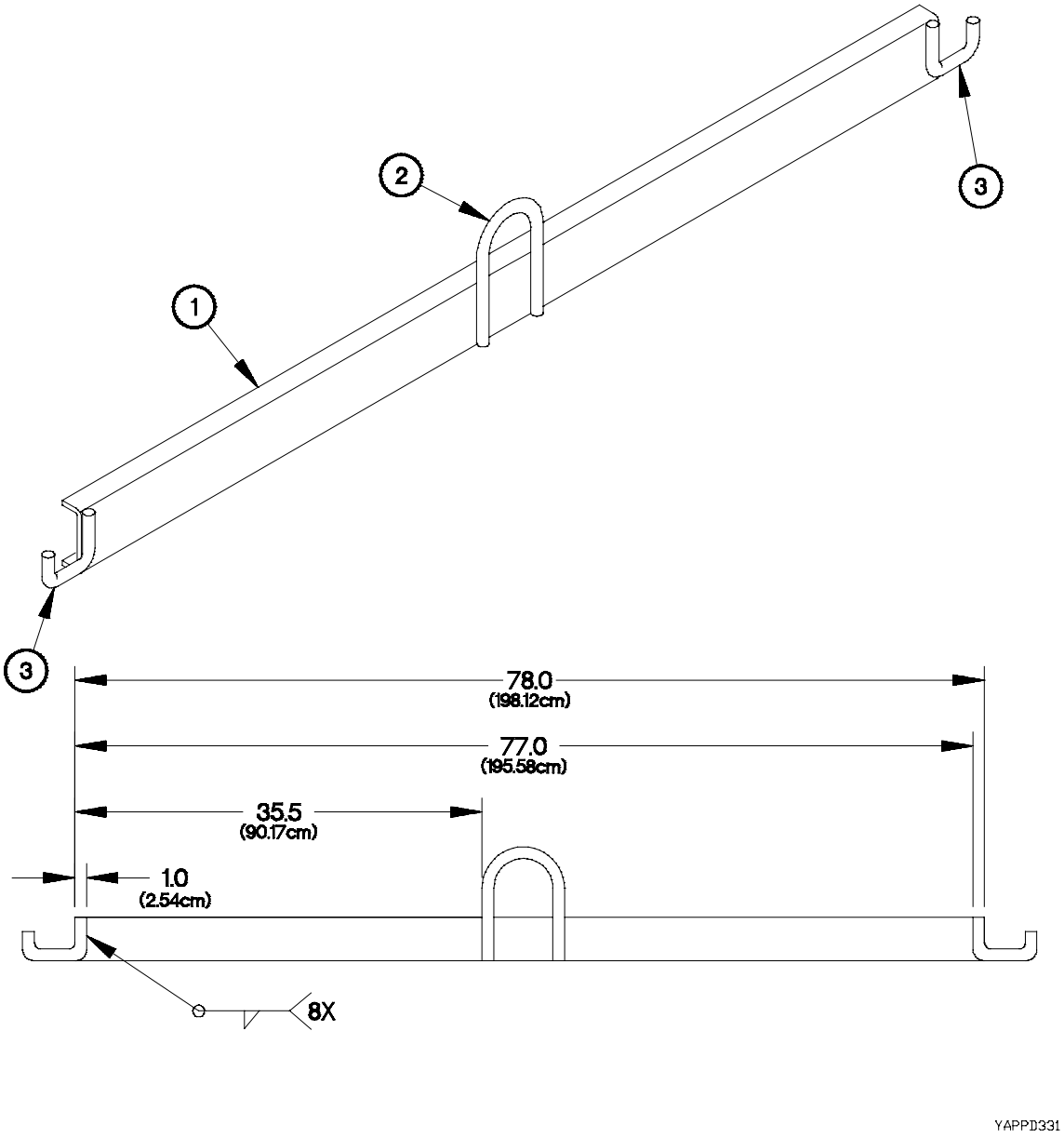


Figure D-33. Spreader Bar Assembly

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

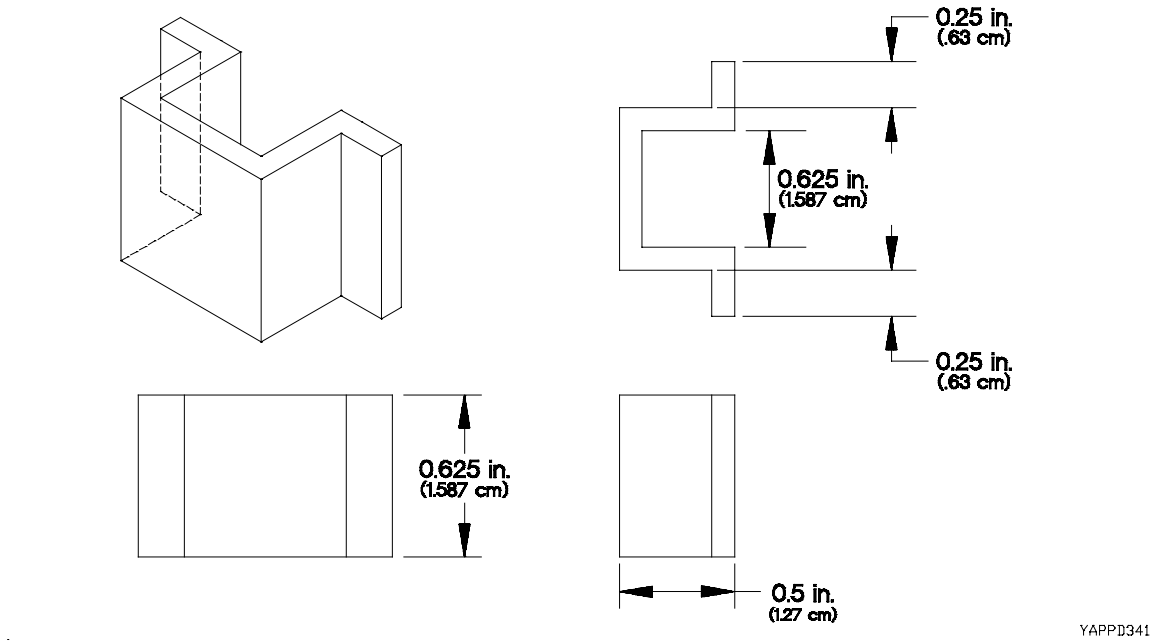


Figure D-34. Steering Stop Shim Gage

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

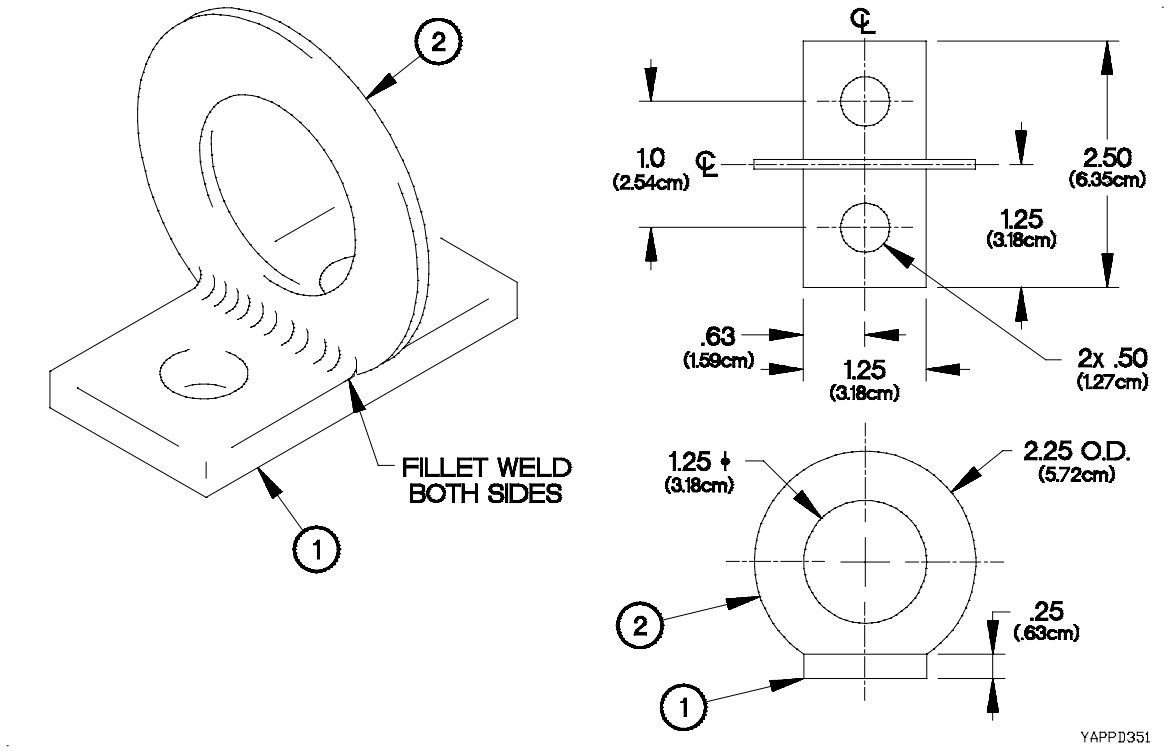


Figure D-35 Swingdrive Assembly Bracket

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

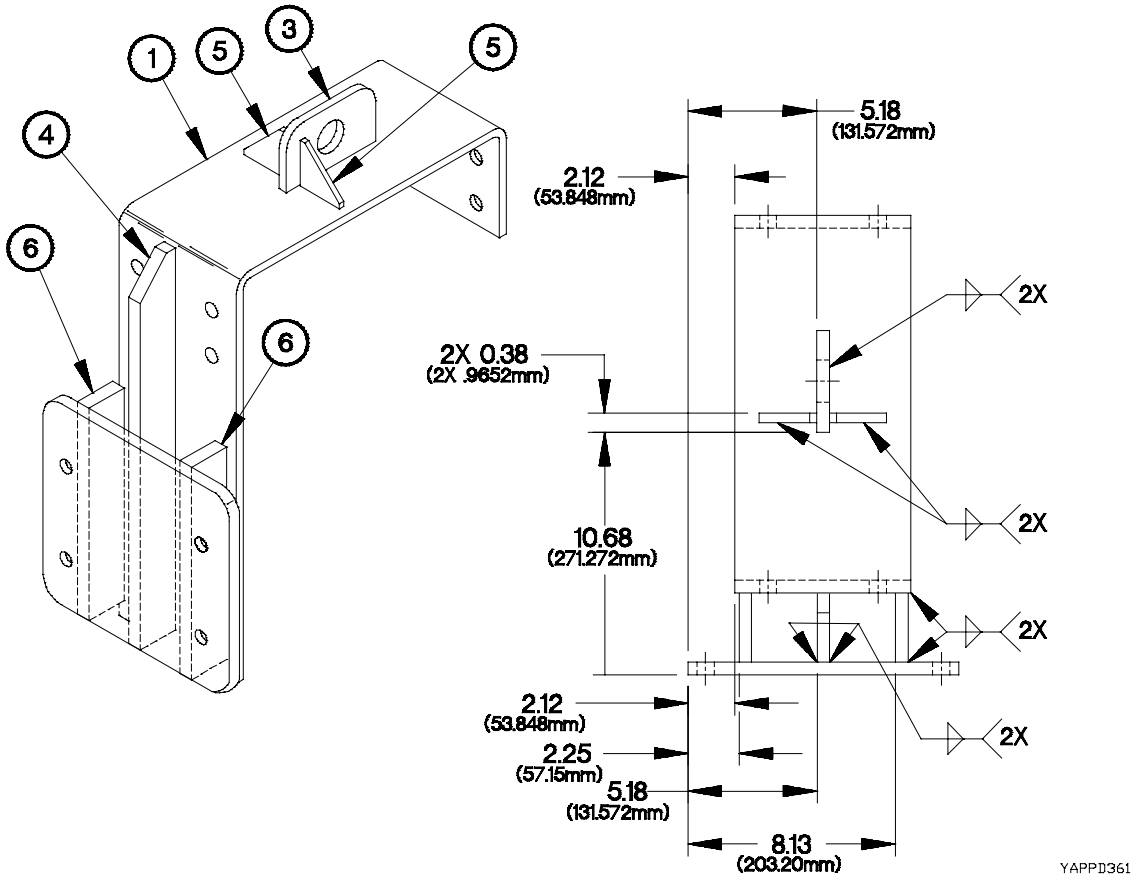


Figure D-36. Transfer Case Lift Bracket Assembly

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

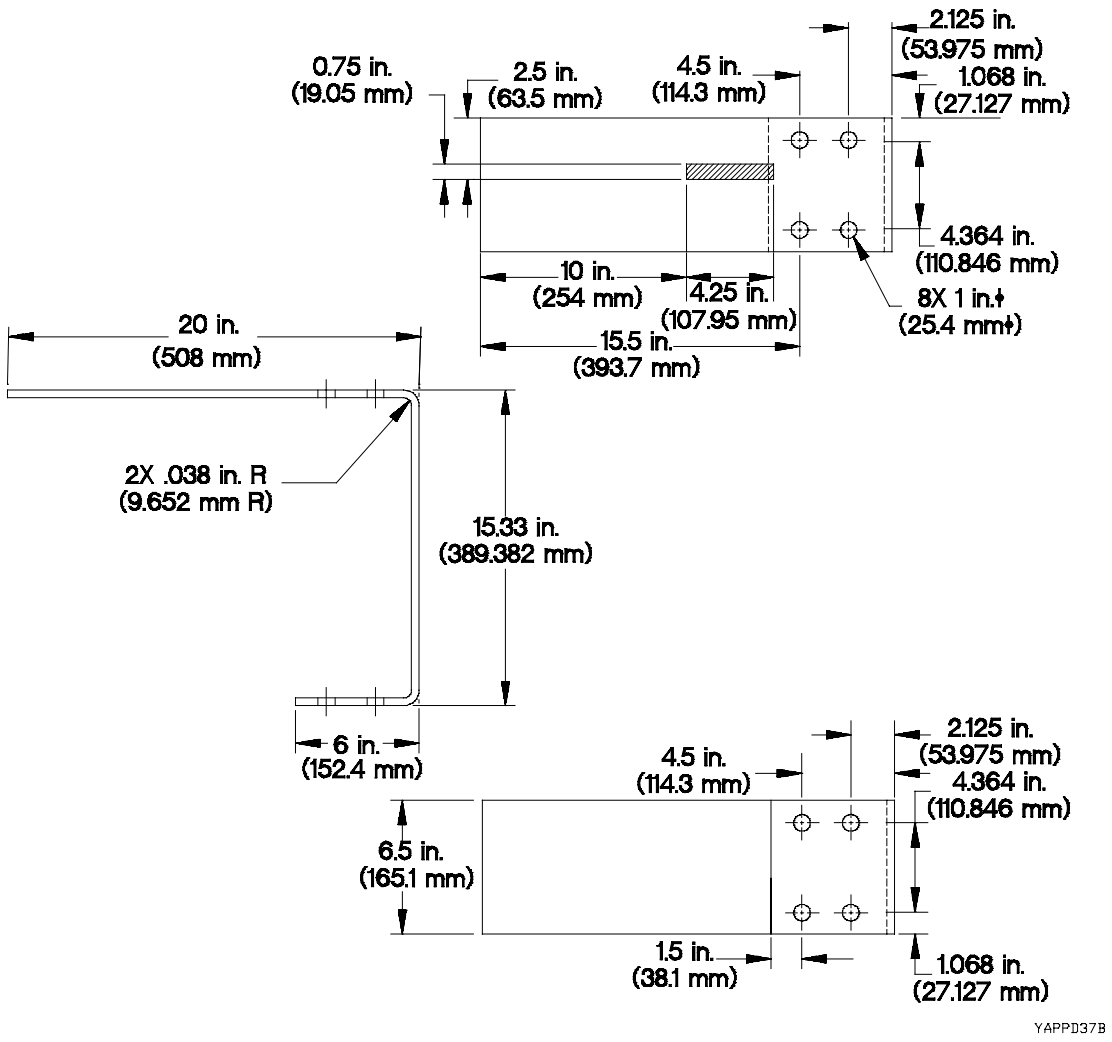


Figure D-37. Transfer Case Lift Bracket Main Mounting Bracket

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

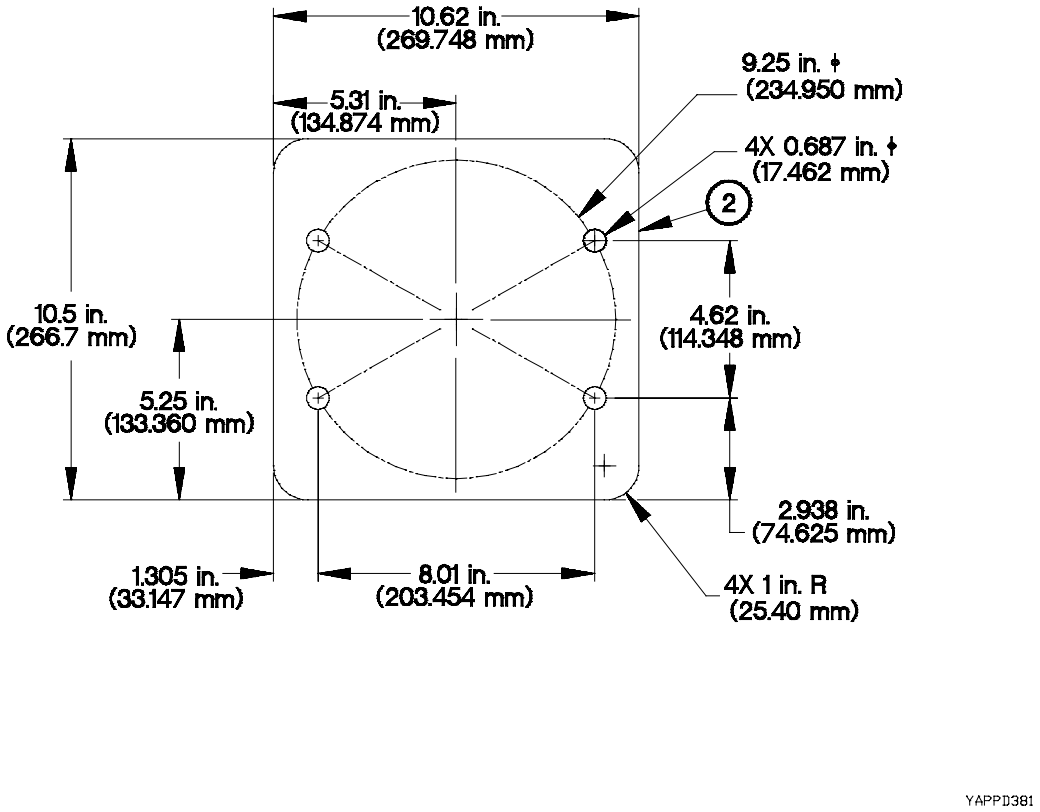


Figure D-38. Transfer Case Lift Bracket Bolt Mounting Bracket

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

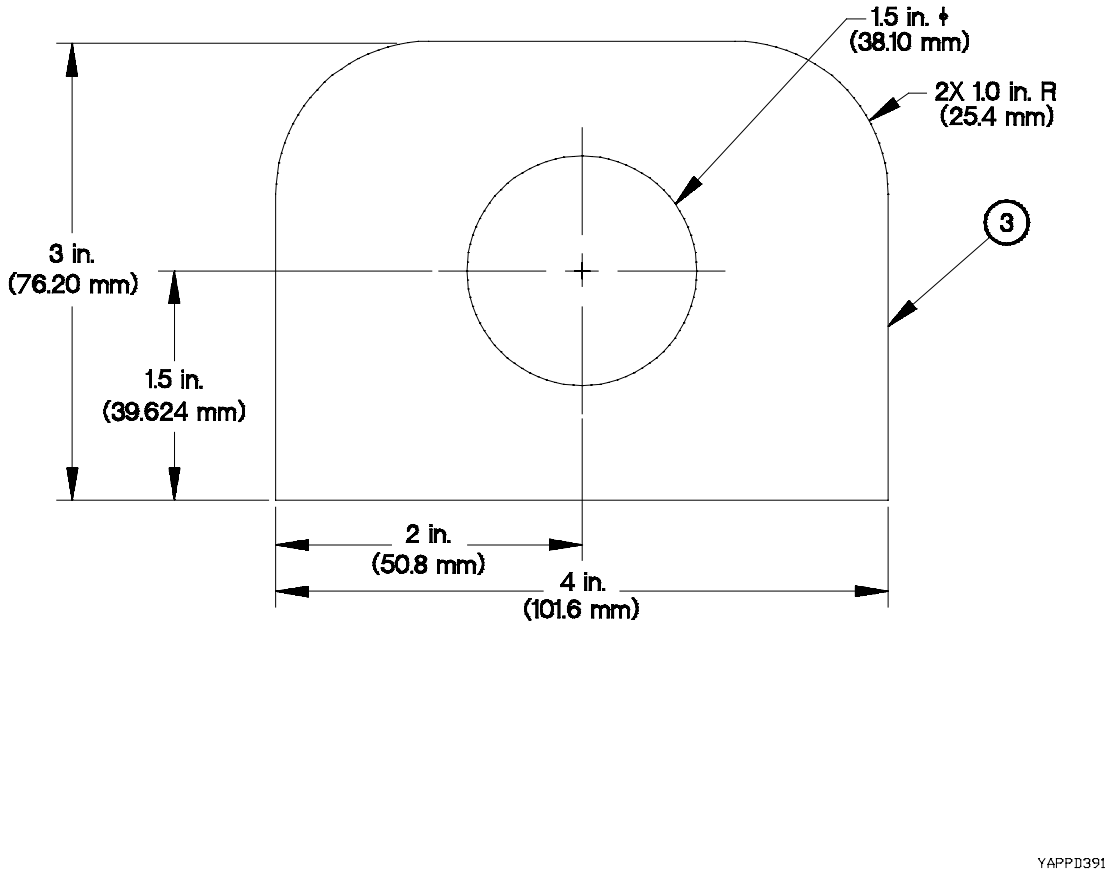


Figure D-39. Transfer Case Lift Bracket Lifting Plate

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

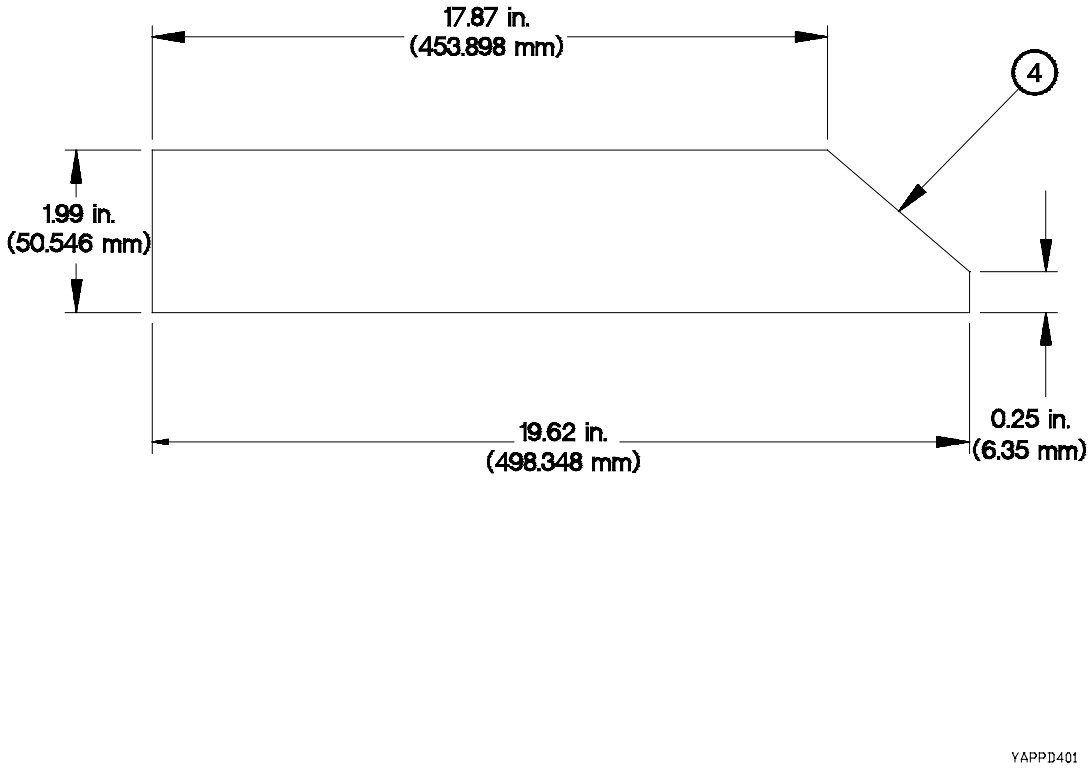


Figure D-40. Transfer Case Lift Bracket Center Support Plate

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

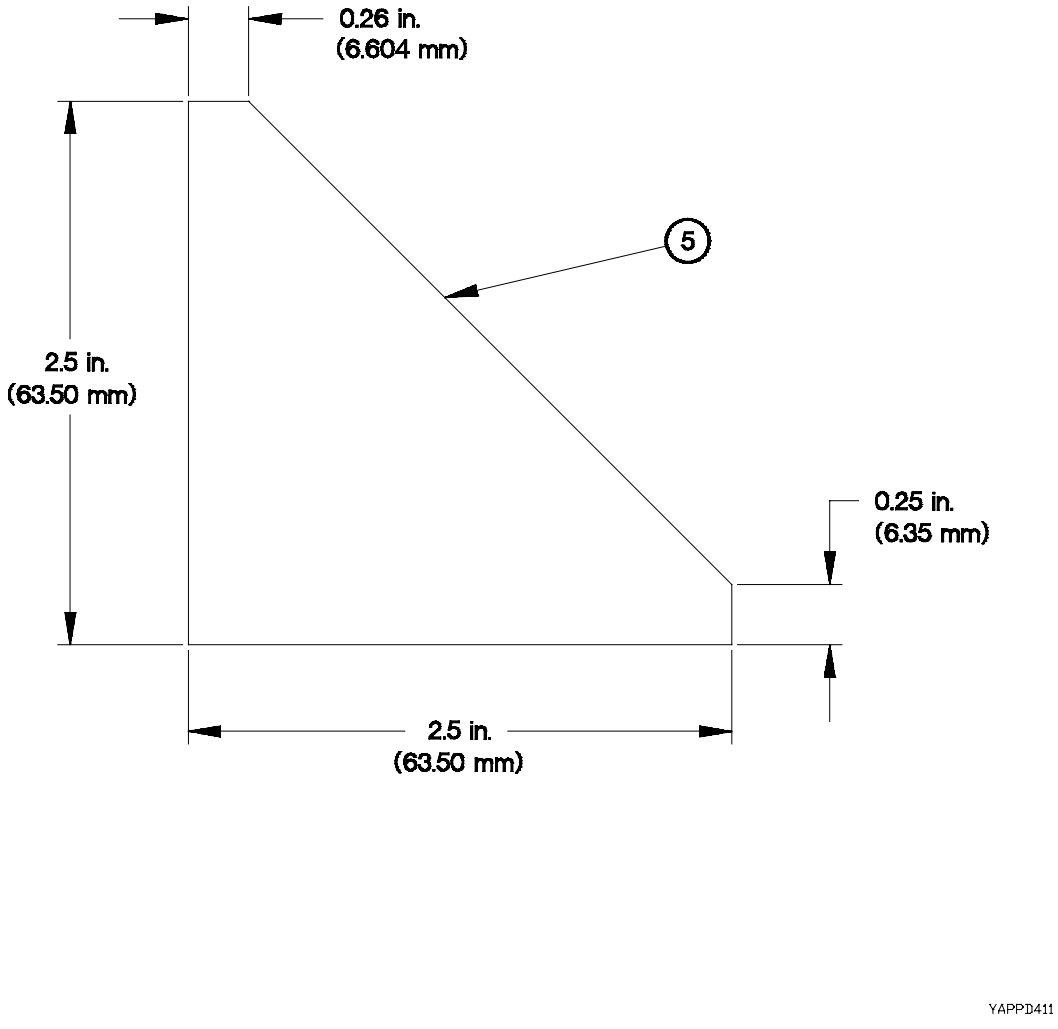


Figure D-41. Transfer Case Lift Bracket Lifting Plate Braces

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

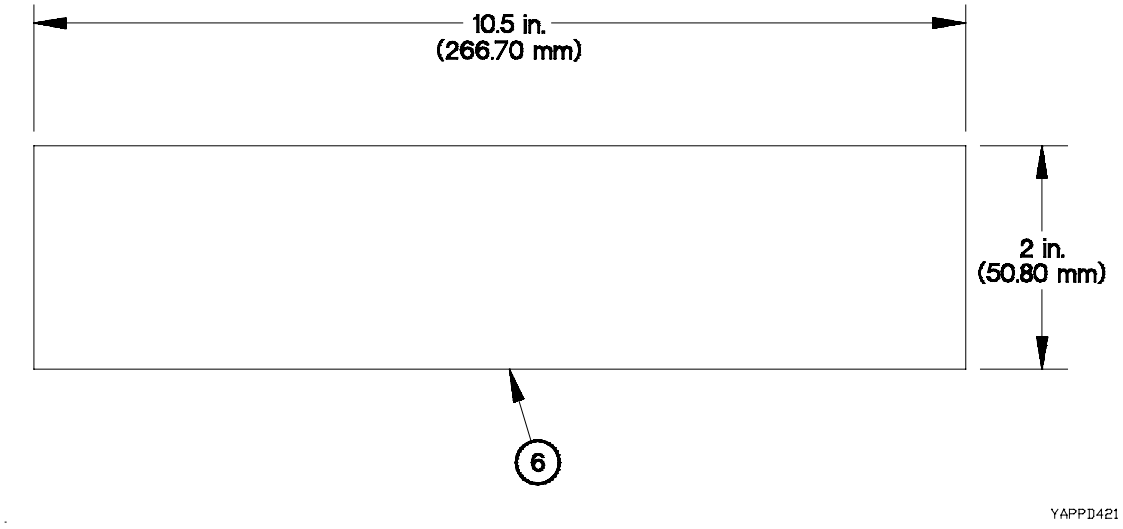


Figure D-42. Transfer Case Lift Bracket Bolt Mounting Bracket Supports

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

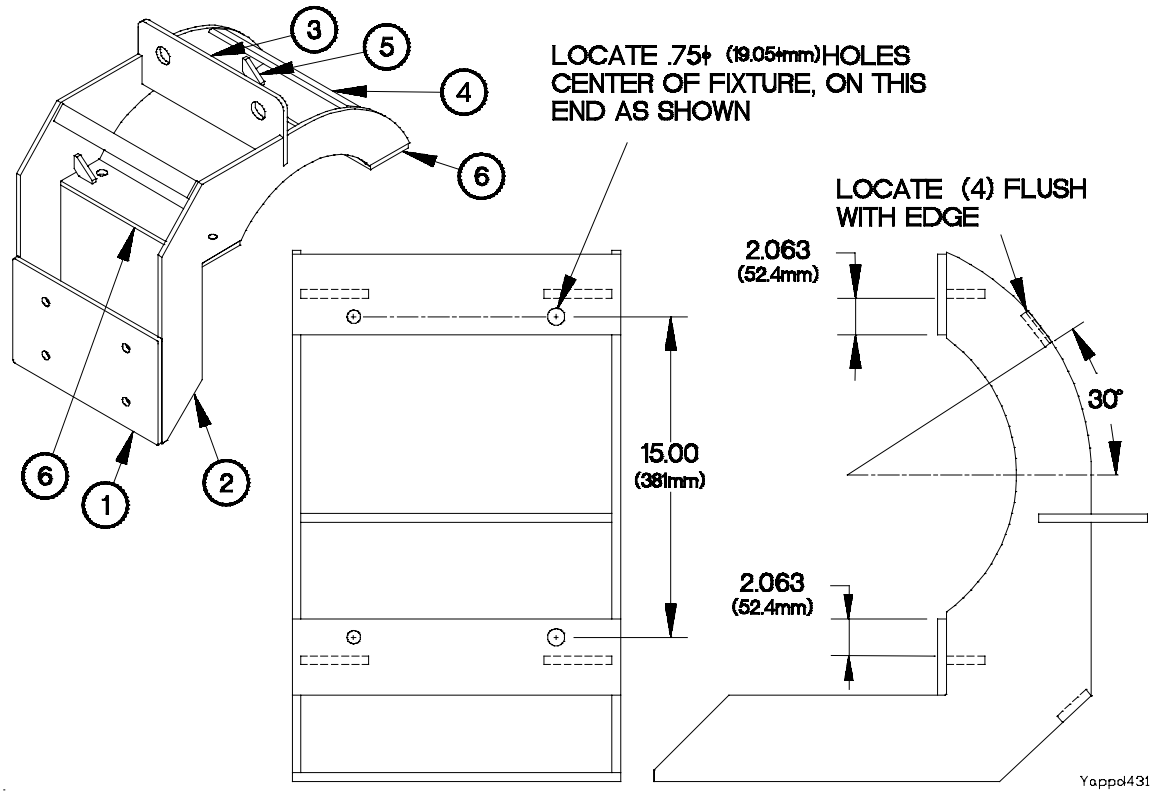


Figure D-43. Transmission Lift and Mounting Bracket Assembly

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

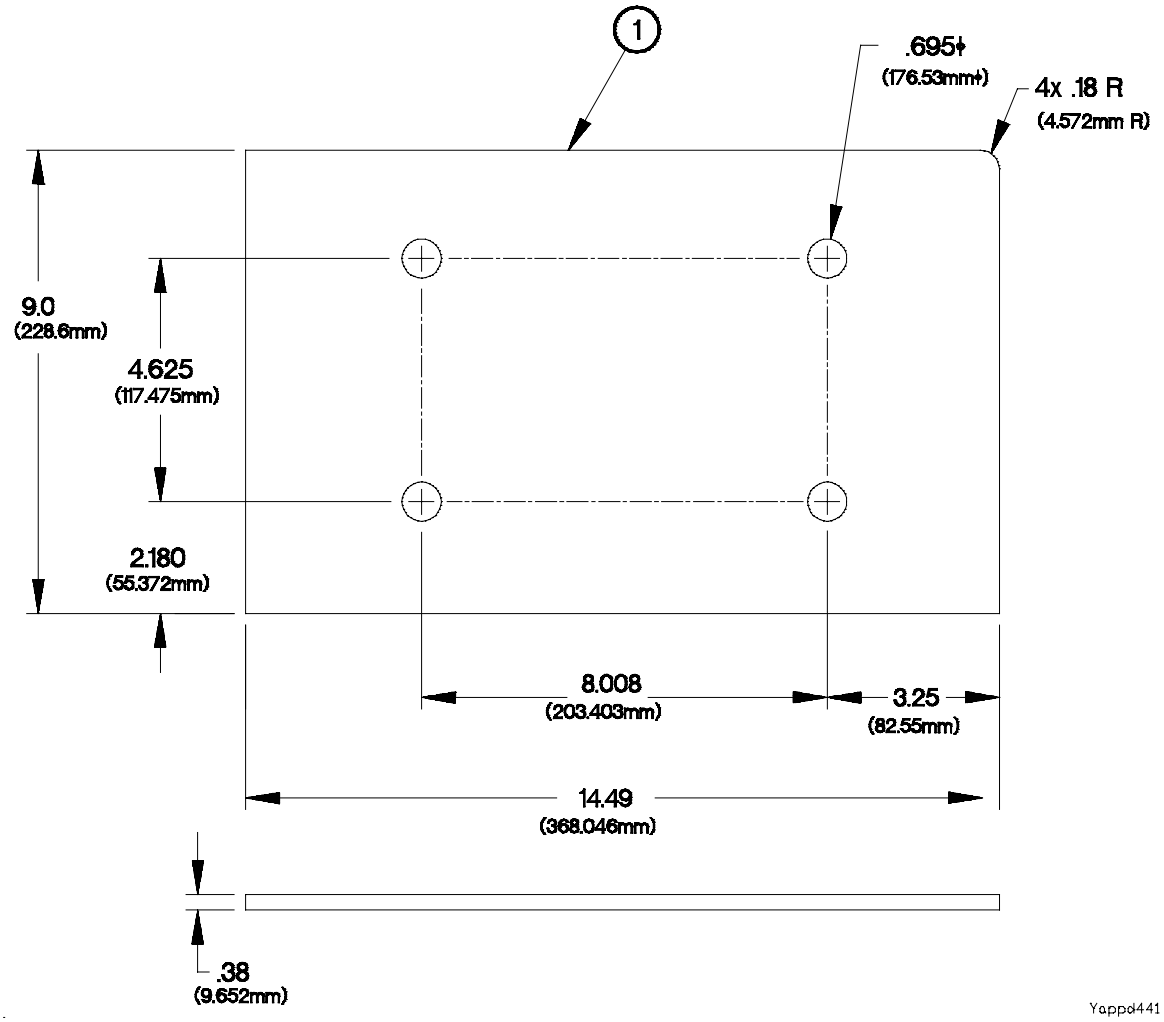


Figure D-44. Transmission Lift and Mounting Bracket Bottom Plate

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

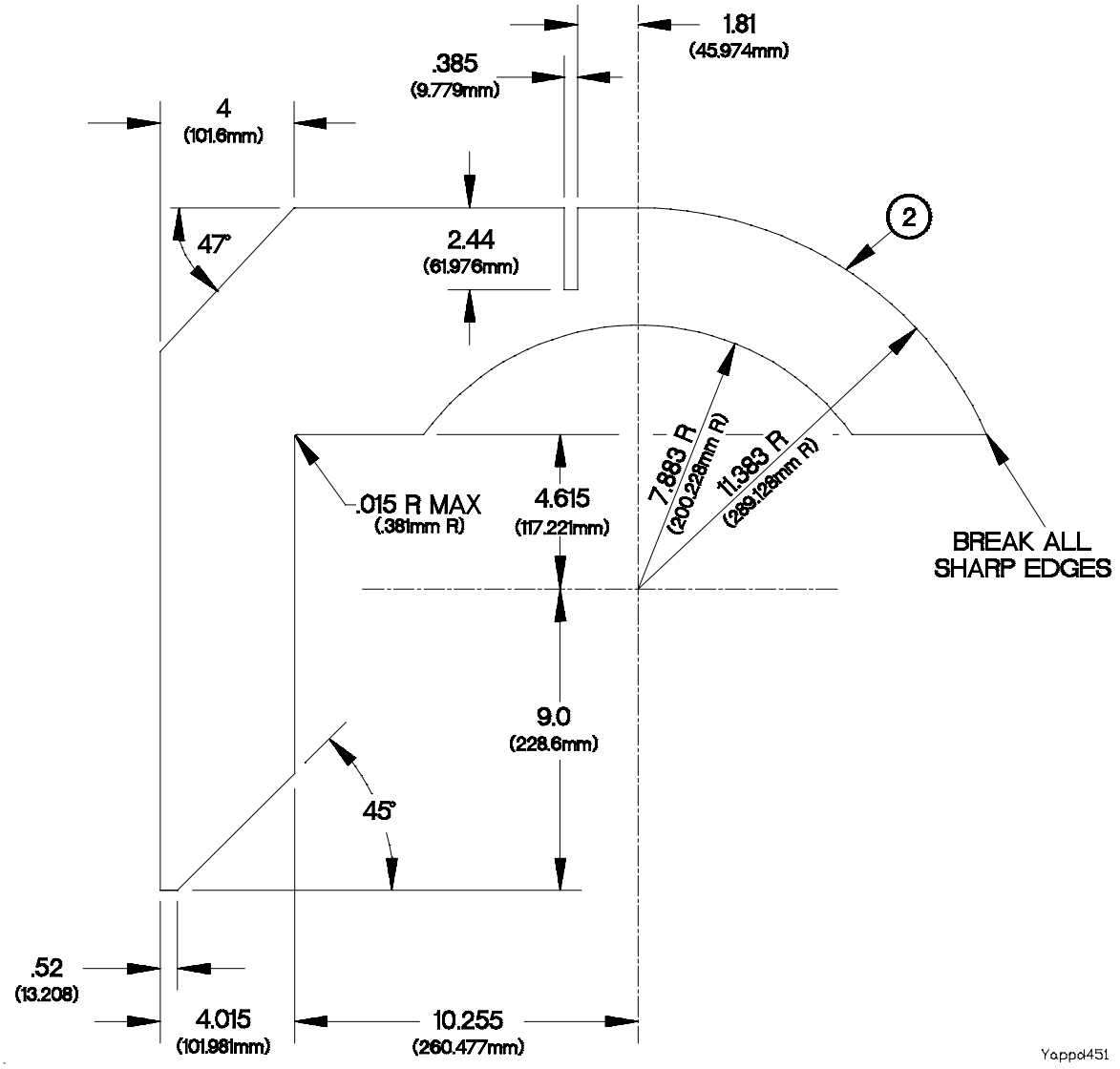


Figure D-45. Tansmission Lift and Mounting Bracket Side Plates

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

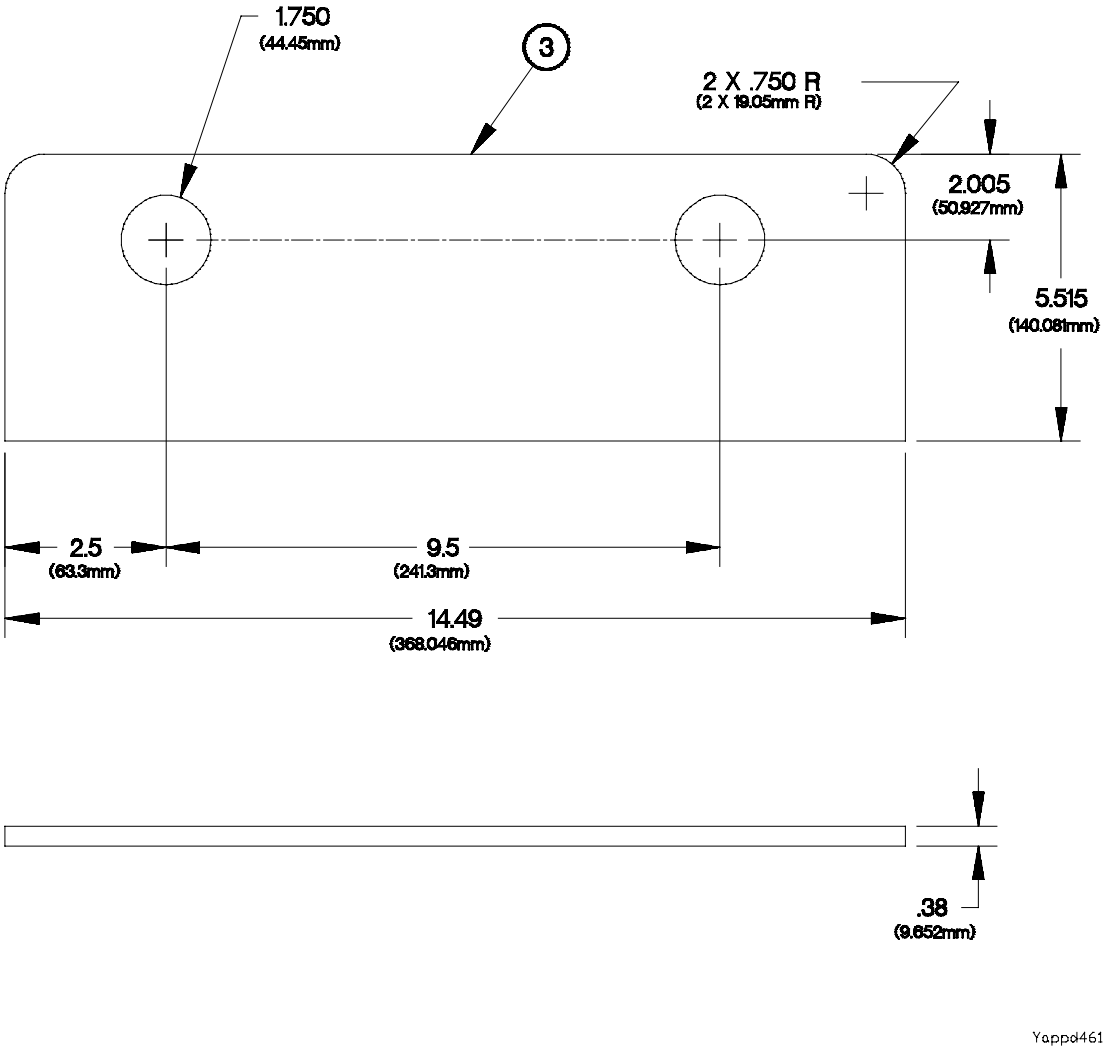


Figure D-46. Transmission Lift and Mounting Bracket Top Plate

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

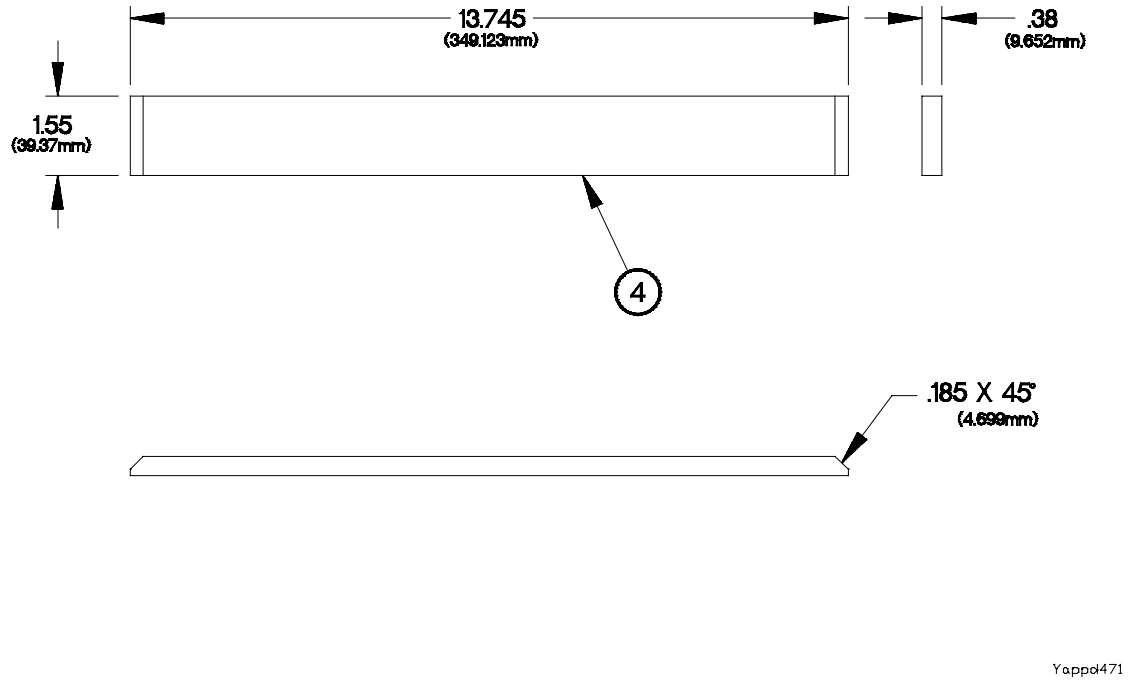


Figure D-47. Tansmission Lift and Mounting Bracket Top and Bottom Braces

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

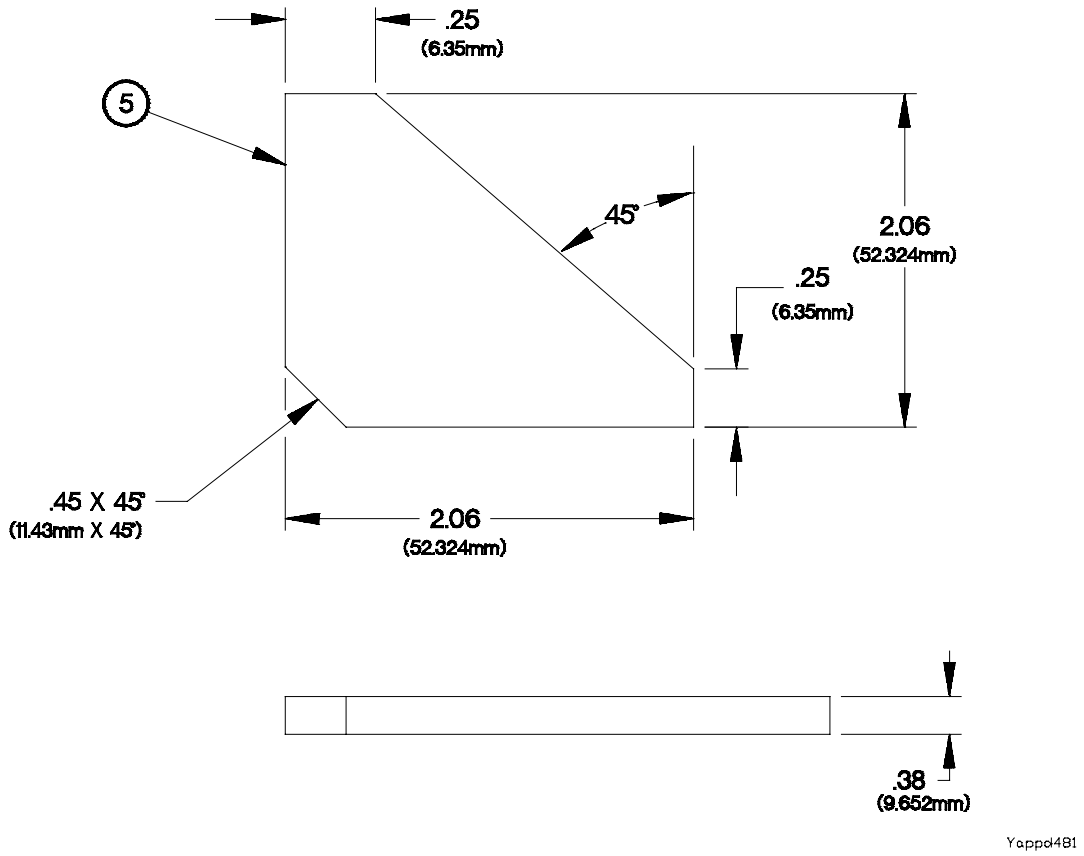


Figure D-48. Transmission Lift and Mounting Bracket Side Supports

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

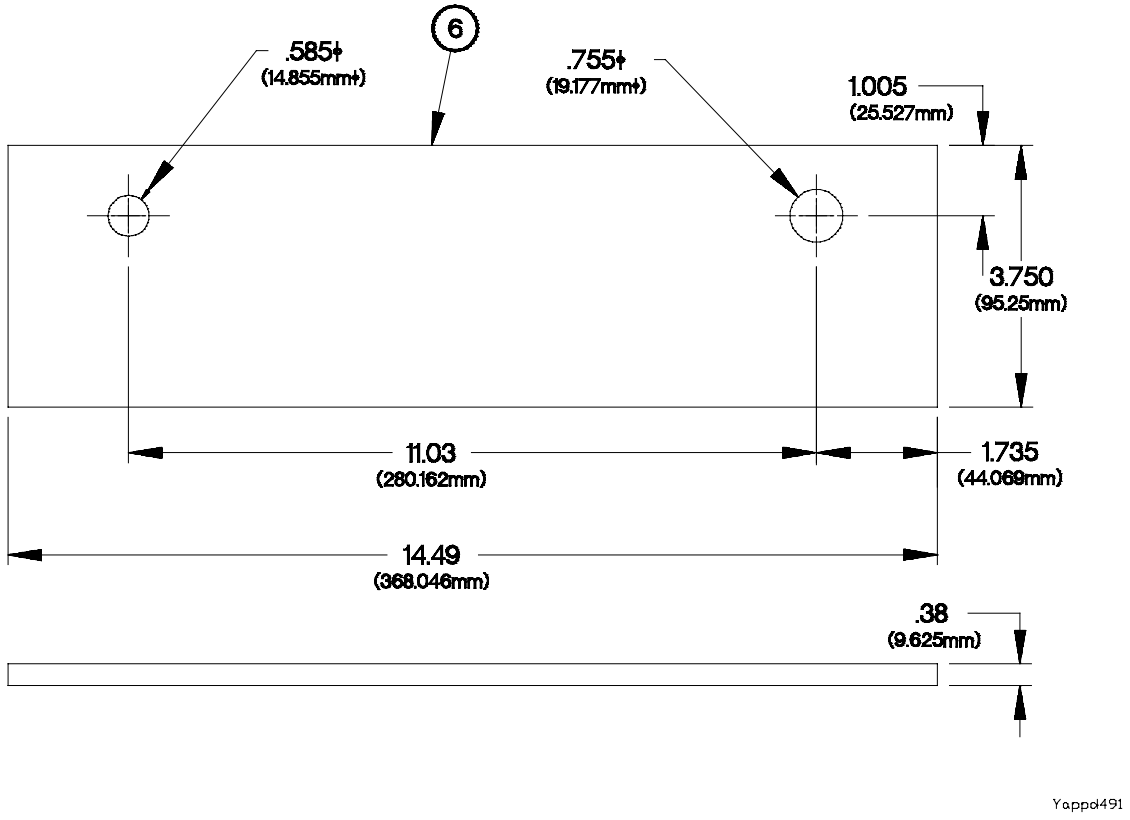


Figure D-49. Transmission Lift and Mounting Bracket Bolt Mounting Plates

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

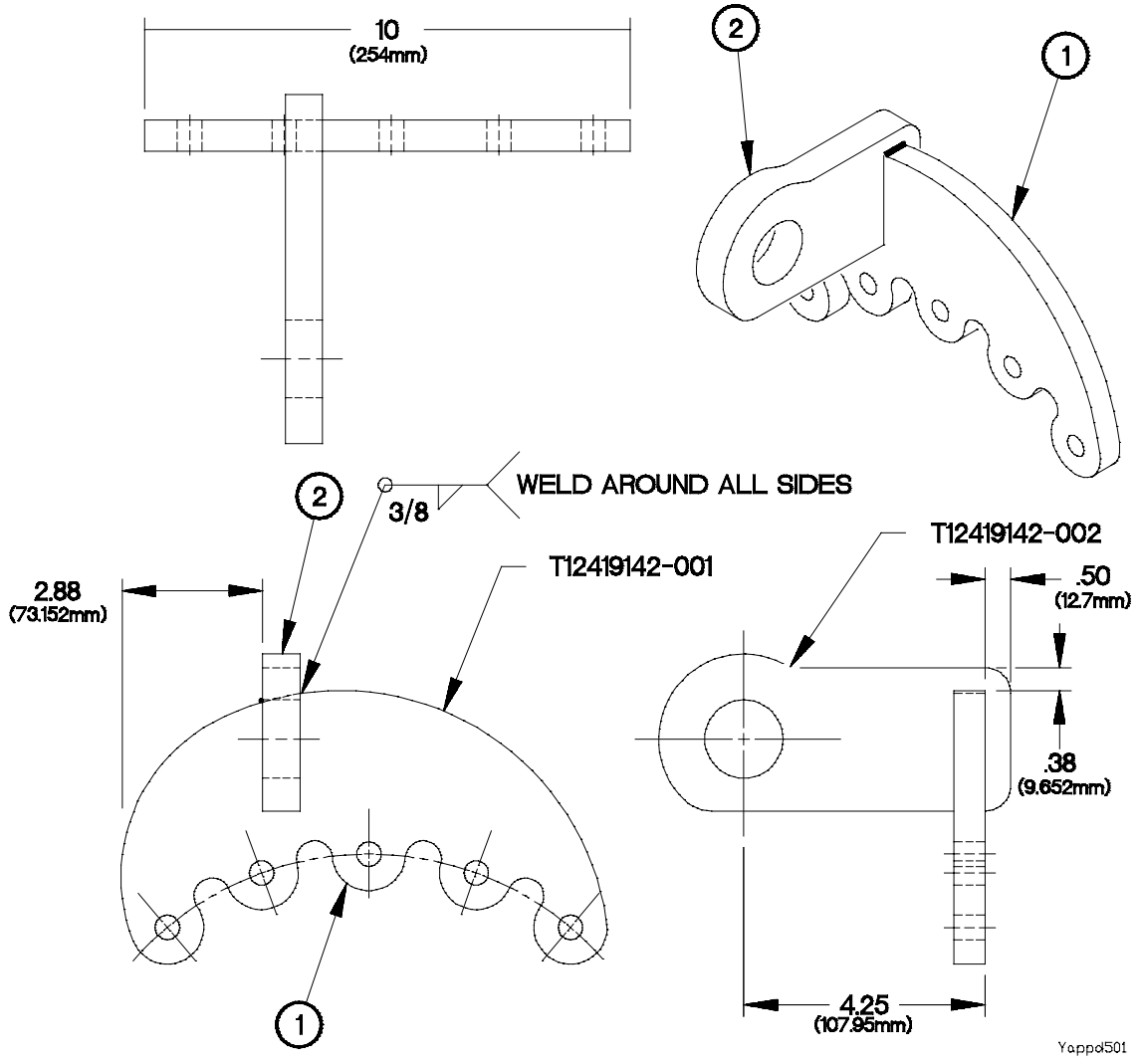


Figure D-50. Transmission Lift Bracket Assembly

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

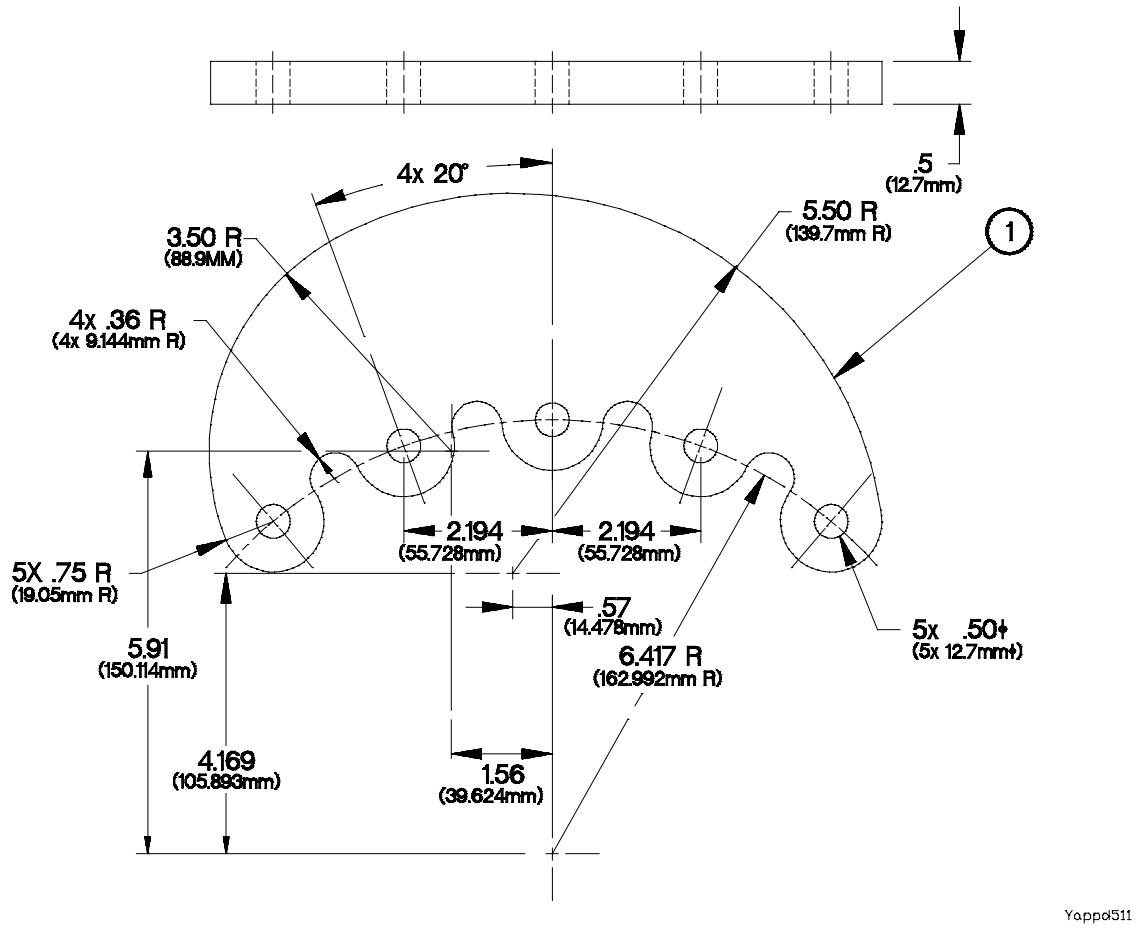


Figure D-51. Lower Lift Bracket

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

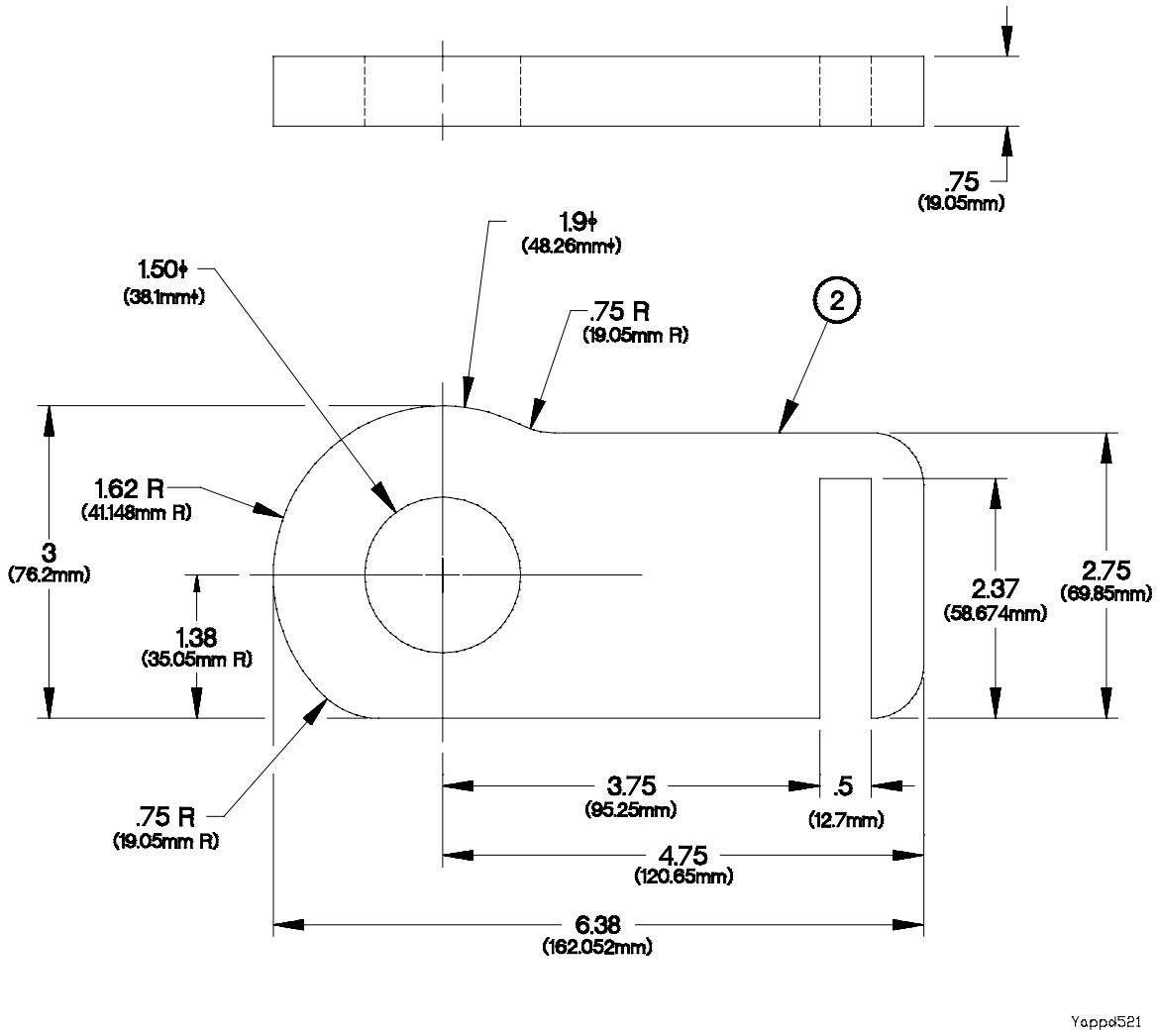


Figure D-52. Upper Lift Bracket

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

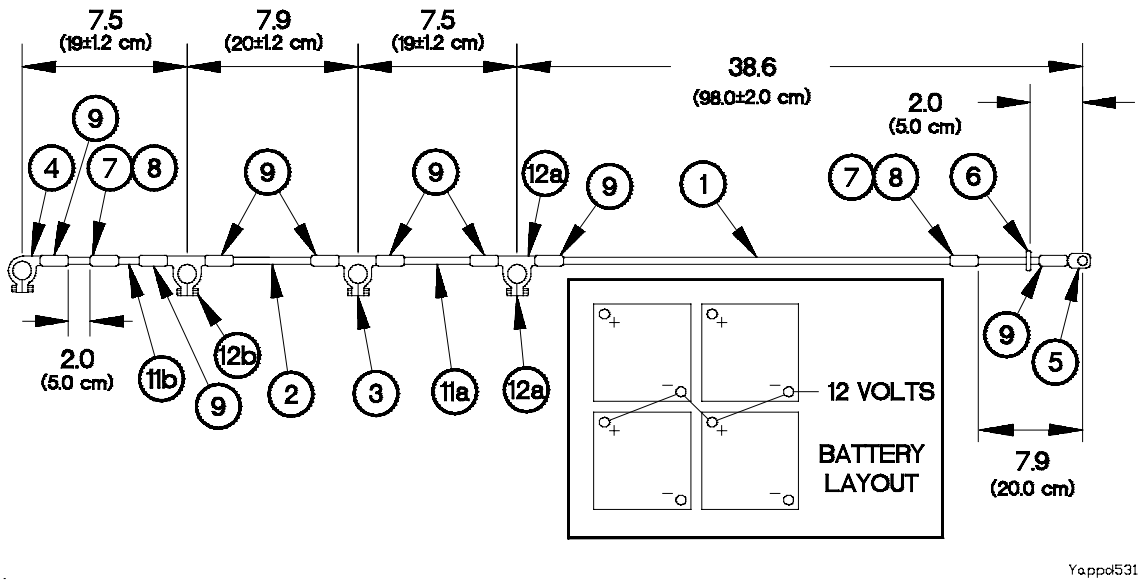


Figure D-53. Battery 12V Cable Assembly

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

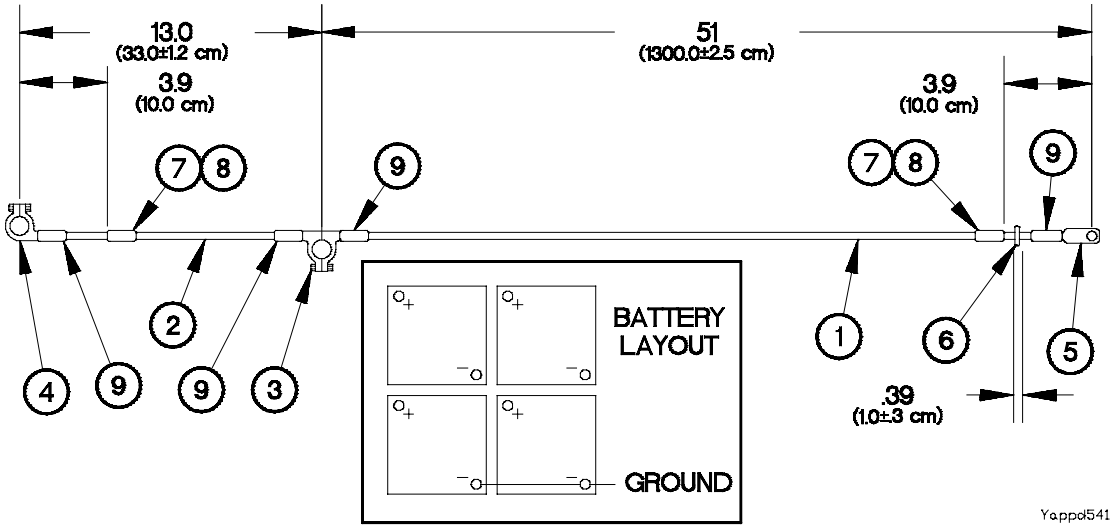


Figure D-54. Battery Ground Cable Assembly

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

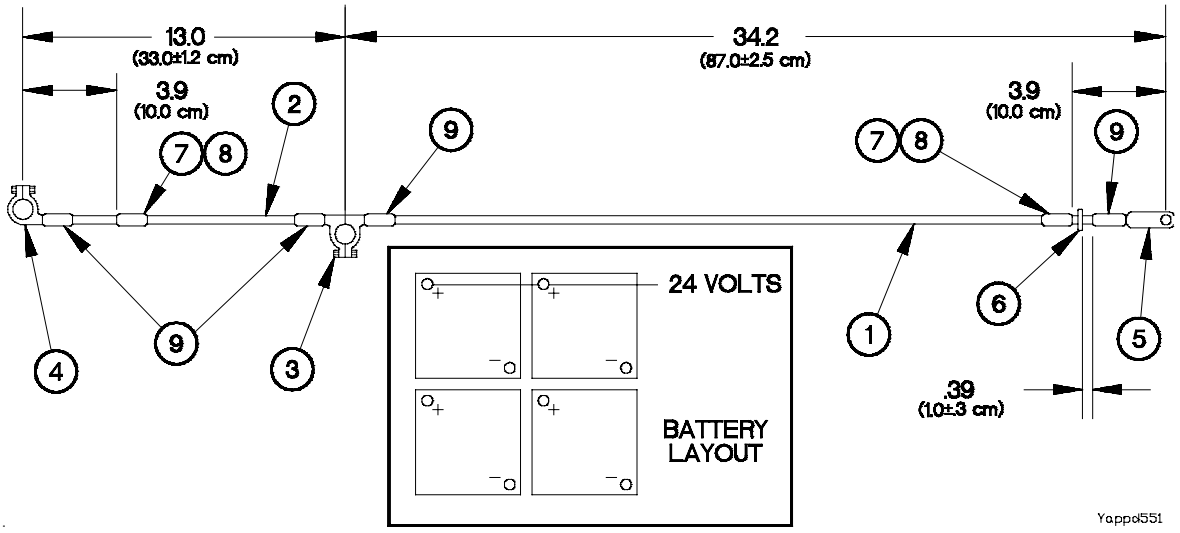


Figure D-55. Battery 24V Cable Assembly

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

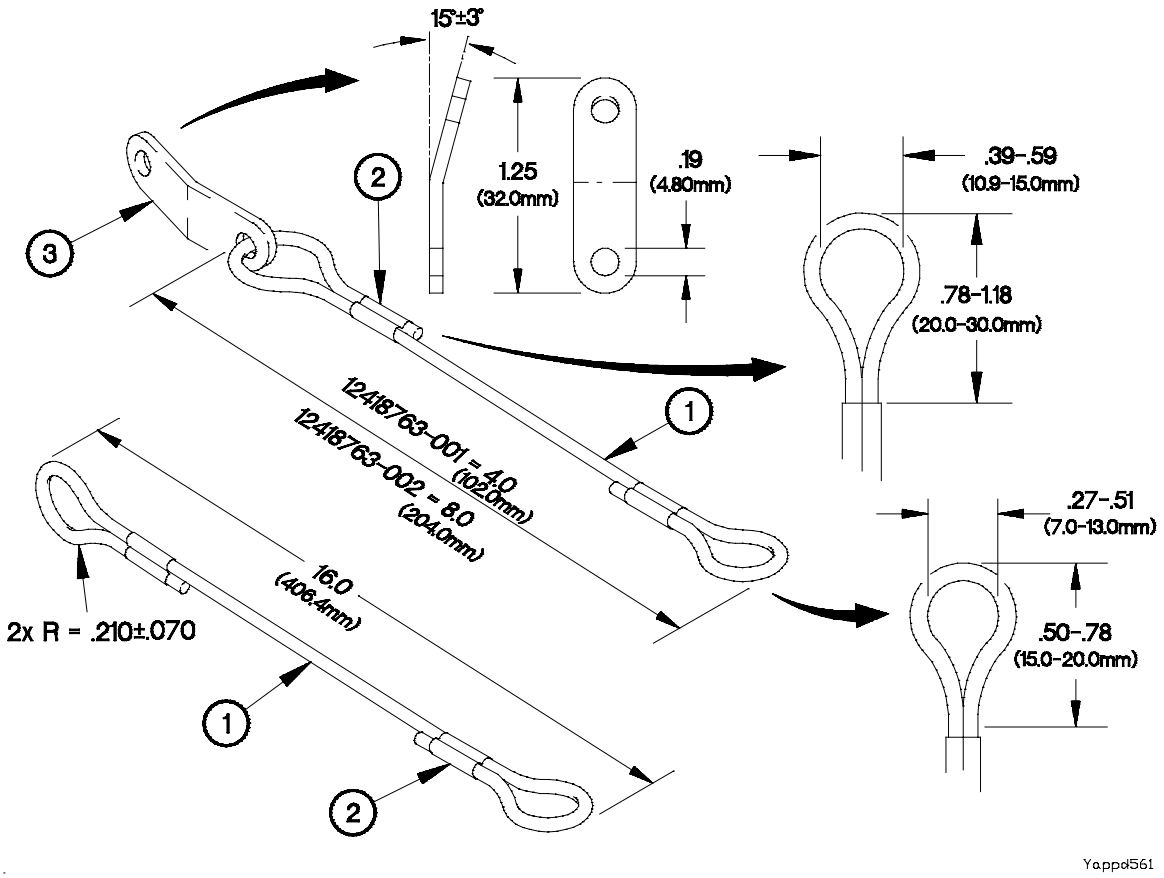


Figure D-56. Lanyard Assembly

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.

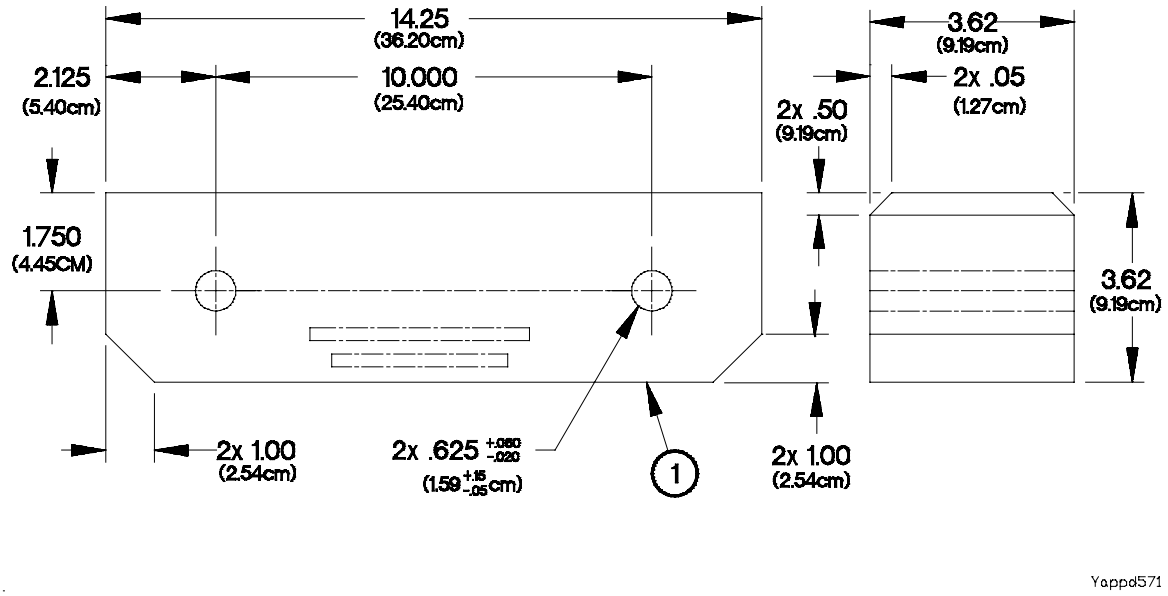


Figure D-57. Wooden Skid

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.

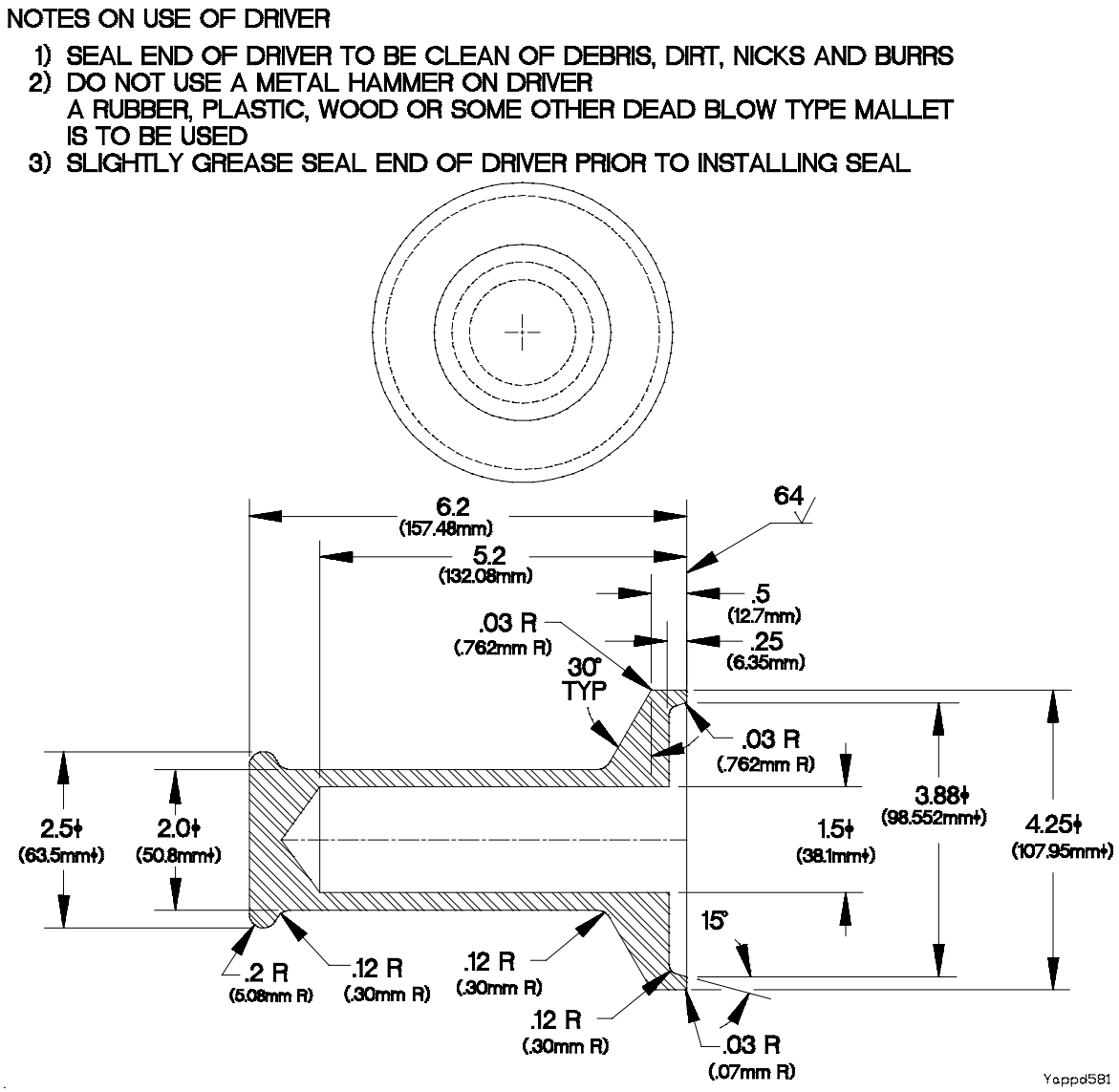


Figure D-58 CTIS Seal Driver

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

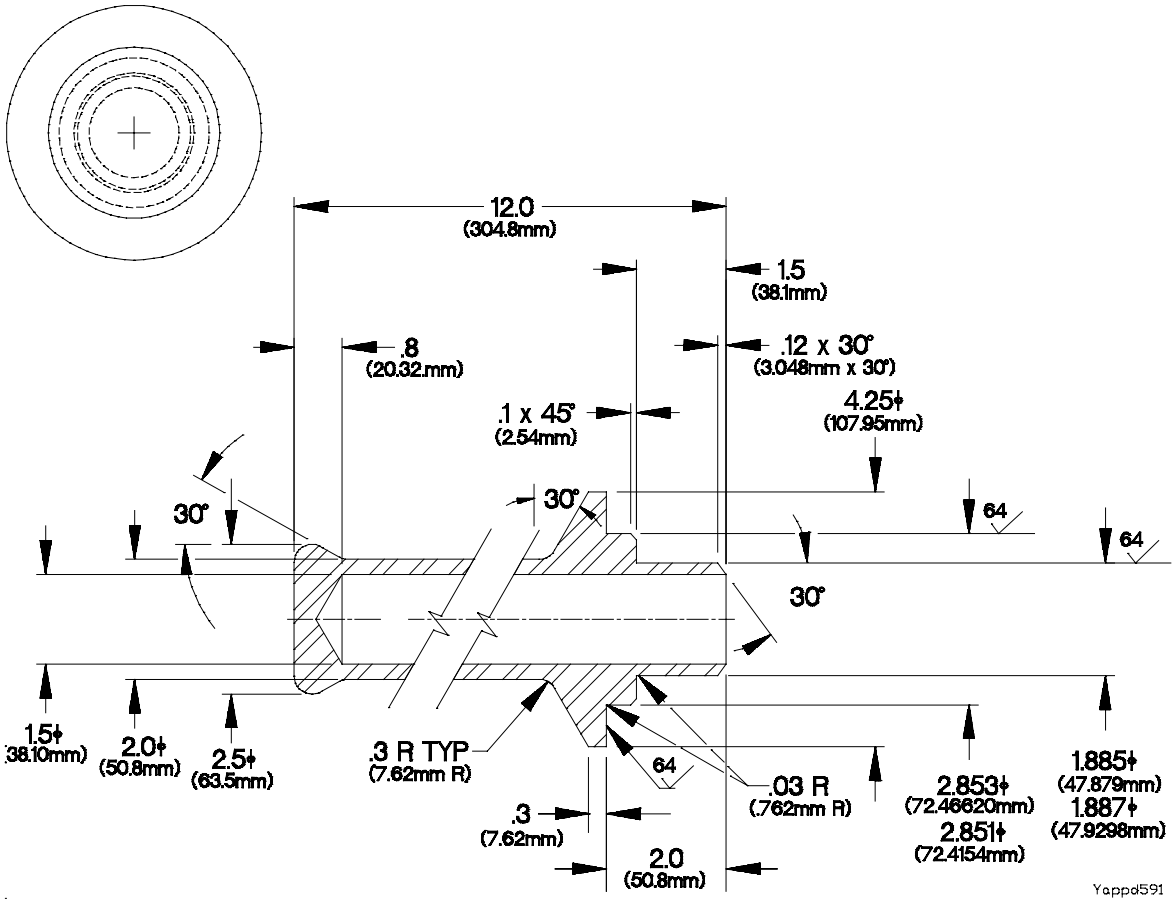


Figure D-59. Front Axle Shaft Seal Driver

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

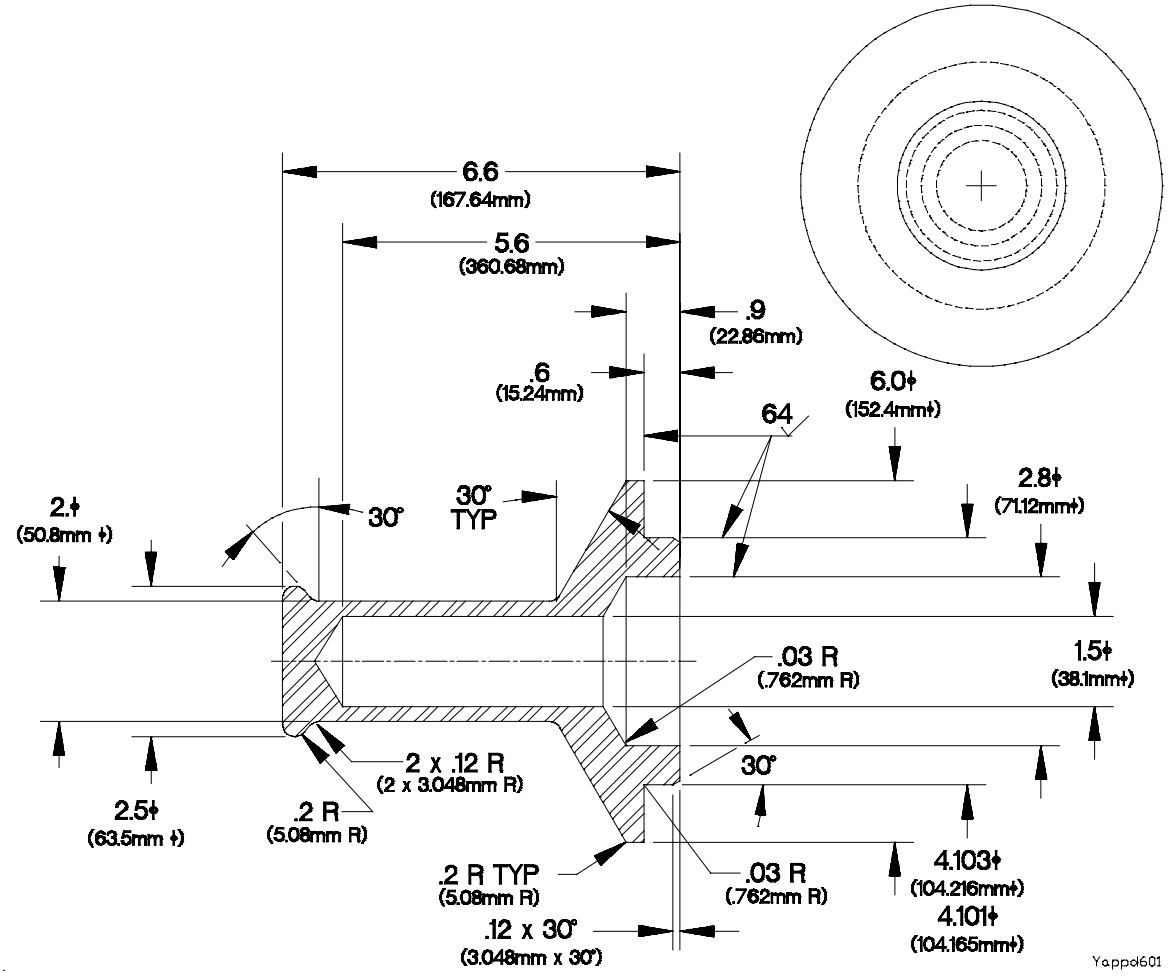


Figure D-60. Wheel Hub Grease Seal Driver

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

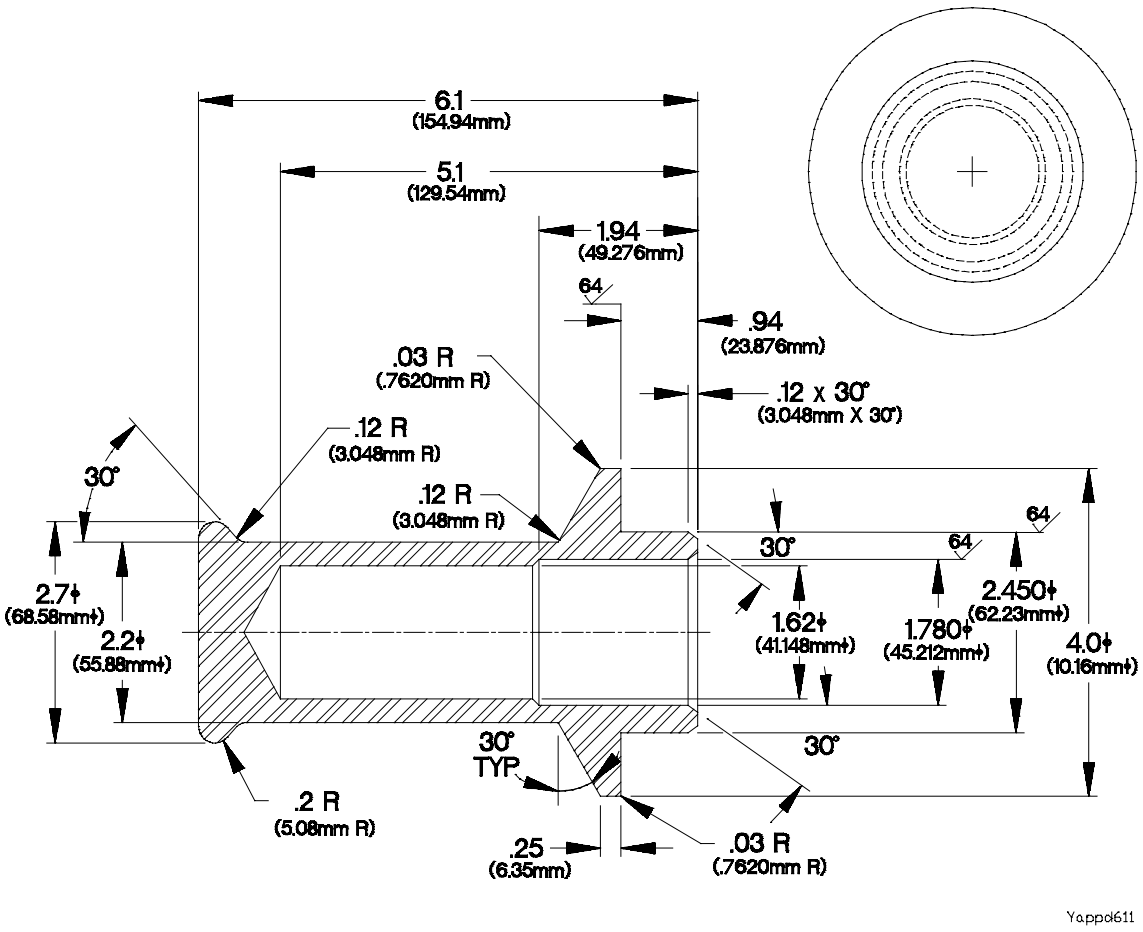


Figure D-61. Intermediate Differential Output (Rear) Seal Driver

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.

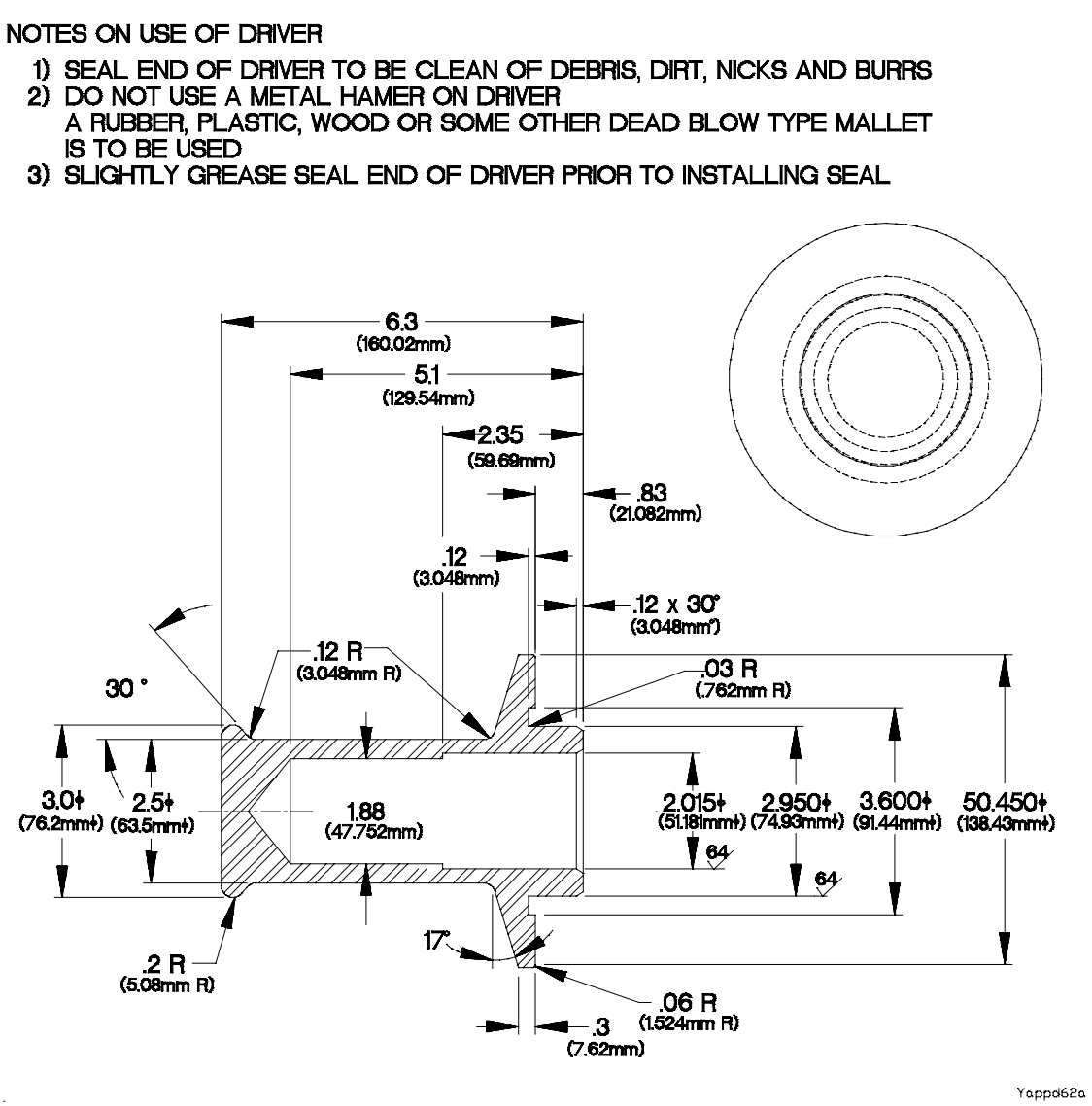


Figure D-62. Differential Pinion Seal Driver

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)

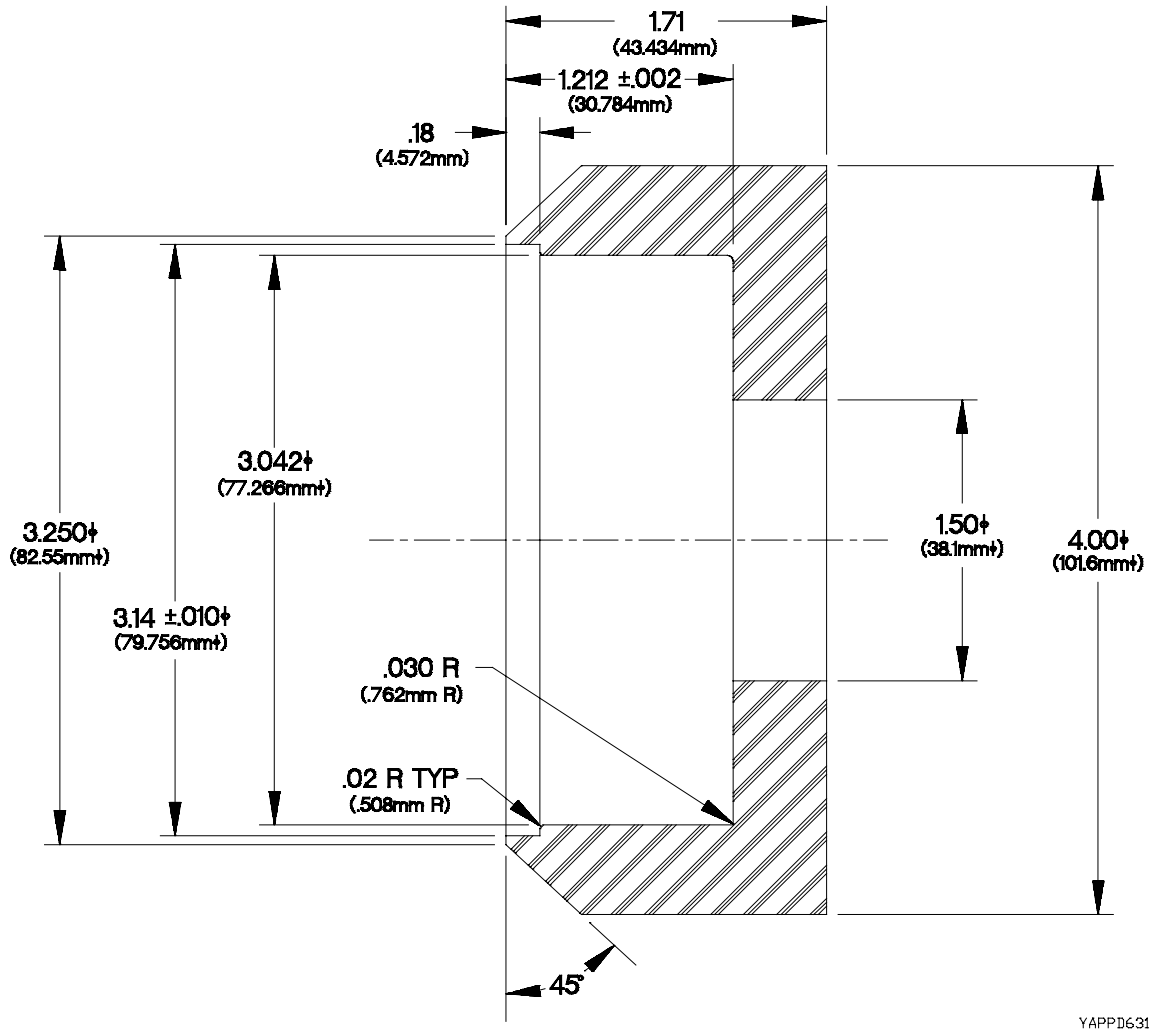


Figure D-63. Intermediate Input Yoke Seal Driver

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)

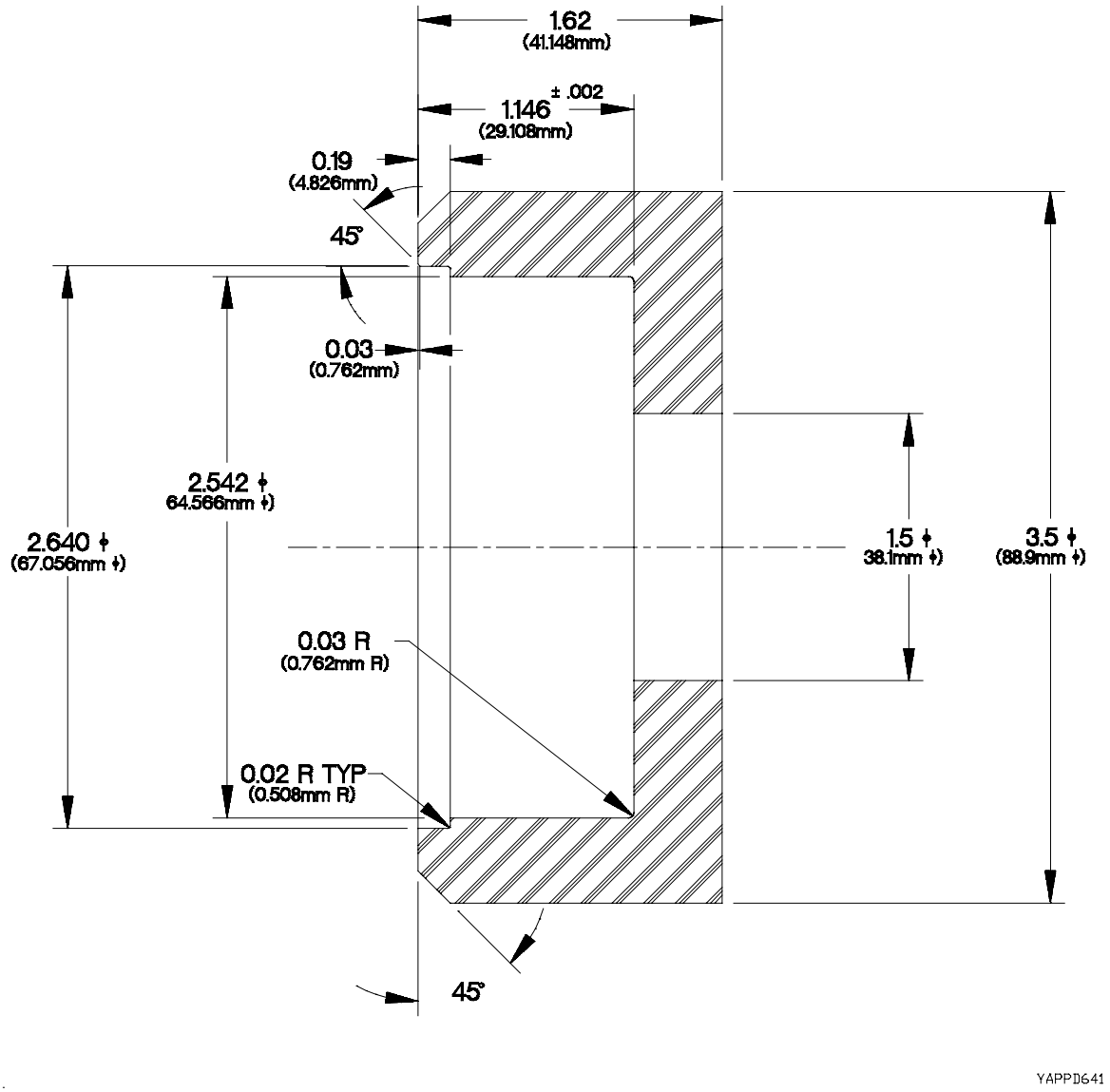


Figure D-64. Intermediate Output Yoke Seal Driver

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)

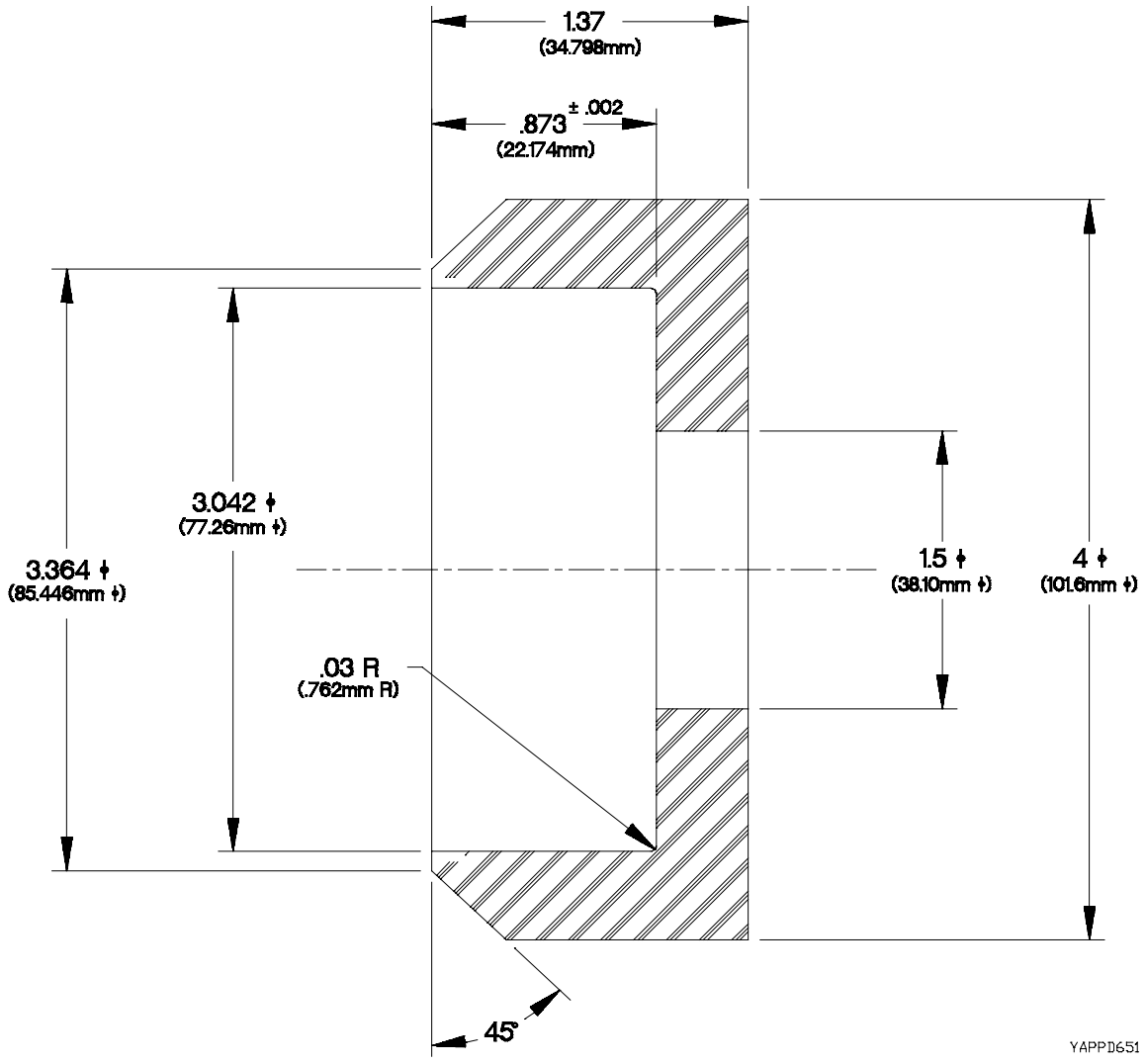


Figure D-65. Front and Rear Differential Yoke Seal Driver

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). Finish Black Oxide Coat, Class I, IAW MIL-C-13924.	14.0 in. (356 mm)	1

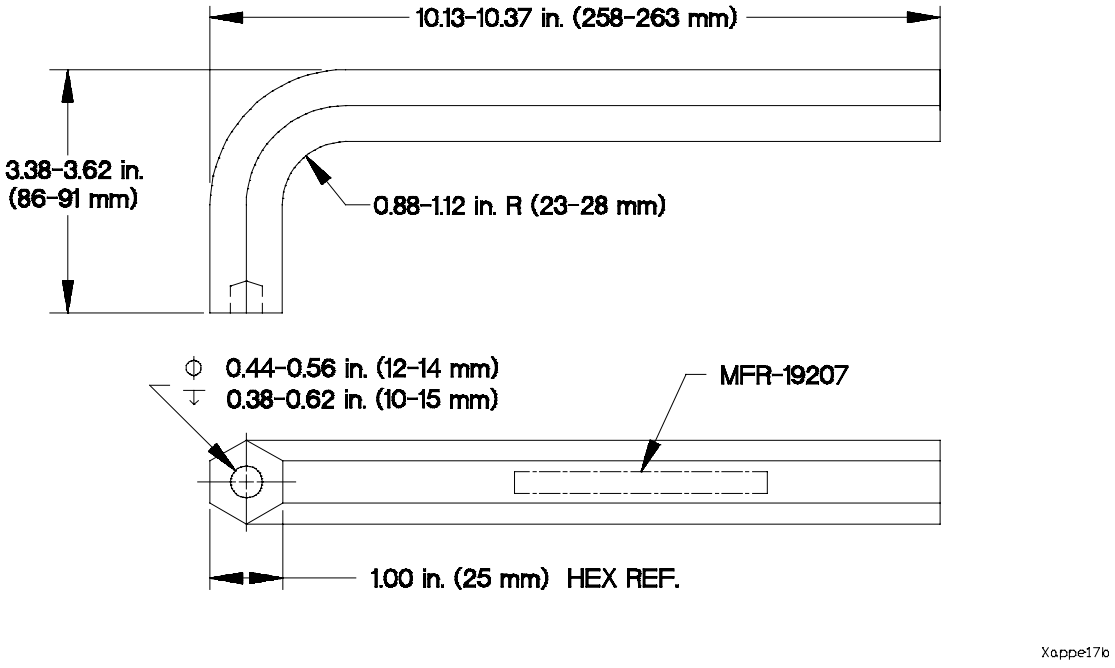


Figure D-66. Purge Valve Tool

a. All dimensions are in inches (cm).
b. Cut steel bar (1) and bend to shape as shown in Figure D-66.
c. Dimensional limits apply after coating.
d. All edges shall be broken and free from burrs.
e. Metal Stamp, electro etch, or engrave with the following marking IAW MIL-STD-130: 19207-12379968 MFR-19207.

D-57. M1089 30K WINCH AIR HOSES

Cut air hoses and convoluted tubing from bulk hose stock listed in Table D-3. M1089 30K Winch Air Hose Lengths and Fittings. Use a fine-toothed hacksaw or suitable cutting device and cut air hoses and convoluted tubing to required length.

Table D-3. M1089 30K Air Hose Lengths and Fittings

Hose Name	Bulk Hose P/N	Hose Cut Length		Bulk Convoluted Tubing P/N	Convoluted Tubing Cut Length		Fittings P/N	Fittings Qty.
		in.	mm		in.	mm		
Air Supply	NB-4-035	96.0	2438	12420924-001	94.0	2388	4-100110B 4-100115B 63NTA-4	2 2 2
Manifold Supply	NB-4-035	40.0	1016	12420924-001	38.0	965	4-100110B 4-100115B 63NTA-4	2 2 2
LH Free Spool	NB-4-035	66.0	1676	12420924-001	64.0	1626	4-100110B 4-100115B 63NTA-4	2 2 2
RH Free Spool	NB-4-035	48.0	1219	12420924-001	46.0	1168	4-100110B 4-100115B 63NTA-4	2 2 2
LH Regulator Input	NB-4-035	12.0	305	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
RH Regulator Input	NB-4-035	12.0	305	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
LH Check Valve Return	NB-4-035	3.0	76	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
RH Check Valve Return	NB-4-035	3.0	76	N/A	N/A	N/A	4-100110B 4-100115B 63NTA-4	2 2 2
Front LH Tension Supply	NB-4-035	48.0	1219	12420924-001	46.0	1168	4-100110B 4-100115B 63NTA-4	2 2 2
Front RH Tension Supply	NB-4-035	66.0	1676	12420924-001	64.0	1626	4-100110B 4-100115B 63NTA-4	2 2 2

Table D-3. M1089 30K Air Hose Lengths and Fittings (Cont)

Hose Name	Bulk Hose P/N	Hose Cut Length		Bulk Convoluted Tubing P/N	Convoluted Tubing Cut Length		Fittings P/N	Fittings Qty.
		in.	mm		in.	mm		
RH 30K Winch Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
RH 30K Winch Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2
Underlift Fold Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	1
Underlift Fold Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
Underlift Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2
Underlift Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
Stinger Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2
Stinger Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
LH 30K Winch Supply	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA 2-2 100202BA	1 1
LH 30K Winch Return	NB-2-016	40.0	1016	N/A	N/A	N/A	2-2 100102BA	2

D-58. M1089 30K WINCH PNEUMATIC TEST ADAPTER

Assembly the M1089 30K winch pneumatic test adapter to the following steps. Refer to the following parts list and Figure D-67. M1089 30K Winch Pneumatic Test Adapter for details.

Part Number	Material Description	National Stock Number	Qty.
NB-4-035	Tubing, Nonmetallic	4720-01-071-4042	14 in. (355.6 mm)
MIL-T-27730	Tape, antiseizing	8030-00-889-3534	1 roll
207P-4	Coupling, Pipe	4730-00-881-1161	1
4-6 100102 BA	Adapter, Straight, Pipe to Tube	4730-01-096-9398	1
4-4 100101 BA	Nipple, Tube	4730-01-091-4012	1

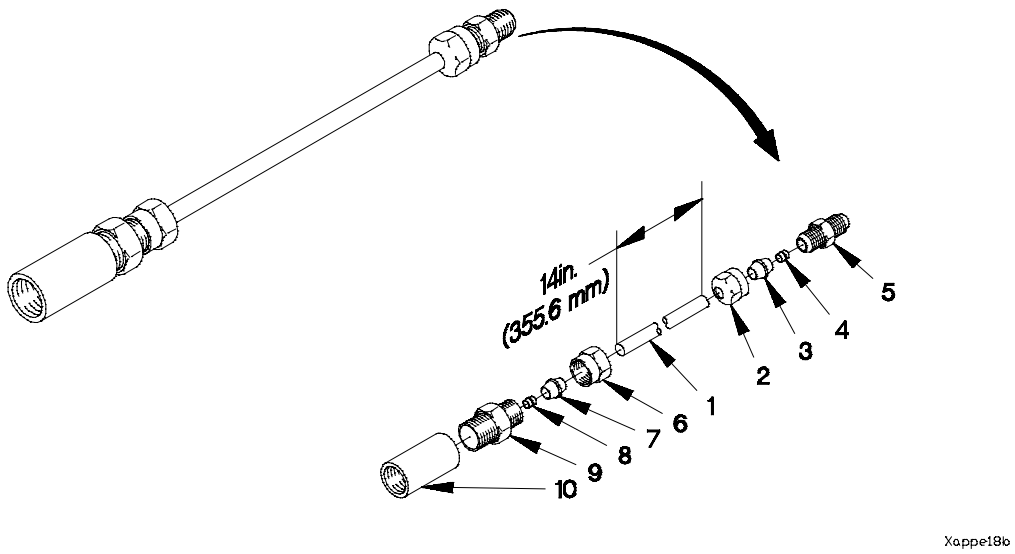


Figure D-67. M1089 30K Winch Pneumatic Test Adapter

a. All dimensions are in inches (millimeter).
b. Cut piece of nonmetallic tubing (1) to 14.0 in. (355.6 mm).
c. Remove two nuts (2), ferrules (3), and sleeves (4) from tube nipple (5).
d. Install nut (2), ferrule (3), and sleeve (4) on nonmetallic tubing (1).
e. Install nonmetallic tubing (1) on tube nipple (5).
f. Remove nut (6), ferrule (7), and sleeve (8) from straight adapter (9).
g. Install nut (6), ferrule (7), and sleeve (8) on nonmetallic tubing (1).
h. Install nonmetallic tubing (1) on straight adapter (9).
i. Apply on wrap of antiseizing tape to threads of straight adapter (9).
j. Install pipe coupling (10) on straight adapter (9).
k. Retain nut (2), ferrule (3), and sleeve (4) for future use.

D-59. BLOCK SEAL 12420489 FABRICATIONy

Make block seal from P/N (0VXY8) STN2.38X.5. Use a suitable cutting tool to cut seal to 0.52 inch (1.3 cm) long.

APPENDIX E
TORQUE LIMITS

E-1. GENERAL

This appendix provides general torque limits for screws and nuts used on the vehicle. Special torque limits are shown in the maintenance procedures for applicable components. Use the general torque limit given in this appendix when specific torque limits are not given in the maintenance procedure. These general torque limits can not be applied to screws that retain rubber components. The rubber components will be damaged before the torque limit is reached. If a special torque limit is not given in the maintenance instructions for a fastener which retains a rubber component, tighten the screw or nut until it touches metal, then tighten one more turn. Whenever possible, the tightening force (torque) should be applied to the nut side of the fastener group.

E-2. TORQUE LIMITS

Refer to **Table E-1. Torque Limits for SAE and ANSI Fasteners** for torque limits on standard (SAE and ANSI) screws and free spinning nuts. Refer to **Table E-2. Torque Limits for SAE and ANSI Prevailing Torque Nuts** for torque limits on standard (SAE and ANSI) self-locking nuts. Refer to **Table E-3. Torque Limits for Metric Screws and Free Spinning Nuts** for torque limits on metric screws and free spinning nuts. Refer to **Table E-4. Torque Limits for Metric Prevailing Torque Nuts** for torque limits on metric self-locking nuts.

E-3. USE OF TORQUE TABLES

(1) Measure the diameter of the screw to be installed.

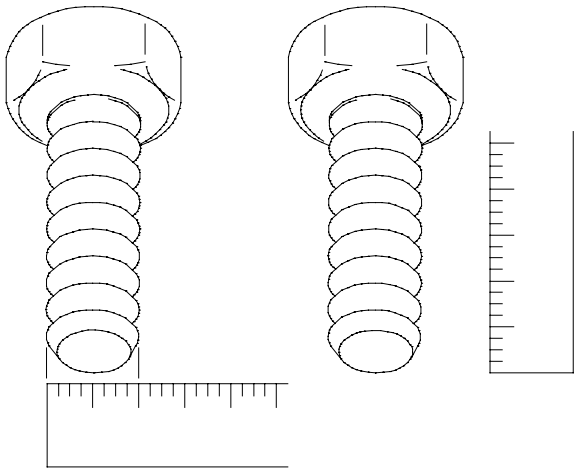
(2) Count the number of threads per inch.

(3) Under the heading DIAMETER look down the column until the diameter of the screw is found. (There are usually two lines beginning with the same diameter.)

(4) Under the heading THREADS PER INCH (SAE and ANSI) or THREAD PITCH (metric), find the number of threads per inch that matches the number counted in step (2).

(5) To find the grade of the screw, match the markings on the head to the correct picture under CAPSCREW HEAD MARKINGS on the torque table.

(6) Look down the column under the picture found in step (5) until the torque limit (lb-ft or N·m) for the diameter and threads per inch (or thread pitch, in the case of metric fasteners) of the screw are located.



YAPPE011

APPENDIX E
TORQUE LIMITS

Table E-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts

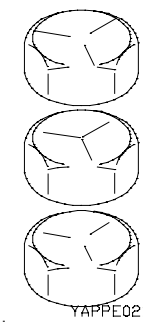
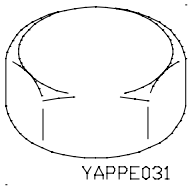
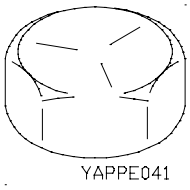
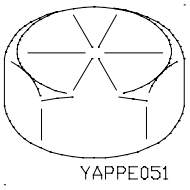
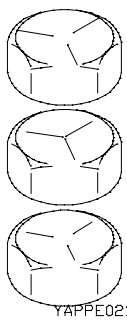
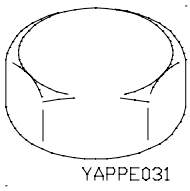
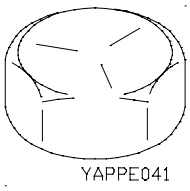
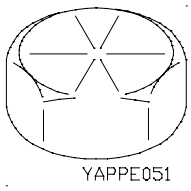
 YAPPE021 **NOTE Manufacturer's marks may vary. These are all SAE Grade 5.**		**Material Grade Markings**					
		 YAPPE031 **SAE Grade 2**		 YAPPE041 **SAE Grade 5**		 YAPPE051 **SAE Grade 8**	
Diameter	**Threads per inch**	**Torque**					
inch		**lb-ft**	**N·m**	**lb-ft**	**N·m**	**lb-ft**	**N·m**
1/4	20	3-5	5-7	5-7	8-10	8-10	10-14
1/4	28	4-6	5-7	6-8	9-11	8-12	12-16
1/4	32	4-6	5-7	7-9	9-11	9-13	12-16
5/16	18	7-9	9-13	11-15	15-21	15-21	21-29
5/16	24	8-10	11-15	12-16	17-23	17-23	24-32
5/16	32	9-11	12-16	14-18	18-24	19-25	27-34
3/8	16	13-17	17-23	20-26	27-35	28-38	38-50
3/8	24	15-19	20-26	22-30	31-41	32-42	43-57
3/8	32	15-21	21-27	24-32	33-43	33-45	55-61
7/16	14	20-28	28-38	32-42	43-57	44-60	61-81
7/16	20	23-31	31-41	35-47	48-64	49-67	68-90
7/16	28	25-33	33-45	37-51	51-69	54-72	73-97
1/2	13	32-42	43-57	49-65	66-88	68-92	93-123
1/2	20	35-47	48-64	55-73	74-98	77-103	105-139
1/2	28	38-50	51-67	58-78	79-105	82-110	111-149
9/16	12	55-61	62-82	70-94	95-127	98-132	134-178
9/16	18	50-68	69-91	78-104	105-141	109-147	149-199
9/16	24	53-71	72-96	82-110	111-149	115-155	158-210
5/8	11	62-84	85-113	95-129	131-175	136-182	184-246
5/8	18	70-94	96-128	108-146	148-198	154-206	209-279
5/8	24	73-99	100-134	114-154	155-207	161-217	219-293

Table E-1. Dry Torque Limits for SAE and ANSI Screws and Free Spinning Nuts (Cont)

 YAPPE021 Manufacturer's marks may vary. These are all SAE Grade 5		Material Grade Markings					
		 YAPPE031 SAE Grade 2		 YAPPE041 SAE Grade 5		 YAPPE051 SAE Grade 8	
Diameter	Threads per inch	Torque					
inch		lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
11/16	24	99-133	135-181	153-207	209-279	217-291	296-394
3/4	10	110-148	150-200	171-229	232-310	240-324	328-438
3/4	16	123-165	168-224	190-256	259-345	269-361	366-488
3/4	20	127-171	174-232	197-265	268-358	278-374	379-505
13/16	20			252-340	345-459	357-481	487-649
7/8	9			275-369	374-498	387-521	528-704
7/8	14			303-407	413-551	427-575	583-777
7/8	20			319-429	435-579	450-606	614-818
15/16	20			395-531	538-718	558-750	760-1014
1	8			411-553	560-748	581-781	792-1056
1	12			450-606	614-818	636-856	867-1155
1	20			483-649	658-878	681-917	929-1239
1-1/16	18			576-776	782-1044	813-1095	1109-1479
1-1/8	7			507-683	693-923	824-1108	1123-1497
1-1/8	12			570-766	776-1034	923-1241	1258-1678
1-1/8	18			600-806	817-1089	971-1307	1324-1766
1-3/16	18			709-953	966-1288	1149-1545	1566-2088
1-1/4	7			716-964	976-1302	1161-1563	1584-2112
1-1/4	12			793-1067	1081-1441	1286-1730	1754-2338
1-1/4	18			831-1117	1132-1510	1346-1812	1835-2447
1-5/16	18			965-1299	1316-1754	1565-2105	2134-2846
1-3/8	6			939-1263	1281-1707	1523-2049	2076-2768

APPENDIX E
TORQUE LIMITS

Table E-2. Dry Torque Limits for SAE and ANSI Prevailing Torque Nuts

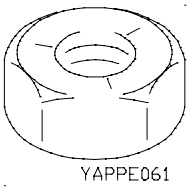
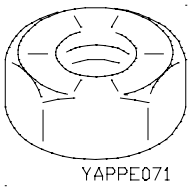
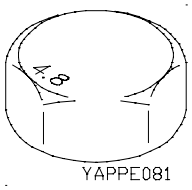
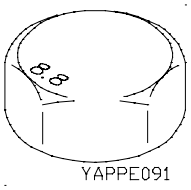
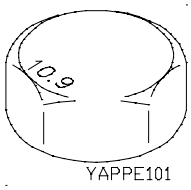
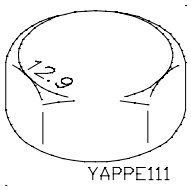
		Material Grade Markings			
		 YAPPE061		 YAPPE071	
		SAE Grade 5		SAE Grade 8	
Hole Diameter	Threads per inch	Torque			
inch		lb-ft	N·m	lb-ft	N·m
1/4	20	10-12	14-16	15-17	20-24
1/4	28	12-14	16-18	14-18	21-25
5/16	18	20-24	27-33	26-32	36-44
5/16	24	22-26	30-36	29-35	40-48
3/8	16	35-41	47-55	48-58	65-77
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

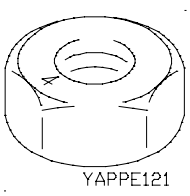
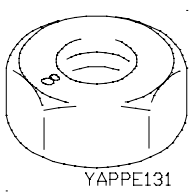
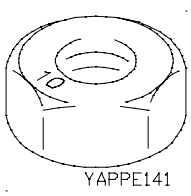
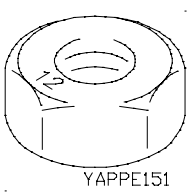
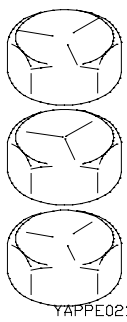
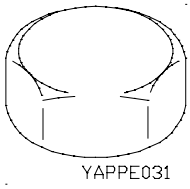
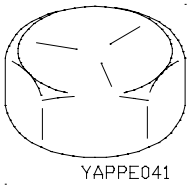
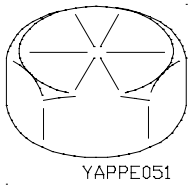
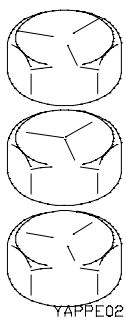
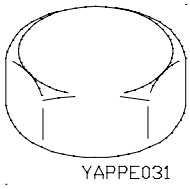
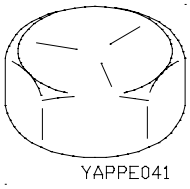
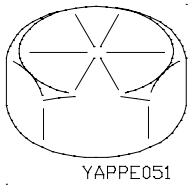
		Material Grade Markings							
		 Metric Grade 4.8		 Metric Grade 8.8		 Metric Grade 10.9		 Metric Grade 12.9	
Diameter	Thread Pitch	Torque							
mm		lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
6	1	5-6	7-8	7-9	10-12	10-12	14-17	11-14	15-19
8	1.25	12-14	16-18	18-22	24-30	24-30	32-40	27-33	36-46
8	1	12-14	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
163.1	LOCKWASHER	12414560-019	5330-01-369-6074
164	LOCKWASHER	12414560-017	5310-01-395-0820
165	LOCKWASHER	12414560-018	5310-01-381-3281
166	LOCKWASHER	12414560-029	5310-01-395-0817
166.1	LOCKWASHER	12414570-019	5310-01-470-2362
167	LOCKWASHER	3059-00870-03	5310-00-397-4524
168	MOUNT, RESILIENT	12414590	5340-01-374-0501
169	NUT, CLINCH	ALS3-610-4.2	5310-01-381-9929
170	NUT, CLINCH	ALS3-4470-.20	5310-01-384-7280
171	NUT, PLAIN, HEX	0770-023-003	5310-01-423-3725
172	NUT, PLAIN, KNURLED	ALS3-470-2.0	5310-01-384-7280
173	NUT, SELF-LOCKING	MS20500-524	5310-00-208-4023
174	NUT, SELF-LOCKING	MS21043-6	5310-00-881-0943
175	NUT, SELF-LOCKING	MS21083N6	5310-00-926-1852
176	NUT, SELF-LOCKING	MS51922-17	5310-00-087-4652
177	NUT, SELF-LOCKING	MS51922-1	5310-00-088-1251
178	NUT, SELF-LOCKING	MS51922-2	5310-00-929-1807
179	NUT, SELF-LOCKING	MS51922-33	5310-00-225-6993
180	NUT, SELF-LOCKING	MS51922-49	5310-00-269-4040
181	NUT, SELF-LOCKING	MS51922-9	5310-00-984-3806
182	NUT, SELF-LOCKING	MS51943-52	5310-00-241-6666
183	NUT, SELF-LOCKING	XB-HNH-34F	5310-01-162-4753
184	NUT, SELF-LOCKING	N9091	5310-01-050-5005
185	NUT, SELF-LOCKING	N9099	5310-01-165-1312
186	NUT, SELF-LOCKING	N9406	5310-01-362-6171
187	NUT, SELF-LOCKING	N9556	5310-01-423-0880
188	NUT, SELF-LOCKING	N9410	5310-01-348-8398
189	NUT, SELF-LOCKING	N9467	5310-01-350-4257
190	NUT, SELF-LOCKING	N9416	5310-01-348-8360
191	NUT, SELF-LOCKING	DIN 934 ST M6	5310-01-342-2739
192	NUT, SELF-LOCKING	40-X-1041	5310-01-391-5251
193	NUT, SELF-LOCKING	40-X-1241	5310-01-391-5249
194	NUT, SELF-LOCKING	40-X-1244	

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
195	NUT, SELF-LOCKING	9-522-010009	5310-01-373-6791
196	NUT, SELF-LOCKING	50066	5310-00-007-0225
196.1	NUT, SELF-LOCKING	11602502	5310-00-930-7979
197	NUT, SELF-LOCKING	11649930	5310-00-402-5220
198	NUT, SELF-LOCKING	12418084	5310-01-371-8419
199	NUT, SELF-LOCKING	12412476-09	5310-01-445-6346
199.1	NUT, SELF-LOCKING	12412476-11	5310-01-407-7178
199.2	NUT, SELF-LOCKING	12412476-13	5310-01-407-7181
200	NUT, SELF-LOCKING	12412478-04	5310-01-381-9901
201	NUT, SELF-LOCKING	12412478-11	5310-01-381-9942
202	NUT, SELF-LOCKING	12414308-002	5310-01-381-9819
203	NUT, SELF-LOCKING	12414308-003	5310-01-374-1382
204	NUT, SELF-LOCKING	12414308-007	5310-01-369-6073
205	NUT, SELF-LOCKING	12414308-016	5310-01-381-9945
206	NUT, SELF-LOCKING	12414308-017	5310-01-381-9830
207	NUT, SELF-LOCKING	12414308-018	5310-01-369-3337
208	NUT, SELF-LOCKING	12414308-019	5310-01-369-9522
209	NUT, SELF-LOCKING	12414308-020	5310-01-381-9849
210	NUT, SELF-LOCKING	12414308-021	5310-01-369-3338
211	NUT, SELF-LOCKING	12414308-025	5310-01-369-6706
212	NUT, SELF-LOCKING	12414308-027	5310-01-369-3339
213	NUT, SELF-LOCKING	12414315-003	5310-01-374-1382
214	NUT, SELF-LOCKING	12414315-004	5310-01-342-2739
214.1	NUT, SELF-LOCKING	12414315-005	5310-01-372-3023
215	NUT, SELF-LOCKING	12414315-006	5310-01-369-3332
216	NUT, SELF-LOCKING	12414315-011	5310-01-368-8667
217	NUT, SELF-LOCKING	12414315-017	5310-01-368-8065
218	NUT, SELF-LOCKING	12414315-020	5310-01-372-6337
219	NUT, SELF-LOCKING	12414315-021	5310-01-434-3778
220	NUT, SELF-LOCKING	15635-93M	5310-01-434-0078
221	NUT, SELF-LOCKING	29507834	5310-01-359-8789

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
221.1	NUT, SELF-LOCKING	40-X-1241	5310-01-391-5249
222	PACKING WITH RETAINER	75-1740-199-025-FB	5330-01-368-8828
223	PACKING, PREFORMED	114-8718	5330-01-348-2720
224	PACKING, PREFORMED	125-8274	5330-01-360-6012
224.1	PACKING, PREFORMED	F4001-16	5331-01-466-0354
224.2	PACKING, PREFORMED	J515-16-3	5331-01-465-3634
224.3	PACKING, PREFORMED	MS28775-006	5330-00-292-0580
224.4	PACKING, PREFORMED	MS28775-010	5331-00-584-0266
225	PACKING, PREFORMED	MS28775-110	5330-00-585-6663
226	PACKING, PREFORMED	MS28775-246	5330-00-585-8249
227	PACKING, PREFORMED	MS28775-208	5330-01-105-7263
228	PACKING, PREFORMED	MS28775-224	5330-00-641-3407
229	PACKING, PREFORMED	MS28778-10	5310-00-285-9842
230	PACKING, PREFORMED	MS28778-12	5330-00-251-8839
231	PACKING, PREFORMED	MS28778-14	5330-00-472-2783
232	PACKING, PREFORMED	MS28778-16	5330-01-804-5694
233	PACKING, PREFORMED	MS28778-20	5330-00-816-3546
234	PACKING, PREFORMED	MS28778-3	5320-00-835-7485
235	PACKING, PREFORMED	MS28778-4	5330-00-805-2966
236	PACKING, PREFORMED	MS28778-6	5330-00-804-5695
237	PACKING, PREFORMED	MS28778-8	5330-00-006-2249
238	PACKING, PREFORMED	MS29512-16	5330-00-263-8034
239	PACKING, PREFORMED	MS9955-113	5330-01-374-2325
240	PACKING, PREFORMED	A82777	5330-00-579-6495
241	PACKING, PREFORMED	M83248-2-906	5331-00-165-1981
242	PACKING, PREFORMED	M83248-2-908	5330-00-167-5173
243	PACKING, PREFORMED	M83461/1-442	5330-01-183-0987
243.1	PACKING, PREFORMED	XA-2265	5331-01-459-5254
244	PACKING, PREFORMED	Z053-074979	5330-00-579-6495
244.1	PACKING, PREFORMED	Z053095777	5331-01-304-3453
245	PACKING, PREFORMED	1J9671	5330-00-613-6500
246	PACKING, PREFORMED	1T1068	5330-01-336-8776

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
247	PACKING, PREFORMED	2M9780	5330-00-939-0687
248	PACKING, PREFORMED	3J1907	5330-01-333-6444
249	PACKING, PREFORMED	3J7354	5330-00-952-8008
250	PACKING, PREFORMED	3K0360	5330-00-948-6482
251	PACKING, PREFORMED	3P1156	5330-00-385-7587
252	PACKING, PREFORMED	4F7391	5330-00-562-1073
253	PACKING, PREFORMED	4F9029	5330-00-118-6559
254	PACKING, PREFORMED	4F9653	5330-00-038-4327
255	PACKING, PREFORMED	4J5477	5330-00-885-8059
255.1	PACKING, PREFORMED	405952	5330-00-454-0528
256	PACKING, PREFORMED	5F9657	5330-00-291-9572
256.1	PACKING, PREFORMED	5X1159	
256.2	PACKING, PREFORMED	5X556	5330-00-203-1172
257	PACKING, PREFORMED	6F6673	5330-00-865-0404
257.1	PACKING, PREFORMED	7-755-018010	5331-01-420-5127
257.2	PACKING, PREFORMED	71041	5331-00-633-6827
258	PACKING, PREFORMED	74980	5330-00-838-6729
259	PACKING, PREFORMED	8L2786	5330-00-973-8301
260	PACKING, PREFORMED	8M4445	5330-00-914-5821
261	PACKING, PREFORMED	2-011-N507-90	5330-01-265-8308
262	PACKING, PREFORMED	2-012-N507-90	5330-01-092-5502
263	PACKING, PREFORMED	2-014-N507-90	5330-01-366-5377
264	PACKING, PREFORMED	2-018-N507-90	5330-01-092-5503
265	PACKING, PREFORMED	2-112-N507-90	5330-01-093-3504
266	PACKING, PREFORMED	2-232-N674-70	5330-01-030-1825
267	PACKING, PREFORMED	2-240-N507-9	5330-01-036-2817
267.1	PACKING, PREFORMED	225163 (35510)	
268	PACKING, PREFORMED	3-906-N552-90	5330-01-104-1093
269	PACKING, PREFORMED	7-755-912003	5330-01-420-5128
270	PACKING, PREFORMED	28-P-120	5330-00-832-9514
271	PACKING, PREFORMED	28-P-121	5330-01-064-6284

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
272	PACKING, PREFORMED	28-P-190	5331-01-443-8050
273	PACKING, PREFORMED	28-P-191	5330-01-361-6959
274	PACKING, PREFORMED	22-P-92	5330-01-361-6962
275	PACKING, PREFORMED	4119-59	5330-00-510-3255
276	PACKING, PREFORMED	11446	5330-00-247-4174
277	PACKING, PREFORMED	9002-00491-68	5330-01-393-5630
278	PACKING, PREFORMED	9002-00741-58	5330-01-195-1500
279	PACKING, PREFORMED	9086-2	5330-01-106-1159
280	PACKING, PREFORMED	250192	5330-01-417-5105
281	PACKING, PREFORMED	9091-1	5330-01-244-8964
282	PACKING, PREFORMED	9612	5330-01-357-0846
283	PACKING, PREFORMED	9891	5330-01-374-2437
284	PACKING, PREFORMED	9972	5330-01-359-2151
285	PACKING, PREFORMED	15058	5330-00-304-9008
286	PACKING, PREFORMED	420828	5340-01-417-3788
287	PACKING, PREFORMED	53125	5365-00-062-3992
288	PACKING, PREFORMED	53155	5330-01-410-7122
289	PACKING, PREFORMED	60539	5330-01-302-2413
290	PACKING, PREFORMED	251216	5331-01-417-5107
291	PACKING, PREFORMED	251391	5310-01-417-1041
292	PACKING, PREFORMED	197755	
293	PACKING, PREFORMED	23014057	5330-01-360-6016
294	PACKING, PREFORMED	23043446	5331-01-424-6629
295	PACKING, PREFORMED	23046274	5330-01-360-6018
296	PACKING, PREFORMED	29500969	5330-01-360-7852
297	PACKING, PREFORMED	29501439	5330-01-388-1528
298	PACKING, PREFORMED	29503380	5330-01-360-6014
299	PACKING, PREFORMED	29503381	5330-01-360-6015
300	PACKING, PREFORMED	29503382	5330-01-360-6013
301	PACKING, PREFORMED	29503383	5330-01-360-6017
302	PACKING, PREFORMED	29507700	5331-01-424-4552
303	PACKING, RETAINER	23049377	5330-01-361-9052

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
304	PACKING, RETAINER	29503208	5330-01-361-9785
305	PANEL, DEFROSTER	12420495-004	2540-01-437-1411
306	PARTS KIT	SKD1VW	5330-01-309-2603
307	PARTS KIT	SK10-2	5330-01-350-4474
308	PARTS KIT	SK10-3	5330-01-186-0851
309	PARTS KIT	990-011-007	5330-01-332-7167
310	PARTS KIT	990-220-006	
311	PARTS KIT, DISC AND SPRING	9401	2530-01-344-5748
312	PARTS KIT, ENGINE FUEL PUMP	5R9065	2910-01-363-6816
313	PARTS KIT, FIFTH WHEEL	RK63506	2510-01-134-8880
313.1	PARTS KIT, SEAL REPLACEMENT	391-1803-387	
313.2	PARTS KIT, SEAL REPLACEMENT	391-1803-457	5330-01-366-5634
313.3	PARTS KIT, SEAL REPLACEMENT	391-1803-469	
313.4	PARTS KIT, SEAL REPLACEMENT	4452	5330-01-469-5782
313.5	PARTS KIT, SEAL REPLACEMENT	4453	5330-01-469-5786
314	PARTS KIT, SEAL REPLACEMENT	9403	5330-01-344-2572
315	PARTS KIT, SEAL REPLACEMENT	60540	5330-01-316-1440
316	PARTS KIT, SEAL REPLACEMENT	61267	5330-01-355-3582
317	PARTS KIT, SEAL REPLACEMENT	23042434	5330-01-360-5459
318	PARTS KIT, SEAL REPLACEMENT	29503974	5330-01-388-1576
319	PARTS KIT, SEAL REPLACEMENT	9752100915	5330-01-354-3834
320	PARTS KIT, SEAL REPLACEMENT	990-011-007	5330-01-332-7167
321	PARTS KIT, WINCH	9402	2590-01-374-2510
322	PARTS KIT, WINCH	9406	5330-01-470-0839
323	PARTS KIT, WINCH	9450	
324	PIN, COTTER	MS24665-181	5315-00-187-9374
325	PIN, COTTER	MS24665-360	5315-00-298-1499
325.1	PIN, COTTER	MS24665-385	5315-00-187-9382
326	PIN, COTTER	MS24665-394	5315-00-234-1628
327	PIN, COTTER	C1949	5315-00-010-3426
328	PIN, COTTER	MS24665-423	5315-00-013-7228

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
329	PIN, COTTER	MS24665-457	5315-00-187-9393
330	PIN, COTTER	MS24665-459	5315-00-187-9394
331	PIN, COTTER	MS24665-498	5315-00-849-9854
332	PIN, COTTER	MS24665-655	5315-00-187-9414
333	PIN, COTTER	XB-781-1	5315-01-369-1346
334	PIN, COTTER	K-2412-Z	5315-01-179-9882
335	PIN, COTTER	1199R2176	5315-00-880-6027
336	PIN, SPRING	XB-07508	5315-01-199-2088
337	PIN, SPRING	XB-21-S-375-1750	5315-01-159-6395
338	PIN, SPRING	1-647-0100004196	
339	PIN, SPRING	586031	5315-00-257-1652
339.1	PIN, STRAIGHT, HEADED	12417962-081	5315-01-447-2297
340	PLUG	3H5552	5340-00-007-6350
341	PLUG, EXPANSION	2M6471	5340-00-410-6762
342	PLUG, MACHINE THREAD	391-2281-010	5365-01-280-5570
343	PLUG, MACHINE THREAD	29503360	5365-01-360-0937
344	PLUG, PLASTIC	12418065-004	4730-01-375-1450
345	PLUG, PLASTIC	12418065-005	4730-01-375-0329
346	PLUG, RUBBER	12417526	5340-01-375-3042
347	PLUG, RUBBER	12417527	5340-01-377-1543
348	PLUG, RUBBER	12417599	5340-01-381-3855
349	PLUG, RUBBER	12420305-001	5340-01-384-1120
350	PLUG, RUBBER	12420305-003	5970-01-089-7447
351	PLUG, RUBBER	12418348	5340-01-384-0869
352	RETAINER, PACKING	MS28783-26	5330-00-944-9577
353	RETAINER, PACKING	MS28783-18	5330-00-171-6761
354	RETAINER, PACKING	8-224-N300-90	5330-00-005-0572
355	RETAINER, PACKING	202624	5330-01-417-7794
356	RETAINER, PACKING	11863-012	5330-01-417-7795
357	RETAINER, PACKING	22000-2	5330-01-322-2471
357.1	RETAINER, PACKING	7-755-016609	5330-01-420-5027
357.2	RETAINER, PACKING	7-755-018609	5330-01-420-5056

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
358	RING	9852	5365-01-224-2304
359	RING, RETAINING	N9008	5365-01-032-4222
360	RING, RETAINING	N9009	5365-01-034-2757
361	RING, RETAINING	6I3033	5365-01-360-0953
362	RING, RETAINING	6I3035	5365-01-360-0954
362.1	RING, SEAL	225148	5331-01-459-6517
363	RING, SEAL	9M4849	5330-00-847-4351
364	RING, WEAR	7-753-000173	3040-01-370-2823
364.1	RIVET, BLIND	12421770-004	
365	RIVET, COMPRESSION	12420756	5325-01-433-4746
365.1	RIVET, COMPRESSION	12418469	5320-01-376-0699
366	RUBBER STRIP	VC08G1R08	5330-01-389-6109
366.1	SCREW, CAP	CSH5-24-39	5305-01-479-7857
367	SCREW, CAP	639AS2710	5305-01-081-7393
368	SCREW, CAPTIVE	12421366	5305-01-439-3247
368.1	SCREW, SELF-LOCKING	7X3347	5305-01-360-0952
369	SEAL	BA3026-1	5330-01-077-4674
370	SEAL	1205F2164	5330-01-362-3392
371	SEAL	9890	5330-01-375-0243
372	SEAL	12415307	5340-01-376-0672
373	SEAL	12417485	5330-01-375-2909
374	SEAL	12418327	5365-01-381-3976
375	SEAL	23046376	5330-01-360-6006
376	SEAL	23048727	5330-01-360-7826
376.1	SEAL KIT	CBV1/2-10	
376.2	SEAL KIT	DG4V-3S	
376.3	SEAL KIT	FCV7-10	
376.4	SEAL KIT	PFR1-16	
376.5	SEAL KIT	PRV1-10	
376.6	SEAL KIT	RV5-10	
377	SEAL, CONNECTOR TUBE	4K1388	5330-00-933-3305
378	SEAL, PLAIN ENCASED	A-1205-E-2501	5330-01-432-2692

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
379	SEAL, PLAIN ENCASED	A-1205-F-2502	5330-01-432-2690
380	SEAL, PLAIN ENCASED	A-1205-D-2500	5330-01-432-2689
381	SEAL, PLAIN	3018-01507-01	5330-01-393-5626
382	SEAL, PLAIN	3018-01519-01	5330-01-331-9283
383	SEAL, PLAIN	3912884-019	5330-01-340-8159
384	SEAL, PLAIN	9057-14	5330-01-306-3438
385	SEAL, PLAIN ENCASED	A-1205-S-2255S	5330-01-360-7754
386	SEAL, PLAIN ENCASED	A-1205-T-2256	5330-01-362-1262
386.1	SEAL, PLAIN ENCASED	KIT-4451	5330-01-362-6102
387	SEAL, PLAIN ENCASED	4R8831	5330-01-360-9023
388	SEAL, PLAIN ENCASED	115-4109	5330-01-361-1456
389	SEAL, PLAIN ENCASED	28-P-119	5330-01-044-6592
390	SEAL, PLAIN ENCASED	28-P-123	
391	SEAL, PLAIN ENCASED	S-19751	5330-01-459-8204
392	SEAL, PLAIN ENCASED	13585	5330-00-202-1292
393	SEAL, PLAIN ENCASED	29515690	5330-01-430-3477
394	SEAL, PLAIN ENCASED	29507528	5330-01-360-5917
395	SEAL, PLAIN ENCASED	A-1205-D-2344	5330-01-360-5253
396	SEAL, PLAIN ENCASED	97799	5330-01-079-6372
397	SEAL, PLAIN ENCASED	S-19750	5330-01-459-8205
398	SEAL, URETHANE FOAM	12420420-001	5680-01-453-8912
399	SEAL, URETHANE FOAM	12420420-003	5680-01-453-8486
400	SEALRING	23045611	5330-01-360-9009
401	SEALRING	23045612	5330-01-360-9100
402	SEALRING	23045614	5330-01-360-9102
403	SEALRING	23045615	5330-01-360-9103
404	SEALRING	23045654	5330-01-360-9104
405	SEALRING	23045655	5330-01-360-9105
406	SEALRING	23041189	5330-01-360-5978
407	SEALRING	29501190	5330-01-360-5979
408	SEALRING	29502161	5365-01-360-1675
409	SEALRING	29502164	5365-01-360-1674

MANDATORY REPLACEMENT PARTS (CONT)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
410	SEALRING	29506399	5330-01-360-5980
411	SEALRING	23046868	2835-01-360-1757
412	SETSCREW	29506222	5305-01-360-1667
413	SHIM	12421159-001	
414	SHIM	12421159-002	
415	SHIM	12421159-003	
416	SHIM	12421159-004	
417	SHIM	9-684-010052	5365-01-461-0456
418	SHIM, OUTPUT BEARING	29505947	5365-01-360-1030
419	SHIM, OUTPUT BEARING	29505948	5365-01-360-1029
420	SHIM, OUTPUT BEARING	29505949	5365-01-360-1028
421	SPACER, NYLON	1926-33	5365-01-408-5374
422	SPACER, PLATE	XA-0014	5365-01-133-0041
423	SPLICE, CONDUCTOR	JANTX1N3957	5961-00-181-0661
423.1	SPLICE, CONDUCTOR	M83519/1-9	5940-01-136-2540
424	SPRING	4088-40615-01	5360-01-392-9389
425	SPRING, COMPRESSION	9L9188	5360-00-175-2701
426	SPRING, COMPRESSION	2322	5360-01-345-5384
427	SPRING, FLAT	29500064	5360-01-360-2023
428	STRAINER, SUCTION	29503670	4730-01-360-4458
428.1	TERMINAL, LUG	12420344	5940-01-082-3321
429	VALVE CHECK	7C1493	4820-01-284-5435
430	WASHER, FIBER	Z095077721	3120-01-302-9301
431	WASHER	1229-M-1625	5310-01-059-7130
431.1	WASHER, FLAT	12414473-014	5310-01-363-0740
431.2	WASHER, FLAT	78302	5310-01-112-1738
432	WASHER, FLAT	78332	5310-01-204-0219
433	WASHER, FLAT	36900	5310-00-482-1999
433.1	WASHER, INSULATION	MES-76 (35510)	
433.2	WASHER, SEAL	XA 1470	5310-01-460-5998
434	WASHER, SEAL	25008.35	
435	WASHER, SEAL	29500025	5310-01-359-8840
435.1	WASHER, SEAL	12422577	5310-01-493-6806
436	WASHER, BRAKE HOUSING	1911644	5310-00-130-8033

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL STOCK NUMBER
437	WASHER, SPRING TENSION	D63474/1-27	5310-01-416-4339
438	WASHER, SPRING TENSION	D63474/1-39	5310-01-PAE-6547
438.1	WASHER, SPRING TENSION	75777	5310-01-112-1740
438.2	WASHER, THRUST	57023	3120-01-460-9421
439	WASHER, WAVE	53117-1	
440	WICK	225165	9390-01-459-7969
441	WICK	99278	9390-01-204-7151

APPENDIX G
ADDITIONAL AUTHORIZATION LIST (AAL)

Section I. INTRODUCTION

G-1. SCOPE

This appendix lists additional items you are authorized for the support of the LMTV.

G-2. GENERAL

This list identifies items that do not have to accompany the LMTV and that do not have to be turned in with it. These items are all authorized to you by Common Tables of Allowance (CTA), Modification Table of Organization and Equipment (MTOE), Tables of Distribution and Allowances (TDA), or Joint Table of Allowance (JTA).

G-3. EXPLANATION OF LISTING

National Stock Numbers, description, and quantities are provided to help you identify and request the additional items you require to support this equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description (CAGE) Part Number	(3) U/M	(4) Qty Auth
6685-01-193-1733	Transmitter, Pressure (0-10,000 PSI) (19207) 12258956	EA	1

APPENDIX H
TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART

Section I. INTRODUCTION

H-1. INTRODUCTION

This appendix lists the various transmission controls and configuration modifications that may be required to permit the transmission to function correctly. This appendix will guide the mechanic through the hardware selection process by identifying compatibility issues between the transmission controls (WTEC II/WTEC III) and the numerous revisions of the Allison MD3070PT transmission (PRE-ID w/ 24-pin connector, PRE-ID w/ 31-pin connector, TID 1, TID 2, and TID 3). Refer to Figure 1. After replacing any component of the transmission controls or the transmission assembly, perform calibration procedures in TM 9-2320-366-20-4 paragraph 8-2 or 8-3.

H-2. EXPLANATION OF COLUMNS

a. Column (1) - Installed Controls or Controls Being Installed. This column lists all of the variables concerning which version of transmission controls are installed in the vehicle, or may need to be installed, to communicate correctly with the transmission.

b. Column (2) - Installed Transmission or Transmission Being Installed. This column lists all of the various revisions of the Allison MD3070PT transmissions that may be installed in the vehicle.

c. Column (3) - Required Modification. This column lists the various electrical interface (hardware) modifications that may be required to allow the transmission controls to communicate with the transmission.

H-3. HOW TO USE THIS CHART

a. Determine which controls and transmission are installed in the vehicle.

b. Determine which component requires replacement.

c. Read across the row to column (3) to determine the required modification.

Section II.

TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART

(1) Installed Controls or Controls Being Installed	(2) Installed Transmission or Transmission Being Installed	(3) Required Modification (Refer to Section III)
WTEC II (with 24-pin connector)	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	No modification required.
WTEC II (with 24-pin connector)	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	Install 31-pin connector.
WTEC II (with 24-pin connector)	TID 1 (transmission serial number 6510090786 to 6510142171)	Install 31-pin connector.
WTEC II (with 24-pin connector)	TID 2 (transmission serial number 6510142172 to 6510262116)	Install 31-pin connector and replace transmission internal wiring harness.

TRANSMISSION/TRANSMISSION CONTROLS ADAPTABILITY CHART (CONT)

(1) Installed Controls or Controls Being Installed	(2) Installed Transmission or Transmission Being Installed	(3) Required Modification (Refer to Section III)
WTEC II (with 24-pin connector)	TID 3 (transmission serial number 6510262117 and subsequent)	Install 31-pin connector, replace transmission internal wiring harness, and reprogram WTEC II TEPSS. [1]
WTEC II (with 31-pin connector)	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	Install adapter cable assembly.
WTEC II (with 31-pin connector)	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	No modification required.
WTEC II (with 31-pin connector)	TID 1 (transmission serial number 6510090786 to 6510142171)	No modification required.
WTEC II (with 31-pin connector)	TID 2 (transmission serial number 6510142172 to 6510262116)	Replace transmission internal wiring harness.
WTEC II (with 31-pin connector)	TID 3 (transmission serial number 6510262117 and subsequent)	Replace transmission internal wiring harness and reprogram WTEC II TEPSS. [1]
WTEC III (with ECU manufactured prior to October 1999) [2]	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	Install adapter cable assembly and ID harness.
WTEC III (with ECU manufactured prior to October 1999) [2]	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	Install ID harness.
WTEC III (with ECU manufactured prior to October 1999) [2]	TID 1 (transmission serial number 6510090786 to 6510142171)	No modification required.
WTEC III (with ECU manufactured prior to October 1999) [2]	TID 2 (transmission serial number 6510142172 to 6510262116)	No modification required.
WTEC III (with ECU manufactured prior to October 1999) [2]	TID 3 (transmission serial number 6510262117 and subsequent)	Reprogram WTEC III ECU [1] or install new WTEC III ECU (P/N 12421787-002).
WTEC III (with ECU manufactured after October 1999) [3]	PRE-ID w/ 24-pin connector (transmission serial number prior to 6510032369)	Install adapter cable assembly and ID harness.
WTEC III (with ECU manufactured after October 1999) [3]	PRE-ID w/ 31-pin connector (transmission serial number 6510032369 to 6510090785)	Install ID harness.
WTEC III (with ECU manufactured after October 1999) [3]	TID 1 (transmission serial number 6510090786 to 6510142171)	No modification required.

[1] Reprogramming can only be accomplished by an authorized Allison Transmission distributor. You must provide the transmission serial number of the transmission being installed to ensure correct reprogramming. If at a later time, an earlier version transmission is installed in a WTEC II equipped vehicle, WTEC II TEPSS will require reprogramming again.
[2] Vehicle serial number 012477 and lower. Refer to Figure 1.
[3] Vehicle serial number 012478 and higher. Refer to Figure 1.

(1) Installed Controls or Controls Being Installed	(2) Installed Transmission or Transmission Being Installed	(3) Required Modification (Refer to Section III)
WTEC III (with ECU manufactured after October 1999) [3]	TID 2 (transmission serial number 6510142172 to 6510262116)	No modification required.
WTEC III (with ECU manufactured after October 1999) [3]	TID 3 (transmission serial number 6510262117 and subsequent)	No modification required.

Section III.

MODIFICATION PARTS IDENTIFICATION

Identification	Part Number/NSN	Description
31-pin connector	300130 5935-21-921-1813	Converts a transmission external wiring harness from a 24-pin ("D" type) connector to a 31-pin (round type) connector.
Transmission internal wiring harness	29529474 6150-01-481-8088	Converts a TID 2 transmission to a TID 1 configuration to allow WTEC II controls to communicate with the transmission.
Gasket	29503283 5330-01-360-9035	Required when replacing transmission internal wiring harness.
ID harness	200100 6150-21-921-1191	Allows WTEC III controls to communicate with a PRE-ID transmission.
Adapter cable assembly	29519210 6150-01-420-5987	Adapts a PRE-ID transmission with 24-pin ("D" type) connector to a transmission external wiring harness with a 31-pin (round) connector.

MODIFICATION PARTS IDENTIFICATION (CONT)

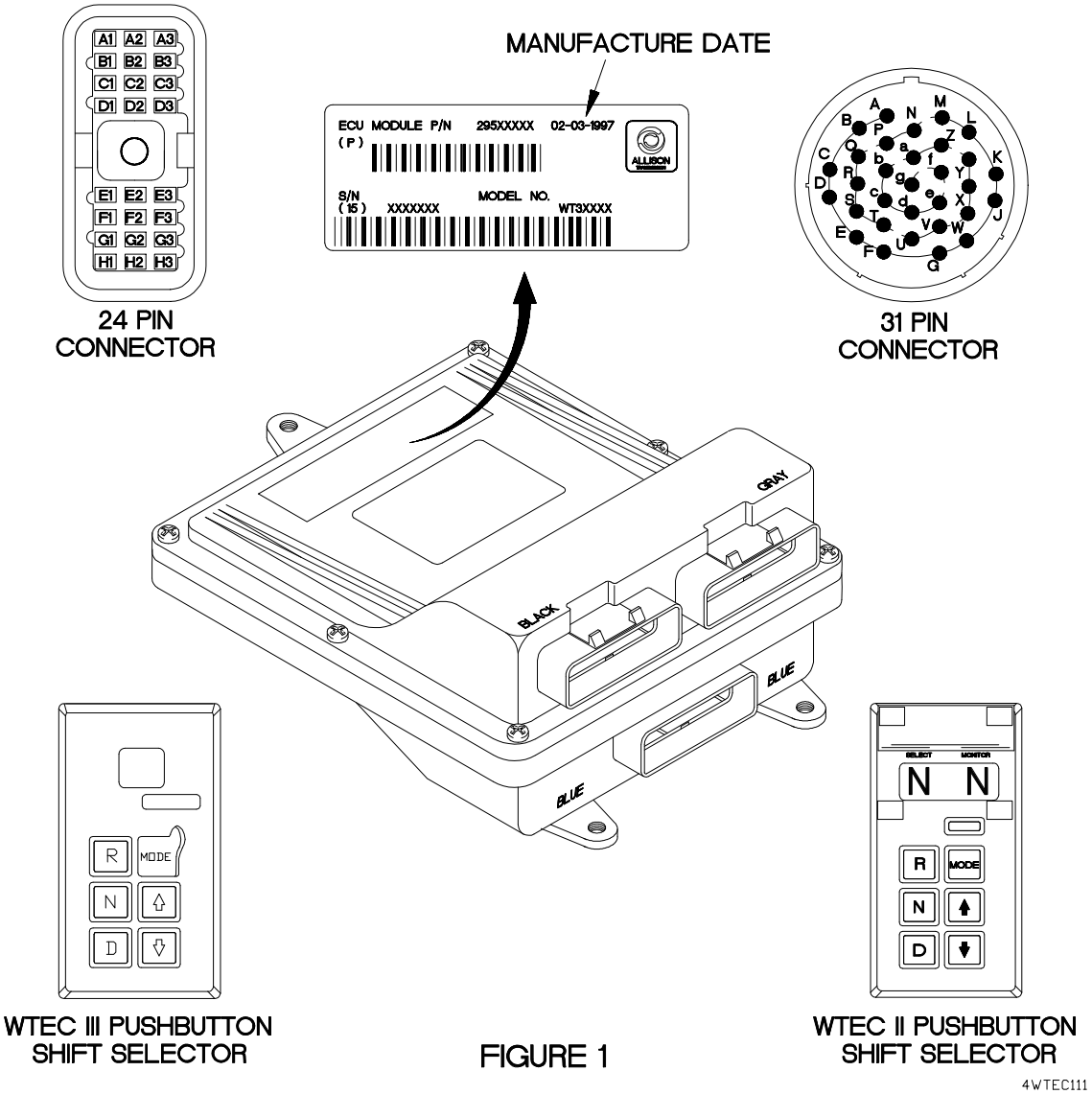


FIGURE 1

SUBJECT INDEX

Subject Para

B

Body and Cab Maintenance Introduction 15-1
Boom Assembly
  M1084/M1086 Boom Assembly Replacement 16-3
  M1089 Boom Assembly Replacement 16-33
Boom Base Section
  M1084/M1086 Boom Base Section Replacement 16-6
M1089 Boom Base Section Replacement 16-36
Boom Fly Section
  M1084/M1086 Boom Fly Section Replacement/Adjustment 16-4
  M1089 Boom Fly Section Replacement/Adjustment 16-34
Boom Mid Section
  M1084/M1086 Boom Mid Section and Telescopic Cylinder Replacement/ Adjustment 16-5
  M1089 Boom Mid Section and Telescopic Cylinder Replacement/Adjustment 16-35

C

Cab
  Body and Cab Maintenance Introduction 15-1
  Front Support Replacement/Repair 15-3
  M1093/M1094 Cab Rear Wall Replacement/Repair 15-5
  M1093/M1094 Cab Side Wall Replacement/Repair 15-4
  M1093/M1094 Cab Windshield Frame Replacement/Repair 15-6
  Replacement 15-2
  Windshield, Side Windows and Door Side Window Replacement 15-7
Cab Protector
  M1090/M1094 Dump Body Cab Protector Replacement 15-11
Cable Follower
  M1084/M1086 Cable Follower Replacement/Repair 16-14
  M1089 Cable Follower Replacement/ Repair 16-44
Cargo Bed Replacement/Repair 15-9

Subject Para

C (Cont)

Control
  M1086 Four Way Control Valve Assembly Replacement/Repair 16-28
  M1084/M1086 Hydraulic Motor Control Valve Replacement 16-17
  M1084/M1086 Three Way Control Valve Assembly Replacement/Repair 16-27
  M1089 Hydraulic Motor Control Valve Replacement 16-47
  M1089 Linear Directional Control Valve Replacement/Repair 16-82
  M1089 Wrecker Control Panel Replacement 16-94
Cooler
  Oil Cooler Replacement 3-19
Counterbalance
  15K Self-Recovery Winch (SRW) Counterbalance/Cartridge Valve Replacement 16-89
  30K Winch Counterbalance/Cartridge/ Solenoid Valve Replacement 16-81
Crane Load Test
  M1084/M1086 Crane Load Test 16-31
  M1089 Crane Load Test 16-62
Cross Relief Valve
  M1084/M1086 Cross Relief Valve Replacement 16-24
  M1089 Cross Relief Valve Replacement 16-54
Crossbar
  M1089 Crossbar Assembly Replacement/ Repair 16-69
Cylinder
  M1084/M1086 Boom Mid Section and Telescopic Cylinder Replacement /Adjustment 16-5
  M1084/M1086 Erection Cylinder Replacement 16-8
  M1084/M1086 Outrigger Jack Cylinder Replacement 16-26
  M1089 Boom Mid Section and Telescopic Cylinder Replacement/ Adjustment 16-35
  M1089 Fold Cylinder Replacement 16-71
  M1089 Lift Cylinder Replacement 16-37
  M1089 Outrigger Extension Cylinder Replacement 16-57

SUBJECT INDEX (CONT)

Subject Para

C (Cont)

Cylinder (Cont)
M1089 Outrigger Jack Cylinder Replacement 16-56
M1089 Stinger Cylinder Replacement 16-70
M1090/M1094 Dump Body Hoist Cylinder Replacement 17-4

D

Door
Cab Windshield, Side Windows and Door Side Window Replacement 15-7
Drive Motor
M1089 30K Winch Drive Motor Assembly Replacement/Repair 16-64
Dump Body
M1090/M1094 Dump Body Cab Protector Replacement 15-11
M1090/M1094 Dump Body Hoist Cylinder Replacement 17-4
M1090/M1094 Dump Body Replacement 15-10

E

Eight-Bank Valve
M1089 Eight-Bank Valve Assembly Replacement/Repair 16-59
Erection Cylinder
M1084/M1086 Erection Cylinder Replacement 16-8
M1089 Erection Cylinder Replacement 16-38
Extension Bracket
M1090 Rear Fender Mounting Bracket and Extension Bracket Replacement 15-8

F

Flowmeter Valve
M1089 Flowmeter Valve Assembly Replacement/Adjustment 16-79
Fold Cylinder
M1089 Fold Cylinder Replacement 16-71
Folding Boom
M1089 Folding Boom Frame Assembly Repair 16-77

Subject Para

F (Cont)

Four Way Control Valve
M1084/M1086 Four Way Control Valve Assembly Replacement/Repair 16-28
M1090/M1094 Four-Way Relief Valve Replacement/Repair 17-3
Frame
M1089 Folding Boom Frame Assembly Repair 16-77
Front
Cab Front Support Replacement/Repair 15-3

G

Gear Set
M1084/M1086 Gear Set Repair 16-21
M1089 Gear Set Repair 16-51

H

Hoist
M1090/M1094 Dump Body Hoist Cylinder Replacement 17-4
Hoist Assembly
M1084/M1086 Hoist Assembly Replacement 16-13
M1089 Hoist Assembly Replacement 16-43
Hoist Hydraulic Motor
M1084/M1086 Hoist Hydraulic Motor Replacement 16-19
M1089 Hoist Hydraulic Motor Replacement 16-49
Holding Valve
M1084/M1086 Holding Valve Replacement 16-18
M1089 Holding Valve Replacement 16-48
Hydraulic
15K Self-Recovery Winch (SRW) Hydraulic Motor Replacement 16-90
M1084/M1086 Hoist Hydraulic Motor Replacement 16-19
M1084/M1086 Hydraulic Motor Control Valve Replacement 16-17
M1084/M1086 Hydraulic Orbit Motor Replacement 16-25
M1089 Hydraulic Motor Control Valve Replacement 16-47

Subject Para

H (Cont)

Hydraulic (Cont)
M1089 Pay-Out Hydraulic Motor Relief Valve Replacement 16-87
M1089 Three Stage Hydraulic Pump Replacement 16-92
Pay-Out Hydraulic Motor Replacement 16-86
Rotary Pump Replacement 16-91
System Maintenance Introduction 17-1

I

Introduction
30K Winches, Underlift and 15K Self-Recovery Winch (SRW) Maintenance Introduction 16-1
Body and Cab Maintenance Introduction 15-1
Hydraulic Maintenance Introduction 27-1
Hydraulic System Maintenance Introduction 17-1

J

Jack Cylinder
M1084/M1086 Outrigger Jack Cylinder Replacement 16-26

L

Left Lower Arm
M1089 Left Lower Arm Assembly Replacement/Repair 16-74
Lift Cylinder
M1084/M1086 Lift Cylinder Replacement 16-7
M1089 Lift Cylinder Replacement 16-37
Linear Directional Control Valve
M1089 Linear Directional Control Valve Replacement/Repair 16-82
Lower Valve
M1089 Lower Valve Assembly Replacement/Repair 16-84

M

M1084
/M1086 Boom Assembly Replacement 16-3
/M1086 Boom Base Section Replacement 16-6
/M1086 Boom Fly Section Replacement/Adjustment 16-4

Subject Para

M (Cont)

M1084 (Cont)
/M1086 Boom Mid Section and Telescopic Cylinder Replacement/Adjustment 16-5
/M1086 Cable Follower Replacement/ Repair 16-14
/M1086 Crane Load Test 16-31
/M1086 Cross Relief Valve Replacement 16-24
/M1086 Erection Cylinder Replacement 16-8
/M1086 Four Way Control Valve Assembly Replacement/Repair 16-28
/M1086 Gear Set Repair 16-21
/M1086 Hoist Assembly Replacement 16-13
/M1086 Hoist Hydraulic Motor Replacement 16-19
/M1086 Holding Valve Replacement 16-18
/M1086 Hydraulic Motor Control Valve Replacement 16-17
/M1086 Hydraulic Orbit Motor Replacement 16-25
/M1086 Lift Cylinder Replacement 16-7
/M1086 Manual Override Valve Replacement 16-30
/M1086 Mast Replacement 16-10
/M1086 Material Handling Crane (MHC) Replacement 16-2
/M1086 Oil Filled Disc Brake Assembly Replacement 16-20
/M1086 Outrigger Jack Cylinder Replacement 16-26
/M1086 Overload Shutdown Replacement 16-22
/M1086 Proximity Sensor Replacement 16-15
/M1086 Swing Drive Assembly Replacement/Repair 16-23
/M1086 Tension Link Cylinder Replacement 16-9
/M1086 Tension Load Cell Replacement 16-16
/M1086 Three Way Control Valve Assembly Replacement/Repair 16-27
/M1086 Turntable Bearing Replacement 16-12
/M1086 Turntable Replacement 16-11
/M1086 Two Way Solenoid Valve Replacement 16-29

SUBJECT INDEX (CONT)

Subject Para

M (Cont)

M1086
- M1084/M1086 Boom Assembly Replacement 16-3
- M1084/M1086 Boom Base Section Replacement 16-6
- M1084/M1086 Boom Fly Section Replacement/Adjustment 16-4
- M1084/M1086 Boom Mid Section and Telescopic Cylinder Replacement /Adjustment 16-5
- M1084/M1086 Cable Follower Replacement/Repair 16-14
- M1084/M1086 Crane Load Test 16-31
- M1084/M1086 Cross Relief Valve Replacement 16-24
- M1084/M1086 Erection Cylinder Replacement 16-8
- M1084/M1086 Four Way Control Valve Assembly Replacement/Repair 16-28
- M1084/M1086 Gear Set Repair 16-21
- M1084/M1086 Hoist Assembly Replacement 16-13
- M1084/M1086 Hoist Hydraulic Motor Replacement 16-19
- M1084/M1086 Holding Valve Replacement 16-18
- M1084/M1086 Hydraulic Motor Control Valve Replacement 16-17
- M1084/M1086 Hydraulic Orbit Motor Replacement 16-25
- M1084/M1086 Lift Cylinder Replacement 16-7
- M1084/M1086 Manual Override Valve Replacement 16-30
- M1084/M1086 Mast Replacement 16-10
- M1084/M1086 Material Handling Crane (MHC) Replacement 16-2
- M1084/M1086 Oil Filled Disc Brake Assembly Replacement 16-20
- M1084/M1086 Outrigger Jack Cylinder Replacement 16-26
- M1084/M1086 Overload Shutdown Replacement 16-22
- M1084/M1086 Proximity Sensor Replacement 16-15
- M1084/M1086 Swing Drive Assembly Replacement/Repair 16-23

Subject Para

M (Cont)

M1086 (Cont)
- M1084/M1086 Tension Link Cylinder Replacement 16-9
- M1084/M1086 Tension Load Cell Replacement 16-16
- M1084/M1086 Three Way Control Valve Assembly Replacement/Repair 16-27
- M1084/M1086 Turntable Bearing Replacement 16-12
- M1084/M1086 Turntable Replacement 16-11
- M1084/M1086 Two Way Solenoid Valve Replacement 16-29

M1089
- 30K Winch Counterbalance/ Cartridge/Solenoid Valve Replacement 16-81
- 30K Winch Drive Motor Assembly Replacement/Repair 16-64
- Boom Assembly Replacement 16-33
- Boom Base Section Replacement 16-36
- Boom Fly Section Replacement/ Adjustment 16-34
- Boom Mid Section and Telescopic Cylinder Replacement/Adjustment 16-35
- Cable Follower Replacement/Repair 16-44
- Crane Load Test 16-62
- Crane Turntable Replacement 16-41
- Cross Relief Valve Replacement 16-54
- Crossbar Assembly Replacement/ Repair 16-69
- Eight-Bank Valve Assembly Replacement/Repair 16-59
- Erection Cylinder Replacement 16-38
- Flowmeter Valve Assembly Replacement/Adjustment 16-79
- Fold Cylinder Replacement 16-71
- Folding Boom Frame Assembly Repair 16-77
- Frame Plate Replacement 13-21
- Frame Rail Replacement 13-31
- Gear Set Repair 16-51
- Hoist Assembly Replacement 16-43
- Hoist Hydraulic Motor Replacement 16-49
- Holding Valve Replacement 16-48
- Hydraulic Motor Control Valve Replacement 16-47
- Hydraulic Orbit Motor Replacement 16-55

Subject Para

M (Cont)

M1089 (Cont)
Left Lower Arm Assembly Replacement/Repair....16-74
Lift Cylinder Replacement....16-37
Linear Directional Control Valve Replacement/Repair....16-82
Lower Valve Assembly Replacement/ Repair....16-84
Manual Override Valve Replacement....16-61
Mast Replacement....16-40
Material Handling Crane (MHC) Replacement....16-32
Monoblock Valve Replacement/ Adjustment....16-85
Oil Filled Disc Brake Assembly Replacement....16-50
Outrigger Beam Replacement....16-58
Outrigger Extension Cylinder Replacement....16-57
Outrigger Jack Cylinder Replacement....16-56
Overload Shutdown Replacement....16-52
Pay-Out Hydraulic Motor Relief Valve Replacement....16-87
Proximity Sensor Replacement....16-45
Relief Valve Replacement....16-87
Right Lower Arm Assembly Replacement/Repair....16-75
Selector Valve Assembly Replacement/ Repair....16-80
Stiffleg Assembly Repair....16-78
Stinger Cylinder Replacement....16-70
Swing Drive Assembly Replacement/ Repair....16-53
Telescopic Lift Cylinder Counterbalance Valve Replacement....16-73
Telescopic Lift Cylinder Replacement....16-72
Tension Link Cylinder Replacement....16-39
Tension Load Cell Replacement....16-46
Three Stage Hydraulic Pump Replacement....16-92
Tool Box Support Structure Replacement....15-12
Turntable Bearing Replacement....16-42
Two Way Solenoid Valve Replacement....16-60
Underlift and Stiffleg Assembly Replacement....16-68
Upper Arm Repair....16-76
Upper Main Valve Assembly Replacement/Repair....16-83

Subject Para

M (Cont)

M1089 (Cont)
Wrecker Control Panel Replacement....16-94
M1090
Rear Fender Mounting Bracket and Extension Bracket Replacement....15-8
/M1094 Dump Body Cab Protector Replacement....15-11
/M1094 Dump Body Hoist Cylinder Replacement....17-4
/M1094 Dump Body Replacement....15-10
/M1094 Four-Way Relief Valve Replacement/Repair....17-3
M1093
/M1094 Cab Rear Wall Replacement/ Repair....15-5
/M1094 Cab Side Wall Replacement/ Repair....15-4
/M1094 Cab Windshield Frame Replacement/Repair....15-6
M1094
M1090/M1094 Dump Body Cab Protector Replacement....15-11
M1090/M1094 Dump Body Hoist Cylinder Replacement....17-4
M1090/M1094 Dump Body Replacement....15-10
M1090/M1094 Four-Way Relief Valve Replacement/Repair....17-3
M1093/M1094 Cab Rear Wall Replacement/Repair....15-5
M1093/M1094 Cab Side Wall Replacement/Repair....15-4
M1093/M1094 Cab Windshield Frame Replacement/Repair....15-6
Manual Override Valve
M1084/M1086 Manual Override Valve Replacement....16-30
M1089 Manual Override Valve Replacement....16-61
Maintenance
30K Winches, Underlift and 15K Self-Recovery Winch (SRW) Maintenance Introduction....16-1
Body and Cab Maintenance Introduction....15-1
Hydraulic Maintenance Introduction....17-1
Mast
M1084/M1086 Mast Replacement....16-10
M1089 Mast Replacement....16-40

SUBJECT INDEX (CONT)

Subject Para

M (Cont)

Material Handling Cranes (MHC)
30K Winches, Underlift and 15K Self-Recovery Winch (SRW) Maintenance Introduction 16-1
M1084/M1086 Material Handling Crane (MHC) Replacement 16-2
M1089 Material Handling Crane (MHC) Replacement 16-32
Monoblock Valve
M1089 Monoblock Valve Replacement/Adjustment 16-85

O

Oil
M1084/M1086 Oil Filled Disc Brake Assembly Replacement 16-20
M1089 Oil Filled Disc Brake Assembly Replacement 16-50
Orbit Motor
M1084/M1086 Hydraulic Orbit Motor Replacement 16-25
M1089 Hydraulic Orbit Motor Replacement 16-55
Outrigger
M1084/M1086 Outrigger Jack Cylinder Replacement 16-26
M1089 Outrigger Beam Replacement 16-58
M1089 Outrigger Extension Cylinder Replacement 16-57
M1089 Outrigger Jack Cylinder Replacement 16-56
Overload Shutdown
M1084/M1086 Overload Shutdown Replacement 16-22
M1089 Overload Shutdown Replacement 16-52

P

Pay-Out
M1089 Pay-Out Hydraulic Motor Relief Valve Replacement 16-87
Power
Takeoff (PTO) Replacement/Repair 16-93
Proximity Sensor
M1084/M1086 Proximity Sensor Replacement 16-15

Subject Para

P (Cont)

Proximity Sensor (Cont)
M1089 Proximity Sensor Replacement 16-45
PTO
Power Takeoff (PTO) Replacement/Repair 16-93
Pump
Hydraulic Rotary Pump Replacement 16-91
M1089 Three Stage Hydraulic Pump Replacement 16-92

R

Rear
M1090 Rear Fender Mounting Bracket and Extension Bracket Replacement 15-8
M1093/M1094 Cab Rear Wall Replacement/Repair 15-5
Relief Valve
30K Winch Relief Valve Replacement/Repair 16-65
M1089 Pay-Out Hydraulic Motor Relief Valve Replacement 16-87
M1090/M1094 Four-Way Relief Valve Replacement/Repair 17-3
Right Lower Arm
M1089 Right Lower Arm Assembly Replacement/Repair 16-75
Rotary Pump
Hydraulic Rotary Pump Replacement 16-91

S

Selector Valve
M1089 Selector Valve Assembly Replacement/Repair 16-80
Self-Recovery
15K Self-Recovery Winch (SRW) Counterbalance/Cartridge Valve Replacement 16-89
15K Self-Recovery Winch (SRW) Hydraulic Motor Replacement 16-90
15K Self-Recovery Winch (SRW) Replacement/Repair 16-88
30K Winches, Underlift and 15K Self-Recovery Winch (SRW) Maintenance Introduction 16-1

Subject Para

S (Cont)

Solenoid
M1084/M1086 Two Way Solenoid Valve Replacement 16-29
M1089 30K Winch Counterbalance/ Cartridge/Solenoid Valve Replacement 16-81
M1089 Two Way Solenoid Valve Replacement 16-60
Stiffleg
M1089 Stiffleg Assembly Repair 16-78
M1089 Underlift and Stiffleg Assembly Replacement 16-68
Support
Cab Front Support Replacement/Repair 15-3
M1089 Tool Box Support Structure Replacement 15-12
Swing Drive
M1084/M1086 Swing Drive Assembly Replacement/Repair 16-23
M1084/M1086 Swing Drive Hydraulic Motor Repair 26-3
M1089 Swing Drive Assembly Replacement/Repair 16-53

T

Telescopic Cylinder
M1084/M1086 Boom Mid Section and Telescopic Cylinder Replacement/ Adjustment 16-5
M1089 Boom Mid Section and Telescopic Cylinder Replacement/ Adjustment 16-35
Telescopic Lift Cylinder
M1089 Telescopic Lift Cylinder Counterbalance Valve Replacement 16-73
M1089 Telescopic Lift Cylinder Replacement 16-72
Tension
M1084/M1086 Tension Link Cylinder Replacement 16-9
M1084/M1086 Tension Load Cell Replacement 16-16
M1089 Tension Link Cylinder Replacement 16-39
M1089 Tension Load Cell Replacement 16-46

Subject Para

T (Cont)

Three Stage
M1089 Three Stage Hydraulic Pump Replacement 16-92
Three Way Control Valve
M1084/M1086 Three Way Control Valve Assembly Replacement/Repair 16-27
Tool Box
M1089 Tool box Support Structure Replacement 15-12
Turntable
M1084/M1086 Turntable Bearing Replacement 16-12
M1084/M1086 Turntable Replacement 16-11
M1089 Crane Turntable Replacement 16-41
M1089 Turntable Bearing Replacement 16-42
Two Way Solenoid Valve
M1084/M1086 Two Way Solenoid Valve Replacement 16-29
M1089 Two Way Solenoid Valve Replacement 16-60

U

Underlift
30K Winches, Underlift and 15K Self-Recovery Winch (SRW) Maintenance Introduction 16-1
M1089 Underlift and Stiffleg Assembly Replacement 16-68
Upper Arm
M1089 Upper Arm Repair 16-76
Upper Main Valve
M1089 Upper Main Valve Assembly Replacement/Repair 16-83

W

Winch
15K Self-Recovery Winch (SRW) Counterbalance/Cartridge Valve Replacement 16-89
15K Self-Recovery Winch (SRW) Hydraulic Motor Replacement 16-90

SUBJECT INDEX (CONT)

Subject Para

W (Cont)

Winch (Cont)
15K Self-Recovery Winch (SRW)
Replacement/Repair 16-88
30K Winch Assembly Replacement/
Repair 16-63
30K Winch Relief Valve
Replacement/Repair 16-65
30K Winches, Underlift and 15K
Self-Recovery Winch (SRW)
Maintenance Introduction 16-1
M1089 30K Winch Counterbalance/
Cartridge/Solenoid Valve
Replacement 16-81
M1089 30K Winch Drive Motor
Assembly Replacement/Repair 16-64
Windows
Cab Windshield, Side Windows and
Door Side Window Replacement 15-7
Windshield
Cab Windshield, Side Windows and
Door Side Window Replacement 15-7
Wrecker
M1089 Wrecker Control Panel
Replacement 16-94

GLOSSARY
ABBREVIATIONS

CTIS	Central Tire Inflation System
ECU	Electronic Control Unit
LH	Left Hand
LMHC	Light Material Handling Crane
MHC	Material Handling Crane
O/R	Outrigger
PTO	Power Takeoff
RH	Right Hand
SRW	15K Self-Recovery Winch
STE/ICE-R	Simplified Test Equipment/Internal Combustion Engine-Reprogrammable
TEPSS	Transmission ECU Pushbutton Shift Selector
TM	Technical Manual
TPS	Throttle Position Sensor
TPSS	Transmission Pushbutton Shift Selector
VIM	Vehicle Interface Module
WTEC II	World Transmission Electronic Controls (version 2)
WTEC III	World Transmission Electronic Controls (version 3)

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
05125

DISTRIBUTION: To be distributed in accordance with the Initial Distribution Number (IDN) 380942, requirements for TM 9-2320-366-34-3.

☆U.S. GOVERNMENT PRINTING OFFICE:1998-746-025/80074

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is OAASA	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE Date you filled out this form
TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	FROM: *(Activity and location) (Include ZIP Code)* Enter your mailing address	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
	Publication Date	Publication Title

ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
10	15-33 19-6	15-7 19-2		4		Item 10. Change Illustration. Reason: Text calls out 90-degree fitting. Art shows straight fitting. Text is correct. Step (4) of removal says to disconnect four hydraulic hoses from manifold. The correct number of hydraulic hoses is five. correct the text to reflect the actual quantity of hydraulic hoses. The supporting illustration is correct.

SAMPLE

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Your title	Your telephone number	Your signature

TO: *(Forward direct to addressee listed in publication)*	FROM: *(Activity and location) (Include ZIP Code)*	DATE
	Enter your mailing address	Date you filled out this form.

PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
	Publication Date	Your Title

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Your title	Your telephone number	Your signature

SAMPLE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2320-366-34-3	15 September 1998	M1083 Series MTV

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

TO: (*Forward direct to addressee listed in publication*) AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 9-2320-366-34-3	15 September 1998	M1083 Series MTV

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

USAPPC V3.00

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2320-366-34-3	15 September 1998	M1083 Series MTV

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

TO: (*Forward direct to addressee listed in publication*) AMSTA-LC-LMIT / T ECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 9-2320-366-34-3	15 September 1998	M1083 Series MTV

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

USAPPC V3.00

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-LMIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2320-366-34-3	15 September 1998	M1083 Series MTV

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

TO: *(Forward direct to addressee listed in publication)*	**FROM:** *(Activity and location) (Include ZIP Code)*	**DATE**

PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

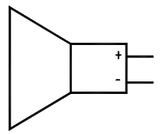
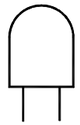
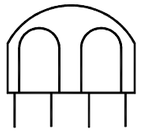
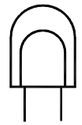
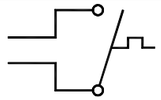
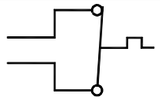
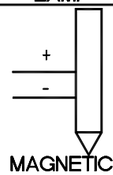
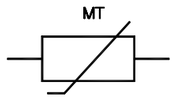
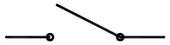
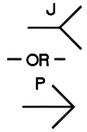
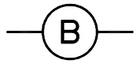
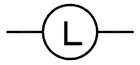
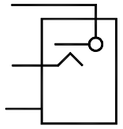
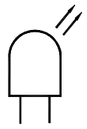
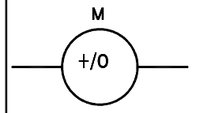
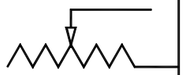
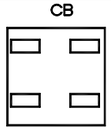
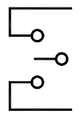
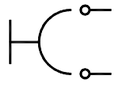
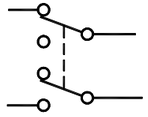
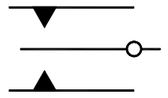
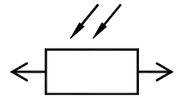
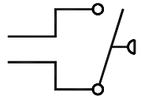
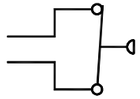
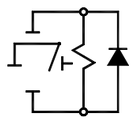
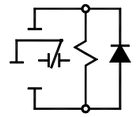
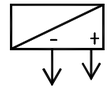
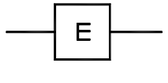
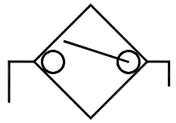
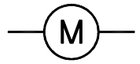
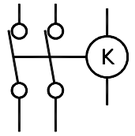
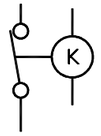
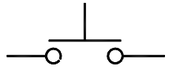
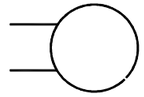
 HORN	BLACKOUT LAMP	 LAMP	 DUALBEAM LAMP	GROUND	 POWER LAMP	OPEN CONTACT	BATTERY
 TEMPERATURE SWITCH OPEN	 TEMPERATURE SWITCH CLOSED	 MAGNETIC PICKUP	 SENSOR	 NORMALLY OPEN	NORMALLY CLOSED	CONNECTOR	 RECEPTACLE
 MOTOR	 SOLENOID	 LEVEL SENSOR	FILTER	 LED	 METER OR GAGE	CLOSED CONTACT	 DIMMER MODULE
 CIRCUIT 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	ILL. NO.	
B	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 (TID1) 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 (TID1)
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	TID1, 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	TID1, 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	TID1, TID2, AND TID3 TRANSMISSION ENGINE SPEED SENSOR CONNECTOR
P73	F75	9	PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION SENSOR CONNECTOR
P73	F79	9	TID1, 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	TID1, TID2, AND TID3 TRANSMISSION CONNECTOR
P119	D82	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION CONNECTOR
P125	G93	11	WINDSHIELD WASHER ROTARY PUMP (B3)
P129	F94	11	CAB MARKER LIGHT FRONT LOWER LEFT
P130	F94	11	CAB MARKER LIGHT LEFT DOOR
P131	A94	11	CAB MARKER LIGHT RIGHT DOOR
P132	B94	11	CAB MARKER LIGHT FRONT LOWER RIGHT
P133	A199	23	LH WORKLIGHTS
P133	B209	24	LH WORKLIGHTS
P133A	B199	23	LH WORKLIGHTS
P133A	B209	24	LH WORKLIGHTS
P134	G199	23	RH WORKLIGHTS
P134	C209	24	RH WORKLIGHTS
P134A	F199	23	RH WORKLIGHTS
P134A	B209	24	RH WORKLIGHTS
P135	D260	29	CAB - DASH - CENTER - OPTIONS PANEL
P136	C260	29	CAB - DASH - CENTER - OPTIONS PANEL
P171	F308	35	CARGO MATERIAL HANDLING CRANE
P172	A300	34	DUMP BODY CONNECTOR
P201	G70	8	ENGINE
P209A	F268	30	TRANSMISSION AUXILIARY OIL COOLER FAN
P209B	G264	30	DUMP, CARGO LWB, CARGO W/MHC, CARGO LWB W/MHC
P209B	G268	30	TRANSMISSION AUXILIARY OIL COOLER FAN
P210	F258	29	CAB - DASH - CENTER - OPTIONS PANEL
P210	C263	30	PTO EQUIPPED
P215	E266	30	PTO EQUIPPED
P216	E265	30	PTO EQUIPPED
P216	A304	34	PTO PRESSURE SWITCH CONNECTOR
P217	C265	30	PTO EQUIPPED
P217	B304	34	PTO SOLENOID CONNECTOR
P901	A245	28	CAB - DASH - CENTER - OPTIONS PANEL
P902	C250	28	CAB - DASH - CENTER - OPTIONS PANEL
P902A	D250	28	CAB - DASH - CENTER - OPTIONS PANEL
P903	C248	28	CAB - DASH - CENTER - OPTIONS PANEL
P903A	D248	28	CAB - DASH - CENTER - OPTIONS PANEL
P904	C247	28	CAB - DASH - CENTER - OPTIONS PANEL
P904A	D247	28	CAB - DASH - CENTER - OPTIONS PANEL
P905	A247	28	CAB - DASH - CENTER - OPTIONS PANEL

FIGURE FO-1 ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 2 OF 40

SIZE B | ILL. NO. 6WD01L2B | FP-3/ (FP-4 BLANK)

CONNECTORS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
P905A	B247	28	CAB - DASH - CENTER - OPTIONS PANEL
P906	A248	28	CAB - DASH - CENTER - OPTIONS PANEL
P906A	B248	28	CAB - DASH - CENTER - OPTIONS PANEL
P908	A251	28	CAB - DASH - CENTER - OPTIONS PANEL
P908A	B251	28	CAB - DASH - CENTER - OPTIONS PANEL
P909	A256	29	CAB - DASH - CENTER - OPTIONS PANEL
P909A	B256	29	CAB - DASH - CENTER - OPTIONS PANEL
P910	B251	28	CAB - DASH - CENTER - OPTIONS PANEL
P910A	D251	28	CAB - DASH - CENTER - OPTIONS PANEL
P911	B256	29	CAB - DASH - CENTER - OPTIONS PANEL
P911A	D256	29	CAB - DASH - CENTER - OPTIONS PANEL
P912	B133	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
P912A	F134	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
P913	B131	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
P913	F245	28	CAB - DASH - CENTER - OPTIONS PANEL
P914	A250	28	CAB - DASH - CENTER - OPTIONS PANEL
P914A	B250	28	CAB - DASH - CENTER - OPTIONS PANEL
P921	G70	8	TROOP TRANSPORT ALARM
P94	A199	23	LH INTERMEDIATE MARKER
P94	A217	25	LH INTERMEDIATE MARKER
P95	G199	23	RH INTERMEDIATE MARKER
P95	G217	25	RH INTERMEDIATE MARKER
P99	F195	22	CHEMICAL ALARM CONNECTOR
PX1	A101	12	ENGINE FAN OFF SWITCH
PX10	D116	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX11	G116	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX12	C121	14	ROTATING WARNING LIGHT SWITCH
PX12A	E121	14	CAB - DASH - LEFT - INSTRUMENT PANEL
PX13	F101	12	ETHER STARTER SWITCH
PX13A	G101	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX14	F121	14	FULL HAZARD WARNING SWITCH
PX14A	H121	14	CAB - DASH - LEFT - INSTRUMENT PANEL
PX15	C124	14	MAIN LIGHT SWITCH
PX17	A121	14	IGNITION SWITCH
PX17A	C112	14	CAB - DASH - LEFT - INSTRUMENT PANEL
PX1A	B101	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX2	D101	12	LAMP TEST SWITCH
PX20	C197	22	TURN SIGNAL FLASHER
PX21	A143	16	WIPER DELAY MODULE
PX22	A193	22	EMI FILTER
PX24	G124	14	INSTRUMENT PANEL LIGHTS DIMMER MODULE
PX25	C128	15	CAB - DASH - CENTER - HEATER/CTIS - ECU
PX26	B188	21	CAB - DASH - LEFT - UNDERDASH
PX2A	E101	12	CAB - DASH - LEFT - INSTRUMENT PANEL
PX33	B191	22	CAB - DASH - RIGHT - UNDERDASH
PX33	G346	39	WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR
PX34	E197	22	FRONT AIR PRESSURE METER
PX4	F106	12	FAN SOLENOID
PX5	B106	12	REAR AIR PRESSURE METER
PX50	D197	22	INTER-AXLE DIFFERENTIAL SOLENOID
PX6	B116	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX7	A113	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX8	G111	13	CAB - DASH - LEFT - INSTRUMENT PANEL
PX9	D106	12	FUEL LEVEL METER

LIGHTS			
NUMBER	ZONE	SH	DESCRIPTION
DS1	D105	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS2	G115	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS3	F105	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS4	B105	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS5	B115	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS6	G110	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS7	D115	13	CAB - DASH - LEFT - INSTRUMENT PANEL
DS8	C100	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS9	B110	13	DUMP BODY UP
DS10	E120	14	CAB - DASH - LEFT - INSTRUMENT PANEL
DS11	G100	12	CAB - DASH - LEFT - INSTRUMENT PANEL
DS12	H120	14	CAB - DASH - LEFT - INSTRUMENT PANEL
DS13	C120	14	CAB - DASH - LEFT - INSTRUMENT PANEL
DS14	B110	13	LEFT TURN SIGNAL
DS15	B110	13	RIGHT TURN SIGNAL

LIGHTS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
DS16	E110	13	HIGH BEAM
DS17	D128	15	HEATER CONTROL PANEL ILLUMINATION
DS18	A244	28	CAB - DASH - CENTER - OPTIONS PANEL
DS19	E110	13	RADIATOR FAN OFF
DS21	C110	13	EMERGENCY BRAKE
DS22	D110	13	PARKING BRAKE
DS23	C110	13	PTO ON
DS24	D110	13	OIL PRESSURE
DS25	C110	13	WATER TEMPERATURE
DS27	C110	13	REAR BRAKE AIR
DS28	E110	13	FRONT AIR BRAKE
DS29	D110	13	ENGINE OIL LEVEL
DS30	F110	13	MASTER STOP
DS31	D249	28	CAB - DASH - CENTER - OPTIONS PANEL
DS32	B110	13	CHEMICAL DETECT
DS34	C110	13	CTIS OVERSPEED
DS35	C207	23	WRECKER BLACKOUT STOP LEFT REAR
DS35	B216	24	TRACTOR BLACKOUT STOP LEFT REAR
DS35	C225	25	LONG WHEEL BASE BLACKOUT STOP LEFT REAR
DS35	C234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT STOP LEFT REAR
DS36	G207	23	WRECKER BLACKOUT STOP RIGHT REAR
DS36	D216	24	TRACTOR BLACKOUT STOP RIGHT REAR
DS36	G225	25	LONG WHEEL BASE BLACKOUT STOP RIGHT REAR
DS36	G234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT STOP RIGHT REAR
DS37	B207	23	WRECKER REAR LEFT COMPOSITE
DS37	A216	24	TRACTOR REAR LEFT COMPOSITE
DS37	B225	25	LONG WHEEL BASE REAR LEFT COMPOSITE
DS37	B234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR LEFT COMPOSITE
DS38	F207	23	WRECKER REAR RIGHT COMPOSITE
DS38	E216	24	TRACTOR REAR RIGHT COMPOSITE
DS38	F225	25	LONG WHEEL BASE REAR RIGHT COMPOSITE
DS38	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR RIGHT COMPOSITE
DS39	F46	6	FRONT LEFT TURN SIGNAL
DS41	D110	13	TRANSMISSION OIL TEMPERATURE
DS42	C47	6	FRONT RIGHT TURN SIGNAL
DS43	D248	28	CAB - DASH - CENTER - OPTIONS PANEL
DS44	D46	6	RIGHT HEADLIGHT
DS45	D207	23	WRECKER BACKUP LIGHT
DS45	C216	24	TRACTOR BACKUP LIGHT
DS45	C225	25	LONG WHEEL BASE BACKUP LIGHT
DS45	C234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BACKUP LIGHT
DS46	D246	28	CAB - DASH - CENTER - OPTIONS PANEL
DS47	G46	6	PARKING LIGHT FRONT LEFT
DS48	B47	6	PARKING LIGHT FRONT RIGHT
DS49	G46	6	BLACKOUT MARKER LEFT FRONT
DS50	B47	6	BLACKOUT MARKER RIGHT FRONT
DS51	B207	23	WRECKER BLACKOUT MARKER LEFT REAR
DS51	B216	24	TRACTOR BLACKOUT MARKER LEFT REAR
DS51	B225	25	LONG WHEEL BASE BLACKOUT MARKER LEFT REAR
DS51	C234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND WRECKER BLACKOUT MARKER LEFT REAR
DS52	F207	23	WRECKER BLACKOUT MARKER RIGHT REAR
DS52	D216	24	TRACTOR BLACKOUT MARKER RIGHT REAR
DS52	F225	25	LONG WHEEL BASE BLACKOUT MARKER RIGHT REAR
DS52	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT MARKER RIGHT REAR
DS53	H46	6	BLACKOUT DRIVE LIGHT
DS54	D93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
DS54	F242	27	LH FRONT TOP CAB CLEARANCE LIGHT
DS52	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE BLACKOUT MARKER RIGHT REAR

LIGHTS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
DS53	H46	6	BLACKOUT DRIVE LIGHT
DS54	D93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE LEFT
DS54	F242	27	LH FRONT TOP CAB CLEARANCE LIGHT
DS55	D93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
DS55	E242	27	MIDDLE FRONT TOP CLEARANCE LIGHT
DS56	C93	11	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
DS56	D242	27	RH FRONT TOP CAB CLEARANCE LIGHT
DS57	C93	11	CAB MARKER LIGHT FRONT UPPER RIGHT
DS57	D242	27	RH FRONT TOP CAB MARKER LIGHT
DS58	E93	11	CAB MARKER LIGHT FRONT UPPER LEFT
DS58	F242	27	LH FRONT TOP CAB MARKER LIGHT
DS59	B93	11	CAB MARKER LIGHT RIGHT DOOR
DS60	F93	11	CAB MARKER LIGHT FRONT LOWER LEFT
DS61	A93	11	CAB MARKER LIGHT RIGHT DOOR
DS62	F93	11	CAB MARKER LIGHT LEFT DOOR
DS63	B246	28	CAB - DASH - CENTER - OPTIONS PANEL
DS64	B248	28	CAB - DASH - CENTER - OPTIONS PANEL
DS65	A207	23	WRECKER LH SIDE MARKER LIGHT
DS65	A225	25	LONG WHEEL BASE LH SIDE MARKER LIGHT
DS65	A234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE LH SIDE MARKER LIGHT
DS66	A207	23	WRECKER LH REAR MARKER LIGHT
DS66	A216	24	TRACTOR LH REAR MARKER LIGHT
DS66	A225	25	LONG WHEEL BASE LH REAR MARKER LIGHT
DS66	A234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE LH REAR MARKER LIGHT
DS67	H207	23	WRECKER RH SIDE MARKER LIGHT
DS67	H225	25	LONG WHEEL BASE RH SIDE MARKER LIGHT
DS67	H234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE RH SIDE MARKER LIGHT
DS68	G207	23	WRECKER RH REAR MARKER LIGHT
DS68	C216	24	TRACTOR RH REAR MARKER LIGHT
DS68	G225	25	LONG WHEEL BASE RH REAR MARKER LIGHT
DS68	G234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE RH REAR MARKER LIGHT
DS69	D207	23	WRECKER LEFT REAR MARKER
DS69	G216	24	TRACTOR LEFT REAR MARKER
DS69	D225	25	LONG WHEEL BASE LEFT REAR MARKER
DS69	D234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE LEFT REAR MARKER
DS70	E207	23	WRECKER MIDDLE REAR MARKER
DS70	F216	24	TRACTOR MIDDLE REAR MARKER
DS70	E225	25	LONG WHEEL BASE MIDDLE REAR MARKER
DS70	E234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE MIDDLE REAR MARKER
DS71	E207	23	WRECKER RIGHT REAR MARKER
DS71	E216	24	TRACTOR RIGHT REAR MARKER
DS71	E225	25	LONG WHEEL BASE RIGHT REAR MARKER
DS71	E234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE RIGHT REAR MARKER
DS72	B207	23	WRECKER REAR LEFT COMPOSITE
DS72	B216	24	TRACTOR REAR LEFT COMPOSITE
DS72	B225	25	LONG WHEEL BASE REAR LEFT COMPOSITE
DS72	B234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR LEFT COMPOSITE
DS73	F207	23	WRECKER REAR RIGHT COMPOSITE
DS73	E216	24	TRACTOR REAR RIGHT COMPOSITE
DS73	F225	25	LONG WHEEL BASE REAR RIGHT COMPOSITE
DS73	F234	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE REAR RIGHT COMPOSITE
DS74	D46	6	LEFT HEADLIGHT
DS96	B251	28	CAB - DASH - CENTER - OPTIONS PANEL
DS97	B255	29	CAB - DASH - CENTER - OPTIONS PANEL
DS98	D251	28	CAB - DASH - CENTER - OPTIONS PANEL
DS99	D255	29	CAB - DASH - CENTER - OPTIONS PANEL
DS100	B249	28	CAB - DASH - CENTER - OPTIONS PANEL
DS101	D128	15	HEATER CONTROL PANEL ILLUMINATION
DS108	E100	12	CAB - DASH - LEFT - INSTRUMENT PANEL

CIRCUIT BREAKERS			
NUMBER	ZONE	SH	DESCRIPTION
CB20	C149	17	CAB RADIO
CB21	C158	18	WTEC II VIM STE/ICE

CIRCUIT BREAKERS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
CB22	C158	18	FAN/ETHER
CB23	C156	18	HEATER BLOWER
CB30	C148	17	CHEMICAL ALARM
CB35	D158	18	WTEC II VIM POWER
CB36	C156	18	HORN POWER
CB37	C160	18	WINDSHIELD WIPER/WASHER
CB38	D156	18	ROTATING BEACON
CB39	C155	18	TRAILER BLACKOUT STOP
CB40	C159	18	CTIS COOLER
CB41	C151	17	TRAILER REAR LIGHTS POWER
CB42	C151	17	BLACKOUT MARKER LIGHTS POWER
CB43	C152	17	REAR COMPOSITE LIGHTS / WTEC III ECU
CB44	C152	17	REAR COMPOSITE LIGHTS
CB45	C148	17	FUEL PREHEAT
CB48	C149	17	ARCTIC CAB/ENGINE KILL
CB49	C160	18	PTO POWER
CB50	C155	18	SWINGFIRE PUMP POWER
CB53	D149	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB54	D151	17	BLACKOUT HEADLIGHT
CB61	D162	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB62	D162	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB63	D160	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB64	D160	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB65	D149	17	PARKING LIGHTS
CB66	D152	17	BLACKOUT MARKER POWER
CB67	D148	17	MARKER LIGHTS
CB68	C161	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB70	D155	18	IGNITION/MAIN LIGHT SWITCH
CB71	D158	18	HAZARD/FLASHER WORKLIGHTS
CB72	D148	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB73	D159	18	BACK-UP LIGHT POWER
CB74	D159	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
CB76	D152	17	BLACKOUT STOP RELAY POWER
CB77	C161	18	ENGINE INSTR POWER
CB78	D156	18	HEADLIGHTS
CB79	C159	18	WTEC II VIM POWER / WTEC III REVERSE WARNING RELAY
CB80	D151	17	TAILLIGHTS

TERMINAL LUGS			
NUMBER	ZONE	SH	DESCRIPTION
TL1	B63	7	POLARITY PROTECTION
TL1	E69	8	ALTERNATOR
TL1	F62	7	200 AMP
TL2	D62	7	200 AMP
TL2	B62	7	POLARITY PROTECTION
TL2	D69	8	ALTERNATOR
TL3	C94	11	CAB MARKER LIGHT FRONT UPPER RIGHT
TL3	D242	27	RH FRONT TOP CAB MARKER LIGHT
TL4	C94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE RIGHT
TL4	D242	27	RH FRONT TOP CAB CLEARANCE LIGHT
TL5	D69	8	ALTERNATOR
TL6	D69	8	ALTERNATOR
TL9	D56	7	24V AUXILIARY STARTER SOLENOID
TL8	D94	11	CAB MARKER LIGHT FRONT UPPER MIDDLE MIDDLE
TL8	E242	27	MIDDLE FRONT TOP CLEARANCE LIGHT
TL10	C61	7	CHASSIS - REAR (REF E1)
TL12	C58	7	BATTERIES
TL12	C71	8	STARTER/STARTER SOLENOID
TL14	E97	11	ROTARY WARNING LIGHT CONNECTOR
TL15	A206	23	WRECKER REAR LIGHTS
TL15	A224	25	LONG WHEEL BASE
TL15	A233	26	LH SIDE MARKER LIGHT
TL16	B206	23	WRECKER REAR LIGHTS
TL16	G215	24	REAR LIGHTS TRACTOR
TL16	B224	25	LONG WHEEL BASE
TL16	A233	26	LH REAR MARKER LIGHT

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL17	C233	26	BACKUP LIGHT
TL17	C206	23	WRECKER REAR LIGHTS
TL17	C215	24	REAR LIGHTS TRACTOR
TL17	C224	25	LONG WHEEL BASE
TL18	C206	23	WRECKER REAR LIGHTS
TL18	H215	24	REAR LIGHTS TRACTOR
TL18	C224	25	LONG WHEEL BASE REAR LIGHTS
TL18	C233	26	LONG WHEEL BASE
TL19	H206	23	WRECKER REAR LIGHTS
TL19	H224	25	LONG WHEEL BASE
TL19	H233	26	RH SIDE MARKER LIGHT
TL20	G233	26	RH REAR MARKER LIGHT
TL20	C215	24	TRACTOR REAR LIGHTS
TL20	G224	25	LONG WHEELBASE REAR LIGHTS
TL20	G206	23	WRECKER REAR LIGHTS
TL21	G206	23	WRECKER REAR LIGHTS
TL21	D215	24	REAR LIGHTS TRACTOR
TL21	G224	25	LONG WHEEL BASE
TL21	G233	26	RH COMPOSITE LIGHT
TL22	D94	11	CAB MARKER LIGHTS
TL22	E242	27	LH FRONT TOP CAB CLEARANCE LIGHT
TL23	D56	7	24V AUXILIARY STARTER SOLENOID
TL24	D56	7	24V AUXILIARY STARTER SOLENOID
TL25	C56	7	CHASSIS - FRONT
TL25	C71	8	STARTER/STARTER SOLENOID
TL26	B56	7	CHASSIS - FRONT
TL26	C71	8	STARTER/STARTER SOLENOID
TL27	E94	11	CAB MARKER LIGHTS
TL27	F242	27	LH FRONT TOP CAB MARKER LIGHT
TL28	G66	8	FUEL SOLENOID
TL29	H66	8	FUEL SOLENOID
TL30	D206	23	WRECKER REAR LIGHTS
TL30	E215	24	REAR LIGHTS TRACTOR
TL30	D224	25	LONG WHEEL BASE
TL30	D233	26	LEFT REAR MARKER
TL31	E206	23	WRECKER REAR LIGHTS
TL31	F215	24	REAR LIGHTS TRACTOR
TL31	E224	25	LONG WHEEL BASE
TL31	E233	26	MIDDLE REAR MARKER
TL32	E206	23	WRECKER REAR LIGHTS
TL32	G215	24	REAR LIGHTS TRACTOR
TL32	E224	25	LONG WHEEL BASE
TL32	E233	26	RIGHT REAR MARKER
TL320	E268	30	PTO EQUIPPED
TL320	C277	31	ARCTIC KIT W/PTO EQUIPPED
TL33	E56	7	24V AUXILIARY STARTER SOLENOID
TL35	D70	8	ALTERNATOR
TL36	B62	7	POLARITY PROTECTION
TL36	F63	7	200 AMP
TL37	F63	7	200 AMP
TL37	B63	7	POLARITY PROTECTION
TL38	D59	7	SHUNT
TL39	C61	7	CHASSIS - REAR (REF E1)
TL41	B62	7	POLARITY PROTECTION
TL42	B62	7	POLARITY PROTECTION
TL44	B62	7	POLARITY PROTECTION
TL44	E63	7	200 AMP
TL45	D59	7	SHUNT
TL46	D58	7	SHUNT
TL46	D71	8	STARTER/STARTER SOLENOID
TL47	F63	7	200 AMP
TL47	C63	7	POLARITY PROTECTION
TL48	E61	7	CHASSIS - REAR (REF E2)
TL49A	D61	7	CHASSIS - REAR (REF E1)
TL49A	F61	7	NATO SLAVE RECEPTACLE
TL50	G130	15	CHASSIS GROUND
TL50A	F61	7	NATO SLAVE RECEPTACLE
TL51	E59	7	SHUNT
TL52	E59	7	SHUNT

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 3 OF 40

SIZE B | ILL NO. 6WD01L3B | FP-5/ (FP-6 BLANK)

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL53	B56	7	CHASSIS - FRONT
TL53	B71	8	STARTER/STARTER SOLENOID
TL54	C200	23	WRECKER REAR LIGHTS
TL55	B56	7	CHASSIS - FRONT
TL55	C71	8	STARTER/STARTER SOLENOID
TL56	F145	17	X3 GROUND
TL57	F145	17	CAB GROUND
TL58	D69	8	ALTERNATOR
TL59	C70	8	ALTERNATOR
TL60	C62	7	POLARITY PROTECTION
TL60	D69	8	ALTERNATOR
TL61	C62	7	POLARITY PROTECTION
TL61	E69	8	ALTERNATOR
TL61	F62	7	200 AMP
TL62	C56	7	CHASSIS - FRONT
TL63	C56	7	CHASSIS - FRONT
TL63	B71	8	STARTER/STARTER SOLENOID
TL66	H70	8	ENGINE (REF P201)
TL67	F307	35	CARGO MATERIAL HANDLING CRANE
TL68	D260	29	CAB - DASH - CENTER - OPTIONS PANEL
TL69	E260	29	CAB - DASH - CENTER - OPTIONS PANEL
TL70	B47	6	FRONT RH COMPOSITE LIGHT
TL71	A94	11	CAB MARKER LIGHT RIGHT DOOR
TL72	H47	6	BLACKOUT DRIVE LIGHT
TL73	B95	11	CAB MARKER LIGHTS
TL74	D95	11	CAB MARKER LIGHTS
TL74	E240	27	AIRDROP ONLY
TL75	F96	11	CAB MARKER LIGHTS
TL76	D265	30	PTO EQUIPPED
TL77	B299	34	DUMP BODY
TL78	B298	34	DUMP BODY
TL77	B299	34	DUMP BODY
TL78	B298	34	DUMP BODY
TL79	F47	6	FRONT LH COMPOSITE LIGHT
TL80	E63	7	200 AMP
TL80	C62	7	POLARITY PROTECTION
TL81	C48	6	CHASSIS - GROUND
TL82	F47	6	CHASSIS - GROUND
TL83	B61	7	FUEL TANK LEVEL SENSOR
TL84	B58	7	CHASSIS - SPARE TIRE (REF J93)
TL85	G61	7	CHASSIS - REAR
TL86	C95	11	CAB MARKER LIGHTS
TL86	D240	27	AIRDROP ONLY
TL87	F95	11	CAB MARKER LIGHTS
TL88	A199	23	WRECKER REAR LIGHTS
TL88	A217	25	LONG WHEEL BASE
TL89	G199	23	WRECKER REAR LIGHTS
TL89	G217	25	LONG WHEEL BASE
TL90	H199	23	WRECKER REAR LIGHTS
TL90	H217	25	LONG WHEEL BASE
TL92	H200	23	WRECKER REAR LIGHTS
TL92	C215	24	REAR LIGHTS TRACTOR
TL92	G224	25	LONG WHEEL BASE
TL92	F231	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
TL93	H199	23	WRECKER REAR LIGHTS
TL93	G215	24	REAR LIGHTS TRACTOR
TL93	G230	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
TL93M	G208	24	REAR LIGHTS TRACTOR
TL94	G94	11	WINDSHIELD WASHER ROTARY PUMP (B3)
TL97	B97	11	CHEMICAL ALARM CONNECTOR
TL98	B97	11	CHEMICAL ALARM CONNECTOR
TL99	D61	7	CHASSIS - REAR (REF E2)
TL101	G264	30	ALL MTV W/O PTO
TL101	G267	30	TRACTOR W/O WINCH
TL109	C209	24	REAR LIGHTS TRACTOR
TL110	D70	8	ALTERNATOR
TL111	D266	30	PTO EQUIPPED
TL123	E47	6	CHASSIS - FRONT (REF J19)
TL126	E135	15	CHASSIS - GROUND
TL130	F94	11	CAB MARKER LIGHTS
TL131	A94	11	CAB MARKER LIGHTS

TERMINAL LUGS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
TL133	F94	11	CAB MARKER LIGHTS
TL134	B94	11	CAB MARKER LIGHT FRONT LOWER RIGHT
TL150	F186	21	SENSOR/FRONT AIR PRESSURE TRANSMITTER
TL151	G186	21	SENSOR/REAR AIR PRESSURE TRANSMITTER
TL152	C188	21	STOPLIGHT SWITCH
TL501	G197	22	CAB - DASH - RIGHT - UNDERDASH
TL502	G197	22	CAB - DASH - RIGHT - UNDERDASH
TL153	C188	21	STOPLIGHT SWITCH
TL154	D188	21	STOPLIGHT SWITCH
TL155	D188	21	STOPLIGHT SWITCH
TL156	F186	21	SWITCH/FRONT AIR PRESSURE TRANSMITTER
TL157	G186	21	SWITCH/REAR AIR PRESSURE TRANSMITTER
TL158	E146	17	START INHIBIT PUSHBUTTON
TL159	E145	17	START INHIBIT PUSHBUTTON
TL162	B123	14	STARTER PUSHBUTTON
TL163	B123	14	STARTER PUSHBUTTON
TL164	G71	8	ENGINE (REF J921)
TL165	G71	8	ENGINE (REF J921)
TL166	F62	7	200 AMP
TL167	E62	7	200 AMP
TL168	D63	7	200 AMP
TL169	D62	7	200 AMP
TL171	F62	7	200 AMP
TL172	F62	7	200 AMP
TL173	E63	7	200 AMP
TL174	D62	7	200 AMP
TL190	D344	39	WTEC III PRESSURE SWITCH GROUND
TL201	E134	15	PARKING BRAKE SWITCH
TL202	E133	15	PARKING BRAKE SWITCH

SWITCHES			
NUMBER	ZONE	SH	DESCRIPTION
S3	A186	21	COLUMN SWITCH
S3	C186	21	COLUMN SWITCH
S4	D123	14	MAIN LIGHT SWITCH
S5/1	B120	14	IGNITION SWITCH
S5/11	A100	12	ENGINE FAN OFF SWITCH
S5/14	C249	28	WINCH ON OFF
S5/15	B248	28	WINCH IN-OUT
S5/16	F100	12	ETHER STARTER SWITCH
S5/2	D100	12	LAMP TEST SWITCH
S5/2	D120	14	ROTATING WARNING LIGHT SWITCH
S5/22	G120	14	FULL HAZARD WARNING SWITCH
S5/25	A255	29	SWINGFIRE PUMP SWITCH
S5/37	C255	29	DUMP UP DOWN SWITCH
S5/5	A247	28	WORKLIGHTS ON/OFF SWITCH
S5/6	B246	28	PTO ON/OFF SWITCH
S5/8	A249	28	BLACKOUT OVERRIDE SWITCH
S5/9	A250	28	FUEL PRE-HEAT SWITCH
S6	A123	14	STARTER PUSHBUTTON
S7	F146	17	START INHIBIT PUSHBUTTON
S10A	C188	21	STOPLIGHT SWITCH
S10B	D188	21	STOPLIGHT SWITCH
S18	D305	34	PTO PRESSURE SWITCH
S20	E186	21	SWITCH/FRONT AIR PRESSURE TRANSMITTER
S23	F61	7	AIR PRESSURE SWITCH FOR CTIS
S24	E134	15	PARKING BRAKE SWITCH
S25	B299	34	DUMP BED POSITION SWITCH
S26	C66	8	WATER TEMPERATURE SENSOR
S27	E68	8	OIL PRESSURE WARNING LIGHT SWITCH
S29	G186	21	SWITCH/REAR AIR PRESSURE TRANSMITTER
S31	A252	28	ARCTIC TROOP HEATER SWITCH
S36	C251	28	TAILGATE RELEASE SWITCH
S40	F67	8	ETHER SENSOR SWITCH
S45	G71	8	TROOP ALARM SWITCH
S56	A66	8	WATER TEMPERATURE SWITCH

GAGES			
NUMBER	ZONE	SH	DESCRIPTION
M2	D115	13	VOLTMETER
M3	B115	13	ENGINE OIL PRESSURE METER
M4	F105	12	FRONT AIR PRESSURE METER
M5	B105	12	REAR AIR PRESSURE METER

GAGES (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
M6	G116	13	WATER TEMPERATURE METER
M7	D105	12	FUEL LEVEL METER
M8	G111	13	SPEEDOMETER
M9	A246	28	TACHOMETER

RELAYS			
NUMBER	ZONE	SH	DESCRIPTION
K1	F158	18	STARTER RELAY
K2	B152	17	CONTROL PANEL RELAY
K6	F153	17	STOPLIGHT RELAY
K7	G162	18	HEADLIGHT RELAY
K8	G160	18	HEADLIGHT LO/HI-BEAM RELAY
K9	A151	17	HAZARD FLASHER BO OVERIDE
K10	F159	18	STARTER RELAY
K11	F155	18	ALTERNATOR EXCITATION RELAY
K12	B148	17	WORKLIGHT RELAY
K13	B158	18	ROTATING BEACON BO OVRD RELAY
K15	B149	17	AUXILIARY COOLER RELAY
K19	B159	18	START INHIBIT RELAY
K20	H147	17	MARKER LIGHTS RELAY
K24	B160	18	CRANKING LOCKOUT RELAY
K25	B346	39	WTEC III REVERSE WARNING RELAY
K26	B344	39	WTEC III NEUTRAL START RELAY
K27	H152	17	BO STOP RELAY
K28	H151	17	TRAILER REAR LIGHTS RELAY
K29	F151	17	BO MARKER RELAY / WTEC III BLACKOUT DRIVE RELAY
K30	H156	18	REAR LEFT COMPOSITE LAMP RELAY
K31	H158	18	REAR RIGHT COMPOSITE LAMP RELAY
K32	B156	18	HORN RELAY
K37	B348	39	WTEC III PTO ENABLE OUTPUT RELAY
K52	H148	17	CTIS OVERSPEED INDICATION RELAY
K53	H149	17	RADIO POWER RELAY

RESISTORS			
NUMBER	ZONE	SH	DESCRIPTION
R1	D88	10	AIR DRYER
R2	E181	21	CAB - DASH - LEFT - UNDERDASH
R4	D184	21	CAB - DASH - LEFT - UNDERDASH
R5	C184	21	CAB - DASH - LEFT - UNDERDASH
R6	F181	21	CAB - DASH - LEFT - UNDERDASH

SOLENOIDS			
NUMBER	ZONE	SH	DESCRIPTION
KS	D56	7	24V AUXILIARY STARTER SOLENOID
L1	E198	22	FAN SOLENOID
L1	H337	38	RIGHT WINCH OUT
L2	H76	8	FUEL SOLENOID
L2	H337	38	RIGHT WINCH IN
L3	B305	34	PTO SOLENOID
L4	E269	30	WINCH IN SOLENOID
L5	D269	30	WINCH OUT SOLENOID
L5	H340	38	LEFT WINCH IN
L6	D198	22	INTER-AXLE DIFFERENTIAL SOLENOID
L6	H339	38	LEFT WINCH OUT
L7	B302	34	TAILGATE RELEASE SOLENOID
L8	B302	34	DUMP BED UP SOLENOID
L9	A302	34	DUMP BED SOLENOID
L11	H338	38	UNDERLIFT DOWN
L13	H339	38	STINGER OUT
L14	H338	38	UNDERLIFT UP
L15	B60	7	CHASSIS - SPARE TIRE
L15	H337	38	UNDERLIFT FOLD DOWN
L16	H339	38	STINGER IN
L18	H338	38	UNDERLIFT FOLD UP

HORNS AND ALARMS			
NUMBER	ZONE	SH	DESCRIPTION
LS1	A46	6	VEHICLE HORN
LS2	H110	13	AUDIBLE ALARM

MOTORS			
NUMBER	ZONE	SH	DESCRIPTION
B2	A192	22	WINDSHIELD WIPER MOTOR
B4	C127	15	FAN MOTOR
B6	F268	30	TRANSMISSION AUXILIARY OIL COOLER FAN
B6A	G268	30	TRANSMISSION AUXILIARY OIL COOLER FAN

BATTERIES			
NUMBER	ZONE	SH	DESCRIPTION
BT1	C61	7	BATTERY
BT2	D61	7	BATTERY
BT3	D61	7	BATTERY
BT4	E61	7	BATTERY

MISCELLANEOUS			
NUMBER	ZONE	SH	DESCRIPTION
10A	C192	22	WTEC II VEHICLE INTERFACE MODULE
10A	E192	22	WTEC II VEHICLE INTERFACE MODULE
A2	F127	15	CTIS ELECTRONIC CONTROL UNIT
A3	G123	14	INSTRUMENT PANEL LIGHTS DIMMER MODULE
A5	A143	16	WIPER DELAY MODULE
A7	B188	21	FREQUENCY DIVIDER
A18	A112	13	LIGHTED INDICATOR DISPLAY
A20	H68	8	FUEL/WATER SEPARATOR
B1	C72	8	STARTER/STARTER SOLENOID
B10	E76	9	WTEC II TRANSFER CASE (SERIAL # 6510032369)
B10	E81	9	WTEC II TRANSFER CASE (SERIAL # 651032369 AND HIGHER)
B10	E75	9	WTEC II TRANSMISSION (SERIAL # 6510032369)
B10	E79	9	WTEC II TRANSMISSION (SERIAL # 6510032369 AND HIGHER)
B10	E85	10	TRANSFER CASE PRIOR (SERIAL # 6510032369 WITH ADAPTER CABLE ASSEMBLY)
B10	E83	10	TRANSMISSION PRIOR TO (SERIAL # 6510032369 WITH ADAPTER CABLE ASSEMBLY)
B3	G92	11	WINDSHIELD WASHER ROTARY PUMP
BJ1	A184	21	JUNCTION BOX
D1A	C147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D1B	C147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D2A	D147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D2B	D147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D3A	B147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D3B	A147	17	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
D7	B307	35	DIODE ASSEMBLY
D7	B318	36	DIODE ASSEMBLY
D8	C307	35	DIODE ASSEMBLY
D8	A318	36	DIODE ASSEMBLY
E1	C61	7	BATTERY
E1	D61	7	BATTERY
E1	D61	7	BATTERY
E1	E61	7	BATTERY
E2	C4	6	CHASSIS - FRONT BUMPER (REF J27)
E2	C52	7	BATTERY
E2	D52	7	BATTERY
E2	E52	7	BATTERY
E2	E52	7	BATTERY
E3	H157	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E4	H159	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E5	B160	18	CAB - DASH - RIGHT - POWER DISTRIBUTION PNL
E14	E221	25	LONG WHEEL BASE
E14	E230	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E15	E224	25	LONG WHEEL BASE
E15	E233	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E16	A224	25	LONG WHEEL BASE
E16	A233	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E17	G222	25	LONG WHEEL BASE

MISCELLANEOUS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
E17	G222	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E18	G212	25	LONG WHEEL BASE
E18	G221	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E19	F212	25	LONG WHEEL BASE
E19	F221	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E20	E213	25	LONG WHEEL BASE
E20	E221	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E21	D213	25	LONG WHEEL BASE
E21	D222	26	ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE
E22	B86	11	CAB MARKER LIGHTS
E27	F213	24	REAR LIGHTS TRACTOR
E28	G215	24	REAR LIGHTS TRACTOR
E29	E209	24	REAR LIGHTS TRACTOR
E30	D214	24	REAR LIGHTS TRACTOR
E31	D213	24	REAR LIGHTS TRACTOR
E32	G212	24	REAR LIGHTS TRACTOR
E33	C209	24	REAR LIGHTS TRACTOR
E34	B210	24	REAR LIGHTS TRACTOR
E35	F209	24	REAR LIGHTS TRACTOR
E36	E210	24	REAR LIGHTS TRACTOR
E37	E211	24	REAR LIGHTS TRACTOR
E38	F209	24	REAR LIGHTS TRACTOR
E39	E210	24	REAR LIGHTS TRACTOR
E40	F210	24	REAR LIGHTS TRACTOR
E41	D211	24	REAR LIGHTS TRACTOR
E42	D210	24	REAR LIGHTS TRACTOR
E43	D210	24	REAR LIGHTS TRACTOR
E44	H213	24	REAR LIGHTS TRACTOR
E45	G209	24	REAR LIGHTS TRACTOR
E46	G203	23	WRECKER REAR LIGHTS
E47	F203	23	WRECKER REAR LIGHTS
E48	E204	23	WRECKER REAR LIGHTS
E49	D203	23	WRECKER REAR LIGHTS
E50	E206	23	WRECKER REAR LIGHTS
E51	A206	23	WRECKER REAR LIGHTS
E52	G204	23	WRECKER REAR LIGHTS
E53	D200	23	WRECKER REAR LIGHTS
E54	B200	23	WRECKER REAR LIGHTS
E55	F200	23	WRECKER REAR LIGHTS
E56	E211	24	REAR LIGHTS TRACTOR
E57	E203	23	WRECKER REAR LIGHTS
E58	D204	23	WRECKER REAR LIGHTS
E59	G204	23	WRECKER REAR LIGHTS
E64	D221	25	LONG WHEEL BASE
E65	B50	6	CHASSIS - FRONT
E66	C50	6	CHASSIS - FRONT
E66	D354	40	WTEC III CAB TRANSMISSION HARNESS (TID1)
E66	D358	40	WTEC III CAB TRANSMISSION HARNESS (TID2)
E67	D47	6	CHASSIS - FRONT
E68	D49	6	CHASSIS - FRONT
E69	D260	29	CAB - DASH - CENTER - OPTIONS PANEL
E70	C265	30	PTO EQUIPPED
E70	F266	30	TRACTOR W/O WINCH
E71	F182	21	CAB - DASH - LEFT - UNDERDASH
E72	G222	25	LONG WHEEL BASE
E74	G266	30	TRACTOR W/O WINCH
E78	A290	34	DUMP BODY
E79	B227	27	ROTARY WARNING LIGHT CONNECTOR
E80	C227	27	ROTARY WARNING LIGHT CONNECTOR
E81	B228	27	ROTARY WARNING LIGHT CONNECTOR
E82	C228	27	ROTARY WARNING LIGHT CONNECTOR
E83	B228	27	ROTARY WARNING LIGHT CONNECTOR
E84	B228	27	ROTARY WARNING LIGHT CONNECTOR
E88	B106	13	CAB - DASH - LEFT - INSTRUMENT PANEL

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 4 OF 40

SIZE B | ILL. NO. 6WD01L4B | FP-7/ (FP-8 BLANK)

MISCELLANEOUS (CONTINUED)			
NUMBER	ZONE	SH	DESCRIPTION
E89	C115	13	CAB - DASH - LEFT - INSTRUMENT PANEL
E90	E354	40	WTEC III CAB TRANSMISSION HARNESS (TID1)
E90	E358	40	WTEC III CAB TRANSMISSION HARNESS (TID2)
E91	C354	40	WTEC III CAB TRANSMISSION HARNESS (TID1)
E91	C358	40	WTEC III CAB TRANSMISSION HARNESS (TID2)
FL	E183	22	WTEC II VEHICLE INTERFACE MODULE
FL1	G85	11	EMI FILTER
FL2	A184	22	EMI FILTER
FL3	C118	15	FAN MOTOR
G1	D70	8	ALTERNATOR
MPU1	F61	8	ENGINE SPEED MAGNETIC PICKUP
MT3	G69	8	ENGINE OIL PRESSURE SENSOR
MT4	E177	21	SENSOR/FRONT AIR PRESSURE TRANSMITTER
MT5	G186	21	SENSOR/REAR AIR PRESSURE TRANSMITTER
MT6	B66	8	WATER COOLER TEMPERATURE
MT7	B61	7	FUEL TANK LEVEL SENSOR
NS	E192	22	WTEC II VEHICLE INTERFACE MODULE
NS	F192	22	WTEC II VEHICLE INTERFACE MODULE
R11	D59	7	SHUNT
TB	C309	35	CARGO MATERIAL HANDLING CRANE
TB	F309	35	CARGO MATERIAL HANDLING CRANE
TB	D319	36	WRECKER MATERIAL HANDLING CRANE
TB	E247	38	WRECKER CONTROLS
TB1	C137	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL
TB2	F139	16	CAB - DASH - RIGHT - POWER DISTRIBUTION PANEL
X1	C146	17	24 VDC
X11	F61	7	NATO SLAVE RECEPTACLE
X2	D146	17	24 VDC
X3	F146	17	GROUND

TRANSMISSION			
NUMBER	ZONE	SH	DESCRIPTION
A10	B192	22	WTEC II VEHICLE INTERFACE MODULE
A11	C347	39	WTEC III TRANSMISSION ECU
A12	G347	39	WTEC III TRANSMISSION PUSHBUTTON SHIFT SELECTOR
A13	A75	9	PRE-BLOCK SEVEN TRANSMISSIONS
A13	A78	9	TID1, TID2 AND TID3 TRANSMISSIONS
A13	A82	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSIONS
B10	E76	9	PRE-BLOCK SEVEN TRANSMISSION OUTPUT SPEED SENSOR
B10	E85	10	PRE-BLOCK SEVEN TRANSMISSION WITH PIGTAIL OUTPUT SPEED SENSOR
B10	E80	9	TID1, TID2, AND TID3 TRANSMISSION OUTPUT SPEED SENSOR
MT9	F76	9	PRE-BLOCK SEVEN TRANSMISSION ENGINE SPEED SENSOR
MT9	F85	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION ENGINE SPEED SENSOR
MT9	F80	9	TID1, TID2, AND TID3 TRANSMISSION ENGINE SPEED SENSOR
MT11	G76	9	PRE-BLOCK SEVEN TRANSMISSION THROTTLE POSITION SENSOR
MT11	F85	10	PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION THROTTLE POSITION SENSOR
MT11	F80	9	TID1, TID2, AND TID3 TRANSMISSION THROTTLE POSITION SENSOR
REV	C192	22	WTEC II VEHICLE INTERFACE MODULE
RW	D192	22	WTEC II VEHICLE INTERFACE MODULE
S02	F192	22	WTEC II VEHICLE INTERFACE MODULE
S03	F192	22	WTEC II VEHICLE INTERFACE MODULE
SF01	D192	22	WTEC II VEHICLE INTERFACE MODULE
SF01	D192	22	WTEC II VEHICLE INTERFACE MODULE
SF02	C192	22	WTEC II VEHICLE INTERFACE MODULE
SF02	D192	22	WTEC II VEHICLE INTERFACE MODULE
SF3	F192	22	WTEC II VEHICLE INTERFACE MODULE
SF04	C192	22	WTEC II VEHICLE INTERFACE MODULE
SF4	D192	22	WTEC II VEHICLE INTERFACE MODULE

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 5 OF 40

SIZE B | ILL. NO. 6WD01IL5B | FP-9/ (FP-10 BLANK)

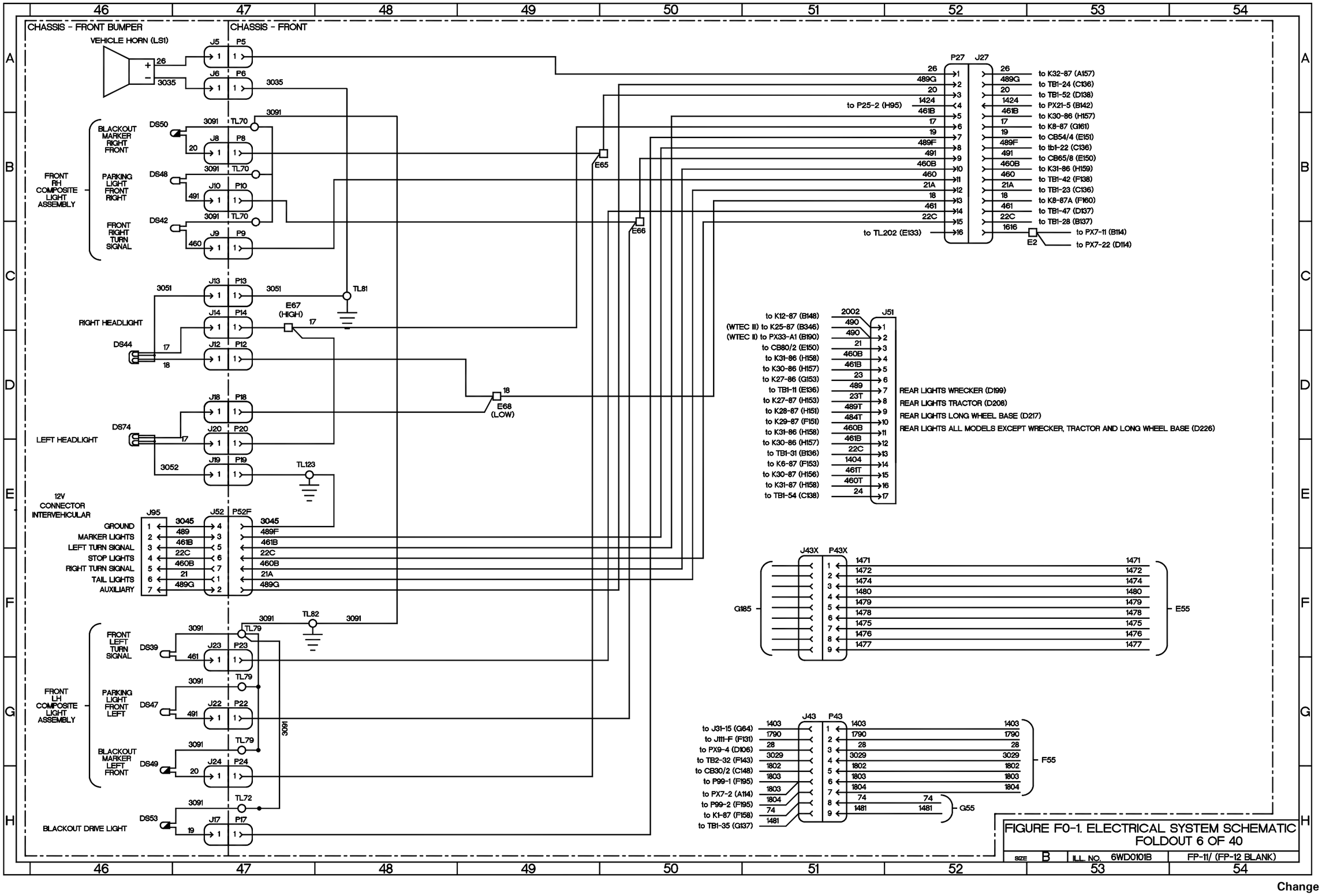


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 6 OF 40

SIZE	ILL. NO.	
B	6WD0101B	FP-11/ (FP-12 BLANK)

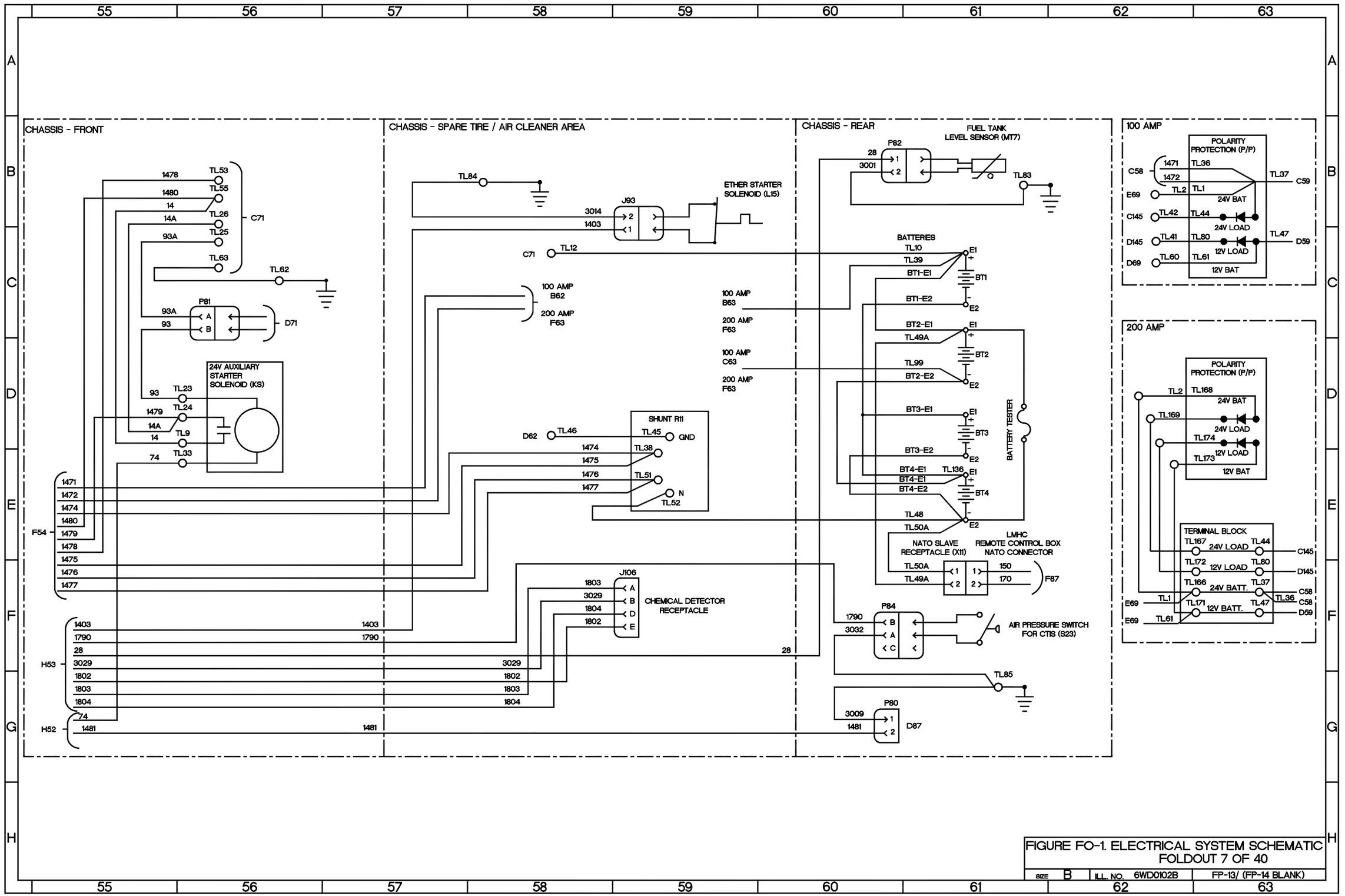


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 7 OF 40

SIZE	ILL. NO.	
B	6WD0102B	FP-13/ (FP-14 BLANK)

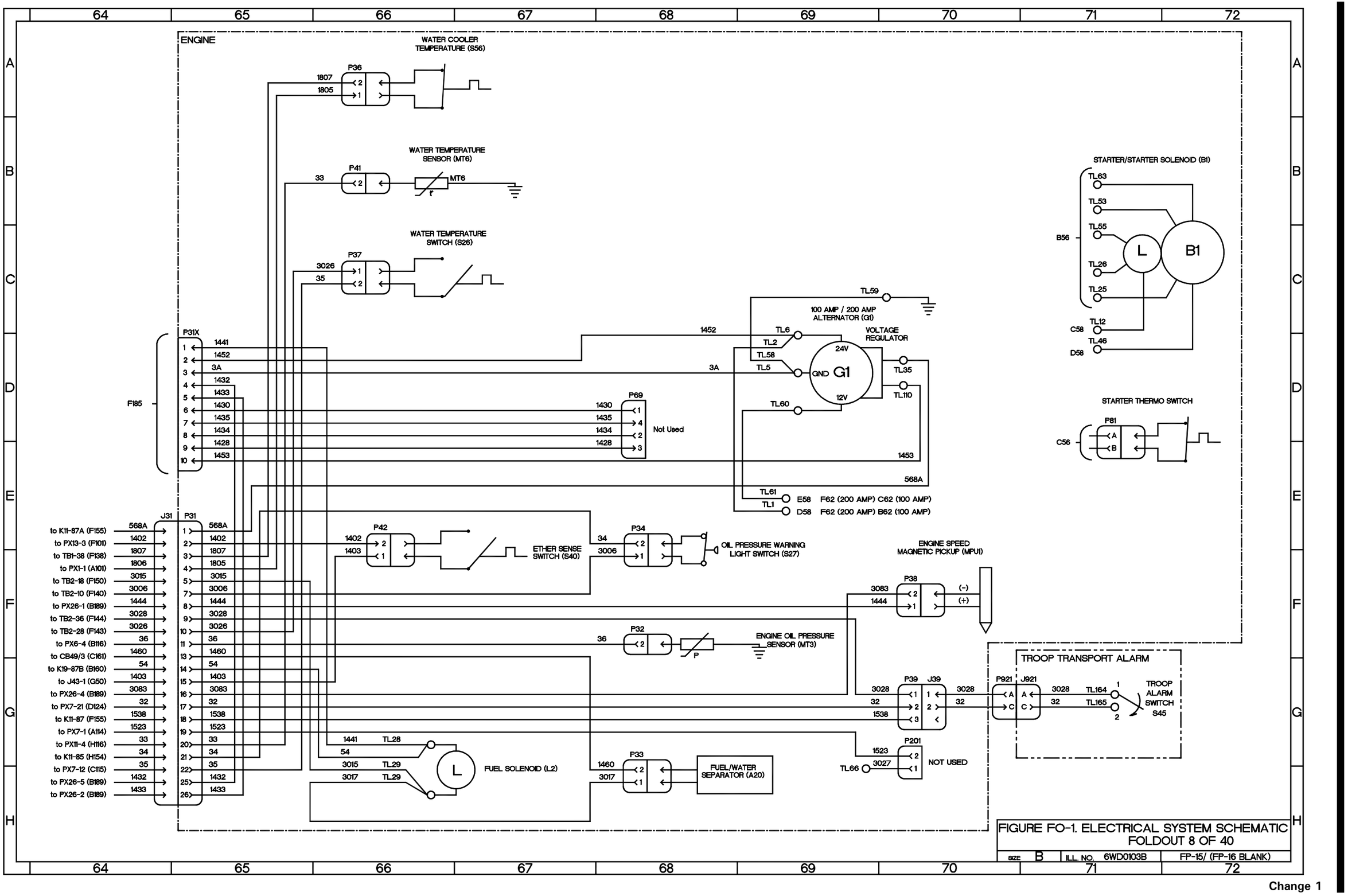


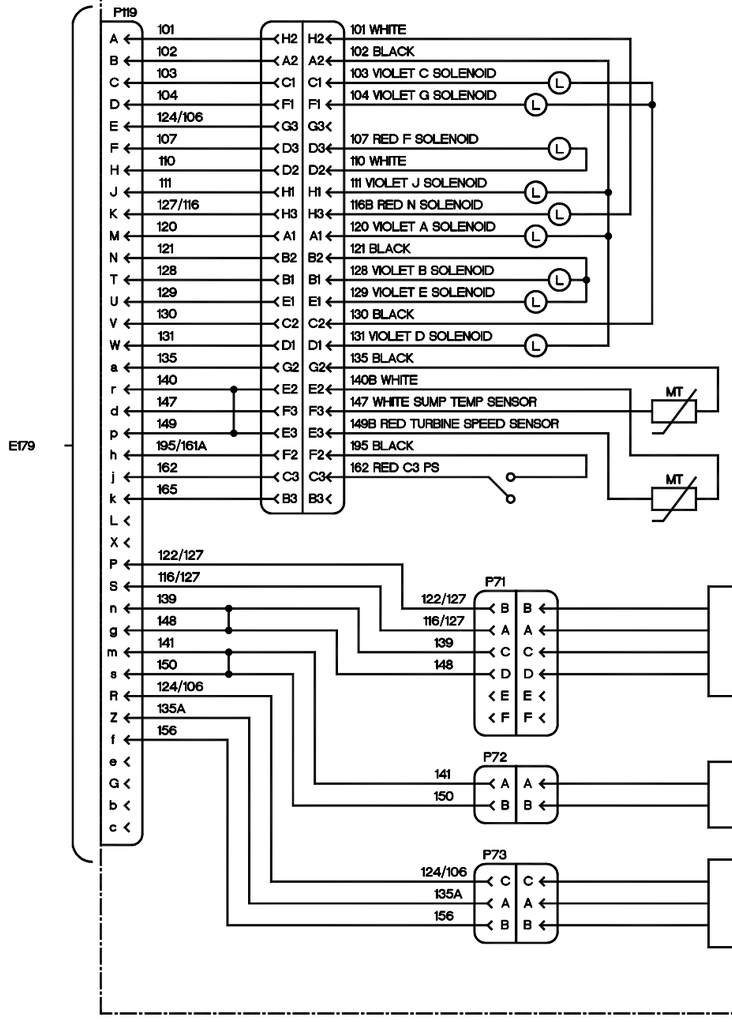
FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 40

SIZE B | ILL. NO. 6WD0103B | FP-15/ (FP-16 BLANK)

PRIOR TO SERIAL NUMBER 6510032369

PRE-BLOCK SEVEN TRANSMISSION

EXTERNAL WIRING HARNESS TO TRANSMISSION CONNECTOR



SERIAL NUMBER 6510032369 AND HIGHER

TID1, TID2, AND TID3 TRANSMISSIONS

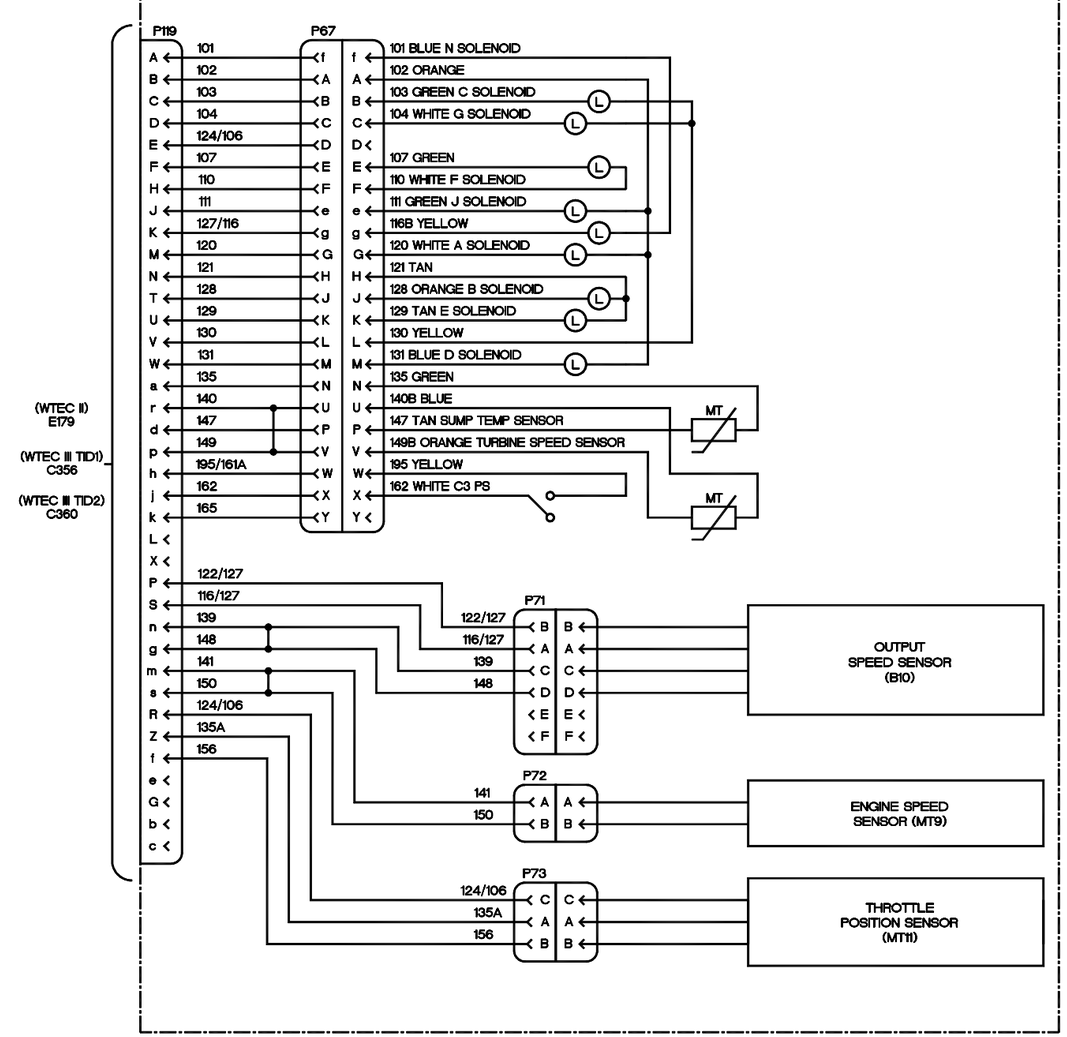
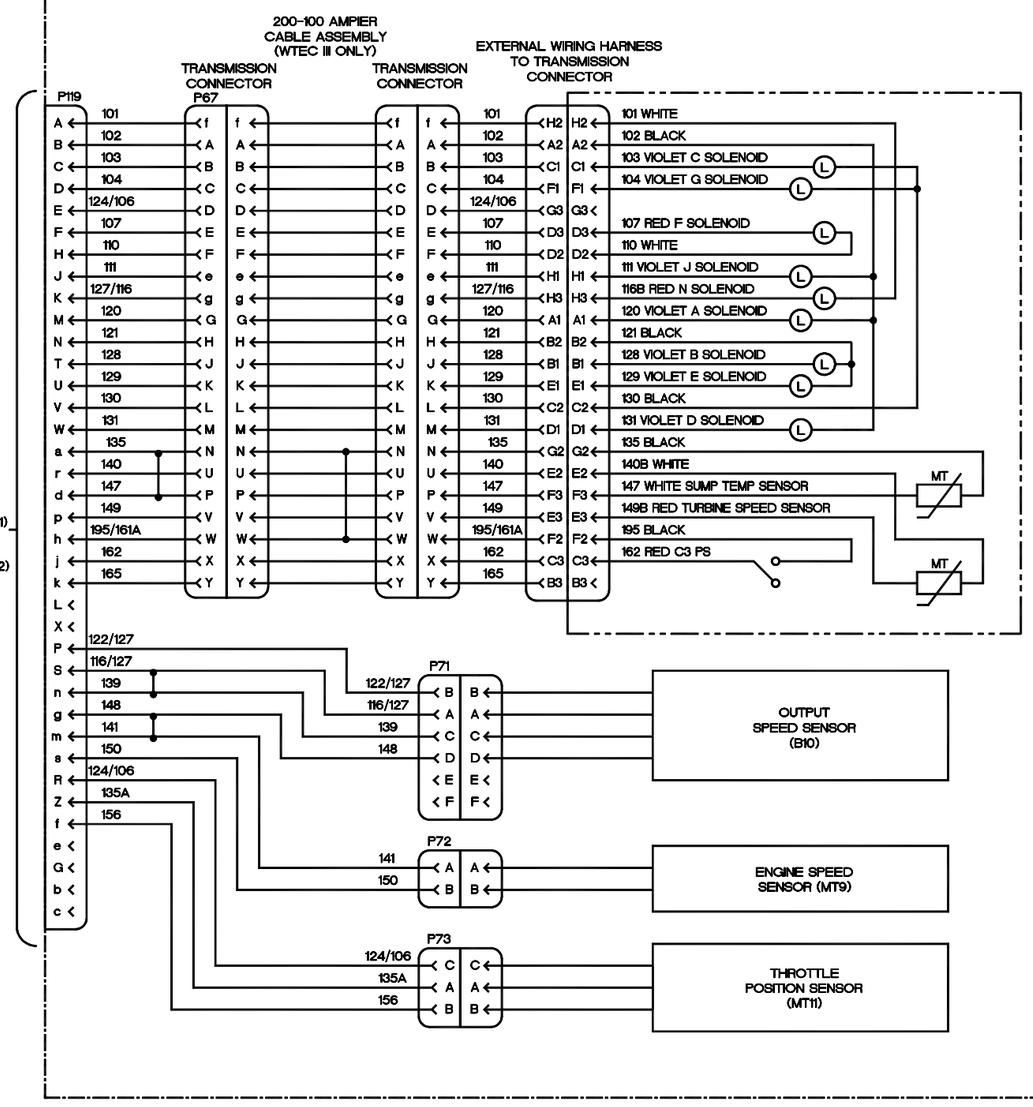


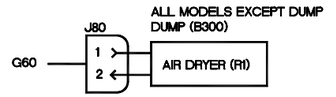
FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 40

SIZE	B	ILL. NO. 6WD0104B	FP-17/ (FP-18 BLANK)

PRIOR TO SERIAL NUMBER 6510032369 WITH ADAPTER CABLE ASSEMBLY

PRE-BLOCK SEVEN WITH PIGTAIL TRANSMISSION





LIGHT MATERIAL HANDLING CRANE (LMHC)

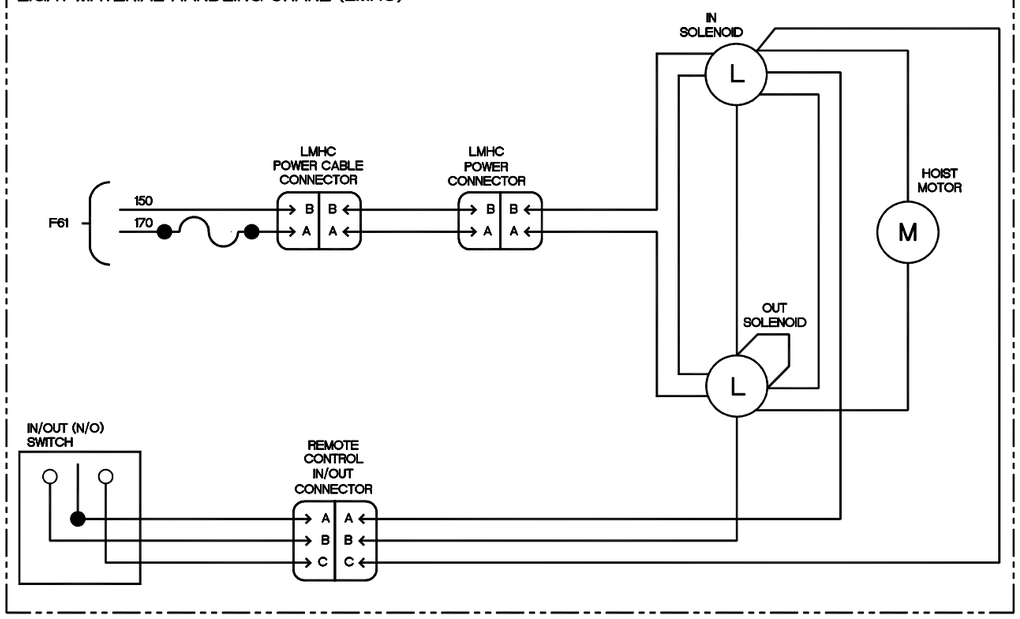


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 10 OF 40

SIZE	ILL. NO.	
B	6WD0105B	FP-19/ (FP-20 BLANK)

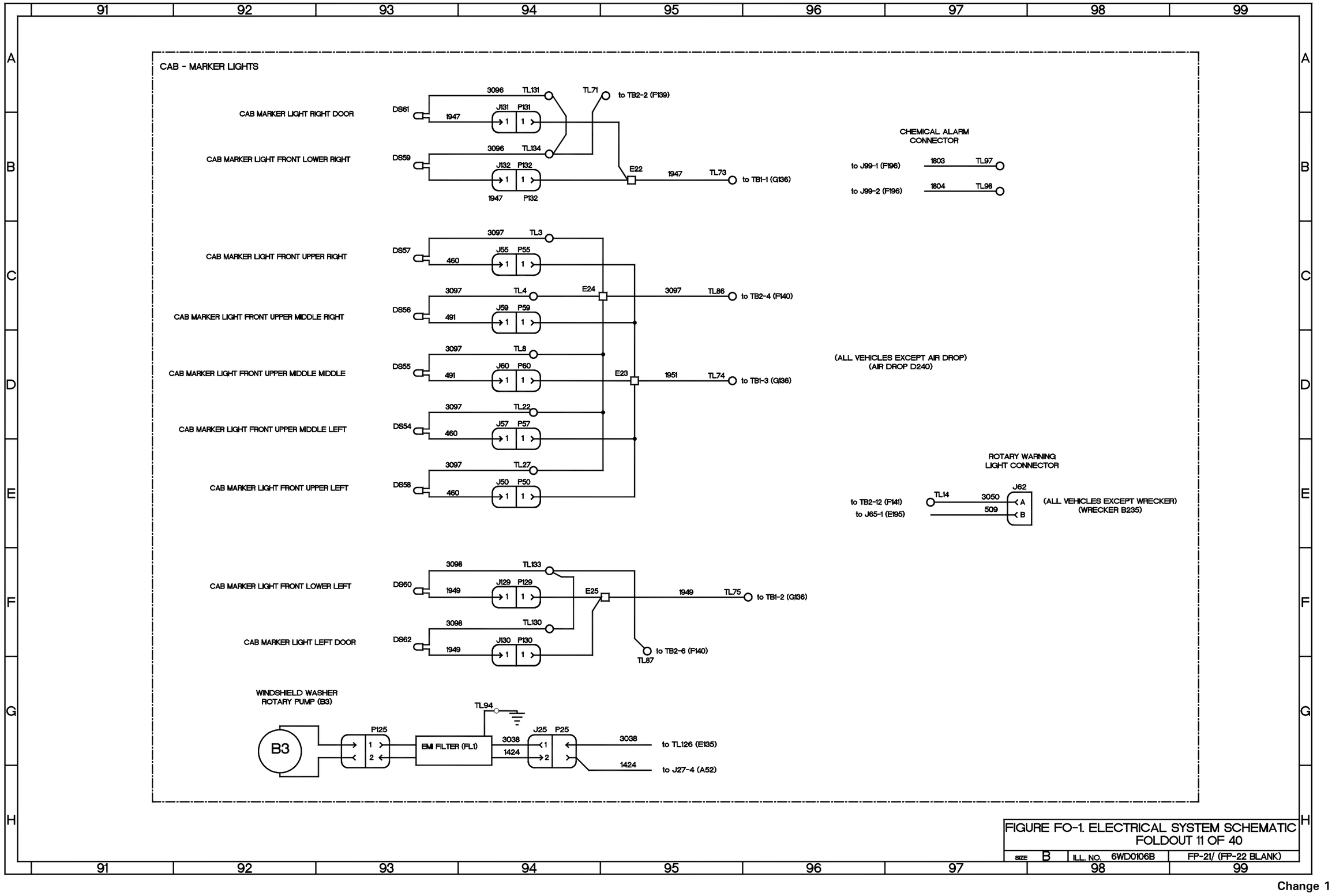


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 11 OF 40

SIZE	ILL. NO.	
B	6WD0106B	FP-21/ (FP-22 BLANK)

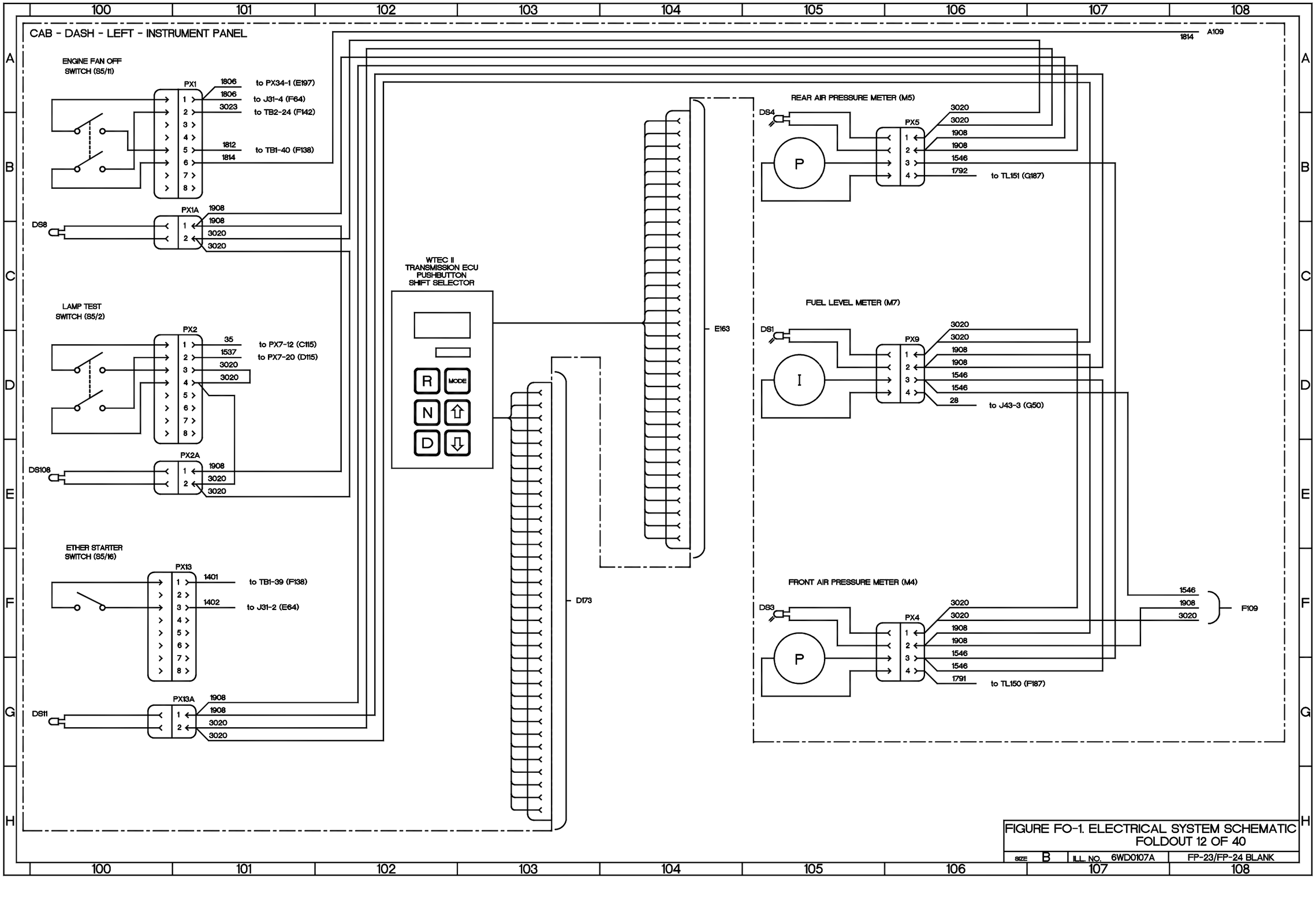


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 40

SIZE B | ILL. NO. 6WD0107A | FP-23/FP-24 BLANK

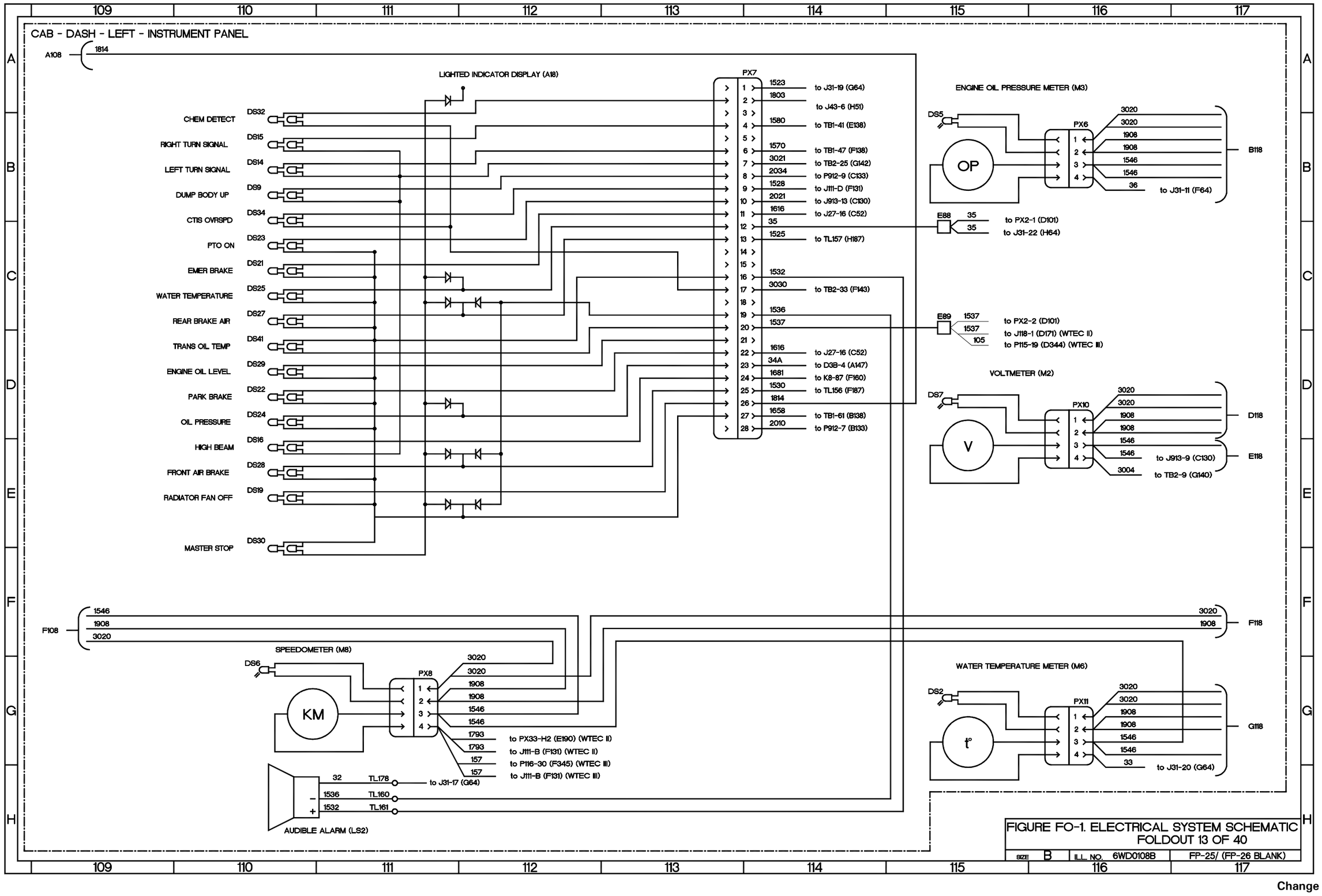


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 13 OF 40

SIZE	ILL. NO.	
B	6WD0108B	FP-25/ (FP-26 BLANK)

CAB - DASH - LEFT - INSTRUMENT PANEL

IGNITION SWITCH (S5/1)

PX17

B117: 3020, 3020, 1908, 1908, 1546, 1546

1548 to K2-86 (A152)

1586 to CB70/4 (E155)

DS13 — PX17A: 1908, 1908, 3020, 3020

STARTER PUSHBUTTON (S6)

TL163 — TL162 — 1405 to K24-87 (A161); 3007 to TB2-11 (G140)

ROTATING WARNING LIGHT SWITCH (S5/2)

PX12

D117: 3020, 3020, 1908, 1908, 1546

E117: 1546

1559 to K13-86 (A158)

1575 to K20-86 (G147)

1575

DS10 — PX12A: 1908, 1908, 3020, 3020

MAIN LIGHT SWITCH (S4)

PX15

1542

22 to D1A-2 (C147)

19 to CB54/3 (D151)

1572 to CB66/1 (D152)

1586 to CB70/4 (D155)

1575

1577 to CB74/5 (D159)

1404 to K6-87 (F152)

491 to CB65/7 (D150)

16 to P18-3 (B187)

23 to K27-86 (G152)

F117: 3020, 1908

FULL HAZARD WARNING SWITCH (S5/22)

PX14

G117: 3020, 3020, 1908, 1908, 1546

1565 to K9-87 (B151)

1566 to J19-5 (D186)

1566 to K10-87A (F159)

1567 to PX20-B (C197)

1568 to J19-12 (E186)

1568 to PX20-A (C197)

1514 to CB74/6 (E159)

INSTRUMENT PANEL LIGHTS DIMMER MODULE (A3)

PX24: 1908, 1908, 1542

DS12 — PX14A: 1908, 1908 to J913-11 (C130); 3020, 3020 to J913-10 (C130)

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 — 1 — 1
to CB37/1 (C161) 1569 — 2 — 2
to J2-4 (B194) 1916 — 3 — 3
to TB2-37 (G144) 3034 — 4 — 4
to P18-8 (B187) 1424 — 5 — 5
to J27-4 (A52) 1424 — 6 — 6
to P18-7 (B187) 1597

WIPER DELAY MODULE (A5)

22C J51-13 (E51) 31 32
1940 K10-87 (F159) 29 30 1940 K10-86 (F159)
22 D1A-1 (C147) 27 28 22C J27-15 (C52)
25 26 1912 CB67-4 (D148)
21A J27-12 (B52) 23 24 489G J27-2 (A52)
21 22 489F J27-8 (B52)
19 20 2040 P912-10 (C133)
17 18
15 16
13 14
489 J51-7 (D51) 11 12
1426 J7-1 (A197) 9 10
7 8
1955 K28-86 (H151) 5 6
1951 TL74 (D95) 3 4
1947 TL73 (B95) 1 2 1949 TL75 (F95)

1930 K11-86 (F155) 63 64 1929 CB77/5 (C161)
1658 K11-30 (F155)
1546 J913-9 (C131) 61
1658 PX7-27 (D114) 62 1690 CB79/5 (C159) (WTEC II)
1462 K19-30 (A159) 59 60 1460 PX33-C1 (C190) (WTEC III)
146 K25-86 (B246) (WTEC III)
1463 TL159 (E145) 57 58 146 J117-C (C343) (WTEC III)
55 56 1572 CB66/2 (E152)
1408 K29-86 (F151) 53 54 24 J51-17 (F51)
1329 K52-86 (H148) 51 52 20 J27-3 (A52)
49 50 2041 P912-11 (C133)
461 J27-14 (B52) 47 48
1570 PX7-6 (B114)
45 46 1581 J19-1 (C186)
1524 J19-4 (D187) 43 44
1580 PX7-4 (B114) 41 42 460 J27-11 (B52)
1401 PX13-1 (F101) 39 40 1812 PX1-5 (B101)
1935 CB22/3 (C158) 37 38 1807 J31-3 (F64)
1481 J43-9 (H51) 35 36 1692 CB21/1 (C158)
1692 PX26-3 (B188)
(WTEC II) 1692 PX33-E1 (D190) 33 34 1692 PX33-F1 (D190) (WTEC II)
(WTEC III) 1692 K34-30 (B347) 1692 K26-30 (B344) (WTEC III)

TB1

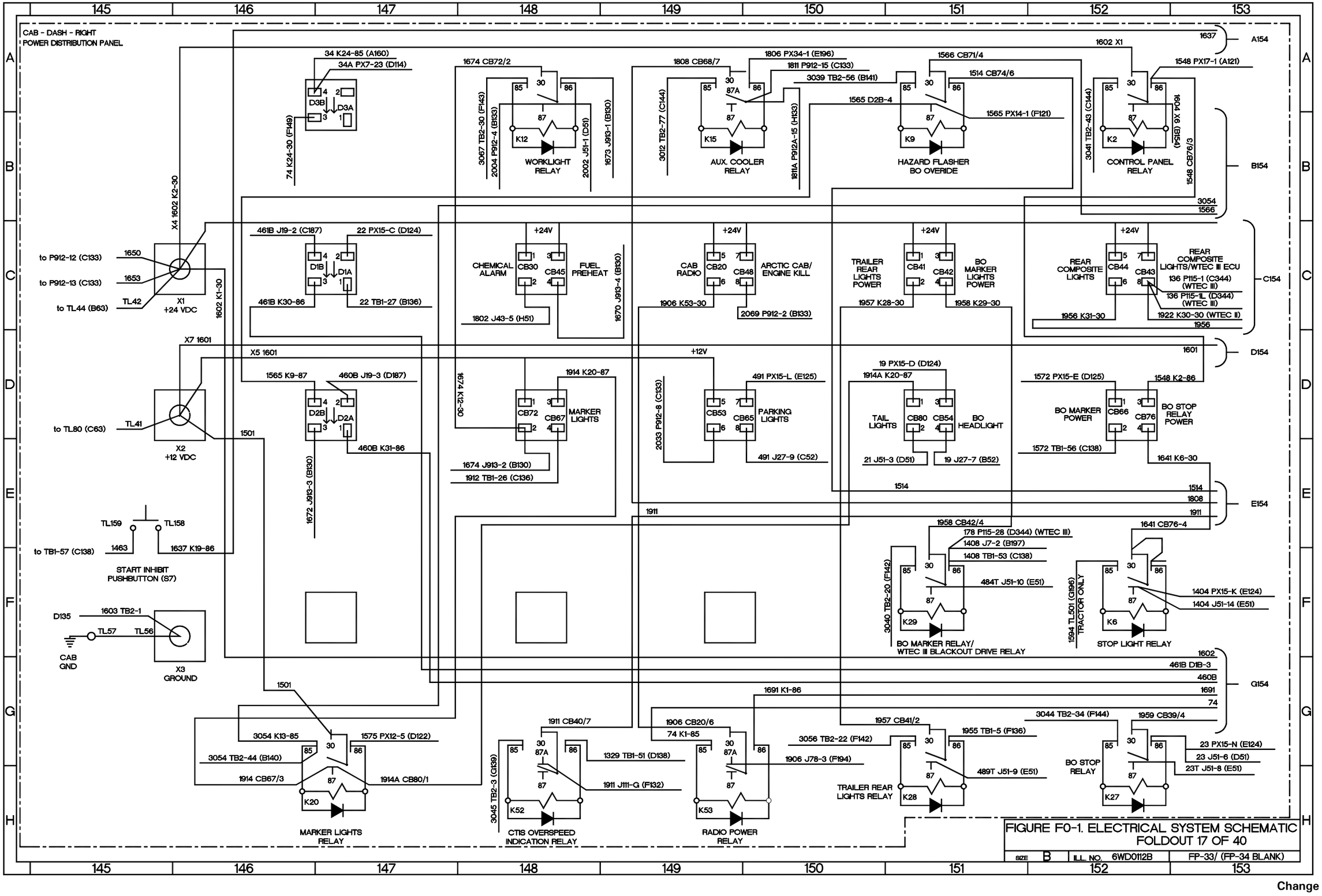
3101 K37-85 (B348) (WTEC III) 40 41
3054 K20-85 (H147) 44 45
3036 K32-85 (A156) 46 47
3047 K30-85 (H156) 50 51
3039 K9-85 (A151) 56 57
3099 J7-3 (B197) 58 59
3046 K10-85 (F160) 60 61
3016 K19-85 (A159) 62 63
3053 K8-85 (F161) 70 71
3002 K7-85 (F162) 74 75
3041 K2-85 (A152) 42 43
3042 TL502 (G196) 48 49
3043 TL153 (C189) 52 53
3048 K31-85 (G158) 54 55
3049 PX20-C (C198) 76 77
3012 K15-85 (A150) 78 79
3011 PX34-2 (E198)

1603 TB2-1 F145

1603 X3
TB2 1
3096 TL71 (A94) 2 3
3097 TL86 (C95) 4 5
3098 TL87 (F95) 6 7
3003 PX25-3 (C129) 8 9
3006 J31-7 (F64) 10 11
3050 TL14 (E97) 12 13
3008 PX50-1 (D197) 14 15
3101 PX33-K1 (F190) (WTEC II) 16 17
143 P115-32 (D344) (WTEC III)
3015 J31-5 (F64) 18 19
3040 K29-85 (F151) 20 21
3056 K28-85 (G151) 22 23
3023 PX1-2 (B101) 24 25
3083 PX26-6 (B188) 26 27
3026 J31-10 (F64) 28 29
3067 K12-85 (A148) 30 31
3029 J43-4 (H52) 32 33
3044 K27-85 (A152) 34 35
3028 J31-9 (F64) 36 37
3037 J2-3 (A194) 38 39
3045 K52-85 (H148)
3004 PX10-4 (E117)
3007 TL163 (B124)
(WTEC II) 188 PX33-V (H346)
(WTEC II) 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)
K12
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)
K15
AUX. COOLER RELAY
181A P912A-15 (H33)
1566 CB71/4
1514 CB74/6
1565 D2B-4
1565 PX14-1 (F121)
K9
HAZARD FLASHER BO OVERIDE
1602 X1
1637
A154
1548 PX17-1 (A121)
3041 TB2-43 (C144)
K2
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)
D1B
D1A
461B K30-86
22 TB1-27 (B136)
+24V
CHEMICAL ALARM
CB30
CB45
FUEL PREHEAT
1802 J43-5 (H51)
1670 J913-4 (B130)
CAB RADIO
CB20
CB48
ARCTIC CAB/ ENGINE KILL
1906 K53-30
2069 P912-2 (B133)
TRAILER REAR LIGHTS POWER
CB41
CB42
BO MARKER LIGHTS POWER
1957 K28-30
1958 K29-30
REAR COMPOSITE LIGHTS
CB44
CB43
REAR COMPOSITE LIGHTS/WTEC III ECU
136 P115-1 (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)
D2B
D2A
460B K31-86
1672 J913-3 (B130)
1674 K12-30
1914 K20-87
CB72
CB67
MARKER LIGHTS
1674 J913-2 (B130)
1912 TB1-26 (C136)
+12V
2033 P912-8 (C133)
491 PX15-L (E125)
CB53
CB65
PARKING LIGHTS
491 J27-9 (C52)
19 PX15-D (D124)
1914A K20-87
TAIL LIGHTS
CB80
CB54
BO HEADLIGHT
21 J51-3 (D51)
19 J27-7 (B52)
1572 PX15-E (D125)
1548 K2-86
BO MARKER POWER
CB66
CB76
BO STOP RELAY POWER
1572 TB1-56 (C138)
1641 K6-30
1514
1808
1911
E154
TL159
TL158
to TB1-57 (C138)
1463
1637 K19-86
START INHIBIT PUSHBUTTON (S7)
1958 CB42/4
178 P115-28 (D344) (WTEC III)
1408 J7-2 (B197)
1408 TB1-53 (C138)
3040 TB2-20 (F142)
K29
484T J51-10 (E51)
BO MARKER RELAY/ WTEC III BLACKOUT DRIVE RELAY
1641 CB76-4
1404 PX15-K (E124)
1404 J51-14 (E51)
1594 TL501 (G196) TRACTOR ONLY
K6
STOP LIGHT RELAY
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
1906 CB20/6
74 K1-85
1329 TB1-51 (D138)
1911 J111-G (F132)
3045 TB2-3 (G139)
K52
CTIS OVERSPEED INDICATION RELAY
K53
RADIO POWER RELAY
1957 CB41/2
3044 TB2-34 (F144)
1959 CB39/4
3056 TB2-22 (F142)
1906 J78-3 (F194)
1955 TB1-5 (F136)
489T J51-9 (E51)
TRAILER REAR LIGHTS RELAY
K28
BO STOP RELAY
K27
23 PX15-N (E124)
23 J51-6 (D51)
23T J51-8 (E51)
FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 40
SIZE B
ILL. NO. 6WD0112B
FP-33/ (FP-34 BLANK)

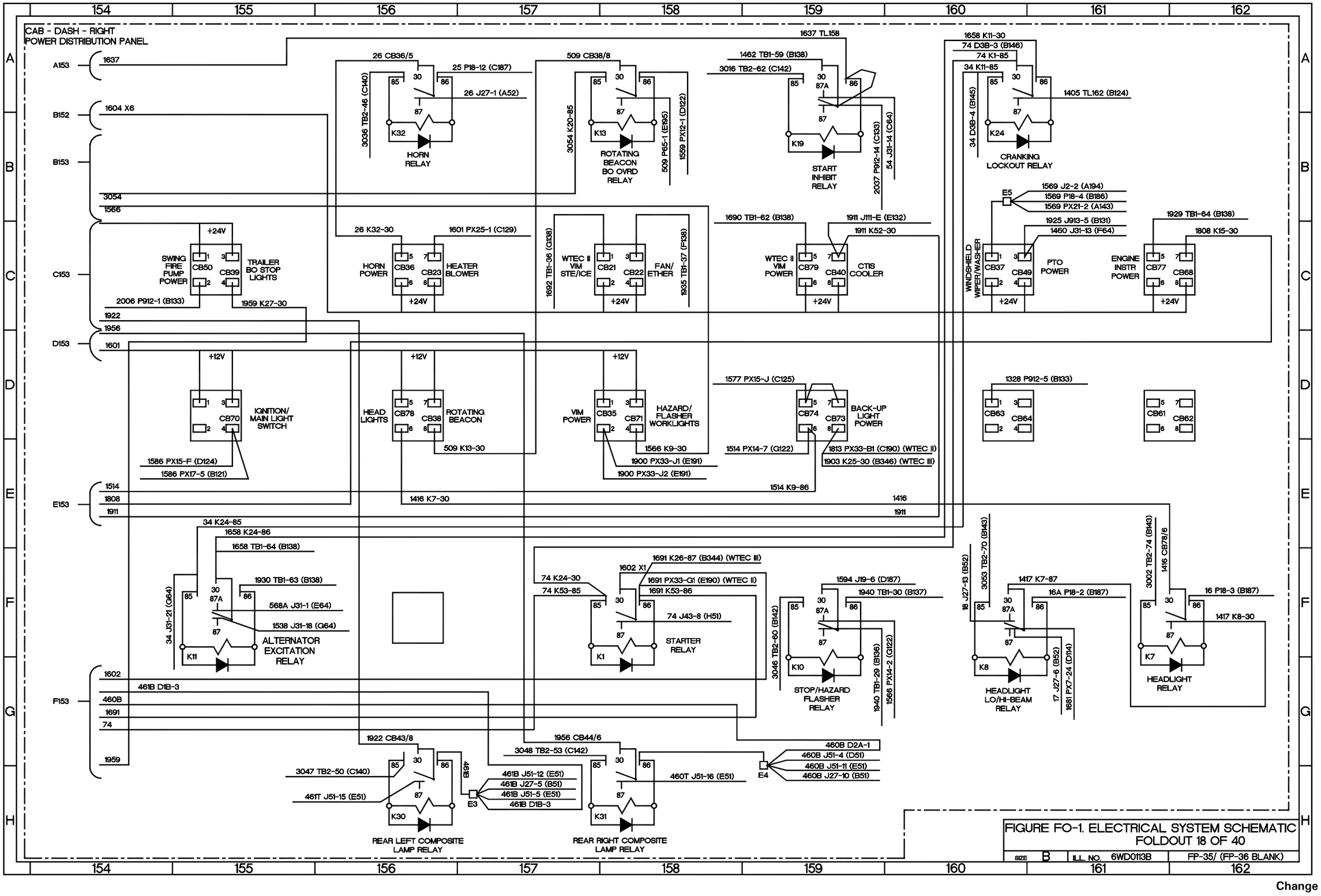


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 40

SIZE B | ILL. NO. 6WD0113B | FP-35/ (FP-36 BLANK)

CAB - DASH - LEFT - WTEC II TRANSMISSION HARNESS

G175: 123 118 115 113 105 / 125 119 117 114 112

H177: 135A/B 156 147 149 161A/B / 162 148 150 165

G176 G176 G176 G176

G174

J115

1	135A/B
2	136A/D
3	137
4	
5	139
6	140
7	141
8	142A/B
9	143A/D
10	144
11	136C/D
12	146
13	147
14	148
15	149
16	150
17	151A/B
18	143C/D
19	153
20	154
21	155
22	156
23	157
24	158
25	
26	
27	161A/B
28	162
29	163
30	
31	165
32	
33	
34	

C104

J116

143A	A1
132	B1
	C1
123	D1
136A	E1
146	F1
143C	A2
157	B2
125	C2
112	D2
136C	E2
113	F2
115	A3
	B3
158	C3
	D3
	E3
114	F3

D194

P118 J118

105	1	1537 PX7-20 (C115)
118	2	
119	3	
	4	
137	5	
142B	6	
151B	7	
153	8	153 J913-8 (B130)
155	9	1954 J913-6 (B130)
	10	
	11	
154	12	
161B	13	161 J913-7 (B130)
163	14	163 PX33-A2 (C190)
	15	
117	16	

J117

143D	A
	B
	C
	D
	E
	F
	G
136D	H
142A	J
151A	K
	L
	M

WTEC II DIAGNOSTIC CONNECTOR

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 40

SIZE B | ILL. NO. 6WD0114B | FP-37/ (FP-38 BLANK)

CAB-DASH-LEFT-WTECII TRANSMISSION HARNESS

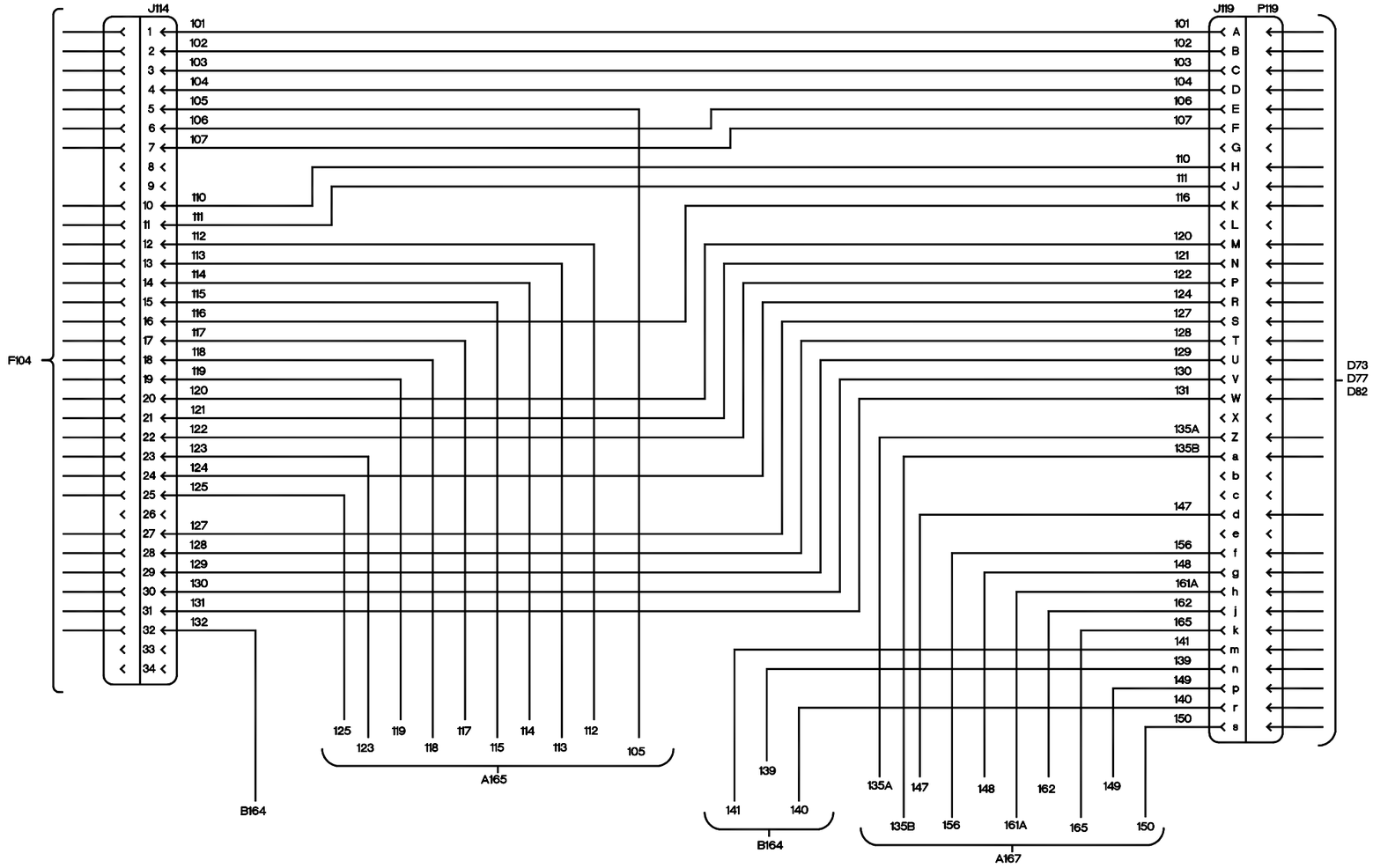


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 40

SIZE	ILL. NO.	
B	6WD0115B	FP-39/ (FP-40 BLANK)

CAB - DASH - LEFT - UNDERDASH

JUNCTION BOX (BJ1)

P83

STE / ICE RECEPTACLE

f 1610 → 1610
AB 1437 → 1430
AD 1431
z 1446
x 1427
p 1423
m 1438
AA 1436
g 1612 → 1437
k 1439 → 1431
n 1421 → 1446
w 1425 → 1427
y 1447 → 1423
AC 1429 → 1438
R 1441
N 1452 → 1436
P 3A → 1612
d 1432 → 1434
c 1433
v 1435 → 1439
u 1428 → 1421
O 1453 → 1425
E 1471 → 1447
V 1472 → 1429
Y 1474
T 1480
S 1479
M 1478
F 1475
X 1476
W 1477
h R2
j
s R6
U 1482
Z 1482 E71
a 1482
b 1482

R5
R4

BLUE
BROWN
GREEN
RED
YELLOW
BLACK
WHITE

J31X
1441 1
1452 2
3A 3
1432 4
1433 5
1430 6
1435 7
1434 8
1428 9
1453 10
D64

J43X
1471 1
1472 2
1474 3
1480 4
1479 5
1478 6
1475 7
1476 8
1477 9
F50

COLUMN SWITCH (S3)

P18
1 16A to K8-86 (F160)
2 16 to K7-86 (F162)
3 16 to PX15-M (E125)
4 1569 to CB37/1 (B161)
5 1527 to J2-5 (B195)
6 1590 to J2-1 (A195)
7 1597 to PX21-6 (B142)
8 1424 to PX21-5 (B142)
9 1599 to PX21-1 (A142)
10
11
12 25 to K32-86 (B156)

HORN PUSHBUTTON SWITCH

COLUMN SWITCH (S3)

J19
1 1581 to TB1-46 (E138)
2 461B to D1B-4 (C146)
3 460B to D2A-2 (D147)
4 1524 to TB1-43 (E137)
5 1566 to PX14-2 (G122)
6 1594 to K10-30 (F159)
7
8
9
10
11
12 1568 to PX14-6 (G122)

FREQUENCY DIVIDER (A7)

INPUT (+)
OUTPUT (+)
+24V POWER
INPUT (-)
OUTPUT (-)
GROUND

PX26
1 1550 to J913-12 (C130)
2 1444 to J31-8 (F64)
3 1433 to J31-26 (H64)
4 1692 to TB1-36 (G138)
5 3083 to J31-16 (G64)
6 1432 to J31-25 (G64)
3083 to TB2-26 (F142)

STOP LIGHT SWITCH (S10A)

TL152 TL153 3043 3043 to TB2/47 (C140)
1594 1594 to TL501 (G197) (TRACTOR ONLY)

STOP LIGHT SWITCH (S10B)

TL154 TL155 3043
1594

FRONT AIR PRESSURE TRANSMITTER

SENSOR (MT4) / SWITCH (S20)

TL150 1791 to PX4-4 (G106)
P
TL156 1530 to PX7-25 (D114)

REAR AIR PRESSURE TRANSMITTER

SENSOR (MT5) / SWITCH (S29)

TL151 1792 to PX5-4 (B106)
P
TL157 1525 to PX7-13 (C114)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 21 OF 40

SIZE B | ILL. NO. 6WD0116B | FP-41/ (FP-42 BLANK)

CAB - DASH - RIGHT - UNDERDASH

WINDSHIELD WIPER MOTOR (B2)

PX22

EMI FILTER (FL2)

P2 J2

1590 to P18-6 (B187)
1569 to CB37/1 (B160)
3037 to TB2-39 (G144)
1916 to PX21-3 (A142)
1527 to P18-5 (B187)

TRANSMISSION DIMMER MODULE

J7

1426 to TB1-9 (F139)
1408 to K29-86 (F150)
3099 to TB2-58 (B144)
158

WTEC II VEHICLE INTERFACE MODULE (A10)

PX33

to J51-2 (D51)
to J118-14 (E171)
to J913-7 (B130)
to CB73/8 (E159)
to TB1-60 (B138)
to TB1-33 (G137)
to J913-14 (D130)
to J913-15 (D130)
to TB1-34 (G138)
to K1-86 (F158)
to PX8-4 (G112)
to CB35/2 (E158)
to CB35/2 (E158)
to TB2-16 (F141)
to TB2-17 (G141)

REV
PTO ENABLE OUTPUT RELAY SF02
DIFFERENTIAL LOCK RELAY SF04
REVERSE WARNING RELAY RW
INDICATOR OUTPUT RELAY SF01
10A
SF01
SF4
SF02
NS
FL
10A
NEUTRAL START RELAY NS
NOT USED SF3
S02
S03

P116

D168

TURN SIGNAL FLASHER (A1)

OUTPUT
INPUT
GROUND

PX20

1568 to PX14-6 (G122)
1567 to PX14-5 (G122)
3049 to TB2-55 (C141)

INTER-AXLE DIFFERENTIAL SOLENOID (L6)

PX50

to TB2-14 (F141)
(WTEC III) 1692 K34-97A (B347)

ROTARY WARNING LIGHTS CONNECTION

P65 J65

to K13-87 (B158)
to J62-B (E97)

FAN SOLENOID (L1)

PX34

to K15-86 (A149)
to PX1-1 (A101)
to TB2-79 (C144)

CHEMICAL ALARM CONNECTION

P99 J99

to J43-6 (H51)
to J43-7 (H51)
to TL88 (B97)
to TL98 (B97)

CAB RADIO CONNECTION

J78

to TB2-21 (G142)
to K53-87A (H150)
to TB2-23 (G142)

J113

G132

CTIS PRESSURE TRANSDUCER

CTIS PNEUMATIC CONTROLLER

C180
to K6-85 (F152)
TL501 TL502
to TB2-45 (D140)

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 22 OF 40

SIZE B | ILL. NO. 6WD0117B | FP-43/ (FP-44 BLANK)

WRECKER REAR LIGHTS

LH INTERMEDIATE MAKER — P94 — 1 — 489 — TL88 — 3089

LH WORK LIGHTS — P133 (A 3063, B 2002); P133A (1 3064, 2 2002) — E54

E341 — P107 (a 3088, b 3087, d 2037, e 2033, f 2069, g 2006, z 2033) — TL54

CAB-DASH-RIGHT-POWER DISTRIBUTION PANEL

D52 — P51 (1 2002, 2 490, 3 21, 4 460B, 5 461B, 6 23, 7 489, 8 23T, 9 489T, 10 484T, 11 460B, 12 461B, 13 22C, 14 1404, 15 461T, 16 460T, 17 24) — E53

B258 — P108 (9 2033, 13 2037, 14 2033, 15 2069, 16 2006)

RH WORK LIGHTS — P134A (1 3062, 2 2002) — E55; P134 (A 3061, B 2002)

RH INTERMEDIATE MARKER — P95 (1 489) — TL89 3089 — T90 3089

TL93 3094; TL92 3094 3094

E49

E57

E48

E58 — 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

E50

E56

E60

E61

E62

E63

E64

E65

E66

E67

E68

E69

E70

E71

E72

E73

P85 489 — DS65 LH SIDE MARKER LIGHT — 3094 TL15

P86 489 — DS66 LH REAR MARKER LIGHT — 3094 TL16

P74 461B — DS37 LH TURN AND STOPLIGHT

P78 21 — DS72 LH TAILLIGHT

P76 24 — DS51 BLACKOUT MARKER LH REAR

P77 23 — DS35 BLACKOUT STOP LH REAR

LH REAR COMPOSITE LIGHT

3094 3094 TL86 — TL18 — DS45

P87 490 — BACKUP LIGHT — 3094 TL17

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	ILL. NO.	
B	6WD0118B	FP-45/ (FP-46 BLANK)

REAR LIGHTS TRACTOR

LH WORKLIGHTS
P133A
P133
RH WORKLIGHTS
P134A
P134
E33
E34
TL109
P51
D52
2002
490
21
460B
461B
23
489
23T
489T
484T
460B
461B
22C
1404
461T
460T
24
E42
E36
E43
E41
E29
E37
E56
E39
E40
E38
E45
E35
P53M
F236
3033
489T
3089
1404
460T
23T
484T
461T
484T
484T
TL93M
P52M
B239
21
489
3045
461B
22C
460B
E32
E31
E30
E26
E27
P53R
F236
3094
489T
3094
1404
460T
23T
484T
461T
484T
484T
P52R
B239
21
489
3045
461B
22C
460B
E44
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
LH REAR COMPOSITE LIGHT
P87
490
DS45
BACKUP 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
3094
TL30
P56
489
DS70
REAR MIDDLE MARKER
3094
TL31
P54
489
DS69
LEFT REAR MARKER
3094
TL32
E28
TL93
TL16
3094
3094
TL18

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 24 OF 40

SIZE B | ILL. NO. 6WD0119B | FP-47/ (FP-48 BLANK)

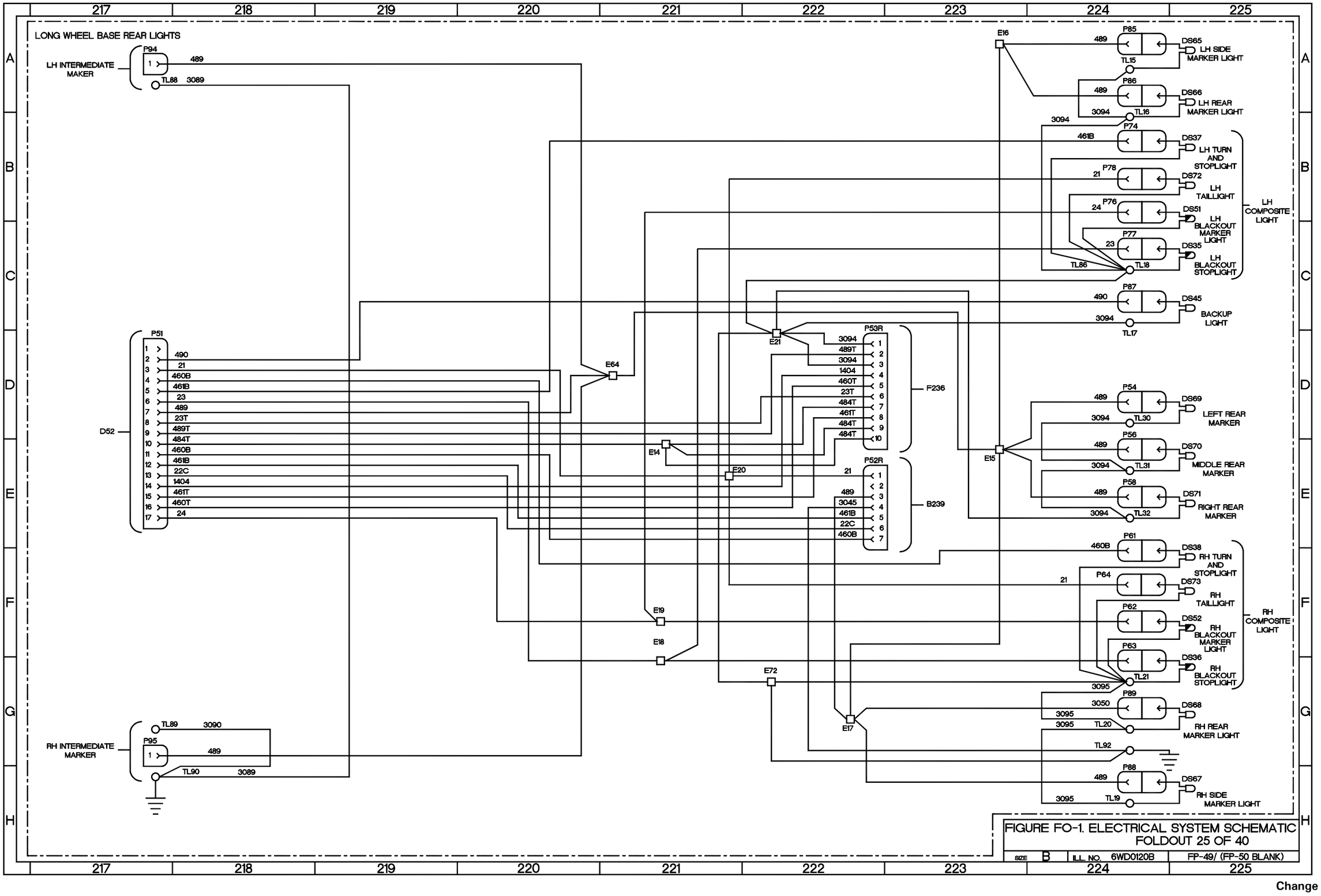


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 25 OF 40

SIZE B | ILL. NO. 6WD0120B | FP-49/ (FP-50 BLANK)

REAR LIGHTS ALL MODELS EXCEPT WRECKER, TRACTOR, AND LONG WHEEL BASE

CAB-DASH-RIGHT-POWER DISTRIBUTION PANEL

D52 — P51
1 490
2 21
3 460B
4 461B
5 23
6 489
7 23T
8 489T
9 484T
10 460B
11 461B
12 22C
13 1404
14 461T
15 460T
16 24
17

E21 — P53R
3094 1
489T 2
3094 3
1404 4
460T 5
23T 6
484T 7
461T 8
484T 9
484T 10
F236

E14 — P52R
21 1
489 2
3045 3
461B 4
22C 5
460B 6
7
B239

E20
E19
E18
E17
TL93
3045 TL92 3095
3094 TL86
3095 TL21
3095 3095

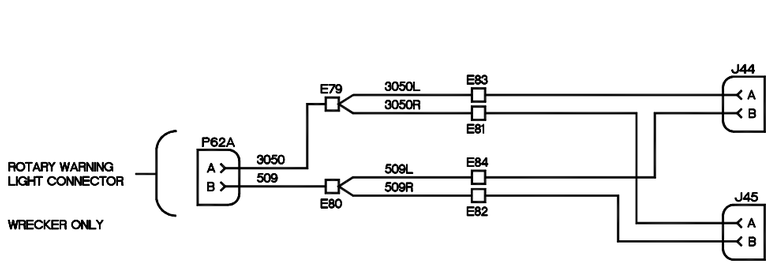
E16
489 P85 DS65 LH SIDE MARKER LIGHT
3094 TL15
489 P86 DS66 LH REAR MARKER LIGHT
3094 TL16
461B P74 DS37 LH TURN AND STOPLIGHT
21 P78 DS72 LH TAILLIGHT
24 P76 DS51 LH BLACKOUT MARKER LIGHT
23 P77 DS35 LH BLACKOUT STOPLIGHT
3094 TL18
LH COMPOSITE LIGHT
490 P87 DS45 BACKUP LIGHT
3094 TL17

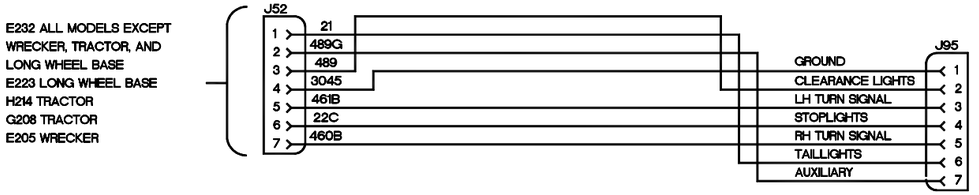
E15
489 P54 DS69 LEFT REAR MARKER
3094 TL30
489 P56 DS70 MIDDLE REAR MARKER
3094 TL31
489 P58 DS71 RIGHT REAR MARKER
3094 TL32

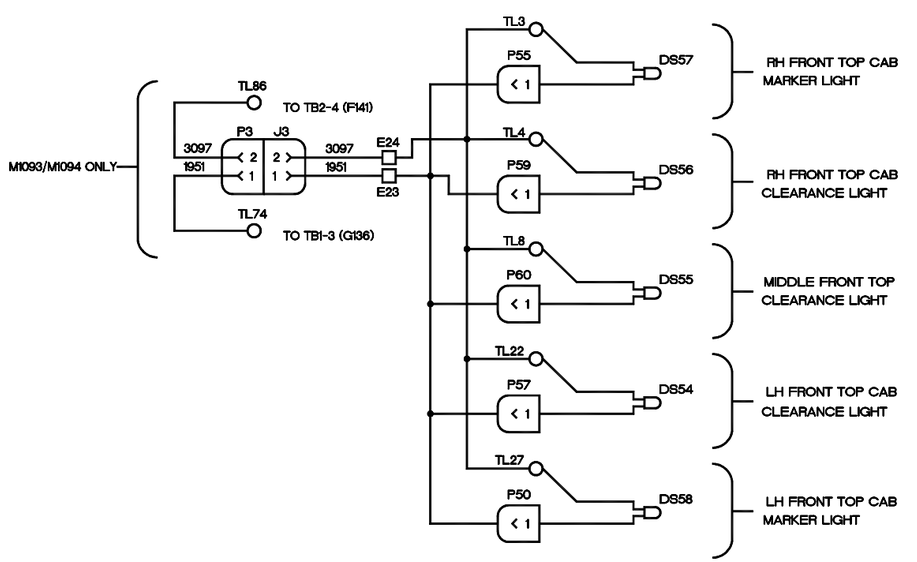
460B P61 DS38 RH TURN AND STOPLIGHT
21 P64 DS73 RH TAILLIGHT
24 P62 DS52 RH BLACKOUT MARKER LIGHT
23 P63 DS36 RH BLACKOUT STOPLIGHT
RH COMPOSITE LIGHT
489 P89 DS68 RH REAR MARKER LIGHT
3095 TL20
489 P88 DS67 RH SIDE MARKER LIGHT
3095 TL19

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 26 OF 40

SIZE B | ILL. NO. 6WD0121B | FP-51/ (FP-52 BLANK)







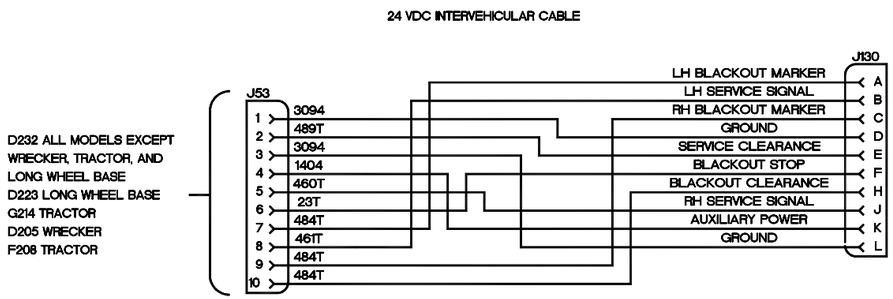
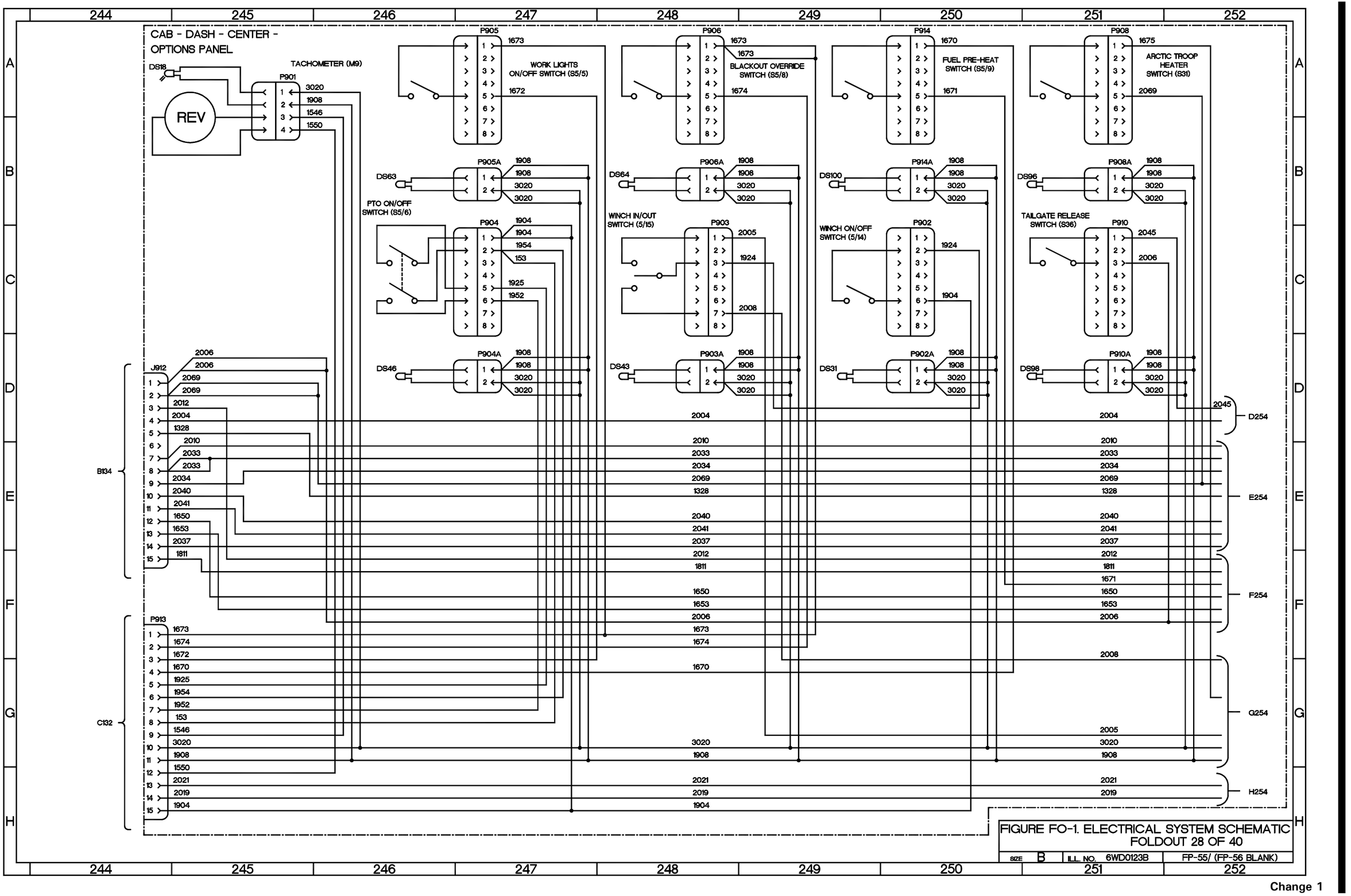


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 27 OF 40

SIZE	ILL. NO.	
B	6WD0122B	FP-53/ (FP-54 BLANK)


CAB - DASH - CENTER - OPTIONS PANEL
TACHOMETER (M9)
DS18
REV
P901
WORK LIGHTS ON/OFF SWITCH (S5/5)
BLACKOUT OVERRIDE SWITCH (S5/8)
FUEL PRE-HEAT SWITCH (S5/9)
ARCTIC TROOP HEATER SWITCH (S31)
PTO ON/OFF SWITCH (S5/6)
WINCH IN/OUT SWITCH (5/15)
WINCH ON/OFF SWITCH (5/14)
TAILGATE RELEASE SWITCH (S36)
DS63
DS64
DS100
DS96
DS46
DS43
DS31
DS98
J912
B134
C132
P913
D254
E254
F254
G254
H254
FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 28 OF 40
SIZE B
ILL. NO. 6WD0123B
FP-55/ (FP-56 BLANK)

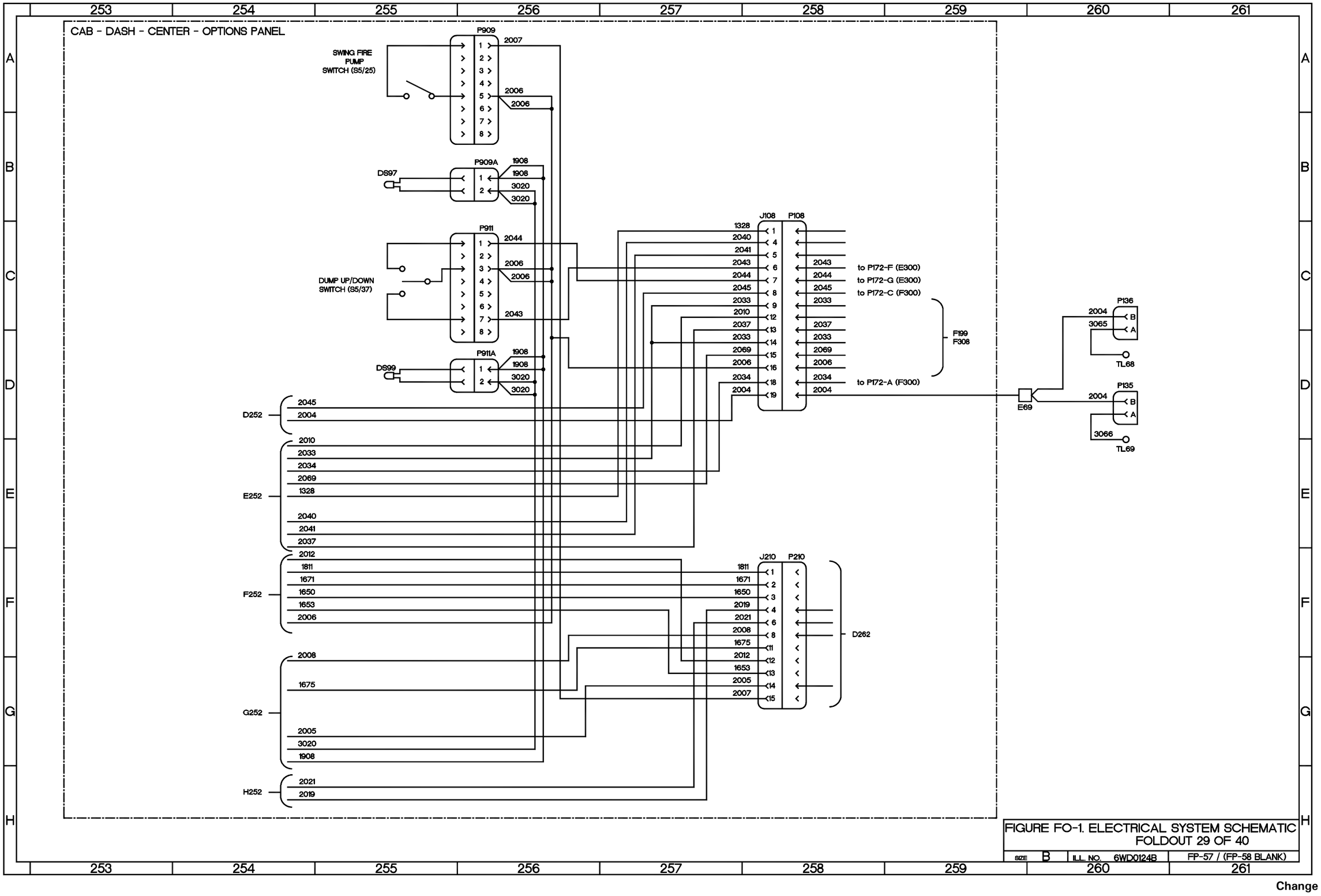


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 29 OF 40

SIZE	ILL. NO.	
B	6WD0124B	FP-57 / (FP-58 BLANK)

PTO EQUIPPED

P210 G258: 1 1811, 4 2019, 6 2021, 8 2008, 14 2005

E70

P217 E304: 3068 A, 2019 B

TL76

P216 D304: 3025 A, 2021 B

J209A F268: 1811 1, 3013 2

3013 TL111

J209B: 1811 1, 3013 2
M1084/M1085/M1086/M1090 G264
M1083/M1088/M1089/M1090/M1093/M1094 G268

WINCH OUT SOLENOID (L5)

L5: 3070 1, 2

P215 J215: 2008 1, 2005 2 — 2008 1, 2005 2

TL320

WINCH IN SOLENOID (L4)

L4: 3069 1, 2

J912 G134: 15 1811 J209 1, 3013 2 F268
3013 TL101
M1083/M1085/M1093 WITHOUT PTO

P209B G268: 1 2 J209 1, 3013 2 D266
M1084/M1086/M1090 M1083/M1085 WITH PTO

J912 G134: 15 1811 E70 J209B 1, 3013 2 G268
E74 3013 TL101
J209A 1, 3013 2 F268
M1088 WITHOUT PTO

P209A C266 F265: 1, 2 B6 TRANSMISSION AUXILIARY OIL COOLER FAN

P209B D266 G264: 1, 2 B6A TRANSMISSION AUXILIARY OIL COOLER FAN

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 B | ILL. NO. 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 B | ILL. NO. 6WD0128B | FP-65/ (FP-66 BLANK)

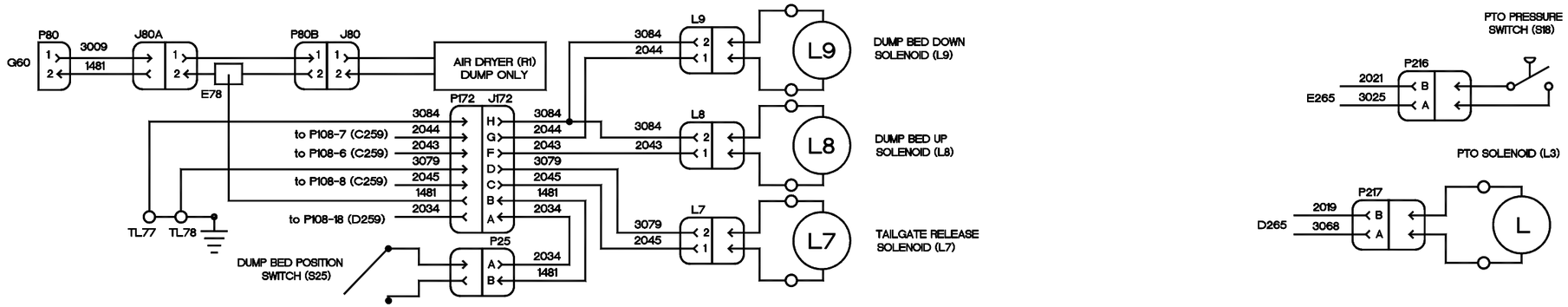


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 34 OF 40

SIZE B | ILL. NO. 6WD0129B | FP-67/ (FP-68 BLANK)

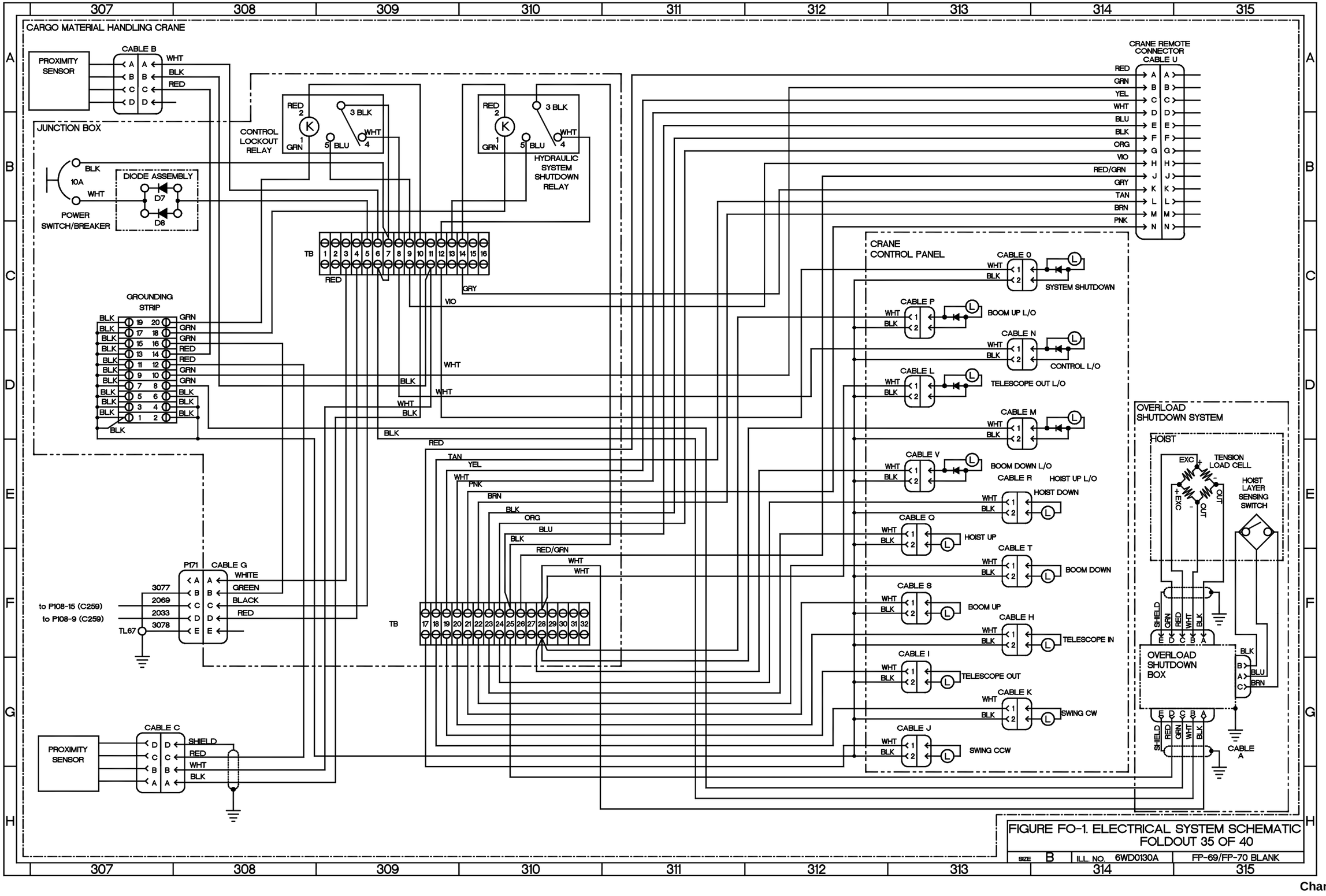


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 35 OF 40

SIZE B | ILL. NO. 6WD0130A | FP-69/FP-70 BLANK

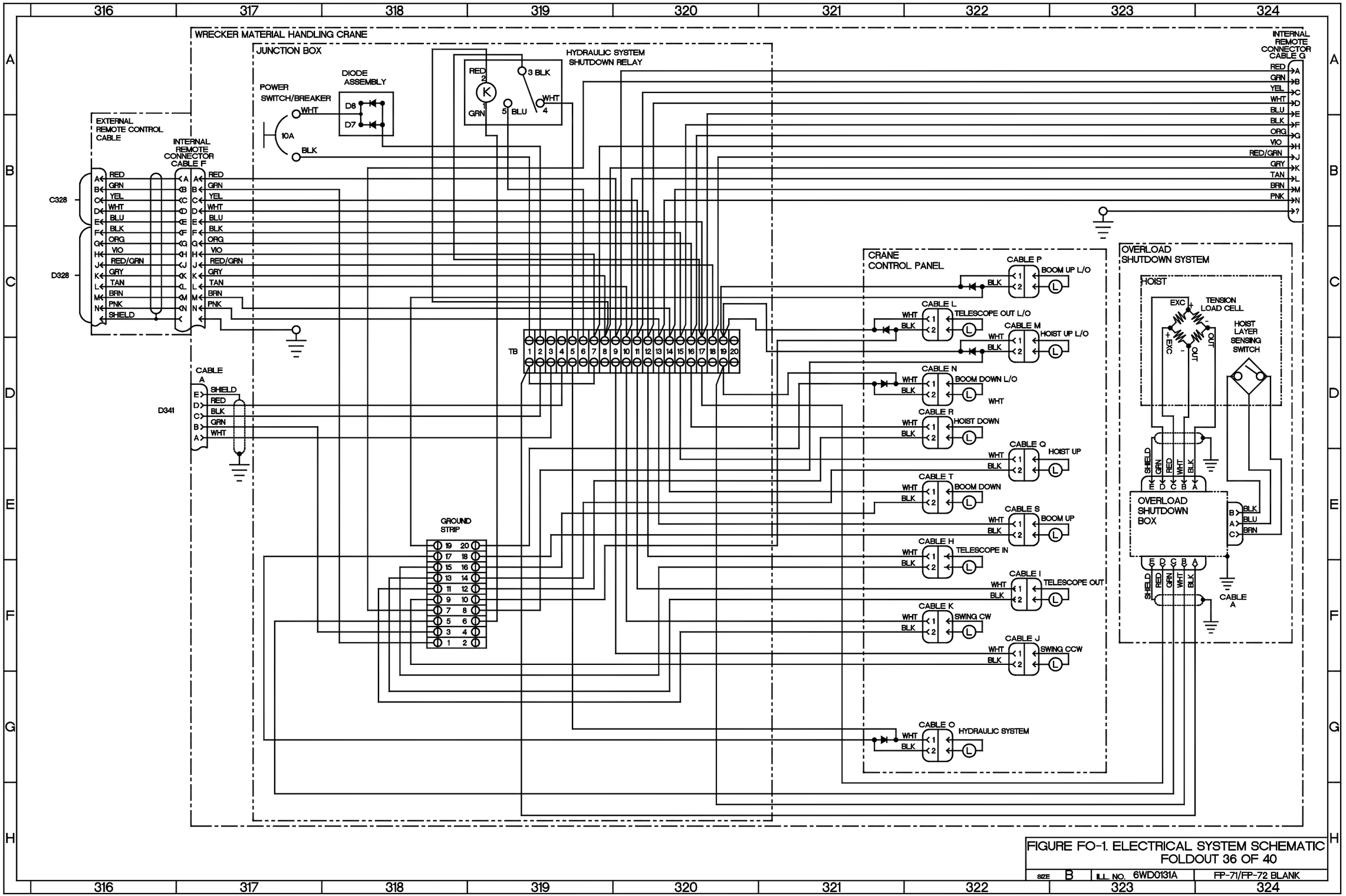


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 36 OF 40

SIZE	ILL. NO.	
B	6WD0131A	FP-71/FP-72 BLANK

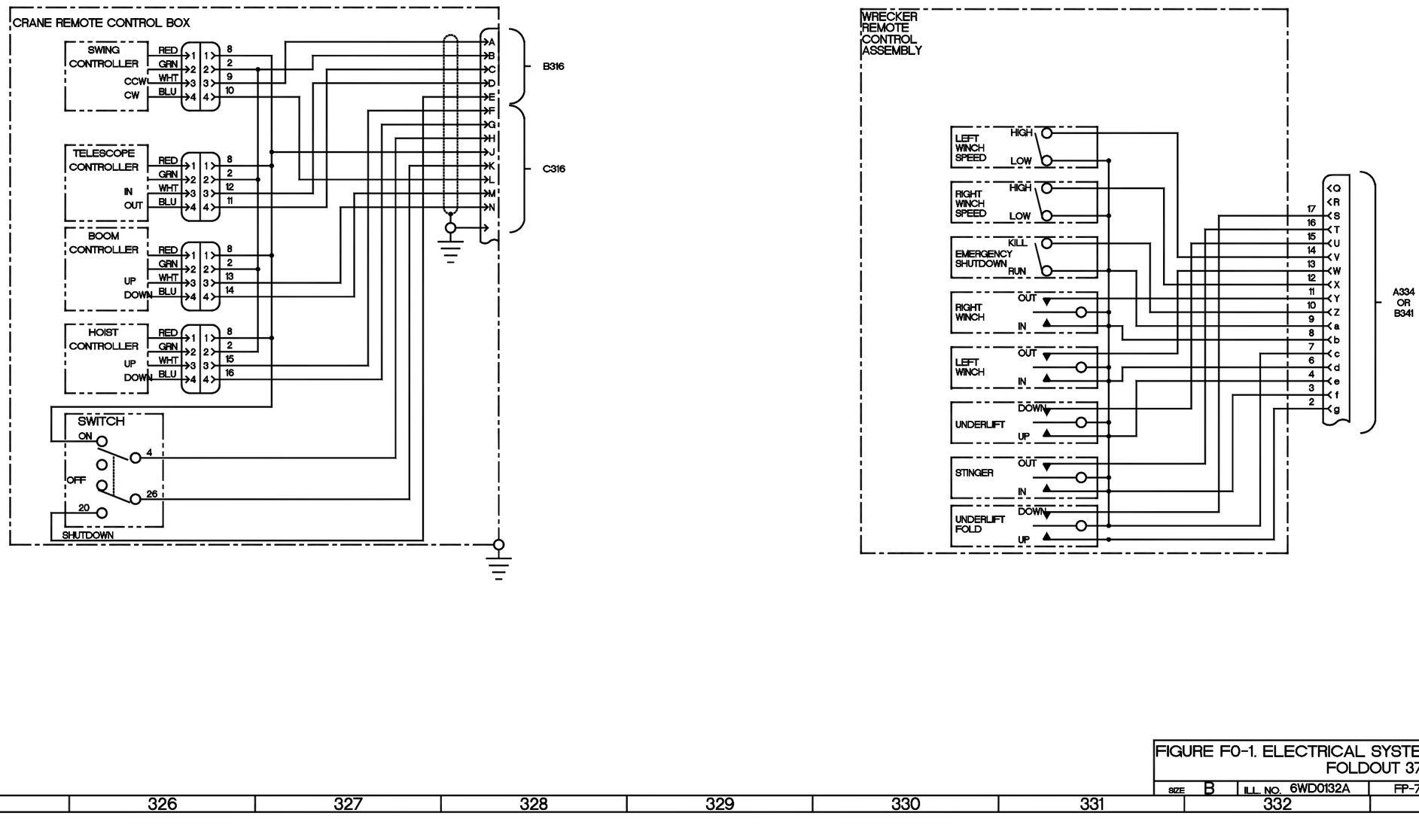


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 37 OF 40

SIZE	ILL. NO.	
B	6WD0132A	FP-73/FP-74 BLANK

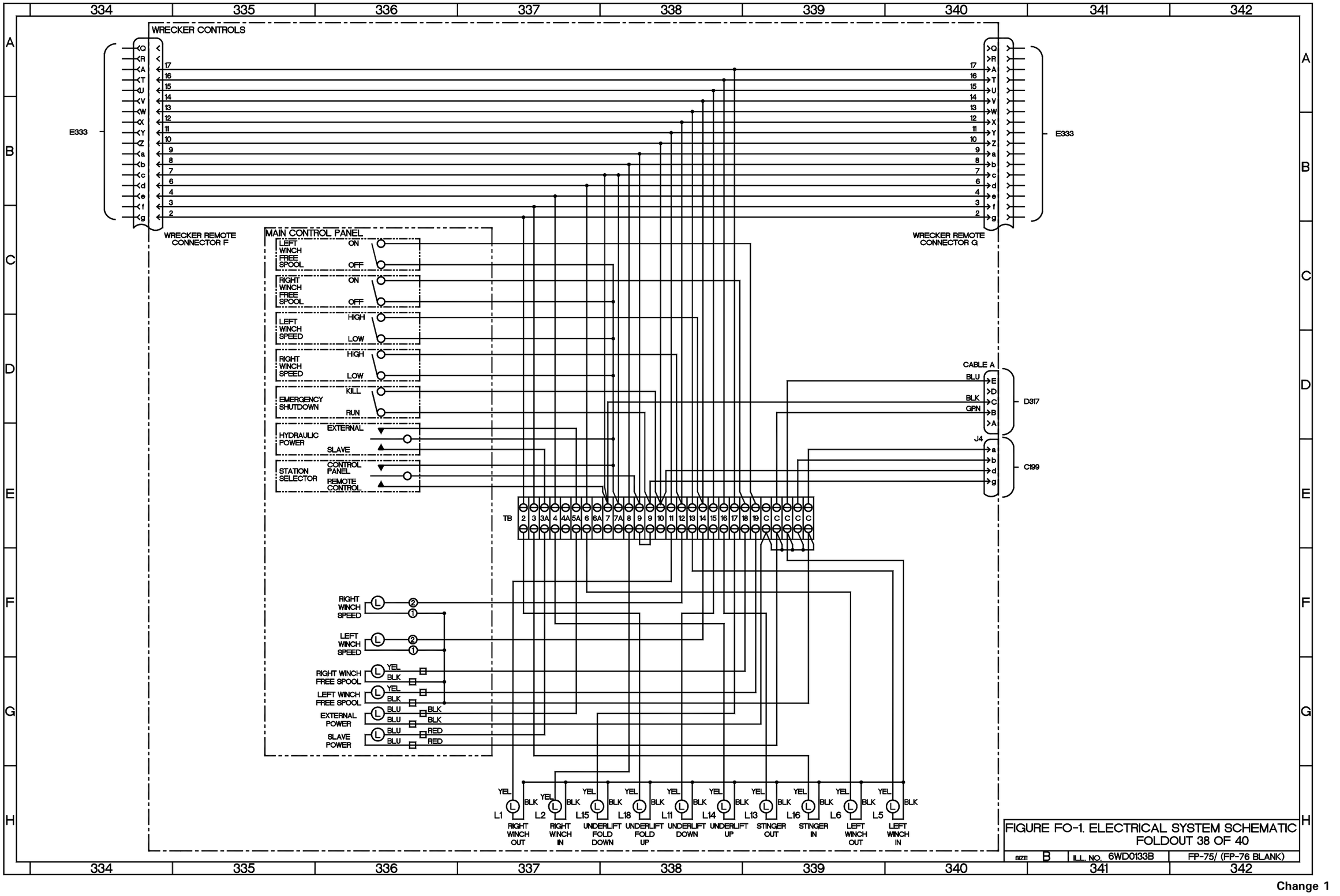


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 38 OF 40

SIZE	ILL. NO.	
B	6WD0133B	FP-75/ (FP-76 BLANK)

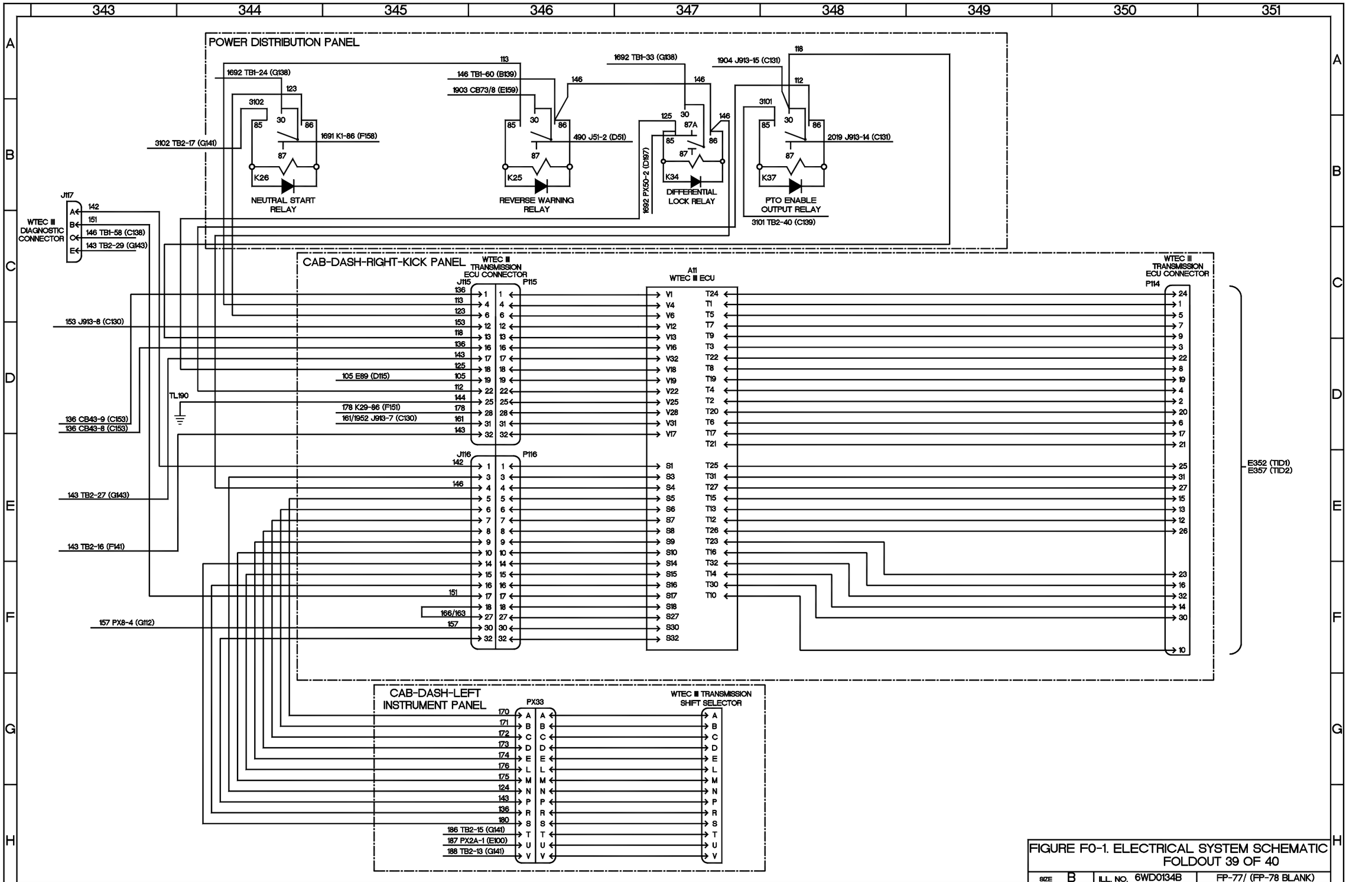


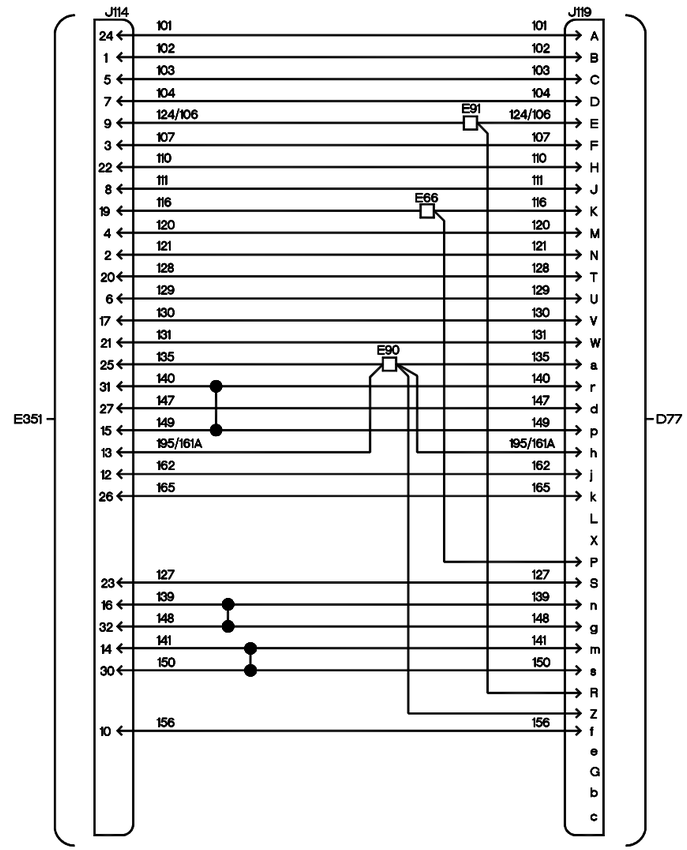
FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 39 OF 40

SIZE	ILL. NO.	
B	6WD0134B	FP-77/ (FP-78 BLANK)

352 353 354 355 356 357 358 359 360

TRANSMISSION SERIAL #: 6510090785 AND LOWER

WTEC III CAB TRANSMISSION HARNESS (TID1)



TRANSMISSION SERIAL #: 6510090786 AND HIGHER

WTEC III CAB TRANSMISSION HARNESS (TID2)

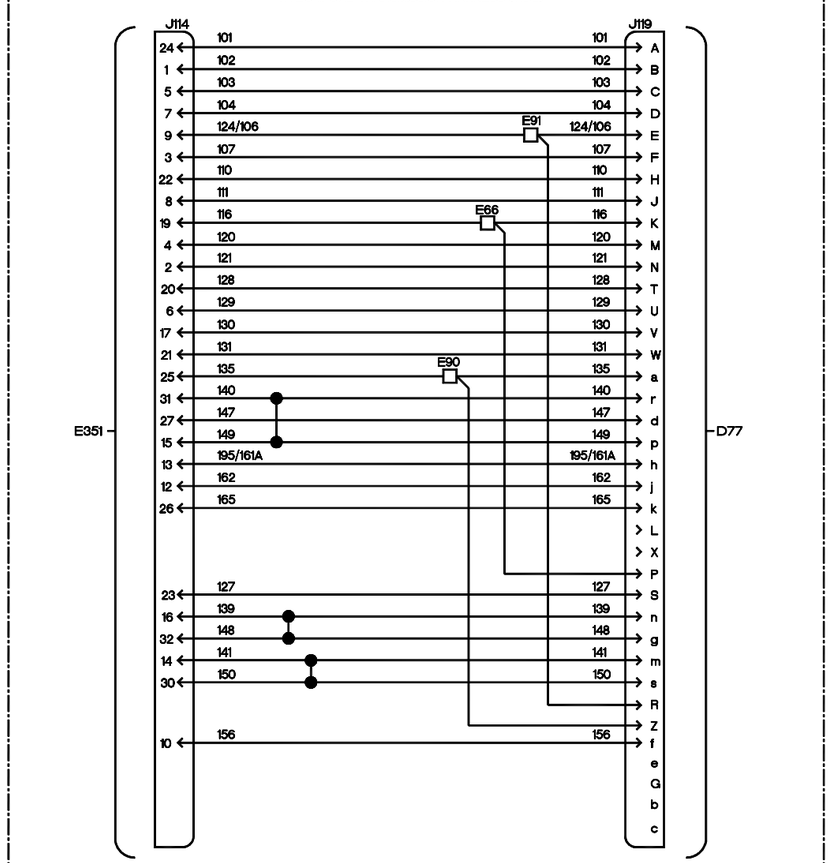


FIGURE F0-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 40 OF 40

SIZE B | ILL NO. 6WD0135B | FP-79/ (FP-80 BLANK)

352 353 354 355 356 357 358 359 360

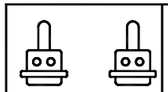
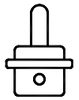
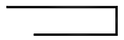
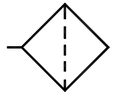
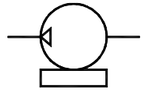
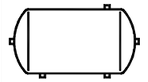
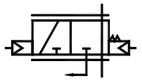
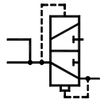
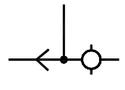
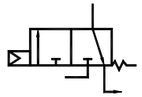
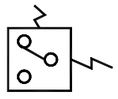
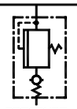
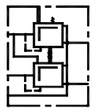
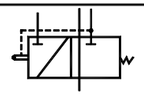
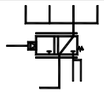
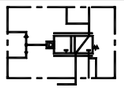
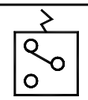
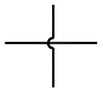
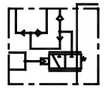
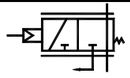
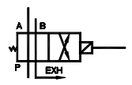
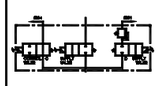
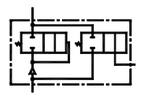
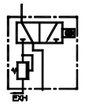
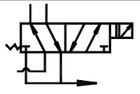
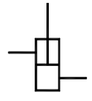
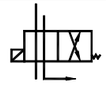
 REAR AXLE BRAKE CHAMBER	 FRONT AXLE BRAKE CHAMBER	 COUPLER AIR BRAKE	AIR DRYER	 AIR CLEANER INTAKE	 AIR COMPRESSOR WITH GOVERNOR	 AIR TANK	DASH GAUGE
MANUAL VALVE	ONE WAY CHECK VALVE	FAN CLUTCH	 MODULATED CONTROL VALVE	 QUICK RELEASE VALVE	 TWO WAY CHECK VALVE	 3/2 WAY SOLENOID VALVE	 PRESSURE SWITCH
 PRESSURE RELIEF VALVE	 FOOT CONTROL VALVE	 PARK CONTROL VALVE (HAND OPERATED)	TRAILER AIR SUPPLY VALVE (HAND OPERATED)	LOAD SENSING VALVE (MECHANICALLY CONTROLLED)	 DIRECTIONAL RELAY VALVE	 CONTROL VALVE WITH TWO WAY CHECK VALVE	 STOPLIGHT SWITCH
CONNECTION	SUPPLY AIR HOSE	 NO CONNECTION	DELIVERY AIR HOSE	PARK/EMERGENCY AIR HOSE	 AIR BRAKE PROTECTING VALVE	INTERMEDIATE DIFFERENTIAL	AIR BRAKE PRESSURE TRANSMITTER
BOOSTER VALVE	 AIR/HYDRAULIC INVERSION VALVE	DELIVERY AIR HOSE NO CONNECTION	 DUMP TAILGATE SOLENOID	BLEED VALVE	TAILGATE CYLINDER	 CTIS MANIFOLD VALVE	 WHEEL VALVE
 KNEELING VALVE	TIRE	(SINGLE ACTING) CYLINDER RETURN SPRING	 2-POSITION SPRING OFFSET SOLENOID VALVE	(DOUBLE ACTING) CYLINDER	 MANIFOLD VALVE	 2-POSITION SOLENOID VALVE	

FIGURE F0-2 PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 1 OF 4

SIZE	ILL. NO.	
B	6PD01AL1	FP-1/FP-2 BLANK

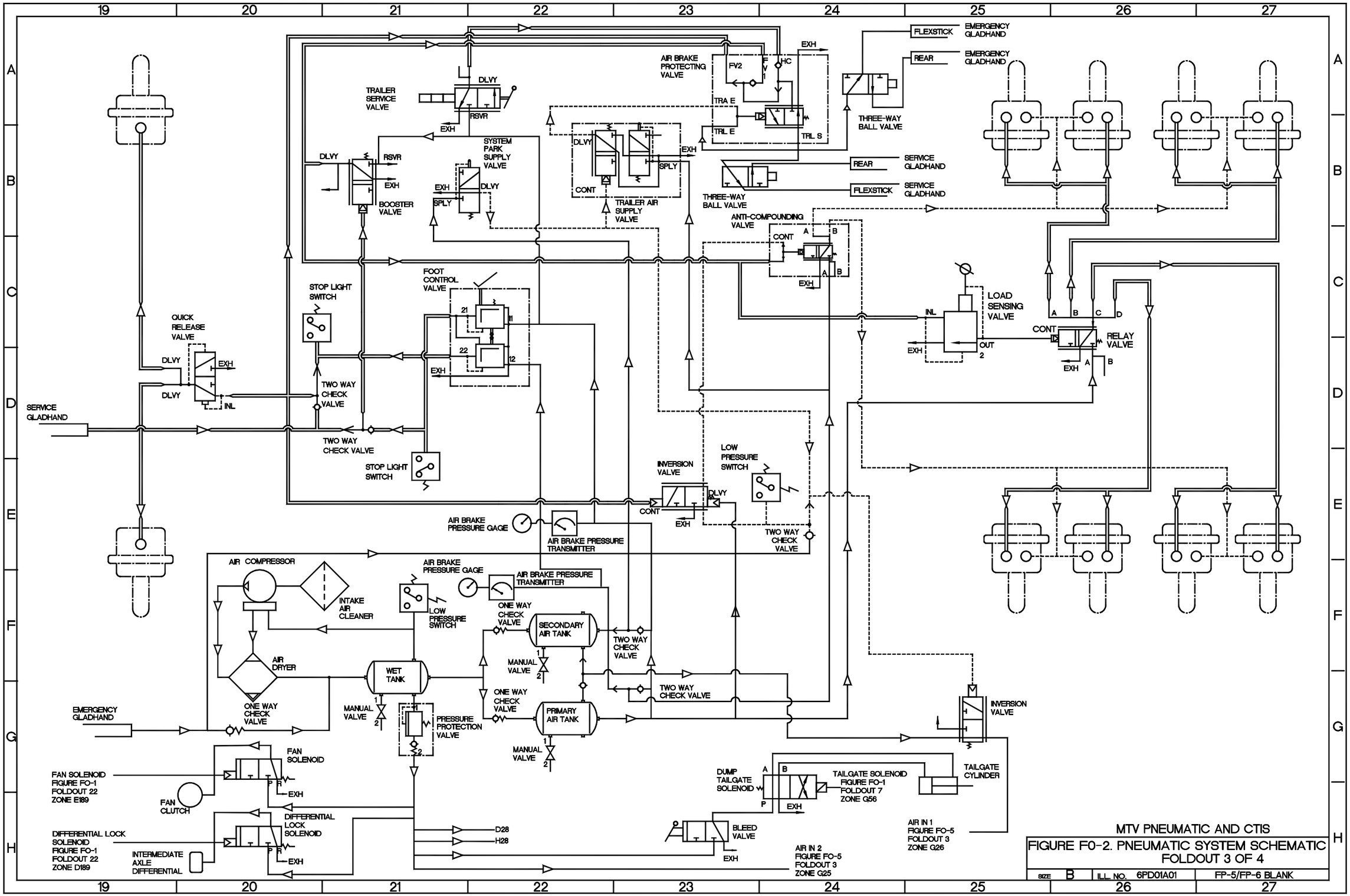
SH	ZONE	DESCRIPTION
3	E22	AIR BRAKE PRESSURE TRANSMITTER
3	F21	AIR BRAKE PRESSURE TRANSMITTER
3	A23	AIR BRAKE PROTECTING VALVE
3	F20	AIR COMPRESSOR
3	F20	AIR DRYER
3	B24	ANTI-COMPOUNDING VALVE
3	H23	BLEED VALVE
3	B21	BOOSTER VALVE
4	D30	CONTROL VALVE
4	C30	CTIS MANIFOLD VALVE
4	D31	DEFLATE VALVE
3	H20	DIFFERENTIAL LOCK SOLENOID
3	G24	DUMP TAILGATE SOLENOID
3	A25	EMERGENCY GLADHAND
3	A25	EMERGENCY GLADHAND
3	G19	EMERGENCY GLADHAND
3	H20	FAN CLUTCH
3	G20	FAN SOLENOID
3	C22	FOOT CONTROL VALVE
3	F20	INTAKE AIR CLEANER
3	H19	INTERMEDIATE AXLE DIFFERENTIAL
3	E23	INVERSION VALVE
3	G25	INVERSION VALVE
4	A28	KNEELING VALVE
4	C28	KNEELING VALVE
4	E28	LH MAIN WINCH FREESPOOL
4	E30	LH MAIN WINCH TENSIONER
4	G29	LH MAIN WINCH VALVE
3	C25	LOAD SENSING VALVE
3	E23	LOW PRESSURE SWITCH
3	F21	LOW PRESSURE SWITCH
4	F28	MANIFOLD
4	G29	MANIFOLD
3	F22	MANUAL VALVE
3	G21	MANUAL VALVE
3	G22	MANUAL VALVE
3	F22	ONE WAY CHECK VALVE
3	G20	ONE WAY CHECK VALVE
3	G22	ONE WAY CHECK VALVE
3	G21	PRESSURE PROTECTION VALVE
3	G22	PRIMARY AIR TANK
4	B30	QUICK RELEASE VALVE
4	B33	QUICK RELEASE VALVE
4	B36	QUICK RELEASE VALVE
3	C20	QUICK RELEASE VALVE
4	E30	REGULATOR
4	E31	REGULATOR

SH	ZONE	DESCRIPTION
4	F28	REGULATOR
3	D26	RELAY VALVE
4	E29	RH MAIN WINCH FREESPOOL
4	E30	RH MAIN WINCH TENSIONER
4	G33	RH MAIN WINCH VALVE
3	F22	SECONDARY AIR TANK
3	B24	SERVICE GLADHAND
3	B24	SERVICE GLADHAND
3	D19	SERVICE GLADHAND
4	G30	STINGER VALVE
3	C20	STOPLIGHT SWITCH
3	E21	STOPLIGHT SWITCH
4	D31	SUPPLY VALVE
3	B21	SYSTEM PARK SUPPLY VALVE
3	G25	TAILGATE CYLINDER
3	A24	THREE WAY BALL VALVE
3	B23	THREE WAY BALL VALVE
3	B22	TRAILER AIR SUPPLY VALVE
3	A21	TRAILER SERVICE VALVE
3	D21	TWO WAY CHECK VALVE
3	D21	TWO WAY CHECK VALVE
3	E24	TWO WAY CHECK VALVE
4	E30	TWO WAY CHECK VALVE
4	E30	TWO WAY CHECK VALVE
3	F23	TWO WAY CHECK VALVE
3	G23	TWO WAY CHECK VALVE
4	G32	UNDERLIFT FOLD VALVE
4	G31	UNDERLIFT VALVE
3	F21	WET TANK
4	C34	WHEEL VALVE
4	A28	WHEEL VALVE
4	A32	WHEEL VALVE
4	A34	WHEEL VALVE
4	C28	WHEEL VALVE
4	C32	WHEEL VALVE

MTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 2 OF 4

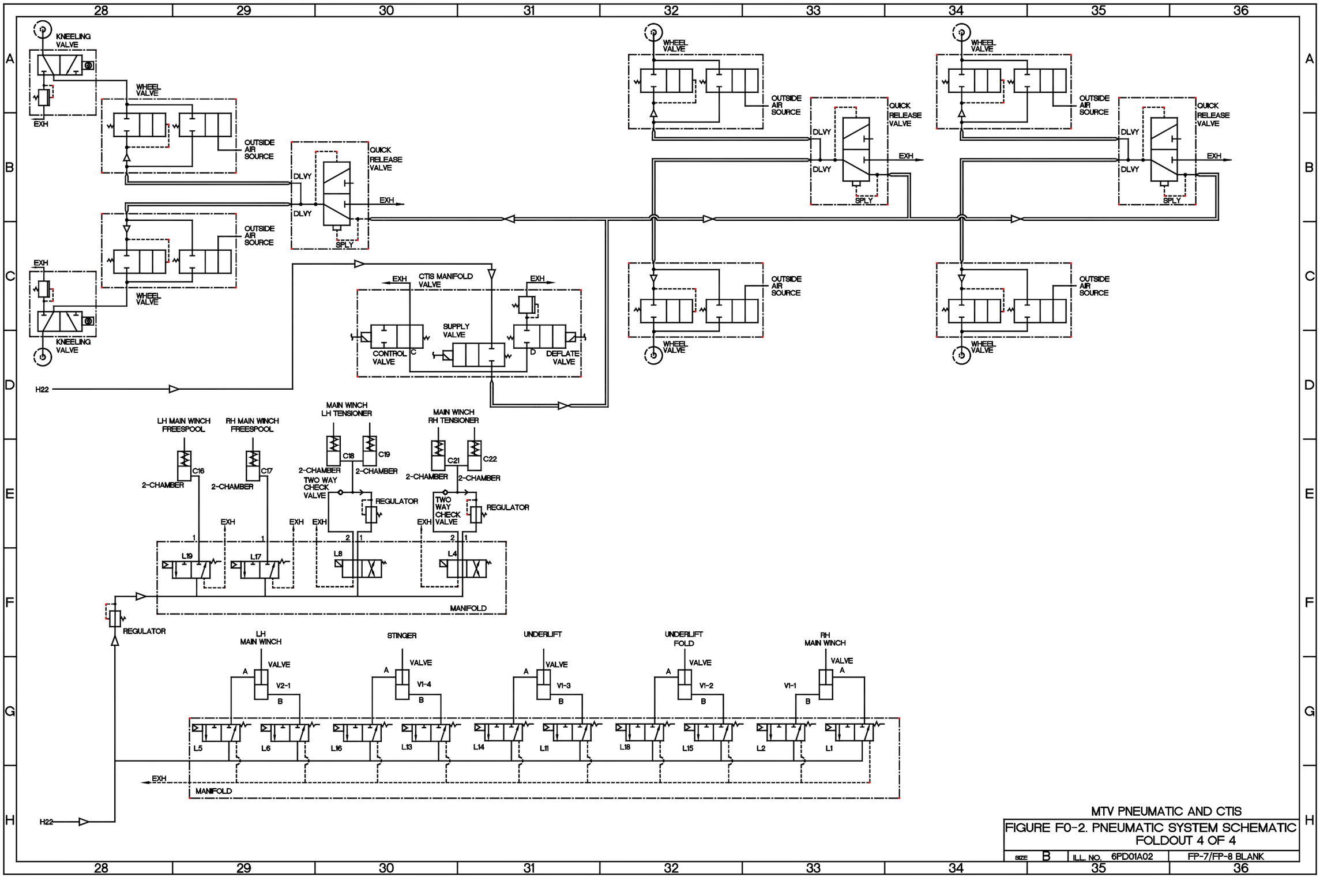
SIZE	ILL. NO.	
B	6PD01AL2	FP-3/FP-4 BLANK



MTV PNEUMATIC AND CTIS

FIGURE FO-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 3 OF 4

SIZE	ILL. NO.	
B	6PD01A01	FP-5/FP-6 BLANK



MTV PNEUMATIC AND CTIS

FIGURE F0-2. PNEUMATIC SYSTEM SCHEMATIC FOLDOUT 4 OF 4

SIZE	ILL. NO.	
B	6PD01A02	FP-7/FP-8 BLANK

CHECK VALVE	BYPASS VALVE	CHECK VALVE	AIR OR OIL FILTER	MOTOR	PUMP	PTO	HOIST CYLINDER
AIR LINE LUBRICATOR	CYLINDER	HYDRAULIC ACCUMULATOR	FLOW CONTROL VALVE	CLOSED 2 WAY VALVE	2 WAY SOLENOID VALVE	VALVE	SWING MOTOR
DIRECTIONAL CONTROL VALVE	PRESSURE CONTROL VALVE	CHECK VALVE	HOLDING VALVE	NORMALLY CLOSED 2 WAY VALVE	PRESSURE RELIEF VALVE	SWING DRIVE	RESERVOIR
VALVE	HYDRAULIC CYLINDER	MANUAL SHUT OFF	SUCTION LINE	CROSS OVER RELIEF VALVE	HAND PUMP	MOTOR CONTROL VALVE	

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC

FOLDOUT 1 OF 8

SIZE	ILL. NO.	
B	6HD01AL1	FP-1/FP-2 BLANK

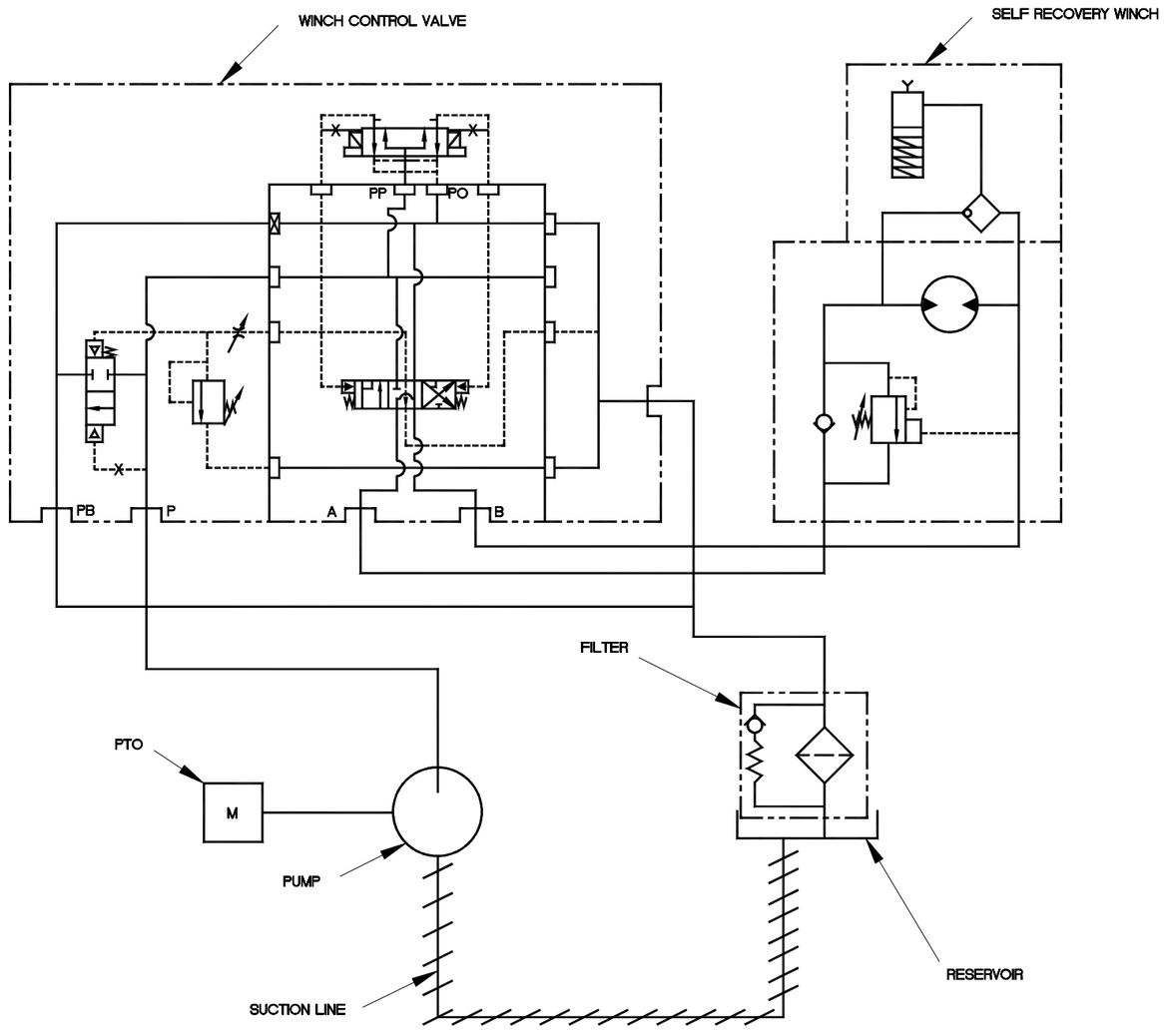
SH	ZONE	DESCRIPTION
6	D46	2 WAY SOLENOID VALVE
7	D60	2 WAY SOLENOID VALVE
7	D55	2 WAY SOLENOID VALVE, OPERATING PRESS
7	F60	3 BANK VALVE ASSEMBLY
7	C61	4 BANK VALVE ASSEMBLY
6	B52	BOOM
7	F55	BULKHEAD PLATE (SUBFRAME)
7	F57	CHECK VALVE
7	G62	CHECK VALVE
7	D55	CHECK VALVE
5	E37	CHECK VALVE CK1
5	E37	CHECK VALVE CK2
5	E37	CHECK VALVE CK3
5	E37	CHECK VALVE CK4
5	E37	CHECK VALVE CK5
5	E37	CHECK VALVE CK6
8	E65	CONTROL VALVE
5	B44	COUNTERBALANCE VALVE
6	B48	CROSS RELIEF VALVE
7	C57	CROSS RELIEF VALVE
8	E64	DUMP BODY HYDRAULIC HOIST
6	G48	ERECTION CYLINDER
5	E38	FC1 SLAVE POWER
5	E38	FC2 EXTERNAL POWER
3	F23	FILTER
4	D34	FILTER
8	E68	FILTER
5	B43	FLOW CONTROL VALVE
5	B45	FLOW CONTROL VALVE
5	B43	FOLD CYLINDER
7	C62	FULL FLOW
6	G54	GAUGE PORT
6	E47	HAND PUMP
7	E56	HAND PUMP
7	G57	HOIST
7	A62	HOIST
6	B53	HOIST
8	G65	HOIST CYLINDER
7	G58	HOIST MOTOR
6	G46	HOIST MOTOR
7	H57	HOIST MOTOR CONTROL VALVE
6	H46	HOIST MOTOR CONTROL VALVE
7	H59	HOLDING VALVE
7	G62	HOLDING VALVE
6	C47	HOLDING VALVE
6	H53	HOLDING VALVE
7	C55	HOLDING VALVE
7	G56	HOLDING VALVES
6	E48	HOLDING VALVES
6	G48	HOLDING VALVES
5	D41	HYDRAULIC MOTOR, PAY-OUT
5	E41	HYDRAULIC MOTOR, PAY-OUT
7	A60	HYDRAULIC ACCUMULATOR

SH	ZONE	DESCRIPTION
6	E54	HYDRAULIC ACCUMULATOR
7	H61	LEFT JACK CYLINDER
6	H49	LEFT JACK CYLINDER
5	G42	LEFT MAIN WINCH
7	A61	LIFT
6	E48	LIFT CYLINDERS
5	C37	LINEAR DIRECTIONAL CONTROL VALVE
5	B42	LOWER MAIN CONTROL VALVE ASSEMBLY
5	D37	M1089 MATERIAL HANDLING CRANE LOC.
6	B51	MANUAL OVERRIDE
7	G61	MAST ERECTION
7	H59	MAST ERECTION CYLINDER
4	C30	MATERIAL HANDLING EQUIPMENT
5	E38	MC1 SLAVE POWER
5	E38	MC2 EXTERNAL POWER
5	D40	MONO BLOCK VALVE ASSEMBLY
7	G58	MOTOR DRAIN
6	G46	MOTOR DRAIN
6	D54	N/C 2 WAY VALVE
6	H52	OUTRIGGER EXTENSION CYLINDER
7	A60	PRESSURE CHECK POINT
3	F21	PTO
4	E32	PTO
8	G68	PTO
3	F22	PUMP
4	E33	PUMP
8	F68	PUMP
5	F37	PUMP ASSEMBLY
5	D41	RELIEF VALVE
5	E41	RELIEF VALVE
5	F42	RELIEF VALVE ASSEMBLY
5	B42	RELIEF VALVE ASSY (RIGHT MAIN WINCH)
3	F24	RESERVOIR
4	F34	RESERVOIR
8	G69	RESERVOIR
5	G40	RETURN VALVE
5	B44	RH UNDERLIFT COUNTERBALANCE VALVE
7	G62	RIGHT JACK CYLINDER
6	H54	RIGHT JACK CYLINDER
5	B42	RIGHT MAIN WINCH
5	F40	SAMPLING VALVE
3	B24	SELF RECOVERY WINCH
5	G41	SELF RECOVERY WINCH
8	B71	SELF RECOVERY WINCH
5	G43	STIFFLEG CYLINDER LH
5	G45	STIFFLEG CYLINDER RH
5	B45	STINGER CYLINDER
7	F55	SUCTION LINE-HAND PUMP
3	G22	SUCTION LINE
4	F33	SUCTION LINE
5	F37	SUPPLY VALVE
7	A58	SWING
6	B50	SWING

SH	ZONE	DESCRIPTION
6	B48	SWING DRIVE
7	B57	SWING DRIVE
6	A48	SWING MOTOR
7	B57	SWING MOTOR
6	C46	TELESCOPE CYLINDER
7	A59	TELESCOPE
6	B51	TELESCOPE
7	B55	TELESCOPE CYLINDER
5	A44	TELESCOPIC LIFT CYLINDER, LH
5	A45	TELESCOPIC LIFT CYLINDER, RH
6	F49	UNLOADER VALVE
7	E56	UNLOADER VALVE
5	E42	UPPER MAIN CONTROL VALVE ASSEMBLY
5	E37	VALVE, SELECTOR
3	B21	WINCH CONTROL VALVE
8	B69	WINCH CONTROL VALVE

FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 8

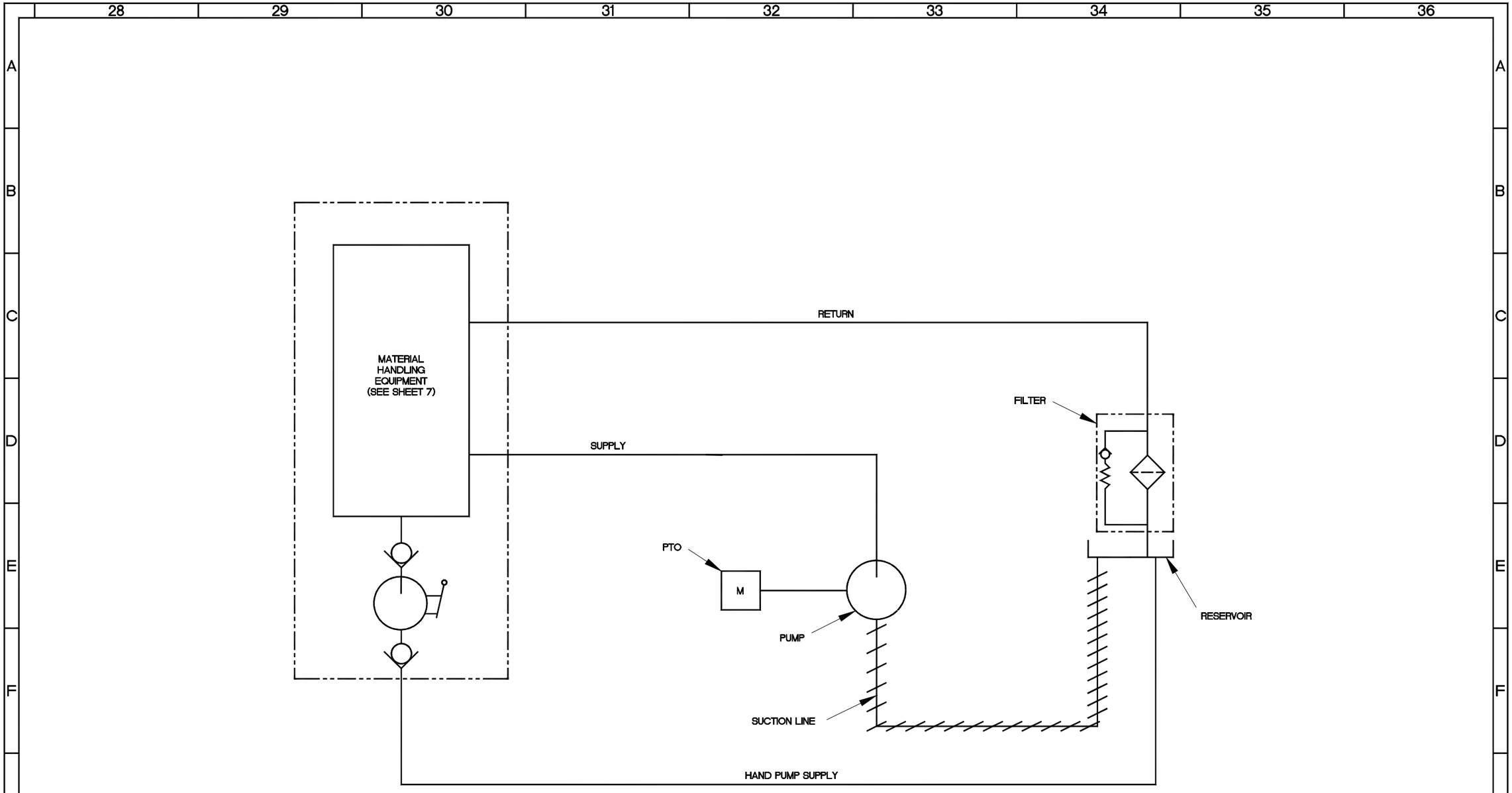
SIZE B | ILL. NO. 6HD01AL2 | FP-3/FP-4 BLANK



MTV TRUCK W/WINCH

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 8

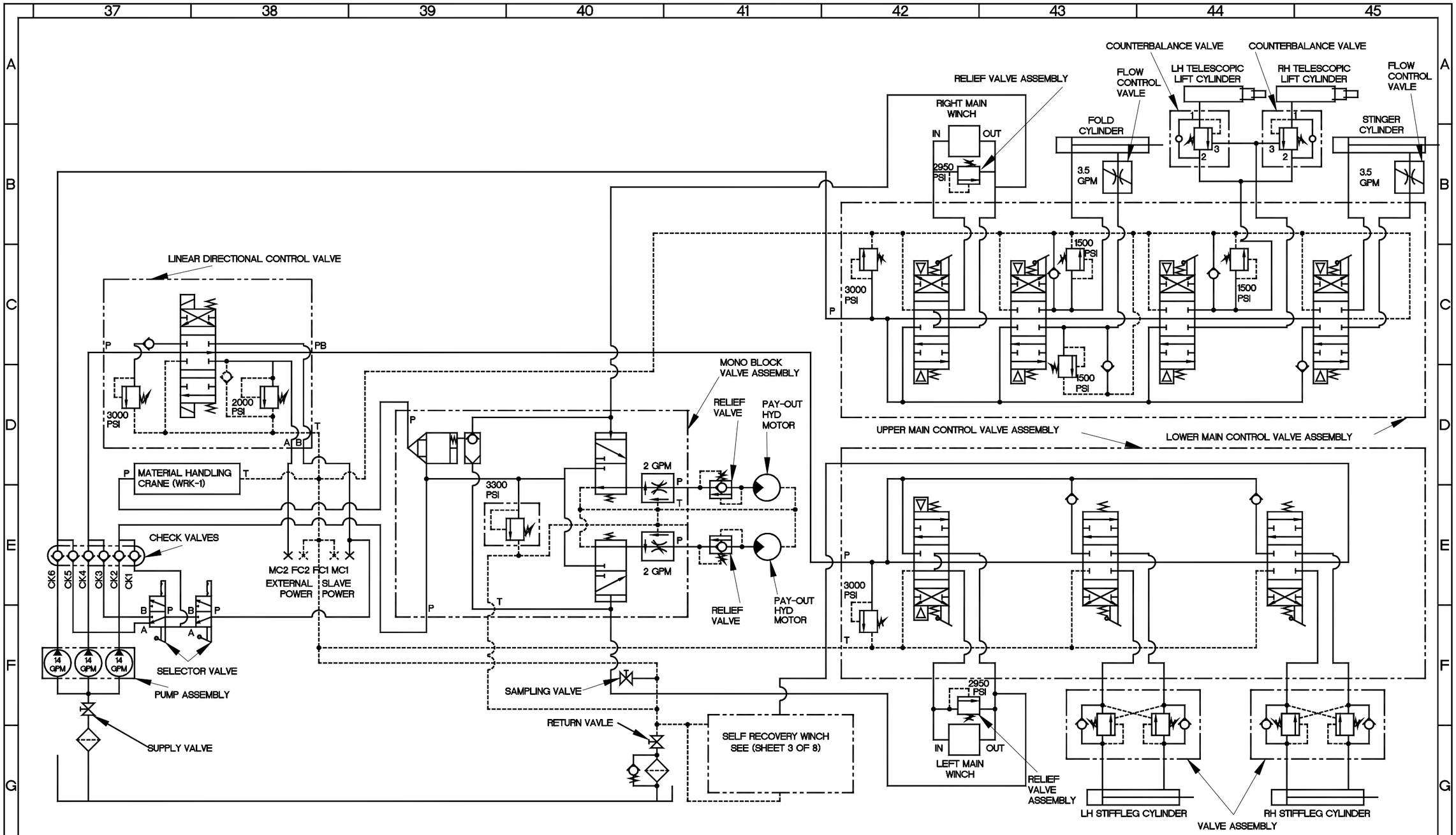
SIZE	ILL. NO.	
B	6HD01A01	FP-5/FP-6 BLANK



MTV MATERIAL HANDLING CRANE

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 4 OF 8

SIZE B | ILL. NO. 6HD01A02 | FP-7/FP-8 BLANK



MTV WRECKER

FIGURE FO-3 HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 5 OF 8

SIZE	ILL. NO.	
B	6HD01A03	FP-9/FP-10 BLANK

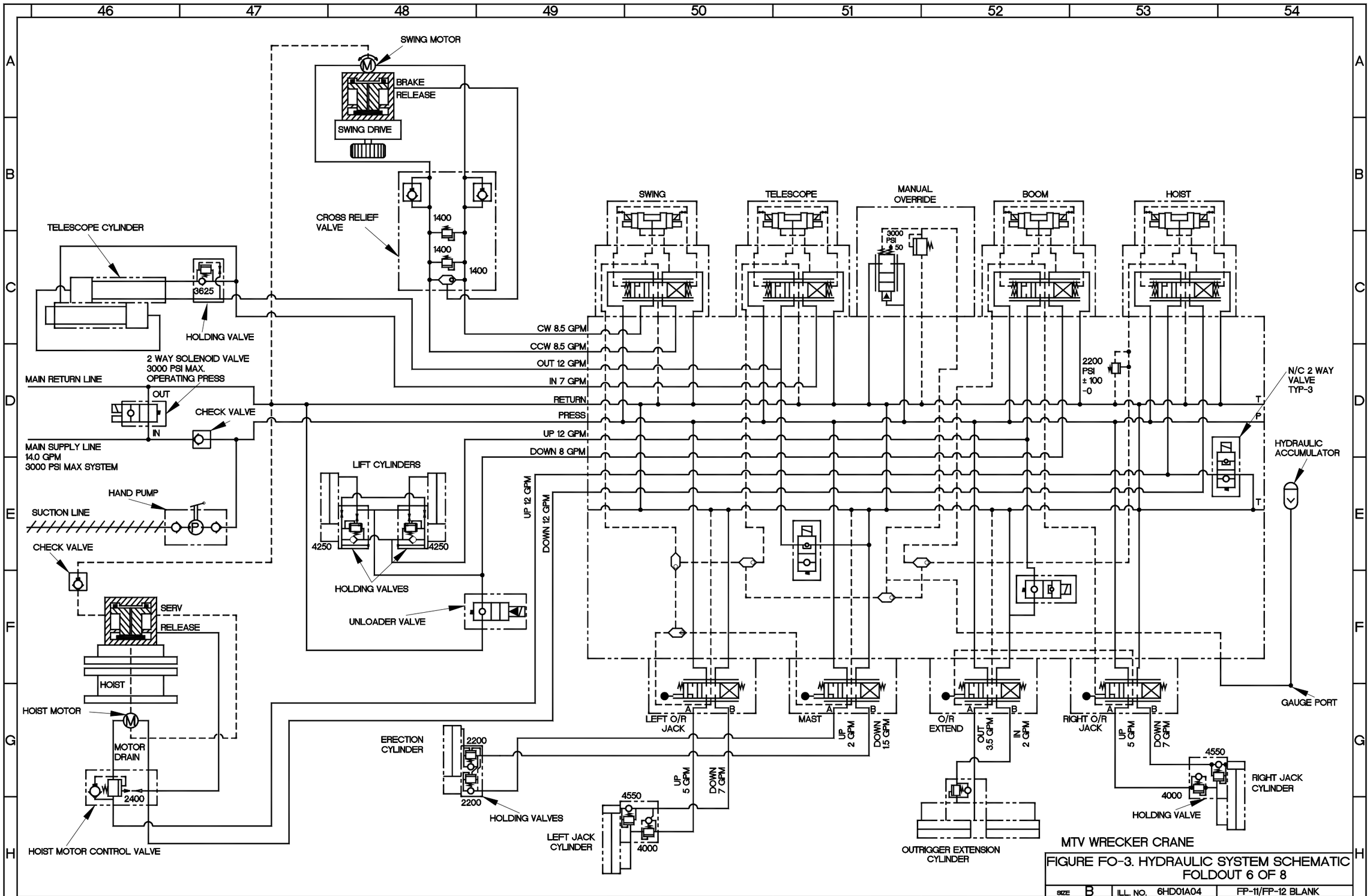
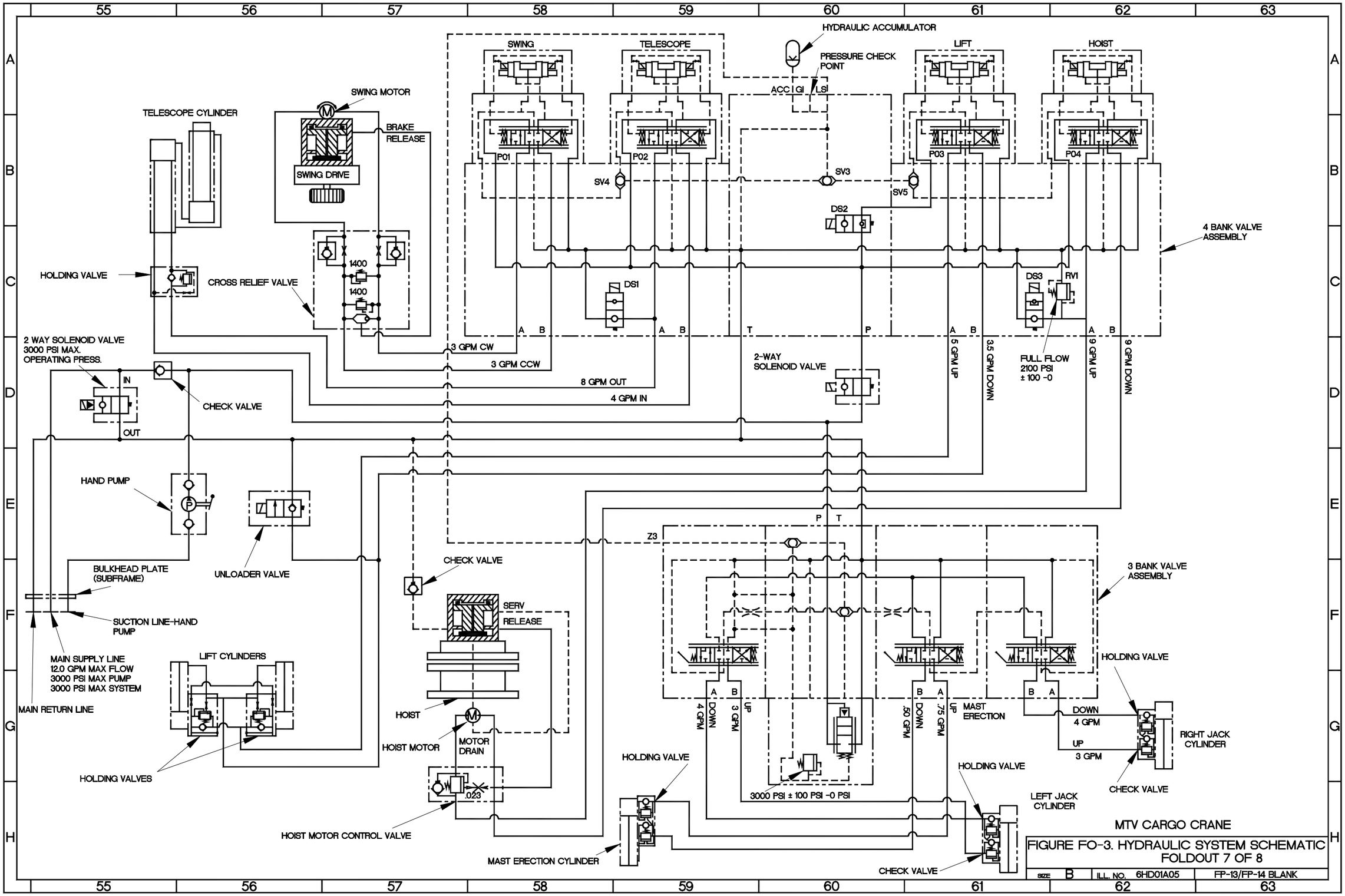


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 6 OF 8

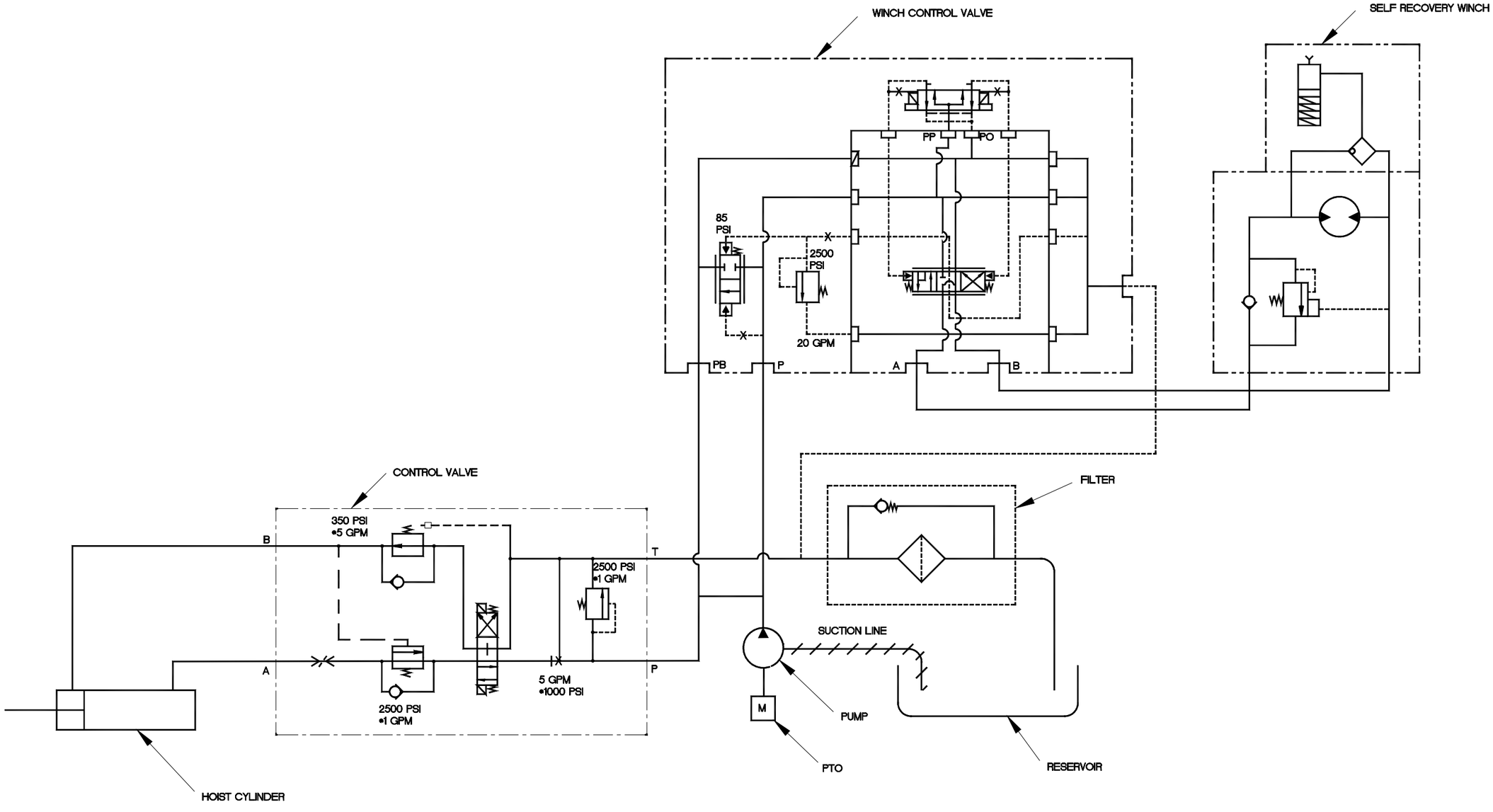
SIZE	ILL. NO.	
B	6HD01A04	FP-11/FP-12 BLANK



MTV CARGO CRANE

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 7 OF 8

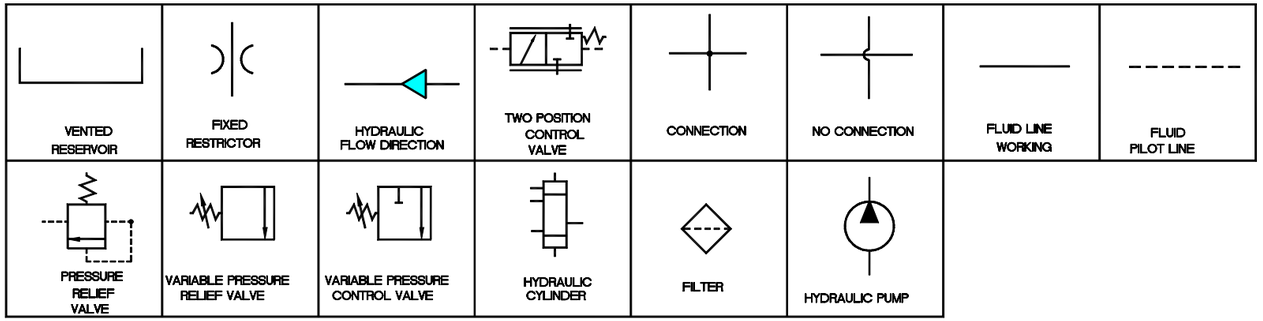
SIZE	ILL. NO.	
B	6HD01A05	FP-13/FP-14 BLANK



MTV DUMP W/ WINCH
MTV DUMP W/O WINCH

FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 8 OF 8

SIZE	ILL. NO.	
B	6HD01A06	FP-15/FP-16 BLANK



SH	ZONE	DESCRIPTION
2	D11	FILTER
2	D14	FIXED RESTRICTOR
2	E17	HYDRAULIC CYLINDER
2	E13	HYDRAULIC PUMP
2	C13	PRESSURE RELIEF VALVE
2	D13	TWO POSITION CONTROL VALVE
2	E16	VARIABLE PRESSURE CONTROL VALVE
2	E16	VARIABLE PRESSURE RELIEF VALVE
2	C11	VENTED RESERVOIR

FIGURE FO-4 HYDRAULIC STEERING SYSTEM

FOLDOUT 1 OF 2

SIZE B | ILL NO. YSD01AL1 | FP-1/FP-2 BLANK

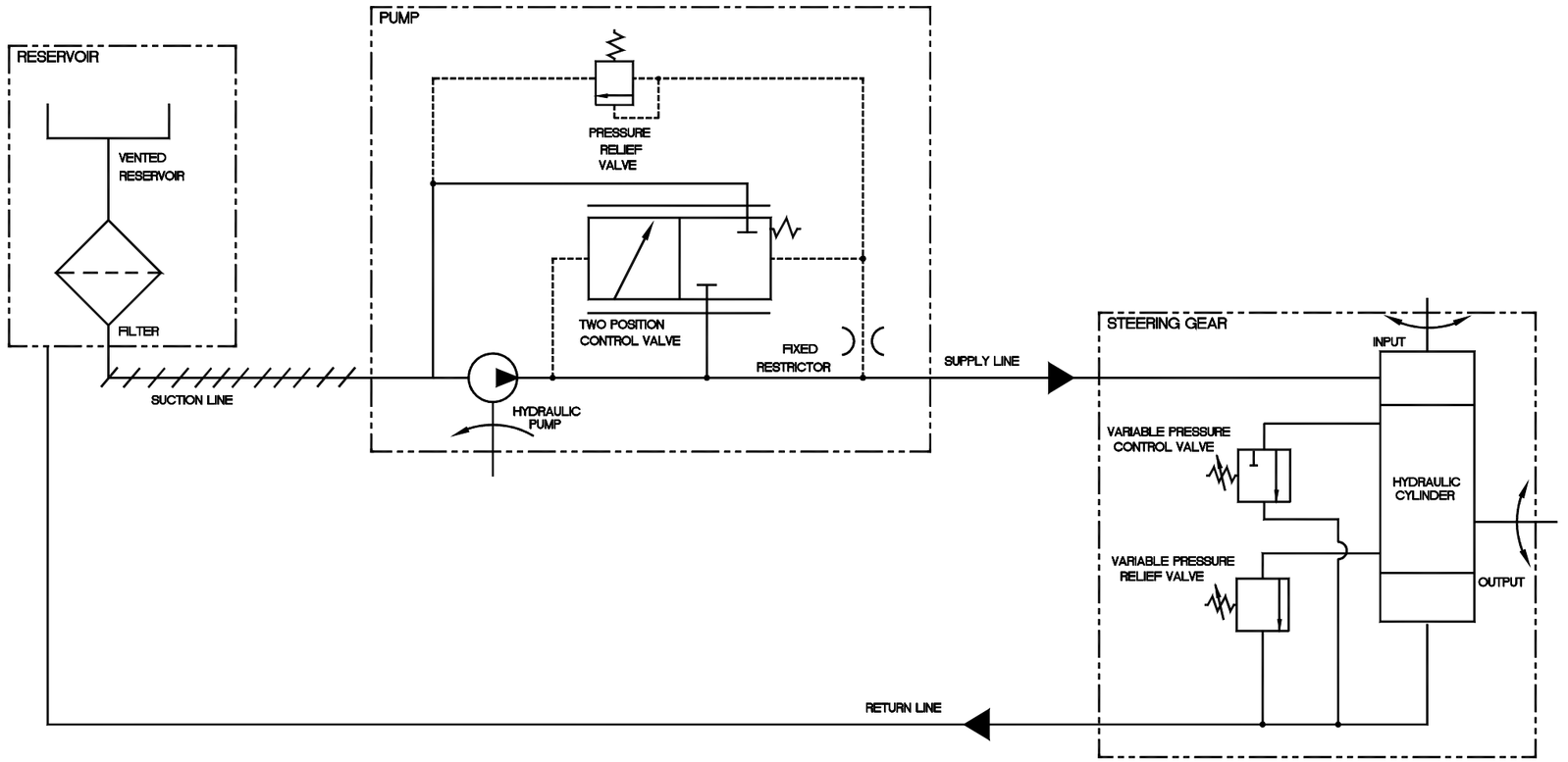


FIGURE FO-4 HYDRAULIC STEERING SYSTEM

FOLDOUT 2 OF 2

SIZE	ILL. NO.	
B	YSD01A01	FP-3/FP-4 BLANK

VENTED RESERVOIR	ABOVE FLUID LEVEL RESERVOIR	HYDRAULIC FLOW DIRECTION	PNEUMATIC FLOW DIRECTION	CONNECTION	NO CONNECTION	FLUID LINE WORKING	FLUID PILOT LINE
FIXED RESTRICTOR	CHECK VALVE	VARIABLE CONTROL CHECK VALVE	CHECK PILOT	PRESSURE RELIEF VALVE	FILTER	HAND PUMP	DETENT
TWO POSITION CAB SUSPENSION VALVE	MUFFLER	HYDRAULIC CYLINDER	CAB AIR SUSPENSION W/DAMPER	REAR CAB LATCH	TWO POSITION AIR PUMP VALVE	PRESSURE INTENSIFIER	HEIGHT CONTROL VALVE
TWO POSITION CAB TILT VALVE	TWO POSITION SUSPENSION VALVE	TWO POSITION SPARE TIRE VALVE	THREE POSITION SELECTION VALVE				

FIGURE F0-5 AIR TRANSPORTABILITY
HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC

FOLDOUT 1 OF 3

SIZE B | ILL NO. YAD01AL1 | FP-1/FP-2 BLANK

SH	ZONE	DESCRIPTION
3	A25	CAB AIR SUSPENSION W/DAMPER
3	F21	CHECK PILOT
3	A22	CHECK VALVE
3	A23	CHECK VALVE
3	B22	CHECK VALVE
3	B23	CHECK VALVE
3	B25	CHECK VALVE
3	C20	CHECK VALVE
3	C21	CHECK VALVE
3	E19	CHECK VALVE
3	E24	CHECK VALVE
3	E25	CHECK VALVE
3	F19	CHECK VALVE
3	F21	CHECK VALVE
3	G21	CHECK VALVE
3	A22	FILTER
3	B22	FILTER
3	A24	FILTER
3	B24	FILTER
3	D19	FILTER
3	D20	FILTER
3	D21	FILTER
3	E19	FILTER
3	G19	FILTER
3	G21	FILTER
3	A22	FIXED RESTRICTOR
3	B22	FIXED RESTRICTOR
3	A23	FIXED RESTRICTOR
3	B23	FIXED RESTRICTOR
3	F19	HAND PUMP
3	B25	HEIGHT CONTROL VALVE
3	B22	HYDRAULIC CYLINDER
3	B23	HYDRAULIC CYLINDER
3	C21	HYDRAULIC CYLINDER
3	F20	MUFFLER
3	F21	PRESSURE INTENSIFIER
3	F19	PRESSURE RELIEF VALVE
3	A24	REAR CAB LATCH
3	E21	THREE POSITION SELECTION VALVE
3	D26	TWO POSITION AIR PUMP VALVE
3	D25	TWO POSITION CAB SUSPENSION VALVE
3	C24	TWO POSITION CAB TILT VALVE
3	C23	TWO POSITION SPARE TIRE VALVE
3	D21	TWO POSITION SUSPENSION VALVE
3	G22	VARIABLE CONTROL CHECK VALVE
3	G22	VENTED RESERVOIR

FIGURE F0-5 AIR TRANSPORTABILITY
HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 2 OF 3

SIZE B | ILL NO. YAD01AL2 | FP-3/FP-4 BLANK

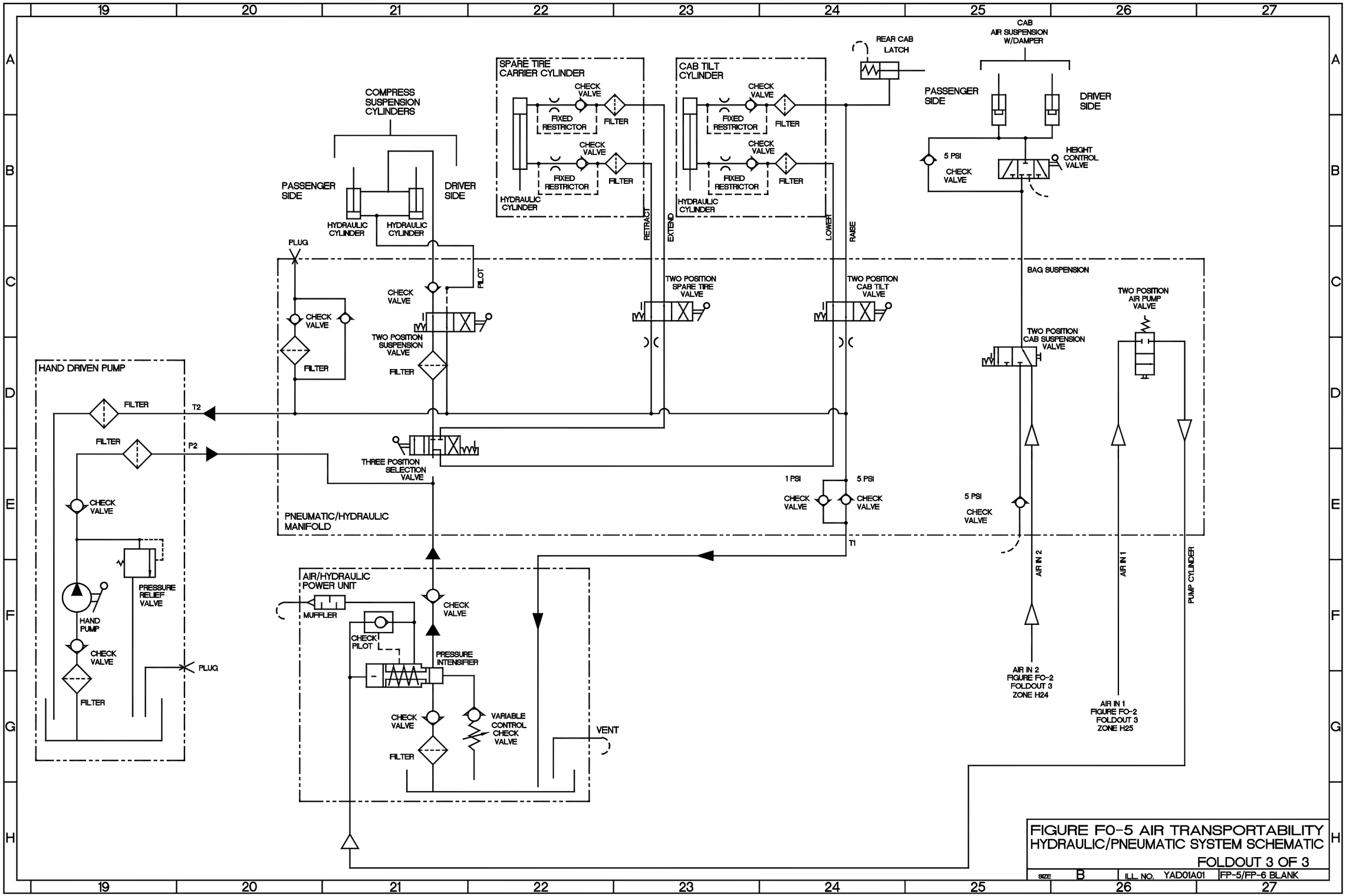


FIGURE FO-5 AIR TRANSPORTABILITY HYDRAULIC/PNEUMATIC SYSTEM SCHEMATIC
FOLDOUT 3 OF 3

SIZE B | ILL NO. YAD01A01 | FP-5/FP-6 BLANK

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE
1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

SQUARE MEASURE
1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

WEIGHTS
1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

CUBIC MEASURE
1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

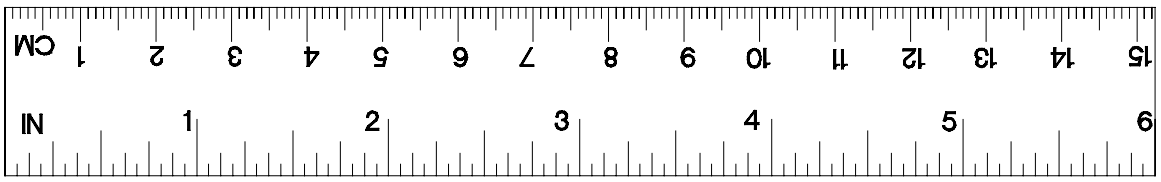
LIQUID MEASURE
1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE
5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° + 32 = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Inches	Millimeters	25.4
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.57
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.35
Pounds	Kilograms	0.454
Pounds (force)	Newtons	4.448
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds/Sq Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Millimeters	Inches	0.0394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Sq Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Newtons	Pounds (force)	0.2248
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Sq Inch	0.145
Km per Liter	Miles per Gallon	2.354
Km per Hour	Miles per Hour	0.621



YMET001A

PIN: 076879-000