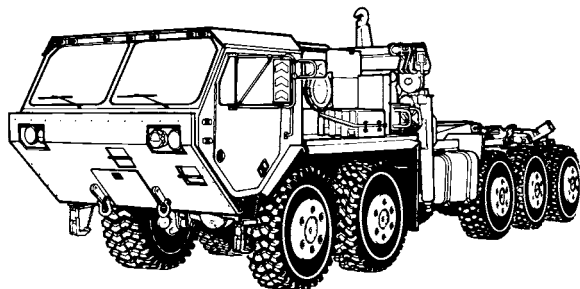


THIS MANUAL SUPERSEDES TM 9-2320-364-34-2 DATED 01 AUG 1999, INCLUDING ALL CHANGES.

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE VOLUME II

PALLETIZED LOAD SYSTEM



MODEL M1074/M1075

NSN 2320-01-304-2277
NSN 2320-01-304-2278

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DISTRIBUTION RESTRICTION A:
Approved for public release;
distribution is unlimited.

WARNING**CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU**

Carbon monoxide is a colorless, odorless, DEADLY POISONOUS gas and when breathed deprives body of oxygen and causes SUFFOCATION. Breathing air with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Permanent BRAIN DAMAGE or DEATH can result from severe exposure.

The following precautions MUST be followed to ensure personnel are safe whenever personnel heater or main or auxiliary engine is operated for any purpose.

- DO NOT operate personnel heater or engine of vehicle in enclosed area without adequate ventilation.
- DO NOT idle engine for long periods without ventilator blower operation. If tactical situation permits, open hatches.
- DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
- NEVER sleep in a vehicle when the heater is operating or the engine is idling.
- BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY EVACUATE AND VENTILATE the area. Affected personnel treatment shall be: expose to fresh air; keep warm, DO NOT PERMIT PHYSICAL EXERCISE; if necessary, give artificial respiration as described in FM 12-11 and get medical attention.
- BE AWARE; neither the gas particulate filter unit nor field protection mask for nuclear-biological-chemical protection will protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

WARNING

Blowing transmission oil can cause injury to eyes. Safety goggles must be worn when testing transmission oil pressure switch.

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.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

WARNING

During pressure tests, ensure air pressure is drained to 0 psi (0 kPa) before taking off air compressor line or taking off any cover plates. If pressure is not released, plates or line could blow off and harm personnel. Air tanks have greater than 30 psi (207 kPa) in them. Do not drain air tanks with any part of body in air spray path. Skin embolisms and/or debris in eyes can occur from released pressure.

WARNING

Allow engine to cool before performing troubleshooting maintenance. If necessary use insulated pads and gloves. Hot engine components will burn and cause injury to personnel.

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

WARNING

High pressure hydraulics [oil under 3675 psi (25,339 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.

WARNING

Fuel and oil are slippery and can cause falls. To avoid injury, wipe up spilled fuel or oil with rags.

WARNING

Do not get under LHS when disconnecting or connecting connectors and hoses. A hydraulic malfunction could cause LHS to lower causing serious injury or death.

WARNING

The LHS hydraulic system operates at oil pressures up to 3625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

Middle frame and hook arm combined weight is 2100 lbs (953 kg). Hook arm cylinders weigh 210 lbs (95 kg) each. Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

High pressure hydraulics [oil under 3000 psi (20,685 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.

WARNING

Do not stand under crane. Mechanical failure and operator error can cause injury or death to personnel.

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.

WARNING

If matchmarks are not aligned during installation of yoke, erratic steering will result. Erratic steering can cause serious injury or death to personnel.

WARNING

Use care when disconnecting intergear link. If it falls, it will cause injury to personnel.

WARNING

The truck steering operates with 3000 psi (20,685 kPa) hydraulic pressure. A high pressure hydraulic oil stream can pierce a body and cause severe injury to personnel. Never disconnect any high pressure hydraulic oil line or fitting without first dropping pressure to zero.

WARNING

Do not stand in front of vehicle when testing air box pressure. Brakes could fail and vehicle could move forward causing injury or death.

WARNING

Do not remove the radiator cap when the engine is hot; steam and hot coolant can escape and burn personnel.

WARNING

Use a clean thick waste cloth or like material to remove the cap. Avoid using gloves. If hot water soaks through gloves, personnel could be burned.

WARNING

Moving engine components can cause severe injury. Keep away from alternator belts and pulleys while engine is running.

WARNING

Never use fuel to clean parts. Fuel is highly flammable. Serious injury to personnel could result if fuel ignites during cleaning.

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

Steam cleaning creates hazardous noise levels and severe burn potential. Eye, skin, and ear protection is required. Failure to comply may result in injury to personnel.

WARNING

Solvents used with a spray gun must be used in a spray booth with filter. Face shield must be used by personnel operating spray gun. Failure to comply may result in injury to personnel.

WARNING

CARC paint contains isocyanate (HDI) which is highly irritating to skin and respiratory system. High concentrations of HDI can produce symptoms of itching and reddening of skin, a burning sensation in throat and nose and watering of the eyes. In extreme concentrations, HDI can cause cough, shortness of breath, pain during respiration, increased sputum production, and chest tightness. The following precautions must be taken whenever using CARC paint:

- ALWAYS use air line respirators when using CARC paint unless air sampling shows exposure to be below standards. Use chemical cartridge respirator if air sampling is below standards.
- DO NOT let skin or eyes come in contact with CARC paint. Always wear protective equipment (gloves, ventilation mask, safety goggles, etc.).
- DO NOT use CARC paint without adequate ventilation.
- NEVER weld or cut CARC-coated materials.
- DO NOT grind or sand painted equipment without high-efficiency air purifying respirators in use.
- BE AWARE of CARC paint exposure symptoms; symptoms can occur a few days after initial exposure. Seek medical help immediately if symptoms are detected.

WARNING

Unsafe welding practices can cause serious injury from fire, explosions, or harmful agents. Allow only authorized personnel to weld or cut metals, and follow safety precautions in TC 9-237. Protective clothing and goggles must be worn; adequate protective equipment used, a suitable fire extinguisher kept nearby, and requirements of TC 9-237 strictly followed.

WARNING

On direct contact, uncured silicone sealant irritates eyes. In case of contact, flush eyes with water and seek medical attention. In case of skin contact, wipe off and flush with water.

WARNING

Engine/transmission assembly weighs 3946 lbs (1791 kg). Attach suitable lifting device of adequate capacity for removal or installation to prevent possible injury to personnel.

WARNING

Use extreme care when installing engine/transmission assembly. Ensure engine/transmission assembly does not swing and damage equipment.

WARNING

Air compressor weighs 115 lbs (52 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Ensure cradle is fully supported upon removal of four screws and lockwashers or cradle may fall and cause injury to personnel.

WARNING

Transmission weighs 1050 lbs (477 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Transmission weighs 1023 lbs (477 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Cylinder head weighs 182 lbs (83 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Use extreme care when removing or installing spring retainers. Spring retainers are under tension and can act as projectiles when released suddenly. Ensure proper eye protection is worn to prevent injury to personnel.

WARNING

Use extreme care when compressing, releasing, removing, or installing springs. Springs are under tension and can act as projectiles when released. Ensure proper eye protection is worn to prevent injury to personnel.

WARNING

Vibration damper may fall from crankshaft and may cause injury to personnel.

WARNING

Ensure there are no personnel working under truck while performing this task. Engine will be supported by lifting device. If lifting device fails, engine may fall and cause severe injury or death to personnel.

WARNING

Lifting device is attached to support engine. Ensure lifting device is positioned snug to engine lifting bracket to prevent engine from falling. Failure to comply may result in injury or death to personnel.

WARNING

Lifting device must remain in place and truck must be properly tagged until after installation of this task is performed. Failure to comply may result in engine falling causing severe injury or death to personnel.

WARNING

Driveshafts can weigh up to 100 lbs (45kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and may cause injury to personnel.

WARNING

Use extreme care when removing spring from oil cooler adapter plate. Spring is under tension and can act as a projectile when released. Ensure all personnel wear proper eye protection to prevent possible injury to personnel.

WARNING

Ensure all debris is kept clear of blower during removal. Failure to comply may result in damage to equipment.

WARNING

Blower lobes turn freely. Ensure fingers, jewelry, and hair are kept clear of rotors in blower. Failure to comply may result in severe injury to personnel.

WARNING

Blower weighs 71 lbs (32 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Gloves must be used when handling turbocharger insulation blanket. Turbocharger insulation blanket is made of fiberglass and may cause skin irritation. Failure to comply may result in injury to personnel.

WARNING

Gloves must be used when handling insulation blanket. Insulation blanket is made of fiberglass and may cause skin irritation. Failure to comply may result in injury to personnel.

WARNING

Turbocharger weighs 57 lbs (26 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Use extreme care when turning rotating assembly. Rotating assembly is sharp and injury to personnel may result.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

WARNING

Bottom tank assembly weighs 82 lbs (37 kg). Ensure bottom tank is fully supported prior to removal or installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Top tank assembly weighs 76 lbs (35 kg). Ensure top tank assembly is fully supported prior to removal or installation. Failure to comply may result in injury to personnel or damage to equipment.

WARNING

Use extreme care when removing tester. Sudden release of pressure can cause injury to personnel.

WARNING

Allow engine to cool before removing harness to avoid injury to personnel.

WARNING

Corrosion compound contains alkali. Do not get in eyes; wear safety goggles/glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush with large amounts of water for at least 15 minutes and get immediate medical attention.

WARNING

Middle frame weighs 2500 lbs (1135 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

After removing wires and cables from battery terminals, ensure no contact is made with battery terminals, other wires, cables or any metal surface to prevent damage to parts, personal injury, or death.

WARNING

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

WARNING

Upon installation of all wires and cables, ensure no contact is made with battery terminals or other wires and cables. Strap wires and cables away from battery terminals and other wires and cables as required to prevent damage to parts, personal injury, or death.

WARNING

Do not drain transmission fluid while transmission is hot. Injury to personnel may result.

WARNING

Driveshaft weighs 90 lbs (41 kg). The aid of an assistant is required to prevent possible injury to personnel.

WARNING

Ensure one screw is left in place behind lifting bracket in flywheel. Screw is intended to secure flywheel until lifting device is in place. Failure to comply may result in serious injury to personnel and damage to equipment.

WARNING

Flywheel weighs 175 lbs (79 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

During flywheel removal, torque converter turbine can remain attached to flywheel or remain on transmission. Use care to prevent torque converter turbine from falling. If torque converter turbine stays attached to flywheel, lockup clutch may fall out of transmission. Use care to prevent lockup clutch from falling. Failure to comply may result in serious injury to personnel and damage to equipment may occur.

WARNING

Flywheel weighs 175 lbs (79 kg). Use extreme caution when dropping flywheel. Keep feet and hands out from under flywheel to avoid injury to personnel.

WARNING

Transfer case weighs 1500 lbs (681 kg). Attach lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Remove and install one transfer case support bracket at a time. Removing both transfer case support brackets at same time will cause transfer case to fall causing damage to parts or severe injury or death to personnel.

WARNING

Axle No. 1 and No. 2 weighs 1,950 lbs (885 kg). Use jackstands to support axles. Failure to do so could result in injury to personnel.

WARNING

Torque rod is under extreme pressure when being pressed from axle. Torque rod can be dangerous when it breaks loose and could cause injury to personnel.

WARNING

Axle No. 1 weighs 1950 lbs (885 kg). Attach a transmission jack prior to removal or installation. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.

WARNING

Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

WARNING

Axle No. 2 weighs 1907 lbs (866 kg) (without brake drums). Attach a transmission jack prior to removal or installation. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.

WARNING

Pivot and spindle assembly weighs 90 lbs (41 kg). Support pivot and spindle assembly prior to removal to prevent possible injury to personnel.

WARNING

Trailing beam assembly weighs 150 lbs (68 kg). Attach a suitable lifting device to axle end of trailing beam assembly prior to removal or installation to prevent possible injury to personnel.

WARNING

Main fuel tank weighs between 50 to 700 lbs (23-318 kg) depending on the quantity of fuel inside. Support main fuel tank with suitable lifting device prior to removing mounting hardware to prevent possible injury to personnel.

WARNING

Axle No. 3 weighs 1780 lbs (808 kg). Attach a suitable lifting device prior to removal or installation to prevent possible injury to personnel. Axle housing must be chained to lifting device to prevent an out of balance condition when longitudinal torque rod is removed. Axle could roll out of control causing serious injury or death to personnel.

WARNING

Ensure axle is fully supported by jackstands prior to removing hydraulic jack from trailing beam assembly. Failure to comply may result in injury to personnel.

WARNING

Keep hands and feet clear of Axle No. 3 until Axle No. 3 is secured by longitudinal torque rod. Failure to comply may result in injury to personnel.

WARNING

Axle No. 4 weighs 1925 lbs (874 kg). Attach a transmission jack prior to removal or installation. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.

WARNING

The truck end of torque rod must not be removed. Axle No. 4 and 5 share mounting hardware for longitudinal torque rod. If hardware is removed from crossmember, an out-of-balance condition for both axles will result. Any personnel under axle No. 5, which is not secured at this time, could be seriously injured or killed.

WARNING

Axle No. 5 weighs 1905 lbs (865 kg). Attach a transmission jack prior to removal or installation. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.

WARNING

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

WARNING

Brake assembly weighs 80 lbs (36 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Brake assembly will swing out on Axles No. 1 and 2 when overhead lifting device is used and screws are removed. Support brake assembly during removal or injury to personnel may result.

WARNING

Use care when removing or installing brake springs. Brake springs are under spring tension and can act as projectiles when released and could cause severe injury to personnel.

WARNING

Ensure braided hose is cool prior to removal or injury to personal may result.

WARNING

Wheel hub assembly weight 115 lbs (52 kg). Support wheel hub assembly with suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

The steering hydraulic system operates at oil pressures up to 3000 psi (20,685 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

Do not remove castle nut from drag link before applying upward pressure on drag link. Serious injury to personnel or damage to equipment may result.

WARNING

Stand clear of tires while turning them. Failure to do so may result in injury or death to personnel.

WARNING

Do not turn relief plunger out more than flush with end of steering gear cover. Plunger could blow out and spray hydraulic oil, causing serious injury to personnel.

WARNING

Steering gear weighs 190 lbs (86 kg). Ensure steering gear is properly supported upon removal from truck. Failure to comply may result in severe injury to personnel.

WARNING

Front steering gear needs to be supported on transmission jack with two wooden blocks located in front of front steering gear. Wooden blocks should be 4 by 6 by 11 in. and 2 by 4 by 11 in. and should be positioned as shown. Failure to comply may result in steering gear falling from transmission jack and causing injury to personnel.

WARNING

Pitman arm is under pressure. Parts can act as projectiles when released and could cause severe eye injury to personnel.

WARNING

Intermediate steering gear weighs 170 lbs (77 kg). Attach lifting device prior to removal to prevent injury to personnel.

WARNING

Steering gear weighs 165 lbs (75 kg). Attach lifting device prior to removal to prevent possible injury to personnel.

WARNING

Cab weighs 1700 lbs (772 kg). Attach suitable lifting device prior to removal or installation of cab support to prevent possible injury to personnel.

WARNING

Rear crossmember weighs 220 lbs (100 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Power module frame weighs 275 lbs. (125 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Ensure truck frame is securely supported before removing spring assembly. If truck falls, serious injury to personnel or death may result.

WARNING

Do not stick fingers in pin holes. Injury to personnel may result.

WARNING

Front spring assembly weighs 208 lbs (94 kg). Rear spring assembly weighs 175 lbs (79 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Air bags may still be pressurized even though air pressure gauge reads 0 psi. Remove air line slowly to allow air to escape. Failure to comply may result in air line blowing off causing serious injury to personnel.

WARNING

Ensure truck is securely supported before removing equalizer beams. If truck falls, serious personal injury or death may result.

WARNING

Two equalizer beams and cross tube weigh 445 lbs (202 kg) assembled. Each equalizer beam weighs 212 lbs (96 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Equalizer beam weighs 212 lbs (96 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Force required to remove beam end bushings and beam center bushing may exceed 30 tons (27 metric tons). Use of a press of 60-ton (54 metric tons) capacity or more is required to remove and install bushings. Use care when pressing out bushings to prevent serious personal injury or death. Always wear eye protection to prevent injury when operating press.

WARNING

Rust preventive contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention.

WARNING

Trailing beam bracket weighs 83 lbs. (38 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Do not drain coolant if water temperature gage reads above 180 degrees F (82 degrees C). Contact with steam or hot coolant will result in serious injury to personnel.

WARNING

Always wear eye protection and protective clothing when handling glass. Failure to comply may result in injury to personnel.

WARNING

Fender weighs 74 lbs (34 kg). Use an assistant to remove to prevent possible injury to personnel.

WARNING

LHS control box weighs 200 lbs (91 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

The crane hydraulic system operates at oil pressures up to 3100 psi (21,375 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

Crane weighs 4,700 lbs (2,134 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Boom weighs 2100 lbs (953 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Erection cylinder weight 78 lbs (35 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

One pin secures erection cylinder, tension cylinder, and mast. Be careful to drive out pin only as far as needed to remove erection cylinder, or other components may fall, causing injury to personnel.

WARNING

Lift cylinder weighs 122 lbs (55 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

One pin secures both lift cylinders and mast. Be careful to drive out pin only as far as needed to remove selected cylinder and prevent possible injury to personnel.

WARNING

Ensure boom is fully supported by the LHS hook. Failure to support boom with LHS hook will cause boom to drop and may result in serious injury or death to personnel.

WARNING

Long pin also holds in mast and erection cylinder. Be careful to drive out pin only as far as needed to remove tension cylinder to prevent possible injury to personnel.

WARNING

Mast weighs 109 lbs (49 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Telescope cylinder weighs 70 lbs (32 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Hoist assembly weighs 210 lbs (95 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

When second spring is released, cable follower may fly up against bracket. Keep hands and face away from this area, or injury to personnel may result.

WARNING

Turntable weighs 150 lbs (68 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Gear weighs 135 lbs (61 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Subframe weighs 1420 lbs (645 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Swing drive gear reducer weighs 140 lbs (64 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Four valve bank weighs 75 lbs (34 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Outrigger cylinder weighs 115 lbs (52 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Using HOIST control lever, crane should lift test weight a maximum of 1 in. (2.5 cm) before Overload Sensing System (OSS) disables hoist. If hoist lifts test load higher than 1 in. (2.5 cm), OSS is not functioning correctly and crane has failed load test. Perform Follow-On Maintenance and notify GS Maintenance.

WARNING

The winch hydraulic system operates at oil pressures up to 3675 psi (25,339 kPa). Never disconnect any hydraulic line or fitting without first dropping the pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

Hook weighs 200 lbs (91 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Hook arm weighs 1100 lbs (499 kg). Attach suitable lifting device prior to installation prevent possible injury to personnel.

WARNING

The LHS hydraulics system operates at oil pressures up to 3675 psi (25,339 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury to personnel.

WARNING

Middle frame weighs 1000 lbs (454 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Main cylinder weighs 325 lbs (148 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Compression frame weighs 4200 lbs (1907 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

LHS main manifold bracket assembly weighs 120 lbs (54 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Main hydraulic pump weighs 215 lbs (98 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Never stand in front of main hydraulic pump during lifting. Hydraulic pump can swing out of door and cause serious injury to personnel.

WARNING

Prolonged contact with lubricating oil, MIL-L-7808 may causes 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.

WARNING

Hook arm cylinders weighs 210 lbs. (95 kg). Attach suitable lifting device prior to removal, installation, or lifting to prevent possible injury to personnel.

WARNING

Ensure hook arm assembly is supported with wooden block prior to removal to prevent possible injury to personnel.

WARNING

Middle frame, hook arm and hook have a combined weight of 2,300 lbs. (1,044 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Oil will spray from cylinder manifold ports when rod is moved in or out. Cover ports with two cleaning cloths to prevent oil from spraying. Failure to comply may result in injury to personnel.

WARNING

Sharp edges of exhaust pipe could cause injury to personnel.

WARNING

Sharp edges of exhaust tube could cause injury to personnel.

WARNING

Battery box weighs 75 lbs (34 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

WARNING

Upon installation of all wires and cables, ensure No contact is made with battery terminals or other wires and cables. Strap wires as required to prevent injury or death to personnel or damage to equipment.

WARNING

200 AMP alternator weight 75 lbs (34 kg) Use an assistant to prevent possible injury.

WARNING

Always disconnect battery ground cable or power source before working on electrical components or injury to personnel may result. Discharge capacitors as noted. If personnel receive an electrical shock, get immediate medical attention.

WARNING

Machine gun ring front support weighs 55 lbs (25 kg). Attach suitable lifting device prior to installation to prevent injury to personnel.

WARNING

Machine gun ring weighs 295 lbs (134 kg). Attach suitable lifting device prior to installation to prevent injury to personnel.

WARNING

Starter weighs 73 lbs. (33 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Engine weighs 2600 lbs (1180 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Keep out from under engine when lifting. If engine slips, sways, or falls, serious injury or death may result.

WARNING

Diesel fuel is flammable. Do not perform this procedure near fire, flame or sparks. Injury or death to personnel could result.

WARNING

When installing lifting device, keep hands clear of rotors to prevent injury to personnel.

WARNING

Cylinder head with lifting device weighs 182 lbs (83 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Flywheel housing weighs 187 lbs (85 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Keep hands clear of gears when loosening nuts to prevent injury to personnel.

WARNING

Vibration damper may drop off crankshaft and may cause injury to personnel.

WARNING

Crankshaft weighs 185 lbs (84 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Control valve cover is under spring tension. Use extreme care when removing cover. Control valve cover may project when released suddenly. Ensure proper eye protection is worn to prevent injury to personnel.

WARNING

Slave piston is retained by spring under compression. Ensure proper eye protection is worn to avoid injury to personnel.

WARNING

Spring is under extreme tension. Wear proper eye protection. Spring may shoot out and cause injury to personnel.

WARNING

Avoid contact with steam. Steam can cause burns, blindness, and other serious injury. Ensure the wearing of protective aprons, gloves, and safety goggles when using live steam or injury to personnel may result.

WARNING

When making this pressure test, make sure personnel are protected against pressurized air and oil from possible rupture or leak in hose or fitting on cylinder head or injury to personnel may result.

WARNING

Some chemical agents (detergents, solvents, alkalis, etc.) may irritate skin or be harmful to the eyes. Others must only be used with adequate ventilation. When working with potentially harmful chemical substances, read and heed the 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 (face shield, gloves, apron, etc.) if required, and use extreme care to avoid injury to personnel.

WARNING

Wear proper eye protection to protect against stream of pressurized water from leak or rupture of fitting, hose, or oil cooler core to prevent injury to personnel.

WARNING

Use care when removing or installing piston rings. Piston rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

WARNING

High pressure steam can blow particles into eyes, can cause severe burns, and creates hazardous noise levels. Eye, skin, and hearing protection is required.

WARNING

Engine block weighs 732 lbs (332 kg). Attach suitable lifting device before removal to prevent possible injury or death to personnel.

WARNING

Be careful when using high air pressure. Ensure connections and seals are tight before applying pressure. High air pressure can blow out parts, hoses or debris with force. Explosive force can damage equipment and cause injury to personnel.

WARNING

Keep out from under engine when lifting. If engine slips, sways or falls, serious injury or death may result.

WARNING

Keep hands and fingers clear of rotors. If rotors turn, fingers may get caught between rotors and result in injury to personnel.

WARNING

Use care when removing retaining pin. Spring behind plug is under tension. Wear proper eye protection to avoid personal injury.

WARNING

Use care when replacing valve plug. Spring behind plug is under tension. Wear proper eye protection to avoid personal injury.

WARNING

Use care when replacing valve stop. Spring behind stop is under tension. Wear proper eye protection to avoid injury to personnel.

WARNING

Cover is under spring pressure. Wear proper eye protection to avoid personal injury.

WARNING

Washer is under spring tension. Wear proper eye protection to avoid injury to personnel.

WARNING

Torque converter housing weighs 100 lbs (45 kg). Attach suitable lifting device for removal or installation to prevent possible injury to personnel.

WARNING

When screws are removed, oil pump will fall. Make sure that assistant firmly supports oil pump inside torque converter housing to prevent personal injury or damage to parts.

WARNING

Forward clutch and turbine shaft assembly weighs 67 lbs (30 kg). Attach suitable lifting device for removal or installation to prevent possible injury to personnel.

WARNING

Use extreme caution when dropping forward clutch assembly. Keep feet and hands out from under parts to avoid personal injury.

WARNING

Ensure personnel wear heat resistant gloves prior to heating PTO gear with propane torch. Failure to comply may result in severe injury or death to personnel.

WARNING

Use extreme caution when dropping fifth clutch housing. Keep feet and hands out from under fifth clutch housing to avoid injury to personnel.

WARNING

Make sure all personnel stand clear when releasing pressure on spring compressor. Retaining ring can cause personal injury if not properly seated in retaining ring groove.

WARNING

Front planetary carrier assembly weighs 54 lbs (25 kg). Attach suitable lifting device for removal to prevent possible injury to personnel.

WARNING

Use extreme care when removing lifting bracket. Sun gear shaft, main shaft and gear fit loosely and may fall out and cause injury to personnel or damage to parts.

WARNING

Do not lift rear planetary assembly by ball bearing on rear end. Bearing may come off and planetary may fall resulting in personal injury or damage to equipment.

WARNING

Keep fingers away from inside of transmission housing while installing rear carrier assembly or injury to personnel may result.

WARNING

Planetary differential assembly weighs 160 lbs (73 kg). Use suitable lifting device to prevent possible injury to personnel.

WARNING

Planetary carrier assembly weighs 85 lbs (39 kg). Use the aid of an assistant to turn differential case over to prevent injury to personnel.

WARNING

Rear shaft assembly weighs 100 lbs (45 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Rear housing weighs 210 lbs (95 kg). Attach suitable lifting device before removal or installation to prevent possible injury to personnel.

WARNING

Center shaft assembly weighs 145 lbs (66 kg). Attach suitable lifting device before removal or installation to prevent possible injury to personnel.

WARNING

Upper shaft assembly weighs 115 lbs (52 kg). Attach suitable lifting device before removal or installation to prevent possible injury to personnel.

WARNING

Differential shaft assembly weighs 100 lbs (45 kg). Use an assistant during removal or installation to prevent possible injury to personnel.

WARNING

Differential housing weighs 90 lbs (41 kg). Attach suitable lifting device before removal or installation to prevent possible injury to personnel.

WARNING

Front housing weighs 200 lbs (91 kg). Attach suitable lifting device before removal to prevent possible injury to personnel.

WARNING

To prevent injury to personnel or equipment damage, make sure chains will not slip off shaft assembly during lifting operation.

WARNING

Assembled portion of upper shaft assembly weighs 100 lbs (45 kg). Use an assistant to prevent possible injury to personnel.

WARNING

Axle No. 3 weighs 1780 lbs (807 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel. Chains must be attached to axle housing to prevent an out of balance condition when axle is lifted. Axle could roll out of control causing serious injury or death to personnel.

WARNING

Brake drum weighs 132 lbs (60 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Spring in air brake chamber is very powerful and is under tension. Failure to cage air brake chamber before removal will release tension of spring abruptly and could result in injury to personnel.

WARNING

Air brake chamber can only be unscrewed a maximum of one turn. Otherwise, incorrect brake operation could result.

WARNING

Wheel hub assembly weighs 115 lbs (52 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Brake assembly weighs 80 lbs (36 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Seal race is extremely hot. Do not touch seal race without protective gloves or severe burns to hands could result.

WARNING

Pivot and spindle assembly weighs 90 lbs (41 kg). Use the aid of an assistant to prevent possible injury to personnel.

WARNING

Differential assembly weighs 198 lbs (90 kg). Attach a suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Differential and bevel gear weighs 70 lbs (32 kg). Attach a suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Prussian Blue Dye is poisonous and can burn skin on contact. Over exposure to dye can cause heart and skin problems, dizziness and unconsciousness.

WARNING

Differential assembly weighs 450 lbs (204 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Split torque weighs 62 lbs (28 kg). The aid of an assistant is required to prevent possible injury to personnel.

WARNING

Split torque weighs 62 lbs (28 kg) without flange assembly and 75 lbs (34 kg) with flange assembly. The aid of an assistant is required to prevent possible injury to personnel.

WARNING

Properly support spindle during removal. Failure to comply may result in injury to personnel.

WARNING

Differential assembly weighs 500 lbs (227 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Front housing weighs 90 lbs (41 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Ring and pinion assembly weighs 60 lbs (27 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Self-recovery winch weighs 980 lbs (445 kg). Attach suitable lifting device prior to removal or installation to prevent injury to personnel.

WARNING

Left side and right side mount weigh 48 lbs (22 kg). Ensure hands and fingers are kept clear of left side and right side mounts during removal. Failure to comply may result in serious injury to personnel.

WARNING

Ensure fingers do not get caught between secondary planetary carrier and ring gear or injury to personnel may result.

WARNING

Wheel end assembly weighs 200 lbs (91 kg). Support wheel end assembly with suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Internal pistons are under moderate spring tension. Keep pistons compressed when installing locknut. Failure to comply may result in injury to personnel.

WARNING

Exhaust manifolds and engine parts are hot. Use care to prevent personal injury.

WARNING

Use care when removing or installing springs. Springs are under tension and can act as projectiles when released and could cause severe eye injury.

WARNING

Alternator weighs 75 lbs (34 kg). Use the aid of an assistant to prevent possible injury to personnel.

WARNING

Engine weighs 2,600 lbs (1,180 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Keep out from under engine when lifting. If engine slips, sways, or falls, serious injury or death may result.

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

WARNING

Accumulator testing and charging can expose personnel to high pressure nitrogen. Use of proper safety equipment is required to prevent serious injury or death.

WARNING

Accumulator testing and servicing can expose personnel to high pressure nitrogen. Use of proper safety equipment is required to prevent serious injury or death.

WARNING

High pressure hydraulics [oil under 3700 psi (25,512 kPa) pressure] operate this equipment. Refer to truck operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.

WARNING

To prevent corrosion, parts should be dipped in rust preventive within two hours of degreasing.

WARNING

Approved hearing protection devices and protective goggles must be worn when performing tasks. Failure to comply may result in injury to personnel.

WARNING

Fan may engage without warning. do not place any part of body in area of fan operation. Failure to do so may result in injury or death to personnel.

WARNING

Use care when removing or installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

WARNING

Release air pressure prior to opening container or injury to personnel could result.

WARNING

Upper container weighs 222 lbs (101 kg). Attach lifting device prior to removal or installation to prevent injury to personnel.

WARNING

Transmission assembly weighs 1,061 lbs (482 kg). Attach lifting device prior to removal or installation to prevent injury to personnel.

WARNING

Protective goggles must be worn when drilling holes. Failure to comply may result in injury to personnel.

WARNING

Upper container weighs 250 lbs (114 kg). Attach lifting device prior to removal or installation to prevent injury to personnel.

WARNING

Transfer case weighs 1,388 lbs (630 kg). Attach lifting device prior to removal or installation to prevent injury to personnel.

WARNING

Axle No. 3 weighs 1,780 lbs (807 kg) and Axle No. 4 weighs 1,925 lbs (873 kg). Use jackstands to support axles. Failure to do so could result in injury to personnel.

WARNING

Driveshafts can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshaft can fall and cause injury to personnel.

WARNING

Pivot and spindle assembly weighs 90 lbs (41 kg). Use the aid of an assistant to prevent possible injury to personnel.

WARNING

Wheel end assembly weighs 300 lbs (136 kg). Support wheel end assembly with suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

The trailing beam assembly weighs 150 lbs (68 kg). Attach a suitable lifting device to truck end of trailing beam assembly prior to removal or installation to prevent possible injury to personnel.

WARNING

Axle No. 3 weighs 1780 lbs (808 kg). Attach a suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Keep fingers out of trailing beam assembly holes. Failure to comply could result in serious injury to personnel.

WARNING

Trailing beam assembly weighs 150 lbs (68 kg). Attach a hydraulic jack to axle end of air suspension beam assembly prior to installation to prevent possible injury to personnel.

WARNING

Main fuel tank weighs 50 to 700 lbs (23 to 318 kg) depending on the quantity of fuel inside. Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Axle No. 4 and Axle No. 5 share mounting hardware for longitudinal torque rods. Both axles must be supported during removal of screws and locknuts or axles may fall. Failure to comply may result in injury or death to personnel.

WARNING

Spindle is heavy. Properly support spindle during disassembly or serious injury to personnel may occur.

WARNING

Seal race is extremely hot. Do not touch seal race without protective gloves or severe burns to hands could result.

WARNING

Ensure crankcase cover is fully supported before removing screws. Failure to comply may result in crankcase cover falling causing injury to personnel.

WARNING

Upper container weighs 480 lbs (218 kg). Attach lifting device prior to removal to prevent injury to personnel.

WARNING

Allow cable to slowly retract. Cable is under tension and can snap back rapidly. Ensure that proper eye protection is used. Failure to comply may result in serious injury to personnel.

WARNING

Allow engine to cool before performing this procedure or injury to personnel may occur.

WARNING

Engine must be cool before performing maintenance. Failure to comply may result in injury to personnel.

WARNING

Use care when removing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

WARNING

Mounts weigh 48 lbs (22 kg). Ensure hands and fingers are kept clear of left side and right side mounts during removal and installation. Failure to comply may result in serious injury to personnel.

WARNING

Do not use brake drum that exceeds maximum wear specification. Failure to comply may result in brake failure and serious injury or death to personnel.

WARNING

Brake drum weighs 134 lbs (61 kg). Use lifting device or aid of an assistant to lift drum. Failure to comply may result in injury to personnel.

WARNING

Do not loosen locknuts more than one full turn. Failure to do so may cause steering gear to fall and cause injury or death to personnel.

WARNING

All personnel must stay clear of cab when lifting is in progress. Failure to comply may result in injury or death to personnel.

WARNING

Inner-mid section weighs 1,000 lbs (454 kg). Attach suitable lifting device prior to removal to prevent injury to personnel.

WARNING

Do not stick fingers under section to remove wear pads, or injury to hands may result.

WARNING

Outer-mid section weighs 800 lbs (363 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

- Fly section weighs 450 lbs (204 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.
- Keep fly section level or structural section will fall out. Move fly section slowly. Keep assembly as level as possible during removal. Failure to comply may cause injury to personnel.

WARNING

Structural section weighs 175 lbs (79 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Unsafe torching practices can cause serious injury from fire, explosions, or harmful agents. Allow only authorized personnel to heat metals. Protective clothing, gloves, and goggles must be worn; adequate protective equipment used; and a suitable fire extinguishers kept nearby. Failure to comply may result in severe injury to personnel.

WARNING

At least 0.06 in. (1.5 mm) of clearance is required between highest spot on fly section and bottom of wear pad or section may not operate properly. Damage to equipment may result.

WARNING

Boom weighs 2,100 lbs (953 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

WARNING

Ensure charging cylinder contains dry nitrogen. Dry nitrogen tanks are marked with one or two black bands. Certain other gasses can cause accumulator to explode. Failure to comply may result in injury to personnel.

WARNING

Compression frame weighs 800 lbs (363 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

WARNING

Screws are extremely hot. Do not touch screws without protective gloves or severe burns to hands could result.

WARNING

The main hydraulic system operates at oil pressures up to 3,675 psi (25,339 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

WARNING

Cylinder weighs in excess of 210 lbs (95 kg). Attach suitable lifting device prior to lifting to prevent possible injury to personnel.

WARNING

Left front support bracket weighs 98 lbs (44 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Box assembly weighs 92 lbs (42 kg). Ensure box assembly is properly supported prior to removal to prevent possible injury to personnel.

WARNING

Right front support bracket weighs 98 lbs (44 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Front support assembly weighs 660 lbs (300 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Stow weldment weighs 410 lbs (186 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Rear guide assembly weighs 70 lbs (32 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Rear roller bracket weighs 155 lbs (70 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Rear roller brackets weigh 150 lbs (68 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Right strut bracket assembly weighs 80 lbs (36 kg). Attach suitable lifting device to prevent possible injury to personnel.

WARNING

Horizontal roller weighs 75 lbs. (34 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

WARNING

Lifting frame weighs 1,600 lbs (704 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

WARNING

Container lock could drop suddenly if not supported. Failure to comply may result in injury to personnel.

WARNING

Tip of removal tool is very sharp. Use caution when using tool. Failure to comply may result in injury to personnel.

WARNING

Gloves must be used when handling turbocharger cover. Turbocharger cover is made of fiberglass and may cause skin irritation. Failure to comply may result in injury to personnel.

WARNING

Components in each valve bore are spring-loaded and must be compressed while removing retaining pin. Ensure proper eye protection is worn to avoid injury to personnel.

WARNING

Rear planetary carrier assembly weighs 86 lbs (39 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

WARNING

Rear cover weighs 98 lbs (44 kg). Attach suitable lifting device for removal or installation to prevent possible injury to personnel.

WARNING

Ensure that upward lifting force is applied to the holding fixture before screws are removed or transfer case may shift downward causing personal injury or damage to equipment.

WARNING

Press on inner diameter of bearing or equipment damage may result.

WARNING

Parts of the brake assembly may be coated with brake dust; breathing this dust can harm personnel.

- Use a filter mask approved for use against asbestos dust.
- Never use compressed air or dry brush to clean these assemblies.
- Use an industrial type vacuum cleaner with a high-efficiency filter system to remove dust.
- Use water and a soft bristle brush or cloth to remove dirt or mud.

WARNING

Differential gear weighs 70 lbs (32 kg). Attach a suitable lifting device prior to installation to prevent possible injury to personnel.

WARNING

Axle No. 3 weighs 2,048 lbs (808 kg). Attach a suitable lifting device prior to removal or installation to prevent possible injury to personnel. Axle housing must be chained to lifting device to prevent an out of balance condition when longitudinal torque rod is removed. Axle could roll out of control causing serious injury or death to personnel.

LIST OF EFFECTIVE PAGES

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B Blank.....	0	12-1 thru 12-12.1.....	0
i thru iii.....	0	12-12.2 Blank.....	0
iv Blank.....	0	12-13 thru 12-93.....	0
3-1 thru 3-191.....	0	12-94 Blank.....	0
3-192 Blank.....	0	A-1 and A-2.....	0
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5-1 thru 5-32.....	0	C-1 thru C-35.....	0
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7-1 thru 7-31.....	0	SCHMTC-5.....	0
7-32 Blank.....	0	SCHMTC-6 Blank.....	0
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TECHNICAL MANUAL

No. 9-2320-364-34

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 30 November 2005

Direct Support and General Support Maintenance Manual

PALLETIZED LOAD SYSTEM

MODEL M1074/M1075
NSN 2320-01-304-2277
NSN 2320-01-304-2278

Current as of 31 October 2005

REPORTING OF 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 2028-2 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <http://aeprs.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, DA Form 2028, or DA Form 2028-2 directly to Command, U.S. Army Tank-Automotive and Armaments Command, ATTN: AMSTA/ACC-LPIT, 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.

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This manual supersedes TM 9-2320-364-34-2, dated 01 August 1999.

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HOW TO USE THIS MANUAL

This manual is designed to help maintain the Model M1074/M1075 Palletized Load System (PLS) truck. Listed below are some special features included in this manual to help locate and use the needed information:

- A front cover table of contents is provided for quick reference to chapters and sections that will be used often.
- Warning, caution, and note headings, subject headings, and other essential information are printed in bold type making them easier to see.
- The maintenance tasks describe what must be done to the truck before starting the task (Equipment Condition), and what must be done to return the vehicle to operating condition after the task is finished (Follow-On Maintenance).
- The Appendixes are located at the end of the manual. They contain a reference guide to other manuals, a list of expendable supplies and materials, and other material for maintaining the PLS truck.
- In addition to text, there are exploded-view illustrations showing how to take a component off and put it back on. Cleaning and inspection procedures are also included as required.
- Chapter 3 through 19 of this manual covers Direct Support Maintenance for each PLS truck.

Follow these guidelines when using this manual:

- Read all WARNINGS and CAUTIONS before performing any procedure.
- The equipment conditions found in the maintenance procedures are of a general nature and the mechanic may be able to perform only certain steps within a procedure to accomplish the equipment condition.

CHAPTER 3

ENGINE MAINTENANCE

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3-1. DIRECT SUPPORT ENGINE MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for repairing, replacing, installing, and servicing engine components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

- a. Follow these maintenance instructions when removing and installing the engine and engine components:
 - (1) When unpacking items, remove packing material (for example: barrier paper, tape, plastic bags, and protective caps).
 - (2) Cap or tape over engine inlets and exhaust ducts to prevent foreign objects from getting inside the engine. Keep dust, dirt and other objects out of internal parts of the engine.

3-1. DIRECT SUPPORT ENGINE MAINTENANCE INTRODUCTION (CONT).

CAUTION

Do not use tape to close off fuel or oil openings. Sticky surface of tape will mix with fuel or oil and will get in the engine lines.

- (3) Cap or tape over open tubes, hoses, fittings and engine openings as soon as parts are taken off.
 - (4) Use suitable container to catch oil and coolant when removing hoses, fittings and plugs.
 - (5) Handle and store removed engine components carefully.
 - (6) Inspect parts as removed for breaks, dents, cracks, surface defects or other obvious damage. Turn in bad parts. Set aside good parts for later use.
 - (7) When possible, replace gaskets, packings and seals removed during repair work. Replace lockwire, lockwashers and cotter pins at time of reassembly.
 - (8) Replace broken, worn or burned electrical wiring.
 - (9) Replace broken, frayed, crimped or soft flexible hoses. Replace stripped or damaged fittings. Replace entire connected flexible hoses if fittings are damaged.
 - (10) Tag and mark shims, connectors, wires, valves, fittings and mating ends of lines before disconnecting or removing. Identify similar parts to ensure correct assembly.
 - (11) Use hoists, jacks and other aids when lifting engine.
- b.* Follow these inspection instructions when removing and installing the engine:
- (1) Inspect mounting surfaces and surfaces in contact with gaskets, seals or machined surfaces. Look for burrs or scratches which might damage parts or seals upon installation. Remove any defects found.
 - (2) Remove drain plugs from engine system components and inspect sediment sticking to plug. Grit or fine metal particles may indicate actual or potential component failure. A few fine particles are normal. This inspection will help to show defective parts before internal inspection of the components.
 - (3) Inspect hose surfaces for broken or frayed fabric. Check for breaks caused by sharp kinks or contact with other parts of the truck. Inspect fitting threads for damage. Replace any defective parts. After assembly and during initial truck operation period, check for leaks. Inspect wiring harnesses for chafed or burned insulation. Inspect terminal connectors for loose connections and broken parts. Visually inspect castings and weldments for cracks.

3-2. ENGINE ADJUSTMENTS.

This task covers:

- a. Exhaust Valve Clearance Adjustment
- b. Engine Brake Retarder Adjustment
- c. Fuel Injector Timing Adjustment
- d. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Gage, Feeler (Item 77, Appendix F)
- Gage, Feeler, Jacobs Brake (Item 78, Appendix F)
- Gage, Timing, Injector (Item 80, Appendix F)
- Wrench Set, Pushrod (Item 272, Appendix F)
- Wrench Set, Socket 3/8 in. Drive (Item 273, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)

Personnel Required

Two

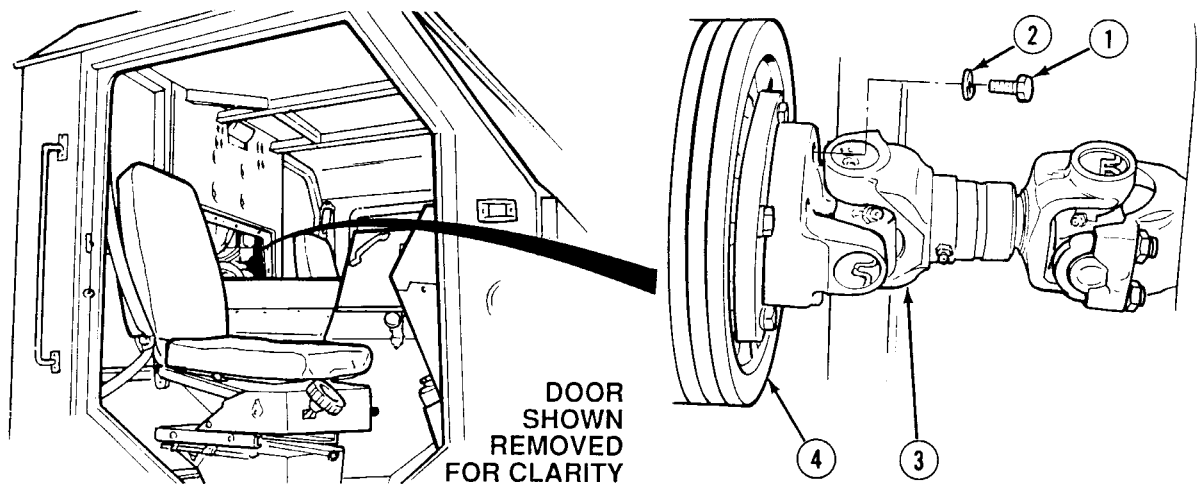
Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Batteries disconnected, (TM 9-2320-364-20)
- Rocker covers removed, (TM 9-2320-364-20)

Materials/Parts

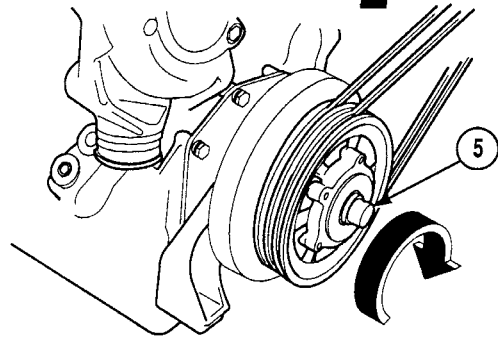
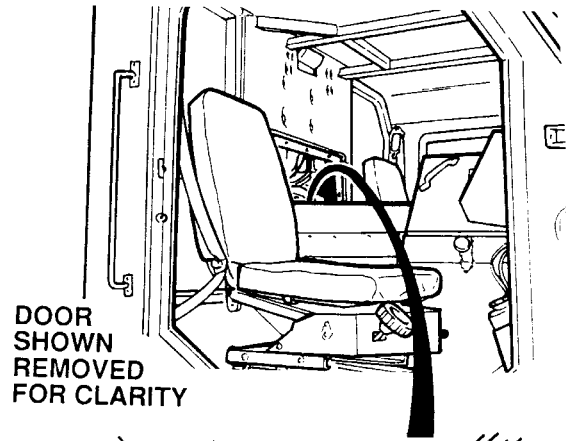
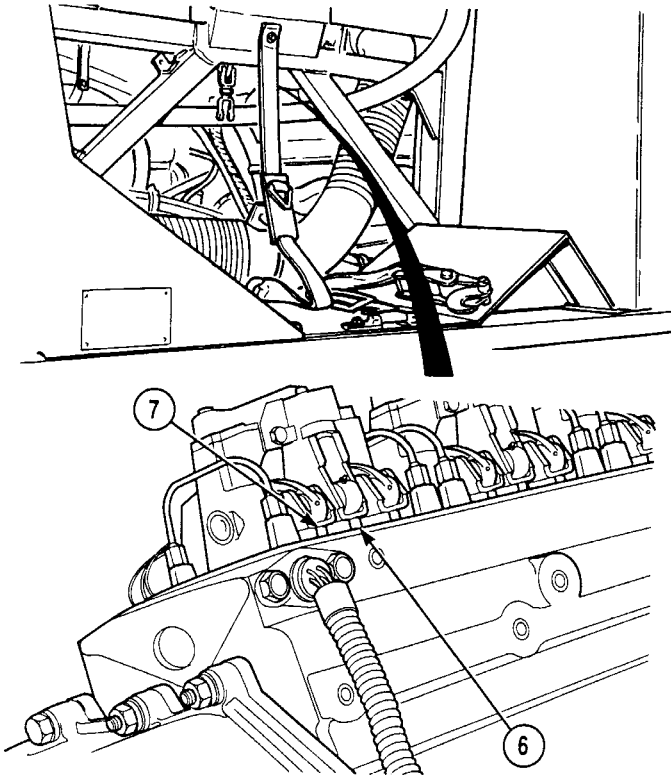
- Sealing Compound (Item 53, Appendix B)
- Lockwasher (4) (Item 252, Appendix E)

a. *Exhaust Valve Clearance Adjustment.*



- (1) Remove four screws (1), lockwashers (2) and pump drive shaft (3) from engine (4). Discard lockwashers.

3-2. ENGINE ADJUSTMENTS (CONT).



CAUTION

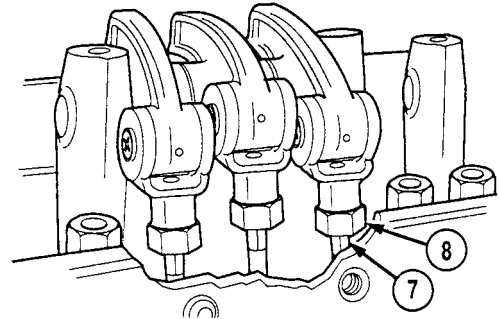
Crankshaft must be turned clockwise only. If crankshaft is turned counterclockwise, crankshaft screw will be loosened resulting in damage to equipment.

NOTE

Two push rods operate four exhaust valves for each of eight cylinders. All 16 exhaust valve clearance adjustments are performed the same way.

- (2) With the aid of an assistant, rotate crankshaft by turning pulley (5) clockwise until engine is on injection stroke. Injector push rods (6) will be fully up, and exhaust push rods (7) will be down.

- (3) Hold push rod (7) and loosen nut (8).

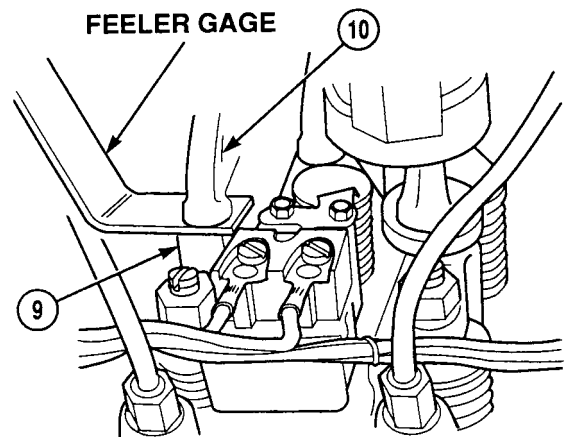


BRAKE RETARDER AND FUEL LINES SHOWN REMOVED FOR CLARITY

NOTE

Clearance is 0.016 in. (0.406 mm) for cold or hot setting.

- (4) Insert feeler gage (9) and valve rocker arm (10) to check clearance.

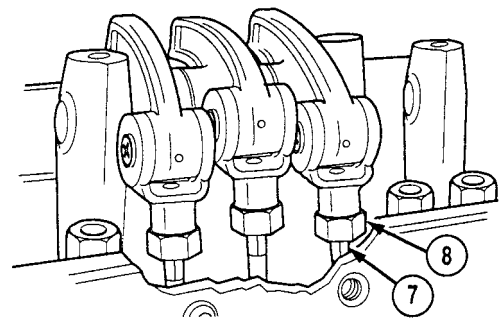


- (5) Adjust push rod (7) until slight drag is felt on feeler gage.

NOTE

Clearance is correct when 0.015 in (0.381 mm) feeler gage passes freely between rocker arm and valve bridge, but the 0.017 in (0.432 mm) feeler gage will not pass through.

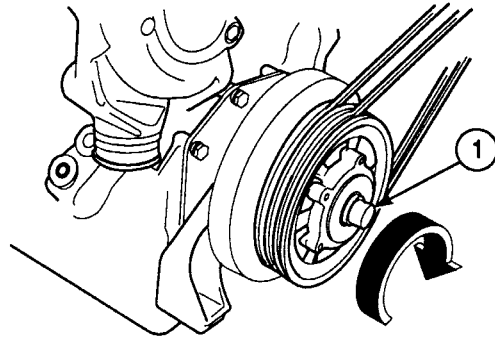
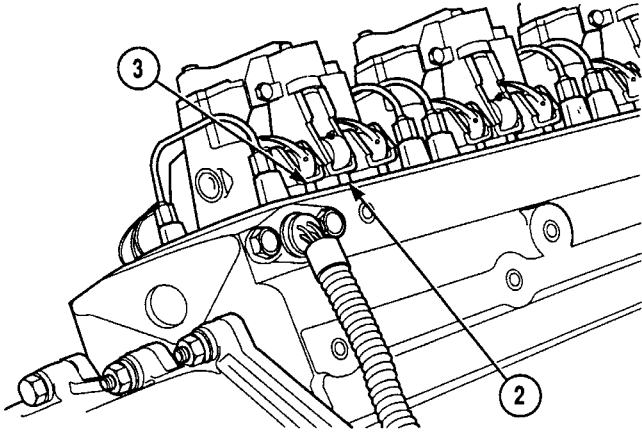
- (6) Remove feeler gage, hold push rod (7) and tighten nut (8). Recheck clearance.
 (7) Repeat Steps (1) through (6) for other 15 exhaust valves.



BRAKE RETARDER AND FUEL LINES SHOWN REMOVED FOR CLARITY

3-2. ENGINE ADJUSTMENTS (CONT).

b. Engine Brake Retarder Adjustment.



CAUTION

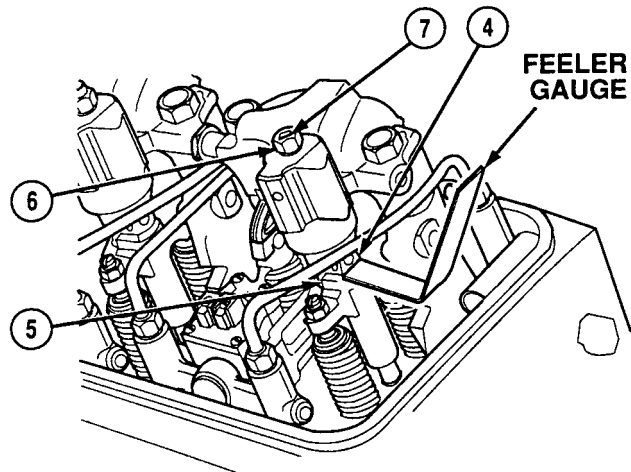
- To prevent engine damage ensure exhaust valves are closed and injector follower is fully depressed.
- Crankshaft must be turned clockwise only. If crankshaft is turned counterclockwise, crankshaft screw will be loosened resulting in damage to equipment.

- (1) With the aid of an assistant, rotate crankshaft by turning pulley (1) clockwise until engine is on injection stroke. Injector push rods (2) will be fully up, and exhaust push rods (3) will be down.

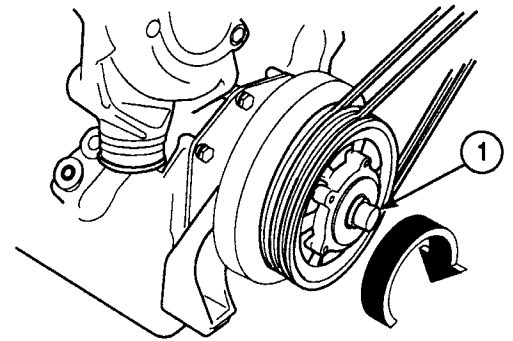
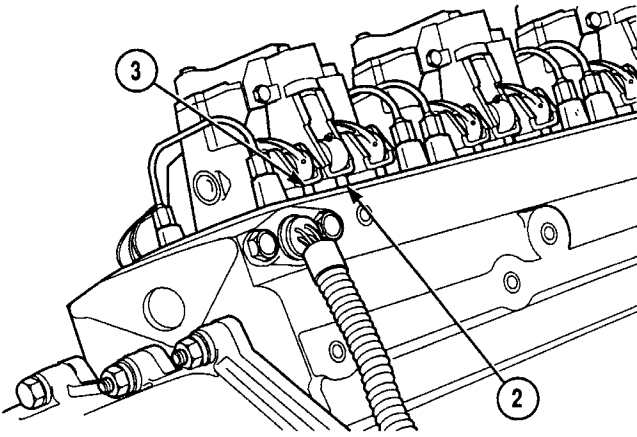
NOTE

Use 0.059 in. (1.5 mm) feeler gage for hot or cold setting.

- (2) Insert feeler gage between slave piston foot (4) and exhaust valve bridge (5).
- (3) Loosen nut (6) and turn adjusting screw (7) until slight drag is felt on feeler gage.
- (4) Check both feet of slave piston (4).
- (5) Tighten nut (6) to 180 to 216 lb-in (20 to 24 N·m) and recheck clearance.
- (6) Repeat Steps (1) through (5) for other seven engine brake retarders.



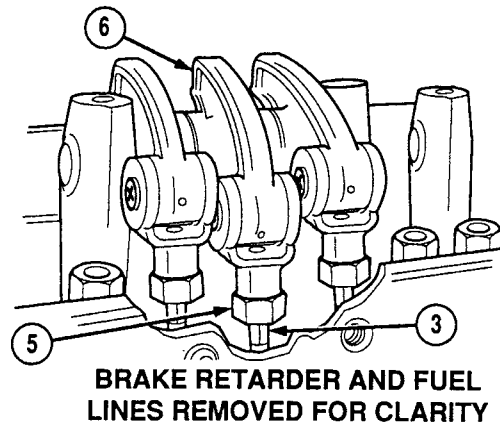
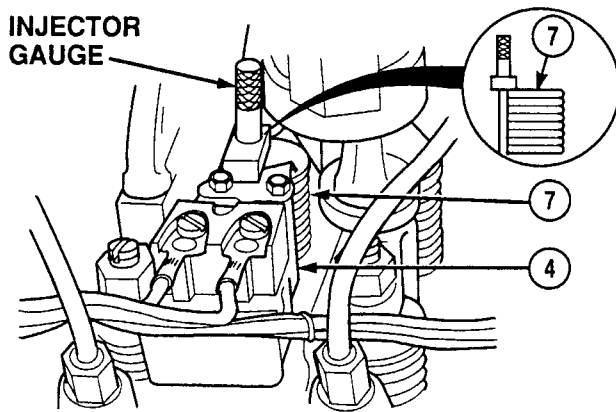
c. *Fuel Injector Timing Adjustment.*



NOTE

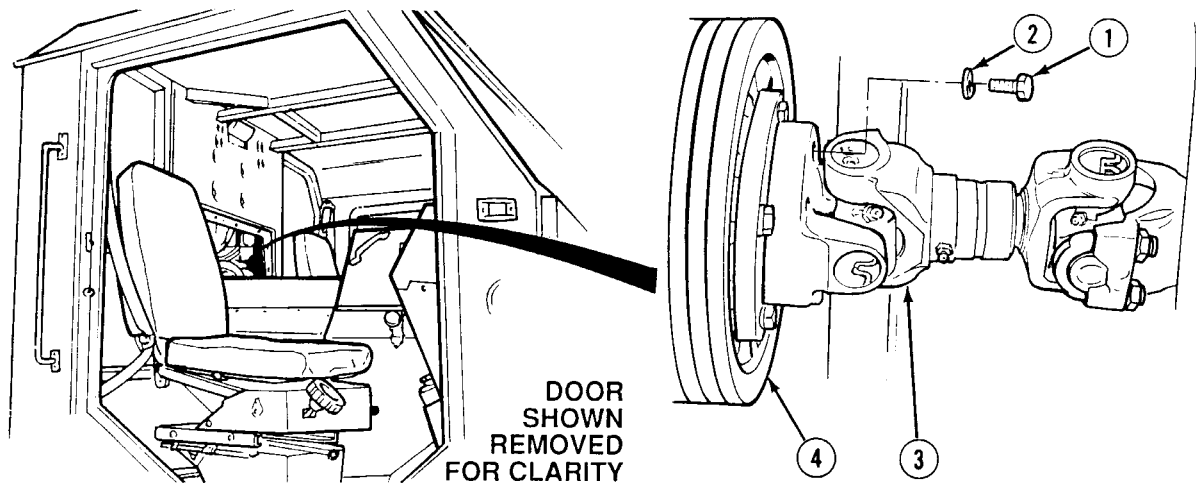
- All eight fuel injector timing adjustments are made the same way.
 - There is one fuel injector for each of eight cylinders.
- (1) With the aid of an assistant, rotate crankshaft by turning pulley (1) clockwise until engine is on exhaust stroke. Injector push rods (2) will be fully down, and exhaust push rods (3) will be fully up.

3-2. ENGINE ADJUSTMENTS (CONT).



NOTE

- Flat side of injector gage faces injector follower.
 - Some supply brake wire harness connectors may have to be removed to adjust fuel injector timing.
- (2) Insert injector gage in hole at top of fuel injector body (4) and check clearance. Clearance should be 1.520 in. (38.6 mm).
 - (3) Hold injector rocker arm push rod (3) and loosen nut (5).
 - (4) Turn push rod (3) and adjust injector rocker arm (6) so flat side of injector gage passes just over top of injector follower (7).
 - (5) Hold push rod (3) and tighten nut (5).
 - (6) Position injector gage in fuel injector body (4) and recheck clearance of injector follower (7). If clearance is wrong, repeat Steps (2) through (5).
 - (7) Repeat Steps (1) through (6) for other seven fuel injectors.



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (8) Coat threads of four screws (1) with sealing compound.
- (9) Install pump drive shaft (3) on engine (4) with four lockwashers (2) and screws (1). Tighten screws to 60 lb-ft (81 N·m).

d. Follow-On Maintenance:

- Install rocker cover, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-3. ENGINE TESTING

This task covers:

- a. Compression Check
- b. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 27, Appendix F)
- Gage Set, Cylinder Compression (Item 65, Appendix F)
- Gloves, Heavy Duty (Item 82, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Wrench, Fuel Line Nut (Item 270, Appendix F)
- Wrench Set, Socket 3/8 in. Drive (Item 273, Appendix F)
- Wrench, Torque, (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Wrench, Torque, (0-60 N·m) (Item 276, Appendix F)

Materials/Parts

- Fuel Pipe, Jumper (Item 53, Appendix E)
- Packing, Preformed (32) (Item 380, Appendix E)
- Packing, Preformed (4) (Item 563, Appendix E)

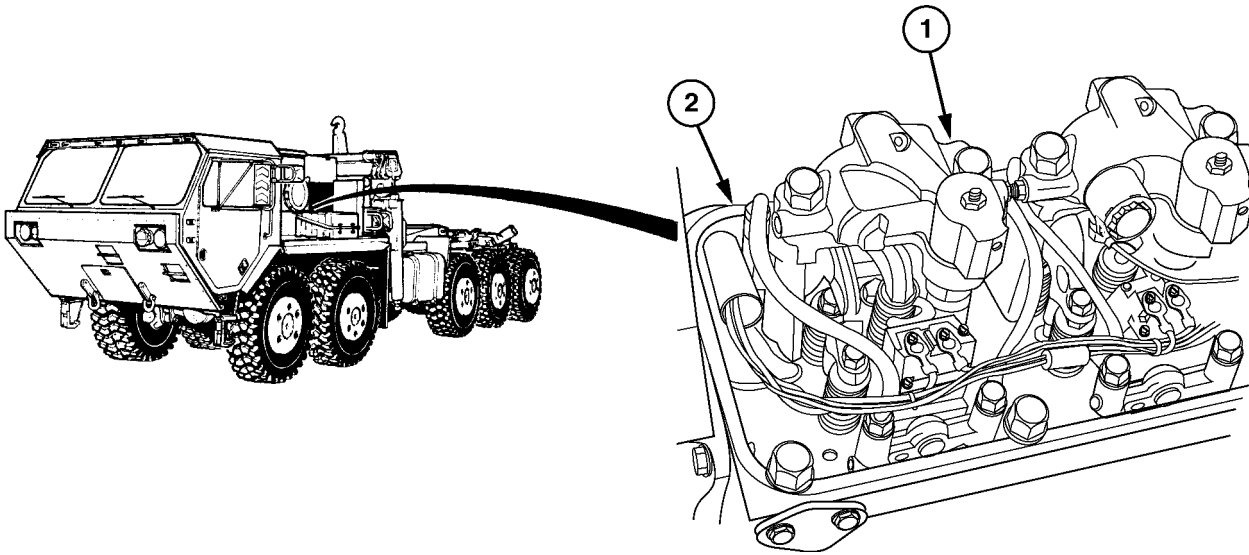
Equipment Condition

- Engine OFF (TM 9-2320-364-10)
- Wheels chocked (TM 9-2320-364-10)
- Rocker covers removed (TM 9-2320-364-20)

Personnel Required

Two

a. *Compression Check*



NOTE

Engine temperature should remain between 180-200° F (93-97° C) during engine testing procedure.

- (1) Start engine and run until normal operating temperature is reached (TM 9-2320-364-10).
- (2) Shut off engine.

WARNING

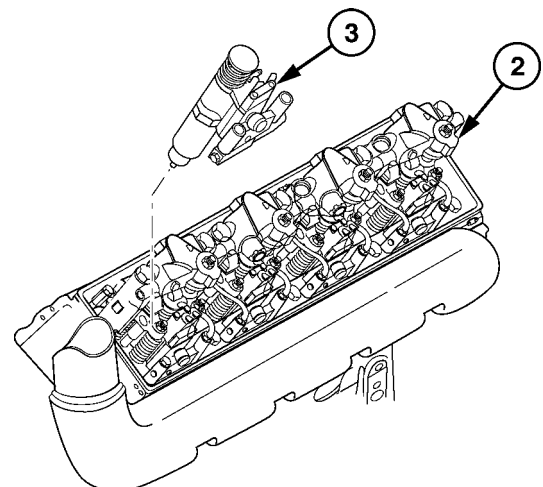
Exhaust manifolds and engine parts are hot. Use care to prevent personal injury.

NOTE

Compression test for all cylinders are performed the same way. Do one cylinder at a time. Number 1 cylinder is shown.

- (3) Remove engine brake (1) from cylinder head (2). (Para 3-32).

- (4) Remove fuel injector (3) from cylinder head (2). (Para 4-2).

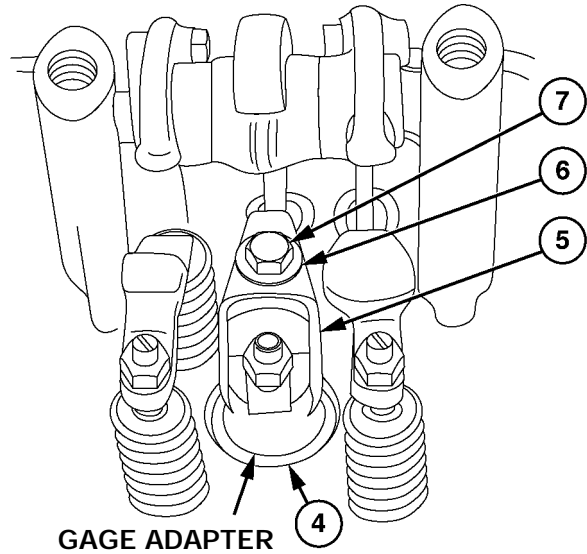


3-3. ENGINE TESTING (CONT).

NOTE

- Gage adapter must be installed with gage fitting facing out.
- Convex side of washer is installed facing clamp.

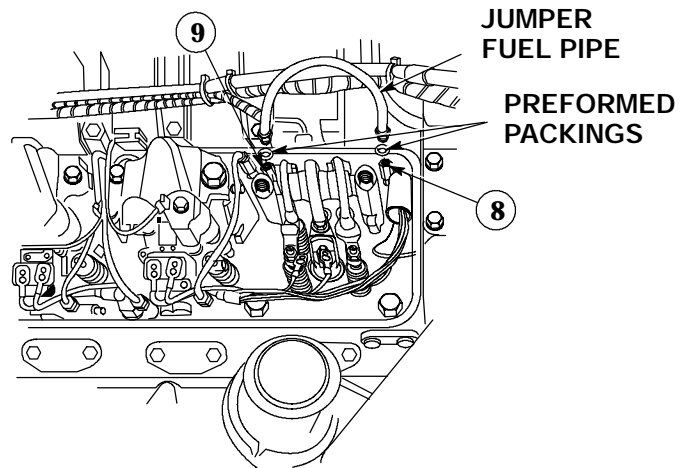
- (5) Install gage adapter in injector tube (4) with clamp (5), convex washer (6), and screw (7). Torque screw to 240-300 lb-in (27.1-33.9 N·m).



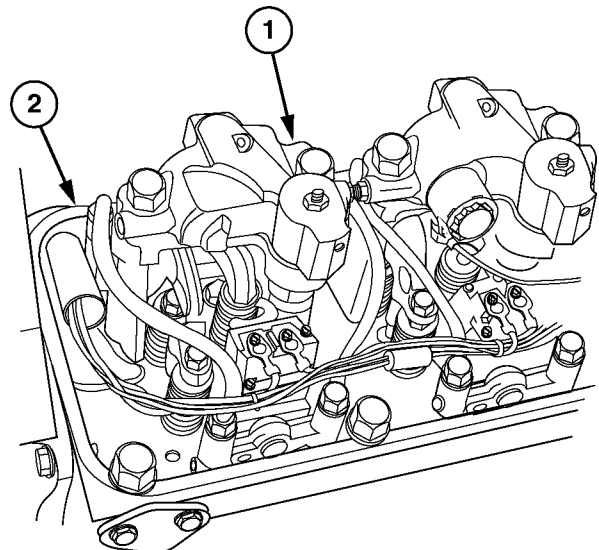
NOTE

Jumper fuel pipe is carefully bent to desired shape to make connection between fuel inlet and return connectors.

- (6) Install jumper fuel pipe and preformed packings on fuel inlet connector (8) and fuel return connector (9). Torque to 145 lb-in (16.3 N·m).



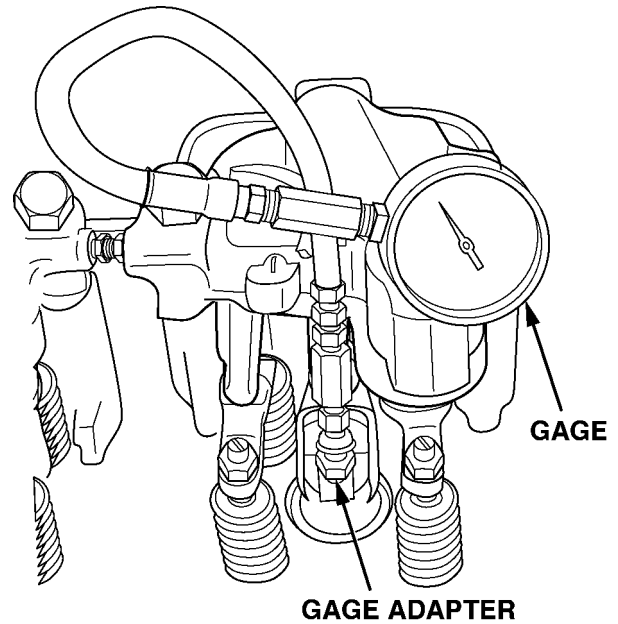
- (7) Install engine brake (1) on cylinder head (2). (Para 3-32).



- (8) Install gage on gage adapter.

WARNING

- Approved hearing protection devices and protective goggles must be worn when performing tasks. Failure to comply may result in injury to personnel.
- Fan may engage without warning. do not place any part of body in area of fan operation. Failure to do so may result in injury or death to personnel.



- (9) Start engine with aid of assistant and run at idle (about 600 rpm).

NOTE

Compression pressure in any one cylinder at a given altitude above sea level must not be less than minimum shown in Table 3-1.

- (10) Record compression pressure shown on gage.

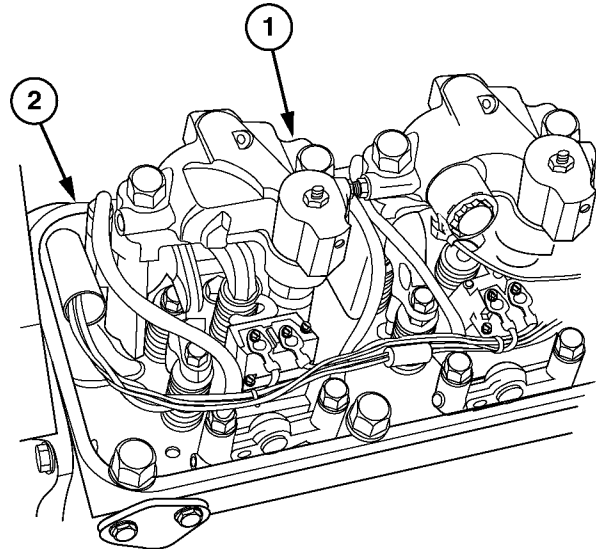
Table 3-1. Compression Pressure Specifications

Minimum Compression pressure at 600 RPM		Altitude above Sea Level	
psi	kPa	feet	meters
450	3101	550	152
415	2859	2,500	762
385	2653	5,000	1,524
355	2446	7,500	2,286
330	2274	10,000	3,048

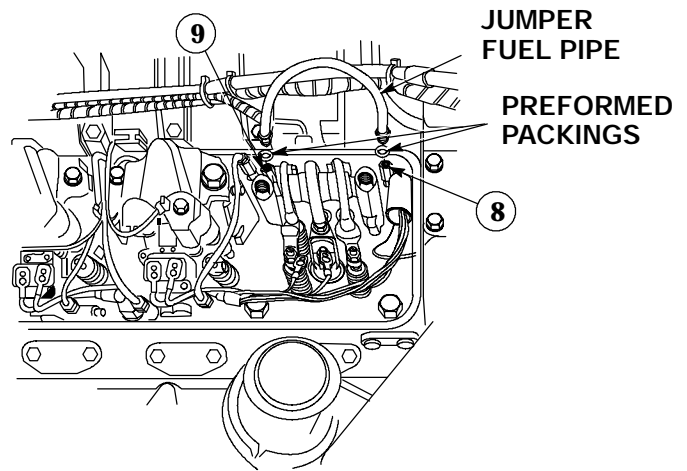
- (11) Shut off engine.
 (12) Remove gage from gage adapter.

3-3. ENGINE TESTING (CONT).

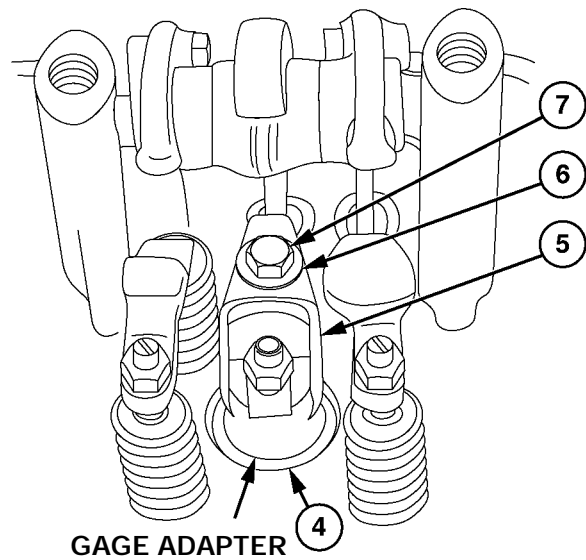
- (13) Remove engine brake (1) from cylinder head (2). (Para 3-32).



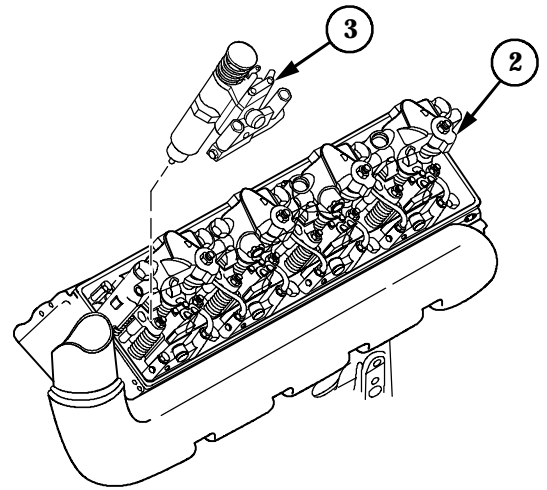
- (14) Remove jumper fuel pipe and preformed packings from fuel inlet connector (8) and fuel return connector (9). Discard preformed packings.



- (15) Remove screw (7), convex washer (6), clamp (5) and gage adapter from injector tube (4).



- (16) Install injector (3) in cylinder head (2).
(Para 4-2).

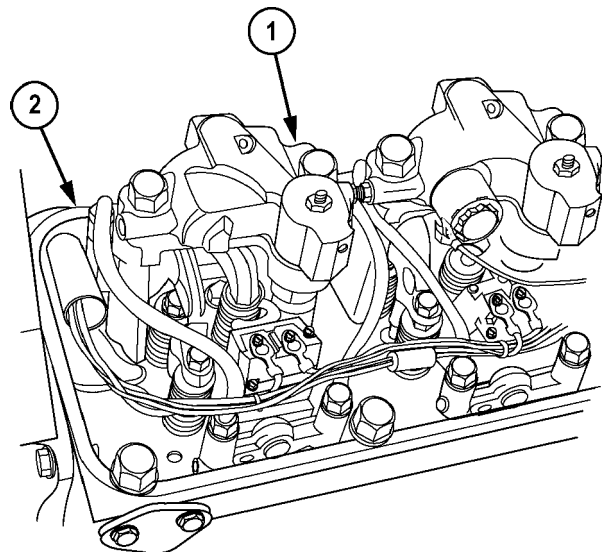


- (17) Install engine brake (1) in cylinder head (2). (Para 3-32).

- (18) Repeat Steps (1) through (17) for remaining cylinders.

b. Follow-On Maintenance

- Install left rocker cover, (TM 9-2320-364-20).
- Install right rocker cover, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

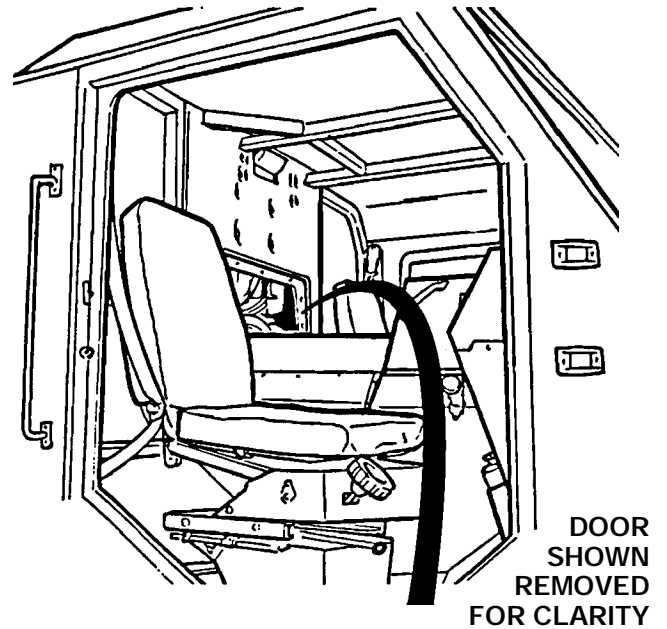


END OF TASK

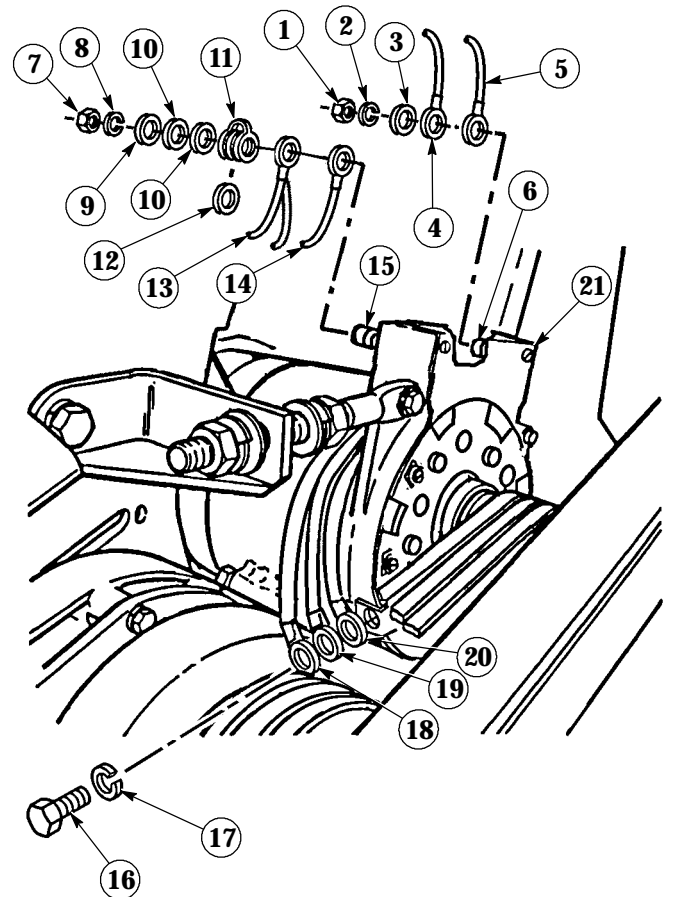
a. *Removal.*

NOTE

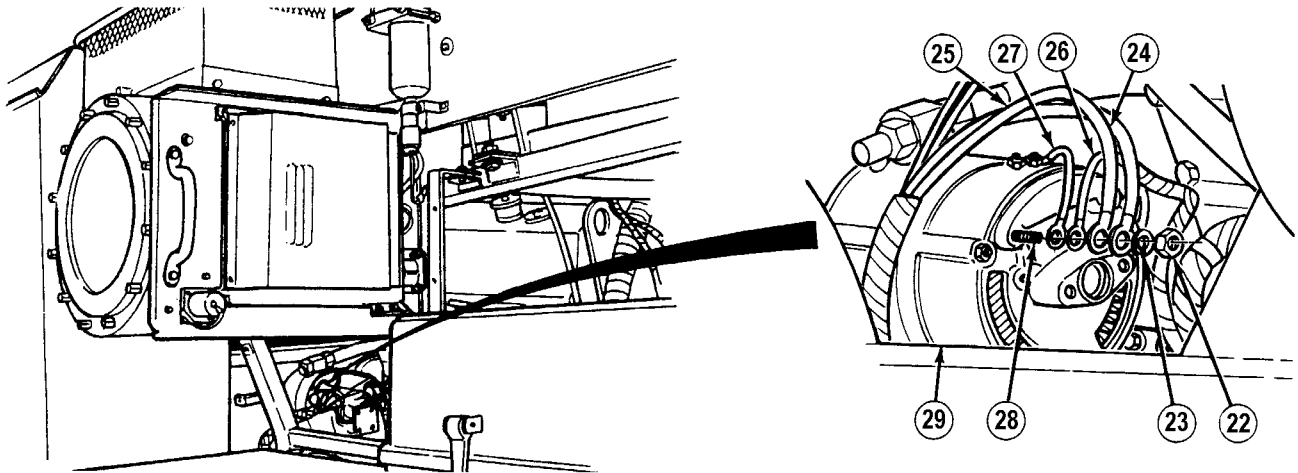
- If equipped with a 200 AMP alternator, perform Steps (1) through (5)
- If equipped with a 145 AMP alternator, perform Steps (6) through (8).
- Tag and mark wires and hoses prior to removal.



- (1) Remove nut (1), lockwasher (2), washer (3), wire 1860 (4) and wire 1274 (5) from 12 volt terminal (6). Discard lockwasher.
- (2) Position washer (3) and nut (1) on 12 volt terminal (6).
- (3) Remove nut (7), lockwasher (8), washer (9), washer(s) (if present) (10), fuse link (11), insulator washer (12), wire 1820/1953 (13) and wire 1281A (14) from 24 volt terminal (15). Discard lockwashers.
- (4) Position fuse link (11), insulator washer (12), washer(s) (if removed) (10), washer (9) and nut (7) on 24 volt terminal (15).
- (5) Remove screw (16), lockwasher (17), wire 1815 (18), wire 1435 (19) and wire 1275 (20) from alternator (21). Discard lockwasher.



3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).



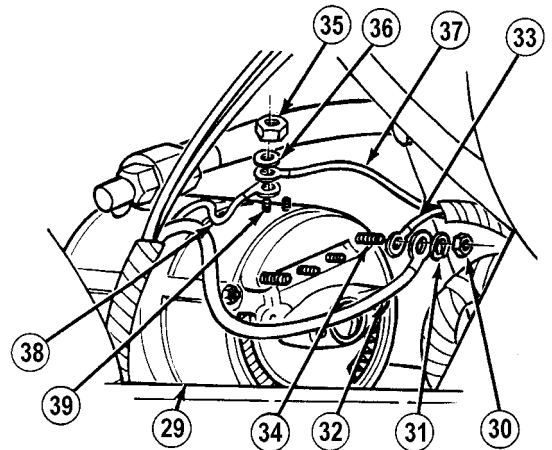
- (6) Remove nut (22), lockwasher (23) and wires 1435 (24), 1815 (25), 1275 (26) and 1057 (27) from negative post (28) on alternator (29). Discard lockwasher.

- (7) Remove nut (30), lockwasher (31) and wires 1278 (32) and 1820 (33) on positive post (34) from alternator (29). Discard lockwasher.

NOTE

One wire on F-positive post will remain on alternator.

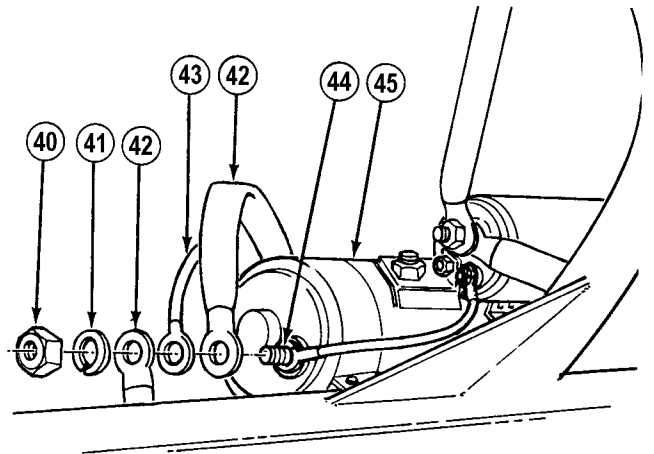
- (8) Remove nut (35), lockwasher (36) and wires 1953 (37) and 1344 (38) from F-positive post (39) on top of alternator (29). Discard lockwasher.



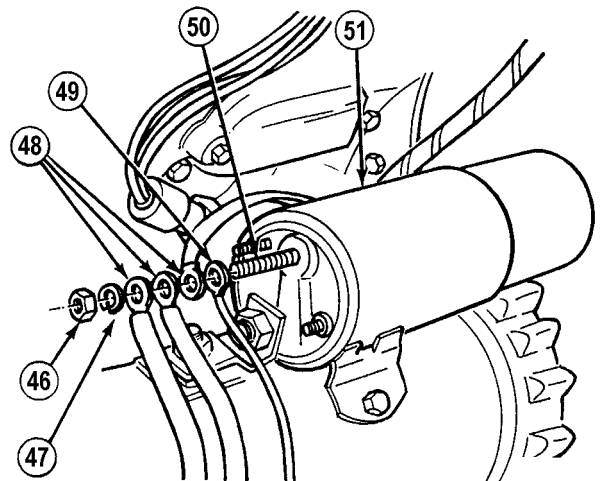
NOTE

One ground wire will remain on starter.

- (9) Remove nut (40), lockwasher (41), two cables 1138 (42) and wire 1819 (43) from negative terminal (44) on starter (45). Discard lockwasher.

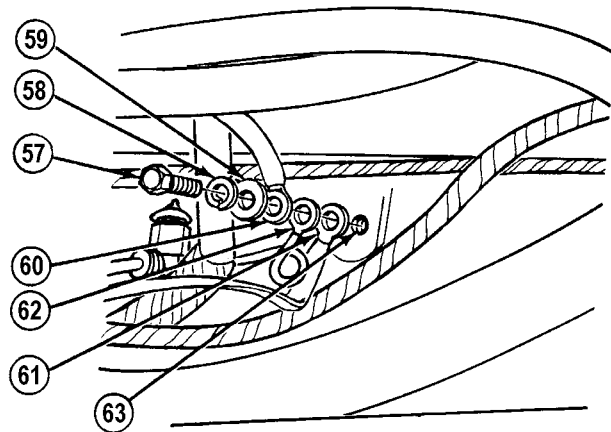
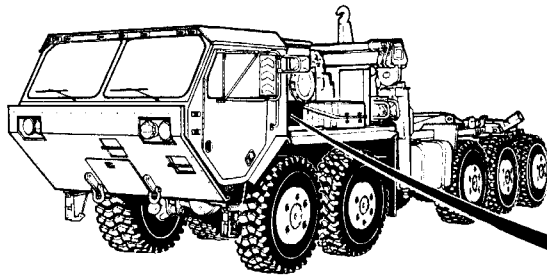
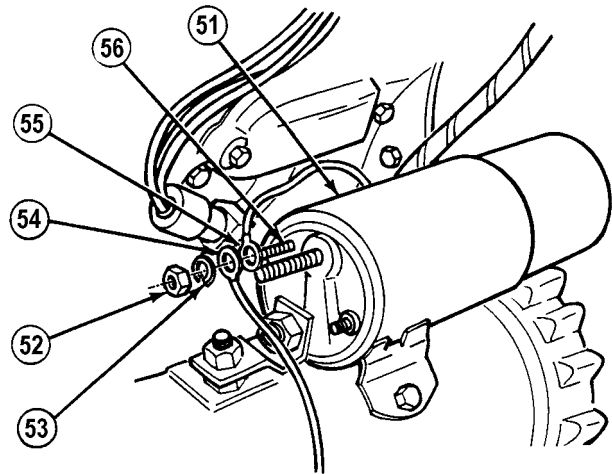


- (10) Remove nut (46), lockwasher (47), three cables 1139 (48) and wire 1055 (49) from positive terminal (50) on starter solenoid (51). Discard lockwasher.



3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

- (11) Remove nut (52), lockwasher (53) and wires 1045 (54) and 1816 (55) from small positive terminal (56) on starter solenoid (51). Discard lockwasher.

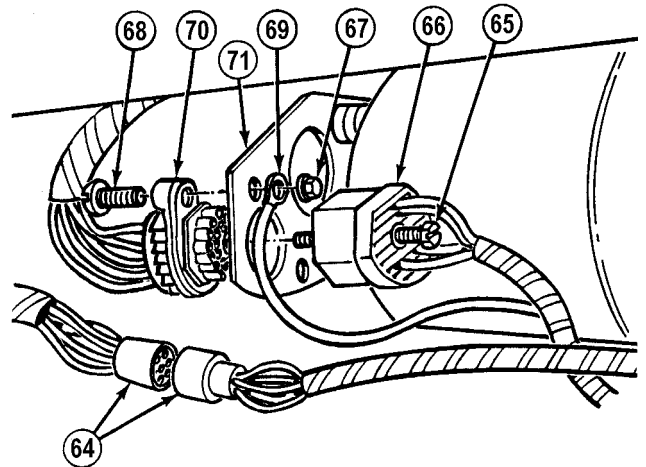


NOTE

- One ground strap will remain on engine block.
- Remove cable ties as required.

- (12) Remove screw (57), lockwasher (58), washer (59), ground straps (60) and (61) and wire 1435 (62) from engine block (63). Discard lockwasher.
- (13) Position screw (57), washer (59), wire 1435 (62) and ground strap (61) on engine block (63).

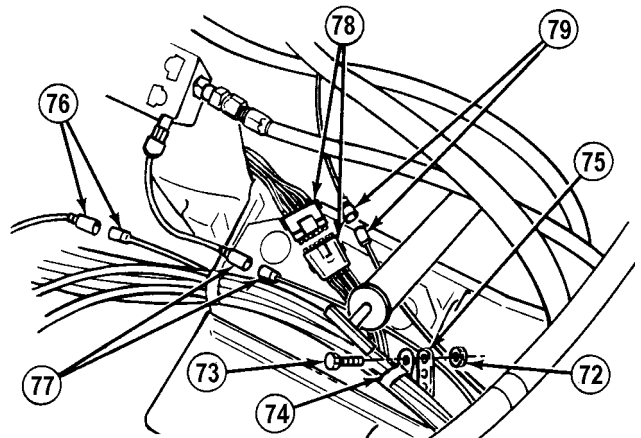
- (14) Disconnect MC70 connector (64).
- (15) Loosen screw (65) and disconnect MC65 connector (66).
- (16) Remove two locknuts (67), screws (68), ground strap (69) and MC65 connector (70) from bracket (71). Discard locknuts.



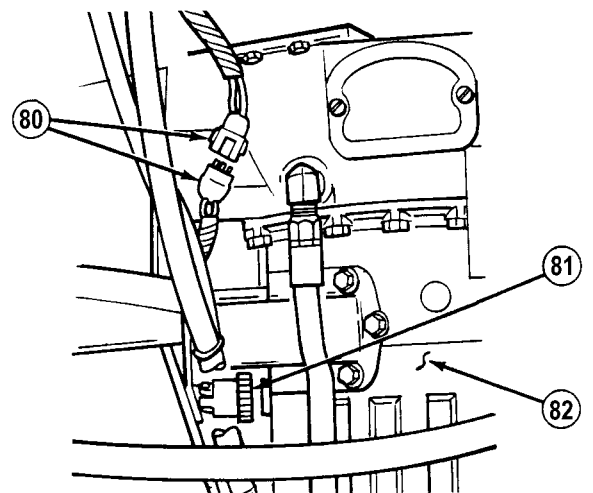
NOTE

Connectors are removed by gently prying up on tab and pulling connector apart.

- (17) Remove locknut (72), screw (73) and cushion clip (74) from bracket (75). Discard locknut.
- (18) Disconnect connectors MC60 (76), MC69 (77), MC62 (78) and MC95 (79).

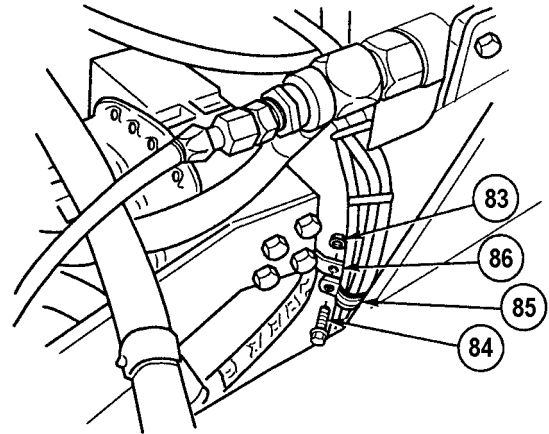


- (19) Disconnect MC63 (80) connector.
- (20) Disconnect MC19 connector (81) from transmission (82).

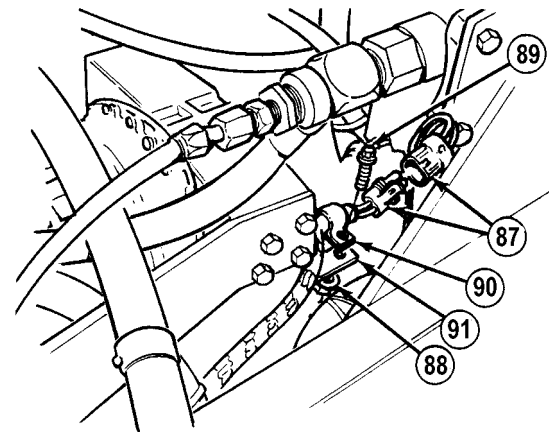


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

- (21) Remove locknut (83), screw (84) and clamp (85) from bracket (86). Discard locknut.



- (22) Disconnect MC20 connector (87).
- (23) Remove locknut (88), screw (89) and cushion clip (90) from bracket (91). Discard locknut.
- (24) Remove cushion clip (90) from MC20 connector (87).

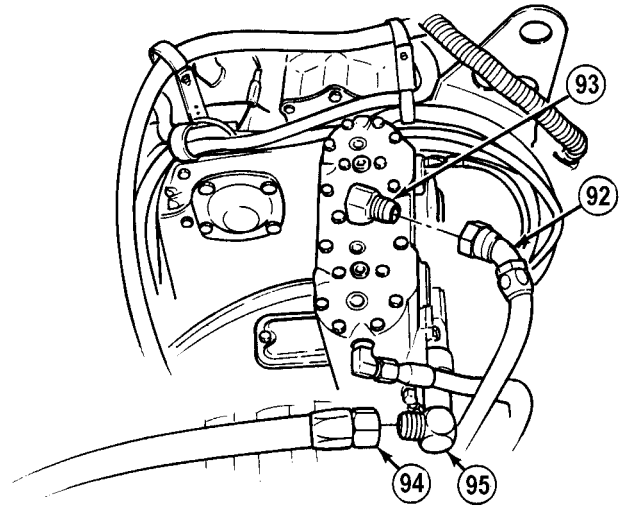


CAUTION

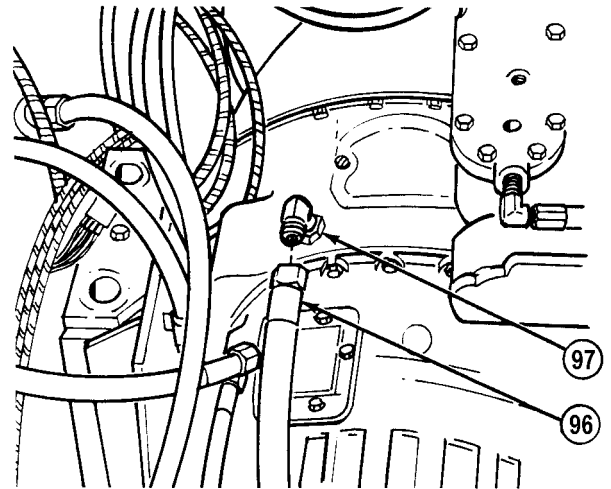
- Ensure braided hose does not kink or damage to equipment may result.
- Cap and plug all hoses after removal.

(25) Remove hose 2001 (92) from elbow (93).

(26) Remove hose 2600 (94) from elbow (95).

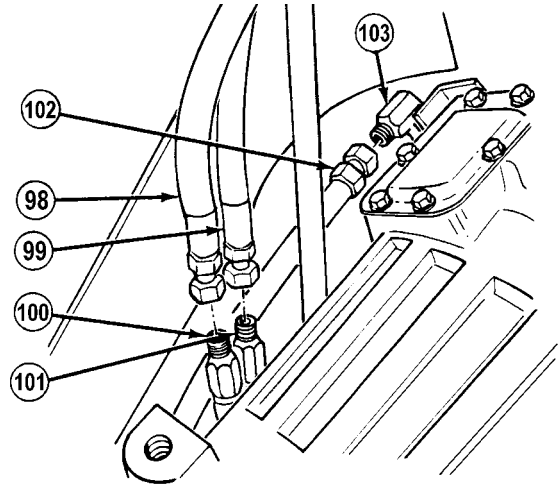


(27) Remove hose 2310 (96) from elbow (97).

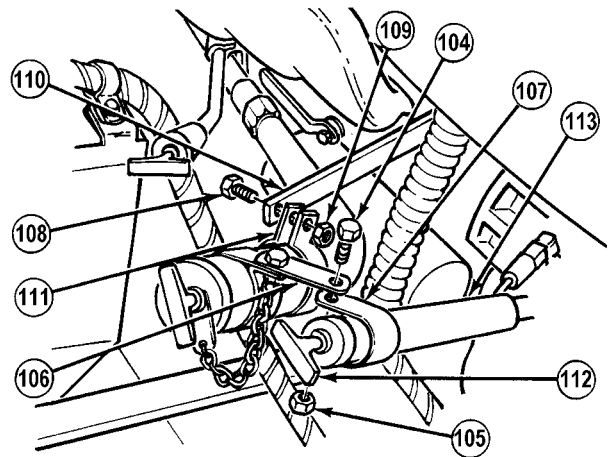


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

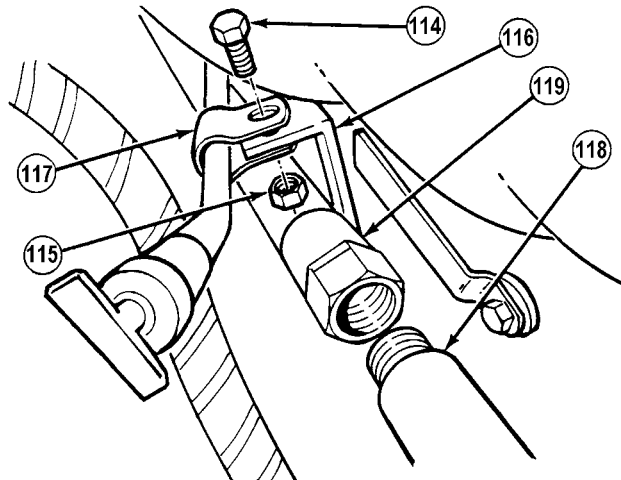
- (28) Remove hose 2260 (98) and hose 2262 (99) from fittings (100) and (101).
- (29) Remove hose 2310 (102) from elbow (103).



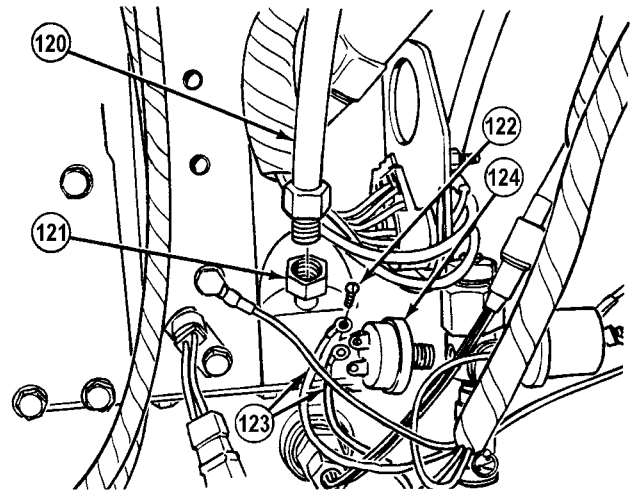
- (30) Remove screw (104) and locknut (105) from bracket (106) and cushion clip (107). Discard locknut.
- (31) Remove screw (108) and locknut (109) from bracket (110) and cushion clip (111). Discard locknut.
- (32) Remove transmission dipstick (112) from dipstick tube (113).



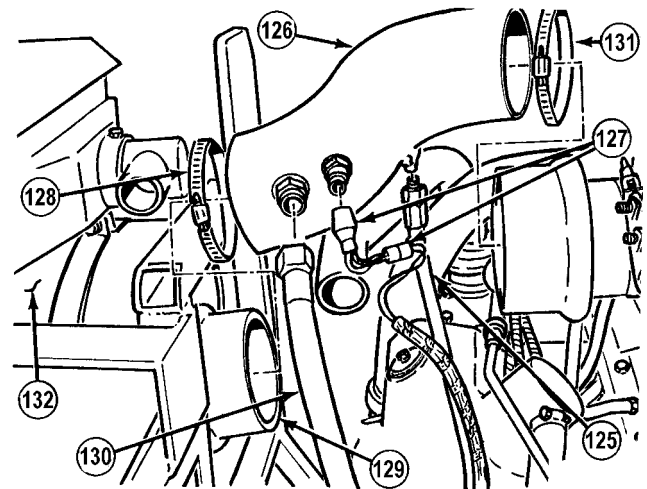
- (33) Remove screw (114) and locknut (115) from bracket (116) and cushion clip (117). Discard locknut.
- (34) Remove engine oil filler tube (118) from engine oil filler hose 2628 (119).



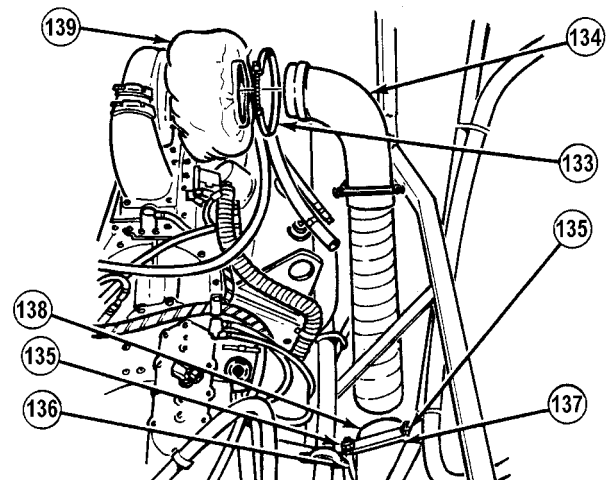
- (35) Remove engine dipstick tube (120) from fitting (121).
- (36) Remove two screws (122) and two wires 1279 (123) from pressure switch (124).



- (37) Remove hose 2381 (125) from air intake pipe (126).
- (38) Disconnect MC67 connector (127).
- (39) Loosen clamp (128) on air intake pipe (126) and elbow (129).
- (40) Remove hose 2600 (130) from air intake pipe (126).
- (41) Loosen clamp (131) and remove air intake pipe (126) from hose (132).

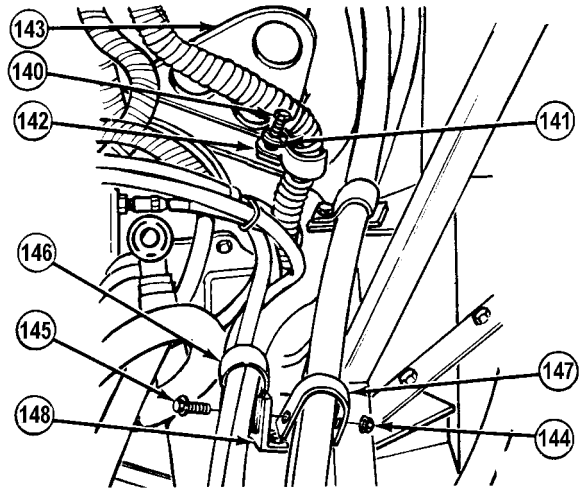


- (42) Remove clamp (133) from exhaust pipe (134).
- (43) Remove two locknuts (135) and U-bolt (136) from bracket (137) and exhaust pipe (138). Discard locknuts and U-bolt.
- (44) Remove exhaust pipe (134) from exhaust pipe (138) and turbocharger (139).

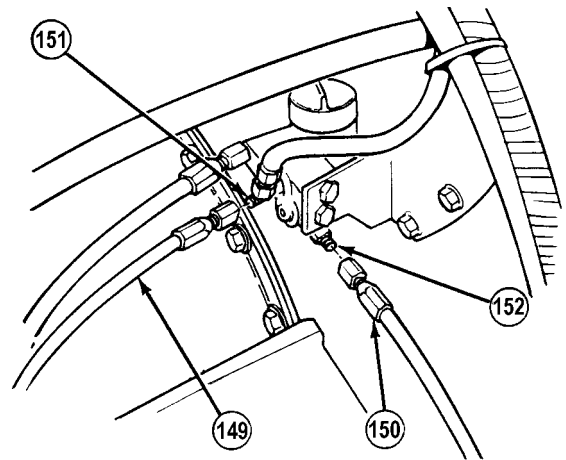


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

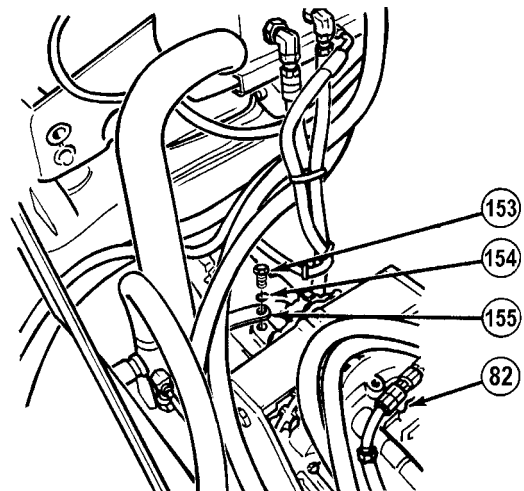
- (45) Remove screw (140), lockwasher (141) and cushion clip (142) from cylinder head (143). Discard lockwasher.
- (46) Remove locknut (144), screw (145) and cushion clips (146) and (147) from standoff bracket (148). Discard locknut.



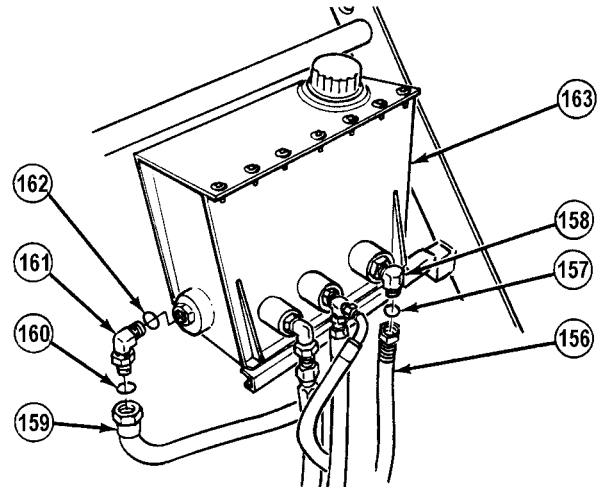
- (47) Remove hose 2040 (149) and hose 2159 (150) from fittings (151) and (152).



- (48) Remove screw (153), lockwasher (154) and bracket (155) from rear of transmission (82). Discard lockwasher.



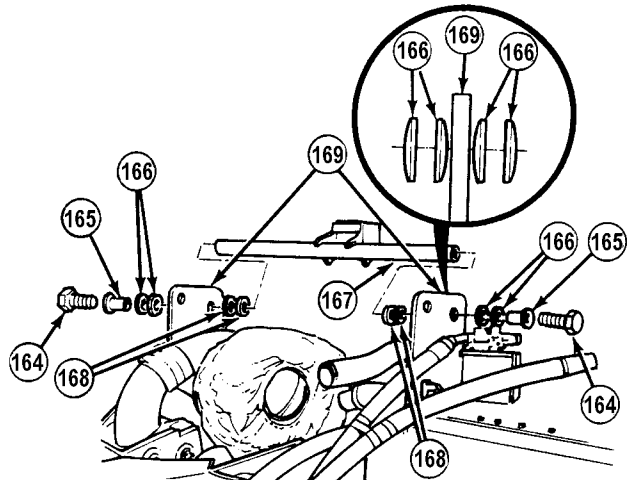
- (49) Remove hose 2278 (156) and preformed packing (157) from elbow (158). Discard preformed packing.
- (50) Remove hose 2553 (159) and preformed packing (160) from elbow (161). Discard preformed packing.
- (51) Remove elbow (161) and performed packing (162) from steering reservoir (163). Discard performed packing.



NOTE

If equipped with machine gun mount, longer screws and spacers are in right side of spreader bar in Step (52).

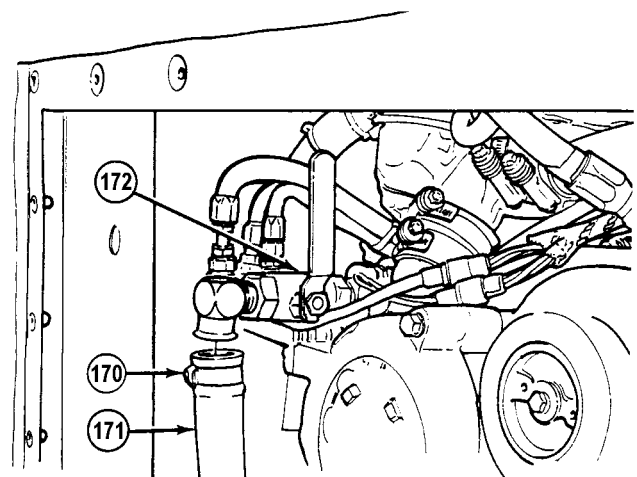
- (52) With the aid of an assistant, remove two screws (164), sleeves (165), four washers (166), spreader bar (167) and four washers (168) from bracket (169).



NOTE

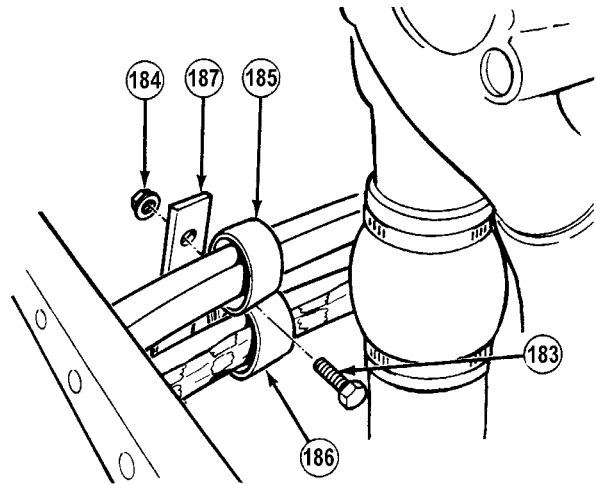
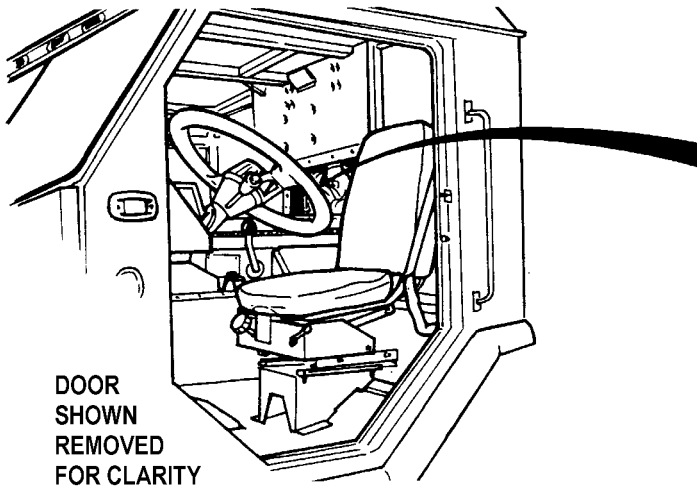
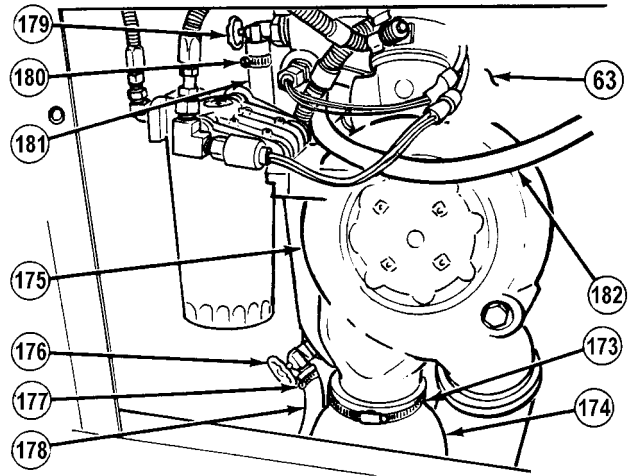
If equipped with arctic kit (Model A), perform Step (53).

- (53) Loosen hose clamp (170) and remove hose (171) from ball valve (172).

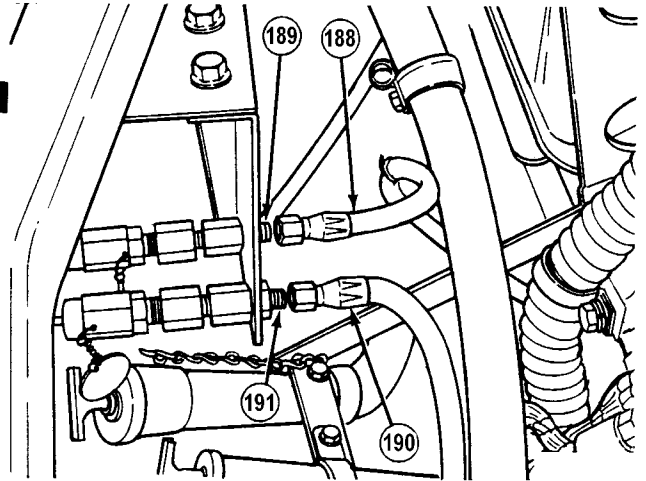
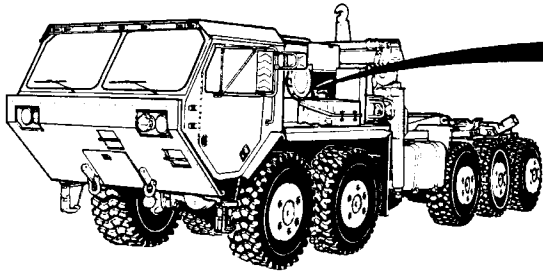


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

- (54) Loosen top clamp (173) and remove hose (174) from water pump (175).
- (55) Turn valve (176) clockwise on engine (63).
- (56) Loosen clamp (177) and remove hose (178) from valve (176).
- (57) Turn valve (179) clockwise on engine (63).
- (58) Loosen clamp (180) and remove hose (181) from valve (179).
- (59) Pull hose 2381 (182) away from engine (63).

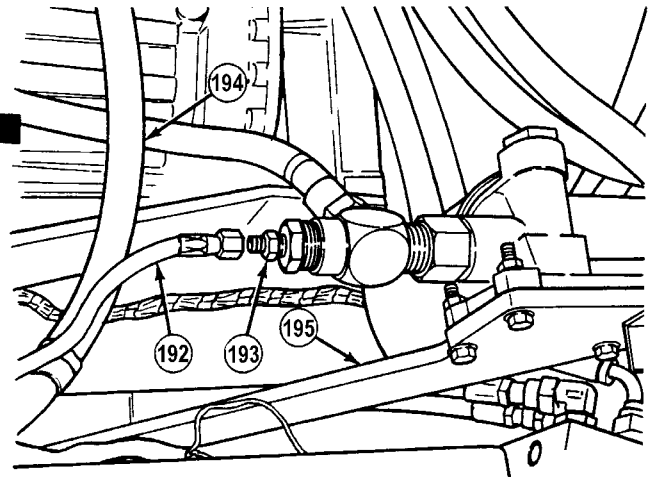
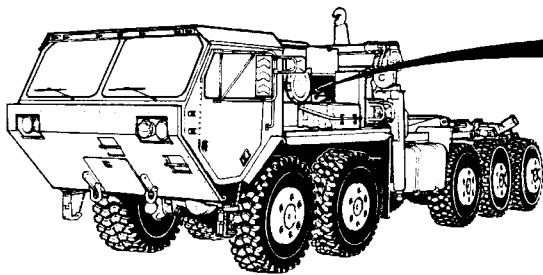


- (60) Remove screw (183), locknut (184) and cushion clips (185) and (186) from bracket (187). Discard locknut.



(61) Remove hose 2689 (188) from fitting (189).

(62) Remove hose 2312 (190) from valve fitting (191).



(63) Remove hose 2312 (192) from fitting (193).

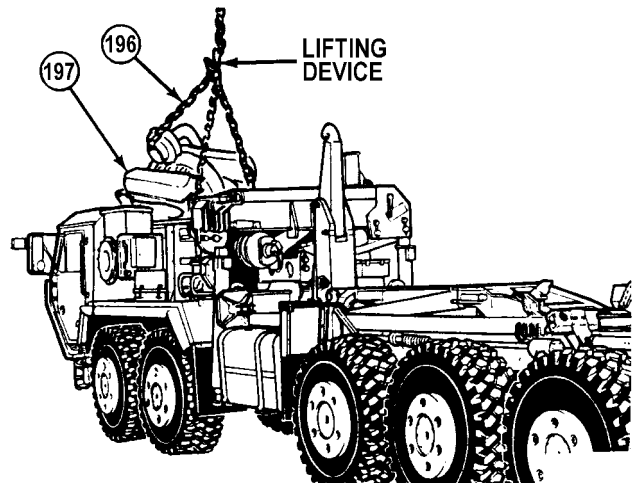
(64) Remove hose 2600 (194) from truck (195).

3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

WARNING

Engine/transmission assembly weighs 3,946 lbs (1,791 kg). Attach suitable lifting device of adequate capacity for removal or installation to prevent possible injury to personnel.

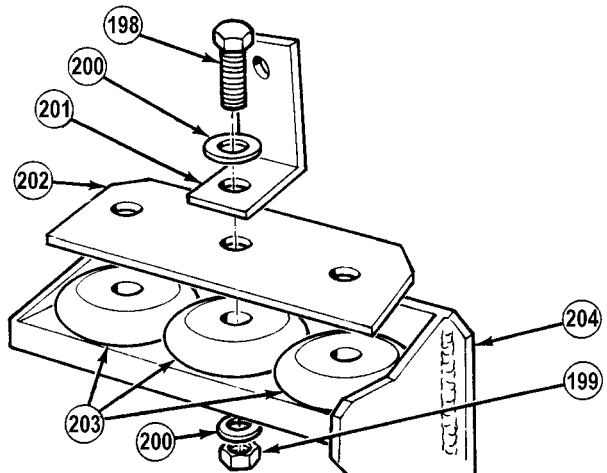
- (65) Attach four point chain (196) and lifting device to lifting points on engine/transmission assembly (197).

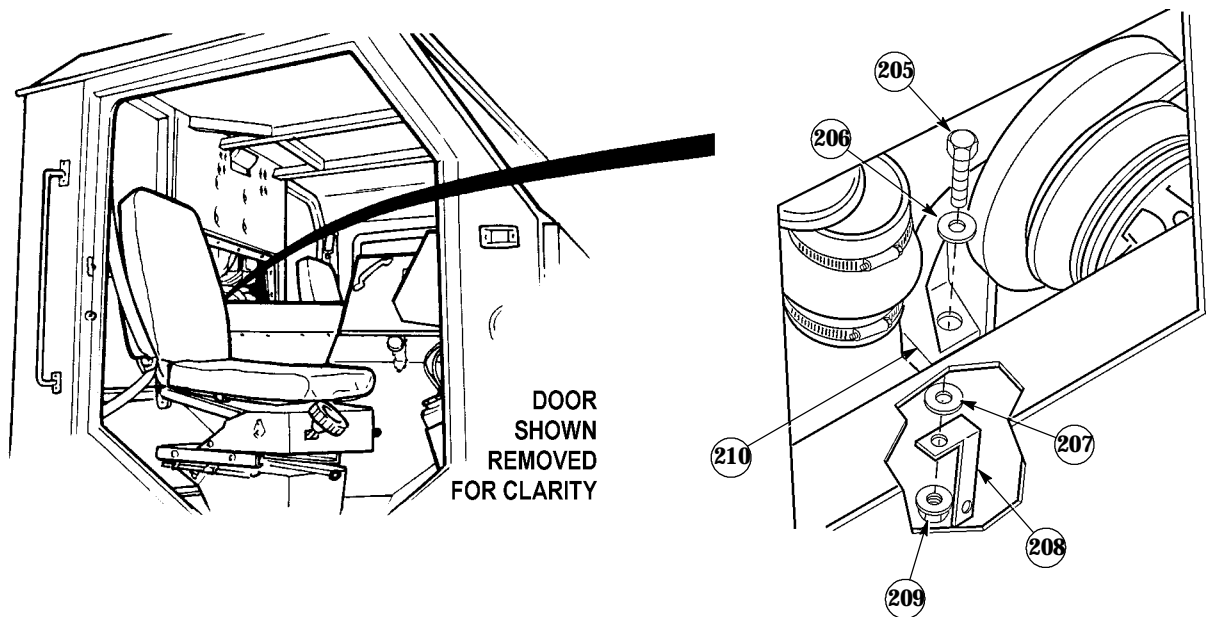


NOTE

Bracket is located on right side only.

- (66) Remove three screws (198), locknuts (199), six washers (200), bracket (201), one plate (202) and six mounts (203) from right cradle (204). Discard locknuts.
- (67) Remove three screws (198), locknuts (199), six washers (200), plate (202) and six mounts (203) from left cradle (204). Discard locknuts.





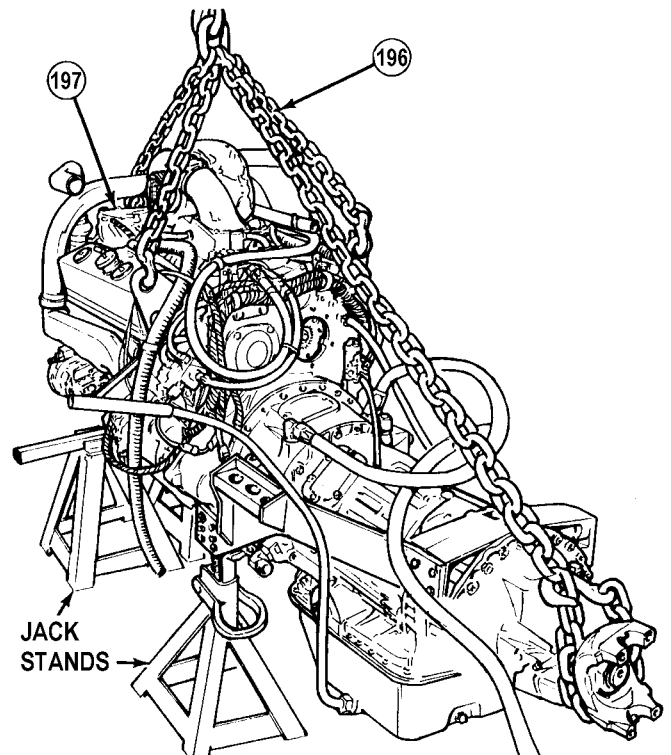
CAUTION

Use extreme care when removing engine/transmission assembly. Ensure engine/transmission assembly does not swing and damage equipment.

NOTE

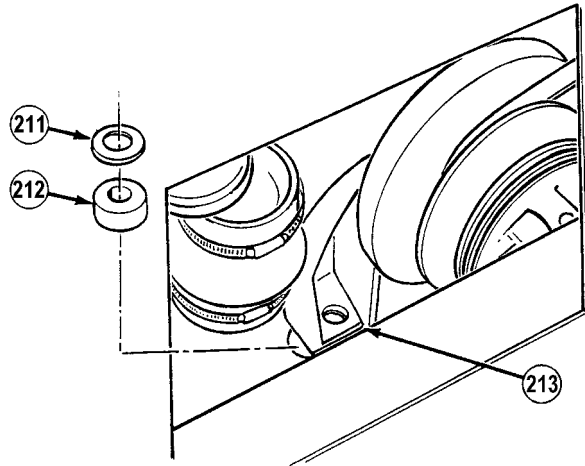
If truck is equipped with remote engine oil filter, bracket will replace washer on right side in Step (68).

- (68) With the aid of an assistant, remove two screws (205), washers (206), washer(s) (207), bracket (208) (if present) and two locknuts (209) from front mounting plate (210). Discard locknuts.
- (69) With the aid of an assistant, remove engine/transmission assembly (197) from truck.
- (70) Position engine/transmission (197) on jackstands and remove four point chain (196) and lifting device from engine/transmission assembly (197).

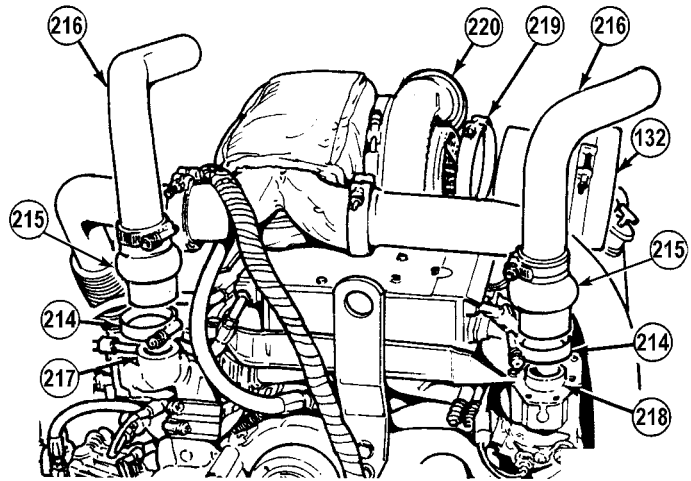


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

- (71) Remove two spacers (211) and mounts (212) from front mounting holes (213).



- (72) Loosen two clamps (214) at bottom of hose (215).
- (73) Remove two coolant tube assemblies (216) from right thermostat housing (217) and left thermostat housing (218).
- (74) Loosen clamp (219) on hose (132).
- (75) Remove hose (132) from turbocharger (220).



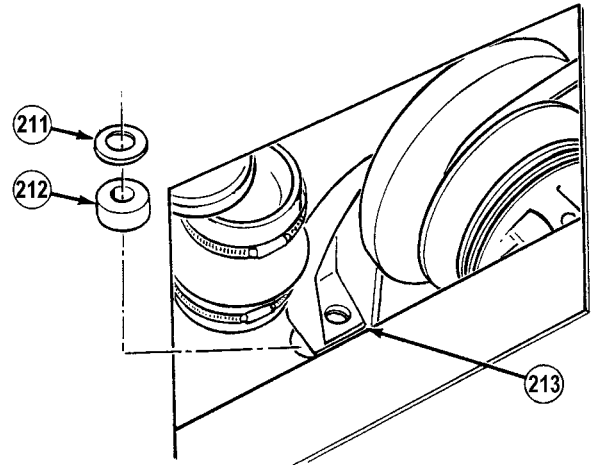
b. Installation.

NOTE

Install cable ties as required.

- (1) Install hose (132) on turbocharger (220) with clamp (219).
- (2) Install two coolant tube assemblies (216) on right thermostat housing (217) and left thermostat housing (218) with two hose clamps (214).

- (3) Position two mounts (212) and spacers (211) on front mounting holes (213).



NOTE

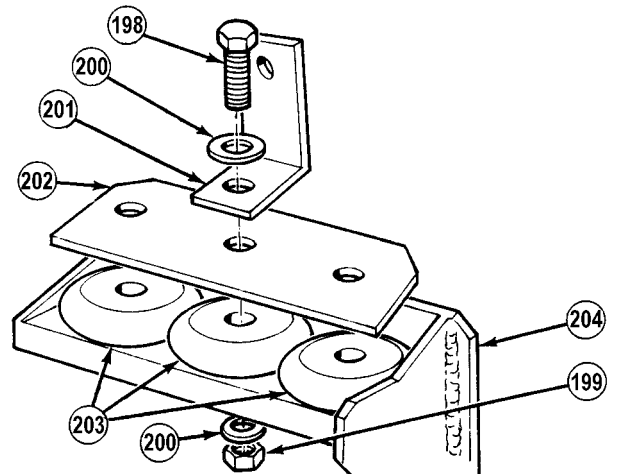
Screws installed in cradles will assist in aligning engine/transmission assembly during installation.

- (4) Position six mounts (203), plate (202), three washers (200) and screws (198) on left cradle (204).

NOTE

Bracket is located on right side only.

- (5) Position six mounts (203), plate (202), bracket (201), three washers (200), locknuts (199) and screws (198) in right cradle (204).

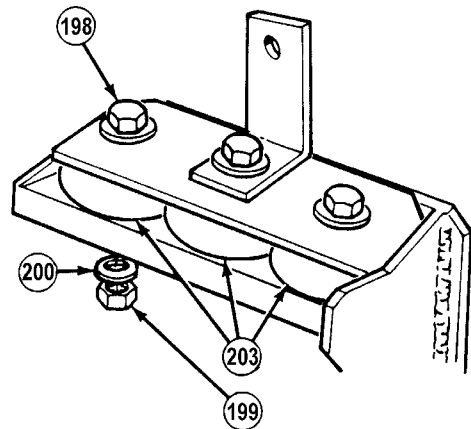
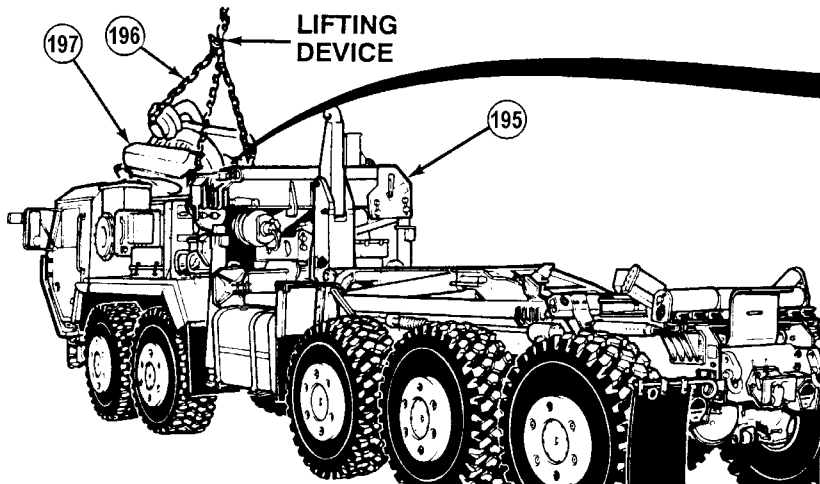
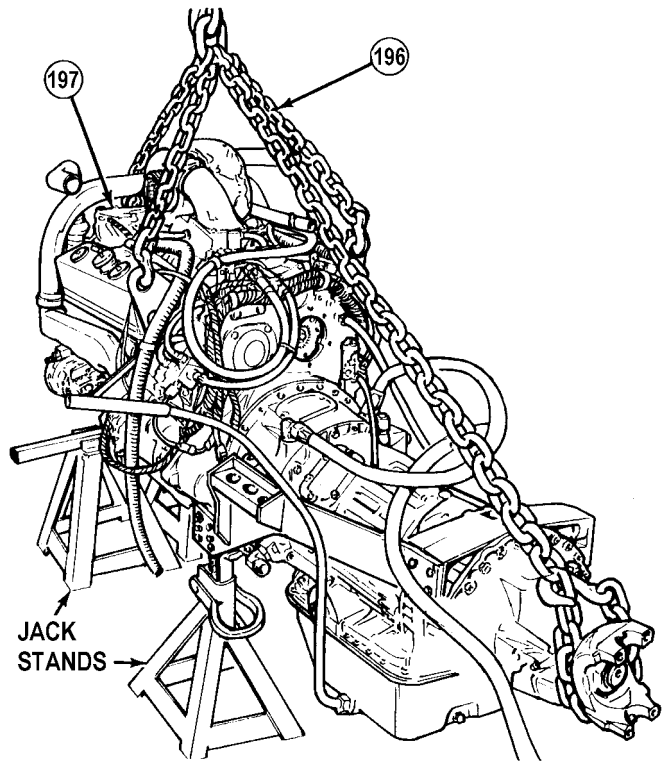


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

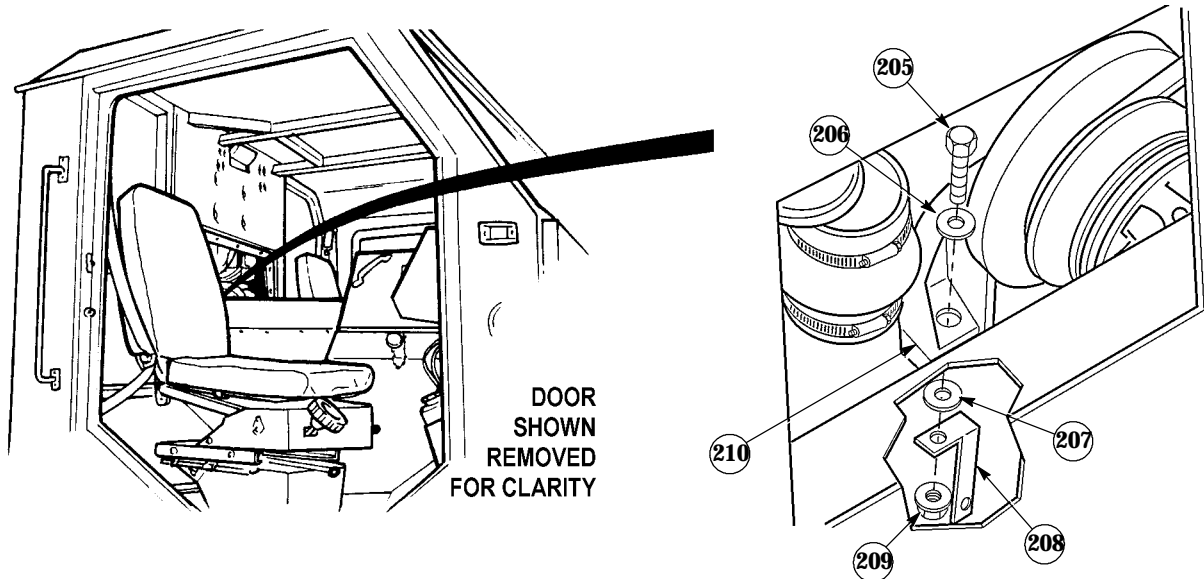
WARNING

- Engine/transmission assembly weighs 3,946 lbs (1,791 kg). Attach suitable lifting device of adequate capacity for removal or installation to prevent possible injury to personnel.
- Use extreme care when installing engine/transmission assembly. Ensure engine/transmission assembly does not swing and damage equipment.

- (6) Attach four point chain (196) and lifting device to engine/transmission assembly (197).



- (7) With the aid of an assistant, lower engine/transmission assembly (197) in truck (195) while aligning six screws (198) in mounts (203).
- (8) Position six washers (200) and locknuts (199) on screws (198).
- (9) Remove lifting device and four point chain (196) from engine/transmission assembly (197).

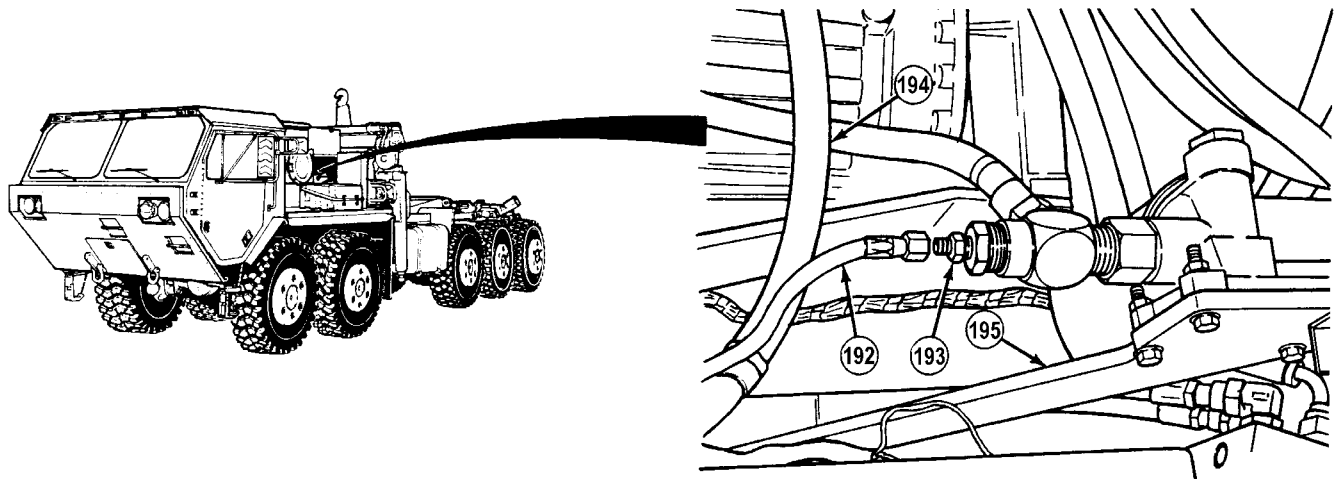


- (10) Position two washers (206) and two screws (205) in front mounting plate (210).

NOTE

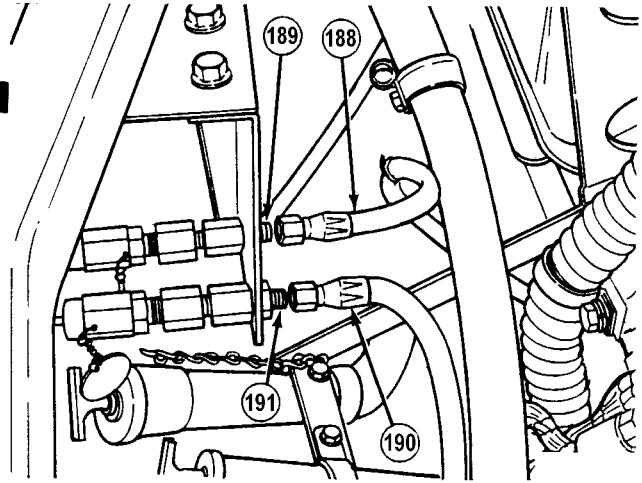
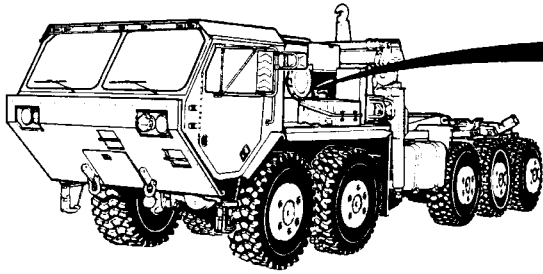
If truck is equipped with remote engine oil filter, bracket will replace washer on right side in Step (11).

- (11) Position washer(s) (207), bracket (208) (if present) and locknuts (209) on two screws (205).
- (12) With the aid of an assistant, tighten locknuts (209) and (199) on screws (205) and (198).

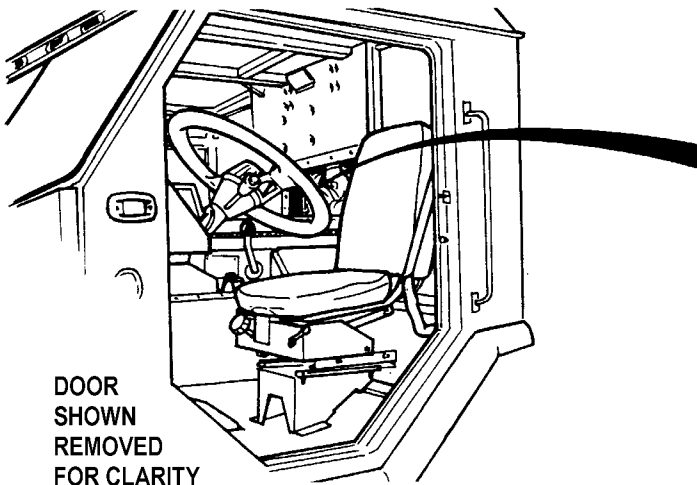


- (13) Position hose 2600 (194) on truck (195).
- (14) Install hose 2312 (192) to fitting (193).

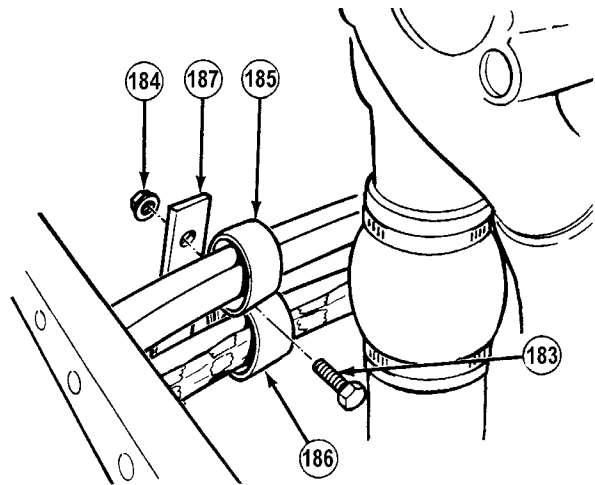
3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).



- (15) Install hose 2312 (190) to fitting (191).
- (16) Install hose 2689 (188) on fitting (189).

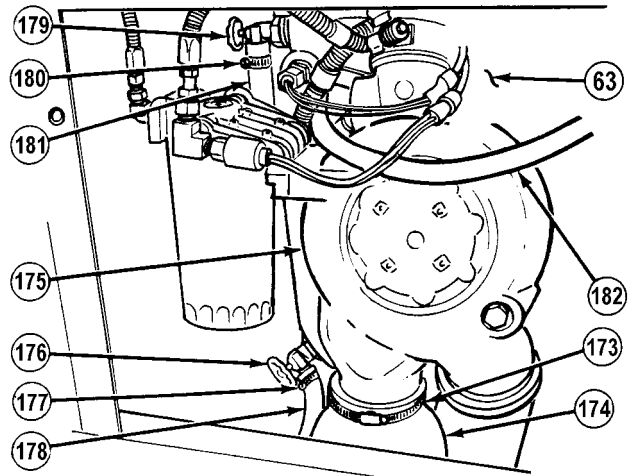


DOOR
SHOWN
REMOVED
FOR CLARITY



- (17) Install cushion clips (186) and (185) on bracket (187) with screw (183) and locknut (184).

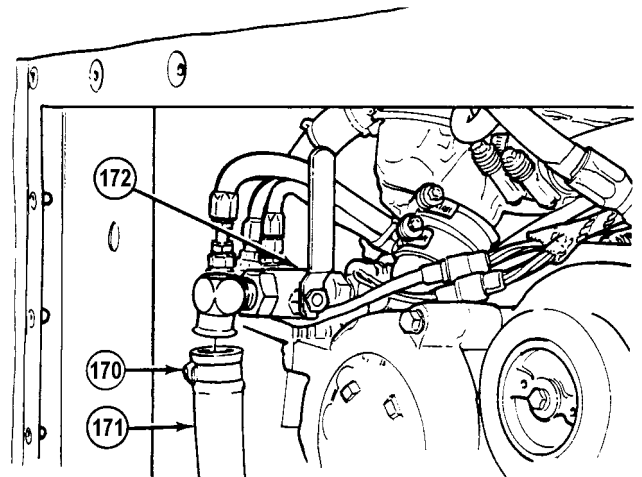
- (18) Route hose 2381 (182) on engine (63).
- (19) Install hose (181) on valve (179) with clamp (180).
- (20) Turn valve (179) counterclockwise on engine (63).
- (21) Install hose (178) on valve (176) with clamp (177).
- (22) Turn valve (176) counterclockwise on engine (63).
- (23) Install hose (174) on water pump (175) with clamp (173).



NOTE

If equipped with arctic kit (Model A), perform Step (24).

- (24) Install hose (171) on valve (172) with clamp (170).

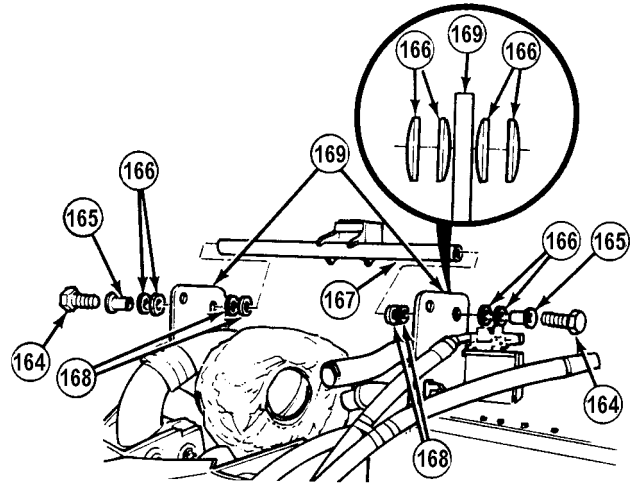


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

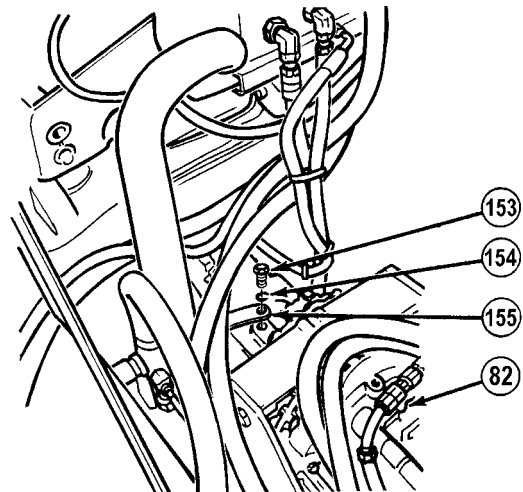
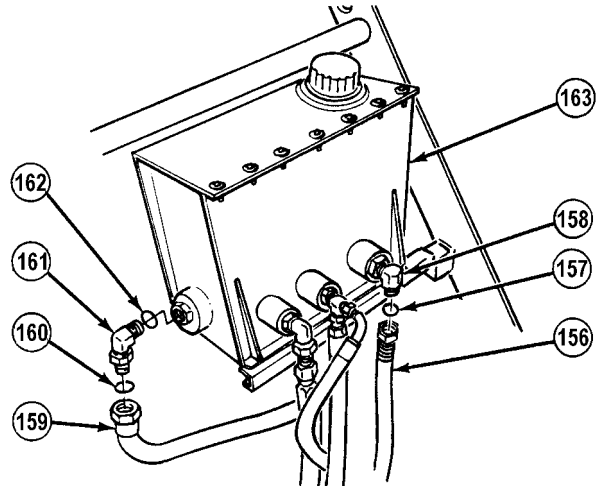
- (25) Apply adhesive sealant to threads of two screws (164).



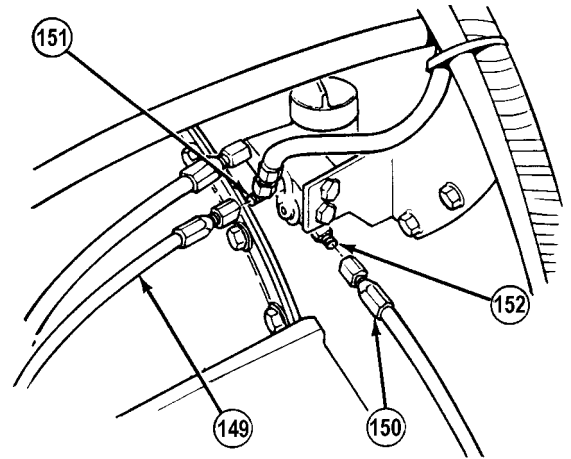
NOTE

If equipped with machine gun mount longer screws and additional spacers go in right side of spreader bar in Step (26).

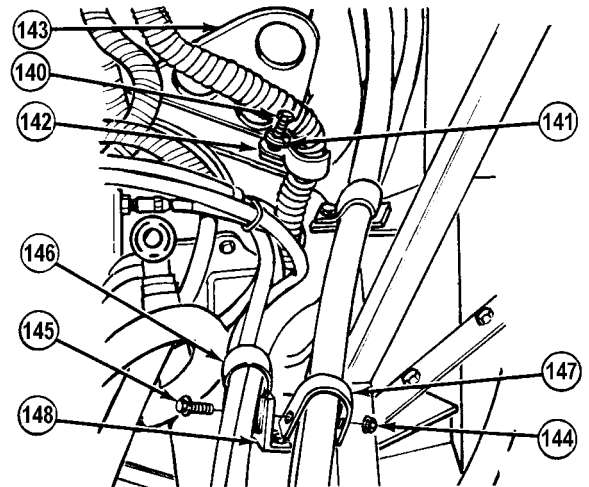
- (26) Install four washers (166), spreader bar (167), four washers (168), two sleeves (165) and screws (164) in bracket (169). Tighten screws to 128 lb-ft (173 N·m).
- (27) Apply hydraulic oil to preformed packings (160), (162) and (157).
- (28) Install preformed packing (162) and elbow (161) on steering reservoir (163).
- (29) Install hose 2553 (159) and preformed packing (160) on elbow (161).
- (30) Install preformed packing (157) and hose 2278 (156) on elbow (158).
- (31) Install bracket (155) on rear of transmission (82) with lockwasher (154) and screw (153).



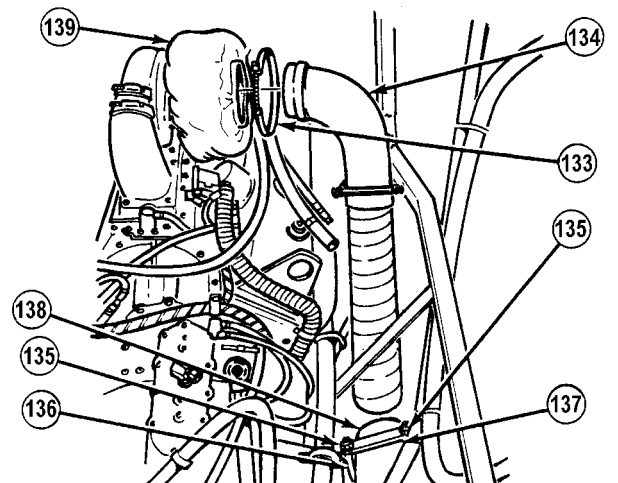
- (32) Install hose 2159 (150) and hose 2040 (149) on fittings (152) and (151).



- (33) Install cushion clip (147) and (146) on standoff bracket (148) with screw (145) and locknut (144).
- (34) Install cushion clip (142) on cylinder head (143) with lockwasher (141) and screw (140).

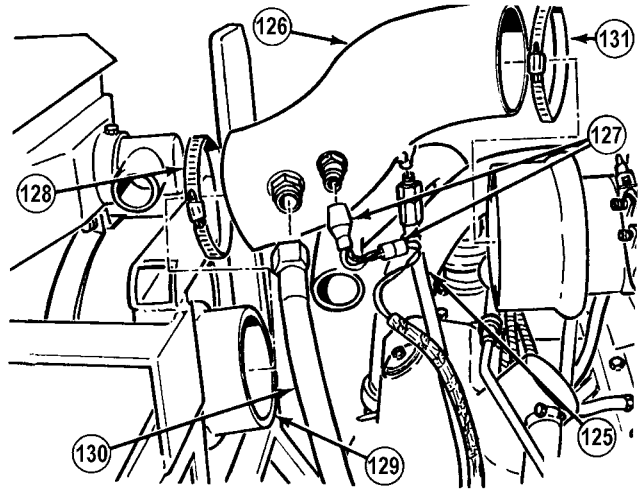


- (35) Position exhaust pipe (134) on exhaust pipe (138) and turbocharger (139).
- (36) Install two locknuts (135) and U-bolt (136) on bracket (137) and exhaust pipe (138).
- (37) Install clamp (133) on exhaust pipe (134) and turbocharger (139).



3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

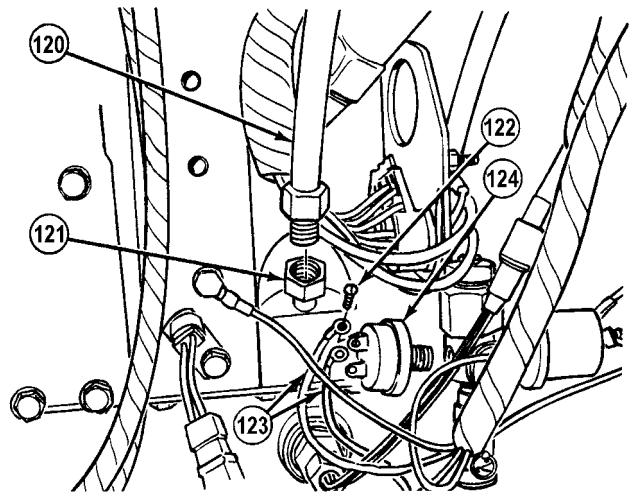
- (38) Position air intake pipe (126) on elbow (129).
- (39) Install clamp (131) on air intake pipe (126).
- (40) Install clamp (128) on air intake pipe (126).
- (41) Install hose 2600 (130) on air intake pipe (126).
- (42) Connect MC67 connector (127)
- (43) Install hose 2381 (125) on air intake pipe (126).



- (44) Install engine dipstick tube (120) in fitting (121).

WARNING

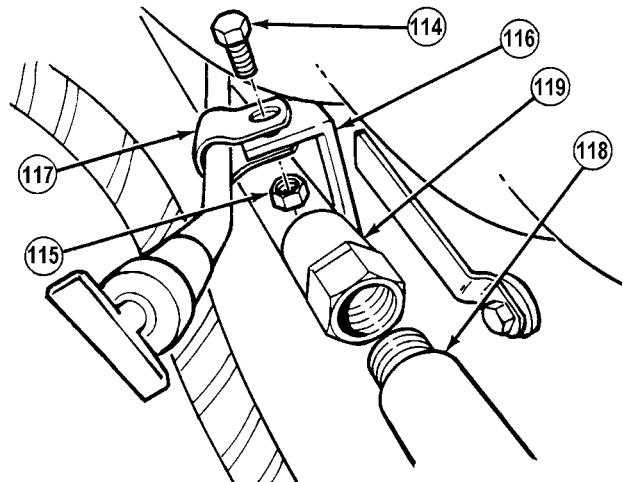
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



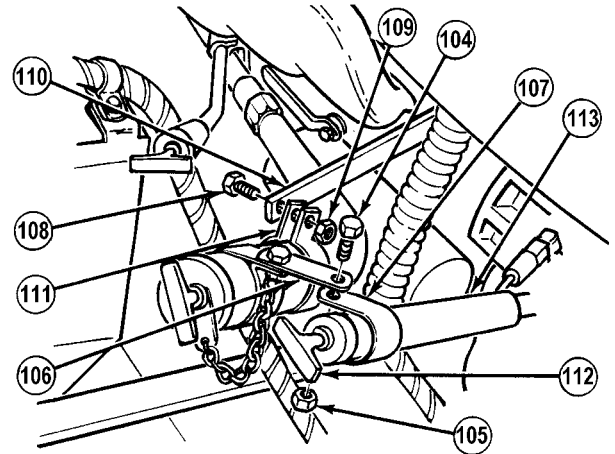
- (45) Install two wires 1279 (123) on pressure switch (124) with two screws (122). Coat terminals with electrical sealant.

- (46) Install engine oil filler tube (118) on engine oil filler hose 2628 (119).

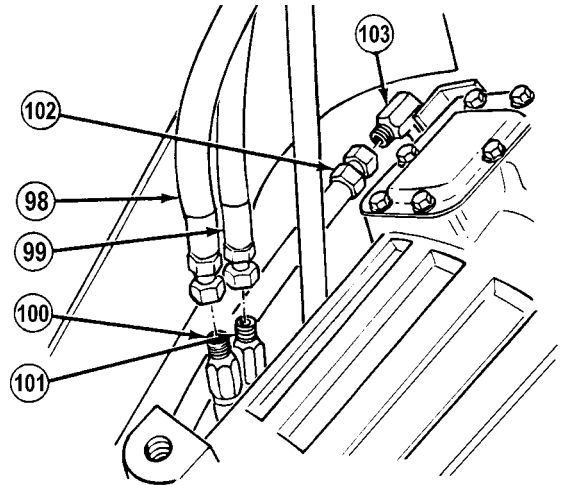
- (47) Install engine dipstick tube (119) to bracket (116) with cushion clip (117), screw (114) and locknut (115).



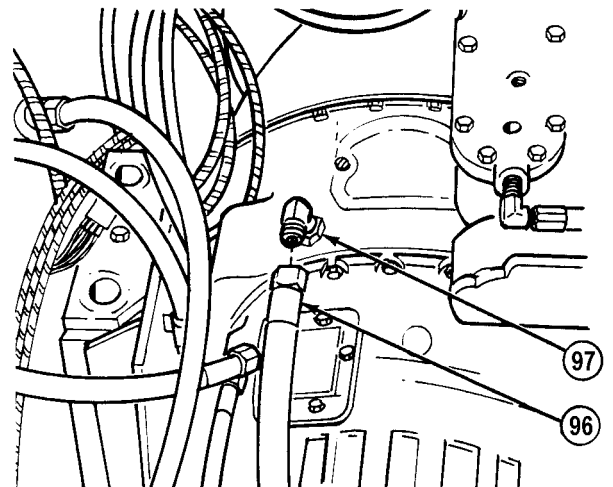
- (48) Install transmission dipstick (112) in dipstick tube (113).
- (49) Install engine oil filler tube (106) to bracket (110) with cushion clip (111) screw (108) and locknut (109).
- (50) Install dipstick tube (113) bracket (110) with cushion clip (107), screw (104) and locknut (105).



- (51) Install hose 2310 (102) to elbow (103).
- (52) Install hose 2262 (99) and hose 2260 (98) to fittings (101) and (100).



- (53) Install hose 2310 (96) on elbow (97).

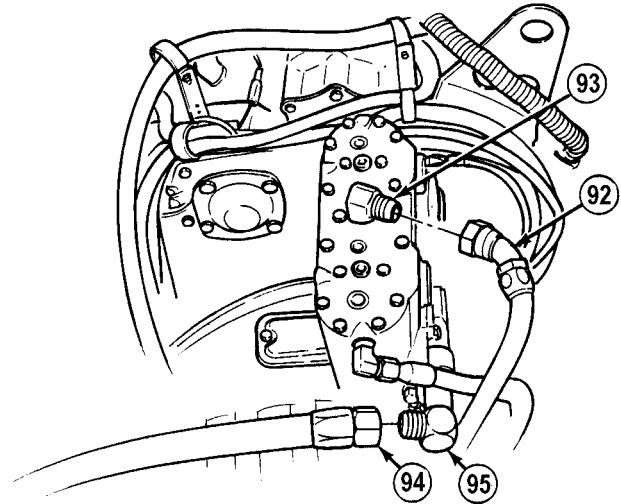


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

(54) Install hose 2600 (94) on elbow (95).

CAUTION

- Ensure braided hose does not kink or damage to equipment may result.
- Ensure all hoses and tubes are clear of braided hose. When engine is running, braided hose is hot and damage to equipment may result.

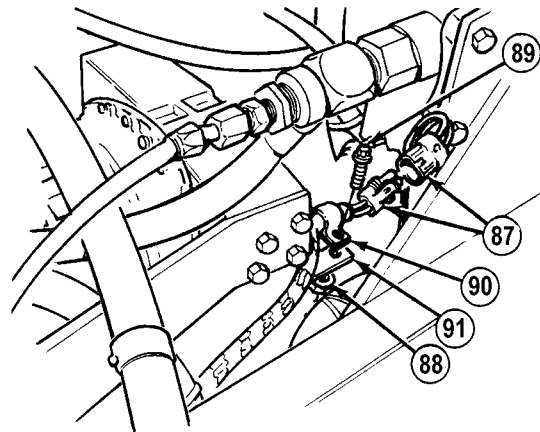


(55) Install hose 2001 (92) on elbow (93).

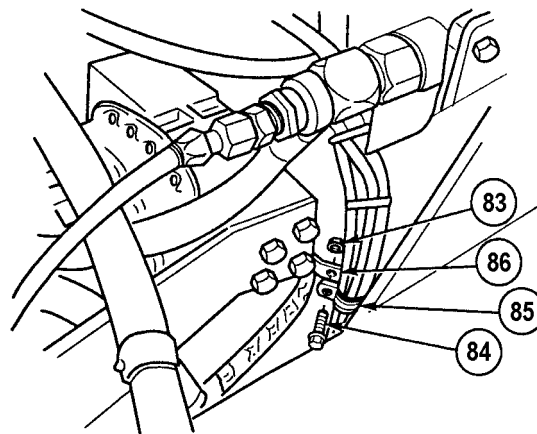
(56) Position MC20 connector (87) in clip (90).

(57) Install cushion clip (90) on bracket (91) with screw (89) and nut (88).

(58) Connect MC20 connector (87).

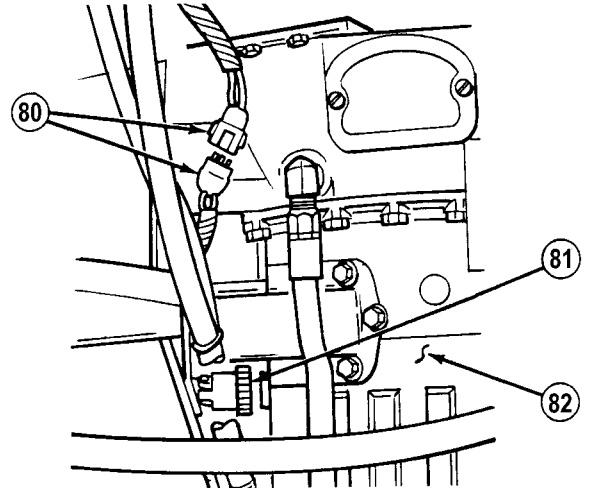


(59) Install clamp (85) on bracket (86) with screw (84) and locknut (83).



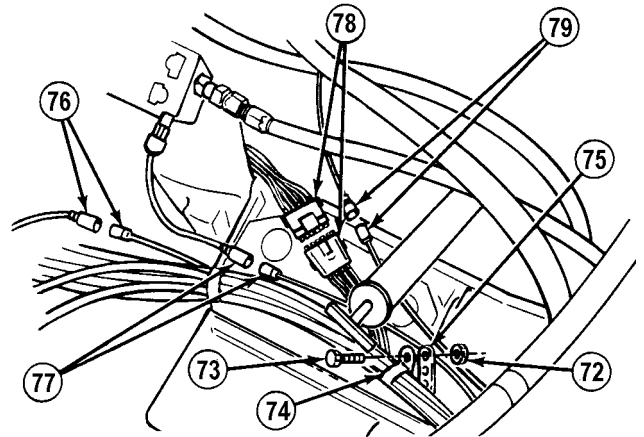
(60) Connect MC19 connector (81) to transmission (82).

(61) Connect MC63 (80) connector.



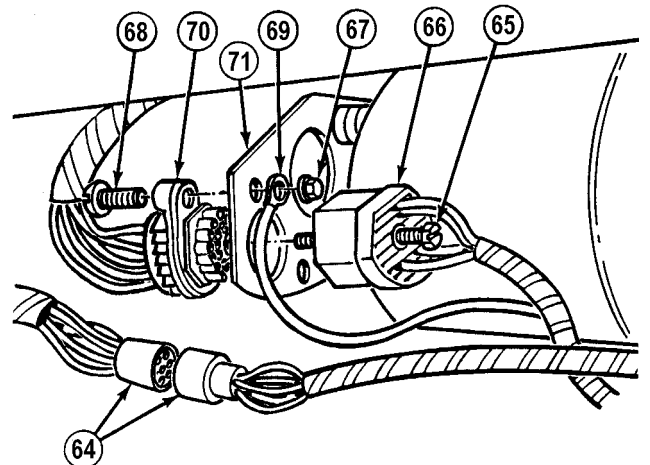
(62) Connect MC95 (79), MC62 (78), MC69 (77) and MC60 (76) connectors.

(63) Install cushion clip (74) screw (73) locknut (72) on bracket (75).



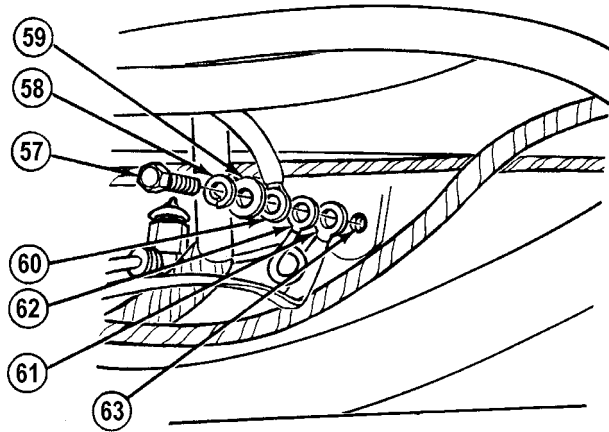
(64) Connect MC65 connector (66) and (70) with one ground strap (69), two screws (68) and locknuts (67) to bracket (71). Tighten center screw (65) in MC65 connector (66).

(65) Connect MC70 connector (64).

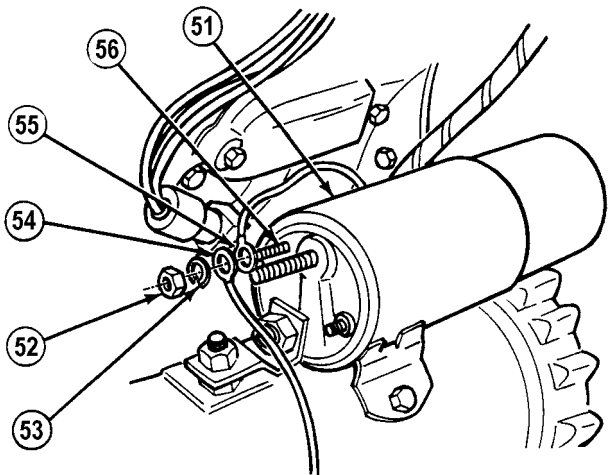


3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

- (66) Remove screw (57) and washer (59) from engine block (63).
- (67) Install ground strap (61), wire 1435 (62) and ground strap (60) with washer (59), lockwasher (58) and screw (57) to engine block (63).



- (68) Install wires 1045 (55) and 1816 (54) to small positive terminal (56) on starter solenoid (45) with lockwasher (53) and nut (52).

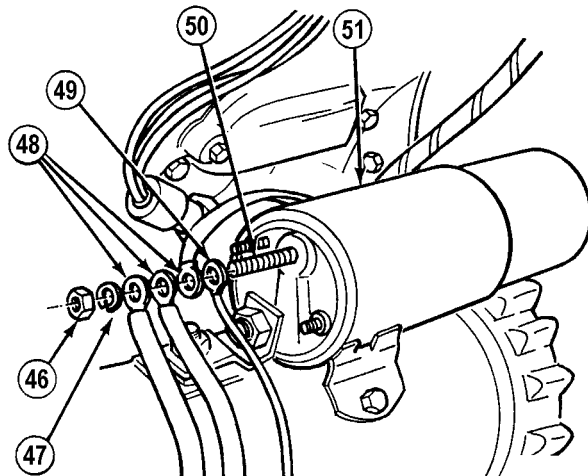


- (69) Install wire 1055 (49) and three cables 1139 (48), on positive terminal (50) on starter solenoid (45) with lockwasher (47) and nut (46).

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.

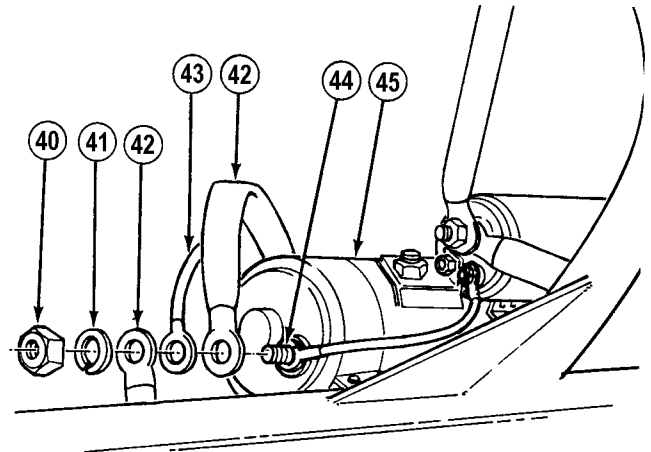
- (70) Coat positive terminal (50), positive terminal (56) and screw (57) with electrical sealant.



- (71) Install wire 1819 (43) and two cables 1138 (42) on negative terminal (44) on starter (45) with lockwasher (41) and nut (40).

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.

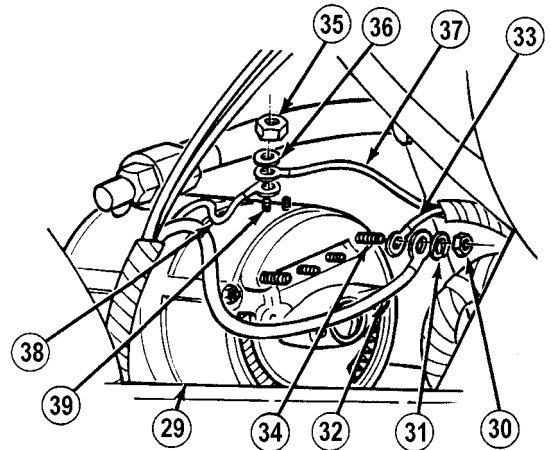


- (72) Coat negative terminal (44) with electrical sealant.

NOTE

- If equipped with a 145 AMP alternator, perform Steps (73) through (78).
- If equipped with 200 AMP alternator, perform Steps (79) through (87).

- (73) Install wires 1953 (38) and 1344 (37) to F-positive post (39) on top of alternator (29) with lockwasher (36) and nut (35).

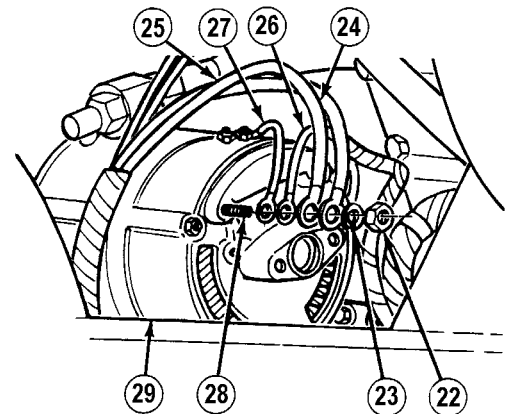


- (74) Coat F-positive post (39) with electrical sealant.

- (75) Install wires 1278 (33) and 1820 (32) to positive post (34) on alternator (29) with lockwasher (31) and nut (30).

- (76) Coat positive post (34) with electrical sealant.

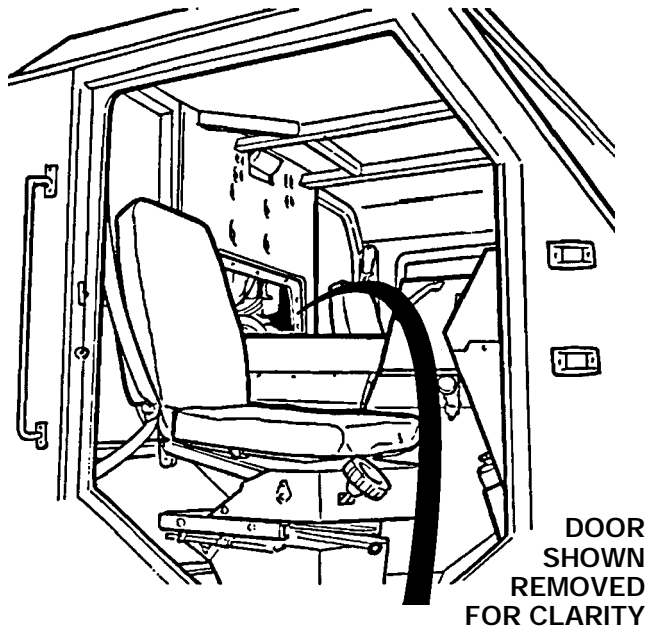
- (77) Install wires 1275 (27), 1057 (26), 1435 (25) and 1815 (24) to negative post (28) on alternator (29) with lockwasher (23) and nut (22).



- (78) Coat negative post (28) with electrical sealant.

3-4. ENGINE/TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

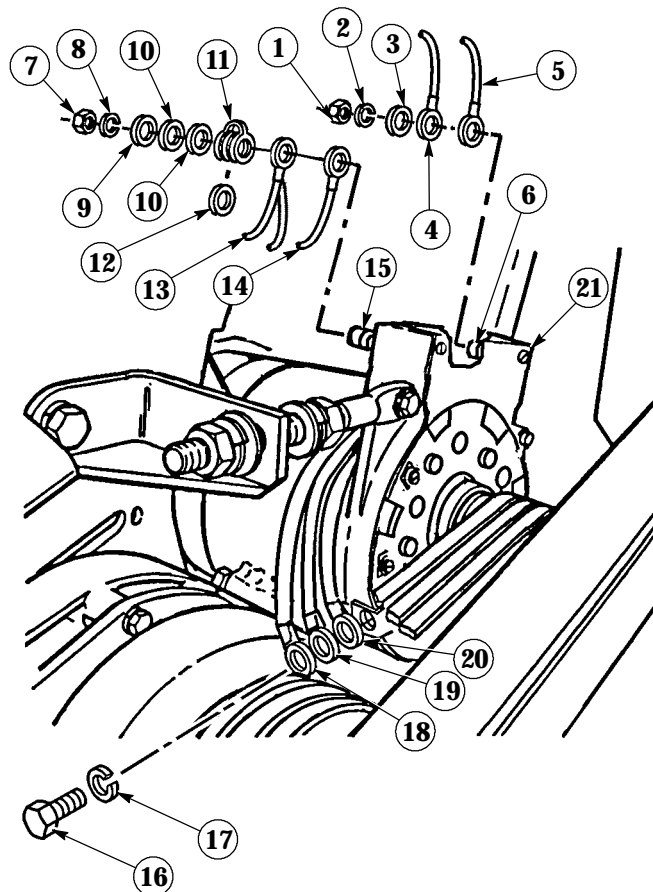
- (79) Install wire 1275 (20), wire 1435 (19), wire 1815 (18), lockwasher (17) and screw (16) on alternator (21).
- (80) Tighten screw (16) to 17 lb-ft (23 N·m).
- (81) Remove nut (7), washer (9), washer(s) (if present) (10), and fuse link (11) with insulator washer (12) from 24 volt terminal (15).
- (82) Install wire 1281A (14), wire 1820/1953 (13), fuse link (11) with insulator washer (12), washer(s) (if removed) (10), washer (9) lockwasher (8) and nut (7) on 24 volt terminal (15).
- (83) Tighten nut (7) to 15 lb-ft (20 N·m).
- (84) Remove nut (1) and washer (3) from 12 volt terminal (6).
- (85) Install wire 1274 (5), wire 1860 (4), lockwasher (2), washer (3) and nut (1) on 12 volt terminal (6).
- (86) Tighten nut (1) to 15 lb-ft (20 N·m).



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.

- (87) Apply electrical sealant to screw (16), 12 volt terminal (6), and 24 volt terminal (15).



c. Follow-On Maintenance:

- Connect engine wiring harness, (Para 7-12).
- Install electronic control box side panel, (TM 9-2320-364-20).
- Install left fender front skirt, (TM 9-2320-364-20).
- Connect drive shaft, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Fill transmission with oil, (TM 9-2320-364-20).
- Fill steering reservoir with oil, (TM 9-2320-364-20).
- Fill engine with oil, (TM 9-2320-364-20).
- Install cooling module, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Install spare tire, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-5. ENGINE/TRANSMISSION SEPARATION.

This task covers:

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

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Cap and Plug Set (Item 26, Appendix F)
- Pan, Drain 6 gal (Item 145, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0 to 175 lb-ft [0-237 N·m]) (Item 276, Appendix F)
- Wrench, Torque (0 to 600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
- Lifting Device, Minimum Capacity 3000 lbs (1362 kg)

Materials/Parts

- Sealing Compound (Item 53, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Tags, Identification (Item 72, Appendix B)

Materials/Parts - Continued

- Gasket (Item 67, Appendix E)
- Gasket (Item 105, Appendix E)
- Locknut (Item 176, Appendix E)
- Lockwasher (2) (Item 237, Appendix E)
- Lockwasher (24) (Item 253, Appendix E)
- Lockwasher (4) (Item 255, Appendix E)
- Lockwasher (8) (Item 260, Appendix E)
- Lockwasher (Item 285, Appendix E)
- Lockwasher (16) (Item 288, Appendix E)
- Screw (2) (Item 516, Appendix E)

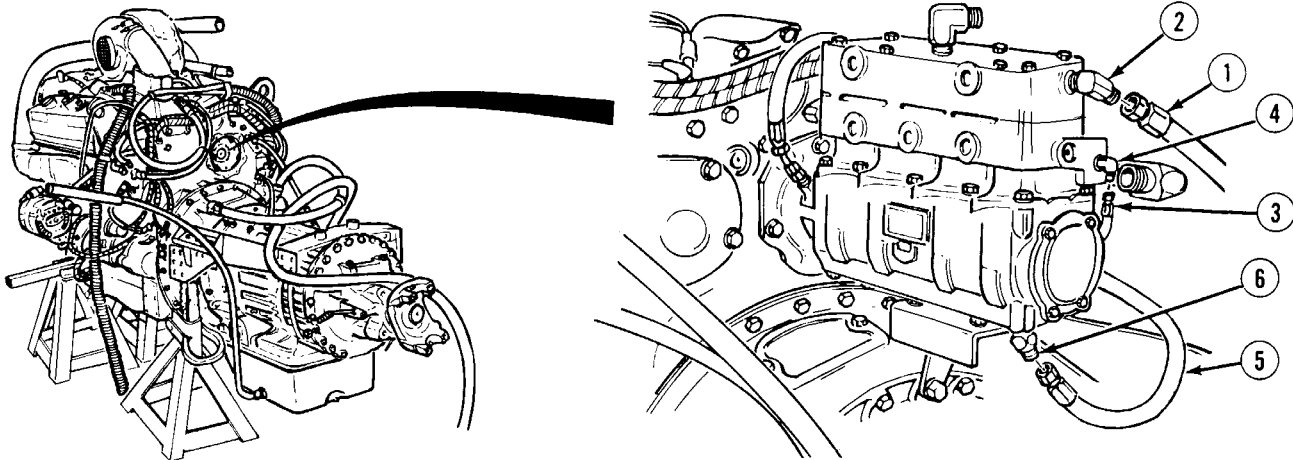
Personnel Required

Two

Equipment Condition

Engine/transmission assembly removed, (Para 3-4)

a. Removal.

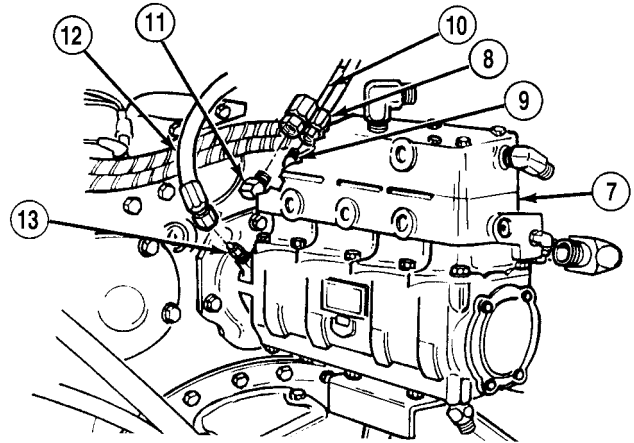


NOTE

- Tag and mark hoses prior to removal.
- Cap and plug hoses after removal.

- (1) Remove hose 2628 (1) from elbow (2).
- (2) Remove hose 2114 (3) from elbow (4).
- (3) Remove hose 2630 (5) from elbow (6).

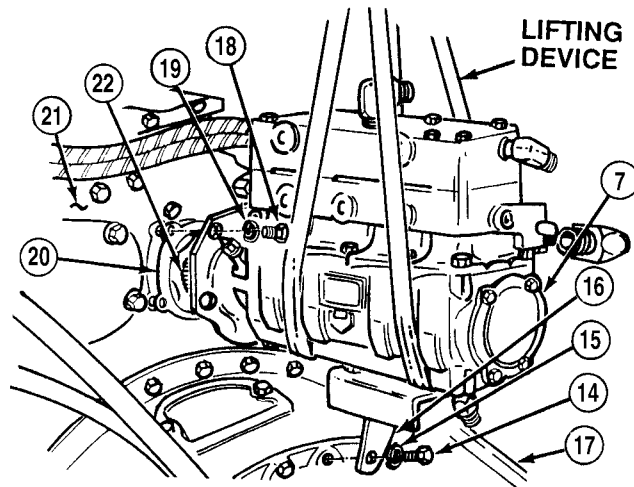
- (4) Deleted.
- (5) Remove hose 2114 (8) from elbow (9).
- (6) Remove hose 2628 (10) from elbow (11).
- (7) Remove hose 2629 (12) from fitting (13).



WARNING

Air compressor weighs 115 lbs (52 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

- (8) Attach lifting device to air compressor (7).
- (9) Remove two screws (14) and lockwashers (15) from air compressor mounting bracket (16) and transmission (17). Discard lockwashers.
- (10) With the aid of an assistant, remove four screws (18), lockwashers (19), air compressor (7) and gasket (20) from engine (21). Discard lockwashers and gasket.



NOTE

Accessory drive gear should remain with engine.

- (11) Remove accessory drive gear (22) from engine (21) or air compressor (7).

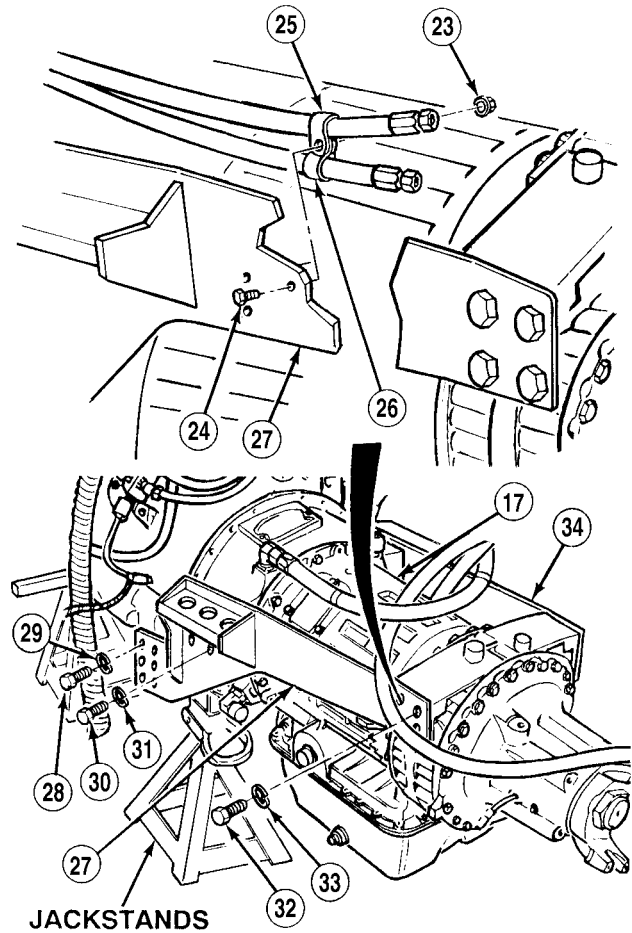
3-5. ENGINE/TRANSMISSION SEPARATION (CONT).

- (12) Remove locknut (23), screw (24) and clips (25) and (26) from left cradle (27). Discard locknut.
- (13) Remove six screws (28) and lockwashers (29) from left cradle (27). Discard lockwashers.
- (14) Remove two screws (30) and lockwashers (31) from left cradle (27). Discard lockwashers.

WARNING

Ensure cradle is fully supported upon removal of four screws and lockwashers or cradle may fall and cause injury to personnel.

- (15) With the aid of an assistant, remove four screws (32), lockwashers (33) and left cradle (27) from transmission (17). Discard lockwashers.
- (16) Remove six screws (28) and lockwashers (29) from right cradle (34). Discard four lockwashers.

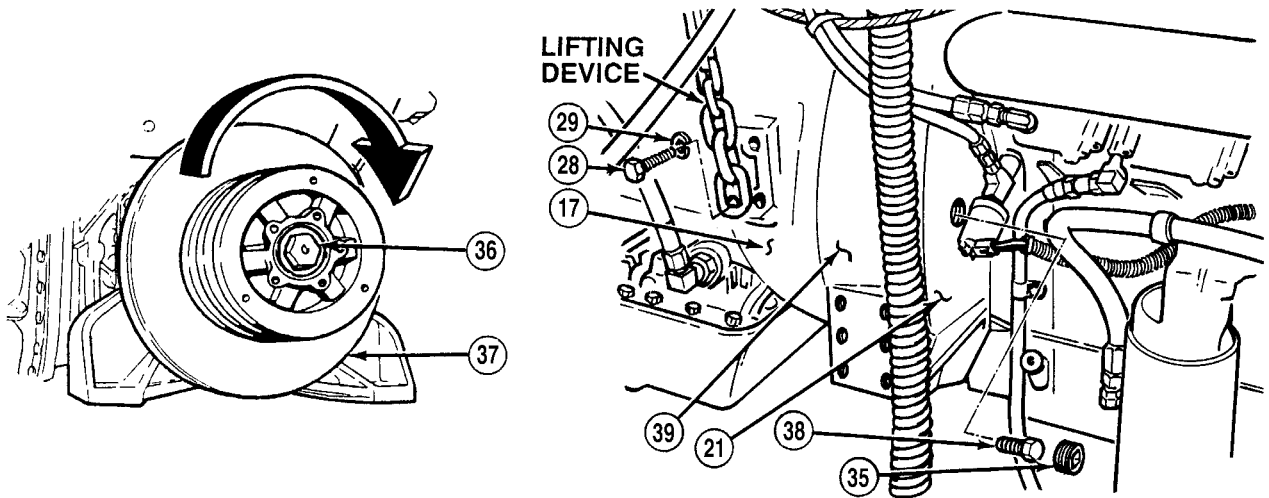


- (17) Remove two screws (30) and lockwashers (31) from right cradle (34). Discard lockwashers.

WARNING

Ensure cradle is fully supported upon removal of four screws and lockwashers or cradle may fall and cause injury to personnel.

- (18) With the aid of an assistant, remove four screws (32), lockwashers (33) and right cradle (34) from transmission (17). Discard lockwashers.



WARNING

Transmission weighs 1,050 lbs (477 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

NOTE

Use two screws and lockwashers removed in Step (15).

- (19) Install lifting device on transmission (17) with two screws (28) and lockwashers (29).
- (20) Remove plug (35) from right side of engine (21).

CAUTION

Ensure nut on crankshaft is turned in clockwise direction only. Turning nut on crankshaft in counterclockwise direction may cause damage to equipment.

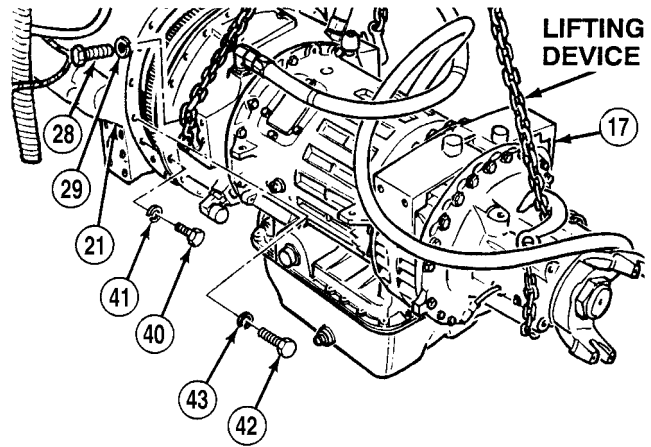
NOTE

Access for removal of 12 screws is through plug hole of plug removed in Step (20).

- (21) With the aid of an assistant, turn nut (36) on crankshaft (37) to access and remove 12 screws (38) from flexplate housing (39).

3-5. ENGINE/TRANSMISSION SEPARATION (CONT).

- (22) Remove two screws (40) and lockwashers (41) from transmission (17). Discard lockwashers.
- (23) Remove 22 screws (42) and lockwashers (43) from transmission (17). Discard lockwashers.
- (24) Remove transmission (17) from engine (21) and position on suitable support.
- (25) Remove two screws (28), lockwashers (29) and lifting device from transmission (17).

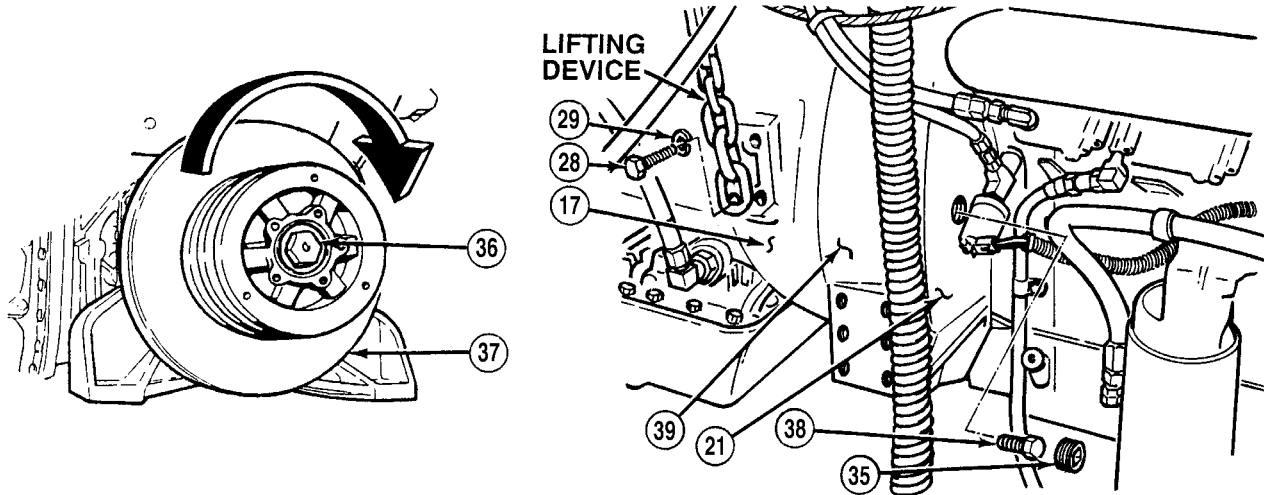


b. Installation.

WARNING

Transmission weighs 1,050 lbs (477 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (1) Attach lifting device to transmission (17) with two screws (28) and lockwashers (29).
- (2) With the aid of an assistant, align transmission (17) with engine (21) and install two lockwashers (41) and screws (40) in transmission. Tighten screws to 54 to 65 lb-ft (73 to 88 N·m).
- (3) Install 22 lockwashers (43) and screws (42) in transmission (17). Tighten screws to 54 to 65 lb-ft (73 to 88 N·m).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

CAUTION

Ensure nut on crankshaft is turned in clockwise direction only. Turning nut on crankshaft in counterclockwise direction may cause damage to equipment.

NOTE

- If 12 screws do not align in Steps (4) through (7), perform Steps (8) and (9) and repeat Steps (4) through (7).
 - Screws must be turned in as far as possible by hand to prevent binding with flexplate housing.
- (4) With the aid of an assistant, turn nut (36) on crankshaft (37) to access screws (38). Apply coat of sealing compound to 12 screws (38) and position screws through flexplate housing (37).
 - (5) Tighten 12 screws (38) to 80 to 90 lb-ft (108 to 122 N·m).
 - (6) Apply sealing compound to plug (35) and install in right side of engine (21).
 - (7) Remove two screws (28), lockwashers (29) and lifting device from transmission (17). Discard lockwashers.

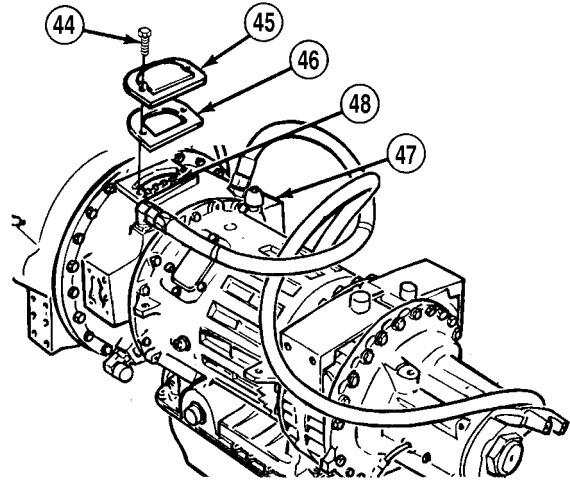
3-5. ENGINE/TRANSMISSION SEPARATION (CONT).

- (8) Remove two screws (44), access cover (45) and gasket (46) from converter housing (47). Discard gasket.
- (9) Turn torque converter pump (48) and repeat Steps (4) through (7).

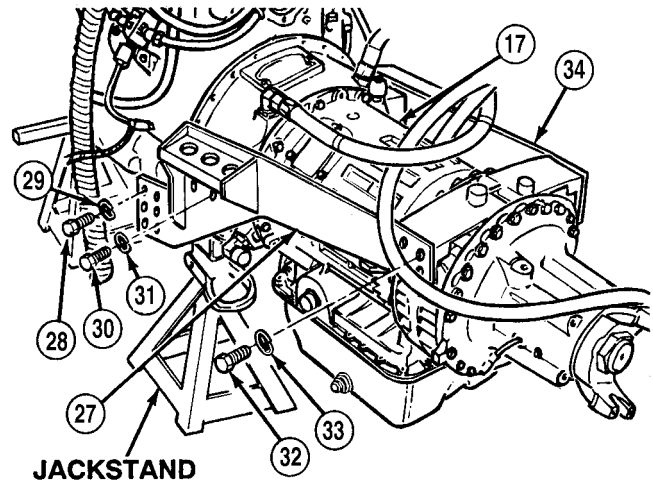
NOTE

If 12 screws were aligned in Steps (5) through (9), go to Step (13). If not, go to Step (10).

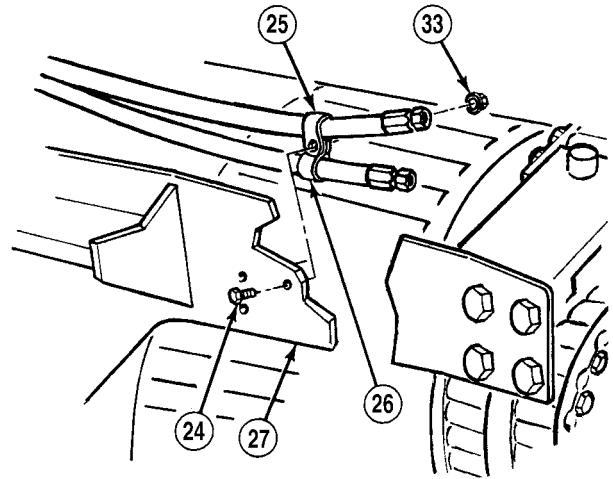
- (10) Install gasket (46), access cover (45) and two screws (44) on converter housing (47). Tighten screws to 26 to 32 lb-ft (35 to 43 N·m).



- (11) With the aid of an assistant, position right cradle (34) on transmission (17) with four lockwashers (33) and screws (32).
- (12) Position two lockwashers (31) and screws (30) in right cradle (34).
- (13) Position six lockwashers (29) and screws (28) in right cradle (34).
- (14) Tighten two screws (30) and six screws (28) in right cradle (34) to 123 to 144 lb-ft (167 to 195 N·m).
- (15) Tighten four screws (32) in right cradle (34) to 213 to 244 lb-ft (289 to 331 N·m).
- (16) With the aid of an assistant, position left cradle (27) on transmission (17) with four lockwashers (33) and screws (32).
- (17) Position two lockwashers (31) and screws (30) in left cradle (27).
- (18) Position six lockwashers (29) and screws (28) in left cradle (27).
- (19) Tighten two screws (30) and six screws (28) in left cradle (27) to 123 to 144 lb-ft (167 to 195 N·m).
- (20) Tighten four screws (32) in left cradle (27) to 213 to 244 lb-ft (289 to 331 N·m).



- (21) Install clips (25) and (26), screw (24) and locknut (23) on left cradle (27).



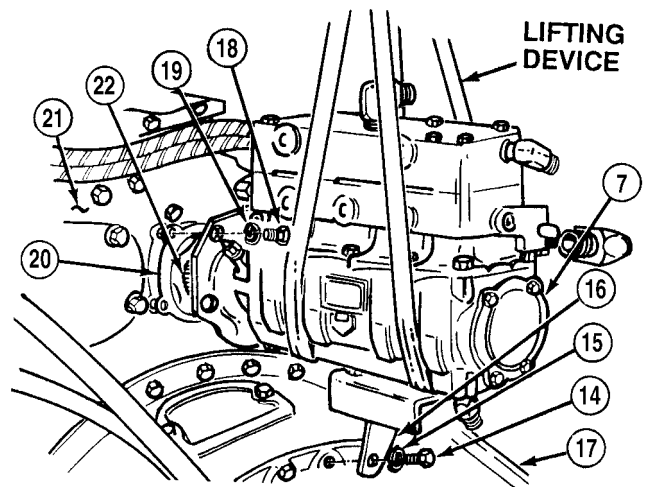
WARNING

Air compressor weighs 115 lbs (52 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (22) Attach lifting device to air compressor (7).
- (23) Install accessory drive gear (22) in air compressor (7).

CAUTION

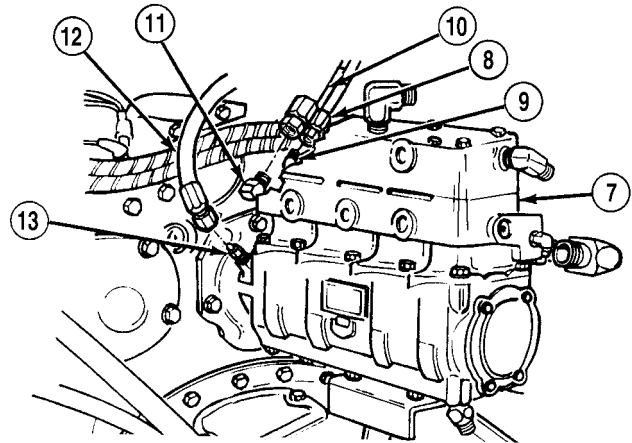
Ensure splines on accessory drive gear align in grooves in accessory drive.



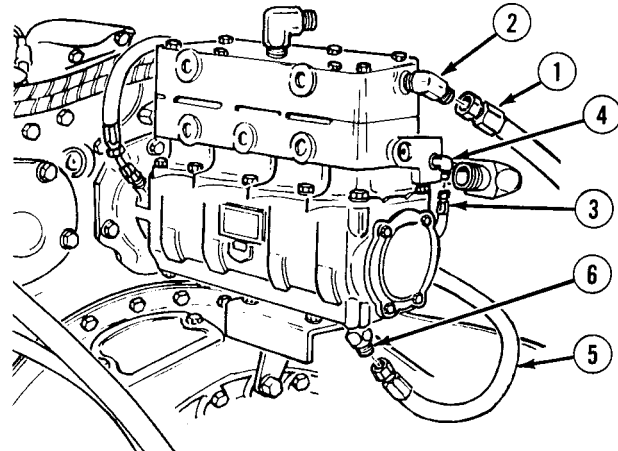
- (24) With the aid of an assistant, position gasket (20) and air compressor (7) on engine (21).
- (25) Position four lockwashers (19) and screws (18) in air compressor (7).
- (26) Position two lockwashers (15) and screws (14) in air compressor mounting bracket (16) and transmission (17).
- (27) Remove lifting device from air compressor (7).
- (28) Tighten two screws (14) on air compressor (7) to 67 to 80 lb-ft (91 to 108 N·m).
- (29) Tighten four screws (18) on air compressor (7) to 70 lb-ft (95 N·m).

3-5. ENGINE/TRANSMISSION SEPARATION (CONT).

- (30) Install hose 2629 (12) on fitting (13).
- (31) Install hose 2628 (10) on elbow (11).
- (32) Install hose 2114 (8) on elbow (9).
- (33) Deleted.



- (34) Install hose 2630 (5) on elbow (6).
- (35) Install hose 2114 (3) on elbow (4).
- (36) Install hose 2628 (1) on elbow (2).



c. Follow-On Maintenance:

- Install engine/transmission assembly, (Para 3-4).

END OF TASK

3-6. ENGINE LIFTING BRACKETS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Wrench, Torque (0 to 175 lb-ft [0-237 N-m]) (Item 277, Appendix F)

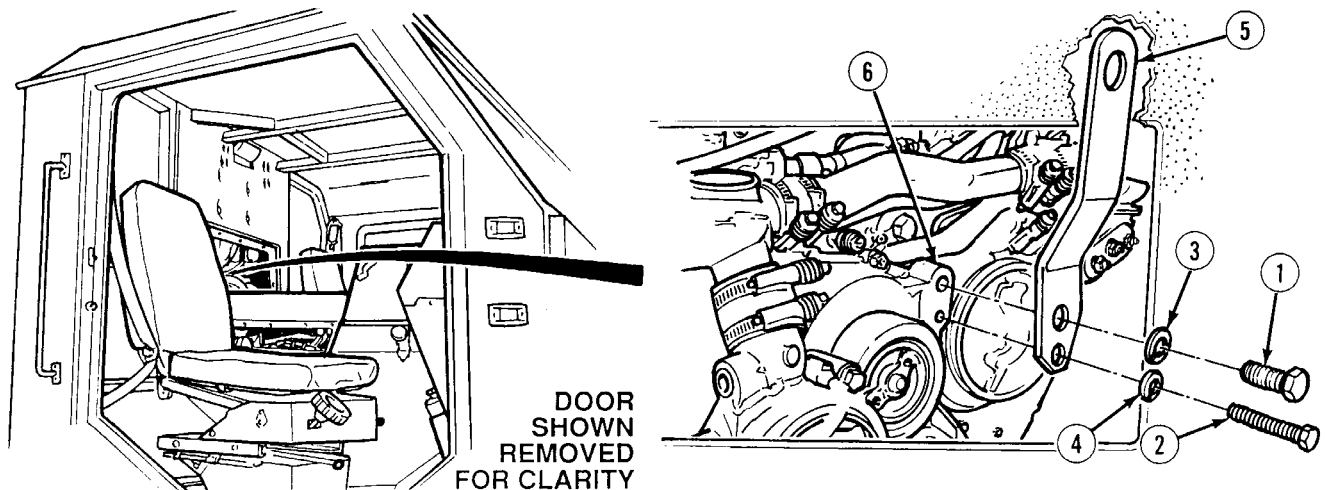
Materials/Parts

- Primer "T" (Item 46, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Gasket (2) (Item 82, Appendix E)
- Lockwasher (7) (Item 285, Appendix E)
- Lockwasher (Item 286, Appendix E)
- Lockwasher (Item 288, Appendix E)

Equipment Condition

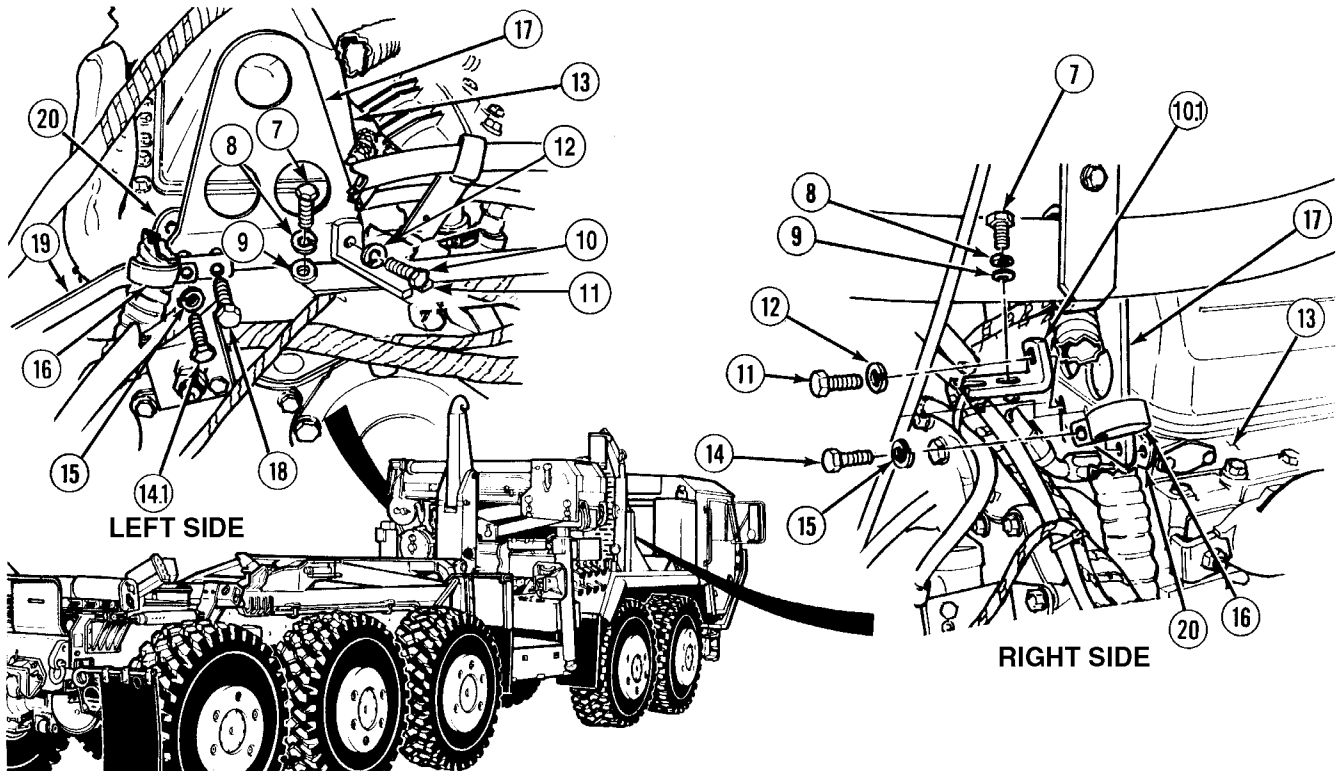
- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Spare tire removed, (TM 9-2320-364-10)
- Cab engine access panel removed, (TM 9-2320-364-20)
- Left side noise panel removed, (TM 9-2320-364-20)
- Right side noise panel removed, (TM 9-2320-364-20)

a. Removal.



- (1) Remove screws (1) and (2), lockwashers (3) and (4) and engine lifting bracket (5) from front balance cover (6). Discard lockwashers.

3-6. ENGINE LIFTING BRACKETS REPLACEMENT (CONT).



NOTE

There is one lifting bracket located on each cylinder head. Both lifting brackets are removed the same way except where noted.

- (2) Remove four screws (7), lockwashers (8) and washers (9) from cylinder head support brackets (10) and (10.1). Discard lockwashers.
- (3) Remove two screws (11), lockwashers (12) and cylinder head support brackets (10) and (10.1) from cylinder head (13). Discard lockwashers.

NOTE

Perform Step (4) for right side lifting bracket.

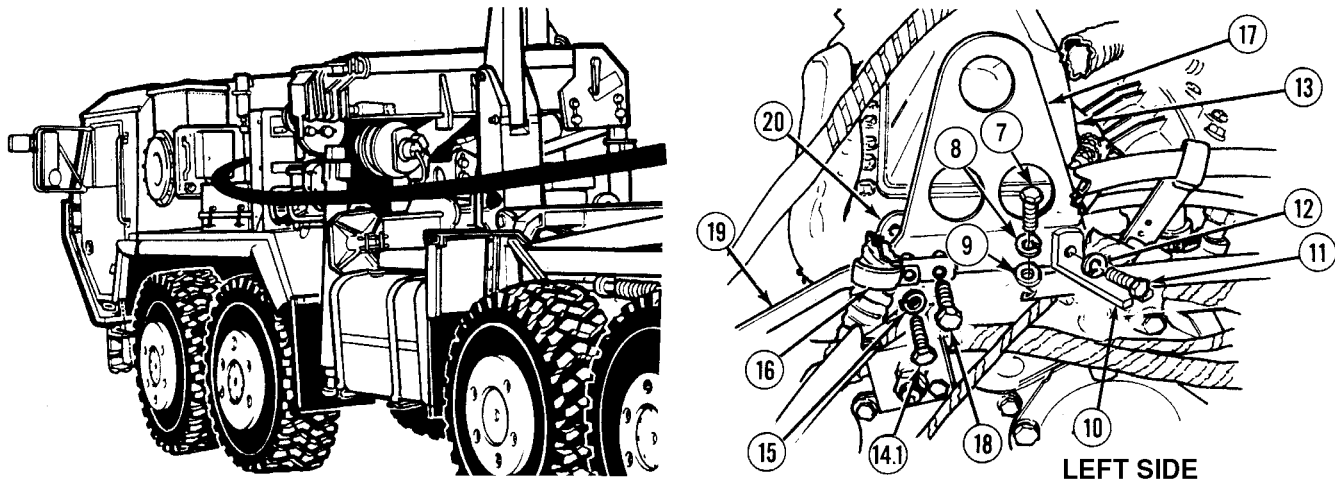
- (4) Remove screw (14), lockwasher (15) and clip (16) and engine lifting bracket (17) and gasket (20) from cylinder head (13). Discard lockwasher and gasket.

NOTE

Perform Step (5) for left side lifting bracket.

- (5) Remove screw (14.1), lockwasher (15), clip (16), screw (18), oil filler bracket (19), engine lifting bracket (17) and gasket (20) from cylinder head (13). Discard lockwasher and gasket.

b. *Installation.*



WARNING

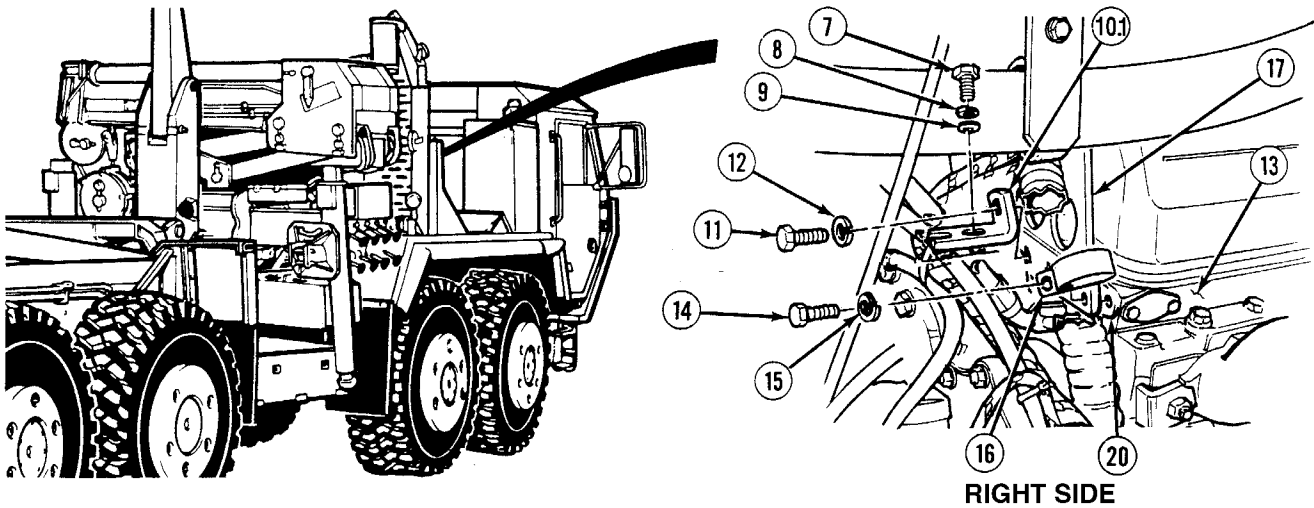
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

NOTE

- There is one lifting bracket located on each cylinder head.
- Oil filler bracket is located on left side only.
- Perform Steps (1) through (12) for left engine lifting bracket only.

- (1) Apply primer and sealing compound to threads of screw (18).
- (2) Position gasket (20), engine lifting bracket (17) and oil filler bracket (19) on cylinder head (13) with screw (18).
- (3) Apply primer and sealing compound to threads of screw (14.1).
- (4) Position clip (16), lockwasher (15) and screw (14.1) in engine lifting bracket (17).
- (5) Deleted.
- (6) Deleted.
- (7) Apply primer and sealing compound to threads of screw (11).
- (8) Position cylinder head support bracket (10) on cylinder head (13) with lockwasher (12) and screw (11).
- (9) Position two washers (9), lockwashers (8) and screws (7) in cylinder head support bracket (10).
- (10) Tighten screw (18) on engine lifting bracket (17) to 23 to 26 lb-ft (31 to 35 N·m).
- (11) Tighten screw (14.1) on engine lifting bracket (17) to 41 to 47 lb-ft (56 to 64 N·m).
- (12) Tighten two screws (7) and screw (11) to 35 to 38 lb-ft (47 to 52 N·m).

3-6. ENGINE LIFTING BRACKETS REPLACEMENT (CONT).



WARNING

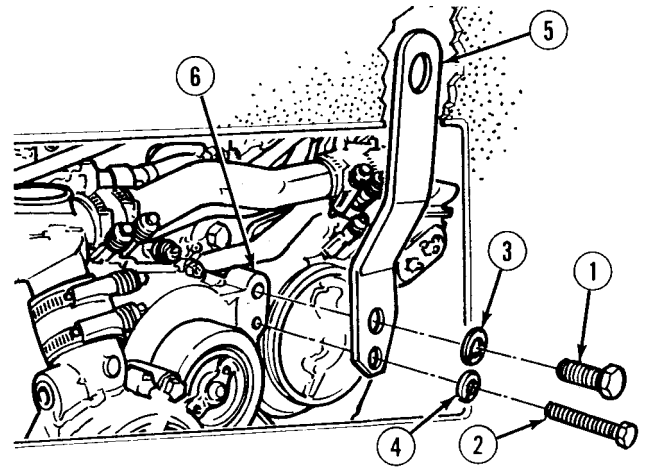
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

NOTE

Perform Steps (13) through (20) for right engine lifting bracket only.

- (13) Apply primer and sealing compound to threads of screw (14).
- (14) Position gasket (20) and engine lifting bracket (17) on cylinder head (13) with clip (16), lockwasher (15) and screw (14).
- (15) Apply primer and sealing compound to threads of screw (11).
- (16) Position cylinder head support bracket (10.1) on cylinder head (13) with lockwasher (12) and screw (11).
- (17) Position two washers (9), lockwashers (8) and screws (7) in cylinder head support bracket (10.1).
- (18) Tighten screw (11) on engine lifting bracket (17) to 23 to 26 lb-ft (31 to 35 N·m).
- (19) Tighten screw (14) on engine lifting bracket (17) to 41 to 47 lb-ft (56 to 64 N·m).
- (20) Tighten two screws (7) and screw (11) on engine lifting bracket (17) to 35 to 38 lb-ft (47 to 52 N·m).

- (21) Position engine lifting bracket (5) on front balance cover (6) with lockwashers (3) and (4) and screws (2) and (1).
- (22) Tighten screw (1) on engine lifting bracket (5) to 71 to 75 lb-ft (96 to 102 N·m).
- (23) Tighten screw (2) on engine lifting bracket (5) to 53 to 56 lb-ft (72 to 76 N·m).
- (24) Tighten screw (1) on engine lifting bracket (5) to 103 to 110 lb-ft (140 to 149 N·m).
- (25) Tighten screw (2) on engine lifting bracket (5) to 71 to 75 lb-ft (96 to 102 N·m).

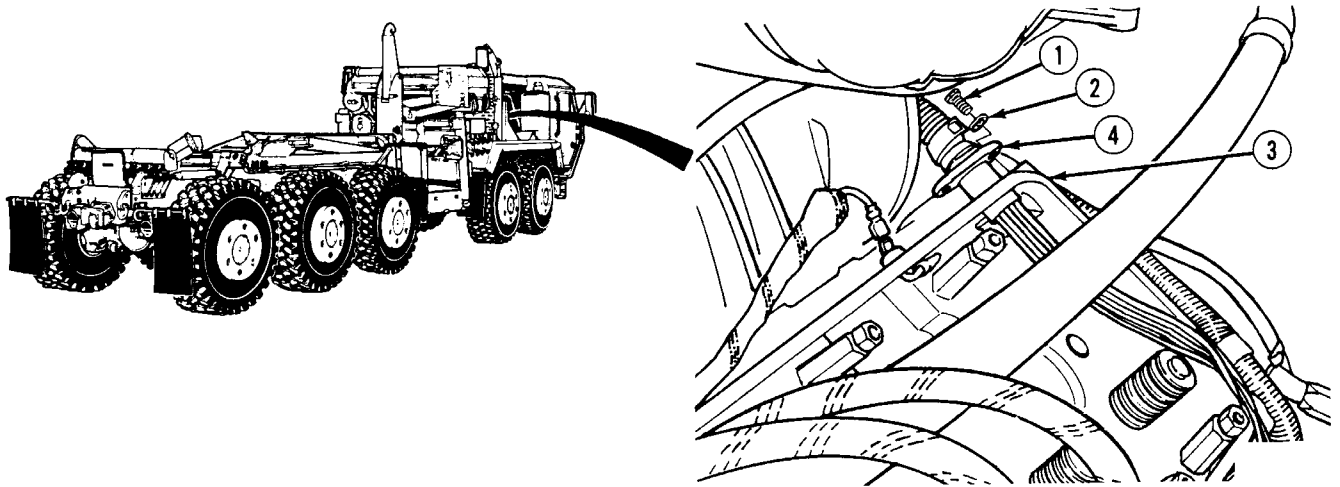


c. Follow-On Maintenance:

- Install right side noise panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Install spare tire, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

a. Removal.



NOTE

- Tag and mark wires, hoses and lines prior to removal.
- Right and left cylinder heads are removed the same way. Right cylinder head shown.

- (1) Remove two screws (1) and washers (2) from cylinder head (3).
- (2) Remove wire harness (4) from cylinder head (3).
- (3) Remove two screws (5), lockwashers (6) and clip (7) from cylinder head (3). Discard lockwashers.

NOTE

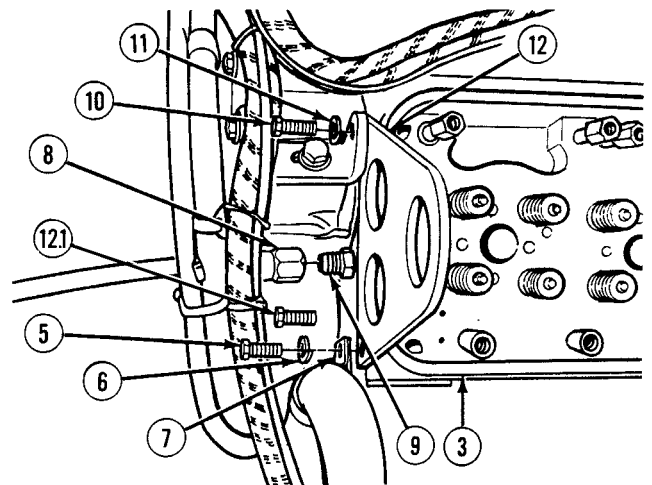
Perform Step (4) for right side only.

- (4) Remove hose 2628 (8) from fitting (9).
- (5) Remove screw (10) and lockwasher (11) from lifting bracket (12). Discard lockwasher.

NOTE

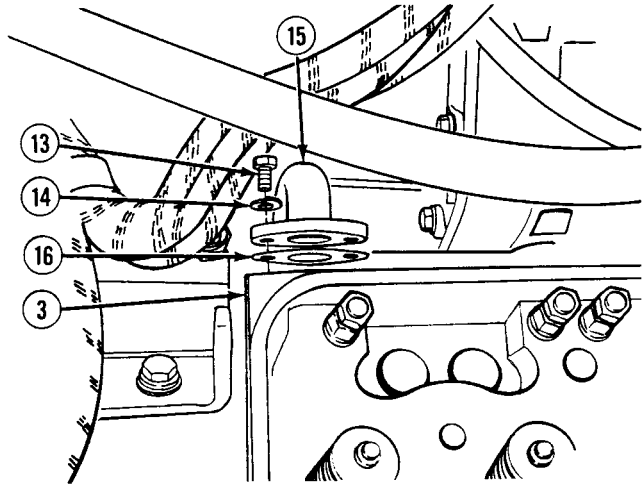
Perform Step (5.1) for left side only.

- (5.1) Remove screw (12.1) from lifting bracket (12).
- (6) Remove lifting bracket (12) from cylinder head (3).

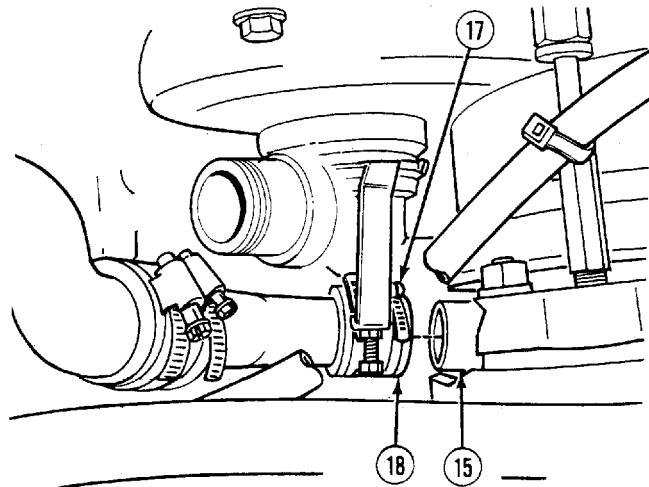


3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

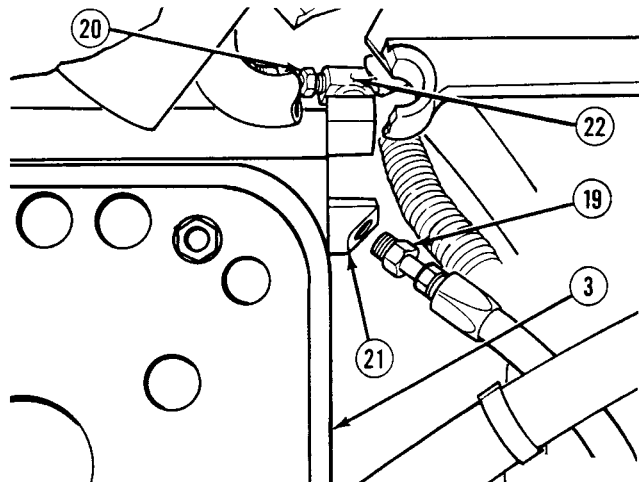
- (7) Remove two screws (13), lockwashers (14), breather tube (15) and gasket (16) from cylinder head (3). Discard lockwashers and gasket.



- (8) Remove clamp (17) and separate breather tube (15) from hose (18).



- (9) Remove fuel lines (19) and (20) from elbows (21) and (22).



- (10) Remove eight screws (23) and washers (24) from cylinder head (3).
- (11) Attach lifting tees and chain to cylinder head (3).

WARNING

Cylinder head weighs 182 lbs (83 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

- (12) Attach lifting device to chain.
- (13) Remove remaining two screws (23) and washers (24) from cylinder head (3).

CAUTION

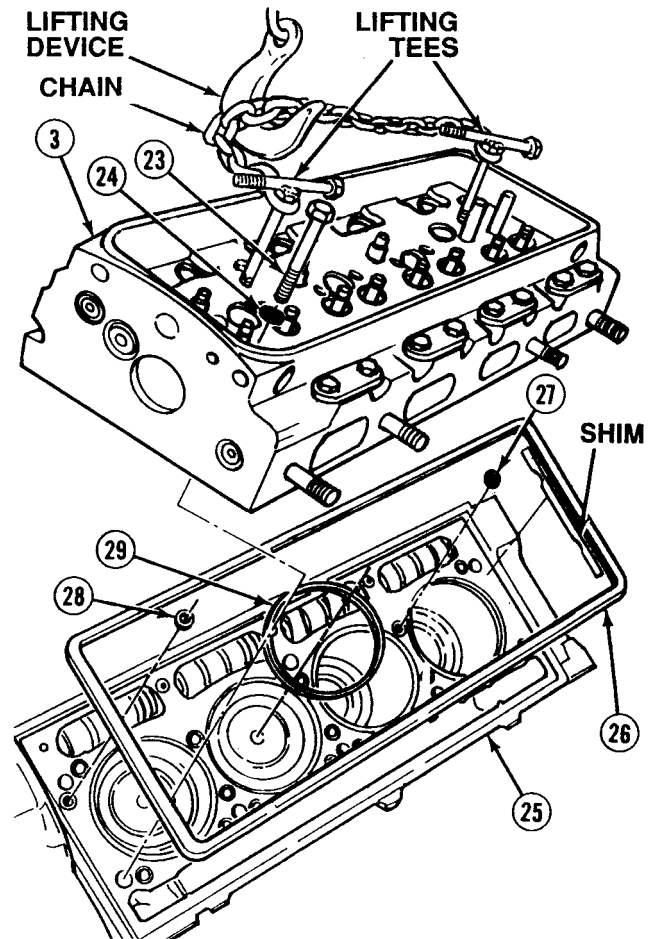
When positioning cylinder head on work bench, support valve side of cylinder head on two in. (51 mm) wooden blocks to prevent damage to cam followers.

- (14) With the aid of an assistant, remove cylinder head (3) from engine block (25) and position on wooden blocks.
- (15) Remove lifting tees and chain from cylinder head (3).
- (16) Remove and discard seal strip gasket (26), 16 water seals (27), oil seal (28) and four compression gaskets (29) from engine block (25).

NOTE

Note position and location of shims prior to removal.

- (17) Remove two support shims from engine block (25). Discard shims.

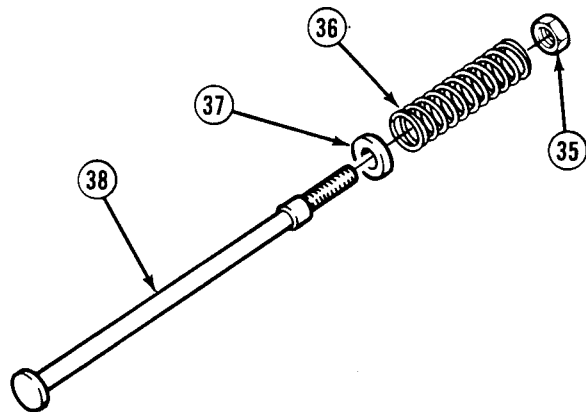
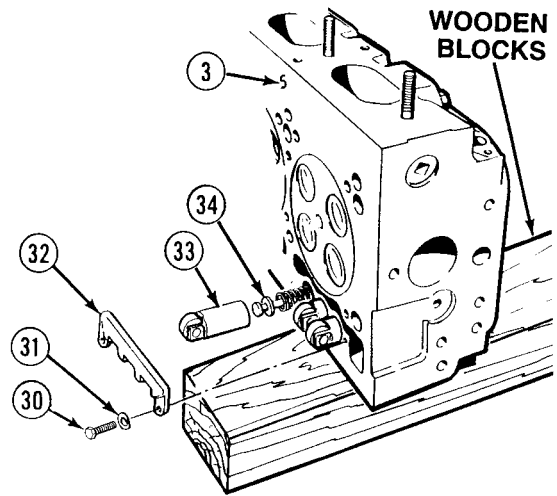


3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

NOTE

- Note location and position of all parts prior to removal.
- All 24 cam followers are removed the same way.

- (18) Position cylinder head (3) on side on wooden blocks.
- (19) Remove two screws (30), lockwashers (31) and cam follower guide (32) from cylinder head (3). Discard lockwashers.
- (20) Remove cam follower (33) from cylinder head (3).
- (21) Remove push rod assembly (34) from cylinder head (3).
- (22) Remove nut (35), spring (36) and lower spring seat (37) from push rod (38).

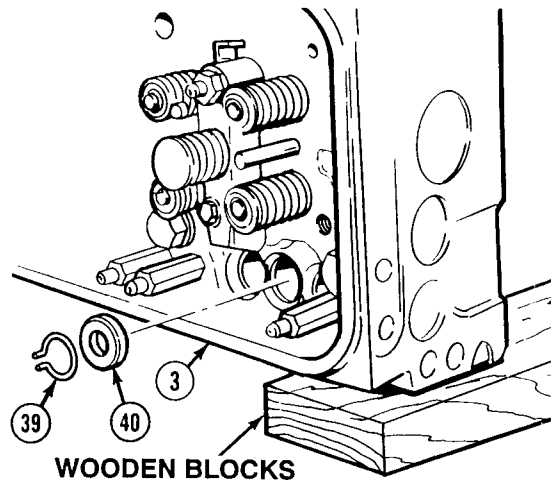


WARNING

Use extreme care when removing spring retainers. Spring retainers are under spring tension and can act as projectiles when released suddenly. Ensure proper eye protection is worn to prevent injury to personnel.

NOTE

Note position of spring retainer prior to removal.



- (23) Remove spring retainer (39) from top side of cylinder head (3).
- (24) Remove upper spring seat (40) from cylinder head (3).

NOTE

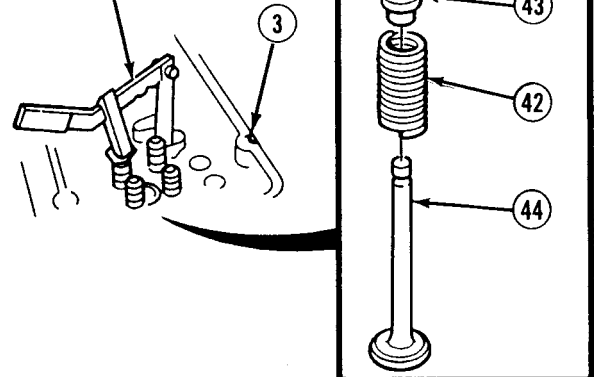
- All 32 exhaust valves are removed the same way.
- Number each valve upon removal to ensure installation in same location.
- Wooden blocks under valve will support valve while two-piece valve lock is being removed.

- (25) Position cylinder head (3) right side up on wooden blocks.
- (26) Install valve spring compressor on cylinder head (3).

WARNING

Use extreme care when compressing springs. Springs are under tension and can act as projectiles when released. Ensure proper eye protection is worn to prevent injury to personnel.

VALVE SPRING COMPRESSOR



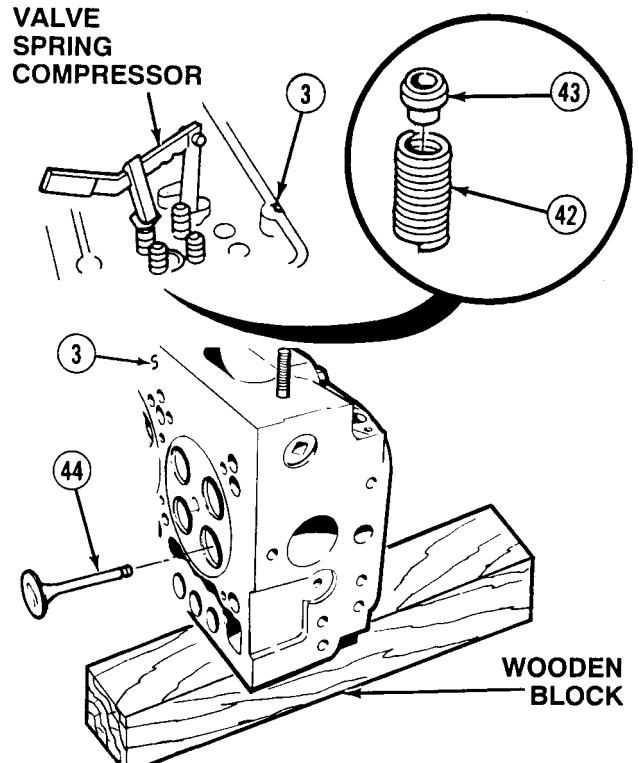
- (27) Compress spring (42) and remove two-piece valve lock (41) from stem of valve (44) and spring cap (43). Discard two-piece valve lock.

3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

WARNING

Use extreme care when releasing springs. Springs are under tension and can act as projectiles when released suddenly. Ensure proper eye protection is worn to prevent injury to personnel.

- (28) Release pressure on spring (42).
- (29) Remove spring cap (43) and valve spring (42) from exhaust valve (44).
- (30) Remove valve spring compressor from cylinder head (3).
- (31) Repeat Steps (25) through (30) for each valve being removed.
- (32) Remove valve guide seal (45) from valve guide (46). Discard seal.
- (33) Turn cylinder head (3) on side and remove valve (44) from bottom of cylinder head.



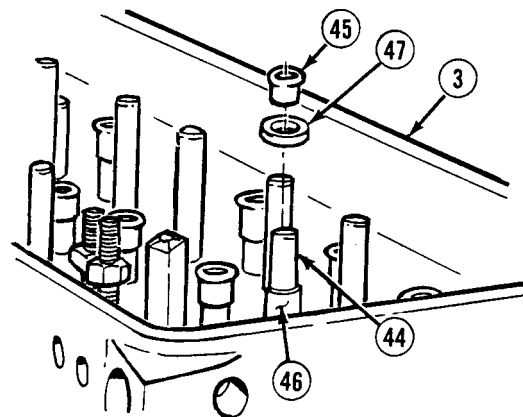
WARNING

Compressed air 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 or death to personnel.

NOTE

Compressed air may be used to remove exhaust valve spring seat from valve guides.

- (34) Remove exhaust valve spring seat (47) from valve guide (46).
- (35) Repeat Steps (32) through (34) for each valve being removed.

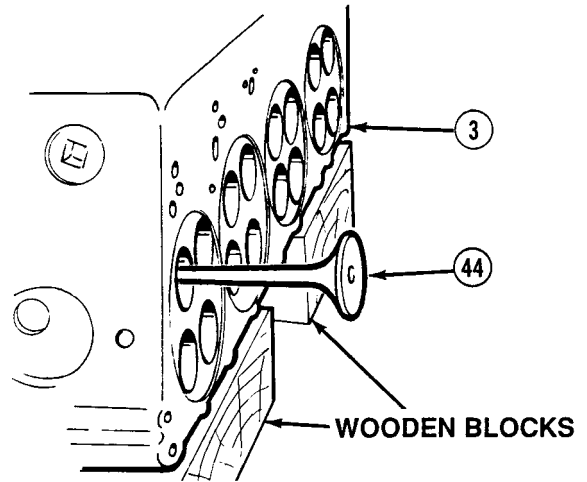


b. Installation.

NOTE

All 32 exhaust valves are installed the same way.

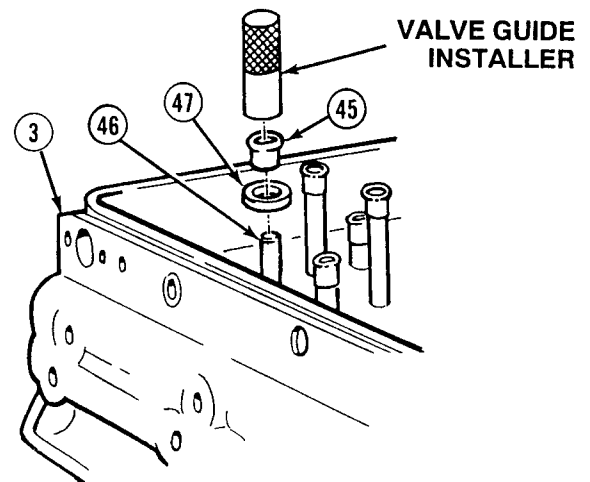
- (1) Position cylinder head (3) on side on wooden blocks.
- (2) Lubricate valve (44) with lubricating oil.
- (3) Install valve (44) in cylinder head (3).
- (4) Position tape on valve (44) to keep valve (44) from falling out of cylinder head (3).
- (5) Repeat Steps (1) through (4) for each valve being installed.
- (6) Position cylinder head (3) right side up on wooden blocks.
- (7) Position exhaust valve spring seat (47) over valve guide (46).



NOTE

Plastic cap which comes with valve guide may be placed over exhaust valve to protect exhaust valve from being scratched upon installation of seal. Ensure plastic cap is removed after installation of seal.

- (8) Using valve guide installer, install valve guide seal (45) on valve guide (46).



3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

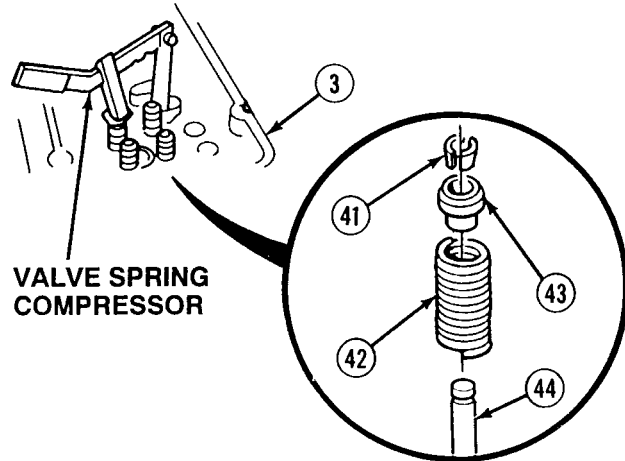
WARNING

Use extreme care when installing springs. Springs are under tension and can act as projectiles when released suddenly. Ensure proper eye protection is worn to prevent injury to personnel.

- (9) Install valve spring (42) and spring cap (43) in cylinder head (3).
- (10) Install valve spring compressor on cylinder head (3).

CAUTION

Compress spring only enough to permit installation of two-piece valve lock. If spring is compressed further than needed, damage may result to valve guide oil seal.



- (11) Compress valve spring (42) on spring cap (43).
- (12) Install two-piece valve lock (41) on spring cap (43) and stem of valve (44).

WARNING

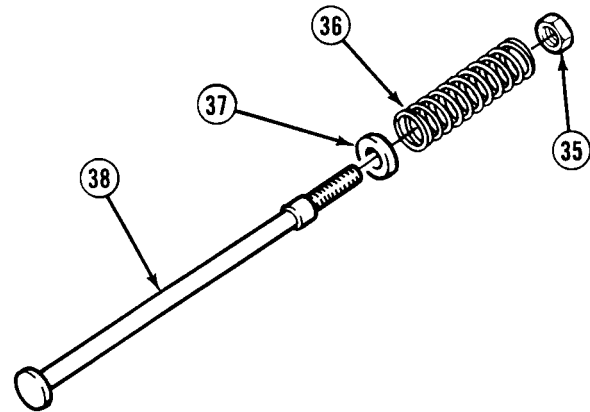
Use extreme care when releasing springs. Springs are under tension and can act as projectiles when released suddenly. Ensure proper eye protection is worn to prevent injury to personnel.

- (13) Release pressure on valve spring (42) and remove valve spring compressor from cylinder head (3).
- (14) Tap end of valve (44) stem with soft faced hammer to properly seat two-piece valve lock (41).
- (15) Remove tape from bottom of cylinder head (3).
- (16) Repeat Steps (6) through (15) for each valve being installed.

NOTE

- All 24 cam followers are installed the same way.
- Install parts in location as noted prior to removal.

- (17) Apply lubricating oil to lower spring seat (37), spring (36), nut (35) and push rod (38).
- (18) Install lower spring seat (37), spring (36) and nut (35) on push rod (38).



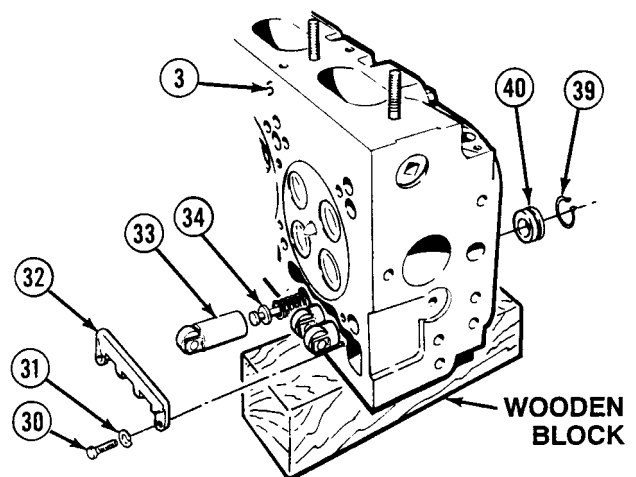
WARNING

Use extreme care when installing spring retainers. Spring retainers are under spring tension and can act as projectiles when released suddenly. Ensure proper eye protection is worn to prevent injury to personnel.

NOTE

Install spring retainers as noted prior to removal.

- (19) Position cylinder head (3) on side on wooden blocks and install upper spring seat (40) and spring retainer (39) in top side of cam follower bore of cylinder head (3).
- (20) Install push rod assembly (34) in cylinder head (3).



NOTE

Cam follower should be positioned so oil hole points away from exhaust valves.

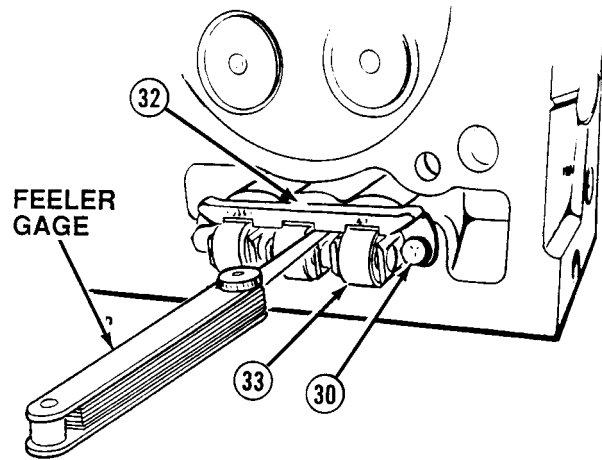
- (21) Install cam follower (33) over push rod assembly (34) and install in cylinder head (3).
- (22) Install cam follower guide (32), two lockwashers (31) and screws (30) in cylinder head (3).

3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

NOTE

There must be 0.005 in. (0.127 mm), but not more than 0.010 in. (0.254 mm), clearance between cam follower guide and cam follower.

- (23) Insert 0.005 in. (0.127 mm) feeler gage between cam follower guide (32) and legs of cam followers (33).
- (24) Tap cam follower guide (32) lightly with soft faced hammer until feeler gage is snug.
- (25) Tighten screws (30) on cam follower guide (32) to 180 lb-in (20 N·m).
- (26) Remove feeler gage from cam follower guide (32) and legs of cam followers (33).
- (27) Re-insert 0.005 in. (0.127 mm) feeler gage between cam follower guide (32) and legs of cam followers (33).
- (28) If there is not enough clearance, loosen screws (30), move guide (32) and repeat Steps (23) through (26) until proper clearance is obtained.
- (29) If proper clearance cannot be obtained, replace cam follower guide (32).
- (30) Repeat Steps (17) through (29) for each cam follower and push rod being installed.



NOTE

Seal strip gasket is installed with color coded side facing outward.

- (31) Install seal strip gasket (26), 16 water seals (27), oil seal (28) and four compression gaskets (29) on engine block (25).

NOTE

Shims are installed in same position and location as noted during removal.

- (32) Remove paper covering from back of two support shims and install glued side down on engine block (25).

CAUTION

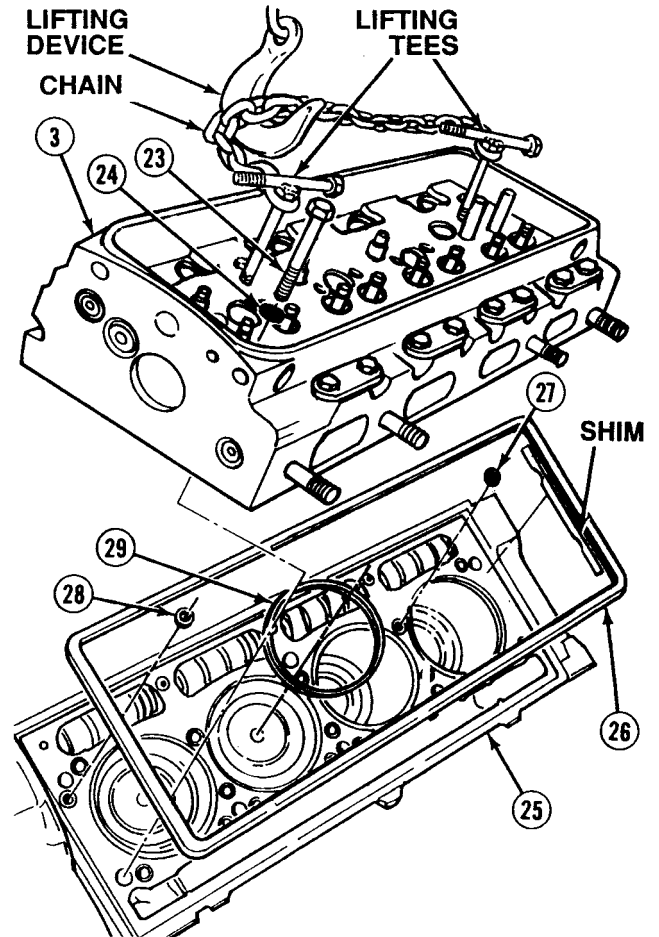
Ensure cam pockets are clear of all dirt and debris. Failure to comply may result in damage to equipment.

- (33) Install lifting tees and chain on cylinder head (3).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (34) Apply International Compound No. 2 to threads of ten screws (23).



3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

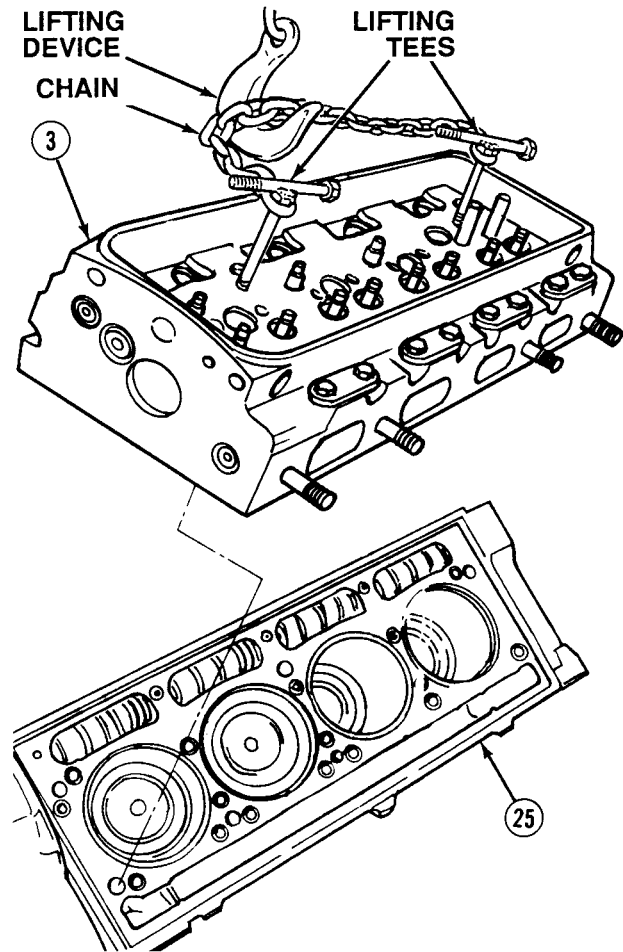
WARNING

Cylinder head weighs 182 lbs (83 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

CAUTION

Ensure all gaskets and seals remain in place during cylinder head installation. Gaskets and seals which are not seated properly will cause leaks and blow-by and result in poor engine performance. Shim strips not in place can result in broken cylinder head bolts. Failure to comply may result in damage to equipment.

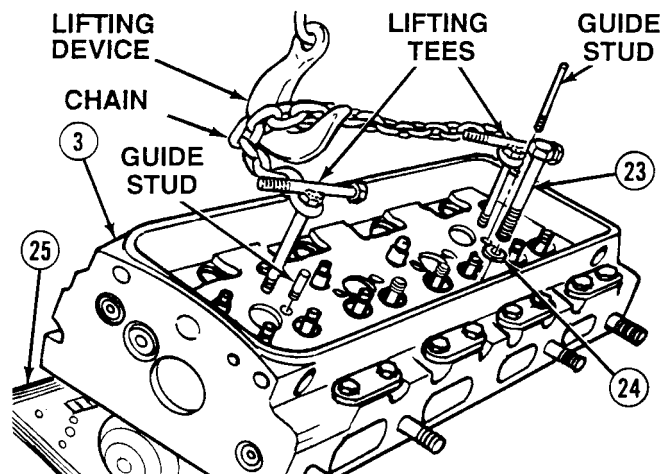
- (35) Attach lifting device to lifting chain.

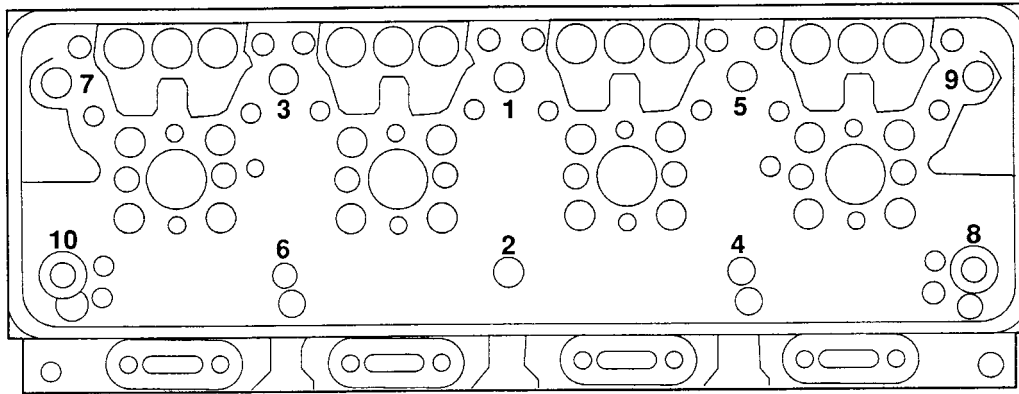


NOTE

Guide studs are to be installed through cylinder head just before cylinder head contacts engine block.

- (36) With the aid of an assistant, lower cylinder head (3) on engine block (25) and install two guide studs through cylinder head (3) and into engine block (25).
- (37) Position eight washers (24) and screws (23) in cylinder head (3).
- (38) Remove guide studs, lifting tees and chain from cylinder head (3).
- (39) Position remaining two washers (24) and screws (23) in cylinder head (3).





TIGHTENING SEQUENCE

- (40) Tighten ten screws (23) in sequence shown to 50 lb-ft (68 N·m). In same order, tighten to 100 lb-ft (136 N·m).

NOTE

Hold wrench at the torque given in Step (41) for 2-3 seconds to allow the screws to turn while the compression seals shrink to their compressed thickness.

- (41) Tighten ten screws (23) to 150 lb-ft (204 N·m) in sequence shown. Hold wrench at this torque for two to three seconds to allow screws to turn while compression seals yield to their crushed thickness.

NOTE

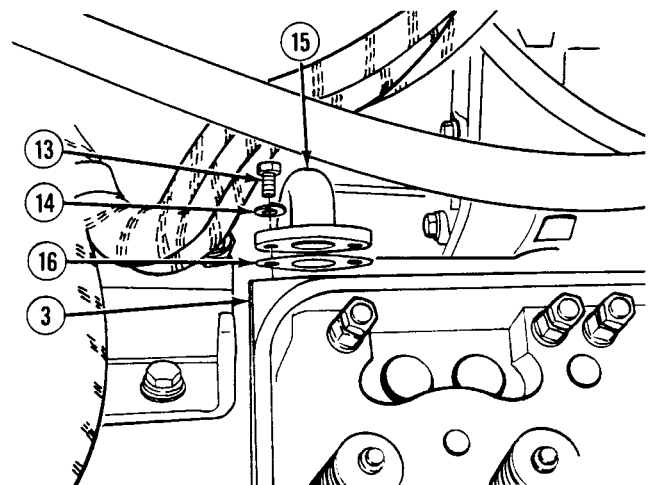
Perform Step (42) completely on each screw before continuing to the next screw. The wrench socket that is used should be marked at four locations, 90 degrees apart.

- (42) In same sequence, one screw at a time, perform following Steps:
- Back off screw until loose (at least one-half turn). Retighten to 100 lb-ft (136 N·m).
 - Mark position of screw head and turn screw an additional 1/3 turn. Try to turn screw in single arc with one pull of wrench to ensure even clamp load on cylinder head.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (43) Apply sealing compound to threads of two screws (13).
- (44) Install gasket (16), two lockwashers (14), screws (13) and breather tube (15) on cylinder head (3). Tighten screw to 60 lb-in (7 N·m).

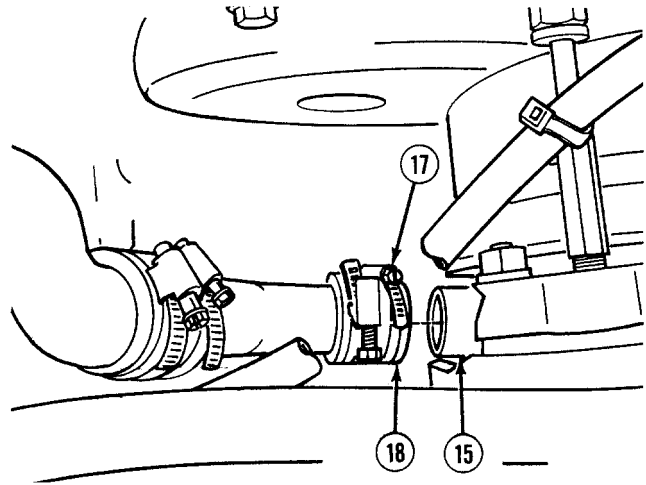


3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

- (45) Connect breather tube (15) with hose (18) and tighten clamp (17).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

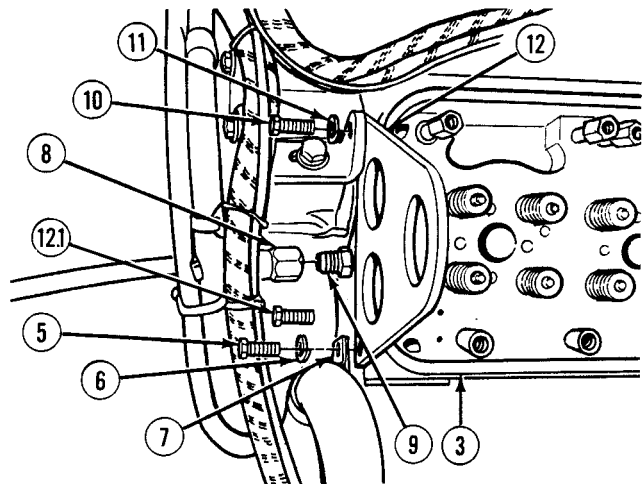


- (46) Apply sealing compound to threads of screw (10).
- (47) Position lifting bracket (12) on cylinder head (3) with one lockwasher (11) and screw (10).

NOTE

Perform Steps (47.1) and (47.2) for left side only.

- (47.1) Apply coat of sealing compound to threads of screw (12.1).
- (47.2) Install screw (12.1) on cylinder head (3).
- (48) Apply coat of sealing compound to threads of screws (5).
- (49) Install lockwashers (6) and two screws (5) in clip (7) and install clip on cylinder head (3). Tighten screws (5), (10) and (12.1) to 60 lb-ft (81 N·m).

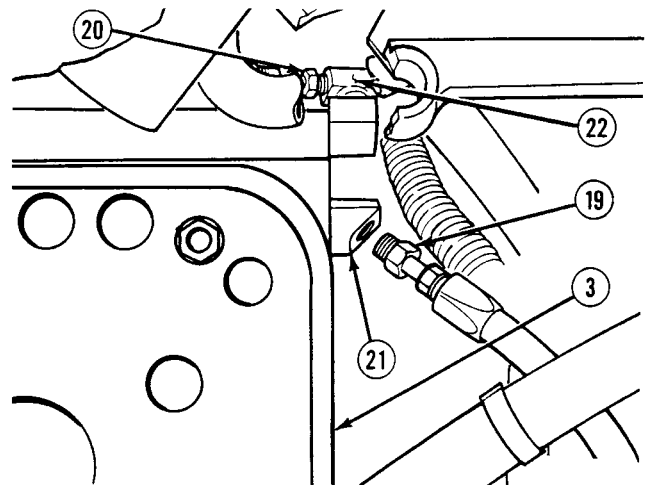


NOTE

Perform Step (50) for right side only.

- (50) Install hose 2628 (8) on fitting (9).

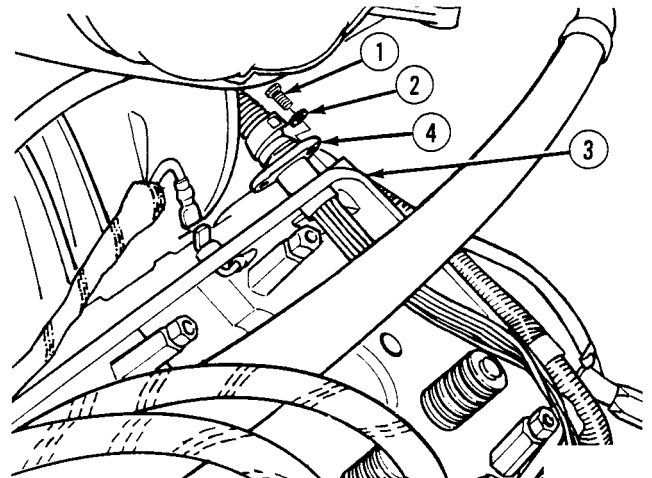
- (51) Connect fuel lines (19) and (20) to elbows (21) and (22).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (52) Apply sealing compound to threads of two screws (1).
- (53) Install wire harness (4) to cylinder head (3) with two washers (2) and screws (1).



3-7. CYLINDER HEAD ASSEMBLY REPLACEMENT (CONT).

c. Follow-On Maintenance:

- Install exhaust valve bridges, (Para 3-17).
- Perform engine tune-up adjustments, (Para 3-2).
- Install thermostat housings, (Para 5-3 and 5-4).
- Fill oil cooler, (TM 9-2320-364-20).
- Install rocker covers, (TM 9-2320-364-20).
- Install tachometer drive, (TM 9-2320-364-20).
- Install exhaust manifolds, (Para 3-31).
- Install cooling assembly, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).
- Start engine and check operation, (TM 9-2320-364-10).

END OF TASK

3-8. EXPANSION PLUG REPLACEMENT.		
This task covers:		
a. Removal	b. Installation	c. Follow-On Maintenance
INITIAL SETUP		
<p><i>Tools and Special Tools</i></p> <p>Tool Kit, General Mechanic's (Item 240, Appendix F)</p> <p>Handle, Driver (Item 90, Appendix F)</p> <p>Plug Installer, Cylinder Block (Item 160, Appendix F)</p> <p><i>Materials/Parts</i></p> <p>Sealing Compound (Item 54, Appendix B)</p> <p><i>Equipment Condition</i></p> <p>Engine OFF, (TM 9-2320-364-10)</p> <p>Wheels chocked, (TM 9-2320-364-10)</p> <p>Cooling system drained, (TM 9-2320-364-20)</p>	<p><i>Equipment Condition - Continued</i></p> <p>Left fender front and rear skirt removed (left side only), (TM 9-2320-364-20)</p> <p>Right fender skirt removed (right side only), (TM 9-2320-364-20)</p> <p>Starter removed (left side plugs No. 2, 3 and 4), (TM 9-2320-364-20)</p> <p>Batteries disconnected (left side only), (TM 9-2320-364-20)</p> <p>Oil cooler adapter removed (right side plugs No. 1, 2 and 3), (Para 3-30)</p>	

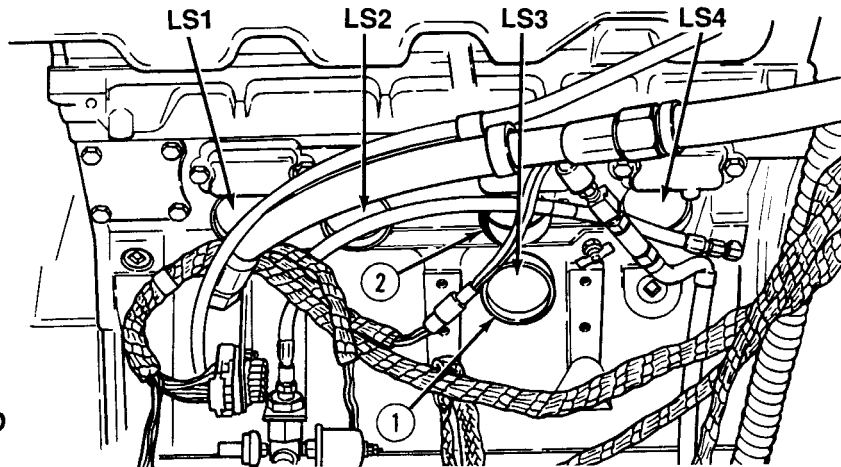
3-8. EXPANSION PLUG REPLACEMENT (CONT).

a. *Removal.* Remove expansion plug (1) from engine block (2). Discard expansion plug.

NOTE

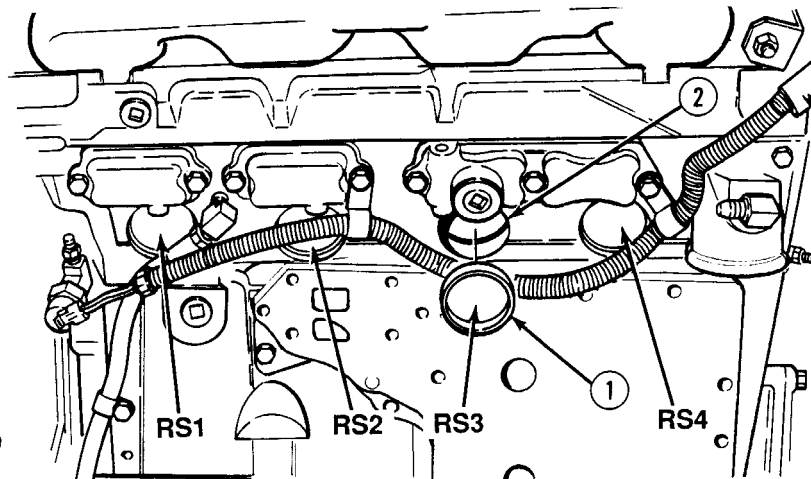
- Left and right side of engine block have four expansion plugs each.
- Remove hoses, cable ties and cushion clips as required.

**LEFT
SIDE VIEW**



**ENGINE
SHOWN REMOVED
FOR CLARITY**

**RIGHT
SIDE VIEW**

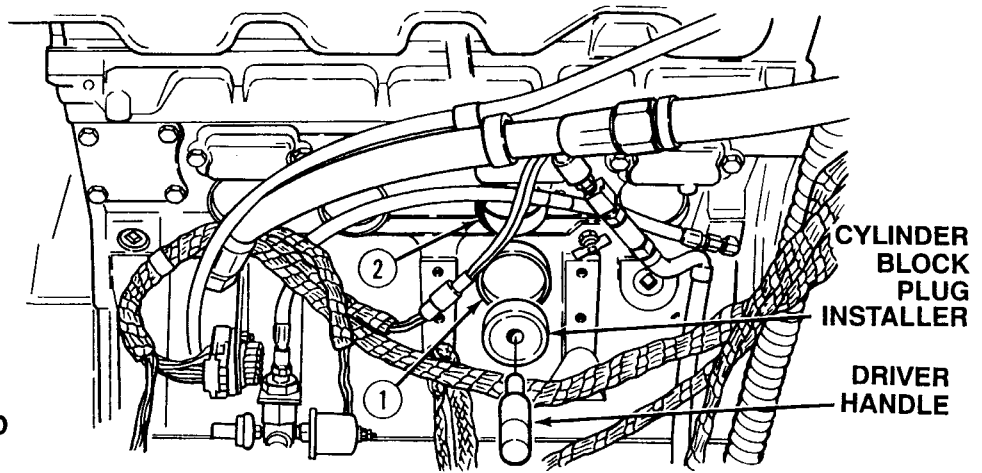


**ENGINE
SHOWN REMOVED
FOR CLARITY**

b. *Installation.*

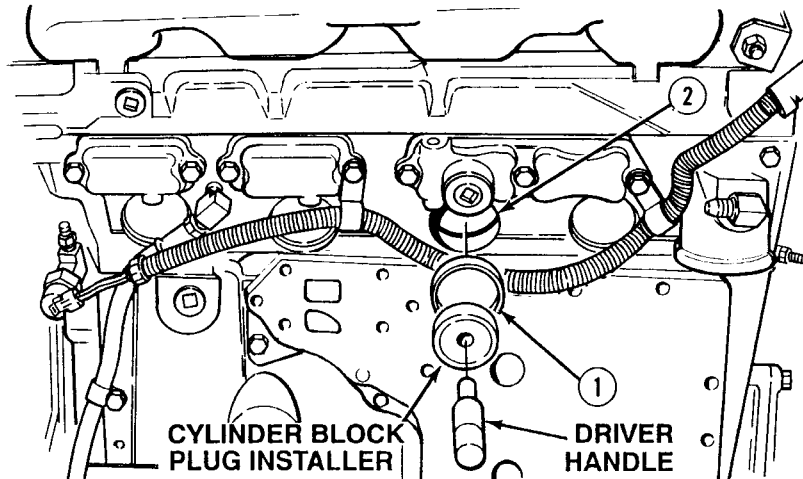
LEFT
SIDE VIEW

ENGINE
SHOWN REMOVED
FOR CLARITY



RIGHT
SIDE VIEW

ENGINE
SHOWN REMOVED
FOR CLARITY



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

Install cushion clips, hoses and cable ties as required.

- (1) Coat expansion plug (1) with sealing compound.
- (2) Using cylinder block plug, install expansion plug (1) in engine block (2) until flush.

3-8. EXPANSION PLUG REPLACEMENT (CONT).

c. Follow-On Maintenance:

- Install oil cooler adapter, (Para 3-30).
- Connect batteries, (TM 9-2320-364-20).
- Install starter, (TM 9-2320-364-20).
- Install right fender skirt, (TM 9-2320-364-20).
- Install left fender front and rear skirt, (TM 9-2320-364-20).
- Fill cooling system, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-9. CRANKSHAFT PULLEY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Hammer, Hand, Soft Plastic
(Item 88, Appendix F)
Pulley Remover (Item 177, Appendix F)
Wrench Set, Socket 3/4 in. Drive
(Item 274, Appendix F)
Wrench, Torque (0 to 600 lb-ft [0-814 N·m])
(Item 278, Appendix F)

Materials/Parts

Oil, Lubricating (Item 38, Appendix B)
Key (2) (Item 138, Appendix E)

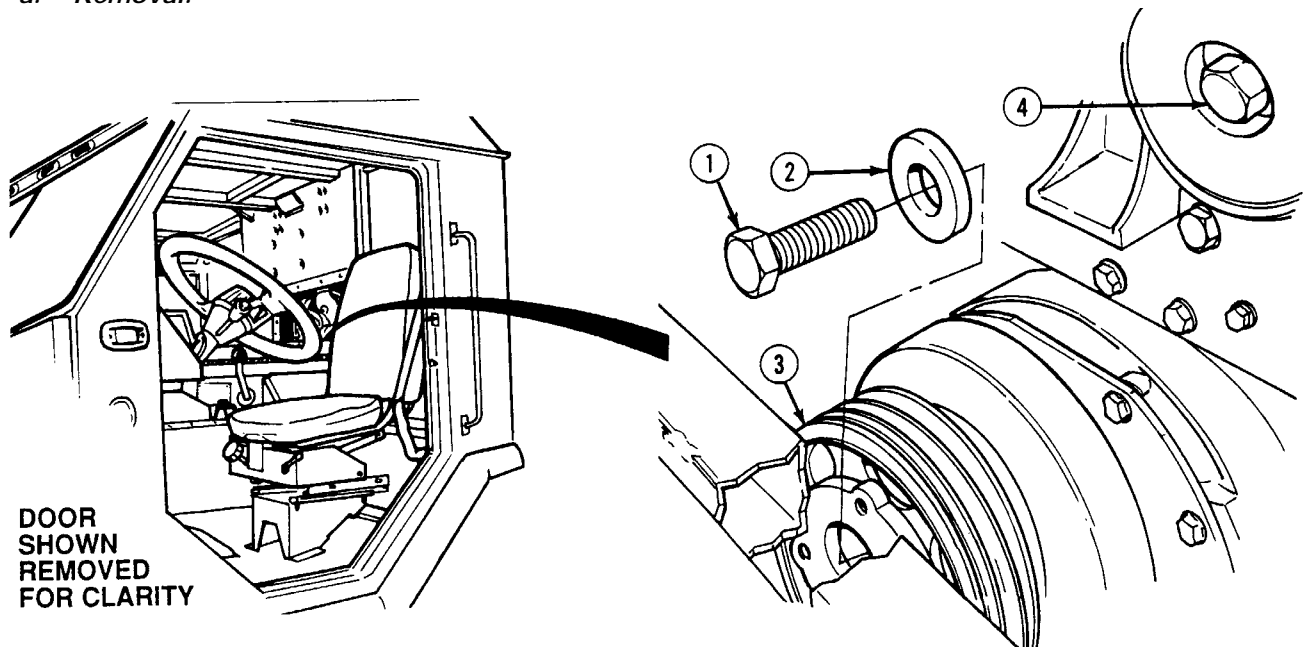
Personnel Required

Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Alternator belts removed, (TM 9-2320-364-20)
PTO adapter removed, (TM 9-2320-364-20)

a. Removal.



- (1) With the aid of an assistant, remove crankshaft screw (1) and washer (2) from crankshaft pulley (3) while holding camshaft nut (4).

3-9. CRANKSHAFT PULLEY REPLACEMENT (CONT).

CAUTION

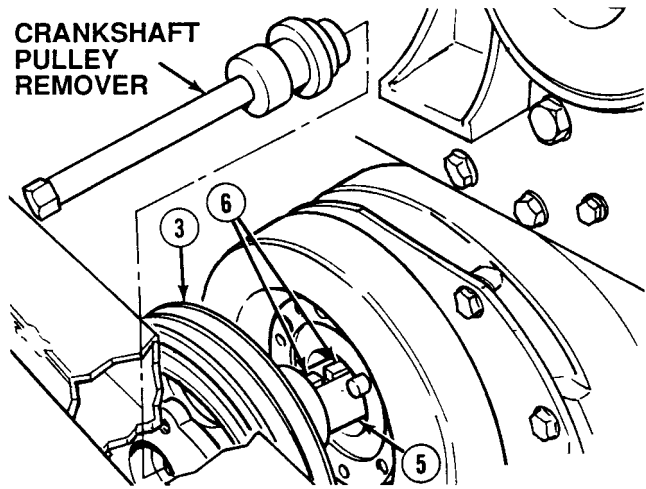
Use extreme care when removing crankshaft pulley. Do not pry on vibration damper or damage may occur to parts.

- (2) Using crankshaft pulley remover, remove crankshaft pulley (3) from crankshaft (5).

NOTE

If keys in crankshaft are loose, perform Step (3).

- (3) Remove and discard two keys (6) from crankshaft (5).
- (4) Remove crankshaft pulley remover from crankshaft pulley (3).



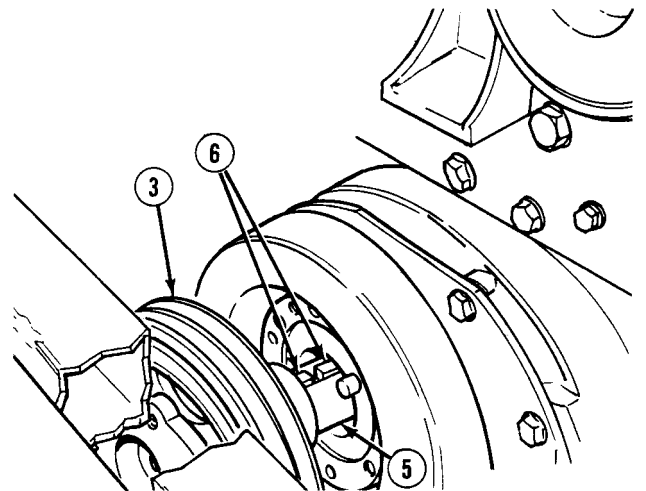
b. Installation.

- (1) Coat end of crankshaft (5) with lubricating oil.

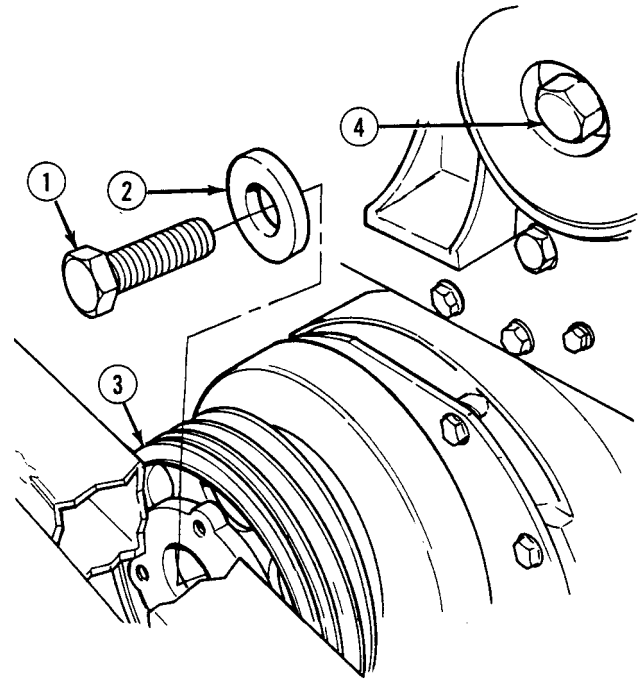
NOTE

If keys were removed, perform Step (2).

- (2) Install two keys (6) in crankshaft (5).
- (3) Install crankshaft pulley (3) on crankshaft (5).



- (4) Position washer (2) and crankshaft screw (1) in crankshaft pulley (3).
- (5) With the aid of an assistant, hold left camshaft nut (4) and tighten screw (1) on crankshaft pulley (3) to 180 lb-ft (244 N·m).
- (6) Strike end of crankshaft screw (1) with soft-faced hammer and brass drift.
- (7) With the aid of an assistant, hold left camshaft nut (4) and tighten screw (1) to 310 lb-ft (420 N·m) and strike screw again.
- (8) With the aid of an assistant, hold left camshaft nut (4) and retighten screw (1) to 310 lb-ft (420 N·m).

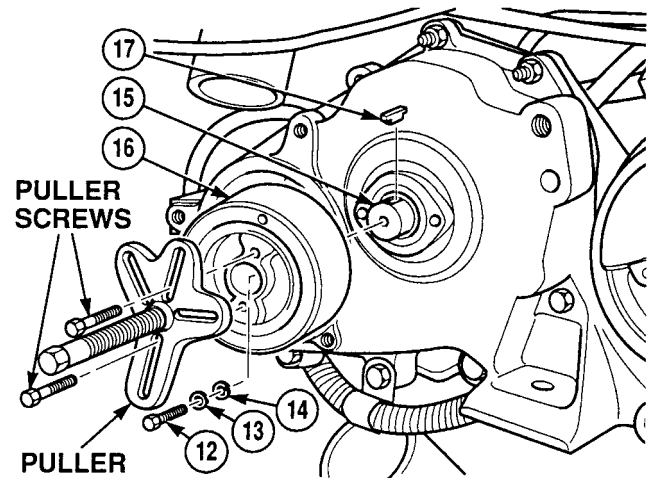


c. Follow-On Maintenance:

- Install PTO adapter, (TM 9-2320-364-20).
- Install alternator belts, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

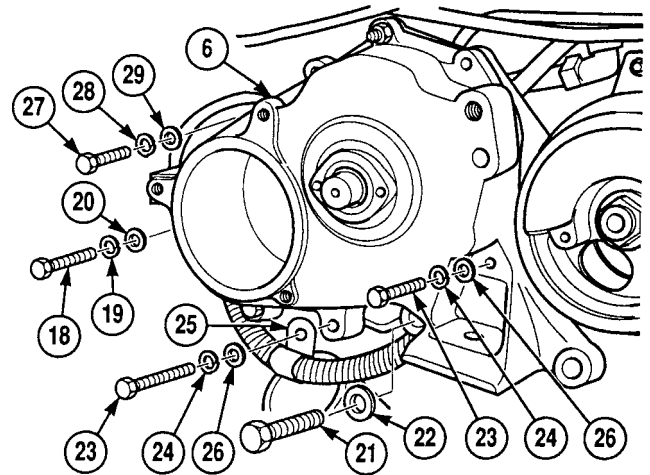
- (4) Remove screw (12), lockwasher (13) and washer (14) from pulley drive shaft (15). Discard lockwasher.
- (5) Install puller with puller screws in vibration damper (16).
- (6) Using puller, remove vibration damper (16) from pulley drive shaft (15).



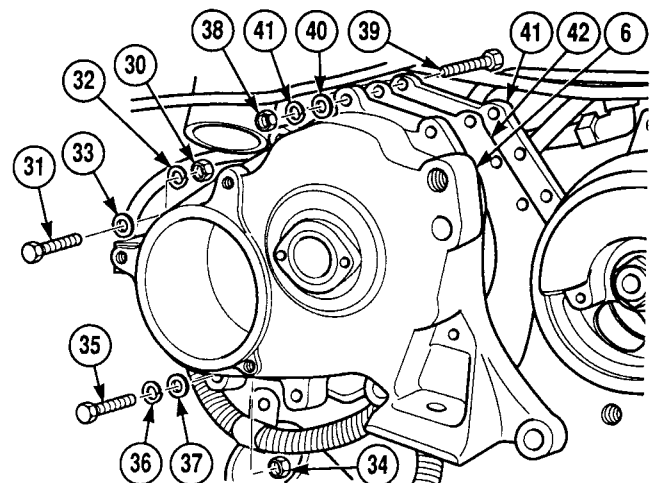
NOTE

If key is loose, perform Step (7).

- (7) Remove and discard key (17) from pulley drive shaft (15).
- (8) Remove puller screws and puller from vibration damper (16).
- (9) Remove screw (18), lockwasher (19) and washer (20) from front balance cover (6). Discard lockwasher.
- (10) Remove screw (21) and washer (22) from front balance cover (6).
- (11) Remove two screws (23), lockwashers (24), cushion clip (25) and two washers (26) from front balance cover (6). Discard lockwashers.
- (12) Remove screw (27), lockwasher (28) and washer (29) from front balance cover (6). Discard lockwasher.

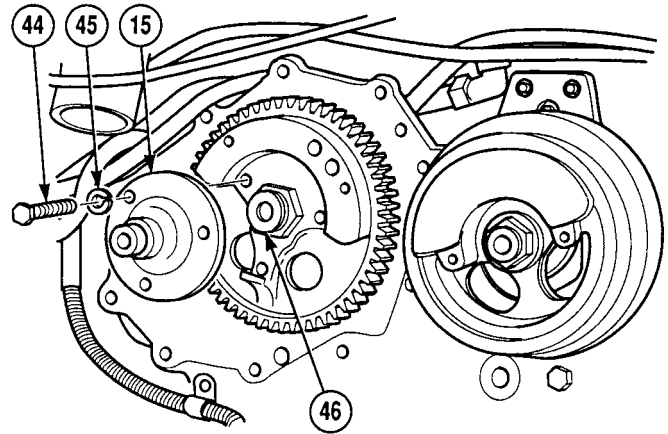


- (13) Remove locknut (30), screw (31), lockwasher (32) and washer (33) from front balance cover (6). Discard lockwasher and locknut.
- (14) Remove locknut (34), screw (35), lockwasher (36) and washer (37) from front balance cover (6). Discard lockwasher and locknut.
- (15) Remove three nuts (38), screws (39), washers (40) and lockwashers (41) from front balance cover (6). Discard lockwashers.
- (16) Remove front balance cover (6) and gasket (42) from end plate (43). Discard gasket.

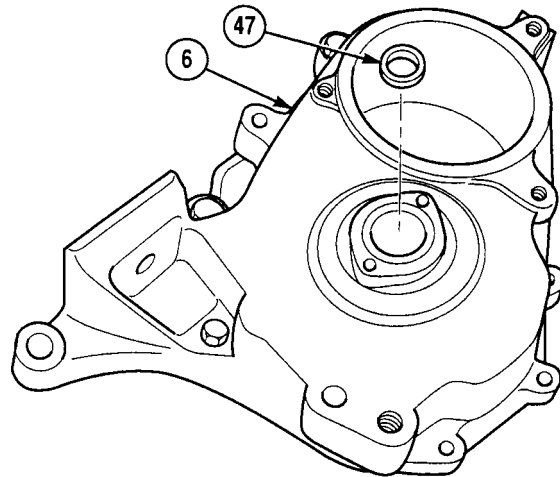


3-10. VIBRATION DAMPER/FRONT BALANCE COVER REPLACEMENT (CONT).

- (17) Remove three screws (44), lockwashers (45) and pulley drive shaft (15) from camshaft (46). Discard lockwashers.

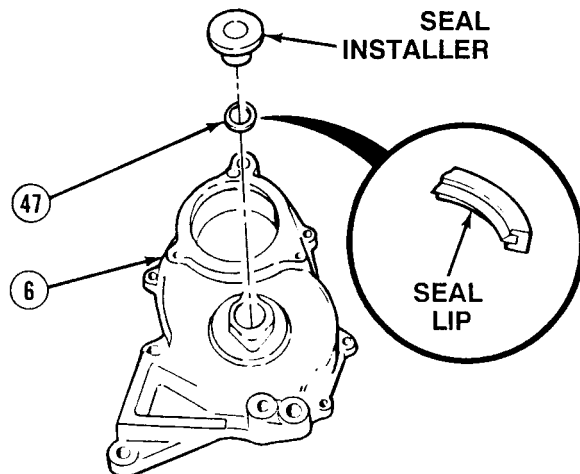


- (18) Remove and discard oil seal (47) from front balance cover (6).

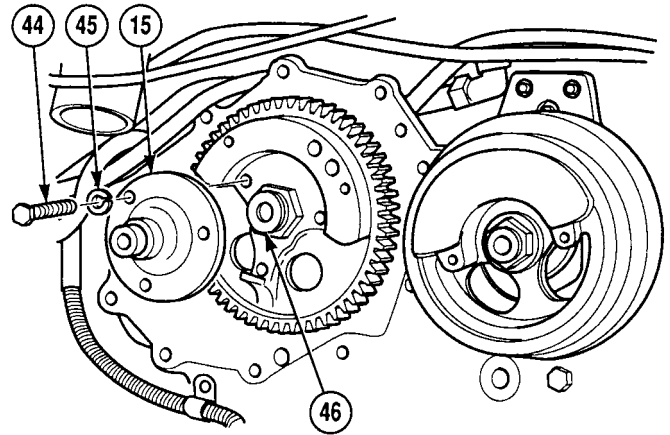


b. Installation.

- (1) Using oil seal installer, install oil seal (47) in front balance cover (6), with lip of seal facing toward inner side of front balance cover (6).



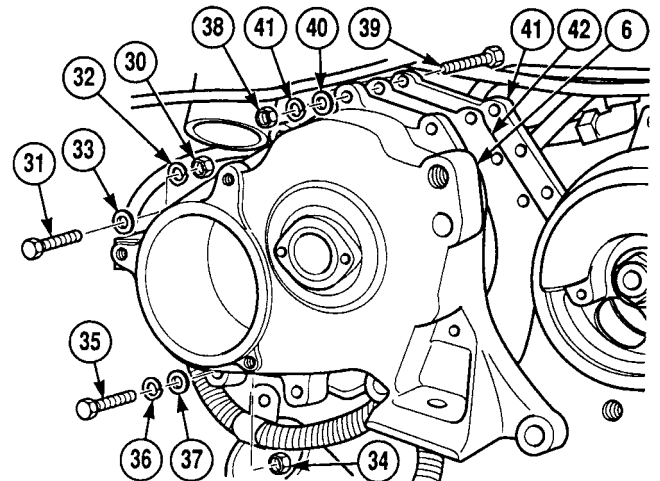
- (2) Install pulley drive shaft (15) on camshaft (46) with three lockwashers (45) and screws (44). Tighten screws to 15 to 19 lb-ft (20 to 26 N·m).



- (3) Apply coat of grease to gasket (42) and install on front balance cover (6).

CAUTION

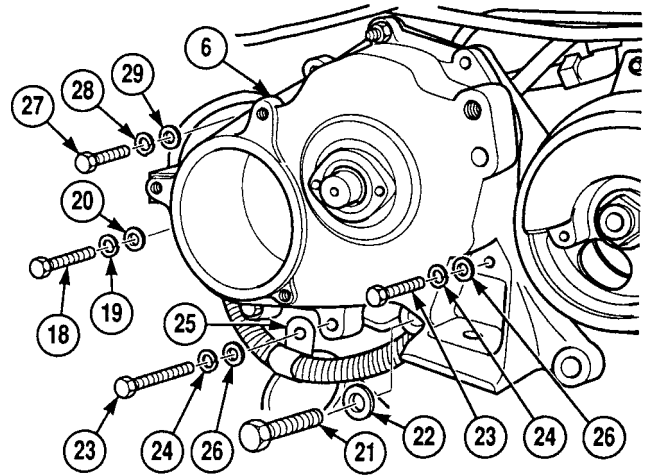
Ensure oil seal is fully seated upon installation of front balance cover. Failure to comply may result in damage to equipment or oil leakage.



- (4) Install front balance cover (6) on end plate (43).
- (5) Install three washers (40), screws (39), lockwashers (41) and nuts (38) in front balance cover (6). Tighten nuts to 30 to 35 lb-ft (41 to 47 N·m).
- (6) Install screw (35), washer (37), lockwasher (36) and locknut (34) in front balance cover (6). Tighten locknut to 35 to 39 lb-ft (47 to 53 N·m).
- (7) (7) Install screw (31), lockwasher (32), washer (33) and locknut (30) in front balance cover (6). Tighten locknut to 35 to 39 lb-ft (47 to 53 N·m).

3-10. VIBRATION DAMPER/FRONT BALANCE COVER REPLACEMENT (CONT).

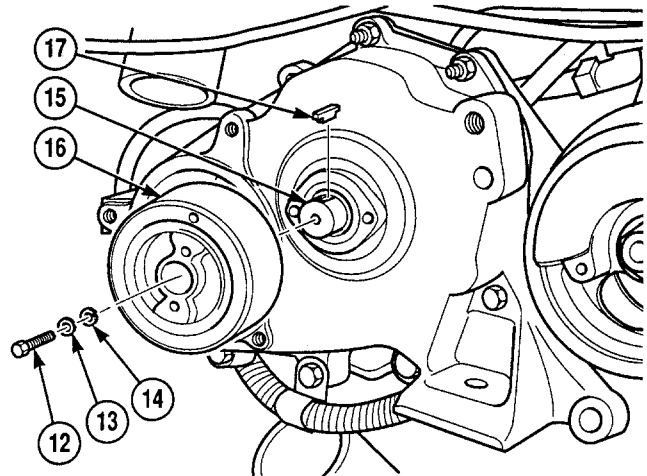
- (8) Install washer (29), lockwasher (28) and screw (27) in front balance cover (6). Tighten screw to 35 to 39 lb-ft (47 to 53 N·m).
- (9) Install cushion clip (25), two washers (26), lockwashers (24) and screws (23) in front balance cover (6). Tighten screws to 30 to 35 lb-ft (41 to 47 N·m).
- (10) Install washer (22) and screw (21) in front balance cover (6). Tighten screw to 137 to 147 lb-ft (186 to 199 N·m).
- (11) Install washer (20), lockwasher (19) and screw (18) in front balance cover (6). Tighten screw to 71 to 75 lb-ft (96 to 102 N·m).



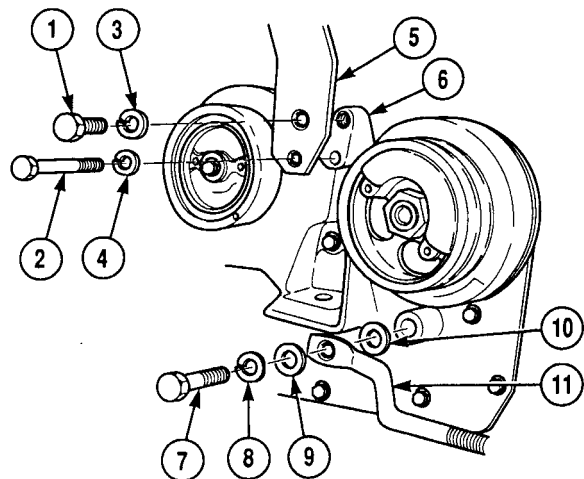
NOTE

If key was removed, perform Step (12).

- (12) Install key (17) in pulley drive shaft (15).
- (13) Install vibration damper (16) on pulley drive shaft (15).
- (14) Install washer (14), lockwasher (13) and screw (12) in pulley drive shaft (15). Tighten screw to 25 lb-ft (34 N·m).



- (15) Position washer (10) and alternator support arm (11) on front balance cover (6).
- (16) Install washer (9), lockwasher (8) and screw (7). Tighten screw to 180 lb-ft (244 N·m).
- (17) Position engine lift bracket (5) on front balance cover (6) with two lockwashers (3) and (4) and screws (2) and (1).
- (18) Tighten screw (2) on engine lift bracket (5) to 71 to 75 lb-ft (96 to 102 Nm).
- (19) Tighten screw (1) on engine lift bracket (5) to 137 to 147 lb-ft (186 to 199 N·m).



c. Follow-On Maintenance:

- **Install ECM, (TM 9-2320-364-20).**
- **Install water pump, (Para 5-6).**
- **Install alternator belts, (TM 9-2320-364-20).**
- **Remove wheel chocks, (TM 9-2320-364-10).**

END OF TASK

3-11. VIBRATION DAMPER REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

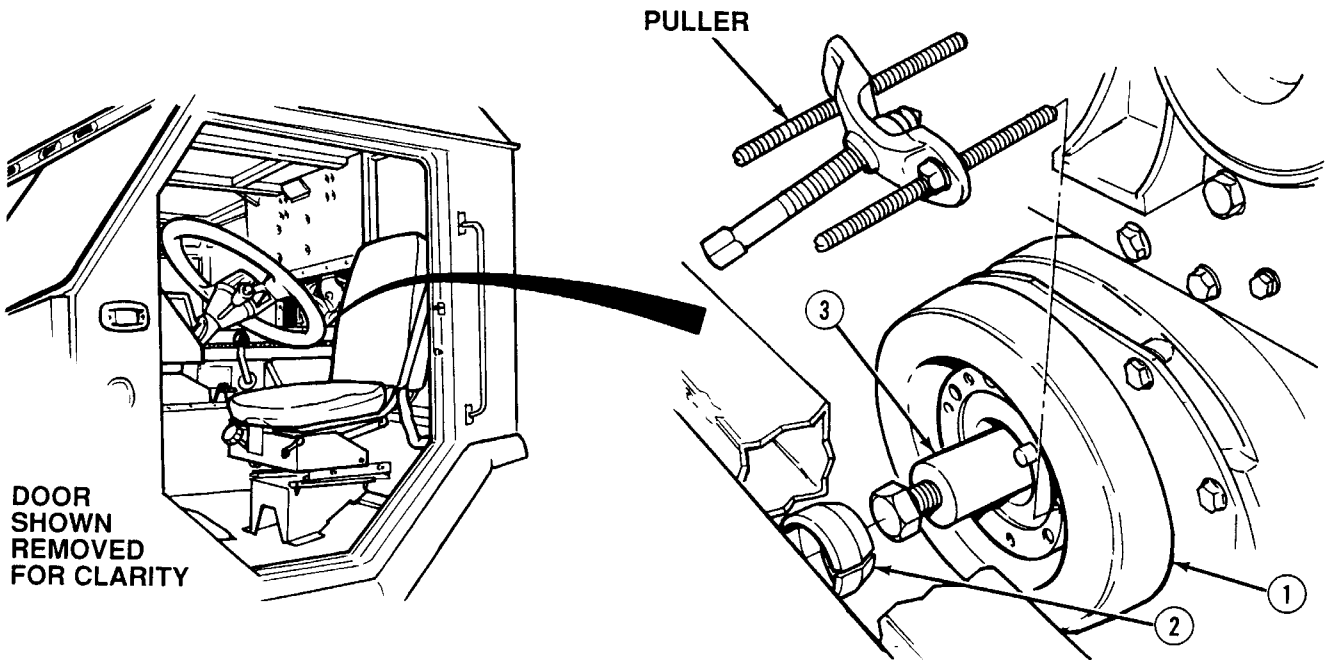
Tool Kit, General Mechanic's
(Item 240, Appendix F)
Puller Kit, Universal (Item 174, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Crankshaft pulley removed, (Para 3-9)

Materials/Parts

Oil, Lubricating (Item 38, Appendix B)
Lockscrew (8) (Item 222, Appendix E)
Packing, Preformed (Item 358, Appendix E)
Pin (2) (Item 415, Appendix E)

a. *Removal.***WARNING**

Vibration damper may fall from crankshaft quickly and cause injury to hands or feet. Keep all personnel clear from under truck.

CAUTION

Use extreme care when removing vibration damper. Pounding, prying or dropping may dent vibration damper and cause damage to equipment.

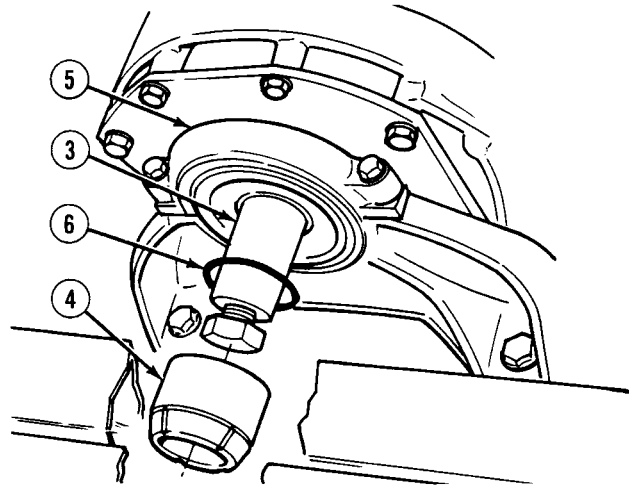
NOTE

If puller does not free vibration damper, use punch in split of sleeve spacer to pop sleeve spacer out.

- (1) Install puller on vibration damper (1).
- (2) Using puller, loosen vibration damper (1) and carefully remove vibration damper and sleeve spacer (2) from crankshaft (3).
- (3) Remove puller from vibration damper (1).

3-11. VIBRATION DAMPER REPLACEMENT (CONT).

- (4) Turn cone (4) clockwise and remove from crankshaft (3) inside trunnion support (5).
- (5) Remove and discard preformed packing (6) from cone (4).



NOTE

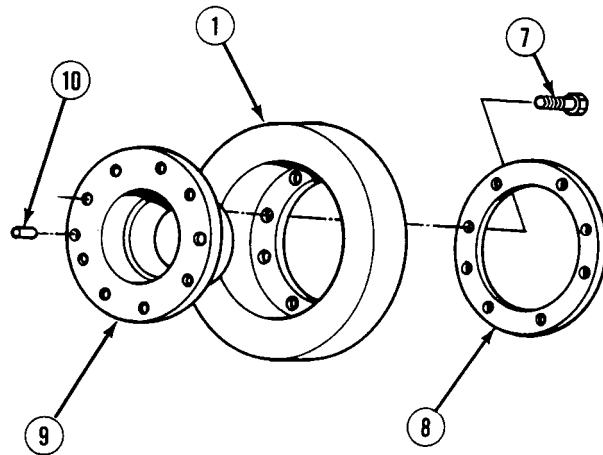
Note location of screws prior to removal.

- (6) Remove eight lock screws (7), mounting plate (8) and hub assembly (9) from vibration damper (1). Discard lock screws.

NOTE

Perform Step (7) only if pins are damaged.

- (7) Remove and discard two pins (10) from hub assembly (9).



b. Installation.

NOTE

Perform Steps (1) and (2) only if pins were removed during removal.

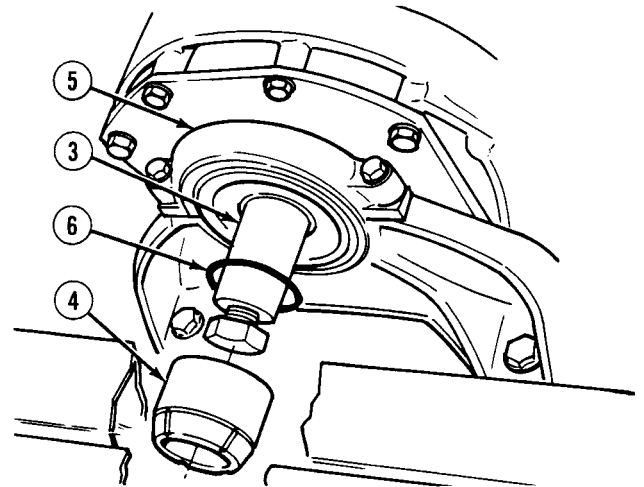
- (1) Install two pins (10) in hub assembly (9).
- (2) Position two pins (10) through hub assembly (9) until pins stick out of hub assembly 3/8 in. (9.5 mm).

NOTE

Install screws as noted prior to removal.

- (3) Install mounting plate (8) and hub assembly (9) on vibration damper (1) with eight lock screws (7). Tighten lock screws to 75 to 85 lb-ft (102 to 115 N-m).

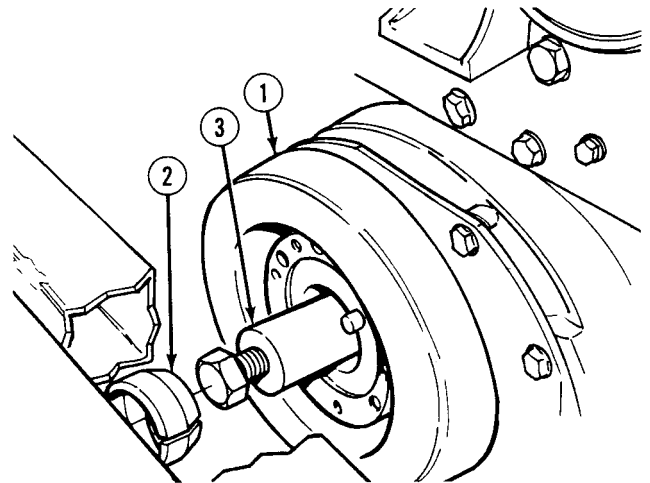
- (4) Apply lubricating oil to preformed packing (6).
- (5) Install preformed packing (6) in cone (4).
- (6) Apply lubricating oil to cone (4) and crankshaft (3).
- (7) Turn cone (4) clockwise and install in trunnion support (5) with tapered end pointing outward.



CAUTION

Use extreme caution when installing vibration damper. Pounding or hammering on vibration damper will damage parts.

- (8) Install vibration damper (1) on crankshaft (3).
- (9) Apply lubricating oil to sleeve spacer (2).
- (10) Install sleeve spacer (2) on crankshaft (3) with tapered end pointing towards vibration damper (1).

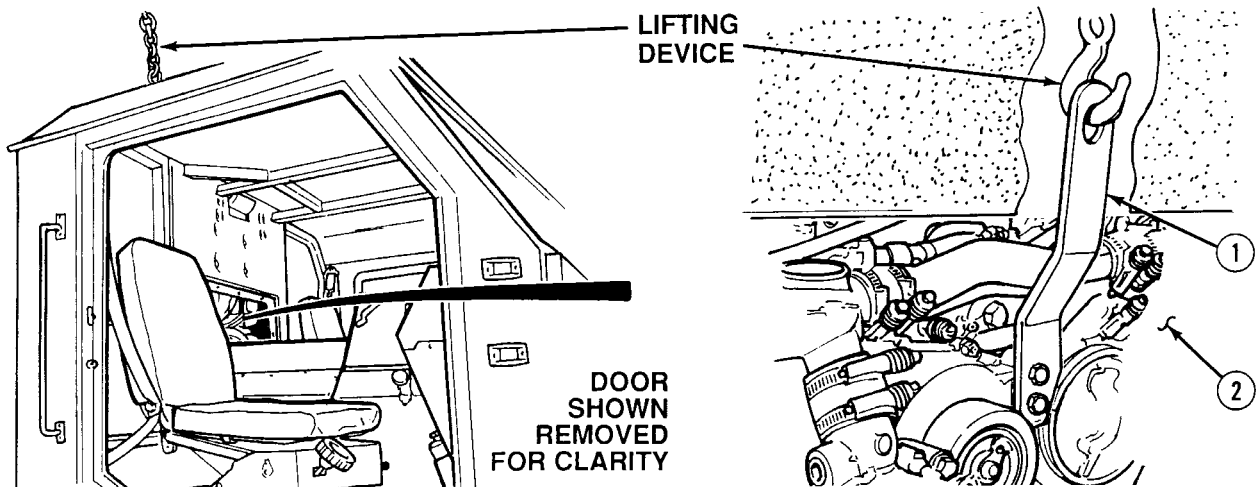


c. Follow-On Maintenance:

- Install crankshaft pulley, (Para 3-9).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

a. Removal.

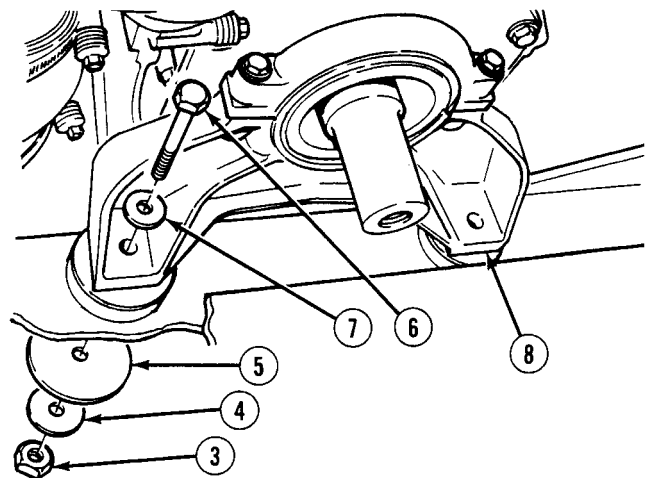


WARNING

- Ensure there are no personnel working under truck while performing this task. Engine will be supported by lifting device. If lifting device fails, engine may fall and cause severe injury or death to personnel.
- Lifting device is attached to support engine. Ensure lifting device is positioned snug to engine lifting bracket to prevent engine from falling. Failure to comply may result in injury or death to personnel.

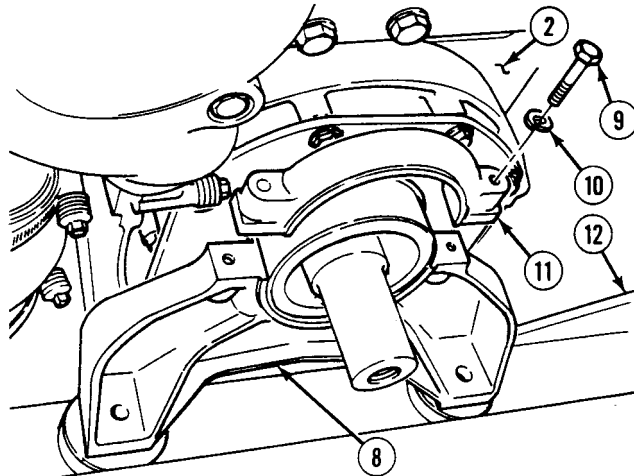
(1) Attach lifting device to front lifting bracket (1) on engine (2).

(2) With the aid of an assistant, remove two locknuts (3), washers (4), washers (5), screws (6) and washers (7) from lower trunnion support assembly (8). Discard locknuts.



3-12. CRANKCASE FRONT COVER AND OIL SEAL REPLACEMENT (CONT).

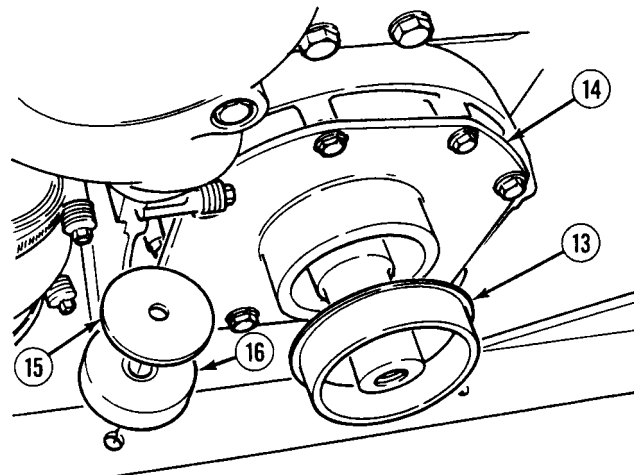
- (3) Remove two screws (9), lockwashers (10) and upper trunnion support assembly (11) from lower trunnion support assembly (8). Discard lockwashers.
- (4) Raise lifting device until engine (2) raises only high enough so lower trunnion assembly (8) can be removed.
- (5) Remove lower trunnion assembly (8) from engine support (12).



NOTE

Note position of ring (13) prior to removal.

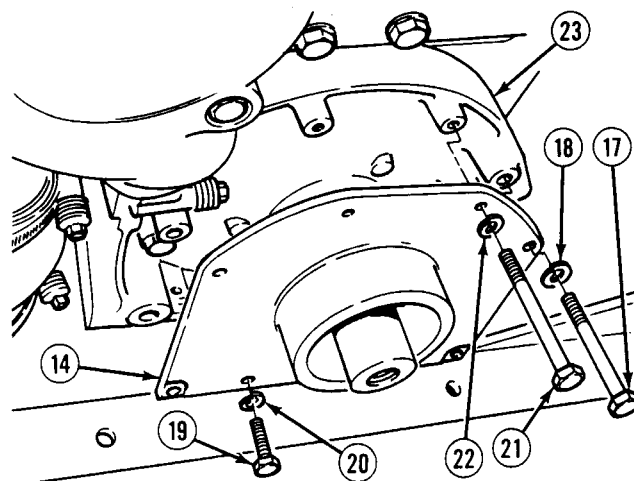
- (6) Remove ring (13) from trunnion plate (14).
- (7) Remove two washers (15) from mounts (16).



CAUTION

Ensure trunnion plate is fully supported upon removal of eight screws. Trunnion plate may fall and cause damage to equipment.

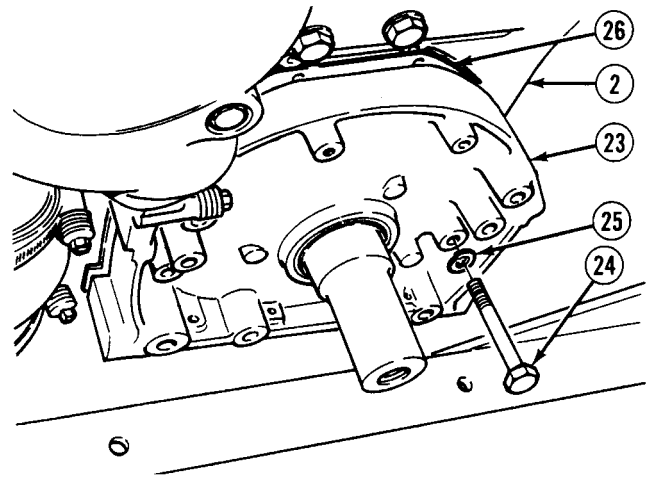
- (8) Remove four screws (17) and lockwashers (18) from trunnion plate (14). Discard lockwashers.
- (9) Remove two screws (19) and lockwashers (20) from trunnion plate (14). Discard lockwashers.
- (10) Remove two screws (21) and lockwashers (22) from trunnion plate (14). Discard lockwashers.
- (11) Remove trunnion plate (14) from crankcase front cover (23).



WARNING

Ensure crankcase cover is fully supported before removing screws. Failure to comply may result in crankcase cover falling causing injury to personnel.

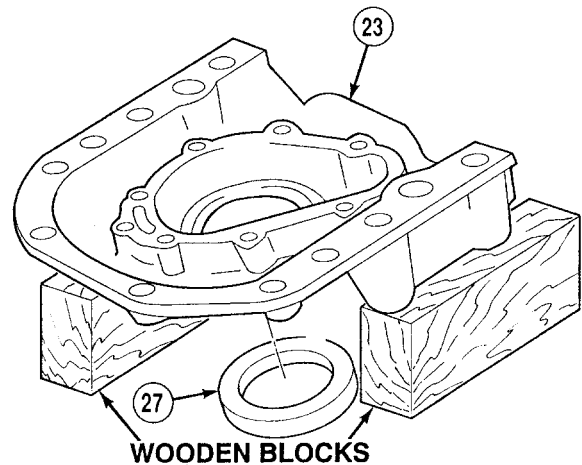
- (12) Remove two screws (24) and lockwashers (25) from crankcase front cover (23). Discard lockwashers.
- (13) Remove crankcase front cover (23) and gasket (26) from engine (2). Discard gasket.



WARNING

Lifting device must remain in place and truck must be properly tagged until after installation of this task is performed. Failure to comply may result in engine falling causing severe injury or death to personnel.

- (14) Position crankcase front cover (23) outer face on wooden blocks and remove oil seal (27) out of front side of crankcase front cover. Discard oil seal.



3-12. CRANKCASE FRONT COVER AND OIL SEAL REPLACEMENT (CONT).

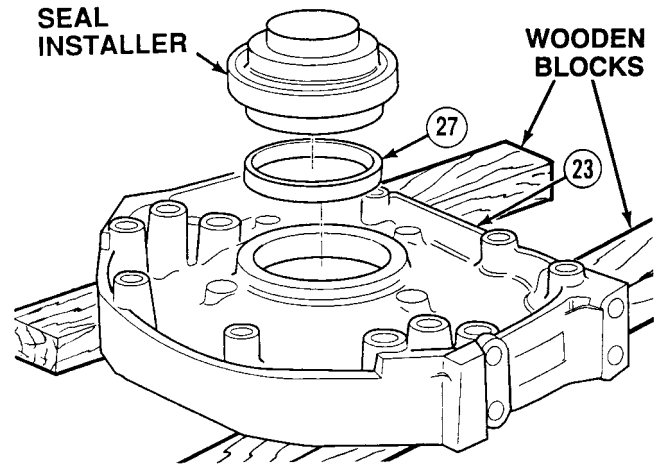
b. Installation.

WARNING

Ensure there are no personnel working under truck while performing this task. Engine will be supported by lifting device. If lifting device fails, engine may fall and cause severe injury or death to personnel.

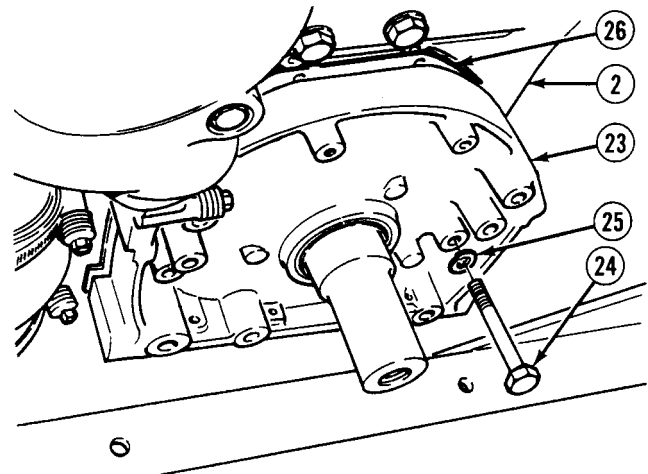
NOTE

Do not remove lubricant or plastic coating from outer surface of oil seal.

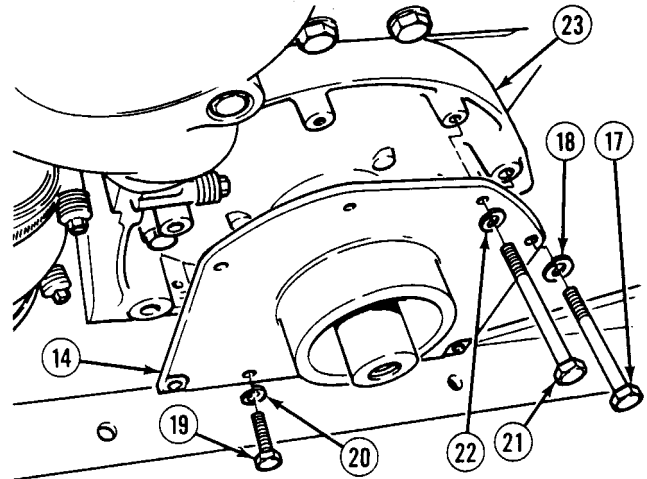


- (1) Position front cover (23) on wooden blocks and coat sealing lip of oil seal (27) with grease.
- (2) Position oil seal (27) in crankcase front cover (23) with sealing lip of front seal against inner face of crankcase front cover.
- (3) Using front seal installer, install front oil seal (27) in crankcase cover (23).

- (4) Coat gasket (26) with grease.
- (5) Position gasket (26) on engine (2).
- (6) Position crankcase front cover (23) on engine (2).
- (7) Install two lockwashers (25) and screws (24) in crankcase front cover (23). Tighten screws to 80 to 90 lb-ft (108 to 122 N·m).



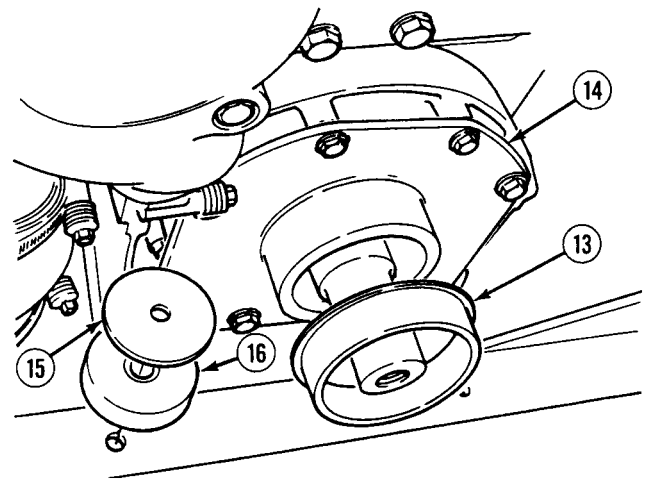
- (8) Position trunnion plate (14) against crankcase cover (23).
- (9) Position four lockwashers (18) and screws (17) in trunnion plate (14).
- (10) Position two lockwashers (20) and screws (19) in trunnion plate (14).
- (11) Position two lockwashers (22) and screws (21) in trunnion plate (14).
- (12) Tighten screws (19) and (21) in trunnion plate (14).
- (13) Tighten four screws (17) in trunnion plate (14) to 80 to 90 lb-ft (108 to 122 N·m).
- (14) Coat inside of ring (13) with light coat of grease.



NOTE

Install ring in position noted prior to removal.

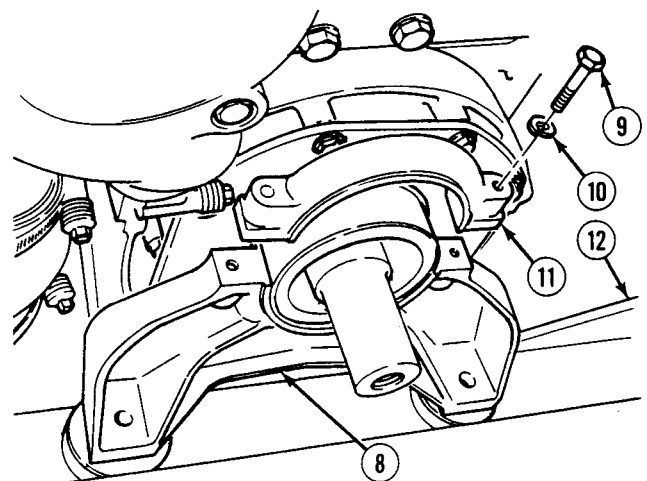
- (15) Install ring (13) on trunnion plate (14).
- (16) Position two washers (15) on mounts (16).



NOTE

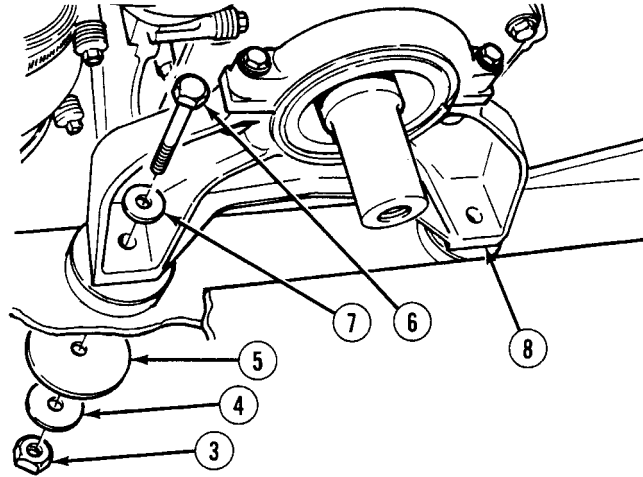
Ensure washers and mounts remain seated while lowering trunnion assembly on engine support.

- (17) Position lower trunnion assembly (8) on engine support (12).
- (18) Install upper trunnion assembly (11) on lower trunnion assembly (8) with two lockwashers (10) and screws (9). Tighten screws to 45 to 50 lb-ft (61 to 68 N·m).

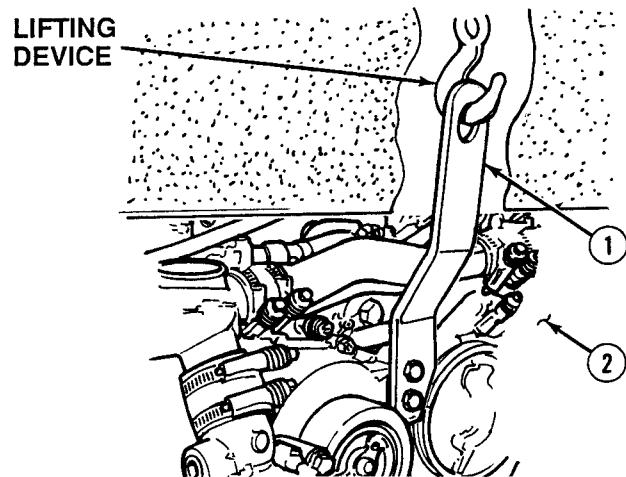


3-12. CRANKCASE FRONT COVER AND OIL SEAL REPLACEMENT (CONT).

- (19) Position two washers (7) and screws (6) in lower trunnion assembly (8).
- (20) Lower lifting device until lower trunnion support assembly (8) is fully seated.
- (21) With the aid of an assistant, install two washers (5), washers (4) and locknuts (3) on two screws (6). Tighten locknuts to 170 lb-ft (231 N·m).



- (22) Remove lifting device from lifting bracket (1) on engine (2).



c. Follow-On Maintenance:

- Install vibration damper, (Para 3-11).
- Install engine oil pan, (Para 3-22).
- Install alternator, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-13. FLEX PLATE AND HUB REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

Personnel Required

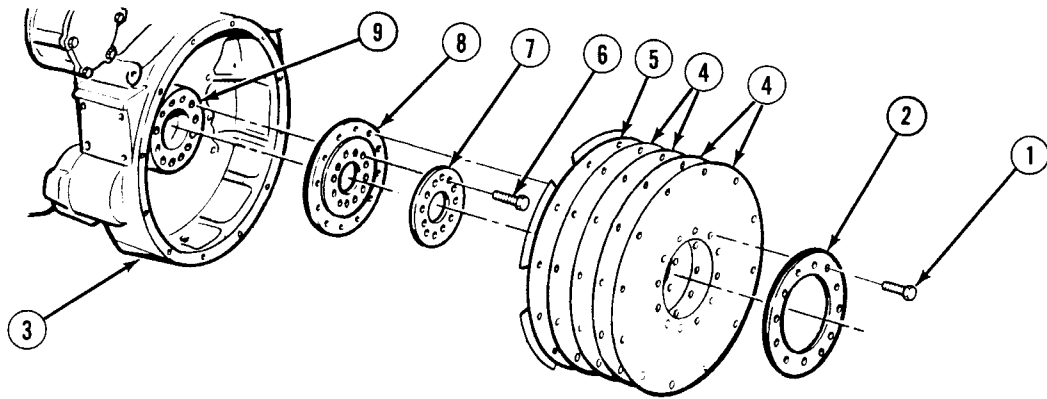
Two

Equipment Condition

Engine/transmission separated, (Para-3-5)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Compound, International No. 2
(Item 16, Appendix B)
Lockscrew (12) (Item 224, Appendix E)

a. Removal.

- (1) Remove 12 lock screws (1) and flywheel plate (2) from flywheel housing (3). Discard lock screws.

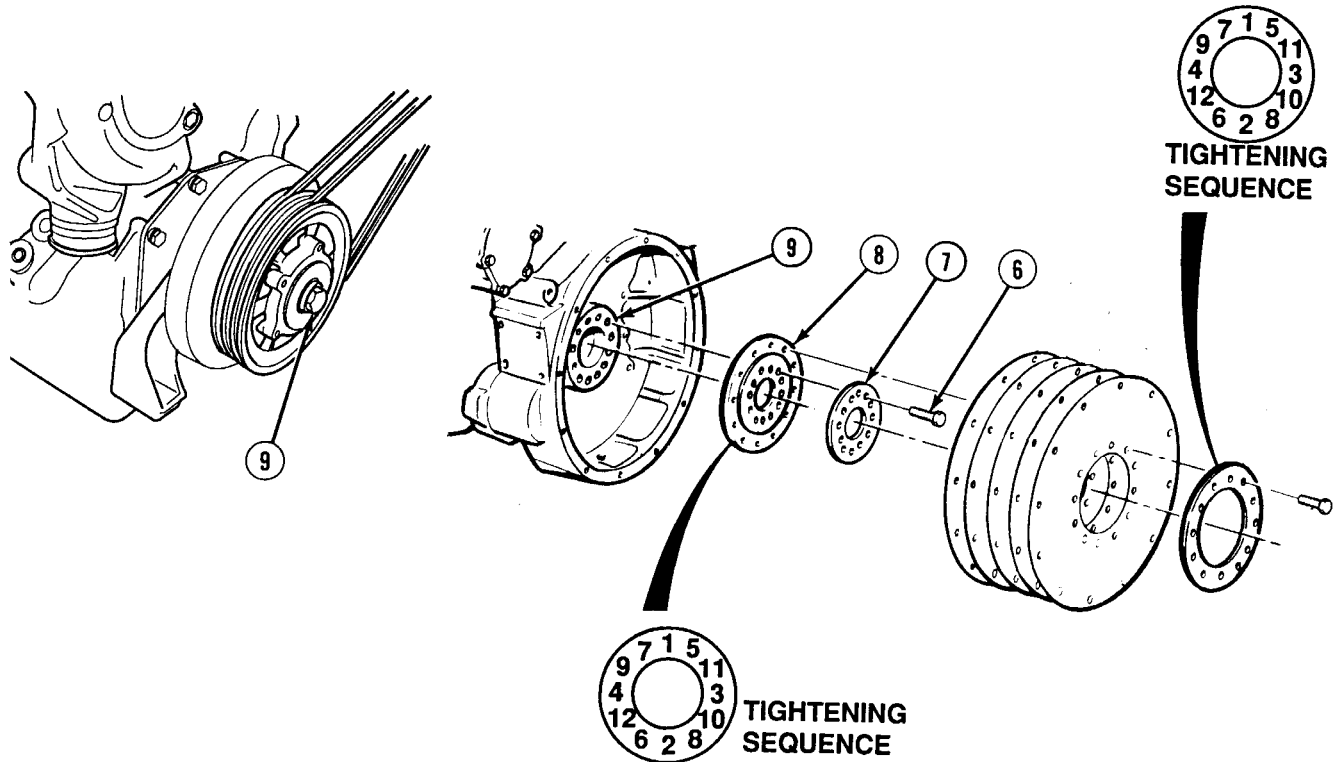
NOTE

Insert cable ties through flex plates to ensure proper installation.

- (2) Remove four flex coupling inserts (4) and disk assembly (5) from flywheel housing (3).
(3) Remove 12 screws (6), mounting plate (7) and hub body (8) from crankshaft (9).

3-13. FLEX PLATE AND HUB REPLACEMENT (CONT).

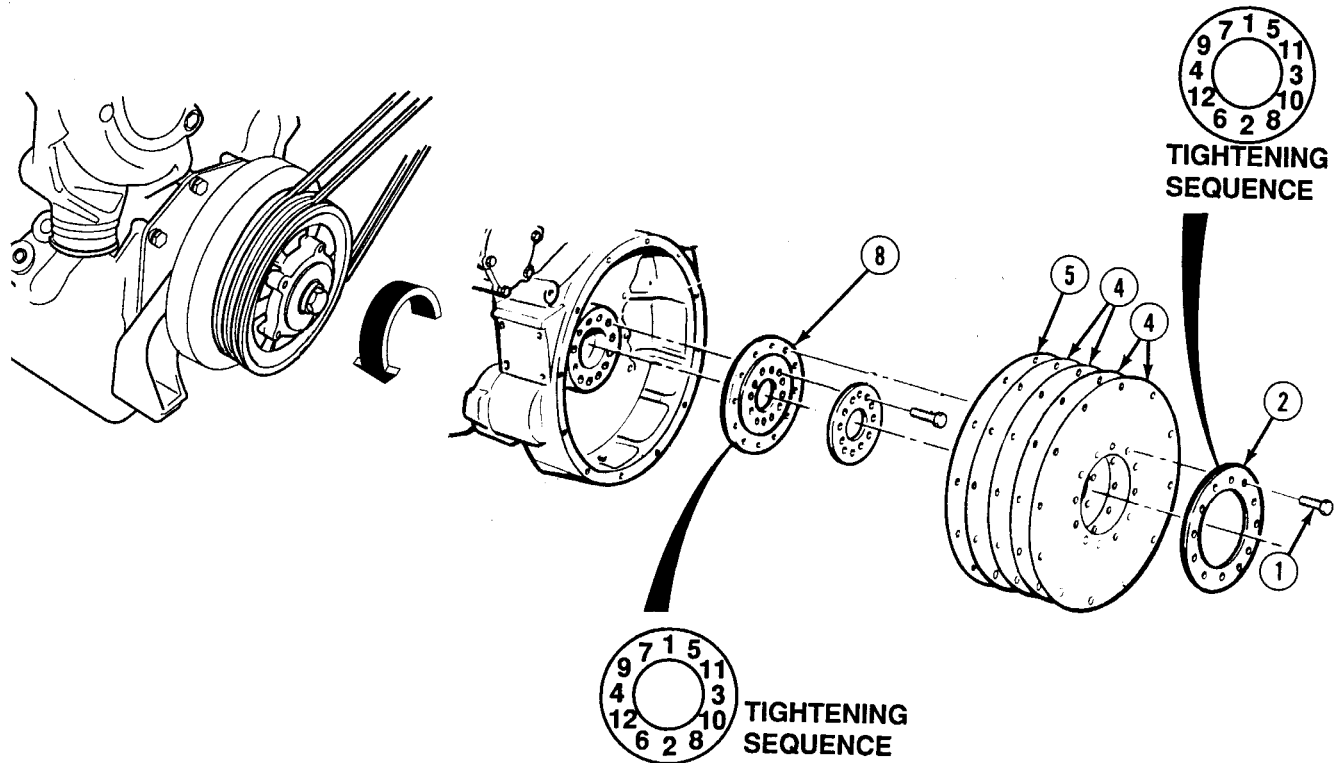
b. Installation.



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.

- (1) Apply International Compound No. 2 to threads of 12 screws (6).
- (2) Align screw holes in hub body (8) and mounting plate (7) with crankshaft (9) and install 12 lockscrews (6). In sequence shown tighten screws (6) to 50 lb-ft (68 N·m).
- (3) With the aid of an assistant, hold front of crankshaft (9), mark position of screws (6) and tighten an additional 90 degrees to 100 degrees in sequence shown.



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.

- (4) Apply International Compound No. 2 to threads of 12 lockscrews (1).

NOTE

- Six welded plates on inner most disk face toward engine.
 - Remove cable ties after flex coupling inserts are aligned.
- (5) Align screw holes in disk assembly (5), flex coupling inserts (4) and flywheel plate (2) with hub body (8).
- (6) With the aid of an assistant, install disk assembly (5), four flex coupling inserts (4) and flywheel plate (2) with 12 lockscrews (1). In sequence shown tighten screws to 100 lb-ft (136 N-m).

c. Follow-On Maintenance:

- Assemble engine/transmission, (Para 3-5).

END OF TASK

3-14. REAR OIL SEAL/SLEEVE REPLACEMENT.

This task covers:

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

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Drill Set, Twist (Item 48, Appendix F)
- Drill, Electric, Portable, 1/4 in. (Item 49, Appendix F)
- Expander, Seal, Oil (Item 54, Appendix F)
- Expander, Seal, Oil (Item 55, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Handle, Driver (Item 90, Appendix F)
- Handle, Driver (Item 91, Appendix F)
- Indicator, Dial, Set w/Magnetic Base (Item 98, Appendix F)
- Installer, Sleeve (Item 120, Appendix F)

Tools and Special Tools - Continued

- Seal Installer, Flywheel (Item 201, Appendix F)
- Stone, Abrasive (Item 228, Appendix F)
- Stud Set (Item 232, Appendix F)
- Washer, 1/4 in. (2)
- Screw, Self-Tapping No. 8 by 1 in. (2)

Materials/Parts

- Sealing Compound (Item 62, Appendix B)

Personnel Required

Two

Equipment Condition

Flex plate and hub removed, (Para 3-13)

a. Removal.

WARNING

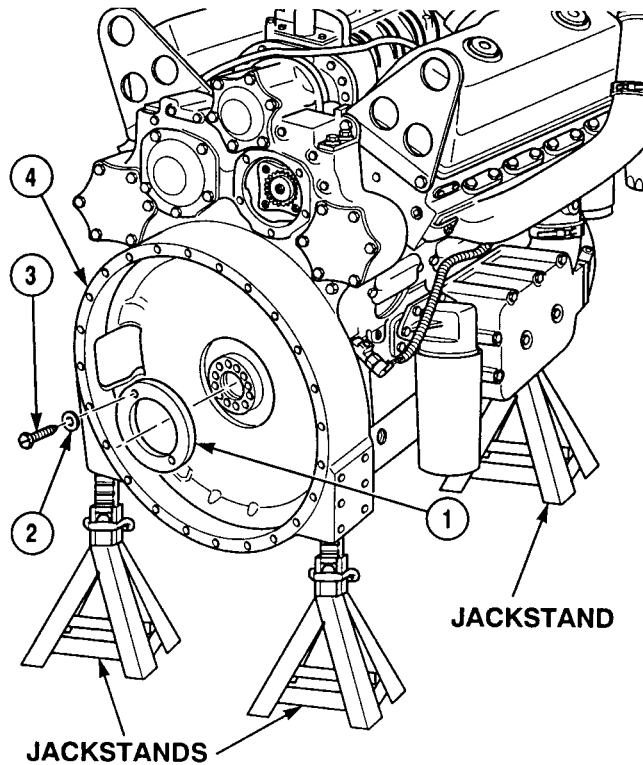
Protective goggles must be worn when drilling holes. Failure to comply may result in injury to personnel.

- (1) Drill two 1/8 in. holes directly opposite each other in seal casing (1).
- (2) Install two washers (2) and self-tapping screws (3) in drilled holes.

NOTE

Seal is removed by prying against washers with pry bar.

- (3) Remove and discard seal (1) from flywheel housing (4).



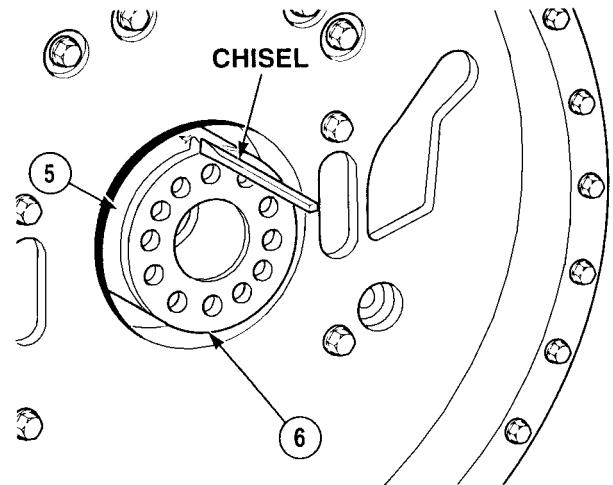
CAUTION

Use care not to damage crankshaft when removing crankshaft sleeve.

NOTE

Perform Steps (4) and (5) if crankshaft sleeve is installed and is being replaced.

- (4) Using a chisel and hammer, split crankshaft sleeve (5).
- (5) Pry crankshaft sleeve (5) from crankshaft (6).



b. Cleaning/Inspection.

- (1) Inspect sealing surface on crankshaft or sleeve for signs of wear or grooving. If crankshaft or sleeve surface is not smooth, a sleeve should be installed or existing sleeve should be replaced.
- (2) Remove high spots from crankshaft sealing surface with abrasive stone before sleeve installation.
- (3) If a sleeve is being replaced, clean off old adhesive from crankshaft.

3-14. REAR OIL SEAL/SLEEVE REPLACEMENT (CONT).

c. Installation.

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.

NOTE

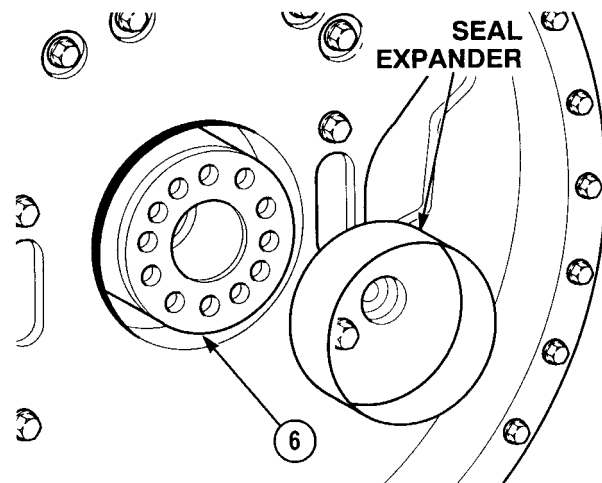
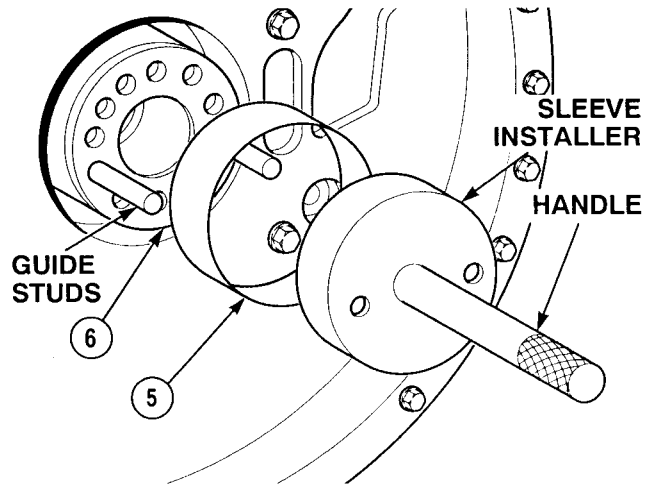
Perform Steps (1) through (3) if crankshaft sleeve is being installed.

- (1) Coat mating surface of crankshaft (6) with sealing compound where crankshaft sleeve (5) is to be installed.
- (2) Position guide studs in end of crankshaft (6).
- (3) Position crankshaft sleeve (5) on sleeve installer and using sleeve installer and J8092 handle, install crankshaft sleeve (5) on crankshaft (6) until sleeve installer bottoms on crankshaft.

NOTE

- If crankshaft sleeve is installed, an oversize seal must be used.
- Perform Step (4) for oversize seal.
- Perform Steps (5) and (6) for standard size seal.

- (4) Position seal expander on crankshaft (6).

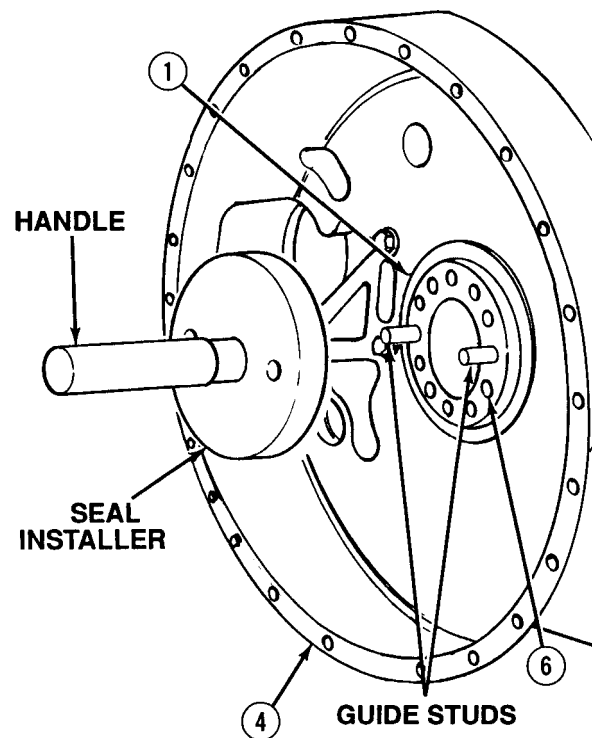
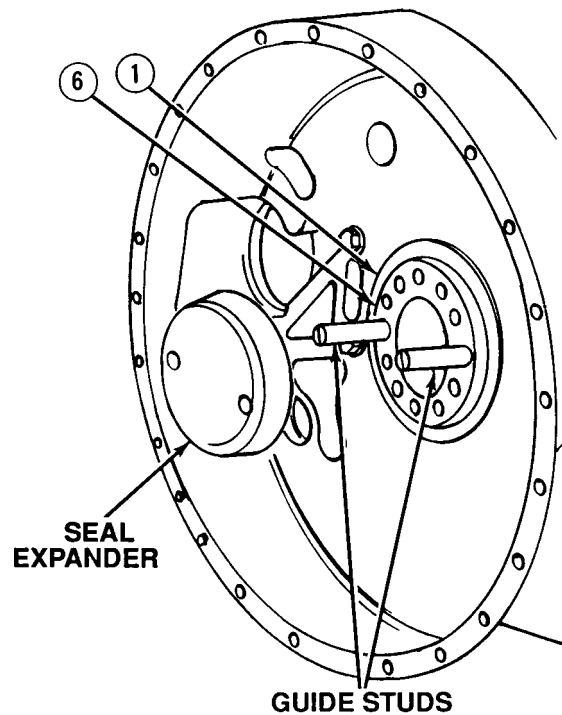


- (5) Position guide studs in end of crankshaft (6).
- (6) Install seal expander on guide studs.

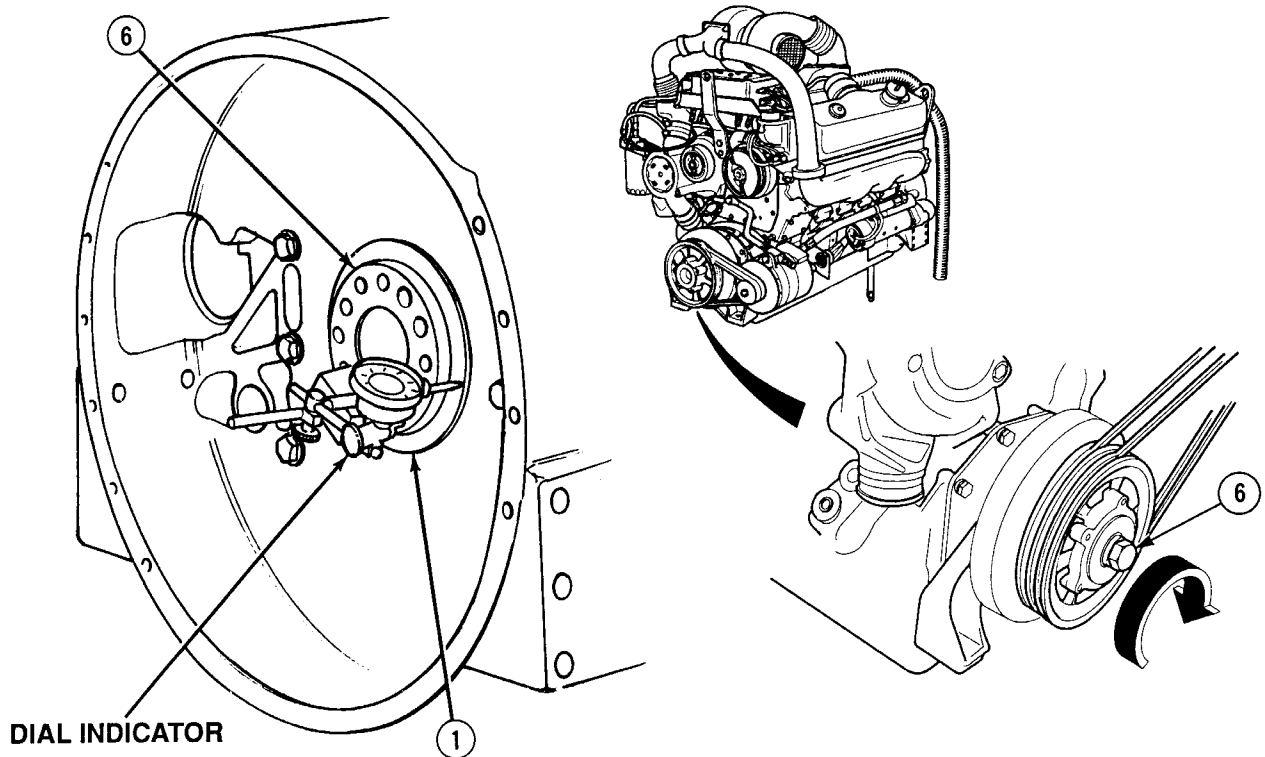
CAUTION

Do not lubricate Teflon seal lip or outside diameter of crankshaft before seal installation. Teflon lip seals must be installed dry to allow transfer of Teflon to crankshaft for proper sealing.

- (7) Position seal (1) on seal expander.
- (8) Slide seal (1) over seal expander and onto crankshaft (6).
- (9) Remove seal expander and guide studs from crankshaft (6).
- (10) Position guide studs in end of crankshaft (6).
- (11) Position seal installer and J-3154-1 handle on guide studs.
- (12) Drive seal (1) with seal installer until seal seats in flywheel housing (4).
- (13) Remove seal installer and guide studs from end of crankshaft.



3-14. REAR OIL SEAL/SLEEVE REPLACEMENT (CONT).



- (14) Attach dial indicator on crankshaft (6).
- (15) Position point of dial indicator on seal (1) face.
- (16) Pry crankshaft (6) toward one end and check to ensure end play of crankshaft is in one direction only.

CAUTION

When using front crankshaft capscrew to bar over engine, always turn in a clockwise direction. Turning over in counterclockwise direction may loosen capscrew and vibration damper. This can cause serious engine damage.

- (17) With the aid of an assistant, rotate crankshaft (6) while noting readings at 12, 9, 6, and 3 o'clock positions. Total runout at each position should not exceed 0.015 in. (0.38 mm).
- (18) If any reading is over 0.015 in. (0.38 mm), position seal installer over seal (1) and lightly tap at high points on seal (1).
- (19) If any reading cannot be adjusted to below 0.015 in. (0.38 mm), remove and discard seal (1) and repeat Steps (1) through (13).

d. Follow-On Maintenance:

- Install flex plate and hub, (Para 3-13).

END OF TASK

3-15. AIR BOX COVER AND GASKET REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

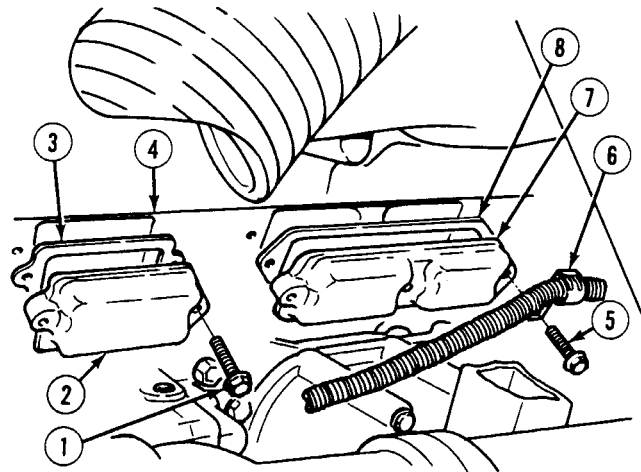
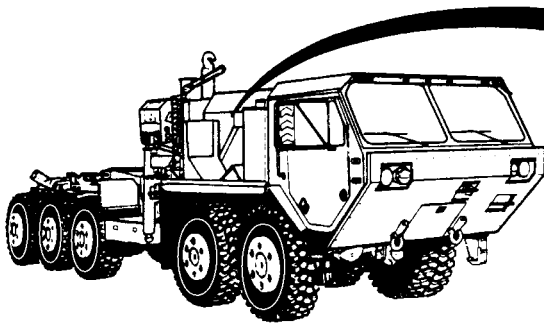
Materials/Parts

Gasket (2) (Item 115, Appendix E)
Gasket (4) (Item 116, Appendix E)
Screw (12) (Item 533, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Spare tire removed, (TM 9-2320-364-10)
Left side noise panel removed,
(TM 9-2320-364-20)
Left front noise panel removed,
(TM 9-2320-364-20)
Right side noise panel removed,
(TM 9-2320-364-20)
Air pressure transducer removed,
(TM 9-2320-364-20)

a. Removal.



NOTE

Right and left air box covers and gaskets are removed the same way. Right side shown.

- (1) Remove four screws (1), two air box covers (2) and gaskets (3) from engine block (4). Discard screws and gaskets.

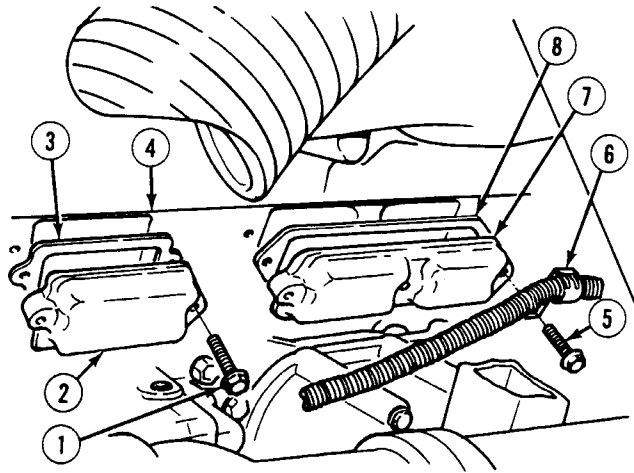
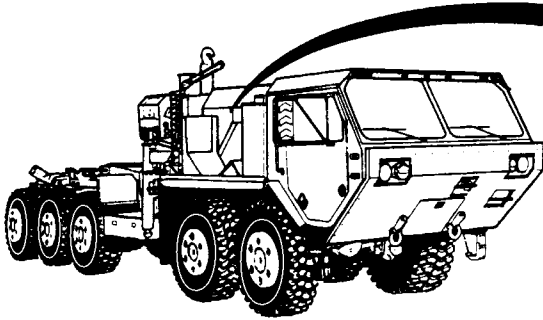
NOTE

Clamp is located on right side only.

- (2) Remove two screws (5), clamp (6), air box cover (7) and gasket (8) from engine block (4). Discard screws and gasket.
- (3) Repeat Steps (1) and (2) for left side air box covers and gaskets.

3-15. REAR OIL SEAL/SLEEVE REPLACEMENT. (CONT).

b. Installation.



NOTE

Clamp is on right side only.

- (1) Install gasket (8), air box cover (7) and clamp (6) on engine block (4) with two screws (5). Tighten screw to 96 to 144 lb-in (11 to 16 N·m).

NOTE

Right and left air box covers and gaskets are installed the same way. Right side shown.

- (2) Install two gaskets (3) and air box covers (2) on engine block (4) with four screws (1). Tighten screws to 96 to 144 lb-in (11 to 16 N·m).
- (3) Repeat Steps (1) and (2) for left side air box covers and gaskets.

c. Follow-On Maintenance:

- Install air pressure transducer, (TM 9-2320-364-20).
- Install left front noise panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Install right side noise panel, (TM 9-2320-364-20).
- Install spare tire, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-16. AIR BOX DRAIN REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

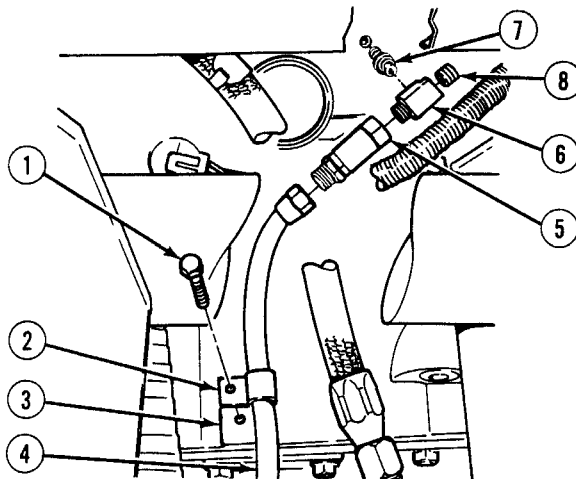
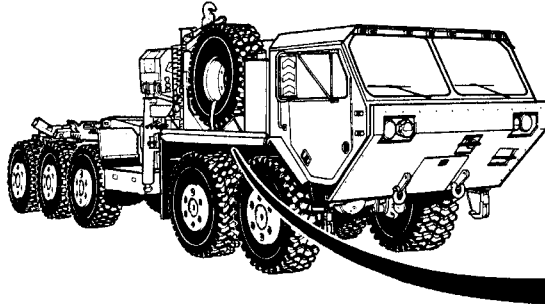
Materials/Parts

Sealing Compound (Item 54, Appendix B)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left front fender skirt removed,
(TM 9-2320-364-20)
Right front fender skirt removed,
(TM 9-2320-364-20)
Air pressure transducer removed,
(TM 9-2320-364-20)

a. Removal.



NOTE

Right and left air box drains are removed the same way. Right side shown.

- (1) Remove screw (1) and clamp (2) from engine block (3).

NOTE

Note location and positions of elbows and adapter prior to removal.

- (2) Remove hose (4) from check valve (5).
- (3) Remove check valve (5) from tee (6).
- (4) Remove tee (6) from adapter (7).

NOTE

If plug is in tee, perform Step (5).

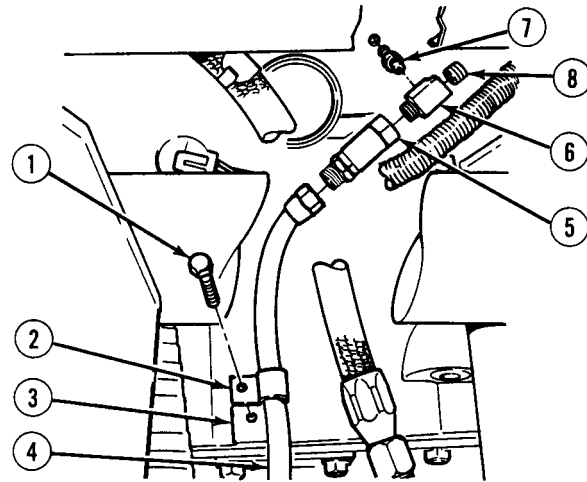
- (5) Remove plug (8) from tee (6).
- (6) Remove adapter (7) from engine block (3).
- (7) Repeat Steps (1) through (6) for left side air box drain.

3-16. AIR BOX DRAIN REPLACEMENT. (CONT).

b. Installation.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



NOTE

- Right and left air box drains are installed the same way. Right side shown.
- Install elbow and adapter as noted prior to removal.

- (1) Apply sealing compound to threads of adapter (7).
- (2) Install adapter (7) in engine block (3).

NOTE

If plug was removed, performs Steps (3) and (4).

- (3) Apply sealing compound to threads of plug (8).
- (4) Install plug (8) in tee (6).
- (5) Install tee (6) on adapter (7).
- (6) Apply sealing compound to threads of tee (6).
- (7) Install check valve (5) on tee (6).
- (8) Install hose (4) on check valve (5).
- (9) Install clamp (2) on engine block (3) with screw (1).
- (10) Repeat Steps (1) through (9) to install left side air box drain.

c. Follow-On Maintenance:

- Install air pressure transducer, (TM 9-2320-364-20).
- Install right front fender skirt, (TM 9-2320-364-20).
- Install left front fender skirt, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-17. EXHAUST VALVE BRIDGE REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Caps, Vise Jaw (Item 27, Appendix F)
Gage Set, Feeler (Item 66, Appendix F)
Vise, Machinist's (Item 248, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

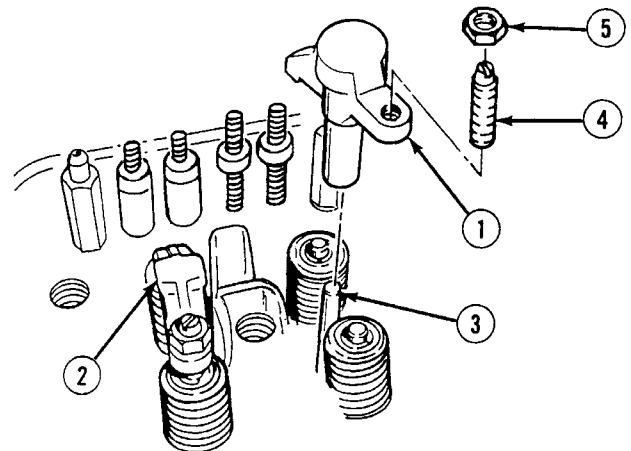
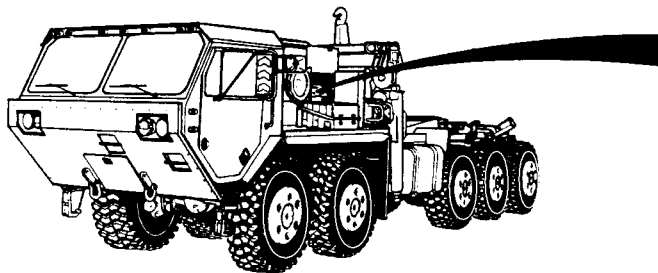
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Rocker arms removed, (Para 3-20)
Fuel injectors removed, (Para 4-2)
Engine brake retarders removed, (Para 3-32)

Materials/Parts

Oil, Lubricating (Item 38, Appendix B)
Tags, Identification (Item 72, Appendix B)

a. Removal.



NOTE

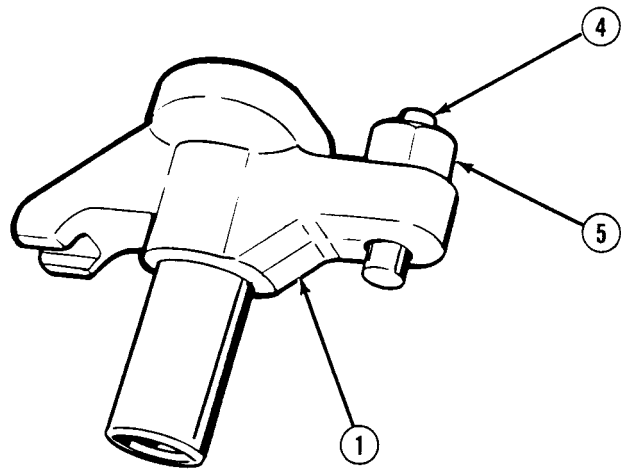
- Note location and position of valve bridges prior to removal.
- All 16 valve bridges are removed the same way.

- (1) Remove valve bridges (1) and (2) from valve bridge guides (3).
- (2) Position valve bridges (1) and (2) in soft jawed vise.
- (3) Remove screw (4) and nut (5) from valve bridges (1) and (2).

3-17. EXHAUST VALVE BRIDGE REPLACEMENT (CONT).

b. Installation.

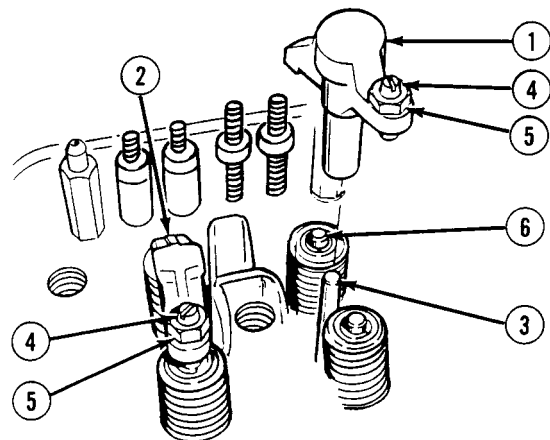
- (1) Position valve bridge (1) in soft jawed vise.
- (2) Install screw (4), slotted end up, in valve bridge (1).
- (3) Position nut (5) on screw (4).
- (4) Remove valve bridge (1) from vise.
- (5) Repeat Steps (1) through (4) for other valve bridges.



NOTE

Ensure grooves in valve bridges fit over top of valve stem.

- (6) Install valve bridges (1) and (2) on valve bridge guide (3).
- (7) Push down on top of valve bridge (1) and turn adjusting screw (4) until it contacts valve stem (6).
- (8) Repeat Step (7) for valve bridge (2).
- (9) Turn screw (4) an additional 1/4 turn and tighten nut (5) finger tight.
- (10) Remove valve bridges (1) and (2) from valve bridge guides (3) and mount in soft jawed vise.
- (11) Hold screw (4) and tighten nut (5) to 20 to 25 lb-ft (27 to 34 N·m).
- (12) Remove valve bridges (1) and (2) from vise.
- (13) Coat valve bridges (1) and (2) and valve bridge guides (3) with lubricating oil.

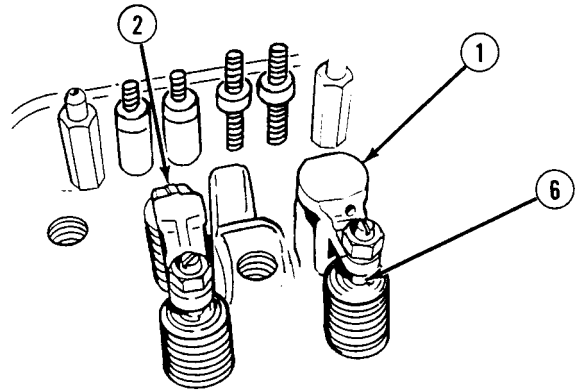


NOTE

Ensure grooves in valve bridges fit over top of valve stem.

- (14) Install valve bridges (1) and (2) on valve bridge guides (3).

- (15) Insert 0.0015 in. (0.0381 mm) feeler gage between end of valve bridges (1) and (2) and exhaust valve stem (6).
- (16) Press down on top surface of valve bridges (1) and (2). Feeler gage must remain tight against valve (6) and valve bridge (1) and (2).
- (17) Repeat Steps (15) and (16) for other end of valve bridges (1) and (2).



c. *Follow-On Maintenance:*

- Install fuel injectors, (Para 4-2).
- Install engine brake retarders, (Para 3-32).
- Install rocker arms, (Para 20-45).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

- (7) Remove valve guide seal (6) from valve guide (7). Discard seal.
- (8) Turn cylinder head (1) on side and remove valve (5) from bottom of cylinder head.

WARNING

Compressed air 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 or death to personnel.

NOTE

Valve seat removal may require use of compressed air.

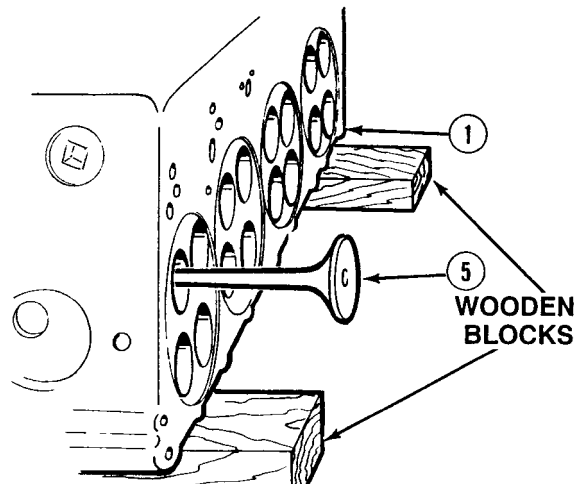
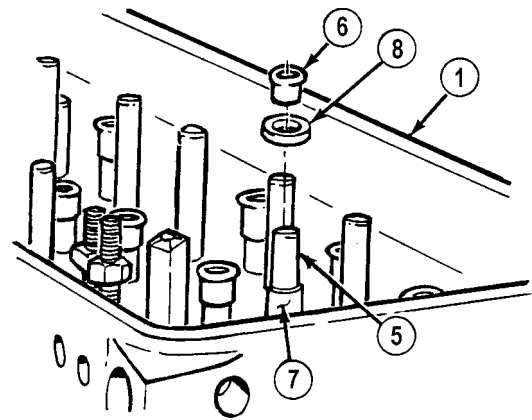
- (9) Remove valve seat (8) from valve guide (7).

b. Installation.

NOTE

- All 32 exhaust valves are installed the same way.
- Repeat Steps (2) through (4) for each valve.

- (1) Set cylinder head (1) on side.
- (2) Lubricate valve (5) with lubricating oil.
- (3) Install valve (5) in cylinder head (1).
- (4) Position tape on valve (5) to keep valve (5) from falling out of cylinder head (1).



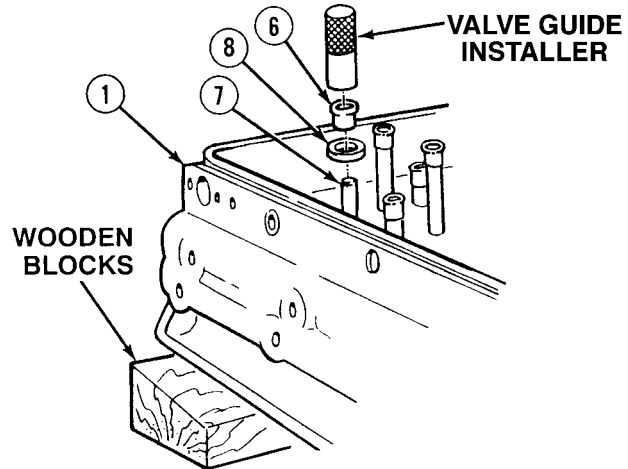
3-18. EXHAUST VALVE REPLACEMENT (CONT).

- (5) Position cylinder head (1) right side up on wooden blocks.
- (6) Install valve seat (8) over valve guide (7).

NOTE

Plastic cap which comes with oil seal may be placed over exhaust valve to protect exhaust valve from being scratched upon installation of valve guide seal. Ensure plastic cap is removed after installation of valve guide seal.

- (7) Using valve guide installer, install valve guide seal (6) on valve guide (7).
- (8) Install valve spring (3) and spring cap (4) in cylinder head (1).
- (9) Install spring compressor on cylinder head (1).

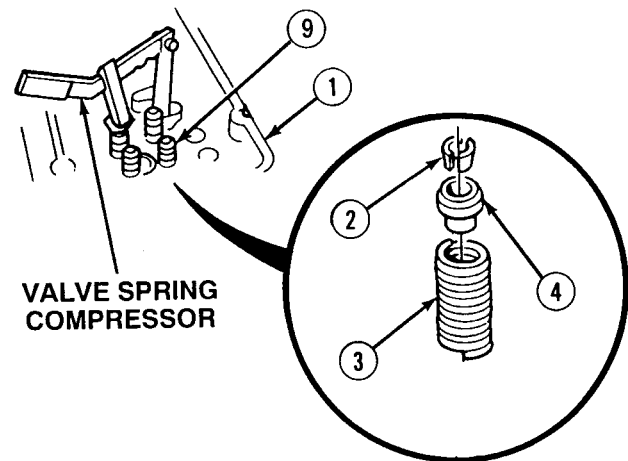


WARNING

Use care when installing springs. Springs are under tension and can act as projectiles when released and could cause injury to personnel.

CAUTION

Compress spring only enough to permit installation of two-piece valve lock. If spring is compressed further than needed, damage may result to valve guide oil seal.



- (10) Compress valve spring (3) using valve spring compressor on spring cap (4).
- (11) Install two-piece valve lock (2) on spring cap (4) and valve stem (9).
- (12) Release pressure on valve spring (3) and remove valve spring compressor from cylinder head (1).
- (13) Tap end of valve stem (9) with soft faced hammer to properly seat two-piece valve locks (2).
- (14) Remove tape from bottom of cylinder head (1).

c. Follow-On Maintenance:

- Install exhaust valve bridges, (Para 3-17).
- Install cylinder head, (Para 3-7).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-19. PUSH ROD AND CAM FOLLOWER REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Gage Set, Feeler (Item 66, Appendix F)
Goggles, Industrial (Item 83, Appendix F)
Hammer, Hand, Soft Plastic
(Item 88, Appendix F)
Pliers, Retaining Ring (Item 154, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)
Wooden Blocks (2) (Appendix C)

Materials/Parts

Oil, Lubricating (Item 38, Appendix B)
Rags, Wiping (Item 47, Appendix B)
Tags, Identification (Item 72, Appendix B)
Lockwasher (2) (Item 290, Appendix E)

Equipment Condition

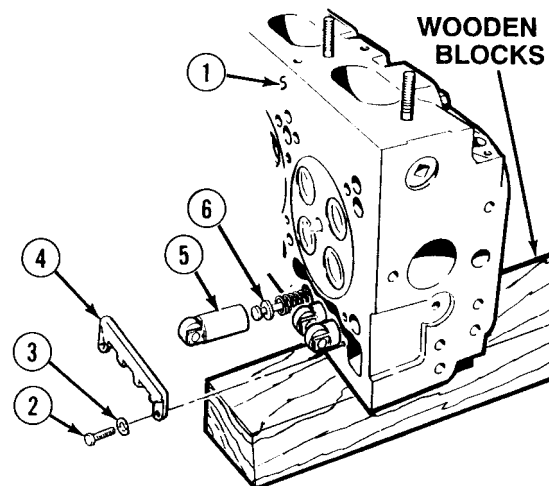
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Rocker arms removed, (Para 3-18)
Cylinder head removed, (Para 3-7)

a. Removal.

NOTE

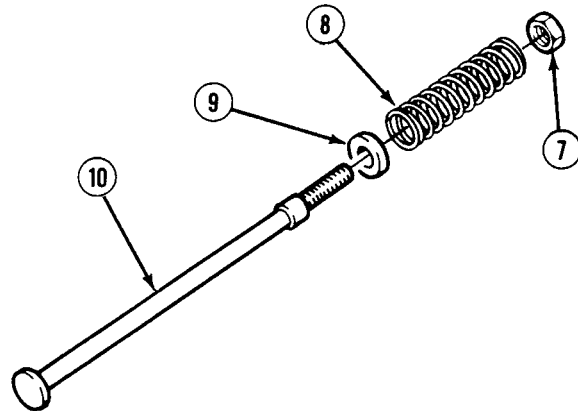
- Note location and position of all parts prior to removal.
- All 24 cam followers are removed the same way.

- (1) Position cylinder head (1) on side on wooden blocks.
- (2) Remove two screws (2), lockwashers (3) and cam follower guide (4) from cylinder head (1). Discard lockwashers.
- (3) Remove cam follower (5) from cylinder head (1).
- (4) Remove push rod assembly (6) from cylinder head (1).



3-19. PUSH ROD AND CAM FOLLOWER REPLACEMENT (CONT).

- (5) Remove nut (7), spring (8) and lower spring seat (9) from push rod (10).



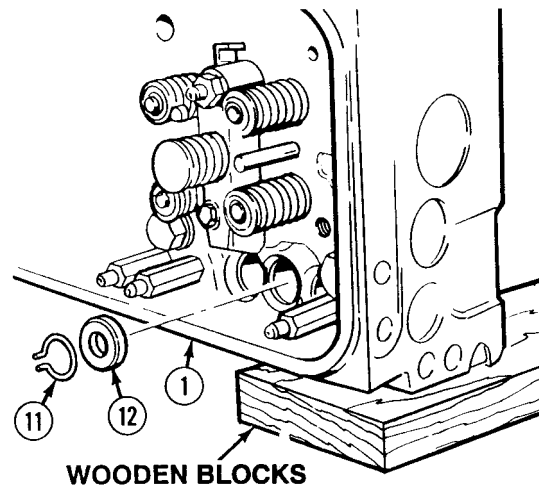
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

NOTE

Note position of retaining ring prior to removal.

- (6) Remove retaining ring (11) from top side of cylinder head (1).
- (7) Remove upper spring seat (12) from cylinder head (1).



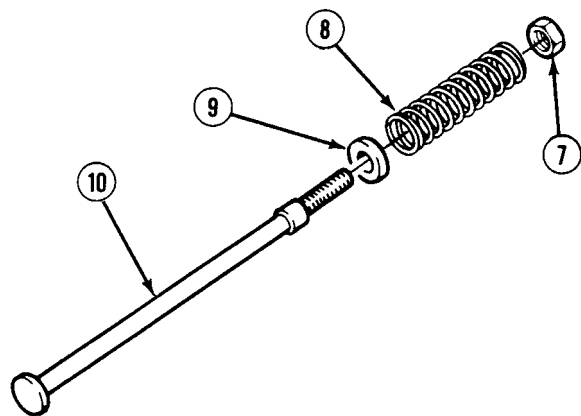
WOODEN BLOCKS

b. Installation.

NOTE

- Apply lubricating oil to all parts before installation.
- All 24 cam followers are installed the same way.
- Install parts in location as noted prior to removal.

- (1) Install lower spring seat (9), spring (8) and nut (7) on push rod (10).



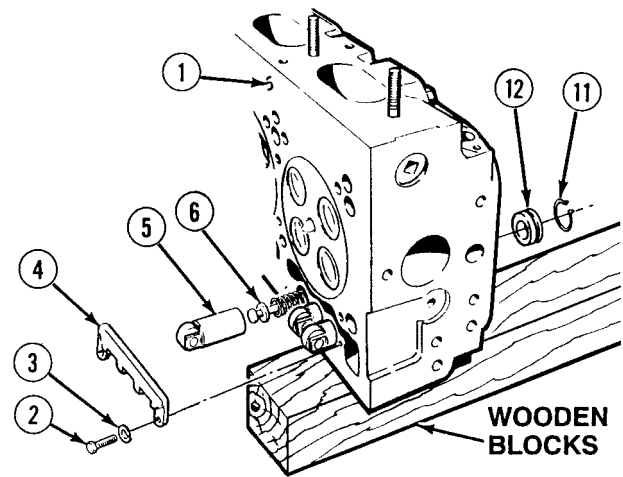
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

NOTE

Install retaining ring as noted prior to removal.

- (2) Install upper spring seat (12) and retaining ring (11) in top side of cam follower bore of cylinder head (1).
- (3) Install push rod assembly (6) in cylinder head (1).
- (4) Install cam follower (5) over push rod assembly (6) and in cylinder head (1).
- (5) Install cam follower guide (4), two lockwashers (3) and screws (2) in cylinder head (1).

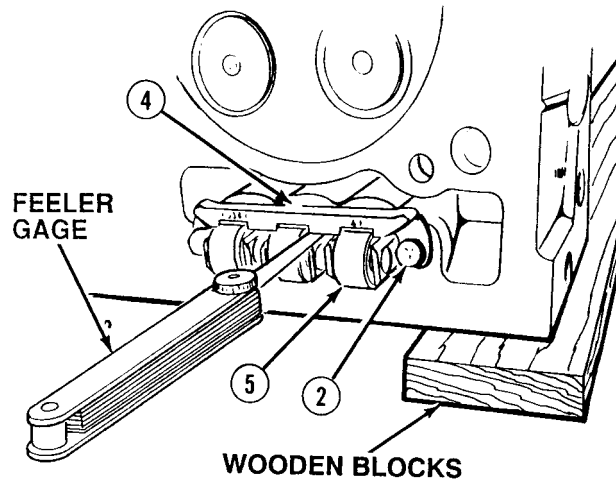


3-19. PUSH ROD AND CAM FOLLOWER REPLACEMENT (CONT).

NOTE

There must be 0.005 in. (0.127 mm), but not more than 0.010 in. (0.254 mm), clearance between cam follower guide and cam follower.

- (6) Insert 0.005 in. (0.13 mm) feeler gage between cam follower guide (4) and legs of cam followers (5).
- (7) Tap cam follower guide (4) lightly with soft faced hammer until feeler gage is snug.
- (8) Tighten screws (2) to 180 lb-in (20 N·m).
- (9) Remove feeler gage from cam follower guide (4) and legs of cam followers (5).
- (10) Check clearance again as in Step (7).
- (11) If there is not enough clearance, loosen screws (2), move guide (4) and repeat Steps (7) through (10) until proper clearance is obtained.
- (12) If proper clearance cannot be obtained, replace cam follower guide (4).



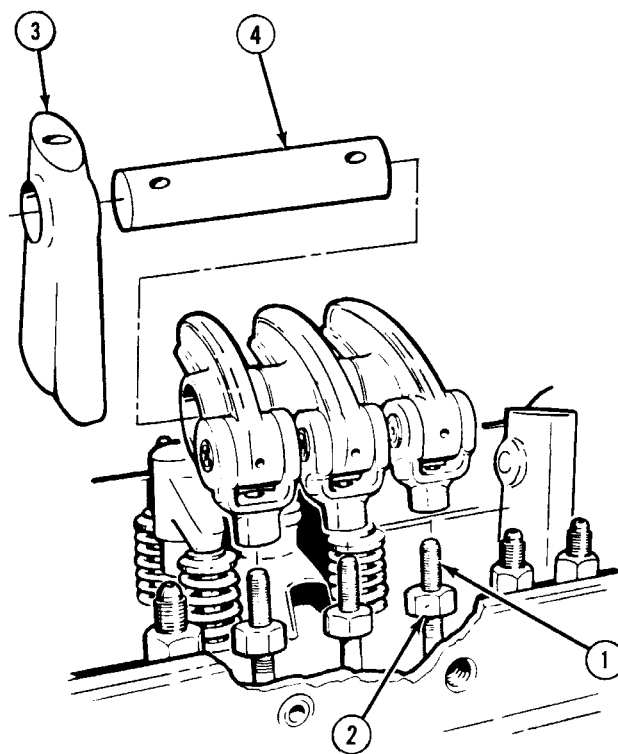
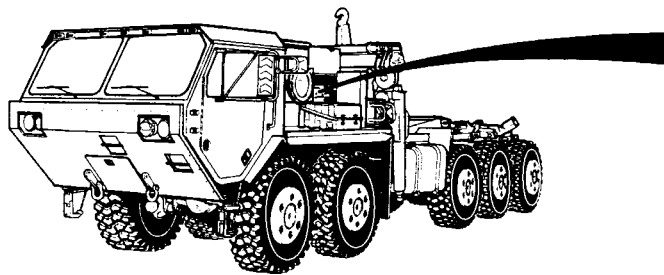
c. Follow-On Maintenance:

- Install cylinder head, (Para 3-7).
- Install rocker arms, (Para 3-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-20. ROCKER ARM REPLACEMENT.		
This task covers:		
a. Removal	b. Installation	c. Follow-On Maintenance
INITIAL SETUP		
<i>Tools and Special Tools</i> Tool Kit, General Mechanic's (Item 240, Appendix F)		<i>Equipment Condition</i> Engine OFF, (TM 9-2320-364-10) Wheels chocked, (TM 9-2320-364-10) Engine brake retarders removed, (Para 3-32)
<i>Materials/Parts</i> Oil, Lubricating (Item 38, Appendix B) Tags, Identification (Item 72, Appendix B)		

a. Removal.

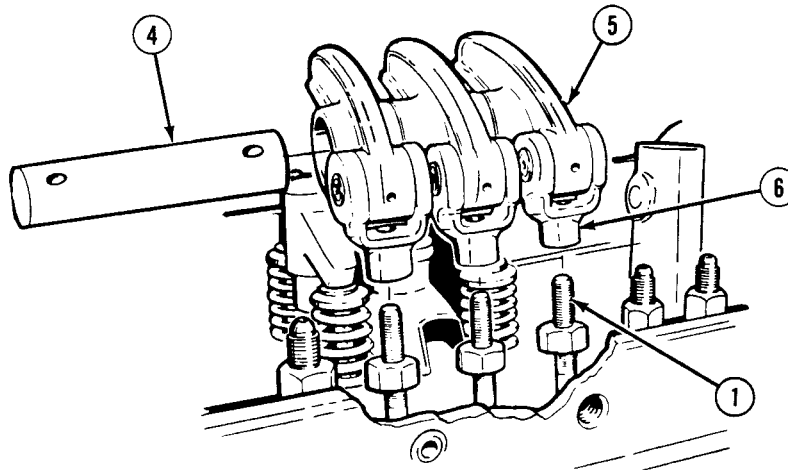


NOTE

All rocker arms are removed the same way.

- (1) Hold three push rods (1) and loosen nuts (2).
- (2) Remove two brackets (3) from shaft (4).

3-20. ROCKER ARM REPLACEMENT (CONT).



CAUTION

- Do not force rocker arms all the way back with shaft in place. Failure to comply may result in damage to equipment.
- Rocker arms need to be moved up and toward center of engine to permit removal of shaft or damage to equipment may occur.

NOTE

Individual rocker arms and shafts must be maintained in sets. Tag and mark each set prior to removal.

- (3) Remove shaft (4) from rocker arms (5).

NOTE

- Rocker arms are removed by lifting up on rocker arm and turning rocker arm counterclockwise until rocker arm and clevis yoke are removed from push rod.
- Rocker arm and clevis yoke are removed as one assembly.

- (4) Remove three rocker arms (5) and clevis yokes (6) from push rods (1).

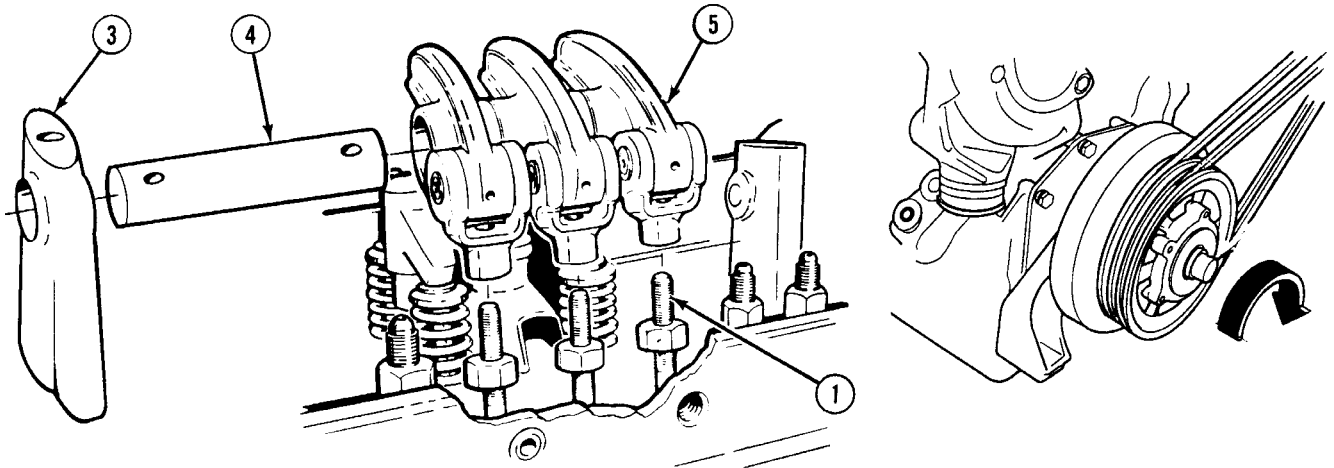
- (5) Repeat Steps (1) through (4) for each rocker arm being removed.

b. Installation.

NOTE

- All rocker arms are installed the same way.
- Assemble rocker arms as tagged prior to removal.

- (1) Install three rocker arms (5) on push rods (1) until end of each push rod is flush with or above inside of each clevis yoke (6).



- (2) Coat shaft (4) with lubricating oil.

CAUTION

- Do not force rocker arms all the way back with shaft in place. Failure to comply may result in damage to equipment.
- Rocker arms need to be moved up and toward center of engine to permit installation of shaft or damage to equipment may occur.

- (3) Raise three rockers arms (5) and slide shaft (4) through rocker arms.

NOTE

Finished surface side of brackets are installed facing rocker arms.

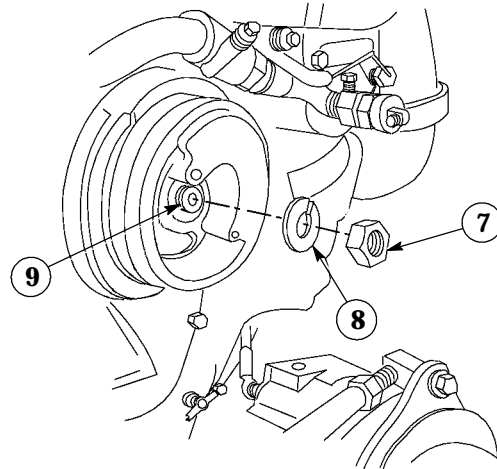
- (4) Lower rocker arms (5) and install two brackets (3), one over each end shaft (4).

c. Follow-On Maintenance:

- Install engine brake retarder, (Para 3-32).
- Tune-up engine, (Para 3-2).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

- (2) Remove nut (7) and lockwasher (8) from left side camshaft (9). Discard lockwasher.

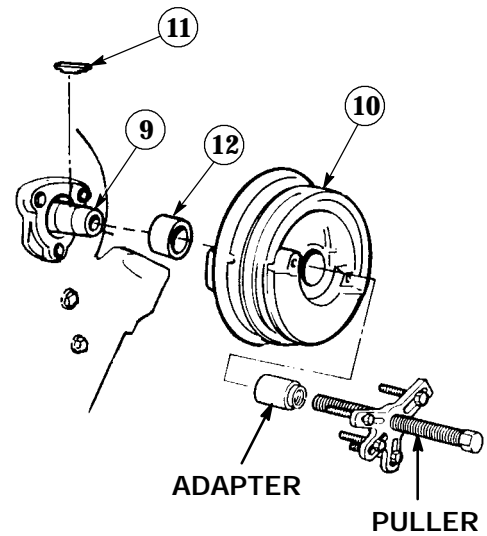


- (3) Using puller and adapter, remove camshaft front balance pulley (10) from left camshaft (9).

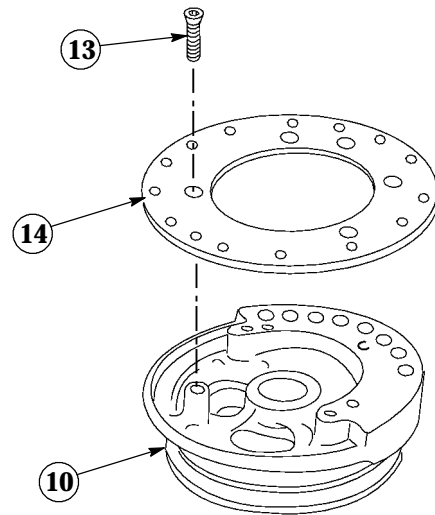
NOTE

Perform Step (4) only if key or spacer is damaged.

- (4) Remove key (11) and spacer (12) from end of left camshaft (9).



- (5) Remove four screws (13) from DDEC speed sensor pulse wheel (14) and front balance pulley (10).



3-21. DDEC SPEED SENSOR PULSE WHEEL REPLACEMENT (CONT).

b. Installation.

WARNING

Adhesive, 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.

NOTE

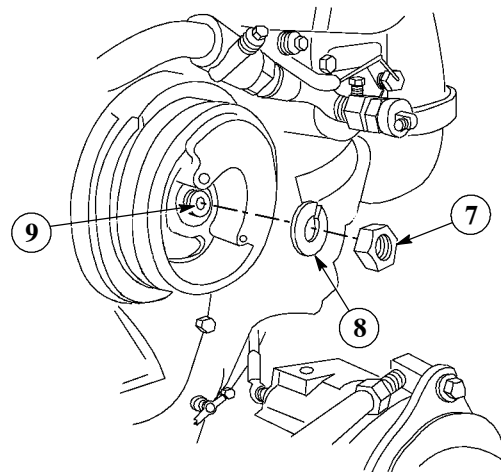
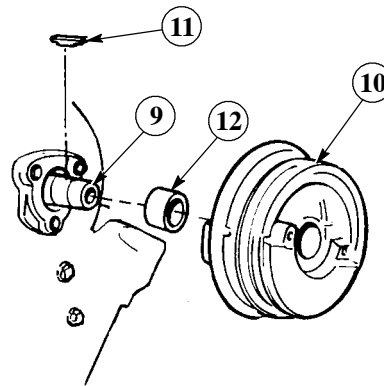
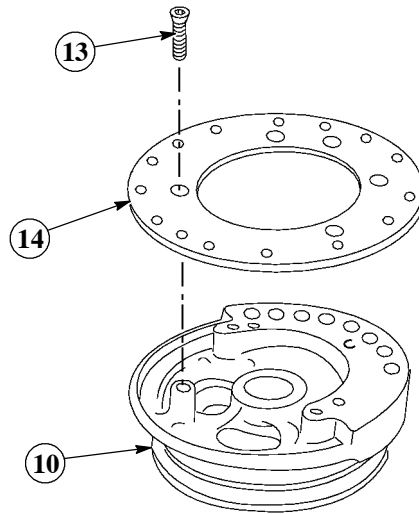
- Two alignment pins on pulse wheel must be installed in alignment holes on back of camshaft pulley.
- DDEC II engines have a 13 tooth pulse wheel; DDEC III/IV engines have a 36 tooth pulse wheel.

- (1) Apply sealing compound to threads of four screws (13).
- (2) Install DDEC speed sensor pulse wheel (14) on front balance pulley (10) with four screws (13). Tighten to 60 to 80 lb-in (7 to 10 N·m).

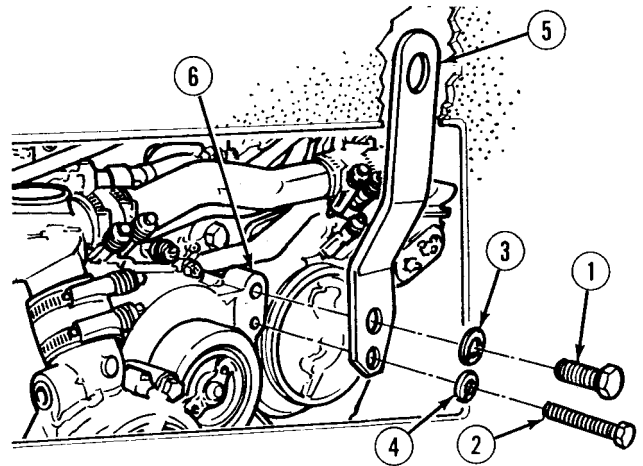
NOTE

Perform Step (3) if key or spacer was removed.

- (3) Install spacer (12) and key (11) on end of left camshaft (9).
- (4) Position front balance pulley (10) on left camshaft (9).
- (5) Install lockwasher (8) and nut (7) on left camshaft (9). Tighten to 300 to 325 lb-ft (407 to 441 N·m).



- (6) Position engine lifting bracket (5) on front balance cover (6) with lockwashers (3) and (4) and screws (2) and (1).
- (7) Tighten screw (1) on engine lifting bracket (5) to 71 to 75 lb-ft (96 to 102 N·m).
- (8) Tighten screw (2) on engine lifting bracket (5) to 53 to 56 lb-ft (72 to 76 N·m).
- (9) Tighten screw (1) on engine lifting bracket (5) to 137 to 147 lb-ft (186 to 199 N·m).
- (10) Tighten screw (2) on engine lifting bracket (5) to 71 to 75 lb-ft (96 to 102 N·m).



c. Follow-On Maintenance:

- Adjust Timing and Synchronous Reference Sensor (TRS/SRS), (DDEC II, Para 6-10) or (DDEC III/IV, Para 6-11).
- Install cab engine access panel, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

NOTE

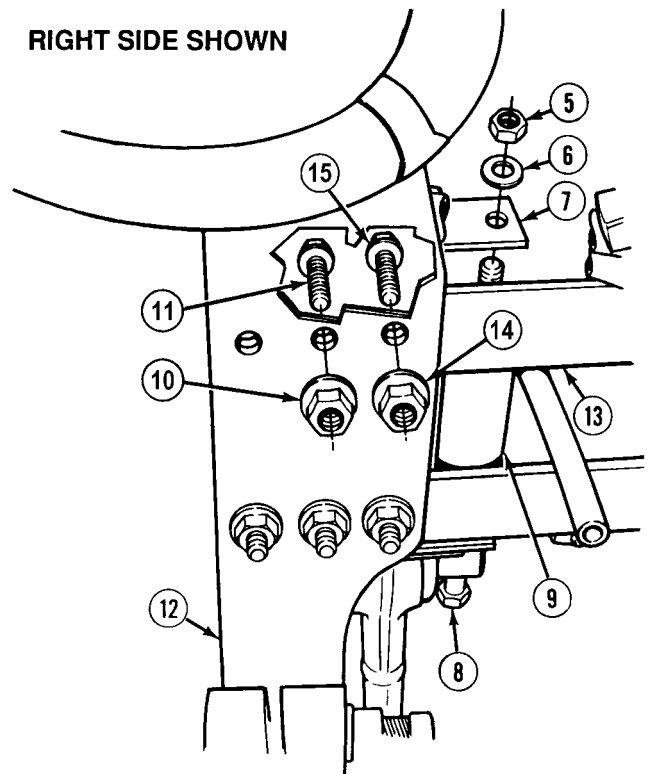
It is not necessary to remove screws from torque rod.

- (3) Remove two locknuts (5), washers (6) and spacer plate (7) from torque rod screws (8). Discard locknuts.

NOTE

Torque rod screws are pulled out only far enough to access two spacers.

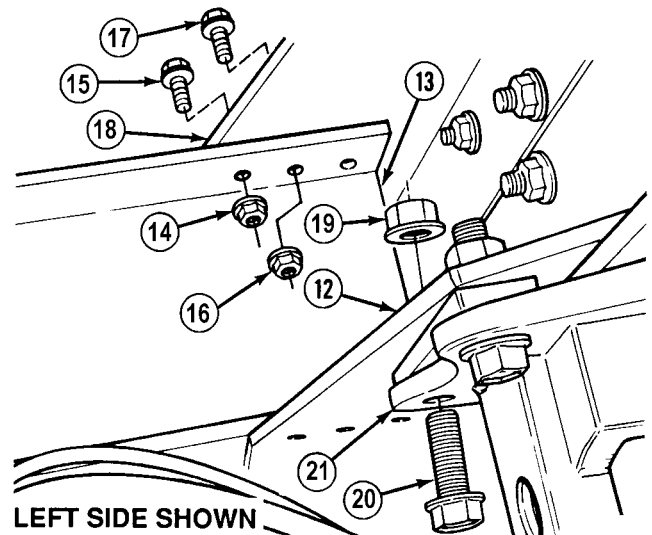
- (4) Pull torque rod screws (8) out and remove two spacers (9).
- (5) Remove two locknuts (10) and screws (11) from bottom gusset (12) and crossmember (13). Discard locknuts.
- (6) Remove four locknuts (14) and screws (15) from bottom gusset (12) and crossmember (13). Discard locknuts.



NOTE

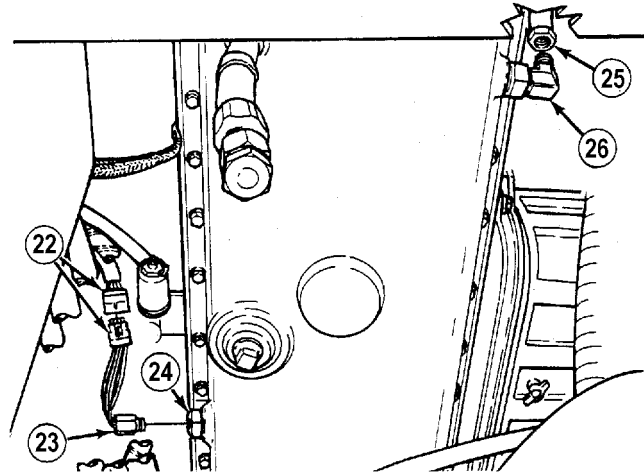
To remove locknuts from top gussets, insert extension rod through holes in bottom gussets.

- (7) With the aid of an assistant, remove two locknuts (16) and screws (17) from top gusset (18) and crossmember (13). Discard locknuts.
- (8) With the aid of an assistant, remove four locknuts (14) and screws (15) from top gusset (18) and crossmember (13). Discard locknuts.
- (9) Remove locknut (19) and screw (20) from spring hanger bracket (21). Discard locknut.
- (10) Remove crossmember (13) from gussets (18) and (12).

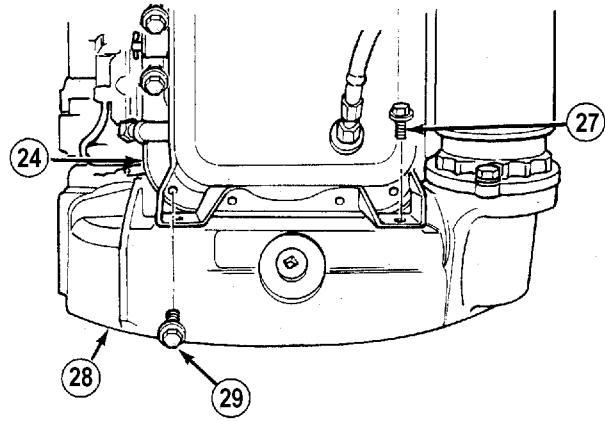


3-22. ENGINE OIL PAN AND GASKET REPLACEMENT (CONT).

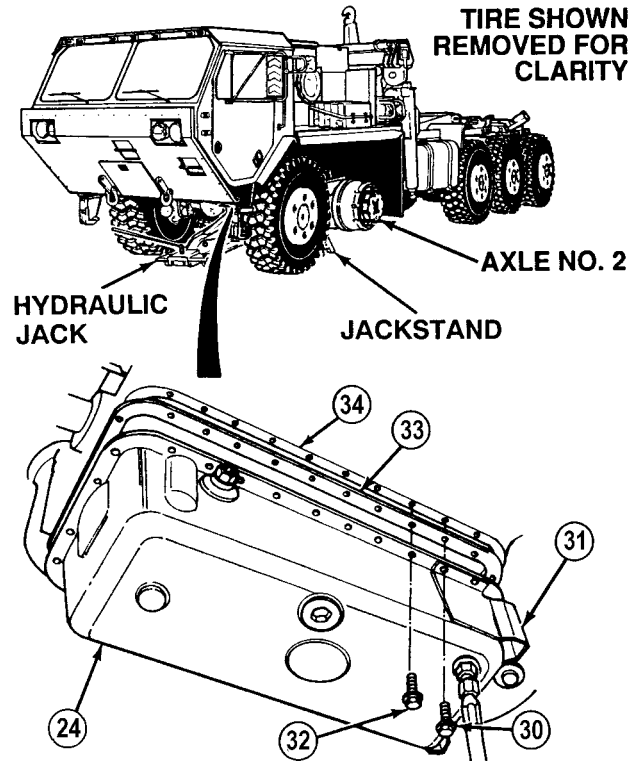
- (11) Disconnect sensor connector (22) and remove sensor (23) from oil pan (24).
- (12) Remove hose 2630 (25) from elbow (26) in oil pan (24).



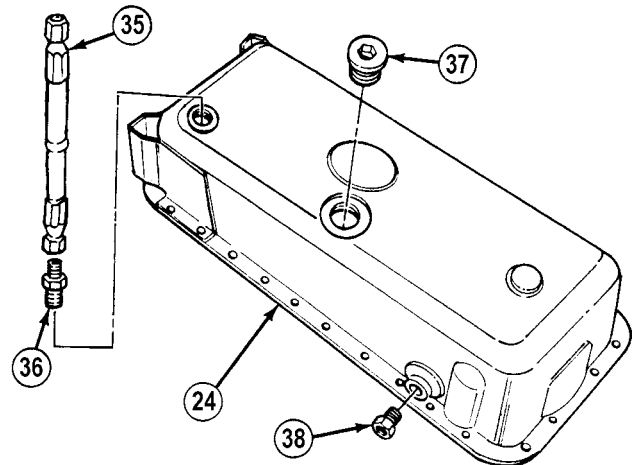
- (13) Remove two screws (27) in flywheel housing (28).
- (14) Remove four screws (29) from rear end of oil pan (24).



- (15) Remove four screws (30) from support bracket (31).
- (16) With the aid of an assistant, remove 20 screws (32) from oil pan (24).
- (17) Position hydraulic jack under Axle No. 2.
- (18) Raise front of truck and position jack stands under Axle No. 2.
- (19) With the aid of an assistant, remove oil pan (24) and gasket (33) from engine block (34). Discard gasket.



- (20) Remove drain hose (35) from adapter (36).
- (21) Remove plug (37), adapter (36) and reducer (38) from oil pan (24).



3-21. ENGINE OIL PAN AND GASKET REPLACEMENT (CONT).

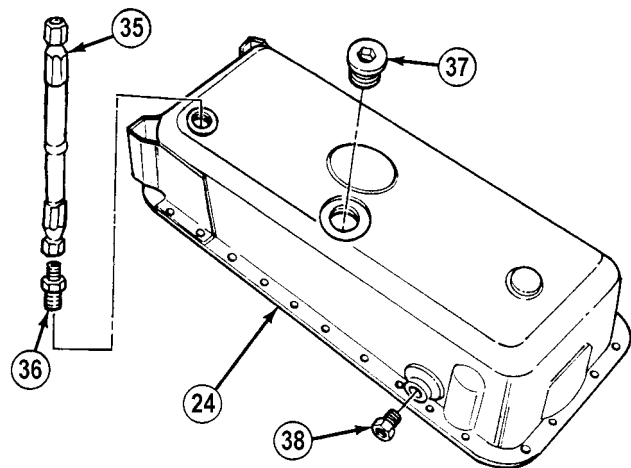
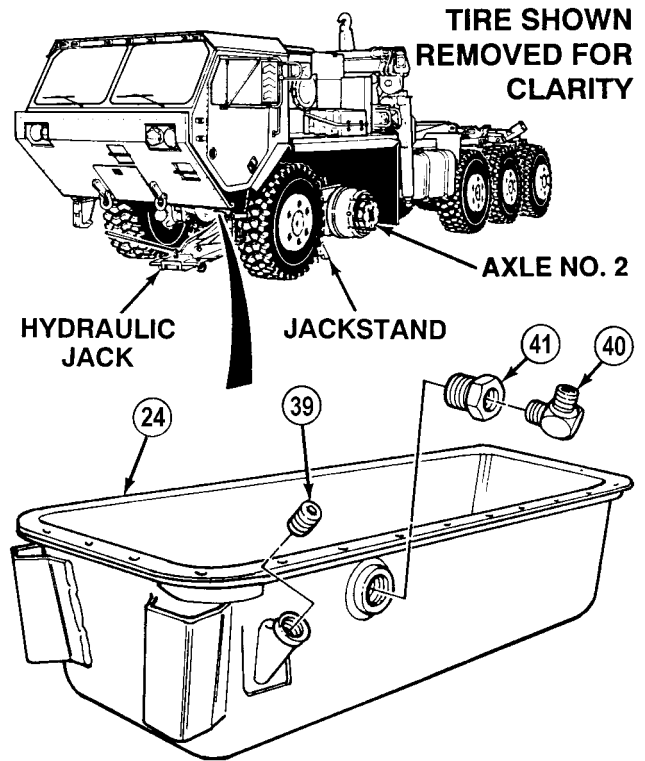
- (22) Remove plug (39), elbow (40) and reducer (41) from oil pan (24).
- (23) Raise front axle and remove jackstands from front axle and lower front of truck to ground.

b. Installation.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

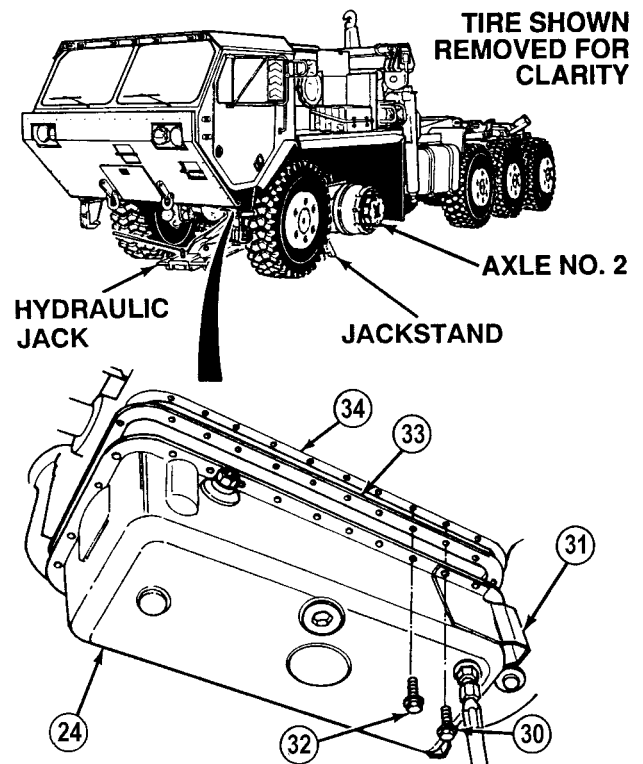
- (1) Apply sealing compound to threads of plug (39), reducer (41) and elbow (40).
- (2) Install plug (39), reducer (41) and elbow (40) in oil pan (24).
- (3) Apply sealing compound to threads of adapter (36), reducer (38) and plug (37).
- (4) Install adapter (36), reducer (38) and plug (37) in oil pan (24).
- (5) Install drain hose (35) on adapter (36) in oil pan (24).



- (6) Apply grease to mating surface of oil pan (24).
- (7) Position gasket (33) on oil pan (24).
- (8) Position jack under Axle No. 2 and raise front of truck and position jackstands under front axle.
- (9) With the aid of an assistant, position oil pan (24) and gasket (33) on engine block (34).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (10) Apply sealing compound to threads of screws (30) and (32).

NOTE

- All screws must be installed in original locations.
 - Screw lengths are given to ensure screws are installed in proper location in oil pan.
- (11) Center and position two (1 in. [25 mm]) screws (32) on each side of oil pan (24).
 - (12) Position four (1.135 in. [28.829 mm]) screws (30) in support bracket (31).
 - (13) Position 18 (1 in. [25 mm]) screws (32) in each side of oil pan (24).

3-22. ENGINE OIL PAN AND GASKET REPLACEMENT (CONT).

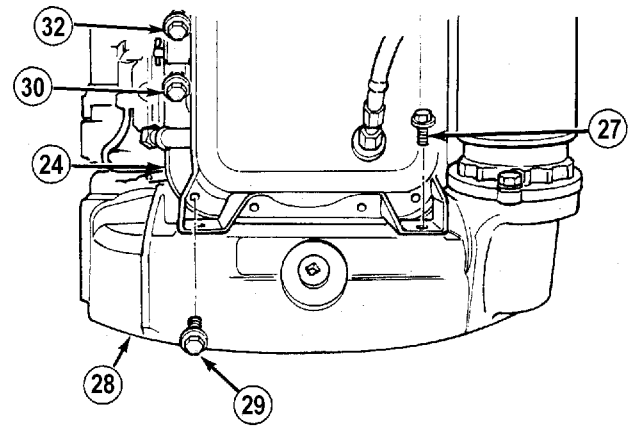
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

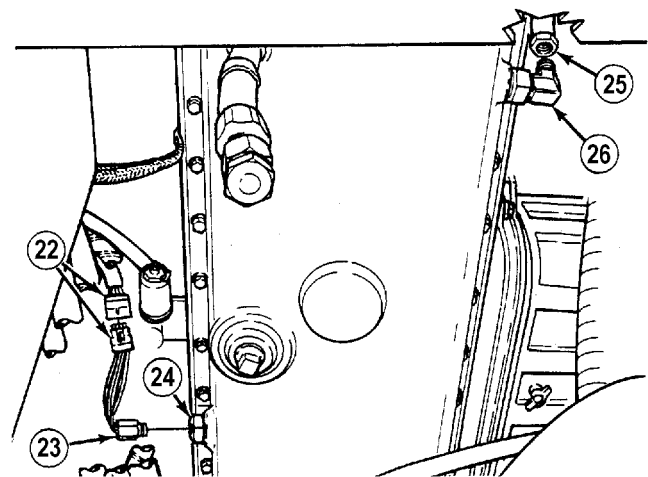
- (14) Apply sealing compound to four screws (29).
- (15) Position four screws (29) in rear of oil pan (24).
- (16) Apply sealing compound to two screws (27).
- (17) Position two screws (27) in flywheel housing (28).

NOTE

Oil pan screws are tightened starting with center screw on each side and working alternately toward each end of oil pan.



- (18) Tighten screws (32), (30) and (27) in oil pan (24) to 120 to 240 lb-in (14 to 27 N·m).
- (19) Apply sealing compound to threads of elbow (26).
- (20) Install elbow (26) in oil pan (24).
- (21) Install hose 2630 (25) on elbow (26).
- (22) Apply sealing compound to threads of sensor (23).
- (23) Install sensor (23) in oil pan (24) and connect sensor connector (22).

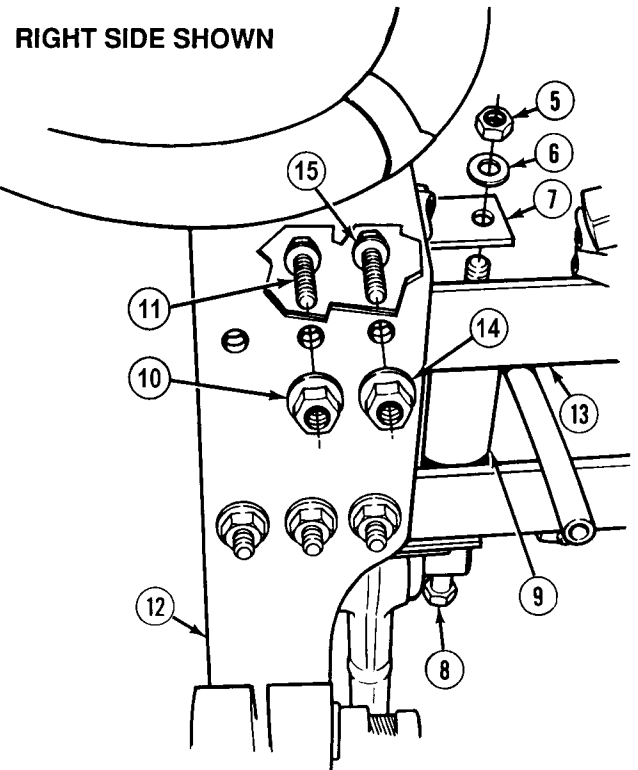
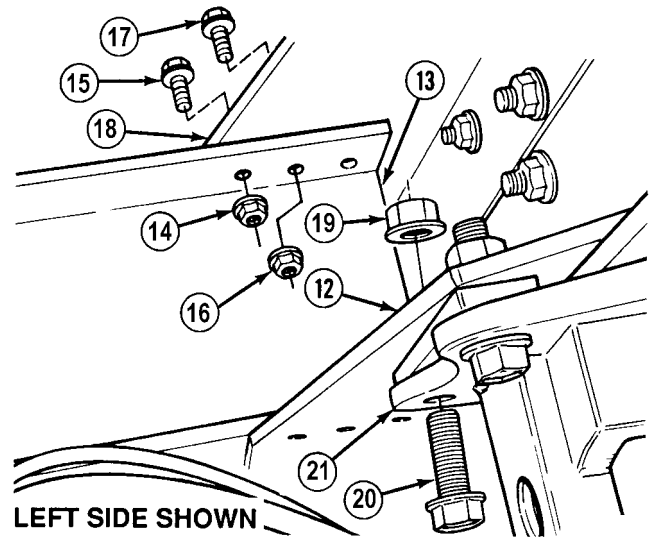


- (24) With the aid of an assistant, position crossmember (13) between gussets (12) and (18).
- (25) Install screw (20) and locknut (19) in spring bracket hanger (21).

NOTE

To install locknuts in top gusset and crossmember, position extension rod through holes in bottom gusset and crossmember.

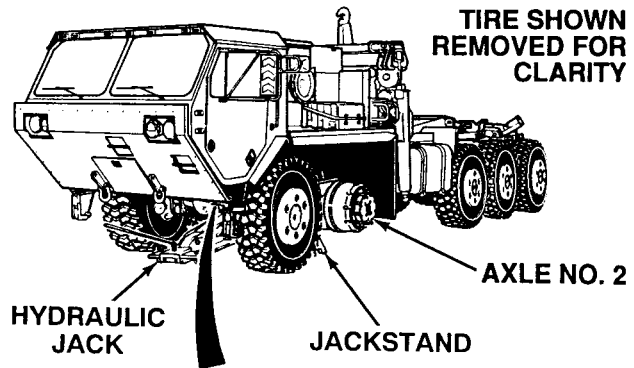
- (26) With the aid of an assistant, install four screws (15) and locknuts (14) in top gusset (18) and crossmember (13).
- (27) With the aid of an assistant, install two screws (17) and locknuts (16) in top gusset (18) and crossmember (13).
- (28) Install four screws (15) and locknuts (14) in bottom gusset (12) and crossmember (13).
- (29) Install two screws (11) and locknuts (10) in bottom gusset (12) and crossmember (13).
- (30) Position two spacers (9) on torque rod screws (8) and push torque rod screws through holes in crossmember (13).
- (31) Install spacer plate (7), two washers (6) and locknuts (5) on torque rod screws (8).



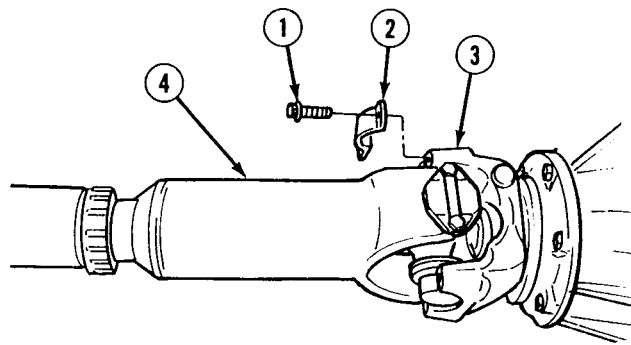
3-22. ENGINE OIL PAN AND GASKET REPLACEMENT (CONT).

WARNING

Driveshafts can weigh up to 100 lbs (45kg). Properly support driveshafts when installing screws. Before screws and brackets are installed, driveshafts can fall and may cause injury to personnel.



- (32) Position front end of driveshaft (4) on Axle No. 1 (3).
- (33) Apply sealing compound to threads of four screws (1).
- (34) Install two straps (2) and four screws (1) on driveshaft (4) and Axle No. 1 (3). Tighten screws to 55 to 60 lb-ft (75 to 81 N·m).
- (35) Raise front of truck with hydraulic jack and remove jackstands from under Axle No. 2.



c. *Follow-On Maintenance:*

- Install brake relay, (TM 9-2320-364-20).
- Fill engine block, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Install front fender skirts, (TM 9-2320-364-20).
- Install left front noise panel, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- Shut OFF engine, (TM 9-2320-364-10).
- Check for oil leaks, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-23. ENGINE OIL BREATHER AND HOSES REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

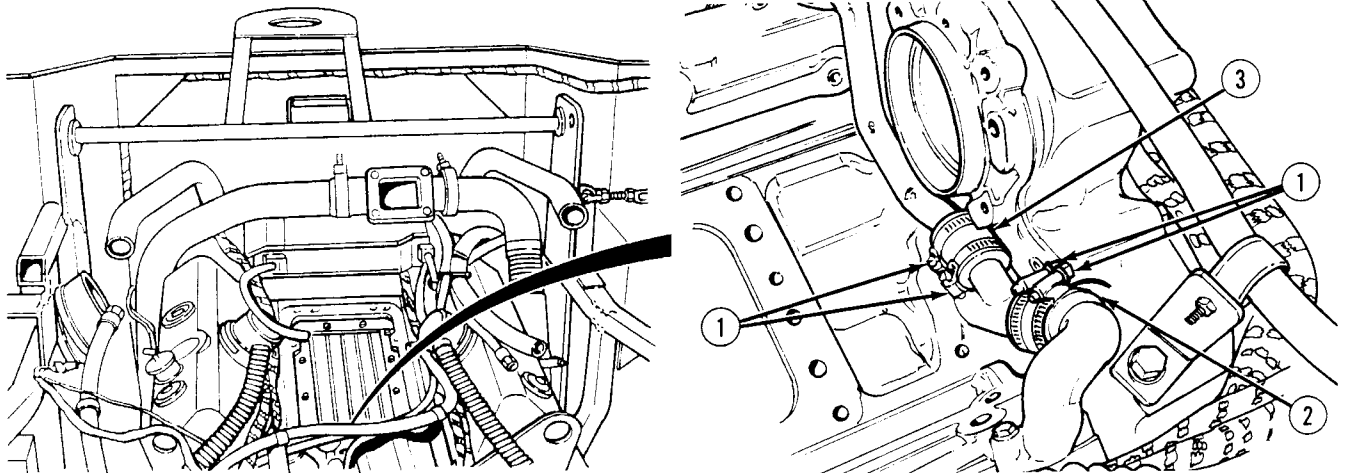
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Blower removed, (Para 4-4)

Materials/Parts

Sealing Compound (Item 53, Appendix B)
Sealing Compound (Item 56, Appendix B)
Gasket (2) (Item 93, Appendix E)
Locknut (Item 176, Appendix E)
Lockwasher (2) (Item 290, Appendix E)

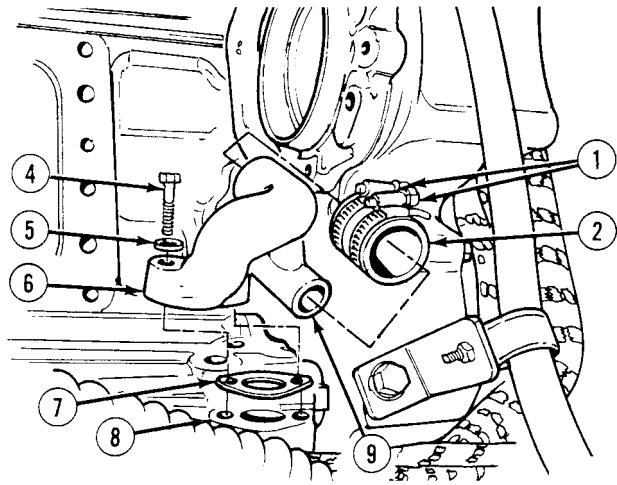
a. Removal.



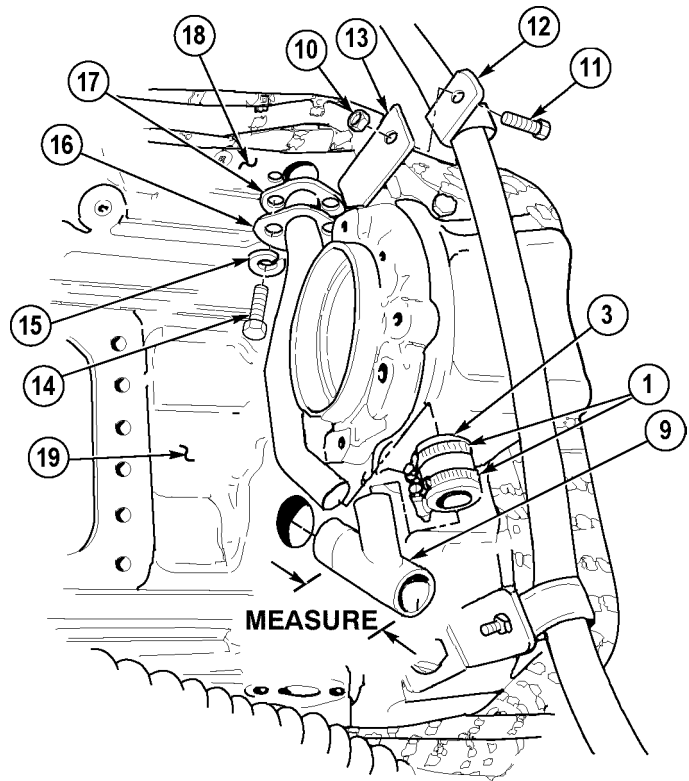
(1) Loosen four clamps (1) on two hoses (2) and (3).

3-23. ENGINE OIL BREATHER AND HOSES REPLACEMENT (CONT).

- (2) Remove two screws (4) and washers (5) from breather elbow (6).
- (3) Remove breather elbow (6) and gasket (7) from left cylinder head (8). Discard gasket.
- (4) Remove hose (2) and two clamps (1) from breather tube (9).



- (5) Remove locknut (10), screw (11) and cushion clip (12) from bracket (13). Discard locknut.
- (6) Remove two screws (14) and lockwashers (15) from breather tube (16). Discard lockwashers.
- (7) Remove breather tube (16) and gasket (17) from right cylinder head (18). Discard gasket.
- (8) Remove hose (3) and two clamps (1) from breather tube (16).



NOTE

Perform Steps (9) and (10) only if breather tube is damaged.

- (9) Measure and record height of breather tube (9) extending from engine block (19).
- (10) Remove breather tube (9) from engine block (19).

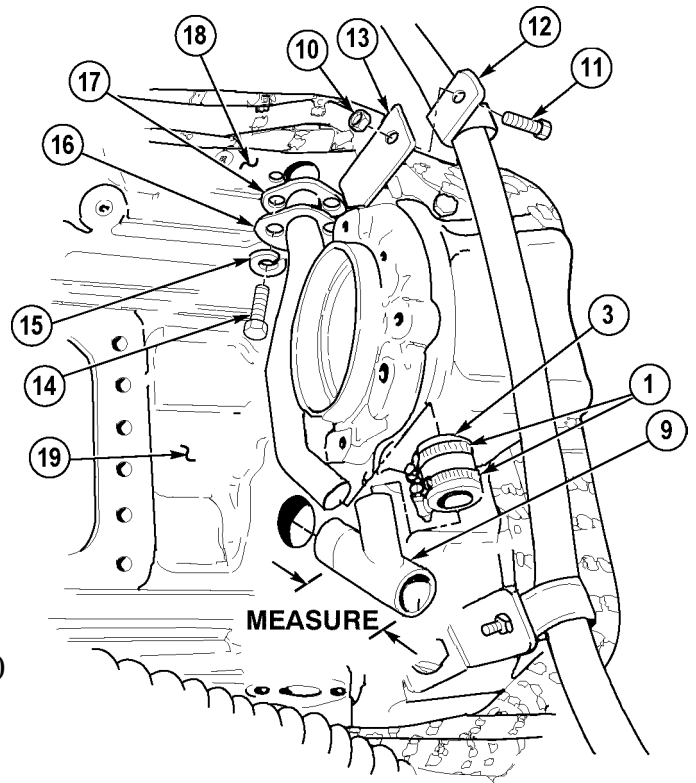
b. *Installation.***WARNING**

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

Perform Steps (1) and (2) only if breather tube was removed.

- (1) Apply sealing compound to breather tube (9).
- (2) Install breather tube (9) in engine block (19) to height noted during removal.
- (3) Position hose (3) and two clamps (1) on breather tube (16).
- (4) Apply sealing compound to two screws (14).
- (5) Install cushion clip (12) on bracket (13) with locknut (10) and screw (11).
- (6) Install gasket (17) and breather tube (16) in right cylinder head (18) with two lockwashers (15) and screws (14). Tighten screws to 60 lb-in (7 N·m).

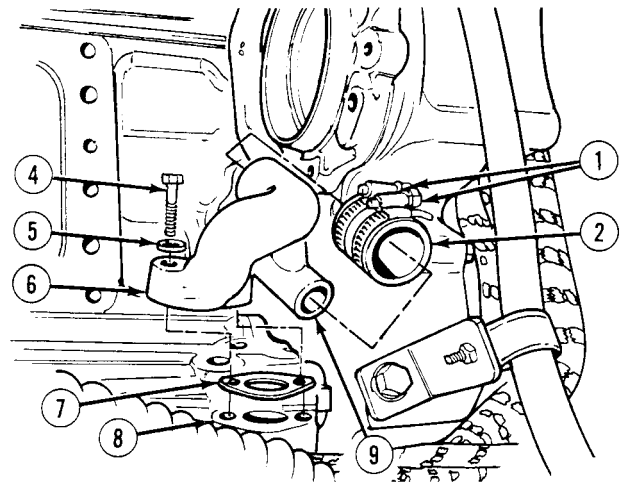


3-23. ENGINE OIL BREATHER AND HOSES REPLACEMENT (CONT).

- (7) Position hose (2) and two clamps (1) on breather tube (9).

WARNING

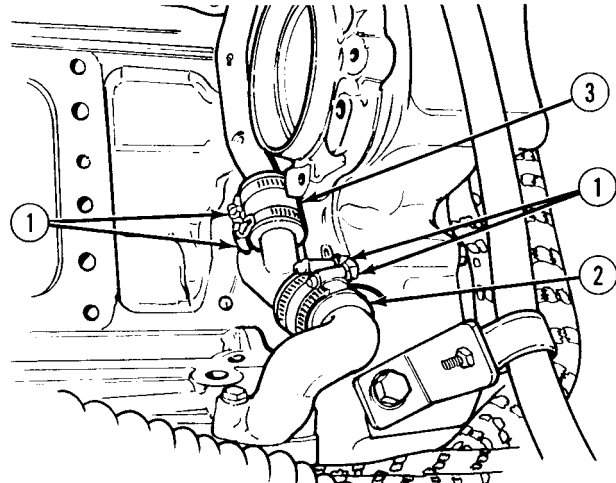
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



- (8) Apply sealing compound to two screws (4).

- (9) Install gasket (7) and breather elbow (6) on left cylinder head (8) with two washers (5) and screws (4). Tighten screws to 60 lb-in (7 N·m).

- (10) Position two hoses (2) and (3) and four clamps (1) in original position as shown. Tighten four clamps (1).



c. Follow-On Maintenance:

- Install blower, (Para 4-4).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-24. ENGINE OIL FILLER TUBE REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

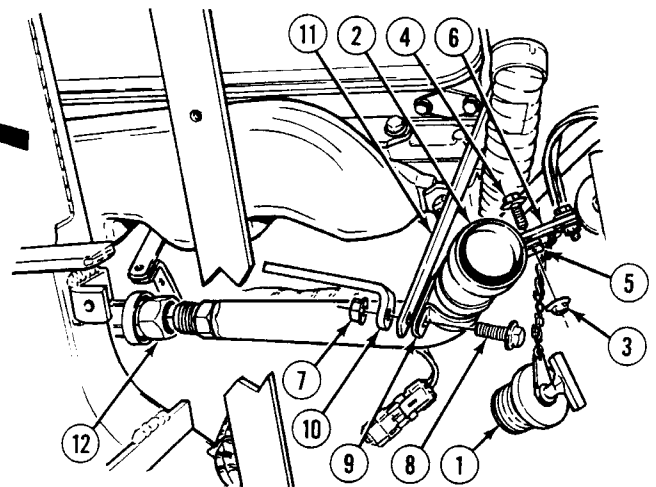
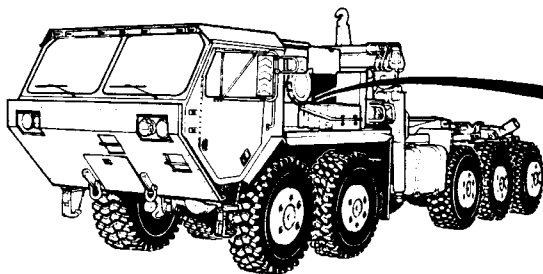
Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Combination, 1-7/16 in.
(Item 259, Appendix F)
Wrench, Combination, 1-1/2 in.
(Item 260, Appendix F)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Engine oil dipstick and dipstick tube
removed, (Para 3-25)

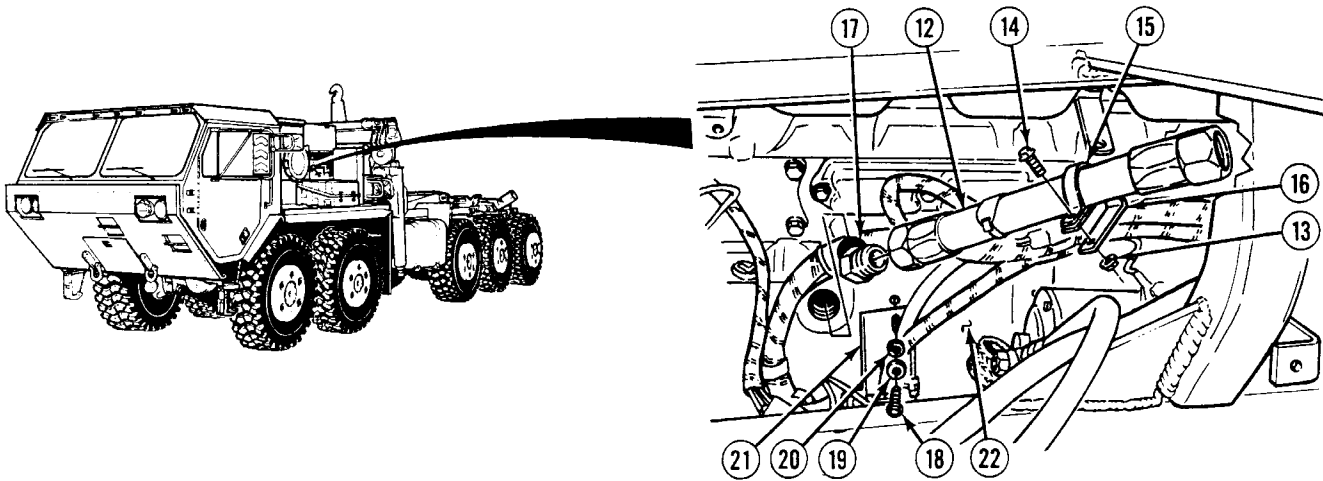
Materials/Parts

Sealing Compound (Item 53, Appendix B)
Locknut (2) (Item 201, Appendix E)
Locknut (Item 210, Appendix E)
Lockwasher (2) (Item 251, Appendix E)

a. Removal.

- (1) Remove filler cap (1) from filler tube (2).
- (2) Remove locknut (3), screw (4) and clamp (5) from bracket (6). Discard locknut.
- (3) Remove locknut (7), screw (8), clamp (9) and bracket (10) from bracket (11). Discard locknut.
- (4) Remove filler tube (2) and two clamps (5) and (9) from hose 2999 (12).
- (5) Remove two clamps (5) and (9) from filler tube (2).

3-24. ENGINE OIL FILLER TUBE REPLACEMENT (CONT).



- (6) Remove locknut (13), screw (14) and clamp (15) from bracket (16). Discard locknut.
- (7) Remove clamp (15) from filler hose 2999 (12).
- (8) Remove filler hose 2999 (12) from elbow (17).
- (9) Remove two screws (18), lockwashers (19), washers (20) and bracket (21) from engine block (22). Discard lockwashers.

NOTE

Mark position of elbow prior to removal.

- (10) Remove elbow (17) from engine block (22).

b. Installation.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

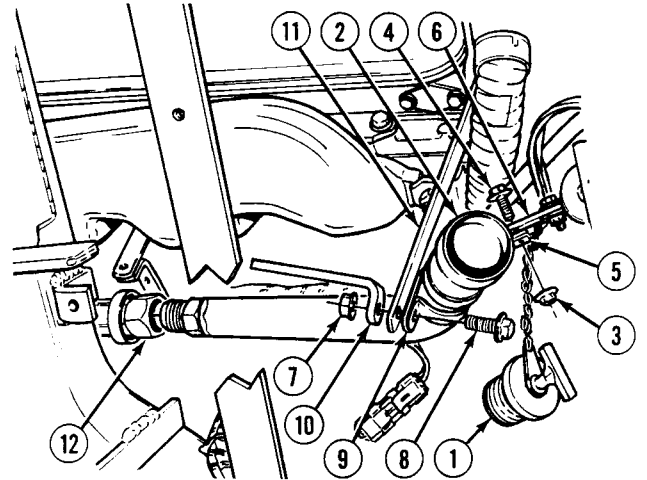
- (1) Apply sealing compound to threads of elbow (17).

NOTE

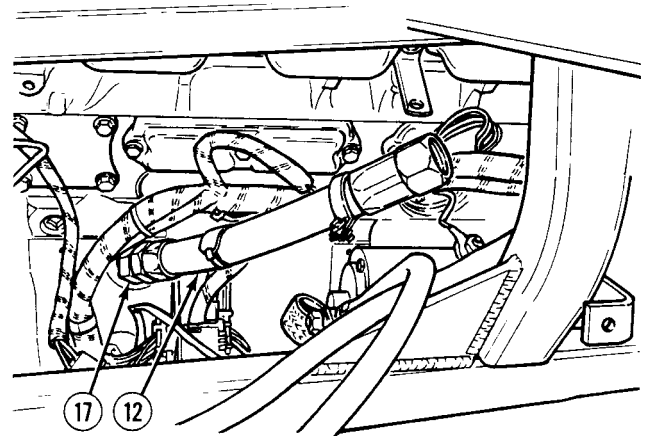
Install elbow in same position as noted during removal.

- (2) Install elbow (17) in engine block (22).
- (3) Install bracket (21) on engine block (22) with two washers (20), lockwashers (19) and screws (18).
- (4) Position filler hose 2999 (12) on elbow (17).
- (5) Position clamp (15) on filler hose 2999 (12).
- (6) Install clamp (15) on bracket (16) with screw (14) and locknut (13).

- (7) Position two clamps (5) and (9) on filler tube (2).
- (8) Install filler tube (2) and two clamps (5) and (9) on filler hose 2999 (12).
- (9) Install bracket (10) and clamp (9) on bracket (11) with screw (8) and locknut (7).
- (10) Install clamp (5) on bracket (6) with screw (4) and locknut (3).
- (11) Install filler cap (1) on filler tube (2).



- (12) Tighten filler hose 2999 (12) at elbow (17).



c. Follow-On Maintenance:

- Install engine oil dipstick and dipstick tube, (Para 3-25).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-25. ENGINE OIL DIPSTICK AND DIPSTICK TUBE REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

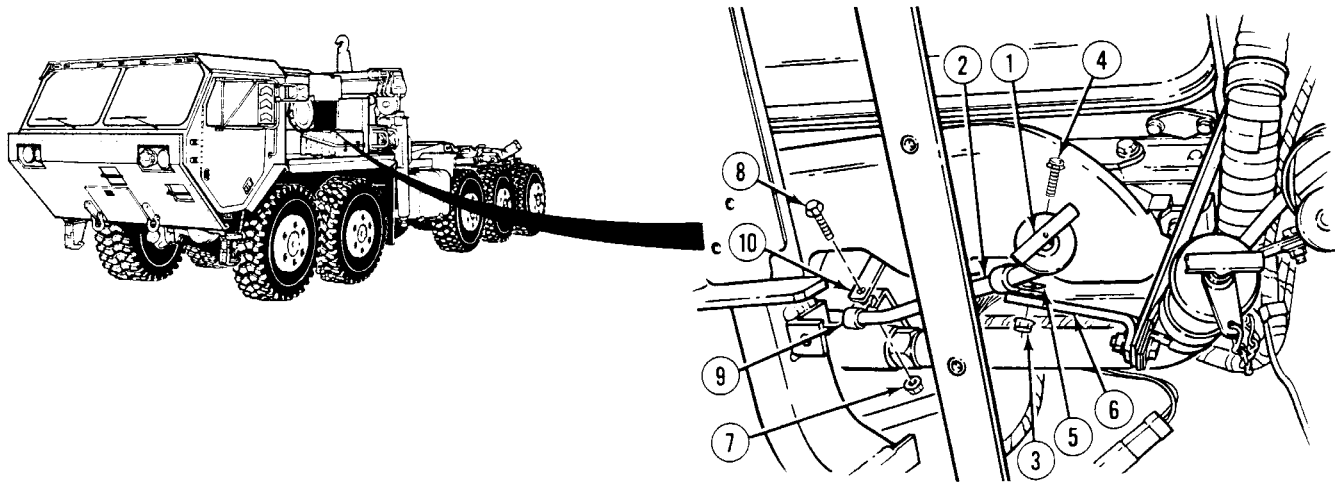
Materials/Parts

Cable Ties (Item 8, Appendix B)
Sealing Compound (Item 53, Appendix B)
Copper Washer (Item 35, Appendix E)
Locknut (Item 201, Appendix E)
Locknut (Item 210, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left side noise panel removed,
(TM 9-2320-364-20)
Left front noise panel removed,
(TM 9-2320-364-20)

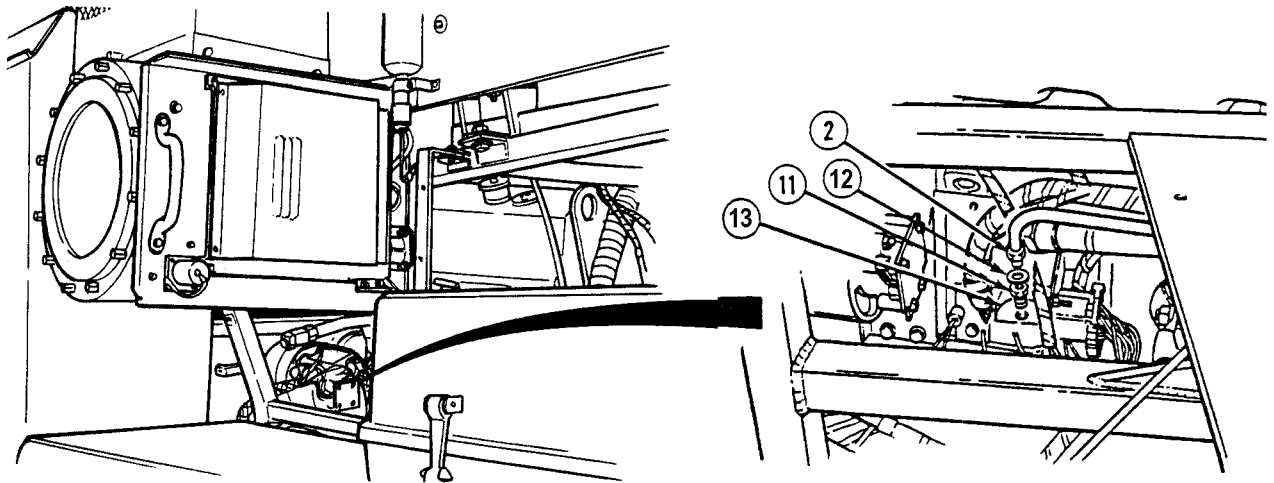
a. Removal.



NOTE

Remove cable ties as required.

- (1) Remove engine oil dipstick (1) from filler neck (2).
- (2) Remove locknut (3), screw (4) and clamp (5) from bracket (6). Discard locknut.
- (3) Remove locknut (7), screw (8) and clamp (9) from bracket (10). Discard locknut.
- (4) Remove two clamps (5) and (9) from filler neck (2).



- (5) Remove filler neck (2) from adapter (11).

NOTE

Some engines do not have copper washers.

- (6) Remove adapter (11) and copper washer (12) from engine block (13). Discard copper washer.

b. Installation.



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

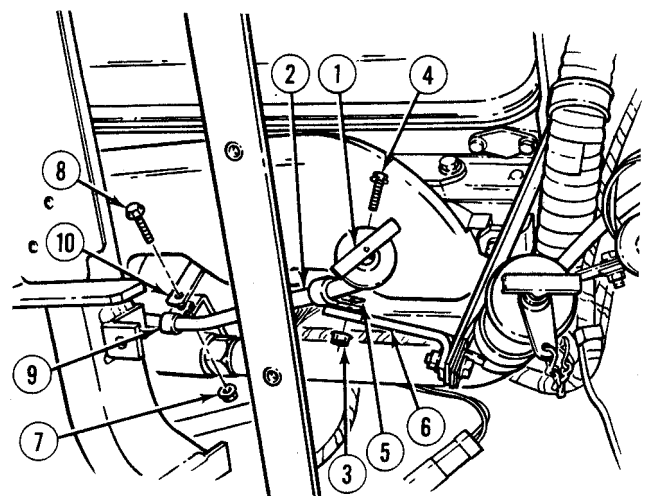
Install cable ties as required.

- (1) Apply sealing compound to threads of adapter (11).
- (2) Install adapter (11) in engine block (13).

NOTE

Some engines did not have copper washers. Copper washers can be installed on all engines to reduce oil seepage.

- (3) Position filler neck (2) and copper washer (12) in adapter (11).
- (4) Position two clamps (5) and (9) on filler neck (2).
- (5) Install clamp (9) on bracket (10) with screw (8) and locknut (7).
- (6) Install clamp (5) on bracket (6) with screw (4) and locknut (3).
- (7) Tighten filler neck (2) in adapter (11).
- (8) Install engine oil dipstick (1) in filler neck (2).



3-25 ENGINE OIL DIPSTICK AND DIPSTICK TUBE REPLACEMENT. (CONT).

c. Follow-On Maintenance:

- Install left front noise panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-26. ENGINE OIL PUMP REPAIR.

This task covers:

- | | | |
|----------------|------------------------|--------------------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | f. Follow-On Maintenance |

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Indicator, Dial Set w/Magnetic Base
(Item 98, Appendix F)
Pan, Drain 4 Gal (Item 144, Appendix F)
Wrench, Crowsfoot, 3/4 in., 3/8 in. Drive
(Item 268, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

Materials/Parts

Solvent, Drycleaning (Item 68, Appendix B)
Tags, Identification (Item 72, Appendix B)
Gasket (Item 94, Appendix E)
Gasket (2) (Item 95, Appendix E)
Locknut (2) (Item 178, Appendix E)
Lockwasher (2) (Item 283, Appendix E)

Materials/Parts - Continued

Lockwasher (10) (Item 292, Appendix E)
Screw, Self-Locking (Item 554, Appendix E)
Shim (2) (Item 632, Appendix E)
Shim (2) (Item 633, Appendix E)
Shim (2) (Item 634, Appendix E)
Strainer, Element (2) (Item 675, Appendix E)

Personnel Required

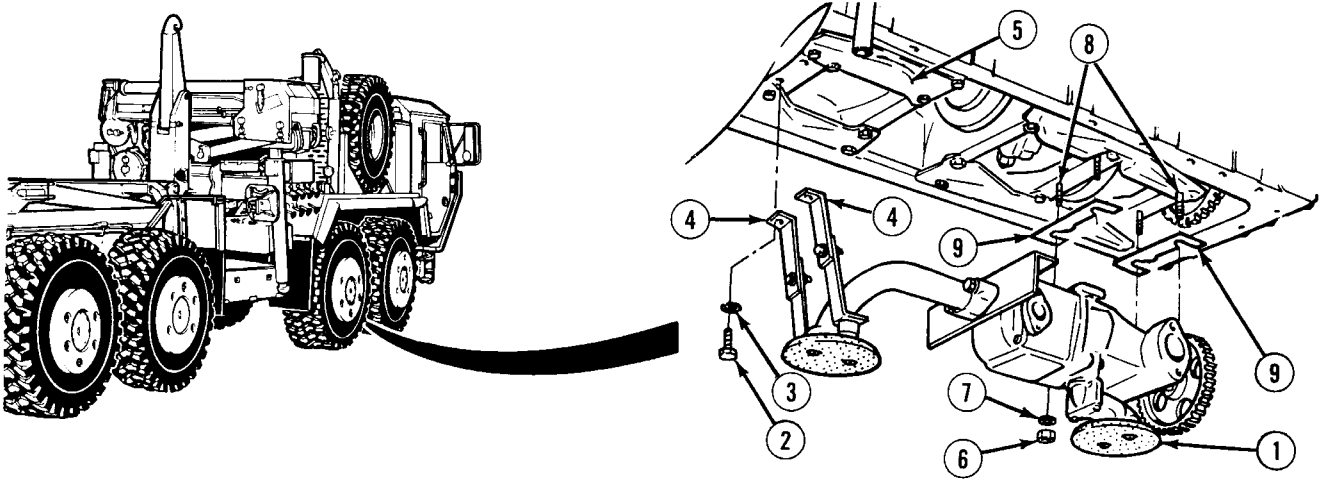
Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Oil pan removed, (Para 3-22)
Oil pressure regulator valve removed,
(Para 3-27)
Oil pressure relief valve removed, (Para 3-28)

3-26. ENGINE OIL PUMP REPAIR (CONT).

a. Removal.



- (1) Position drain pan under oil pump (1).
- (2) Remove two screws (2) and lockwashers (3) from oil tube brackets (4) on main bearing cap (5). Discard lockwashers.
- (3) With the aid of an assistant, remove four nuts (6) and lockwashers (7) from main bearing cap studs (8) and support oil pump (1). Discard lockwashers.

NOTE

A small amount of oil will be in the oil pump when removed.

- (4) With the aid of an assistant, remove oil pump (1) from main bearing cap studs (8).

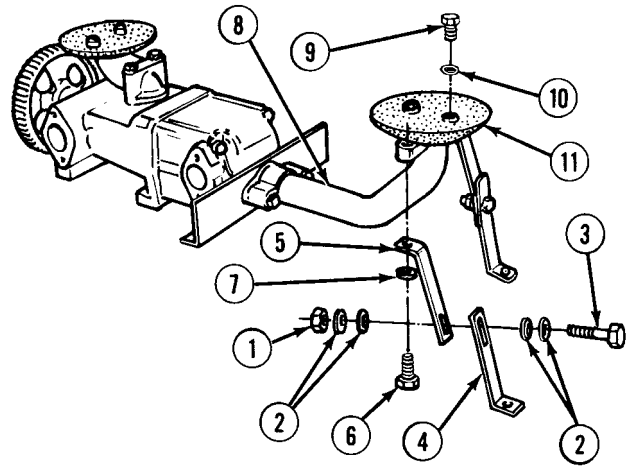
NOTE

Shims are mounted between the oil pump mounting feet and main bearing cap. Tag and mark shims after removal.

- (5) Remove shims (9) from oil pump (1).

b. Disassembly.

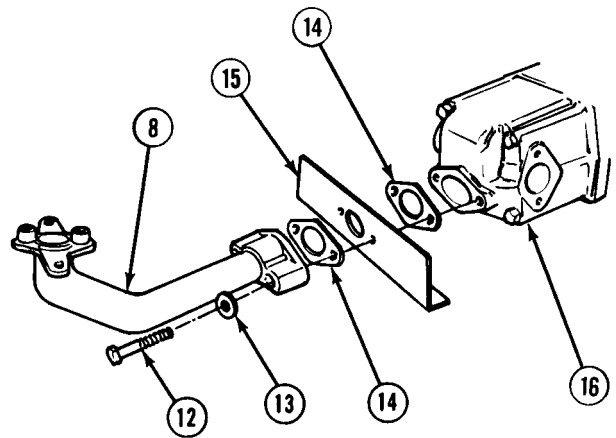
- (1) Remove two locknuts (1), four washers (2), two screws (3) and bracket extensions (4) from brackets (5). Discard locknuts.
- (2) Remove two screws (6), lockwashers (7) and brackets (5) from tube assembly (8). Discard lockwashers.
- (3) Remove two self-locking screws (9), washers (10) and strainer (11) from tube assembly (8). Discard self-locking screws and strainer.



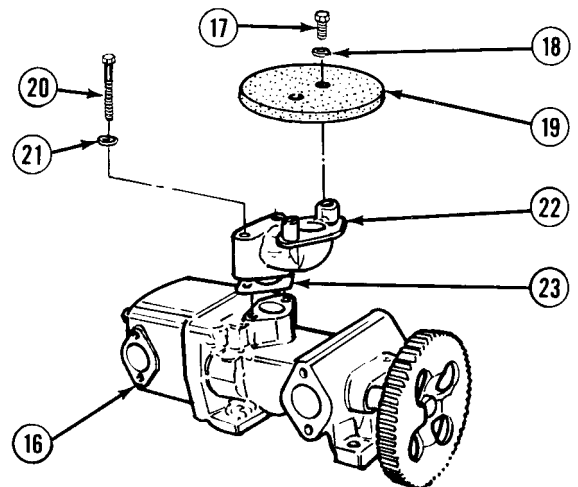
NOTE

Place drain pan under oil baffle to catch excess oil.

- (4) Remove two screws (12), lockwashers (13), tube assembly (8), two gaskets (14) and oil baffle (15) from oil pump (16). Discard lockwashers and gaskets.



- (5) Remove two self-locking screws (17), washers (18) and strainer (19) from oil pump (16). Discard self-locking screws and strainer.
- (6) Remove two screws (20), lockwashers (21), strainer adapter (22) and gasket (23) from oil pump (16). Discard lockwashers and gasket.



3-26. ENGINE OIL PUMP REPAIR (CONT).

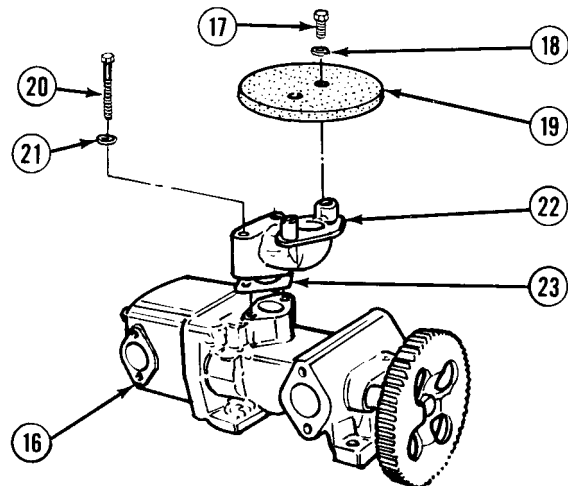
c. Cleaning/Inspection.

WARNING

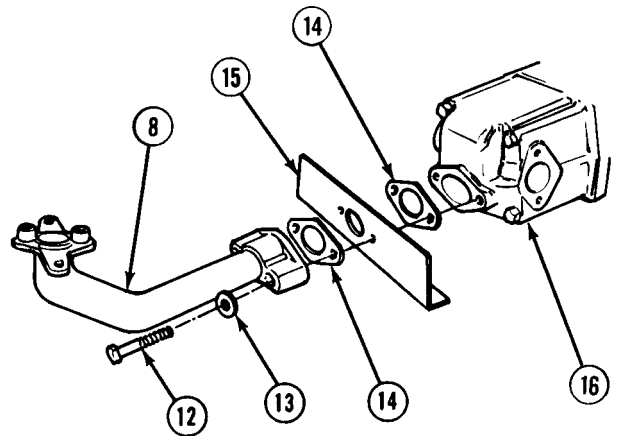
- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent. The flashpoint for Type II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- (1) Clean all parts with drycleaning solvent and allow to air dry.
 - (2) Inspect oil pump for cracks or other damage.
 - (3) Inspect drive gear for worn or broken gear teeth.
 - (4) Replace all damaged parts.

d. Assembly.

- (1) Install gasket (23) and strainer adapter (22) on oil pump (16) with two lockwashers (21) and screws (20).
- (2) Install strainer (19) on strainer adapter (22) with two washers (18) and self-locking screws (17).



- (3) Install two gaskets (14), baffle (15) and tube assembly (8) on oil pump (16) with two lockwashers (13) and screws (12).

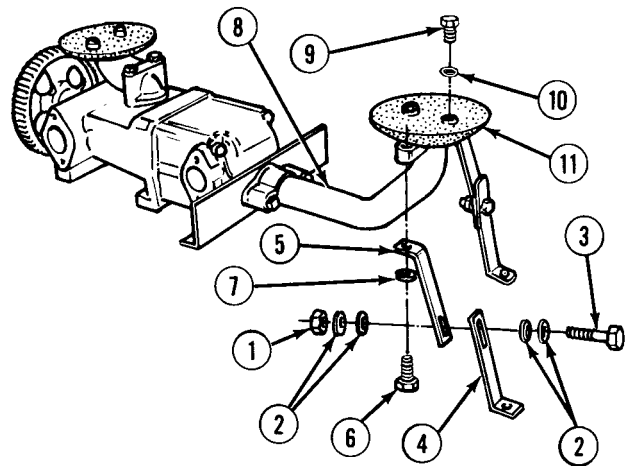


- (4) Install strainer (11) on tube assembly (8) with two washers (10) and self-locking screws (9).
- (5) Install two brackets (5) on tube assembly (8) with two lockwashers (7) and screws (6).

NOTE

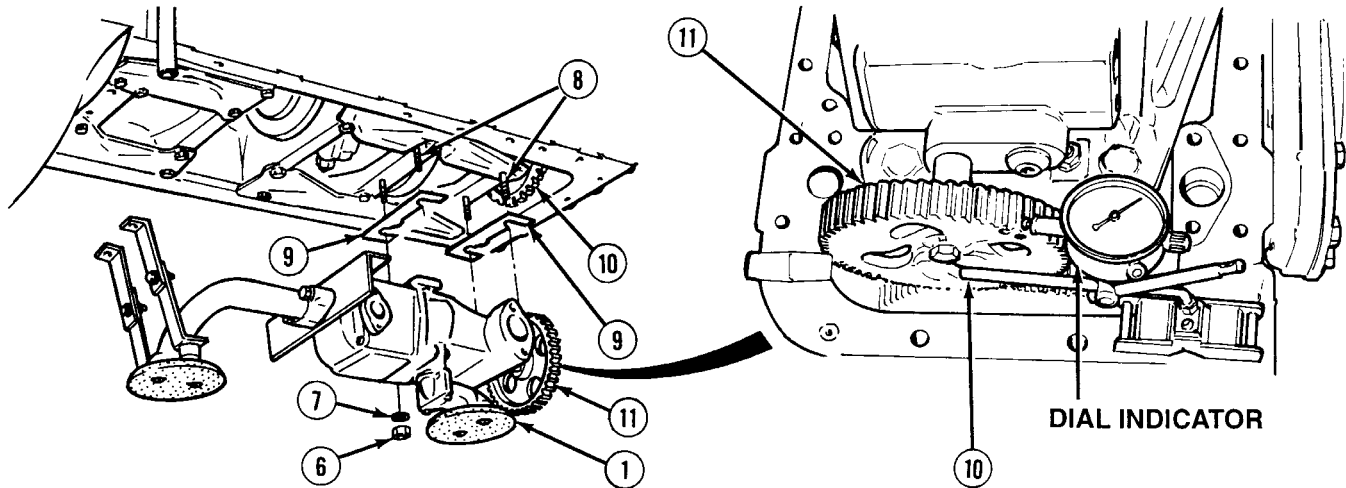
Adjustment of brackets will be done in *e. Installation*.

- (6) Install two bracket extensions (4) on brackets (5) with two screws (3), four washers (2) and two locknuts (1).



3-26. ENGINE OIL PUMP REPAIR (CONT).

e. Installation.



- (1) With the aid of an assistant, position oil pump (1) on main bearing cap studs (8).
- (2) With the aid of an assistant, hold oil pump (1) and install four lockwashers (7) and nuts (6) on oil pump (1) and main bearing cap studs (8).
- (3) Tighten four nuts (6) to 27 lb-ft (37 N·m).

NOTE

Backlash should be 0.006 to 0.012 in. (0.152-0.305 mm).

- (4) Using a dial indicator, measure backlash between crankshaft gear (10) and oil pump drive gear (11).
- (5) Remove four nuts (6) and lockwashers (7) from main bearing cap studs (8). Discard lockwashers.
- (6) Remove oil pump (1) from main bearing cap studs (8).

NOTE

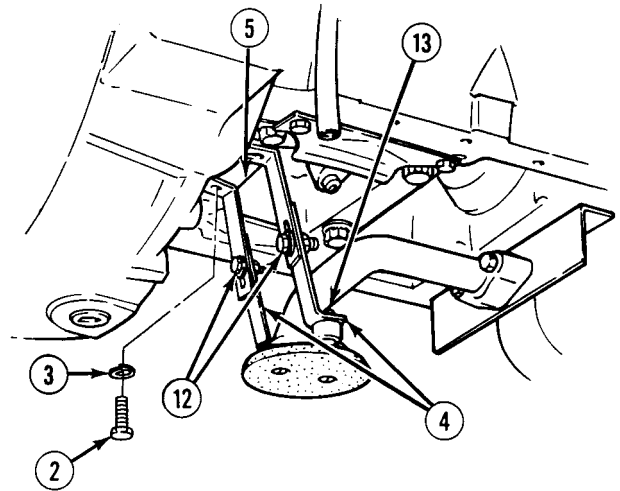
- Each 0.005 in. shim (0.127 mm) changes gear backlash 0.0035 in. (0.0889 mm).
- Add same thickness of shims on front and rear of oil pump.

- (7) Install shims (9) as necessary between oil pump (1) and main bearing cap studs (8).
- (8) Repeat Steps (1) through (3).

NOTE

Perform Steps (9), (11), (13) and (14) if oil tube brackets do not align with screw holes.

- (9) Loosen four nuts (12) and (13) on oil tube brackets (4).
- (10) Install two lockwashers (3) and screws (2) in oil tube brackets (4) and main bearing cap (5).
- (11) Adjust oil tube brackets (4) to seat firmly against main bearing cap (5).
- (12) Tighten two screws (2) on oil tube brackets (4) to 26 to 29 lb-ft (35 to 39 N·m).
- (13) Tighten two nuts (12) on oil tube brackets (4) to 26 to 29 lb-ft (35 to 39 N·m).
- (14) Tighten two nuts (13) on oil tube brackets (4) to 120 to 156 lb-in (14 to 18 N·m).

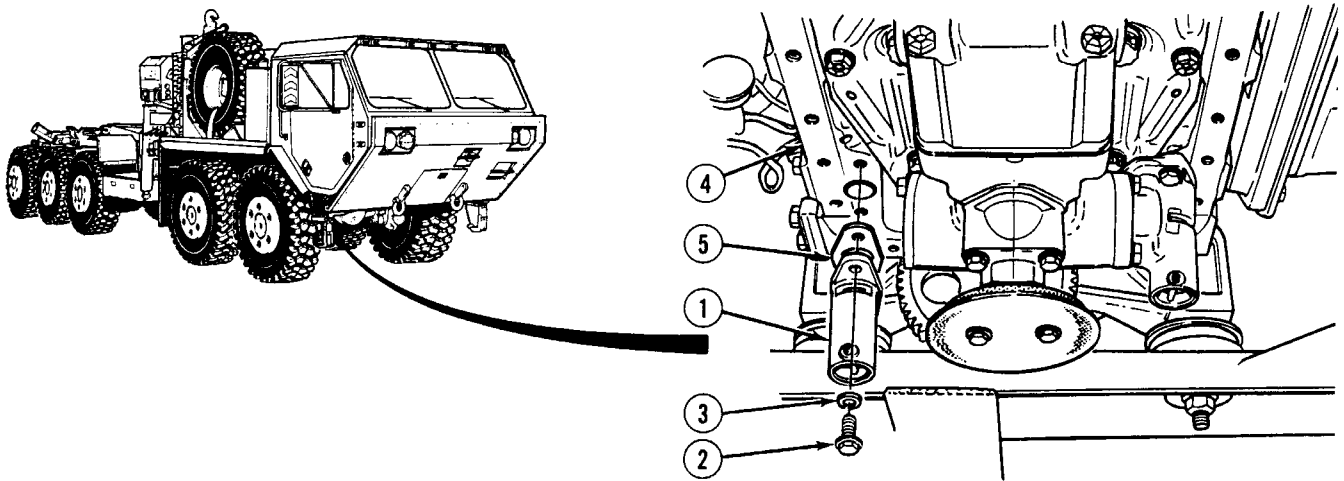


f. Follow-On Maintenance:

- Install oil pressure relief valve, (Para 3-28).
- Install oil pressure regulator valve, (Para 3-27).
- Install oil pan, (Para 3-22).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

b. Installation.



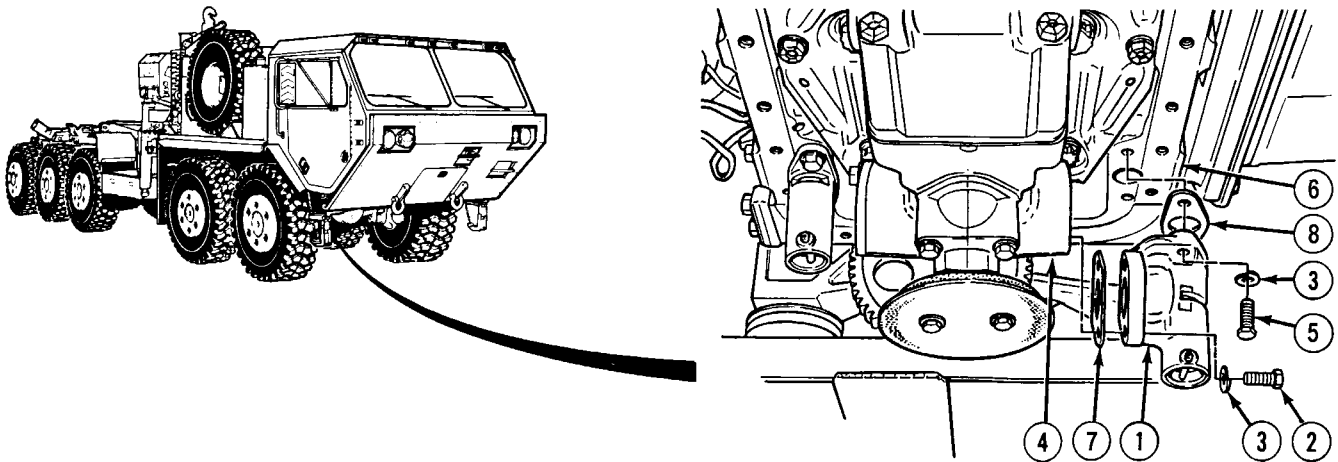
- (1) Position gasket (5) and oil pressure regulator valve (1) on engine block (4).
- (2) Install two lockwashers (3) and screws (2) in oil pressure regulator valve (1), gasket (5) and engine block (4). Tighten screws (2) to 30 to 35 lb-ft (41 to 47 N·m).

c. Follow-On Maintenance:

- Install oil pan, (Para 3-22).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

b. Installation.



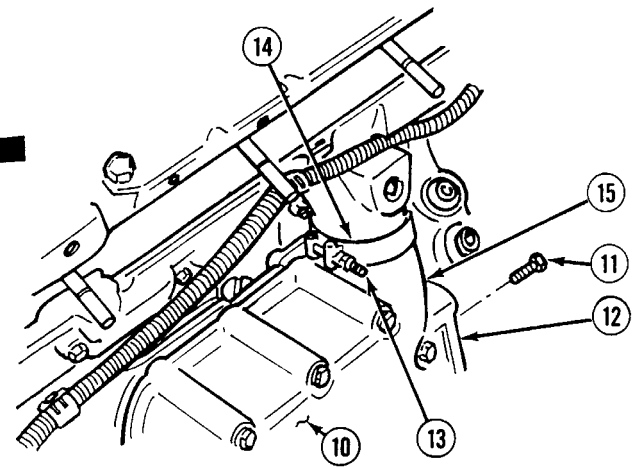
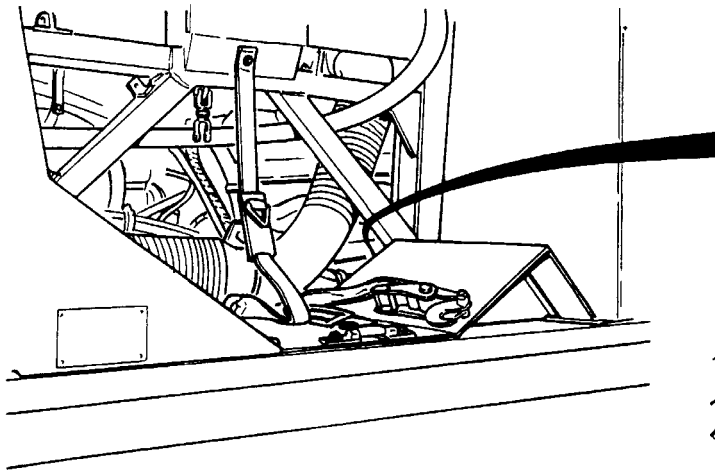
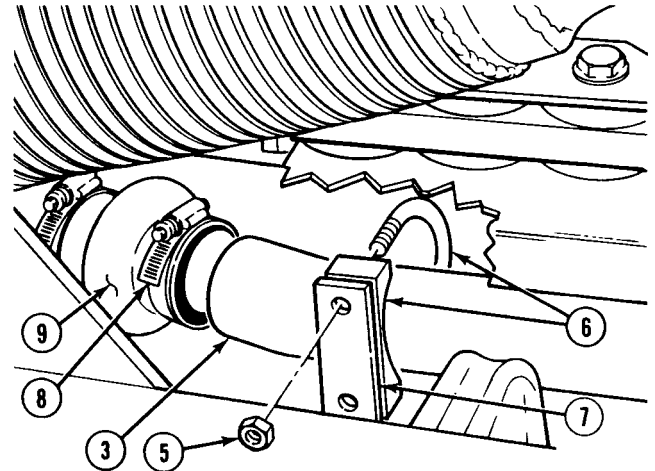
- (1) Apply grease to mating surface of oil pump (4) and engine block (6).
- (2) Position gasket (8) on engine block (6) and gasket (7) on oil pump (4).
- (3) Position oil pressure relief valve (1) on oil pump (4) and engine block (6).
- (4) Position two lockwashers (3) and screws (5) in oil pressure relief valve (1) and engine block (6).
- (5) Position two lockwashers (3) and screws (2) in oil pressure relief valve (1) and oil pump (4).
- (6) Tighten four screws (2) in oil pressure relief valve (1) to 23 to 26 lb-ft (31 to 35 N·m).

c. Follow-On Maintenance:

- Install oil pan, (Para 3-22).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

- (3) Remove two nuts (5) from clamp (6). Discard nuts.
- (4) Remove and discard clamp (6) from bracket (7).
- (5) Loosen clamp (8) on hump hose (9) and remove water hose (3) from hump hose.
- (6) Position water hose (3) to access oil cooler.



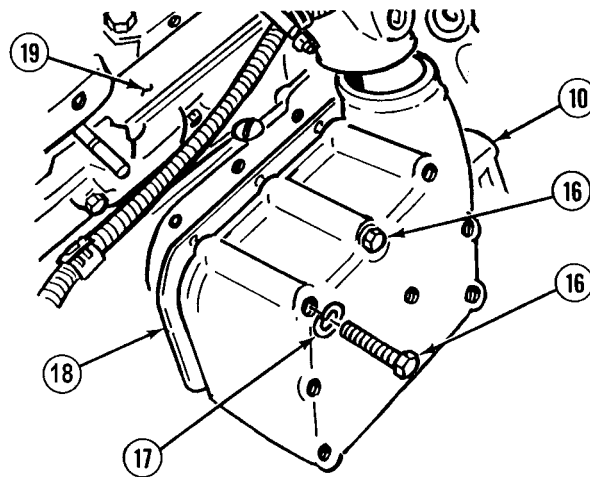
- (7) Position drain pan under oil cooler (10).
- (8) Remove four screws (11) from water inlet housing (12).
- (9) Loosen locknut (13) and remove clamp (14) from water outlet (15) and oil cooler (10). Discard clamp.

3-29. ENGINE OIL COOLER ASSEMBLY REPLACEMENT (CONT).

CAUTION

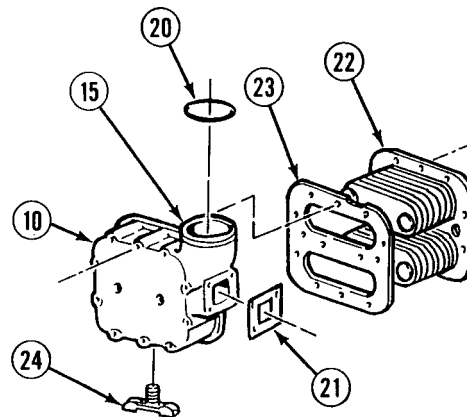
There are 12 screws in oil cooler. Ensure only 11 screws are removed in Step (10) or oil cooler will fall and damage to equipment may occur.

- (10) With the aid of an assistant, remove 11 screws (16) and lockwashers (17) from oil cooler (10). Discard lockwashers.



CAUTION

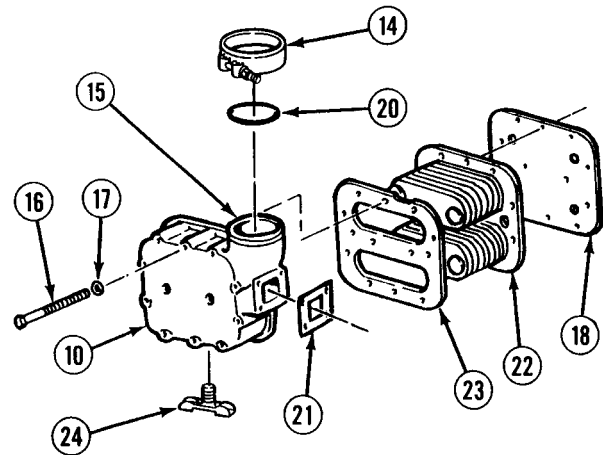
- Inlet and outlet openings in oil cooler are marked "IN" and "OUT". Ensure oil cooler is reinstalled in its original position to prevent oil flow from being reversed. If openings are unidentified, tag and mark them.
- Oil cooler weighs 50 lbs (23 kg). Ensure oil cooler is properly supported upon removal. Oil cooler contains oil cooler core and gaskets which may fall out and cause damage to parts if not supported.



- (11) With the aid of an assistant, remove screw (16), lockwasher (17), oil cooler (10) and gasket (18) from engine (19). Discard gasket and lockwasher.
- (12) Remove and discard seal (20) from water outlet (15).
- (13) Remove and discard gasket (21) from oil cooler (10).
- (14) Remove oil cooler core (22) and gasket (23) from oil cooler (10). Discard gasket.
- (15) Remove drain cock (24) from oil cooler (10).

b. *Installation.***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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (1) Apply sealing compound to drain cock (24).
- (2) Install drain cock (24) in oil cooler (10).
- (3) Install gasket (23) and oil cooler core (22) in oil cooler (10).

NOTE

Two screws are installed in oil cooler in Step (4) for ease of alignment during installation of oil cooler.

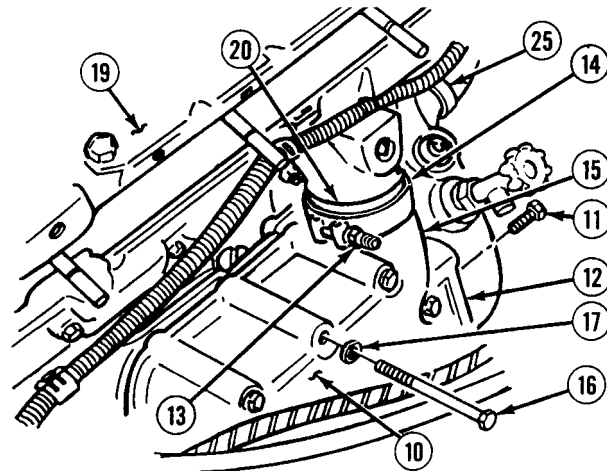
- (4) Position two lockwashers (17) and screws (16) in oil cooler (10).
- (5) Apply light coat of grease on gasket (21).
- (6) Install gasket (21) on oil cooler (10).
- (7) Apply grease to gasket (18).
- (8) Position gasket (18) on oil cooler (10).
- (9) Install seal (20) on water outlet (15).
- (10) Position clamp (14) over seal (20).

3-29. ENGINE OIL COOLER ASSEMBLY REPLACEMENT (CONT).

CAUTION

- Inlet and outlet openings in oil cooler are marked “IN” and “OUT”. Ensure oil cooler is installed as noted during removal to prevent oil flow from being reversed.
- Oil cooler weighs 50 lbs (23 kg). Ensure oil cooler is properly supported upon installation. Oil cooler contains oil cooler core and gaskets which may fall out and cause damage to parts if not supported.

- (11) With the aid of an assistant, position oil cooler (10) on engine (19) and install ten lockwashers (17) and screws (16) in oil cooler (10).
- (12) Tighten 12 screws (16) in oil cooler (10) to 10 to 13 lb-ft (14 to 18 N·m).
- (13) Position seal (20) over water outlet (15) and oil cooler (10).
- (14) Tighten locknut (13) on clamp (14).
- (15) Loosen lower hose clamp (25) so water inlet housing (12) can be installed.

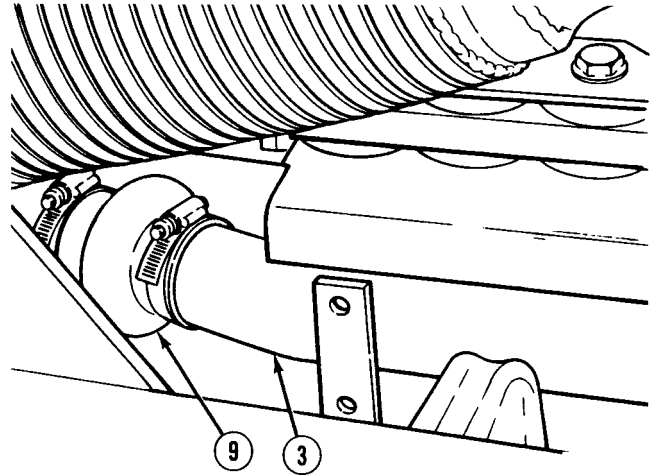


WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (16) Apply sealing compound to four screws (11).
- (17) Install four screws (11) in water inlet housing (12). Tighten screws to 23 to 26 lb-ft (31 to 35 N·m).
- (18) Tighten lower hose clamp (25) to 40 lb-in (5 N·m).

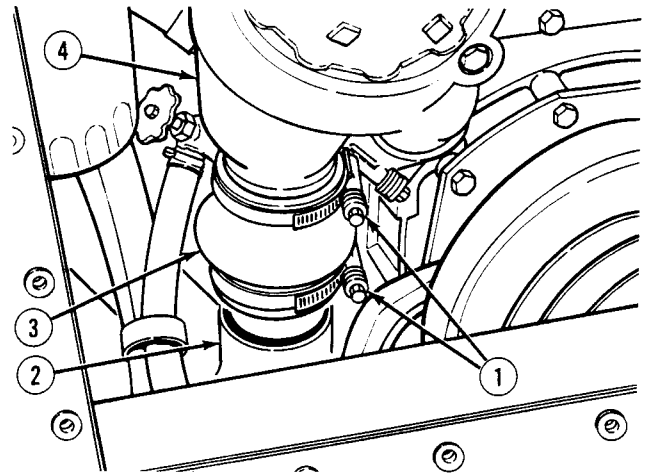
- (19) Position water hose (3) in hump hose (9).



- (20) Install hump hose (3) and two clamps (1) on water pump (4).

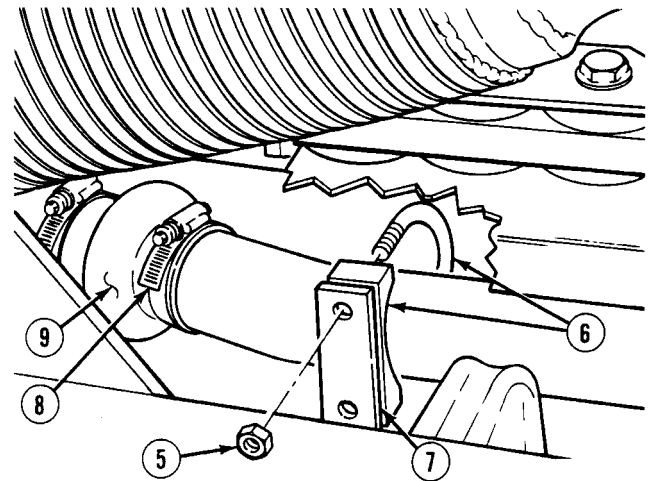
- (21) Position water hose (2) in hump hose (3) on water pump (4). Tighten two clamps to 100 lb-in (11 N·m).

- (22) Tighten two clamps (1) to 100 lb-in (11 N·m).



- (23) Install clamp (6) on bracket (7) with two nuts (5).

- (24) Tighten clamp (8) on hump hose (9) to 100 lb-in (11 N·m).



3-29. ENGINE OIL COOLER ASSEMBLY REPLACEMENT (CONT).

c. Follow-On Maintenance:

- Install right front fender skirt, (TM 9-2320-364-20).
- Install right side noise panel, (TM 9-2320-364-20).
- Install exhaust tubes, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Install spare tire, (TM 9-2320-364-10).
- Fill cooling system, (TM 9-2320-364-20).
- Check for leaks, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-30. ENGINE OIL COOLER ADAPTER REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Bit Set, Screwdriver (Item 17, Appendix F)
Goggles, Industrial (Item 83, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N-m])
(Item 277, Appendix F)

Materials/Parts

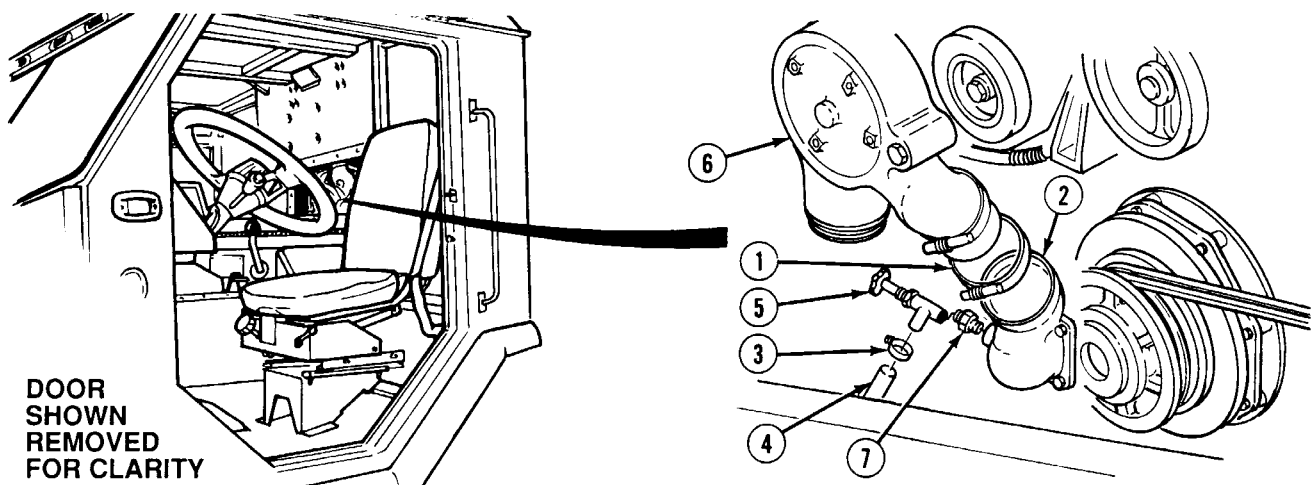
Grease (Item 21, Appendix B)
Sealing Compound (Item 53, Appendix B)
Sealing Compound (Item 56, Appendix B)
Gasket (2) (Item 83, Appendix E)

Materials/Parts - Continued

Gasket (Item 112, Appendix E)
Gasket (Item 114, Appendix E)
Lockwasher (2) (Item 292, Appendix E)
Lockwasher (8) (Item 293, Appendix E)
Spring (Item 666, Appendix E)
Washer, Flat (Item 694, Appendix E)

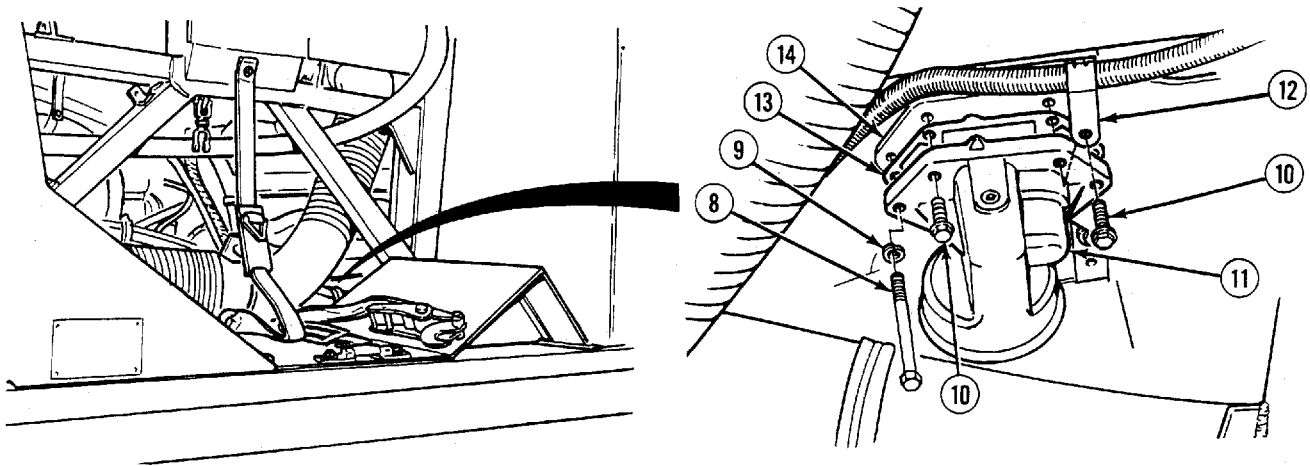
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Oil filter removed, (TM 9-2320-364-20)
Oil cooler removed, (Para 3-29)

a. Removal.

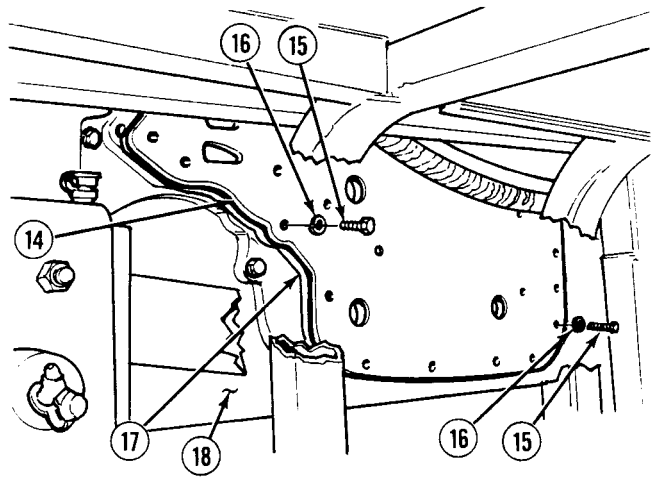
- (1) Remove upper hose clamp (1) from oil cooler outlet elbow (2).
- (2) Remove hose clamp (3) and hose (4) from angle valve (5).
- (3) Remove oil cooler outlet elbow (2) from water pump (6).
- (4) Remove angle valve (5) from adapter (7).
- (5) Remove adapter (7) from oil cooler outlet elbow (2).

3-30. ENGINE OIL COOLER ADAPTER REPLACEMENT (CONT).



(6) Remove two screws (8), lockwashers (9), four screws (10) oil filter head (11), cushion clip (12) and gasket (13) from oil cooler adapter cover (14). Discard lockwashers and gasket.

(7) Remove eight screws (15), lockwashers (16), oil cooler adapter cover (14) and gasket (17) from engine (18). Discard lockwashers and gasket.



- (8) Remove three screws (19) and washers (20) from oil cooler adapter plate (21).

CAUTION

Use extreme caution when removing oil cooler adapter plate from engine. Ensure oil cooler adapter plate is fully supported upon removal of three screws or component may fall and damage to parts may occur.

- (9) Remove three screws (22), oil cooler adapter plate (21), two gaskets (23) and spacers (24) and (25) from engine (18). Discard gaskets.

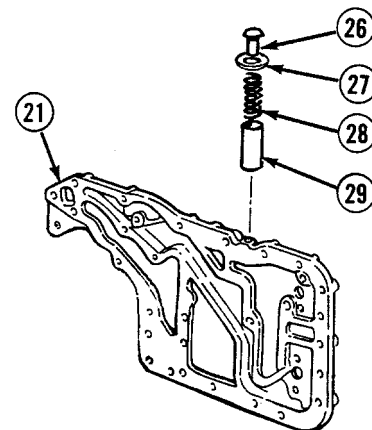
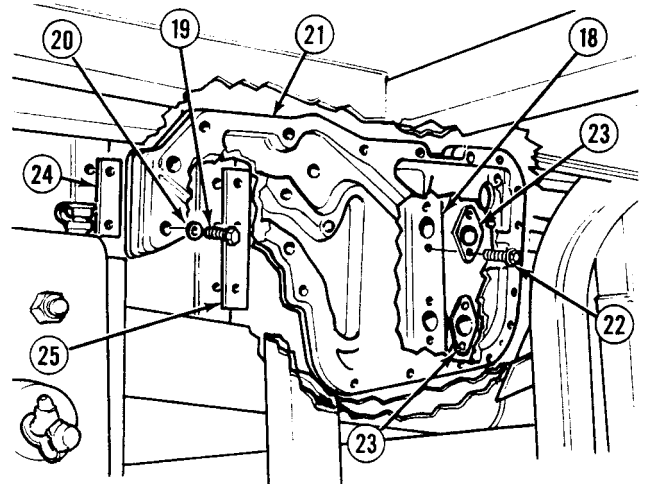
WARNING

Use extreme care when removing spring from oil cooler adapter plate. Spring is under tension and can act as a projectile when released. Ensure all personnel wear proper eye protection to prevent possible injury to personnel.

- (10) Remove plug (26), washer (27), spring (28) and valve (29) from oil cooler adapter plate (21). Discard spring and washer.

b. Installation.

- (1) Install valve (29), spring (28), washer (27) and plug (26) in oil cooler adapter plate (21). Tighten 25 to 30 lb-ft (34 to 41 N·m).

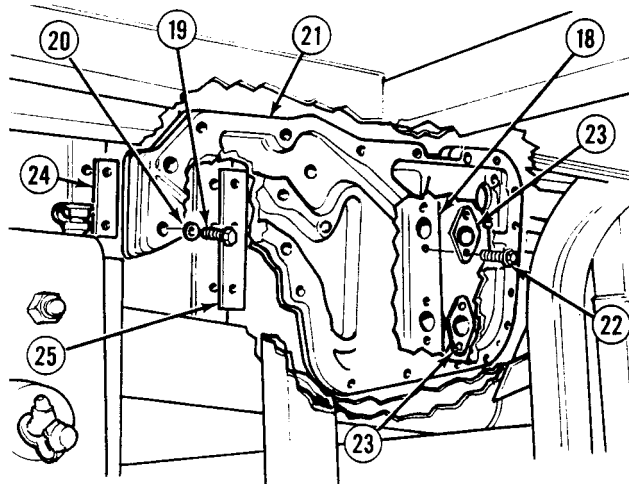


3-30. ENGINE OIL COOLER ADAPTER REPLACEMENT (CONT).

- (2) Apply grease to two gaskets (23).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



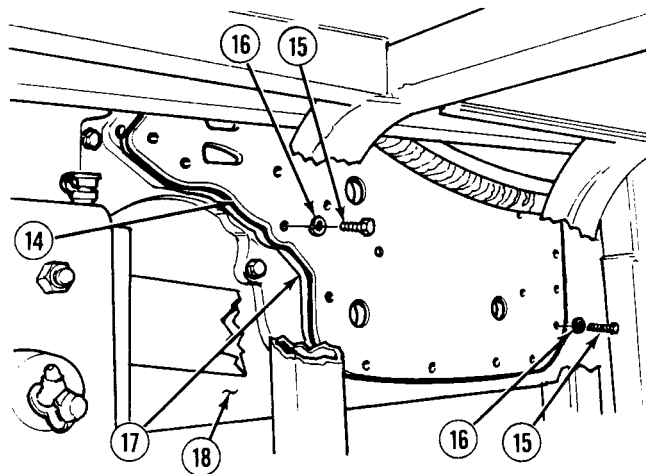
- (3) Apply sealing compound to threads of three screws (22).

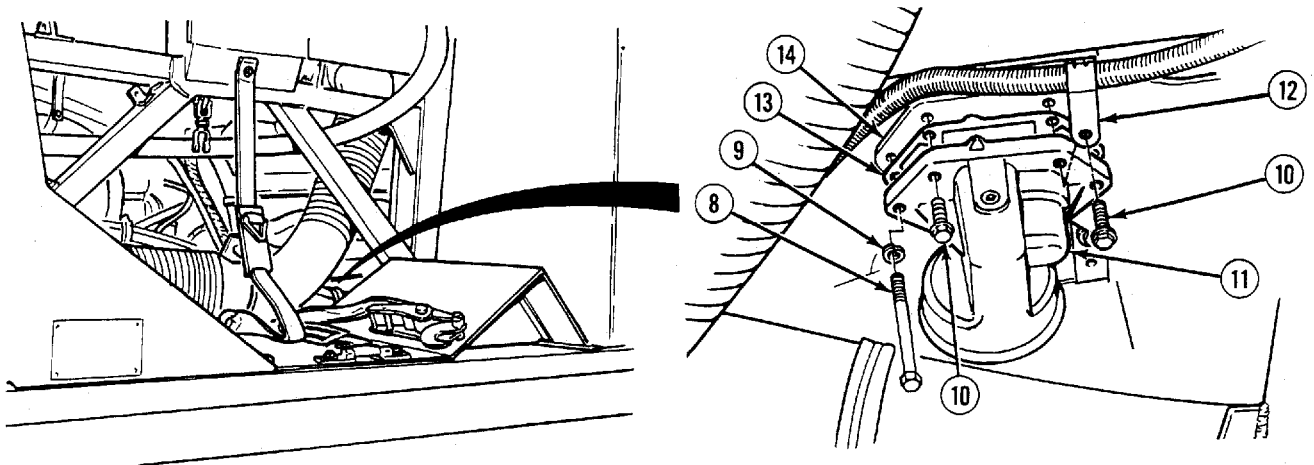
- (4) Install spacers (24) and (25), gaskets (23) and oil cooler adapter plate (21) on engine (18) with three screws (22). Tighten screws to 30 to 35 lb-ft (41 to 47 N·m).

- (5) Apply sealing compound to three screws (19).

- (6) Install three washers (20) and screws (19) in oil cooler adapter plate (21). Tighten screws to 30 to 35 lb-ft (41 to 47 N·m).

- (7) Position gasket (17) and oil cooler adapter cover (14) on engine (18) with eight lockwashers (16) and screws (15).

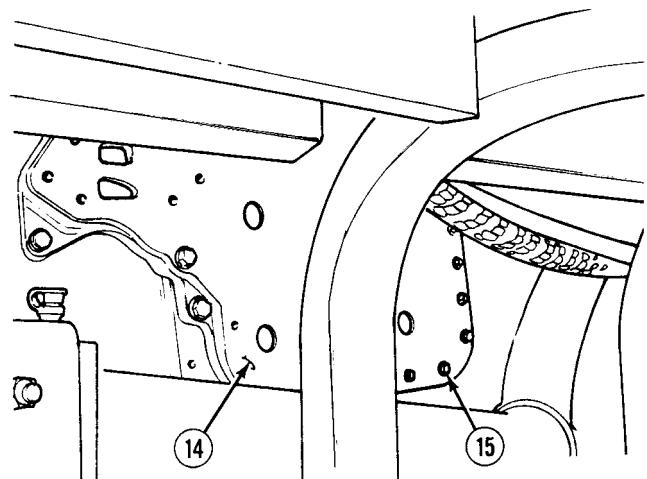




WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

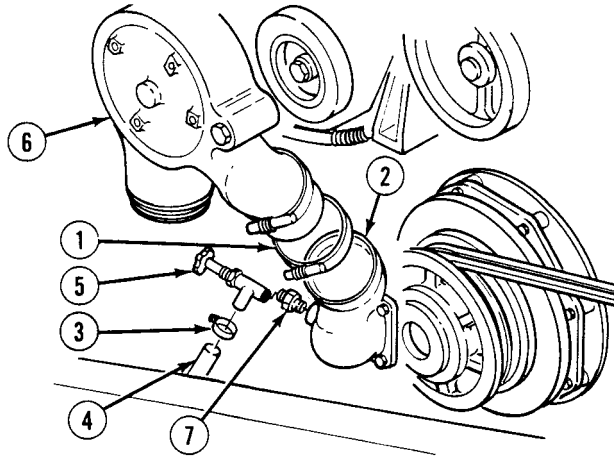
- (8) Apply sealing compound to four screws (10).
- (9) Install gasket (13), cushion clip (12) and oil filter head (11) on oil cooler adapter cover (14) with two lockwashers (9), screws (8) and four screws (10). Tighten screws to 30 to 35 lb-ft (41 to 47 N·m).
- (10) Tighten eight screws (15) on oil cooler adapter cover (14) to 12 to 16 lb-ft (16 to 22 N·m).



3-30. ENGINE OIL COOLER ADAPTER REPLACEMENT (CONT).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (11) Apply sealing compound to threads of adapter (7) and angle valve (5).
- (12) Install adapter (7) in oil cooler elbow (2).
- (13) Install angle valve (5) in adapter (7).
- (14) Position upper hose clamp (1) on oil cooler elbow (2).
- (15) Position oil cooler elbow (2) on water pump (6).
- (16) Install hose (4) and hose clamp (3) on angle valve (5).
- (17) Tighten upper hose clamp (1) on oil cooler elbow (2).

c. *Follow-On Maintenance:*

- Install oil cooler, (Para 3-29).
- Install oil filter, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-31. EXHAUST MANIFOLD REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

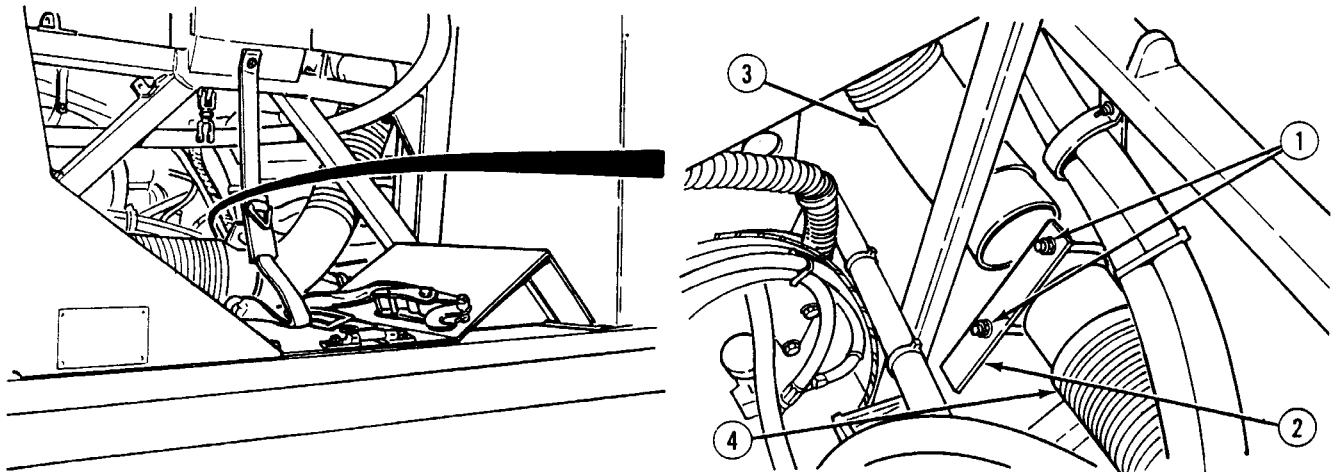
Materials/Parts

Gasket (2) (Item 87, Appendix E)
Locknut (2) (Item 176, Appendix E)
Locknut (10) (Item 191, Appendix E)

Equipment Condition

Engine cold, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Spare tire removed, (for right exhaust manifold only) (TM 9-2320-364-10)
Right side noise panel removed, (for right exhaust manifold only) (TM 9-2320-364-20)
Left side noise panel removed, (for left exhaust manifold only) (TM 9-2320-364-20)
Left front noise panel removed, (for left exhaust manifold only) (TM 9-2320-364-20)

a. Removal.

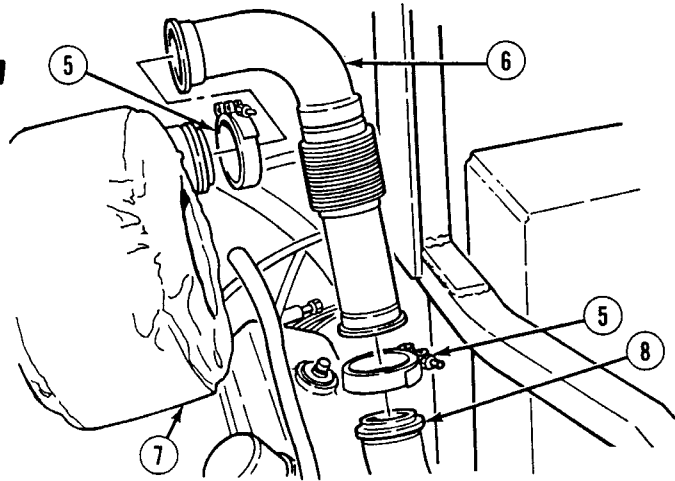
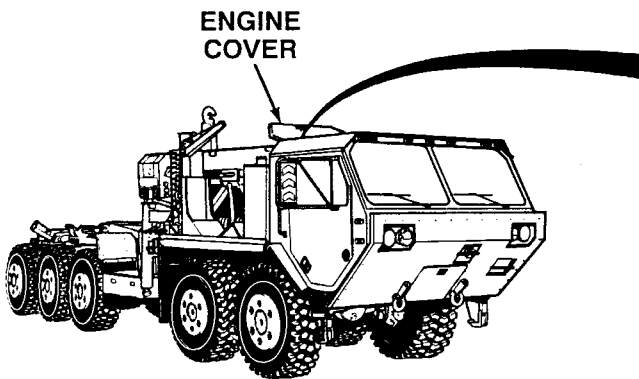


NOTE

- Perform Step (1) for right exhaust manifold only.
- Left and right side manifolds are removed the same way. Right side shown.

(1) Remove two locknuts (1) on clamp (2) and remove turbo outlet tube (3) from turbo outlet tube (4). Discard locknuts.

3-31. EXHAUST MANIFOLD REPLACEMENT (CONT).

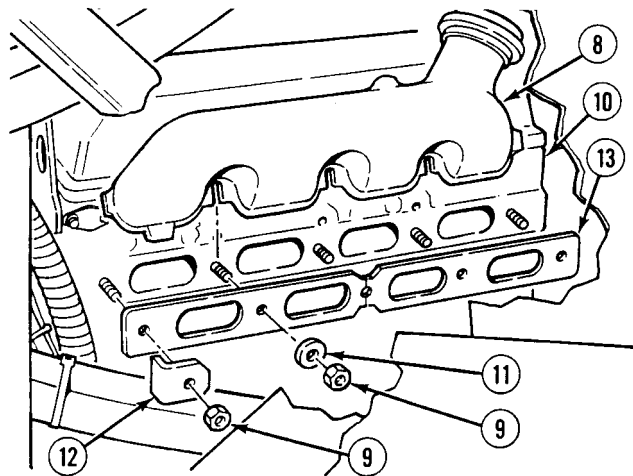


- (2) Open engine cover and loosen two clamps (5) and remove turbo intake tube (6) from turbocharger (7) and exhaust manifold (8).
- (3) Loosen five locknuts (9) on exhaust manifold (8).
- (4) Remove exhaust manifold (8) from cylinder head (10).

NOTE

Center locknut on the left side has a bracket.

- (5) Remove five locknuts (9) three washers (11) and two crabs (12) from cylinder head (10). Discard locknuts.
- (6) Remove and discard two gaskets (13) from cylinder head (10).

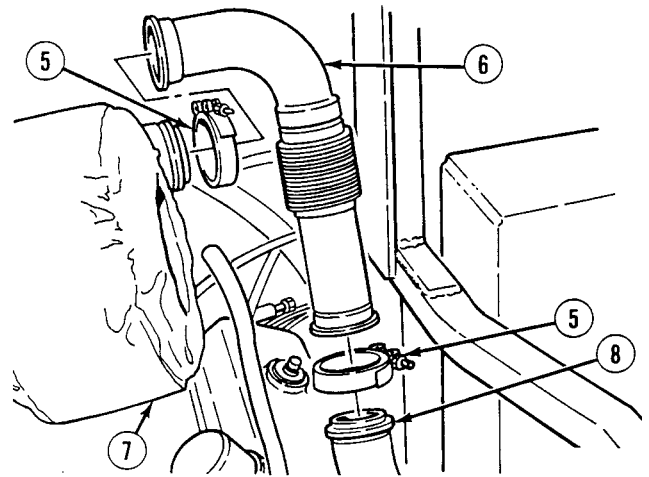
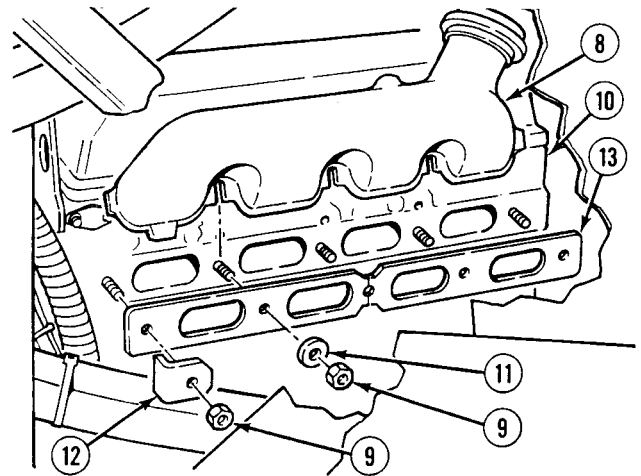


b. *Installation.*

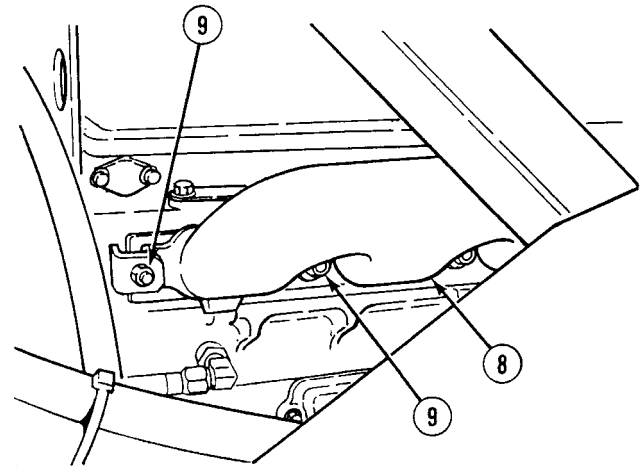
NOTE

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

- (1) Install two gaskets (13) on cylinder head (10).
- (2) Position three washers (11) and locknuts (9) on cylinder head (10).
- (3) Position exhaust manifold (8) on cylinder head (10) with two crabs (12) and locknuts (9).
- (4) Install two clamps (5) and turbo intake tube (6) on turbocharger (7) and exhaust manifold (8).



- (5) Tighten locknuts (9) on exhaust manifold (8) to 30 to 35 lb-ft (41 to 47 N·m).

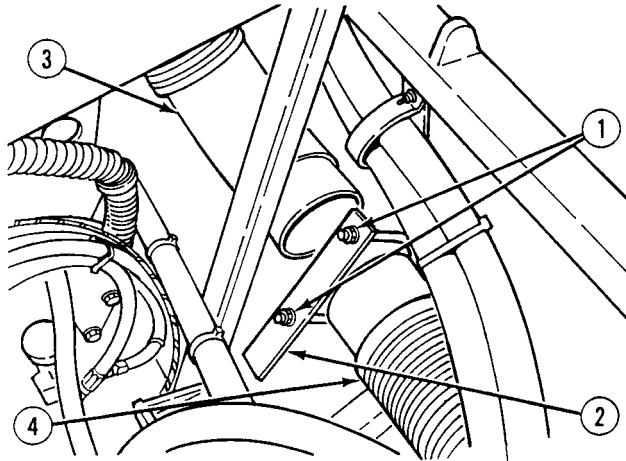


3-31. EXHAUST MANIFOLD REPLACEMENT (CONT).

NOTE

Perform Step (6) for right exhaust manifold only.

- (6) Install turbo outlet tube (3) on turbo outlet tube (4) with clamp (2). Tighten two locknuts (1) on clamp.



c. Follow-On Maintenance:

- Install left front noise panel (left exhaust manifold only), (TM 9-2320-364-20).
- Install left side noise panel (left exhaust manifold only), (TM 9-2320-364-20).
- Install right side noise panel (right exhaust manifold only), (TM 9-2320-364-20).
- Install spare tire, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-32. ENGINE BRAKE RETARDER REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)

Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)

Wheels chocked, (TM 9-2320-364-10)

Rocker covers removed, (TM 9-2320-364-20)

Materials/Parts

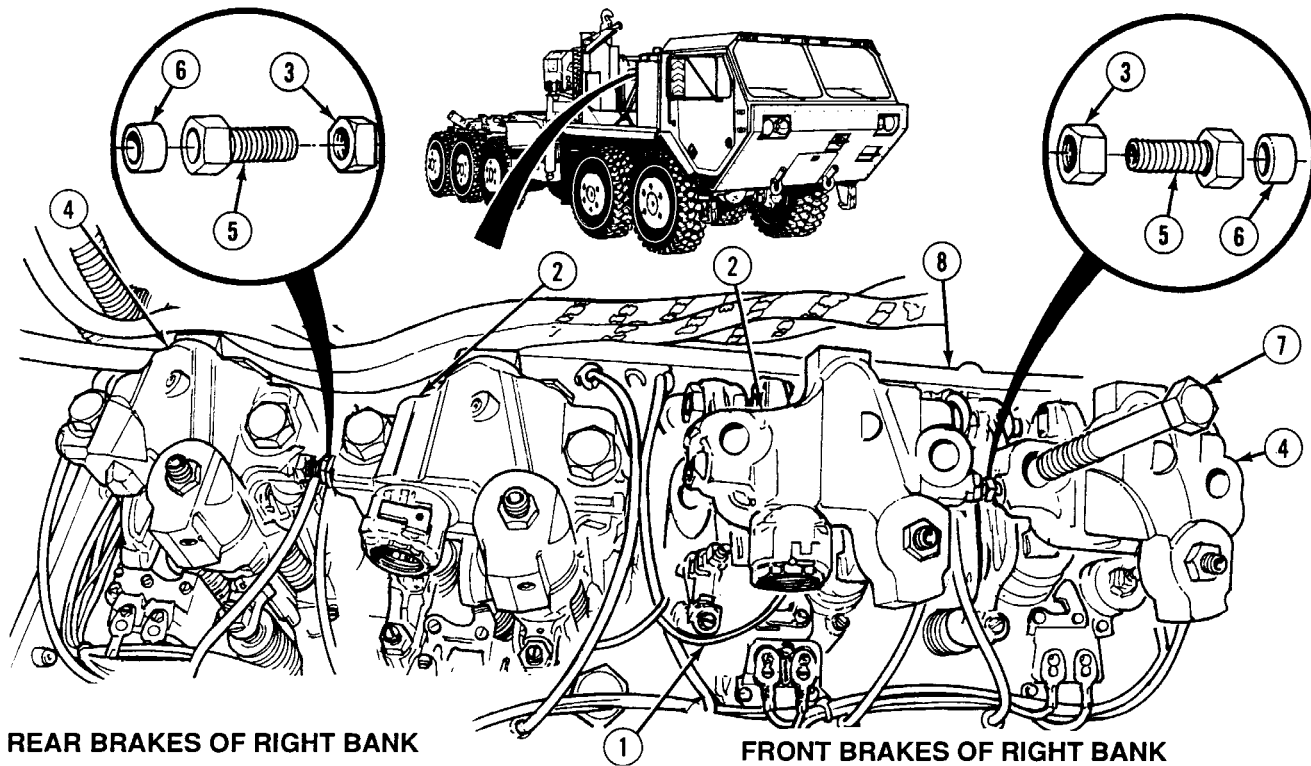
Oil, Lubricating (Item 38, Appendix B)

Tags, Identification (Item 72, Appendix B)

Packing, Preformed (4) (Item 563, Appendix E)

3-32. ENGINE BRAKE RETARDER REPLACEMENT (CONT).

a. Removal.



NOTE

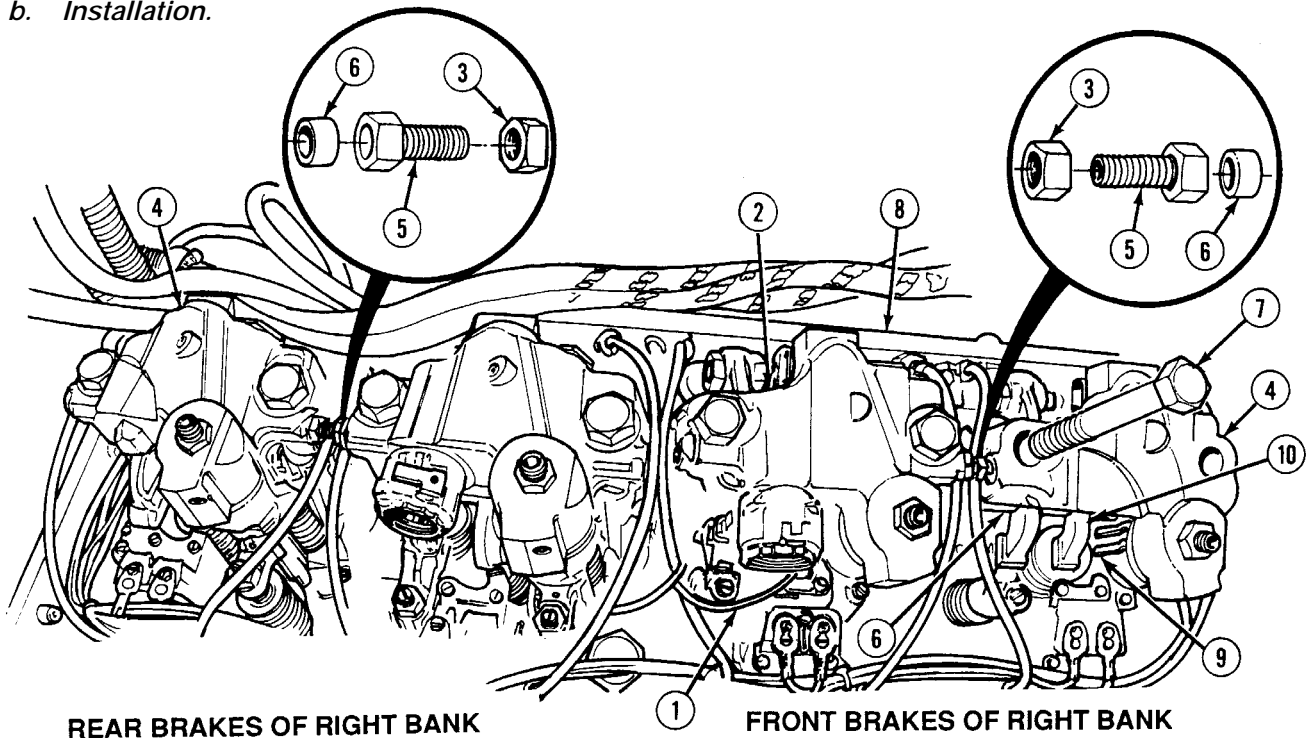
- There are two supply brakes and two drones on each cylinder bank. Supply brakes are two center brakes in cylinder head. Drones are two end brakes in cylinder head. All supply brakes and drones are removed the same way. Right cylinder bank shown.
- Tag and mark wires prior to removal.
- If supply brake is being removed, perform Step (1). If not, go to Step (2).

- (1) Remove wire connector (1) from supply brake (2).
- (2) Loosen nut (3) between supply brake (2) and drone (4).

NOTE

Perform Step (3) for forward brakes of left bank and rear brakes of right bank. Perform Step (4) for forward brakes of right bank and rear brakes of left bank.

- (3) Thread connector (5) into drone (4) to clear preformed packing (6).
- (4) Thread connector (5) into supply brake (2) to clear preformed packing (6).
- (5) Remove two screws (7) from drone (4) and remove drone from cylinder head (8).
- (6) Remove and discard preformed packing (6) from drone (4).
- (7) Repeat Steps (1) through (6) for removal of other supply brakes or drones.

b. *Installation.***NOTE**

There are two supply brakes and two drones on each cylinder bank. Supply brakes are two center brakes in cylinder head. Drones are two end brakes in cylinder head. All supply brakes and drones are removed the same way. Right cylinder bank shown.

- (1) Apply lubricating oil to preformed packing (6).
- (2) Install preformed packing (6) in drone (4).
- (3) Position master piston fork assembly (9) of drone (4) over injector rocker clevis (10) and install two screws (7) in cylinder head (8). Tighten two screws to 90 lb-ft (122 N·m).
- (4) Move master piston fork assembly (9) up and down several times to ensure it rides freely on injector rocker clevis (10).
- (5) Repeat Steps (1) through (4) for other supply brakes or drones.
- (6) Unscrew connector (5) from applicable brake until connector covers preformed packing (6) and makes contact with adjacent housing.
- (7) Back off connector (5) 1/3 turn and hold while tightening nut (3) against drone (4).
- (8) Repeat Steps (1) through (7) for remaining brake sets.
- (9) Install wire connector (1) at supply brake (2).

3-32. ENGINE BRAKE RETARDER REPLACEMENT (CONT).

c. Follow-On Maintenance:

- Tune-up engine, (Para 3-2).
- Install rocker covers, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

3-33. SHIPPING CONTAINER, ENGINE ASSEMBLY REPLACEMENT.

This task covers:

- | | | |
|-------------------------------------------|---------------------------------|--------------------------|
| a. Upper Container Removal | c. Engine Assembly Installation | e. Follow On Maintenance |
| b. Engine Assembly Removal From Container | Into Container | |
| | d. Upper Container Installation | |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Jackstand (4) (Item 132, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Lifting Device, Minimum Capacity 2600 lbs (1180 kg)

Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Primer "T" (Item 46, Appendix B)
- Sealing Compound (Item 53, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Gasket (Item 55, Appendix E)

Materials/Parts - Continued

- Locknut (12) (Item 199, Appendix E)
- Locknut (2) (Item 200, Appendix E)
- Locknut (Item 210, Appendix E)
- Lockwasher (4) (Item 286, Appendix E)
- Lockwasher (12) (Item 288, Appendix E)

Personnel Required

Two

Equipment Condition

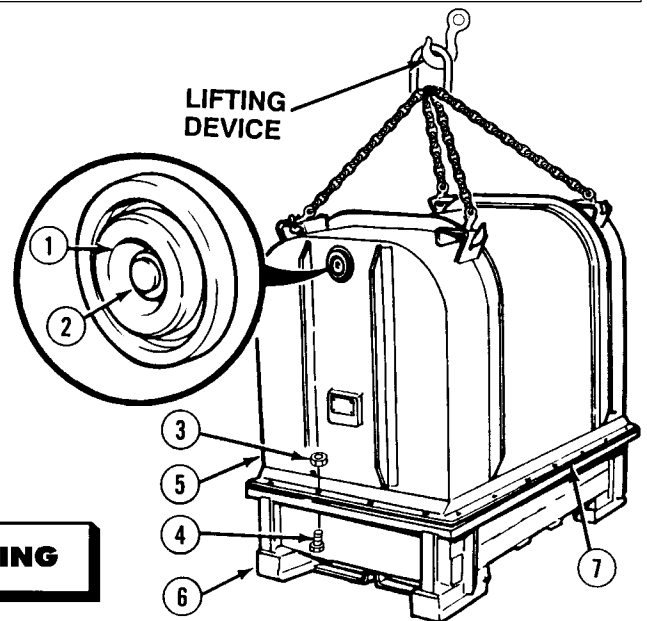
Transmission and air compressor removed from engine, (Para 3-5)

a. Upper Container Removal.

WARNING

Release air pressure prior to opening container or injury to personnel could result.

- (1) Release air pressure at breather valve (1) by pressing air release button (2).
- (2) Remove 26 nuts (3) and screws (4) from upper and lower container (5) and (6).



WARNING

Upper container weighs 480 lbs (218 kg). Attach lifting device prior to removal to prevent injury to personnel.

- (3) With the aid of an assistant, attach lifting device to upper container (5).
- (4) Remove upper container (5) from lower container (6).
- (5) Remove and discard gasket (7) from lower container (6).
- (6) Remove lifting device from upper container (5).

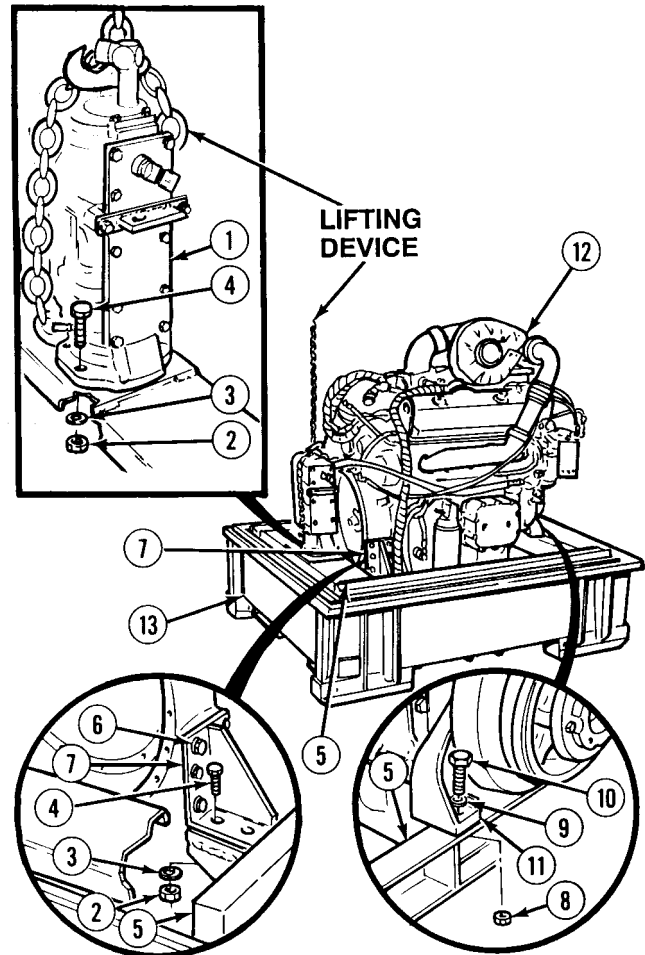
3-33. SHIPPING CONTAINER, ENGINE ASSEMBLY REPLACEMENT (CONT).

b. Engine Assembly Removal From Container.

WARNING

Air compressor weighs 115 lbs (52 kg). Attach suitable lifting device prior to removal to prevent injury to personnel.

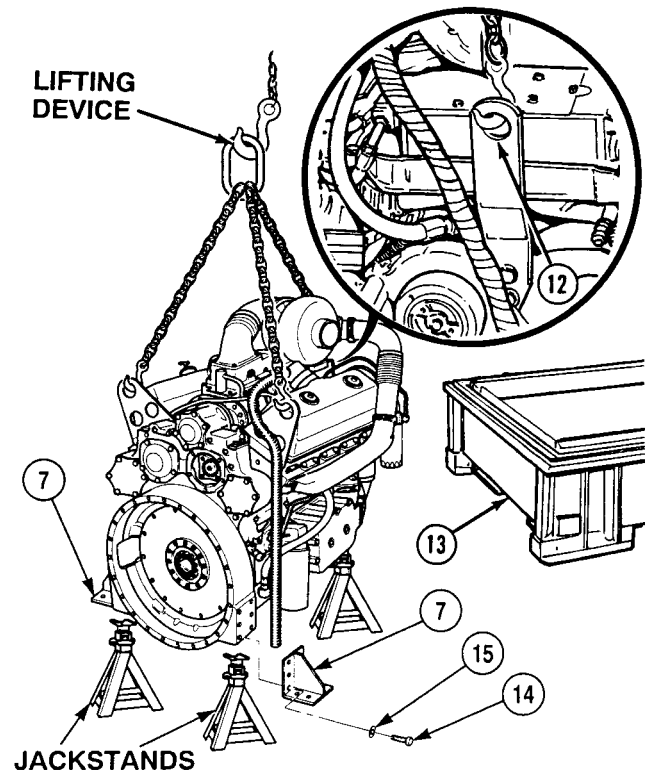
- (1) Attach lifting device to air compressor (1).
- (2) Remove four locknuts (2), washers (3) screws (4) and air compressor (1) from inner frame (5). Discard locknuts.
- (3) Remove lifting device from air compressor (1).
- (4) Loosen 12 screws (6) from two engine brackets (7).
- (5) Remove eight locknuts (2), washers (3) and screws (4) from two engine brackets (7) and inner frame (5). Discard locknuts.
- (6) Remove two locknuts (8) washers (9) and screws (10) from engine mounts (11) and inner frame (5). Discard locknuts.



WARNING

Engine assembly weighs 2,600 lbs (1,180 kg). Attach suitable lifting device prior to removal to prevent injury to personnel.

- (7) With the aid of an assistant, attach lifting device to engine assembly (12).
- (8) Remove engine assembly (12) from lower container (13) and support on jackstands.
- (9) Remove twelve screws (14) lockwashers (15) and two engine mounting brackets (7) from engine assembly (12). Discard lockwashers.
- (10) Remove lifting device from engine assembly (12).



3-33. SHIPPING CONTAINER, ENGINE ASSEMBLY REPLACEMENT (CONT).

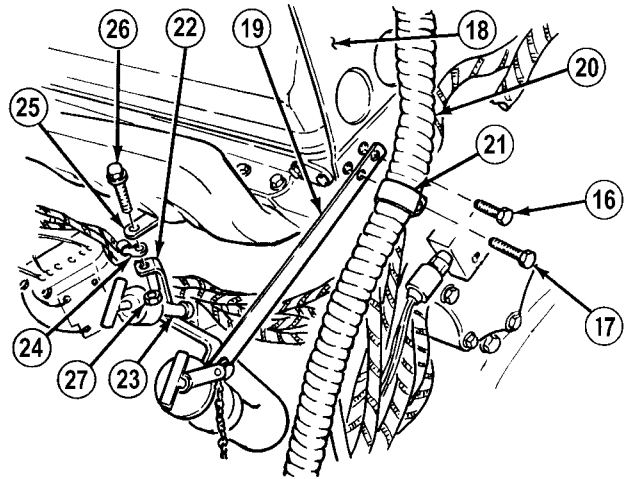
NOTE

Remove cable ties as required.

- (11) Remove screw (16) and screw (17) from engine bracket (18).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (12) Apply primer and sealing compound to the threads of screw (16).

NOTE

Dipstick tube brackets and dipstick tubes are cable tied to engine for shipping.

- (13) Install bracket (19) on engine bracket (18) with screw (16). Tighten screw to 23 to 26 lb-ft (31-35 N·m).
- (14) Apply primer and sealing compound to the threads of screw (17).
- (15) Install hose (20) on bracket (19) and engine bracket (18) with cushion clip (21) and screw (17). Tighten screw 41 to 47 lb-ft (56-64 N·m).
- (16) Install bracket (22), dipstick tube (23) and cushion clip (24) on bracket (25) with screw (26) and locknut (27).

NOTE

Retain plug removed in Step (15) for installation on old engine.

- (17) Remove plug (28) from oil pan (29).

NOTE

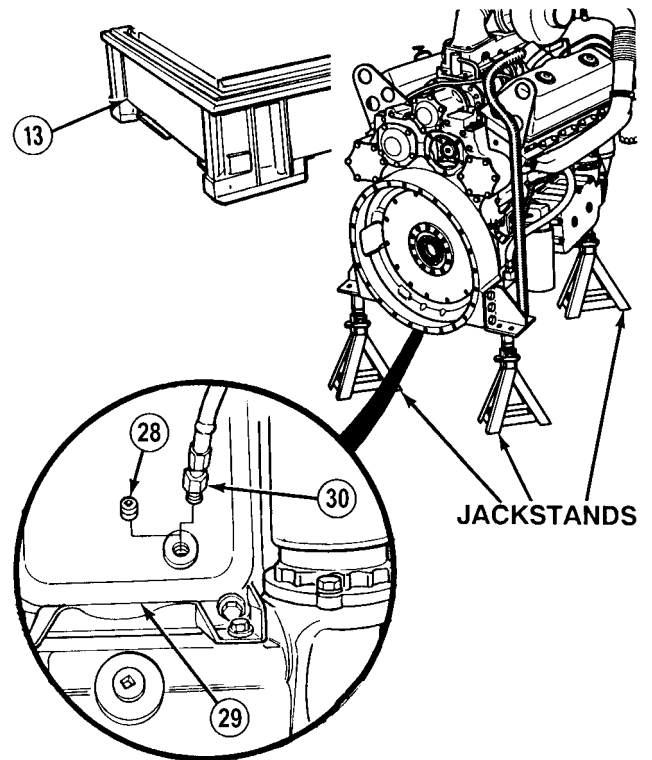
- Note location of oil drain hose prior to removal from container.
- Oil drain hose is cable tied to lower container for shipping.

- (18) Remove oil drain hose (30) from lower container (13).

WARNING

Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and is harmful to skin and clothing. To avoid injury or death, 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.

- (19) Apply sealing compound to threads of oil drain hose (30).
- (20) Install oil drain hose (30) to oil pan (29).



3-33. SHIPPING CONTAINER, ENGINE ASSEMBLY REPLACEMENT (CONT).

- (21) Remove screw (31) and flat washer (32) from cover (33).

NOTE

Retain cover removed in Step (22) for installation on old engine.

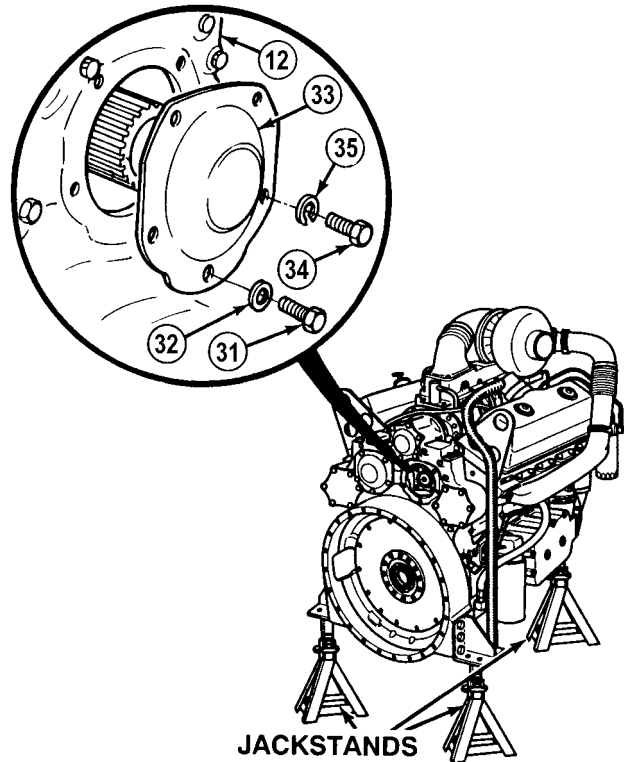
- (22) Remove four screws (34) lockwashers (35) and cover (33) from engine assembly (12). Discard lockwashers.

c. Engine Assembly Installation Into Container.

NOTE

Use cover removed in Para 3-32b, Step (20) for installation on old engine.

- (1) Install cover (33) on engine assembly (12) with four screws (34) and lockwashers (35).
 (2) Install screw (31) and flat washer (32) on cover (33).



NOTE

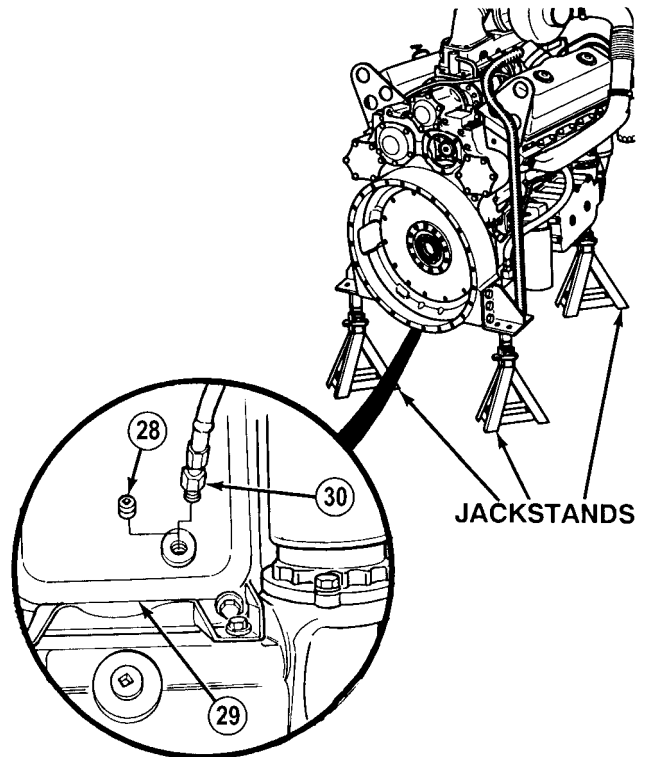
- Install oil drain hose to lower engine container.
- Install cable ties as required.

- (3) Remove oil drain hose (30) from oil pan (29).

NOTE

Use plug removed in Para 3-33b, Step (17) for installation on old engine.

- (4) Install plug (28) to engine oil pan (29).

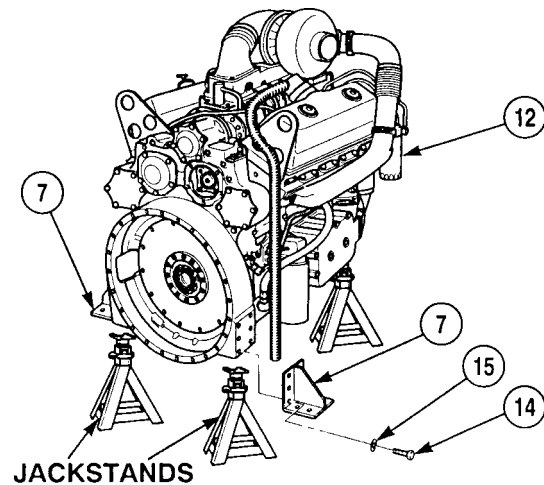
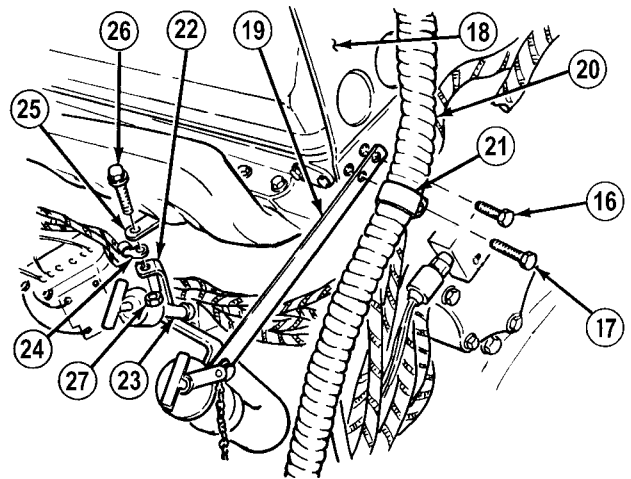


- (5) Remove locknut (27), screw (26), bracket (22), dipstick tube (23) and cushion clip (24) from bracket (25). Discard locknut.

NOTE

Dipstick tube brackets and dipstick tubes are cable tied to engine for shipping. Install cable ties as required.

- (6) Install screw (26) and locknut (27) on bracket (25).
- (7) Remove screw (17), cushion clip (21) and hose (20) from engine bracket (18).
- (8) Remove screw (16) and bracket (19) from engine bracket (18).
- (9) Install screw (16) on engine bracket (19). Tighten screw to 23 to 26 lb-ft (31 to 35 N·m).
- (10) Install screw (17) on engine bracket (18). Tighten screw to 41 to 47 lb-ft (56 to 64 N·m).
- (11) Install engine mounting brackets (7) on engine assembly (12) with twelve lockwashers (15) and screws (14). Tighten screws to 112 to 120 lb-ft (152 to 163 N·m).

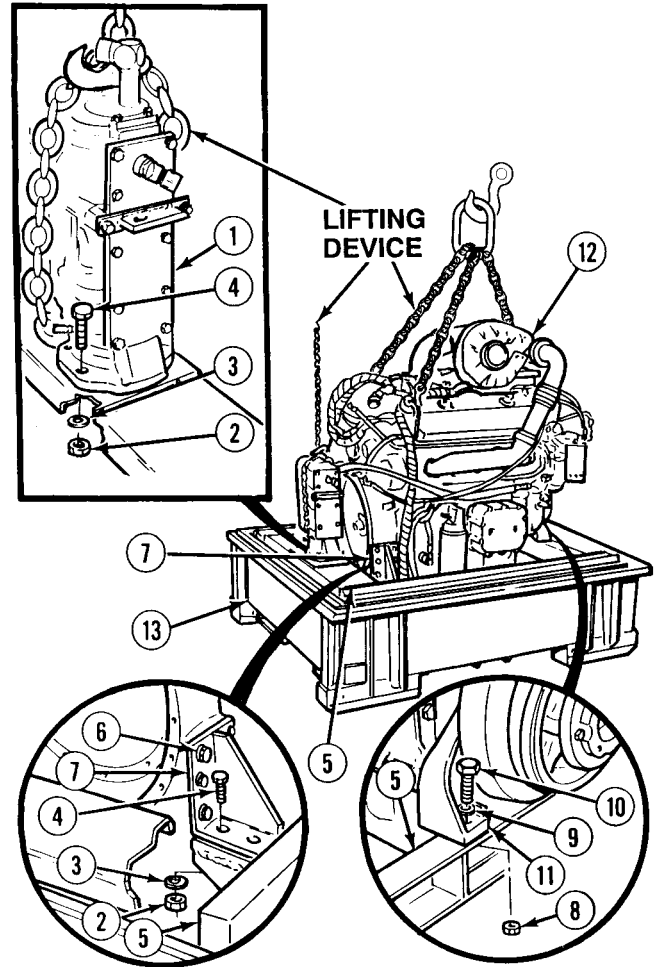


3-33. SHIPPING CONTAINER, ENGINE ASSEMBLY REPLACEMENT (CONT).

WARNING

Engine assembly weighs 2600 lbs (1180 kg). Attach suitable lifting device prior to installation to prevent injury to personnel.

- (12) With the aid of an assistant, attach a lifting device to engine assembly (12).
- (13) Install engine assembly (12) to lower container (13).
- (14) Install mounting brackets (7) on inner frame (5) with eight screws (4), washers (3) and locknuts (2). Tighten locknuts to 58 to 66 lb-ft (79 to 89 N·m). Tighten 12 screws (6) on mounting bracket (7) to 58 to 66 lb-ft (79 to 89 N·m).
- (15) Install two engine mounts (11) to inner frame (5) with two screws (10), washers (9) and locknuts (8). Tighten locknuts to 122 to 130 lb-ft (165 to 176 N·m).
- (16) Remove lifting device from engine assembly (12).



WARNING

Air compressor weighs 115 lbs (52 kg). Attach suitable lifting device prior to installation to prevent injury to personnel.

- (17) Attach a lifting device to air compressor (1).
- (18) Install air compressor to inner frame (5) with four screws (4), washers (3) and locknuts (2). Tighten locknuts to 58 to 66 lb-ft (79 to 89 N·m).
- (19) Remove lifting device from air compressor (1).

d. *Upper Container Installation.*

- (1) Position gasket (7) on lower container (6).

WARNING

Upper container weighs 480 lbs (218 kg). Attach lifting device prior to removal to prevent injury to personnel.

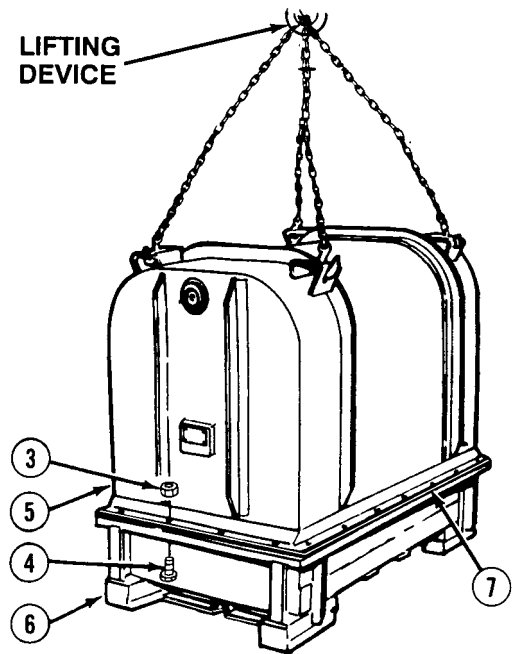
- (2) With the aid of an assistant, attach lifting device to upper container (5).

NOTE

Insure gasket is seated in place on lower container.

- (3) With the aid of an assistant, install upper container (5) on lower container (6) with 22 screws (4) and nuts (3). Tighten nuts to 52 to 60 lb-ft (70 to 81 N·m).

- (4) Remove lifting device from upper container (5).



e. *Follow-On Maintenance:*

- Install transmission and air compressor on engine, (Para 3-5).

END OF TASK

CHAPTER 4

FUEL SYSTEM MAINTENANCE

Para	Contents	Page
4-1	Direct Support Fuel System Maintenance Introduction	4-1
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4-4	Blower Assembly Replacement	4-14
4-5	Blower Oil Supply Tube Assembly Repair	4-26
4-6	Blower Drive Assembly Replacement	4-28
4-7	Blower By-Pass Valve Replacement	4-31
4-8	Turbocharger Replacement	4-34
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4-10	Fuel Pump Replacement	4-47

4-1. DIRECT SUPPORT FUEL SYSTEM MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for repairing, replacing, installing and servicing fuel system components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

4-2. FUEL INJECTOR REPAIR.

This task covers:

- | | | |
|------------------------|-----------------|--------------------------|
| a. Removal | d. Assembly | f. Placing in Service |
| b. Disassembly | e. Installation | g. Follow-On Maintenance |
| c. Cleaning/Inspection | | |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Cap and Plug Set (Item 26, Appendix F)
- Cartridge, DDEC (DDEC III only) (Item 29, Appendix F)
- Cartidge, Multi-Protocol (DDEC III/IV only) (Item 29.1, Appendix F)
- Compressor Unit, Air (Item 35, Appendix F)
- Die Set, Metal Stamping (Item 46, Appendix F)
- Gloves, Chemical Oil Protective (Item 81, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Gun, Airblow (Item 86, Appendix F)
- Reader, Diagnostic (DDEC III/IV only) (Item 180, Appendix F)
- Smart Card (DDEC III/IV only) (Item 202.1, Appendix F)
- Wrench, Fuel Line (Item 270, Appendix F)
- Wrench Set, Socket 3/8 in. Drive (Item 273, Appendix F)
- Wrench, Torque (0-60 N·m) (Item 276, Appendix F)

Tools and Special Tools (Cont'd)

- Wrench, Torque (0 to 175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Wrench, Torque Driver (Item 279, Appendix F)

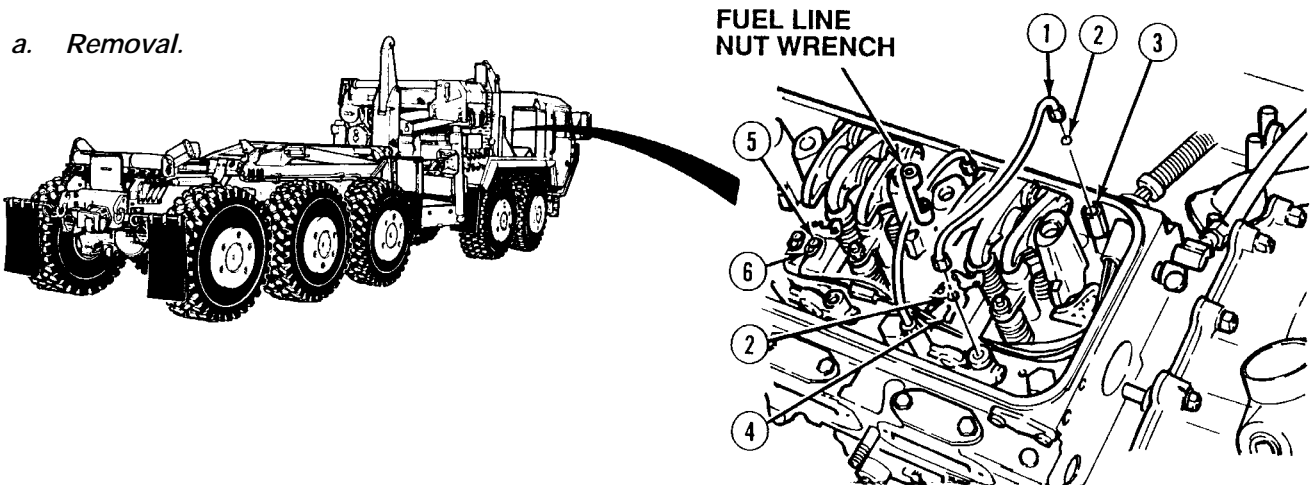
Materials/Parts

- Oil, Lubricating (Item 38, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Hardware Kit, Electronic (Item 130, Appendix E)
- Packing, Preformed (2) (Item 380, Appendix E)

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Engine brake retarders removed, (Para 3-32)

a. Removal.



WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

NOTE

- There are eight fuel injectors. All fuel injectors are removed the same way.
 - Cap fuel pipe connectors after removal of fuel pipes.
- (1) Using fuel line nut wrench, remove fuel pipe (1) and two preformed packings (2) from fuel supply fitting (3) and fuel injector (4). Discard preformed packings.

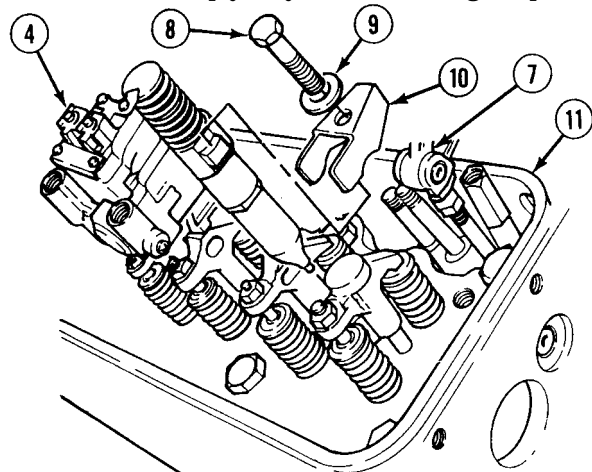
NOTE

Tag and mark all harness wires upon removal.

- (2) Loosen two screws (5) and remove injector harness wires (6) from fuel injector (4).

CAUTION

- When removing fuel injectors caution should be taken not to damage fuel injector tips.
 - Do not force rocker arms all the way back with shaft in place. Only position rocker arm back far enough to access fuel injector. Failure to comply may result in damage to push rods.
- (3) Lift rocker arms (7) and remove screw (8), washer (9), clamp (10) and fuel injector (4) from cylinder head (11).



4-2. FUEL INJECTOR REPAIR (CONT).

b. Disassembly.

CAUTION

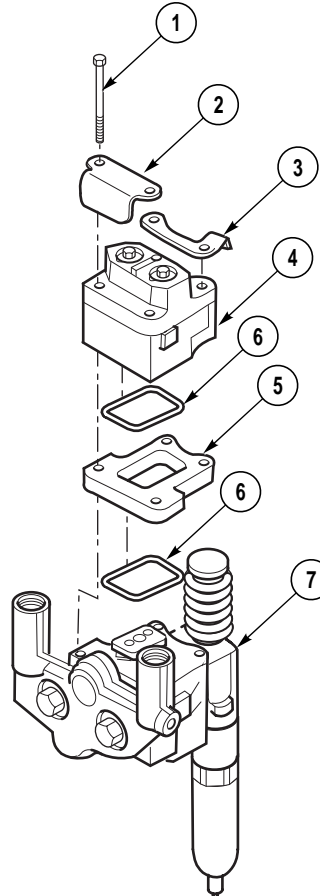
Do not reuse screws, load plate or follower retainer. This may cause damage to the solenoid or screws.

- (1) Remove four screws (1), load plate (2) follower retainer (3) and solenoid (4) from spacer (5). Discard screws, load plate and follower retainer.
- (2) Remove seal (6) from solenoid (4). Discard seal.

NOTE

Tag and mark the spacer and injector prior to removal. The spacer is a matched component and must stay with the same injector.

- (3) Remove spacer (5) and seal (6) from injector assembly (7). Discard seal.



c. *Cleaning/Inspection.*

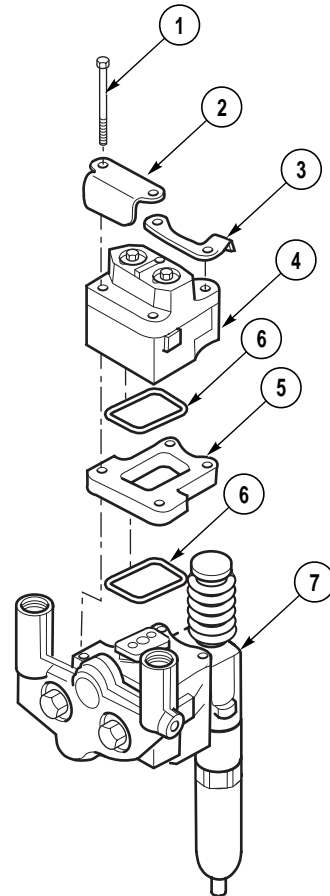
WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- 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 or death to personnel.

- (1) Clean all metal parts with drycleaning solvent.
- (2) Dry all metal parts with compressed air.
- (3) Inspect solenoid for cracks, holes, dents or stripped threads.

d. *Assembly.*

- (1) Apply lubricating oil to seal (6) and position seal (6) and spacer (5) on injector assembly (7).
- (2) Apply lubricating oil to seal (6) and position seal (6) on solenoid (4).
- (3) Position solenoid (4), follower retainer (3) and load plate (2) on spacer (5) using four screws (1).

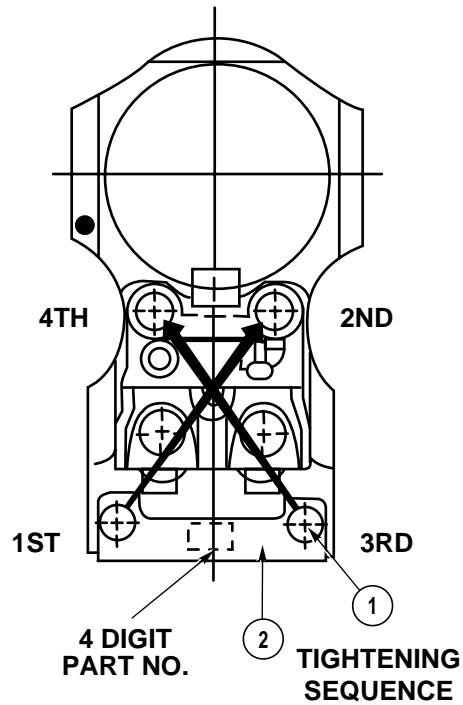


4-2. FUEL INJECTOR REPAIR (CONT).

CAUTION

Do not tighten screws more than 5 lb-in (0.6 N·m).

- (4) Tighten four screws (1) to 19 lb-in (2.15 N·m) in sequence shown.
- (5) Stamp the last four digits of injector part number on load plate (2).



e. Installation.

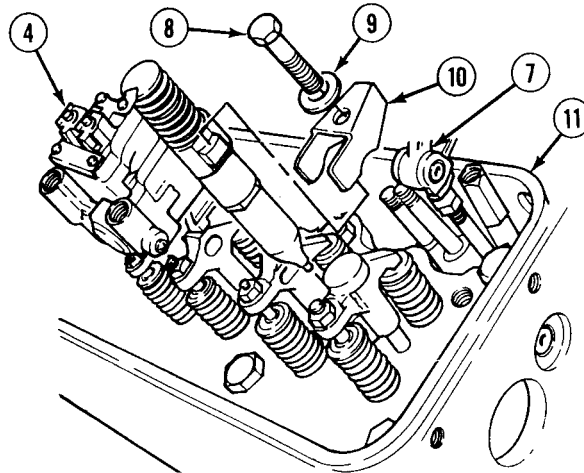
NOTE

There are eight fuel injectors. All fuel injectors are installed the same.

- (1) Position fuel injector (4) in cylinder head (11).

CAUTION

- Ensure clamp does not interfere with injector spring or valve springs. Interference of clamp with spring travel can cause damage to components.
- Do not force rocker arms all the way back with shaft in place. Only position rocker arm back far enough to access fuel injector. Failure to comply may result in damage to push rods.



NOTE

Convex side of washer is installed facing clamp.

- (2) Lift rocker arms (7) and install clamp (10), washer (9) and screw (8) on fuel injector (4). Tighten screw to 20 to 25 lb-ft (27 to 34 N·m).
- (3) Position rocker arms (7) back down on fuel injector (4).

- (4) Position two injector harness wires (6) on fuel injector (4) and tighten two screws (5).

NOTE

Ensure all caps are removed from fuel pipes prior to installation.

- (5) Apply lubricating oil to two preformed packings (2).
- (6) Install two preformed packings (2) and using fuel line nut wrench install fuel pipe (1) on fuel supply fitting (3) and fuel injector (4). Tighten fuel pipe to 160 lb-in (18 N·m).

NOTE

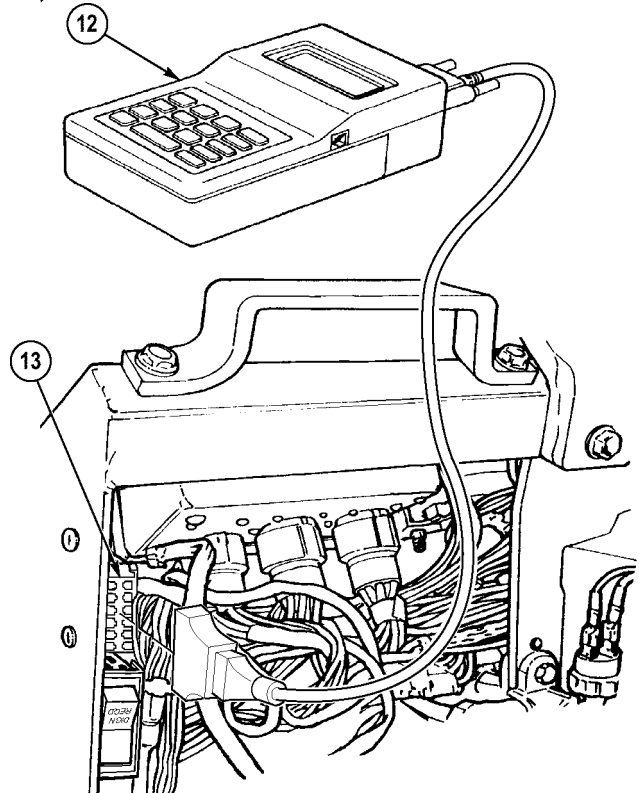
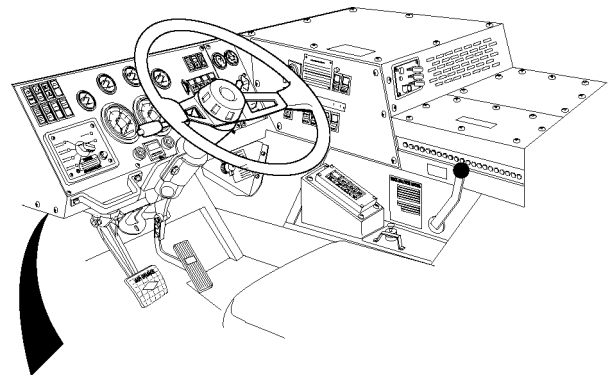
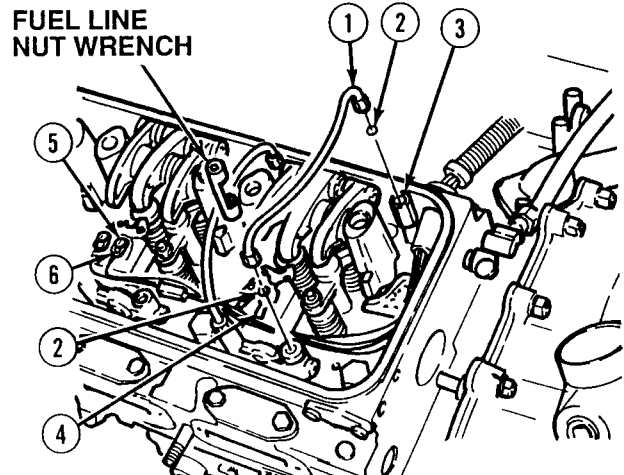
Subparagraph *f.* applies only to DDEC III/IV engines.

f. Placing in Service



Whenever a DDEC III/IV injector is removed from engine, it should be reinstalled in its original location to maintain proper cylinder balance. If reinstalled in a different cylinder head location, injector calibration must be rechecked with DDR and updated, if necessary. Failure to observe these steps may result in reduced engine performance.

- (1) Connect Diagnostic Data Reader (DDR) (12) into diagnostic connector (13).



4-2. FUEL INJECTOR REPAIR (CONT).

- (2) Turn ignition to ON position without running engine.
- (3) From “DDEC III/IV Select Menu,” select [ENGINE] and press ENTER key.

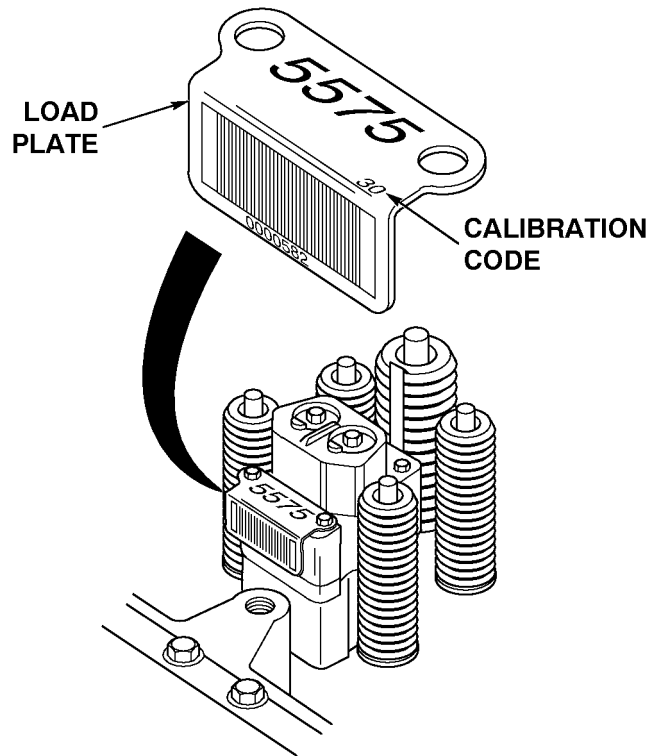
NOTE

Refer to Table 4-1, Fuel Injector Calibration Sequence.

- (4) Scroll to “FUEL INJECTOR INFO” and press ENTER.
- (5) Scroll to “CAL UPDATE” and press ENTER.
- (6) From “CAL UPDATE” select [VIEW] and press ENTER.

NOTE

Injector calibration codes and bar codes may be missing on early-production DDEC replacement injectors. The DDEC III/IV calibration code for these injectors is “01”.



- (7) Compare calibration code(s) shown on display with two-digit calibration code(s) on replaced injector(s). If no changes are required, press FUNCTION key, turn off ignition, and disconnect DDR.
- (8) If any calibration code on display is different from calibration code on replaced injector for that cylinder, press FUNCTION to return to “CAL UPDATE” menu.
- (9) From “CAL UPDATE” select [UPDATE] and press ENTER.
- (10) Type four-digit “Update Injector Calibration” password for DDR and press ENTER. This feature is not password protected, type “0000” and press ENTER.
- (11) An information message will appear telling you to use UP and DOWN arrow keys to select FUNCTION, LEFT, and RIGHT arrow keys to change option, and TYPE # (injector calibration code). Press ENTER.
- (12) An asterisk (*) will highlight first cylinder number in list. Scroll to cylinder requiring change and type in new two-digit injector calibration code number. Press ENTER.

NOTE

ENTER key must be pressed before DDR will allow selection of another cylinder number.

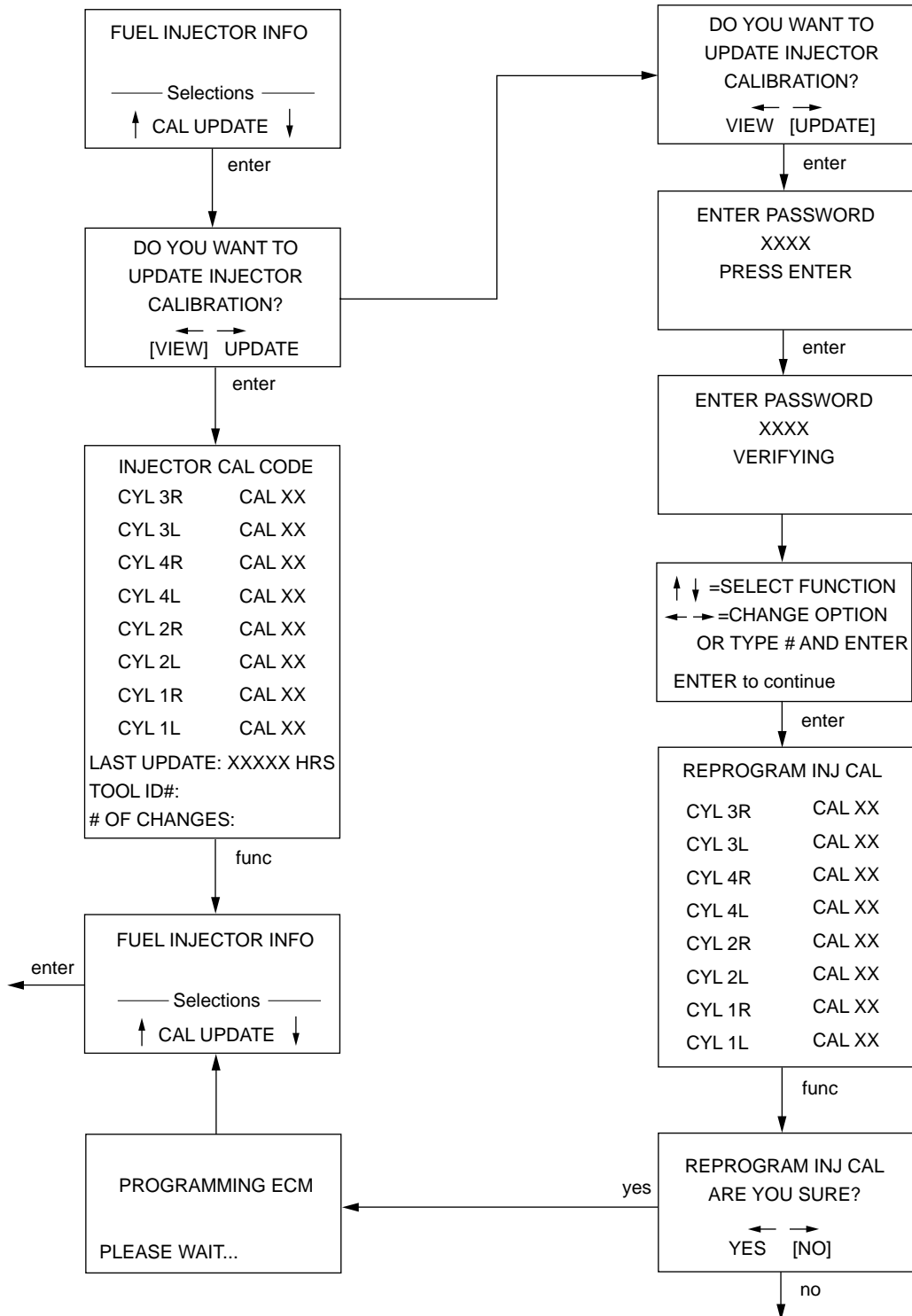
- (13) When all cylinders have been updated with required calibration code numbers, press FUNCTION key.

NOTE

Engine may be started immediately after inputting injector calibration data.

- (14) Select [YES] from display and press ENTER to reprogram ECM with revised injector calibration codes.

Table 4-1. Fuel Injector Calibration Sequence



4-2. FUEL INJECTOR REPAIR (CONT).

g. Follow-On Maintenance:

- Install engine brake retarders, (Para 3-32).
- Remove wheel chocks, (TM 9-2320-364-10).
- DDEC II: Clear historic codes, (Para 2-8).
- DDEC III/IV: Clear inactive codes, (TM 9-2320-364-20).

END OF TASK

4-3. AIR INLET HOUSING REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Wrench, Torque (0 to 175 lb-ft [0-237 N·m]) (Item 277, Appendix F)

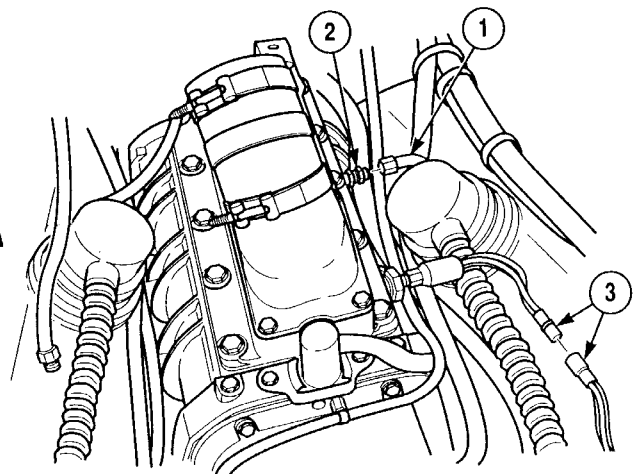
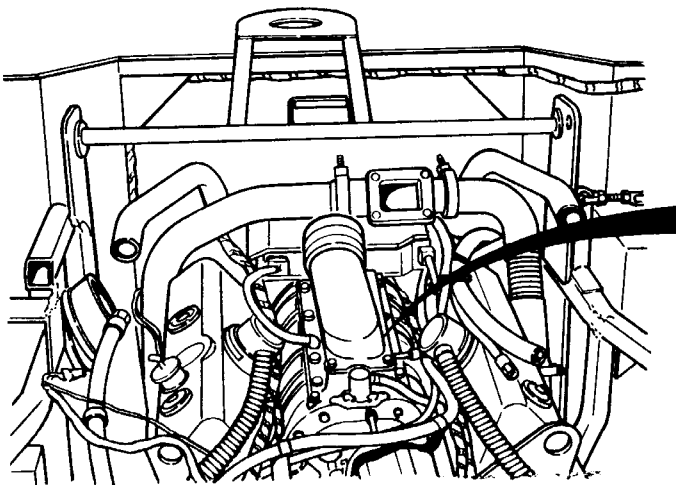
Materials/Parts

- Cloth, Cleaning (Item 11, Appendix B)
- Oil, Lubricating (Item 38, Appendix B)
- Gasket (Item 73, Appendix E)
- Lockwasher (10) (Item 285, Appendix E)
- Packing, Preformed (2) (Item 368, Appendix E)

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Turbo boost pressure switch removed, (TM 9-2320-364-20)
- Turbocharger removed, (Para 4-8)

a. Removal.



- (1) Remove air line 1402 (1) from adapter (2).
- (2) Disconnect MC66 connector (3).

4-3. AIR INLET HOUSING REPLACEMENT (CONT).

- (3) Remove ten screws (4) and lockwashers (5) from air inlet housing (6). Discard lockwashers.

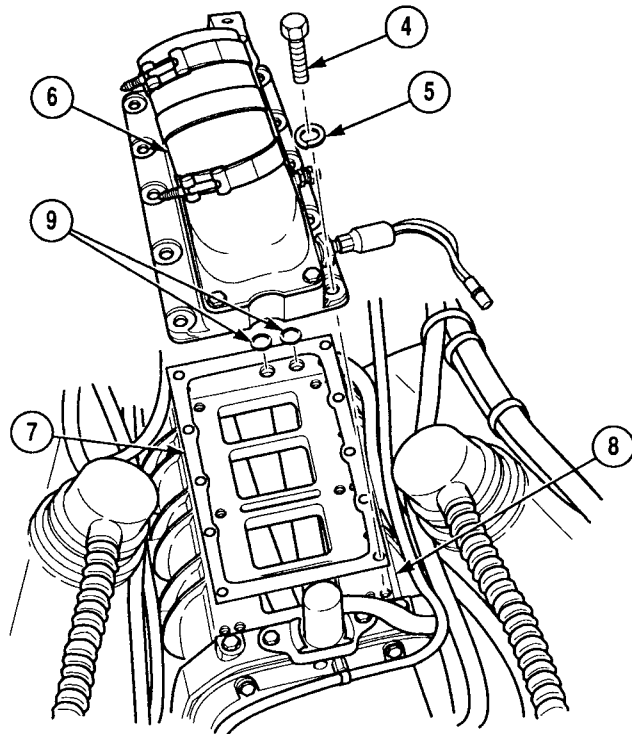
CAUTION

Use extreme care when removing air inlet housing from blower. Failure to comply may result in serious scratching or denting of blower.

- (4) Remove air inlet housing (6) and gasket (7) from blower (8). Discard gasket.

NOTE

- Preformed packings may come off with air inlet housing or may remain on blower.
 - Place clean, dry cloth over blower to keep blower free of debris.
- (5) Remove and discard two preformed packings (9) from air inlet housing (6) or blower (8).



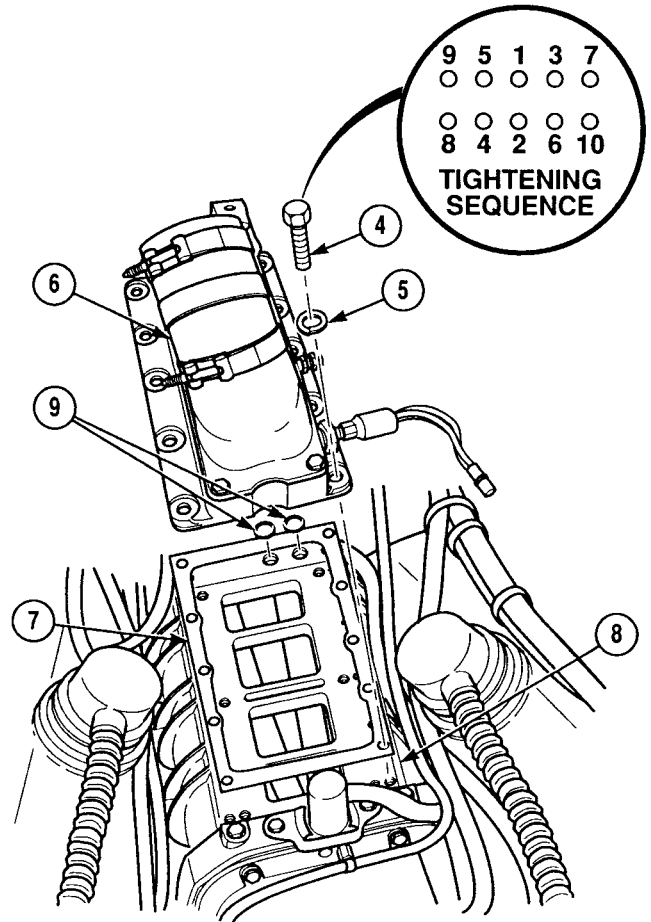
b. *Installation.*

- (1) Apply lubricating oil to preformed packings (9).
- (2) Install two preformed packings (9) on blower (8).
- (3) Install gasket (7) on blower (8).

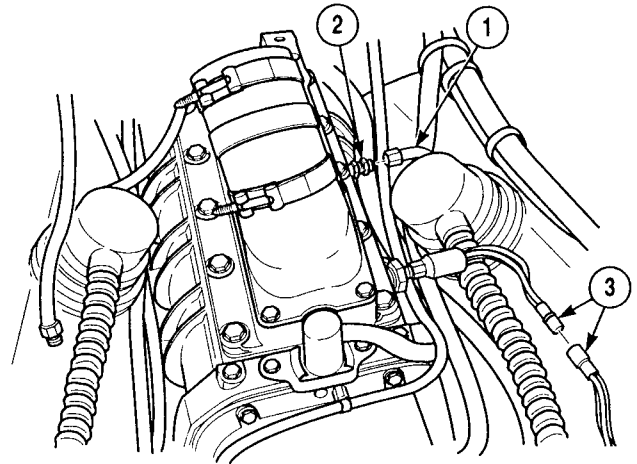
CAUTION

Use extreme care when installing air inlet housing on blower. Failure to comply may result in serious scratching or denting of blower.

- (4) Install air inlet housing (6) on blower (8).
- (5) Position ten lockwashers (5) and screws (4) in air inlet housing (6).
- (6) Tighten screws (4) in sequence shown 40 to 45 lb-ft (54 to 61 N·m).



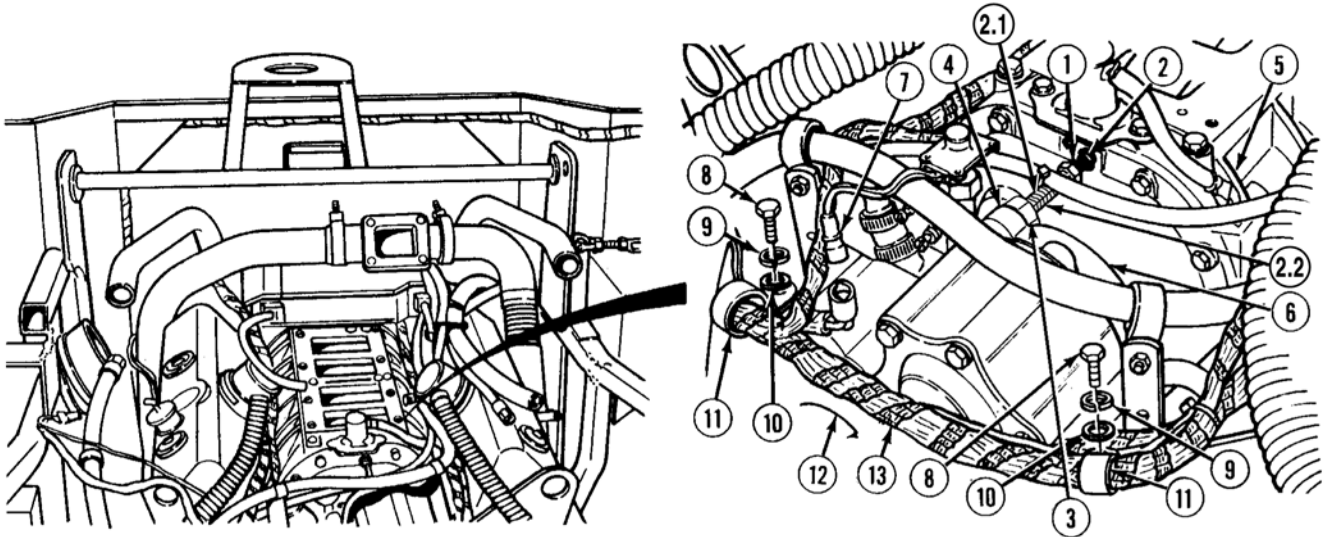
- (7) Connect MC66 connector (3).
- (8) Install air line 1402 (1) on adapter (2).



c. *Follow-On Maintenance:*

- Install turbo boost pressure switch, (TM 9-2320-364-20).
- Install turbocharger, (Para 4-8).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

a. Removal.**WARNING**

Ensure all debris is kept clear of blower during removal. Failure to comply may result in damage to equipment.

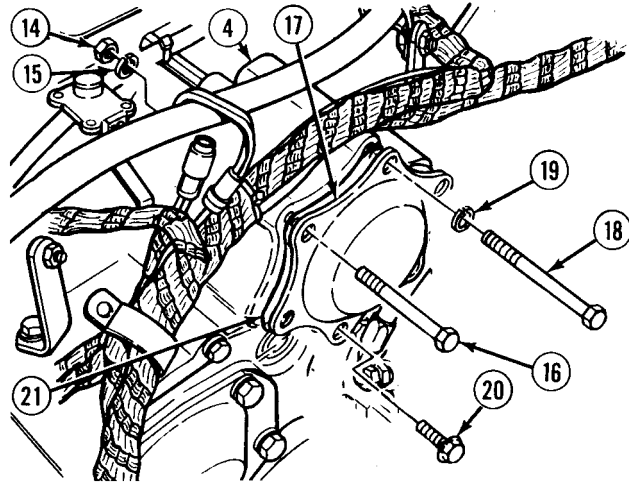
NOTE

Remove cable ties as required.

- (1) Remove adapter (1) from nut (2).
- (1.1) Remove loom (2.1) from oil supply tube (2.2).
- (2) Loosen adapter (3) and remove oil supply tube (2.2) from blower drive support (4). Slide adapter fitting (3) toward blower (5).
- (3) Loosen clamp (6) on blower drive support (4).
- (4) Disconnect tachometer drive connector (7).
- (5) Remove two screws (8), lockwashers (9), washers (10) and cushion clips (11) from rear of engine (12) and wiring harness (13). Discard lockwashers.

4-4. BLOWER ASSEMBLY REPLACEMENT (CONT).

- (6) Remove nut (14), lockwasher (15) and screw (16) from flywheel housing cover (17). Discard lockwasher.
- (7) Remove three screws (18) and lockwashers (19) from flywheel housing cover (17). Discard lockwashers.
- (8) Remove two screws (20), flywheel housing cover (17) and gasket (21) from blower drive support (4). Discard gasket.



WARNING

- Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.
- Blower lobes turn freely. Ensure fingers, jewelry, and hair are kept clear of rotors in blower. Failure to comply may result in severe injury to personnel.

- (9) Wrap wiping rags around driveshaft hub (22).
- (10) Install alignment tool and remove and discard retaining ring (23) from driveshaft hub (22).

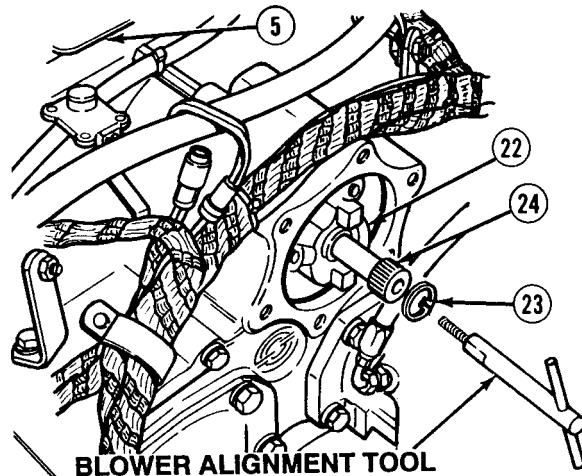
CAUTION

Use extreme caution when handling driveshaft. Driveshaft can be easily scratched if not carefully handled. Failure to comply may result in damage to parts.

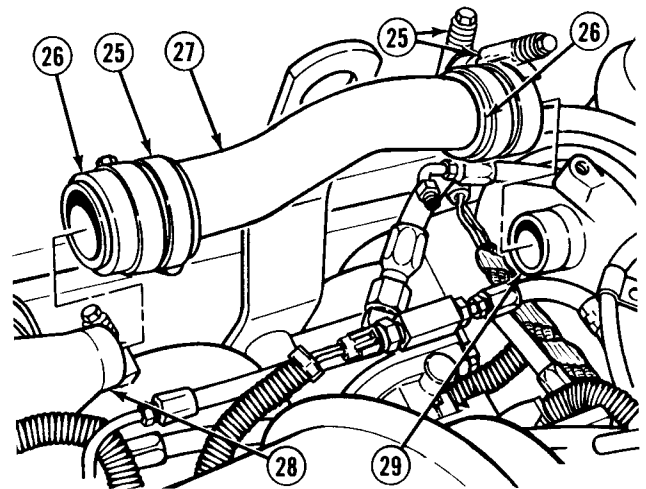
NOTE

Driveshaft is pulled out only far enough to clear blower.

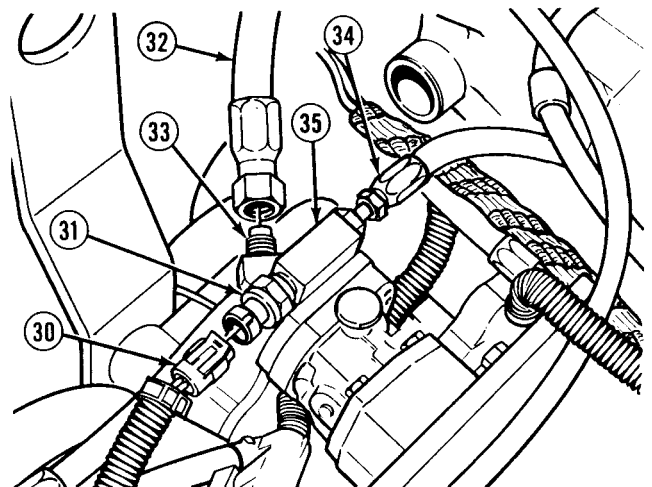
- (11) Slowly pull driveshaft (24) out from blower (5) until driveshaft turns freely.



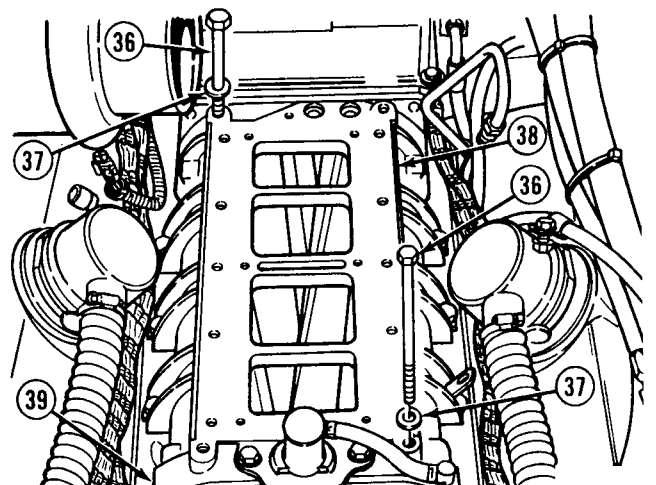
- (12) Loosen four clamps (25) and position two rubber tubes (26) on crossover tube (27).
- (13) Remove crossover tube (27) from right thermostat housing (28) and left thermostat housing (29).



- (14) Disconnect connector (30) from sensor (31).
- (15) Remove fuel hose 2260 (32) from elbow (33).
- (16) Remove fuel hose 3572 (34) from tee (35).

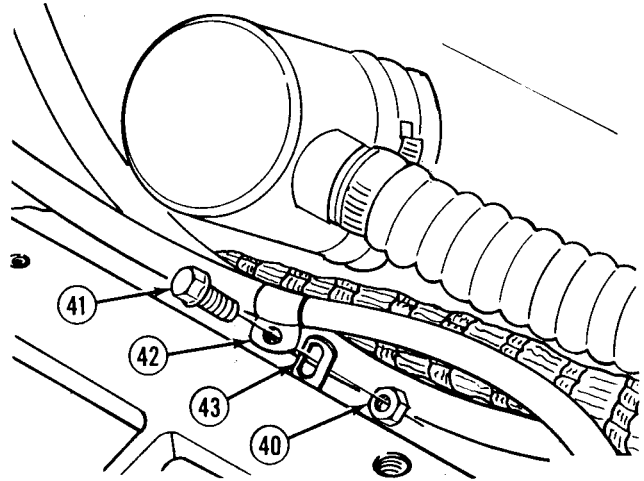


- (17) Remove two screws (36) and washers (37) from front end plate (38).
- (18) Remove two screws (36) and washers (37) from rear end plate (39).



4-4. BLOWER ASSEMBLY REPLACEMENT (CONT).

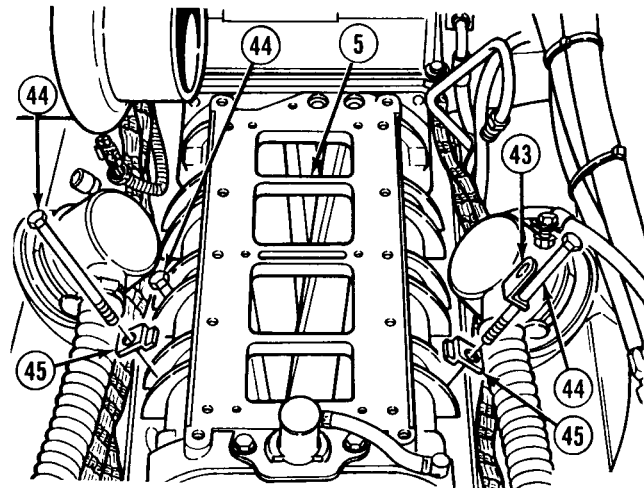
- (19) Remove nut (40), screw (41) and cushion clip (42) from bracket (43).



- (20) Remove screw (44), bracket (43) and retainer (45) from blower (5).
- (21) Remove four screws (44) and retainers (45) from blower (5).

CAUTION

Screw loosened in Step (22) will be removed with blower. Ensure screw is fully loosened or damage to equipment may occur when blower is removed from engine.



- (22) Loosen screw (44) on blower (5).

WARNING

- Blower weighs 71 lbs (32 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.
- Blower lobes turn freely. Ensure fingers, jewelry, and hair are kept clear of rotors in blower. Failure to comply may result in severe injury to personnel.

(23) Attach lifting device to blower (5).

CAUTION

Use extreme caution when removing blower from engine. Ensure oil pressure hose on blower does not get damaged upon removal.

(24) Lift blower (5) up slightly.

(25) Move blower (5) forward to remove blower seal (46) from blower drive support (4).

(26) Remove blower (5) and gasket (47) from engine (12) and position on clean level surface. Discard gasket.

(27) Remove screw (44) and retainer (45) from blower (5).

(28) Remove lifting device from blower (5).

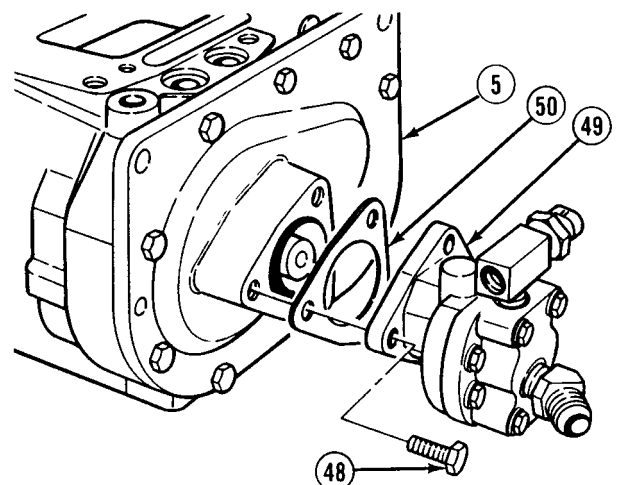
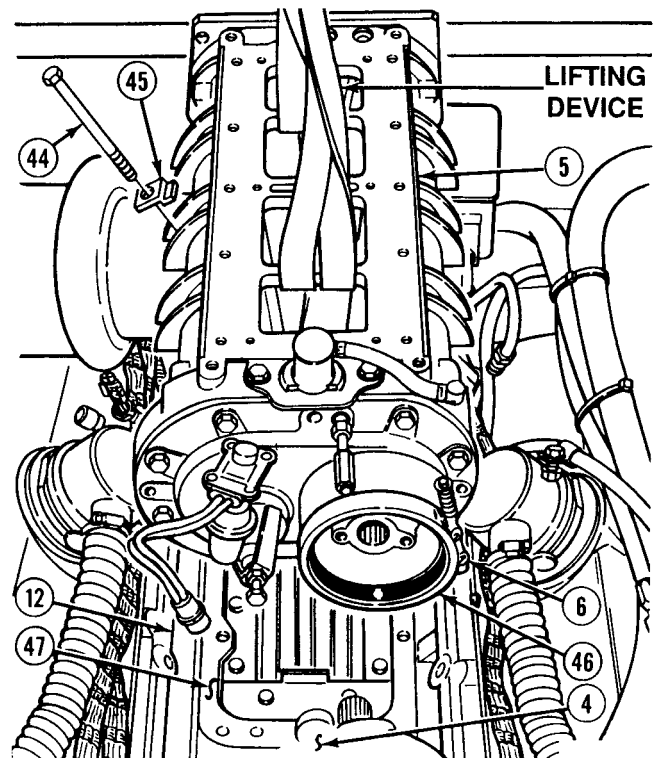
(29) Remove and discard seal (46) from clamp (6).

(30) Position clean rags over engine (12) to keep engine free of dirt and debris.

(31) Remove three screws (48) and fuel pump (49) from blower (5). Discard screws.

(32) Remove and discard gasket (50) from fuel pump (49) or blower (5).

(33) Position rag over blower (5) to keep blower free of dirt and debris.



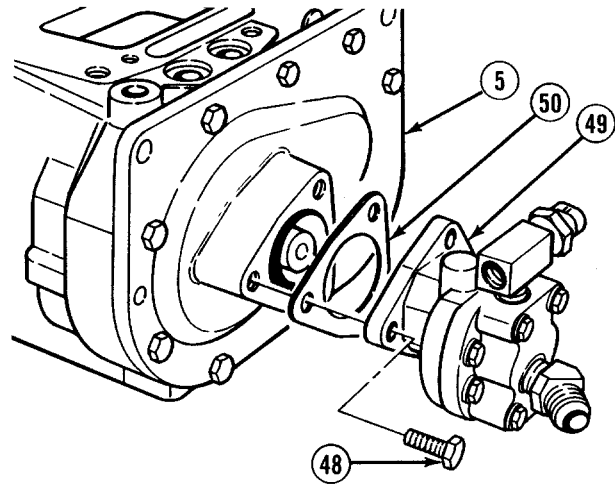
4-4. BLOWER ASSEMBLY REPLACEMENT (CONT).

b. Installation.

CAUTION

Ensure all debris is kept clear of blower during installation. Failure to comply may result in damage to equipment.

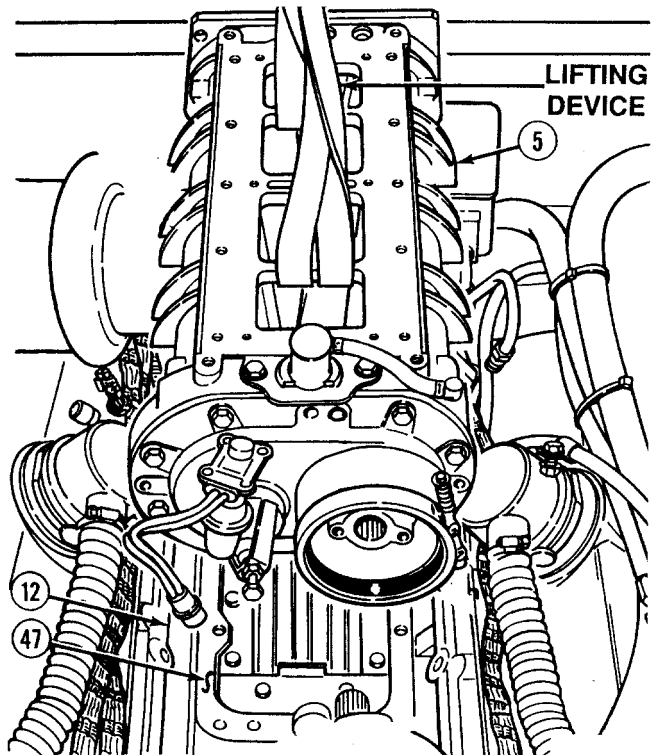
- (1) Remove rag from blower (5).
- (2) Install gasket (50) on fuel pump (49).
- (3) Install fuel pump (49) on blower (5) with three screws (48).
- (4) Remove rags from engine (12).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (5) Apply adhesive to bottom side of gasket (47).
- (6) Install gasket (47) on engine (12).



WARNING

Blower weighs 71 lbs (32 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

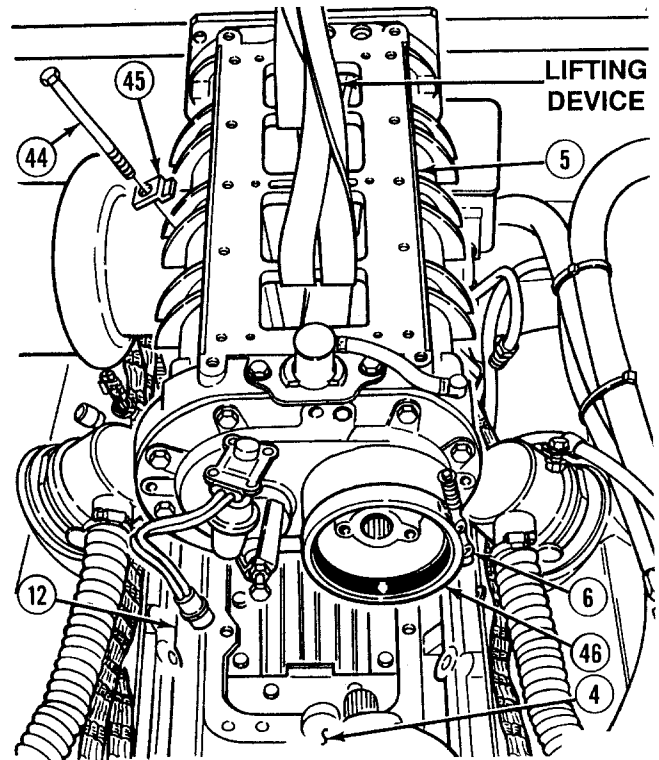
- (7) Attach lifting device to blower (5).

- (8) Position blower (5) over engine (12).
- (9) Install retainer (45) and screw (44) in blower (5).
- (10) Position seal (46) and clamp (6) on blower (5).

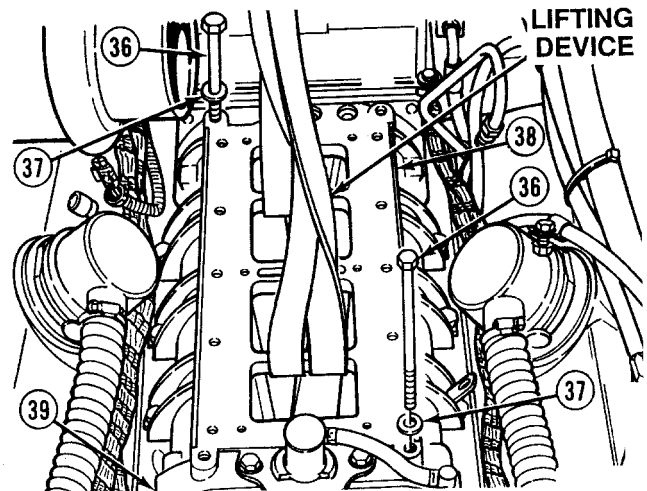
CAUTION

Ensure driveshaft is pulled from blower drive support and wrapped in clean rag from removal. Failure to comply may result in damage to equipment.

- (11) Lower blower (5) on engine (12) and position seal (46) on blower drive support (4).

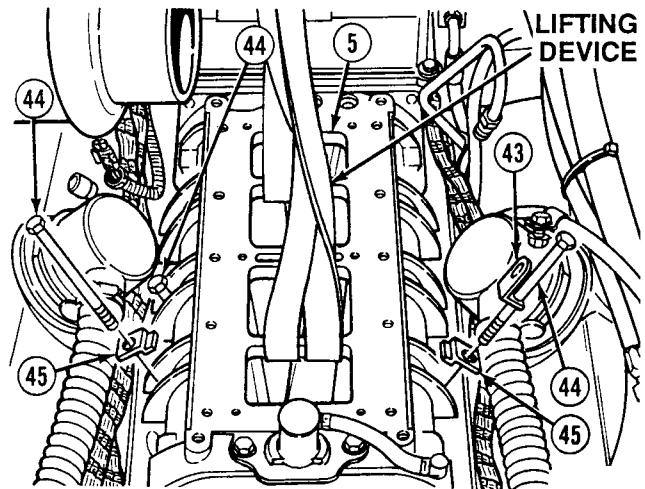


- (12) Position two washers (37) and screws (36) in rear end plate (39).
- (13) Install two washers (37) and screw (36) in front end plate (38).

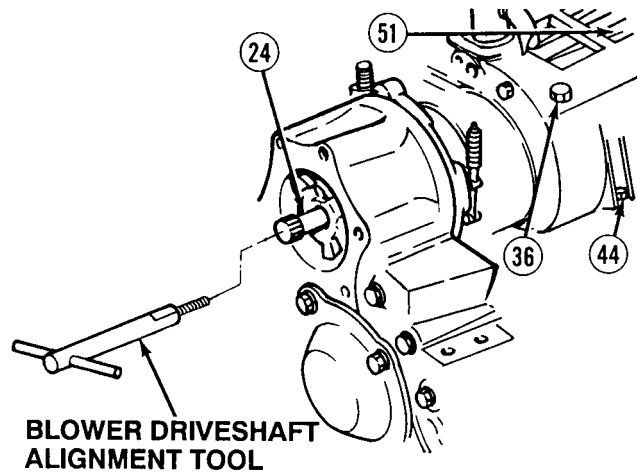


4-4. BLOWER ASSEMBLY REPLACEMENT (CONT).

- (14) Position four retainers (45) and screws (44) in blower (5).
- (15) Position bracket (43), retainer (45) and screw (44) in blower (5).
- (16) Remove lifting device from blower (5).



- (17) Remove rag from driveshaft (24).
- (18) Install blower driveshaft alignment tool in blower driveshaft (24).
- (19) Rotate blower lobes (51) in 90 degree increments. Check alignment at each stop by making sure blower driveshaft (24) can be moved in and out without binding.
- (20) Tighten four screws (36) to 40 to 45 lb-ft (54 to 61 N·m).
- (21) Tighten six screws (44) to 20 lb-ft (27 N·m) and then tighten in equal five lb-ft increments until tightened 30 to 35 lb-ft (41 to 47 N·m).
- (22) Blower driveshaft (24) should move freely. If not, loosen screws (36) and (44) and repeat Steps (18) through (21).



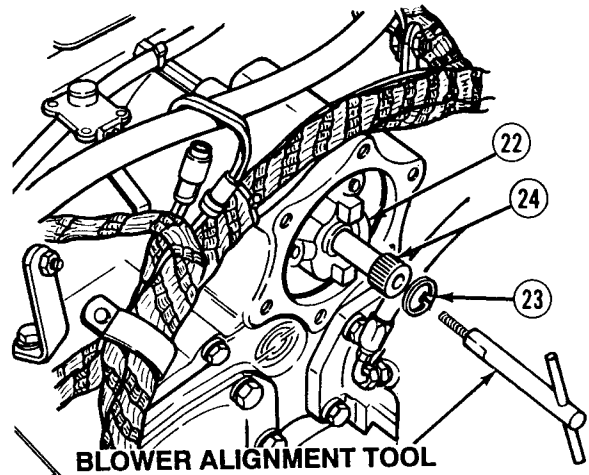
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

CAUTION

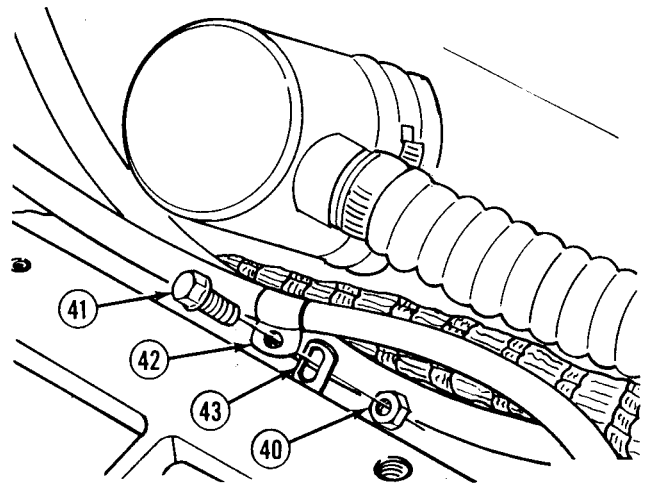
Retaining ring is installed over blower drive shaft alignment tool to keep retaining ring from falling into flywheel housing.

- (23) Install retaining ring (23) on blower driveshaft (24) and remove blower driveshaft alignment tool.
- (24) Remove clean rag from around driveshaft hub (22).

**WARNING**

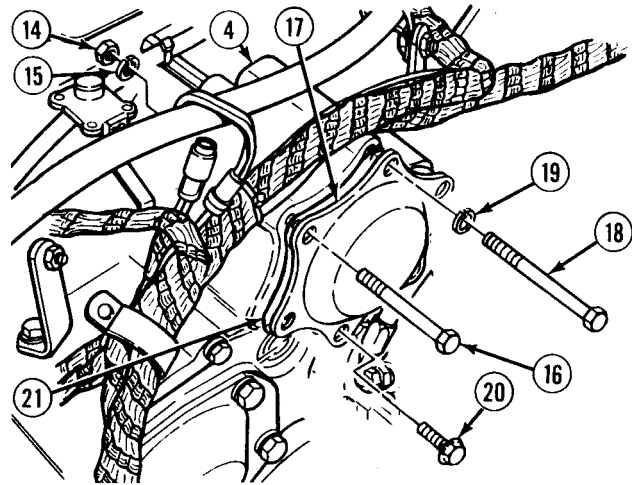
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (25) Apply sealing compound to threads of screw (41).
- (26) Install cushion clip (42), screw (41) and nut (40) in bracket (43).



4-4. BLOWER ASSEMBLY REPLACEMENT (CONT).

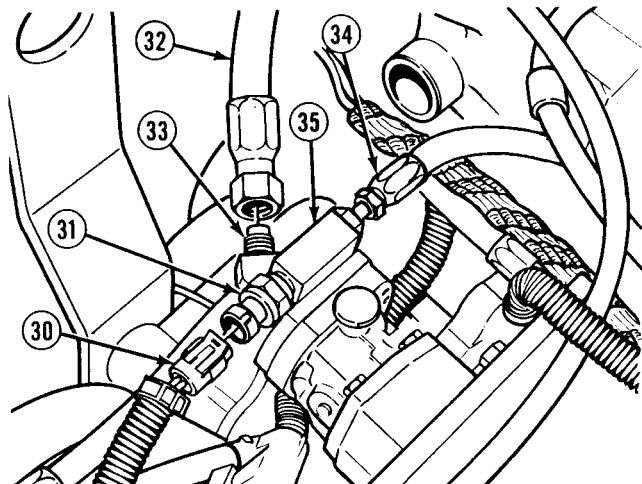
- (27) Position gasket (21) on flywheel housing cover (17).
- (28) Position flywheel housing cover (17) on blower drive support (4).
- (29) Position three lockwashers (19) and screws (18) in flywheel housing cover (17).



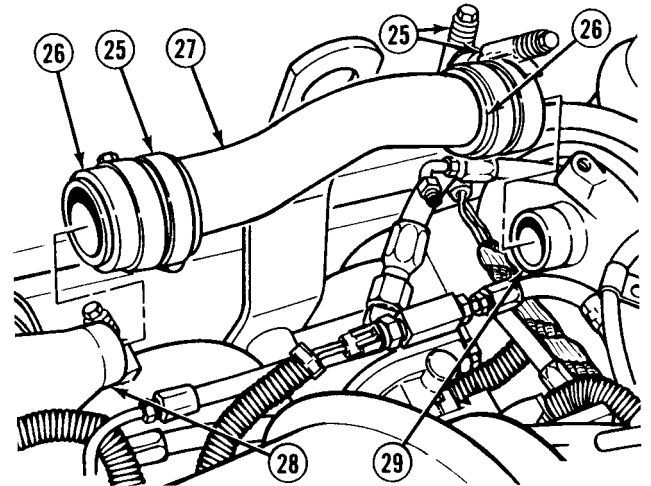
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (30) Apply sealing compound to two screws (20).
- (31) Position two screws (20) in flywheel housing cover (17).
- (32) Position screw (16), lockwasher (15) and nut (14) in flywheel housing cover (17).
- (33) Tighten six screws (18), (20) and (16) on flywheel housing cover (17) to 30 to 35 lb-ft (41 to 47 N·m).
- (34) Install fuel hose 3572 (34) to tee (35).
- (35) Install fuel hose 2260 (32) on elbow (33).
- (36) Connect connector (30) on sensor (31).



- (37) Install crossover tube (27) on left thermostat housing (29) and right thermostat housing (28).
- (38) Position rubber tube (26) on crossover tube (27) and left thermostat housing (29).
- (39) Position rubber tube (26) on crossover tube (27) and right thermostat housing (28).
- (40) Position four clamps (25) over rubber tubes (26) and tighten 40 lb-in (5 N·m).
- (41) Install two lockwashers (9), washers (10), screws (8) and cushion clips (11) on rear of engine (12) and wiring harness (13). Tighten screw 23 lb-ft (31 N·m).



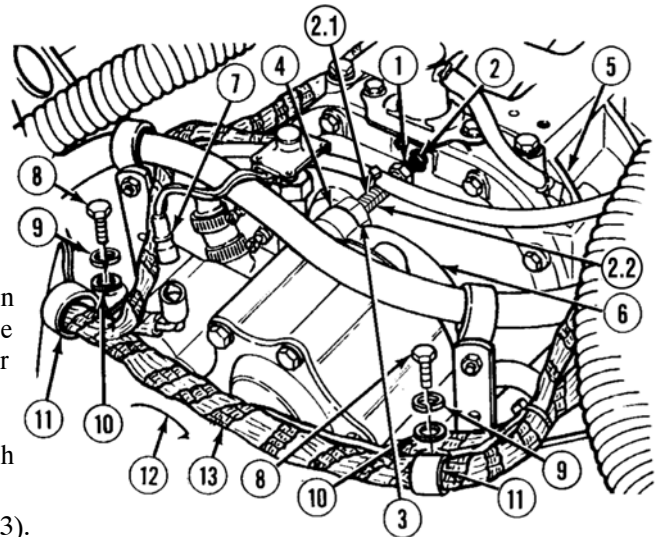
CAUTION

Ensure clamp is properly positioned around seal prior to Step (42). Failure to comply may result in leakage of seal.

- (42) Tighten clamp (6) on blower drive support (4) until clamp is completely compressed.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (43) Apply sealing compound to threads of adapter (3).
- (44) Position oil supply tube (2.2) on blower drive support (4) and tighten adapter (3).

CAUTION

Ensure slit in loom is positioned opposite of fuel line. Failure to comply may result in damage to oil supply tube or fuel line.

NOTE

Install cable ties as required.

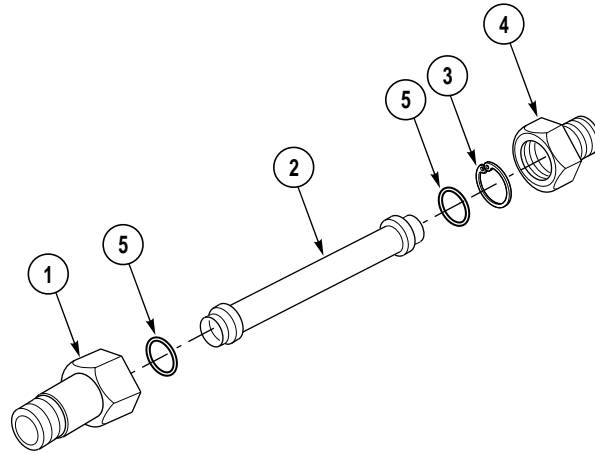
- (44.1) Install loom (2.1) on oil supply tube (2.2).
- (45) Tighten adapter (1) on nut (2).
- (46) Connect tachometer drive connector (7) at rear of blower (5).

c. Follow-On Maintenance:

- Install air inlet housing, (Para 4-3).
- Install air compressor, (Para 10-4).
- Install engine cold plate and ECM, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

b. *Assembly.*



- (1) Position retaining ring (3) on tube (2).
- (2) Apply lubricating oil to two preformed packings (5).
- (3) Install two preformed packings (5) on tube (2).
- (4) Install fitting (4) on tube (2).

WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

- (5) Install retaining ring (3) on fitting (4).
- (6) Install fitting (1) on tube (2).

c. *Follow-On Maintenance:*

- Install blower oil supply tube assembly, (Para 4-4).

END OF TASK

4-6. BLOWER DRIVE ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Indicator, Dial, Set w/Magnetic Base
(Item 98, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

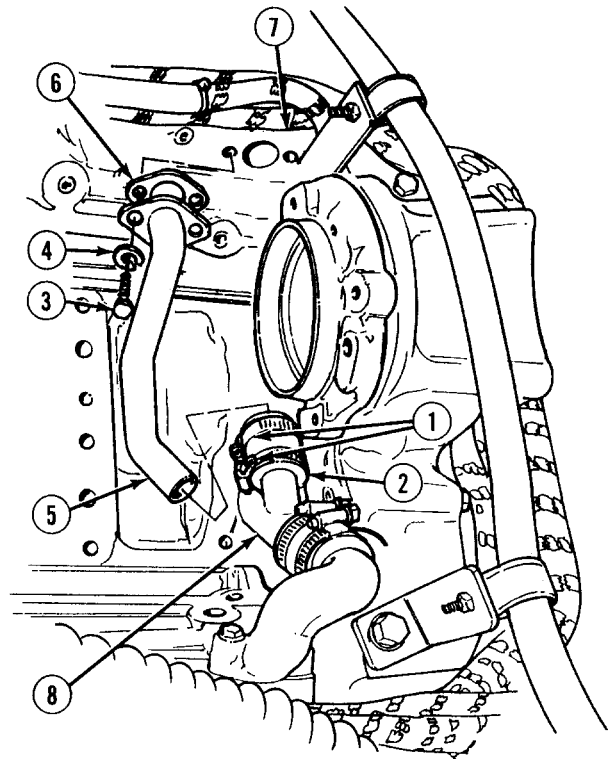
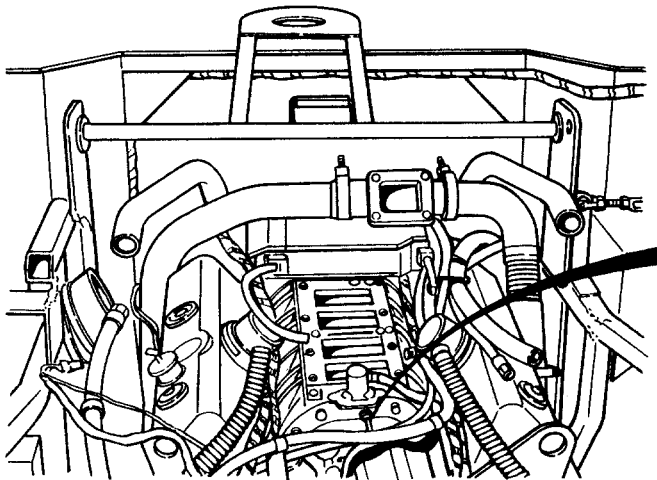
Materials/Parts

Sealing Compound (Item 56, Appendix B)
Copper Washer (2) (Item 34, Appendix E)
Gasket (Item 93, Appendix E)
Gasket (Item 103, Appendix E)
Lockwasher (2) (Item 290, Appendix E)

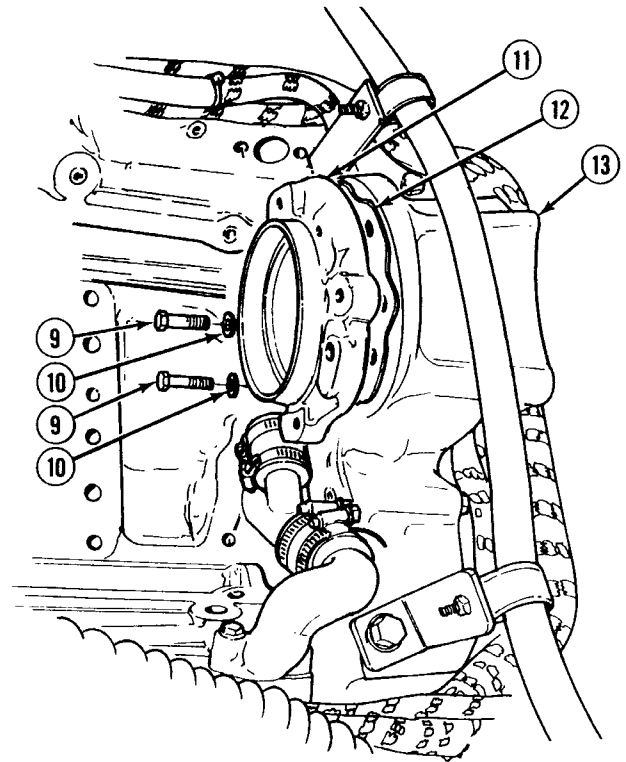
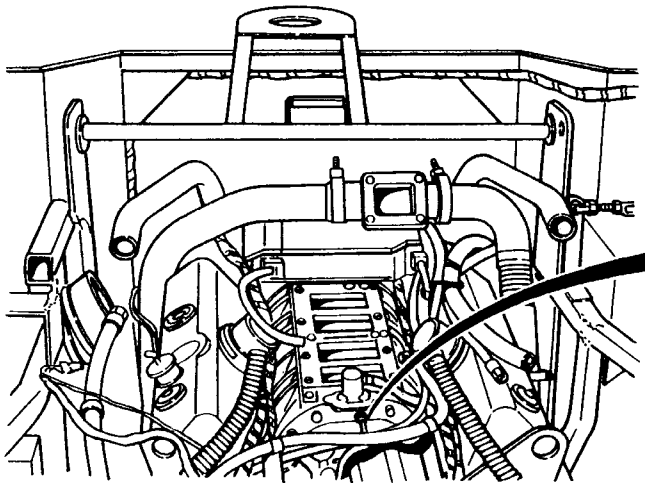
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Blower removed, (Para 4-4)

a. Removal.



- (1) Loosen two clamps (1) on hose (2).
- (2) Remove two screws (3) and lockwashers (4) from breather tube (5). Discard lockwashers.
- (3) Remove breather tube (5) and gasket (6) from right cylinder head (7) and hose (2). Discard gasket.
- (4) Remove hose (2) and two clamps (1) from breather tube (8).



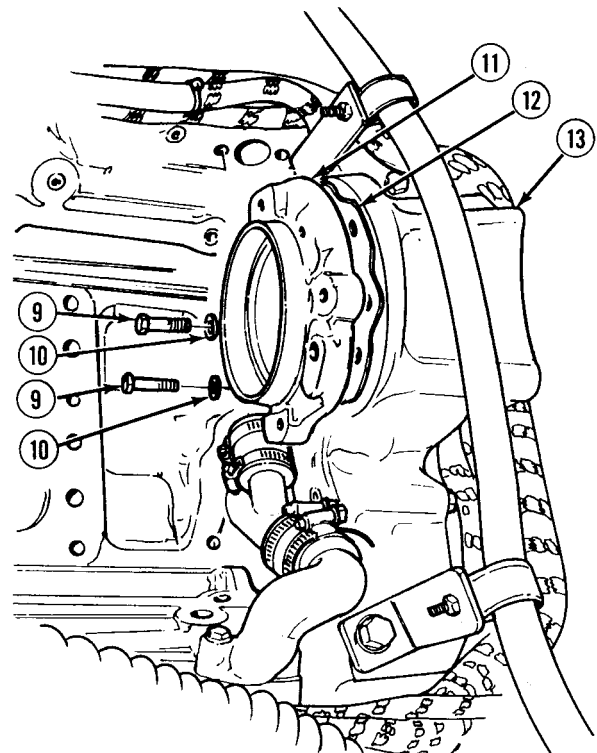
- (5) Remove two screws (9) and copper washers (10) from blower drive assembly (11). Discard copper washers.
- (6) Remove blower drive assembly (11) and gasket (12) from flywheel housing (13). Discard gasket.

b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, 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.

- (1) Apply sealing compound to two screws (9).
- (2) Install gasket (12) and blower drive assembly (11) on flywheel housing (13) with two copper washers (10) and screws (9). Tighten screws to 25 to 30 lb-ft (34 to 41 N·m).



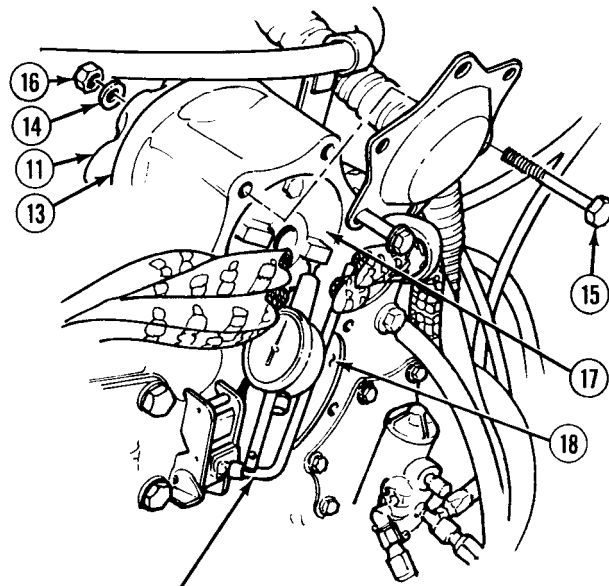
4-6. BLOWER DRIVE ASSEMBLY REPLACEMENT (CONT).

- (3) Install washer (14), screw (15) and nut (16) in top of blower drive assembly (11) and draw blower drive assembly tight to flywheel housing (13).

NOTE

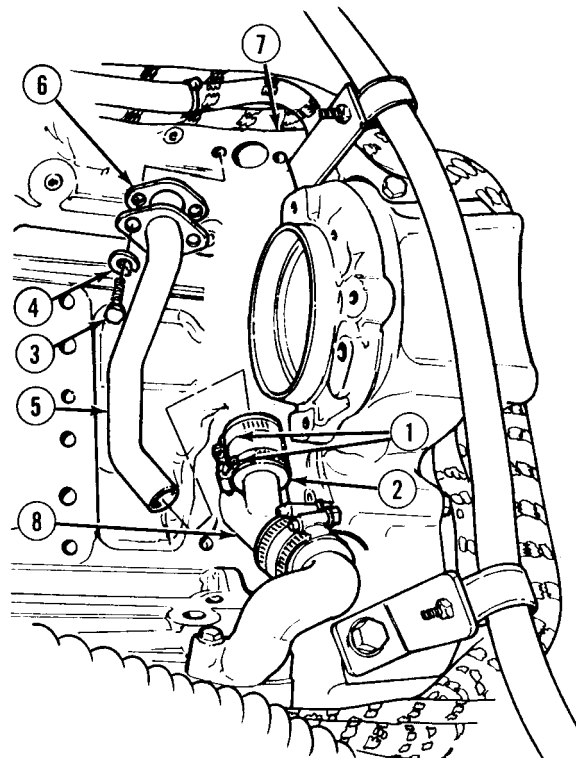
Backlash must be 0.002 in. to 0.010 in. (0.051 to 0.254 mm).

- (4) Position dial indicator on blower drive gear (17) and check backlash between blower drive gear and right back camshaft gear (18).
- (5) If backlash is below minimum specification, replace blower drive assembly.
- (6) Remove nut (16), screw (17) and washer (14) from blower drive assembly (11).
- (7) Remove dial indicator from blower drive gear (17).



DIAL INDICATOR

- (8) Install hose (2) and two clamps (1) on breather tube (8).
- (9) Install gasket (6) and breather tube (5) on right cylinder head (7) with two lockwashers (4) and screws (3). Tighten screws to 60 lb-in (7 N·m).
- (10) Tighten two clamps (1) on hose (2).



c. Follow-On Maintenance:

- Install blower, (Para 4-4).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

4-7. BLOWER BY-PASS VALVE REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench Set, Socket 3/8 in.
(Item 273, Appendix F)

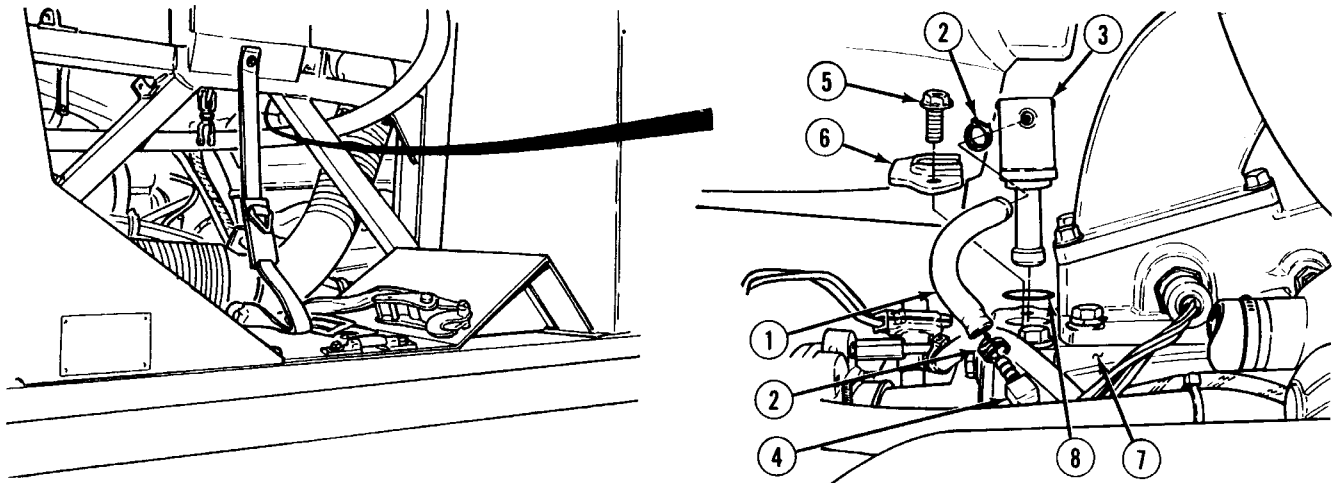
Materials/Parts

Oil, Lubricating (Item 38, Appendix B)
Sealing Compound (Item 56, Appendix B)
Packing, Preformed (Item 379, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)
Spare tire removed, (TM 9-2320-364-10)
Right side skin removed, (TM 9-2320-364-20)
Right side noise panel removed,
(TM 9-2320-364-20)

a. Removal.



- (1) Remove hose (1) and two clamps (2) from blower by-pass valve (3) and fitting (4).
- (2) Remove two clamps (2) from hose (1).
- (3) Remove two screws (5) from retainer (6).
- (4) Remove retainer (6) from blower by-pass valve (3) and blower (7).

CAUTION

Use extreme care when removing blower by-pass valve from blower. Preformed packing fits loosely on blower by-pass valve. Ensure preformed packing does not fall from blower by-pass valve and into blower. Failure to comply may result in severe damage to equipment.

- (5) Remove blower by-pass valve (3) and preformed packing (8) from blower (7). Discard preformed packing.

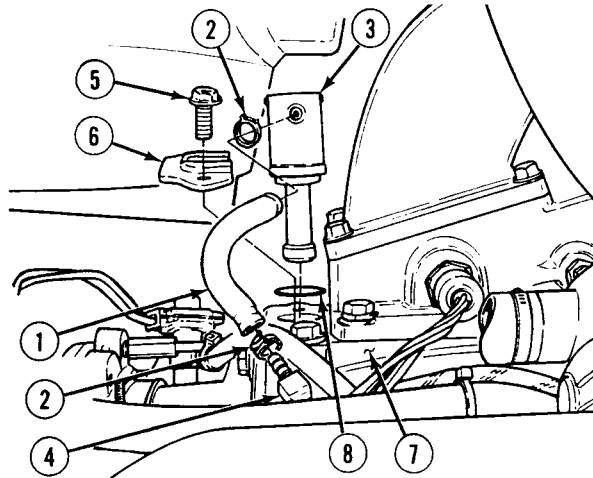
4-7. BLOWER BY-PASS VALVE REPLACEMENT (CONT).

b. Installation.

- (1) Apply lubricating oil to preformed packing (8) and install on blower by-pass valve (3).

CAUTION

Use extreme care when installing blower by-pass valve in blower. Preformed packing fits loosely on blower by-pass valve. Ensure preformed packing does not fall from blower by-pass valve and fall in blower. Failure to comply may result in severe damage to equipment.



- (2) Position blower by-pass valve (3) and preformed packing (8) in blower (7).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (3) Apply sealing compound to threads of two screws (5).
- (4) Install retainer (6) on blower by-pass valve (3) and blower (8) with two screws (5).
- (5) Position two clamps (2) on hose (1).
- (6) Install hose (1) and two clamps (2) on blower by-pass valve (3) and fitting (4).

c. Follow-On Maintenance:

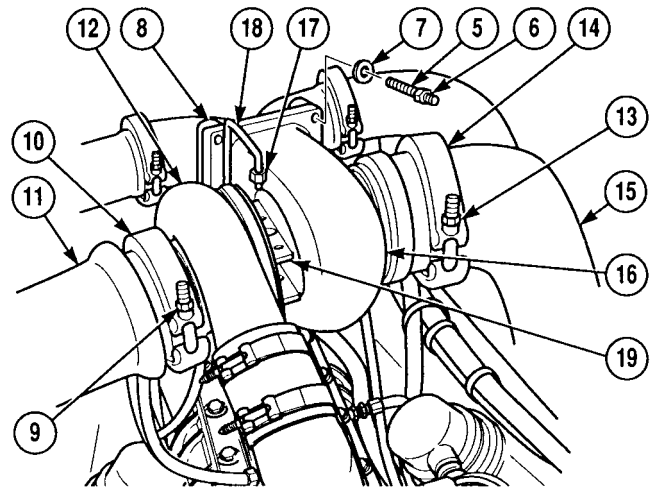
- **Install right side noise panel, (TM 9-2320-364-20).**
- **Install right side skin, (TM 9-2320-364-20).**
- **Install spare tire, (TM 9-2320-364-10).**
- **Connect batteries, (TM 9-2320-364-20).**
- **Remove wheel chocks, (TM 9-2320-364-10).**

END OF TASK

NOTE

Studs, nuts and washers may be removed as one assembly.

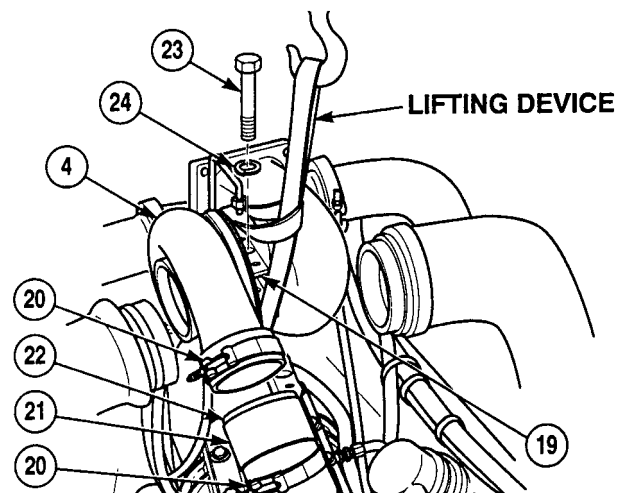
- (2) Remove four studs (5), nuts (6) and washers (7) from exhaust manifold flange (8).
- (3) Remove and discard four locknuts (6) from studs (5).
- (4) Remove and discard nut (9) on clamp (10).
- (5) Remove air inlet tube (11) from turbocharger compressor housing (12).
- (6) Remove and discard clamp (10) from air inlet tube (11).
- (7) Remove and discard nut (13) from clamp (14).
- (8) Remove and discard clamp (14) from exhaust tube (15).
- (9) Remove exhaust tube (15) from turbocharger turbine housing (16).
- (10) Loosen fitting (17) and disconnect oil inlet tube (18) from top of turbocharger center housing (19).



WARNING

Turbocharger weighs 57 lbs (26 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

- (11) Attach lifting device to turbocharger (4).
- (12) Loosen two clamps (20) and push rubber sleeve (21) down on air inlet housing (22).
- (13) Remove two screws (23) and lockwashers (24) from turbocharger center housing (19). Discard lockwashers.

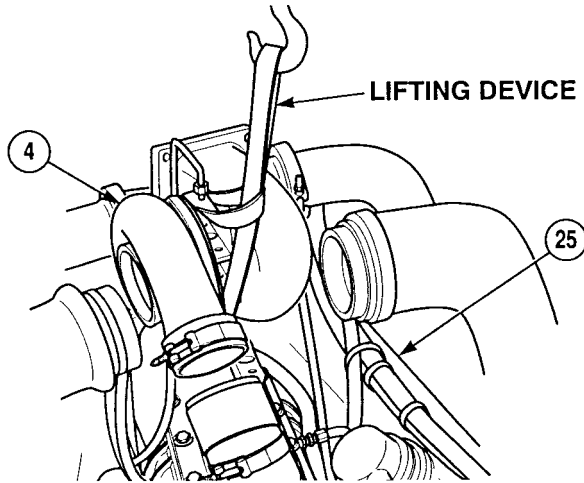


4-8. TURBOCHARGER REPLACEMENT (CONT).

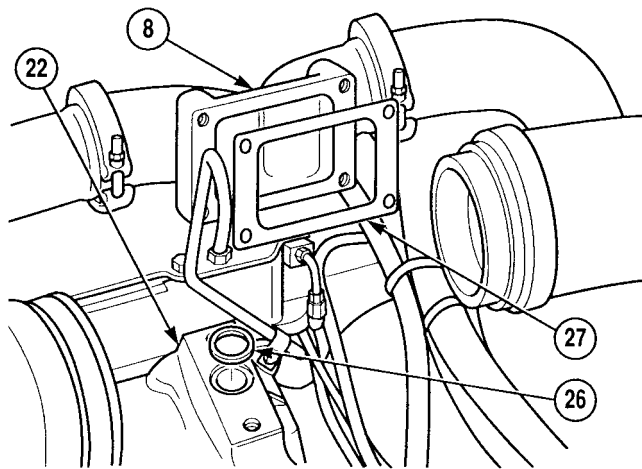
CAUTION

Use extreme care when removing turbocharger from engine. Failure to comply could result in damage to air inlet housing.

- (14) Remove turbocharger (4) from engine (25) and position on clean level surface.
- (15) Remove lifting device from turbocharger (4).

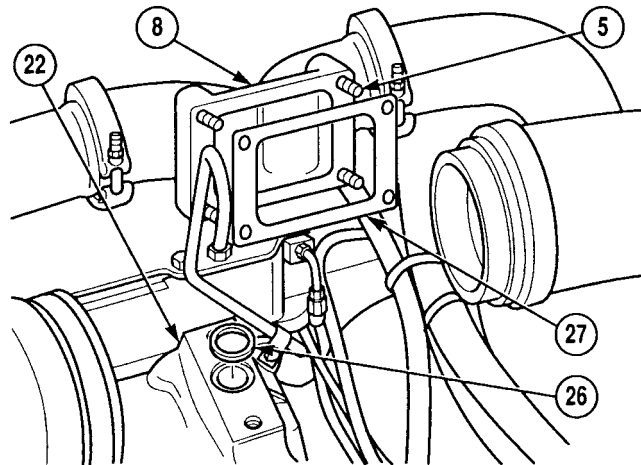


- (16) Remove and discard gasket (26) from air inlet housing (22).
- (17) Remove and discard gasket (27) from exhaust manifold flange (8).



b. Installation.

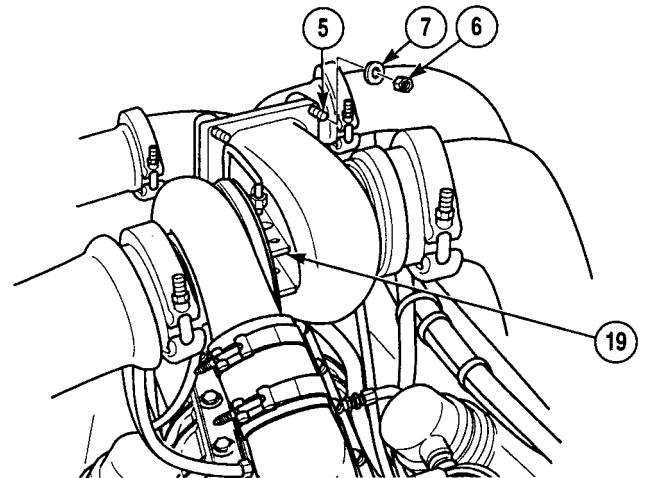
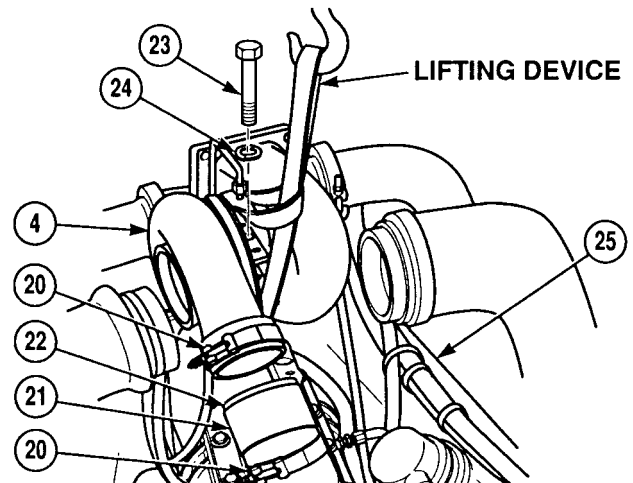
- (1) Install four studs (5) on exhaust manifold flange (8).
- (2) Position gasket (27) on exhaust manifold flange (8).
- (3) Apply grease to gasket (26).
- (4) Install gasket (26) on air inlet housing (22).



WARNING

Turbocharger weighs 57 lbs (26 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (5) Attach lifting device to turbocharger (4).
- (6) Install turbocharger (4) on engine (25) with two lockwashers (24) and screws (23). Tighten screws to 45 to 50 lb-ft (61 to 68 N·m).
- (7) Remove lifting device from turbocharger (4).
- (8) Align rubber sleeve (21) with turbocharger (4) and air inlet housing (22) and secure with two clamps (20).
- (9) Install four washers (7) and locknuts (6) on studs (5). Tighten locknuts to 30 to 35 lb-ft (41 to 47 N·m).
- (10) Fill turbocharger center housing (19) with lubricating oil.



4-8. TURBOCHARGER REPLACEMENT (CONT).

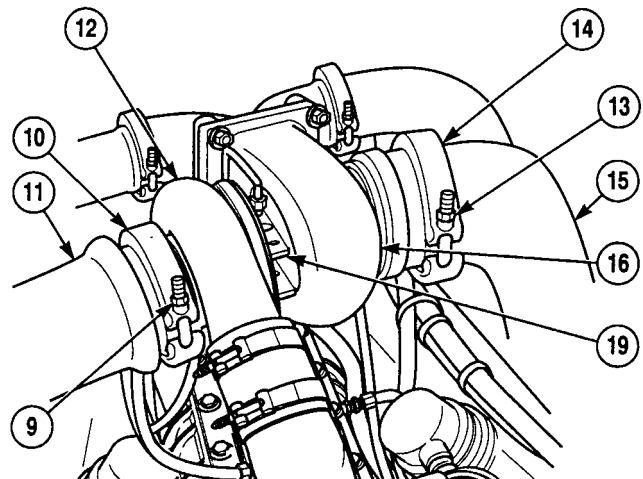
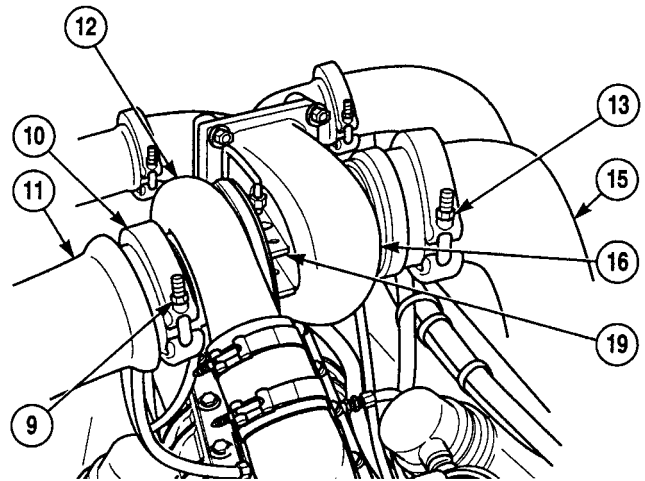
WARNING

Use extreme care when turning rotating assembly. Rotating assembly is sharp and injury to personnel may result.

NOTE

Rotating assembly is turned to coat internal surface of turbocharger.

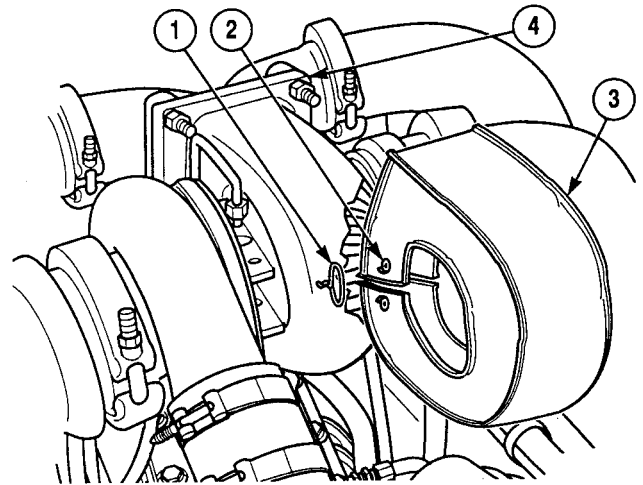
- (11) Turn rotating assembly (29) by hand.
- (12) Fill turbocharger center housing (19) with lubricating oil.
- (13) Connect oil inlet tube (18) on top of turbocharger center housing (19) and tighten fitting (17).
- (14) Install exhaust tube (15) on turbocharger turbine housing (16).
- (15) Install clamp (14) on exhaust tube (15).
- (16) Tighten nut (13) on clamp (14).
- (17) Install air inlet tube (11) on turbocharger compressor housing (12).
- (18) Install clamp (10) on air inlet tube (11).
- (19) Tighten nut (9) on clamp (10).



WARNING

Gloves must be worn when handling insulation blanket. Insulation blanket is made of fiberglass and may cause skin irritation. Failure to comply may result in injury to personnel.

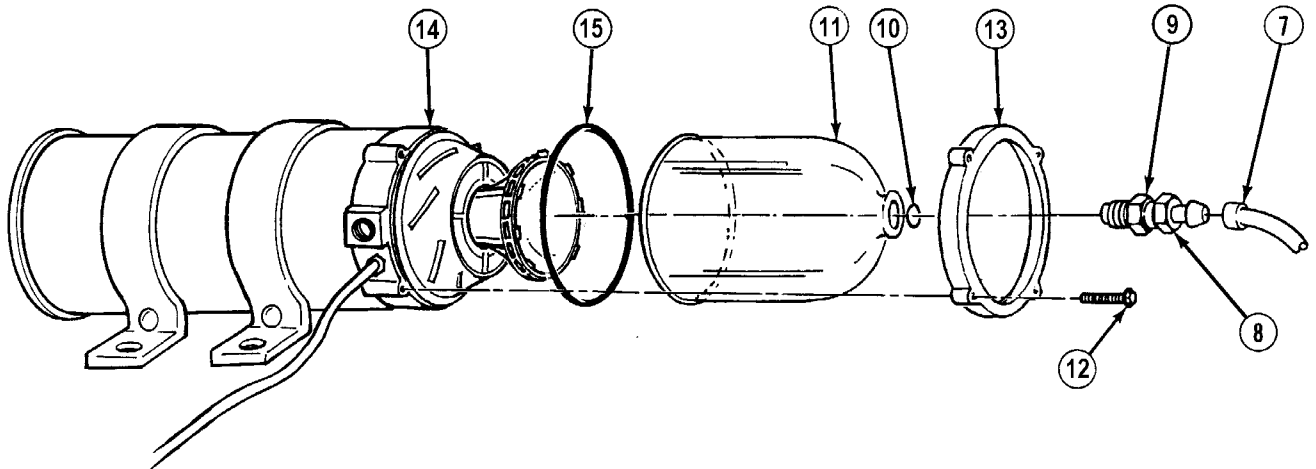
- (20) Install insulation blanket (3) on turbocharger (4).
- (21) Install two wires (1) on tabs (2).



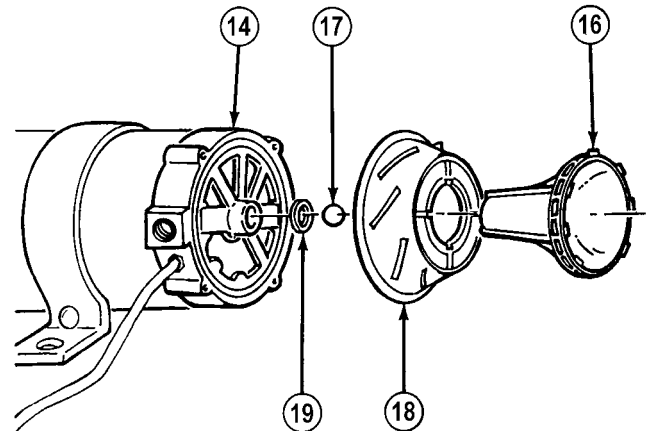
c. Follow-On Maintenance:

- Install cooling assembly, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK



- (5) Remove drain hose (7) from drain valve (8).
- (6) Remove drain valve (8), nut (9) and preformed packing (10) from bowl (11). Discard preformed packing.
- (7) Remove four screws (12) from bowl ring (13).
- (8) Remove bowl ring (13) and bowl (11) from base (14).
- (9) Remove and discard bowl gasket (15) from base (14).
- (10) Unscrew turbine baffle (16) and check ball (17) from base (14).
- (11) Remove filter baffle (18) and gasket (19) from base (14). Discard gasket.



4-9. FUEL/WATER SEPARATOR REPAIR (CONT).

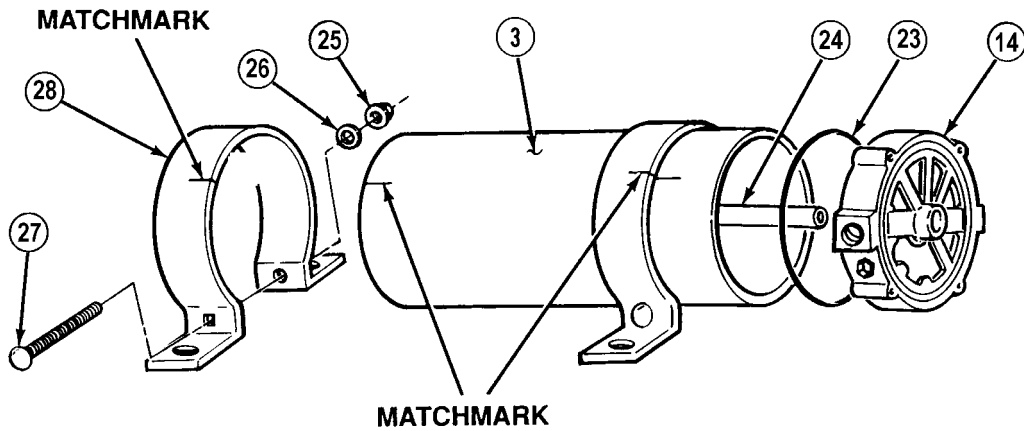
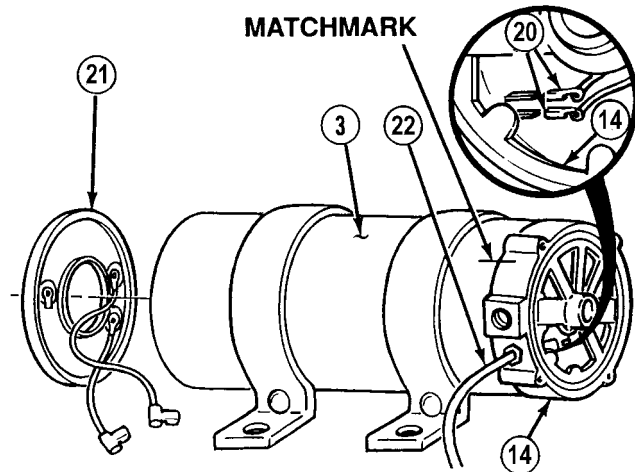
(12) Disconnect two spade connectors (20) from base (14).

(13) Remove heater (21) from housing (3).

NOTE

Match mark housing and base.

(14) Remove heater feed wire (22) from base (14).



(15) Install housing (3) in soft jawed vise.

(16) Remove housing (3) and gasket (23) from base (14). Discard gasket.

(17) Remove return tube (24) from base (14).

NOTE

- Match mark clamps and housing.
- Perform Step (18) if clamps are damaged.

(18) Remove two locknuts (25), washers (26), carriage bolts (27) and clamps (28) from housing (3). Discard locknuts.

(19) Remove housing (3) from soft jawed vise.

b. *Cleaning/Inspection.*

WARNING

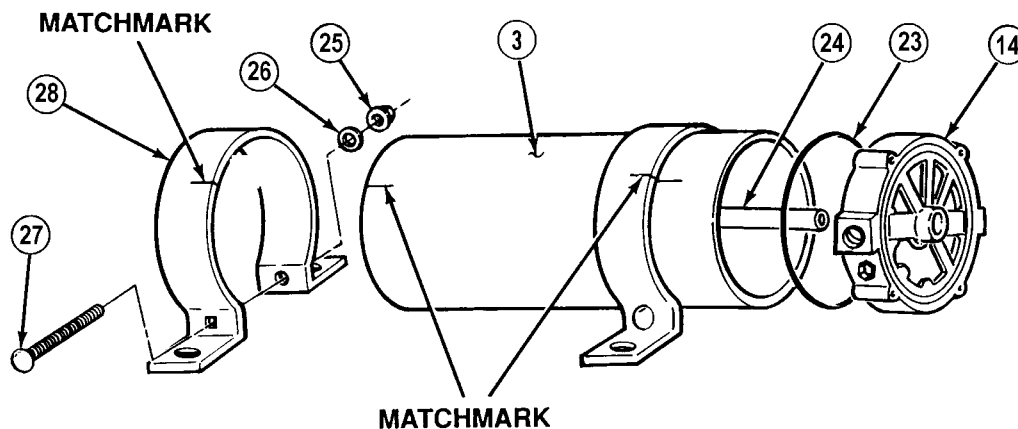
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

CAUTION

Clean all parts of fuel/water separator with diesel fuel only. Other cleaning agents may damage parts.

- (1) Clean all parts with diesel fuel. Dry with a cleaning cloth.
- (2) Inspect for excessive contamination, cracked, worn, or damaged parts.
- (3) Replace all defective parts.

c. *Assembly.*



NOTE

- Align match marks made prior to removal.
- Perform Step (1) if clamps were removed.

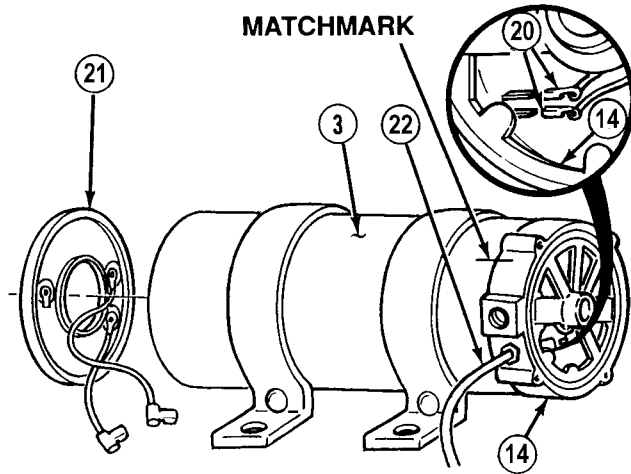
- (1) Install clamps (28) on housing (3) with two carriage bolts (27), washers (26) and locknuts (25).
- (2) Install return tube (24) in base (14).
- (3) Lubricate gasket (23) with diesel fuel.
- (4) Install gasket (23) in base (14).

4-9. FUEL/WATER SEPARATOR REPAIR (CONT).

NOTE

Align match marks made prior to removal.

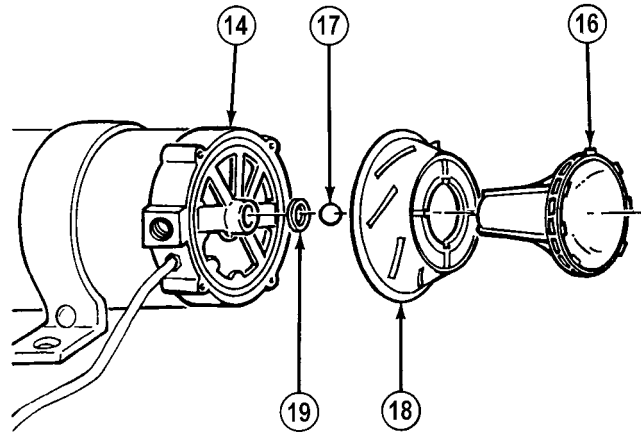
- (5) Install housing (3) in base (14).
- (6) Install heater (21) on housing (3).
- (7) Connect two spade connectors (20) to base (14).
- (8) Install heater feed wire (22) in base (14).

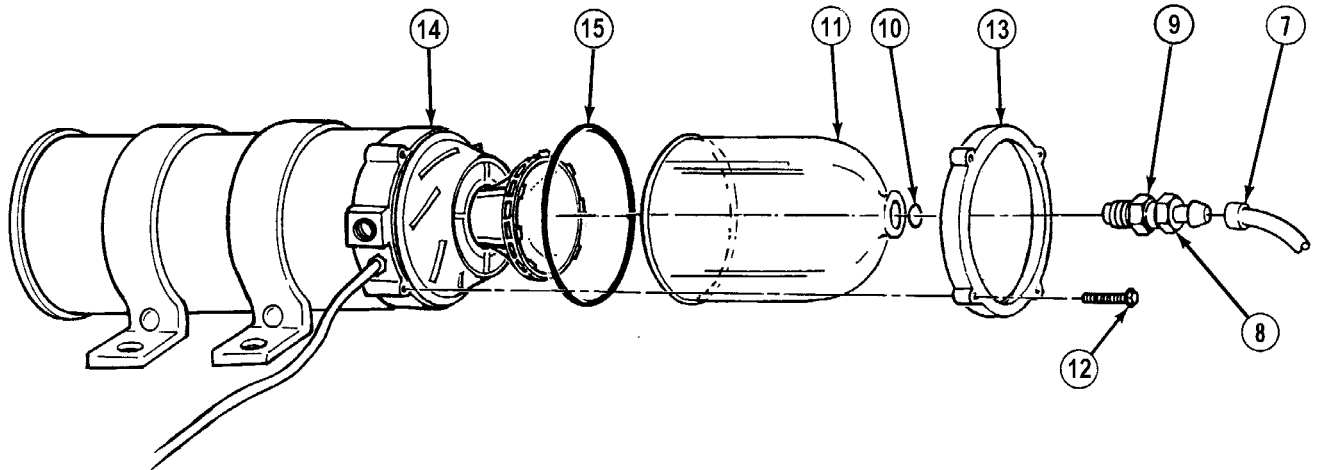


NOTE

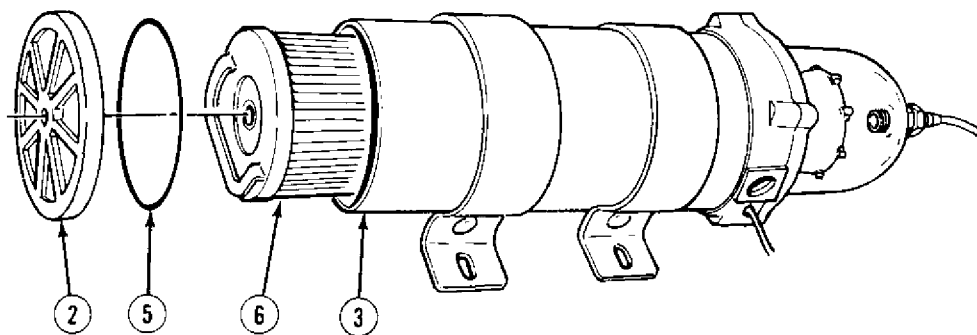
Install gasket so side marked TOP is against base.

- (9) Install gasket (19) and baffle (18) on base (14).
- (10) Install check ball (17) and turbine baffle (16) on base (14).



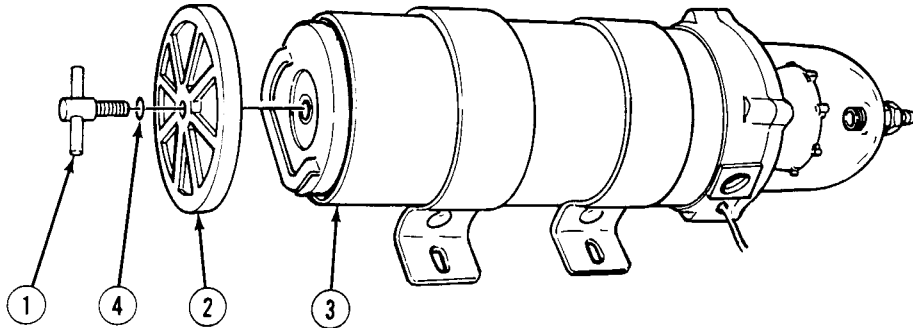


- (11) Lubricate preformed packing (10) with diesel fuel.
- (12) Install preformed packing (10) on drain valve (8).
- (13) Position drain valve (8) on bowl (11).
- (14) Tighten nut (9) on drain valve (8) to 26 to 30 lb-in (3 N·m).
- (15) Install drain hose (7) on drain valve (8).
- (16) Lubricate bowl gasket (15) with diesel fuel.
- (17) Install bowl gasket (15) in base (14).
- (18) Install bowl (11) and bowl ring (13) on base (14) with four screws (12).



- (19) Install filter element (6) in housing (3).
- (20) Lubricate gasket (5) with diesel fuel.
- (21) Install gasket (5) in lid (2).

4-9. FUEL/WATER SEPARATOR REPAIR (CONT).



- (22) Install lid (2) on housing (3).
- (23) Lubricate preformed packing (4) with diesel fuel.
- (24) Install preformed packing (4) on T-handle (1).
- (25) Install T-handle (1) on lid (2).

END OF TASK

4-10. FUEL PUMP REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

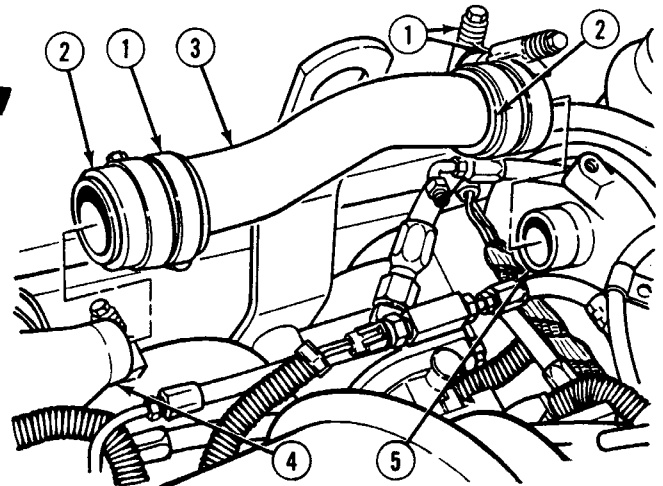
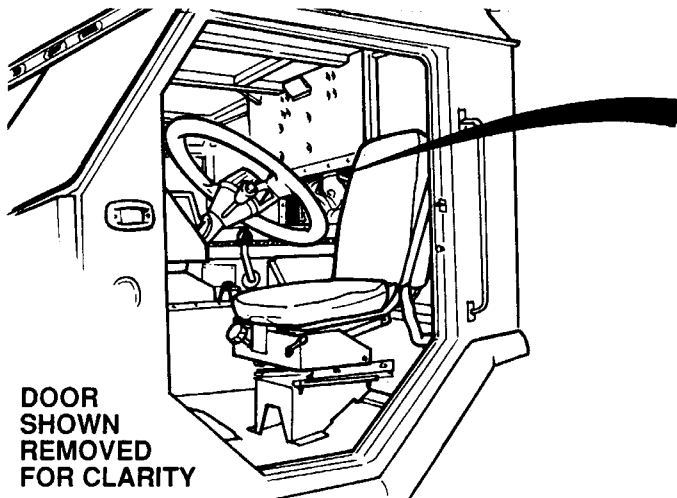
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Cooling system drained, (TM 9-2320-364-20)
Engine lifting bracket removed, (Para 3-6)

Materials/Parts

Grease (Item 21, Appendix B)
Rags, Wiping (Item 47, Appendix B)
Sealant Compound (Item 53, Appendix B)
Sealing Compound (Item 56, Appendix B)
Gasket (Item 104, Appendix E)
Screw (3) (Item 537, Appendix E)

a. Removal.



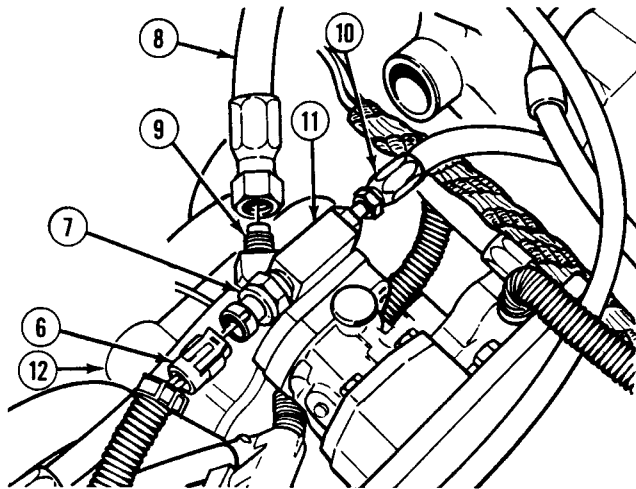
- (1) Loosen four clamps (1) and position two rubber tubes (2) on crossover tube (3).
- (2) Remove crossover tube (3) from right thermostat housing (4) and left thermostat housing (5).

4-10. FUEL PUMP REPLACEMENT (CONT).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

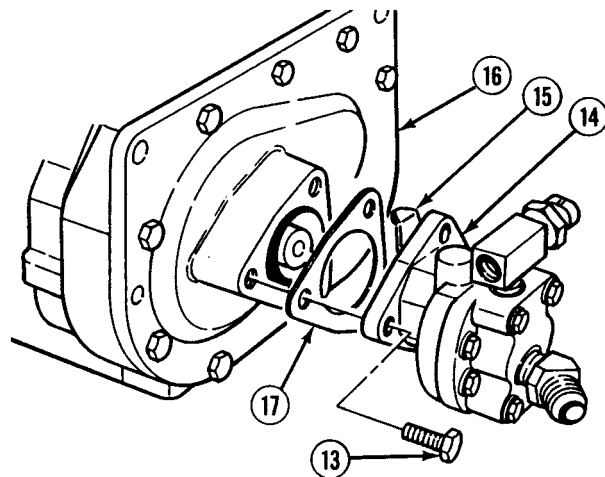
- (3) Disconnect connector (6) from sensor (7).
- (4) Remove fuel hose 2260 (8) from elbow (9).
- (5) Remove fuel hose 3572 (10) from tee (11).
- (6) Position clean wiping rags over engine (12) to keep engine free of dirt and debris.



NOTE

Drive coupling fork may come off with pump or may stay with engine.

- (7) Remove three screws (13), fuel pump (14) and drive coupling fork (15) from blower (16). Discard screws.
- (8) Remove and discard gasket (17) from fuel pump (14) or blower (16).
- (9) Position clean wiping rag over blower (16) to keep blower free of dirt and debris.

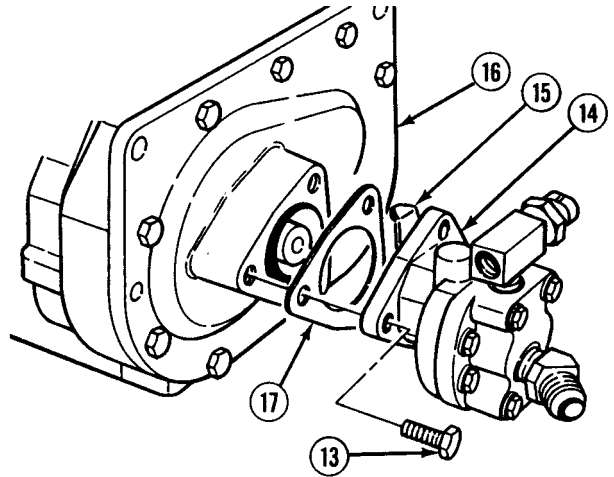


b. *Installation.*

CAUTION

Ensure all debris is kept clear of blower during installation. Failure to comply may result in damage to equipment.

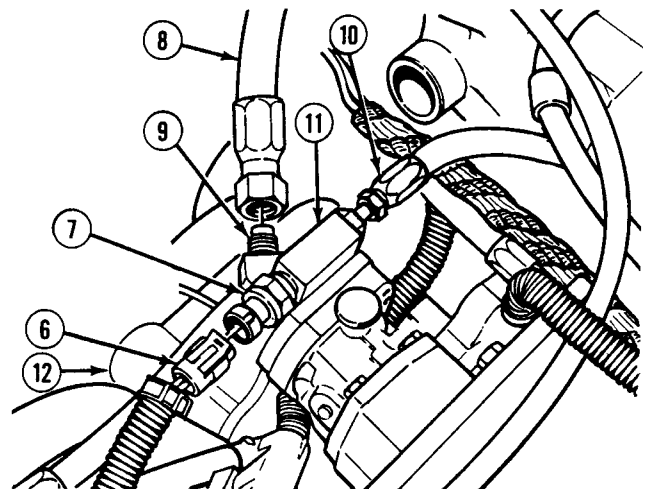
- (1) Remove wiping rag from blower (16).
- (2) Apply grease to gasket (17).
- (3) Position gasket (17) on fuel pump (14).
- (4) Align drive coupling fork (15) in fuel pump (14) with blower shaft and position fuel pump (14) on blower housing (16).



WARNING

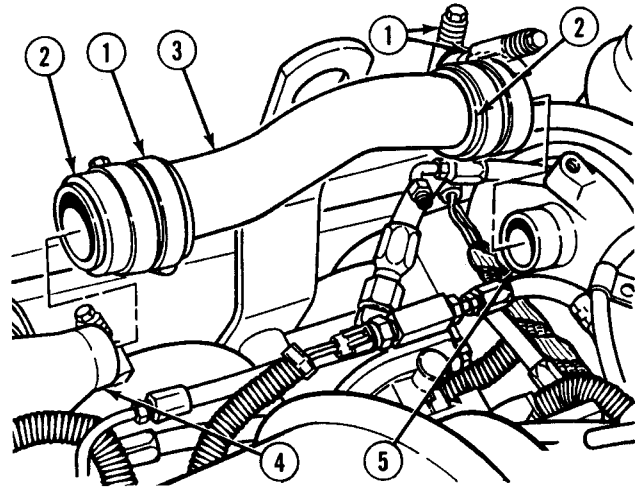
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (5) Coat threads of three screws (13) with sealing compound.
- (6) Install screws (13) in fuel pump (14). Tighten 120 to 156 lb-in (14 to 18 N·m)
- (7) Remove wiping rags from engine (12).
- (8) Install fuel hose 3572 (10) to tee (11).
- (9) Install fuel hose 2260 (8) on elbow (9).
- (10) Connect connector (6) on sensor (7).



4-10. FUEL PUMP REPLACEMENT (CONT).

- (11) Install crossover tube (3) on left thermostat housing (5) and right thermostat housing (4).
- (12) Position rubber tube (2) on crossover tube (3) and left thermostat housing (5).
- (13) Position rubber tube (2) on crossover tube (3) and right thermostat housing (4).
- (14) Position four clamps (1) over rubber tubes (2) and tighten 40 lb-in (5 N·m).



c. Follow-On Maintenance:

- Install engine lifting bracket, (Para 3-6).
- Fill cooling system, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

CHAPTER 5

COOLING SYSTEM MAINTENANCE

Para	Contents	Page
5-1	Direct Support Cooling System Maintenance Introduction	5-1
5-2	Radiator Assembly Repair/Test	5-2
5-3	Right Side Thermostat Housing Replacement	5-9
5-4	Left Side Thermostat Housing Replacement	5-13
5-5	Aftercooler Replacement	5-15
5-6	Water Pump Assembly Replacement	5-19
5-7	Water Pump Drive Gear Replacement	5-25
5-8	Suction Fan Assembly Replacement	5-27
5-9	Fan Drive Motor Replacement	5-29

5-1. DIRECT SUPPORT COOLING SYSTEM MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for replacing cooling system components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

5-2. RADIATOR ASSEMBLY REPAIR/TEST.

This task covers:

- a. Disassembly
- b. Cleaning/Inspection
- c. Assembly
- d. Testing
- e. Follow-On Maintenance

INITIAL SETUP

Test Equipment

Adapter, Radiator (Item 6, Appendix F)
 Tester, Pressure, Radiator (Item 237, Appendix F)

Tools and Special Tools

Tool Kit, General Mechanic's (Item 240, Appendix F)
 Cap and Plug Set (Item 26, Appendix F)
 Jackstand (4) (Item 132, Appendix F)
 Wrench Set, Socket 3/8 in. Drive (Item 273, Appendix F)
 Wrench, Torque (0-60 N·m) (Item 276, Appendix F)
 Plywood Sheet (Appendix C)

Materials/Parts

Cloth, Crocus (Item 12, Appendix B)
 Sealing Compound (Item 53, Appendix B)
 Gasket (2) (Item 57, Appendix E)
 Lockwasher (120) (Item 293, Appendix E) (Model A only)
 Nut, Flanged Wiz Lock (120) (Item 310, Appendix E) (Model B only)

Personnel Required

Two

Equipment Condition

Coolant level sight glass removed, (TM 9-2320-364-20)
 Radiator removed, (TM 9-2320-364-20)

a. *Disassembly.*

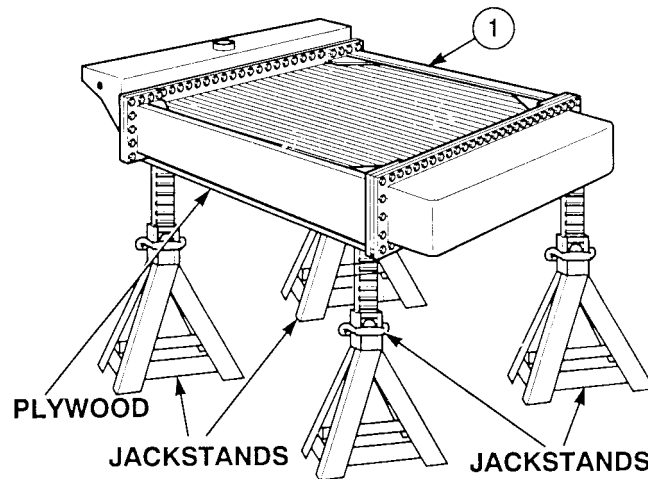


Failure to properly support radiator as described in Step (1), will result in damage to radiator.

NOTE

- There are two types of radiators. Model B replaced Model A.
- Model A uses standard lockwashers for assembly.
- Model B uses flanged wiz locknuts for assembly.
- Both models are disassembled and assembled the same way.
- Model A discards lockwashers. Model B discards wiz locknuts and does not have lockwashers.
- Jackstands should be positioned at highest level for easier access to lower side of radiator.

- (1) Position radiator assembly (1) on 32 in. by 36 in. (81 by 91 cm) plywood sheet supported by four jackstands.

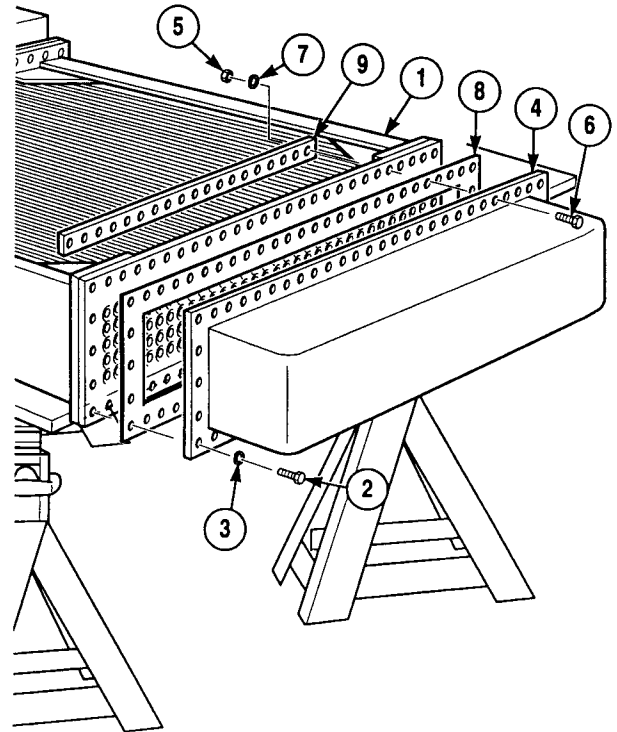


- (2) Remove five screws (2) and lockwashers (3) from left side of bottom tank assembly (4). Discard lockwashers.
- (3) Remove five screws (2) and lockwashers (3) from right side of bottom tank assembly (4). Discard lockwashers.

WARNING

Bottom tank assembly weighs 82 lbs (37 kg). Ensure bottom tank is fully supported prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

- (4) With the aid of an assistant, remove 50 nuts (5), screws (6) and lockwashers (7) from bottom tank assembly (4) and remove bottom tank assembly (4), gasket (8) and two bolt straps (9) from radiator assembly (1). Discard lockwashers and gasket.

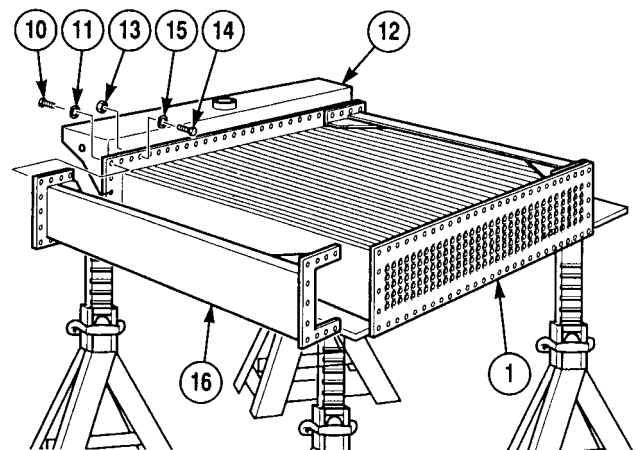


- (5) Remove five screws (10) and lockwashers (11) from left side of top tank assembly (12). Discard lockwashers.
- (6) Remove three nuts (13), screws (14) and lockwashers (15) from left side of top tank assembly (12). Discard lockwashers.

CAUTION

Side column assembly may fall upon removal of three nuts and screws in Step (7). Ensure side column assembly is supported to prevent damage to parts.

- (7) With the aid of an assistant, remove three nuts (13), screws (14) and lockwashers (15) from bottom of top tank assembly (12) and remove side column assembly (16) from radiator assembly (1). Discard lockwashers.

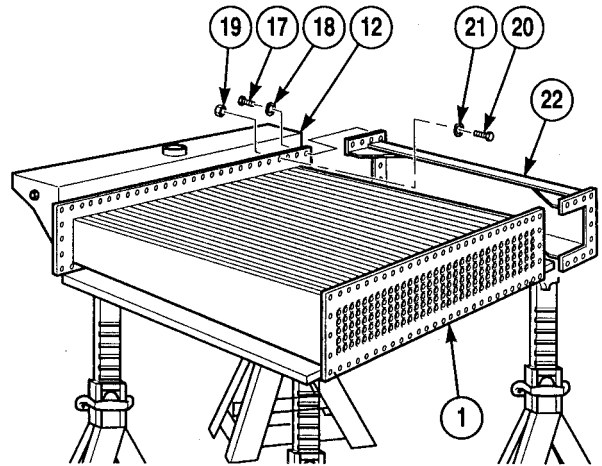


5-2. RADIATOR ASSEMBLY REPAIR/TEST (CONT).

- (8) Remove five screws (17) and lockwashers (18) from right side of top tank assembly (12). Discard lockwashers.
- (9) Remove three nuts (19), screws (20) and lockwashers (21) from top right of top tank assembly (12). Discard lockwashers.

CAUTION

Ensure side column assembly is fully supported prior to Step (10) or side column assembly may fall and damage to parts may occur.



- (10) With the aid of an assistant, remove three nuts (19), screws (20) and lockwashers (21) from bottom left of top tank assembly (12) and remove side column assembly (22) from radiator assembly (1). Discard lockwashers.

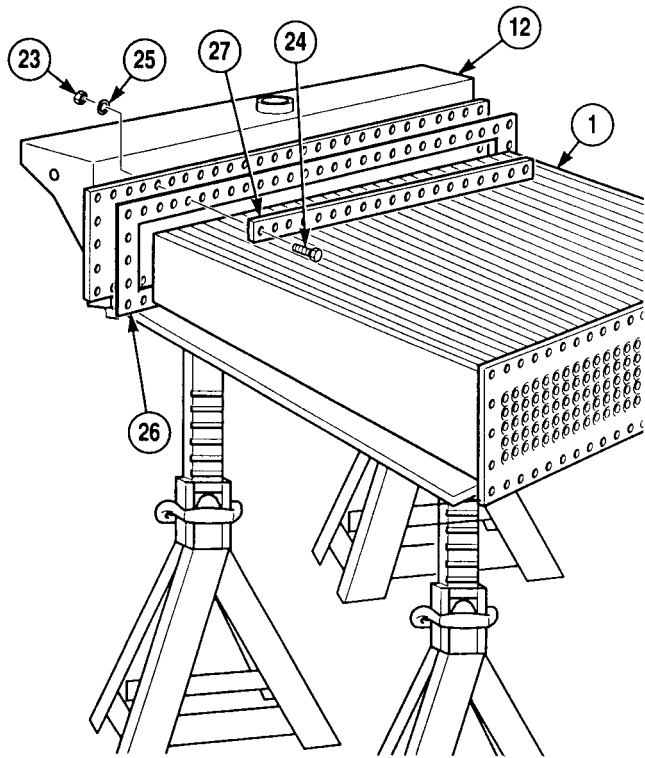
WARNING

Top tank assembly weighs 76 lbs (34 kg). Ensure top tank assembly is fully supported prior to removal. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Note and record position of screws in Step (11) prior to removal to ensure proper installation.

- (11) With the aid of an assistant, remove 38 nuts (23), screws (24) and lockwashers (25) from top tank assembly (12). Discard lockwashers.
- (12) With the aid of an assistant, remove top tank assembly (12), gasket (26) and two bolt straps (27) from radiator assembly (1). Discard gasket.



b. *Cleaning/Inspection.*

- (1) Scrape excess gasket material from radiator assembly.
- (2) Ensure gasket surfaces are smooth and free of bumps. Smooth gasket surfaces with crocus cloth if required.
- (3) Inspect radiator tanks for cracks, dents and other damage. Replace damaged tanks.
- (4) Inspect radiator core for plugged tubes. Light should be visible through all tubes that are not sealed.

c. *Assembly.*

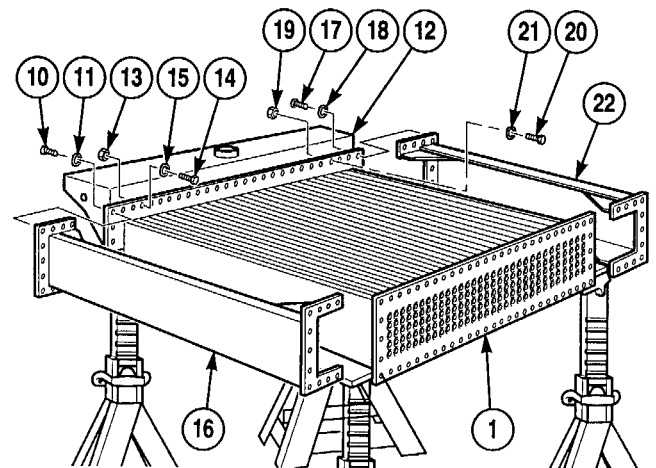
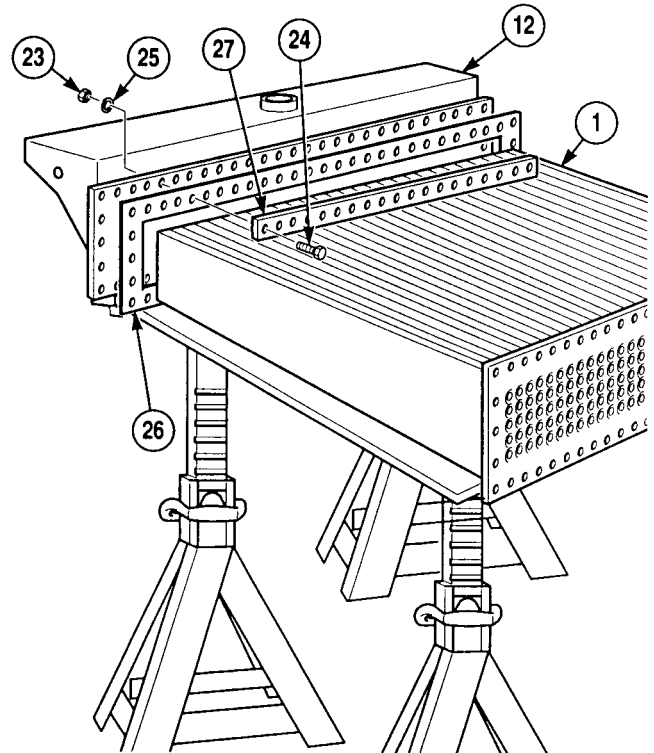
WARNING

Top tank assembly weighs 76 lbs (34 kg). Ensure top tank assembly is fully supported prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Ensure screws are installed in Step (1) in same position as noted during removal.

- (1) With the aid of an assistant, position gasket (26), top tank assembly (12) and two bolt straps (27) on radiator assembly (1) with 38 lockwashers (25), screws (24) and nuts (23).
- (2) With the aid of an assistant, position right side column assembly (22) on radiator assembly (1) with six lockwashers (21), screws (20) and nuts (19).
- (3) Position five lockwashers (18) and screws (17) in left of top tank assembly (12).
- (4) With the aid of an assistant, position left side column assembly (16) on radiator assembly (1) with six screws (14), lockwashers (15) and nuts (13).
- (5) Position five lockwashers (11) and screws (10) in right of top tank assembly (12).

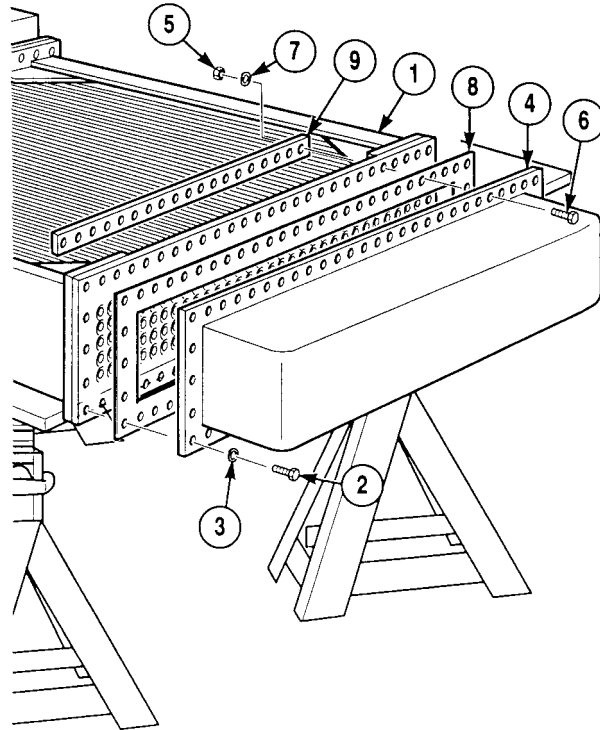


5-2. RADIATOR ASSEMBLY REPAIR/TEST (CONT).

WARNING

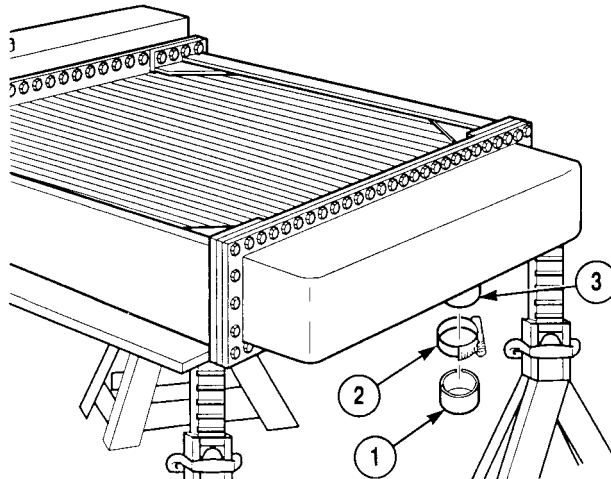
Bottom tank assembly weighs 82 lbs (37 kg). Ensure bottom tank assembly is fully supported prior to installation. Failure to comply may result in injury to personnel or damage to equipment.

- (6) With the aid of an assistant, position gasket (8), bottom tank assembly (4) and two bolt straps (9) on radiator assembly (1) with 50 lockwashers (7), screws (6) and nuts (5).
- (7) Position five lockwashers (3) and screws (2) in right of bottom tank assembly (4).
- (8) Tighten 120 screws (2), (6), (10), (14), (17), (20) and (24) to 17 to 21 lb-ft (23 to 28 N·m).



d. Testing.

- (1) Install plug (1) and clamp (2) in bottom tank assembly (3).



- (2) Install two plugs (4) and clamps (5) in upper radiator inlet necks (6).
- (3) Install plugs (7) and (8) and clamps (9) and (10) in shunt line (11) and deaeration line (12).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (4) Coat threads of sight glass (13) with sealing compound.
- (5) Install sight glass (13) in radiator assembly (14).
- (6) Fill radiator assembly (14) with water.
- (7) Install adapter on radiator assembly (14).
- (8) Install radiator tester on adapter.
- (9) Using tester, pressurize radiator assembly (14) to 10 psi (69 kPa).

NOTE

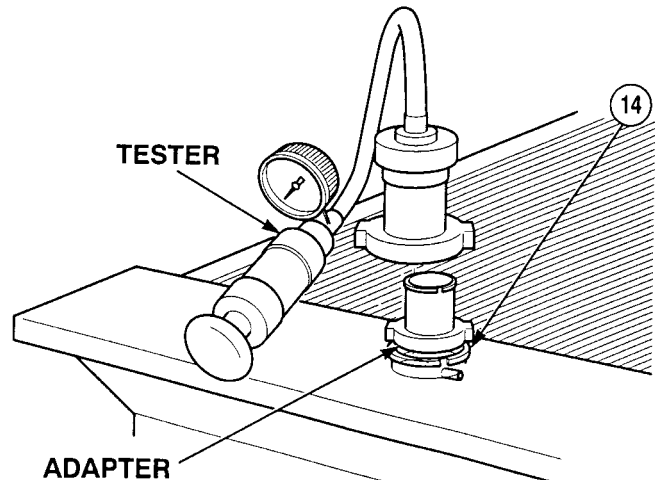
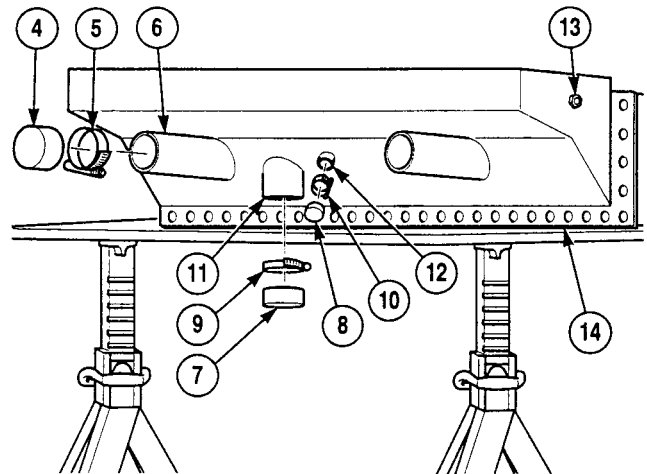
If radiator leaks or loss of pressure is noted, replace the radiator.

- (10) Observe radiator assembly (14) for water leaks and loss of pressure on tester.

WARNING

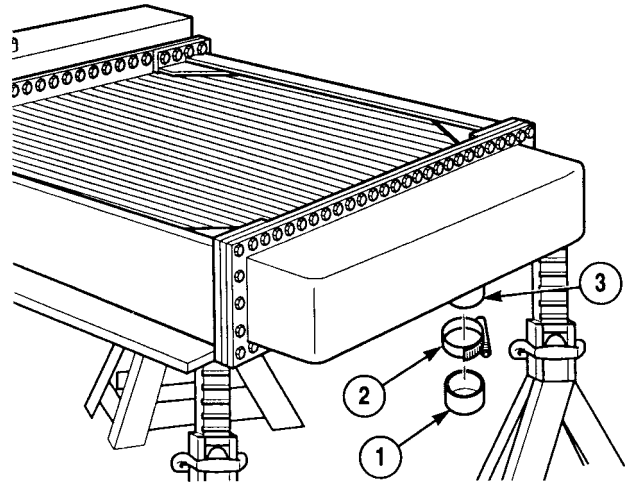
Use extreme care when removing tester. Sudden release of pressure can cause injury to personnel.

- (11) Slowly remove tester and adapter from radiator assembly (14).

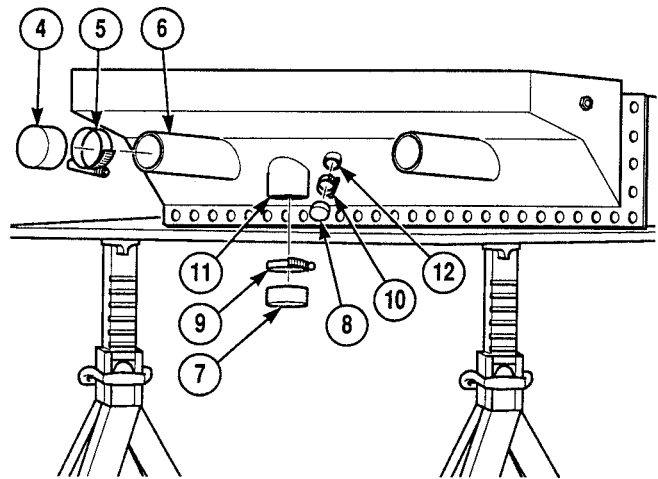


5-2. RADIATOR ASSEMBLY REPAIR/TEST (CONT).

- (12) Remove plug (1) and clamp (2) from bottom tank assembly (3) and allow water to drain.



- (13) Remove four plugs (4), (7) and (8) and clamps (5), (9) and (10) from radiator inlet necks (6), shunt line (11) and deaeration line (12).



e. Follow-On Maintenance:

- Install radiator assembly, (TM 9-2320-364-20).

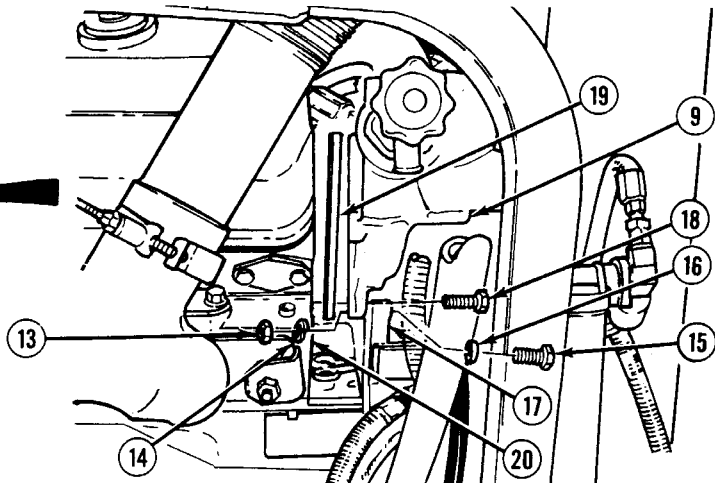
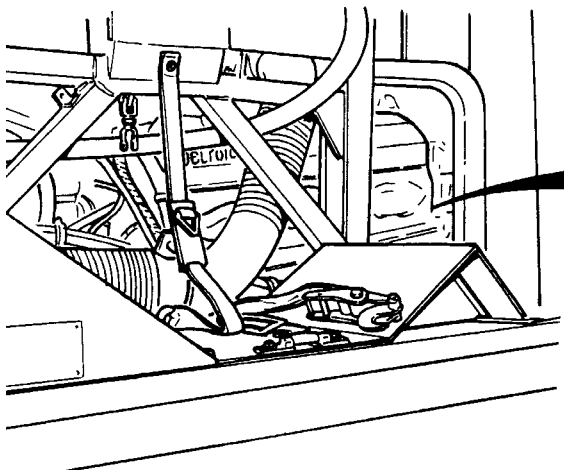
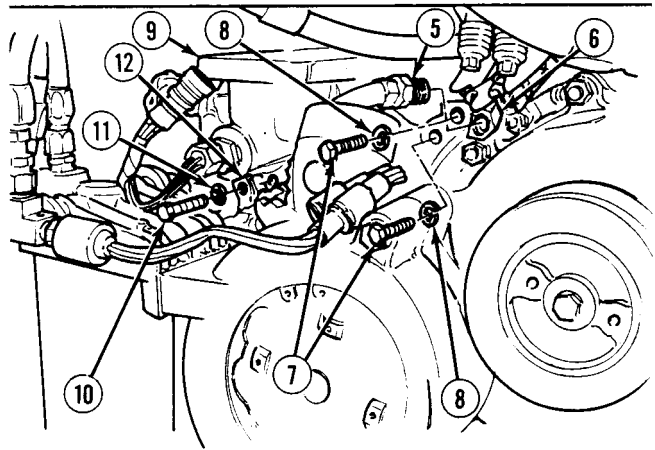
END OF TASK

5-3. RIGHT SIDE THERMOSTAT HOUSING REPLACEMENT (CONT).

NOTE

Tag and mark hoses and screws prior to removal.

- (3) Disconnect hose 3572 (5) from elbow (6).
- (4) Remove two screws (7) and lockwashers (8) from thermostat housing (9). Discard lockwashers.
- (5) Remove screw (10), lockwasher (11) and clip (12) from thermostat housing (9). Discard lockwasher.



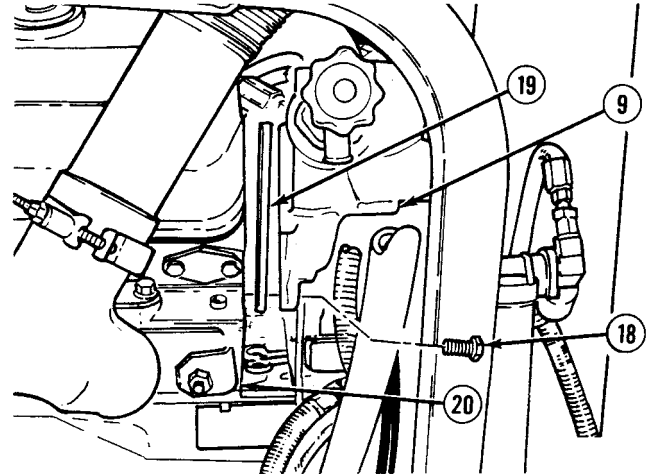
- (6) Remove nut (13), lockwasher (14), screw (15) and washer (16) from front timing cover (17). Discard lockwasher.
- (7) Loosen screw (18) and remove thermostat housing (9) and gasket (19) from cylinder head (20). Discard gasket.
- (8) Remove screw (18) from cylinder head (20).

b. *Installation.*

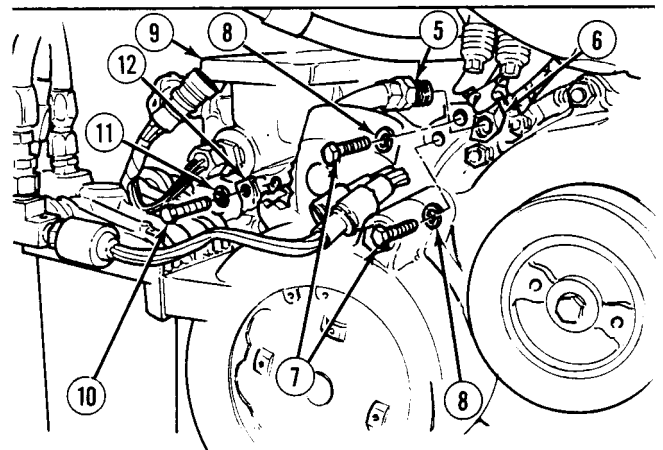
NOTE

Install cable ties as required.

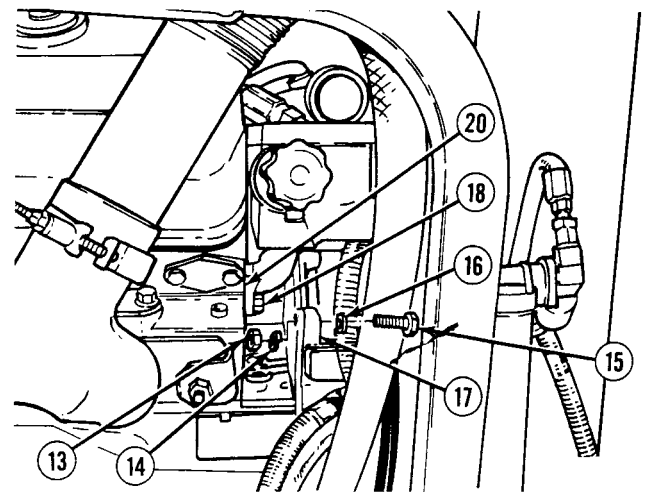
- (1) Position screw (18) in cylinder head (20).
- (2) Coat both sides of gasket (19) with grease.
- (3) Install gasket (19) on thermostat housing (9).
- (4) Position gasket (19) and thermostat housing (9) on screw (18) against cylinder head (20).



- (5) Install clip (12) on thermostat housing (9) with lockwasher (11) and screw (10). Tighten screw to 23 to 26 lb-ft (31 to 35 N·m).
- (6) Install two lockwashers (8) and screws (7) in thermostat housing (9). Tighten screws to 23 to 26 lb-ft (31 to 35 N·m).
- (7) Connect hose 3572 (5) on elbow (6).

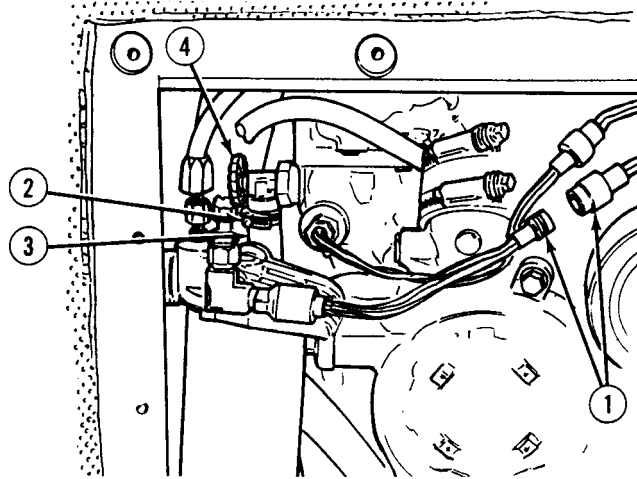


- (8) Tighten screw (18) on cylinder head (20) to 35 to 38 lb-ft (47 to 52 N·m).
- (9) Install washer (16), screw (15), lockwasher (14) and nut (13) in front timing cover (17). Tighten nut to 30 to 35 lb-ft (41 to 47 N·m).



5-3. RIGHT SIDE THERMOSTAT HOUSING REPLACEMENT (CONT).

- (10) Install hose (3) on shutoff valve (4) with clamp (2). Tighten clamp to 40 lb-in (4.5 N·m).
- (11) Connect MC71 connector (1).



c. Follow-On Maintenance:

- Install hydraulic reservoir, (TM 9-2320-364-20).
- Install right thermostat, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

5-4. LEFT SIDE THERMOSTAT HOUSING REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

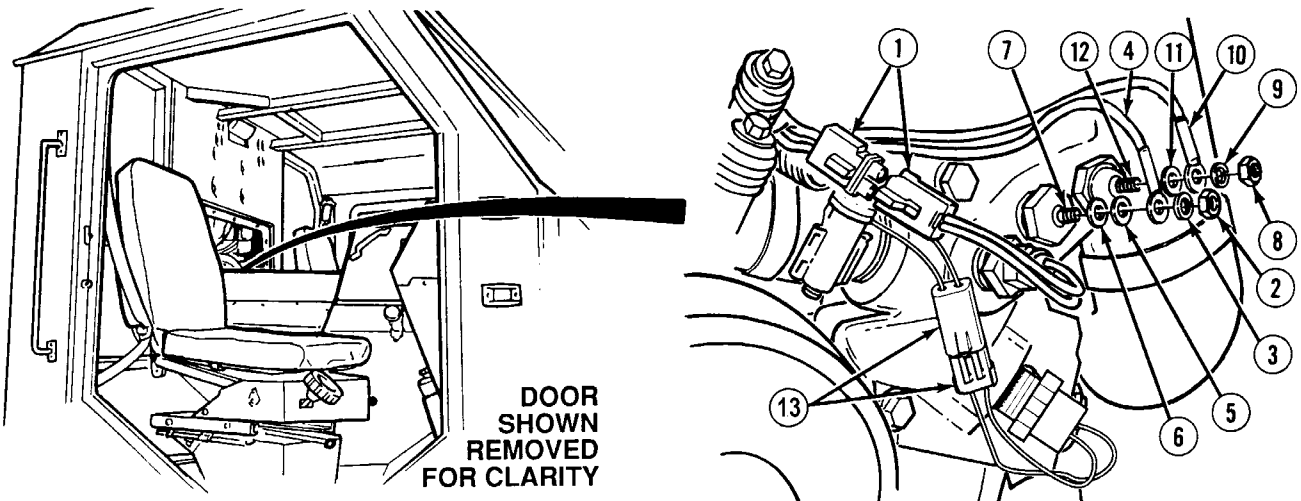
Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Left thermostat removed,
(TM 9-2320-364-20)

Materials/Parts

Grease (Item 26, Appendix B)
Tags, Identification (Item 72, Appendix B)
Gasket (Item 86, Appendix E)
Lockwasher (3) (Item 292, Appendix E)

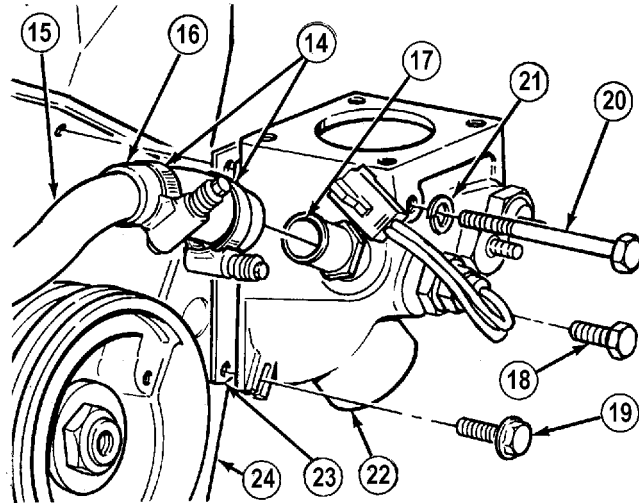
a. Removal.**NOTE**

Tag and mark all wires prior to removal.

- (1) Disconnect MC61 connector (1).
- (2) Remove nut (2), lockwasher (3), wire 1320 (4), washer (5) and washer (6) from sensor (7). Discard lockwasher.
- (3) Remove nut (8), lockwasher (9), wire 1147 (10) and washer (11) from sensor (12). Discard lockwasher.
- (4) Disconnect MC128 connector (13).

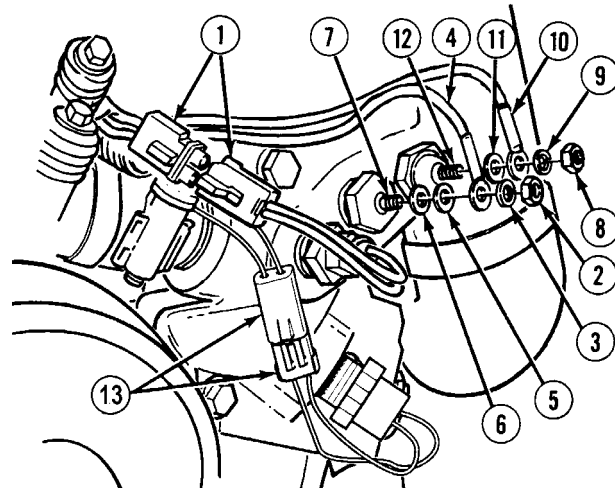
5-4. LEFT SIDE THERMOSTAT HOUSING REPLACEMENT (CONT).

- (5) Loosen two clamps (14) on crossover tube (15) and slide hose (16) from adapter (17) onto crossover tube.
- (6) Remove screws (18), (19) and (20) and lockwasher (21) from lower left thermostat housing (22). Discard lockwasher.
- (7) Remove housing (22) and gasket (23) from left cylinder head (24). Discard gasket.



b. Installation.

- (1) Coat both sides of gasket (23) with grease.
- (2) Position gasket (23) on thermostat housing (22).
- (3) Install gasket (23) and housing (22) on cylinder head (24) with lockwasher (21) and screws (20), (19) and (18). Tighten screws to 23 to 26 lb-ft (31 to 35 N·m).
- (4) Position hose (16) on adapter (17) and crossover tube (15) and tighten two clamps (14).
- (5) Install washer (11), wire 1147 (10), lockwasher (9) and nut (8) on sensor (12).
- (6) Install washer (6), washer (5), wire 1320 (4), lockwasher (3) and nut (2) on sensor (7).
- (7) Connect MC61 connector (1).
- (8) Connect MC128 connector (13).



c. Follow-On Maintenance:

- Install left thermostat, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

5-5. AFTERCOOLER REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

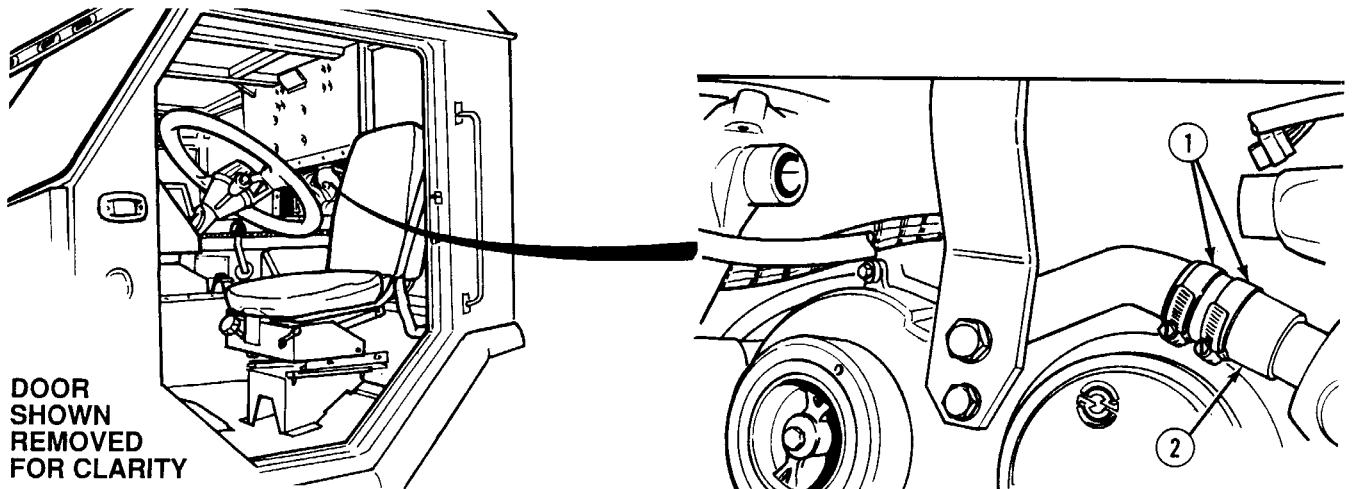
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Engine block drained, (TM 9-2320-364-20)
Blower assembly removed, (Para 4-4)

Materials/Parts

Oil, Lubricating (Item 38, Appendix B)
Sealing Compound (Item 56, Appendix B)
Gasket (Item 102, Appendix E)
Lockscrew (8) (Item 220, Appendix E)
Packing, Preformed (4) (Item 365, Appendix E)

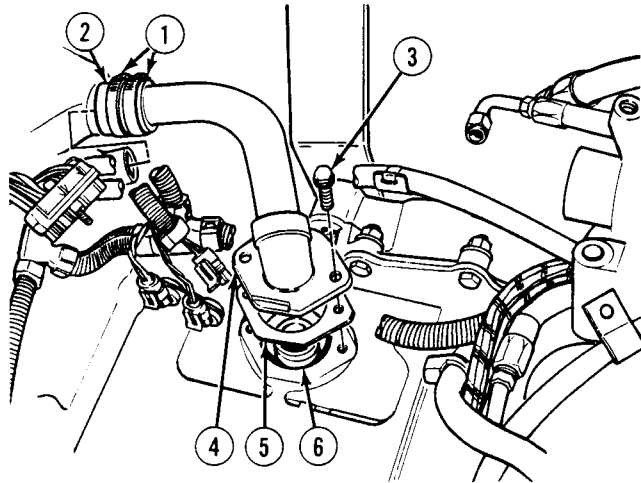
a. Removal.



(1) Loosen two clamps (1) on hose (2).

5-5. AFTERCOOLER REPLACEMENT (CONT).

- (2) Remove two screws (3) from outlet elbow and tube (4).
- (3) Remove outlet elbow and tube (4), hose (2), two clamps (1) and gasket (5) from aftercooler (6). Discard gasket.

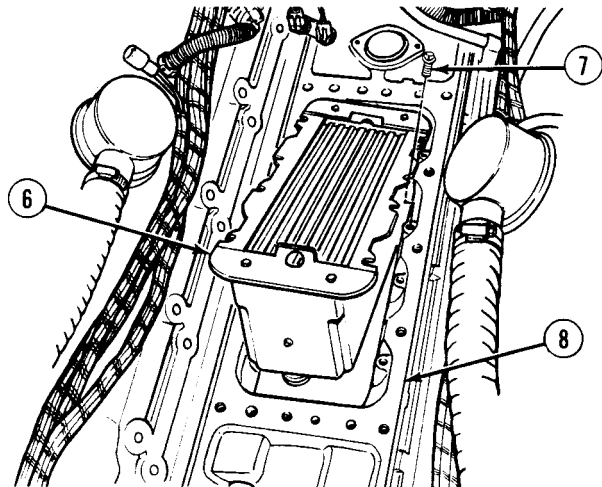


- (4) Remove and discard eight lock screws (7) from aftercooler (6).

NOTE

Lift aftercooler straight up and then tilt to allow outlet to clear engine block.

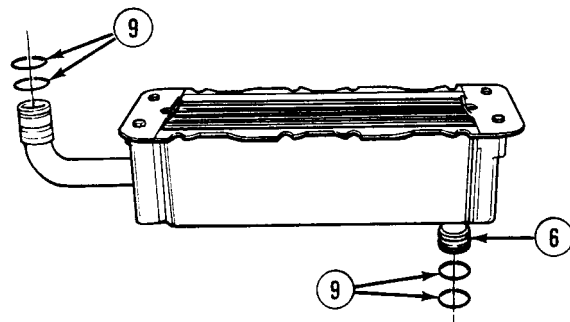
- (5) Remove aftercooler (6) from engine block (8).



- (6) Remove and discard four preformed packings (9) from aftercooler (6).

b. Installation.

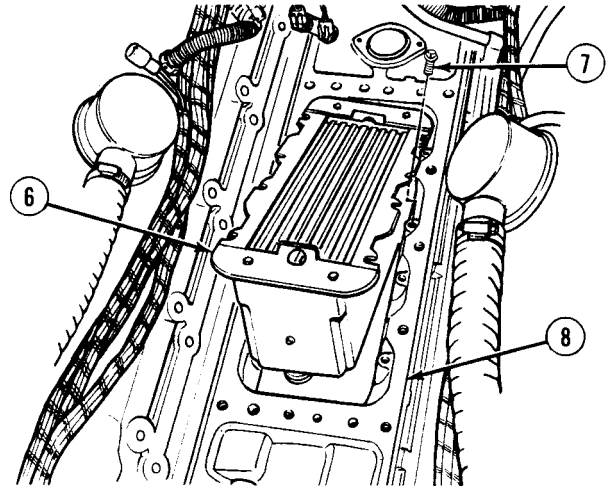
- (1) Apply lubricating oil to four preformed packings (9).
- (2) Install four preformed packings (9) in aftercooler (6).



NOTE

Lower aftercooler straight down and then tilt to allow outlet to clear engine block.

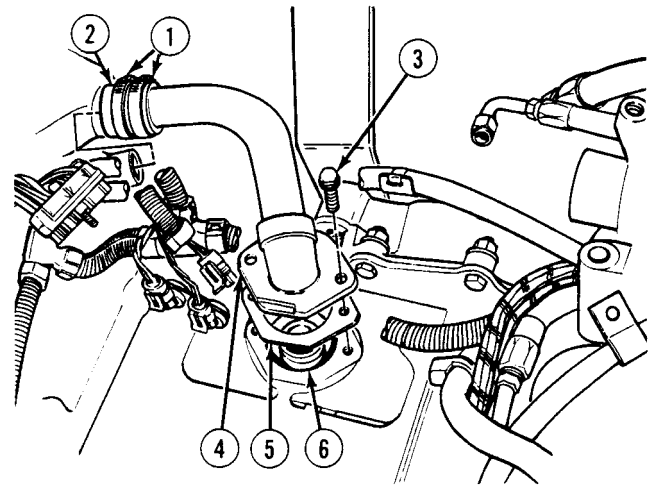
- (3) Position aftercooler (6) on engine block (8) with eight lock screws (7).



- (4) Position gasket (5), two clamps (1), hose (2) and outlet elbow and tube (4) on aftercooler (6).

WARNING

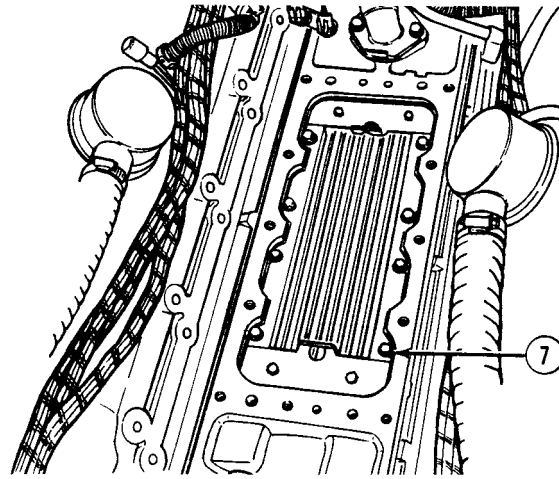
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



- (5) Apply sealing compound to two screws (3).
- (6) Install two screws (3) in outlet elbow and tube (4). Tighten screws to 156 to 204 lb-in (18 to 23 N·m).
- (7) Tighten two clamps (1) on hose (2).

5-5. AFTERCOOLER REPLACEMENT (CONT).

- (8) Tighten eight lock screws (7) to 120 to 156 lb-in (14 to 18 N·m).



c. Follow-On Maintenance:

- Install blower assembly, (Para 4-4).
- Fill cooling system, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

5-6. WATER PUMP ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Cap and Plug Set (Item 26, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Hammer, Hand, Soft Plastic (Item 88, Appendix F)
- Indicator, Dial Set w/Magnetic Base (Item 98, Appendix F)
- Pan, Drain 4 gal (Item 144, Appendix F)
- Pliers, Retaining Ring (Item 157, Appendix F)
- Wrench Set, Socket 3/8 in. Drive (Item 273, Appendix F)
- Wrench, Torque (0-60 N·m) (Item 276, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)

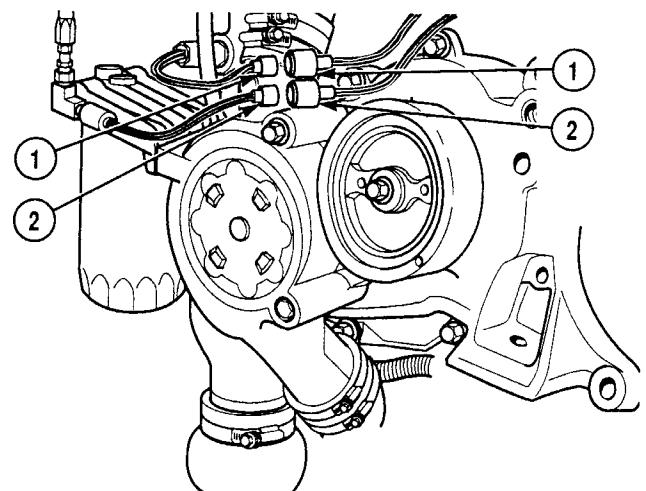
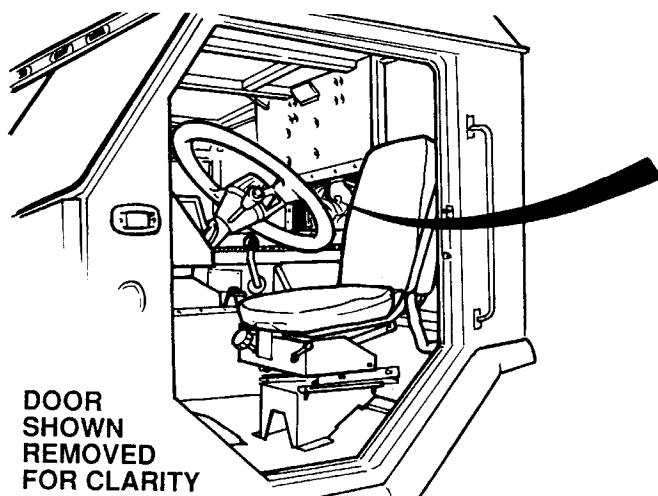
Materials/Parts

- Oil, Diesel, Fuel (Item 32, Appendix B)
- Rags, Wiping (Item 47, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Filter Element (Item 47, Appendix E)
- Lockwasher (3) (Item 285, Appendix E)
- Packing, Preformed (Item 366, Appendix E)
- Ring, Seal (Item 508, Appendix E)

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Cooling system drained, (TM 9-2320-364-20)
- Cab engine access panel removed, (TM 9-2320-364-20)

a. Removal.



NOTE

Tag and mark wires prior to removal.

- (1) Disconnect MC71 connector (1) and MC43 connector (2).

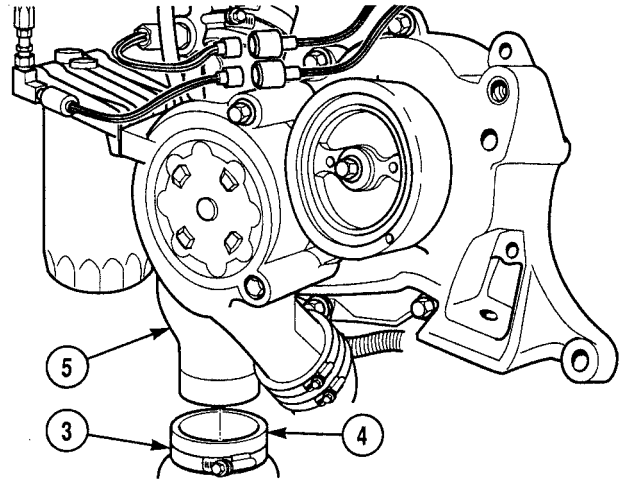
5-6. WATER PUMP ASSEMBLY REPLACEMENT (CONT).

- (2) Position drain pan under water pump (5).

CAUTION

Cap or plug all hoses upon removal. Loose parts or dirt may fall in open hose and damage to parts may occur.

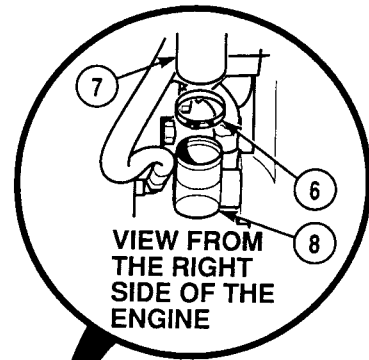
- (3) Loosen clamp (3) and remove hump hose (4) from water pump (5).



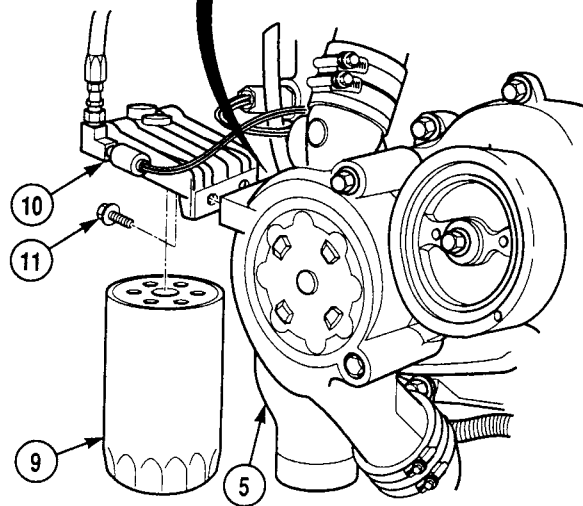
- (4) Loosen clamp (6) and remove hose (7) from fitting (8).

WARNING

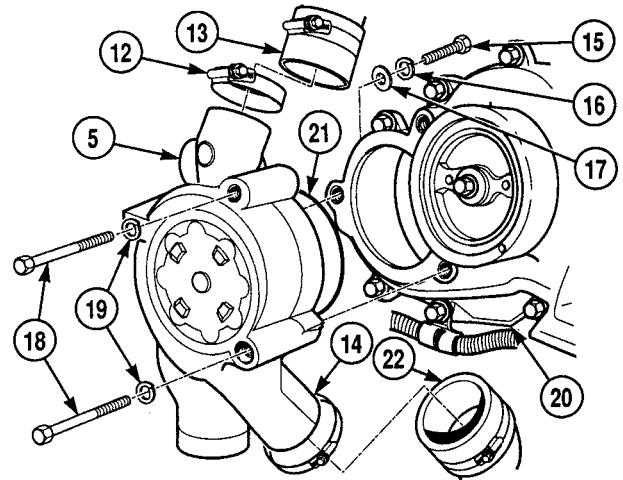
Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.



- (5) Remove and discard fuel filter (9) from fuel filter housing (10).
- (6) Remove two screws (11) and fuel filter housing (10) from water pump (5).

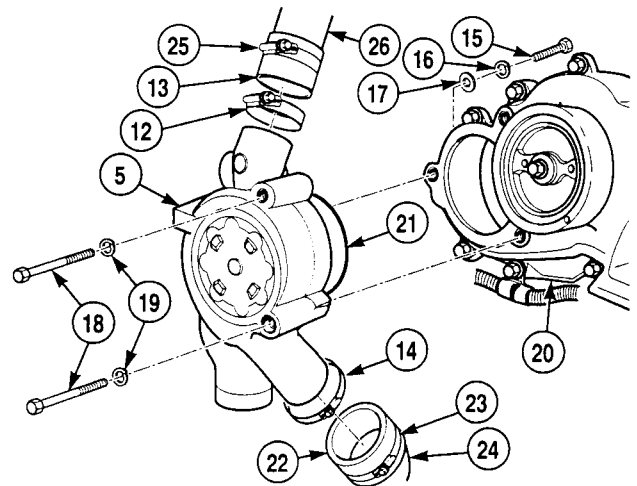


- (7) Loosen clamp (12) on hose (13) on top of water pump (5).
- (8) Loosen clamp (14) on bottom of water pump (5).
- (9) Remove screw (15), lockwasher (16) and washer (17) from rear right of water pump (5). Discard lockwasher.
- (10) Remove two screws (18) and lockwashers (19) from water pump (5). Discard lockwashers.
- (11) Remove water pump (5) from engine (20).
- (12) Remove and discard seal ring (21) from water pump (5).
- (13) Cover water hoses (13) and (22) with clean rag to prevent debris from entering water system.



b. Installation.

- (1) Remove rag from water hoses (13) and (22).
- (2) Install seal ring (21) in water pump (5).
- (3) Loosen clamp (23) and push hose (22) downward on water tube (24).
- (4) Loosen clamp (25) and push hose (13) upward on water tube (26).
- (5) Install water pump (5) on engine (20) with two lockwashers (19) and two screws (18). Tighten screws to 45 to 50 lb-ft (61 to 68 N·m).
- (6) Install washer (17), lockwasher (16) and screw (15) in right rear of water pump (5). Tighten screw to 20 to 25 lb-ft (27 to 34 N·m).
- (7) Push hose (13) downward and position over water pump (5).
- (8) Push hose (22) upward and position on water pump (5).
- (9) Tighten clamps (14) and (23) on hose (22).
- (10) Tighten clamps (12) and (25) on hose (13) on top of water pump (5) to 40 lb-in (5 N·m).



5-6. WATER PUMP ASSEMBLY REPLACEMENT (CONT).

WARNING

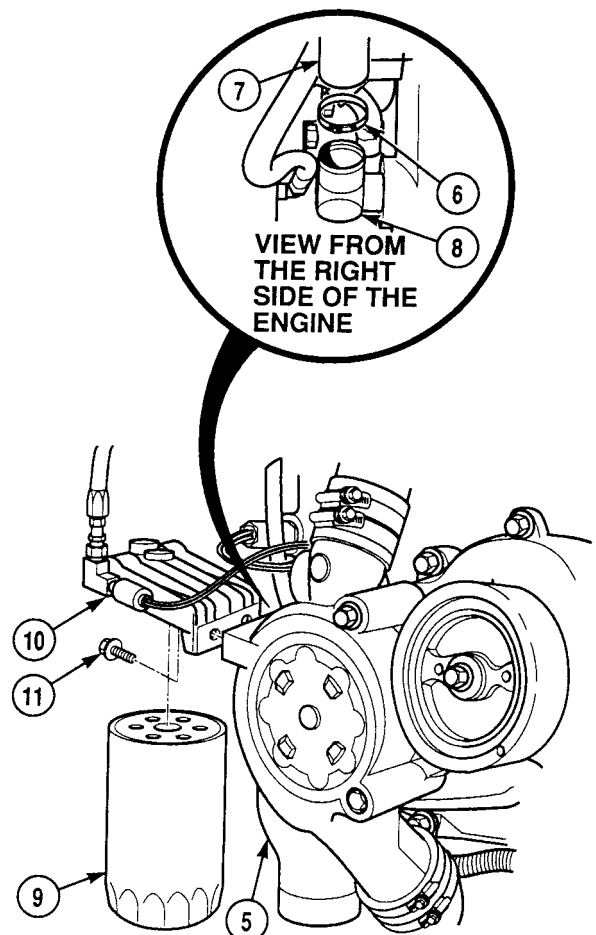
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (11) Apply sealing compound to threads of two screws (11).
- (12) Install fuel filter housing (10) on water pump (5) with two screws (11). Tighten screws to 30 to 35 lb-ft (41 to 47 N·m).

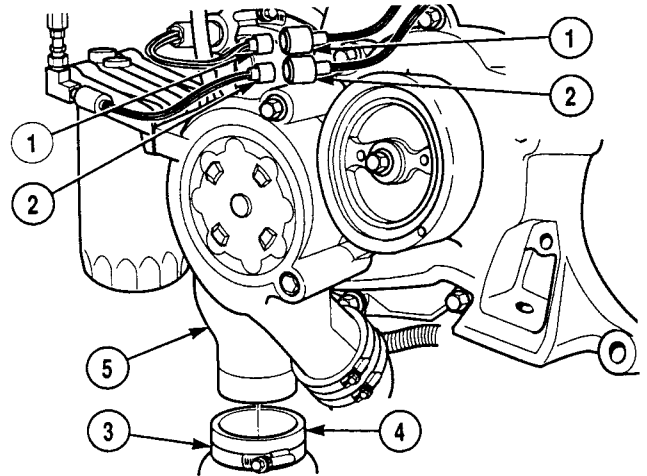
WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

- (13) Fill fuel filter (9) with fuel.
- (14) Position fuel filter (9) in fuel filter housing (10). Tighten until fuel filter (9) contacts fuel filter housing (10). Turn fuel filter (9) an additional 3/4 of a turn.
- (15) Install hose (7) on fitting (8) and tighten clamp (6).



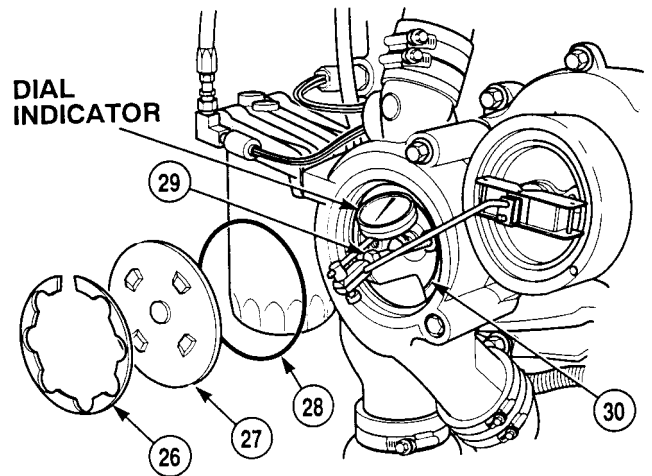
- (16) Install hump hose (4) on water pump (5) and tighten clamp (3) to 100 lb-in (11 N·m).
- (17) Connect MC71 connector (1) and MC43 connector (2).



WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

- (18) Remove retaining ring (26), access cover (27) and preformed packing (28). Discard preformed packing.
- (19) Install 5/16-18 by 2 in. screw (29) in impeller (30).



NOTE

Limits for gear backlash are 0.001 to 0.006 in. (0.025 to 0.152 mm).

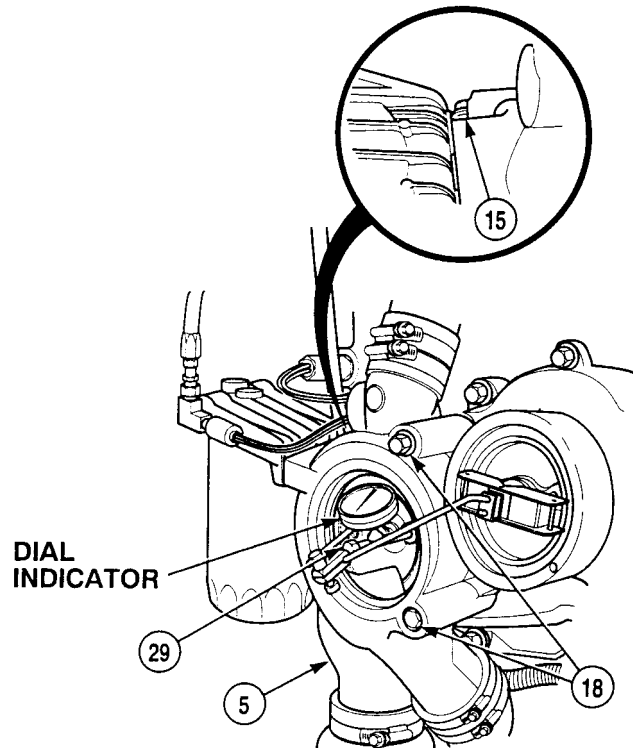
- (20) Place plunger of dial indicator against screw (29). Rotate impeller (30) and read backlash.

5-6. WATER PUMP ASSEMBLY REPLACEMENT (CONT).

NOTE

If proper backlash cannot be obtained, do Steps (21) through (23). If proper backlash is obtained, go on to Step (24).

- (21) Loosen three water pump screws (15) and (18) and pivot water pump (5) as required to obtain proper backlash.
- (22) Tighten two screws (18) to 45 to 50 lb-ft (61 to 68 N·m).
- (23) Tighten screw (15) to 20 to 25 lb-ft (27 to 34 N·m).
- (24) Remove screw (29) and dial indicator from water pump (5).



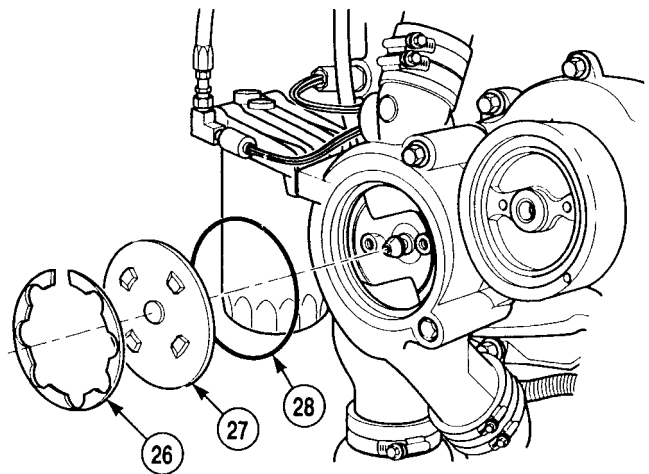
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

- (25) Install preformed packing (28), access cover (27) and retaining ring (26).
- (26) Strike access cover (26) several times with soft-faced hammer until fully seated.

c. Follow-On Maintenance:

- Install cab engine access panel, (TM 9-2320-364-20).
- Fill cooling system, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).



END OF TASK

5-7. WATER PUMP DRIVE GEAR REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's (Item 240, Appendix F)
 Adapter, Mechanical Puller (Item 4, Appendix F)
 Hammer, Hand, Soft Plastic (Item 88, Appendix F)
 Puller, Mechanical (Item 173, Appendix F)
 Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
 Wooden Block (Appendix C)

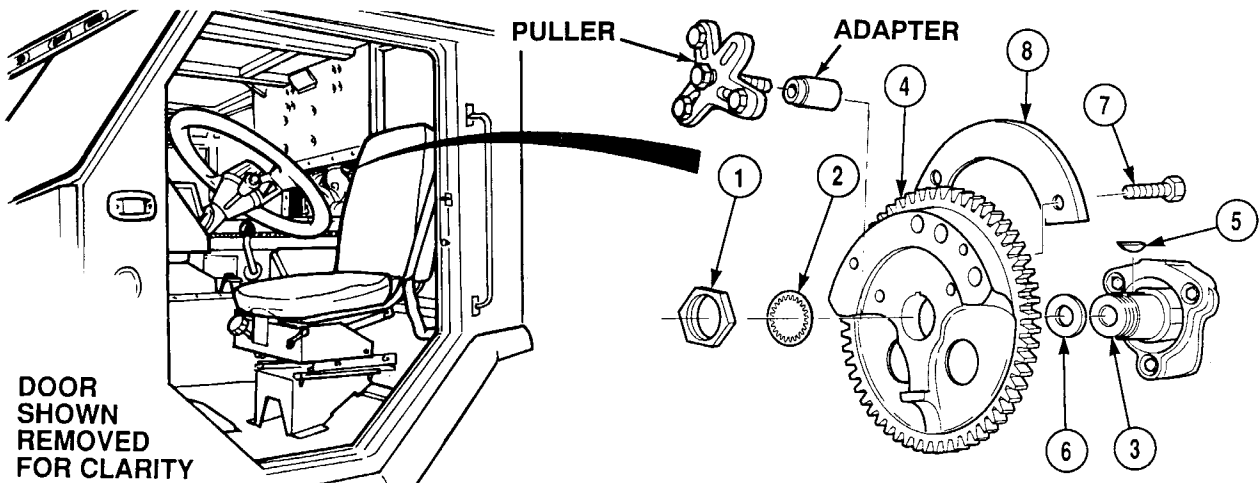
Materials/Parts

Key (Item 142, Appendix E)
 Lockwasher (Item 258, Appendix E)
 Screw, Self-Locking (2) (Item 556, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
 Wheels chocked, (TM 9-2320-364-10)
 Water pump assembly removed, (Para 5-6)
 Vibration damper and front balance cover removed, (Para 3-10)

a. Removal.



- (1) Remove nut (1) and lockwasher (2) from right camshaft (3). Discard lockwasher.

NOTE

Ensure key remains in right camshaft upon removal of water pump drive gear.

- (2) Using mechanical puller with adapter, remove water pump drive gear (4) from right camshaft (3).
- (3) Remove key (5) and spacer (6) from camshaft (3). Discard key.
- (4) Remove two lockscrews (7) and front balance weight (8) from water pump drive gear (4). Discard lockscrews.

5-7. WATER PUMP DRIVE GEAR REPLACEMENT (CONT).

b. Installation.

- (1) Install front balance weight (8) on water pump drive gear (4) with two lock screws (7). Tighten screws to 35 to 40 lb-ft (47 to 54 N·m).
- (2) Install spacer (6) and key (5) on camshaft (3).

NOTE

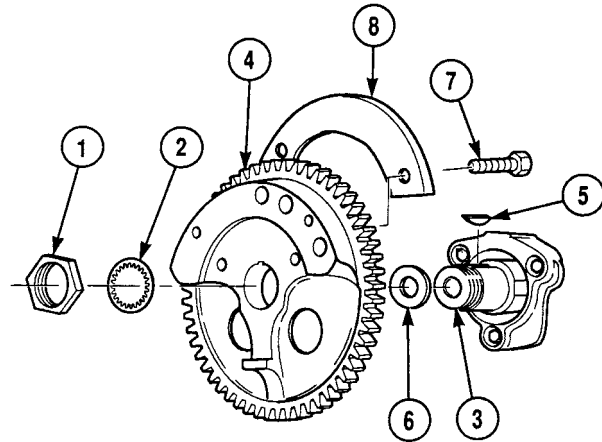
Ensure key is secure in right camshaft upon installation of water pump drive gear.

- (3) Install water pump drive gear (4) on right camshaft (3). Tap lightly with soft face hammer as required until fully seated.

NOTE

It may be necessary to position block of hard wood under gear teeth to hold gear in place while tightening nut.

- (4) Install lockwasher (2) and nut (1) on right camshaft (3). Tighten nut to 300 to 325 lb-ft (407 to 441 N·m).



c. Follow-On Maintenance:

- Install vibration damper and front balance cover, (Para 3-10).
- Install water pump assembly, (Para 5-6).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

5-8. SUCTION FAN ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)

Materials/Parts

- Lockwasher (6) (Item 232, Appendix E)

Personnel Required

Two

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Radiator assembly removed, (TM 9-2320-364-20)

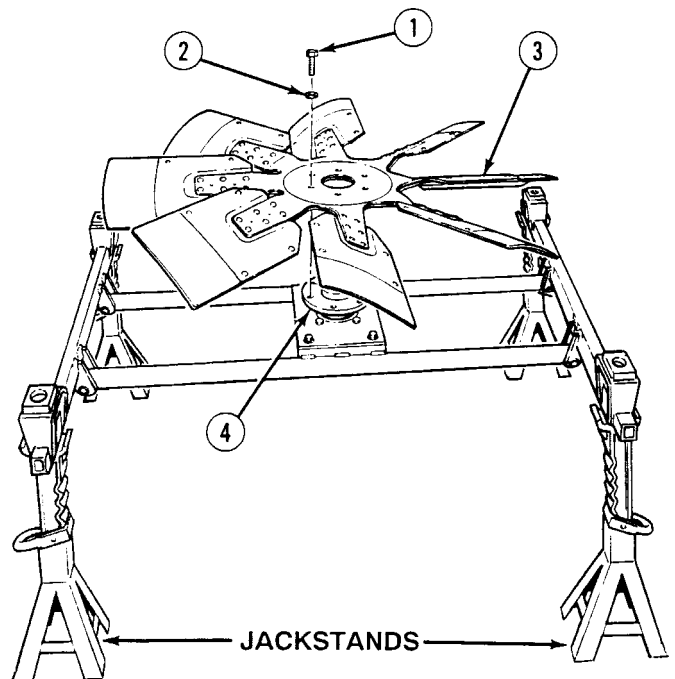
a. *Removal.*

- (1) Remove six screws (1) and lockwashers (2) from suction fan (3). Discard lockwashers.



Note and record position of suction fan blade angle prior to removal. Failure to comply may result in damage to equipment.

- (2) With the aid of an assistant, remove suction fan (3) from fan motor (4).



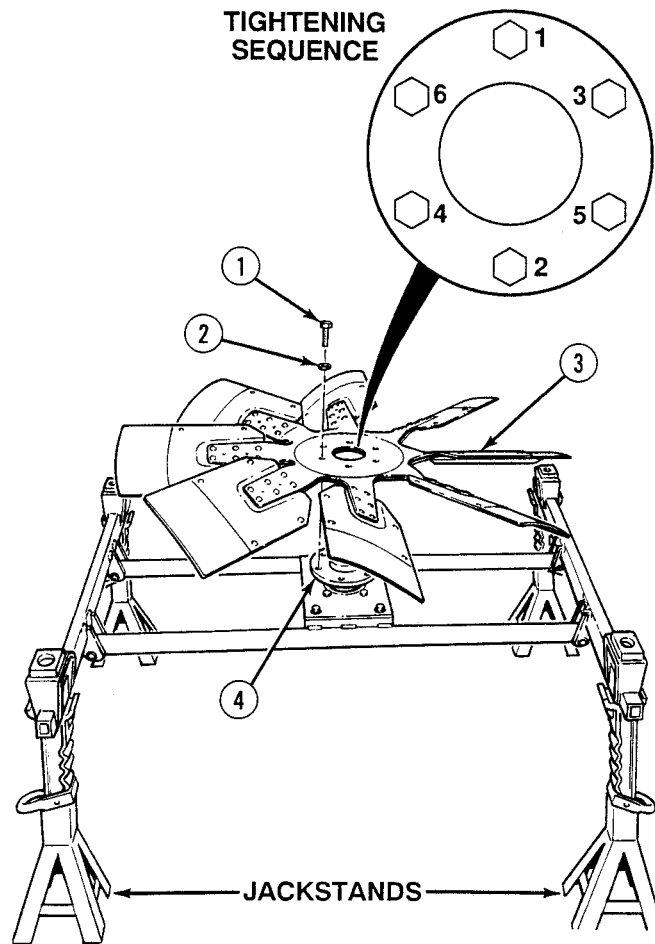
5-8. SUCTION FAN ASSEMBLY REPLACEMENT (CONT).

b. Installation.

CAUTION

Ensure suction fan is installed with blade angle in same position as noted prior to removal. Failure to comply may result in damage to equipment.

- (1) With the aid of an assistant, position suction fan (3) on fan motor (4) until suction fan is fully seated.
- (2) Install six lockwashers (2) and screws (1) in suction fan (3). Tighten screws in sequence shown to 80 lb-ft (108 N·m).



c. Follow-On Maintenance:

- Install radiator assembly, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

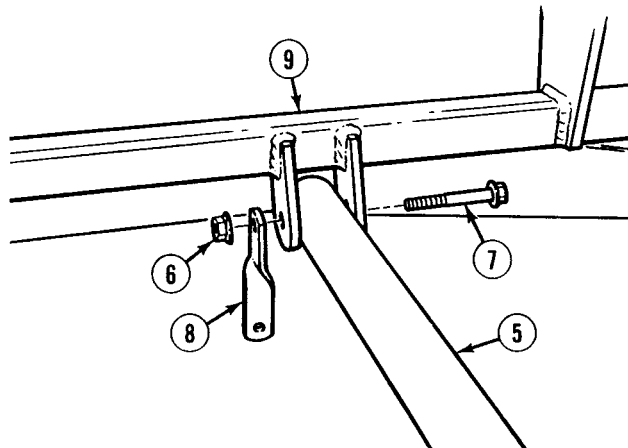
END OF TASK

5-9. FAN DRIVE MOTOR REPLACEMENT (CONT).

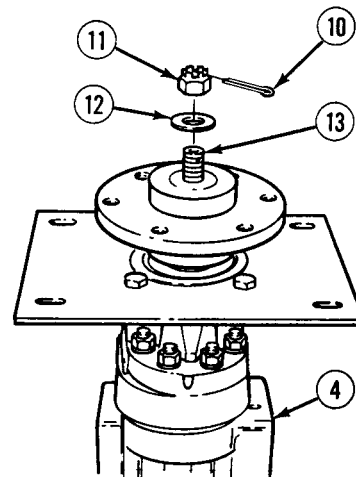
NOTE

Perform Steps (3) and (4) if fan support assembly is damaged.

- (3) Remove four locknuts (6), screws (7), three air hose brackets (8) and two fan support assemblies (5) from frame (9). Discard locknuts.
- (4) Remove two fan support assemblies (5) from frame (9).



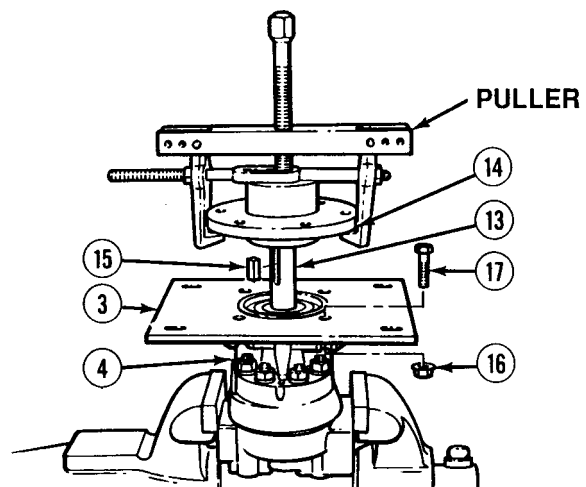
- (5) Position fan drive motor (4) in vise with soft jaws.
- (6) Remove and discard cotter pin (10) from nut (11).
- (7) Remove nut (11) and washer (12) from fan motor shaft (13).



NOTE

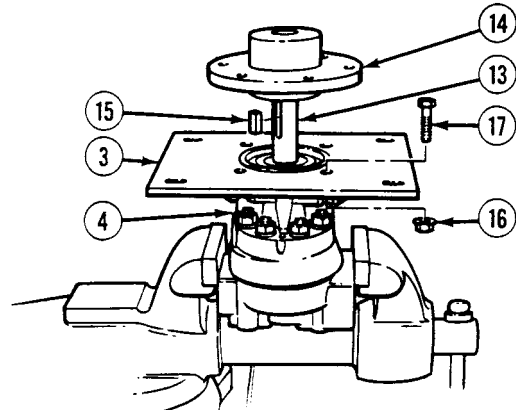
Key may come out with fan clutch hub or may stay with fan motor shaft.

- (8) Using puller, remove fan clutch hub (14) from fan motor shaft (13).
- (9) Remove key (15) from fan clutch hub (14) and install key in fan motor shaft (13).
- (10) Remove four locknuts (16), screws (17) and fan motor plate (3) from fan drive motor (4). Discard locknuts.
- (11) Remove fan drive motor (4) from vise.



b. Installation.

- (1) Position fan drive motor (4) in vise with soft jaws.
- (2) Install fan motor plate (3) on fan drive motor (4) with four screws (17) and locknuts (16). Tighten nuts to 80 lb-ft (108 N·m).
- (3) Position key (15) in fan motor shaft (13).



WARNING

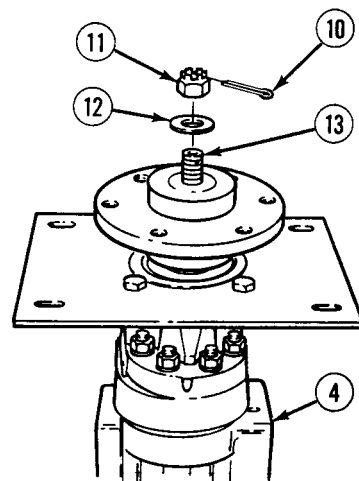
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (4) Apply antiseize compound to fan motor shaft (13).

NOTE

Fan clutch hub is installed with wide shoulder facing downward.

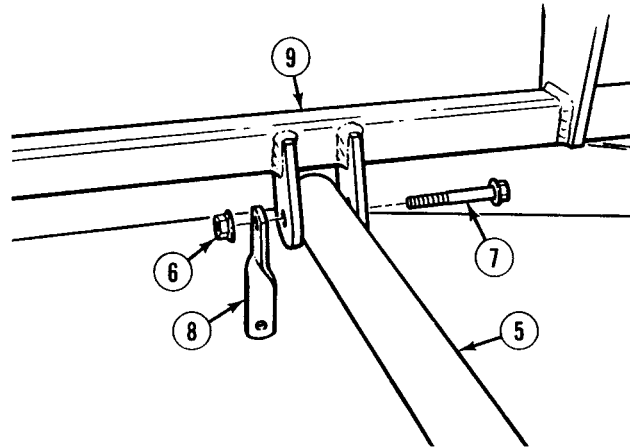
- (5) Position fan clutch hub (14) on fan motor shaft (13).
- (6) Install washer (12) and nut (11) on fan motor shaft (13). Tighten nut 209 lb-ft (283 N·m).
- (7) Tighten nut (11) on fan motor shaft (13) until slot in nut (10) aligns with hole in fan motor shaft (13).
- (8) Install cotter pin (10) in fan motor shaft (13) and nut (10).



5-9. FAN DRIVE MOTOR REPLACEMENT (CONT).

NOTE

- Perform Step (9) if fan support assembly was removed during removal. If fan support assembly was not removed, go on Step (10).
- In Step (9), two locknuts on left hand side of truck do not get tightened. Only locknuts located on right hand side of frame are tightened.

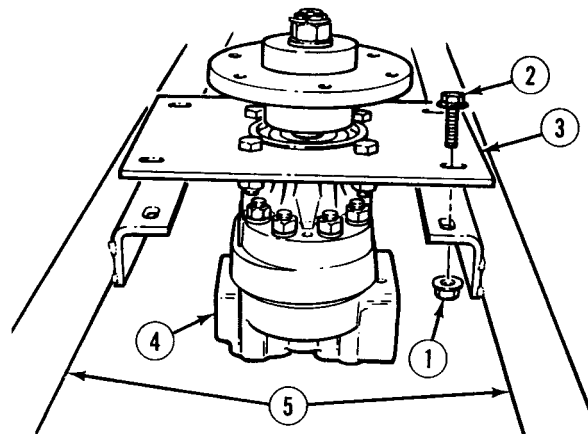


- (9) Install two fan support assemblies (5) and three air hose brackets (8) on frame (9) with four screws (7) and locknuts (6).

NOTE

- Ensure fan drive motor is installed as noted during removal.
- Fan drive motor screws will be tightened in radiator installation during fan adjustment.

- (10) Position fan drive motor (4) on fan support assembly (5) with four screws (2) and locknuts (1) in fan motor plate (3).



c. Follow-On Maintenance:

- Install suction fan, (Para 5-8).

END OF TASK

CHAPTER 6

ELECTRICAL SYSTEM MAINTENANCE

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6-1. DIRECT SUPPORT ELECTRICAL SYSTEM MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for replacing, repairing and adjusting electrical system components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP).

This task covers:

- | | |
|----------------|------------------------|
| a. Disassembly | c. Cleaning/Inspection |
| b. Testing | d. Assembly |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Compressor Unit, Air (Item 35, Appendix F)
- Gloves, Chemical Oil Protective (Item 81, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Gun, Airblow (Item 86, Appendix F)
- Multimeter (Item 140, Appendix F)
- Press, 60 Ton (Item 164, Appendix F)

Materials/Parts

- Alcohol, Isopropyl (Item 5, Appendix B)
- Cloth, Cleaning (Item 11, Appendix B)
- Cloth, Crocus (Item 12, Appendix B)
- Compound, Corrosion Preventive (Item 15, Appendix B)
- Grease (Item 25, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Tape, Pressure Sensitive (Item 75, Appendix B)

Materials/Parts - Continued

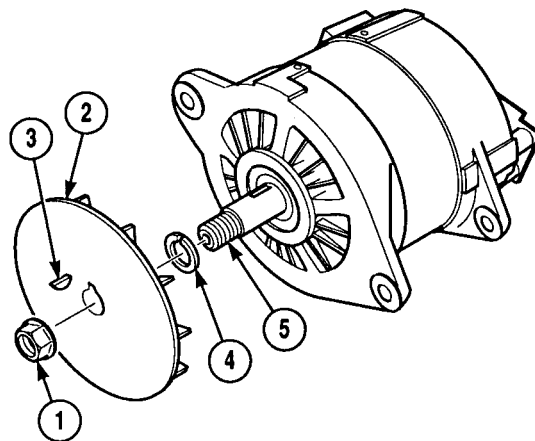
- Gasket (Item 111, Appendix E)
- Gasket (Item 121, Appendix E)
- Locknut (3) (Item 169, Appendix E)
- Lockwasher (3) (Item 246, Appendix E)
- Lockwasher (2) (Item 247, Appendix E)
- Lockwasher (2) (Item 282, Appendix E)
- Lockwasher (2) (Item 283, Appendix E)

Equipment Condition

Alternator on clean work surface

a. *Disassembly.*

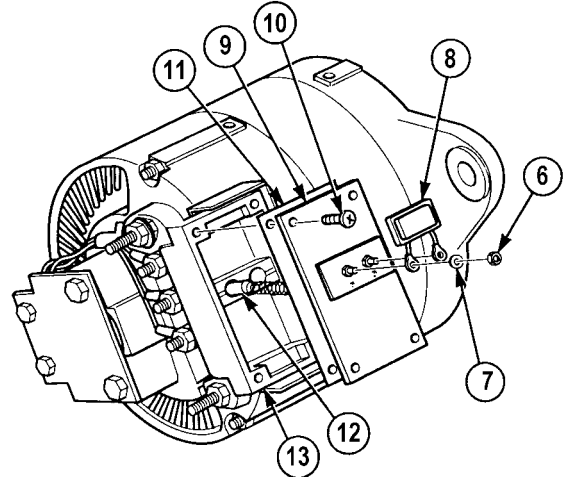
- (1) Remove nut (1), fan (2), key (3) and spacer (4) from shaft (5).



NOTE

- Remove tape, if applied.
- Capacitor may need to be pried off to remove.

- (2) Remove two nuts (6), lockwashers (7) and capacitor (8) from cover (9). Discard lockwashers.
- (3) Remove four screws (10), cover (9), gasket (11) and two electrical contact brushes (12) from brush housing (13). Discard gasket.

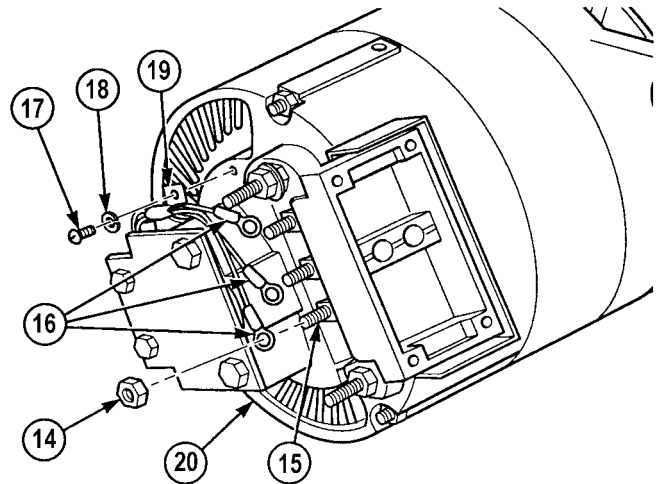


- (4) Remove three nuts (14) from studs (15).

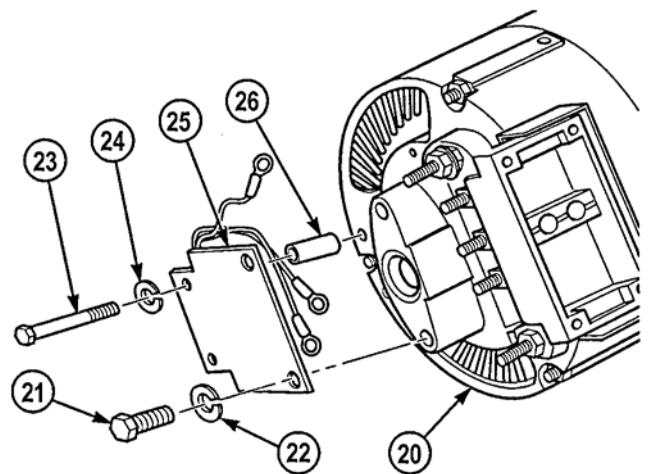
NOTE

Tag and mark all wires prior to removal.

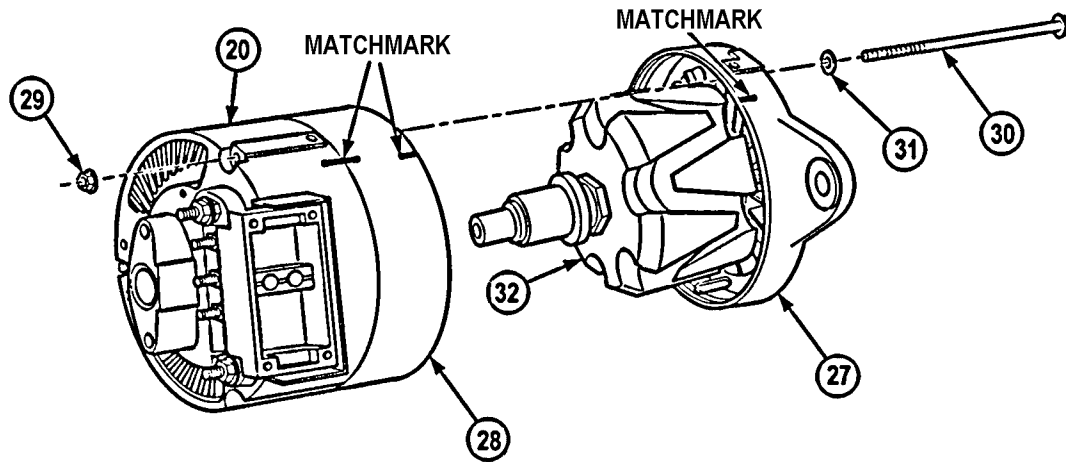
- (5) Remove three wires (16) from studs (15).
- (6) Remove screw (17), lockwasher (18) and clip (19) from slip ring end housing (20) and remove clip from wires (16). Discard lockwasher.



- (7) Remove two screws (21), lockwashers (22), screws (23), lockwashers (24), capacitor (25) and spacers (26) from slip ring end housing (20). Discard lockwashers.



6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP) (CONT).



- (8) Matchmark drive end housing (27), stator (28) and slip ring end housing (20).
- (9) Remove three locknuts (29), screws (30) and washers (31) from slip ring end housing (20) and drive end housing (27). Discard locknuts.

CAUTION

When removing rotor, completely separate rotor from stator. Stator will still be attached to slip ring housing. Do not separate stator from slip ring housing, or damage to stator wires may result.

NOTE

Rotor will remain attached to drive end housing during removal.

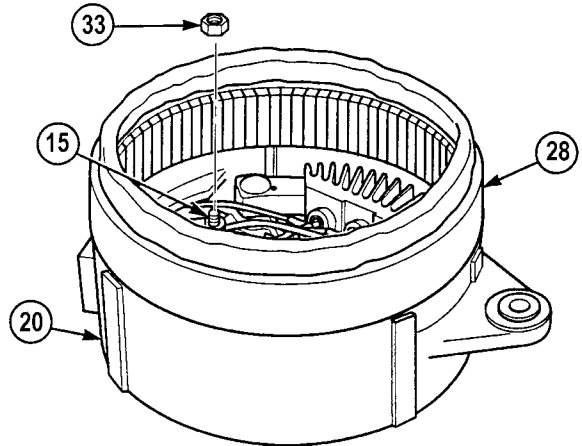
- (10) Remove drive end housing (27) and rotor assembly (32) from slip ring end housing (20) and stator (28).

- (11) Remove three nuts (33) from studs (15).

NOTE

Wires are part of stator. Wires are stiff, will keep position, and will come off with stator.

- (12) Remove stator (28) from slip ring end housing (20).



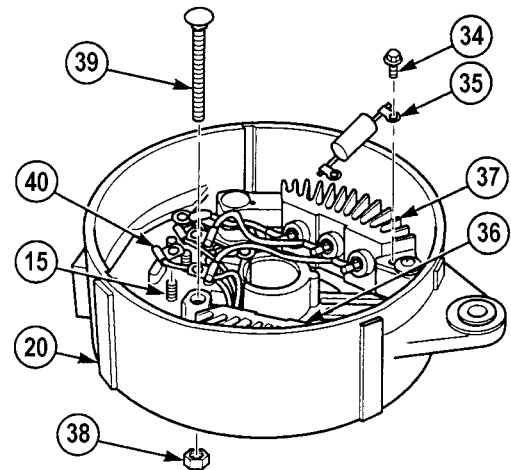
- (13) Remove two screws (34) and capacitor (35) from positive rectifier (36) and negative rectifier (37).

- (14) Remove nut (38) and screw (39) from positive rectifier (36) and slip ring end housing (20).

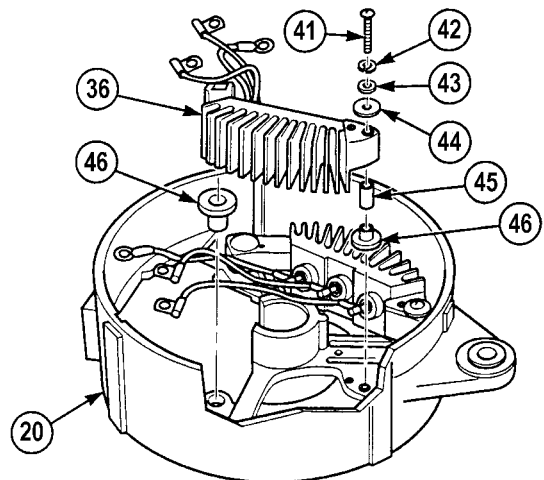
NOTE

Tag and mark all wires prior to removal.

- (15) Remove six wires (40) from three studs (15).

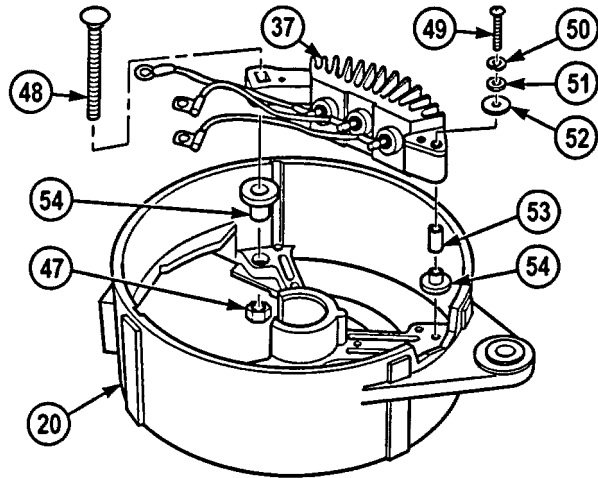


- (16) Remove screw (41), lockwasher (42), washer (43), insulator (44) positive rectifier (36), bushing (45) and two bushings (46) from slip ring end housing (20). Discard lockwasher.

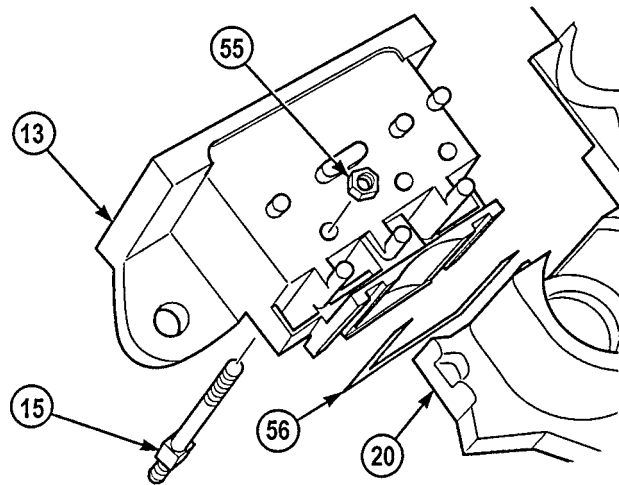


6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP) (CONT).

- (17) Remove nut (47) and screw (48) from negative rectifier (37) and slip ring end housing (20).
- (18) Remove screw (49), lockwasher (50), washer (51), insulator (52) negative rectifier (37), bushing (53) and two bushings (54) from slip ring end housing (20). Discard lockwasher.



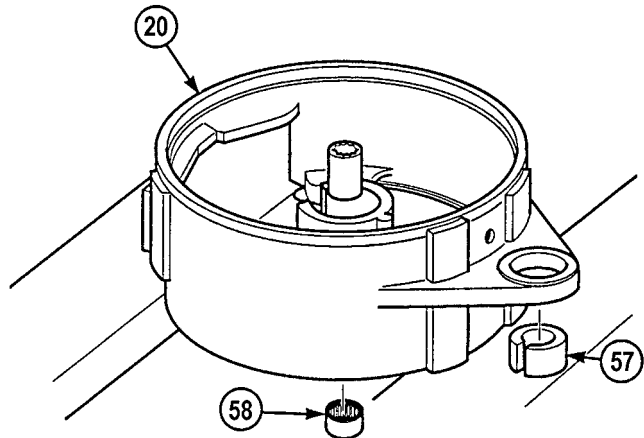
- (19) Remove three nuts (55) and studs (15) from brush housing (13).
- (20) Remove brush housing (13) and gasket (56) from slip ring end housing (20). Discard gasket.



NOTE

Perform Step (21) only if bushing is damaged.

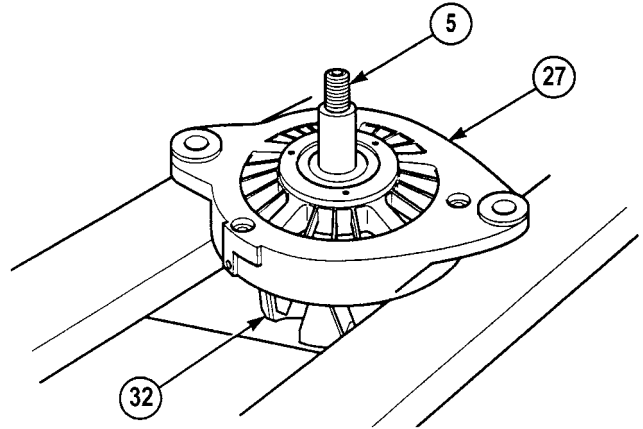
- (21) Remove bushing (57) from slip ring end housing (20).
- (22) Position slip ring end housing (20) in press.
- (23) Remove bearing (58) from slip ring end housing (20) and remove from press.



- (24) Position drive end housing (27) and rotor assembly (32) in press with threaded end of shaft (5) up.

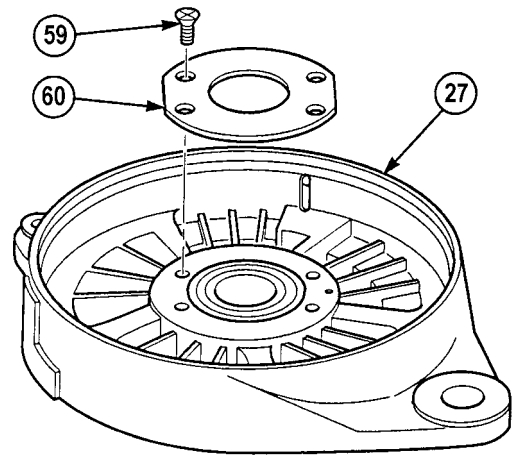
CAUTION

Support rotor assembly while pressing end housing, or damage to equipment may result.



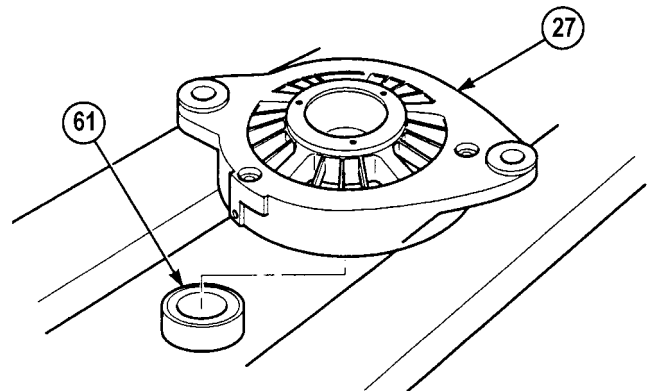
- (25) Press rotor assembly (32) from drive end housing (27) and remove drive end housing from press.

- (26) Remove four screws (59) and retaining plate (60) from drive end housing (27).



- (27) Reposition drive end housing (27) in press with bearing (61) side down.

- (28) Press bearing (61) from drive end housing (27) and remove from press.



6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP) (CONT).

b. Testing.

- (1) Touch negative (-) test lead to bare metal surface on positive rectifier (1).

NOTE

If reading is not between 15-19 ohms for each terminal, rectifier is defective. Replace rectifier.

- (2) Touch positive (+) test lead separately to each of three eyelet terminals (2).
- (3) Touch positive (+) test lead to bare metal surface on positive rectifier (1).

NOTE

If multimeter does not indicate infinity in Step (4), positive rectifier is defective. Replace rectifier.

- (4) Touch negative (-) test lead separately to each of three eyelet terminals (2).
- (5) Touch negative lead (-) to bare metal surface on negative rectifier (3).

NOTE

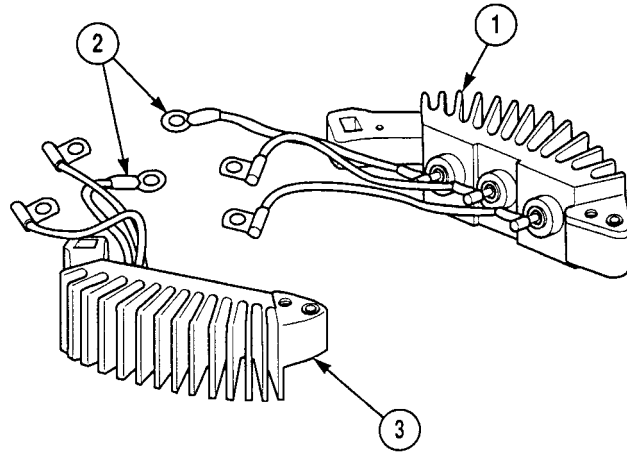
If multimeter does not indicate infinity, in Step (6), negative rectifier is defective. Replace rectifier.

- (6) Touch positive (+) test lead separately to each of three eyelet terminals (2).
- (7) Touch negative lead (-) to bare metal surface on negative rectifier (3).

NOTE

If reading is not between 15-19 ohms for each terminal, rectifier is defective. Replace rectifier.

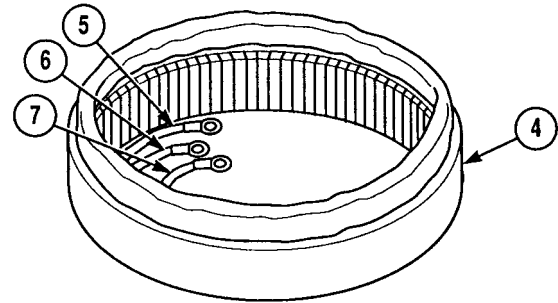
- (8) Touch negative (-) test lead separately to each of three eyelet terminals (2).



NOTE

If resistance reading in Step (9) is low (2.6 to 2.8 ohms), stator is grounded. Replace stator.

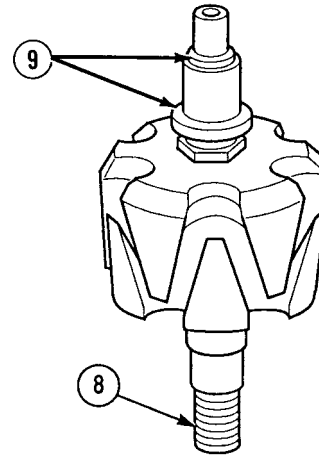
- (9) Touch one test lead to bare metal surface of stator (4) and other test lead separately to each pair of three stator ring terminals (5), (6) and (7).



NOTE

If resistance is not 1.0 ohm or less, stator is defective. Replace stator.

- (10) Touch test leads to three pairs of stator ring terminals (5) and (6), (6) and (7) and (5) and (7) and read resistance across each set of terminals.



NOTE

If multimeter does not indicate an open circuit in either test, rotor coil is grounded. Replace rotor.

- (11) Touch one test lead to bare metal surface on shaft (8) and other test lead separately to each slip ring (9).

NOTE

If resistance is not 10.0 ohms or less, replace stator.

- (12) Touch test leads to each slip ring (9).

NOTE

Minimum outside diameter of slip rings is 1.057 in. (26.848 mm). If measurement is less, replace rotor.

- (13) Measure outside diameter of slip rings (9).

NOTE

Minimum outside diameter of shaft is 0.669 in. (16.9 mm). If measurement is less, replace rotor.

- (14) Measure outside diameter of shaft (8).

6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP) (CONT).

c. *Cleaning/Inspection.*

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.

CAUTION

Do not soak stator or rotor in solvents. Damage to insulation may result.

- (1) Clean stator and rotor with drycleaning solvent.
- (2) Wipe dry with clean cloth.

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 or death to personnel.

- (3) Dry stator and rotor with compressed air.
- (4) Clean all other components except bearings in drycleaning solvent.
- (5) Inspect electrical assemblies for frayed wires, or loose connectors.
- (6) Inspect mechanical assemblies for cracks, chipping, scratches or gouges. Check for old or excess grease.
- (7) Clean rectifier assembly holes and terminal screws to ensure good electrical contact.
- (8) Clean carbon coating off slip rings with crocus cloth.
- (9) Inspect brushes for burnt appearance, cracks, or broken edges.
- (10) Check brush wear and replace if length measures less than 3/16 in. (4.76 mm).
- (11) Check drive end housing bearing for smooth operation. If bearing binds, replace bearing.
- (12) Check slip ring housing bearing for missing rollers. If rollers are missing, replace bearing.

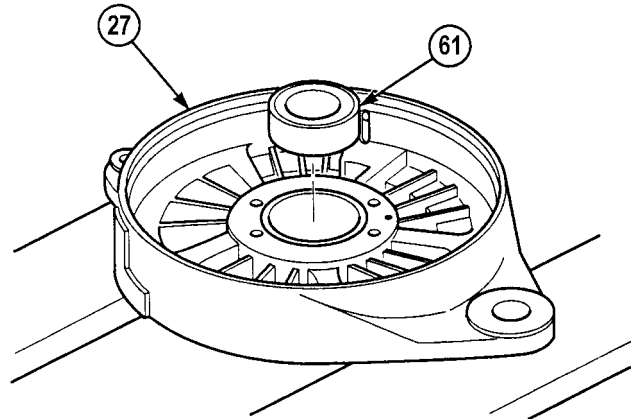
d. *Assembly.*

- (1) Position drive end housing (27) in press.

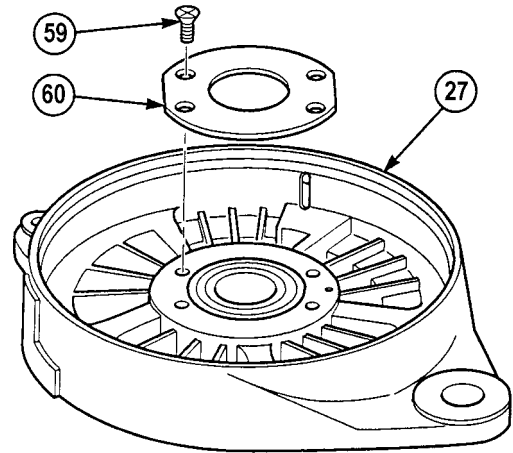
CAUTION

Apply pressure only on outer portion of race when pressing bearing into drive end housing, or damage to equipment may result.

- (2) Press bearing (61) in drive end housing (27).



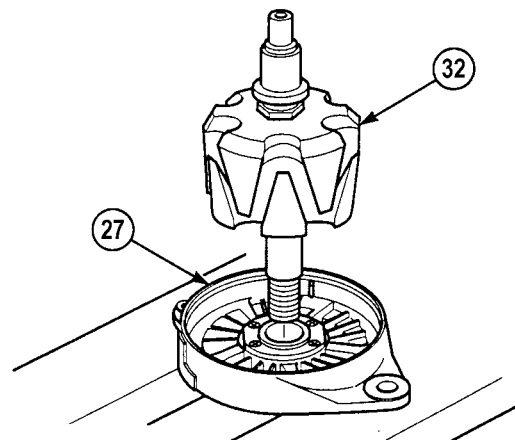
- (3) Install bearing retainer (60) in drive end housing (27) with four screws (59).



NOTE

Threaded end of shaft must point downward.

- (4) Install rotor assembly (32) in drive end housing (27) and remove from press.



6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP) (CONT).

- (5) Position slip ring end housing (20) in press.

NOTE

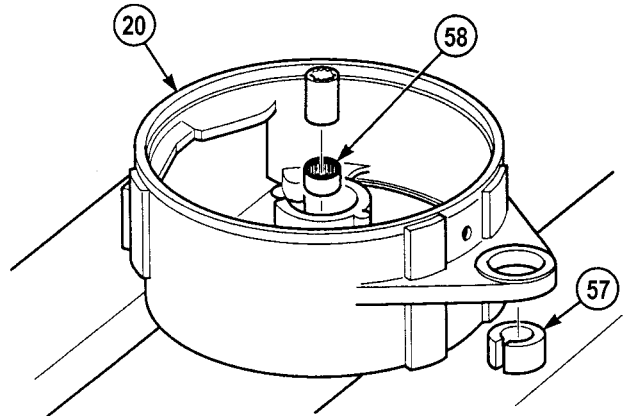
Perform Step (6) only if bushing was removed.

- (6) Install bushing (57) in slip ring end housing (20).

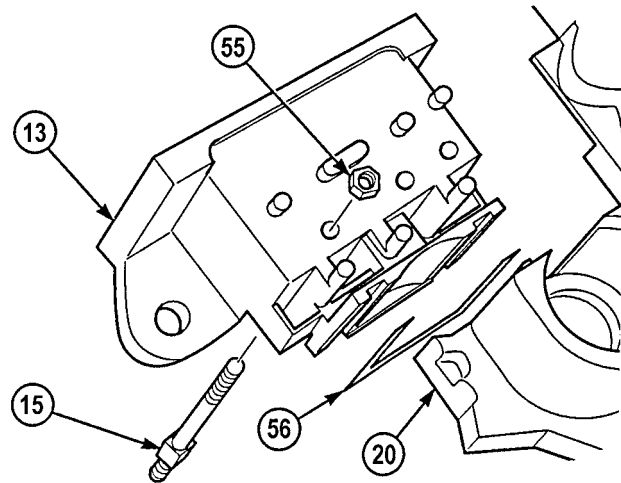
NOTE

When properly installed, bearing seats on lip in bearing bore.

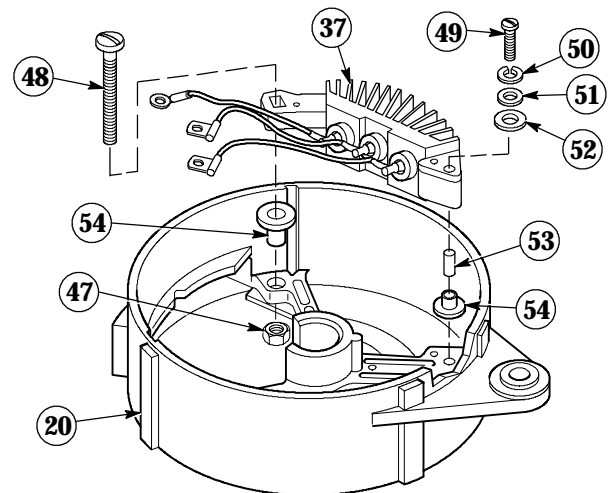
- (7) Install bearing (58) in slip ring end housing (20) and remove from press.
 (8) Coat rollers of bearing (58) with grease.



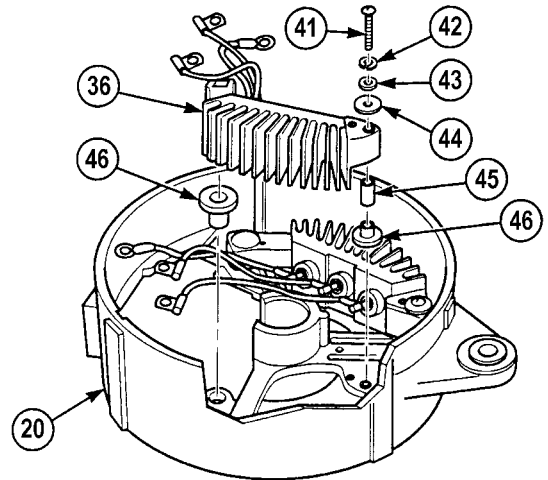
- (9) Install three studs (15) and nuts (55) in brush housing (13).
 (10) Position gasket (56) and brush housing (13) in slip ring end housing (20).



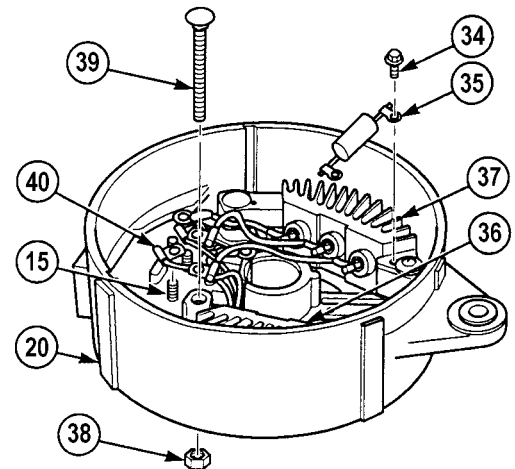
- (11) Install negative rectifier (37) in slip ring end housing (20) with two bushings (54), bushing (53), insulator (52), washer (51), lockwasher (50) and screw (49).
 (12) Install screw (48) and nut (47) in negative rectifier (37) and slip ring end housing (20).



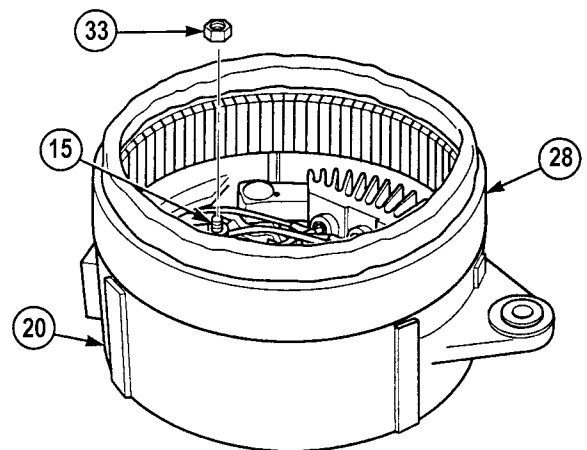
- (13) Install positive rectifier (36) in slip ring end housing (20) with two bushings (46), bushing (45), insulator (44), washer (43), lockwasher (42) and screw (41).



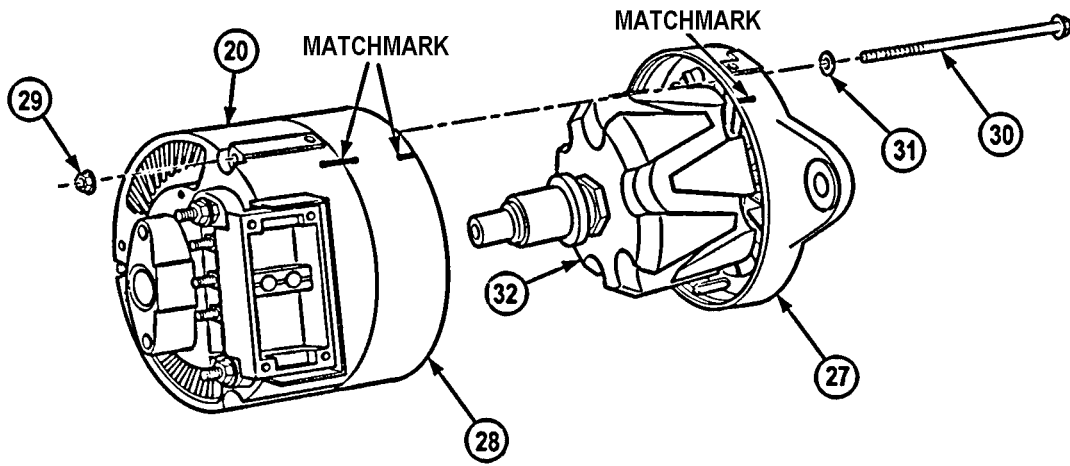
- (14) Install six wires (40) on three studs (15).
- (15) Install screw (39) and nut (38) in positive rectifier (36) and slip ring end housing (20).
- (16) Install capacitor (35) on positive rectifier (36) and negative rectifier (37) with two screws (34).



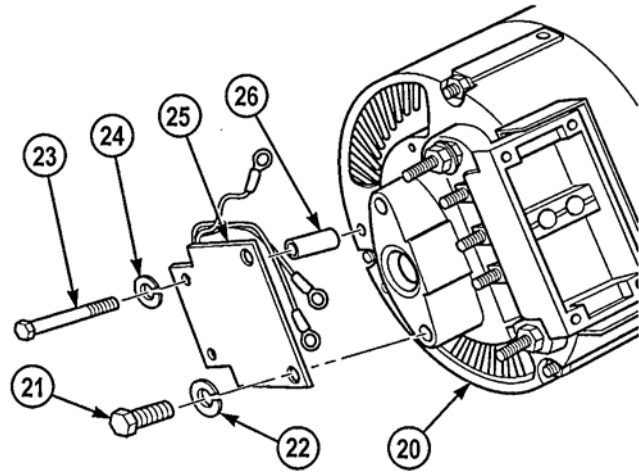
- (17) Align matchmarks and install stator (28) on slip ring end housing (20).
- (18) Install three nuts (33) on studs (15).



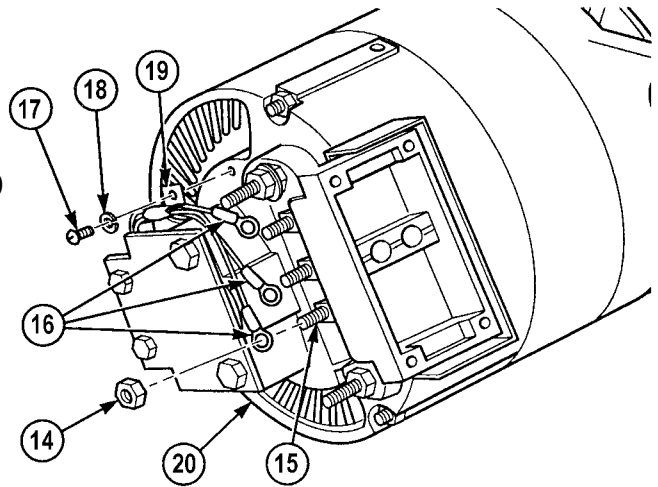
6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP) (CONT).



- (19) Align matchmarks and install slip ring end housing (20) and stator (28) on drive end housing (27) with three screws (30), washers (31) and locknuts (29).
- (20) Install two spacers (26) and capacitor (25) on slip ring end housing (20) with two lockwashers (24), screws (23), lockwashers (22) and screws (21).



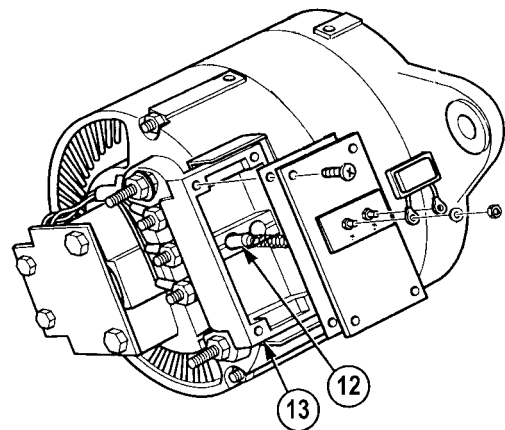
- (21) Install three wires (16) in clip (19).
- (22) Install three wires (16) on studs (15) with nuts (14).
- (23) Install clip (19) on slip ring end housing (20) with lockwasher (18) and screw (17).



NOTE

- If using original brushes, wear pattern must match radius of slip rings.
- Brush springs are held compressed with 1/16 in. socket head screw key through hole in brush housing to aid in installation of cover.

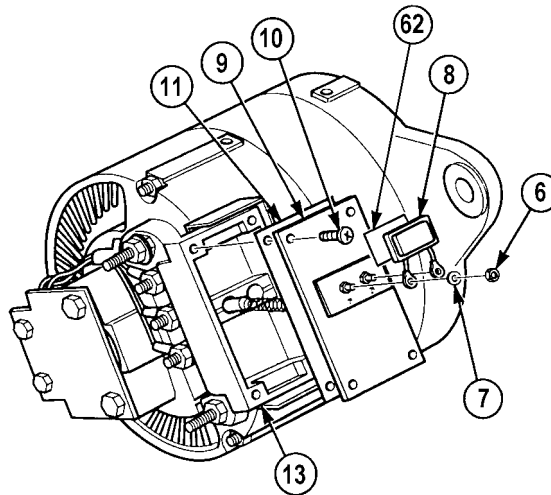
- (24) Insert two electrical contact brushes (12) in brush housing (13) and compress brush springs.



6-2. ALTERNATOR ASSEMBLY REPAIR (145 AMP) (CONT).

CAUTION

- Cover can only be installed one way. Pins in cover must be positioned over brush holes.
- 1/16 in. socket head screw key must be removed before screws are fully tightened, or damage to equipment may result

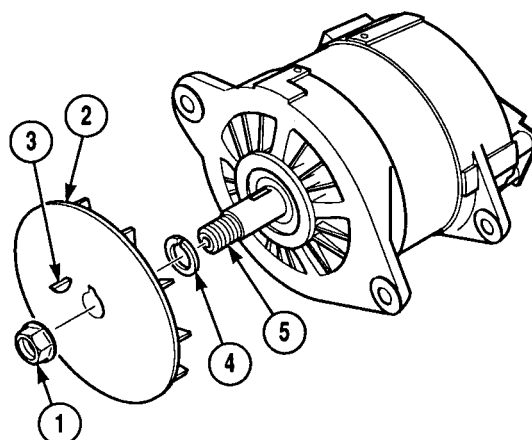


- (25) Install gasket (11) and cover (9) with four screws (10) in brush housing (13).

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.

- (26) Clean the bottom surface of capacitor (8) and cover (9) with an equal mixture of isopropyl alcohol and water, and let air dry.
- (27) Install two sided tape (62) to the bottom surface of capacitor (8).
- (28) Install capacitor (8) on cover (9) with two lockwashers (7) and nuts (6).
- (29) Press capacitor (8) firmly to cover (9) with two lockwashers (7) and nuts (6).
- (30) Apply corrosion preventive compound to two terminals on cover (9).
- (31) Install spacer (4), key (3) and fan (2) on shaft (5) with nut (1).



END OF TASK

6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP).

This task covers:

- a. Disassembly
- b. Testing
- c. Cleaning/Inspection
- d. Assembly

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Caps, Vise Jaw (Item 27, Appendix F)
- Compressor Unit, Air (Item 35, Appendix F)
- Gloves, Chemical Oil Protective (Item 81, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Gun, Airblow (Item 86, Appendix F)
- Multimeter (Item 140, Appendix F)
- Pliers, Retaining Ring (Item 156, Appendix F)
- Press, 60 Ton (Item 164, Appendix F)
- Vise, Machinist's (Item 248, Appendix F)
- Wrench Set, Socket 3/8 in. Drive (Item 273, Appendix F)
- Wrench, Torque (0-60 N·m) (Item 276, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)

Materials/Parts

- Cloth, Crocus (Item 12, Appendix B)
- Sealant, Adhesive (Item 49, Appendix B)
- Sealing Compound (Item 55, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Bolt, Self-Locking (5) (Item 20, Appendix E)
- Locknut (Item 195, Appendix E)
- Locknut (12) (Item 207, Appendix E)
- Locknut (18) (Item 214, Appendix E)
- Lockwasher (Item 296, Appendix E)
- Lockwasher (7) (Item 297, Appendix E)
- Lockwasher (13) (Item 298, Appendix E)
- Lockwasher (Item 300, Appendix E)

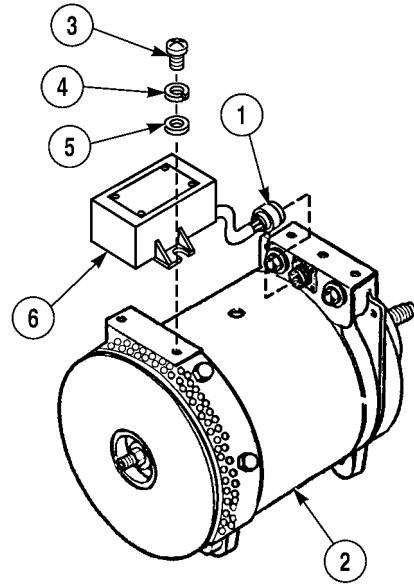
Equipment Condition

200 amp alternator on clean work surface

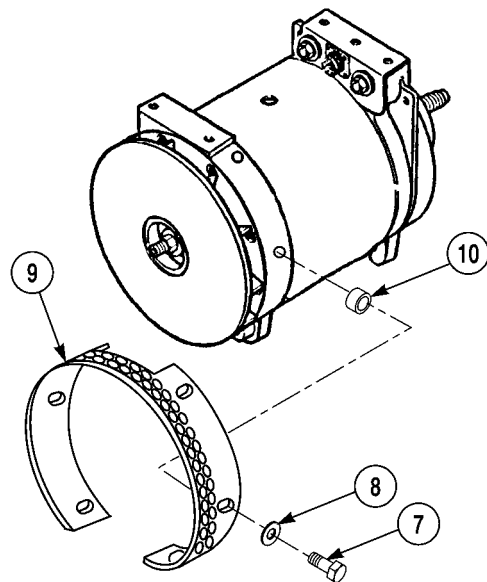
6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).

a. Disassembly.

- (1) Disconnect connector (1) from alternator (2).
- (2) Remove two screws (3), lockwashers (4), washers (5) and regulator (6) from alternator (2). Discard lockwashers.



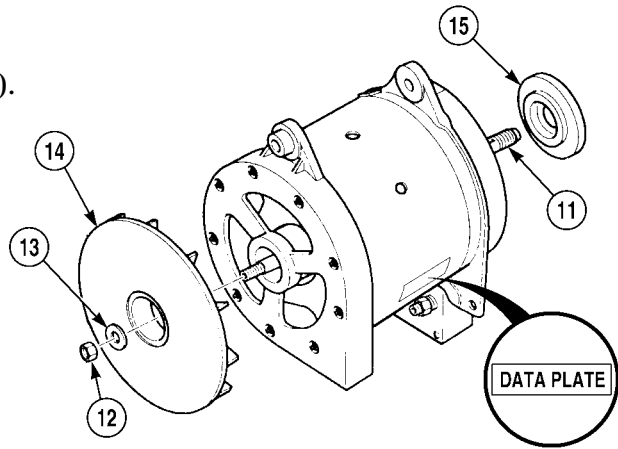
- (3) Remove five self-locking bolts (7), washers (8), fan guard (9) and five fan guard bushings (10). Discard self-locking bolts.



- (4) Hold shaft (11) and remove locknut (12), washer (13) and fan (14) from shaft. Discard locknut.
- (5) Remove pulley bushing (15) from shaft (11).

CAUTION

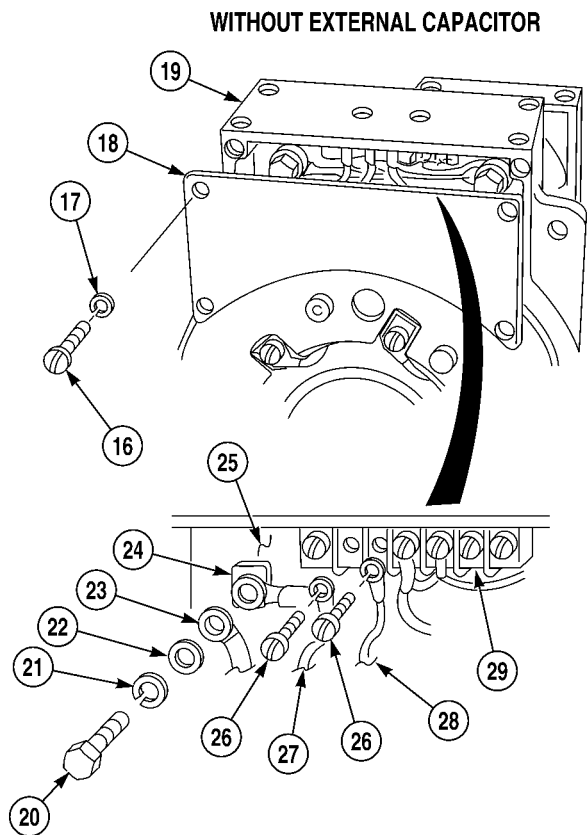
RTV or loose hardware falling into alternator can cause damage. Prevent this by using a shop rag, towel or tape to temporarily plug passages just below 24V B+ connections.



NOTE

- Alternators with external capacitor installed are identified by a letter C stamped on lower right side of cover. Once cover is removed, external capacitor configuration is identifiable by capacitor located behind cover.
- Internal capacitor configuration has capacitor potted in housing and are serial number 317 and higher. See data plate for serial number.
- Tag and mark all wires prior to removal.
- Perform Steps (6), (7) and (8) for alternators without external capacitor kit installed.
- Perform Steps (6), (8.1), (8.2) and (8.3) for alternators with external capacitor kit installed.

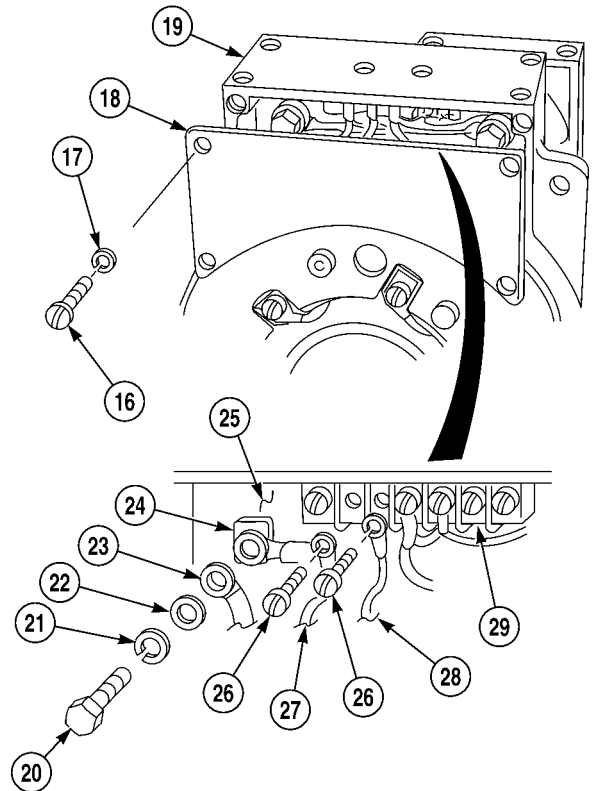
- (6) Remove four screws (16), lockwashers (17) and cover (18) from front housing (19). Discard lockwashers.



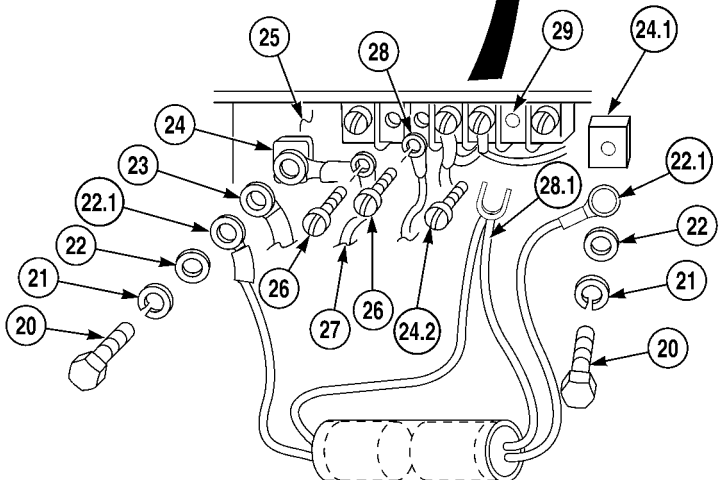
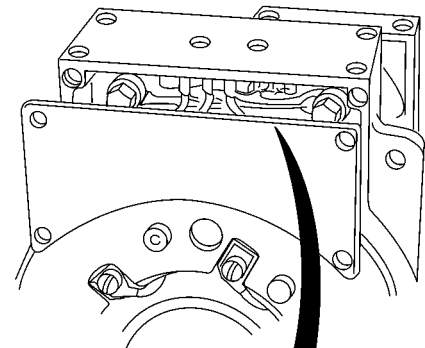
NOTE

- Perform Steps (7) and (8) for alternators without external capacitor installed.
- Perform Steps (8.1) and (8.2) for alternators with external capacitor kit installed.
- Alternators with external capacitor installed are identified by a letter C stamped on lower right side of cover. Once cover is removed, external capacitor configuration is identifiable by capacitor located behind cover.
- Internal capacitor configuration has capacitor potted in housing and are serial number 317 and higher. See data plate for serial number.

WITHOUT EXTERNAL CAPACITOR

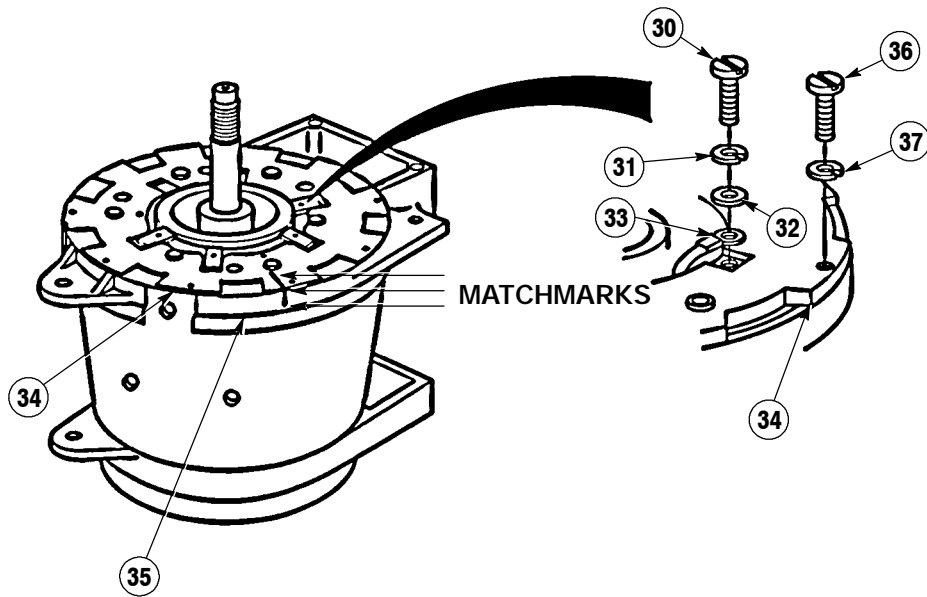


WITH EXTERNAL CAPACITOR



- (7) Remove screw (20), lockwasher (21), washer (22) and large gauge B+ lead (23) at 24 volt connection (24) inside control unit (25). Discard lockwasher.
- (8) Remove two screws (26), brown wire (27) and red wire (28) from terminal strip (29).
- (8.1) Remove RTV from head of B+ screws (20) and terminal screw (24.2).
- (8.2) Remove two screws (20), lockwashers (21), washers (22), capacitor leads (22.1) and large B+ lead (23) from 24 volt connection (24) and 12 volt connection (24.1) inside control unit (25). Discard lockwasher.
- (8.3) Remove screw (24.2) two screws (26), brown wire (27), red wire (28) and black wire (28.1) from terminal strip (29).

6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).



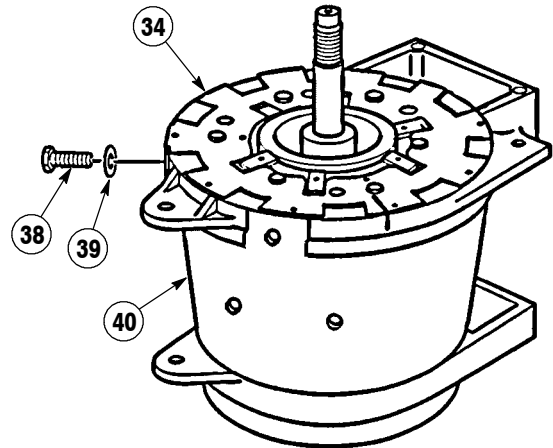
- (9) Remove six screws (30), lockwashers (31) and washers (32) attaching phase leads (33) to heat sink (34). Position phase leads clear of heat sink.
- (10) Matchmark heat sink (34) and front housing (35).
- (11) Remove nine screws (36) and lockwashers (37) from heat sink (34) and front housing (35). Discard lockwashers

CAUTION

Ensure wires are not cut or ripped loose when disassembling housing. Damage to equipment may result.

NOTE

- Tag and mark all wires prior to removal.
- Ensure all adhesive sealant is removed from heat sink and control box connectors upon disassembly.



(12) Remove screw (38), lockwasher (39) and heat sink (34) from alternator housing (40). Discard lockwasher.

(13) Remove nine locknuts (41) from studs (42). Discard locknuts.

(14) Matchmark and remove end housing (43) from alternator housing (40).

NOTE

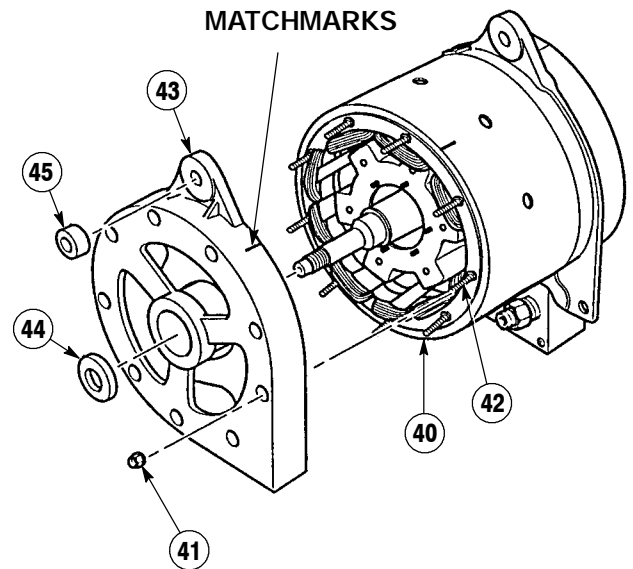
Perform Step (15) if bearing is damaged.

(15) Remove bearing (44) from end housing (43).

NOTE

Perform Step (16) if bushing is damaged.

(16) Remove bushing (45) from end housing (43).

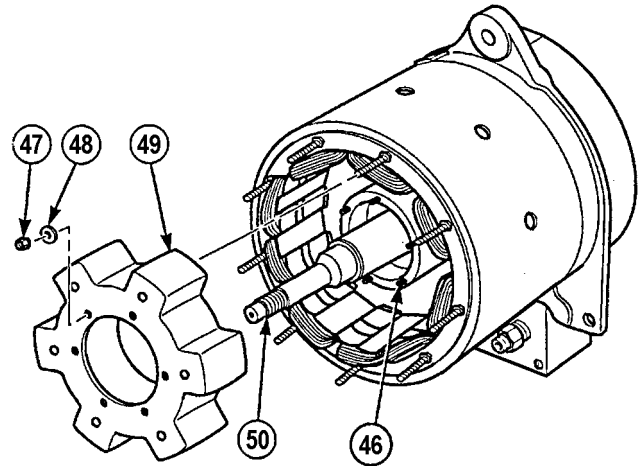


6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).

(17) Hold studs (46) and remove six locknuts (47), washers (48) and rear rotor (49) from shaft (50). Discard locknuts.

(18) Remove nine locknuts (51), front housing (35) and shaft (50) from alternator housing (40). Discard locknuts.

(19) Position front housing (35) in press.

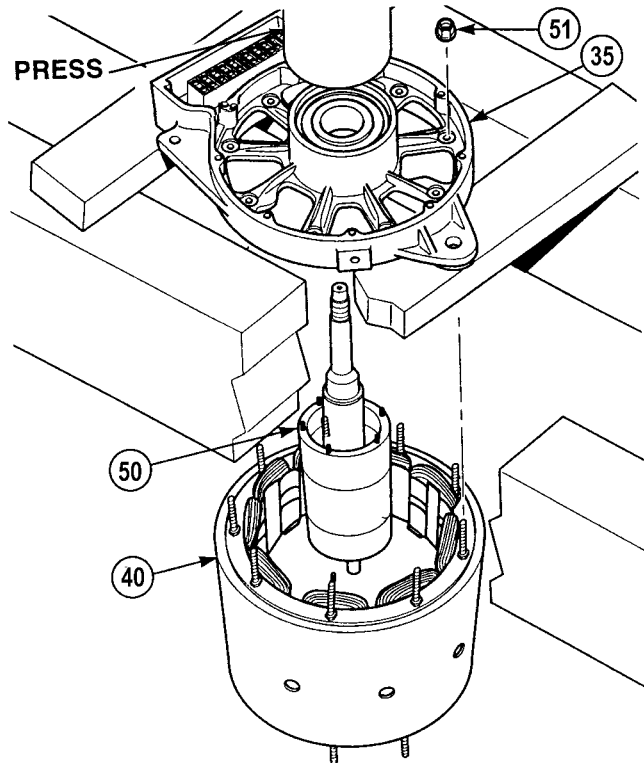


CAUTION

Ensure shaft is fully supported upon removal from front housing. Failure to comply may result in damage to equipment.

(20) Press shaft (50) from front housing (35).

(21) Remove front housing (35) from press.



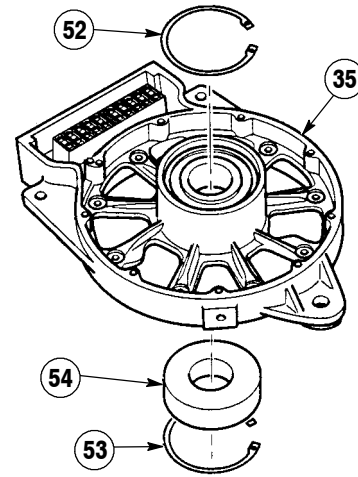
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

NOTE

Note location and position of retaining rings during removal.

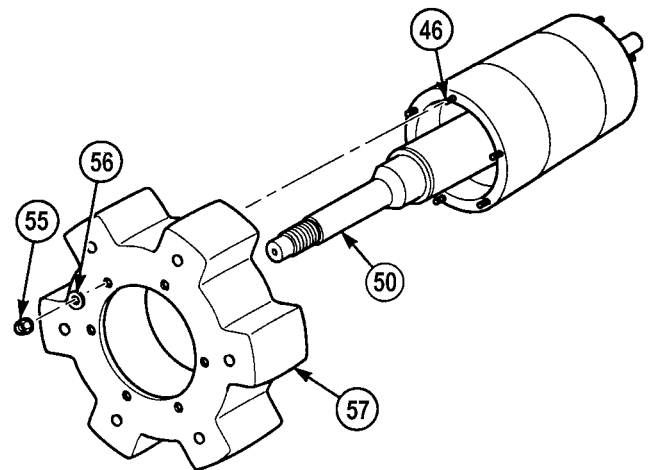
- (22) Remove retaining rings (52) and (53) and bearing (54) from front housing (35).



NOTE

Studs may come out with locknuts.

- (23) Hold six studs (46) and remove locknuts (55) and washers (56) from front rotor (57). Discard locknuts.
- (24) Remove front rotor (57) from shaft (50).



b. Testing.

NOTE

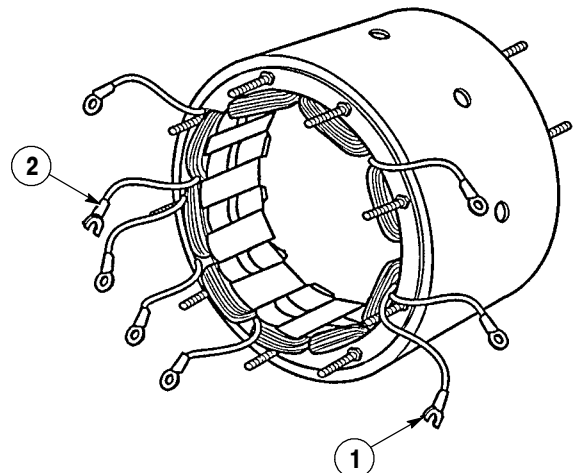
Multimeter should read less than 3 ohms in Step (1). If multimeter reads above the specified limit, field coil is open and must be replaced.

- (1) Check for open field coil. Set multimeter to x1 range and zero meter. Touch one multimeter test lead to F+ (1) and other test lead to F- (2) and measure resistance.

NOTE

Multimeter should read infinity in Step (2). If multimeter reads less than infinity, field coil is grounded and must be replaced.

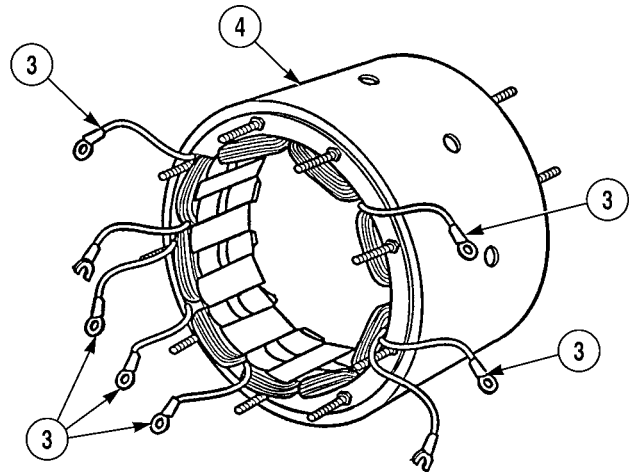
- (2) Check for grounded field coil. Set multimeter to x10k range and zero meter. Touch one multimeter test lead to F+ (1) or F- (2) and other to known good ground.



6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).

NOTE

- 200 amp alternator has two stators. Three wires are for one stator and the other three wires are for remaining stator. Perform Steps (3) and (4) for each stator.
- Multimeter should read zero ohms between three wires in each stator in Step (3). If ohm meter does not read zero ohms, stator is defective and alternator housing must be replaced.



- (3) Check stators by touching two of three stator wires (3) with test leads. Test each combination of all wires in each stator.

NOTE

Multimeter should read infinity in Step (4). If any reading is not infinity, stator is grounded and alternator housing must be replaced.

- (4) Check stators by touching one test lead to each wire (3) and other test lead to alternator housing (4).

NOTE

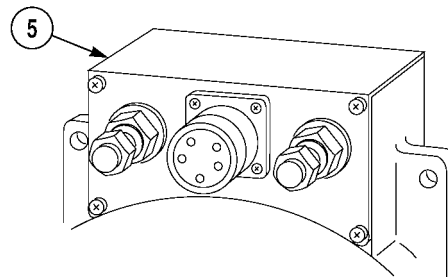
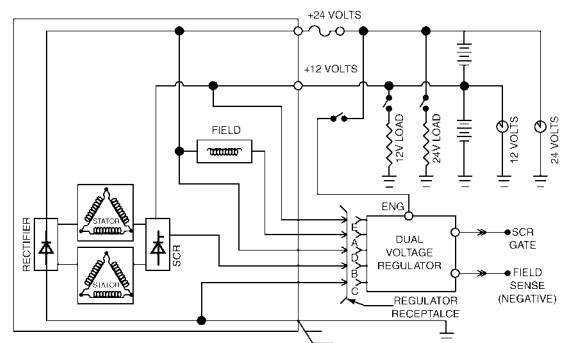
Each terminal should show continuity. Refer to Table 6-1 and alternator schematic.

- (5) Test front housing (5) continuity by setting multimeter to x10 range and touching two control unit connector terminals at a time. Test each combination of terminals to ensure all internal wiring is intact.

Table 6-1. PIN ASSIGNMENTS, REGULATOR CONNECTOR, ON ALTERNATOR

CONNECTOR PIN	MEASURE TO:	METER READING
A	+24 v Stud	More than 2 ohms but less than 3 ohms (Field Coil)
B	C	1.5k ohms
C	Gnd	Less than .1 ohms
D	+24 v Stud	Less than .1 ohms
E	+12 v Stud	Less than .1 ohms

ALTERNATOR SCHEMATIC



NOTE

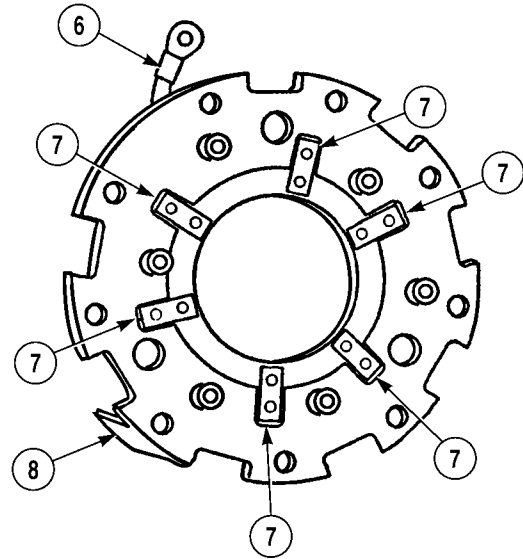
All readings should be similar ± 10 percent in Step (6). If readings are not alike ± 10 percent, diode rectifier assembly is defective, and heat sink assembly must be replaced.

- (6) Check positive diodes. Touch negative test lead to 24V output wire (6) and positive test lead to each heat sink phase terminals (7).

NOTE

All readings in Step (7) should indicate an open circuit. If any reading does not indicate an open circuit, diode rectifier assembly is defective, and heat sink assembly must be replaced.

- (7) Touch positive lead to 24V output wire (6) and negative test lead to each heat sink phase terminals (7).

**NOTE**

All readings should be similar ± 10 percent in Step (8). If readings are not alike ± 10 percent, diode rectifier assembly is defective, and heat sink assembly must be replaced.

- (8) Check negative diodes. Touch positive test lead to ground tab (8) and negative test lead to each heat sink phase terminals (7).

NOTE

All readings in Step (9) should read infinity. If any readings are not infinity, diode rectifier assembly is defective and heat sink assembly must be replaced.

- (9) Touch negative test lead to ground tab (8) and positive test lead to each heat sink terminal (7).

6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).

c. Cleaning/Inspection.

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- 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 or death to personnel.

CAUTION

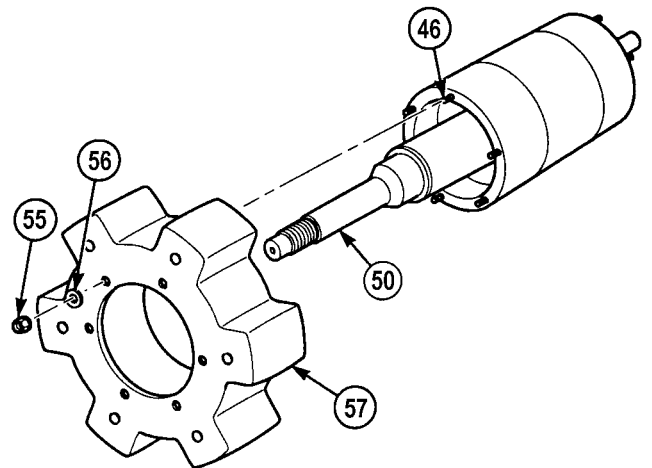
Do not soak stator or rotor in solvents. Damage to insulation may result.

- (1) Clean stator and rotor with drycleaning solvent and dry with compressed air.
- (2) Clean all other components, except bearings, in drycleaning solvent.
- (3) Inspect electrical assemblies for cracks, frayed wires, or loose connectors.
- (4) Inspect mechanical assemblies for cracks, gouges or scratches. Check for old or excess grease.
- (5) Clean rectifier assembly holes and terminal screws to ensure good electrical contact.
- (6) Clean carbon coating off slip rings with crocus cloth.
- (7) Inspect brushes for burnt appearance, cracks or broken edges.
- (8) Check brush wear and replace if length measures less than 3/16 in. (4.76 mm).
- (9) Check drive end housing bearing for smooth operation. If bearing binds, replace bearing.
- (10) Check slip ring housing bearing for missing rollers. If rollers are missing, replace bearing.
- (11) Replace all damaged parts.

d. *Assembly.***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.

- (1) Coat threads of six studs (46) with sealing compound.
- (2) Position front rotor (57) on shaft (50) and install six washers (56) and locknuts (55). Hold shaft and tighten locknuts to 45 lb-in (5 N·m).

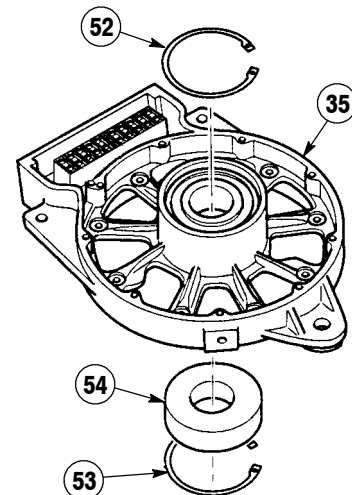
**WARNING**

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

NOTE

Install retaining rings as noted during removal.

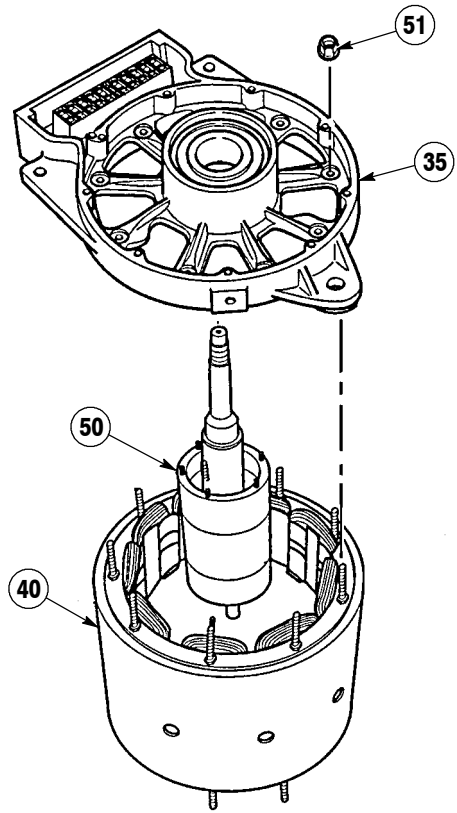
- (3) Install bearing (54) and retaining rings (52) and (53) in front housing (35).



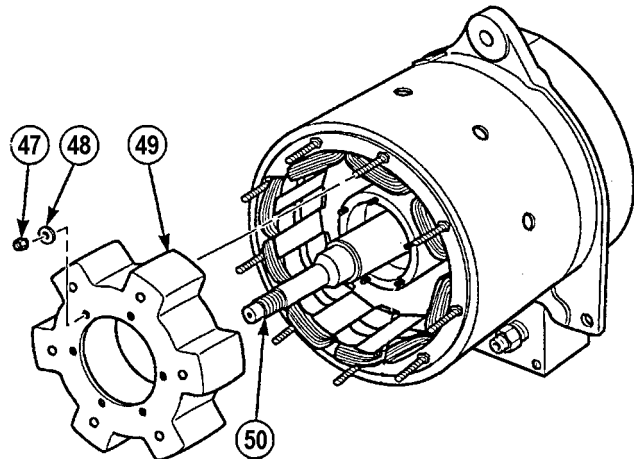
6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).

(4) Position shaft (50) in front housing (35).

(5) Install front housing (35) with shaft (50) on alternator housing (40) with nine locknuts (51). Tighten locknuts to 18 lb-in (2 N·m).



(6) Position rear rotor (49) on shaft (50) and install six washers (48) and locknuts (47). Hold shaft and tighten locknuts to 45 lb-in (5 N·m).



NOTE

Perform Steps (7) and (8) if bushing and bearing were removed.

- (7) Install bushing (45) in end housing (43).
- (8) Install bearing (44) in end housing (43).
- (9) Align matchmarks and install end housing (43) on alternator housing (40).

WARNING

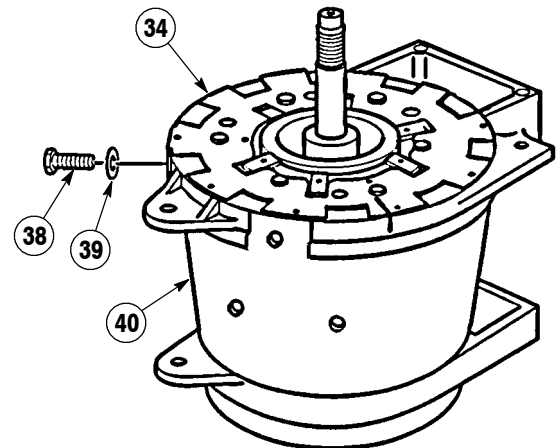
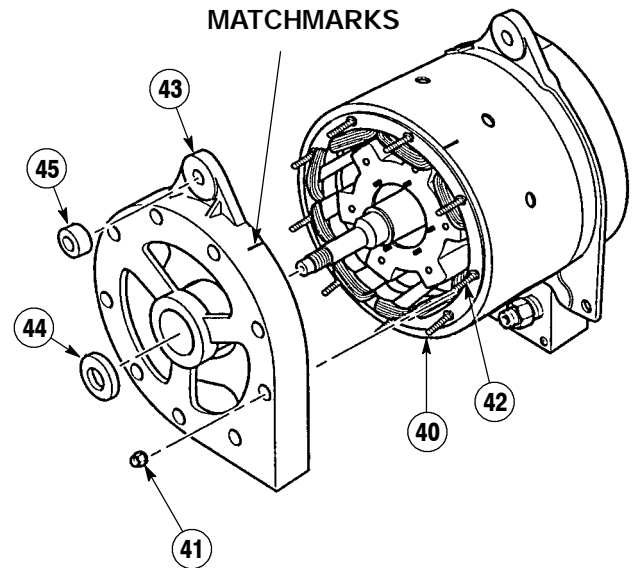
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (10) Coat threads of nine studs (42) with sealing compound.
- (11) Install nine locknuts (41) on studs (42). Tighten locknuts to 18 lb-in (2 N·m).
- (12) Coat mating surfaces of alternator housing (40) and heat sink (34) with adhesive.

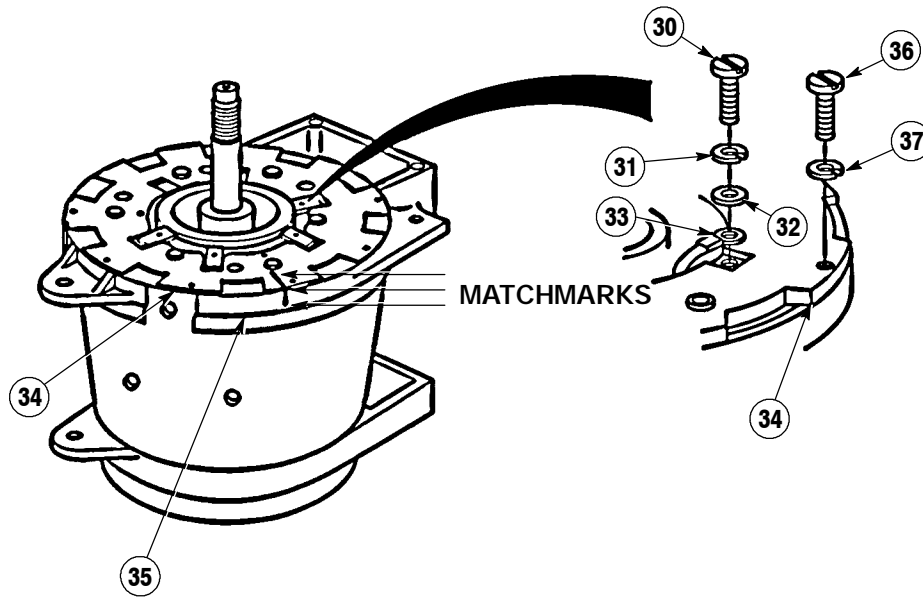
NOTE

Ensure wires are correctly routed as noted prior to removal.

- (13) Install heat sink (34) on alternator housing (40) with lockwasher (39) and screw (38). Tighten screw to 132 lb-in (15 N·m).



6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).



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.

- (14) Coat threads of screws (36) with sealing compound.
- (15) Position matchmarks of heat sink (34) and front housing (35) then secure with nine lockwashers (37) and screws (36). Tighten screws to 20 lb-in (2.2 N·m).

NOTE

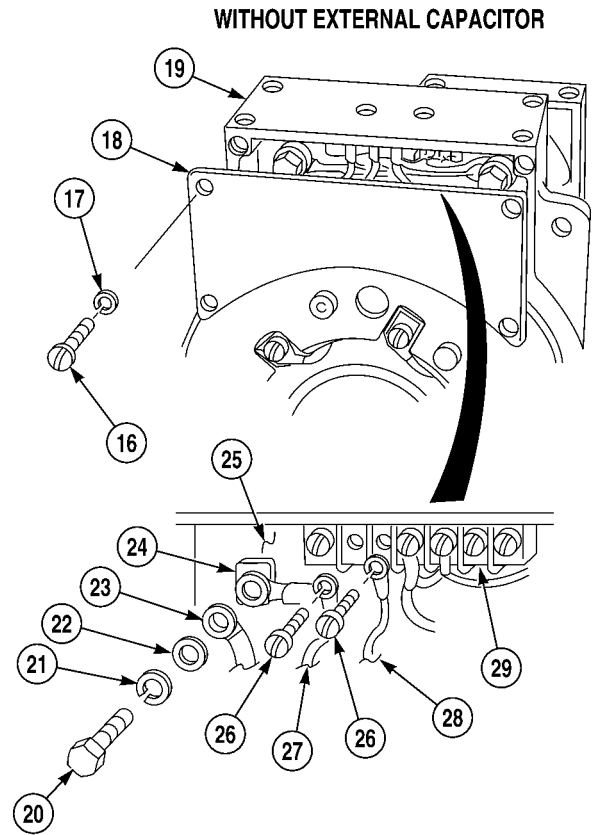
Ensure installed wires do not interfere with free spinning of shaft.

- (16) Coat threads of screws (30) with sealing compound.
- (17) Position phase leads (33) on heat sink (34) with six washers (32), lockwashers (31) and screws (30). Tighten screws to 20 lb-in (2.2 N·m).

NOTE

Perform steps (18) and (19) for alternators without external capacitor kit installed.

- (18) Install brown wire (27) and red wire (28) on terminal strip (29) with two screws (26).
- (19) Install large gauge B+ lead (23), washer (22), lockwasher (21) and bolt (20) on 24 volt connection (24) inside control unit (25).



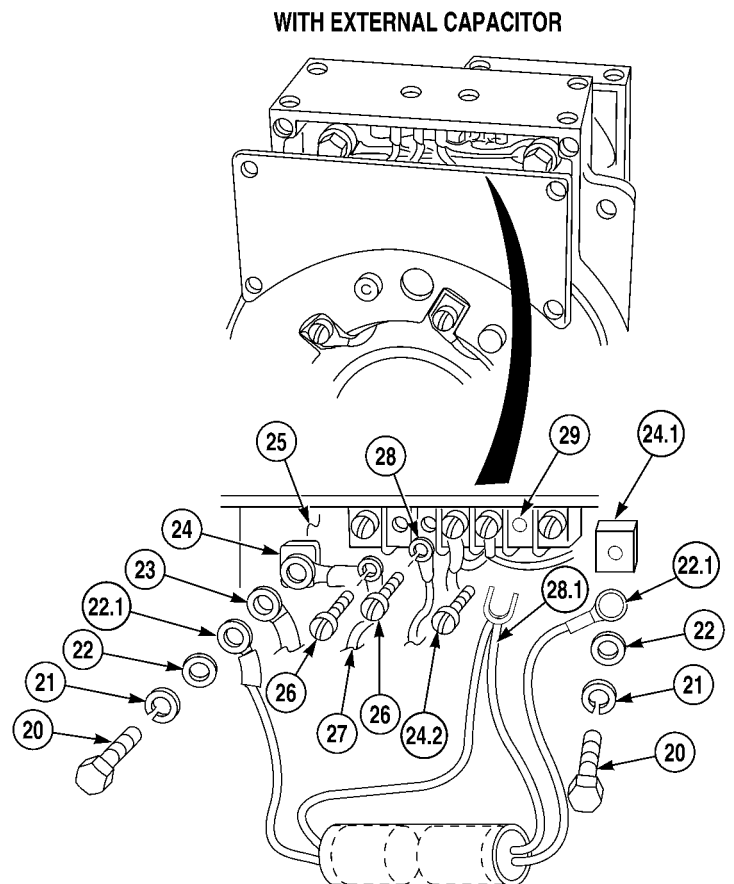
CAUTION

Do not install an external capacitor kit on alternators with a serial number of 317 and higher. These have internal capacitors. Additional capacitor may cause damage to equipment.

NOTE

Perform steps (19.1) and (19.2) for alternators with external capacitor kit installed.

- (19.1) Install brown wire (27), red wire (28) using two screws(26) and black wire (28.1) using one screw (24.2) on terminal strip (29).
- (19.2) Install 12 volt connection (24.1), large B+ lead (23), and capacitor leads (22.1) on 12 volt connection (24.1) and 24 volt connection (24) using two washers (22), lockwashers (21) and screws (20).



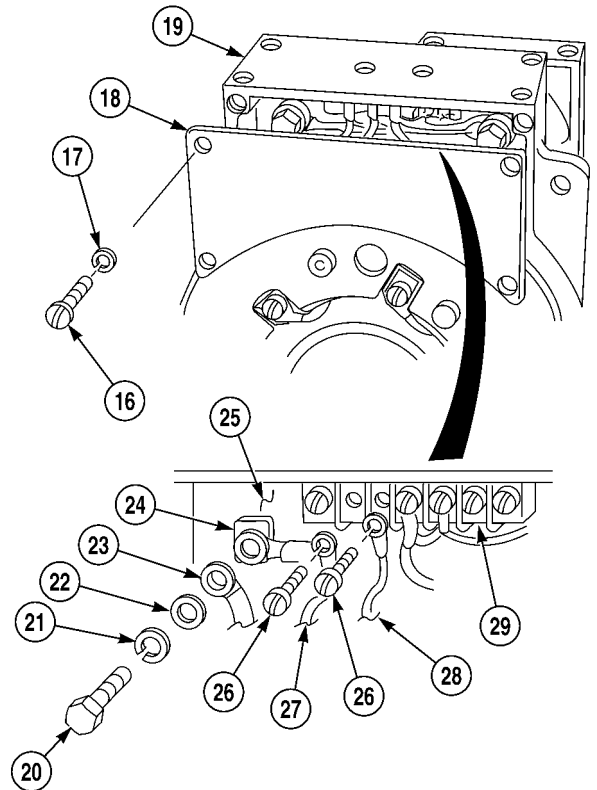
6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).

WARNING

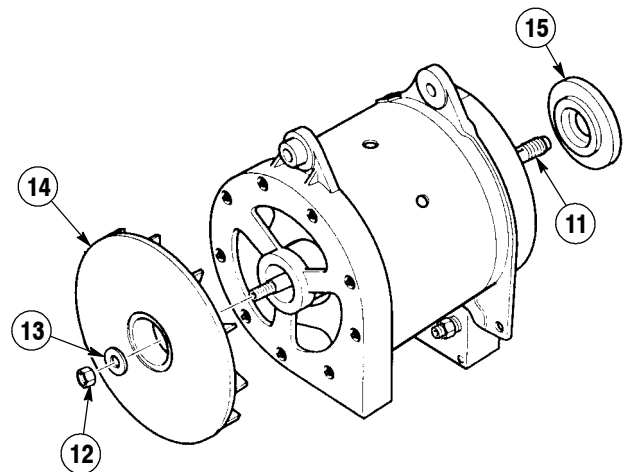
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (20) Coat connections of wires on terminal strip (29), screws (20), terminal (22.1) and connections (24) and (24.1) with adhesive sealant.
- (21) Coat edge of cover (18) with adhesive sealant and four screws (16) with sealing compound.
- (22) Install cover (18) on front housing (19) with four lockwashers (17) and screws (16). Tighten screws to 10 lb-in (1.1 N-m).

WITHOUT EXTERNAL CAPACITOR

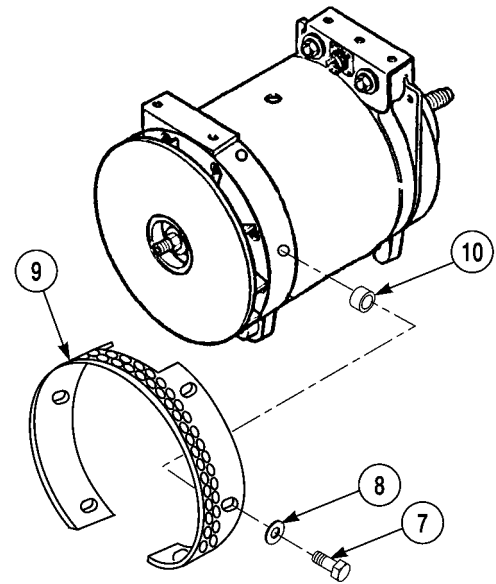


- (23) Install pulley bushing (15) on shaft (11).
- (24) Install fan (14) on shaft (11) with washer (13) and locknut (12). Tighten locknut to 50 lb-ft (58 N-m).



6-3. ALTERNATOR ASSEMBLY REPAIR (200 AMP) (CONT).

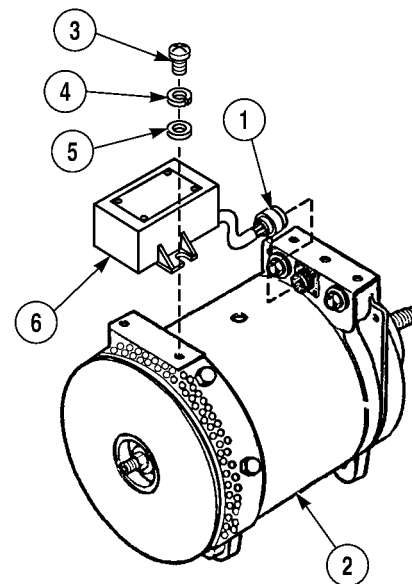
- (25) Install fan guard (9) with five fan guard bushings (10), washers (8) and self-locking bolts (7). Torque bolts to 65 lb-in (7 N·m).



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.

- (26) Apply sealing compound to threads of two screws (3).
- (27) Install regulator (6) on alternator (2) with washers (5), lockwashers (4), and two screws (3).
- (28) Connect connector (1) to alternator (2).



END OF TASK

6-4. STARTER REPAIR.

This task covers:

- | | |
|------------------------|-------------|
| a. Disassembly | c. Testing |
| b. Cleaning/Inspection | d. Assembly |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Compressor Unit, Air (Item 35, Appendix F)
Gage Set, Telescoping (Item 69, Appendix F)
Gloves, Chemical Oil Protective
(Item 81, Appendix F)
Goggles, Industrial (Item 83, Appendix F)
Gun, Airblow (Item 86, Appendix F)
Hook, Wire, 6 in. (Appendix C)
Micrometer, Outside, Caliper Set
(Item 139, Appendix F)
Multimeter (Item 140, Appendix F)
Vise, Machinist's (Item 248, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

Materials/Parts

Grease (Item 25, Appendix B)
Oil, Lubricating (Item 38, Appendix B)
Sealing Compound (Item 56, Appendix B)
Solvent, Drycleaning (Item 68, Appendix B)
Lockplate (4) (Item 218, Appendix E)
Lockwasher (5) (Item 225.1, Appendix E)
Lockwasher (2) (Item 304.1, Appendix E)
Lockwasher (2) (Item 304.2, Appendix E)
Packing, Preformed (Item 393.0.1, Appendix E)
Packing, Preformed (2) (Item 402.1, Appendix E)
Packing, Preformed (Item 403.1, Appendix E)
Packing, Preformed (Item 403.2, Appendix E)
Packing, Preformed (Item 403.3, Appendix E)
Screw (8) (Item 546.1, Appendix E)
Seal, Oil (Item 598.1, Appendix E)
Washer, Fiber (Item 692.1, Appendix E)
Washer, Seal (6) (Item 695.1, Appendix E)

Equipment Condition

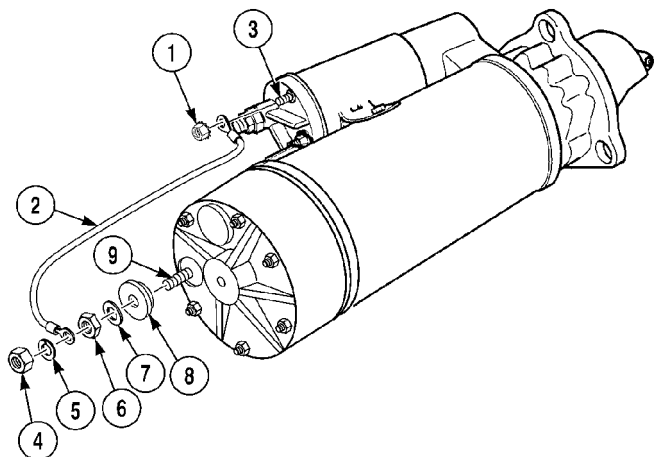
Starter on clean work surface.

a. *Disassembly.*

NOTE

- There are two configurations of starters, models MD and ME. Repairs to model MD are limited to replacement of brushes and solenoid.
- For model MD brush removal, perform Steps (38) through (40).
- For models MD and ME solenoid removal, perform Steps (1) through (5).

- (1) Remove tenz nut (1) and ground wire (2) from terminal No. 4 (3).
- (2) Remove nut (4), lockwasher (5), ground wire (2), nut (6), washer (7) and insulator (8) from ground stud (9). Discard lockwasher.

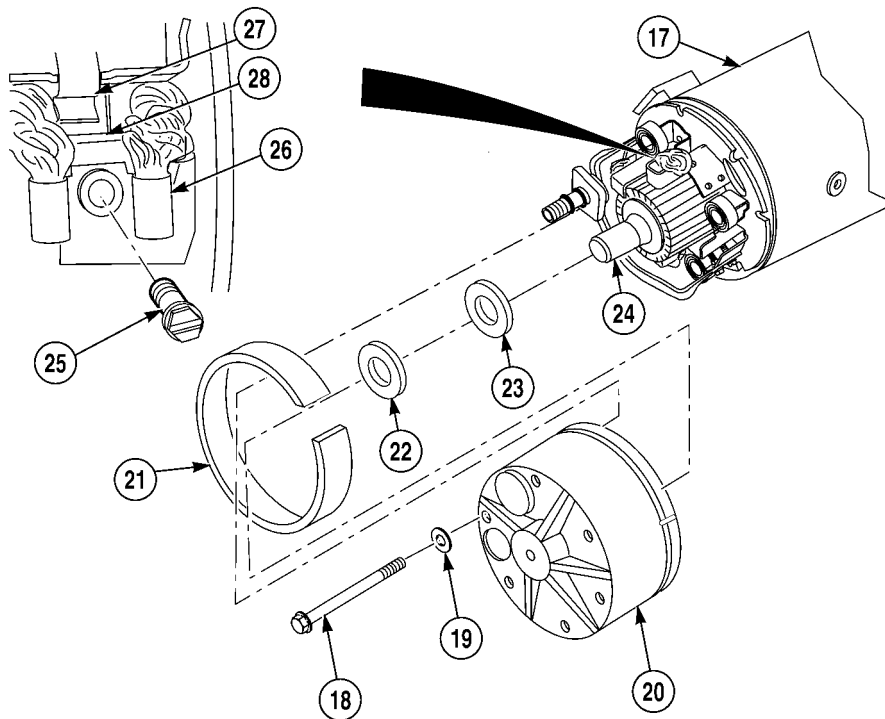
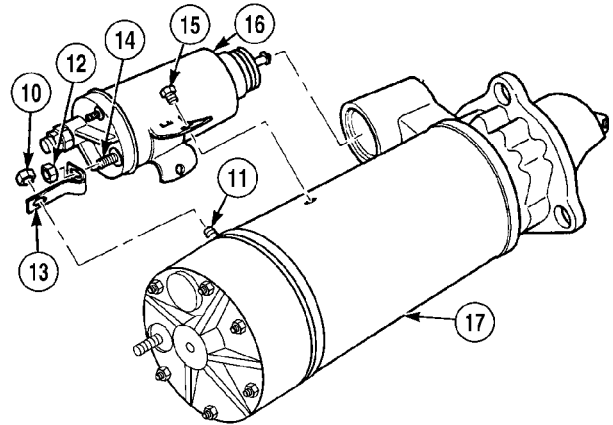


6-4. STARTER REPAIR (CONT).

CAUTION

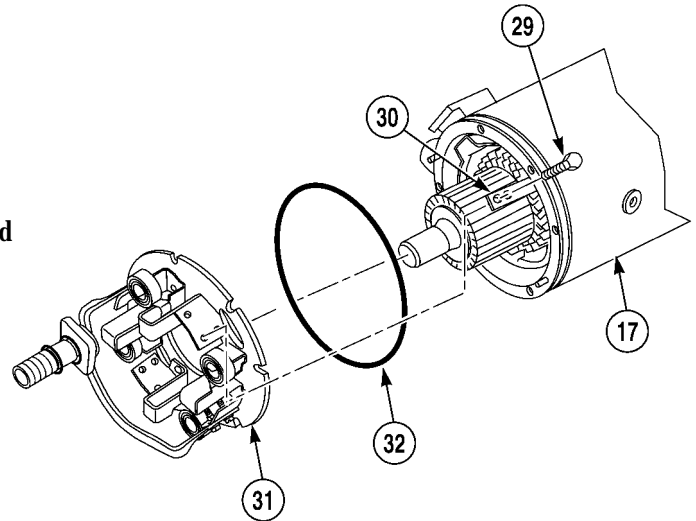
Hold bottom nut while removing top nut. Failure to comply may damage equipment.

- (3) Remove nut (10) from field coil stud (11).
- (4) Remove nut (12) and jumper strap (13) from terminal No. 3 (14).
- (5) Remove two screws (15) and solenoid (16) from field ring (17).

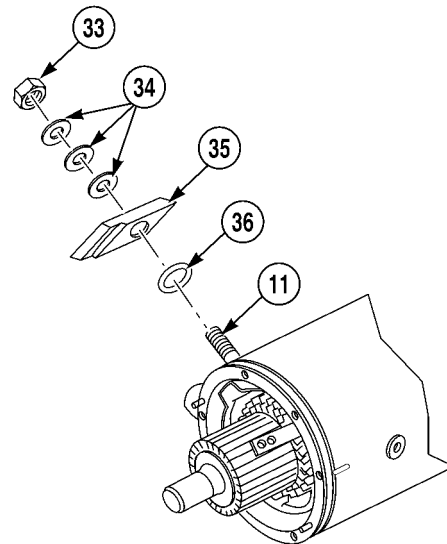


- (6) Remove six screws (18), seal washers (19) and commutator end housing (20) from field ring (17). Discard seal washers.
- (7) Remove insulator (21) from commutator end housing (20).
- (8) Remove fiber washer (22) and washer (23) from armature shaft (24). Discard fiber washer.
- (9) Remove four screws (25) from four brushes (26).
- (10) Using a wire hook, pull four springs (27) upward and remove brushes (26) from brush holders (28).

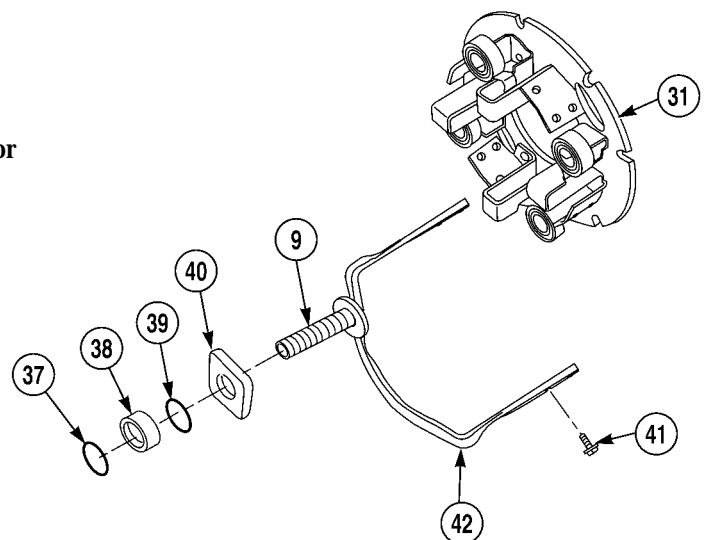
- (11) Remove four screws (29) from field coil (30) and brush plate (31).
- (12) Remove brush plate (31) and preformed packing (32) from field ring (17). Discard preformed packing.



- (13) Remove nut (33), three washers (34), insulator (35) and preformed packing (36) from field coil stud (11). Discard preformed packing.

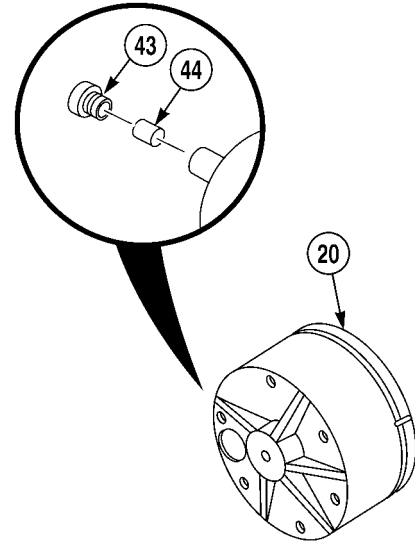


- (14) Remove preformed packing (37), spacer (38), preformed packing (39) and insulator (40) from ground stud (9). Discard preformed packings.
- (15) Remove four screws (41) from ground jumper (42) and brush plate (31).
- (16) Remove ground jumper (42) from brush plate (31).

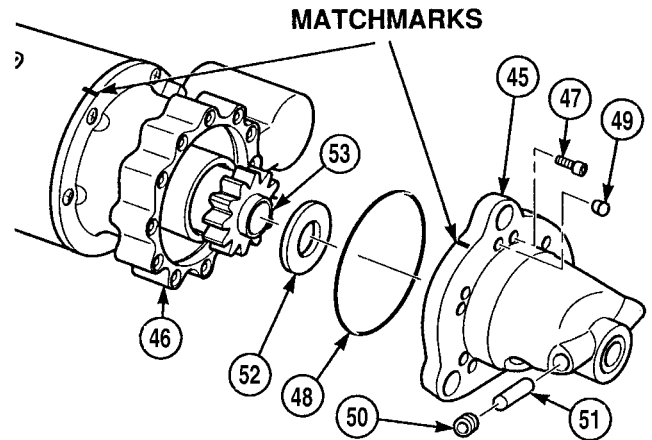


6-4. STARTER REPAIR (CONT).

- (17) Remove plug (43) and wick (44) from commutator end housing (20).



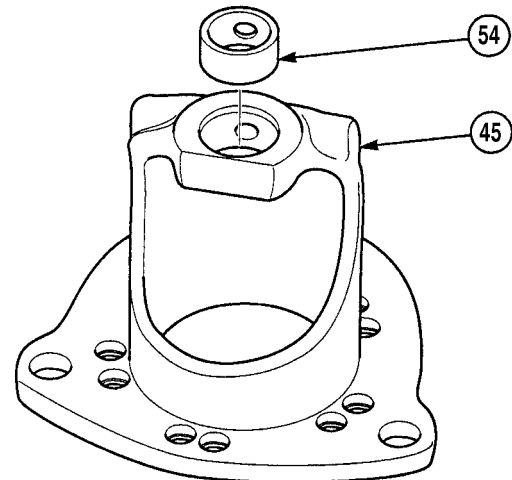
- (18) Matchmark nose housing (45) and shift housing (46).
- (19) Remove six screws (47), nose housing (45) and preformed packing (48) from shift housing (46). Discard preformed packing.
- (20) Remove six rubber plugs (49) from nose housing (45).
- (21) Remove plug (50) and wick (51) from nose housing (45).
- (22) Remove washer (52) from drive assembly (53).

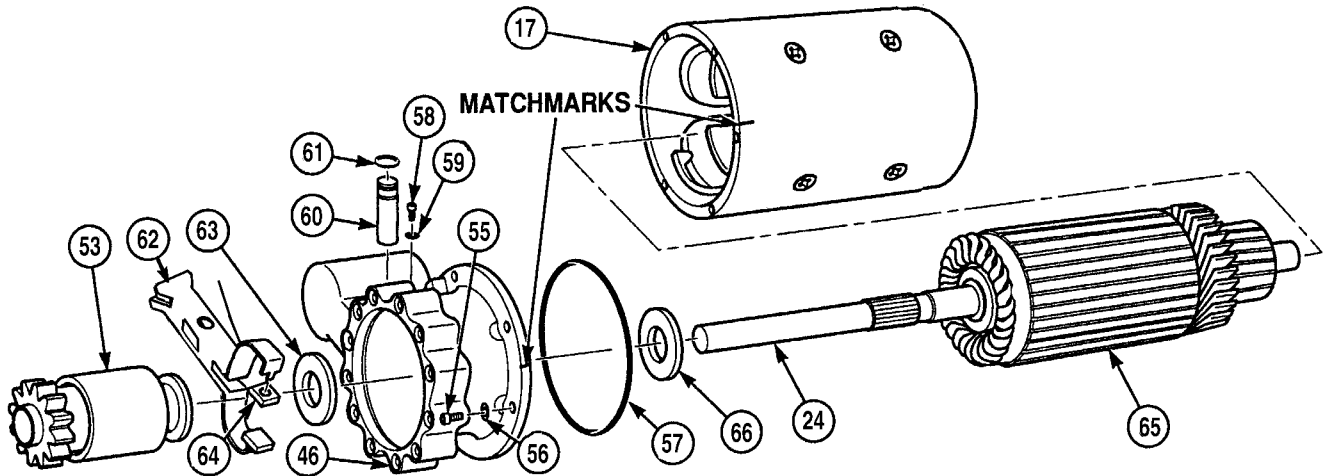


NOTE

Perform Step (23) if bushing fails inspection.

- (23) Remove bushing (54) from nose housing (45).





- (24) Matchmark shift housing (46) and field ring (17).
- (25) Remove five screws (55) and lockwashers (56) from shift housing (46). Discard lockwashers.
- (26) Remove shift housing (46) and preformed packing (57) from field ring (17). Discard preformed packing.
- (27) Remove screw (58), washer (59), shaft (60) and preformed packing (61) from shift housing (46). Discard preformed packing.

NOTE

Note position of shift lever prior to removal to ensure proper installation.

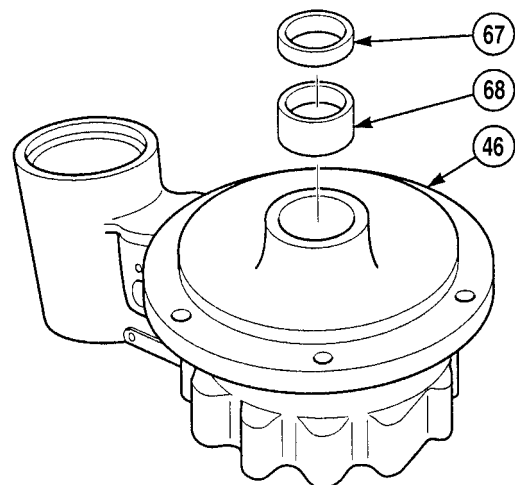
- (28) Remove shift lever (62), drive assembly (53) and brake washer (63) from shift housing (46).
- (29) Remove two cams (64) from shift lever (62).
- (30) Remove armature (65) from shift housing (46).
- (31) Remove thrust washer (66) from armature shaft (24).

- (32) Remove oil seal (67) from shift housing (46). Discard oil seal.

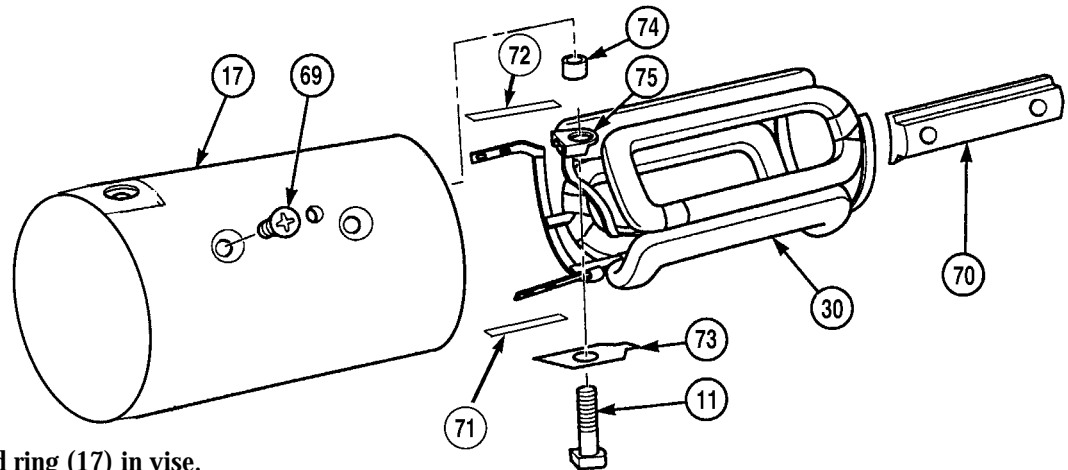
NOTE

Perform Step (33) if bushing fails inspection.

- (33) Remove bushing (68) from shift housing (46).



6-4. STARTER REPAIR (CONT).

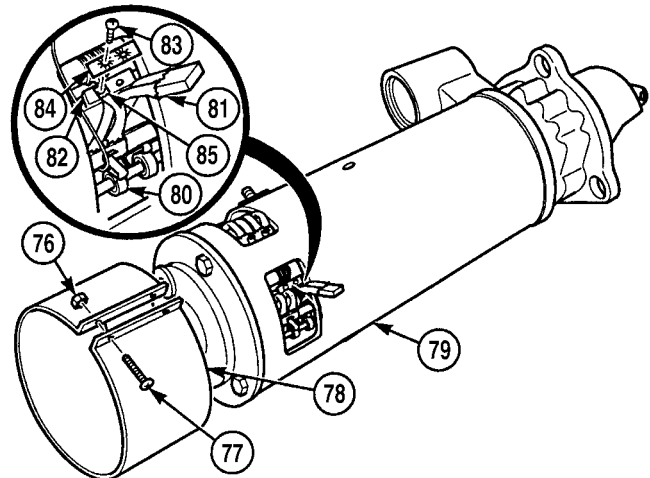


(34) Position field ring (17) in vise.

NOTE

Note location of insulators (71) and (72) prior to removal to ensure proper installation.

- (35) Remove eight screws (69), four pole pieces (70), and two insulator strips (71) and (72) from field ring (17). Discard screws.
- (36) Remove field coil stud (11), washer (73) and bushing (74) from field coil jumper (75).
- (37) Remove field coil (30) from field ring (17).
- (38) Remove two nuts (76), screws (77) and brush opening band (78) from field ring (79).
- (39) Using a wire hook, pull eight springs (80) upward and remove eight brushes (81) from four brush holders (82).
- (40) Remove eight screws (83), four lockplates (84) and eight brush wires (85) from four brush holders (82). Discard lockplates.



b. Cleaning/Inspection.

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.

CAUTION

Do not dip solenoid, armature, field coil, or drive assembly in drycleaning solvent, or damage to components may result.

- (1) Clean solenoid, armature, field coil and drive assembly with cleaning cloth dipped in drycleaning solvent.
- (2) Clean brush holder assembly, insulation washers, bushings and spacers by dipping in drycleaning solvent.
- (3) Clean all other components with drycleaning solvent and wire brush.

WARNING

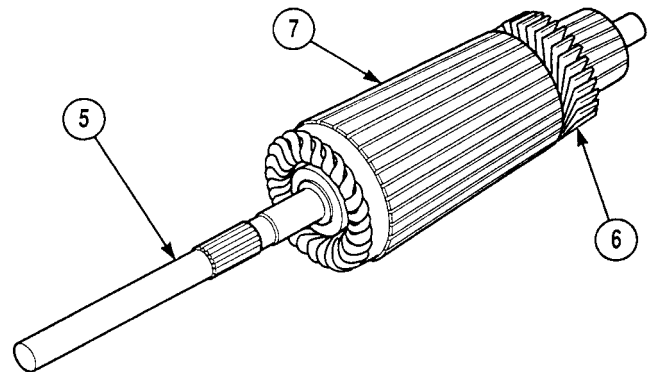
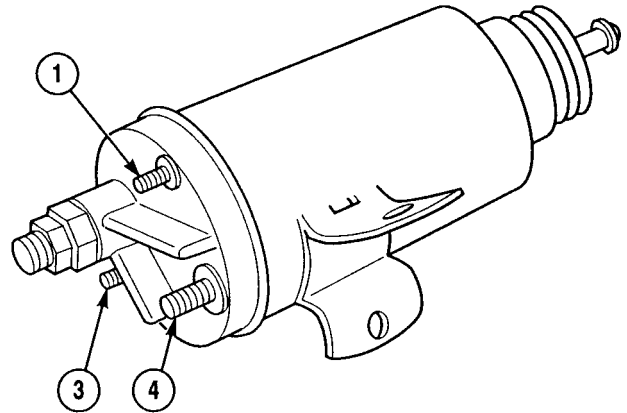
Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury or death to personnel.

- (4) Dry all parts with compressed air.
- (5) Inspect solenoid rubber boot for cracks or tears. If boot is damaged, replace solenoid.
- (6) Inspect brushes for excessive wear. Brushes less than 0.625 in. (15.875 mm) long must be replaced.
- (7) Inspect brush holders for heat damage or defective springs. Replace faulty brush holders.
- (8) Inspect all insulation washers and bushings. Broken, cracked, or burned insulators must be replaced.
- (9) Inspect nose bushing for wear. If inside diameter is greater than 0.753 in. (19.1 mm), bushing must be replaced.
- (10) Inspect commutator end housing bushing for wear. If inside diameter is greater than 0.756 in. (19.202 mm), housing bushing must be replaced.
- (11) Inspect shift housing bushing for wear. If inside diameter is greater than 0.878 in. (22.301 mm), bushing must be replaced.
- (12) Inspect shift shaft and shift housing. If grooves are found in shift shaft, or pivot hole in shift housing is not round, replace shift shaft or shift housing.
- (13) Inspect gear teeth and splines on drive assembly for wear or damage. If gear rotates in both directions, or does not move freely in and out of assembly, replace gear.
- (14) Check splines on armature shaft for wear or damage.
- (15) Inspect armature commutator surface. If surface is pitted, scored, burned, or coated with hard carbon or oil, replace armature.
- (16) Measure armature commutator surface. If commutator diameter is less than 2.063 in. (52.4 mm), replace armature.
- (17) Inspect inside of field ring and field coil. If burn marks are found, replace field coil. If pole pieces and armature show wear due to rubbing, commutator end housing, shift housing and nose housing bushings must be replaced.

6-4. STARTER REPAIR (CONT).

c. Testing.

- (1) Connect one multimeter test lead to terminal No. 1 (1) and second test lead to a known good ground. Multimeter should read no continuity (infinity). Low resistance indicates coil is grounded and switch assembly must be replaced.
- (2) Connect one multimeter test lead to terminal No. 3 (3) and second test lead to terminal No. 4 (4). If multimeter reads outside 0 to 5 ohms, switch must be replaced.
- (3) Connect one multimeter test lead to splined end of armature shaft (5). Run second test lead across all commutator (6) contacts. Multimeter should read no continuity (infinity). Low resistance indicates a ground, and armature (7) must be replaced.

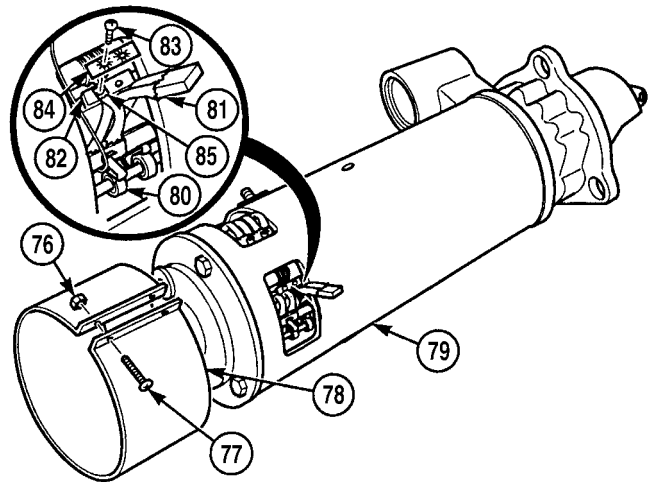


d. Assembly.

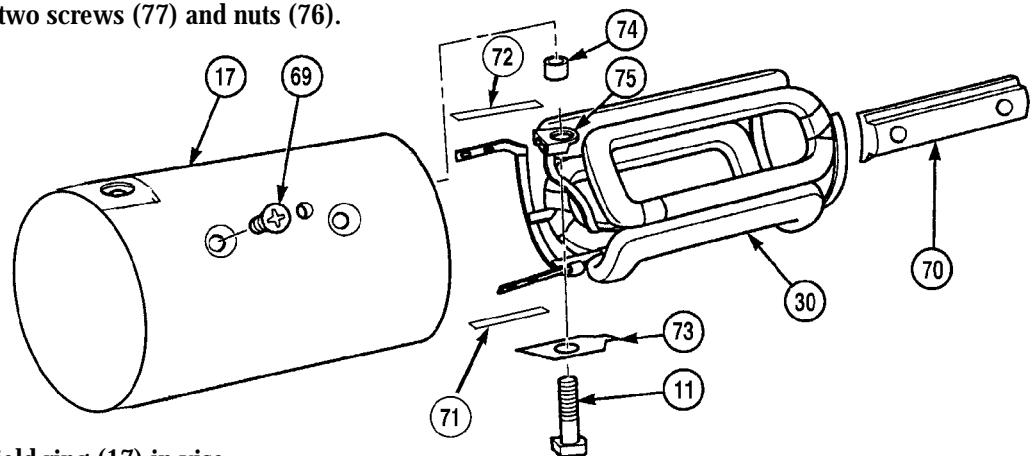
NOTE

- For model MD brush installation, perform Steps (1) through (3) only.
- For model ME brush installation, perform Steps (41) through (46).

- (1) Pull eight springs (80) upward and install eight brushes (81) in four brush holders (82).
- (2) Install eight brush wires (85) in four brush holders (82) with four lockplates (84) and eight screws (83).
- (3) Install brush opening band (78) on field ring (79) with two screws (77) and nuts (76).



- (4) Position field ring (17) in vise.



NOTE

Field coil stud hole in field coil jumper should be aligned with field coil stud hole in field ring.

- (5) Position field coil (30) in field ring (17).
- (6) Position bushing (74) between field coil jumper (75) and field ring (17).

NOTE

Flat side of stud faces brush opening.

- (7) Install field coil stud (11) through field coil jumper (75) and washer (73).

NOTE

Install insulator strips in locations noted prior to removal.

- (8) Position two insulator strips (71) and (72) between field coil (30) and field ring (17).
- (9) Install four pole pieces (70) in field ring (17) with eight screws (69). Tighten screws to 18 to 22 lb-ft (24 to 30 N-m).

6-4. STARTER REPAIR (CONT).

NOTE

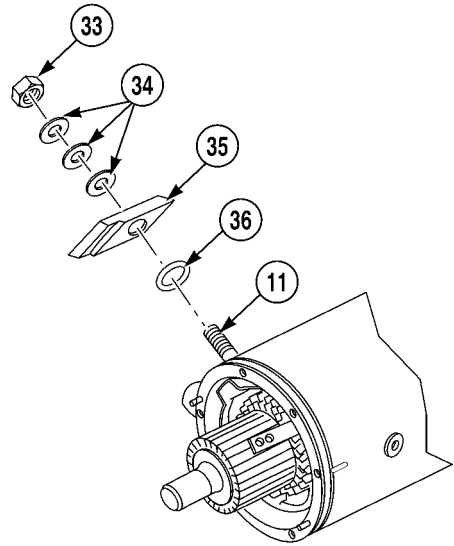
When properly installed, bushing should be on stud as far as it will go and preformed packing should be flush with housing.

- (10) Install preformed packing (36) on field coil stud (11).

NOTE

Curved side of insulator faces field ring; notched end faces brush openings.

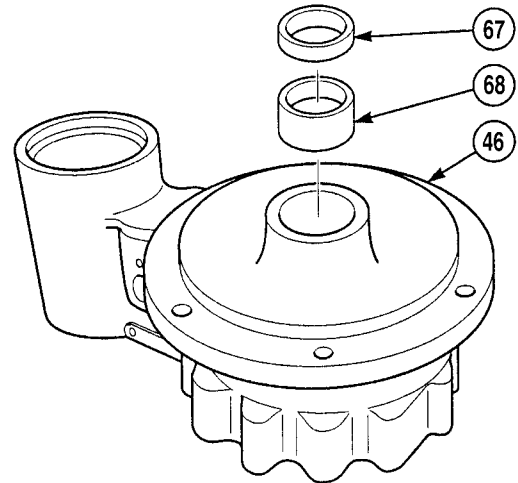
- (11) Install insulator (35), three washers (34) and nut (33) on field coil stud (11). Tighten nut to 18 to 22 lb-ft (24 to 34 N·m).



NOTE

Perform Step (12) if bushing was removed.

- (12) Install bushing (68) in shift housing (46).
- (13) Install oil seal (67) in shift housing (46).



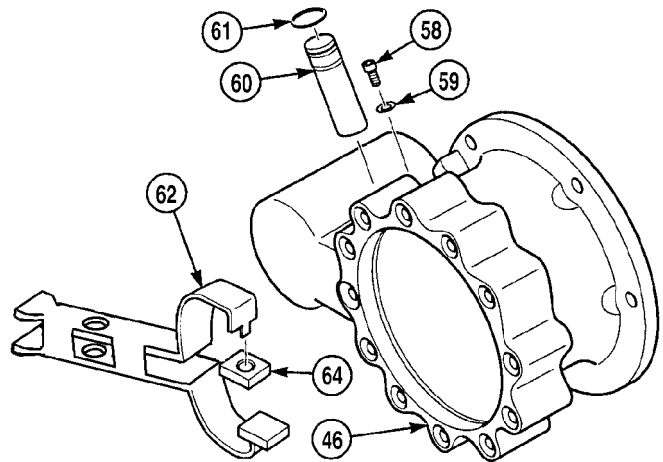
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

Install shift lever as noted during removal to ensure proper operation.

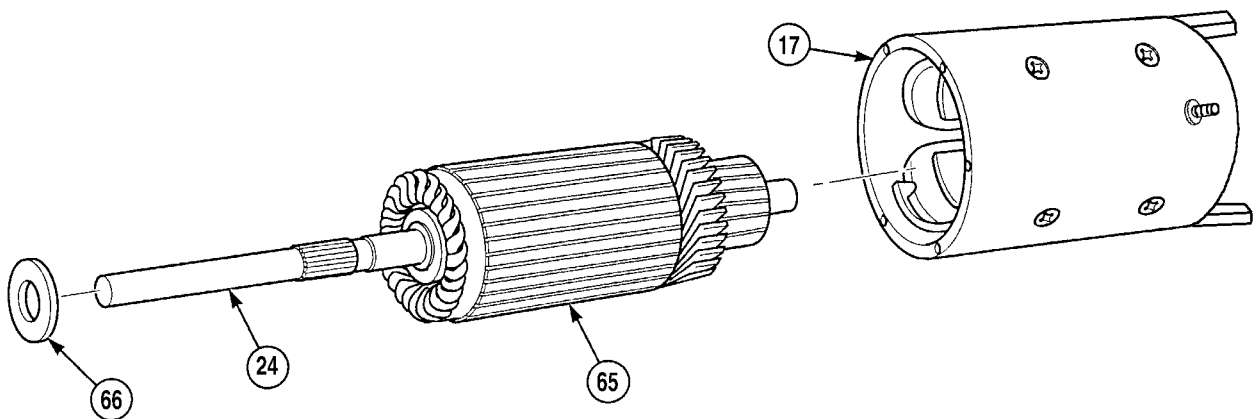
- (14) Coat threads of screw (58) with sealing compound.
- (15) Install shift lever (62) in shift housing (46) with preformed packing (61), shaft (60), washer (59) and screw (58).



NOTE

When properly installed, cams will be positioned in grooves on shift lever.

- (16) Install two cams (64) on shift lever (62).
- (17) Lightly coat cams (64) with grease.



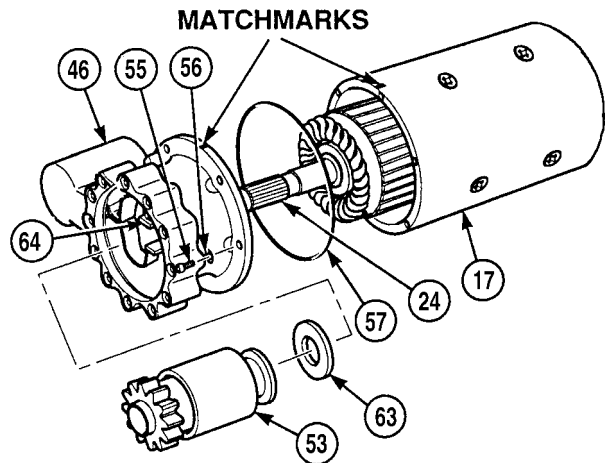
- (18) Coat splines of armature shaft (24) with light film of lubricating oil.
- (19) Install armature (65) in field ring (17).
- (20) Install thrust washer (66) on armature shaft (24).

6-4. STARTER REPAIR (CONT).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (21) Coat threads of five screws (55) with sealing compound.
- (22) Align matchmarks and install preformed packing (57) and shift housing (46) on field ring (17) with five lockwashers (56) and screws (55).
- (23) Slide armature shaft (24) into shift housing (46) until 0.5 in. (12.7 mm) of shaft sticks through base of shift housing (46).
- (24) Install brake washer (63) on armature shaft (24).



NOTE

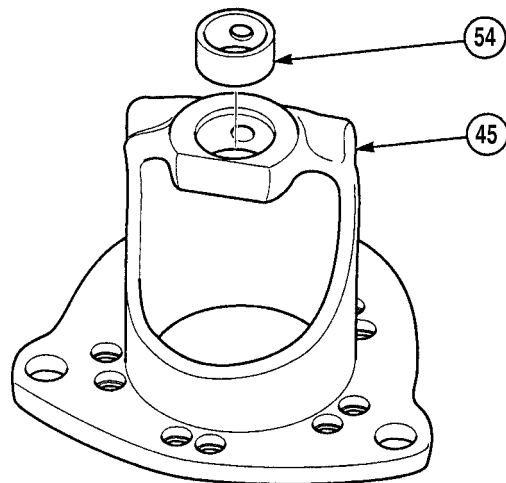
Shaft may have to be rotated to align splines.

- (25) Gently pull cams (64) away from armature shaft (24), position drive assembly (53) on armature shaft, and allow cams (64) to position in groove of drive assembly (53).
- (26) Slide armature shaft (24) through drive assembly (53).

NOTE

- Perform Step (27) if bushing was removed.
- Hole in bushing is off-center. Narrow edge goes in first.
- Hole in bushing must be aligned with wick bore in nose housing.

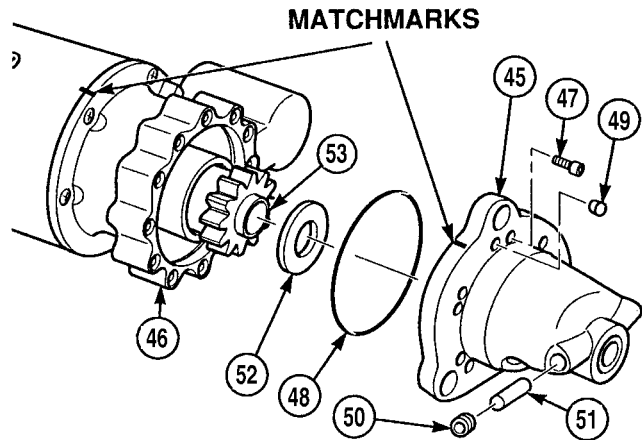
- (27) Install bushing (54) in nose housing (45).



- (28) Install thrust washer (52) on drive assembly (53).
- (29) Install six rubber plugs (49) in nose housing (45).
- (30) Soak wick (51) in lubricating oil.
- (31) Install wick (51) and plug (50) in nose housing (45).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

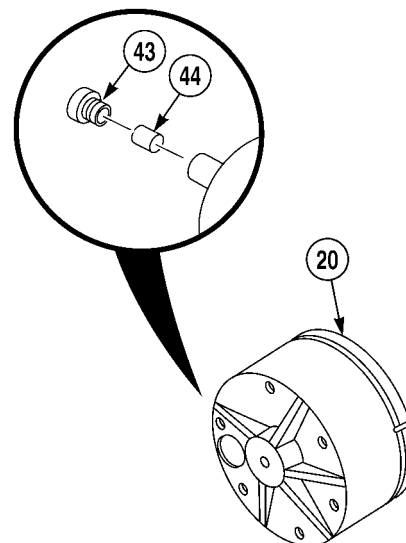


- (32) Coat threads of six screws (47) with sealing compound.
- (33) Align matchmarks and install preformed packing (48) and nose housing (45) on shift housing (46) with six screws (47).

NOTE

Hole in bushing must be aligned with wick bore in commutator end housing.

- (34) Soak wick (44) in lubricating oil.
- (35) Install wick (44) and plug (43) in commutator end housing (20).



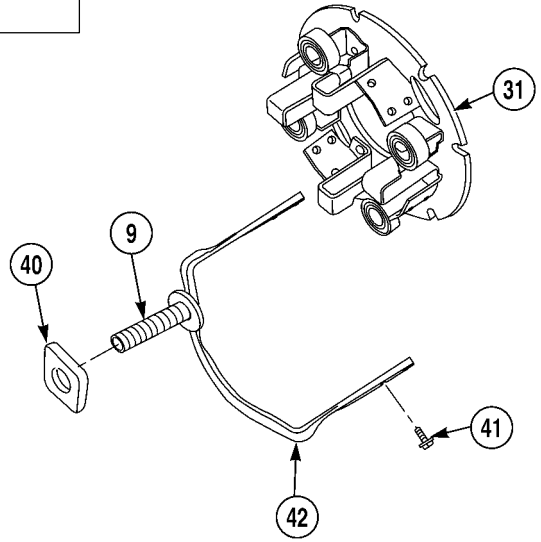
6-4. STARTER REPAIR (CONT).

- (36) Install ground jumper (42) on brush plate (31) with four screws (41).

NOTE

Indented side of insulator goes over ground stud.

- (37) Position insulator (40) on ground stud (9).



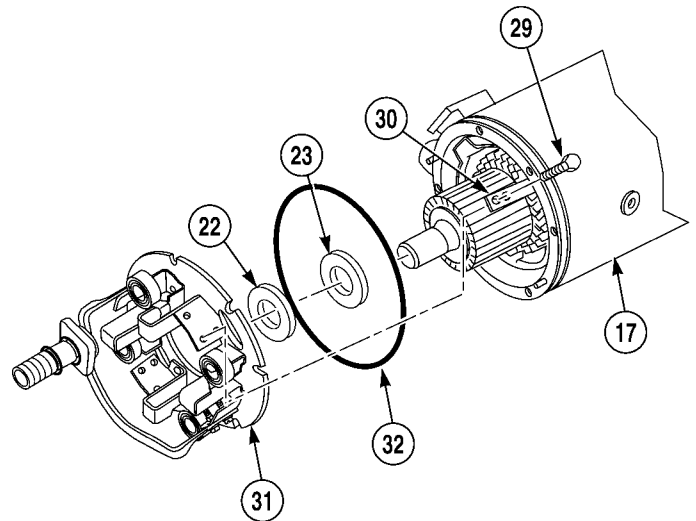
- (38) Apply lubricating oil to preformed packing (32).

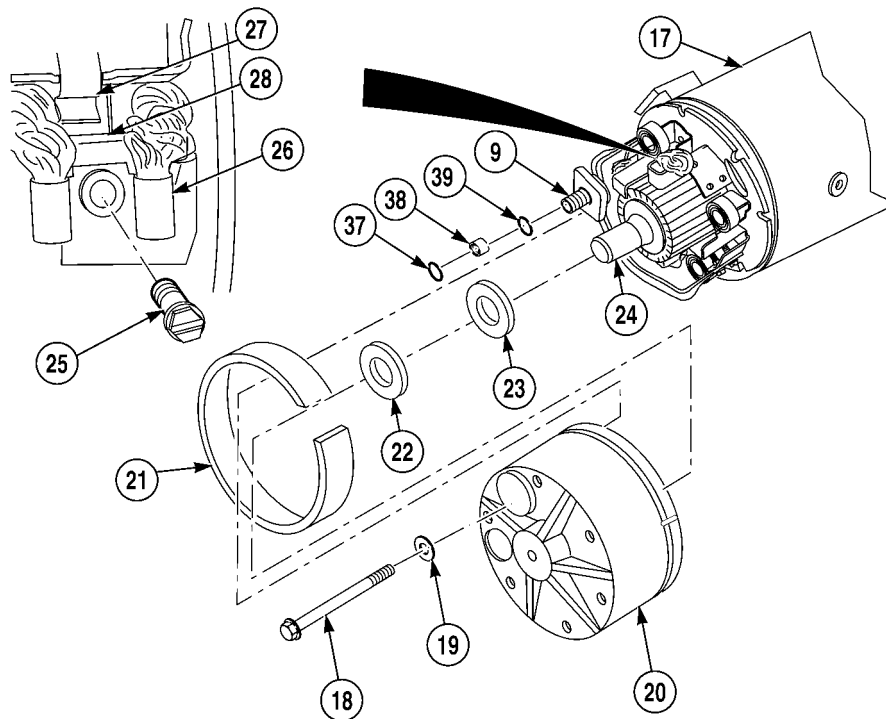
- (39) Install preformed packing (32) on field ring (17).

NOTE

- Prior to installing new brush plate assembly, remove brushes from brush plate assembly.
- Pins in field ring must align with holes in brush plate.

- (40) Install brush plate (31) onto field coil (30) using four screws (29).





- (41) Pull four springs (27) upward and install brushes (26) in brush holders (28).
- (42) Install four brushes (26) on brush holders (28) with screws (25).

NOTE

Brush wires may have to be flattened to install insulator.

- (43) Install washer (23) and fiber washer (22) onto armature shaft (24).
- (44) Install insulator (21) over brushes (24).

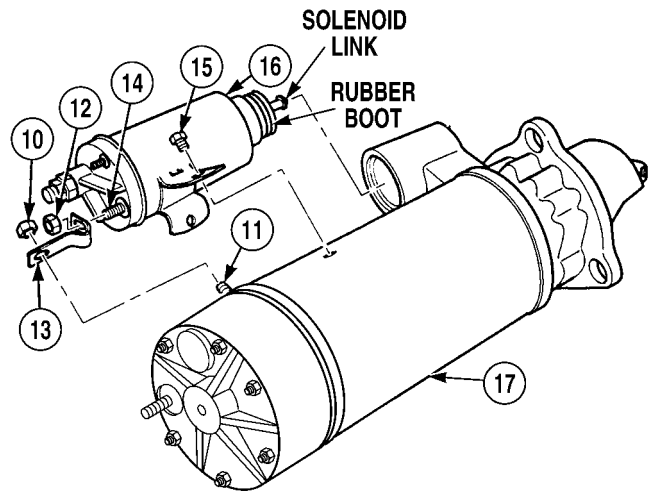
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (45) Coat threads of six screws (18) with sealing compound.
- (46) Install commutator end housing (20) on field ring (17) with six seal washers (19) and screws (18). Tighten screws to 62 to 66 lb-in (7 to 8 N·m).
- (47) Install preformed packing (39), spacer (38), and preformed packing (37) on ground stud (10).

NOTE

- Model MD and ME solenoids are installed the same way.
- Solenoid link spool must engage into shift lever.
- To aid in solenoid installation, starter drive should be positioned all the way out of armature. Solenoid should be installed with mounting legs facing away from field ring, then rotated into mounting position.
- To aid in installation, rubber boot may have to be manually inserted into housing to allow alignment of mounting screws.



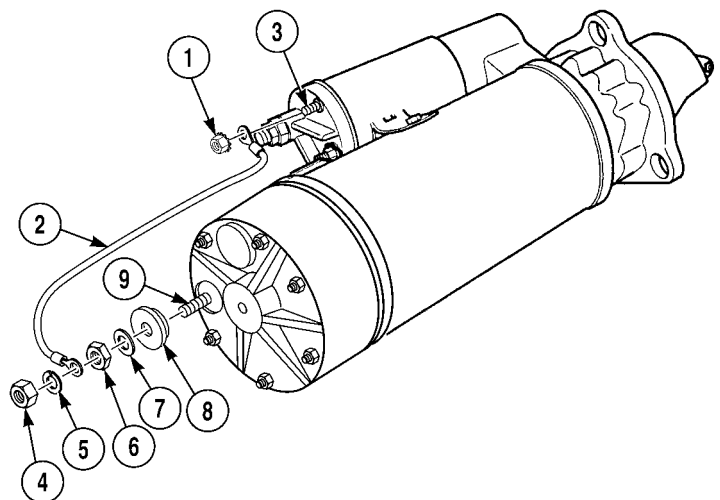
- (48) Install solenoid (16) on field ring (17) with two screws (15).

CAUTION

Hold bottom nut while installing top nut, or damage to equipment may result.

- (49) Install jumper strap (13) on terminal No. 3 (14) and field coil stud (11) with nuts (12) and (10).

- (50) Install insulator (8), washer (7) and nut (6) on ground stud (9). Tighten nut to 23 to 27 lb-ft (31 to 37 N·m).
- (51) Install ground wire (2) on ground stud (9) with lockwasher (5) and nut (4).
- (52) Install ground wire (2) on terminal No. 4 (3) with tenz nut (1).

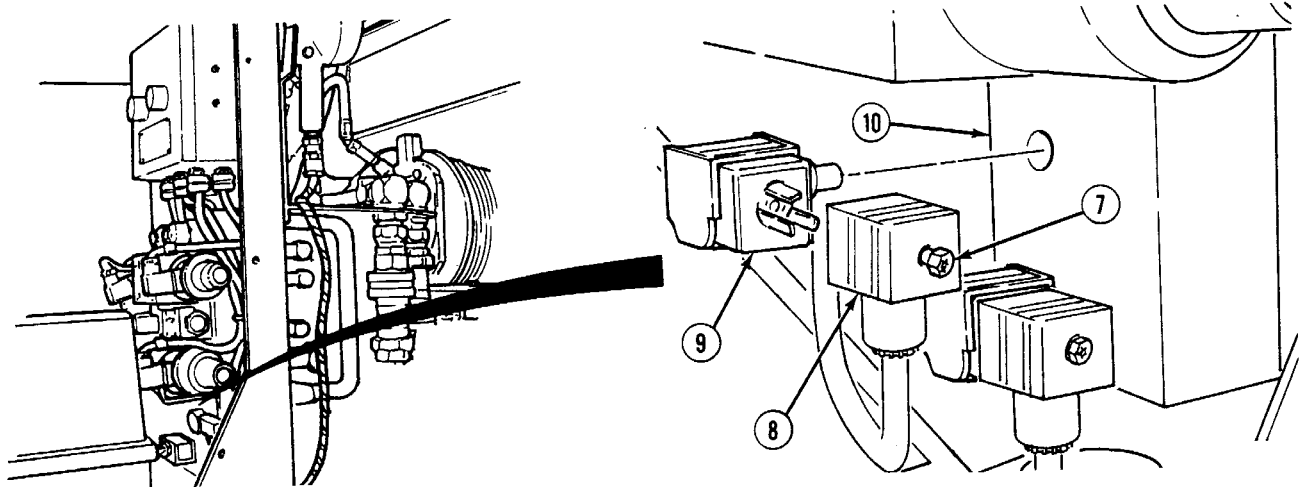
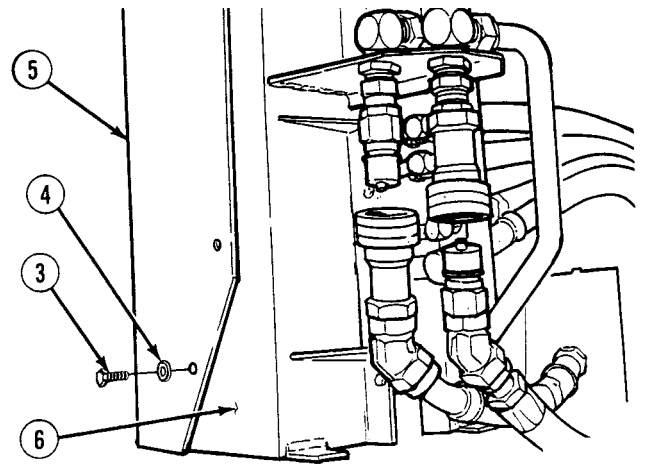


END OF TASK

NOTE

Only remove center screw on engine side of LHS control box cover.

- (2) Remove four screws (3), lockwashers (4) and LHS main junction box cover (5) from LHS main junction box (6). Discard lockwashers.



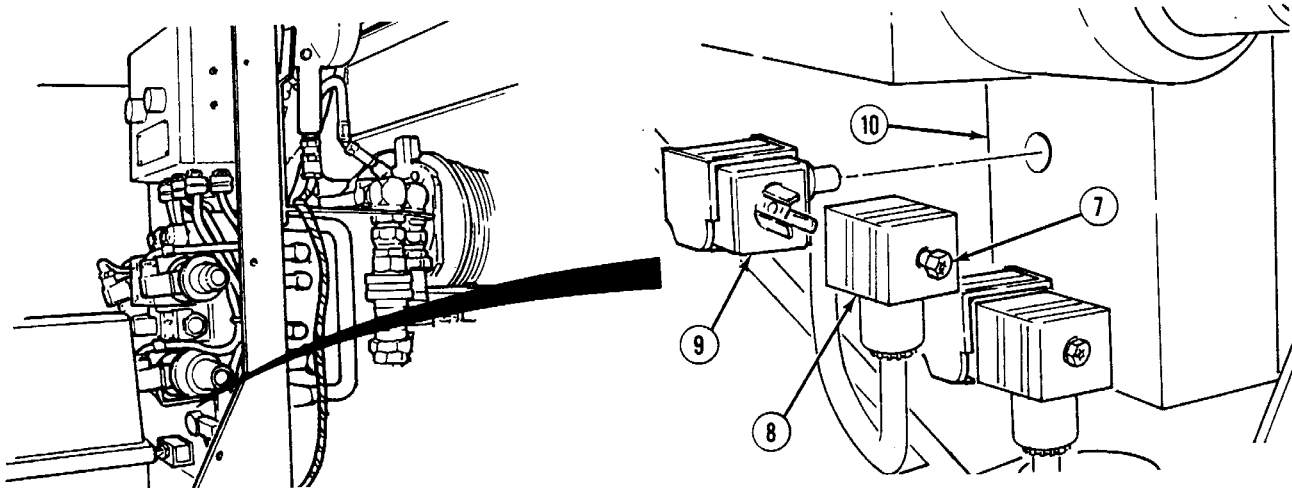
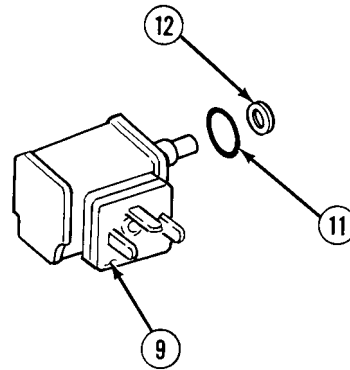
- (3) Loosen screw (7) and remove connector (8) from differential pressure switch (9).
- (4) Remove differential pressure switch (9) from manifold (10).

6-5. LHS DIFFERENTIAL PRESSURE SWITCH REPLACEMENT (CONT).

- (5) Remove preformed packings (11) and (12) from differential pressure switch (9). Discard preformed packings.

b. Installation.

- (1) Apply hydraulic oil to preformed packings (12) and (11).
- (2) Install preformed packings (12) and (11) on differential pressure switch (9).



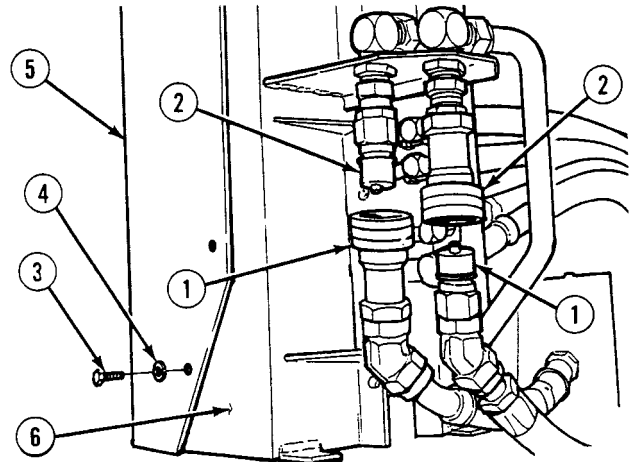
- (3) Install differential pressure switch (9) in manifold (10). Tighten switch to 20 lb-ft (27 N·m).
- (4) Position connector (8) on differential pressure switch (9) and tighten screw (7).

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.

- (5) Apply sealing compound to head of screw (7).

- (6) Connect two quick disconnects (1) on main control box quick disconnects (2).
- (7) Install LHS main junction box cover (5) on LHS main junction box (6) with four screws (3) and lockwashers (4).



c. Follow-On Maintenance:

- Start engine, (TM 9-2320-364-10).
- Operate LHS, (TM 9-2320-364-10).
- Shut OFF engine, (TM 9-2320-364-10).
- Check for oil leaks, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-6. CRANE JUNCTION BOX ASSEMBLY REPAIR.

This task covers:

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

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Drill Set, Twist (Item 48, Appendix F)
- Drill, Electric, Portable, 1/4 in. (Item 49, Appendix F)
- Gloves, Chemical Oil Protective (Item 81, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Rivet Gun (Item 196, Appendix F)

Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)

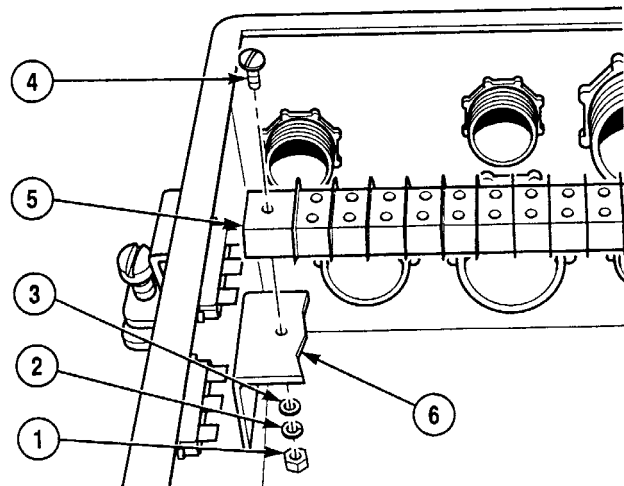
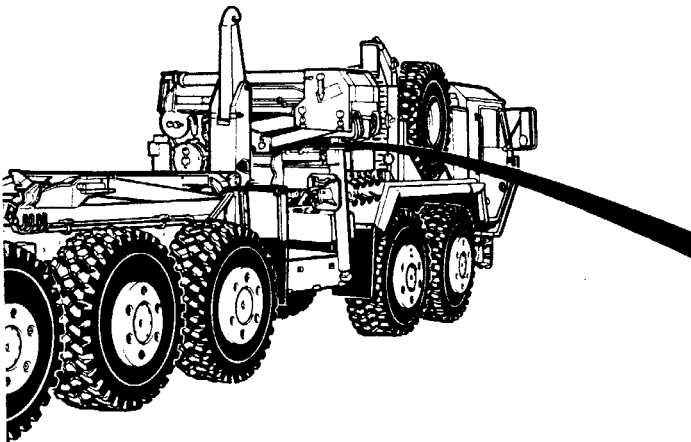
Materials/Parts - Continued

- Lockwasher (8) (Item 279, Appendix E)
- Lockwasher (4) (Item 282, Appendix E)

Equipment Condition

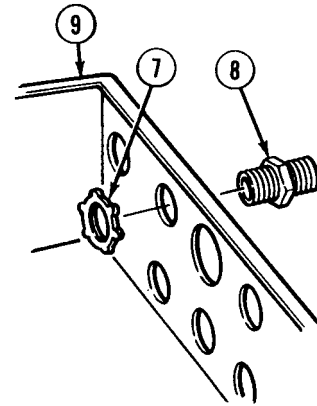
- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Batteries disconnected, (TM 9-2320-364-20)
- Crane junction box wiring removed, (Para 6-30)

a. Removal.

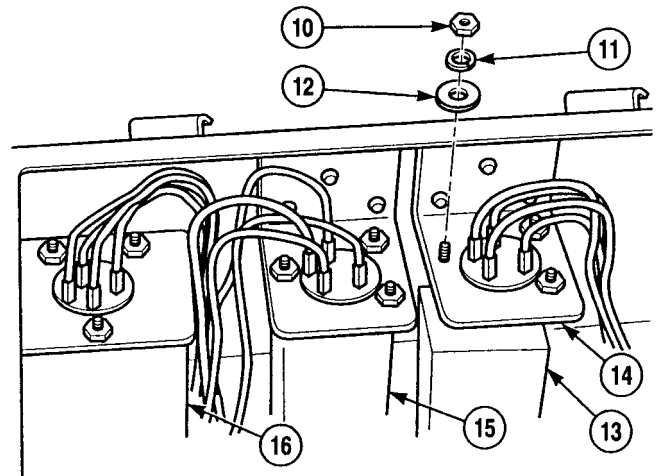


- (1) Remove two nuts (1), lockwashers (2), washers (3), screws (4) and terminal board (5) from bracket (6). Discard lockwashers.

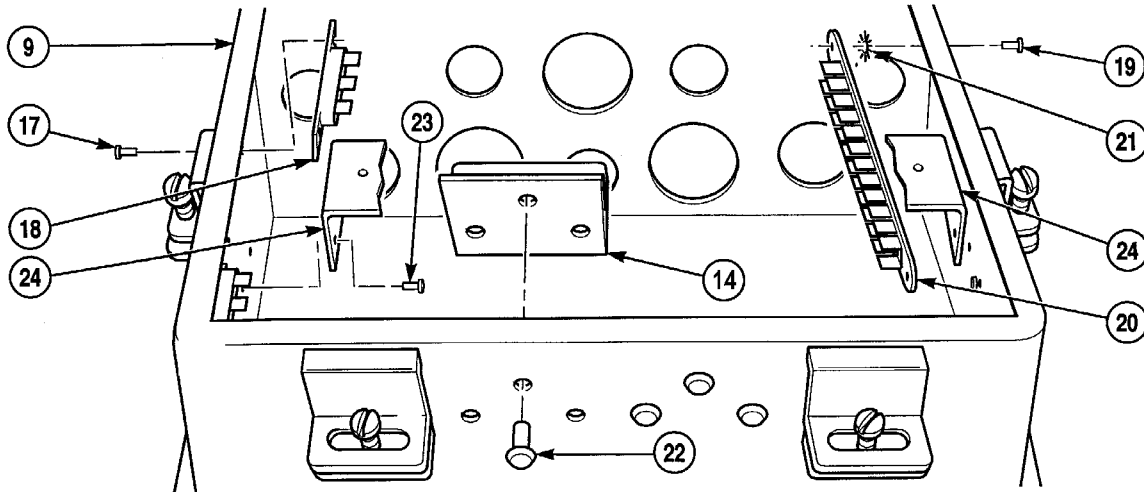
- (2) Remove nut (7) and connector (8) from crane junction box (9).
- (3) Repeat Step (2) for other 10 connectors (8).



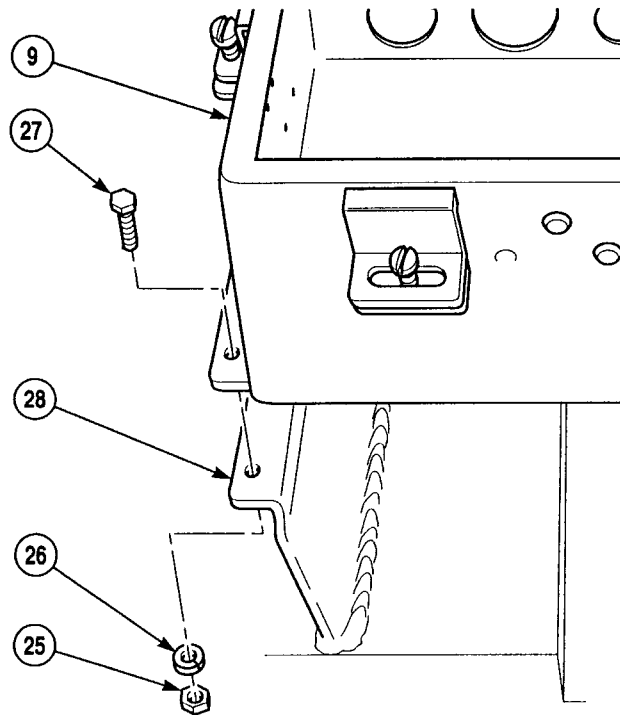
- (4) Remove three nuts (10), lockwashers (11), washers (12) and throttle relay (13) from bracket (14). Discard lockwashers.
- (5) Repeat Step (4) for control lockout relay (15) and system shutdown relay (16).



6-6. CRANE JUNCTION BOX ASSEMBLY REPAIR (CONT).



- (6) Remove four rivets (17) and two rectifiers (18) from crane junction box (9). Discard rivets.
- (7) Remove three rivets (19), ground strip (20) and lockwashers (21) from crane junction box (9). Discard lockwashers and rivets.
- (8) Remove nine rivets (22) and three brackets (14) from crane junction box (9). Discard rivets.
- (9) Remove four rivets (23) and bracket (24) from crane junction box (9). Discard rivets.
- (10) Remove four nuts (25), lockwashers (26), screws (27) and crane junction box (9) from subframe (28). Discard lockwashers.



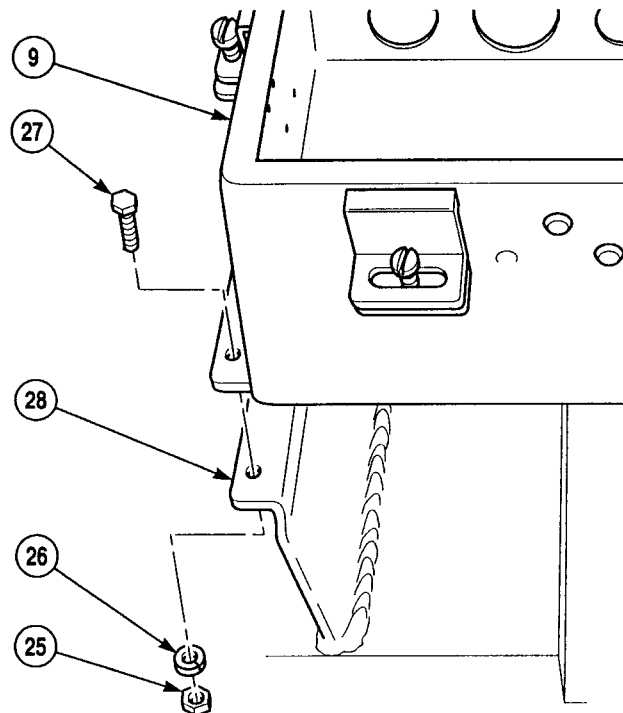
b. *Cleaning/Inspection.*

WARNING

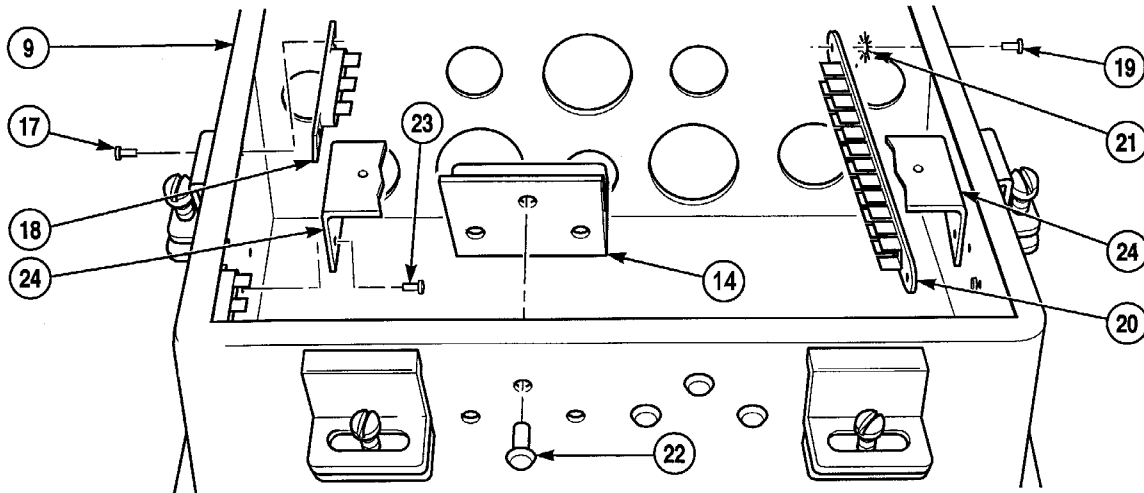
- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent. The flashpoint for Type II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- (1) Wash metal parts in drycleaning solvent.
 - (2) Inspect metal parts for cracks, dents, and broken welds. Replace damaged parts.
 - (3) Inspect diodes, relays, and terminal strips for cracks, broken terminals and stripped threads. Replace damaged parts.
 - (4) Check wires for loose or broken connections, or missing insulation. Replace damaged parts.

c. *Installation.*

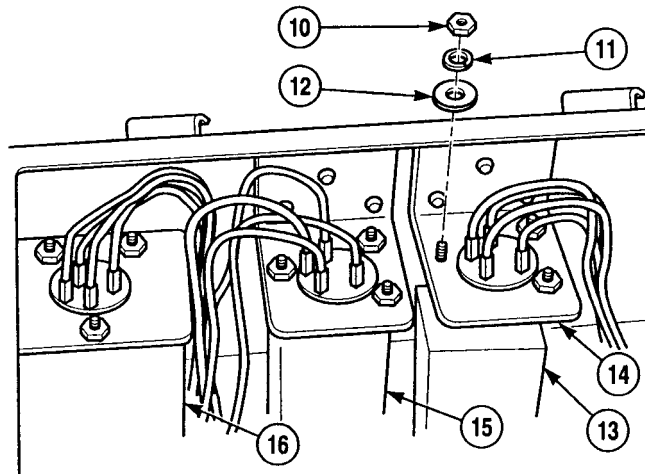
- (1) Install crane junction box (9) on subframe (28) with four screws (27), lockwashers (26) and nuts (25).



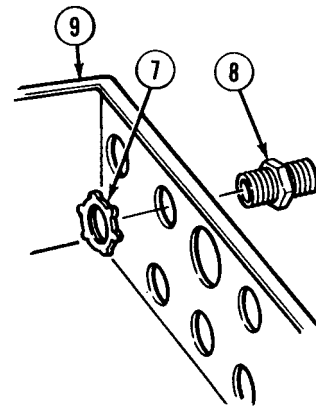
6-6. CRANE JUNCTION BOX ASSEMBLY REPAIR (CONT).



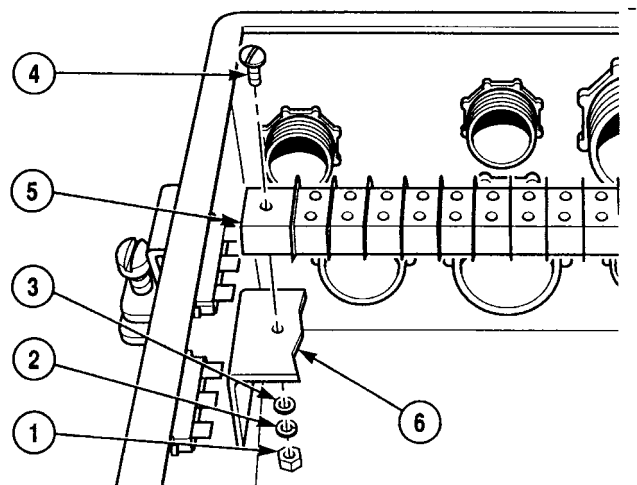
- (2) Install bracket (24) with four rivets (23) on crane junction box (9).
- (3) Install three brackets (14) with nine rivets (22) on crane junction box (9).
- (4) Install three lockwashers (21) and ground strip (20) with three rivets (19) on crane junction box (9).
- (5) Install two rectifiers (18) with four rivets (17) on crane junction box (9).
- (6) Install throttle relay (13) on bracket (14) with three washers (12), lockwashers (11) and nuts (10).
- (7) Repeat Step (6) for control lockout relay (15) and system shutdown relay (16).



- (8) Install connector (8) in crane junction box (9) with nut (7).
- (9) Repeat Step (8) for other 10 connectors (8).



- (10) Install terminal board (5) on bracket (6) with two screws (4), washers (3), lockwashers (2) and nuts (1).

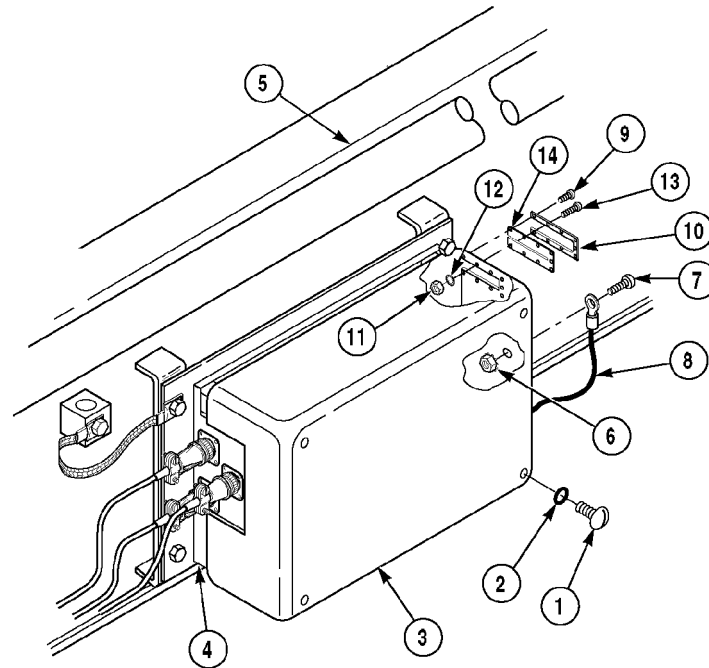


d. Follow-on Maintenance:

- Connect crane junction box wiring, (Para 6-30).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

b. *Installation.*



- (1) Position wire gate (14) and wire gate clamp (10) on cover (3), and install seven screws (13), star washers (12), and nuts (11).
- (2) Install two screws (9), on wire gate clamp (10).

WARNING

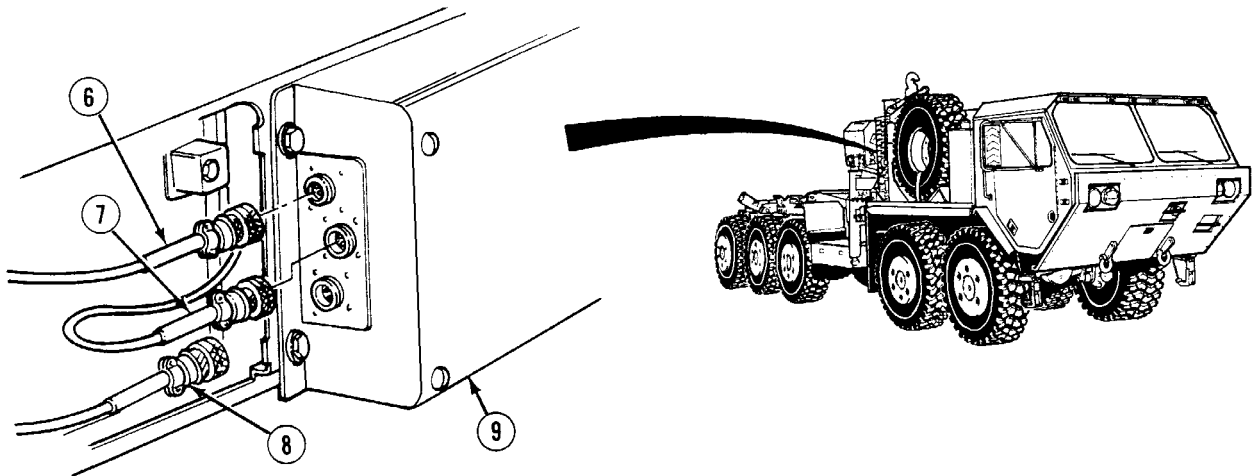
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

NOTE

Apply adhesive to the upper and side edges of cover. Do not apply adhesive on edge of cover.

- (3) Apply a bead of adhesive to edges of cover (3).
 - (4) Position cover (3) on boom (5).
 - (5) Install ground wire (8) on cover (3) using screw (7) and locknut (6).
 - (6) Install cover (3) on crane overload control (4), using four screws (1), and preformed packings (2).
- c. *Follow-on Maintenance:*
- Remove wheel chocks (TM 9-2320-364-10).

END OF TASK



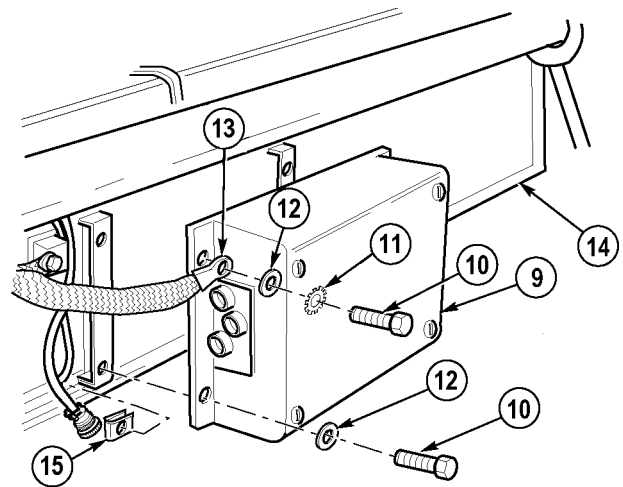
NOTE

Tag and mark all connectors before removal.

- (2) Remove connectors (6), (7) and (8) from overload control box (9).
- (3) Remove screw (10), lockwasher (11), washer (12) and ground strap (13) from boom (14). Discard lockwasher.
- (4) Remove three screws (10), washers (11), overload control box (9) and four spring clip nuts (15) from boom (14). Discard spring clip nuts.

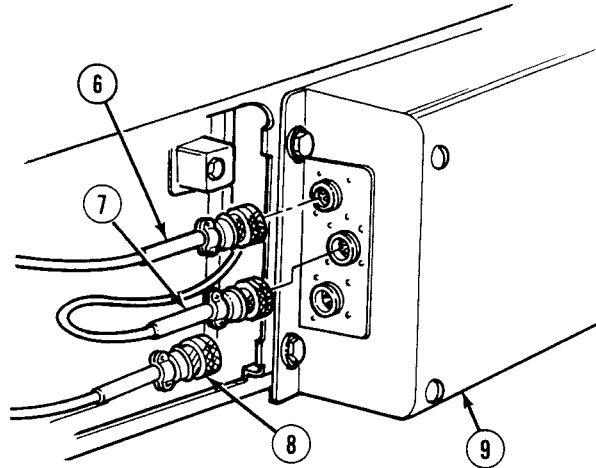
b. Installation.

- (1) Install four spring clip nuts (15), and overload control box (9) on boom (14) with three washers (12) and screws (10).
- (2) Install ground strap (13) on boom (14) and overload control box (9) with washer (12), lockwasher (11) and screw (10).

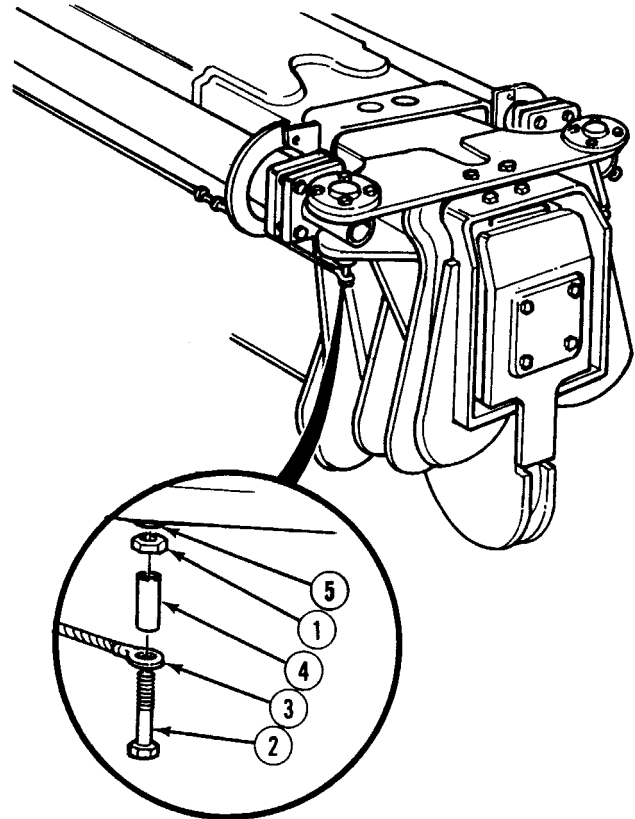


6-8. OVERLOAD SHUTDOWN SYSTEM REPLACEMENT (CONT).

- (3) Connect connectors (8), (7) and (6) on overload control box (9).



- (4) Position cable (3) on mast pin (5) with nut (1) spacer (4) and screw (2). Tighten nut against boom.



c. Follow-on Maintenance:

- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-9. HOIST PROXIMITY SENSOR REPLACEMENT/ADJUSTMENT.

This task covers:

- | | |
|-----------------|--------------------------|
| a. Removal | c. Adjustment |
| b. Installation | d. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Combination 1 7/16 in. (2)
(Item 259, Appendix F)

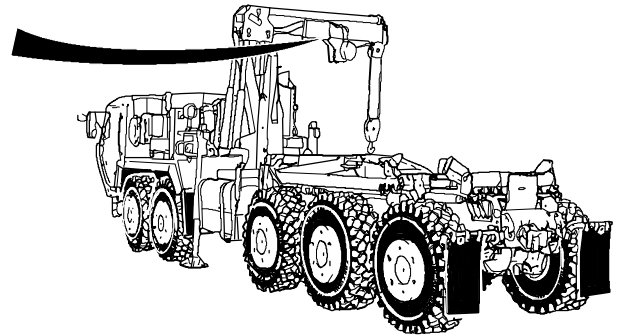
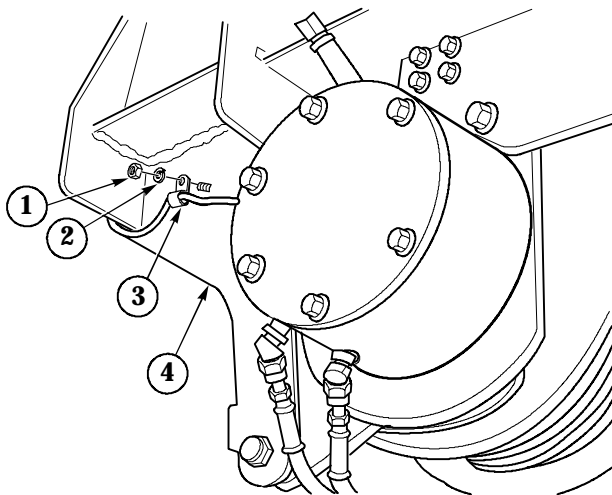
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Crane erected, (TM 9-2320-364-10)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Sealing Compound (Item 56, Appendix B)
Lockwasher (2) (Item 282, Appendix E)

a. Removal.



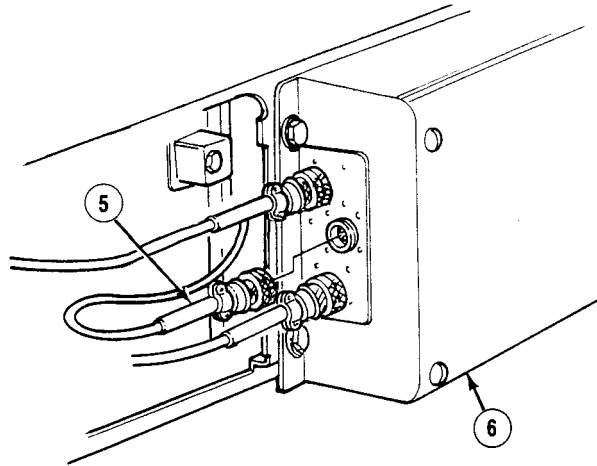
NOTE

Remove cable ties as required.

- (1) Remove nut (1), lockwasher (2) and cushion clip (3) from crane boom (4). Discard lockwasher.

6-9. HOIST PROXIMITY SENSOR REPLACEMENT/ADJUSTMENT (CONT).

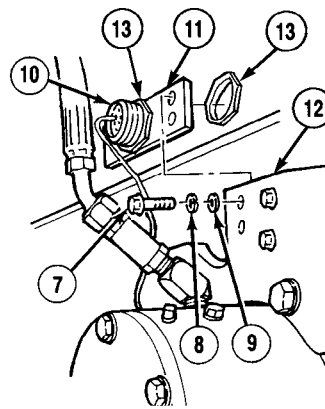
- (2) Disconnect overload harness connector (5) from overload box (6).



NOTE

Hoist proximity sensor cable is positioned in bottom of overload box.

- (3) Remove two screws (7), lockwashers (8), washers (9), hoist proximity sensor (10) and bracket (11) from cable guide bracket (12). Discard lockwashers.
- (4) Remove nut (13) and hoist proximity sensor (10) from bracket (11).



b. Installation.

NOTE

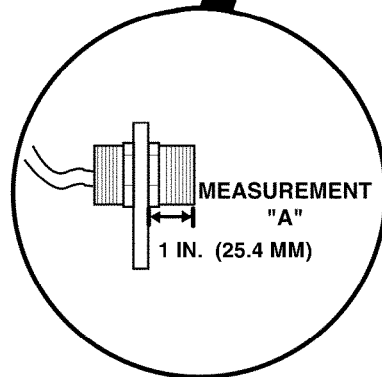
Install cable ties as required.

- (1) Position hoist proximity sensor (10) on bracket (11) with two nuts (13) until outer edge of hoist proximity sensor (10) is 1 in. (25.4 mm) from edge of bracket (11), Measurement "A".

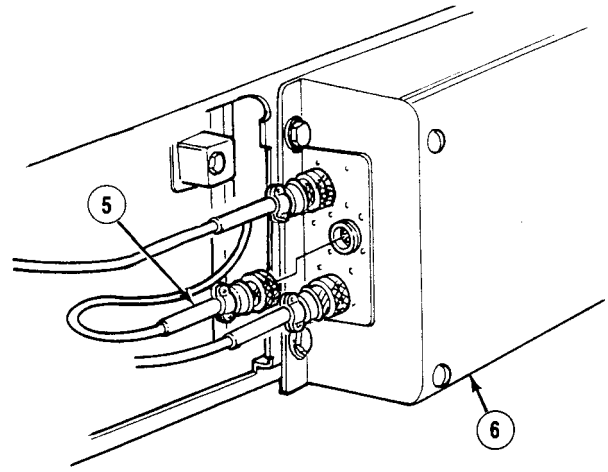
NOTE

Position hoist proximity sensor cable in bottom of overload box.

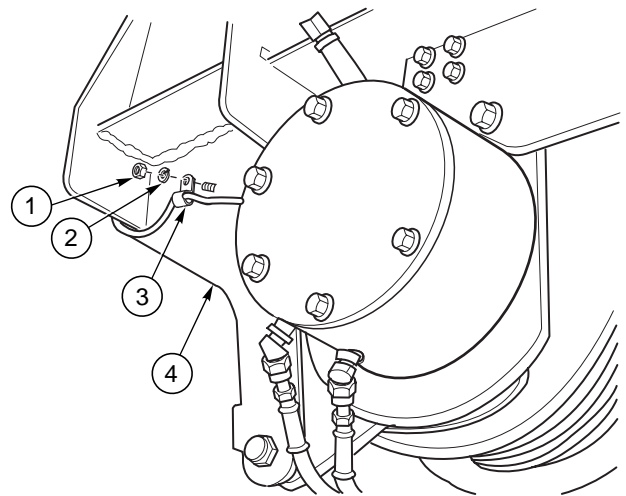
- (2) Install hoist proximity sensor (10) and bracket (11) on cable guide bracket (12) with two washers (9), lockwashers (8) and screws (7).



- (3) Connect overload harness connector (5) to overload box (6).

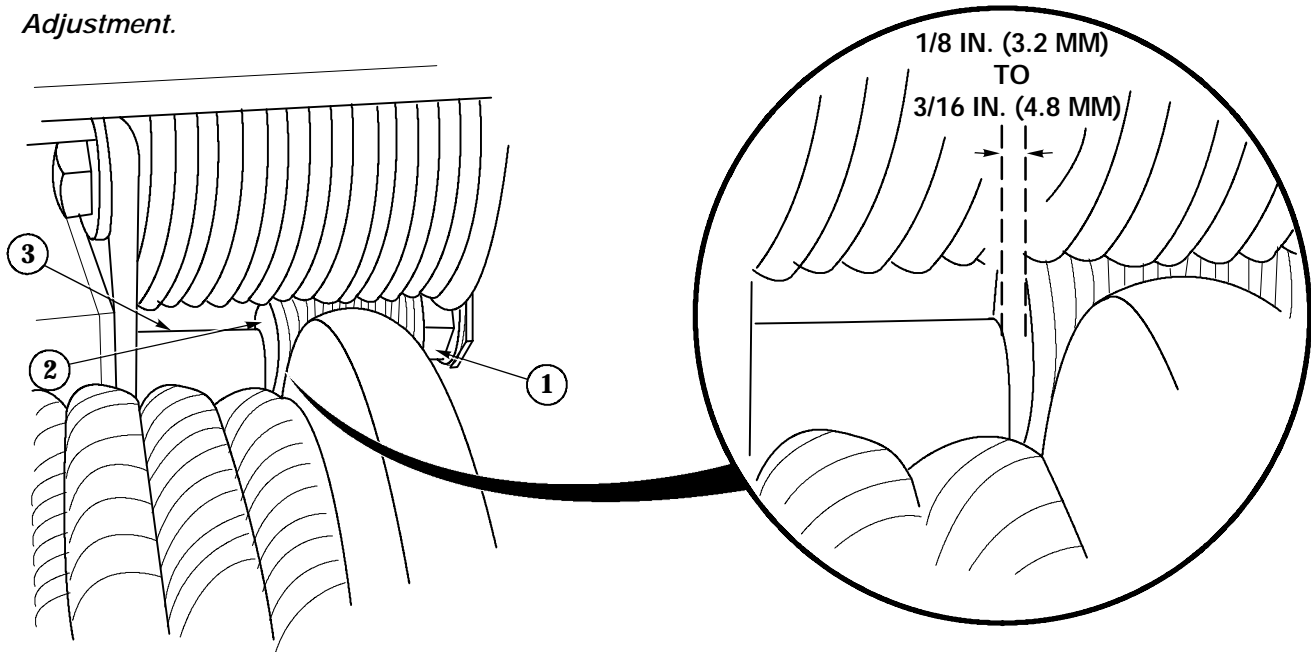


- (4) Install cushion clip (3) on crane boom (4) with lockwasher (2) and nut (1).



6-9. HOIST PROXIMITY SENSOR REPLACEMENT/ADJUSTMENT (CONT).

c. Adjustment.



- (1) Loosen nuts (1) and move hoist proximity sensor (2) in or out until sensor is 1/8 to 3/16 in. (3.2 to 4.8 mm) from edge of cable tensioner roller (3).
- (2) Remove two screws (4), lockwashers (5), washers (6), hoist proximity sensor (2) and bracket (7) from cable guide bracket (8).

CAUTION

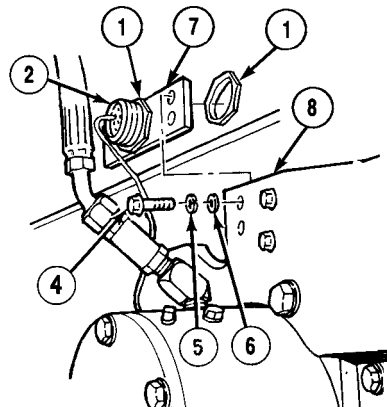
Do not overtighten nuts or damage to equipment will result. Tighten nuts just enough to lock sensor in place.

- (3) Tighten nuts (1) on hoist proximity sensor (2).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (4) Coat threads of two screws (4) with sealing compound.
- (5) Install hoist proximity sensor (2) and bracket (7) on cable guide bracket (8) with two washers (6), lockwashers (5) and screws (4).



NOTE

Repeat Steps (1) through (5) if adjustment is incorrect.

(6) Recheck adjustment and adjust again if necessary.

d. Follow-On Maintenance:

- Stow crane, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-10. DDEC II TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT.

This task covers:

- | | |
|-----------------|--------------------------|
| a. Removal | c. Adjustment |
| b. Installation | d. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Holder, Stator Roller (Item 95, Appendix F)
- Indicator, Dial, Timing Tool (Item 99, Appendix F)
- Tool, Timing, SRS/TRS (Item 246, Appendix F)
- Wrench Set, Socket 3/8 in. Drive (Item 273, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0-60 N·m) (Item 276, Appendix F)

Personnel Required

Two

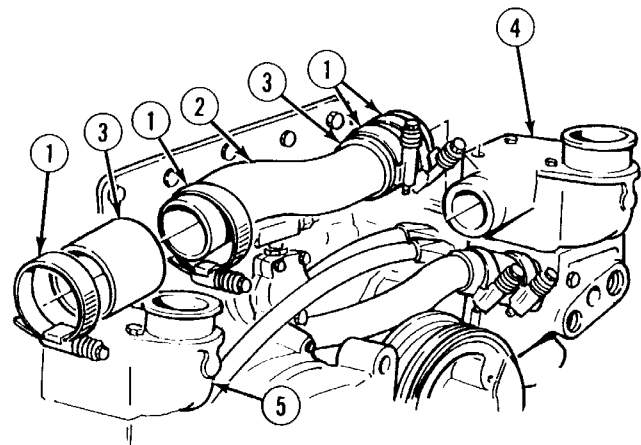
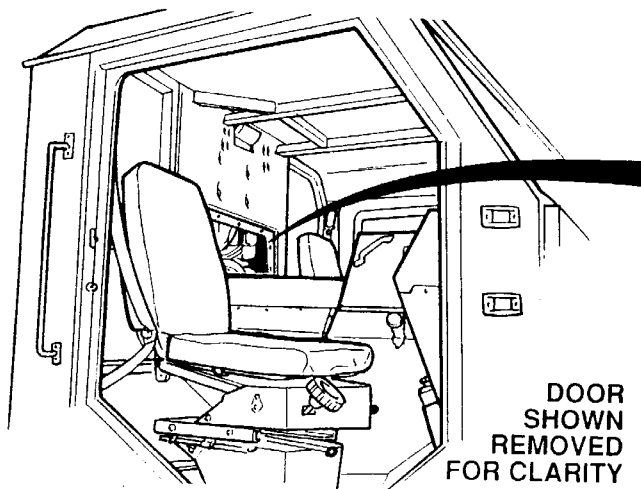
Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Cooling assembly removed, (TM 9-2320-364-20)
- ECM removed, (TM 9-2320-364-20)
- No. 1 right fuel injector removed, (Para 4-2)

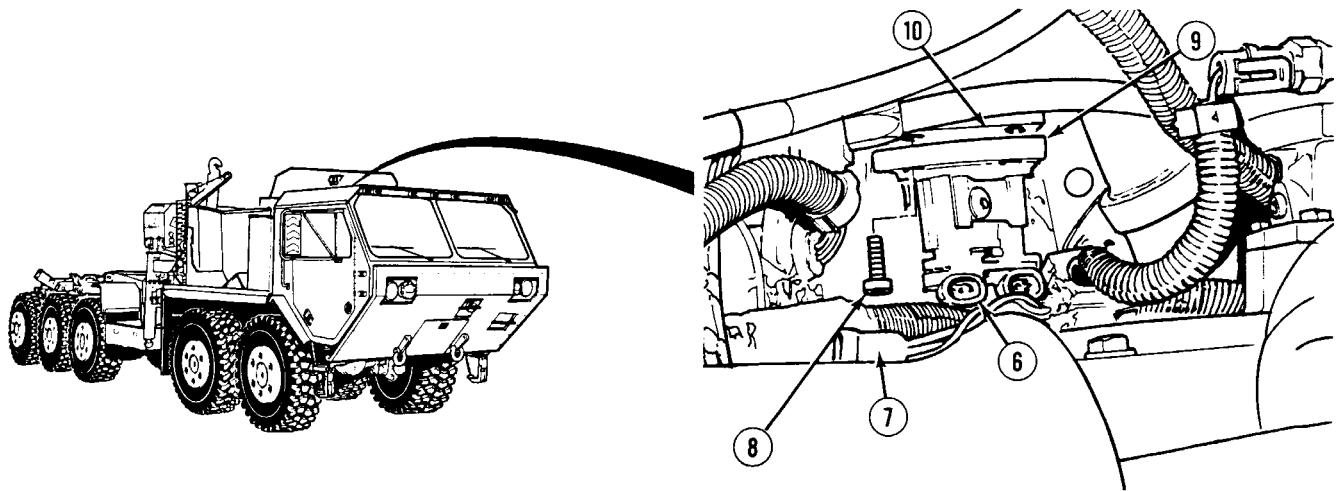
Materials/Parts

- Tags, Identification (Item 72, Appendix B)

a. Removal.



- (1) Loosen four clamps (1) on thermostat housing crossover tube (2) and remove two hoses (3) and crossover tube from thermostat housings (4) and (5).



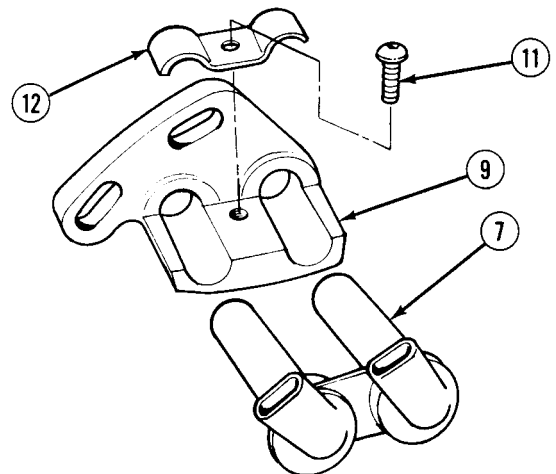
NOTE

Tag and mark connectors before removal.

- (2) Disconnect two connectors (6) from Synchronous Reference Sensor and Timing Reference Sensor (SRS/TRS) (7).
- (3) Remove two screws (8) and bracket (9) from front end plate (10).
- (4) Remove screw (11) and retaining clip (12) from bracket (9).
- (5) Remove SRS/TRS (7) from bracket (9).

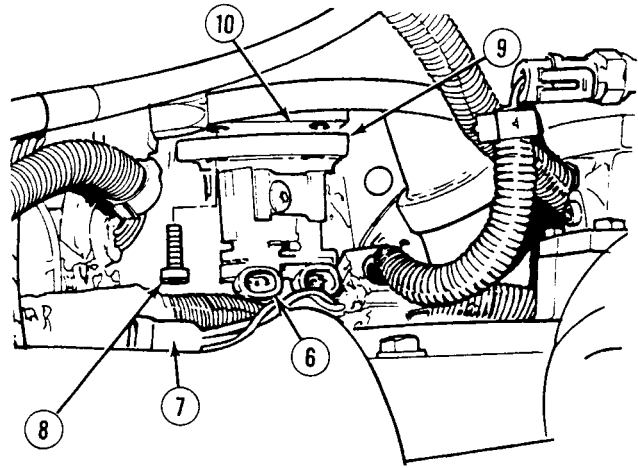
b. Installation.

- (1) Install SRS/TRS (7) in bracket (9).
- (2) Position retaining clip (12) on SRS/TRS (7) and bracket (9).
- (3) Position screw (11) in retaining clip (12) and bracket (9).



6-10. DDEC II TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT(CONT).

- (4) Position bracket (9) on front end plate (10) with two screws (8).
- (5) Connect two connectors (6) to SRS/TRS (7).

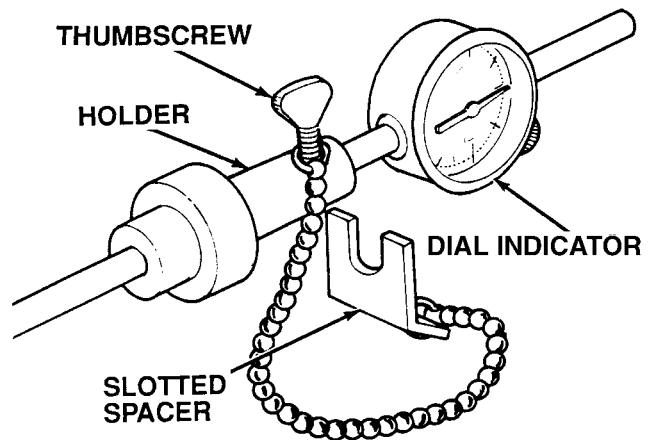


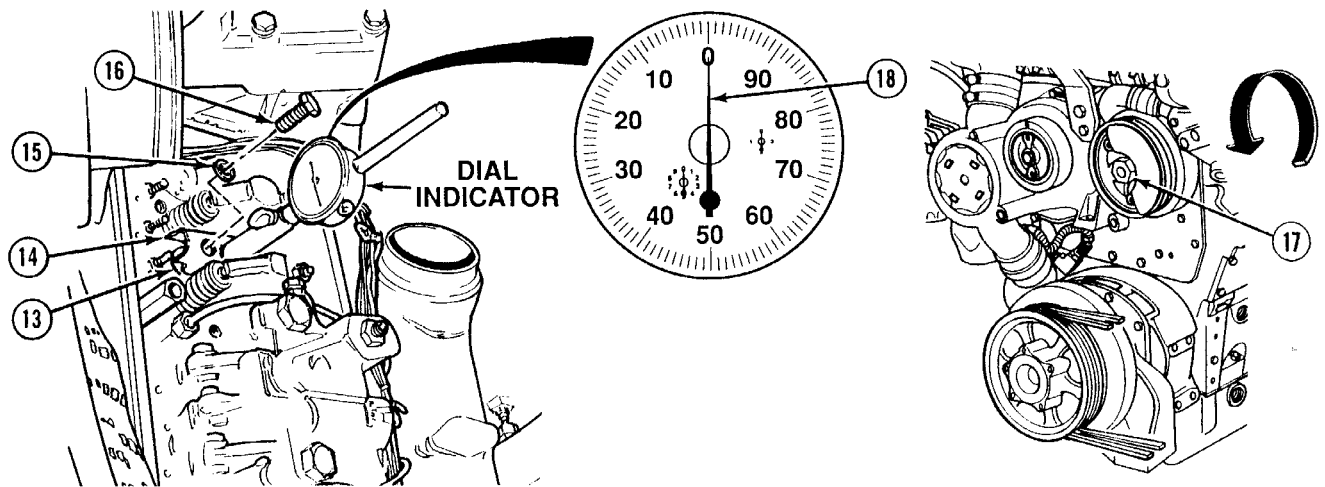
c. Adjustment.

CAUTION

Ensure spacer is installed between dial indicator and top of holder. Failure to comply may result in damage to dial indicator if piston is already at top of travel when dial indicator is installed.

- (1) Install slotted spacer between dial indicator and top of holder. Tighten thumbscrew.





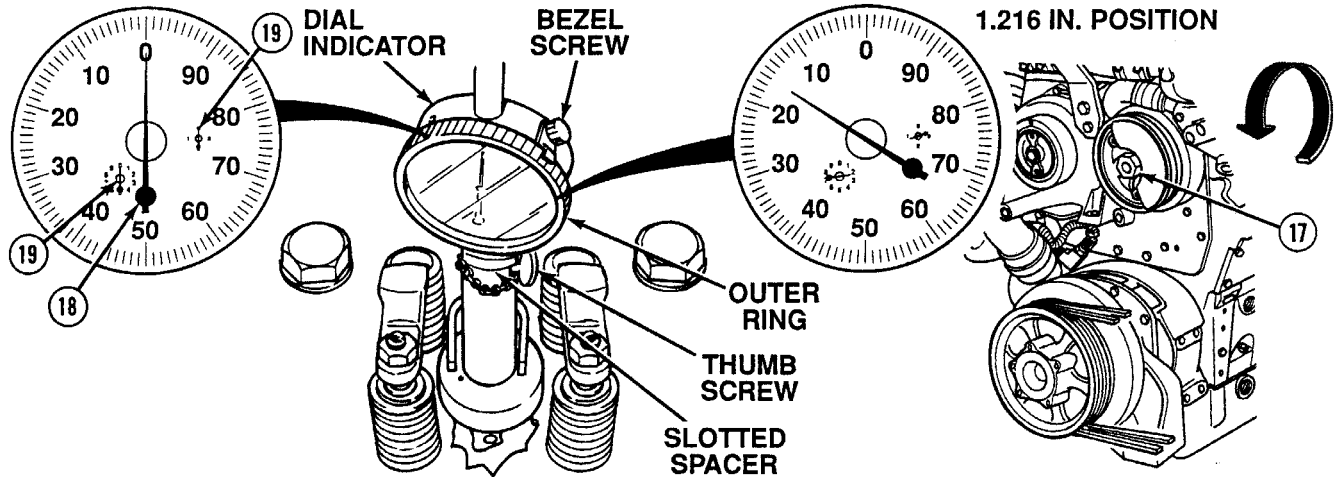
- (2) Position dial indicator in No. 1 right injector bore (13) and install clamp (14), washer (15) and screw (16) on injector. Tighten screw to 20 to 25 lb-ft (27 to 34 N·m).
- (3) With the aid of an assistant, turn left camshaft (17) slowly clockwise until large dial hand (18) starts moving.
- (4) Continue turning left camshaft (17) slowly clockwise until large dial hand (18) stops moving.

CAUTION

If camshaft pulley loosens during procedure, tighten to appropriate torque value. Failure to comply may result in loose camshaft pulley and possible engine damage may occur.

- (5) Turn left camshaft (17) slowly counterclockwise until large dial hand (18) barely starts to move. Piston is now at top-dead-center.

6-10. DDEC II TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT (CONT).



NOTE

Dial indicator must be zeroed before piston downward travel can be measured. Perform Steps (6) through (8) to measure downward travel.

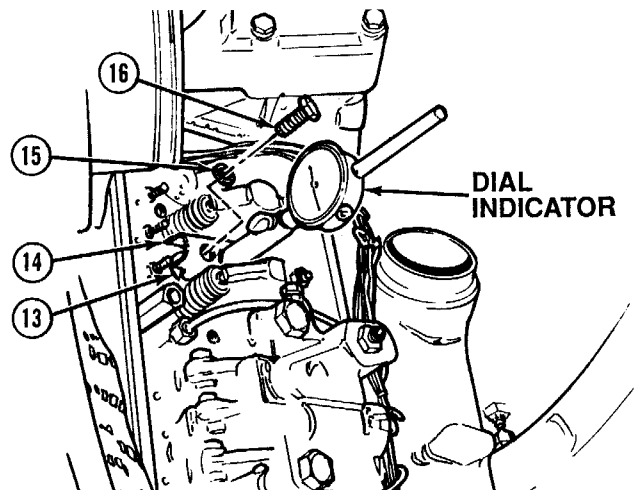
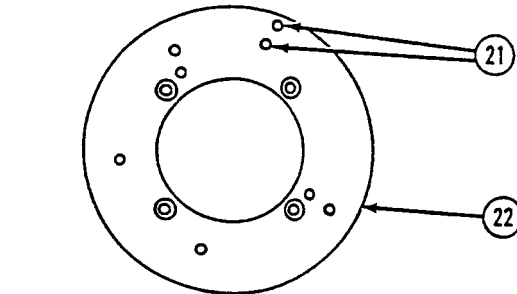
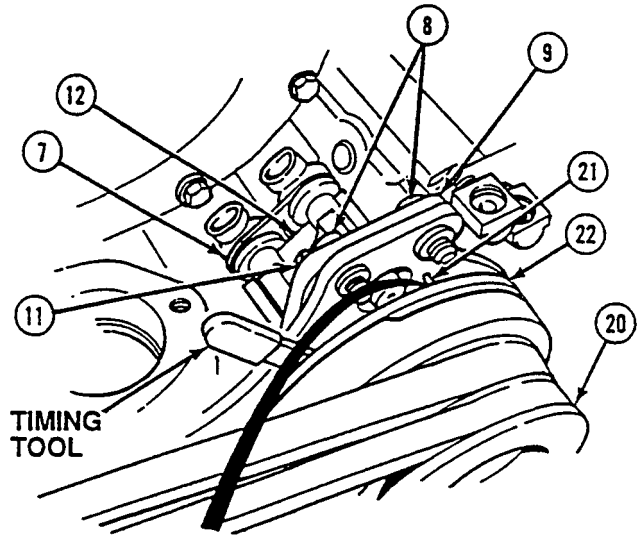
- (6) Loosen thumbscrew and remove slotted spacer.
- (7) Lower dial indicator until two small dial hands (19) are at zero and large dial hand (18) is near zero. Tighten thumbscrews.
- (8) Loosen screw and rotate outer ring of dial until zero lines up with large dial hand (18). Tighten screw.
- (9) Turn left camshaft (17) slowly counterclockwise until dial reads exactly 1.216 in. (30.89 mm).

- (10) Tap end of camshaft pulley (20) to take up end play.
- (11) Insert grooved end of timing tool between TRS/SRS (7) and double teeth (21) on pulse wheel (22).
- (12) Loosen two screws (8) in bracket (9).
- (13) Loosen screw (11) in retaining clip (12) and bracket (9).

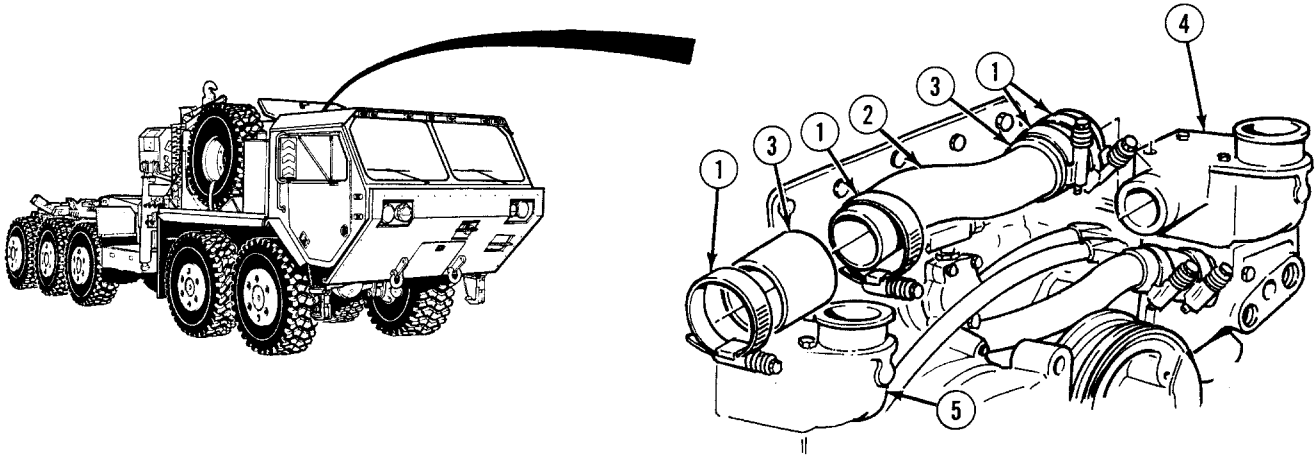
NOTE

Ensure timing tool surface is flush with double teeth and TRS/SRS.

- (14) Move bracket (9) to align end of TRS/SRS (7) with groove in timing tool.
- (15) Hold bracket (9) and tighten two socket head screws (8).
- (16) Tighten screw (11) while pushing TRS/SRS (7) toward pulse wheel (20).
- (17) Remove timing tool from pulse wheel (22).
- (18) Remove screw (16), washer (15), clamp (14) and dial indicator from No. 1 right injector bore (13).



6-10. DDEC II TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT(CONT).



(19) Install thermostat housing crossover tube (2), two hoses (3) and four clamps (1) between thermostat housings (4) and (5).

(20) Tighten four clamps (1) to 40 lb-ft (54 N·m).

d. Follow-On Maintenance:

- Install No. 1 right fuel injector, (Para 4-2).
- Install ECM, (TM 9-2320-364-20).
- Install cooling assembly, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-11. DDEC III/IV TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT.

This task covers:

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

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Hammer, Hand (Soft-faced)
(Item 88, Appendix F)
Indicator, Dial, Timing Tool,
(Item 99, Appendix F)
Socket, Sockethead Screw, 3/16 in.
(Item 210, Appendix F)
Tool, Timing SRS/TRS
(Item 246, Appendix F)
Wrench Set, Socket 3/4 in. Drive
(Item 274, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

Personnel Required

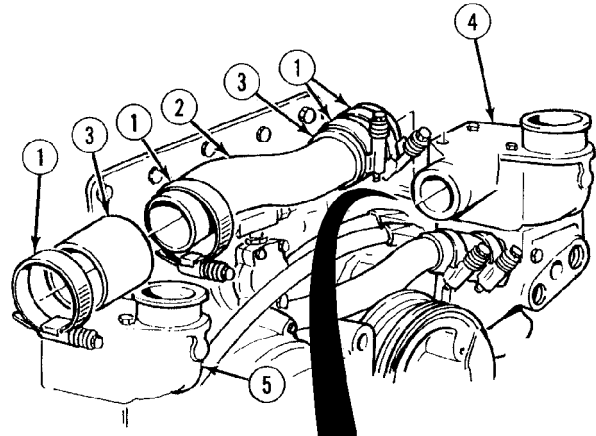
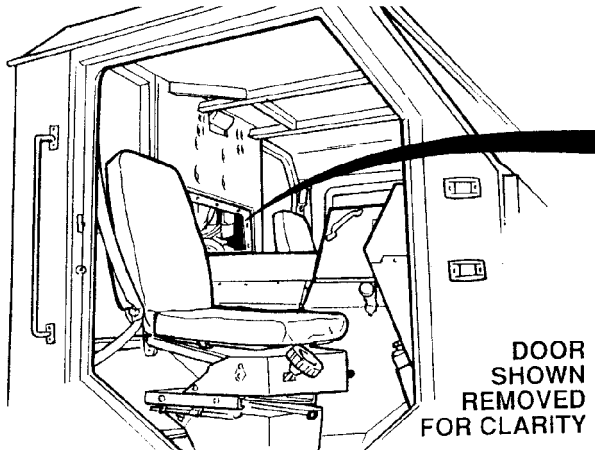
Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Cooling assembly removed,
(TM 9-2320-364-20)
ECM removed, (TM 9-2320-364-20)
No. 1 right fuel injector removed, (Para 4-2)

6-11. DDEC III/IV TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT(CONT).

a. Removal.

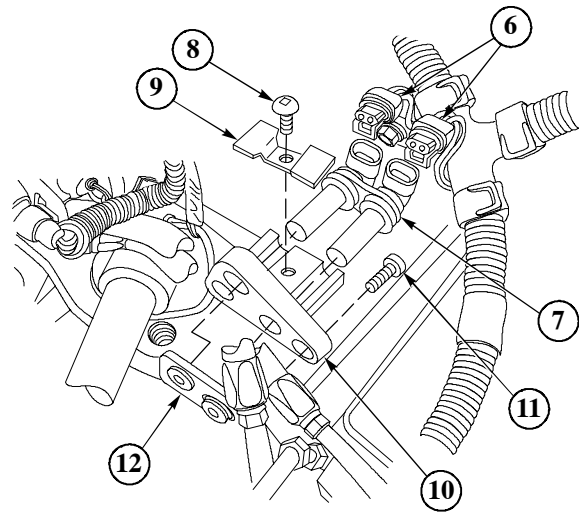


- (1) Loosen four clamps (1) on thermostat housing crossover tube (2) and remove two hoses (3) and crossover tube from thermostat housings (4) and (5).
- (2) Disconnect two connectors (6) from synchronous reference sensor and timing reference sensor (SRS/TRS) (7).
- (3) Remove screw (8) and retaining clip (9) from bracket (10).
- (4) Remove SRS/TRS (7) from bracket (10).

NOTE

Perform Step (5) only if mounting bracket is damaged.

- (5) Remove two sockethead screws (11) and bracket (10) from front end plate (12).

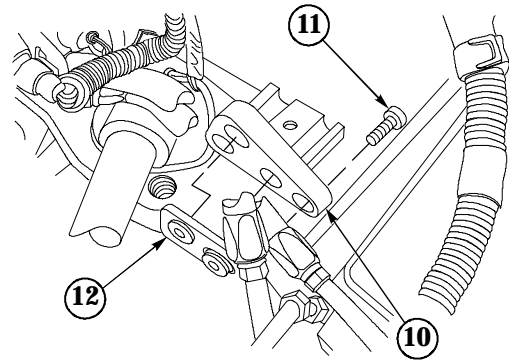


b. *Installation/Adjustment.*

NOTE

If mounting bracket was not removed, go to Step (16).

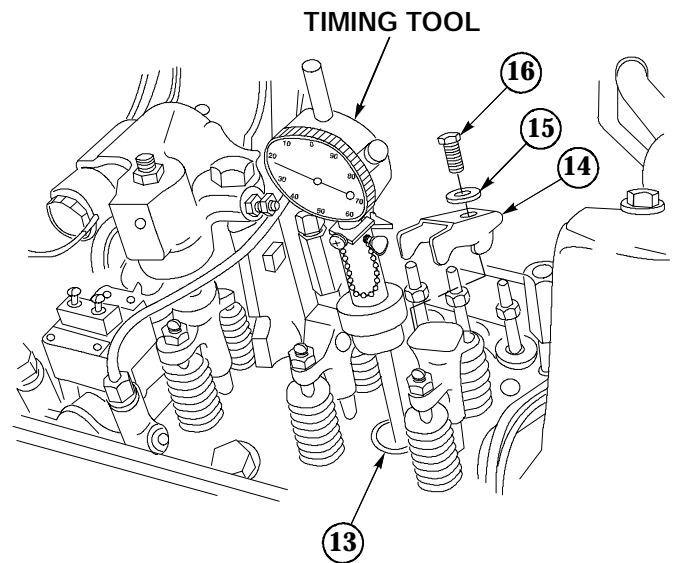
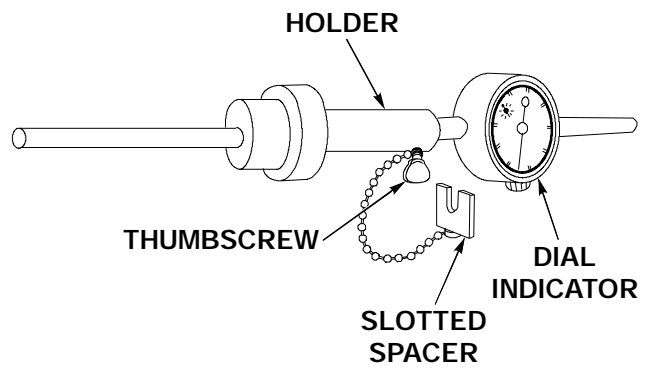
- (1) Install bracket (10) on front end plate (12) with two sockethead screws (11). Do not tighten.



CAUTION

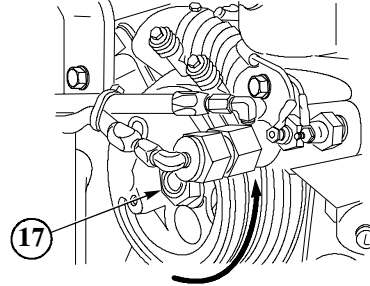
Ensure spacer is installed between dial indicator and top of holder. Failure to comply may result in damage to dial indicator if piston is already at top of travel when tool is installed.

- (2) Install slotted spacer between dial indicator and top of holder. Tighten thumbscrew.
- (3) Install timing tool in injector bore (13) with clamp (14), washer (15) and screw (16). Torque to 240-300 lb-in (27-34 N·m).



6-11. DDEC III/IV TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT(CONT).

- (4) Turn camshaft (17) slowly counterclockwise until large dial hand (18) starts moving.
- (5) Continue turning camshaft (17) slowly counterclockwise until large dial hand (18) stops moving.
- (6) Turn camshaft (17) slowly in opposite direction until large dial hand (18) barely starts to move. Piston is now at top-dead-center.



NOTE

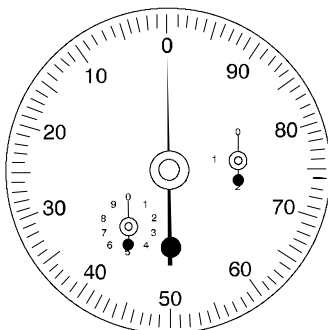
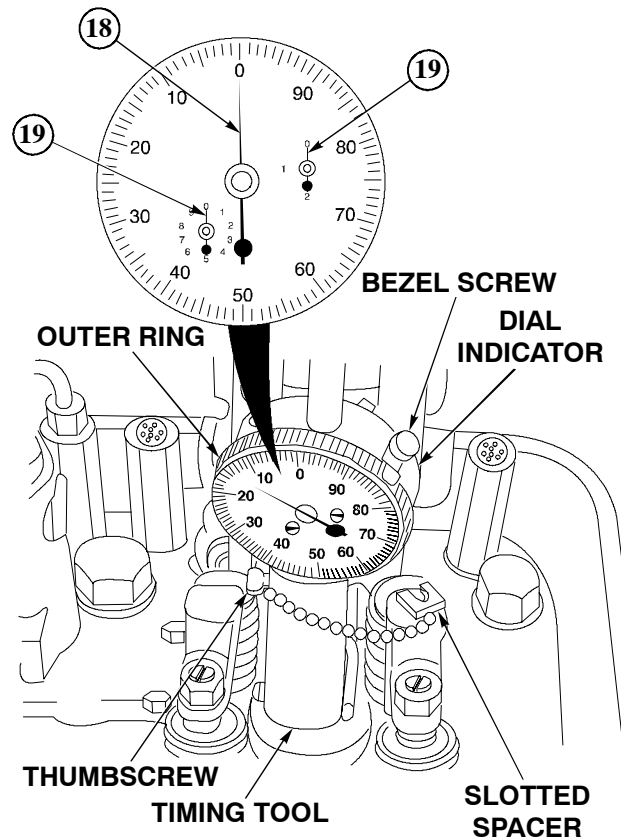
Dial indicator must be zeroed before piston downward travel can be measured. Perform Steps (7) thru (9) to zero dial indicator.

- (7) Loosen thumbscrew and remove slotted spacer.
- (8) Lower timing tool until two small dial hands (19) are at zero and the large dial hand (18) is near zero. Tighten thumbscrew.
- (9) Loosen bezel screw and rotate outer ring of dial until zero lines up with large dial hand (18). Tighten bezel screw.

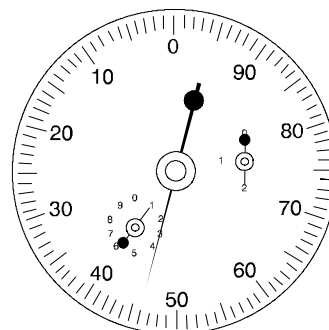
CAUTION

If pulley loosens during procedure, tighten to torque values specified in Appendix D. Failure to comply may result in loss of camshaft pulley and possible engine damage.

- (10) Zero dial indicator and turn camshaft (17) slowly counterclockwise, until dial indicates exactly 2.146 in. (54.51 mm). (See below).



ZERO POSITION



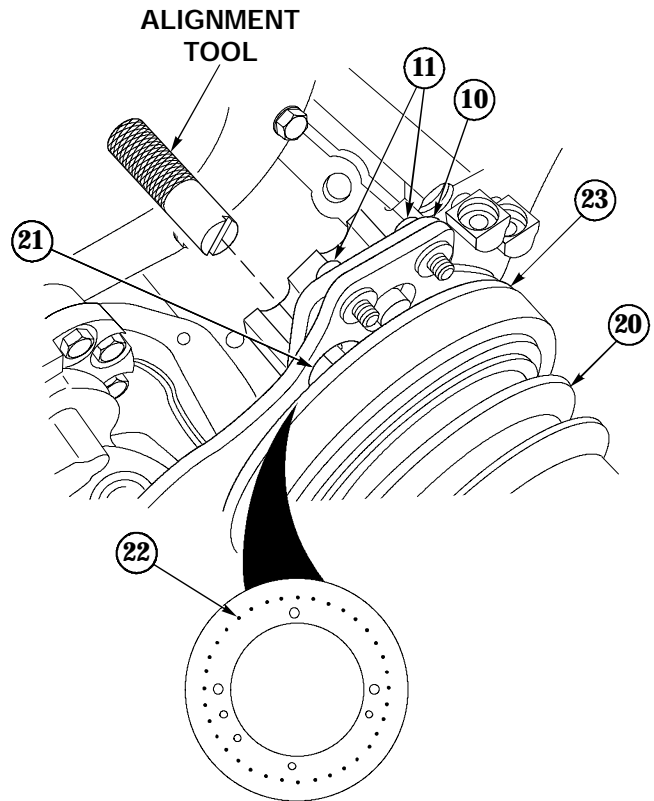
2.146 IN. POSITION

- (11) Tap end of camshaft pulley (20) with soft-faced hammer to take up end play.
- (12) Insert alignment tool in TRS hole (21) of bracket (10).

NOTE

There is a notch on the edge of the pulse wheel next to the correct TRS timing pin.

- (13) Move bracket (10) until notch in tool engages with TRS timing pin (22) on pulse wheel (23).
- (14) Tighten two sockethead screws (11) and remove alignment tool.
- (15) Tap end of camshaft pulley (20) again to take up end play.

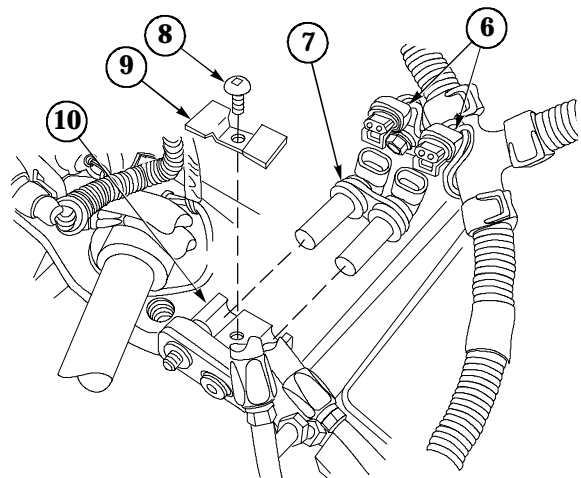


- (16) Install SRS/TRS (7) in bracket (10) with retaining clip (9) and screw (8). Do not tighten.

NOTE

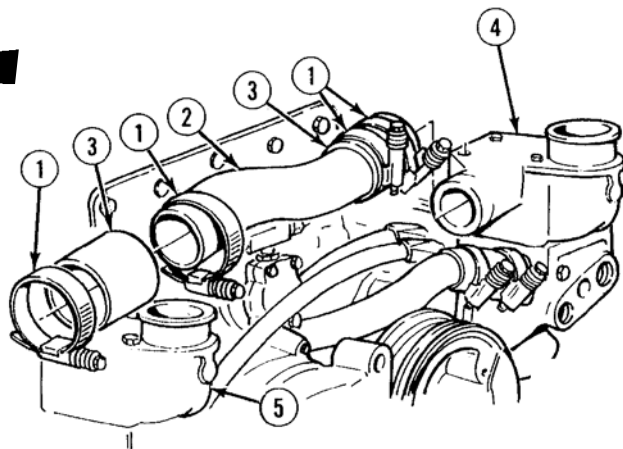
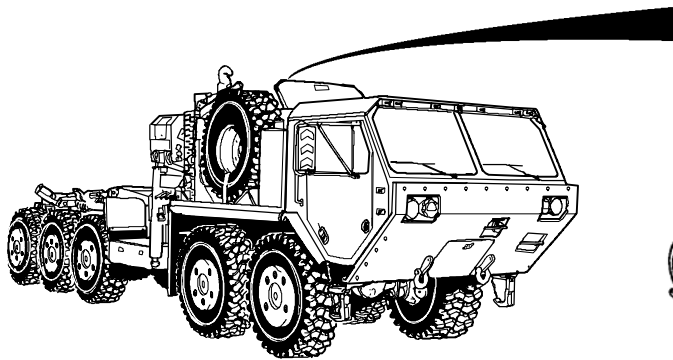
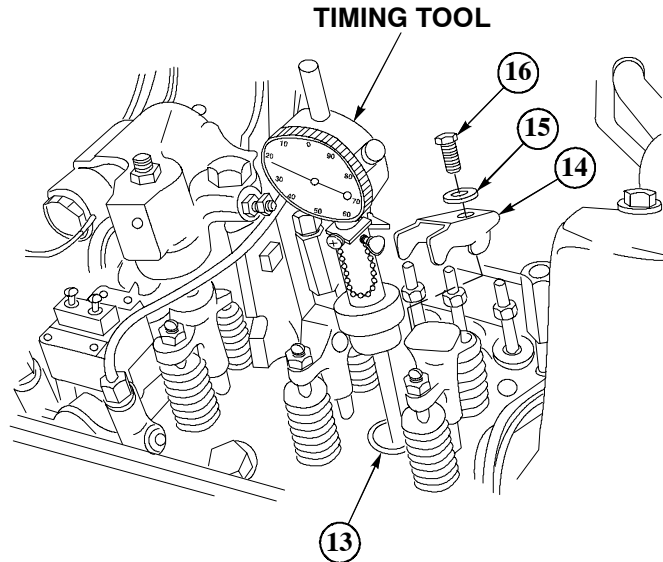
When properly adjusted, there should be .018 - .022 in. (.46 - .56 mm) between pulse wheel teeth and the end of the sensor.

- (17) Position a .020 in. (.50 mm) feeler gage between TRS (7) and the TRS pin on the pulse wheel (23).
- (18) Slide the SRS/TRS (7) against feeler gage and tighten screw (8).
- (19) Connect two connectors (6) to SRS/TRS (7).



6-11. DDEC III/IV TIMING AND SYNCHRONOUS REFERENCE SENSOR (TRS/SRS) REPLACEMENT/ADJUSTMENT(CONT).

- (20) Remove screw (16), washer (15), clamp (14) and timing tool from injector bore (13).



- (21) Install thermostat housing crossover tube (2), two hoses (3) and four clamps (1) between thermostat housings (4) and (5).
- (22) Tighten four clamps (1) to 40 lb-ft (54 N·m).

c. Follow-On Maintenance

- Install no. 1 right fuel injector, (Para 4-2).
- Install ECM, (TM 9-2320-364-20).
- Clear inactive codes, (TM 9-2320-364-20-4).
- Install cooling assembly, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-12. ELECTRICAL PROPORTIONAL ANALOG CONTROL (EPAC) REPLACEMENT AND ADJUSTMENT.

This task covers:

- | | |
|-----------------|--------------------------|
| a. Removal | c. Adjustment |
| b. Installation | d. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Multimeter (Item 140, Appendix F)

Materials/Parts

Locknut (3) (Item 176, Appendix E)
Lockwasher (Item 295, Appendix E)

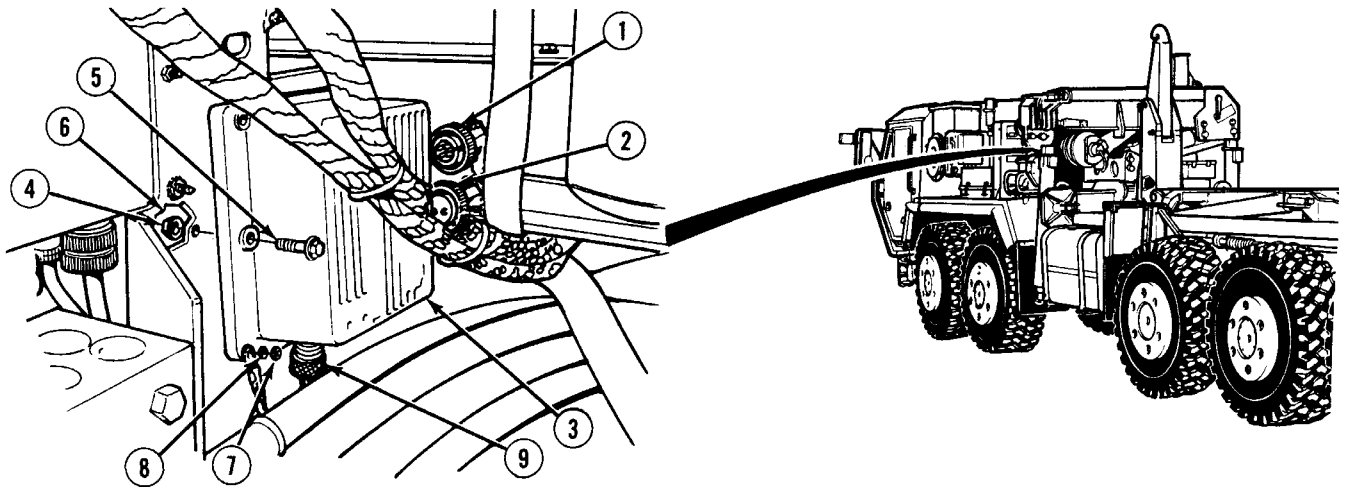
Personnel Required

Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

a. Removal.

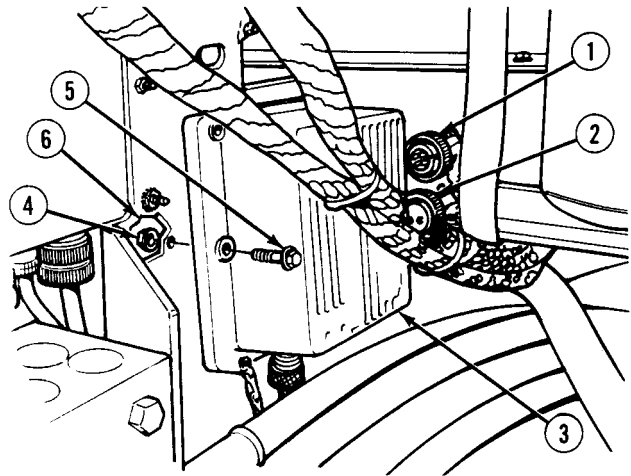


- (1) Remove connectors MC59 (1) and MC73 (2) from EPAC (3).
- (2) Remove three locknuts (4), screws (5) and EPAC (3) from bracket (6). Discard locknuts.
- (3) Remove nut (7), lockwasher (8) and cap and chain (9) from EPAC (3). Discard lockwasher.

6-12. ELECTRICAL PROPORTIONAL ANALOG CONTROL (EPAC) REPLACEMENT AND ADJUSTMENT (CONT).

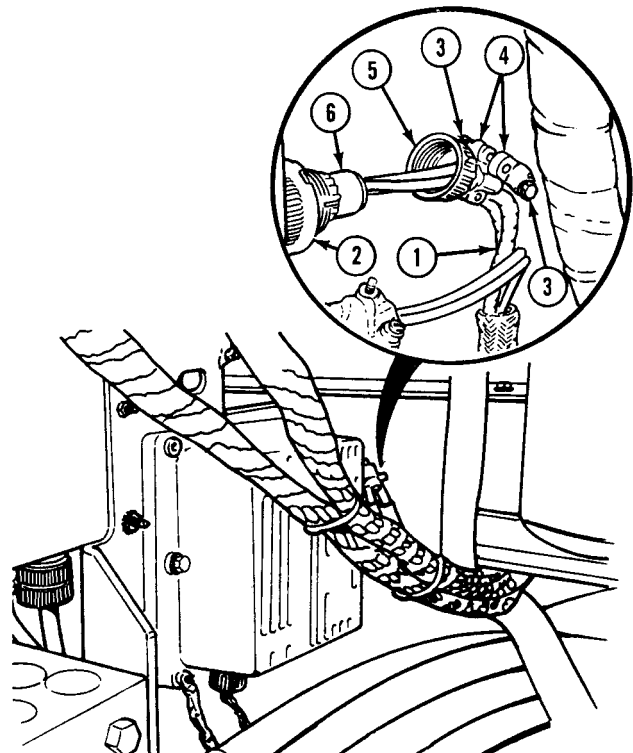
b. Installation.

- (1) Install cap and chain (9), lockwasher (8) and nut (7) on EPAC (3).
- (2) Install EPAC (3) on bracket (6) with three screws (5) and locknuts (4).
- (3) Install connectors MC73 (2) and MC59 (1) on EPAC (3).



c. Adjustment.

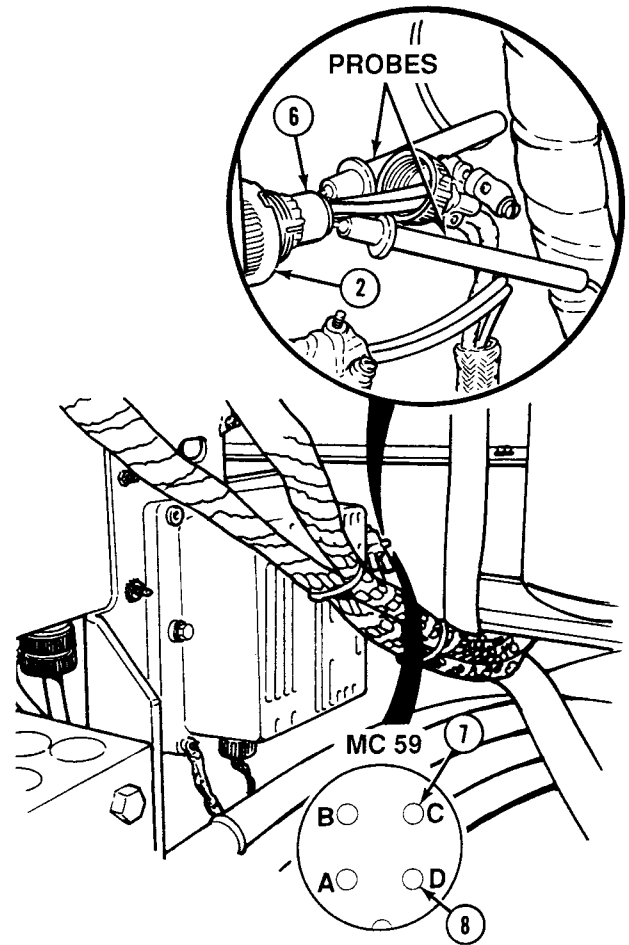
- (1) Remove connector MC59 (1) from EPAC terminal (2).
- (2) Remove two screws (3) and cable clamps (4) from strain relief housing (5).
- (3) Remove strain relief housing (5) from connector shell (6).



NOTE

Multimeter must be connected to connector leads from the back side of the connector shell.

- (4) Insert positive probe against pin C (7) from the back side of connector shell (6).
- (5) Insert negative probe against pin D (8) from the back side of connector shell (6).
- (6) Connect connector shell (6) with probes to EPAC terminal (2).



6-12. ELECTRICAL PROPORTIONAL ANALOG CONTROL (EPAC) REPLACEMENT AND ADJUSTMENT (CONT).

- (7) Start engine.
- (8) Remove dust cap (9) from EPAC (10).

CAUTION

Turning trim pot too far clockwise may cause the engine to overheat if not carefully monitored.

NOTE

- Truck should be at operating temperature (190 degrees F [88 degrees C]) to make adjustment.
- A 3/4 turn clockwise increases engine water temperature 15 degrees F (4 degrees C).
- A 3/4 turn counterclockwise decreases engine water temperature 15 degrees F (4 degrees C).

- (9) Set multimeter to volts DC.
- (10) With the aid of an assistant, take multimeter reading and engine water temperature reading from water temperature gage (11). Readings should match as shown on Table 6-2.
- (11) If readings do not match, perform Step (12).
- (12) With aid of assistant, turn trim pot (12) until voltage reading on multimeter matches the value listed in Table 6-2.
- (13) If reading still does not match, repeat Steps (10) through (12).
- (14) Shut off engine and install dust cap (9) on EPAC (10).

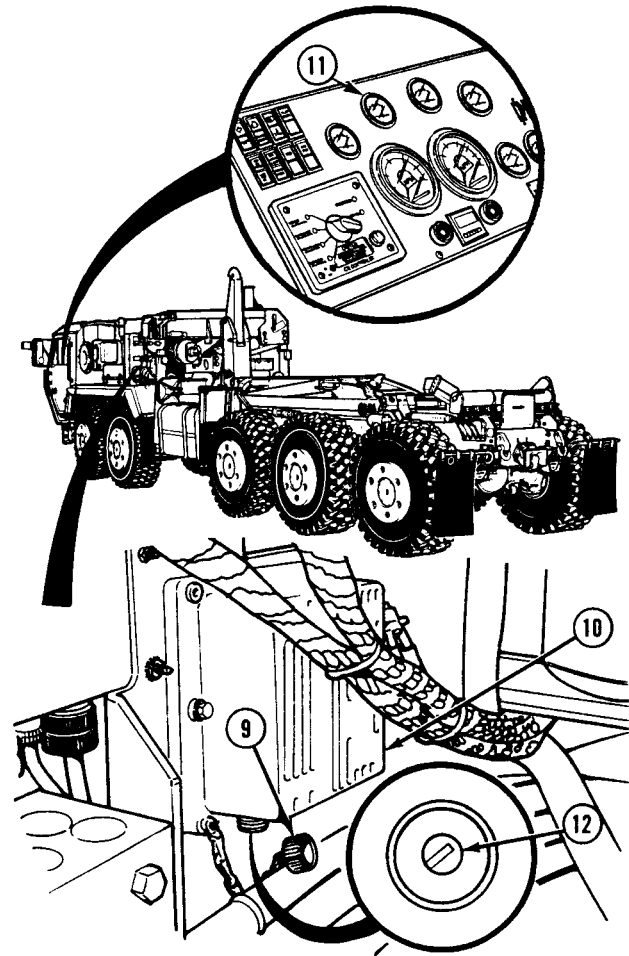
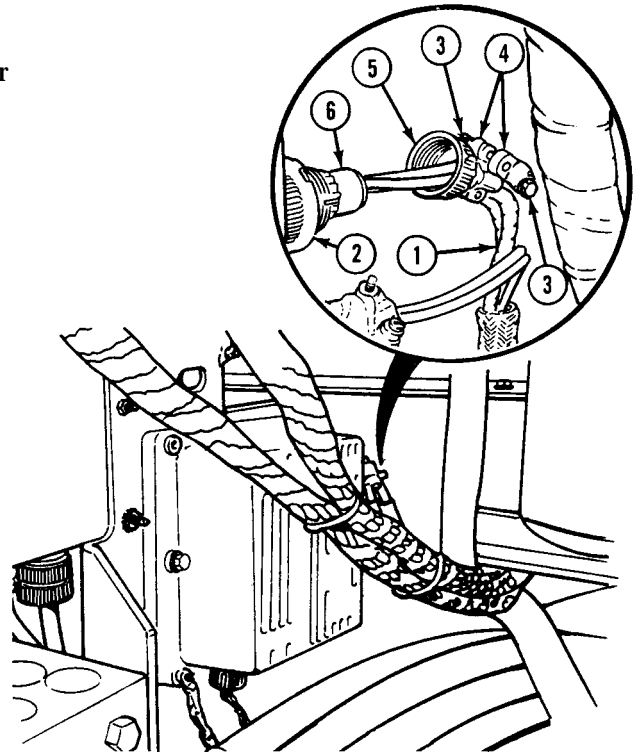


Table 6-2. EPAC Readings

VDC	Temp °F(°C)
22.00	170 (77)
16.00	175 (79)
12.00	185 (85)
10.00	190 (88)

- (15) Remove probes from connector shell (6).
- (16) Install strain relief housing (5) on connector shell (6).
- (17) Install connector shell (6) with two cable clamps (4) and screws (3).
- (18) Install connector MC59 (1) on EPAC terminal (2).

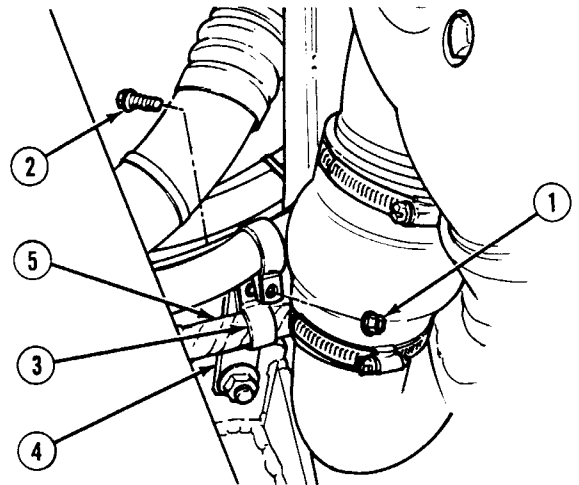
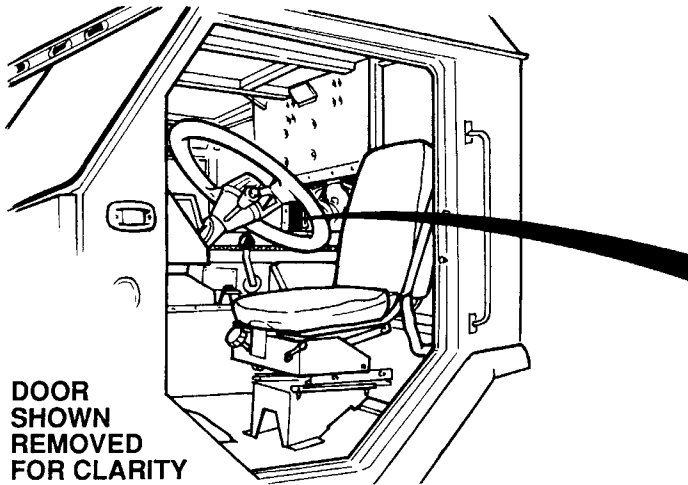


d. Follow-on Maintenance:

- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

a. Removal.



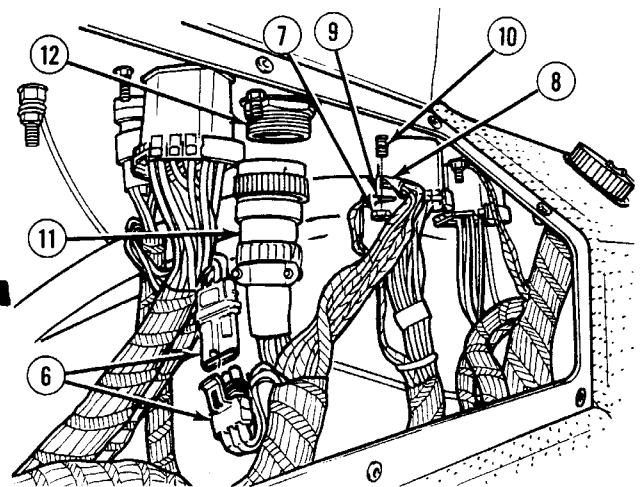
WARNING

Allow engine to cool before removing harness to avoid injury to personnel.

NOTE

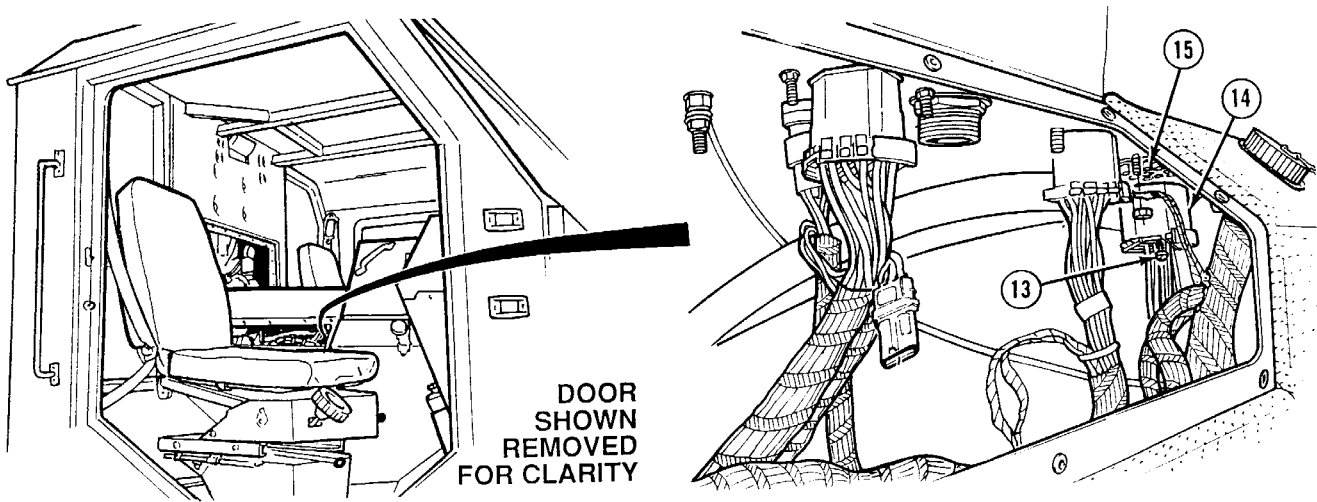
- Tag and mark all wire and connectors prior to removal.
- Remove cable ties as required.

- (1) Remove locknut (1), screw (2) and cushion clip (3) from bracket (4). Discard locknut.
- (2) Remove engine wire harness (5) from cushion clip (3).

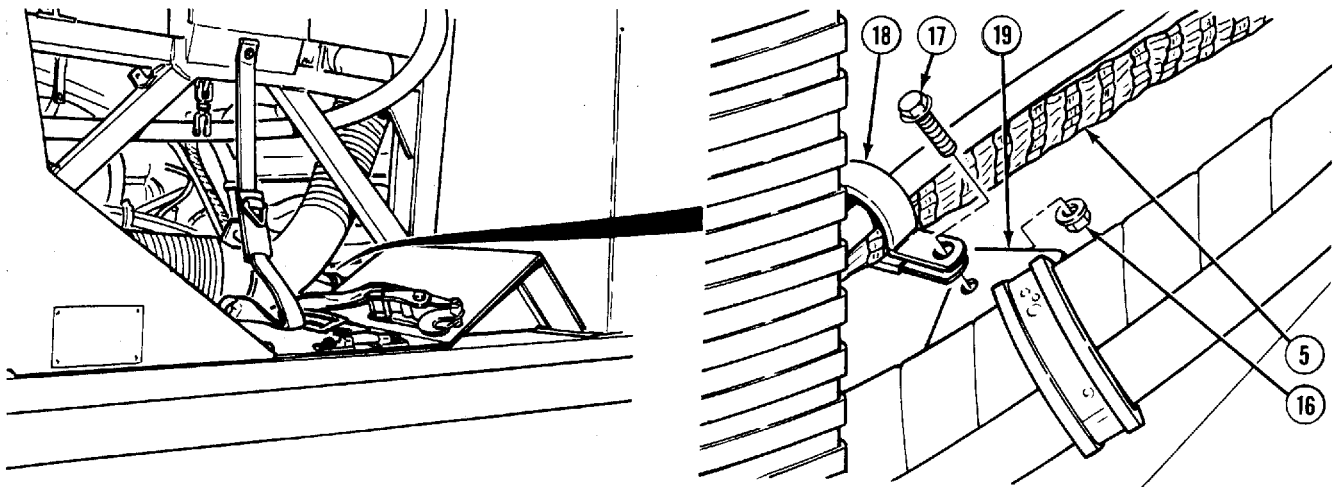


- (3) Disconnect MC118 connector (6).
- (4) Remove locknut (7) and shield wires (8) and (9) from stud (10). Discard locknut.
- (5) Disconnect MC11 connector (11) from bulkhead connector (12).

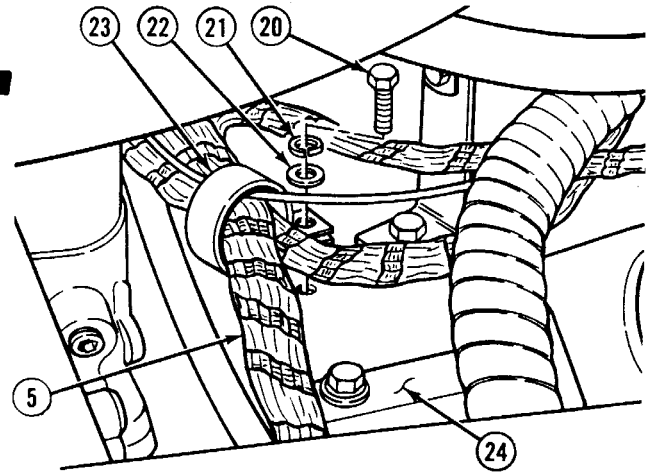
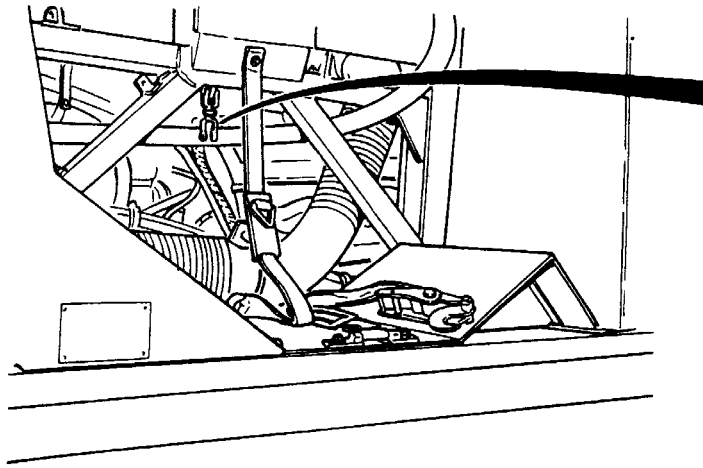
6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).



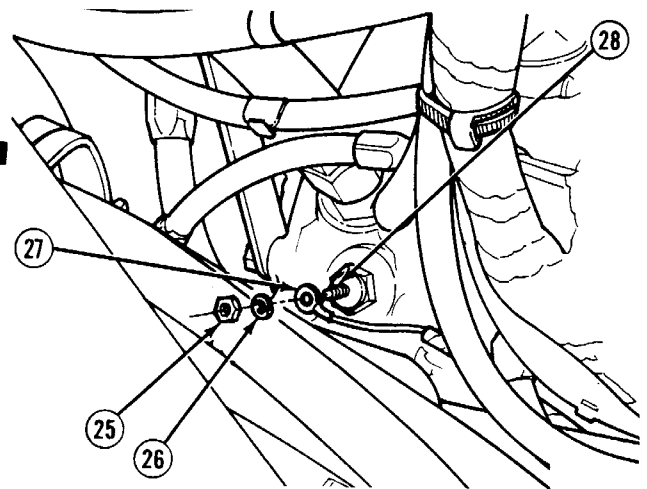
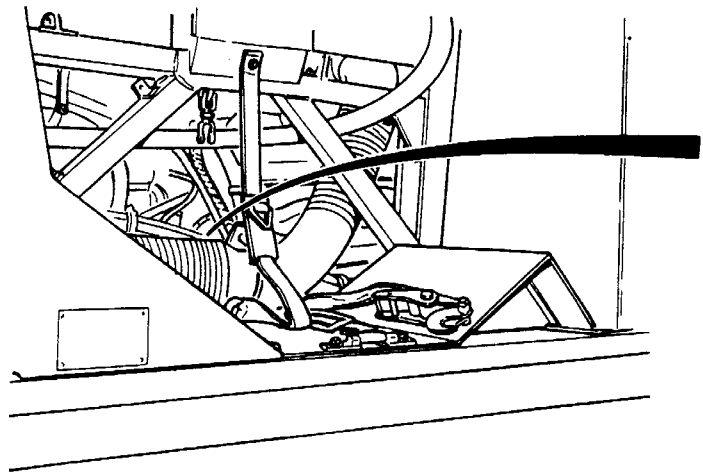
- (6) Loosen screw (13) and disconnect MC21 connector (14) from bulkhead connector (15).



- (7) Remove locknut (16), screw (17) and cushion clip (18) from bracket (19). Discard locknut.
- (8) Remove engine wire harness (5) from cushion clip (18).

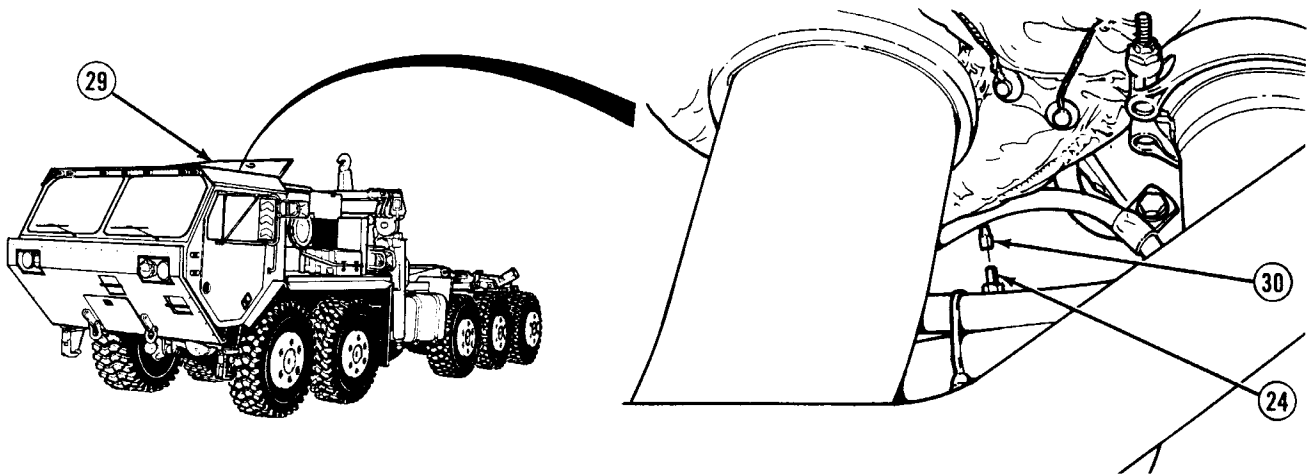


- (9) Remove screw (20), lockwasher (21), washer (22) and cushion clip (23) from engine (24). Discard lockwasher.
- (10) Remove engine wire harness (5) from cushion clip (23).



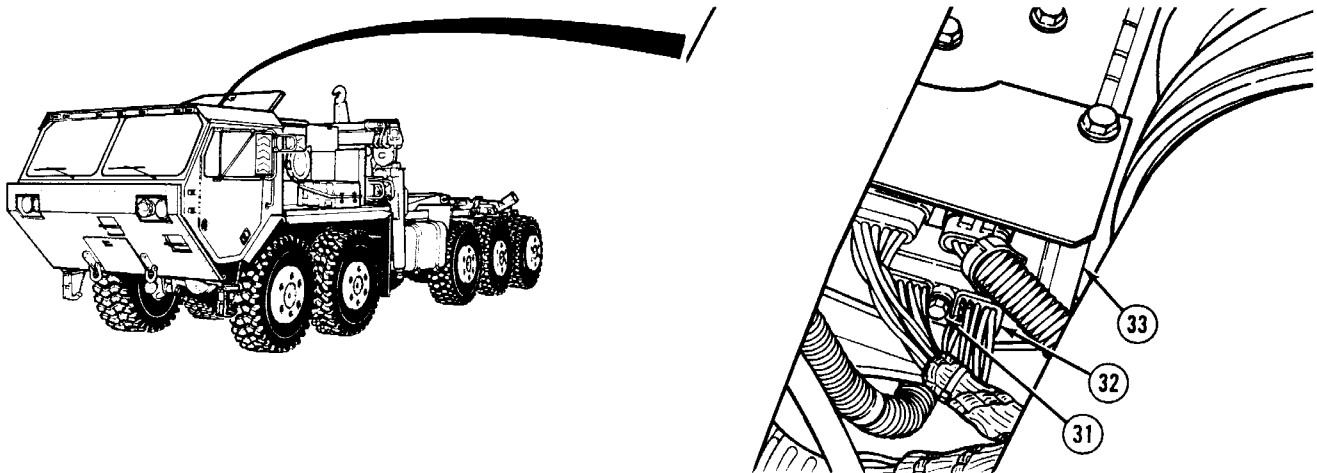
- (11) Remove nut (25), lockwasher (26) and wire 1449 (27) from transmission oil temperature sending unit (28). Discard lockwasher.

6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).



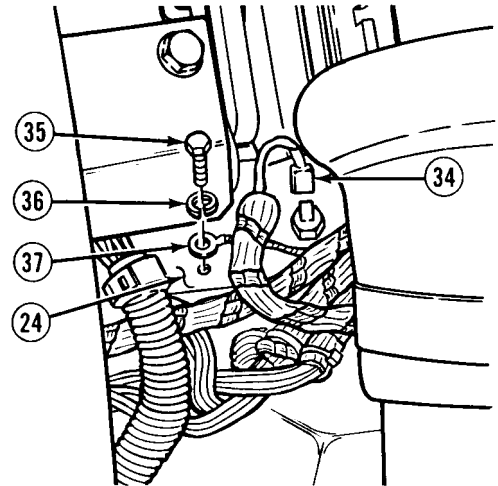
(12) Open engine cover (29).

(13) Remove wire 1715 (30) from engine (24).

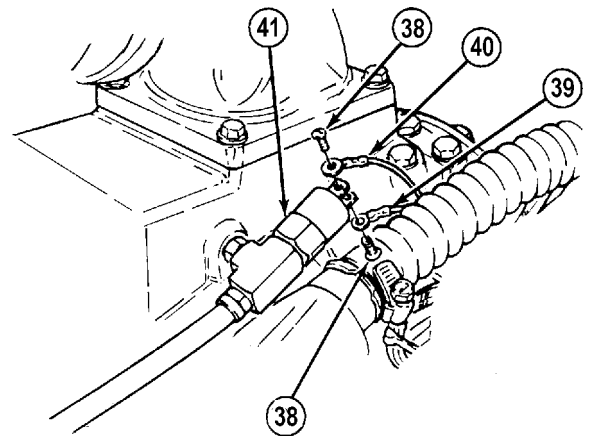


(14) Loosen screw (31) and disconnect MC18 connector (32) from electronic control module (33).

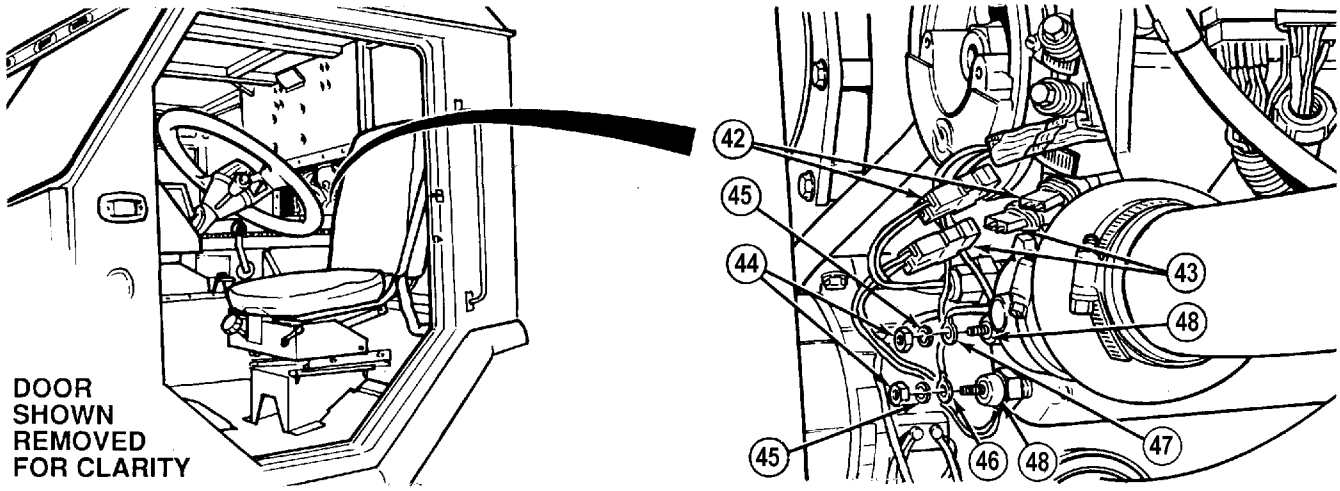
- (15) Remove wire 1716 (34) from engine (24).
- (16) Remove screw (35), lockwasher (36) and shield wire (37) from engine (24). Discard lockwasher.



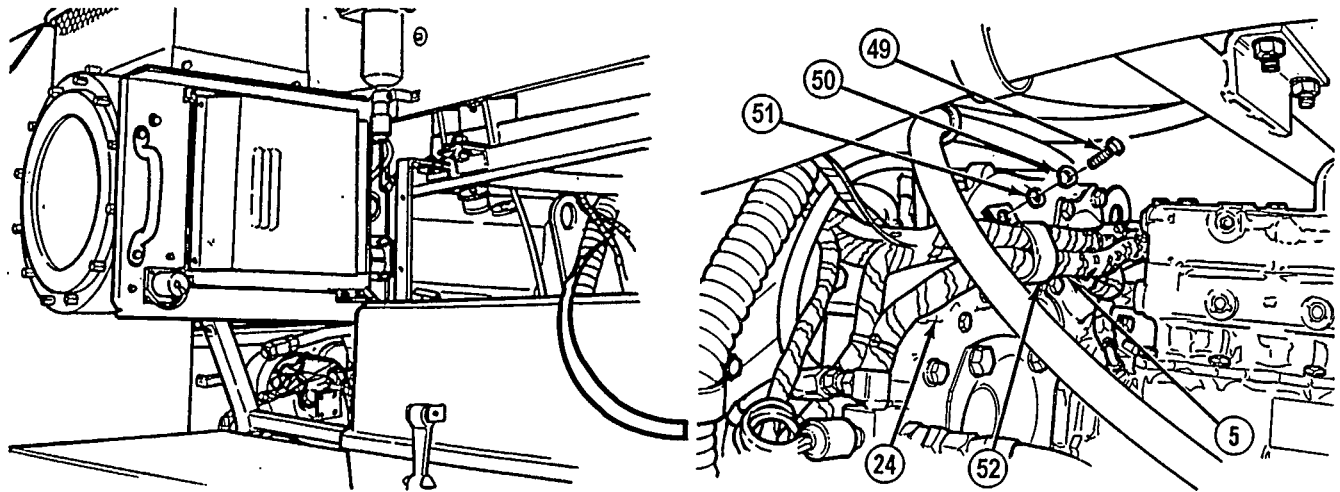
- (17) Remove two screws (38) wire 1955 (39) and wire 1957 (40) from pressure switch (41).



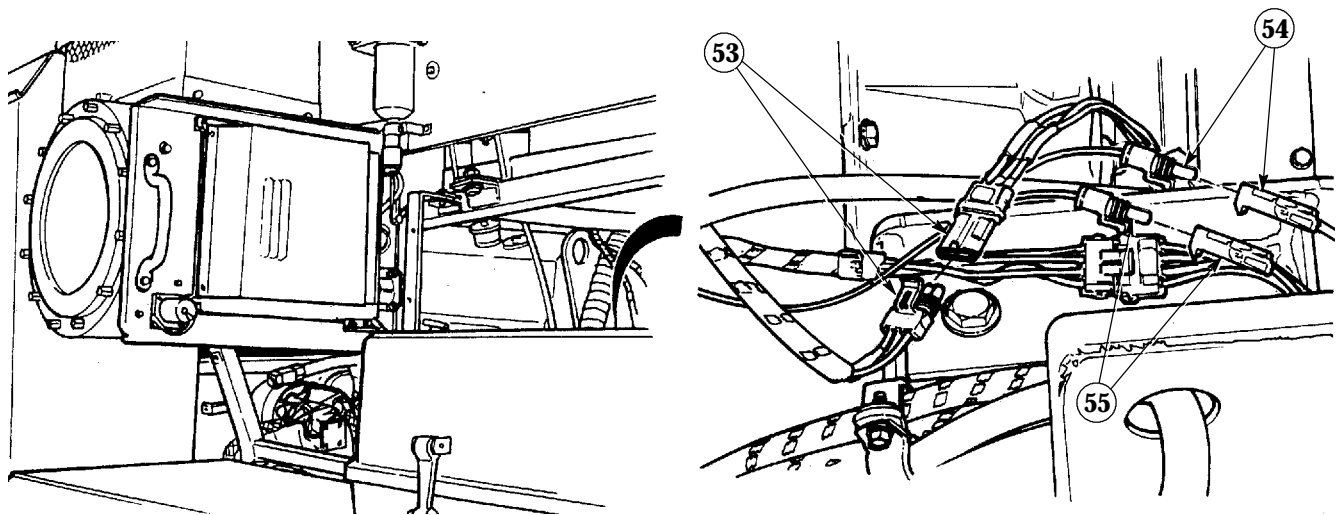
6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).



- (18) Disconnect MC61 connector (42).
- (19) Disconnect MC128 connector (43).
- (20) Remove two nuts (44), lockwashers (45) and wires 1147 (46) and 1320 (47) from two temperature sending units (48). Discard lockwashers.

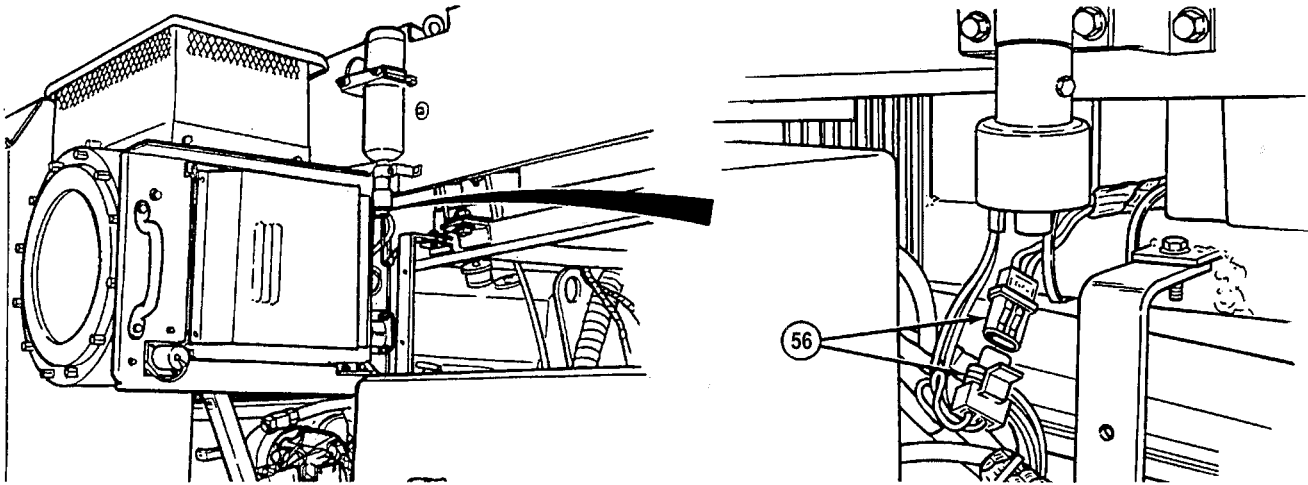


- (21) Remove screw (49), lockwasher (50), washer (51) and cushion clip (52) from engine (24). Discard lockwasher.
- (22) Remove engine wire harness (5) from cushion clip (52).

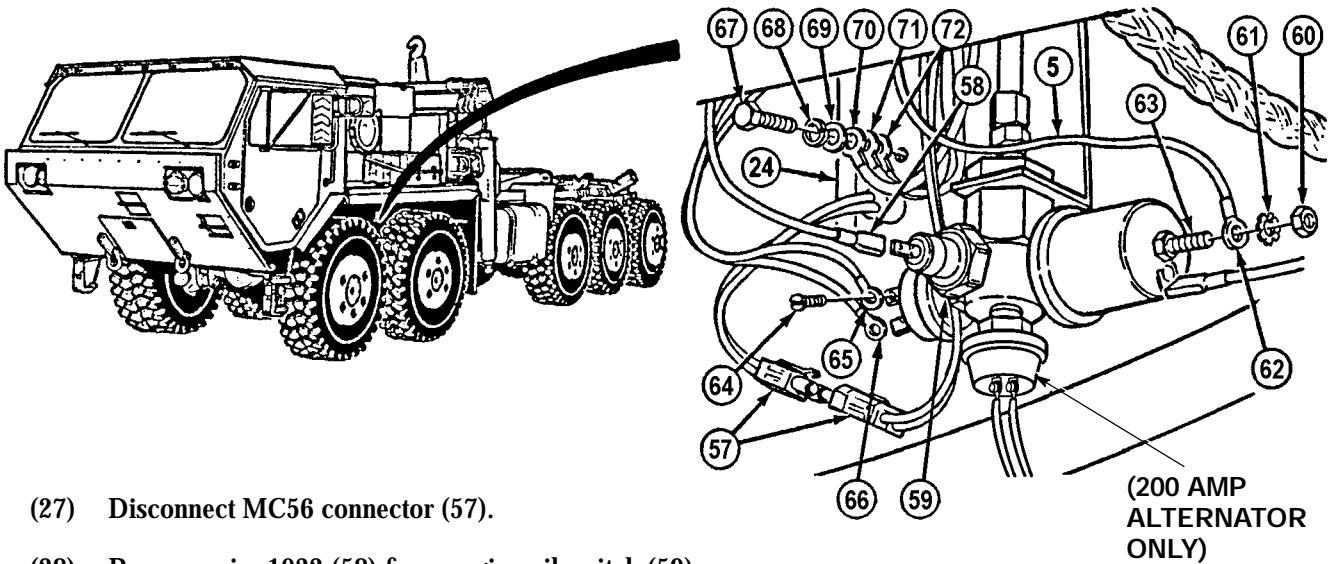


- (23) Disconnect MC63 connector (53).
- (24) Disconnect MC95 connector (54).
- (25) Disconnect MC60 connector (55)

6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).

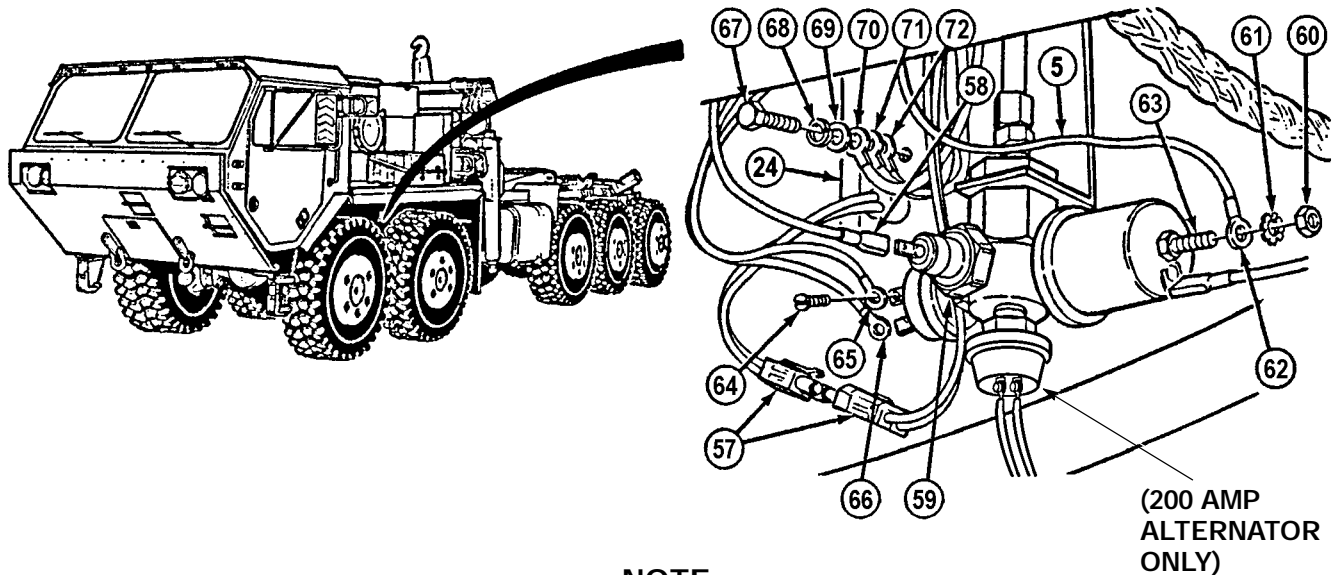


- (26) Disconnect MC23 connector (56).



- (27) Disconnect MC56 connector (57).
- (28) Remove wire 1032 (58) from engine oil switch (59).
- (29) Remove nut (60), lockwasher (61) and wire 1113 (62) from engine oil sending unit stud (63). Discard lockwasher.
- (30) Remove two screws (64) and wires 1871 (65) and 1517 (66) from engine oil switch (59).
- (31) Remove screw (67), lockwasher (68), washer (69), wire 1435 (70) and shield wires (71) and (72) from engine (24). Discard lockwasher.
- (32) Remove engine wire harness (5) from truck.

b. Installation.

**NOTE**

- Evenly distribute any slack in harness.
- Install cable ties as required.

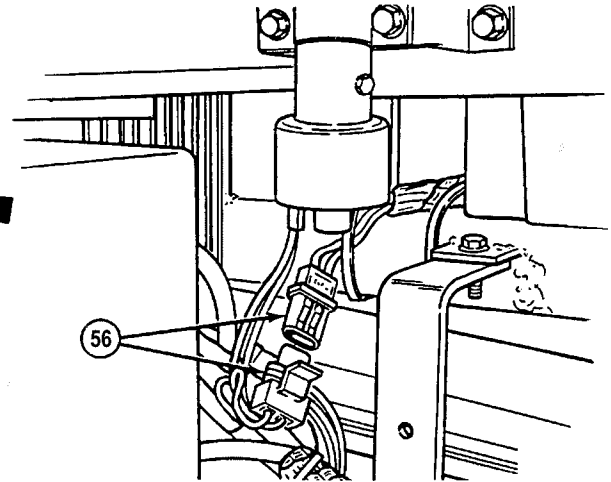
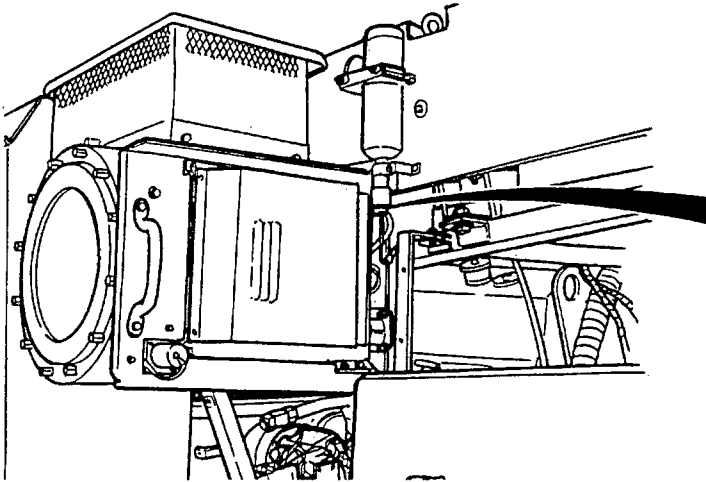
- (1) Position engine wire harness (5) through truck.
- (2) Install shield wires (72) and (71), wire 1435 (70), washer (69), lockwasher (68) and screw (67) on engine (24).
- (3) Install wires 1871 (65) and 1517 (66) and two screws (64) on engine oil switch (59).
- (4) Install wire 1113 (62), lockwasher (61) and nut (60) on engine oil sending unit stud (63).

WARNING

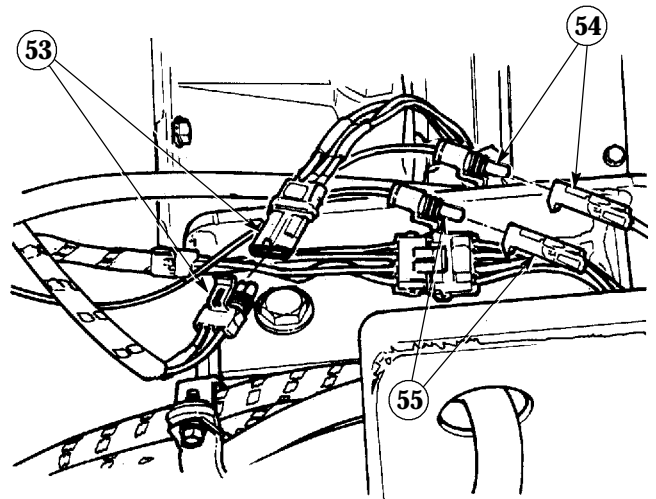
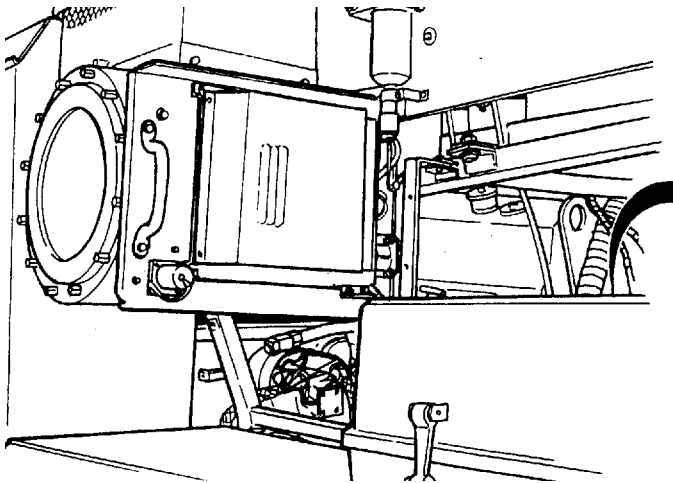
Adhesives, solvents, and sealing compounds can burn easily can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (5) Coat stud (63), two screws (64), and screw (67) with electrical sealant.
- (6) Install wire 1032 (58) on engine oil switch (59).
- (7) Connect MC56 connector (57).

6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).



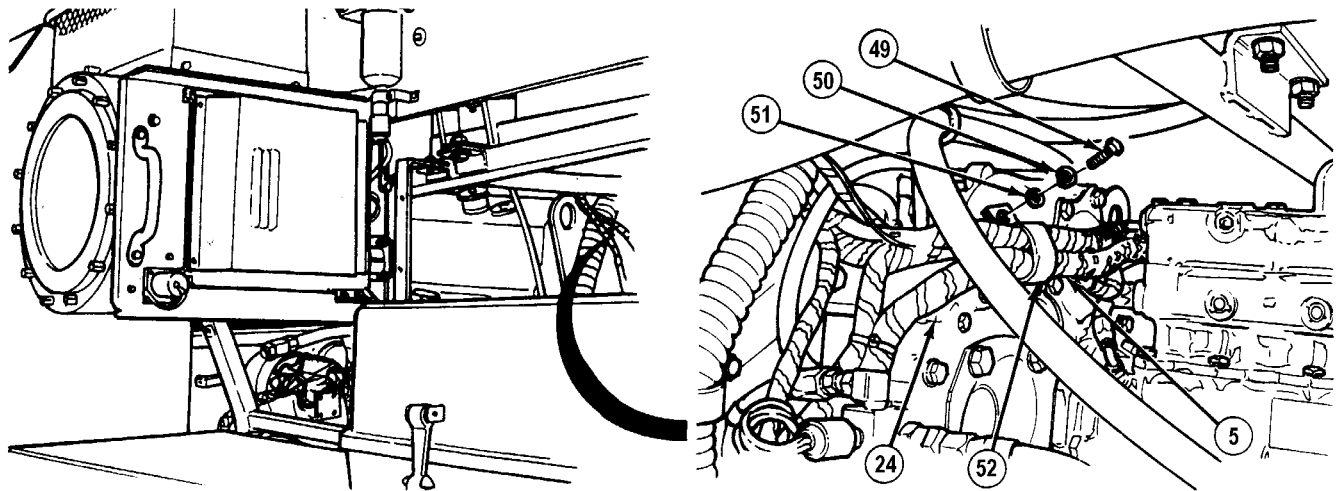
(8) Connect MC23 connector (56).



(9) Connect MC60 connector (55).

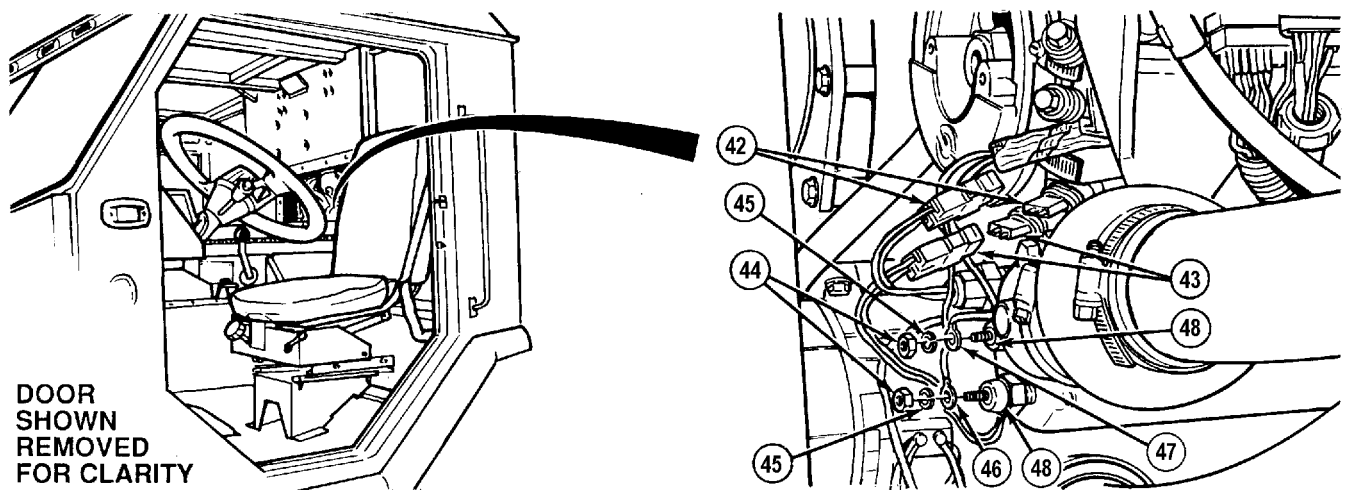
(10) Connect MC95 connector (54).

(11) Connect MC63 connector (53).



(12) Position engine wire harness (5) in cushion clip (52).

(13) Install cushion clip (52), washer (51), lockwasher (50) and screw (49) on engine (24).



DOOR
SHOWN
REMOVED
FOR CLARITY

(14) Install wires 1147 (47) and 1320 (46), two lockwashers (45) and nuts (44) on temperature sending unit studs (48).

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.

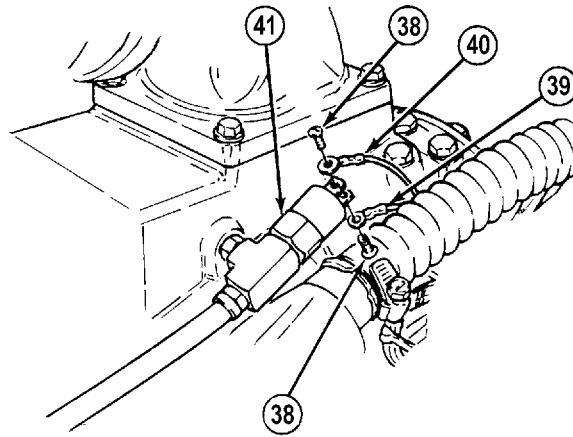
(15) Coat temperature sending unit studs (48) with electrical sealant.

(16) Connect MC128 connector (43).

(17) Connect MC61 connector (42).

6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).

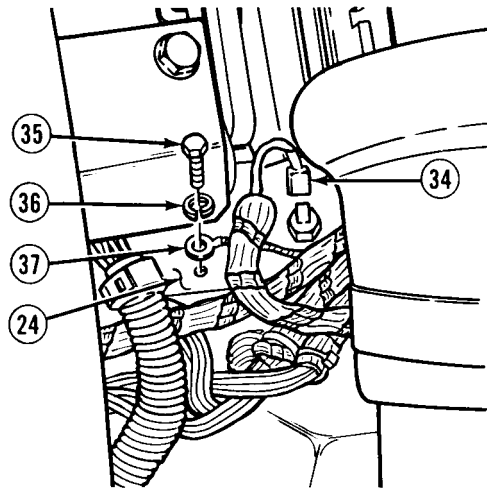
- (18) Install wire 1957 (40) and wire 1955 (39) on pressure switch (41) with two screws (38).



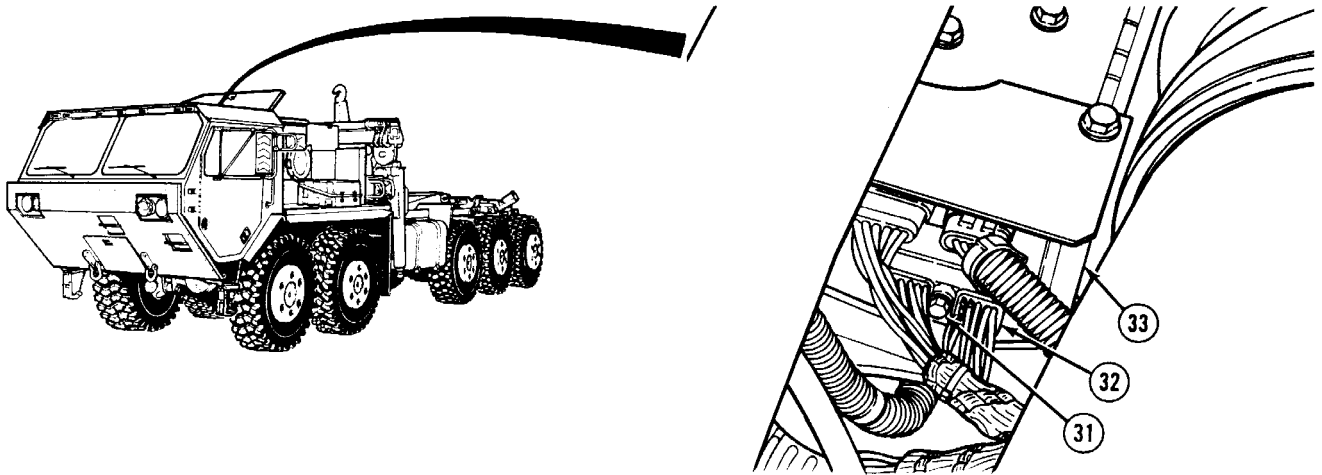
- (19) Install shield wire (37), lockwasher (36) and screw (35) on engine (24).

WARNING

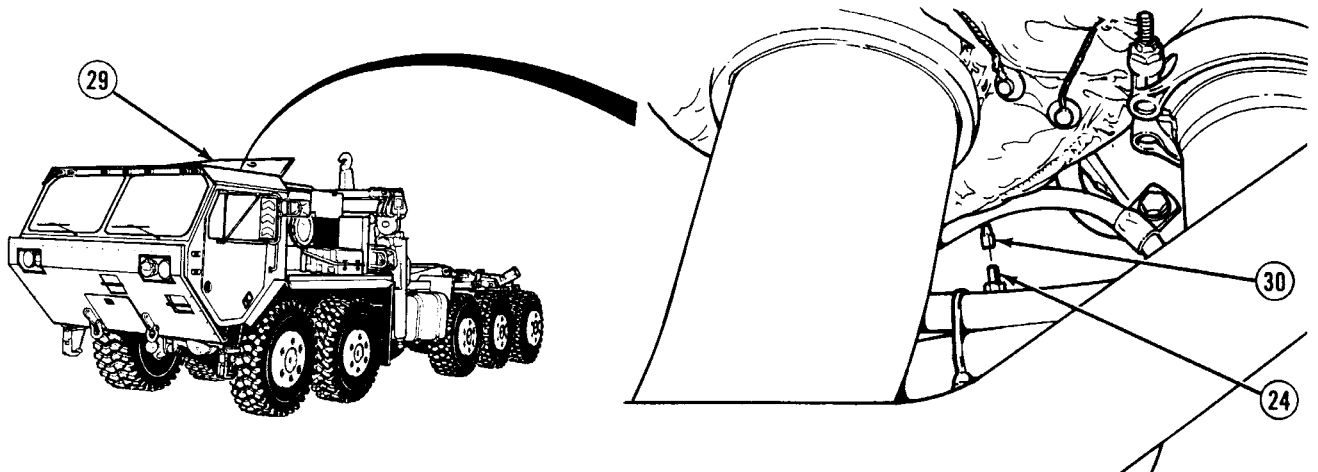
Corrosion compound contains alkali. Do not get in eyes; wear safety goggles/glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush with large amounts of water for at least 15 minutes and get immediate medical attention.



- (20) Coat screw (35) with corrosion preventative compound.
- (21) Install wire 1716 (34) on engine (24).



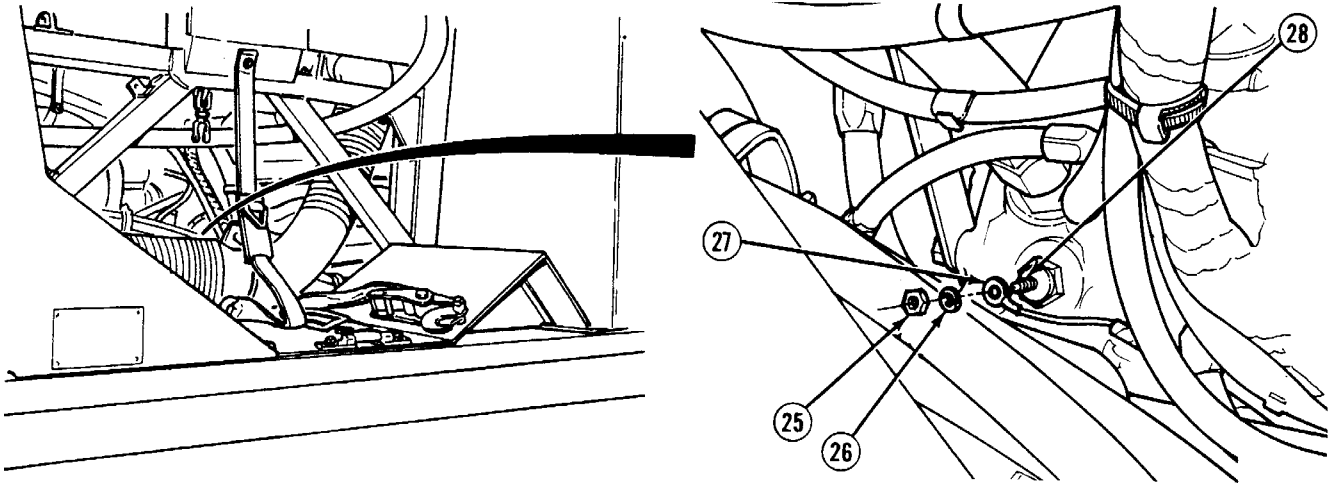
(22) Connect MC18 connector (32) to electronic control module (33). Tighten screw (31).



(23) Install wire 1715 (30) on engine (24).

(24) Close engine cover (29).

6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).

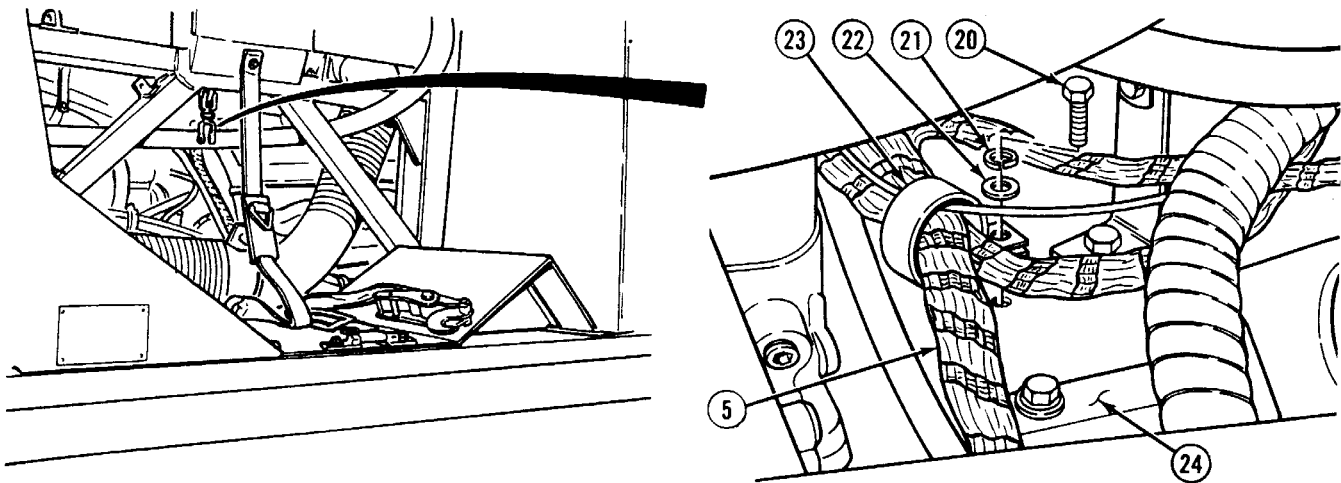


- (25) Install wire 1449 (27), lockwasher (26) and nut (25) on transmission oil temperature sending unit stud (28).

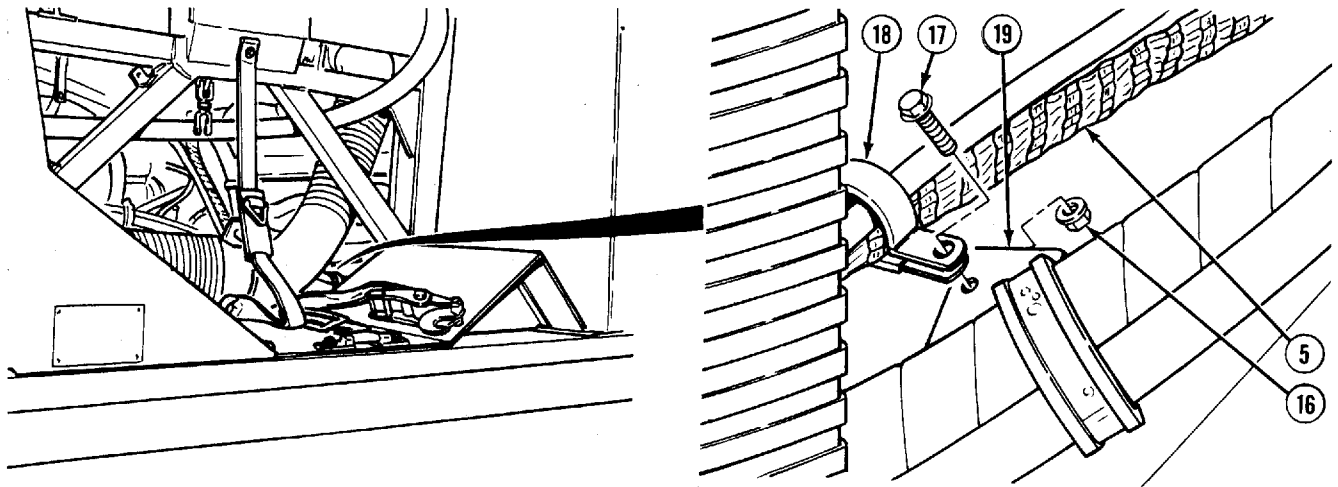
WARNING

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.

- (26) Coat oil temperature sending unit stud (28) with electrical sealant.

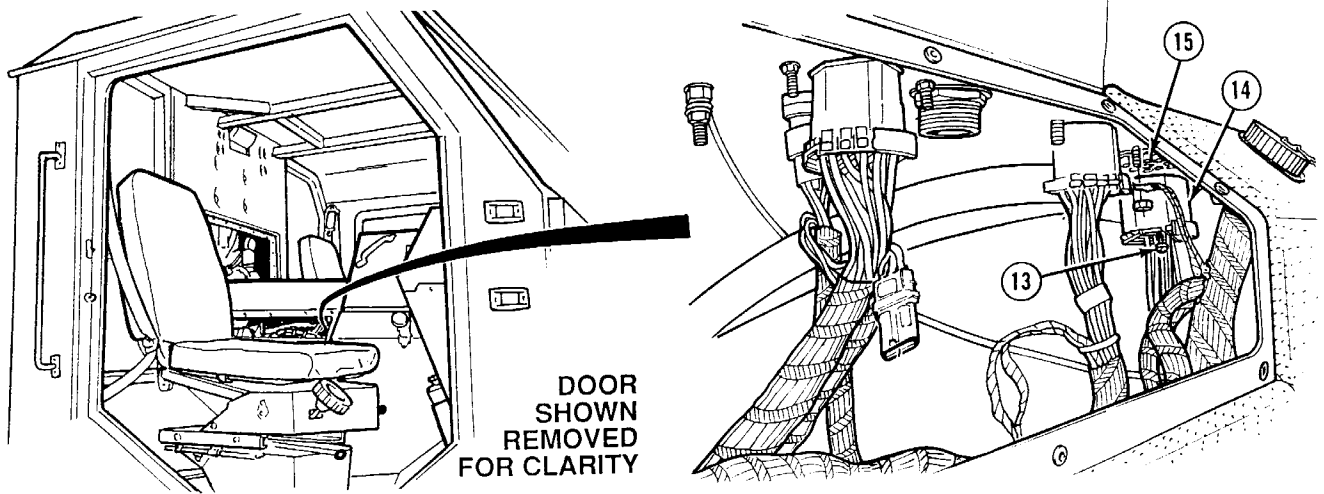


- (27) Position engine wire harness (5) in cushion clip (23).
- (28) Install cushion clip (23), washer (22), lockwasher (21) and screw (20) on engine (24).



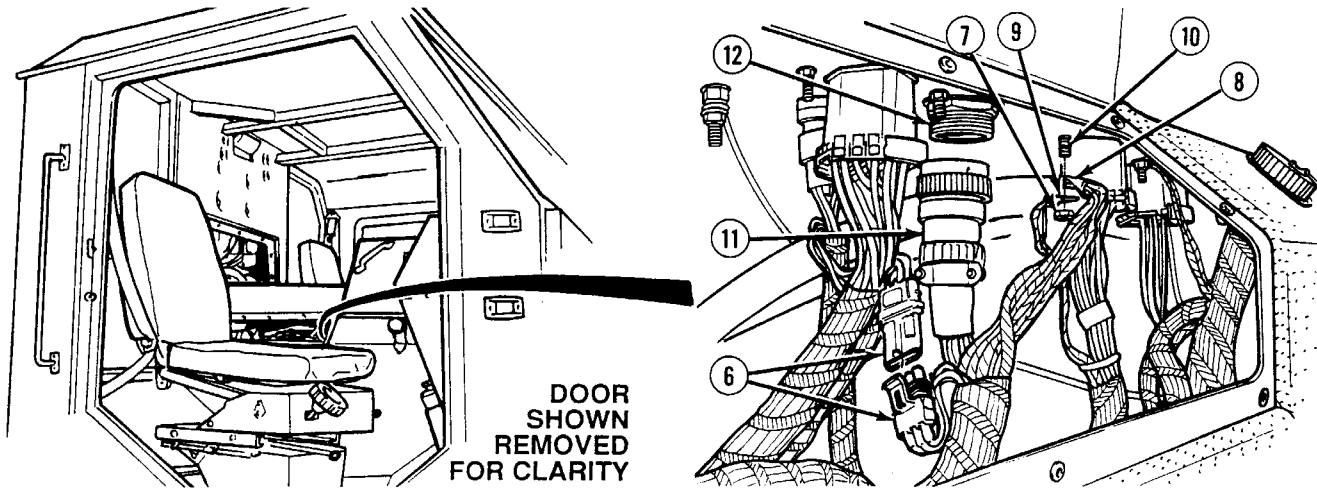
(29) Position engine wire harness (5) in cushion clip (18).

(30) Install cushion clip (18), screw (17) and locknut (16) on bracket (19).



(31) Connect MC21 connector (14) to bulkhead connector (15). Tighten screw (13).

6-13. ENGINE WIRE HARNESS REPLACEMENT (CONT).

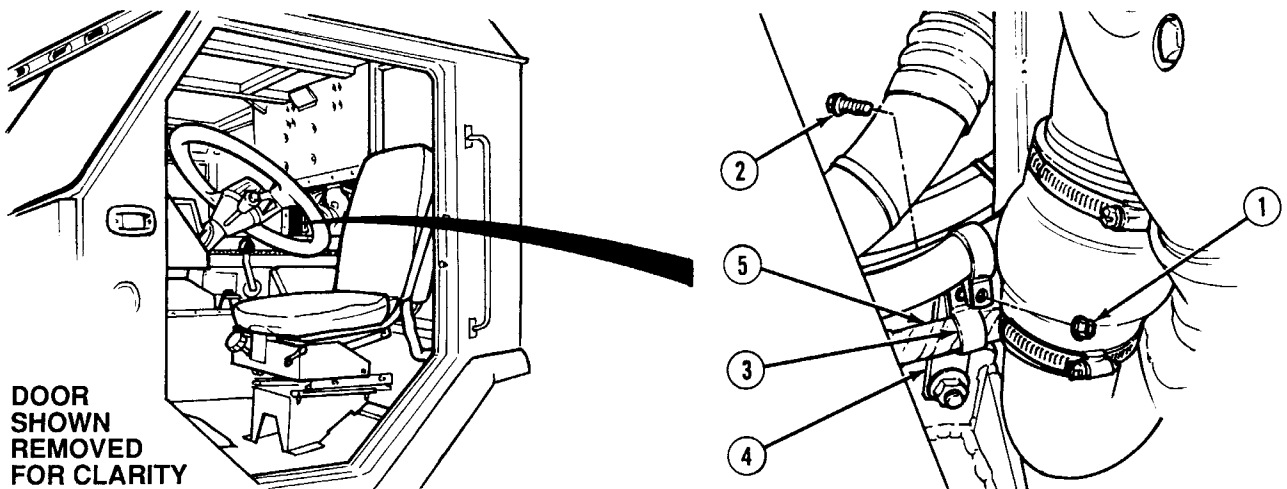


- (32) Connect MC11 connector (11) to bulkhead connector (12).
- (33) Install shield wires (9) and (8) and locknut (7) on stud (10).

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.

- (34) Coat stud (10) with electrical sealant.
- (35) Connect MC118 connector (6).

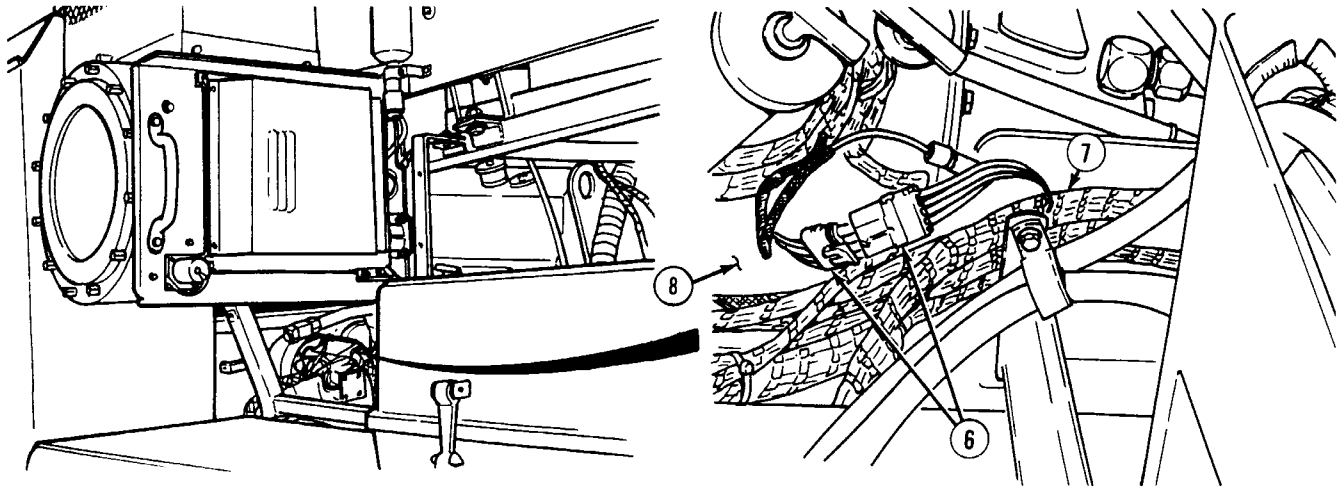


- (36) Position engine wire harness (5) in cushion clip (3).
- (37) Install screw (2), cushion clip (3) and locknut (1) on bracket (4).

c. Follow-On Maintenance:

- Install cab engine access panel, (TM 9-2320-364-20).
- Install left front splash guard, (TM 9-2320-364-20).
- Install Electronic Control Box (ECB) right access panel, (TM 9-2320-364-20).
- Install left front noise panel, (TM 9-2320-364-20).
- Install right side noise panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

**NOTE**

Disconnect connector by prying up on tabs and gently pulling connector apart.

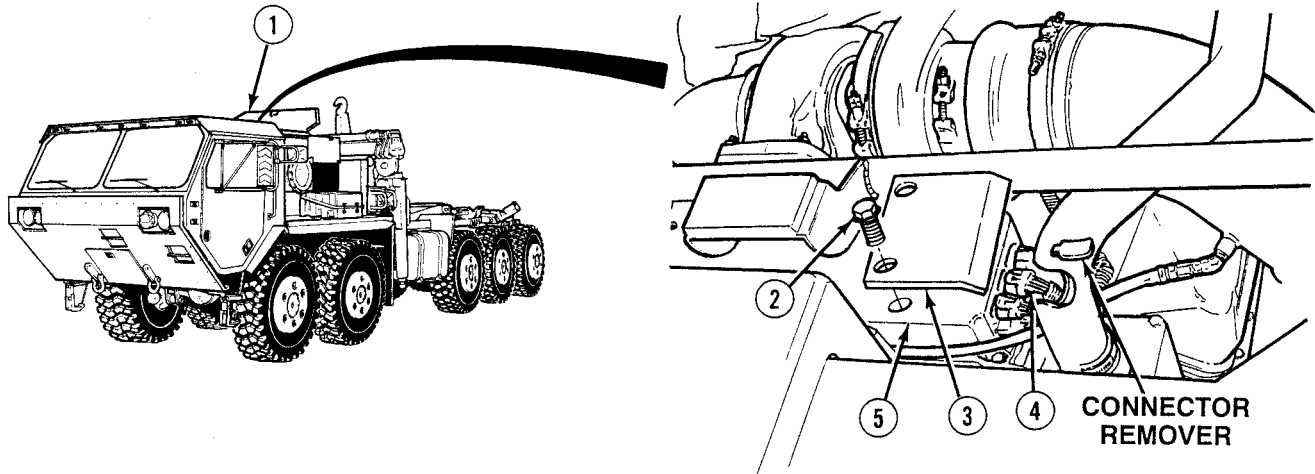
- (4) Disconnect MC62 connector (6).
- (5) Remove DDEC engine power wire harness (7) from engine (8).

b. Installation.**NOTE**

Install cable ties as needed.

- (1) Position DDEC engine power wire harness (7) on engine (8).
- (2) Connect MC62 connector (6).

6-14. DDEC ENGINE POWER WIRE HARNESS REPLACEMENT (CONT).



- (3) Connect MC17 connector (4) on electronic control module (5).
- (4) Install cover plate (3) on electronic control module (5) with two screws (2).
- (5) Close engine cover (1).

c. *Follow-On Maintenance:*

- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

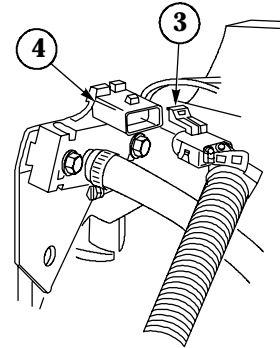
END OF TASK

6-15. DDEC II WIRE HARNESS REPLACEMENT (CONT).

NOTE

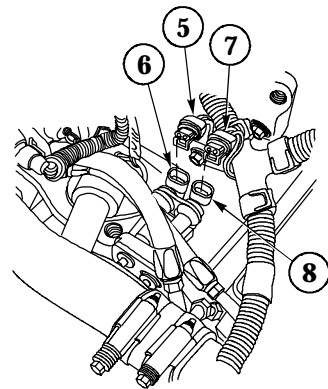
Connectors are removed by gently prying up on tab and pulling connector apart.

- (2) Disconnect connector (3) from turbo boost sensor (4).

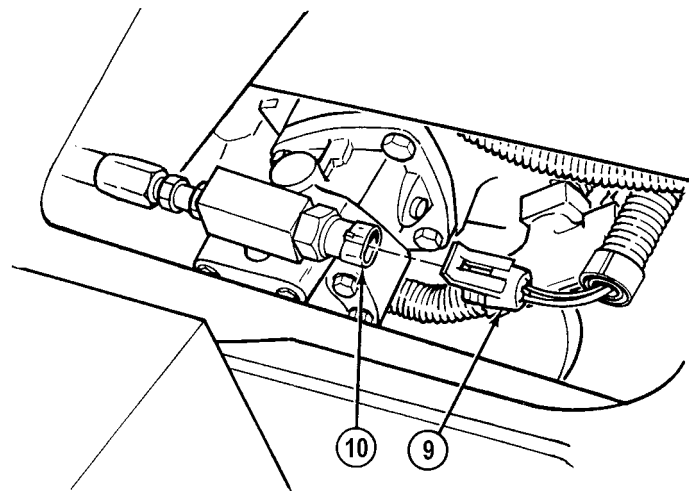


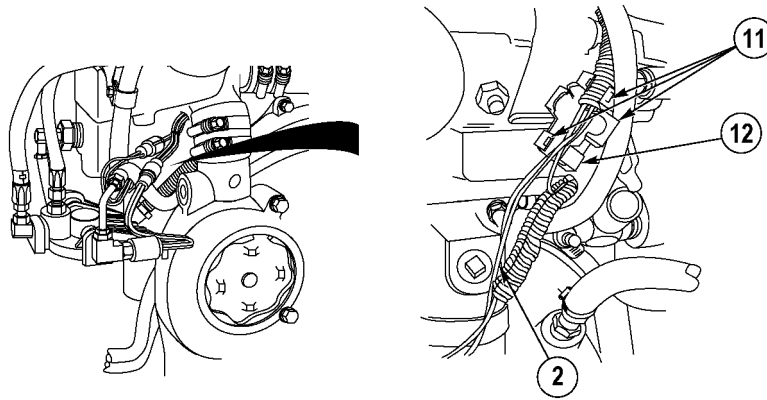
- (3) Disconnect connector (5) from TRS sensor (6).

- (4) Disconnect connector (7) from SRS sensor (8).

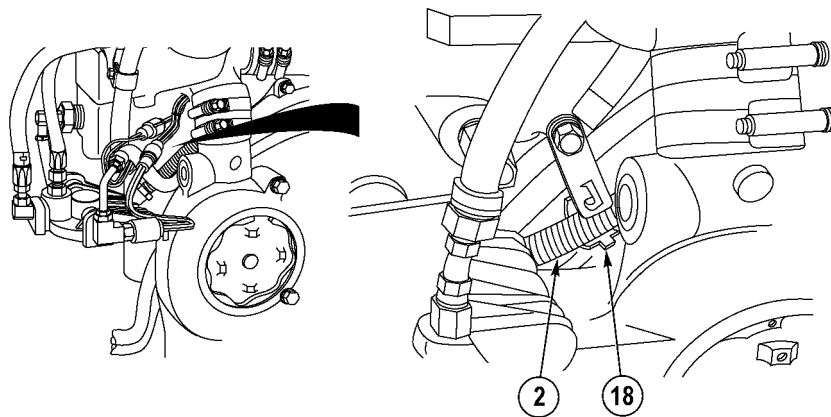
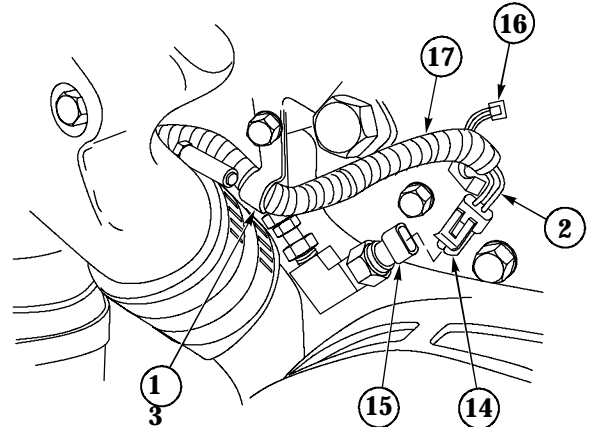


- (5) Disconnect connector (9) from fuel temperature sensor (10).



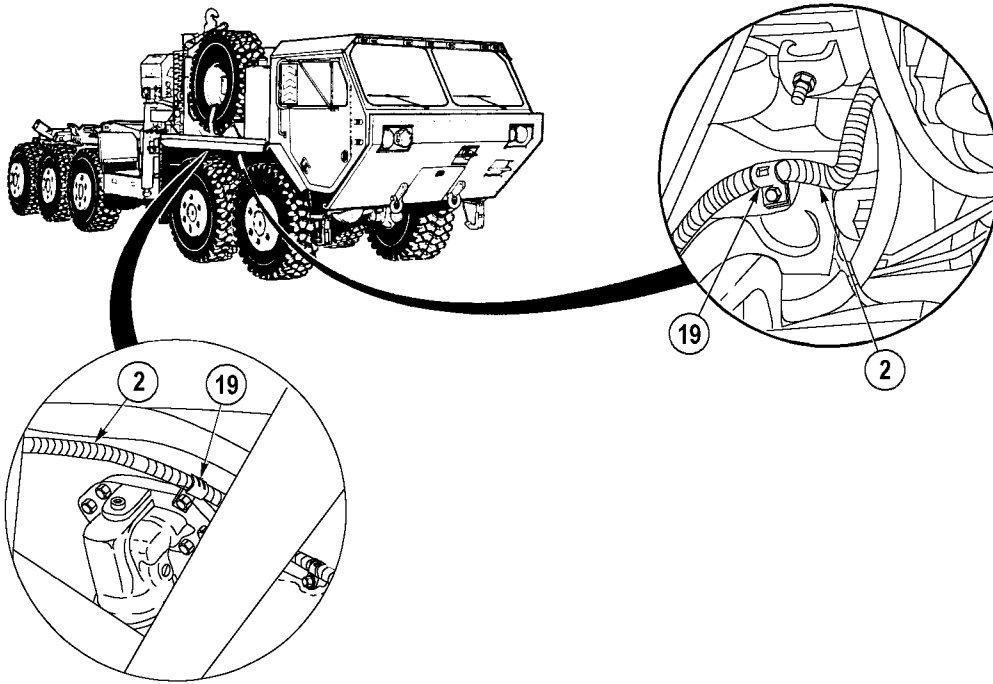


- (6) Open three clips (11) and remove tee (12) from DDEC II wire harness (2).
- (7) Open clip (13) and remove DDEC II wire harness (2) from clip.
- (8) Disconnect connector (14) from oil temperature sensor (15).
- (9) Remove clip (16) and wire loom (17) from oil temperature sender portion of DDEC II wire harness (2).

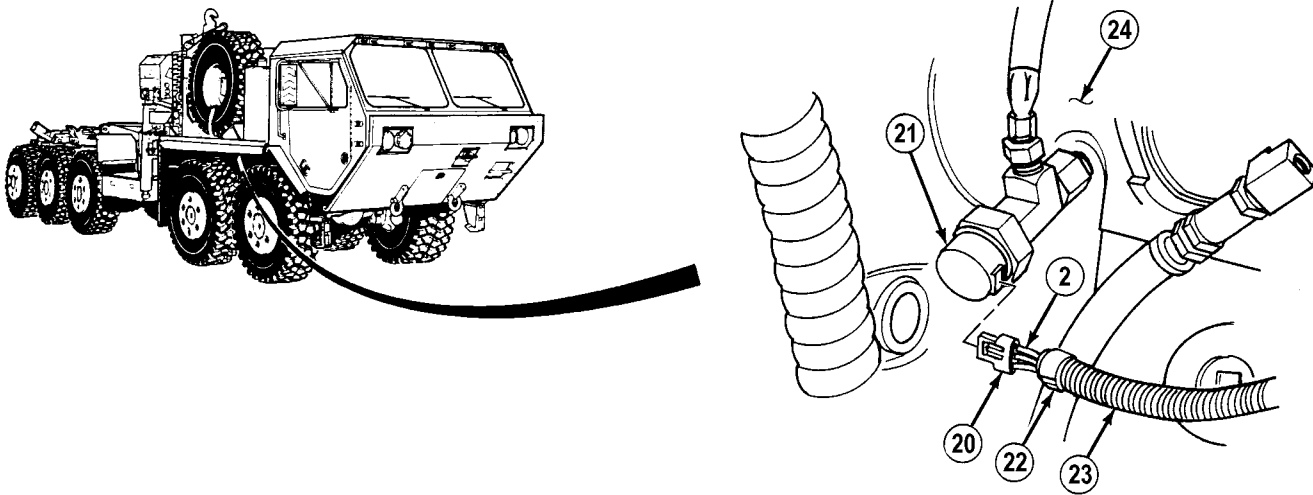


- (10) Open clip (18) and remove DDEC II wire harness (2) from clip.

6-15. DDEC II WIRE HARNESS REPLACEMENT (CONT).



(11) Open two clips (19) and remove DDEC II wire harness (2) from clips.

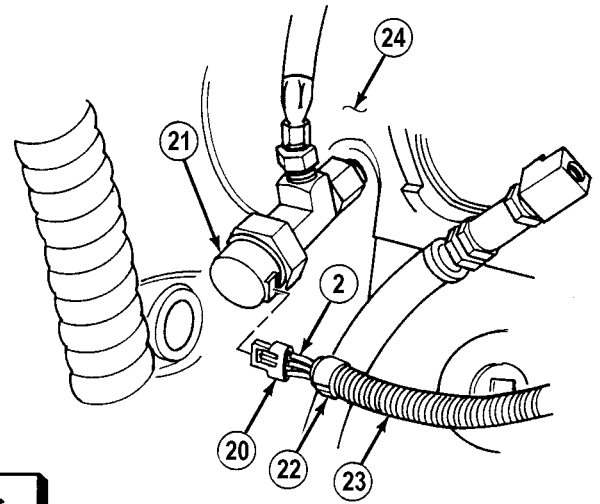
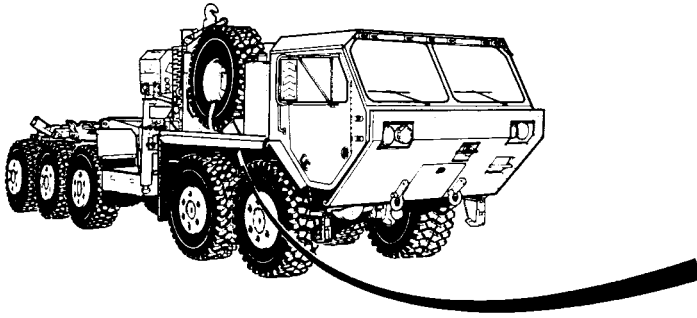


NOTE

Connectors are removed by gently prying up on tab and pulling apart connectors.

- (12) Disconnect connector (20) from DDEC engine oil pressure sensor (21).
- (13) Remove clip (22) and loom (23) from DDEC oil pressure sensor portion of DDEC II wire harness (2).
- (14) Remove DDEC II wire harness (2) from engine (24).

b. *Installation.*



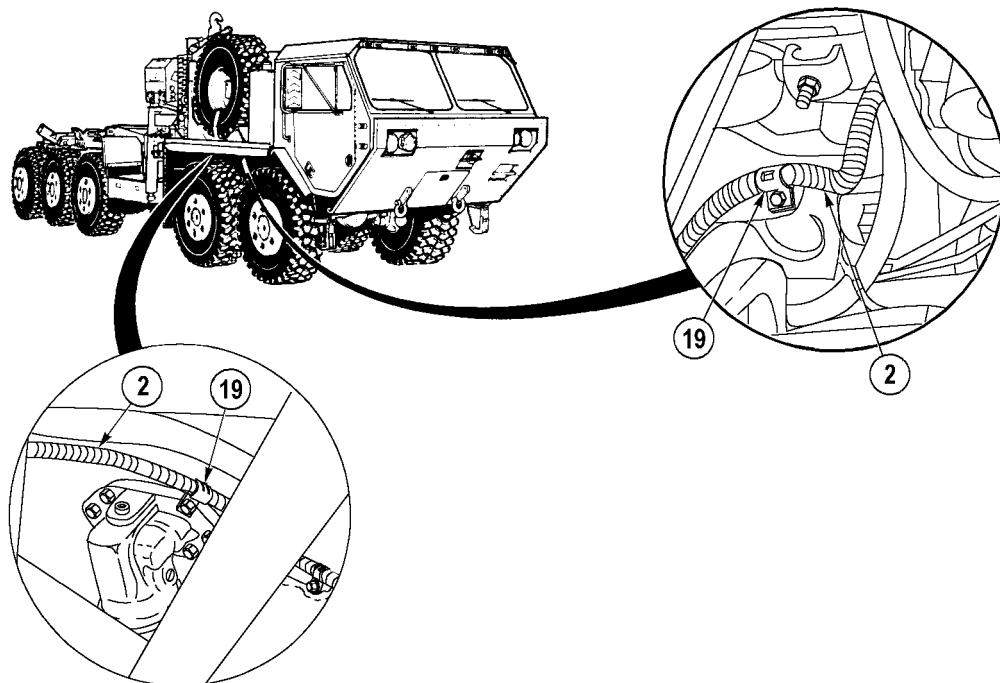
WARNING

Engine must be cool before performing maintenance. Failure to comply may result in injury to personnel.

NOTE

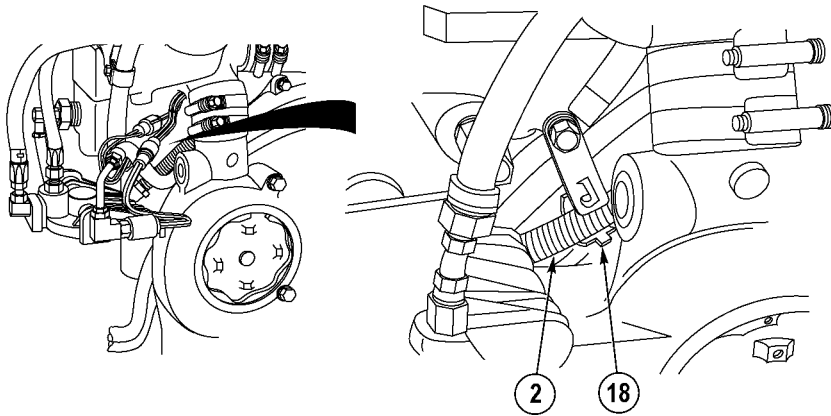
Evenly distribute any slack in harness. Do not make any connections.

- (1) Position DDEC II wire harness (2) on engine (24).
- (2) Install loom (23) and clip (22) on DDEC oil pressure sensor portion of DDEC II wire harness (2).
- (3) Connect connector (20) on DDEC engine oil pressure sensor (21).



- (4) Install DDEC II wire harness (2) in two clips (19) and close clips.

6-15. DDEC II WIRE HARNESS REPLACEMENT (CONT).



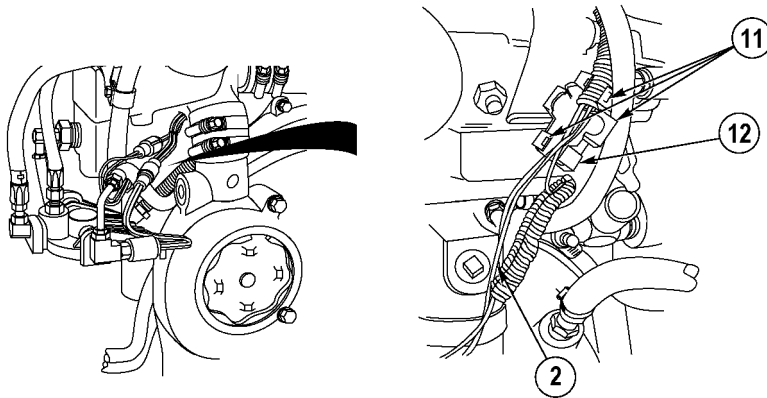
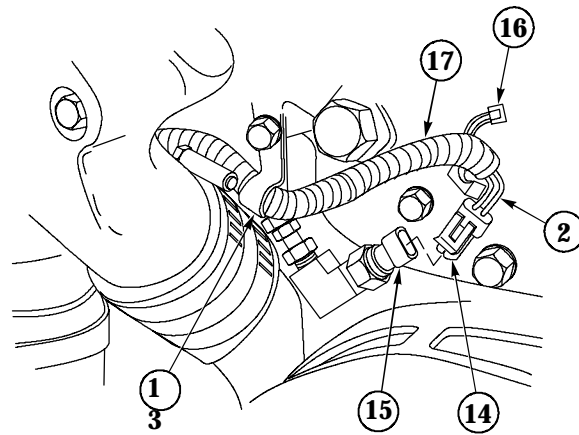
(5) Install DDEC II wire harness (2) in clip (18) and close clip.

(6) Install wire loom (17) and clip (16) on oil temperature sender portion of DDEC II wire harness (2).

(7) Connect connector (14) on oil temperature sender (15).

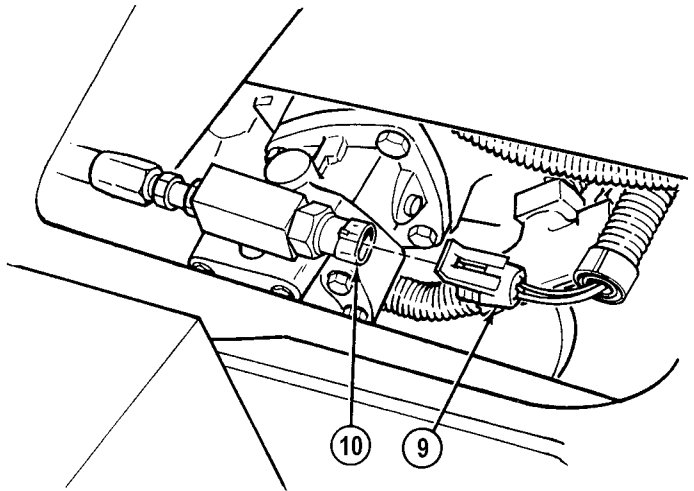
(8) Install DDEC II wire harness (2) in clip (13) and close clip.

(9) Install tee (12) on DDEC II wire harness (2).

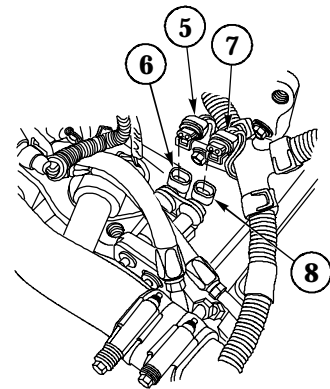


(10) Install tee (12) and DDEC II wire harness (2) in three clips (11) and close clips.

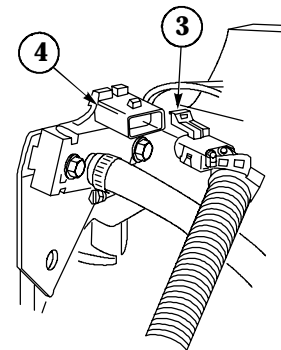
- (11) Connect connector (9) to fuel temperature sensor (10).



- (12) Connect connector (7) to SRS sensor (8).
- (13) Connect connector (5) to TRS sensor (6).

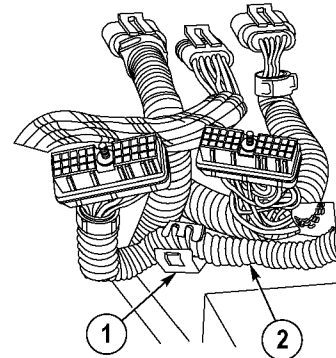


- (14) Connect connector (3) to turbo boost sensor (4).



6-15. DDEC II WIRE HARNESS REPLACEMENT (CONT).

- (15) Install DDEC II wire harness (2) in clip (1) and close clip.



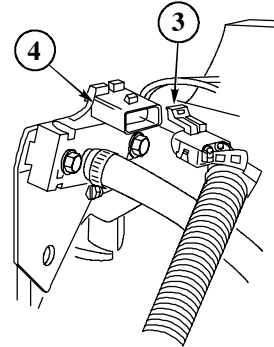
c. Follow-On Maintenance:

- Install inner fender (right side only), (TM 9-2320-364-20).
- Install DDEC II ECM, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

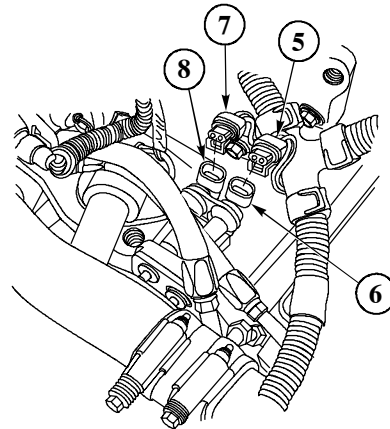
END OF TASK

6-16. DDEC III/IV WIRE HARNESS REPLACEMENT (CONT).

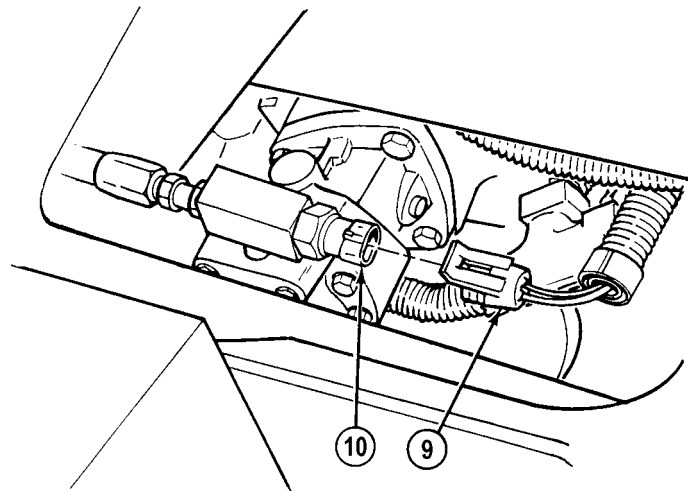
- (2) Disconnect connector (3) from turbo boost sensor (4).

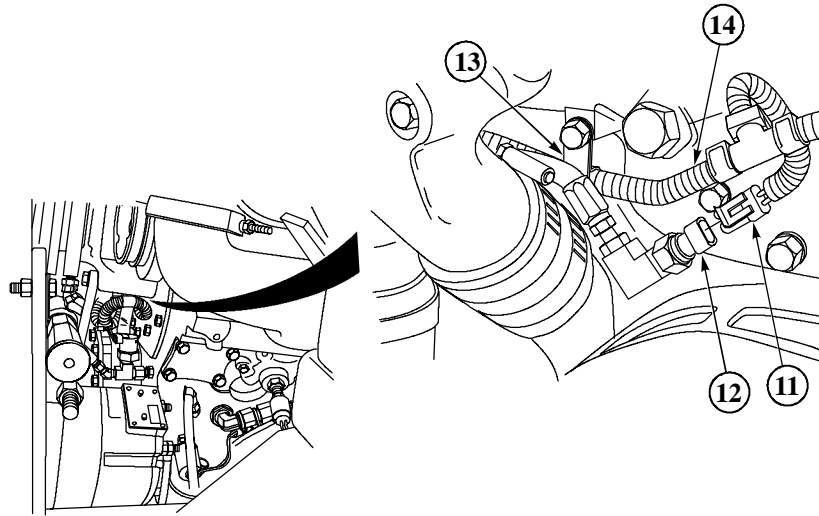


- (3) Disconnect connector (5) from SRS sensor (6).
- (4) Disconnect connector (7) from TRS sensor (8).



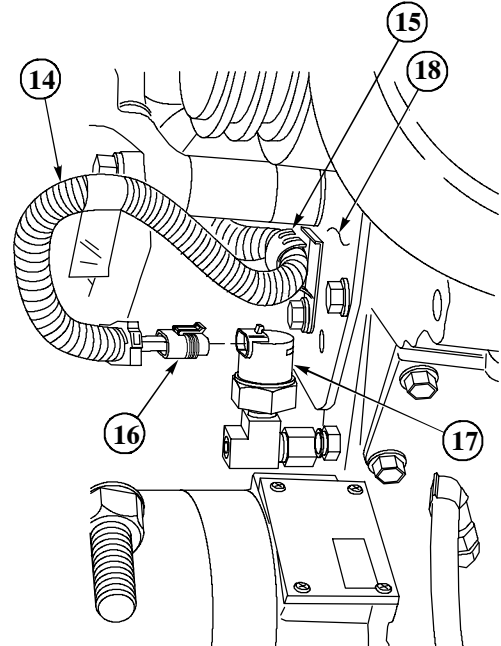
- (5) Disconnect connector (9) from fuel temperature sensor (10).





- (6) Disconnect connector (11) from oil temperature sensor (12).
- (7) Open clip (13) and remove DDEC III/IV wire harness (14) from clip.

- (8) Open clip (15) and remove DDEC III/IV wire harness (14) from clip.
- (9) Disconnect connector (16) from oil pressure sensor (17).
- (10) Remove DDEC III/IV wire harness (14) from engine (18).



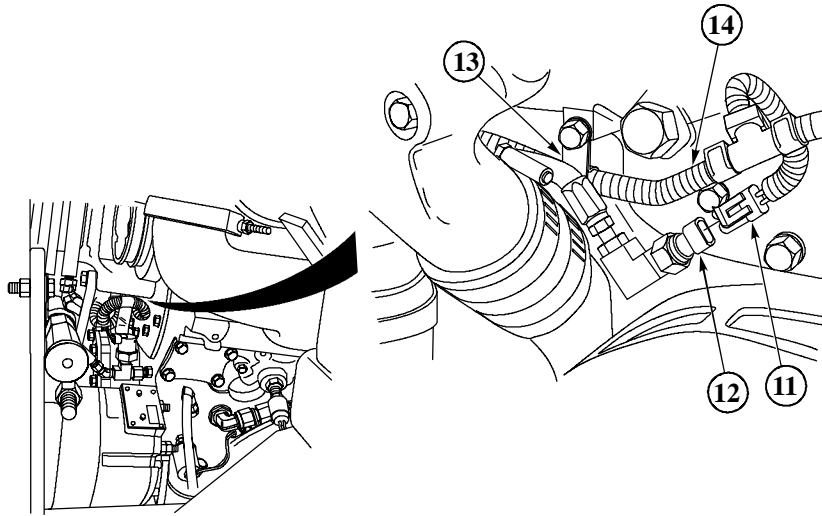
b. Installation.

NOTE

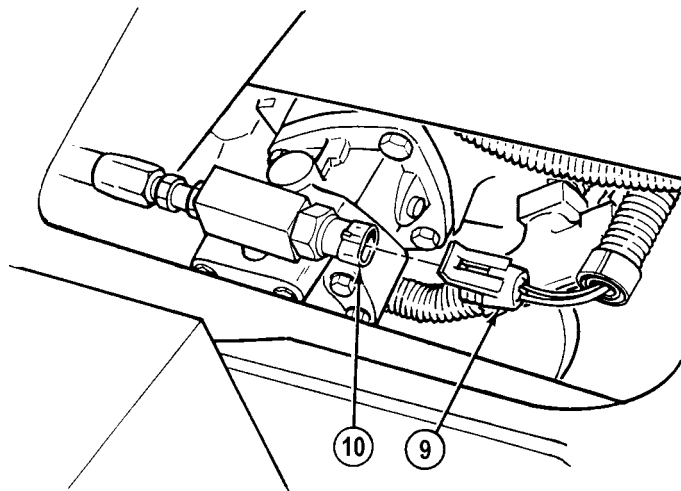
- Evenly distribute any slack in harness. Do not mark any connections.
- Install cable ties as required.

- (1) Position DDEC III/IV wire harness (14) on engine (18).
- (2) Connect connector (16) on oil pressure sensor (17).
- (3) Install DDEC III/IV wire harness (14) on clip (15) and close clip.

6-16. DDEC III/IV WIRE HARNESS REPLACEMENT (CONT).

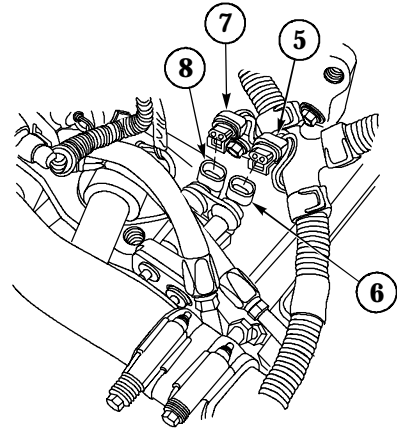


- (4) Install DDEC III/IV wire harness (14) in clip (13) and close clip.
- (5) Connect connector (11) on oil temperature sensor (12).

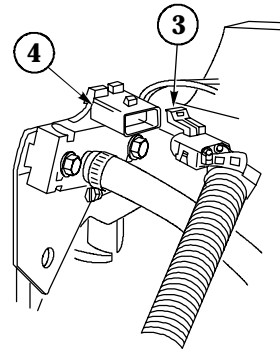


- (6) Connect connector (9) on fuel temperature sensor (10).

- (7) Connect connector (7) on TRS sensor (8).
- (8) Connect connector (5) on SRS sensor (6).

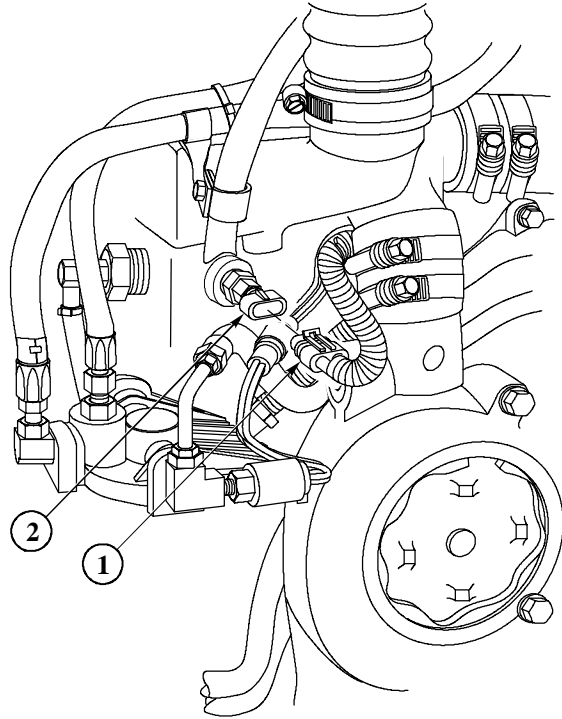


- (9) Connect connector (3) on turbo boost sensor (4).



6-16. DDEC III/IV WIRE HARNESS REPLACEMENT (CONT).

- (10) Connect connector (1) on coolant temperature sensor (2).



c. Follow-On Maintenance:

- Install inner fender (right side only), (TM 9-2320-364-20).
- Install DDEC III/IV ECM, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-17. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Goggles, Industrial (Item 83, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

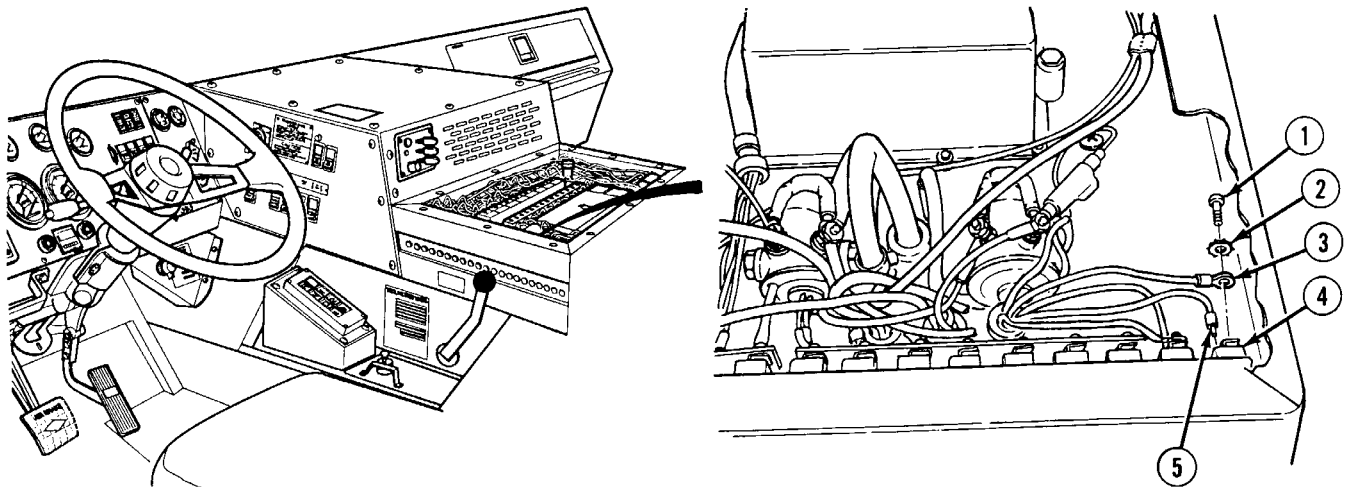
Materials/Parts

Cable Ties (Item 9, Appendix B)
Compound, Corrosion Preventative
(Item 15, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (2) (Item 169, Appendix E)
Locknut (4) (Item 176, Appendix E)
Lockwasher (2) (Item 279, Appendix E)
Lockwasher (2) (Item 298, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)
Left side noise panel removed,
(TM 9-2320-364-20)
Left fender front skirt removed,
(TM 9-2320-364-20)
Electronic Control Box (ECB) cover removed,
(TM 9-2320-364-20)
Cab engine access panel removed,
(TM 9-2320-364-20)

a. Removal.



NOTE

- Tag and mark all wires and connectors prior to removal.
- Remove cable ties as needed.

- (1) Remove screw (1), lockwasher (2) and wire 240 (3) from circuit breaker CB23 (4). Discard lockwasher.
- (2) Disconnect wire 240 (5) from circuit breaker CB23 (4).

6-17. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT (CONT).

- (3) Remove screw (6), lockwasher (7) and wire 241 (8) from circuit breaker CB22 (9). Discard lockwasher.
- (4) Disconnect wire 241 (10) from circuit breaker CB22 (9).

NOTE

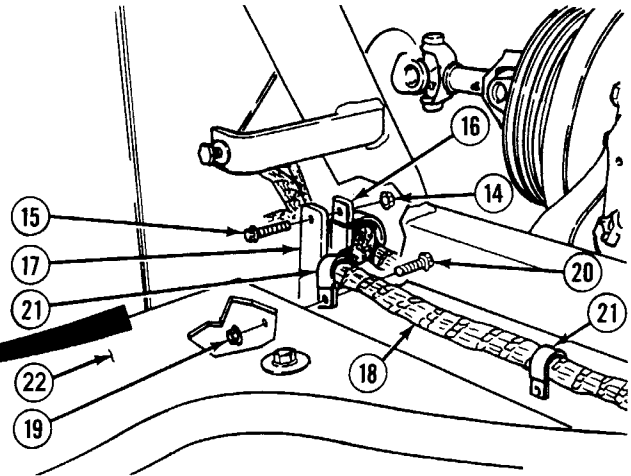
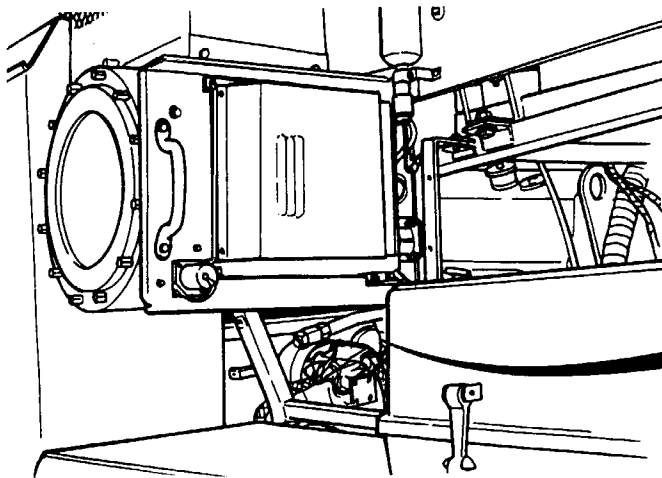
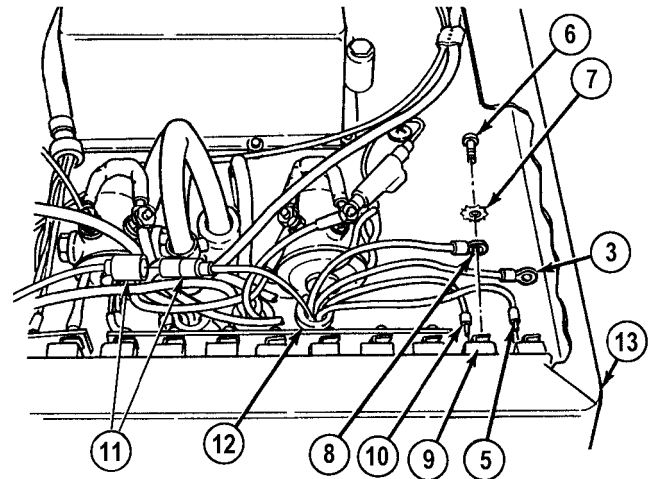
Perform Step (5) for DDEC III/IV trucks only.

- (5) Disconnect MC14 connector (11).

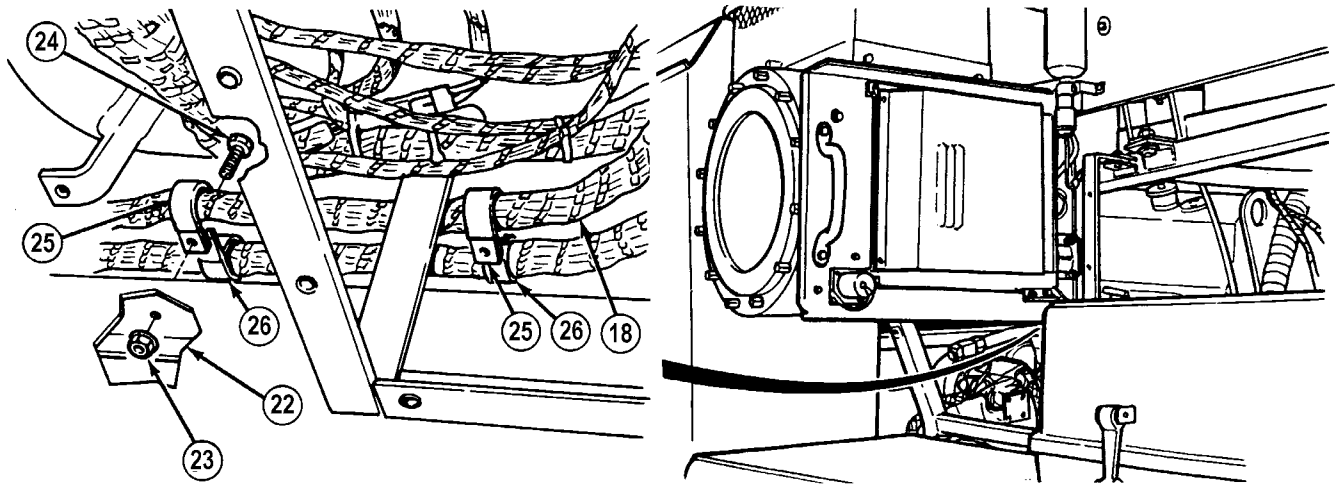
NOTE

MC14 connector in Step (6) will be on DDEC III/IV trucks only.

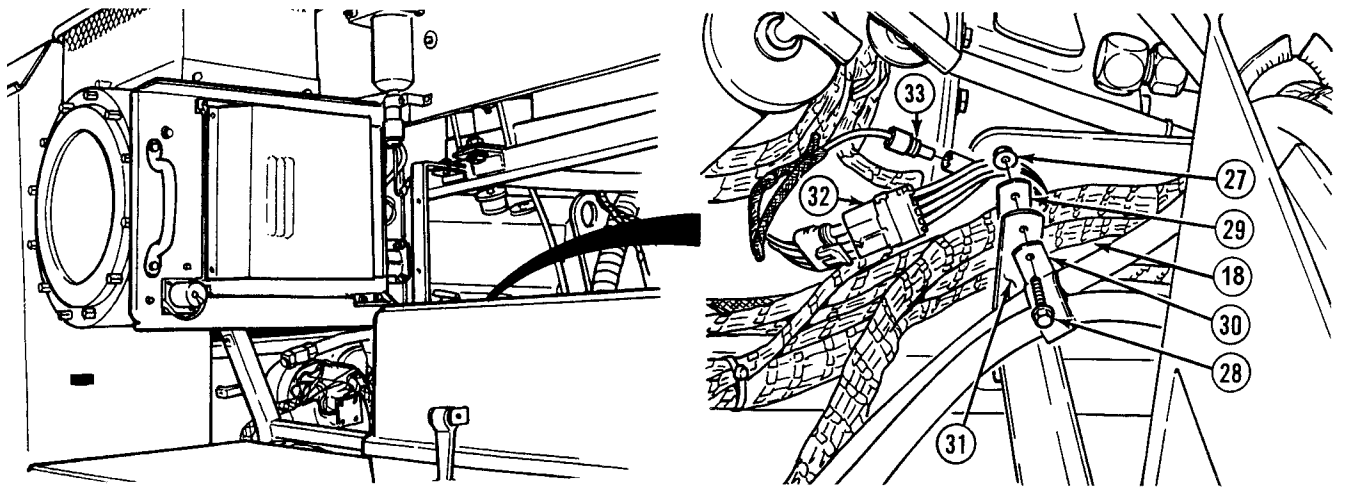
- (6) Pull two wires 240 (3) and (5) and two wires 241 (8) and (10) and MC14 connector (11) through grommet (12) on electrical control box (13).



- (7) Remove locknut (14), screw (15) and cushion clip (16) from bracket (17) and DDEC battery power wire harness (18). Discard locknut.
- (8) Remove two locknuts (19), screws (20) and cushion clips (21) from fender (22) and DDEC battery power wire harness (18). Discard locknuts.

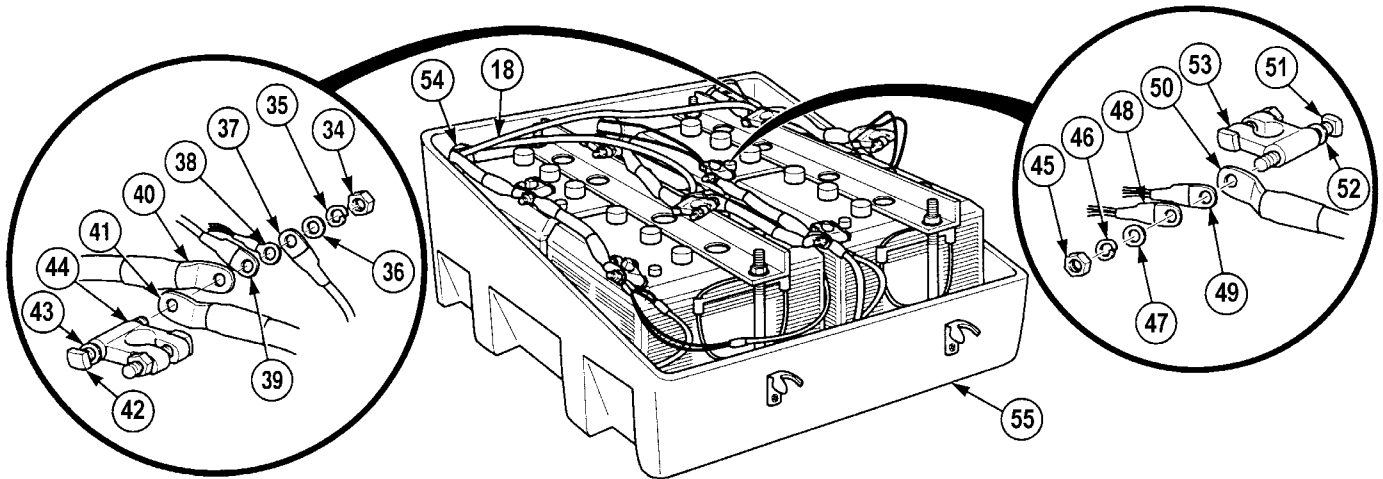


- (9) Remove two locknuts (23), screws (24) and four cushion clips (25) and (26) from fender (22) and DDEC battery power wire harness (18). Discard locknuts.



- (10) Remove locknut (27), screw (28) and cushion clips (29) and (30) from bracket (31) and DDEC battery power wire harness (18). Discard locknut.
- (11) Disconnect connectors MC62 (32) and MC95 (33).

6-17. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT (CONT).

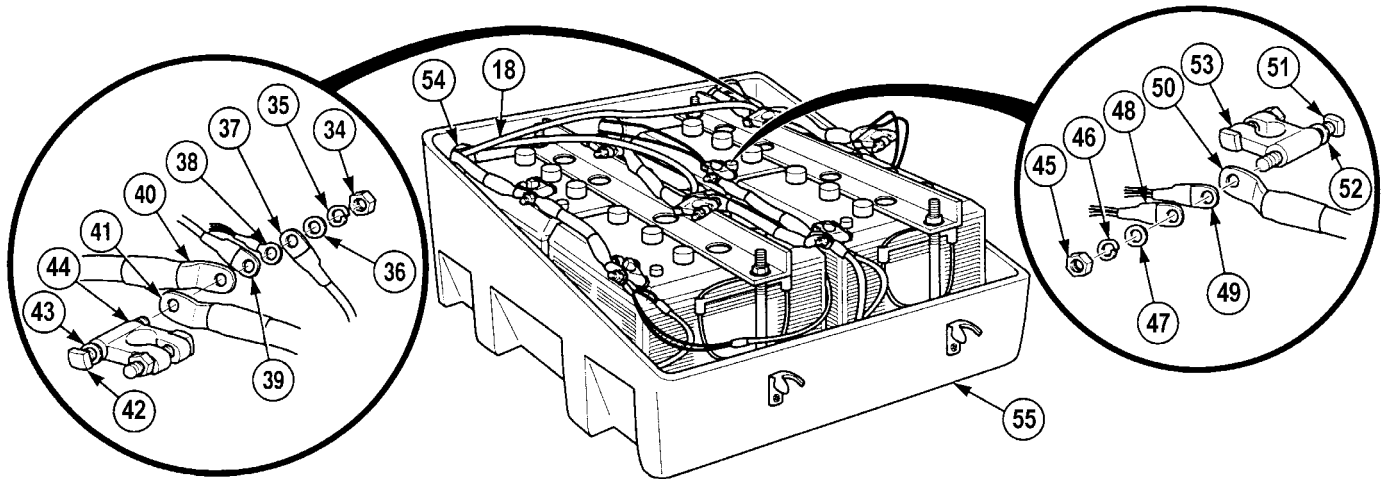


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

- (12) Remove nut (34), lockwasher (35), washer (36), wire 1275 (37), wire 150/150 (38), wire 208/209 (39), cable (40), cable (41), screw (42) and washer (43) from negative terminal (44). Discard lockwasher.
- (13) Remove nut (45), lockwasher (46), washer (47), wire 240/241 (48), wire 1079 (49), cable (50), screw (51) and washer (52) from positive terminal (53). Discard lockwasher.
- (14) Pull DDEC battery power wire harness (18) through hole in battery box (54) and remove DDEC battery power wire harness (55) from truck.

b. Installation.

**WARNING**

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

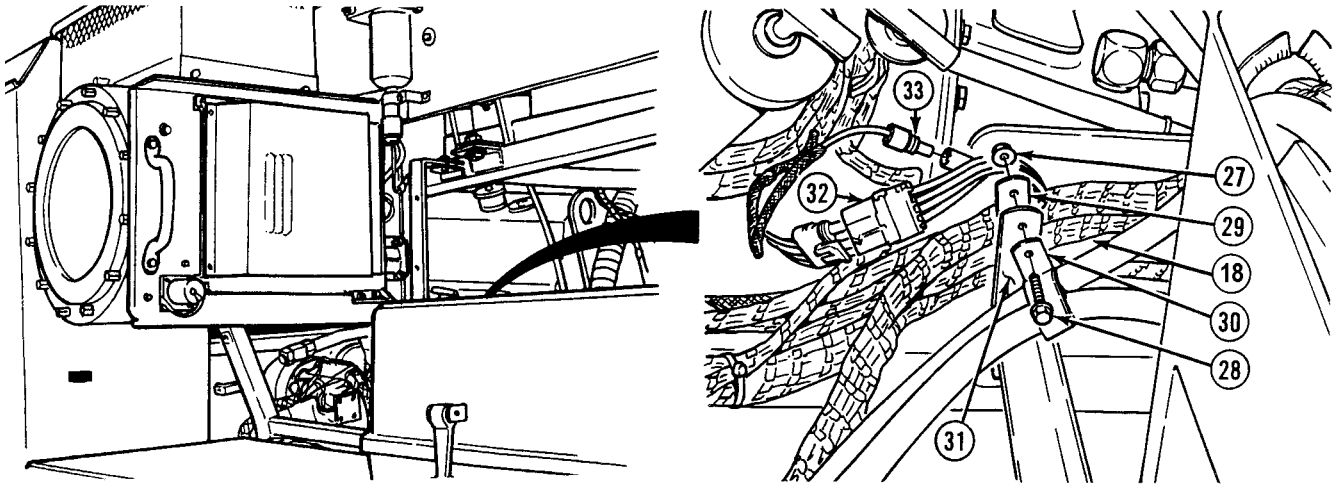
- (1) Pull DDEC battery power wire harness (18) through hole (54) in battery box (55) and position in truck.
- (2) Position washer (52), screw (51), cable (50), wire 1079 (49), wire 240/241 (48), washer (47), lockwasher (46) and nut (45) on positive terminal (53).
- (3) Tighten nut (45) to 12 to 16 lb-ft (16 to 22 N·m).
- (4) Position washer (43), screw (42), cable (41), cable (40), wire 208/209 (39), wire 150/150 (38), wire 1275 (37), washer (36), lockwasher (35) and nut (34) on negative terminal (44).
- (5) Tighten nut (34) to 12 to 16 lb-ft (16 to 22 N·m).

WARNING

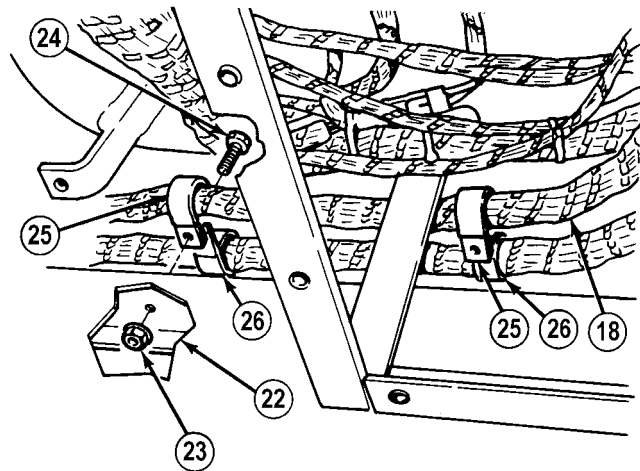
Corrosion compound contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water at least 15 minutes and get immediate medical attention.

- (6) Apply corrosion preventative compound to two terminals (44) and (53).

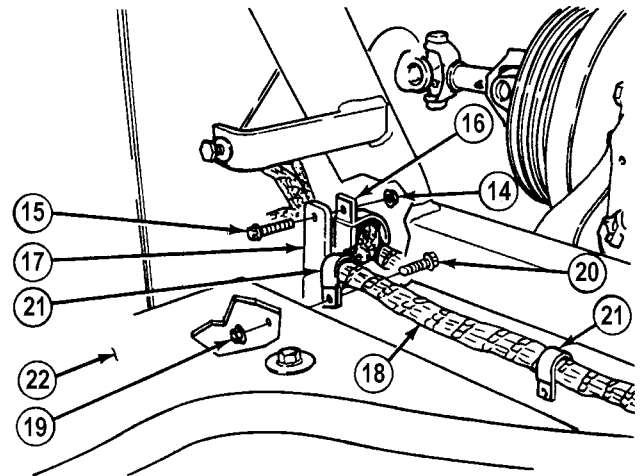
6-17. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT (CONT).



- (7) Connect MC95 connector (33) and MC62 connector (32).
- (8) Install cushion clip (29) on DDEC battery power wire harness (18).
- (9) Install cushion clips (30) and (29) on bracket (31) with screw (28) and locknut (27).
- (10) Install cushion clips (25) and (26) on DDEC battery power wire harness (18).
- (11) Install cushion clips (25) and (26) on fender (22) with two screws (24) and locknuts (23).



- (12) Install two cushion clips (21) on DDEC battery power wire harness (18).
- (13) Install two cushion clips (21) on fender (22) with two screws (20) and locknuts (19).
- (14) Install cushion clip (16) on DDEC battery power wire harness (18).
- (15) Install cushion clip (16) on bracket (17) with screw (15) and locknut (14).



NOTE

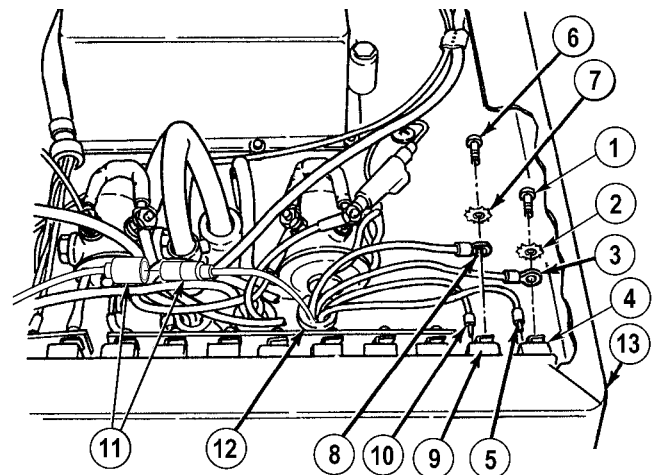
MC14 connector in Step (16) is on DDEC III/IV trucks only.

- (16) Push two wires 240 (3) and (5) and two wires 241 (8) and (10) and MC14 connector (11) through grommet (12) on electrical control box (13).

NOTE

Perform Step (17) for DDEC III/IV trucks only.

- (17) Connect MC14 connector (11).
- (18) Connect wire 241 (10) on circuit breaker CB22 (9).
- (19) Install wire 241 (8) on circuit breaker CB22 (9) with lockwasher (7) and screw (6).
- (20) Connect wire 240 (5) on circuit breaker CB23 (4).
- (21) Install wire 240 (3) on circuit breaker CB23 (4) with lockwasher (2) and screw (1).

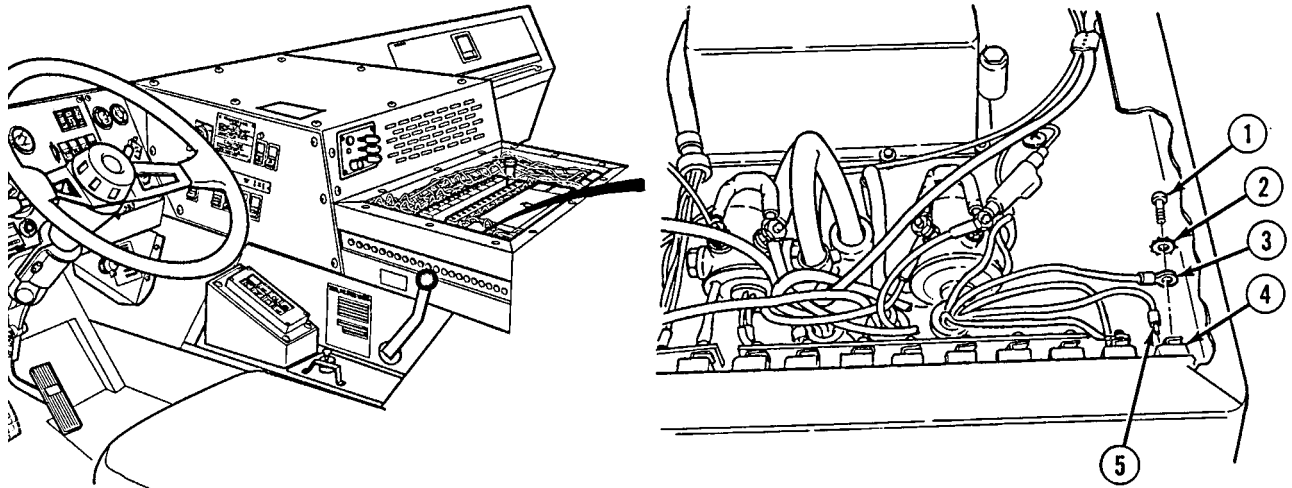


c. Follow-On Maintenance:

- Install Electronic Control Box (ECB) covers, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Install left fender front skirt, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

a. *Removal.*



NOTE

- Tag and mark all wires and connectors prior to removal.
- Remove cable ties as required.

- (1) Remove screw (1), lockwasher (2) and wire 240 (3) from circuit breaker CB23 (4). Discard lockwasher.
- (2) Disconnect wire 240 (5) from circuit breaker CB23 (4).

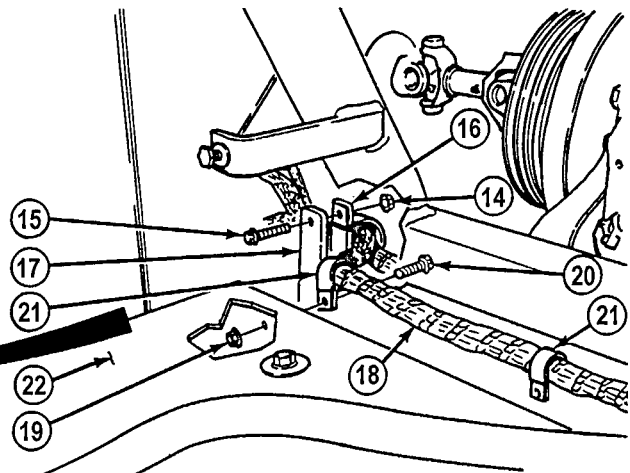
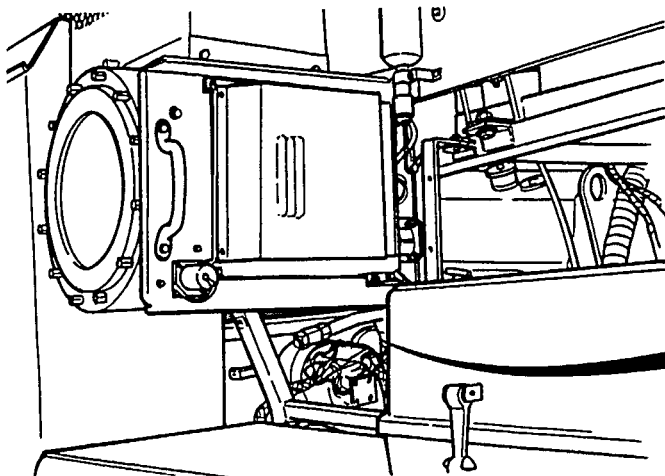
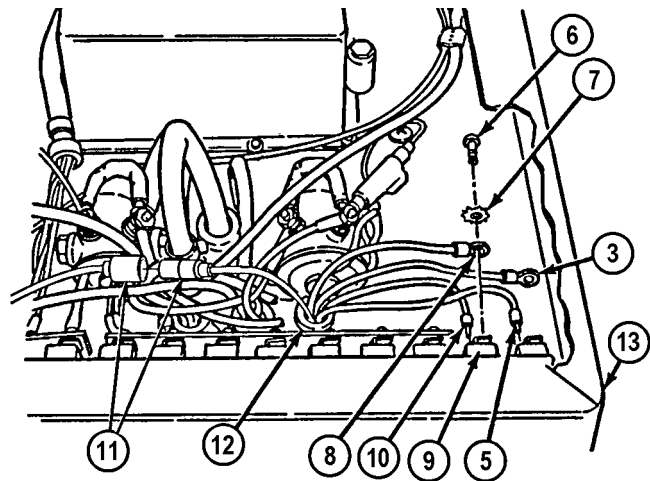
6-18. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

- (3) Remove screw (6), lockwasher (7) and wire 241 (8) from circuit breaker CB22 (9). Discard lockwasher.
- (4) Disconnect wire 241 (10) from circuit breaker CB22 (9).

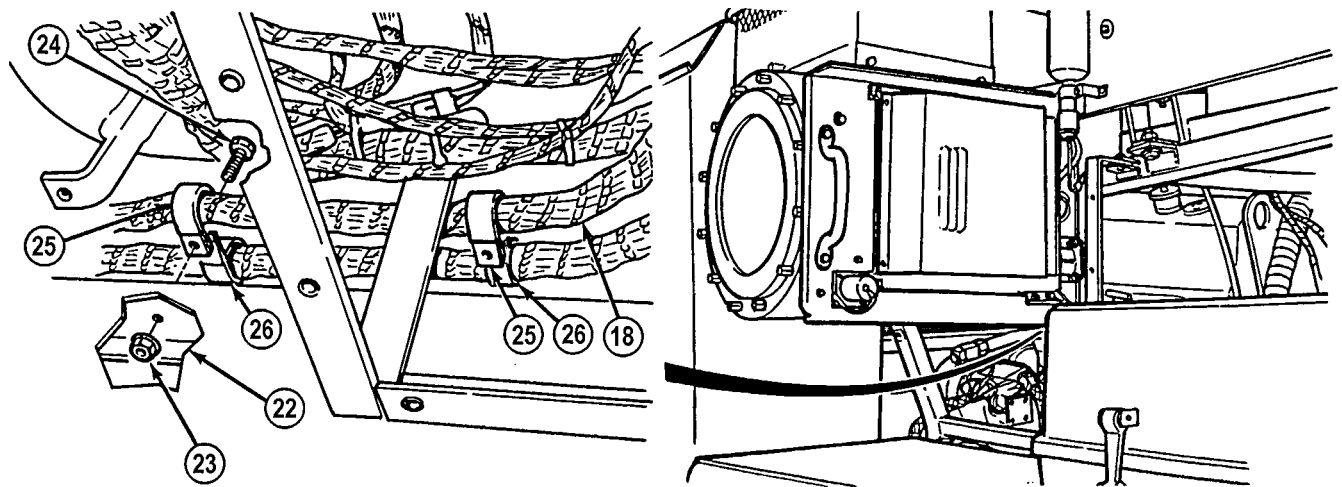
NOTE

Perform Step (5) for DDEC III/IV trucks only.

- (5) Disconnect MC14 connector (11).
- (6) Pull two wires 240 (3) and (5) and two wires 241 (8) and (10) and MC14 connector (11) through grommet (12) on electrical control box (13).



- (7) Remove locknut (14), screw (15) and cushion clip (16) from bracket (17) and DDEC battery power wire harness (18). Discard locknut.
- (8) Remove two locknuts (19), screws (20) and cushion clips (21) from fender (22) and DDEC battery power wire harness (18). Discard locknuts.

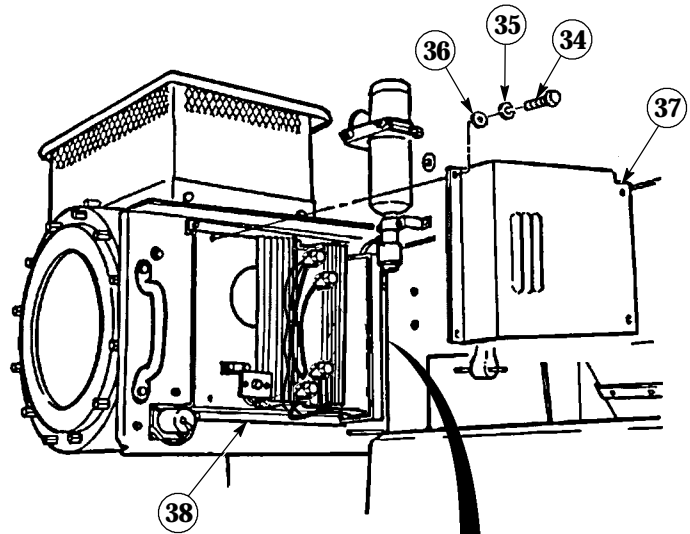
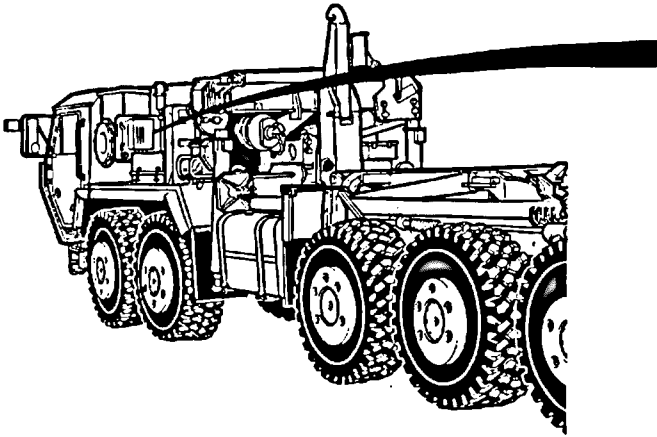


- (9) Remove two locknuts (23), screws (24) and four cushion clips (25) and (26) from fender (22) and DDEC battery power wire harness (18). Discard locknuts.



- (10) Remove locknut (27), screw (28) and cushion clips (29) and (30) from bracket (31) and DDEC battery power wire harness (18). Discard locknut.
- (11) Disconnect connectors MC62 (32) and MC95 (33).

6-18. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

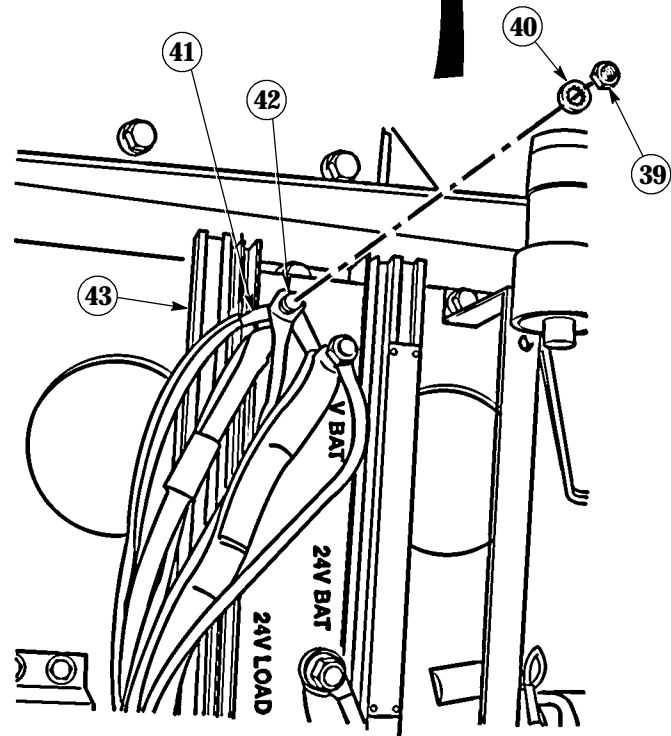


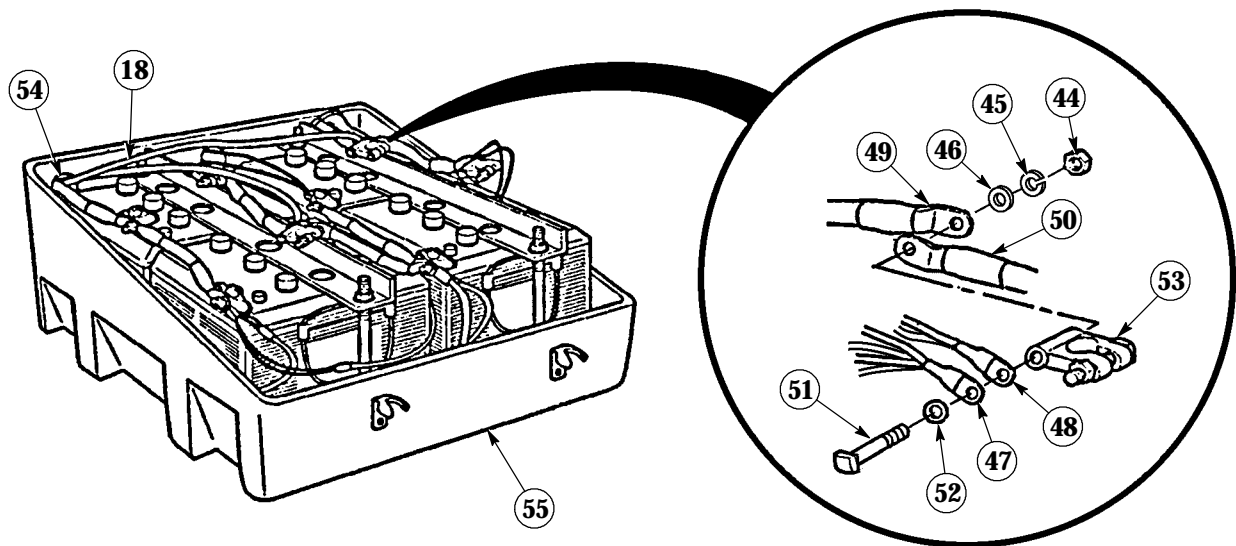
- (12) Remove four screws (34), lockwashers (35), washers (36) and splash guard (37) from electric bracket (38). Discard lockwashers.

NOTE

There are five wires located on 12 volt load terminal. Remove only wire 240/241 and position remaining wires back on 12 volt load terminal.

- (13) Remove nut (39), lockwasher (40) and wire 240/241 (41) from 12 volt load terminal (42) of polarity protection control (43). Reinstall nut on 12 volt load terminal. Discard lockwasher.





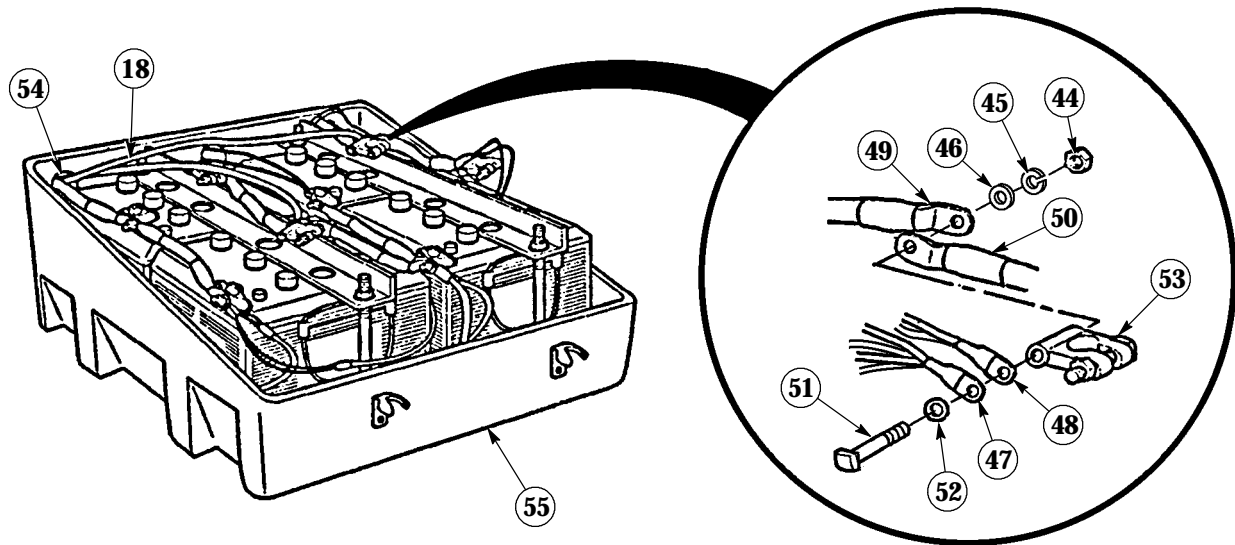
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

- (14) Remove nut (44), lockwasher (45), washer (46), wire 150/150/151/953 (47), wire 208/209 (48), cable 1138 (49), cable 1137 (50), screw (51) and washer (52) from negative terminal (53). Discard lockwasher.
- (15) Pull DDEC battery power wire harness (18) through hole (54) in battery box (55) and remove DDEC battery power wire harness (18) from truck.

6-18. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

b. Installation.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

Install cable ties as required.

- (1) Position DDEC battery power wire harness (18) through hole (54) in battery box (55).
- (2) Position screw (51), washer (52), cable 1137 (50), cable 1138 (49), wire 208/209 (48), wire 150/150/151/953 (47), washer (46), lockwasher (45) and nut (44) on negative terminal (53).
- (3) Tighten nut (44) to 12 to 16 lb-ft (16-22 N·m).

WARNING

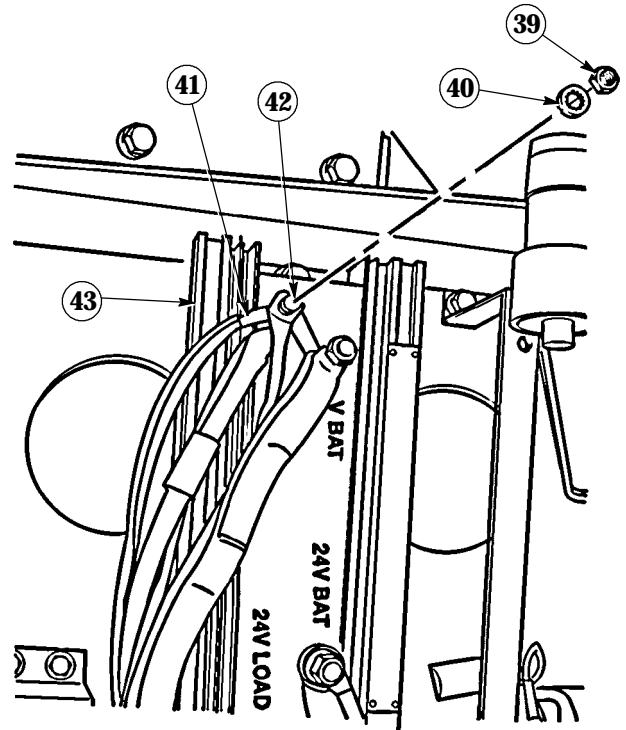
Corrosion compound contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water at least 15 minutes and get immediate medical attention.

- (4) Apply corrosion preventative compound to terminal (53).

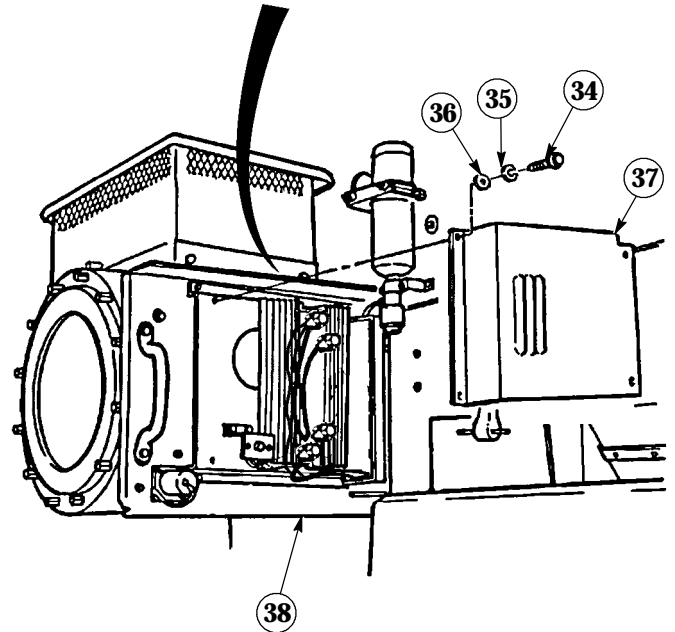
- (5) Remove nut (39) from 12 volt load terminal (42) of polarity protection control (43). Install wire 240/241 (41), lockwasher (40) and nut on 12 volt load terminal.

WARNING

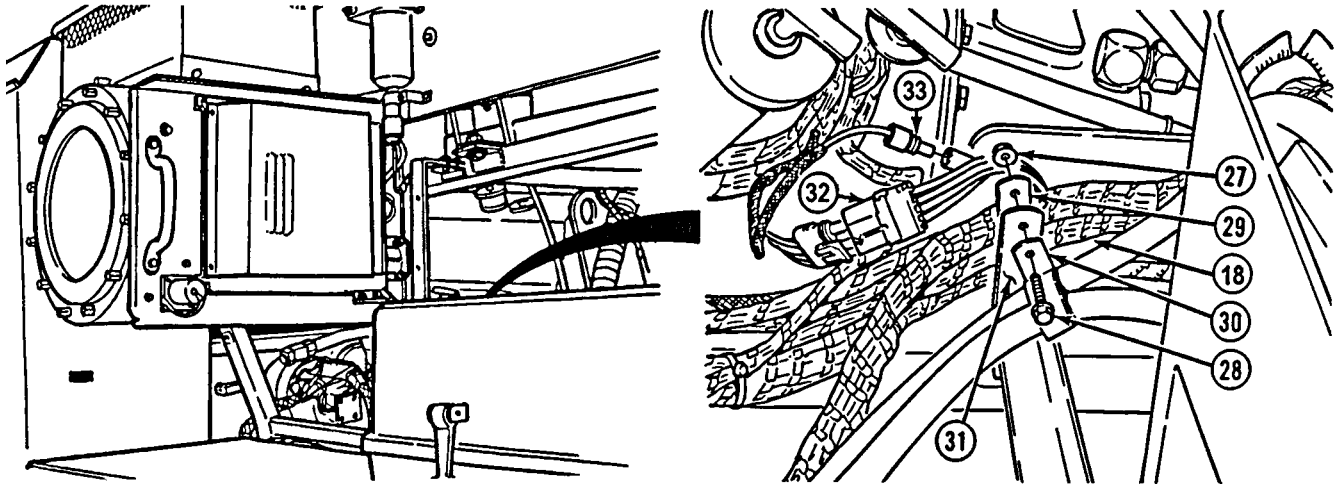
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



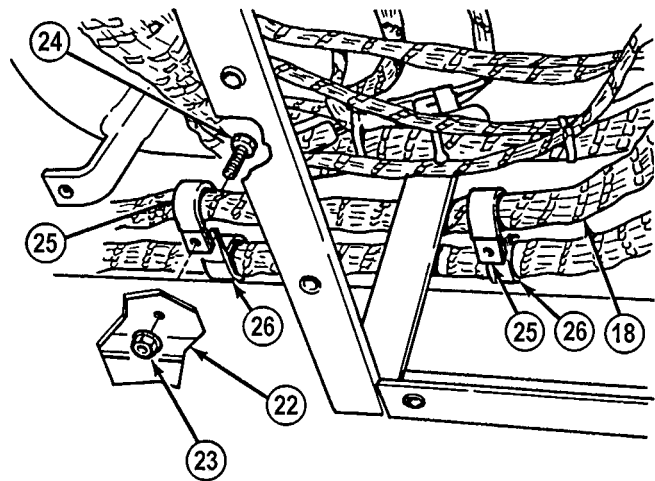
- (6) Apply electrical sealant to 12 volt load terminal (42).
- (7) Install splash guard (37), four washers (36), lockwashers (35) and screws (34) on electric bracket (38).



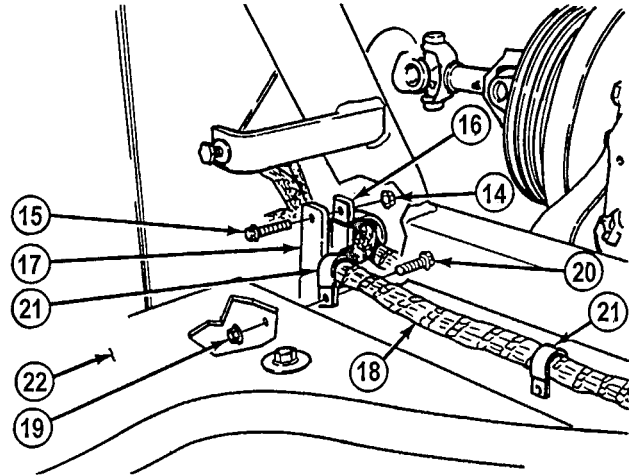
6-18. DDEC BATTERY POWER WIRE HARNESS REPLACEMENT (200 AMP) (CONT).



- (8) Connect MC95 connector (33) and MC62 connector (32).
- (9) Install cushion clip (29) on DDEC battery power wire harness (18).
- (10) Install cushion clips (30) and (29) on bracket (31) with screw (28) and locknut (27).
- (11) Install cushion clips (26) and (25) on DDEC battery power wire harness (18).
- (12) Install cushion clips (26) and (25) on fender (22) with two screws (24) and locknuts (23).



- (13) Install two cushion clips (21) on DDEC battery power wire harness (18).
- (14) Install two cushion clips (21) on fender (22) with two screws (20) and locknuts (19).
- (15) Install cushion clip (16) on DDEC battery power wire harness (18).
- (16) Install cushion clip (16) on bracket (17) with screw (15) and locknut (14).

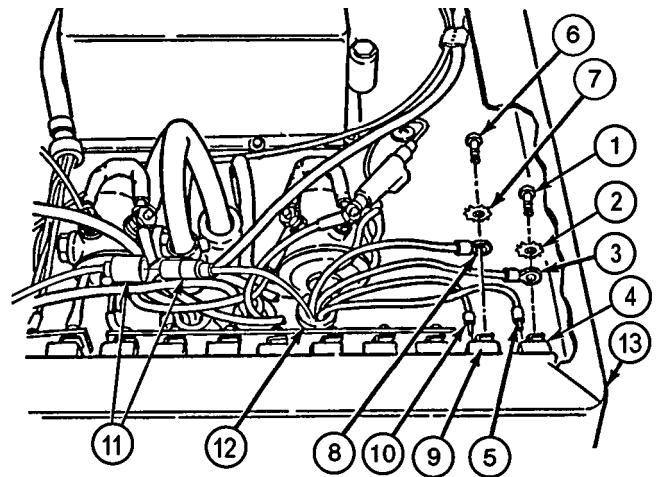


- (17) Push two wires 240 (3) and (5) and two wires 241 (8) and (10) and MC14 connector (11) through grommet (12) on electrical control box (13).

NOTE

Perform Step (18) for DDEC III/IV trucks only.

- (18) Connect MC14 connector (11).
- (19) Connect wire 241 (10) on circuit breaker CB22 (9).
- (20) Install wire 241 (8) on circuit breaker CB22 (9) with lockwasher (7) and screw (6).
- (21) Connect wire 240 (5) on circuit breaker CB23 (4).
- (22) Install wire 240 (3) on circuit breaker CB23 (4) with lockwasher (2) and screw (1).

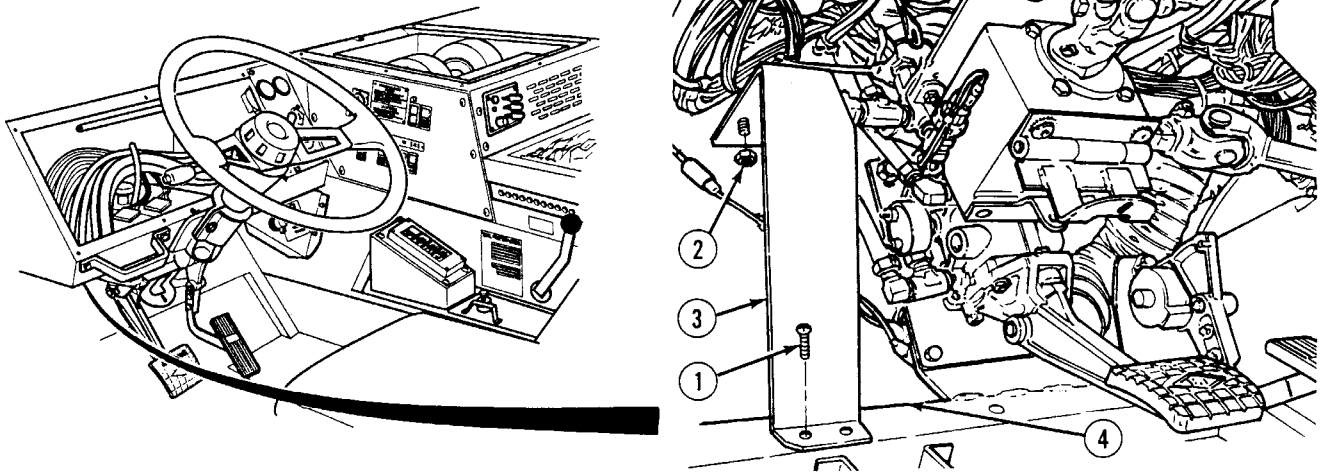


c. Follow-On Maintenance.

- Install Electronic Control Box (ECB) covers, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Install left fender front skirt, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

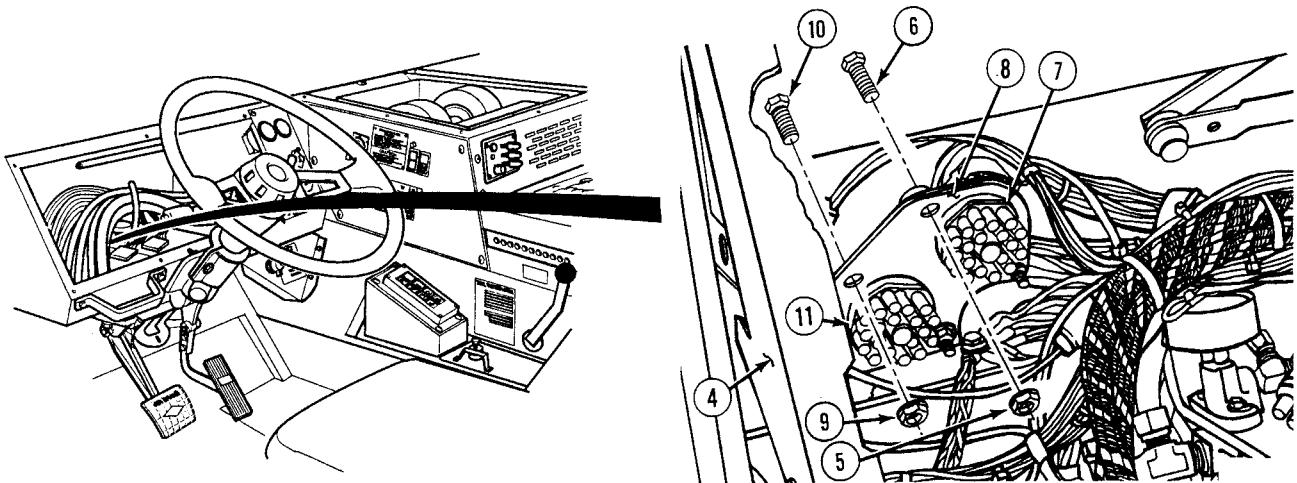
a. Removal.



NOTE

- Tag and mark all wires and connectors prior to removal.
- Remove cable ties required.
- Steps (1) through (46) are located in dash area.

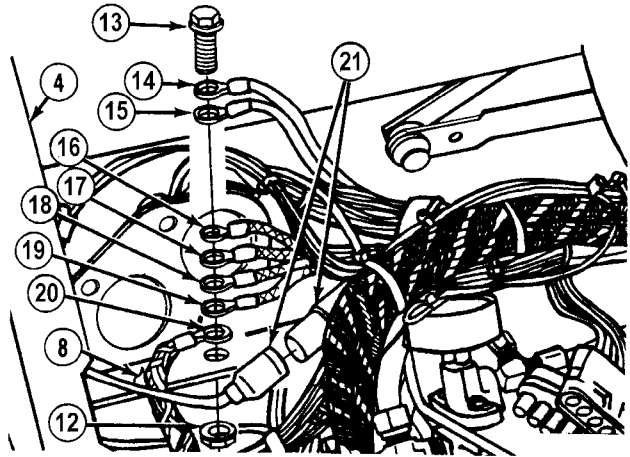
(1) Remove two screws (1), locknut (2) and headlight guard (3) from cab (4). Discard locknut.



- (2) Remove two locknuts (5) and screws (6) from switch harness MC4 connector (7) and bracket (8). Discard locknuts.
- (3) Remove switch harness MC4 connector (7) from bracket (8).
- (4) Remove two locknuts (9) and screws (10) from gage harness MC8 connector (11) and bracket (8). Discard locknuts.
- (5) Remove gage harness MC8 connector (11) from bracket (8).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

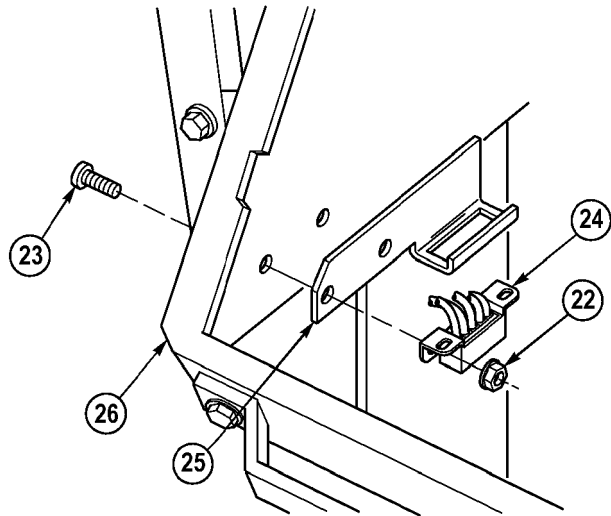
- (6) Remove locknut (12) and screw (13) from cab (4) and remove two wires 1435 (14) and (15), shield wire (16), wire 1435 (17) and shield wire (18), shield wire (19) and shield wire (20).
- (7) Position screw (13) and locknut (12) on bracket (8).
- (8) Disconnect I.D. clearance light 1012 connector (21).



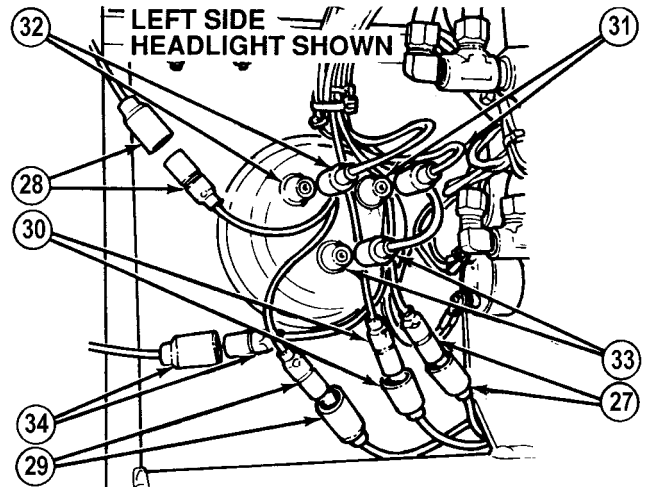
NOTE

Removal of bracket in Step (9) is for DDEC III/IV engines only.

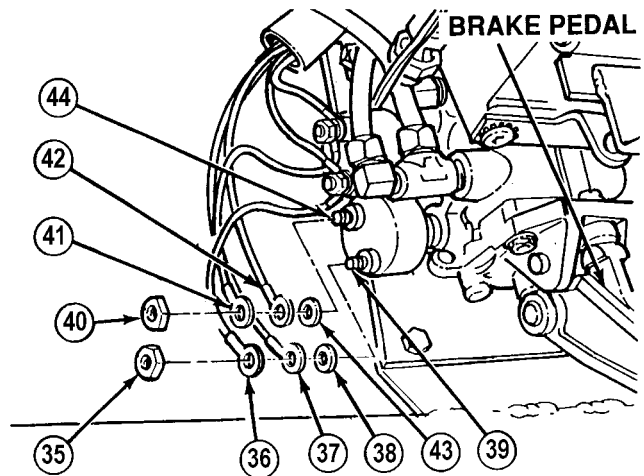
- (9) Remove two locknuts (22), screws (23) and MC13 diagnostic connector (24) and bracket (25) from left side of dash panel (26). Discard locknuts.



- (10) Disconnect parking light 1008 connector (27).
- (11) Disconnect left side turn light 1002 connector (28).
- (12) Disconnect left side turn light 1002 connector (29).
- (13) Disconnect marker light 1680 connector (30).
- (14) Disconnect left side headlight 1007 connector (31).
- (15) Disconnect left side headlight 1006 connector (32).
- (16) Disconnect left side headlight 1435 connector (33).
- (17) Disconnect left side marker light 1012 connector (34).

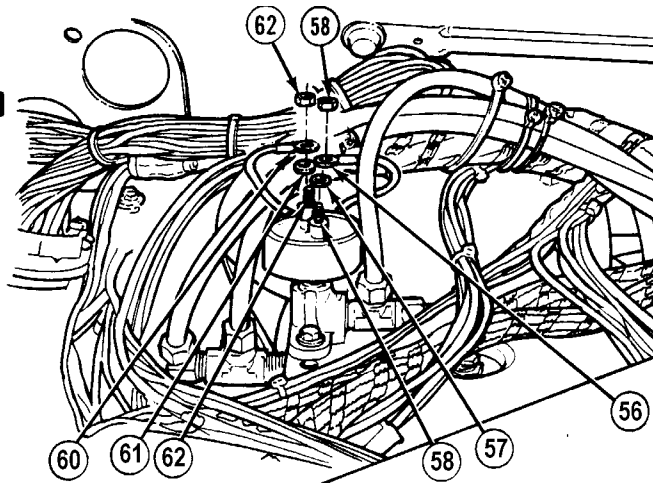
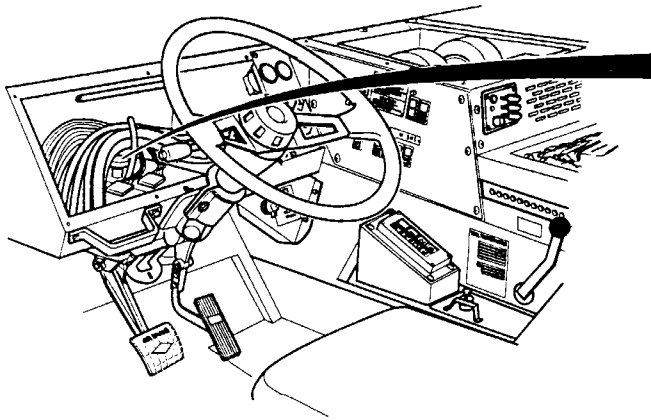
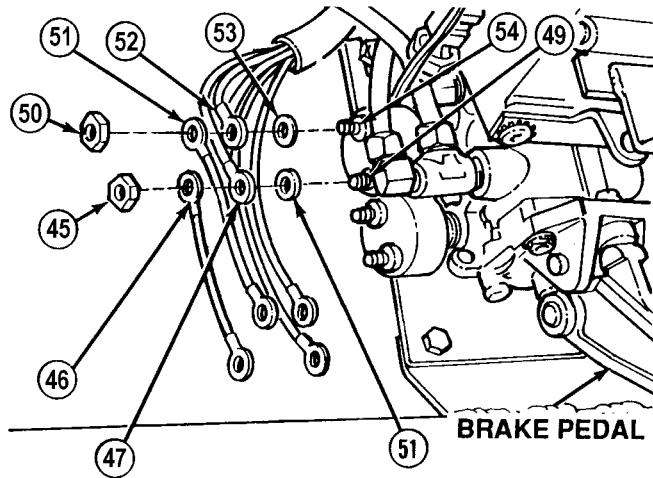


- (18) Remove nut (35), jumper wire 1009 (36), wire 1009 (37) and washer (38) from terminal (39).
- (19) Position washer (38) and nut (35) on terminal (39).
- (20) Remove nut (40), jumper wire 1005 (41), wire 1005 (42) and washer (43) from terminal (44).
- (21) Position washer (43) and nut (40) on terminal (44).

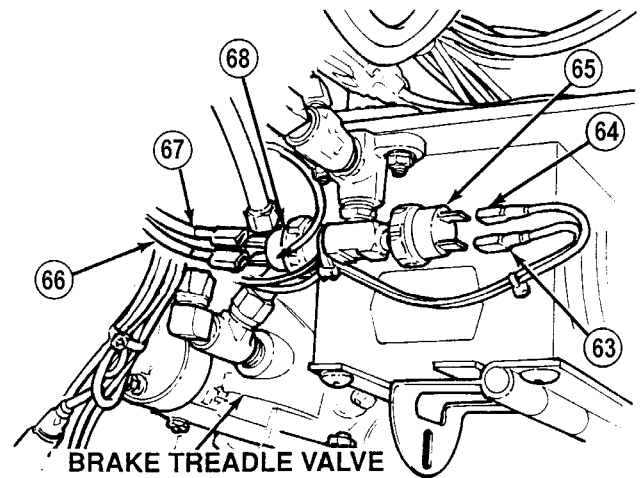
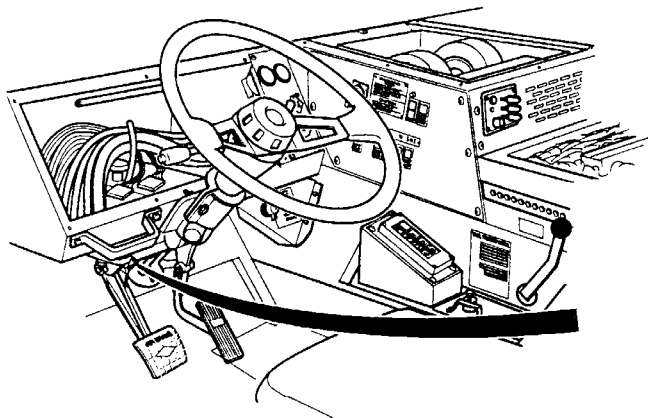


6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

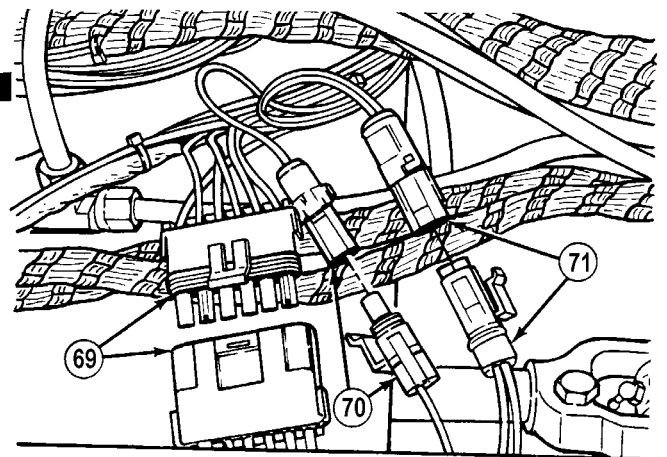
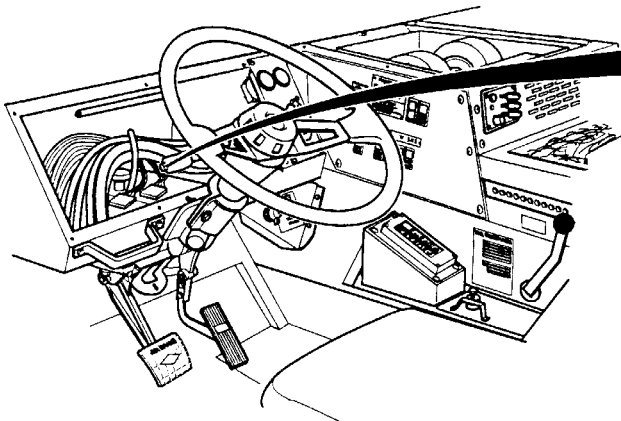
- (22) Remove nut (45), jumper wire 1009 (46), wire 1009 (47) and washer (48) from terminal (49).
- (23) Position washer (48) and nut (45) on terminal (49).
- (24) Remove nut (50), jumper wire 1005 (51), wire 1005 (52) and washer (53) from terminal (54).
- (25) Position washer (53) and nut (50) on terminal (54).



- (26) Remove nut (55), wire 1009 (56) and washer (57) from hand brake terminal (58).
- (27) Position washer (57) and nut (55) on hand brake terminal (58).
- (28) Remove nut (59), wire 1005 (60) and washer (61) from hand brake terminal (62).
- (29) Position washer (61) and nut (59) on hand brake terminal (62).



- (30) Disconnect wire 510 (63) and wire 1525 (64) from parking brake switch (65).
- (31) Disconnect wire 1371 (66) and wire 1435 (67) from parking brake switch (68).



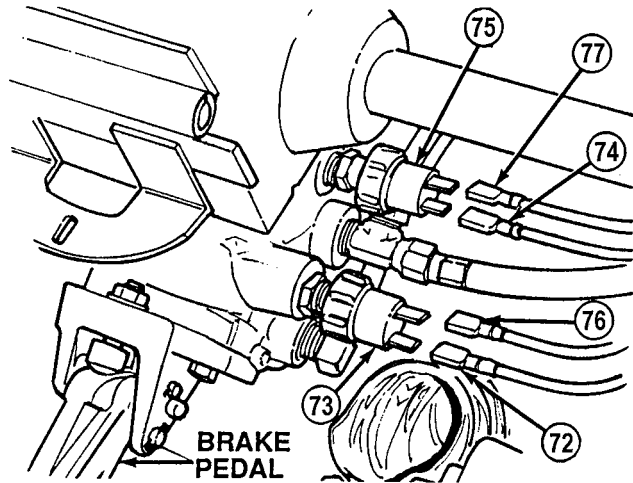
NOTE

Disconnect connector by prying up on tabs and gently pulling apart connector.

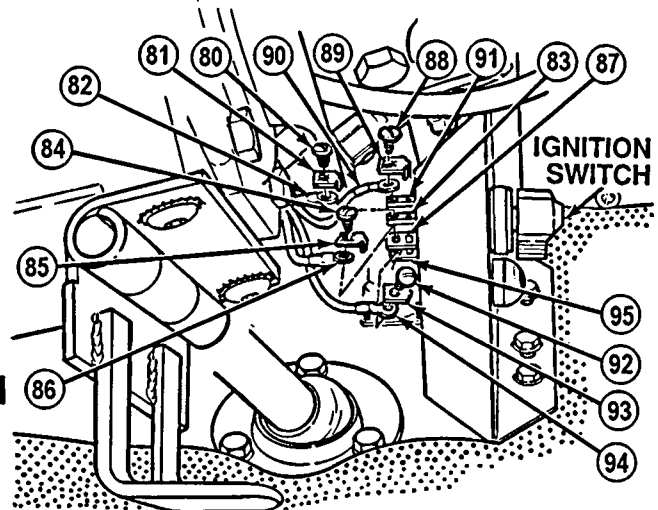
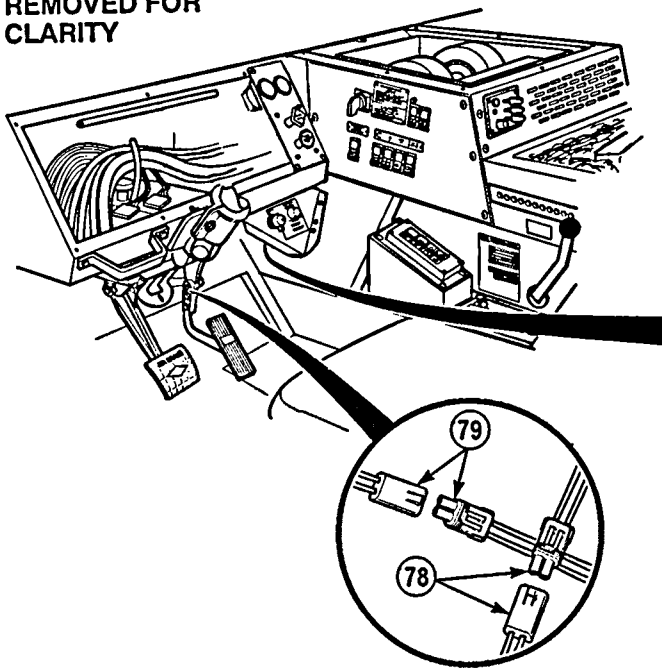
- (32) Disconnect turn signal MC7 connector (69).
- (33) Disconnect turn signal MC92 connector (70).
- (34) Disconnect turn signal MC91 connector (71).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

- (35) Remove wire 1120 (72) from low air pressure switch (73).
- (36) Remove wire 1120 (74) from low air pressure switch (75).
- (37) Remove wire 1435 (76) from low air pressure switch (73).
- (38) Remove wire 1435 (77) from low air pressure switch (75).

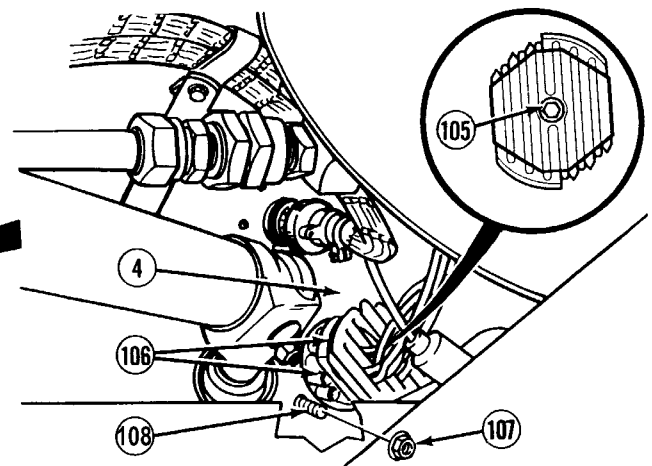
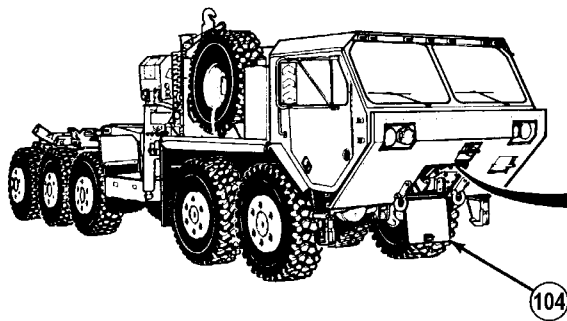
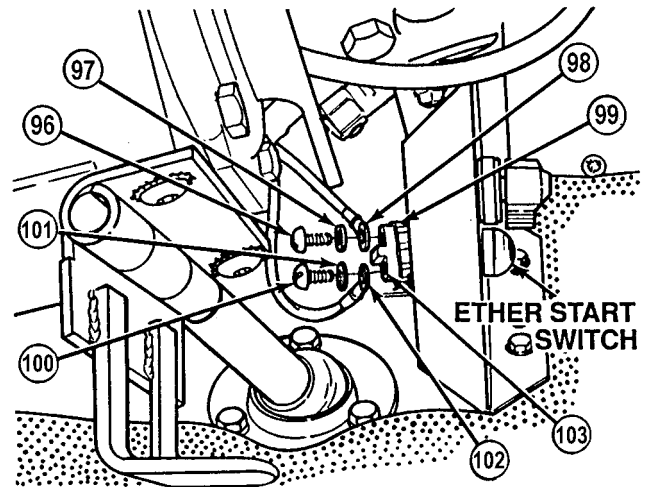


**STEERING WHEEL SHOWN
REMOVED FOR
CLARITY**



- (39) Disconnect throttle position switch connector MC127 (78).
- (40) Disconnect throttle sensor connector MC6 (79).
- (41) Remove screw (80), retaining plate (81) and wire 1021 (82) from ignition switch terminal (83).
- (42) Remove screw (84), retaining plate (85) and wire 1640 (86) from ignition switch terminal (87).
- (43) Remove screw (88), retaining plate (89) and wire 1020 (90) from ignition switch terminal (91).
- (44) Remove screw (92), retaining plate (93) and wire 1431 (94) from ignition switch terminal (95).

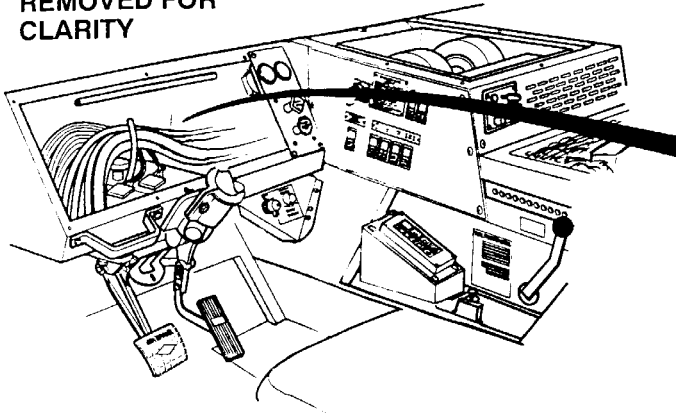
- (45) Remove screw (96), lockwasher (97) and wire 1036 (98) from ether start switch terminal (99). Discard lockwasher.
- (46) Remove screw (100), lockwasher (101) and wire 1487 (102) from ether start switch terminal (103). Discard lockwasher.



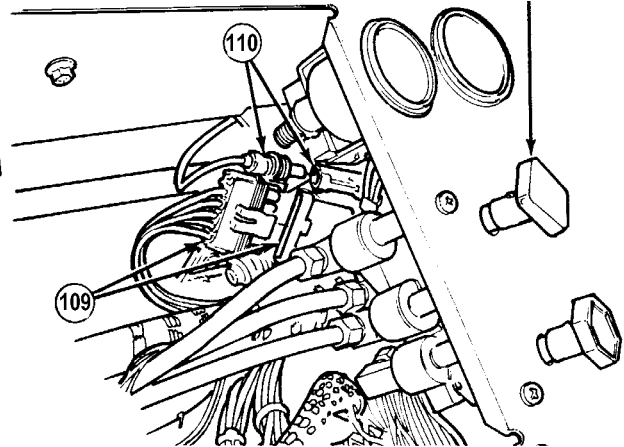
- (47) Open front access cover (104).
- (48) Loosen center screw (105) and disconnect chassis harness MC31 connector (106) from cab (4).
- (49) With the aid of an assistant, remove two locknuts (107) and screws (108) from chassis harness MC31 connector (106). Discard locknuts.

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

**STEERING WHEEL SHOWN
REMOVED FOR
CLARITY**



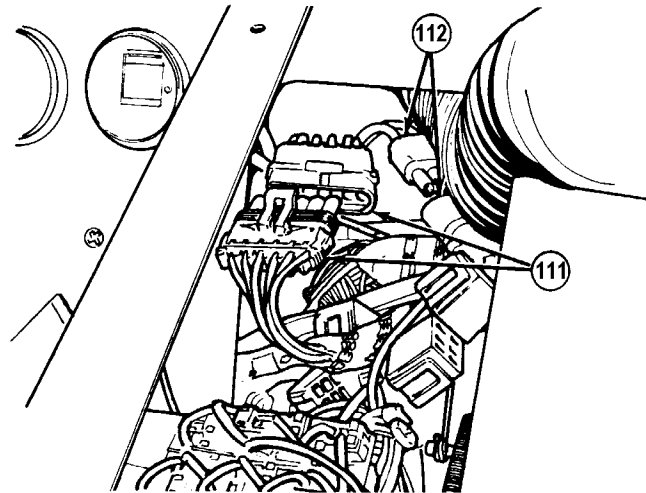
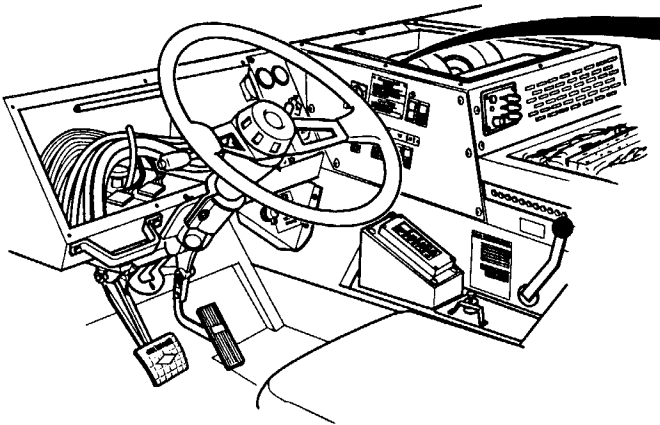
PARKING BRAKE CONTROL



NOTE

Disconnect connector by prying up on tabs and gently pulling apart connector.

- (50) Disconnect wiper motor MC5 connector (109).
- (51) Disconnect air gage light wire 1052 connector (110).



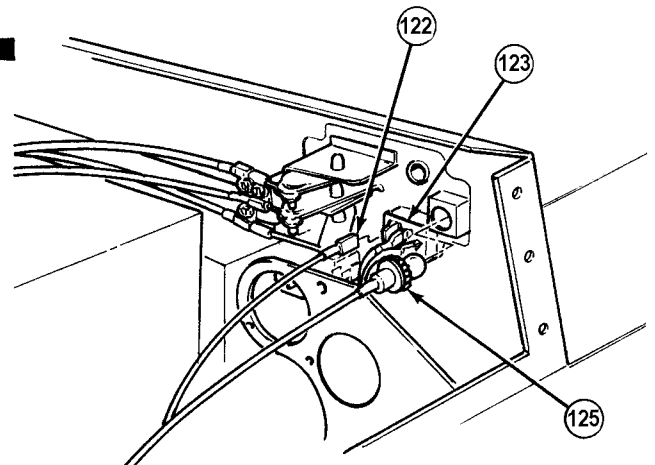
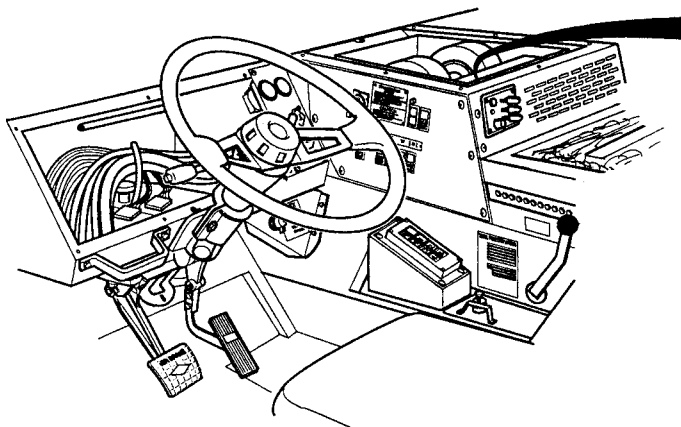
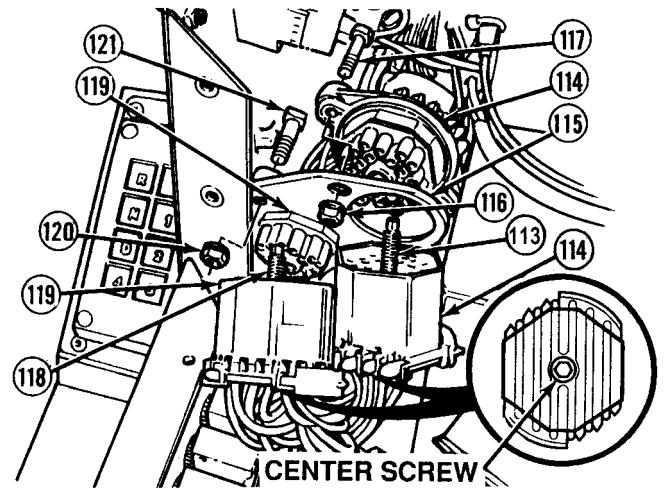
- (52) Disconnect LHS MC33 connector (111).

NOTE

Perform Step (53) if truck is equipped with chemical alarm system.

- (53) Disconnect chemical alarm MC104 connector (112).

- (54) Loosen center screw (113) and disconnect control box harness MC1 connector (114) from bracket (115).
- (55) Remove two locknuts (116) and screws (117) from control box harness MC1 connector (114) and bracket (115). Discard locknuts.
- (56) Loosen center screw (118) and disconnect ECB light harness MC2 connector (119) from bracket (115).
- (57) Remove two locknuts (120) and screws (121) from ECB light harness MC2 connector (119) and bracket (115). Discard locknuts.



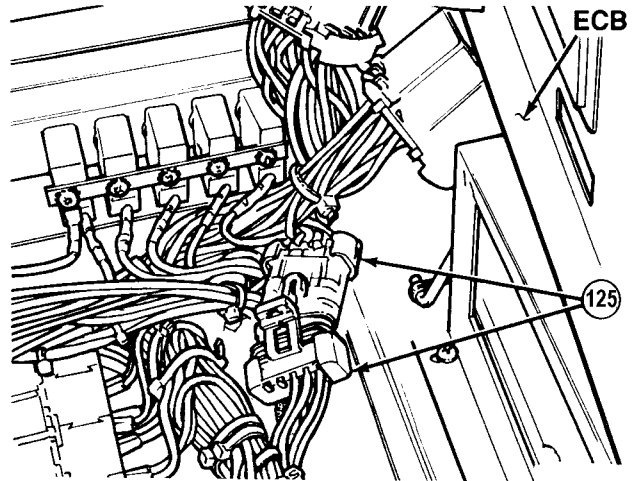
- (58) Disconnect 1082 connector (122) from heater switch (123).
- (59) Remove lamp 1052 socket (124) from heater switch (123).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

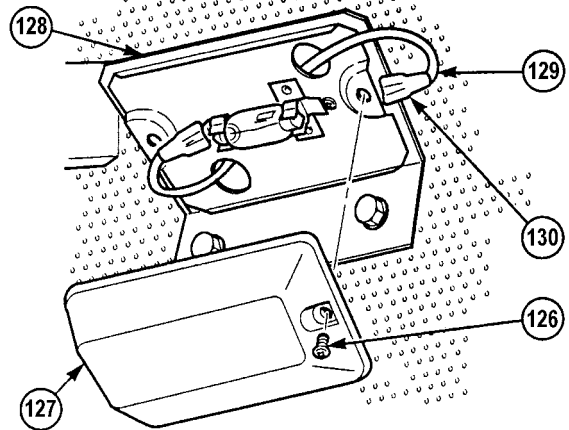
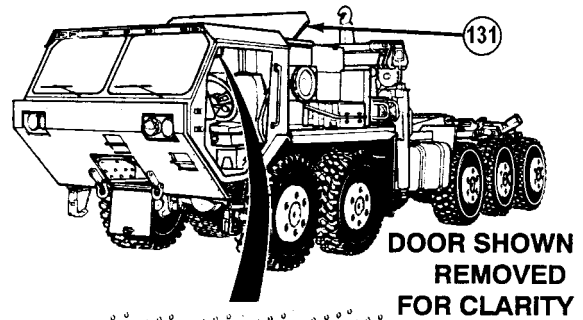
NOTE

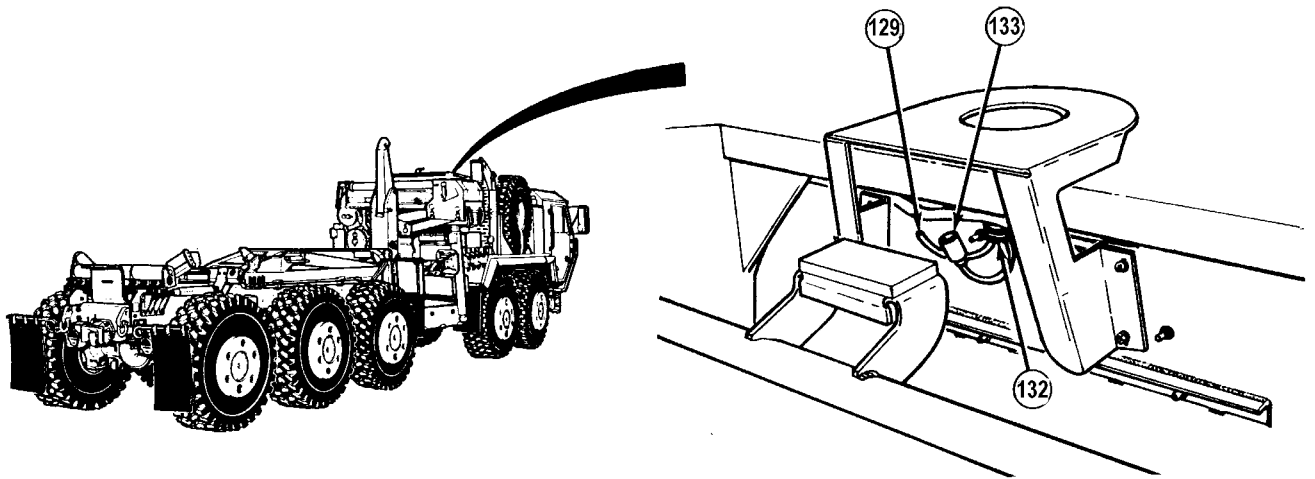
Disconnect connector by prying up on tabs and gently pulling apart connector.

- (60) Disconnect DDEC MC106 connector (125).



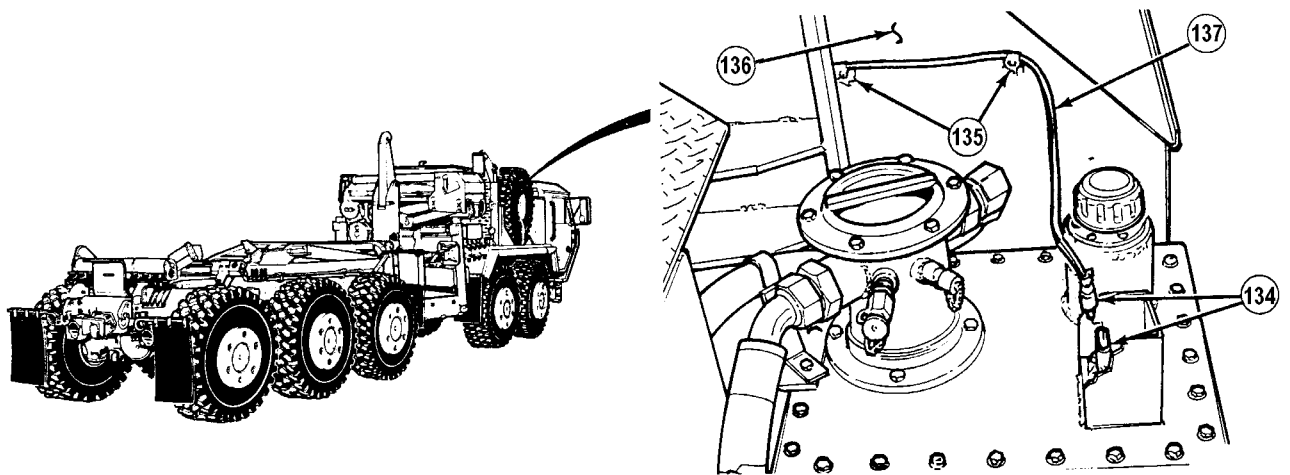
- (61) Remove two screws (126) and dome light cover (127) from bracket (128).
- (62) Disconnect dome light wire 1153 (129).
- (63) Cut off and discard dome light 1153 connector (130).
- (64) Open engine cover (131).





(65) Pull dome light wire 1153 (129) out through grommet (132).

(66) Disconnect beacon light MC28 connector (133).



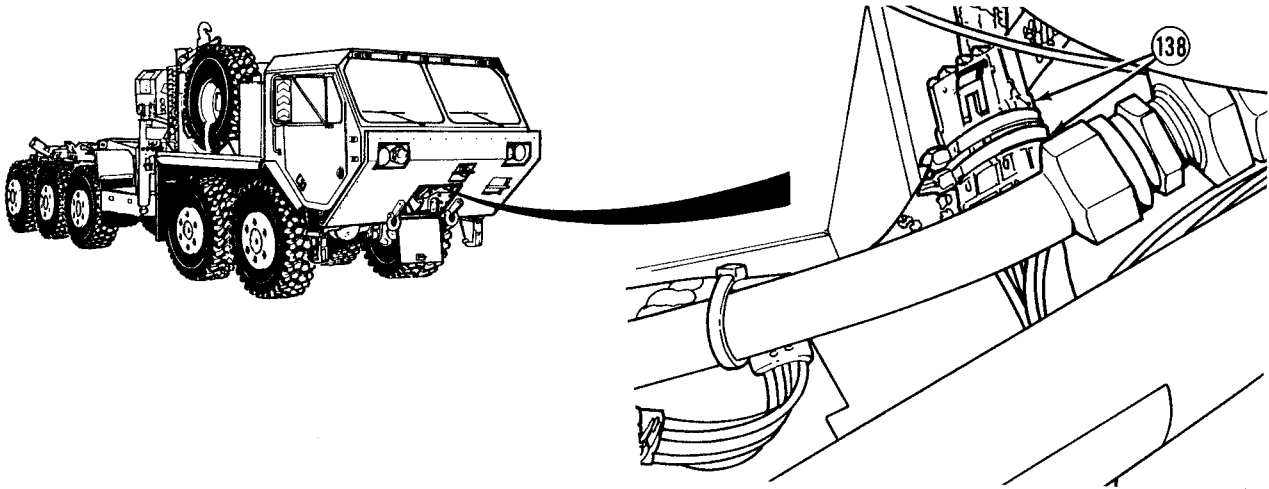
CAUTION

Plastic connector on gage breaks easily. Gently remove connector to avoid damage.

(67) Disconnect low hydraulic oil MC96 connector (134).

(68) Remove 12 clips (135) from rear of cab (136) on cab wire harness (137).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

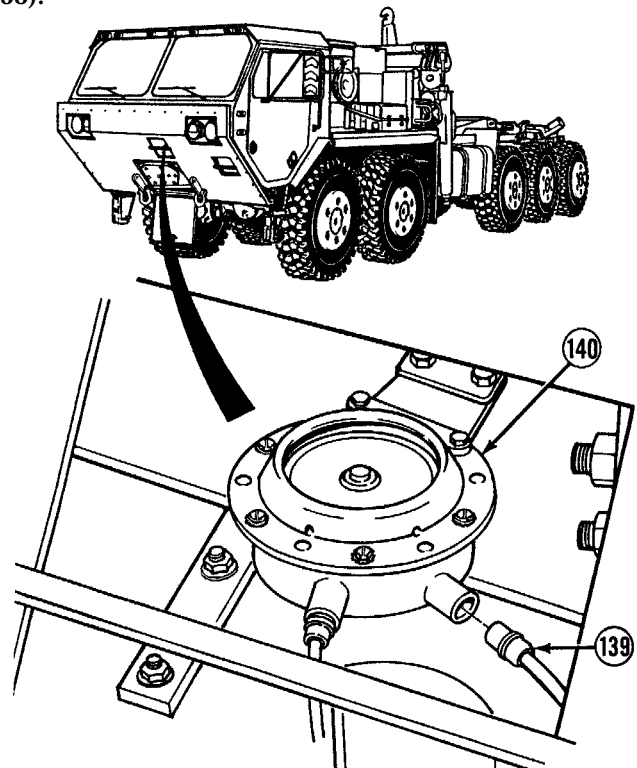


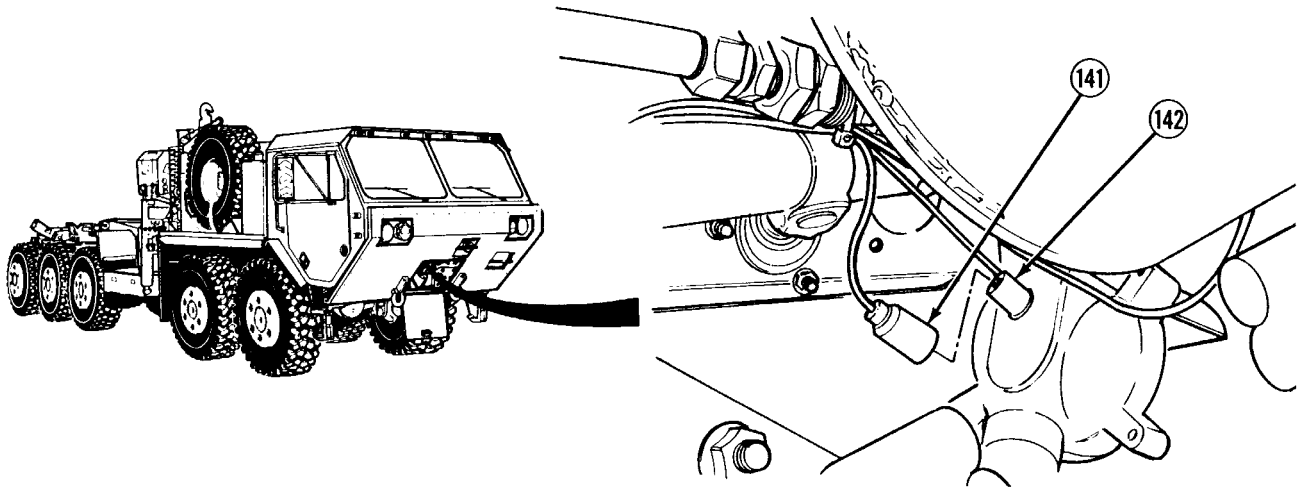
NOTE

- Perform Step (69) if vehicle is equipped with chemical alarm.
- Disconnect connector by prying up on tabs and gently pulling apart connector.

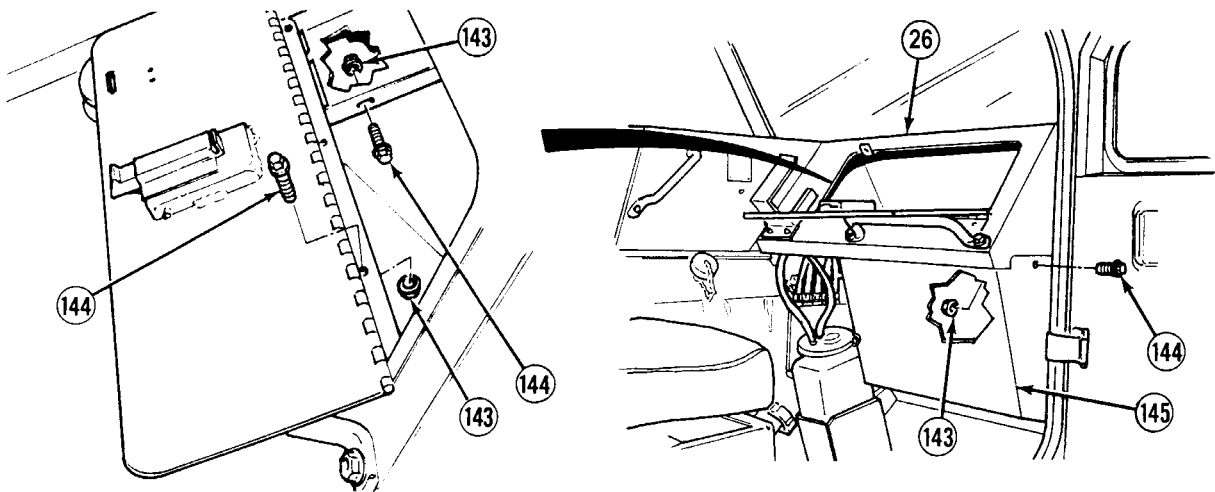
(69) Disconnect chemical alarm MC103 connector (138).

(70) Disconnect horn M15 connector (139) from horn (140).





(71) Disconnect blackout driving light 1679 connector (141) from blackout light (142).



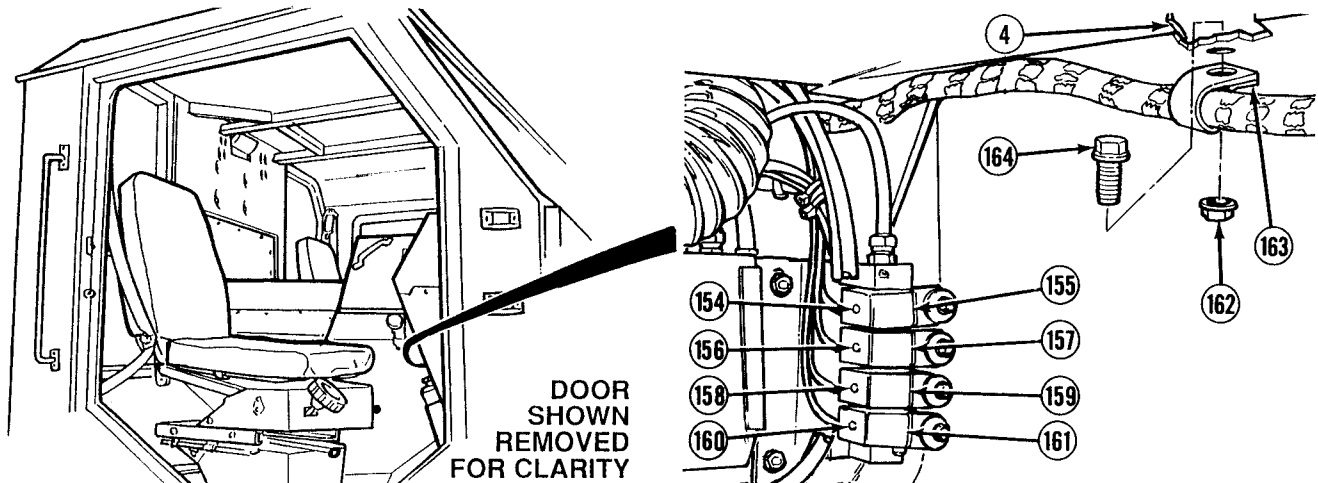
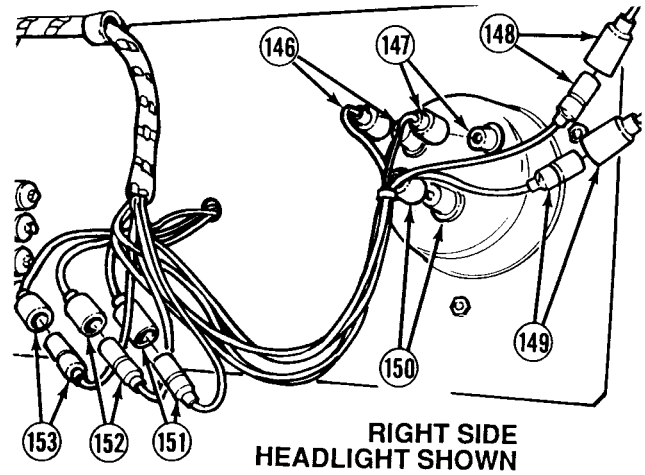
NOTE

Steps (72) through (85) are located inside cab on right side under dash.

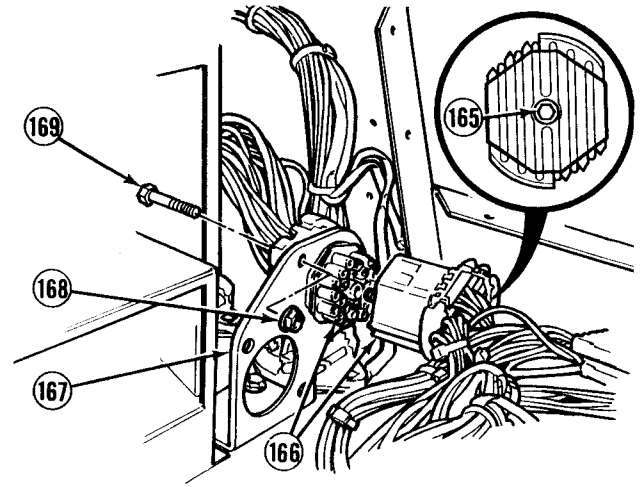
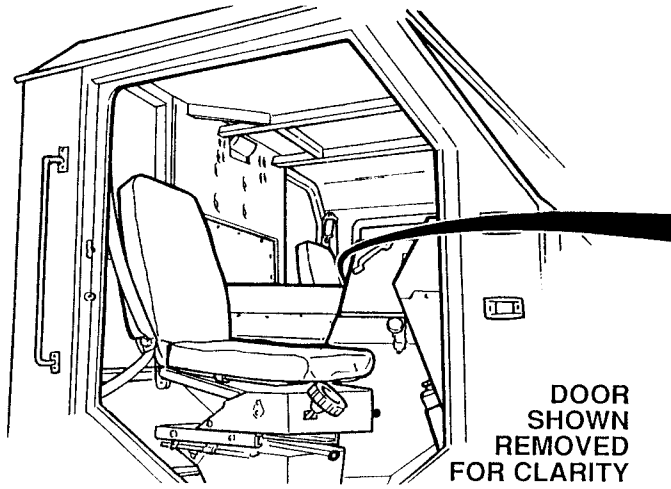
(72) Remove six locknuts (143), screws (144) and glove box (145) from right side of dash (26). Discard locknuts.

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

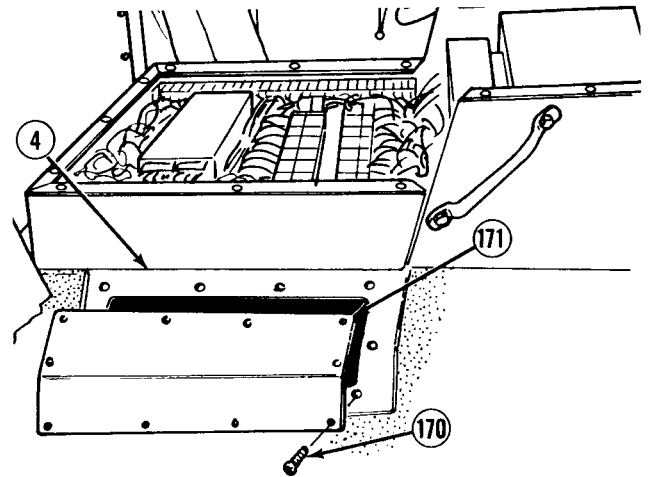
- (73) Disconnect 1006 connector (146).
- (74) Disconnect 1007 connector (147).
- (75) Disconnect 1001 connector (148).
- (76) Disconnect 1012 connector (149).
- (77) Disconnect 1435 connector (150).
- (78) Disconnect 1001 connector (151).
- (79) Disconnect 1680 connector (152).
- (80) Disconnect 1008 connector (153).



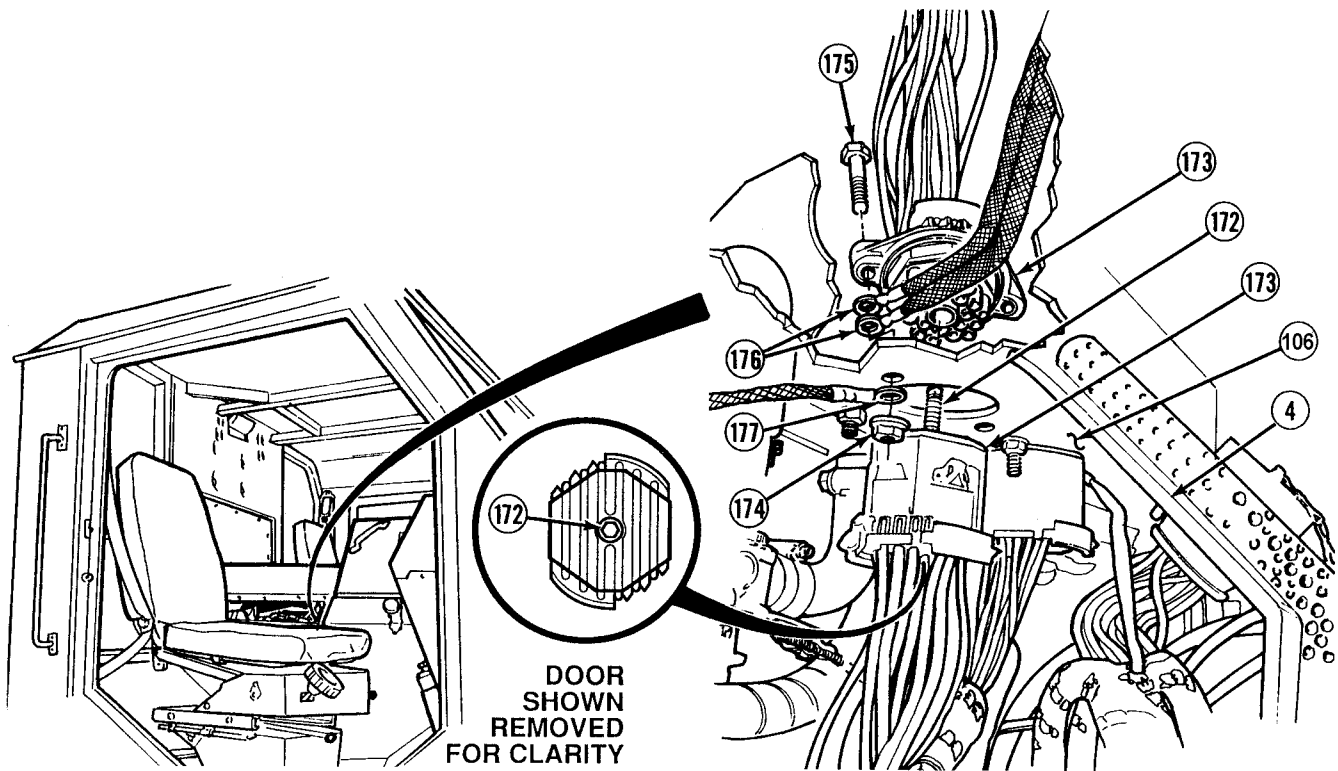
- (81) Loosen screw (154) and disconnect washer M1 connector (155).
- (82) Loosen screw (156) and disconnect transfer case M49 connector (157).
- (83) Loosen screw (158) and disconnect differential M51 connector (159).
- (84) Loosen screw (160) and disconnect inter/axle M50 connector (161).
- (85) Remove locknut (162), cushion clip (163) and screw (164) from cab (4). Discard locknut.



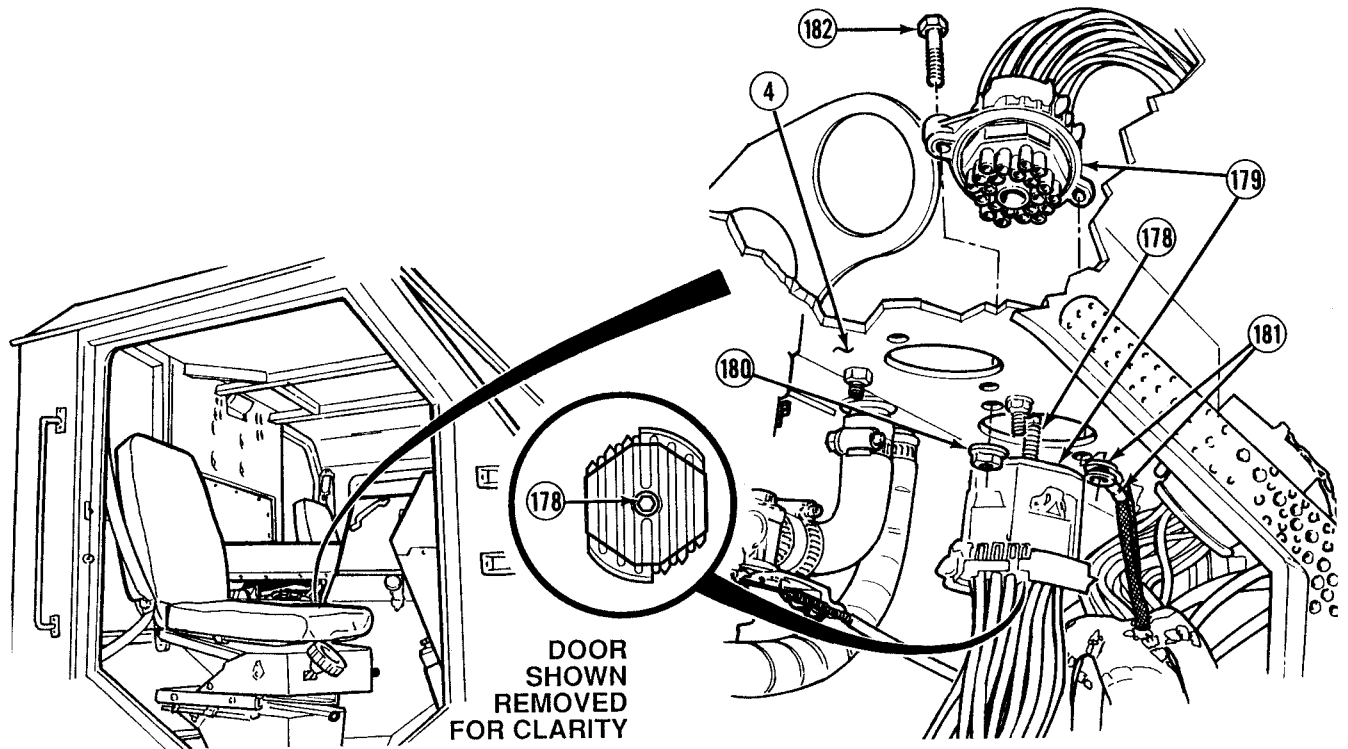
- (86) Loosen center screw (165) and disconnect control box harness MC44 connector (166) from bracket (167).
- (87) Remove two locknuts (168) and screws (169) from control box harness MC44 connector (166) and bracket (167). Discard locknuts.
- (88) Remove ten screws (170) and ECB right side panel (171) from cab (4).



6-19. CAB WIRE HARNESS REPLACEMENT (CONT).



- (89) Loosen center screw (172) and disconnect chassis harness MC3 connector (173).
- (90) Remove two locknuts (174) and screws (175) from chassis harness MC3 connector (173), heater panel (106), two braided shield wires (176) and ground strap (177) from cab (4). Discard locknuts.

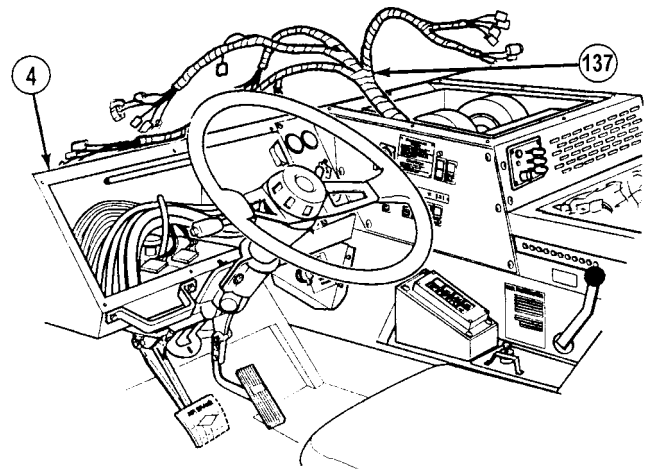


- (91) Loosen center screw (178) and disconnect engine harness MC21 connector (179).
- (92) Remove two locknuts (180), two ground wires (181) and screws (182) from engine harness MC21 connector (179) and cab (4).

CAUTION

Use extreme caution when removing cab wire harness from cab. Ensure assistant routes cab wire harness wires away from all remaining cab wires. Failure to comply could result in damage to wires and connectors.

- (93) With the aid of an assistant, remove cab wire harness (137) from cab (4).



6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

b. Installation.

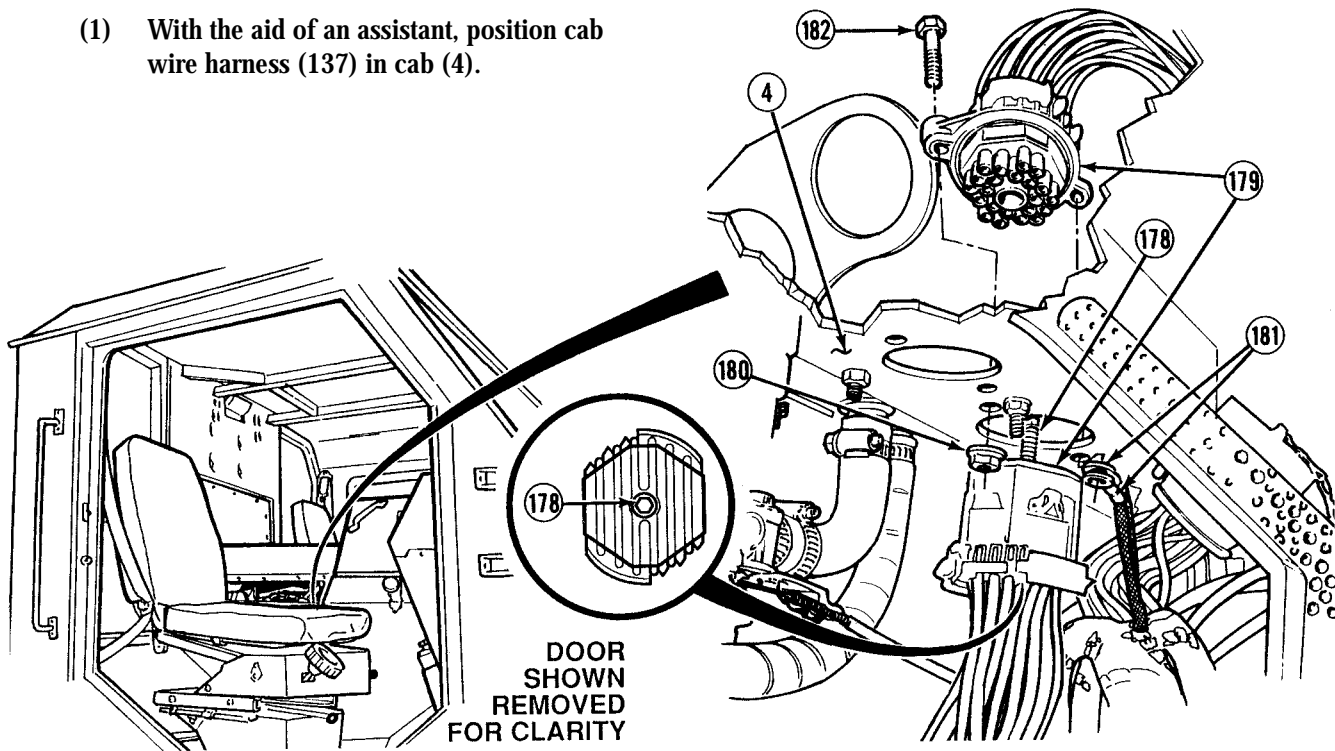
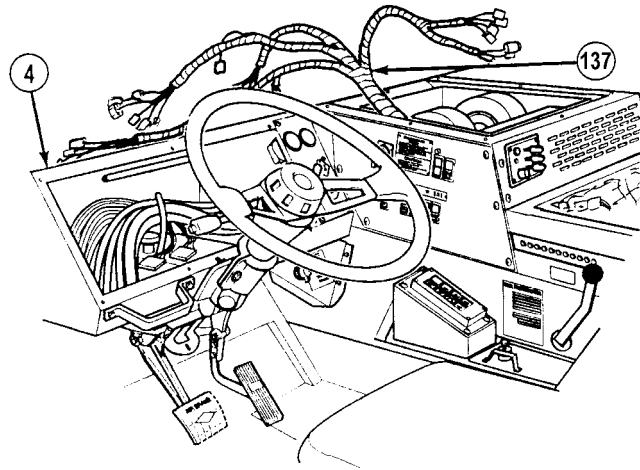
CAUTION

Use extreme caution when installing cab wire harness in cab. Ensure assistant routes cab wire harness wires away from all remaining cab wires. Failure to comply could result in damage to wires and connectors.

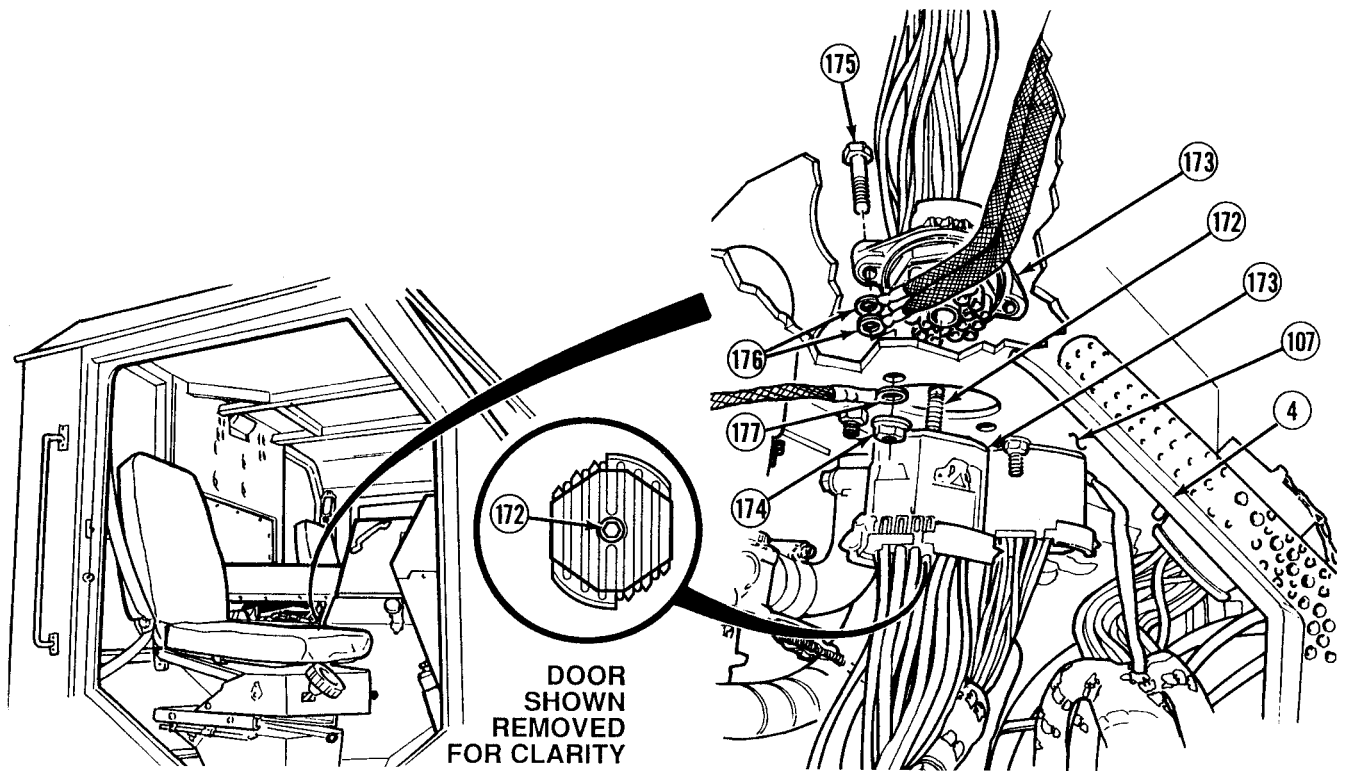
NOTE

Install cable ties as required.

- (1) With the aid of an assistant, position cab wire harness (137) in cab (4).

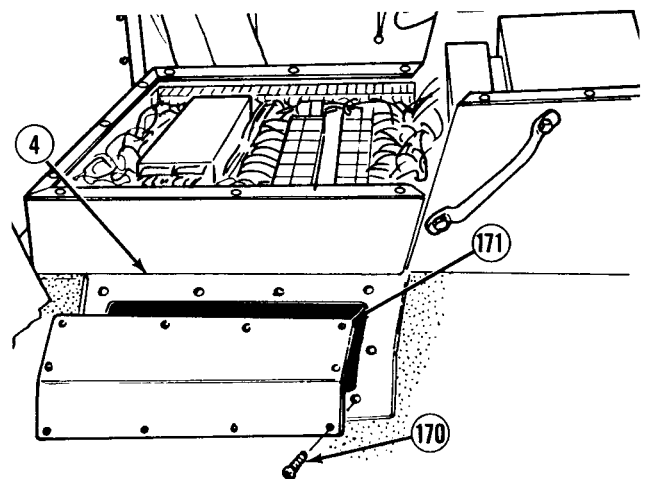


- (2) Position two screws (182) in engine harness MC21 connector (179) and position engine harness MC21 connector in cab (4).
- (3) Install two ground wires (181) and two locknuts (180) on two screws (182).
- (4) Connect bottom engine harness MC21 connector (179) and tighten center screw (178).

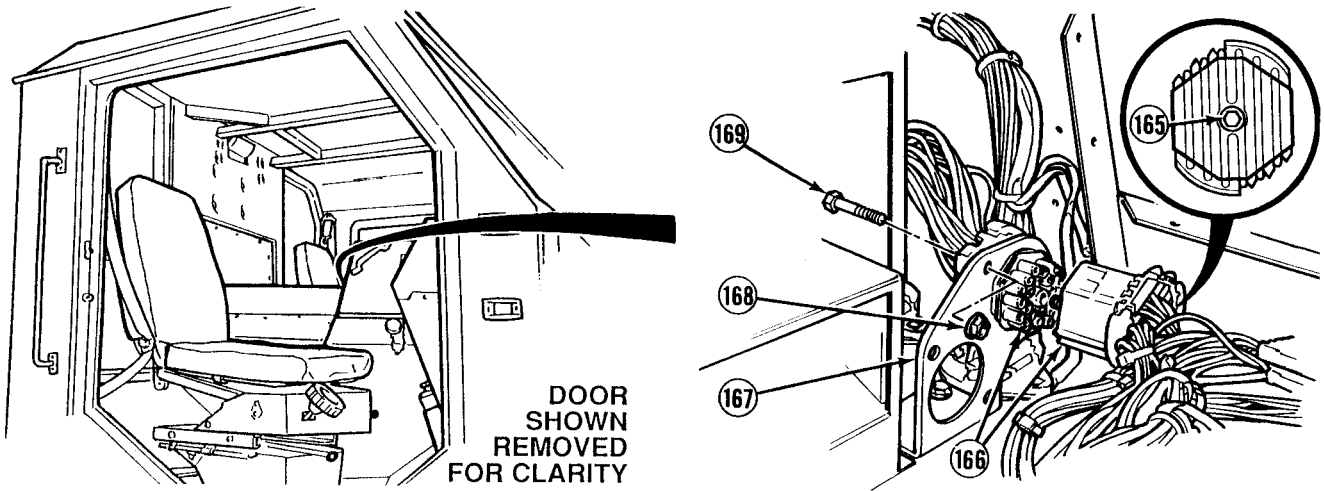


- (5) Install two screws (175) in chassis harness MC3 connector (173).
- (6) Position chassis harness MC3 connector (173), two braided shield wires (176) and screws (175) in cab (4).
- (7) Install ground strap (177) and two locknuts (174) on screws (175).
- (8) Connect chassis harness MC3 connector (173) and tighten center screw (172).

- (9) Install ECB right side panel (171) on cab (4) with ten screws (170).

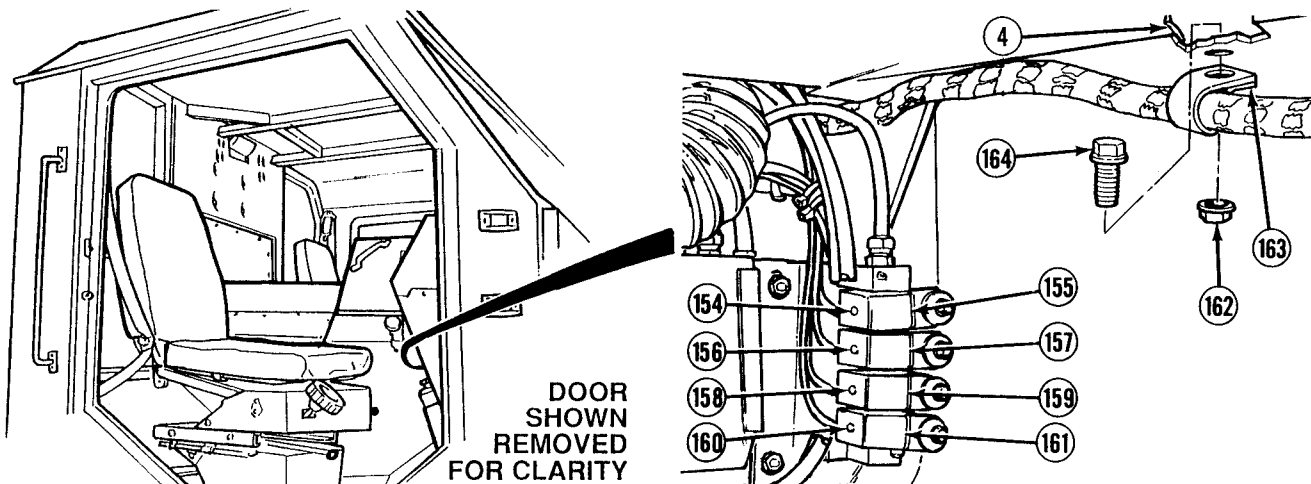


6-19. CAB WIRE HARNESS REPLACEMENT (CONT).



(10) Install control box harness MC44 connector (166) and two screws (169) in bracket (167) with two locknuts (168).

(11) Connect control box harness MC44 connector (166) and tighten center screw (165).



(12) Install cushion clip (163) and locknut (162) and screw (164) in cab (4).

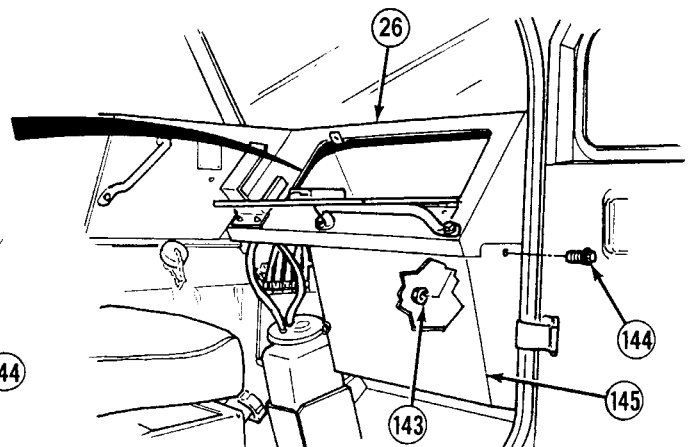
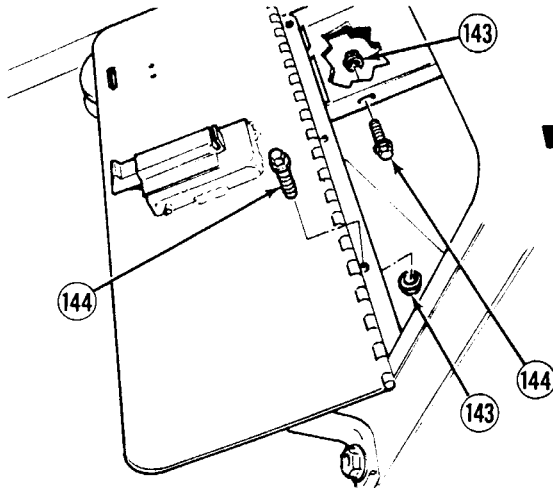
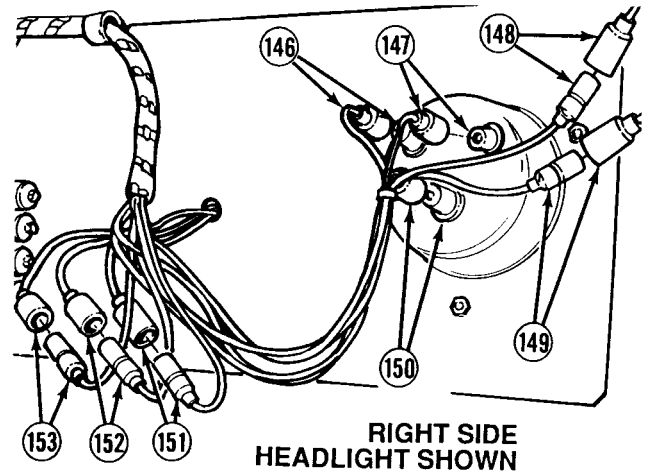
(13) Connect inter/axle M50 connector (161) and tighten screw (160).

(14) Connect differential M51 connector (159) and tighten screw (158).

(15) Connect transfer case M49 connector (157) and tighten screw (156).

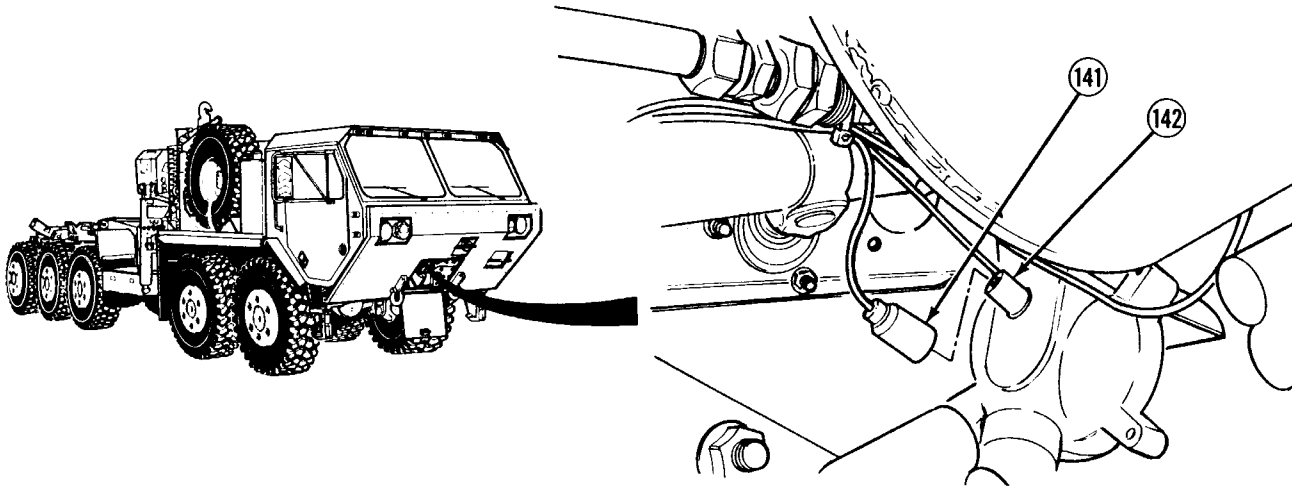
(16) Connect washer M1 connector (155) and tighten screw (154).

- (17) Connect 1680 connector (152).
- (18) Connect 1008 connector (153).
- (19) Connect 1001 connector (151).
- (20) Connect 1001 connector (148).
- (21) Connect 1435 connector (150).
- (22) Connect 1007 connector (147).
- (23) Connect 1006 connector (146).
- (24) Connect 1012 connector (149).



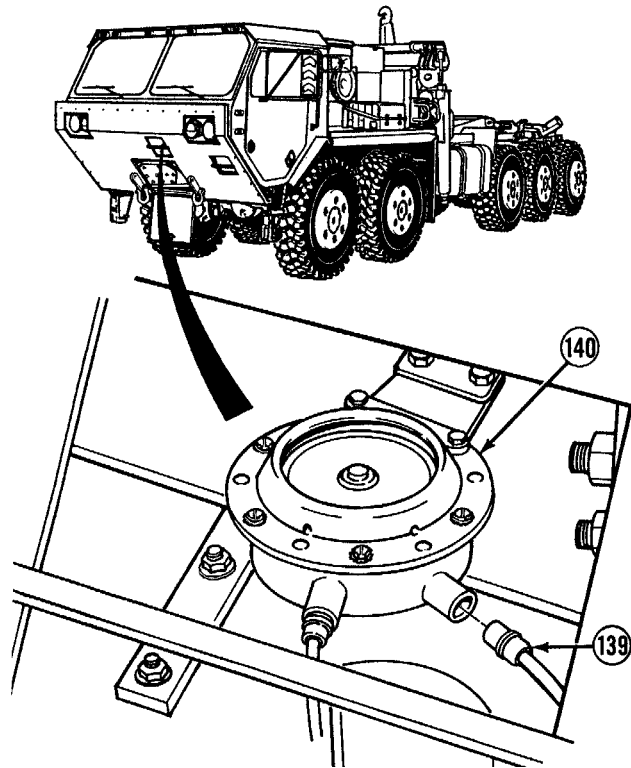
- (25) Install glove box (145) under right side of dash (26) with six screws (144) and locknuts (143).

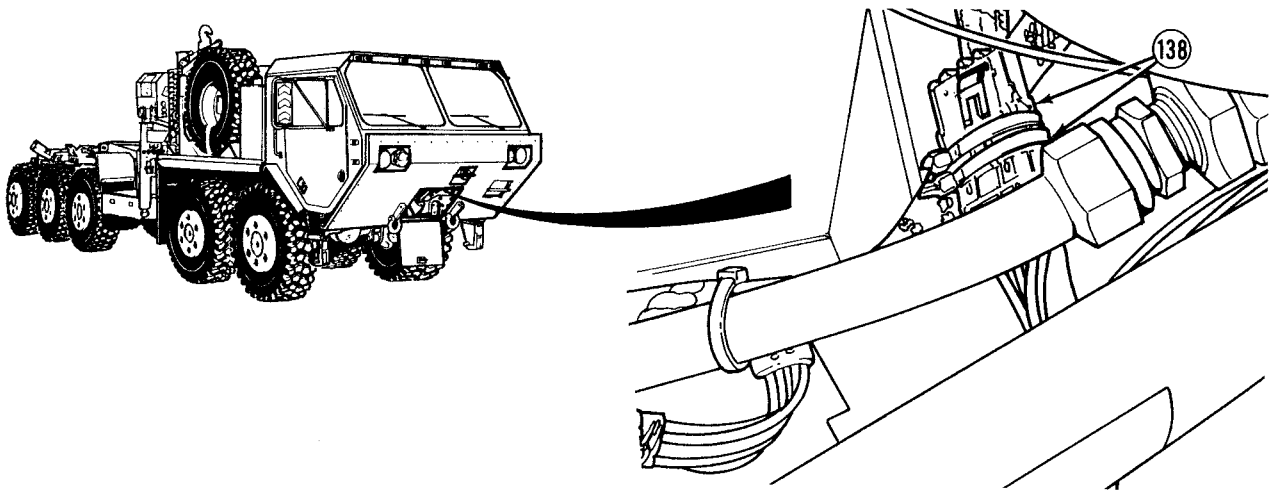
6-19. CAB WIRE HARNESS REPLACEMENT (CONT).



(26) Connect blackout driving light 1679 connector (141) on blackout light (142).

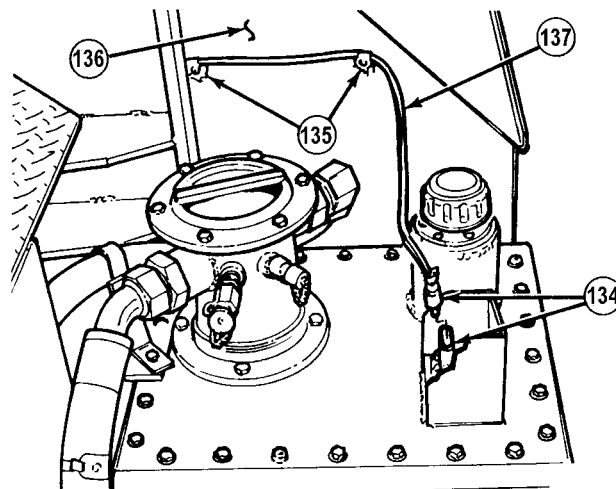
(27) Connect horn M15 connector (139) on horn (140).



**NOTE**

Perform Step (28) only if chemical alarm was disconnected during removal.

- (28) Connect chemical alarm MC103 connector (138).



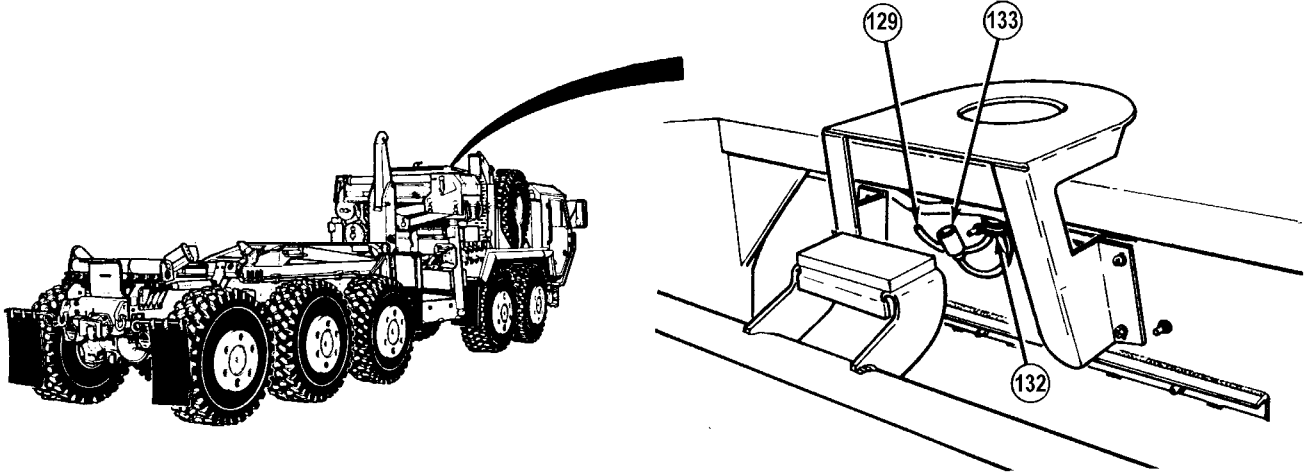
- (29) Connect low hydraulic oil MC96 connector (134).

WARNING

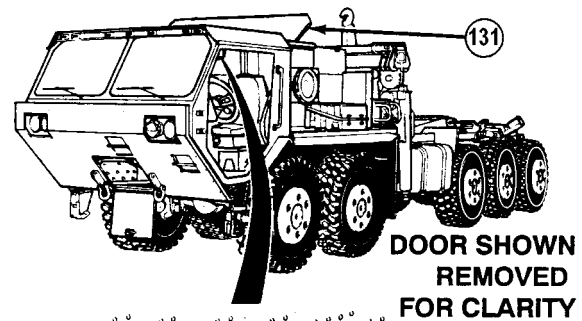
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (30) Apply adhesive to 12 clips (135).
- (31) Install 12 clips (135) on cab wiring harness (137) and to rear of cab (136).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).



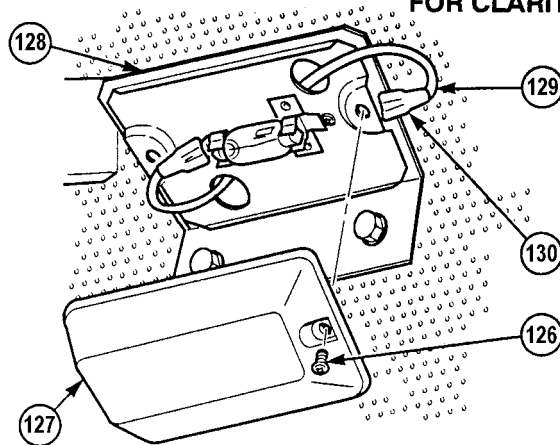
- (32) Connect beacon light MC28 connector (133).
- (33) Route wire 1153 (129) through grommet (132).
- (34) Route wire 1153 (129) through dome light bracket (128) and install heat shrink and connector on wire 1153 (129).
- (35) Connect dome light 1153 connector (130).
- (36) Install dome light cover (127) on dome light bracket (128) with two screws (126).



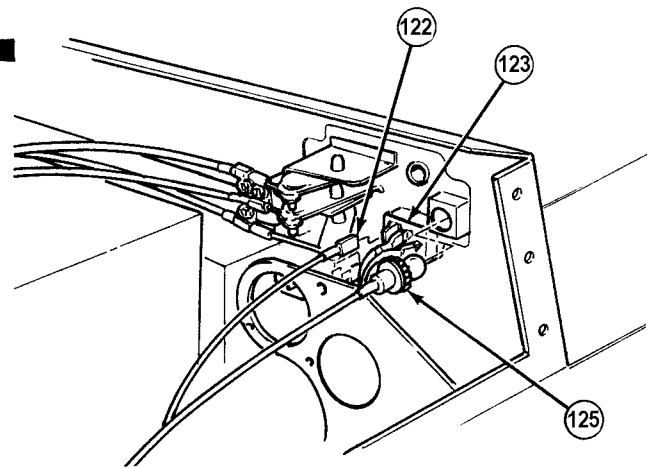
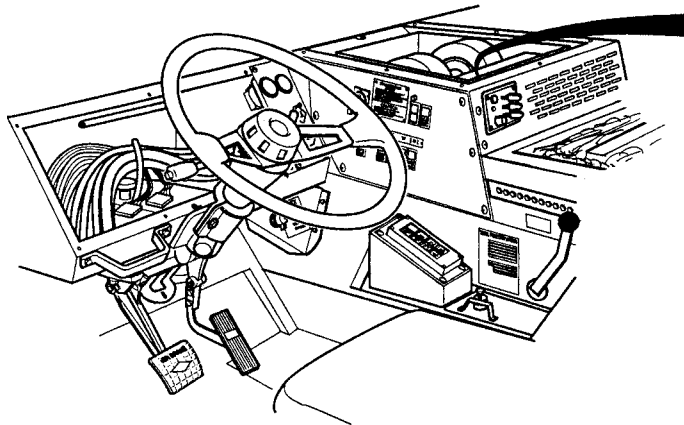
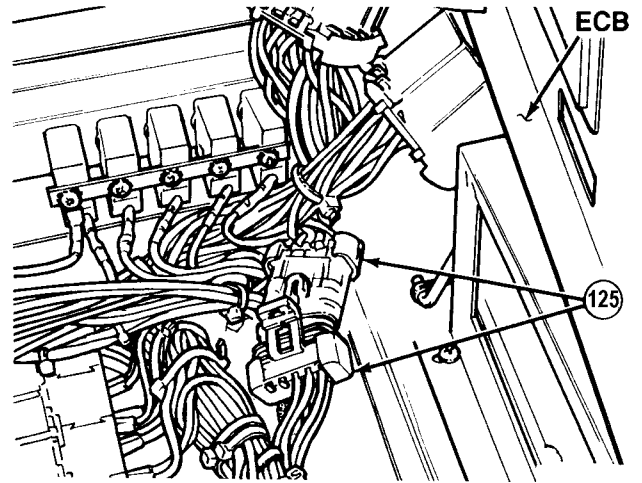
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (37) Apply sealing compound to dome light wire (129) and grommet (132).
- (38) Close engine cover (131).



(39) Connect DDEC MC106 connector (125).

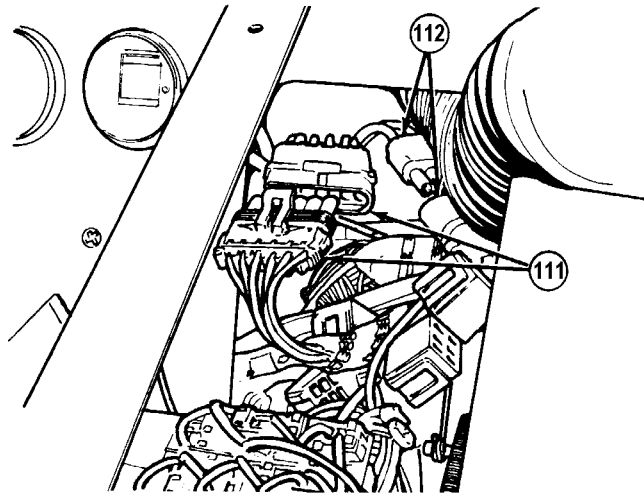
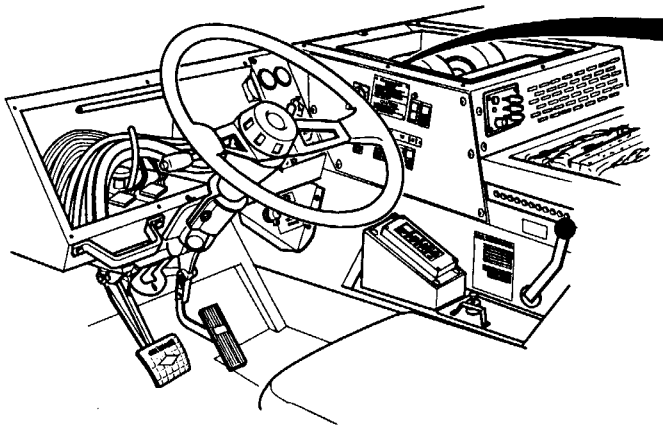
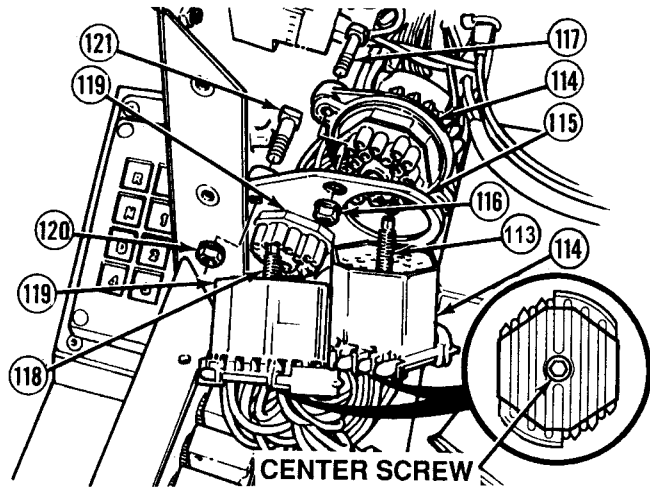


(40) Connect 1082 connector (122) on heater switch (123).

(41) Install lamp socket 1052 (124) on heater switch (123).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

- (42) Install two screws (121) and ECB light harness MC2 connector (119) on bracket (115) with two locknuts (120).
- (43) Install two screws (117) and control box harness MC1 connector (114) on bracket (115) with two locknuts (116).
- (44) Connect control box harness MC1 connector (114) and tighten center screw (113).
- (45) Connect ECB light harness MC2 connector (119) and tighten center screw (118).

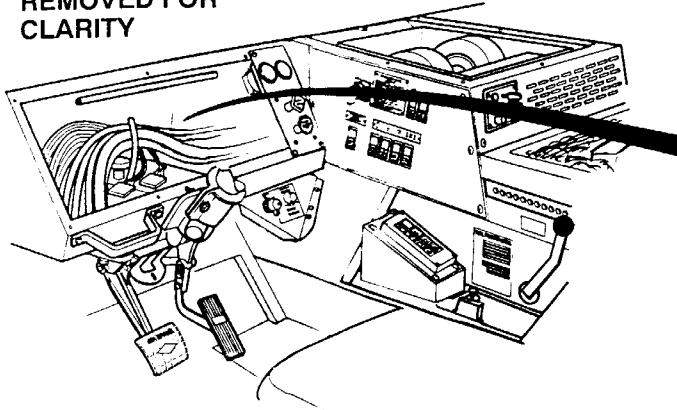


NOTE

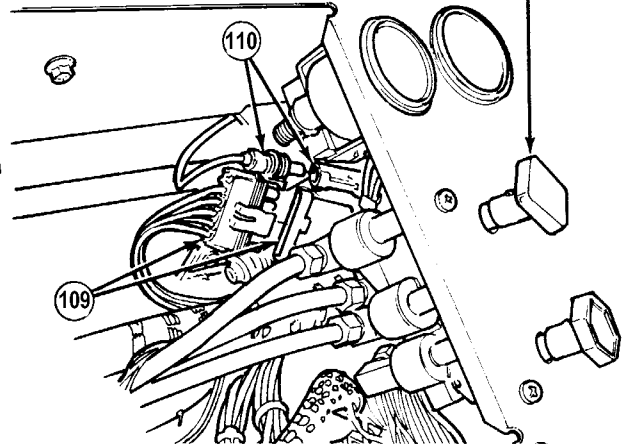
Perform Step (46) if disconnected during removal.

- (46) Connect chemical alarm MC104 connector (112).
- (47) Connect LHS MC33 connector (111).

STEERING WHEEL SHOWN
REMOVED FOR
CLARITY

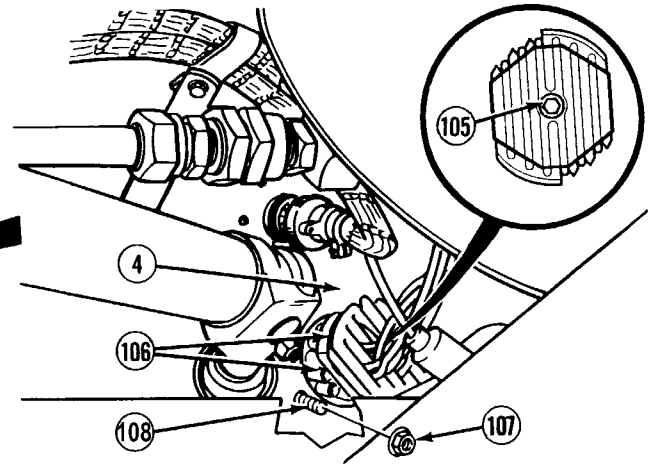
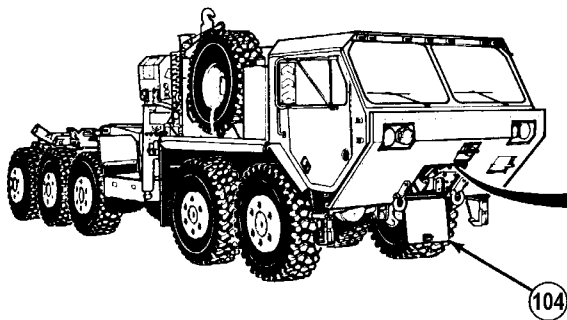


PARKING BRAKE CONTROL



(48) Connect air gage light 1052 connector (110).

(49) Connect wiper motor MC5 connector (109).



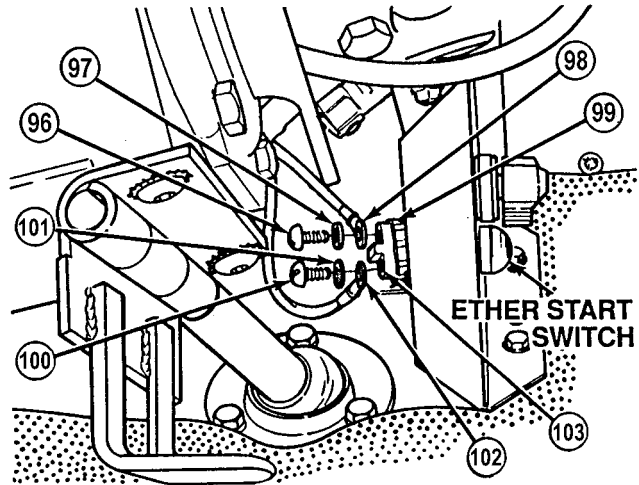
(50) With the aid of an assistant, install two screws (108) in chassis harness MC31 connector (106) in cab (4) with two locknuts (107).

(51) Connect chassis harness MC31 connector (106) and tighten center screw (105).

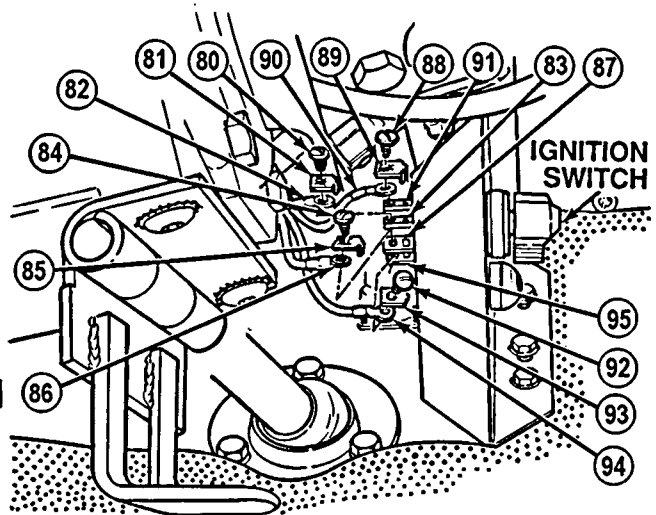
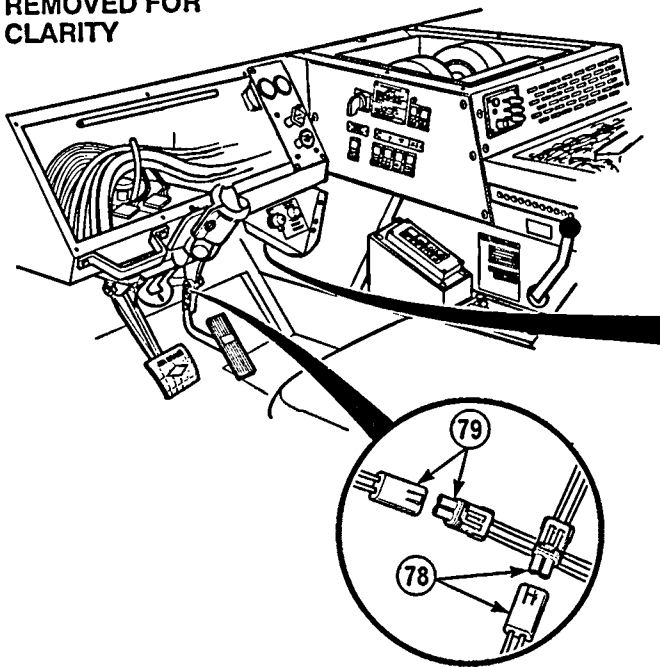
(52) Close front access cover (104).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

- (53) Install wire 1487 (102), lockwasher (101) and screw (100) on ether start switch terminal (103).
- (54) Install wire 1036 (98), lockwasher (97) and screw (96) on ether start switch terminal (99).

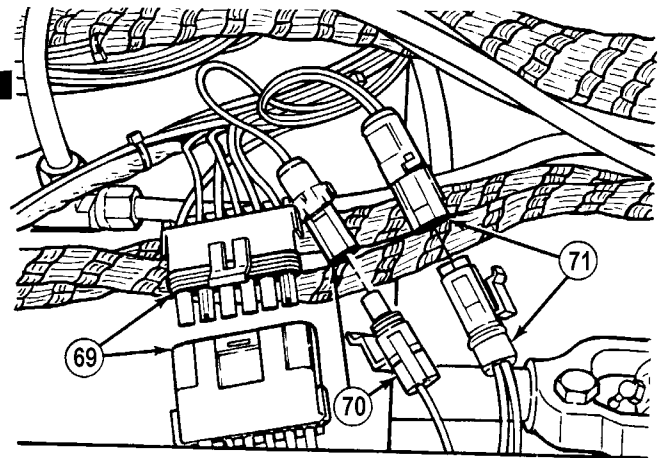
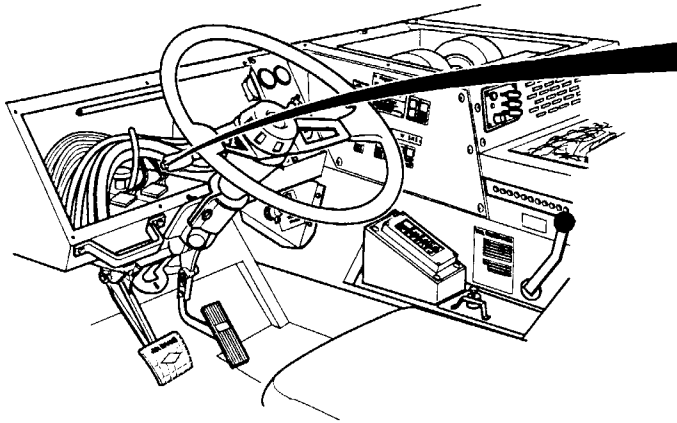
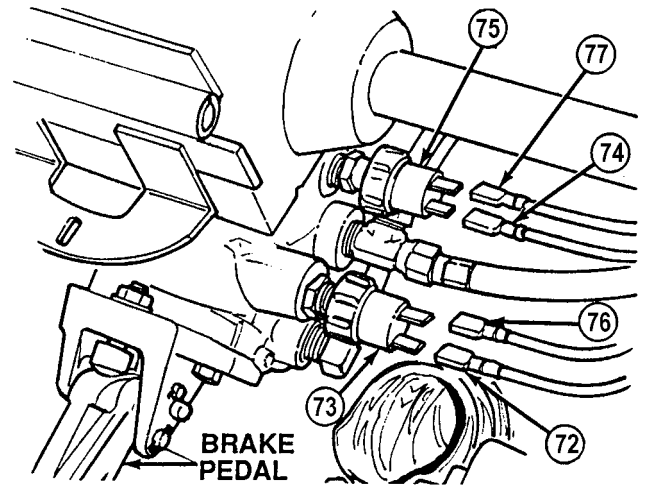


**STEERING WHEEL SHOWN
REMOVED FOR
CLARITY**



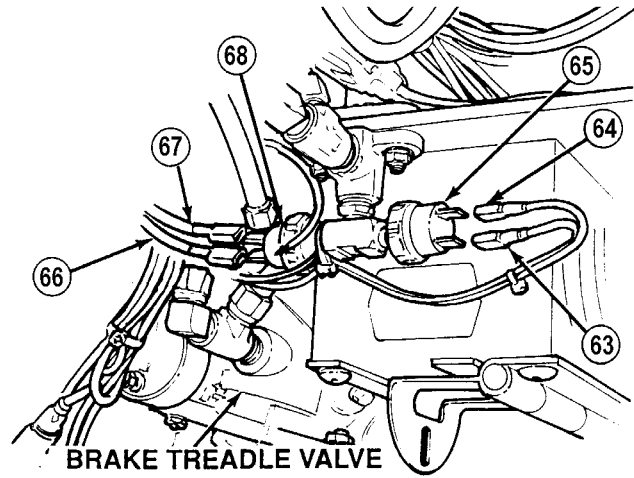
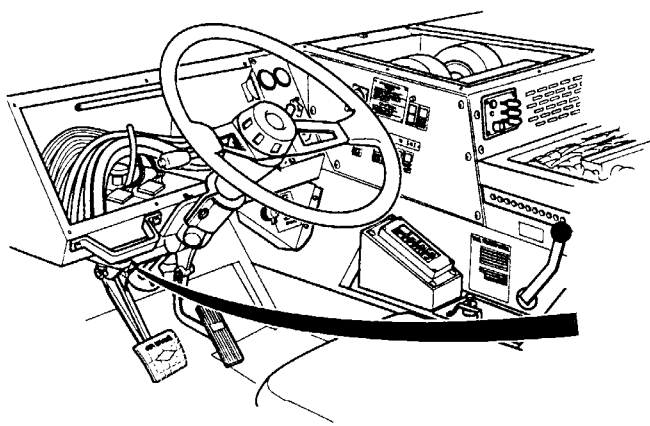
- (55) Install wire 1431 (94), retaining plate (93) and screw (92) on ignition switch terminal (95).
- (56) Install wire 1020 (90), retaining plate (89) and screw (88) on ignition switch terminal (91).
- (57) Install wire 1640 (86), retaining plate (85) and screw (84) on ignition switch terminal (87).
- (58) Install wire 1021 (82), retaining plate (81) and screw (80) on ignition switch terminal (83).
- (59) Connect throttle sensor connector MC6 (79).
- (60) Connect throttle position switch connector MC127 (78).

- (61) Connect wire 1435 (77) to low air pressure switch (75).
- (62) Connect wire 1435 (76) to low air pressure switch (73).
- (63) Connect wire 1120 (74) to low air pressure switch (75).
- (64) Connect wire 1120 (72) to low air pressure switch (73).

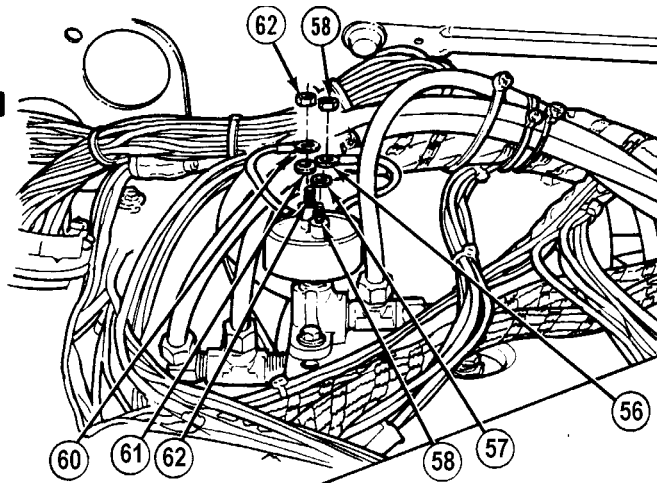
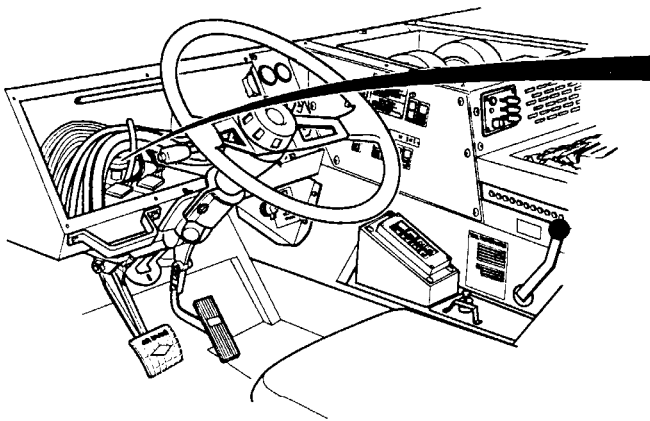


- (65) Connect turn signal MC91 connector (71).
- (66) Connect turn signal MC92 connector (70).
- (67) Connect turn signal MC7 connector (69).

6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

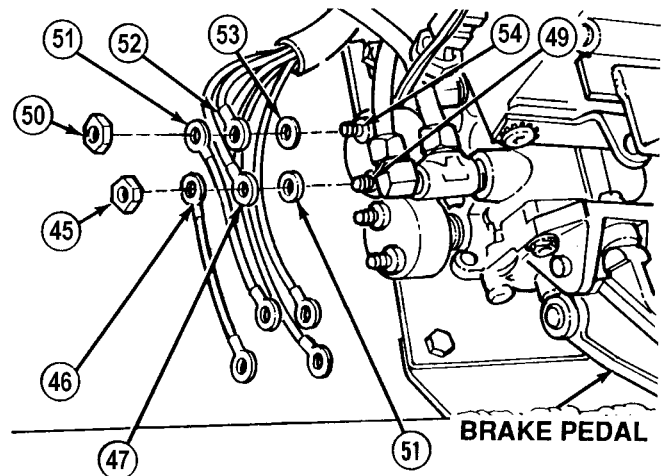


- (68) Connect wire 1371 (66) and wire 1435 (67) to parking brake switch (68).
- (69) Connect wire 510 (63) and wire 1525 (64) to parking brake switch (65).

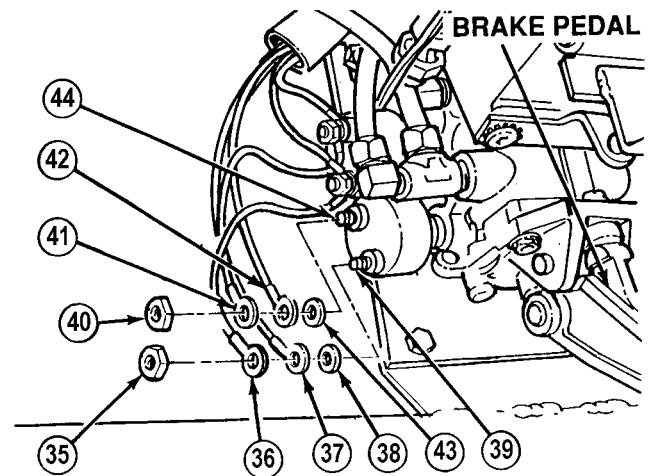


- (70) Remove nut (59) and washers (61) from hand brake terminal (62).
- (71) Install washer (61), wire 1005 (60) and nut (59) on hand brake terminal (62).
- (72) Remove nut (55) and washer (57) from hand brake terminal (58).
- (73) Install washer (57), wire 1009 (56) and nut (55) on hand brake terminal (58).

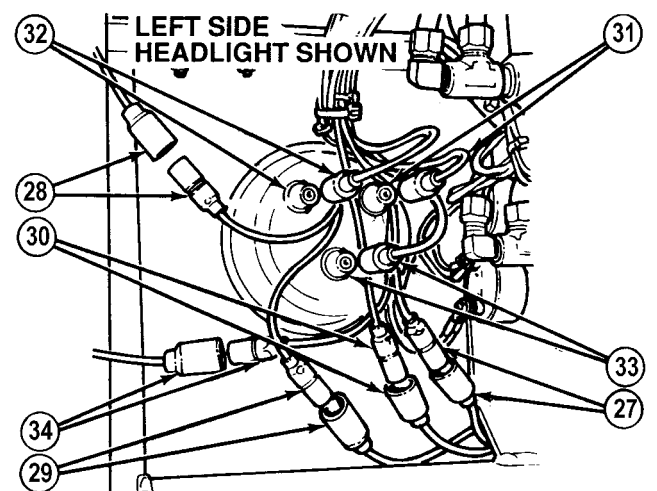
- (74) Remove nut (50) and washer (53) from terminal (54).
- (75) Install washer (53), wire 1005 (52), jumper wire 1005 (51) and nut (50) on terminal (54).
- (76) Remove nut (45) and washer (48) from terminal (49).
- (77) Install washer (48), wire 1009 (47), jumper wire 1009 (46) and nut (45) on terminal (49).



- (78) Remove nut (40) and washer (43) from terminal (44).
- (79) Install washer (43), wire 1005 (42), jumper wire 1005 (41) and nut (40) on terminal (44).
- (80) Remove nut (35) and washer (38) from terminal (39).
- (81) Install washer (38), wire 1009 (37), jumper wire 1009 (36) and nut (35) on rear brake terminal (39).



- (82) Connect left side marker light 1012 connector (34).
- (83) Connect left side headlight 1435 connector (33).
- (84) Connect left side headlight 1006 connector (32).
- (85) Connect left side headlight 1007 connector (31).
- (86) Connect marker light 1680 connector (30).
- (87) Connect left side turn light 1002 connector (29).
- (88) Connect left side turn light 1002 connector (28).
- (89) Connect parking light 1008 connector (27).

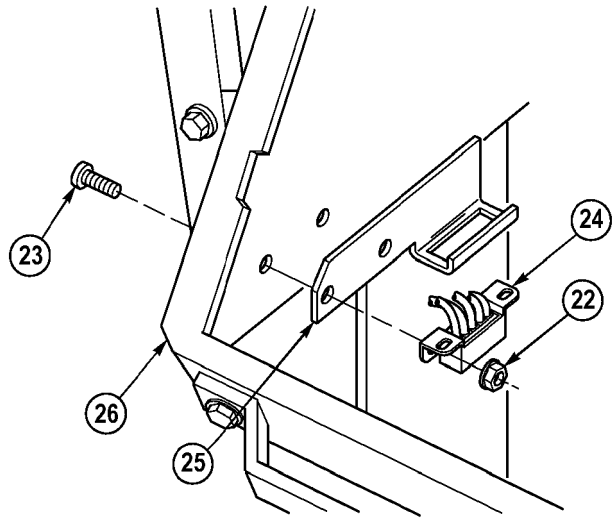


6-19. CAB WIRE HARNESS REPLACEMENT (CONT).

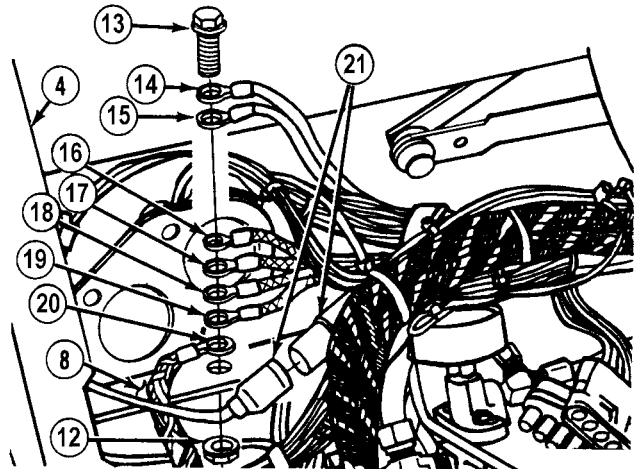
NOTE

Installation of bracket in Step (90) is for DDEC III/IV engines only.

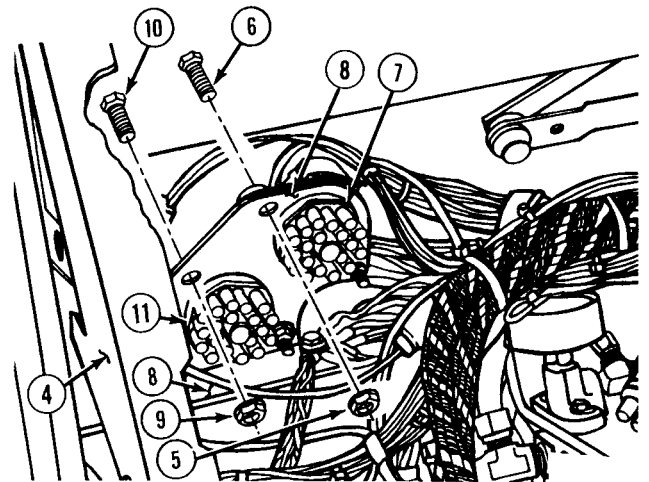
- (90) Install bracket (25), MC13 diagnostic connector (24), two screws (23) and locknuts (22) on left side of dash panel (26).



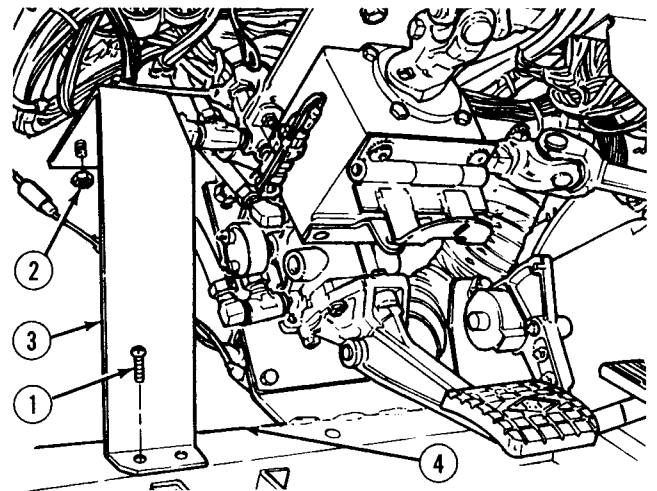
- (91) Connect I.D. and clearance light 1012 connector (21).
- (92) Remove locknut (12) and screw (13) in cab (4). Discard locknut.
- (93) Install shield wire (20), shield wire (19), shield wire (18), wire 1435 (17), shield wire (16), wire 1435 (15) and wire 1435 (14), on bracket (8) with screw (13) and locknut (12).



- (94) Install gage harness MC8 connector (11) on bracket (8) with two screws (10) and locknuts (9).
- (95) Install switch harness MC4 connector (7) on bracket (8) with two screws (6) and locknuts (5).



- (96) Install headlight guard (3) in cab (4) with two screws (1) and locknut (2).



c. Follow-On Maintenance:

- Install diagnostic request switch, (TM 9-2320-364-20).
- Install heater/defroster ducting, (TM 9-2320-364-20).
- Install Electronic Control Box (ECB) covers, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Install instrument panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-20. STE/ICE-R WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

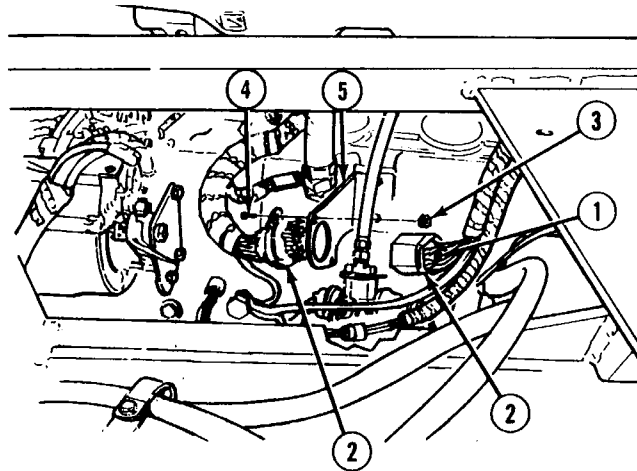
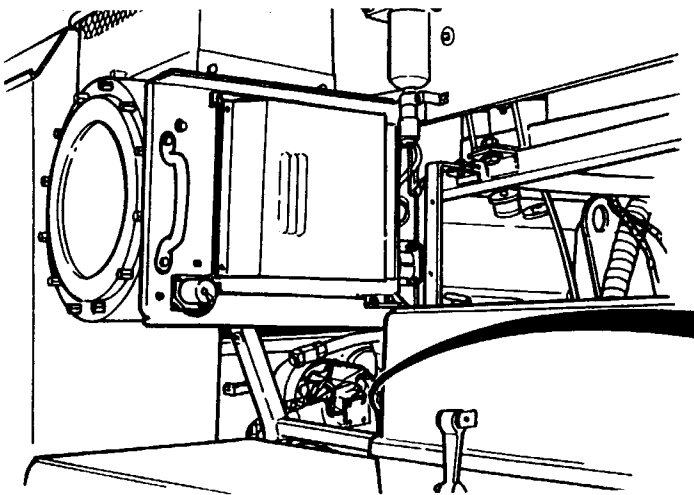
Materials/Parts

Cable Ties (Item 9, Appendix B)
Sealant, Electrical (Item 50, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (2) (Item 176, Appendix E)
Lockwasher (2) (Item 242, Appendix E)
Lockwasher (2) (Item 252, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)
Right side noise panel removed,
(TM 9-2320-364-20)
Left side noise panel removed,
(TM 9-2320-364-20)
Left front noise panel removed,
(TM 9-2320-364-20)

a. Removal.



WARNING

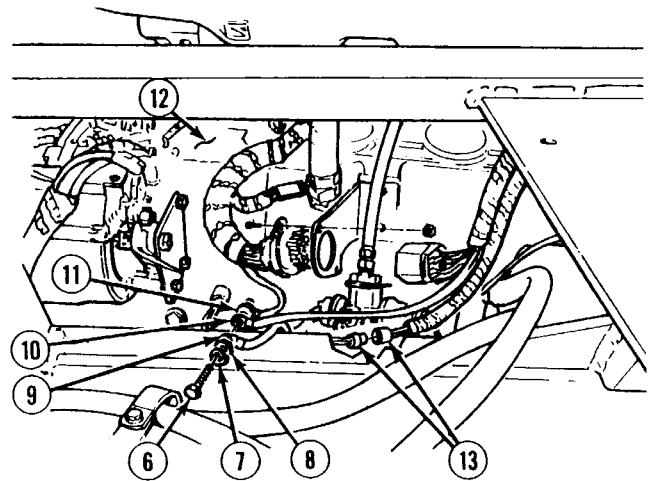
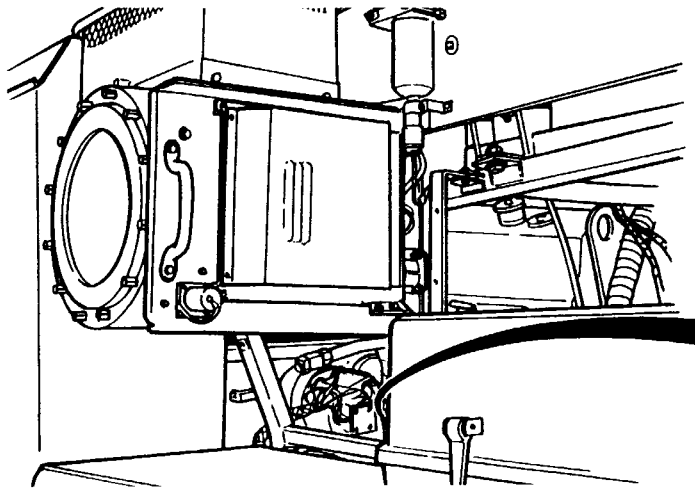
Allow engine to cool before removing wire harness to avoid injury to personnel.

NOTE

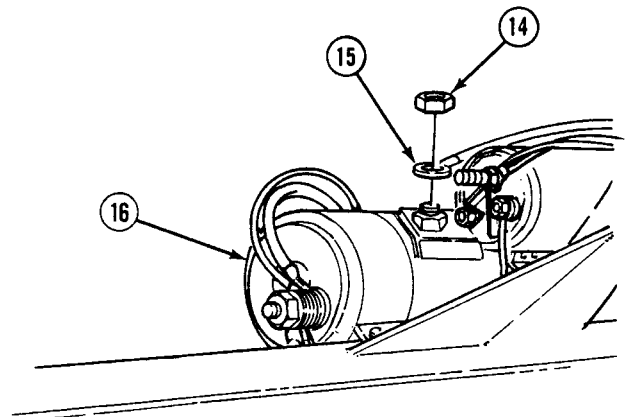
- Tag and mark all wires and connectors before removal.
- Remove cable ties as required.

(1) Loosen screw (1) on MC65 connector (2) and disconnect MC65 connector.

(2) Remove two locknuts (3), screws (4) and MC65 connector (2) from mounting bracket (5). Discard locknuts.

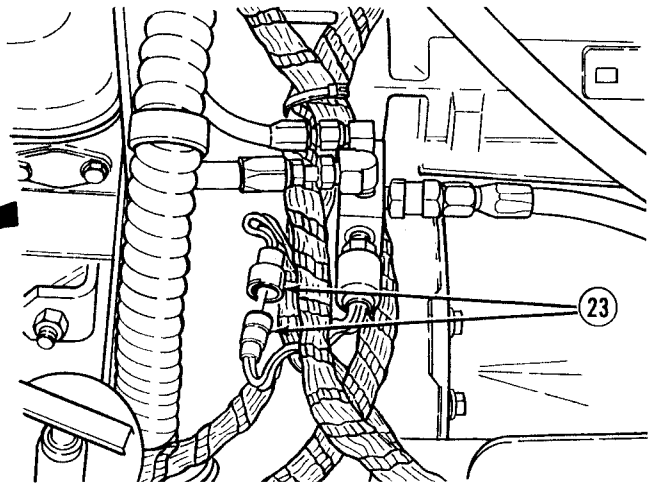
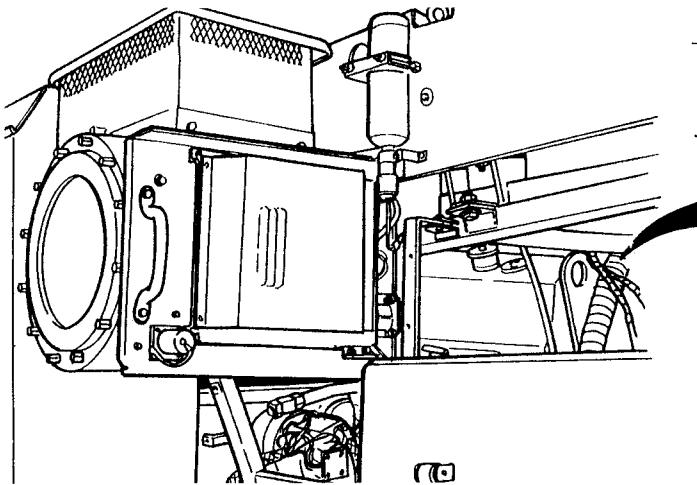
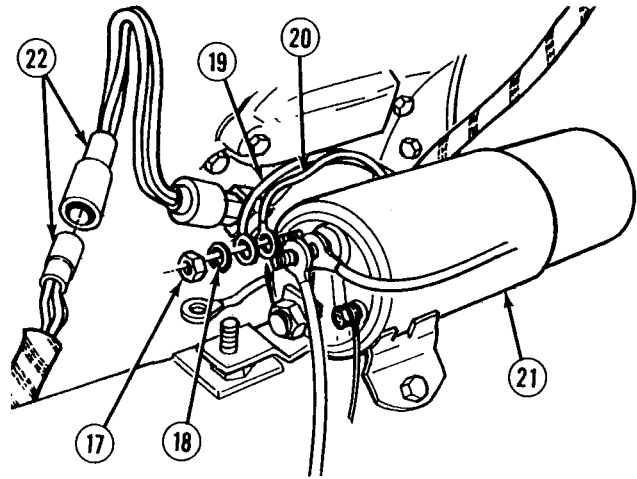


- (3) Remove screw (6), lockwasher (7), washer (8), wire 1435 (9) and shield wires (10) and (11) from engine (12). Discard lockwasher.
- (4) Disconnect MC70 connector (13).
- (5) Remove nut (14) and wire 1818 (15) from starter (16).

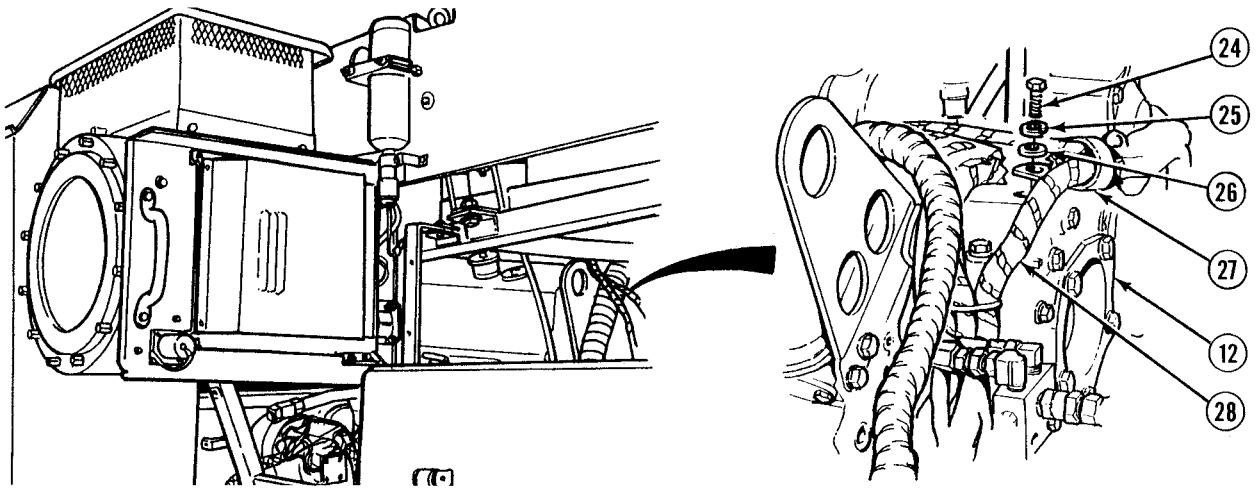


6-20. STE/ICE-R WIRE HARNESS REPLACEMENT (CONT).

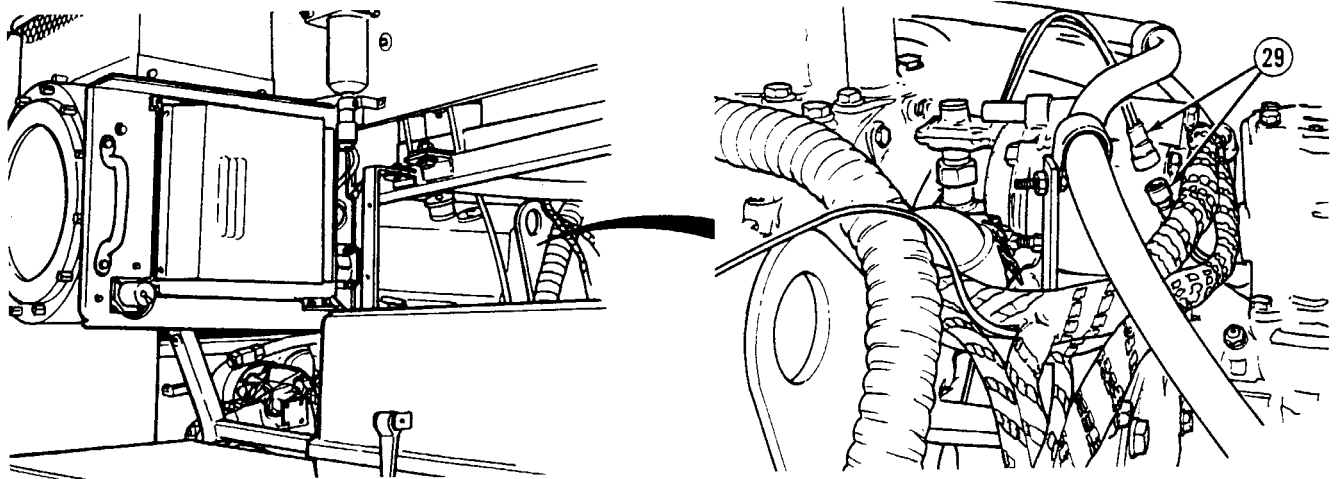
- (6) Remove nut (17), lockwasher (18), wire 1816 (19) and wire 1045 (20) from starter solenoid (21). Discard lockwasher.
- (7) Disconnect MC68 connector (22).



- (8) Disconnect MC69 connector (23).

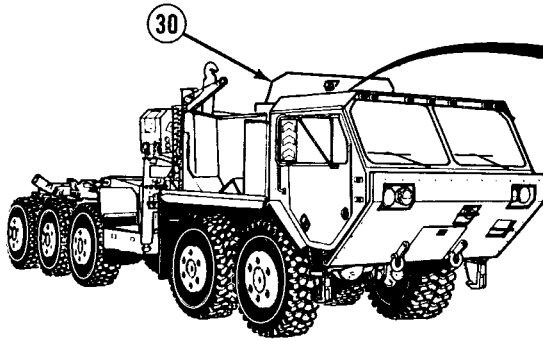


- (9) Remove screw (24), lockwasher (25), washer (26) and cushion clip (27) from engine (12). Discard lockwasher.
- (10) Remove STE/ICE-R engine wire harness (28) from cushion clip (27).

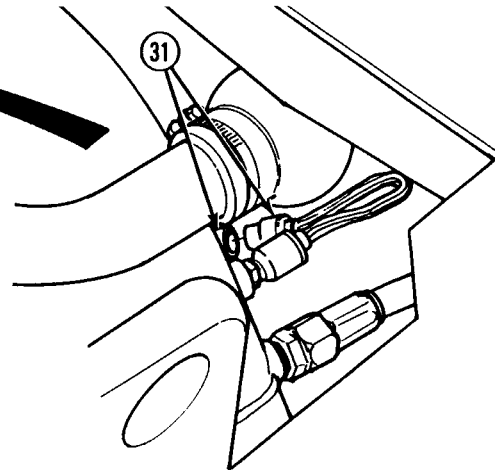


- (11) Disconnect MC41 connector (29).

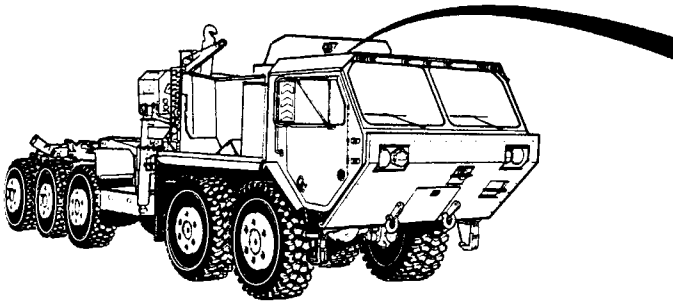
6-20. STE/ICE-R WIRE HARNESS REPLACEMENT (CONT).



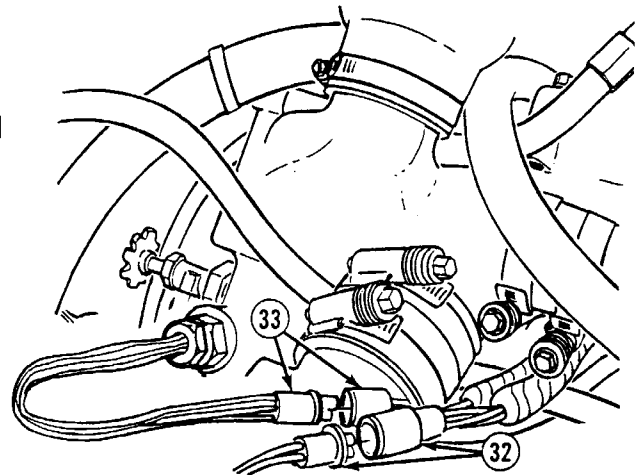
(12) Open engine cover (30).



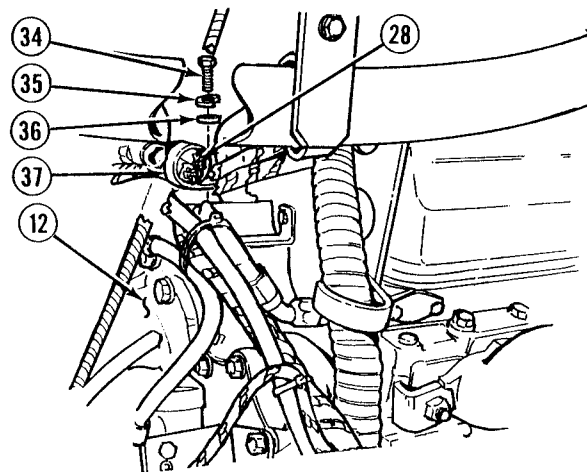
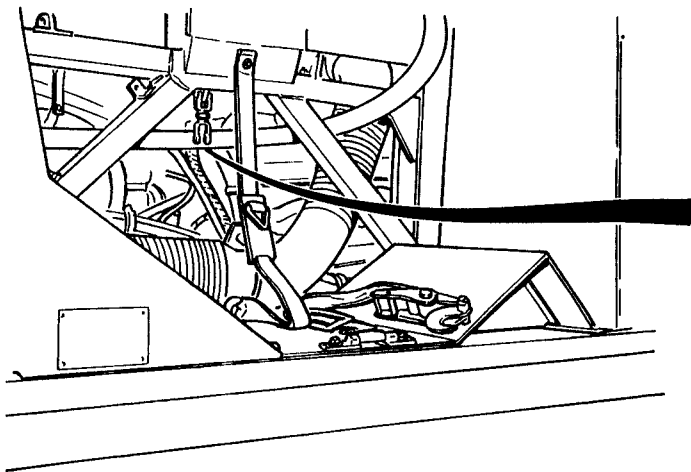
(13) Disconnect MC67 connector (31).



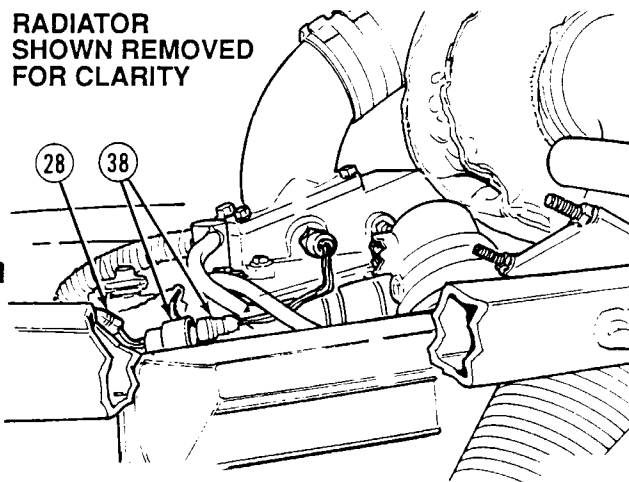
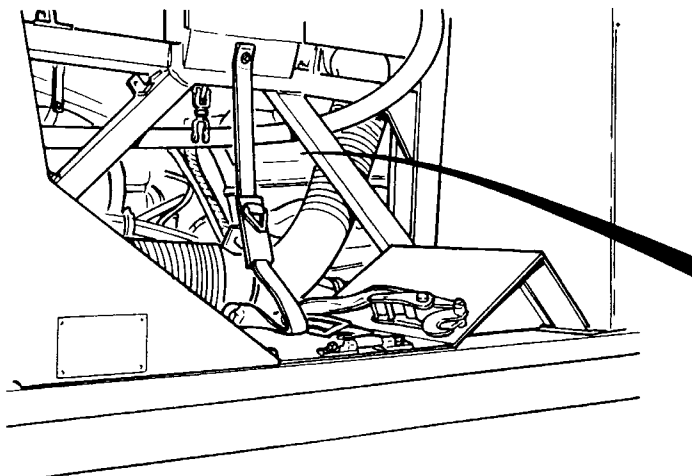
(14) Disconnect MC43 connector (32).



(15) Disconnect MC71 connector (33).



- (16) Remove screw (34), lockwasher (35), washer (36) and cushion clip (37) from engine (12). Discard lockwasher.
- (17) Remove STE/ICE-R engine wire harness (28) from cushion clip (37).



- (18) Disconnect MC66 connector (38).
- (19) Remove STE/ICE-R engine wire harness (28) from truck.

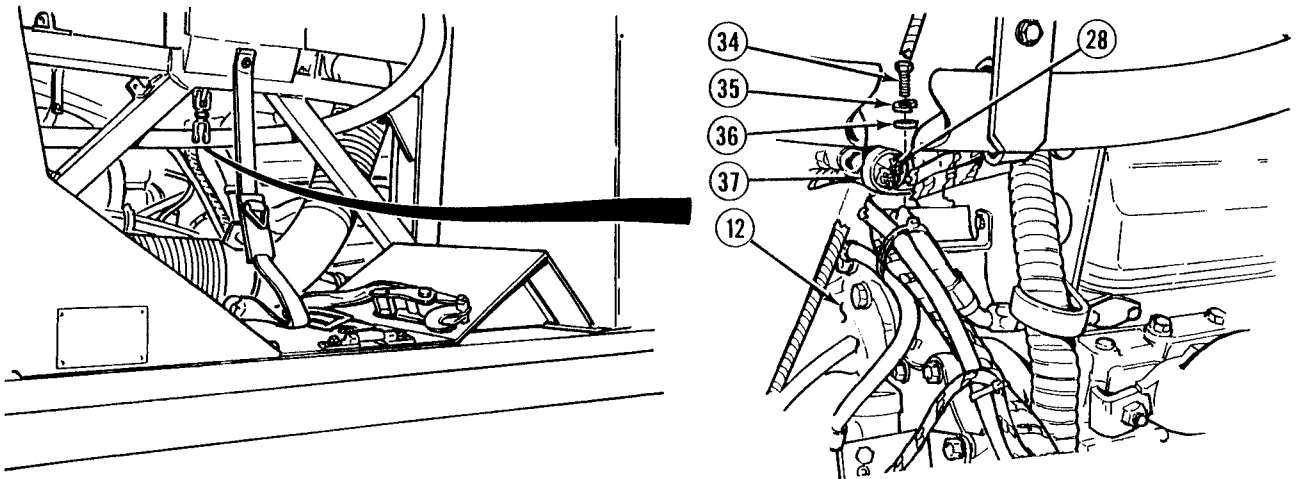
b. Installation.

NOTE

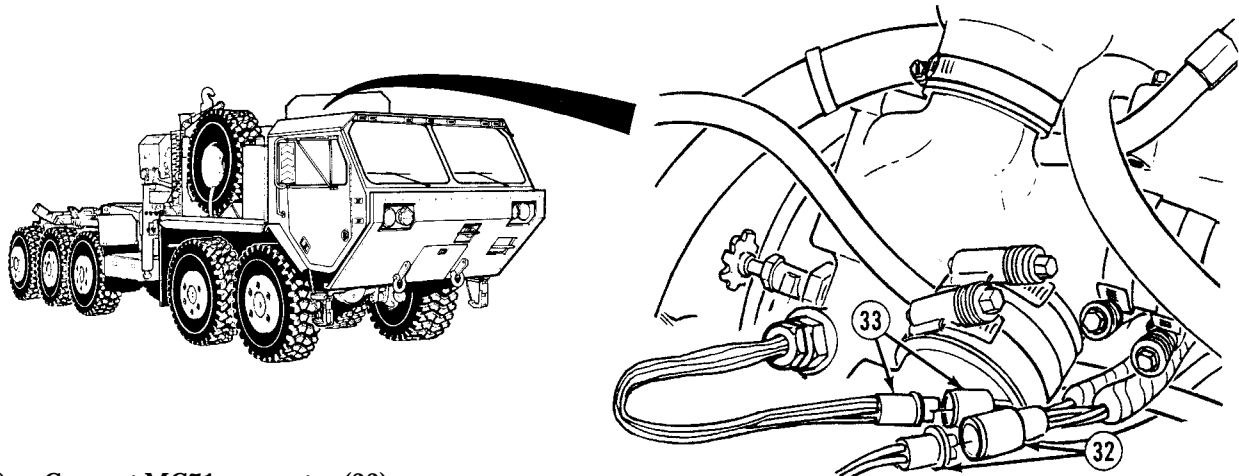
- Evenly distribute any slack in harness.
- Install cable ties as required.

- (1) Position STE/ICE-R engine wire harness (28) through truck.
- (2) Connect MC66 connector (38).

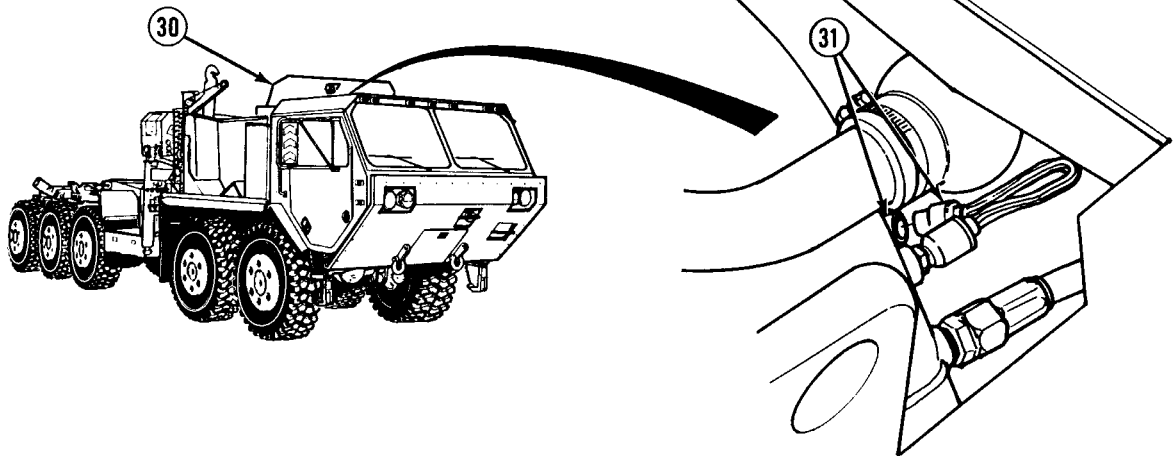
6-20. STE/ICE-R WIRE HARNESS REPLACEMENT (CONT).



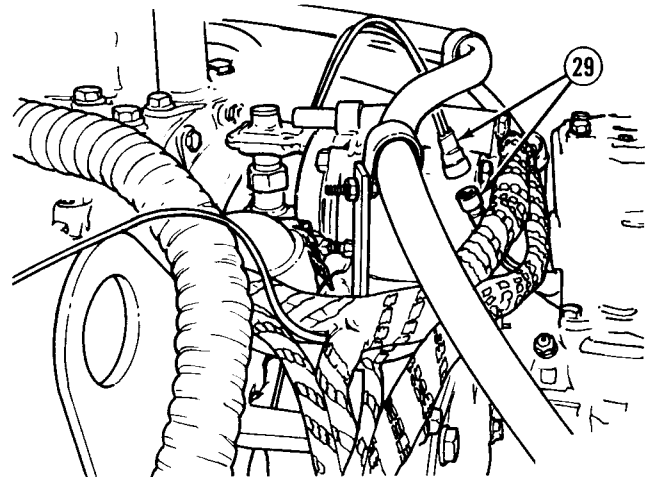
- (3) Position STE/ICE-R wire harness (28) in cushion clip (37).
- (4) Install cushion clip (37), washer (36), lockwasher (35) and screw (34) on engine (12).



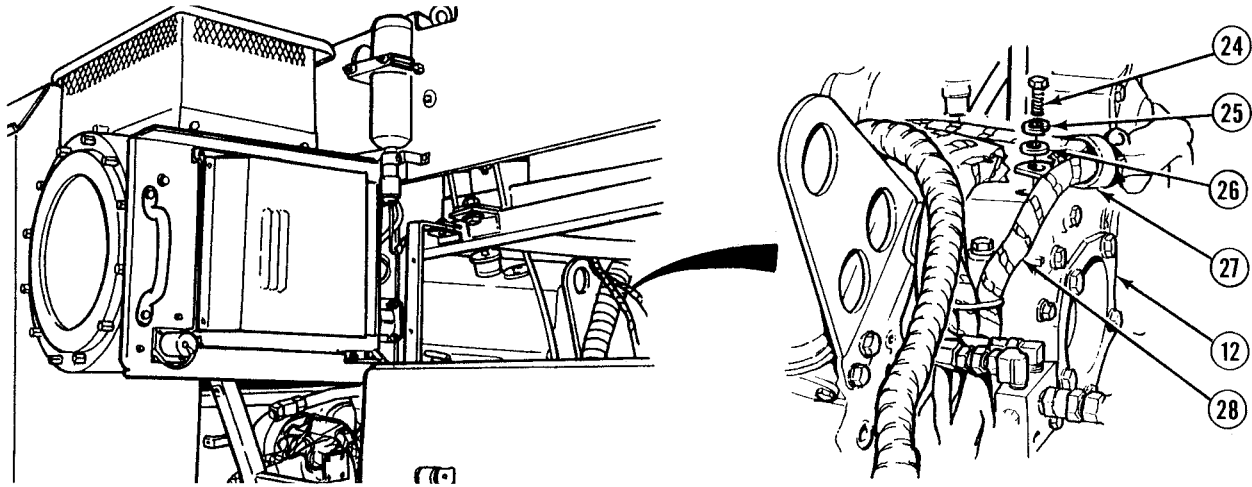
- (5) Connect MC71 connector (33).
- (6) Connect MC43 connector (32).



- (7) Connect MC67 connector (31).
- (8) Close engine cover (30).
- (9) Connect MC41 connector (29).

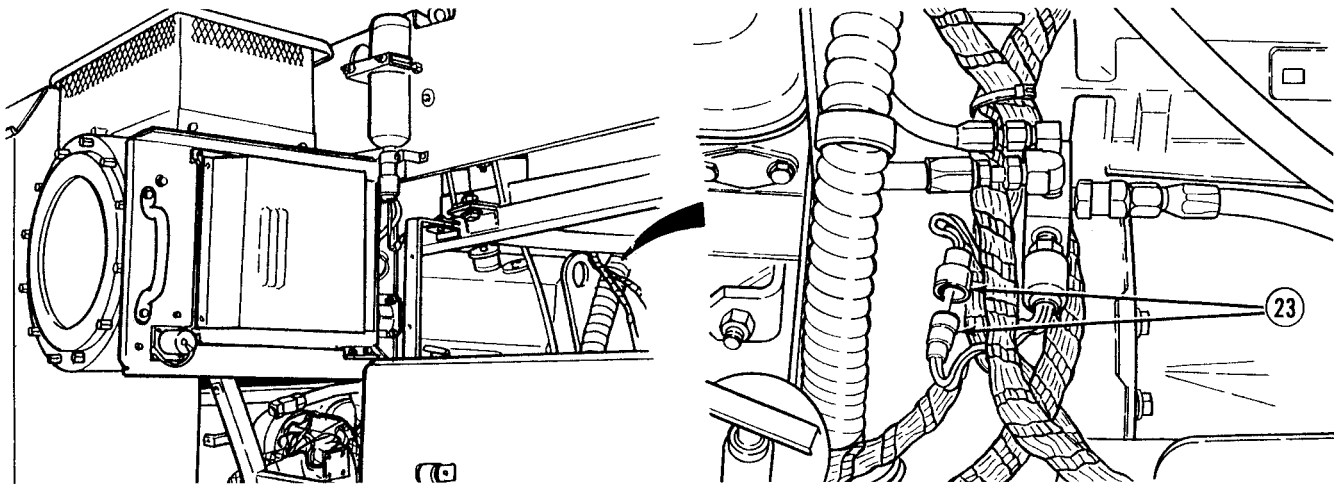


6-20. STE/ICE-R WIRE HARNESS REPLACEMENT (CONT).



(10) Position STE/ICE-R engine wire harness (28) in cushion clip (27).

(11) Install cushion clip (27), washer (26), lockwasher (25) and screw (24) on engine (12).

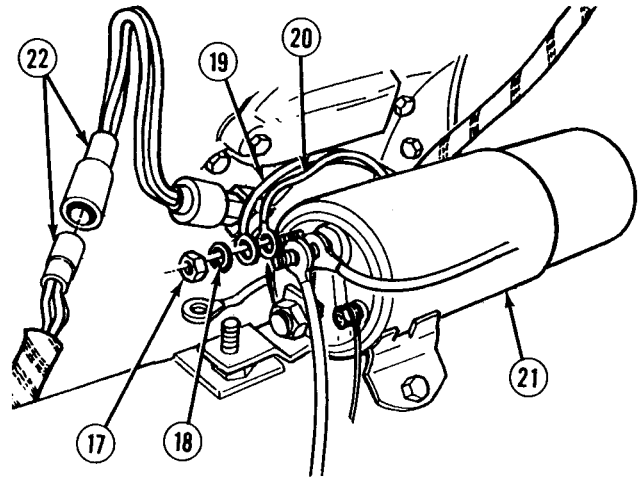


(12) Connect MC69 connector (23).

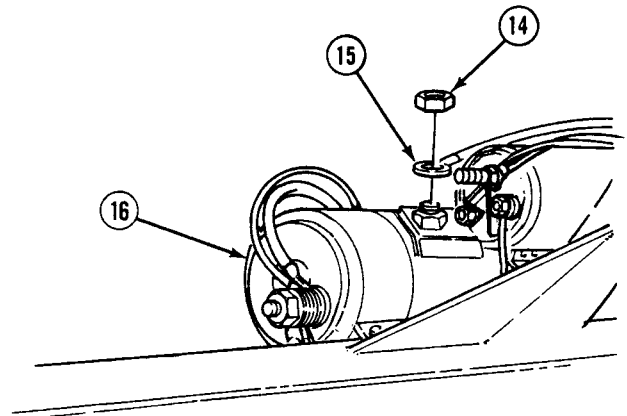
- (13) Connect MC68 connector (22).
- (14) Install wire 1045 (20), wire 1816 (19), lockwasher (18) and nut (17) on starter solenoid (21).

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.

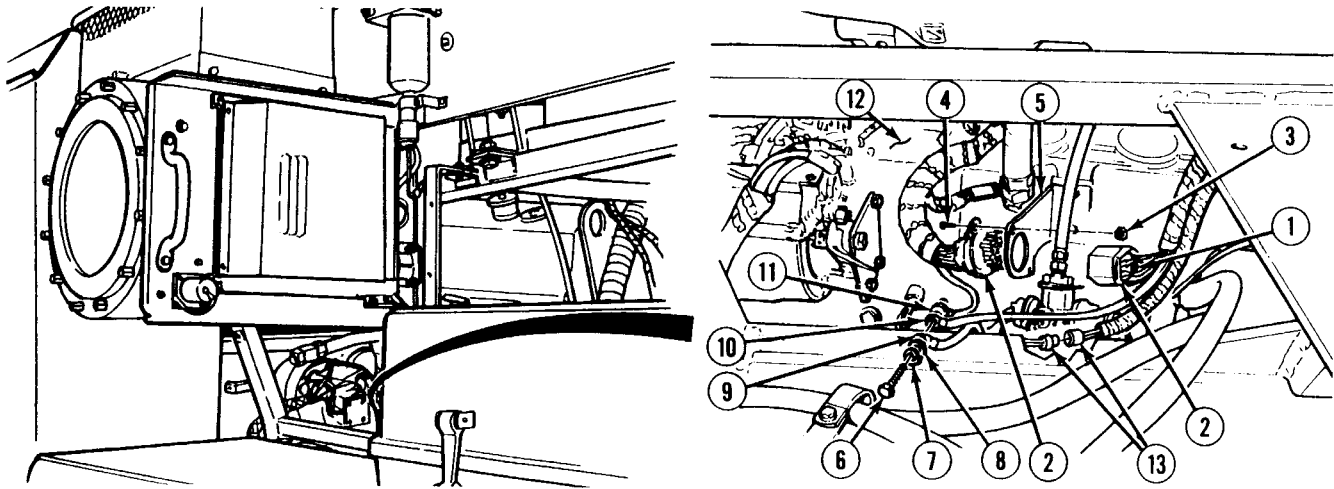


- (15) Apply electrical sealant to starter solenoid (21) terminal.



- (16) Install wire 1818 (15) and nut (14) on starter (16).

6-20. STE/ICE-R WIRE HARNESS REPLACEMENT (CONT).



- (17) Connect MC70 connector (13).
- (18) Install shield wires (10) and (11), wire 1435 (9), washer (8), lockwasher (7) and screw (6) on engine (12).

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.

- (19) Apply electrical sealant to screw (6).
- (20) Install MC65 connector (2), two screws (4) and locknuts (3) on mounting bracket (5).
- (21) Connect MC65 connector (2) and tighten screw (1).

c. Follow-On Maintenance:

- Install left front noise panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Install right side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

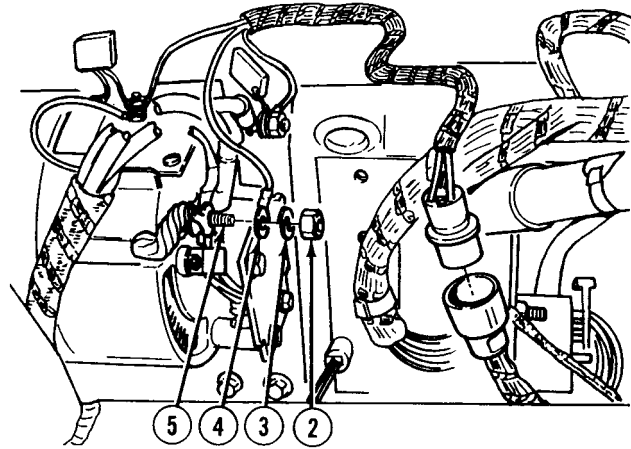
END OF TASK

6-21. STE/ICE-R ALTERNATOR HARNESS REPLACEMENT (145 AMP) (CONT).

NOTE

There are four wires located on negative terminal. Remove only wire 1815 and position remaining three wires back on negative terminal.

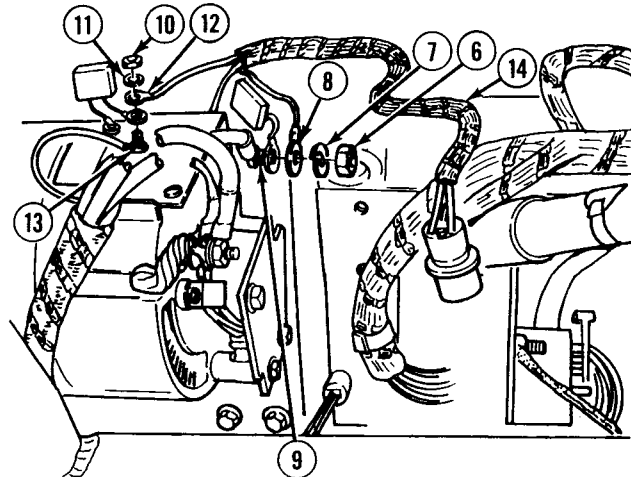
- (2) Remove nut (2), lockwasher (3) and wire 1815 (4) from negative terminal (5) and reinstall nut on negative terminal. Discard lockwasher.



NOTE

There are two wires and a capacitor located on positive terminal. Remove only wire 1820 and position remaining wire and capacitor back on positive terminal.

- (3) Remove nut (6), lockwasher (7) and wire 1820 (8) from positive terminal (9) and reinstall nut on positive terminal. Discard lockwasher.



NOTE

There are two wires and a capacitor located on F-positive terminal. Remove only wire 1953 and position remaining wire and capacitor back on F-positive terminal

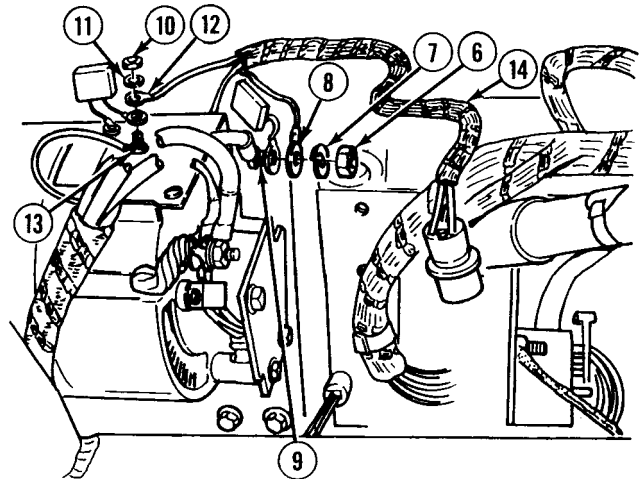
- (4) Remove nut (10), lockwasher (11) and wire 1953 (12) from F-positive terminal (13) and reinstall nut on F-positive terminal. Discard lockwasher.
- (5) Remove STE/ICE-R alternator harness (14) from truck.

b. *Installation.*

NOTE

- Evenly distribute any slack in harness.
- Install cable ties as required.

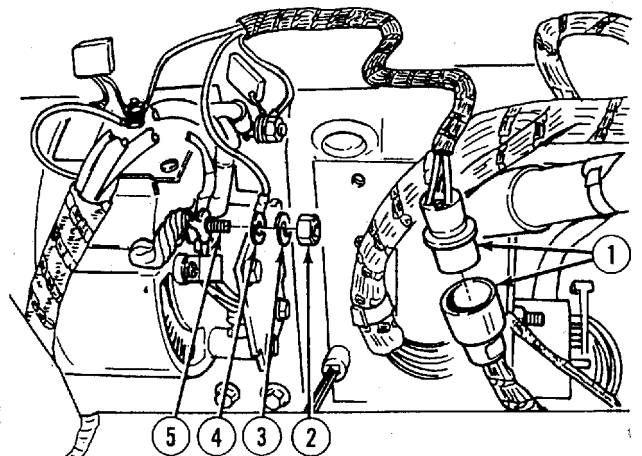
- (1) Position STE/ICE-R alternator harness (14) in truck.
- (2) Remove nut (10) from F-positive terminal (13) and install wire 1953 (12), lockwasher (11) and nut on F-positive terminal.
- (3) Remove nut (6) from positive terminal (9) and install wire 1820 (8), lockwasher (7) and nut on positive terminal.
- (4) Remove nut (2) from negative terminal (5) and install wire 1815 (4), lockwasher (3) and nut on negative terminal.



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.

- (5) Apply electrical sealant to F positive terminal (13), positive terminal (9), and negative terminal (5).
- (6) Connect MC40 connector (1).



c. *Follow-On Maintenance:*

- Install left front noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

NOTE

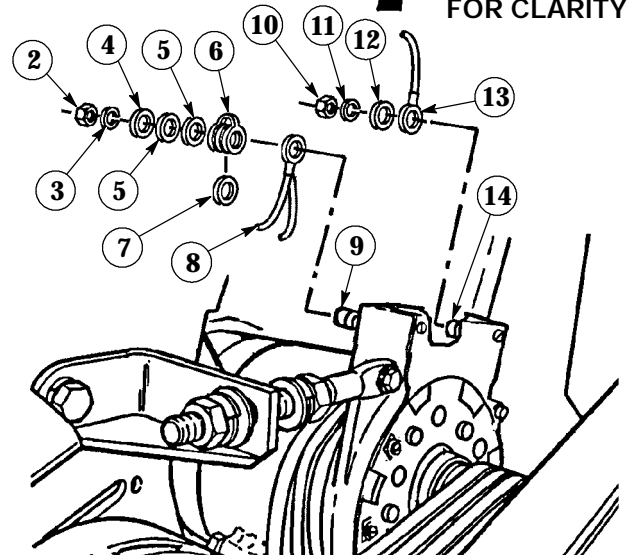
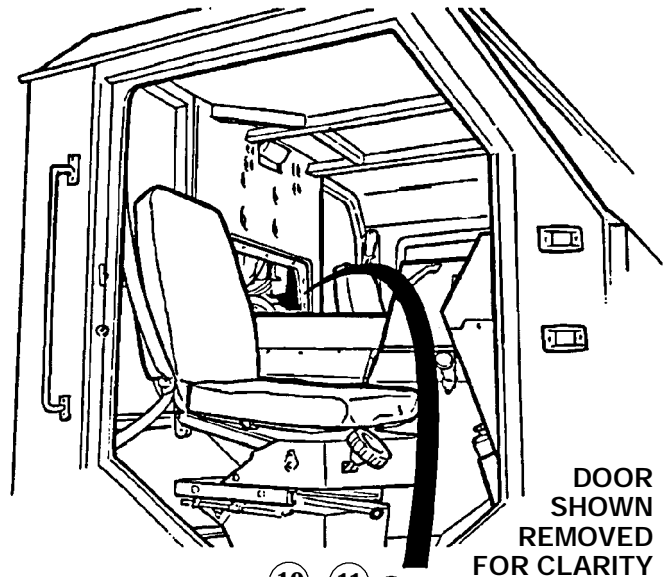
There are two wires located on 24 volt terminal. Only remove wire 1820/1953 and position remaining wire back on 24 volt terminal.

- (2) Remove nut (2), lockwasher (3), washer (4), washer(s) (5) (if present), fuse link (6) with insulator washer (7) and wire 1820/1953 (8) from 24 volt terminal (9). Discard lockwasher.
- (3) Position fuse link (6) with insulator washer (7), washer(s) (5) (if removed), washer (4) and nut (2) on 24 volt terminal (9).

NOTE

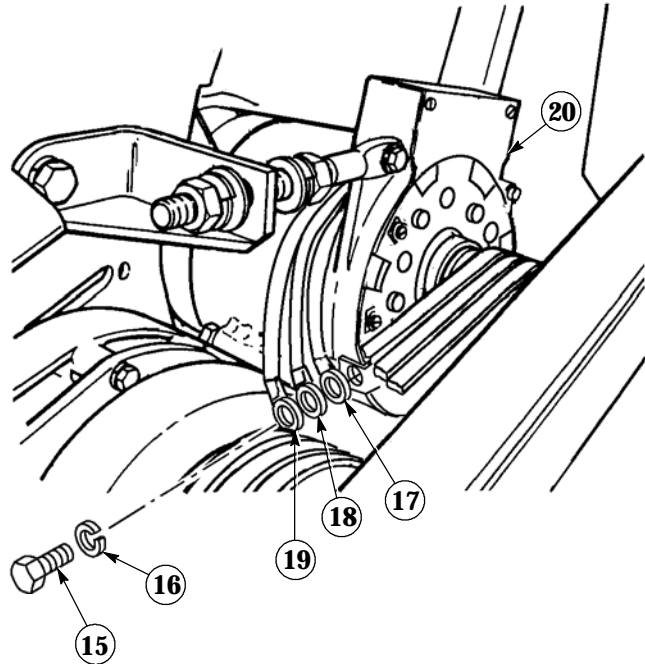
There are two wires on 12 volt terminal. Remove only wire 1860 and position remaining wire back on 12 volt terminal.

- (4) Remove nut (10), lockwasher (11), washer (12) and wire 1860 (13) from 12 volt terminal (14). Discard lockwasher.
- (5) Position nut (10) and washer (12) on 12 volt terminal (15).



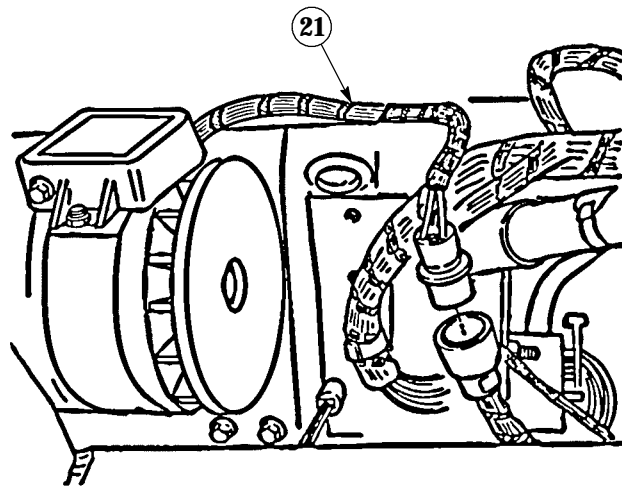
6-22. STE/ICE-R ALTERNATOR HARNESS REPLACEMENT (200 AMP)(CONT).

- (6) Remove screw (15), lockwasher (16), wire 1815 (17), wire 1435 (18) and wire 1275 (19) from alternator (20). Discard lockwasher.



- (7) Position wire 1275 (19), wire 1435 (18) and screw (15) on alternator (20).

- (8) Remove STE/ICE-R alternator harness (21) from truck.

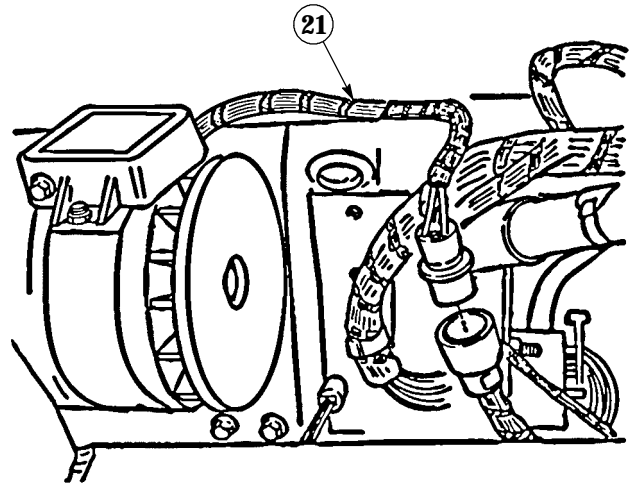


b. Installation.

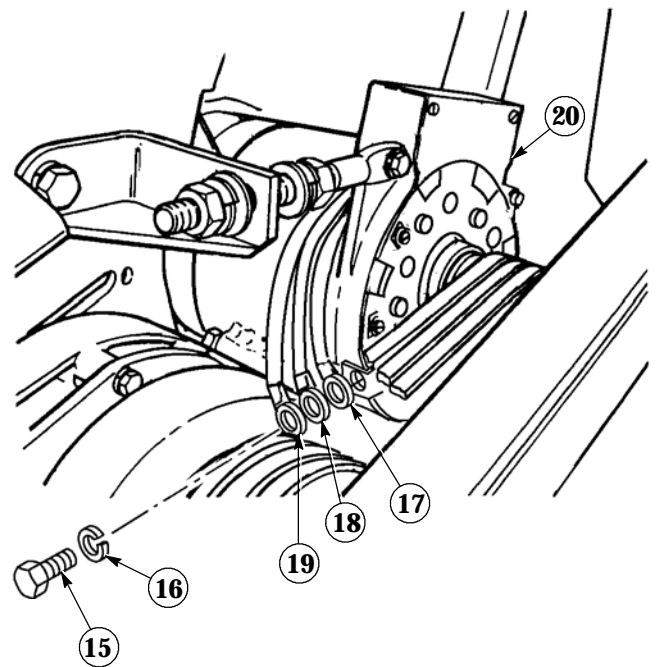
NOTE

- Evenly distribute any slack in harness.
- Install cable ties as required.

- (1) Position STE/ICE-R alternator harness (21) in truck.

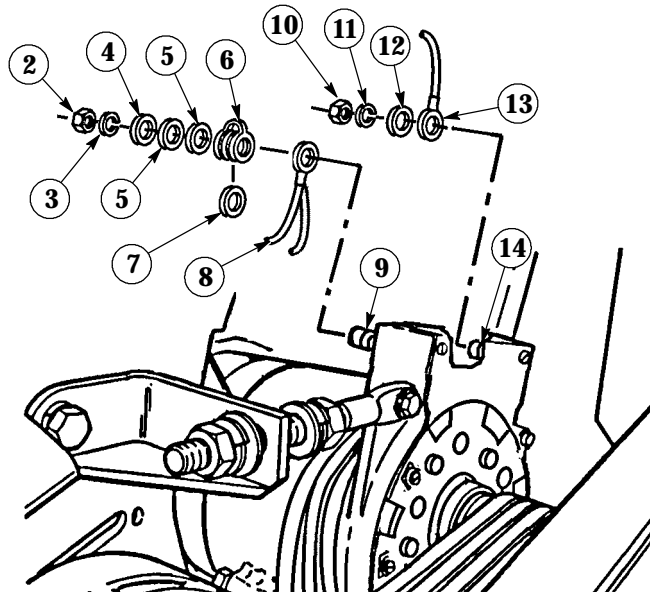


- (2) Remove screw (15), wire 1275 (19) and wire 1435 (18) from alternator (20).
- (3) Install wire 1275, wire 1435, wire 1815 (17), lockwasher (16) and screw (15) on alternator.
- (4) Tighten screw (15) to 17 lb-ft (23 N·m).



6-22. STE/ICE-R ALTERNATOR HARNESS REPLACEMENT (200 AMP)(CONT).

- (5) Remove nut (10) and washer (12) from 12 volt terminal (15)
- (6) Install wire 1860 (13), washer (12), lockwasher (11) and nut (10) on 12 volt terminal.
- (7) Tighten nut (10) to 15 lb-ft (20 N·m).
- (8) Remove nut (2), washer (4), washer(s) (5) (if present), and fuse link (6) with insulator washer (7) from 24 volt terminal (9).
- (9) Install wire 1820/1953 (8), fuse link (6) with insulator washer, washer(s) (5) (if removed), washer (4), lockwasher (3) and nut on 24 volt terminal.
- (10) Tighten nut (2) to 15 lb-ft (20 N·m).



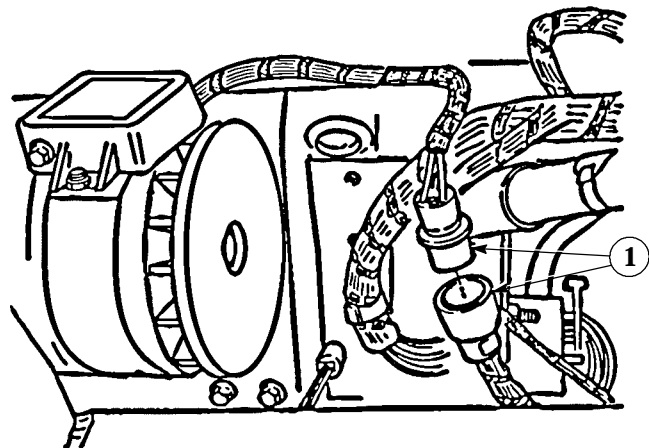
WARNING

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.

- (11) Apply electrical sealant to 24 volt terminal (9), 12 volt terminal (14) and screw (15).
- (12) Connect MC24 connector (1).

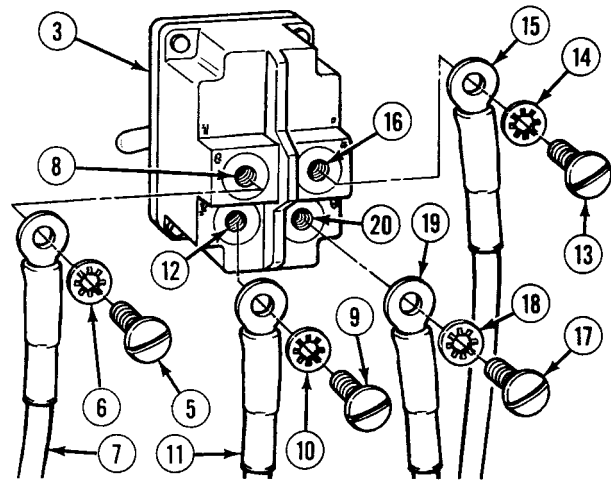
c. Follow-On Maintenance:

- Install left front noise panel, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

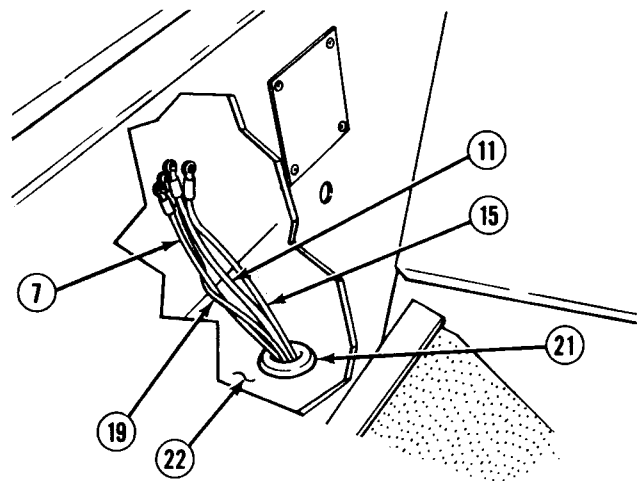


6-23. STE/ICE-R CHASSIS WIRE HARNESS REPLACEMENT (CONT).

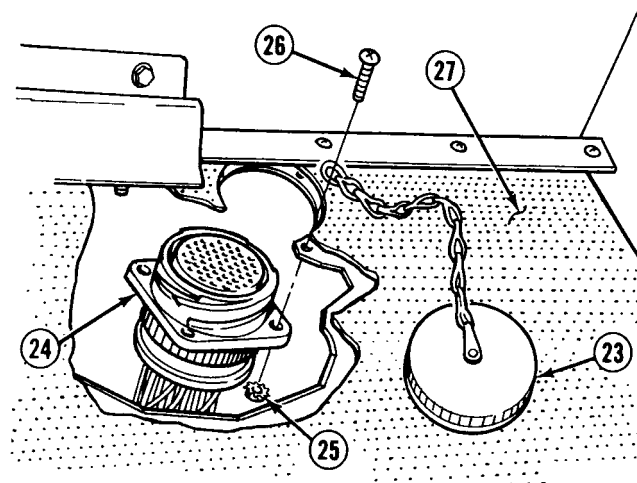
- (2) Remove screw (5), lockwasher (6) and wire 1939B (7) from terminal 2 (8) on toggle switch (3). Discard lockwasher.
- (3) Remove screw (9), lockwasher (10) and wire 1940B (11) from terminal 3 (12) on toggle switch (3). Discard lockwasher.
- (4) Remove screw (13), lockwasher (14) and wire 1938B (15) from terminal 5 (16) on toggle switch (3). Discard lockwasher.
- (5) Remove screw (17), lockwasher (18) and wire 1952B (19) from terminal 6 (20) on toggle switch (3). Discard lockwasher.

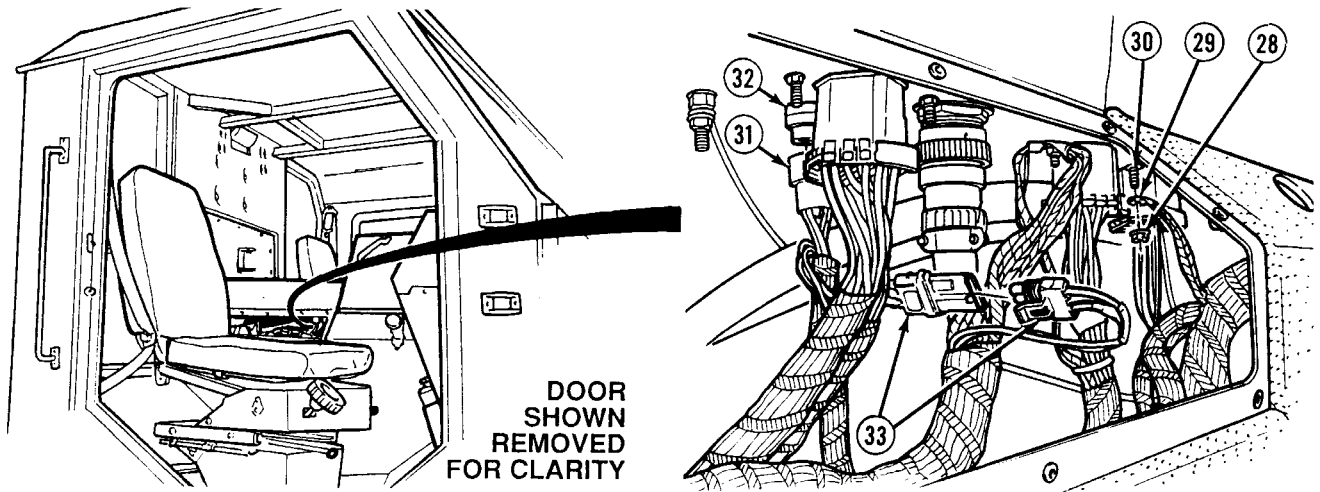


- (6) Push wires 1939B (7), 1940B (11), 1938B (15) and 1952B (19) through grommet (21) on bottom of heater compartment (22).



- (7) Unscrew cap and chain (23) from MC39 connector (24).
- (8) Remove four locknuts (25), screws (26) and cap and chain (23) from heater panel (27). Discard locknuts.
- (9) Remove MC39 connector (24) from heater panel (27).



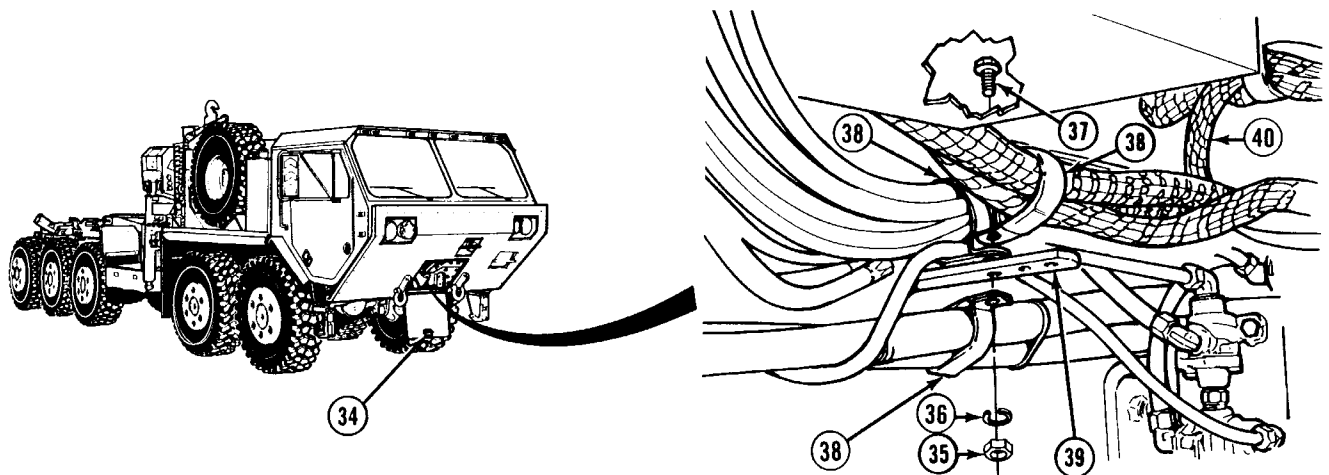


- (10) Remove locknut (28) and shield wire (29) from connector mounting screw (30). Discard locknut.
- (11) Disconnect MC40 connector (31) from bulkhead connector (32).

NOTE

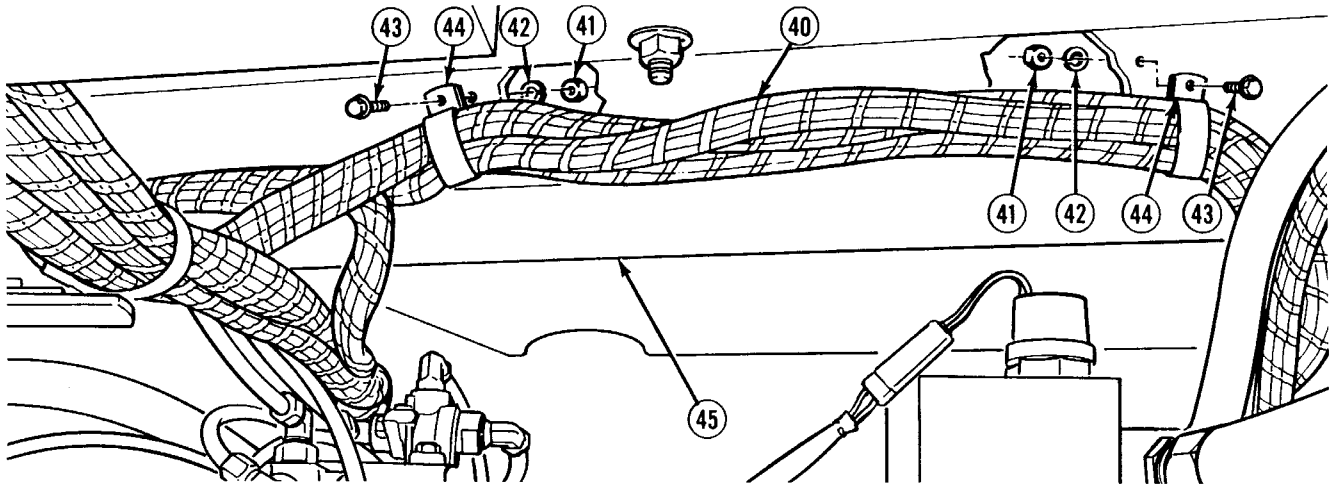
Disconnect connector by prying up on tabs and gently pulling apart connector.

- (12) Disconnect MC118 connector (33).

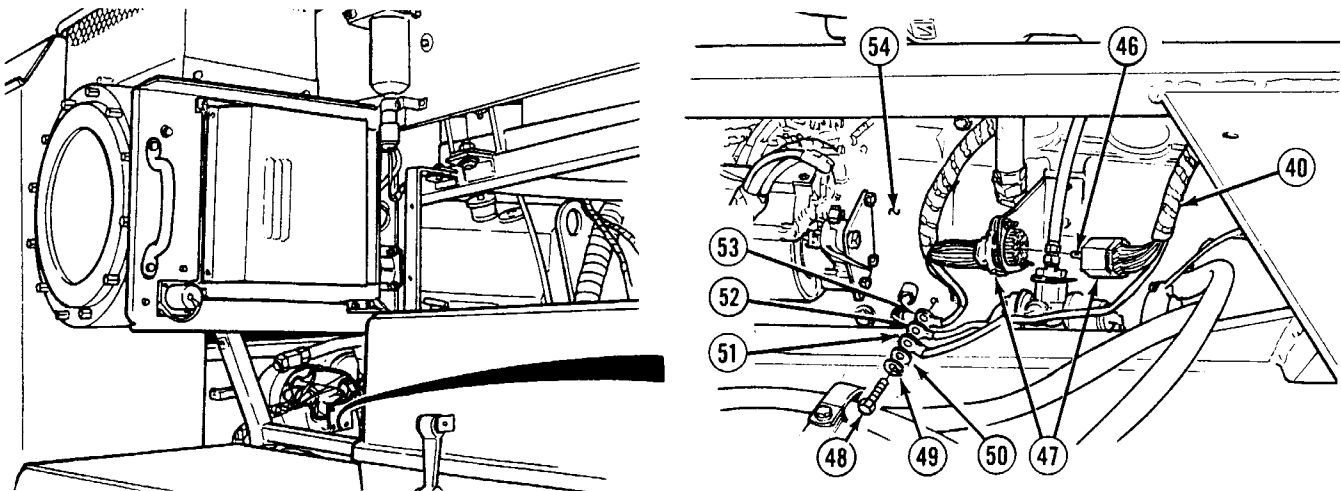


- (13) Open front access cover (34).
- (14) Remove locknut (35), lockwasher (36), screw (37) and cushion clips (38) from bracket (39). Discard locknut and lockwasher.
- (15) Remove STE/ICE-R chassis wire harness (40) from cushion clip (38).

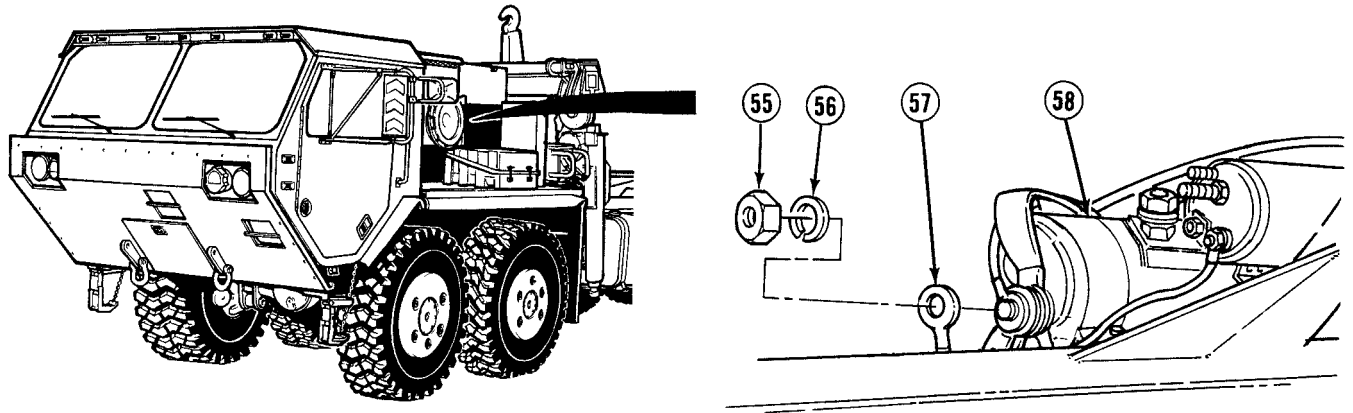
6-23. STE/ICE-R CHASSIS WIRE HARNESS REPLACEMENT (CONT).



- (16) Remove two locknuts (41), lockwashers (42), screws (43) and cushion clips (44) from crossmember (45). Discard locknuts and lockwashers.
- (17) Remove STE/ICE-R chassis wire harness (40) from cushion clips (44).

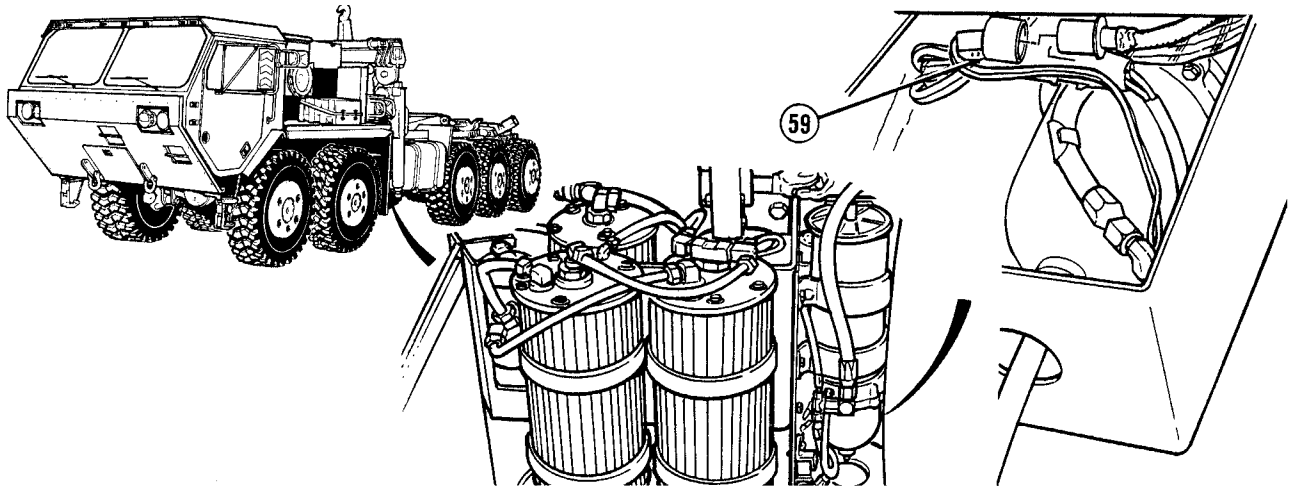


- (18) Loosen screw (46) and disconnect MC65 connector (47).
- (19) Remove screw (48), lockwasher (49), washer (50), wire 1435 (51) and shield wires (52) and (53) from engine (54). Discard lockwasher.



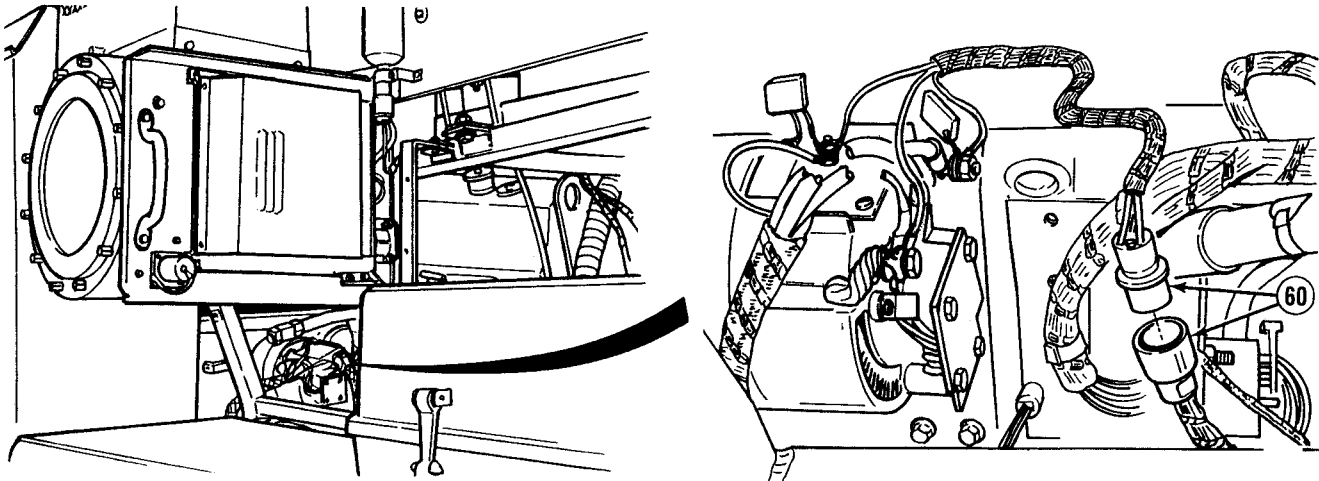
(20) Remove nut (55), lockwasher (56) and wire 1819 (57) from starter (58).

(21) Reinstall lockwasher (56) and nut (55) on starter (58).

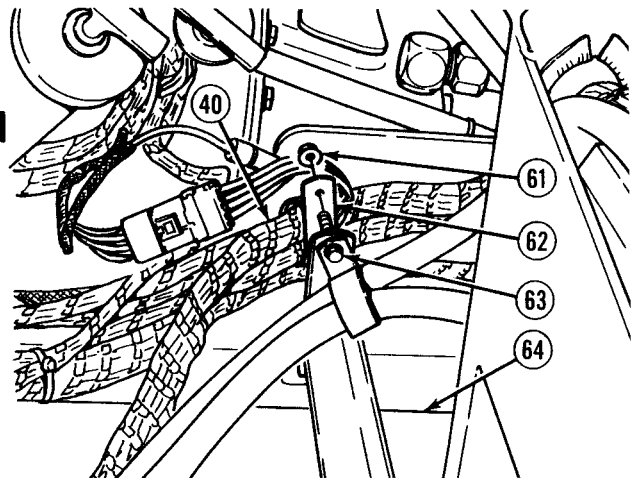
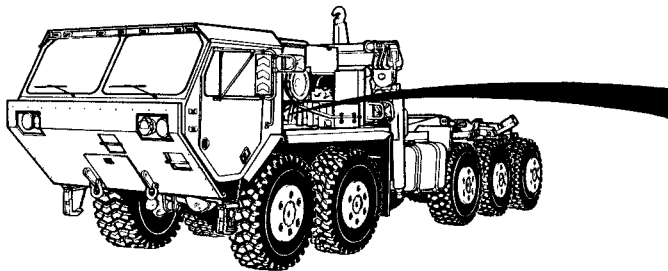


(22) Disconnect MC42 connector (59).

6-23. STE/ICE-R CHASSIS WIRE HARNESS REPLACEMENT (CONT).



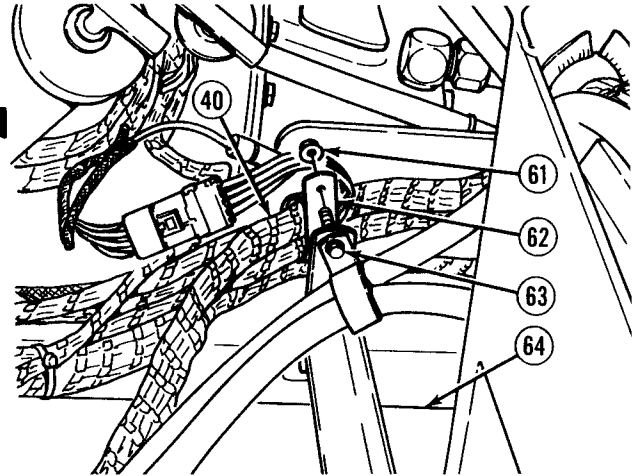
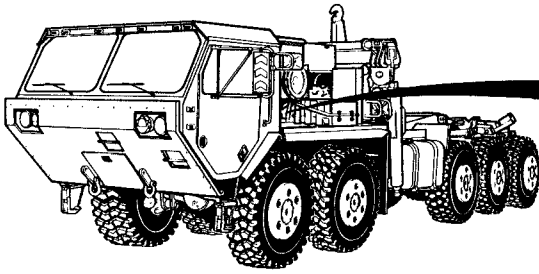
(23) Disconnect MC24 connector (60).



(24) Remove locknut (61) and cushion clip (62) from screw (63) and STE/ICE-R chassis wire harness (40). Reinstall locknut (61) on screw (63).

(25) Remove STE/ICE-R chassis wire harness (40) from truck (64).

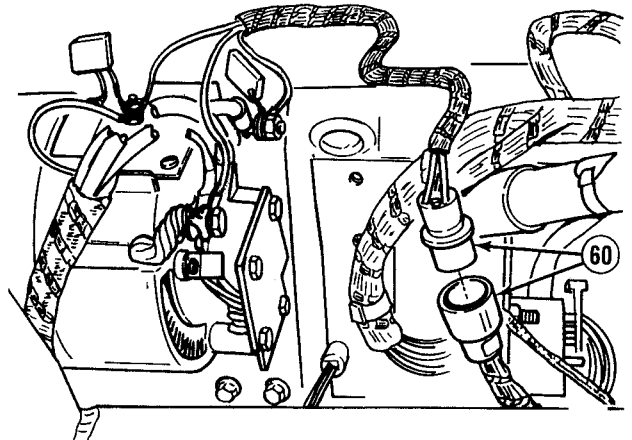
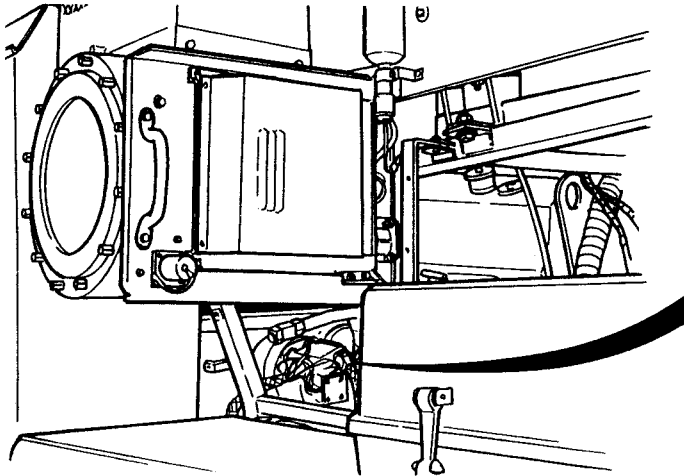
b. Installation.



NOTE

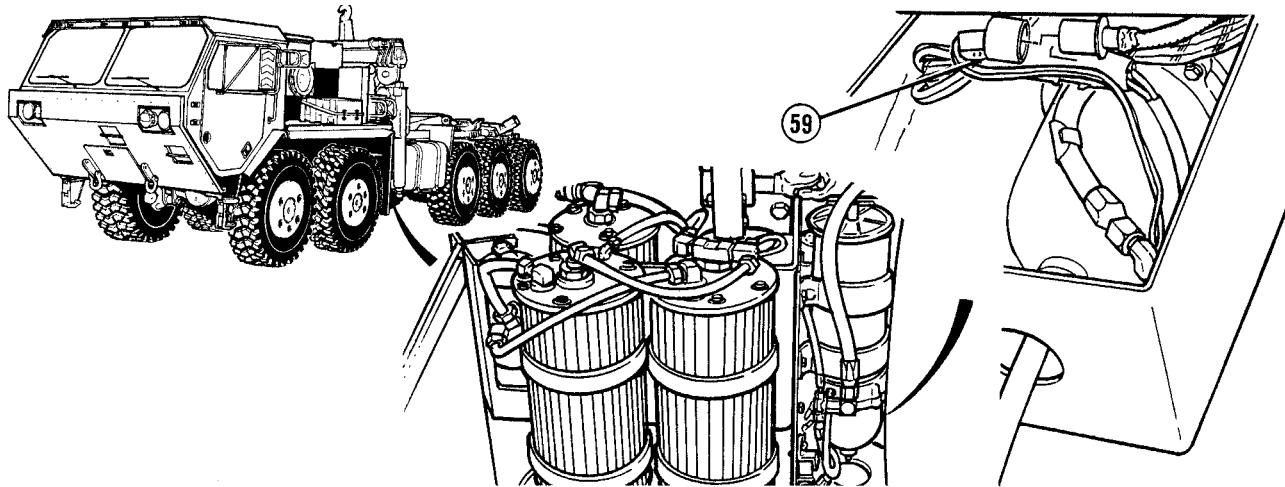
- Evenly distribute any slack in harness.
- Install cable ties as required.

- (1) Position STE/ICE-R chassis wire harness (40) on truck (64).
- (2) Remove and discard locknut (61) from screw (63).
- (3) Install cushion clip (62) to STE/ICE-R chassis wire harness (40) with locknut (61) and screw (63).

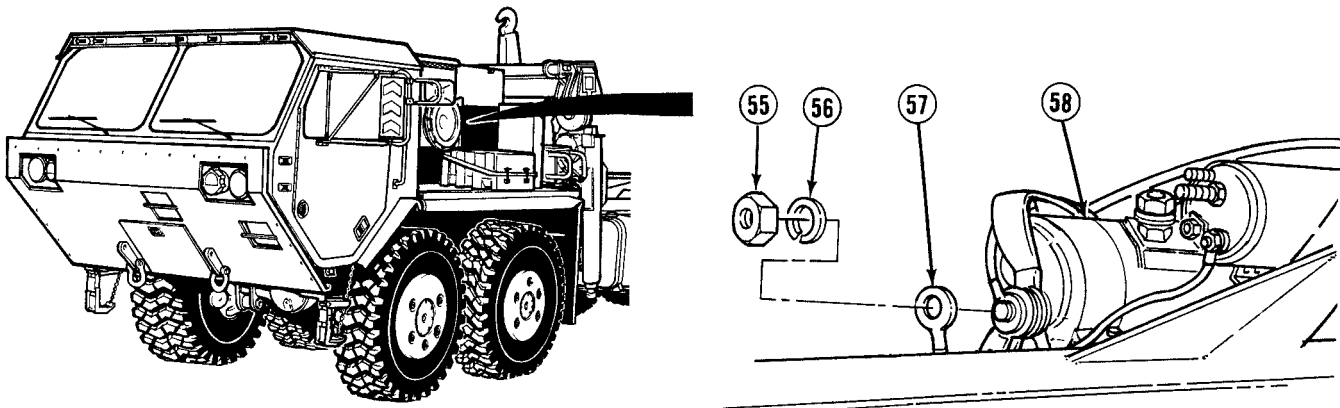


- (4) Connect MC24 connector (60).

6-23. STE/ICE-R CHASSIS WIRE HARNESS REPLACEMENT (CONT).



- (5) Connect MC42 connector (59).

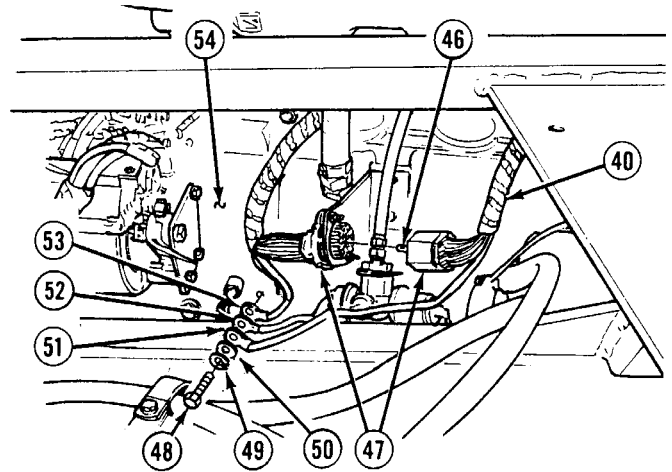
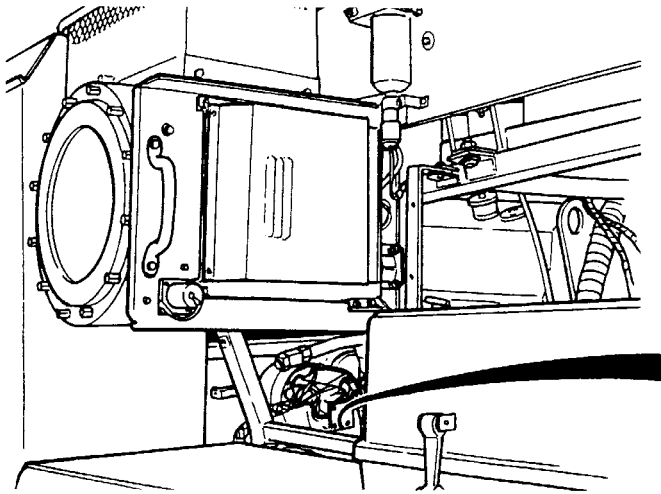


- (6) Remove nut (55) and lockwasher (56) from starter (58). Discard lockwasher.
- (7) Install wire 1819 (57), lockwasher (56) and nut (55) to starter (58).

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.

- (8) Apply electrical sealant to starter (58) terminal.

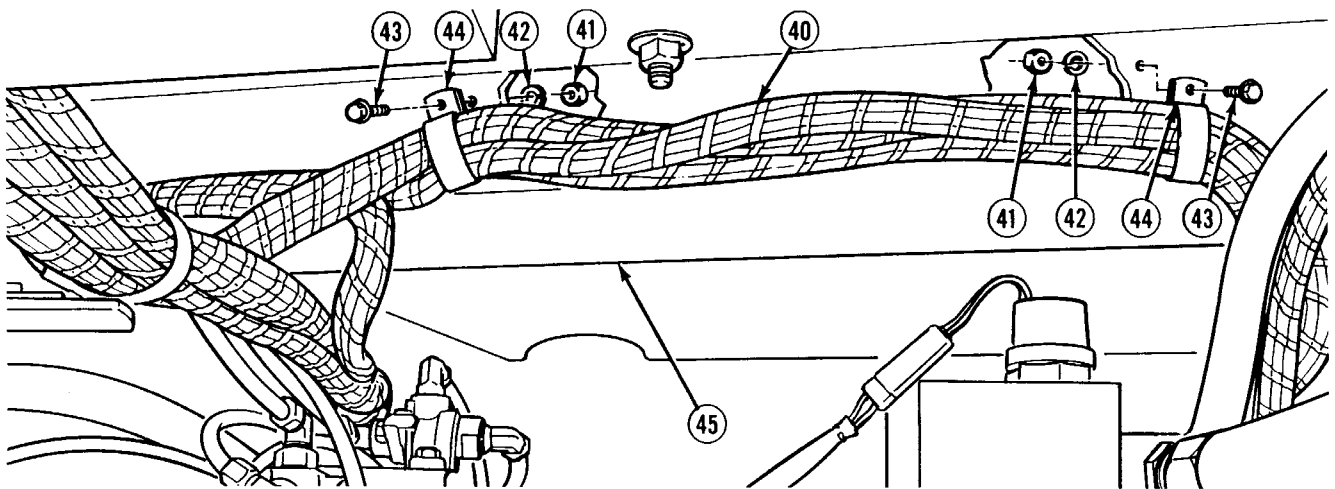


- (9) Install shield wires (52) and (53), wire 1435 (51), washer (50), lockwasher (49) and screw (48) on engine (54).

WARNING

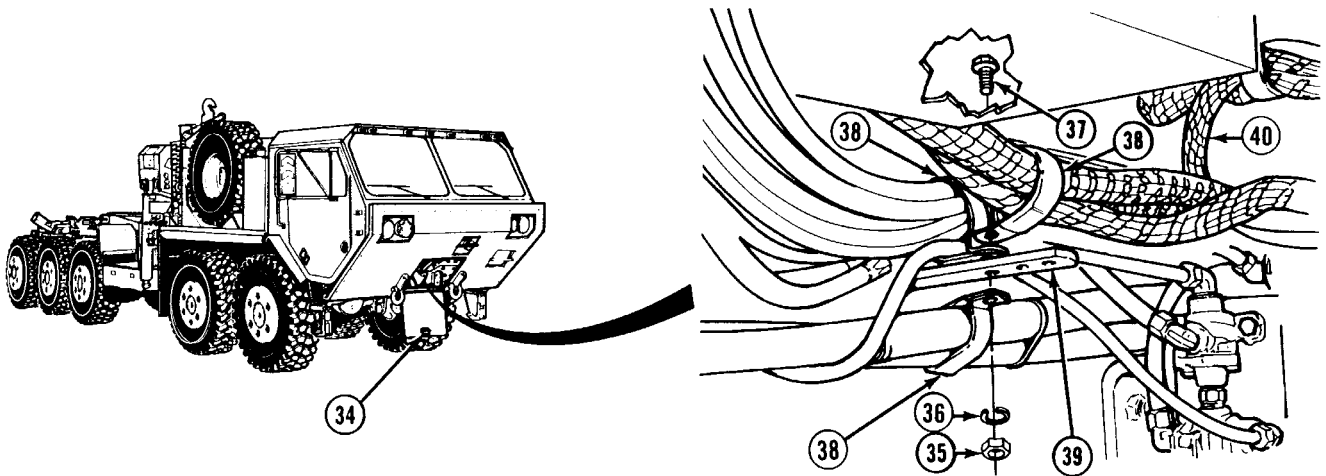
Adhesives, solvents, and sealing compounds can burn easily can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (10) Apply electrical sealant to screw (48).
 (11) Connect MC65 connector (47) and tighten screw (46).

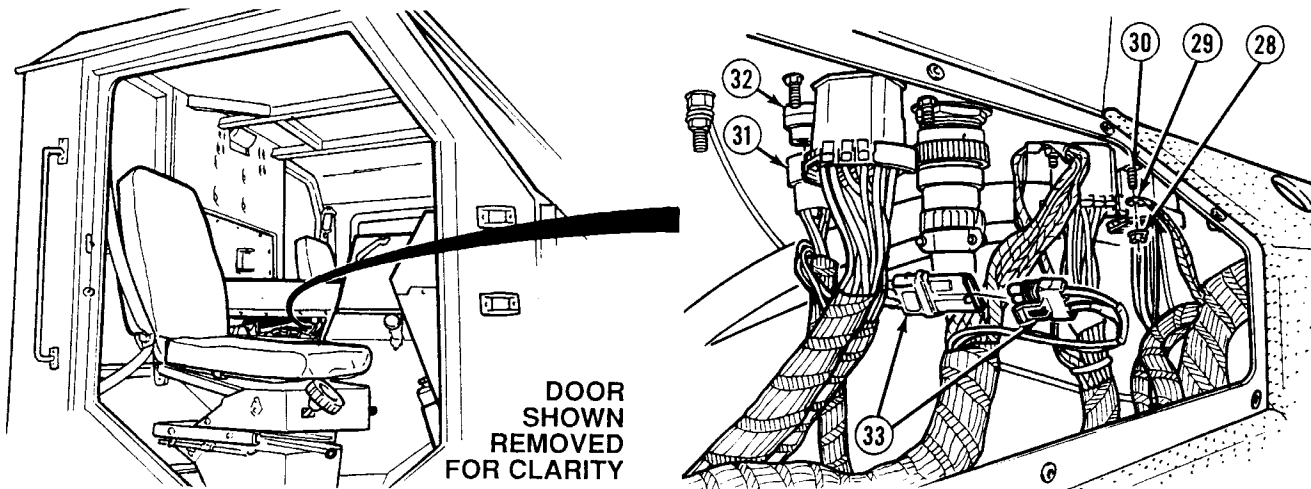


- (12) Position STE/ICE-R chassis wire harness (40) in cushion clip (44).
 (13) Install two cushion clips (44), screws (43), lockwashers (42) and locknuts (41) on crossmember (45).

6-23. STE/ICE-R CHASSIS WIRE HARNESS REPLACEMENT (CONT).

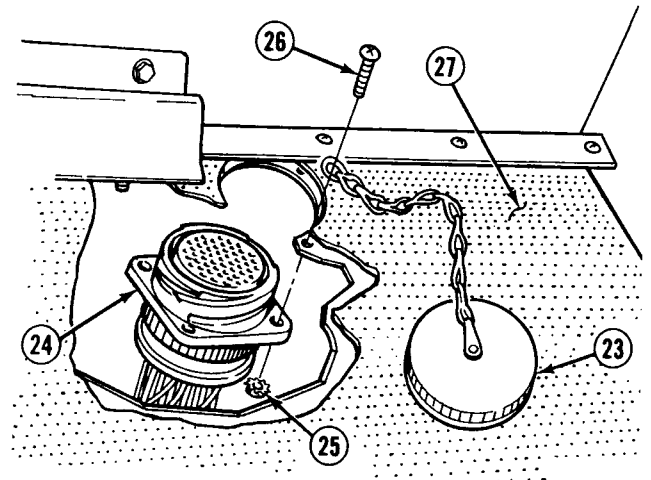


- (14) Position STE/ICE-R chassis wire harness (40) in cushion clip (38).
- (15) Install cushion clips (38), screw (37), lockwasher (36) and locknut (35) on bracket (39).
- (16) Close front access cover (34).

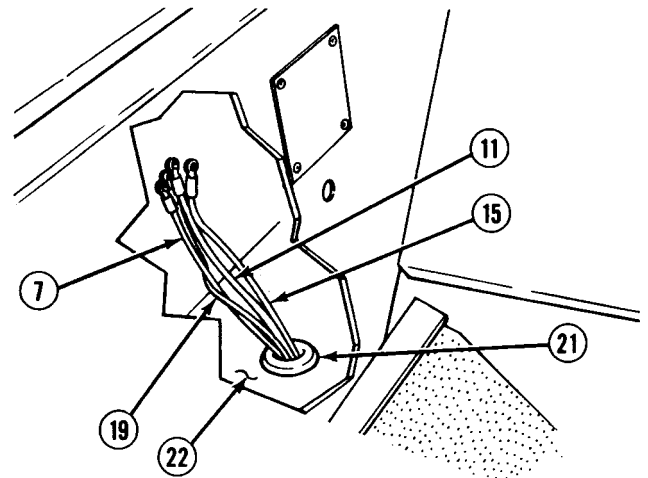


- (17) Connect MC118 connector (33).
- (18) Connect MC40 connector (31) to bulkhead connector (32).
- (19) Install shield wire (29) and locknut (28) on connector mounting screw (30).

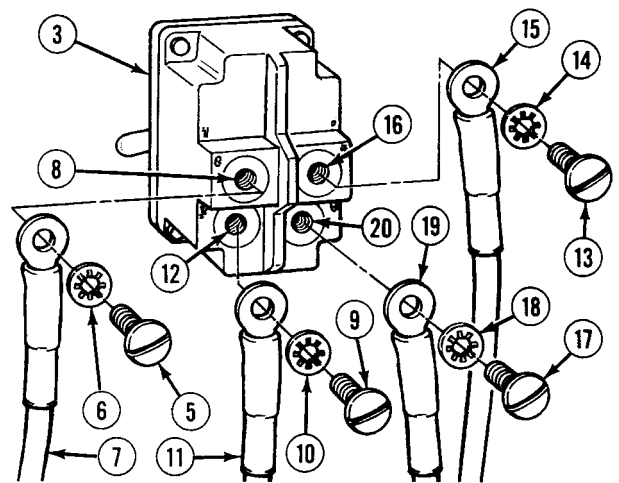
- (20) Position MC39 connector (24) on heater panel (27).
- (21) Install cap and chain (23), four screws (26) and locknuts (25) on MC39 connector (24).
- (22) Install cap and chain (23) on MC39 connector (24).



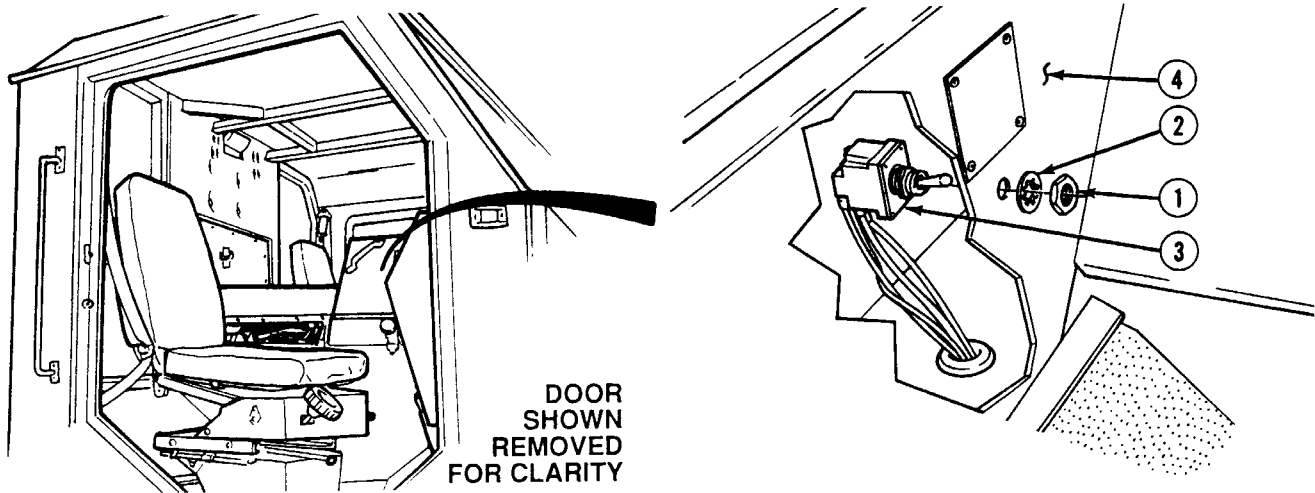
- (23) Apply soap solution to grommet (21) and push wires 1939B (7), 1940B (11), 1938B (15) and 1952B (19) through grommet on bottom of heater compartment (22).



- (24) Install wire 1952B (19), lockwasher (18) and screw (17) in terminal 6 (20) on toggle switch (3).
- (25) Install wire 1938B (15), lockwasher (14) and screw (13) in terminal 5 (16) on toggle switch (3).
- (26) Install wire 1940B (11), lockwasher (10) and screw (9) in terminal 3 (12) on toggle switch (3).
- (27) Install wire 1939B (7), lockwasher (6) and screw (5) in terminal 2 (8) on toggle switch (3).



6-23. STE/ICE-R CHASSIS WIRE HARNESS REPLACEMENT (CONT).



(28) Install toggle switch (3), lockwasher (2) and nut (1) on heater control panel (4).

c. Follow-On Maintenance:

- Install Electronic Control Box (ECB) right cover, (TM 9-2320-364-20).
- Install Electronic Control Box (ECB) right panel, (TM 9-2320-364-20).
- Install heater access panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Install left front noise panel, (TM 9-2320-364-20).
- Batteries connected, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-24. ELECTRONIC CONTROL BOX LIGHT WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Tags, Identification (Item 72, Appendix B)

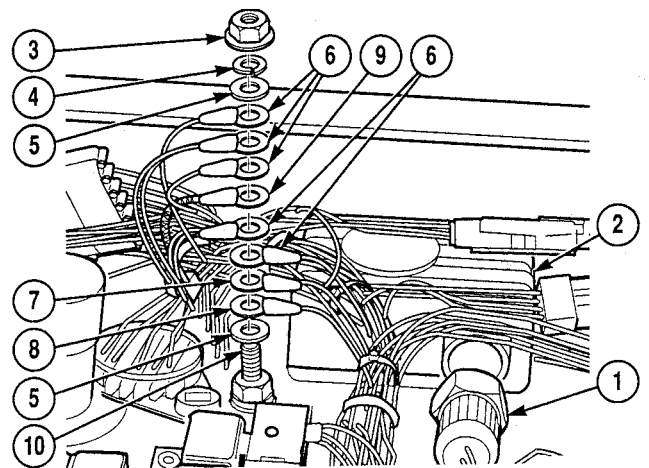
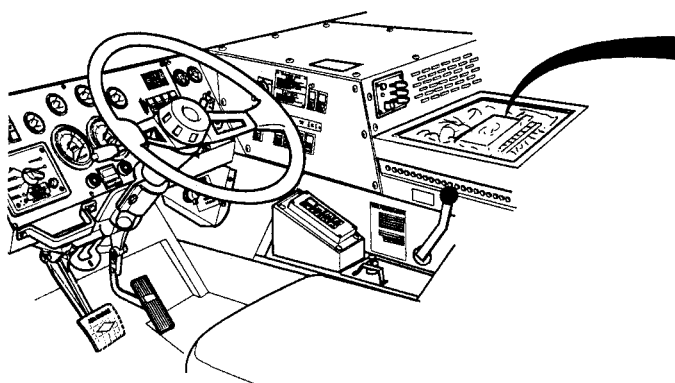
Materials/Parts - Continued

Lockwasher (2) (Item 242, Appendix E)
Lockwasher (Item 251, Appendix E)

Equipment Condition

Batteries disconnected, (TM 9-2320-364-20)
Electronic Control Box (ECB) covers removed,
(TM 9-2320-364-20)

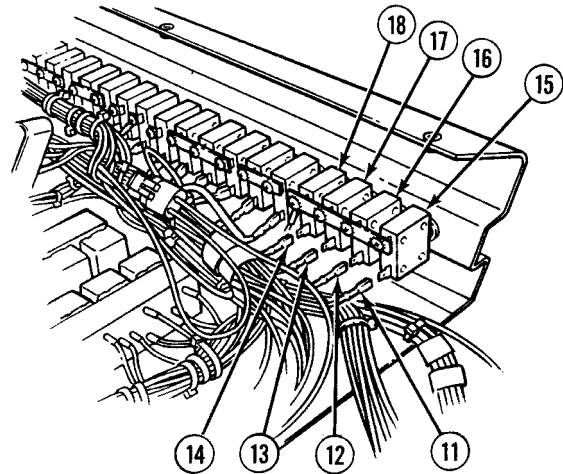
a. Removal.



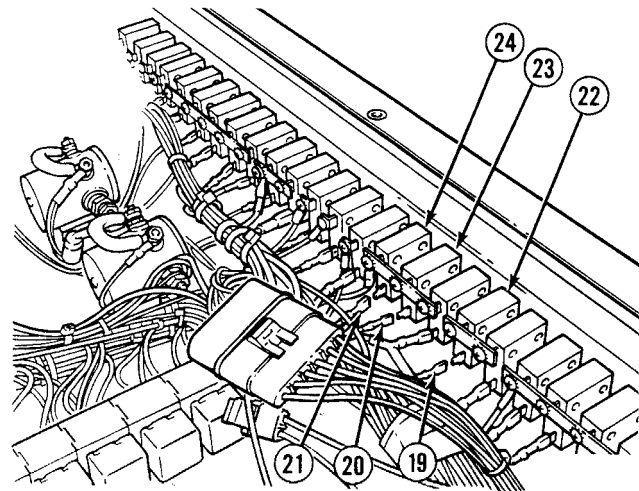
- (1) Remove MC5 connector (1) from flasher unit (2).
- (2) Remove nut (3), lockwasher (4), washer (5), three ground wires 1435 (6), shield wire (9), two ground wires 1435 (6), wire 4201 (7), wire 222 (8) and washer (5) from ground stud (10). Discard lockwasher.

6-24. ELECTRONIC CONTROL BOX LIGHT WIRE HARNESS REPLACEMENT (CONT.)

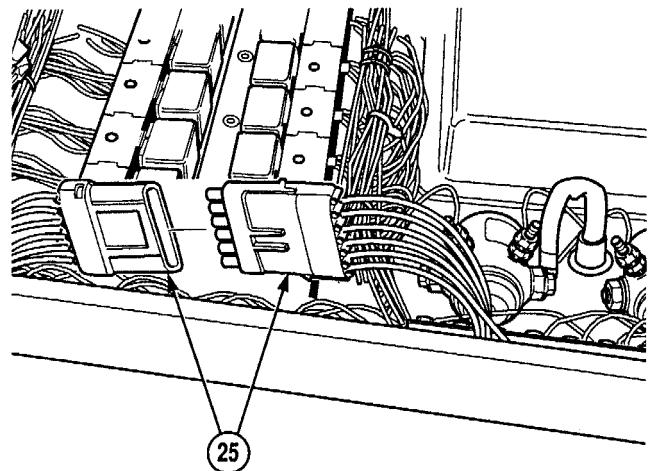
- (3) Remove wires 1927 (11), 1835 (12), 1413 (13) and 1040/1292 (14) from circuit breakers CB1 (15), CB2 (16), CB3 (17) and CB4 (18).



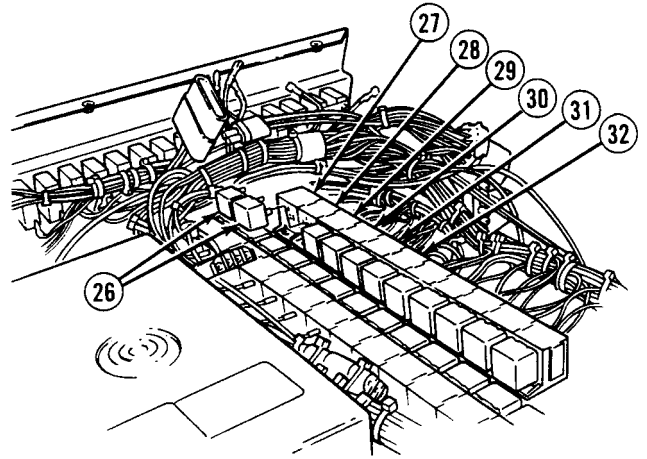
- (4) Remove wires 1009 (19), 1534 (20) and 1919 (21) from circuit breakers CB6 (22), CB8 (23) and CB9 (24).



- (5) Disconnect MC52 connector (25).

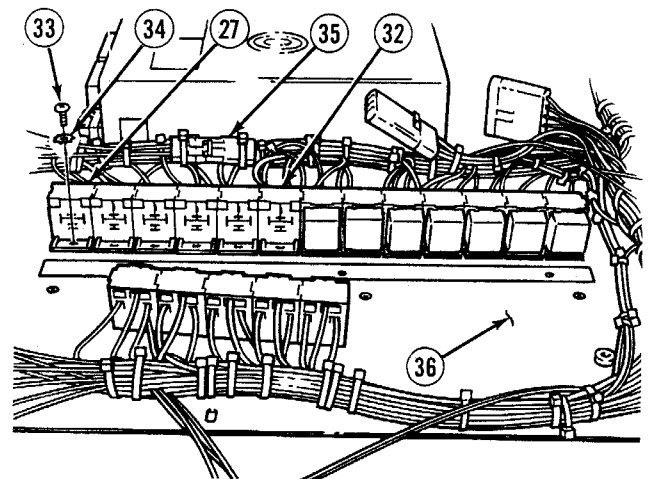


- (6) Remove six 12V relays (26) from relay sockets R1 (27), R2 (28), R3 (29), R4 (30), R5 (31) and R6 (32).



- (7) Remove two screws (33) and lockwashers (34) from relay sockets R1 (27) and R6 (32). Discard lockwashers.

- (8) Remove light wire harness (35) from ECB (36).



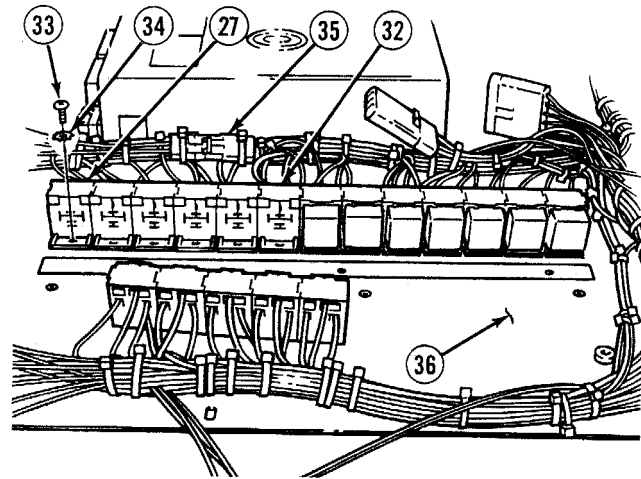
6-24. ELECTRONIC CONTROL BOX LIGHT WIRE HARNESS REPLACEMENT (CONT.)

b. Installation.

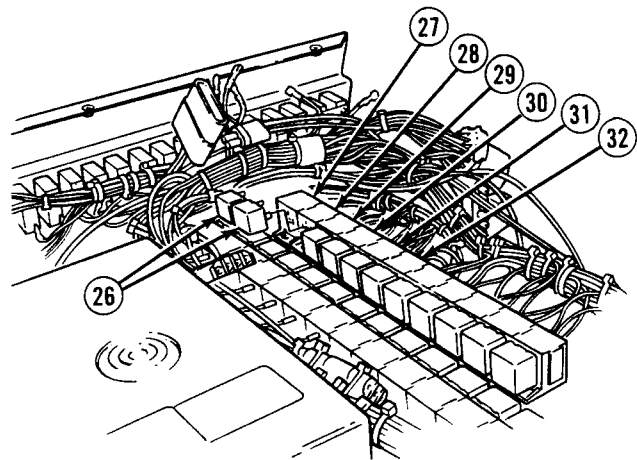
NOTE

- Install cable ties as required.
- Refer to Table 6-3 for wire locations.

- (1) Position light wire harness (35) in ECB (36).
- (2) Install relay sockets R1 (27) and R6 (32) with two lockwashers (34) and screws (33).



- (3) Install six 12V relays (26) in relay sockets R1 (27), R2 (28), R3 (29), R4 (30), R5 (31) and R6 (32).



- (4) Connect MC52 connector (25).

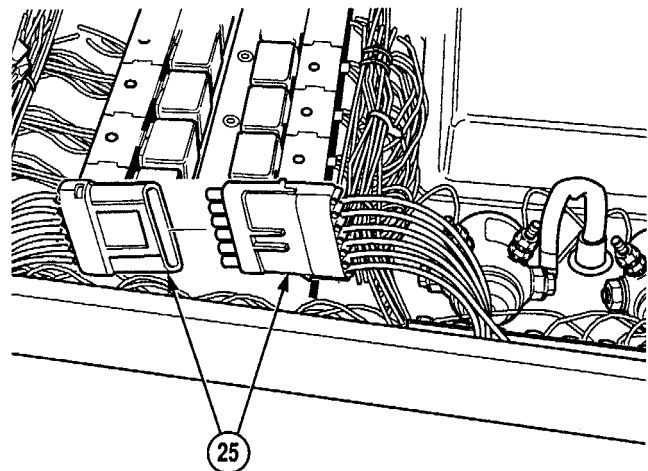
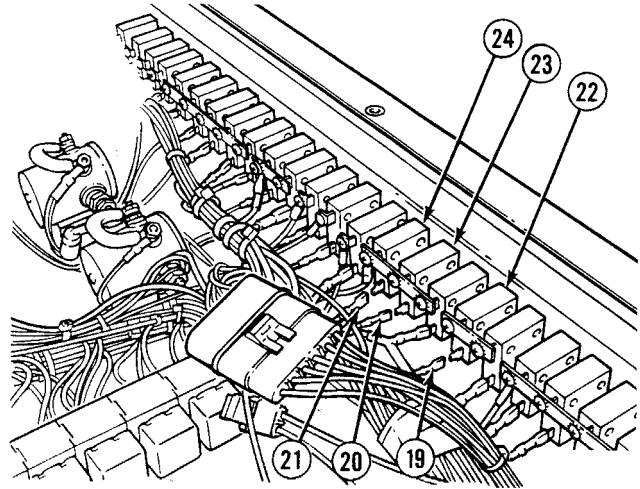


Table 6-3. Circuit Breaker Wiring Positions

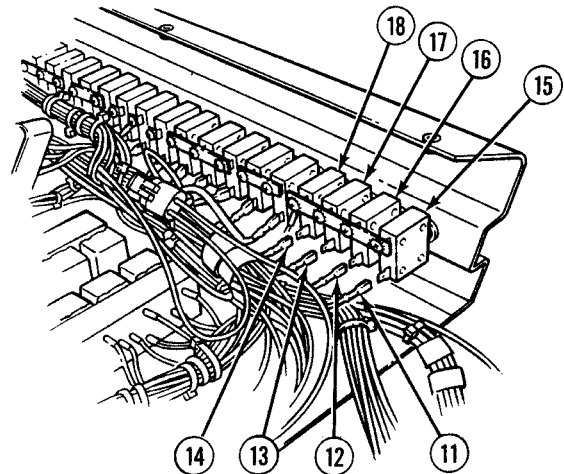
Circuit Breaker	Connected to Top Connection	Connected to Bottom Connection
CB1	Bus Bar	1927
CB2	Bus Bar	1835
CB3	Bus Bar	1413
CB4	1175, Bus Bar	1040, 1292
CB5	1079, Bus Bar	1084
CB6	Bus Bar	1009
CB7	Bus Bar	1712
CB8	Bus Bar	1534
CB9	1074, Bus Bar	1919
CB10	1872	1872
CB11	1711, 1871	225
CB12	1867,1866	203
CB13	Bus Bar	439
CB14	1875, Bus Bar	223A
CB15	Bus Bar	1082, 1534, 1340, 1487
CB16	Bus Bar	1026, 1093, 1888
CB17	Bus Bar	1880
CB18	Bus Bar	1723, 1755
CB19	Bus Bar, 1280	1717
CB20	1431	1676, 1665C, 1026, 1431
CB21	1280, 1280	1739
CB22	241	241
CB23	240	240
CB25	1958	OPEN
CB26	1959	OPEN

6-24. ELECTRONIC CONTROL BOX LIGHT WIRE HARNESS REPLACEMENT (CONT.)

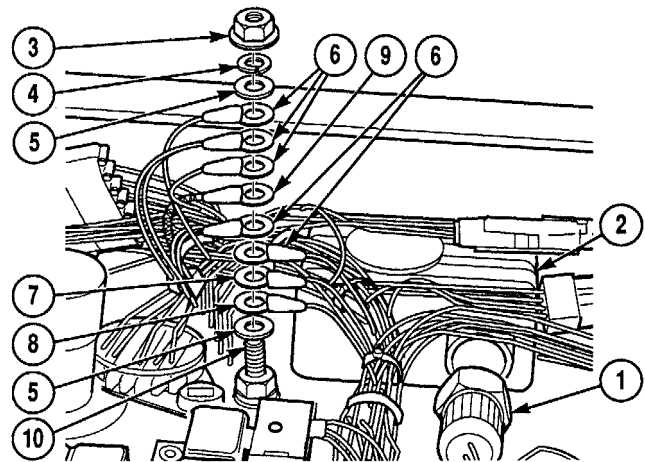
- (5) Install wire 1919 (21) on CB9 (24).
- (6) Install wire 1534 (20) on CB8 (23).
- (7) Install wire 1009 (19) on CB6 (22).



- (8) Install wires 1040/1292 (14) on CB4 (18).
- (9) Install wire 1413 (13) on CB3 (17).
- (10) Install wire 1835 (12) on CB2 (16).
- (11) Install wire 1927 (11) on CB1 (15).



- (12) Install washer (5), wire 222 (8), wire 4201 (7), two ground wires 1435 (6), shield wire (9), three ground wires 1435 (6), washer (5), lockwasher (4) and nut (3) on ground stud (10).
- (13) Install MC5 connector (1) on flasher unit (2).



c. Follow-On Maintenance:

- Install Electronic Control Box (ECB) covers, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).

END OF TASK

6-25. ELECTRONIC CONTROL BOX WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Combination, 1-1/8 in.
(Item 255, Appendix F)
Wrench, Combination, 1-7/8 in.
(Item 265, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Sealing Compound (Item 62, Appendix B)
Tags, Identification (Item 72, Appendix B)

Materials/Parts - Continued

Locknut (2) (Item 176, Appendix E)
Lockwasher (Item 227, Appendix E)
Lockwasher (7) (Item 242, Appendix E)
Lockwasher (11) (Item 283, Appendix E)

Equipment Condition

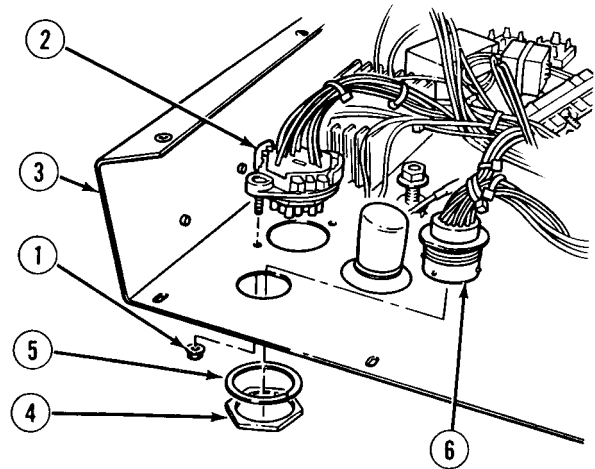
Electronic Control Box (ECB) removed,
(TM 9-2320-364-20)
ATEC wire harness removed, (Para 6-26)
Electronic Control Box (ECB) light wire harness
removed, (Para 6-24)

a. Removal.

NOTE

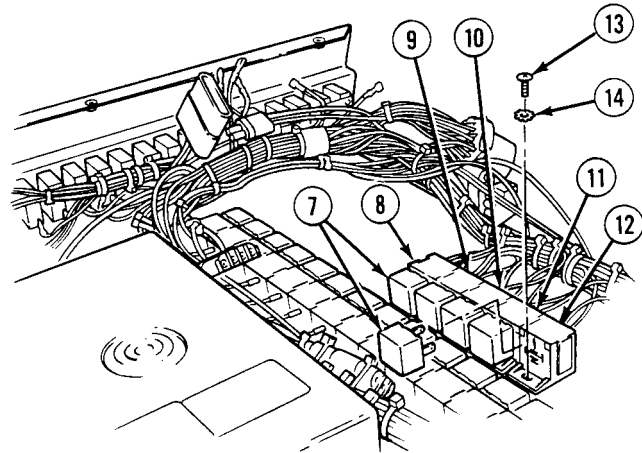
- Remove cable ties as required.
- Tag and mark all wires and harnesses prior to removal.

- (1) Remove two locknuts (1) and MC25 connector (2) from Electronic Control Box (ECB) (3). Discard locknuts.
- (2) Remove nut (4), lockwasher (5) and MC11 connector (6) from ECB (3). Discard lockwasher.



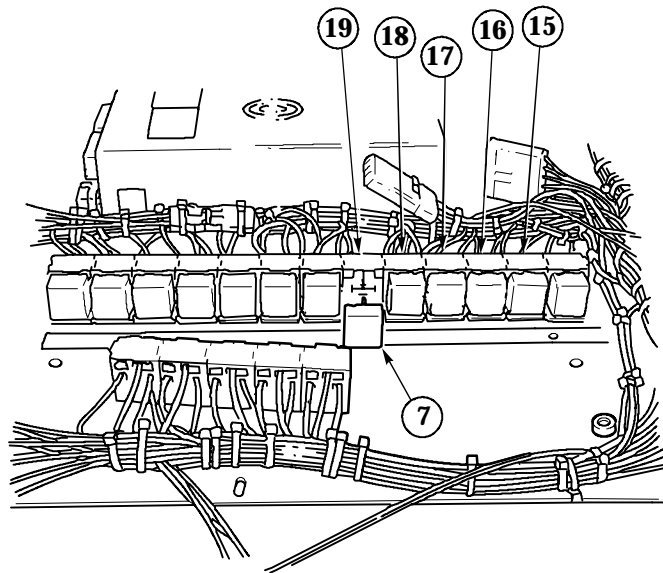
6-25. ELECTRONIC CONTROL BOX WIRE HARNESS REPLACEMENT (CONT).

- (3) Remove five 12V relays (7) from relay sockets R7 (8), R8 (9), R9 (10), R10 (11) and R11 (12).



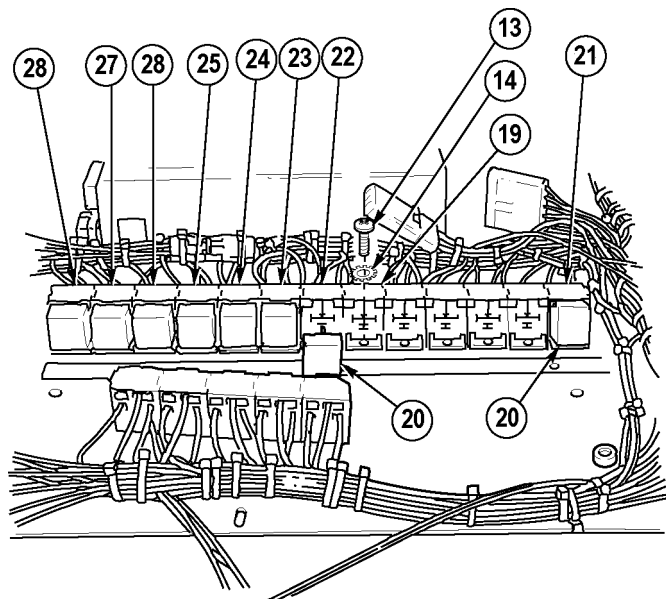
- (4) Remove screw (13) and lockwasher (14) from relay socket R11 (12). Discard lockwasher.

- (5) Remove five 12V relays (7) from relay sockets R13 (15), R14 (16), R15 (17), R16 (18) and R17 (19).



- (6) Remove eight 24V relays (20) from relay sockets R12 (21), R18 (22), R19 (23), R20 (24), R21 (25), R22 (26), R23 (27) and R24 (28).

- (7) Remove three screws (13), lockwashers (14) from relay sockets R12 (21), R17 (19) and R24 (28). Discard lockwashers.

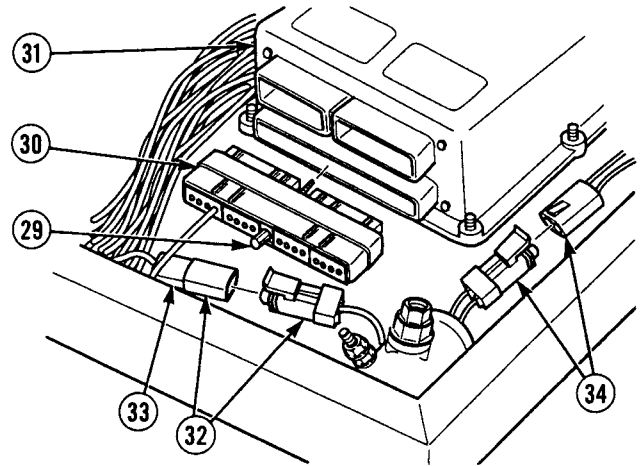


- (8) Loosen screw (29) and remove MC45 connector (30) from ATEC (31).
- (9) Disconnect 908 connector (32) and remove throttle position control (33).

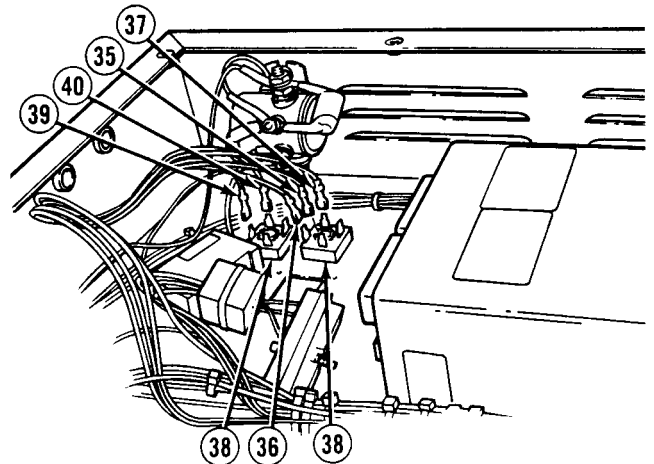
NOTE

Perform Step (10) only if truck is equipped with swing fire heater.

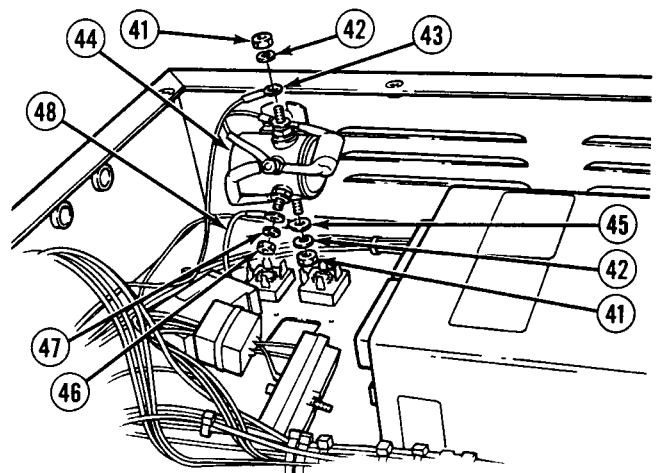
- (10) Disconnect MC101 connector (34).



- (11) Remove wires 1021 (35), 1538 (36) and 1534 (37) from rectifier (38).
- (12) Remove wires 1884 (39) and 1885 (40) from rectifier (38).



- (13) Remove nut (41), lockwasher (42) and wire 1074 (43) from solenoid (44). Discard lockwasher.
- (14) Remove nut (41), lockwasher (42) and wire 1075B (45) from solenoid (44). Discard lockwasher.
- (15) Remove nut (46), lockwasher (47) and wire 1072 (48) from solenoid (44). Discard lockwasher.

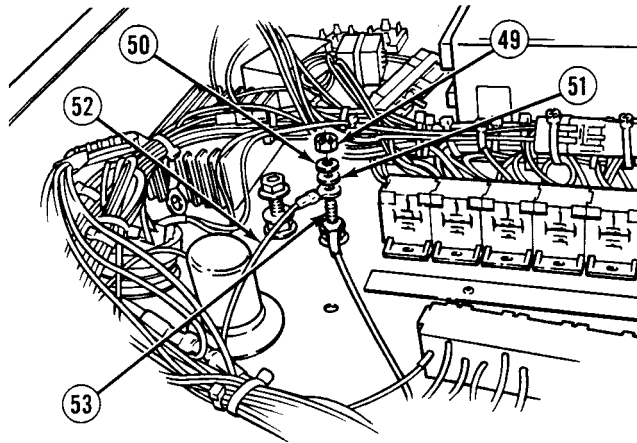


6-25. ELECTRONIC CONTROL BOX WIRE HARNESS REPLACEMENT (CONT).

NOTE

Wire 1435 remains on ground stud during ground wire removal.

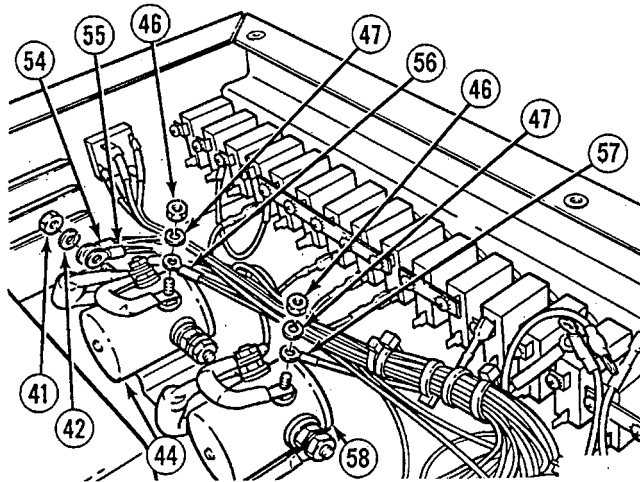
- (16) Remove nut (49), lockwasher (50), washer (51) and ground wire 201 (52) from ground stud (53). Replace washer and nut on ground stud. Discard lockwasher.



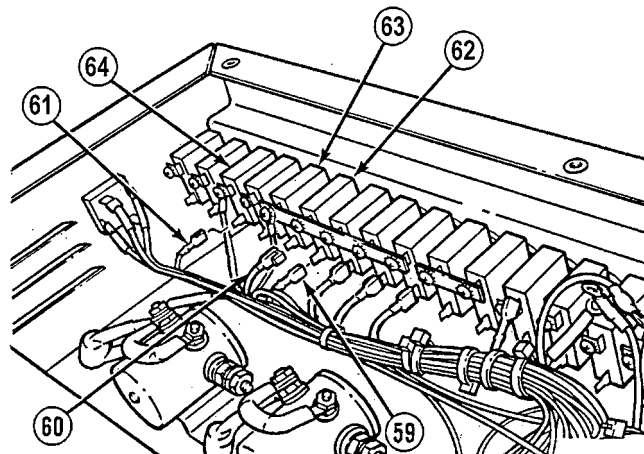
- (17) Remove nut (41), lockwasher (42), wire 1072/1702 (54) and wire 1280 (55) from solenoid (44). Discard lockwasher.

- (18) Remove nut (46), lockwasher (47) and wire 1640/1640 (56) from solenoid (44). Discard lockwasher.

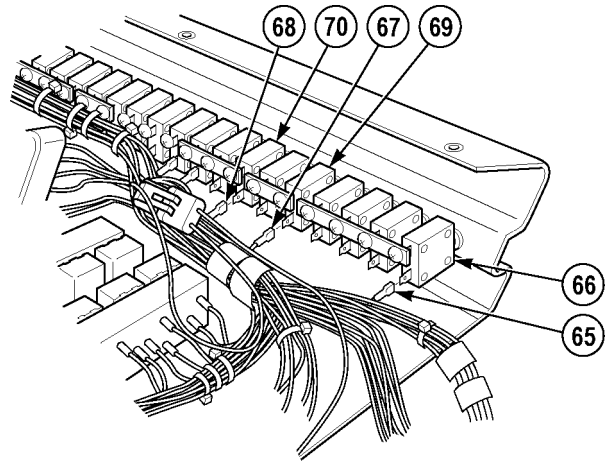
- (19) Remove nut (46), lockwasher (47) and wire 1189 (57) from solenoid (58).



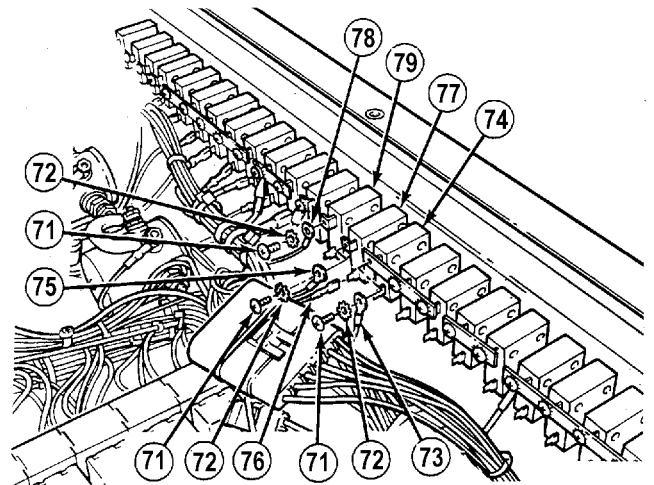
- (20) Remove wire 1755/1723 (59), 1717 (60) and 1739 (61) from circuit breakers CB18 (62), CB19 (63) and CB21 (64).



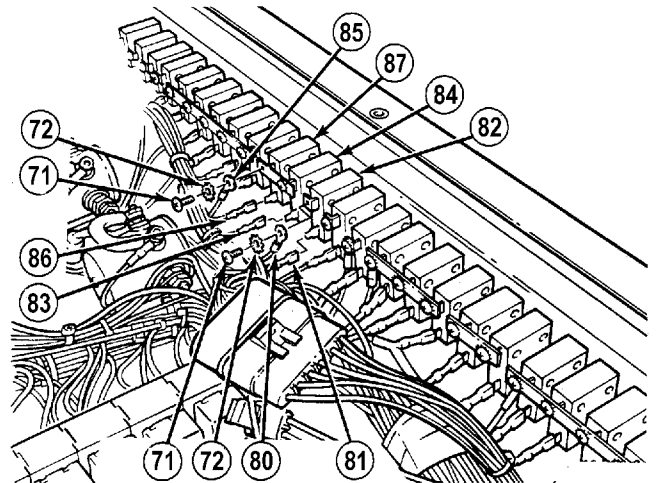
- (21) Remove wire 1052 (65) from circuit breaker CB1 (66).
- (22) Remove wires 1084 (67) and 1712 (68) from circuit breakers CB5 (69) and CB7 (70).



- (23) Remove screw (71), lockwasher (72) and wire 1074 (73) from circuit breaker CB9 (74). Discard lockwasher.
- (24) Remove screw (71), lockwasher (72), wire 1872 (75) and wire 1026 (76) from circuit breaker CB10 (77). Discard lockwasher.
- (25) Remove screw (71), lockwasher (72) and wire 1871/1871/1711 (78) from circuit breaker CB11 (79). Discard lockwasher.



- (26) Remove screw (71), lockwasher (72) and wires 1867 (80) and 203 (81) from circuit breaker CB12 (82). Discard lockwasher.
- (27) Remove wire 439 (83) from circuit breaker CB13 (84).
- (28) Remove screw (71), lockwasher (72) and wires 1875 (85) and 223A (86) from circuit breaker CB14 (87). Discard lockwasher.



6-25. ELECTRONIC CONTROL BOX WIRE HARNESS REPLACEMENT (CONT).

- (29) Remove wire 1082/1340/1487/1534 (88) from circuit breaker CB15 (89).
- (30) Remove wires 1093/1888 (90) from circuit breaker CB16 (91).
- (31) Remove wire 1880 (92) from circuit breaker CB17 (93).
- (32) Remove screw (65), lockwasher (66), wire 1431 (94), 1676/1665C/1026 (95) and wire 1431 (96) from circuit breaker CB20 (97). Discard lockwasher.

NOTE

Perform Step (33) for DDEC III/IV trucks only.

- (33) Disconnect MC14 connector (98).
- (34) Remove ECB wire harness (99) from ECB (3).

b. Installation.

NOTE

- Install cable ties as required.
- Refer to Table 6-4 for circuit breaker wiring and mounting positions.

- (1) Position ECB wire harness (99) in ECB (3).

NOTE

Perform Step (2) for DDEC III/IV trucks only.

- (2) Connect MC14 connector (98).
- (3) Install wire 1676/1665C/1026 (95) and wire 1431 (96) on circuit breaker CB20 (97).
- (4) Install wire 1431 (94) on circuit breaker CB20 (97) with lockwasher (72) and screw (71).
- (5) Install wire 1880 (92) on circuit breaker CB17 (93).
- (6) Install wire 1093/1888 (90) on circuit breaker CB16 (91).
- (7) Install wire 1082/1340/1487/1534 (88) on circuit breaker CB15 (89).

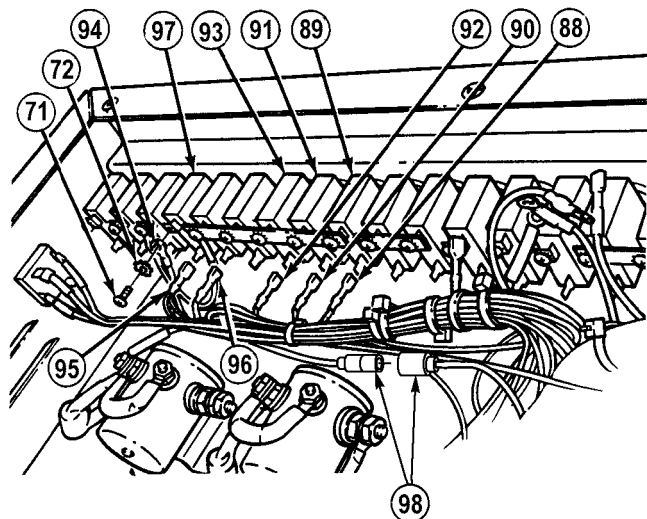
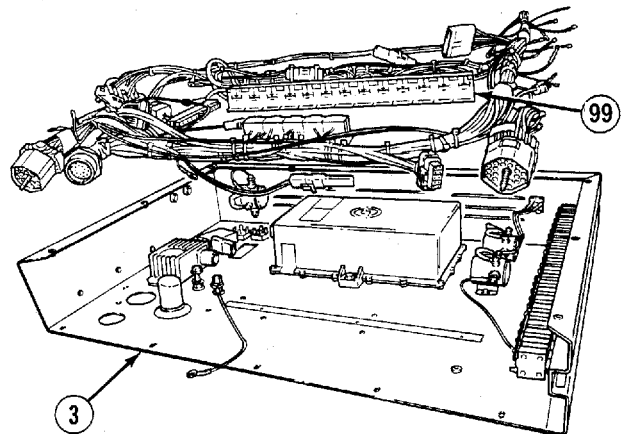
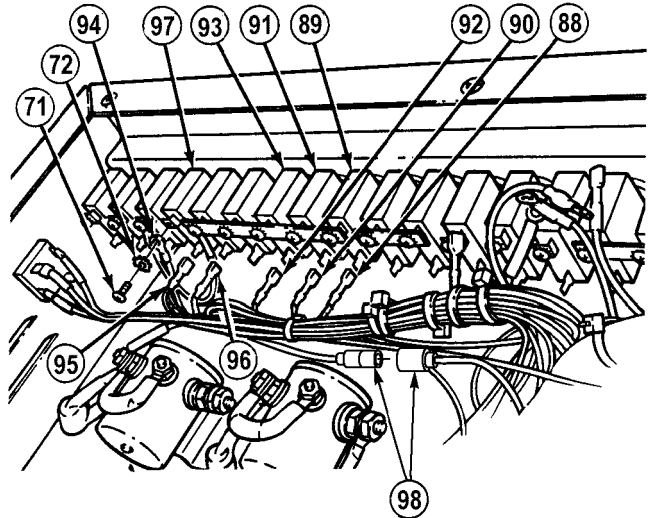
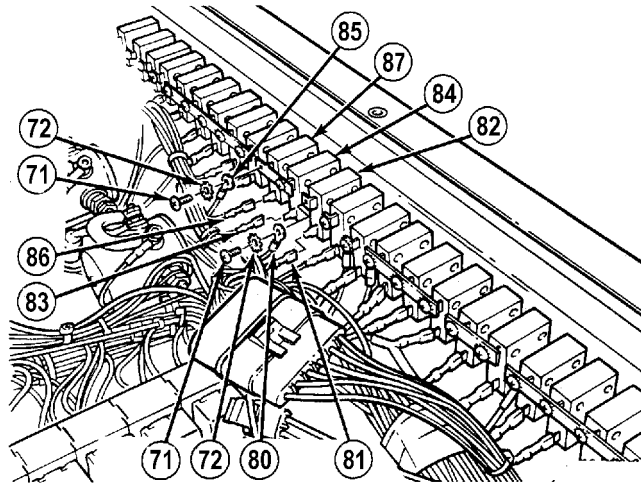


Table 6-4. Circuit Breaker Wiring Positions

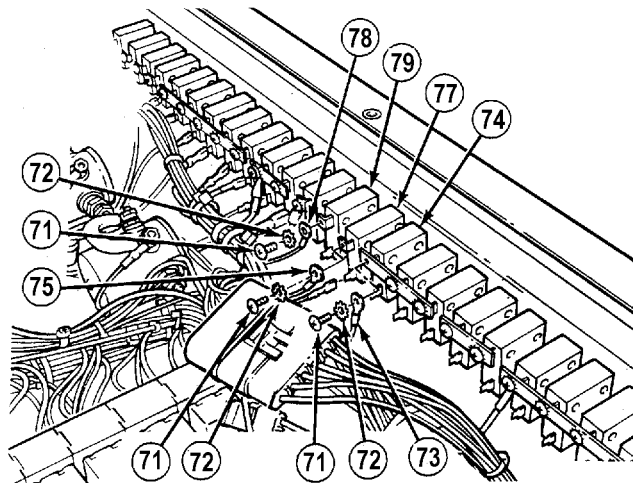
Circuit Breaker	Connected to Top Connection	Connected to Bottom Connection
CB1	Bus Bar	1927, 1052
CB2	Bus Bar	1835
CB3	Bus Bar	1413
CB4	1175, Bus Bar	1040, 1292
CB5	1079, Bus Bar	1084
CB6	Bus Bar	1009
CB7	Bus Bar	1712
CB8	Bus Bar	1534
CB9	1074, Bus Bar	1919
CB10	1872	1872
CB11	1711, 1871	225
CB12	1867, 1866	203
CB13	Bus Bar	439
CB14	1875, Bus Bar	223A
CB15	Bus Bar	1082, 1534, 1340, 1487
CB16	Bus Bar	1026, 1093, 1888
CB17	Bus Bar	1880
CB18	Bus Bar	1723, 1755
CB19	Bus Bar, 1280	1717
CB20	1431	1676, 1665C, 1026, 1431
CB21	1280, 1280	1739
CB22	241	241
CB23	240	240
CB25	1958	OPEN
CB26	1959	OPEN

6-25. ELECTRONIC CONTROL BOX WIRE HARNESS REPLACEMENT (CONT).

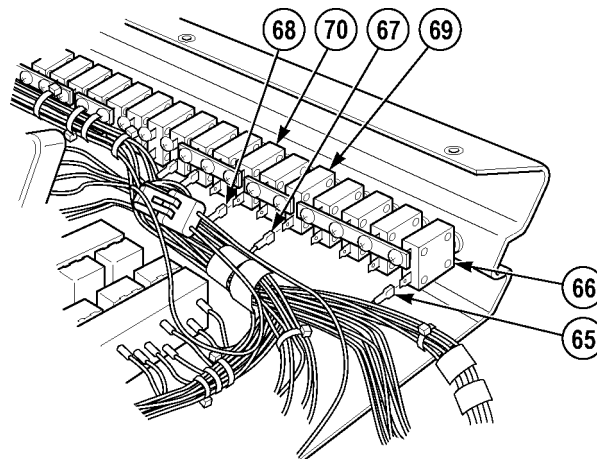
- (8) Install wire 223A (86) on circuit breaker CB14 (87).
- (9) Install wire 1875 (85) on circuit breaker CB14 (87) with lockwasher (72) and screw (71).
- (10) Install wire 439 (83) on circuit breaker CB13 (84).
- (11) Install wire 203 (81) on circuit breaker CB12 (82).
- (12) Install wire 1867 (80) on circuit breaker CB12 (82) with lockwasher (72) and screw (71).



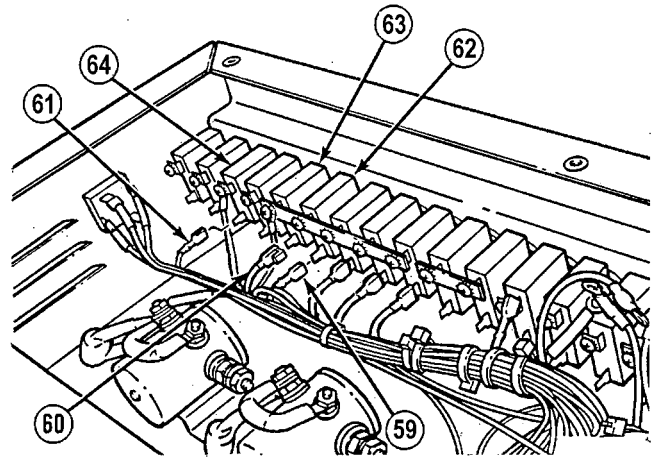
- (13) Install wires 1871/1871/1711 (78) on circuit breaker CB11 (79) with lockwasher (72) and screw (71).
- (14) Install wire 1872 (75) on circuit breaker CB10 (77) with lockwasher (72) and screw (71).
- (15) Install wire 1074 (73) on circuit breaker CB9 (74) with lockwasher (72) and screw (71).



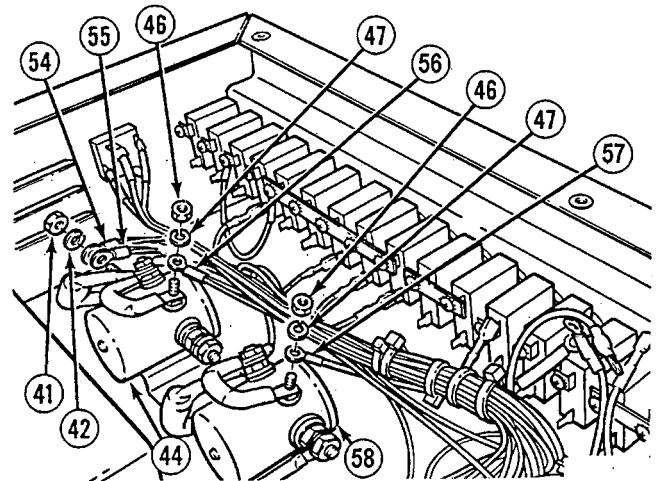
- (16) Install wire 1712 (68) on circuit breaker CB7 (70).
- (17) Install wire 1084 (67) on circuit breaker CB5 (69).
- (18) Install wire 1052 (65) on circuit breaker CB1 (66).



- (19) Install wire 1739 (61) on circuit breaker CB21 (64).
- (20) Install wire 1717 (60) on circuit breaker CB19 (63).
- (21) Install wires 1755/1723 (59) on circuit breaker CB18 (62).



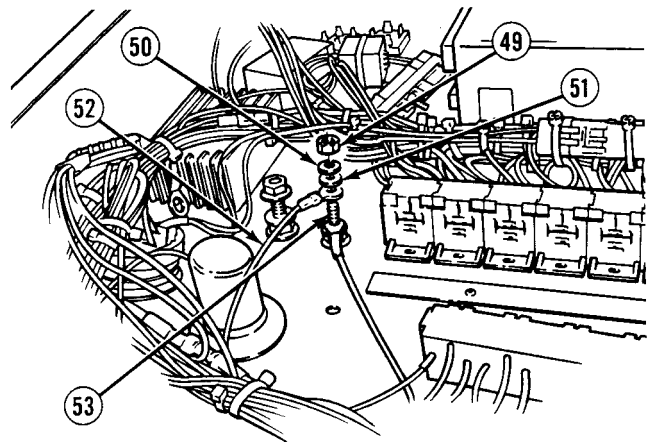
- (22) Position wire 1189 (57) on solenoid (58) with lockwasher (47) and nut (46). Tighten nut to 10 to 15 lb-in (1 to 2 N·m).
- (23) Position wires 1640/1640 (56) on solenoid (44) with lockwasher (47) and nut (46). Tighten nut to 10 to 15 lb-in (1 to 2 N·m).
- (24) Position wires 1072/1702 (54) and wire 1280 (55) on solenoid (44) with lockwasher (42) and nut (41). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).



NOTE

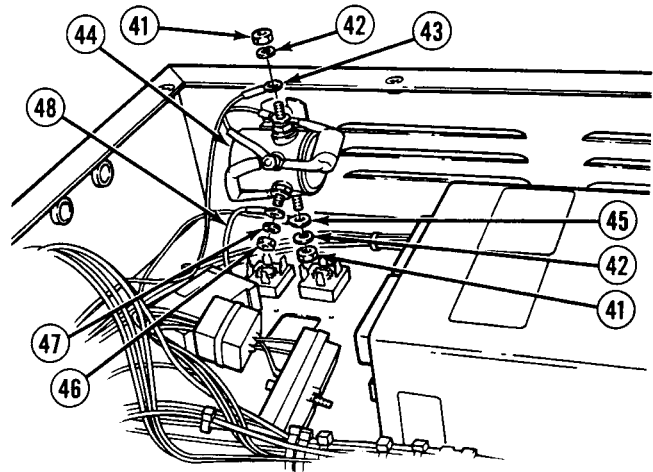
Leave wire 1435 on ground stud during ground wire installation.

- (25) Remove nut (49) and washer (51) from ground stud (53).
- (26) Install ground wire 201 (52) on ground stud (53) with washer (51), lockwasher (50) and nut (49).

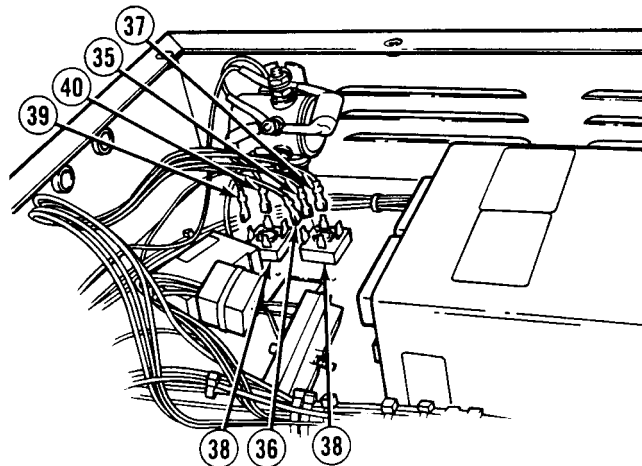


6-25. ELECTRONIC CONTROL BOX WIRE HARNESS REPLACEMENT (CONT).

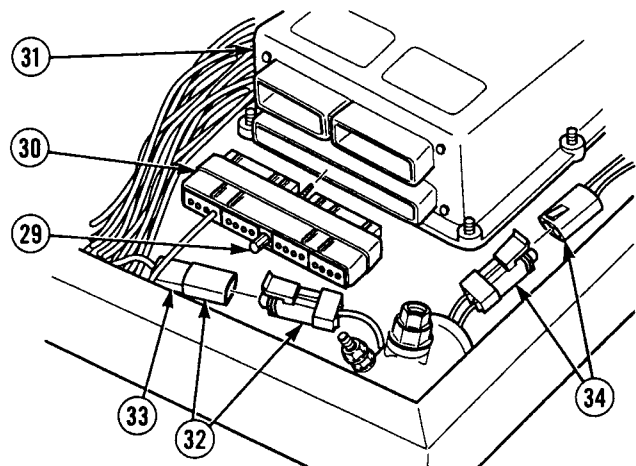
- (27) Position wire 1072 (48) on solenoid (44) with lockwasher (47) and nut (46). Tighten nut to 10 to 15 lb-in (1 to 2 N·m).
- (28) Position wire 1075B (45) on solenoid (44) with lockwasher (42) and nut (41). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).
- (29) Position wire 1074 (43) on solenoid (44) with lockwasher (42) and nut (41). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).



- (30) Install wires 1884 (39) and 1885 (40) on rectifier (38).
- (31) Install wires 1021 (35), 1538 (36) and 1534 (37) on rectifier (38).



- (32) Connect 908 connector (32) and connect throttle position control (33) to 908 connector (32).
- (33) Install MC45 connector (30) on ATEC (31) and secure with screw (29).



NOTE

Perform Step (34) only if MC101 connector was disconnected.

- (34) Connect MC101 connector (34).

NOTE

Refer to Figure 6-1 for relay mounting positions.

- (35) Install relay sockets R24 (28), R17 (19) and R12 (21) with three lockwashers (14) and screws (13).
- (36) Install eight 24V relays (20) in relay sockets R12 (21), R18 (22), R19 (23), R20 (24), R21 (25), R22 (26), R23 (27) and R24 (28).

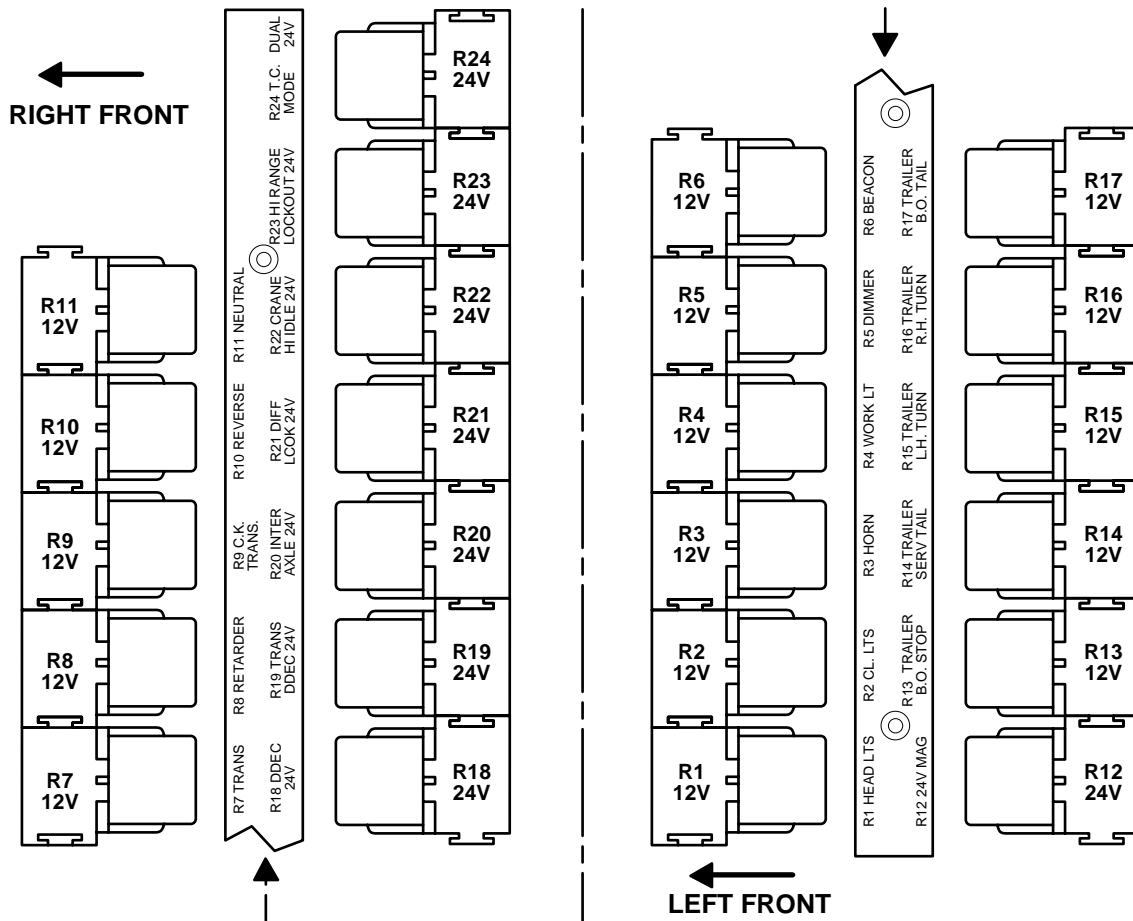
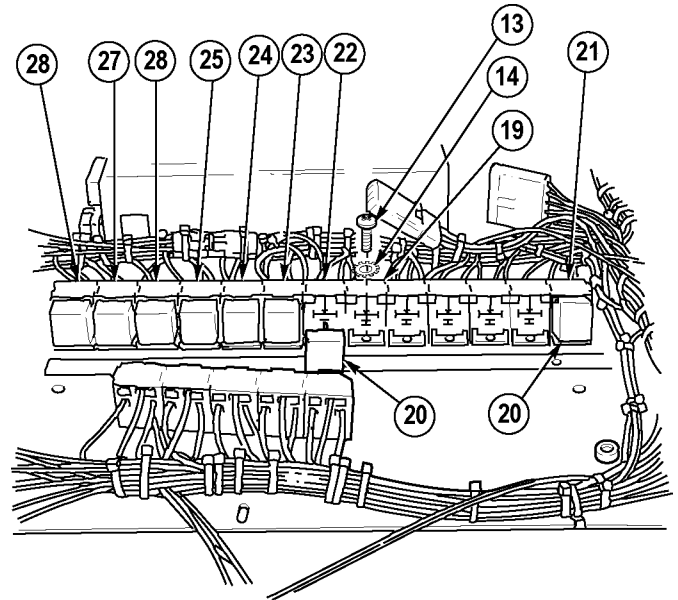
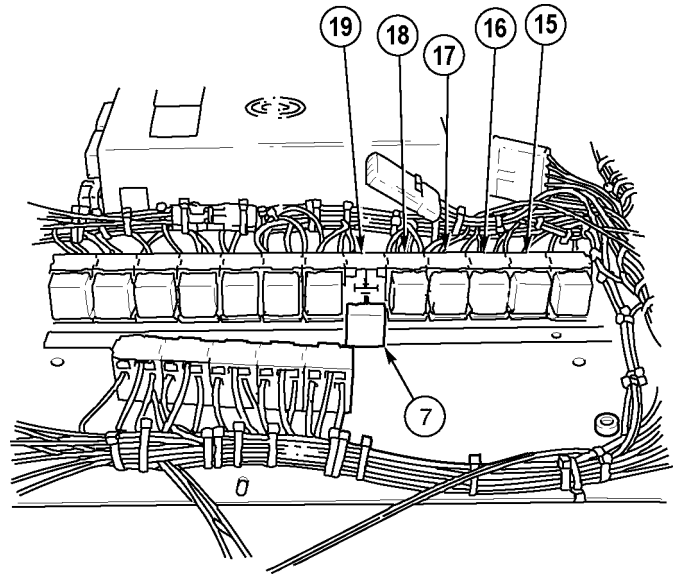


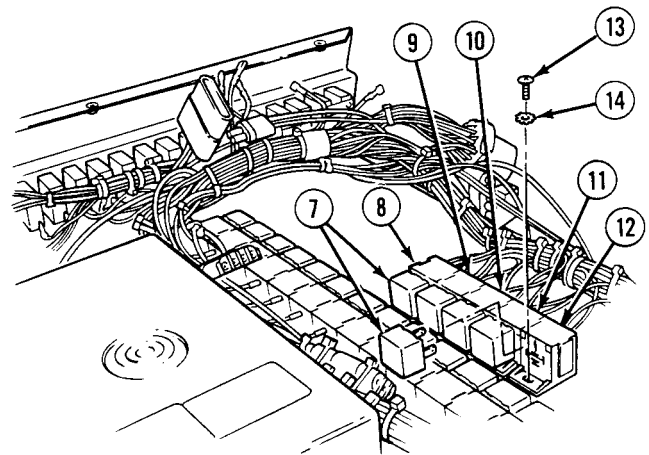
Figure 6-1. Relay Mounting Positions

6-25. ELECTRONIC CONTROL BOX WIRE HARNESS REPLACEMENT (CONT).

- (37) Install five 12V relays (7) in relay sockets R13 (15), R14 (16), R15 (17), R16 (18) and R17 (19).



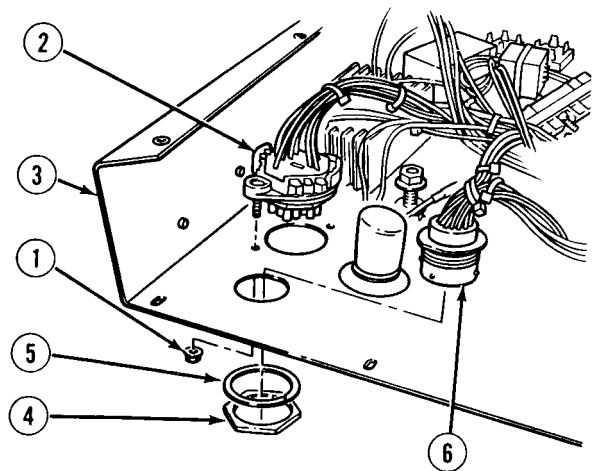
- (38) Install relay socket R11 (12) with lockwasher (14) and screw (13).
- (39) Install four 12V relays (7) in relay sockets R7 (8), R8 (9), R10 (11) and R11 (12).



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.

- (40) Apply sealing compound to mounting surface of MC11 connector (6).
- (41) Install MC11 connector (6) in ECB (3) with lockwasher (5) and nut (4).
- (42) Install MC25 connector (2) in ECB (3) with two locknuts (1).

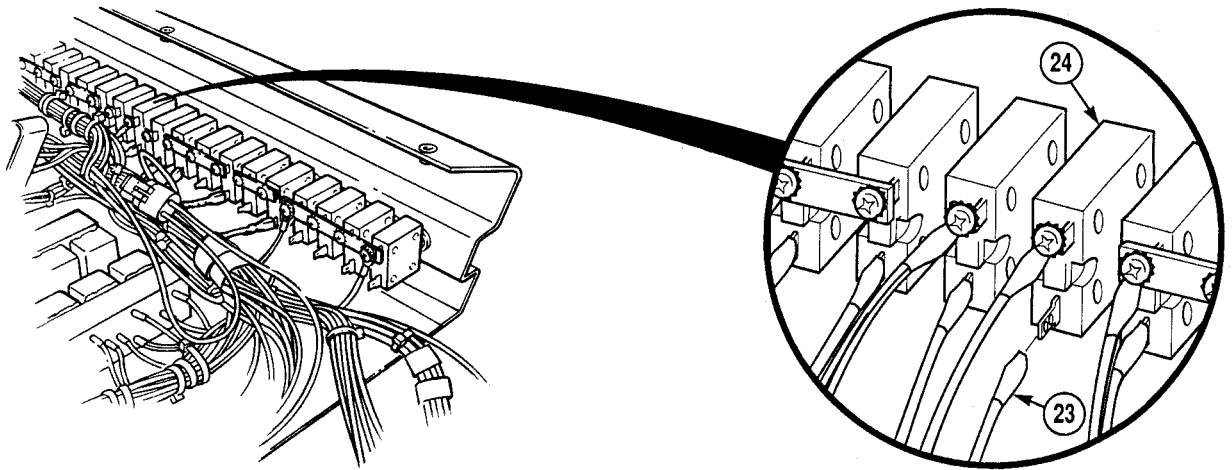
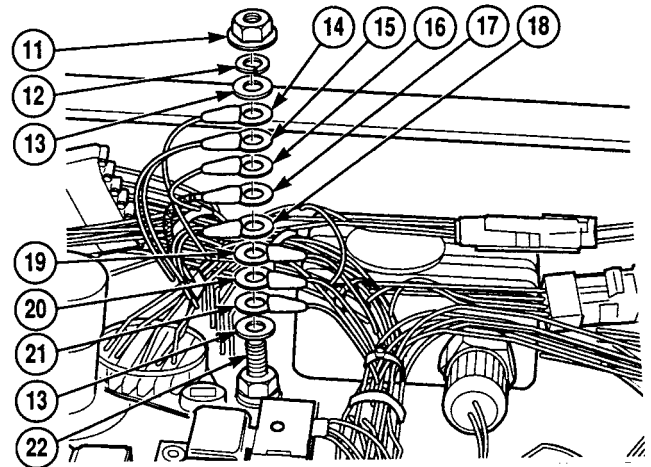


c. Follow-On Maintenance:

- **Install Electronic Control Box (ECB) light wire harness, (Para 6-24).**
- **Install ATEC control box wire harness, (Para 6-26).**
- **Install Electronic Control Box (ECB), (TM 9-2320-364-20).**

END OF TASK

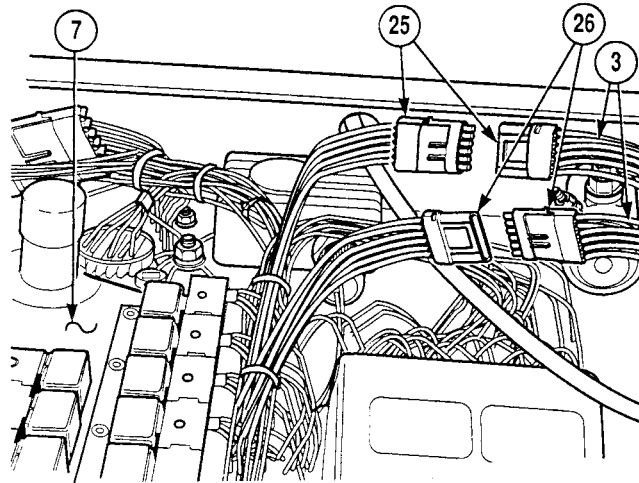
- (4) Remove locknut (11), lockwasher (12), washer (13), shield wire (14), wire 222/234 (15), wires 1435 (16), (17), (18), (19), (20) and (21) and washer (13) from ground stud (22). Discard locknut and lockwasher.



- (5) Remove wire 225 (23) from circuit breaker CB11 (24).

6-26. ATEC WIRE HARNESS REPLACEMENT (CONT).

- (6) Disconnect connectors MC50 (25) and MC51 (26).
- (7) Remove ATEC wire harness (3) from ECB (7).

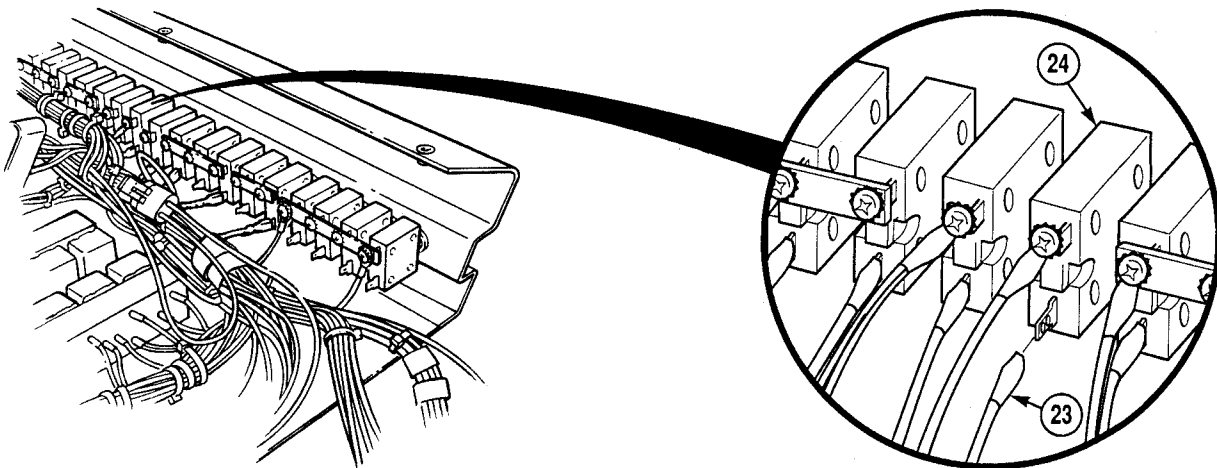


b. Installation.

NOTE

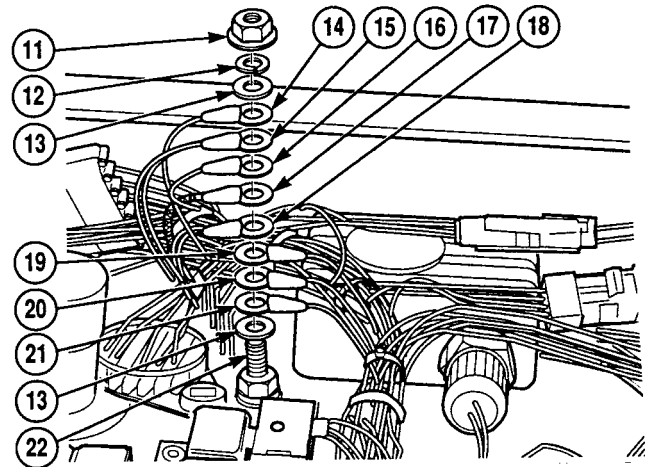
Install cable ties as required.

- (1) Position ATEC wire harness (3) in electronic control box (7).
- (2) Connect connectors MC51 (26) and MC50 (25).

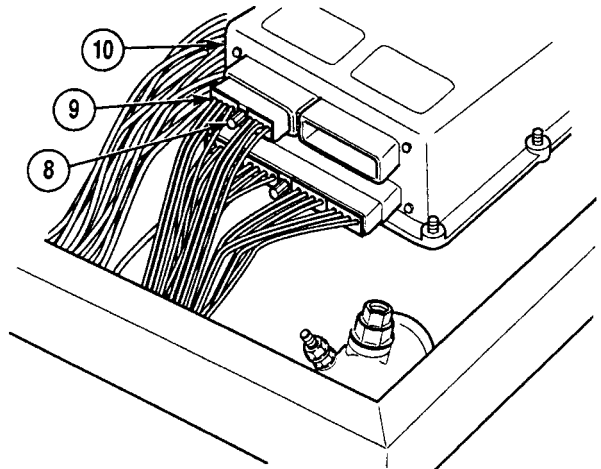


- (3) Install wire 225 (23) on circuit breaker CB11 (24).

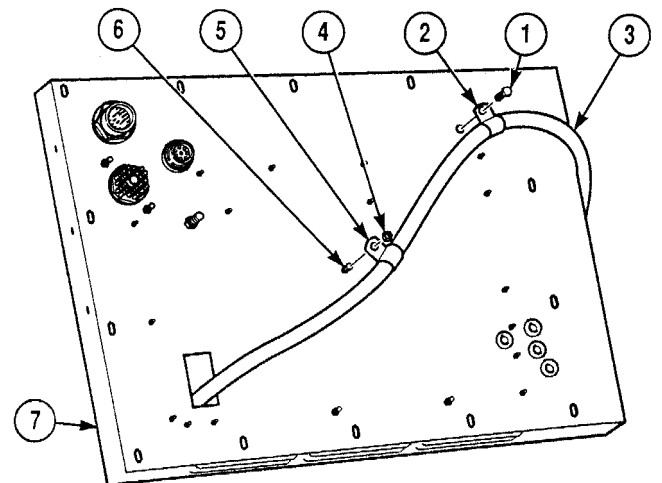
- (4) Install washer (13), wires 1435 (21), (20), (19), (18), (17) and (16), shield wire (14), wire 222/234 (15), washer (13) and lockwasher (12) on ground stud (22) with locknut (11).



- (5) Install MC9 connector (9) on ATEC (10) and tighten screw (8).



- (6) Install ATEC wire harness (3) on screw (6) with clamp (5) and nut (4).
 (7) Install clamp (2) and ATEC wire harness (3) on ECB (7) with screw (1).



c. Follow-On Maintenance:

- Install Electronic Control Box (ECB), (TM 9-2320-364-20).
- Connect transmission shift connector, (TM 9-2320-364-20).

END OF TASK

6-27. CTIS CAB WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

Personnel Required

Two

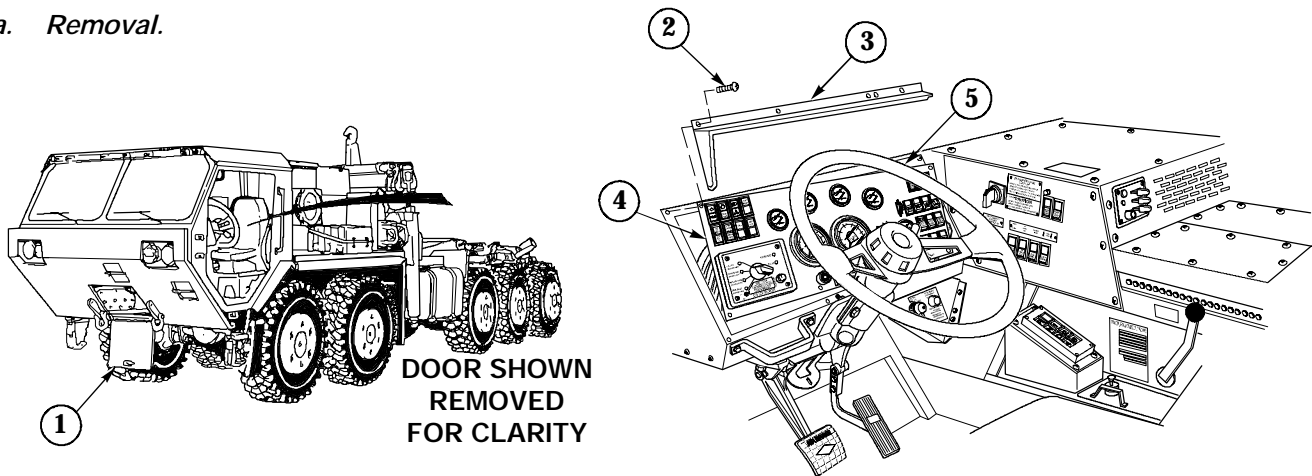
Materials/Parts

Cable Ties (Item 9, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (Item 174, Appendix E)
Locknut (2) (Item 176, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)

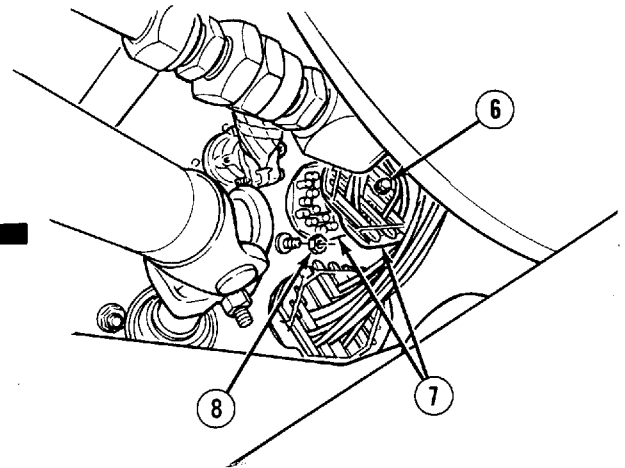
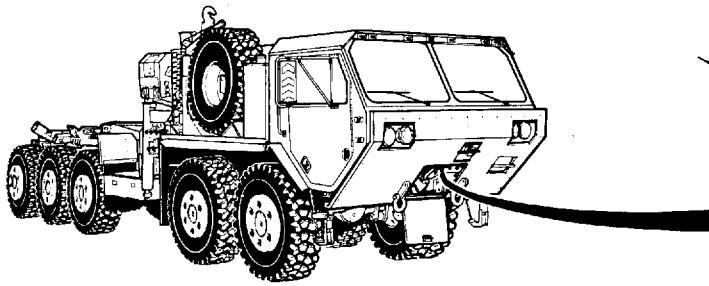
a. Removal.



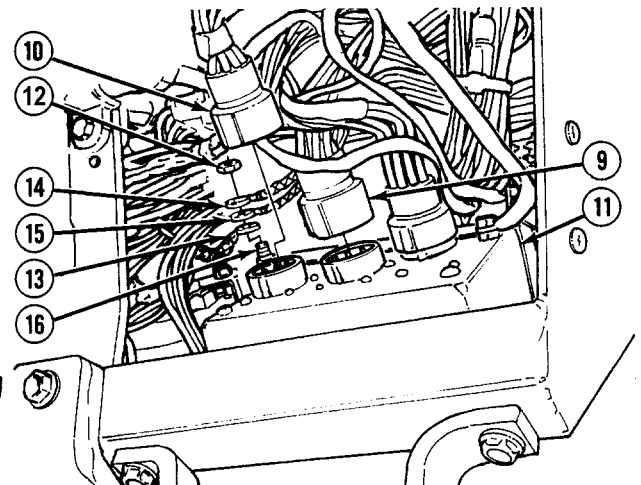
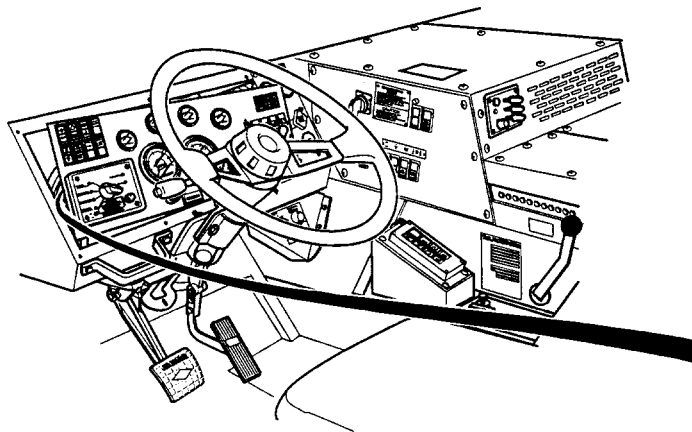
NOTE

- Remove cable ties as required.
- Tag and mark all wires and connectors prior to removal.

- (1) Open front access cover (1).
- (2) Remove ten screws (2) and sunshield (3) from dash panel (4).
- (3) Tilt top of dash panel (4) towards steering wheel (5).

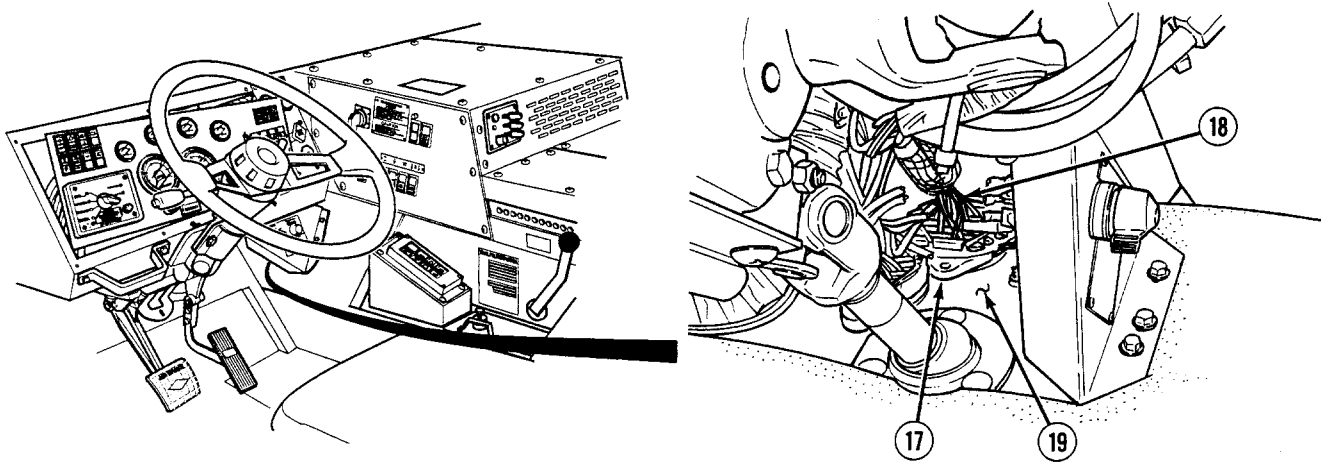


- (4) Loosen screw (6) and disconnect MC32 connector (7).
- (5) With the aid of an assistant, remove and discard two locknuts (8) from MC32 connector (7).



- (6) Disconnect connectors MC110 (9) and MC111 (10) from CTIS controller (11).
- (7) Remove locknut (12), shield wires (13), (14) and (15) from stud (16). Discard locknut.

6-27. CTIS CAB WIRE HARNESS REPLACEMENT (CONT).



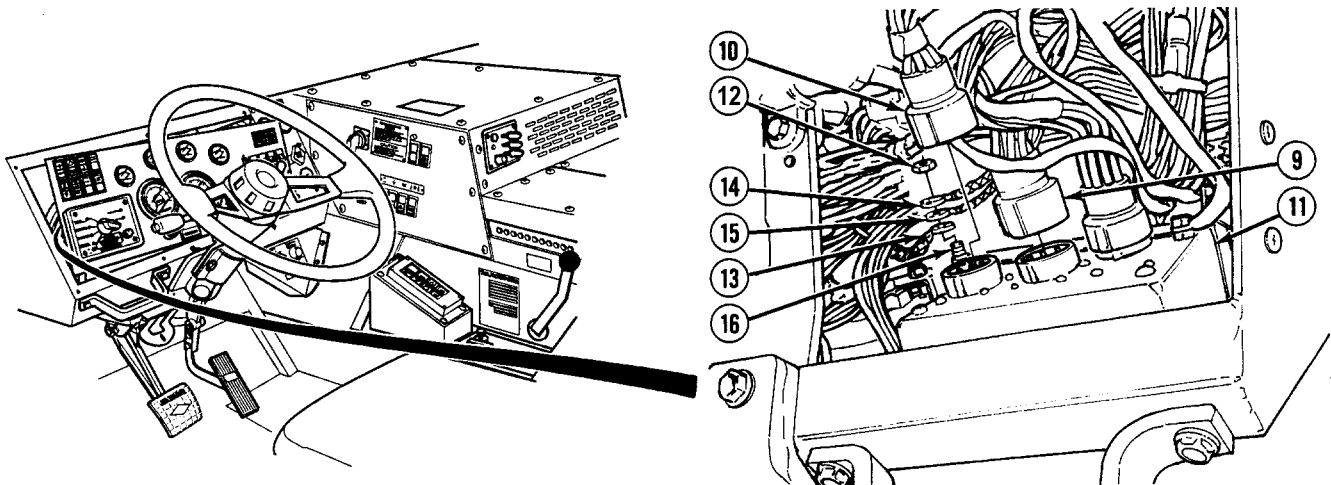
(8) Remove MC32 connector (17) and CTIS cab wire harness (18) from truck (19).

b. Installation.

NOTE

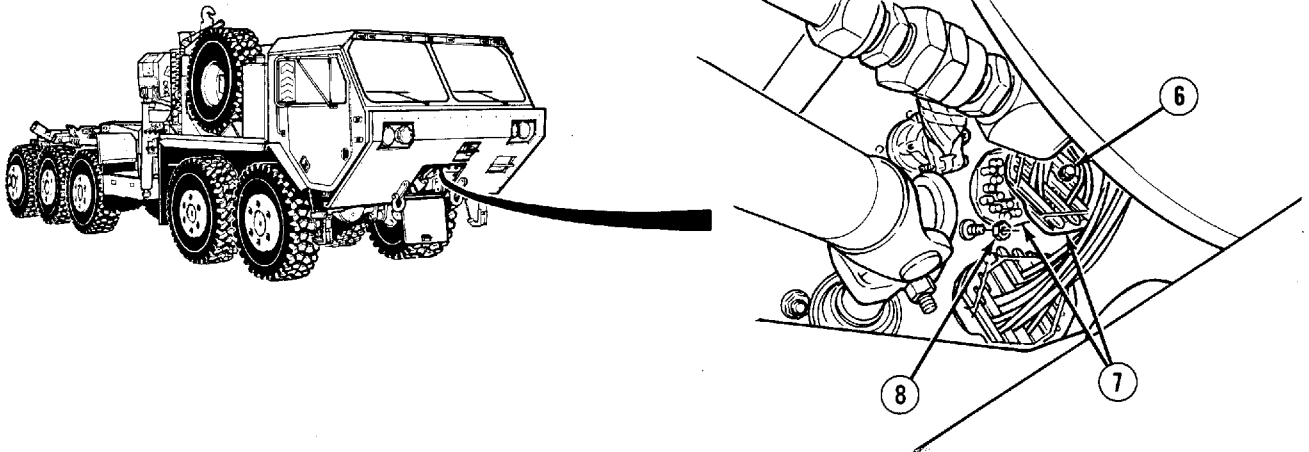
- Evenly distribute any slack in harness.
- Install cable ties as required.

(1) Position CTIS cab wire harness (18) and MC32 connector (17) in truck (19).

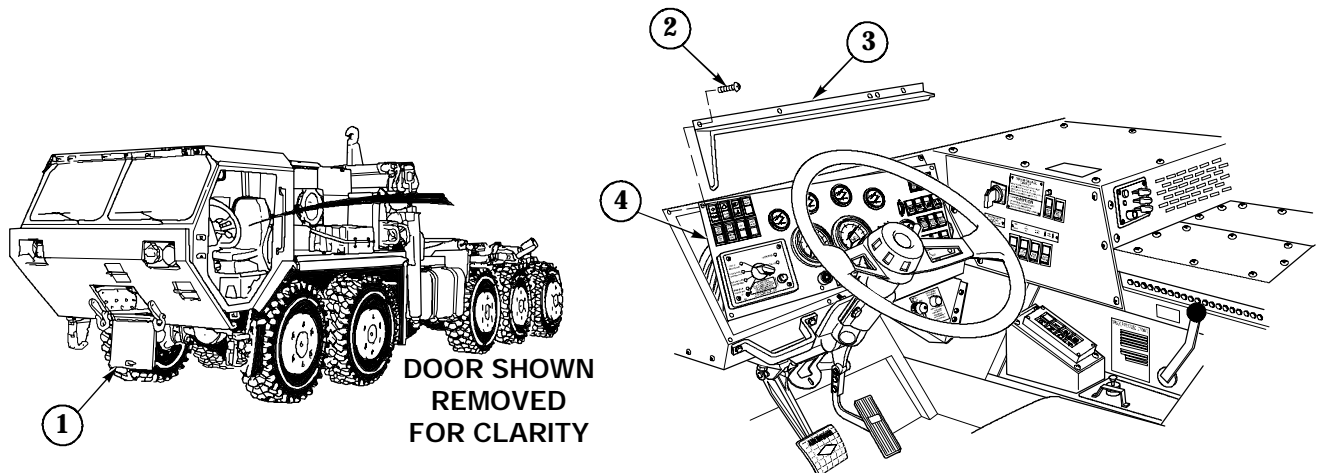


(2) Install shield wires (13), (14) and (15) and locknut (12) on stud (16).

(3) Connect MC111 connector (10) and MC110 connector (9) to CTIS controller (11).



- (4) With the aid of an assistant install two locknuts (8) on MC32 connector (7).
- (5) Connect MC32 connector (7) and tighten screw (6).



- (6) Install dash panel (4) and sunshield (3) with ten screws (2).
- (7) Close front access cover (1).

c. Follow-On Maintenance:

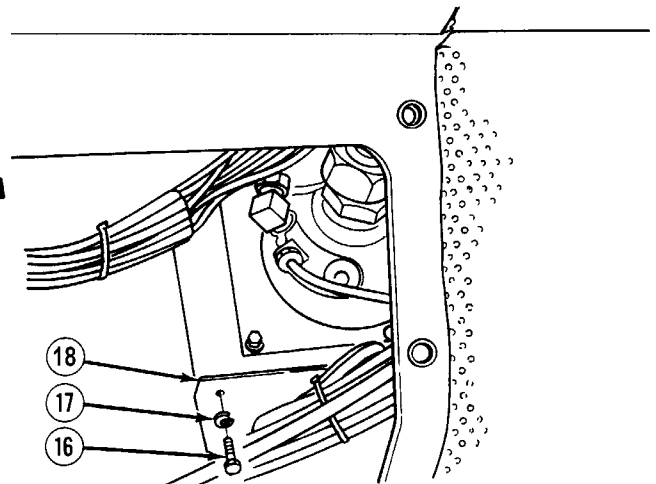
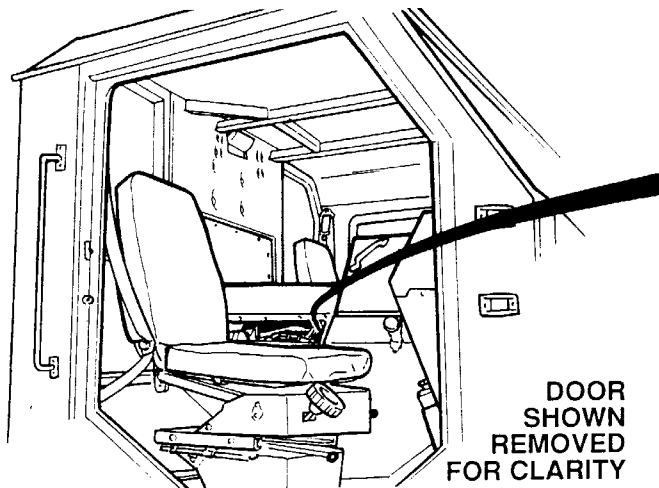
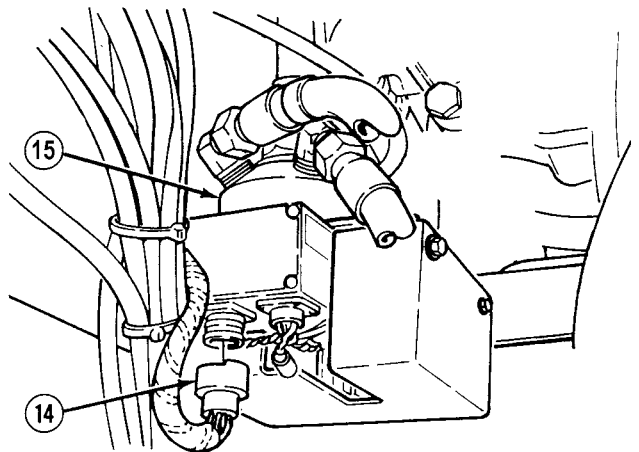
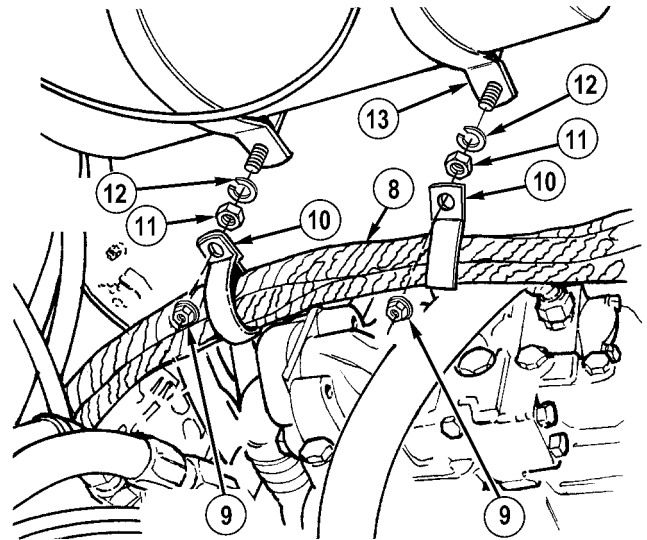
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

NOTE

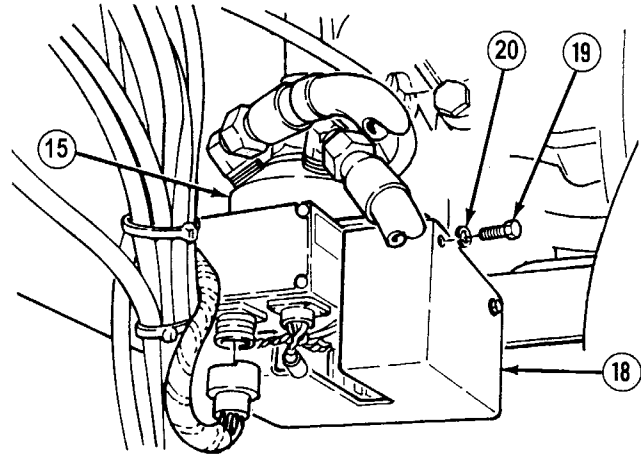
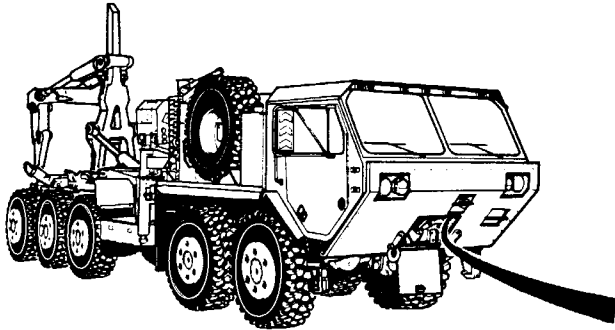
- There may or may not be locknuts present in Step (5).
- Cushion clips may be installed under locknuts or under nuts and lockwashers. If mounted under locknuts, do not remove nuts and lockwashers.

- (5) Remove two locknuts (9), and cushion clips (10), nuts (11), and lockwashers (12) from air tank brackets (13). Discard lockwashers and locknuts.
- (6) Remove CTIS chassis wire harness (8) from two cushion clips (10).
- (7) Disconnect MC109 connector (14) from front CTIS manifold (15).



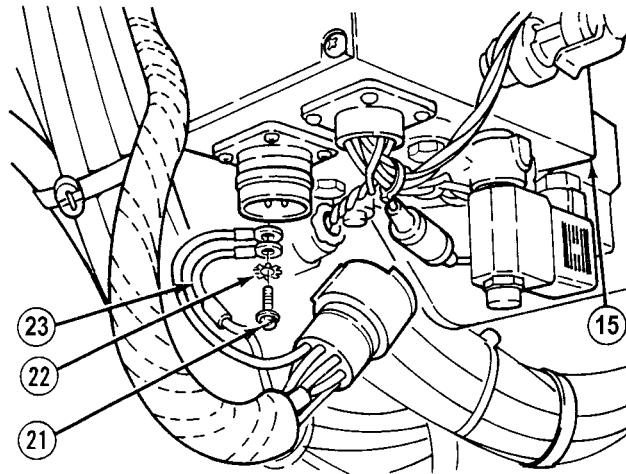
- (8) Remove screw (16) and lockwasher (17) from CTIS front manifold valve cover (18). Discard lockwasher.

6-28. CTIS CHASSIS WIRE HARNESS REPLACEMENT (CONT).

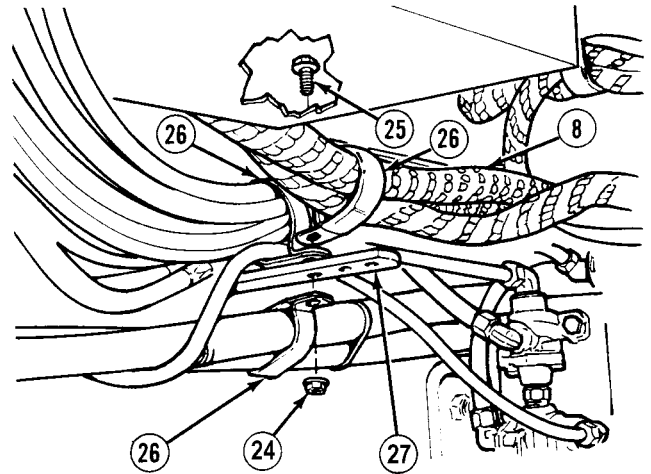


(9) Remove three screws (19), lockwashers (20) and CTIS front manifold valve cover (18) from CTIS front manifold (15). Discard lockwashers.

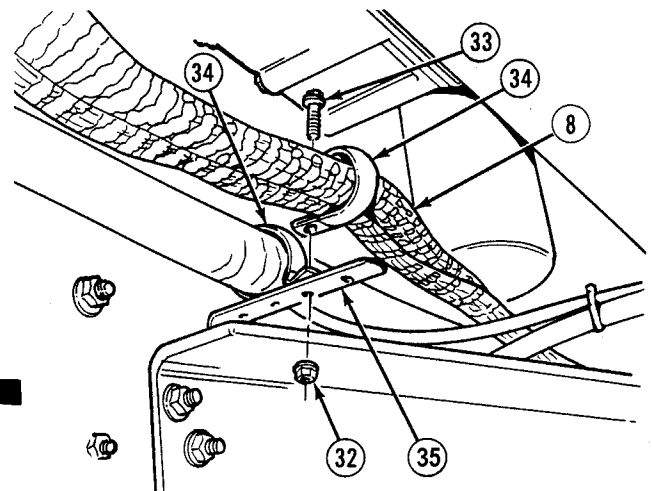
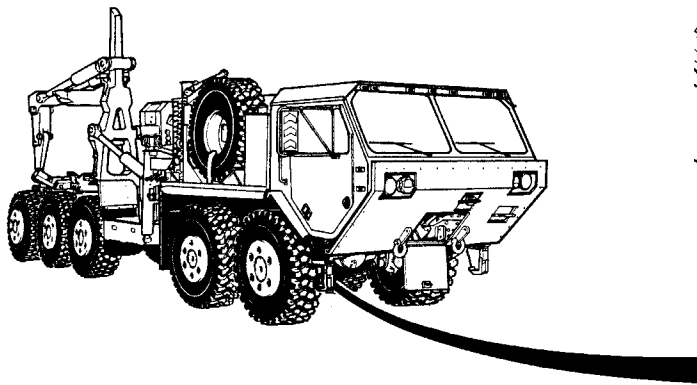
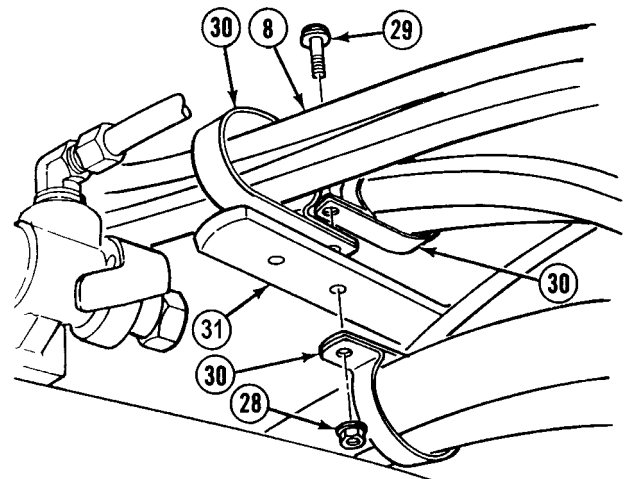
(10) Remove screw (21), lockwasher (22) and two wires 1063 (23) from CTIS front manifold (15). Discard lockwasher.



- (11) Remove locknut (24), screw (25) and three cushion clips (26) from bracket (27). Discard locknut.
- (12) Remove CTIS chassis wire harness (8) from cushion clip (26).

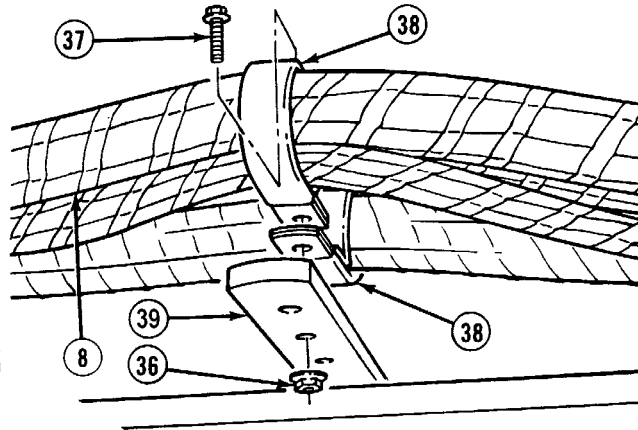
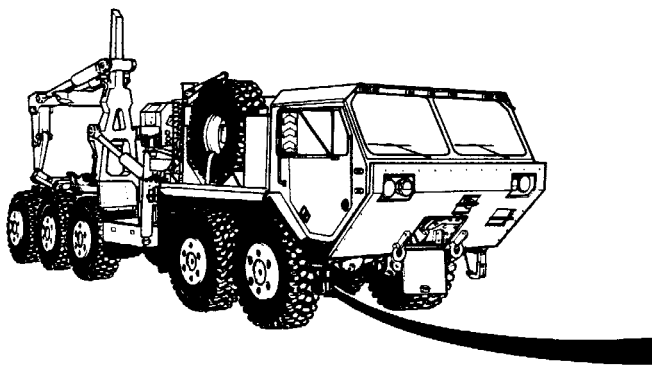


- (13) Remove locknut (28), screw (29) and three cushion clips (30) from bracket (31). Discard locknut.
- (14) Remove CTIS chassis wire harness (8) from cushion clip (30).

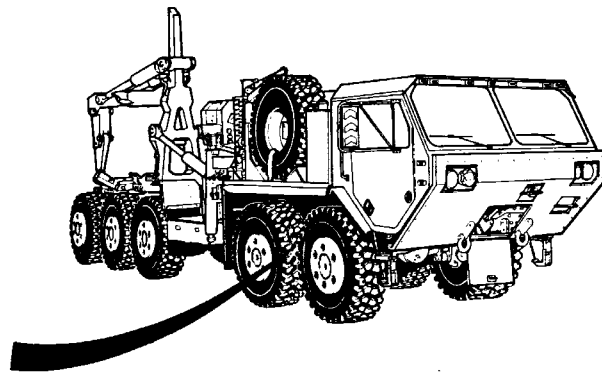
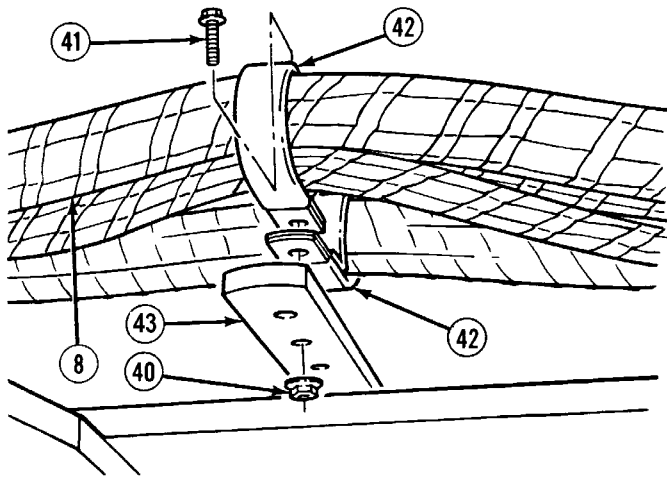


- (15) Remove locknut (32), screw (33) and two cushion clips (34) from bracket (35). Discard locknut.
- (16) Remove CTIS chassis wire harness (8) from cushion clip (34).

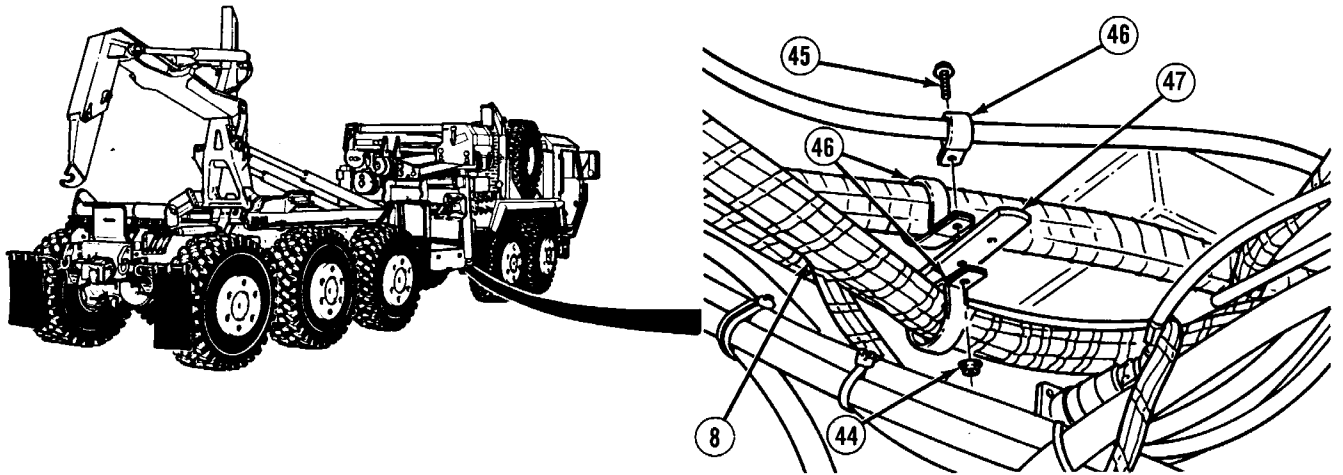
6-28. CTIS CHASSIS WIRE HARNESS REPLACEMENT (CONT).



- (17) Remove locknut (36), screw (37) and two cushion clips (38) from bracket (39). Discard locknut.
- (18) Remove CTIS chassis wire harness (8) from cushion clip (38).

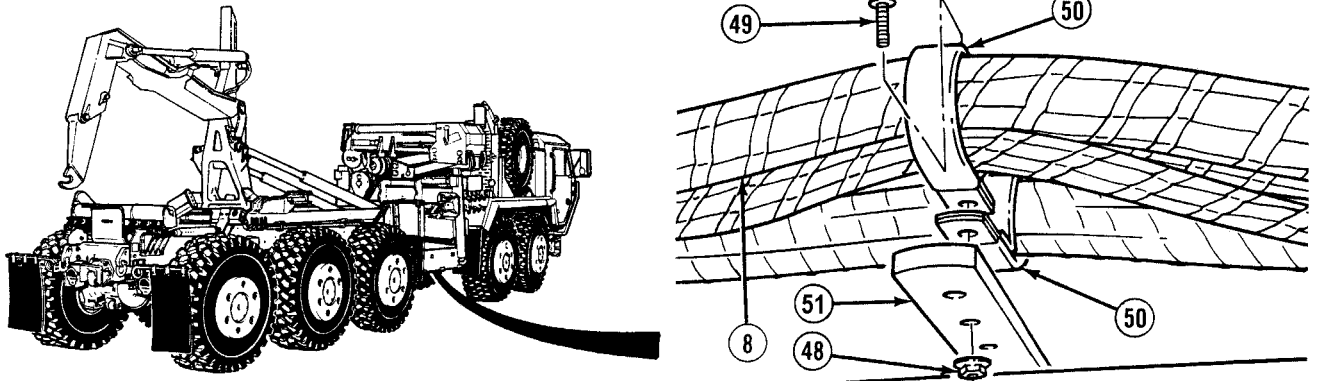


- (19) Remove locknut (40), screw (41) and two cushion clips (42) from bracket (43). Discard locknut.
- (20) Remove CTIS chassis wire harness (8) from cushion clip (43).



(21) Remove locknut (44), screw (45) and three cushion clips (46) from bracket (47). Discard locknut.

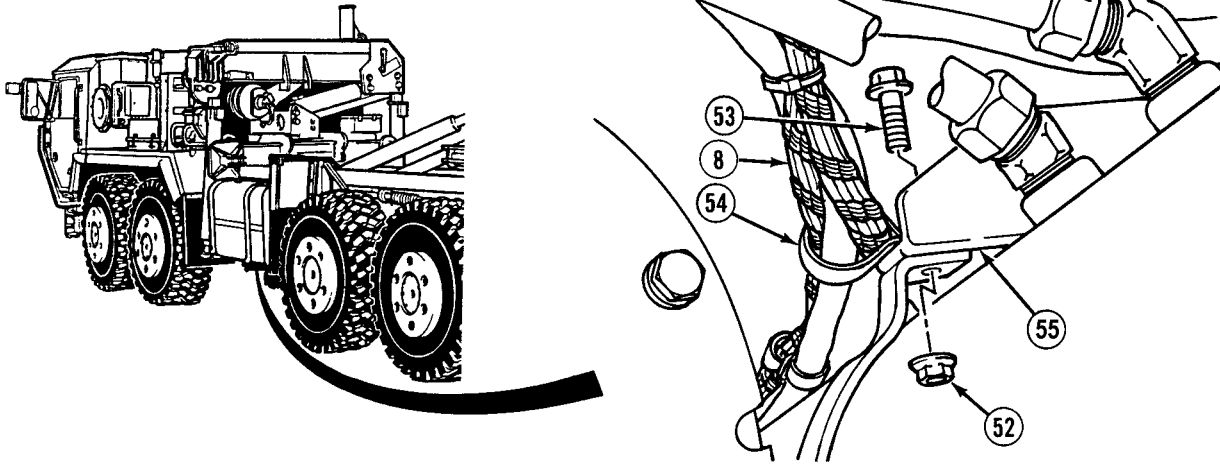
(22) Remove CTIS chassis wire harness (8) from cushion clip (46).



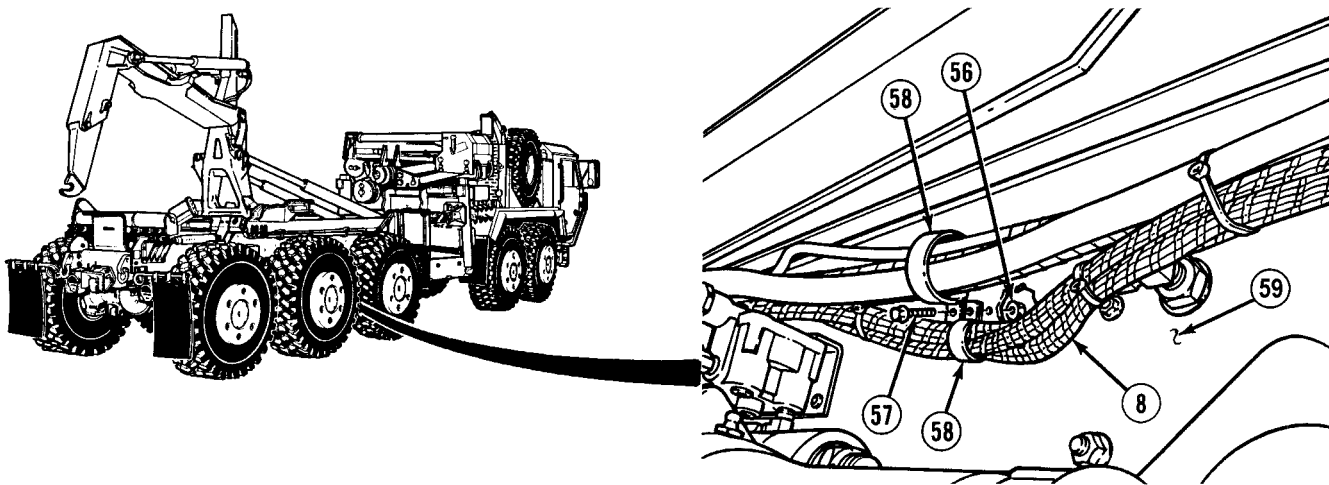
(23) Remove locknut (48), screw (49) and two cushion clips (50) from bracket (51). Discard locknut.

(24) Remove CTIS chassis wire harness (8) from cushion clip (50).

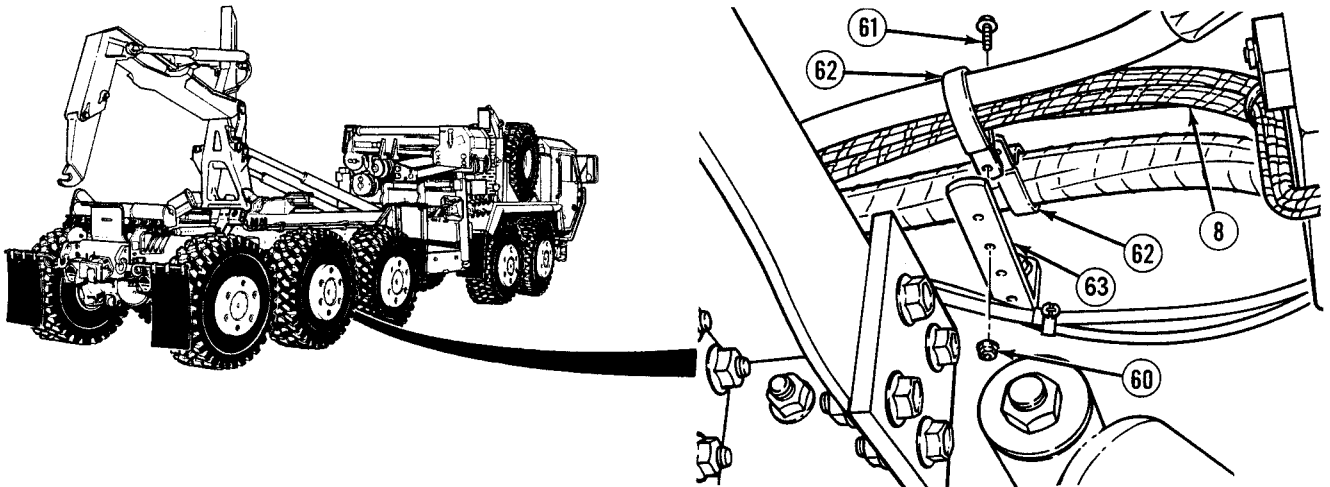
6-28. CTIS CHASSIS WIRE HARNESS REPLACEMENT (CONT).



- (25) Remove locknut (52), screw (53) and two cushion clips (54) from bracket (55). Discard locknut.
- (26) Remove CTIS chassis wire harness (8) from cushion clip (54).



- (27) Remove locknut (56), screw (57) and two cushion clips (58) from frame (59). Discard locknut.
- (28) Remove CTIS chassis wire harness (8) from cushion clip (58).



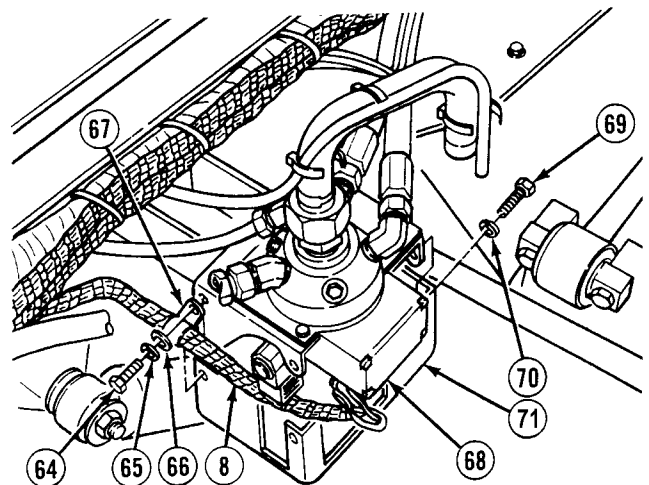
(29) Remove locknut (60), screw (61) and two cushion clips (62) from bracket (63). Discard locknut.

(30) Remove CTIS chassis wire harness (8) from cushion clip (62).

(31) Remove screw (64), lockwasher (65), washer (66) and cushion clip (67) from CTIS rear manifold (68). Discard lockwasher.

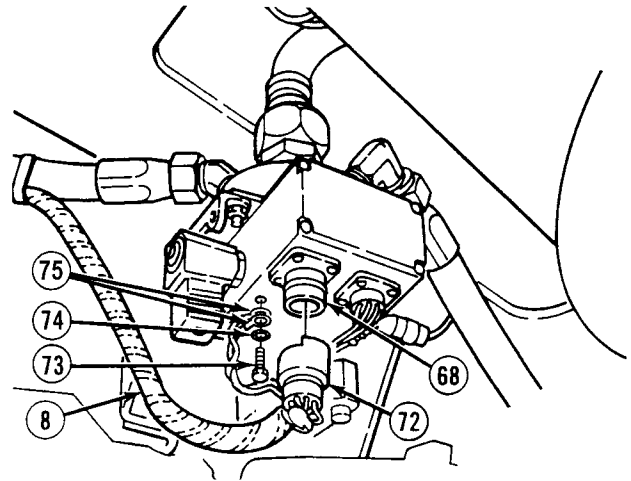
(32) Remove three screws (69), lockwashers (70) and CTIS rear manifold valve cover (71) from CTIS rear manifold (68). Discard lockwashers.

(33) Remove CTIS chassis wire harness (8) from cushion clip (67).



6-28. CTIS CHASSIS WIRE HARNESS REPLACEMENT (CONT).

- (34) Disconnect MC64 connector (72) from CTIS rear manifold (68).
- (35) Remove screw (73), lockwasher (74) and two wires 1067 (75) from CTIS rear manifold (68). Discard lockwasher.
- (36) Remove CTIS chassis wire harness (8) from truck.

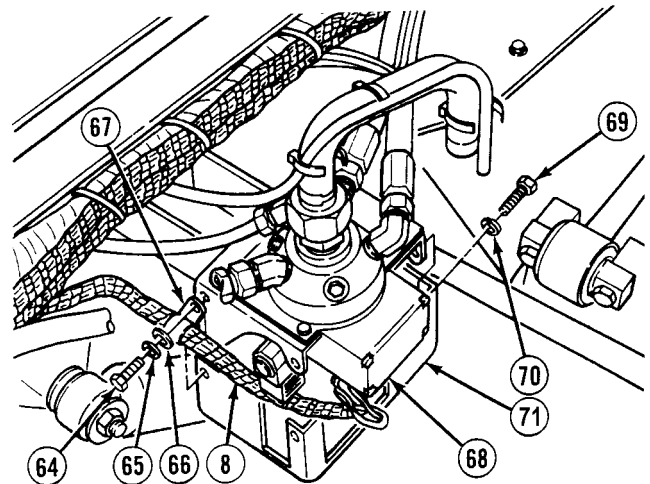


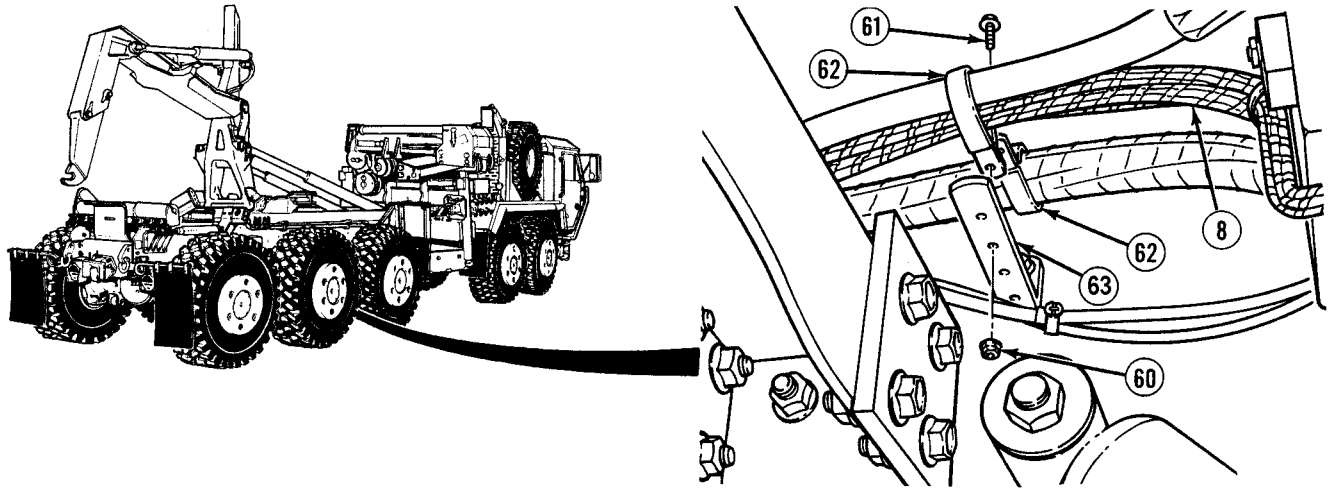
b. Installation.

NOTE

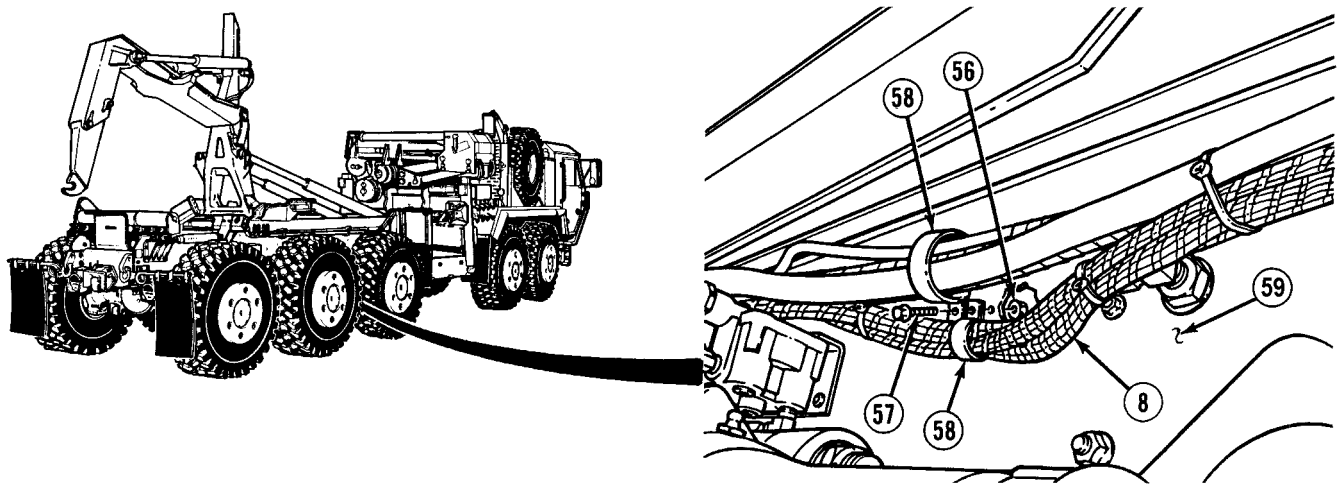
- Evenly distribute any slack in harness.
- Install cable ties as required.

- (1) Position CTIS chassis wire harness (8) in truck.
- (2) Install two wires 1067 (75), lockwasher (74) and screw (73) on CTIS rear manifold (68).
- (3) Connect MC64 connector (72) to CTIS rear manifold (68).
- (4) Install CTIS rear manifold valve cover (71), three lockwashers (70) and screws (69) on CTIS rear manifold (68).
- (5) Position CTIS chassis wire harness (8) in cushion clip (67).
- (6) Install cushion clip (67), washer (66), lockwasher (65) and screw (64) on CTIS rear manifold valve cover (71).



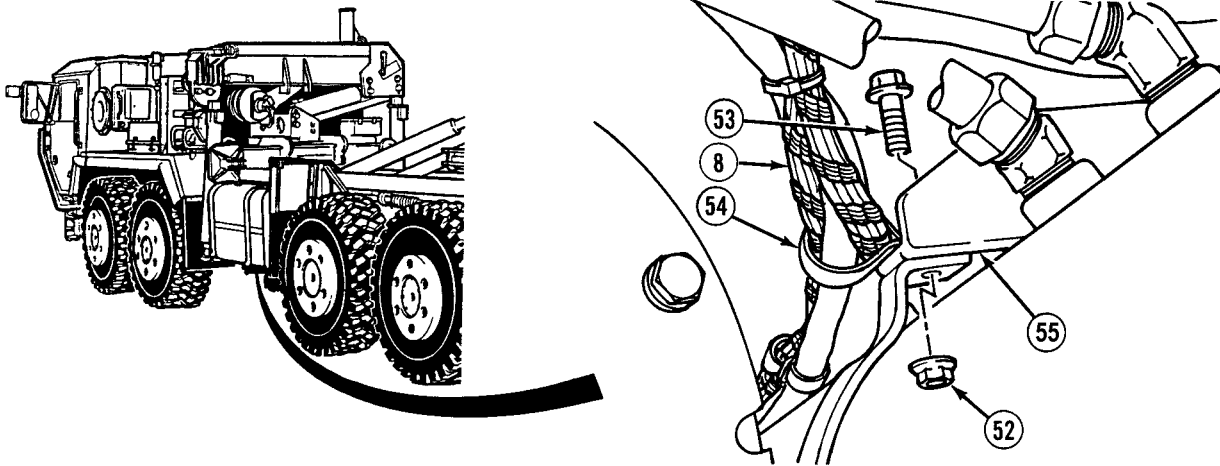


- (7) Position CTIS chassis wire harness (8) in cushion clip (62).
- (8) Install two cushion clips (62), screw (61) and locknut (60) on bracket (63).

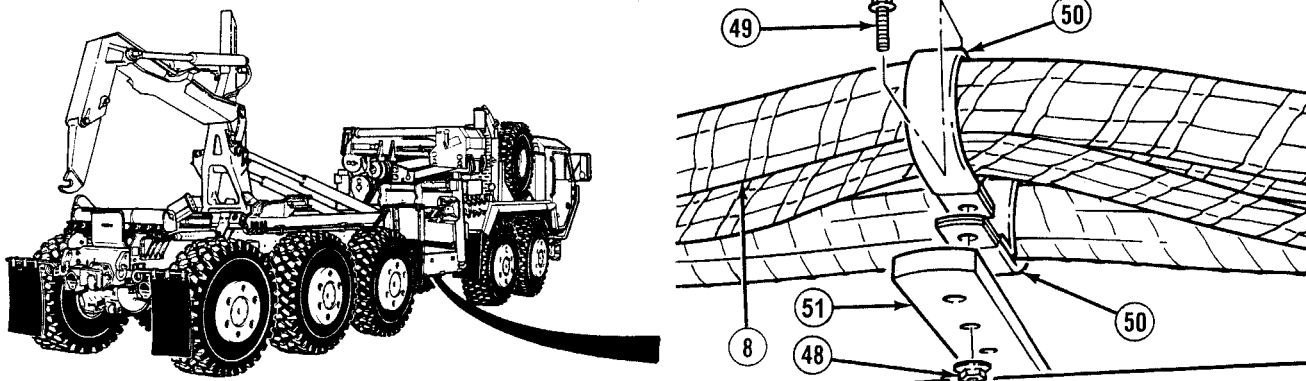


- (9) Position CTIS chassis wire harness (8) in cushion clip (58).
- (10) Install two cushion clips (58), screw (57) and locknut (56) on frame (59).

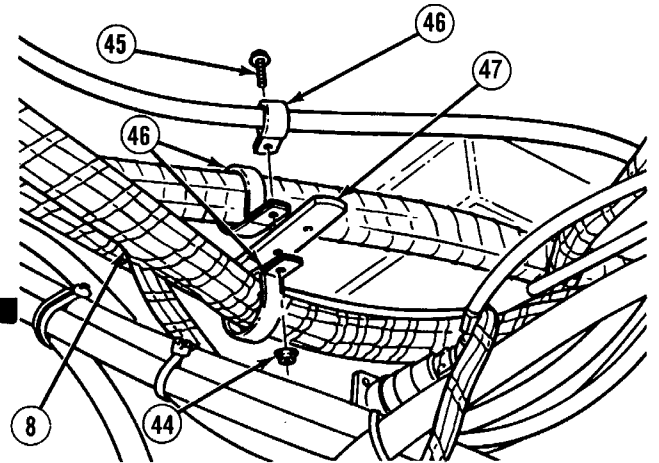
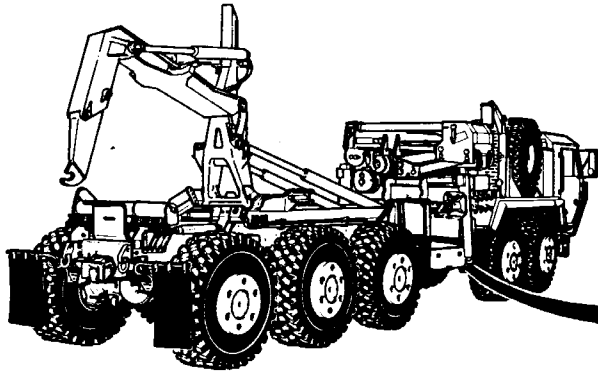
6-28. CTIS CHASSIS WIRE HARNESS REPLACEMENT (CONT).



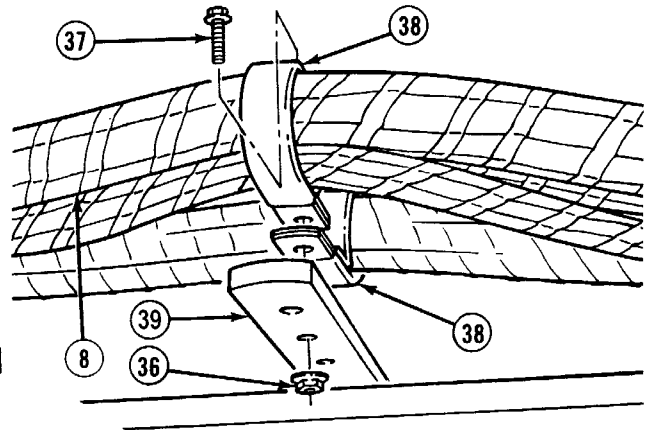
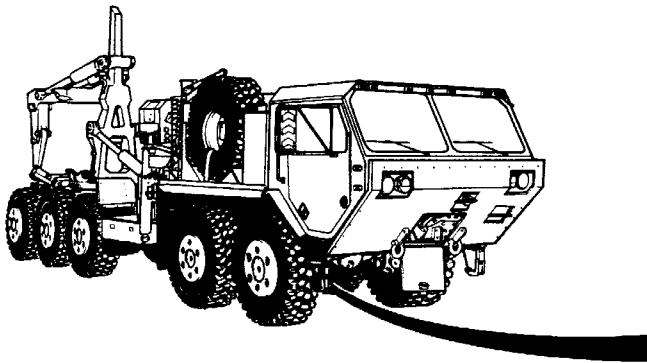
- (11) Position CTIS chassis wire harness (8) in cushion clip (54).
- (12) Install two cushion clips (54), screw (53) and locknut (52) on bracket (55).



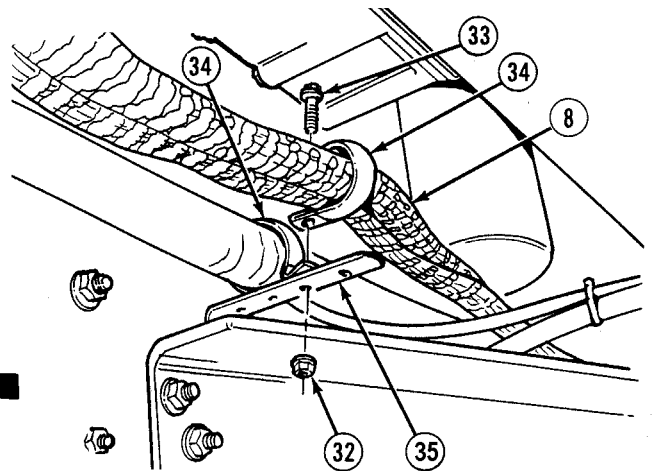
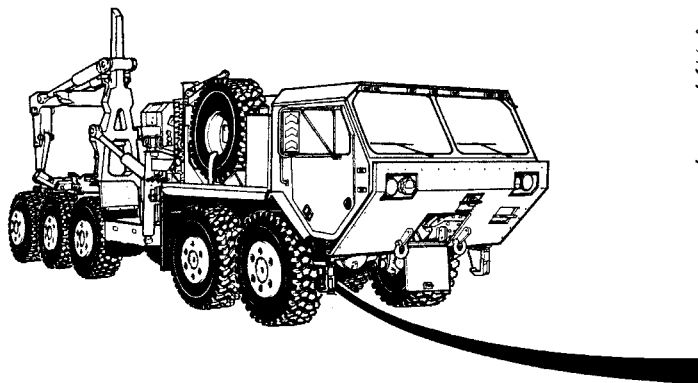
- (13) Position CTIS chassis wire harness (8) in cushion clip (50).
- (14) Install two cushion clips (50), screw (49) and locknut (48) on bracket (51).



- (15) Position CTIS chassis wire harness (8) in lower cushion clip (46).
- (16) Install three cushion clips (46), screw (45) and locknut (44) on bracket (47).



- (17) Position CTIS chassis wire harness (8) in cushion clip (38).
- (18) Install two cushion clips (38), screw (37) and locknut (36) on bracket (39).

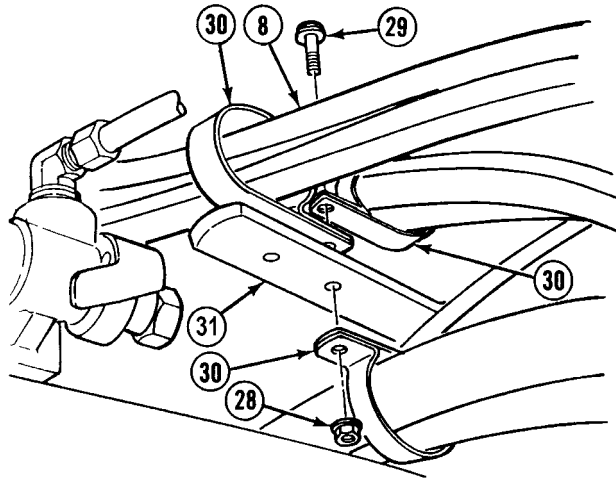


- (19) Position CTIS chassis wire harness (8) in cushion clip (34).
- (20) Install two cushion clips (34), screw (33) and locknut (32) on bracket (35).

6-28. CTIS CHASSIS WIRE HARNESS REPLACEMENT (CONT).

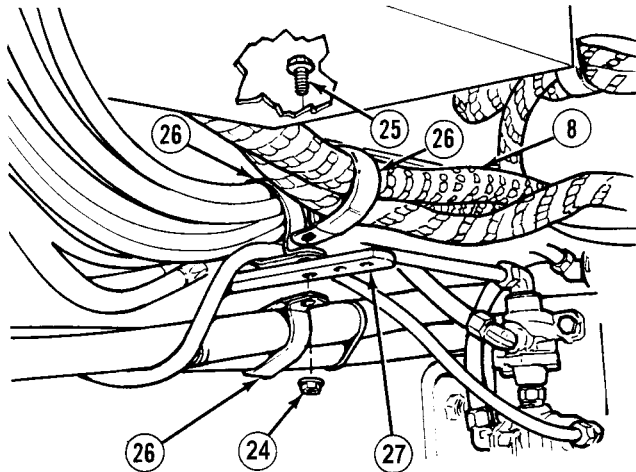
(21) Position CTIS chassis wire harness (8) in cushion clip (30).

(22) Install three cushion clips (30), screw (29) and locknut (28) on bracket (31).

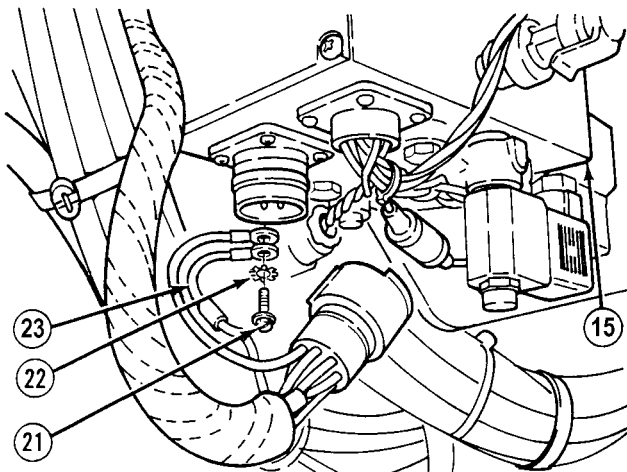


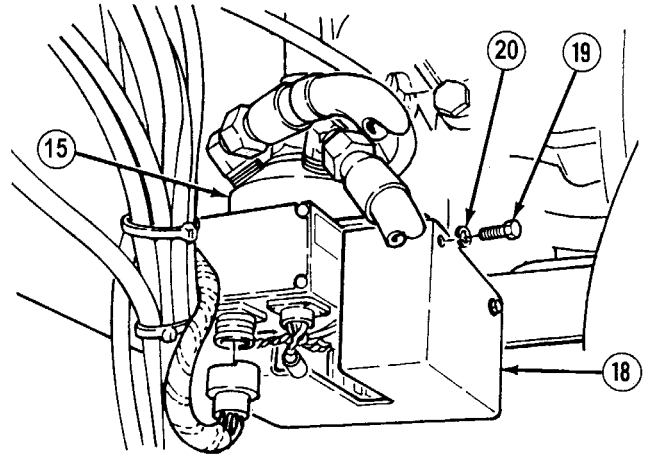
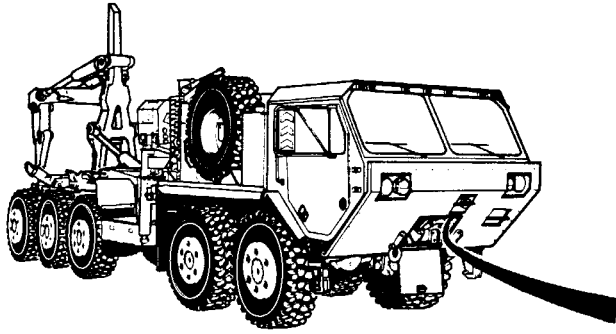
(23) Position CTIS chassis wire harness (8) in cushion clip (26).

(24) Install three cushion clips (26), screw (25) and locknut (24) on bracket (27).

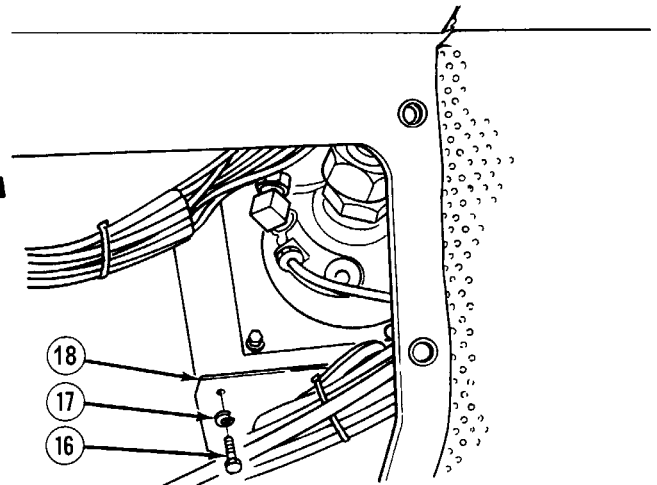
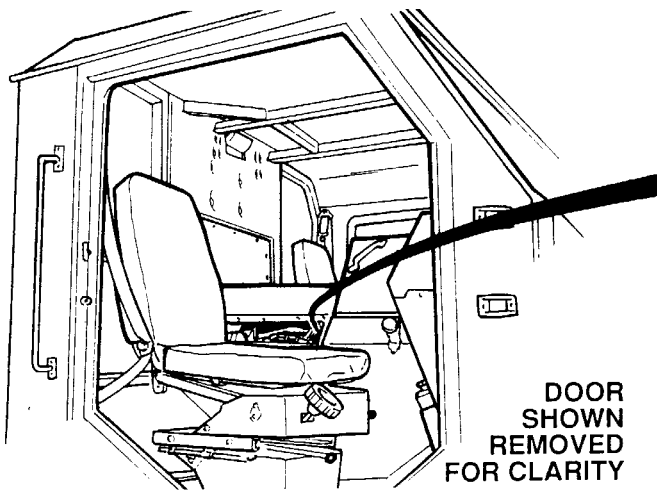


(25) Install two wires 1063 (23), lockwasher (22) and screw (21) on CTIS front manifold (15).





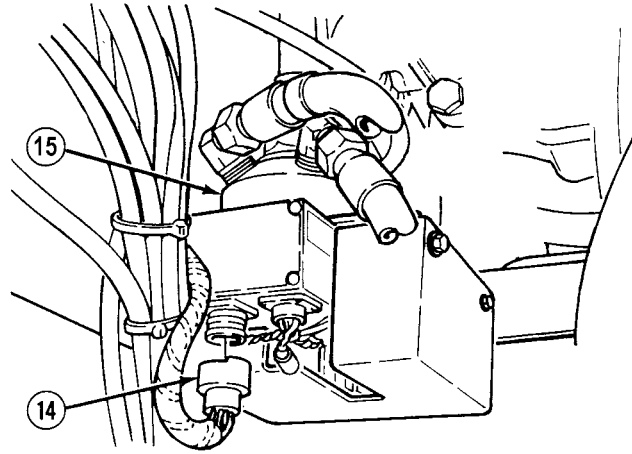
(26) Install CTIS front manifold valve cover (18), three lockwashers (20) and screws (19) on CTIS front manifold (15).



(27) Install lockwasher (17) and screw (16) on CTIS front manifold valve cover (18).

6-28. CTIS CHASSIS WIRE HARNESS REPLACEMENT (CONT).

- (28) Connect MC109 connector (14) on front CTIS manifold (15).

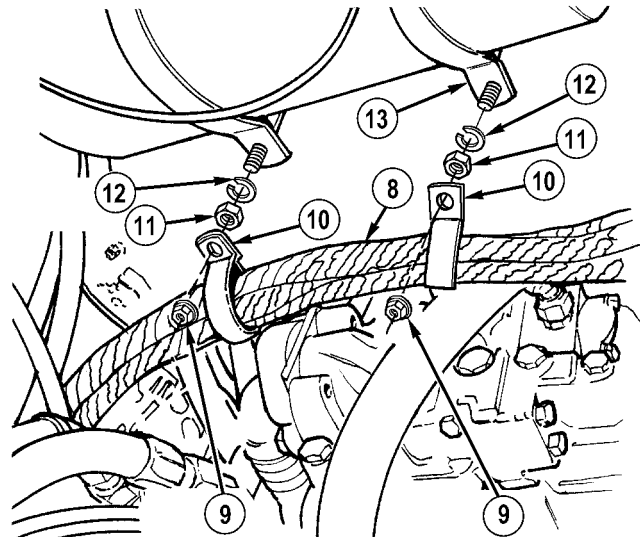


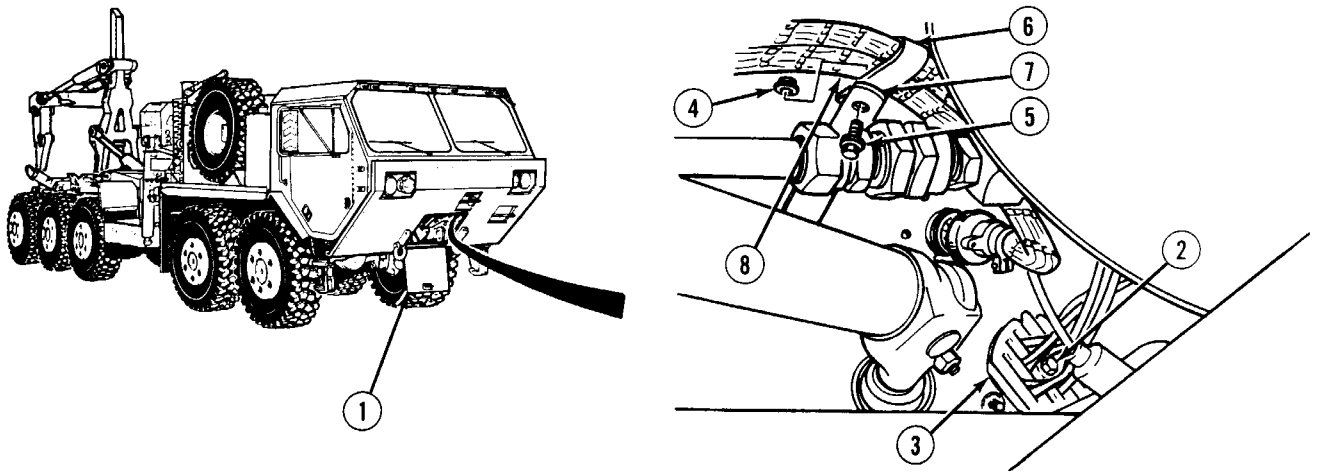
- (29) Position CTIS chassis wire harness (8) in two cushion clips (10).

NOTE

Nuts and lockwashers in Step (30) may not have been removed during disassembly.

- (30) Install two lockwashers (12), nuts (11), cushion clips (10) and locknuts (9) on air tank brackets (13).





- (31) Position CTIS chassis wire harness (8) in cushion clip (6).
- (32) Install cushion clip (6), screw (5) and locknut (4) on bracket (7).
- (33) Connect MC32 connector (3) and tighten screw (2).
- (34) Close front access cover (1).

c. Follow-On Maintenance:

- Install Electronic Control Box (ECB) right side panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- LHS in transit position, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-29. CHASSIS WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

**Tool Kit, General Mechanic's
(Item 240, Appendix F)**

Materials/Parts

**Cable Ties (Item 9, Appendix B)
Compound, Corrosion Preventative
(Item 15, Appendix B)
Primer, "T" (Item 46, Appendix B)
Sealant, Electrical (Item 50, Appendix B)
Sealing Compound (Item 56, Appendix B)
Sealing Compound (Item 62, Appendix B)
Solution, Soap (Item 67, Appendix B)
Tags, Identification (Item 72, Appendix B)
Tape, Electrical (Item 74, Appendix B)
Clip (12) (Item 31, Appendix E)
Locknut (3) (Item 174, Appendix E)
Locknut (23) (Item 176, Appendix E)**

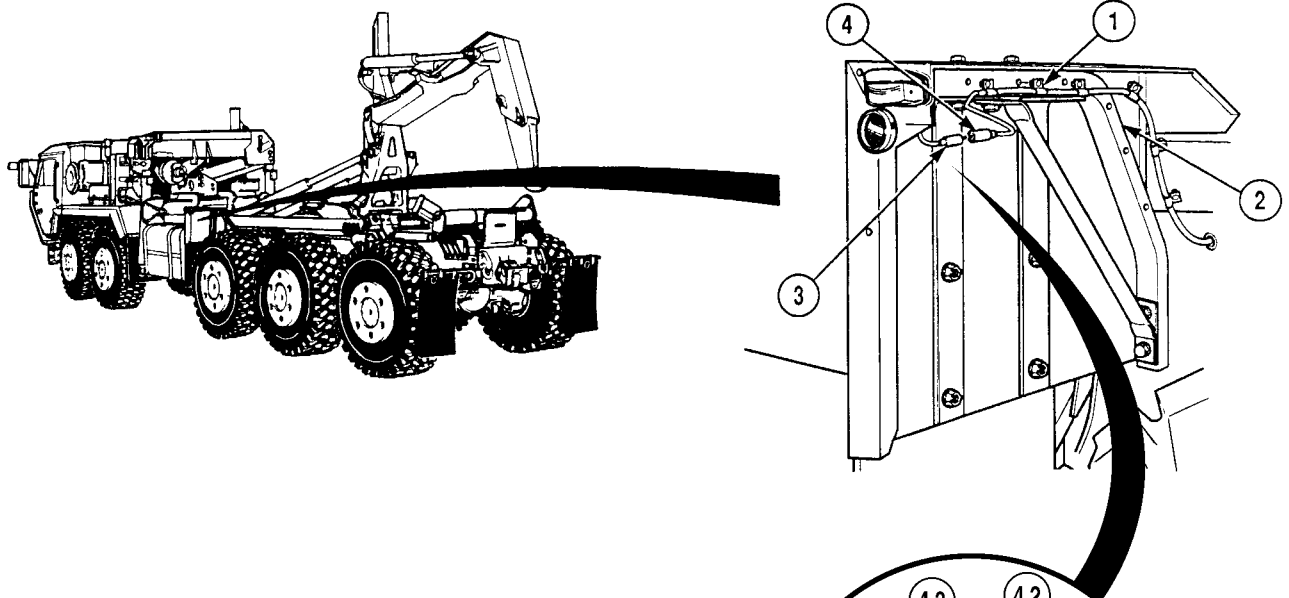
Materials/Parts - Continued

**Locknut (5) (Item 201, Appendix E)
Locknut (2) (Item 210, Appendix E)
Lockwasher (4) (Item 240, Appendix E)
Lockwasher (Item 273, Appendix E)
Lockwasher (2) (Item 282, Appendix E)
Lockwasher (2) (Item 286, Appendix E)
Screw (Item 517, Appendix E)
Screw, self-tapping (2) (Item 561, Appendix E)**

Equipment Condition

**Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
LHS fully extended, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)
Left side noise panel removed,
(TM 9-2320-364-20)
Tread platform removed, (TM 9-2320-364-20)
DUVAC cover removed, (TM 9-2320-364-20)**

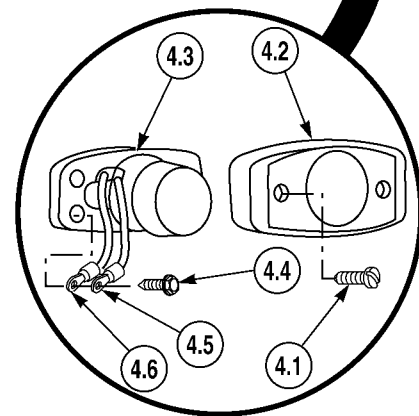
a. *Removal.*



NOTE

- Remove cable ties as required.
- Tag and mark all wires and connectors prior to removal.

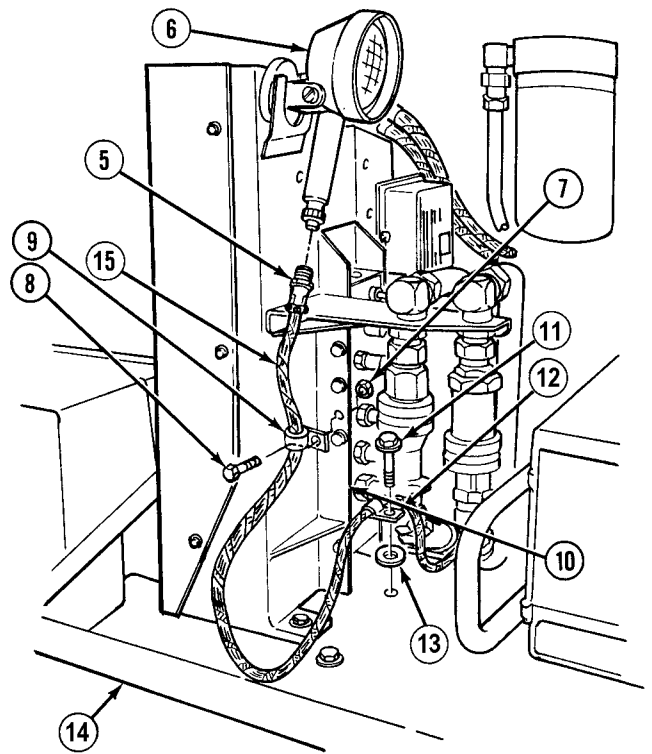
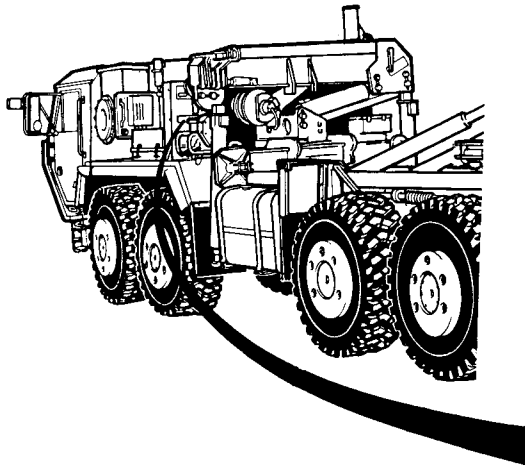
- (1) Remove and discard six clips (1) from fender support (2).
- (2) Disconnect wire 1012 (3) from wire 489 (4).



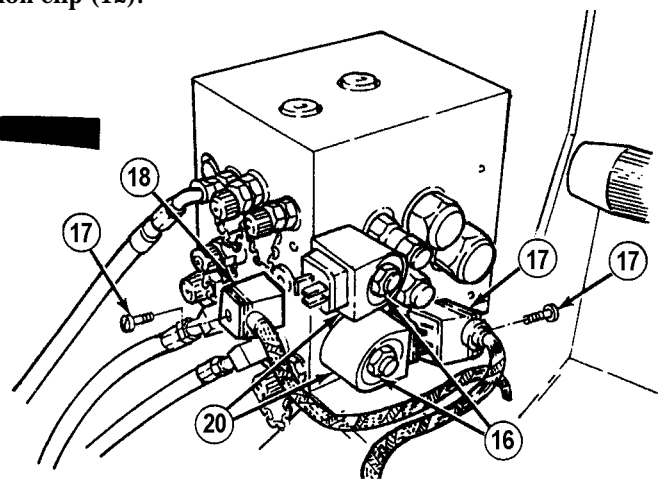
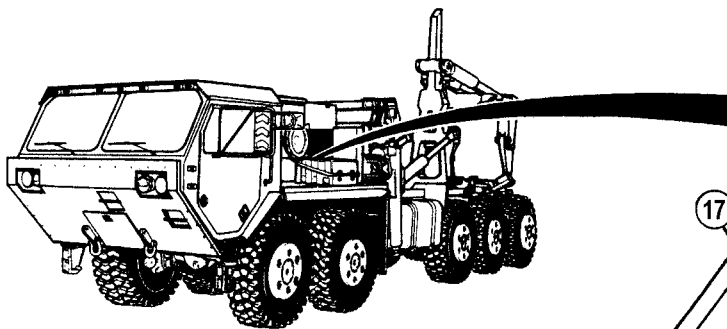
NOTE

Perform Steps (2.1) and (2.2) if wire 1435 is present.

- (2.1) Remove two screws (4.1) and cover (4.2) from side marker light (4.3).
- (2.2) Remove self-tapping screw (4.4), ground wire (4.5) and 1435 wire (4.6) from side marker light (4.3). Discard self-tapping screw.



- (6) Disconnect MC54 connector (5) from left side work lamp (6).
- (7) Remove locknut (7), screw (8) and cushion clip (9) from bracket (10). Discard locknut.
- (8) Remove screw (11), cushion clip (12) and washer (13) from fender (14). Discard screw.
- (9) Remove chassis wire harness (15) from cushion clip (12).

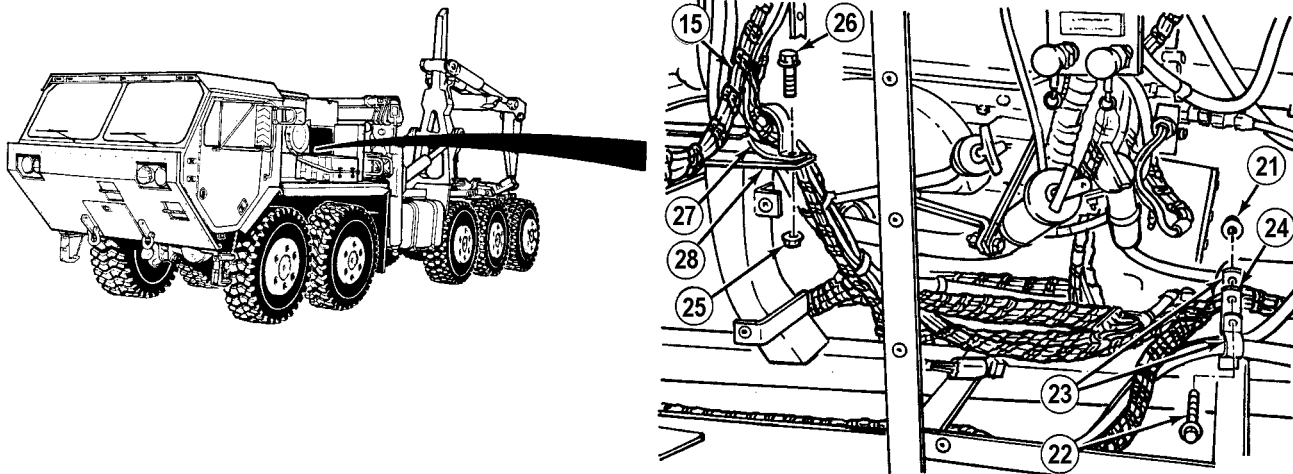


NOTE

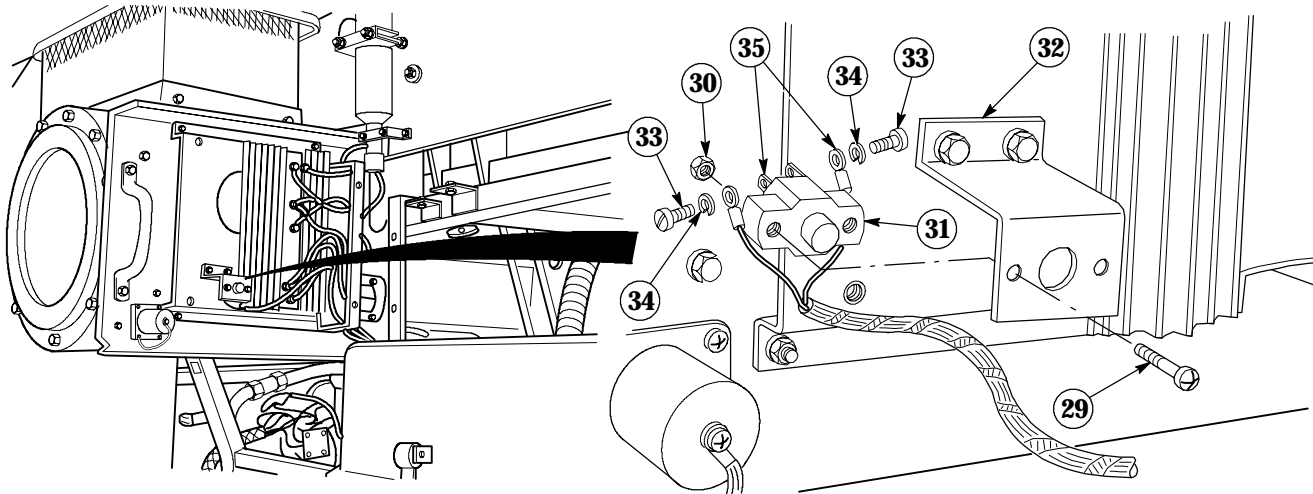
It may be necessary to loosen nuts (16) on solenoid valves and rotate solenoid valves in order to remove connectors M10 and M51.

- (10) Loosen screws (17) and disconnect connectors M10 (18) and M51 (19) from solenoid valves (20).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



- (11) Remove locknut (21), screw (22) and cushion clips (23) from bracket (24). Discard locknut.
- (12) Remove chassis wire harness (15) from cushion clip (23).
- (13) Remove locknut (25), screw (26) and cushion clip (27) from bracket (28). Discard locknut.
- (14) Remove chassis wire harness (15) from cushion clip (27).



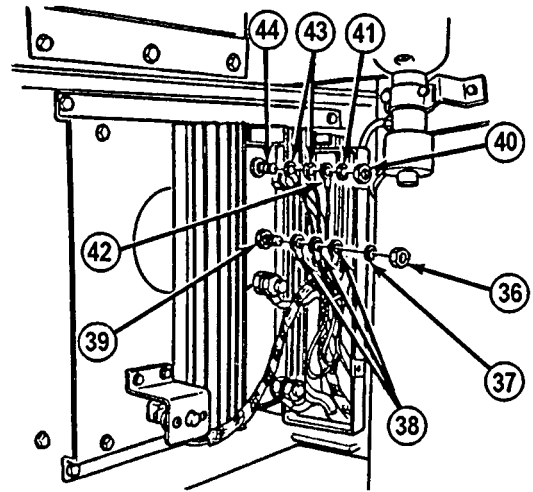
- (15) Remove two screws (29), locknuts (30) and circuit breaker (31) from bracket (32). Discard locknuts.

NOTE

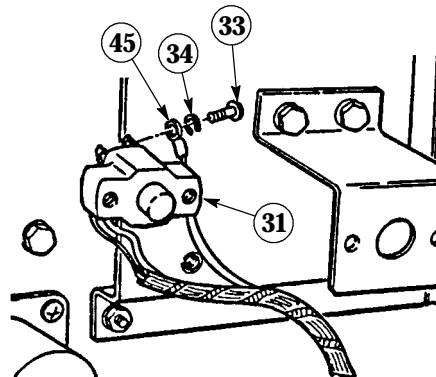
- Perform steps (16) through (18) for trucks equipped with a 145 amp alternator.
- Perform steps (19) through (23) for trucks equipped with a 200 amp alternator.

- (16) Remove two screws (33), lockwashers (34) and two wires 1020 (35) from circuit breaker (31). Discard lockwashers.

- (17) Remove nut (36), lockwasher (37) and three wires 1435 (38) from stud (39). Discard lockwasher.
- (18) Remove nut (40), lockwasher (41), brown wire (42) and two wires 1020 (43) from stud (44). Discard lockwasher.



- (19) Remove screw (33), lockwasher (34) and wire 1020 (45) from circuit breaker (31). Discard lockwasher.

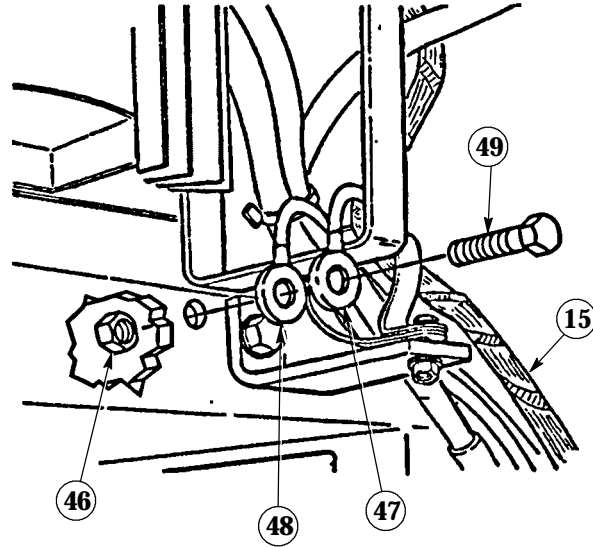


6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).

NOTE

There are two wires secured by screw and nut. Remove only wire 1435 of chassis wire harness and secure remaining wire with screw and nut.

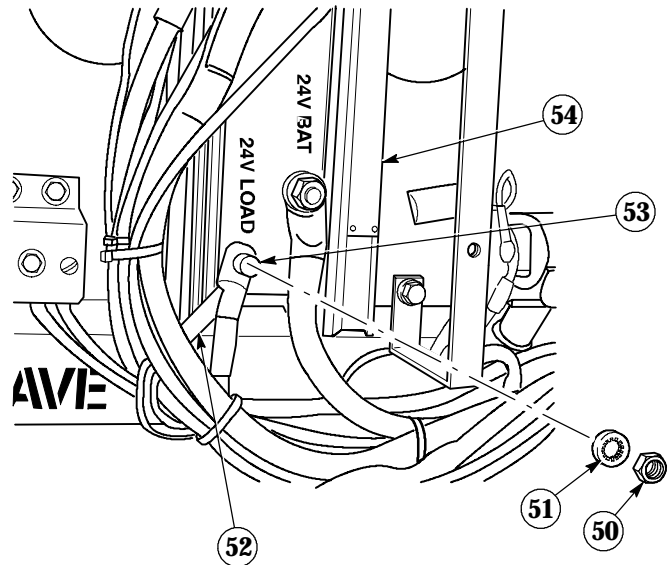
- (20) Remove nut (46), wire 1435 (47), and wire 1435 (48) of chassis wire harness (15) and screw (49).
- (21) Position wire 1435 (47) screw (49) and nut (46).



NOTE

There are two wires located on 24 volt load terminal of polarity protection control. Remove only wire 1431 and position remaining wire back on terminal.

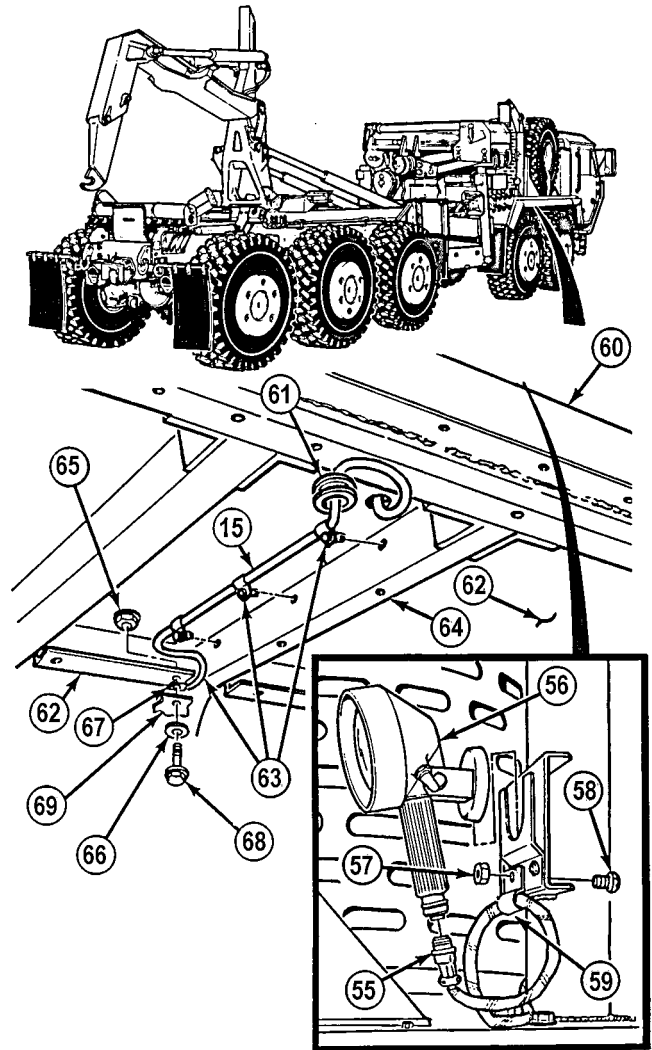
- (22) Remove nut (50), lockwasher (51) and wire 1431 (52) from 24 volt load terminal (53) of polarity protection control (54). Discard lockwasher.
- (23) Position nut (50) on 24 volt load terminal (53).



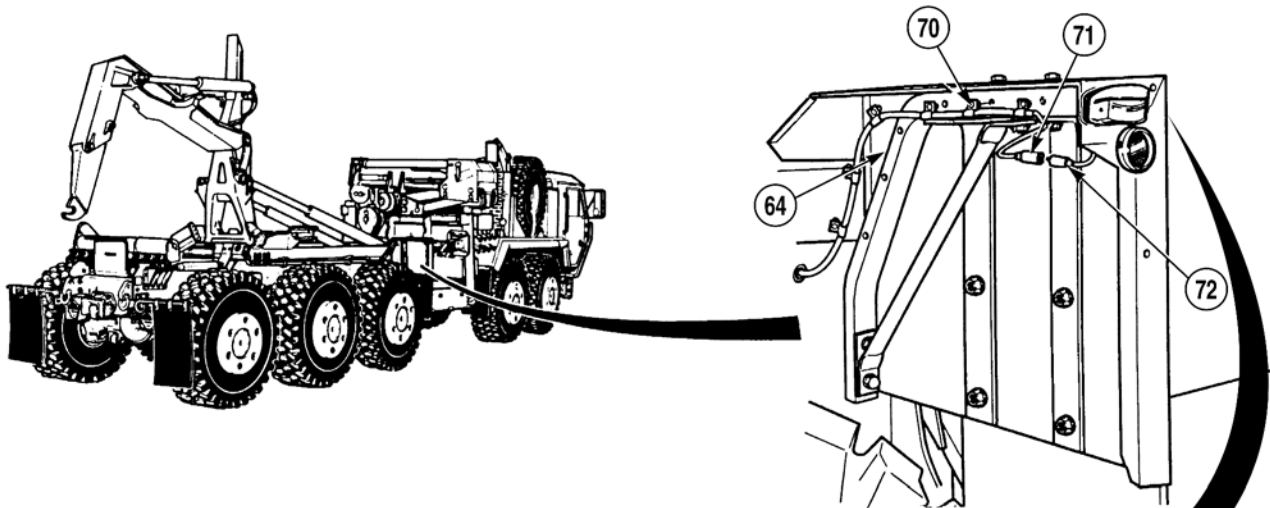
NOTE

Apply soap solution to grommets prior to wire harness removal.

- (24) Disconnect MC79 connector (55) from right side work lamp (56).
- (25) Remove locknut (57), screw (58) and cushion clip (59) from bracket (60). Discard locknut.
- (26) Pull chassis wire harness (15) and grommet (61) through bottom of fender (62).
- (27) Remove grommet (61) from chassis wire harness (15).
- (28) Remove and discard three clips (63) from fender support (64).
- (29) Remove locknut (65), washer (66), cushion clip (67) and screw (68) from mud flap (69) and fender (62). Discard locknut.
- (30) Remove chassis wire harness (15) from cushion clip (67).



6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



(31) Remove and discard six clips (70) from fender support (64).

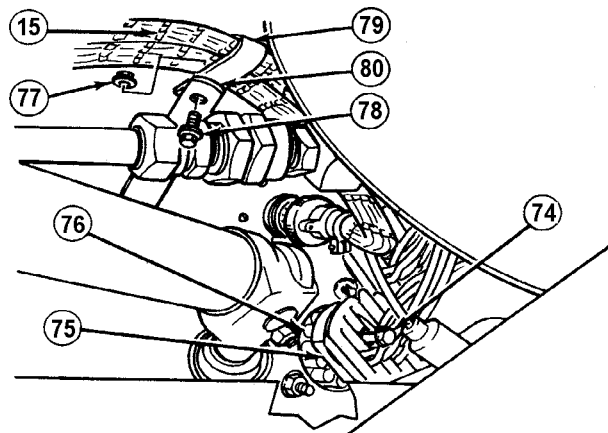
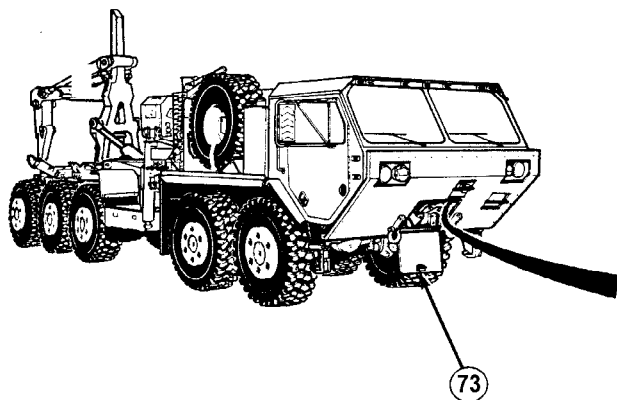
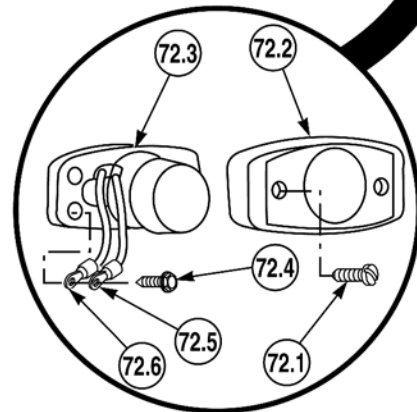
(32) Disconnect wire 1012 (71) from wire 489 (72).

NOTE

Perform Steps (29.1) and (29.2) if wire 1435 is present.

(29.1) Remove two screws (72.1) and cover (72.2) from side marker light (72.3).

(29.2) Remove self-tapping screw (72.4), ground wire (72.5) and wire 1435 (72.6) from side marker light (72.3). Discard self-tapping screw.

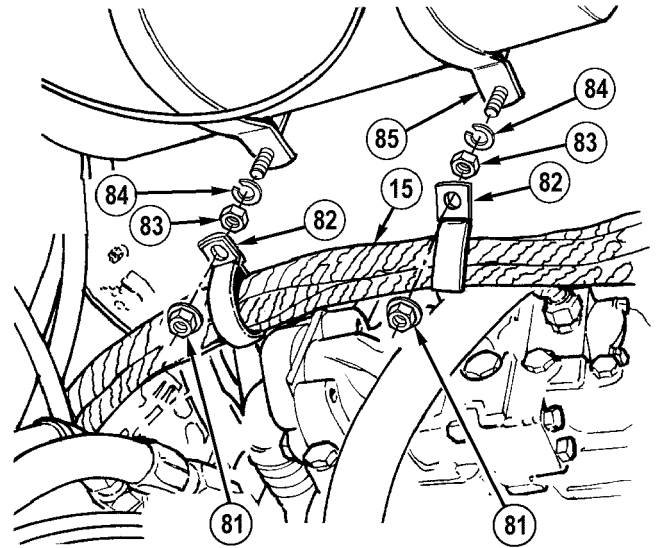
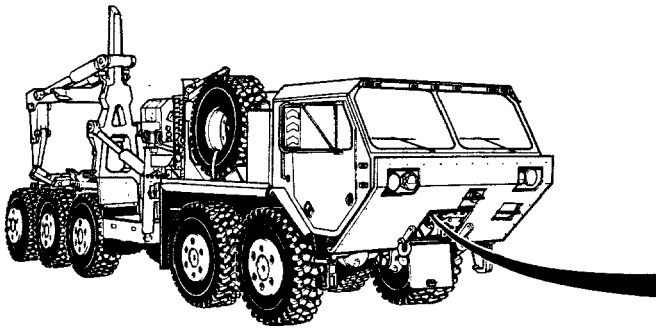


(33) Open front access cover (73).

(34) Loosen screw (74) on MC31 connector (75) and remove MC31 connector from bulkhead connector (76).

(35) Remove locknut (77), screw (78) and cushion clip (79) from bracket (80). Discard locknut.

(36) Remove chassis wire harness (15) from cushion clip (79).

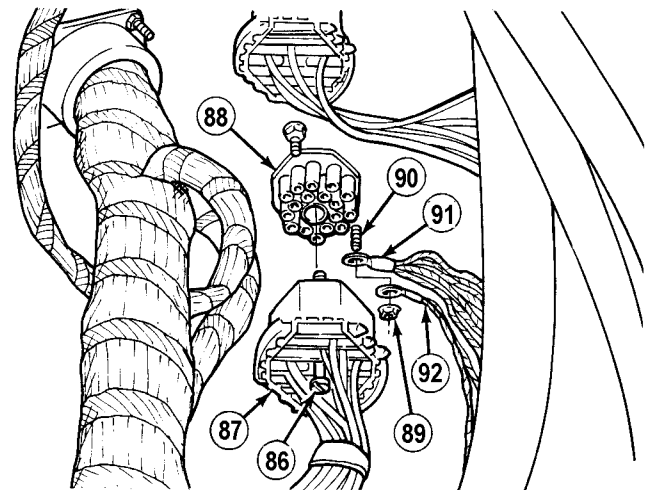
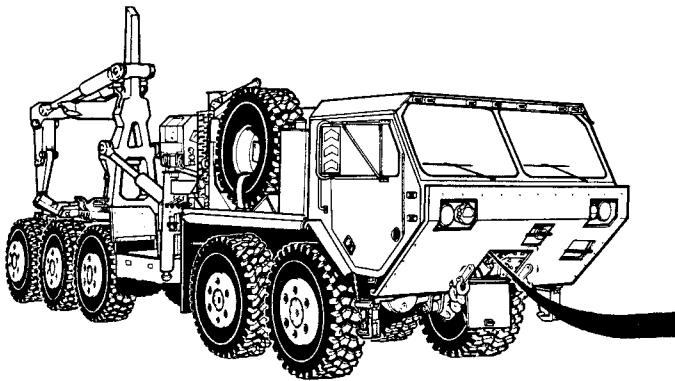


NOTE

- There may or may not be locknuts present in Step (37).
- Cushion clips may be installed under locknut or under nuts and lockwashers. If mounted under locknuts, do not remove nuts and lockwashers.

(37) Remove two locknuts (81), cushion clips (82), nuts (83) and lockwashers (84) from screws (85). Discard lockwashers and locknuts.

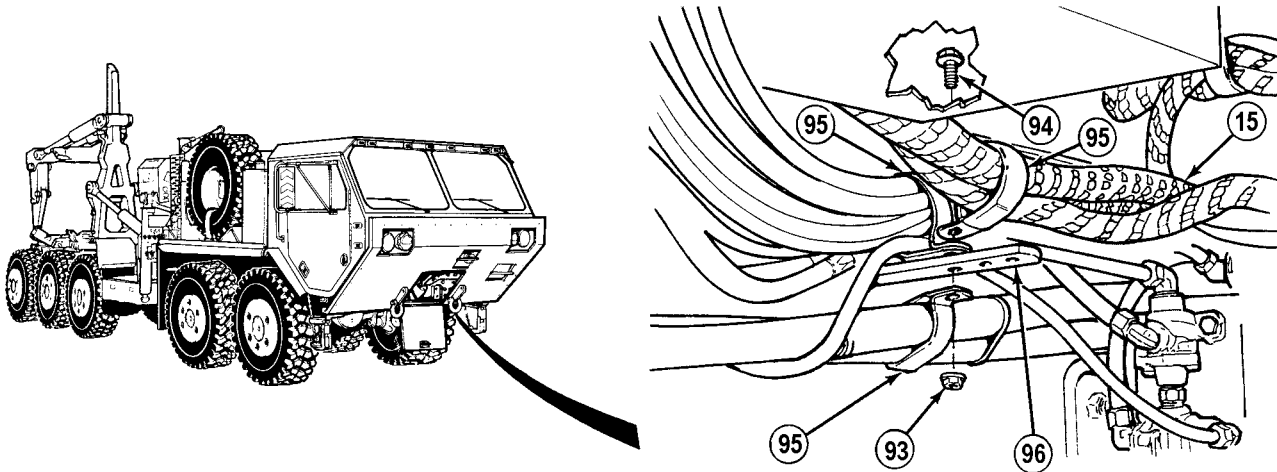
(38) Remove chassis wire harness (15) from cushion clips (82).



(39) Loosen screw (86) from MC3 connector (87) and remove MC3 connector from bulkhead connector (88).

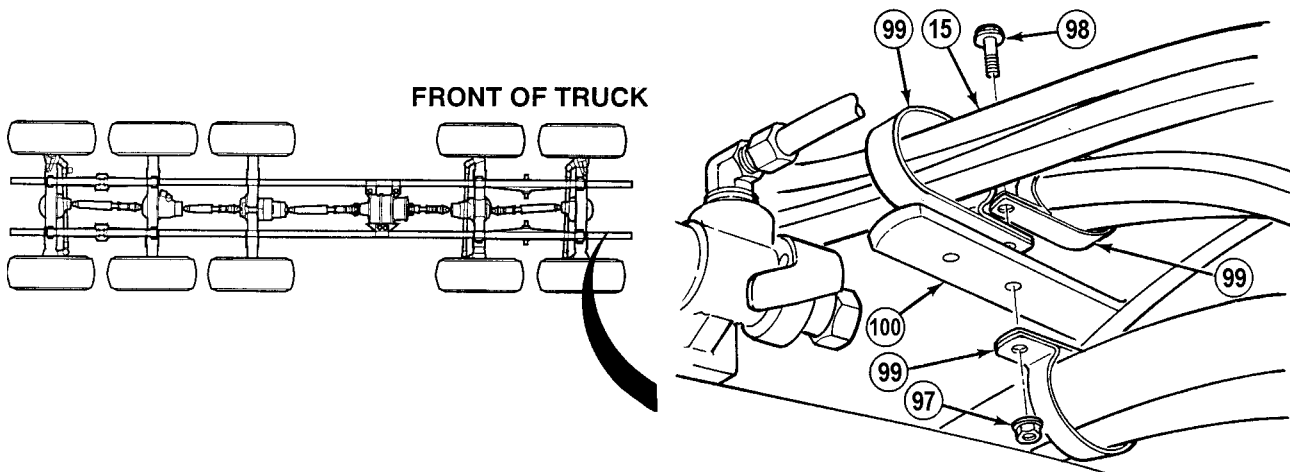
(40) Remove locknut (89), screw (90) and two shield wires (91) and (92) from bulkhead connector (88). Discard locknut.

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



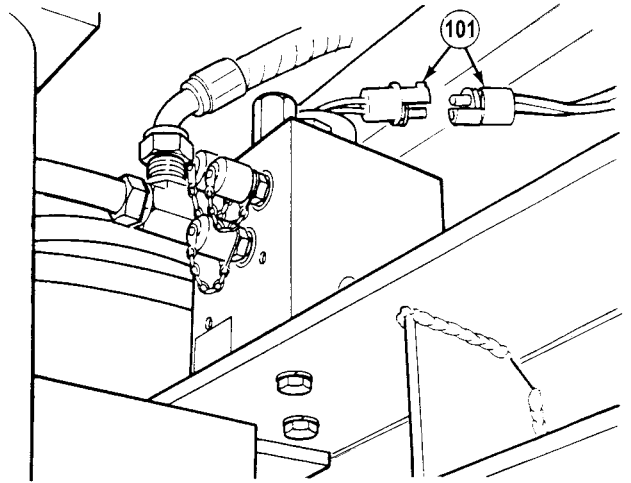
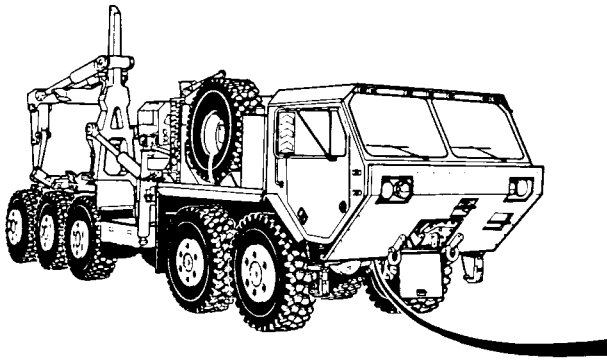
(41) Remove locknut (93), screw (94) and cushion clips (95) from bracket (96). Discard locknut.

(42) Remove chassis wire harness (15) from cushion clip (95).



(43) Remove locknut (97), screw (98) and cushion clips (99) from bracket (100). Discard locknut.

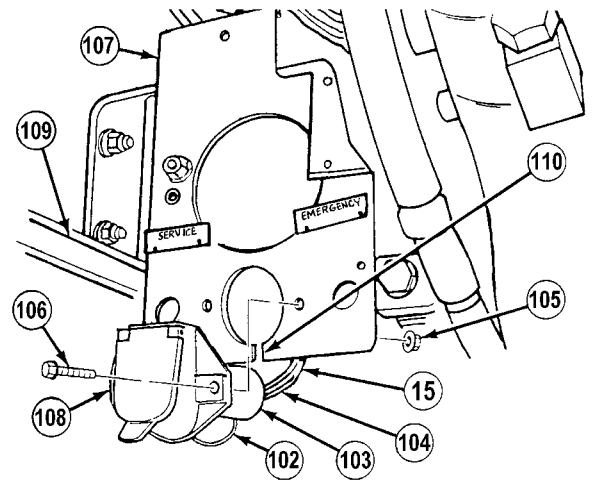
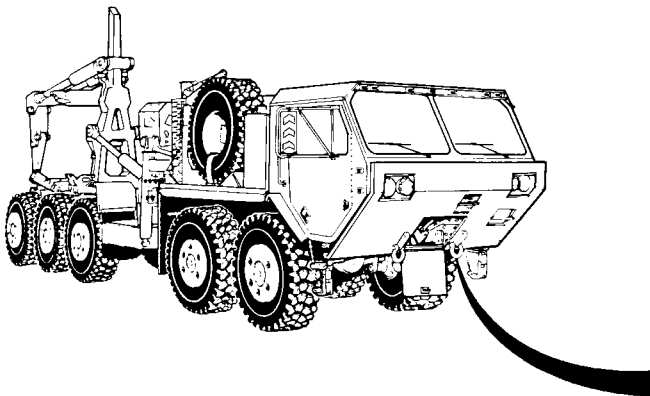
(44) Remove chassis wire harness (15) from cushion clip (99).



NOTE

Disconnect connector by prying up on tabs and gently pulling apart connector.

(45) Disconnect MC113 connector (101).



NOTE

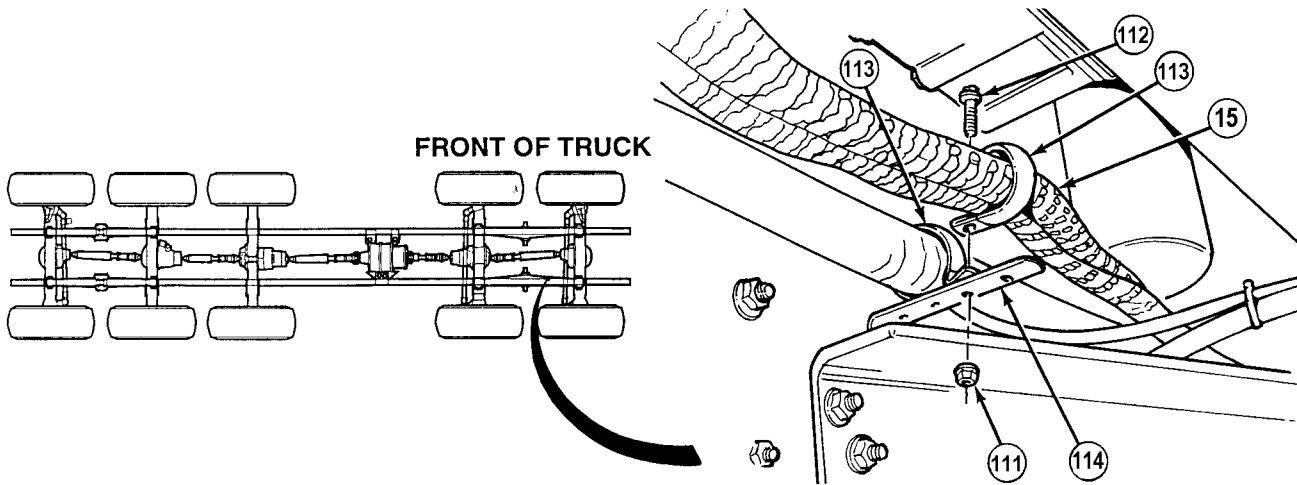
- There are two types of 7-pin electrical connectors. Model B replaced Model A.
- Model A has a rubber boot covering the back.
- Model B uses rubber push on connectors on the back.
- Perform Step (46) for Model A connector.

(46) Remove cable tie (102) and slide boot (103) back on wires (104) of harness (15).

(47) Remove two locknuts (105) and screws (106) from bracket (107). Discard locknuts.

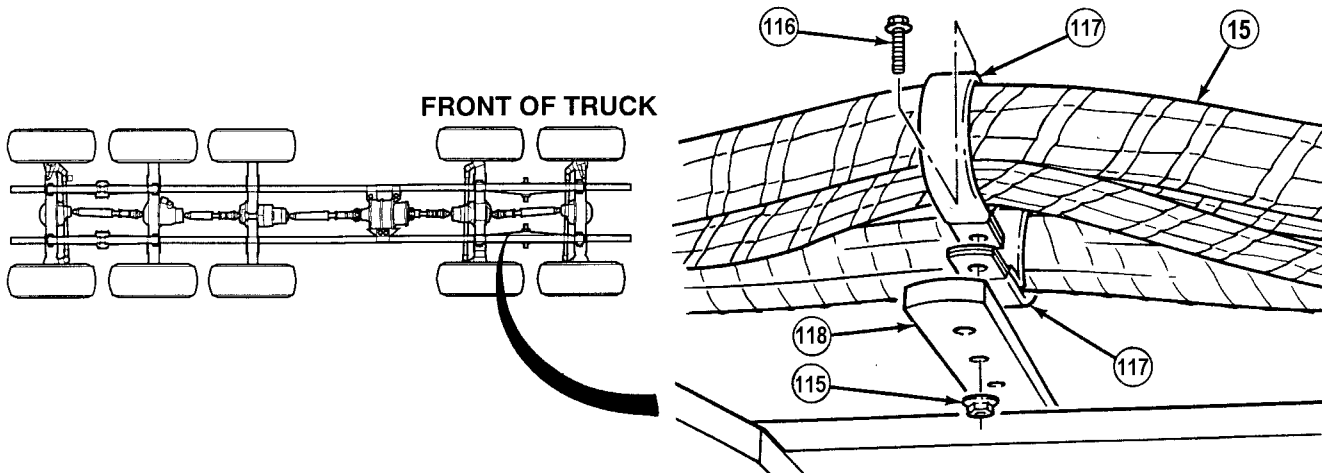
(48) Pull MC27 connector (108) toward front of truck (109) and guide chassis wire harness (15) down through slot (110) on bracket (88).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



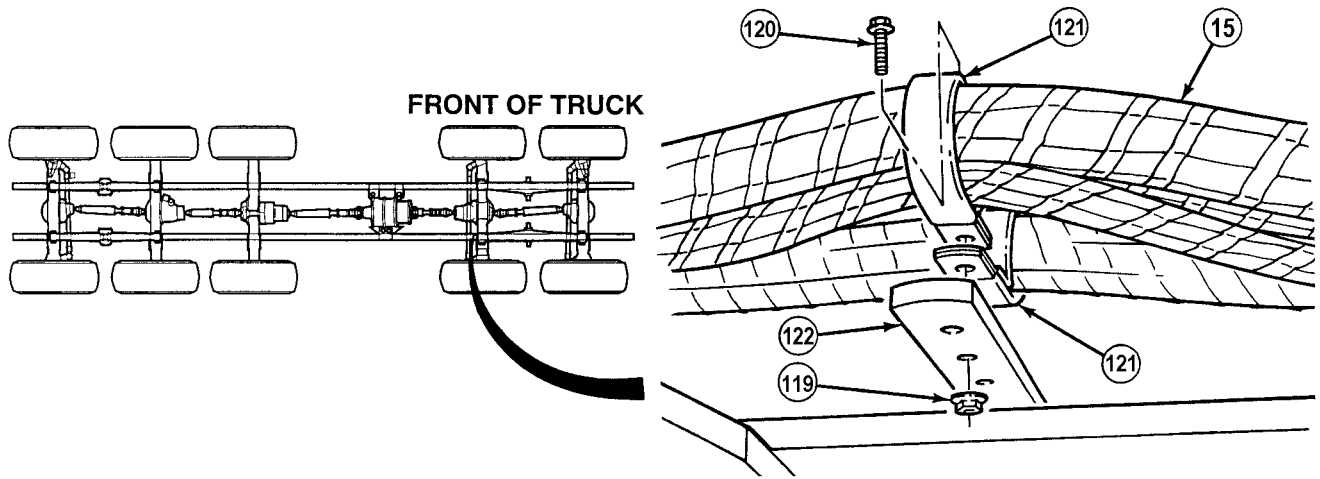
(49) Remove locknut (111), screw (112) and cushion clips (113) from bracket (114). Discard locknut.

(50) Remove chassis wire harness (15) from cushion clip (113).

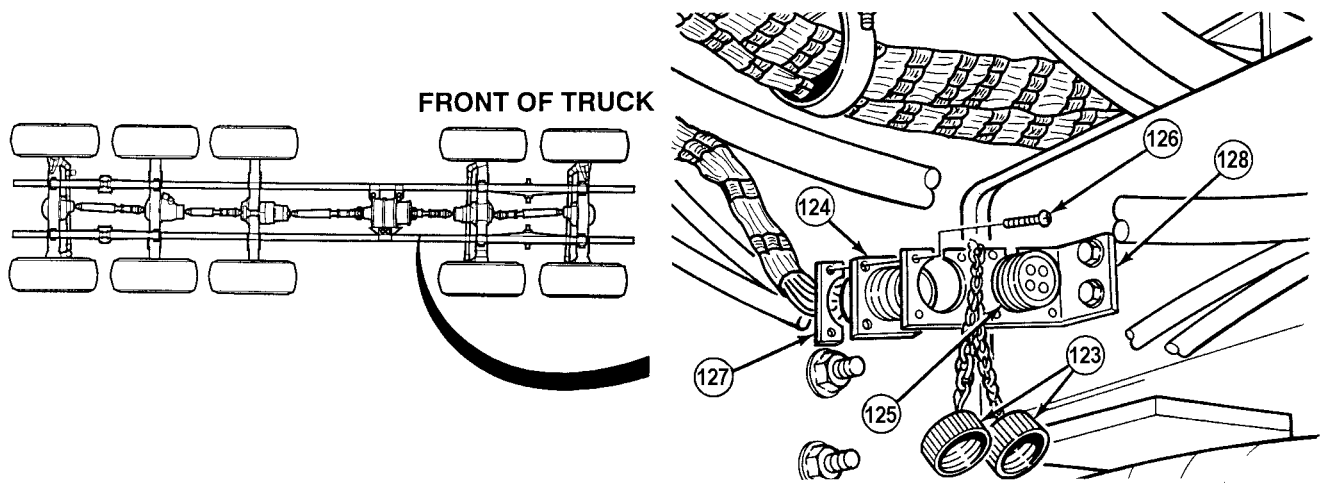


(51) Remove locknut (115), screw (116) and cushion clips (117) from bracket (118). Discard locknut.

(52) Remove chassis wire harness (15) from cushion clip (117).



- (53) Remove locknut (119), screw (120) and cushion clips (121) from bracket (122). Discard locknut.
- (54) Remove chassis wire harness (15) from cushion clip (121).

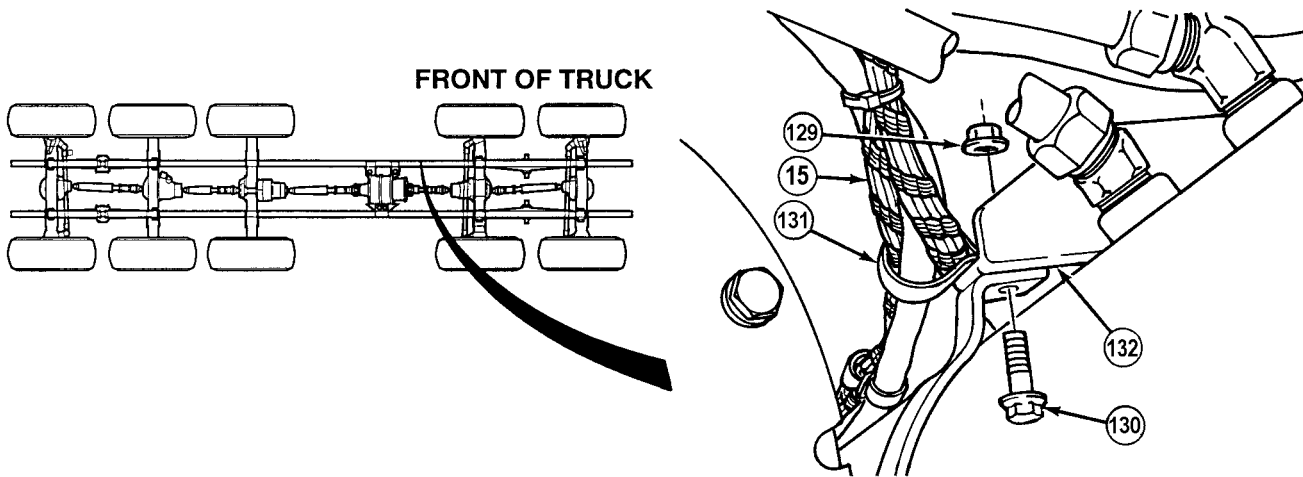


NOTE

If truck is equipped with crane and/or winch, disconnect MC29 connector (124) and/or MC55 connector (125) instead of removing caps (123).

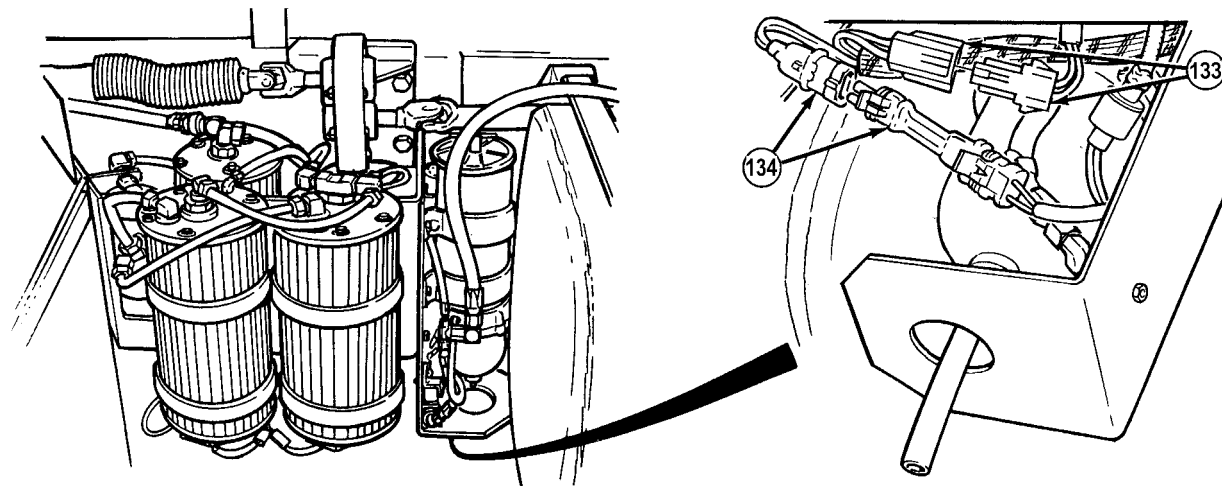
- (55) Remove two caps (123) from connectors MC29 (124) and MC55 (125).
- (56) Remove eight screws (126), four clips (127) and connectors MC29 (124) and MC55 (125) from bracket (128).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



(57) Remove locknut (129), screw (130) and cushion clip (131) from bracket (132). Discard locknut.

(58) Remove chassis wire harness (15) from cushion clip (131).

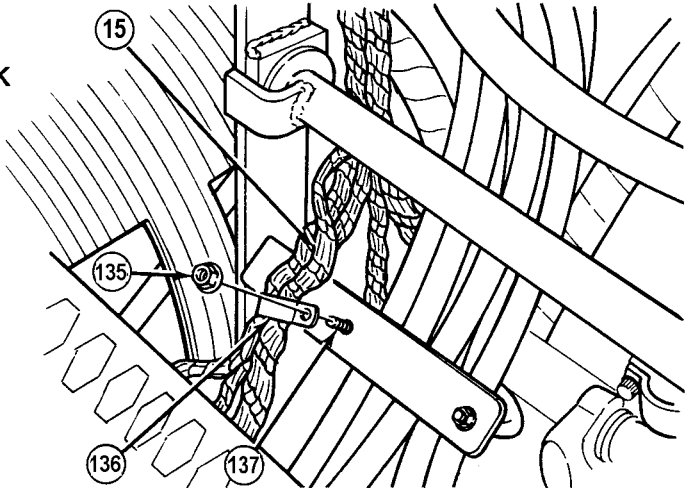
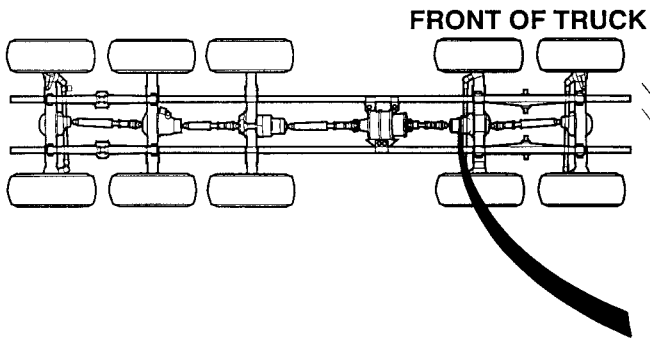


NOTE

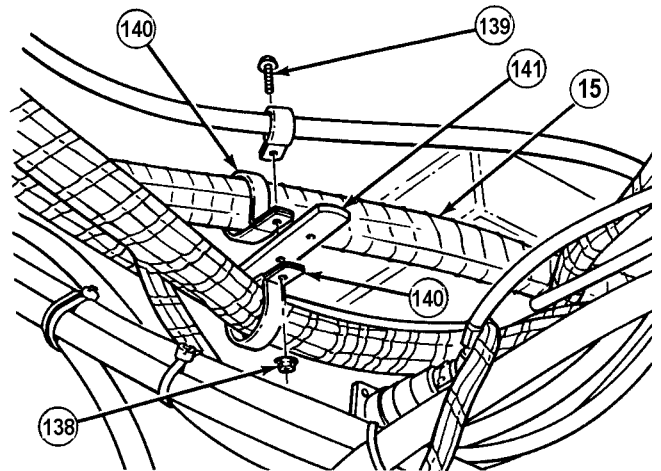
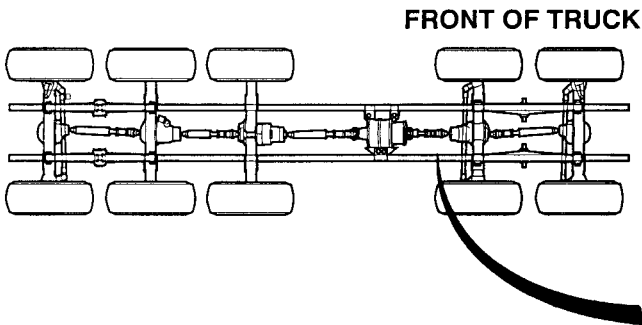
Disconnect connector by prying up on tabs and gently pulling apart connector.

(59) Disconnect MC107 connector (133).

(60) Disconnect MC108 connector (134).



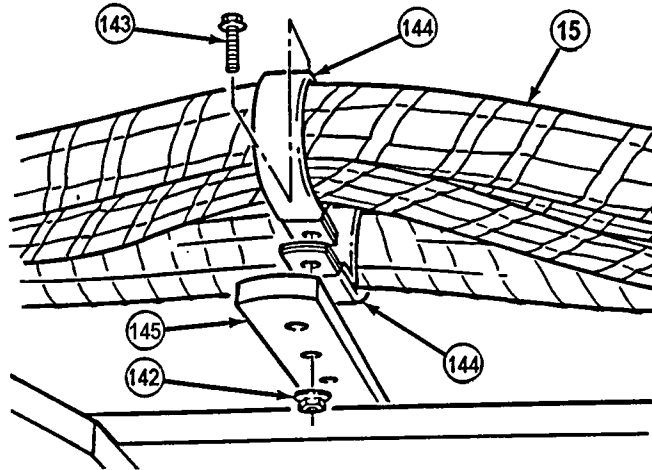
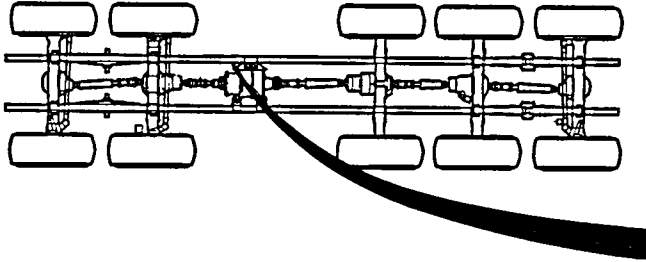
- (61) Remove locknut (135) and cushion clip (136) from U-bolt (137). Discard locknut.
- (62) Remove chassis wire harness (15) from cushion clip (136).



- (63) Remove locknut (138), screw (139) and cushion clips (140) from bracket (141). Discard locknut.
- (64) Remove chassis wire harness (15) from cushion clip (140).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).

FRONT OF TRUCK

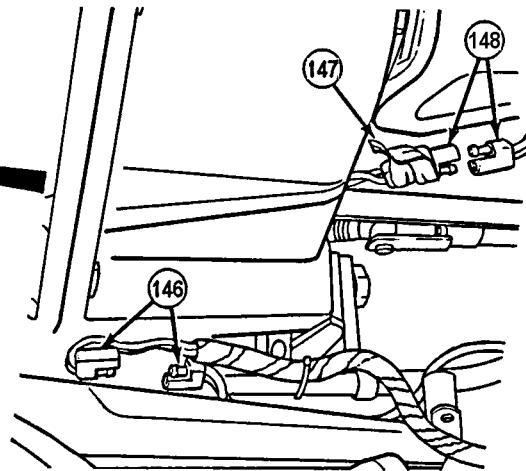
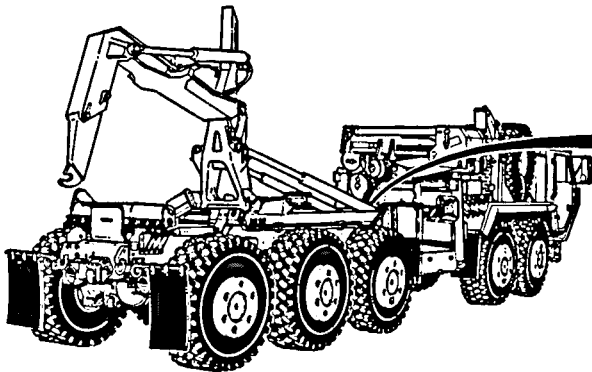


(65) Remove locknut (142), screw (143) and cushion clips (144) from bracket (145). Discard locknut.

NOTE

If cushion clip is part of chassis wire harness, go to Step (67).

(66) Remove chassis wire harness (15) from cushion clip (144).

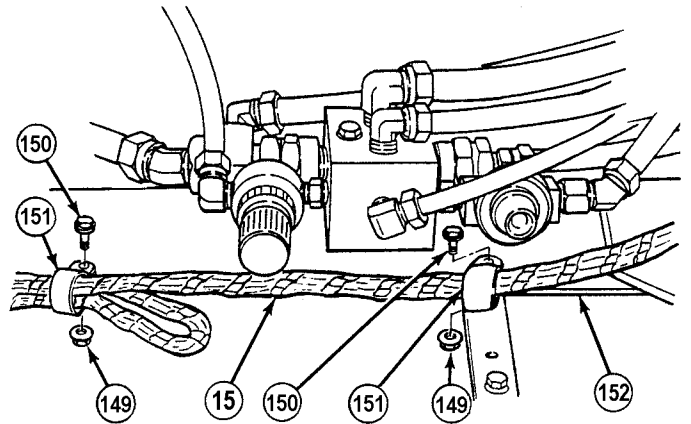
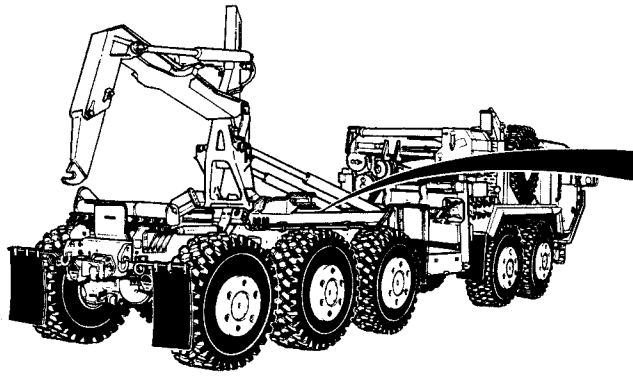


NOTE

Disconnect connector by prying up on tabs and gently pulling apart connector.

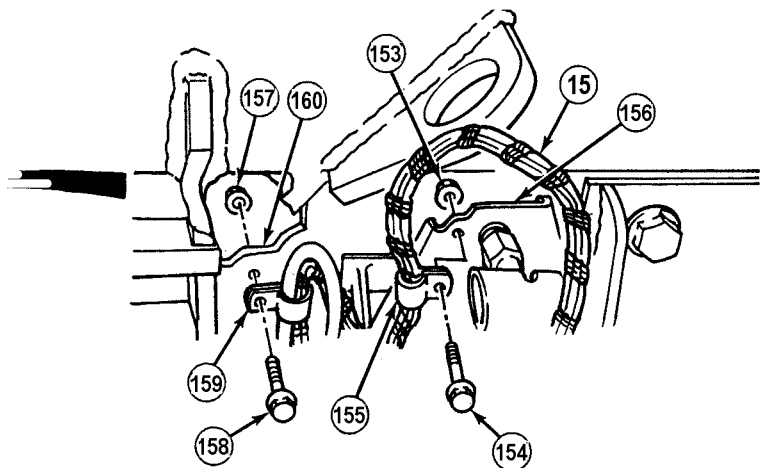
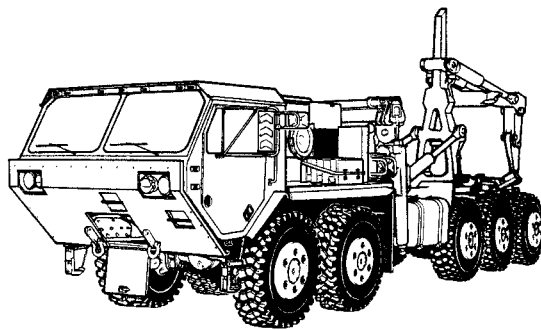
(67) Disconnect MC57 connector (146).

(68) Remove electrical tape (147) from SU4 connector (148) and disconnect SU4 connector.



(69) Remove two locknuts (149), screws (150) and cushion clips (151) from cross member (152).

(70) Remove chassis wire harness (15) from cushion clips (151).



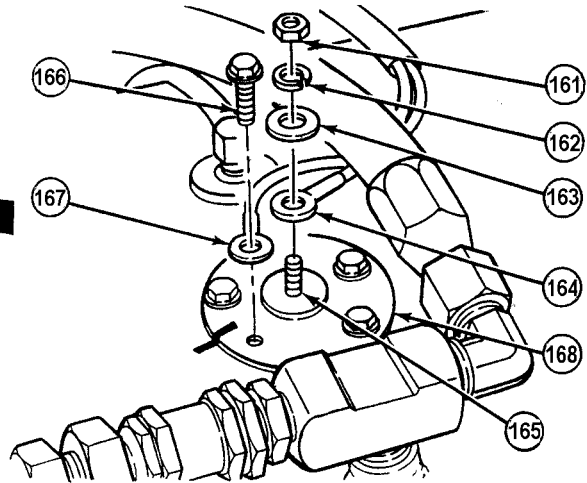
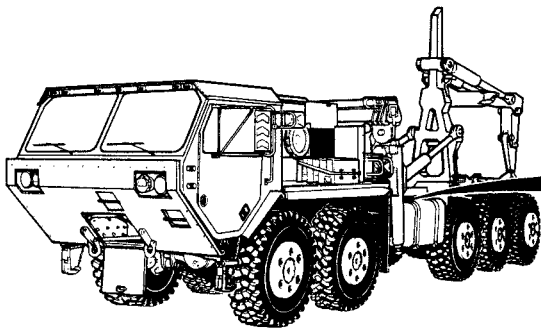
(71) Remove locknut (153), screw (154) and cushion clip (155) from fuel tank mounting bracket (156). Discard locknut.

(72) Remove chassis wire harness (15) from cushion clip (155).

(73) Remove locknut (157), screw (158) and cushion clip (159) from frame (160). Discard locknut.

(74) Remove chassis wire harness (15) from cushion clip (159).

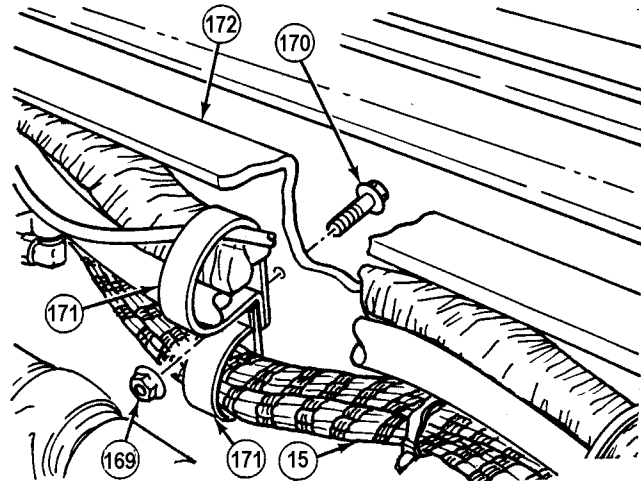
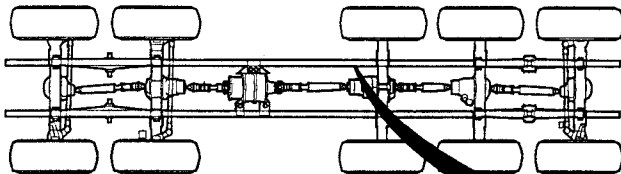
6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



(75) Remove nut (161), lockwasher (162), washer (163) and wire 1318 (164) from stud (165). Discard lockwasher.

(76) Remove screw (166) and wire 1435 (167) from fuel tank sending unit (168).

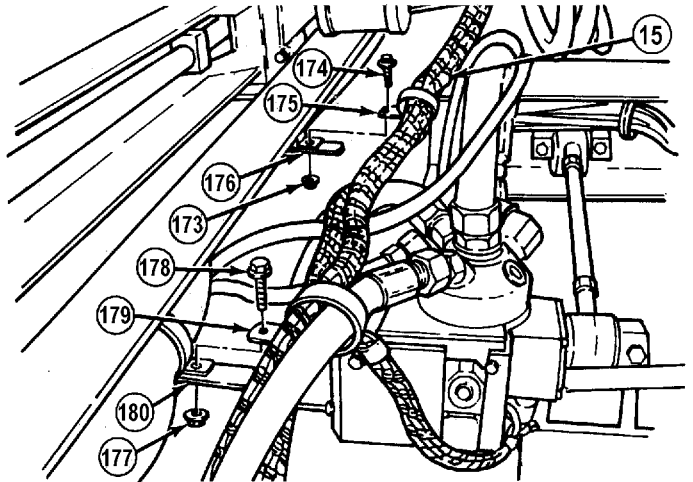
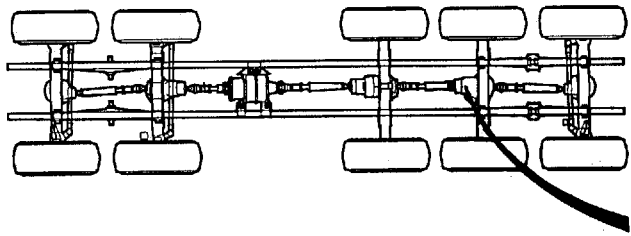
FRONT OF TRUCK



(77) Remove locknut (169), screw (170) and cushion clips (171) from frame (172). Discard locknut.

(78) Remove chassis wire harness (15) from cushion clip (171).

FRONT OF TRUCK



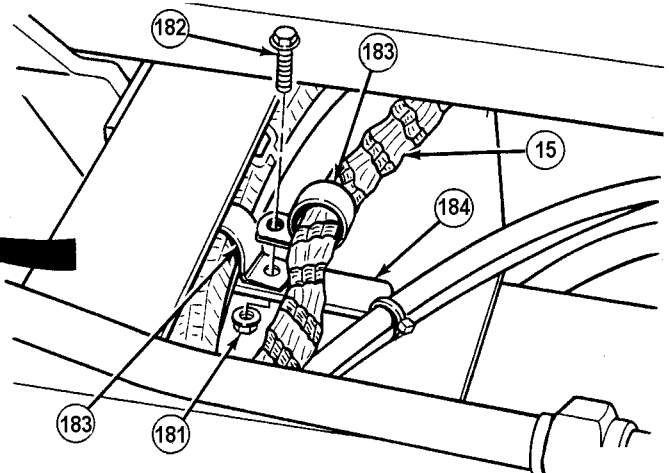
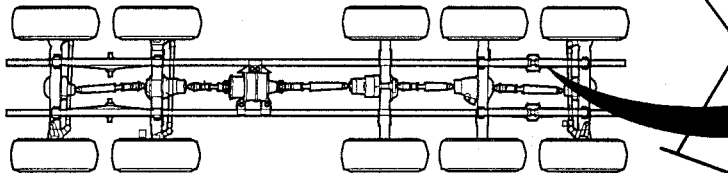
- (79) Remove locknut (173), screw (174) and cushion clips (175) from bracket (176). Discard locknut.

NOTE

If cushion clip is part of chassis wire harness, go to Step (81).

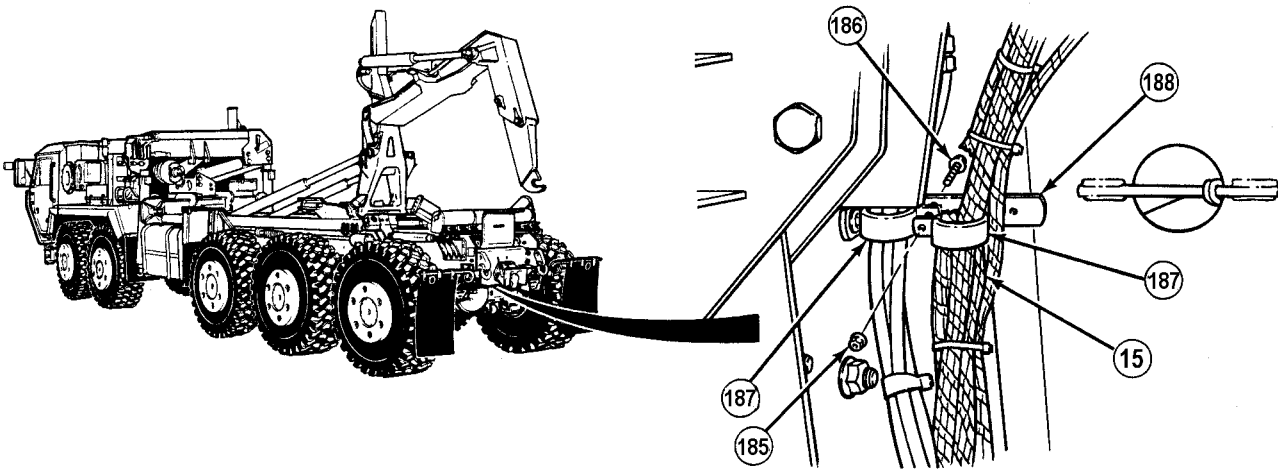
- (80) Remove chassis wire harness (15) from cushion clip (175).
- (81) Remove locknut (177), screw (178) and cushion clips (179) from bracket (180). Discard locknut.
- (82) Remove chassis wire harness (15) from cushion clip (179).

FRONT OF TRUCK

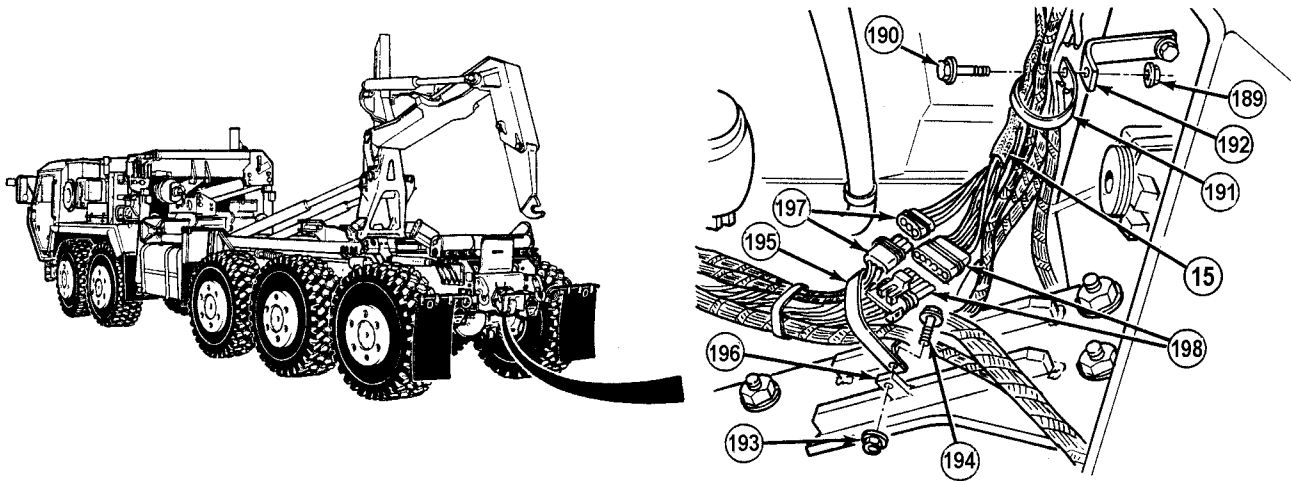


- (83) Remove locknut (181), screw (182) and cushion clips (183) from bracket (184). Discard locknut.
- (84) Remove chassis wire harness (15) from cushion clip (183).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



- (85) Remove locknut (185), screw (186) and cushion clips (187) from bracket (188). Discard locknut.
- (86) Remove chassis wire harness (15) from cushion clip (187).

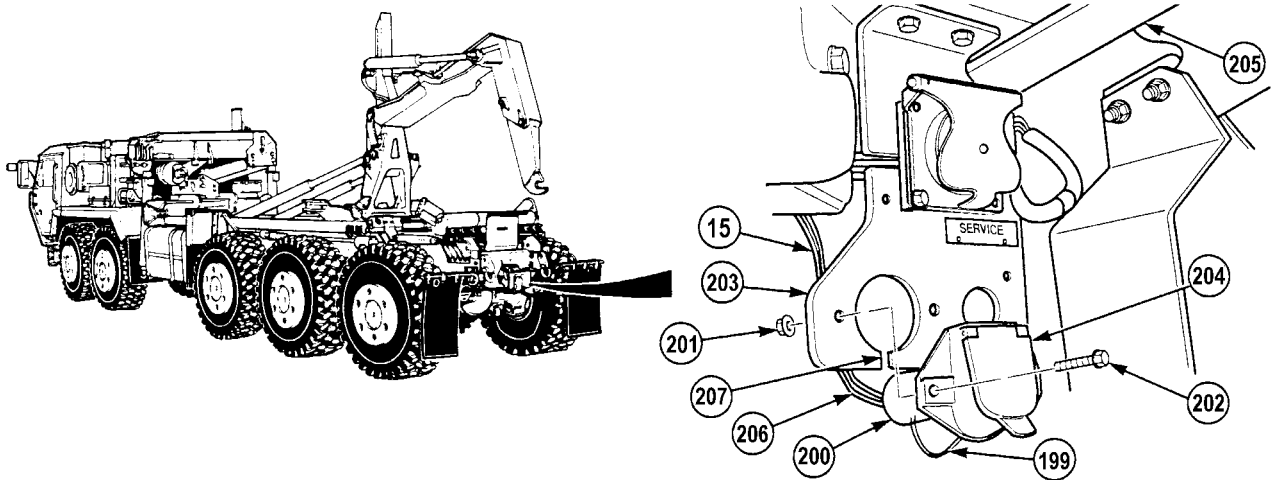


- (87) Remove locknut (189), screw (190) and cushion clip (191) from bracket (192). Discard locknut.
- (88) Remove chassis wire harness (15) from cushion clip (191).
- (89) Remove locknut (193), screw (194) and cushion clip (195) from bracket (196). Discard locknut.
- (90) Remove chassis wire harness (15) from cushion clip (195).

NOTE

Disconnect connector by prying up on tabs and gently pulling apart connector.

- (91) Disconnect MC80 connector (197).
- (92) Disconnect MC78 connector (198).



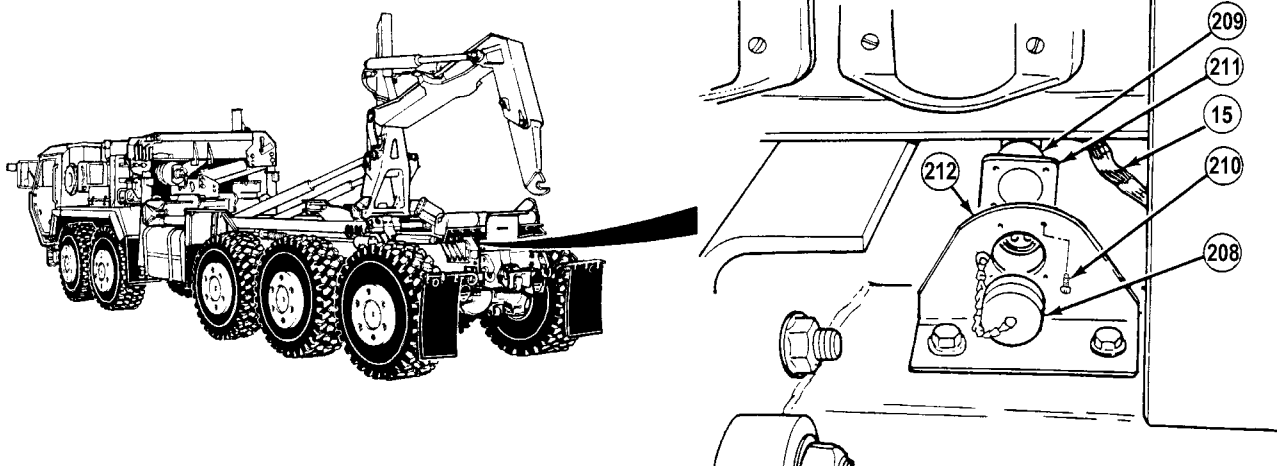
NOTE

- There are two types of 7- pin electrical connectors. Model B replaced Model A.
- Model A has a rubber boot covering the back.
- Model B uses rubber push on connectors on the back.
- Perform Step (93) for Model A connector.

(93) Remove cable tie (199) and slide boot (200) back on chassis wire harness (15).

(94) Remove two locknuts (201) and screws (202) from bracket (203). Discard locknuts.

(95) Pull MC16 connector (204) toward rear of truck (205) and guide wires (206) down through slot (207) on bracket (203).



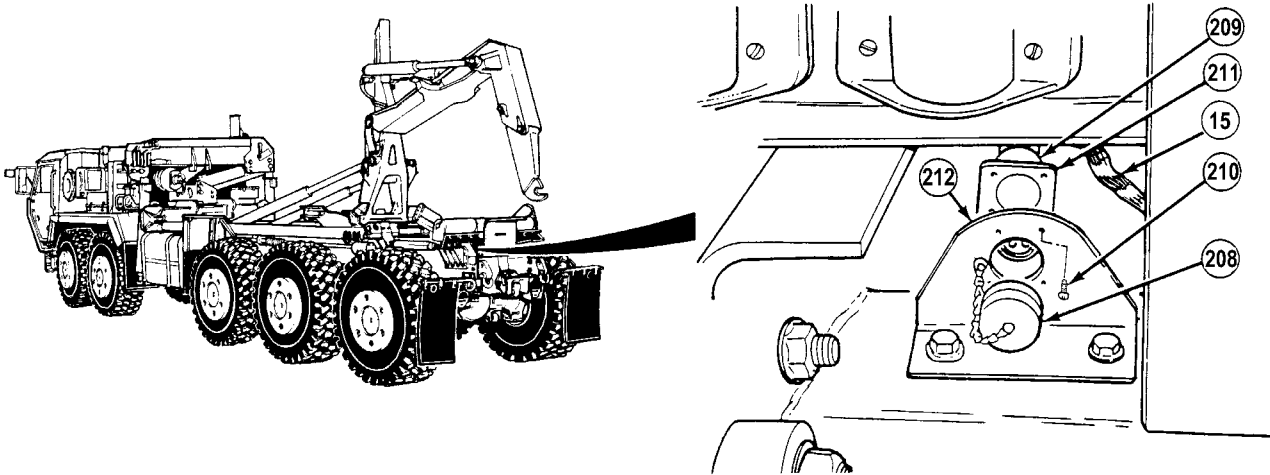
(96) Remove cap (208) from MC30 connector (209).

(97) Remove four screws (210), two clips (211) and MC30 connector (209) from bracket (212).

(98) Remove chassis wire harness (15) from truck.

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).

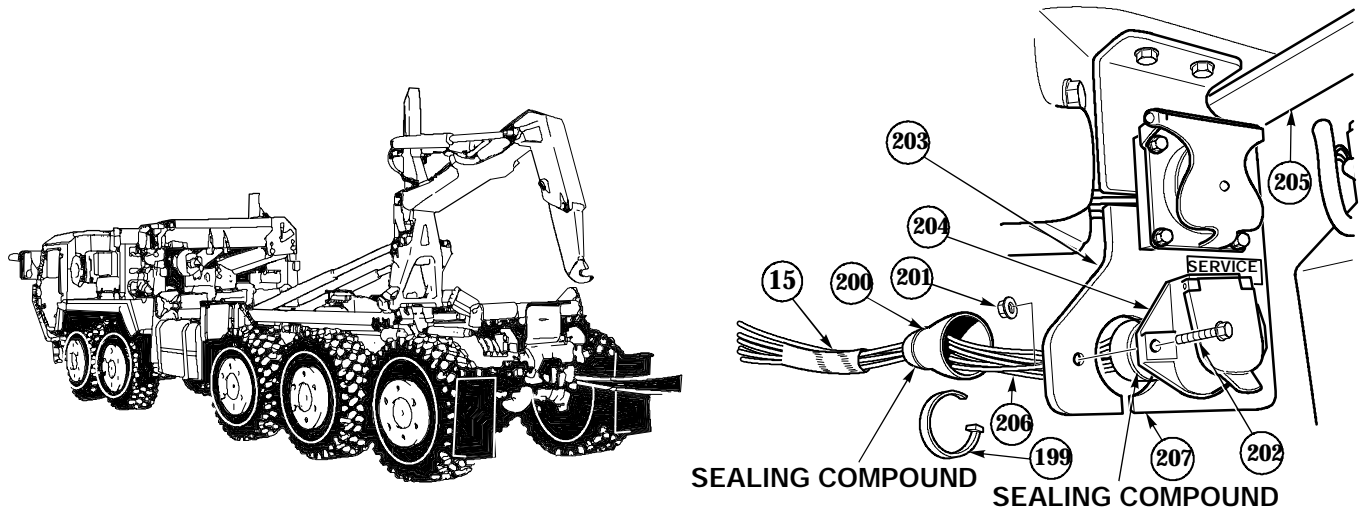
b. Installation.



NOTE

- Install cable ties as required.
- Evenly distribute any slack in harness.

- (1) Position chassis wire harness (15) in truck.
- (2) Install MC30 connector (209), two clips (211) and four screws (210) on bracket (212).
- (3) Install cap (208) on MC30 connector (209).



- (4) Guide wires (206) on MC16 connector (204) through slot (207) on bracket (203) on rear of truck (205).
- (5) Install two screws (202), locknuts (201) and MC16 connector (204) on bracket (203).

WARNING

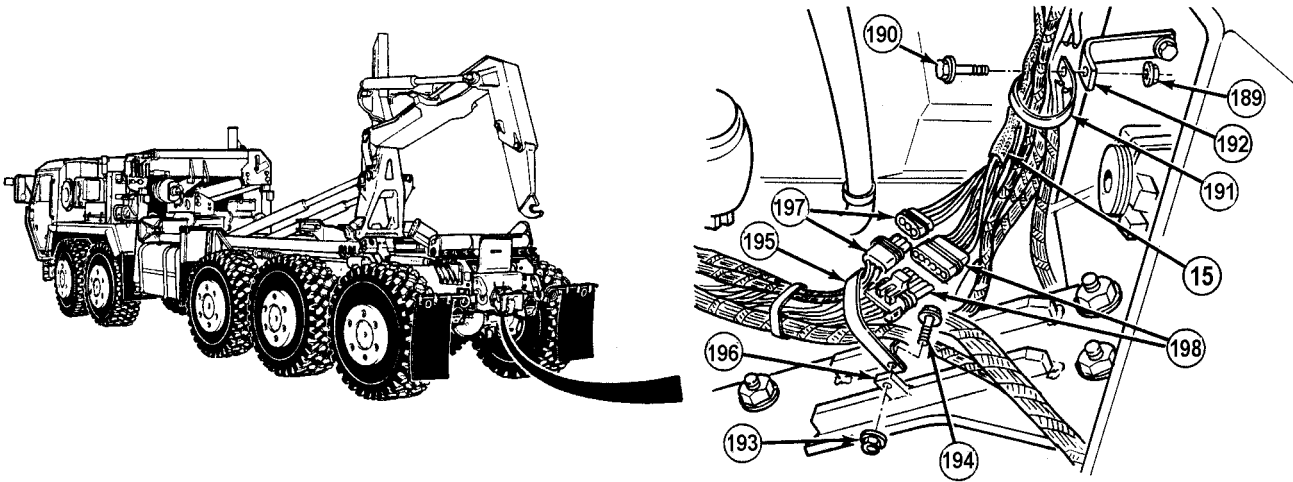
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

NOTE

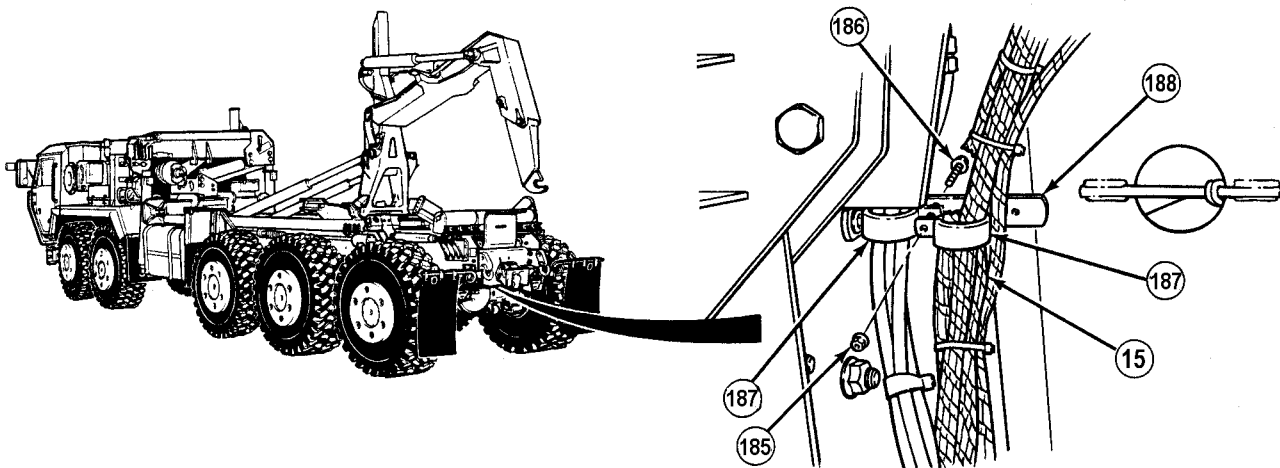
Perform Steps (6) and (7) for Model A connector.

- (6) Push boot (200) back on chassis wire harness (15). Apply a thin strip of sealing compound around rear of MC16 connector (204) and slide boot (200) on MC16 connector (204).
- (7) Install cable tie (199) over boot (200) on MC16 connector (204). Apply a thin strip of sealing compound to rear of boot (200) where wires (15) enter boot (200).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).

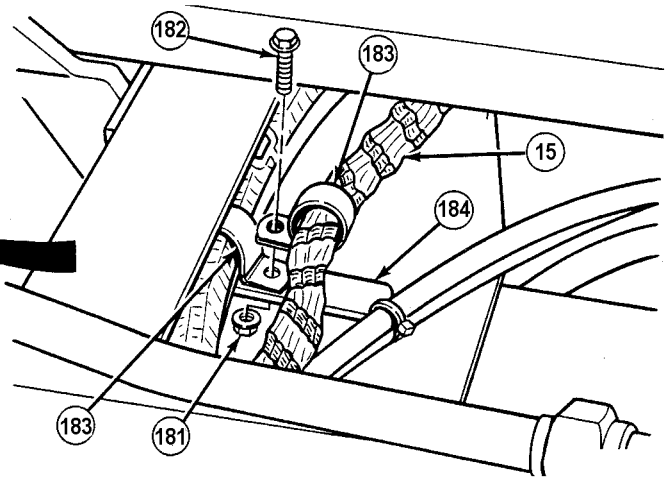
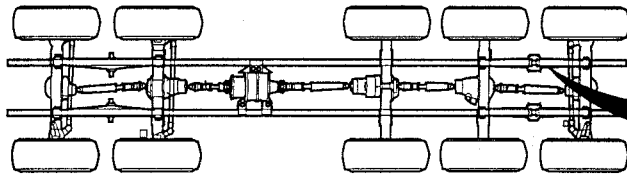


- (8) Connect MC78 connector (198).
- (9) Connect MC80 connector (197).
- (10) Position chassis wire harness (15) in cushion clip (195).
- (11) Install cushion clip (195), screw (194) and locknut (193) on bracket (196).
- (12) Position chassis wire harness (15) in cushion clip (191).
- (13) Install cushion clip (191), screw (190) and locknut (189) on bracket (192).



- (14) Position chassis wire harness (15) in cushion clip (187).
- (15) Install cushion clip (187), screw (186) and locknut (185) on bracket (188).

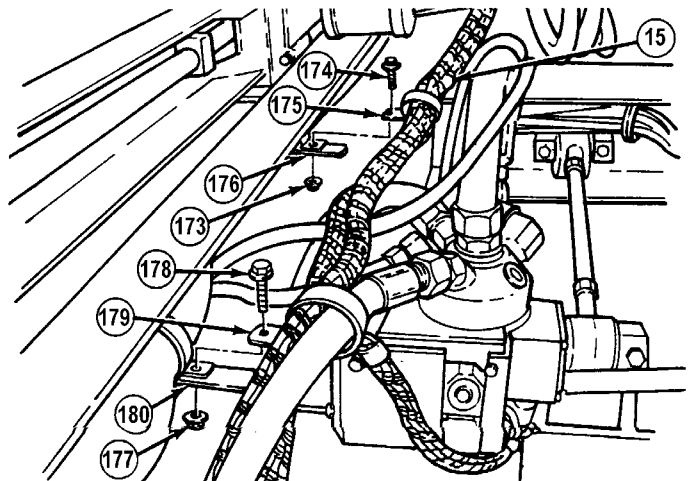
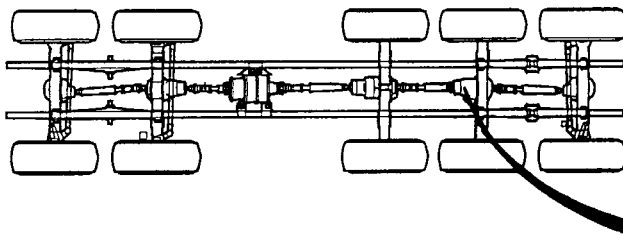
FRONT OF TRUCK



(16) Position chassis wire harness (15) in cushion clip (183).

(17) Install cushion clip (183), screw (182) and locknut (181) on bracket (184).

FRONT OF TRUCK



(18) Position chassis wire harness (15) in cushion clip (179).

(19) Install cushion clip (179), screw (178) and locknut (177) on bracket (180).

NOTE

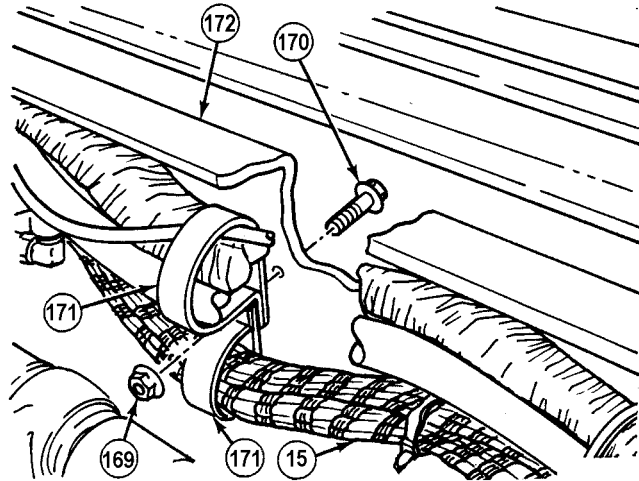
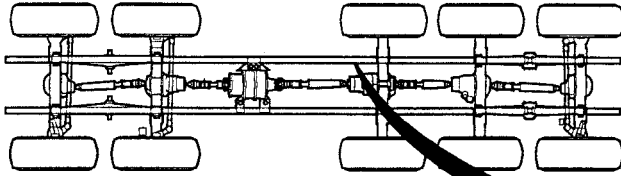
If cushion clip is part of chassis wire harness, go to Step (21).

(20) Position chassis wire harness (15) in cushion clip (175).

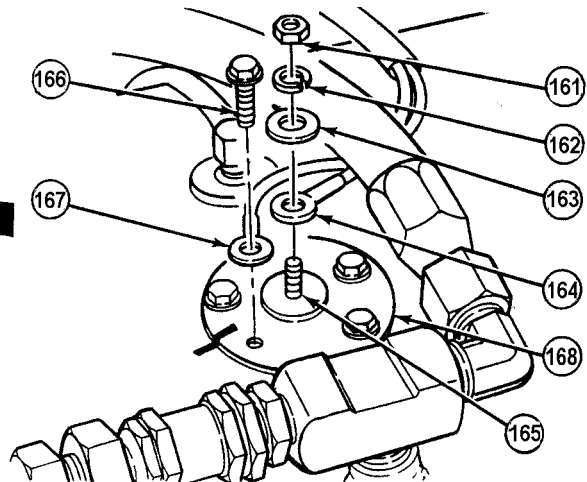
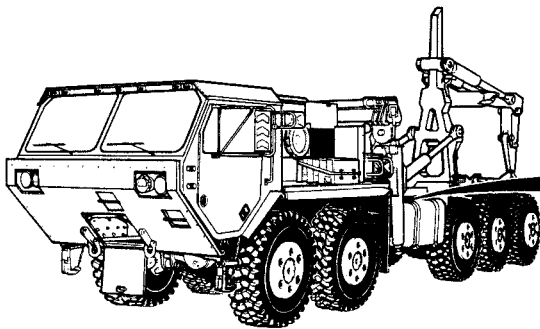
(21) Install cushion clip (175), screw (174) and locknut (173) on bracket (176).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).

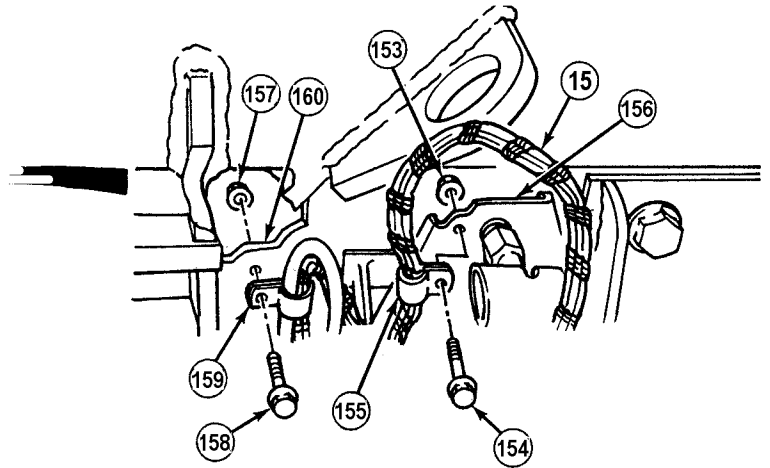
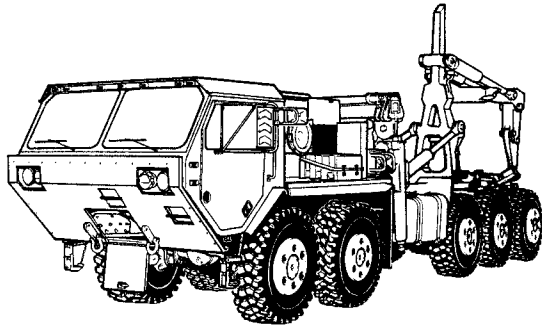
FRONT OF TRUCK



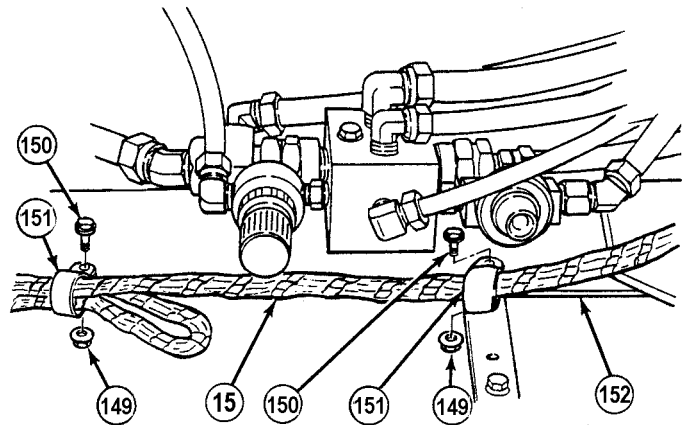
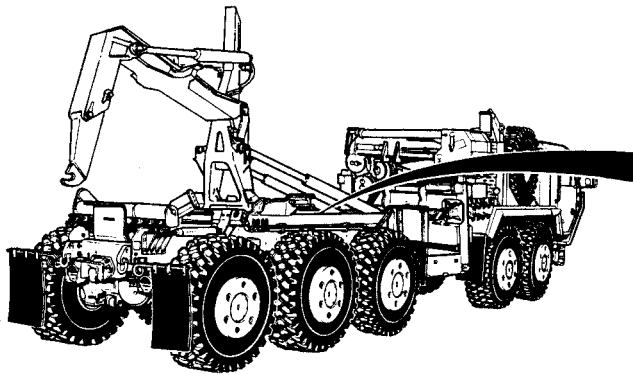
- (22) Position chassis wire harness (15) in cushion clip (171).
- (23) Install cushion clip (171), screw (170) and locknut (169) on frame (172).



- (24) Install wire 1435 (167) and screw (166) on fuel sending unit (168).
- (25) Install wire 1318 (164), washer (163), lockwasher (162) and nut (161) on stud (165).

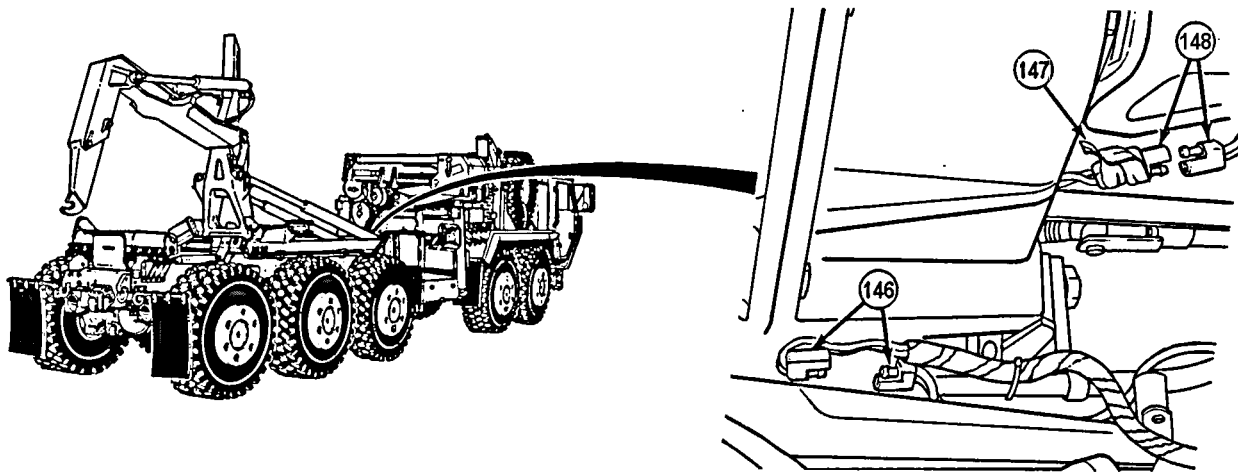


- (26) Position chassis wire harness (15) in cushion clip (159).
- (27) Install cushion clip (159), screw (158) and locknut (157) in frame (160).
- (28) Position chassis wire harness (15) in cushion clip (155).
- (29) Install cushion clip (155), screw (154) and locknut (153) on fuel tank mounting bracket (156).



- (30) Position chassis wire harness (15) in cushion clip (151).
- (31) Install two cushion clips (151), screws (150) and locknuts (149) on cross member (152).

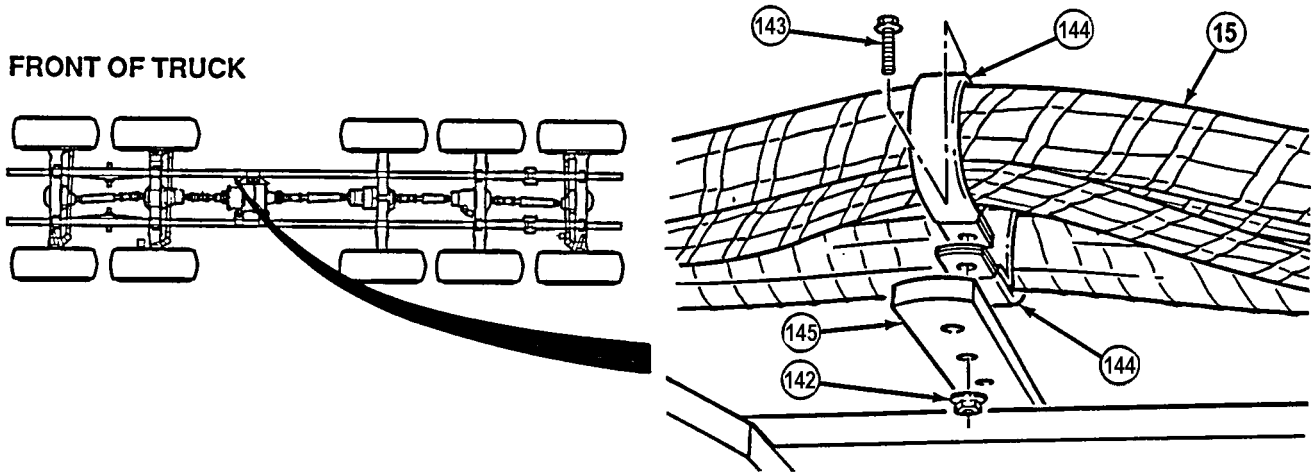
6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



(32) Connect SU4 connector (148) and apply electrical tape (147) to SU4 connector.

(33) Connect MC57 connector (146).

FRONT OF TRUCK

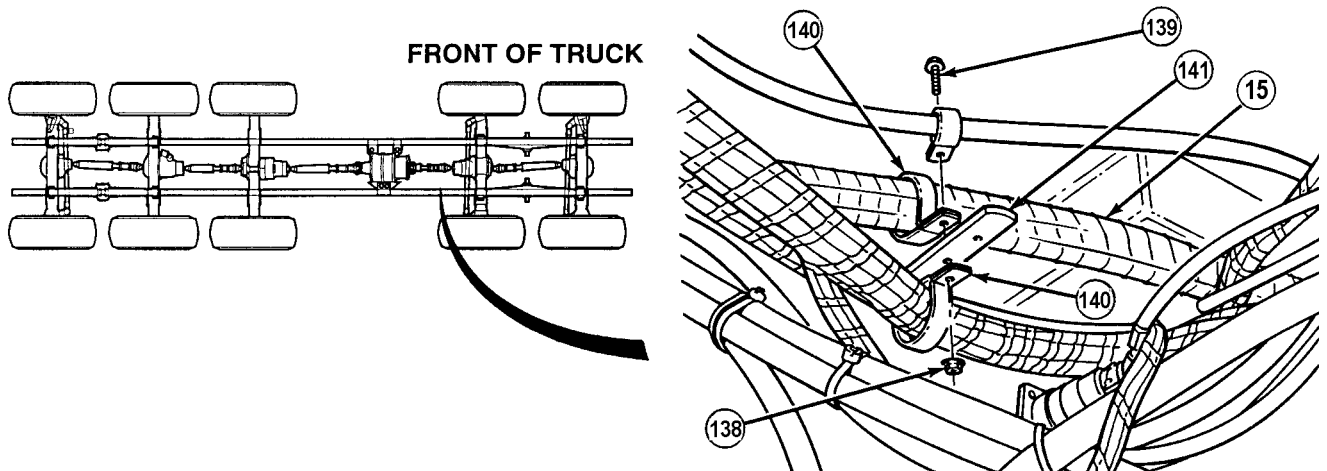


NOTE

If cushion clip is part of chassis wire harness, go to Step (35).

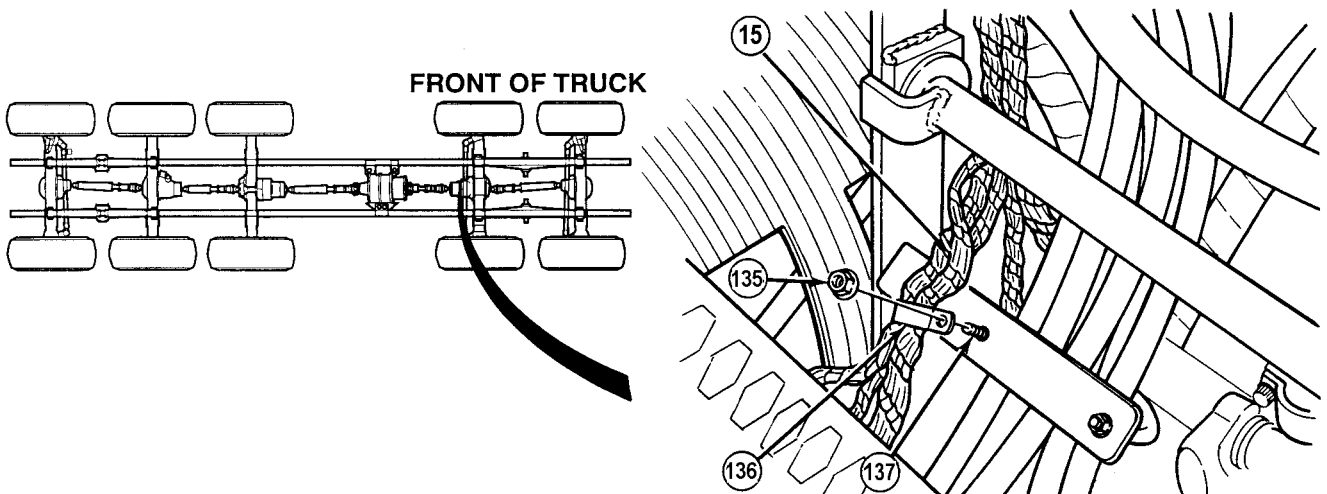
(34) Position chassis wire harness (15) in cushion clip (144).

(35) Install cushion clip (144), screw (143) and locknut (142) on bracket (145).



(36) Position chassis wire harness (15) in cushion clip (140).

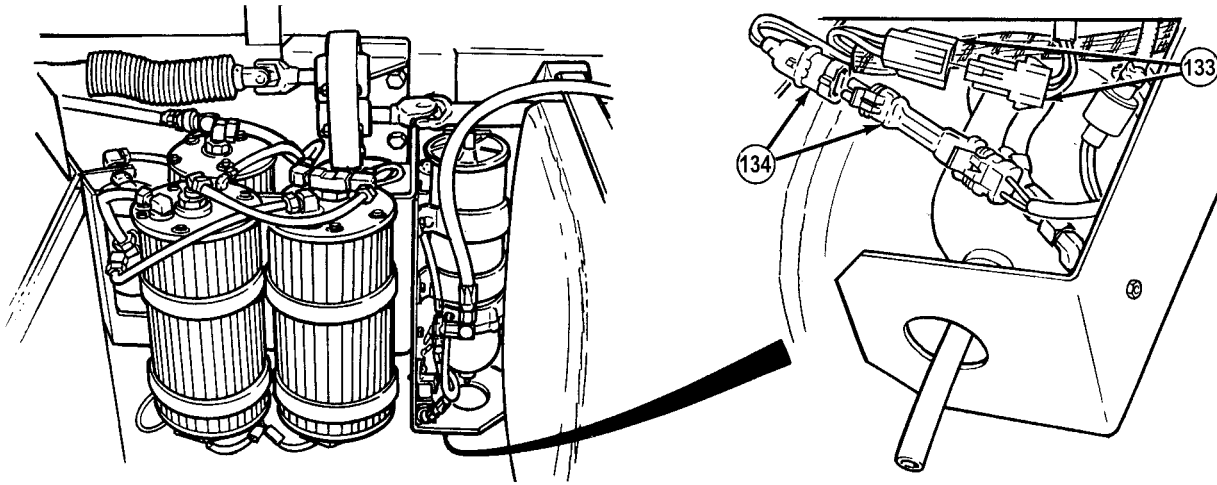
(37) Install cushion clip (140), screw (139) and locknut (138) on bracket (141).



(38) Position chassis wire harness (15) in cushion clip (136).

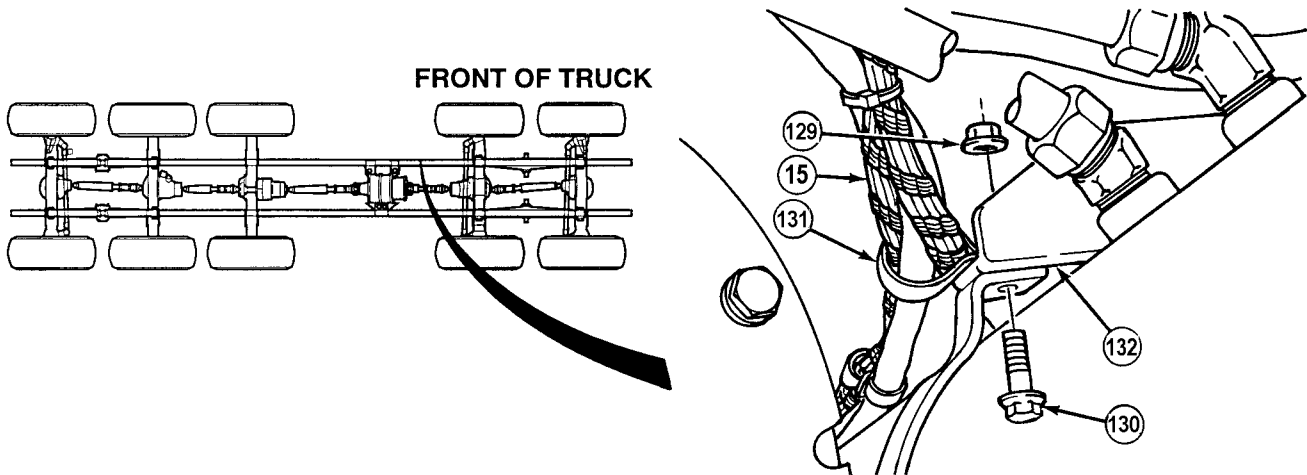
(39) Install cushion clip (136) and locknut (135) on U-bolt (137).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



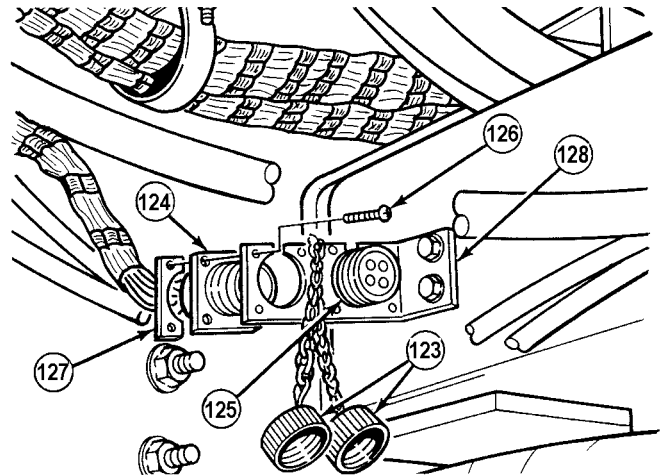
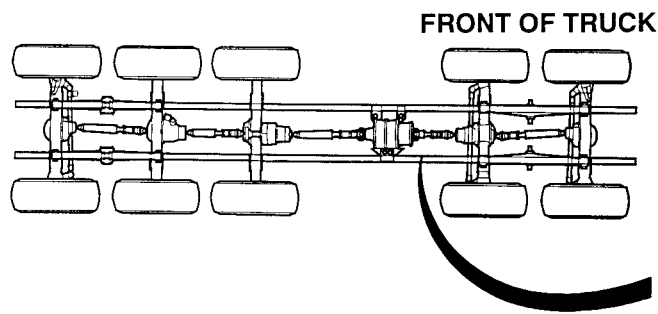
(40) Connect MC108 connector (134).

(41) Connect MC107 connector (133).



(42) Position chassis wire harness (15) in cushion clip (131).

(43) Install cushion clip (131), screw (130) and locknut (129) on bracket (132).

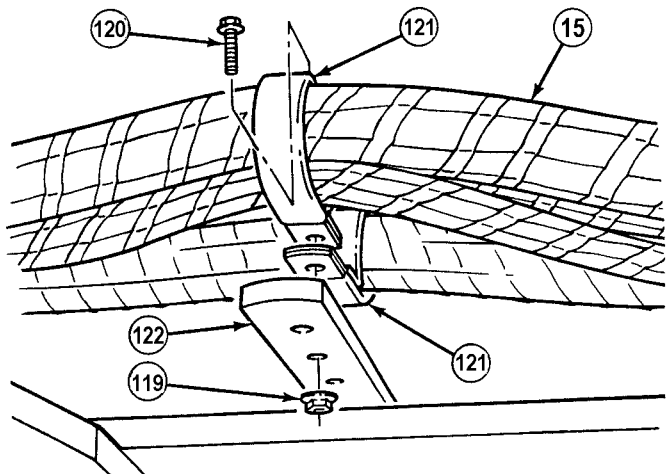
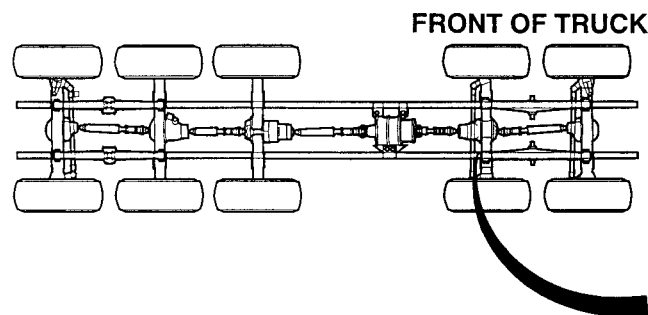


- (44) Install four clips (127), eight screws (126) and connectors MC55 (125) and MC29 (124) on bracket (128).

NOTE

If truck is equipped with crane and/or winch, connect MC55 connector and/or MC29 connector instead of installing caps.

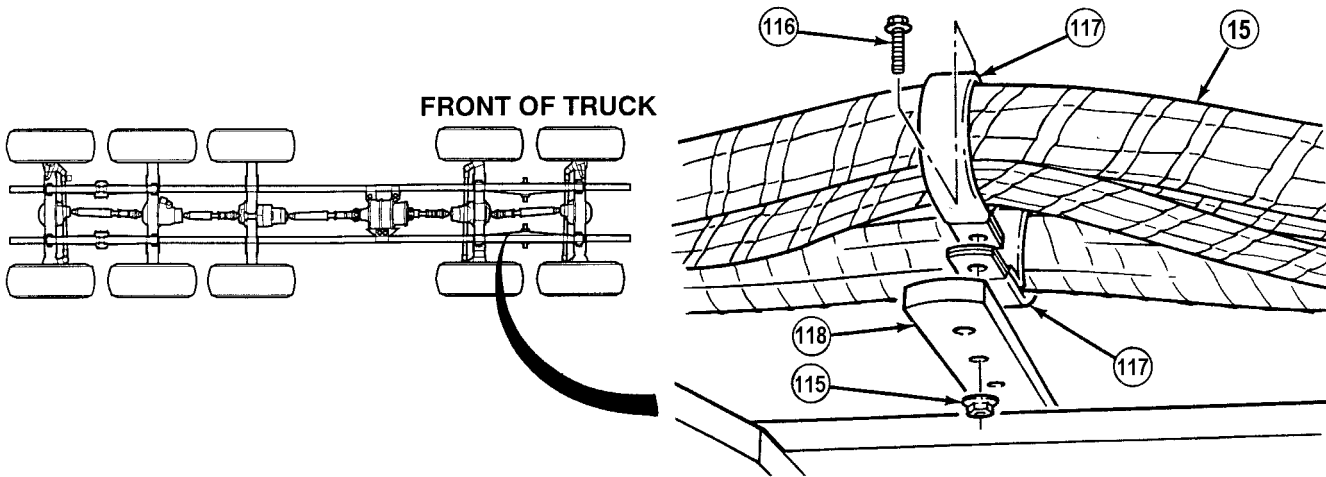
- (45) Install two caps (123) on connectors MC55 (125) and MC29 (124).



- (46) Position chassis wire harness (15) in cushion clip (121).

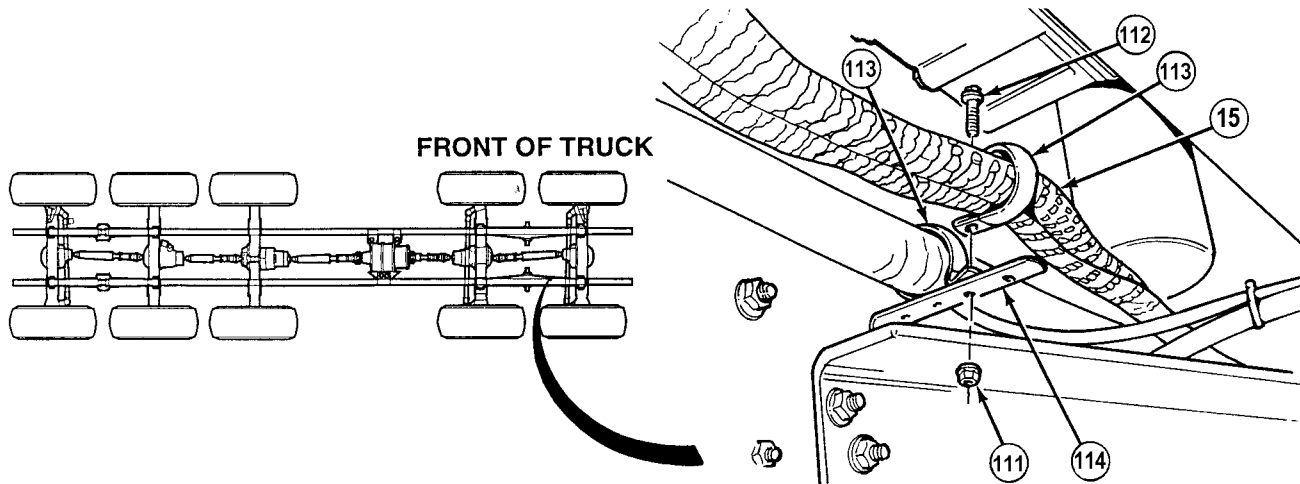
- (47) Install cushion clip (121), screw (120) and locknut (119) on bracket (122).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



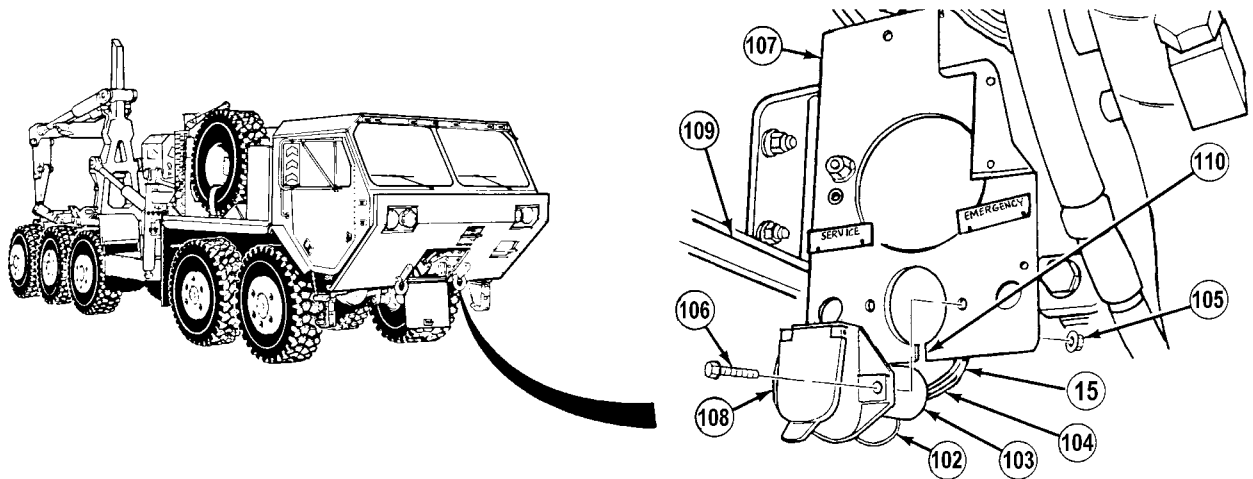
(48) Position chassis wire harness (15) in cushion clip (117).

(49) Install cushion clip (117), screw (116) and locknut (115) on bracket (118).



(50) Position chassis wire harness (15) in cushion clip (113).

(51) Install cushion clip (113), screw (112) and locknut (111) on bracket (114).



- (52) Guide wires (104) of harness (15) from MC27 connector (108) through slot (110) on bracket (107).
- (53) Install two screws (106), locknuts (105) and MC27 connector (108) on bracket (107).

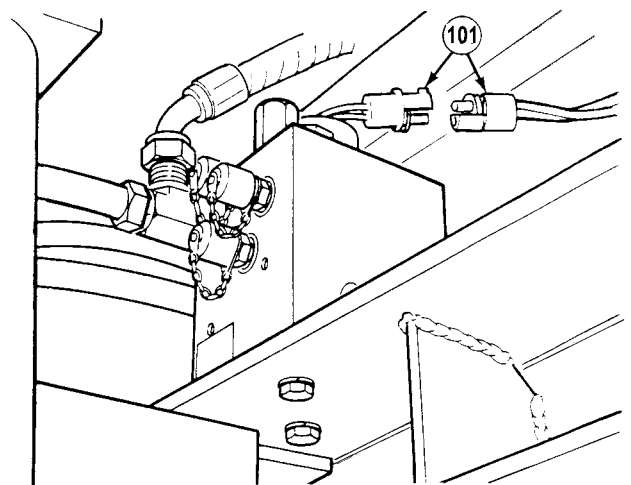
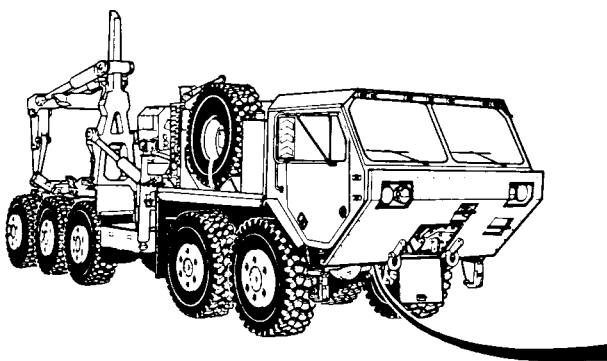
WARNING

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.

NOTE

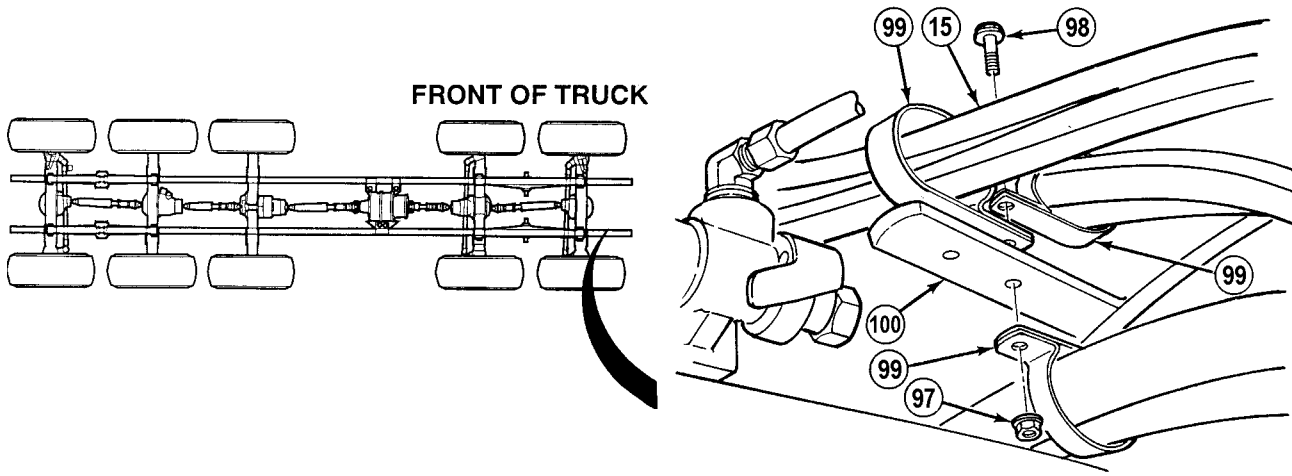
Perform Steps (54) and (55) for Model A connector.

- (54) Push boot (103) back on chassis wire harness (104). Apply a thin strip of sealing compound around rear of MC27 connector (108) and slide boot (103) on MC27 connector (108).
- (55) Install cable tie (102) over boot (103) on MC27 connector (108). Apply a thin strip of sealing compound to rear of boot (103) where wires (15) enter boot (103).

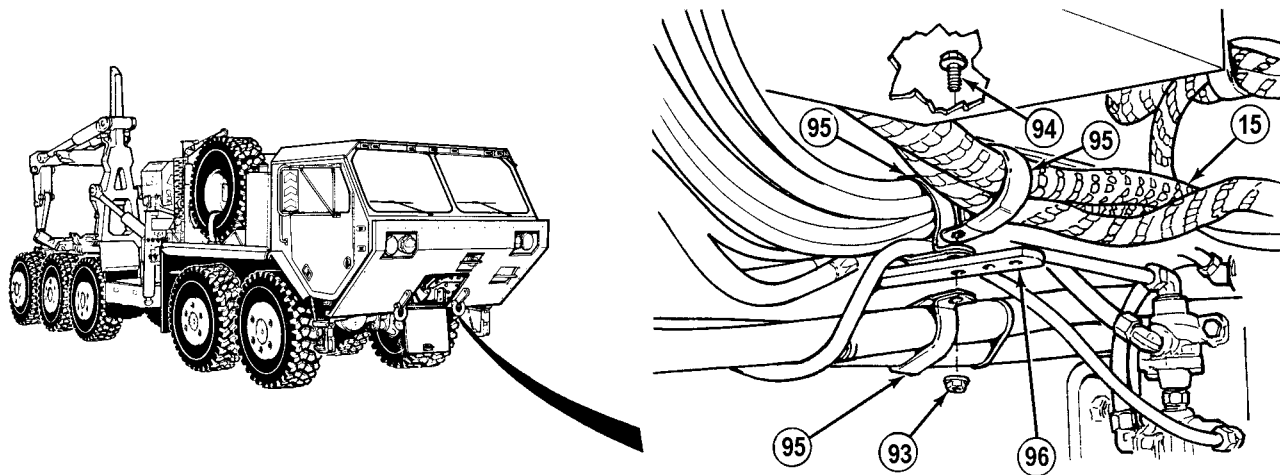


- (56) Connect MC113 connector (101).

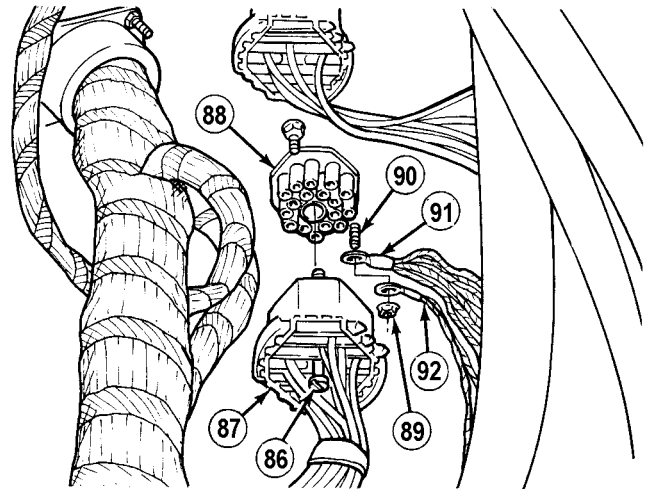
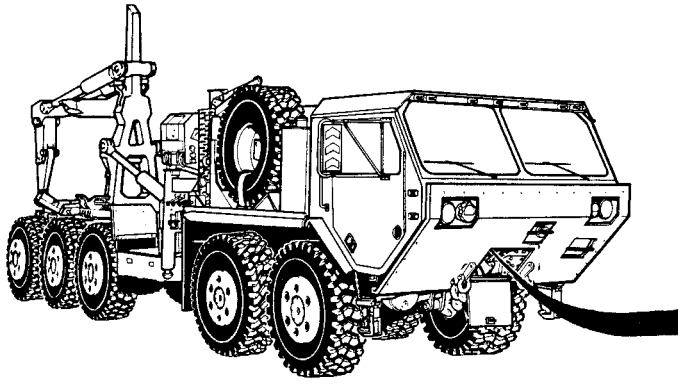
6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



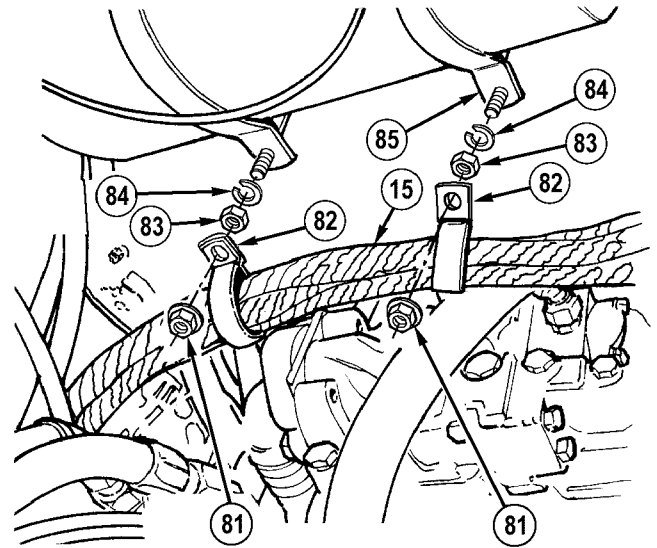
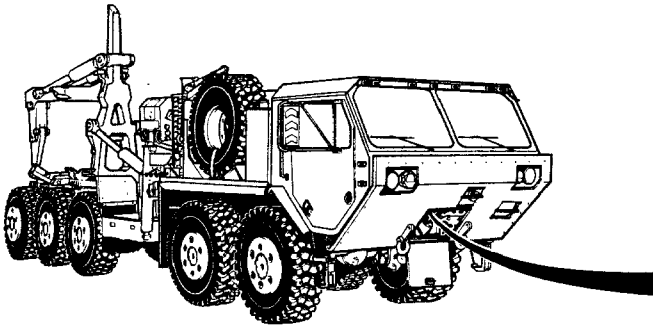
- (57) Position chassis wire harness (15) in cushion clip (99).
- (58) Install cushion clips (99), screw (98) and locknut (97) on bracket (100).



- (59) Position chassis wire harness (15) in cushion clip (95).
- (60) Install cushion clip (95), screw (94) and locknut (93) on bracket (96).



- (61) Install two shield wires (91) and (92), screw (90) and locknut (89) on bulkhead connector (88).
- (62) Connect MC3 connector (87) to bulkhead connector (88). Tighten screw (86).



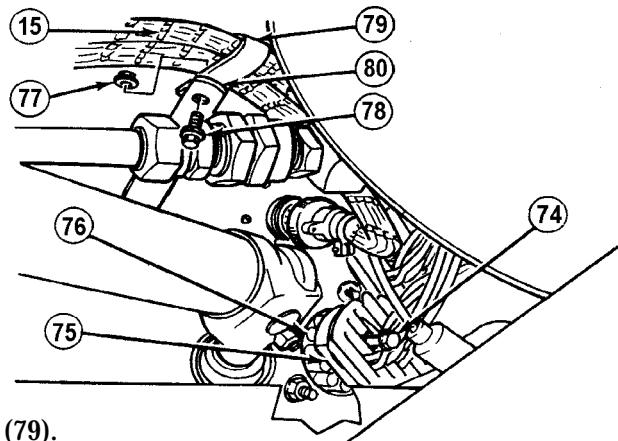
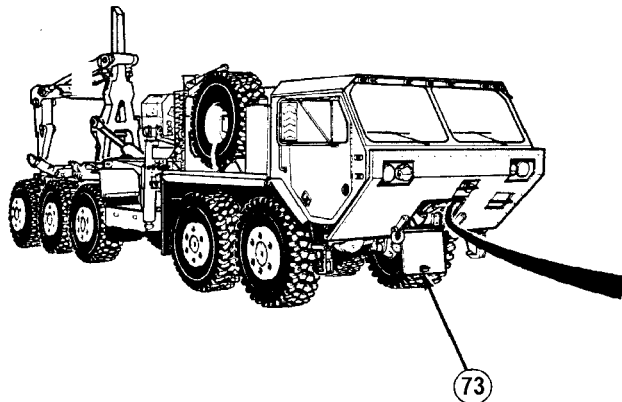
- (63) Position chassis wire harness (15) in cushion clips (82).

NOTE

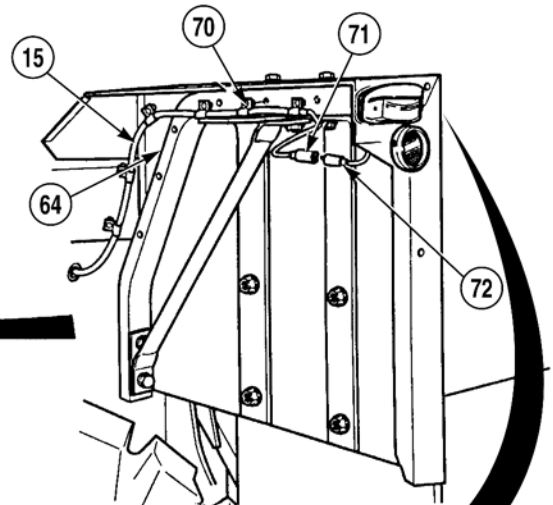
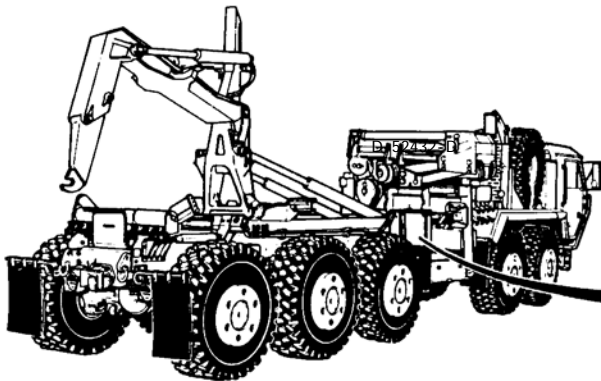
Nuts and lockwashers in Step (64) may not have been removed during disassembly.

- (64) Install two lockwashers (84), nuts (83), cushion clips (82) and locknuts (81) on screws (85).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



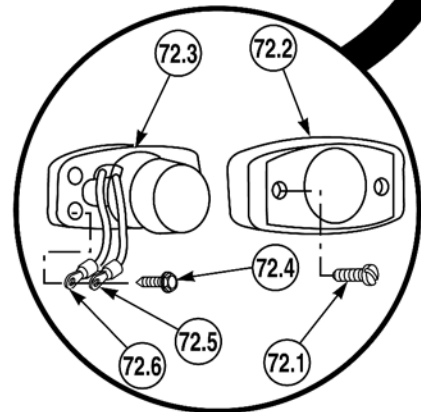
- (65) Position chassis wire harness (15) in cushion clip (79).
- (66) Install cushion clip (79), screw (78) and locknut (77) on bracket (80).
- (67) Connect MC31 connector (75) to bulkhead connector (76). Tighten screw (74).
- (68) Close front access cover (73).

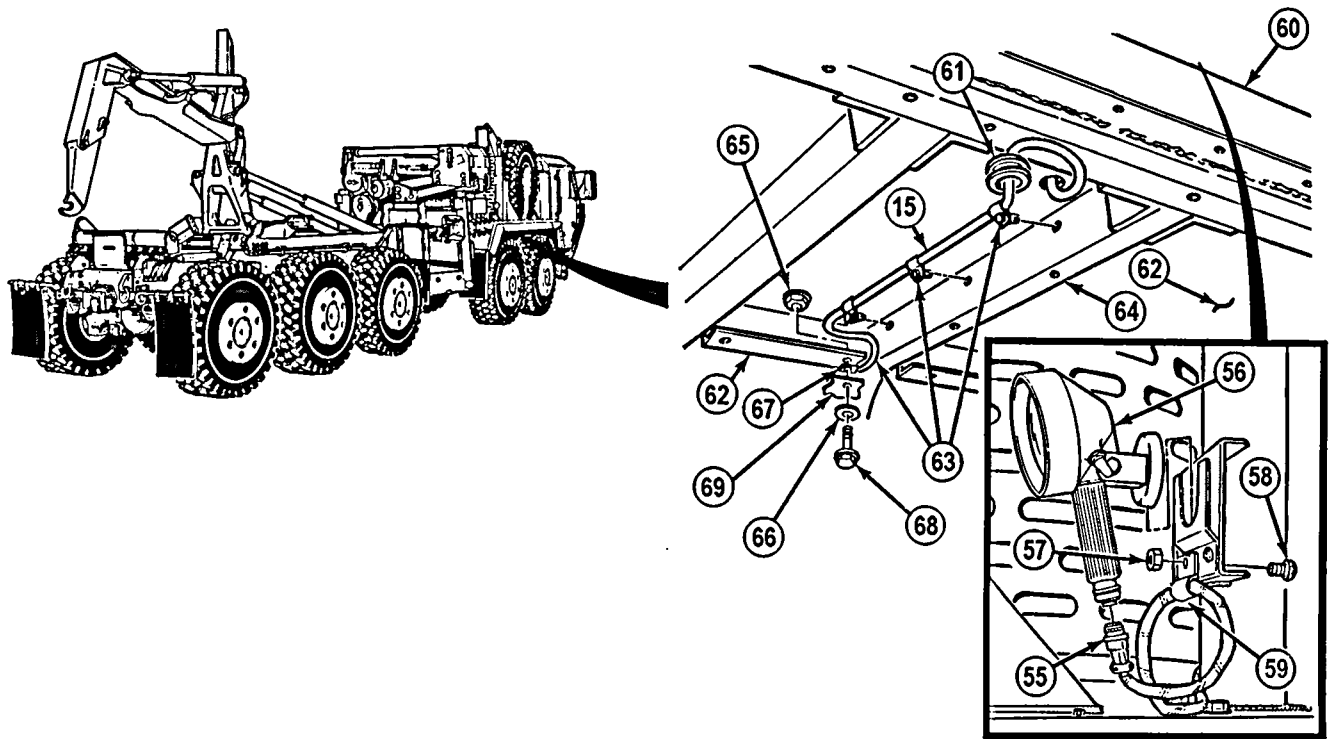


NOTE

Perform Steps (68.1) through (68.3) if wire 1435 is present.

- (68.1) Position wire 1435 (72.6) through hole in side marker light (72.3).
- (68.2) Install ground wire (72.5) and wire 1435 (72.6) on side marker light (72.3) with self-tapping screw (72.4).
- (68.3) Install cover (72.2) on side marker light (72.3) with two screws (72.1).
- (69) Connect wire 1012 (71) to wire 489 (72).
- (70) Position chassis wire harness (15) in six clips (70).
- (71) Install six clips (70) on fender support (64).





NOTE

Apply soap solution to grommets prior to harness installation.

- (72) Position chassis wire harness (15) in cushion clip (67).
- (73) Install screw (68), cushion clip (67), washer (66) and locknut (65) on mud flap (69) and fender (62).
- (74) Position chassis wire harness (15) in three clips (63).
- (75) Install three clips (63) on fender support (64).
- (76) Install grommet (61) on chassis wire harness (15).
- (77) Pull 11 in. of chassis wire harness (15) down through grommet (61).
- (78) Guide chassis wire harness (15) through bottom fender (62). Install grommet (61) on fender (62).
- (79) Install cushion clip (59) on bracket (60) with screw (58) and locknut (57)

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

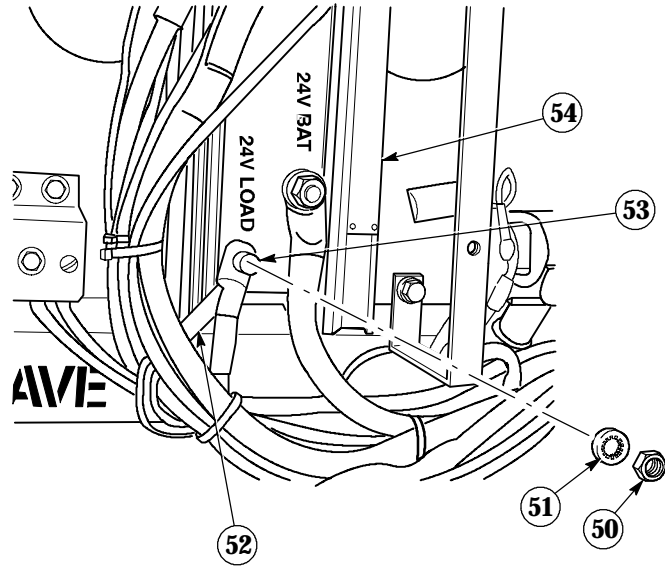
- (80) Apply primer and sealing compound to three threads on MC79 connector (55).
- (81) Connect MC79 connector (55) to right side work lamp (56).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).

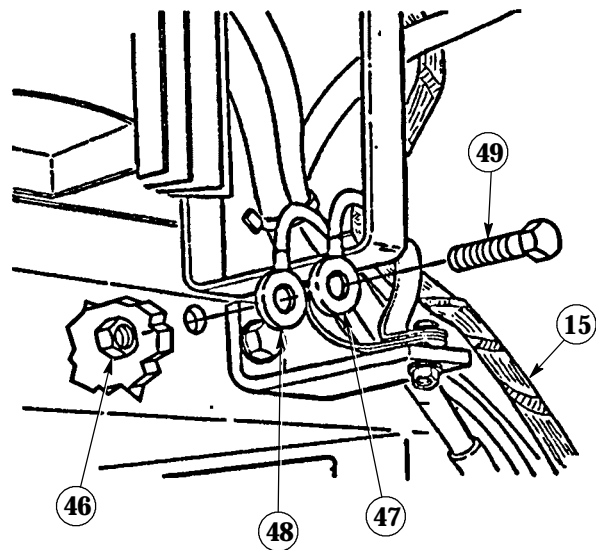
NOTE

- Perform steps (82) through (87) for trucks equipped with a 200 amp alternator.
- Perform steps (88) through (91) for trucks equipped with a 145 amp alternator.

- (82) Remove nut (50) from 24 volt load terminal (53) of polarity protection control (54).
- (83) Install wire 1431 (52), lockwasher (51) and nut (50) on 24 volt load terminal (53).



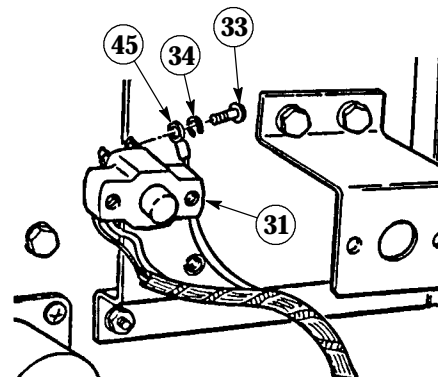
- (84) Remove nut (46), wire 1435 (47) and screw (49).
- (85) Install screw (49), wire 1435 (47) and wire 1435 (48) of chassis wire harness (15) and nut (46).
- (86) Install wire 1020 (45), lockwasher (34) and screw (33) on circuit breaker (31).



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.

- (87) Apply electrical sealant to screw (33), screw (49) and 24 volt load terminal (53).

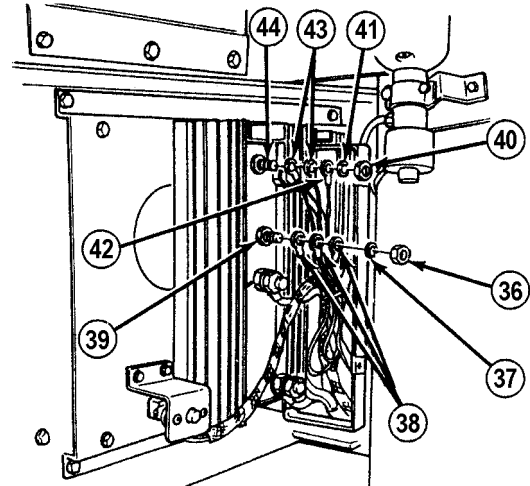


(88) Install two wires 1020 (43), brown wire (42), lockwasher (41) and nut (40) on stud (44).

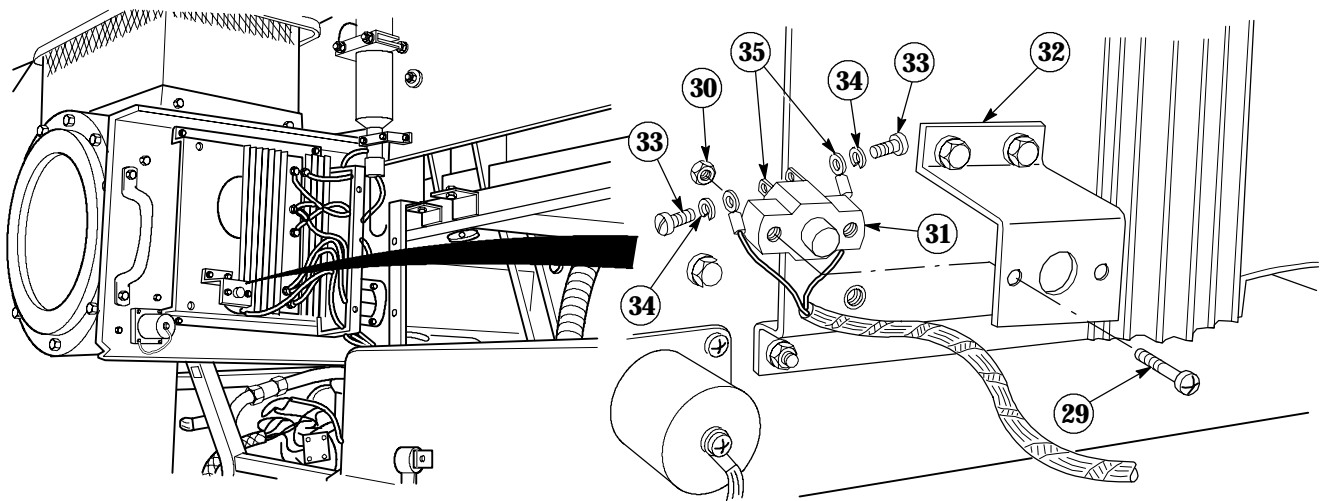
(89) Install three wires 1435 (38), lockwasher (37) and nut (36) on stud (39).

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.



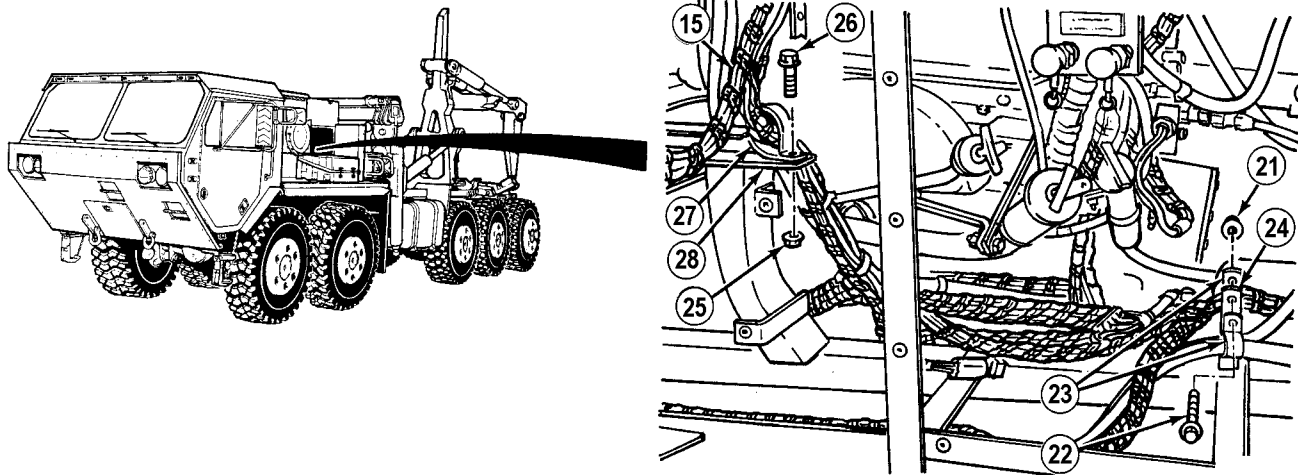
(90) Apply electrical sealant on stud (39) and stud (44).



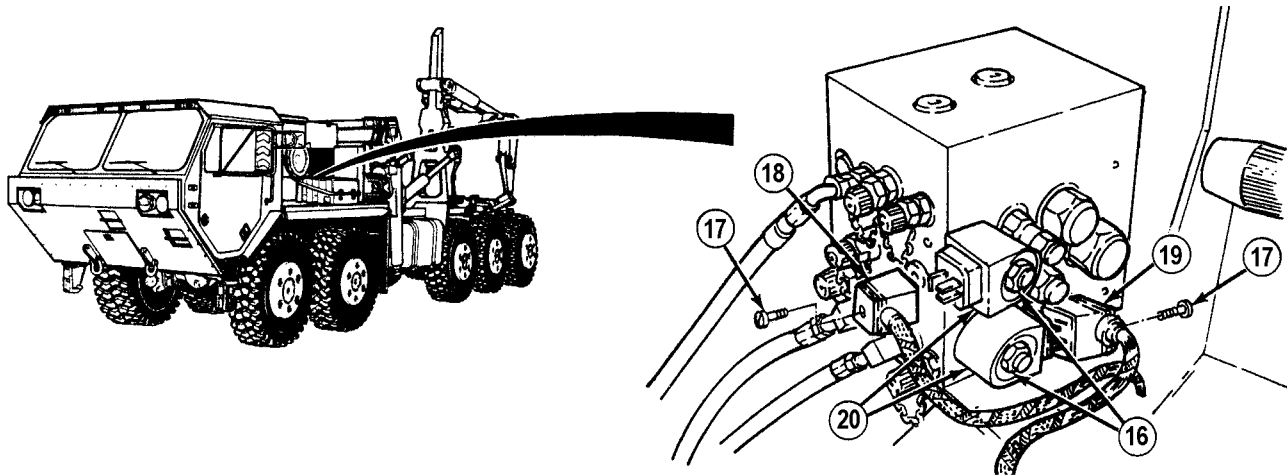
(91) Install two wires 1020 (35), lockwashers (34) and screws (33) on circuit breaker (31).

(92) Install circuit breaker (31), two screws (29) and locknuts (30) on bracket (32).

6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



- (93) Position chassis wire harness (15) in cushion clip (27).
- (94) Install cushion clip (27), screw (26) and locknut (25) on bracket (28).
- (95) Position chassis wire harness (15) in cushion clip (23).
- (96) Install cushion clips (23), screw (22) and locknut (21) on bracket (24).

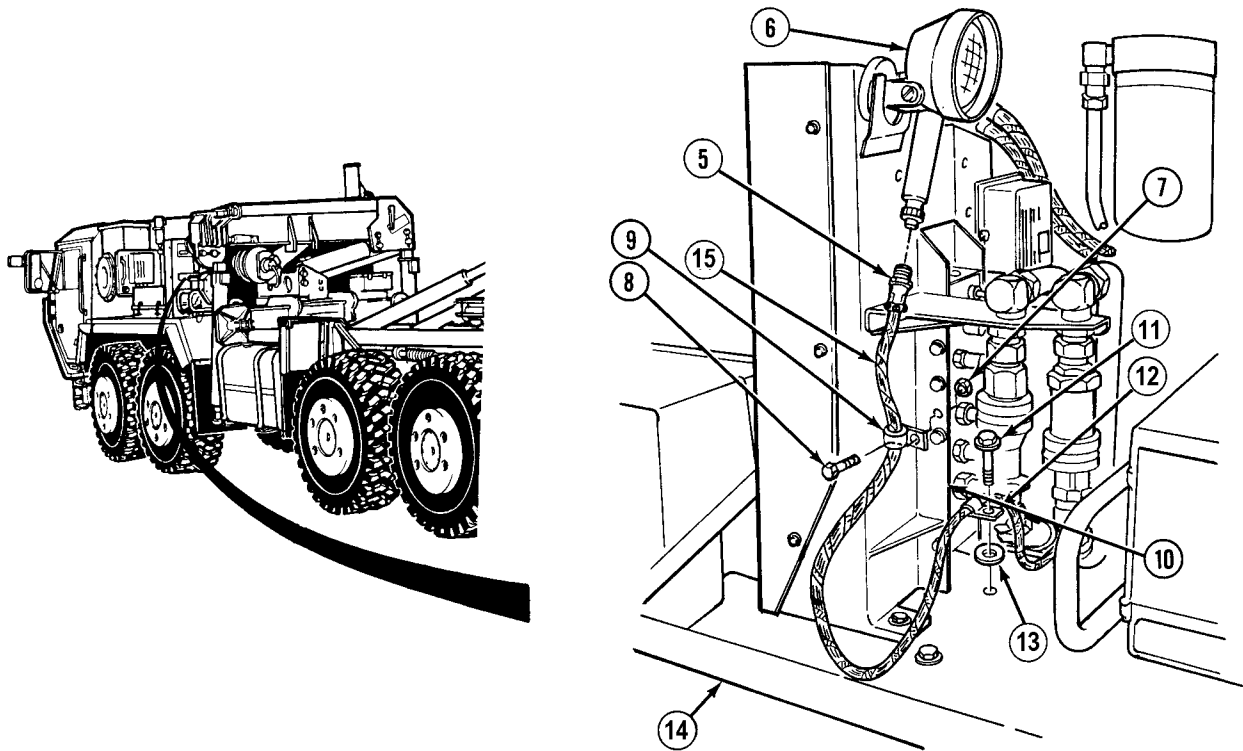


- (97) Connect connectors M10 (18) and M51 (19) to solenoid valves (20).
- (98) Tighten screws (17) on connectors M10 (18) and M51 (19).

NOTE

Perform Step (99) only if nuts on solenoid valves were loosened.

- (99) Tighten nuts (16) on solenoid valves (20).



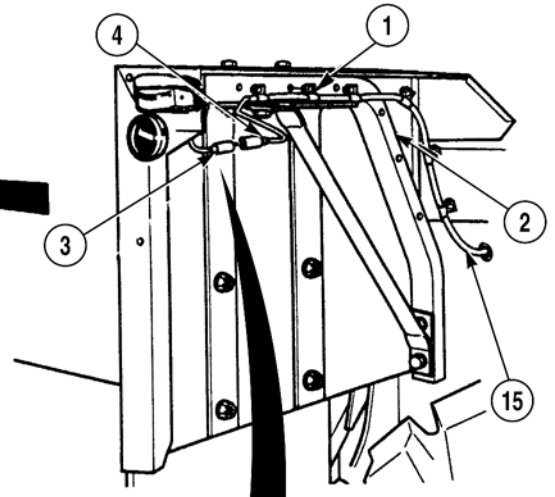
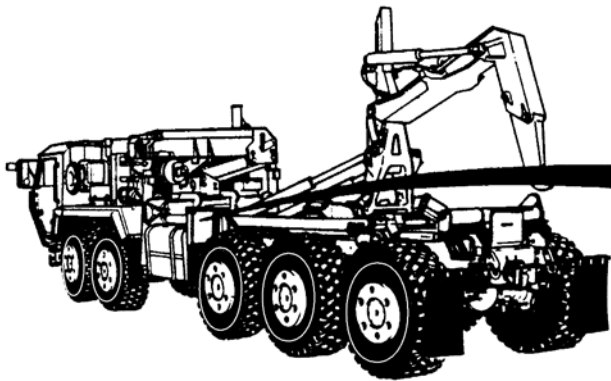
- (100) Position chassis wire harness (15) in cushion clip (12).
- (101) Install cushion clip (9) on bracket (10) with screw (8) and locknut (7).
- (102) Install washer (13), cushion clip (12) and screw (11) on fender (14).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (103) Apply primer and sealing compound to three threads on MC54 connector (5).
- (104) Connect MC54 connector (5) to left side work lamp (6).

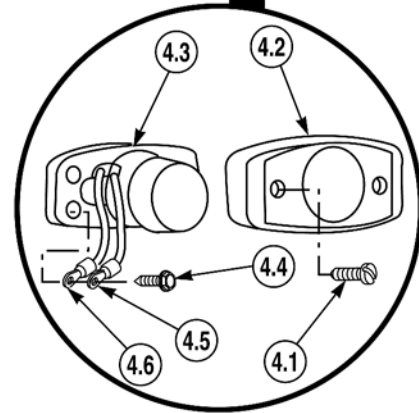
6-29. CHASSIS WIRE HARNESS REPLACEMENT (CONT).



NOTE

Perform Steps (104.1) through (104.3) if wire 1435 is present.

- (104.1) Position wire 1435 (4.6) through hole in side marker light (4.3).
- (104.2) Install ground wire (4.5) and wire 1435 (4.6) on side marker light (4.3) with self-tapping screw (4.4).
- (104.3) Install cover (4.2) on side marker light (4.3) with two screws (4.1).
- (105) Connect wire 1012 (3) to wire 489 (4).
- (106) Position chassis wire harness (15) in six clips (1).
- (107) Install six clips (1) on fender support (2).



c. Follow-on Maintenance:

- Install DUVAC cover, (TM 9-2320-364-20).
- Install tread platform, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- LHS in transit position, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-30. CRANE WIRING REPLACEMENT.

This task covers:

- a. Junction Box Wiring Replacement
- b. Power Cable Replacement
- c. Remote Control Harness Replacement
- d. Overload Shutdown Cable Replacement
- e. Central Solenoid Harness Replacement
- f. On/Off and High Idle Harness Replacement
- g. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

Materials/Parts - Continued

Lockwasher (8) (Item 282, Appendix E)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Sealing Compound (Item 56, Appendix B)
Tags, Identification (Item 72, Appendix B)
Lockwasher (Item 228, Appendix E)

Equipment Condition

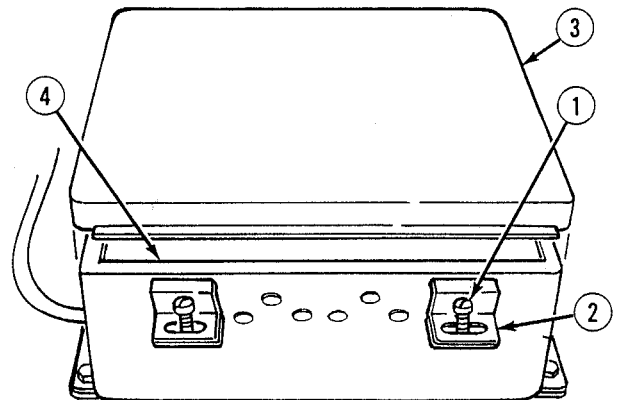
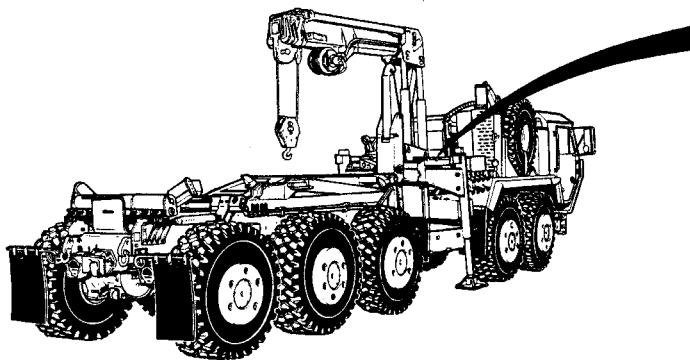
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Crane erected, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)

a. *Junction Box Wiring Replacement.*

NOTE

This procedure shows removal of crane wiring from several different sources. Only remove wiring that is required to complete the task.

(1) *Removal.*

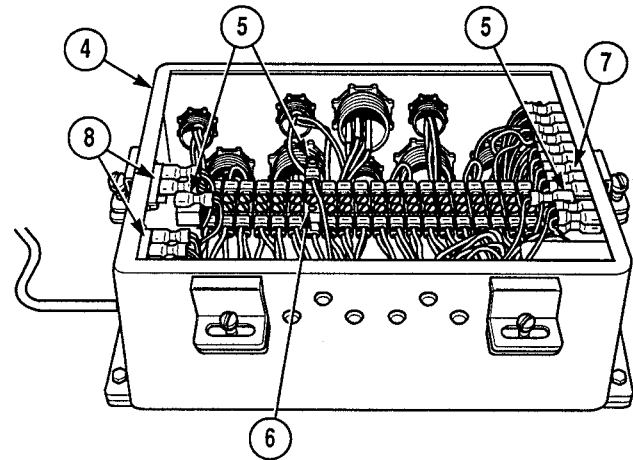


(a) Loosen six screws (1), move clips (2) aside and remove cover (3) from junction box (4).

6-30. CRANE WIRING REPLACEMENT (CONT).

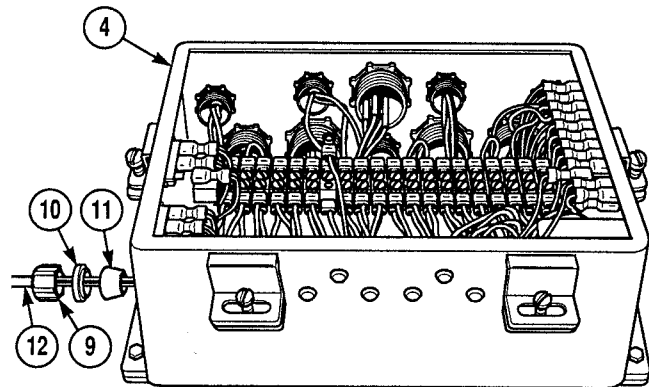
NOTE

- Disconnect only wires required to complete task. Refer to Table 6-5 and Figure 6-2 for specific junction box wiring replacement.
 - Tag and mark wires prior to removal.
 - Cut cable ties as required.
- (b) Disconnect harness wires (5) from terminal strip (6), ground strip (7) and diodes (8) in junction box (4).



NOTE

- Remove only harnesses and caps required to complete task. Refer to Table 6-5 and Figures 6-2 and 6-3.
 - All harnesses and caps are removed from junction box the same way.
- (c) Remove cap (9), washer (10), grommet (11) and harness (12) from junction box (4) as required.



NOTE

- Table and schematic should be used to help remove and install wiring but is *not* a substitute for marking and tagging wires.
- Refer to cable section for complete harness removal instructions.

Table 6-5. Junction Box Wiring

Cable No.	Cable	Cable Section	To	To	To
1	Power Cable	b	Ground Strip GRN & Shield	Terminals (2) BLK (6) PNK (17) WHT	
2	Right Side Remote Control Cable	c	Ground Strip GRN & Shield	Terminals (9) PNK (11) YEL (12) WHT (19) BLU (15) BLK (16) ORG (8) VIO (7) GRY (10) TAN (14) BRN (13) LTPNK	Diodes PNK/GRN
3	Overload Shutdown Cable	d	Ground Strip GRN & Shield	(1) BLK (18) WHT (19) PNK	
4	Swing Solenoid (Counterclockwise)	e	Ground Strip BLK	Terminal (9) WHT	
5	Swing Solenoid (Clockwise)	e	Ground Strip BLK	Terminal (10) WHT	
6	Telescope Solenoid (Out)	e	Ground Strip BLK	Terminal (11) WHT	
7	Telescope Solenoid (In)	e	Ground Strip BLK	Terminal (12) WHT	
8	Lift Solenoid (Up)	e	Ground Strip BLK	Terminal (13) WHT	
9	Lift Solenoid (Down)	e	Ground Strip BLK	Terminal (14) WHT	
10	Hoist Solenoid (Up)	e	Ground Strip BLK	Terminal (15) WHT	
11	Hoist Solenoid (Down)	e	Ground Strip BLK	Terminal (16) WHT	
12	O/R-Mast Shutdown Solenoid	e	Ground Strip BLK	Terminal (19) WHT	
13	Overload Shutdown Solenoid (Hoist Up)	e	Ground Strip BLK	Terminal (18) WHT	
14	MHC Main Hydraulic Pressure Solenoid	e	Ground Strip BLK	Terminal (3) WHT	
15	Overload Shutdown Solenoid (Lift Up/Down)	e	Ground Strip BLK	Terminal (18) WHT	
16	Overload Lookout Solenoid (Telescope Out)	e	Ground Strip BLK	Terminal (18) WHT	
17	Crane Function Lockout Solenoid	e	Ground Strip BLK	Terminal (8) WHT	
18	Proximity Switch (Right Side)*	e	Ground Strip BLU	Terminals (4) BLK (20) BRN	
19	Left Side Remote Control Cable	b,c	Ground Strip GRN & Shield	Terminals (9) PNK (11) GRN (12) WHT (20) BLU (15) BLK (16) ORG (8) VIO (7) GRY (10) TAN (14) BRN (13) LTPNK	Diode PNK/GRN
20	On/Off an High Idle Switches	f		Terminals (1) BLK & (17) GRN	Diodes WHT/PNK
21	Proximity Switch (Left Side)*		Ground Strip BLU	Terminals (4) BRN (5) BLK	

*Replacement of harnesses 18 and 21 are covered in TM 9-2320-364-20.

6-30. CRANE WIRING REPLACEMENT (CONT).

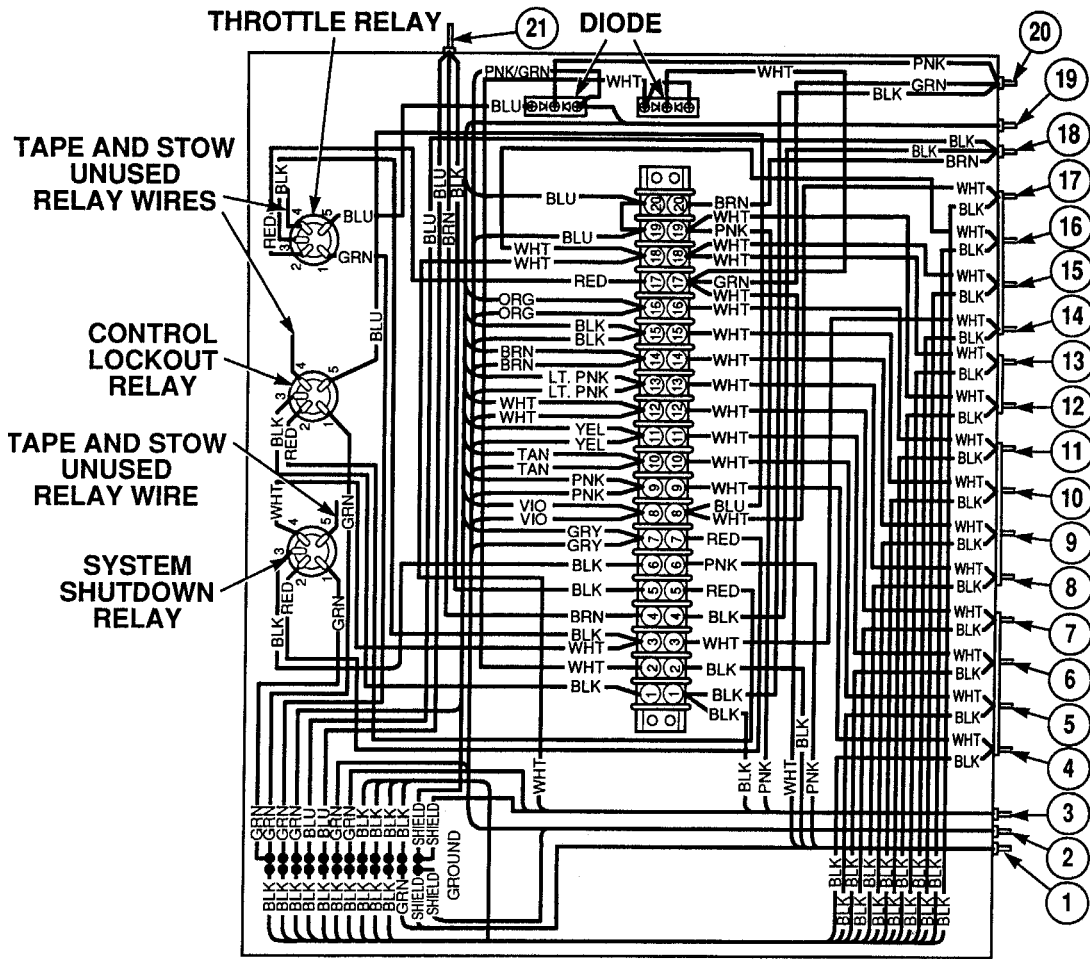


Figure 6-2. Junction Box Wiring

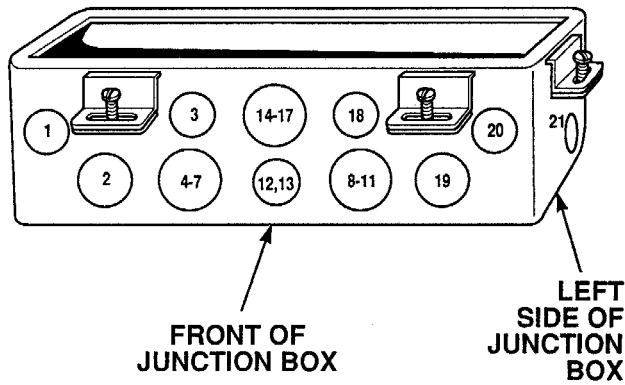


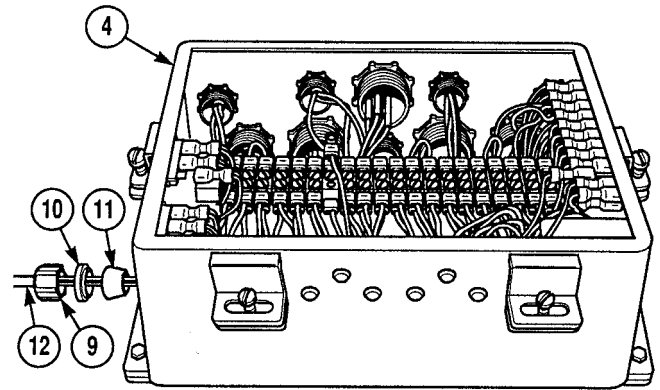
Figure 6-3. Junction Box Wire Harness Locations

(2) *Installation.*

NOTE

All harnesses and caps are installed in junction box the same way.

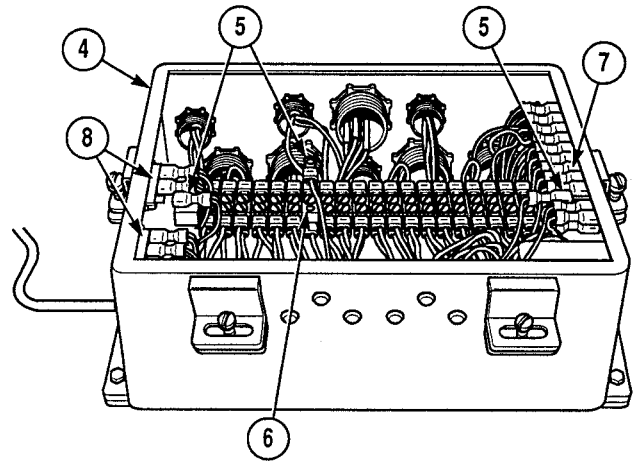
- (a) Position cap (9), washer (10) and grommet (11) on end of harness (12).
- (b) Position harness (12) in junction box (4) and install grommet (11), washer (10) and cap (9).



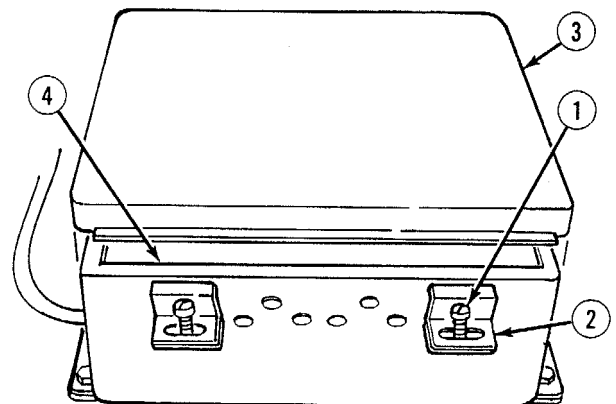
NOTE

- Connect only wires required to complete task. Refer to Table 6-5 and Figure 6-3 for specific junction box wire replacement.
- Install cable ties as required.

- (c) Connect harness wires (5) to terminal strip (6), ground strip (7) and diodes (8) in junction box (4).



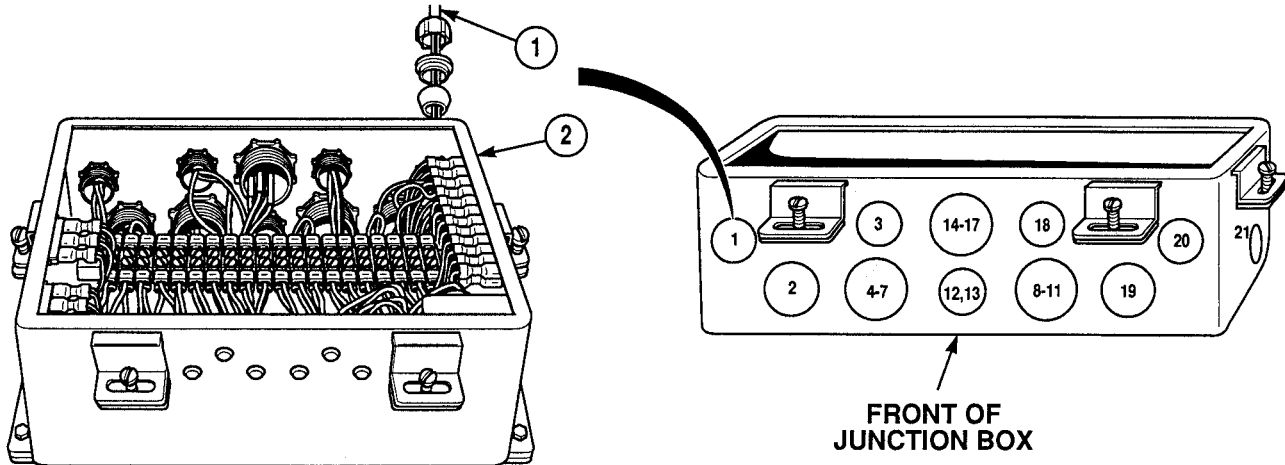
- (d) Position cover (3) on junction box (4).
- (e) Position six clips (2) over cover (3) and tighten six screws (1).



6-30. CRANE WIRING REPLACEMENT (CONT).

b. Power Cable Replacement.

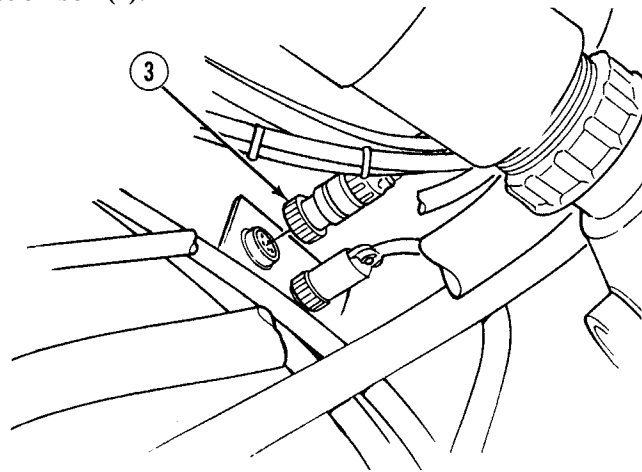
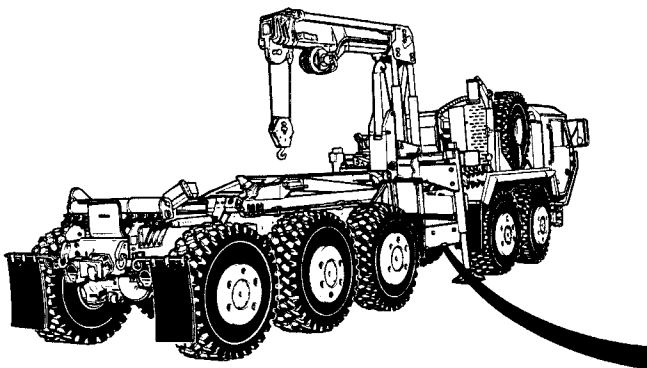
(1) *Removal.*



NOTE

- Wire and harness removal from junction box is covered in junction box wiring replacement (Para 6-6).
- Cut cable ties as required.

(a) Remove power cable harness (1) from junction box (2).



(b) Disconnect power cable MC29 connector (3).

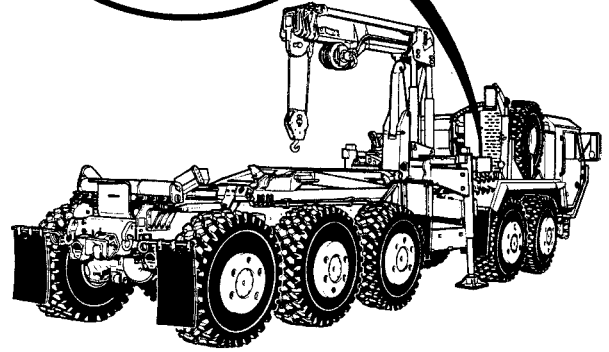
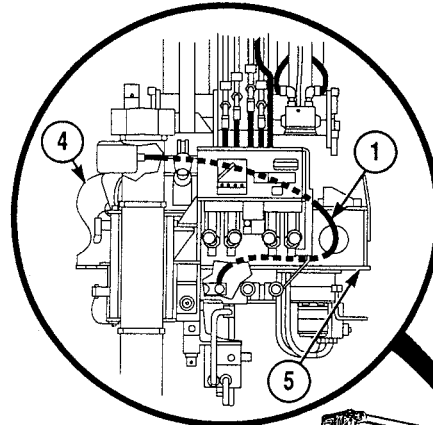
- (c) Remove power cable harness (1) from crane assembly (4) and truck (5).

(2) *Installation.*

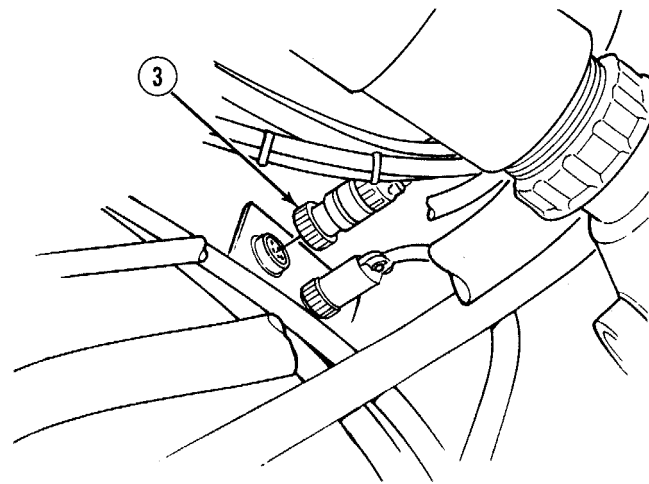
NOTE

Install cable ties as required.

- (a) Position power cable harness (1) in truck (5) through crane assembly (4).



- (b) Connect power cable MC29 connector (3).

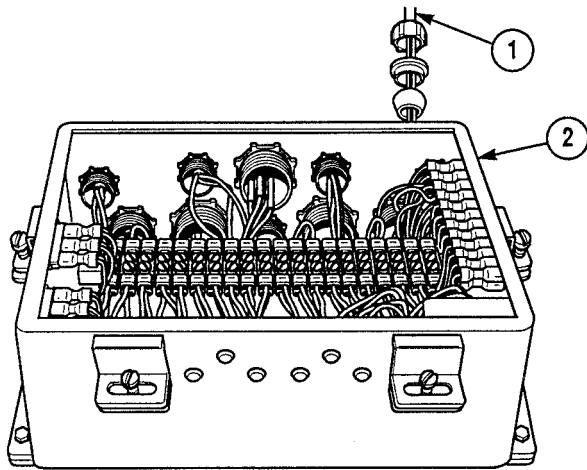


6-30. CRANE WIRING REPLACEMENT (CONT).

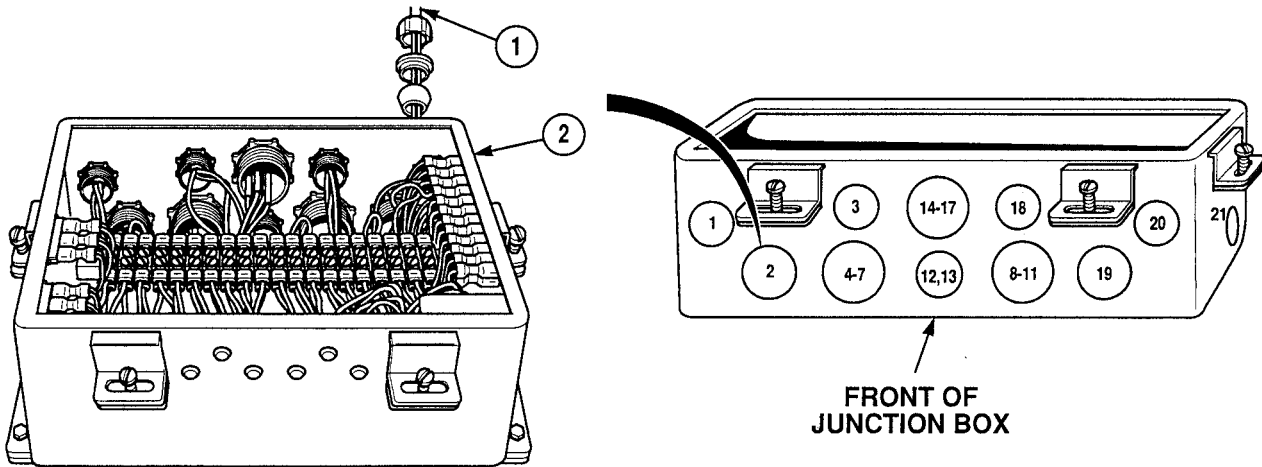
NOTE

Installation of harness and wires in junction box is covered in junction box wiring replacement (Para 6-6).

- (c) Install power cable harness (1) in junction box (2).



c. Remote Control Harness Replacement.

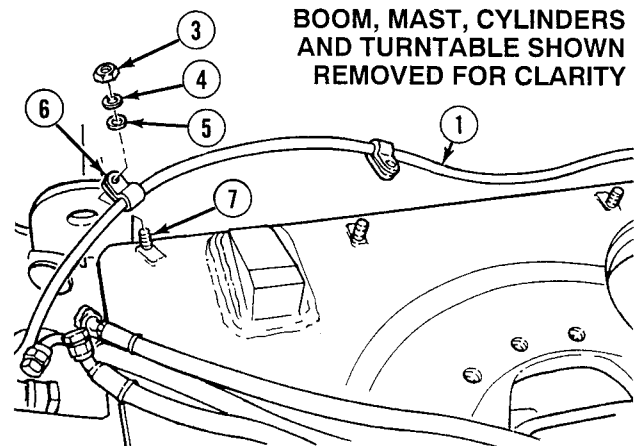
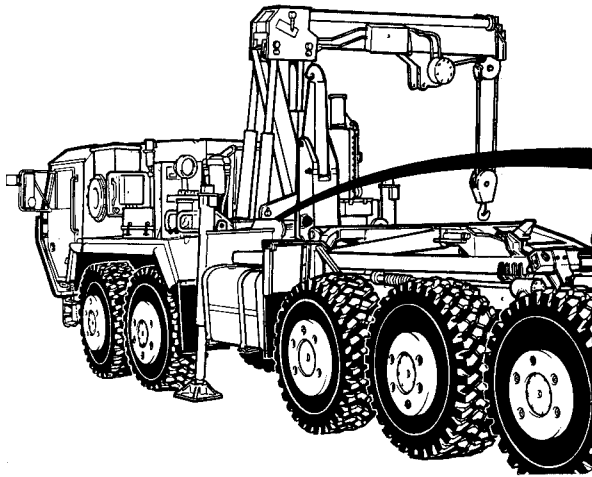


NOTE

- Left side control harness is shown. Right side control harness is similar.
- Wires and harness removal from junction box is covered in junction box wiring replacement (Para 6-6).
- Cut cable ties as required.

(1) *Removal.*

- (a) Remove remote control harness (1) from junction box (2).

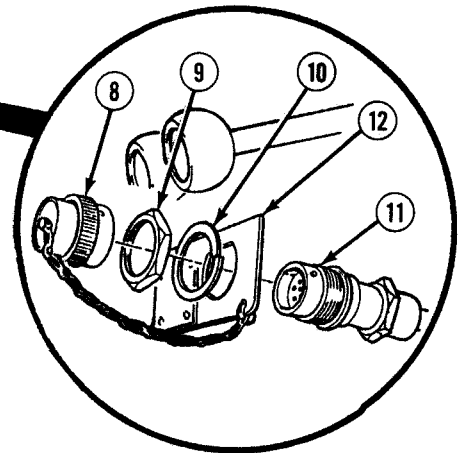
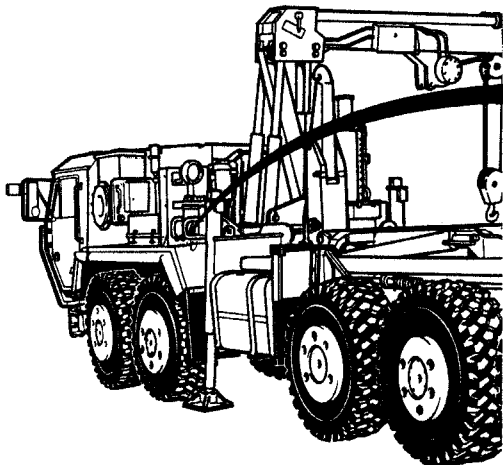


**BOOM, MAST, CYLINDERS
AND TURNTABLE SHOWN
REMOVED FOR CLARITY**

NOTE

Steps (b) and (c) are for left side harness removal only.

- (b) Remove six nuts (3), lockwashers (4), washers (5) and cushion clips (6) from studs (7). Discard lockwashers.
- (c) Remove remote control harness (1) from six cushion clips (6).



- (d) Remove dust cap (8), nut (9), lockwasher (10) and remote control harness connector (11) from bracket (12). Discard lockwasher.

6-30. CRANE WIRING REPLACEMENT (CONT).

- (e) Remove remote control harness (1) from crane base (13) and truck (14).

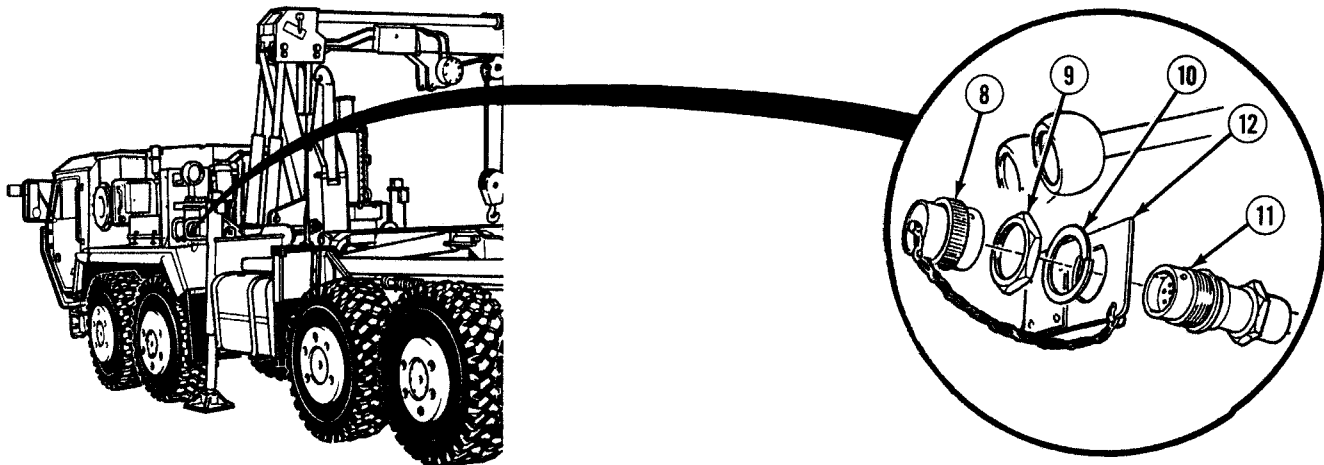
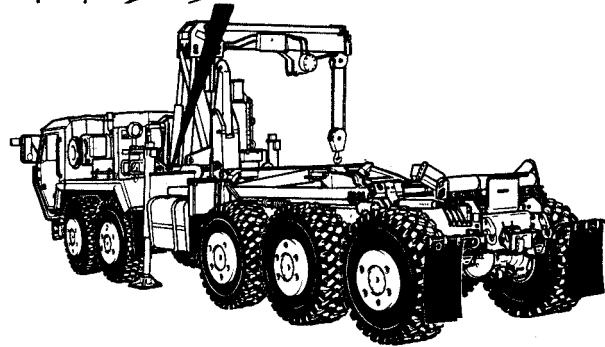
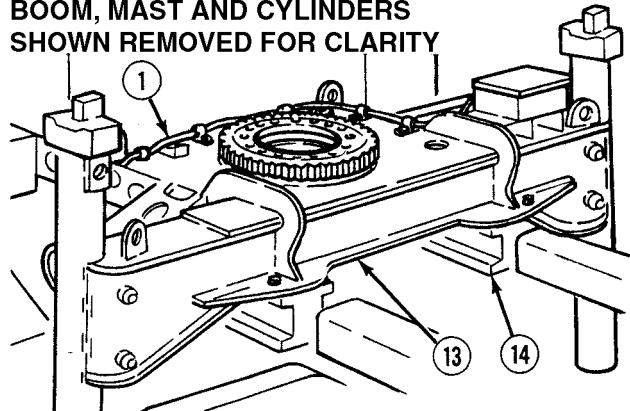
(2) *Installation.*

NOTE

Install cable ties as required.

- (a) Position remote control harness (1) on truck (14) and crane base (13).

**BOOM, MAST AND CYLINDERS
SHOWN REMOVED FOR CLARITY**

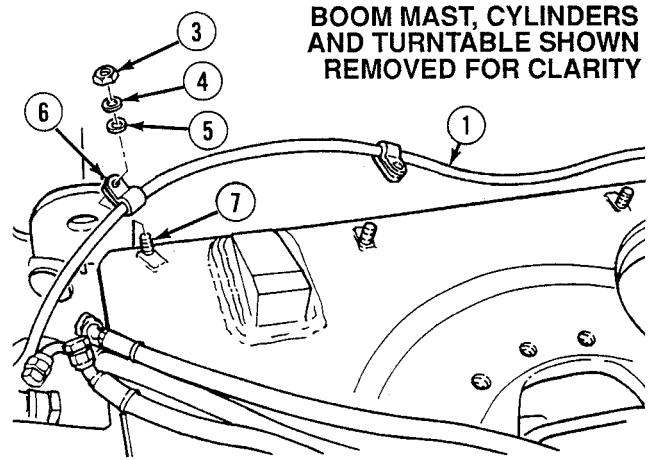


- (b) Install remote control harness connector (11) in bracket (12) with lockwasher (10), nut (9) and dust cap (8).

NOTE

Steps (c) and (d) apply to left side cable installation only.

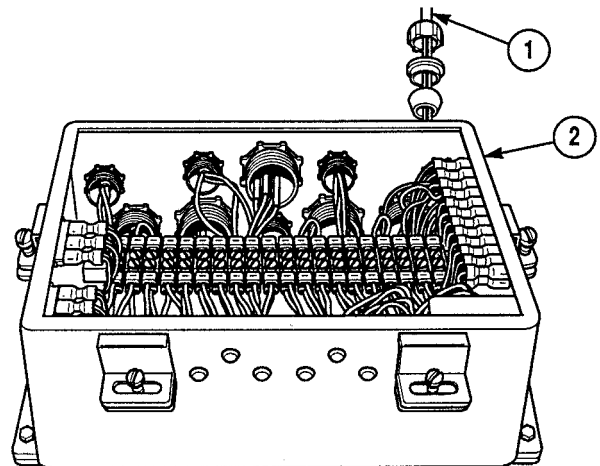
- (c) Position six cushion clips (6) on remote control harness (1) and six studs (7).
- (d) Install six cushion clips (6) on studs (7) with washers (5), lockwashers (4) and nuts (3).



NOTE

Installation of harness and wires in junction box is covered in junction box wiring replacement (Para 6-6).

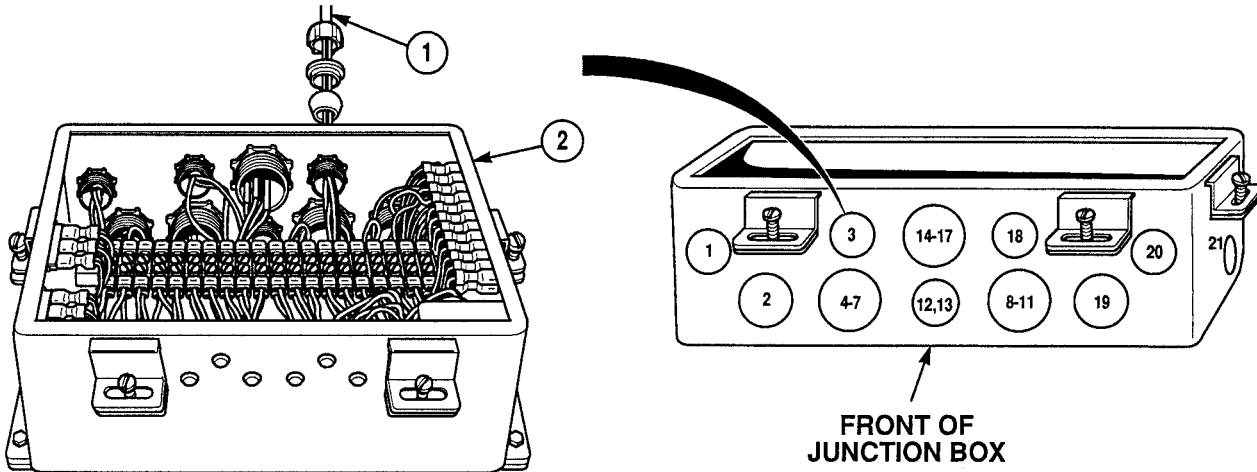
- (e) Install remote control harness (1) in junction box (2).



6-30. CRANE WIRING REPLACEMENT (CONT).

d. Overload Shutdown Cable Replacement.

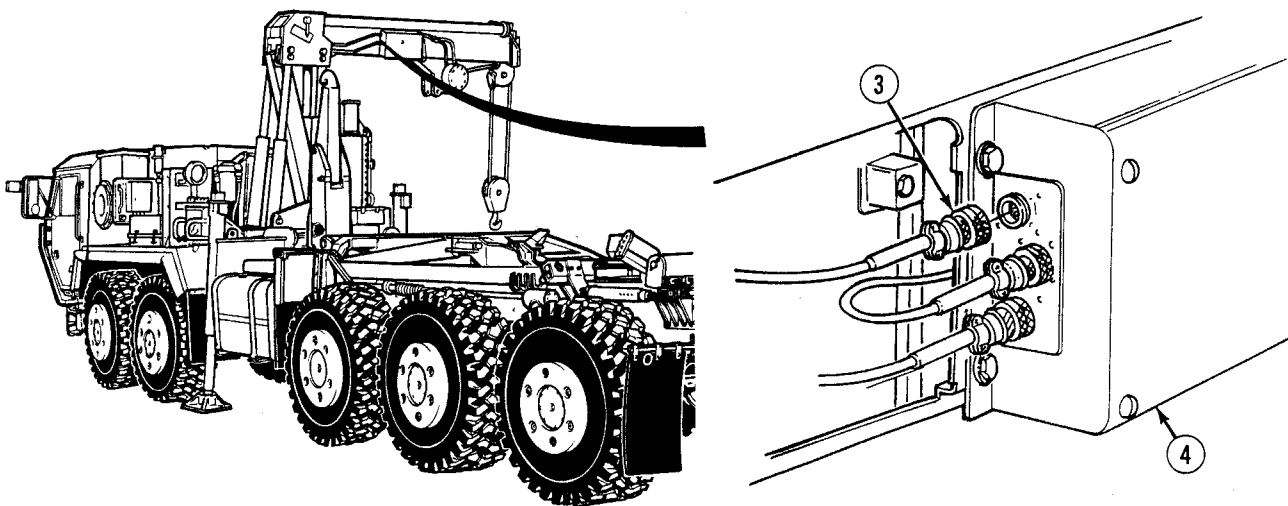
(1) *Removal.*



NOTE

- Wire and harness removal from junction box is covered in junction box wiring replacement (Para 6-6).
- Cut cable ties as required.

(a) Remove overload shutdown harness (1) from junction box (2).



(b) Disconnect overload harness connector (3) from overload box (4).

NOTE

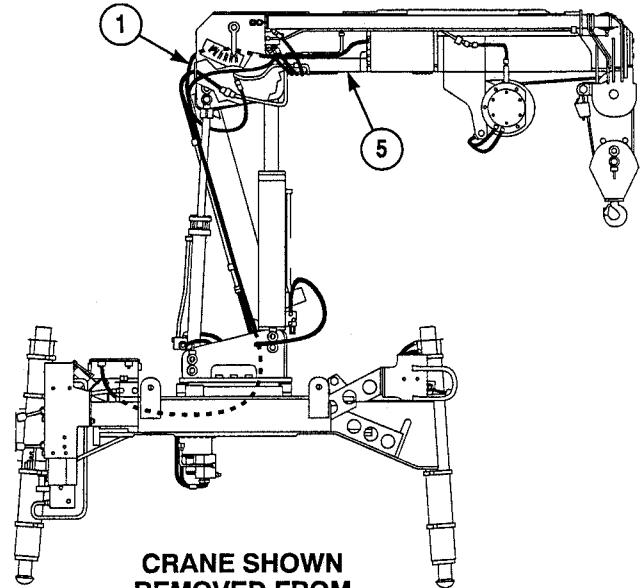
Note routing of harness before removing.

- (c) Remove overload harness (1) from crane (5).
- (2) *Installation.*

NOTE

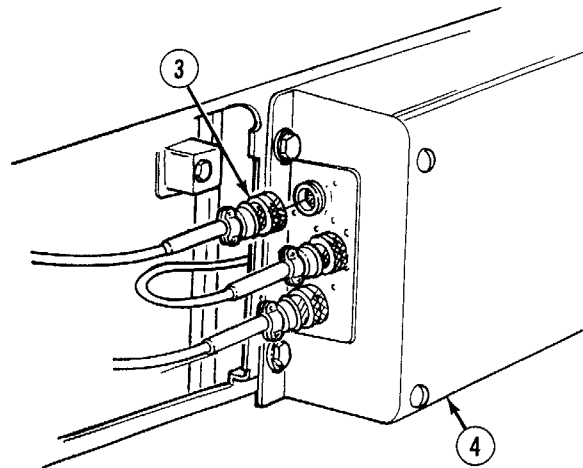
Install cable ties as required.

- (a) Position overload harness (1) on crane (5).



**CRANE SHOWN
REMOVED FROM
TRUCK FOR CLARITY**

- (b) Connect overload harness connector (3) to overload box (4).

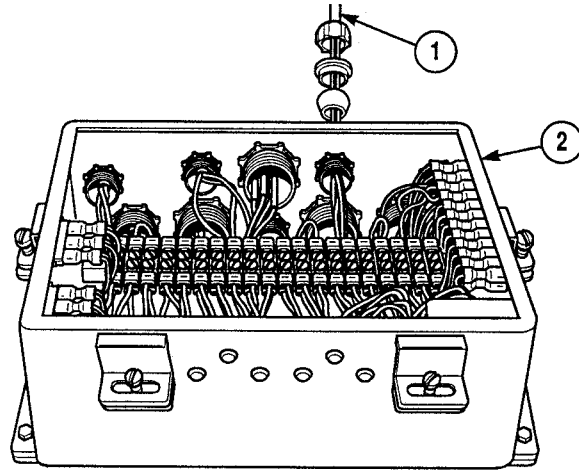


6-30. CRANE WIRING REPLACEMENT (CONT).

NOTE

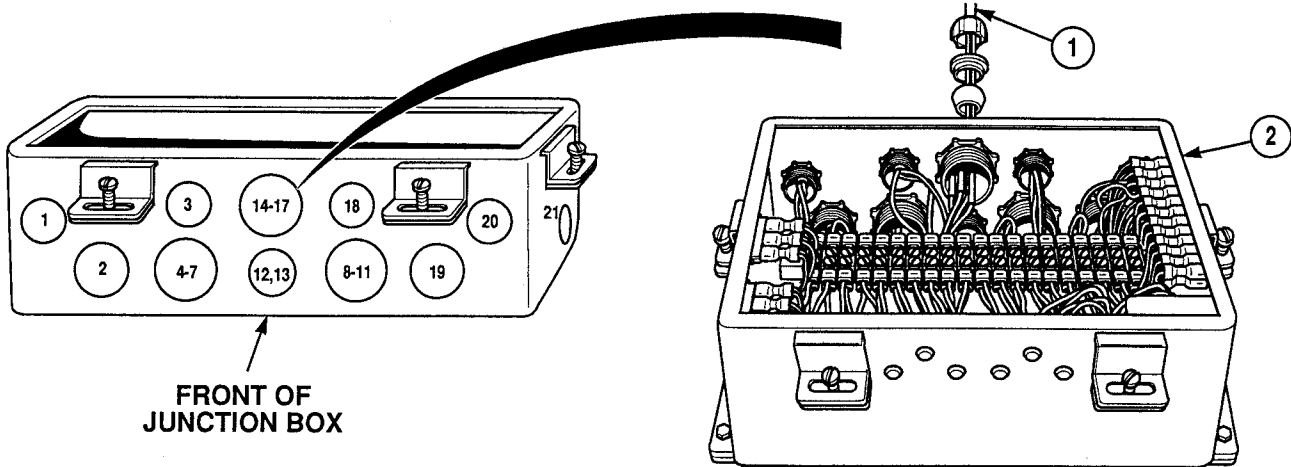
Installation of harness and wires in junction box is covered in junction box wiring replacement (Para 6-6).

- (c) Install overload shutdown harness (1) in junction box (2).



e. Control Solenoid Harness Replacement.

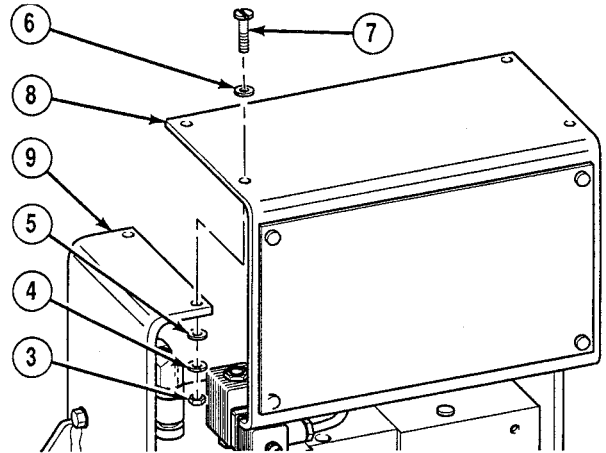
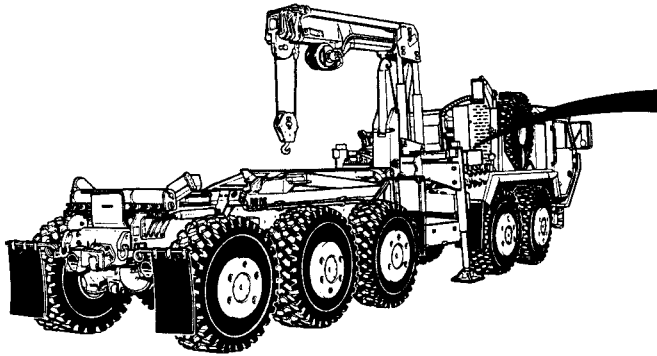
- (1) *Removal.*



NOTE

- Wires and harness removal from junction box is covered in junction box wiring replacement.
- Cut cable ties as required.

- (a) Remove solenoid harness (1) from junction box (2).

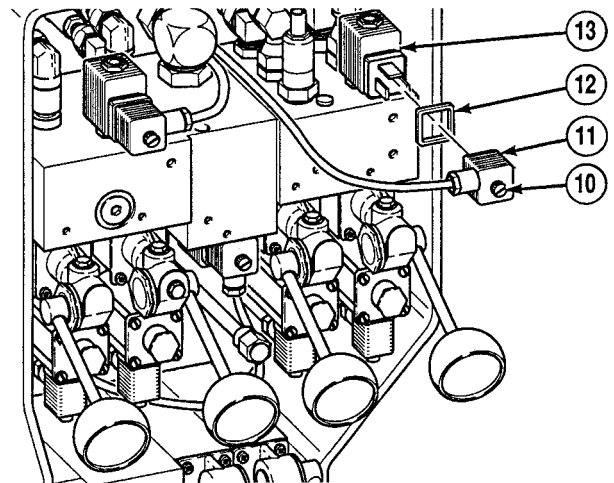


- (b) Remove four nuts (3), lockwashers (4), washers (5), washers (6), screws (7) and cover (8) from bracket (9). Discard lockwashers.

NOTE

Overload shutdown solenoid shown. There are 14 control valves; wiring to all control valve connectors is removed the same way.

- (c) Loosen screw (10) and remove connector (11) and square seal (12) from control valve (13).



6-30. CRANE WIRING REPLACEMENT (CONT).

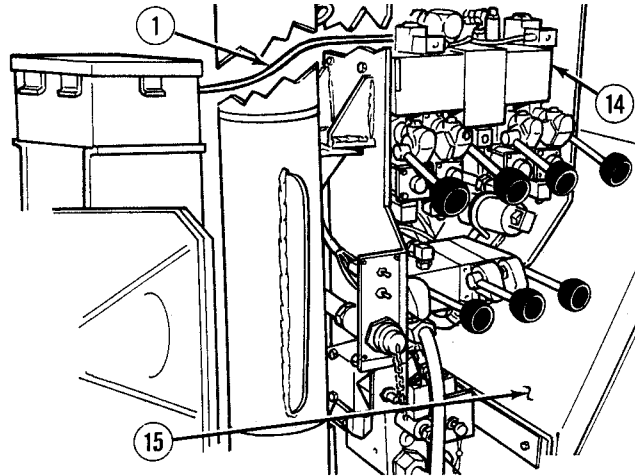
- (d) Remove solenoid harness (1) from crane (14) and truck (15).

(2) *Installation.*

NOTE

Install cable ties as required.

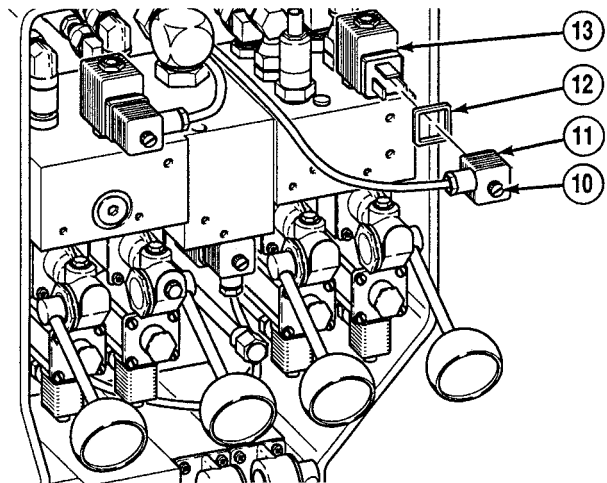
- (a) Position solenoid harness (1) on truck (15) and crane (14).



NOTE

Wires to all control valves are installed the same way.

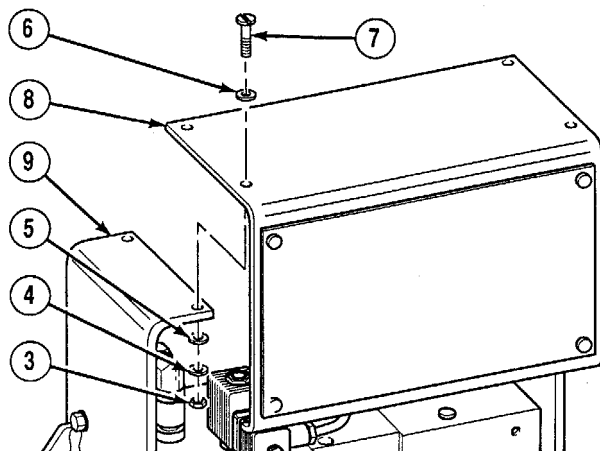
- (b) Install square seal (12) and connector (11) on control valve (13) with screw (10).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

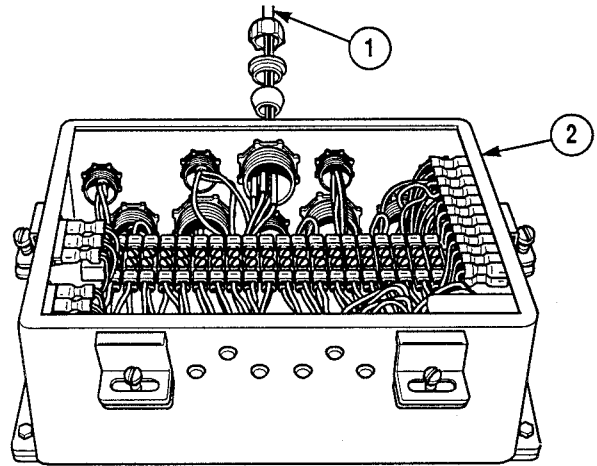
- (c) Apply sealing compound to four screws (7).
- (d) Install cover (8) on bracket (9) with four screws (7), washer (6), washer (5), lockwasher (4) and nut (3).



NOTE

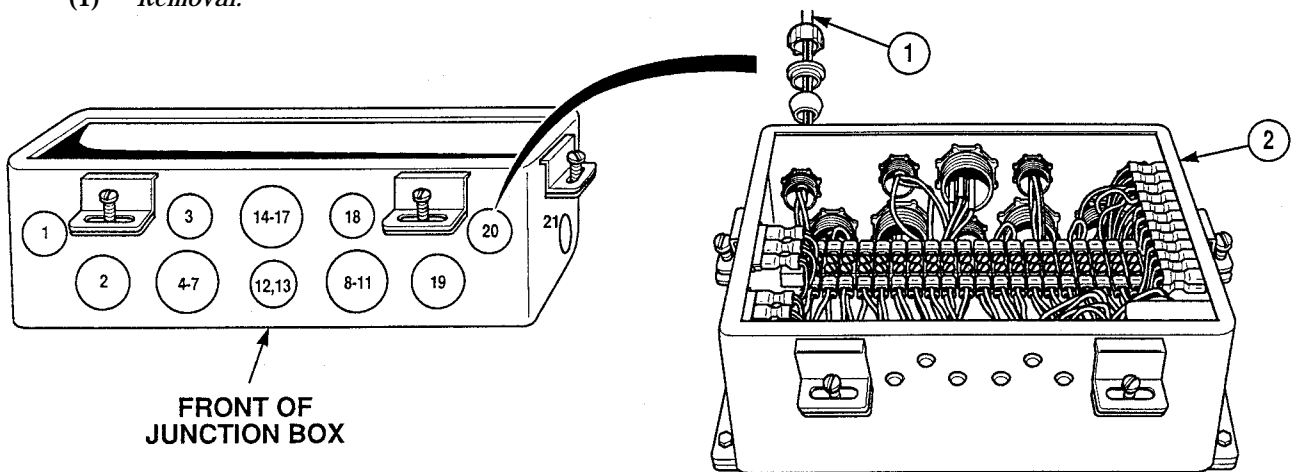
Installation of harness and wires in junction box is covered in a. Junction Box Wiring Replacement.

- (e) Install solenoid harness (1) in junction box (2).



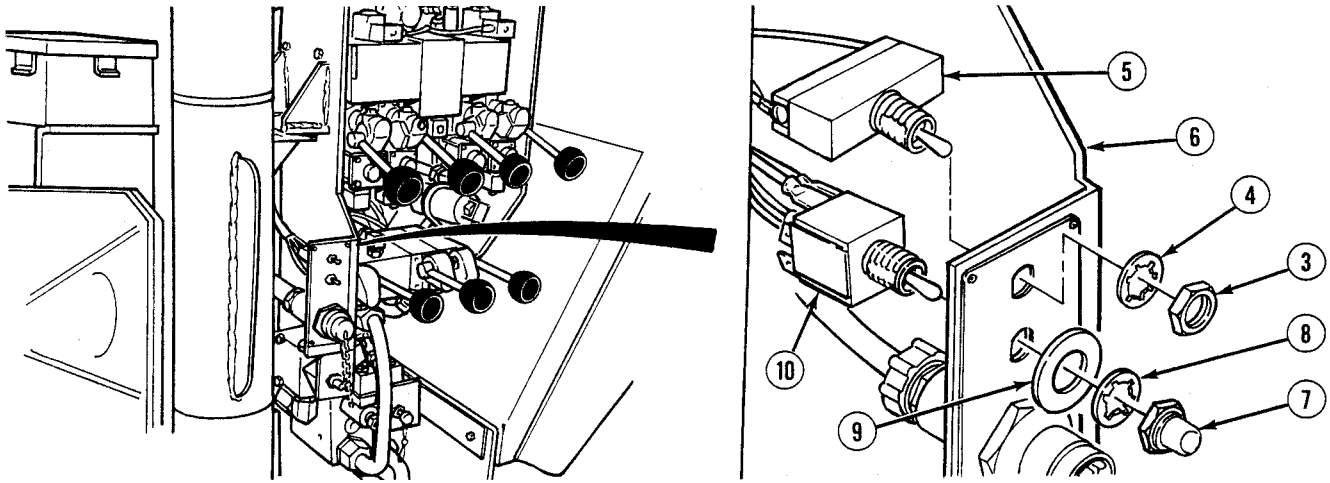
f. On/Off and High Idle Switch Harness Replacement

- (1) *Removal.*



- (a) Remove on/off and high idle harness (1) from junction box (2).

6-30. CRANE WIRING REPLACEMENT (CONT).

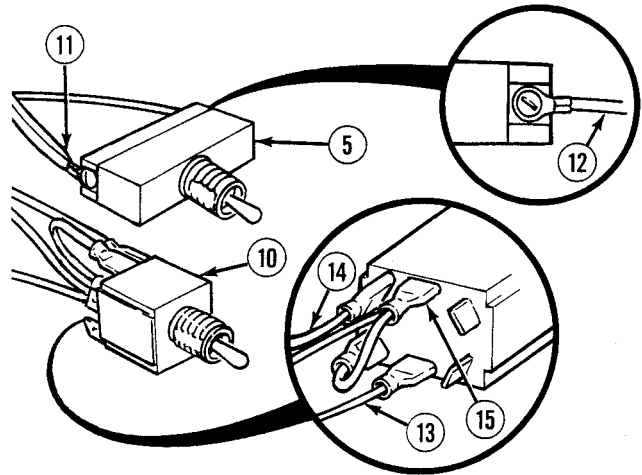


- (b) Remove nut (3), lockwasher (4) and ON/OFF switch (5) from bracket (6).
- (c) Remove nut boot (7), lockwasher (8), washer (9) and high idle switch (10) from bracket (6).

NOTE

Tag and mark position of wires before removal.

- (d) Remove black wire (11) and white wire (12) from ON/OFF switch (5).
- (e) Remove black wire (13), pink wire (14) and green wire (15) from high idle switch (10).



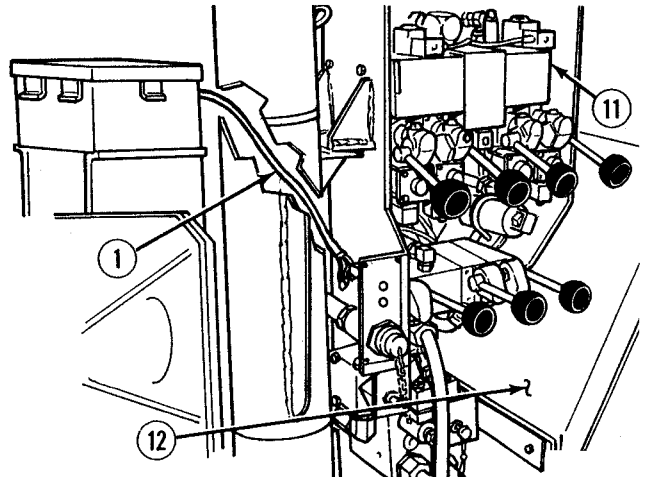
- (f) Remove ON/OFF and high idle harness (1) from crane (11) and truck (12).

(2) *Installation.*

NOTE

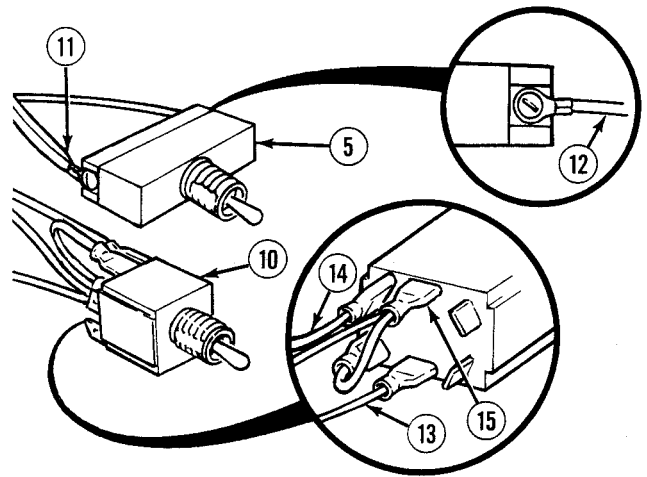
Install cable ties as required.

- (a) Position ON/OFF and high idle harness (1) on truck (12) and crane (11).



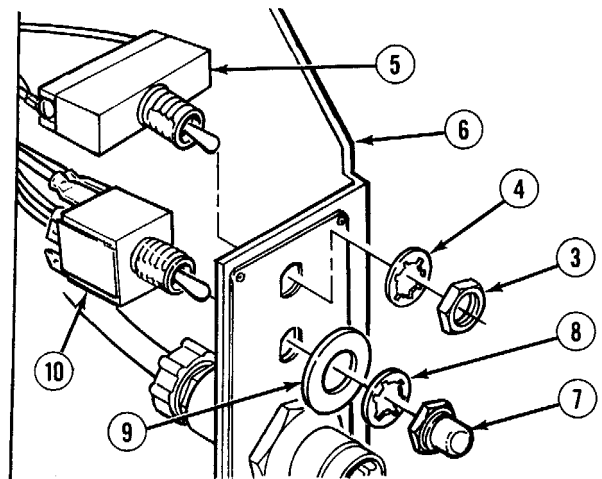
- (b) Install green wire (15), pink wire (14) and black wire (13) on high idle switch (10).

- (c) Install white wire (12) and black wire (11) on ON/OFF switch (5).



- (d) Install high idle switch (10) on bracket (6) with washer (9), lockwasher (8) and nut boot (7).

- (e) Install ON/OFF switch (5) on bracket (6) with lockwasher (4) and nut (3).

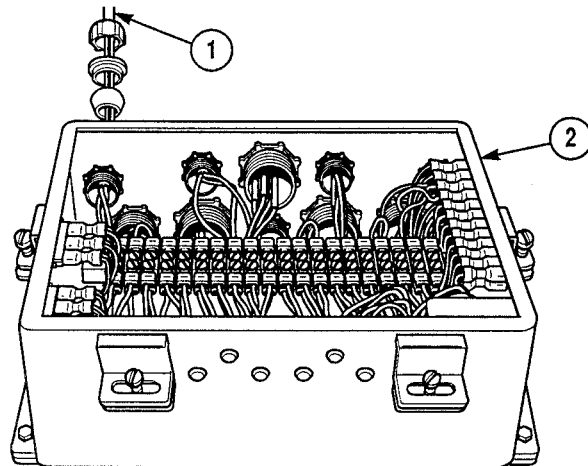


6-30. CRANE WIRING REPLACEMENT (CONT).

NOTE

Installation of harness and wires in junction box is covered in a. Junction Box Wiring Replacement.

- (f) Install ON/OFF and high idle harness (1) in junction box (2).



g. Follow-On Maintenance:

- Connect batteries, (TM 9-2320-364-20).
- Check crane operations, (TM 9-2320-364-10).
- Stow crane, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-31. LHS MAIN WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)

Tool Kit, Electric (Item 239, Appendix F)

Lifting Device, Minimum Capacity 2500 lbs
(1135 kg)

Wooden Block (2) (Appendix C)

Materials/Parts

Cable Ties (Item 9, Appendix B)

Sealing Compound (Item 59, Appendix B)

Tape, Electrical (Item 73, Appendix B)

Locknut (4) (Item 176, Appendix E)

Lockwasher (4) (Item 252, Appendix E)

Personnel Required

Two

Equipment Condition

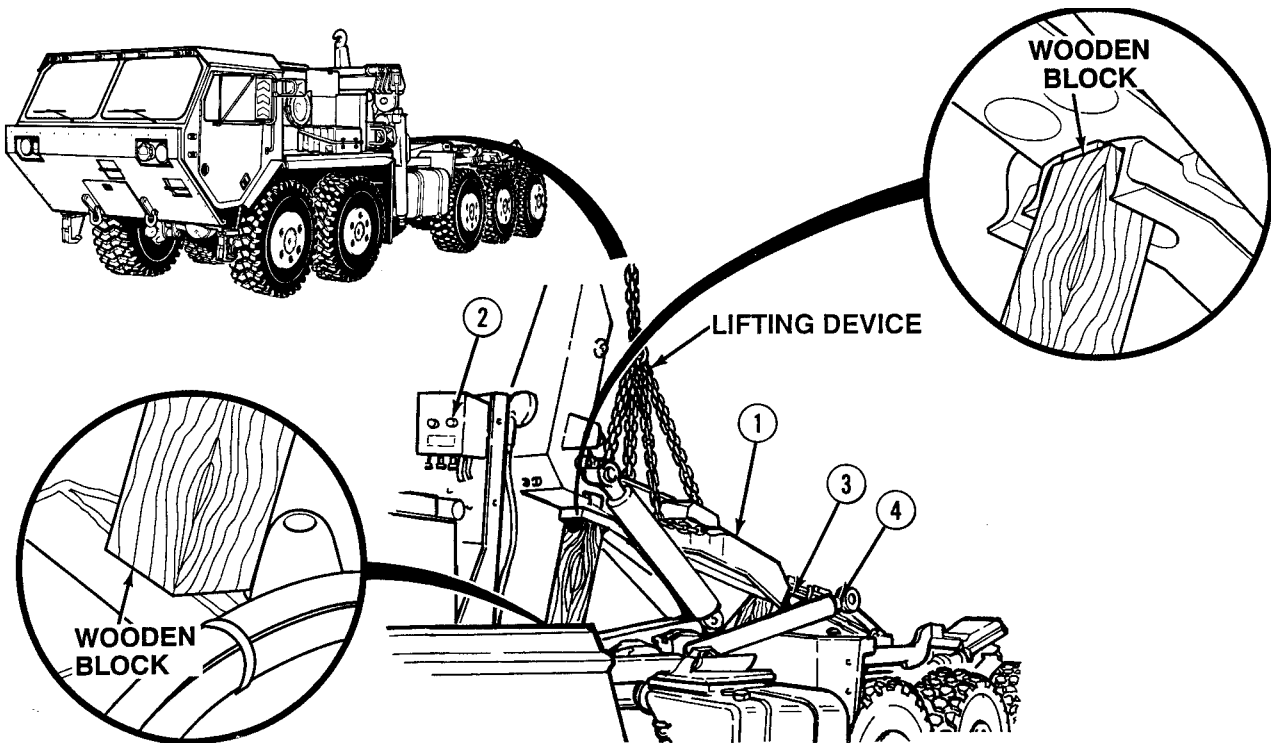
Engine OFF, (TM 9-2320-364-10)

Wheels chocked, (TM 9-2320-364-10)

Hydraulic selector switch in OFF position,
(TM 9-2320-364-10)

6-31. LHS MAIN WIRE HARNESS REPLACEMENT (CONT).

a. Removal.

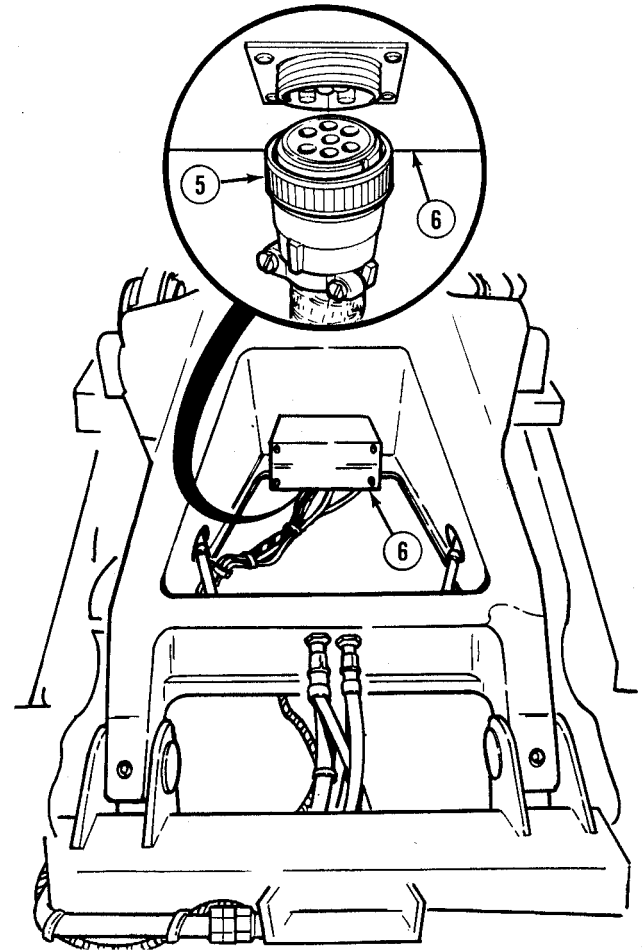


WARNING

Middle frame weighs 2,500 lbs (1,135 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

- (1) Attach lifting device to middle frame (1).
- (2) Turn ON engine switch.
- (3) With the aid of an assistant, push safe lowering button (2) while using lifting device to lift middle frame (1) until hook arm pivot pin (3) is above main cylinder (4).
- (4) Turn OFF engine switch.
- (5) Block middle frame (1) up in two places with wooden blocks and remove lifting device from middle frame (1).

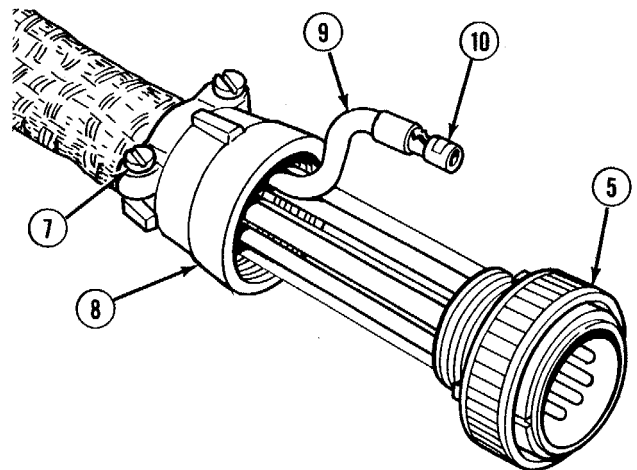
- (6) Disconnect LHS main wire harness connector (5) from LHS junction box (6).



NOTE

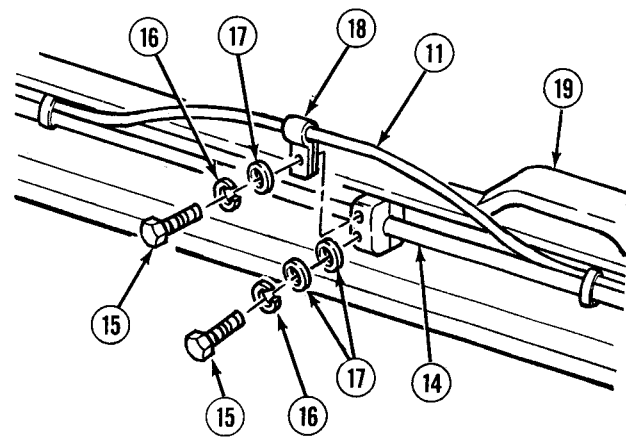
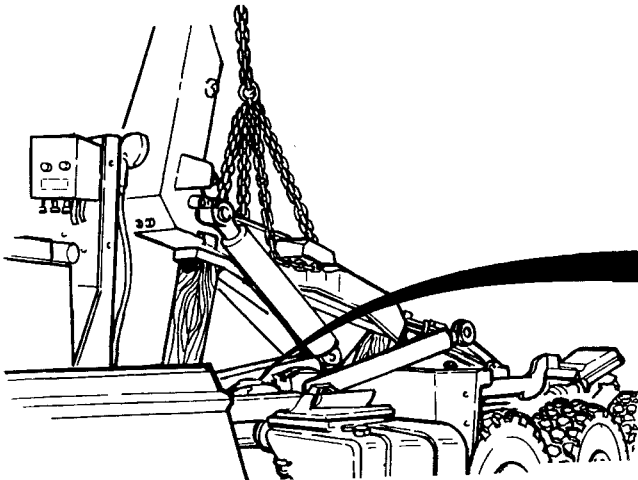
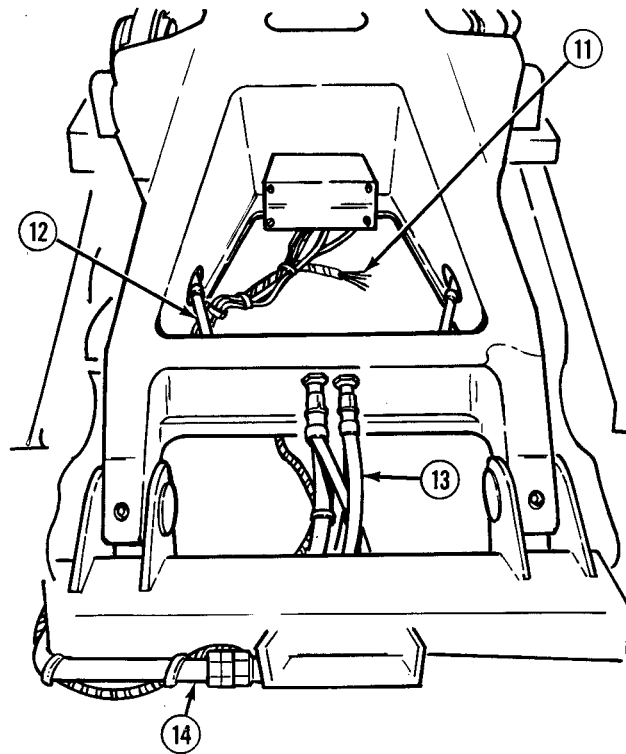
Tag all wires prior to removal.

- (7) Loosen two screws (7) and remove nut (8) from LHS main wire harness connector (5).
- (8) Remove seven wires (9) with terminals (10) from LHS main wire harness connector (5) and tape wires together using electrical tape.

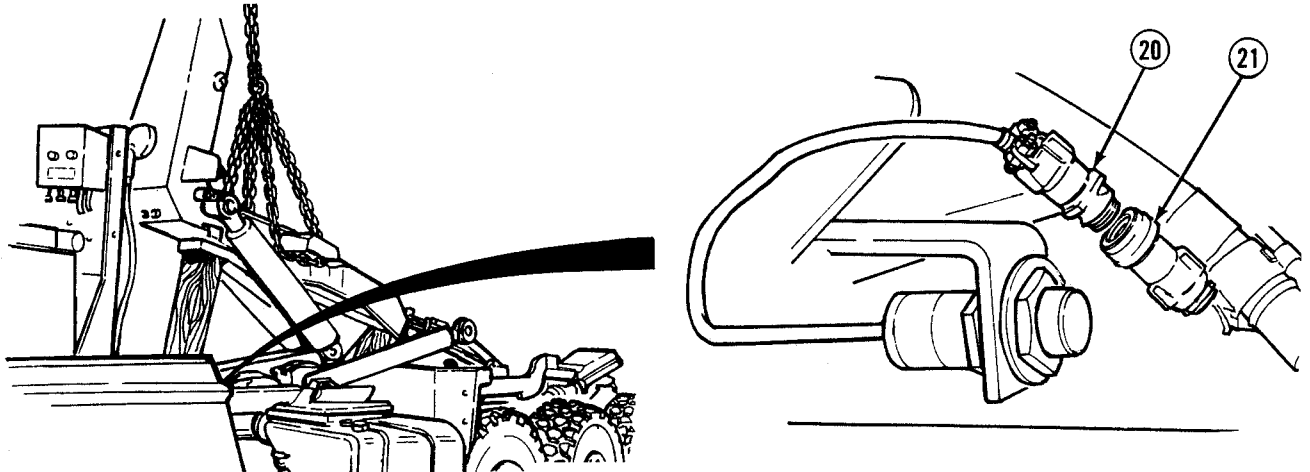


6-31. LHS MAIN WIRE HARNESS REPLACEMENT (CONT).

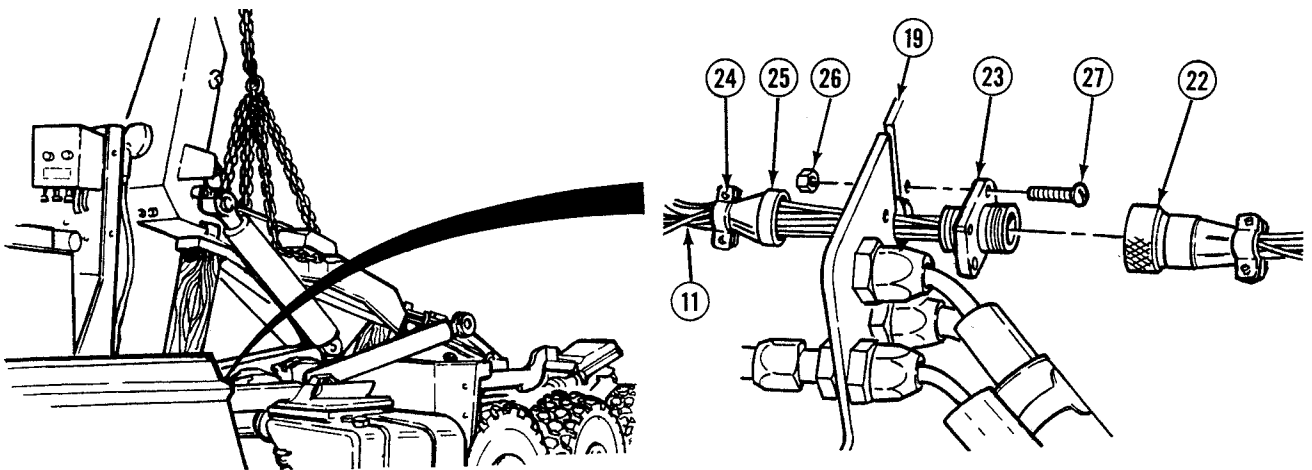
- (9) Remove LHS main wire harness (11) from middle frame tubes (12), hoses (13) and left compression frame tube (14) where attached with cable ties.



- (10) Remove four screws (15), lockwashers (16), five washers (17), four cushion clips (18) and LHS main wire harness (11) from compression frame tube (14) at inside of left compression frame rail (19). Discard lockwashers.



- (11) Disconnect proximity switch (hook arm down) connector (20) from MC88 connector (21).

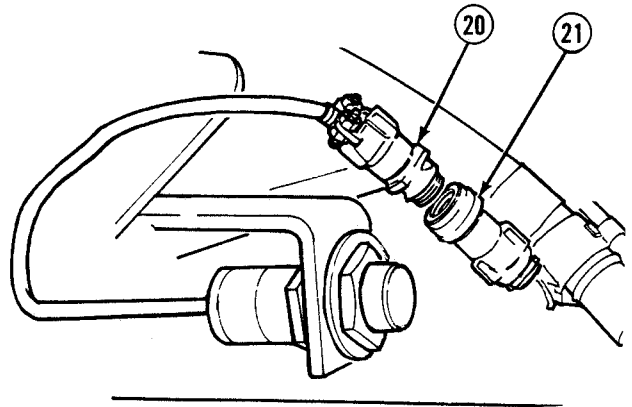
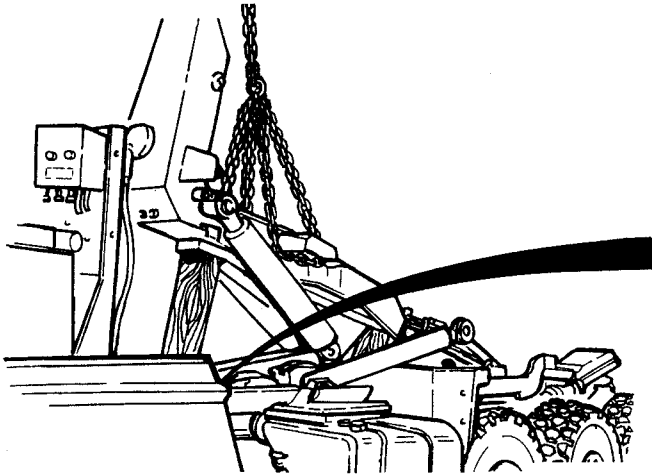


- (12) Remove MC86 connector (22) from bulkhead connector (23).
- (13) Loosen two screws (24) and remove nut (25) from bulkhead connector (23).
- (14) Remove four locknuts (26) and screws (27) from bulkhead connector (23) and compression frame (19). Discard locknuts.
- (15) Lift bulkhead connector (23) up through slot in compression frame (19) and remove LHS main wire harness (11) from truck.

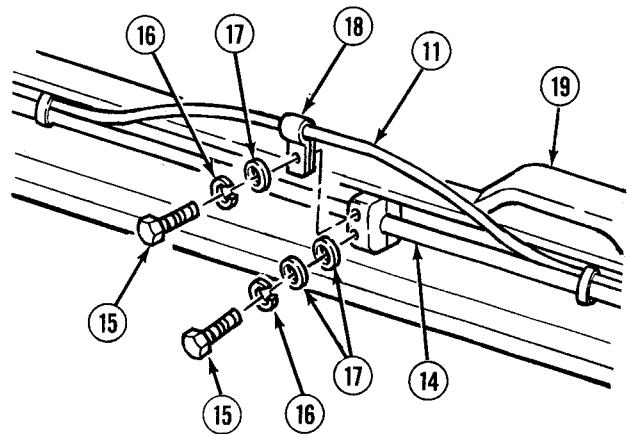
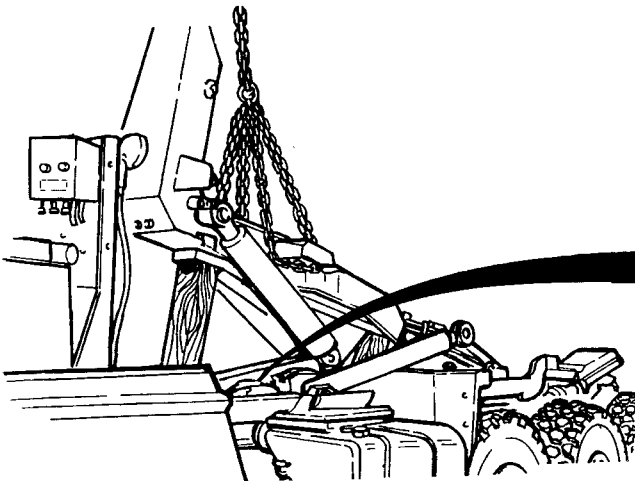
b. Installation.

- (1) Install bulkhead connector (23) in compression frame (19) with four screws (27) and locknuts (26).
- (2) Install nut (25) on bulkhead connector (23) and tighten two screws (24).
- (3) Install connector (22) on bulkhead connector (23).

6-31. LHS MAIN WIRE HARNESS REPLACEMENT (CONT).



- (4) Connect MC88 connector (21) to proximity switch (hook arm down) connector (20).



- (5) Install four cushion clips (18) on harness (11).

WARNING

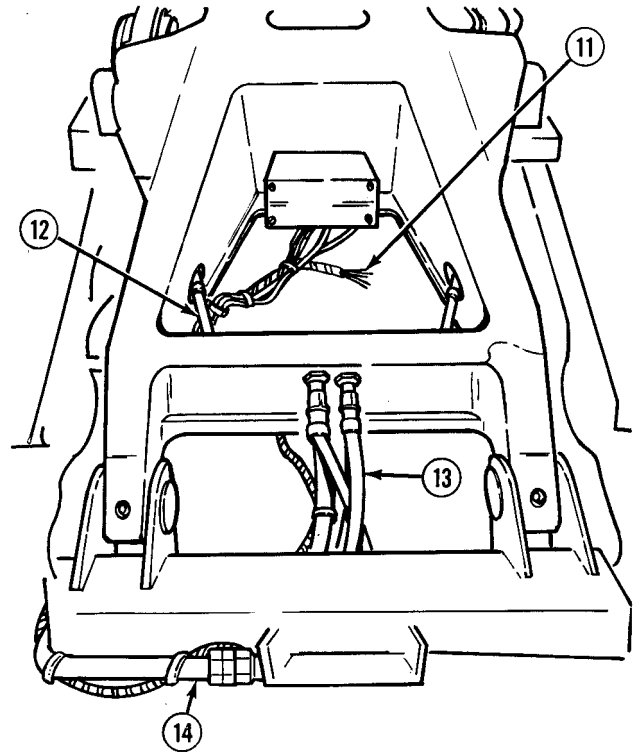
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

NOTE

Do not apply sealing compound to upper screw, until cushion clips have been installed.

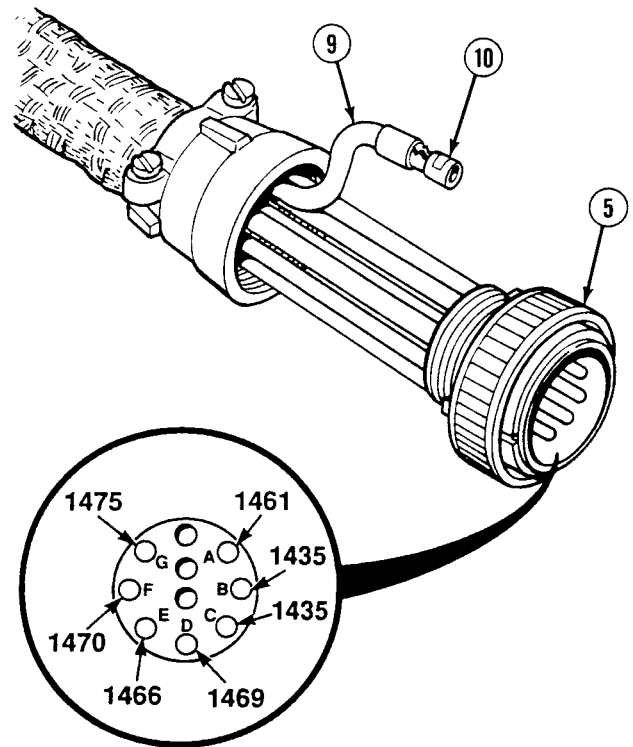
- (6) Apply sealing compound to threads of screws (15).
 (7) Install four cushion clips (18) with five washers (17), four lockwashers (16) and four screws (15) to compression frame tube (14) at inside of left compression frame rail (19).

- (8) Using cable ties, attach LHS main wire harness (11) to compression frame tube (14).
- (9) Using cable ties, attach LHS main wire harness (11) to middle frame hoses (13) and middle frame tubes (12).



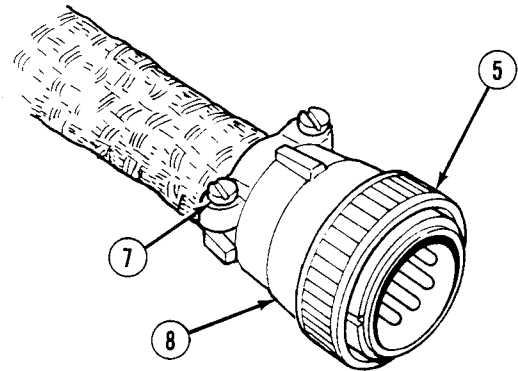
- (10) Install seven terminals (10) with wires (9) in LHS main wire harness connector (5) in following positions.

Wire	Position
1461	A
1435	B
1435	C
1469	D
1466	E
1470	F
1475	G

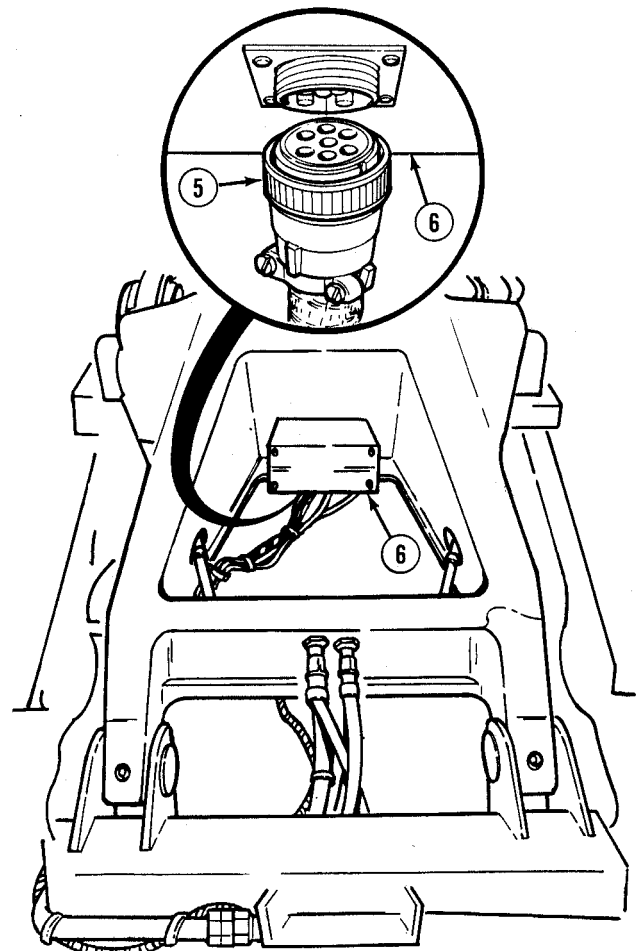


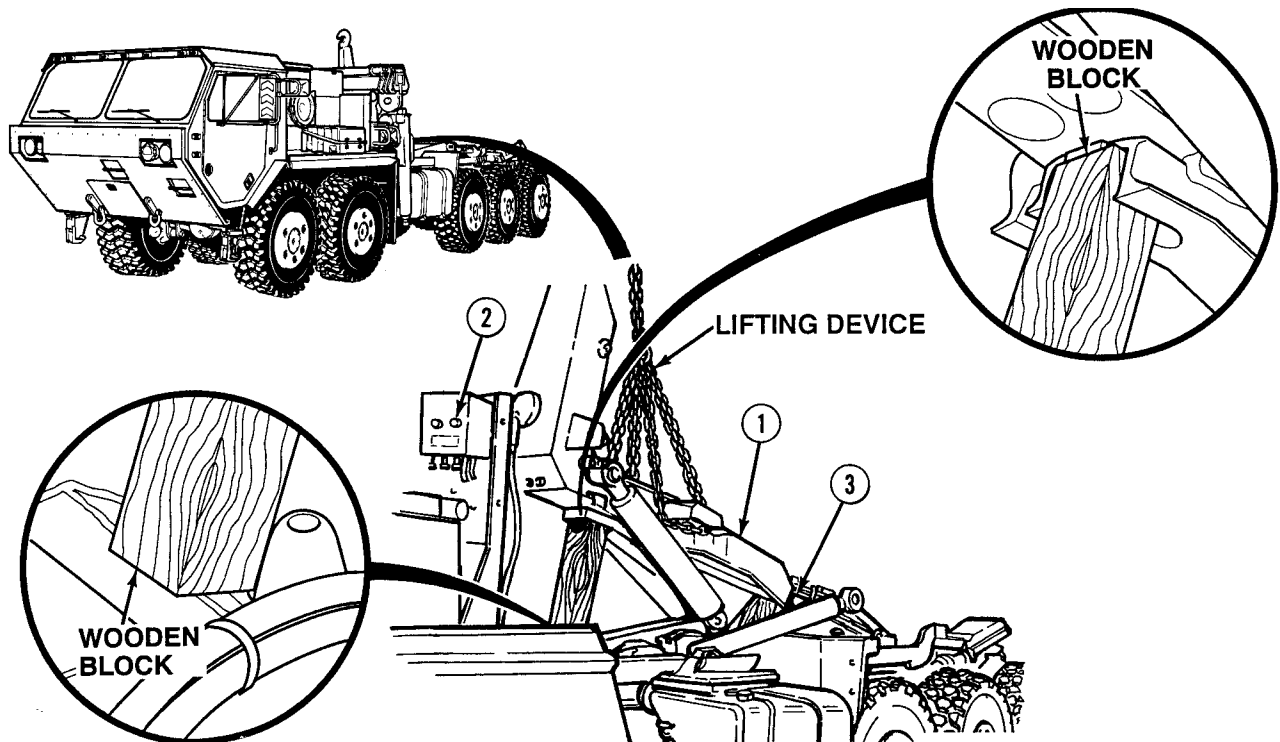
6-31. LHS MAIN WIRE HARNESS REPLACEMENT (CONT).

- (11) Install nut (8) on LHS main wire harness connector (5) and tighten two screws (7) on nut.



- (12) Connect LHS main wire harness connector (5) to LHS junction box (6).





WARNING

Middle frame weighs 2,500 lbs (1,135 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (13) Attach lifting device to middle frame (1).
- (14) Turn ON engine switch.
- (15) With the aid of an assistant, push middle frame safe lowering button (2) to lift middle frame (1) and remove wooden block.
- (16) Turn OFF engine switch.
- (17) With the aid of an assistant, push safe lowering buttons (3) to lower middle frame (1) to transit position.

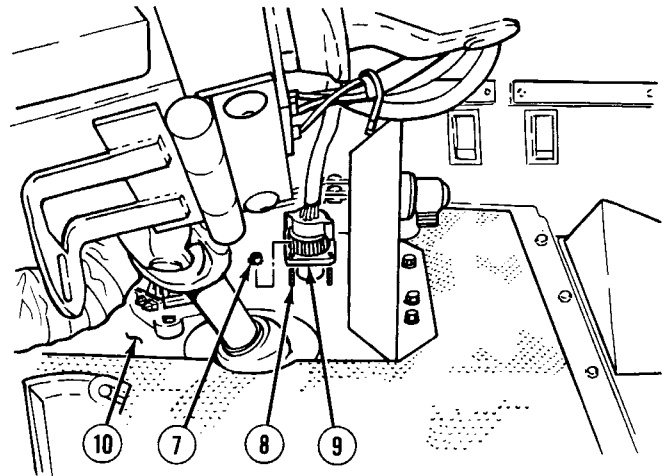
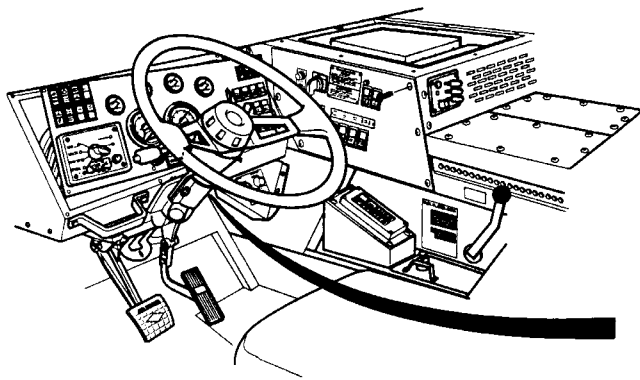
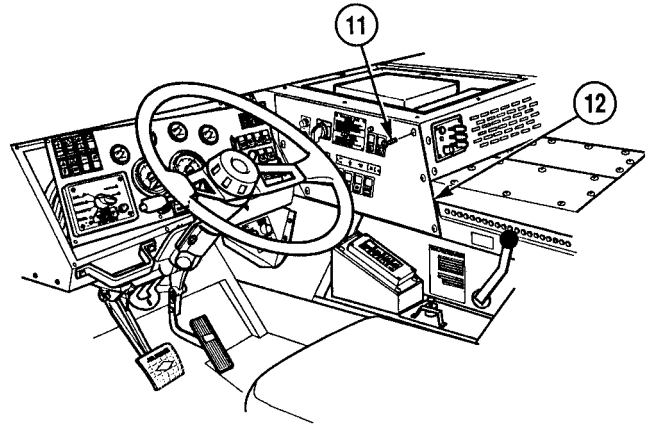
c. Follow-On Maintenance:

- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

(3) Remove eight screws (4) from instrument panel (5).

(4) Pull top of instrument panel (5) toward steering wheel (6).



(5) With the aid of an assistant, remove four locknuts (7), screws (8) and MC84 connector (9) from cab (10). Discard locknuts.

6-32. LHS CAB INTERFACE WIRE HARNESS REPLACEMENT (CONT).

- (6) Remove six screws (11) from heater left side panel (12).
- (7) Pull top of heater left side panel (12) toward steering wheel (6).

NOTE

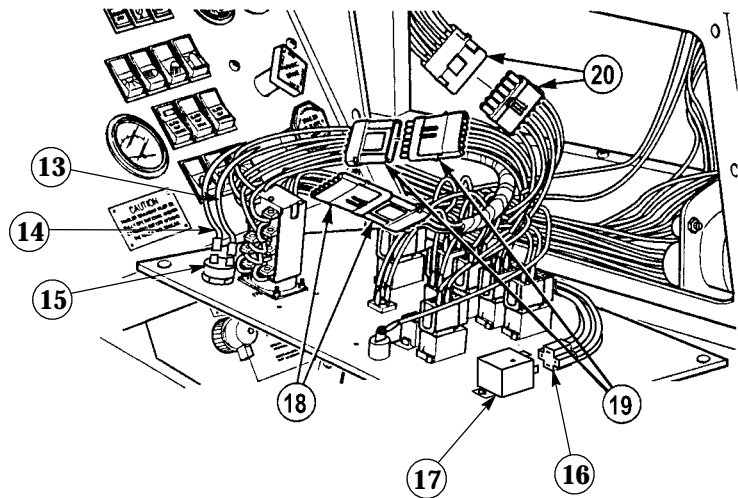
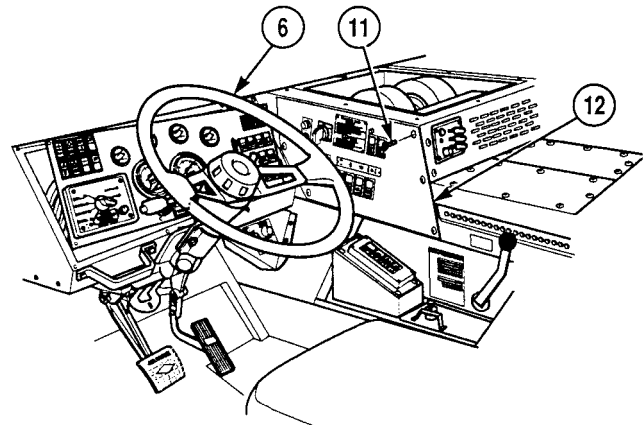
Perform Steps (8) and (9) if equipped with LHS Controller Protection Kit.

- (8) Disconnect wires 1755 (13) and 1755A (14) from fuse holder (15).
- (9) Disconnect relay connector (16) from relay (17).

NOTE

Disconnect connector by pulling up on tabs and gently prying apart connector.

- (10) Disconnect MC94 connector (18).
- (11) Disconnect MC93 connector (19).
- (12) Disconnect MC33 connector (20).
- (13) Remove cab interface wire harness from truck.



b. Installation.

NOTE

- Evenly distribute any slack in harness.
- Install cable ties as required.

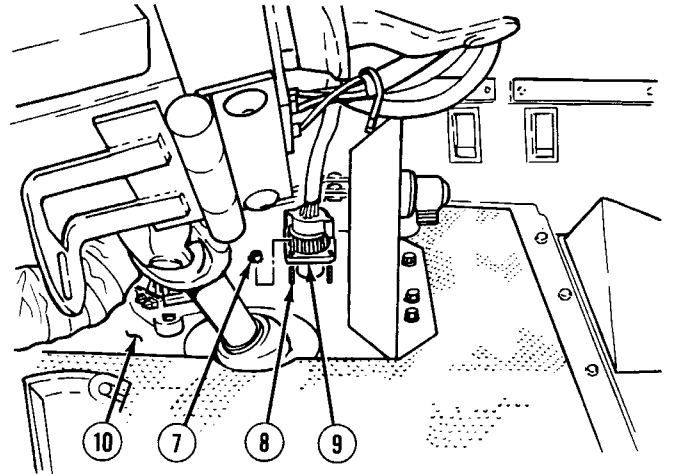
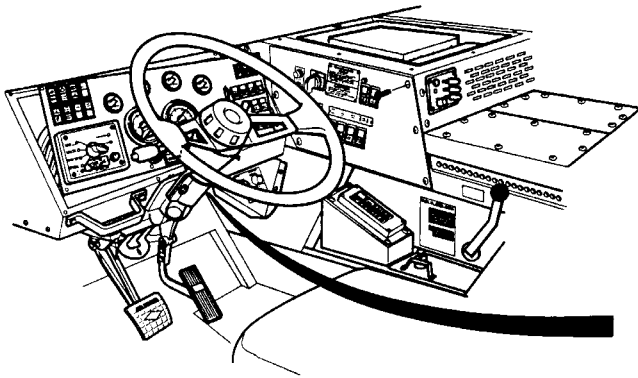
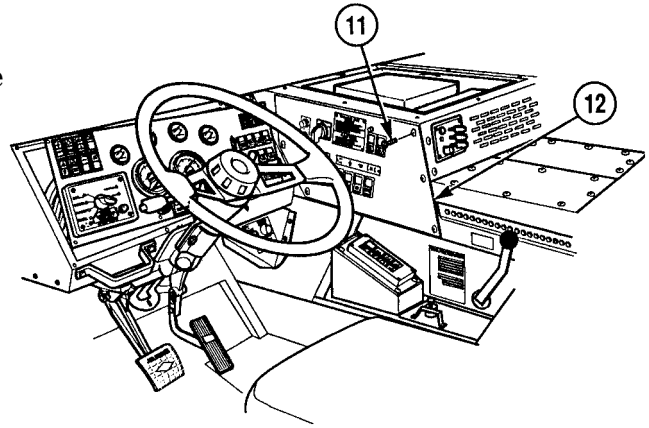
- (1) Position cab interface wire harness in truck.
- (2) Connect MC33 connector (20).
- (3) Connect MC93 connector (19).
- (4) Connect MC94 connector (18).

NOTE

Perform Steps (5) and (6) if equipped with LHS Controller Protection Kit.

- (5) Connect relay connector (16) to relay (17).
- (6) Connect wires 1755A (14) and 1755 (13) to fuse holder (15).

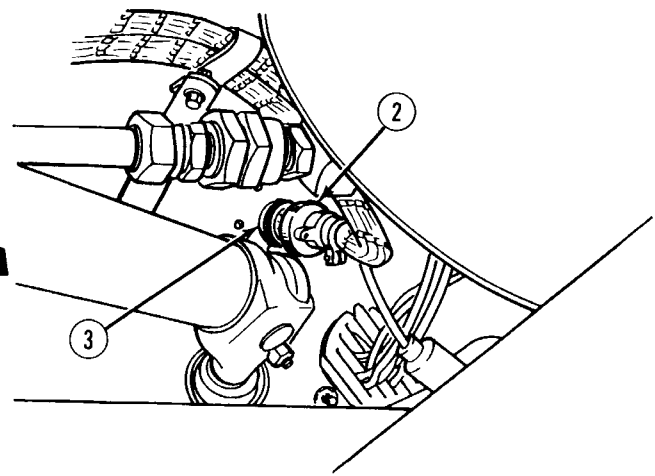
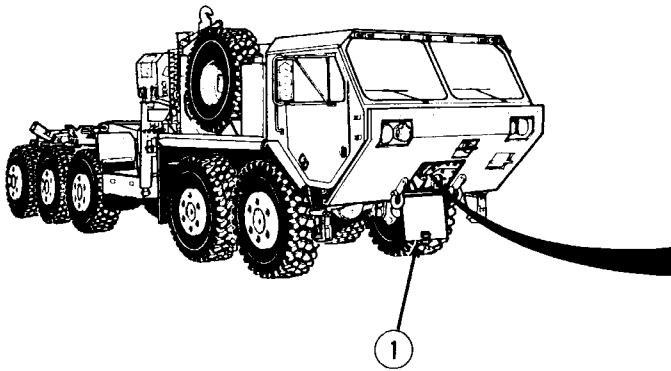
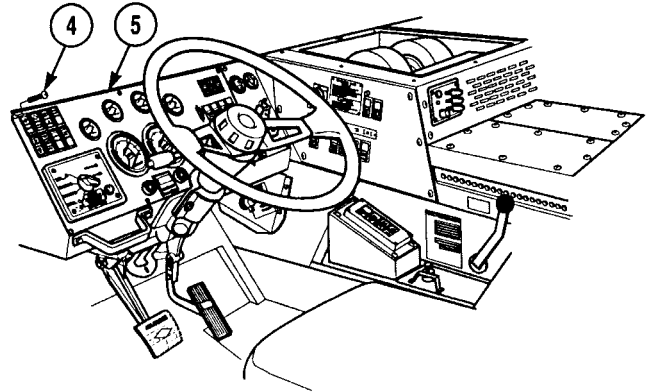
- (7) Position heater left side panel (12) in truck and install six screws (11) in heater left side panel.



- (8) With the aid of an assistant, install four screws (8), locknuts (7) and MC84 connector (9) on cab (10).

6-32. LHS CAB INTERFACE WIRE HARNESS REPLACEMENT (CONT).

- (9) Position instrument panel (5) in truck and install eight screws (4) in instrument panel.



- (10) Connect MC84 connector (2) to bulkhead connector (3).
(11) Close front access cover (1).

c. Follow-On Maintenance:

- Install heater cover, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-33. LHS CAB-TO-BULKHEAD WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

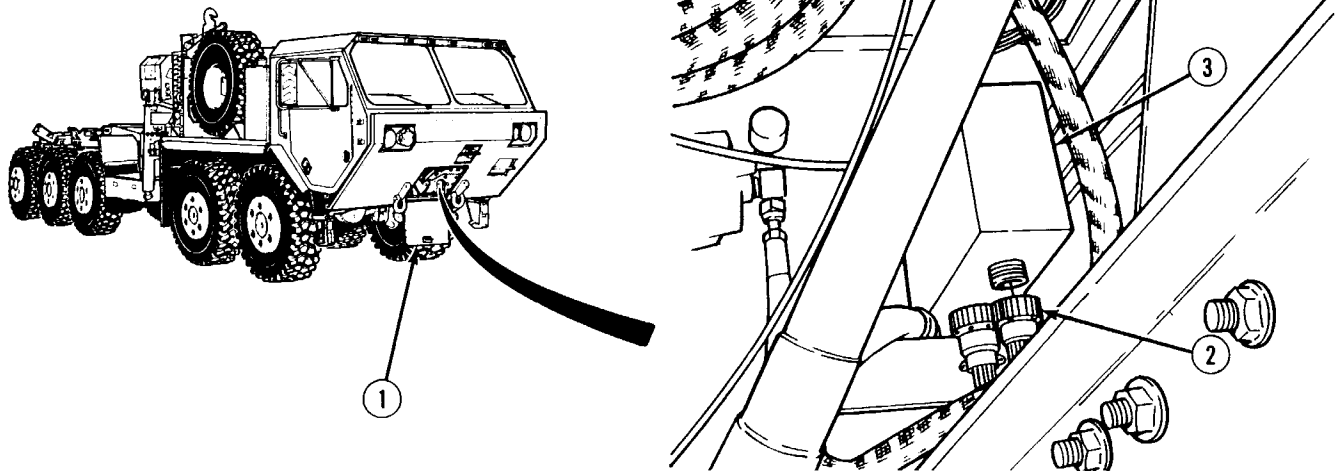
Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (Item 176, Appendix E)

a. Removal.



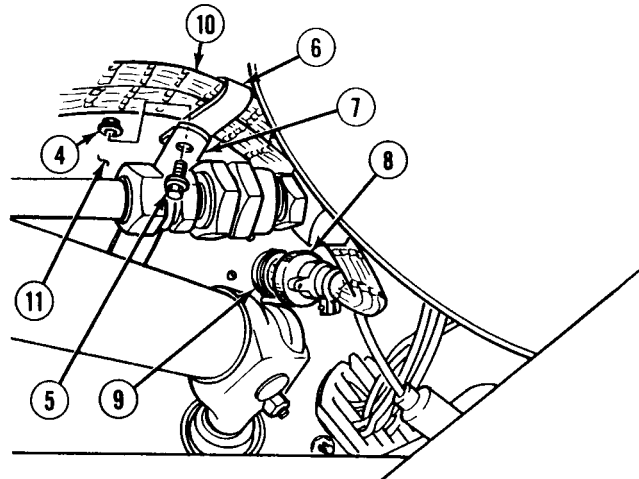
NOTE

- Tag and mark all connectors prior to removal.
- Remove cable ties as required.

- (1) Open front access cover (1).
- (2) Disconnect MC83 connector (2) from LHS control box (3).

6-33. LHS CAB-TO-BULKHEAD WIRE HARNESS REPLACEMENT. (CONT).

- (3) Remove locknut (4), screw (5) and cushion clip (6) from bracket (7). Discard locknut.
- (4) Remove cab to bulkhead wire harness (10) from cushion clip (6).
- (5) Disconnect MC84 connector (8) from cab bulkhead connector (9).
- (6) Remove cab to bulkhead wire harness (10) from truck (11).

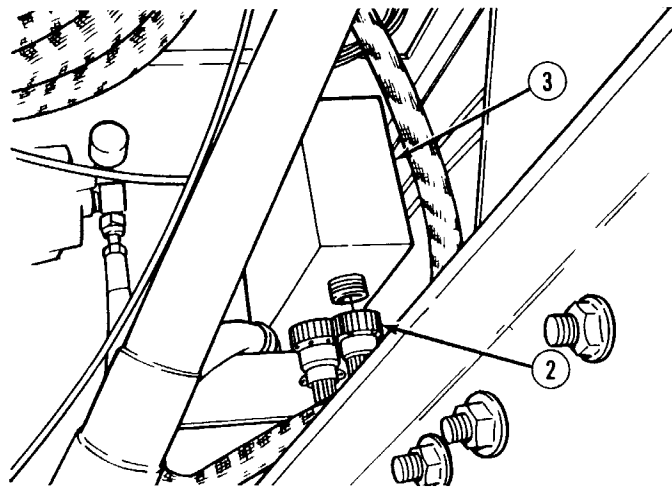
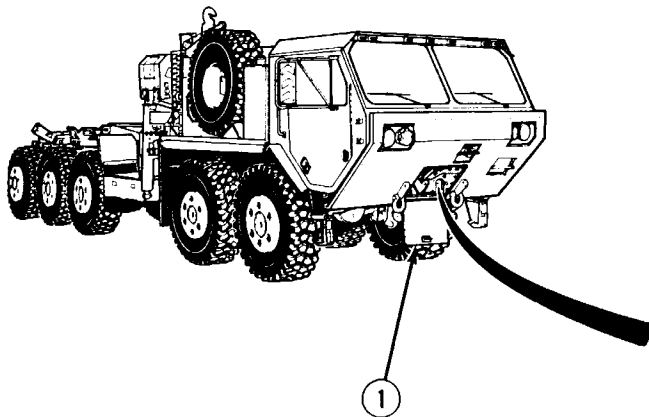


b. Installation.

NOTE

- Evenly distribute any slack in harness.
- Install cable ties as required.

- (1) Position cab to bulkhead wire harness (10) through truck (11).
- (2) Connect MC84 connector (8) to cab bulkhead connector (9).
- (3) Position cab to bulkhead wire harness (10) in cushion clip (6).
- (4) Install cushion clip (6), screw (5) and locknut (4) on bracket (7).



- (5) Connect MC83 connector (2) to control box (3).
- (6) Close front access cover (1).

c. Follow-On Maintenance:

- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-33.1. LHS MAIN JUNCTION BOX TO LHS BULKHEAD WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

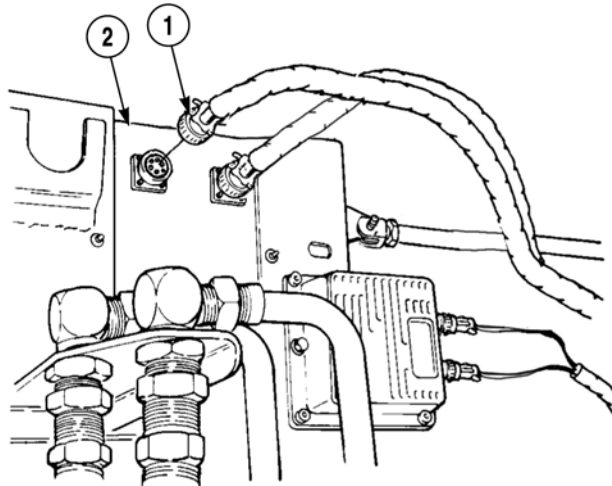
Materials/Parts

Cable Ties (Item 9, Appendix B)
Tags, Identification (Item 72, Appendix B)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)

a. Removal.

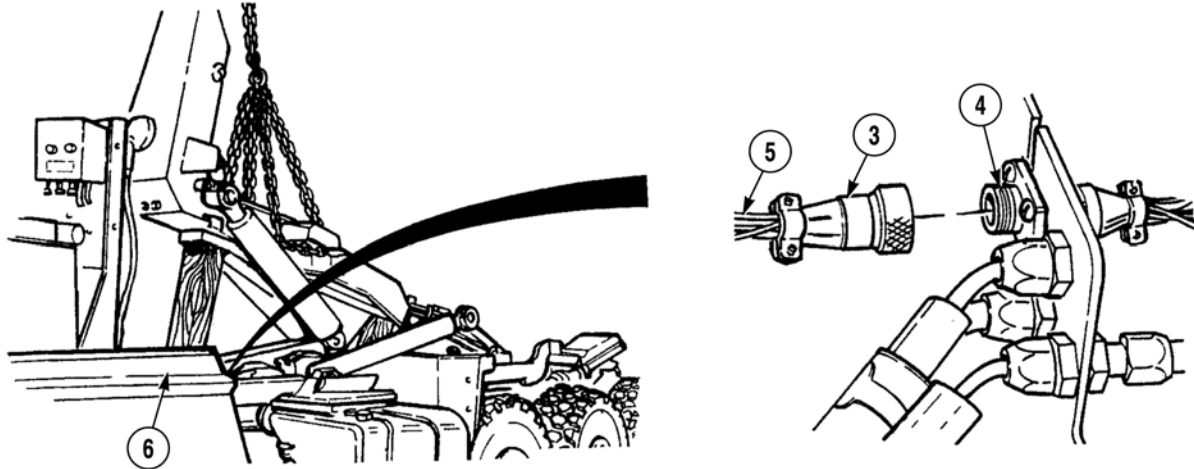


NOTE

- Tag and mark all connectors prior to removal.
- Remove cable ties as required.

(1) Disconnect MC85 connector (1) from main junction box (2).

6-33.1. LHS MAIN JUNCTION BOX TO LHS BULKHEAD WIRE HARNESS REPLACEMENT (CONT).



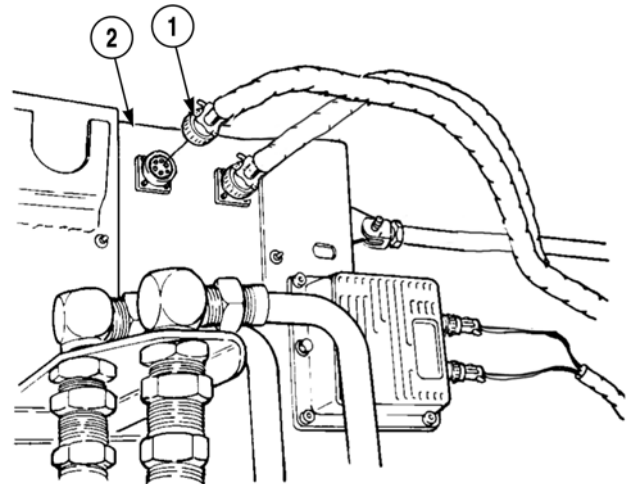
- (2) Disconnect MC86 connector (3) from LHS bulkhead connector (4).
- (3) Remove main junction box to LHS bulkhead wire harness (5) from truck (6).

b. Installation.

NOTE

- Evenly distribute any slack in harness.
- Install cable ties as required.

- (1) Position main junction box to LHS bulkhead wire harness (5) through truck (6).
- (2) Connect MC86 connector (3) to LHS bulkhead connector (4).
- (3) Connect MC85 connector (1) to main junction box (2).



c. Follow-On Maintenance:

- Connect batteries (TM 9-2320-364-20).
- Remove wheel chocks (TM 9-2320-364-10).

END OF TASK

6-33.2. LHS CONTROL BOX TO LHS MAIN JUNCTION BOX WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

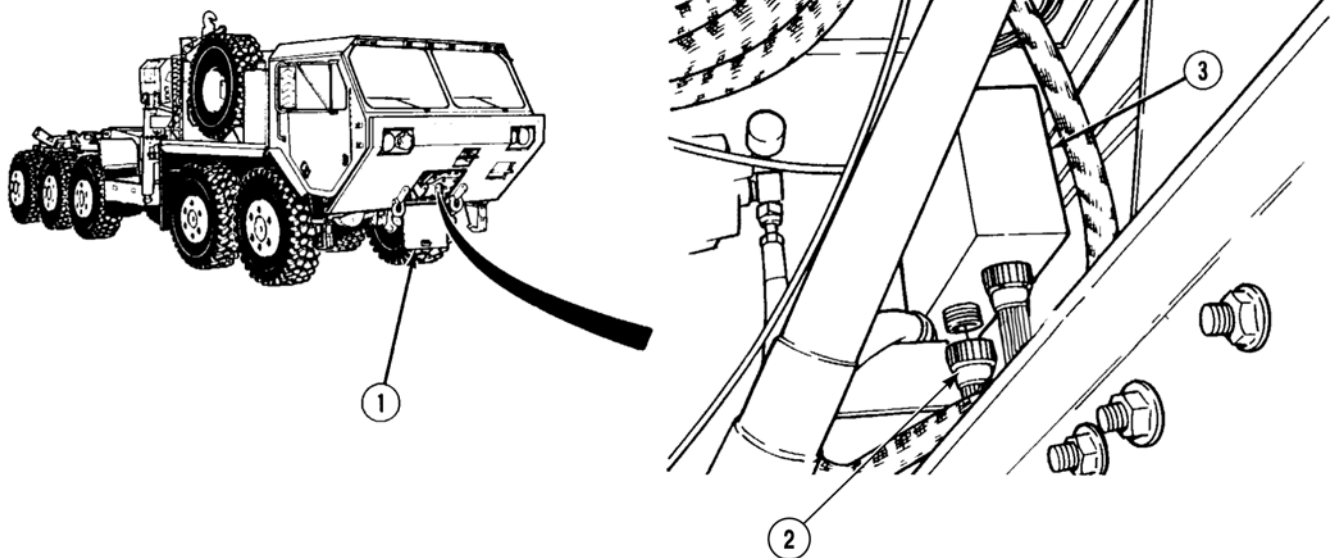
Materials/Parts

Cable Ties (Item 9, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (3) (Item NO TAG, Appendix NO TAG)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-20)

a. Removal.



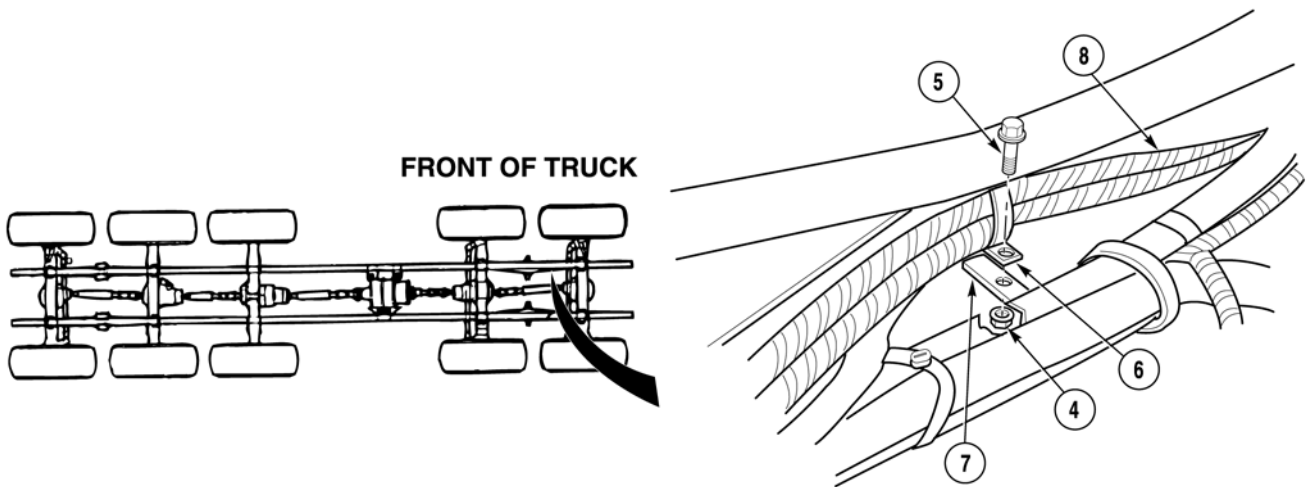
NOTE

- Tag and mark all connectors prior to removal.
- Remove cable ties as required.

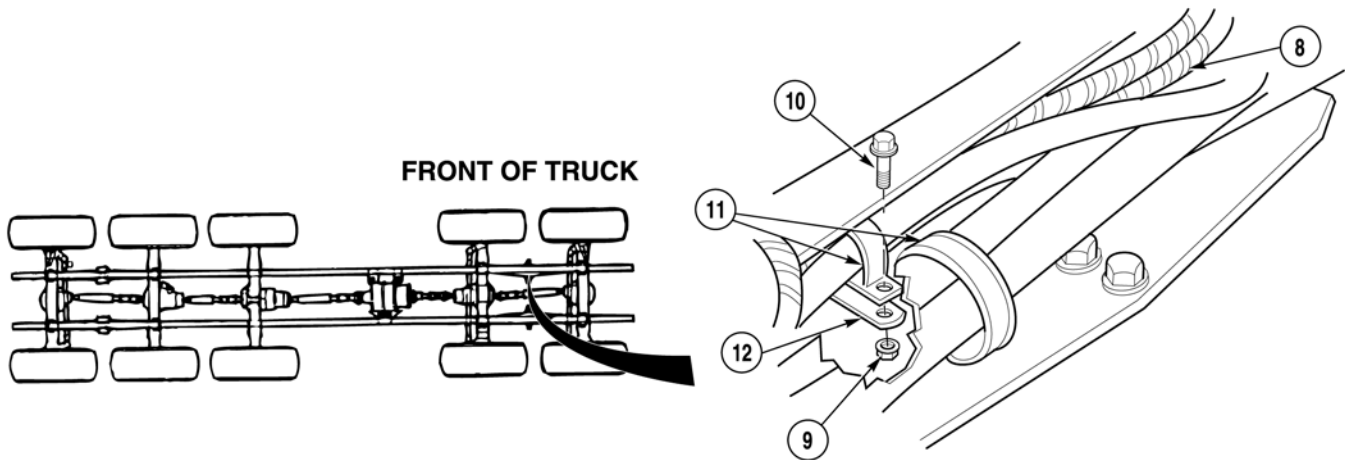
(1) Open front access cover (1).

(2) Disconnect MC81 connector (2) from LHS control box (3).

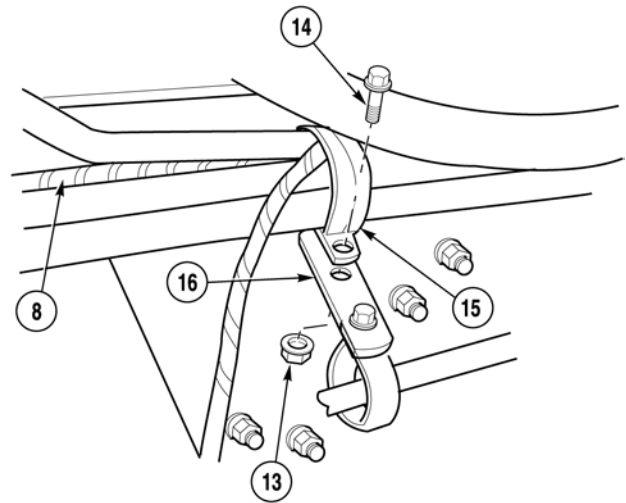
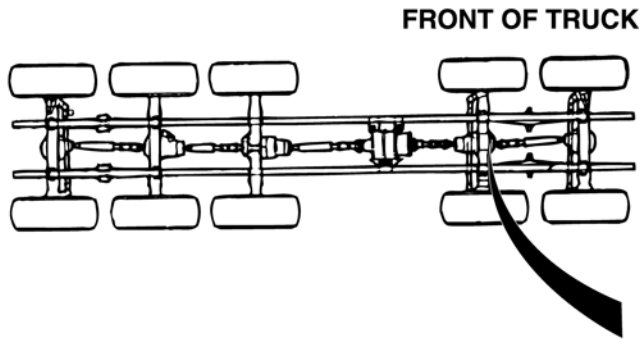
6-33.2. LHS CONTROL BOX TO LHS MAIN JUNCTION BOX WIRE HARNESS REPLACEMENT (CONT).



- (3) Remove locknut (4), screw (5) and cushion clip (6) from bracket (7). Discard locknut.
- (4) Remove cab to main junction box wire harness (8) from cushion clip (6).



- (5) Remove locknut (9), screw (10) and two cushion clips (11) from bracket (12). Discard locknut.
- (6) Remove cab to main junction box wire harness (8) from cushion clip (11).

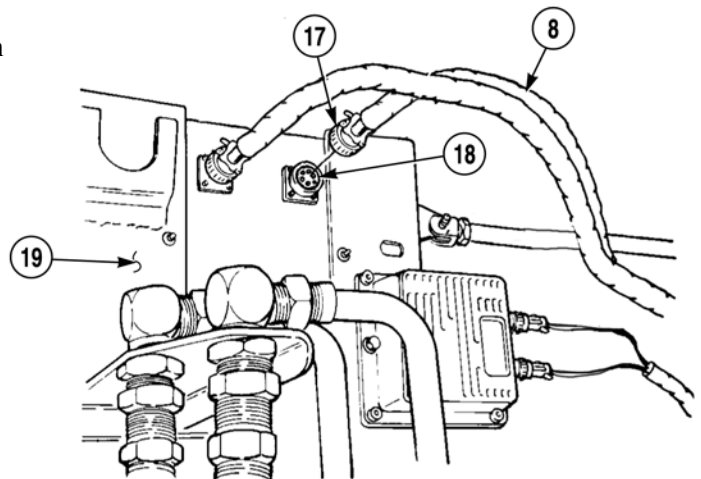


- (7) Remove locknut (13), screw (14) and cushion clip (15) from bracket (16). Discard locknut.
- (8) Remove cab to main junction box wire harness (8) from cushion clip (15).
- (9) Disconnect MC82 connector (17) from main junction box connector (18).
- (10) Remove cab to main junction box wire harness (8) from truck (19).

b. Installation.

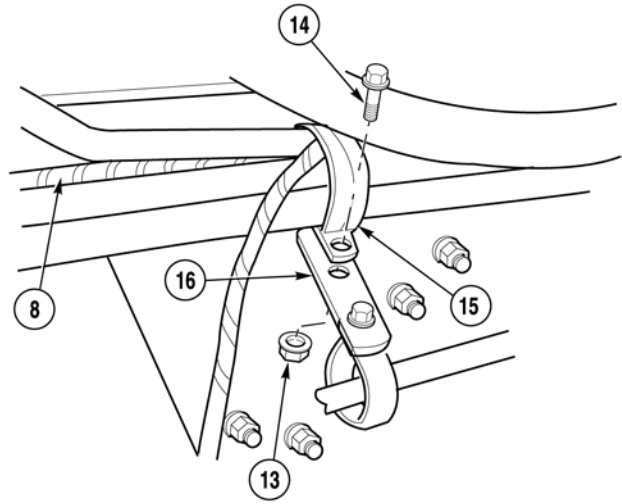
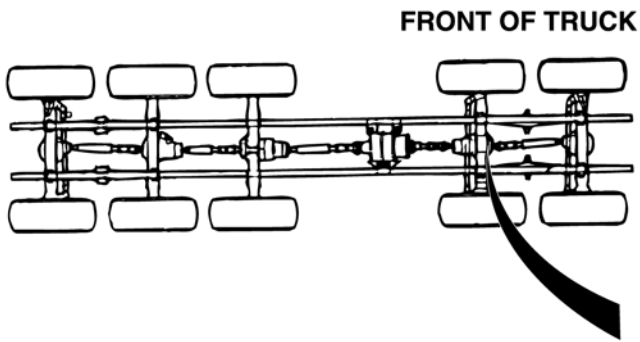
NOTE

- Evenly distribute any slack in harness.
- Install cable ties as required.

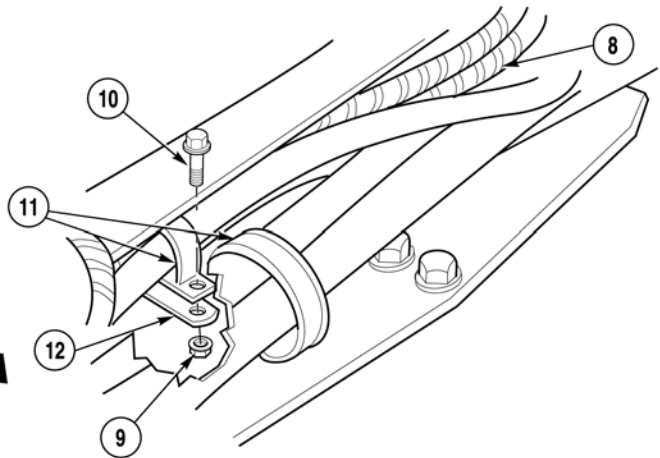
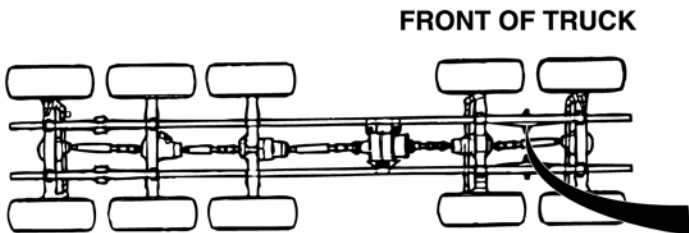


- (1) Position cab to main junction box wire harness (8) through truck (19).
- (2) Connect MC82 connector (17) to main junction box connector (18).

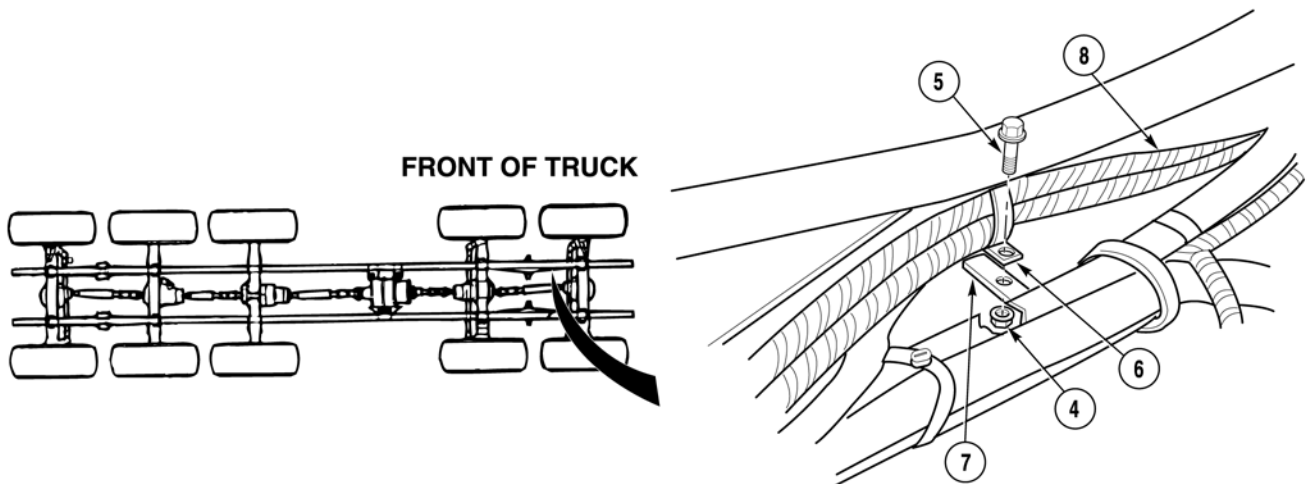
6-33.2. LHS CONTROL BOX TO LHS MAIN JUNCTION BOX WIRE HARNESS REPLACEMENT (CONT).



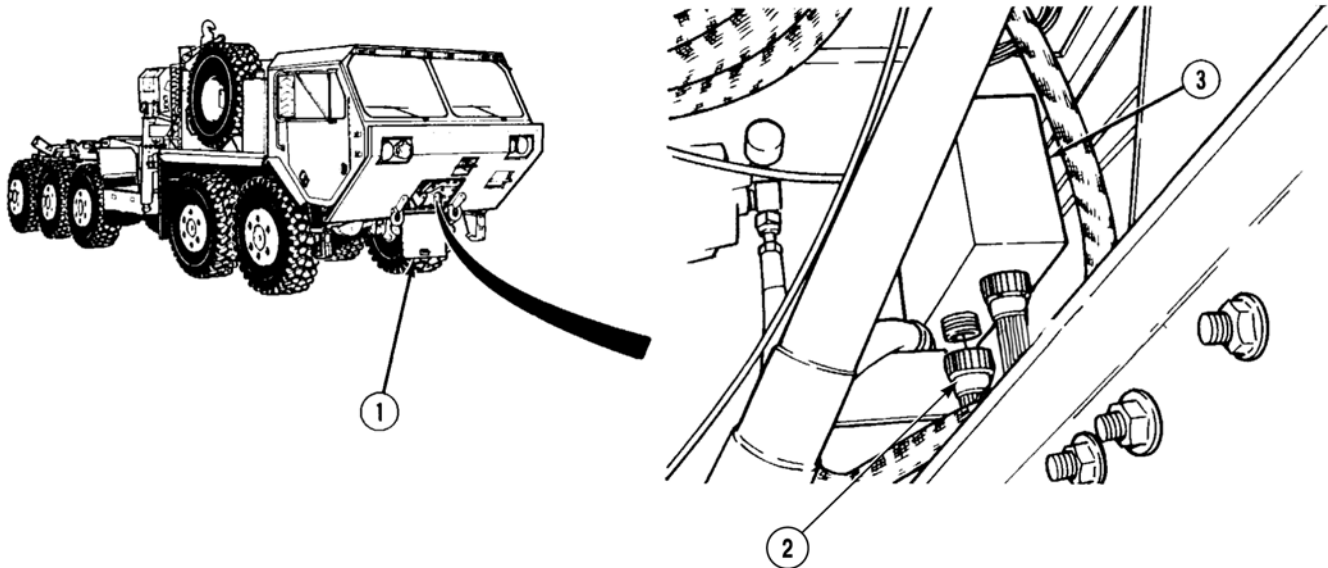
- (3) Position cab to main junction box wire harness (8) in cushion clip (15).
- (4) Install cushion clip (15) on bracket (16) with screw (14) and locknut (13).
- (5) Position cab to main junction box wire harness (8) in cushion clip (11).



- (6) Install two cushion clips (11) on bracket (12) with screw (10) and locknut (9).



- (7) Position cab to main junction box wire harness (8) in cushion clip (6).
- (8) Install cushion clip (6) on bracket (7) with screw (5) and locknut (4).



- (9) Connect MC81 connector (2) to LHS control box (3).
- (10) Close front access cover (1).

c. Follow-On Maintenance:

- Connect batteries (TM 9-2320-364-20).
- Remove wheel chocks (TM 9-2320-364-10).

END OF TASK

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

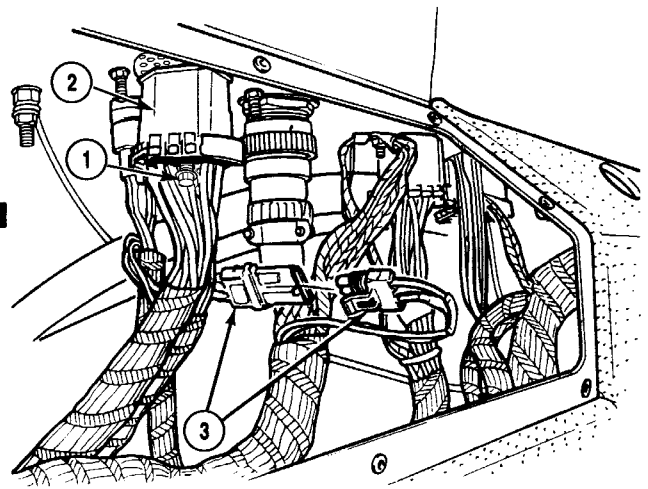
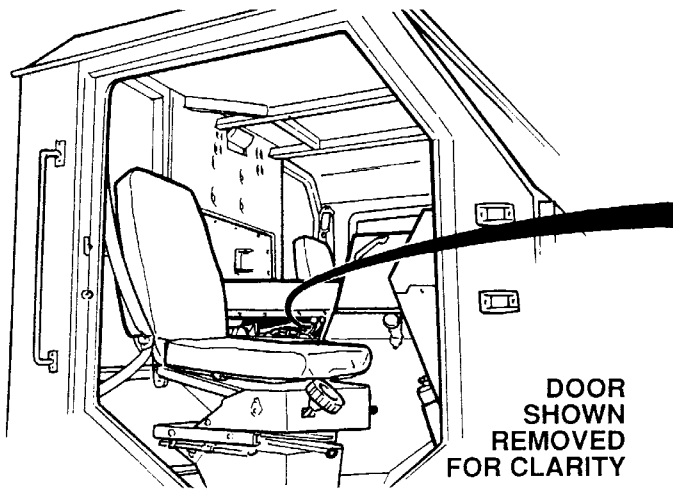
Materials/Parts

Cable Ties (Item 9, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (23) (Item 176, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
LHS fully extended, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-10)
Left side noise panel removed,
(TM 9-2320-364-20)
Electronic Control Box (ECB) right side
panel removed, (TM 9-2320-364-20)

a. Removal.



NOTE

- Remove cable ties as required.
- Tag and mark all wire connectors prior to removal.

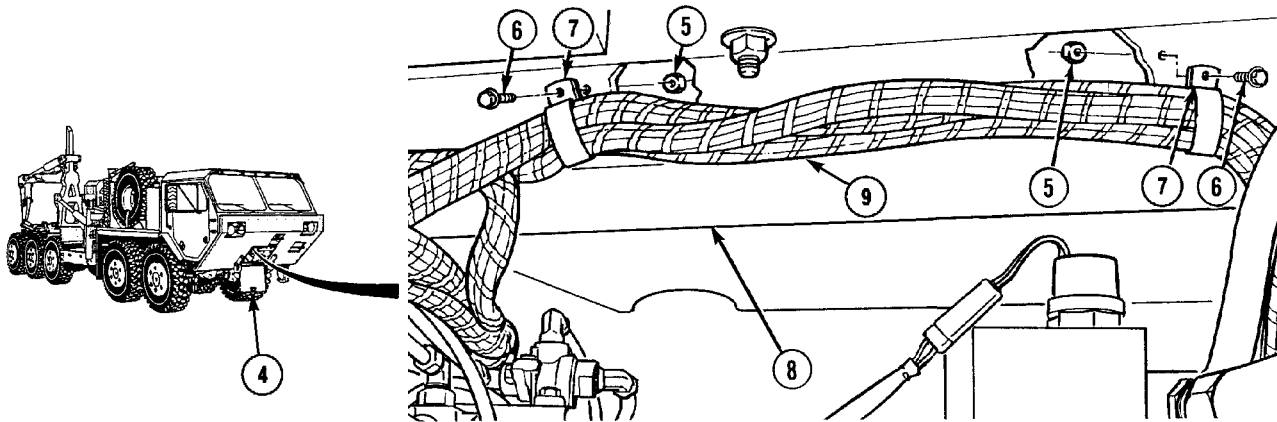
(1) Loosen screw (1) and disconnect MC25 connector (2).

NOTE

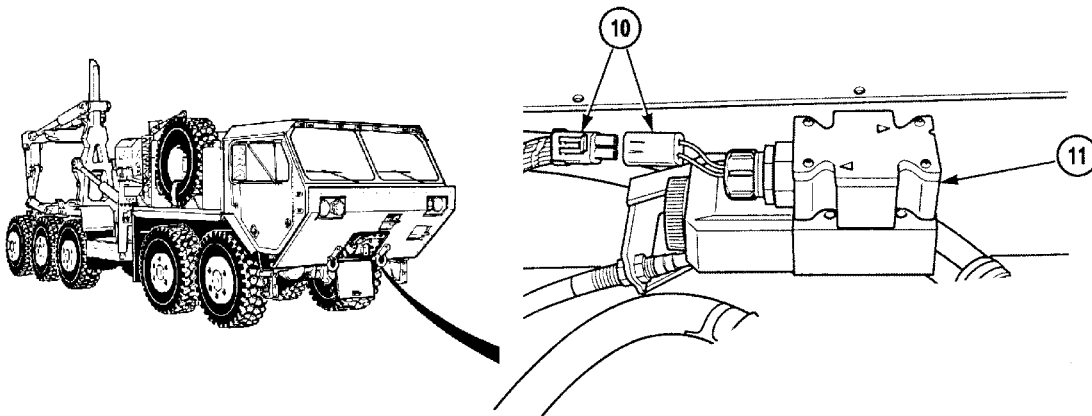
Disconnect connector by gently prying up on tabs and pulling apart connector.

(2) Disconnect MC120 connector (3).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).

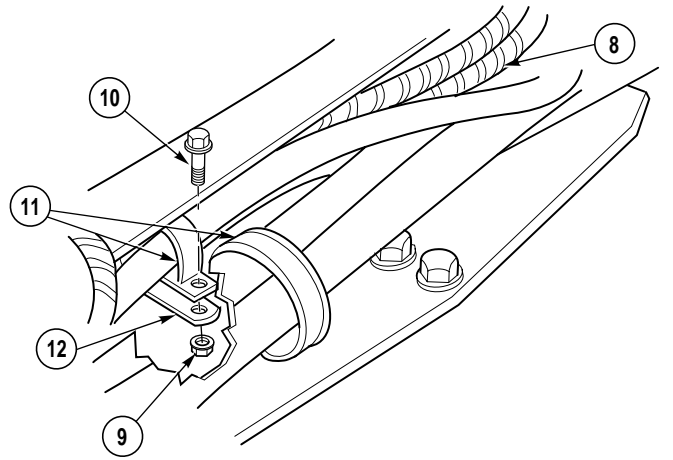
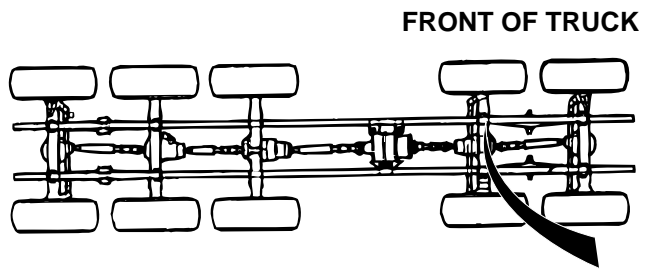


- (3) Open front access cover (4).
- (4) Remove two locknuts (5), screws (6) and cushion clips (7) from crossmember (8). Discard locknuts.
- (5) Remove 24 volt trailer wire harness (9) from two cushion clips (7).

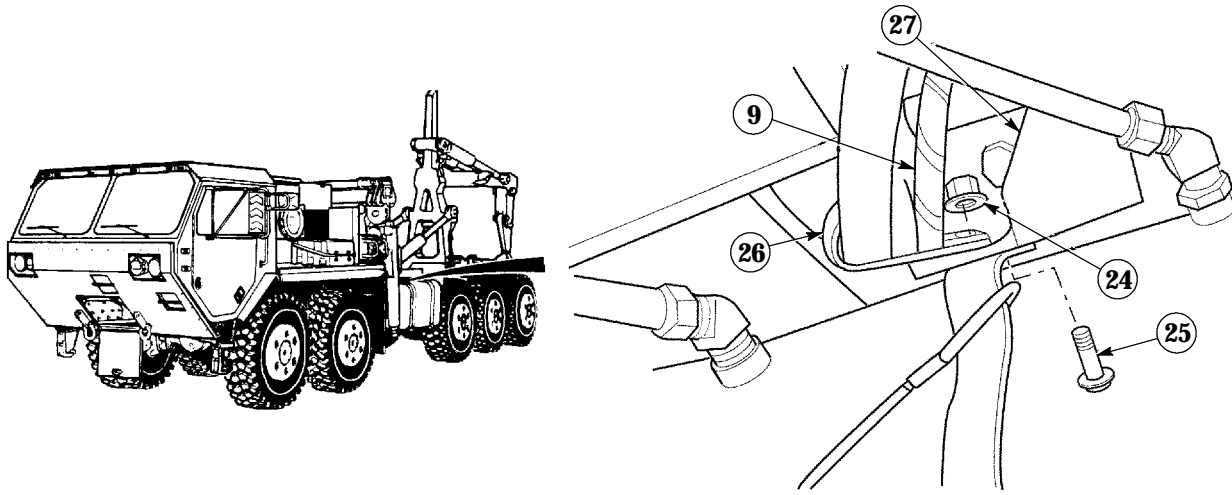


- (6) Disconnect MC76 connector (10) from fan control solenoid (11).

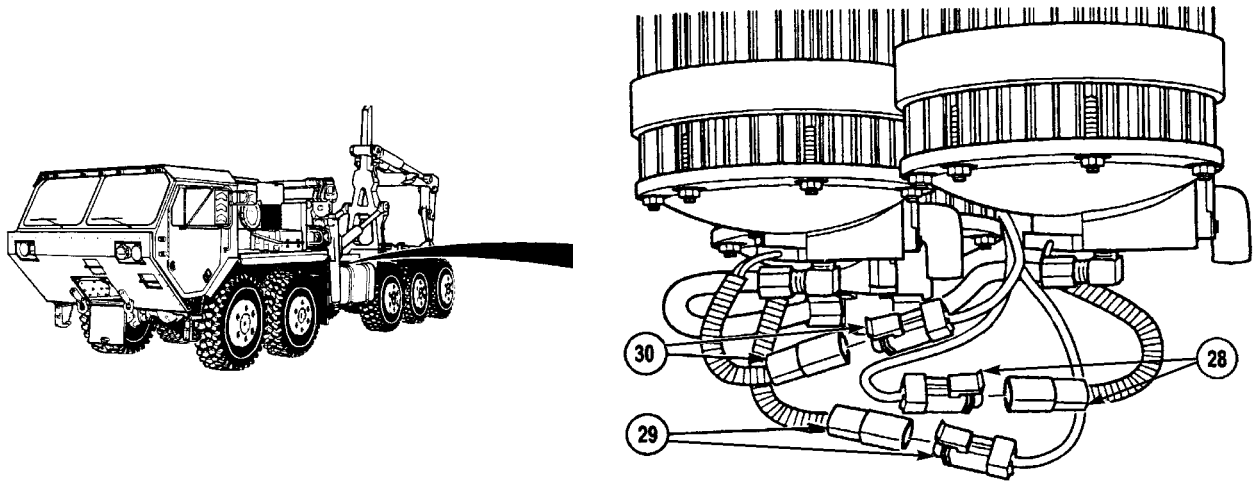
PLSF00799



6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).



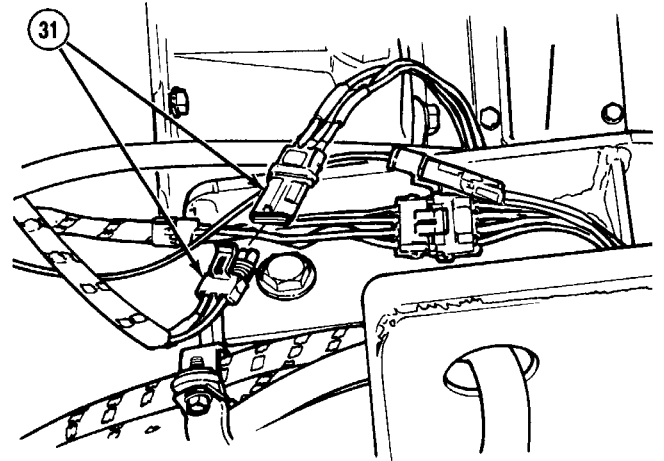
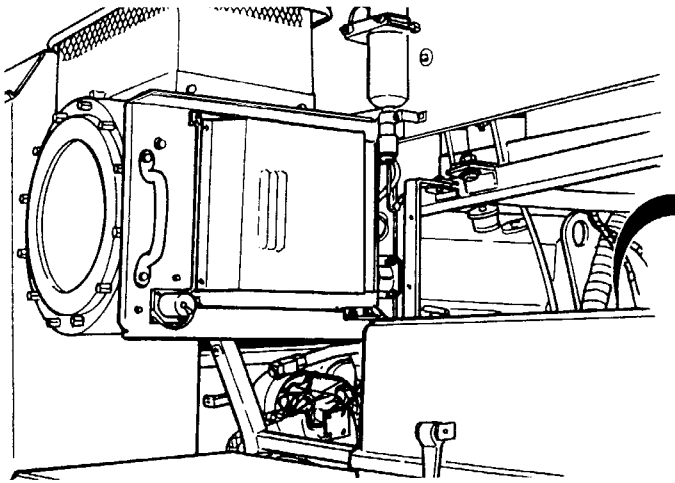
- (13) Remove locknut (24), screw (25) and cushion clip (26) from reservoir bracket (27). Discard locknut.
- (14) Remove 24 volt trailer wire harness (9) from cushion clip (26).



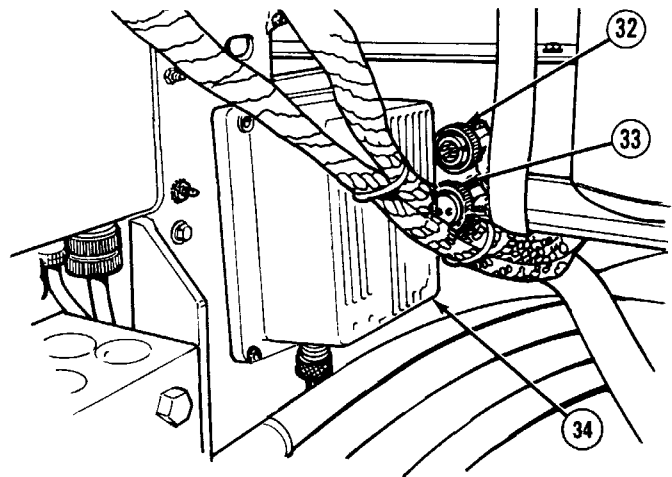
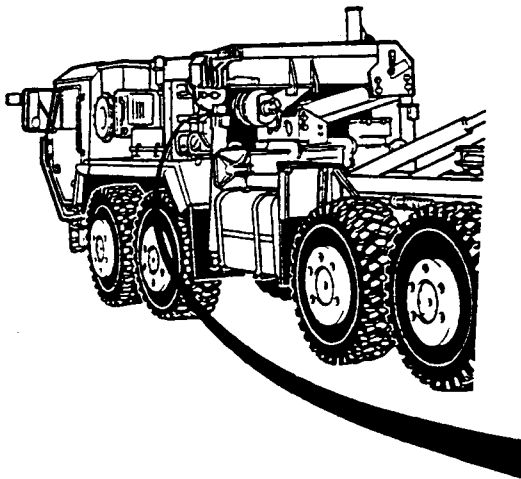
NOTE

Connectors are removed by gently prying up on lock tab and pulling connectors apart.

- (15) Disconnect connectors MC97 (28), MC99 (29) and MC98 (30).

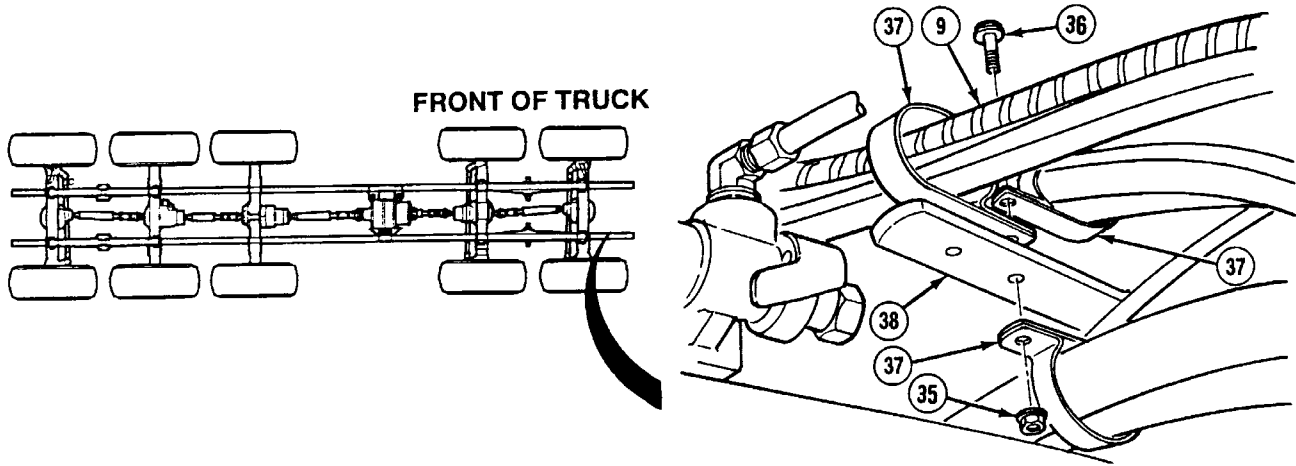


(16) Disconnect MC63 connector (31).

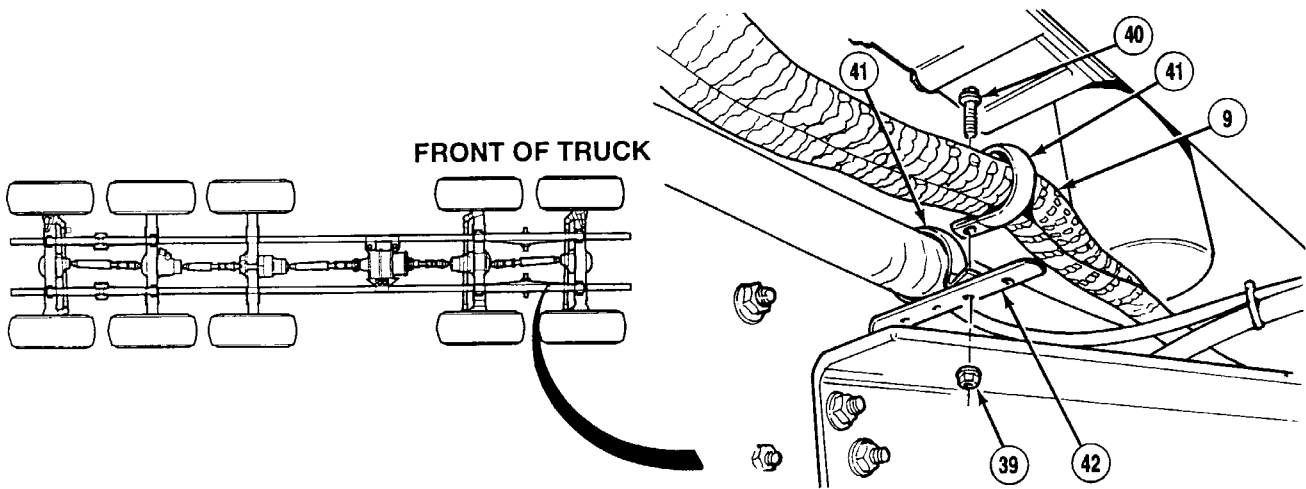


(17) Remove connectors MC59 (32) and MC73 (33) from EPAC (34).

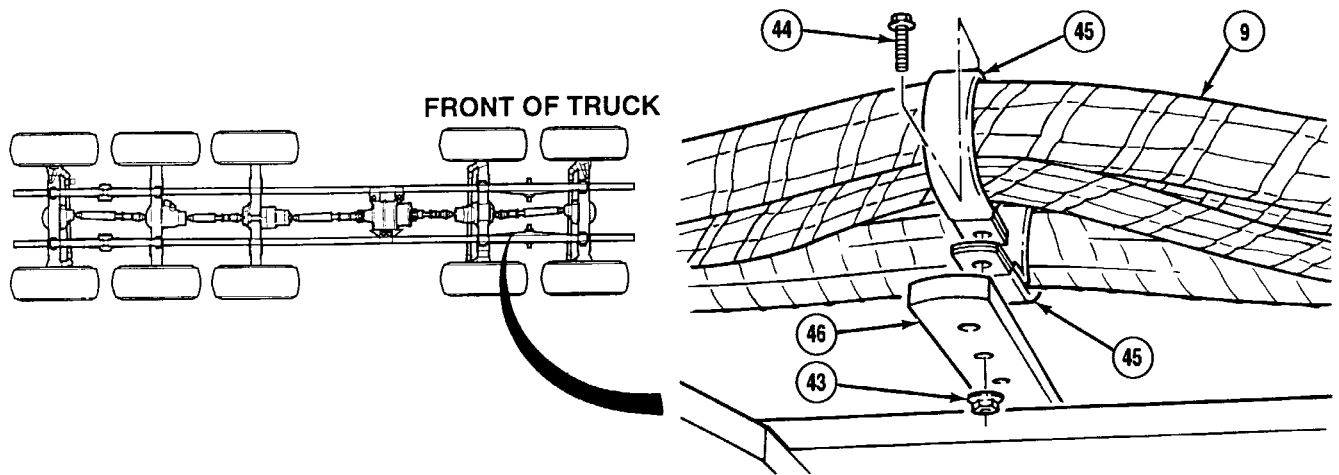
6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).



- (18) Remove locknut (35), screw (36) and three cushion clips (37) from bracket (38). Discard locknut.
- (19) Remove 24 volt trailer wire harness (9) from cushion clip (37).

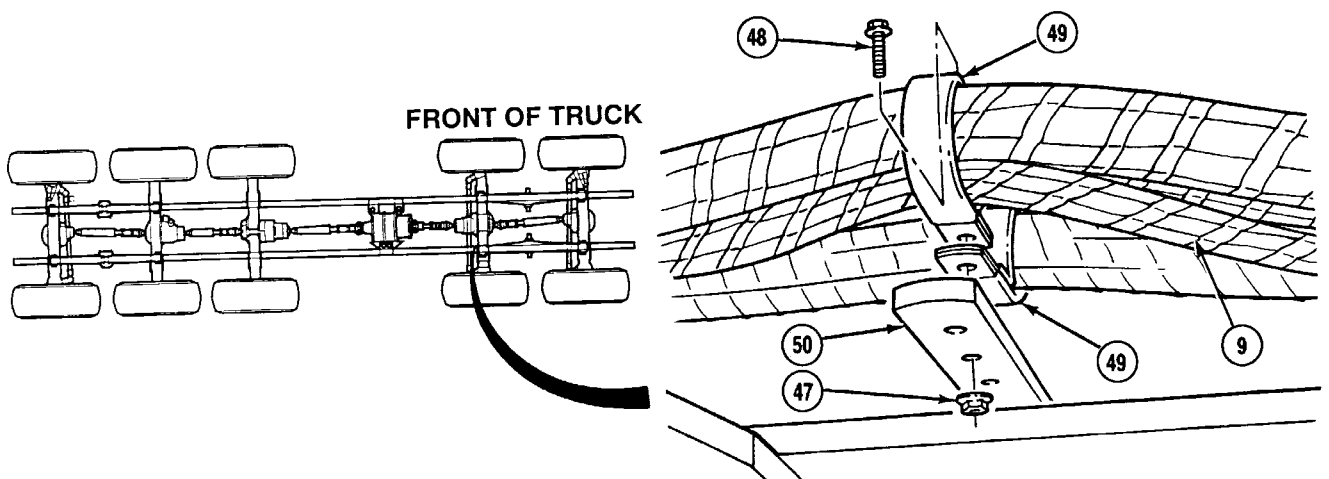


- (20) Remove locknut (39), screw (40) and two cushion clips (41) from bracket (42). Discard locknut.
- (21) Remove 24 volt trailer wire harness (9) from cushion clip (41).



(22) Remove locknut (43), screw (44) and two cushion clips (45) from bracket (46). Discard locknut.

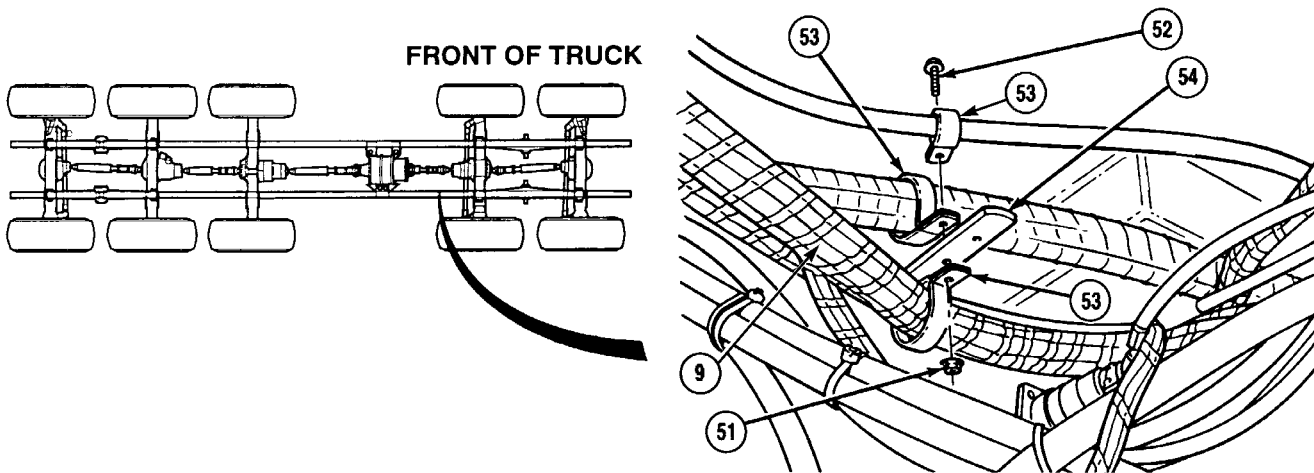
(23) Remove 24 volt trailer wire harness (9) from cushion clip (45).



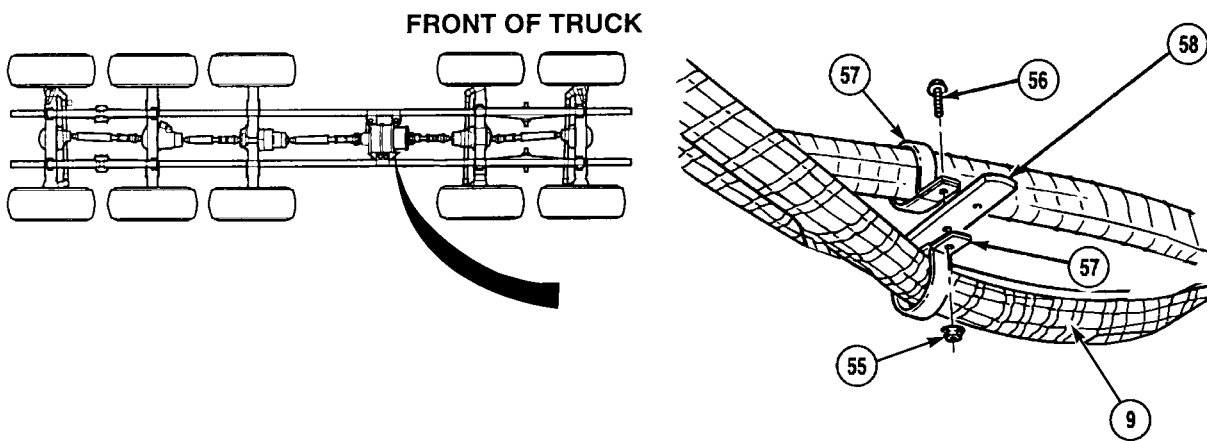
(24) Remove locknut (47), screw (48) and two cushion clips (49) from bracket (50). Discard locknut.

(25) Remove 24 volt trailer wire harness (9) from cushion clip (49).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).



- (26) Remove locknut (51), screw (52) and three cushion clips (53) from bracket (54). Discard locknut.
- (27) Remove 24 volt trailer wire harness (9) from cushion clip (53).



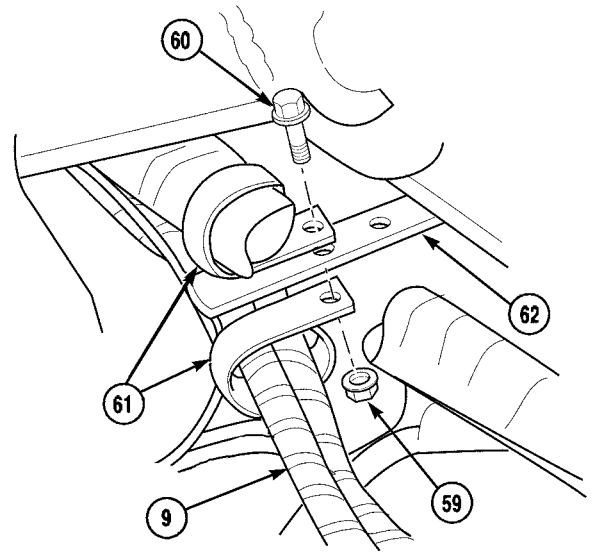
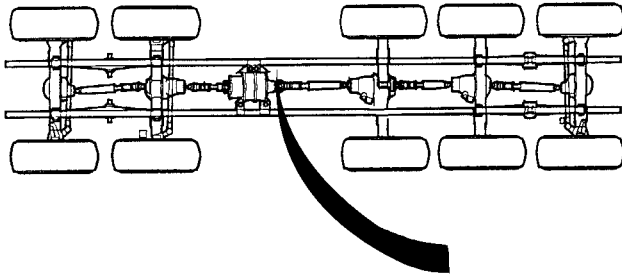
- (28) Remove locknut (55), screw (56) and two cushion clips (57) from bracket (58). Discard locknut.

NOTE

If cushion clip is part of 24 volt wire harness, go to Step (30).

- (29) Remove 24 volt trailer wire harness (9) from cushion clip (57).

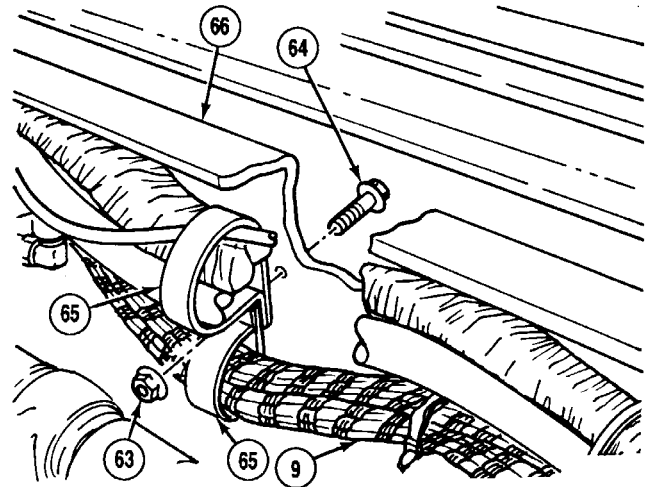
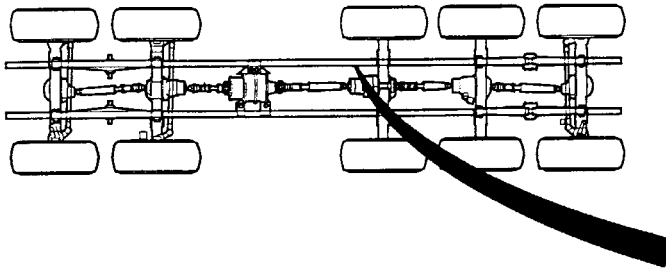
FRONT OF TRUCK



(30) Remove locknut (59), screw (60) and two cushion clips (61) from bracket (62). Discard locknut.

(31) Remove 24 volt trailer wire harness (9) from cushion clip (61).

FRONT OF TRUCK

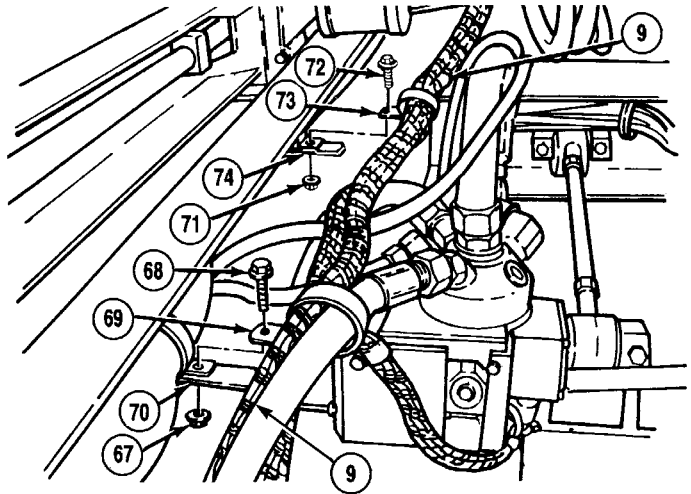
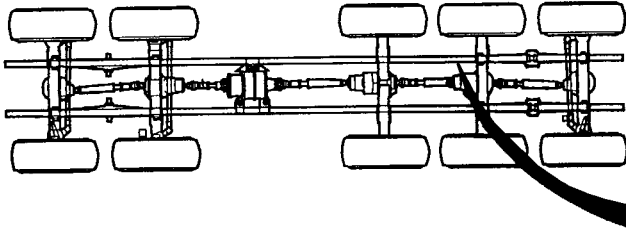


(32) Remove locknut (63), screw (64) and two cushion clips (65) from frame (66). Discard locknut.

(33) Remove 24 volt trailer wire harness (9) from cushion clip (65).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).

FRONT OF TRUCK



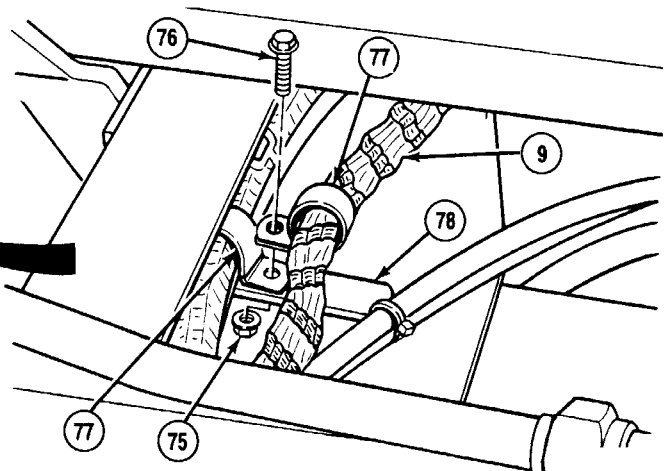
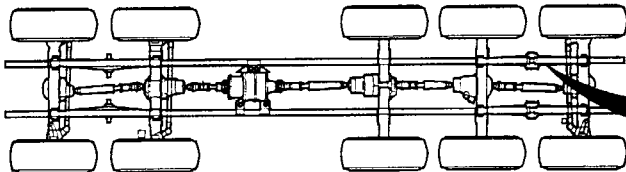
- (34) Remove locknut (67), screw (68) and two cushion clips (69) from bracket (70). Discard locknut.
- (35) Remove 24 volt trailer wire harness (9) from cushion clip (69).
- (36) Remove locknut (71), screw (72) and two cushion clips (73) from bracket (74). Discard locknut.

NOTE

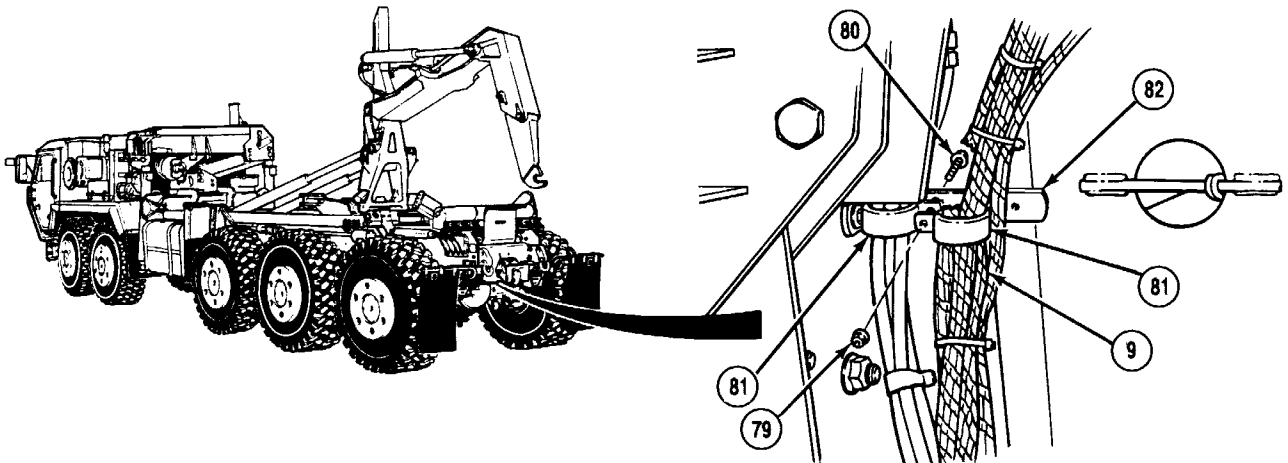
If cushion clip is part of 24 volt wire harness, go to Step (38).

- (37) Remove 24 volt trailer wire harness (9) from cushion clip (73).

FRONT OF TRUCK

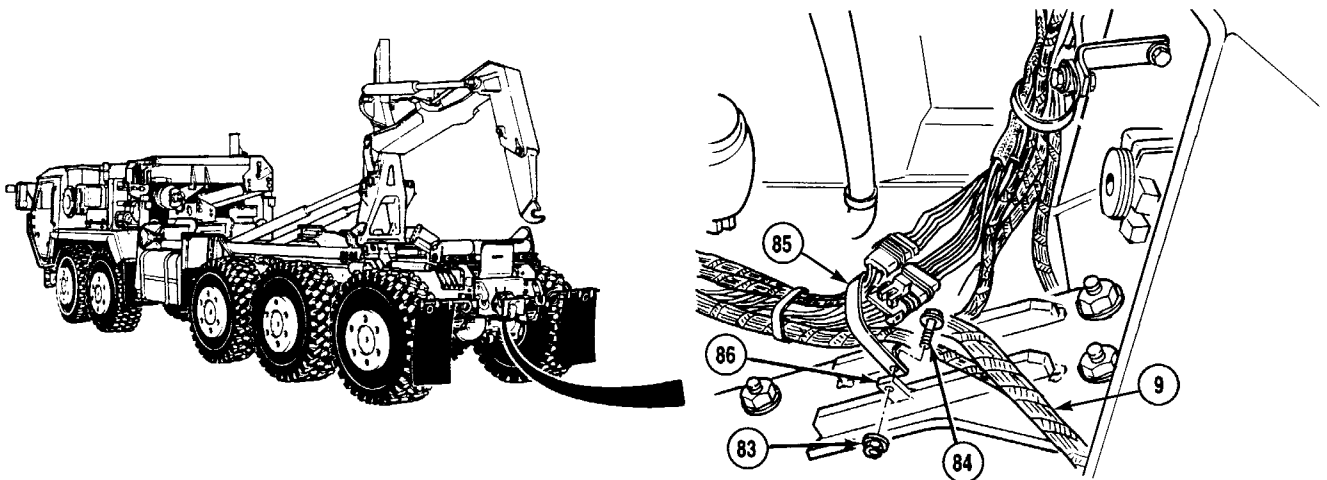


- (38) Remove locknut (75), screw (76) and two cushion clips (77) from bracket (78). Discard locknut.
- (39) Remove 24 volt trailer wire harness (9) from cushion clip (77).



(40) Remove locknut (79), screw (80) and two cushion clips (81) from bracket (82). Discard locknut.

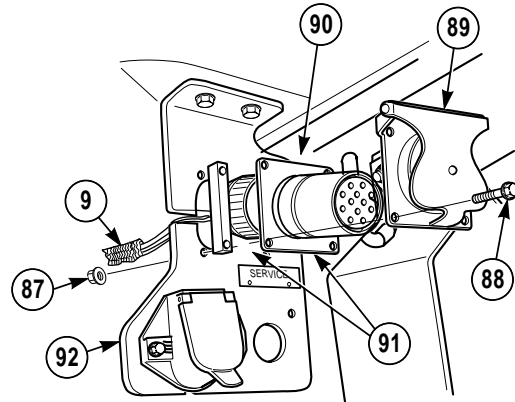
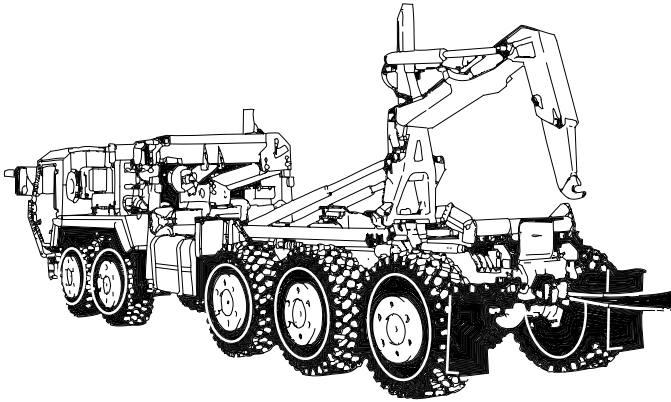
(41) Remove 24 volt trailer wire harness (9) from cushion clip (81).



(42) Remove locknut (83), screw (84) and cushion clip (85) from bracket (86). Discard locknut.

(43) Remove 24 volt trailer wire harness (9) from cushion clip (85).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).



NOTE

24 volt trailer harness is removed by pulling wires through slot in mounting bracket.

- (44) Remove four locknuts (87), screws (88), spring cover (89), 24 volt trailer connector (90) and two spacers (91) from mounting bracket (92). Discard locknuts.
- (45) Remove 24 volt trailer wire harness (9) from truck.

b. Installation.

NOTE

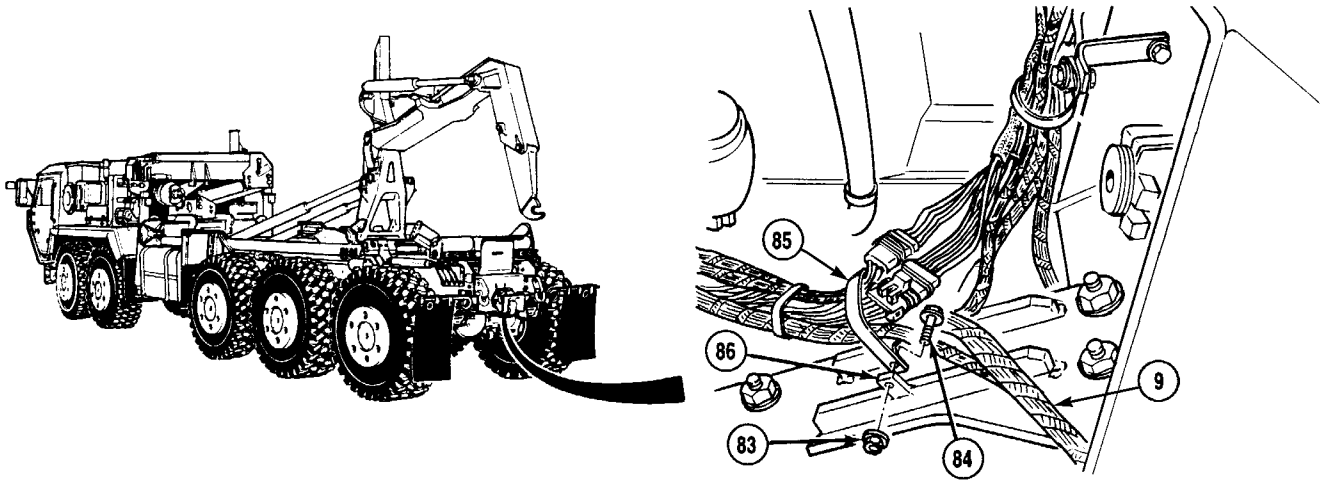
- Install cable ties as required.
- Evenly distribute any slack in harness.

- (1) Position 24 volt trailer wire harness (9) in truck.

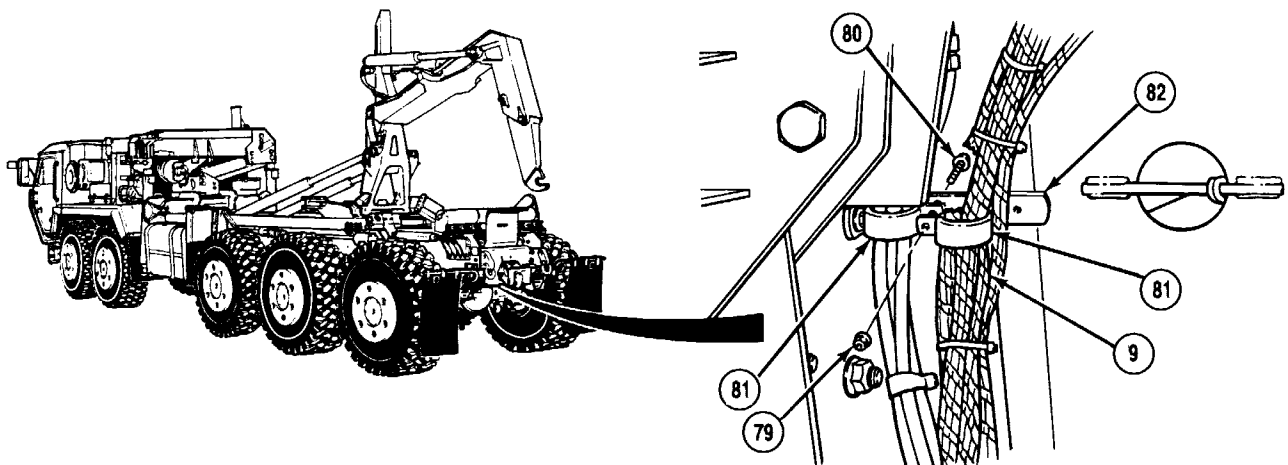
NOTE

24 volt trailer harness connector is installed by pulling wires through slot in mounting bracket.

- (2) Install 24 volt trailer connector (90) on mounting bracket (92) with four screws (88), locknuts (87), two spacers (91) and spring cover (89).

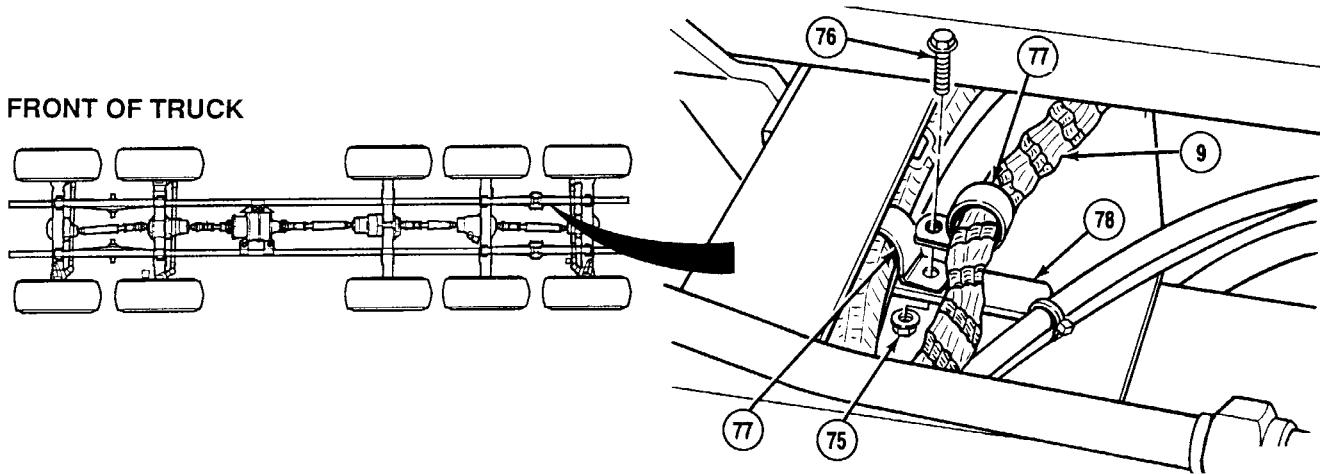


- (3) Position 24 volt trailer wire harness (9) in cushion clip (85).
- (4) Install cushion clip (85), screw (84) and locknut (83) on bracket (86).

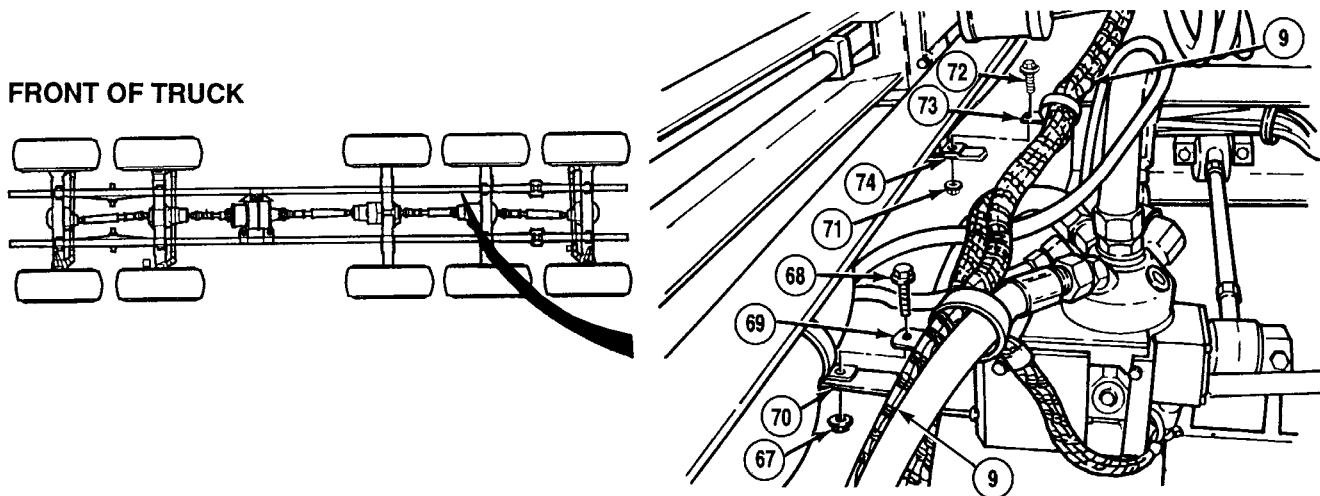


- (5) Position 24 volt trailer wire harness (9) in cushion clip (81).
- (6) Install two cushion clips (81), screw (80) and locknut (79) on bracket (82).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).



- (7) Position 24 volt trailer wire harness (9) in cushion clip (77).
- (8) Install two cushion clips (77), screw (76) and locknut (75) on bracket (78).

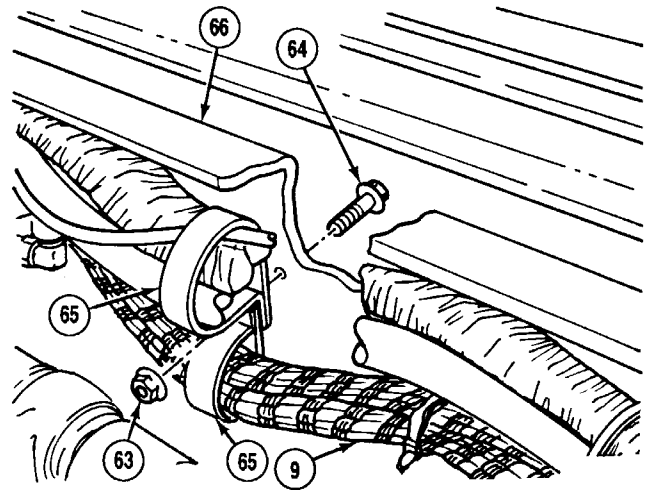
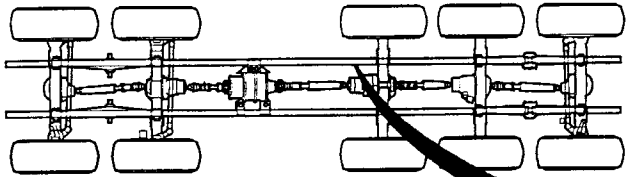


NOTE

If cushion clip is part of 24 volt wire harness, go to Step (10).

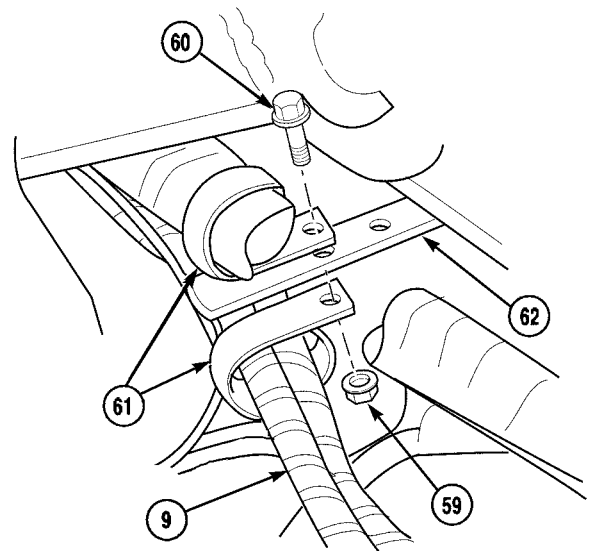
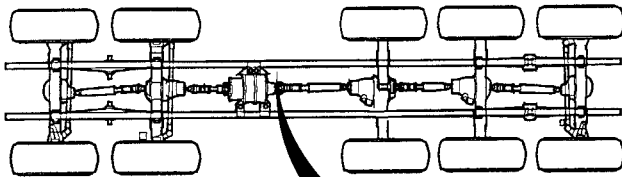
- (9) Position 24 trailer wire harness (9) in cushion clip (73).
- (10) Install two cushion clips (73), screw (72) and locknut (71) on bracket (74).
- (11) Position 24 volt trailer wire harness (9) in cushion clip (69).
- (12) Install two cushion clips (69), screw (68) and locknut (67) on bracket (70).

FRONT OF TRUCK



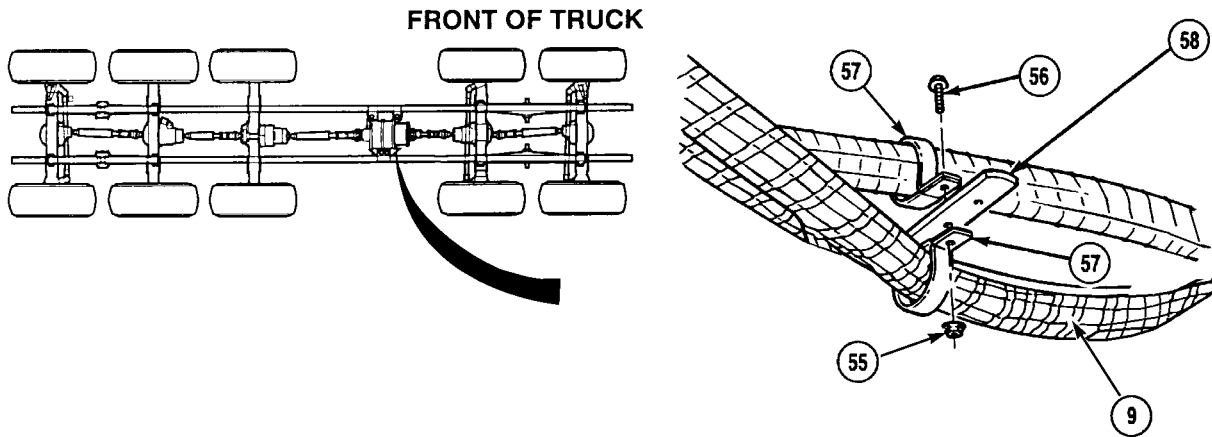
- (13) Position 24 volt trailer wire harness (9) in cushion clip (65).
- (14) Install two cushion clips (65), screw (64) and locknut (63) on frame (66).

FRONT OF TRUCK



- (15) Position 24 volt trailer wire harness (9) in cushion clip (61).
- (16) Install two cushion clips (61), screw (60) and locknut (59) on bracket (62).

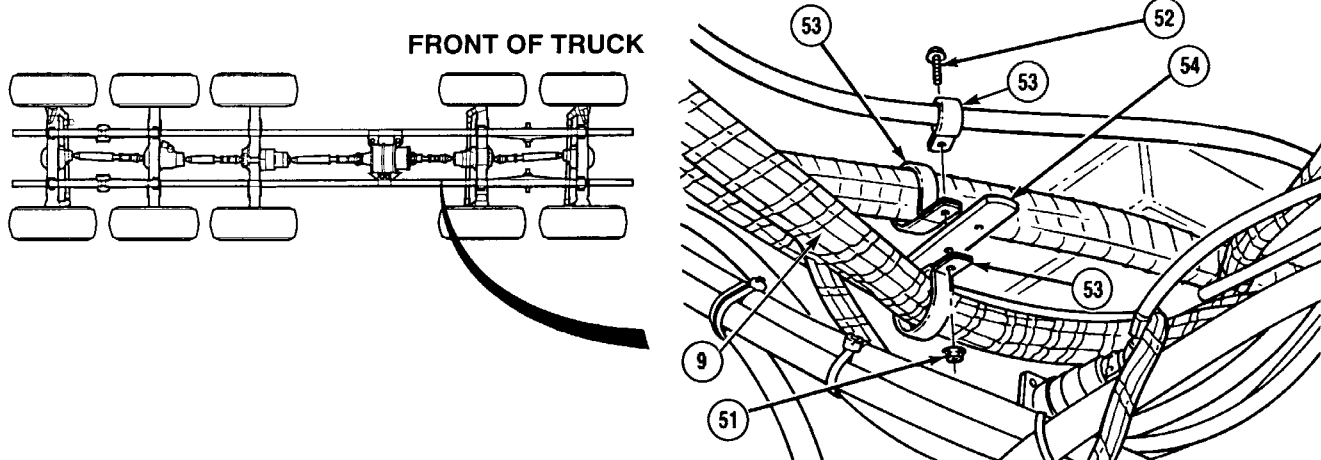
6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).



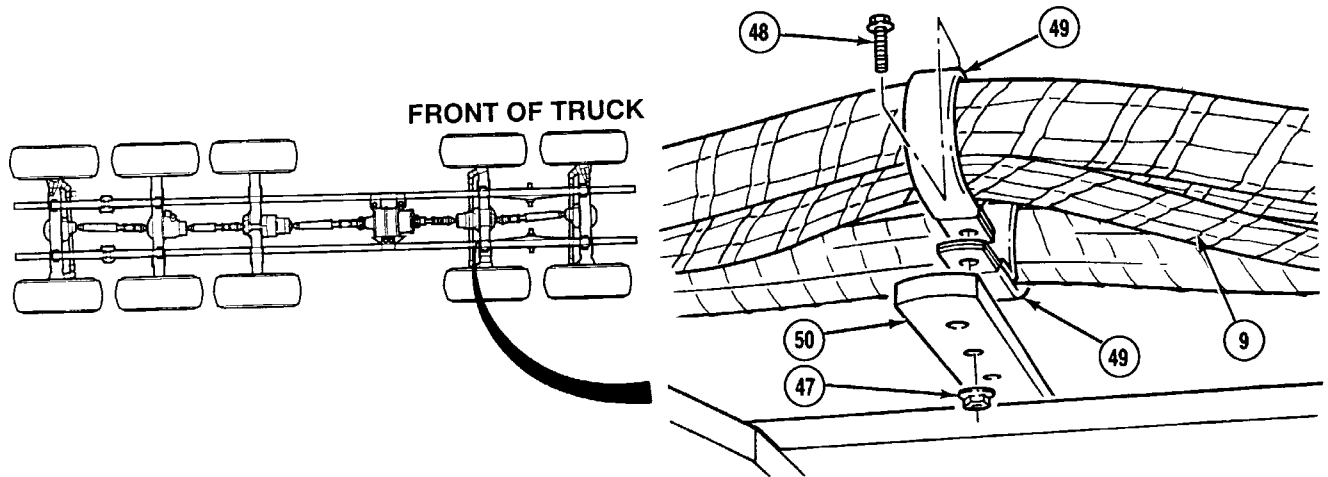
NOTE

If cushion clip is part of 24 volt wire harness, go to Step (18).

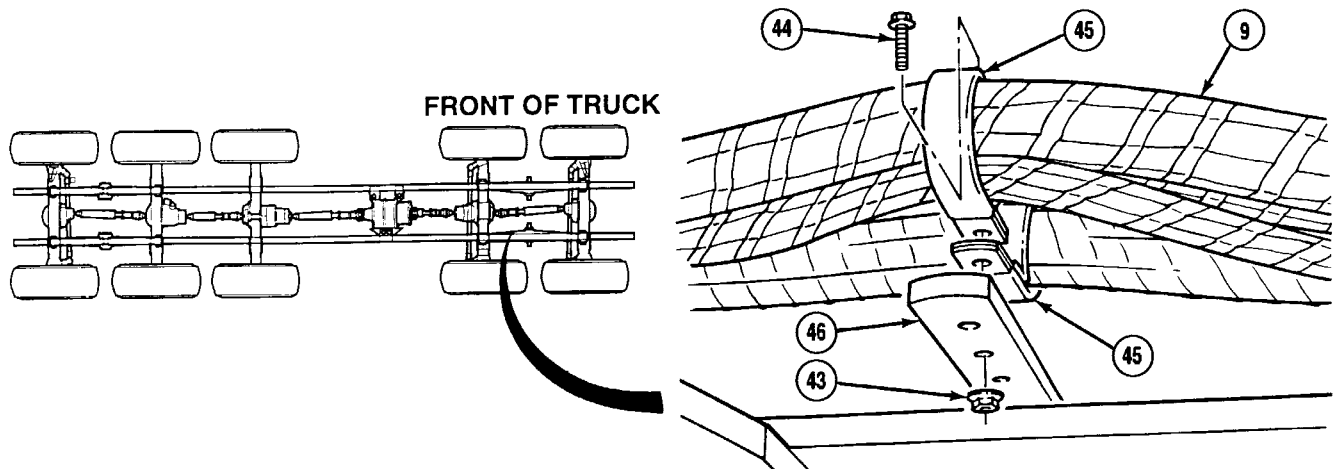
- (17) Position 24 volt trailer wire harness (9) in cushion clip (57).
- (18) Install two cushion clips (57), screw (56) and locknut (55) on bracket (58).



- (19) Position 24 volt trailer wire harness (9) in cushion clip (53).
- (20) Install three cushion clips (53), screw (52) and locknut (51) on bracket (54).

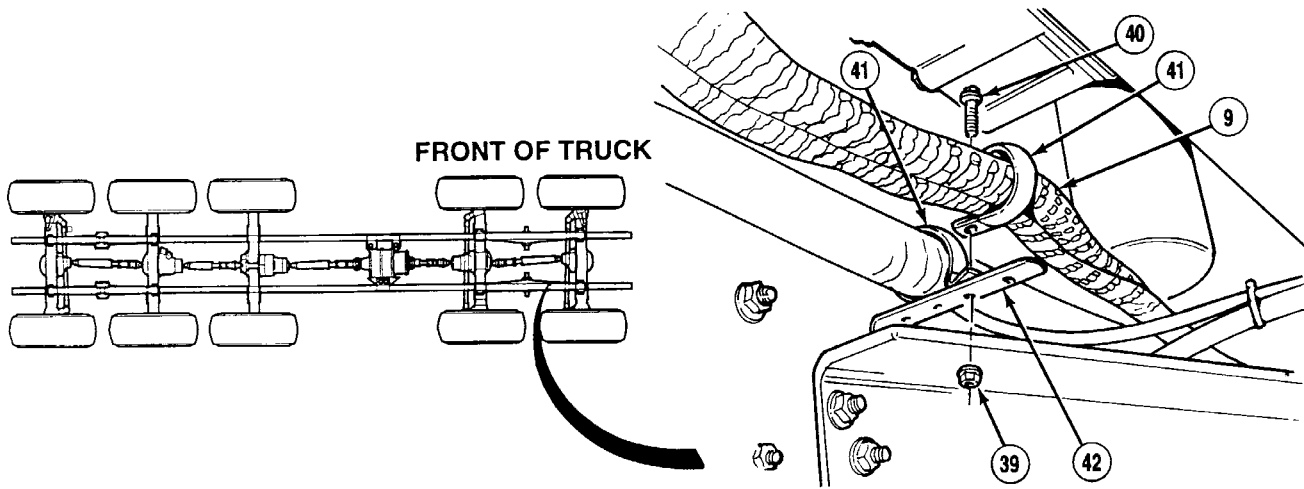


- (21) Position 24 volt trailer wire harness (9) in cushion clip (49).
- (22) Install two cushion clips (49), screw (48) and locknut (47) on bracket (50).

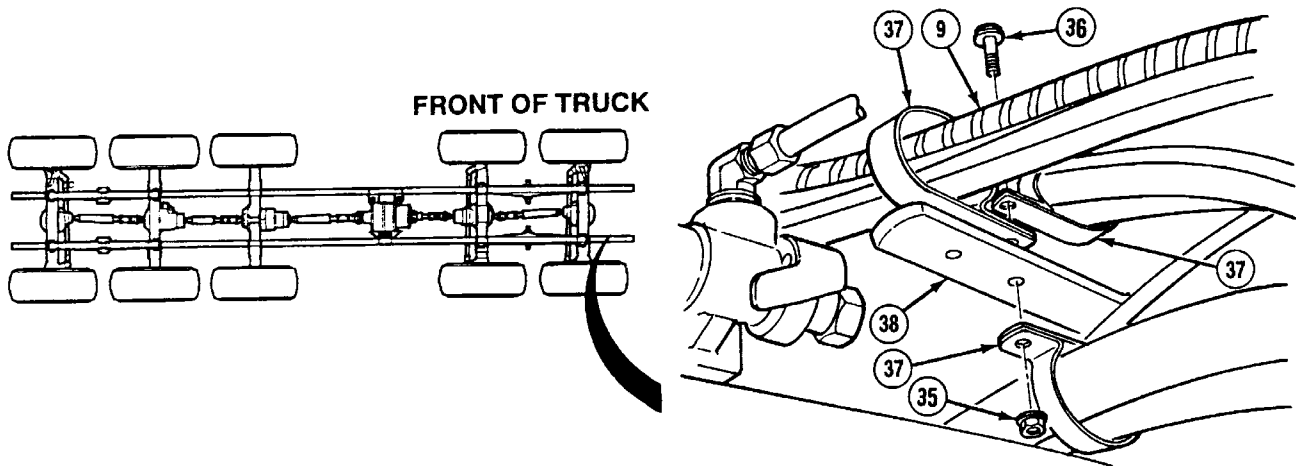


- (23) Position 24 volt trailer wire harness (9) in cushion clip (45).
- (24) Install two cushion clips (45), screw (44) and locknut (43) on bracket (46).

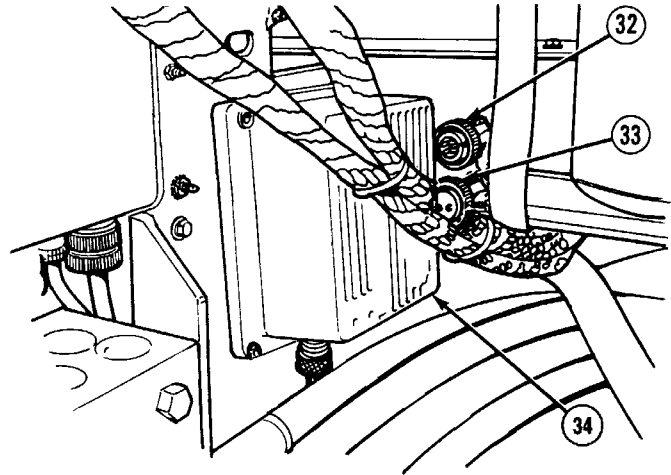
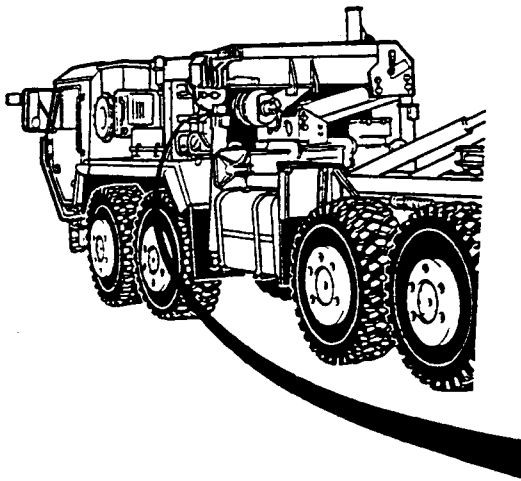
6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).



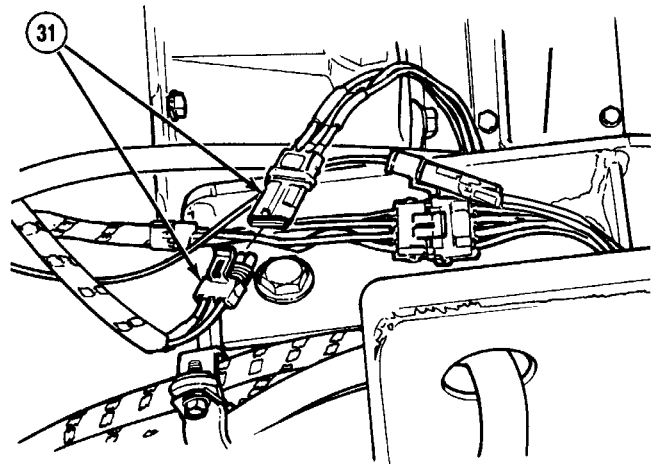
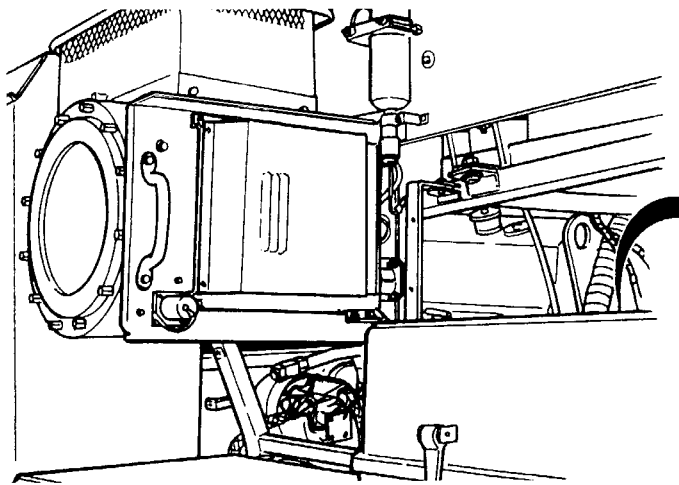
- (25) Position 24 volt trailer wire harness (9) in cushion clip (41).
- (26) Install two cushion clips (41), screw (40) and locknut (39) on bracket (42).



- (27) Position 24 volt trailer wire harness (9) in cushion clip (37).
- (28) Install three cushion clips (37), screw (36) and locknut (35) on bracket (38).

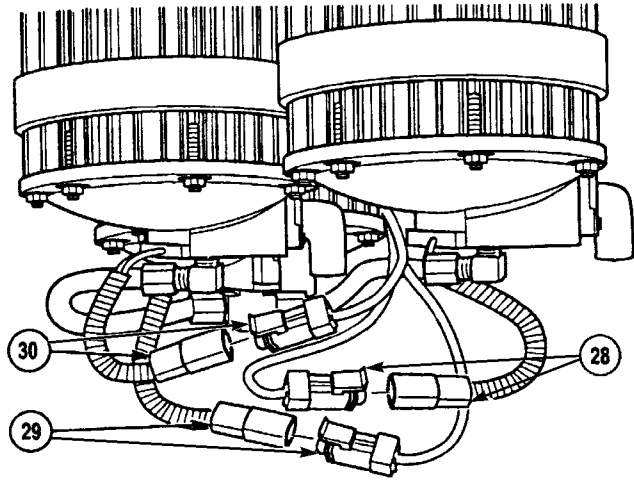
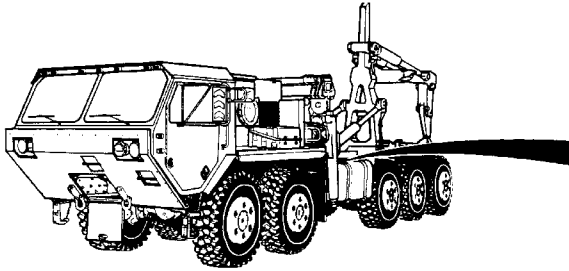


(29) Connect connectors MC59 (32) and MC73 (33) on EPAC (34).

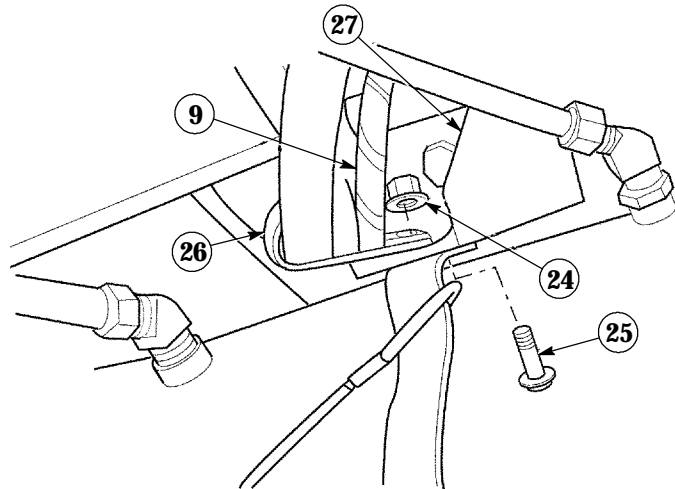
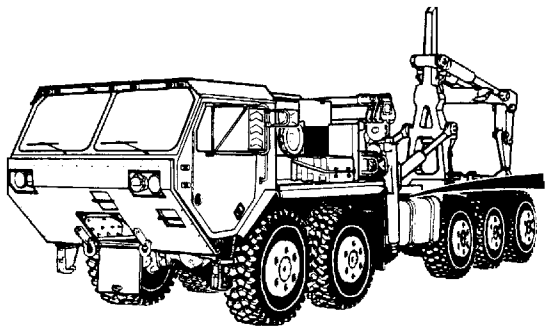


(30) Connect MC63 connector (31).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).

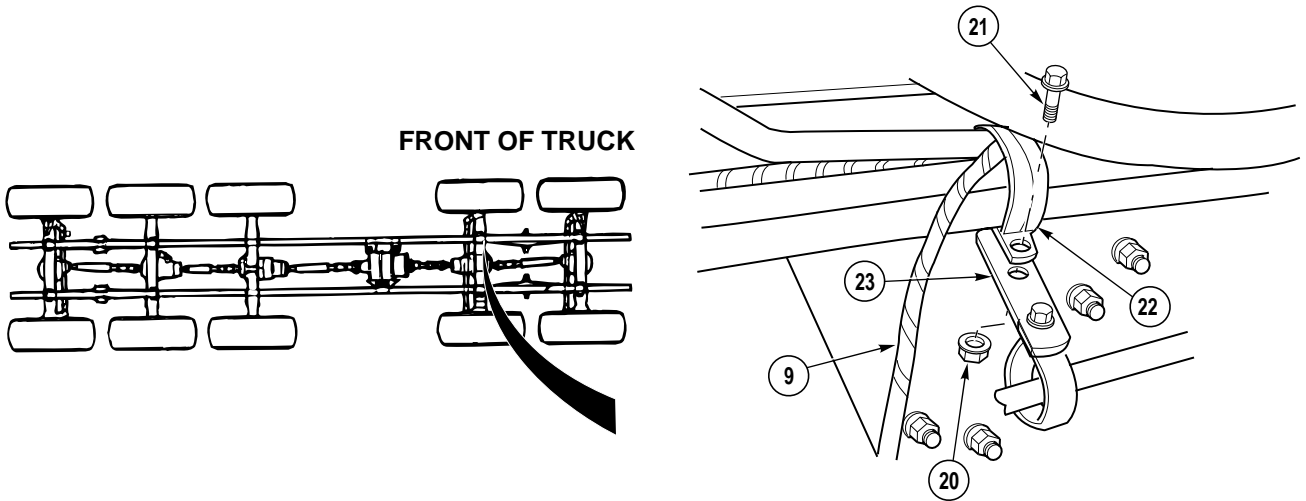


(31) Connect connectors MC97 (28), MC99 (29) and MC98 (30).



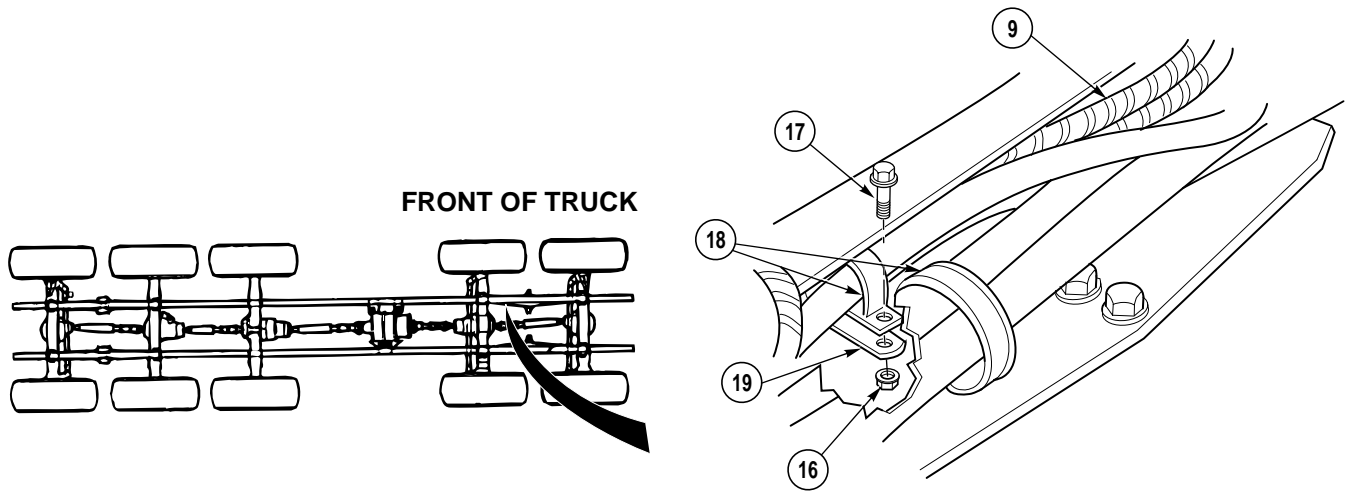
(32) Position 24 volt trailer wire harness (9) in cushion clip (26).

(33) Install cushion clip (26), screw (25) and locknut (24) on reservoir bracket (27).



(34) Position 24 volt trailer wire harness (9) in cushion clip (22).

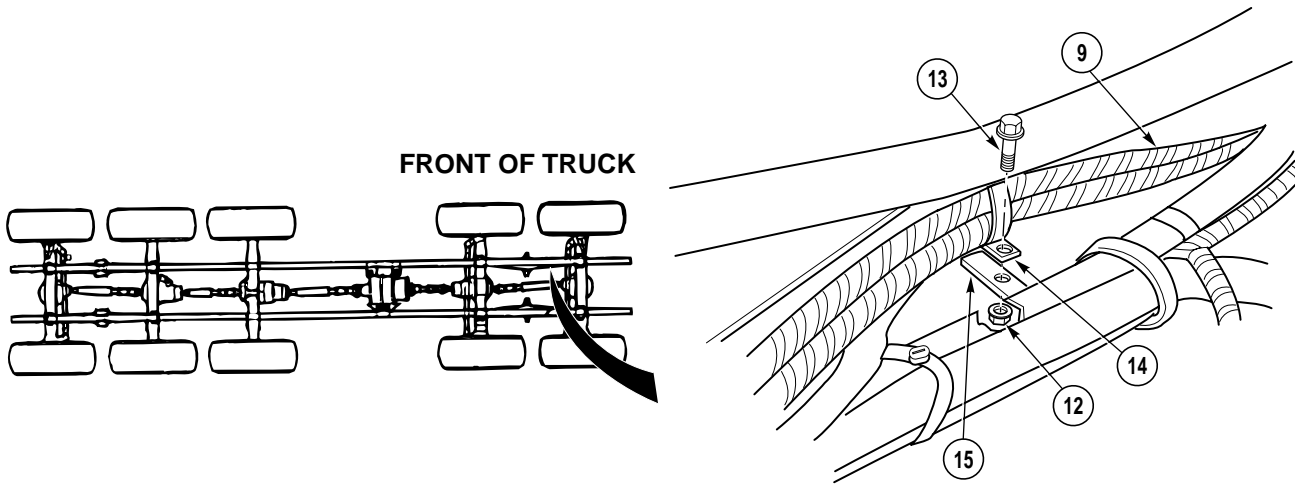
(35) Install cushion clip (22), screw (21) and locknut (20) on bracket (23).



(36) Position 24 volt trailer wire harness (9) in cushion clip (18).

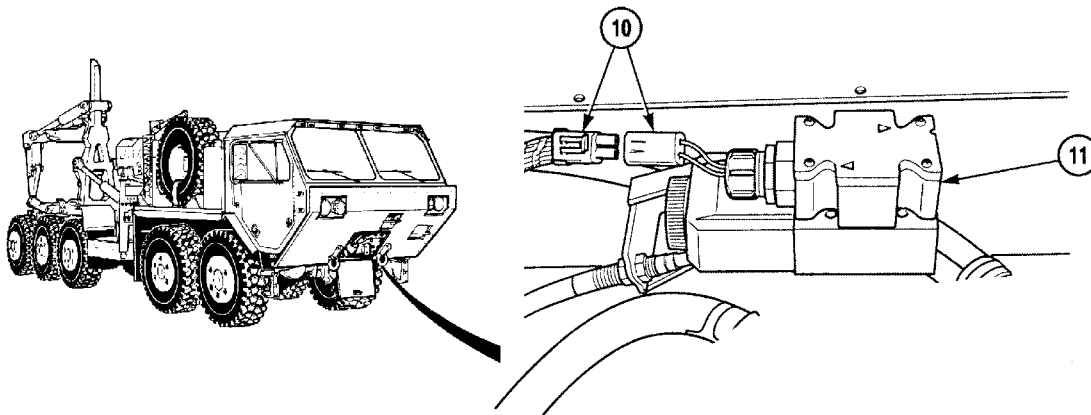
(37) Install two cushion clips (18), screw (17) and locknut (16) on bracket (19).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).

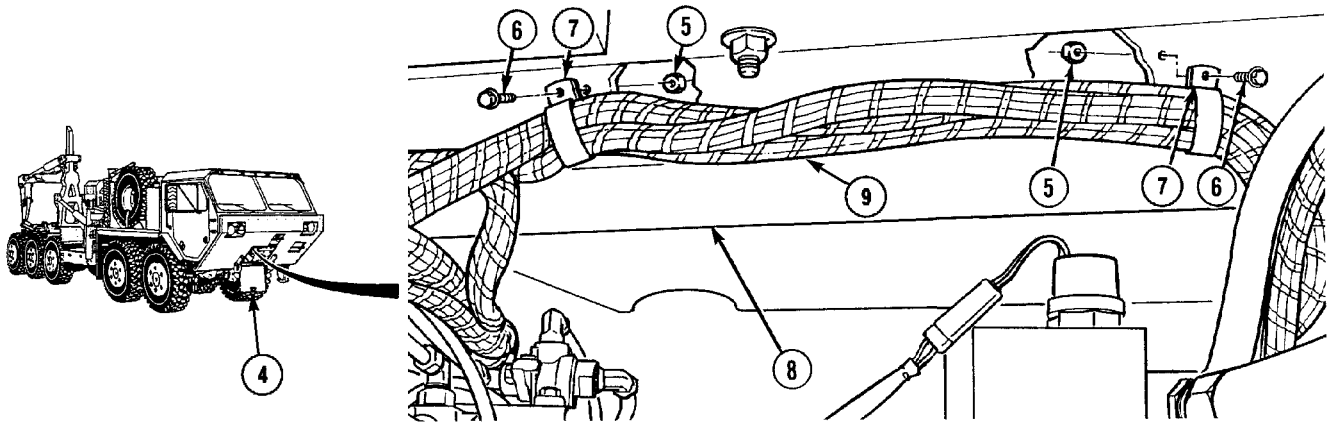


(38) Position 24 volt trailer wire harness (9) in cushion clip (14).

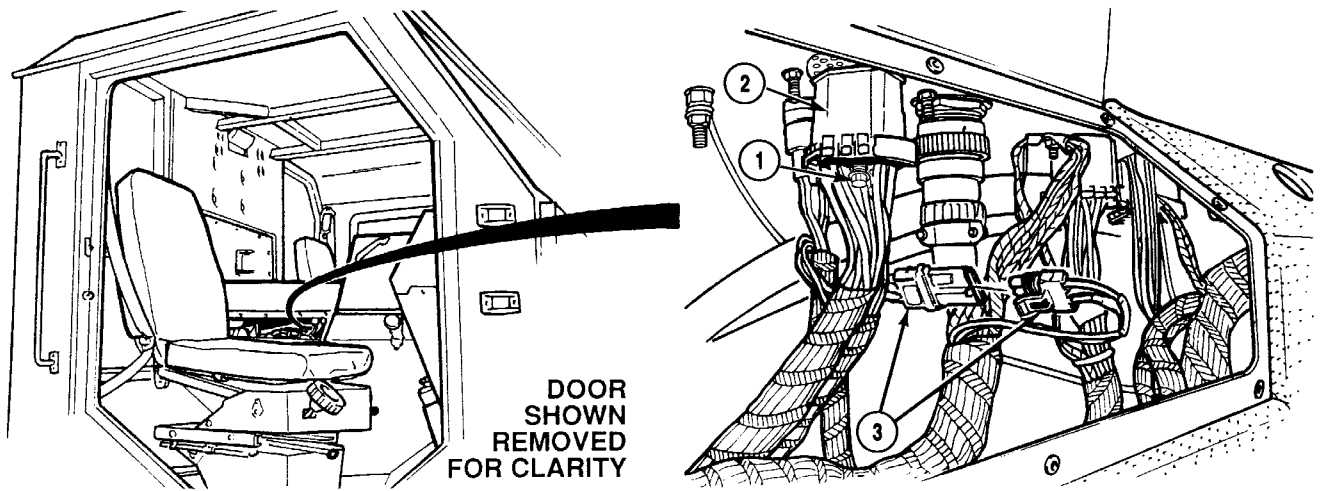
(39) Install cushion clip (14), screw (13) and locknut (12) on bracket (15).



(40) Connect MC76 connector (10) on fan control solenoid (11).



- (41) Position 24 volt trailer wire harness (9) in two cushion clips (7).
- (42) Install two cushion clips (7), screws (6) and locknuts (5) on crossmember (8).
- (43) Close front access cover (4).



- (44) Connect MC120 connector (3).
- (45) Connect MC25 connector (2) and tighten screw (1).

6-34. 24 VOLT TRAILER WIRE HARNESS REPLACEMENT (CONT).

c. Follow-On Maintenance:

- Install right side Electronic Control Box (ECB) panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Stow LHS, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-35. ECB/TRANSMISSION WIRE HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

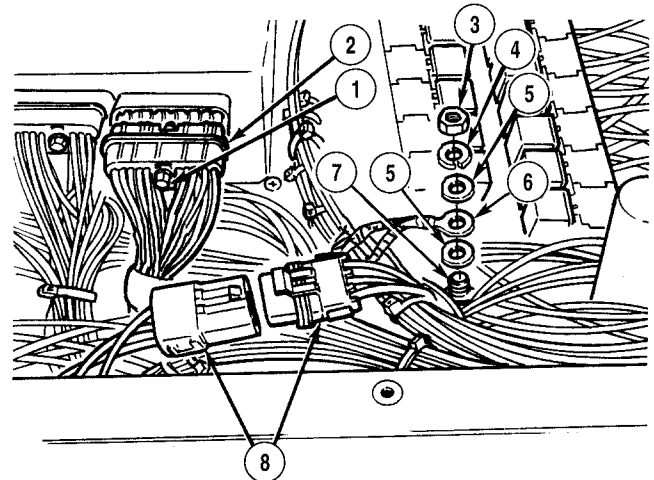
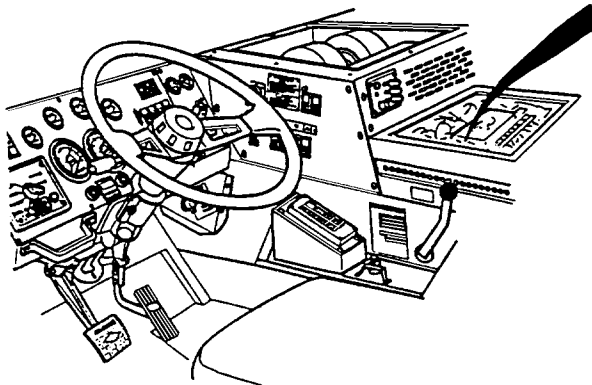
Materials/Parts

Cable Ties (Item 9, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (7) (Item 176, Appendix E)
Lockwasher (Item 251, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
LHS fully extended, (TM 9-2320-364-10)
Batteries disconnected, (TM 9-2320-364-10)
Left side noise panel removed,
(TM 9-2320-364-20)
Electronic Control Box (ECB) right side
panel removed, (TM 9-2320-364-20)
Electronic Control Box (ECB)
top panels removed, (TM 9-2320-364-20)

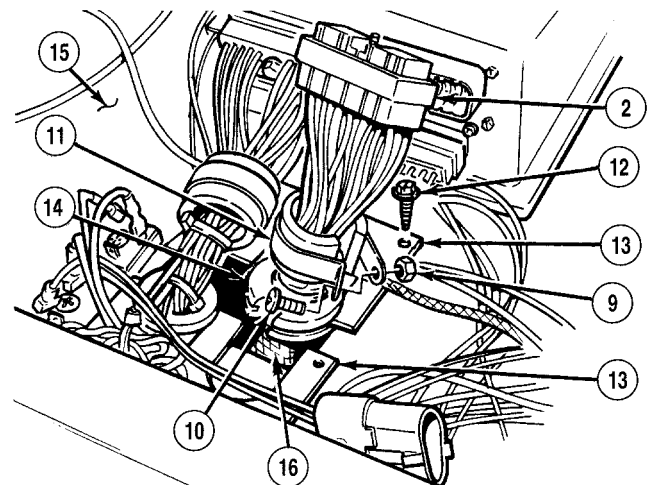
a. Removal.



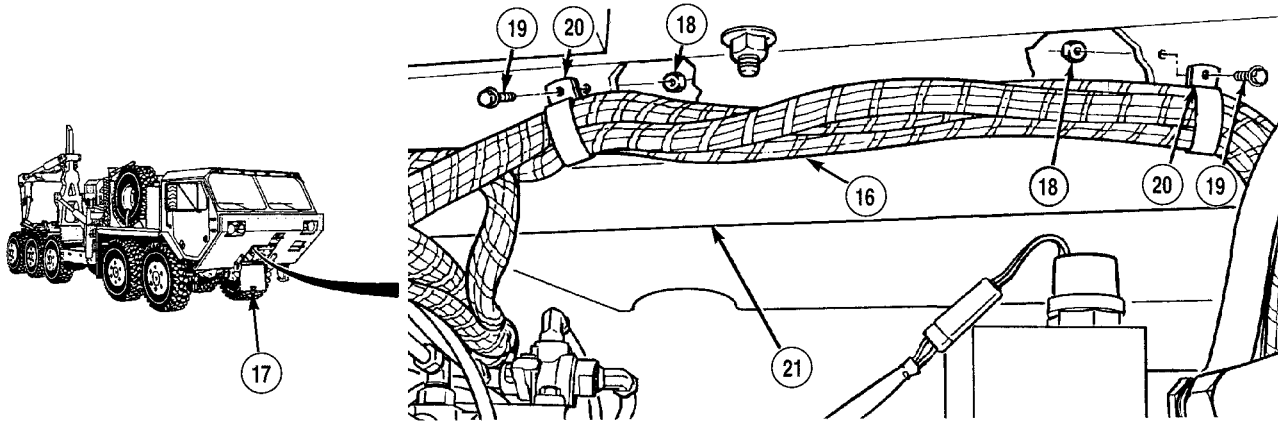
NOTE

- Remove cable ties as required.
- Connectors are removed by gently prying on tab and pulling apart connectors.

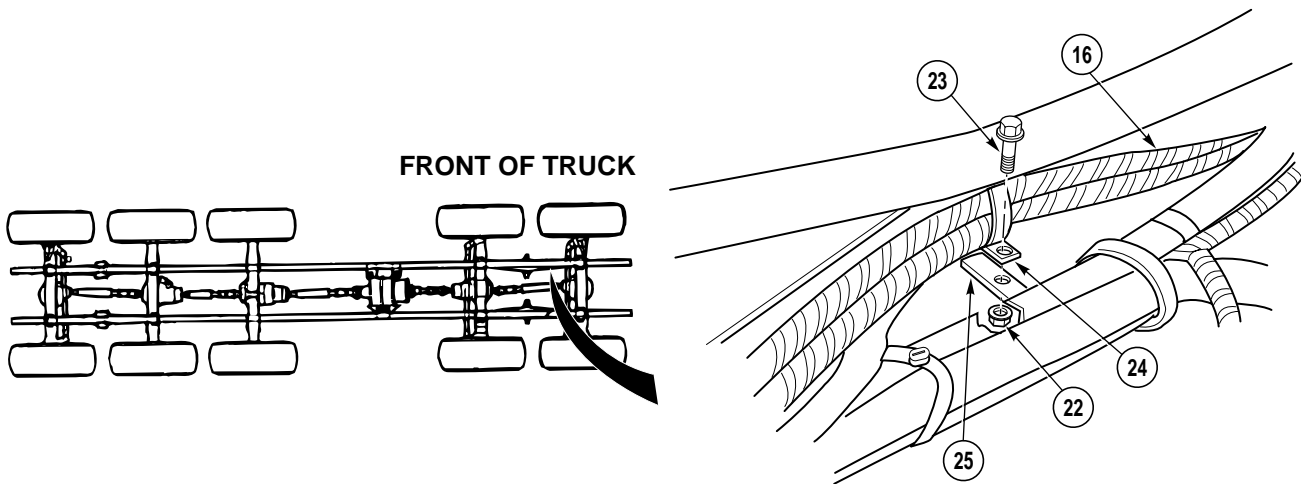
- (1) Loosen screw (1). Disconnect MC10 connector (2).
- (2) Remove nut (3), lockwasher (4), washer (5), double braided ground wire (6) and washer (5) from stud (7). Discard lockwasher.
- (3) Disconnect MC36 connector (8).
- (4) Remove locknut (9), screw (10) and clamp (11) from MC10 connector (2). Discard locknut.
- (5) Remove four screws (12), plates (13) and rubber grommet (14) from electronic control box (15).
- (6) Push ECB/transmission wire harness (16) through ECB (15).



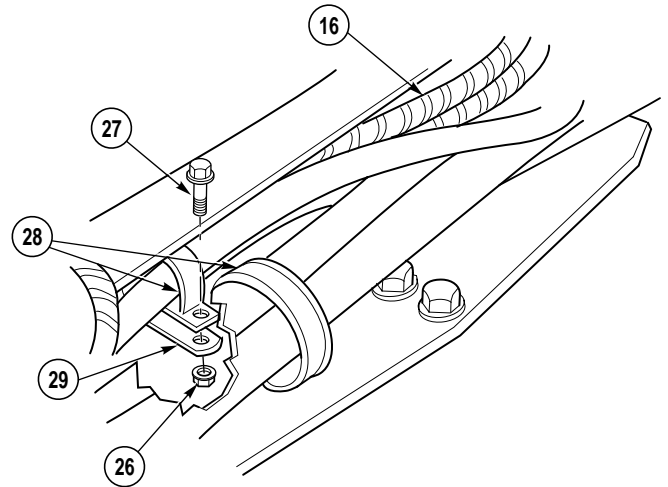
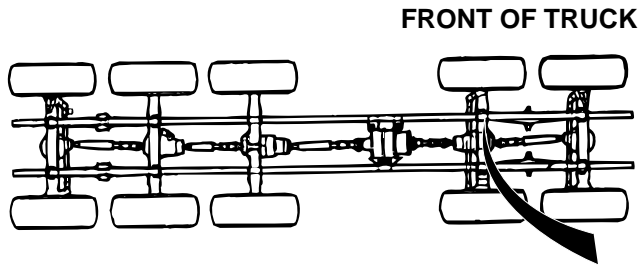
6-35. ECB/TRANSMISSION WIRE HARNESS REPLACEMENT (CONT).



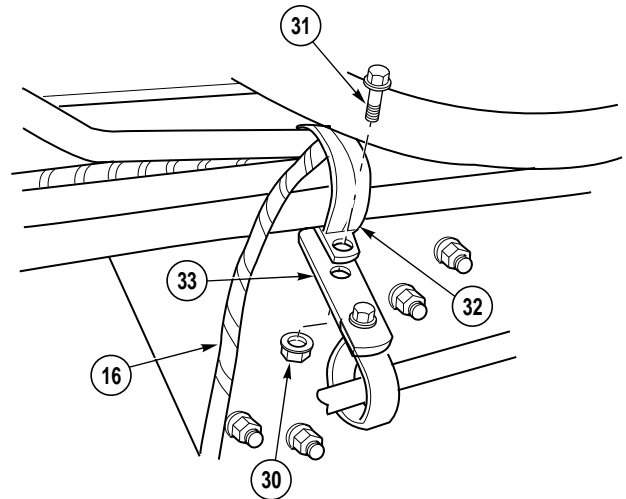
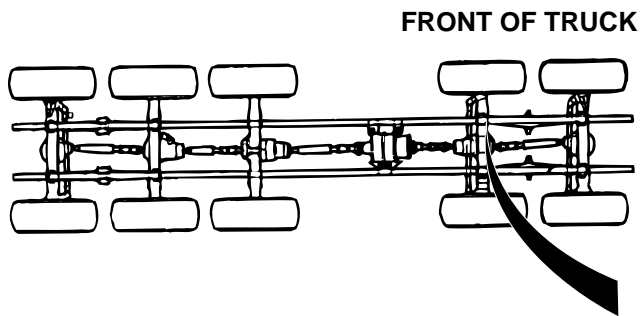
- (7) Open front access cover (17).
- (8) Remove two locknuts (18), screws (19) and cushion clips (20) from crossmember (21). Discard locknuts.
- (9) Remove ECB/transmission wire harness (16) from two cushion clips (20).



- (10) Remove locknut (22), screw (23) and cushion clip (24) from bracket (25). Discard locknut.
- (11) Remove ECB/transmission wire harness (16) from cushion clip (24).



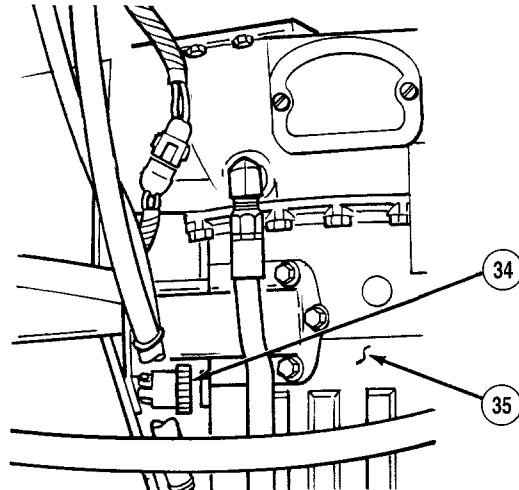
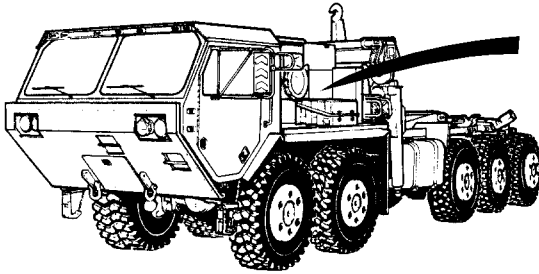
- (12) Remove locknut (26), screw (27) and two cushion clips (28) from bracket (29). Discard locknut.
- (13) Remove ECB/transmission wire harness (16) from cushion clip (28).



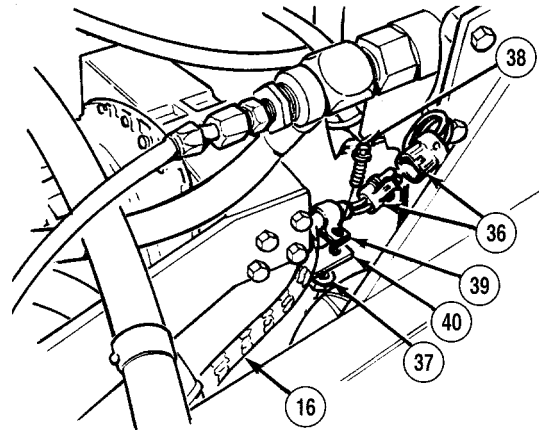
- (14) Remove locknut (30), screw (31) and cushion clip (32) from bracket (33). Discard locknut.
- (15) Remove ECB/transmission wire harness (16) from cushion clip (32).

6-35. ECB/TRANSMISSION WIRE HARNESS REPLACEMENT (CONT).

- (16) Disconnect MC19 connector (34) from transmission (35).



- (17) Disconnect MC20 connector (36).
- (18) Remove locknut (37), screw (38) and cushion clip (39) from bracket (40). Discard locknut.
- (19) Remove cushion clip (39) from MC20 connector (36).
- (20) Remove ECB/transmission wire harness (16) from truck.

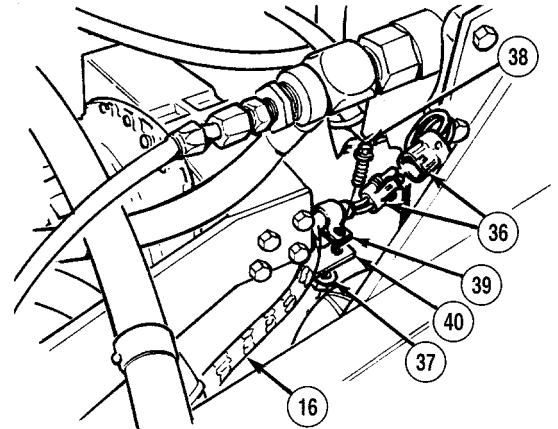


b. Installation.

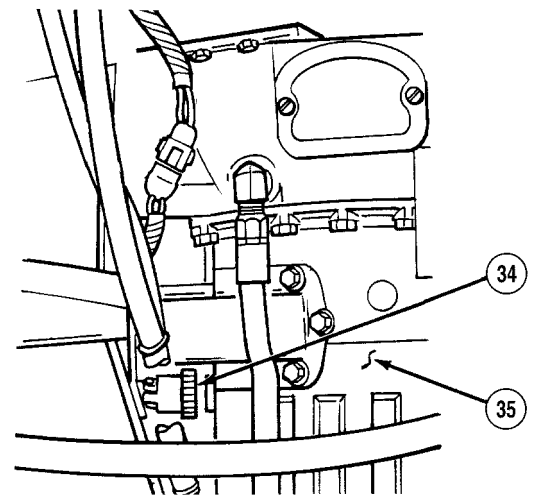
NOTE

- Install cable ties as required.
- Evenly distribute any slack in harness.

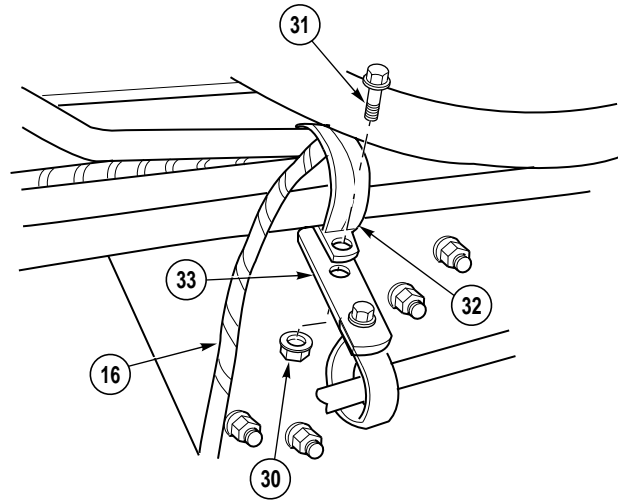
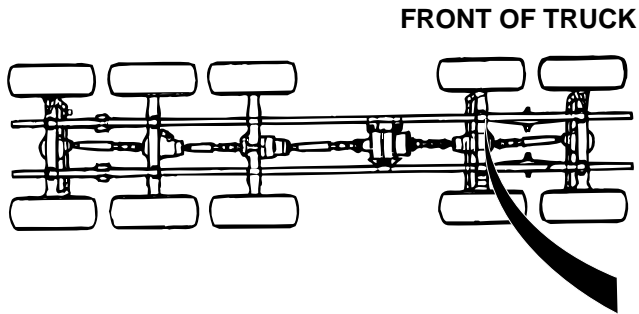
- (1) Position ECB/transmission wire harness (16) in truck.
- (2) Position MC20 connector (36) in clip (39).
- (3) Install cushion clip (39) on bracket (40) with screw (38) and locknut (37).
- (4) Connect MC20 connector (36).



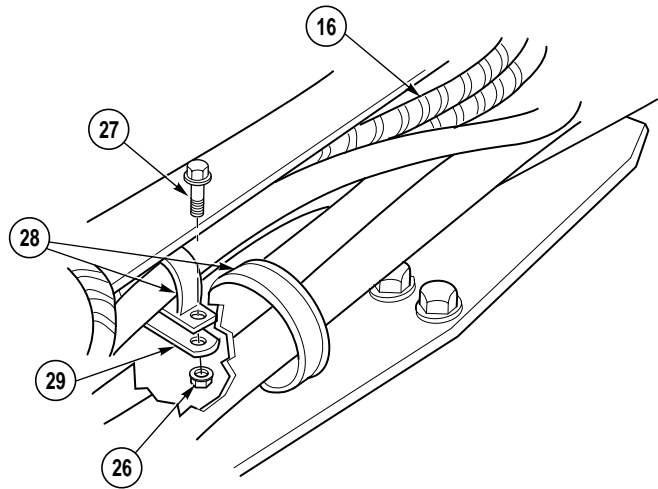
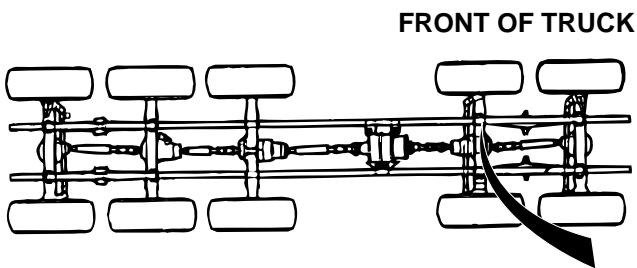
- (5) Connect MC19 connector (34) to transmission (35).



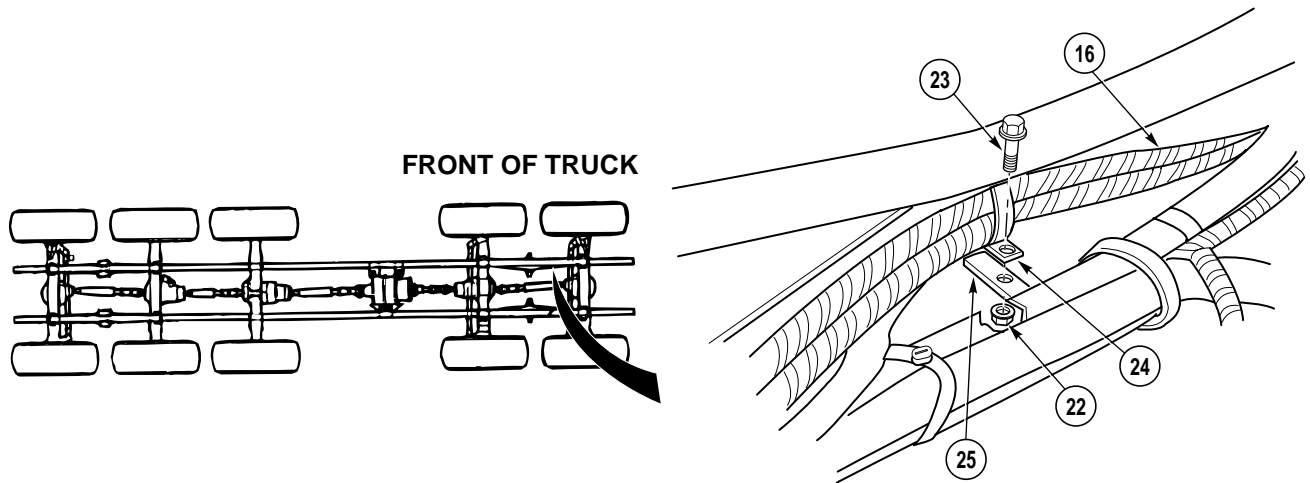
6-35. ECB/TRANSMISSION WIRE HARNESS REPLACEMENT (CONT).



- (6) Position ECB/transmission wire harness (16) in cushion clip (32).
- (7) Install cushion clip (32), screw (31) and locknut (30) on bracket (33).

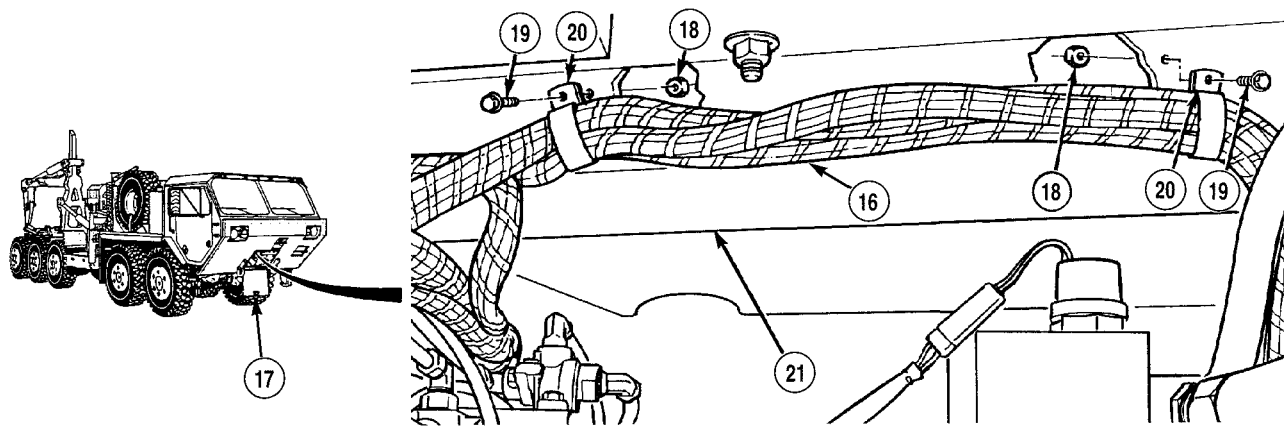


- (8) Position ECB/transmission wire harness (16) in cushion clip (28).
- (9) Install two cushion clips (28), screw (27) and locknut (26) on bracket (29).



(10) Position ECB/transmission wire harness (16) in cushion clip (24).

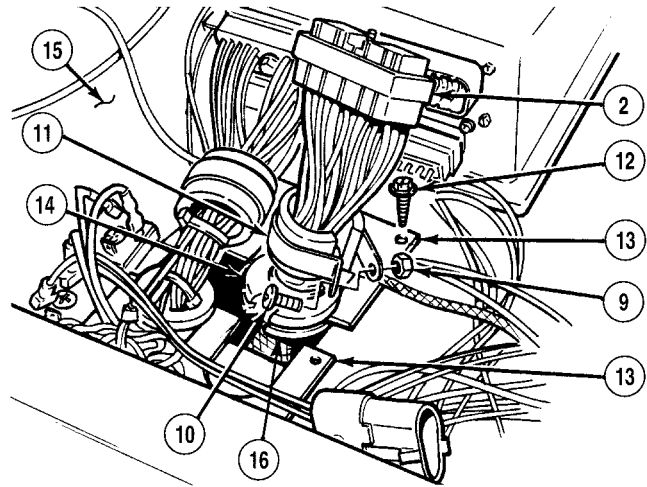
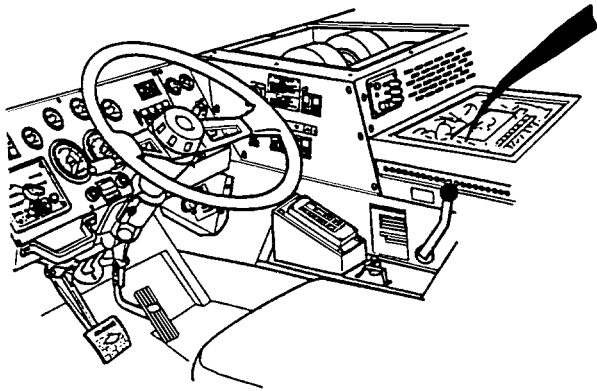
(11) Install cushion clip (24), screw (23) and locknut (22) on bracket (25).



(12) Position ECB/transmission wire harness (16) in two cushion clips (20).

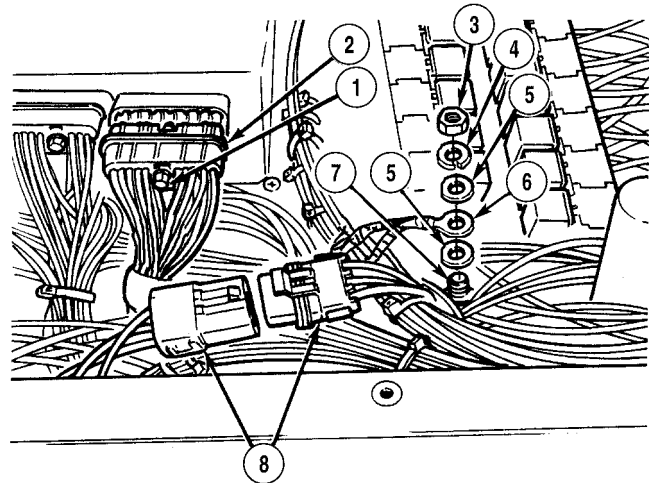
(13) Install two cushion clips (20), screws (19) and locknuts (18) on crossmember (21).

(14) Close front access cover (17).



- (15) Position MC10 connector (2) through ECB (15).
- (16) Install rubber grommet (14), plates (13) and four screws (12) on ECB (15).
- (17) Install clamp (11) on MC10 connector (2) with screw (10) and locknut (9).

- (18) Connect MC36 connector (8).
- (19) Install double braided ground wire (6) on stud (7) with nut (3), lockwasher (4) and two washers (5).
- (20) Connect MC10 connector (2) and tighten screw (1).



c. Follow-On Maintenance:

- Install Electronic Control Box (ECB) top cover, (TM 9-2320-364-20).
- Install right side Electronic Control Box (ECB) panel, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Stow LHS, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-36. REVERSE POLARITY POWER WIRE HARNESS REPLACEMENT (145 AMP).

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Wrench, Torque (0-60 N·m) (Item 276, Appendix F)

Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Compound, Corrosion Preventive (Item 15, Appendix B)
- Sealant, Electrical (Item 50, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Locknuts (3) (Item 176, Appendix E)
- Lockwasher (Item 250, Appendix E)
- Lockwasher (3) (Item 251, Appendix E)
- Lockwasher (2) (Item 271, Appendix E)
- Lockwasher (Item 273, Appendix E)
- Lockwasher (Item 274, Appendix E)

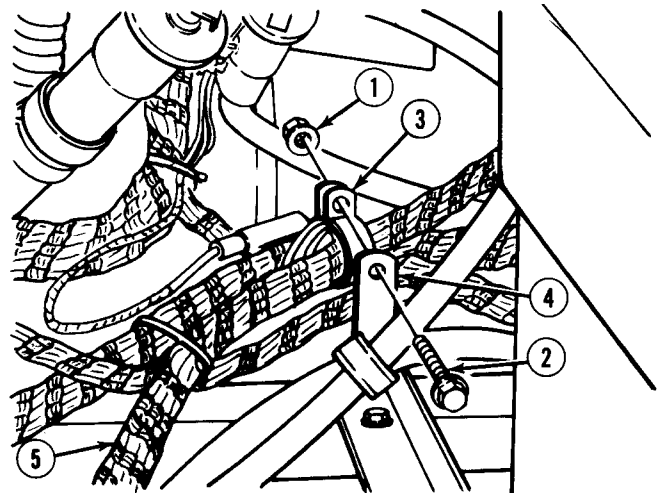
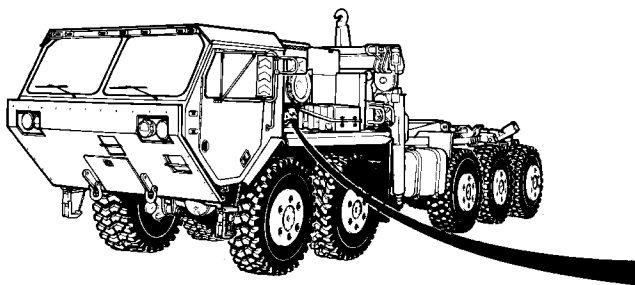
Materials/Parts - Continued

- Lockwasher (3) (Item 276, Appendix E)
- Lockwasher (2) (Item 280, Appendix E)
- Lockwasher (Item 281, Appendix E)
- Lockwasher (5) (Item 283, Appendix E)
- Lockwasher (2) (Item 286, Appendix E)

Equipment Condition

- Batteries disconnected, (TM 9-2320-364-20)
- Arctic batteries disconnected, if equipped, (TM 9-2320-364-20)
- Left side splash guard removed, (TM 9-2320-364-20)
- Left side noise panel removed, (TM 9-2320-364-20)
- Electronic control box access panels removed, (TM 9-2320-364-20)
- Engine access panel removed, (TM 9-2320-364-20)

a. Removal.



NOTE

- Tag and mark wires prior to removal.
- Remove cable ties as required.

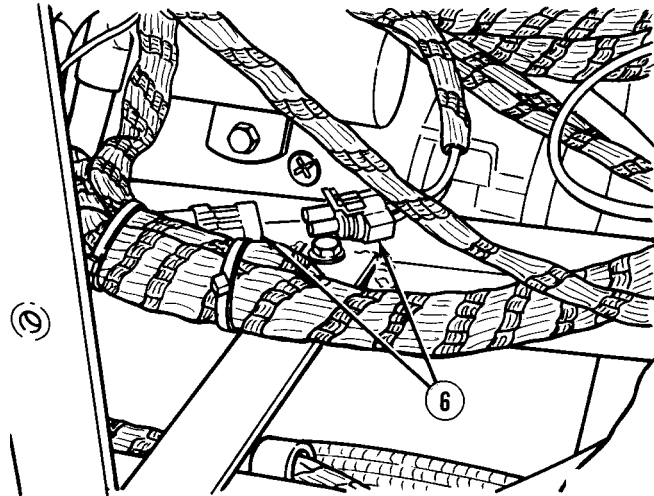
- (1) Remove locknut (1), screw (2) and cushion clip (3) from bracket (4) and wire harness (5). Discard locknut.

6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).

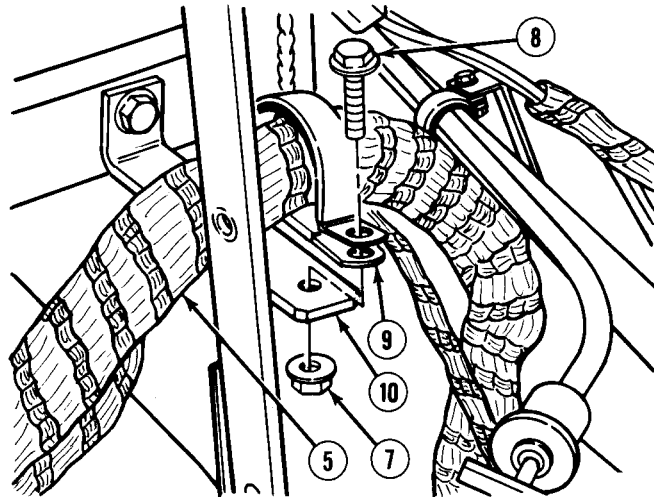
NOTE

Disconnect connector by prying up on tabs and gently pulling apart connector.

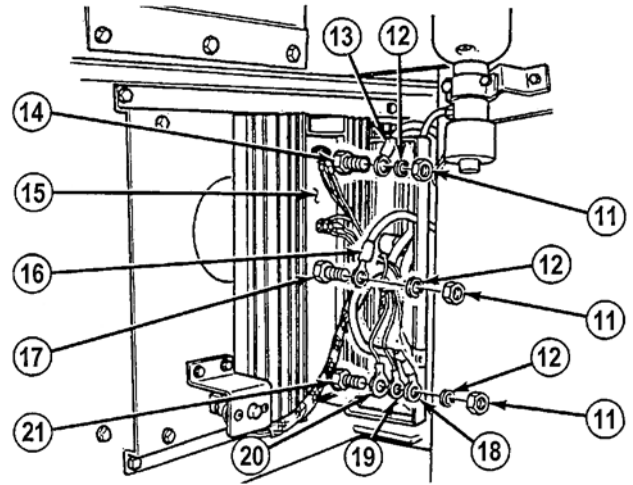
- (2) Disconnect connector MC60 (6).



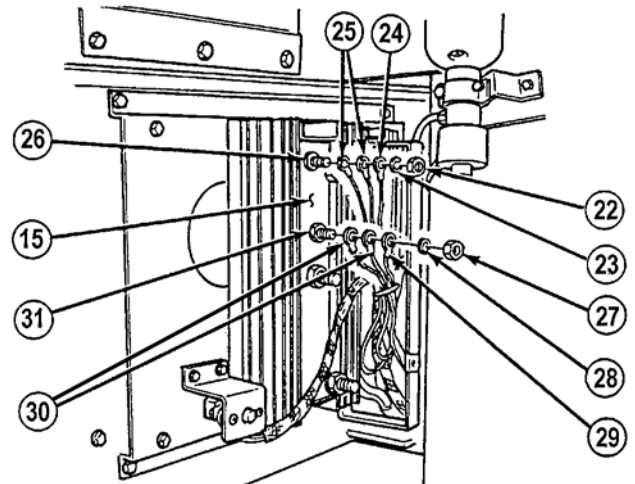
- (3) Remove locknut (7), screw (8), cushion clip (9) and wire harness (5) from bracket (10). Discard locknut.



- (4) Remove nut (11), lockwasher (12) and wire 1277 (13) from 24 volt battery stud (14) of DUVAC controller (15). Discard lockwasher.
- (5) Remove nut (11), lockwasher (12) and wire 1278 (16) from 24 volt alternator stud (17) of DUVAC controller (15). Discard lockwasher.
- (6) Remove nut (11), lockwasher (12), wire 1274 (18), orange wire (19) and red wire (20) from 12 volt battery stud (21) of DUVAC controller (15). Discard lockwasher.

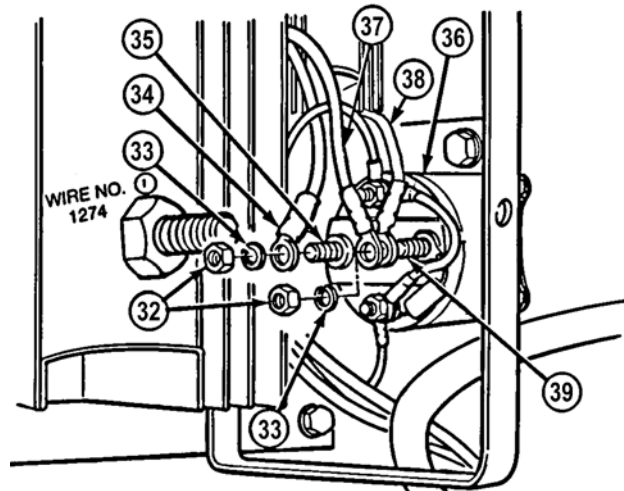


- (7) Remove nut (22), lockwasher (23), brown wire (24) and two wires 1020 (25) from IGN stud (26) of DUVAC controller (15). Discard lockwasher.
- (8) Remove nut (27), lockwasher (28), black wire (29) and two wires 1435 (30) from ground stud (31) of DUVAC controller (15). Discard lockwasher.

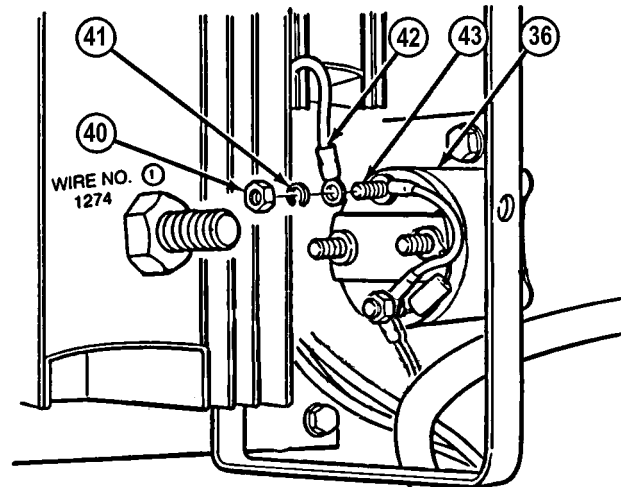


6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT.)

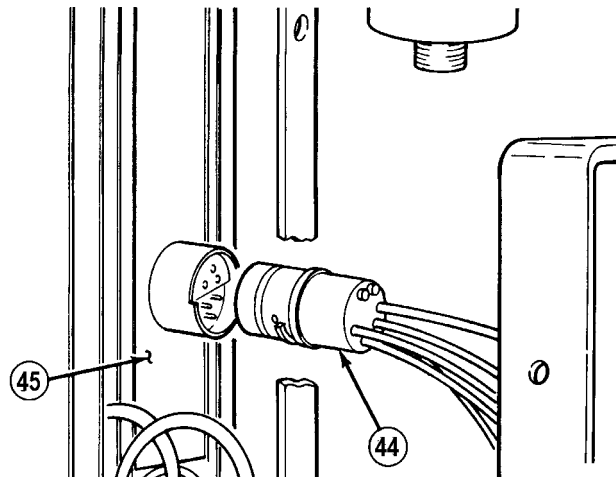
- (9) Remove nut (32), lockwasher (33) and wire 1281 (34) from stud (35) of 24 volt solenoid switch (36). Discard lockwasher.
- (10) Remove nut (32), lockwasher (33), wire 1045 (37) and capacitor wire (38) from stud (39) of 24 volt solenoid switch (36). Discard lockwasher.



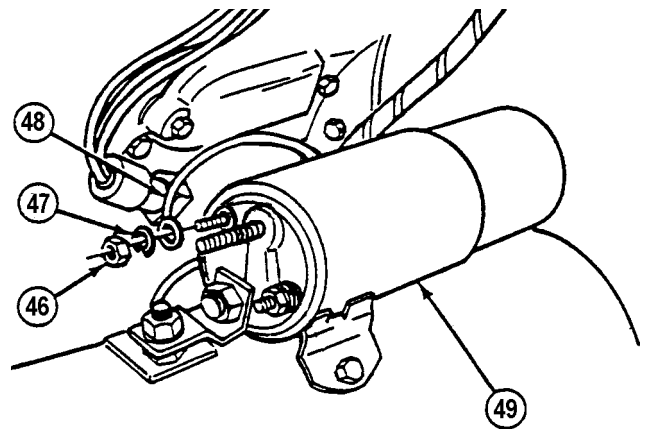
- (11) Remove nut (40), lockwasher (41) and wire 1021A (42) from stud (43) of 24 volt solenoid switch (36). Discard lockwasher.



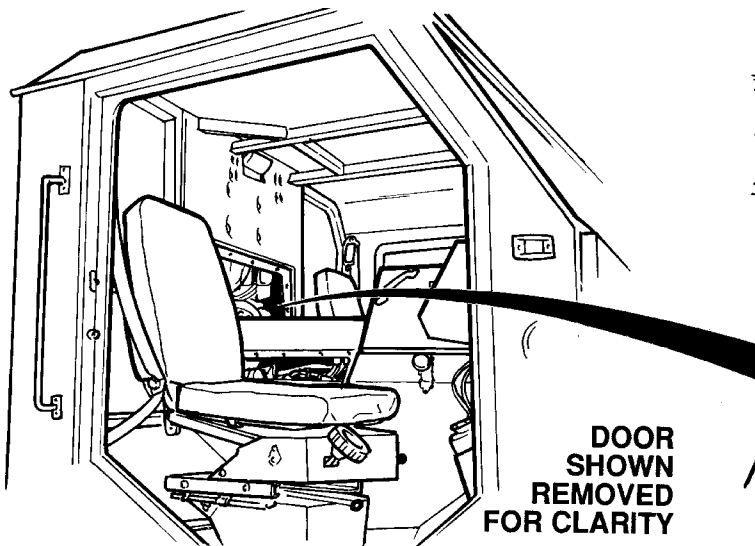
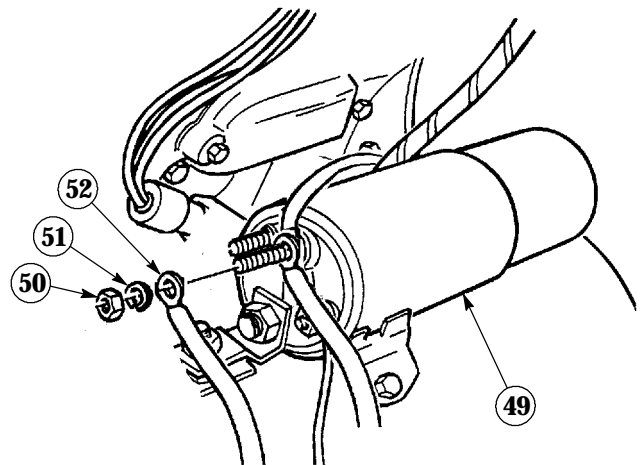
- (12) Disconnect voltage regulator harness (44) from voltage regulator (45).



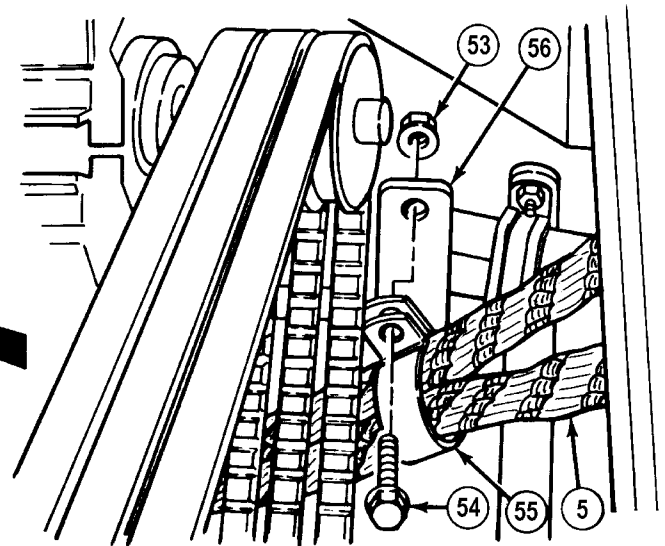
- (13) Remove nut (46), lockwasher (47) and wire 1045 (48) from solenoid (49). Discard lockwasher.



- (14) Remove nut (50), lockwasher (51) and wire 1055 (52) from solenoid (49). Discard lockwasher.

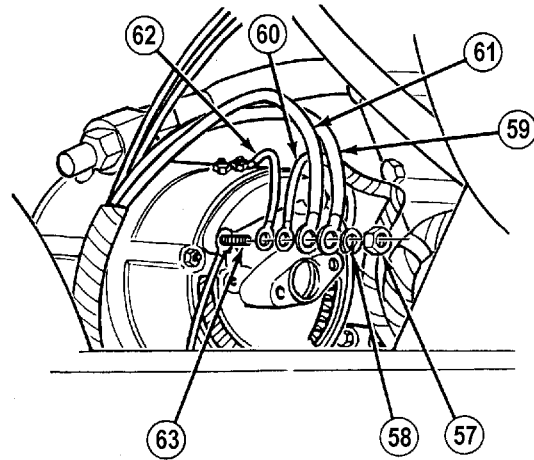
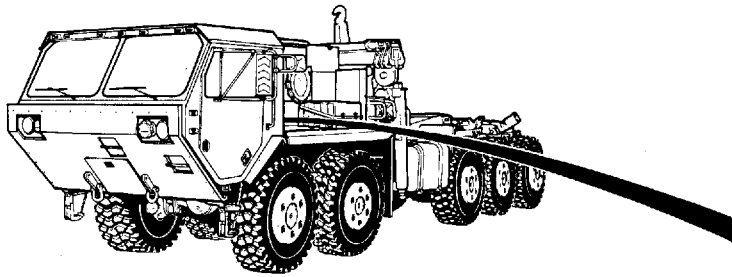


DOOR
SHOWN
REMOVED
FOR CLARITY



- (15) Remove locknut (53), screw (54), cushion clip (55) and wire harness (5) from bracket (56). Discard locknut.

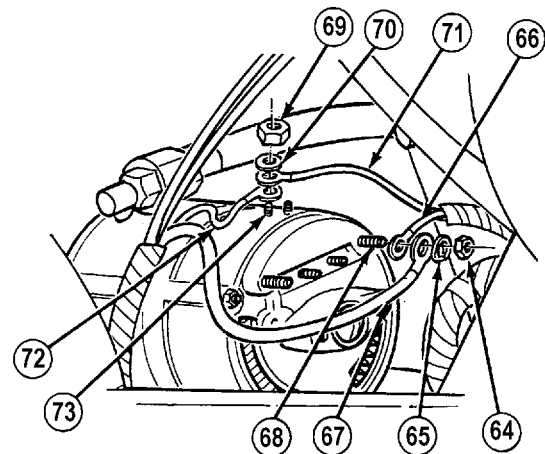
6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).

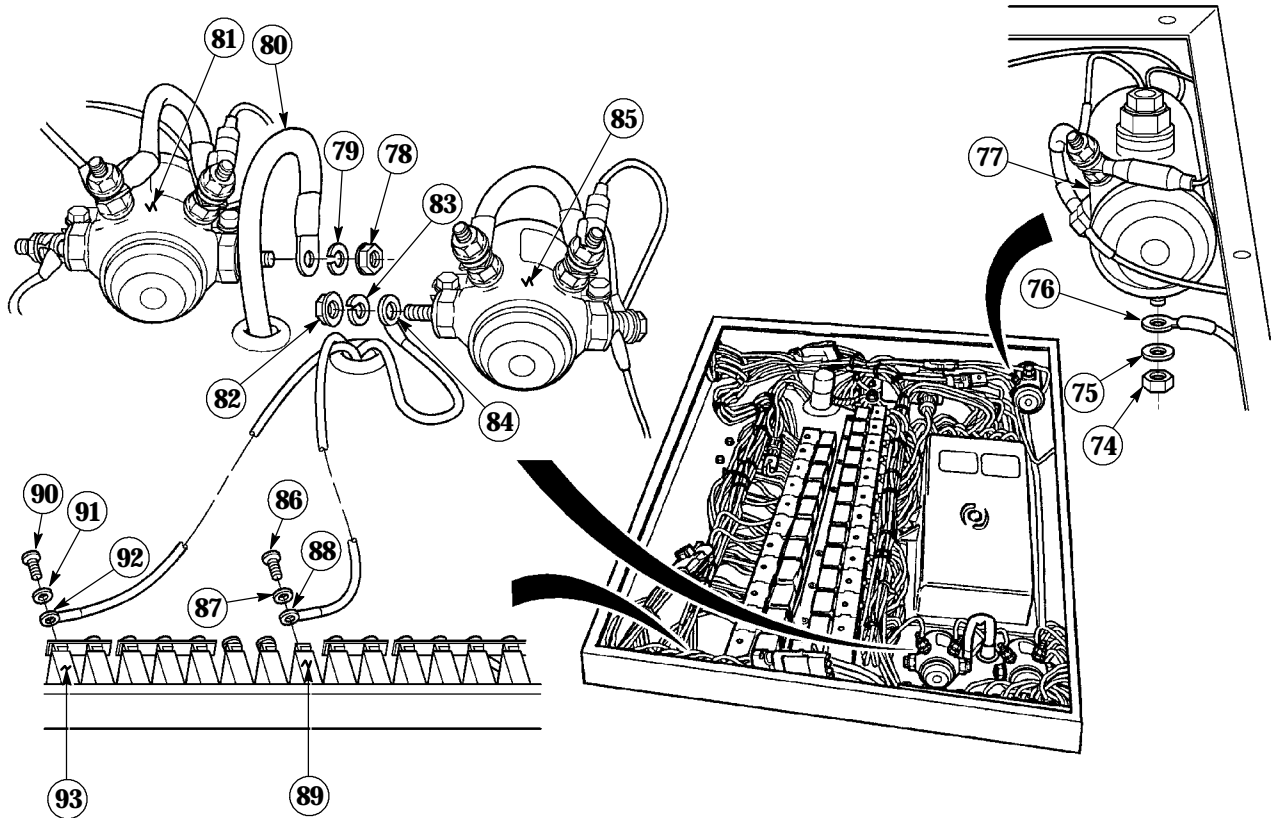


- (16) Remove nut (57), lockwasher (58), and wires 1275 (59), 1815 (60), 1435 (61) and 1057 (62) from negative terminal (63). Discard lockwasher.

- (17) Remove nut (64), lockwasher (65) and wires 1820 (66) and 1278 (67) from positive terminal (68). Discard lockwasher.

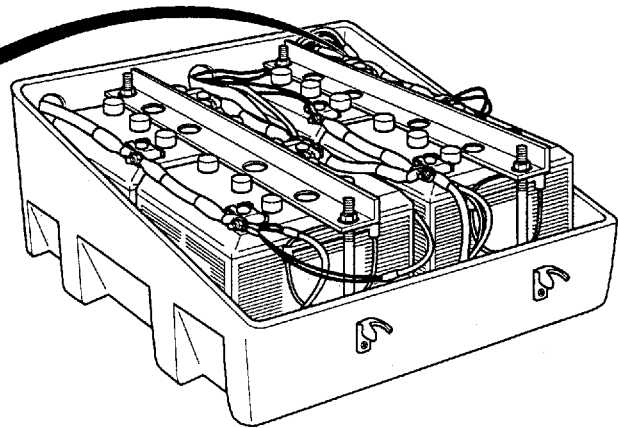
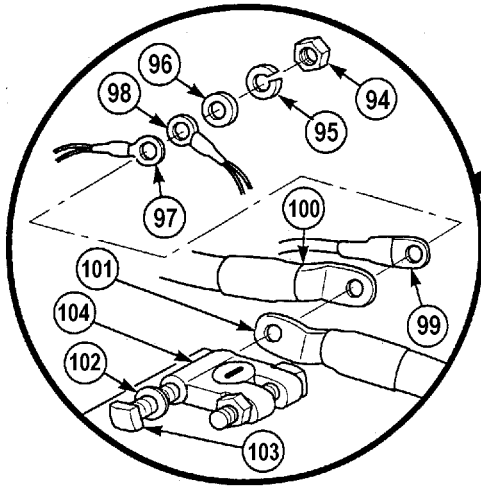
- (18) Remove nut (69), lockwasher (70) and wires 1953 (71) and 1344 (72) from F-positive terminal (73). Discard lockwasher.



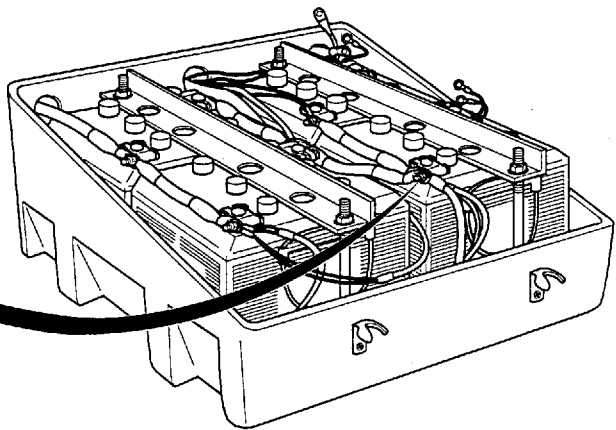
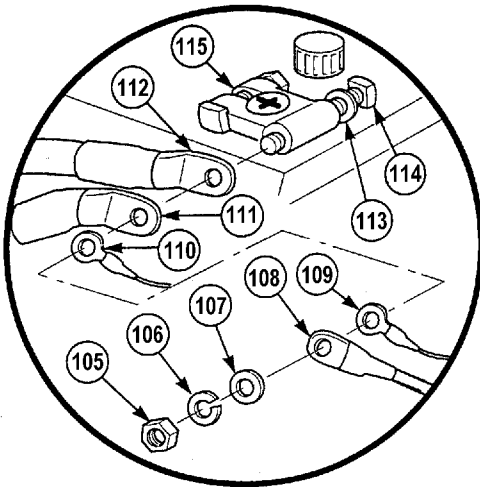


- (19) Remove nut (74), lockwasher (75) and wire 1075 (76) from solenoid (77). Discard lockwasher.
- (20) Remove nut (78), lockwasher (79) and wire 1430 (80) from solenoid (81). Discard lockwashers.
- (21) Remove nut (82) lockwasher (83) and wire 1281 (84) from solenoid (85). Discard lockwasher.
- (22) Remove screw (86), lockwasher (87) and wire 1866 (88) from circuit breaker CB5 (89). Discard lockwasher.
- (23) Remove screw (90), lockwasher (91) and wire 1079 (92) from circuit breaker CB12 (93). Discard lockwasher.

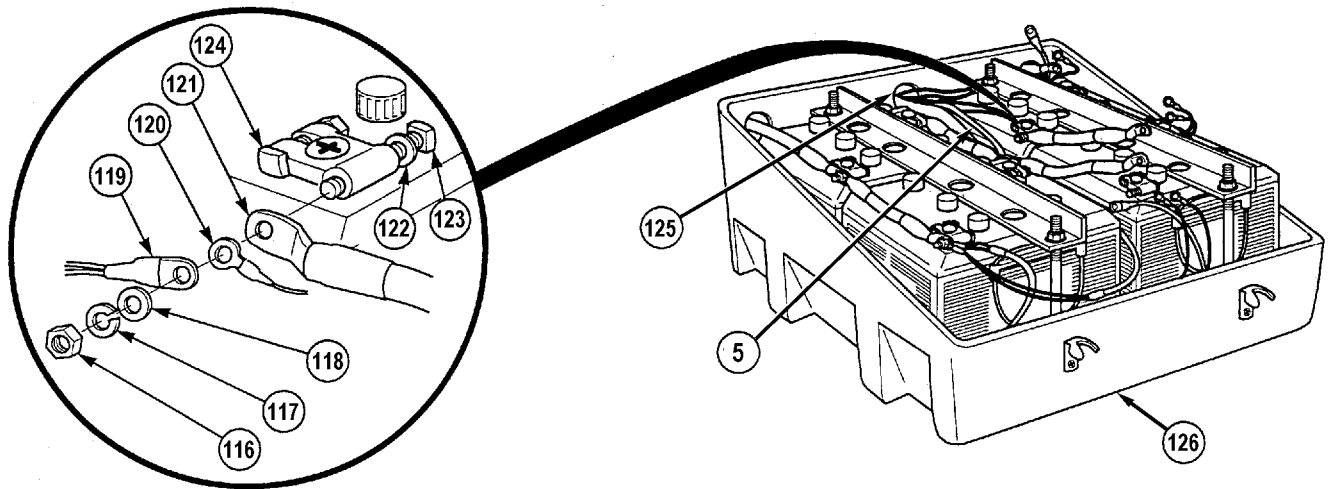
6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).



(24) Remove nut (94), lockwasher (95), washer (96), wires 150/150 (97), wires 208/209 (98), wire 1275 (99), cable 1138 (100), cable 1137 (101), washer (102) and screw (103) from negative terminal (104). Discard lockwasher.



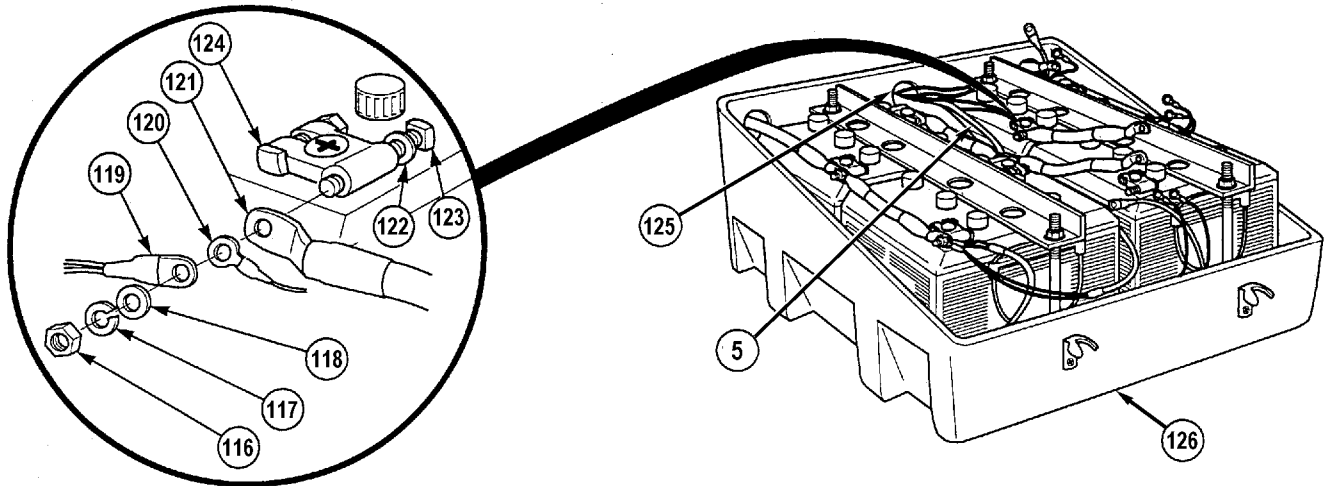
(25) Remove nut (105), lockwasher (106), washer (107), wire 1566 (108), wire 1866 (109), wire 1075 (110), cable 1137 (111), cable 1137 (112), washer (113) and screw (114) from positive terminal (115). Discard lockwasher.



- (26) Remove nut (116), lockwasher (117), washer (118), wires 240/241 (119), wire 1079 (120), cable 1137 (121), washer (122) and screw (123) from positive terminal (124). Discard lockwasher.
- (27) Pull wire harness (5) through hole (125) of battery box (126).
- (28) Remove wire harness (5) from truck.

6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).

b. Installation.



NOTE

Install cable ties as required.

- (1) Position wire harness (5) in truck.
- (2) Pull wire harness (5) through hole (125) of battery box (126).

WARNING

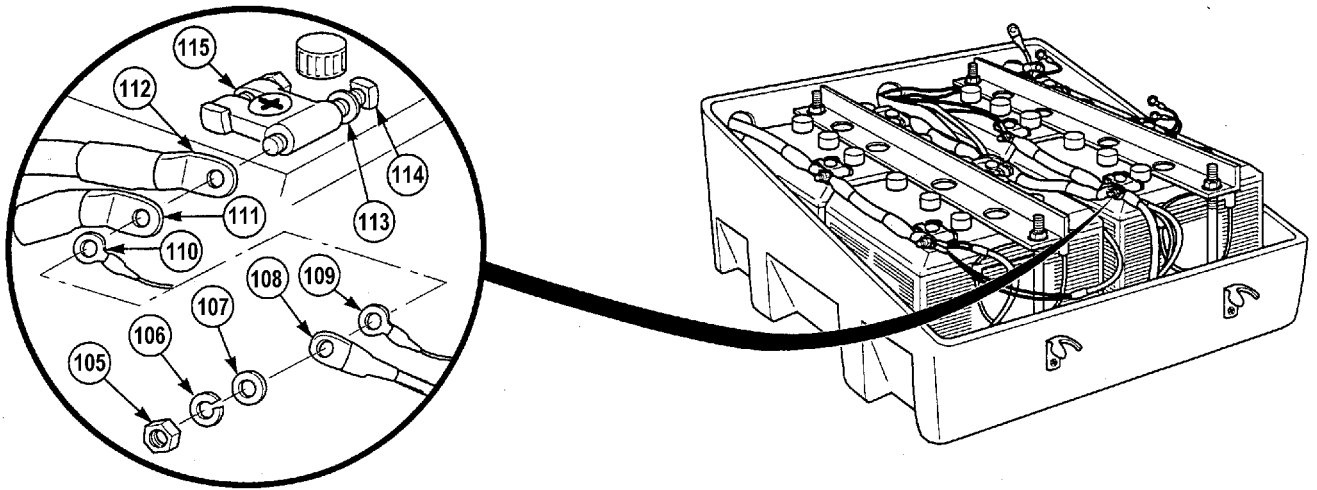
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

- (3) Position screw (123), washer (122), cable 1137 (121), wire 1079 (120), wires 240/241 (119), washer (118), lockwasher (117) and nut (116) on positive terminal (124).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (4) Tighten nut (116) to 12 to 16 lb-ft (16-22 N·m).



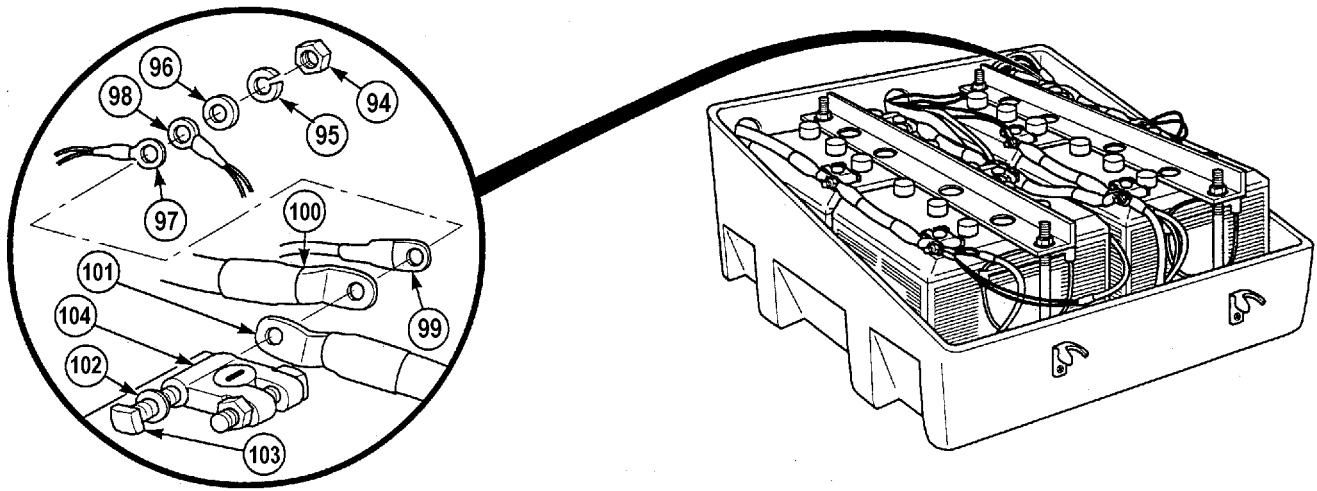
- (5) Position screw (114), washer (113), cable 1137 (112), cable 1137 (111), wire 1075 (110), wire 1866 (109), wire 1566 (108), washer (107), lockwasher (106) and nut (105) on positive terminal (115).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (6) Tighten nut (105) to 12 to 16 lb-ft (16-22 N·m).

6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).



- (7) Position screw (103), washer (102), cable 1137 (101), cable 1138 (100), wire 1275 (99), wires 208/209 (98), wires 150/150 (97), washer (96), lockwasher (95) and nut (94) on negative terminal (104).

CAUTION

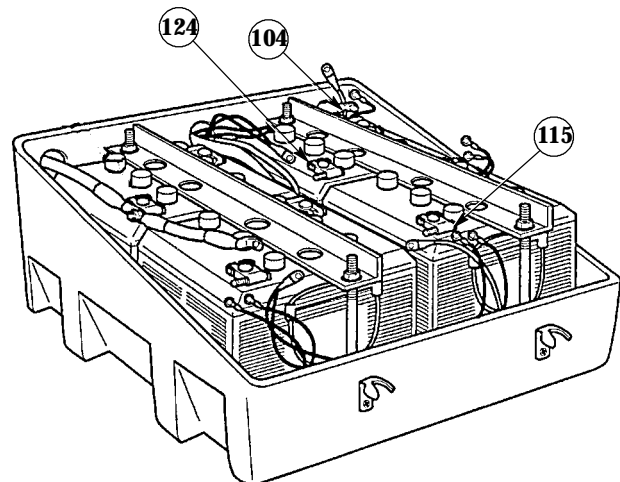
While applying torque to nut, hold screw with wrench or damage to battery may occur.

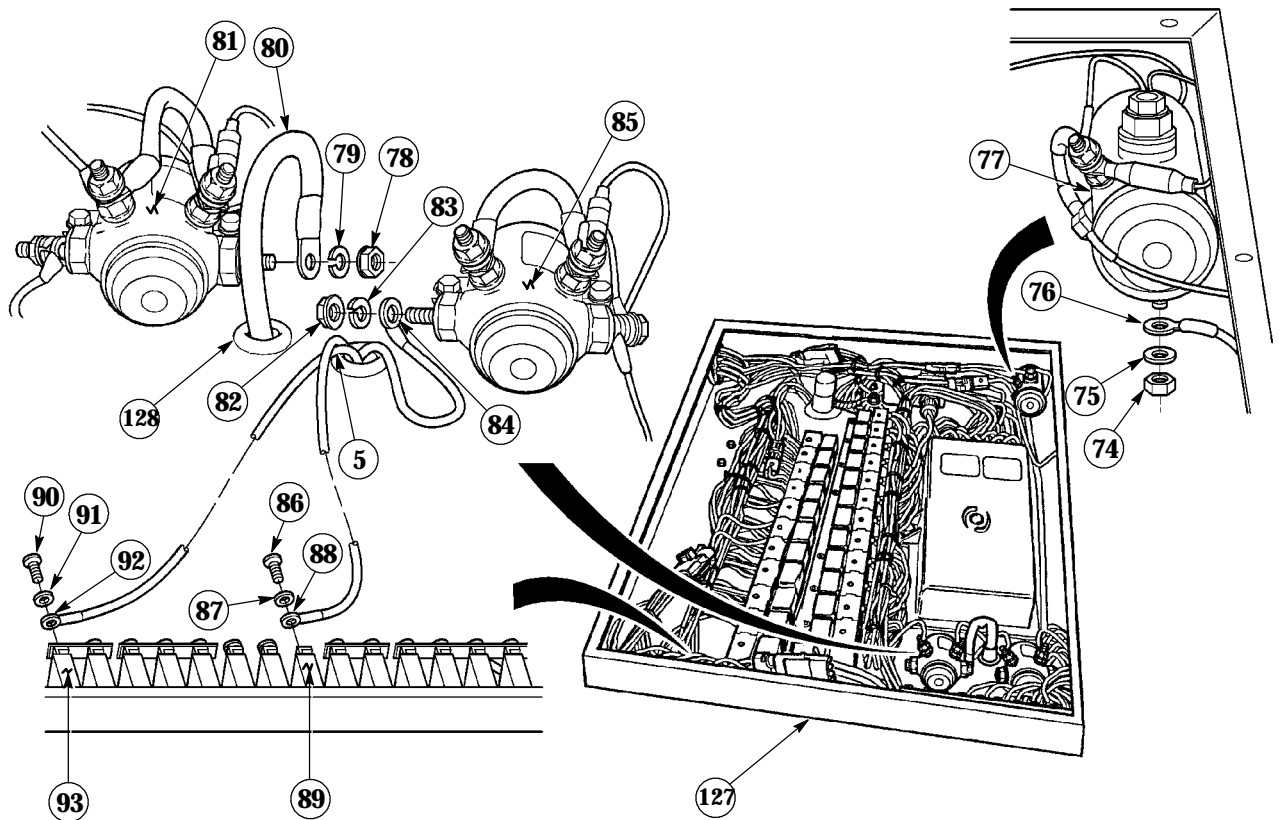
- (8) Tighten nut (94) to 12 to 16 lb-ft (16-22 N·m).

WARNING

Corrosion compound contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water at least 15 minutes and get immediate medical attention.

- (9) Apply corrosion preventative compound to negative terminal (104), positive terminal (115) and positive terminal (124).

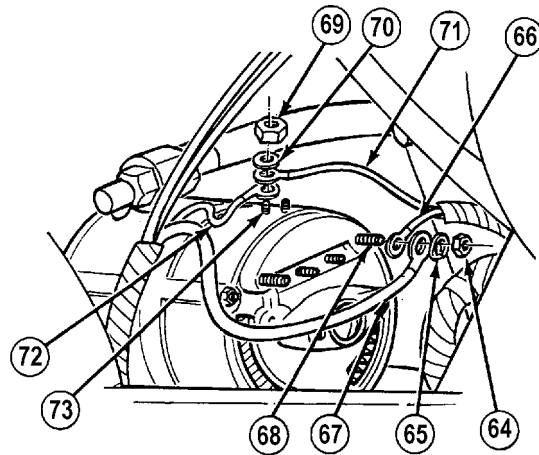




- (10) Position wire harness (5) in ECB (127) through grommets (128).
- (11) Install wire 1079 (92) on circuit breaker CB12 (93) with lockwasher (91) and screw (90).
- (12) Install wire 1866 (88) on circuit breaker CB5 (89) with lockwasher (87) and nut (86).
- (13) Position wire 1281 (84) on solenoid (85) with lockwasher (83) and nut (82). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).
- (14) Position wire 1430 (80) on solenoid (81) with lockwasher (79) and nut (78). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).
- (15) Position wire 1075 (76) on solenoid (77) with lockwasher (75) and nut (74). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).

6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).

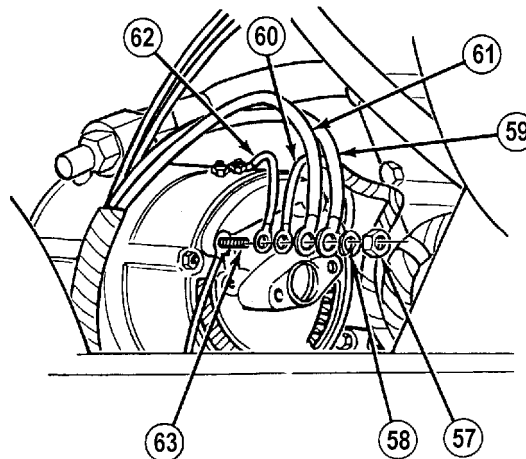
- (16) Install wires 1344 (72) and 1953 (71), lockwasher (70) and nut (69) on F-positive terminal (73).
- (17) Install wires 1278 (67) and 1820 (66), lockwasher (65) and nut (64) on positive terminal (68).
- (18) Install wires 1057 (62), 1435 (61), 1815 (60) and 1275 (59), lockwasher (58) and nut (57) on negative terminal (63).



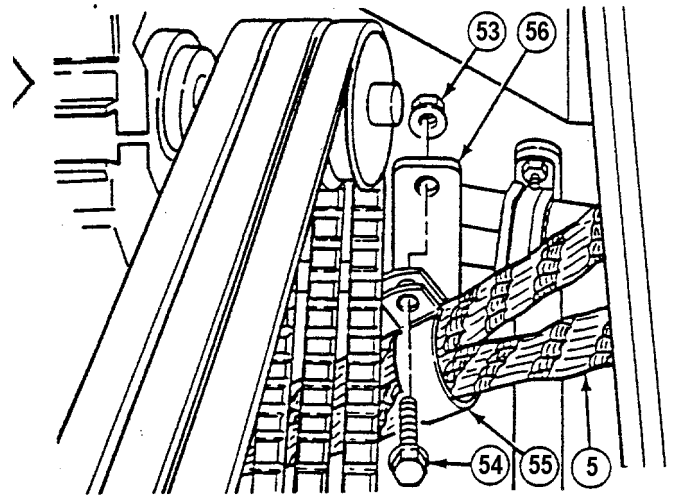
WARNING

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.

- (19) Apply electrical sealant to negative terminal (63), positive terminal (68) and F-positive terminal (73).



- (20) Secure cushion clip (55) and wire harness (5) to bracket (56) with screw (54) and locknut (53).

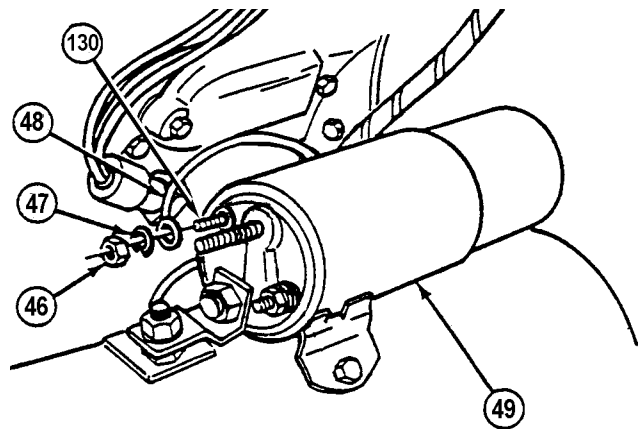
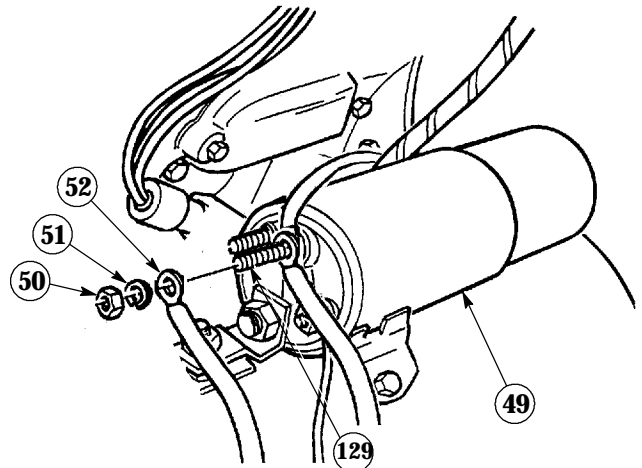


- (21) Install wire 1055 (52), lockwasher (51) and nut (50) on solenoid (49).
- (22) Install wire 1045 (48), lockwasher (47) and nut (46) on solenoid (49).

WARNING

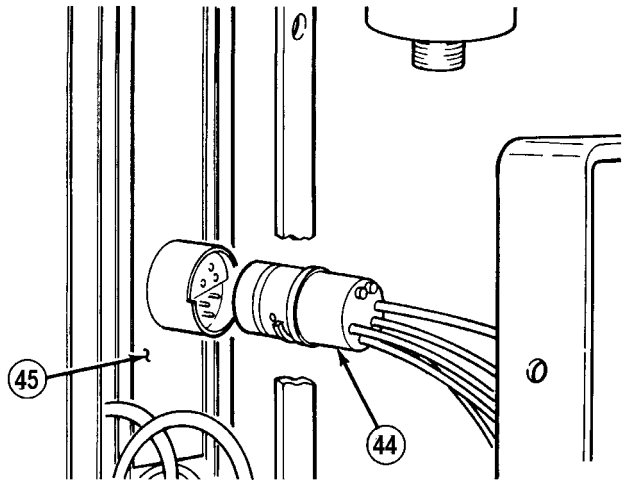
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (23) Apply electrical sealant to terminal (129) and terminal (130).

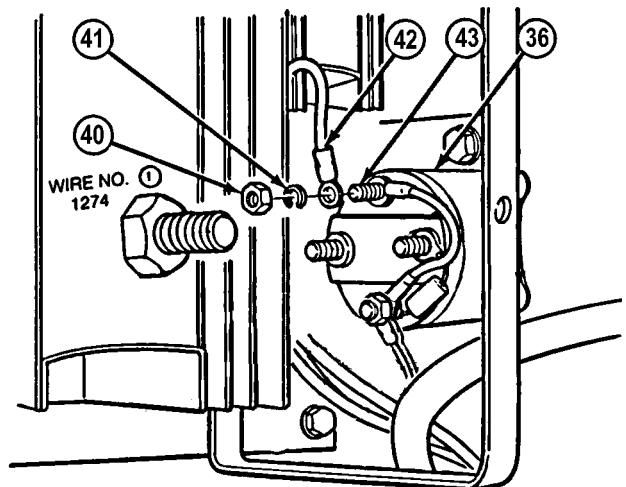


6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT.)

- (24) Connect voltage regulator harness (44) to voltage regulator (45).

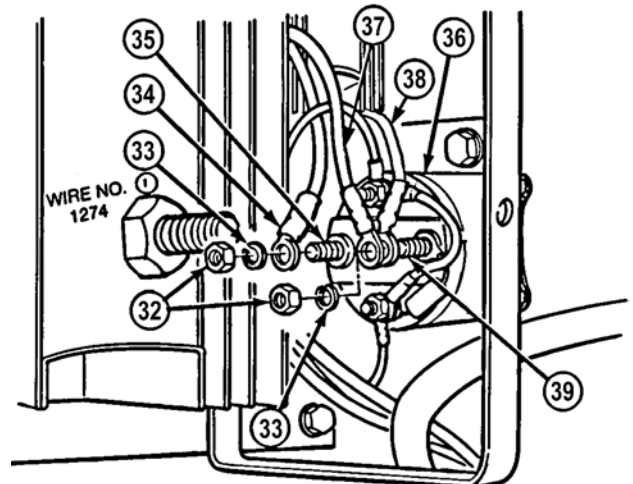


- (25) Install wire 1021A (42), lockwasher (41) and nut (40) on stud (43) of 24 volt solenoid switch (36).

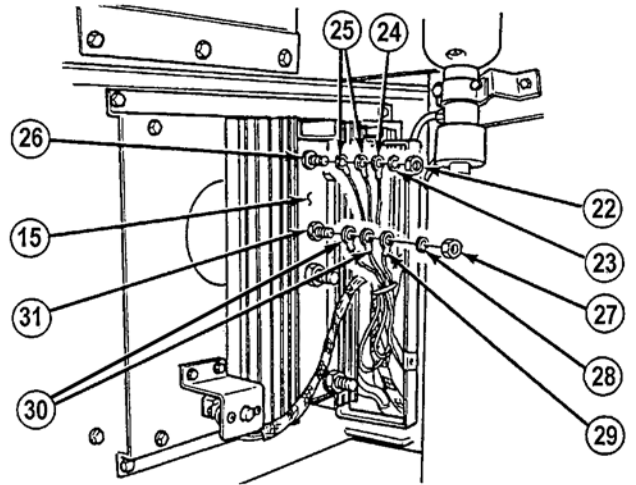


- (26) Install capacitor wire (38), wire 1045 (37), lockwasher (33) and nut (32) on stud (39) of 24 volt solenoid switch (36).

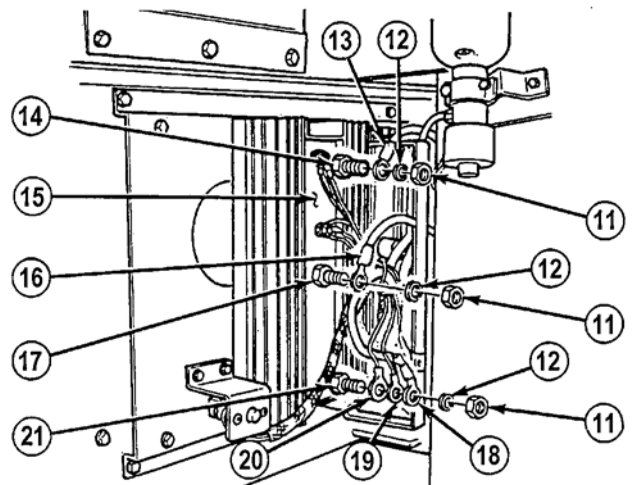
- (27) Install wire 1281 (34), lockwasher (33) and nut (32) on stud (35) of 24 volt solenoid switch (36).



- (28) Install two wires 1435 (30), black wire (29), lockwasher (28) and nut (27) on ground stud (31) of DUVAC controller (15).
- (29) Install two wires 1020 (25), brown wire (24), lockwasher (23) and nut (22) on IGN stud (26) of DUVAC controller (15).



- (30) Install red wire (20), orange wire (19), wire 1274 (18), lockwasher (12) and nut (11) on 12 volt battery stud (21) of DUVAC controller (15).
- (31) Install wire 1278 (16), lockwasher (12) and nut (11) on 24 volt alternator stud (17) of DUVAC controller (15).
- (32) Install wire 1277 (13), lockwasher (12) and nut (11) on 24 volt battery stud (14) of DUVAC controller (15).

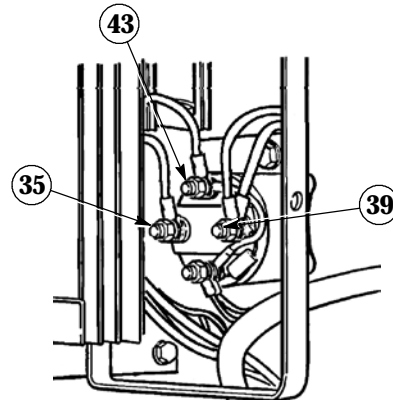
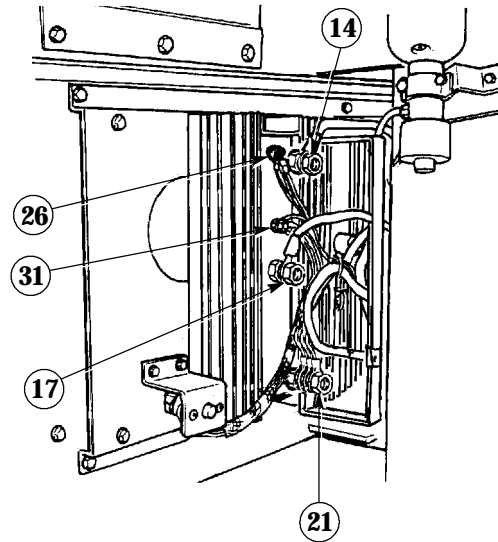


6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).

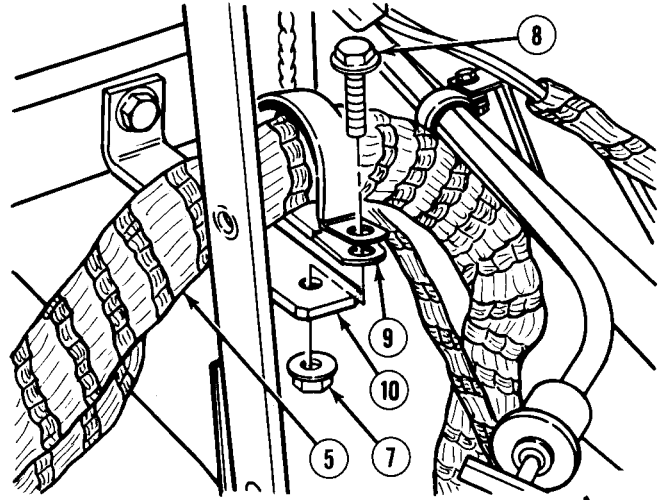
WARNING

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.

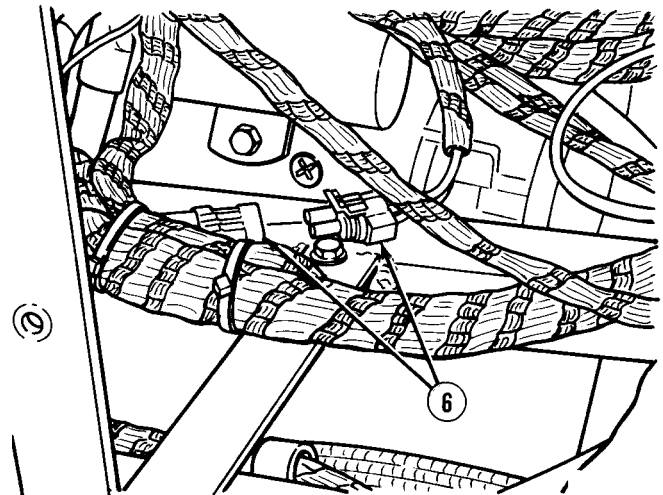
- (33) Apply electrical sealant to 12 volt battery stud (21), 24 volt alternator stud (17), ground stud (31), IGN stud (26), 24 volt battery stud (14), stud (43), stud (39) and stud (35).



- (34) Secure cushion clip (9) and wire harness (5) to bracket (10) with screw (8) and locknut (7).

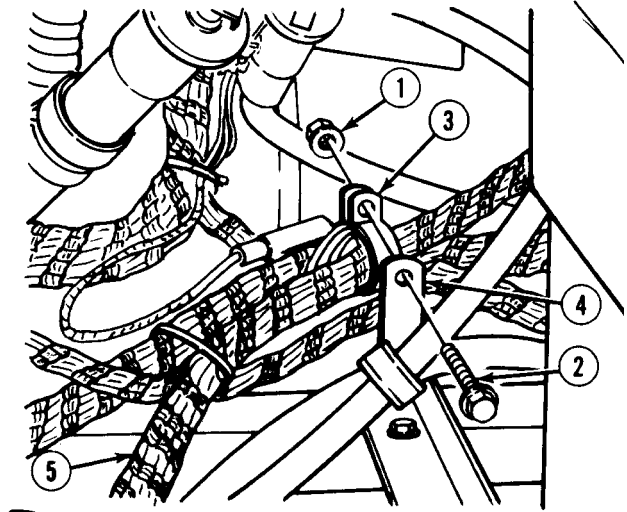


- (35) Connect connector MC60 (6).



6-36. REVERSE POLARITY WIRING HARNESS REPLACEMENT (145 AMP) (CONT).

- (36) Secure cushion clip (3) and wire harness (5) to bracket (4) with screw (2) and locknut (1).



c. Follow-On Maintenance:

- Install engine access panel, (TM 9-2320-364-20).
- Install electronic control box access panels, (TM 9-2320-364-20).
- Install left side noise panel, (TM 9-2320-364-20).
- Install left side splash guard, (TM 9-2320-364-20).
- Connect arctic batteries, if equipped, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-37. POLARITY POWER WIRE HARNESS REPLACEMENT (200 AMP).

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*Tool Kit, General Mechanic's
(Item 240, Appendix F)Wrench, Torque, (0 to 60 N·m)
(Item 276, Appendix F)Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)*Materials/Parts*

Cable Ties (Item 9, Appendix B)

Compound, Corrosion Preventive
(Item 15, Appendix B)

Rags, Wiping (Item 47, Appendix B)

Sealant, Electrical (Item 50, Appendix B)

Materials/Parts - Continued

Tags, Identification (Item 72, Appendix B)

Lockwasher (2) (Item 251, Appendix E)

Lockwasher (4) (Item 282, Appendix E)

Lockwasher (Item 283, Appendix E)

Lockwasher (Item 286, Appendix E)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)

Wheels chocked, (TM 9-2320-364-10)

Batteries disconnected, (TM 9-2320-364-20)

Left side noise panel removed,
(TM 9-2320-364-20)**WARNING**

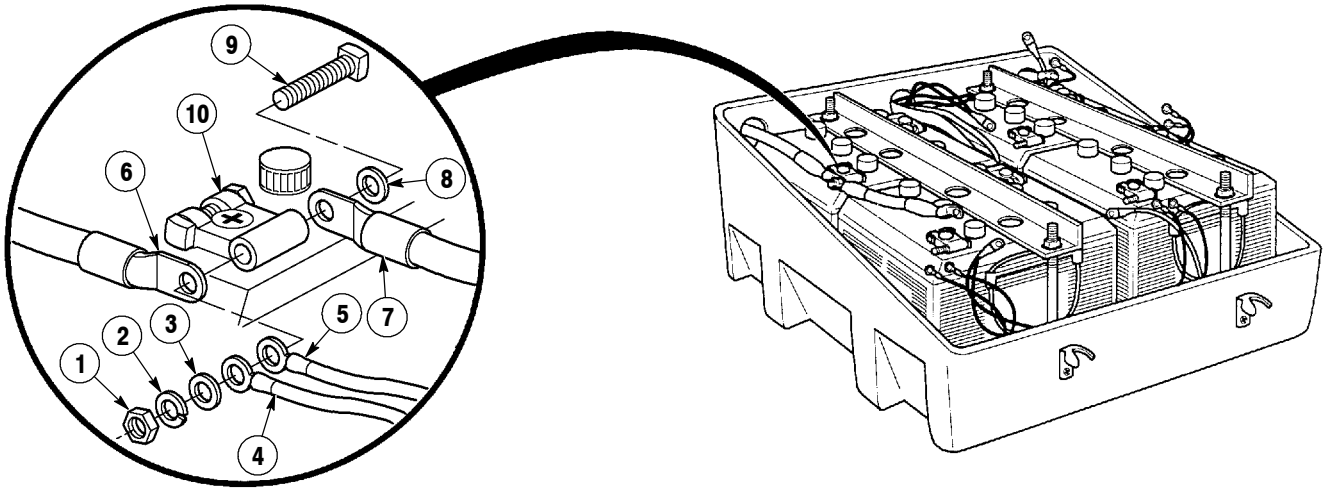
- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries. Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent clothing being damaged.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

6-37. POLARITY POWER WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

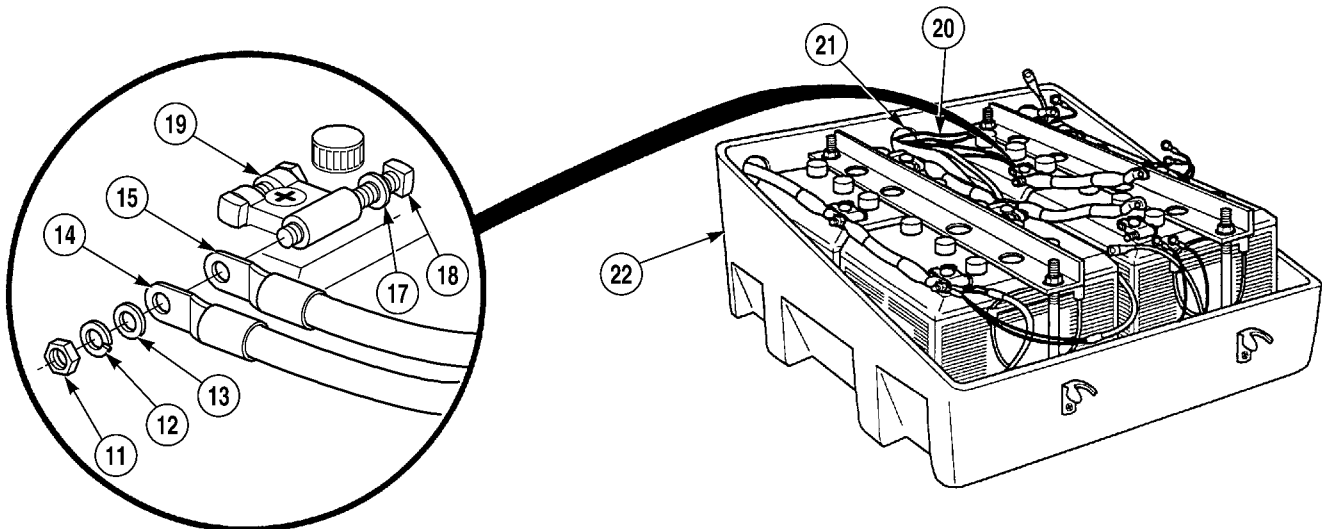
a. Removal.

NOTE

- Tag and mark all wires prior to removal.
- Remove cable ties as required.

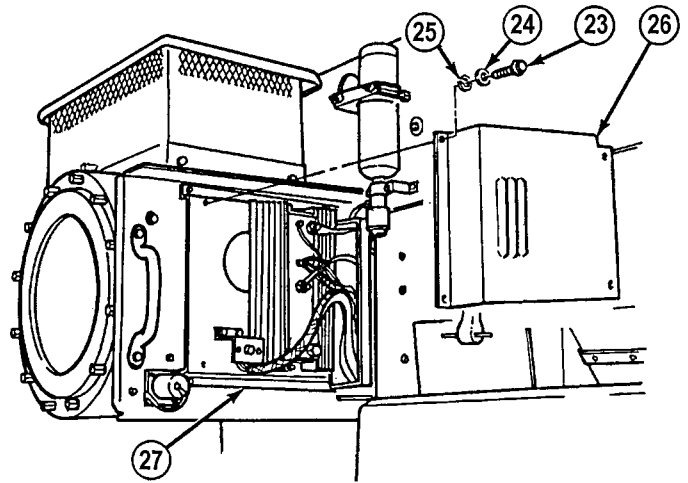


- (1) Remove nut (1), lockwasher (2), washer (3), cable 1281A (4), cable 1281A (5), cable 1139 (6), cable 1137 (7), washer (8) and screw (9) from positive terminal (10). Discard lockwasher.



- (2) Remove nut (11), lockwasher (12), washer (13), cable 1566 (14), cable 1137 (15), washer (17), and screw (18) from positive terminal (19). Discard lockwasher.
- (3) Pull polarity power wire harness (20) through holes (21) of battery box (22).

- (4) Remove four screws (23), lockwashers (24), washers (25) and splash guard (26) from electric bracket (27). Discard lockwashers.



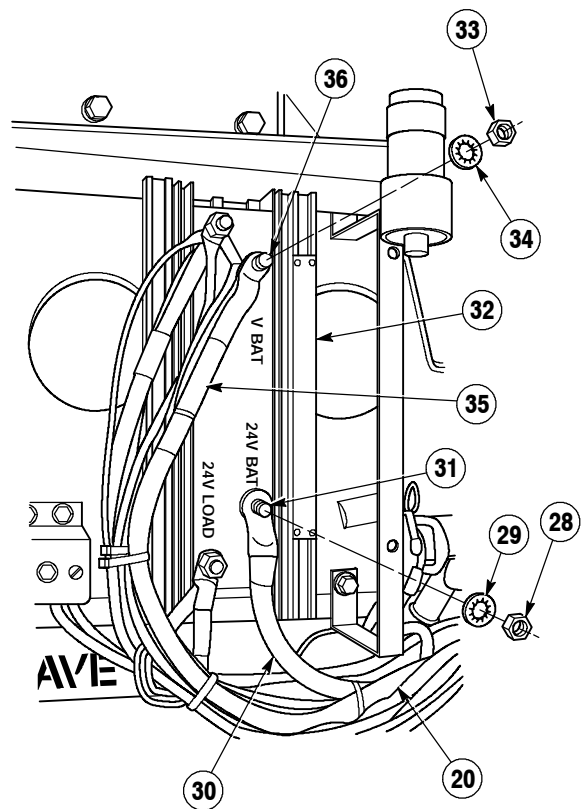
- (5) Remove nut (28), lockwasher (29) and wire 1281A (30) from 24 volt battery terminal (31) of polarity protection control (32). Discard lockwasher.

- (6) Position nut (28) on 24 volt battery terminal (31).

- (7) Remove nut (33), lockwasher (34) and wire 1566 (35) from 12 volt battery terminal (36) of polarity protection control (32). Discard lockwasher.

- (8) Position nut (33) on 12 volt battery terminal (36).

- (9) Remove polarity power wire harness (20) from truck.



6-37. POLARITY POWER WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

b. Installation.

NOTE

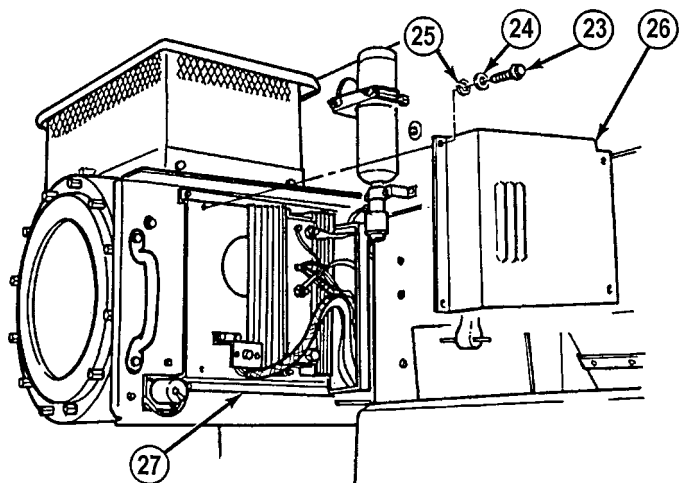
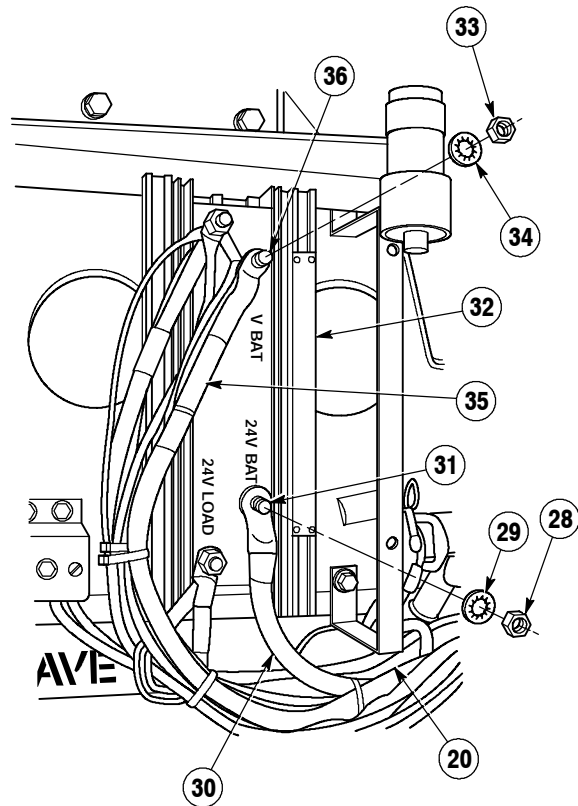
Install cable ties as required.

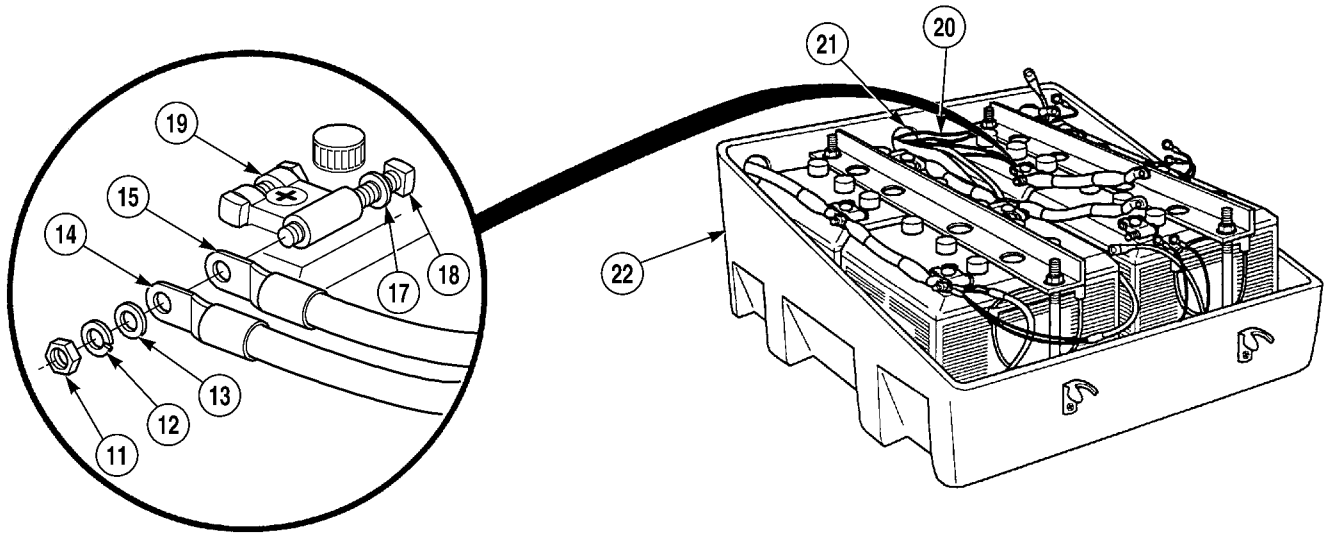
- (1) Position polarity power wire harness (20) in truck.
- (2) Remove nut (33) from 12 volt battery terminal (36) of polarity protection control (32).
- (3) Install wire 1566 (35), lockwasher (34) and nut (33) on 12 volt battery terminal (36).
- (4) Remove nut (28) from 24 volt battery terminal (31) of polarity protection control (32).
- (5) Install wire 1281A (30), lockwasher (29) and nut (28) on 24 volt battery terminal (31).

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.

- (6) Apply electrical sealant to 24 volt battery terminal (31) and 12 volt battery terminal (36).
- (7) Install splash guard (26), four washers (25), lockwashers (24) and screws (23) on electric bracket (27).





WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

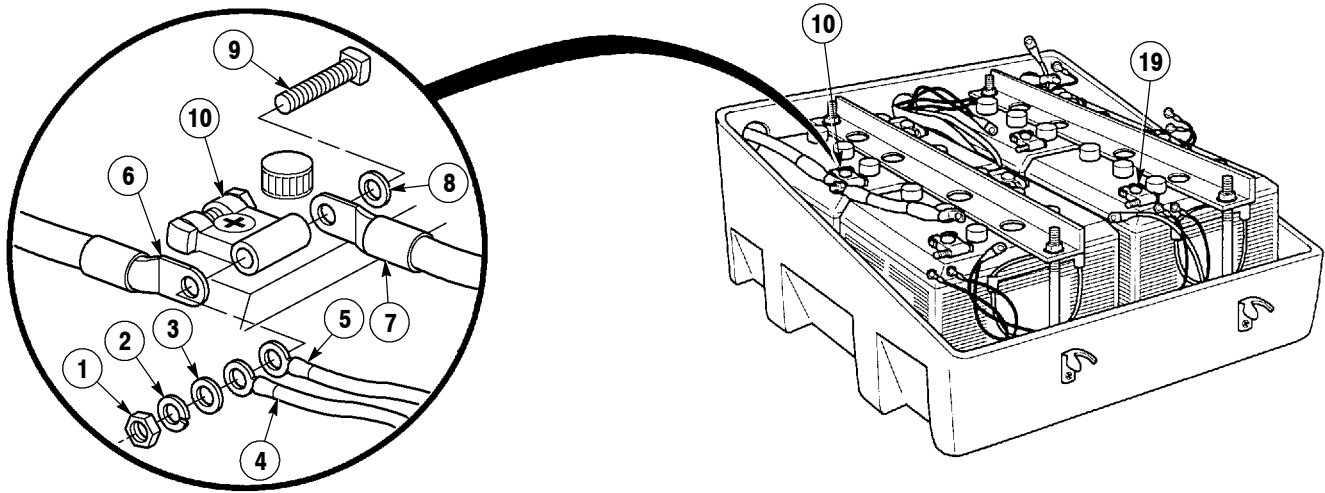
- (8) Pull polarity power wire harness (20) through hole (21) in battery box (22) and position in truck.
- (9) Position screw (18), washer (17), cable 1137 (15), cable 1566 (14), washer (13), lockwasher (12) and nut (11) on positive terminal (19).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (10) Tighten nut (11) to 12 to 16 lb-ft (16-22 N·m).

6-37. POLARITY POWER WIRE HARNESS REPLACEMENT (200 AMP) (CONT).



- (11) Position screw (9), washer (8), cable 1137 (7), cable 1139 (6), cable 1281A (5), cable 1281A (4), washer (3), lockwasher (2) and nut (1) on positive terminal (10).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (12) Tighten nut (1) to 12 to 16 lb-ft (16-22 N·m).

WARNING

Corrosion compound contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water at least 15 minutes and get immediate medical attention.

- (13) Apply corrosion preventative compound to positive terminal (10) and positive terminal (19).

c. *Follow-On Maintenance:*

- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP).		
This task covers:		
a. Removal	b. Installation	c. Follow-On Maintenance
INITIAL SETUP		
<p><i>Tools and Special Tools</i></p> <p>Tool Kit, General Mechanic's (Item 240, Appendix F)</p> <p>Wrench, Torque, (0 to 60 N·m) (Item 276, Appendix F)</p> <p>Wrench, Torque (0 to 175 lb-ft [0-237 N·m]) (Item 277, Appendix F)</p> <p><i>Materials/Parts</i></p> <p>Cable Ties (Item 9, Appendix B)</p> <p>Compound, Corrosion Preventive (Item 15, Appendix B)</p> <p>Rags, Wiping (Item 47, Appendix B)</p> <p>Sealant, Electrical (Item 50, Appendix B)</p> <p>Tags, Identification (Item 72, Appendix B)</p> <p>Locknut (2) (Item 174, Appendix E)</p> <p>Locknut (Item 176, Appendix E)</p> <p>Locknut (Item 209, Appendix E)</p>	<p><i>Materials/Parts - Continued</i></p> <p>Lockwasher (Item 249, Appendix E)</p> <p>Lockwasher (9) (Item 251, Appendix E)</p> <p>Lockwasher (2) (Item 271, Appendix E)</p> <p>Lockwasher (2) (Item 281, Appendix E)</p> <p>Lockwasher (4) (Item 282, Appendix E)</p> <p>Lockwasher (6) (Item 283, Appendix E)</p> <p>Lockwasher (3) (Item 286, Appendix E)</p> <p>Lockwasher (2) (Item 299, Appendix E)</p> <p><i>Equipment Condition</i></p> <p>Engine OFF, (TM 9-2320-364-10)</p> <p>Wheels chocked, (TM 9-2320-364-10)</p> <p>Batteries disconnected, (TM 9-2320-364-20)</p> <p>Cab engine access panel removed, (TM 9-2320-364-20)</p> <p>Left side noise panel removed, (TM 9-2320-364-20)</p>	

WARNING

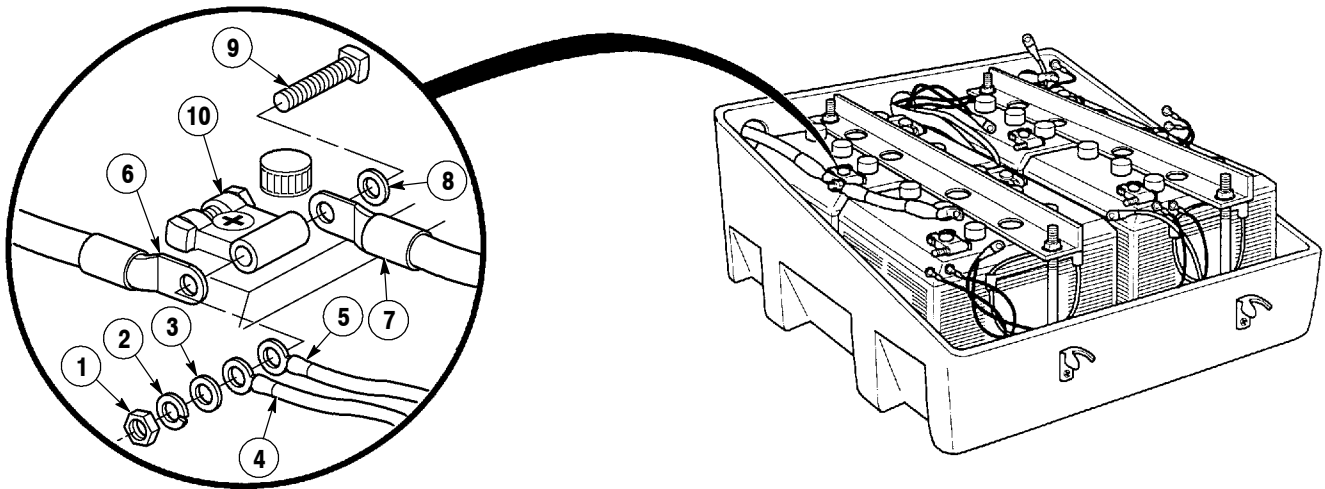
- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries. Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent clothing being damaged.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

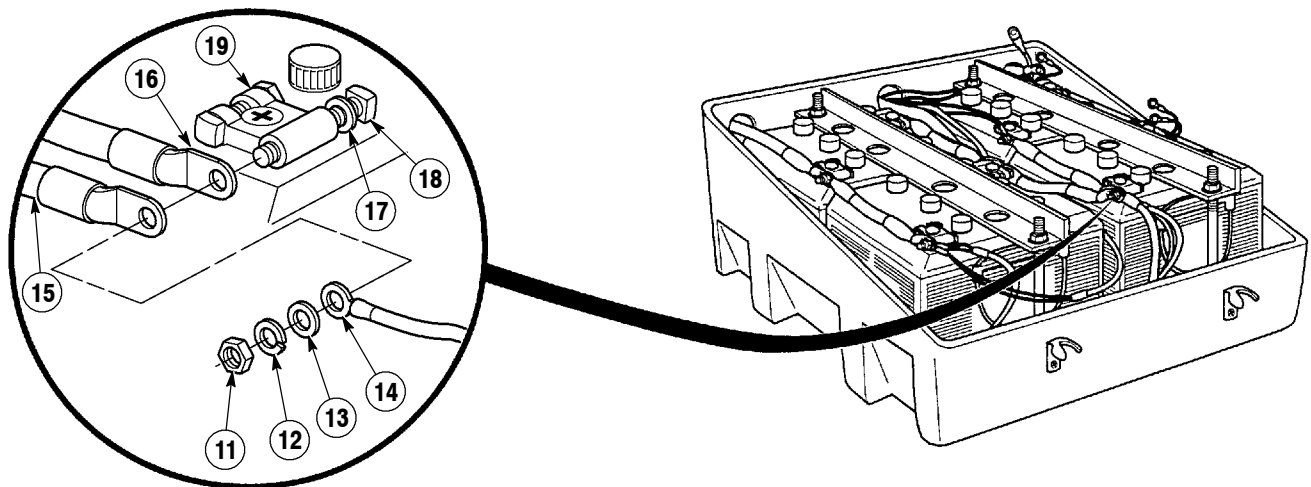
a. Removal.

NOTE

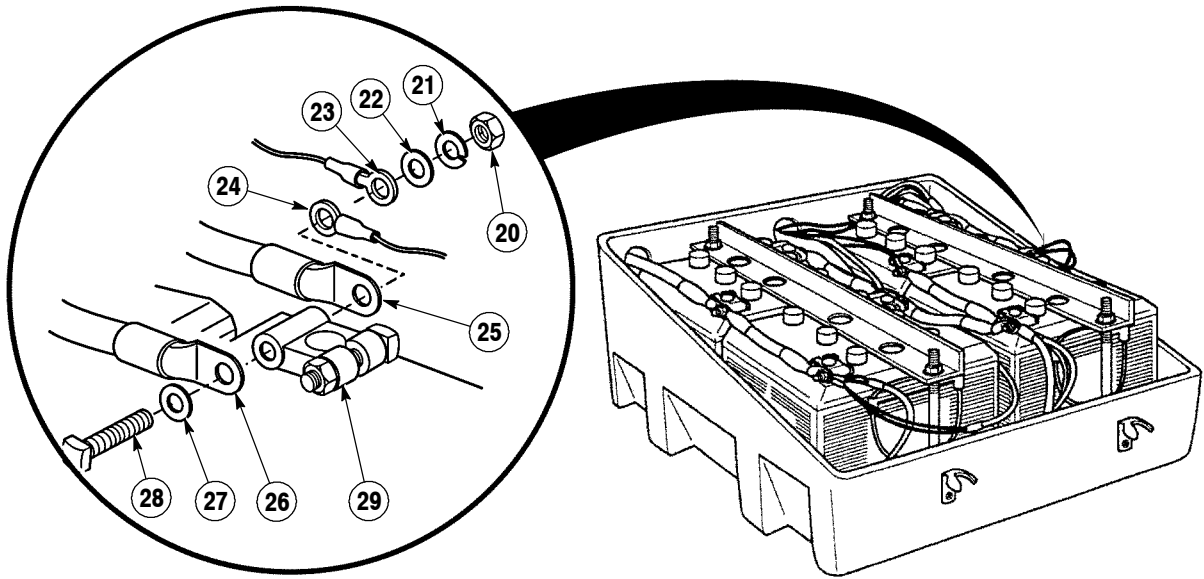
- Tag and mark all wires and connectors prior to removal.
- Remove cable ties as required.
- Perform Steps (1) and (2) only if truck is not equipped with battery disconnect switch.



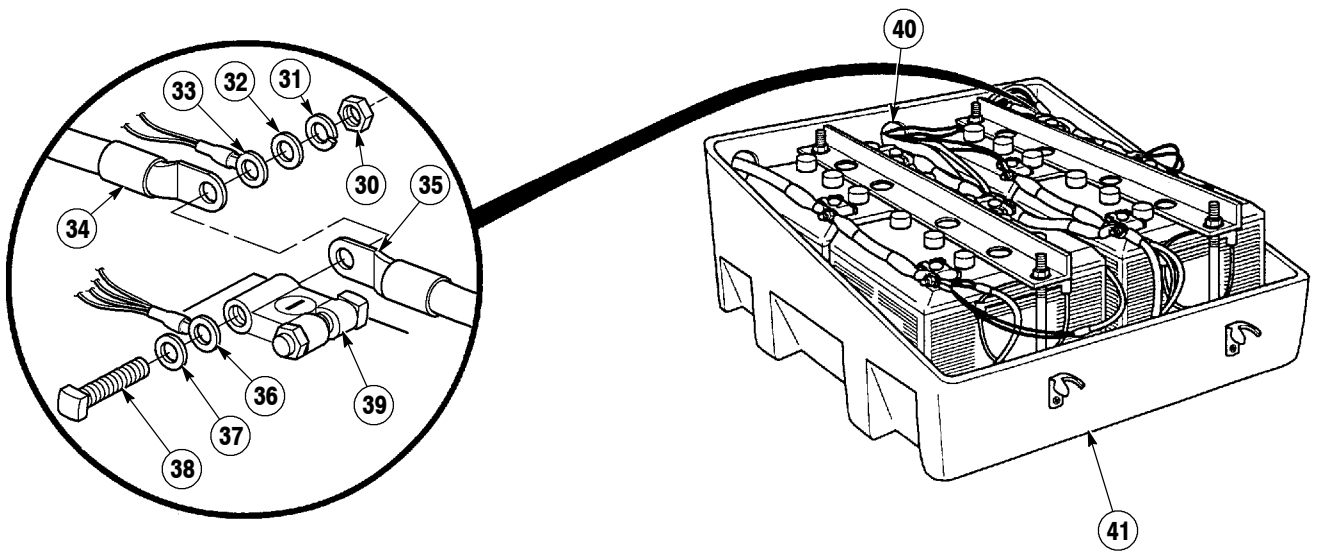
- (1) Remove nut (1), lockwasher (2), washer (3), cable 1281A (4), cable 1281A (5), cable 1139 (6), cable 1137 (7), washer (8) and screw (9) from positive terminal (10). Discard lockwasher.



- (2) Remove nut (11), lockwasher (12), washer (13), cable 1566 (14), cable 1137 (15), cable 1137 (16), washer (17) and screw (18) from positive terminal (19). Discard lockwasher.

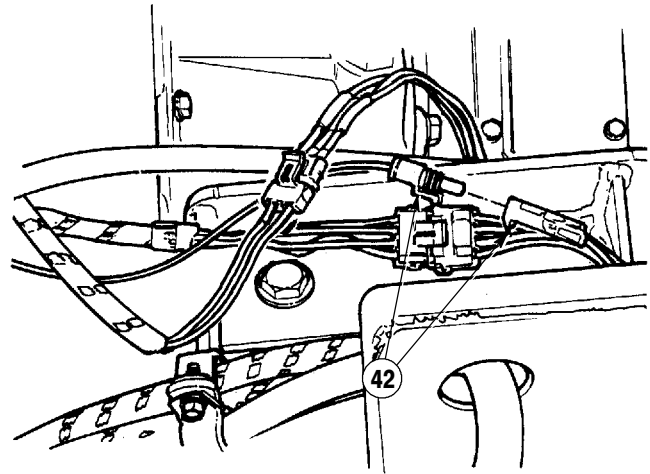
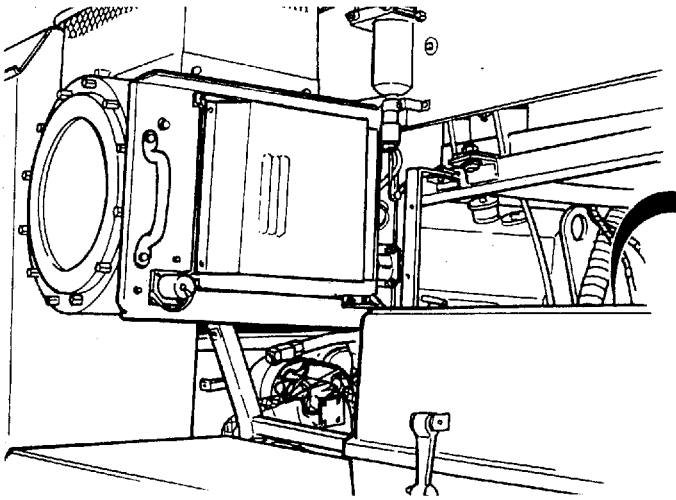


- (3) Remove nut (20), lockwasher (21), washer (22), wire 1813 (23), wire 1821 (24), cable 1275 (25), cable 1137 (26), washer (27) and screw (28) from negative terminal (29). Discard lockwasher.

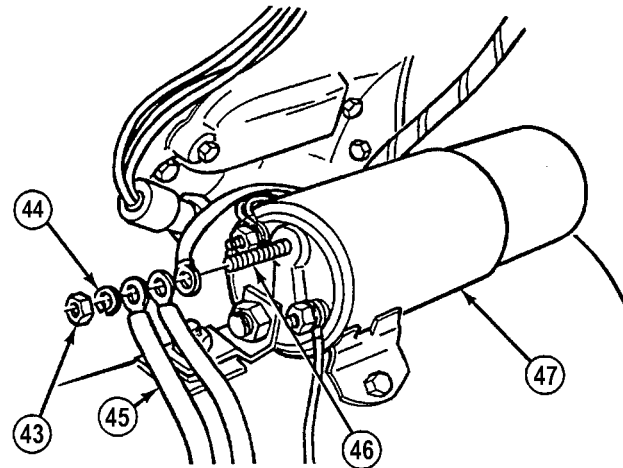
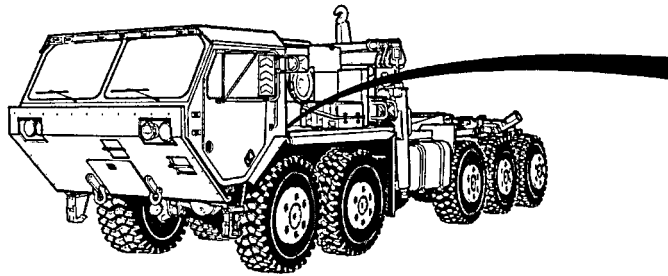


- (4) Remove nut (30), lockwasher (31), washer (32), wires 150/150/151/953 (33), wires 208/209 (34), cable 1138 (35), cable 1137 (36), washer (37) and screw (38) from negative terminal (39). Discard lockwasher.
- (5) Pull 200 AMP polarity wire harness through holes (40) of battery box (41).

6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).



- (6) Disconnect MC60 connector (42).



NOTE

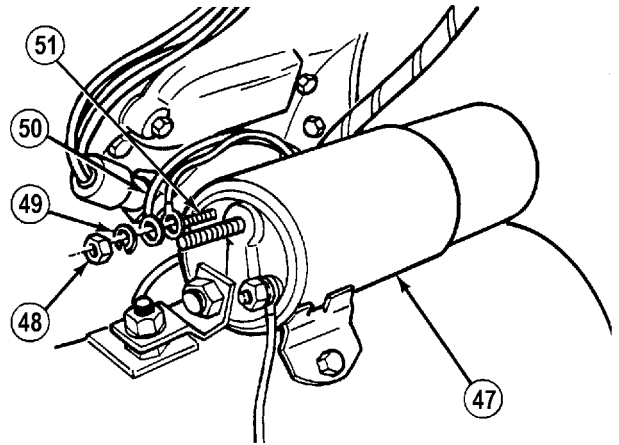
There are three wires located on starter solenoid terminal. Remove only wire 1055 and position remaining wires back on terminal.

- (7) Remove nut (43), lockwasher (44) and wire 1055 (45) from terminal (46) of starter solenoid (47). Discard lockwasher.
- (8) Position nut (43) on terminal (46).

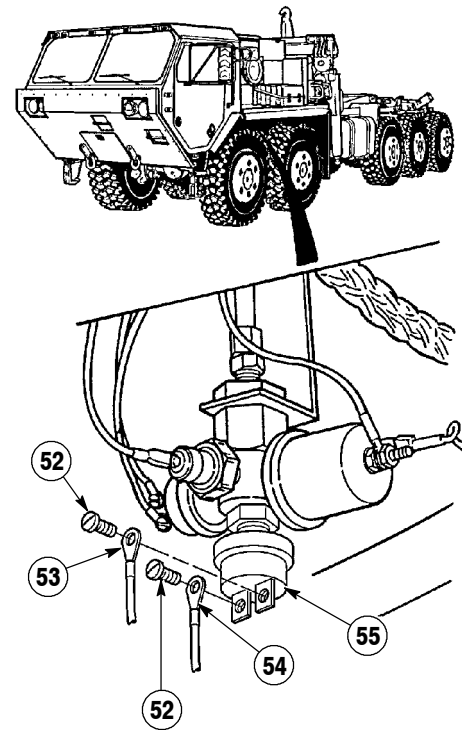
NOTE

There are two wires located on starter solenoid terminal. Remove only wire 1045 and position remaining wire back on terminal.

- (9) Remove nut (48), lockwasher (49), wire 1045 (50) from terminal (51) of starter solenoid (47). Discard lockwasher.
- (10) Position nut (48) on terminal (50).

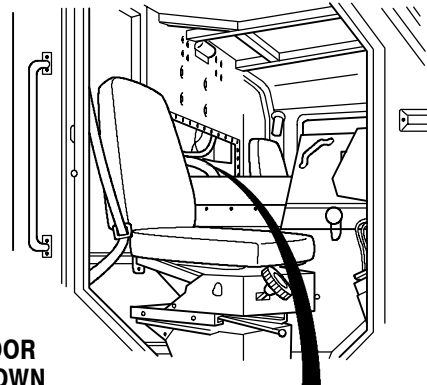


- (11) Remove two screws (52), wire 1020A (53) and 1020B (54) from oil pressure switch (55).

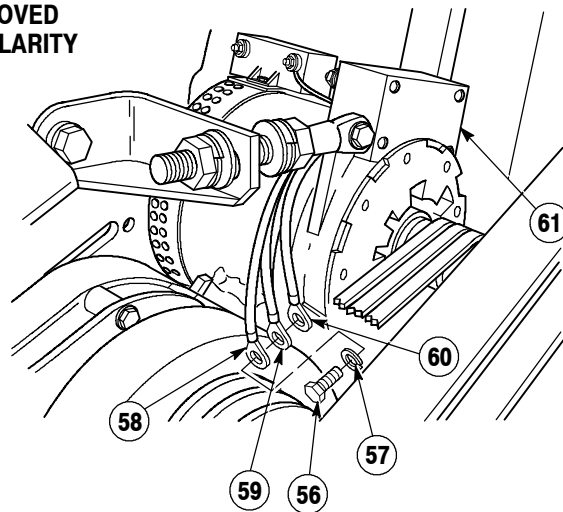


6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

- (12) Remove screw (56), lockwasher (57), wire 1815 (58), wire 1435 (59) and wire 1275 (60) from alternator (61). Discard lockwasher.
- (13) Position wire 1815 (58) and screw (56) on alternator (61).



DOOR SHOWN REMOVED FOR CLARITY



NOTE

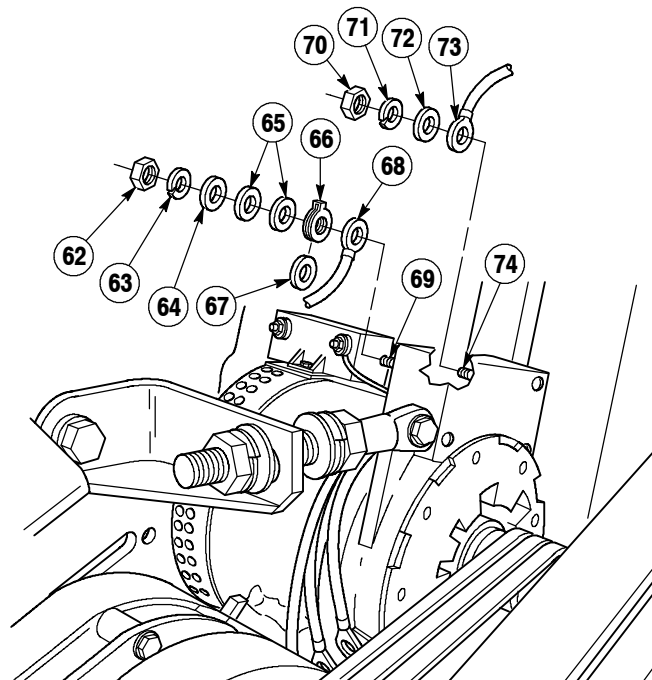
- There are two wires located on 24 volt terminal. Remove only wire 1281A and position remaining wire back on 24 volt terminal.
- Perform Steps (14) through (17) only if truck is not equipped with battery disconnect switch.

- (14) Remove nut (62), lockwasher (63), washer (64), washer(s) (65), if present, fuse link (66) with insulator washer (67), wire 1281A (68) from 24 volt terminal (69). Discard lockwasher.
- (15) Position fuse link (66) with insulator washer (67), washer(s) (65), if removed, washer (64) and nut (62) on 24 volt terminal (69).

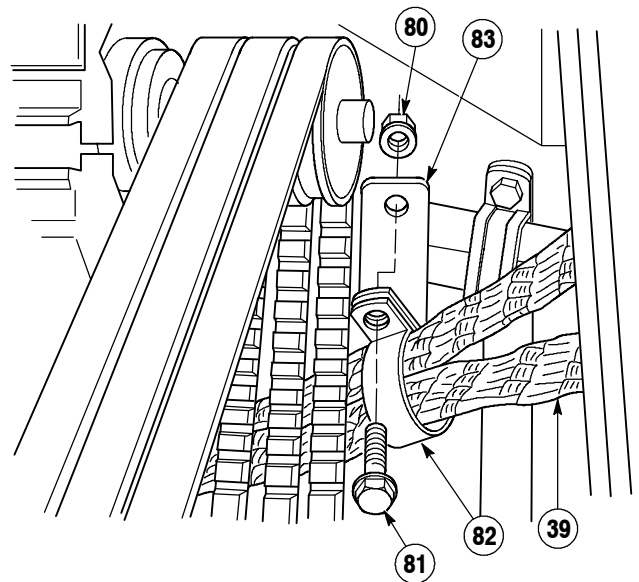
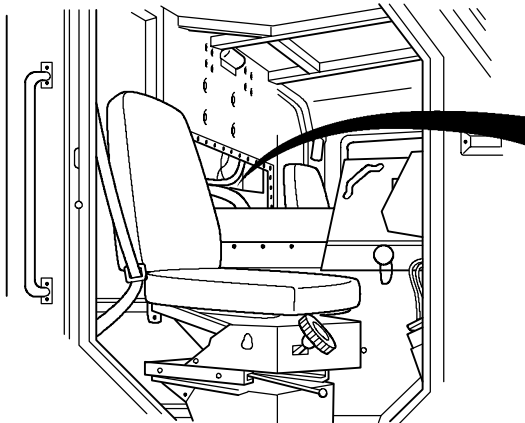
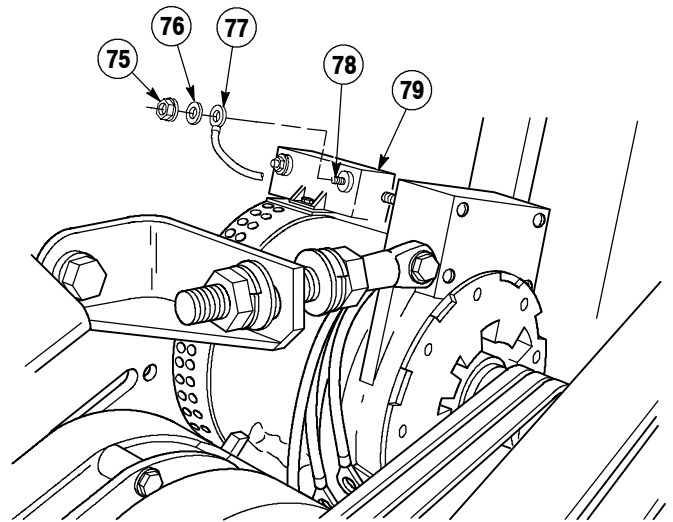
NOTE

There are two wires on 12 volt terminal. Remove only wire 1274 and position remaining wire back on 12 volt terminal.

- (16) Remove nut (70), lockwasher (71) washer (72) and wire 1274 (73) from 12 volt terminal (74). Discard lockwasher.
- (17) Position nut (70) and washer (72) on 12 volt terminal (74).

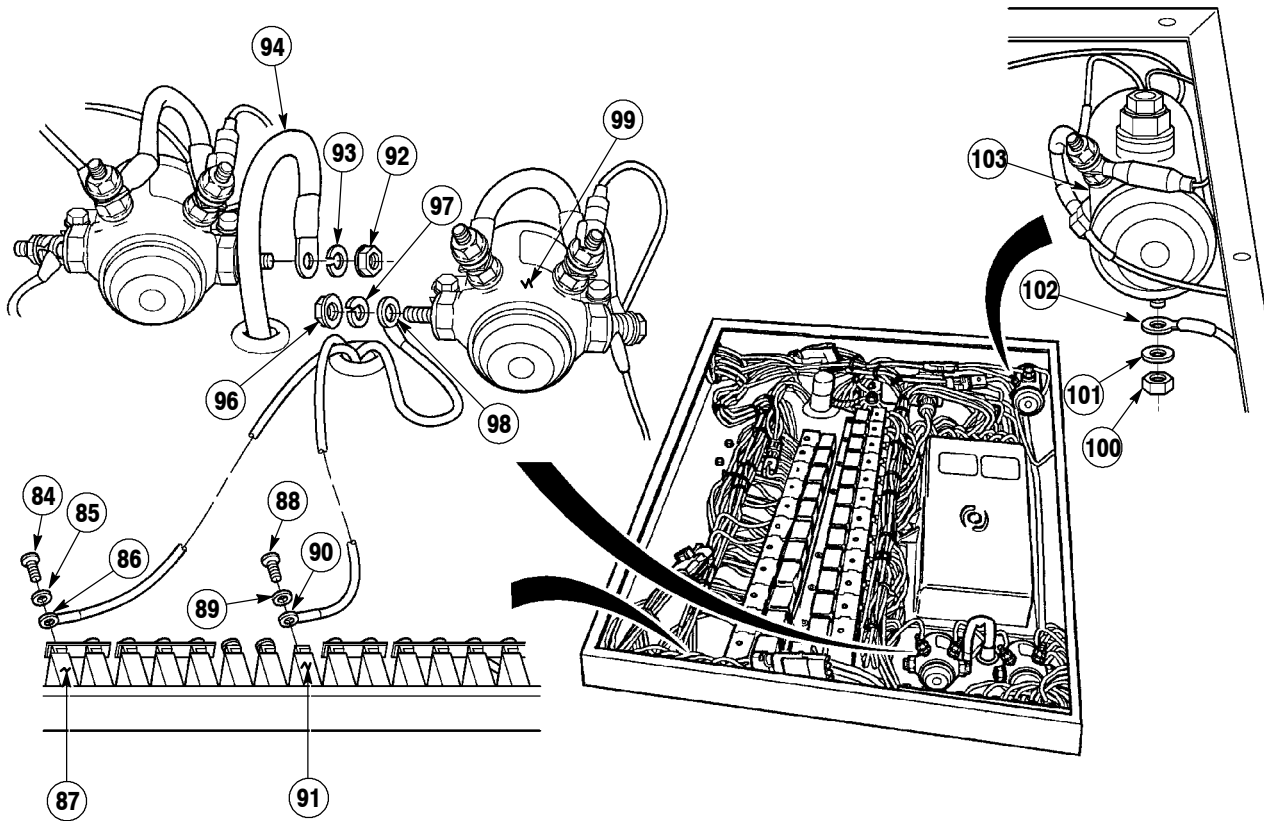


- (18) Remove locknut (75), washer (76) and wire 1020B (77) from terminal (78) of regulator (79). Discard locknut.

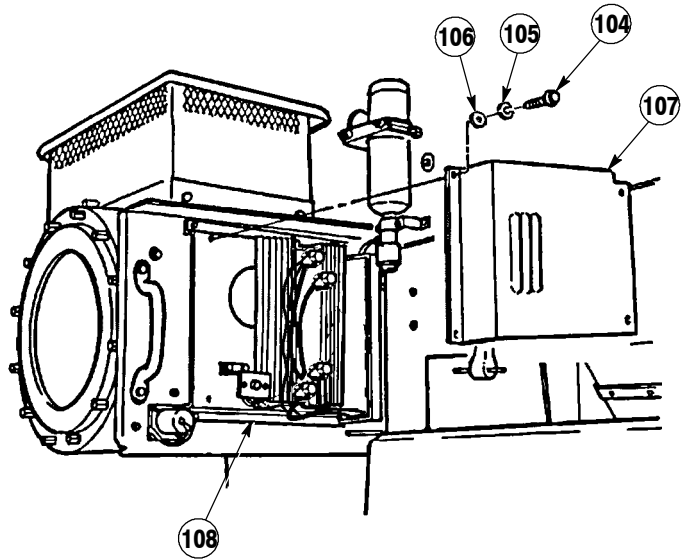
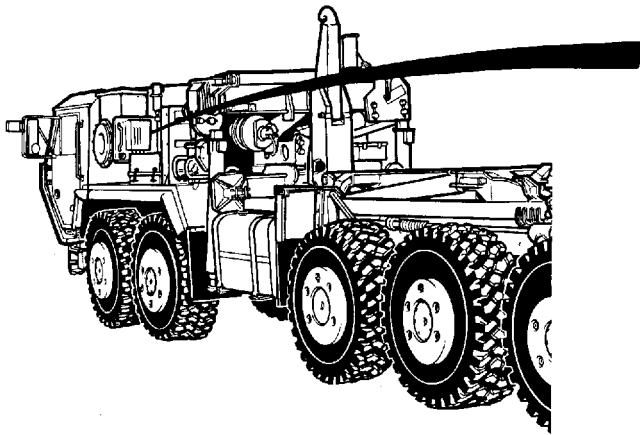


- (19) Remove locknut (80), screw (81) and cushion clip (82) from bracket (83). Discard locknut.
- (20) Remove 200 AMP polarity wire harness (39) from cushion clip (82).

6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).



- (21) Remove screw (84), lockwasher (85) and wire 1079 (86) from circuit breaker CB5 (87). Discard lockwasher.
- (22) Remove screw (88), lockwasher (89) and wire 1866 (90) from circuit breaker CB12 (91). Discard lockwasher.
- (23) Remove nut (92), lockwasher (93) and wire 1430 (94) from solenoid (95). Discard lockwasher.
- (24) Remove nut (96), lockwasher (97) and wire 1281 (98) from solenoid (99). Discard lockwasher.
- (25) Remove nut (100), lockwasher (101) and wire 1075 (102) from solenoid (103). Discard lockwasher.

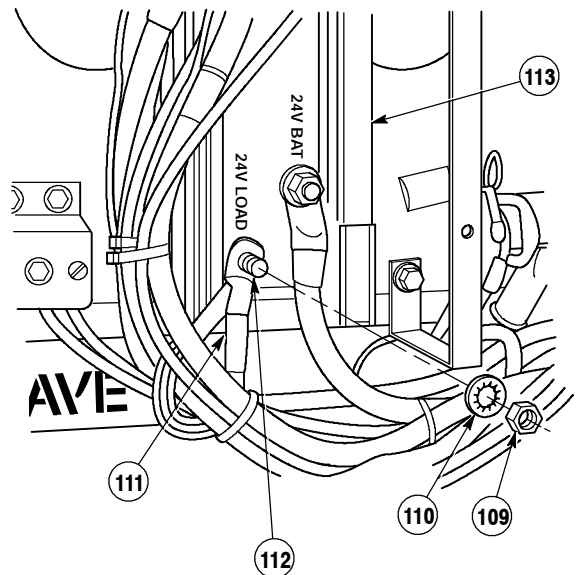


- (26) Remove four screws (104), lockwashers (105), washers (106) and splash guard (107) from electric bracket (108). Discard lockwashers.

NOTE

There are two wires located on the 24 volt load terminal. Remove only wire 1281 and position remaining wire back on 24 volt load terminal.

- (27) Remove nut (109), lockwasher (110) and wire 1281 (111) from 24 volt load terminal (112) of polarity protection control (113). Discard lockwasher.
- (28) Position nut (109) on 24 volt load terminal (112).

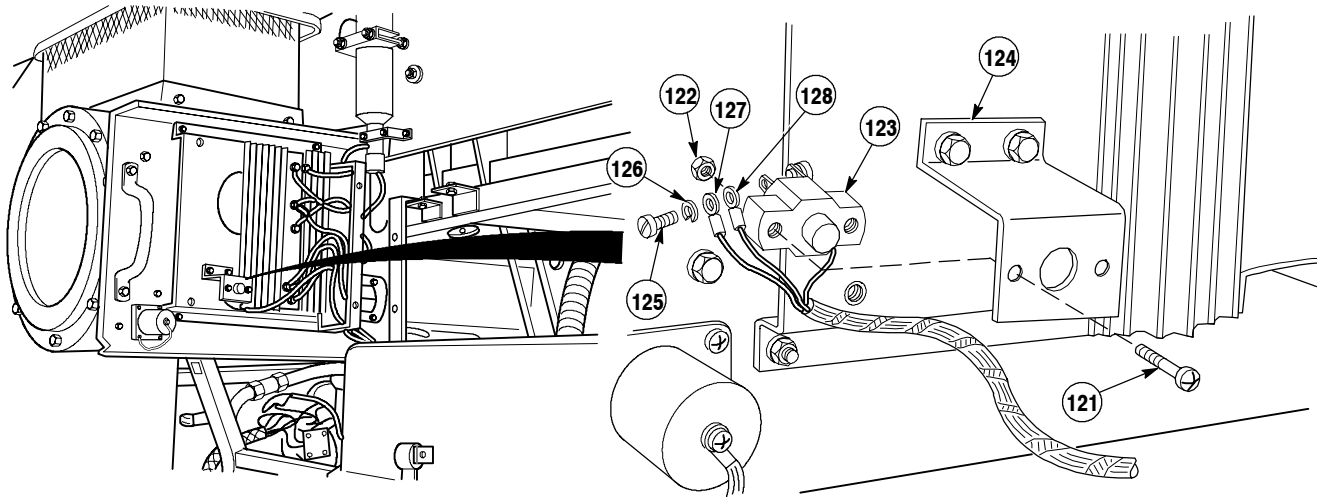
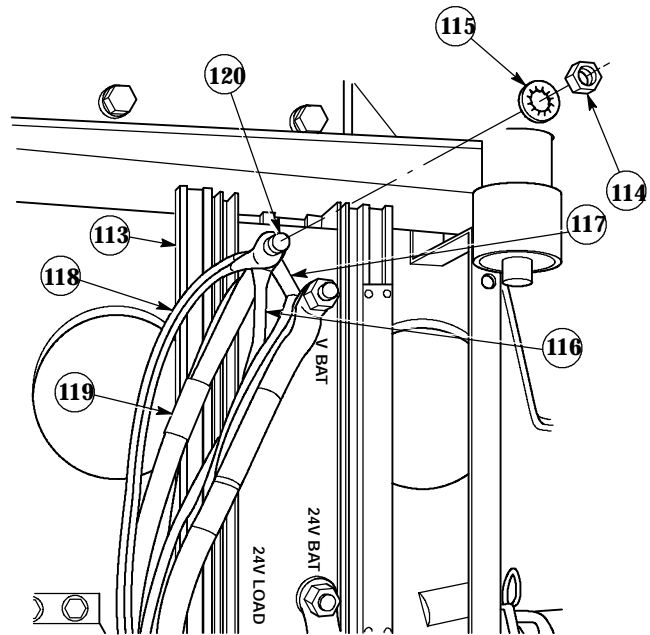


6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

NOTE

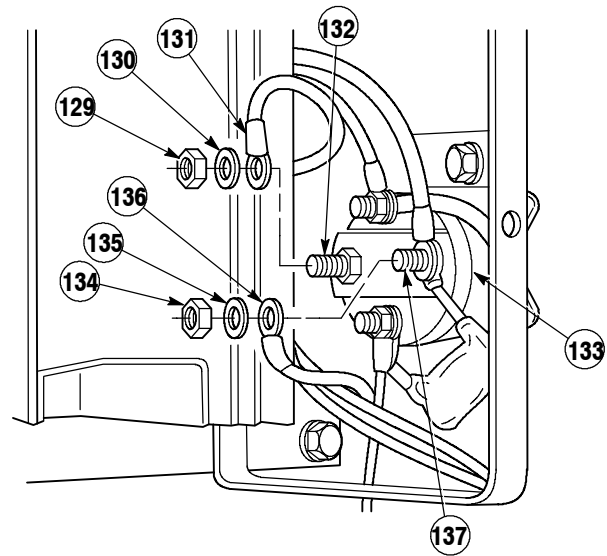
There are five wires located on 12 volt load terminal. Remove all but wire 240/241 from 12 volt load terminal.

- (29) Remove nut (114), lockwasher (115), wire 1430 (116), wire 1866 (117), wire 1075 (118), and wire 1079 (119) from 12 volt load terminal (120) of polarity protection control (113).
- (30) Position nut on 12 volt load terminal. Discard lockwasher.

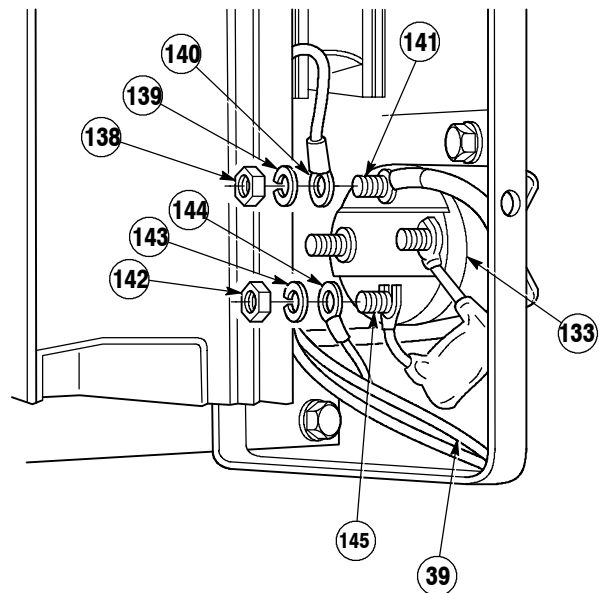


- (31) Remove two screws (121), locknuts (122) and circuit breaker (123) from bracket (124). Discard locknuts.
- (32) Remove screw (125), lockwasher (126), wire 1020 (127), and wire 1020A (128) from circuit breaker (123). Discard lockwasher.

- (33) Remove nut (129), lockwasher (130) and wire 1055 (131) from terminal (132) of 24 volt solenoid switch (133). Discard lockwasher.
- (34) Position nut (129) on terminal (132).
- (35) Remove nut (134), lockwasher (135) and wire 1045 (136) from terminal (137) of 24 volt solenoid switch (133). Discard lockwasher.
- (36) Position nut (134) on terminal (137).



- (37) Remove nut (138), lockwasher (139) and wire 1021A (140) from terminal (141) of 24 volt solenoid switch (133). Discard lockwasher.
- (38) Position nut (138) on terminal (141).
- (39) Remove nut (142), lockwasher (143) and wire 1435 (144) of 200 AMP polarity wire harness (39) from terminal (145) of 24 volt solenoid switch (133). Discard lockwasher.
- (40) Position nut (142) on terminal (145).
- (41) Remove 200 AMP polarity wire harness (39) from truck.



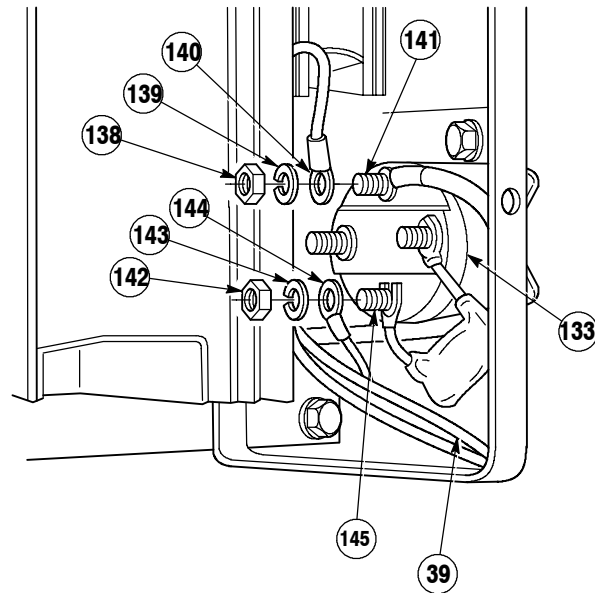
6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

b. Installation.

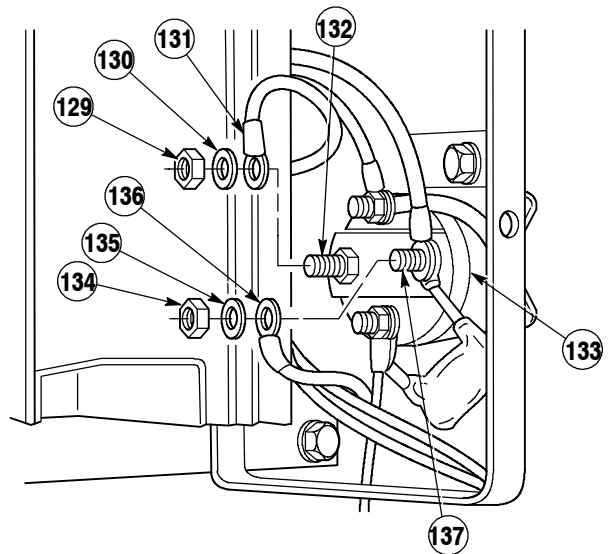
NOTE

Install cable ties as required.

- (1) Position 200 AMP polarity wire harness (39) in truck.
- (2) Remove nut (142) from terminal (145) of 24 volt solenoid switch (133).
- (3) Install wire 1435 (144), lockwasher (143) and nut (142) on terminal (145).
- (4) Remove nut (138) from terminal (141) of 24 volt solenoid switch (133).
- (5) Install wire 1021A (140), lockwasher (139) and nut (138) on terminal (141).



- (6) Remove nut (134) from terminal (137) of 24 volt solenoid switch (133).
- (7) Install wire 1045 (136), lockwasher (135) and nut (134) on terminal (137).
- (8) Remove nut (129) from terminal (132) of 24 volt solenoid switch (133).
- (9) Install wire 1055 (131), lockwasher (130) and nut (129) on terminal (132).



WARNING

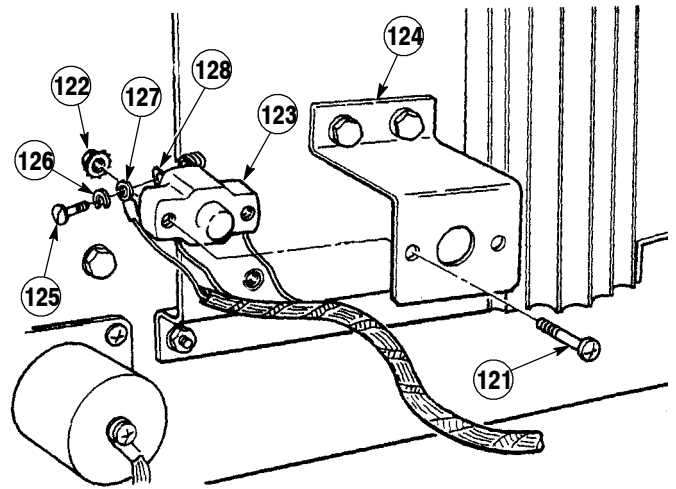
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (10) Apply electrical sealant to terminal (132), terminal (137), terminal (141) and terminal (145).

- (11) Install wire 1020A (128), wire 1020 (127), lockwasher (126), and screw (125) on circuit breaker (123).
- (12) Install circuit breaker (123) on bracket (124) with two screws (121) and locknuts (122).

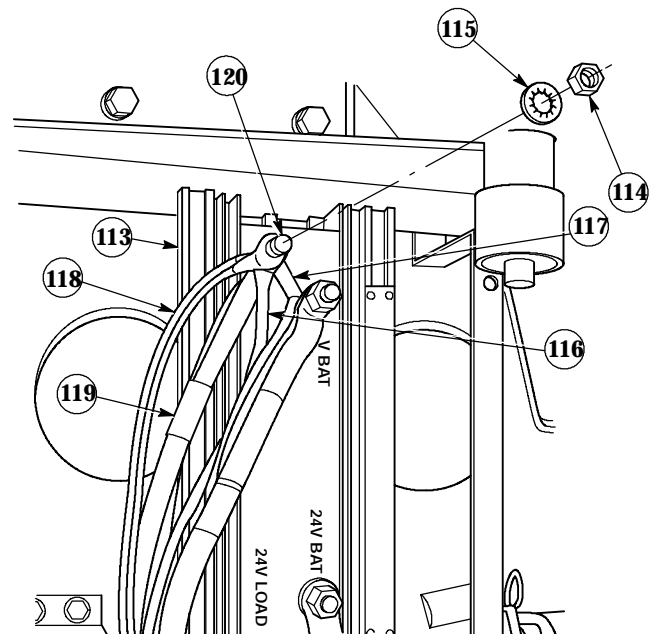
WARNING

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.



- (13) Apply electrical sealant to screw (125).

- (14) Remove nut (114) from 12 volt load terminal (120) of polarity protection control (113).
- (15) Install wire 1079 (119), wire 1075 (118), wire 1866 (117), wire 1430 (116), lockwasher (115) and nut (114) on 12 volt load terminal (120).

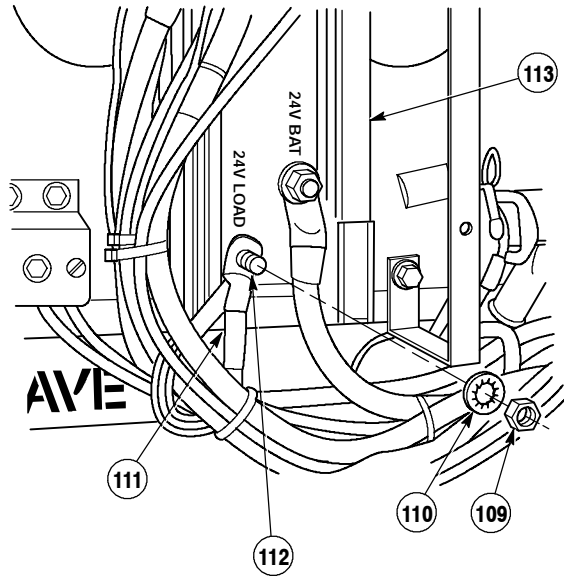


6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

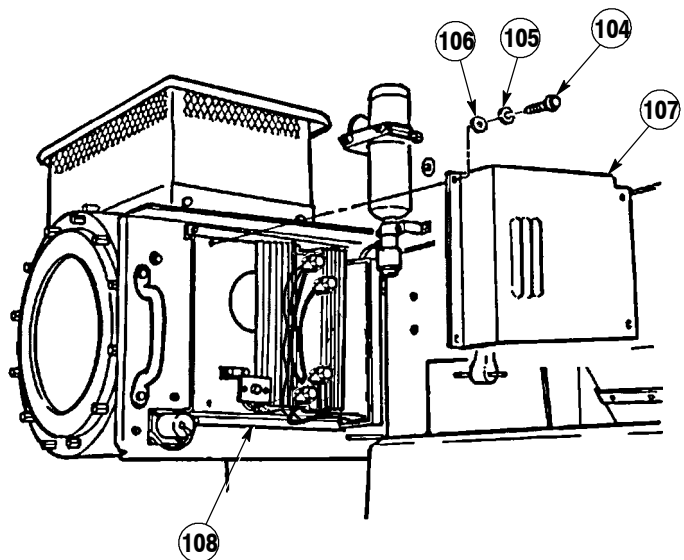
- (16) Remove nut (109) from 24 volt load terminal (112) of polarity protection control (113).
- (17) Install wire 1281 (111), lockwasher (110) and nut (109) on 24 volt load terminal (112).

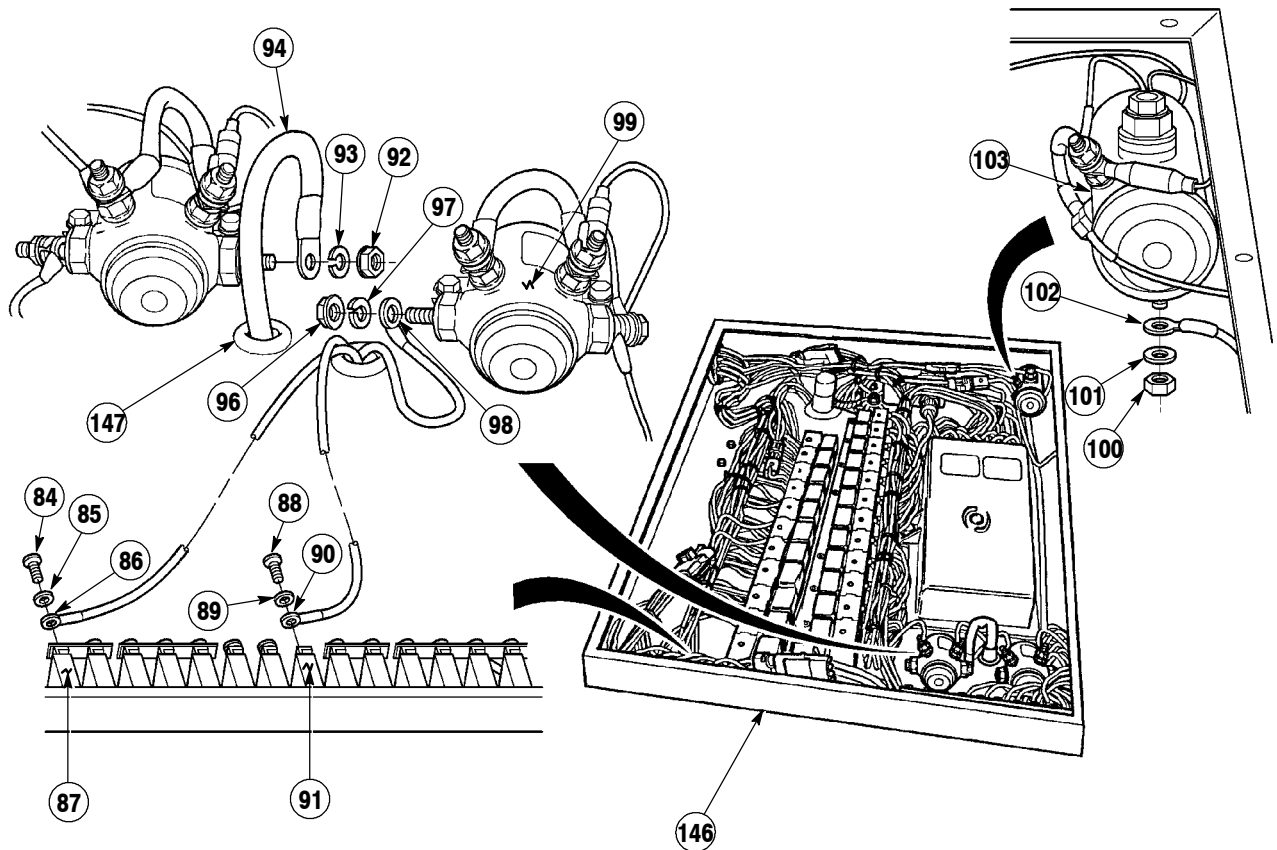
WARNING

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.



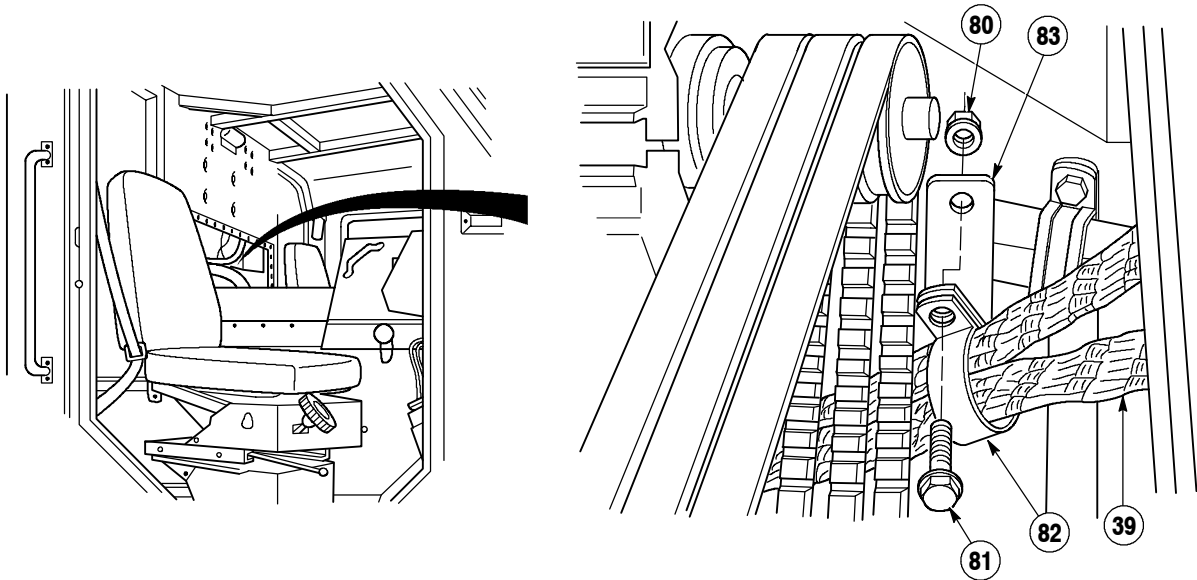
- (18) Apply electrical sealant to 24 volt load terminal (112) and 12 volt terminal (120).
- (19) Install splash guard (107), four washers (106), lockwashers (105) and screws (104) on electric bracket (108).





- (20) Position 200 AMP polarity wire harness in ECB (146) through grommets (147).
- (21) Position wire 1075 (102), lockwasher (101) and nut (100) on solenoid (103). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).
- (22) Position wire 1281 (98), lockwasher (97) and nut (96) on solenoid (99). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).
- (23) Position wire 1430 (94), lockwasher (93) and nut (92) on solenoid (95). Tighten nut to 30 to 35 lb-in (3 to 4 N·m).
- (24) Install wire 1866 (90), lockwasher (89) and screw (88) on circuit breaker CB12 (91).
- (25) Install wire 1079 (86), lockwasher (85) and screw (84) on circuit breaker CB5 (87).

6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

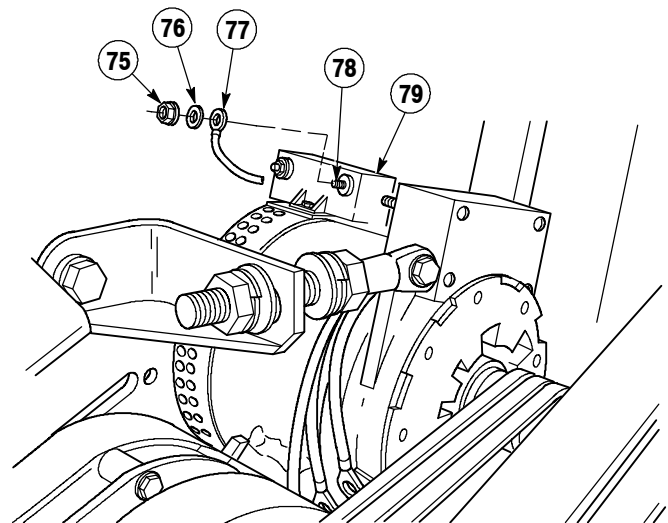


(26) Install 200 AMP polarity wire harness (39) in cushion clip (82).

(27) Position cushion clip (82) on bracket (83) and secure with screw (81) and locknut (80).

(28) Install washer (76), wire 1020B (77) and locknut (75) on terminal (78) of regulator (79).

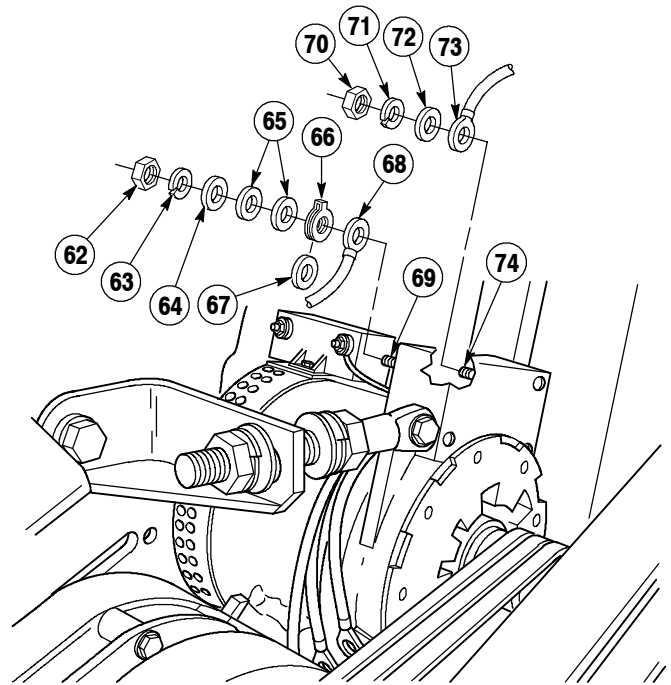
(29) Tighten locknut (75) to 25 lb-in (3 N·m).



NOTE

Perform Steps (30) through (35) only if truck is not equipped with battery disconnect switch.

- (30) Remove nut (70) and washer (72) from 12 volt terminal (74).
- (31) Install wire 1274 (73), washer (72), lockwasher (71) and nut (70) on 12 volt terminal (74).
- (32) Tighten nut (70) to 15 lb-ft (20 N·m).
- (33) Remove nut (62), washer (64), washer(s) (if present) (65), and fuse link (66) with insulator washer (67) from 24 volt terminal (69).
- (34) Install wire 1281A (68), fuse link (66) with insulator washer (67), washer(s) (if removed) (65), washer (64), lockwasher (63) and nut (62) on 24 volt terminal (69).
- (35) Tighten nut (57) to 15 lb-ft (20 N·m).

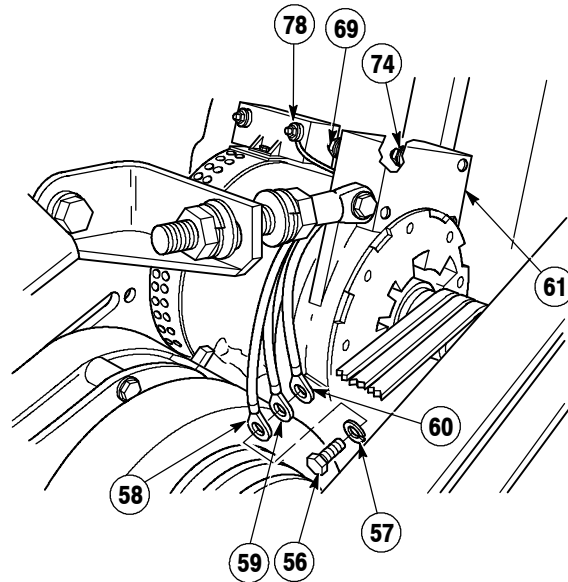


6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).

- (36) Remove screw (56) and wire 1815 (58) from alternator (61). Install wire 1275 (60), wire 1435 (59), wire 1815, lockwasher (57) and screw on alternator.
- (37) Tighten screw (56) to 17 lb-ft (23 N-m).

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.

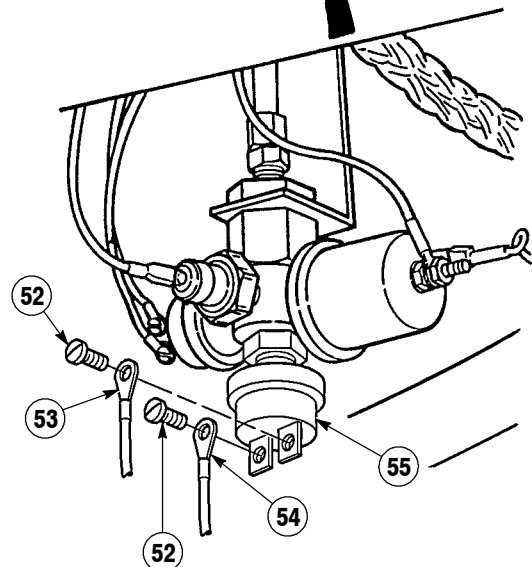
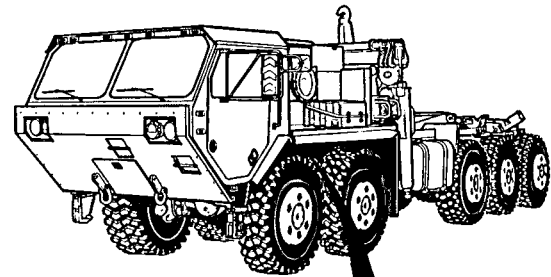


- (38) Apply electrical sealant to screw (56), 24 volt terminal (69), 12 volt terminal (74), and terminal (78).

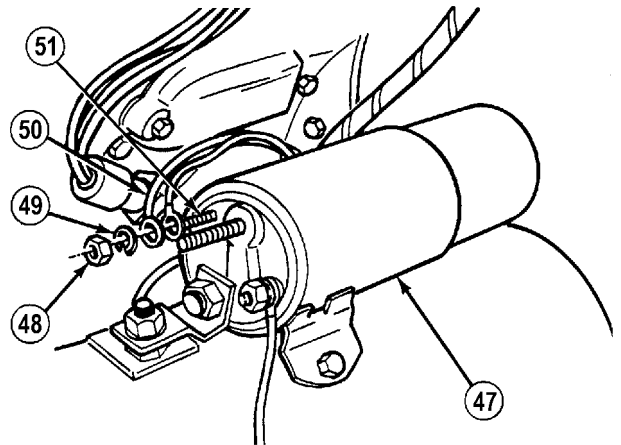
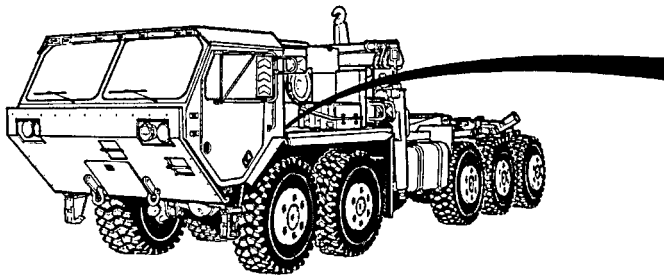
- (39) Install wire 1020B (54), wire 1020A (53) and two screws (52) on oil pressure switch (55).

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.



- (40) Apply electrical sealant to two screws (52).

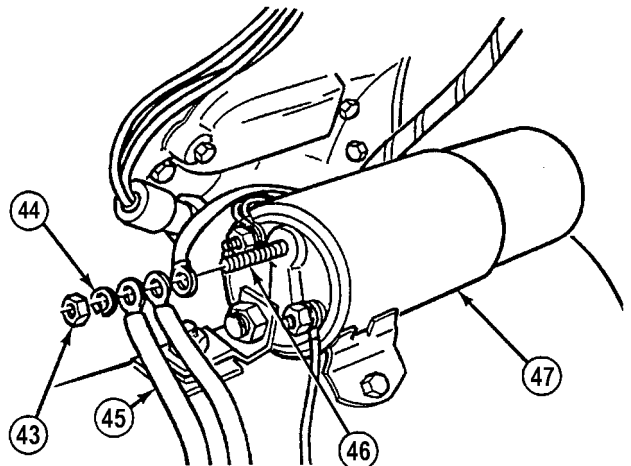


- (41) Remove nut (48) from terminal (51) of starter solenoid (47).
- (42) Install wire 1045 (50), lockwasher (49) and nut (48) on terminal.

- (43) Remove nut (43) from terminal (46) of starter solenoid (47). Install wire 1055 (45), lockwasher (44) and nut on terminal.

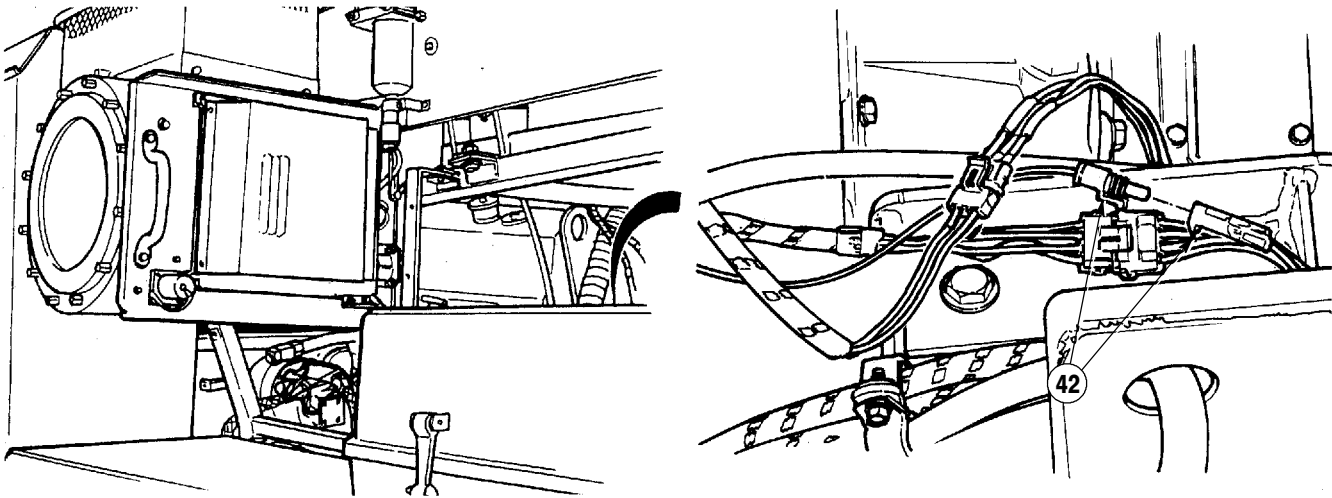
WARNING

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.

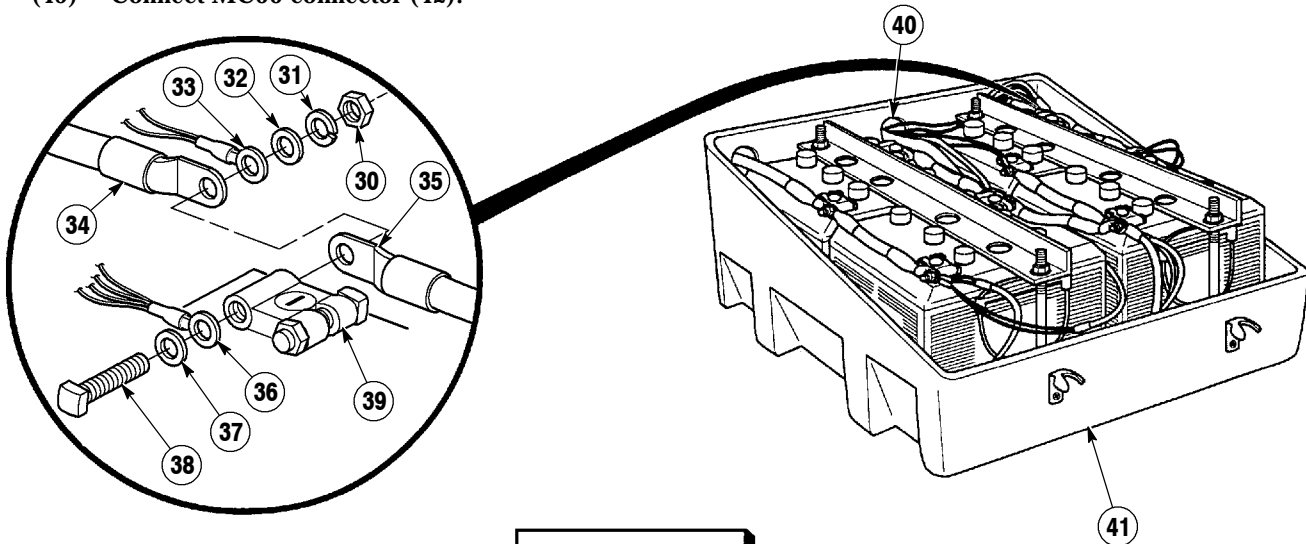


- (44) Apply electrical sealant to terminal (46) and terminal (51).

6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).



(45) Connect MC60 connector (42).



WARNING

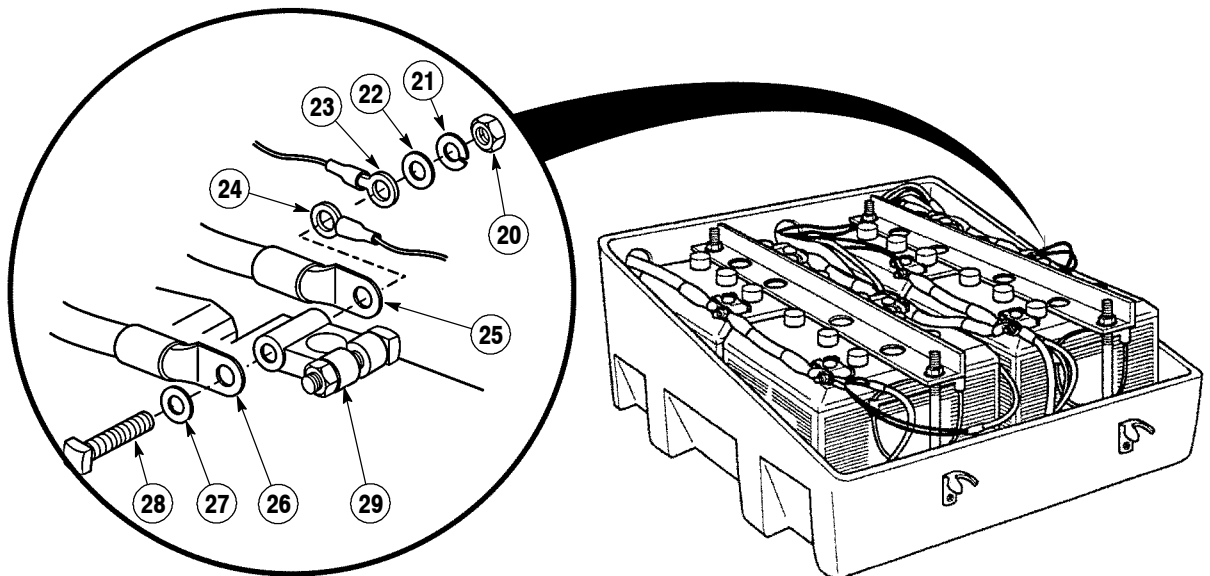
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

- (46) Pull 200 AMP polarity wire harness (39) through holes (40) of battery box (41).
- (47) Position screw (38), washer (37), cable 1137 (36), cable 1138 (35), wires 208/209 (34), wires 150/150/151/953 (33), washer (32), lockwasher (31) and nut (30) on negative terminal (39).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (48) Tighten nut (30) to 12 to 16 lb-ft (16-22 N·m).



- (49) Position screw (28), washer (27), cable 1137 (26), cable 1275 (25), wire 1821 (24), wire 1813 (23), washer (22), lockwasher (21) and nut (20) on negative terminal (29).

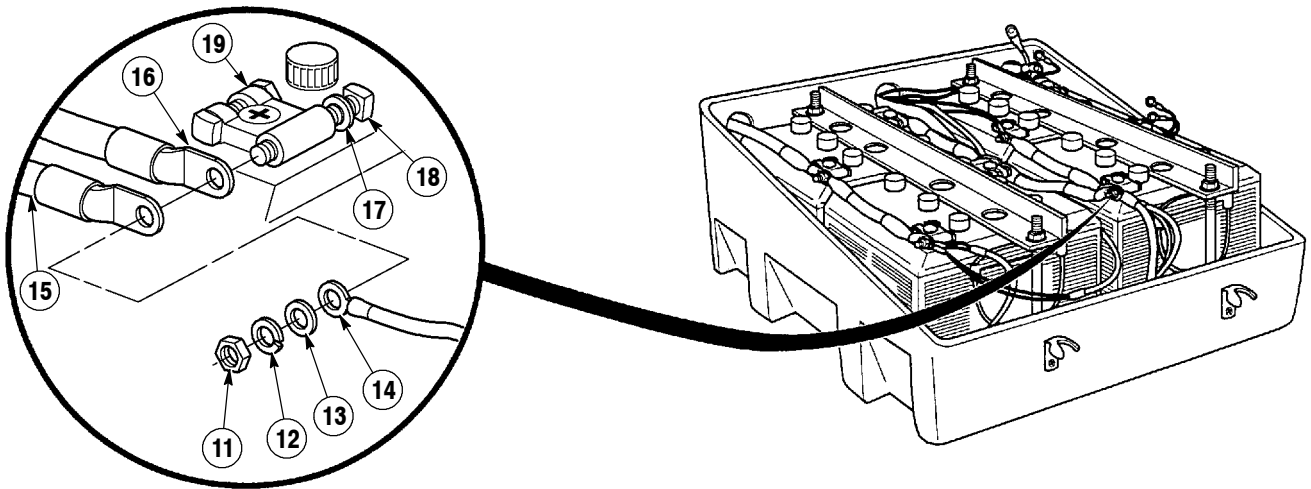
CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (50) Tighten nut (20) to 12 to 16 lb-ft (16-22 N·m).

NOTE

Perform Steps (51) through (54) only if truck is not equipped with battery disconnect switch.



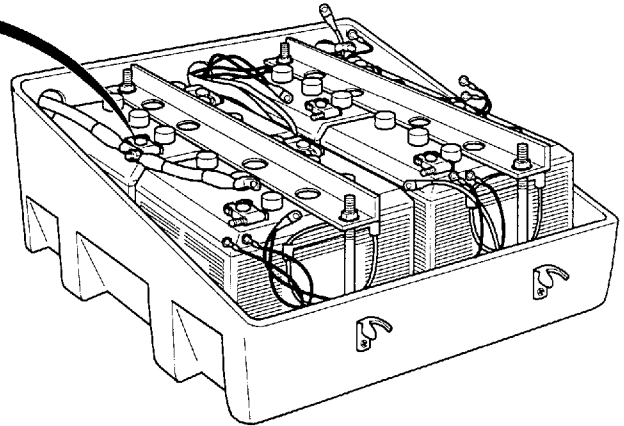
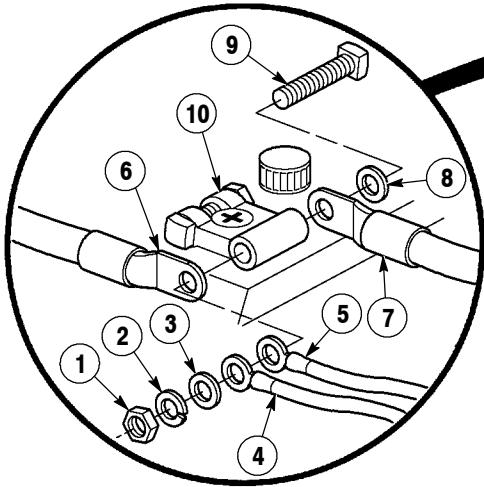
- (51) Position screw (18), washer (17), cable 1137 (16), cable 1137 (15), cable 1566 (14), washer (13), lockwasher (12) and nut (11) on positive terminal (19).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (52) Tighten nut (11) to 12 to 16 lb-ft (16-22 N·m).

6-38. POLARITY WIRE HARNESS REPLACEMENT (200 AMP) (CONT).



- (53) Position screw (9), washer (8), cable 1137 (7), cable 1139 (6), wire 1281A (5), wire 1281A (4), washer (3), lockwasher (2) and nut (1) on positive terminal (10).

CAUTION

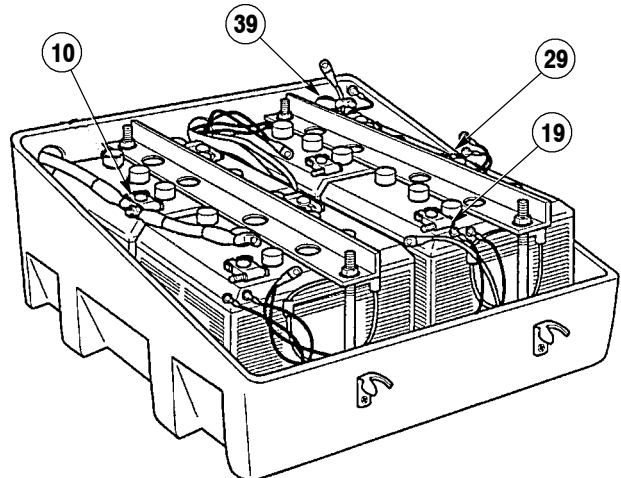
While applying torque to locknut, hold screw with wrench or damage to battery may occur.

- (54) Tighten nut (1) to 12 to 16 lb-ft (16-22 N·m).

WARNING

Corrosion compound contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water at least 15 minutes and get immediate medical attention.

- (55) Apply corrosion preventative compound to positive terminal (10), positive terminal (19), negative terminal (29) and negative terminal (39).



c. Follow-On Maintenance:

- Install left side noise panel, (TM 9-2320-364-20).
- Install cab engine access panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

6-39. GENERAL WELDING MAINTENANCE.

This task covers:

- | | |
|------------------------|----------------------------|
| a. Welding Preparation | c. Post Welding Procedures |
| b. Welding | d. Follow-On Maintenance |

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Connector Remover (Item 42, Appendix F)
Goggles, Industrial (Item 83, Appendix F)

Materials/Parts

Compound, Corrosion Preventive
(Item 15, Appendix B)
Sealant, Electrical (Item 50, Appendix B)
Tags, Identification (Item 72, Appendix B)
Lockwasher (Item 250, Appendix E)
Lockwasher (Item 273, Appendix E)
Lockwasher (Item 274, Appendix E)
Lockwasher (3) (Item 276, Appendix E)
Lockwasher (2) (Item 280, Appendix E)
Lockwasher (2) (Item 283, Appendix E)
Lockwasher (2) (Item 286, Appendix E)
Lockwasher (Item 296, Appendix E)
Lockwasher (2) (Item 299, Appendix E)

Personnel Required

Two

Equipment Condition

All switches turned off, (TM 9-2320-364-10)
Battery box cover removed, (TM 9-2320364-10)
Left front noise panel removed,
(TM 9-2320-364-20)
Left side noise panel removed,
(TM 9-2320-364-20)
Electronic Control Box (ECB) removed,
(TM 9-2320-364-20)
DUVAC control cover removed (145 AMP only),
(TM 9-2320-364-20)
Reverse polarity protection cover removed
(200 AMP only), (TM 9-2320-364-20)

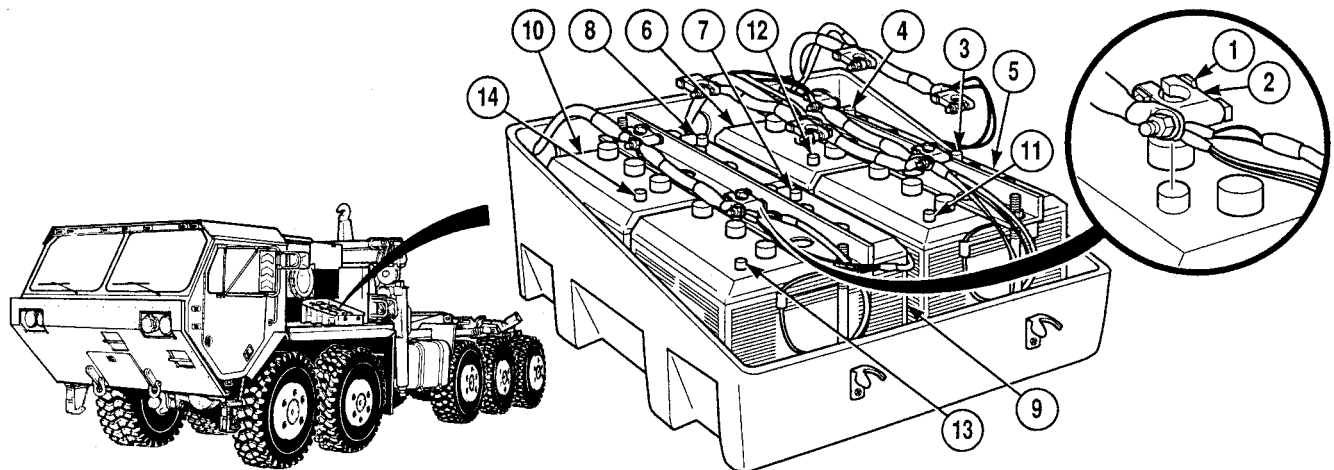
6-39. GENERAL WELDING MAINTENANCE (CONT).

WARNING

- CARC paint contains isocyanate (HDI) which is highly irritating to skin and respiratory system. High concentrations of HDI can produce symptoms of itching and reddening of skin, a burning sensation in throat and nose and watering of the eyes. In extreme concentrations, HDI can cause cough, shortness of breath, pain during respiration, increased sputum production, and chest tightness. The following precautions must be taken whenever using CARC paint:
- NEVER weld or cut CARC-coated materials.
- Do not let skin or eyes come in contact with CARC paint. Always wear protective equipment (gloves, safety goggles, etc.).
- DO NOT grind or sand painted equipment without high-efficiency air purifying respirators in use.
- BE AWARE of CARC paint exposure symptoms; symptoms can occur a few days after initial exposure. Seek medical help immediately if symptoms are detected.
- Unsafe welding practices can cause serious injury from fire, explosion, or harmful agents. Allow only authorized personnel to weld or cut metals and follow safety precautions in TC 9-237. Protective clothing and goggles must be worn; adequate protective equipment used, a suitable fire extinguisher kept nearby, and requirements of TC 9-237 strictly followed.

CAUTION

- Do not attempt to weld on the vehicle without following the general welding maintenance procedures or damage to the vehicles electrical system may result.
- Do not weld on the frame. The frame is heat treated and damage may result.
- Do not weld on or near electronic components or damage to the component may result.
- Do not connect welding cables to electronic components or damage to the component may result.
- Place grounding clamp on or near part being welded or damage to other components may result.

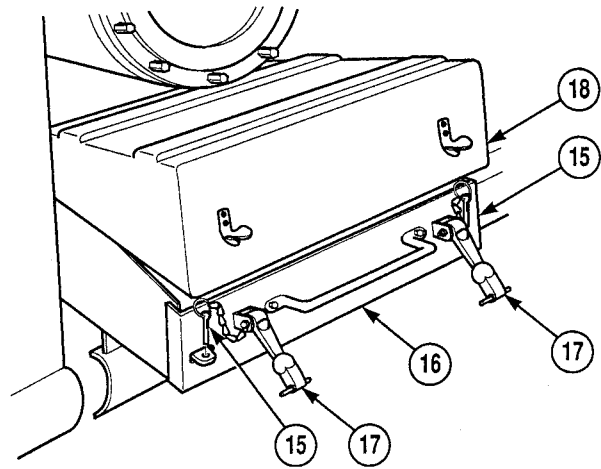
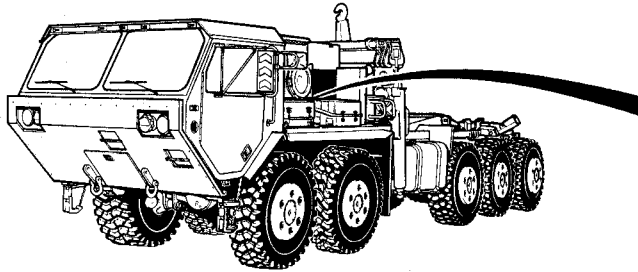
a. *Welding Preparation.***WARNING**

- After removing wires and cables from battery terminals, ensure no contact is made with battery terminals, other wires, cables or any metal surface to prevent damage to parts, personal injury, or death.
- 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.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

NOTE

- Tag and mark all cables prior to removal.
 - Cut cable ties as necessary.
- (1) Loosen two nuts (1) and remove two terminals (2) from negative posts (3) and (4) on battery three (5) and battery four (6).
 - (2) Loosen two nuts (1) and remove two terminals (2) from negative post (7) and (8) on battery one (9) and battery two (10).
 - (3) Loosen two nuts (1) and remove two terminals (2) from positive posts (11) and (12) on battery three (5) and battery four (6).
 - (4) Loosen two nuts (1) and remove two terminals (2) from positive posts (13) and (14) on battery one (9) and battery two (10).

6-39. GENERAL WELDING MAINTENANCE (CONT).



NOTE

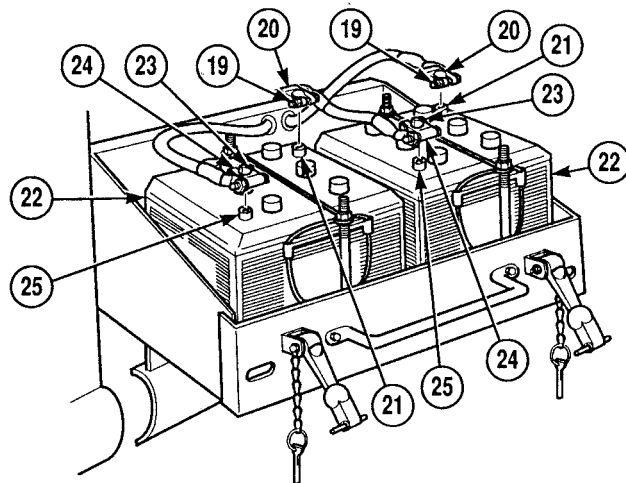
If arctic batteries are installed, perform Steps (5) through (10). If not, go on to Step (11).

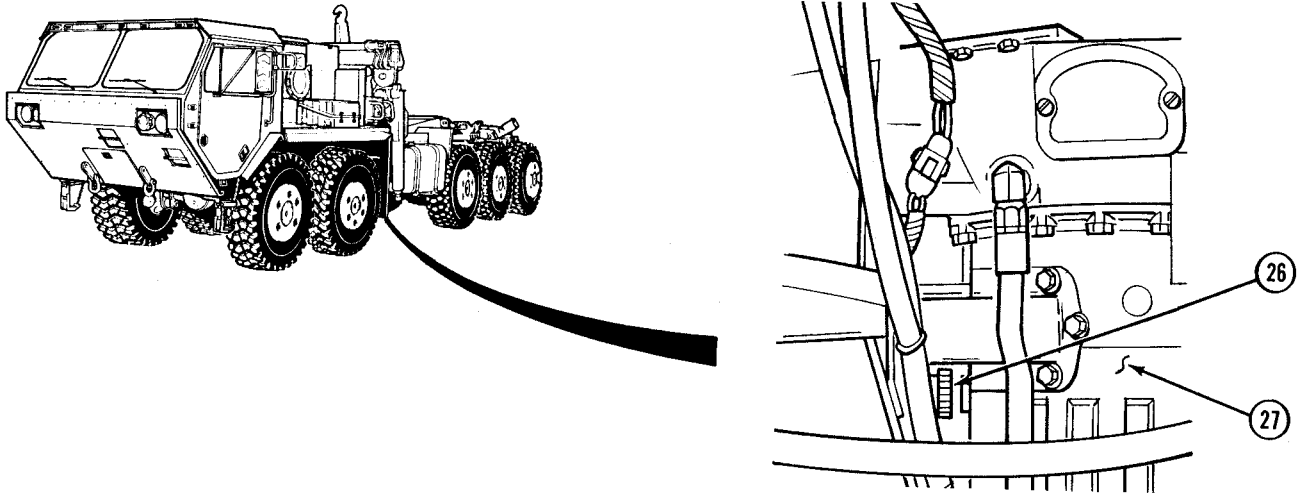
- (5) Remove two flip rings (15) from arctic battery box (16).
- (6) Slide arctic battery box (16) out.
- (7) Disconnect two latches (17) from battery box cover (18).
- (8) Remove battery box cover (18) from arctic battery box (16).

NOTE

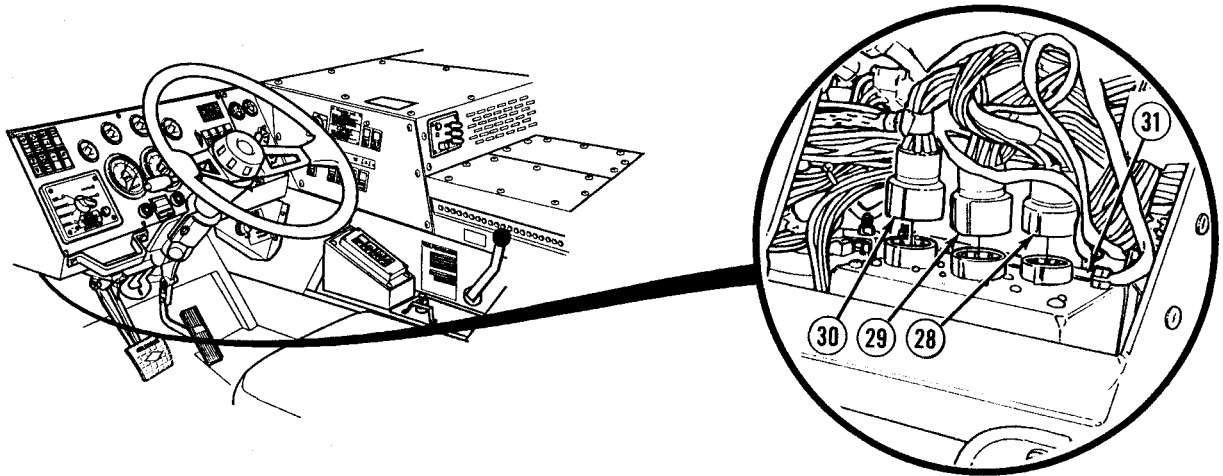
Tag and mark all cable connections prior to removal.

- (9) Loosen two nuts (19) and remove two terminals (20) from negative battery posts (21) on arctic batteries (22).
- (10) Loosen two nuts (23) and remove terminals (24) from positive battery posts (25) on arctic batteries (22).



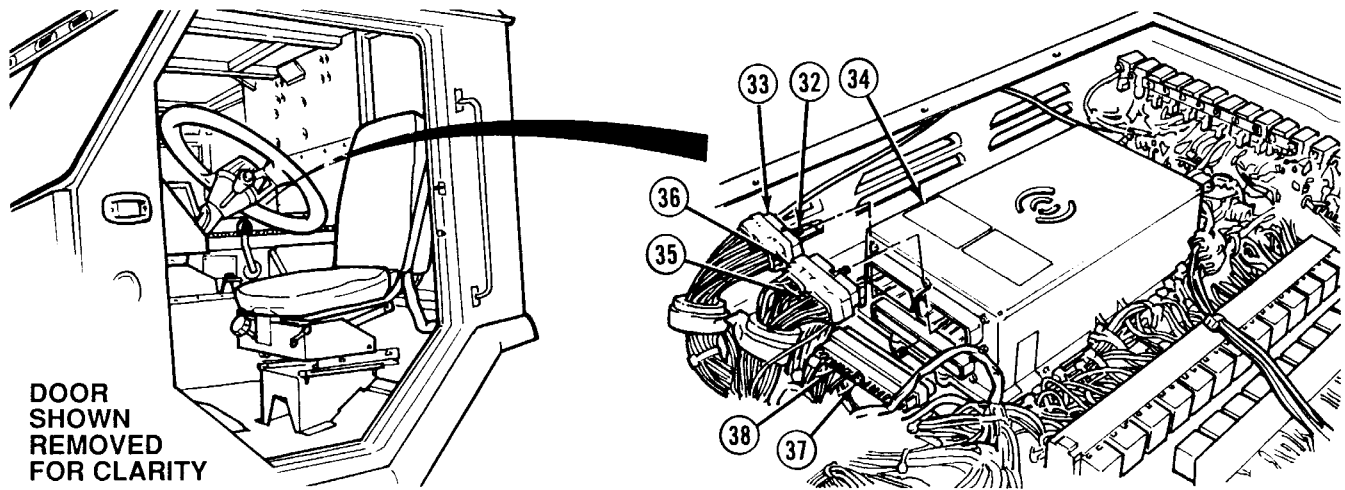


(11) Disconnect ATEC electrical connector (26) from transmission (27).

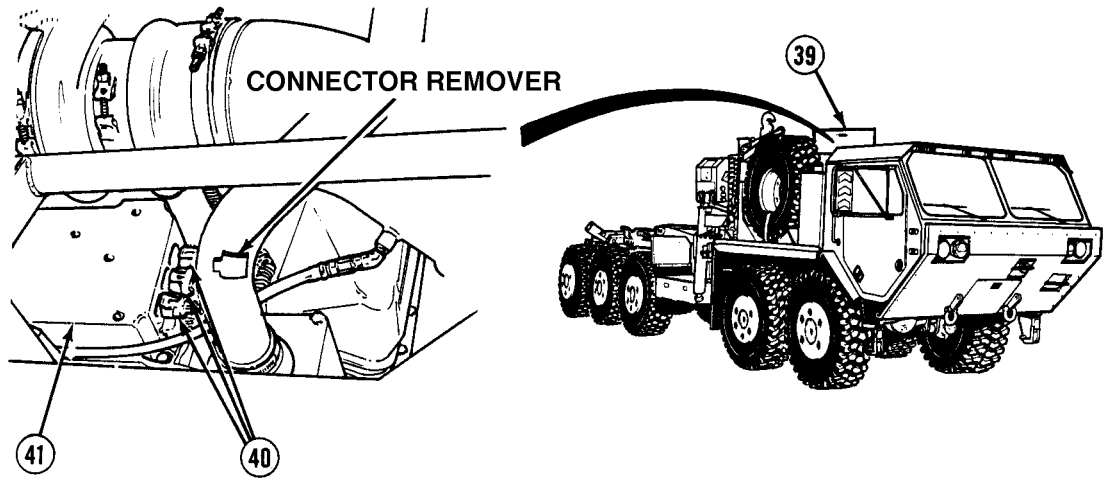


(12) Disconnect connectors MC111 (28), MC112 (29) and MC35 (30) from CTIS controller (31).

6-39. GENERAL WELDING MAINTENANCE (CONT).



- (13) Loosen screw (32) and disconnect MC9 ECB/A TEC DDEC wire harness connector (33) from transmission ECU (34).
- (14) Loosen screw (35) and disconnect MC10 cab/transmission wire harness connector (36) from transmission ECU (34).
- (15) Loosen screw (37) and disconnect MC45 ECB/blackout wire harness connector (38) from transmission ECU (34).



CAUTION

Use harness connector remover, do not use a screwdriver to pry up the lock arm. Damage to connector could result.

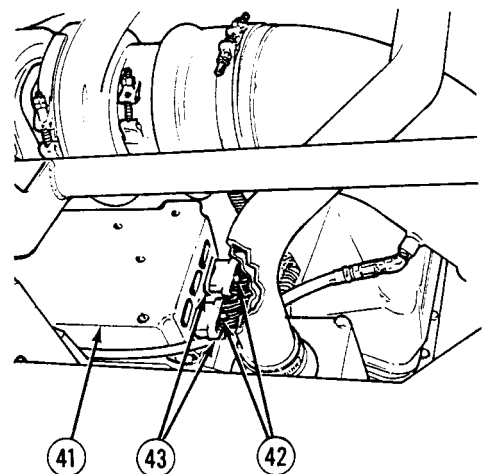
- (16) Open engine cover (39).

NOTE

- Perform Steps (17) and (18) for DDEC II trucks only.
- Perform Steps (19) through (22) for DDEC III/IV trucks only.

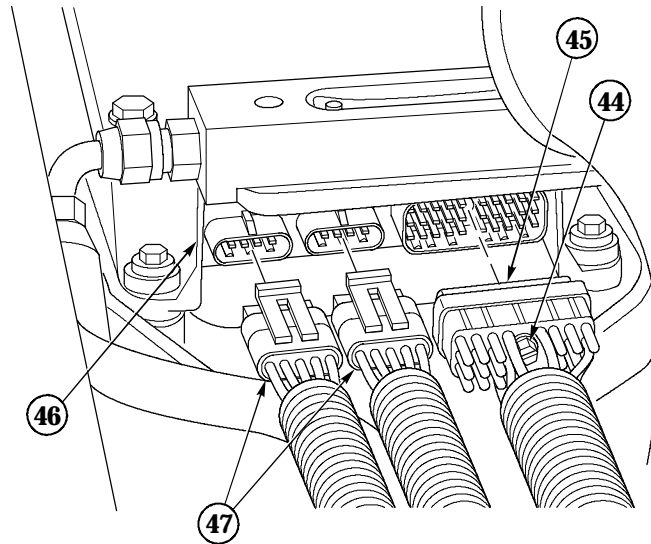
- (17) Using harness connector remover, remove three wiring harness connectors (40) from ECM (41).

- (18) Loosen two screws (42) and remove wiring harness connector (43) from ECM (41).

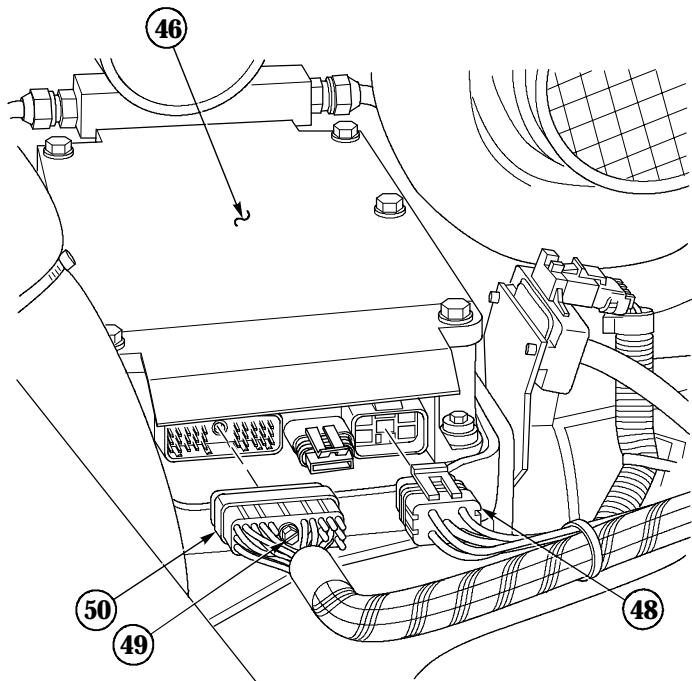


6-39. GENERAL WELDING MAINTENANCE (CONT).

- (19) Loosen screw (44) and remove engine wire harness connector (45) from right side of ECM (46).
- (20) Using harness connector remover, remove two injector wiring harness connectors (47) from right side of ECM (46).



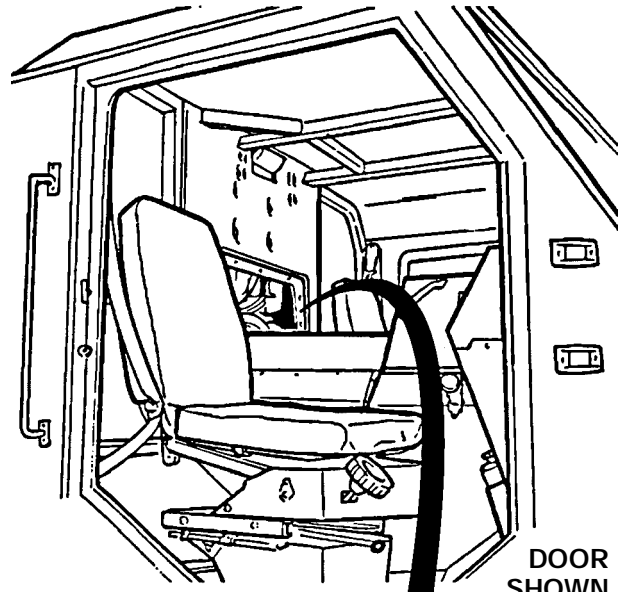
- (21) Using harness connector remover, remove power wire harness connector (48) from left side of ECM (46).
- (22) Loosen screw (49) and remove chassis wire harness connector (50) from left side of ECM (46).



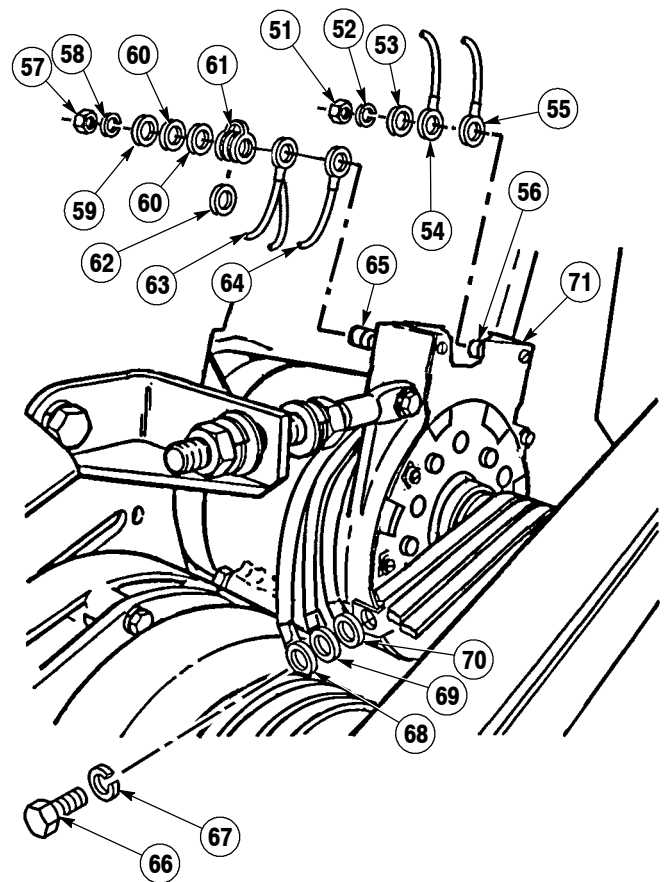
NOTE

- If 200 amp alternator is installed, perform Steps (23) through (29).
- If 145 amp alternator is installed, perform Steps (30) through (36).

- (23) Remove nut (51), lockwasher (52), washer (53), wire 1860 (54) and wire 1274 (55) from 12 volt terminal (56). Discard lockwasher.
- (24) Remove nut (57), lockwasher (58), washer (59), washer(s) (if present) (60), fuse link (61), insulator washer (62), wire 1820/1953 (63) and wire 1281A (64) from 24 volt terminal (65). Discard lockwashers.
- (25) Remove screw (66), lockwasher (67), wire 1815 (68), wire 1435 (69) and wire 1275 (70) from alternator (71). Discard lockwasher.

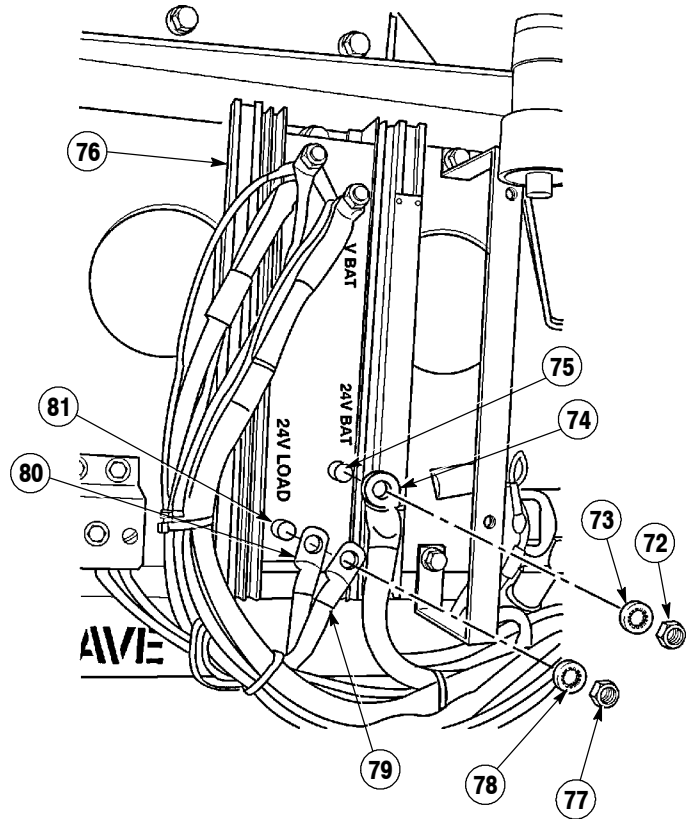


DOOR SHOWN REMOVED FOR CLARITY

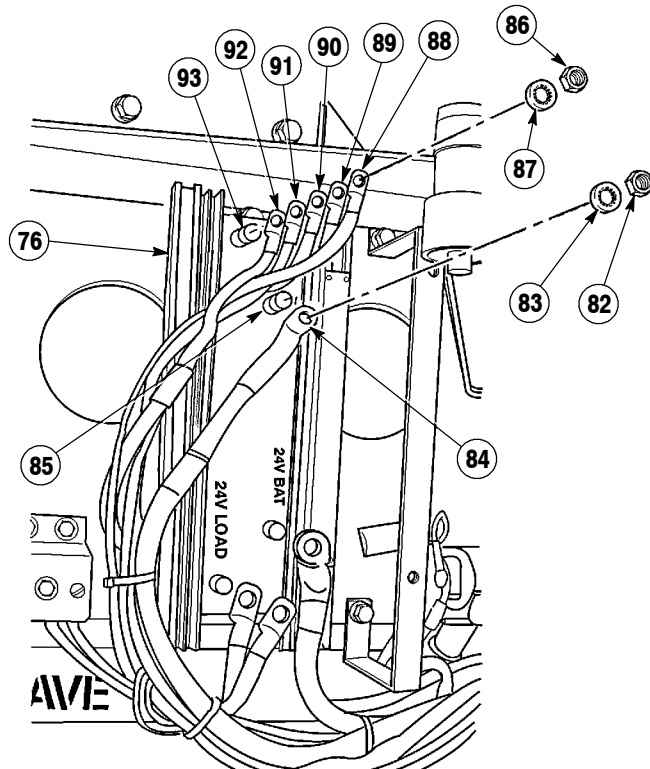


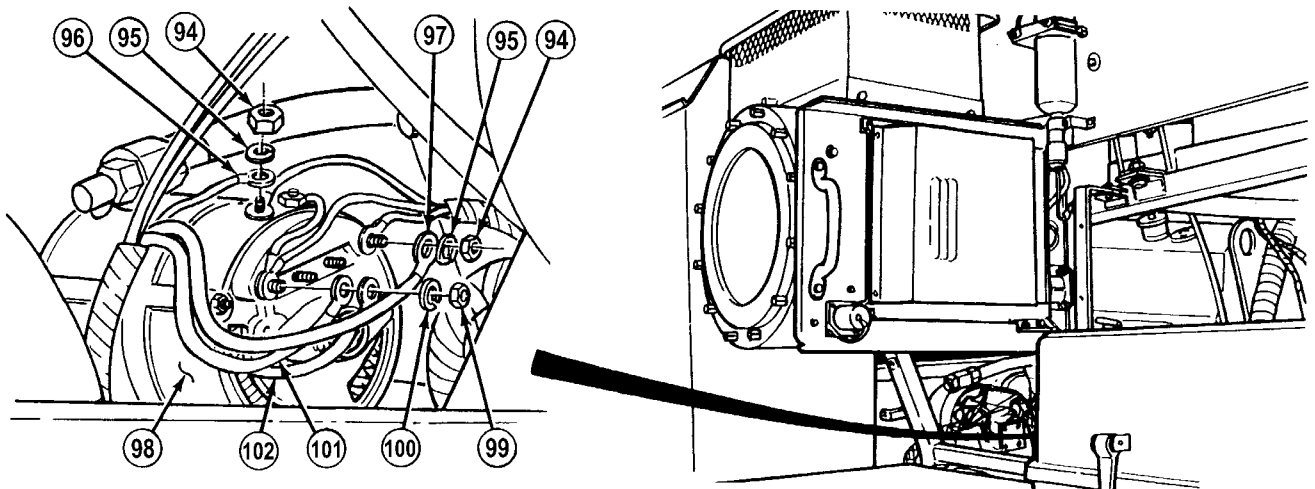
6-39. GENERAL WELDING MAINTENANCE (CONT).

- (26) Remove nut (72), lockwasher (73) and wire 1281A (74) from 24 volt battery terminal (75) of polarity protection controller (76). Discard lockwasher.
- (27) Remove nut (77), lockwasher (78), wire 1431 (79) and wire 1281 (80) from 24 volt load terminal (81) of polarity protection controller (76). Discard lockwasher.



- (28) Remove nut (82), lockwasher (83) and wire 1566 (84) from 12 volt battery terminal (85) of polarity protection controller (76). Discard lockwasher.
- (29) Remove nut (86), lockwasher (87), wire 240/241 (88), wire 1866 (89), wire 1075 (90), wire 1079 (91) and wire 1430 (92) from 12 volt load terminal (93) of polarity protection controller (76). Discard lockwasher.

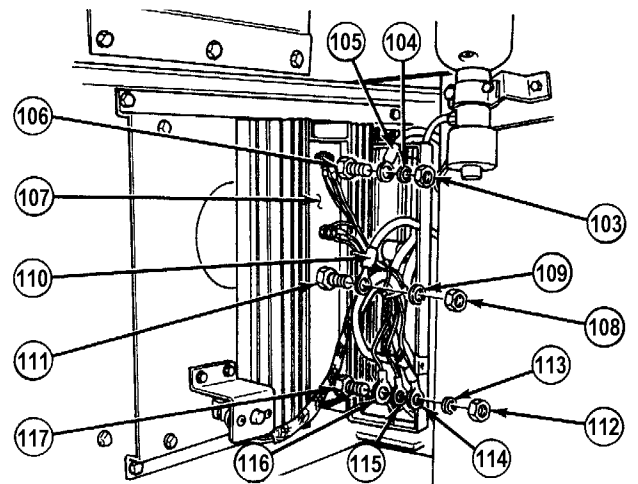




CAUTION

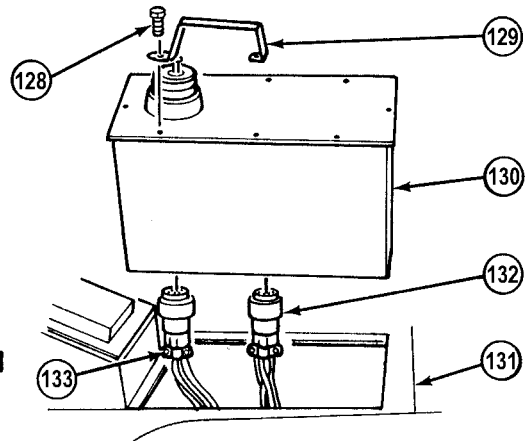
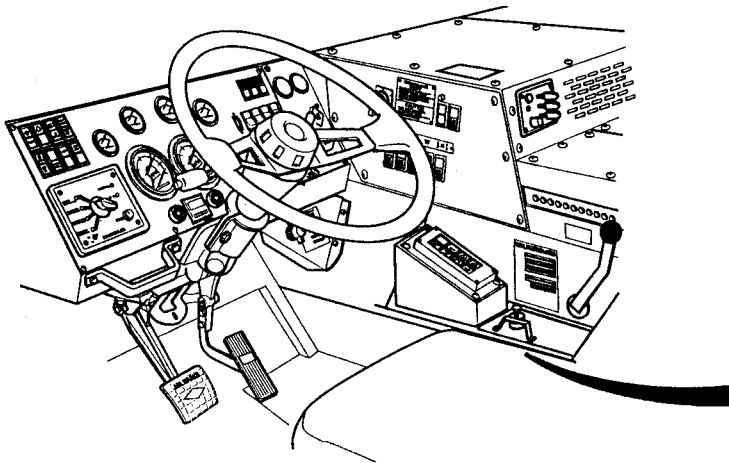
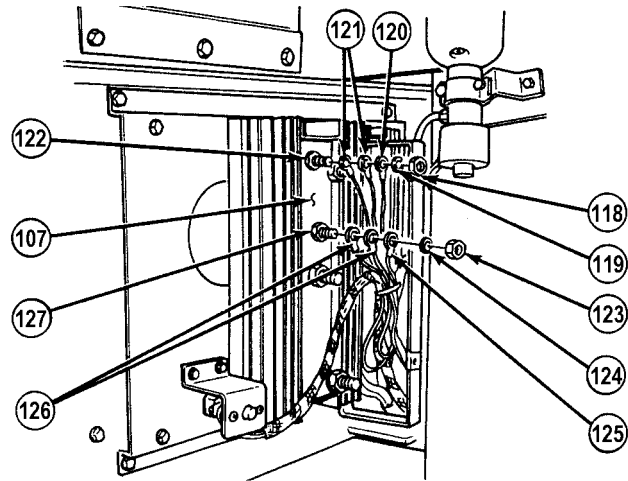
Disconnected wires must be isolated to prevent contact with other wires or metal, or damage to equipment may result.

- (30) Remove two nuts (94), lockwashers (95) and wires 1344 (96) and 1278 (97) from alternator (98). Discard lockwashers.
- (31) Remove nut (99), lockwasher (100) and wires 1435 (101) and 1275 (102) from alternator (98). Discard lockwasher.
- (32) Remove nut (103), lockwasher (104) and wire 1277 (105) from 24 volt battery stud (106) of DUVAC controller (107). Discard lockwasher.
- (33) Remove nut (108), lockwasher (109) and wire 1278 (110) from 24 volt alternator stud (111) of DUVAC controller (107). Discard lockwasher.
- (34) Remove nut (112), lockwasher (113), wire 1274 (114), orange wire (115) and red wire (116) from 12 volt battery stud (117) of DUVAC controller (107). Discard lockwasher.

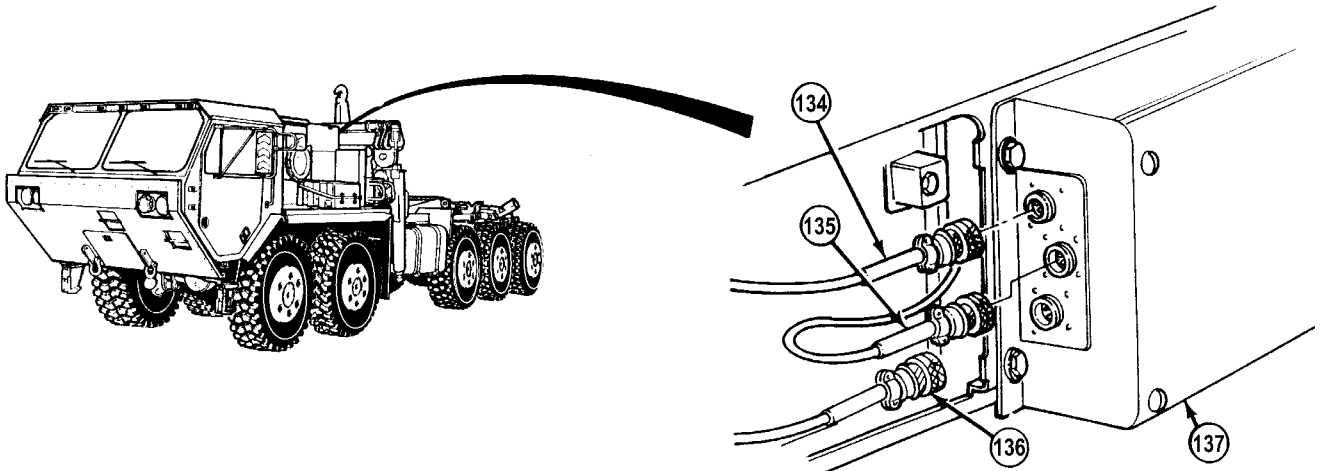


6-39. GENERAL WELDING MAINTENANCE (CONT).

- (35) Remove nut (118), lockwasher (119), brown wire (120) and two 1020 wires (121) from ignition stud (122) of DUVAC controller (107). Discard lockwasher.
- (36) Remove nut (123), lockwasher (124), black wire (125) and two 1435 wires (126) from ground stud (127) of DUVAC controller (107). Discard lockwasher.



- (37) Remove eight screws (128) and guard (129) from LHS control box (130).
- (38) Remove LHS control box (130) from console (131).
- (39) Disconnect two connectors MC83 (132) and MC81 (133) from LHS control box (130).



NOTE

Perform Step (40) if truck is equipped with crane.

(40) Disconnect connectors (134), (135) and (136) from crane overload box (137).

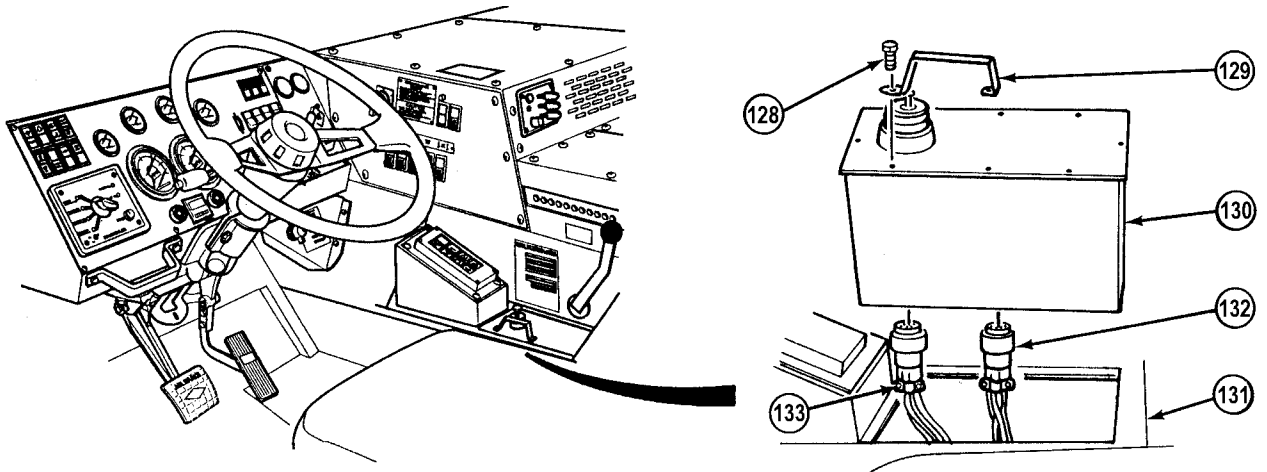
b. *Welding.* Refer to TC 9-237 for welding procedures.

c. *Post Welding Procedures.*

NOTE

Perform Step (1) if truck is equipped with crane.

(1) Connect connectors (136), (135) and (134) on crane overload box (137).



(2) Connect connectors MC83 (132) and MC81 (133) on LHS control box (130).

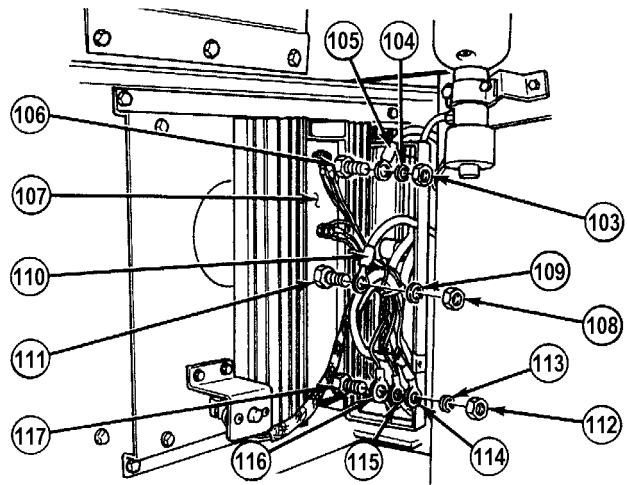
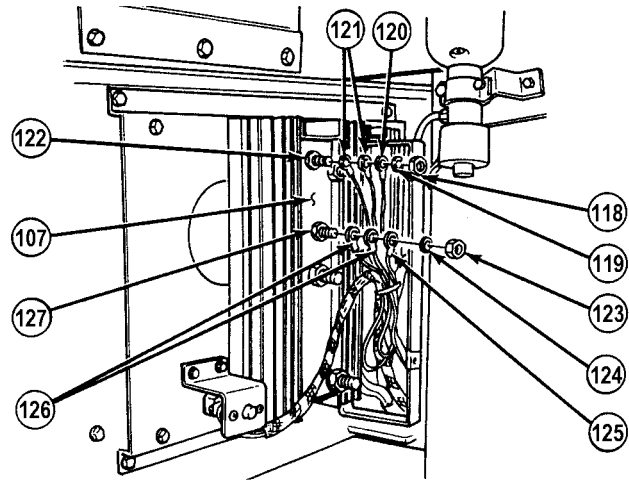
(3) Install LHS control box (130) and guard (129) in console (131) with eight screws (128).

6-39. GENERAL WELDING MAINTENANCE (CONT).

NOTE

- If equipped with 145 amp alternator, perform Steps (4) through (12).
- If equipped with 200 amp alternator, perform Steps (13) through (24).

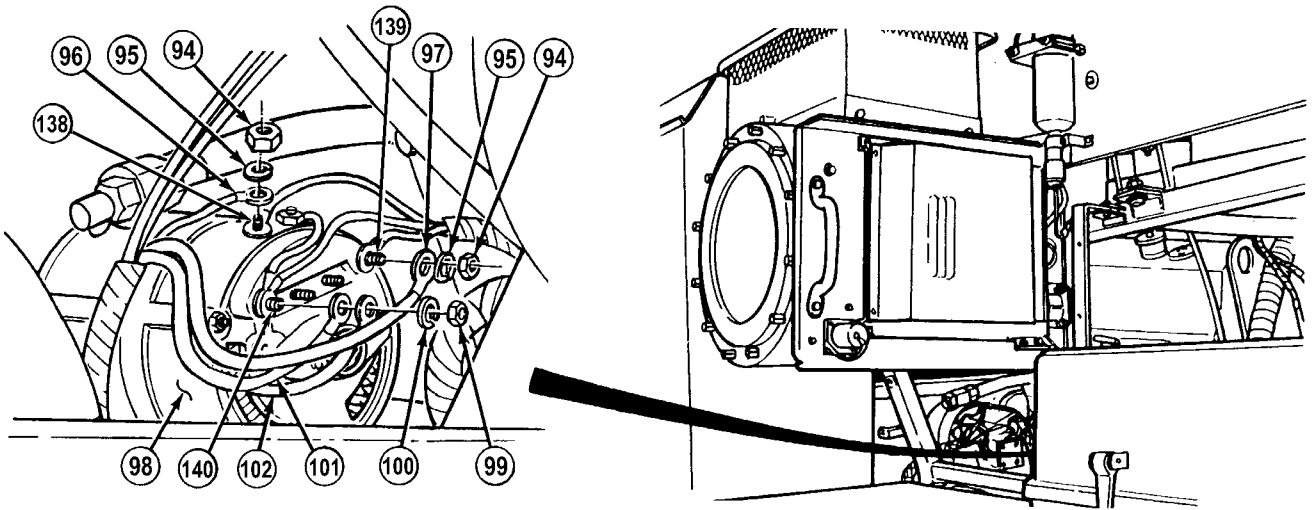
- (4) Install two wires 1435 (126), black wire (125), lockwashers (124) and nut (123) on ground stud (127) of DUVAC controller (107).
- (5) Install two wires 1020 (121), brown wire (120), lockwasher (119) and nut (118) on ignition stud (122) of DUVAC controller (107).
- (6) Install wire 1274 (114), orange wire (115), red wire (116), lockwasher (113) and nut (112) on 12 volt battery stud (117) of DUVAC controller (107).
- (7) Install wire 1278 (110), lockwasher (109) and nut (108) on 24 volt alternator stud (111) of DUVAC controller (107).
- (8) Install wire 1277 (105), lockwasher (104) and nut (103) on 24 volt battery stud (106) of DUVAC controller (107).



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.

- (9) Apply electrical sealant to 24 volt battery stud (106), 24 volt alternator stud (111), 12 volt battery stud (117), ignition stud (122) and ground stud (127)



- (10) Install wires 1435 (101) and 1275 (102), lockwasher (100) and nut (99) on alternator (98).
- (11) Install wires 1344 (96) and 1278 (97), two lockwashers (95) and nuts (94) on alternator (98).

WARNING

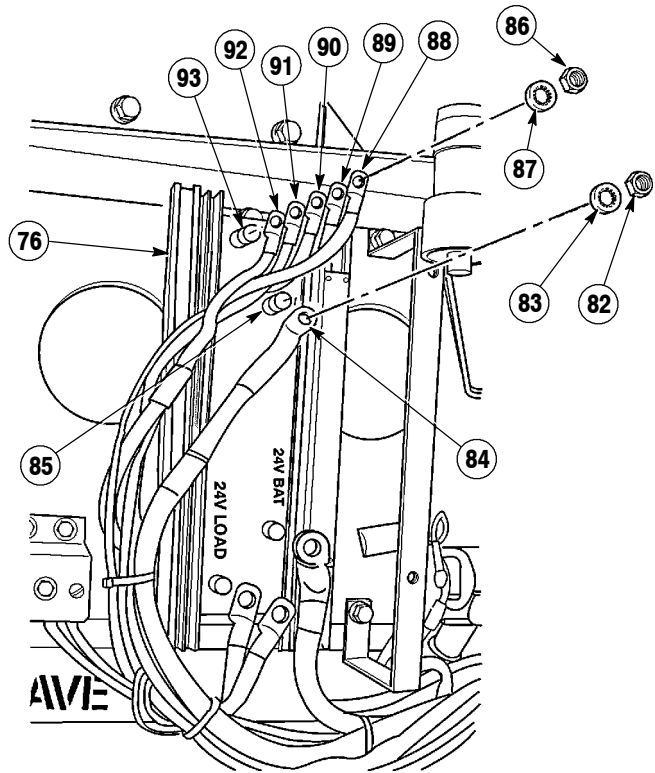
Adhesives, solvents, and sealing compounds can burn easily can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (12) Apply electrical sealant to terminals (138), (139) and (140) of alternator (98).

6-39. GENERAL WELDING MAINTENANCE (CONT).

- (13) Install wire 1430 (92), wire 1079 (91), wire 1075 (90), wire 1866 (89), wire 240/241 (88), lockwasher (87) and nut (86) on 12 volt load terminal (93) of polarity protection controller (76).

- (14) Install wire 1566 (84), lockwasher (83) and nut (82) on 12 volt battery terminal (85) of polarity protection controller (76).



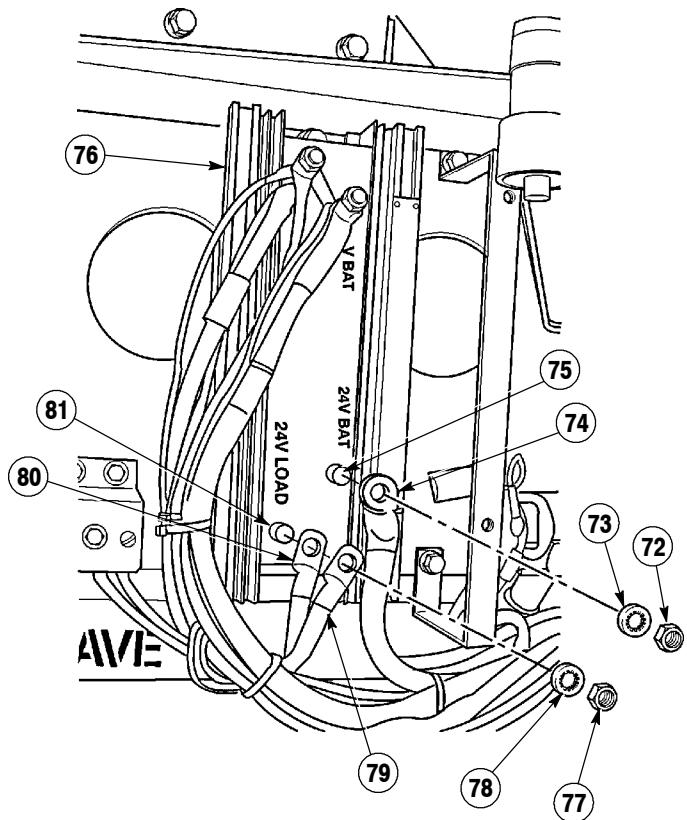
- (15) Install wire 1281 (80), wire 1431 (79), lockwasher (78) and nut (77) on 24 volt load terminal (81) of polarity protection controller (76).

- (16) Install wire 1281A (74), lockwasher (73) and nut (72) on 24 volt battery terminal (75) of polarity protection controller (76).

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.

- (17) Apply electrical sealant to 24 volt battery terminal (75), 12 volt load terminal (93), 12 volt battery terminal (85), 24 volt load terminal (81).

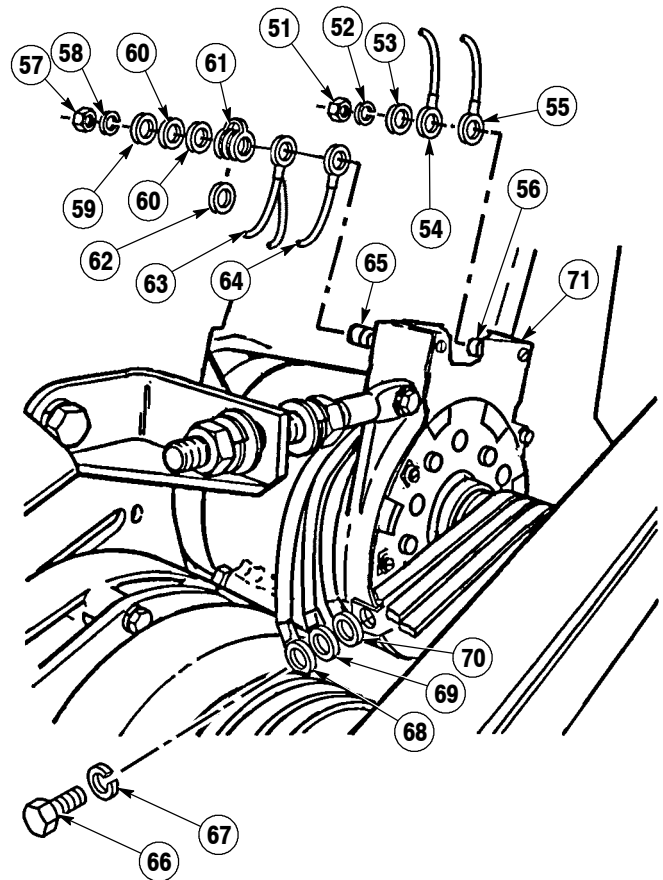


- (18) Install wire 1275 (70), wire 1435 (69), wire 1815 (68), lockwasher (67) and screw (66) on alternator (71).
- (19) Tighten screw (66) to 17 lb-ft (23 N·m).
- (20) Install wire 1281A (64), wire 1820/1953 (63), fuse link (61) with insulator washer (62), washer(s) (if removed) (60), washer (59), lockwasher (58) and nut (57) on 24 volt terminal (65).
- (21) Tighten nut (57) to 15 lb-ft (20 N·m).
- (22) Install wire 1274 (55), wire 1860 (54), washer (53), lockwasher (52) and nut (51) on 12 volt terminal (56).
- (23) Tighten nut (51) to 15 lb-ft (20 N·m).

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.

- (24) Apply electrical sealant to screw (66), 12 volt terminal (56) and 24 volt terminal (65).



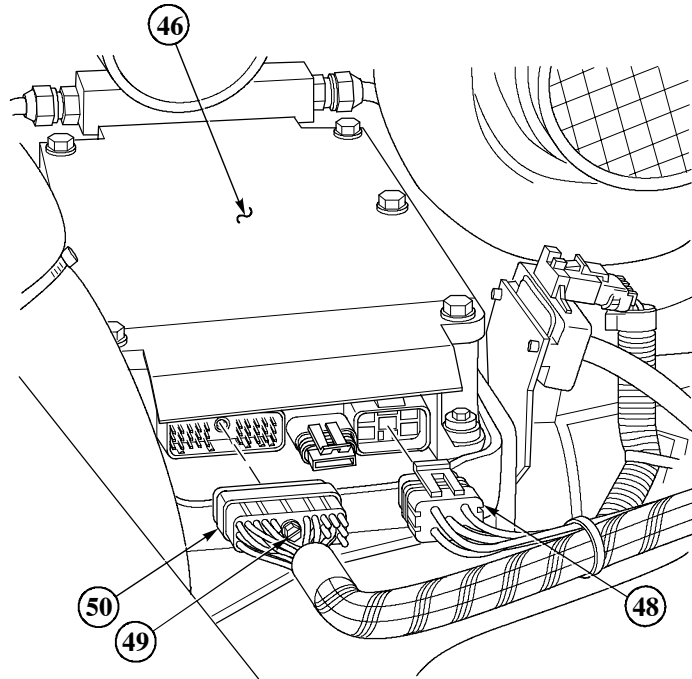
6-39. GENERAL WELDING MAINTENANCE (CONT).

CAUTION

Use caution while installing connectors from ECM. The ECM has plastic retainers that may break if connectors are not properly installed.

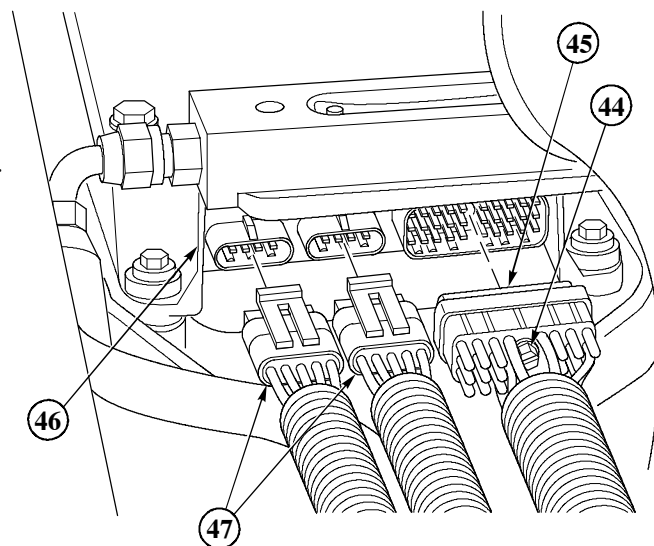
NOTE

- Perform Steps (25) through (28) for DDEC III/IV trucks only.
- Perform Steps (29) and (30) for DDEC II trucks only.
- Ensure locking tangs are locked in place when installing wiring harness connectors.
- ECM wiring harnesses are designed to be installed in only one location.

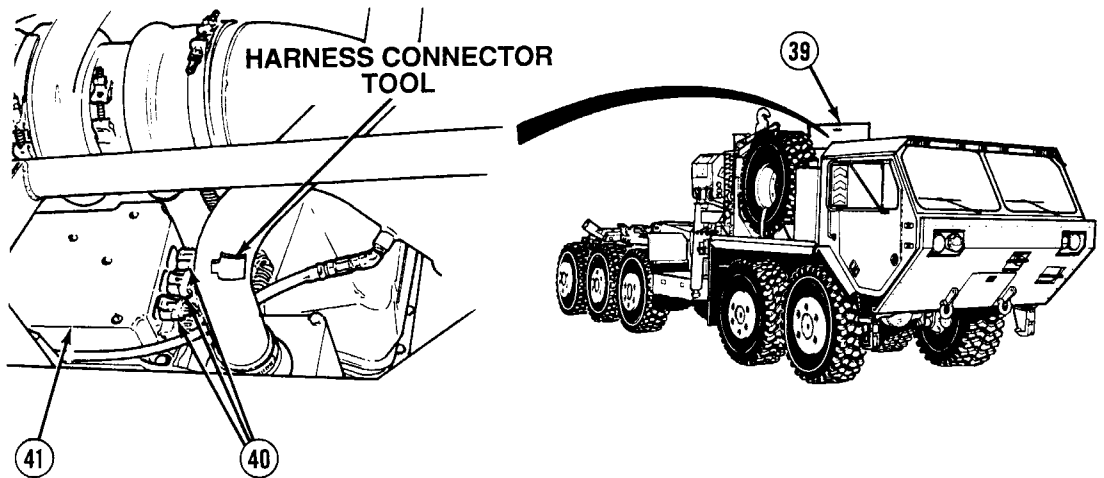
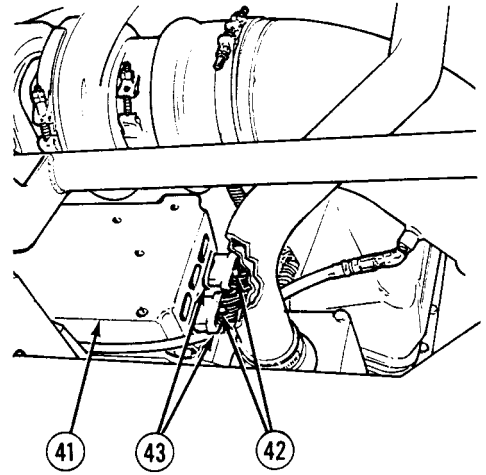


- (25) Connect chassis wire harness connector (50) to left side of ECM (46) and tighten screw (49).
- (26) Connect power wire harness connector (48) to left side of ECM (46).

- (27) Connect two injector wiring harness connectors (47) to right side of ECM (46).
- (28) Connect engine wiring harness connector (45) to right side of ECM (46) and tighten screw (44).

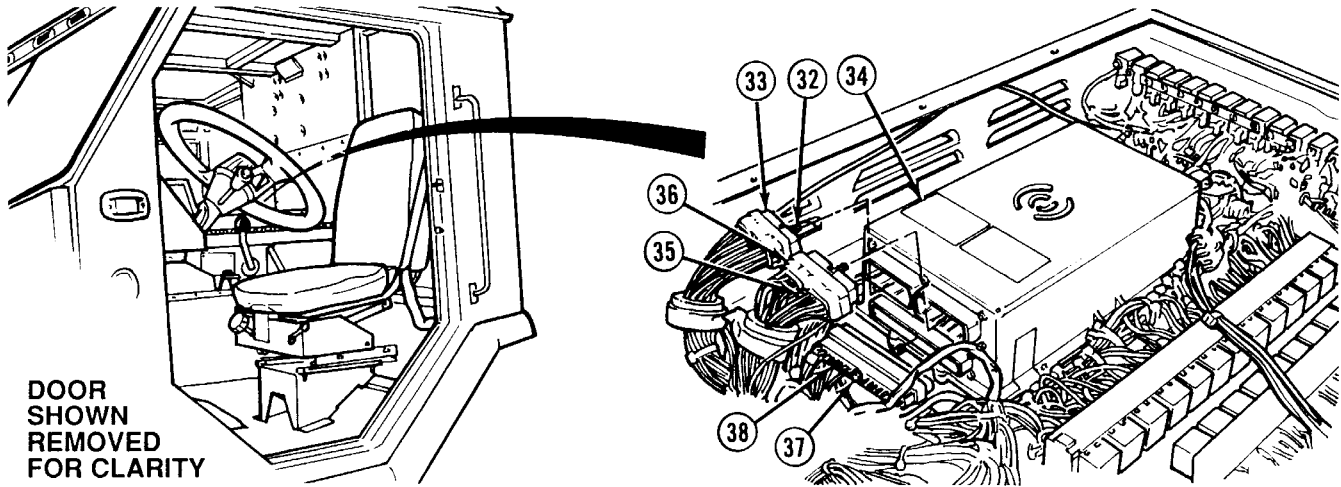


- (29) Connect two wire harness connectors (43) on ECM (41) and tighten two screws (42).

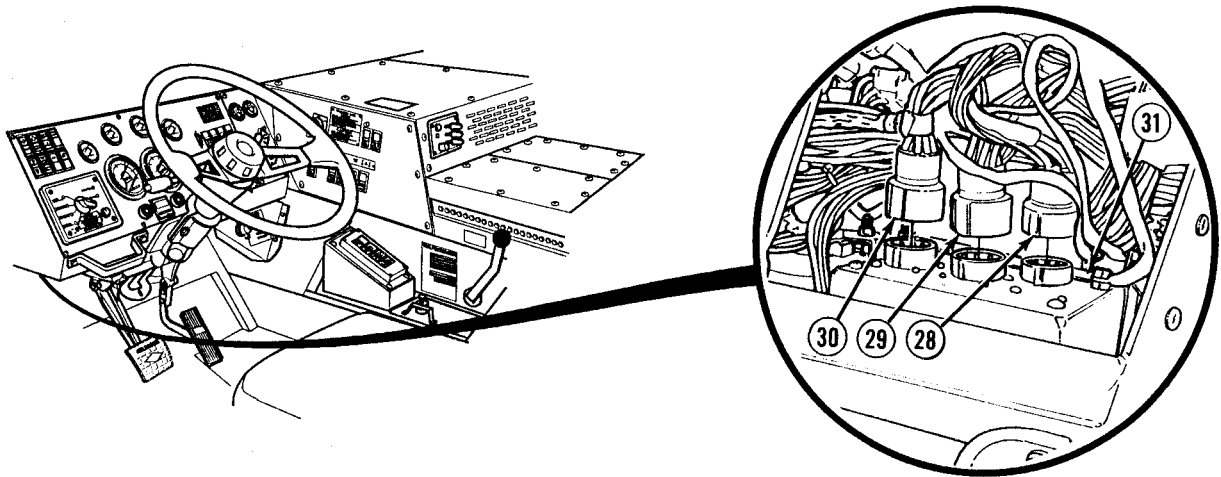


- (30) Install three wire harness connectors (40) on ECM (41).
- (31) Close engine cover (39).

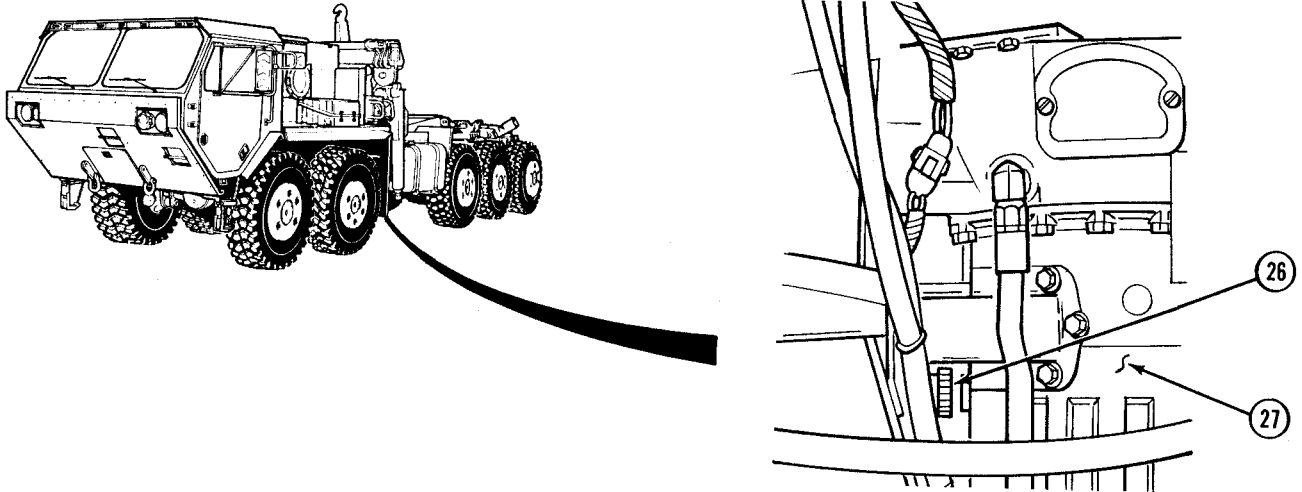
6-39. GENERAL WELDING MAINTENANCE (CONT).



- (32) Install MC45 ECB/blackout wire harness connector (38) on transmission ECU (34). Tighten screw (37).
- (33) Install MC10 cab/transmission wire harness connector (36) on transmission ECU (34). Tighten screw (35).
- (34) Install MC9 ECB/A TEC DDEC wire harness connector (33) on transmission ECU (34). Tighten screw (32).



- (35) Connect connectors MC111 (28), MC112 (29) and MC35 (30) on CTIS controller (31).



(36) Connect ATEC electrical connector (26) on transmission (27).

WARNING

- Upon installation of all wires and cables, ensure no contact is made with battery terminals or other wires and cables. Strap wires and cables away from battery terminals and other wires and cables as required to prevent damage to parts, personal injury, or death.
- 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.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

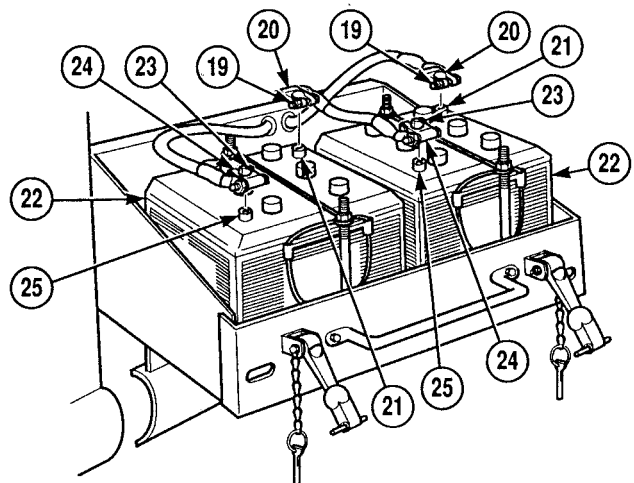
CAUTION

Do not over-torque terminal connectors, damage to terminals can result.

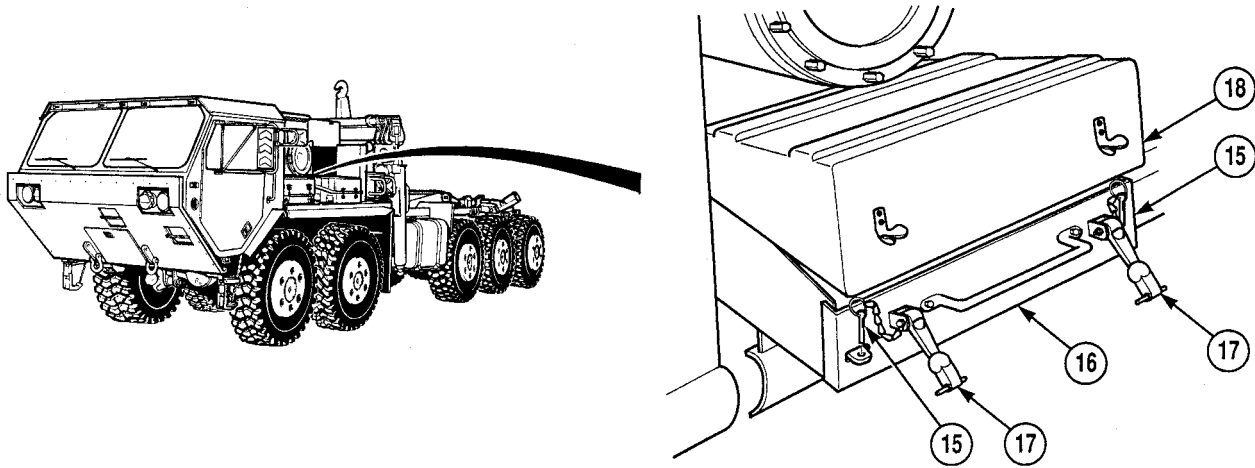
NOTE

If arctic batteries are installed, perform Steps (37) through (42). If not, go to Step (43).

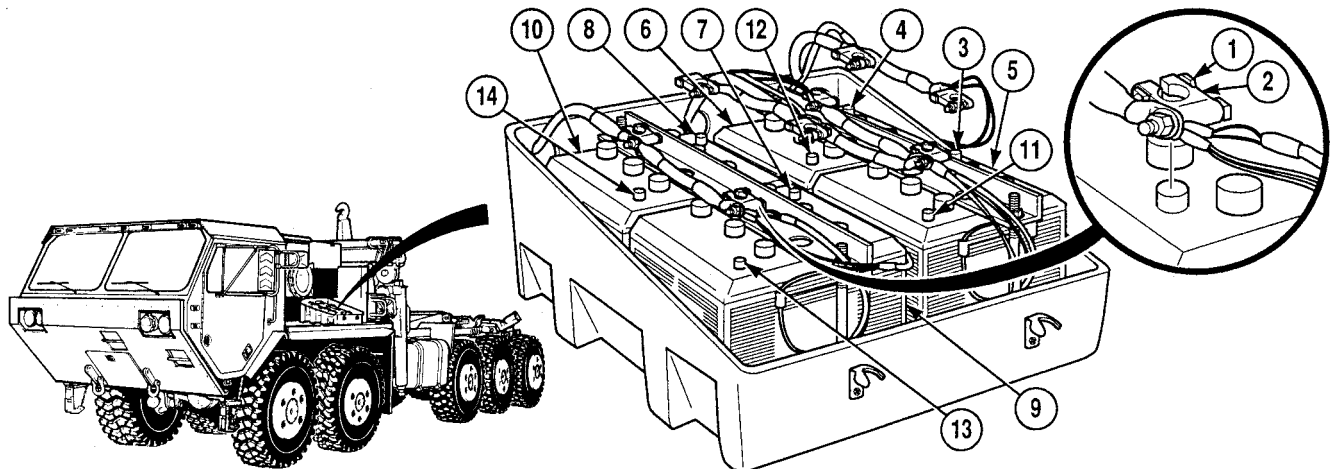
- (37) Install two terminals (24) on positive battery posts (25) and tighten two nuts (23) to 84 to 96 lb-in (9 to 11 N·m) on arctic batteries (22).
- (38) Install two terminals (20) on negative battery posts (21) and tighten two nuts (19) to 84 to 96 lb-in (9 to 11 N·m) on arctic batteries (22).



6-39. GENERAL WELDING MAINTENANCE (CONT).



- (39) Install battery box cover (18) on arctic battery box (16).
- (40) Connect two latches (17) to battery box cover (18).
- (41) Push in arctic battery box (16) into stored position.
- (42) Install two flip rings (15) on arctic battery box (16).



WARNING

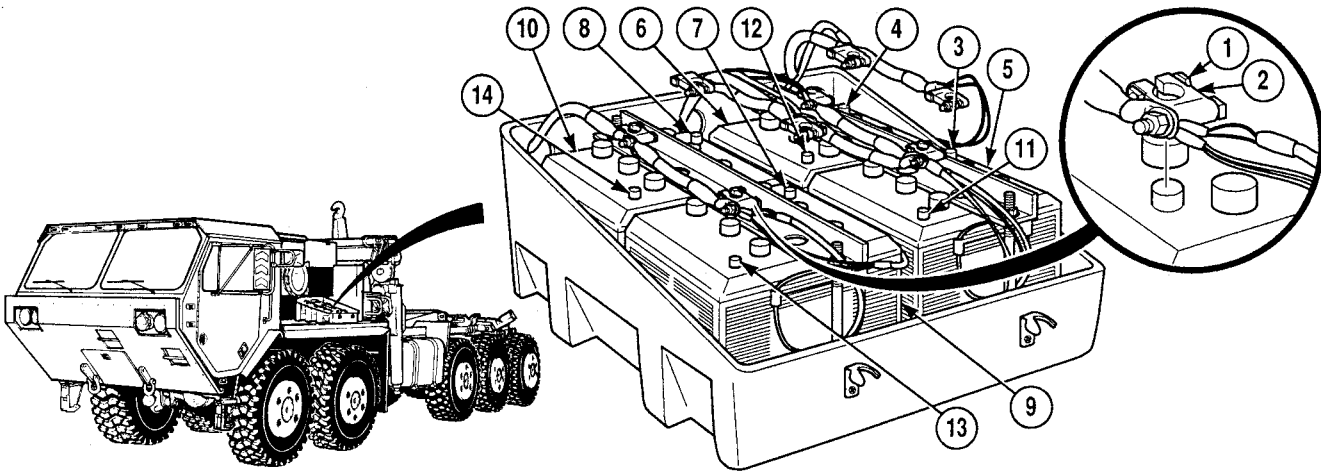
- Upon installation of all wires and cables, ensure no contact is made with battery terminals or other wires and cables. Strap wires and cables away from battery terminals and other wires and cables as required to prevent damage to parts, personal injury, or death.
- Battery acid (electrolyte) is extremely 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.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

CAUTION

Do not over-torque terminal connectors. Damage to terminals can result.

- (43) Install two terminals (2) on positive posts (13) and (14) on batteries one (9) and two (10) and tighten two nuts (1) 84 to 96 lb-in (9 to 11 N·m).
- (44) Install two terminals (2) on positive posts (11) and (12) on batteries three (5) and four (6) and tighten two nuts (1) 84 to 96 lb-in (9 to 11 N·m).
- (45) Install two terminals (2) on negative posts (7) and (8) on batteries one (9) and two (10) and tighten two nuts (1) 84 to 96 lb-in (9 to 11 N·m).
- (46) Install two terminals (2) on negative post (3) and (4) on batteries three (5) and four (6) and tighten two nuts (1) 84 to 96 lb-in (9 to 11 N·m).

6-39. GENERAL WELDING MAINTENANCE (CONT).



WARNING

Corrosion compound contains alkali. Do not get in eyes; wear goggles/safety glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water at least 15 minutes and get immediate medical attention.

- (47) Apply anticorrosion compound to positive posts (11), (12), (13) and (14) and negative posts (3), (4), (7) and (8) and eight terminals (2).

d. Follow-On Maintenance:

- Install left side noise panel, (TM 9-2320-364-20).
- Install front side noise panel, (TM 9-2320-364-20).
- Install Electronic Control Box (ECB) cover, (TM 9-2320-364-20).
- Install DUVAC control cover (145 AMP only), (TM 9-2320-364-20).
- Install reverse polarity protection cover (200 AMP only), (TM 9-2320-364-20).
- Battery box cover installed, (TM 9-2320-364-10).
- Wheel chocked removed, (TM 9-2320-364-10).

END OF TASK

6-40. POLARITY PROTECTION AND ALTERNATOR WIRE HARNESS REPLACEMENT (200 AMP WITH BATTERY DISCONNECT SWITCH).

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Wrench, Torque, (0 to 60 N·m) (Item 276, Appendix F)

Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Compound, Corrosion Preventive (Item 15, Appendix B)
- Rags, Wiping (Item 47, Appendix B)
- Sealant, Electrical (Item 50, Appendix B)
- Tags, Identification (Item 72, Appendix B)

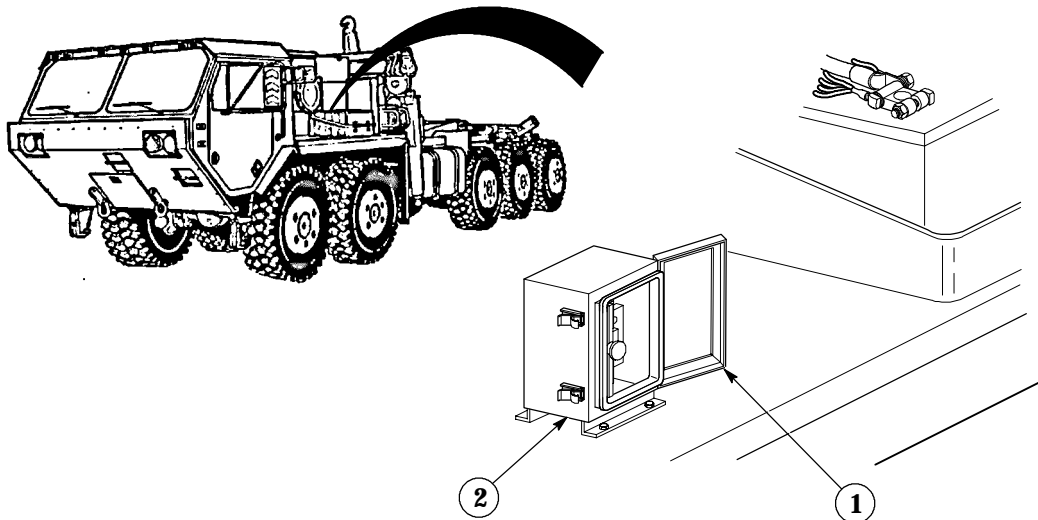
Materials/Parts - Continued

- Locknut (2) (Item 172, Appendix E)
- Lockwasher (4) (Item 241, Appendix E)
- Lockwasher (2) (Item 251, Appendix E)
- Lockwasher (Item 283, Appendix E)
- Lockwasher (Item 286, Appendix E)
- Lockwasher (2) (Item 299, Appendix E)

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Batteries disconnected, (TM 9-2320-364-20)
- Left side noise panel removed, (TM 9-2320-364-20)

a. Removal.



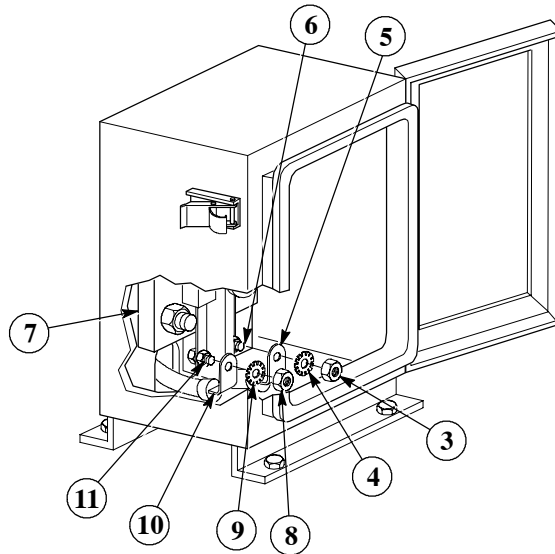
NOTE

- Tag and mark all wires prior to removal.
- Remove cable ties as required.

(1) Open door (1) on disconnect switch box (2).

6-40. POLARITY PROTECTION AND ALTERNATOR WIRE HARNESS REPLACEMENT (200 AMP WITH BATTERY DISCONNECT SWITCH) (CONT).

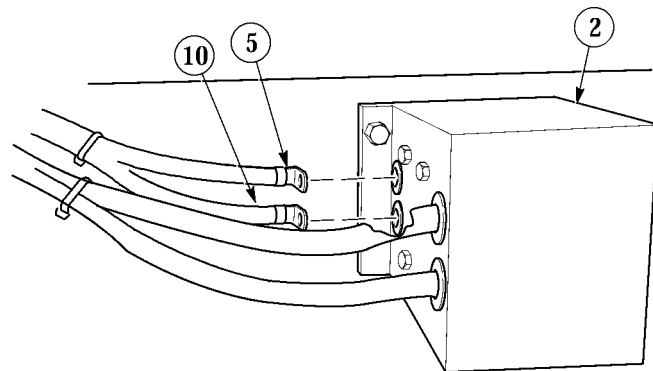
- (2) Remove nut (3), lockwasher (4), wire 1281A (5) from stud (6) of battery disconnect switch (7). Discard lockwasher.
- (3) Remove nut (8), lockwasher (9), wire 1274 (10) from stud (11) of battery disconnect switch (7). Discard lockwasher.



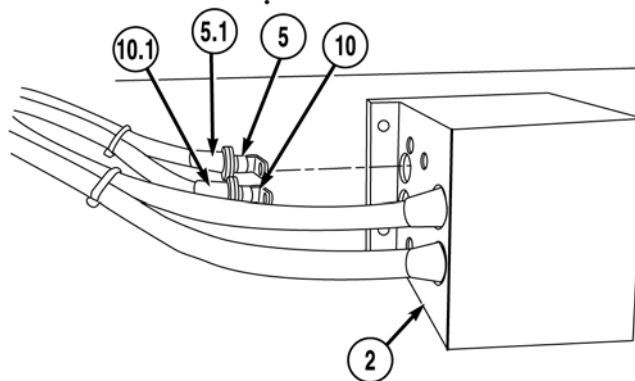
NOTE

Model A wire harness does not come with tapered grommets. Model B wire harness does come with tapered grommets. Perform Step (4) for Model A. Perform Step (4.1) for Model B.

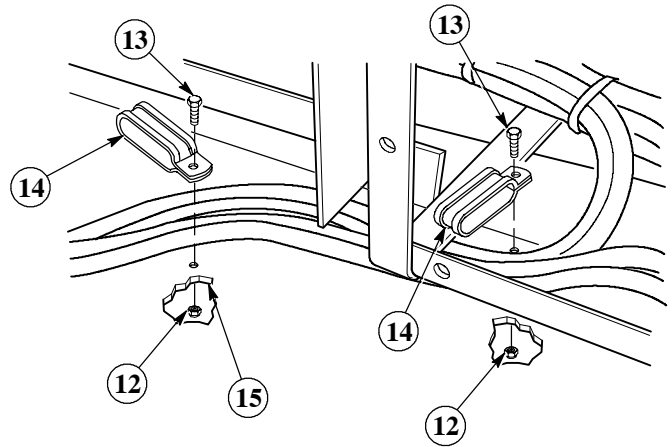
- (4) Pull wire 1281A (5) and wire 1274 (10) out of battery disconnect switch box (2).



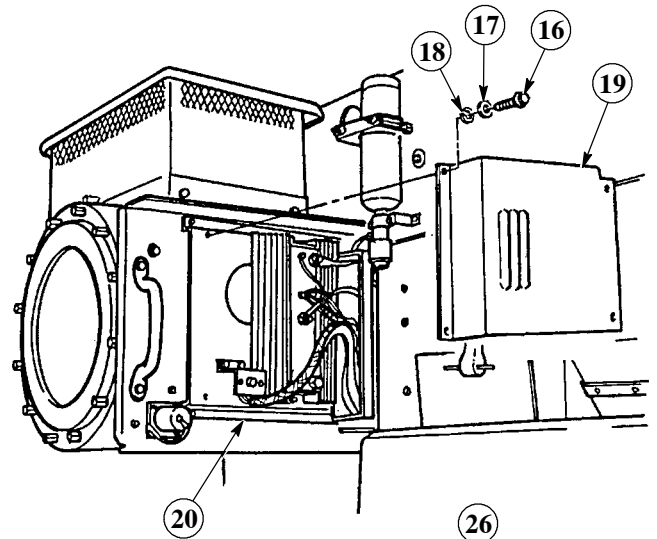
- (4.1) Pull wire 1281A (5), grommet (5.1), wire 1274 (10) and grommet (10.1) out of battery disconnect switch box (2).



- (5) Remove two locknuts (12), screws (13) and cushion clips (14) from left fender (15). Discard locknuts.



- (6) Remove four screws (16), lockwashers (17), washers (18) and splash guard (19) from electric bracket (20). Discard lockwashers.

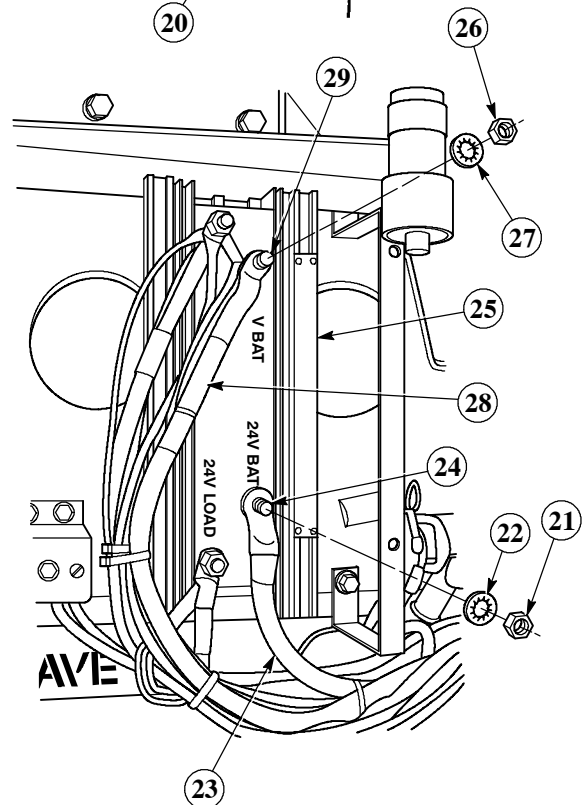


- (7) Remove nut (21), lockwasher (22) and wire 1281A (23) from 24 volt battery terminal (24) of polarity protection control (25). Discard lockwasher.

- (8) Position nut (21) on 24 volt battery terminal (24).

- (9) Remove nut (26), lockwasher (27) and wire 1566 (28) from 12 volt battery terminal (29) of polarity protection control (25). Discard lockwasher.

- (10) Position nut (26) on 12 volt battery terminal (29).



6-40. POLARITY PROTECTION AND ALTERNATOR WIRE HARNESS REPLACEMENT (200 AMP WITH BATTERY DISCONNECT SWITCH) (CONT).

NOTE

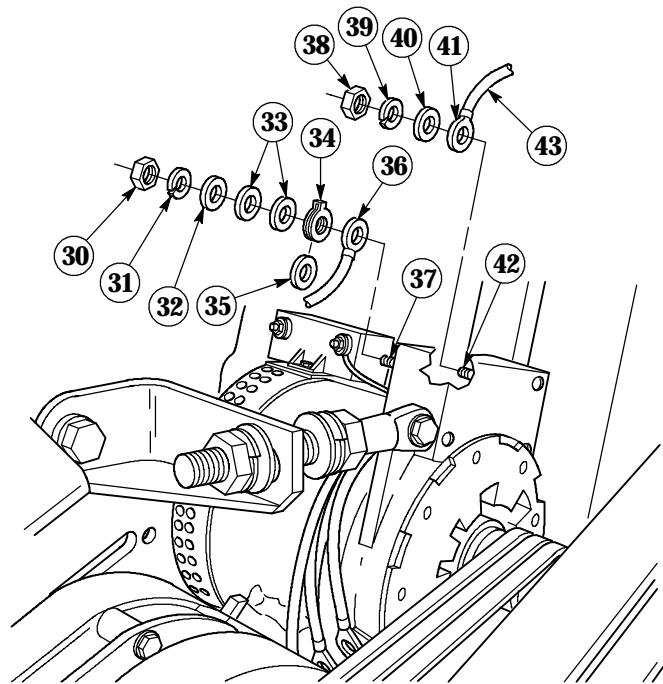
There are three wires located on 24 volt terminal. Remove only wire 1281A and position remaining wires back on 24 volt terminal.

- (11) Remove nut (30), lockwasher (31), washer (32), washer(s) (33), if present, fuse link (34) with insulator washer (35), wire 1281A (36) from 24 volt terminal (37). Discard lockwasher.
- (12) Position fuse link (34) with insulator washer (35), washer(s) (33), if removed, washer (32) and nut (30) on 24 volt terminal (37).

NOTE

There are two wires on 12 volt terminal. Remove only wire 1274 and position remaining wire back on 12 volt terminal.

- (13) Remove nut (38), lockwasher (39) washer (40) and wire 1274 (41) from 12 volt terminal (42). Discard lockwasher.
- (14) Position nut (38) and washer (40) on 12 volt terminal (42).
- (15) Remove polarity protection and alternator wire harness (43) from truck.

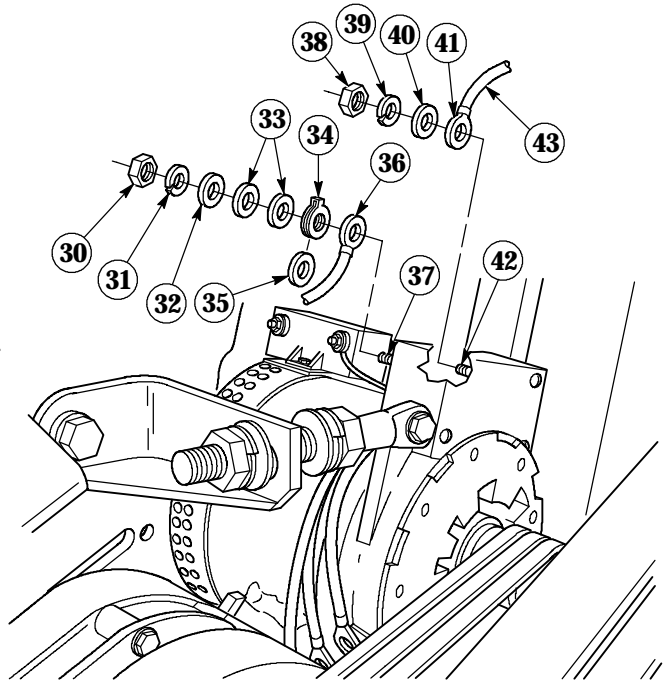


b. Installation.

NOTE

Install cable ties as required.

- (1) Position polarity protection and alternator wire harness (43) in truck.
- (2) Remove nut (38) and washer (40) from 12 volt terminal (42).
- (3) Install wire 1274 (41), washer (40), lockwasher (39) and nut (38) on 12 volt terminal (42).
- (4) Tighten nut (38) to 15 lb-ft (20 N·m).
- (5) Remove nut (30), washer (32), washer(s) (if present) (33), and fuse link (34) with insulator washer (35) from 24 volt terminal (37).
- (6) Install wire 1281A (36), fuse link (34) with insulator washer (35), washer(s) (if removed) (33), washer (32), lockwasher (31) and nut (30) on 24 volt terminal (37).
- (7) Tighten nut (30) to 15 lb-ft (20 N·m).

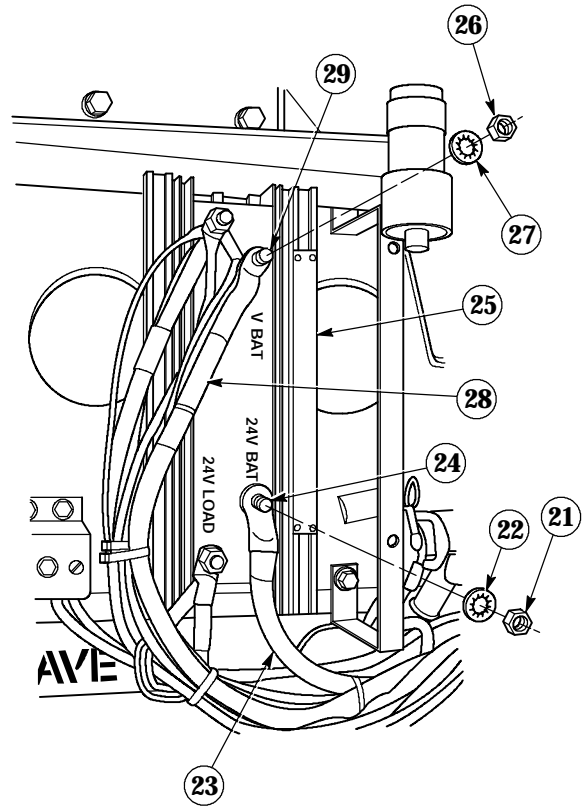


6-40. POLARITY PROTECTION AND ALTERNATOR WIRE HARNESS REPLACEMENT (200 AMP WITH BATTERY DISCONNECT SWITCH) (CONT).

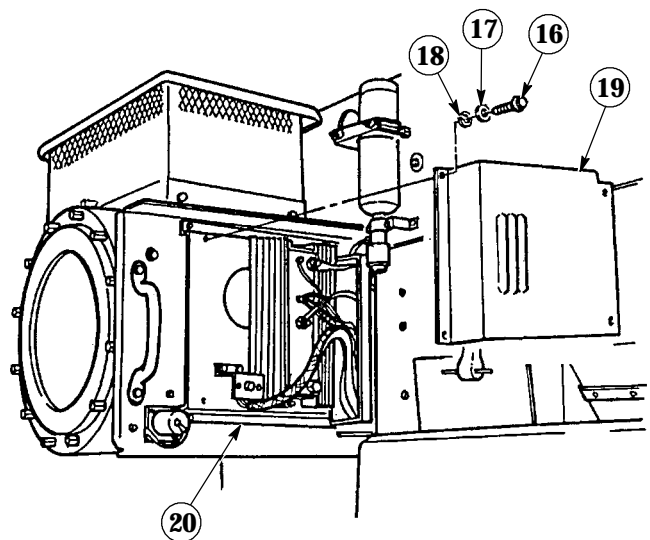
- (8) Remove nut (26) from 12 volt battery terminal (29) of polarity protection control (25).
- (9) Install wire 1566 (28), lockwasher (27) and nut (26) on 12 volt battery terminal (29).
- (10) Remove nut (21) from 24 volt battery terminal (24) of polarity protection control (25).
- (11) Install wire 1281A (23), lockwasher (22) and nut (21) on 24 volt battery terminal (24).

WARNING

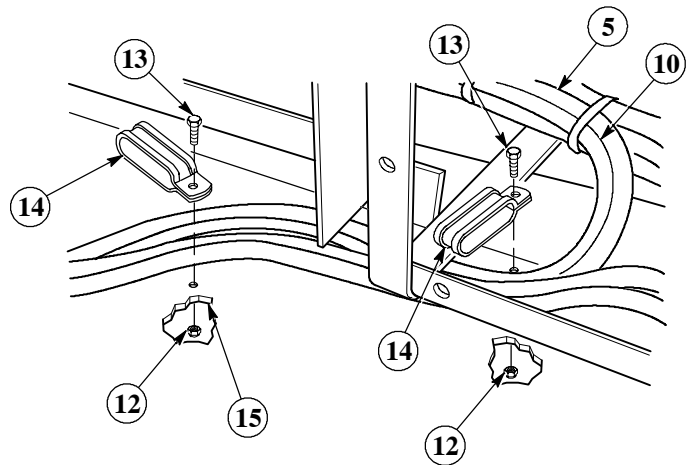
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



- (12) Apply electrical sealant to 24 volt battery terminal (24) and 12 volt battery terminal (29).
- (13) Install splash guard (19), four washers (18), lockwashers (17) and screws (16) on electric bracket (20).



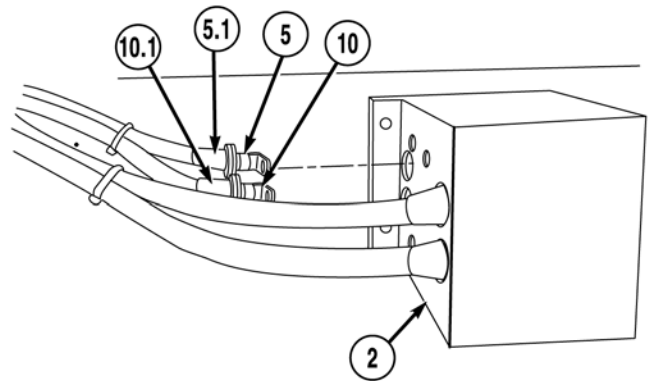
- (14) Secure wire 1281A (5) and wire 1274 (10) to left fender (15) with two cushion clips (14), screws (13) and locknuts (12).



NOTE

When replacing wire harness, new wire harness will be equipped with tapered grommets. If old grommets are not damaged, cut off tapered grommets and re-use old grommets. If old grommets are damaged, battery disconnect switch box will need to be replaced (TM 9-2320-364-20).

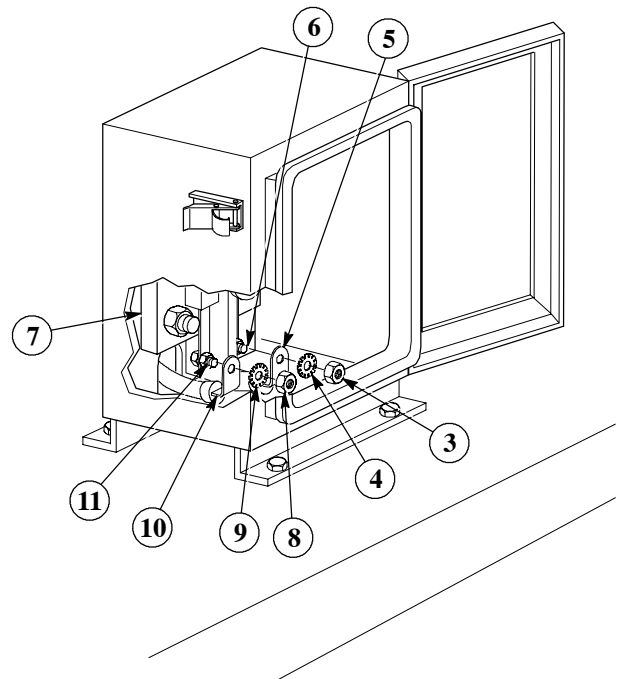
- (15) Pull wire 1281A (5) and wire 1274 (10) through battery disconnect switch box (2).
- (15.1) Install two grommets (5.1) and (10.1) in battery disconnect switch box (2).



WARNING

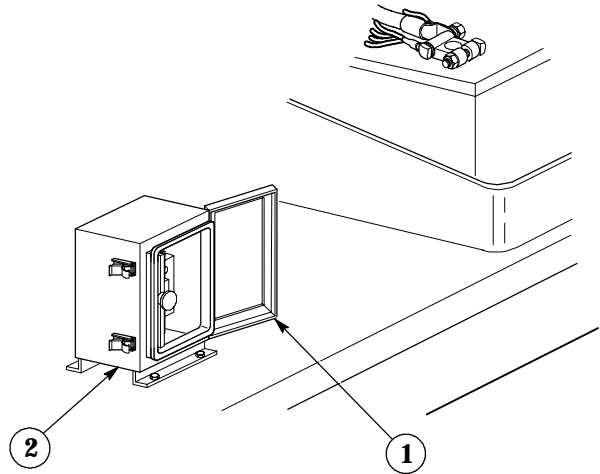
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (15.2) Apply electrical sealant to two grommets (5.1) and (10.1).
- (16) Install wire 1274 (10), lockwasher (9) and nut (8) on stud (11) of battery disconnect switch (7).
- (17) Install wire 1281A (5), lockwasher (4) and nut (3) on stud (6) of battery disconnect switch (7).
- (18) Tighten nut (3) and nut (8) to 15 lb-ft (20 N·m).
- (19) Apply electrical sealant to stud (6) and stud (11).



**6-40. POLARITY PROTECTION AND ALTERNATOR WIRE HARNESS REPLACEMENT
(200 AMP WITH BATTERY DISCONNECT SWITCH) (CONT).**

- (20) Close door (1) on battery disconnect switch box (2).



c. Follow-On Maintenance:

- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

<p>6-41. BATTERY DISCONNECT WIRE HARNESS REPLACEMENT (200 AMP WITH BATTERY DISCONNECT SWITCH).</p>		
<p>This task covers:</p>		
<p>a. Removal</p>	<p>b. Installation</p>	<p>c. Follow-On Maintenance</p>
<p>INITIAL SETUP</p>		
<p><i>Tools and Special Tools</i> Tool Kit, General Mechanic's (Item 240, Appendix F) Wrench, Torque, (0 to 60 N·m) (Item 276, Appendix F)</p>	<p><i>Materials/Parts - Continued</i> Tags, Identification (Item 72, Appendix B) Locknut (2) (Item 172, Appendix E) Lockwasher (4) (Item 241, Appendix E) Lockwasher (2) (Item 251, Appendix E)</p>	<p><i>Equipment Condition</i> Engine OFF, (TM 9-2320-364-10) Wheels chocked, (TM 9-2320-364-10) Batteries disconnected, (TM 9-2320-364-20) Left side noise panel removed, (TM 9-2320-364-20)</p>
<p><i>Materials/Parts</i> Cable Ties (Item 9, Appendix B) Compound, Corrosion Preventive (Item 15, Appendix B) Rags, Wiping (Item 47, Appendix B) Sealant, Electrical (Item 50, Appendix B)</p>		

WARNING

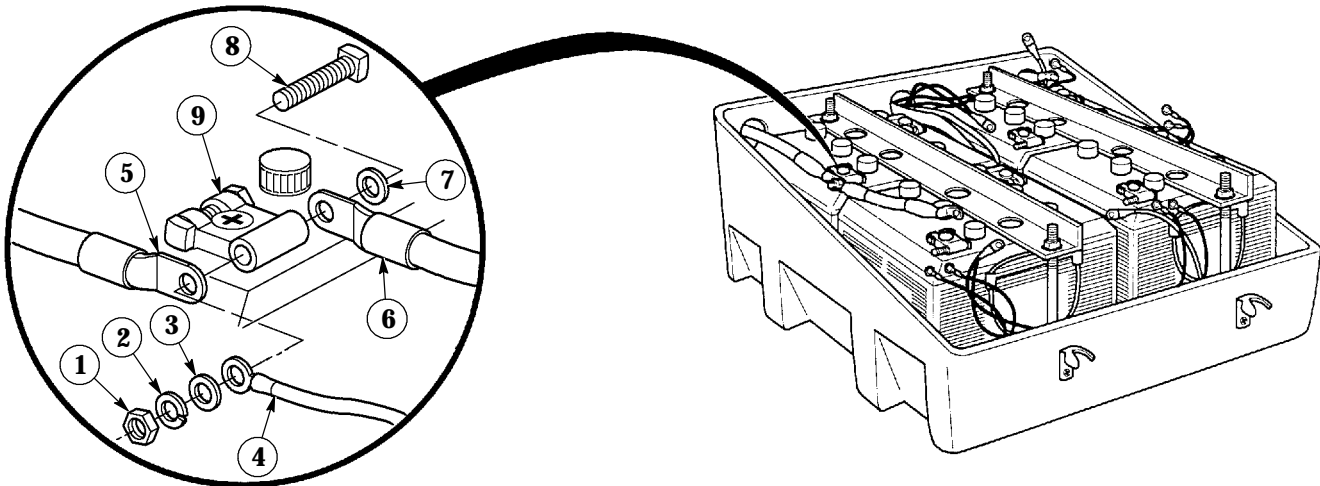
- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries. Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent clothing being damaged.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

**6-41. BATTERY DISCONNECT WIRE HARNESS REPLACEMENT
(200 AMP WITH BATTERY DISCONNECT SWITCH) (CONT).**

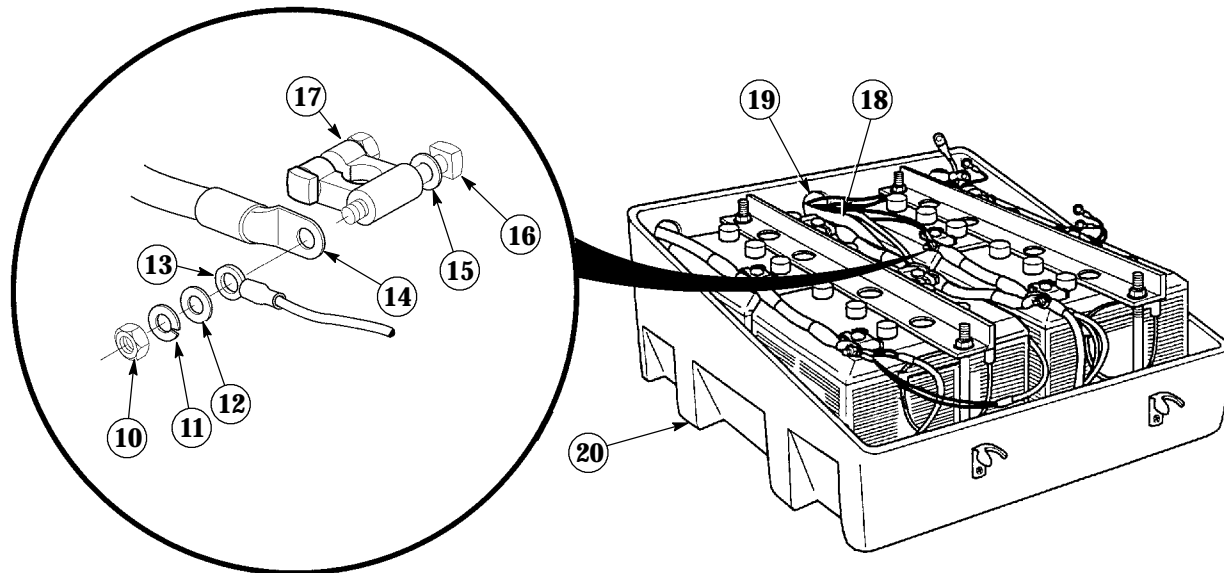
a. Removal.

NOTE

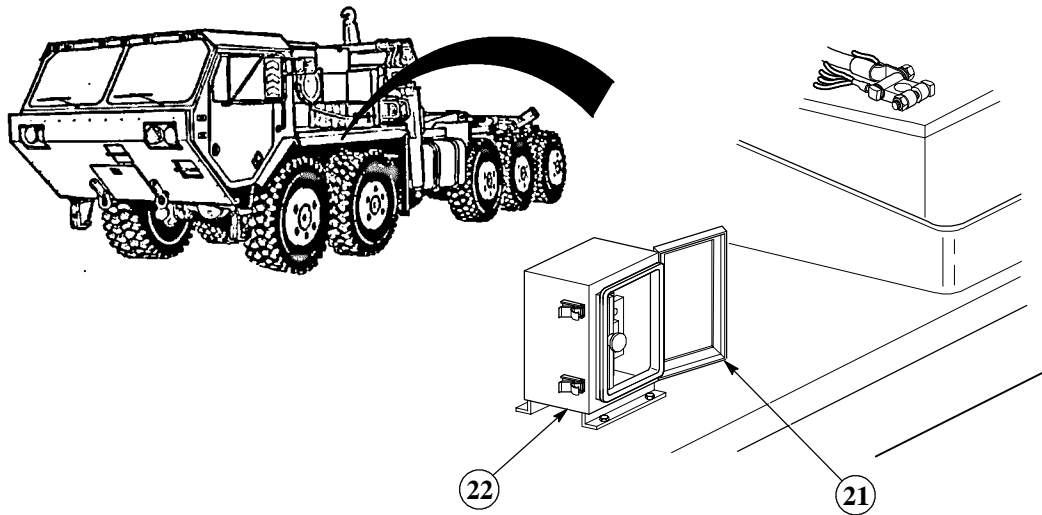
- Tag and mark all wires prior to removal.
- Remove cable ties as required.



- (1) Remove nut (1), lockwasher (2), washer (3), cable 1281A (4), cable 1139 (5), cable 1137 (6), washer (7) and screw (8) from positive terminal (9). Discard lockwasher.



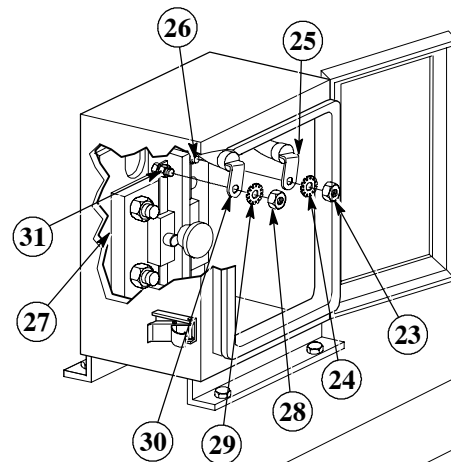
- (2) Remove nut (10), lockwasher (11), washer (12), cable 1566 (13), cable 1137 (14), washer (15), and screw (16) from positive terminal (17). Discard lockwasher.
- (3) Pull battery disconnect harness (18) through holes (19) of battery box (20).



(4) Open door (21) on disconnect switch box (22).

(5) Remove nut (23), lockwasher (24), wire 1281A (25) from stud (26) of battery disconnect switch (27). Discard lockwasher.

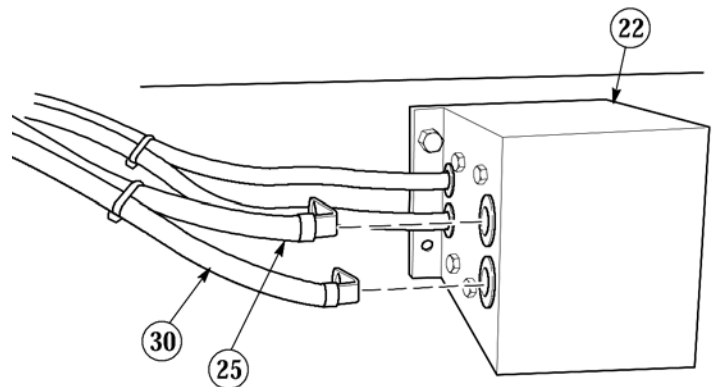
(6) Remove nut (28), lockwasher (29), wire 1566 (30) from stud (31) of battery disconnect switch (27). Discard lockwasher.



NOTE

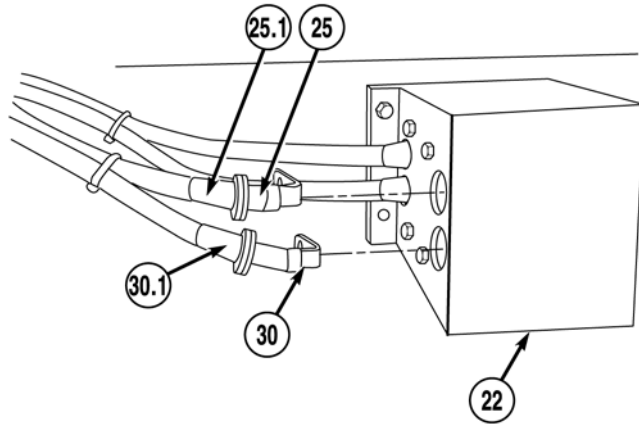
Model A wire harness does not come with tapered grommets.
 Model B wire harness does come with tapered grommets. Perform Step (7) for Model A. Perform Step (7.1) for Model B.

(7) Pull wire 1281A (25) and wire 1566 (30) out of battery disconnect switch box (22).



**6-41. BATTERY DISCONNECT WIRE HARNESS REPLACEMENT
(200 AMP WITH BATTERY DISCONNECT SWITCH) (CONT).**

- (7.1) Pull wire 1281A (25), grommet (25.1), wire 1566 (30) and grommet (30.1) out of battery disconnect switch box (22).
- (8) Remove two locknuts (32), screws (33) and cushion clips (34) from left fender (35). Discard locknuts.
- (9) Remove battery disconnect wire harness (18) from truck.

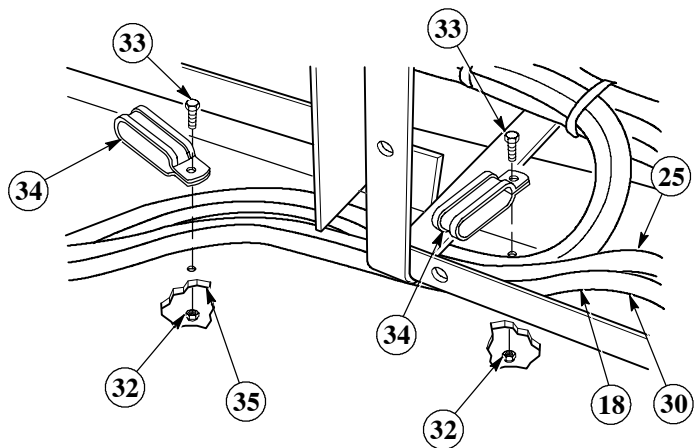


b. Installation.

NOTE

Install cable ties as required.

- (1) Position battery disconnect wire harness (18) in truck.
- (2) Secure wire 1281A (25) and wire 1566 (30) to left fender (35) with two cushion clips (34), screws (33) and locknuts (32).



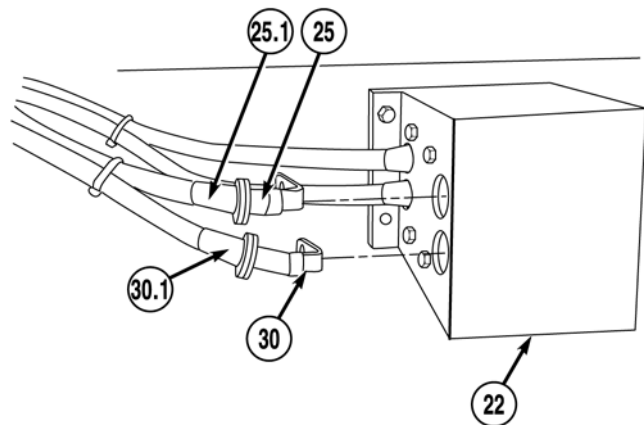
NOTE

When replacing wire harness, new wire harness will be equipped with tapered grommets. If old grommets are not damaged, cut off tapered grommets and re-use old grommets. If old grommets are damaged, battery disconnect switch box will need to be replaced (TM 9-2320-364-20).

- (3) Pull wire 1281A (25) and wire 1566 (30) through battery disconnect switch box (22).
- (3.1) Install two grommets (25.1) and (30.1) in battery disconnect switch box (22).

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.

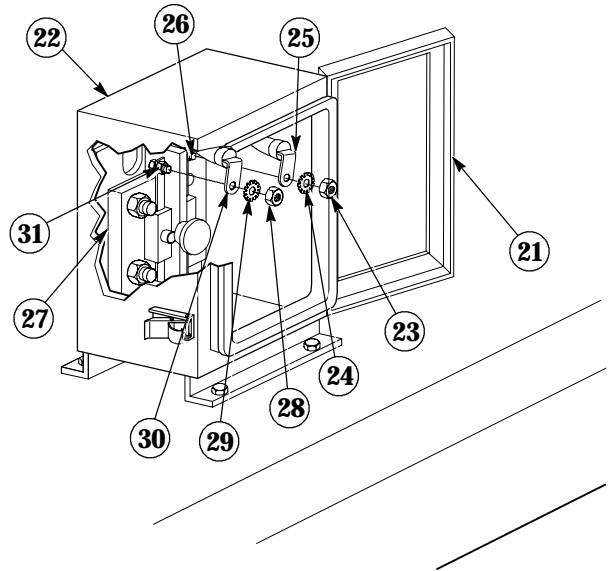


- (3.2) Apply electrical sealant to two grommets (25.1) and (30.1).

- (4) Install wire 1566 (30), lockwasher (29) and nut (28) on stud (31) of battery disconnect switch (27).
- (5) Install wire 1281A (25), lockwasher (24) and nut (23) on stud (26) of battery disconnect switch (27).
- (6) Tighten nuts (23) and (28) to 15 lb-ft (20 N·m).

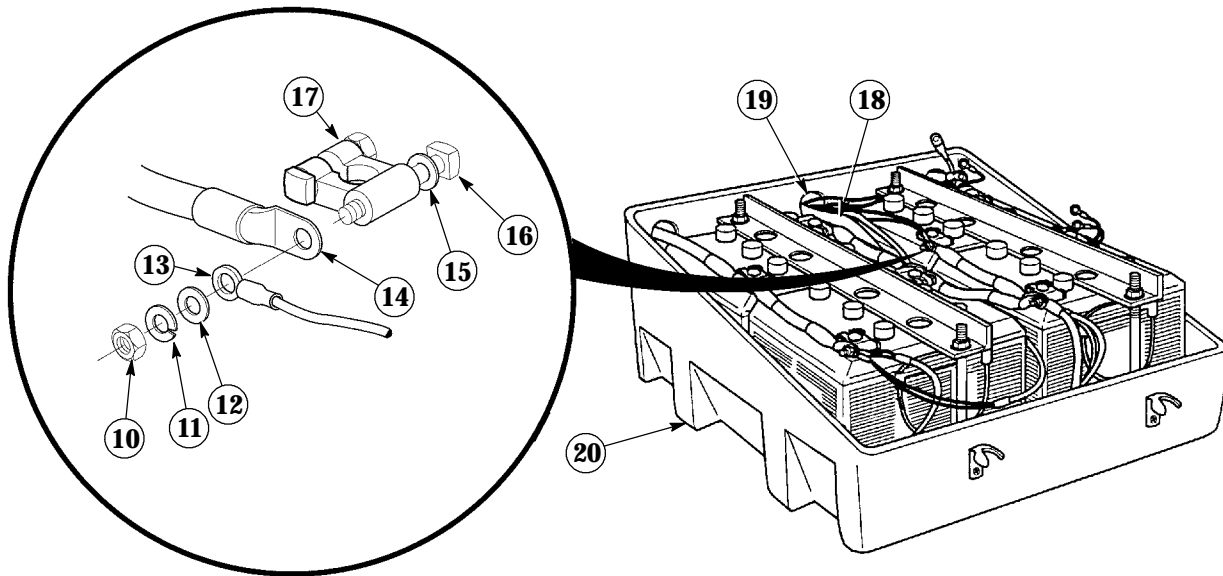
WARNING

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.



- (7) Apply electrical sealant to studs (26) and (31).
- (8) Close door (21) on battery disconnect switch box (22).

**6-41. BATTERY DISCONNECT WIRE HARNESS REPLACEMENT
(200 AMP WITH BATTERY DISCONNECT SWITCH) (CONT).**



WARNING

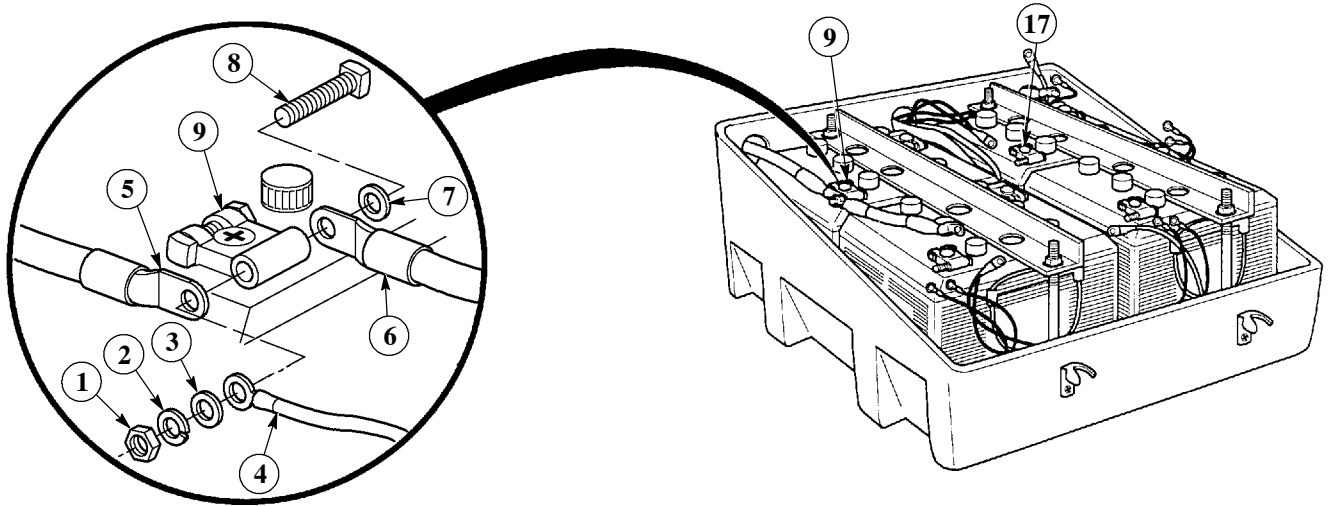
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry or tools contact positive electrical circuits, a direct short may result. Damage to equipment, injury or death to personnel may occur.

- (9) Pull battery disconnect wire harness (18) through hole (19) in battery box (20) and position in truck.
- (10) Position screw (16), washer (15), cable 1137 (14), cable 1566 (13), washer (12), lockwasher (11) and nut (10) on positive terminal (17).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (11) Tighten nut (10) to 12 to 16 lb-ft (16-22 N·m).



- (12) Position screw (8), washer (7), cable 1137 (6), cable 1139 (5), cable 1281A (4), washer (3), lockwasher (2) and nut (1) on positive terminal (9).

CAUTION

While applying torque to nut, hold screw with wrench or damage to battery may occur.

- (13) Tighten nut (1) to 12 to 16 lb-ft (16-22 N·m).

WARNING

Corrosion compound contains alkali. Do not get in eyes; wear safety goggles/glasses when using. Avoid contact with skin. In case of contact, immediately wash area with soap and water. If eyes are contacted, flush with large amounts of water for at least 15 minutes and get immediate medical attention.

- (14) Apply corrosion preventative compound to positive terminal (9) and positive terminal (17).

c. Follow-On Maintenance:

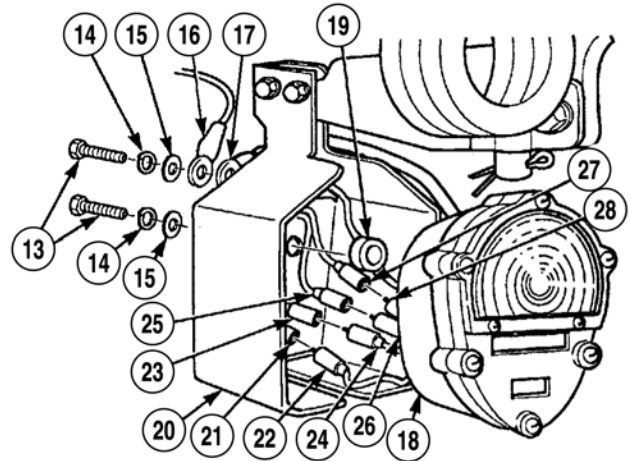
- Install left side noise panel, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

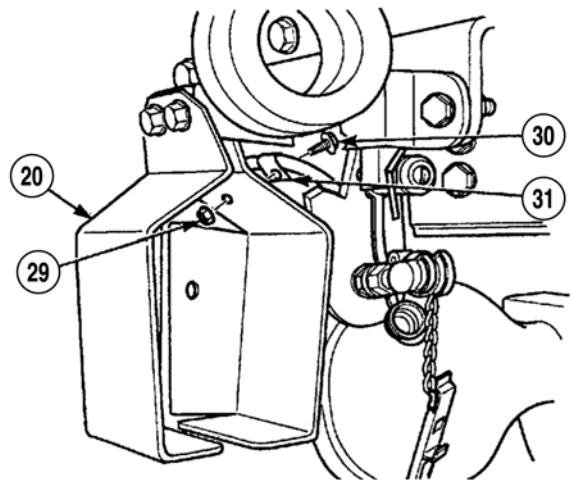
NOTE

LED composite light has ground wire pigtail.

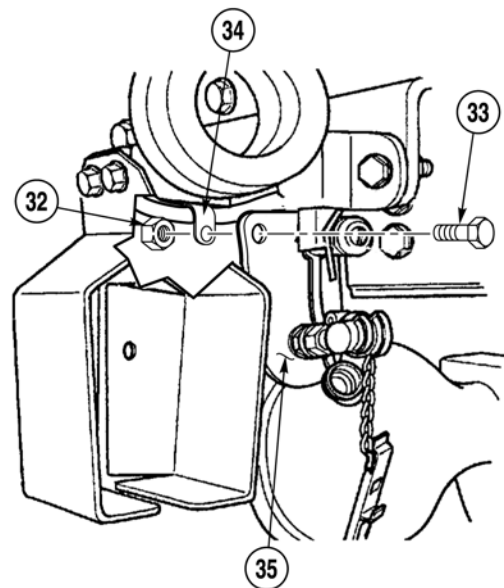
- (7) Remove two screws (13), lockwashers (14), washers (15), wire 1435 (16), ground wire pigtail (17), light (18) and two spacers (19) from rear composite light mounting bracket (20). Discard lockwashers.
- (8) Disconnect wire 1678 (21) from wire 23 (22).
- (9) Disconnect wire 1680 (23) from wire 24 (24).
- (10) Disconnect wire 1003 (25) from wire 22 (26).
- (11) Disconnect wire 1008 (27) from wire 21 (28).



- (12) Remove locknut (29), screw (30) and cushion clip (31) from rear composite light mounting bracket (20). Discard locknut.



- (13) Remove locknut (32), screw (33) and cushion clip (34) from bracket (35). Discard locknut.

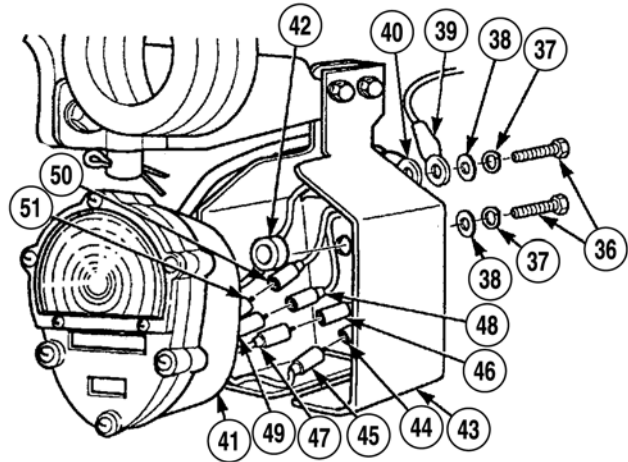


6-42. REAR LIGHT WIRE HARNESS REPLACEMENT (CONT).

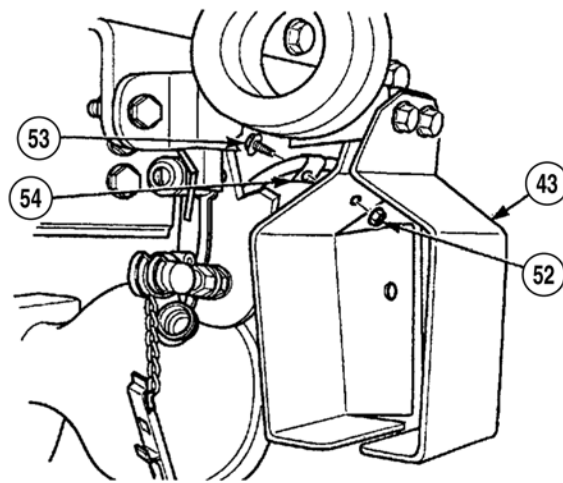
NOTE

LED composite light has ground wire pigtail.

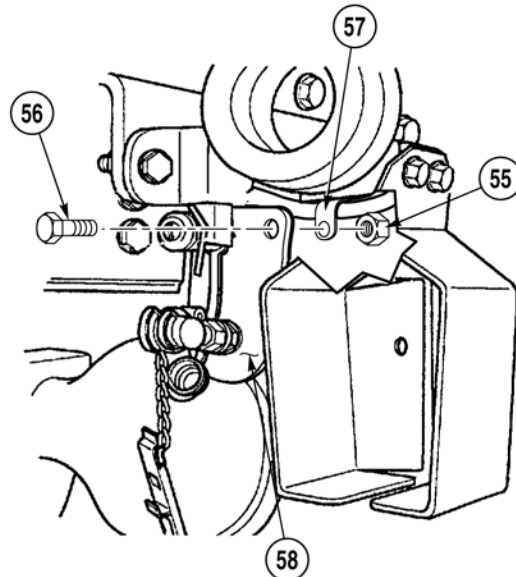
- (14) Remove two screws (36), lockwashers (37), washers (38), wire 1435 (39), ground wire pigtail (40), light (41) and two spacers (42) from rear composite light mounting bracket (43). Discard lockwashers.
- (15) Disconnect wire 1678 (44) from wire 23 (45).
- (16) Disconnect wire 1680 (46) from wire 24 (47).
- (17) Disconnect wire 1004 (48) from wire 22 (49).
- (18) Disconnect wire 1008 (50) from wire 21 (51).



- (19) Remove locknut (52), screw (53) and cushion clip (54) from rear composite light mounting bracket (43). Discard locknut.



- (20) Remove locknut (55), screw (56) and cushion clip (57) from bracket (58). Discard locknut.



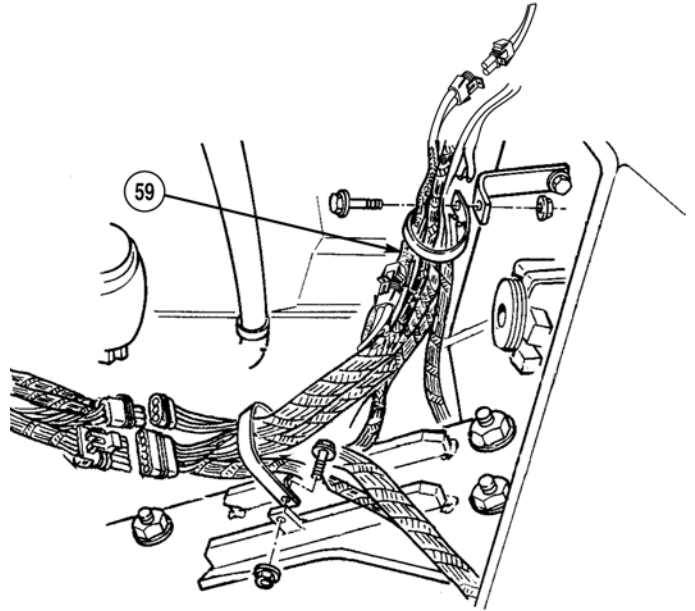
- (21) Remove rear light wire harness (59) from truck.

b. Installation.

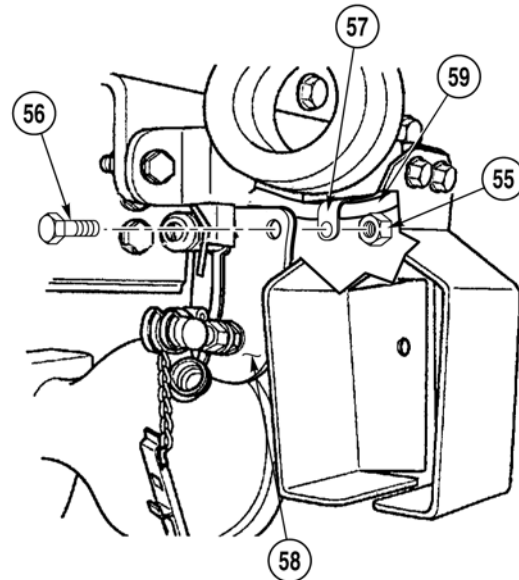
NOTE

- Install cable ties as required.
- Evenly distribute any slack in rear light wire harness.

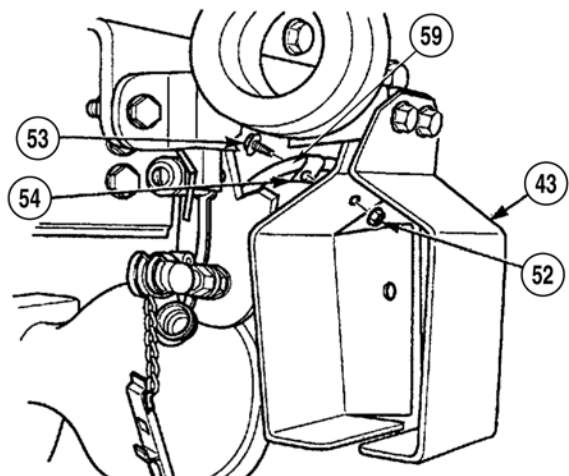
- (1) Position rear light wire harness (59) in truck.



- (2) Position rear light wire harness (59) in cushion clip (57).
- (3) Install cushion clip (57) on bracket (58) with screw (56) and locknut (55).



- (4) Position rear light wire harness (59) on cushion clip (54).
- (5) Install cushion clip (54) on rear composite light mounting bracket (43) with screw (53) and locknut (52).



6-42. REAR LIGHT WIRE HARNESS REPLACEMENT (CONT).

NOTE

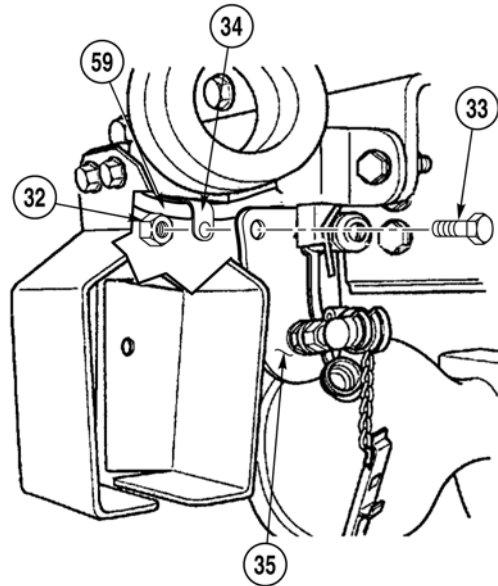
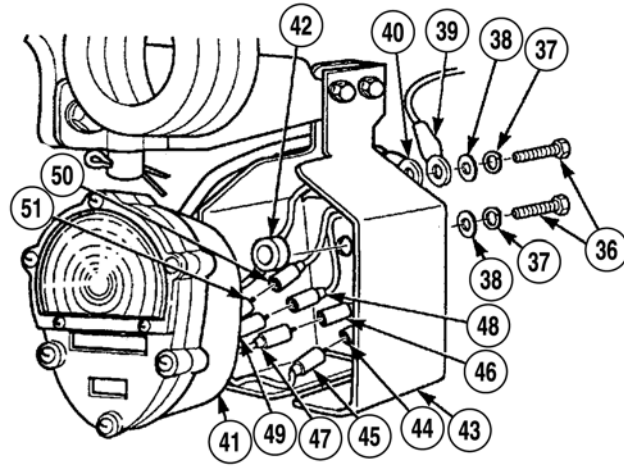
Feed wires through rear of bracket during installation.

- (6) Connect wire 1008 (50) to wire 21 (51).
- (7) Connect wire 1004 (48) to wire 22 (49).
- (8) Connect wire 1680 (46) to wire 24 (47).
- (9) Connect wire 1678 (44) to wire 23 (45).

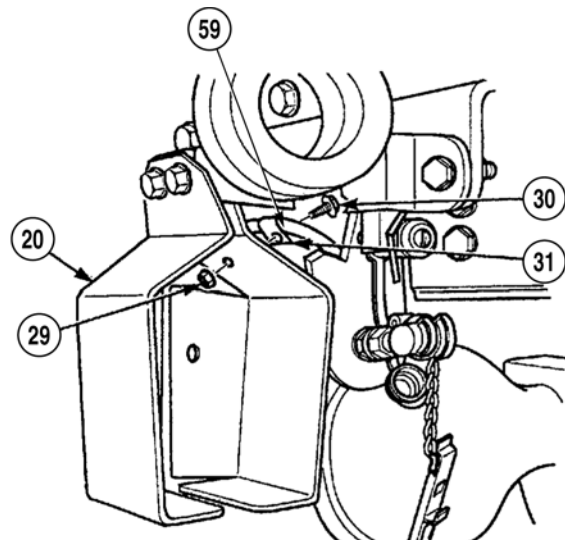
NOTE

LED composite light has ground wire pigtail.

- (10) Install light (41), ground wire pigtail (40) and wire 1435 (39) on rear composite light mounting bracket (43) with two screws (36), lockwashers (37), washers (38) and spacers (42).
- (11) Position rear light wire harness (59) in cushion clip (34).
- (12) Install cushion clip (34) on bracket (35) with screw (33) and locknut (32).



- (13) Position rear light wire harness (59) in cushion clip (31).
- (14) Install cushion clip (31) on rear composite light mounting bracket (20) with screw (30) and locknut (29).



NOTE

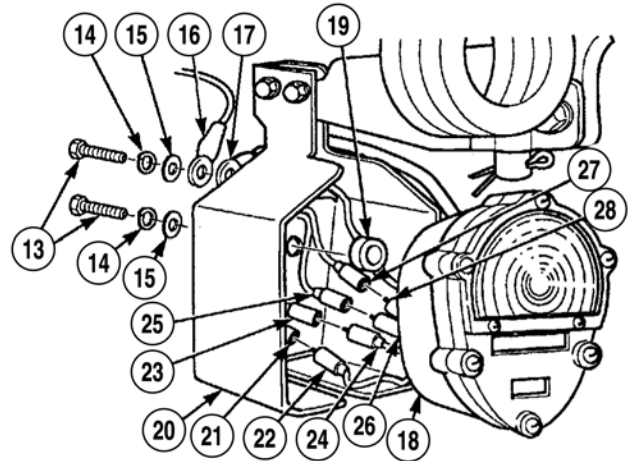
Feed wires through rear of bracket during installation.

- (15) Connect wire 1008 (27) to wire 21 (28).
- (16) Connect wire 1003 (25) to wire 22 (26).
- (17) Connect wire 1680 (23) to wire 24 (24).
- (18) Connect wire 1678 (21) to wire 23 (22).

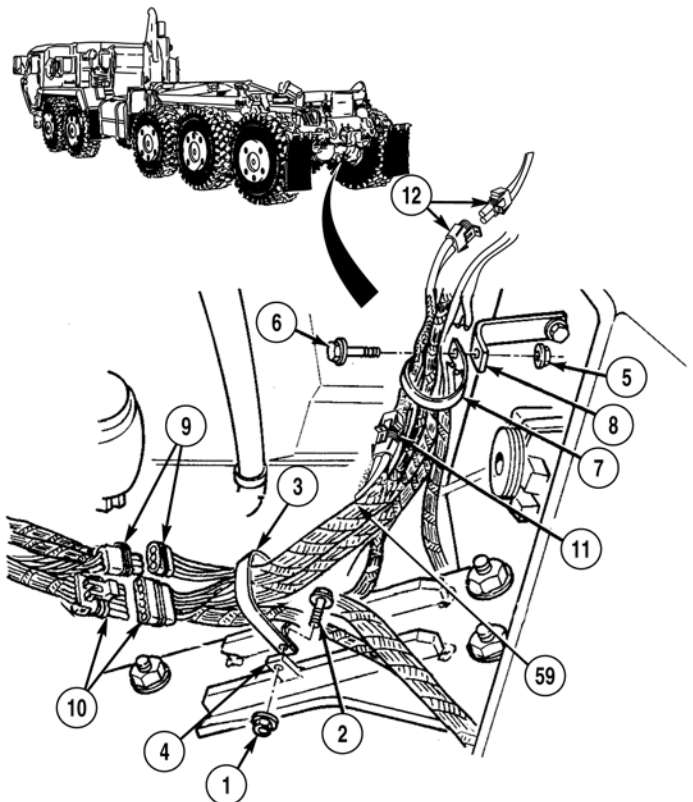
NOTE

LED composite light has ground wire pigtail.

- (19) Install light (18), ground wire pigtail (17), and wire 1435 (16) on rear composite light mounting bracket (20) with two screws (13), lockwashers (14), washers (15) and spacers (19).



- (20) Connect MC90 connector (12).
- (21) Connect MC124 connector (11).
- (22) Connect MC78 connector (10).
- (23) Connect MC80 connector (9).
- (24) Position rear light wire harness (59) in cushion clip (7).
- (25) Install cushion clip (7) on bracket (8) with screw (6) and locknut (5).



NOTE

Perform Steps (26) and (27) if cushion clip was removed.

- (26) Position rear light wire harness (59) in cushion clip (3).
- (27) Install cushion clip (3) on bracket (4) with screw (2) and locknut (1).

c. Follow-On Maintenance:

- Connect batteries, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

CHAPTER 7

TRANSMISSION MAINTENANCE

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7-1. DIRECT SUPPORT TRANSMISSION MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for repairing, replacing, installing and servicing transmission components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

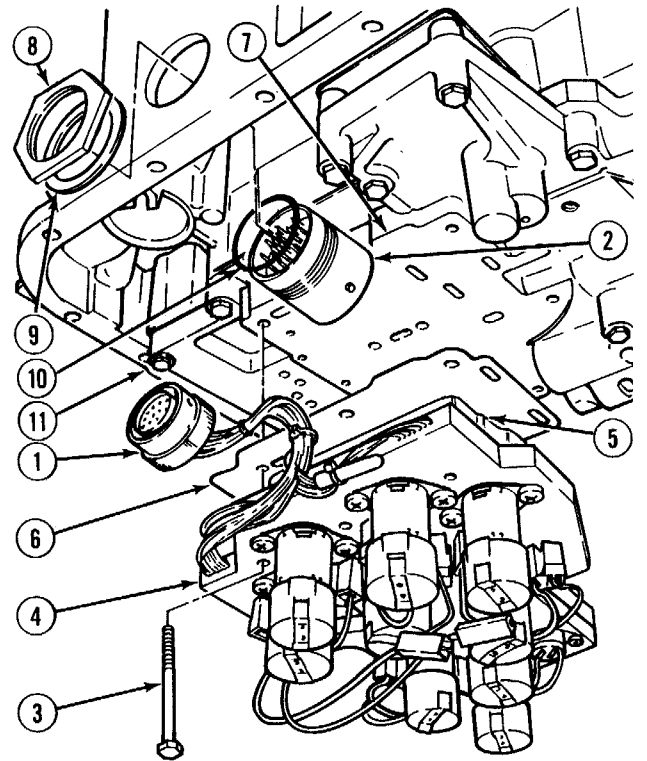
b. Installation.

- (1) Install gasket (6), plate (5), solenoid wiring harness assembly (4) and nine screws (3) on transmission (7).

NOTE

Perform Steps (2) through (5) if bulkhead connector was removed.

- (2) Apply hydraulic oil to preformed packing (10).
- (3) Install preformed packing (10) on connector (2).
- (4) Install bulkhead connector (2) in transmission housing (11).
- (5) Install lockwasher (9) and nut (8) on connector (2). Tighten to 60 to 68 lb-in (7 to 8 N·m).
- (6) Connect connector (1) to bulkhead connector (2).



c. Follow-On Maintenance:

- Install transmission low oil sensor assembly, (Para 7-5).
- Remove wheel chocks, (TM 9-2320-364-10).

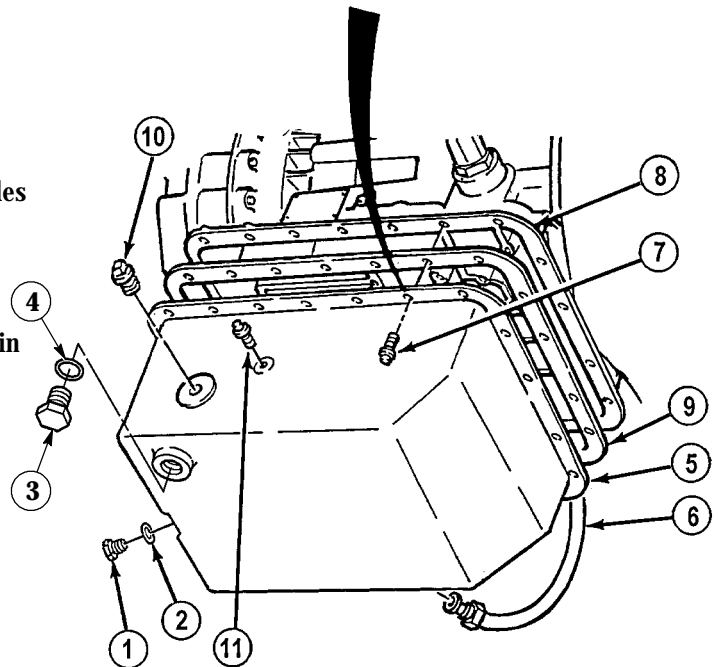
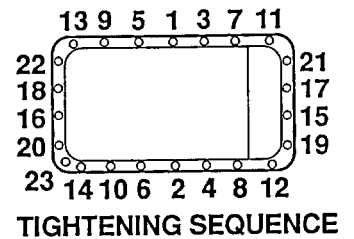
END OF TASK

b. *Installation.*



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply sealing compound to threads of plug (11).
- (2) Install plug (11) in transmission oil pan (5). Tighten plug to 120 to 144 lb-in (14 to 16 N·m).
- (3) Apply sealing compound to threads of plug (10).
- (4) Install plug (10) in transmission oil pan (5). Tighten plug to 75 to 80 lb-ft (102 to 108 N·m).
- (5) Align gasket (9) screw holes with screw holes in transmission oil pan (5).
- (6) Install gasket (9), oil pan (5) and 23 screws (7) on transmission (8). Tighten screws in sequence shown to 120 to 156 lb-in (14 to 18 N·m).
- (7) Apply sealing compound to threads of dipstick tube (6).
- (8) Position transmission dipstick tube (6) on transmission oil pan (5).
- (9) Install gasket (4) and drain plug (3) or gasket (2) and plug (1) in transmission oil pan (5). Tighten plug 180 to 240 lb-in (20-27 N·m).



c. *Follow-On Maintenance:*

- Install driveshaft on front of Axle No. 2, (TM 9-2320-364-20).
- Fill transmission with oil, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- Check transmission fluid level, (TM 9-2320-364-10).
- Check for oil leaks, (TM 9-2320-364-10).
- Shut OFF engine, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

7-5. TRANSMISSION LOW OIL SENSOR ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Combination 1-1/16 in.
(Item 254, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

Materials/Parts

Tags, Identification (Item 72, Appendix B)

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Internal oil filter removed, (Para 7-4)

a. Removal.

NOTE

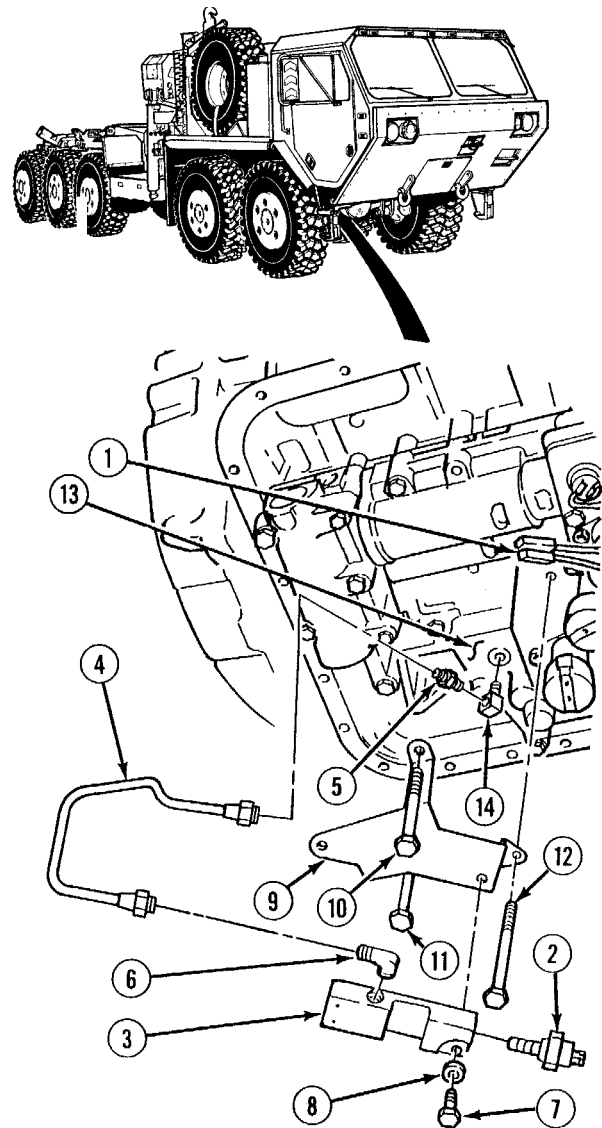
Tag and mark all wires prior to removal.

- (1) Remove two connectors (1) from low oil sensor switch (2).
- (2) Remove low oil sensor switch (2) from low oil sensor body (3).
- (3) Remove low oil sensor tube assembly (4) from adapter (5) and elbow (6).
- (4) Remove two screws (7), washers (8) and low oil sensor body (3) from bracket assembly (9).
- (5) Remove screws (10), (11) and (12) and sensor bracket (9) from valve body (13).

NOTE

Note position of fittings prior to removal.

- (6) Remove adapter (5) and elbow (14) from valve body (13).
- (7) Remove elbow (6) from low oil sensor body (3).



7-5. TRANSMISSION LOW OIL SENSOR ASSEMBLY REPLACEMENT (CONT).

b. Installation.

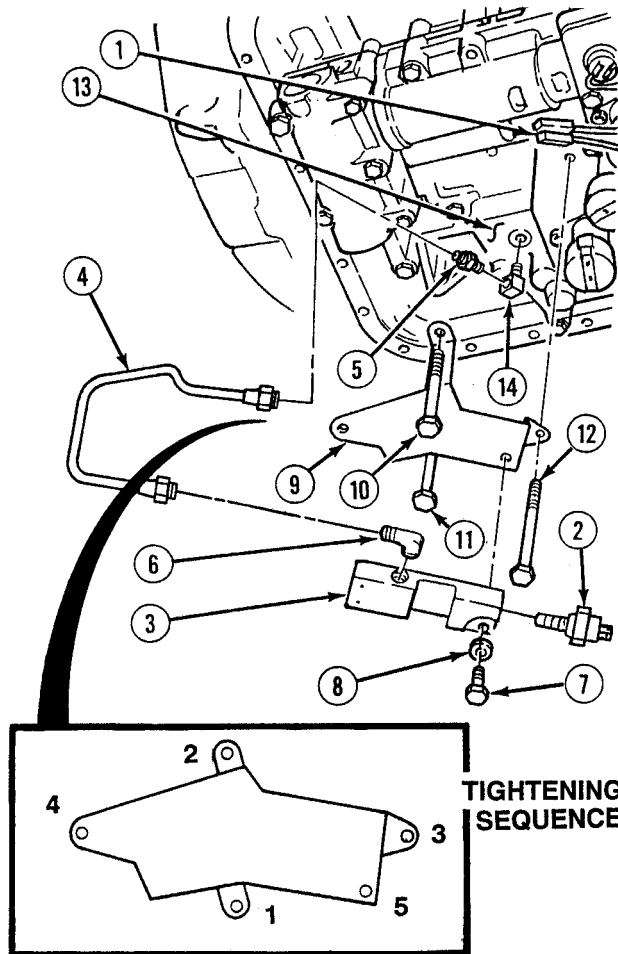
NOTE

Install fittings as noted prior to removal.

- (1) Install elbow (6) in low oil sensor body (3).
- (2) Install elbow (14) and adapter (5) on valve body (3).
- (3) Position sensor bracket (9) with screws (12), (11) and (10) in valve body (13).
- (4) Position low oil sensor body (3), with two washers (8) and screws (7) on sensor bracket assembly (9).
- (5) Install oil pressure switch (2) in low oil sensor body (3).

NOTE

- Step (6) includes all screws on control valve assembly, solenoid assembly and valve assemblies.
- If screw binds during installation, loosen all screws, check alignment of control valve and components and repeat tightening procedure until all screws can be tightened without binding.



- (6) Using sequence shown, tighten screws finger tight starting with screw closest to center of control valve body. Using same sequence, tighten all screws to 96 to 144 lb-in (11 to 16 N·m).
- (7) Install low oil sensor tube assembly (4) on elbow (6) and adapter (5).
- (8) Install two connectors (1) on low oil sensor switch (2).

c. Follow-On Maintenance:

- Install internal oil filter, (Para 7-4).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

7-6. TRANSMISSION LOW OIL SENSOR HARNESS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)

Equipment Condition

Transmission internal oil filter element
removed, (Para 7-4)

Materials/Parts

Tags, Identification (Item 72, Appendix B)

a. Removal.

NOTE

Tag and mark all connectors
prior to removal.

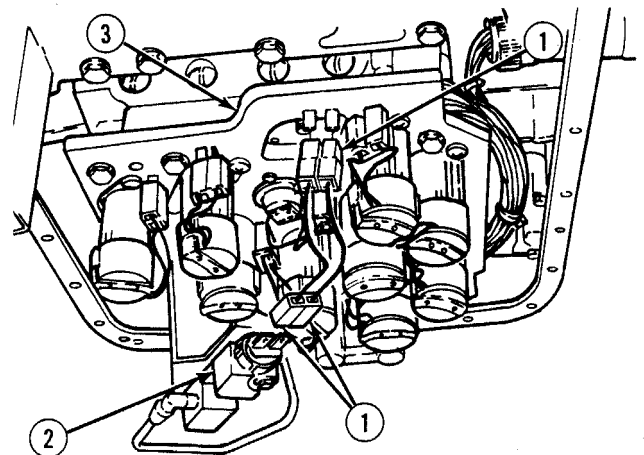
- (1) Disconnect two connectors (1) from low oil sensor switch (2).
- (2) Disconnect two connectors (1) from solenoid wire harness (3).

b. Installation.

- (1) Connect two connectors (1) on solenoid wire harness (3).
- (2) Connect two connectors (1) on low oil sensor switch (2).

c. Follow-On Maintenance:

- Install transmission oil filter element, (Para 7-4).



END OF TASK

7-7. TRANSMISSION SOLENOID REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Bit Set, Screwdriver (Item 17, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

Materials/Parts

Oil, Hydraulic (Item 34, Appendix B)
Tags, Identification (Item 72, Appendix B)
Packing, Preformed (Item 399, Appendix E)

Equipment Condition

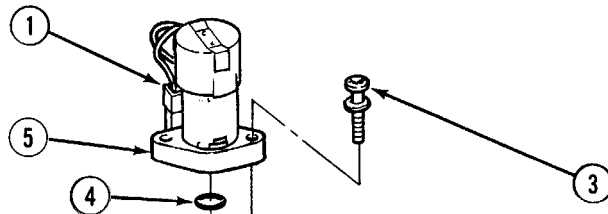
Transmission solenoid wiring harness
removed, (Para 7-2)

a. Removal.

NOTE

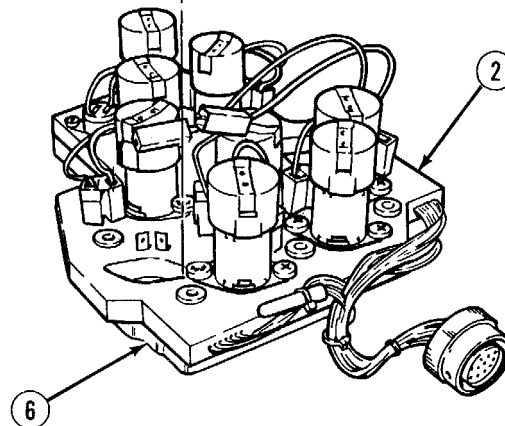
- There are two different types of solenoids; six are the same, three are the same.
- All nine solenoids are removed and installed the same way.
- Tag, mark and note the position of solenoids and connectors prior to removal.

- (1) Disconnect connector (1) from solenoid harness assembly (2).
- (2) Remove two screws and washers (3), preformed packing (4) and solenoid (5) from solenoid plate (6). Discard preformed packing.



b. Installation.

- (1) Apply hydraulic oil to preformed packing (4).
- (2) Install preformed packing (4), solenoid (5) and two screws and washer (3) on solenoid plate (6). Tighten screws to 84 to 108 lb-in (9 to 12 N·m).
- (3) Connect connector (1) on solenoid harness assembly (2).



c. Follow-On Maintenance:

- Install transmission solenoid wiring harness, (Para 7-2).

END OF TASK

7-8. TRANSMISSION SOLENOID PRESSURE SWITCH REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Bit Set, Screwdriver (Item 17, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

Materials/Parts

Oil, Hydraulic (Item 34, Appendix B)
Tags, Identification (Item 72, Appendix B)
Packing, Preformed (Item 400, Appendix E)

Equipment Condition

Transmission solenoid wiring harness removed,
(Para 7-2)

a. *Removal.*

NOTE

- Both pressure switches are removed and installed the same way. Reverse pressure switch shown.
- Tag, mark and note position of each pressure switch prior to removal.

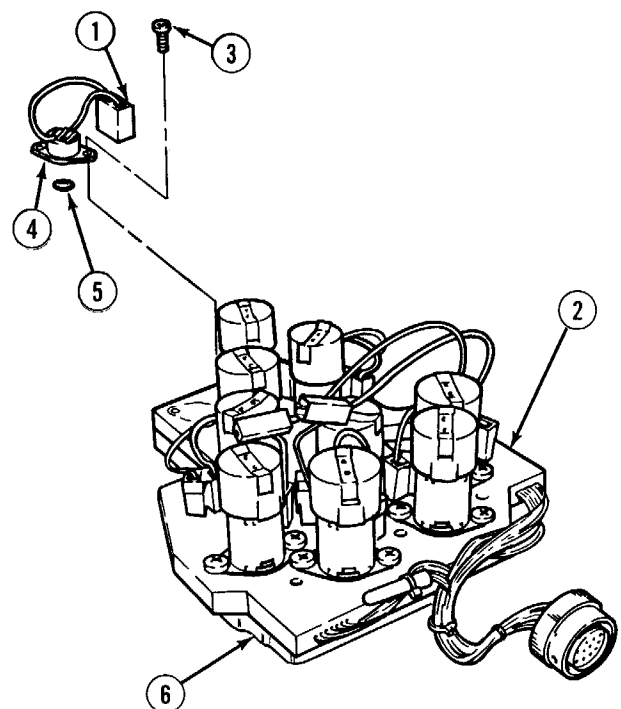
- (1) Disconnect connector (1) from solenoid wire harness assembly (2).
- (2) Remove two screws (3), pressure switch (4) and preformed packing (5) from solenoid plate (6). Discard preformed packing.

b. *Installation.*

- (1) Apply hydraulic oil to preformed packing (5).
- (2) Install preformed packing (5), pressure switch (4) and two screws (3) on solenoid plate (6). Tighten screws to 60 to 84 lb-in (7 to 9 N·m).
- (3) Connect connector (1) on solenoid wire harness assembly (2).

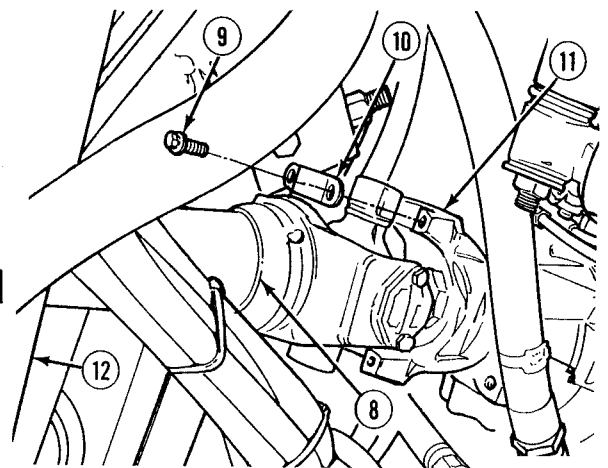
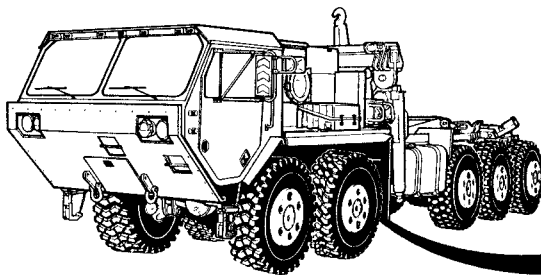
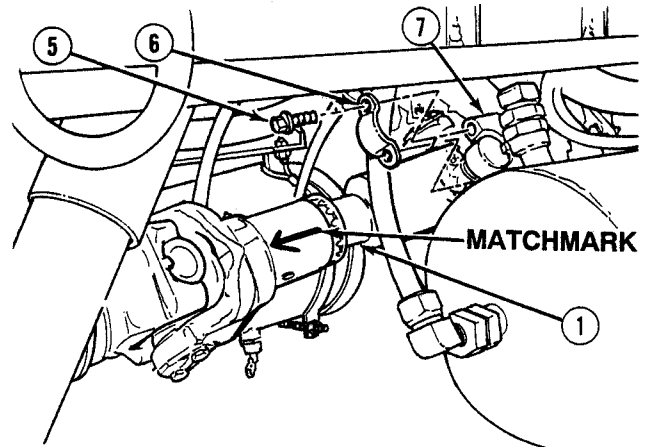
c. *Follow-On Maintenance:*

- Install transmission solenoid wiring harness, (Para 7-2).



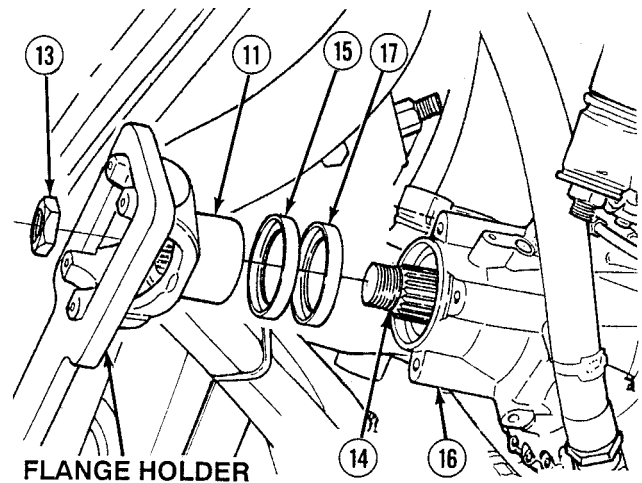
END OF TASK

- (3) Support driveshaft (1) and remove four screws (5), two bearing straps (6) and driveshaft from lower transfer case yoke (7). Lower driveshaft to ground.



- (4) Support driveshaft (8) and remove four screws (9), two bearing straps (10) and driveshaft from transmission yoke (11). Position driveshaft on crossmember (12).

- (5) Position drain pan under transmission yoke (11).
- (6) Using flange holder to hold transmission yoke (11), remove locknut (13) and transmission yoke from output shaft (14). Discard locknut.
- (7) Remove dust shield (15) and oil seal (17) from rear cover (16). Discard dust shield and oil seal.



7-9. TRANSMISSION YOKE/DUST SHIELD/OIL SEAL REPLACEMENT (CONT).

b. Installation.

- (1) Coat sealing lip of oil seal (17) with high temperature grease.

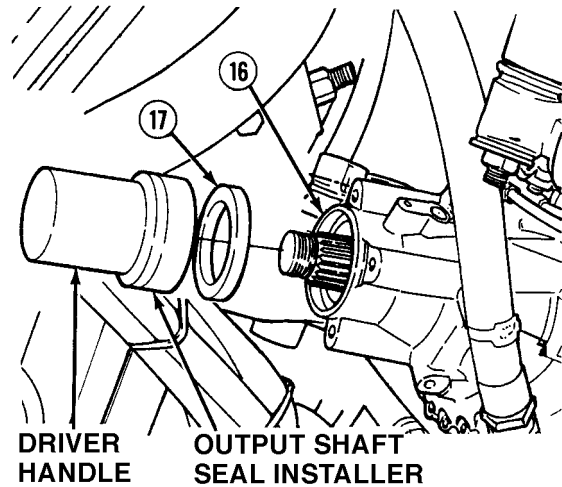
NOTE

Install oil seal until oil seal installer lip contacts rear cover.

- (2) Using driver handle and output shaft seal installer, install oil seal (17) lip first, in rear cover (16).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (3) Coat outer surface of dust shield (15) with adhesive (RTV 108).

NOTE

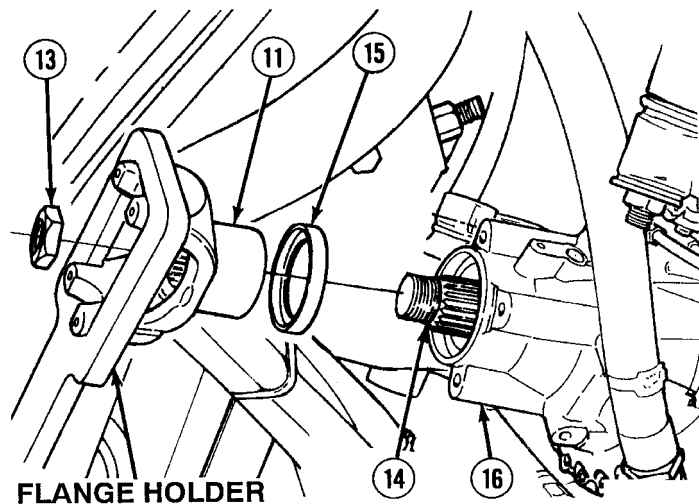
- Install dust shield in rear cover until rear edge of dust shield is flush with surface of rear cover.
- Dust shield is installed in rear cover flat side first.

- (4) Install dust shield (15) in rear cover (16).

- (5) Coat splines of output shaft (14) with adhesive (RTV 732).

- (6) Position transmission yoke (11) on output shaft (14).

- (7) With the aid of an assistant, use flange holder to hold transmission yoke (11), install locknut (13) on output shaft (14). Tighten locknut to 700 lb-ft (949 N·m).

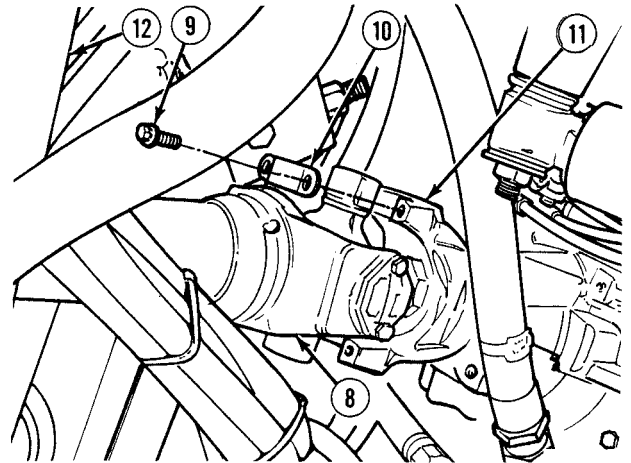


- (8) Remove driveshaft (8) from crossmember (12) and position driveshaft on transmission yoke (11).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (9) Apply sealing compound to threads of four screws (9).
- (10) Install two bearing straps (10), four screws (9) and driveshaft (8) on transmission yoke (11). Tighten screws to 130 lb-ft (176 N·m).



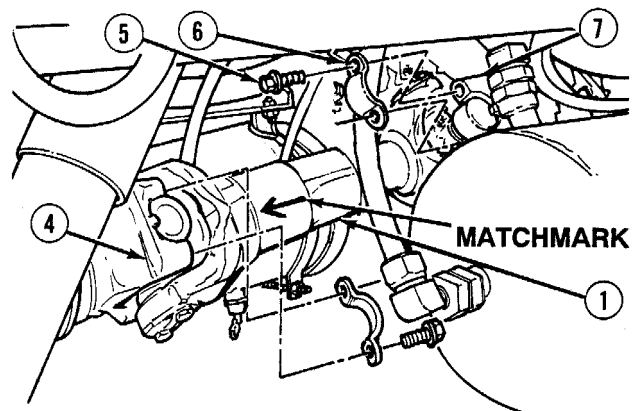
WARNING

Driveshaft weighs 90 lbs (41 kg). The aid of an assistant is required to prevent possible injury to personnel.

NOTE

Driveshaft should be installed with arrow mark on shaft pointing toward front of truck.

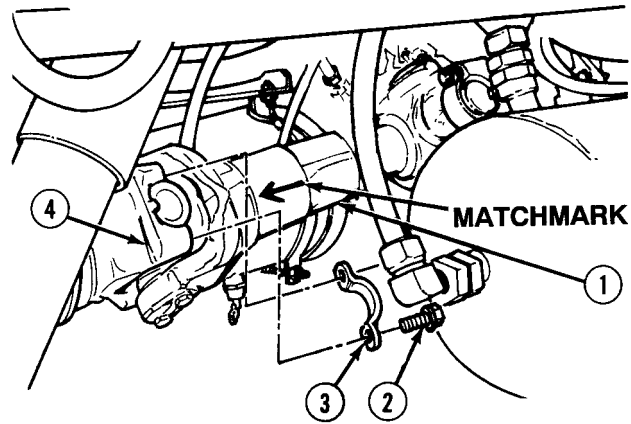
- (11) With the aid of an assistant, position driveshaft (1) in lower transfer case yoke (7) and Axle No. 2 yoke (4).
- (12) Apply sealing compound to the threads of four screws (5).
- (13) Install four screws (5), two bearing straps (6) and driveshaft (1) on transfer case yoke (7). Tighten to 130 lb-ft (176 N·m).



7-9. TRANSMISSION YOKE/DUST SHIELD/OIL SEAL REPLACEMENT (CONT).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (14) Apply sealing compound to threads of four screws (2).
- (15) Install four screws (2), two bearing straps (3) and driveshaft (1) on Axle No. 2 yoke (4). Tighten screws to 130 lb-ft (176 N·m).

c. *Follow-On Maintenance:*

- Install right side skirt, (TM 9-2320-364-20).
- Check and fill transmission oil, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

7-10. FLYWHEEL AND TORQUE CONVERTER TURBINE REPAIR.

This task covers:

- | | | |
|----------------|------------------------|--------------------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | f. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Compressor Unit, Air (Item 35 Appendix F)
Gloves, Chemical Oil Protective
(Item 81, Appendix F)
Goggles, Industrial (Item 83, Appendix F)
Gun, Airblow (Item 86, Appendix F)
Lifting Bracket (Item 136, Appendix F)
Pan, Drain 4 gal (Item 144, Appendix F)
Pin, Guide (2) (Item 146, Appendix F)
Puller Kit, Universal, Slide Hammer
(Item 175, Appendix F)
Rule, Steel, Machinist (Item 197, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)
Lifting Device, Minimum Capacity 200 lb
(91 kg)
Wooden Blocks (2) (Appendix C)

Materials/Parts

Cloth, Cleaning (Item 11, Appendix B)
Grease (Item 22, Appendix B)
Oil, Hydraulic (Item 34, Appendix B)
Rags, Wiping (Item 47, Appendix B)
Solvent, Drycleaning (Item 68, Appendix B)
Gasket (Item 105, Appendix E)
Gasket (Item 109, Appendix E)
Key (2) (Item 139, Appendix E)
Ring, Seal (Item 507, Appendix E)
Screw (2) (Item 542, Appendix E)
Screw, Self-Locking (30) (Item 555, Appendix E)
Seal Ring (Item 612, Appendix E)
Seal Ring (Item 613, Appendix E)

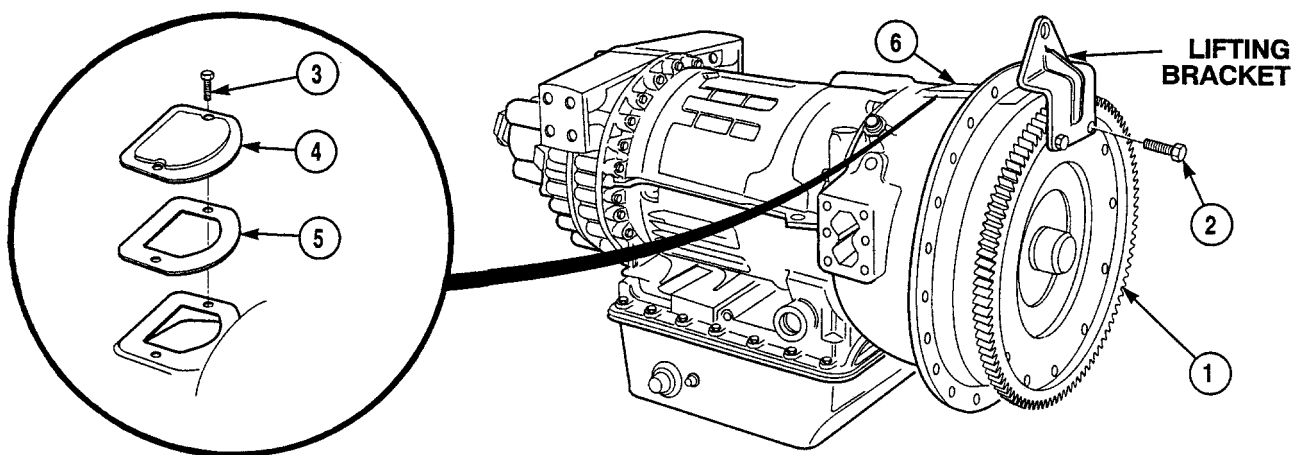
Personnel Required

Two

Equipment Condition

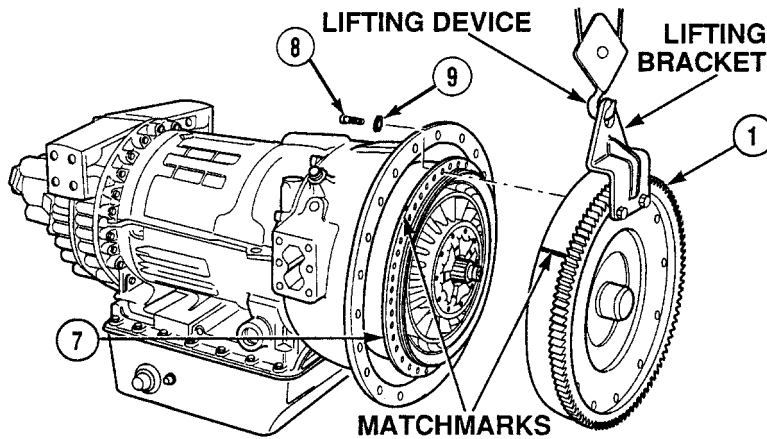
Transmission separated from engine, (Para 3-5)

a. Removal.



- (1) Position drain pan under flywheel (1).
- (2) Install lifting bracket on flywheel (1) with two screws (2).
- (3) Remove two screws (3), access cover (4) and gasket (5) from converter housing (6). Discard gasket.

7-10. FLYWHEEL AND TORQUE CONVERTER TURBINE REPAIR (CONT).



- (4) Matchmark flywheel (1) and converter pump (7).

WARNING

Ensure one screw is left in place behind lifting bracket in flywheel. Screw is intended to secure flywheel until lifting device is in place. Failure to comply may result in serious injury to personnel and damage to equipment.

NOTE

Use flywheel lifting bracket to turn flywheel for access to screws inside converter housing.

- (5) Remove 29 of 30 screws (8) and washers (9) from flywheel (1). Discard screws.

WARNING

Flywheel weighs 175 lbs (79 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

- (6) Install lifting device to lifting bracket.
 (7) Remove remaining screw (8) and washer (9). Discard screw and washer.

WARNING

During flywheel removal, torque converter turbine can remain attached to flywheel or remain on transmission. Use care to prevent torque converter turbine from falling. If torque converter turbine stays attached to flywheel, lockup clutch may fall out of transmission. Use care to prevent lockup clutch from falling. Failure to comply may result in serious injury to personnel and damage to equipment may occur.

- (8) With the aid of an assistant, remove flywheel (1) from converter pump (7).

- (9) Position flywheel (1) on wooden blocks with torque converter turbine (10) facing upward.

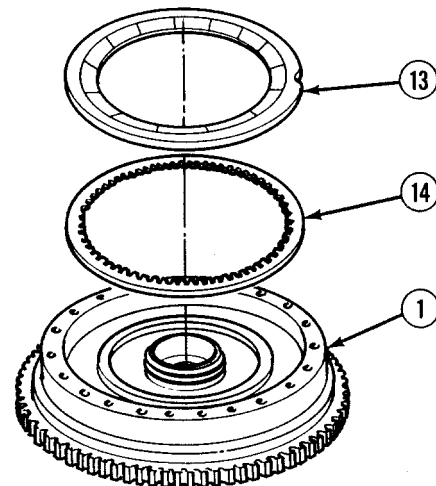
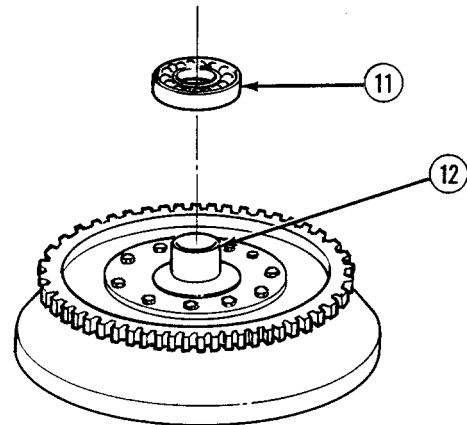
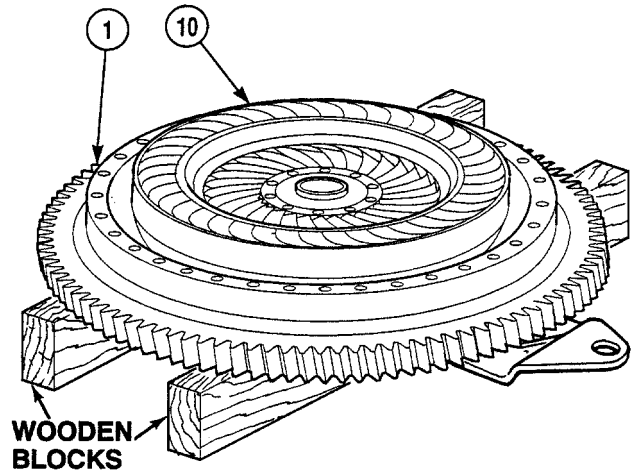
CAUTION

Torque converter turbine must be evenly pried up and off of flywheel. Use wiping rags at two pry points to prevent scoring or other damage to torque converter turbine or flywheel.

- (10) Remove torque converter housing (10) from flywheel (1).

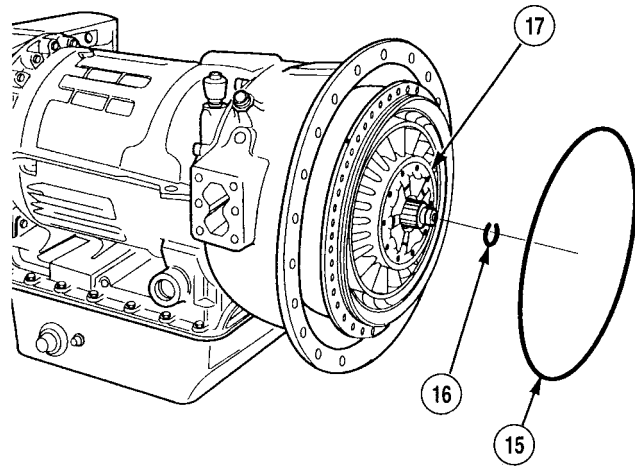
- (11) Position torque converter housing (10) with bearing (11) facing upward and, using two-jaw puller, remove bearing (11) from torque converter turbine hub (12).

- (12) Remove backplate (13) and lockup clutch plate (14) from flywheel (1).

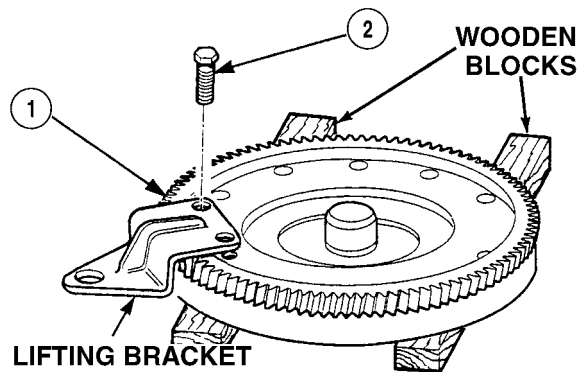


7-10. FLYWHEEL AND TORQUE CONVERTER TURBINE REPAIR (CONT).

- (13) Remove and discard torque converter gasket (15) and turbine shaft seal ring (16) from converter pump (17).



- (14) With the aid of an assistant, turn flywheel (1) over so that lifting bracket is facing upward.
- (15) Remove two screws (2) and lifting bracket from flywheel (1).



b. *Disassembly.*

NOTE

Keys may need to be tapped out of flywheel with chisel.

- (1) Remove two keys (1) from flywheel (2). Discard keys.
- (2) With the aid of an assistant, position flywheel (2) on blocks with piston (3) facing up.

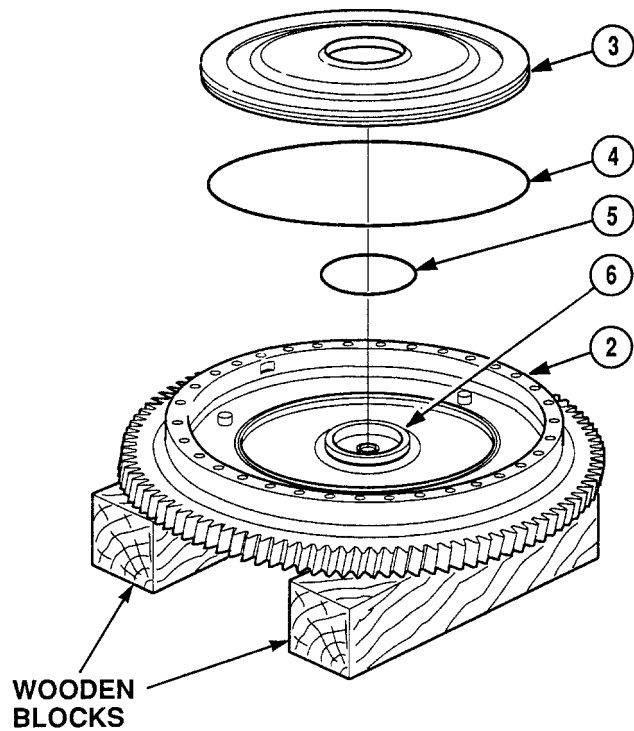
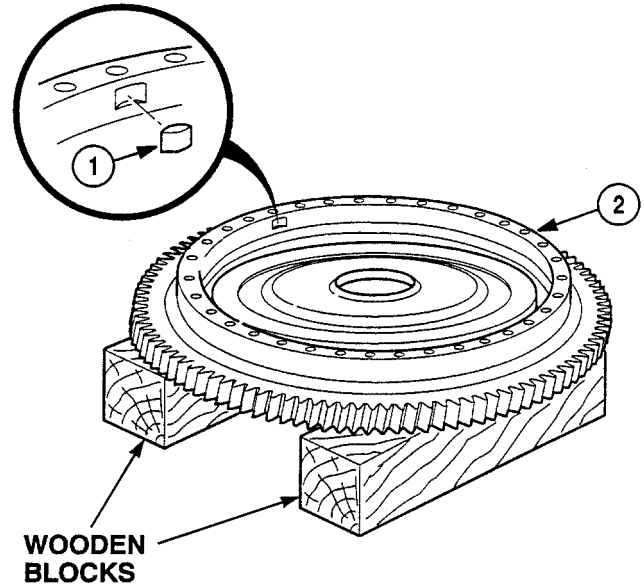
WARNING

Flywheel weighs 175 lbs (79 kg). Use extreme caution when dropping flywheel. Keep feet and hands out from under flywheel to avoid injury to personnel.

NOTE

Perform Step (3) until piston is removed from flywheel.

- (3) With the aid of an assistant, lift flywheel (2) approximately one ft (30.5 cm) and drop flywheel (2) on wooden blocks to remove piston (3) from flywheel.
- (4) With the aid of an assistant, turn flywheel (2) over and place on wooden blocks.
- (5) Remove and discard seal ring (4) from piston (3).
- (6) Remove and discard seal ring (5) from flywheel hub (6).



7-10. FLYWHEEL AND TORQUE CONVERTER TURBINE REPAIR (CONT).

c. Cleaning/Inspection.

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- (1) Clean all metal parts with drycleaning solvent P-D-680.

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 or death to personnel.

- (2) Dry all parts, except for bearings, with compressed air.

CAUTION

Keep bearings clean. The presence of dirt or grit on bearing rollers/balls is usually responsible for bearing failures, it is important to keep bearings clean during removal, inspection, and installation. To make sure maximum bearing life, do not remove wrapper from new or clean used bearings until ready to install them. Do not remove grease in which bearings are packed. Do not lay bearings on a dirty bench; place them on a clean lint-free paper.

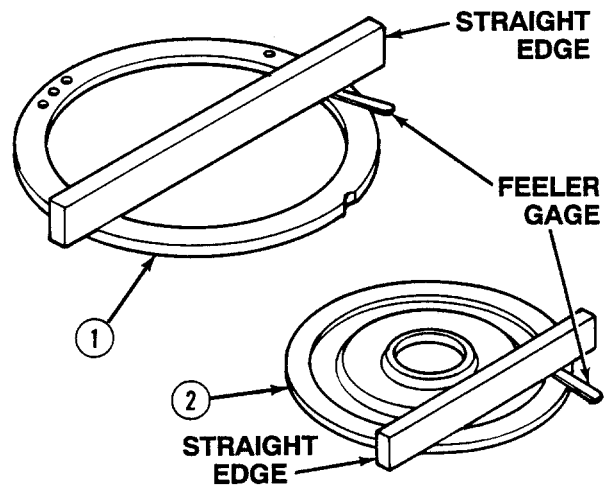
- (3) Inspect bearings for roughness of rotation. Replace bearing if its rotation is still rough after cleaning and oiling.
- (4) Inspect torque converter turbine for cracks, gouges, wear or binding. Replace torque converter turbine if damaged.
- (5) Inspect lockup clutch plate for uneven wear or signs of overheating. Replace if damaged.
- (6) Measure thickness of lockup clutch plate. Replace if less than 0.19 in. (4.83 mm) thick.

- (7) Place straight edge on backplate (1) and insert feeler gage. Measure gap between straight edge and backplate. If feeler gage larger than 0.010 in. (0.254 mm) will fit under straight edge, replace backplate.

NOTE

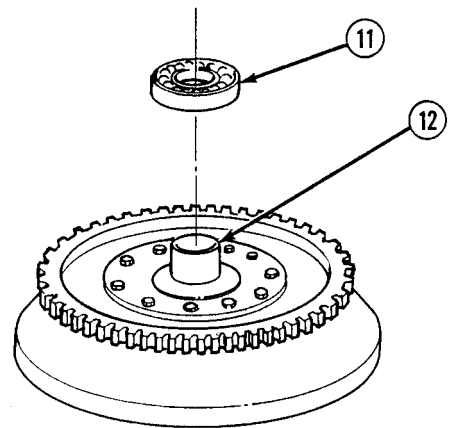
If assembly is not going to be completed at once, wrap or cover the exposed bearings with clean paper or clean cloth to keep out dust.

- (8) Place straight edge on piston (2) and insert feeler gage. Measure gap between straight edge and piston. If feeler gage larger than 0.010 in. (.254 mm) will fit under straight edge, replace piston.



d. Assembly.

- (1) Coat torque converter turbine hub (12) and bearing (11) with hydraulic oil.
- (2) Install bearing (11) on torque converter turbine hub (12).



7-10. FLYWHEEL AND TORQUE CONVERTER TURBINE REPAIR (CONT).

- (3) Coat outside of flywheel hub (6) and seal ring (5) with grease and install in flywheel hub.
- (4) Apply hydraulic oil to outer groove of piston (3) and seal ring (4) and install seal ring in piston (3).

NOTE

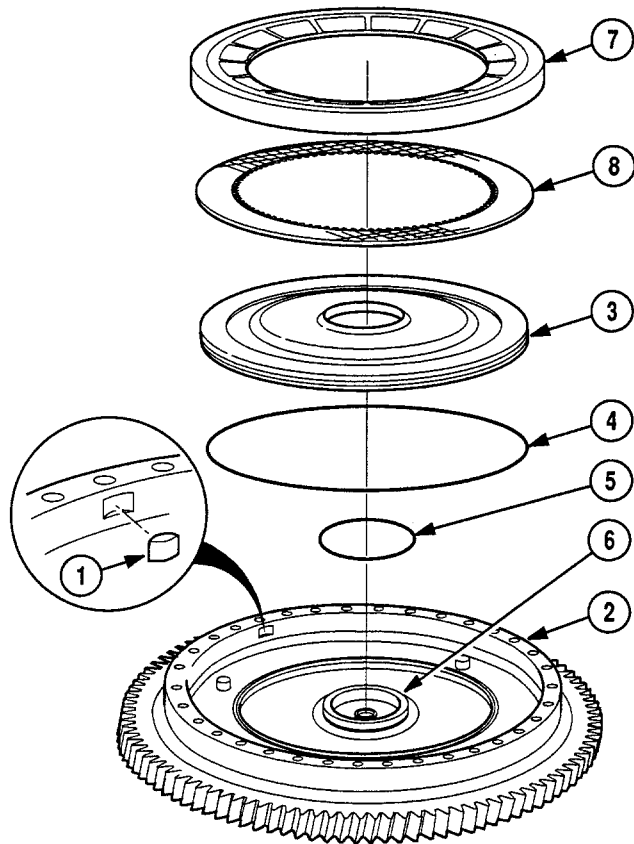
Ensure oil hole is positioned in center of key slot.

- (5) Apply hydraulic oil to inner hub of piston (3) and to piston seal surface of flywheel (2).
- (6) Position piston (3) in flywheel (2) and align six holes in piston with six pins on flywheel (2). Ensure piston (3) is seated firmly on pins.

CAUTION

Use extreme care when installing keys in flywheel or damage to parts may occur.

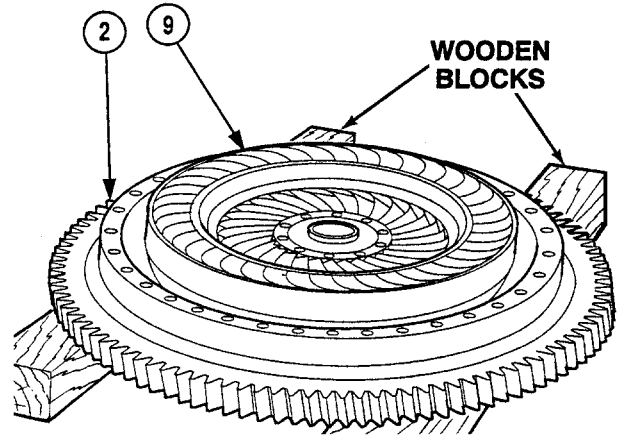
- (7) Install two keys (1) in flywheel (2).
- (8) Soak clutch plate (8) in hydraulic oil for a minimum of two minutes and install in flywheel (2).
- (9) Align notch in backplate (7) with key (1) and install in flywheel (2).



CAUTION

Hub splines on torque converter turbine must be lined up with internal splines of lockup clutch plate before installation or damage may result.

- (10) Install torque converter turbine (9) in flywheel (2).

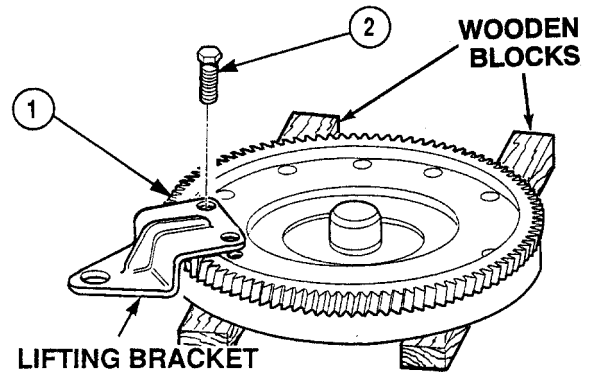


e. Installation.

- (1) Install flywheel lifting bracket securely to flywheel (1) with two screws (2).

CAUTION

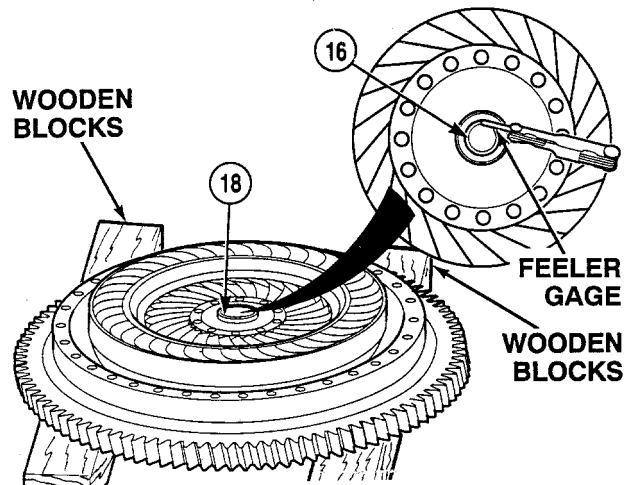
Seal ring is in air tight package. Do not open package until ready to install seal ring. Seal ring will expand from humidity which will cause clutch piston cavity to leak and cause clutch slippage.



NOTE

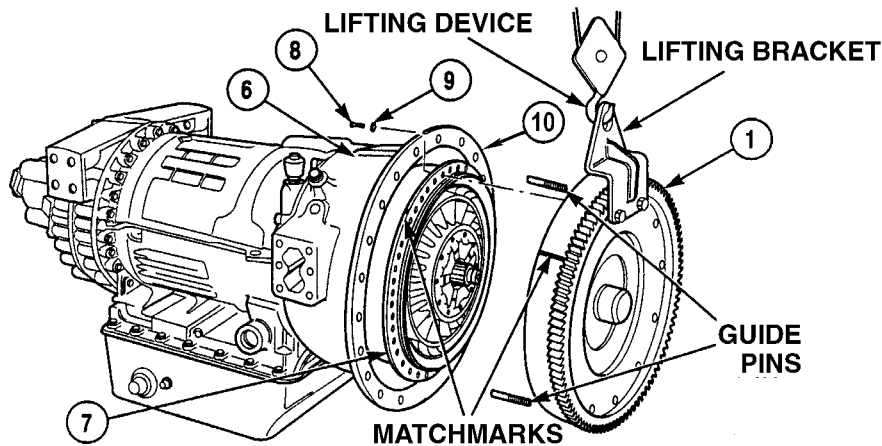
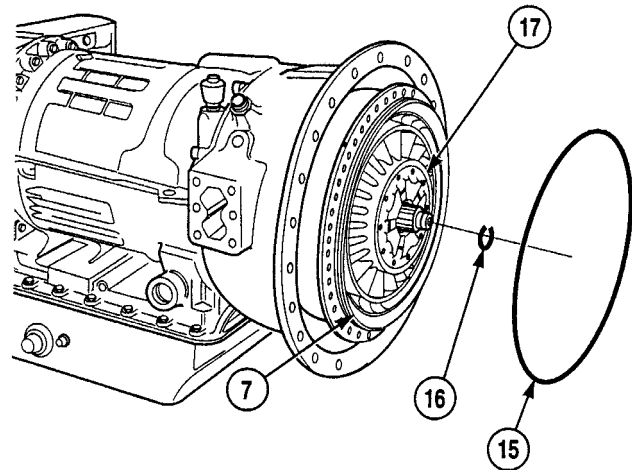
If end clearance is less than 0.010 in. (0.25 mm), discard seal ring and repeat Step (2).

- (2) Position seal ring (16) in flywheel hub (18) and measure end clearance. Remove seal ring (16).



7-10. FLYWHEEL AND TORQUE CONVERTER TURBINE REPAIR (CONT).

- (3) Pack turbine shaft seal ring groove (17) with grease and install seal ring (16) in groove.
- (4) Coat torque converter gasket (15) with hydraulic oil and install on converter pump (7).

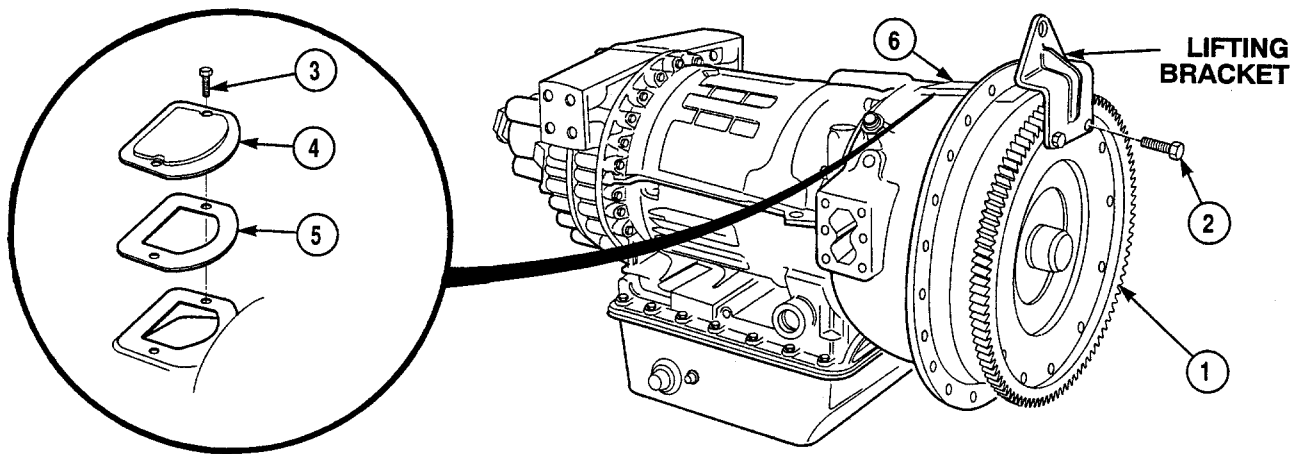


- (5) Install two guide pins into flywheel (1) mounting holes.

WARNING

Flywheel weighs 175 lbs (79 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (6) With the aid of an assistant, lift and align flywheel (1) on converter pump (7).
- (7) Position washer (9) and screw (8) through access hole in converter housing (10).
- (8) Remove lifting device from lifting bracket.
- (9) Remove guide pins from flywheel (1).
- (10) Using lifting bracket as an aid to turn flywheel (1), position 29 washers (9) and screws (8) through access hole in converter housing (6).
- (11) Tighten 30 screws (8) to 41 to 49 lb-ft (56 to 66 N·m).



(12) Remove two screws (2) and flywheel lifting bracket from flywheel (1).

(13) Install gasket (5) and access cover (4) on converter housing (6) with two screws (3). Tighten screws to 26 to 32 lb-ft (35 to 43 N·m).

f. Follow-On Maintenance:

- Attach transmission to engine, (Para 3-5).

END OF TASK

7-11. SHIPPING CONTAINER, TRANSMISSION ASSEMBLY REPLACEMENT.

This task covers:

- | | | |
|-------------------------------------------------|---------------------------------------|--------------------------|
| a. Upper Container Removal | c. Transmission Assembly Installation | e. Follow On Maintenance |
| b. Transmission Assembly Removal From Container | Into Container | |
| | d. Upper Container Installation | |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)
Lifting Device, Minimum Capacity 1061 lbs
(482 kg)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Gasket (Item 56, Appendix E)

Materials/Parts - continued

Locknut (24) (Item 199, Appendix E)
Lockwasher (12) (Item 288, Appendix E)
Lockwasher (8) (Item 289, Appendix E)

Personnel Required

Two

Equipment Condition

Transmission separated from engine, (Para 3-5)

a. Upper Container Removal.

WARNING

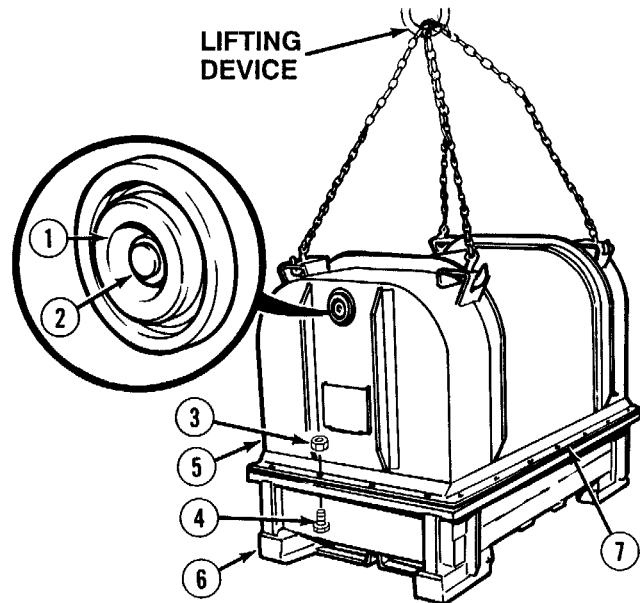
Release air pressure prior to opening container or injury to personnel could result.

- (1) Release air pressure at breather valve (1) by pressing air release button (2).
- (2) Remove 22 nuts (3) and screws (4) from upper and lower container (5) and (6).

WARNING

Upper container weighs 222 lbs (101 kg). Attach lifting device prior to removal to prevent injury to personnel.

- (3) With the aid of an assistant, attach lifting device to upper container (5).
- (4) Remove upper container (5) from lower container (6).
- (5) Remove and discard gasket (7) from lower container (6).
- (6) Remove lifting device from upper container (5).

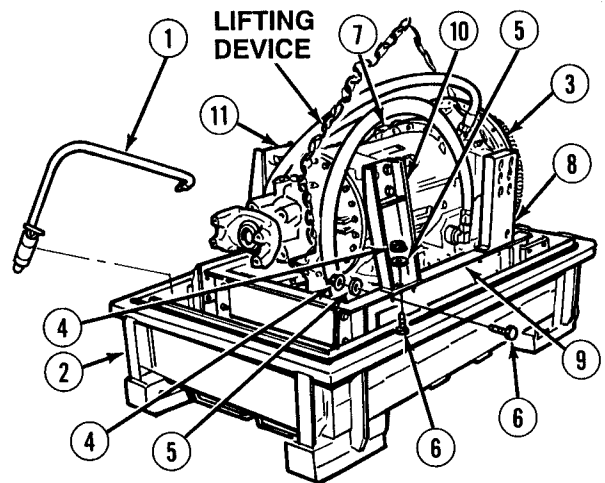


b. *Transmission Assembly Removal From Container.*

NOTE

- Remove cable ties as required.
- Note location of dipstick prior to removal from container.

- (1) Remove dipstick (1) from lower container (2).
- (2) With the aid of an assistant, attach lifting device to transmission assembly (3).



NOTE

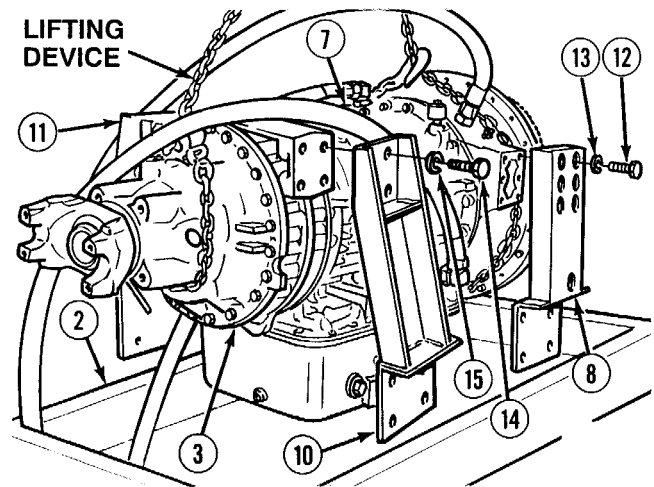
Note position of brackets prior to removal to assist in assembly.

- (3) Remove 12 locknuts (4), washers (5) and screws (6) from brackets (7) and (8) and inner frame side rails (9). Discard locknuts.
- (4) Remove 12 locknuts (4), washers (5) and screws (6) from brackets (10) and (11) and inner frame side rails (9). Discard locknuts.

WARNING

Transmission assembly weighs 1,061 lbs (482 kg). Attach lifting device prior to removal to prevent injury to personnel.

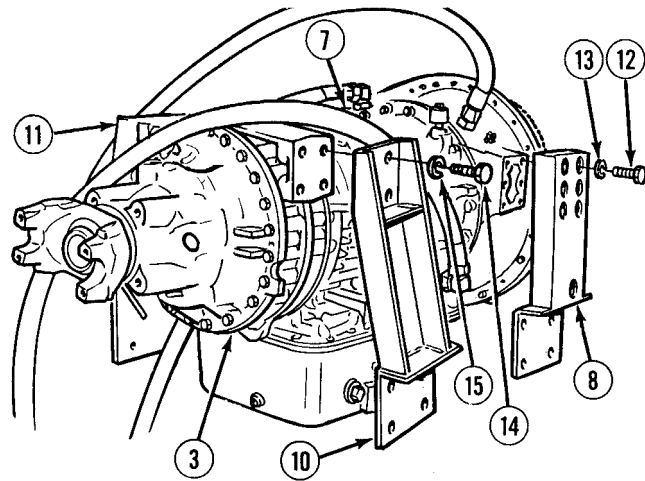
- (5) Remove transmission assembly (3) from lower container (2).
- (6) Remove 12 screws (12), lockwashers (13) and brackets (7) and (8) from transmission assembly (3). Discard lockwashers.
- (7) Remove eight screws (14), lockwashers (15) and brackets (10) and (11) from transmission assembly (3). Discard lockwashers.
- (8) Remove lifting device from transmission assembly (3).



7-11. SHIPPING CONTAINER, TRANSMISSION ASSEMBLY REPLACEMENT (CONT).

c. Transmission Assembly Installation Into Container.

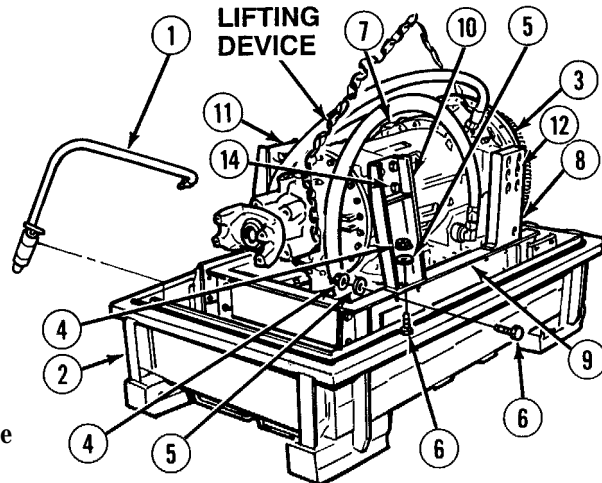
- (1) Position brackets (10) and (11) on transmission assembly (3) with eight lockwashers (15) and screws (14).
- (2) Position brackets (7) and (8) on transmission assembly (3) with 12 lockwashers (13) and screws (12).



WARNING

Transmission assembly weighs 1,061 lbs (482 kg). Attach lifting device prior to installation to prevent injury to personnel.

- (3) With the aid of an assistant, attach lifting device to transmission assembly (3) and lower transmission assembly into lower container (2).
- (4) Position brackets (10) and (11) on inner frame side rails (9) with 12 screws (6), washers (5) and locknuts (4).
- (5) Position brackets (7) and (8) on inner frame side rails (9) with 12 screws (6), washers (5) and locknuts (4).
- (6) Tighten locknuts (4) to 58 to 66 lb-ft (79 to 89 N·m).
- (7) Tighten screws (12) to 112 to 120 lb-ft (152 to 163 N·m).
- (8) Tighten screws (14) to 208 to 216 lb-ft (282 to 293 N·m).
- (9) Position dipstick (1) in lower container (2) and secure with cable ties as noted during removal.



d. *Upper Container Installation.*

- (1) Position gasket (7) on lower container (6).

WARNING

Upper container weighs 222 lbs (101 kg). Attach lifting device prior to installation to prevent injury to personnel.

- (2) Attach lifting device to upper container (5).

CAUTION

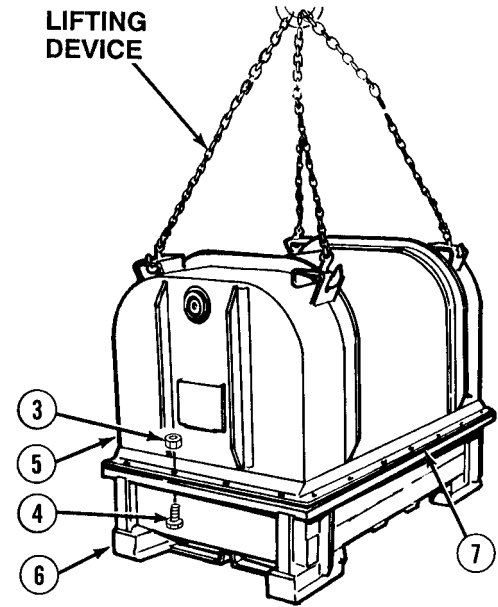
Ensure gasket is seated in place on lower container.

- (3) With the aid of an assistant, install upper container (5) on lower container (6) with 22 screws (4) and nuts (3). Tighten nuts to 52 to 60 lb-ft (71 to 81 N·m).

e. *Follow-On Maintenance:*

- Install transmission on engine, (Para 3-5).

END OF TASK



CHAPTER 8

TRANSFER CASE MAINTENANCE

Para	Contents	Page
8-1	Direct Support Transfer Case Maintenance Introduction	8-1
8-2	Transfer Case Assembly Replacement	8-2
8-3	Transfer Case Assembly Support Replacement	8-10
8-4	Transfer Case Yoke And Oil Seal Replacement	8-23
8-5	Transfer Case Lubrication Pump Replacement	8-27
8-6	Shipping Container, Transfer Case Assembly Replacement	8-29

8-1. DIRECT SUPPORT TRANSFER CASE MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for removing, replacing, installing and adjusting components of the transfer case on truck authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

8-2. TRANSFER CASE ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Cap and Plug Set (Item 26, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
- Lifting Device, Minimum Capacity 2000 lbs (908 kg)
- Washer (2) 1/2 in.
- Screw (2) 1/2 - 13 by 2 in.

Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Sealing Compound (Item 53, Appendix B)
- Sealing Compound (Item 54, Appendix B)

Materials/Parts - Continued

- Sealing Compound (Item 65, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Locknut (4) (Item 188, Appendix E)
- Lockwasher (2) (Item 282, Appendix E)

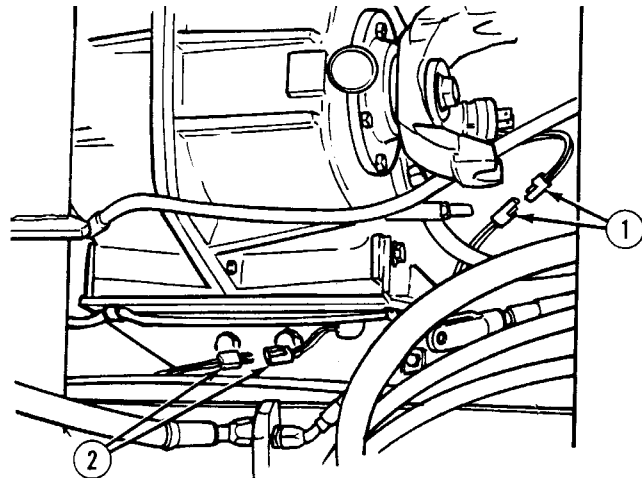
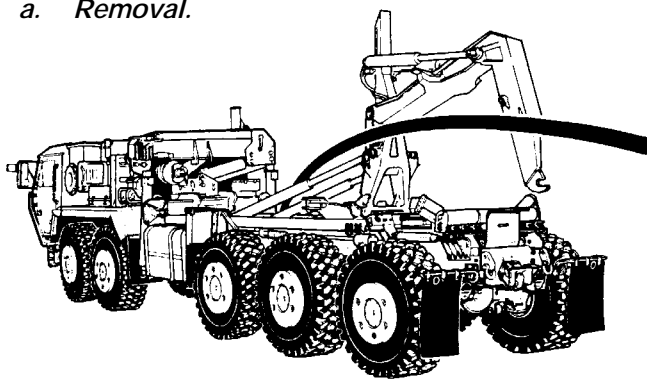
Personnel Required

Three

Equipment Condition

- LHS fully extended, (TM 9-2320-364-10)
- Transfer case in Neutral, (TM 9-2320-364-10)
- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Air system drained, (TM 9-2320-364-10)
- Shift cable disconnected, (TM 9-2320-364-20)
- Driveshaft disconnected, (TM 9-2320-364-20)
- Hoses and adapters disconnected from emergency steering pump, (TM 9-2320-364-20)
- Transfer case drained, (TM 9-2320-364-20)

a. Removal.



NOTE

- Remove cable ties as required.
- Connectors are removed by gently prying up on tabs.

(1) Disconnect transfer case sending unit connector (1).

(2) Disconnect MC57 connector (2).

CAUTION

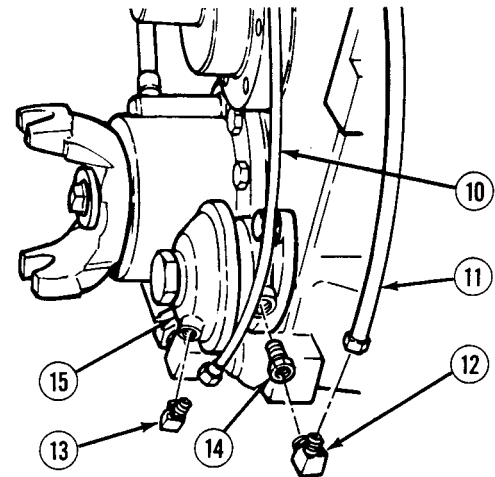
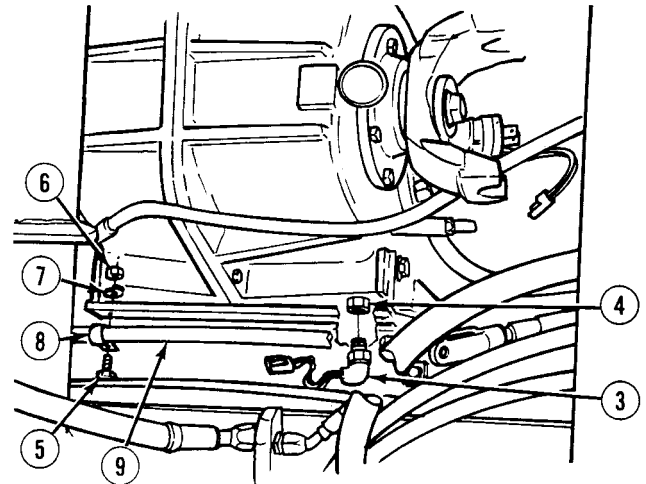
Neutral start switch is easily broken. Carefully remove this item using two wrenches. Do not remove adapter. Failure to comply may result in damage to equipment.

- (3) Remove neutral start switch (3) from adapter (4).
- (4) Remove two screws (5), nuts (6), lockwashers (7) and cushion clips (8) from hose 2815 (9). Discard lockwashers.
- (5) Disconnect air line 2923 (10) and air line 2874 (11) from elbows (12) and (13).

NOTE

Note location and position of elbows and adapters prior to removal.

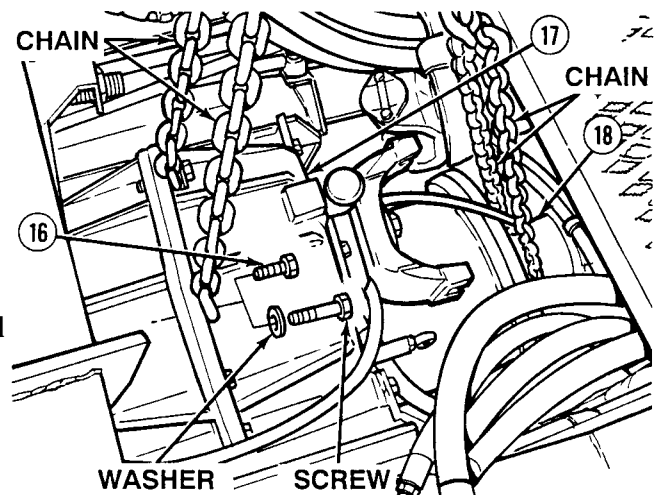
- (6) Remove elbow (12) from adapter (14).
- (7) Remove adapter (14) from air chamber (15).
- (8) Remove elbow (13) from air chamber (15).



WARNING

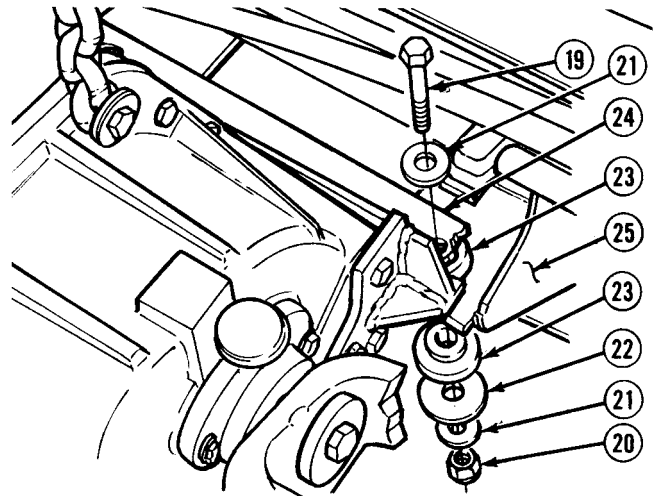
Transfer case weighs 1500 lbs (681 kg). Attach lifting device prior to removal to prevent possible injury to personnel.

- (9) Remove two screws (16) from transfer case (17).
- (10) Attach 6 ft (1.8 m) chain to transfer case (17) with two 1/2-13 by 2 in. screws and 1/2 in. washers. Tighten screws to 88 lb-ft (119 N·m).
- (11) Attach lifting device to chain.
- (12) Attach 6 ft (1.8 m) chain to front shaft assembly (18) and lifting device.



8-2. TRANSFER CASE ASSEMBLY REPLACEMENT (CONT).

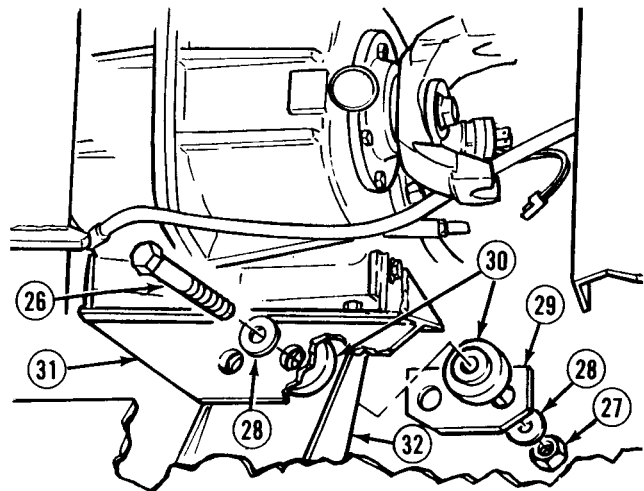
- (13) With the aid of an assistant, remove two screws (19), locknuts (20), four washers (21), two washers (22) and mounts (23) from left support assembly (24) and two brackets (25). Discard locknuts.



WARNING

Transfer case weighs 1500 lbs (681 kg). Attach lifting device prior to removal to prevent possible injury to personnel.

- (14) With the aid of an assistant, remove two screws (26), locknuts (27), four washers (28), plate (29) and two mounts (30) from right support assembly (31) and bracket (32). Discard locknuts.

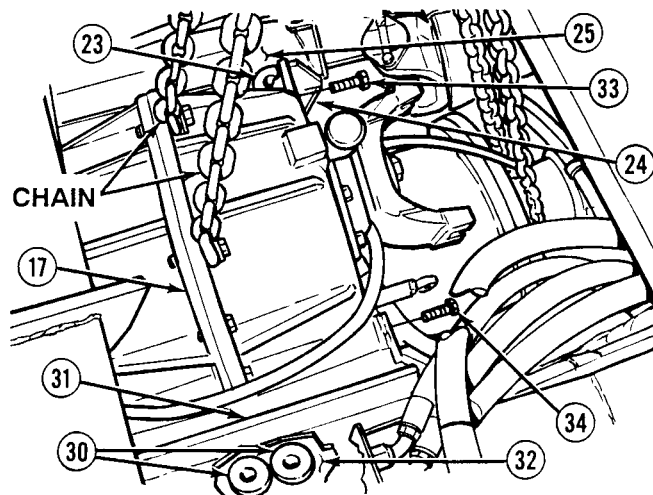


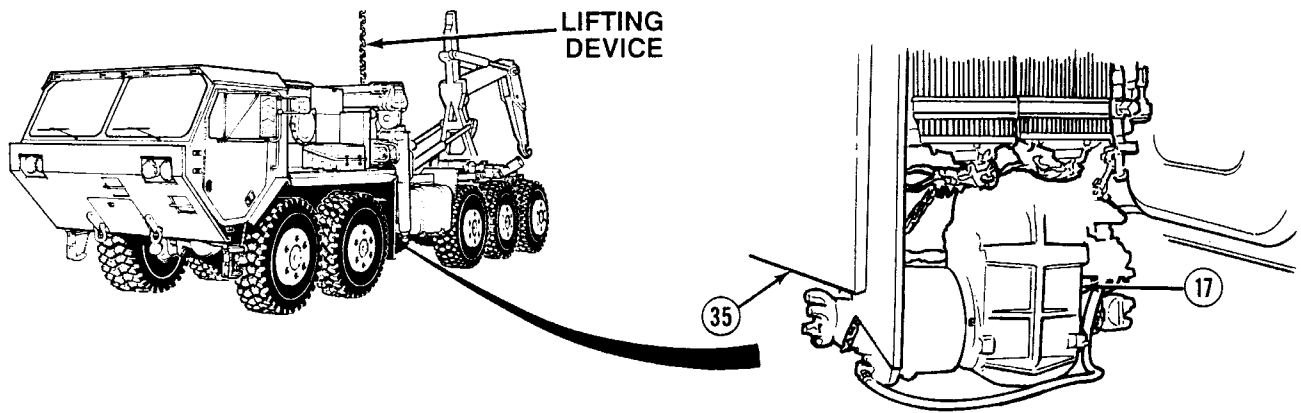
- (15) With the aid of an assistant, remove nine screws (33), three screws (34) and support assemblies (24) and (31) from transfer case (17).

NOTE

Perform Step (16) if mounts are damaged.

- (16) Remove mounts (23) and (30) from brackets (25) and (32). Discard mounts.





CAUTION

When removing transfer case, ensure transfer case does not contact other parts of truck. Failure to comply may result in damage to equipment.

NOTE

Transfer case must be on its side to be removed.

- (17) With the aid of an assistant, lower transfer case (17) and remove from truck (35).

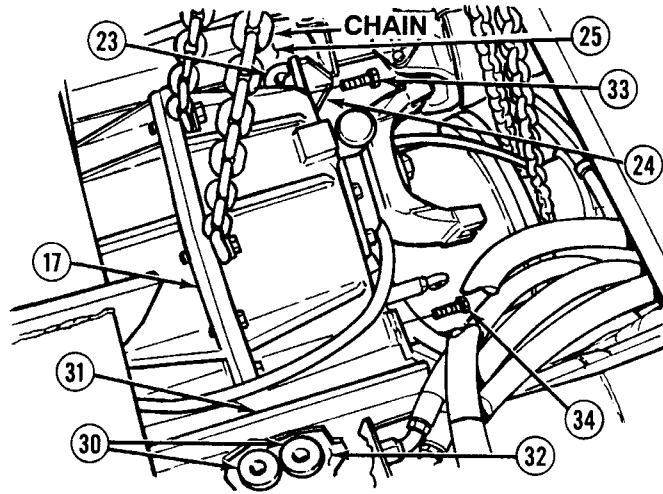
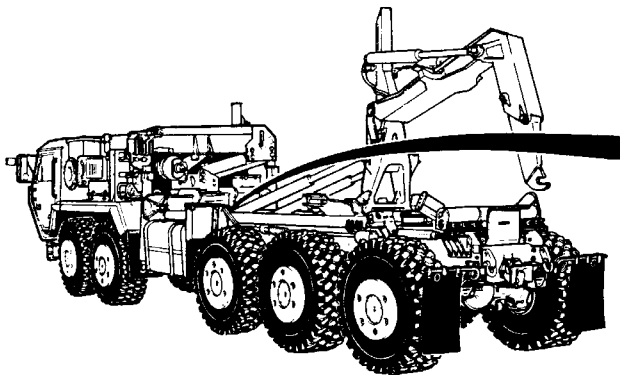
b. Installation.

WARNING

Transfer case weighs 1500 lbs (681 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (1) With the aid of an assistant, position transfer case (17) under truck (35) and attach lifting device.
- (2) With the aid of an assistant, raise transfer case (17) into position on truck (35).

8-2. TRANSFER CASE ASSEMBLY REPLACEMENT (CONT).



WARNING

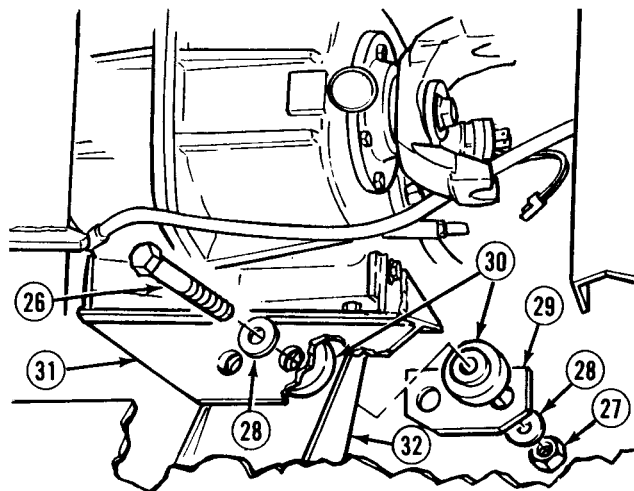
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (3) Coat threads of nine screws (33) and three screws (34) with sealing compound.

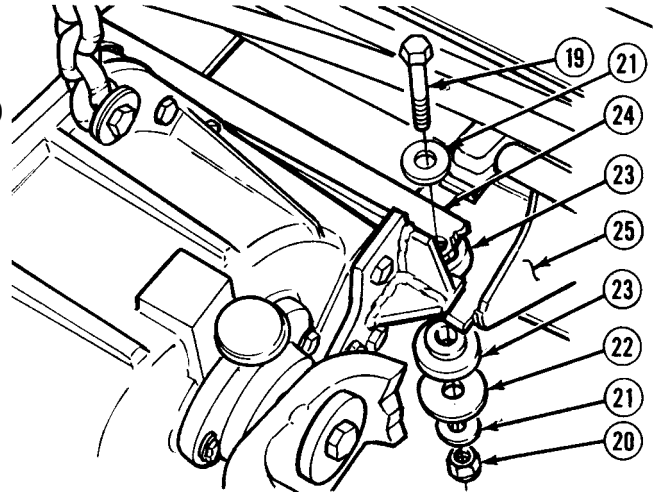
NOTE

Perform Step (4) if mounts were removed.

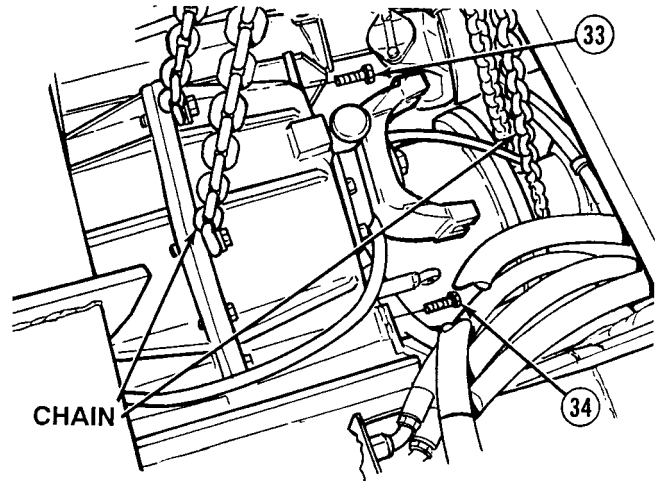
- (4) With the aid of an assistant, position mounts (23) and (30) in brackets (25) and (32).
- (5) With the aid of an assistant, position support assemblies (24) and (31) to transfer case (17) with nine screws (33) and three screws (34).
- (6) While assistant holds two screws (26), position right support assembly (31) to bracket (32) with two mounts (30), plate (29) four washers (28) and two locknuts (27).



- (7) While assistant holds two screws (19), position left support assembly (24) to two brackets (25) with mounts (23), washers (22) four washers (21) and two locknuts (20).
- (8) With the aid of an assistant, tighten locknuts (27) and (20) on screws (26) and (19) to 170 lb-ft (231 N·m).



- (9) Tighten nine screws (33) and three screws (34) to 187 lb-ft (254 N·m).

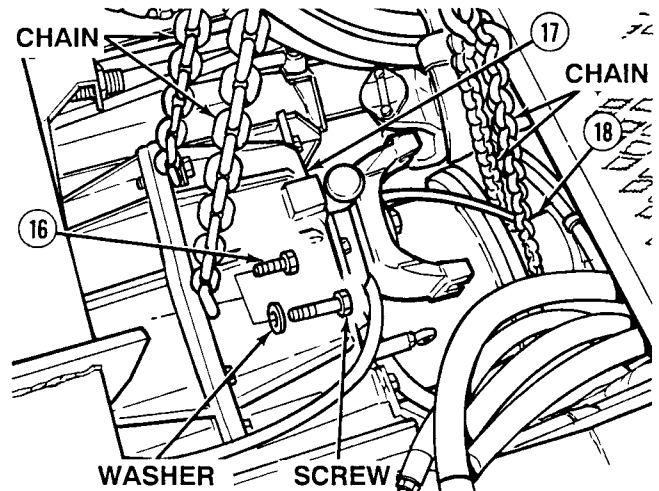


- (10) Remove lifting device, chains, two 1/2-13 by 2 in. screws and 1/2 in. washers from transfer case (17) and front shaft assembly (18).

WARNING

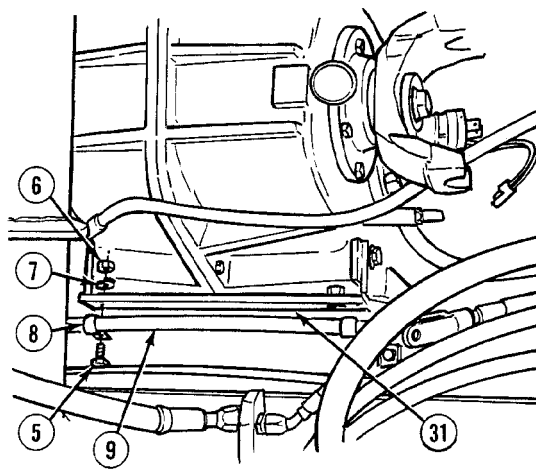
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (11) Coat threads of two screws (16) with sealing compound.
- (12) Install two screws (16) in transfer case (17).



8-2. TRANSFER CASE ASSEMBLY REPLACEMENT (CONT).

- (13) Install hose assembly 2815 (9) to right support assembly (31) with two cushion clips (8), screws (5), nuts (6) and lockwashers (7).



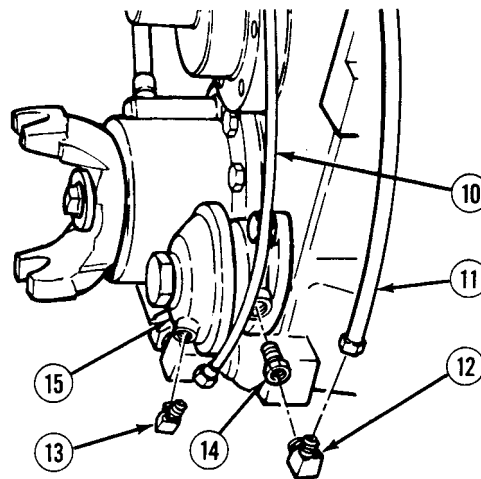
WARNING

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.

NOTE

Install elbows and adapter as noted prior to removal.

- (14) Coat threads of adapter (14) with sealing compound.
 (15) Install adapter (14) in air chamber (15).
 (16) Coat threads of elbow (13) with sealing compound.
 (17) Install elbow (13) in air chamber (15).
 (18) Coat threads of elbow (12) with sealing compound.
 (19) Install elbow (12) in adapter (14).
 (20) Connect air line 2923 (10) and air line 2874 (11) to elbows (13) and (12).



CAUTION

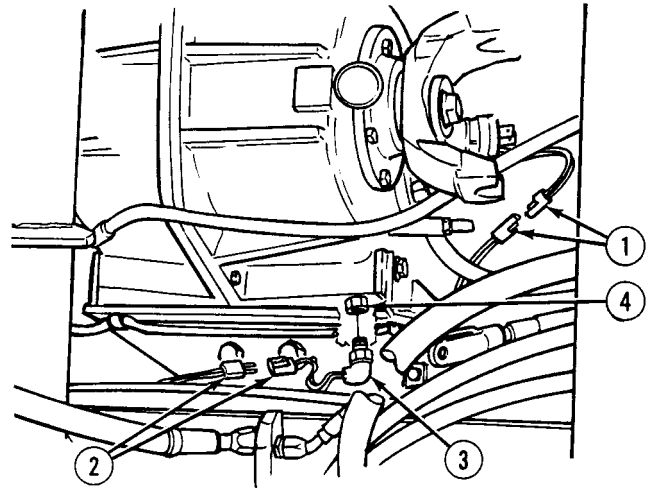
Neutral start switch is easily damaged. Install carefully using two wrenches. Failure to comply may result in damage to equipment.

- (21) Install neutral start switch (3) into adapter (4).

NOTE

Install cable ties as required.

- (22) Connect MC57 connector (2).
- (23) Connect transfer case sending unit connector (1).



c. Follow-On Maintenance:

- Connect hoses and adapters to emergency steering pump, (TM 9-2320-364-20).
- Connect driveshafts, (TM 9-2320-364-20).
- Connect shift cable, (TM 9-2320-364-20).
- Fill transfer case, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- LHS in transit position, (TM 9-2320-364-10).
- Shut OFF engine, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

8-3. TRANSFER CASE ASSEMBLY SUPPORT REPLACEMENT.

This task covers:

- a. Left Transfer Case Support Bracket Replacement
- b. Right Transfer Case Support Bracket Replacement
- c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Jack, Transmission (Item 131, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)

Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Sealing Compound (Item 54, Appendix B)
- Locknut (14) (Item 167, Appendix E)
- Locknut (4) (Item 188, Appendix E)

Materials/Parts - Continued

- Locknut (Item 210, Appendix E)
- Lockwasher (2) (Item 282, Appendix E)

Personnel Required

Two

Equipment Condition

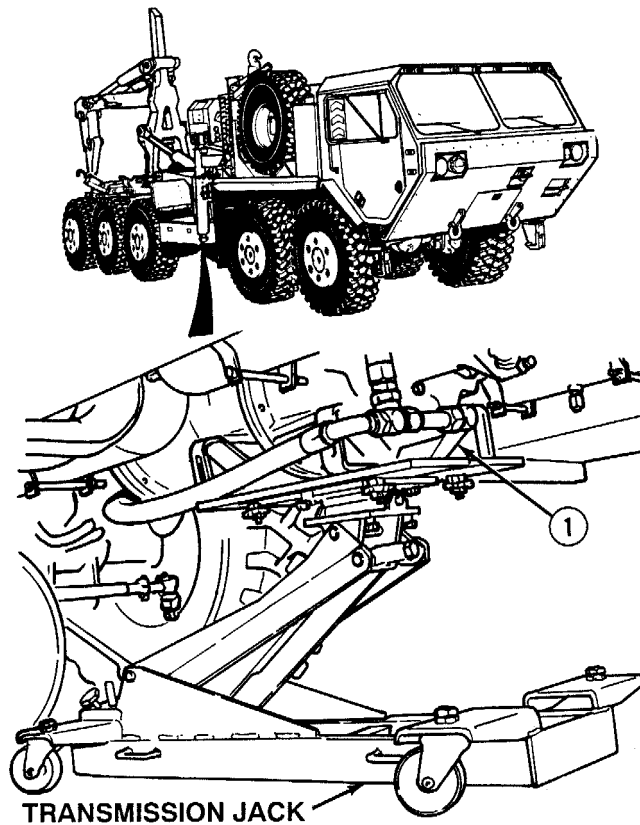
- Wheels chocked, (TM 9-2320-364-10)
- LHS fully extended, (TM 9-2320-364-10)
- Engine OFF, (TM 9-2320-364-10)
- Air system drained, (TM 9-2320-364-10)
- Auxiliary fuel tank removed (if equipped), (TM 9-2320-364-20)

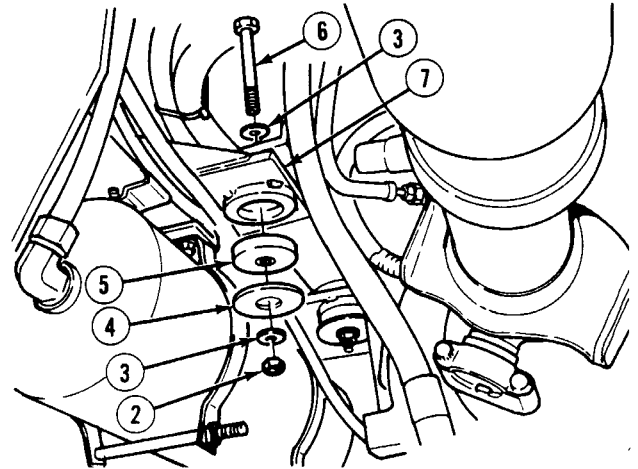
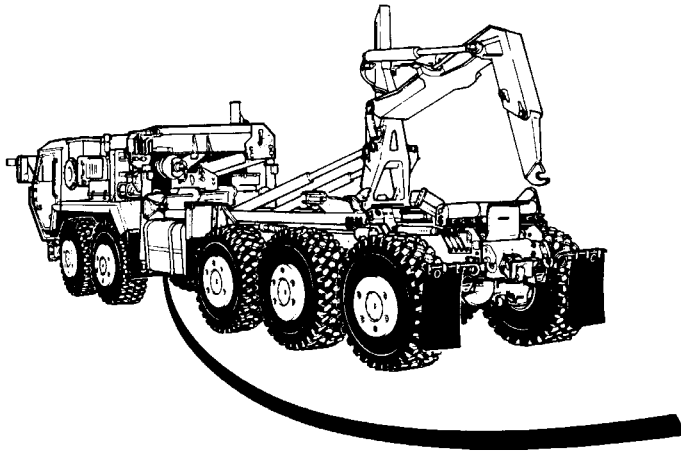
- a. *Left Transfer Case Support Bracket Replacement.*



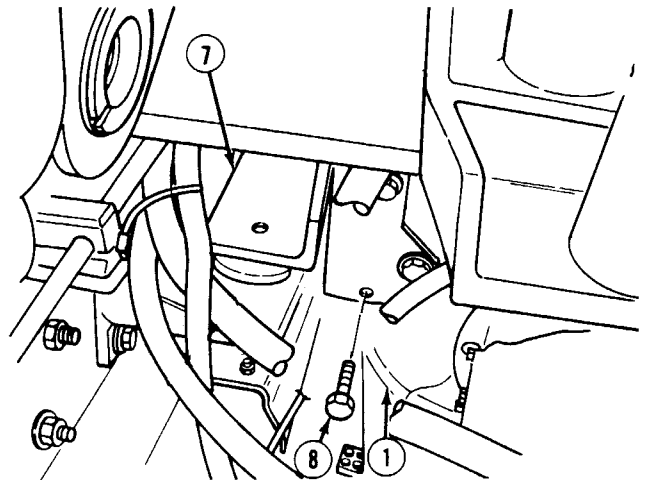
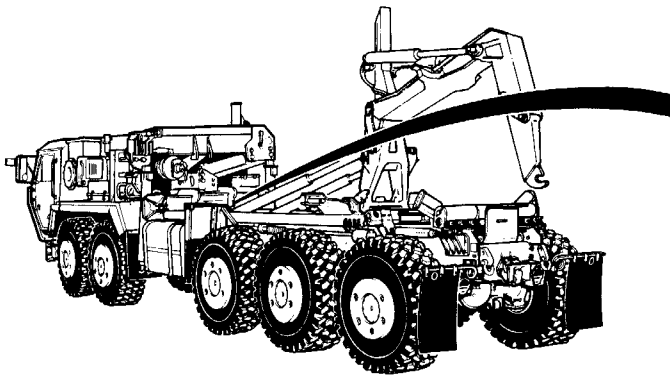
Remove and install one transfer case support bracket at a time. Removing both transfer case support brackets at same time will cause transfer case to fall causing damage to parts or severe injury or death to personnel.

- (1) *Removal.*
 - (a) Position transmission jack under transfer case (1).





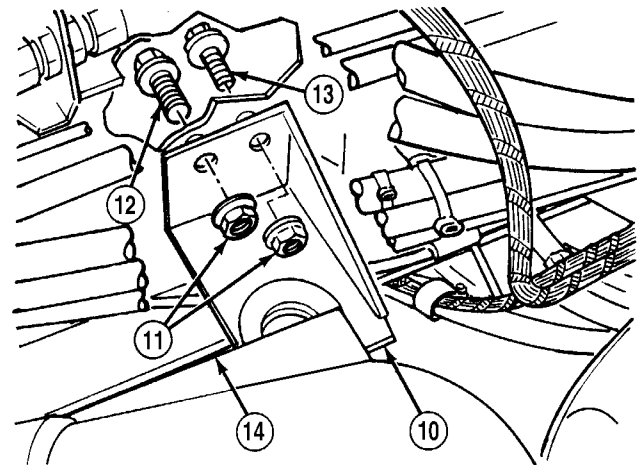
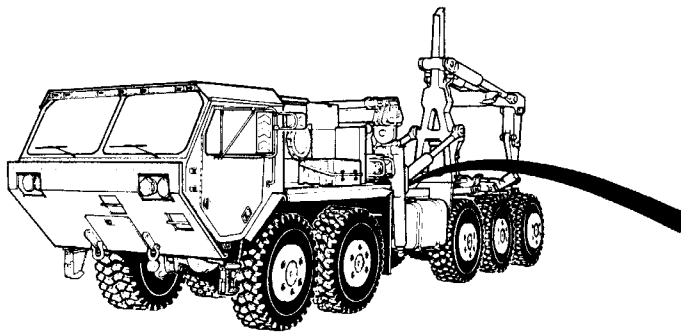
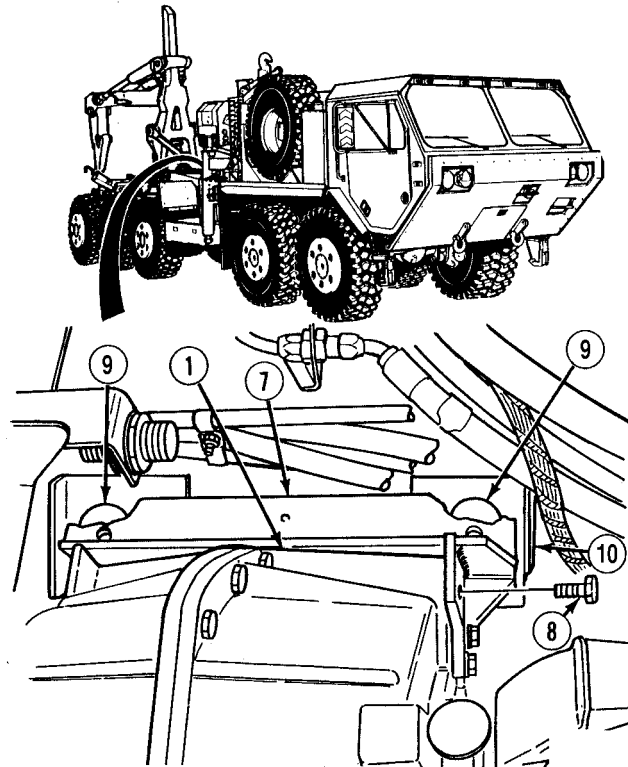
- (b) With the aid of an assistant, remove two locknuts (2), washers (3), washers (4), lower mounts (5), screws (6) and washers (3) from support bracket (7). Discard locknuts.



- (c) Using transmission jack, raise transfer case (1) to take pressure off of support bracket (7).
- (d) Remove three rear screws (8) from transfer case (1) and support bracket (7).

8-3. TRANSFER CASE ASSEMBLY SUPPORT REPLACEMENT (CONT).

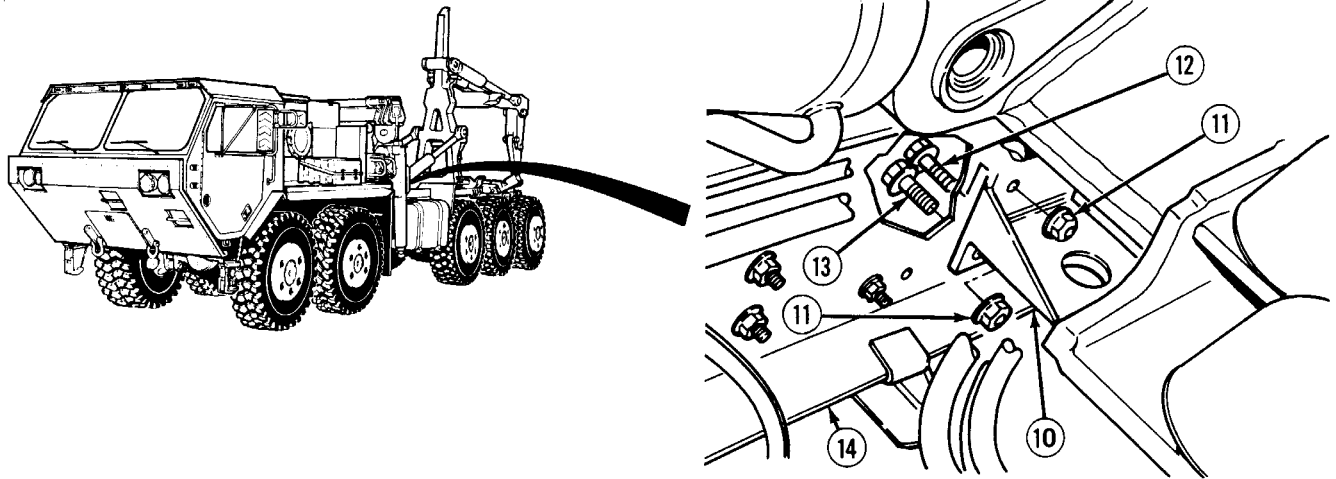
- (e) Remove three front screws (8) from transfer case (1) and support bracket (7).
- (f) Remove support bracket (7) from transfer case (1) and two upper mounts (9).
- (g) Remove two upper mounts (9) from two frame brackets (10).



NOTE

If frame brackets are bent, cracked, or have other damage, perform Steps (h) and (i). If frame brackets are not damaged, go on to Step (2).

- (h) With the aid of an assistant, remove four locknuts (11), front frame bracket (10), two screws (12) and screws (13) from frame (14). Discard locknuts.



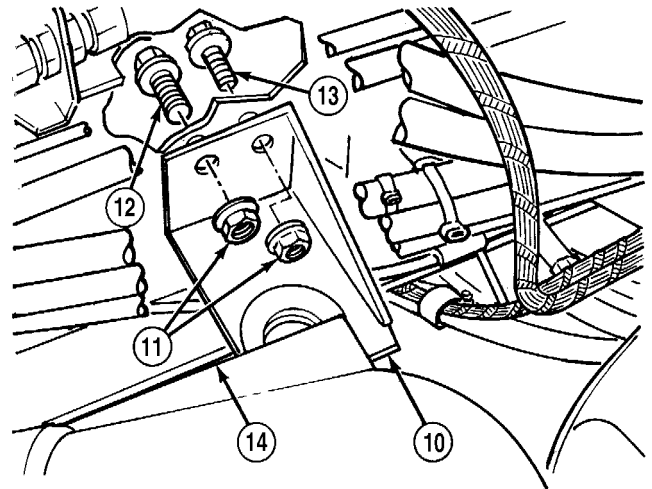
- (i) With the aid of an assistant, remove four locknuts (11), rear frame bracket (10), two screws (12) and screws (13) from frame (14). Discard locknuts.

(2) *Installation.*

NOTE

If frame brackets were removed during support bracket removal, perform Steps (a) and (b). If frame brackets were not removed during removal, go on to Step (c).

- (a) With the aid of an assistant, install two screws (12), screws (13) and rear frame bracket (10) on frame (14) with four locknuts (11).
- (b) With the aid of an assistant, install two screws (12), screws (13) and front frame bracket (10) on frame (14) with four locknuts (11).

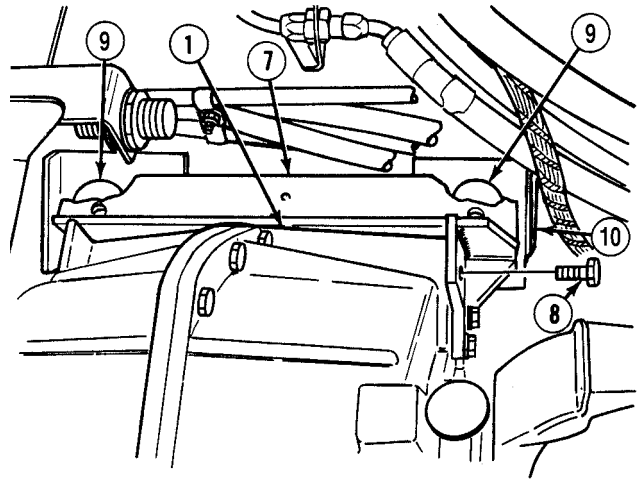


8-3. TRANSFER CASE ASSEMBLY SUPPORT REPLACEMENT (CONT).

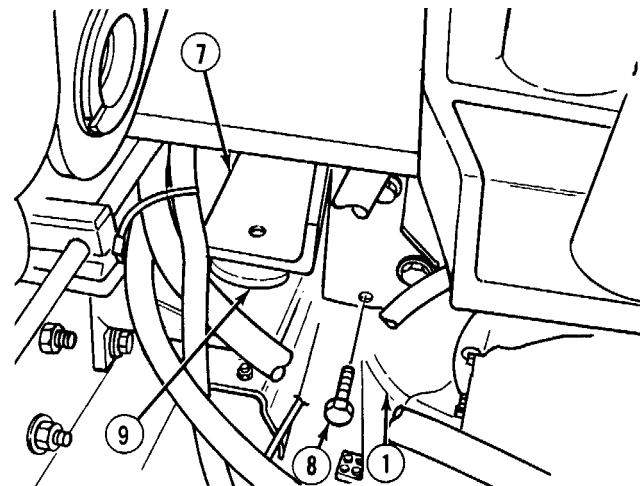
- (c) Position two upper mounts (9) on two frame brackets (10).
- (d) Position support bracket (7) on two upper mounts (9) and transfer case (1).

WARNING

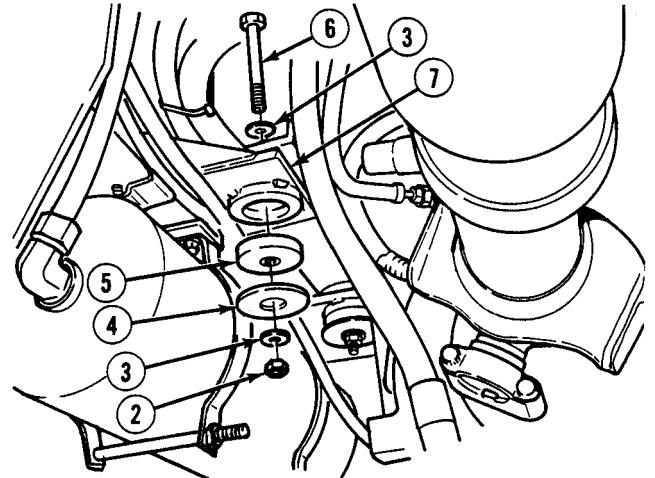
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



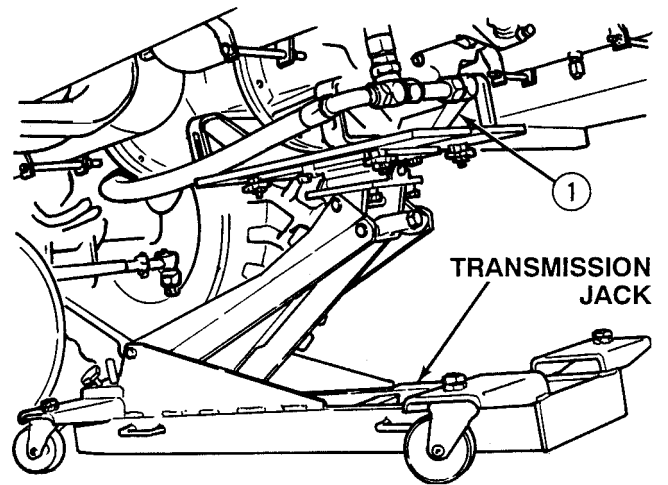
- (e) Apply sealing compound to threads of six screws (8).
- (f) Position six screws (8) in support bracket (7) and front and rear of transfer case (1).
- (g) Tighten three screws (8) in support bracket (7) and front of transfer case (1) to 187 lb-ft (254 N·m).
- (h) Tighten three screws (8) in support bracket (7) and rear of transfer case (1) to 187 lb-ft (254 N·m).
- (i) Lower transfer case (1) to position support bracket (7) on two upper mounts (9).



- (j) With the aid of an assistant, install two washers (3) and screws (6) in support bracket (7) with two lower mounts (5), washers (4), washers (3) and locknuts (2).

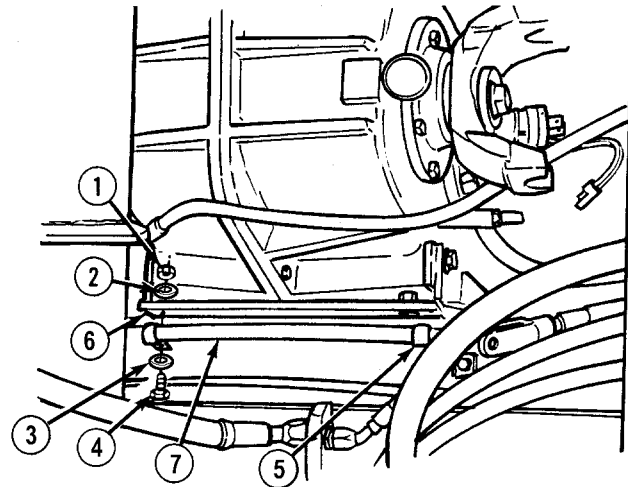
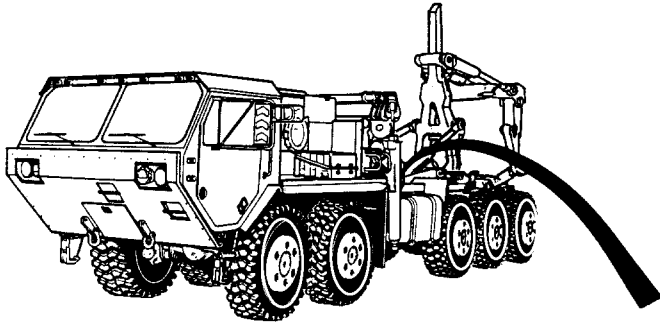


- (k) Remove transmission jack from under transfer case (1).



8-3. TRANSFER CASE ASSEMBLY SUPPORT REPLACEMENT (CONT).

b. Right Transfer Case Support Bracket Replacement.

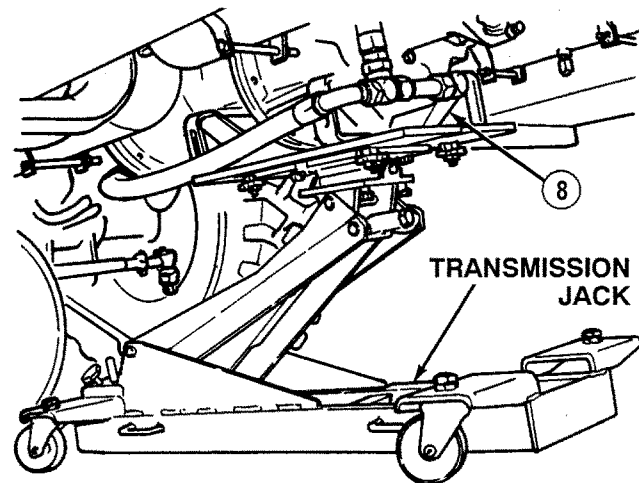


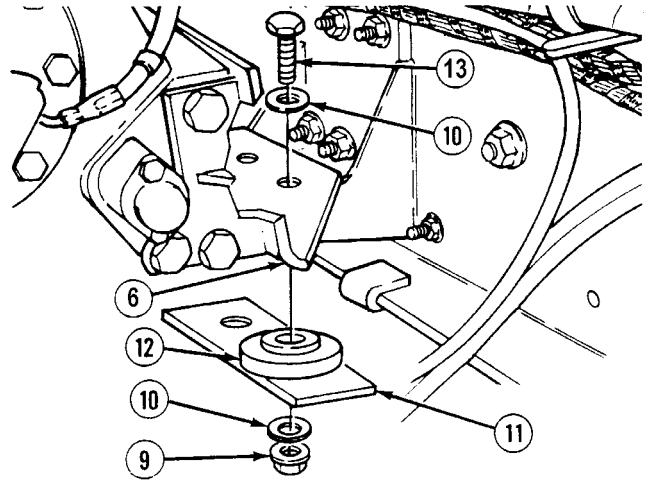
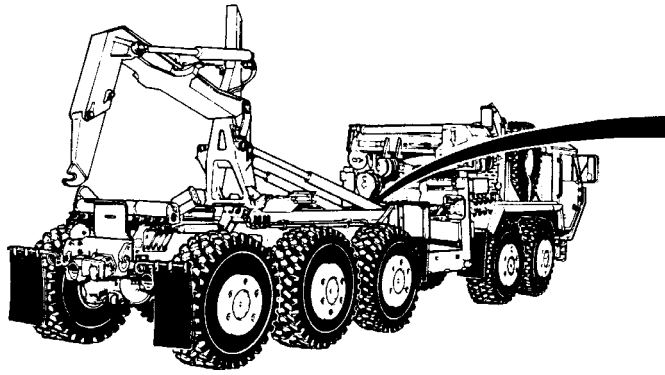
NOTE

Ensure transfer case is in low.

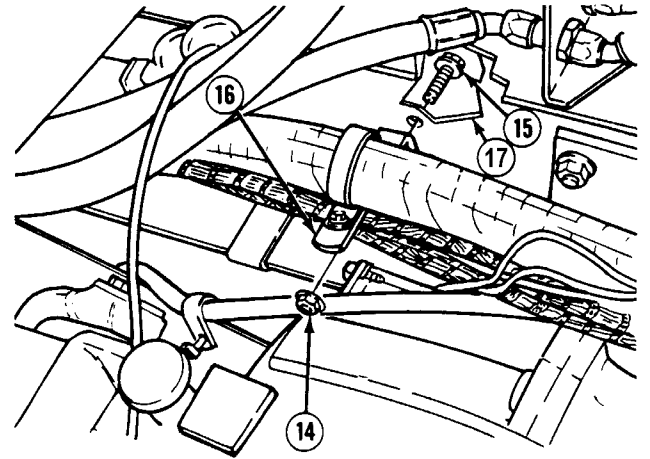
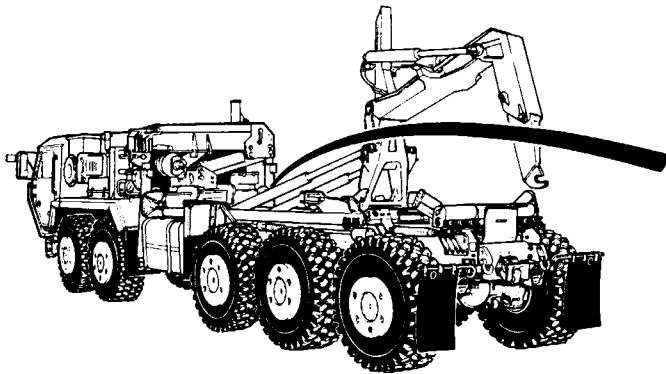
(1) *Removal.*

- (a) Remove two nuts (1), lockwashers (2), washers (3), screws (4) and cushion clips (5) from support bracket (6). Discard lockwashers.
- (b) Position hose 2831 (7) out of the way.
- (c) Position transmission jack under transfer case (8).



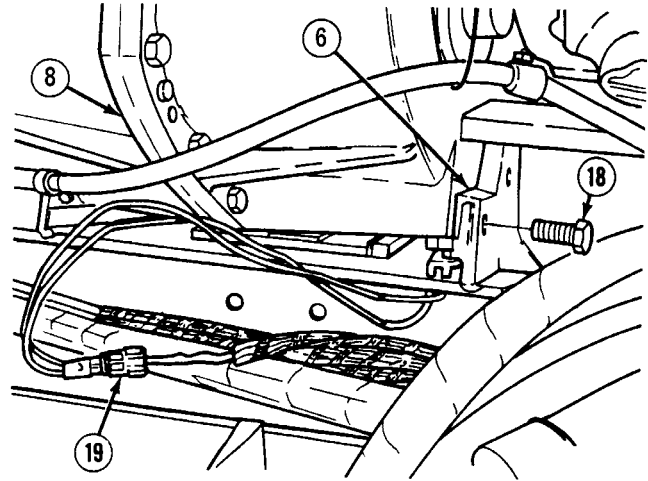
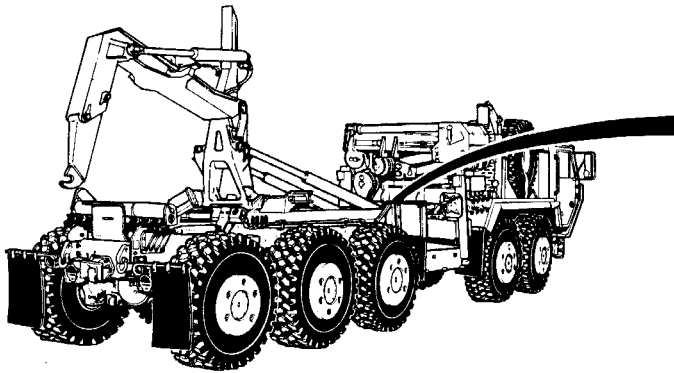


- (d) With the aid of an assistant, remove two locknuts (9), washers (10), retainer plate (11), two lower mounts (12), screws (13) and washers (10) from support bracket (6). Discard locknuts.



- (e) Remove locknut (14) and screw (15) from standoff bracket (16) and frame (17).

8-3. TRANSFER CASE ASSEMBLY SUPPORT REPLACEMENT (CONT).

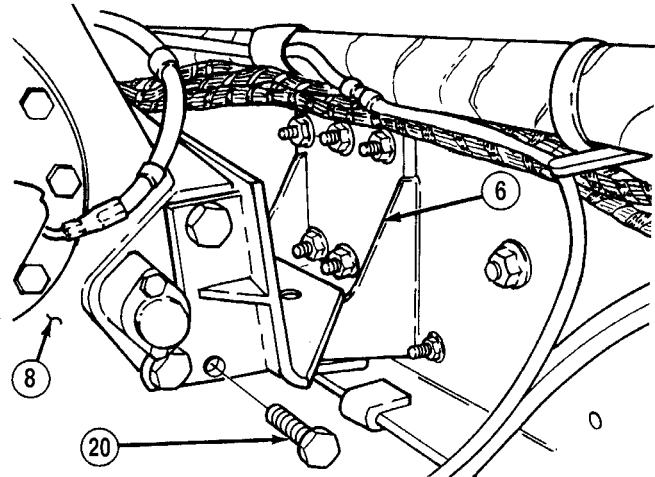
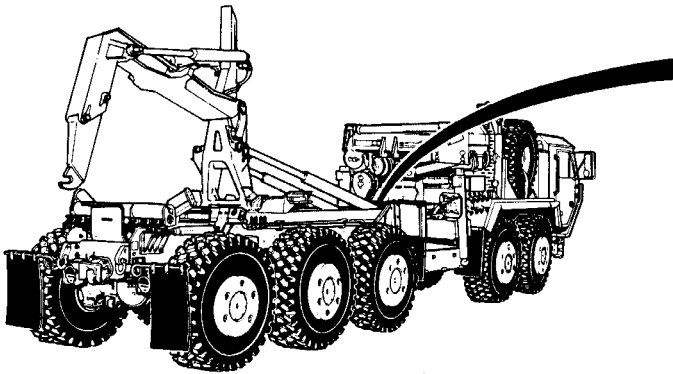


- (f) Using transmission jack, raise transfer case (8) to take pressure off of support bracket (6).
- (g) Remove three screws (18) from support bracket (6) and front of transfer case (8).

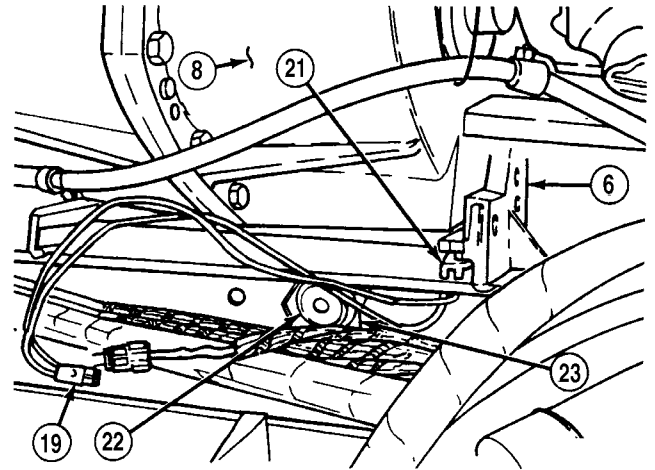
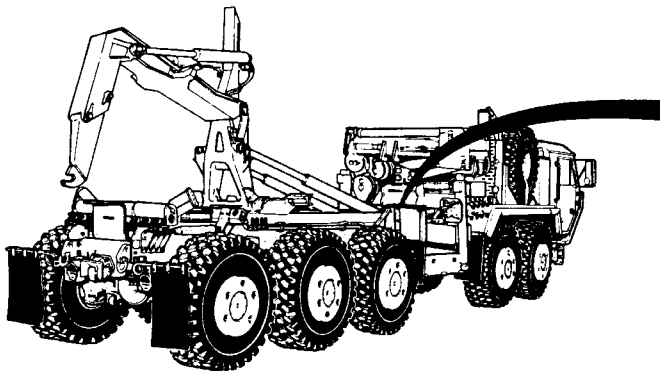
NOTE

Remove cable ties as required.

- (h) Disconnect MC57 connector (19).



- (i) Remove three screws (20) from support bracket (6) and rear of transfer case (8).

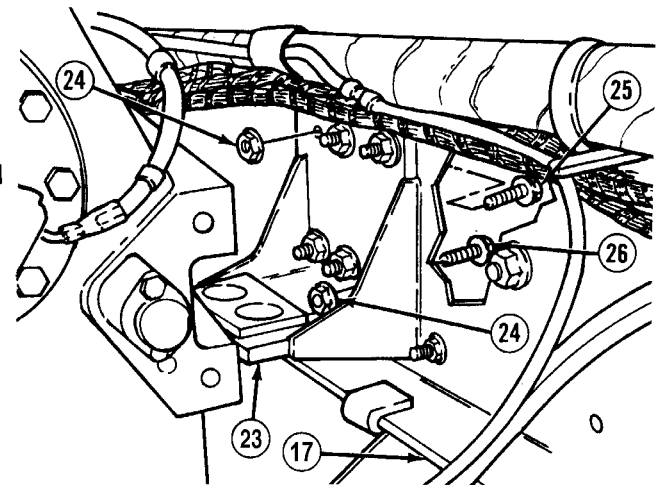
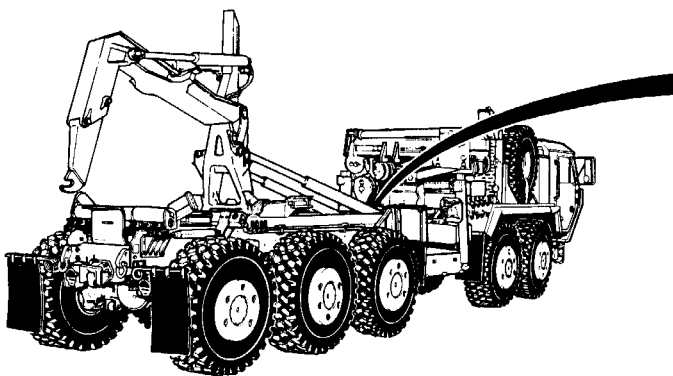


- (j) Pull support bracket (6) out to clear neutral start switch (21).
- (k) Feed neutral start connector wires (19) through hole in support bracket (6).

CAUTION

Failure to clear neutral start switch during support bracket removal could damage neutral start switch.

- (l) Remove support bracket (6) from transfer case (8) and two upper mounts (22).
- (m) Remove two upper mounts (22) from right frame bracket (23).



NOTE

If frame bracket is bent, cracked or has other damage, perform Step (n).

- (n) With the aid of an assistant, remove six locknuts (24), right frame bracket (23), four screws (25) and two screws (26) from frame (17). Discard locknuts.

8-3. TRANSFER CASE ASSEMBLY SUPPORT REPLACEMENT (CONT).

(2) *Installation.*

NOTE

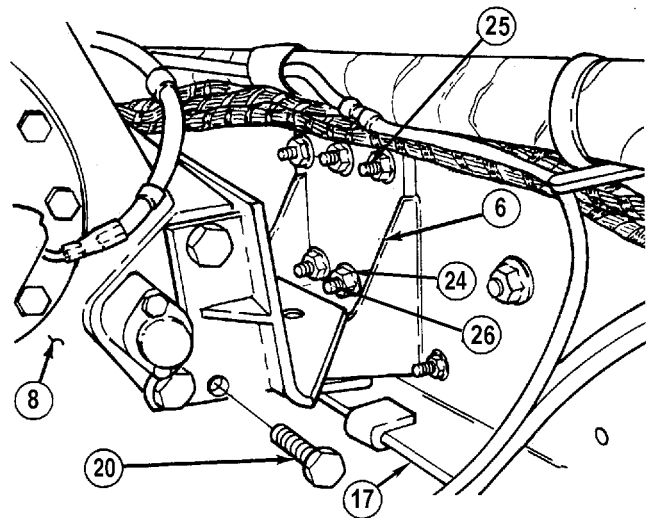
If frame bracket was removed, perform Step (a).

- (a) With the aid of an assistant, install two screws (26), four screws (25) and right frame bracket (23) on frame (17) with six locknuts (24).
- (b) Position two upper mounts (22) on right frame bracket (23).

CAUTION

Failure to clear neutral start switch during installation could damage neutral start switch.

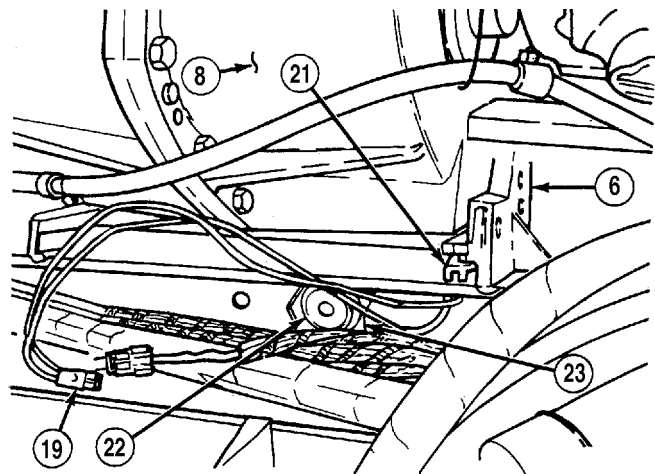
- (c) Feed neutral start connector wires (19) through hole in support bracket (6) and position support bracket (6) over neutral start switch (21) and on upper mounts (22) and transfer case (8).



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.

- (d) Apply sealing compound on threads of six screws (20).
- (e) Position three screws (20) in support bracket (6) and rear of transfer case (8).



WARNING

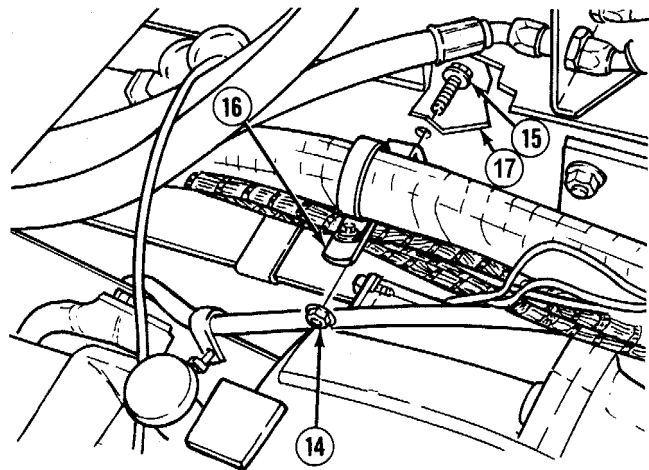
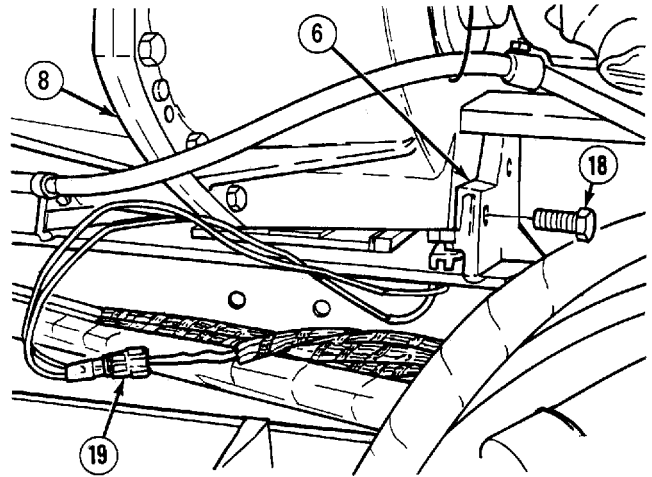
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (f) Apply sealing compound on threads of six screws (18).
- (g) Position three screws (18) in support bracket (6) and front of transfer case (8).
- (h) Tighten three screws (20) and (18) to 187 lb-ft (254 N·m).

NOTE

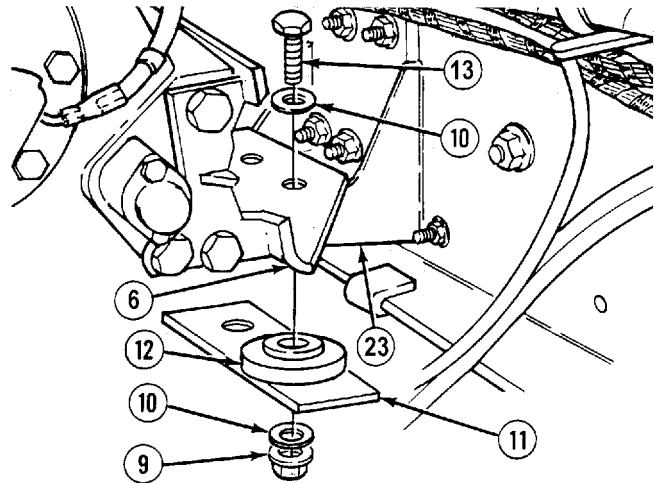
Install cable ties as required.

- (i) Connect MC57 connector (19).
- (j) Lower transfer case (8) to position support bracket (6).
- (k) Install standoff bracket (16) on frame (17) with screw (15) and locknut (14).

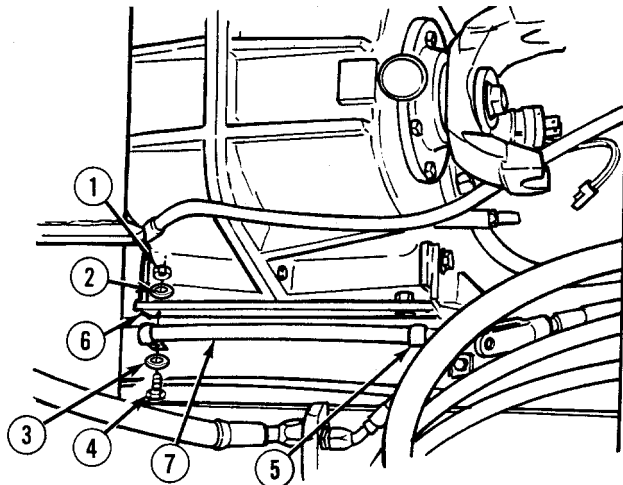


8-3. TRANSFER CASE ASSEMBLY SUPPORT REPLACEMENT (CONT).

- (l) Position two washers (10) and screws (13) in support bracket (6) and right frame bracket (23).
- (m) With the aid of an assistant, install two lower mounts (12), plate (11), two washers (10) and locknuts (9) on screws (13).



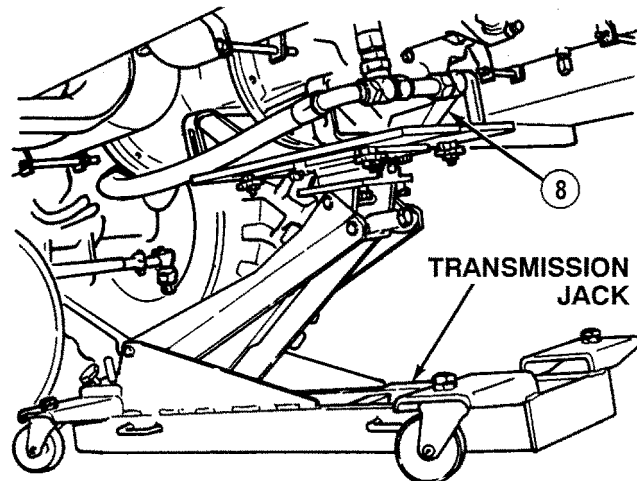
- (n) Reposition hose 2831 (7) and install two cushion clips (5) on support bracket (6) with two screws (4), washers (3), lockwashers (2) and nuts (1).



- (o) Remove transmission jack from under transfer case (8).

c. Follow-On Maintenance:

- Install auxiliary fuel tank (if equipped), (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- Build air pressure to 125 psi (861 kPa).
- LHS in transit position, (TM 9-2320-364-10).
- Shut OFF engine, (TM 9-2320-364-10).
- Check for leaks, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).



END OF TASK

8-4. TRANSFER CASE YOKE AND OIL SEAL REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Drill Set, Twist (Item 48, Appendix F)
Drill, Electric, Portable, 1/4 in.
(Item 49, Appendix F)
Installer, Seal, Transfer Case
(Item 119, Appendix F)
Wrench Set, Socket 3/4 in. Drive
(Item 274, Appendix F)
Wrench, Torque (0-600 lb-ft [0-814 N·m])
(Item 278, Appendix F)
Holder, Flange (Appendix C)
Screw, Sheet Metal, No. 8 by 1 in. (2)
Washer 3/16 in. (2)

Materials/Parts

Adhesive (Item 1, Appendix B)
Grease (Item 21, Appendix B)
Sealing Compound (Item 54, Appendix B)

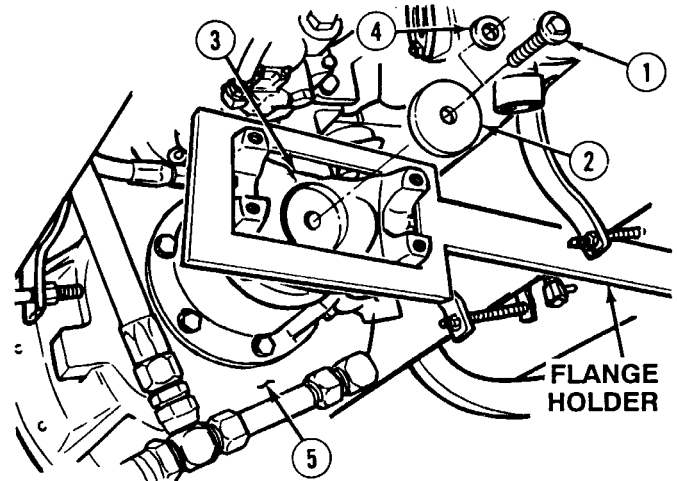
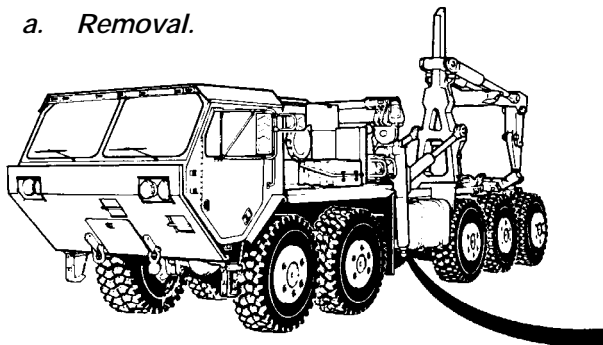
Personnel Required

Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Driveshaft disconnected, (TM 9-2320-364-20)
Transfer case drained, (TM 9-2320-364-20)

a. Removal.



NOTE

- There are three transfer case yokes. Lower rear yoke is shown.
- To remove front yoke, perform Step (1).
- To remove rear yoke, perform Step (2).

- (1) With the aid of an assistant, use flange holder and remove screw (1) and retainer washer (2) from front yoke end (3).
- (2) With the aid of an assistant, use flange holder and remove screw (1), washer (4) and retainer washer (2) from rear yoke end (3).
- (3) Remove yoke end (3) from transfer case (5).

8-4. TRANSFER CASE YOKE AND OIL SEAL REPLACEMENT (CONT).

- (4) Position drain pan under bearing cover (6).

WARNING

Protective goggles must be worn when drilling holes. Failure to comply may result in injury to personnel.

- (5) Drill two 1/8 in. (3.2 mm) holes directly opposite each other in seal casing (7).
 (6) Install two washers (8) and sheet metal screws (9) in drilled holes.

NOTE

Seal is removed by prying against washers with pry bar.

- (7) Remove and discard oil seal (7) from bearing cover (6).

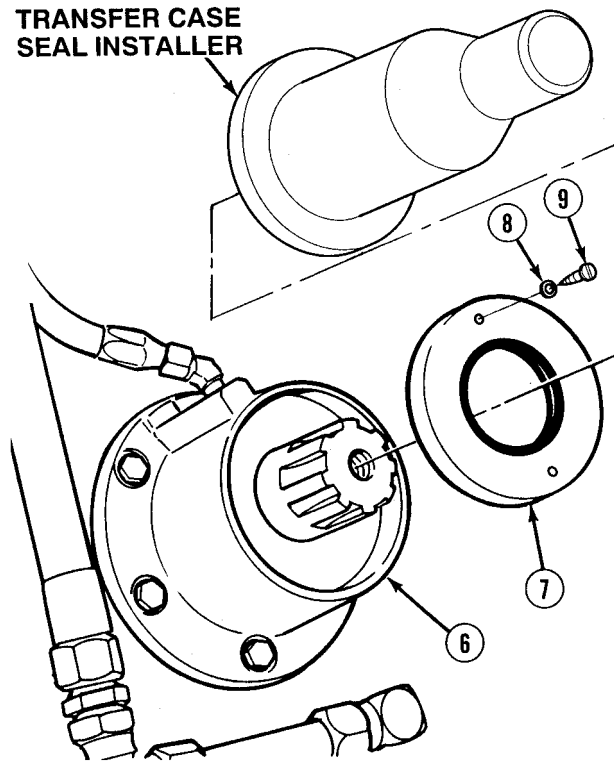
b. Installation.

- (1) Coat lip of oil seal (7) with grease.

NOTE

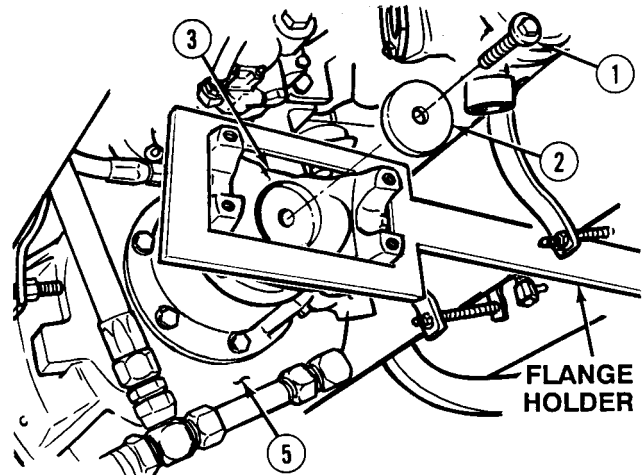
- Installer is only used on two bottom output seals.
- Ensure that lip of seal is facing inside of bearing.

- (2) Using transfer case seal installer, install oil seal (7) in bearing cover (6).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



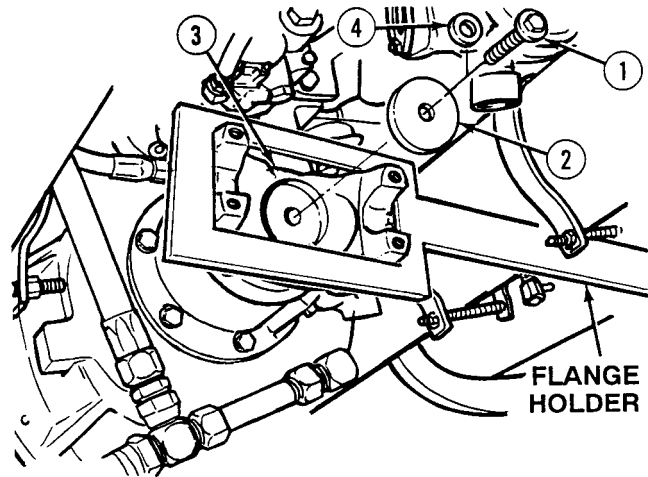
- (3) Apply sealing compound to threads of screw (1).
- (4) Install yoke end (3) to transfer case (5).
- (5) Apply adhesive to outer edge of spline on yoke end (3).

NOTE

- There are three transfer case yokes. Lower rear yoke is shown.
 - Perform Step (6) to install front yoke.
 - Perform Step (7) to install rear yoke.
- (6) Position retainer washer (2) and screw (1) on front yoke end (3).

8-4. TRANSFER CASE YOKE AND OIL SEAL REPLACEMENT (CONT).

- (7) Position retainer washer (2), washer (4) and screw (1) on rear yoke end (3).
- (8) With aid of an assistant and using flange holder, tighten screw (1) on yoke end (3) to 375 lb-ft (509 N·m).



c. Follow-On Maintenance:

- Fill transfer case, (TM 9-2320-364-20).
- Install driveshaft, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

8-5. TRANSFER CASE LUBRICATION PUMP REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Cap and Plug Set (Item 26, Appendix F)
Wrench Set, Socket 3/8 in. Drive
(Item 273, Appendix F)
Wrench, Torque (0-60 N·m)
(Item 276, Appendix F)

Materials/Parts

Sealing Compound (Item 53, Appendix B)

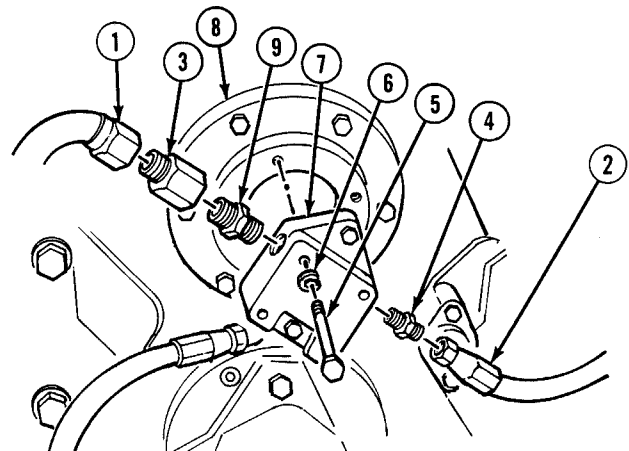
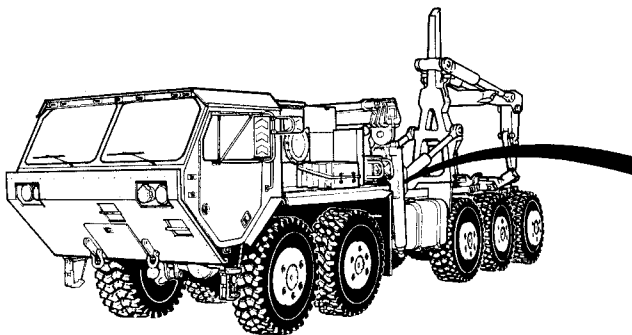
Materials/Parts - Continued

Sealing Compound (Item 56, Appendix B)
Sealing Compound (Item 65, Appendix B)
Tags, Identification (Item 72, Appendix B)
Lockwasher (4) (Item 252, Appendix E)

Equipment Condition

LHS fully extended, (TM 9-2320-364-10)
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

a. Removal.



NOTE

- Tag and mark hoses prior to removal.
- Cap or plug all hoses upon removal.

- (1) Disconnect hose 2815 (1) and hose 2831 (2) from reducer (3) and adapter (4).
- (2) Remove four screws (5), lockwashers (6) and lubrication pump (7) from bearing cover (8). Discard lockwashers.
- (3) Remove adapters (4) and (9) from lubrication pump (7).
- (4) Remove reducer (3) from adapter (9).

8-5. TRANSFER CASE LUBRICATION PUMP REPLACEMENT (CONT).

b. Installation.

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.

- (1) Coat pipe threads of adapters (4) and (9) with sealing compound.

NOTE

Adapters must be installed so flat side of hex shoulder is aligned with base of pump.

- (2) Install adapters (4) and (9) on lubrication pump (7).
- (3) Install reducer (3) in adapter (9).
- (4) Coat threads of four screws (5) with sealing compound.

NOTE

When installing replacement lube pump, ensure that pipe plug has been installed in drive end of pump.

- (5) Apply sealing compound to bottom lip of lubrication pump (7).

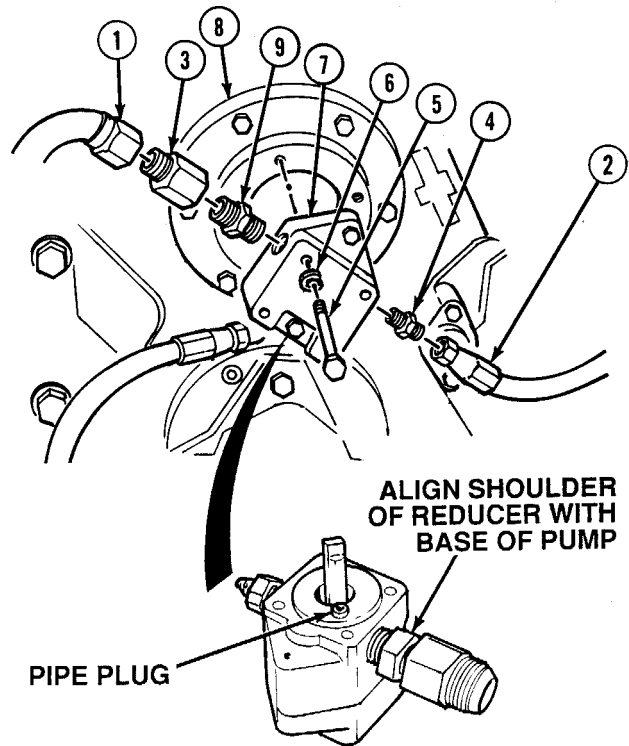
CAUTION

Ensure spline on shaft engages with slot on drive plate. Failure to comply will result in damage to equipment.

- (6) Install lubrication pump (7) on bearing cover (8) with four lockwashers (6) and screws (5). Tighten screws to 168 lb-in (19 N·m).
- (7) Install hose 2815 (1) and hose 2831 (2) on reducer (3) and adapter (4).

c. Follow-On Maintenance:

- Fill transfer case, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- LHS in transit position, (TM 9-2320-364-10).
- Shut OFF engine, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).



END OF TASK

8-6. SHIPPING CONTAINER, TRANSFER CASE ASSEMBLY REPLACEMENT.

This task covers:

- a. Upper Container Removal
- b. Transmission Assembly Removal From Container
- c. Transmission Assembly Installation Into Container
- d. Upper Container Installation
- e. Follow On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Lifting Device, Minimum Capacity 1388 lbs (630 kg)

Materials/Parts

- Gasket (Item 56, Appendix E)

Materials/Parts - Continued

- Locknut (14) (Item 199, Appendix E)
- Locknut (4) (Item 200, Appendix E)

Personnel Required

Two

Equipment Condition

Transfer case removed, (Para 8-2)

a. *Upper Container Removal.*

WARNING

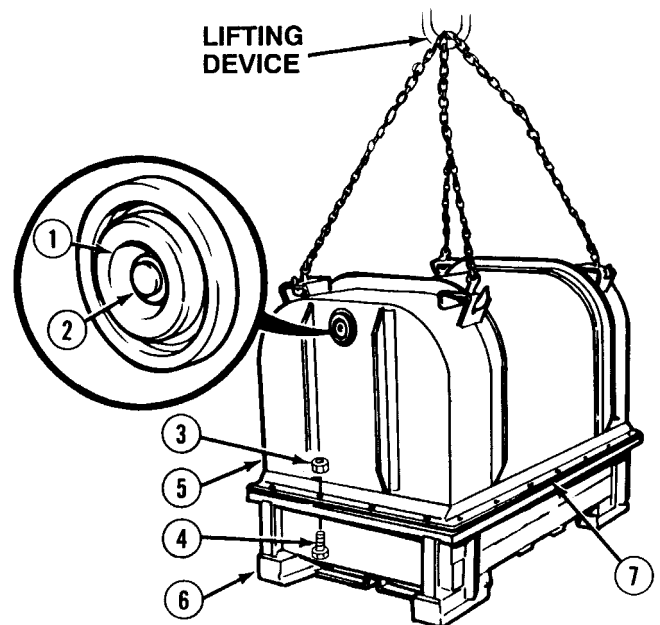
Release air pressure prior to opening container or injury to personnel could result.

- (1) Release air pressure at breather valve (1) by pressing air release button (2).
- (2) Remove 22 nuts (3) and screws (4) from upper and lower container (5) and (6).

WARNING

Upper container weighs 250 lbs (114 kg). Attach lifting device prior to removal to prevent injury to personnel.

- (3) With the aid of an assistant, attach lifting device to upper container (5).
- (4) Remove upper container (5) from lower container (6).
- (5) Remove and discard gasket (7) from lower container (6).
- (6) Remove lifting device from upper container (5).



8-6. SHIPPING CONTAINER, TRANSFER CASE ASSEMBLY REPLACEMENT (CONT).

b. Transfer Case Removal From Container.

NOTE

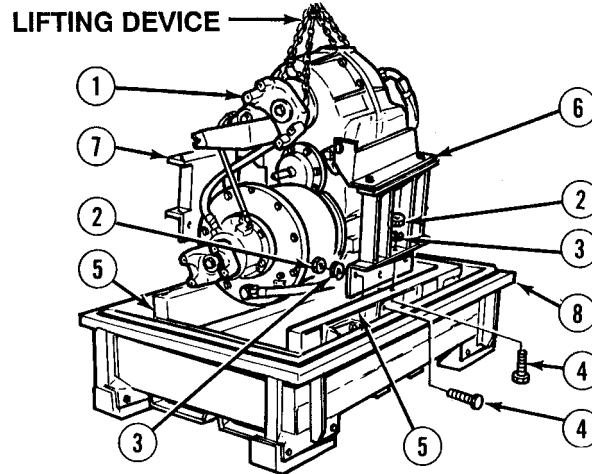
Lifting device is positioned around two upper yokes on transfer case.

- (1) With the aid of an assistant, attach lifting device to transfer case (1).

NOTE

Note position of brackets prior to removal to assist in assembly.

- (2) Remove 14 locknuts (2), washers (3) and screws (4) from inner frame side brackets (5) and two mounting brackets (6) and (7). Discard locknuts.



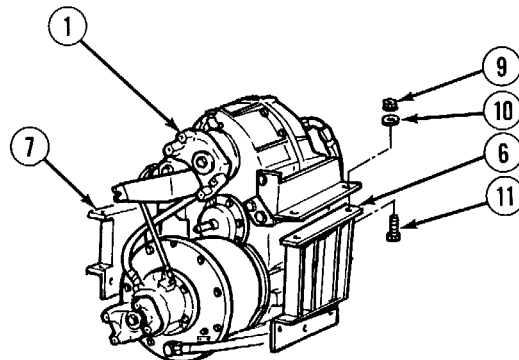
WARNING

Transfer case weighs 1,388 lbs (630 kg). Attach lifting device prior to removal to prevent injury to personnel.

- (3) Remove transfer case (1) from lower container (8).
- (4) Remove four locknuts (9), washers (10), screws (11) and two brackets (6) and (7) from transfer case (1). Discard locknuts.
- (5) Remove lifting device from transfer case (1).

c. Transfer Case Installation Into Container.

- (1) Position two brackets (6) and (7) on transfer case (1) with four screws (11), washers (10) and locknuts (9).



WARNING

Transfer case weighs 1,388 lbs (630 kg). Attach lifting device prior to installation to prevent injury to personnel.

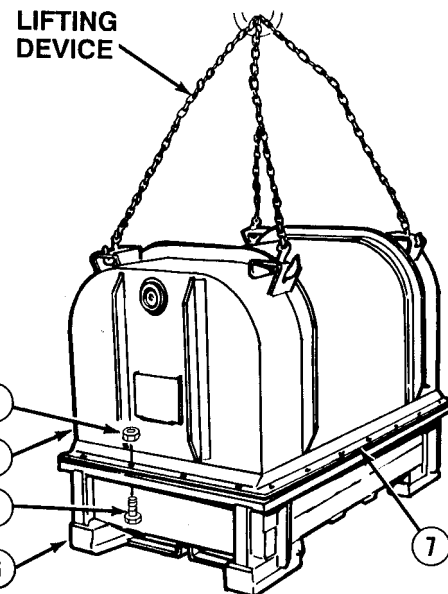
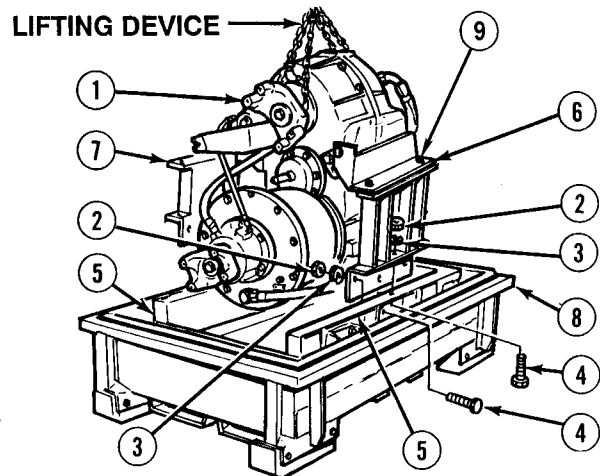
NOTE

Lifting device is positioned around two upper yokes on transfer case.

- (2) With the aid of an assistant, attach lifting device to transfer case (1) and lower transfer case (1) into lower container (8).
- (3) With the aid of an assistant, install transfer case (1) into lower container (8) with 14 screws (4), washers (3) and locknuts (2). Tighten locknuts to 58 to 66 lb-ft (79 to 89 N·m).
- (4) Tighten locknuts (9) to 112 to 120 lb-ft (152 to 163 N·m).
- (5) Remove lifting device from transfer case (1).

d. Upper Container Installation.

- (1) Position gasket (7) on lower container (6).



WARNING

Upper container weighs 250 lbs (114 kg). Attach lifting device prior to installation to prevent injury to personnel.

- (2) With the aid of an assistant, attach lifting device to upper container (5).

CAUTION

Ensure gasket is seated in place on lower container.

- (3) Install upper container (5) on lower container (6) with 22 screws (4) and nuts (3). Tighten nuts to 52 to 60 lb-ft (71 to 81 N·m)
- (4) Remove lifting device from upper container (5).

e. Follow-On Maintenance:

- Install transfer case, (Para 8-2).

END OF TASK

CHAPTER 9

AXLE MAINTENANCE

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9-2	Axle No. 1, 2 And 5 Trunnion Bearing Inspection	9-2
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9-4	Axle No. 2 Assembly Replacement	9-15
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9-1. DIRECT SUPPORT AXLE MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for replacing, repairing and servicing the axle components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

9-2. AXLE NO. 1, 2 AND 5 TRUNNION BEARING INSPECTION.

This task covers:

- a. Inspection
- b. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Crowbar (Item 43, Appendix F)
- Jack, Hydraulic, Hand (Item 128, Appendix F)
- Jackstand (Item 132, Appendix F)

Personnel Required

Two

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)

a. *Inspection.*



Axle No. 1 weighs 1950 lbs (885 kg). Use jackstands to support axles. Failure to do so could result in injury to personnel.

NOTE

Axles No. 1, 2 and 5 are inspected the same way. Axle No. 1 is shown.

- (1) Using a hydraulic jack, raise Axle No. 1 (1) so tire (2) is clear of ground.
- (2) Position jackstand under Axle No. 1 (1) and lower axle onto jackstand.
- (3) Position crowbar under tire (2).

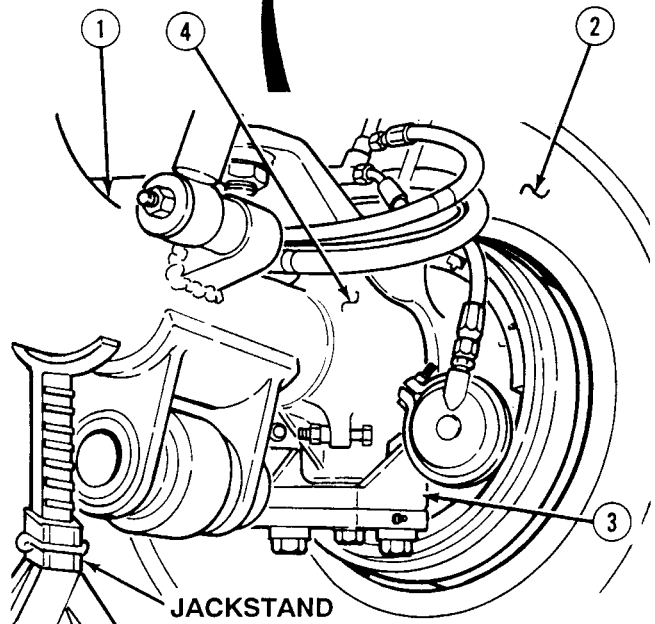
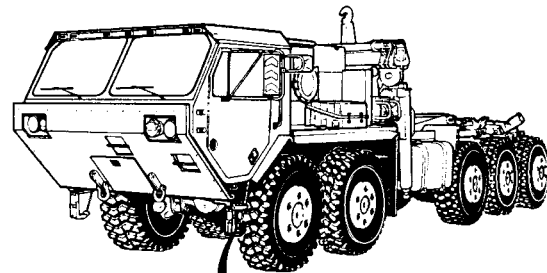
NOTE

If any wheel play is noticed, replace trunnion bearing (Para 9-9).

- (4) With the aid of an assistant, watch for play at wheel end socket (3) and ball (4) while prying up on tire (2) with crow bar.
- (5) Raise Axle No. 1 (1) and remove jackstand.
- (6) Lower Axle No. 1 (1) and remove lifting device.

b. *Follow-On Maintenance:*

- Remove wheel chocks, (TM 9-2320-364-10).



END OF TASK

9-3. AXLE NO. 1 ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Hammer, Hand, Soft Plastic (Item 88, Appendix F)
- Jack, Kit, Hydraulic, Hand (Item 129, Appendix F)
- Jack, Transmission (Item 131, Appendix F)
- Protractor, Square (Item 171, Appendix F)
- Wrench, Combination, 1-1/4 in. (Item 256, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
- Steel Plate (Appendix C)
- Wooden Block (Appendix C)

Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Oil, Lubricating (Item 36, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Locknut (2) (Item 166, Appendix E)
- Locknut (Item 181, Appendix E)
- Locknut (2) (Item 182, Appendix E)
- Locknut (4) (Item 188, Appendix E)
- Pin, Cotter (Item 421, Appendix E)

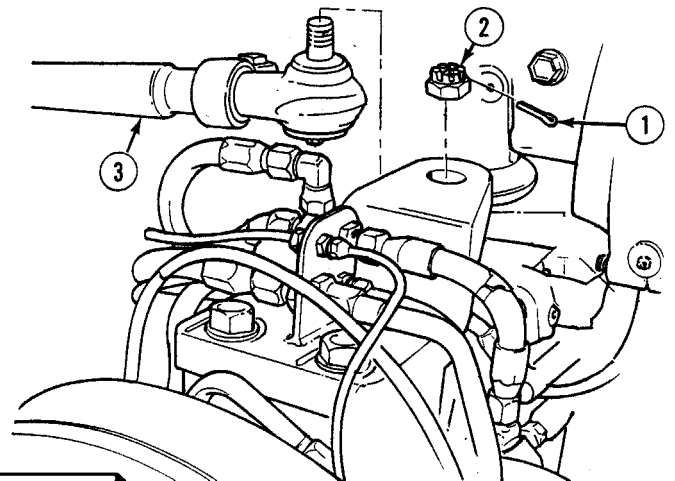
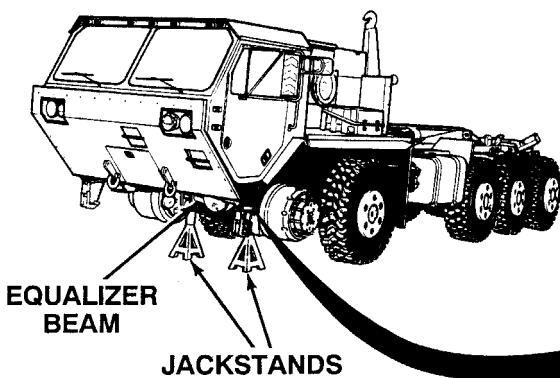
Personnel Required

Two

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Wheels/tires removed, (TM 9-2320-364-10)
- Shock absorbers removed, (TM 9-2320-364-20)
- Axle oil drained, (TM 9-2320-364-20)

a. Removal.



WARNING

Axle No. 1 weighs 1,950 lbs (885 kg). Use jackstands to support axles. Failure to do so could result in injury to personnel.

- (1) Position jackstands under axle No. 1 end of equalizer beams.
- (2) Remove cotter pin (1) from castle nut (2). Discard cotter pin.
- (3) Remove castle nut (2) from drag link (3).

9-3. AXLE NO. 1 ASSEMBLY REPLACEMENT (CONT).

NOTE

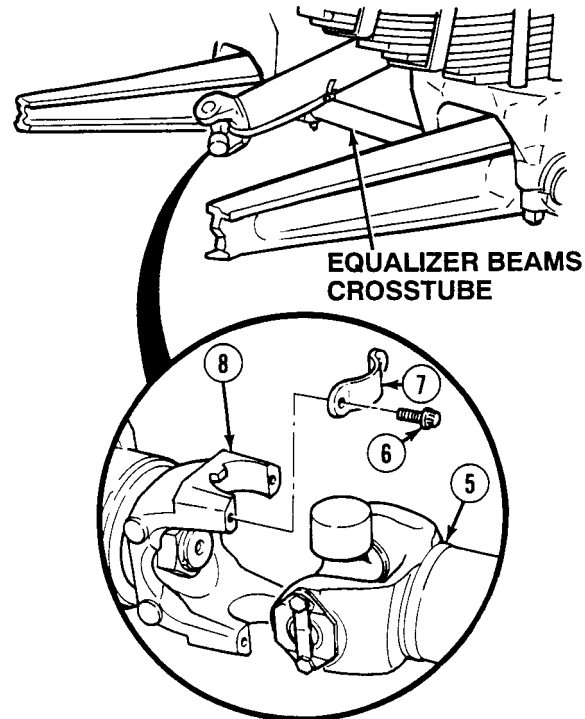
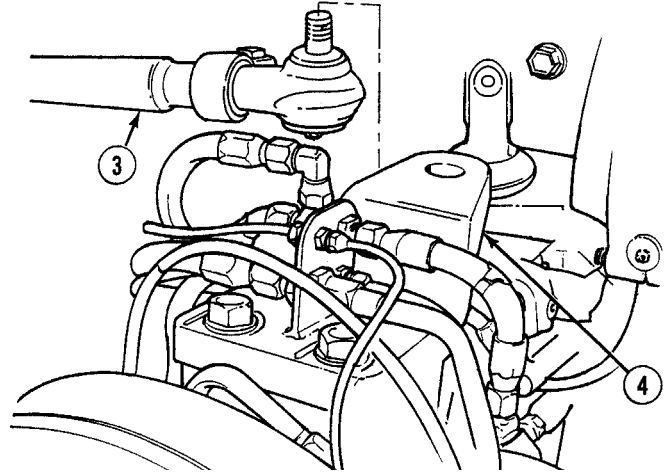
It may be necessary to tap on steering arm bracket with hammer to remove drag link.

- (4) With the aid of an assistant, apply downward pressure and remove drag link (3) from steering arm bracket (4).
- (5) Tie axle end of drag link (3) up out of way with cable ties.

WARNING

Driveshafts can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshaft can fall and cause injury to personnel.

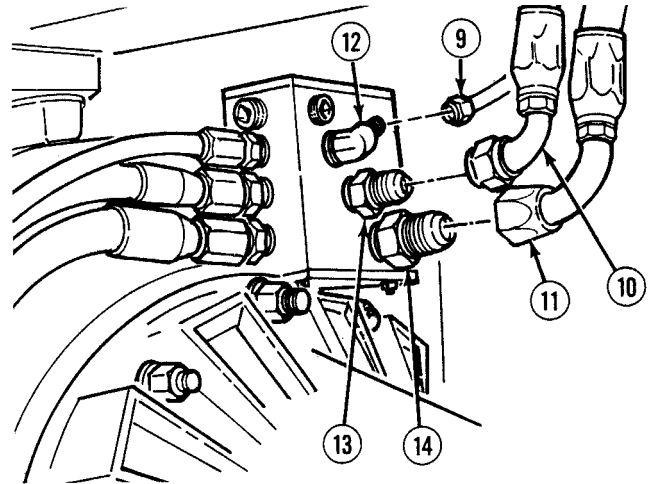
- (6) With the aid of an assistant, support driveshaft (5) and remove four screws (6) and two brackets (7) from flange assembly (8).
- (7) With the aid of an assistant, remove Axle No. 1 end of driveshaft (5) from flange assembly (8) and position driveshaft (5) on equalizer beams crosstube.



NOTE

Tag and mark air lines prior to removal.

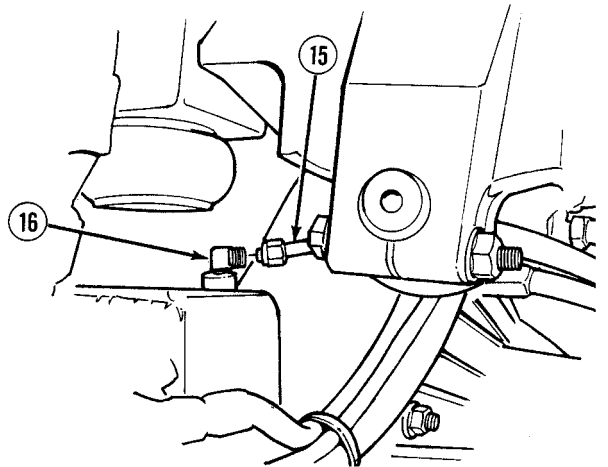
- (8) Remove air line 2874 (9), air line 2543 (10) and air line 2096 (11) from elbow (12) and fittings (13) and (14).



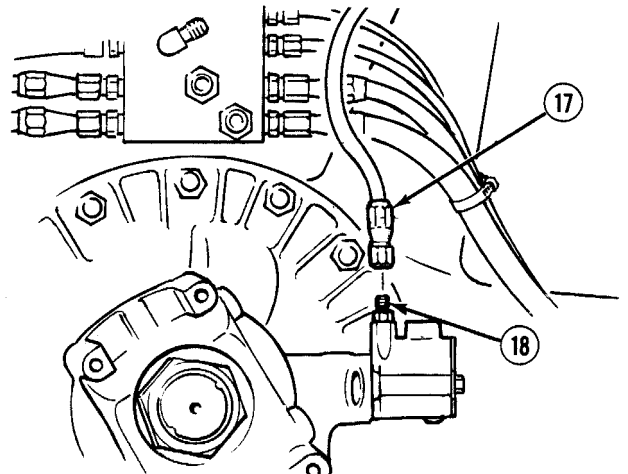
NOTE

Remove cable ties as required.

- (9) Remove breather line (15) from elbow (16).



- (10) Remove air line 2419 (17) from fitting (18).



9-3. AXLE NO. 1 ASSEMBLY REPLACEMENT (CONT).

- (11) Loosen locknut (19) until locknut is flush with threaded end of torque rod (20).

WARNING

Torque rod is under extreme pressure when being pressed from axle. Torque rod can be dangerous when it breaks loose and could cause injury to personnel.

NOTE

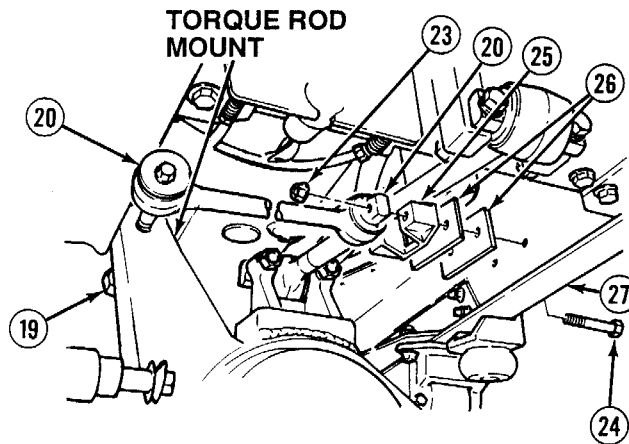
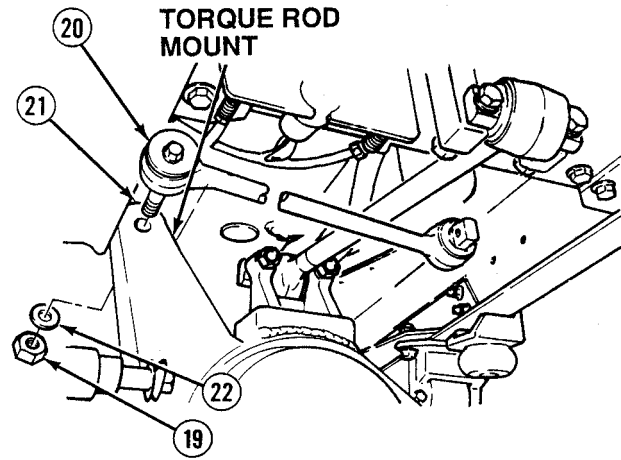
Strike torque rod mount with soft-face hammer while pressure is being applied to torque rod.

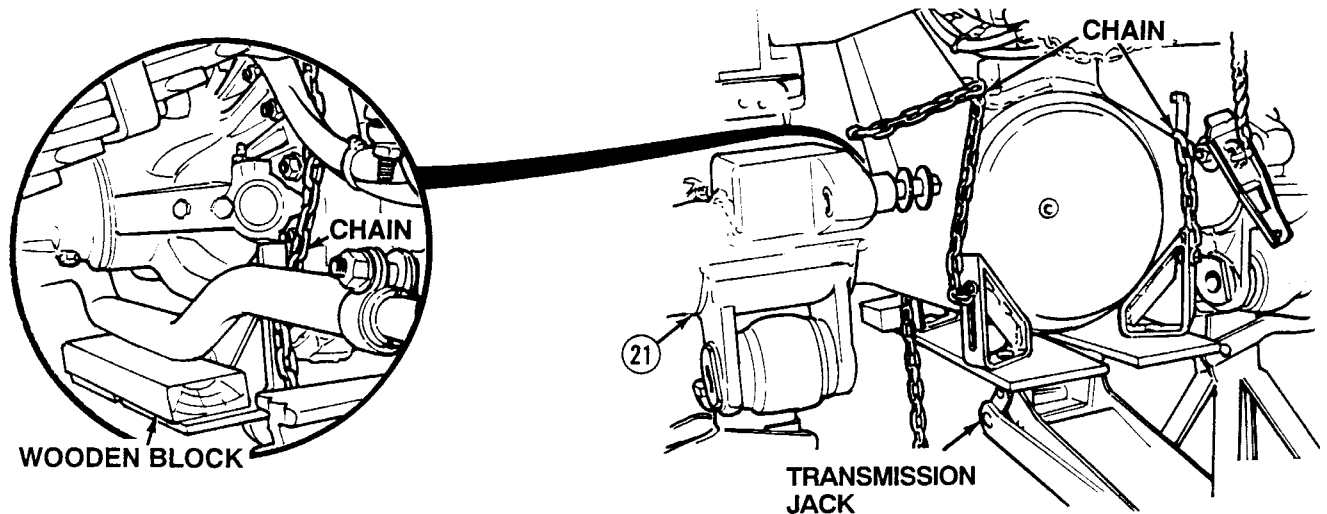
- (12) Using hand jack kit, press tapered end of torque rod (20) from Axle No. 1 (21) until torque rod is loosened.
- (13) Remove locknut (19) and washer (22) from torque rod (20). Discard locknut.

NOTE

Tag and note number and size of spacers.

- (14) With the aid of an assistant, remove two locknuts (23), screws (24), torque rod (20), bracket (25) and spacers (26) from frame (27). Discard locknuts.

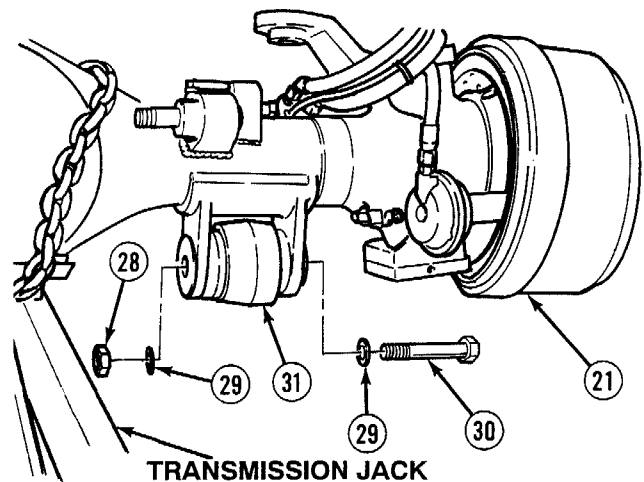




WARNING

- Axle No. 1 weighs 1,950 lbs (885 kg). Attach a transmission jack prior to removal. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

- (15) Position transmission jack under Axle No. 1 (21) and secure with chains.
- (16) With the aid of an assistant, remove locknut (28), two washers (29) and screw (30) from each equalizer beam (31). Discard locknuts.

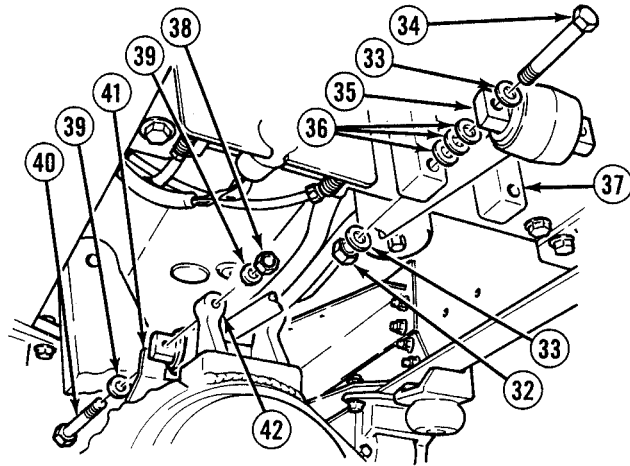


9-3. AXLE NO. 1 ASSEMBLY REPLACEMENT (CONT).

NOTE

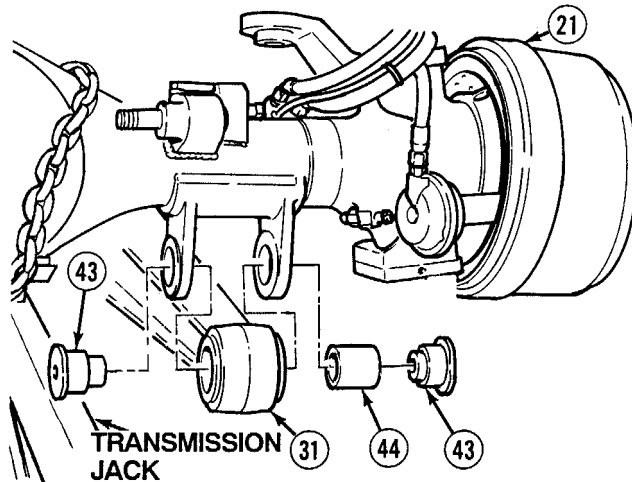
Tag and note number and size of spacers.

- (17) With the aid of an assistant, remove two locknuts (32), four washers (33), two screws (34), truck end of torque rod (35) and spacers (36) from bracket (37). Discard locknuts.
- (18) With the aid of an assistant, remove two locknuts (38), four washers (39), two screws (40), bracket (41) and torque rod (35) from axle bracket (42). Discard locknuts.



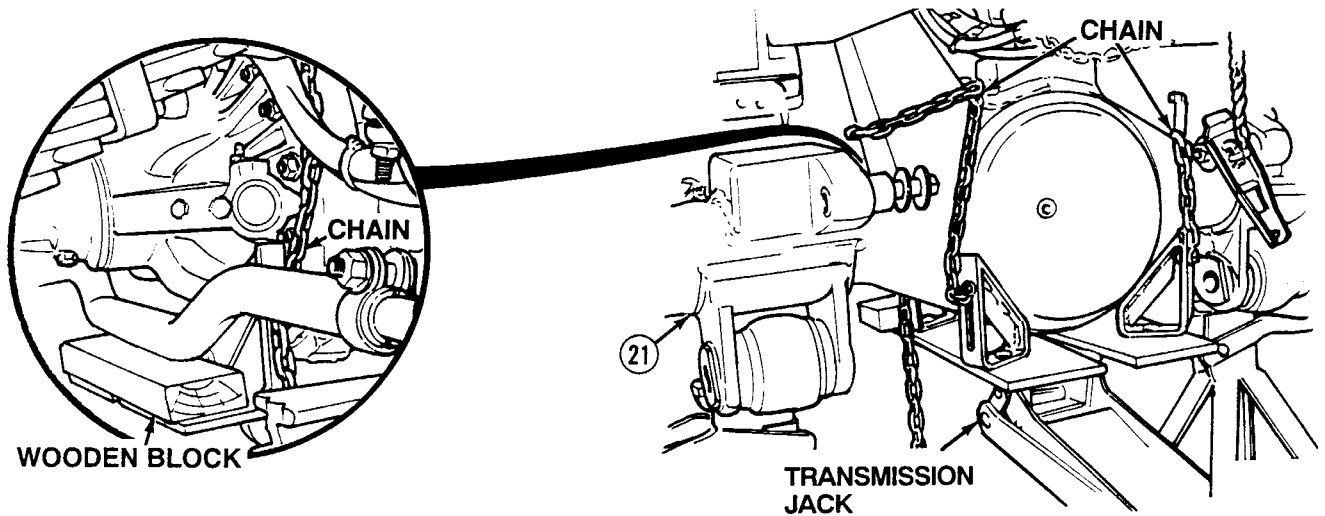
WARNING

- Axle No. 1 weighs 1,950 lbs (885 kg). Attach a transmission jack prior to removal. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.



- (19) Remove two adapters (43) from each equalizer beam (31).
- (20) With the aid of an assistant, use transmission jack to remove Axle No. 1 (21) from equalizer beam (31).
- (21) Remove spacer (44) from each equalizer beam (31).
- (22) Remove Axle No. 1 (21) from transmission jack.

b. *Installation.*



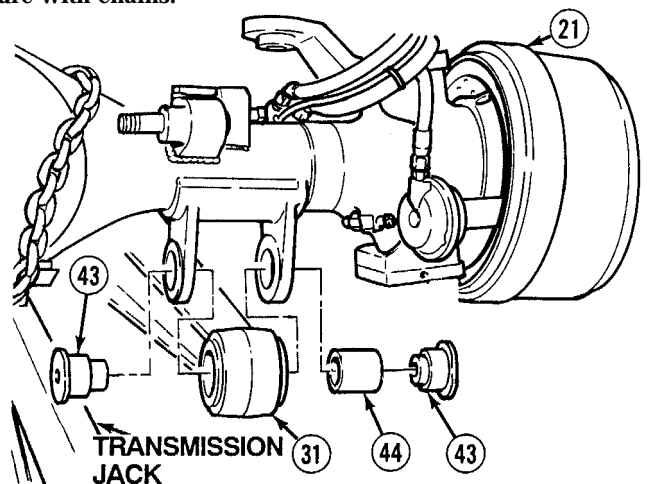
WARNING

- Axle No. 1 weighs 1,950 lbs (885 kg). Attach a transmission jack prior to installation. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

NOTE

If installing a new axle, remove and discard brake drum retaining screws.

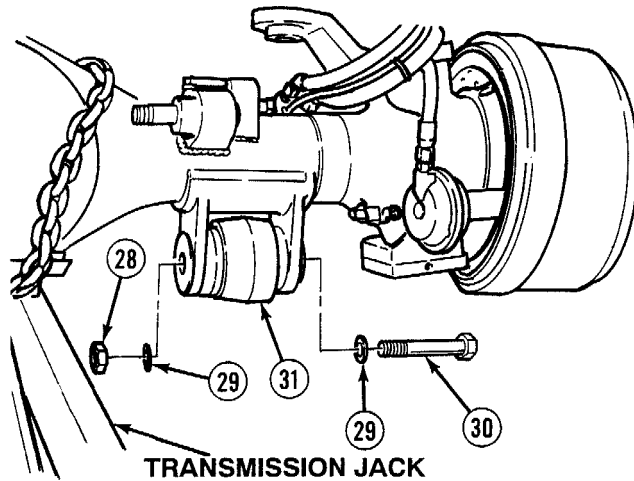
- (1) Position axle (21) on transmission jack and secure with chains.
- (2) Coat outside diameters of two spacers (44) and four adapters (43) with lubricating oil.
- (3) Install spacer (44) in each equalizer beam (31).
- (4) With the aid of an assistant, use transmission jack to position Axle No. 1 (21) on two equalizer beams (31).
- (5) Install two adapters (43) in each equalizer beam (31).



9-3. AXLE NO. 1 ASSEMBLY REPLACEMENT (CONT).

WARNING

- Axle No. 1 weighs 1,950 lbs (885 kg). Attach a transmission jack prior to installation. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

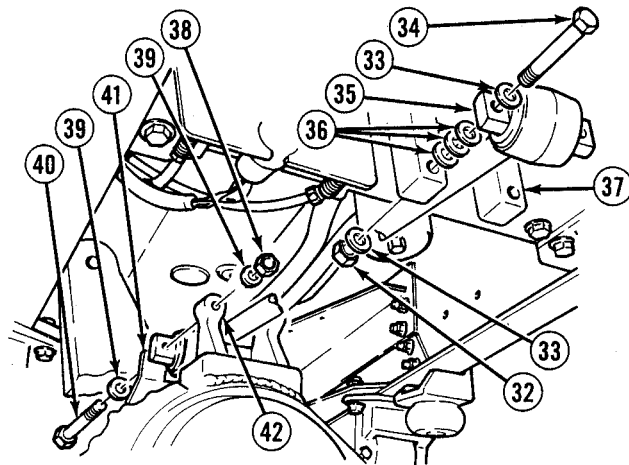


- (6) Coat threads of screw (30) with lubricating oil.
- (7) With the aid of an assistant, install screw (30), two washers (29) and locknut (28) in each equalizer beam (31). Tighten locknuts to 210 to 240 lb-ft (285 to 325 N-m).
- (8) With the aid of an assistant, position axle end of torque rod (35) and bracket (41) on axle bracket (42) with two screws (40), four washers (39) and two locknuts (38).

NOTE

Install same number and size spacers as noted during removal.

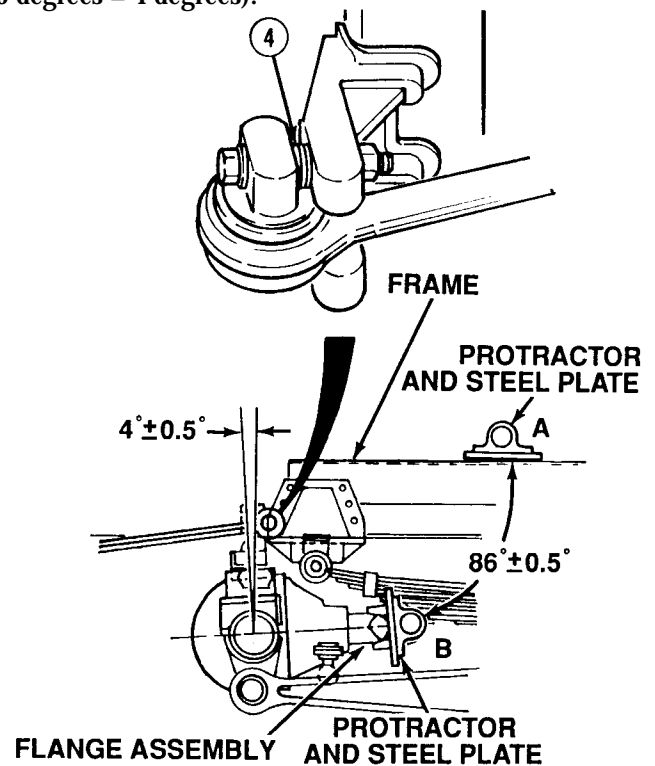
- (9) With the aid of an assistant, position spacers (36), truck end of torque rod (35), two screws (34), four washers (33) and two locknuts (32) in bracket (37).
- (10) With the aid of an assistant, tighten two locknuts (38) on screws (40).
- (11) With the aid of an assistant, tighten two locknuts (32) on screws (34).



NOTE

- Equalizer beams and frame must be level to perform axle camber adjustment properly.
- Axle camber angle measurements must be taken with relationship to frame. If frame is not level, the angle the frame is inclined must be added or subtracted from the axle camber measurement.
- Axle flange assembly measurement of $86 \text{ degrees} \pm 0.5 \text{ degrees}$ equals axle camber of $4 \text{ degrees} \pm 0.5 \text{ degrees}$ ($90 \text{ degrees} - 86 \text{ degrees} = 4 \text{ degrees}$).

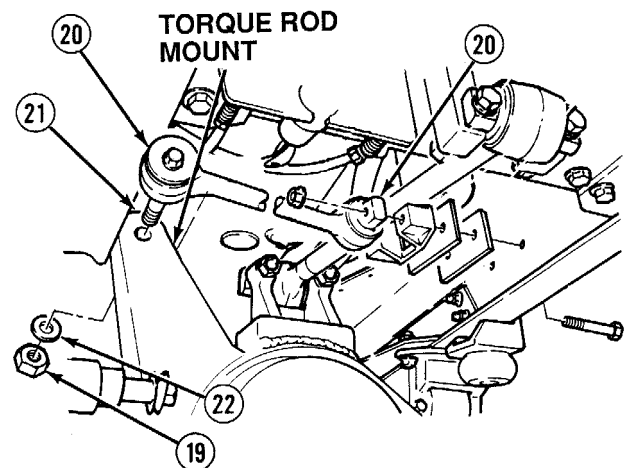
- (12) Measure the angle (in degrees) that flange assembly (8) is cambered.
 - (a) Position protractor and steel plate on frame at point A. Adjust protractor to zero degrees.
 - (b) Position protractor and steel plate on machined surface of the flange assembly (8) and record measurement. Measurement should read $86 \text{ degrees} \pm 0.5 \text{ degrees}$.
- (13) If axle camber is not $4 \text{ degrees} \pm 0.5 \text{ degrees}$, add or subtract spacers (36) until correct axle camber is achieved.
- (14) Remove chains and transmission jack from Axle No. 1 (21).
- (15) Coat threads on shaft of torque rod (20) with lubricating oil.
- (16) Install tapered shaft of torque rod (20) in Axle No. 1 (21).



NOTE

Tighten locknut only until locknut is flush with threads of torque rod. Otherwise, other end of torque rod will be difficult to install.

- (17) Position washer (22) and locknut (19) on torque rod (20).



9-3. AXLE NO. 1 ASSEMBLY REPLACEMENT (CONT).

NOTE

Install same number and size spacers (26), bracket (25) and truck end of torque rod (20) on frame (27) with two screws (24) and locknuts (23).

- (18) With the aid of an assistant, install spacers (26), bracket (25) and truck end of torque rod (20) on frame (27) with two screws (24) and locknuts (23).

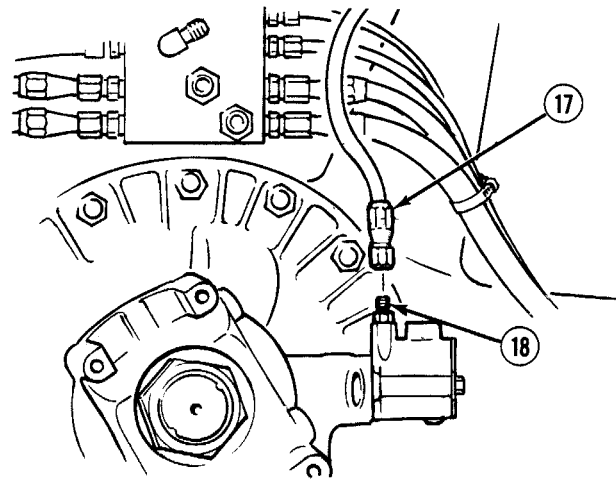
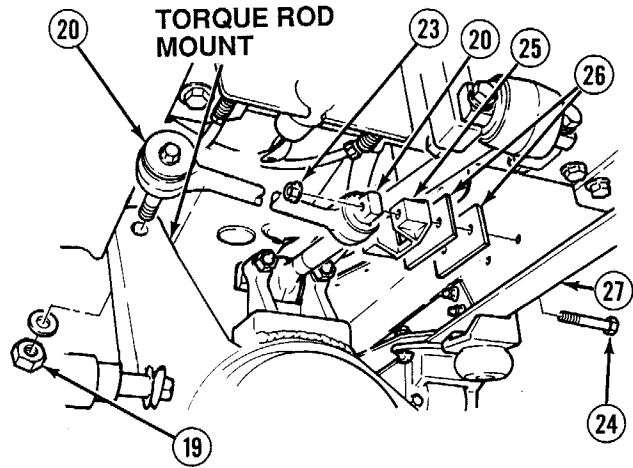
- (19) Tighten locknut (19) on torque rod (20) to 175 to 225 lb-ft (237 to 305 N-m).

NOTE

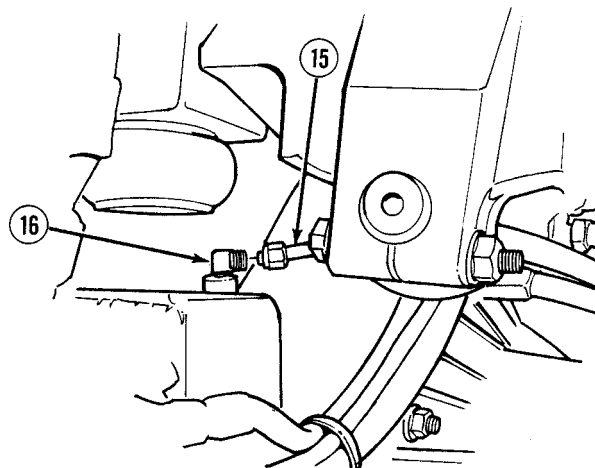
To seat torque rod, strike torque rod mount of axle with hammer.

- (20) Retighten locknut (19) on torque rod (20) to 175 to 225 lb-ft (237 to 305 N-m).

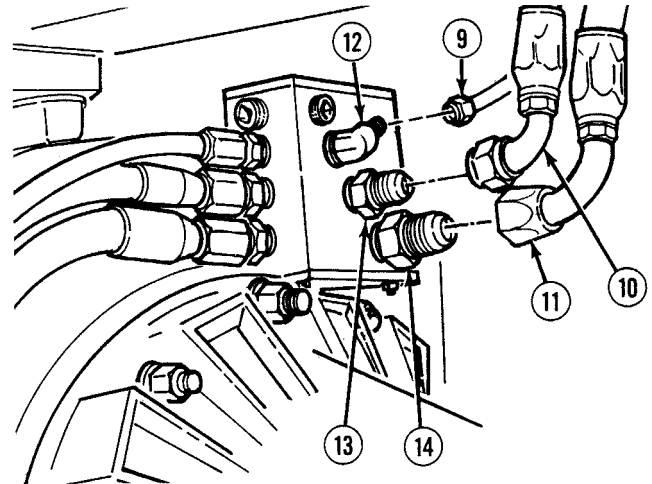
- (21) Install air line 2419 (17) to fitting (18).



- (22) Install breather line (15) to elbow (16).

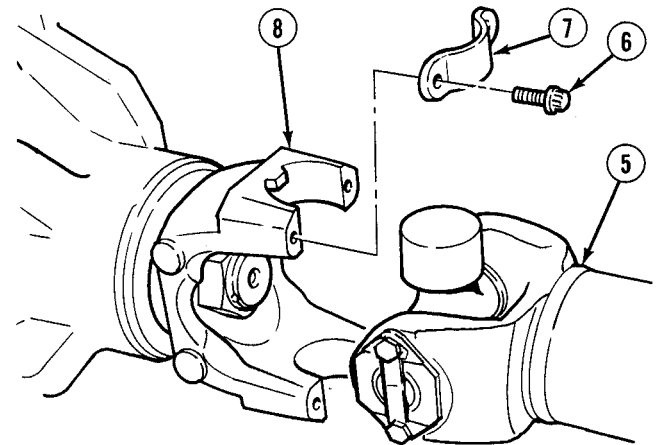


- (23) Install air line 2874 (9), air line 2543 (10) and air line 2096 (11) to elbow (12) and fittings (13) and (14).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Driveshafts can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshaft can fall and cause injury to personnel.



- (24) Coat threads of four screws (6) with sealing compound.
- (25) Position driveshaft (5) in flange assembly (8).
- (26) Install two brackets (7) and four screws (6) on flange assembly (8). Tighten screws to 55 to 60 lb-ft (75 to 81 N·m).

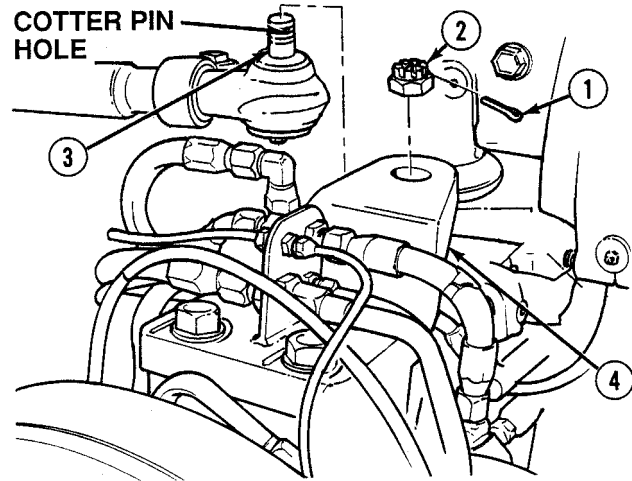
9-3. AXLE NO. 1 ASSEMBLY REPLACEMENT (CONT).

- (27) Install drag link (3) in steering arm (4) with castle nut (2). Tighten castle nut to 165 lb-ft (224 N·m).

NOTE

It may be necessary to rotate castle nut slightly to install cotter pin.

- (28) Install cotter pin (1) in castle nut (2).



c. Follow-On Maintenance:

- Install shock absorbers, (TM 9-2320-364-20).
- Fill axle oil, (TM 9-2320-364-20).
- Align suspension, (Para 12-8).
- Adjust brakes, (TM 9-2320-364-20).
- Install wheels/tires, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).
- Check operations, (TM 9-2320-364-10).

END OF TASK

9-4. AXLE NO. 2 ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Hammer, Hand, Soft Plastic (Item 88, Appendix F)
- Jack, Kit, Hydraulic Hand (Item 129, Appendix F)
- Jack, Transmission (Item 131, Appendix F)
- Protractor, Square (Item 171, Appendix F)
- Wrench, Combination 1-1/4 in. (Item 256, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
- Steel Plate (Appendix C)

Personnel Required

Two

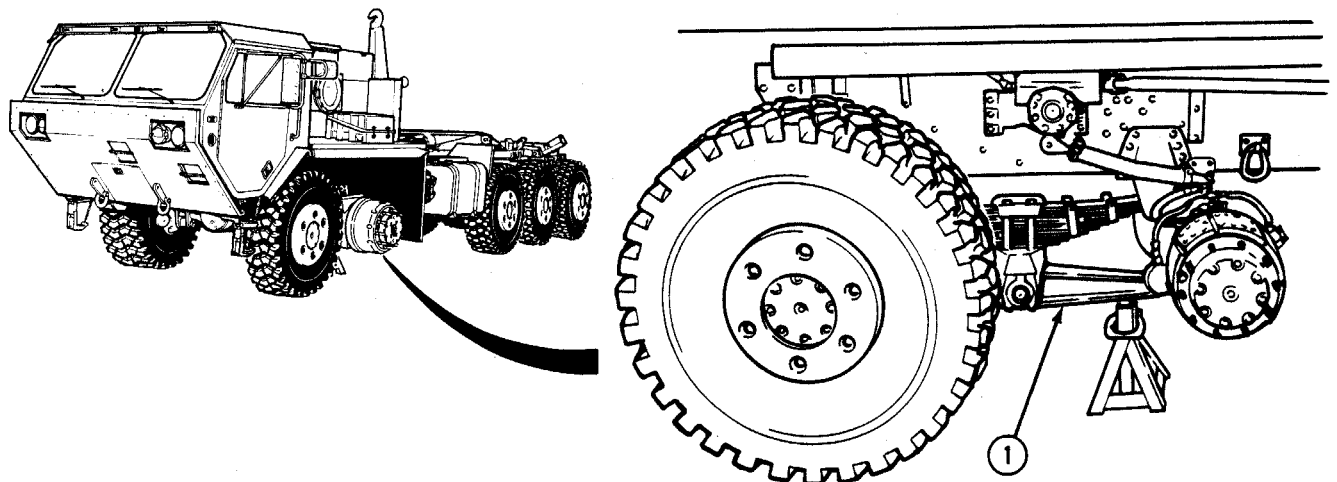
Materials/Parts

- Cable Ties (Item 9, Appendix B)
- Oil, Lubricating (Item 36, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Locknut (2) (Item 166, Appendix E)
- Locknut (Item 181, Appendix E)
- Locknut (2) (Item 182, Appendix E)
- Locknut (2) (Item 188, Appendix E)
- Lockwasher (2) (Item 252, Appendix E)
- Pin, Cotter (Item 421, Appendix E)

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Wheels/tires removed, (TM 9-2320-364-10)
- Shock absorbers removed, (TM 9-2320-364-20)
- Axle oil drained, (TM 9-2320-364-20)
- Brake drums removed, (TM 9-2320-364-20)

a. Removal.



WARNING

Axle No. 2 weighs 1,950 lbs (885 kg). Use jackstands to support axles. Failure to do so could result in injury to personnel.

- (1) Position jackstands under axle No. 2 end of equalizer beams (1).

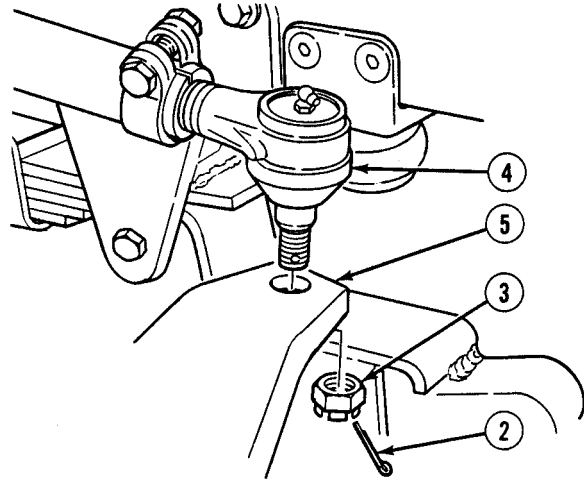
9-4. AXLE NO. 2 ASSEMBLY REPLACEMENT (CONT).

- (2) Remove and discard cotter pin (2) from castle nut (3).
- (3) Remove castle nut (3) from drag link (4).

NOTE

It may be necessary to tap on steering arm bracket with hammer to remove drag link.

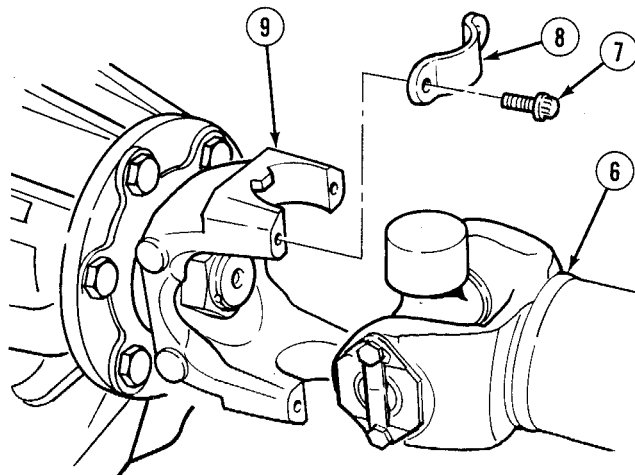
- (4) With the aid of an assistant, apply upward pressure to drag link (4) and remove drag link (4) from steering arm bracket (5).
- (5) Tie axle end of drag link (4) up out of way with cable tie.



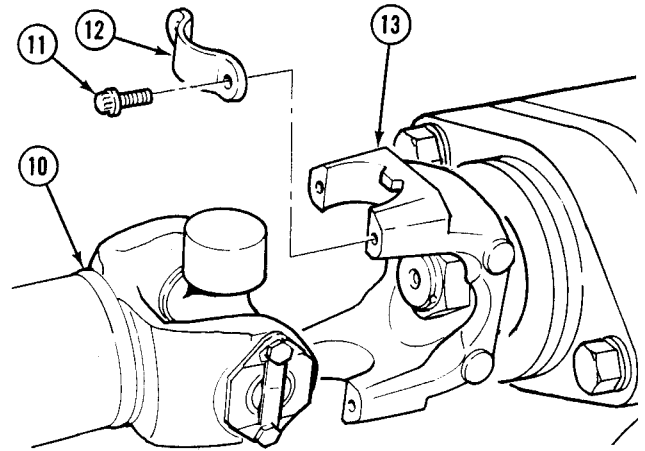
WARNING

Driveshafts can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshaft can fall and cause serious injury to personnel.

- (6) With the aid of an assistant, support driveshaft (6), and remove four screws (7) and two brackets (8).
- (7) Remove Axle No. 2 end of driveshaft (6) from flange assembly (9).
- (8) With the aid of an assistant, support driveshaft (6), and tie axle end of driveshaft up out of way with cable tie.



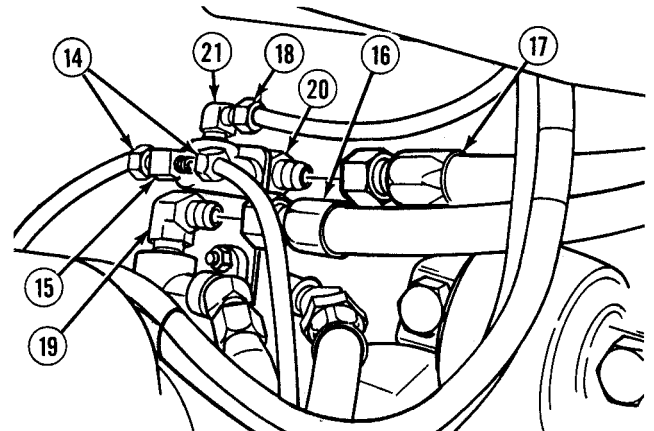
- (9) With the aid of an assistant, support driveshaft (10), and remove four screws (11) and two brackets (12).
- (10) Remove Axle No. 2 end of driveshaft (10) from flange assembly (13).
- (11) With the aid of an assistant, support driveshaft (10), and tie axle end of driveshaft up out of way with cable tie.



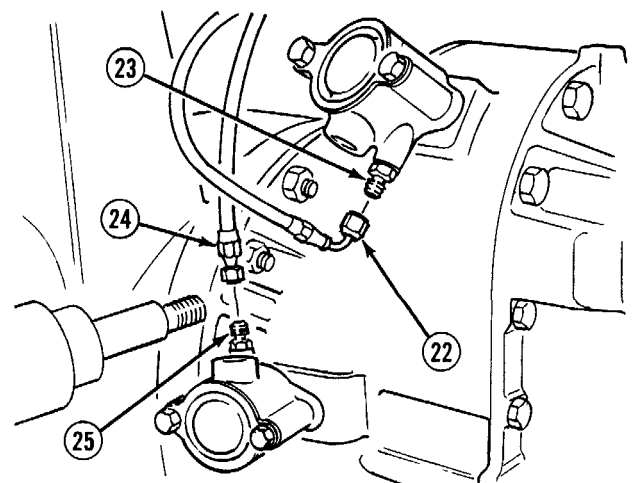
NOTE

Tag and mark air lines prior to removal.

- (12) Remove two air lines 2874 (14) from tee (15), and air line 2544 (16), air line 2098 (17) and air line 2874 (18) from elbows (19), (20) and (21).



- (13) Remove air line 2056 (22) from fitting (23).
- (14) Remove air line 2420 (24) from fitting (25).



9-4. AXLE NO. 2 ASSEMBLY REPLACEMENT (CONT).

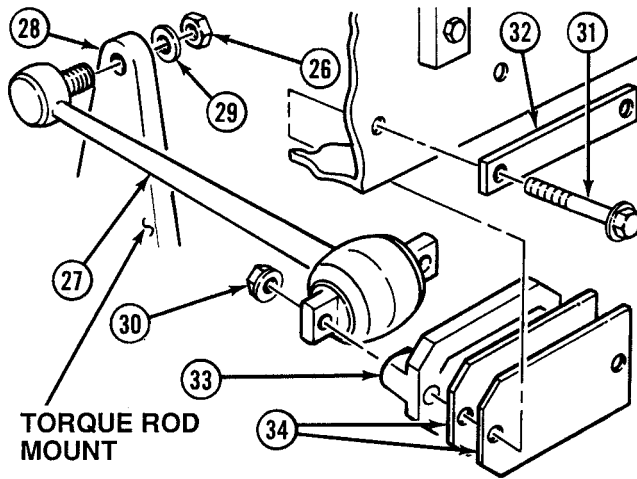
- (15) Loosen locknut (26) until locknut is flush with threaded end of torque rod (27).

WARNING

Torque rod is under extreme pressure when being pressed from axle. Torque rod can be dangerous when it breaks loose and could cause injury to personnel.

NOTE

Strike torque rod mount with soft-face hammer while pressure is being applied to torque rod.

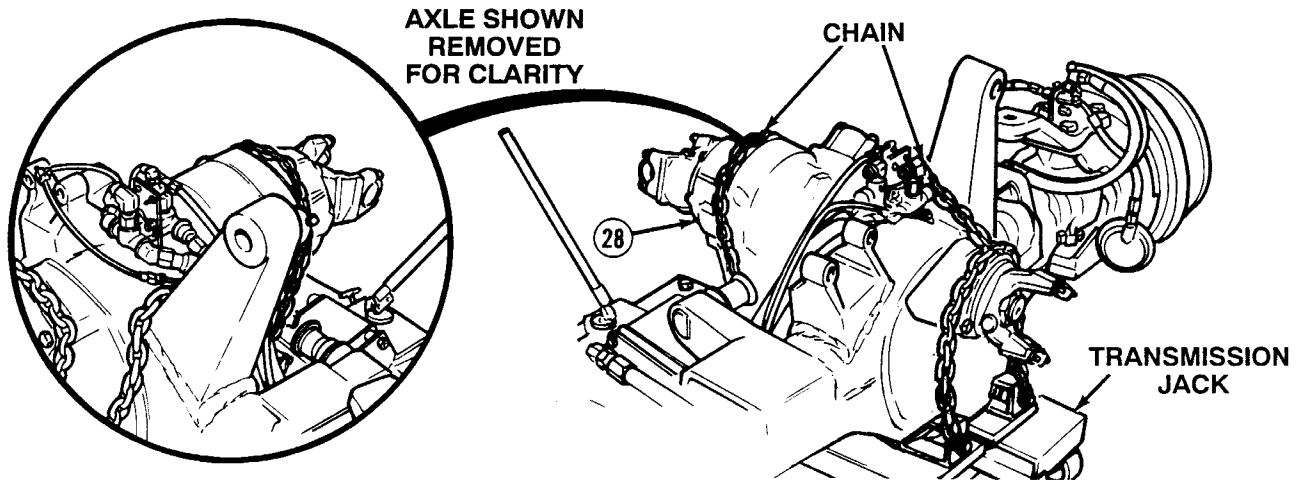


- (16) Using hand jack kit, press tapered end of torque rod (27) from Axle No. 2 (28) until torque rod is loosened.
- (17) Remove locknut (26) and washer (29) from torque rod (27). Discard locknut.

NOTE

Tag and note number and size of spacers for installation.

- (18) With aid of assistant, remove two locknuts (30), screws (31), torque rod (27), plate (32), bracket (33) and spacers (34). Discard locknuts.

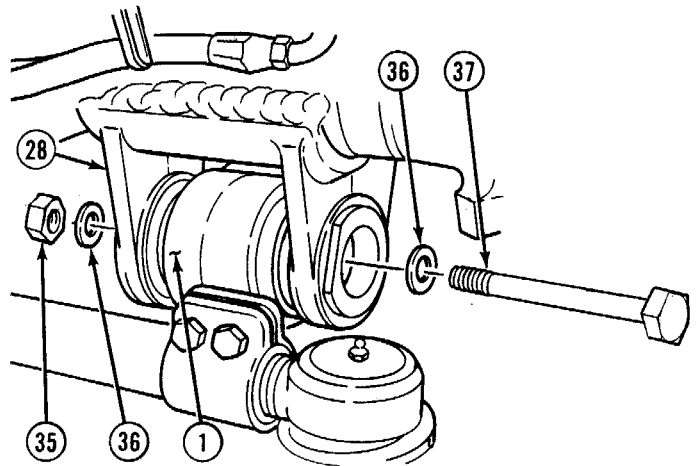


WARNING

- Axle No. 2 weighs 1,907 lbs (866 kg) (without brake drums). Attach a transmission jack prior to removal. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

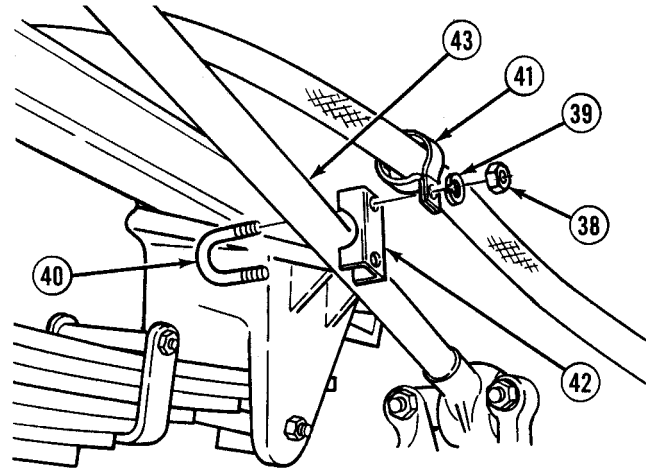
(19) Position Axle No. 2 (28) on transmission jack and secure with chains.

(20) With the aid of an assistant, remove locknut (35), washer (36) and screw (37) from each equalizer beam (1) and Axle No. 2 (28). Discard locknuts.

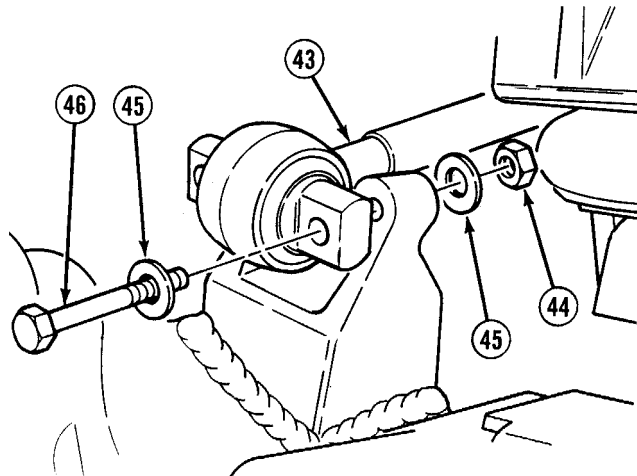


9-4. AXLE NO. 2 ASSEMBLY REPLACEMENT (CONT).

- (21) Remove two nuts (38), lockwashers (39), U-bolt (40), clamp (41) and U-bolt half (42) from torque rod (43). Discard lockwashers.



- (22) With the aid of an assistant, remove two locknuts (44), four washers (45) and two screws (46) from torque rod (43). Discard locknuts.



- (23) With aid of assistant, remove two locknuts (47), washers (48) and plate (49) from two screws (50). Discard locknuts.

NOTE

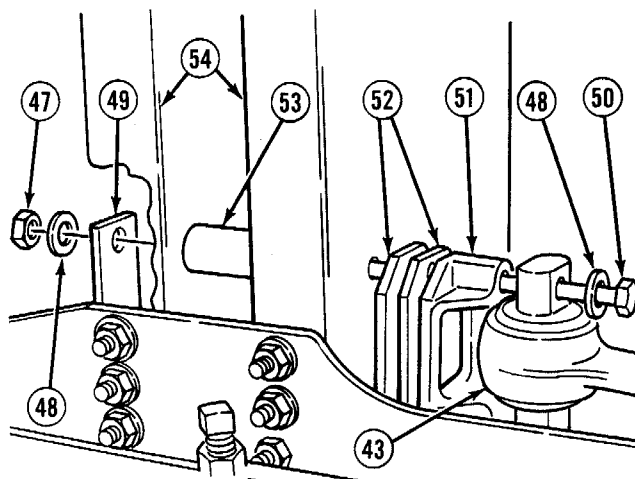
Tag and note number and size of spacers.

- (24) With aid of assistant, remove two screws (50), washers (48), torque rod (43), bracket (51) and spacers (52).

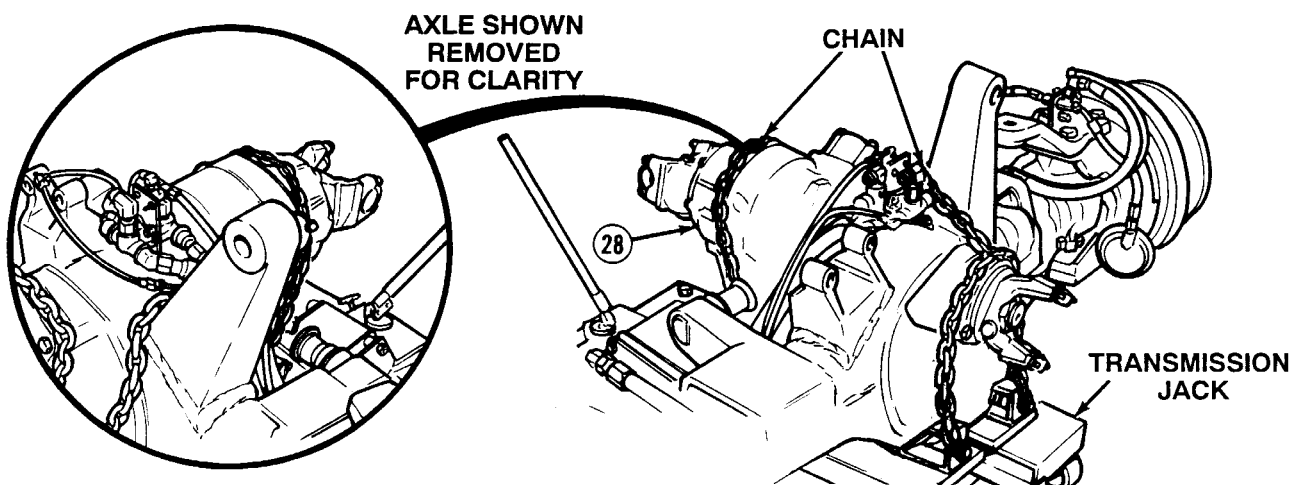
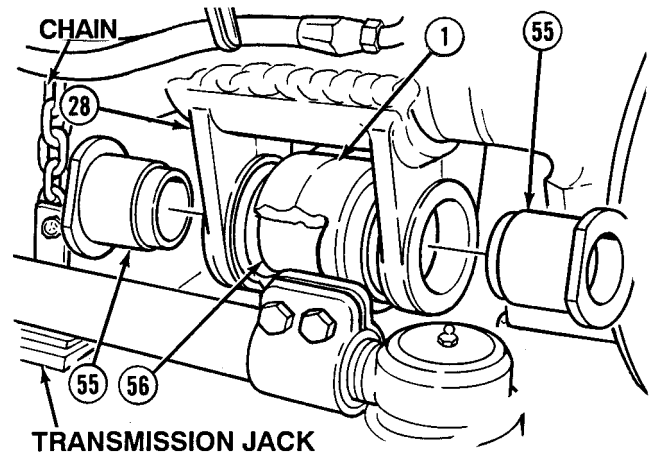
NOTE

Perform Step (25) if spacers are damaged.

- (25) Remove two spacers (53) from between frame rails (54).



- (26) Remove two adapters (55) from each equalizer beam (1) and Axle No. 2 (28).
- (27) With the aid of an assistant, use transmission jack to remove Axle No. 2 (28) from equalizer beams (1).
- (28) Remove spacer (56) from each equalizer beam (1).



- (29) Remove Axle No. 2 (28) from transmission jack.

b. Installation.

WARNING

- Axle No. 2 weighs 1,907 lbs (866 kg) (without brake drums). Attach a transmission jack prior to installation. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

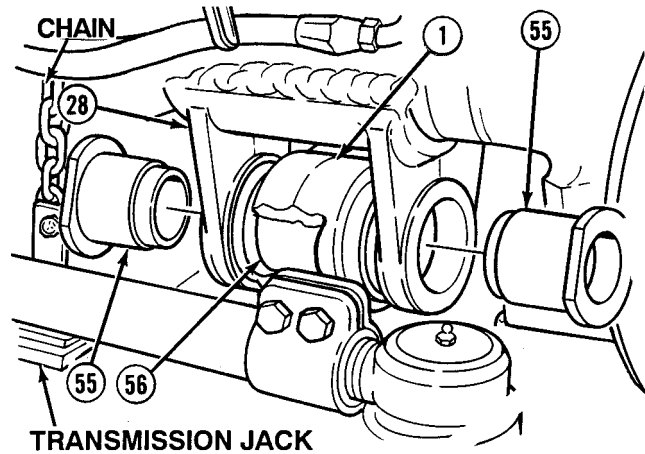
NOTE

If installing a new axle, remove and discard brake drum retaining screws.

- (1) Position Axle No. 2 (28) on transmission jack and secure with chains.

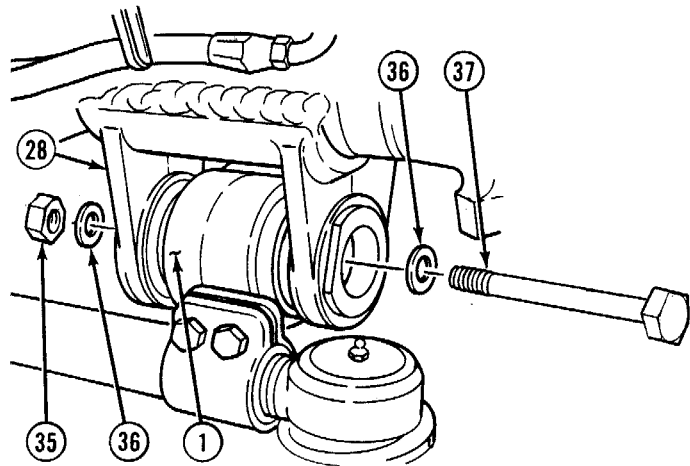
9-4. AXLE NO. 2 ASSEMBLY REPLACEMENT (CONT).

- (2) Coat outside diameters of two spacers (56) and four adapters (55) with lubricating oil.
- (3) Install spacer (56) in each equalizer beam (1) and Axle No. 2 (28).



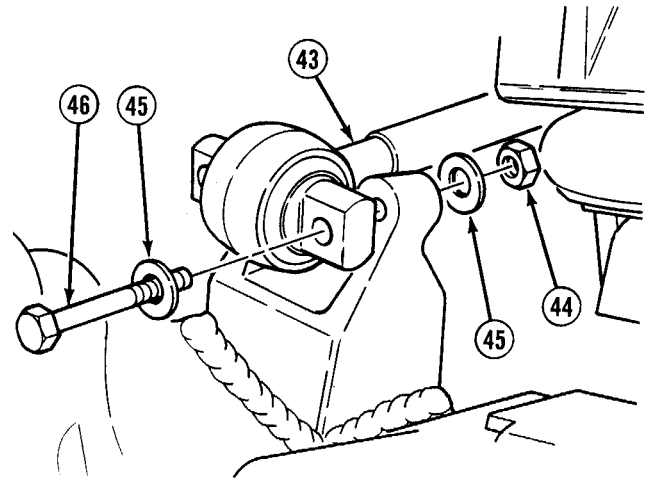
WARNING

- Axle No. 2 weighs 1,907 lbs (866 kg) (without brake drums). Attach a transmission jack prior to installation. The axle must be chained to the transmission jack or an out of balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.



- (4) With the aid of an assistant, use transmission jack to position Axle No. 2 (28) under truck.
- (5) Install two adapters (55) in each equalizer beam (1).
- (6) Coat threads of screw (37) with lubricating oil.
- (7) With the aid of an assistant, install screw (37), two washers (36) and locknut (35) in each equalizer beam (1) of Axle No. 2 (28). Tighten locknut 210 to 240 lb-ft (285 to 325 N-m).

- (8) With the aid of an assistant, position axle end of torque rod (43) with two screws (46), four washers (45) and two locknuts (44).



NOTE

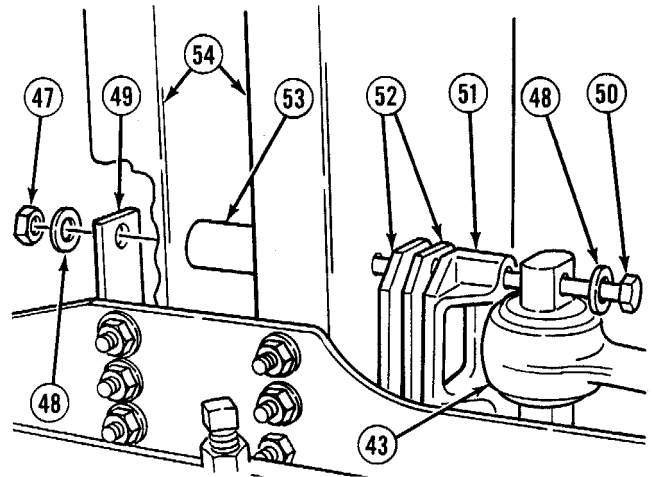
Perform Step (9) if spacers were removed.

- (9) Install two spacers (53) between frame rails (54).

NOTE

Install same number and size spacers as noted during removal.

- (10) With the aid of an assistant, position spacers (52), bracket (51) and truck end of torque rod (43) with two screws (50), washers (48), plate (49) and two locknuts (47).



- (11) With the aid of an assistant, tighten two locknuts (44) on screw (46).

- (12) With the aid of an assistant, tighten two locknuts (47) on screw (50).

9-4. AXLE NO. 2 ASSEMBLY REPLACEMENT (CONT).

NOTE

- Equalizer beams and frame must be level to perform axle camber adjustment properly.
- Axle camber angle measurements must be taken with relationship to frame. If frame is not level, the angle the frame is inclined must be added or subtracted from flange assembly measurement.
- Axle flange assembly measurement of $87 \text{ degrees} \pm 0.5 \text{ degrees}$ equals axle camber of $3 \text{ degrees} \pm 0.5 \text{ degrees}$ ($90 \text{ degrees} - 87 \text{ degrees} = 3 \text{ degrees}$).

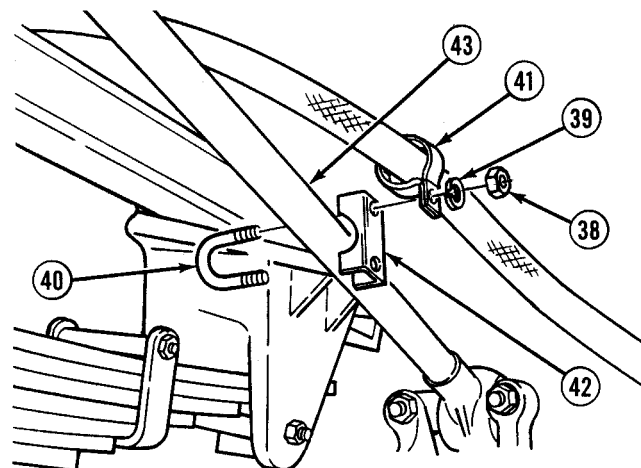
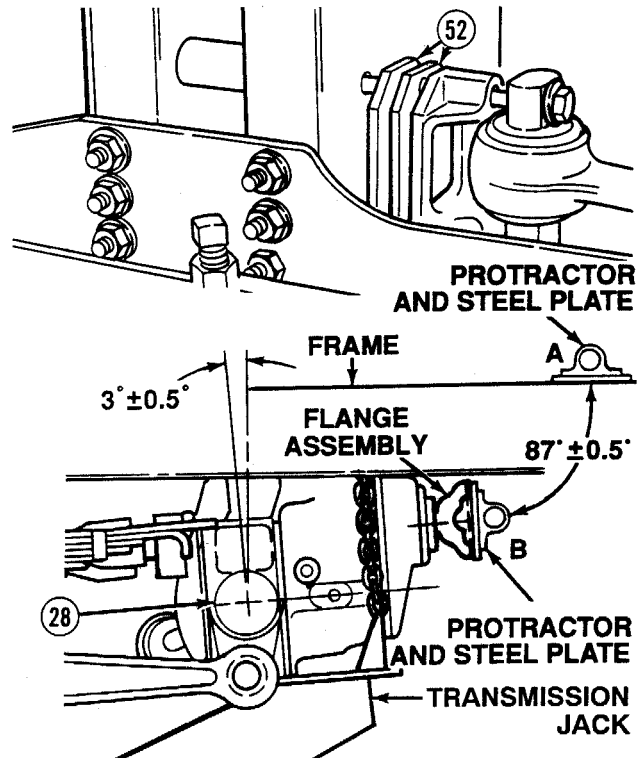
(13) Measure the angle (in degrees) that flange assembly (9) is cambered.

- Position protractor and steel plate on frame at point A. Adjust protractor to zero degrees.
- Position protractor and steel plate on machined surface of the flange assembly (9) at point B and record measurement. Measurement should read $87 \text{ degrees} \pm 0.5 \text{ degrees}$.

(14) If axle camber is not $3 \text{ degrees} \pm 0.5 \text{ degrees}$, add or subtract spacers (52) until axle camber is correct.

(15) Remove transmission jack from Axle No. 2 (28).

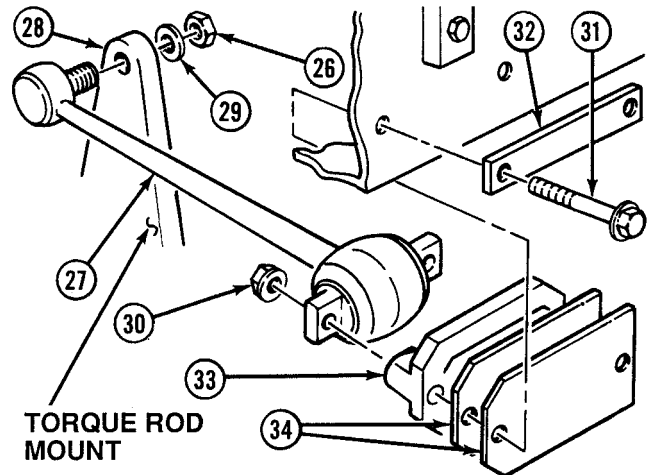
(16) Install U-bolt half (42), U-bolt (40) and clamp (41) on torque rod (43) with two lockwashers (39) and nuts (38).



- (17) Coat threads on tapered shaft of torque rod (27) with lubricating oil.
- (18) Install tapered shaft of torque rod (27) in Axle No. 2 (28).

NOTE

Tighten locknut only until threads of locknut are fully engaged with threads of torque rod. Otherwise, other end of torque rod will be difficult to install.



- (19) Position washer (29) and locknut (26) on torque rod (27).

NOTE

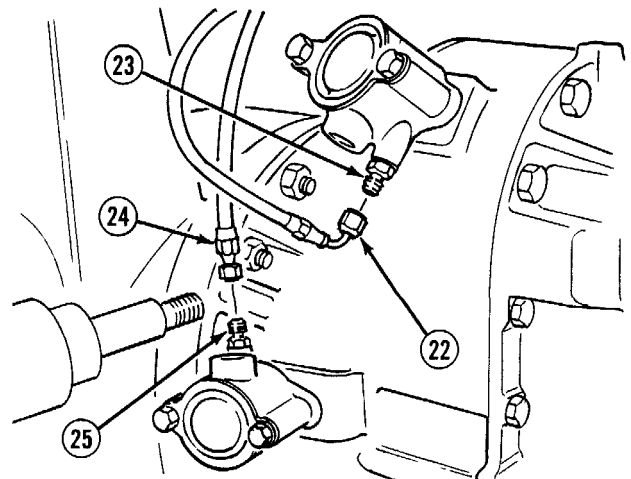
Install same number and size spacers as noted during removal.

- (20) With the aid of an assistant, install plate (32), spacers (34), bracket (33) and end of torque rod (27) with two screws (31) and locknuts (30).
- (21) Tighten locknut (26) on torque rod (27) to 175 to 225 lb-ft (237 to 305 N·m).

NOTE

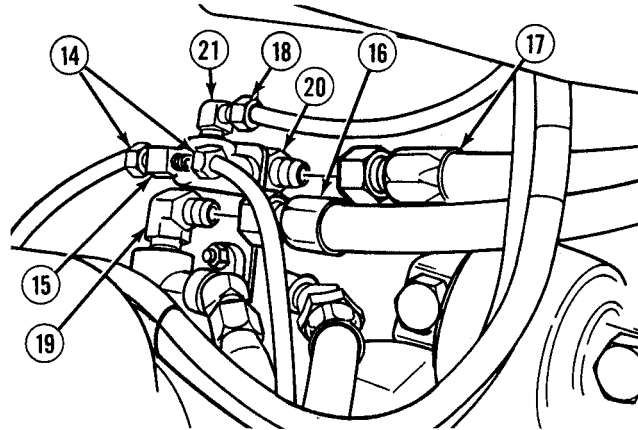
To seat torque rod, strike torque rod mount of axle with hammer.

- (22) Retighten locknut (26) on torque rod (27) to 175 to 225 lb-ft (237 to 305 N·m).
- (23) Install air line 2420 (24) to fitting (25).
- (24) Install air line 2056 (22) to fitting (23).



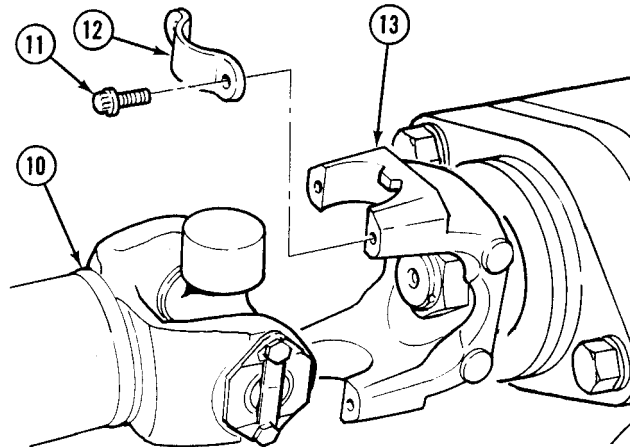
9-4. AXLE NO. 2 ASSEMBLY REPLACEMENT (CONT).

- (25) Install air line 2874 (18), air line 2098 (17) and air line 2544 (16) to elbows (21), (20) and (19).
- (26) Install two air lines 2874 (14) to tee (15).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Driveshafts can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshaft can fall and cause serious injury to personnel.



- (27) Coat threads of four screws (11) with sealing compound.
- (28) Position driveshaft (10) in flange assembly (13).
- (29) Install two brackets (12) and four screws (11) in flange assembly (13). Tighten screws 130 to 135 lb-ft (176 to 183 N·m).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (30) Coat threads of four screws (7) with sealing compound.
- (31) Position driveshaft (6) in flange assembly (9).
- (32) Install two brackets (8) and four screws (7) in flange assembly (9). Tighten screws 55 to 60 lb-ft (75 to 81 N·m).
- (33) Install drag link (4) in steering arm (5) with castle nut (3). Tighten castle nut to 165 to 180 lb-ft (224 to 244 N·m).

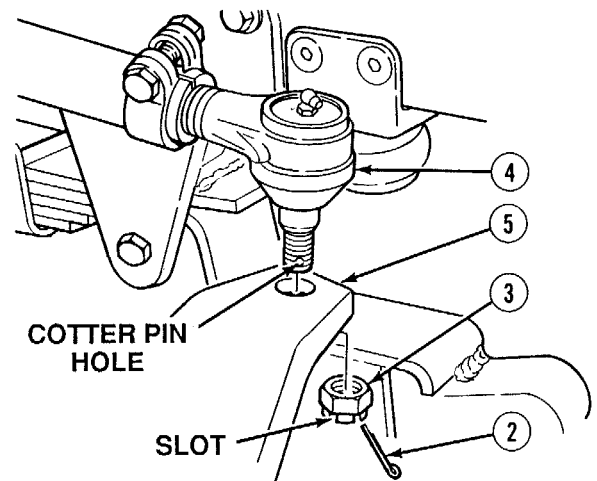
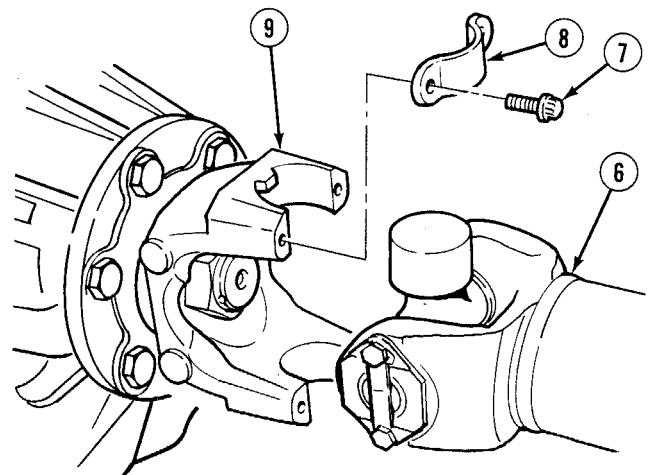
NOTE

It may be necessary to rotate castle nut slightly to install cotter pin.

- (34) Install cotter pin (2) in castle nut (3).

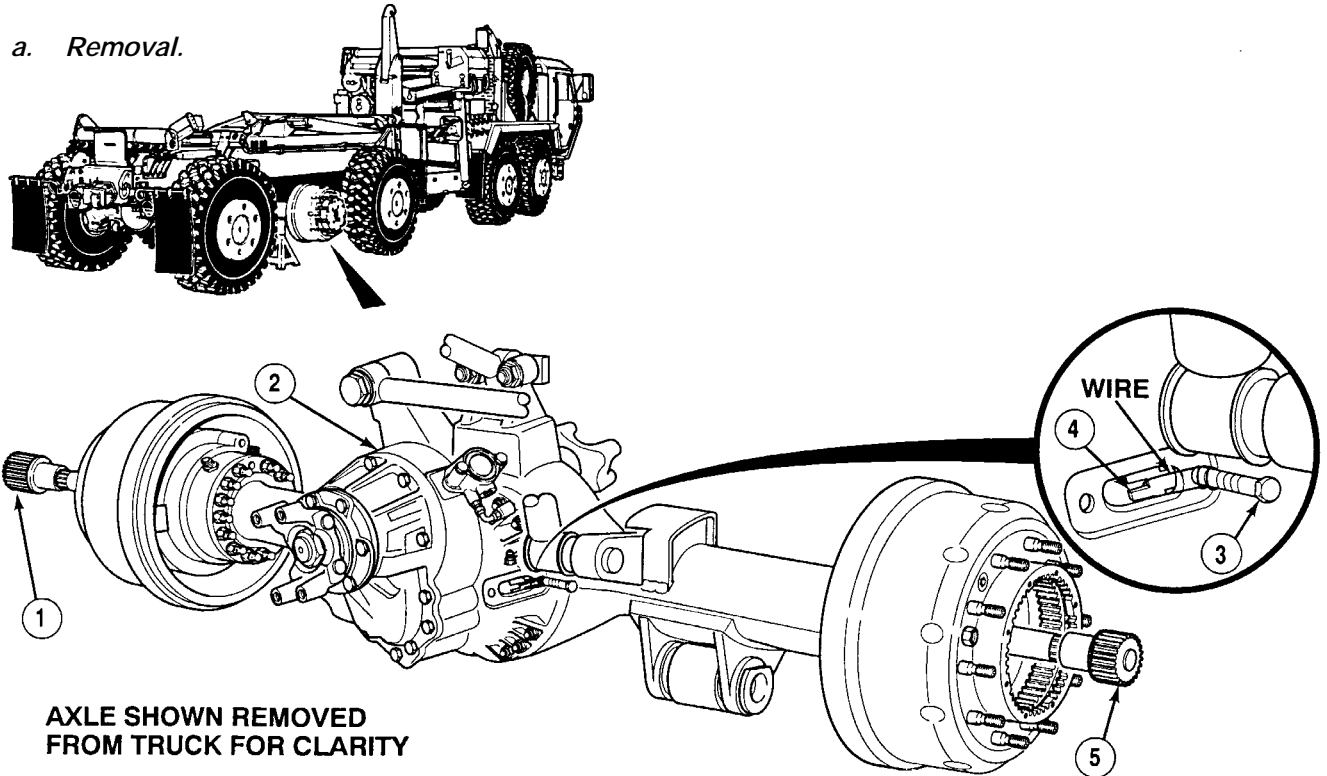
c. Follow-On Maintenance:

- Install brake drums, (TM 9-2320-364-20).
- Install shock absorbers, (TM 9-2320-364-20).
- Fill axle oil, (TM 9-2320-364-20).
- Align suspension, (Para 12-8).
- Adjust brakes, (TM 9-2320-364-20).
- Install wheels/tires, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).
- Check operation, (TM 9-2320-364-10).



END OF TASK

a. Removal.



AXLE SHOWN REMOVED
FROM TRUCK FOR CLARITY

WARNING

Axle No. 3 weighs 1,780 lbs (807 kg) and Axle No. 4 weighs 1,925 lbs (873 kg). Use jackstands to support axles. Failure to do so could result in injury to personnel.

NOTE

- Axle No. 3 and Axle No. 4 shafts are removed the same way. Axle No 4 is shown.
- Step (1) is for right side axle shaft only.

(1) Pull axle shaft (1) from Axle No. 4 housing (2).

CAUTION

Steps (2) through (4) keeps clutch gears from disengaging after axle shaft is removed. Failure to perform Steps (2) through (4) will make installation of axle shaft more difficult and could damage parts.

NOTE

- Steps (2) through (5) are for the left side axle shaft only.
- Screw used in Step (2) is from locking cylinder.

(2) Install screw (3) in Axle No. 4 housing (2).

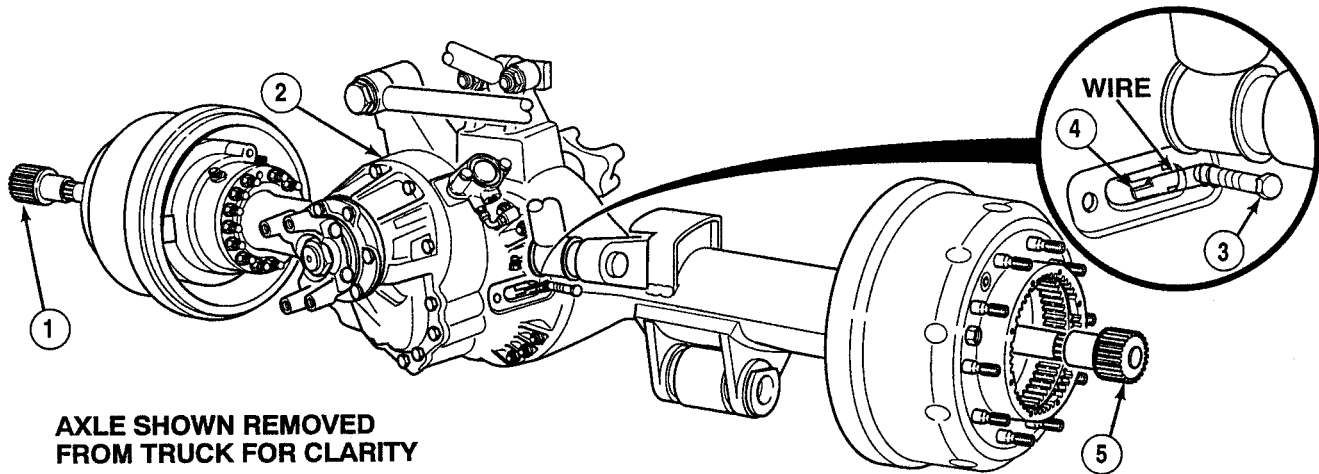
(3) Position a wire around fingers of fork (4).

(4) Wrap wire around screw (3).

(5) Pull axle shaft (5) from Axle No. 4 housing (2).

9-5. AXLE NO. 3 AND 4 AXLE SHAFT REPLACEMENT (CONT).

b. Installation.



WARNING

Axle No. 3 weighs 1,780 lbs (807 kg) and Axle No. 4 weighs 1,925 lbs (873 kg). Use jackstands to support axles. Failure to do so could result in injury to personnel.

NOTE

- Steps (1) and (2) are for left side axle shaft only.
- End of axle shaft with long splines goes in axle housing.
- Axle No. 3 and Axle No. 4 axle shafts are installed the same way. Axle No. 4 shown.
- Axle shaft is installed by aligning axle shaft splines of axle shaft with differential carrier splines and pushing axle shaft inward and upward until axle shaft bottoms out.

- (1) Install axle shaft (5) into Axle No. 4 housing (2).
- (2) Remove screw (3) and wire from fork (4).

NOTE

Step (3) is for right side axle shaft only.

- (3) Install axle shaft (1) into Axle No. 4 housing (2).

c. Follow-On Maintenance:

- Install planetary gear assembly, (Para 9-6).
- Fill axle oil, (TM 9-2320-364-20).
- Install locking cylinder, (Axle No. 3 [Para 9-17]) or (Axle No. 4 [Para 9-16]) (left side only).
- Install wheels/tires, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

9-6. AXLE PLANETARY HUB GEARS REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Socket, Socket Head Screw 12 mm (Item 206, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Extractor, Jet (Appendix C)

Materials/Parts

- Adhesive (Item 1, Appendix B)
- Sealing Compound (Item 56, Appendix B)

Materials/Parts - Continued

- Locknut (8) (Item 217, Appendix E)

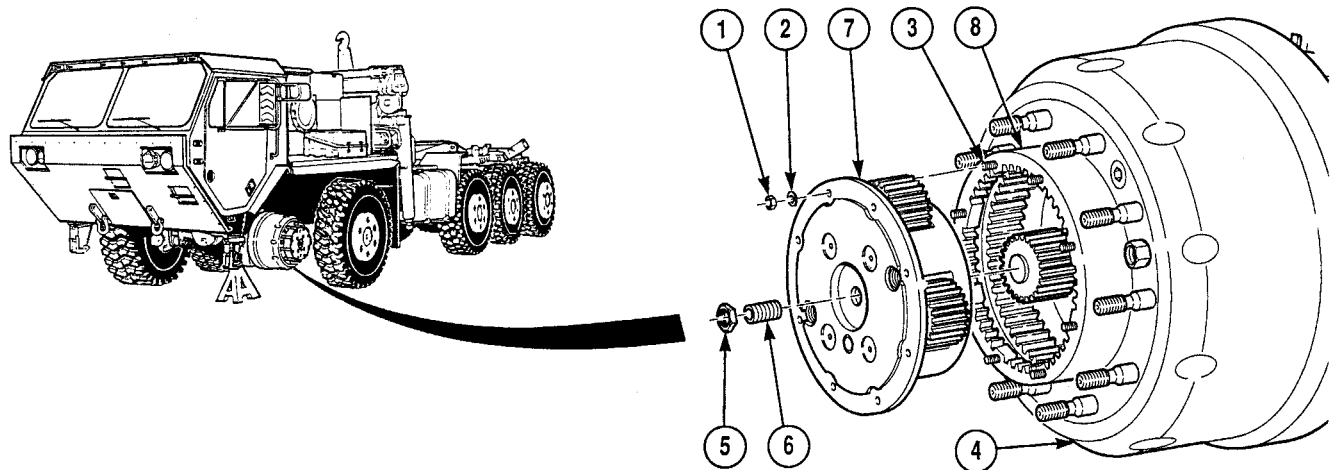
Personnel Required

Two

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Wheels/tires removed, (TM 9-2320-364-10)
- Wheel end oil drained, (TM 9 2320-364-20)

a. Removal.



NOTE

All planetary hub gears are removed the same way. Axle No. 1 is shown.

- (1) Remove eight locknuts (1) and washers (2) from studs (3). Discard locknuts.

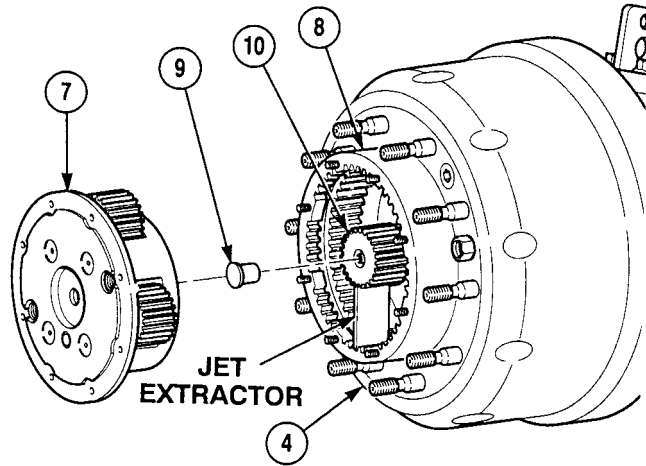
NOTE

If screw comes off with nut, separate screw from nut and re-install screw.

- (2) Hold hub (4) and remove nut (5) from screw (6).
- (3) Turn screw (6) clockwise until planetary gear carrier assembly (7) is separated from ring gear carrier assembly (8).
- (4) Turn screw (6) counterclockwise and remove from planetary gear carrier assembly (7).

9-6. AXLE PLANETARY HUB GEARS REPLACEMENT (CONT).

- (5) Remove planetary gear carrier assembly (7) from ring gear carrier assembly (8) of hub (4).
- (6) Remove end cap (9) from sun gear (10).
- (7) Position jet extractor between teeth of sun gear (10) and teeth of ring gear carrier assembly (8).

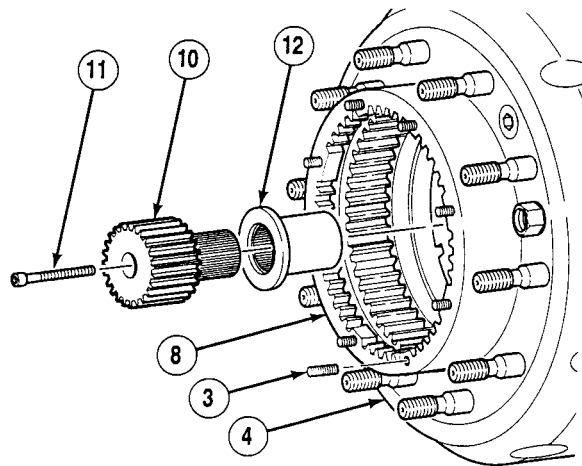


- (8) Remove screw (11) from sun gear (10) and hub (4).
- (9) Remove jet extractor from sun gear (10) and hub (4).
- (10) Remove sun gear (10) and muff (12) from ring gear carrier assembly (8).

NOTE

Perform Step (11) if studs are damaged.

- (11) Remove eight studs (3) from ring gear carrier assembly (8).



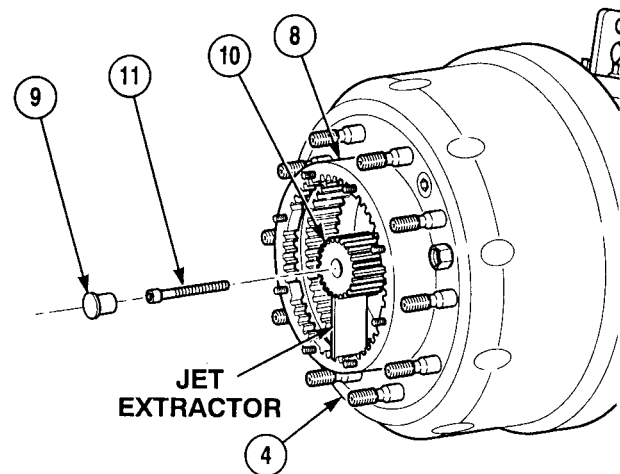
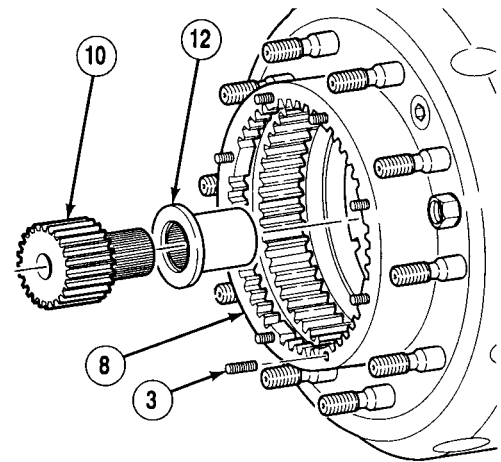
b. *Installation.***WARNING**

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

Perform Steps (1) and (2) if studs were removed.

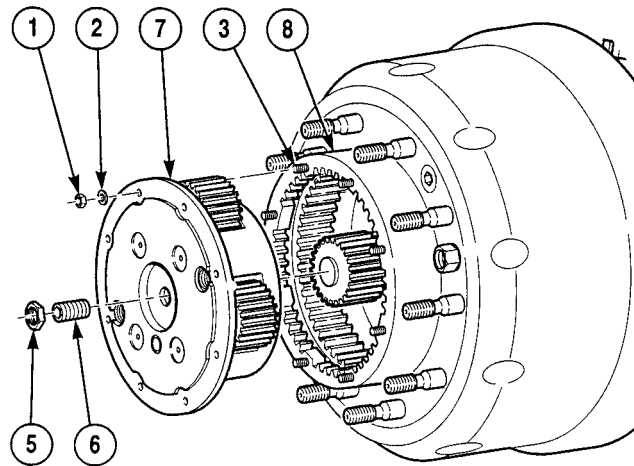
- (1) Coat threads of eight studs (3) with sealing compound.
- (2) Install eight studs (3) in ring gear carrier assembly (8). Tighten studs to 65 lb-ft (88 N·m).
- (3) Install muff (12) and sun gear (10) in ring gear carrier assembly (8).
- (4) Position jet extractor between teeth of sun gear (10) and teeth of ring gear carrier assembly (8).
- (5) Coat threads of screw (11) with sealing compound.
- (6) Install screw (11) in sun gear (10) and hub (4). Tighten screw to 135 to 165 lb-ft (183 to 224 N·m).
- (7) Install end cap (9) on sun gear (10).



9-6. AXLE PLANETARY HUB GEARS REPLACEMENT (CONT).

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.



- (8) Coat mating surface of ring gear carrier assembly (8) with adhesive.
- (9) Position planetary gear carrier assembly (7) in ring gear carrier assembly (8).
- (10) Coat protruding threads of eight studs (3) with sealing compound.
- (11) Install eight washers (2) and locknuts (1) on studs (3). Tighten locknuts to 31 lb-ft (42 N·m).
- (12) Install screw (6) in planetary gear carrier assembly (7) and tighten until screw bottoms out. Back screw off 3/4 of a turn.
- (13) Coat protruding threads of screw (6) with adhesive.
- (14) Install nut (5) on screw (6). Tighten nut to 87 lb-ft (118 N·m).

c. Follow-On Maintenance:

- Fill wheel ends, (TM 9-2320-364-20).
- Install wheels/tires, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

9-7. AXLE NO. 1 AND 5 FLANGE ASSEMBLY AND OIL SEAL REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Multiplier, Torque (Item 141, Appendix F)
Pan, Drain 4 gal (Item 144, Appendix F)
Socket, 55 mm (Item 217, Appendix F)
Puller Kit, Universal, Slide Hammer
(Item 175, Appendix F)
Wrench Set, Socket 3/4 in. Drive
(Item 274, Appendix F)
Wrench, Torque (0 to 600 lb-ft [0-814 N·m])
(Item 278, Appendix F)
Holder, Flange (Appendix C)

Materials/Parts

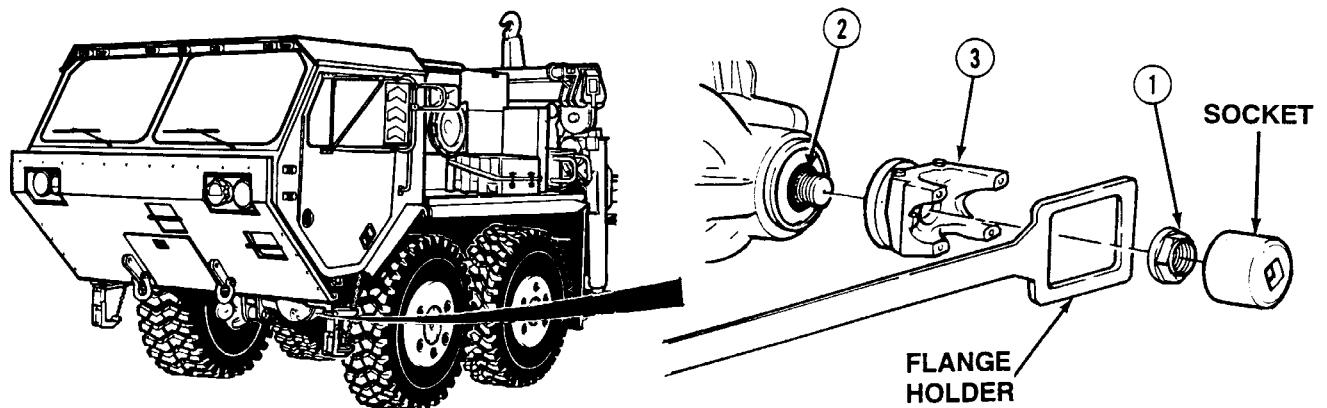
Adhesive (Item 1, Appendix B)
Nut, Adjusting (Item 308, Appendix E)
Sealing Compound (Item 56, Appendix B)
Grease (Item 22, Appendix B)

Personnel Required

Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Driveshaft disconnected, (TM 9-2320-364-20)

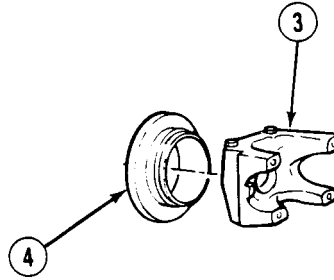
a. Removal.**NOTE**

- Axle No. 1 and Axle No. 5 flange assembly and oil seals are removed the same way. Axle No. 1 is shown.
- Ensure flange is positioned so flange holder can be used.

- (1) Bend up staked parts of adjusting nut (1) on pinion shaft (2).
- (2) With the aid of an assistant and using flange holder and socket, remove adjusting nut (1) from pinion shaft (2). Discard adjusting nut.
- (3) Position drain pan under flange assembly (3) and remove flange assembly (3) from pinion shaft (2).

9-7. AXLE NO. 1 AND 5 FLANGE ASSEMBLY AND OIL SEAL REPLACEMENT (CONT).

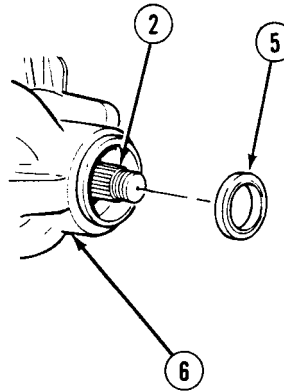
- (4) Separate dust cover (4) from flange assembly (3).



- (5) Using puller, remove oil seal (5) from axle housing (6). Discard oil seal.

b. Installation.

- (1) Coat sealing lip of oil seal (5) with grease.
- (2) Install oil seal (5) in axle housing (6).



- (3) Install dust cover (4) on flange assembly (3).

NOTE

Flange assembly should be positioned so large openings of flange assembly align with slots of pinion shaft. This will ease staking of nut.

- (4) Install flange assembly (3) on pinion shaft (2).

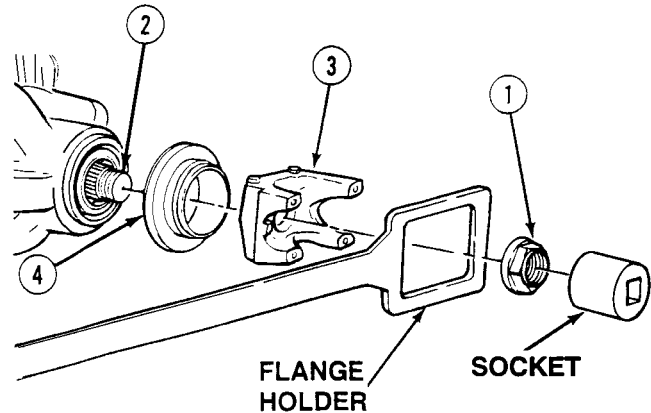
WARNING

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.

- (5) Apply sealing compound to threads of pinion shaft (2).
- (5.1) Apply adhesive to pinion shaft (2), and face of flange assembly (3) where adjusting nut (1) seats.
- (6) With the aid of an assistant and using flange holder and socket, install adjusting nut (1) on pinion shaft (2). Tighten adjusting nut to 486 to 572 lb-ft (659-776 N·m).
- (7) Ensure adhesive has squeezed out around entire outside diameter of adjusting nut (1). If adhesive is not visible around entire outside diameter of adjusting nut (1), remove and discard adjusting nut (1) and repeat Steps (5) and (6).
- (8) Stake adjusting nut (1) in two slots of pinion shaft (2) directly 180 degrees apart.

c. Follow-On Maintenance:

- Connect driveshaft, (TM 9-2320-364-20).
- Check axle oil level, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-346-10).



END OF TASK

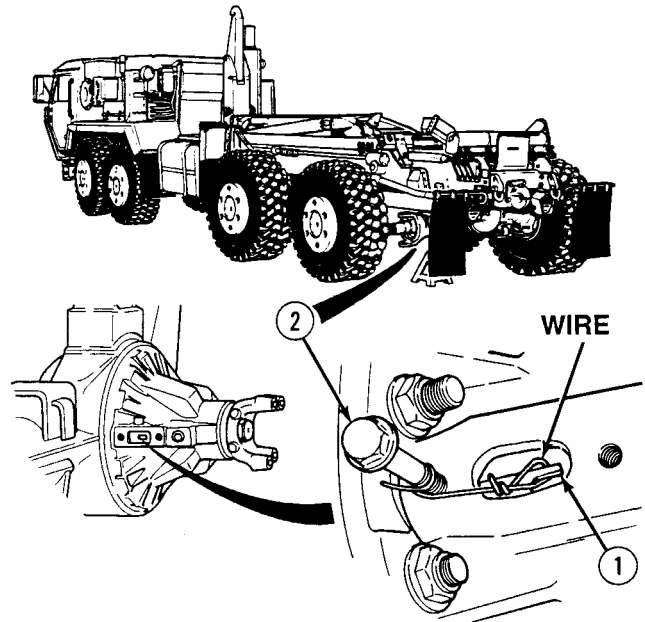
a. *Removal.***CAUTION**

The following Step keeps clutch gear from disengaging after constant velocity shafts are removed. Failure to perform Step makes assembly difficult and could damage parts.

NOTE

- The screw used in Step (1) is from locking cylinder.
- Step (1) is for right side constant velocity shaft removal on Axles No. 1 and 5 only.
- Step (1) is for left side constant velocity shaft removal on Axle No. 2 only.
- Axles No. 1, 2 and 5 constant velocity shafts are removed the same. Axle No. 5 is shown.

- (1) Position a wire around fingers of fork (1) and anchor wire with screw (2).



9-8. AXLE NO. 1, 2, AND 5 CONSTANT VELOCITY JOINT REPAIR (CONT).

(2) Remove constant velocity shaft (3) from axle housing (4).

(3) Remove seal (5) from axle housing (4). Discard seal.

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released and could cause injury to personnel.

(4) Remove retaining ring (6) from axle housing (4). Discard retaining ring.

(5) Using mechanical puller, remove bearing (7) from axle housing (4).

(6) Remove two grease fittings (8) from block (9). Discard grease fittings.

(7) Remove two retaining rings (10) from block (9). Discard retaining rings.

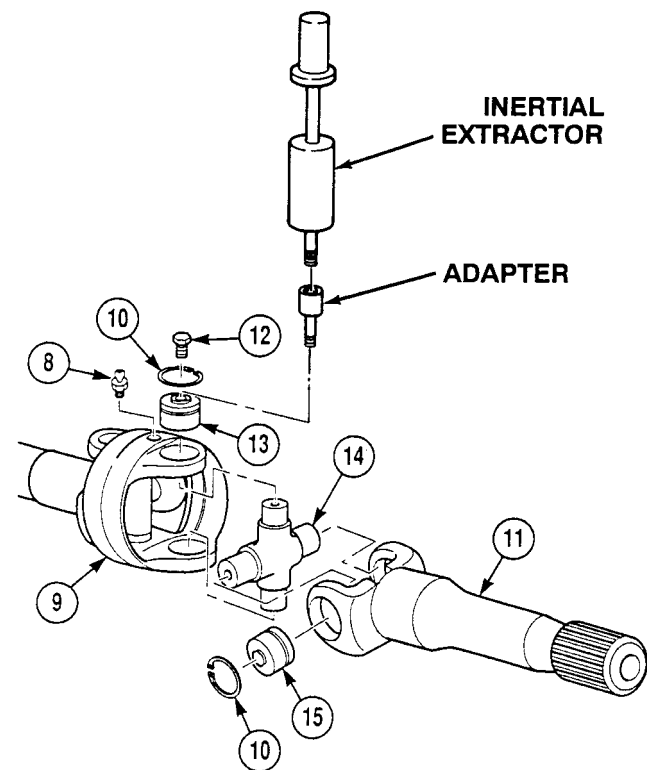
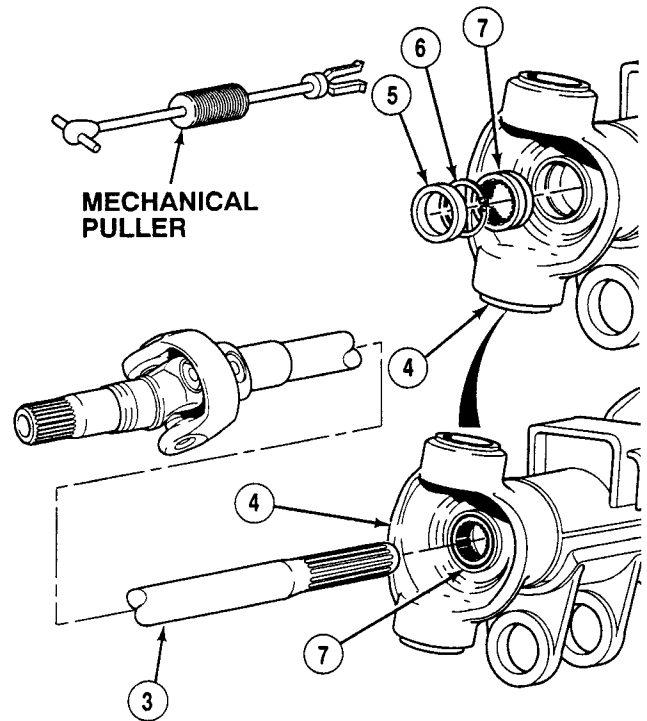
(8) Remove two retaining rings (10) from shaft (11). Discard retaining rings.

(9) Remove two screws (12) from caps (13). Discard screws.

(10) Using inertial extractor and adapter, remove two caps (13) from cross (14) and block (9). Discard caps.

(11) Using a press, remove two caps (15) from cross (14) and shaft (11). Discard caps.

(12) Remove cross (14) from shaft (11). Discard cross.



- (13) Repeat Steps (6) through (12) for remaining shaft.
- (14) Repeat Steps (2) through (12) for remaining axle.

b. Installation.

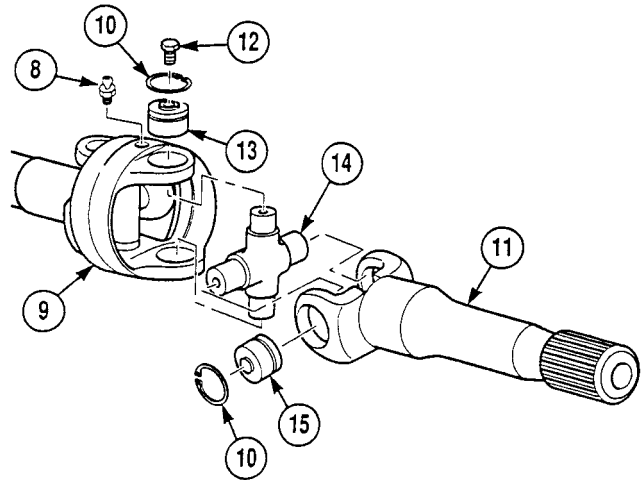
WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released and could cause injury to personnel.

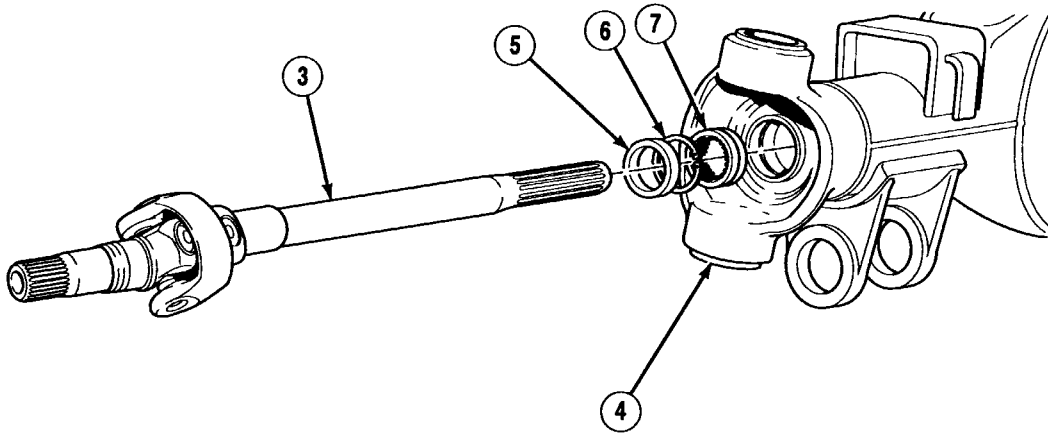
NOTE

Ensure protruding side of cross faces shaft.

- (1) Position cross (14) into shaft (11).
- (2) Install two caps (15) on cross (14) and shaft (11).
- (3) Install two retaining rings (10) on shaft (11).
- (4) Install two caps (13) on cross (14) and block (9).
- (5) Install two retaining rings (10) on block (9).
- (6) Install two screws (12) in caps (13).
- (7) Install two grease fittings (8) on block (9).



9-8. AXLE NO. 1, 2, AND 5 CONSTANT VELOCITY JOINT REPAIR (CONT).



- (8) Coat bearing (7) with light coat of grease.
- (9) Install bearing (7) in axle housing (4).

WARNING

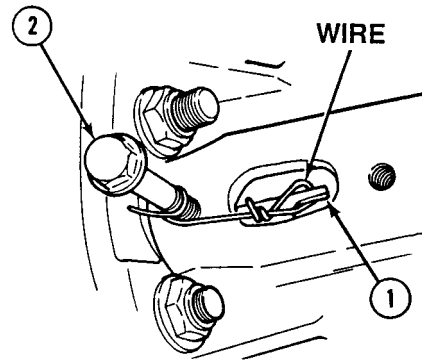
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released and could cause severe eye injury.

- (10) Install retaining ring (6) in axle housing (4).
- (11) Coat seal (5) with a light coat of grease.
- (12) Install seal (5) in axle housing (4).
- (13) Install constant velocity shaft (3) in axle housing (4).
- (14) Repeat Steps (2) through (13) for remaining shaft.

NOTE

Perform Step (15) for Axle No. 1 and Axle No. 5 right side and Axle No. 2 left side.

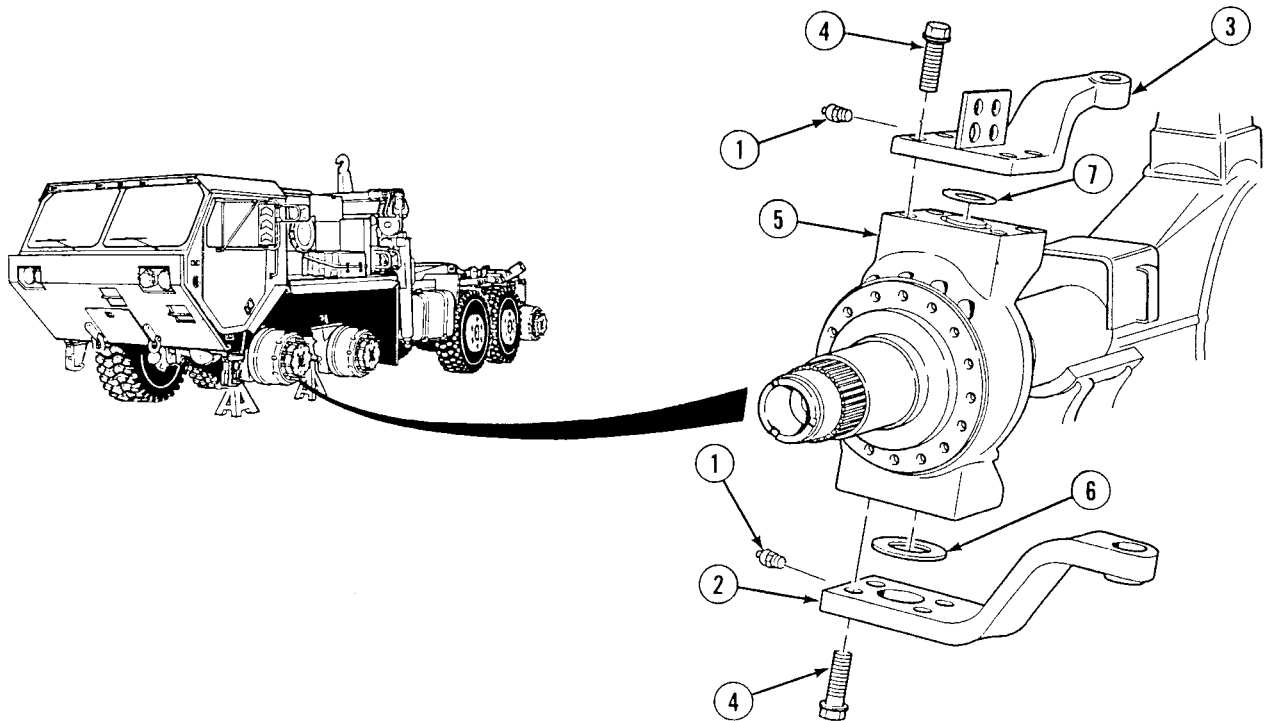
- (15) Remove screw (2) and wire from around fingers of fork (1).



c. Follow-On Maintenance:

- Install pivot and spindle assembly, (Para 9-9).
- Install locking cylinders, (Para 9-15 or Para 9-16).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

a. *Removal.***NOTE**

- Tag and mark all parts prior to removal.
- Pivot and spindle assembly on left side of truck contains steering swivel arm. Pivot and spindle assembly on right side of truck contains upper cover.
- Procedures for spindles are the same. Axle No. 1 left side is shown.

- (1) Remove two grease fittings (1) from steering swivel arm (2) and steering arm (3).
- (2) Remove four screws (4) and steering swivel arm (2) from pivot and spindle assembly (5).
- (3) Remove shim (6) from pivot and spindle assembly (5). Discard shim.
- (4) Remove four screws (4) and steering arm (3) from pivot and spindle assembly (5).
- (5) Remove shim (7) from pivot and spindle assembly (5). Discard shim.

9-9. AXLE NO. 1, 2 AND 5 PIVOT AND SPINDLE ASSEMBLY AND OUTER AXLE SHAFT SEAL AND BEARING REPLACEMENT (CONT).

WARNING

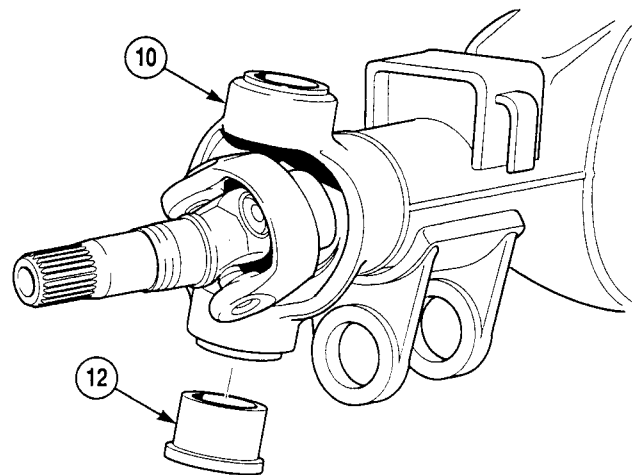
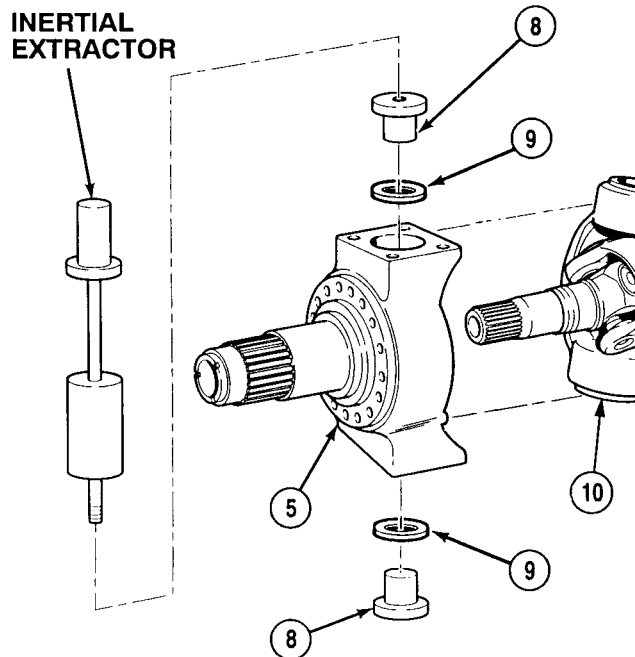
Pivot and spindle assembly weighs 90 lbs (41 kg). Support pivot and spindle assembly prior to removal to prevent possible injury to personnel.

- (6) With the aid of an assistant, support pivot and spindle assembly (5) and use inertial extractors to remove two trunnions (8).
- (7) Remove two oil seals (9) by tapping down on one side of oil seal to knock it loose. Discard oil seals.

CAUTION

Support constant velocity shaft during removal of pivot and spindle assembly to prevent damage to bearings inside pivot and spindle assembly.

- (8) With the aid of an assistant, remove pivot and spindle assembly (5) from axle housing (10) and axle shaft (11).
- (9) Using a chisel remove two trunnion bearings (12) from axle housing (10).



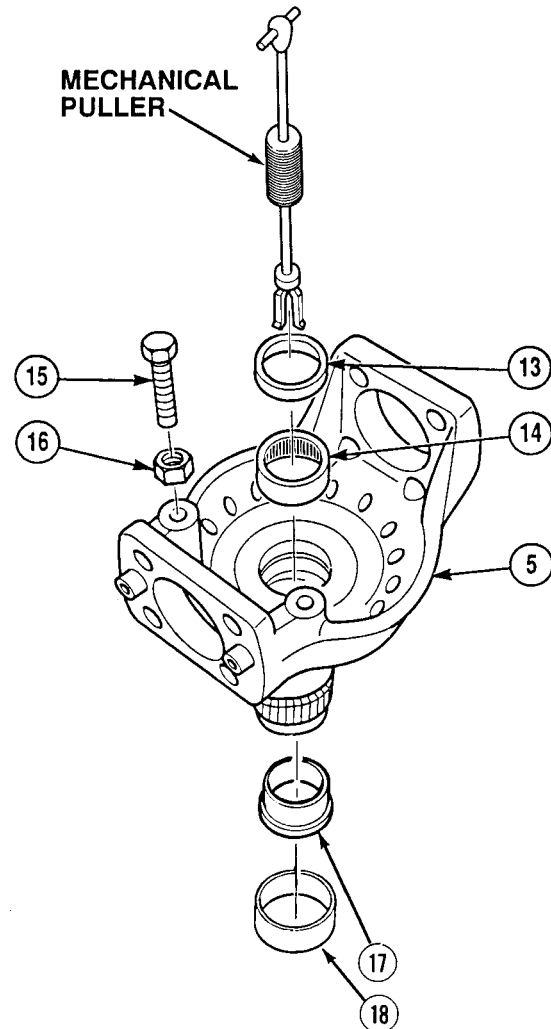
- (10) Using a mechanical puller remove seal (13) and bearing (14) from pivot and spindle assembly (5). Discard seal and bearing.
- (11) Remove steering stop bolt (15) and nut (16) from pivot and spindle assembly (5).
- (12) Remove spindle ring (17) from spindle assembly (5).
- (13) Remove seal race (18) from pivot and spindle assembly (5).

b. Installation.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply sealing compound to inside of seal race (18).
- (2) Install seal race (18) on pivot and spindle assembly (5).
- (3) Apply sealing compound to outside of spindle ring (17).
- (4) Install spindle ring (17) on spindle assembly (5).
- (5) Install steering stop bolt (15) and locking nut (16) on pivot and spindle assembly (5).
- (6) Lightly coat seal (13) and bearing (14) with grease.
- (7) Install bearing (14) in pivot and spindle assembly (5).
- (8) Install seal (13) in pivot and spindle assembly (5).

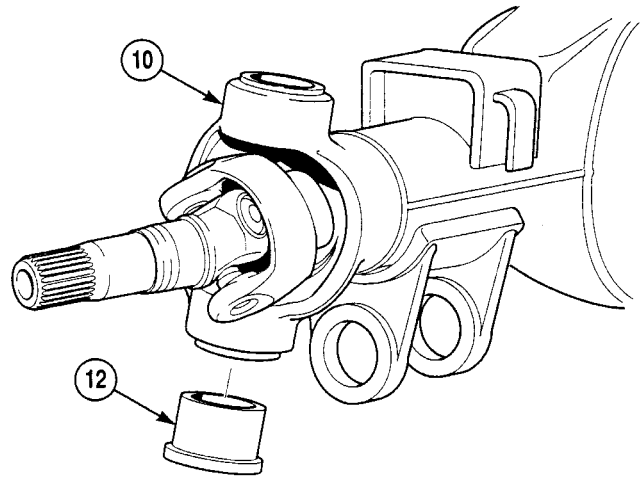


9-9. AXLE NO. 1, 2 AND 5 PIVOT AND SPINDLE ASSEMBLY AND OUTER AXLE SHAFT SEAL AND BEARING REPLACEMENT (CONT).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (9) Lightly coat surface of two trunnion bearings (12) with sealant.
- (10) Install two trunnion bearings (12) to axle housing (10).
- (11) Coat two oil seals (9) and inside of pivot and spindle assembly (5) where trunnions (8) seat with grease.



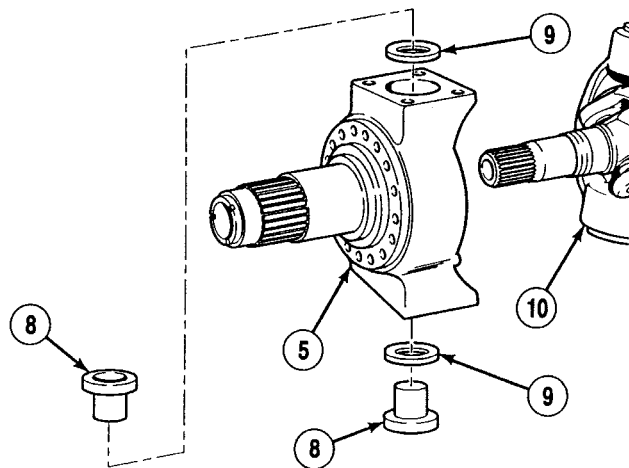
WARNING

Pivot and spindle assembly weighs 90 lbs (41 kg). Use the aid of an assistant to prevent possible injury to personnel.

CAUTION

Support axle during installation of pivot and spindle assembly to prevent damage to bearings inside pivot and spindle assembly.

- (12) With the aid of an assistant install pivot and spindle assembly (5) on axle housing (10).



NOTE

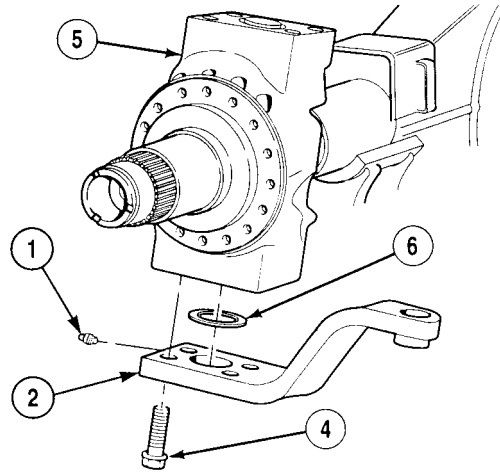
Lip of oil seal should be facing toward bottom of trunnions when installed.

- (13) Install two oil seals (9) on two trunnions (8).
- (14) With the aid of an assistant, align pivot and spindle assembly (5) and install two trunnions (8) into pivot and spindle assembly with soft faced mallet.

WARNING

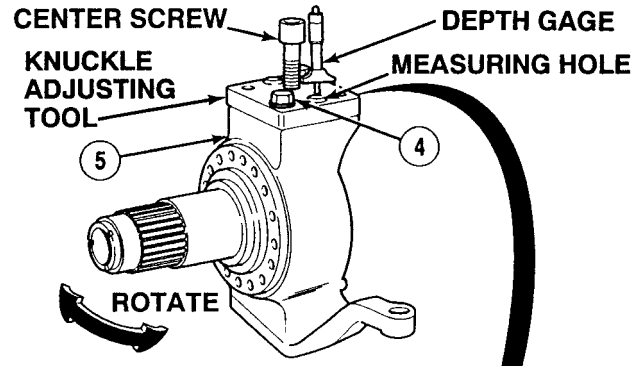
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (15) Coat mating surface of steering swivel arm (2) and pivot and spindle assembly (5) with adhesive.
- (16) Install 0.0039 in. (0.10 mm) shim (6) on steering swivel arm (2).
- (17) Position steering swivel arm (2) on pivot and spindle assembly (5).
- (18) With the aid of an assistant install four screws (4). Using torque wrench and multiplier, tighten screws first to 250 lb-ft (339 N·m), then to 500 lb-ft (678 N·m) and then to 720 to 800 lb-ft (976 to 1085 N·m).
- (19) Install grease fitting (1) on steering swivel arm (2).



9-9. AXLE NO. 1, 2 AND 5 PIVOT AND SPINDLE ASSEMBLY AND OUTER AXLE SHAFT SEAL AND BEARING REPLACEMENT (CONT).

- (20) Install knuckle adjusting tool on pivot and spindle assembly (5) with two screws (4). Tighten screws to 200 lb-ft (271 N·m).
- (21) Install center screw of adjusting tool. Tighten center screw to 200 lb-ft (271 N·m).
- (22) Loosen center screw slightly until pivot and spindle assembly (5) rotates freely.
- (23) Center pivot and spindle assembly (5).
- (24) Tighten center screw in adjusting tool to 50 lb-ft (68 N·m).



NOTE

Measure distance through measuring hole.

- (25) Using depth gage, measure distance from top of adjusting tool to top of pivot and spindle assembly (5) and record as dimension A.
- (26) Using depth gage, measure distance from top of adjusting tool to top of trunnion (8) and record as dimension B.
- (27) Subtract dimension A from dimension B (B - A). The answer is the gap between pivot and spindle assembly (5) and top of trunnion (8).
- (28) Refer to Table 9-1 to determine shim (7) thickness.
- (29) Remove two screws (4) and adjusting tool.

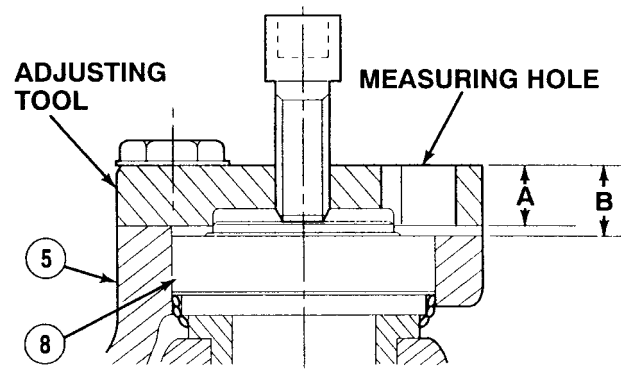


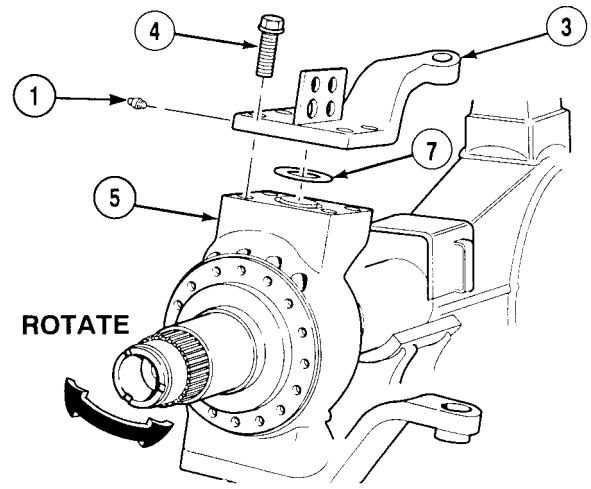
Table 9-1. Determining Shim Thickness

Gap between pivot and spindle assembly and trunnion	Shim thickness
0.018 to 0.022 in. (0.46 - 0.56 mm)	0.016 in. (0.4 mm)
0.022 to 0.026 in. (0.56 - 0.66 mm)	0.020 in. (0.5 mm)
0.026 to 0.030 in. (0.66-0.76 mm)	0.024 in. (0.6 mm)
0.030 to 0.033 in. (0.76-0.84 mm)	0.028 in. (0.7 mm)
0.033 to 0.037 in. (0.84-0.94 mm)	0.031 in. (0.8 mm)
0.037 to 0.041 in. (0.94-1.04 mm)	0.035 in. (0.9 mm)
0.041 to 0.045 in. (1.04-1.14 mm)	0.039 in. (1.0 mm)

- (30) Position pivot and spindle assembly (5) to centered position (parallel to axle).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (31) Coat mating surface of spindle assembly (5) with adhesive.
- (32) Install shim (7), thickness determined in Step (24), on steering arm (3).
- (33) Install steering arm (3) on pivot and spindle assembly (5).
- (34) Install four screws (5). Tighten screws to 100 lb-ft (136 N·m).
- (35) Install grease fitting (1) to pivot and spindle assembly (5).
- (36) Rotate pivot and spindle assembly (5) around three times to check for excessive play or force. If incorrect, repeat Steps (16) through (25).
- (37) Tighten four screws (4) first to 250 lb-ft (339 N·m), then to 500 lb-ft (678 N·m) and then to 720 to 800 lb-ft (976 to 1085 N·m).
- (38) With torque wrench on screw (4), verify that pivot and spindle assembly (5) requires between 57 to 72 lb-ft (77 to 98 N·m) to start rotation of the pivot and spindle assembly (5) about its pivot from the center position. If incorrect, repeat Steps (16) through (34).

c. *Follow-On Maintenance:*

- Install axle air lines, (TM 9-2320-364-20).
- Install tie rod end, (TM 9-2320-364-20).
- Install brake assembly, (Para 10-2).
- Install self-recovery winch (SRW) rear guide (axle no. 5 only), (TM 9-2320-364-20).
- Install wheels/tires, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

9-10. AXLE NO. 1, 2 AND 5 INNER AND OUTER AXLE SHAFT SEALS AND BEARING REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Extractor, Internal (Item 56, Appendix F)
- Extractor, Internal (Item 57, Appendix F)
- Gage, Depth (Item 71, Appendix F)
- Micrometer (Item 139, Appendix F)
- Multiplier, Torque (Item 141, Appendix F)
- Plier, Retaining Ring (Item 154, Appendix F)
- Puller Kit, Universal,
- Slide Hammer (Item 175, Appendix F)
- Tool, Knuckle, Adjusting (Item 243, Appendix F)
- Wrench Set, Socket, 3/4 in. (Item 274, Appendix F)
- Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
- Lifting Device - Minimum Capacity 300 lbs (136 kg)

Materials/Parts

- Adhesive (Item 2, Appendix B)
- Grease (Item 22, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Wire, Non Electrical (Item 79, Appendix B)
- Seal, Oil (2) (Item 599, Appendix E)
- Sealing Kit, (Inner) (Item 623, Appendix E)
- Sealing Kit, (Outer) (Item 624, Appendix E)
- Shim Kit, Adjusting (Item 644, Appendix E)

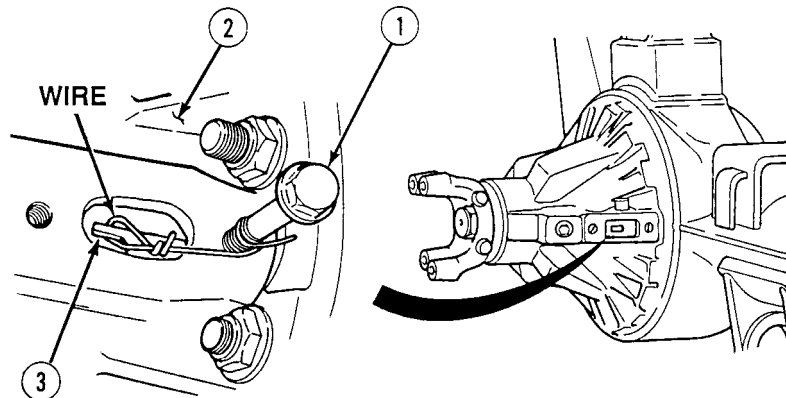
Personnel Required

Two

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Wheels/tires removed, (TM 9-2320-364-10)
- Axle oil drained, (TM 9-2320-364-20)
- Tie rod removed, (TM 9-2320-364-20)
- Brake drum removed, (TM 9-2320-364-20)
- Drag link disconnected, (TM 9-2320-364-20)
- Axle air lines removed, (TM 9-2320-364-20)
- Planetary hub gear removed, (Para 9-6)
- Locking cylinder removed, (Para 9-15 or 9-16)

a. Removal.



CAUTION

- The following Steps (1) and (2) keep clutch gears from disengaging after wheel end assembly is removed. Failure to perform Steps (1) and (2) makes installation of wheel end assembly difficult.
- Ensure clutch gears are fully engaged prior to Steps (1) and (2) or damage to parts may occur.

NOTE

- Tag and mark all parts prior to removal.
- Wheel end assemblies on left side of truck contain the steering arm. Wheel end assemblies on right side of truck contain the upper cover.
- Axle No. 1, 2 and 5 Axle wheel end assemblies are removed the same way. Axle No. 1 is shown in illustration. Axles No. 2 and 5 are similar.
- Steps (1) and (2) are for right side wheel end assembly removal on Axle No. 1 and 5 only.
- Steps (1) and (2) are for left side wheel end assembly removal on Axle No. 2 only.
- Screw in Step (1) was removed with locking cylinder.

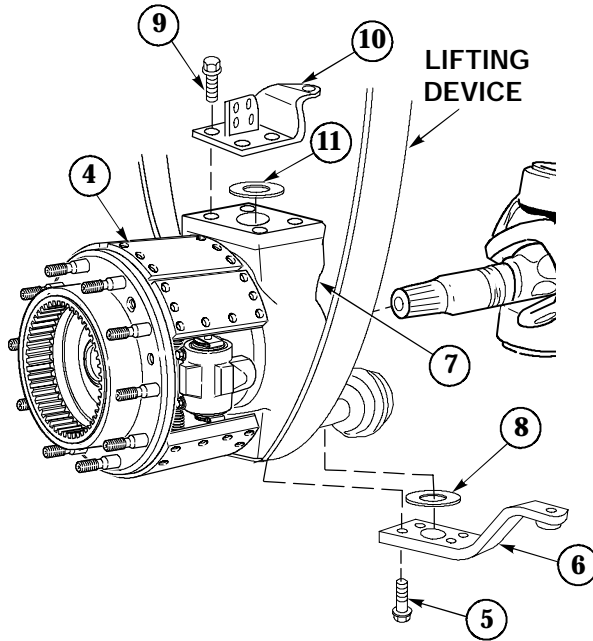
- (1) Position screw (1) in differential housing (2).
- (2) Form a wire hook around fingers of fork (3) and anchor wire with screw (1).

9-10. AXLE NO. 1, 2 AND 5 INNER AND OUTER AXLE SHAFT SEAL AND BEARING REPLACEMENT (CONT).

WARNING

Wheel end assembly weighs 300 lbs (136 kg). Support wheel end assembly with suitable lifting device prior to removal to prevent possible injury to personnel.

- (3) Attach lifting device to wheel end assembly (4).
- (4) Remove four screws (5) and steering swivel arm (6) from pivot and spindle assembly (7).
- (5) Remove shim (8) from pivot and spindle assembly (7). Discard shim.
- (6) Remove four screws (9) and steering arm (10) from pivot and spindle assembly (7).
- (7) Remove shim (11) from pivot and spindle assembly (7). Discard shim.



- (8) Using inertial extractor, remove two trunnions (12) from pivot and spindle assembly (7).

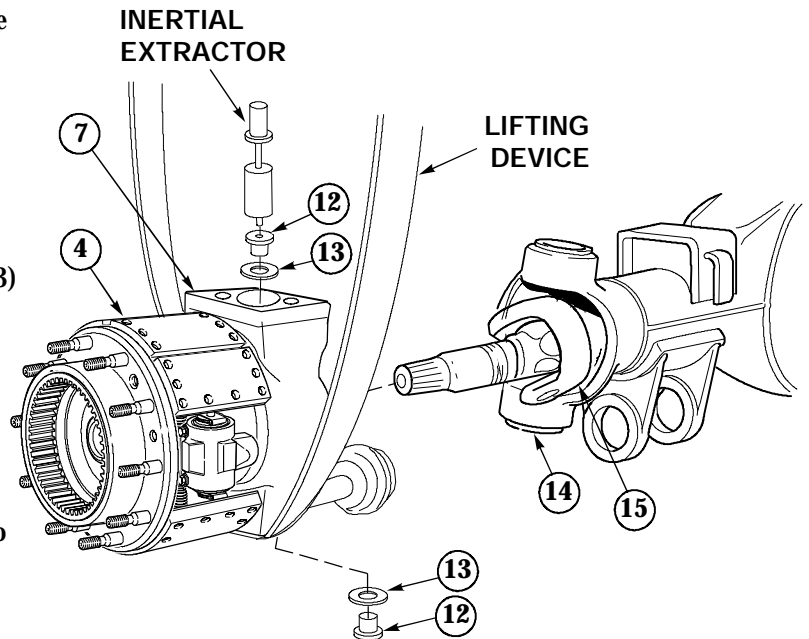
NOTE

Oil seals are removed by tapping down on one side of oil seal to work it loose.

- (9) Remove and discard two oil seals (13) from pivot and spindle assembly (7).

CAUTION

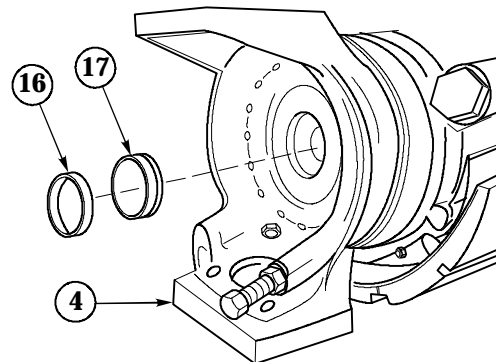
Ensure constant velocity shaft remains in axle housing when wheel end is removed. Damage to bearings inside pivot and spindle assembly or axle housing may occur.



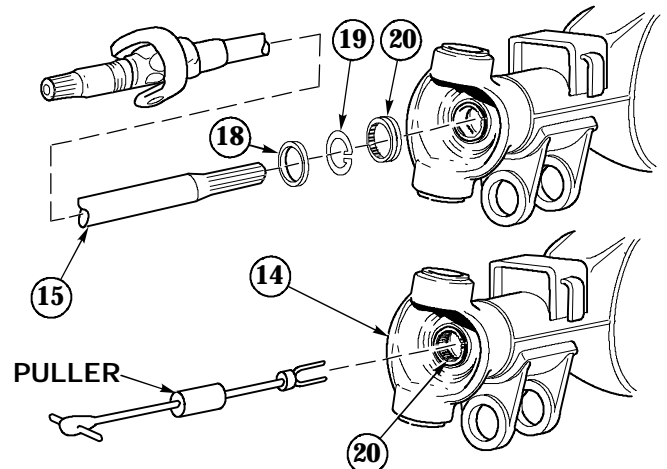
- (10) With the aid of an assistant, remove wheel end assembly (4) from axle housing (14).
- (11) Remove and discard seal (16) and bearing (17) from wheel end (4).
- (12) Remove constant velocity shaft (15) from axle housing (14).

WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released and could cause severe eye injury.



- (13) Remove and discard seal (18), and retaining ring (19) from axle housing (14).
- (14) Using puller, remove and discard bearing (20) from axle housing (14).



9-10. AXLE NO. 1, 2 AND 5 INNER AND OUTER AXLE SHAFT SEAL AND BEARING REPLACEMENT (CONT).

b. Installation.

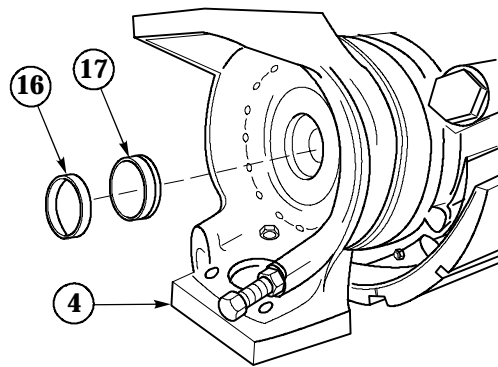
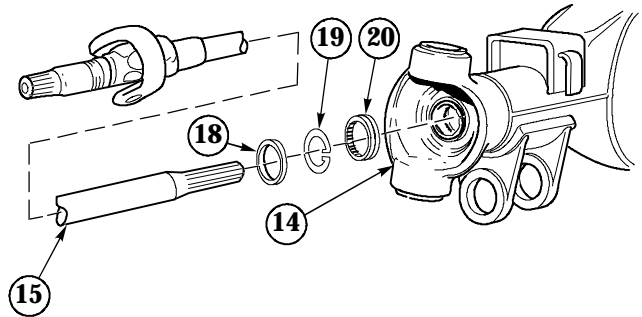
- (1) Apply light coat of grease to bearing (20).
- (2) Install bearing (20) in axle housing (14).

WARNING

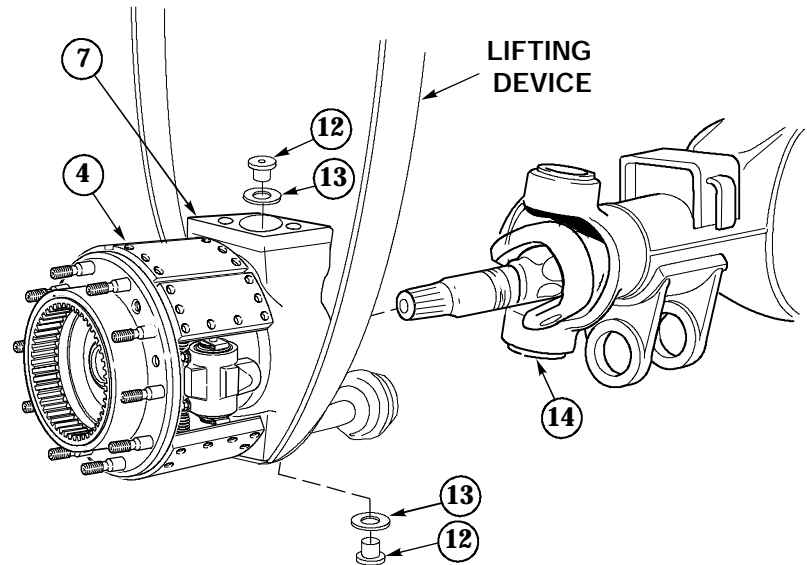
Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released and could cause severe eye injury.

- (3) Install retaining ring (19) in axle housing (14).
- (4) Apply light coat of grease to seal (18).
- (5) Install seal (18) in axle housing (14).
- (6) Install constant velocity shaft (15) in axle housing (14).

- (7) Apply light coat of grease to bearing (17) and seal (16).
- (8) Install bearing (17) in wheel end (4).
- (9) Install seal (16) in wheel end (4).



- (10) Coat two oil seals (13) and inside of pivot and spindle assembly (7), where two trunnions (12) seat, with grease.



WARNING

Wheel end assembly weighs 300 lbs (136 kg). Support wheel end assembly with suitable lifting device prior to installation to prevent possible injury to personnel.

- (11) Support wheel end assembly (4) with lifting device.
- (12) With the aid of an assistant, install wheel end assembly (4) on axle housing (14).

NOTE

Lip of oil seal should be facing toward bottom of trunnions when installed.

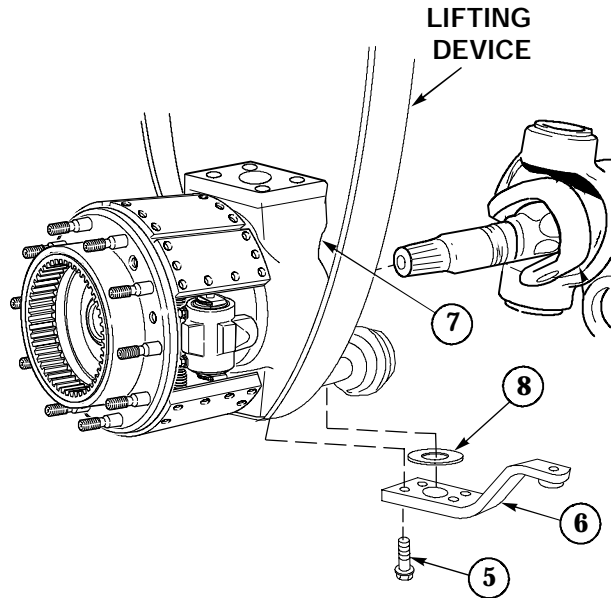
- (13) Install two oil seals (13) on two trunnions (12).
- (14) With the aid of an assistant, align wheel end assembly (4) while installing two trunnions (12) into pivot and spindle assembly (7).

9-10. AXLE NO. 1, 2 AND 5 INNER AND OUTER AXLE SHAFT SEAL AND BEARING REPLACEMENT (CONT).

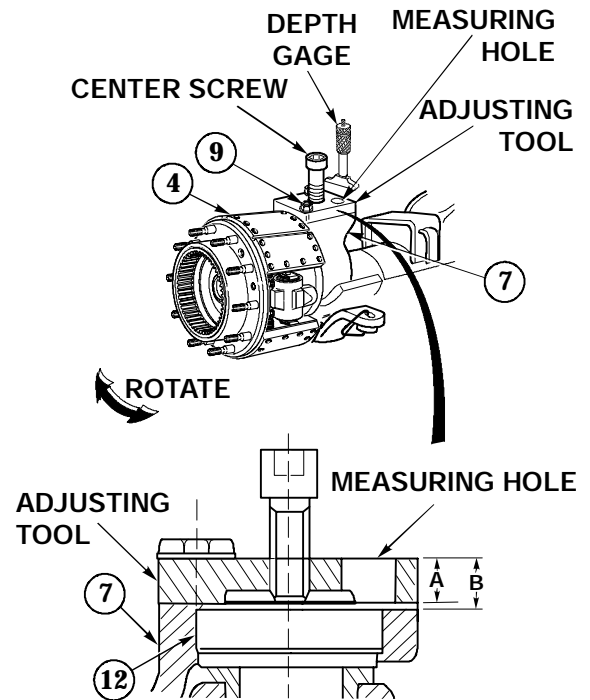
WARNING

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.

- (15) Coat mating surface of steering swivel arm (6) and pivot and spindle assembly (7) with adhesive.
- (16) Install 0.039 in. (0.99 mm) shim (8) on steering swivel arm (6).
- (17) Position steering swivel arm (6) on pivot and spindle assembly (7).
- (18) With the aid of an assistant, install four screws (5). Using torque wrench and multiplier, tighten screws first to 250 lb-ft (339 N·m), then to 500 lb-ft (678 N·m) and then to 720 to 800 lb-ft (976 to 1085 N·m).



- (19) Install adjusting tool on pivot and spindle assembly (7) with two screws (9). Tighten screws to 200 lb-ft (271 N·m).
- (20) Install center screw in adjusting tool. Tighten center screw to 200 lb-ft (271 N·m).
- (21) Loosen center screw slightly until wheel end assembly (4) moves freely under its own weight.
- (22) Center wheel end assembly (4) with pivot and spindle assembly (7).
- (23) Tighten center screw in adjusting tool to 50 lb-ft (68 N·m).



NOTE

Measure distance through measuring hole.

- (24) Using a depth gage, measure distance from top of adjusting tool to top of pivot and spindle assembly (7) and record as dimension A.
- (25) Using a depth gage, measure distance from top of adjusting tool to top of trunnion (12) and record as dimension B.
- (26) Subtract dimension A from dimension B (B - A). The answer is the gap between pivot and spindle assembly (7) and top of trunnion (12).
- (27) Refer to Table 9-2 to determine shim thickness.
- (28) Remove screws (9) and adjusting tool and rotate wheel end assembly (4) to centered position.

Table 9-2. Determining Shim Thickness

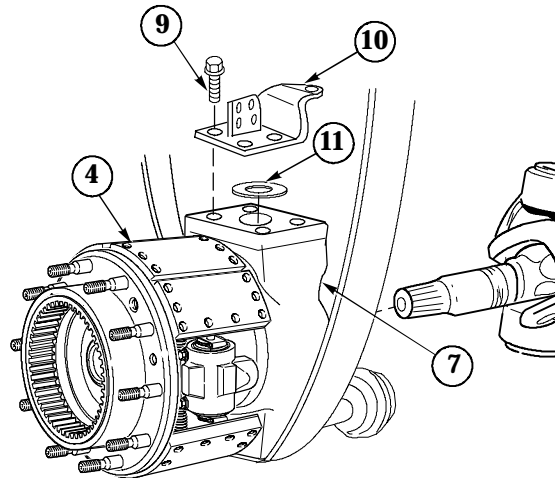
Gap between pivot and spindle assembly and trunnion	Shim thickness
0.018 to 0.022 in. (0.46 - 0.56 mm)	0.016 in. (0.4 mm)
0.022 to 0.026 in. (0.56 - 0.66 mm)	0.020 in. (0.5 mm)
0.026 to 0.030 in. (0.66 - 0.76 mm)	0.024 in. (0.6 mm)
0.030 to 0.033 in. (0.76 - 0.84 mm)	0.028 in. (0.7 mm)
0.033 to 0.037 in. (0.84 - 0.94 mm)	0.031 in. (0.8 mm)
0.037 to 0.041 in. (0.94 - 1.04 mm)	0.035 in. (0.9 mm)
0.041 to 0.045 in. (1.04 - 1.14 mm)	0.039 in. (1.0 mm)

9-10. AXLE NO. 1, 2 AND 5 INNER AND OUTER AXLE SHAFT SEAL AND BEARING REPLACEMENT (CONT).

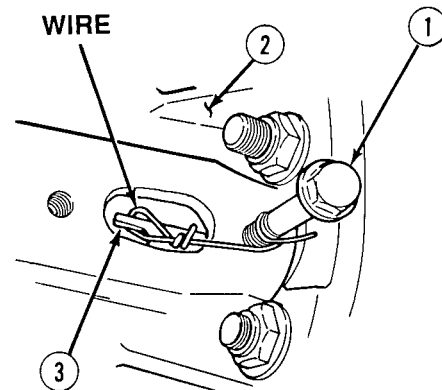
WARNING

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.

- (29) Coat mating surface of steering arm (10) and pivot and spindle assembly (7) with adhesive.
- (30) Install shim (11), thickness determined in Step (19), on steering arm (10).
- (31) Install steering arm (10) on pivot and spindle assembly (7).
- (32) Install four screws (9) on steering arm (10). Tighten screws to 100 lb-ft (136 N·m).
- (33) Rotate wheel end assembly (4) around three times to check for excessive play or force. If incorrect, repeat Steps (10) through (21).
- (34) Tighten four screws (9) on steering arm (10) first to 250 lb-ft (339 N·m), then to 500 lb-ft (678 N·m) and then to 750 lb-ft (1017 N·m).
- (35) Remove lifting device from wheel end assembly (4).
- (36) With torque wrench on screw (9), verify that wheel end assembly (4) requires between 57 to 72 lb-ft (77 to 98 N·m) to start pivoting of the wheel end assembly from the centered position. If incorrect, repeat Steps (15) through (27).



- (37) Remove screw (1) and wire hook from around fingers of fork (3) on differential housing (2).



c. Follow-On Maintenance:

- Install locking cylinder, (Para 9-15 or 9-16).
- Install planetary hub gear, (Para 9-6).
- Install axle air lines, (TM 9-2320-364-20).
- Install drag link, (TM 9-2320-364-20).
- Install brake drum, (TM 9-2320-364-20).
- Install tie rod, (TM 9-2320-364-20).
- Add oil to axle, (TM 9-2320-364-20).
- Install wheel/tire, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Hammer, Hand, Soft Plastic (Item 88, Appendix F)
- Jack, Hydraulic, Hand (Item 128, Appendix F)
- Jack Kit, Hydraulic, Hand (Item 129, Appendix F)
- Jack, Transmission (Item 131, Appendix F)
- Jackstand (Item 132, Appendix F)
- Level (Item 134, Appendix F)
- Multiplier, Torque (Item 141, Appendix F)
- Press, Arbor, Hand Operated (Item 162, Appendix F)
- Protractor, Square (Item 171, Appendix F)
- Wrench, Combination, 1-1/4 in. (Item 256, Appendix F)
- Wrench, Combination, 1-5/8 in. (Item 261, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0 to 175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Wrench, Torque (0 to 600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
- Steel Plate (Appendix C)
- Wooden Block (Appendix C)

Materials/Parts

- Adhesive, (Item 1, Appendix B)
- Cable Ties (Item 9, Appendix B)
- Oil, Lubricating (Item 36, Appendix B)

Materials/Parts - Continued

- Sealing Compound (Item 56, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Bolt Set (2) (Item 20, Appendix E)
- Bushing, Plastic, Spacer (Item 25, Appendix E)
- Locknut (2) (Item 166, Appendix E)
- Locknut (3) (Item 182, Appendix E)
- Locknut (4) (Item 188, Appendix E)
- Locknut (2) (Item 212, Appendix E)
- Lockwasher (2) (Item 252, Appendix E)
- Spacer, Plate (Item 651, Appendix E)

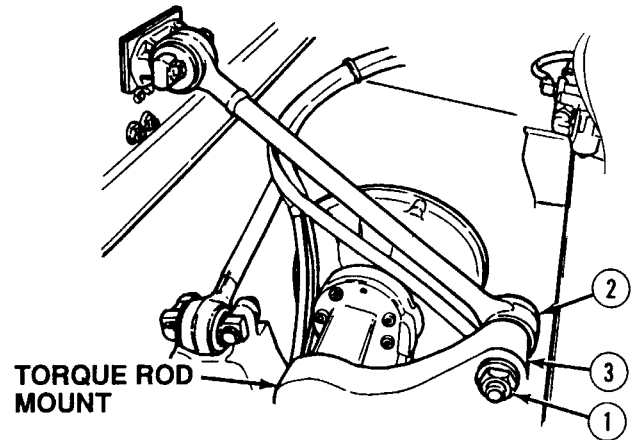
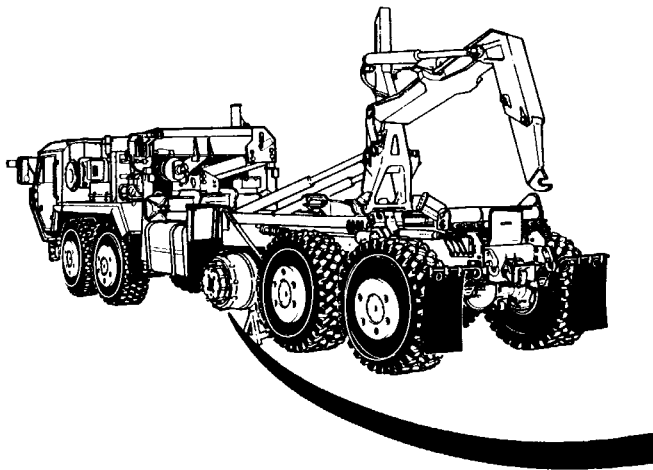
Personnel Required

Two

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- LHS fully extended, (TM 9-2320-364-10)
- Wheels/tires removed, (TM 9-2320-364-10)
- Air system drained, (TM 9-2320-364-10)
- Brake drums removed, (TM 9-2320-364-20)
- Shock absorbers removed, (TM 9-2320-364-20)
- Rear stowage box bracket removed, (TM 9-2320-364-20)
- Axle oil drained, (TM 9-2320-364-20)
- Suspension air bags removed, (Para 14-3)

a. Removal.



- (1) Loosen locknut (1) until locknut is flush with threaded end of torque rod (2).

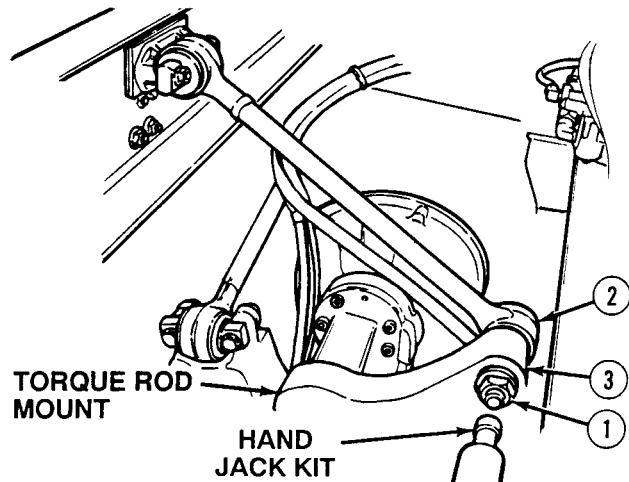
WARNING

Torque rod is under extreme pressure when being pressed from axle. Torque rod can be dangerous when it breaks loose and could cause injury to personnel.

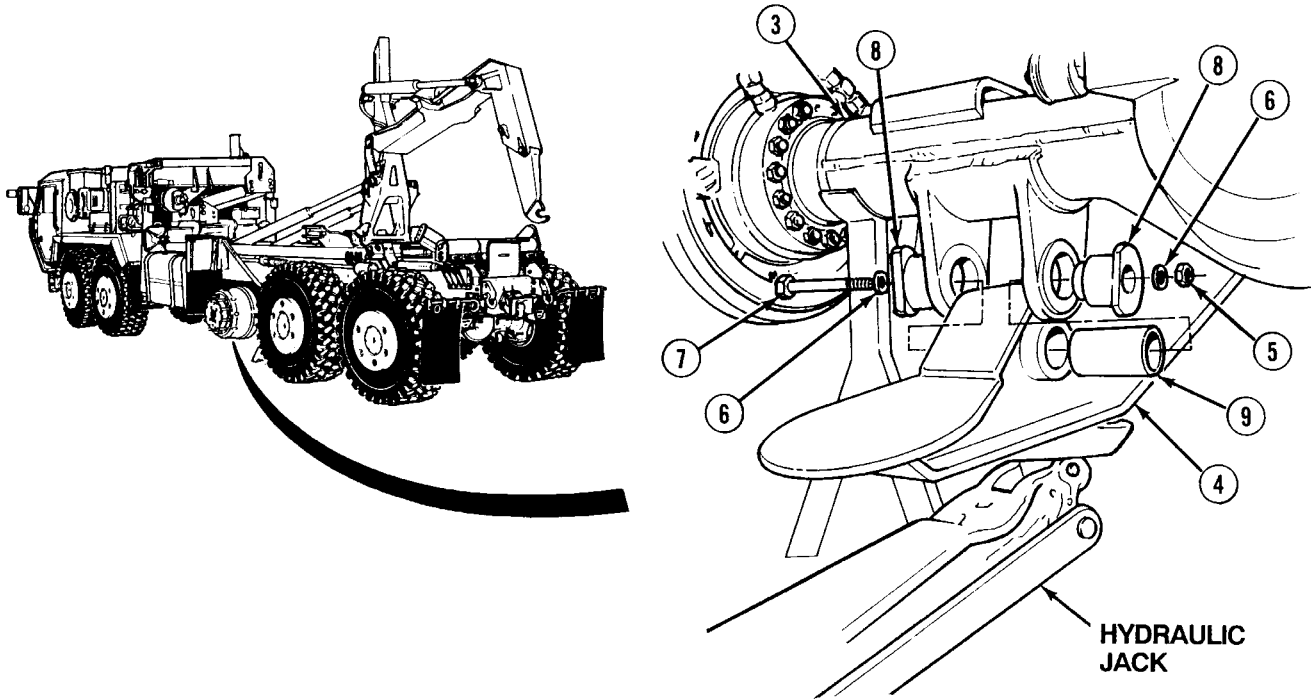
NOTE

Strike torque rod mount with soft faced hammer while pressure is being applied to torque rod.

- (2) Using hand jack kit, press tapered end of torque rod (2) from Axle No. 3 (3), until torque rod (2) is loosened.



9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).



WARNING

Trailing beam assembly weighs 150 lbs (68 kg). Attach a hydraulic jack to axle end of trailing beam assembly prior to removal to prevent possible injury to personnel.

NOTE

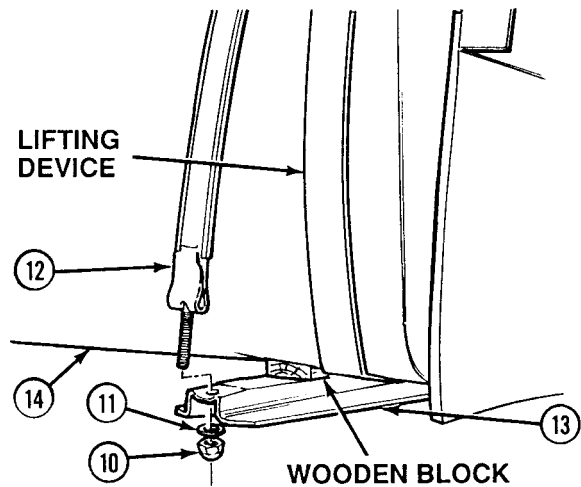
Both trailing beams are removed the same way. Left side of Axle No. 3 is shown.

- (3) Support Axle No. 3 (3) end of trailing beam assembly (4) with a jack.
- (4) Remove locknut (5), two washers (6) and screw (7) from trailing beam assembly (4). Discard locknut.
- (5) Remove two adapters (8) from trailing beam assembly (4).
- (6) Using hydraulic jack, lower Axle No. 3 (3) end of trailing beam assembly (4).
- (7) Remove spacer (9) from trailing beam assembly (4).

- (8) Remove two locknuts (10) and washers (11) from stud of each fuel tank strap (12).
- (9) Separate two fuel tank straps (12) from fuel tank bracket (13).

WARNING

Main fuel tank weighs 50 to 700 lbs (23 to 318 kg) depending on the quantity of fuel inside. Support main fuel tank with suitable lifting device prior to removing mounting hardware to prevent possible injury to personnel.

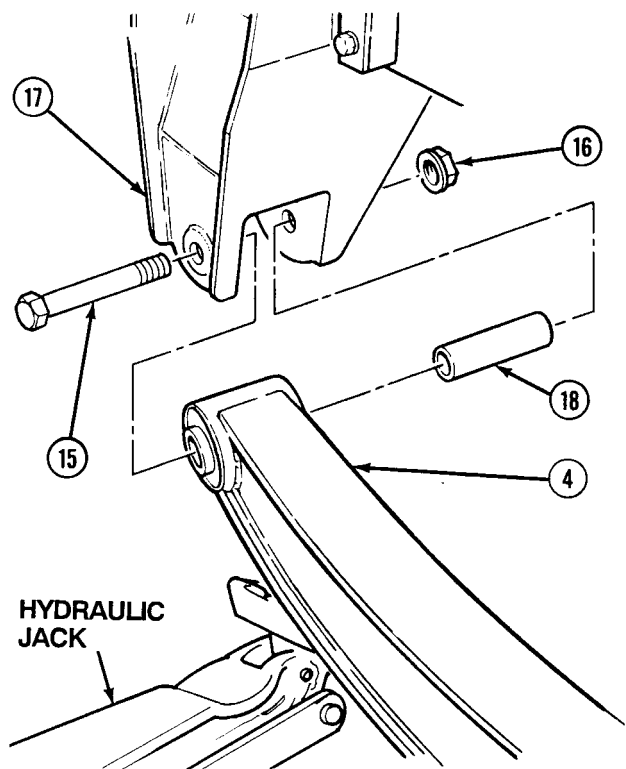


- (10) Using lifting device, lift right side of main fuel tank (14) upward approximately 3 in. (76 mm).
- (11) Position block of wood on right fuel tank bracket (13). Lower right side of main fuel tank (14) onto wood block.

WARNING

The trailing beam assembly weighs 150 lbs (68 kg). Attach a suitable lifting device to truck end of trailing beam assembly prior to removal or installation to prevent possible injury to personnel.

- (12) Support truck end of trailing beam assembly (4) with hydraulic jack.
- (13) With the aid of an assistant, remove screw (15) and locknut (16) from trailing beam assembly (4). Discard bolt and locknut.
- (14) Using lifting device, remove truck end of trailing beam assembly (4) from trailing beam assembly mount (17) and lower to ground.
- (15) Remove plastic bushing (18) from each trailing beam assembly (4). Discard plastic bushing.



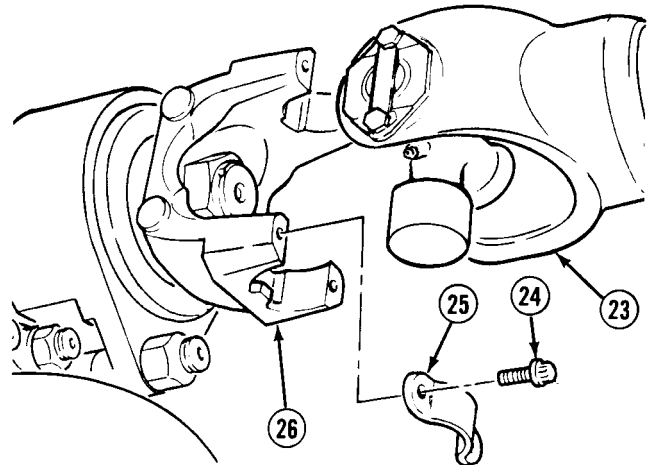
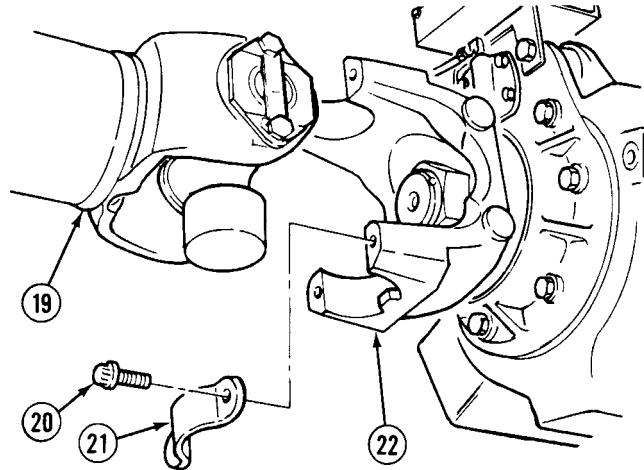
9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

- (16) Repeat Steps (3) through (7) and (12) through (15) for right side air suspension beam assembly (4).

WARNING

Driveshaft weighs up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and cause serious injury to personnel.

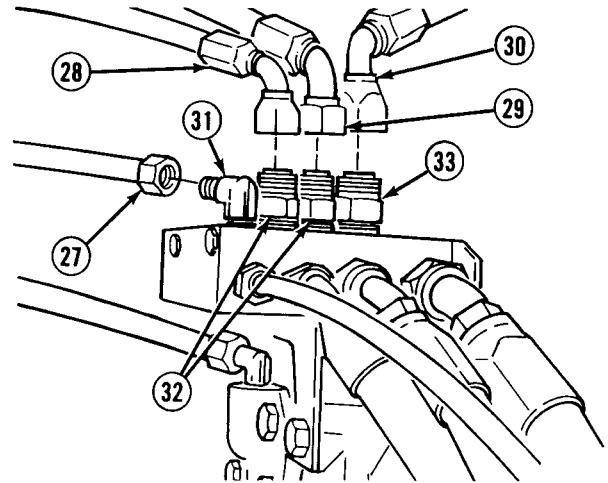
- (17) With the aid of an assistant, support driveshaft (19) and remove four screws (20) and two straps (21) from flange assembly (22).
- (18) Remove Axle No. 3 end of driveshaft (19) from flange assembly (22).
- (19) With the aid of an assistant, support driveshaft (19) and tie driveshaft out of the way using a cable tie.
- (20) With the aid of an assistant, support driveshaft (23) and remove four screws (24) and two brackets (25) from flange assembly (26).
- (21) Remove Axle No. 3 end of driveshaft (23) from flange assembly (24).
- (22) With the aid of an assistant, support driveshaft (23) and tie driveshaft out of the way using a cable tie.



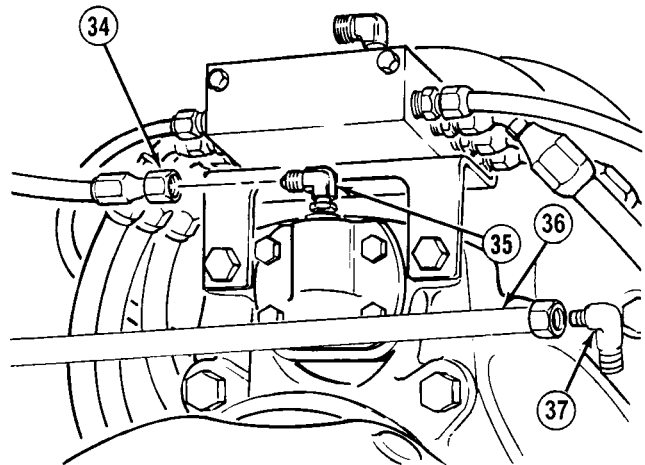
NOTE

Tag and mark all air lines prior to removal.

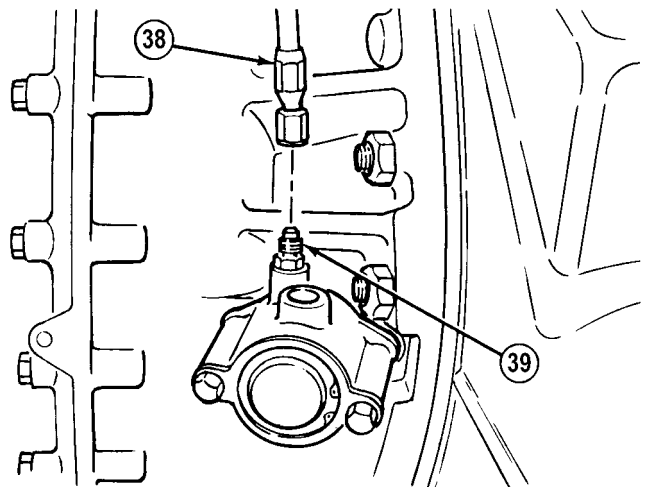
- (23) Remove air line 2874 (27), air line 2075 (28), air line 2545 (29) and air line 2104 (30) from elbow (31), two fittings (32) and fitting (33).



- (24) Remove air line 2389 (34) from elbow (35).
- (25) Disconnect air line 2893 (36) from axle breather elbow (37) on left side of axle tube.

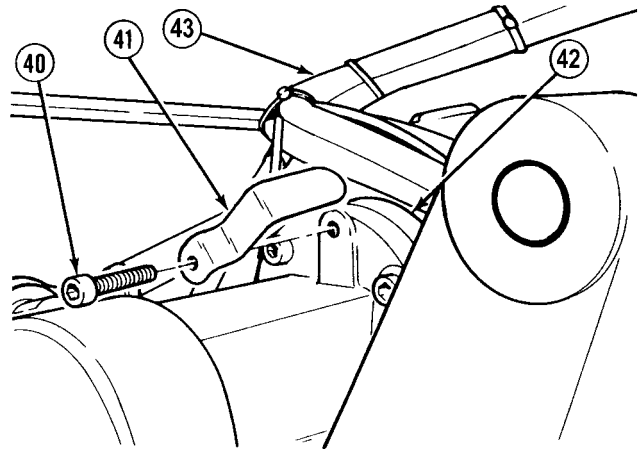


- (26) Remove air line 2421 (38) from fitting (39).



9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

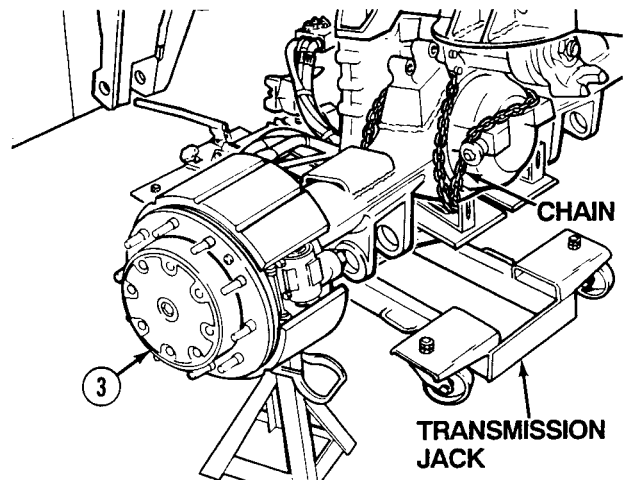
- (27) Remove screw (40) and bracket (41) from differential assembly (42).
- (28) Position hoses (43) away from differential assembly (42).



WARNING

Axle No. 3 weighs 1780 lbs (808 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel. Axle housing must be chained to lifting device to prevent an out of balance condition when longitudinal torque rod is removed. Axle could roll out of control causing serious injury or death to personnel.

- (29) Position transmission jack under Axle No. 3 (3) and chain Axle No. 3 housing to transmission jack.

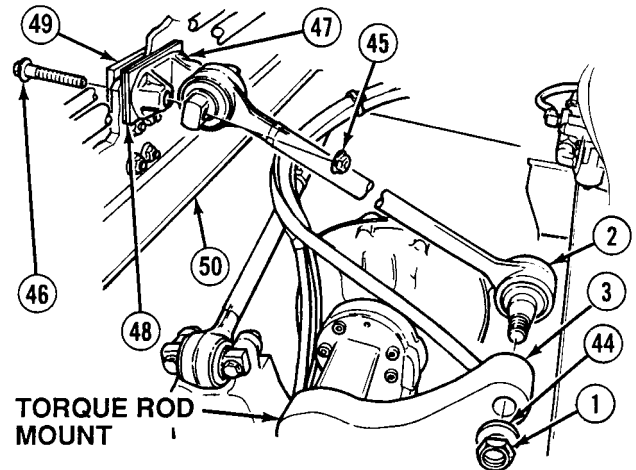


- (30) Remove locknut (1) and washer (44) from torque rod (2). Discard locknut.

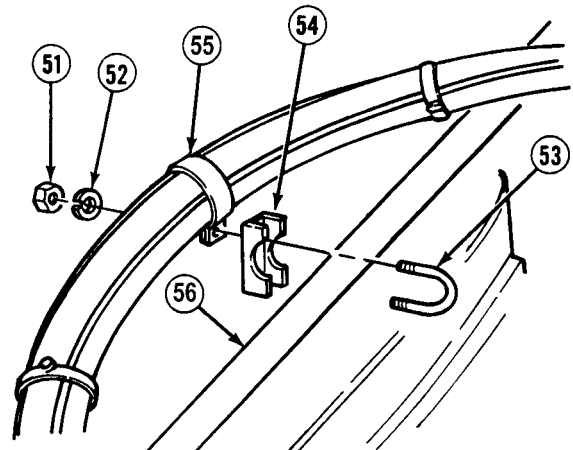
NOTE

Tag and note number and size of spacers.

- (31) With the aid of an assistant, remove two locknuts (45), screws (46), torque rod (2), bracket (47), spacers (48) and plate (49) from frame (50) and tie rod mount (3). Discard locknuts.



- (32) Remove two nuts (51), lockwashers (52), U-bolt (53), U-bolt half (54) and clamp (55) from torque rod (56). Discard locknuts.



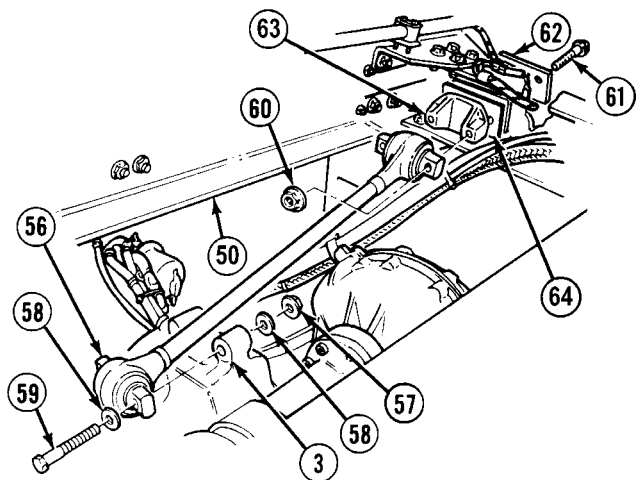
- (33) With the aid of an assistant, remove two locknuts (57), washers (58), screws (59) and washers (58) from axle end of torque rod (56) and Axle No. 3 (3). Discard locknuts.

- (34) Remove axle end of torque rod (56) from Axle No. 3 (3).

NOTE

Tag and note number and size of spacers.

- (35) With the aid of an assistant, remove two locknuts (60), screws (61), plate (62), torque rod (56), bracket (63) and spacers (64) from frame (50). Discard locknuts.

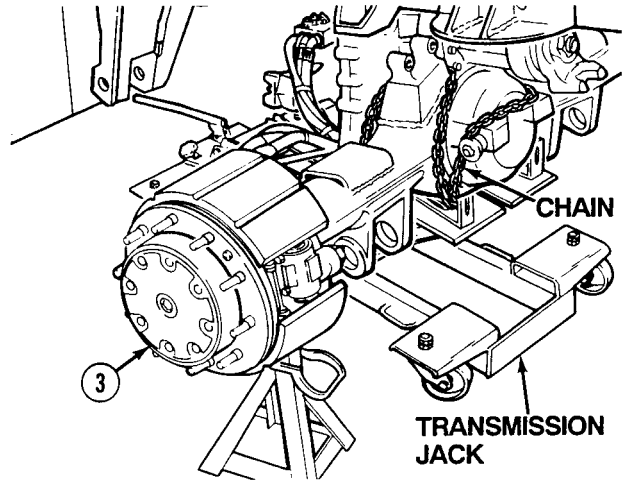


9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

WARNING

Axle No. 3 weighs 1780 lbs (808 kg). Attach a suitable lifting device prior to removal to prevent possible injury to personnel.

- (36) Using transmission jack, lift Axle No. 3 (3) and remove jackstands.
- (37) With the aid of an assistant and transmission jack, lower Axle No. 3 (3) and remove axle from under truck.
- (38) Remove Axle No. 3 (3) from transmission jack.



b. Installation.

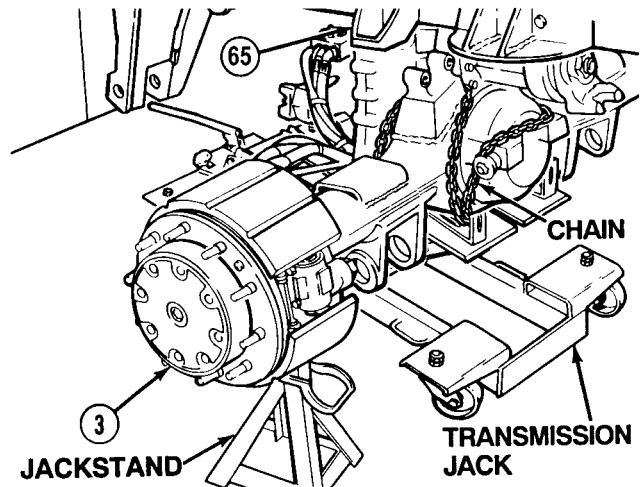
WARNING

Axle No. 3 weighs 1780 lbs (808 kg). Attach a suitable lifting device prior to installation to prevent possible injury to personnel.

NOTE

If installing a new axle, remove and discard brake drum retaining screws.

- (1) Position Axle No. 3 (3) on transmission jack.
- (2) Using a chain, secure Axle No. 3 (3) to transmission jack.
- (3) With the aid of an assistant and transmission jack, position Axle No. 3 (3) under truck.
- (4) Raise transmission jack and Axle No. 3 (3) directly under axle stops (65).
- (5) Position jackstand under each end of Axle No. 3 (3).



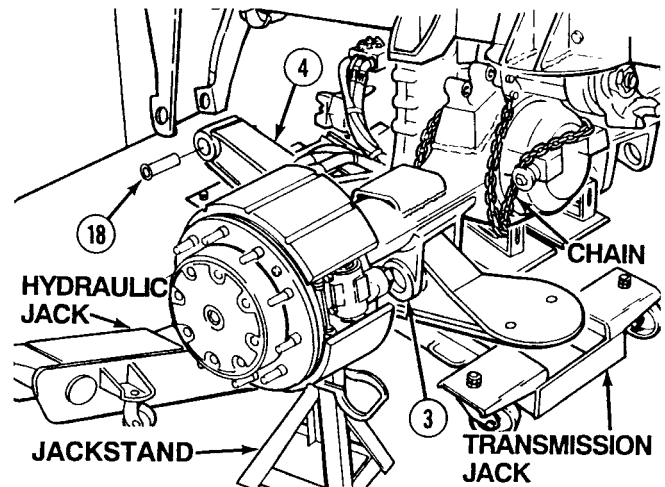
WARNING

Trailing beam assembly weighs 150 lbs (68 kg). Attach a hydraulic jack to axle end of air suspension beam assembly prior to installation to prevent possible injury to personnel.

NOTE

Both trailing beam assemblies are installed the same way. Left side of Axle No. 3 is shown.

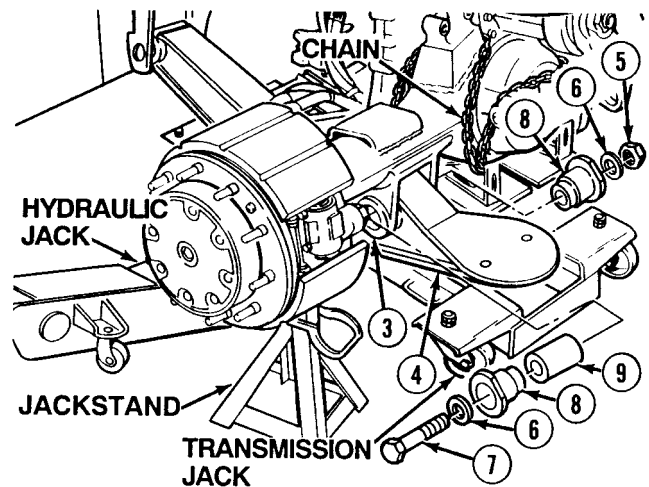
- (6) Position trailing beam assembly (4) on hydraulic jack and install plastic bushing (18) in trailing beam assembly.
- (7) Using hydraulic jack, position trailing beam assembly (4) below Axle No. 3 (3).
- (8) Coat threads of screw (7) with lubricating oil.



WARNING

Keep fingers out of trailing beam assembly holes. Failure to comply could result in serious injury to personnel.

- (9) Position spacer (9) in Axle No. 3 (3) and trailing beam assembly (4).
- (10) Apply a thin coat of lubricating oil on adapters (8).
- (11) Position adapter (8), washer (6), screw (7), adapter (8), washer (6) and nut (5) in axle (3) and trailing beam assembly (4).



9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

NOTE

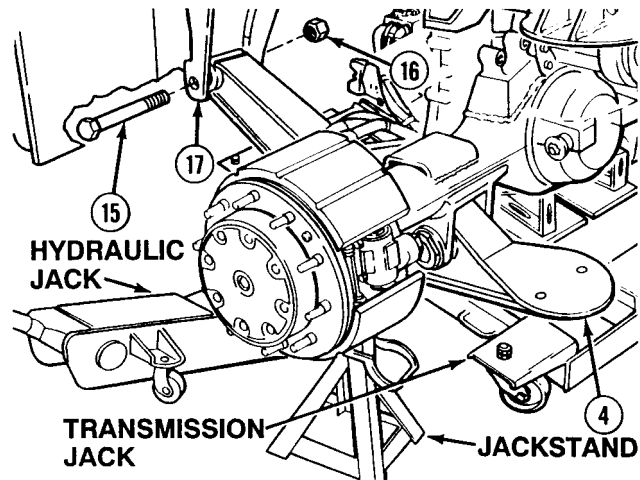
Axle may need slight adjustment for proper alignment in frame hanger.

- (12) Using transmission jack, raise trailing beam assembly (4) and position in trailing beam assembly mount (17).
- (13) Position trailing beam assembly (4) in trailing beam assembly mount (17) with screw (15) and nut (16).

WARNING

Ensure axle is fully supported by jackstands prior to removing hydraulic jack from trailing beam assembly. Failure to comply may result in injury to personnel.

- (14) Remove hydraulic jack from below trailing beam assembly (4).
- (15) Repeat Steps (5) through (14) for remaining trailing beam assembly (4).



WARNING

Keep hands and feet clear of Axle No. 3 until Axle No. 3 is secured by longitudinal torque rod. Failure to comply may result in injury to personnel.

NOTE

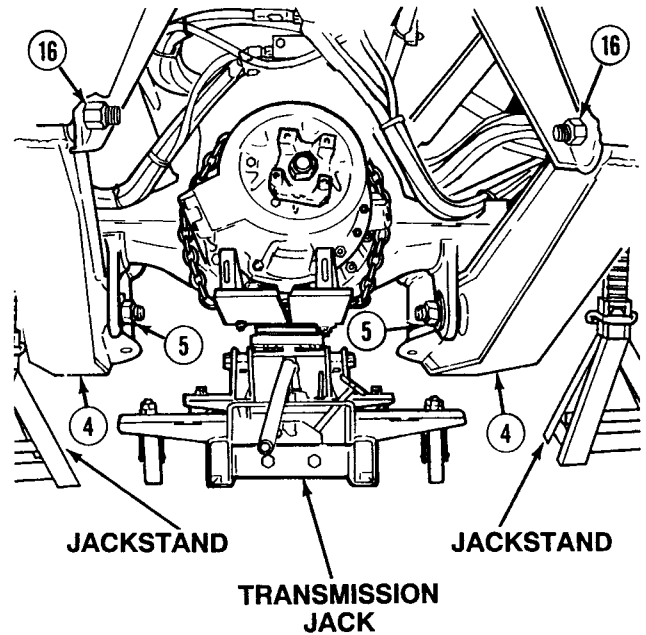
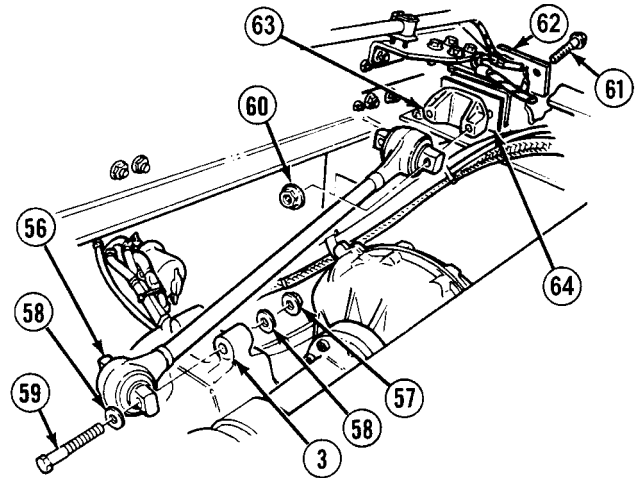
It may be necessary to raise front of differential with floor jack to aid in installation of longitudinal torque rod.

- (16) With the aid of an assistant, position axle end of torque rod (56) on Axle No. 3 (3) with two washers (58), screws (59), washers (58) and locknuts (57).

NOTE

Install same number and size spacers in their original location that they were removed from.

- (17) With the aid of an assistant, install plate (62), spacers (64), bracket (63) and end of torque rod (56) with two screws (61) and locknuts (60).
- (18) With the aid of an assistant, tighten locknuts (57) on screws (59).
- (19) With the aid of an assistant, tighten two locknuts (5) on trailing beam assemblies (4) 210 to 240 lb-ft (285 to 325 N·m).
- (20) With the aid of an assistant, tighten two locknuts (16) on trailing beam assemblies (4) to 800 lb-ft (1085 N·m).

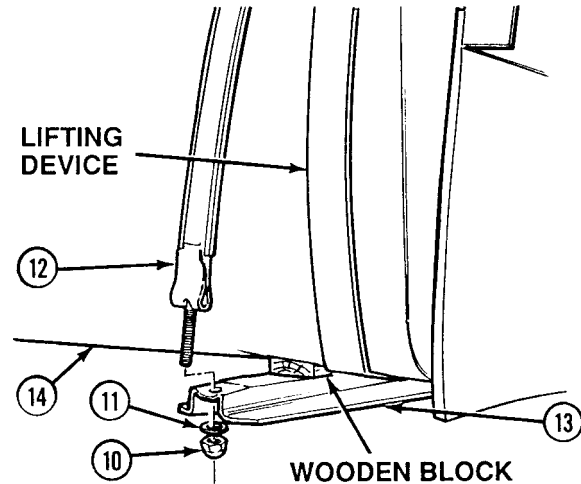


9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

WARNING

Main fuel tank weighs 50 to 700 lbs (23 to 318 kg) depending on the quantity of fuel inside. Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.

- (21) Using lifting device, raise main fuel tank (14) up slightly and remove block of wood.
- (22) Lower main fuel tank (14) onto fuel tank bracket (13).



NOTE

Apply soap solution to fuel tank straps before installing.

- (23) Insert studs of two fuel tank straps (12) through holes in fuel tank brackets (13).
- (24) Install two washers (11) and locknuts (10) on studs of fuel tank straps (12). Tighten locknuts 30 lb-ft (41 N·m).
- (25) Tap fuel tank straps (12) with soft faced hammer. Tighten locknuts (10) 30 lb-ft (41 N·m). Repeat step until torque remains at 30 lb-ft (41 N·m).

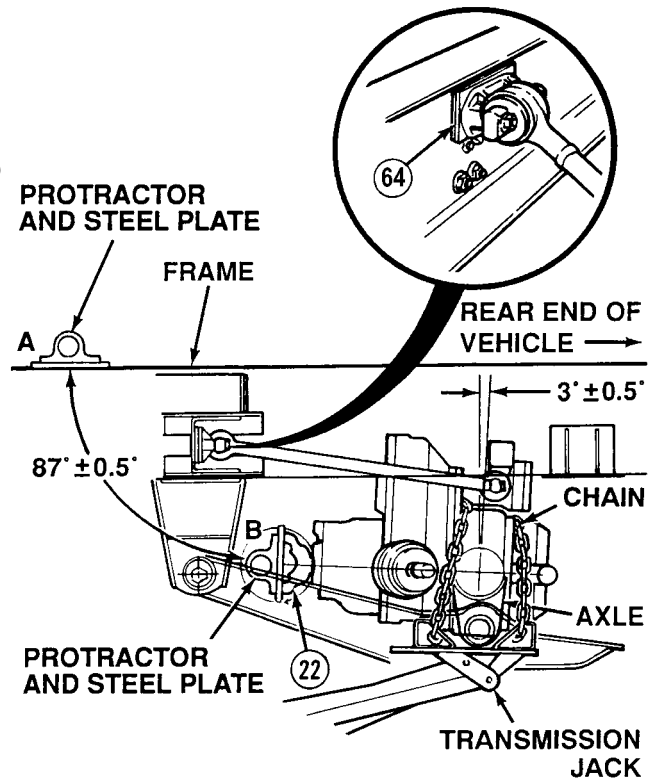
NOTE

- Equalizer beams and frame must be level to perform axle camber adjustment properly.
- Axle camber angle measurements must be taken with relationship to frame. If frame is not level, the angle the frame is inclined must be added or subtracted from flange assembly measurement.
- Axle flange assembly measurement of $87 \text{ degrees} \pm 0.5 \text{ degrees}$ equals axle camber of three degrees $\pm 0.5 \text{ degrees}$ ($90 \text{ degrees} - 87 \text{ degrees} = 3 \text{ degrees}$).

(26) Measure the angle (in degrees) that flange assembly (22) is cambered.

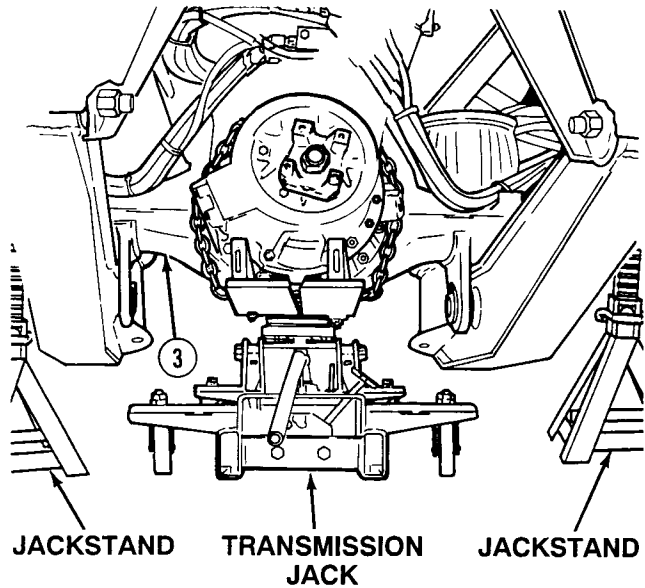
- Position protractor and steel plate on frame at point A. Adjust protractor to zero degrees.
- Position protractor and steel plate on machined surface of the flange assembly (22) at point B and record measurement. Measurement should read $87 \text{ degrees} \pm 0.5 \text{ degrees}$.

(27) If axle camber is not three degrees ± 0.5 degrees, add or subtract spacers (64) until axle camber is correct.



9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

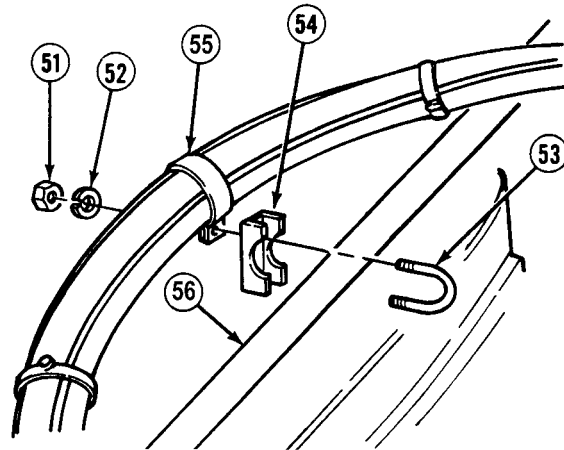
- (28) Remove transmission jack from Axle No. 3 (3).



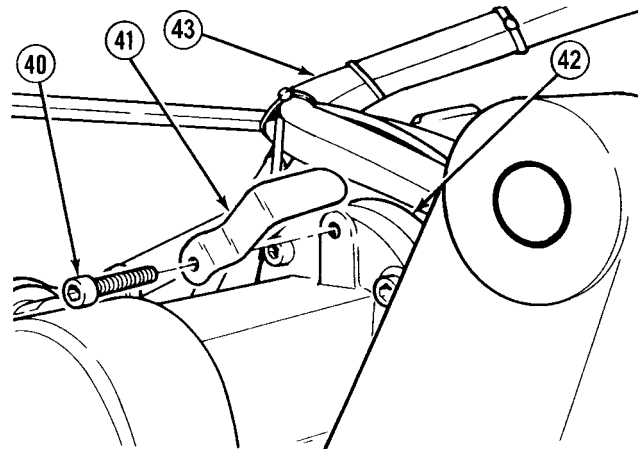
- (29) Install clamp (55), U-bolt half (54) and U-bolt (53) on torque rod (56) with two lockwashers (52) and nuts (51).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (30) Coat threads of screw (40) with adhesive.
- (31) Position air hoses (43) on differential assembly (42) with bracket (41) and screw (40).



- (32) Coat threads of torque rod (2) with lubricating oil.
- (33) Install tapered shaft of torque rod (2) in Axle No. 3 (3).

NOTE

Tighten locknut only until threads of locknut are fully engaged with threads of torque rod. Otherwise other end of torque rod will be difficult to install.

- (34) Position washer (44) and locknut (1) on torque rod (2).

NOTE

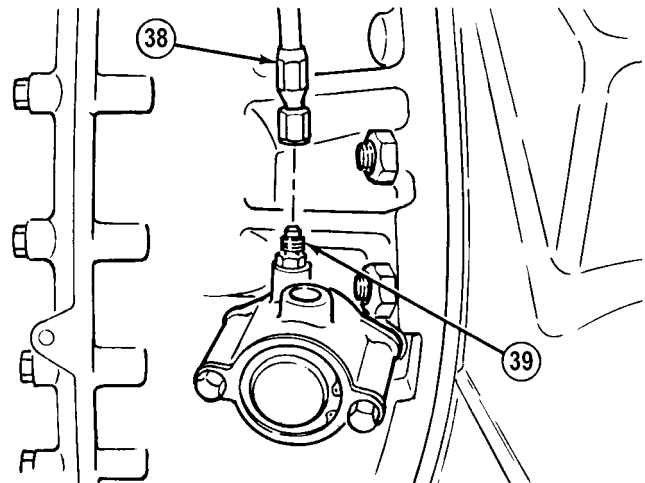
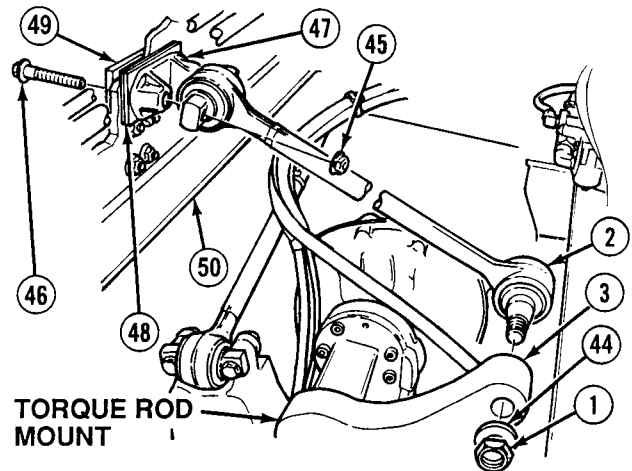
Install same number and size of spacers as noted during removal.

- (35) With the aid of an assistant, install spacers (48), bracket (47), truck end of torque rod (2), plate (49), two screws (46) and locknuts (45) on frame (50).
- (36) Tighten locknuts (1) on torque rod (2) 175 to 225 lb-ft (237 to 305 N·m).

NOTE

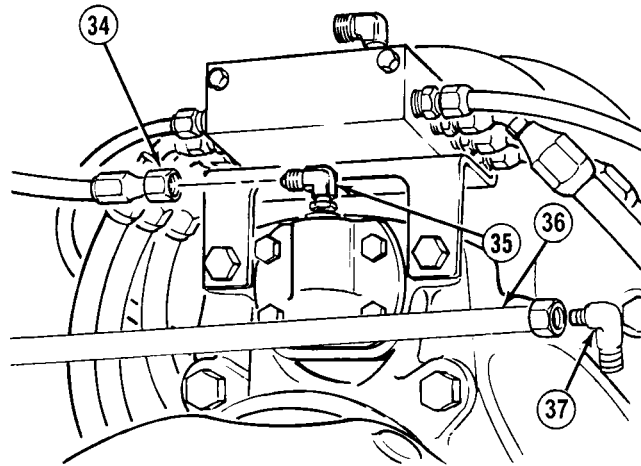
To seat torque rod, strike axle rod mount with soft-faced hammer.

- (37) Retighten locknut (1) on torque rod (2) 175 to 225 lb-ft (237 to 350 N·m).
- (38) Install air line 2421 (38) on fitting (39).

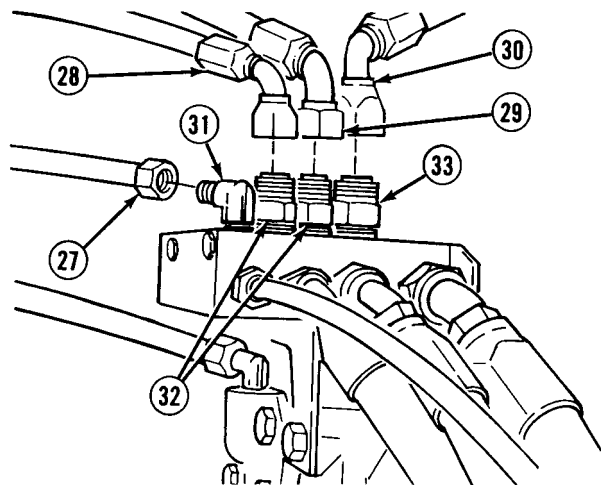


9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

- (39) Install air line 2389 (34) on elbow (35).
- (40) Connect air line 2893 (36) to axle breather elbow (37) on left side of axle tube.



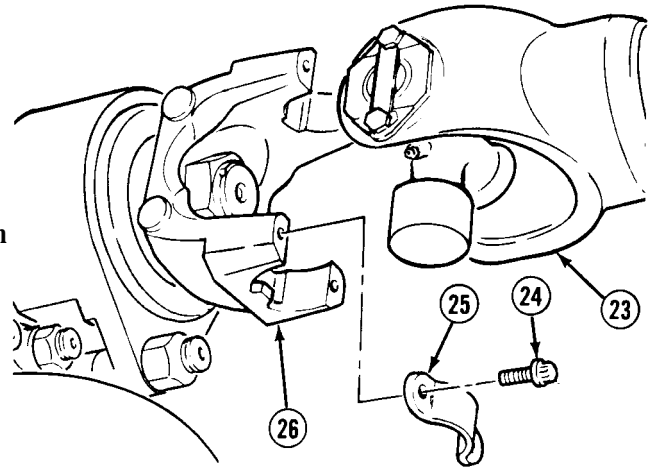
- (41) Install air line 2874 (27), air line 2075 (28), air line 2545 (29) and air line 2104 (30) to elbow (31), two fittings (32) and fitting (33).



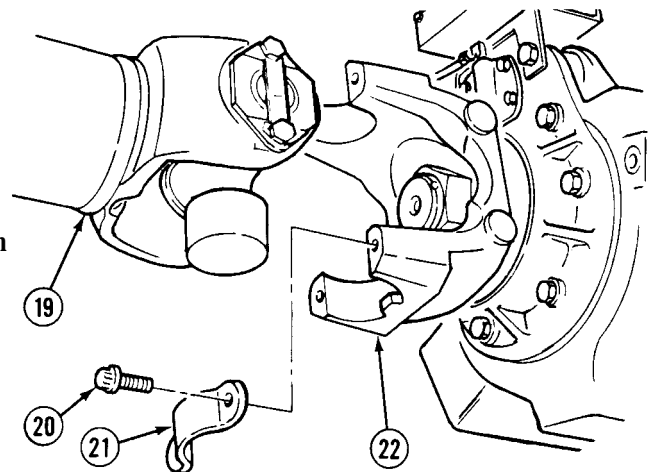
WARNING

- 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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Driveshaft weighs up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and cause serious injury to personnel.

- (42) Coat threads of four screws (24) with sealing compound.
- (43) Position driveshaft (23) in flange assembly (26).
- (44) Install two straps (25) and four screws (24) on driveshaft (23) and flange assembly (26). Tighten screws 130 to 135 lb-ft (176 to 183 N·m).



- (45) Coat threads of four screws (20) with sealing compound.
- (46) Position driveshaft (19) in flange assembly (22).
- (47) Install two straps (21) and four screws (20) on driveshaft (19) and flange assembly (22). Tighten screws 130 to 135 lb-ft (176 to 183 N·m).



9-11. AXLE NO. 3 ASSEMBLY REPLACEMENT (CONT).

c. Follow-On Maintenance:

- Fill axle oil, (TM 9-2320-364-20).
- Install rear stowage bracket, (TM 9-2320-364-20).
- Install shock absorbers, (TM 9-2320-364-20).
- Install suspension air bags, (Para 14-3).
- Install brake drums, (TM 9-2320-364-20).
- Align Axle No. 3, (Para 12-8).
- Install wheels/tires, (TM 9-2320-364-10).
- LHS in transit position, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

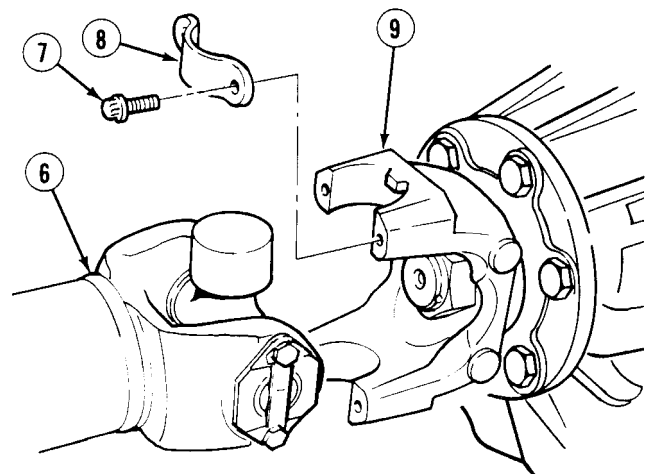
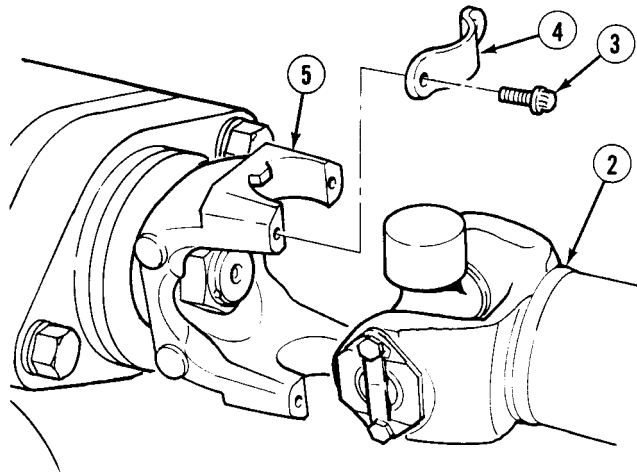
END OF TASK

9-12. AXLE NO. 4 ASSEMBLY REPLACEMENT (CONT).

WARNING

Driveshafts can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and cause serious injury to personnel.

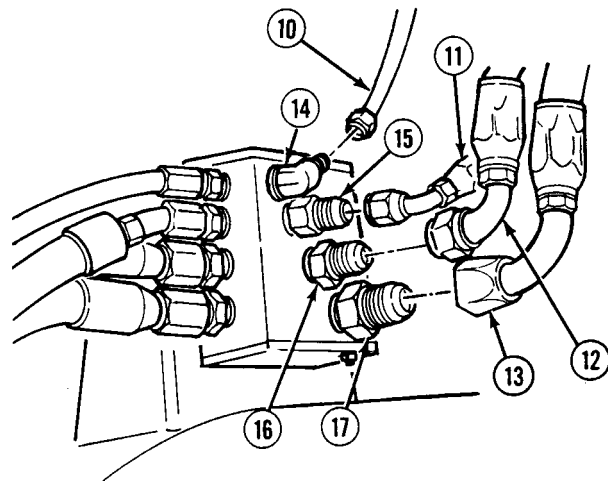
- (2) With the aid of an assistant, support driveshaft (2), remove four screws (3) and two brackets (4) from flange assembly (5).
- (3) Remove Axle No. 4 end of driveshaft (2) from flange assembly (5).
- (4) With the aid of an assistant, support driveshaft (2), and tie driveshaft up out of way with cable ties.
- (5) With the aid of an assistant, support driveshaft (6), and remove four screws (7) and two brackets (8) from flange assembly (9).
- (6) Remove Axle No. 4 end of driveshaft (6) from flange assembly (9).
- (7) With the aid of an assistant, support driveshaft (6), and tie driveshaft up out of way with cable tie.



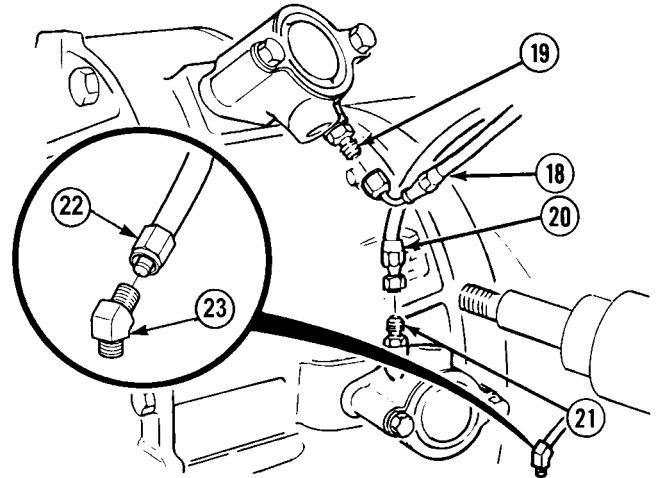
NOTE

Tag and mark air lines prior to removal.

- (8) Remove air line 2874 (10), air line 2139 (11), air line 2015 (12) and air line 2107 (13) from elbow (14) and fittings (15), (16) and (17).



- (9) Remove air line 2422 (18) from fitting (19).
- (10) Remove air line 2359 (20) from fitting (21).
- (11) Disconnect air line 2893 (22) from axle breather elbow (23) on left side of axle tube.



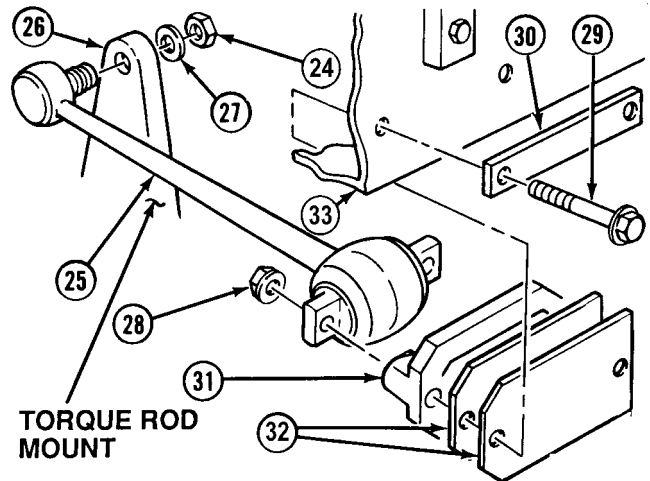
- (12) Loosen locknut (24) until locknut is flush with threaded end of torque rod (25).

WARNING

Torque rod is under extreme pressure when being pressed from axle. Torque rod can be dangerous when it breaks loose and could cause injury to personnel.

NOTE

Strike torque rod mount with soft face hammer while pressure is being applied to torque rod.



- (13) Using hand jack kit, press tapered end of torque rod (25) from Axle No. 4 (26) until torque rod is loosened.

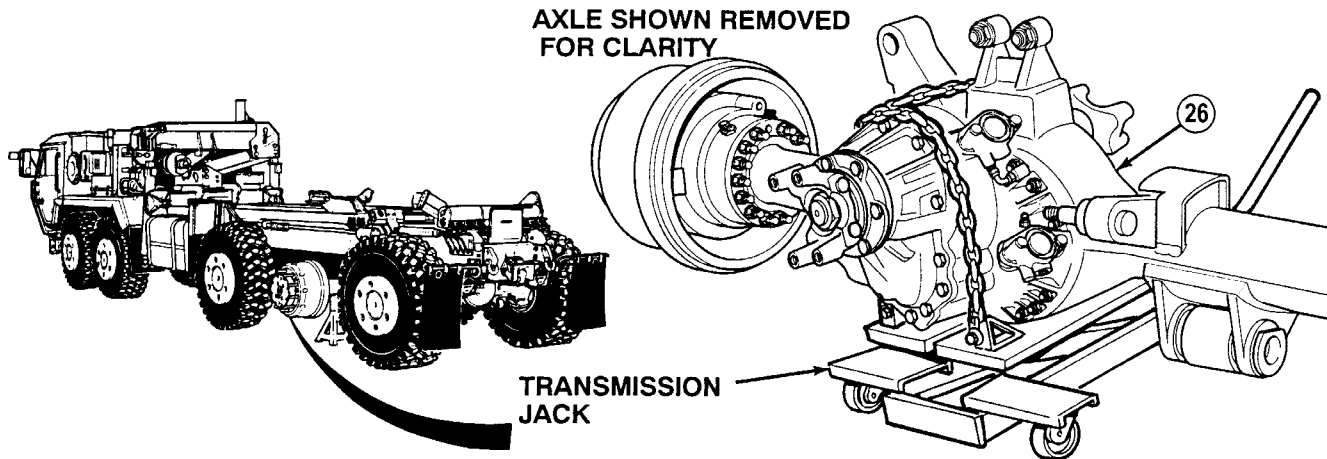
- (14) Remove locknut (24) and washer (27) from torque rod (25). Discard locknut.

NOTE

Tag and note number and size of spacers.

- (15) With the aid of an assistant, remove two locknuts (28), screws (29), plate (30), torque rod (25), bracket (31) and spacers (32) from frame (33). Discard locknuts.

9-12. AXLE NO. 4 ASSEMBLY REPLACEMENT (CONT).

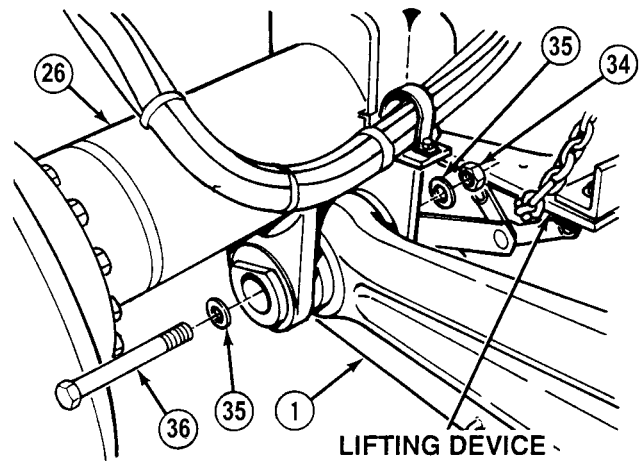


WARNING

- Axle No. 4 weighs 1,925 lbs (874 kg). Attach a transmission jack prior to removal. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

(16) Position transmission jack under Axle No. 4 (26) and secure with chain.

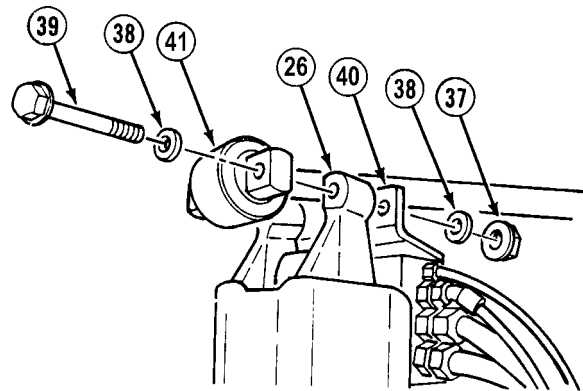
(17) With the aid of an assistant, remove locknut (34), two washers (35) and screw (36) from each equalizer beam (1). Discard locknuts.



WARNING

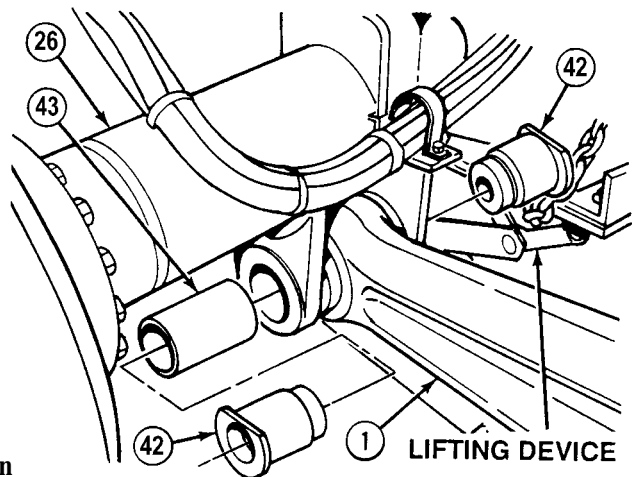
The truck end of torque rod must not be removed. Axle No. 4 and 5 share mounting hardware for longitudinal torque rod. If hardware is removed from cross-member, an out-of-balance condition for both axles will result. Any personnel under axle No. 5, which is not secured at this time, could be seriously injured or killed.

- (18) With the aid of an assistant, remove two locknuts (37), four washers (38), two screws (39), air manifold bracket (40) and axle end of torque rod (41) from Axle No. 4 (26). Discard locknuts.
- (19) Remove two adapters (42) from each equalizer beam (1).

**WARNING**

- Axle No. 4 weighs 1,925 lbs (874 kg). Attach a transmission jack prior to removal. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

- (20) With the aid of an assistant and transmission jack, remove Axle No. 4 (26) from equalizer beams (1).
- (21) Remove spacer (43) from each equalizer beam (1).
- (22) Remove Axle No. 4 (26) from transmission jack.



9-12. AXLE NO. 4 ASSEMBLY REPLACEMENT (CONT).

b. Installation.

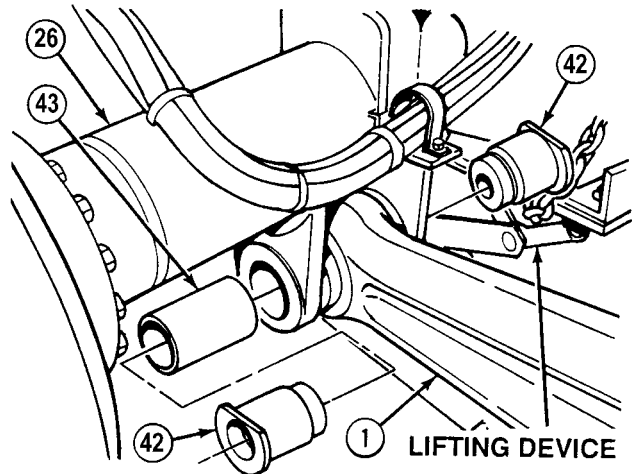
WARNING

- Axle No. 4 weighs 1,925 lbs (874 kg). Attach a transmission jack prior to removal. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

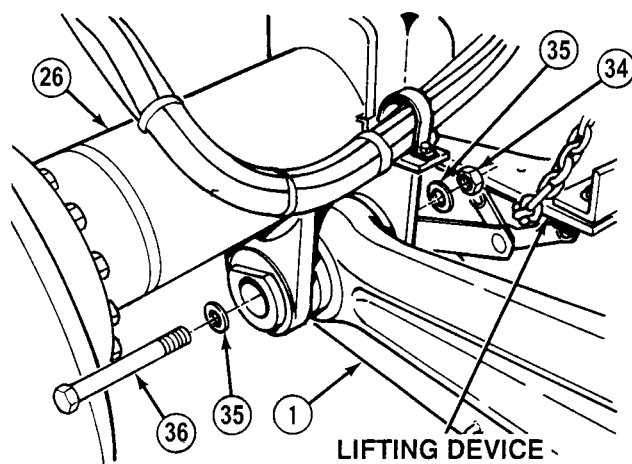
NOTE

If installing a new axle, remove and discard brake drum retaining screws.

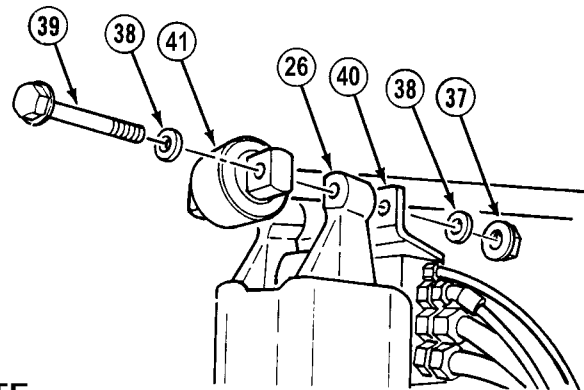
- (1) Position Axle No. 4 (26) on transmission jack and secure with chain.
- (2) Coat outside diameters of two spacers (43) and four adapters (42) with lubricating oil.
- (3) Install two spacers (43) in equalizer beams (1).



- (4) With the aid of an assistant and transmission jack, position Axle No. 4 (26) under truck in two equalizer beams (1).
- (5) Install two adapters (42) in each equalizer beam (1).
- (6) Coat threads of screw (36) with lubricating oil.
- (7) With the aid of an assistant, install screw (36), two washers (35) and locknut (34) in each equalizer beam (1). Tighten locknuts to 210 to 240 lb-ft (285 to 325 N·m).



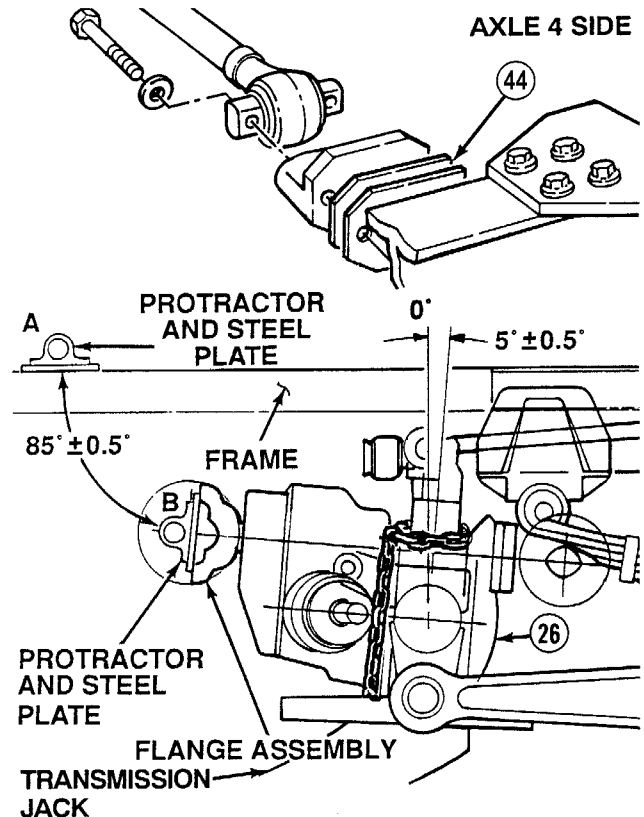
- (8) With the aid of an assistant, position axle end of torque rod (41) and air manifold bracket (40) on Axle No. 4 (26) with two screws (39), four washers (38) and two locknuts (37).



NOTE

- Equalizer beams and frame must be level to perform axle camber adjustment properly.
- Axle camber angle measurements must be taken with relationship to frame. If frame is not level, the angle the frame is inclined must be added or subtracted from flange assembly measurement.
- Axle flange measurement of 85 ± 0.5 degrees equals axle camber of five degrees ± 0.5 (90 degrees - 85 degrees = 5 degrees).

- (9) Position protractor and steel plate on frame at point A. Adjust protractor to zero.
- (10) Position protractor and steel plate on machined surface of the flange assembly and record measurement. This is point B. Measurement should read $85 \text{ degrees} \pm 0.5$ degrees.
- (11) Subtract measurement recorded at point B from 90 degrees. This will be axle camber.



WARNING

Axle No. 4 and Axle No. 5 share mounting hardware for longitudinal torque rods. Both axles must be supported during removal of screws and locknuts or axles may fall. Failure to comply may result in injury or death to personnel.

- (12) If Axle No. 4 camber is not five degrees ± 0.5 degrees, support Axle No. 5 and add or subtract spacers (44) until correct axle camber is achieved.
- (13) Remove transmission jack from Axle No. 4 (26).

9-12. AXLE NO. 4 ASSEMBLY REPLACEMENT (CONT).

- (14) Coat threads on tapered shaft of torque rod (25) with lubricating oil.
- (15) Install tapered shaft of torque rod (25) in axle (26).

NOTE

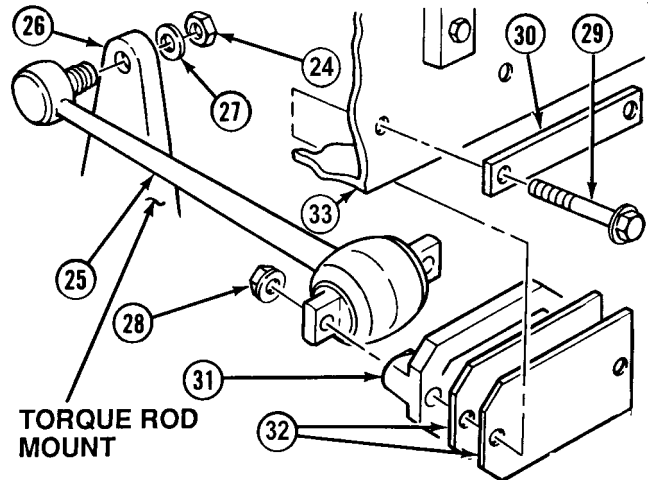
Tighten locknut only until threads of locknut are fully engaged with threads of torque rod. Otherwise, other end of torque rod will be difficult to install.

- (16) Position washer (27) and locknut (24) on torque rod (25).

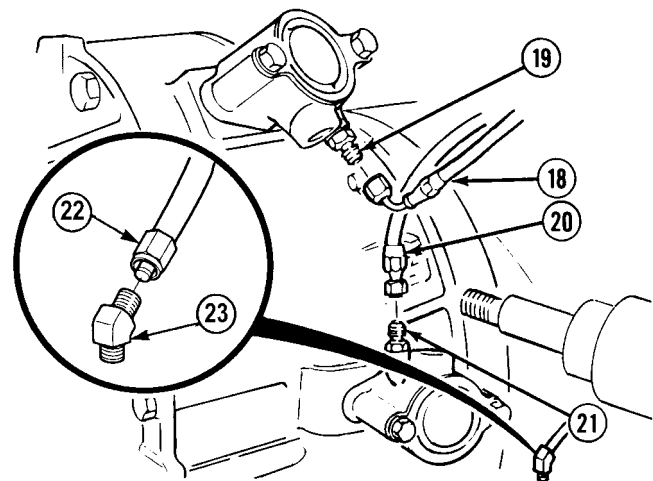
NOTE

Install same number and size of spacers as noted during removal.

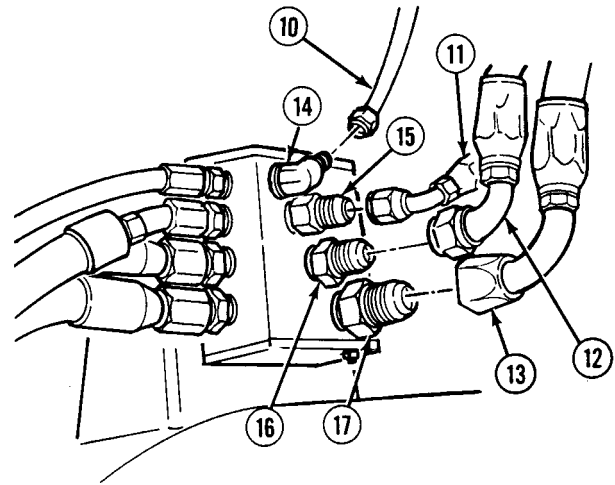
- (17) With the aid of an assistant, install spacers (32), bracket (31), truck end of torque rod (25) and plate (30) on frame (33) with screws (29) and locknuts (28).
- (18) Tighten locknut (24) on torque rod (25) to 175 to 225 lb-ft (237 to 305 N-m).
- (19) To seat torque rod (25), strike axle torque rod mount with soft faced hammer, then retighten locknut (24) on torque rod (25) to 175 to 225 lb-ft (237 to 305 N-m).



- (20) Install air line 2359 (20) to fitting (21).
- (21) Install air line 2422 (18) to fitting (19).
- (22) Connect air line 2893 (22) to axle breather elbow (23) on left side of axle tube.

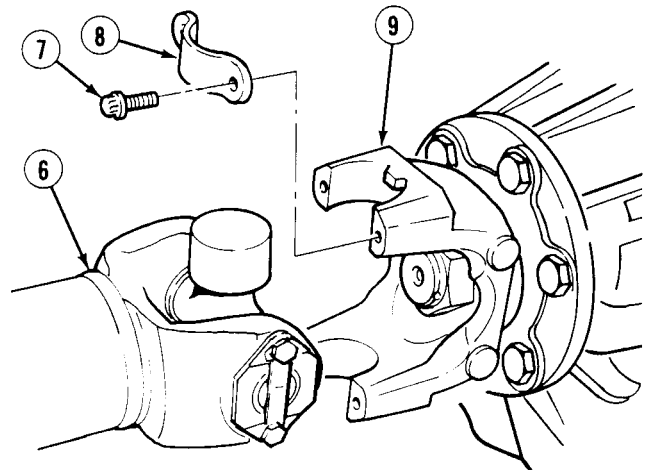


- (23) Install air line 2874 (10), air line 2139 (11), air line 2015 (12) and air line 2107 (13) to elbow (14) and fittings (15), (16) and (17).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Driveshaft weighs up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and cause serious injury to personnel.

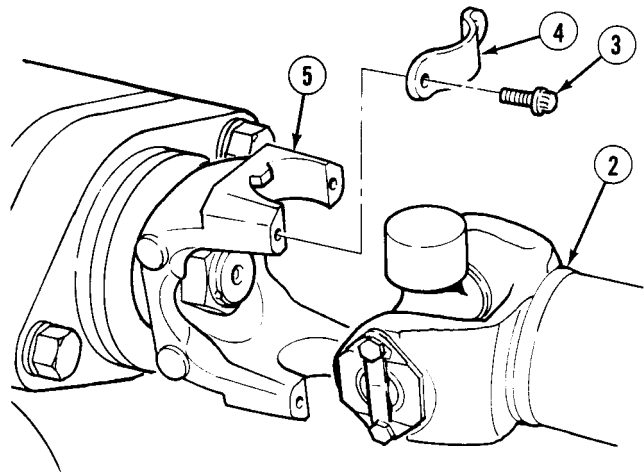


- (24) Coat threads of four screws (7) with sealing compound.
- (25) Position driveshaft (6) in flange assembly (9).
- (26) Install two brackets (8) and four screws (7) on flange assembly (9). Tighten screws 130 to 135 lb-ft (176 to 183 N·m).

9-12. AXLE NO. 4 ASSEMBLY REPLACEMENT (CONT).

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Driveshaft weighs up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and cause serious injury to personnel.



- (27) Coat threads of four screws (3) with sealing compound.
- (28) Position driveshaft (2) in flange assembly (5).
- (29) Install two brackets (4) and four screws (3) on flange assembly (5). Tighten screws 55 to 60 lb-ft (75 to 81 N·m).

c. *Follow-On Maintenance:*

- Install shock absorbers, (TM 9-2320-364-20).
- Fill axle oil, (TM 9-2320-364-20).
- Align suspension, (Para 12-8).
- Adjust brakes, (TM 9-2320-364-20).
- Install wheels/tires, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).
- Check operations, (TM 9-2320-364-10).

END OF TASK

9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
 (Item 240, Appendix F)
 Hammer, Hand, Soft Plastic
 (Item 88, Appendix F)
 Jack Kit, Hydraulic, Hand
 (Item 129, Appendix F)
 Jack, Transmission (Item 131, Appendix F)
 Jackstand (Item 132, Appendix F)
 Protractor, Square (Item 171, Appendix F)
 Wrench, Combination, 1-1/4 in.
 (Item 256, Appendix F)
 Wrench Set, Socket 3/4 in. Drive
 (Item 274, Appendix F)
 Wrench, Torque (0-175 lb-ft [0-237 N·m])
 (Item 277, Appendix F)
 Wrench, Torque (0-600 lb-ft [0-814 N·m])
 (Item 278, Appendix F)
 Steel Plate (Appendix C)
 Wooden Block (Appendix C)

Personnel Required

Two

Equipment Condition

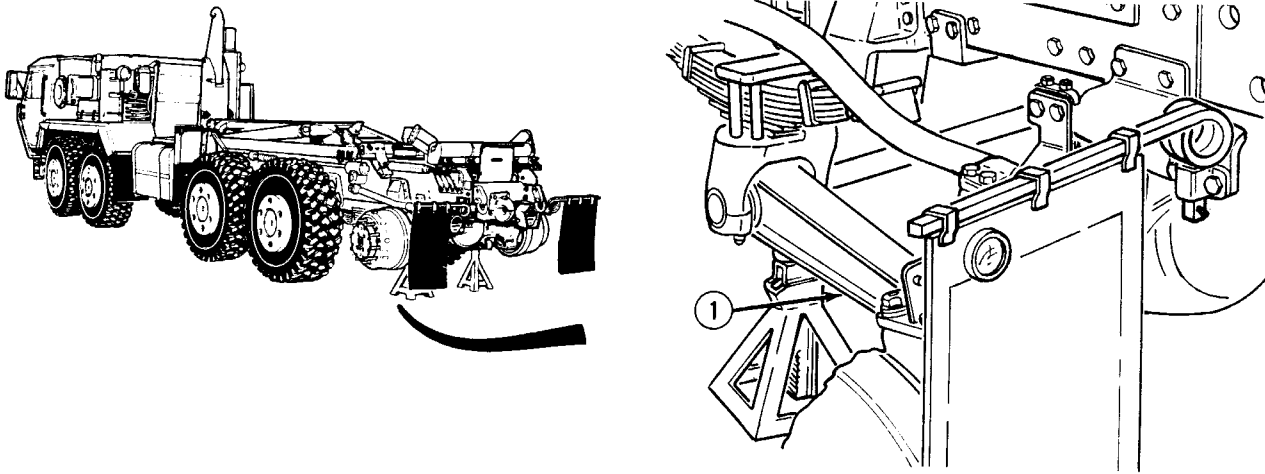
Engine OFF, (TM 9-2320-364-10)
 Wheels chocked, (TM 9-2320-364-10)
 Wheels/tires removed, (TM 9-2320-364-10)
 Shock absorbers removed, (TM 9-2320-364-20)
 Axle oil drained, (TM 9-2320-364-20)

Materials/Parts

Cable Ties (Item 9, Appendix B)
 Grease (Item 21, Appendix B)
 Oil, Lubricating (Item 36, Appendix B)
 Sealing Compound (Item 56, Appendix B)
 Tags, Identification (Item 72, Appendix B)
 Locknut (2) (Item 165, Appendix E)
 Locknut (2) (Item 166, Appendix E)
 Locknut (Item 181, Appendix E)
 Locknut (2) (Item 182, Appendix E)
 Locknut (4) (Item 188, Appendix E)
 Locknut (2) (Item 192, Appendix E)
 Pin, Cotter (Item 421, Appendix E)

9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT (CONT).

a. Removal.



NOTE

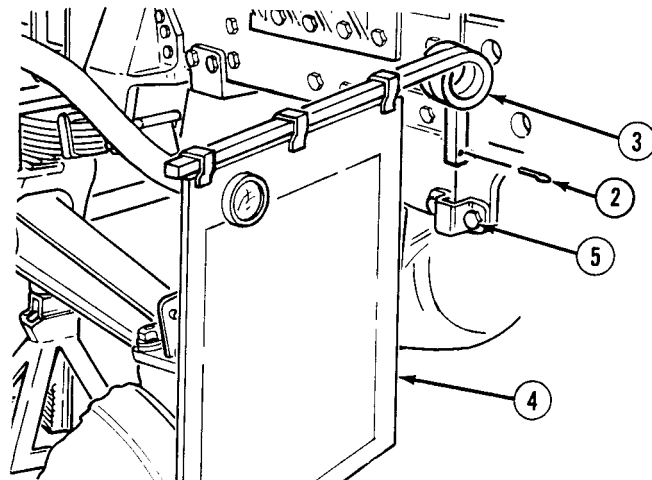
Tag and mark air lines prior to removal.

- (1) Position jackstands under Axle No. 5 end of equalizer beams (1).

NOTE

There are two mud flaps. Left mud flap shown.

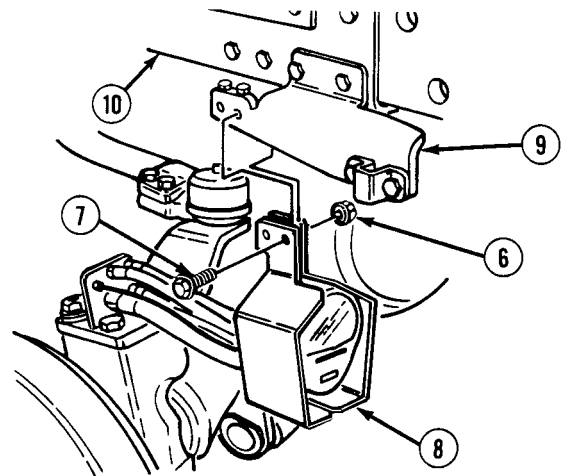
- (2) Remove and discard cotter pin (2) from mud flap bracket (3).
- (3) Remove mud flap (4) and bracket (3) from bracket (5).
- (4) Repeat Steps (2) and (3) for right mud flap.



NOTE

There are two tail light assemblies. Left tail light shown.

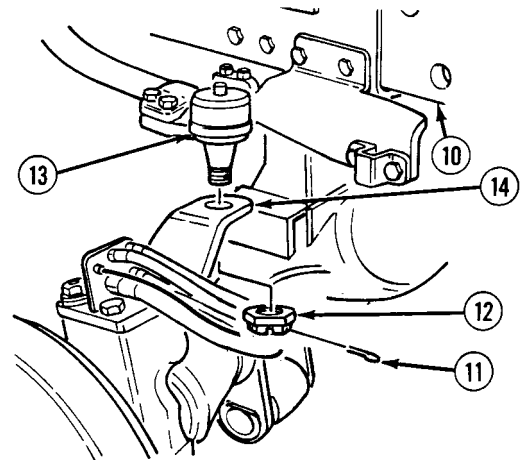
- (5) With the aid of an assistant, remove two locknuts (6), screws (7) and tail light assembly (8) from bracket (9).
- (6) Tie tail light assembly (8) up out of way to frame (10) with cable ties.
- (7) Repeat Steps (5) and (6) for right tail light assembly.
- (8) Remove and discard cotter pin (11) from castle nut (12).
- (9) Remove castle nut (12) from drag link (13).



NOTE

It may be necessary to tap on steering arm bracket with hammer to remove drag link.

- (10) With the aid of an assistant, apply upward pressure to draglink (13) and remove draglink (13) from steering arm bracket (14).
- (11) Tie axle end of drag link (13) to frame (10) with cable ties.



9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT (CONT).

WARNING

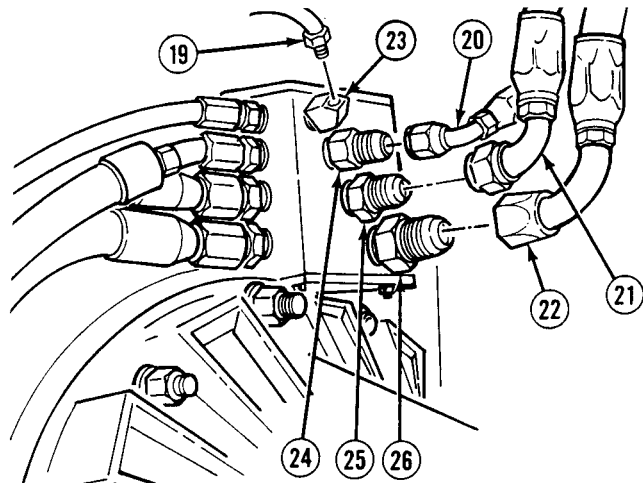
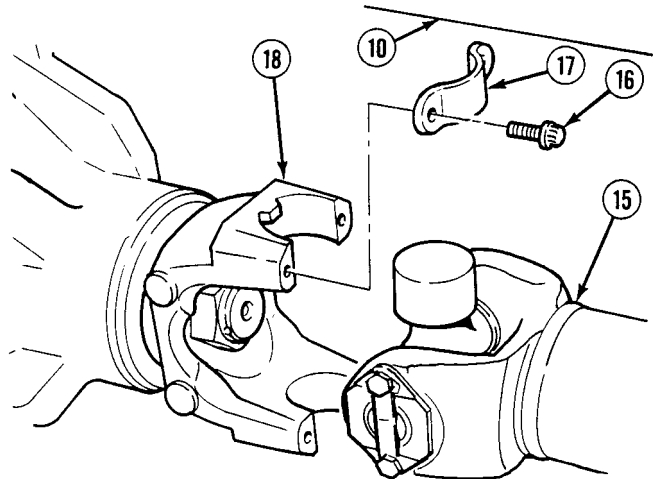
Driveshaft can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and cause serious injury to personnel.

- (12) With the aid of an assistant, support driveshaft (15) and remove four screws (16) and two brackets (17) from flange assembly (18).
- (13) Remove Axle No. 5 end of driveshaft (15) from flange assembly (18).
- (14) With the aid of an assistant, support driveshaft (15) and tie axle end of driveshaft to frame (10) with cable ties.

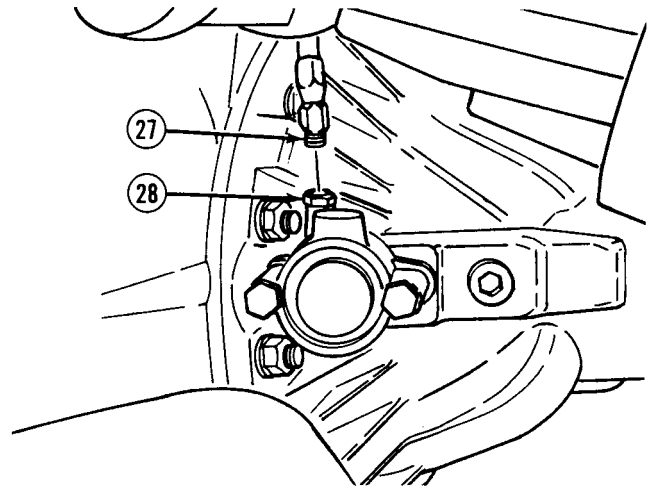
NOTE

Tag and mark air lines prior to removal.

- (15) Remove air line 2874 (19), air line 2369 (20), air line 2144 (21) and air line 2098 (22) from elbow (23) and fittings (24), (25) and (26).



- (16) Remove air line 2338 (27) from fitting (28).



NOTE

Perform Steps (17) through (19) if truck is equipped with a self-recovery winch.

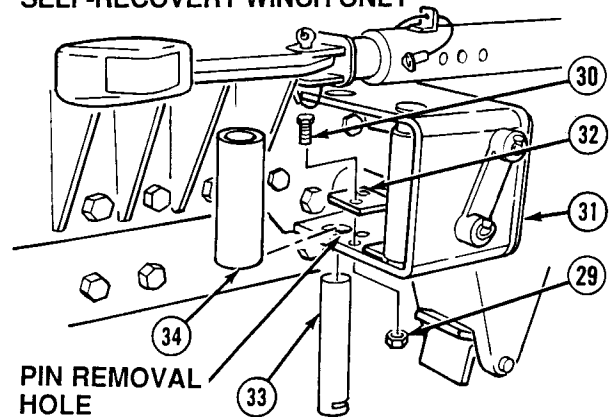
- (17) Remove two locknuts (29) and screws (30) from self-recovery winch bracket (31). Discard locknuts.

NOTE

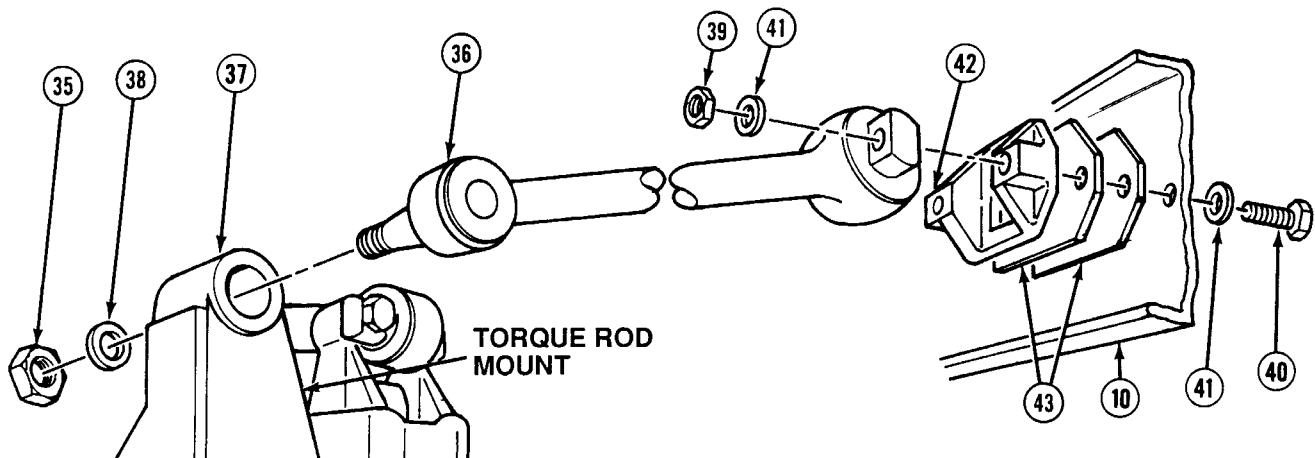
Pin will drop when locking plate is removed.

- (18) Remove locking plate (32) and pin (33) from self-recovery winch bracket (31).
 (19) Remove roller (34) from self-recovery winch bracket (31).

ON TRUCKS WHICH HAVE SELF-RECOVERY WINCH ONLY



9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT (CONT).



- (20) Loosen locknut (35) until locknut is flush with threaded end of torque rod (36).

WARNING

Torque rod is under extreme pressure when being pressed from axle. Torque rod can be dangerous when it breaks loose and could cause injury to personnel.

NOTE

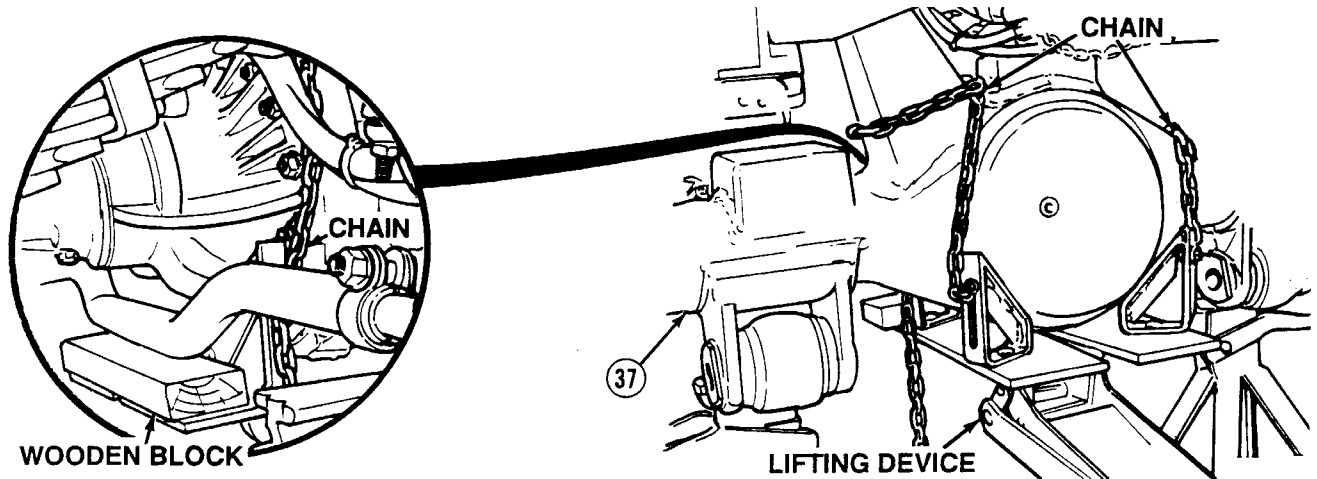
Strike torque rod mount with soft faced hammer while pressure is being applied to torque rod.

- (21) Using hand jack kit, press tapered end of torque rod (36) from Axle No. 5 (37) until torque rod is loosened.
- (22) Remove locknut (35) and washer (38) from torque rod (36). Discard locknut.

NOTE

Tag and note number and size of spacers.

- (23) With the aid of an assistant, remove two locknuts (39), screws (40), four washers (41), torque rod (36), bracket (42) and spacers (43) from frame (10). Discard locknuts.

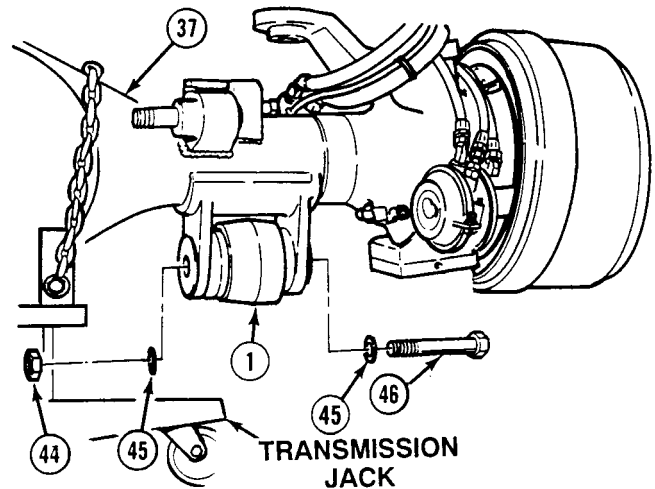


WARNING

- Axle No. 5 weighs 1,905 lbs (865 kg). Attach a transmission jack prior to removal. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

(24) Position transmission lifting device under Axle No. 5 (37) and secure with chain.

(25) With the aid of an assistant, remove locknut (44), two washers (45) and screw (46) from each equalizer beam (1). Discard locknut.



9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT (CONT).

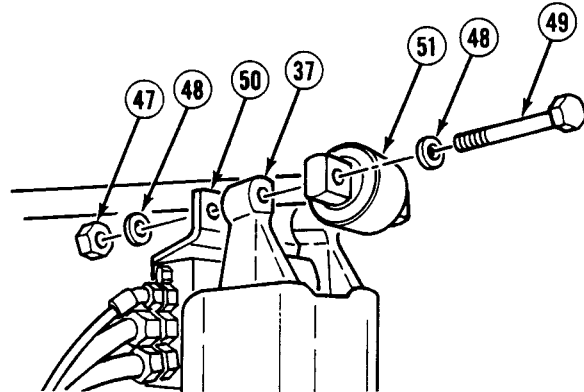
WARNING

The truck end of torque rod must not be removed. Axles No. 4 and 5 share mounting hardware for longitudinal torque rod. If hardware is removed from crossmember, an out-of-balance condition for both axles will result. Any personnel under Axle No. 4, which is not secured at this time, could be seriously injured or killed.

NOTE

Tag and note number and size of spacers.

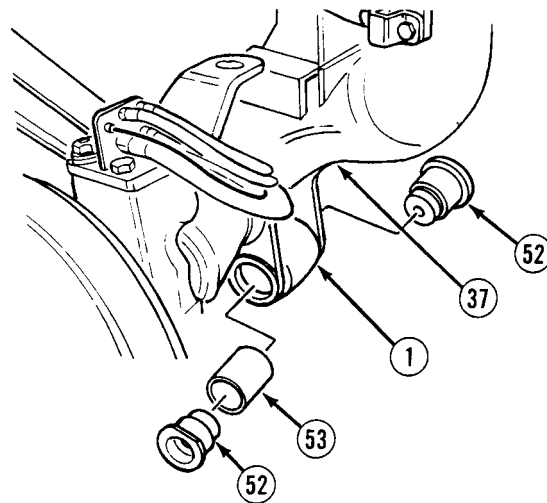
- (26) With the aid of an assistant, remove two locknuts (47), four washers (48), two screws (49), air manifold bracket (50) and axle end of torque rod (51) from Axle No. 5 (37). Discard locknuts.



WARNING

- Axle No. 5 weighs 1,905 lbs (865 kg). Attach a transmission jack prior to removal. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

- (27) Remove two adapters (52) from each equalizer beam (1).
- (28) With the aid of an assistant, use transmission jack to remove Axle No. 5 (37) from equalizer beams (1).
- (29) Remove spacer (53) from each equalizer beam (1).
- (30) Remove Axle No. 5 (37) from transmission jack.



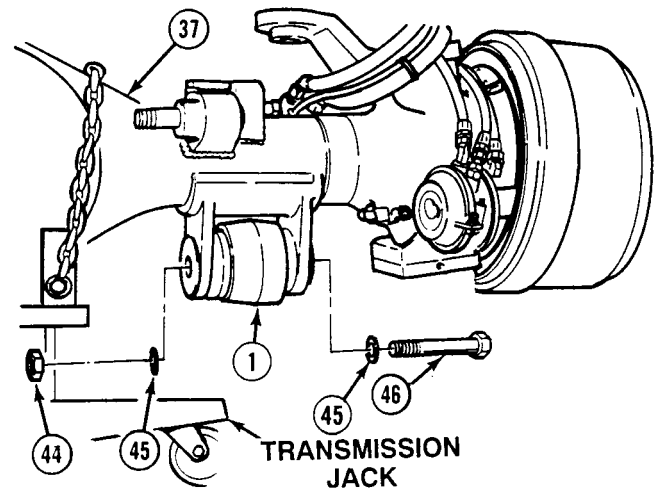
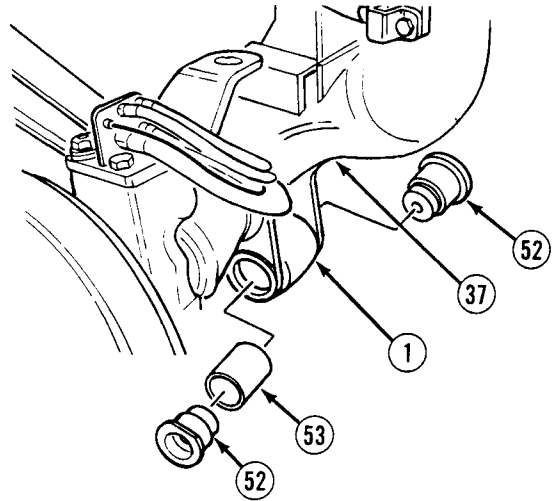
b. *Installation.***WARNING**

- Axle No. 5 weighs 1,905 lbs (865 kg). Attach a transmission jack prior to installation. The axle housing must be chained to transmission jack or an out-of-balance condition may result. Failure to comply may result in serious injury or death to personnel.
- Keep fingers out of beam holes. Failure to comply could result in serious injury to personnel.

NOTE

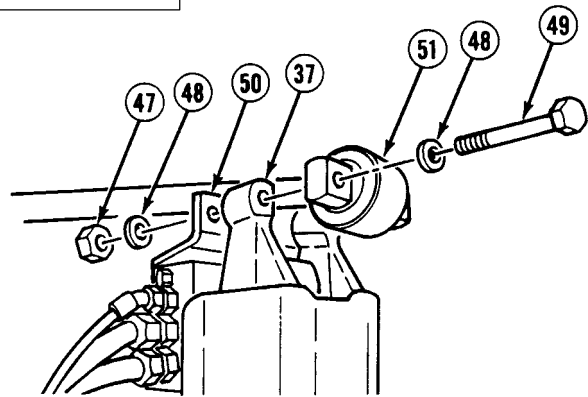
If installing a new axle, remove and discard brake drum retaining screws.

- (1) Position Axle No. 5 (37) on transmission jack and secure with chain.
- (2) Coat outside diameters of two spacers (53) and four adapters (52) with lubricating oil.
- (3) Install two spacers (53) in each equalizer beam (1).
- (4) With the aid of an assistant and transmission jack, position Axle No. 5 (37) under truck.
- (5) Install two adapters (52) in each equalizer beam (1).
- (6) Coat threads of screw (46) with lubricating oil.
- (7) With the aid of an assistant, install screw (46), two washers (45) and locknut (44) in each equalizer beam (1). Tighten locknuts 210 to 240 lb-ft (285 to 325 N·m).



9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT (CONT).

- (8) Install axle end of torque rod (51) and air manifold bracket (50) on Axle No. 5 (37) with two screws (49), four washers (48) and two locknuts (47).



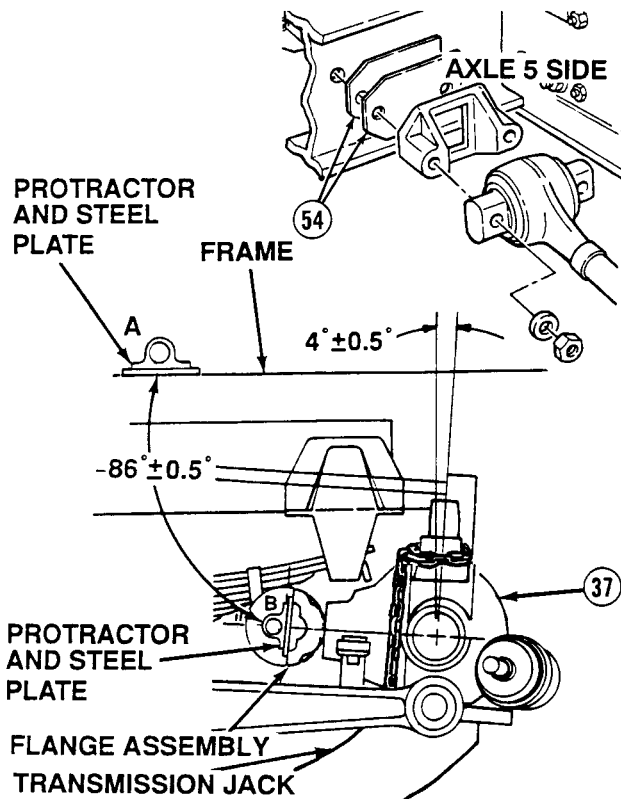
NOTE

- Equalizer beams and frame must be level to perform axle camber adjustment properly.
- Axle camber angle measurements must be taken with relationship to frame. If frame is not level, the angle the frame is inclined must be added or subtracted from flange assembly measurement.
- Axle flange measurement of 86 ± 0.5 degrees equals axle camber of four degrees ± 0.5 (90 degrees - 86 degrees = 4 degrees).

- (9) Position protractor and steel plate on frame at point A. Adjust protractor to zero.

- (10) Position protractor and steel plate on machined surface of the flange assembly and record measurement. This is point B. Measurement should read $86 \text{ degrees} \pm 0.5$ degrees.

- (11) Subtract measurement recorded at point B from 90 degrees. This will be axle camber.

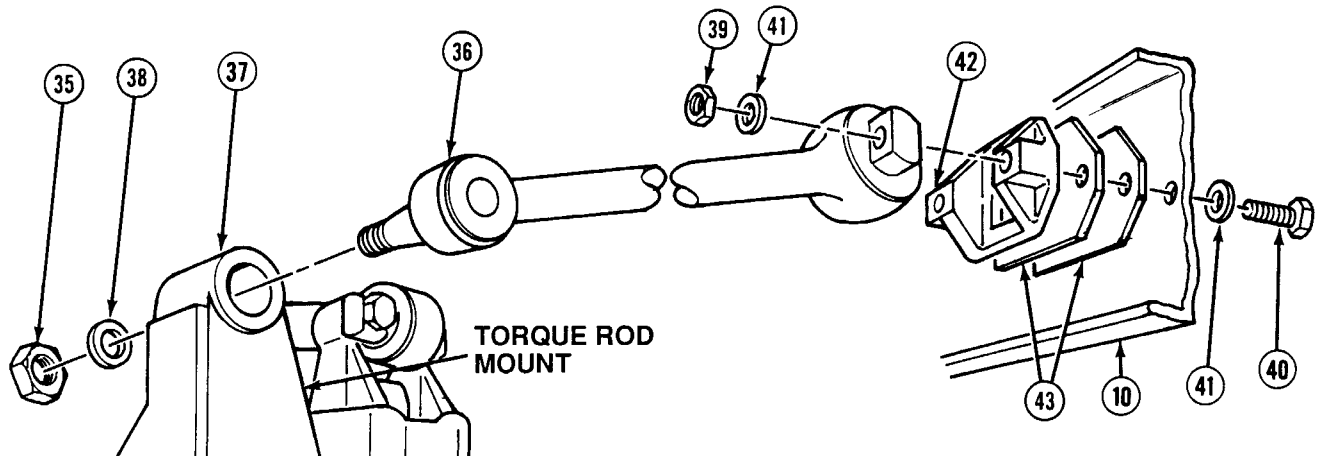


WARNING

Axle No. 4 and Axle No. 5 share mounting hardware for longitudinal torque rods. Both axles must be supported during removal of screws and locknuts or axles may fall. Failure to comply may result in injury or death to personnel.

- (12) If Axle No. 5 camber is not four degrees ± 0.5 degrees, support Axle No. 4 and add or subtract spacers (54) until correct axle camber is achieved.

- (13) Remove transmission jack from Axle No. 5 (37).



- (14) Coat threads on shaft of torque rod (36) with lubricating oil.
- (15) Install tapered shaft of torque rod (36) in axle (37).

NOTE

Tighten locknut only until threads of locknut are fully engaged with threads of torque rod. Otherwise, other end of torque rod will be difficult to install.

- (16) Position washer (38) and locknut (35) on torque rod (36).

NOTE

Install same number and size spacers as noted during removal.

- (17) With the aid of an assistant, install spacers (43), bracket (42) and truck end of torque rod (36) on frame (10) with two screws (40), four washers (41) and two locknuts (39).
- (18) Tighten locknuts (35) on torque rod (36) 175 to 225 lb-ft (237 to 305 N·m).

NOTE

To seat torque rod, strike torque rod mount with hammer.

- (19) Retighten locknut (35) on torque rod (36) to 175 to 225 lb-ft (237 to 305 N·m).

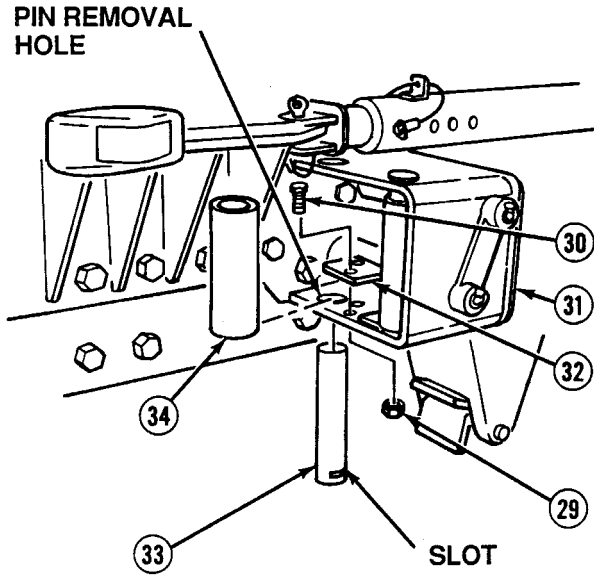
9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT (CONT).

NOTE

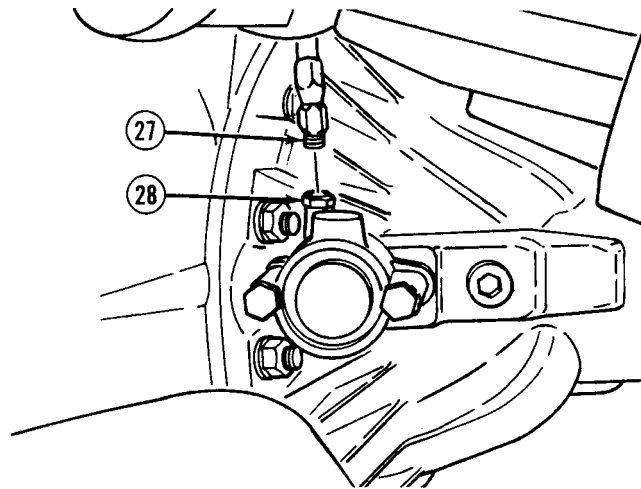
Perform Steps (20) through (23) if truck is equipped with self-recovery switch.

- (20) Position roller (34) on self-recovery winch bracket (31).
- (21) Coat pin (33) with grease.
- (22) Position pin (33) up through pin removal hole in self-recovery winch bracket (31).
- (23) Position locking plate (32) into slot of pin (33) and install two screws (30) and locknuts (29) on self-recovery winch bracket (31). Tighten locknuts to 130 lb-ft (18 N-m).

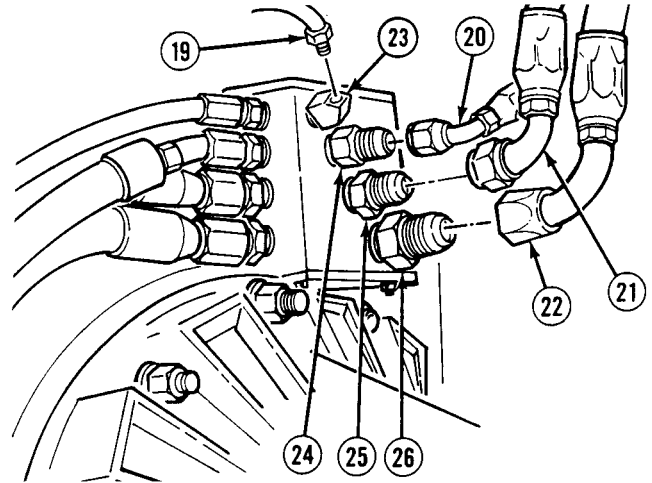
ON TRUCKS WHICH HAVE SELF-RECOVERY WINCH ONLY



- (24) Install air line 2338 (27) to fitting (28).

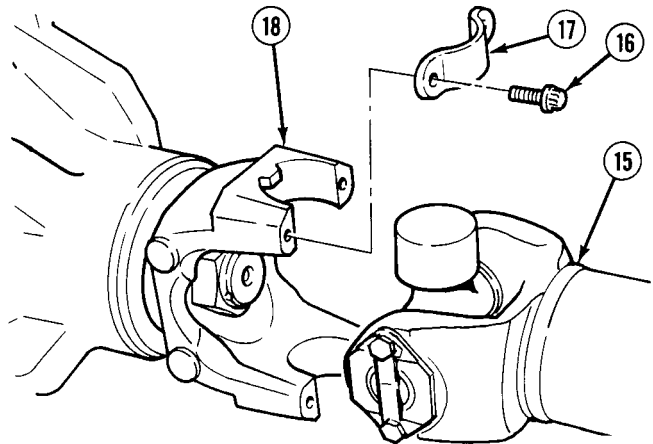


- (25) Install air line 2874 (19), air line 2369 (20), air line 2144 (21) and air line 2098 (22) to elbow (23) and fittings (24), (25) and (26).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (26) Coat threads of four screws (16) with sealing compound.

WARNING

Driveshaft can weigh up to 100 lbs (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshafts can fall and cause serious injury to personnel.

- (27) Position driveshaft (15) in flange assembly (18).
- (28) Install two brackets (17) and four screws (16) to flange assembly (18). Tighten screws 55 to 60 lb-ft (75 to 81 N·m).

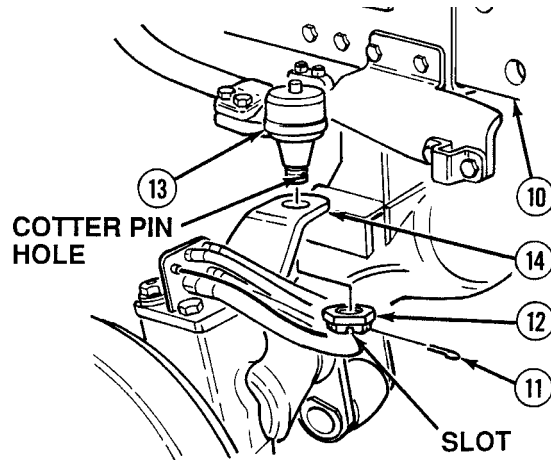
9-13. AXLE NO. 5 ASSEMBLY REPLACEMENT (CONT).

- (29) Install draglink (13) in steering arm (14) with castle nut (12). Tighten nut to 165 to 180 lb-ft (224 to 244 N·m).

NOTE

It may be necessary to rotate castle nut slightly to install cotter pin.

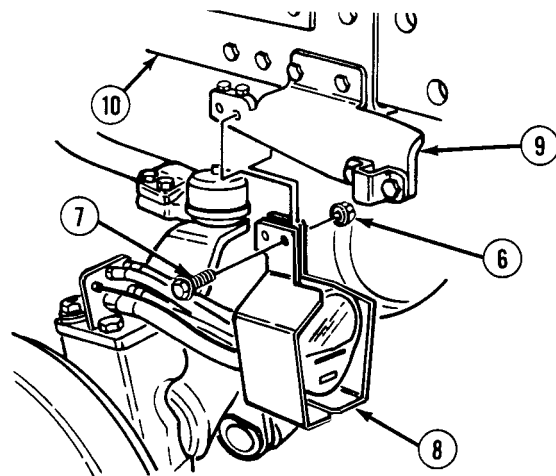
- (30) Install cotter pin (11) through castle nut (12) on draglink shaft (14).



NOTE

There are two tail light assemblies. Left tail light assembly shown.

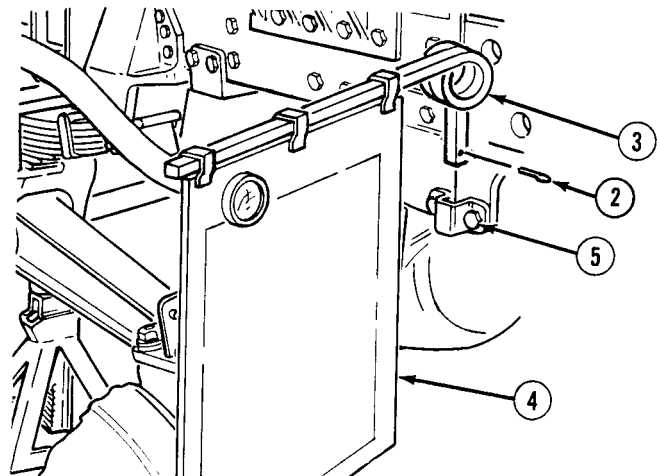
- (31) With the aid of an assistant, install tail light assembly (8) on bracket (9) of frame (10) with two screws (7) and locknuts (6).
- (32) Repeat Step (30) for right tail light assembly (8).



NOTE

There are two mud flaps. Left mud flap shown.

- (33) Install mud flap (4) in bracket (5).
- (34) Install cotter pin (2) mud flap bracket (3).
- (35) Repeat Steps (32) and (33) for right mud flap.



c. Follow-On Maintenance:

- **Install shock absorbers, (TM 9-2320-364-20).**
- **Fill axle oil, (TM 9-2320-364-20).**
- **Align suspension, (Para 12-8).**
- **Adjust brakes, (TM 9-2320-364-20).**
- **Install wheels/tires, (TM 9-2320-364-10).**
- **Remove wheel chocks, (TM 9-2320-364-10).**
- **Check operations, (TM 9-2320-364-10).**

END OF TASK

9-14. AXLE NO. 3 AND 4 SPINDLE ASSEMBLY REPAIR.

This task covers:

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

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Gloves, Heavy Duty (Item 82, Appendix F)
Press, 60 Ton (Item 164, Appendix F)
Puller Kit, Universal (Item 174, Appendix F)
Socket, Socket Head Screw, 12 mm
(Item 206, Appendix F)
Torch, Propane (Item 247, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

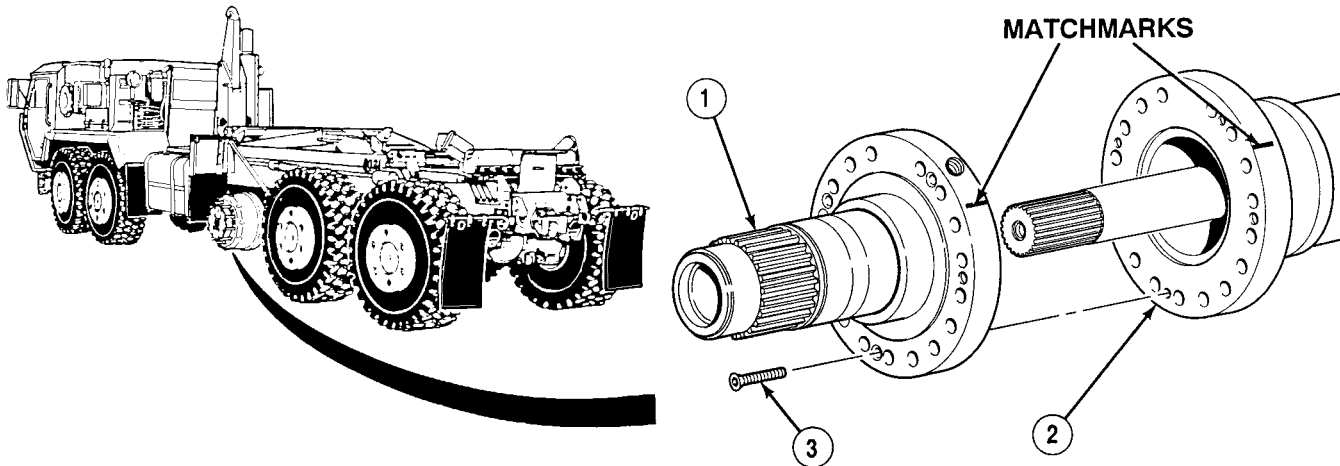
Materials/Parts

Sealing Compound (Item 60, Appendix B)

Equipment Condition

Engine shut OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Brake assembly removed, (Para 10-2)
Axle air lines removed, (TM 9-2320-364-20)

a. Removal.



WARNING

Spindle is heavy. Properly support spindle during disassembly or serious injury to personnel may occur.

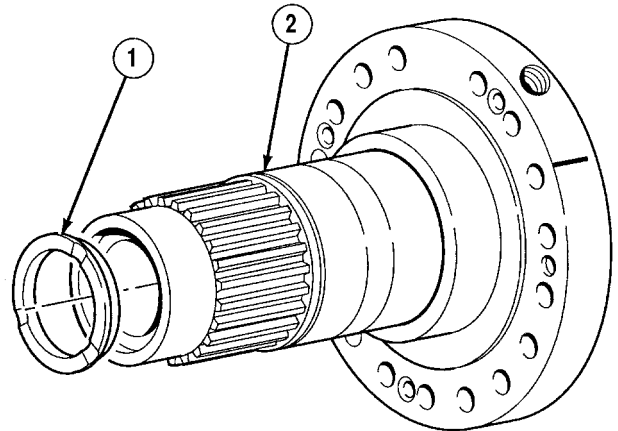
NOTE

- It may be necessary to tap spindle with soft faced mallet to break adhesive grip.
- Axle No. 3 and 4 spindles are replaced the same way.
- Axle No. 3 spindle is shown.

- (1) Matchmark spindle (1) and Axle No. 3 housing (2).
- (2) Remove two screws (3) and spindle (1) from Axle No. 3 housing (2).

b. *Disassembly.*

- (1) Using puller, remove spindle ring (1) from spindle (2).

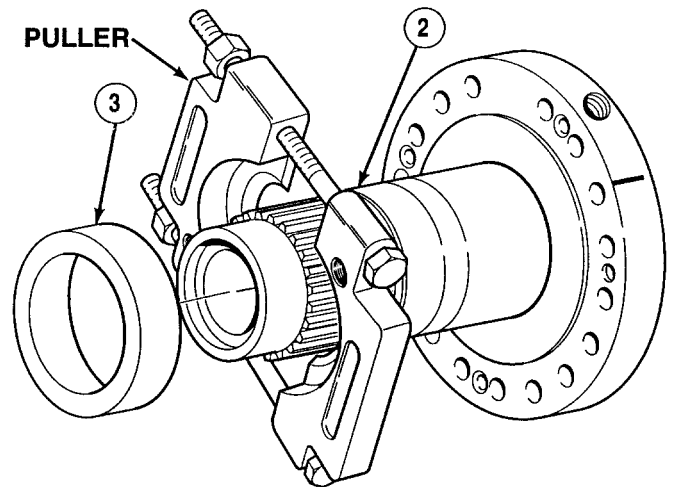


- (2) Heat seal race (3) with propane torch.

WARNING

Seal race is extremely hot. Do not touch seal race without protective gloves or severe burns to hands could result.

- (3) Using puller and press, remove seal race (3) from spindle (2).

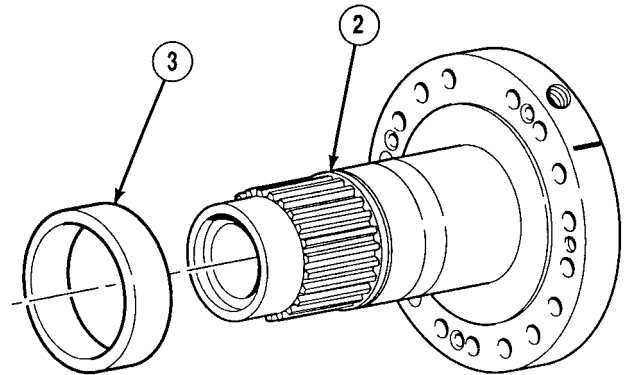


9-14. AXLE NO. 3 AND 4 SPINDLE ASSEMBLY REPAIR (CONT).

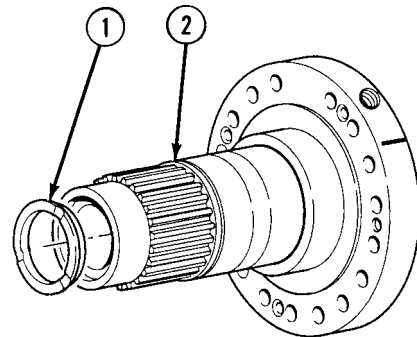
c. Assembly.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



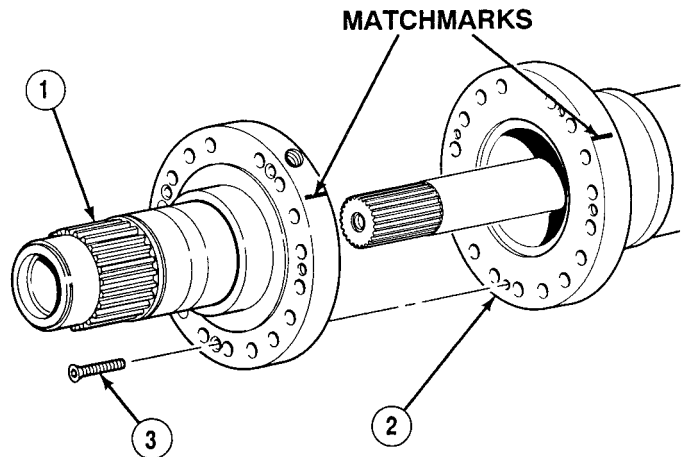
- (1) Coat mating surface of seal race (3) on spindle (2) with sealing compound.
- (2) Using press, install seal race (3) on spindle (2).
- (3) Coat outer surface of spindle ring (1) with sealing compound.
- (4) Using handle and driver, install spindle ring (1) on spindle (2).



*d. Installation.***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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Coat mating surface of Axle No. 3 housing (2) with sealing compound.
- (2) Align matchmarks and install spindle (1) on Axle No. 3 housing (2) with two screws (3). Tighten screws 15 to 20 lb-ft (20 to 27 N·m).

*e. Follow-On Maintenance.*

- Install axle air lines, (TM 9-2320-364-20).
- Install brake assembly, (Para 10-2).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

9-15. AXLE NO. 1 AND 5 LOCKING CYLINDER REPLACEMENT.

This task covers:

- | | |
|-----------------|--------------------------|
| a. Removal | c. Adjustment |
| b. Installation | d. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Caliper, Dial, 0-6 in. w/Dial
(Item 25, Appendix F)
Micrometer, Outside, Caliper, Set
(Item 139, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

Materials/Parts

Adhesive (Item 1, Appendix B)
Tags, Identification (Item 72, Appendix B)
Shim Kit, Adjusting (2) (Item 639, Appendix E)

Equipment Condition

Air system drained, (TM 9-2320-364-10)
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

a. Removal.

NOTE

- Axle No. 1 and Axle No. 5 locking cylinders are removed the same way.
- Axle No. 1 is shown.
- Tag and mark air line prior to removal.

- (1) Remove air line 2419 (1) from fitting (2).

NOTE

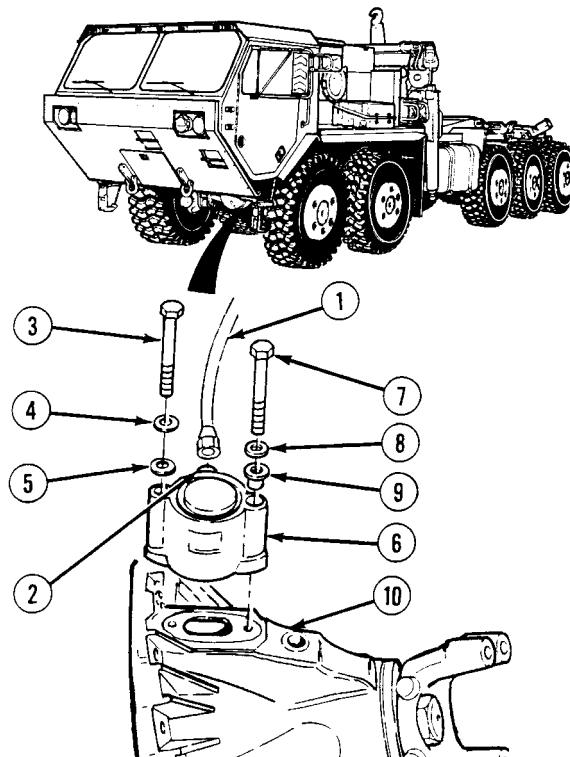
Note and tag which screw location contains shim kit.

- (2) Remove screw (3), washer (4) and shim kit (5) from locking cylinder (6). Discard shim kit.
- (3) Remove screw (7), washer (8) and plastic washer (9) from locking cylinder (6).

NOTE

To remove locking cylinder, pull left and outward.

- (4) Remove locking cylinder (6) from differential housing (10).



b. *Installation.*

WARNING

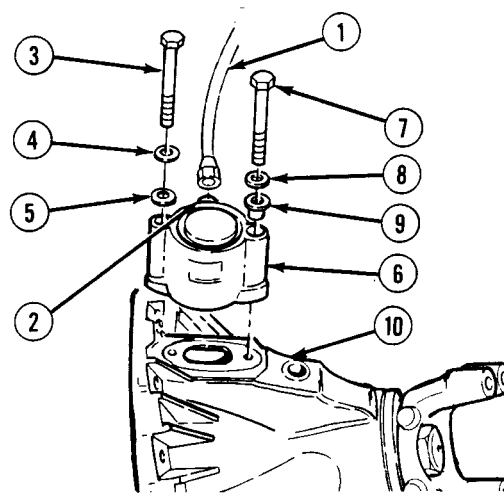
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (1) Coat mating surface of differential (10) with adhesive.
- (2) Position locking cylinder (6) on differential (10).
- (3) Position plastic washer (9), washer (8) and screw (7) on locking cylinder (6).

NOTE

Install screw only to keep screw hole in locking cylinder aligned with differential. Screw should be positioned so that three or four threads of screw are engaged.

- (4) Position washer (4) and screw (3) on locking cylinder (6).
- (5) Tighten screw (7) on locking cylinder (6) to 22 to 32 lb-ft (30 to 43 N·m).
- (6) Install air line 2419 (Axle No. 1) (1) to fitting (2).

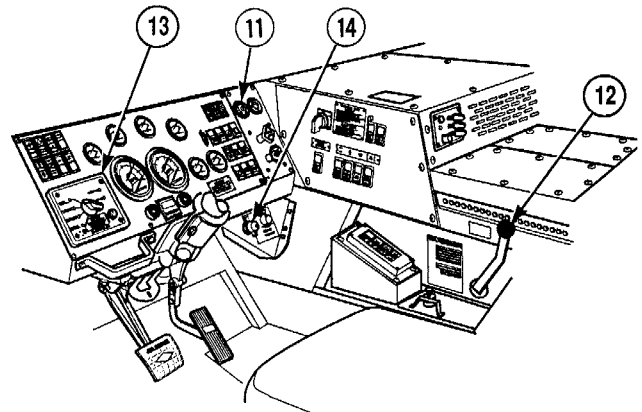


c. *Adjustment.*

NOTE

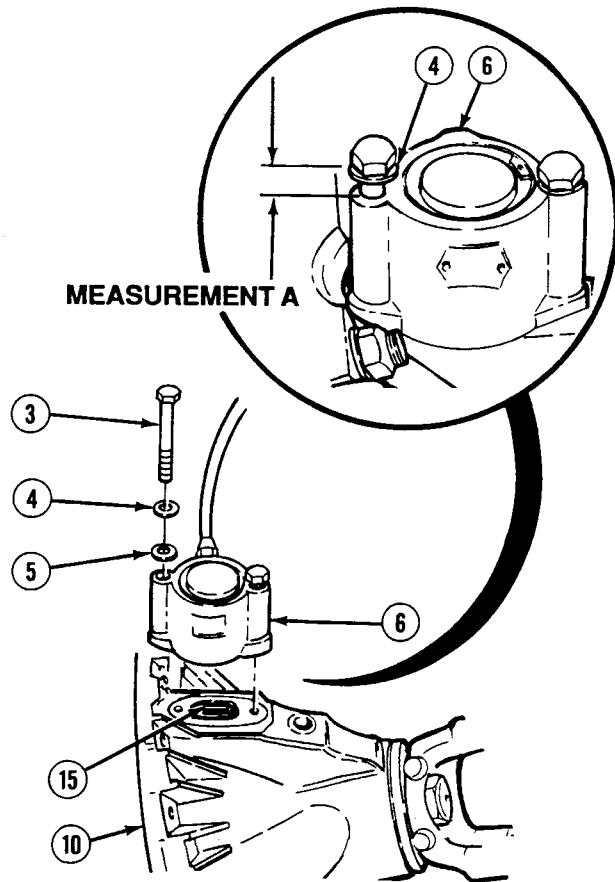
Perform adjustment only if a new locking cylinder was installed or axle differential was removed.

- (1) Remove wheel chocks.
- (2) Start engine and build up air pressure (11) to 125 psi (862 kPa).
- (3) Shift transfer case (12) to low.
- (4) Switch CTIS controller (13) to EMERGENCY.
- (5) Drive truck forward or backward five ft (1.5 m).
- (6) Turn OFF engine switch (14).
- (7) Chock wheels.



9-15. AXLE NO. 1 AND 5 LOCKING CYLINDER REPLACEMENT (CONT).

- (8) Tighten screw (3) slowly until screw contacts fork (15) in differential (10).
- (9) Using caliper, measure distance between face of washer (4) and top of locking cylinder (6) and record as measurement A.
- (10) Determine shim kit (5) thickness. Shim kit thickness is: measurement A - 0.004 to 0.020 in. (0.102 to 0.508 mm).
- (11) Remove screw (3) and washer (4) from locking cylinder (6).
- (12) Install shim kit (5) thickness determined in Step (16), washer (4) and screw (3) on locking cylinder (6). Tighten screw 22 to 32 lb-ft (30 to 43 N·m).



d. Follow-On Maintenance:

- Check axle oil level, (TM 9-2320-364-20).
- Check for oil and air leaks, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

9-16. AXLE NO. 2 AND 4 LOCKING CYLINDER REPLACEMENT.

This task covers:

- | | |
|-----------------|--------------------------|
| a. Removal | c. Adjustment |
| b. Installation | d. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Caliper, Dial, 0-6 in. w/Dial
(Item 25, Appendix F)
Micrometer, Outside, Caliper, Set
(Item 139, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

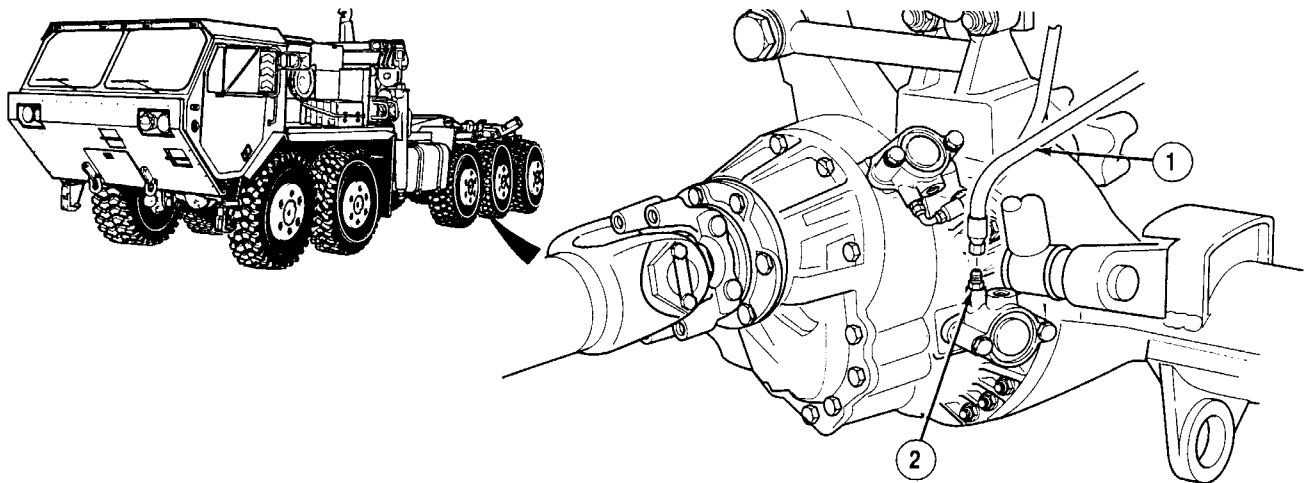
Materials/Parts

Adhesive, (Item 1, Appendix B)
Tags, Identification (Item 72, Appendix B)
Shim Kit, Adjusting (Item 639, Appendix E)

Equipment Condition

Air system drained, (TM 9-2320-364-10)
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

a. Removal.

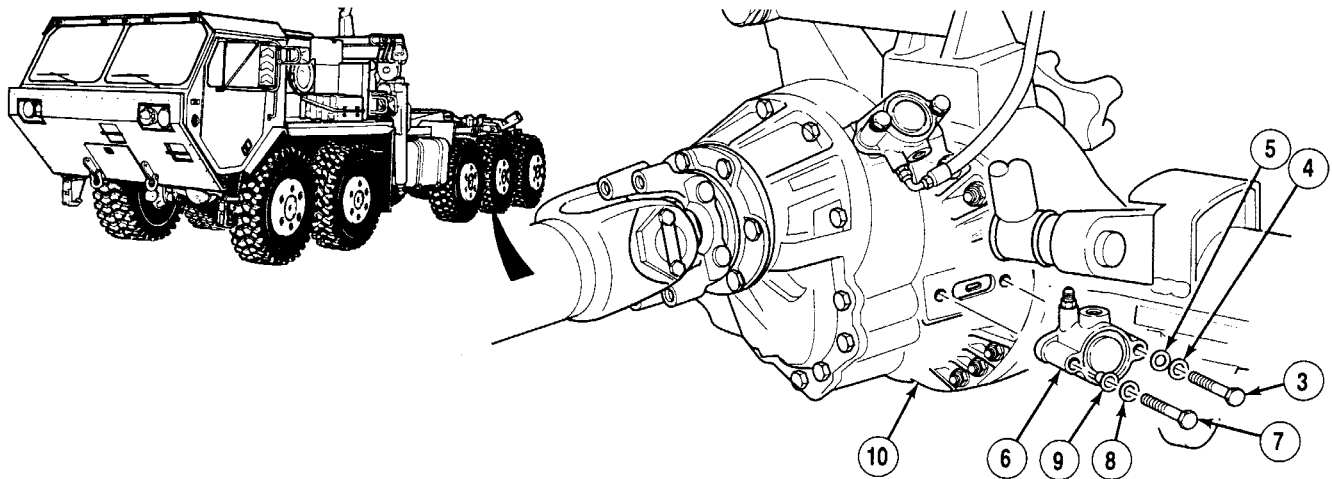


NOTE

- Both axle locking cylinders are removed the same way.
- Axle No. 4 is shown.
- Tag and mark air lines before disconnecting.
- Only discard shim kits if a new locking cylinder is to be installed or axle differential is to be removed.

(1) Remove air line 2420 (1) from fitting (2).

9-16. AXLE NO. 2 AND 4 LOCKING CYLINDER REPLACEMENT (CONT).



NOTE

Tag and note which screw location contains shim kit.

- (2) Remove screw (3), washer (4) and shim kit (5) from locking cylinder (6). Discard shim kit.
- (3) Remove screw (7), washer (8) and plastic washer (9) from locking cylinder (6).

NOTE

To remove locking cylinder, pull left and outward.

- (4) Remove locking cylinder (6) from differential housing (10).

NOTE

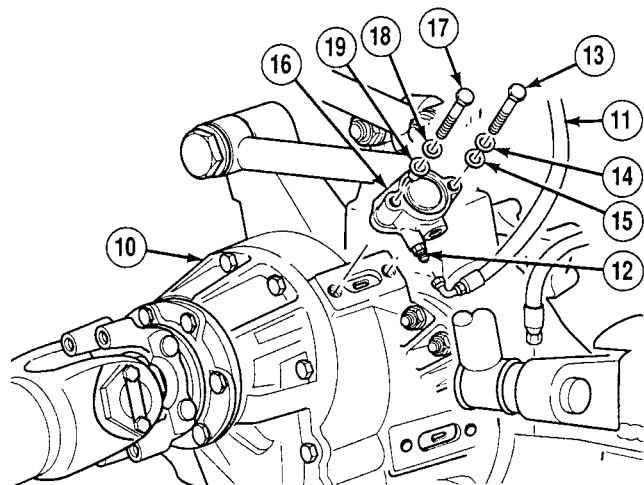
Tag and mark air line prior to removal.

- (5) Remove air line 2056 (11) from fitting (12).

NOTE

Tag and note which screw location contains shim kit.

- (6) Remove screw (13), washer (14) and shim kit (15) from locking cylinder (16). Discard shim kit.
- (7) Remove screw (17), washer (18) and plastic washer (19) from locking cylinder (16).



NOTE

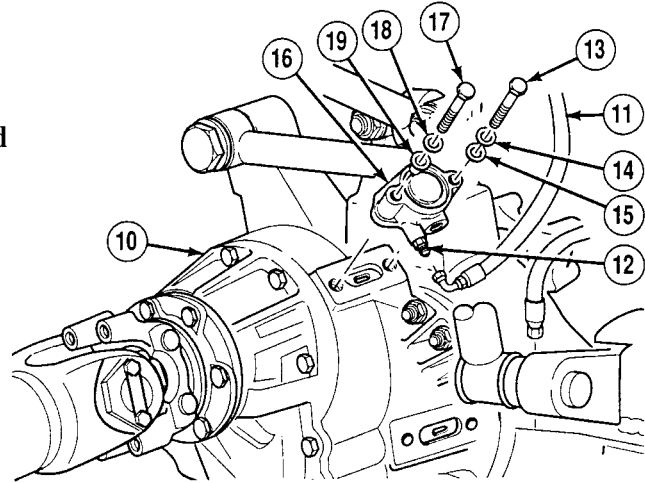
To remove locking cylinder pull left and outward.

- (8) Remove locking cylinder (16) from differential (10) by pulling left and outward on locking cylinder.

b. Installation.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (1) Coat mating surface of locking cylinder (16) with adhesive.
- (2) Position locking cylinder (16) on differential (10).
- (3) Position plastic washer (19), washer (18) and screw (17) on locking cylinder (16).

NOTE

- If a new locking cylinder was installed or axle differential was removed, perform Steps (4) and (6). If the same locking cylinder was installed, perform Steps (5) and (7).
 - Install screw only to keep screw hole in locking cylinder aligned with differential. Screw should be positioned so that three or four threads of screw are engaged.
- (4) Position washer (14) and screw (13) on locking cylinder (16).
 - (5) Position washer (14), shim kit (15) and screw (13) on locking cylinder (16).
 - (6) Tighten screw (17) on locking cylinder (16) 22 to 32 lb-ft (30 to 43 N·m).
 - (7) Tighten screws (13) and (17) on locking cylinder (16) 22 to 32 lb-ft (30 to 43 N·m).
 - (8) Install air line 2056 (Axle No. 2) or 2422 (Axle No. 4) (11) to fitting (12).

9-16. AXLE NO. 2 AND 4 LOCKING CYLINDER REPLACEMENT (CONT).

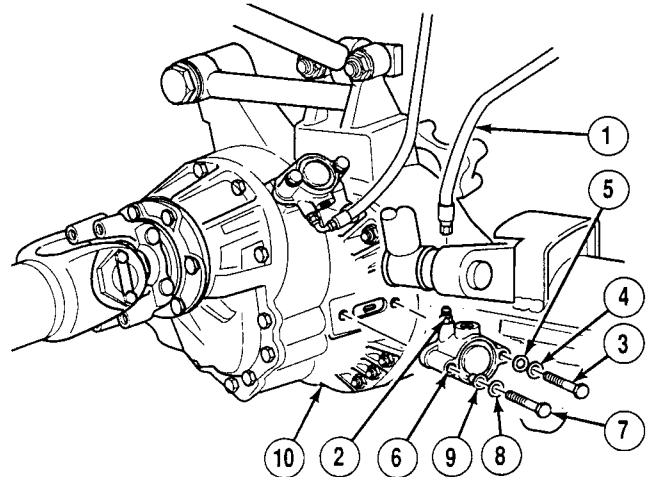
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (9) Coat mating surface of locking cylinder (6) with adhesive.
- (10) Position locking cylinder (6) on differential (10).
- (11) Position plastic washer (9), washer (8) and screw (7).

NOTE

- If a new locking cylinder was installed or axle differential was removed, perform Steps (12) and (14). If the same locking cylinder was installed, perform Steps (13) and (15).
- Install screw only to keep screw hole in locking cylinder aligned with differential. Screw should be installed so that three or four threads of screw are engaged.



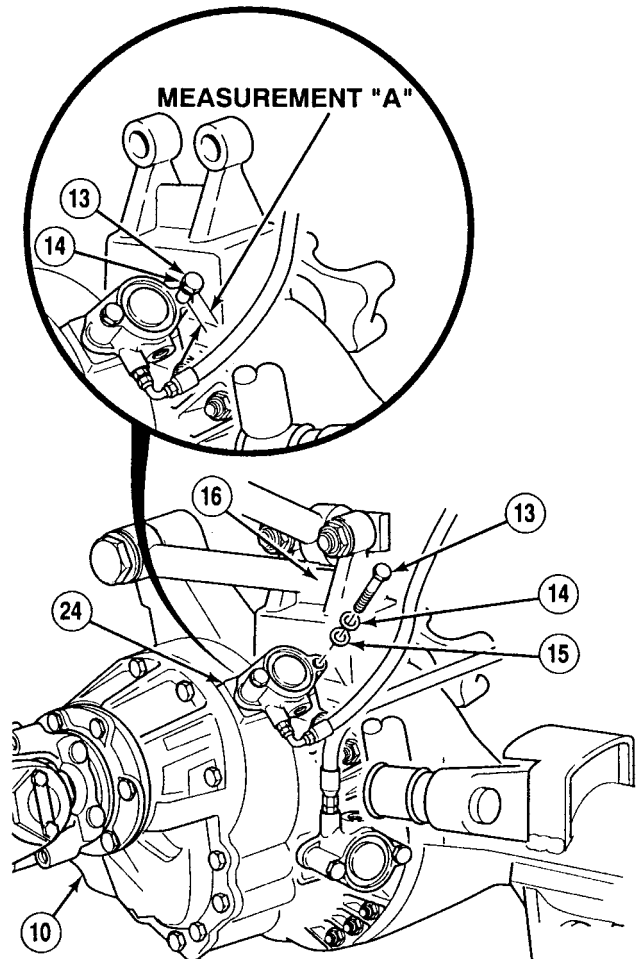
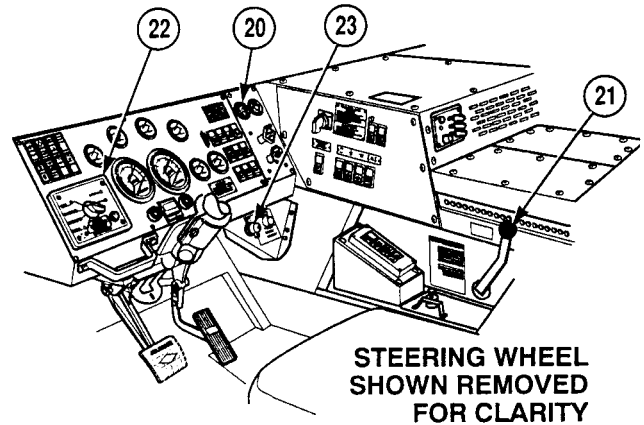
- (12) Position washer (4) and screw (3) on locking cylinder (6).
- (13) Position washer (4), shim kit (5) and screw (3) on locking cylinder (6).
- (14) Tighten screw (7) on locking cylinder (6) 22 to 32 lb-ft (30 to 43 N·m).
- (15) Tighten screws (3) and (7) on locking cylinder (6) 22 to 32 lb-ft (30 to 43 N·m).
- (16) Install air line 2420 (Axle No. 2) or 2359 (Axle No. 4) (1) to fitting (2).

c. *Adjustment.*

NOTE

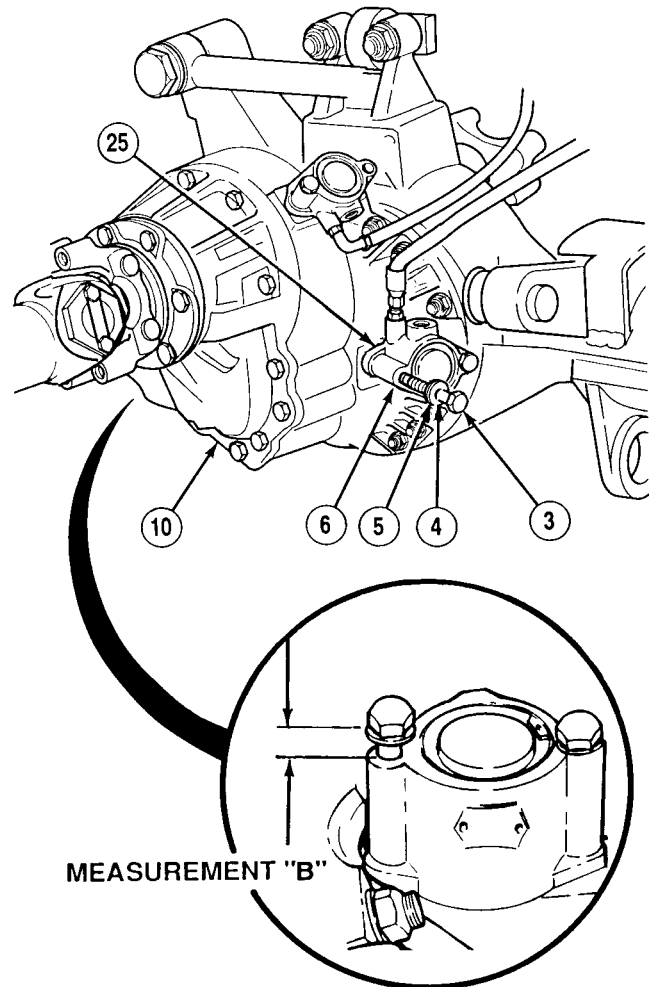
Perform adjustment only if a new locking cylinder was installed or axle differential was removed.

- (1) Remove wheel chocks.
- (2) Start engine and build up air pressure (20) to 125 psi (862 kPa).
- (3) Shift transfer case (21) to low.
- (4) Switch CTIS controller (22) to EMERGENCY.
- (5) Drive truck forward or backward 5 ft (1.5 m).
- (6) Turn OFF engine switch (23).
- (7) Chock wheels.
- (8) Tighten screw (13) slowly until screw contacts fork (24) in differential (10).
- (9) Using caliper, measure distance between face of washer (14) and top of locking cylinder (16) and record as measurement A.
- (10) Determine shim kit (15) thickness. Shim kit thickness is: measurement A - 0.004 to 0.020 in. (0.102 to 0.508 mm).
- (11) Remove screw (13) and washer (14) from locking cylinder (16).
- (12) Install shim kit (15) thickness determined in Step (10), washer (14) and screw (13). Tighten screw 22 to 32 lb-ft (30 to 43 N·m).



9-16. AXLE NO. 2 AND 4 LOCKING CYLINDER REPLACEMENT (CONT).

- (13) Tighten screw (3) slowly until screw contacts fork (25) in differential (10).
- (14) Using caliper, measure distance between face of washer (4) and top of locking cylinder (6) and record as measurement B.
- (15) Determine shim kit (5) thickness. Shim kit thickness is: measurement B - 0.004 to 0.020 in. (0.102 to 0.508 mm).
- (16) Remove screw (3) and washer (4) from locking cylinder (6).
- (17) Install shim kit (5) thickness determined in Step (15), washer (4) and screw (3). Tighten screw 22 to 32 lb-ft (30 to 43 N·m).



d. Follow-On Maintenance:

- Check axle oil level, (TM 9-2320-364-20).
- Check for oil and air leaks, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

9-17. AXLE NO. 3 LOCKING CYLINDER REPLACEMENT.

This task covers:

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

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Caliper, Dial, 0-6 in. w/Dial (Item 25, Appendix F)
- Micrometer, Outside, Caliper, Set (Item 139, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)

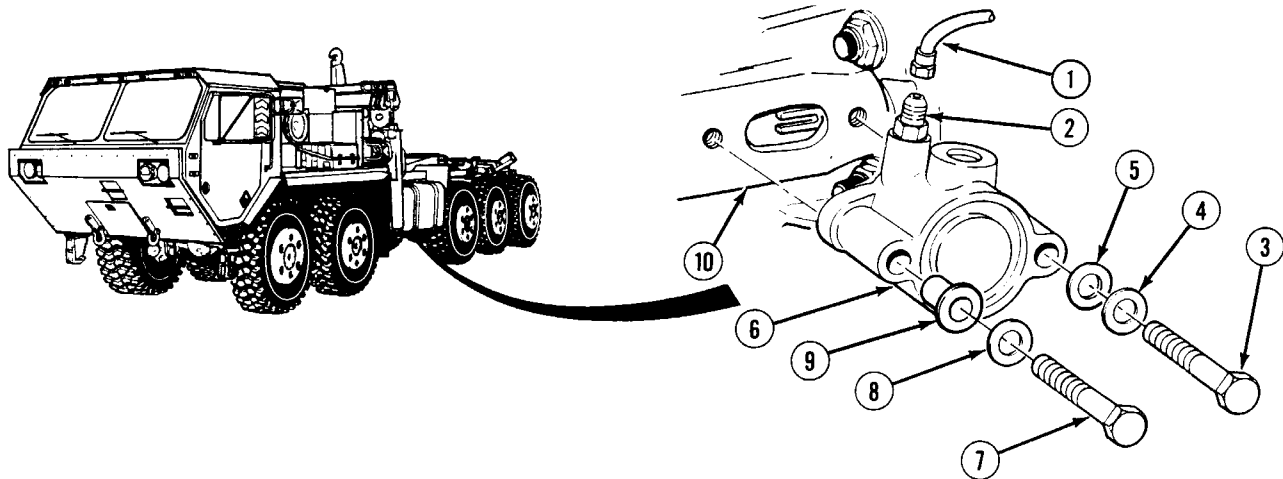
Materials/Parts

- Adhesive (Item 1, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)
- Tags, Identification (Item 72, Appendix B)
- Shim Kit, Adjusting (2) (Item 639, Appendix E)

Equipment Condition

- Air system drained, (TM 9-2320-364-10)
- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)

a. Removal.



NOTE

Tag and mark air line prior to removal.

- (1) Remove air line 2421 (1) from fitting (2).

NOTE

Tag and note which screw location contains shim kit.

- (2) Remove screw (3), washer (4) and shim kit (5) from locking cylinder (6). Discard shim kit.
- (3) Remove screw (7), washer (8) and plastic washer (9) from locking cylinder (6).

9-17. AXLE NO. 3 LOCKING CYLINDER REPLACEMENT (CONT).

NOTE

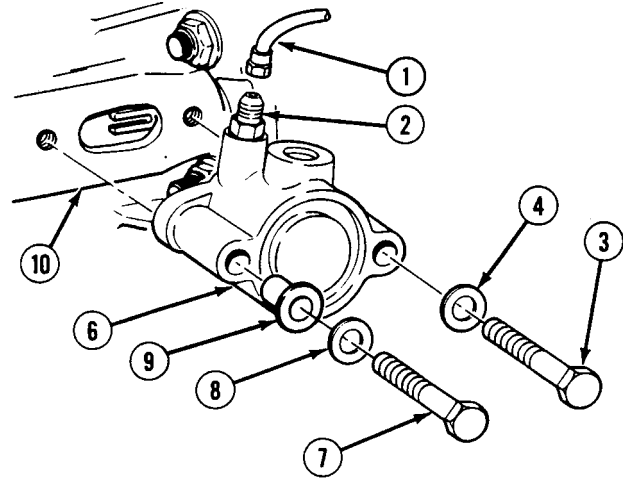
To remove locking cylinder, pull left and outward.

- (4) Remove locking cylinder (6) from differential housing (10).

b. Installation.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (1) Coat mating surface of locking cylinder (6) with adhesive.
- (2) Position locking cylinder (6) on differential (10).
- (3) Position plastic washer (9), washer (8) and screw (7) on locking cylinder (6).

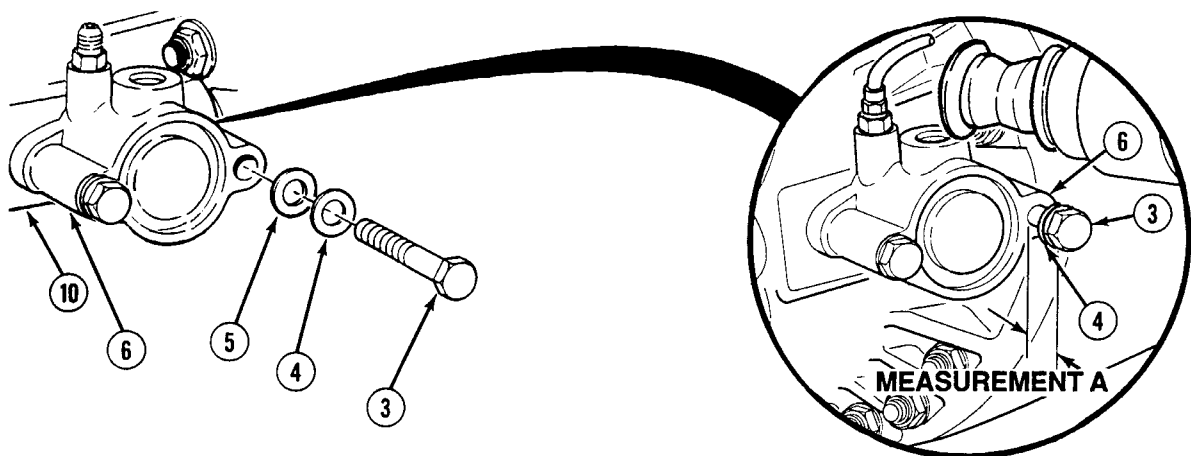
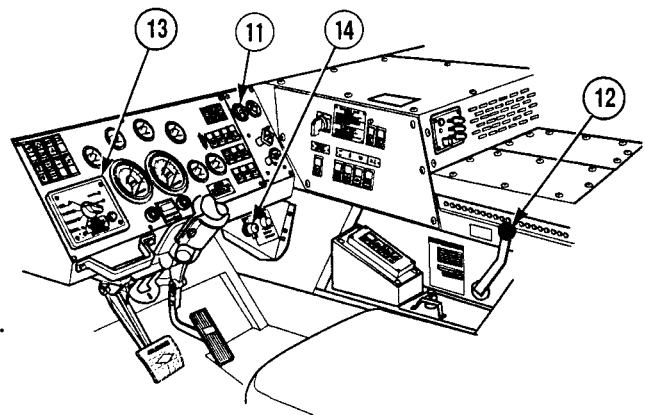
NOTE

Install screw so that only three or four threads of screw are engaged. Screw is being installed only to keep screw hole in locking cylinder aligned with differential.

- (4) Position washer (4) and screw (3) on locking cylinder (6).
- (5) Tighten screw (7) on locking cylinder (6) to 22 to 32 lb-ft (30 to 43 N·m).
- (6) Install air line 2421 (1) on fitting (2).

c. *Adjustment.*

- (1) Remove wheel chocks.
- (2) Start engine and build up air pressure (11) to 125 psi (862 kPa).
- (3) Shift transfer case (12) to low.
- (4) Switch CTIS controller (13) to EMERGENCY.
- (5) Drive truck forward or backward 5 ft (1.5 m).
- (6) Turn OFF engine switch (14).
- (7) Chock wheels.

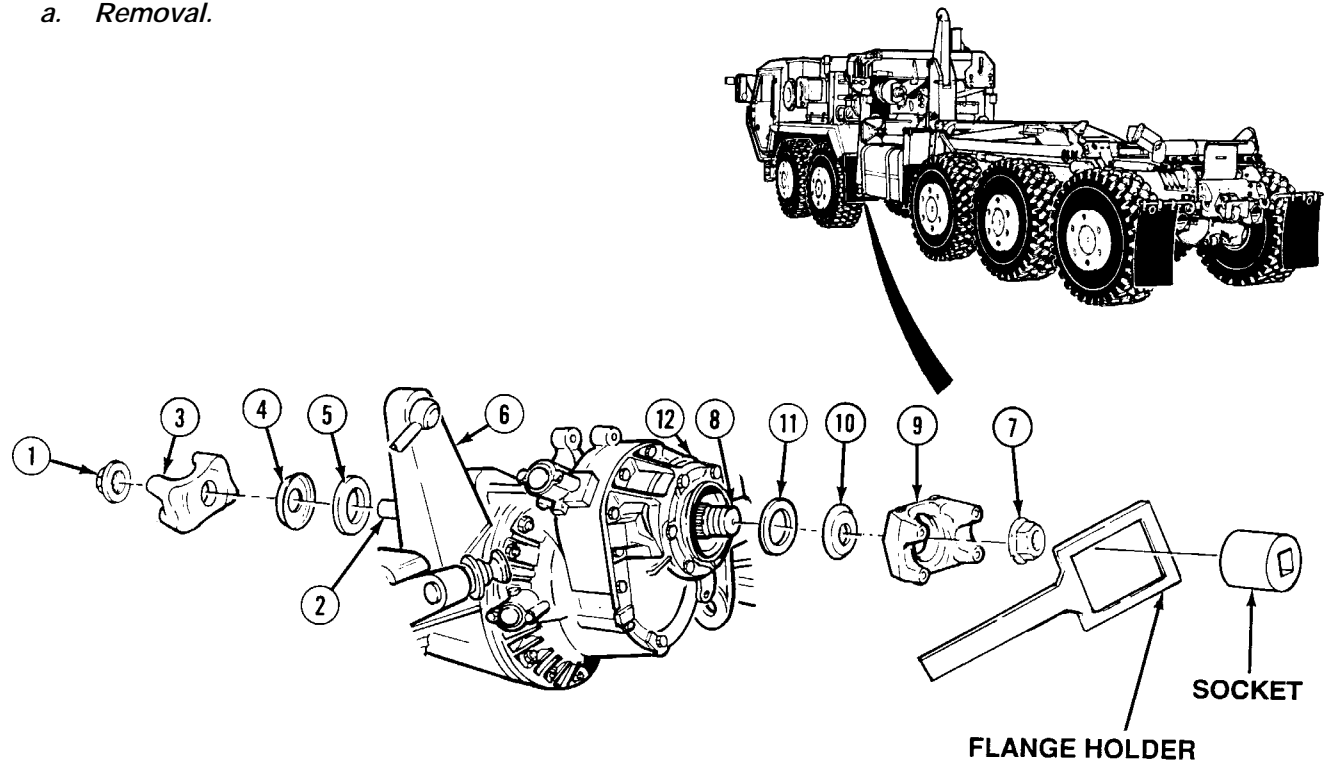


- (8) Tighten screw (3) slowly until screw contacts fork in differential (10).
- (9) Using caliper, measure distance between face of washer (4) and top of locking cylinder (6) and record as measurement A.
- (10) Determine shim kit (5) thickness. Shim kit thickness is: measurement A - 0.004 to 0.020 in. (0.102 to 0.508 mm).
- (11) Remove screw (3) and washer (4) from locking cylinder (6).
- (12) Install shim kit (5) thickness determined in Step (10), with washer (4) and screw (3). Tighten screw 22 to 32 lb-ft (30 to 43 N·m).

d. *Follow-On Maintenance:*

- Check axle oil level, (TM 9-2320-364-20).
- Check for oil and air leaks, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

a. *Removal.***NOTE**

- Axle No. 2, 3 and 4 flange assembly and oil seal are removed the same way.
- Axle No. 2 is shown.

- (1) Bend up staked parts of adjusting nut (1) on pinion shaft (2).
- (2) With the aid of an assistant and using flange holder and socket, remove adjusting nut (1) from pinion shaft (2). Discard adjusting nut.
- (3) Remove flange assembly (3) from pinion shaft (2).
- (4) Separate dust cover (4) from flange assembly (3).
- (5) Remove oil seal (5) from axle housing (6). Discard oil seal.
- (6) Bend up staked parts of adjusting nut (7) on pinion shaft (8).
- (7) With the aid of an assistant and using flange holder and socket, remove adjusting nut (7) from pinion shaft (8). Discard adjusting nut.
- (8) Remove flange assembly (9) from pinion shaft (8).
- (9) Separate dust cover (10) from flange assembly (9).
- (10) Using puller, remove oil seal (11) from cover (12). Discard oil seal.

9-18. AXLE NO. 2, 3 AND 4 FLANGE ASSEMBLY AND OIL SEAL REPLACEMENT (CONT).

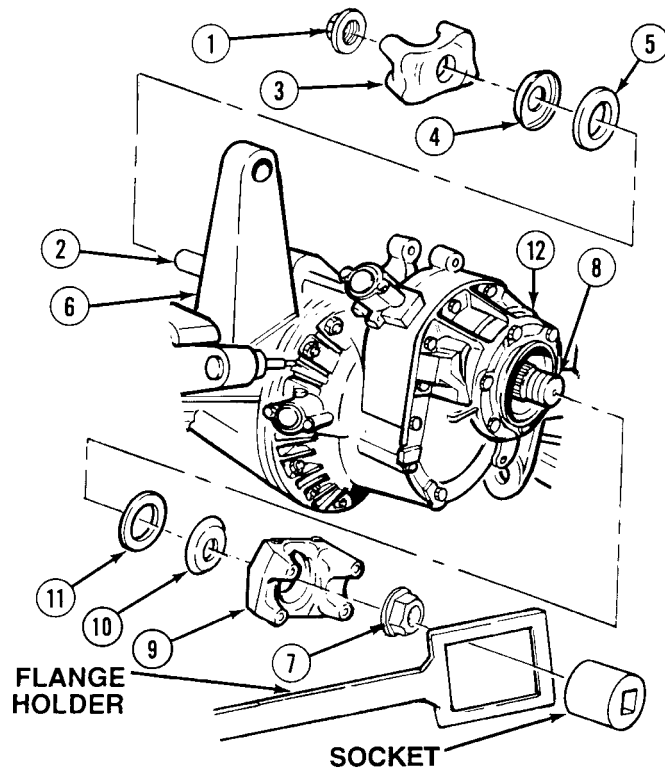
b. Installation.

- (1) Coat sealing lip of oil seals (5) and (11) with grease.
- (2) Install oil seal (11) in cover (12).
- (3) Install dust cover (10) on flange assembly (9).

NOTE

Flange assembly should be positioned so large openings of flange assembly align with slots of pinion shaft. This will ease staking of nut.

- (4) Install flange assembly (9) on pinion shaft (8).
- (5) With the aid of an assistant and using flange holder and socket, install adjusting nut (7) on pinion housing (8). Tighten adjusting nut 680 to 796 lb-ft (922 to 1079 N·m).
- (6) Install oil seal (5) on axle housing (6).
- (7) Install dust cover (4) on flange assembly (3).
- (8) Install flange assembly (3) on pinion shaft (2).



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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (9) Apply sealing compound to threads of pinion shaft (8).
- (10) Apply adhesive to pinion shaft (8) (over sealing compound) and to face of flange assembly (3) where adjusting nut (1) seats.
- (11) With the aid of an assistant and using flange holder and socket, install adjusting nut (1) on pinion shaft (2). Tighten adjusting nut to 680 to 796 lb-ft (922 to 1079 N·m).
- (12) Ensure adhesive has squeezed out around entire outside diameter of adjusting nut (1). If adhesive is not visible around entire outside diameter of adjusting nut (1), remove and discard adjusting nut (1) and repeat Steps (9) through (11).
- (13) Stake adjusting nuts (1) and (7) in two slots of pinion shafts (2) and (8) directly 180 degrees apart.

c. Follow-On Maintenance:

- Connect driveshaft, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

CHAPTER 10

BRAKE SYSTEM MAINTENANCE

Para	Contents	Page
10-1	Direct Support Brake System Maintenance Introduction	10-1
10-2	Axle Brake Assembly Replacement	10-2
10-3	Brake Treadle Valve Repair	10-8
10-4	Air Compressor Replacement	10-19

10-1. DIRECT SUPPORT BRAKE SYSTEM MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for repairing, replacing, installing and servicing brake system components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

10-2. AXLE BRAKE ASSEMBLY REPLACEMENT.

This task covers:

- a. Axles No. 1, 2 and 5 Replacement b. Axles No. 3 and 4 Replacement c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Adapter, Socket (3/4 in. female to 1/2 in. male)
(Item 9, Appendix F)
Jack, Hydraulic, Hand (Item 128, Appendix F)
Respirator, Air Filter (Item 195, Appendix F)
Socket, Socket Head Screw 14 mm
(Item 207, Appendix F)
Wrench Set, Socket 3/4 In. Drive
(Item 274, Appendix F)
Wrench, Torque (0 to 600 lb-ft [0-814 N·m])
(Item 278, Appendix F)
Lifting Device, Minimum Capacity 100 lbs
(45 Kg)

Materials/Parts

Rags, Wiping (Item 47, Appendix B)
Sealing Compound (Item 56, Appendix B)
Tape, Masking (Item 73, Appendix B)
Locknut (15) (Item 216, Appendix E)

Personnel Required

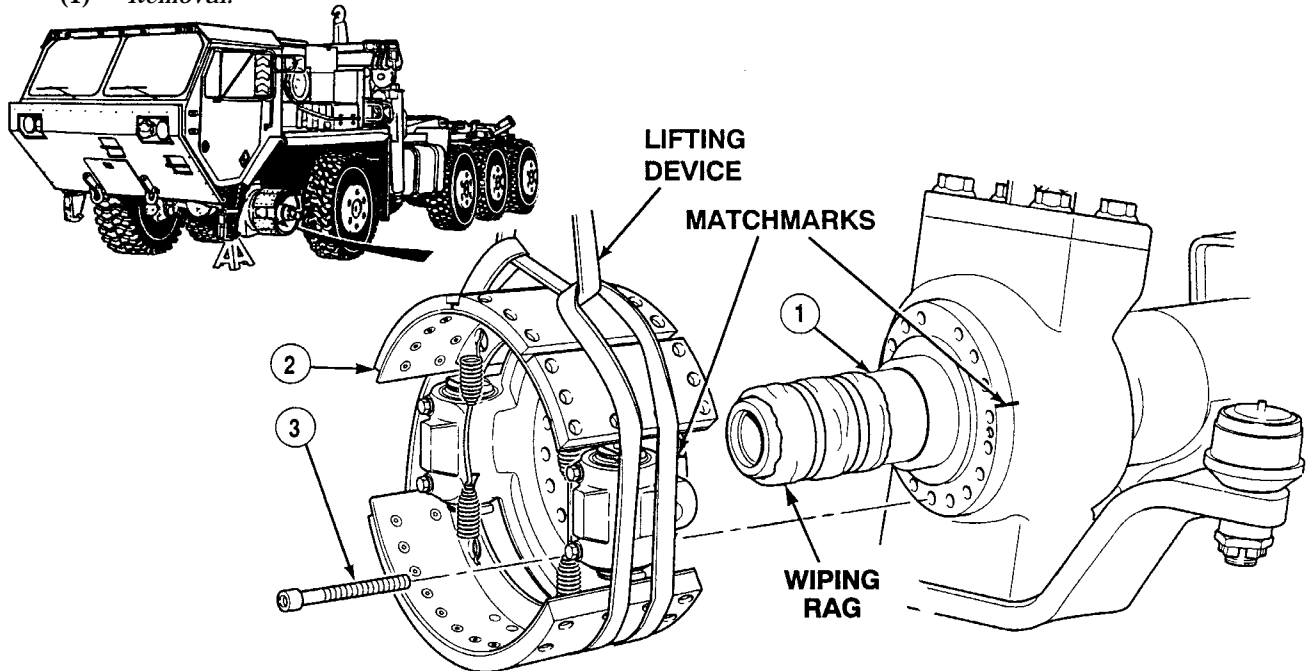
Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Oil drained from axle, (TM 9-2320-364-20)
Brake drum removed, (TM 9-2320-364-20)
Planetary hub gear removed, (Para 9-6)
Wheel hub assembly removed, (Para 11-2)
Air chamber(s) removed, (TM 9-2320-364-20)

a. *Axles No. 1, 2 and 5 Replacement.*

(1) *Removal.*



WARNING

- Brake shoes may be coated with dust. Breathing this dust may be harmful to your health. Do not use compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury or death to personnel.
- Brake assembly weighs 80 lbs (36 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

NOTE

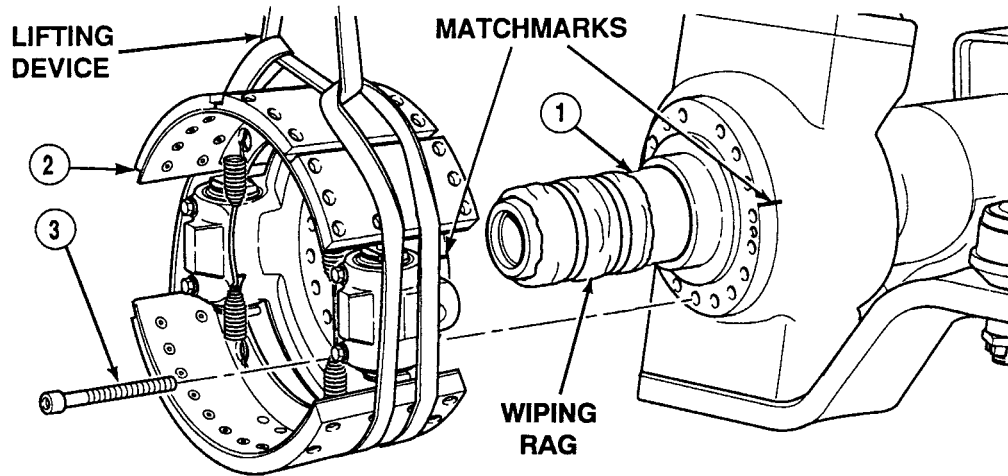
- Matchmark brake assembly and pivot and spindle assembly prior to removal.
 - Axle No 1, 2 and 5 brake assemblies are removed the same way. Axle No. 1 is shown.
- Wrap and tape a wiping clean rag around pivot and spindle assembly (1) to protect spindle races.
 - Attach lifting device to brake assembly (2).
 - Support brake assembly (2) with lifting device.

WARNING

Brake assembly will swing out on Axles No. 1 and 2 when overhead lifting device is used and screws are removed. Support brake assembly during removal or injury to personnel may result.

- Remove 16 screws (3) from brake assembly (2) and pivot and spindle assembly (1).
- Remove brake assembly (2) from pivot and spindle assembly (1).
- Remove lifting device from brake assembly (2).
- Remove wiping rag from pivot and spindle assembly (1).

10-2. AXLE BRAKE ASSEMBLY REPLACEMENT (CONT).



(2) *Installation.*

- (a) Wrap and tape a clean wiping rag around spindle of pivot and spindle assembly (1) to protect spindle.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (b) Coat end threads of 16 screws (3) with sealing compound.

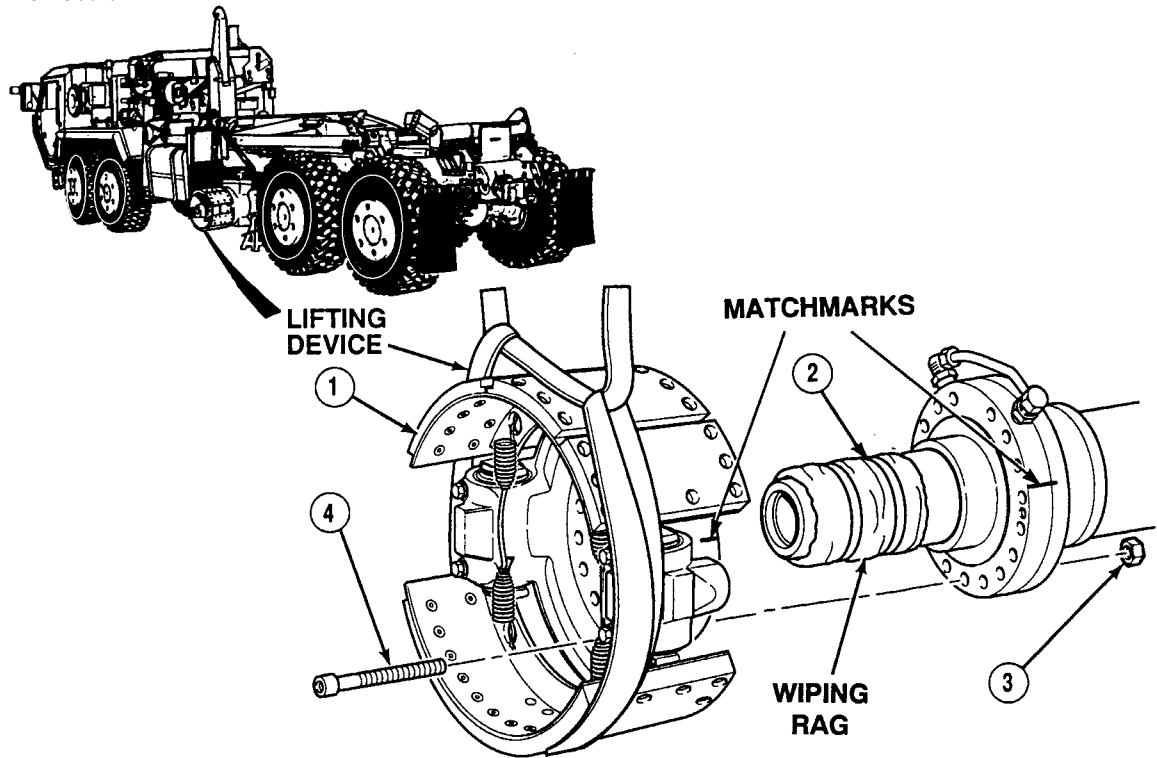
WARNING

Brake assembly weighs 80 lbs (36 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (c) Attach lifting device to brake assembly (2).
- (d) Position brake assembly (2) onto pivot and spindle assembly (1).
- (e) Align matchmarks on brake assembly (2) and pivot and spindle assembly (1).
- (f) Install 16 screws (3) on brake assembly (2) and pivot and spindle assembly (1). Tighten screws to 205 lb-ft (278 N·m).
- (g) Remove lifting device from brake assembly (2).
- (h) Remove wiping rag from pivot and spindle assembly (1).

b. *Axles No. 3 and 4 Replacement.*

(1) *Removal.*



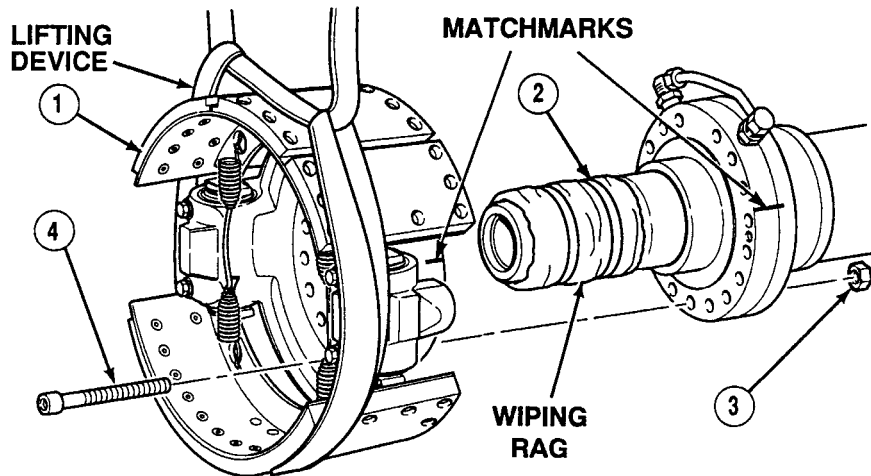
WARNING

- Brake shoes may be coated with dust. Breathing this dust may be harmful to your health. Do not use compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury or death to personnel.
- Brake assembly weighs 80 lbs (36 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.

NOTE

- Axle No. 3 and 4 brake assemblies are removed the same way. Axle No. 3 is shown.
 - Matchmark brake assembly and pivot and spindle assembly prior to removal.
- Wrap and tape a clean wiping rag around pivot and spindle assembly (2) to protect spindle races.
 - Attach lifting device to brake assembly (1).
 - Support brake assembly (1) with lifting device.
 - With the aid of an assistant, remove 15 locknuts (3) and screws (4) from brake assembly (1). Discard locknuts.
 - Remove brake assembly (1) from pivot and spindle assembly (2).
 - Remove lifting device from brake assembly (1).
 - Remove rag from pivot and spindle assembly (2).

10-2. AXLE BRAKE ASSEMBLY REPLACEMENT (CONT).



(2) *Installation.*

- (a) Wrap and tape a clean wiping rag around spindle of pivot and spindle assembly (2) to protect spindle races.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (b) Coat end threads of 15 screws (4) with sealing compound.

WARNING

Brake assembly weighs 80 lbs (36 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (c) Attach lifting device to brake assembly (1).
- (d) Position brake assembly (1) on pivot and spindle assembly (2).
- (e) Align matchmarks on brake assembly (1) and pivot and spindle assembly (2).
- (f) With the aid of an assistant, install 15 screws (4) and locknuts (3) to brake assembly (1) and pivot and spindle assembly (2). Tighten screws to 205 lb-ft (278 N·m).
- (g) Remove lifting device from brake assembly (1).
- (h) Remove rag from pivot and spindle assembly (2).

c. Follow-On Maintenance:

- Install air chamber, (TM 9-2320-364-20).
- Install wheel hub assembly, (Para 11-2).
- Install planetary hub gear, (Para 9-6).
- Install brake drum, (TM 9-2320-364-20).
- Adjust brakes, (TM 9-2320-364-20).
- Fill axle oil, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

10-3. BRAKE TREADLE VALVE REPAIR

This task covers:

- a. Disassembly
- b. Cleaning/Inspection
- c. Assembly
- d. Testing
- e. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 241, Appendix F)
- Caps, Vise Jaw (Item 27, Appendix F)
- Pliers, Retaining Ring (Item 155, Appendix F)
- Pliers, Retaining Ring (Item 156, Appendix F)
- Pressure Test Kit (Item 165, Appendix F)
- Vise, Machinist's (Item 248, Appendix F)
- Wrench, Torque, 0-60 N·m (Item 276, Appendix F)
- Plug, Pipe, 1/4 In. (8) (MS27769-3)
- Plug, Pipe, 1/2 In. (2) (MS27769-5)

Materials/Parts

- Cloth, Crocus (Item 12, Appendix B)
- Compound, Silicone (Item 19, Appendix B)
- Sealing Compound (Item 53, Appendix B)
- Sealing Compound (Item 56, Appendix B)
- Solution, Soap (Item 67, Appendix B)
- Solvent, Dry Cleaning (Item 68, Appendix B)
- Parts Kit, Air Flow (Item 406, Appendix E)
- Pins, Cotter (2) (Item 419, Appendix E)
- Screw, Cap w/Lockwashers (Item 548, Appendix E)

Personnel Required
Two

Equipment Condition

Brake treadle removed (TM 9-2320-364-20).

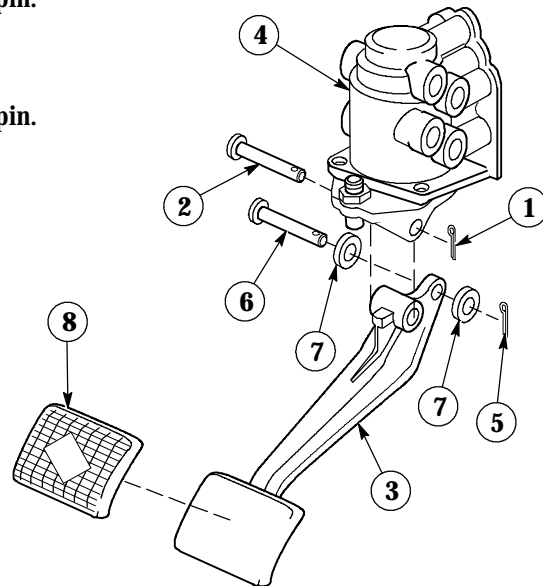
a. *Disassembly.*

- (1) Remove cotter pin (1) from pin (2). Discard cotter pin.
- (2) Remove pin (2) and pedal (3) from cover (4).
- (3) Remove cotter pin (5) from pin (6). Discard cotter pin.
- (4) Remove pin (6) and two rollers (7) from pedal (3).

NOTE

Perform Step (5) only if pad is damaged.

- (5) Remove pad (8) from pedal (3).

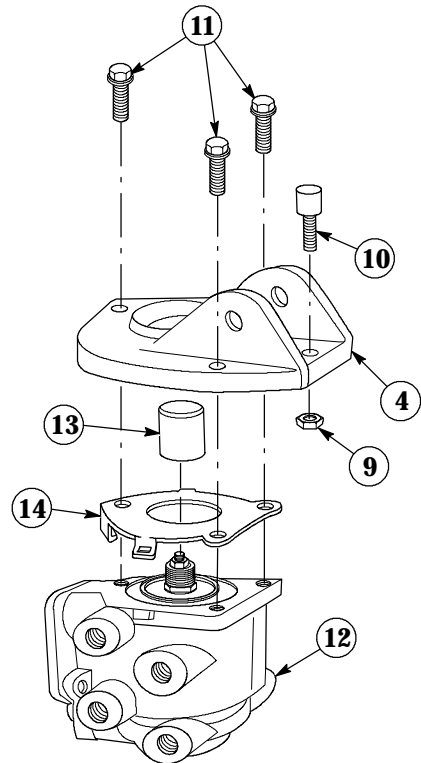


- (6) Remove nut (9) and stop button (10) from cover (4).
- (7) Remove three screws with lockwashers (11) and cover (4) from housing (12). Discard screws with lockwashers.
- (8) Remove sleeve (13) from housing (12).

NOTE

Three tabs must be pryed out to remove retaining plate.

- (9) Remove retaining plate (14) from housing (12).

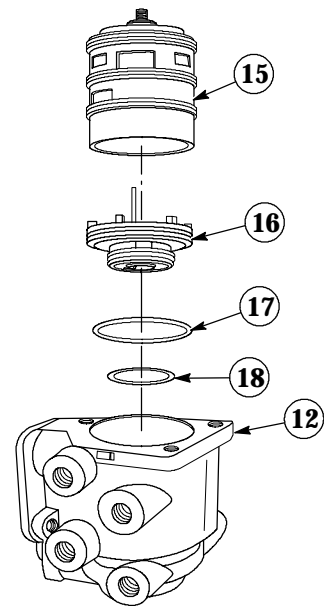


- (10) Remove lower static piston assembly (15) from housing (12).

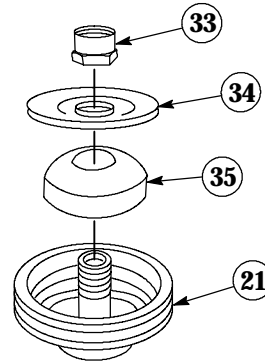
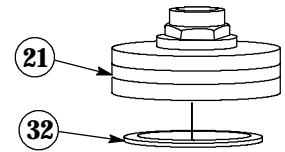
NOTE

Upper static piston can be removed by tapping housing on wooden block.

- (11) Remove upper static piston (16) from housing (12).
- (12) Remove preformed packing (17) and preformed packing (18) from piston (16). Discard preformed packings.



- (19) Remove preformed packing (32) from lower piston (21). Discard preformed packing.
- (20) Remove nut (33), spring seat (34), and resilient mount (35) from lower piston (21).

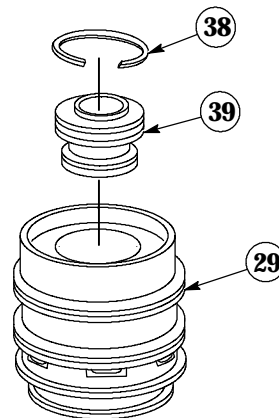
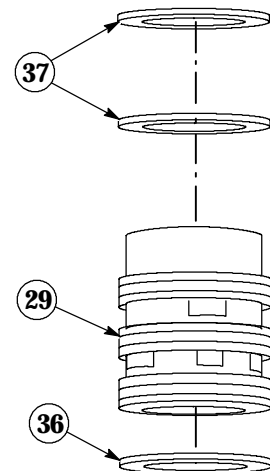


- (21) Remove preformed packing (36) and two preformed packings (37) from lower static piston body (29). Discard preformed packings.

WARNING

Use care when removing retaining rings. Retaining rings are under spring tension and can act as projectiles when released causing injury to personnel.

- (22) Remove retaining ring (38) from lower static piston body (29).
- (23) Remove and discard valve stem guide (39) from lower static piston body (29).



10-3. BRAKE TREADLE VALVE REPAIR (CONT).

- (24) Remove screw (40), retainer (41), and diaphragm (42) from housing (12). Discard diaphragm.
- (25) Remove pipe plugs (43) and (44) from housing (12).

b. Cleaning/Inspection

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.

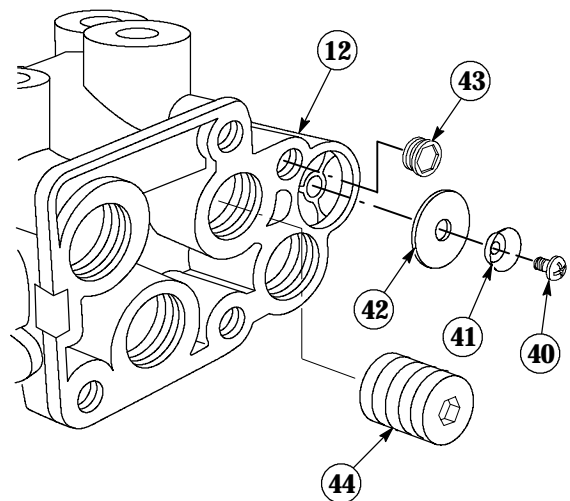
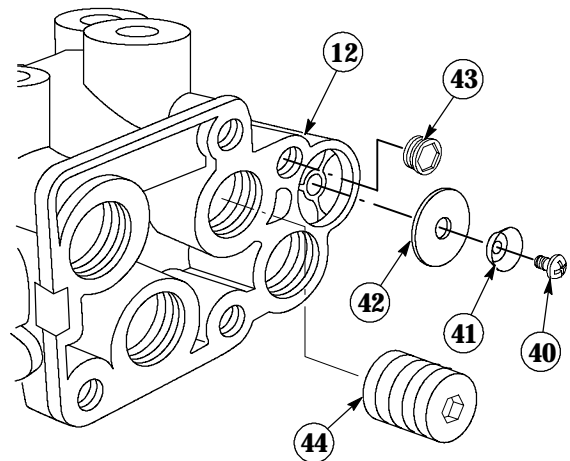
- (1) Clean metal parts in dry-cleaning solvent.
- (2) Inspect parts for damage, cracks, breaks, or deterioration.
- (3) Inspect rubber parts for cracks or deterioration.
- (4) Inspect machined surfaces for deep scratches.
- (5) Remove small nicks or burrs from pistons and housings with crocus cloth.
- (6) Replace unserviceable parts.

c. Assembly

WARNING

Adhesive, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, 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.

- (1) Coat threads of pipe plugs (44) and (43) with sealing compound.
- (2) Install pipe plugs (44) and (43) in housing (12).
- (3) Install diaphragm (42), retainer (41), and screw (40) in housing (12).



CAUTION

Lubricate all preformed packings, bores, and mating surfaces with silicone compound before assembly. Failure to comply may result in damage to equipment.

- (4) Install valve stem guide (39) in lower static piston body (29).

WARNING

Use care when installing retaining rings. Retaining rings are under spring tension and can act as projectiles when released causing injury to personnel.

- (5) Install retaining ring (38) in lower static piston body (29).
- (6) Install two preformed packings (37) and preformed packing (36) on lower static piston body (29).

WARNING

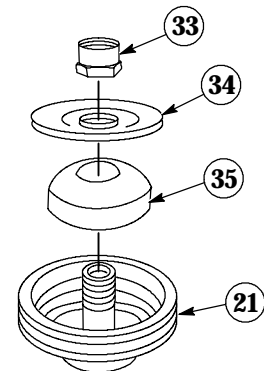
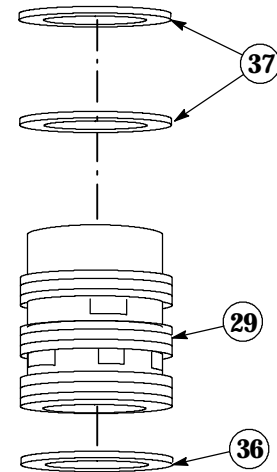
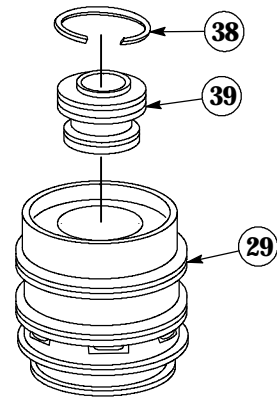
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. IF adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (7) Coat threads of nut (33) with sealing compound.

NOTE

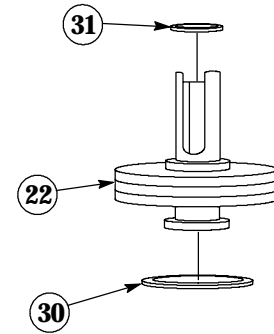
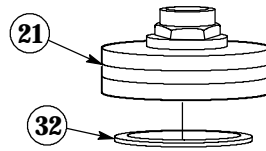
Do not lubricate resilient mount.

- (8) Install resilient mount (35), spring seat (34), and nut (33) on lower piston (21).



10-3. BRAKE TREADLE VALVE REPAIR (CONT).

- (9) Install preformed packing (32) on lower piston (21).
- (10) Install preformed packing (30) and preformed packing (31) on relay piston (22).



NOTE

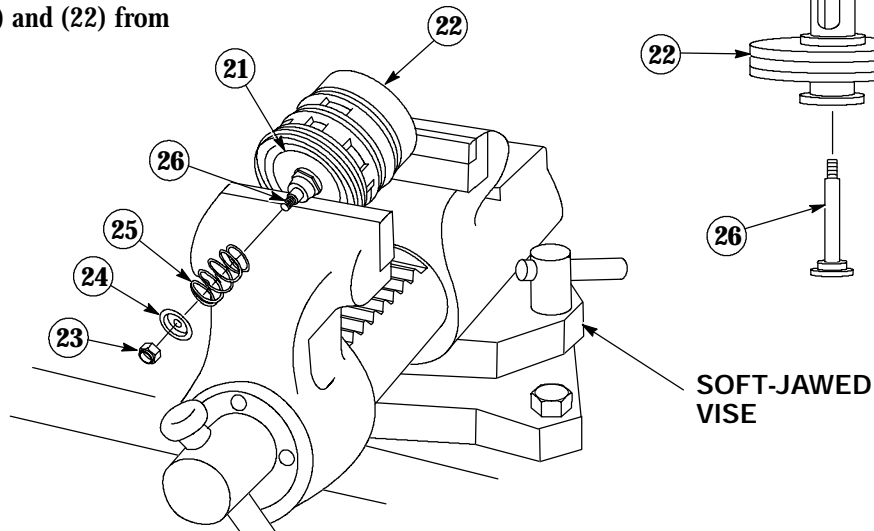
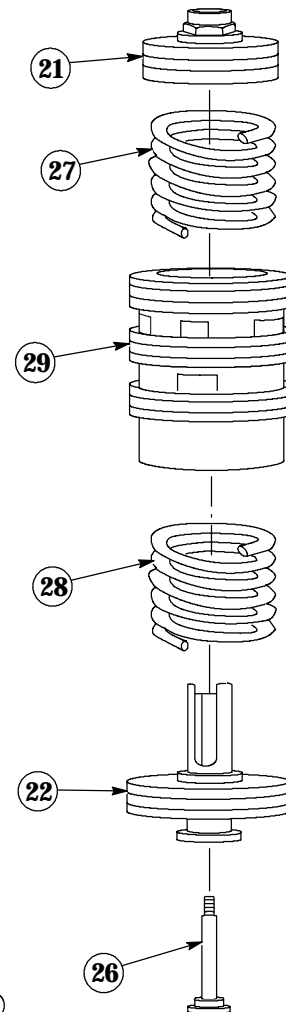
Then gage spring is located on relay piston side of lower static piston housing.

- (11) Install spring (28) and relay piston (22) in bottom of lower static piston body (29).
- (12) Install spring (27) and lower piston (21) in top of lower static piston body (29).
- (13) Install stem bolt (26) in relay piston (22).
- (14) Position pistons (21) and (22) in soft-jawed vise.

WARNING

Internal pistons are under moderate spring tension. Keep pistons compressed when installing locknut. Failure to comply may result in injury to personnel.

- (15) With the aid of an assistant, compress pistons (21) and (22) using a soft-jawed vise and install spring (25), guide (24), and locknut (23) on stem bolt (26). Torque 20 to 30 lb-in (2.3 to 3.4 N·m).
- (16) Remove pistons (21) and (22) from soft-jawed vise.



- (17) Install inlet cartridge (20) in upper static piston (16).

WARNING

Use care when installing retaining rings. Retaining rings are under spring tension and can act as projectiles when released causing injury to personnel.

- (18) Install retaining ring (19) in upper static piston (16).
- (19) Install preformed packing (17) and preformed packing (18) on upper static piston (16).
- (20) Install upper static piston (16) in housing (12).
- (21) Install lower static piston body (15) in housing (12).

NOTE

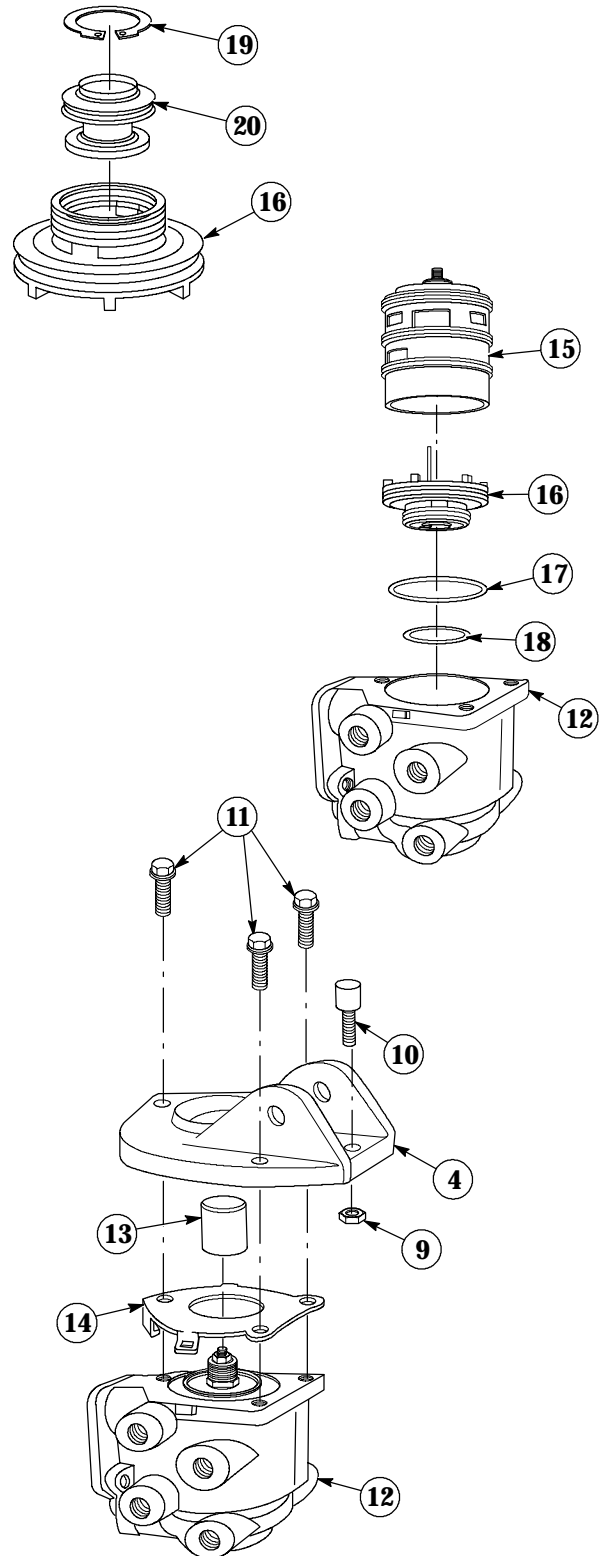
Three tabs on retainer must lock on housing.

- (22) Install retaining plate (14) on housing (12).
- (23) Install sleeve (13) on housing (12).
- (24) Install cover (4) on housing (12), with three screws with lockwashers (11).

NOTE

Plunger must be in contact with spring seat. Adjust stop button so rollers and plunger contact each other. Roller must turn freely by hand.

- (25) Install stop button (10) and nut (9) on cover (4).



10-3. BRAKE TREADLE VALVE REPAIR (CONT).

NOTE

Do Step (26) only if pad was removed.

- (26) Install pad (8) on pedal (3).
- (27) Install two rollers (7) and pin (6) on pedal (3).
- (28) Install cotter pin (5) in pin (6).
- (29) Install pedal (3) on cover (4) with pin (2).
- (30) Install cotter pin (1) in pin (2).

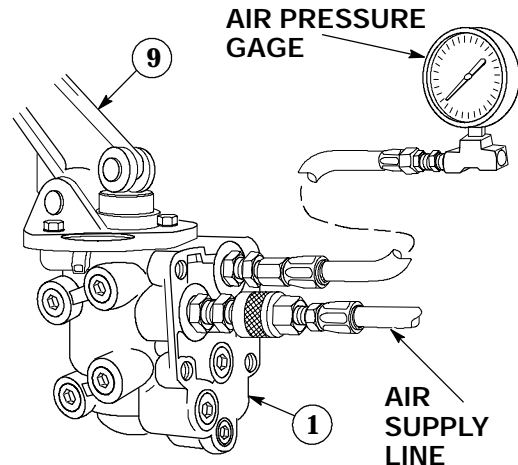
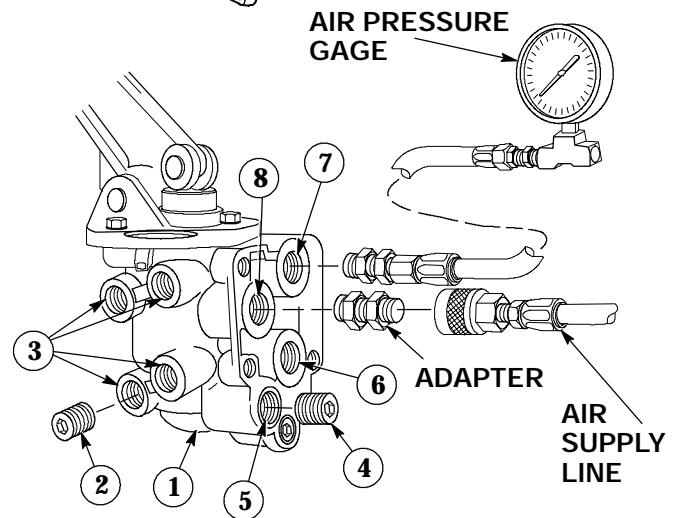
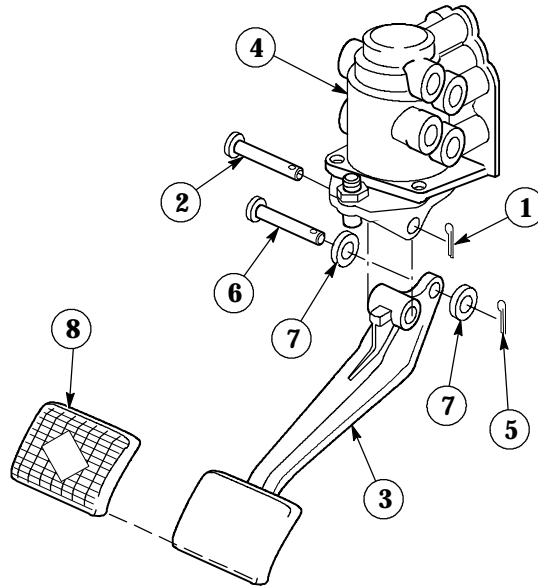
d. Testing

- (1) Position treadle valve (1) in soft-jawed vise.
- (2) Install eight pipe plugs (2) in four ports (3) on each side of treadle valve (1).
- (3) Install two pipe plugs (4) in upper ports (5) and (6) on backside of treadle valve (1).
- (4) Install air pressure gage in lower delivery port (7) on backside of treadle valve (1).
- (5) Install air supply line and adapter in lower supply supply port (8) on backside of treadle valve (1).

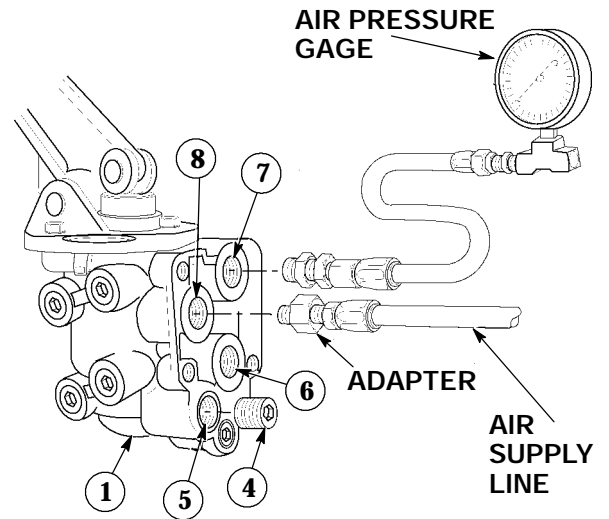
NOTE

Air pressure should be between 80 to 120 psi (552 to 827 kPa). Failure to comply may result in damage to equipment.

- (6) Press pedal (9) to several positions between fully released and fully applied. Delivered pressure on air pressure gage should vary proportionately when movement of pedal (9).
- (7) Press pedal (9) until treadle valve (1) is fully applied. Reading on air pressure gage should fall off to zero when pedal (9) is released.



- (8) Remove air supply and adapter from lower supply port (8).
- (9) Remove air pressure gage from lower delivery port (7) on backside of treadle valve (1).
- (10) Remove two pipe plugs (4) from upper ports (5) and (6) on backside of treadle valve (1).

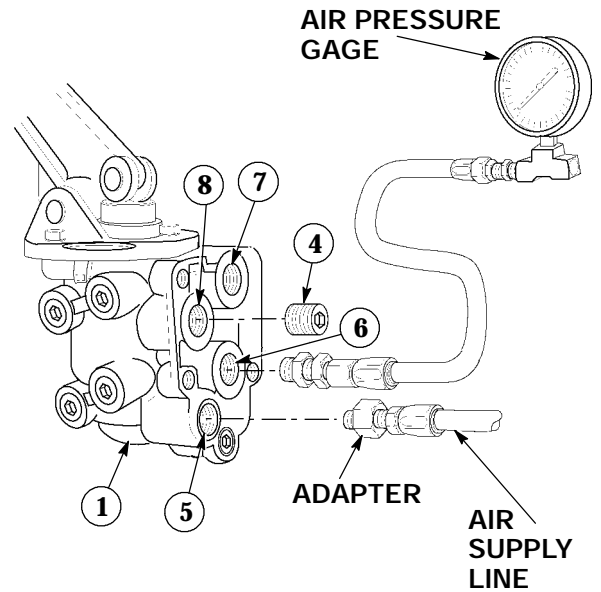


- (11) Install two pipe plugs (4) in lower ports (7) and (8) on backside of treadle valve (1).
- (12) Install air pressure gage in upper delivery port (6) on backside of treadle valve (1).

CAUTION

Air pressure should be between 80 to 120 psi (552 to 827 kPa). Failure to comply may result in damage to equipment.

- (13) Install air supply line and adapter in upper supply port (5).



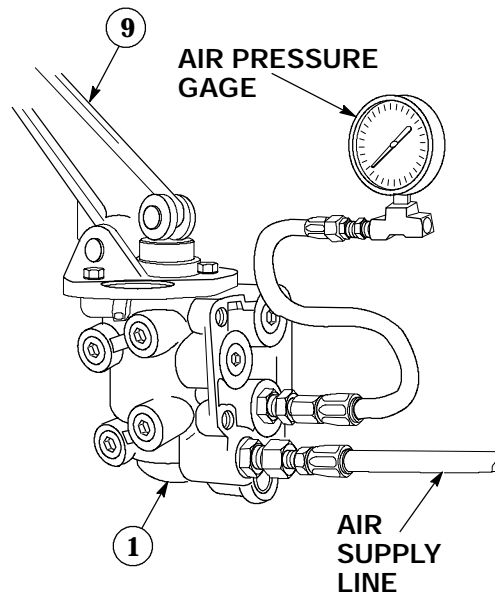
10-3. BRAKE TREADLE VALVE REPAIR (CONT).

- (14) Press pedal (9) to several positions between fully released and fully applied. Delivered pressure on air pressure gage should vary proportionately with movement of pedal (9).
- (15) Press pedal (9) until treadle valve (1) is fully applied. Reading on air pressure gage should fall off to zero when pedal (9) is released.
- (16) Coat exhaust port (10) and body of treadle valve (1) with soap solution.

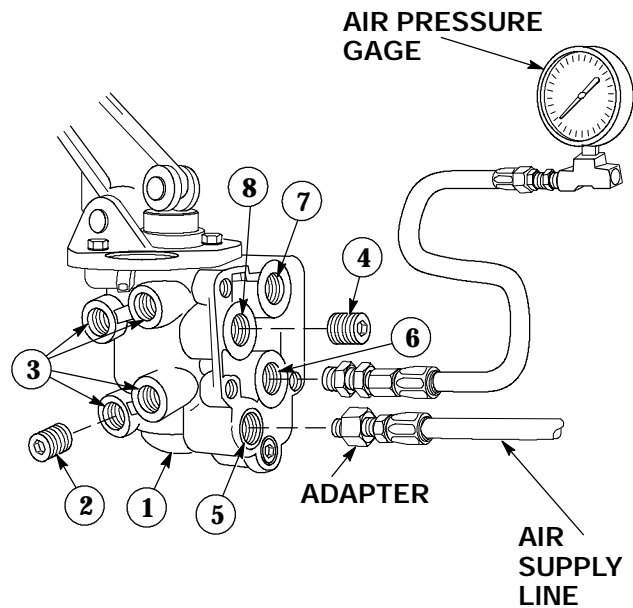
NOTE

Air leakage of exhaust port in Step (17) must not exceed 1 in. (2.5 cm) bubble in three seconds in both applied and released positions.

- (17) Press pedal (9) until treadle valve (1) is fully applied and check for leakage.



- (18) Remove air supply line from upper supply port (5).
- (19) Remove air pressure gage from upper delivery port (6) on backside of treadle valve (1).
- (20) Remove two pipe plugs (4) from lower ports (8) and (7) on backside of treadle valve (1).
- (21) Remove eight pipe plugs (2) from four ports (3) on each side of treadle valve (1).
- (22) Remove treadle valve (1) from soft jawed vise.

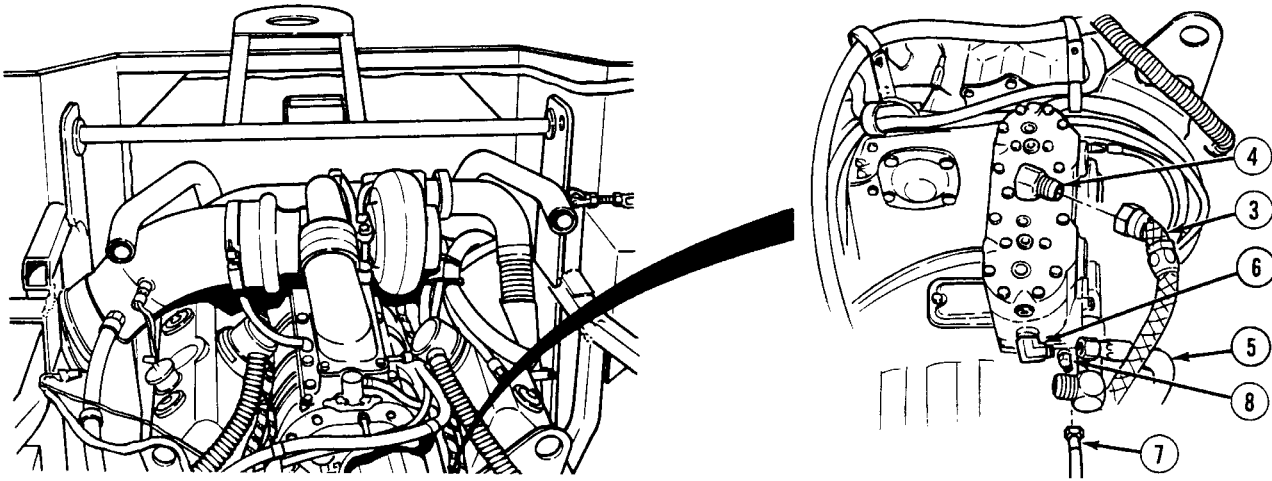


e. Follow-On Maintenance

Install brake treadle (TM 9-2320-364-20).

END OF TASK

10-4. AIR COMPRESSOR REPLACEMENT (CONT).



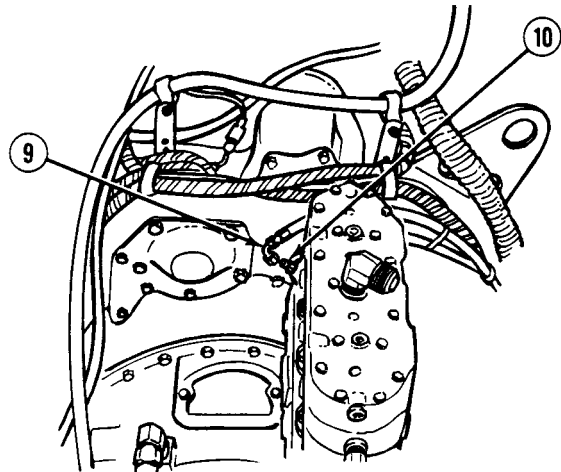
WARNING

Ensure braided hose is cool prior to removal or injury to personal may result.

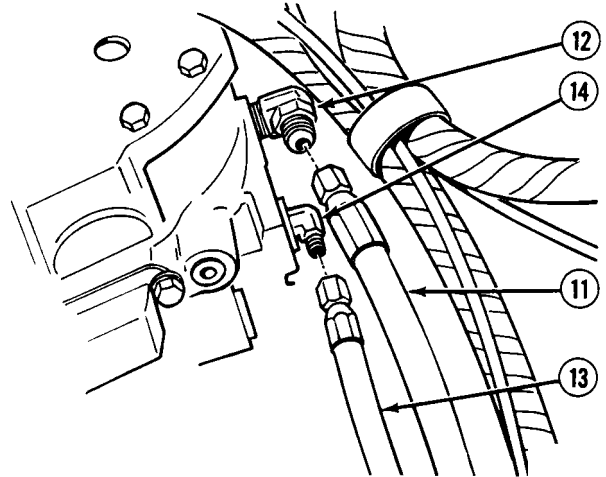
CAUTION

Do not bend or kink braided hose. Damage to hose may result.

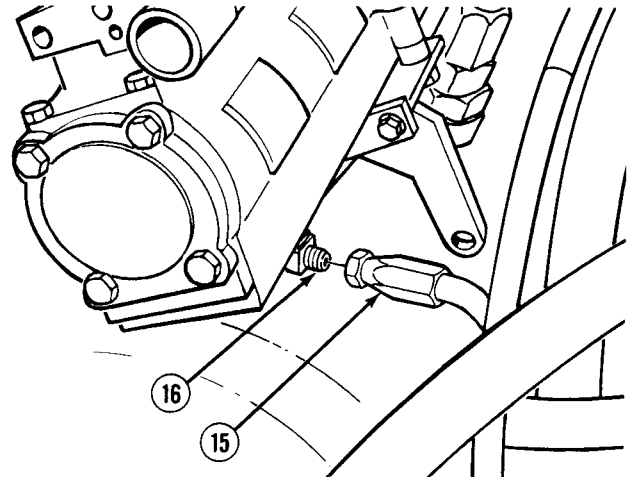
- (2) Remove braided hose 2001 (3) from elbow (4).
- (3) Remove hose 2628 (5) from elbow (6).
- (4) Remove hose 2114 (7) from elbow (8).
- (5) Remove hose 2629 (9) from elbow (10).



- (6) Remove hose 2628 (11) from elbow (12).
- (7) Remove hose 2114 (13) from elbow (14).



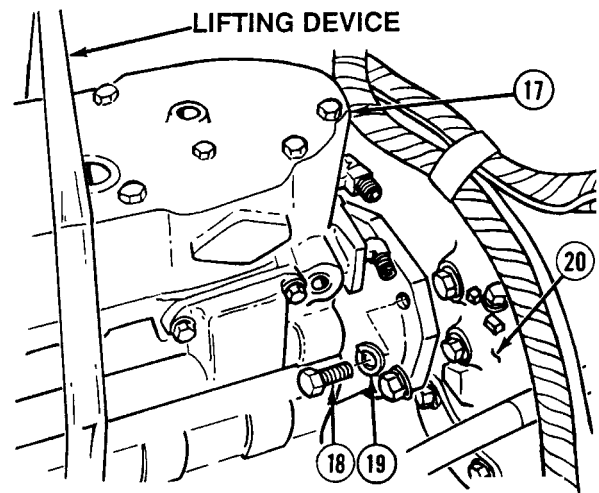
- (8) Remove hose 2630 (15) from elbow (16).



WARNING

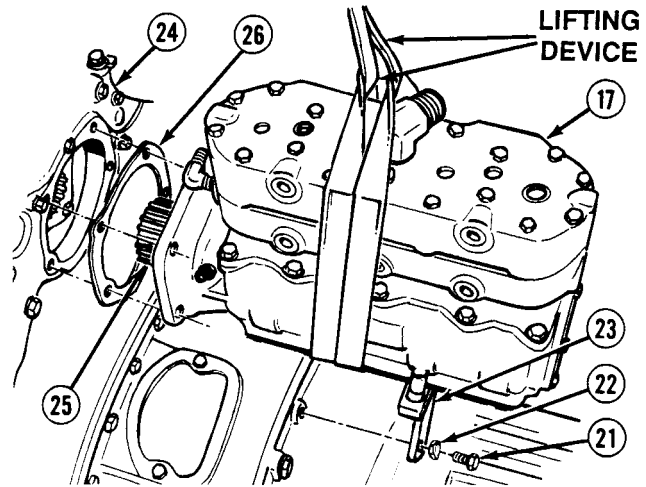
Air compressor weighs 115 lbs (52 kg). Attach suitable lifting device prior to removal to prevent possible injury.

- (9) Attach lifting device to air compressor (17).
- (10) Remove four screws (18) and lockwashers (19) from air compressor (17) and flywheel housing (20). Discard lockwashers.



10-4. AIR COMPRESSOR REPLACEMENT (CONT.)

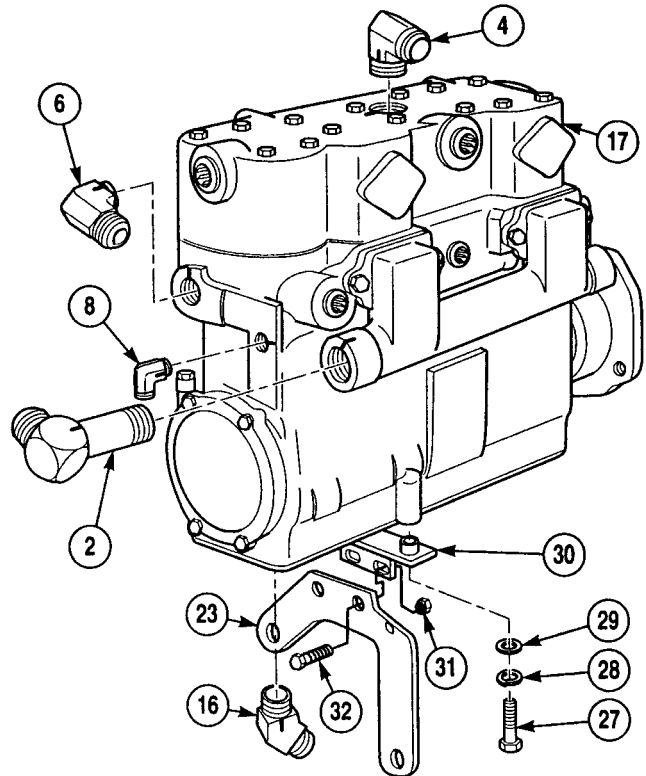
- (11) Remove two screws (21) and lockwashers (22) from air compressor mounting bracket (23). Discard lockwashers.
- (12) Remove air compressor (17) from engine (24).
- (13) Remove drive coupling (25) from engine (24) or air compressor (17).
- (14) Remove and discard gasket (26) from engine (24) or air compressor (17).
- (15) Remove lifting device from air compressor (17).



NOTE

Note location and position of elbows prior to removal.

- (16) Remove elbows (2), (4), (6), (8) and (16) from air compressor (17).
- (17) Remove two screws (27), lockwashers (28), washers (29) and bracket (30) from air compressor (17). Discard lockwashers.
- (18) Remove two locknuts (31), screws (32) and bracket (30) from air compressor mounting bracket (23). Discard locknuts.



- (19) Remove elbows (10), (12) and (14) from air compressor (17).

b. Installation.

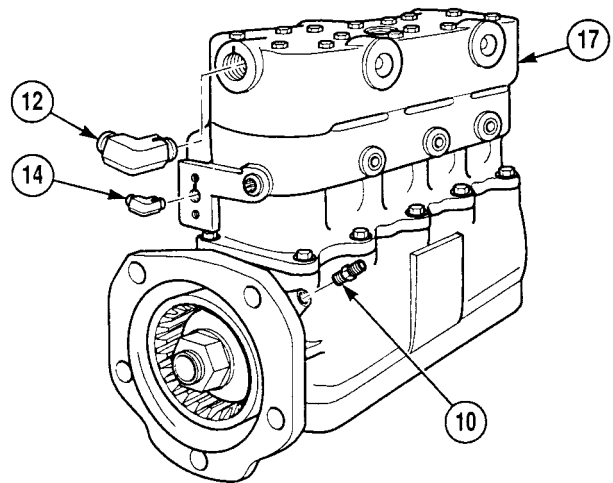
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

Install elbows as noted prior to removal.

- (1) Apply sealing compound to elbows (10), (12) and (14).
- (2) Install elbows (10), (12) and (14) in air compressor (17).

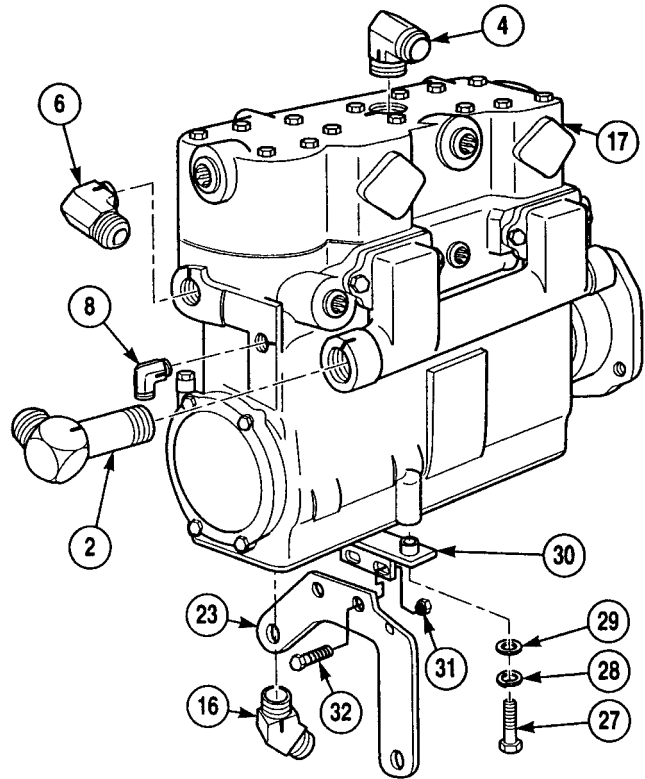


10-4. AIR COMPRESSOR REPLACEMENT (CONT).

- (3) Install bracket (30) on air compressor mounting bracket (23) with two screws (32) and locknuts (31).
- (4) Install bracket (30), two washers (29), lockwashers (28) and screws (27) in air compressor (17).

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.

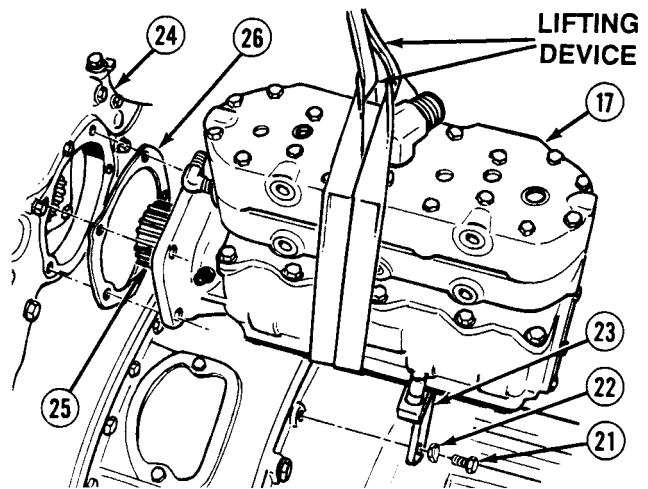


- (5) Apply sealing compound to elbows (2), (4), (6), (8) and (16).
- (6) Install elbows (2), (4), (6), (8) and (16) in air compressor (17).
- (7) Apply grease to gasket (26) and install on air compressor (17).

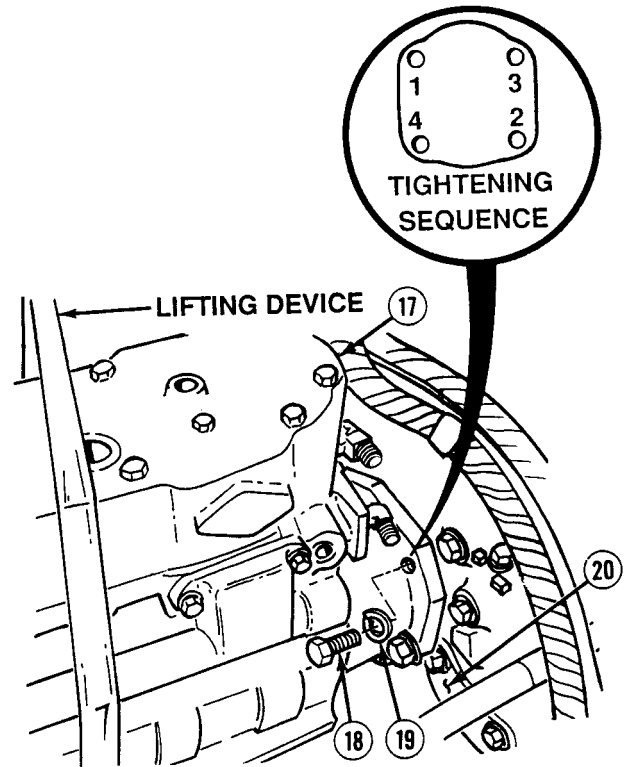
WARNING

Air compressor weighs 115 lbs (52 kg). Attach suitable lifting device prior to installation to prevent possible injury.

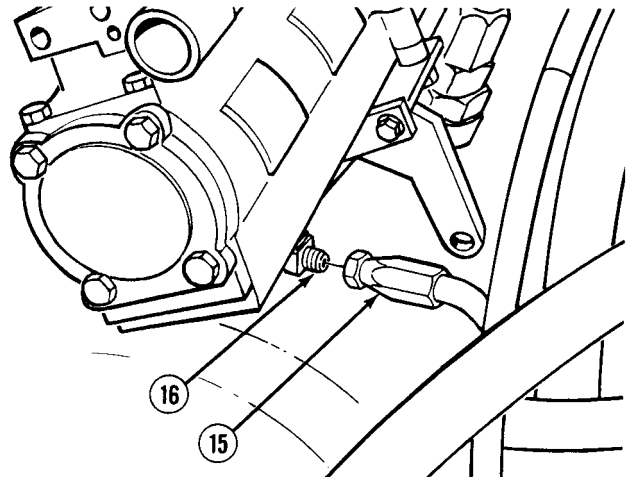
- (8) Attach lifting device to air compressor (17).
- (9) Install drive coupling (25) on air compressor (17).
- (10) Align drive coupling (25) in engine (24).
- (11) Install air compressor (17) on engine (24).
- (12) Install two lockwashers (22) and screws (21) in air compressor mounting bracket (23). Tighten screws to 80 lb-ft (108 N·m).



- (13) Install four lockwashers (19) and screws (18) in air compressor (17) and flywheel housing (20). Tighten screws in sequence shown to 80 lb-ft (108 N·m).
- (14) Remove lifting device from air compressor (17).



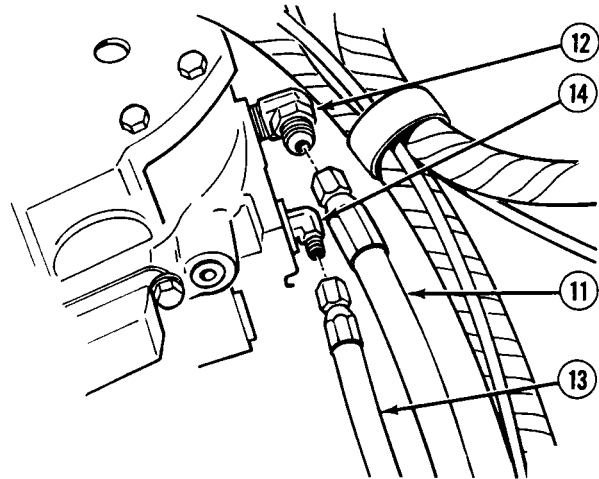
- (15) Install hose 2630 (15) on elbow (16).



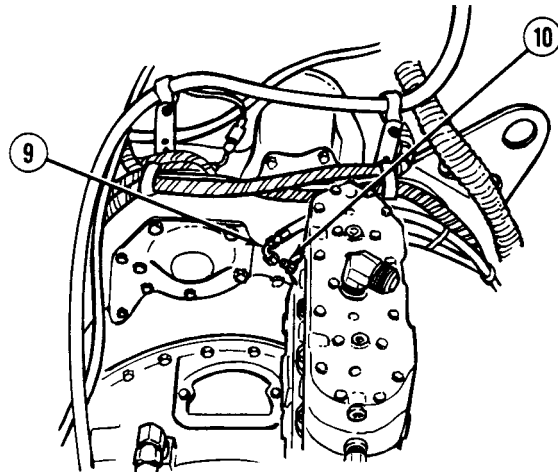
10-4. AIR COMPRESSOR REPLACEMENT (CONT).

(16) Install hose 2114 (13) on elbow (14).

(17) Install hose 2628 (11) on elbow (12).



(18) Install hose 2629 (9) on elbow (10).



(19) Install hose 2114 (7) on elbow (8).

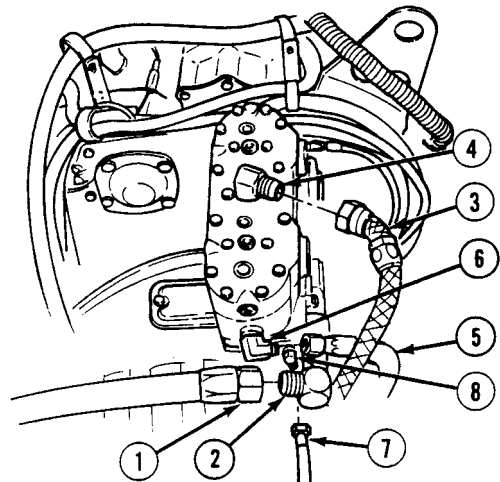
(20) Install hose 2628 (5) on elbow (6).

CAUTION

Do not bend or kink braided hose or damage to hose may result.

(21) Install braided hose 2001 (3) on elbow (4).

(22) Install hose 2600 (1) on elbow (2).



c. Follow-On Maintenance:

- Install cooling assembly, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

CHAPTER 11

WHEEL AND TIRE MAINTENANCE

Para	Contents	Page
11-1	Direct Support Wheel And Tire Maintenance Introduction	11-1
11-2	Axle Wheel Hub Assembly Repair	11-2
11-3	Brake Drum Inspection/Repair	11-11

11-1. DIRECT SUPPORT WHEEL AND TIRE MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for repairing, replacing, installing, and servicing wheel and tire components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

11-2. AXLE WHEEL HUB ASSEMBLY REPAIR.

This task covers:

- | | | |
|-------------|-----------------|--------------------------|
| a. Removal | b. Disassembly | c. Cleaning/Inspection |
| d. Assembly | e. Installation | f. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Adapter, Socket (3/4 in. female to 1 in. male) (Item 10, Appendix F)
- Driver, CTIS Seal (Item 52, Appendix F)
- Driver, CTIS Seal (Item 53, Appendix F)
- Gloves, Chemical Oil Protective (Item 81, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Press, 60 Ton (Item 164, Appendix F)
- Protector, Spindle (Item 169, Appendix F)
- Puller Kit, Universal, Slide Hammer (Item 175, Appendix F)
- Socket, Spindle Nut (Item 219, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)

Materials/Parts

- Grease (Item 21, Appendix B)
- Oil, Lubricating (Item 41, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)
- Lockwasher (Item 302, Appendix E)
- Seal, Oil (Item 600, Appendix E)
- Seal, Oil (item 601, Appendix E)
- Seal, Ring (Item 618, Appendix E)
- Seal, Ring (Item 619, Appendix E)

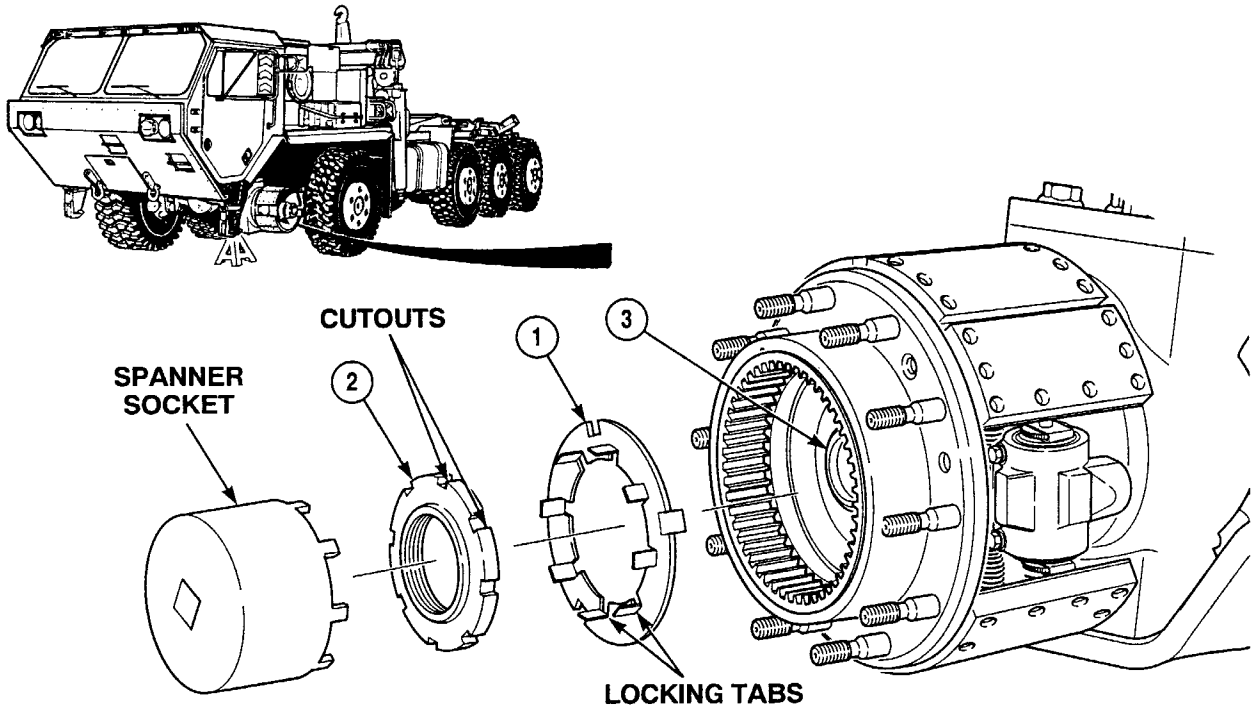
Personnel Required

Two

Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)
- Planetary hub gear assembly removed, (Para 9-6)

a. *Removal.*

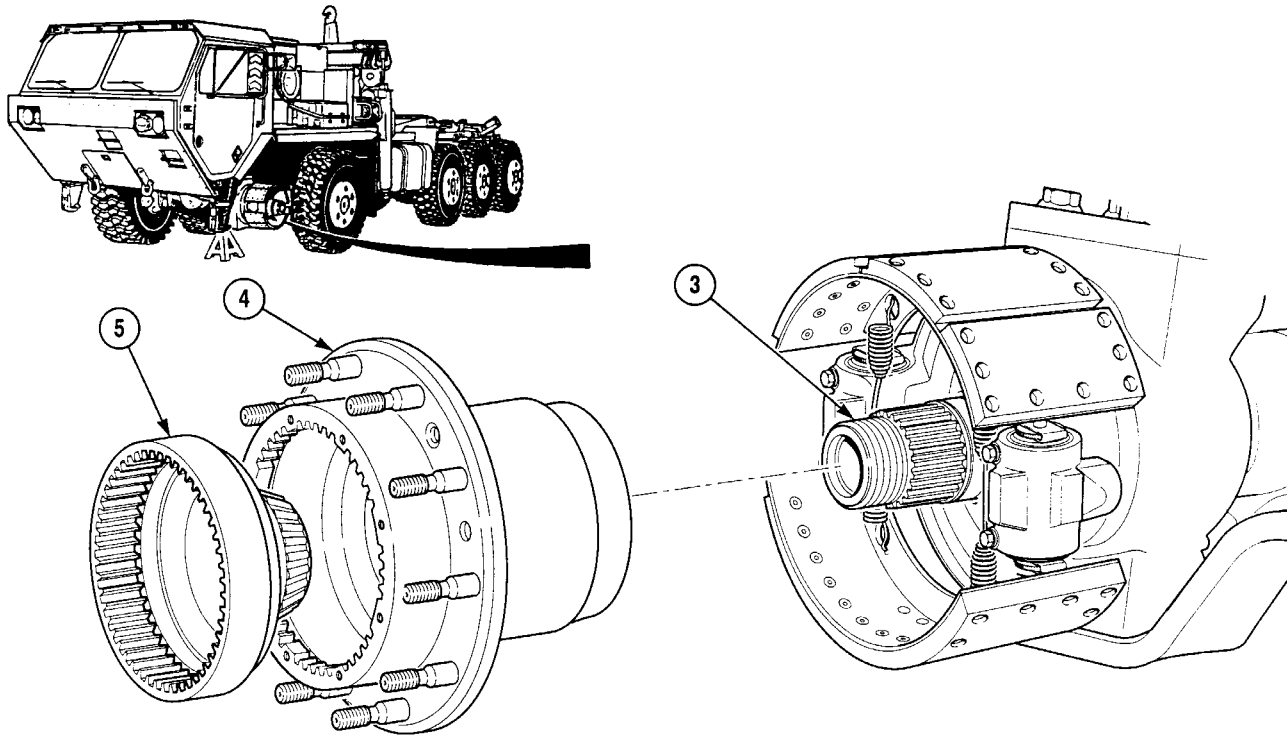


NOTE

All axle wheel hub assemblies are removed the same way. Axle No. 1 is shown.

- (1) Bend up two locking tabs of lockwasher (1).
- (2) Using spanner socket, remove spindle nut (2) and lockwasher (1) from pivot and spindle assembly (3). Discard lockwasher.

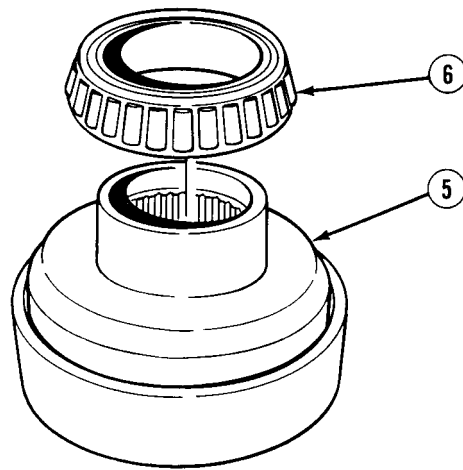
11-2. AXLE WHEEL HUB ASSEMBLY REPAIR (CONT).



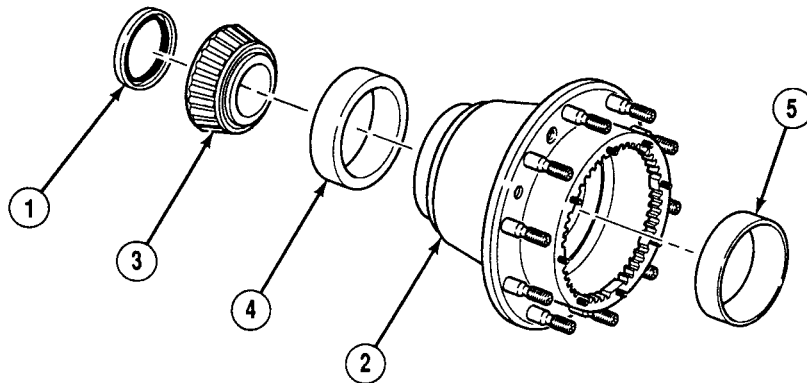
WARNING

Wheel hub assembly weight 115 lbs (52 kg). Support wheel hub assembly with suitable lifting device prior to removal to prevent possible injury to personnel.

- (3) With the aid of an assistant, remove wheel hub assembly (4) from pivot and spindle assembly (3).
- (4) Remove ring gear carrier assembly (5) from wheel hub assembly (4).
- (5) Using press, remove bearing (6) from ring gear carrier assembly (5).



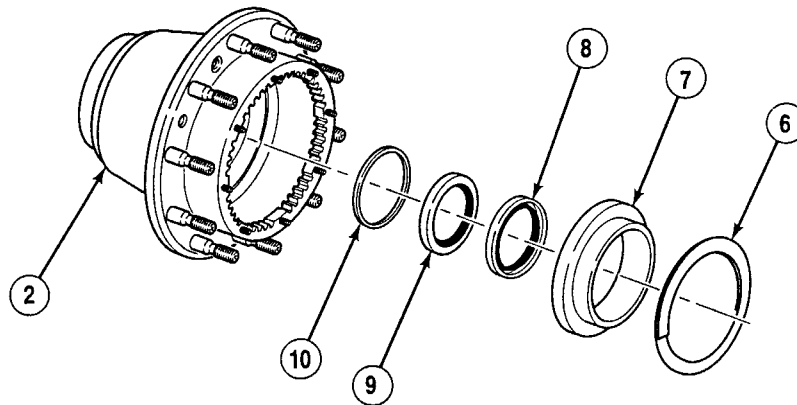
b. *Disassembly.*



NOTE

Tag and mark location and position of bearings and races prior to removal.

- (1) Remove oil seal (1) from wheel hub (2). Discard oil seal.
- (2) Remove bearing (3) from wheel hub (2).
- (3) Remove bearing races (4) and (5) from wheel hub (2).



WARNING

Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

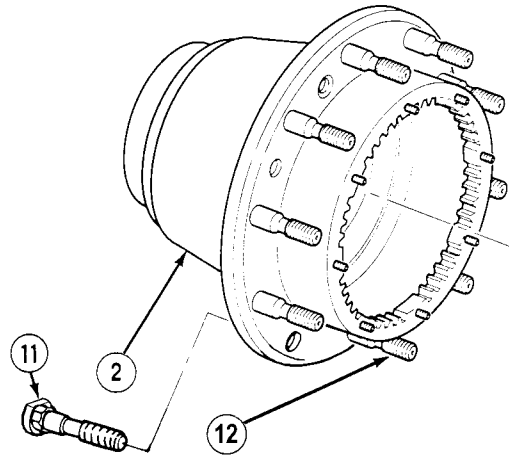
- (4) Remove retaining ring (6), outside ring (7), seals (8) and (9) and guide ring (10) from wheel hub (2). Discard seals.

11-2. AXLE WHEEL HUB ASSEMBLY REPAIR (CONT).

NOTE

- Perform Step (5) if studs are damaged.
- Four studs are longer than the other six studs to retain wheel cover. Mark locations of these studs for proper assembly.

- (5) Remove studs (11) and (12) from wheel hub (2).



c. Cleaning/Inspection.

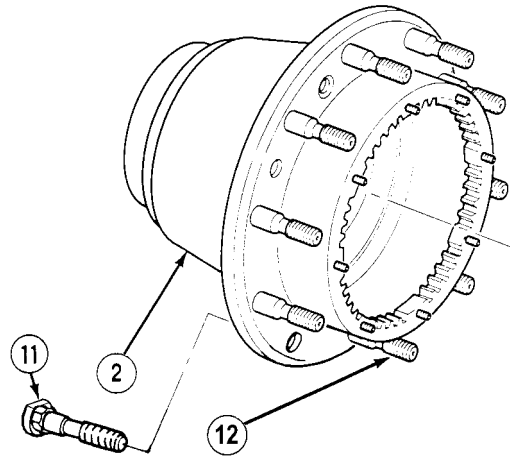
WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- (1) Clean all metal parts with drycleaning solvent.
 - (2) Inspect metal parts for breaks, cracks, burrs, and sharp edges.
 - (3) Inspect bearings for wear, scoring, cracks, or other obvious damage.
 - (4) Replace all damaged parts.

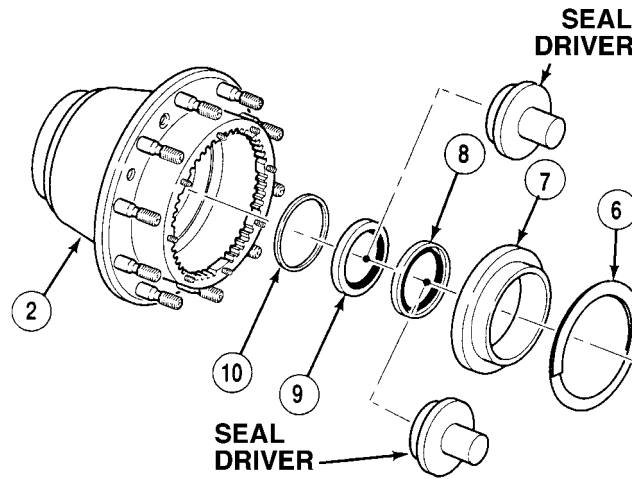
d. Assembly.

NOTE

- Perform Step (1) if studs were removed.
- Install four longer studs in positions marked during disassembly.
- Ensure flat edge of stud head is positioned parallel to flat edge of wheel hub.



- (1) Install studs (11) and (12) in wheel hub (2).

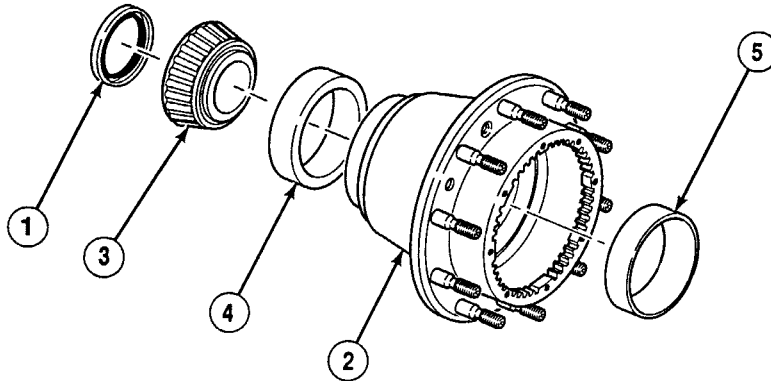


WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

- (2) Using seal drivers, install guide ring (10), seals (8) and (9), outside ring (7) and retaining ring (6) in wheel hub (2).

11-2. AXLE WHEEL HUB ASSEMBLY REPAIR (CONT).



- (3) Pack bearing (3) with grease.
- (4) Coat bearing race (4) with grease.
- (5) Coat bearing race (5) with lubricating oil.

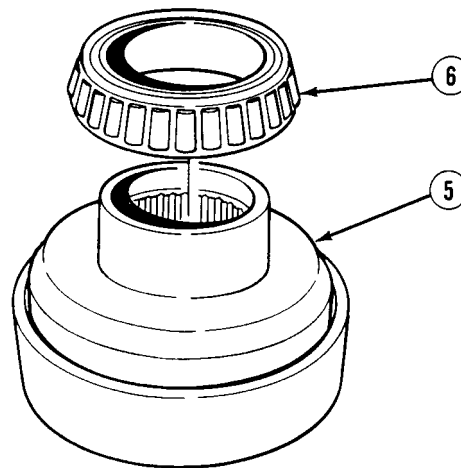
NOTE

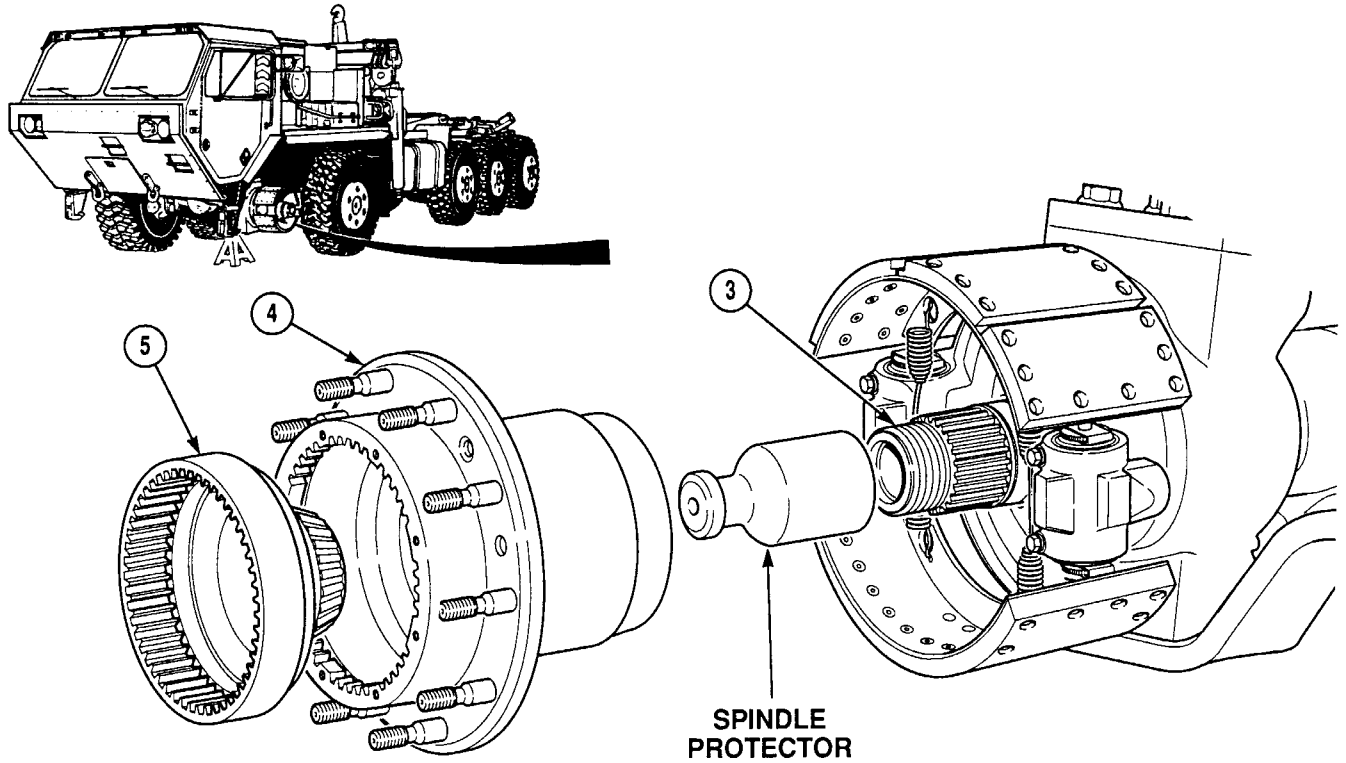
Install bearings and races as noted prior to removal.

- (6) Install bearing races (4) and (5) in wheel hub (2).
- (7) Install bearing (3) in wheel hub (2).
- (8) Coat oil seal (1) with grease.
- (9) Install oil seal (1) in wheel hub (2).

e. Installation.

- (1) Pack bearing (6) with grease.
- (2) Install bearing (6) on ring gear carrier assembly (5).





- (3) Install spindle protector on pivot and spindle assembly (3).

WARNING

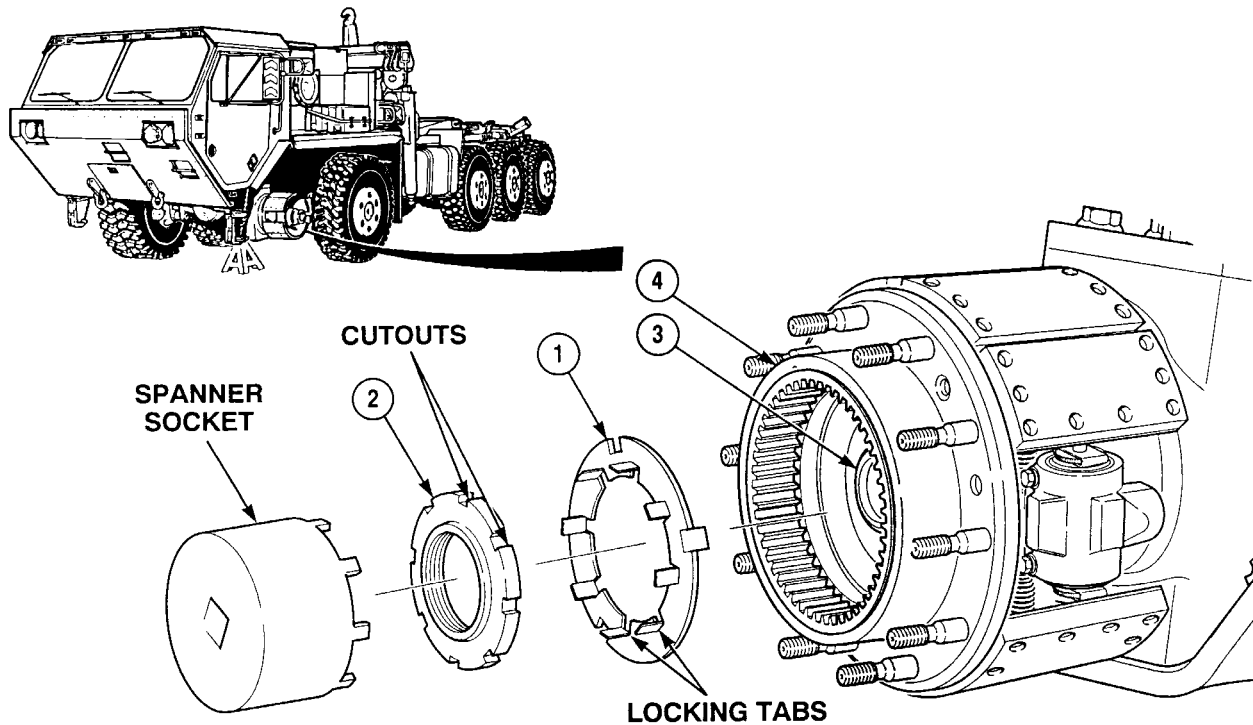
Wheel hub assembly weighs 115 lbs (52 kg). Support wheel hub assembly with suitable lifting device prior to installation to prevent possible injury to personnel.

CAUTION

Using spindle protector, install wheel hub assembly straight on spindle. Take care not to drag wheel hub assembly along spindle shaft to prevent damage to CTIS seals.

- (4) With the aid of an assistant, position wheel hub assembly (4) on pivot and spindle assembly (3).
- (5) Remove spindle protector from pivot and spindle assembly (3).
- (6) Position ring gear carrier assembly (5) in wheel hub assembly (4)

11-2. AXLE WHEEL HUB ASSEMBLY REPAIR (CONT).



- (7) Position lockwasher (1) on pivot and spindle assembly (3).
- (8) Position spindle nut (2) on pivot and spindle assembly (3).
- (9) With the aid of an assistant, hold spanner socket on spindle nut (2), rotate wheel hub assembly (4) and tighten spindle nut to 247 to 290 lb-ft (335 to 393 N·m).
- (10) While rotating wheel hub assembly (4) use a soft-faced hammer to seat wheel hub assembly.
- (11) With the aid of an assistant, hold spanner socket on spindle nut (2) and tighten to 247 to 290 lb-ft (335 to 393 N·m).
- (12) Using spanner socket, unscrew spindle nut (2) 1/16 of a turn. Continue to unscrew spindle nut until two locking tabs of lockwasher (1) are aligned with cutouts of spindle nut.
- (13) Bend two locking tabs of lockwasher (1) into cutouts on spindle nut (2).

f. *Follow-On Maintenance:*

- Install planetary hub gear assembly, (Para 9-6).

END OF TASK

11-3. BRAKE DRUM INSPECTION/REPAIR.

This task covers:

- a. Inspection and Repair b. Follow-On Maintenance

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Lathe, Brake Drum (Item 133, Appendix F)

Personnel Required

Two

Equipment Condition

Brake drum removed, (TM 9-2320-364-20)

Materials/Parts

Cloth, Crocus (Item 12, Appendix B)
Solvent, Drycleaning (Item 68, Appendix B)

- a. *Inspection and Repair.*

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- Brake drum may be coated with dust. Breathing dust may be harmful to personnel. Do not use compressed air to clean brake drum. Wear filter mask approved for use against brake dust.

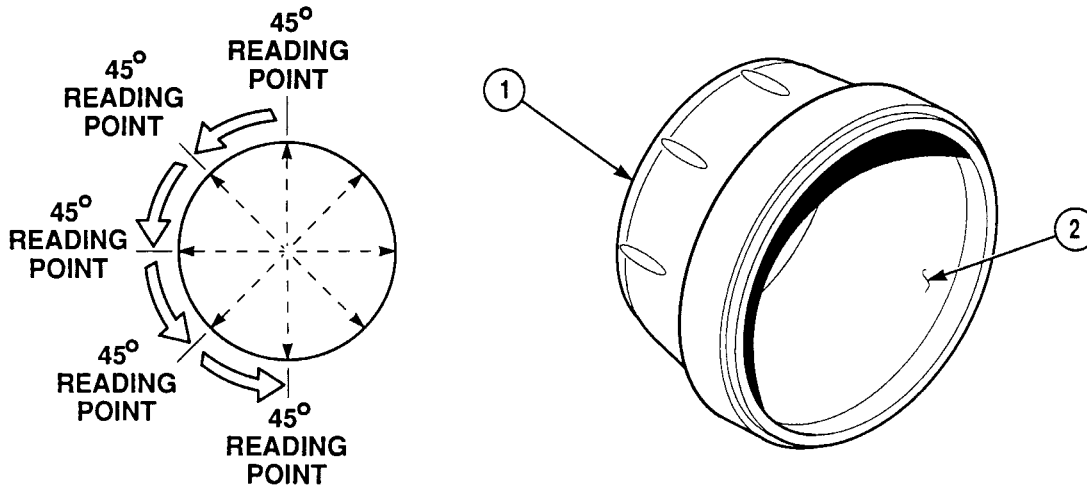
- (1) Clean brake drum with drycleaning solvent.

NOTE

Brake drum must be round within 0.003 in. (0.076 mm). If drum is out of round, go to Step (3).

- (2) Check brake drum for badly scored finish, heat cracks or other damage. If drum is scored, machine drum. Go to Step (3).

11-3. BRAKE DRUM INSPECTION/REPAIR (CONT).



WARNING

Brake drum weighs 134 lbs (61 kg). Use lifting device or aid of an assistant to lift drum. Failure to comply may result in injury to personnel.

- (3) Install brake drum (1) on turning equipment.

NOTE

Machine drum only enough to obtain a smooth, clean finish, free of pits, grooves or cracks.

- (4) Reface braking surface (2) with brake drum lathe, removing a maximum of 0.01 in. (0.25 mm) per cut.
- (5) Remove brake drum (1) from turning equipment.

WARNING

Do not use brake drum that exceeds maximum wear specification. Failure to comply may result in brake failure and serious injury or death to personnel.

NOTE

Take four measurements 45 degrees apart.

- (6) Discard brake drum (1) if inside diameter is larger than 16.625 in. (42.228 cm) after repair.
- (7) Check braking surface (2) for glossy or heat spots. If glossy or heat spots are visible, clean with crocus cloth.

b. Follow-On Maintenance:

- Install brake drum, (TM 9-2320-364-20).

END OF TASK

CHAPTER 122

STEERING SYSTEM MAINTENANCE

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12-2	Steering System Hydraulic Adjustment	12-2
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12-4	Intergear Link Repair	12-19
12-5	90 Degree Gearbox Repair	12-26
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12-1. DIRECT SUPPORT STEERING SYSTEM MAINTENANCE INTRODUCTION.

This chapter contains maintenance instructions for replacing, repairing and adjusting steering system components as authorized by the Maintenance Allocation Chart (MAC) at the Direct Support Maintenance level.

12-2. STEERING SYSTEM HYDRAULIC ADJUSTMENT.

This task covers:

- a. Steering Pump Hydraulic Pump Control Adjustment
- b. Steering Sequence Valve and Pressure Relief Valve 12B Adjustment
- c. Steering and Pressure Relief Valve 12A Adjustment
- d. Front Steering Gear Internal Relief Adjustment
- e. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Pan, Drain 4 gal (Item 144, Appendix F)
Pressure Test Kit (Item 165, Appendix F)
Steel, Plate, 1/8 in. (Appendix C)

Personnel Required

Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

Materials/Parts

Oil, Hydraulic (Item 34, Appendix B)
Lockwasher (22) (Item 282, Appendix E)
Packing, Preformed (Item 327, Appendix E)

a. *Steering Pump Hydraulic Pump Control Adjustment.***WARNING**

The steering hydraulic system operates at oil pressures up to 3,000 psi (20,685 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

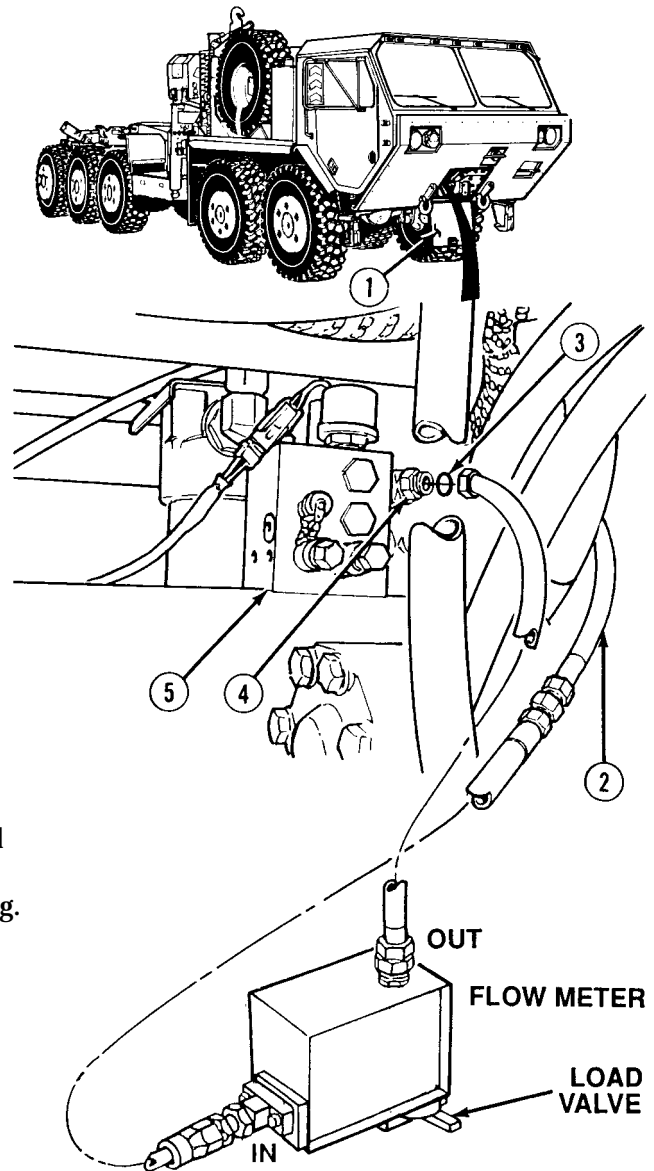
CAUTION

If steering system hydraulic adjustments are not performed in the correct sequence, serious damage to equipment will occur. Perform steering system hydraulic adjustment in the following sequence.

NOTE

Position drain pan under hoses.

- (1) Open front access cover (1).
- (2) Disconnect hose 2393 (2) and preformed packing (3) from elbow (4) on steering manifold (5). Discard preformed packing.
- (3) Apply hydraulic oil to preformed packing (3).
- (4) Position preformed packing (3) on elbow (4).
- (5) Install flow meter in line between hose 2393 (2) and elbow (4) on steering manifold (5).
- (6) Fully open load valve on flow meter.
- (7) Start engine.

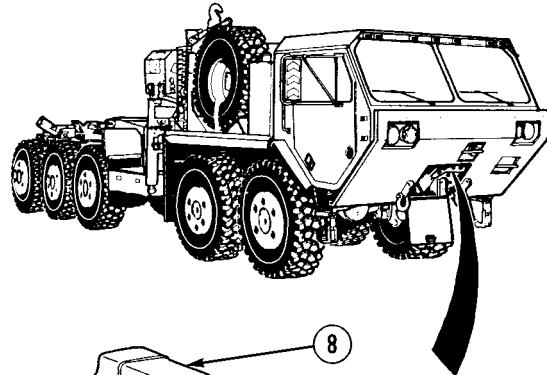


12-2. STEERING SYSTEM HYDRAULIC ADJUSTMENT (CONT).

CAUTION

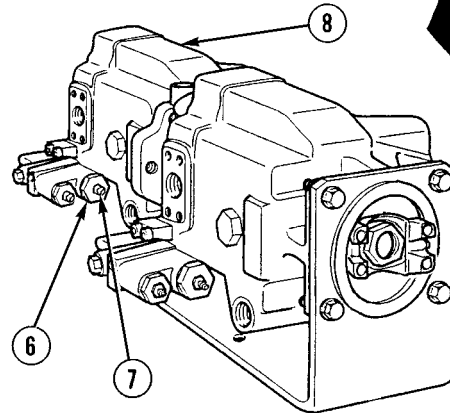
Do not allow loading valve to remain closed longer than 10 seconds or damage to equipment may result.

- (8) Slowly close load valve on flow meter.
 - (a) If 3,000 psi \pm 150 psi (20,685 kPa \pm 1,034 kPa) are not present when valve is fully closed, go to Step (9).
 - (b) If 3,000 psi \pm 150 psi (20,685 kPa \pm 1,034 kPa) are present, steering pump adjustment is OK, go to Step (15).
- (9) Shut OFF engine.



CAUTION

- Outside hydraulic pump control set screw is factory set and non-adjustable at any level of maintenance.
- Adjustment of outside hydraulic pump control set screw could result in damage to truck hydraulic system and components. Adjust inside hydraulic pump control set screw only.



STEERING AND MAIN HYDRAULIC PUMP SHOWN REMOVED FOR CLARITY

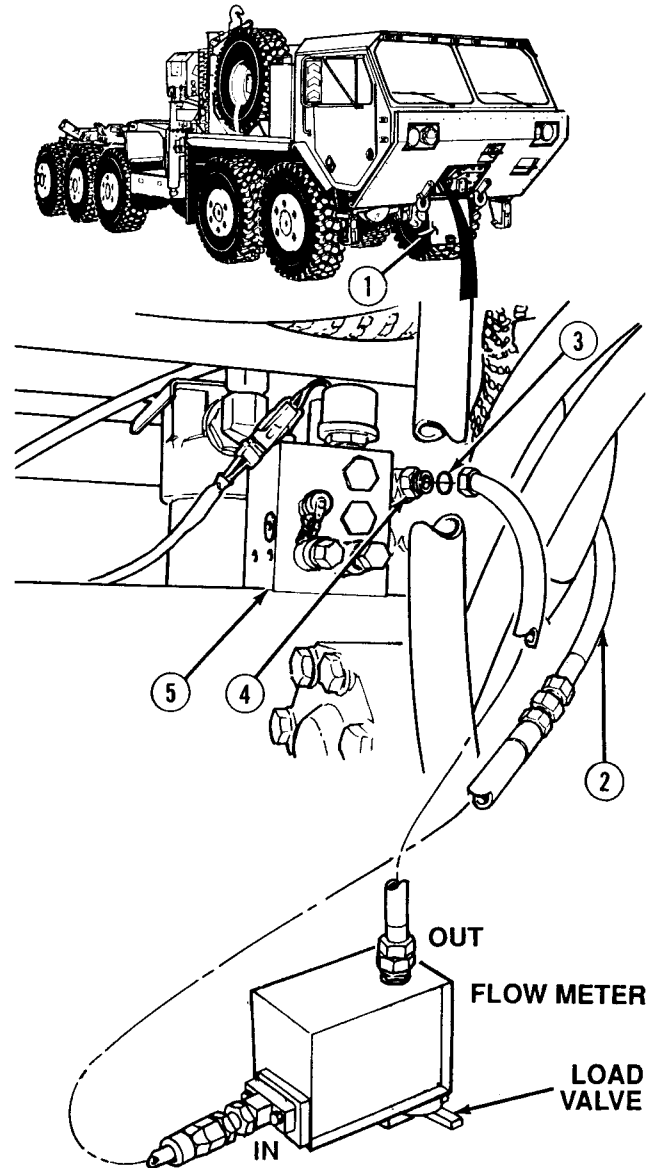
- (10) Loosen nut (6) on inside hydraulic pump control set screw (7).

NOTE

Turning hydraulic pump control set screw to the right will increase pump output pressure and turning to the left will decrease pump output pressure. Each full turn will change the output pressure about 330 psi (2,275 kPa).

- (11) Turn set screw (7) and adjust steering pump (8) output pressure to 3,000 psi \pm 150 psi (20,685 kPa \pm 1,034 kPa).
- (12) Tighten nut (6) on set screw (7).
- (13) Start engine.
- (14) Verify pressure and make necessary adjustments. Refer to Steps (6) through (13).
- (15) Shut OFF engine.

- (16) Disconnect flow meter from hose 2393 (2) and elbow (4).
- (17) Remove preformed packing (3) from elbow (4). Discard preformed packing.
- (18) Apply hydraulic oil to preformed packing (3).
- (19) Position preformed packing (3) on elbow (4).
- (20) Connect hose 2393 (2) to elbow (4) on steering manifold (5).
- (21) Check steering oil level and add oil as necessary.
- (22) Close front access cover (1).



12-2. STEERING SYSTEM HYDRAULIC ADJUSTMENT (CONT).

b. Steering Sequence Valve and Pressure Relief Valve 12B Adjustment.

WARNING

The steering hydraulic system operates at oil pressures up to 3,000 psi (20,685 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

CAUTION

If steering system hydraulic adjustments are not performed in the correct sequence serious damage to equipment will occur. Perform steering system hydraulic adjustment in the following sequence.

NOTE

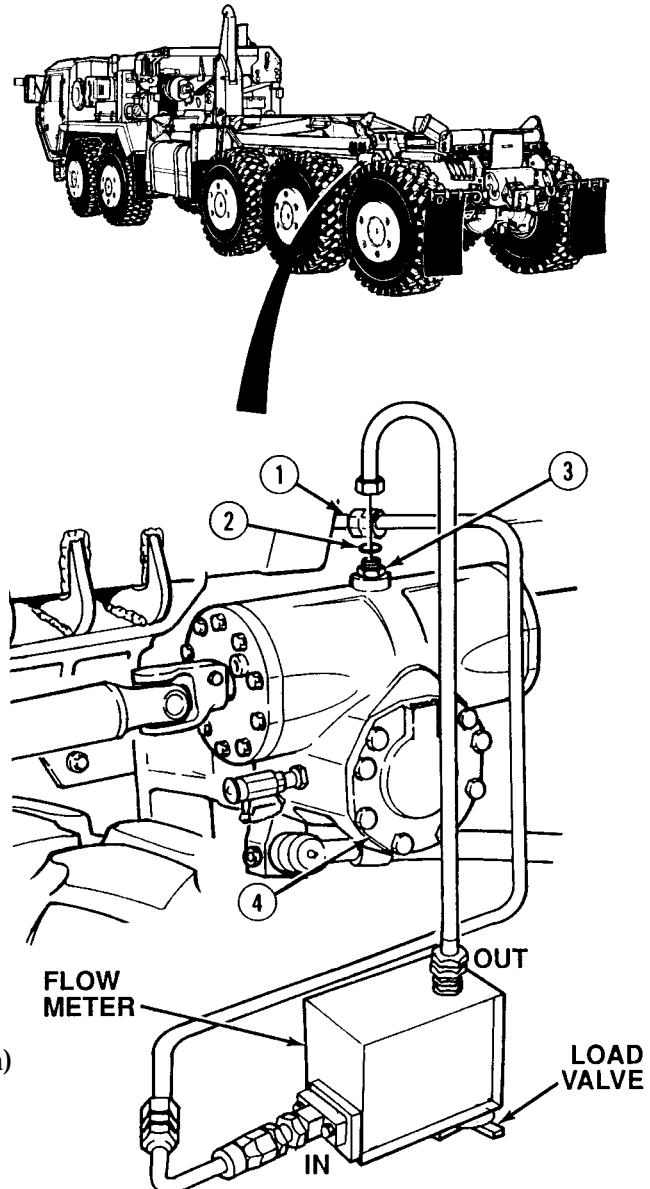
Position drain pan under hoses.

- (1) Disconnect hose 2275 (1) and remove preformed packing (2) from fitting (3) on rear steering gear (4). Discard preformed packing.
- (2) Apply hydraulic oil to preformed packing (2).
- (3) Position preformed packing (2) on fitting (3).
- (4) Install a flow meter in line between hose 2275 (1) and fitting (3) on rear steering gear (4).
- (5) Fully open load valve on flow meter.
- (6) Start engine.

CAUTION

Do not allow load valve to remain closed for more than 10 seconds. Damage to equipment could occur.

- (7) Slowly close load valve on meter.
 - (a) If 2,000 to 2,025 psi (13,790 to 13,962 kPa) are not present when valve is fully closed, go to Step (8).
 - (b) If 2,000 to 2,025 psi (13,790 to 13,962 kPa) are present, pressure relief valve 12B is adjusted correctly. Go to Step (16).
- (8) Shut OFF engine.

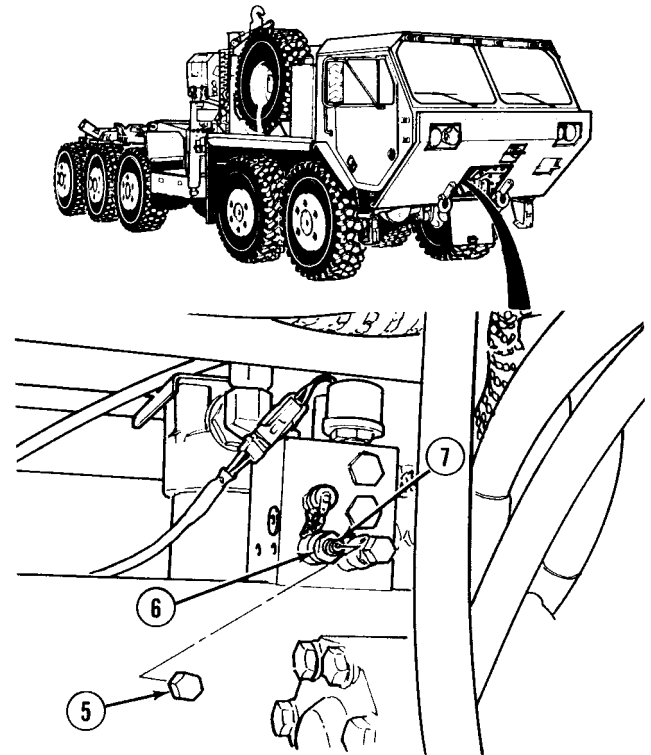


- (9) Remove pressure relief valve 12B cover (5).

NOTE

Turning pressure relief valve set screw to the right will increase pump output pressure and turning to the left will decrease pump output pressure. Each full turn will change the output pressure about 400 psi (2,758 kPa).

- (10) Loosen nut (6) and adjust pressure relief valve with set screw (7).
- (11) Start engine.
- (12) Verify pressure and make necessary adjustments. Refer to Steps (5) through (11).
- (13) Tighten nut (6).
- (14) Shut OFF engine.
- (15) Install relief valve 12B cover (5).
- (16) Fully open load valve on flow meter .
- (17) Start engine.



CAUTION

Do not allow load valve to remain closed for more than 10 seconds. Damage to equipment could occur.

- (18) While assistant slowly turns steering wheel in one direction, slowly close load valve. When load valve is fully closed, pressure should be 1,800 to 1,825 psi (12,411 to 12,583 kPa) and flow will drop to zero and front axles will not steer.
- (a) If 1,800 to 1,825 psi (12,411 to 12,583 kPa) are not present, go to Step (19).
- (b) If 1,800 to 1,825 psi (12,411 to 12,583 kPa) are present, sequence valve is adjusted correctly. Shut OFF engine and go to Step (27).
- (19) Shut OFF engine.

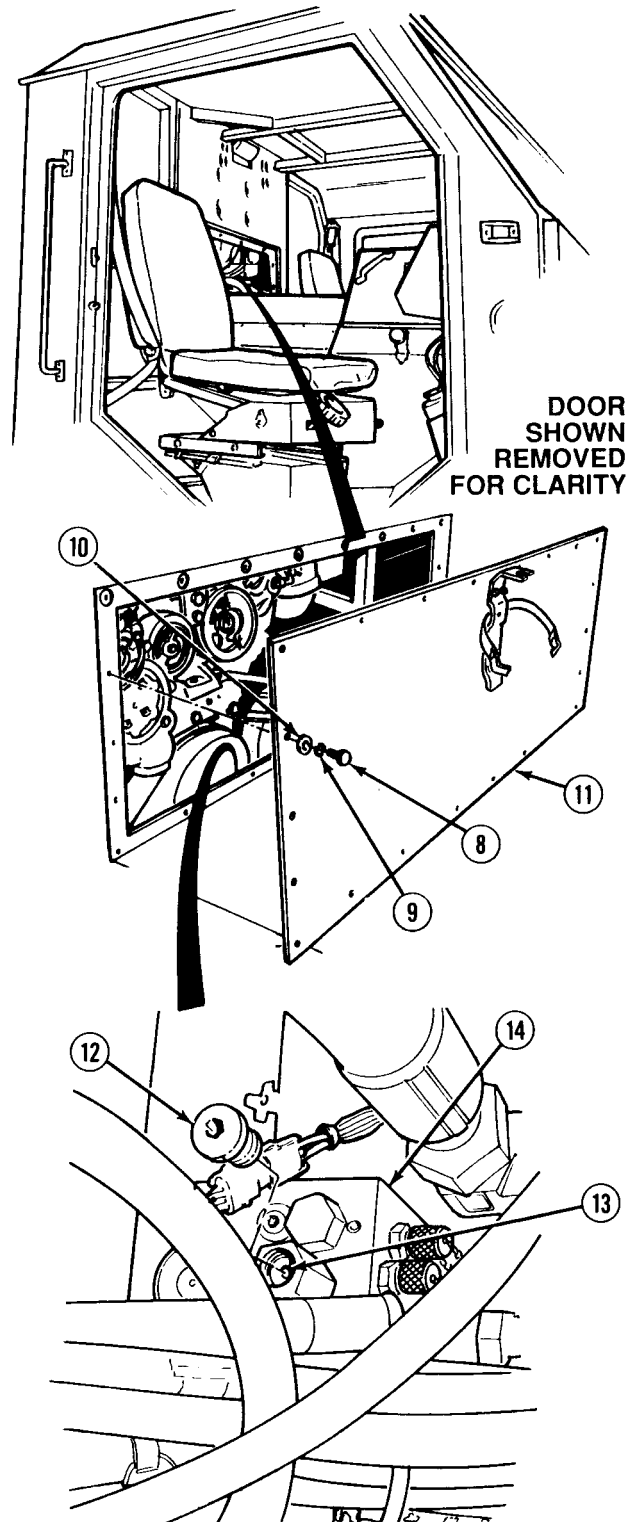
12-2. STEERING SYSTEM HYDRAULIC ADJUSTMENT (CONT).

- (20) Remove 22 screws (8), lockwashers (9), washers (10) and cab engine access panel (11). Discard lockwashers.
- (21) Remove sequence valve cover (12) from set screw (13).

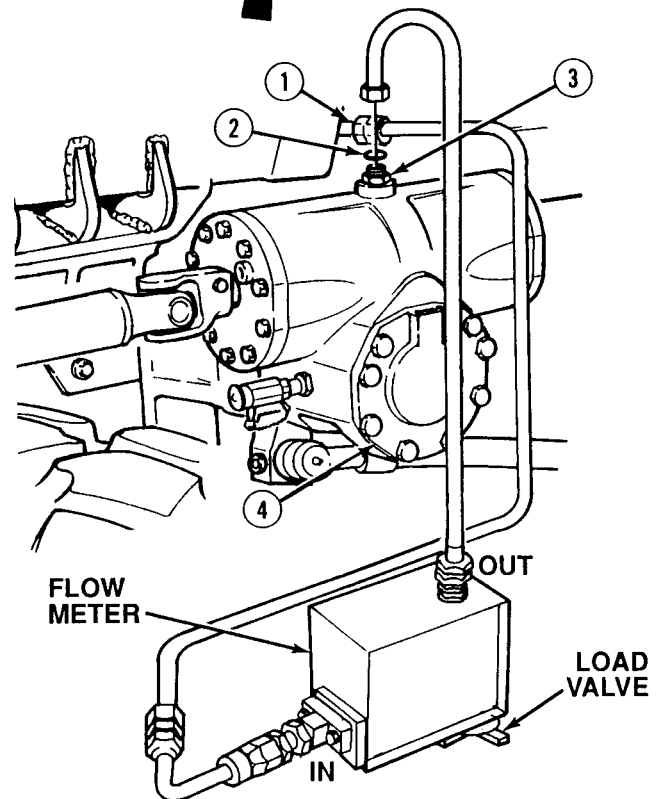
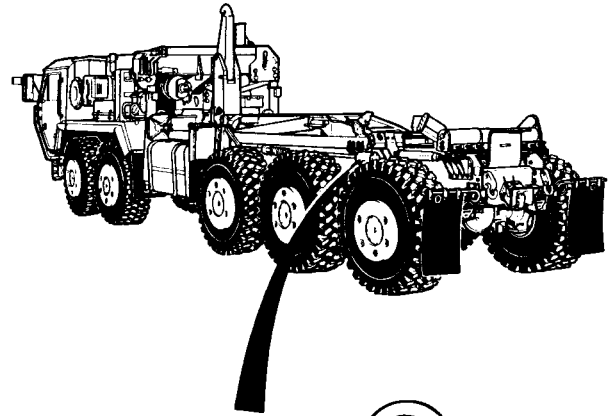
NOTE

Turning sequence valve set screw to the right will increase pump output pressure and turning to the left will decrease pump output pressure. Each full turn will change the output pressure about 150 psi (1,034 kPa).

- (22) Turn set screw (13) and adjust sequence valve (14) relief pressure.
- (23) Repeat Steps (16) through (22) until 1,800 to 1,825 psi (12,411 to 12,583 kPa) are present.
- (24) Shut OFF engine.
- (25) Install sequence valve cover (12).
- (26) Install cab engine access panel (11) with 22 washers (10), lockwashers (9) and screws (8).



- (27) Disconnect flow meter from hose 2275 (1) and fitting (2).
- (28) Remove preformed packing (2) from fitting (3). Discard preformed packing.
- (29) Apply hydraulic oil to preformed packing (2).
- (30) Position preformed packing (2) on fitting (3).
- (31) Connect hose 2275 (1) to fitting (3) on rear steering gear (4).
- (32) Check steering oil level and add oil as necessary.



12-2. STEERING SYSTEM HYDRAULIC ADJUSTMENT (CONT).

c. Steering and Pressure Relief Valve 12A Adjustment.

WARNING

The steering hydraulic system operates at oil pressures up to 3,000 psi (20,685 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

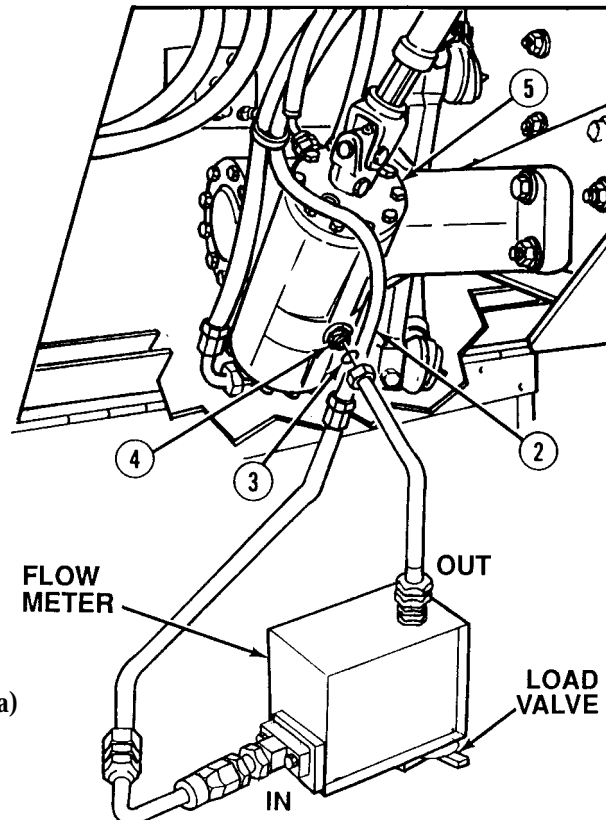
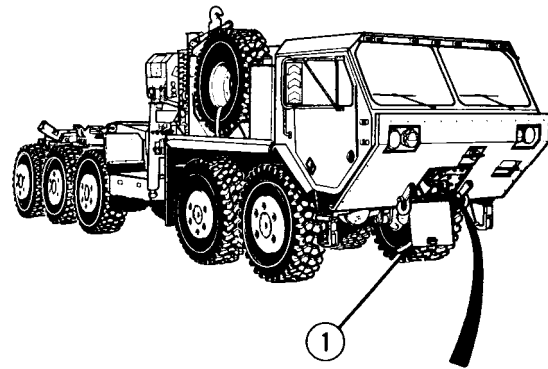
CAUTION

If steering system hydraulic adjustments are not performed in the correct sequence serious damage to equipment will occur. Perform steering system hydraulic adjustment in the following sequence.

NOTE

Position drain pan under hoses.

- (1) Open front access cover (1).
- (2) Disconnect hose 2301 (2) and remove preformed packing (3) from fitting (4) in front steering gear (5). Discard preformed packing.
- (3) Apply hydraulic oil to preformed packing (3).
- (4) Position preformed packing (3) on fitting (4).
- (5) Install a flow meter in line between hose 2301 (2) and fitting (4).
- (6) Fully open load valve on flow meter.
- (7) Start engine.



CAUTION

Do not allow load valve to remain closed for more than 10 seconds. Damage to equipment could occur.

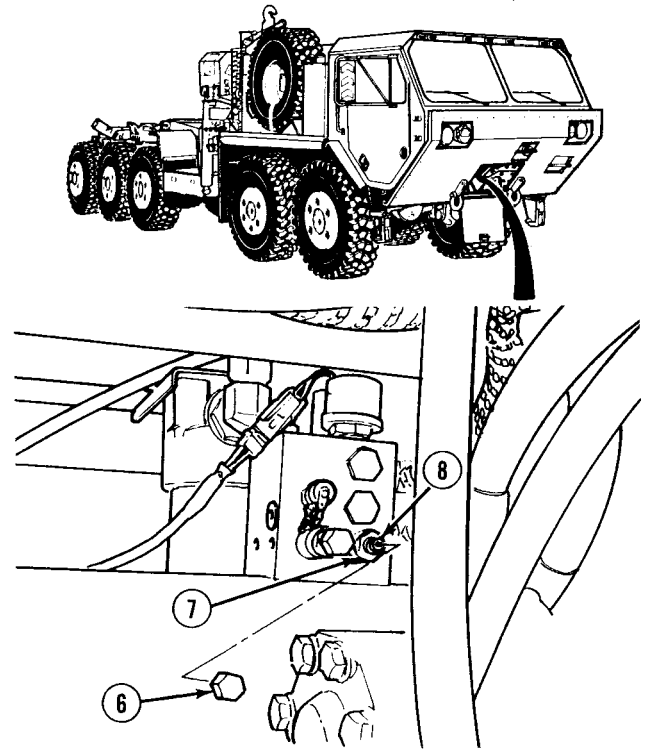
- (8) Slowly close load valve on flow meter.
 - (a) If 2,000 to 2,025 psi (13,790 to 13,962 kPa) are not present when valve is fully closed, go to Step (9).
 - (b) If 2,000 to 2,025 psi (13,790 to 13,962 kPa) are present, pressure relief valve 12A is adjusted correctly. Go to Step (18).
- (9) Shut OFF engine.

- (10) Remove pressure relief valve 12A cover (6).

NOTE

Turning pressure relief valve set screw to the right will increase pump output pressure and turning to the left will decrease pump output pressure. Each full turn will change the output pressure about 400 psi (2,758 kPa).

- (11) Loosen nut (7) and adjust pressure with set screw (8).
- (12) Tighten nut (7) on set screw (8).
- (13) Start engine.
- (14) Verify pressure and make necessary adjustments. Refer to Steps (6) through (13).
- (15) Repeat Steps (6) through (13) until 2,000 psi (13,790 kPa) present when load valve is fully closed.
- (16) Shut OFF engine.
- (17) Install relief valve cover (6).



NOTE

Do not remove flow meter at this time.

- (18) Go to Step *d*.

12-2. STEERING SYSTEM HYDRAULIC ADJUSTMENT (CONT).

d. Front Steering Gear Internal Relief Adjustment.

CAUTION

- If steering system hydraulic adjustments are not performed in the correct sequence serious damage to equipment will occur. Perform steering system hydraulic adjustment in the following sequence.
- Perform Para 12-8 d, "Axle Steering Stops Adjustment" prior to setting internal reliefs or damage to equipment may occur.

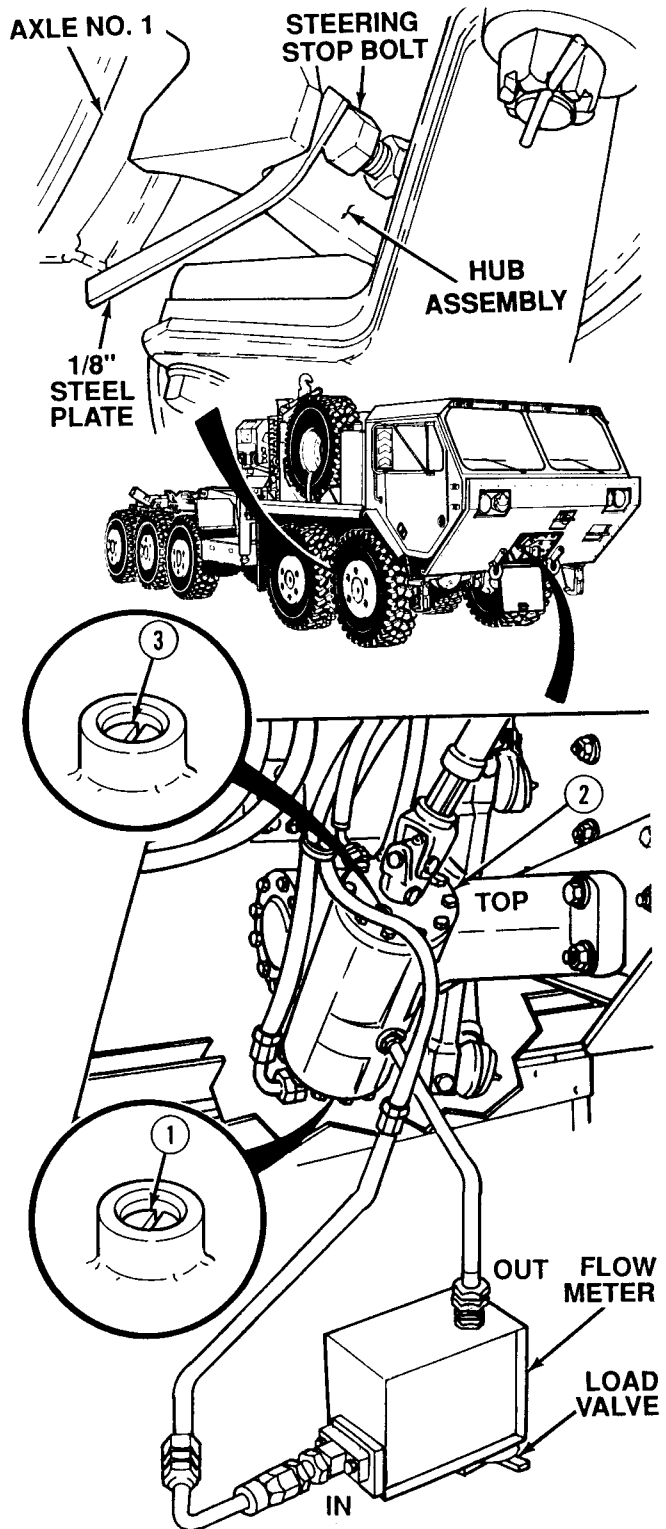
NOTE

No adjustment of rear steering gear is required.

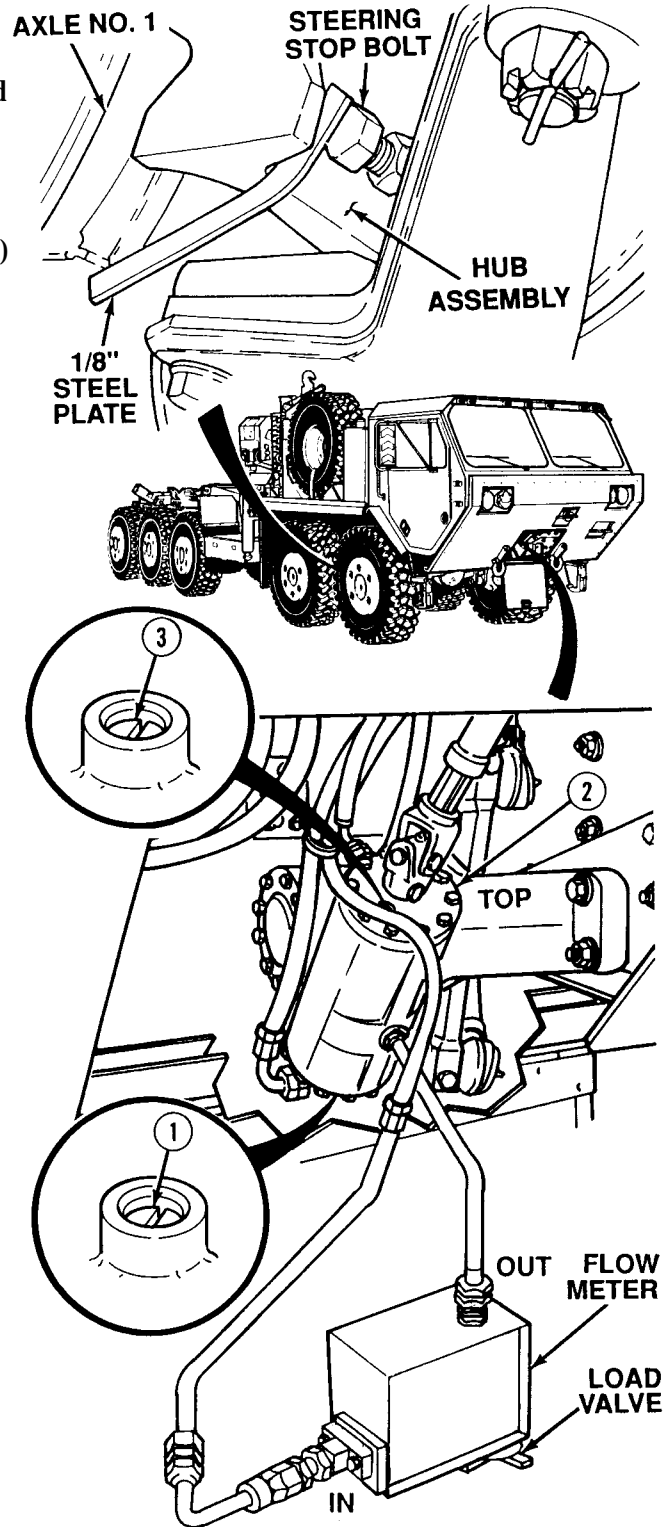
- (1) Start engine.
- (2) With the aid of an assistant, turn steering wheel all the way to the right, while placing a 1/8 in. steel plate between the stop and hub assembly on Axle No. 1.

CAUTION

- Do not cramp wheels more than 10 seconds. Damage to equipment could occur.
 - Do not turn relief plunger out more than even with steering gear cover. Relief plunger could pop out under pressure causing damage to plunger.
- (3) Turn the bottom relief plunger (1) on the front steering gear (2) until the supply pressure drops to 500 to 600 psi (3,448 to 4,137 kPa) when cramped.



- (4) With the aid of an assistant, turn steering wheel all the way to the left, while placing a 1/8 in. piece of steel between the stop and hub assembly on Axle No. 1.
- (5) Turn the top relief plunger (3) on the front steering gear (2) until the supply pressure drops to 500 to 600 psi (3,448 to 4,137 kPa) when cramped.
- (6) Shut OFF engine.



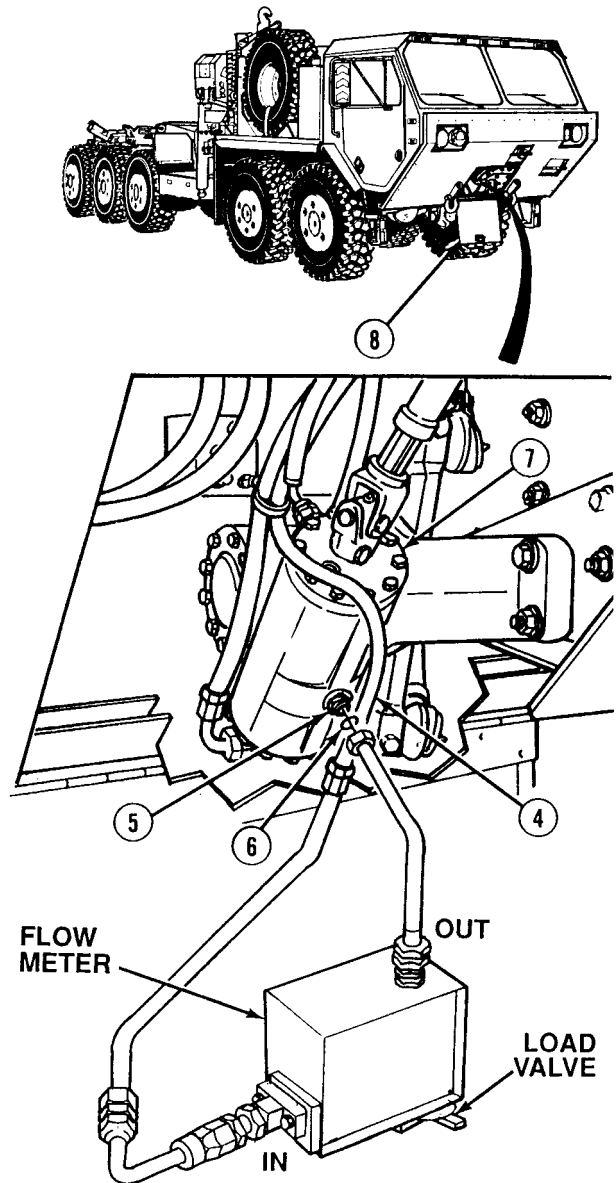
WARNING

The steering hydraulic system operates at oil pressures up to 3,000 psi (20,685 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

NOTE

Position drain pan under hoses.

- (7) Disconnect flow meter from hose 2301 (4) and fitting (5).
- (8) Remove preformed packing (6) from fitting (5). Discard preformed packing.
- (9) Apply lubricating oil to preformed packing (6).
- (10) Position preformed packing (6) on fitting (5).
- (11) Connect hose 2301 (4) to fitting (5) on front steering gear (7).
- (12) Check steering oil level and add oil as necessary.
- (13) Close front access cover (8).



e. *Follow-On Maintenance:*

- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

12-3. DRAG LINK REPAIR.

This task covers:

- | | | |
|----------------|------------------------|--------------------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | f. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Adapter, Socket (3/4 in. male to 1/2 in. female) (Item 8, Appendix F)
- Caps, Vise Jaw (Item 27, Appendix F)
- Compressor Unit, Air (Item 35, Appendix F)
- Gloves, Chemical Oil Protective (Item 81, Appendix F)
- Goggles, Industrial (Item 83, Appendix F)
- Gun, Airblow (Item 86, Appendix F)
- Vise, Machinist's (Item 248, Appendix F)
- Wrench, Combination 1-5/16 in. (Item 257, Appendix F)
- Wrench Set, Socket 3/4 in. Drive (Item 274, Appendix F)
- Wrench, Torque (0 to 175 lb-ft [0-237 N·m]) (Item 277, Appendix F)

Materials/Parts

- Cloth, Cleaning (Item 11, Appendix B)
- Grease (Item 21, Appendix B)
- Solvent, Drycleaning (Item 68, Appendix B)
- Lockwasher (Item 249, Appendix E)
- Pin, Cotter (2) (Item 421, Appendix E)

Personnel Required

Two

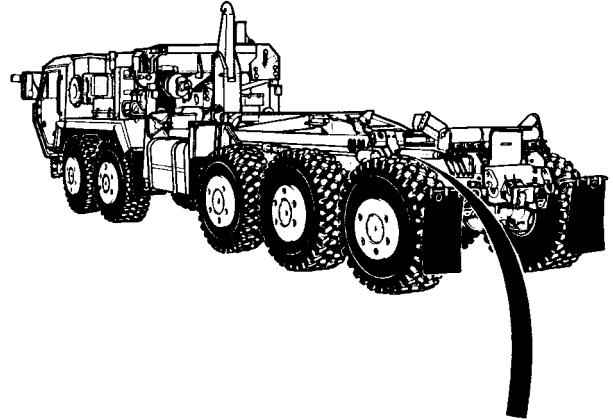
Equipment Condition

- Engine OFF, (TM 9-2320-364-10)
- Wheels chocked, (TM 9-2320-364-10)

a. Removal.

NOTE

- Axles No. 1, 2 and 5 drag links are removed the same way. Axle No. 5 drag link shown.
- Do not move truck during replacement. If truck or wheels are moved, perform steering timing procedures (Para 12-8).



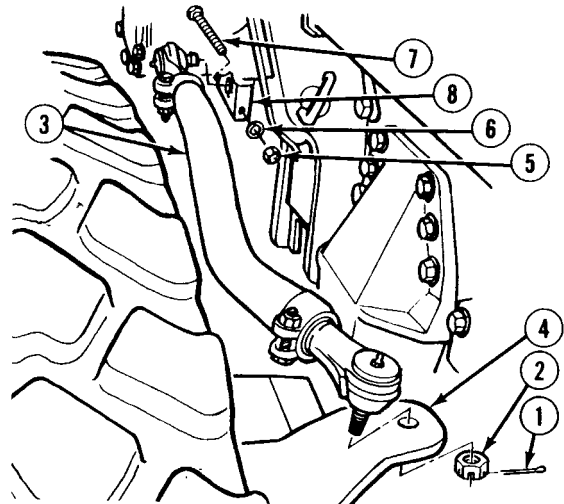
- (1) Remove cotter pin (1) from castle nut (2). Discard cotter pin.
- (2) Loosen castle nut (2) until flush with end of threads on drag link (3).

WARNING

Do not remove castle nut from drag link before applying upward pressure on drag link. Serious injury to personnel or damage to equipment may result.

NOTE

- Note position of clamps and drag links prior to removal.
 - It may be necessary to tap steering arm with hammer to remove drag link.
- (3) With the aid of an assistant, apply upward pressure to drag link (3) and remove drag link (3) and castle nut (2) from steering arm bracket (4).
 - (4) Remove nut (5), lockwasher (6), screw (7) and drag link (3) from pitman arm (8). Discard lockwasher.



12-3. DRAG LINK REPAIR (CONT).

b. Disassembly.

NOTE

- Both ends of the drag link are removed the same way.
- Tag and mark location and position of vertical sockets prior to removal.
- Note position of clamps prior to disassembly.

- (1) Install drag link (3) in soft-jawed vise.

NOTE

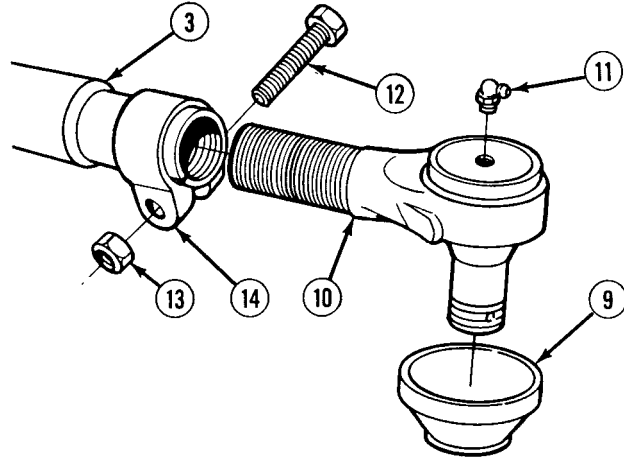
Do not perform Steps (2) and (3) if vertical socket assembly is lube for life.

- (2) Remove boot (9) from vertical socket assembly (10).
- (3) Remove lube fitting (11) from vertical socket assembly (10).

NOTE

Do not remove clamp.

- (4) Hold screw (12) and loosen nut (13) on clamp (14).
- (5) Remove vertical socket assembly (10) from drag link (3).
- (6) Repeat Steps (1) through (5) for remaining vertical socket assembly (10).



c. *Cleaning/Inspection.***WARNING**

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- (1) Clean all metal parts using drycleaning solvent.

WARNING

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

- (2) Clean rubber parts with a clean, dry cloth.
- (3) Inspect all parts for cracks, stripped threads and other signs of wear.
- (4) Replace all damaged parts.

d. *Assembly.***NOTE**

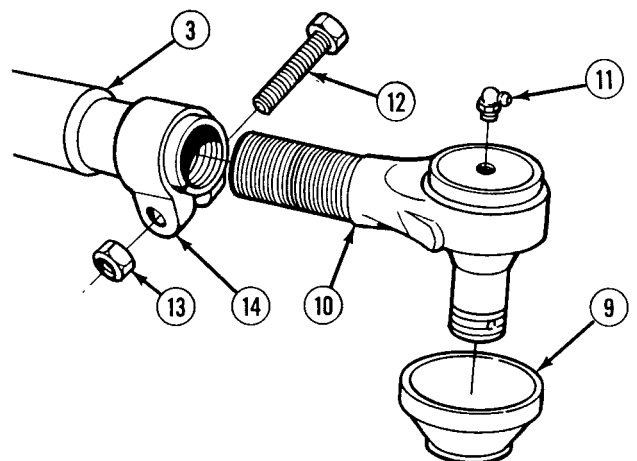
Ensure vertical socket assembly is installed as noted during removal.

- (1) Install vertical socket assembly (10) on drag link (3).
- (2) Tighten nut (13) on screw (12) 50 to 60 lb-ft (68 to 81 N·m).

NOTE

Do not perform Steps (3) and (4) if vertical socket assembly is lube for life.

- (3) Install lube fitting (11) on vertical socket assembly (10).
- (4) Install boot (9) on vertical socket assembly (10).
- (5) Repeat Steps (1) through (4) for remaining vertical socket assembly (10).



12-3. DRAG LINK REPAIR (CONT).

e. Installation.

- (1) Install drag link (3) on pitman arm (8) with screw (7), lockwasher (6) and nut (5). Tighten nut 70 lb-ft (95 N·m).

NOTE

It may be necessary to remove CTIS air lines to tighten castle nut.

- (2) Install drag link (3) on steering arm (4) with castle nut (2).
- (3) Tap on steering arm (4) and retighten castle nut (2) on drag link (3). Tighten nut to 165 to 180 lb-ft (224 to 244 N·m).

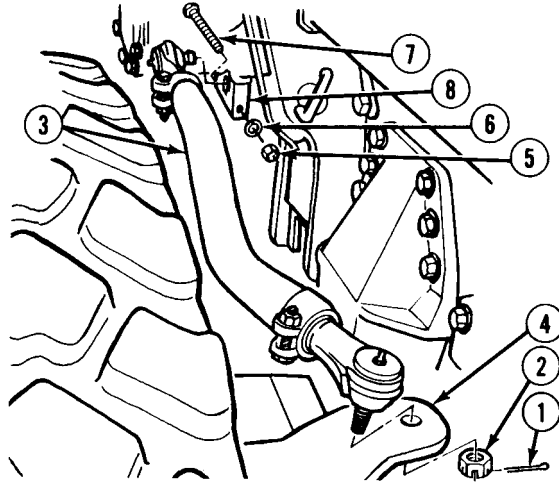
NOTE

It may be necessary to rotate castle nut slightly to install cotter pin.

- (4) Install cotter pin (1) in castle nut (2).

f. Follow-On Maintenance:

- Lubricate drag link, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).



END OF TASK

12-4. INTERGEAR LINK REPAIR.

This task covers:

- | | | |
|----------------|------------------------|--------------------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | f. Follow-On Maintenance |

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Caps, Vise Jaw (Item 27, Appendix F)
Compressor Unit, Air (Item 35, Appendix F)
Gloves, Chemical Oil Protective
(Item 81, Appendix F)
Goggles, Industrial (Item 83, Appendix F)
Gun, Airblow (Item 86, Appendix F)
Vise, Machinist's (Item 248, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0 to 237 N·m])
(Item 277, Appendix F)

Materials/Parts

Cloth, Cleaning (Item 11, Appendix B)
Solvent, Drycleaning (Item 68, Appendix B)

Materials/Parts - Continued

Tags, Identification (Item 72, Appendix B)
Dust Cover (2) (Item 40, Appendix E)
Locknut (2) (Item 194, Appendix E)
Locknut (12) (Item 202, Appendix E)
Lockwasher (2) (Item 249, Appendix E)

Personnel Required

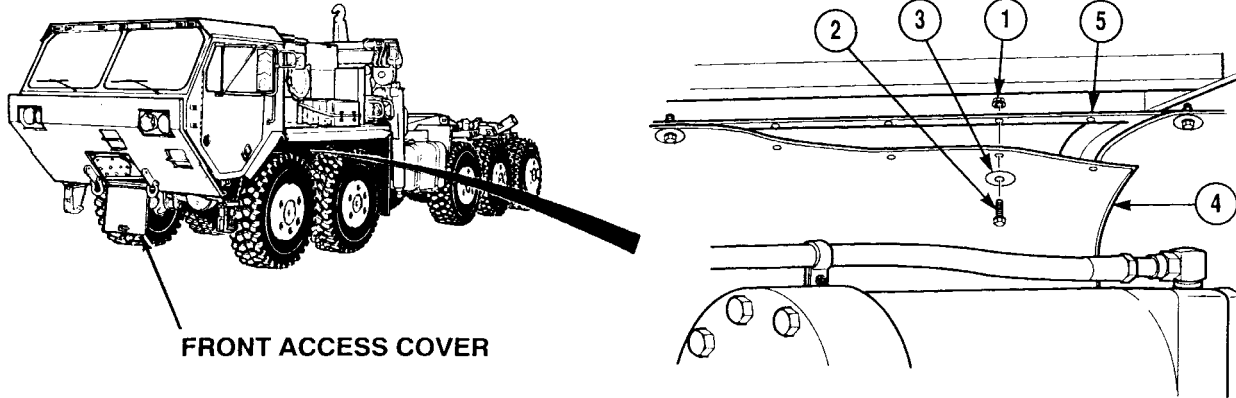
Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Driveshaft disconnected from drive gear,
(TM 9-2320-364-20)

12-4. INTERGEAR LINK REPAIR (CONT).

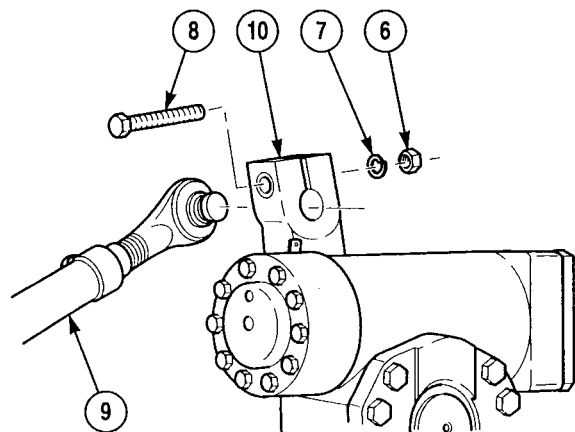
a. Removal.

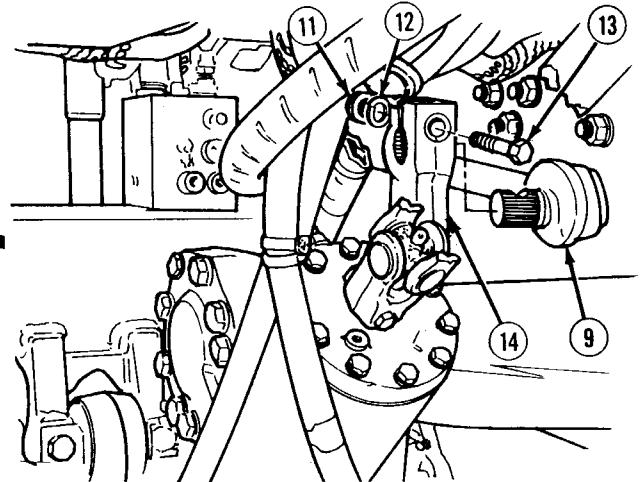
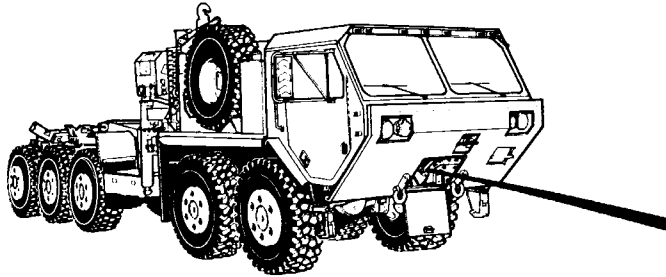


NOTE

- Note location and position of intergear link prior to removal.
- Do not move truck during replacement. If truck or wheels are moved, perform steering system alignment procedure (Para 12-8).

- (1) Remove 12 locknuts (1), screws (2), washers (3) and two fender skirts (4) from fender (5). Discard locknuts.
- (2) Open front access cover and remove nut (6), lockwasher (7), screw (8) and intergear link (9) from intermediate steering gear arm (10). Discard lockwasher.





- (3) With aid of assistant, remove nut (11), lockwasher (12), screw (13) and intergear link (9) from pitman arm (14). Discard lockwasher.

b. Disassembly.

NOTE

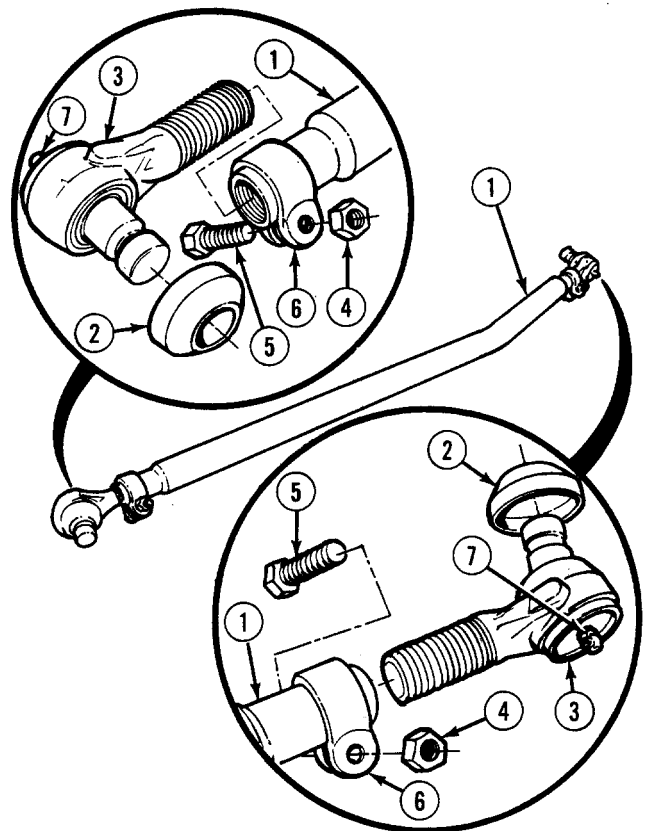
Tag and mark location and position of sockets prior to removal.

- (1) Position intergear link (1) in soft jawed vise.
- (2) Remove locknut (4) and screw (5) from clamp (6). Discard locknut.
- (3) Remove socket (3) from intergear link (1).

NOTE

Do not perform Steps (4) and (5) if socket is lube for life.

- (4) Remove and discard dust boot (2) from socket (3).
- (5) Remove grease fitting (7) from socket (3).
- (6) Repeat Steps (2) through (5) for remaining socket (3).



12-4. INTERGEAR LINK REPAIR (CONT).

c. *Cleaning/Inspection.*

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
- (1) Clean all metal parts with drycleaning solvent.

WARNING

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

- (2) Dry all metal parts with compressed air.
- (3) Clean rubber parts with clean, dry cloth.
- (4) Inspect all parts for cracks, stripped threads and other signs of wear.
- (5) Replace all damaged parts.

d. *Assembly.*

NOTE

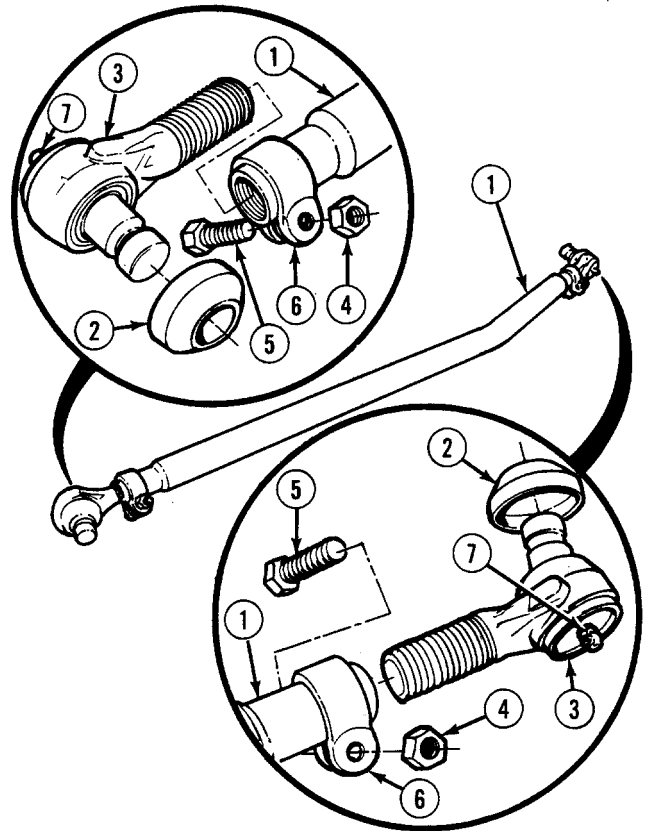
Ensure sockets are installed as noted prior to removal.

- (1) Position intergear link (1) in soft jawed vise.

NOTE

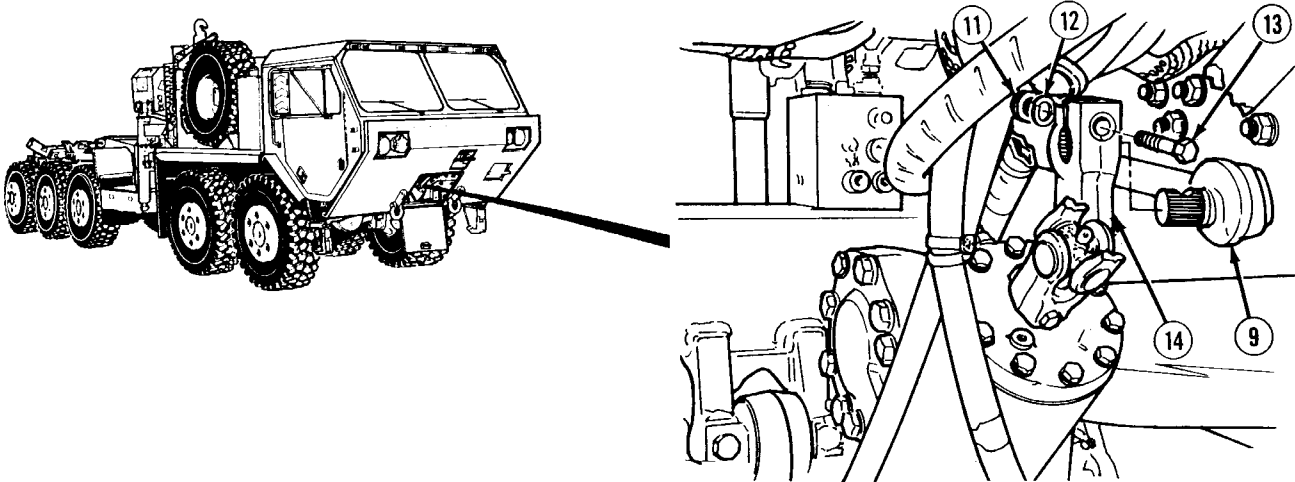
Do not perform Steps (2) and (3) if socket is lube for life.

- (2) Install grease fitting (7) on socket (3).
- (3) Install dust boot (2) on socket (3).
- (4) Install socket (3) on intergear link (1).
- (5) Install screw (5) and locknut (4) on clamp (6). Tighten locknut to 50 to 60 lb-ft (68 to 81 N-m).
- (6) Repeat Steps (2) through (5) for remaining socket (3).



12-4. INTERGEAR LINK REPAIR (CONT).

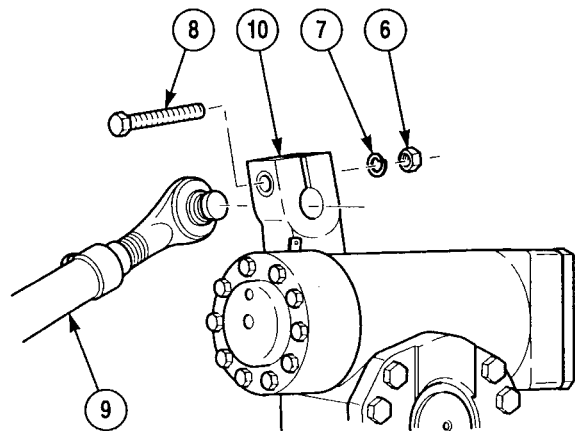
e. Installation.

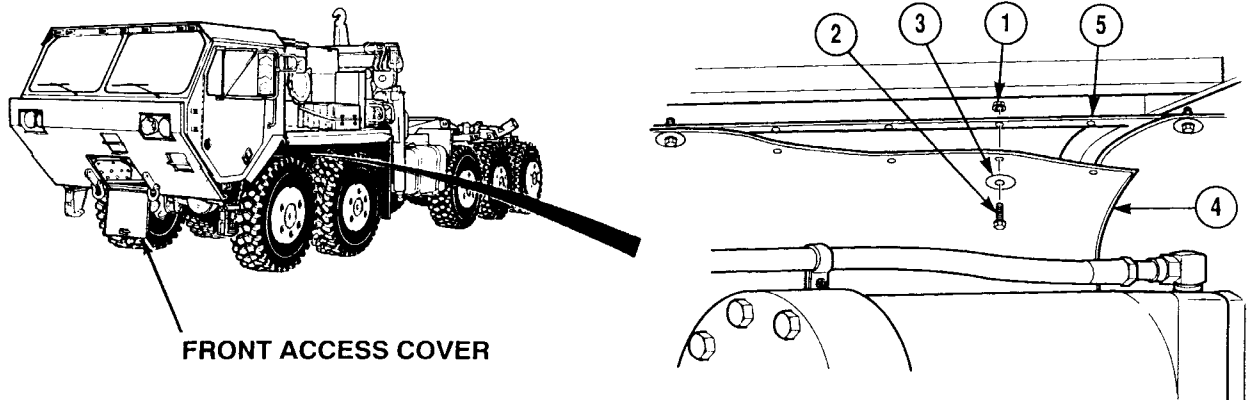


NOTE

Install intergear link in position as noted prior to removal.

- (1) With the aid of an assistant, install intergear link (9) on pitman arm (14) with screw (13), lockwasher (12) and nut (11). Tighten nut to 70 lb-ft (95 N·m).
- (2) Install intergear link (9) on intermediate steering gear arm (10) with screw (8), lockwasher (7) and nut (6). Tighten nut 70 lb-ft (95 N·m).





(3) Install fender skirt (4) on fender (5) with 12 washers (3), screws (2) and locknuts (1).

(4) Close front access cover.

f. Follow-On Maintenance:

- Remove wheel chocks, (TM 9-2320-364-10).

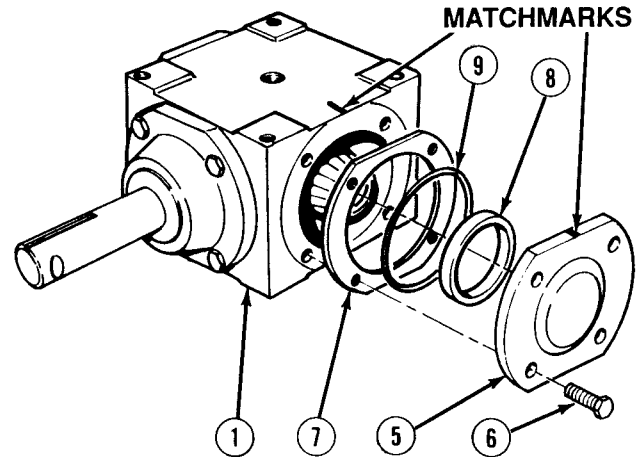
END OF TASK

- (5) Matchmark housing (1) and closed end cap (5).

NOTE

Note the number of gaskets removed during disassembly.

- (6) Remove four screws (6), closed end cap (5) and gasket (7) from housing (1). Discard gasket.
- (7) Remove bearing cup (8) and preformed packing (9) from closed end cap (5). Discard preformed packing.

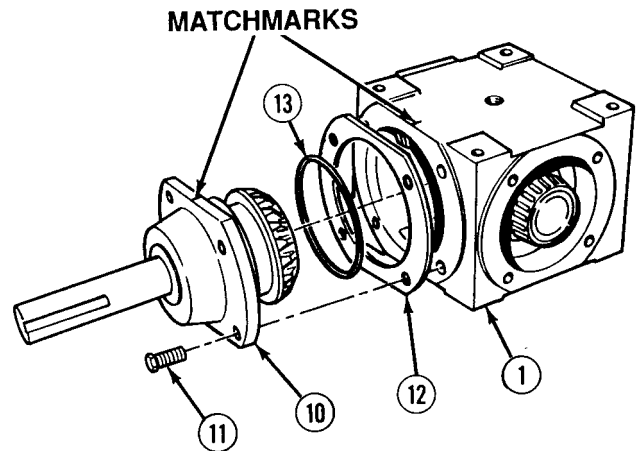


- (8) Matchmark housing (1) and pinion housing (10).

NOTE

Note the number of gaskets removed during disassembly.

- (9) Remove four screws (11), pinion housing (10) and gasket (12) from housing (1). Discard gasket.
- (10) Remove preformed packing (13) from pinion housing (10). Discard preformed packing.



12-5. 90 DEGREE GEARBOX REPAIR (CONT).

NOTE

Tag and mark pinion shaft and output shaft components during removal.

- (11) Remove locknut (15), bevel gear (16) and key (17) from pinion shaft (14). Discard locknut and key.

WARNING

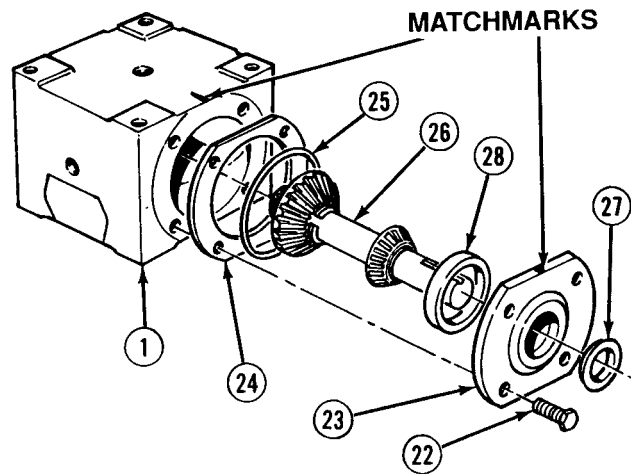
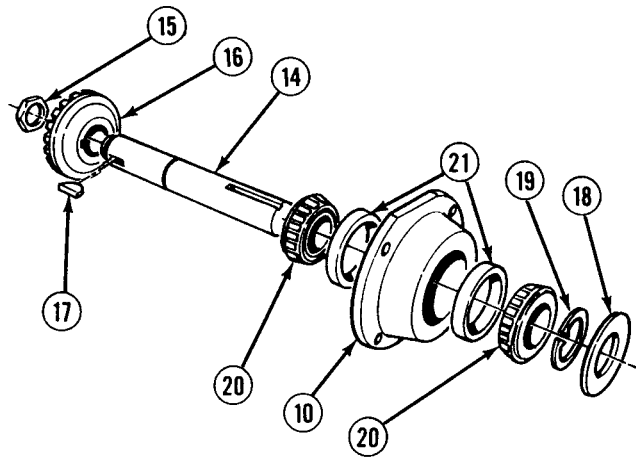
Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

- (12) Remove oil seal (18), retaining ring (19), cone bearing (20) and pinion housing (10) from pinion shaft (14). Discard oil seal and retaining ring.
- (13) Remove cone bearing (20) and bearing cups (21) from pinion housing (10).
- (14) Matchmark housing (1) and open end cap (23).

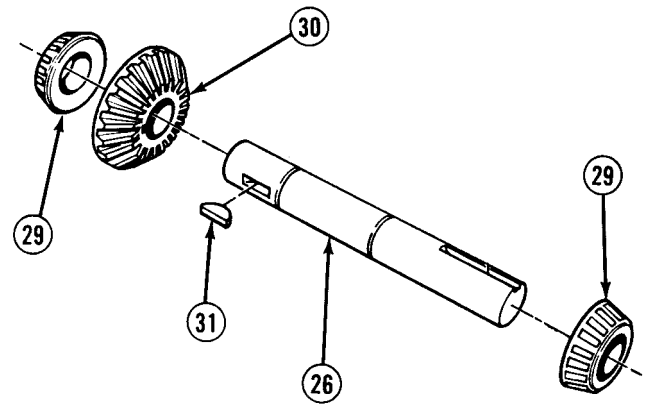
NOTE

Note the number of gaskets removed during disassembly.

- (15) Remove four screws (22), open end cap (23), gasket (24), preformed packing (25) and output shaft (26) from housing (1). Discard gasket and preformed packing.
- (16) Remove oil seal (27), bearing cup (28) and open end cap (23) from output shaft (26). Discard oil seal.



- (17) Remove two cone bearings (29), bevel gear (30) and key (31) from output shaft (26). Discard key.



b. Cleaning/Inspection.

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.
 - 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 excess grease and sealing compound residue from housing using drycleaning solvent and a cleaning cloth.
 - (2) Clean all parts in drycleaning solvent.
 - (3) Dry components with compressed air.
 - (4) Inspect all components with machined surfaces for scratches, cracks, gouges and stripped threads.
 - (5) Replace damaged components.

12-5. 90 DEGREE GEARBOX REPAIR (CONT).

c. Assembly.

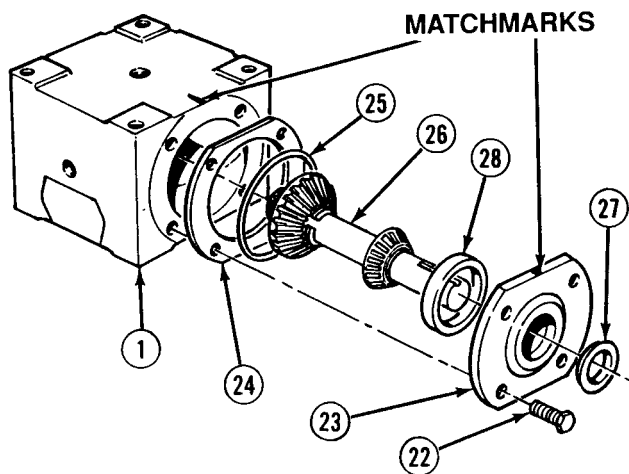
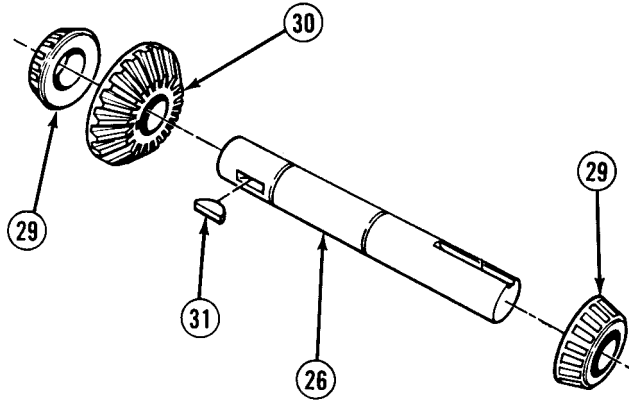
WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

NOTE

Align all matchmarks made during disassembly.

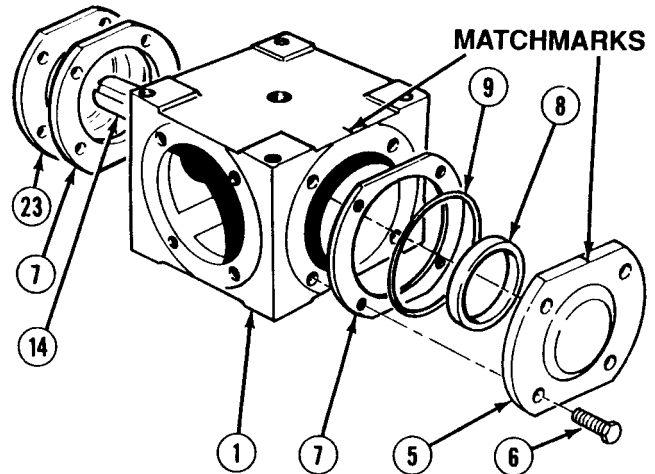
- (1) Pack two cone bearings (29) with grease.
- (2) Install key (31), bevel gear (30) and two cone bearings (29) on output shaft (26).
- (3) Install bearing cup (28) and oil seal (27) in open end cap (23).
- (4) Install open end cap (23) on output shaft (26).
- (5) Apply lubricating oil to preformed packing (25).
- (6) Install preformed packing (25), gasket (24), output shaft (26) and open end cap (23) in housing (1) with four screws (22).



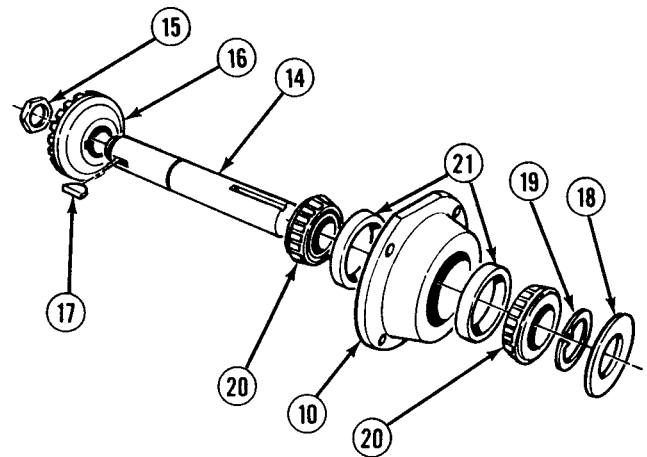
- (7) Apply lubricating oil to preformed packing (9).
- (8) Install preformed packing (9) and bearing cup (8) in closed end cap (5).
- (9) Install gasket (7) and closed end cap (5) in housing (1) with four screws (6).

NOTE

- When adjusting bearings, ensure the number of gaskets on each end does not differ by more than one.
- When making adjustments, install and remove screws in caps as necessary to get a proper adjustment.



- (10) Add and/or remove gaskets (7) from closed end cap (5) and open end cap (23) until output shaft (14) turns freely by hand.
- (11) Pack two cone bearings (20) with grease.
- (12) Position two bearing cups (21), cone bearings (20) in pinion housing (10).
- (13) Install pinion shaft (14) in pinion housing (10).



WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

- (14) Install retaining ring (19) and oil seal (18) on pinion housing (19).
- (15) Install key (17) and bevel gear (16) on pinion shaft (14).
- (16) Install crimped pinion nut (15) on pinion shaft (14). Back crimped pinion nut (15) off 1/4 turn and, using soft faced hammer, hit end of pinion shaft (14) sharply to seat bearings.

12-5. 90 DEGREE GEARBOX REPAIR (CONT).

- (17) Apply lubricating oil to preformed packing (13).
- (18) Install preformed packing (13) on pinion housing (10).

NOTE

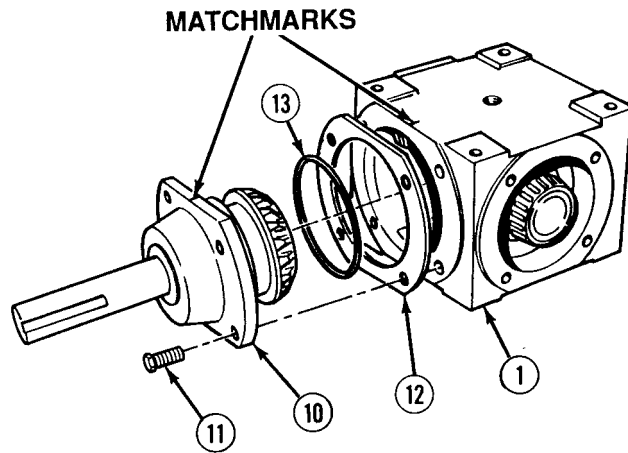
Ensure gear teeth mesh as components are assembled.

- (19) Install gasket (12) and pinion housing (10) on housing (1) with four screws (11).

NOTE

When making adjustments, install and remove screws in pinion housing as necessary to obtain a proper adjustment.

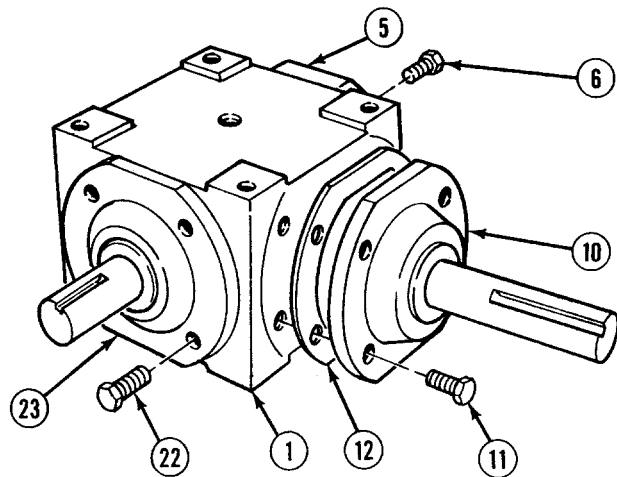
- (20) Add and/or remove gaskets (12) from pinion housing (10) until pinion shaft (14) rotates freely.



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.

- (21) Remove four screws (22) from open end cap (23) and apply sealing compound to threads.
- (22) Install four screws (22) in open end cap (23).
- (23) Remove four screws (6) from closed end cap (5) and apply sealing compound to threads.
- (24) Install four screws (6) in closed end cap (5).
- (25) Remove four screws (11), pinion housing (10) and gasket (12) from housing (1).



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.

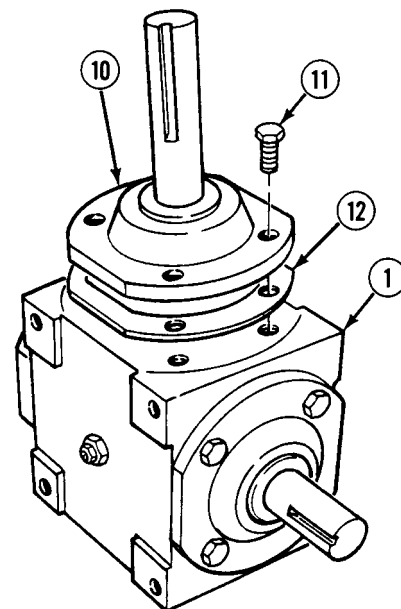
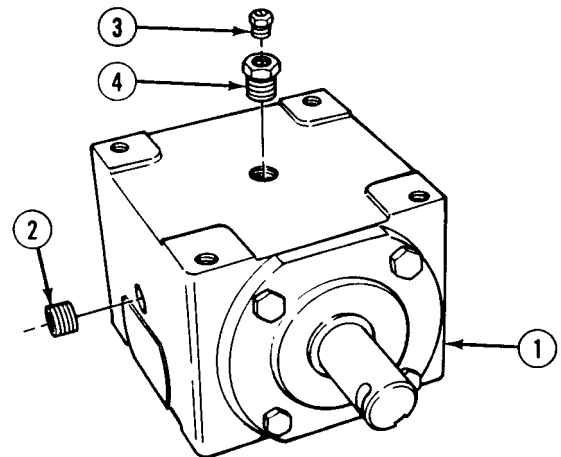
- (26) Coat threads of two plugs (2) and reducer bushing (4) with sealing compound.
- (27) Install two plugs (2) and reducer bushing (4) in housing (1).
- (28) Coat threads of vent (3) with sealing compound.
- (29) Install vent (3) in reducer bushing (4).

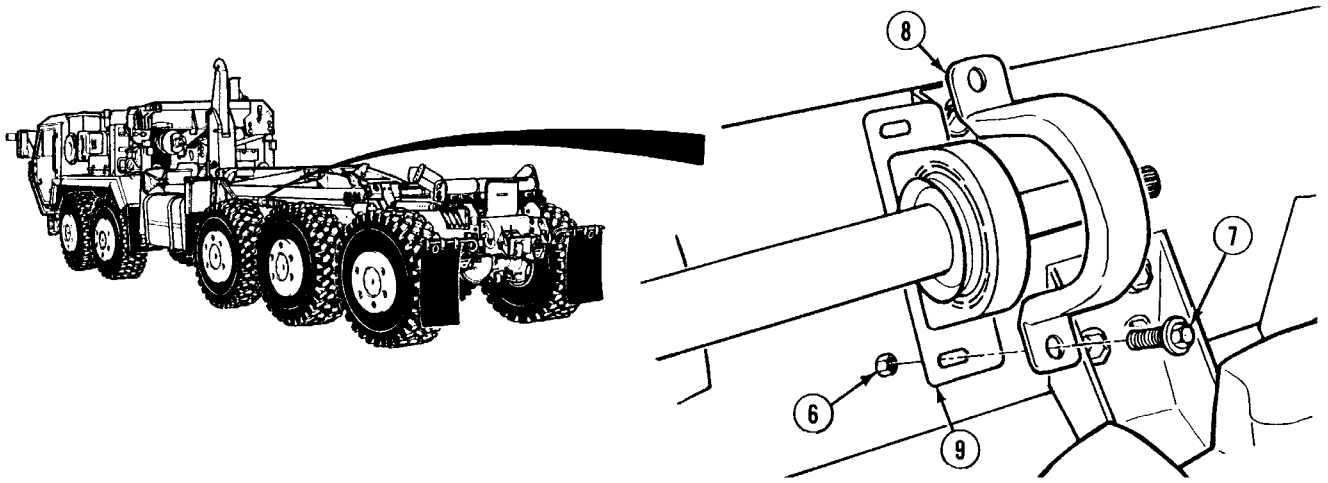
NOTE

Two-thirds is approximately 1/4 in. (6 mm) above output shaft.

- (30) Position housing (1) with pinion housing (10) hole facing up. Fill two-thirds full with grease.
- (31) Apply sealing compound to threads of four screws (11).
- (32) Install pinion housing (10) and gasket (12) on housing (1) with four screws (11).

END OF TASK





- (2) Remove two locknuts (6), screws (7) and center bearing bracket (8) from bracket (9). Discard locknuts.
- (3) Remove locknut (1), screw (2), steering shaft (10) and key (4) from gear reducer (5). Discard locknut and key.
- (4) Remove steering shaft (10) from truck (11).
- (5) Position drain pan under gear reducer (5).

NOTE

Save three screws and washers for gear reducer installation.

- (6) Remove three locknuts (12), screws (13), washers (14) and gear reducer (5) from frame (15). Discard locknuts.

NOTE

If bearing has nicks, burrs, scratches or dents, perform Step (7) to replace bearing.

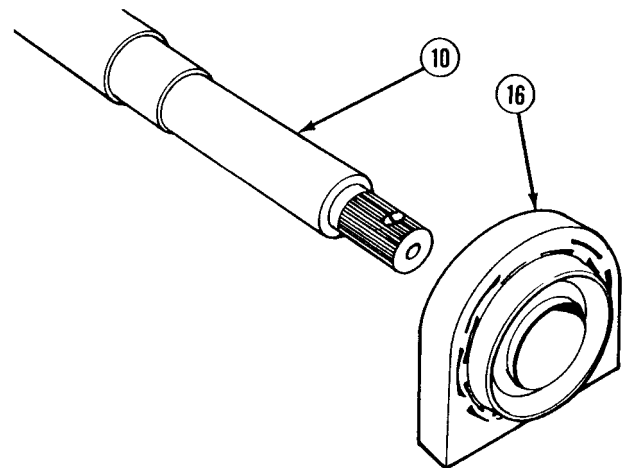
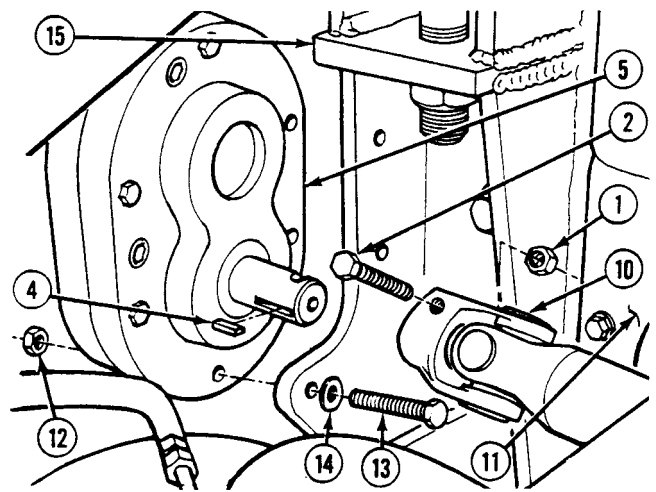
- (7) Remove center bearing (16) from steering shaft (10). Discard bearing.

b. Installation.

NOTE

If center bearing was removed, perform Step (1).

- (1) Install center bearing (16) on steering shaft (10).



12-6. 2.21:1 GEAR REDUCER AND INTER-STEERING SHAFT REPLACEMENT (CONT).

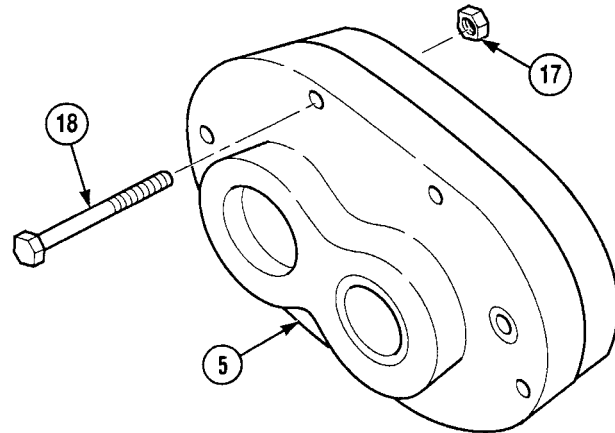
CAUTION

Steering gear reducer must be installed with output shaft facing to the rear of the truck.
Failure to comply may result in damage to equipment.

NOTE

- Output shaft turns one revolution for every 2.21 revolutions of input shaft.
- Output shaft housing side has three pipe plugs. Input Shaft housing side has one pipe plug.
- Remove two screws from frame side and one screw from bottom side of gear reducer.
- If installing a new gear reducer, perform Step (2).

- (2) Remove three nuts (17) and screws (18) from new gear reducer (5) and install in old gear reducer (5).

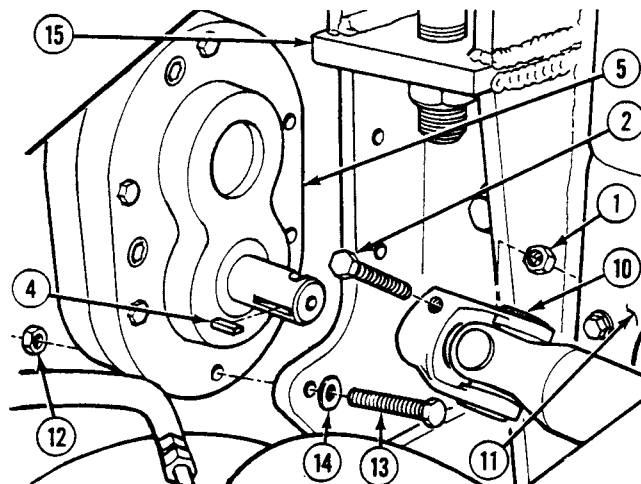


- (3) Install gear reducer (5) on frame (15) with three washers (14), screws (13) and locknuts (12).
- (4) Position key (4) in gear reducer (5).

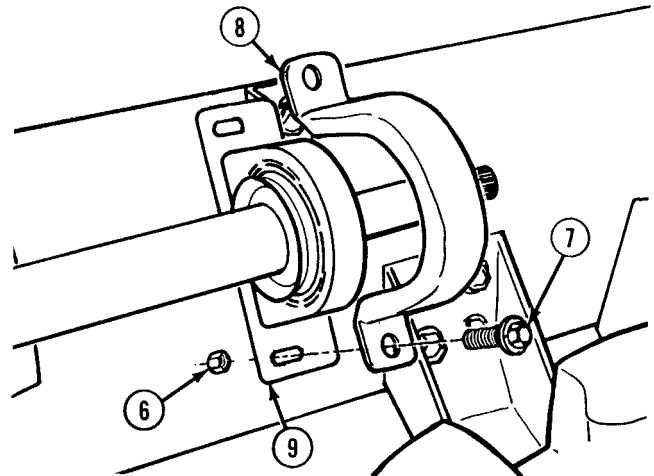
NOTE

Align key on gear reducer with slot in steering shaft yoke.

- (5) Position steering shaft (10) on truck (11) and gear reducer (5).
- (6) Install screw (2) and locknut (1) in steering shaft (10).



- (7) Install two screws (7), center bearing bracket (8) and locknuts (6) on bracket (9).

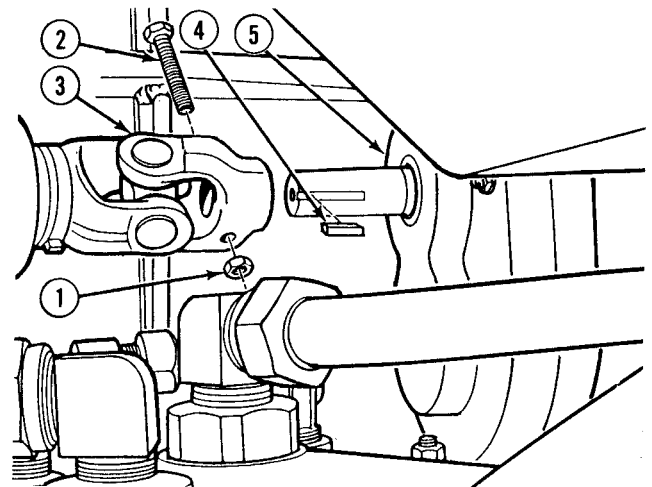


- (8) Position key (4) in gear reducer (5).

NOTE

Align key on gear reducer with slot in steering shaft yoke.

- (9) Position steering shaft (3) on gear reducer (5).
- (10) Install screw (2) and locknut (1) in steering shaft (3).



c. Follow-On Maintenance:

- Install Axle No. 5 steering shaft, (TM 9-2320-364-20).
- Lubricate steering shafts, (TM 9-2320-364-20).
- Fill gear reducer as required, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

12-7. INTER-STEERING SHAFT REPAIR.

This task covers:

- | | |
|------------------------|--------------------------|
| a. Disassembly | c. Assembly |
| b. Cleaning/Inspection | d. Follow-On Maintenance |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Compressor Unit Air (Item 35, Appendix F)
Gloves, Chemical Oil Protective
(Item 81, Appendix F)
Goggles, Industrial (Item 83, Appendix F)
Gun, Air Blow (Item 86, Appendix F)

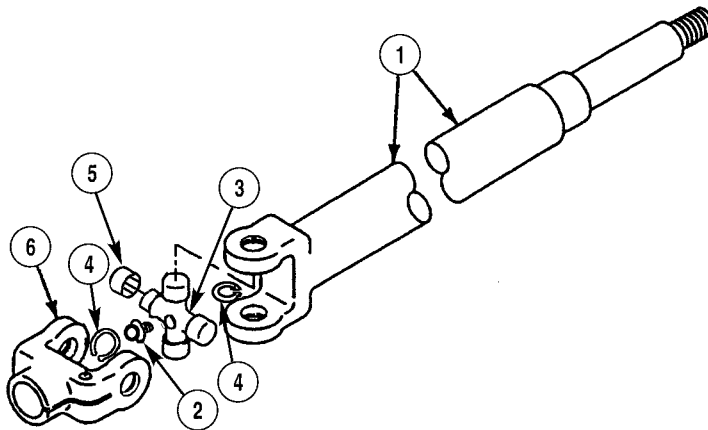
Materials/Parts

Solvent, Drycleaning (Item 68, Appendix B)
Cross and Bearing (Item 39, Appendix E)
Fitting, Lubrication (Item 51, Appendix E)

Equipment Condition

Inter-steering shaft removed, (Para 12-6)

a. *Disassembly.*

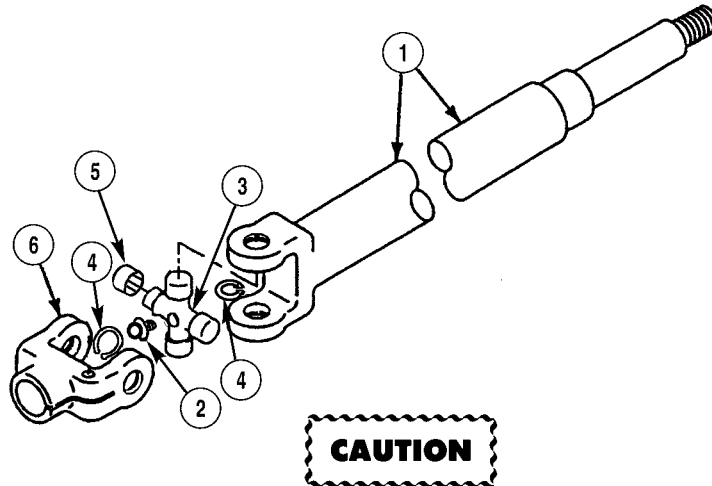


- (1) Position inter-steering shaft (1) on clean work surface.
- (2) Remove lube fitting (2) from cross and bearing assembly (3).

WARNING

Use care when removing retaining rings. Retaining rings are under spring tension and can act as projectiles when released causing injury to personnel.

- (3) Remove four retaining rings (4) from cross and bearing assembly (3).



CAUTION

Use caution when removing bearing assemblies. Needles in bearing assemblies may become lost or damaged.

- (4) Remove four bearing assemblies (5) from inter-steering shaft (1) and rod end clevis (6).
- (5) Remove rod end clevis (6) and cross and bearing assembly (3) from inter-steering shaft (1).

b. Cleaning/Inspection.

WARNING

- Drycleaning Solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a 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 II Drycleaning Solvent is 140 degrees F (60 degrees C) and Type III Drycleaning Solvent is 200 degrees F (93 degrees C). Failure to do so may result in 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.

- (1) Clean all metal parts with drycleaning solvent.

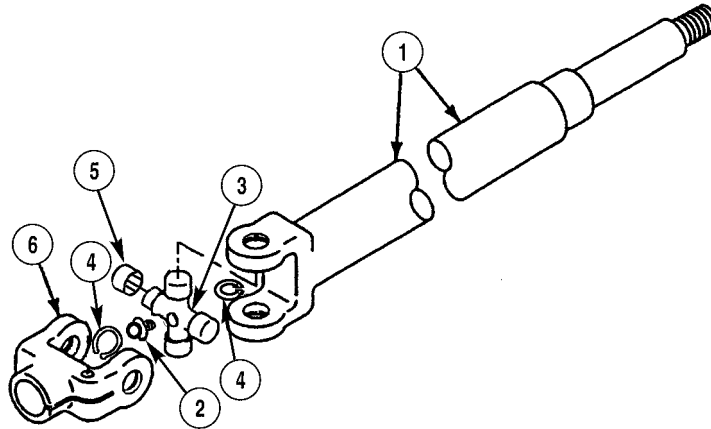
WARNING

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

- (2) Dry all parts with compressed air.
- (3) Inspect inter-steering shaft for cracks or dents.
- (4) Inspect universal joints for pitting and gouges.
- (5) Inspect bearing caps for cracks or missing needle bearings.
- (6) Inspect splines and dust cap for cracks.
- (7) Replace all damaged parts.

12-7. INTER-STEERING SHAFT REPAIR (CONT).

c. Assembly.



CAUTION

Use caution when removing bearing assemblies. Needles in bearing assemblies may become lost or damaged.

- (1) Position cross and bearing assembly (3) and rod end clevis (6) in inter-steering shaft (1).
- (2) Position four bearing assemblies (5) in rod end clevis (6) and inter-steering shaft (1).

WARNING

Use care when removing retaining rings. Retaining rings are under spring tension and can act as projectiles when released causing injury to personnel.

- (3) Install four retaining rings (4) in cross and bearing assembly (3).
- (4) Install lube fitting (2) in cross and bearing assembly (3).

d. Follow-On Maintenance:

- Install inter-steering shaft, (Para 12-6).
- Lubricate inter-steering shaft, (TM 9-2320-364-20).

END OF TASK

12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT.

This task covers:

- | | | |
|----------------------------------|----------------------------------------|-----------------------------------|
| a. Front Tandem Axle Alignment | d. Axle No. 1, 2 and 5 Wheel Alignment | f. Axle Steering Stops Adjustment |
| b. Axle No. 3, 4 and 5 Alignment | e. Drag Link Adjustment | g. Follow-On Maintenance |
| c. Pitman Arm Angle Adjustment | | |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's (Item 240, Appendix F)
- Box, Chalk, Reel and Line (Item 19, Appendix F)
- Jackstand (Item 132, Appendix F)
- Plumb Bob (Item 161, Appendix F)
- Protractor, Magnetic (Item 170, Appendix F)
- Socket Set, Deep Well (Item 205, Appendix F)
- Wrench, Torque (0-175 lb-ft [0-237 N·m]) (Item 277, Appendix F)
- Wrench, Torque (0-600 lb-ft [0-814 N·m]) (Item 278, Appendix F)
- Plate, Flat Steel, 1/8 by 1 by 8 in. (Appendix C)
- Plate, Flat Steel, 3/16 by 2 1/2 by 8 in. (Appendix C)

Personnel Required

Two

Equipment Condition

- All tires inflated to HIGHWAY SETTING, (TM 9-2320-364-10)
- Engine OFF, (TM 9-2320-364-10)
- Left side splash guard removed, (TM 9-2320-364-20-3)
- Steering reservoir filled, (TM 9-2320-364-20)
- Toe-in adjustment, (TM 9-2320-364-20)

Materials/Parts

- Chalk (Item 10, Appendix B)
- Locknut (Item 213, Appendix E)
- Lockwasher (4) (Item 249, Appendix E)

12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).

NOTE

Perform all of these tasks whenever suspension components or axles are replaced.

a. Front Tandem Axle Alignment.

- (1) Start engine.
- (2) Drive truck straight ahead on a hard, level surface, then back up 20 ft (6 m) and coast to a stop.
- (3) Shut OFF engine.

CAUTION

- Ensure that truck air pressure is at 125 psi (862 kPa) and valve to air bag is open.
- Suspension alignment must be performed with truck unloaded or alignment will not be accurate and could cause damage to equipment during operation.

NOTE

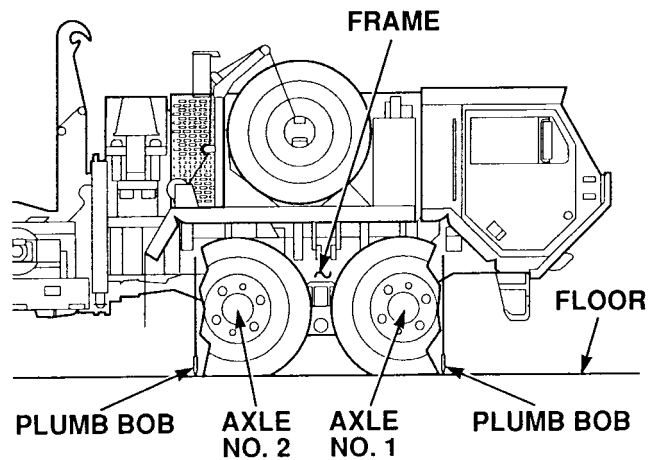
Do not apply parking brakes at this time.

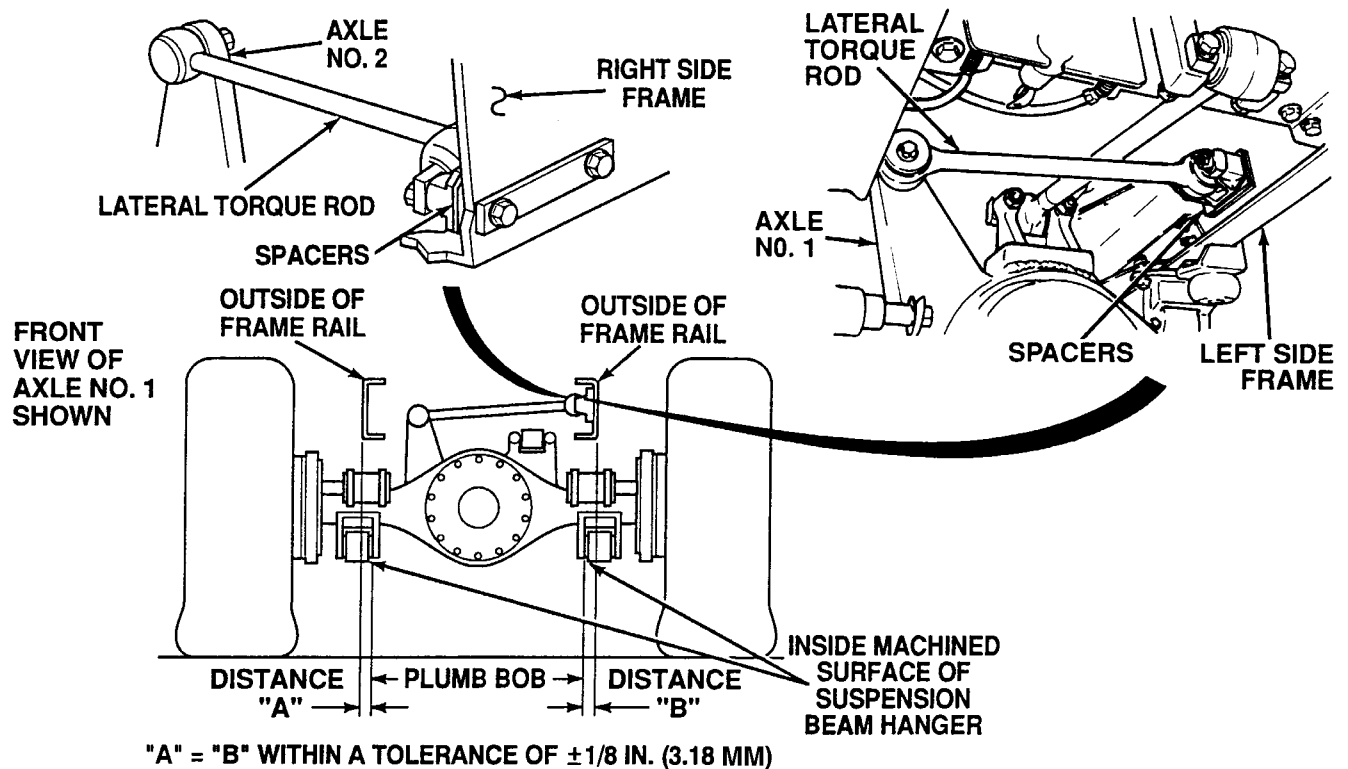
- (4) Chock rear tandem axle wheels.

NOTE

Distances should be measured from the outside of frame rail to the inside machined surface of suspension beam hanger.

- (5) With the aid of an assistant, at right front of Axle No. 1, hold plumb-bob from center of frame straight down to floor and scribe line on floor.
- (6) With the aid of an assistant, at right rear of Axle No. 2, hold plumb-bob from center of frame straight down to floor and scribe line on floor.
- (7) With the aid of an assistant, using a chalkline box, snap a line from Axle No. 1 scribe mark to Axle No. 2 scribe mark.





- (8) At right front of suspension beam hanger, hold plumb-bob from inside machined surface of suspension beam hanger straight down to floor and scribe mark on floor.
- (9) At right rear of suspension beam hanger, hold plumb-bob from inside machined surface of suspension beam hanger straight down to floor and scribe mark on floor.
- (10) Repeat Steps (5) through (9) for left side of front tandem axles and suspension beam hanger.
- (11) Distance A (left side) measurement should equal distance B (right side) measurement within a tolerance of $\pm 1/8$ in. (3.18 mm) for both Axles No. 1 and 2.
- (12) If distance between A and B is not equal within tolerances, add or subtract spacers on lateral torque rods, (Para 14-8).
- (13) If spacers are added or subtracted, it will be necessary to repeat Steps (1) through (12).

12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).

b. Axle No. 3, 4 and 5 Alignment.

- (1) Start engine.
- (2) Drive truck straight ahead on a hard, level surface, then back up 20 ft (6 m) and coast to a stop.
- (3) Shut OFF engine.

CAUTION

- Ensure that truck air pressure is at 125 psi (862 kPa) and valve to air bag is open.
- Suspension alignment must be performed with truck unloaded or alignment will not be accurate and could cause damage to equipment during operation.

NOTE

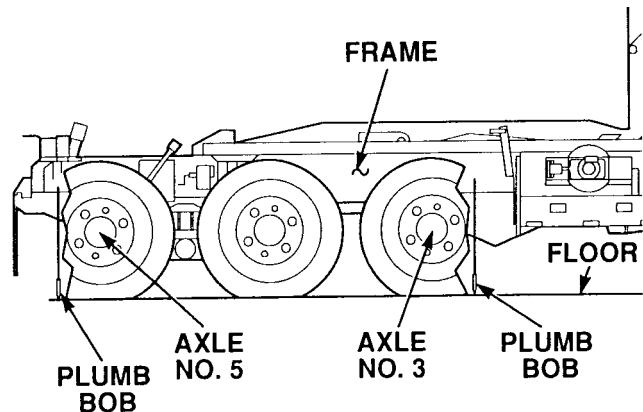
Do not apply parking brakes at this time.

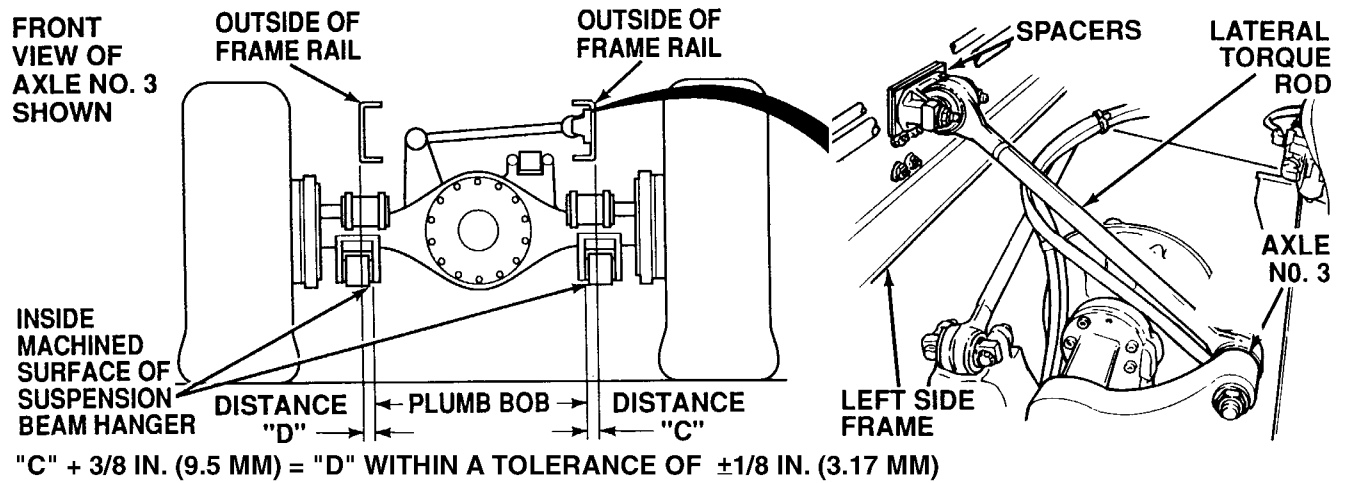
- (4) Chock front axle tandem wheels.

NOTE

Distances should be measured from the outside of frame rail to the inside machined surface of suspension beam hanger.

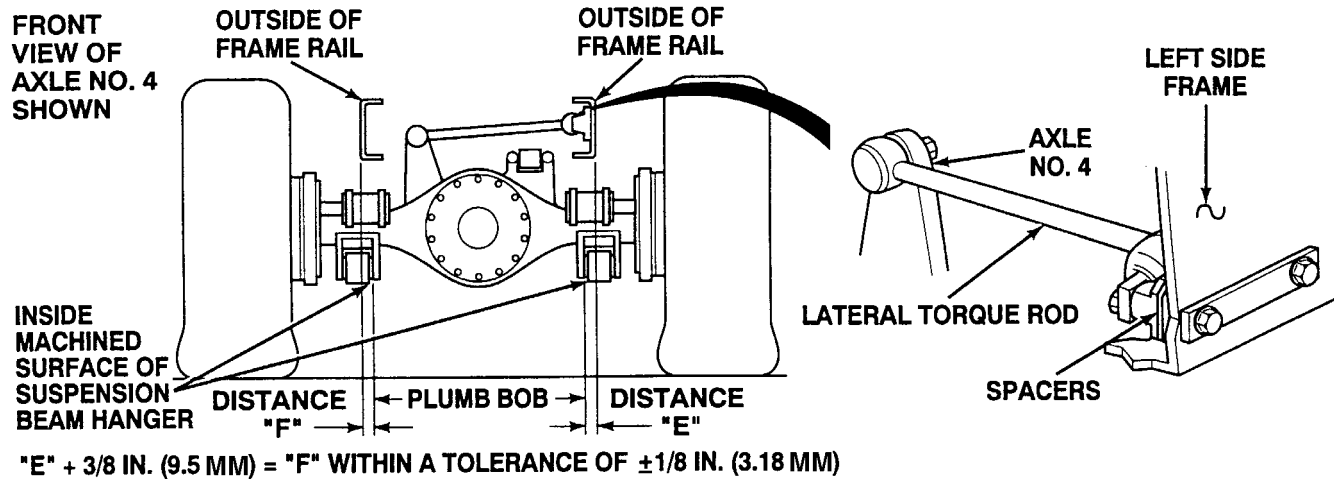
- (5) With the aid of an assistant, at right front of Axle No. 3, hold plumb-bob from center of frame straight down to floor and scribe line on floor.
- (6) With the aid of an assistant, at right rear of Axle No. 5, hold plumb-bob from center of frame straight down to floor and scribe line on floor.
- (7) With the aid of an assistant, using a chalkline box, snap a line from Axle No. 3 scribe mark to Axle No. 5 scribe mark.



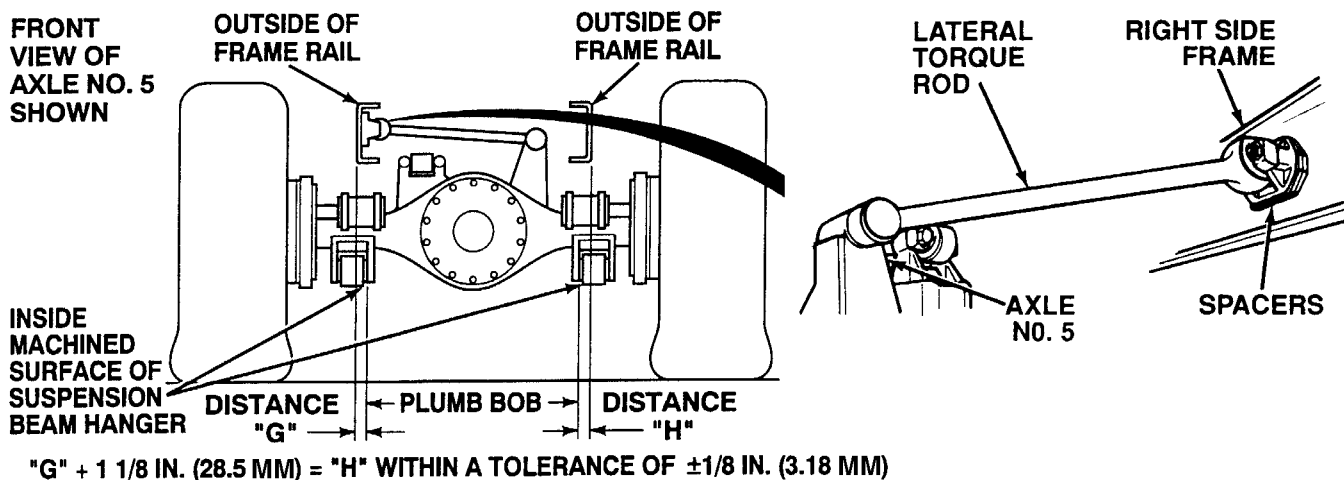


- (8) At right front of suspension beam hanger, hold plumb-bob from inside machined surface of suspension beam hanger straight down to floor and scribe mark on floor.
- (9) At right rear of suspension beam hanger, hold plumb-bob from inside machined surface of suspension beam hanger straight down to floor and scribe mark on floor.
- (10) Repeat Steps (5) through (9) for left side of Axle No. 3 and suspension beam hanger.
- (11) Distance C (left side) measurement plus 3/8 in. (9.5 mm) should equal the distance D (right side) measurement within a tolerance of ± 1/8 in. (3.18 mm) for Axle No. 3.
- (12) If distance between C and D is not equal within tolerances, add or subtract spacers on lateral torque rods, (Para 14-8).
- (13) If spacers are added or subtracted, it will be necessary to repeat Steps (1) through (12) to verify measurements.

12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).

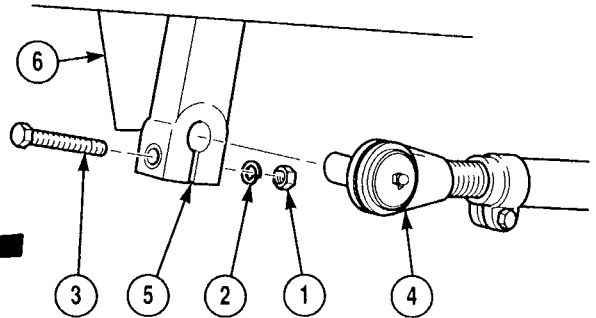
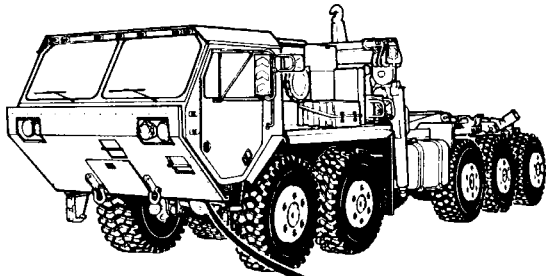


- (14) Repeat Steps (5) through (10) for Axle No. 4.
- (15) Distance E (left side) measurement plus 3/8 in. (9.5 mm) should equal distance F within a tolerance of ± 1/8 in. (3.18 mm) for Axle No. 4.
- (16) If distance between E and F is not equal within tolerances, add or subtract spacers on lateral torque rods, (Para 14-8).
- (17) If spacers are added or subtracted, it will be necessary to repeat Steps (14) through (16) to verify measurements.

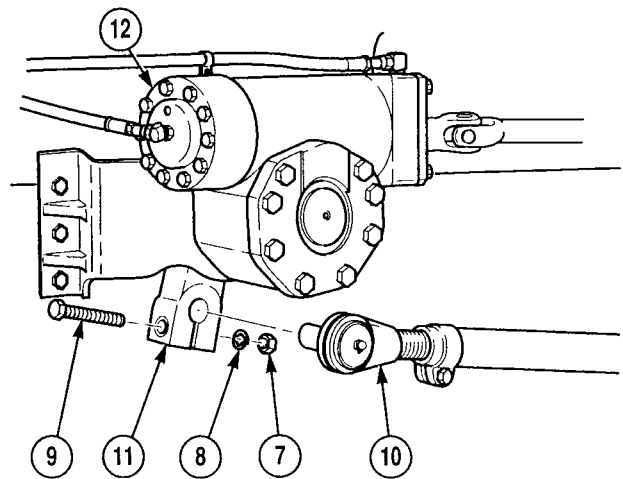
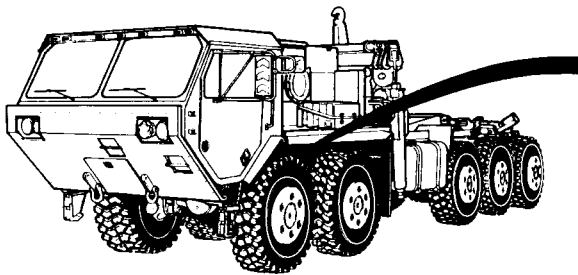


- (18) Repeat Steps (5) through (10) for Axle No. 5.
- (19) Distance G (left side) measurement plus 1 1/8 in. (28.5 mm) should equal distance H within a tolerance of ± 1/8 in. (3.18 mm) for Axle No. 5.
- (20) If distance between G and H is not equal within tolerances, add or subtract spacers on lateral torque rods, (Para 14-8).
- (21) If spacers are added or subtracted, it will be necessary to repeat Steps (18) through (20) to verify measurements.

c. Pitman Arm Angle Adjustment.



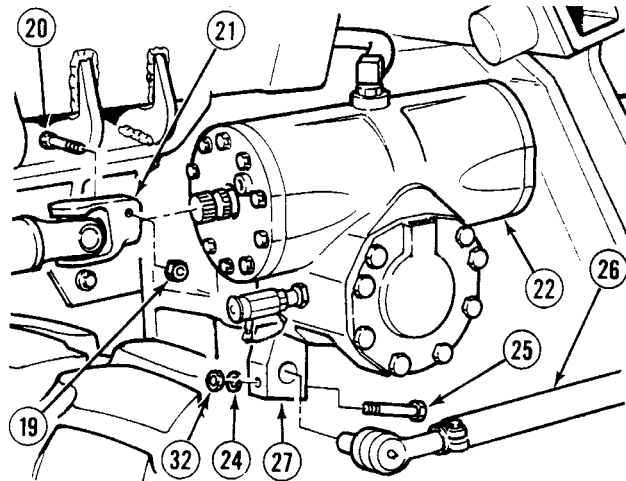
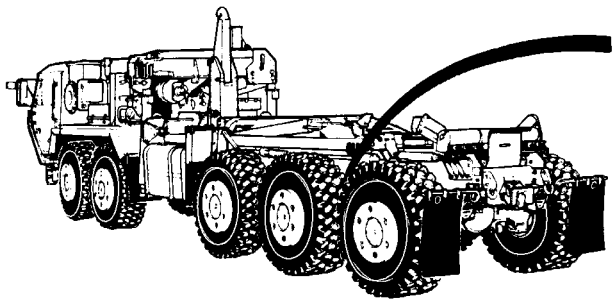
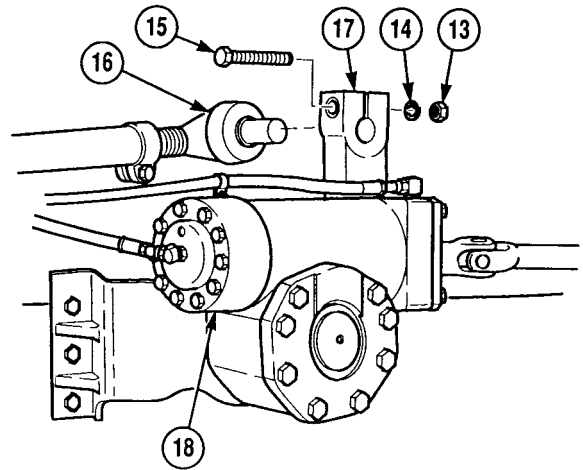
- (1) Remove nut (1), lockwasher (2), screw (3) and drag link (4) from pitman arm (5) on front steering gear (6). Discard lockwasher.



- (2) Remove nut (7), lockwasher (8), screw (9) and drag link (10) from pitman arm (11) on intermediate steering gear (12). Discard lockwasher.

12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).

- (3) Remove nut (13), lockwasher (14), screw (15) and intergear link (16) from pitman arm (17) on intermediate steering gear (18). Discard lockwasher.

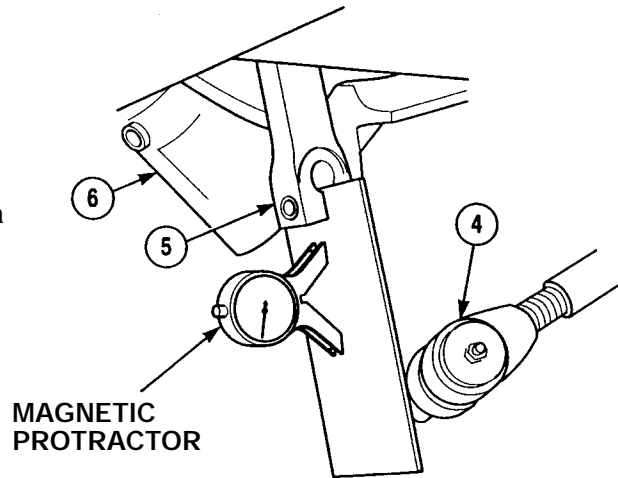


- (4) Remove locknut (19) and screw (20) from steering shaft yoke (21) on rear steering gear (22). Discard locknut.
- (5) Disconnect steering shaft yoke (21) from rear steering gear (22).
- (6) Remove nut (23), lockwasher (24), screw (25) and drag link (26) from pitman arm (27) on rear steering gear (22). Discard lockwasher.

NOTE

Pitman arm angles must be measured relative to frame.

- (7) Position a 3/16 by 2-1/2 by 8 in. flat steel plate between the end of No. 1 pitman arm (5) on front steering gear (6) and tap in place with hammer.
- (8) Position magnetic protractor on steel plate and adjust the angle of pitman arm (5) so that the pitman arm is pitched rearward three degrees \pm 0.5 degrees. Remove magnetic protractor and plate.
- (9) Repeat Steps (7) and (8) for the other two steering gears so that their pitman arms are pitched forward seven degrees \pm 0.5 degrees.
- (10) Remove chock blocks from front tandem axle.



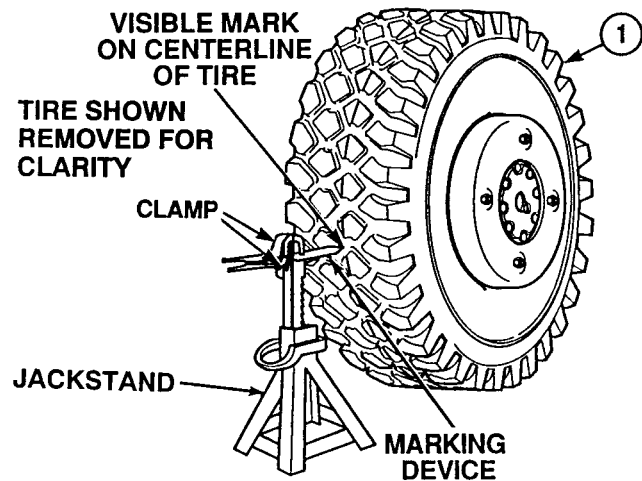
d. Axle No. 1, 2 and 5 Wheel Alignment.

- (1) Chock wheels on Axle No. 3.
- (2) Jack up Axles No. 1, 2 and 5 and position jackstands under each side of suspension beams.

NOTE

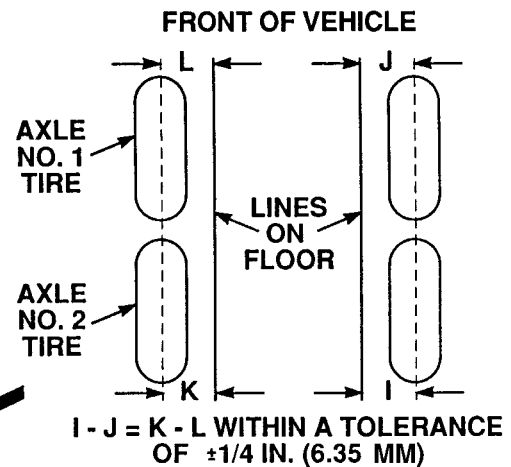
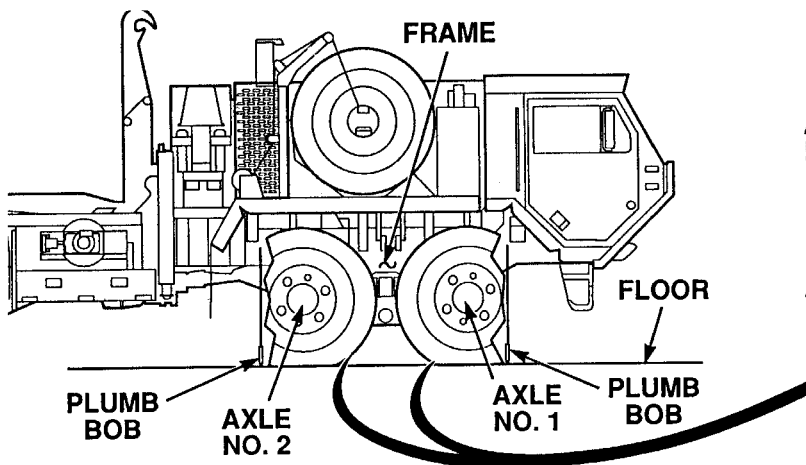
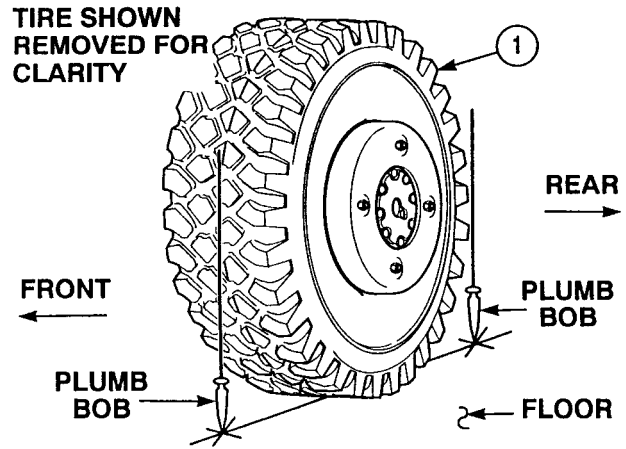
- A sharpened piece of steel stock will be used as a marking device and a jackstand will make the marking device stationary. Use a clamp to hold steel stock to jackstand. The marking device must be able to make a visible mark on the tire.
- A visible mark must be made as close to the centerline of the tire as possible.

- (3) With the aid of an assistant, spin tire (1) while holding steel stock in place at centerline of tire. Continue turning tire until a visible mark is made around entire diameter of tire.
- (4) Repeat Step (3) for right tire.



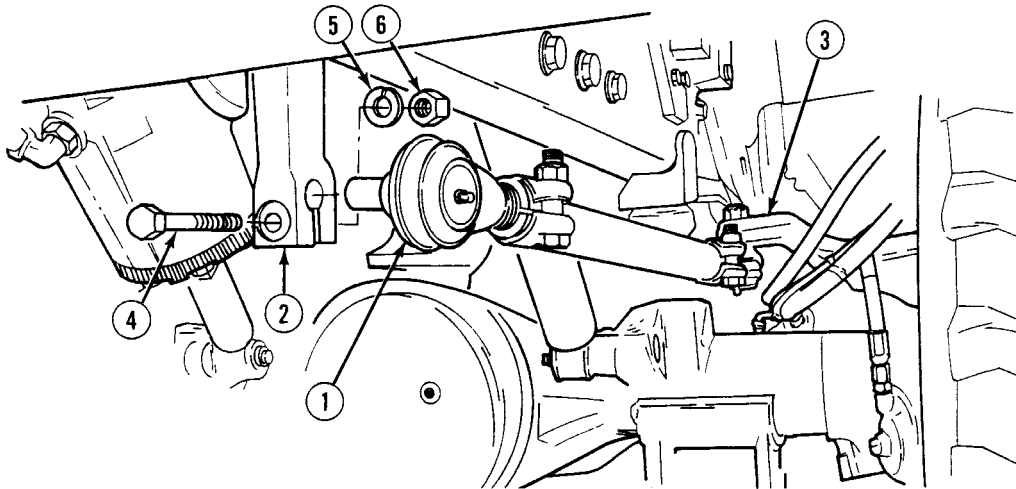
12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).

- (5) With the aid of an assistant, at front center of left tire (1), position plumb-bob on visible mark on centerline of tire and allow to hang to floor. Mark centerline on floor and repeat for rear of tire.
- (6) Repeat Step (5) for right tire.



- (7) With the aid of an assistant, at front right side of Axle No. 1, hold plumb-bob from center of frame straight down to floor and scribe mark on floor.
- (8) With the aid of an assistant, at rear right side of Axle No. 2, hold plumb-bob from center of frame straight down to floor and scribe mark on floor.
- (9) With the aid of an assistant, repeat Steps (7) and (8) for left side of Axles No. 1 and 2.
- (10) With the aid of an assistant, using a chalkline box, snap a line between two scribe marks made in Steps (7) through (9).
- (11) Measure distances I and J, and K and L.
- (12) Measurement I minus J should equal measurement K minus L within a tolerance of $\pm 1/4$ in. (6.35 mm).
- (13) Repeat Steps (3) through (12) for Axles No. 4 and 5.

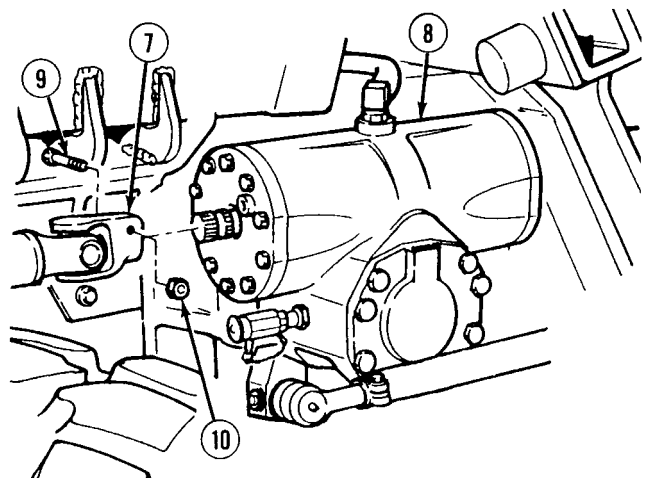
e. *Drag Link Adjustment.*



NOTE

- Ensure that angle of the pitman arms are properly adjusted and wheels are straight ahead prior to beginning this task.
- Steering adjustment will be incorrect if either the pitman arm or wheels are moved.

- (1) Adjust length of drag link (1) between pitman arm (2) and Axle No. 1 steering arm (3).
- (2) Position drag link (1) on pitman arm (2) with screw (4), lockwasher (5) and nut (6).
- (3) Recheck the angle of pitman arm (2), (Para 12-8c, Step (8)).
- (4) Repeat Steps (1) through (3) for Axles No. 2 and 5, then recheck wheel alignment, (Para 12-8d).
- (5) If pitman arm angles and wheel alignments are properly adjusted, connect steering shaft yoke (7) to rear steering gear (8) and install screw (9) and locknut (10). Tighten locknut to 35 lb-ft (47 N·m).
- (6) Tighten nut (6) on drag link (1) to 70 lb-ft (95 N·m).
- (7) Repeat Step (6) for intermediate and rear steering gears.



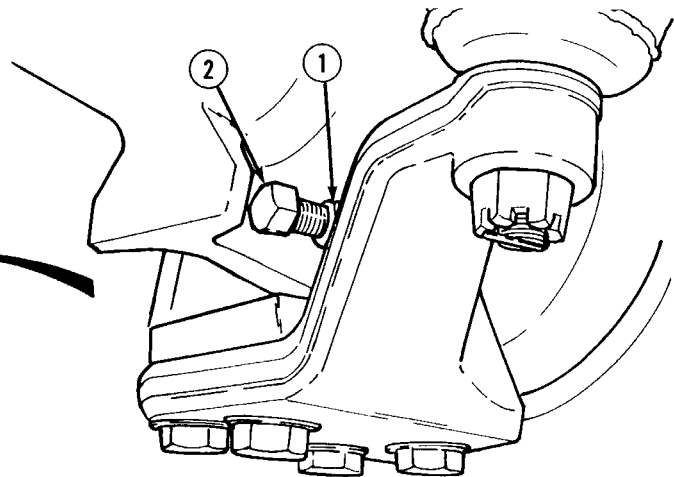
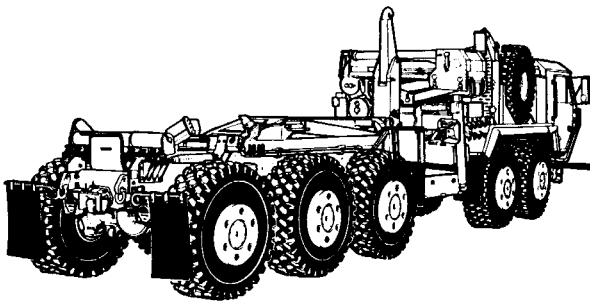
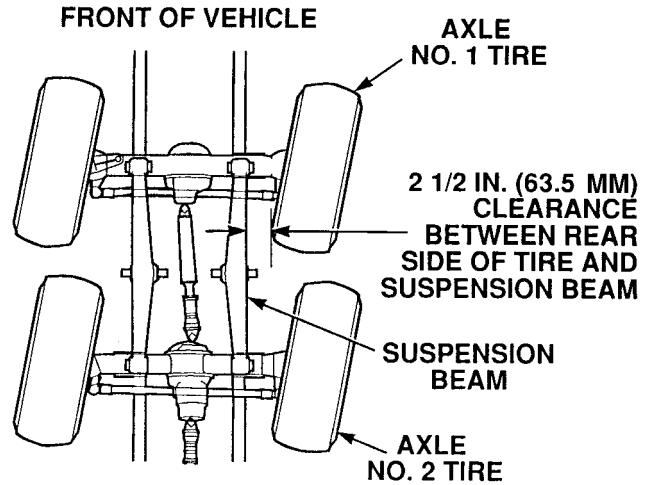
12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).

f. Axle Steering Stops Adjustment.

WARNING

Stand clear of tires while turning them. Failure to do so may result in injury or death to personnel.

- (1) With the aid of an assistant, start truck and turn the steering wheel to the right until the rear side of the right front tire is 2 1/2 in. (63.5 mm) away from the suspension beam.



NOTE

Axle steering stop arrangement for Axles No. 1 and 2 are the same.

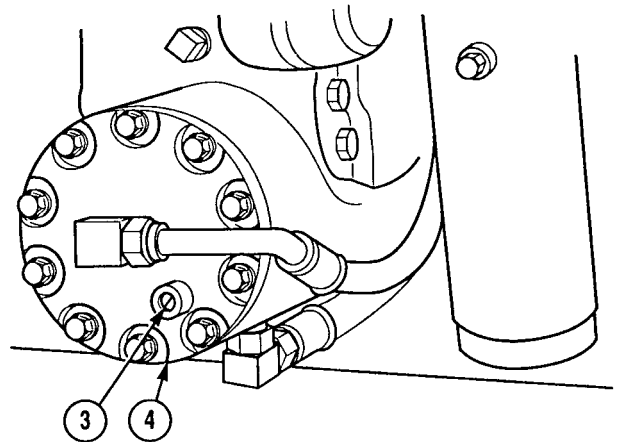
- (2) If 2 1/2 in. (63.5 mm) cannot be attained, loosen nut (1) and turn steering stop bolt (2) until it bottoms out.
- (3) Repeat Steps (1) and (2) for Axle No. 2.

WARNING

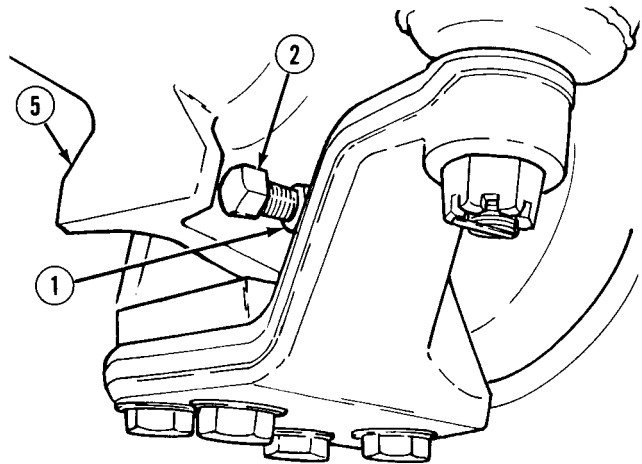
The steering hydraulic system operates at pressures up to 3,000 psi (20,685 kPa). Do not turn relief plunger out more than flush with end of steering gear cover. Plunger could blow out and spray hydraulic oil, causing serious injury to personnel.

NOTE

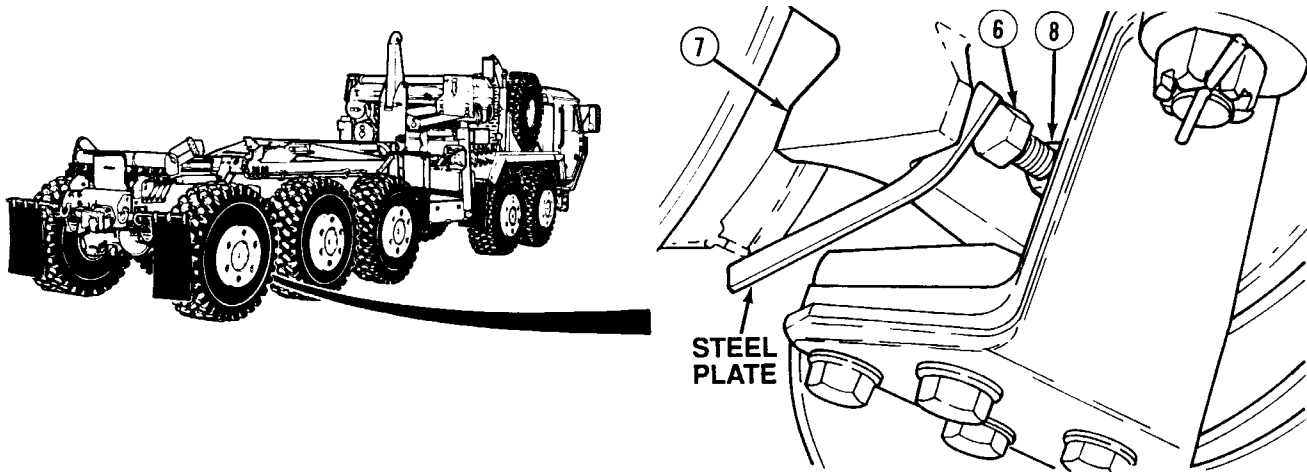
When relief plunger is adjusted it will be necessary to turn the tires straight forward, then return the tires to the original position.



- (4) If measurement still cannot be attained, adjust bottom relief plunger (3) on front steering gear (4) out until 2 1/2 in. (63.5 mm) can be attained.
- (5) Adjust steering stop bolt (2) and nut (1) on right side of Axles No. 1 and 2 until stop bolt touches the hub assembly (5).



12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).



- (6) Place a 1/8 by 1 by 8 in. steel plate between right Axle No. 5 steering stop bolt (6) and hub assembly (7).
- (7) Loosen nut (8).
- (8) Adjust steering stop bolt (6) and nut (8) so stop bolt touches the steel plate.
- (9) With the aid of an assistant, turn the steering wheel full left.

NOTE

It may be necessary to rotate jamnut right or left 1/2 flat to permit installation of deep well socket on nut.

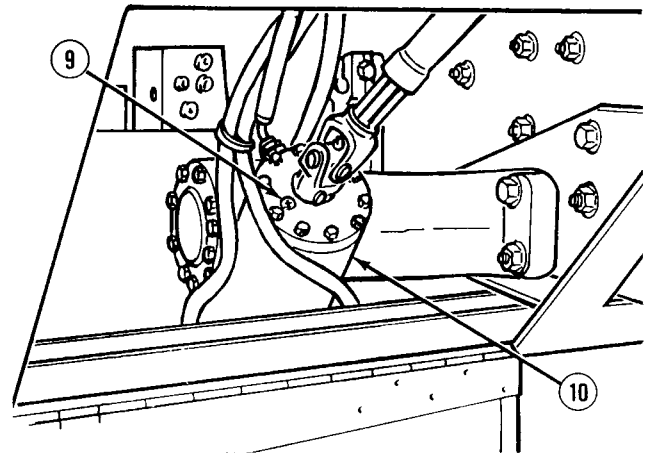
- (10) Tighten nuts (1) and (8) to 147 lb-ft (199 N·m).
- (11) With the aid of an assistant, turn the steering wheel to the left until the rear side of the left front tire is 2 1/2 in. (63.5 mm) away from the suspension beam.
- (12) If 2 1/2 in. (63.5 mm) cannot be attained, loosen nut (8) and turn steering stop bolt (6) until it bottoms out.
- (13) Repeat Steps (11) and (12) for Axle No. 2.

WARNING

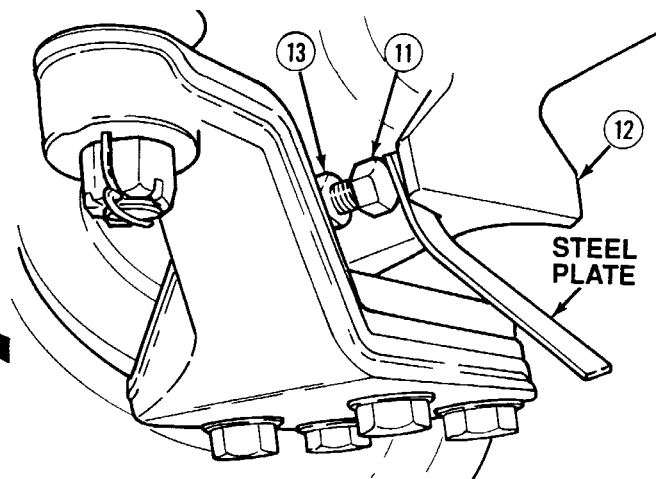
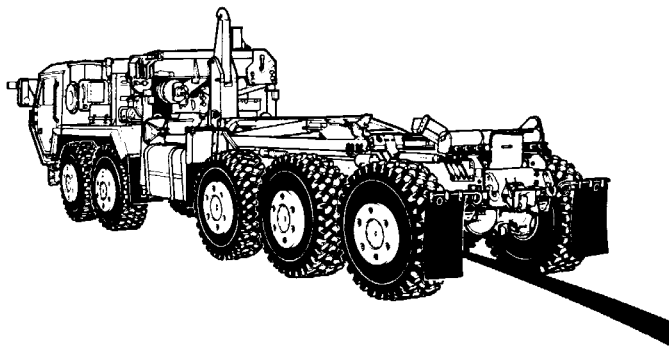
Do not turn relief plunger out more than flush with end of steering gear cover. Plunger could blow out and spray hydraulic oil, causing serious injury to personnel.

NOTE

When relief plunger is adjusted it will be necessary to turn the tires straight forward, then return the tires to the original position.



- (14) If measurement still cannot be attained, adjust top relief plunger (9) on front steering gear (10) until 2 1/2 in. (63.5 mm) can be attained.



- (15) Adjust steering stop bolt (11) and nut (13) on left side of Axles No. 1 and 2 until stop bolt touches the hub assembly (12).
- (16) Place a 1/8 by 1 by 8 in. steel plate between left Axle No. 5 steering stop bolt (11) and hub assembly (12).
- (17) Loosen nut (13).
- (18) Adjust steering stop bolt (11) and nut (13) so stop bolt touches the steel plate.
- (19) With the aid of an assistant, turn steering wheel full right.

NOTE

It may be necessary to rotate jamnut right or left 1/2 flat to permit installation of deep well socket on nut.

- (20) Tighten nuts (13) on left side of Axles No. 1, 2 and 5 to 147 lb-ft (199 N-m).
- (21) Turn tires straight forward and shut OFF engine.
- (22) Remove jackstands.

12-8. STEERING SYSTEM ALIGNMENT AND ADJUSTMENT (CONT).

g. Follow-On Maintenance:

- Adjust front steering gear internal relief pressure, (Para 12-2).
- Install left side splash guard, (TM 9-2320-364-20).
- Fill steering hydraulic reservoir, (TM 9-2320-364-20).
- Lubricate drag link, (TM 9-2320-364-20).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

12-9. FRONT STEERING GEAR AND PITMAN ARM REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
 (Item 240, Appendix F)
 Cap and Plug Set (Item 26, Appendix F)
 Jack, Transmission (Item 131, Appendix F)
 Pan, Drain 4 gal (Item 144, Appendix F)
 Puller Kit, Universal (Item 174, Appendix F)
 Socket, Socket Head Screw, 3/4 in.
 (Item 208, Appendix F)
 Vise, Pipe, Chain (Item 249, Appendix F)
 Wrench Set, Socket 3/4 in. Drive
 (Item 274, Appendix F)
 Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
 (Item 277, Appendix F)
 Wrench, Torque (0 to 600 lb-ft [0-814 N·m])
 (Item 278, Appendix F)
 Steel Disc (Appendix C)
 Wooden Block (Appendix C)
 Wooden Block (Appendix C)
 Wooden Block (Appendix C)
 Lifting Device, Minimum Capacity
 200 lbs (91 kg)

Materials/Parts

Cable Ties (Item 9, Appendix B)
 Compound, Antiseize (Item 14, Appendix B)
 Oil, Hydraulic (Item 34, Appendix B)
 Sealing Compound (Item 53, Appendix B)
 Tags, Identification (Item 72, Appendix B)
 Locknut (5) (Item 213, Appendix E)
 Lockwasher (2) (Item 249, Appendix E)
 Lockwasher (8) (Item 287, Appendix E)
 Packing, Preformed (3) (Item 337, Appendix E)
 Packing, Preformed (Item 389, Appendix E)
 Packing, Preformed (Item 390, Appendix E)
 Ring, Locking (Item 479, Appendix E)
 Ring, Retaining (Item 488, Appendix E)
 Screw (8) (Item 520, Appendix E)
 Spacer (Item 650, Appendix E)

Personnel Required

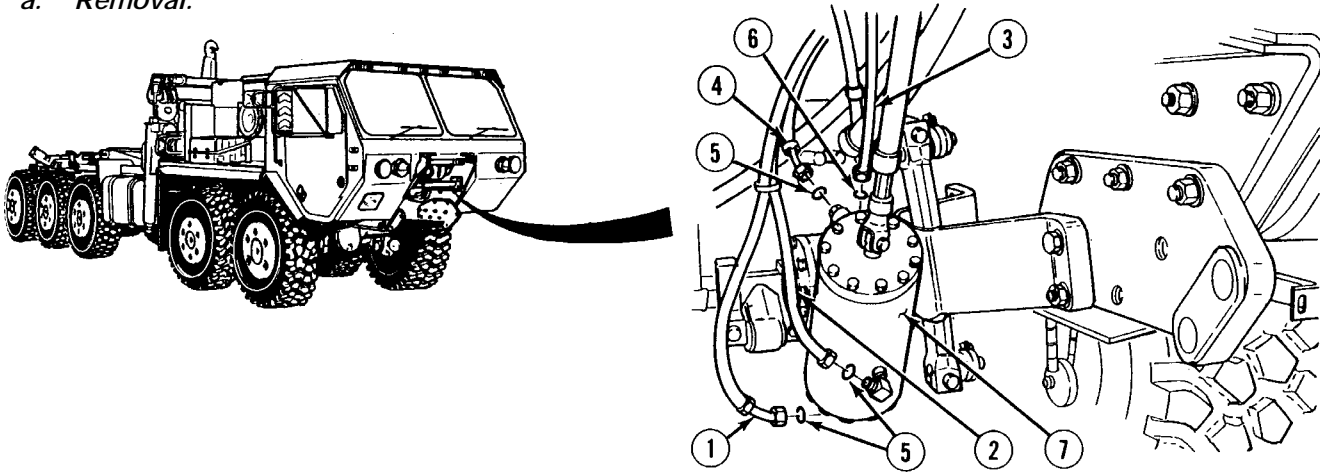
Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
 Wheels chocked, (TM 9-2320-364-10)
 Skid plate crossmember removed,
 (TM 9-2320-364-20)

12-9. FRONT STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

a. Removal.



NOTE

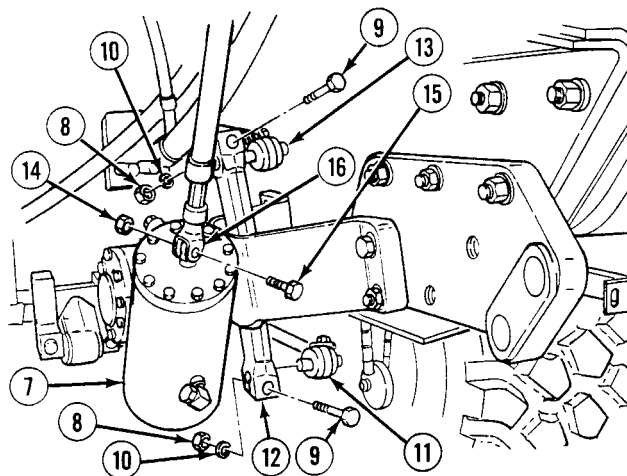
- Position drain pan under front steering gear.
- Remove cable ties as required.
- Cap all hoses and fittings after removal.
- Tag and mark all hoses and fittings prior to removal from forward steering gear.

- (1) Remove hose 2877 (1), hose 2301 (2), hose 2928 (3), hose 2878 (4) and preformed packings (5) and (6) from front steering gear (7). Discard preformed packings.
- (2) Remove nut (8), screw (9) and lockwasher (10) from drag link end (11). Discard lockwasher.

NOTE

If drag link end does not break loose from pitman arm, with the aid of an assistant, turn steering wheel until drag link end can be removed.

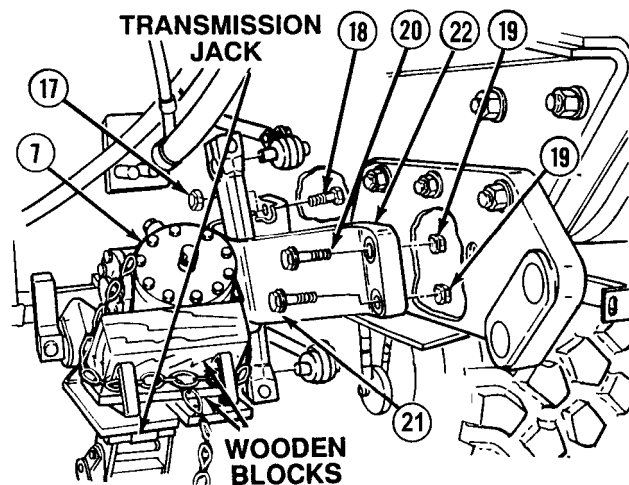
- (3) Remove front drag link end (11) from pitman arm (12).
- (4) Remove nut (8), screw (9) and lockwasher (10) from intergear link (13). Discard lockwasher.
- (5) Loosen intergear link end (13) from pitman arm (12).
- (6) Remove locknut (14), screw (15) and end yoke (16) from front steering gear (7). Discard locknut.



WARNING

- Steering gear weighs 190 lbs (86 kg). Ensure steering gear is properly supported upon removal from truck. Failure to comply may result in severe injury to personnel.
- Front steering gear needs to be supported on transmission jack with two wooden blocks located in front of front steering gear. Wooden blocks should be 4 by 6 by 11 in. and 2 by 4 by 11 in. and should be positioned as shown. Failure to comply may result in steering gear falling from transmission jack and causing injury to personnel.

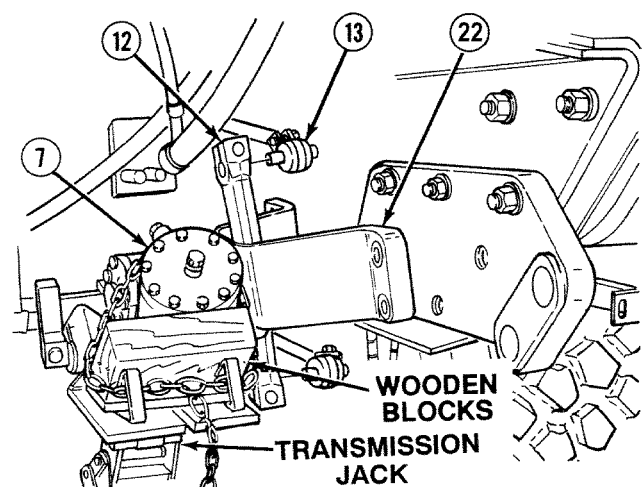
- (7) Position transmission jack and two wooden blocks under front steering gear (7).
- (8) Secure front steering gear (7) to transmission jack with chains.
- (9) With the aid of an assistant, remove two locknuts (17) and screws (18) from front steering gear (7). Discard locknuts.
- (10) With the aid of an assistant, remove two locknuts (19), screw (20) and screw (21) from bracket (22). Discard locknuts.



NOTE

Intergear link end is removed from pitman arm as forward steering gear is removed from truck.

- (11) With the aid of an assistant, remove front steering gear (7) and bracket (22) from frame and remove intergear link end (13) from pitman arm (12).
- (12) Lower jack to floor and remove chains from front steering gear (7).

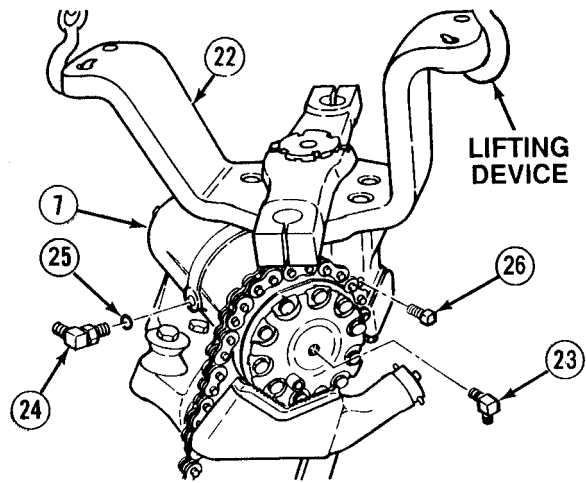


12-9. FRONT STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

WARNING

Steering gear weighs 190 lbs (86 kg). Attach lifting device prior to removal to prevent possible injury to personnel.

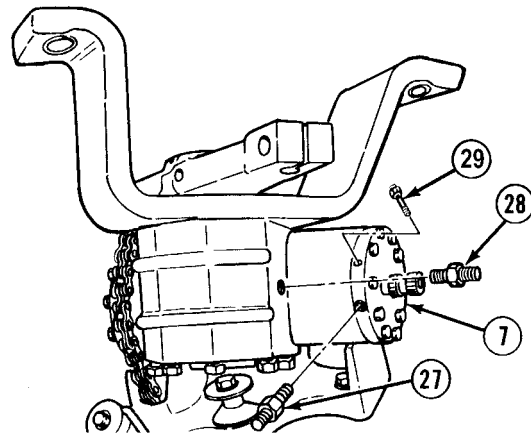
- (13) Attach lifting device to mounting bracket (22).
- (14) Position front steering gear (7) in chain vise.
- (15) Remove lifting device from mounting bracket (22).



NOTE

- Oil will drain from front steering gear upon removal of fittings. Cap and plug front steering gear immediately upon removal of all fittings and plugs.
- Note location and position of elbows and fittings prior to removal.

- (16) Remove elbows (23) and (24) and preformed packing (25) from front steering gear (7). Discard preformed packing.
- (17) Remove plug (26) from front steering gear (7).
- (18) Remove fittings (27) and (28) and grease fitting (29) from front steering gear (7).



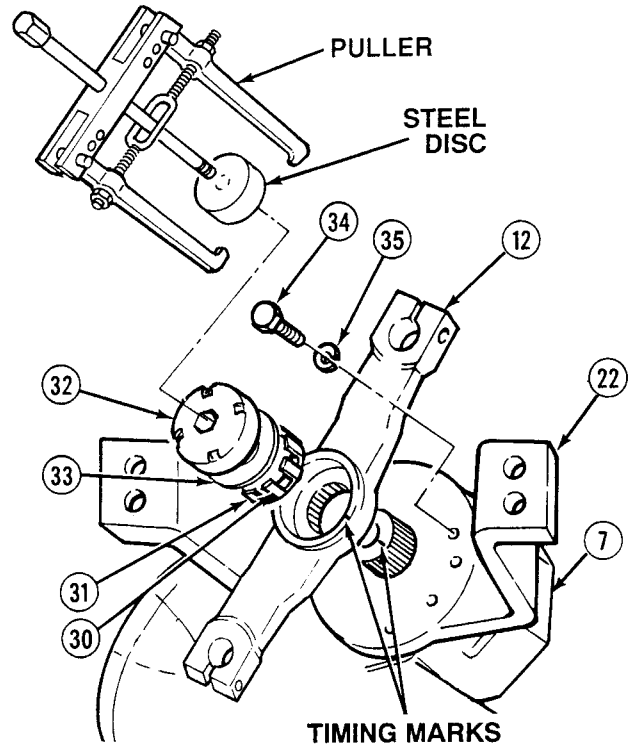
- (19) Bend up two locking tabs (30) on locking ring (31).
- (20) Remove and discard retainer (32), locking ring (31) and spacer (33) as an assembly from pitman arm (12).

WARNING

Pitman arm is under pressure. Parts can act as projectiles when released and could cause severe eye injury to personnel.

NOTE

Note location of two timing marks in pitman arm and on shaft.



- (21) Using puller and steel disc, remove pitman arm (12) from front steering gear (7).
- (22) Remove puller and steel disc from pitman arm (12).
- (23) Remove eight screws (34), lockwashers (35) and bracket (22) from front steering gear (7). Discard screws and lockwashers.
- (24) Attach lifting device to front steering gear (7) and remove from chain vise.
- (25) Remove lifting device from front steering gear (7).

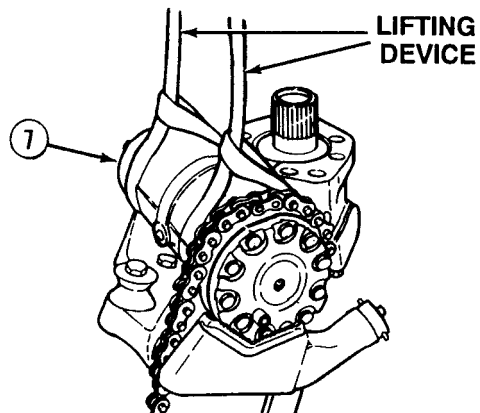
b. Installation.

WARNING

Steering gear weighs 190 lbs (86 kg). Attach lifting device prior to installation to prevent possible injury to personnel.

NOTE

Install cable ties as required.



- (1) Attach lifting device to front steering gear (7) and position in chain vise.

12-9. FRONT STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

- (2) Install bracket (22) on steering gear (7) with eight lockwashers (35) and screws (34). Tighten screws in sequence shown to 160 to 170 lb-ft (217 to 231 N·m).

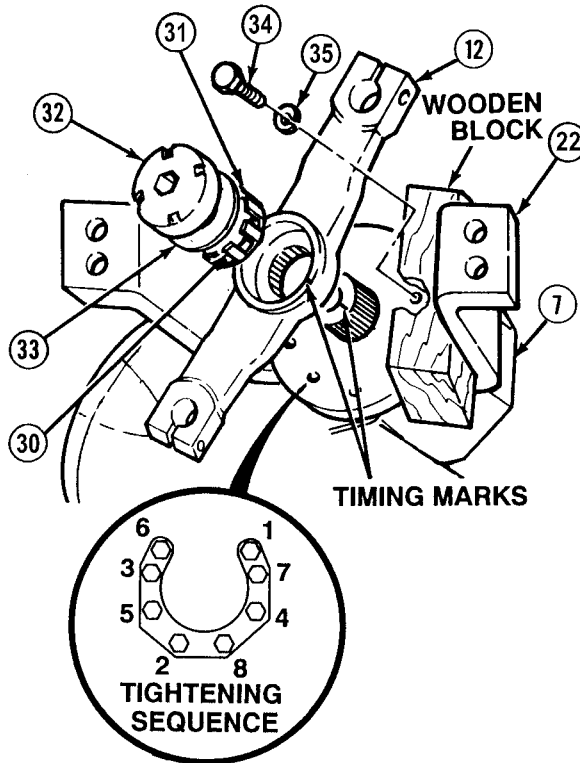
NOTE

Ensure timing marks are aligned as noted prior to removal.

- (3) Align timing marks and install pitman arm (12) on front steering gear (7).

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.



- (4) Coat retainer (32) with antiseize compound.
- (5) Position locking ring (31), spacer (33) and retainer (32) as one assembly on pitman arm (12).
- (6) Bend two opposing tabs (30) on locking ring (31) into grooves in pitman arm (12).

NOTE

Wooden block used in Step (7) should be 2 by 4 by 12 in.

- (7) Wedge wooden block between pitman arm (12) and bracket (22).
- (8) Tighten retainer (32) on pitman arm (12) to 450 lb-ft (610 N·m).
- (9) Bend two opposing tabs (30) on locking ring (29) down into next available slot on retainer (32).

NOTE

Retainer may have to be tightened slightly to align tabs with slots.

- (10) Remove wooden block from pitman arm (12) and bracket (22).

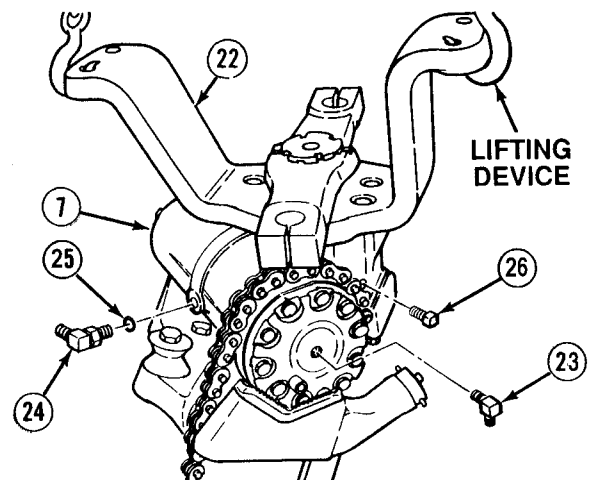
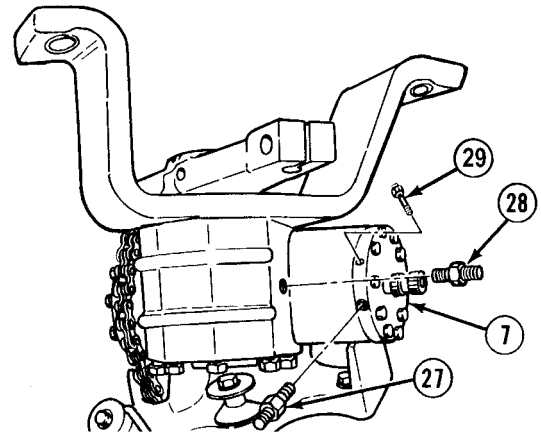
WARNING

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

Ensure elbows and fittings are installed as noted prior to removal.

- (11) Apply sealing compound to threads of grease fitting (29).
- (12) Install grease fitting (29) in front steering gear (7).
- (13) Apply sealing compound to threads of fittings (27) and (28).
- (14) Install fittings (27) and (28) in front steering gear (7).
- (15) Apply sealing compound to threads of plug (26).
- (16) Install plug (26) in front steering gear (7).
- (17) Apply sealing compound to threads of elbow (23).
- (18) Install elbow (23) in front steering gear (7).
- (19) Apply hydraulic oil to preformed packing (25) and install on elbow (24) in front steering gear (7).



WARNING

Steering gear weighs 190 lbs (86 kg). Attach lifting device prior to installation to prevent possible injury to personnel.

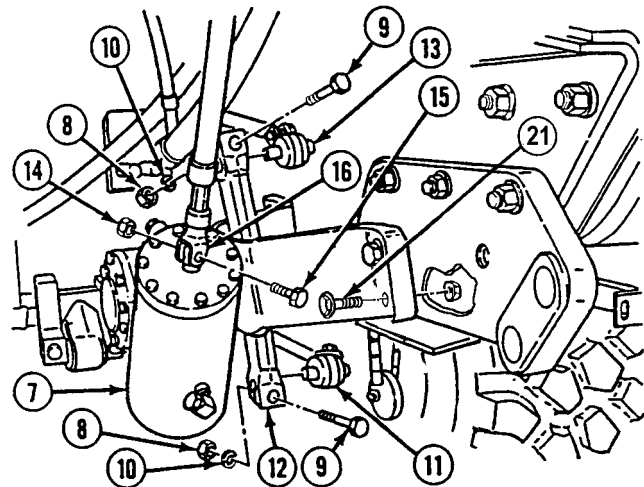
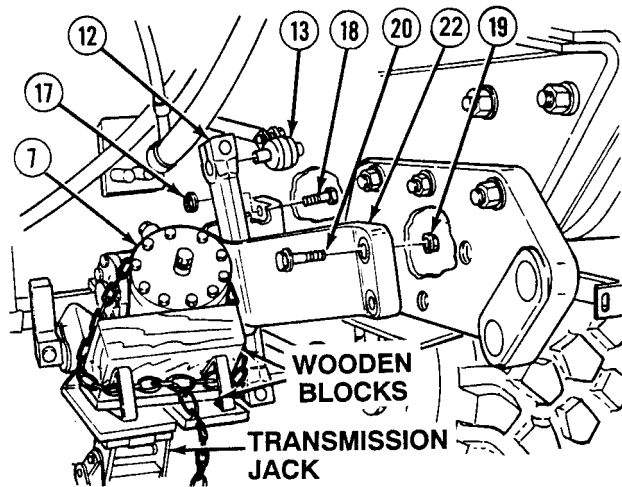
- (20) Attach lifting device to mounting bracket (22) and remove from chain vise.

12-9. FRONT STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

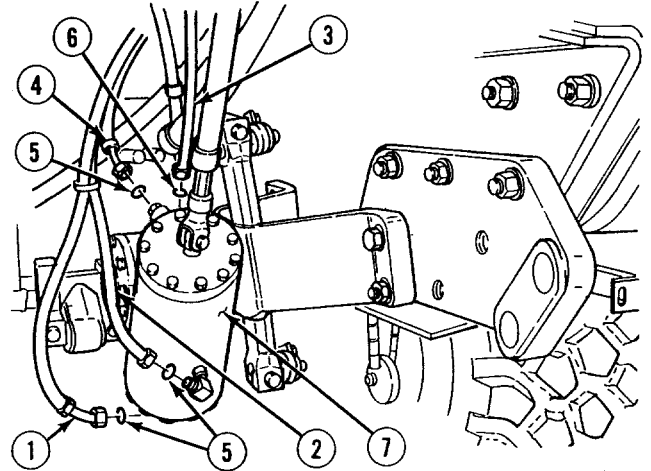
WARNING

Front steering gear needs to be supported on transmission jack with two wooden blocks located in front of front steering gear. Wooden blocks should be 4 by 6 by 11 in. and 2 by 4 by 11 in. and should be positioned as shown.

- (21) Position mounting bracket (22) on two wooden blocks and transmission jack.
- (22) Secure front steering gear (7) to transmission jack with chains.
- (23) Remove lifting device from mounting bracket (22).
- (24) With the aid of an assistant, raise transmission jack and position front steering gear (7) until screw holes are aligned in bracket (22).
- (25) With the aid of an assistant, position front drag link end (11) and intergear link end (13) in pitman arm (12).
- (26) With the aid of an assistant, install screws (18) and locknuts (17) in bracket (22).
- (27) With the aid of an assistant, install screw (21), screw (20) and nuts (19) in bracket (22).
- (28) Remove chains and two wooden blocks from forward steering gear (7) and transmission jack.
- (29) Install end yoke (16) on front steering gear (7) with screw (15) and locknut (14).
- (30) Install screw (9), lockwasher (10) and nut (8) in pitman arm (12) in intergear link end (13).
- (31) Install screw (9), lockwasher (10) and nut (8) in pitman arm (12) in drag link end (11).



- (32) Apply hydraulic oil to performed packing (5) and (6).
- (33) Install preformed packings (5) and (6) and hose 2877 (1), hose 2301 (2), hose 2928 (3) and hose 2878 (4).



c. Follow-On Maintenance:

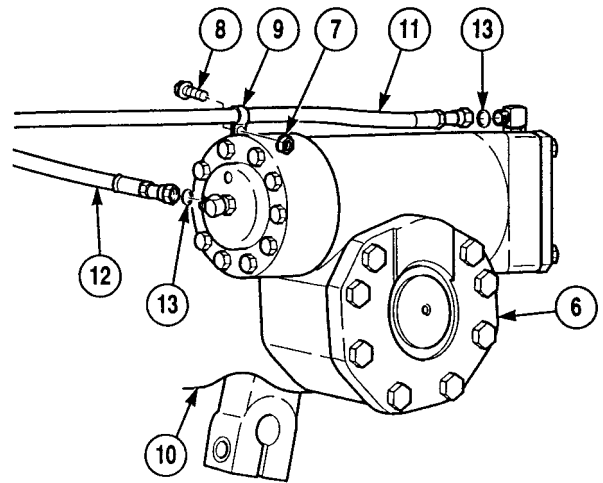
- Install skid plate crossmember, (TM 9-2320-364-20).
- Install skid plate structure, (TM 9-2320-364-20).
- Install skid plate, (TM 9-2320-364-20).
- Fill steering reservoir, (TM 9-2320-364-20).
- Lube steering gear, drag link and intergear link, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- Turn steering wheel back and forth three times.
- Shut off engine, (TM 9-2320-364-10).
- Check steering reservoir level, (TM 9-2320-364-20).
- Fill steering reservoir as required, (TM 9-2320-364-20).
- Perform steering adjustments, (Para 12-8).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

- (2) Remove locknut (7), screw (8) and cushion clip (9) from bracket (10). Discard locknut.

NOTE

- Position drain pan under front steering gear.
- Remove cable ties as required.
- Tag and mark hoses prior to removal.
- Cap hoses after removal.

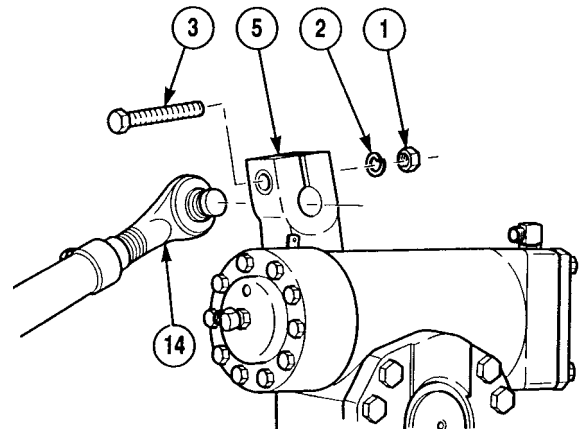


- (3) Remove hose 2878 (11), hose 2877 (12) and preformed packings (13) from steering gear (6). Discard preformed packings.

- (4) Remove nut (1), lockwasher (2), screw (3) and intergear link (14) from pitman arm (5). Discard lockwasher.

- (5) Tie end of intergear link (14) out of the way with cable ties.

- (6) Remove locknut (15), screw (16) and intergear steering shaft yoke (17) from steering gear (1). Discard locknut.



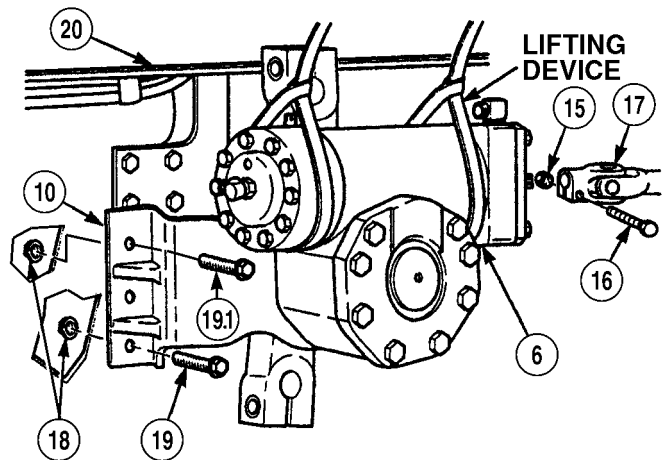
WARNING

Intermediate steering gear weighs 170 lbs (77 kg). Attach lifting device prior to removal to prevent injury to personnel.

- (7) Attach lifting device to steering gear (6) and bracket (10).

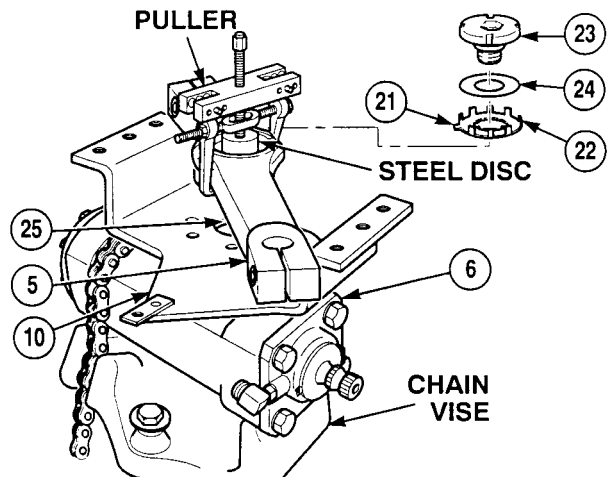
- (8) With the aid of an assistant, remove six locknuts (18), two screws (19), four screws (19.1), steering gear (6) and bracket (10) from frame (20). Discard locknuts.

- (9) Position steering gear (6) and bracket (10) in chain vise.



12-10. INTERMEDIATE STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

- (10) Remove lifting device from steering gear (6) and bracket (10).
- (11) Bend up two locking tabs (21) on locking ring (22).
- (12) Remove and discard retainer (23), locking ring (22) and spacer (24) from pitman arm (5).



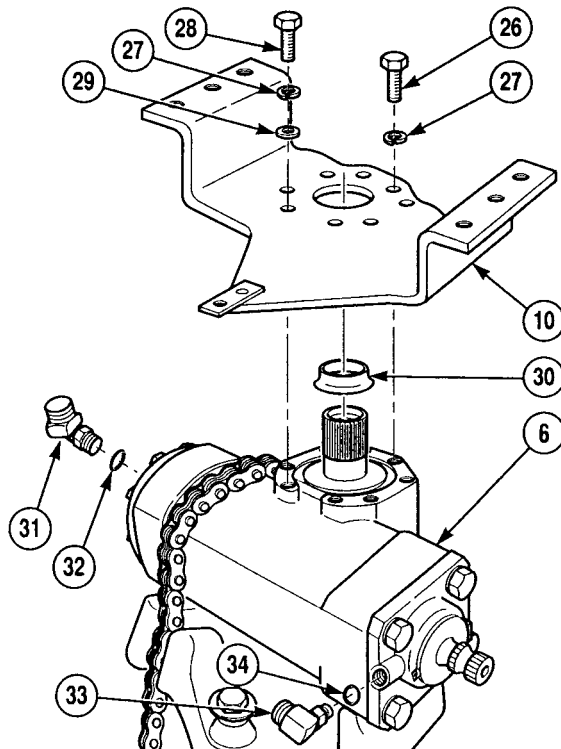
WARNING

Pitman arm is under pressure. Parts can act as projectiles when released and could cause severe eye injury.

NOTE

Note location of two timing marks in pitman arm.

- (13) Using puller and steel disc, remove pitman arm (5) from shaft (25).
- (14) Remove puller and steel disc from pitman arm (5).
- (15) Remove six screws (26) and lockwashers (27) from bracket (10). Discard lockwashers.
- (16) Remove two screws (28), lockwashers (27) and washers (29) from bracket (10). Discard lockwashers.
- (17) Remove bracket (10) and rubber boot (30) from steering gear (6).



NOTE

- Cap and plug holes in steering gear after removal of elbows.
- Note location and position of elbows.

- (18) Remove elbow (31) and preformed packing (32) from steering gear (6). Discard preformed packing.
- (19) Remove elbow (33) and preformed packing (34) from steering gear (6). Discard preformed packing.

WARNING

Intermediate steering gear weighs 170 lbs (77 kg). Attach lifting device prior to moving steering gear to prevent injury to personnel.

- (20) Attach lifting device to steering gear (6).
- (21) Remove steering gear (6) from chain vise.
- (22) Remove lifting device from steering gear (6).

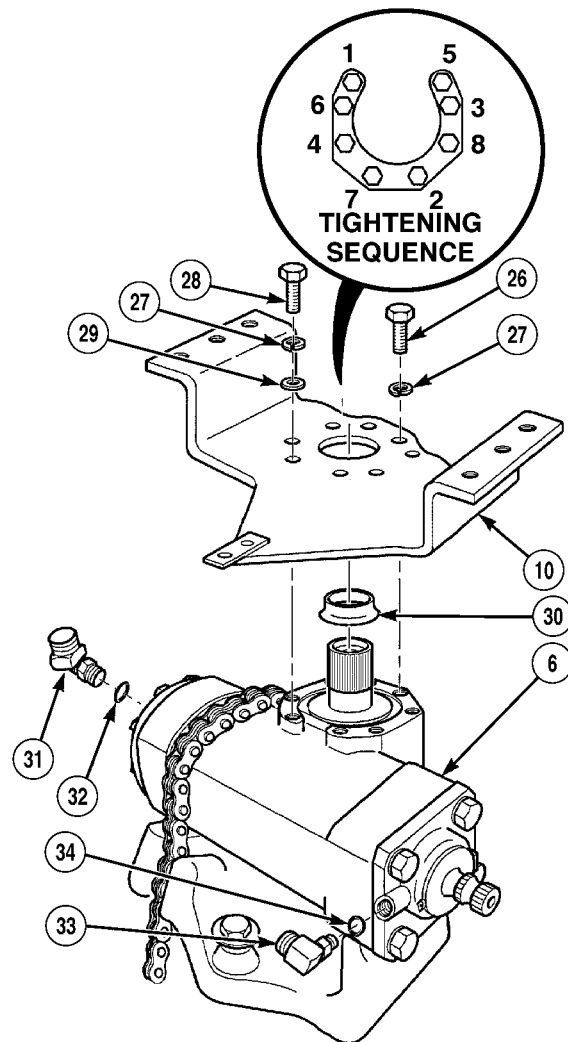
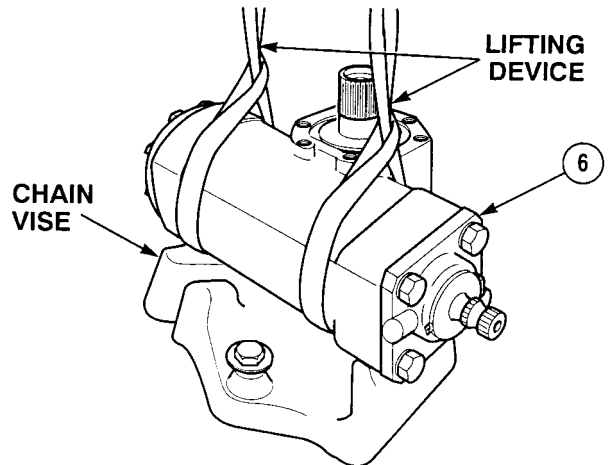
b. Installation.

- (1) Attach lifting device to steering gear (6).
- (2) Position steering gear (6) in chain vise.
- (3) Remove lifting device from steering gear (6).

NOTE

- Install cable ties as required
- Install elbows as noted prior to removal.

- (4) Apply hydraulic oil to preformed packing (34).
- (5) Install preformed packing (34) on elbow (33).
- (6) Install elbow (33) in steering gear (6).
- (7) Apply hydraulic oil to preformed packing (32).
- (8) Install preformed packing (32) on elbow (31).
- (9) Install elbow (31) in steering gear (6).
- (10) Position rubber boot (30) on steering gear (6).
- (11) Position bracket (10) on steering gear (6) with six lockwashers (27) and screws (26).
- (12) Position two washers (29), lockwashers (27) and screws (28) in bracket (10).
- (13) Tighten screws (26) and (28) in sequence shown to 153 to 187 lb-ft (207 to 254 N·m).
- (14) Recheck torque on screws (26) and (28).



12-10. INTERMEDIATE STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

NOTE

Ensure timing marks are aligned as noted prior to removal.

- (15) Align timing marks and install pitman arm (5) on shaft (25).

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.

- (16) Coat retainer (23) with antiseize compound.
- (17) Position locking ring (22), spacer (24) and retainer (23) as one assembly on pitman arm (5).
- (18) Bend two opposing tabs (21) on locking ring (22) into pitman arm (5).

NOTE

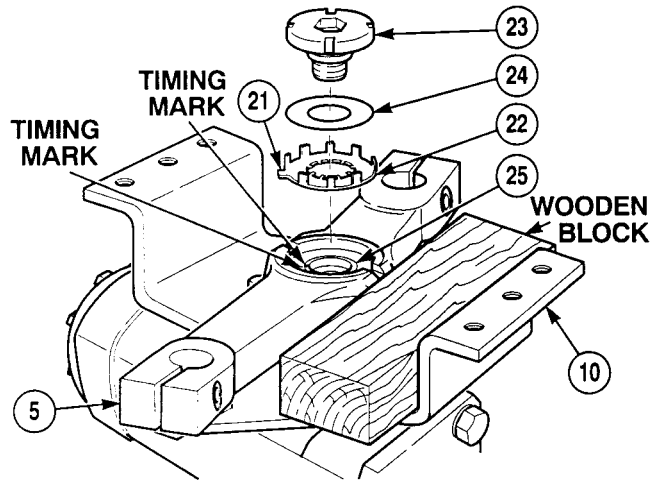
Wooden block used in Step (19) should be 2 by 4 by 12 in.

- (19) Wedge wooden block between pitman arm (5) and bracket (10).
- (20) Tighten retainer (23) to 450 lb-ft (610 N-m).

NOTE

Retainer may have to be tightened slightly to align tabs with slots.

- (21) Bend two tabs (21) on locking ring (22) down into next available slots on retainer (23).
- (22) Remove wooden block from pitman arm (6) and bracket (10).



WARNING

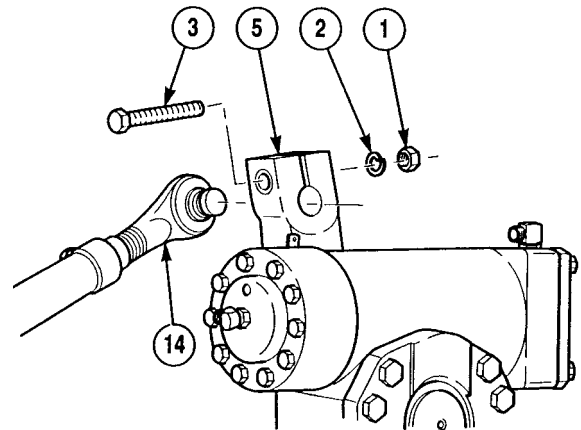
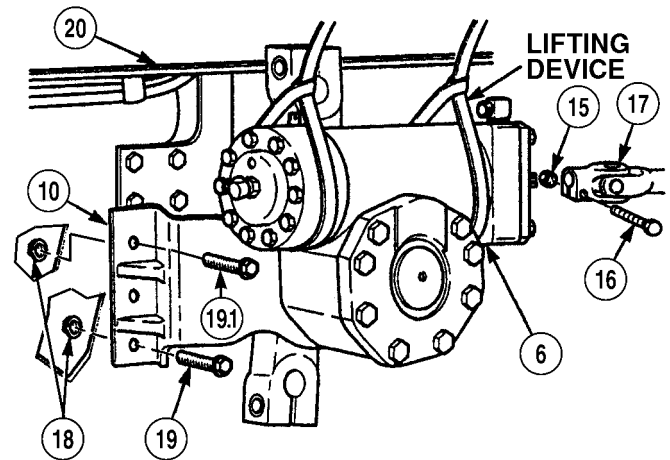
Intermediate steering gear weighs 170 lbs (77 kg). Attach lifting device prior to installation to prevent injury to personnel.

- (23) Attach lifting device to steering gear (6) and bracket (10).

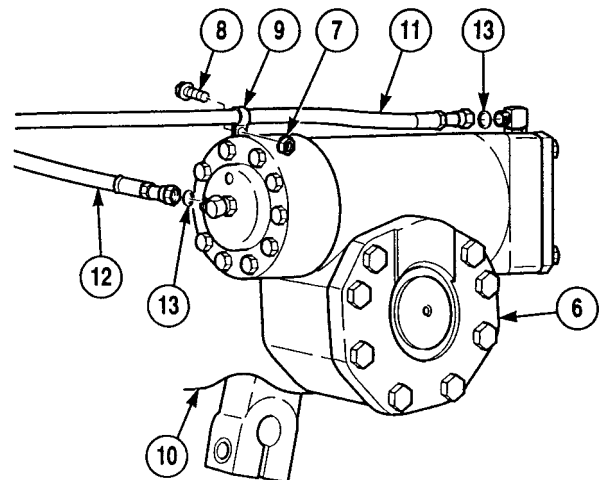
NOTE

Longer screws are installed in bottom.

- (24) With the aid of an assistant, install steering gear (6) and bracket (10) on frame (20) with four screws (19.1), two screws (19) and six locknuts (18).
- (25) Remove lifting device from steering gear (6) and bracket (10).
- (26) Install intergear link (14) in pitman arm (5) with screw (3), lockwasher (2) and nut (1).

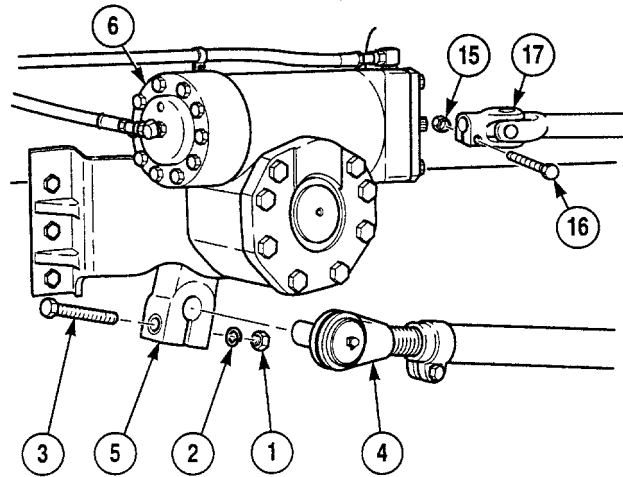


- (27) Apply hydraulic oil to two preformed packings (13).
- (28) Install two preformed packings (13), hose 2878 (11) and hose 2877 (12) on steering gear (6).
- (29) Install cushion clip (9) on steering gear (6) with screw (8) and locknut (7).



12-10. INTERMEDIATE STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

- (30) Install drag link (4) on pitman arm (5) with screw (3), lockwasher (2) and nut (1).
- (31) Install intergear steering shaft yoke (17) on steering gear (6) with screw (16) and locknut (15).



c. Follow-On Maintenance:

- Install left side noise panel, (TM 9-2320-364-20).
- Fill steering reservoir, (TM 9-2320-364-20).
- Lubricate steering gear, (TM 9-2320-364-20).
- Install left front splash guard, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- Turn steering wheel back and forth three times.
- Shut off engine, (TM 9-2320-364-10).
- Check and fill steering reservoir as required, (TM 9-2320-364-20).
- Perform steering adjustments, (Para 12-8).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

12-11. REAR STEERING GEAR AND PITMAN ARM REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Cap and Plug Set (Item 26, Appendix F)
Pan, Drain 4 gal (Item 144, Appendix F)
Puller Kit, Universal (Item 174, Appendix F)
Socket, Socket Head Screw, 3/4 in.
(Item 208, Appendix F)
Vise, Pipe, Chain (Item 246, Appendix F)
Wrench, Combination 1-1/16 in.
(Item 254, Appendix F)
Wrench, Torque (0 to 175 lb-ft [0-237 N·m])
(Item 277, Appendix F)
Wrench, Torque (0 to 600 lb-ft [0-814 N·m])
(Item 278, Appendix F)
Steel Disc (Appendix C)
Wooden Block (Appendix C)
Lifting Device, Minimum Capacity 170 lbs (77 kg)

Materials/Parts

Cable Ties (Item 9, Appendix B)
Compound, Antiseize (Item 14, Appendix B)
Oil, Hydraulic (Item 34, Appendix B)
Sealing Compound (Item 53, Appendix B)
Tags, Identification (Item 72, Appendix B)
Locknut (5) (Item 166, Appendix E)
Lockwasher (Item 249, Appendix E)
Lockwasher (8) (Item 287, Appendix E)
Packing, Preformed (3) (Item 337, Appendix E)
Retainer (Item 470, Appendix E)
Ring, Locking (Item 479, Appendix E)
Screw (8) (Item 520, Appendix E)
Spacer (Item 650, Appendix E)

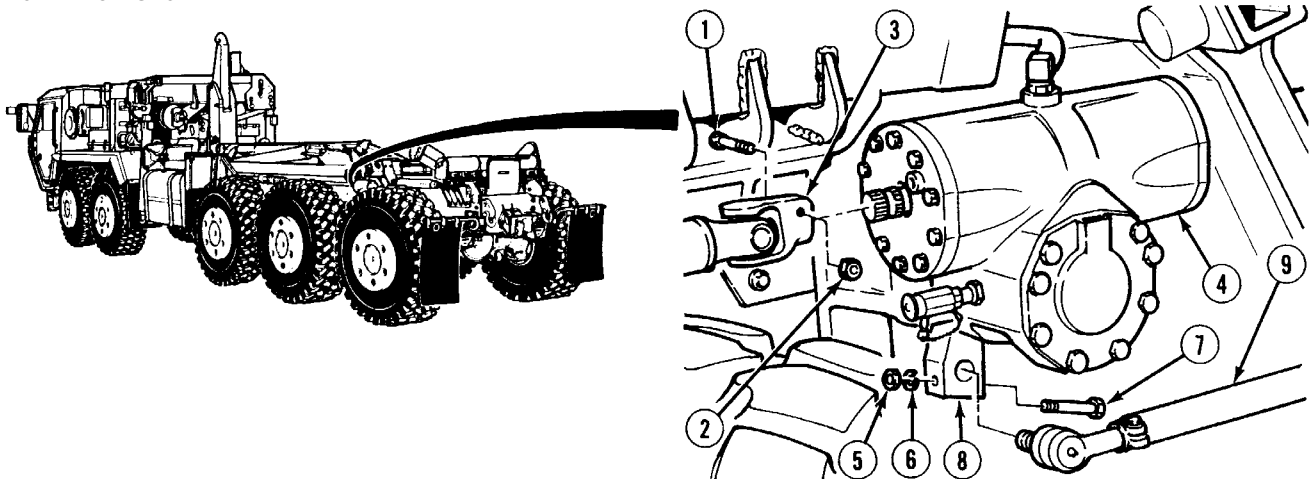
Personnel Required

Two

Equipment Condition

Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)

a. Removal.



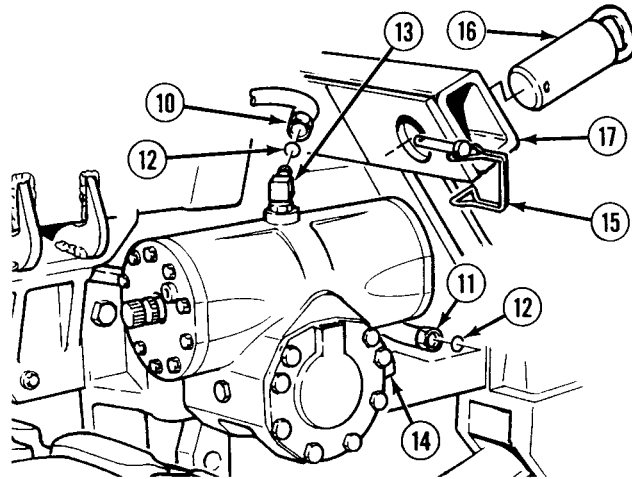
- (1) Remove screw (1), locknut (2) and end yoke (3) from rear steering gear (4). Discard locknut.
- (2) Remove nut (5), lockwasher (6) and screw (7) from pitman arm (8). Discard lockwasher.
- (3) Remove rear drag link (9) from pitman arm (8).

12-11. REAR STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

NOTE

- Tag and mark all hoses and tubes prior to removal.
- Remove cable ties as required.
- Cap hoses and elbows after removal.
- Position drain pan under steering gear.

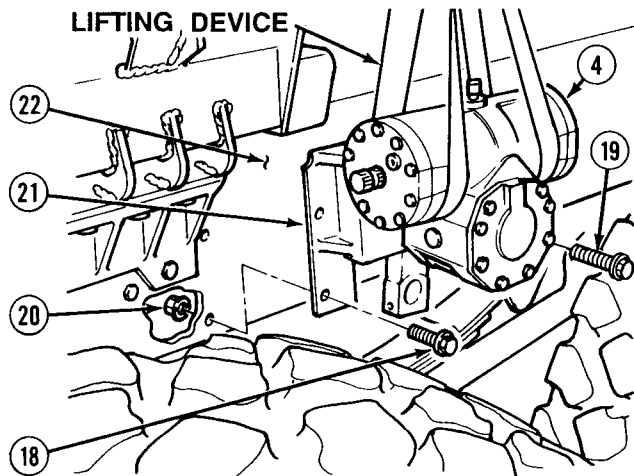
- (4) Remove hose 2275 (10) and hose 2276 (11) and two preformed packings (12) from elbows (13) and (14). Discard preformed packings.
- (5) Remove clip (15) and pin (16) from hard lift point (17).

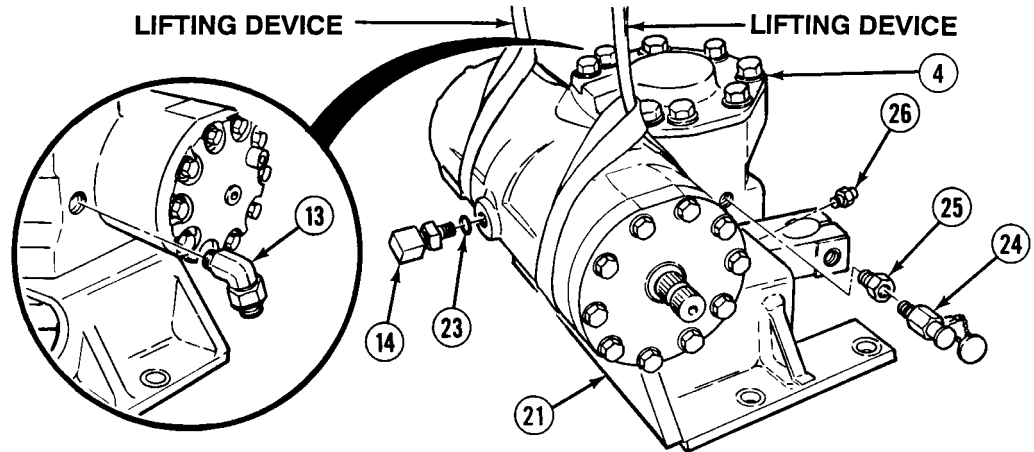


WARNING

Steering gear weighs 165 lbs (75 kg). Attach lifting device prior to removal to prevent possible injury to personnel.

- (6) Attach lifting device to steering gear (4).
- (7) With the aid of an assistant, remove four screws (18) and (19), locknuts (20), steering gear (4) and bracket (21) from frame (22). Discard locknuts.



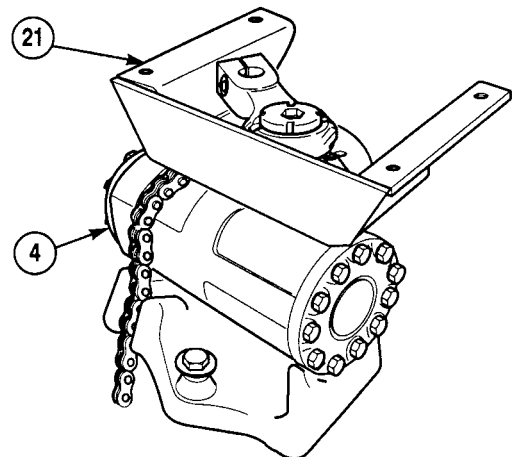


WARNING

Steering gear weighs 165 lbs (75 kg). Attach lifting device prior to moving steering gear and bracket to prevent injury to personnel.

NOTE

- Cap and plug steering gear after removal of elbows, fittings and grease fitting gear after removal of elbows, fittings and grease fitting.
 - Note location and position of elbows and fittings prior to removal.
- (8) Position steering gear (4) and bracket (21) on flat surface and remove elbows (13) and (14) and preformed packing (23) from steering gear (4). Discard preformed packing.
 - (9) Remove sampling valve (24) and fitting (25) from steering gear (4).
 - (10) Remove grease fitting (26) from steering gear (4).
 - (11) Rotate steering gear (4) and bracket (21) and position in chain vise.
 - (12) Remove lifting device from steering gear (4).



12-11. REAR STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).

- (13) Bend up two locking tabs (27) on locking ring (28).
- (14) Remove and discard retainer (29), locking ring (28) and spacer (30) as an assembly from pitman arm (8).

WARNING

Pitman arm is under pressure. Parts can act as projectiles when released and could cause injury to personnel.

NOTE

Note location of two timing marks in pitman arm and shaft.

- (15) Using puller and steel disc, remove pitman arm (8) from shaft (31).
- (16) Remove puller and steel disc from pitman arm (8).
- (17) Remove eight screws (32), lockwashers (33) and bracket (21) from steering gear (4). Discard screws and lockwashers.

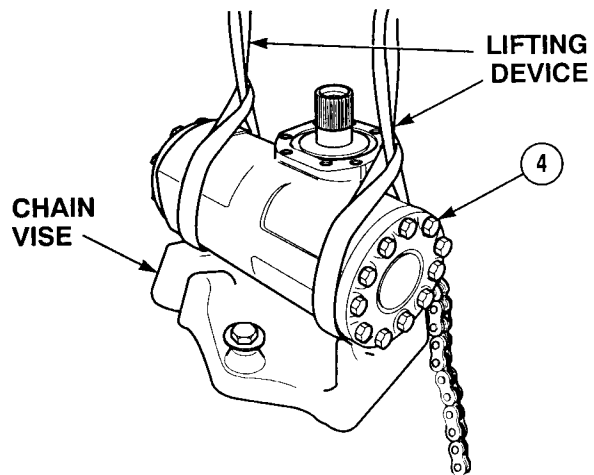
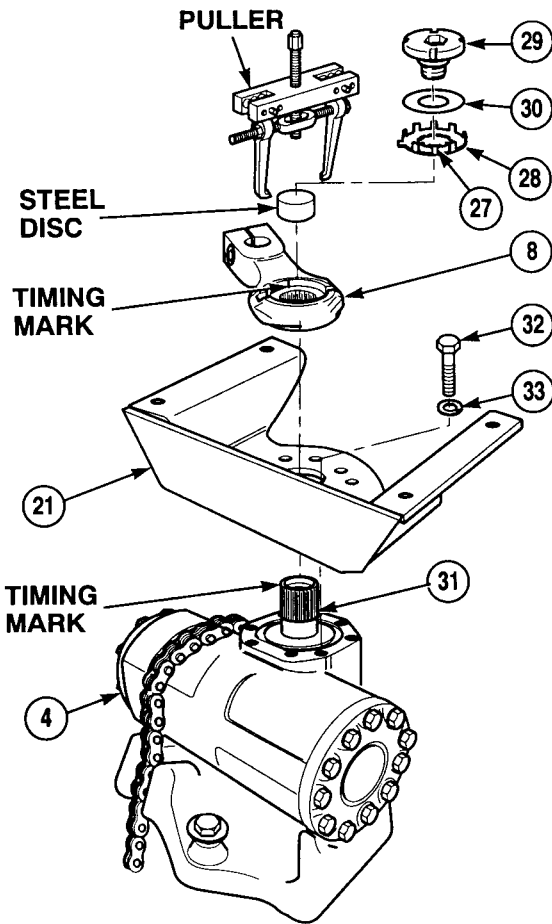
WARNING

Steering gear weighs 165 lbs (75 kg). Attach lifting device prior to moving steering gear and bracket to prevent injury to personnel.

- (18) Attach lifting device to rear steering gear (4) and remove from chain vise.
- (19) Remove lifting device from rear steering gear (4).

b. Installation.

- (1) Attach lifting device to rear steering gear (4).
- (2) Position rear steering gear (4) in chain vise.



- (3) Install bracket (21) on steering gear (4) with eight lockwashers (33) and screws (32). Tighten screws to 160 to 170 lb-ft (217 to 231 N·m) in sequence shown. Recheck torques.

NOTE

Ensure timing marks are aligned as prior to removal.

- (4) Align timing marks and install pitman arm (8) on shaft (31).

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.

- (5) Coat retainer (29) with antiseize compound.
- (6) Position locking ring (28), spacer (30) and retainer (29) as one assembly on pitman arm (8).
- (7) Bend two opposing tabs (27) on locking ring (28) into pitman arm (8).

NOTE

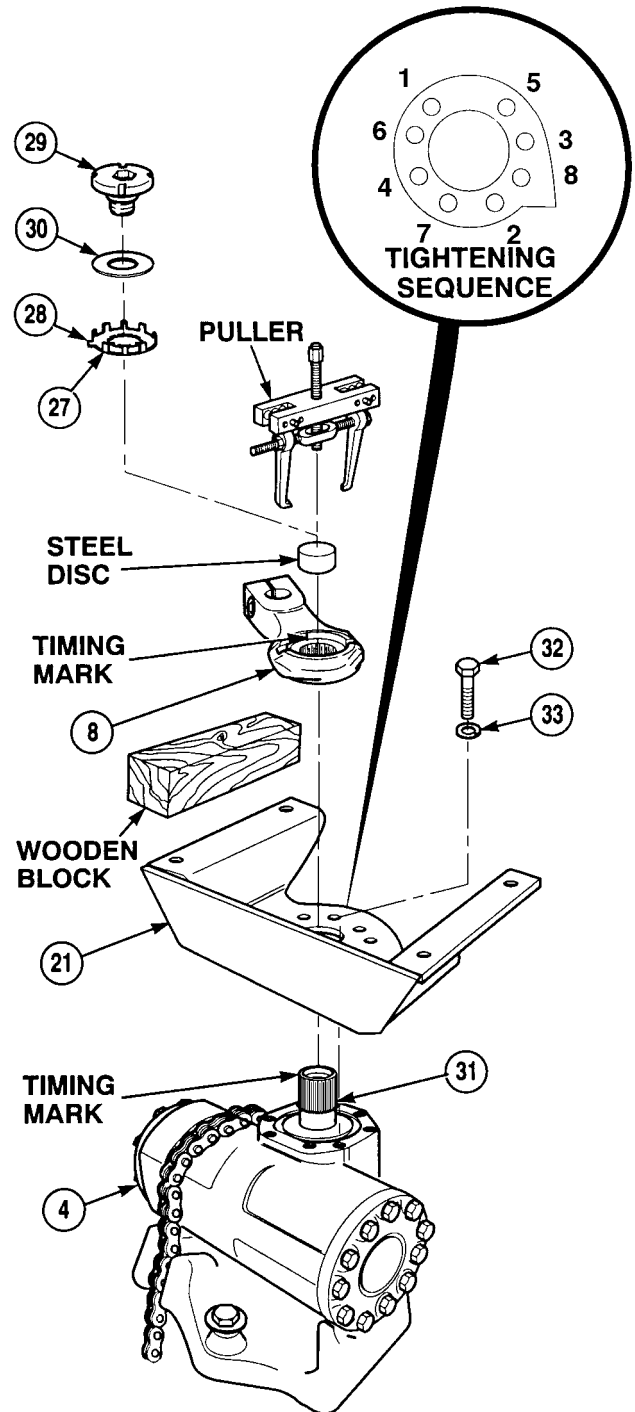
Wooden block used in Step (7) should be 2 by 4 by 12 in.

- (8) Wedge wooden block between pitman arm (8) and bracket (21).
- (9) Tighten retainer (29) to 450 lb-ft (610 N·m).
- (10) Bend two opposing tabs (27) on locking ring (28) down into next available slot on retainer (29).

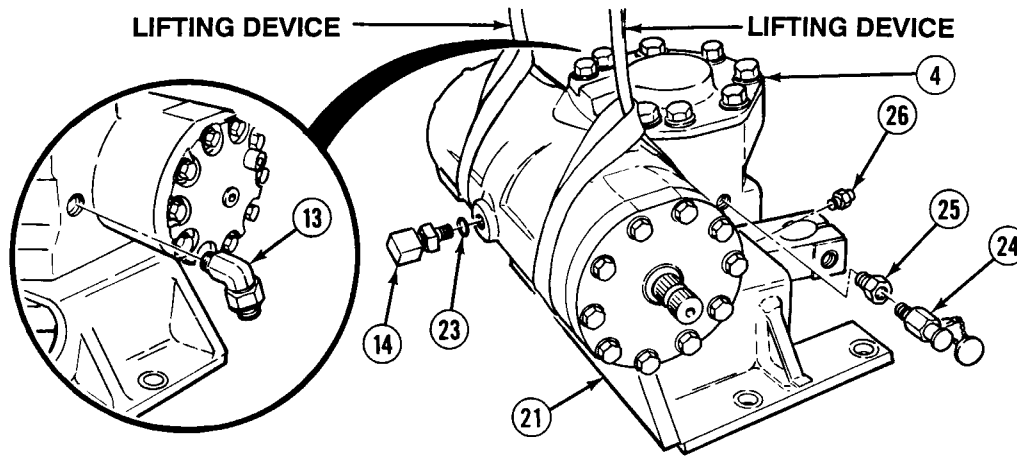
NOTE

Retainer may have to be tightened slightly to align tabs with slots.

- (11) Remove wooden block from pitman arm (8) and bracket (21).



12-11. REAR STEERING GEAR AND PITMAN ARM REPLACEMENT (CONT).



WARNING

Steering gear weighs 165 lbs (75 kg). Attach lifting device prior to moving steering gear and bracket to prevent injury to personnel.

- (12) Attach lifting device to rear steering gear (4) and remove from chain vise.
- (13) Rotate rear steering gear (4) and position on flat surface.

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 well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

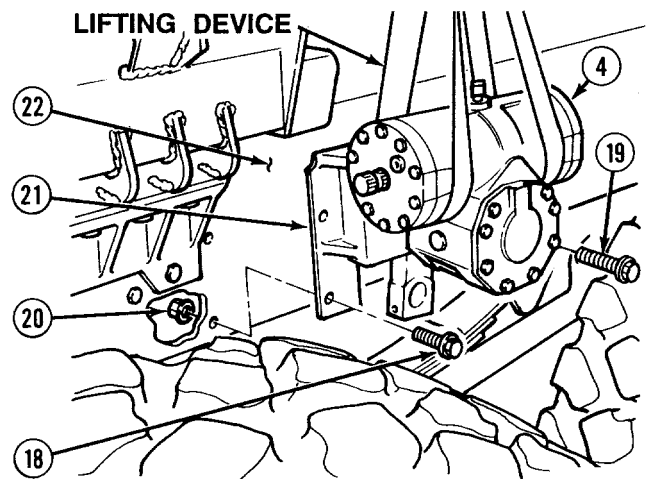
Install fittings and elbows as noted prior to removal.

- (14) Apply sealing compound to threads of grease fitting (26).
- (15) Install grease fitting (26) in steering gear (4).
- (16) Apply sealing compound to threads of fitting (25).
- (17) Install fitting (25) and sampling valve (24) in steering gear (4).
- (18) Apply sealing compound to threads of elbows (13).
- (19) Apply hydraulic oil to preformed packing (23).
- (20) Install preformed packing (23) and two elbows (13) and (14) in steering gear (4).

WARNING

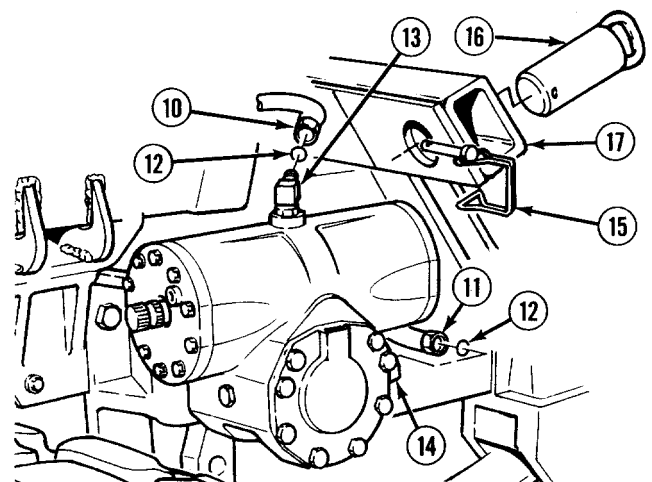
Steering gear weighs 165 lbs (75 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (21) With the aid of an assistant, install steering gear (4) and bracket (21) on frame (22) with four screws (18) and (19) and locknuts (20).
- (22) Remove lifting device from steering gear (4).



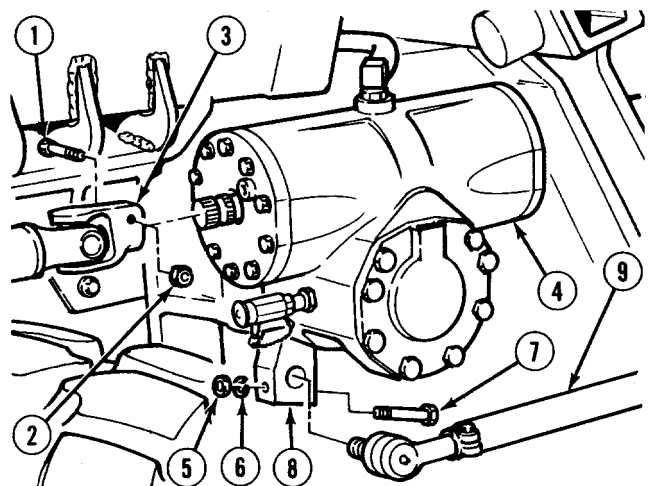
NOTE

- Install cable ties as required
 - Install elbows as noted prior to removal.
- (23) Apply hydraulic oil to two preformed packings (12).
 - (24) Install two preformed packings (12), hose 2275 (10) and hose 2276 (11) on elbows (13) and (14).
 - (25) Install pin (16) and clip (15) in hard lift point (17).
 - (26) Install drag link (9) in pitman arm (8) with screw (7), lockwasher (6) and nut (5).
 - (27) Install end yoke (3) on steering gear (4) with screw (1) and locknut (2).



c. Follow-On Maintenance:

- Lube steering gear and pitman arm, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- Turn steering wheel back and forth three times.
- Shut off engine, (TM 9-2320-364-10).
- Check steering reservoir, (TM 9-2320-364-20).
- Fill steering reservoir as required, (TM 9-2320-364-20).
- Perform steering adjustments, (Para 12-8).
- Remove wheel chocks, (TM 9-2320-364-10).



END OF TASK

12-12. EMERGENCY STEERING PUMP REPLACEMENT.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Caps, Vise Jaw (Item 27, Appendix F)
Vise, Machinist's (Item 248, Appendix F)
Wrench, Combination 1-1/16 in.
(Item 254, Appendix F)
Wrench, Combination 1-3/8 in.
(Item 258, Appendix F)
Wrench, Combination 1-7/8 in.
(Item 265, Appendix F)

Materials/Parts

Oil, Hydraulic (Item 34, Appendix B)
Sealing Compound (Item 56, Appendix B)
Sealing Compound (Item 62, Appendix B)
Packing, Preformed (Item 334, Appendix E)
Packing, Preformed (Item 337, Appendix E)

Materials/Parts - Continued

Packing, Preformed (Item 338, Appendix E)
Packing, Preformed (Item 397, Appendix E)

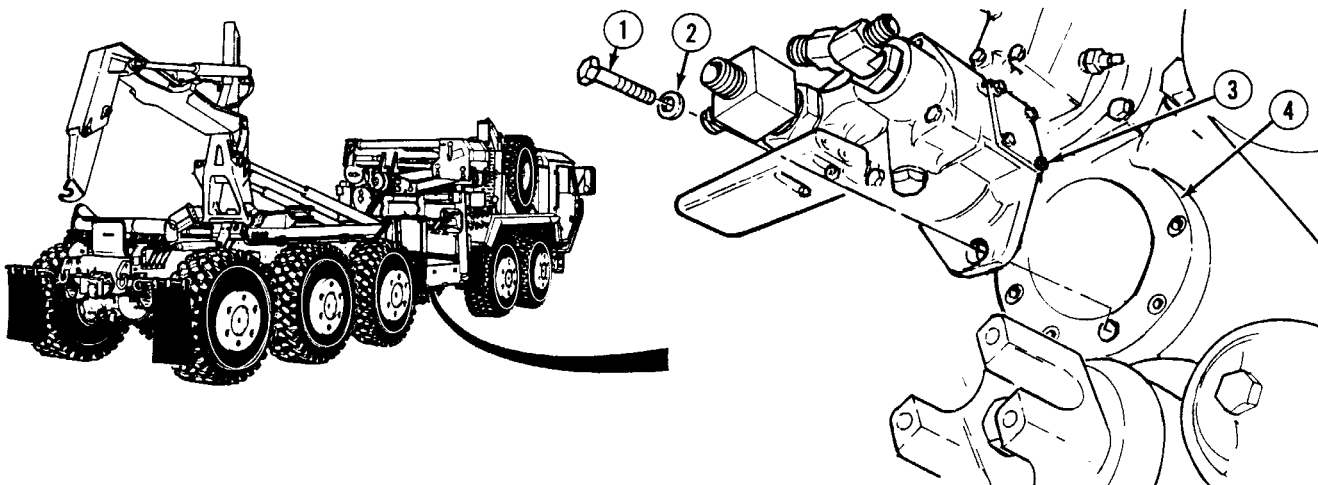
Personnel Required

Two

Equipment Condition

LHS fully extended, (TM 9-2320-364-10)
Engine OFF, (TM 9-2320-364-10)
Wheels chocked, (TM 9-2320-364-10)
Steering reservoir drained,
(TM 9-2320-364-20)
Emergency steering pump hoses removed,
(TM 9-2320-364-20)
Emergency steering valve removed,
(TM 9-2320-364-20)
Driveshaft between transfer case and Axle No. 3
removed, (TM 9-2320-364-20)

a. Removal.

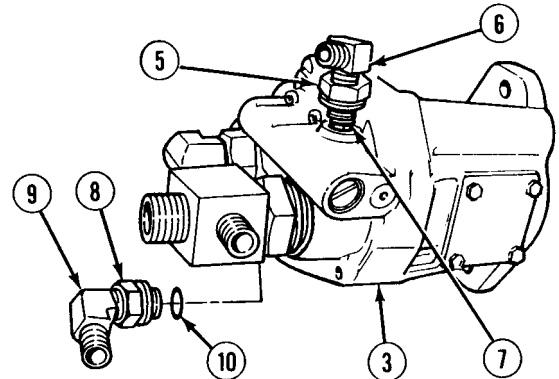


- (1) With the aid of an assistant, remove two screws (1), washers (2) and emergency steering pump (3) from transfer case (4).

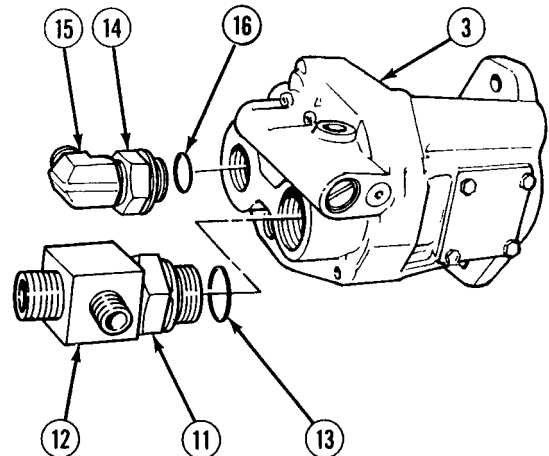
NOTE

Note position of fittings and elbows prior to removal.

- (2) Position emergency steering pump (3) in vise with soft jaws.
- (3) Loosen nut (5) and remove elbow (6) and preformed packing (7) from emergency steering pump (3). Discard preformed packings.
- (4) Loosen nut (8) and remove elbow (9) and preformed packing (10) from emergency steering pump (3). Discard preformed packing.



- (5) Loosen nut (11) and remove tee (12) and preformed packing (13) from emergency steering pump (3). Discard preformed packing.
- (6) Loosen nut (14) and remove elbow (15) and preformed packing (16) from emergency steering pump (3). Discard preformed packing.



b. Installation.

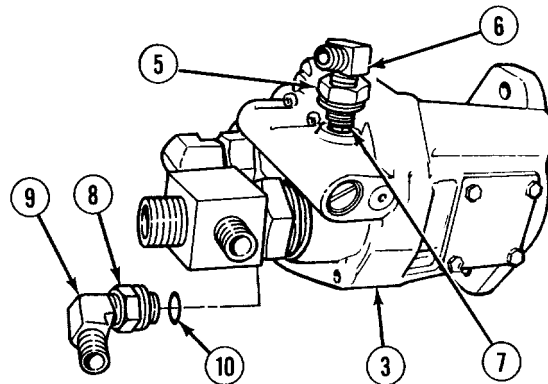
NOTE

Install fittings and elbows as noted prior to removal.

- (1) Apply hydraulic oil to preformed packing (16).
- (2) Install preformed packing (16) and elbow (15) in emergency steering pump (3) and tighten nut (14).
- (3) Apply hydraulic oil to preformed packing (13).
- (4) Install preformed packing (13) and tee (12) in emergency steering pump (3) and tighten nut (11).

12-12. EMERGENCY STEERING PUMP REPLACEMENT (CONT).

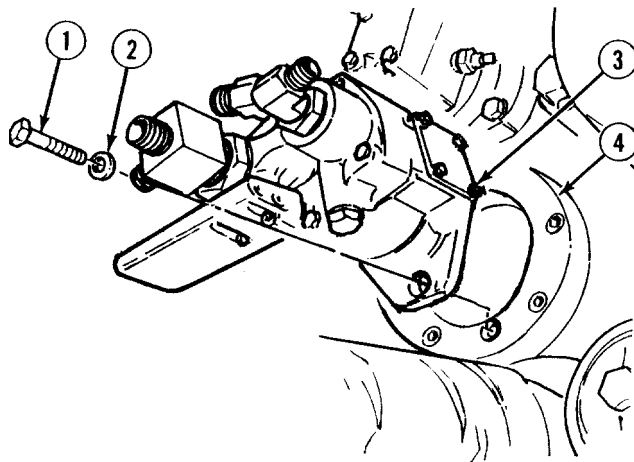
- (5) Apply hydraulic oil to preformed packing (10).
- (6) Install preformed packing (10) and elbow (9) in emergency steering pump (3) and tighten nut (8).
- (7) Apply hydraulic oil to preformed packing (7).
- (8) Install preformed packing (7) and elbow (6) in emergency steering pump (3) and tighten nut (5).



WARNING

Adhesives, solvents and sealing compounds can burn easily, and give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, 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.

- (9) Coat face of emergency steering pump (3) with sealing compound.
- (10) Coat threads of screws (1) with sealing compound.
- (11) With the aid of an assistant, install emergency steering pump (3) on transfer case (4) with two washers (2) and screws (1).



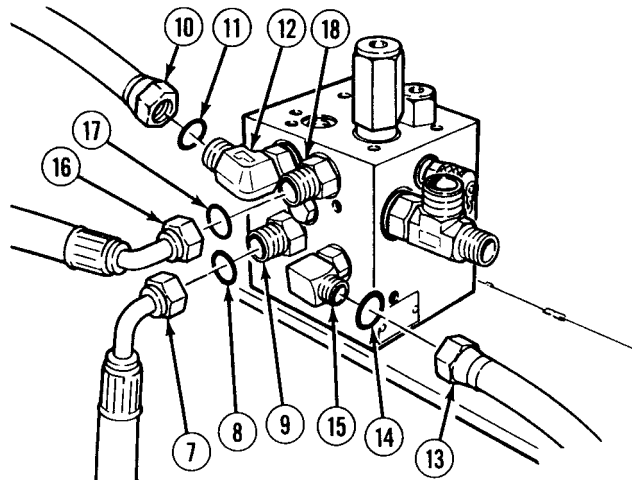
c. Follow-On Maintenance:

- Install emergency steering valve, (TM 9-2320-364-20).
- Install emergency steering pump hoses, (TM 9-2320-364-20).
- Install driveshaft between transfer case and Axle No. 3, (TM 9-2320-364-20).
- Fill steering reservoir, (TM 9-2320-364-20).
- Start engine and check for oil leaks, (TM 9-2320-364-10).
- Check level of steering reservoir, (TM 9-2320-364-20).
- LHS in transit position, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

12-13. STEERING SYSTEM MANIFOLD REPAIR (CONT).

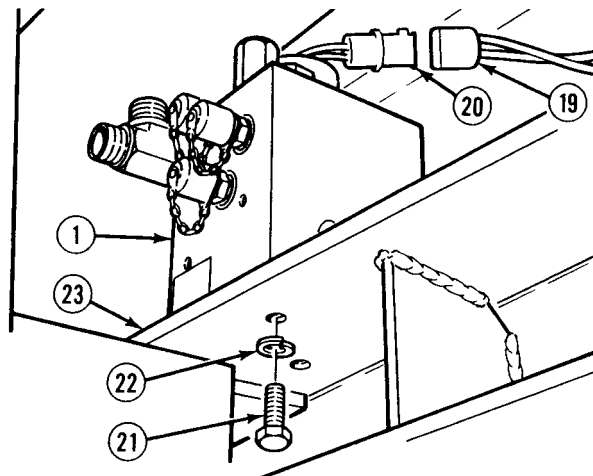
- (4) Remove hose 2496 (7) and preformed packing (8) from adapter (9). Discard preformed packing.
- (5) Remove hose 2393 (10) and preformed packing (11) from elbow (12). Discard preformed packing.
- (6) Remove hose 2274 (13) and preformed packing (14) from elbow (15). Discard preformed packing.
- (7) Remove hose 2301 (16) and preformed packing (17) from adapter (18). Discard preformed packing.



NOTE

Connectors are removed by gently prying up on tab and pulling connectors apart.

- (8) Disconnect MC113 connector (19) from pressure switch connector (20).
- (9) Remove two screws (21), lockwashers (22) and manifold (1) from crossmember (23). Discard lockwashers.

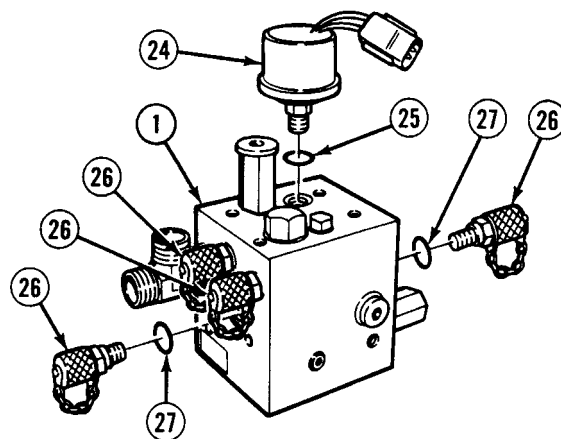


- (10) Position manifold (1) in soft jawed vise and remove pressure switch (24) and preformed packing (25) from manifold (1). Discard preformed packing.

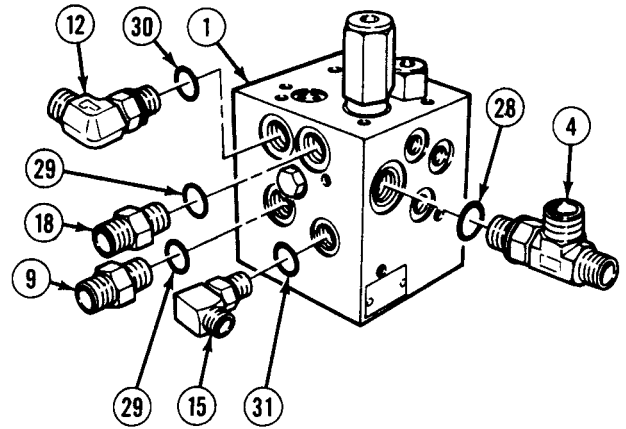
NOTE

Note location and positions of couplings, adapters, tee and elbows prior to removal.

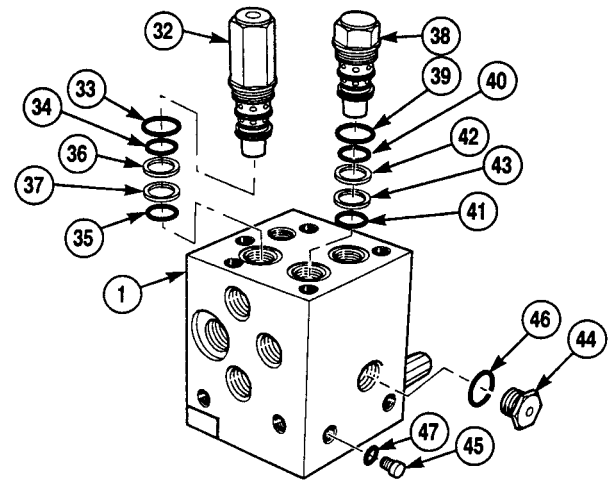
- (11) Remove four mini-check couplings (26) and preformed packings (27) from manifold (1). Discard preformed packings.



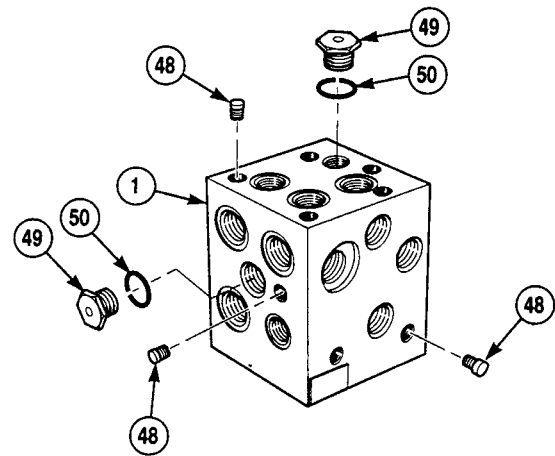
- (12) Remove tee (4) and preformed packing (28) from manifold (1). Discard preformed packing.
- (13) Remove two adapters (9) and (18) and preformed packings (29) from manifold (1).
- (14) Remove elbow (12) and preformed packing (30) from manifold (1). Discard preformed packing.
- (15) Remove elbow (15) and preformed packing (31) from manifold (1). Discard preformed packing.



- (16) Remove pressure valve (32), preformed packings (33), (34), (35) and packing retainers (36) and (37) from manifold (1). Discard preformed packings and packing retainers.
- (17) Remove primary flow regulator (38), preformed packing (39), (40), (41) and two packing retainers (42) and (43) from manifold (1). Discard preformed packings and packing retainers.
- (18) Remove machine plugs (44) and (45) and preformed packings (46) and (47) from manifold (1). Discard preformed packings. Perform Step (19) if expansion plugs leak or are damaged.

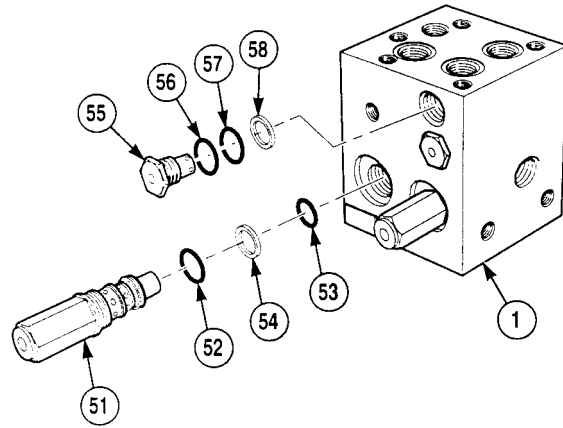


- (19) Remove eights expansion plugs (48) from manifold (1).
- (20) Remove two machine plugs (49) and preformed packings (50) from manifold (1). Discard preformed packings.



12-13. STEERING SYSTEM MANIFOLD REPAIR (CONT).

- (21) Remove two relief valves (51), preformed packings (52) and (53) and packing retainers (54) from manifold (1).
- (22) Remove two check valves (55), preformed packings (56) and (57) and packing retainers (58) from manifold (1).
- (23) Remove manifold (1) from soft-jawed vise.



b. Installation.

NOTE

Install elbows, fittings and couplings as noted prior to removal.

- (1) Position manifold (1) in a soft jawed vise.
- (2) Apply hydraulic oil to two preformed packings (56) and (57) and packing retainers (58).
- (3) Install two preformed packings (56) and (57) and packing retainers (58) on check valves (55).
- (4) Install two check valves (55) in manifold (1). Tighten to 10 to 12 lb-ft (14 to 16 N·m).
- (5) Apply hydraulic oil to two preformed packings (53) and (53) and packing retainers (54).
- (6) Install two preformed packings (52) and (53) and packing retainers (54) on two relief valves (51).

WARNING

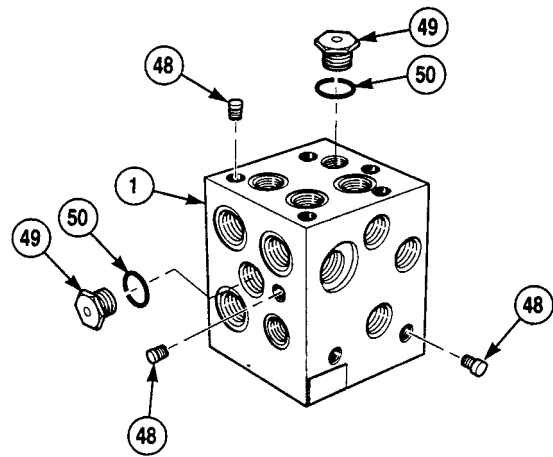
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (7) Apply sealing compound to threads of two relief valves (51).
- (8) Install two relief valves (51) in manifold (1).

- (9) Apply hydraulic oil to two preformed packings (50).
- (10) Install two preformed packings (50) on machine plugs (49).
- (11) Install two machine plugs (49) in manifold.

WARNING

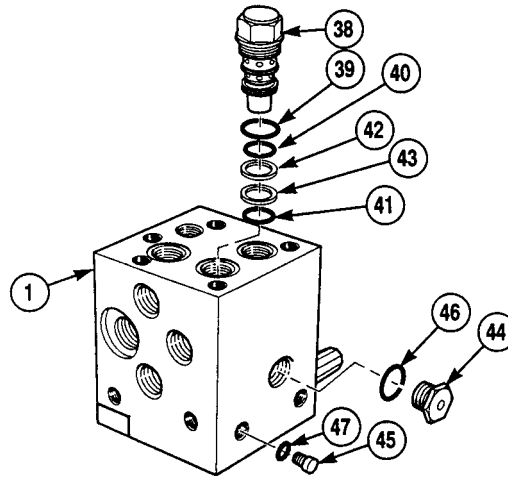
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



- (12) Apply sealing compound to threads of eight expansion plugs (48).
- (13) Install eight expansion plugs (48) in manifold (1).

12-13. STEERING SYSTEM MANIFOLD REPAIR (CONT).

- (14) Apply hydraulic oil to preformed packings (46) and (47).
- (15) Install preformed packing (46) on machine plug (44).
- (16) Install preformed packing (47) on machine plug (45).
- (17) Apply hydraulic oil to preformed packings (39), (40), (41) and packing retainers (42) and (43).
- (18) Install preformed packings (39), (40), (41) and packing retainers (42) and (43) on primary flow regulators (38).

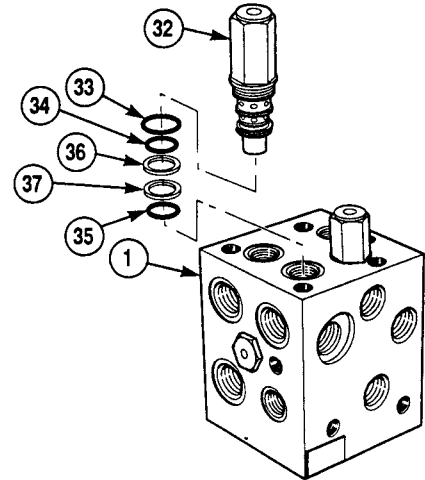


WARNING

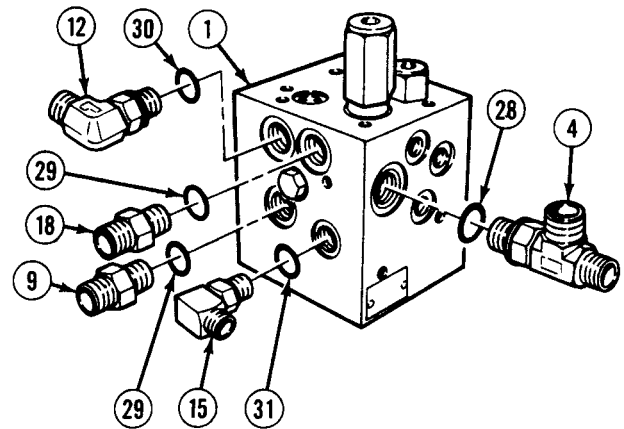
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (19) Apply sealing compound to threads of primary flow regulator (38).
- (20) Install primary flow regulator (38) in manifold (1).

- (21) Apply hydraulic oil to preformed packings (33), (34), (35) and packing retainers (36) and (37).
- (22) Install preformed packings (33), (34), (35) and packing retainers (36) and (37) on pressure valve (32).
- (23) Install pressure valve (32) in manifold (1).

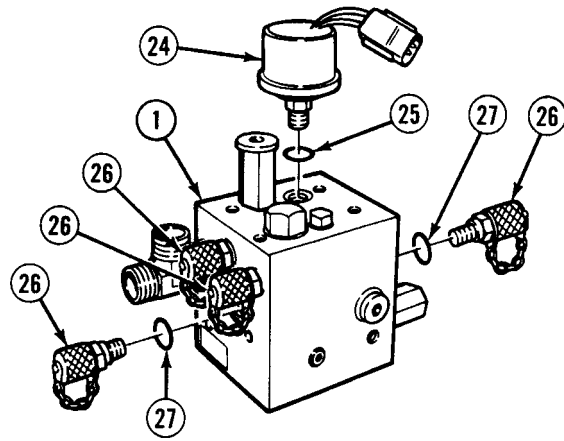


- (24) Apply hydraulic oil to preformed packing (31).
- (25) Install reformed packing (31) and elbow (15) in manifold (1).
- (26) Apply hydraulic oil to preformed packing (30).
- (27) Install preformed packing (30) and elbow (12) in manifold (1).
- (28) Apply hydraulic oil to two preformed packing (29).
- (29) Install two preformed packings (29), adapters (9) and (18) in manifold (1).
- (30) Apply hydraulic oil to four preformed packings (28).
- (31) Install preformed packing (28) and tee (4) in manifold (1).

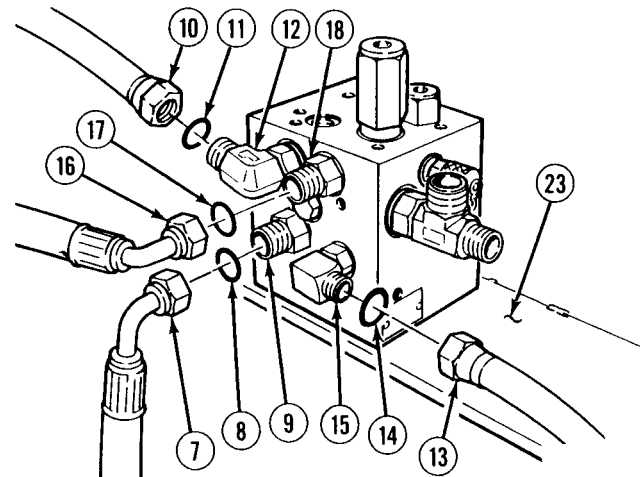


12-13. STEERING SYSTEM MANIFOLD REPAIR (CONT).

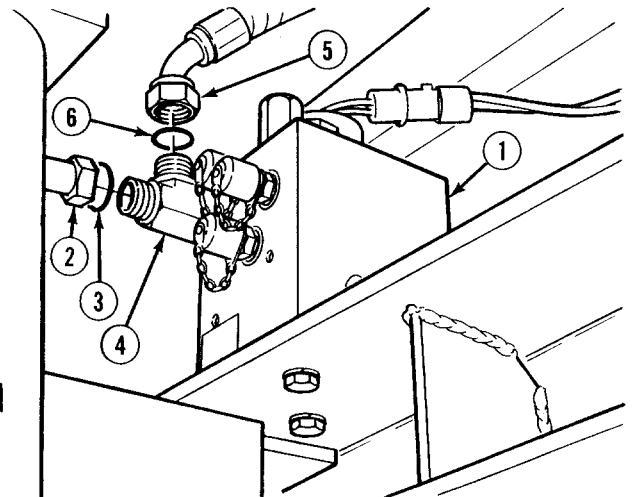
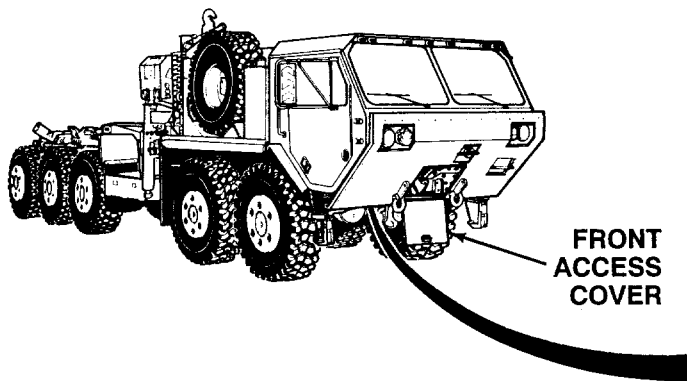
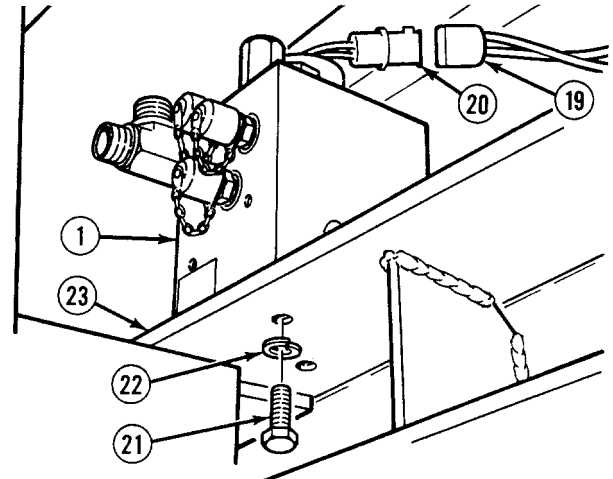
- (32) Apply hydraulic oil to preformed packing (27).
- (33) Install four preformed packings (27) and mini-check valves (26) in manifold (1).
- (34) Apply hydraulic oil to preformed packing (25).
- (35) Install preformed packing (25) and pressure switch (24) on manifold (1).



- (36) Position manifold (1) on crossmember (23).
- (37) Apply hydraulic oil to preformed packing (8).
- (38) Install preformed packing (8) and hose 2496 (7) on adapter (9).
- (39) Apply hydraulic oil to preformed packing (17).
- (40) Install preformed packing (17) and hose 2301 (16) on adapter (18).
- (41) Apply hydraulic oil to preformed packing (11).
- (42) Install preformed packing (11) and hose 2393 (10) on elbow (12).
- (43) Apply hydraulic oil to preformed packing (14).
- (44) Install preformed packing (14) and hose 2274 (13) on elbow (15).



- (45) Install manifold (1) on crossmember (23) with two screws (21) and lockwashers (22).
- (46) Connect MC113 connector (19) on pressure switch connector (20).



- (47) Apply hydraulic oil to preformed packing (6).
- (48) Install preformed packing (6) and hose 2928 (5) on tee (4).
- (49) Apply hydraulic oil to preformed packing (3).
- (50) Install preformed packing (3) and hose 2726 (2) on tee (4).
- (51) Close front access cover.

c. Follow-On Maintenance:

- Fill steering hydraulic reservoir, (TM 9-2320-364-20).
- Connect batteries, (TM 9-2320-364-20).
- Start engine, (TM 9-2320-364-10).
- Check for oil leaks, (TM 9-2320-364-10).
- Shut OFF engine, (TM 9-2320-364-10).
- Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

12-14. STEERING SYSTEM PURGING PROCEDURE

This task covers:

- a. Purging
- b. Follow-On Maintenance

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's
(Item 240, Appendix F)
Pan, Drain 4 Gal. (Item 144, Appendix F)
Wrench, Torque (0-175 lb-ft [0-237 N·m])
(Item 277, Appendix F)

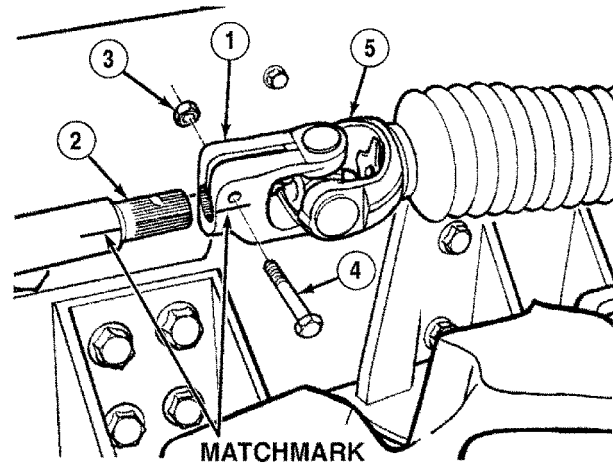
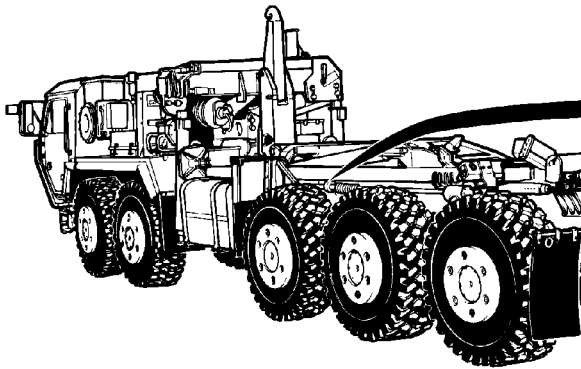
Equipment Condition

Engine Off, (TM 9-2320-364-10)
Wheels Chocked, (TM 9-2320-364-10)
Draglinks Removed, (from Pitman Arm only)
(Para 12-3)
Steering Reservoir Filled, (TM 9-2320-364-10)

Materials/Parts

Locknut (Item 213, Appendix E)

a. Purging



- (1) Matchmark slip yoke (1) and splined shaft (2).
- (2) Remove locknut (3), Screw (4) and steering shaft (5), from splined shaft (2). Discard locknut
- (3) Start engine (TM 9-2320-364-10).

NOTE

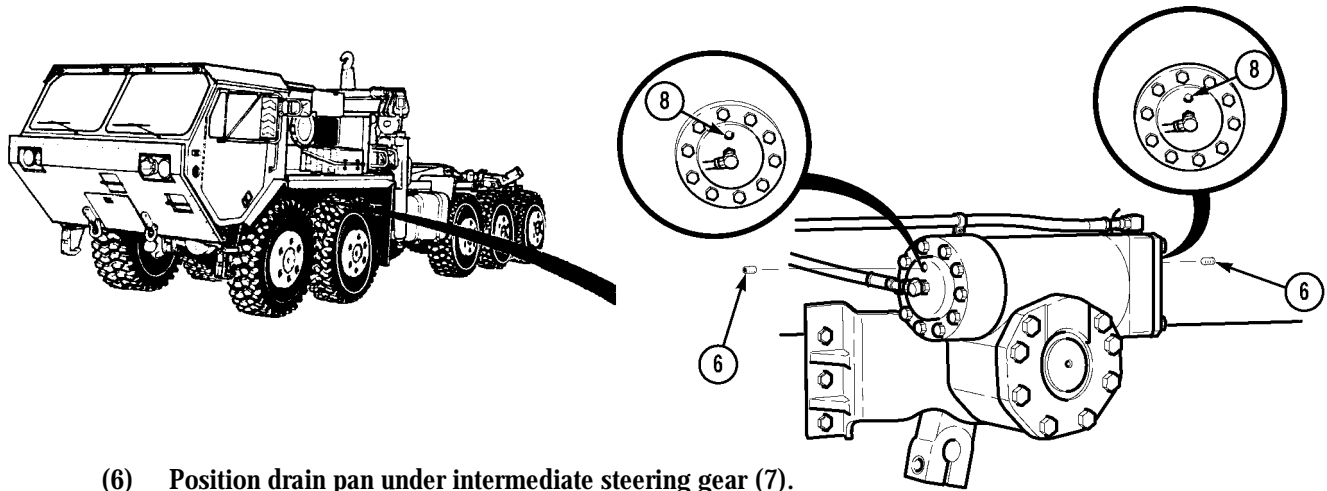
Allow hydraulic oil to circulate one minute without turning steering wheel.

- (4) Turn steering wheel full left, then full right, two times.

NOTE

Ensure pitman arm rotates completely forward and rearward during Step 5.

- (5) By hand, rotate rear steering shaft (5) full left, then full right, two times.



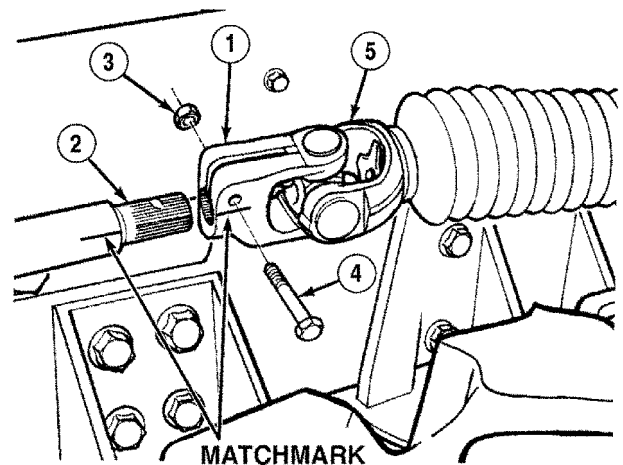
- (6) Position drain pan under intermediate steering gear (7).
- (7) Remove two plugs (6) from intermediate steering gear (7).

CAUTION

Do not remove bleeders in Step (8). Damage to equipment may occur.

NOTE

- Do not move steering wheel during Step (8).
 - Air is purged from steering system when there are no air bubbles in hydraulic oil.
 - Proceed to Step (9) when there are no air bubbles present in hydraulic oil.
- (8) Turn two bleeders (8) to the left six turns.
 - (9) Turn two bleeders (8) to the right six turns, or until tight.
 - (10) Install two plugs (6) in intermediate steering gear (7).
 - (11) Shut off engine.



CAUTION

Matchmarks must be aligned as marked during removal. Failure to comply may result in damage.

- (12) Align matchmarks and install rear steering shaft (5), on splined shaft (2), using screw (4) and locknut (3). Tight to 35 lb-ft (47 N·m).
- b. Follow-On Maintenance:*
- Fill steering hydraulic reservoir, (TM 9-2320-364-10).
 - Install drag links, (Rear steering gear pitman arm only) (Para 12-14).
 - Remove wheel chocks, (TM 9-2320-364-10).

END OF TASK

APPENDIX A

REFERENCES

A-1. SCOPE.

Indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this publication.

Military Publication Indexes.

Consolidated Index of Army Publications and Forms DA PAM 310-1

A-2. FORMS.

Refer to DA PAM 738-750, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms pertaining to the vehicle.

A-3. FIELD MANUALS.

The following publications contain information pertinent to the vehicle material.

Camouflage	FM 20-3
Manual for Wheel Vehicle Driver	FM 21-305
Nuclear, Biological, and Chemical Defense	FM 21-40
Basic Cold Weather Manual	FM 31-70
Northern Operations	FM 31-71
Chemical, Biological, and Radiological (CBR) Decontamination	FM 3-5
Nuclear, Biological, and Chemical (NBC) Reconnaissance and Decontamination Operations (How to Fight)	FM 3-87 (HTF)
Army Motor Transport Units and Operations	FM 55-30
Operation and Maintenance of Ordnance Materiel in Cold Weather 0°F to -65°F	FM 9-207

A-4. TECHNICAL MANUALS.

Painting Instructions	TM 43-0139
General Shop Practice Requirements for Repair, Maintenance, and Test of Electronic Equipment	TM 43-0158

A-4. TECHNICAL MANUALS (CONT).

Administrative Storage of Equipment **TM 740-90-1**

**Procedures for Destruction of Tank Automotive Equipment to Prevent
Enemy Use (U.S. Army Tank-Automotive Command)** **TM 750-244-6**

**Operator's and Organizational Support Maintenance Manual
for Care, Maintenance, Repair, and Inspection of Pneumatic
Tires and Inner Tubes** **TM 9-2610-200-14**

**Operator/Unit/Direct Support/General Support Maintenance Manual Including
Repair Parts and Special Tools List for Simplified Test Equipment
For Internal Combustion Engines** **TM 9-4910-571-12&P**

Maintenance and Repair for Lead-Acid Storage Batteries **TM 9-6140-200-14**

Inspection, Care, and Maintenance of Antifriction Bearings **TM 9-214**

**Materials Used for Cleaning, Preserving, Abrading, and Cementing
Ordinance Material and Related Materials Including Chemicals** **TM 9-247**

A-5. MISCELLANEOUS PUBLICATIONS.

Description, Use, Bonding Techniques, and Properties of Adhesives **TB ORD1032**

Safety Inspection and Testing of Lifting Devices **TB 43-0142**

**Use of Antifreeze Solutions and Cleaning Compounds in
Engine Cooling Systems** **TB 750-651**

Operator's Circular for Welding Theory and Application **TC 9-237**

APPENDIX B

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

B-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the truck. These items are authorized to you by CTA50-970, Expendable Items (Except Medical, Class V, Repair Parts and Heraldic Items) or CTA8-100, Army Medical Department Expendable/Durable Items.

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 task box to identify the material (e.g., “Compound, Antiseize, Item 14, Appendix B”).
- b. Column (2) - Level.** This indicates the level of maintenance authorized to use the material as approved by the Maintenance Allocation Chart (MAC).
- c. Column (3) - National Stock Number.** This is the National Stock Number assigned to the item; use it to request or requisition the item.
- d. Column (4) - Description.** Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity (CAGE) code in parentheses followed by the part number.
- e. Column (5) - Unit of Measure.** Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	F	8040-00-843-0802 8040-00-225-4548	Adhesive, RTV 108 (80244) MIL-A-46106 GP1TY1 3 ounce kit 12 ounce tube	oz oz
2	F	8040-00-865-8991	Adhesive, RTV 732 (19207) 12266964	kt
3	F		Adhesive, (0PMN0) Sika 255FC BLK (45152) 3145938	oz
4	F		Adhesive, Spray (45152) 1537350	oz
5	F	6810-01-075-5546	Alcohol, Isopropyl (53390) 7618-19-4 40 ounce bottle	oz
6	F	6850-00-181-7940	Antifreeze	gl
7	F	7920-00-062-5468	Brush, Bristle (72387) 2-305SBN	ea
8	H	8020-00-324-9700	Brush, Paint (96906) MS 16866	ea
9	F	5975-00-273-8133	Cable Ties (96906) MS3367-3	pk
10	F	7510-00-223-6706	Chalk (58536) A-A-318	bx
11	F	7920-00-165-7195 7920-00-044-9281	Cloth, Cleaning (81349) MIL-C-85043 Type 1 - 10 lb box Type 2 - 10 lb box	lb lb
12	F	5350-00-221-0872	Cloth, Crocus (81348) P-C-458 50 sheet package	sh
13	F	8030-01-106-8393	Coating, Protective (09687) 57-021-102 1 quart can	qt
14	F	8030-01-087-8254 8030-00-155-6444	Compound, Antiseize (81399) MIL-A-907 8 ounce can with brush applicator 16 ounce aerosol can	oz oz

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
15	F	8030-00-062-6950 8030-01-149-1731 8030-00-837-6557 8030-00-903-0931	Compound, Corrosion Preventive (81349) MIL-C-16173 Grade 1 - 1 quart can Grade 2 - 1 quart can Grade 3 - 1 pint can Grade 4 - 1 pint can	qt qt pt pt
16	F		Compound, International No. 2 (45152) 5198563	oz
17	H		Compound, Retaining Type II (81349) MIL-R-46082B	oz
18	F	8030-00-231-2349 8030-00-231-2344	Compound, Rust Preventive (81349) MIL-R-10036 1 gallon can 5 gallon can	gl gl
19	F	6950-01-092-3550	Compound, Silicone (75037) 1609 can aerosol	oz
20	H	8010-00-889-9745	Dye, Prussian Blue (45152) 15963	oz
21	F	9150-01-197-7688 9150-01-197-7689	Grease, Automotive and Artillery (81349) MIL-G-10924 2.25 ounce tube 6.5 pound can	oz lb
22	F	9150-01-306-9202 9150-00-823-8047	Grease, General Purpose (81349) MIL-G-23549 1 pound can 35 pound can	lb lb
23	F	9150-01-145-1259	Grease, High Temperature (81349) DOD-G-85733	qt
24	F	9150-01-137-4657	Grease, HI-Vacuum (98079) 269352-2	qt
25	H	9150-01-235-5057	Grease, Instrument (97343) SRI-2 1 pint can	pt
26	F	9150-00-076-1587	Grease, Lithium (07748) 5555	oz
27	F	9150-01-091-9336	Grease, Molybdenum Disulfide (58372) 60G 1.5 pound can	lb

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
28	F	9150-00-754-2595 9150-00-965-2003	Grease, Molybdenum Disulfide (81349) MIL-G-21164 1.75 pound can 35 pound can	lb lb
29	F		Heatshrink, Sealed (46152) 1704940	ea
30	F	5970-00-815-1295	Heatshrink, Sealed (45152) 1704950	ea
31	F	2540-00-256-5529 2540-00-256-5526 2540-00-256-5527	Lubricant, Tire (96980) AA20 5 gallon can 1 quart can (96980) AA17 1 gallon can	gl qt gl
32	F	9140-00-286-5294	Oil, Diesel, Fuel BULK (81348) VVF800GRADEDF2RE	gl
33	H	9150-01-024-6059	Oil, Honing (58436) MB-30	qt
34	F	9150-00-189-6727 9150-00-183-7807	Oil, Hydraulic OE/HDO 10 (81349) MIL-L-2104 1 quart can 55 gallon drum	qt gl
35	F	6850-00-779-6851	Oil, Injector Test (33287) J 26400-5	oz
36	F	9150-00-186-6681 9150-00-189-6729	Oil, Lubricating OE/HDO 30 (81349) MIL-L-2104 1 quart can 55 gallon drum	qt gl
37	F	9150-00-189-6730 9150-00-405-2987	Oil, Lubricating, Engine OE/HDO 40 (81349) MIL-L-2104 1 quart can 55 gallon drum	qt gl
38	F	9150-01-152-4117 9150-01-152-4119	Oil, Lubricating, Engine OE/HDO 15W/40 (81349) MIL-L-2104 1 quart can 55 gallon drum	qt gl
39	F	9150-00-186-6699 9150-00-186-6703	Oil, Lubricating, Engine OE/HDO 10W/30 (81349) MIL-L-46152 1 quart can 55 gallon drum	qt gl

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
40	F		Oil, Lubricating, Gear 75 W/90 (81349) MIL-L-2105	qt
41	F	9150-01-035-5392 9150-00-001-9395	Oil, Lubricating, Gear 80W/90 (81349) MIL-L-2105 1 quart can 5 gallon can	qt gl
42	H		Paint, Black (45152) PS-025-9	oz
43	H	9150-00-250-0931 9150-00-250-0933	Petrolatum (81348) VV-P-236 8 ounce tube 7.5 pound can	oz lb
44	H	5210-00-640-6178	Plastigage (77220) PR-1	ea
45	F		Primer, (OPMN0) Sika Cleaner 205 (45152) 3145939	oz
46	F	8030-01-388-5604	Primer, "T" 7471 (05972) 19267	oz
47	F	7920-00-205-1711	Rags, Wiping (58536) A-A-531 50 pound bale	lb
48	F	4020-00-106-9342	Rope, 3/4 in. thick, 20 ft. (19207) MIL-R-24050	ea
49	F	8030-00-111-2762 8030-01-253-2319	Sealant, Adhesive (81349) MIL-S-46163 50 cc bottle 12 ounce tube	bt tu
50	F		Sealant, Electrical (00CE9) RTV200-257	
51	F		Sealer, Automotive (45152) 706786X	oz
52	H	8030-00-954-9371	Sealing Compound (77247) 51D 1 pint can	pt
53	F	8030-01-166-0675	Sealing Compound (05972) 56765	tu
54	F	8030-01-158-6070	Sealing Compound (05972) MIL-S-46163 Type 1 Grade K 10 milliliter bottle	bt

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
55	F	8030-01-069-3046	Sealing Compound (111280A) (05972) MIL-S-46163A Type II Grade M	bt
56	F	8030-01-104-5392 8030-01-025-1692	Sealing Compound (05972) Loctite #242 (80244) MIL-S-46163A Type 2 Grade N 10 milliliter bottle 250 milliliter bottle	bt bt
57	F	8030-01-159-4374 8030-01-142-9830 8030-01-142-3131	Sealing Compound (05972) Loctite #262 10 milliliter bottle 50 milliliter bottle 250 milliliter bottle	ml ml ml
58	F	8030-01-303-0502 8030-01-387-2007	Sealing Compound (05972) Loctite #680 50 milliliter bottle 250 milliliter bottle	ml ml
59	F	8030-00-180-6150 8030-00-180-6222 8030-00-891-8358	Sealing Compound (05972) Loctite #609 (80244) MIL-R-46082B Type 1 10 milliliter bottle 50 milliliter bottle 250 milliliter bottle	bt bt bt
60	F		Sealing Compound (05972) Loctite #518 50 milliliter bottle 300 milliliter cartridge	bt cr
61	O	8030-01-054-0740 8030-00-204-9149 8030-01-166-0675	Sealing Compound (05972) Loctite #567 50 milliliter bottle 250 milliliter tube (05972) Loctite #567-47 50 milliliter tube	ml ml ml
62	F	8040-01-260-1939	Sealing Compound (71984) RTV 738	oz
63	F	8030-00-291-1787 8030-00-291-1789	Sealing Compound (81349) MIL-S-45180 1 pint can 1 gallon can	pt gl
64	F	8030-00-656-1426	Sealing Compound (77247) Permatex-3D 1 pint can	pt

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
65	F	8030-01-137-6964	Sealing Compound (05972) Loctite #515 50 milliliter tube	tu
65.1	F	8030-01-026-1538	Sealing Compound (05972) Loctite #569 250 milliliter bottle	bt
66	O	6850-00-177-5094	Silicone Compound, Anti-Corrosion (71984) DC4-2OZ 2 ounce tube	oz
67	F	6810-00-252-1345	Solution, Soap (81349) MIL-W-15000 Class C	bt
68	F	6850-00-664-5685 6850-00-264-9038	Solvent, Drycleaning (81348) P-D-680 1 quart can 5 gallon can (Environmentally Compliant Solvent) (OK209) Breakthrough	qt gl
		6850-01-378-0679	5 gallon can	gl
69	F	8010-00-440-4224	Spirits, Mineral (83992) 3526	gl
70	F	9515-01-268-9500	Strip, Metal (39428) 9500K18	in
71	F	9320-00-491-5351	Strip, Rubber (98882) 70-17-13	ft
72	F	9905-00-537-8957 9905-00-537-8955	Tags, Identification (81349) MIL-T-12755 White Yellow	ea ea
73	F	7510-00-680-2395	Tape, Masking (26066) 231	ea
74	F	5970-00-547-0966	Tape, Electrical (19207) BISEALTYPE3	ea
75	F	7510-01-358-8770	Tape, Pressure Sensitive (52152) 4950 36 yard roll	yd
76	H	8010-00-401-0421	Varnish (79810) FIXATIF	qt
77	F	5970-00-901-5331	Varnish, Insulating, Electrical (15202) 10-9002	oz

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
78	F	6145-01-074-7535	Wire, 16 Gage (45152) 1927FX	ft
79	H	9505-00-331-3275	Wire, Nonelectrical (96906) MS20995C41	lb

APPENDIX C

ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

C-1. SCOPE.

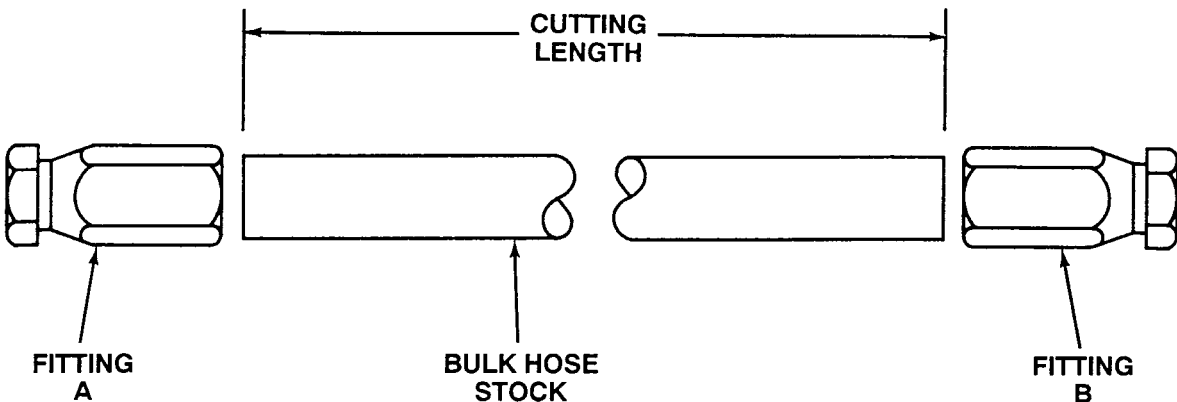
This appendix includes complete instructions for manufacturing or fabricating authorized items locally. All bulk materials needed to manufacture an item are listed by part number or specification number in a tabular list with an illustration, as needed.

Section II. MANUFACTURED ITEMS

C-2. FUEL HOSE FABRICATION.

The following hoses are cut from bulk hose using a fine-toothed hacksaw or suitable cutting device. Locations and installation instructions for fuel hoses are found in TM 9-2320-364-20. Table C-1 lists the fuel hoses.

Table C-1. Fuel System Hoses



Hose Assembly P/N	Bulk Hose P/N	Cut off Length	
		Inches	cm
65068AX-024	2575-48RL	24	610
47371AXU-018	FC350-04	18	457
EU102958-025	FC350-06	25	635
EU101958-052	FC350-06	52	1321
1924600U-034	FC350-10	34	864
56845AXU-005	FC350-10	5	127

C-3. AIR INTAKE HOSE FABRICATION.

There are two hoses in the air intake system that require fabrication. Both hoses can be cut from bulk stock using a fine-toothed hacksaw or suitable cutting device. Refer to TM 9-2320-364-20 for locations and installation instructions.

Table C-2. Air Intake Hoses

Hose Assembly P/N	Bulk Hose P/N	Cutoff Length	
		Inches	mm
2103FXW-120	21020FX	120	3048
1732400U-067	FC300-16	67	1702

C-4. COOLING SYSTEM HOSES FABRICATION.

The following hoses for the cooling system are cut from bulk hose using a fine-toothed hacksaw or suitable cutting device. Locations and installation instructions are found in TM 9-2320-364-20.

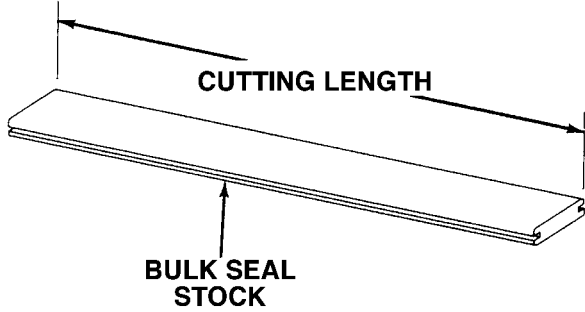
Table C-3. Cooling System Hoses

Hose Assembly P/N	Bulk Hose P/N	Cutoff Length	
		Inches	mm
69940AX-048	3230-0293	48	1219
4811FX-100	4811FX	100	2540
46754AX-U-020	FC350-06	20	508

C-5. SEAL FABRICATION.

Fabricate seals from bulk seal stock listed in Table C-4. Use a suitable cutting tool to cut seal to length required.

Table C-4. Seal, Nonmetallic



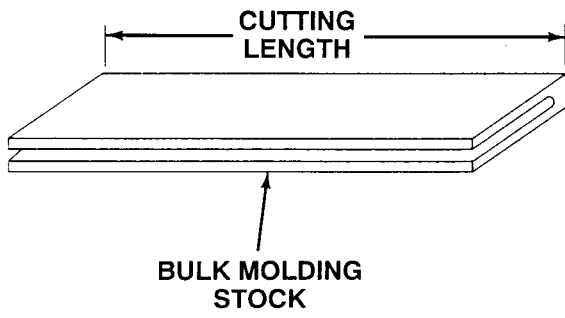
The diagram shows a perspective view of a long, thin, rectangular piece of bulk seal stock. A double-headed arrow above the piece is labeled "CUTTING LENGTH", indicating the distance from the left end to a specific point on the right side. An arrow points from the text "BULK SEAL STOCK" below to the center of the piece.

Seal P/N	Seal Bulk P/N	Cutoff Length	
		inches	mm
59747AX-040	101-2203	40	1016
59747AX-055	101-2203	55	1397
59745AX-040	75000519	40	1016
59745AX-055	75000519	55	1397
125865A-047	75001366	47	1194
125865A-116	75001366	116	2946
125865A-160	75001366	160	4064

C-6. EDGING AND MOLDING FABRICATION.

Edging and molding can be fabricated from bulk stock listed in Table C-5. Use suitable cutting tool to cut to length required.

Table C-5. Edging and Molding

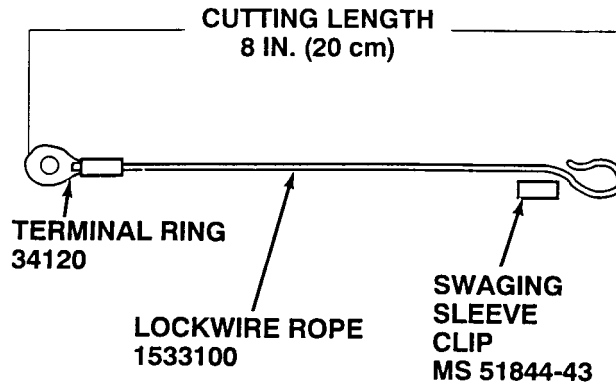


The diagram shows a perspective view of a rectangular block of material, labeled 'BULK MOLDING STOCK'. A horizontal double-headed arrow above the block is labeled 'CUTTING LENGTH', indicating the dimension to be cut to for fabrication.

Edging/Molding P/N	Edging/Molding Bulk P/N	Cutoff Length	
		inches	mm
1339700-011	1339700	11	279
26927AX-026	26927AX	26	660
26947BX-002	75000317	2	51
26947BX-003	75000317	3	76
26947BX-004	75000317	4	102
26947BX-005	75000317	5	127
26947BX-006	75000317	6	152
26947BX-017	75000317	17	432
26947BX-018	75000317	18	457
1467160-012	75000317	12	305
42925AX-005	OR40	5	127
27022AX-002	R-422-N	2	5
27022AX-019	R-422-N	19	483
27022AX-024	R-422-N	24	610
27022AX-043	R-422-N	43	1092
27022AX-093	R-422-N	93	2362
27022AX-101	R-422-N	101	2565
27022AX-130	R-422-N	130	3302

C-7. LOCKWIRE ROPE FABRICATION.

The lockwire length is shown in Table C-6. Crimped button stop caps are used to attach the lockwire to other components. Each application requires two swaging sleeve clips.



NOTES:

1. Obtain all components required to fabricate lockwire.
2. Use a fine toothed hacksaw or suitable cutting device, and cut lockwire to length required.
3. Slide wire through hole in component, until lockwire comes through other side.
4. Slide cap onto lockwire, until cap bottoms against component and wire comes through cap.
5. Crimp cap to lockwire.
6. Slide opposite end of wire through assembly, and slide other cap over end of wire.
7. Slide wire through hole in component, until lockwire comes through other side.
8. Slide cap onto lockwire, until cap bottoms against component and wire comes through cap.
9. Crimp cap to lockwire

The following wire rope is cut from bulk stock. Refer to Table C-6 for cutting lengths.

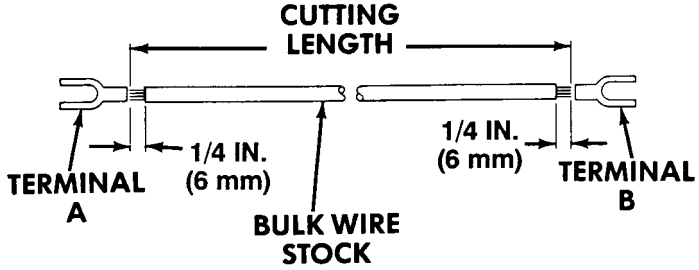
Table C-6. Lockwire Rope

Lockwire Rope Part Number	Lockwire Rope Bulk Park Number	Cutoff Length	
		Inches	cm
1533100-010	1533100	10	25
1533100-015	1533100	15	38
1533100-020	1533100	20	51
1533100-024	1533100	24	61

C-8. WIRE AND WIRE ASSEMBLIES FABRICATION.

Fabricate from bulk wire stock listed in Table C-7. Use wire cutters to cut wire to required length, then strip ends of wire 1/4 in (6.35 mm). Crimp the required lugs or terminals onto wire ends.

Table C-7. Wire and Wire Assemblies



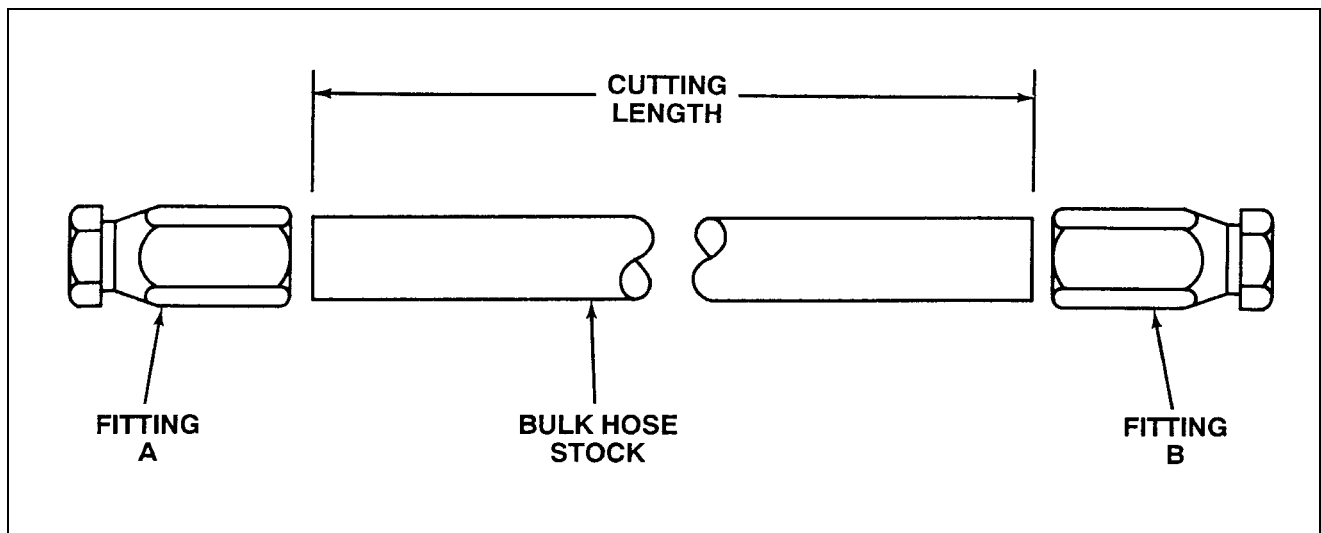
The diagram illustrates the fabrication of a wire assembly. It shows a central section of 'BULK WIRE STOCK' with a 'CUTTING LENGTH' indicated by a double-headed arrow above it. On both ends of the wire, there are 'TERMINAL A' and 'TERMINAL B' crimped onto the wire. The distance from the center of the bulk wire stock to the center of each terminal is marked as '1/4 IN. (6 mm)'.

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length	
		inches	cm
1884540W-012	121782A	12	31
1947560W-012	121782A	12	31
1959390W-012	121782A	12	31
1959600W-012	121782A	12	31
1977300W-010	4127FX	10	25
1974580-013	R-64951	13	33
1974590-005	R-64951	5	13
1978470W-005	R-64951	5	13

C-9. HOSES AND TUBES.

Fabricate hoses and tubes from bulk hose or tube stock listed in Table C-8. Use a fine toothed hacksaw or suitable cutting device and cut hose/tube to desired length. Place fitting A in vise and screw hose/tube counterclockwise until hose/tube bottoms out in fitting. Back off 1/4 turn. Repeat for fitting B.

Table C-8. Hoses and Tubes



Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
5113689-12	1525-6	12	31
21021FX-026	2102CFX	26	66
32850AX-014	22020	14	36
32850AX-016	22020	16	41
32850AX-030	22020	30	76
32850AX-036	22020	36	91
32850AX-51	22020	51	130
31270AX-029	31270AX	29	74
31270AX-082	31270AX	82	208
31270AX-096	31270AX	96	244
31270AX-140	31270AX	140	356
69940AX-006	3230-0293	6	15
69940AX-065	3230-0293	65	165
31271AX-040	3250-101	40	102
31271AX-047	3250-101	47	119
31271AX-053	3250-101	53	135
31271AX-092	3250-101	92	234
31271AX-150	3250-101	150	381

Table C-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
AAAC0085	5199575	85	216
AAAC0105	5199575	105	267
AAAC0190	5199575	190	483
AAAC0260	5199575	260	660
AAAE0090	5199575	90	229
1944510	70-062		Variable
1944520	70-062		Variable
23319FX-012	C604-200 BLK	12	31
23319FX-023	C604-200 BLK	23	58
23319FX-029	C604-200 BLK	29	74
23319FX-244	C604-200 BLK	244	620
23319FX-257	C604-200 BLK	257	653
23323FX-008	C606 BLACK	8	20
23323FX-008	C606 BLACK	8	20
23323FX-010	C606 BLACK	10	25
23323FX-010	C606 BLACK	10	25
23323FX-012	C606 BLACK	12	31
23323FX-014	C606 BLACK	14	36
23323FX-019	C606 BLACK	19	48
23323FX-022	C606 BLACK	22	56
23323FX-026	C606 BLACK	26	66
23323FX-030	C606 BLACK	30	76
23323FX-033	C606 BLACK	33	84
23323FX-042	C606 BLACK	42	107
23323FX-042	C606 BLACK	42	107
23323FX-044	C606 BLACK	44	112
23323FX-046	C606 BLACK	46	117
23323FX-050	C606 BLACK	50	127
23323FX-052	C606 BLACK	52	132
23323FX-055	C606 BLACK	55	140
23323FX-057	C606 BLACK	57	145
23323FX-060	C606 BLACK	60	152
23323FX-060	C606 BLACK	60	152
23323FX-082	C606 BLACK	82	208
23323FX-087	C606 BLACK	87	221
23323FX-089	C606 BLACK	89	226

Table C-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
23323FX-148	C606 BLACK	148	376
23323FX-159	C606 BLACK	159	404
23323FX-163	C606 BLACK	163	414
23323FX-200	C606 BLACK	200	508
23323FX-335	C606 BLACK	335	851
23323FX-377	C606 BLACK	377	958
198872A U-200	FC300-04	20	51
115134A W-004	FC300-04	4	10
1732400 U-067	FC300-16	67	170
1620950 U-099	FC350-04	99	252
47371AX U-055	FC350-04	5	13
47371AX U-006	FC350-04	6	15
47371AX U-012	FC350-04	12	31
47371AX U-017	FC350-04	17	43
47371AX U-018	FC350-04	18	46
47371AX U-120	FC350-04	120	305
60264AX U-031	FC350-04	31	79
60264AX U-034	FC350-04	34	86
60264AX U-054	FC350-04	54	137
60264AX U-057	FC350-04	57	145
60264AX U-063	FC350-04	63	160
60264AX U-082	FC350-04	82	208
60296AX U-029	FC350-04	29	74
60296AX U-036	FC350-04	36	91
60296AX U-061	FC350-04	61	155
1780700 U-032	FC350-06	32	81
1780700 U-035	FC350-06	35	89
1780700 U-039	FC350-06	39	99
1780700 U-041	FC350-06	41	104
1782400 U-022	FC350-06	22	56
1782410 U-021	FC350-06	21	53
1782450 U-025	FC350-06	25	64
47336AX-060	FC350-06	60	152
47554AX U-020	FC350-06	20	51
118971A U-022	FC350-08	22	56
118971A U-095	FC350-08	95	241

Table C-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
119784A U-010	FC350-08	10	25
119784A U-021	FC350-08	21	53
119784A U-047	FC350-08	47	119
1782340 U-019	FC350-08	19	48
1782360 U-020	FC350-08	20	51
1921290 U-025	FC350-08	25	64
1936150 U-032	FC350-08	32	81
1936150 U-034	FC350-08	34	86
1936150 U-038	FC350-08	38	97
1936150 U-040	FC350-08	40	102
69390AX U-006	FC350-08	6	15
69390AX U-019	FC350-08	19	48
69390AX U-020	FC350-08	20	51
69390AX U-020	FC350-08	20	51
69390AX U-021	FC350-08	21	53
69390AX U-025	FC350-08	25	37
1780720 U-020	FC350-10	20	51
1780720 U-051	FC350-10	51	130
1782370 U-037	FC350-10	37	94
1782380 U-031	FC350-10	31	79
1782390 U-020	FC350-10	20	51
1782420 U-039	FC350-10	39	99
1782430 U-031	FC350-10	31	79
1782440 U-019	FC350-10	19	48
1924600 U-090	FC350-10	90	229
47750AX U-009	FC350-10	9	23
58989AX U-020	FC350-10	20	51
58989AX U-034	FC350-10	34	86
58989AX U-064	FC350-10	64	163
66798AX U-020	FC350-10	20	51
66798AX U-025	FC350-10	25	64
66798AX U-030	FC350-10	30	76
66798AX U-077	FC350-10	77	196
1780710 U-082	FC350-12	82	208
1780710 U-083	FC350-12	83	211
47369AX U-127	FC350-12	127	323

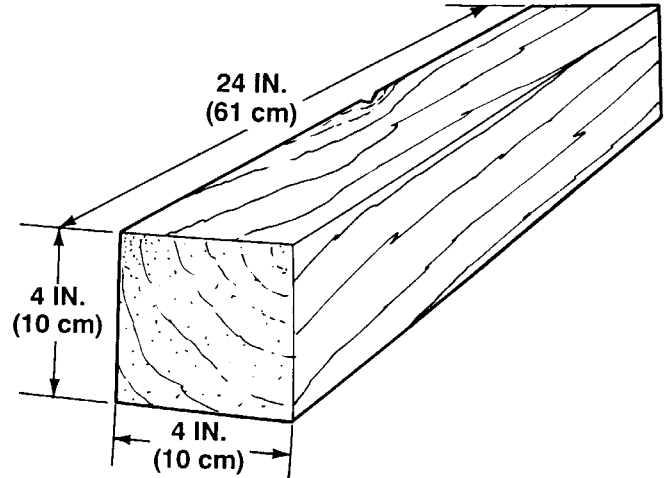
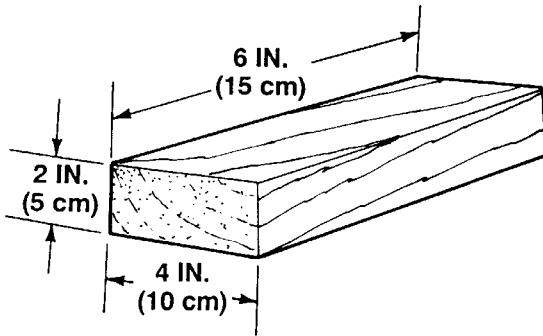
Table C-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
61608AX U-093	FC350-12	93	236
61608AX U-142	FC350-12	142	361
47468AX U-011	FC350-16	11	28
47468AX U-022	FC350-16	22	56
47468AX U-045	FC350-16	45	114
47468AX U-046	FC350-16	46	117
47468AX U-089	FC350-16	89	226
47213AX-012	NT10012-50FT	12	31
47213AX-016	NT10012-50FT	16	41
47213AX-021	NT10012-50FT	21	53
47213AX-023	NT10012-50FT	23	58
47213AX-025	NT10012-50FT	25	64
47213AX-025	NT10012-50FT	25	64
47213AX-060	NT10012-50FT	60	152
47213AX-073	NT10012-50FT	73	185
47213AX-073	NT10012-50FT	73	185
47213AX-173	NT10012-50FT	173	439
47213AX-194	NT10012-50FT	194	493
1656470-030	PFT-4A-BLU	30	76
1656470-104	PFT-4A-BLU	104	264
1656470-115	PFT-4A-BLU	115	292
1656470-139	PFT-4A-BLU	139	353
1605260-008	PFT-4A-GRN	8	20
1605330-020	PFT-4A-ORG	20	51
1605330-040	PFT-4A-ORG	40	102
1605330-071	PFT-4A-ORG	71	180
1605330-112	PFT-4A-ORG	112	285
1605330-124	PFT-4A-ORG	124	315
1605170-007	PFT-4A-RED	7	18
1605270-023	PFT-6B-GRN	23	58
1605270-028	PFT-6B-GRN	28	71
1605270-056	PFT-6B-GRN	56	142
1605270-057	PFT-6B-GRN	57	145
1605270-100	PFT-6B-GRN	100	254
1605270-108	PFT-6B-GRN	108	274
1605270-146	PFT-6B-GRN	146	371

Table C-8. Hoses and Tubes (Cont)

Hose/Tube Part Number	Bulk Hose Part Number	Cutoff Length	
		Inches	cm
1605320-205	PFT-6B-ORG	205	521
1605160-012	PFT-6B-RED	12	31
1605160-014	PFT-6B-RED	14	36
1605160-030	PFT-6B-RED	30	76
1605160-031	PFT-6B-RED	31	79
1605160-047	PFT-6B-RED	47	119
1605160-048	PFT-6B-RED	48	122
1605160-049	PFT-6B-RED	49	125
1605160-055	PFT-6B-RED	55	140
1605160-102	PFT-6B-RED	102	259
1605160-103	PFT-6B-RED	103	262
1605160-114	PFT-6B-RED	114	290
1605160-165	PFT-6B-RED	165	419
1605160-213	PFT-6B-RED	213	541
1605300-026	PFT-6B-YEL	26	66
1605300-066	PFT-6B-YEL	66	168
1605300-070	PFT-6B-YEL	70	178
1605300-129	PFT-6B-YEL	129	328
1605300-132	PFT-6B-YEL	132	335
1605300-150	PFT-6B-YEL	150	381
1605300-022	PFT-8B-BLU	22	56
1605300-316	PFT-8B-BLU	316	802
1656500-128	PFT-10B-GRN	128	325
1656500-183	PFT-10B-GRN	183	465
1656490-102	PFT-10B-RED	102	259
1656490-202	PFT-10B-RED	202	513
1656490-257	PFT-10B-RED	257	653
W-22-13	W-22	13	33
W-22-9	W-22	9	23
40AW168-010	W-22-L	10	25
40AW168-050	W-22-L	50	127
40AW168-19	W-22-L	19	48
40AW168-27	W-22-L	27	69
40AW168-45	W-22-L	45	114

C-10. WOODEN BLOCKS.



- a. Fabricate from MML751 lumber stock.
- b. Using saw and standard planing machine, cut stock to size required in Table C-9.

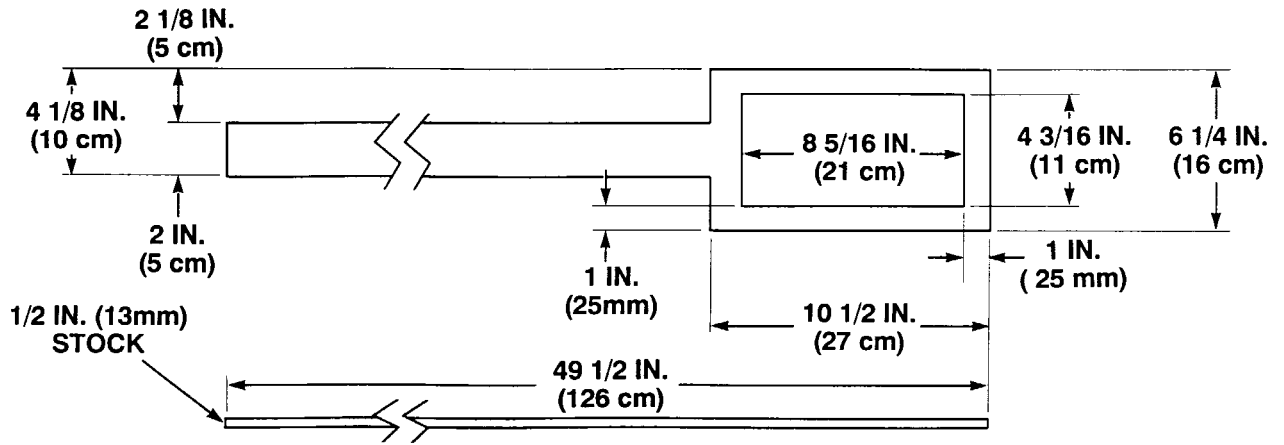
Table C-9. Wooden Blocks

Para Number	Finished Dimensions of Block In. (cm)	Qty.
2-14	3 by 12 by 72 in. (8 by 30 by 183 cm)	4
2-15	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
2-15	4 by 4 by 24 in. (10 by 10 by 61 cm)	1
3-7	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
3-12	2 by 4 by 16 in. (5 by 10 by 41 cm)	2
3-18	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
3-19	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
3-33	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
5-7	2 by 4 by 12 in. (5 by 10 by 30 cm)	2
6-31	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
7-10	2 by 4 by 30 in. (5 by 10 by 76 cm)	2
9-3	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
9-11	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
9-13	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
12-9	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
12-9	2 by 4 by 11 in. (5 by 10 by 28 cm)	1
12-9	4 by 6 by 11 in. (10 by 15 by 28 cm)	1
12-10	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
12-11	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
13-2	2 by 4 by 6 in. (5 by 10 by 15 cm)	2
13-4	2 by 4 by 6 in. (5 by 10 by 15 cm)	2
13-13	6 by 7 by 15 in. (15 by 18 by 38 cm)	2
14-6	1 by 3 by 12 in. (3 by 8 by 30 cm)	1
15-2	2 by 2 by 4 in. (5 by 5 by 10 cm)	2
16-2	4 by 6 by 42 in. (10 by 15 by 107 cm)	4
16-3	2 by 4 by 12 in. (5 by 10 by 30 cm)	1
16-3	4 by 4 by 36 in. (10 by 10 by 91 cm)	1

Table C-9 Wooden Blocks (Continued)

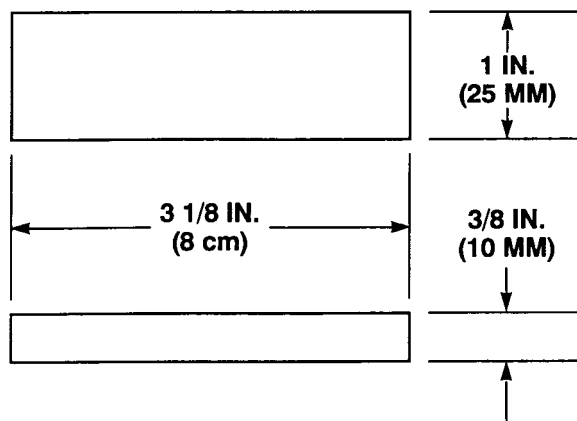
Para Number	Finished Dimensions of Block In. (cm)	Qty.
16-6	4 by 4 by 18 in. (10 by 10 by 46 cm)	1
16-17	4 by 6 by 42 in. (10 by 15 by 107 cm)	2
16-26	4 by 4 by 18 in. (10 by 10 by 46 cm)	1
16-31	2 by 4 by 6 in. (5 by 10 by 15 cm)	1
16-38	4 by 6 by 35 in. (10 by 15 by 89 cm)	2
16-40	4 by 6 by 35 in. (10 by 15 by 89 cm)	2
16-41	2 by 4 by 6 in. (5 by 10 by 15 cm)	2
17-8	2 by 4 by 6 in. (5 by 10 by 15 cm)	2
17-12	4 by 6 by 35 in. (10 by 15 by 89 cm)	2
17-13	4 by 6 by 35 in. (10 by 15 by 89 cm)	2
17-14	1 by 2 by 6 in. (3 by 5 by 15 cm)	2
17-15	4 by 6 by 35 in. (10 by 15 by 89 cm)	2
17-16	4 by 6 by 35 in. (10 by 15 by 89 cm)	2
20-19	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
20-39	2 by 4 by 12 in. (5 by 10 by 30 cm)	2
20-47	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
20-48	2 by 4 by 36 in. (5 by 10 by 91 cm)	2
20-49	2 by 4 by 36 in. (5 by 10 by 91 cm)	2
20-50	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
20-52	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
20-53	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
21-2	4 by 4 by 16 in. (10 by 10 by 41 cm)	2
23-12	2 by 4 by 30 in. (5 by 10 by 76 cm)	2
23-13	4 by 6 by 24 in. (10 by 15 by 61 cm)	2
23-14	6 by 6 by 16 in. (15 by 15 by 41 cm)	2
23-15	4 by 4 by 16 in. (10 by 10 by 41 cm)	2
23-18	2 by 4 by 30 in. (5 by 10 by 76 cm)	1
23-18	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
23-19	4 by 4 by 24 in. (10 by 10 by 61 cm)	2
28-2	2 by 2 by 12 in. (5 by 5 by 30 cm)	2
28-3	2 by 2 by 12 in. (5 by 5 by 30 cm)	1
28-6	2 by 2 by 12 in. (5 by 5 by 30 cm)	2
28-9	4 by 6 by 35 in. (10 by 15 by 89 cm)	1
28-11	2 by 2 by 12 in. (5 by 5 by 30 cm)	2
28-13	2 by 2 by 12 in. (5 by 5 by 30 cm)	2
28-14	4 by 4 by 24 in. (10 by 10 by 61 cm)	2

C-11. FLANGE HOLDER.



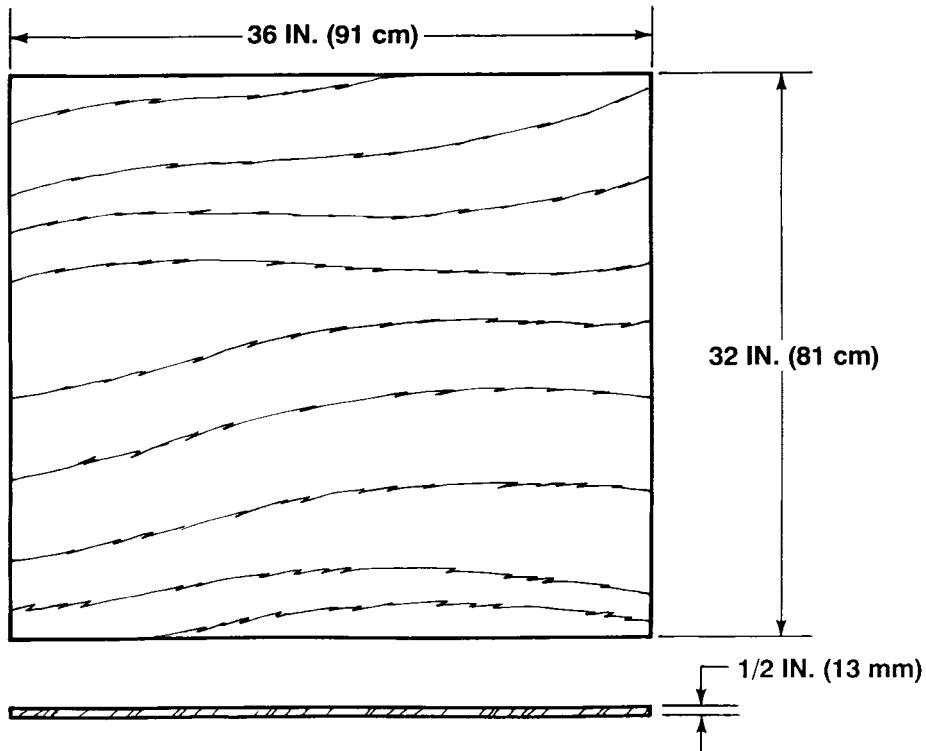
Fabricate the flange holder from 1/2 in. (13 mm) thick mild steel stock. Using a torch, cut steel stock to dimensions shown. Using a grinder, remove all rough edges.

C-12. JET EXTRACTOR.



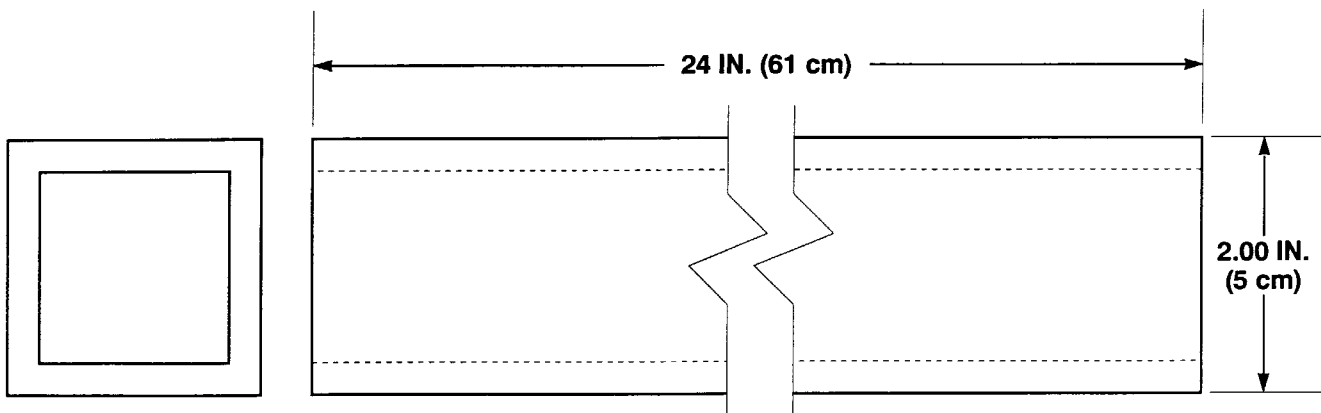
Fabricate from 3/8 in. (10 mm) thick mild steel stock. Using a hacksaw, cut to dimensions shown. Using a file or grinder, remove all rough edges.

C-13. PLYWOOD SHEET.



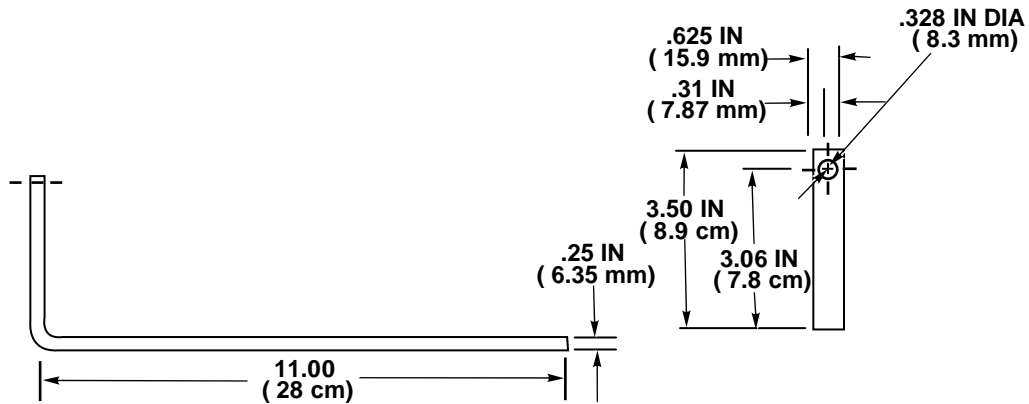
Fabricate from 1/2 in. (13 mm) thick plywood stock. Using a saw, cut to dimensions shown. Using a file or sandpaper, remove all rough edges.

C-14. STEEL TUBE.



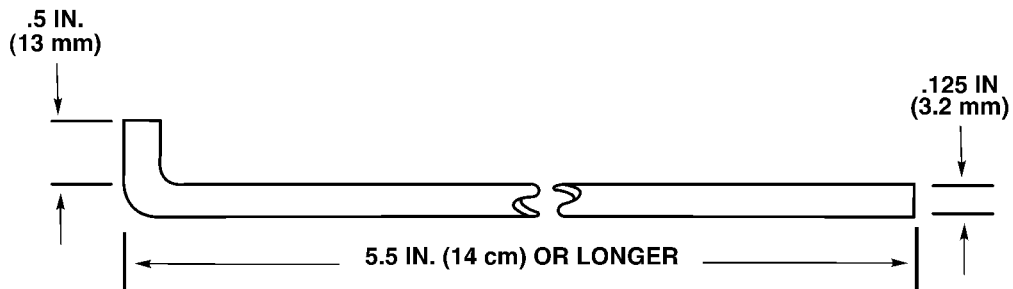
Fabricate from 1/4 in. (6 mm) thick steel square tube stock. Using a hacksaw, cut a 24 in. (61 cm) length piece of tube. File off rough edges.

C-15. ADAPTER DIFFERENTIAL PRELOAD.



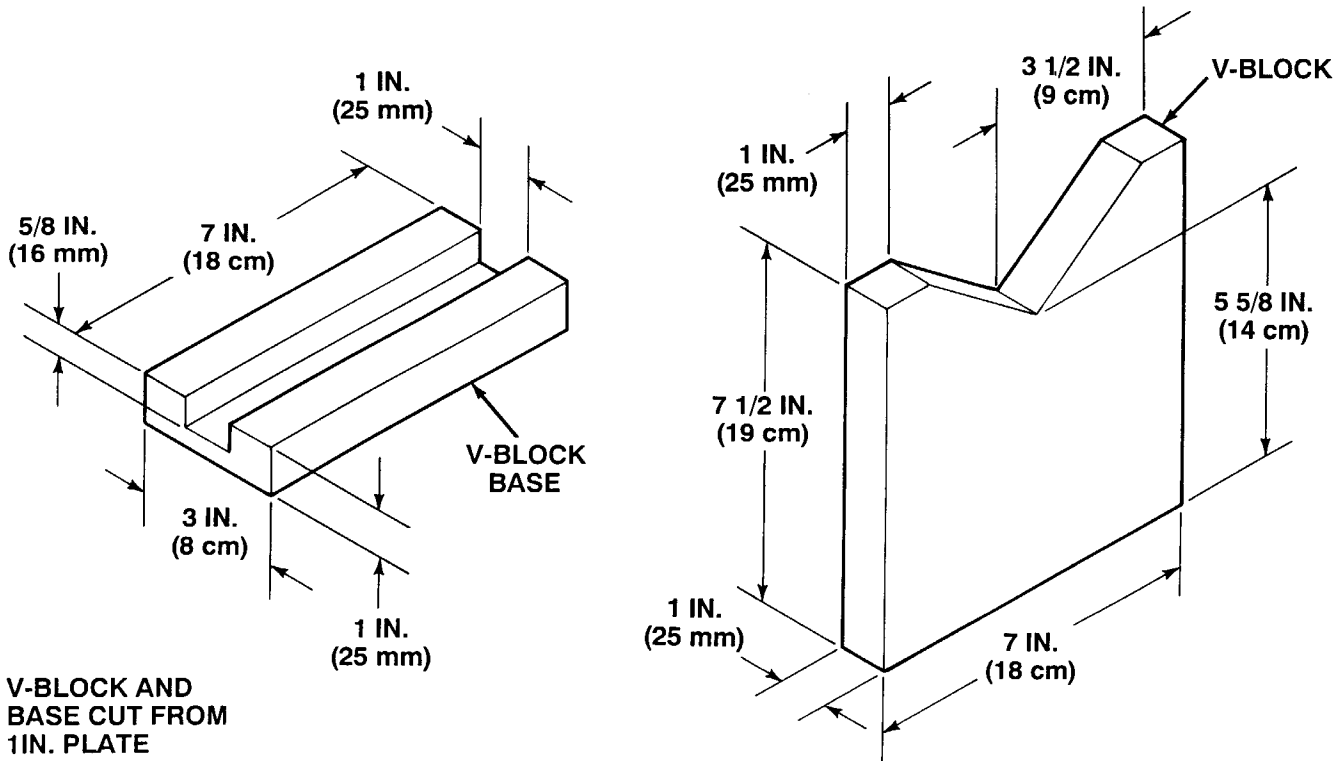
- (1) Fabricate from .250 in. (6.4 mm) thick x .625 in. (13 mm) wide mild steel stock.
- (2) Drill .328 in. (8.3 mm) hole where indicated.
- (3) Bend 90° where indicated.

C-16. WIRE HOOK.

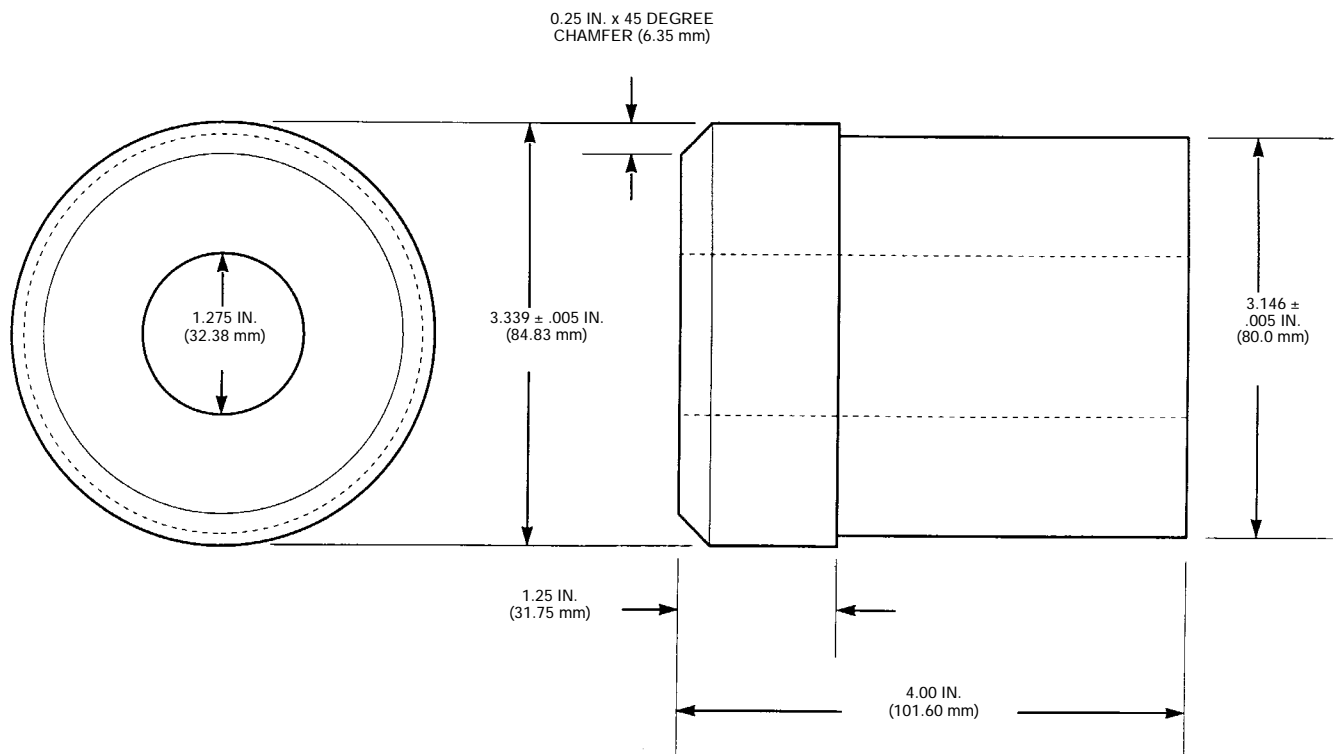


- (1) Fabricate from 1/8 in. (3.2 mm) diameter steel welding rod or equivalent stiff wire.
- (2) Using cutting pliers, cut welding rod to 6 in. (15.2 cm) length or longer.
- (3) Using machinist's vise, bend 1/2 in. (13 mm) length of rod 90 degrees.

C-17. V-BLOCK BASE AND V-BLOCK.



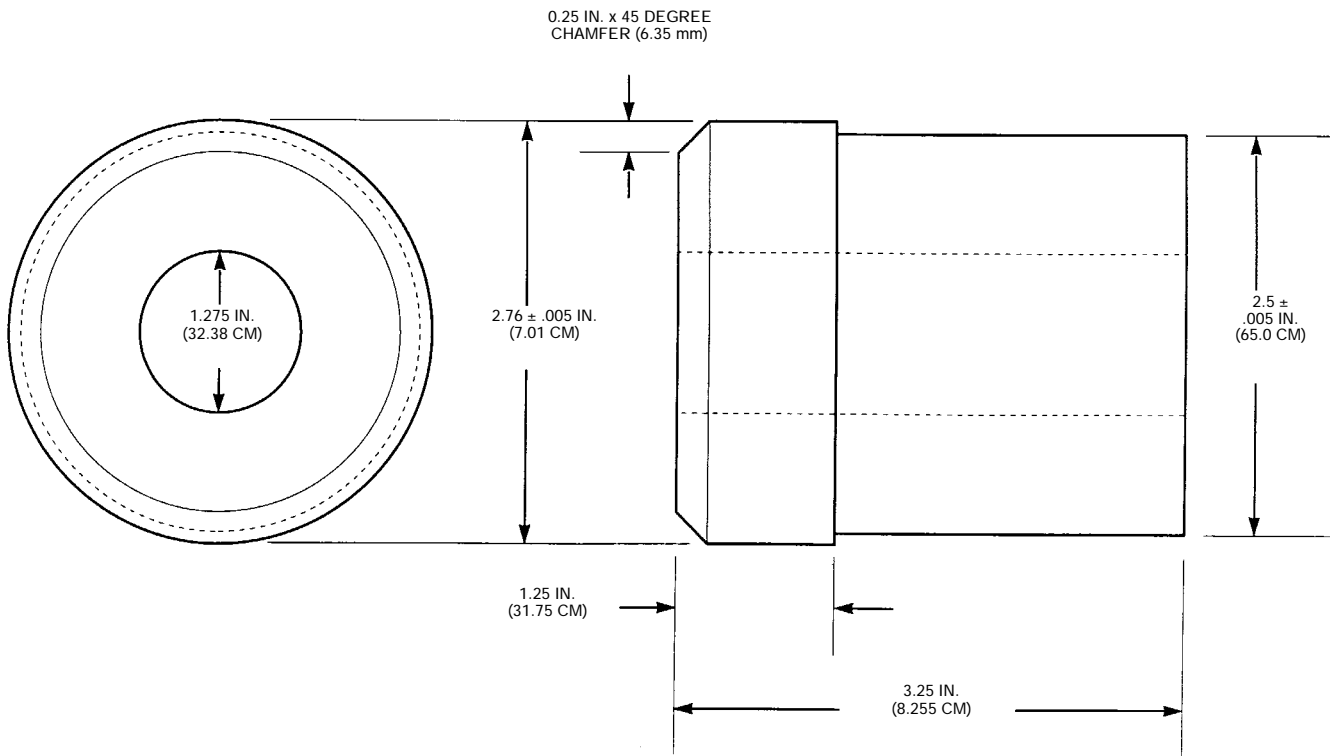
Fabricate V-Block from 1 in. (25 mm) thick mild steel stock. Using a grinder, remove any sharp edges. Using a file and then a sharpening stone, remove roughness from the inside surface of the V.

C-18. LHS BUSHING REMOVER/INSTALLER (SMALL).


Fabricate large LHS bushing remover/installer from 4 in. (101 mm) x 3.339 in. diameter steel stock.

- a. Turn round stock to 3.339 in. ± .005 in.
- b. Cut a 1/4 in. (6 mm) x 45 degree chamfer where indicated.
- c. Drill through a 1.275 in. hole in the center of the 3.339 in. diameter steel stock where indicated.
- d. Starting at the end opposite of the chamfer, turn a length of 2.75 in. down to 3.146 in. ± .005 in. where indicated.
- e. Paint as required.

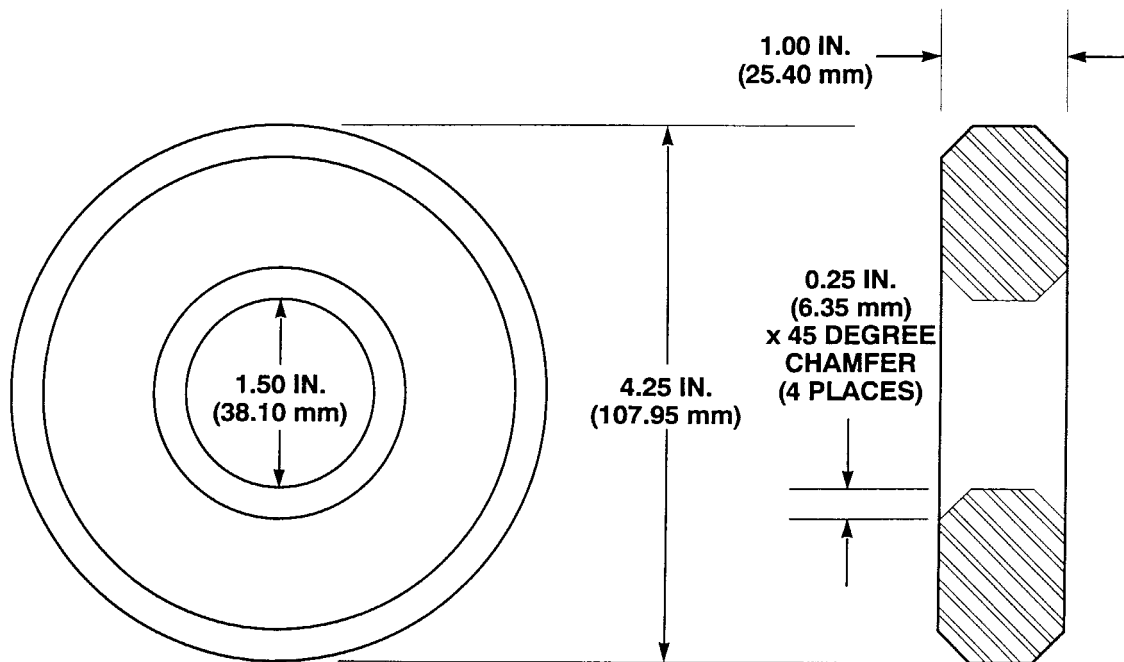
C-19. CHU BUSHING REMOVER/INSTALLER (SMALL).



Fabricate small CHU bushing remover/installer from 3.25 in. (8.255 cm) x 2.76 in. (7.01 cm) diameter steel stock.

- a. Turn round stock to 2.76 in. ± .005 in. (7.01 cm ± ∞ ®)
- b. Cut a 1/4 in. (6 mm) x 45 degree chamfer where indicated.
- c. Drill through a 1.275 in. (32.38 mm) hole in the center of the 2.76 in. diameter steel stock where indicated.
- d. Starting at the end opposite of the chamfer, turn a length of 2.00 in. down to 2.5 in. ± .005 in. where indicated.
- e. Paint as required.

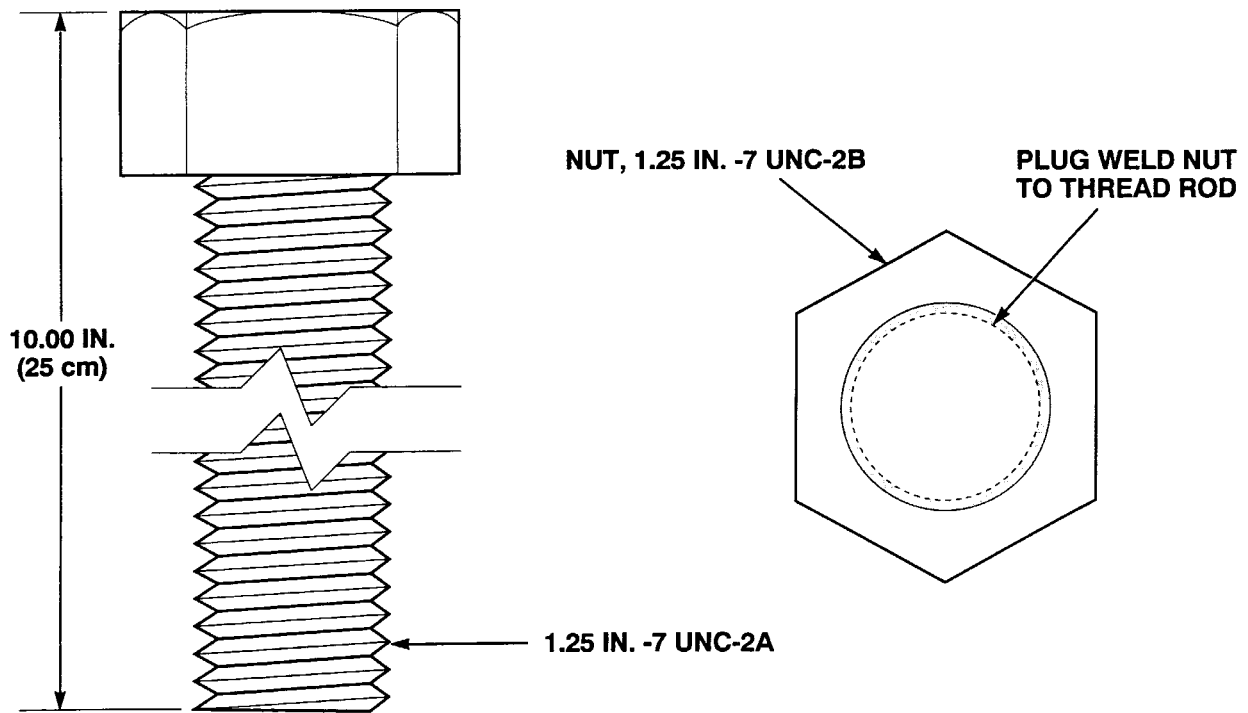
C-20. LHS BUSHING REMOVER/INSTALLER (LARGE).



Fabricate small LHS bushing remover/installer from 1 in. (25 mm) x 4 1/4 in. (108 mm) diameter steel stock.

- a. Drill 1 1/2 in. (38 mm) through steel stock where indicated.
- b. Cut a 1/4 in. (6.35 mm) x 45 degree chamfer on both inside and outside diameters where indicated.
- c. Paint as required.

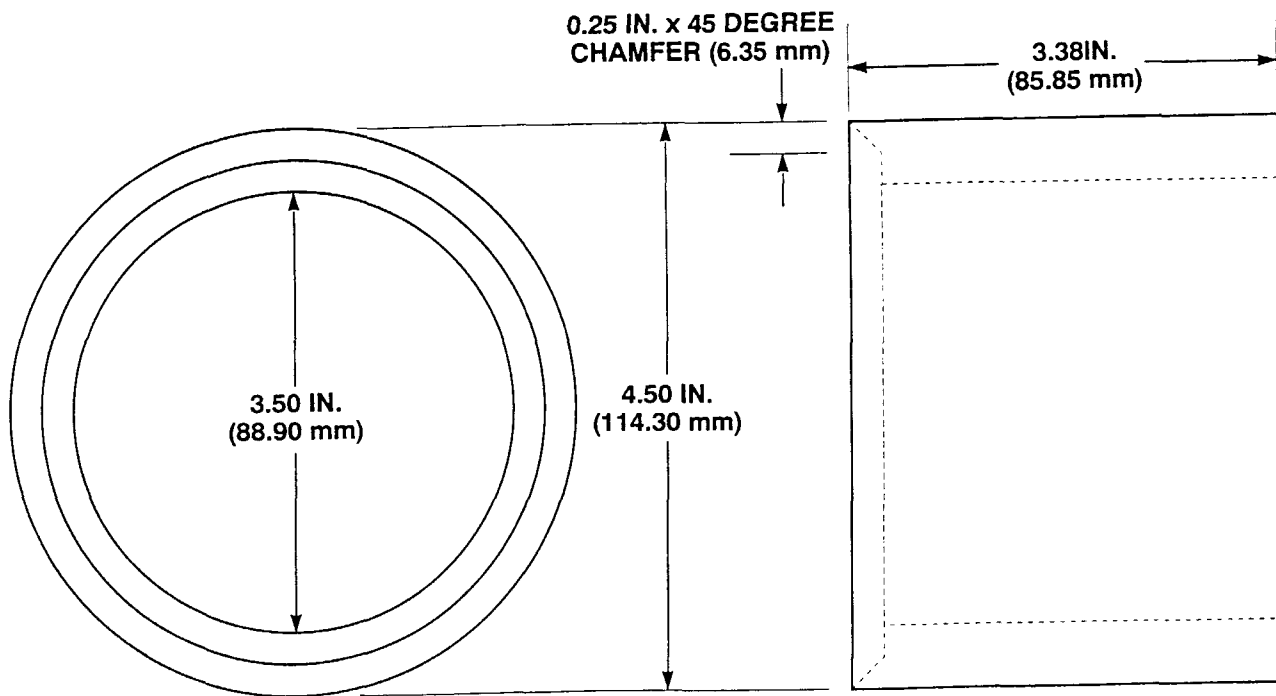
C-21. LHS LEAD SCREW.



Fabricate LHS lead screw from grade 8 steel.

- a. Cut length of thread rod to 9.750 in. (25 cm).
- b. Thread nut on rod until total length measures 10.00 in. (25 cm).
- c. Plug weld nut to thread rod.
- d. Two grade 8 nuts are required, one loose and one welded.

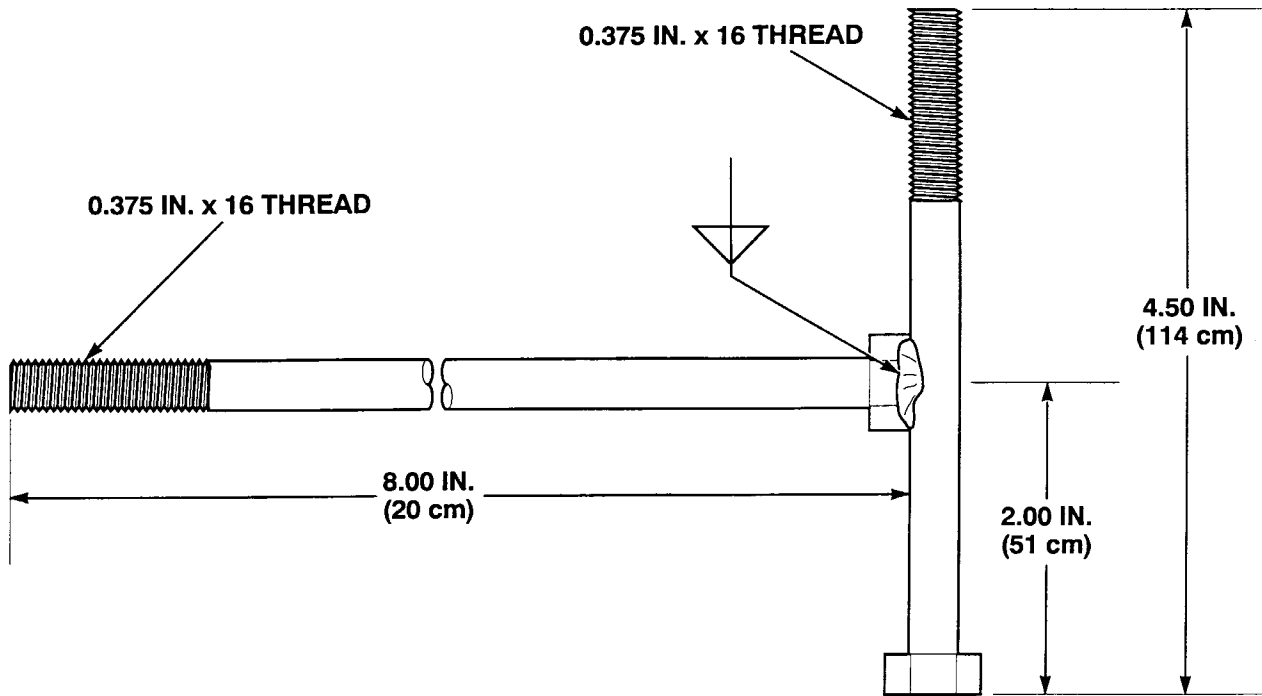
C-22. LHS BUSHING REMOVER.



Fabricate LHS bushing remover from 3.38 in. (85.85mm) x 4 1/2 in. (114 mm) diameter steel tubing.

- a. Cut 4 1/2 in. (114 mm) outside diameter x 1/2 in. (13 mm) thick tubing to cut length of 3.38 in. (85.85 mm).
- b. Cut a 1/4 in. (6 mm) x 45 degree chamfer where indicated.
- c. Paint as required.

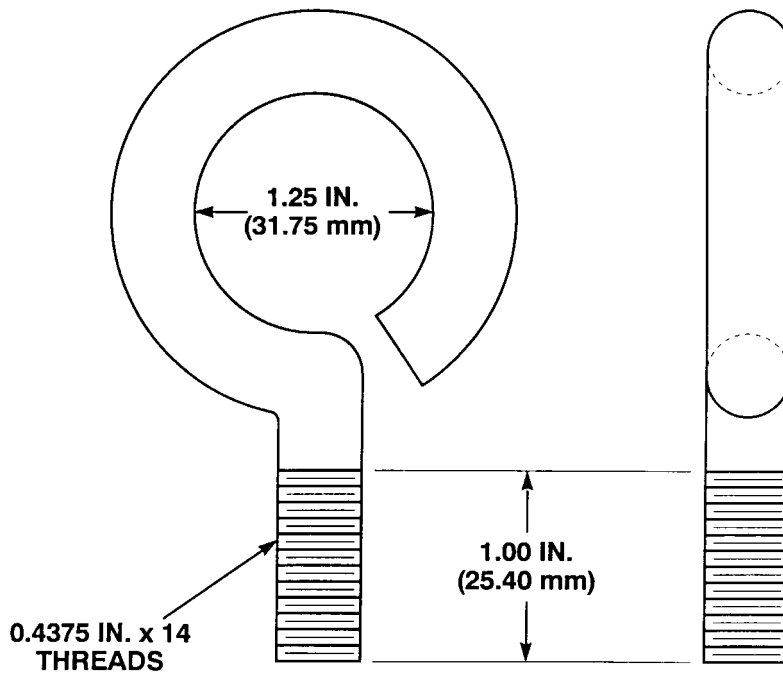
C-23. LIFTING TEE HANDLES.



Fabricate material from: screw (1) .375 in. x 16 x 8 in. (20 cm) grade 5, and screw (1) .375 in. x 16 x 4 1/2 in. (11 cm) grade 5.

- a. Weld together screws where indicated.
- b. Paint as required.

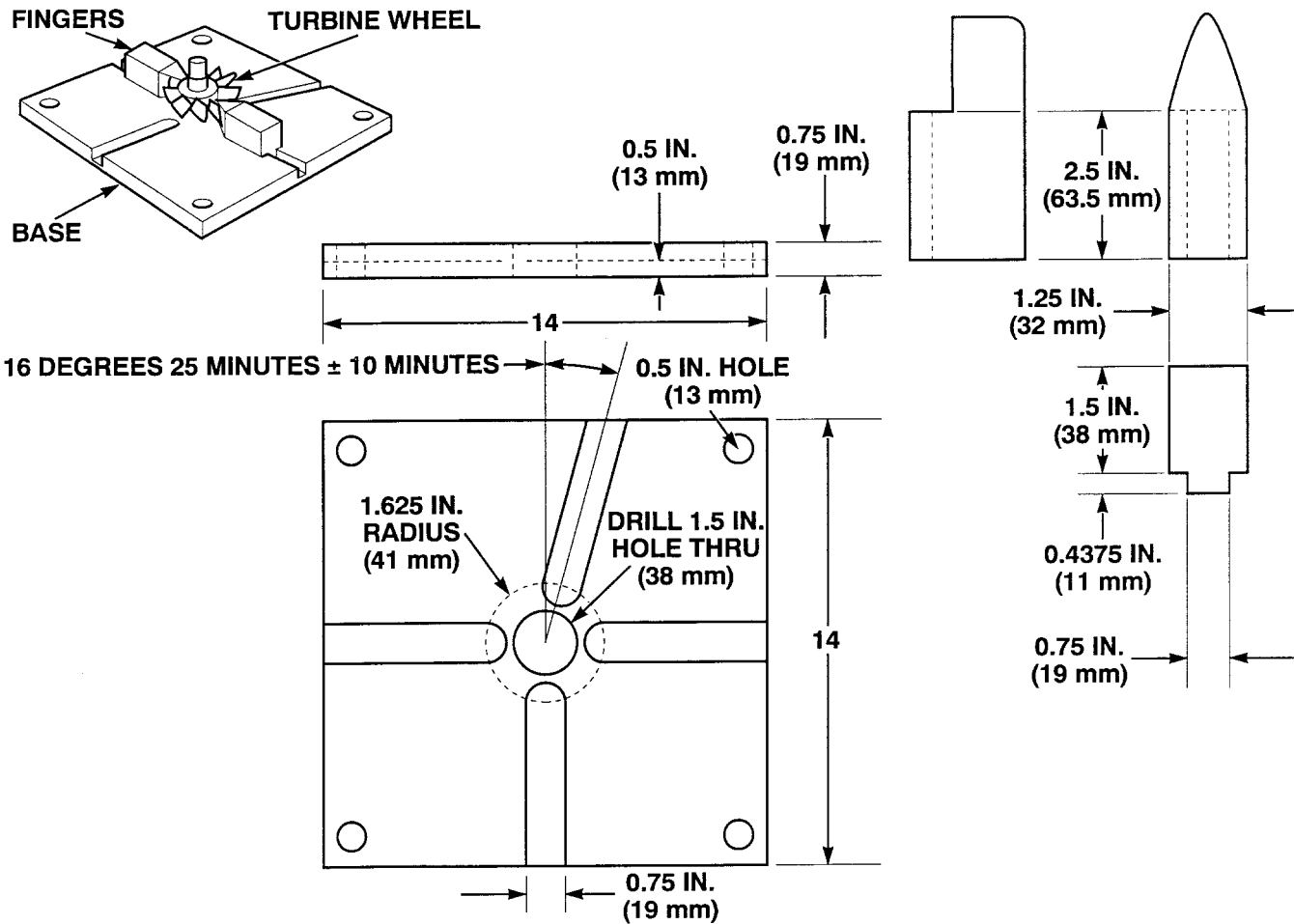
C-24. LIFTING EYES.



Fabricate from 7/16 in. (11 mm) x 6 in. (152 mm) cold rolled steel.

- a. Thread 7/16 x 14 x 1 in. (25 mm) long.
- b. Heat unthreaded end and bend over 1 1/4 in. (32 mm) diameter rod.

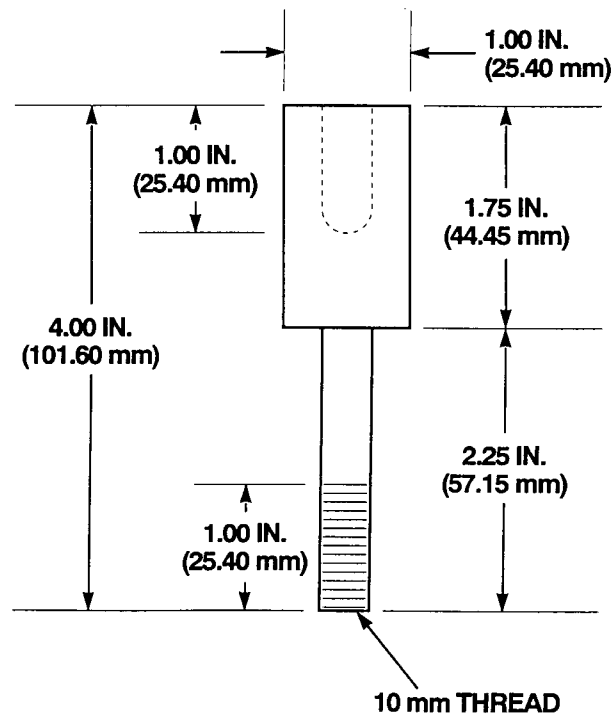
C-25. TURBOCHARGER HOLDING FIXTURE.



Fabricate from 3/4 in. (19 mm) exterior grade plywood.

- a. Drill 1 1/2 in (38 mm) diameter hole in center of base.
- b. Drill four 1/2 in. (13 mm) diameter holes in corners of base.
- c. Draw a circle with a 1 5/8 in. (41 mm) radius.
- d. Route four 1/2 in. (13 mm) x 3/4 in. (19 mm) slots in base into circle as shown.
- e. Fabricate two 1 15/16 in. (49 mm) x 2 1/2 in (63.5 mm) x 1 1/4 in. (32 mm) fingers from plywood.
- f. Grind bottom of fingers 23/32 in. (18 mm) wide and 7/16 in. (11 mm) high. Contour front surface of fingers to fit turbine wheel blades.

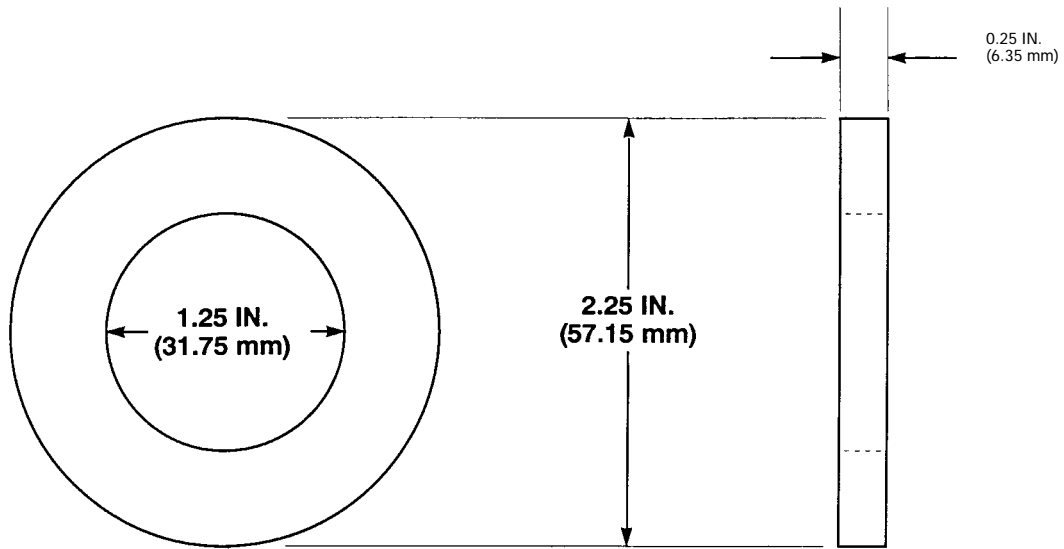
C-26. CONSTANT VELOCITY U-JOINT BEARING CAP REMOVAL TOOL.



Fabricate from 1 in. (25.4 mm) mild steel round stock; 4 in. (101.6 mm) long.

- a. Turn down 2 1/4 in. (57.15 mm) of 1 in. (25.4 mm) mild steel round stock to .39 in. (10 mm).
- b. Tap 1 in. (25.4 mm) of 10 mm diameter shaft with 10 mm by 1 in. (25.4 mm) threads.
- c. Drill 5/8 in. (16mm) hole 1 in. (25.4mm) deep in 1 in. (25.4 mm) end of mild steel round stock.
- d. Tap 1 in. (25.4 mm) of 3/4 in. by 16 diameter hole in 1 in. (25.4 mm) end of mild steel round stock.

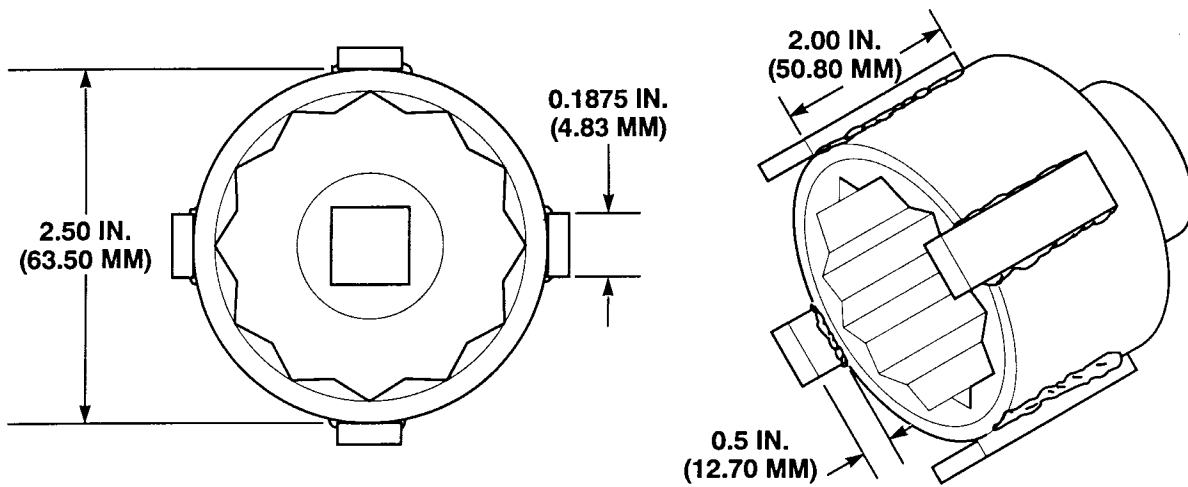
C-27. LHS WASHER.



Fabricate LHS washer from 2 1/4 in. (57.15 mm) by 1/4 in. (6.35 mm) diameter steel stock.

- a. Drill 1 1/4 in. (31.75 mm) hole through steel stock where indicated.
- b. Paint as required.
- c. An alternate flat washer that may be used is part number MS51412-44.

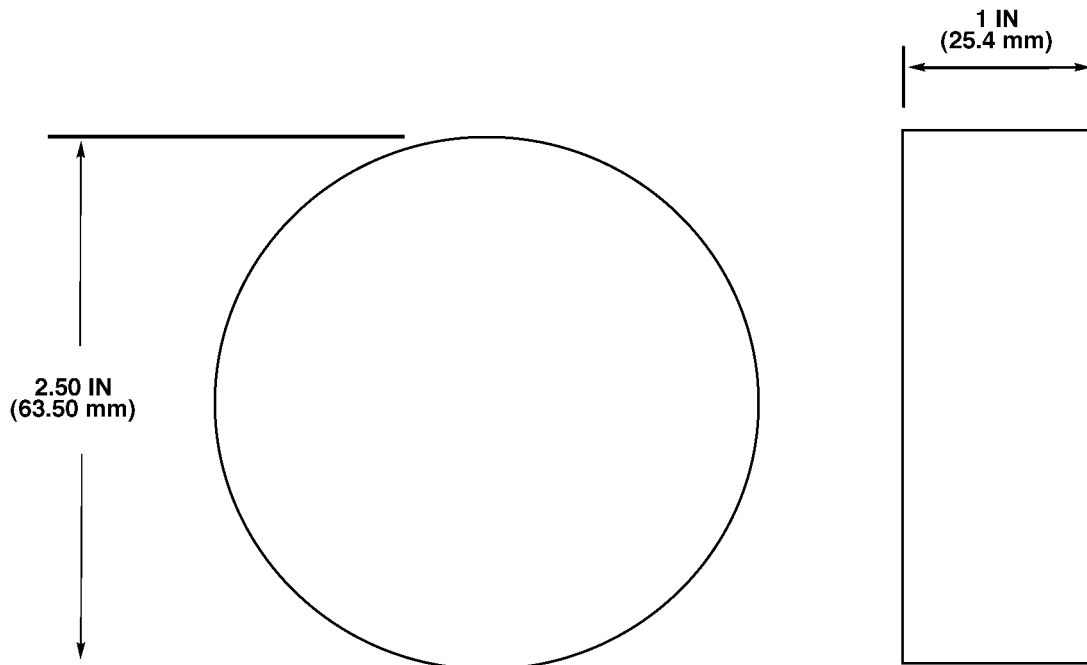
C-28. SPANNER SOCKET.



Fabricate spanner wrench from any 2 1/2 in. (63.50 mm) OD socket.

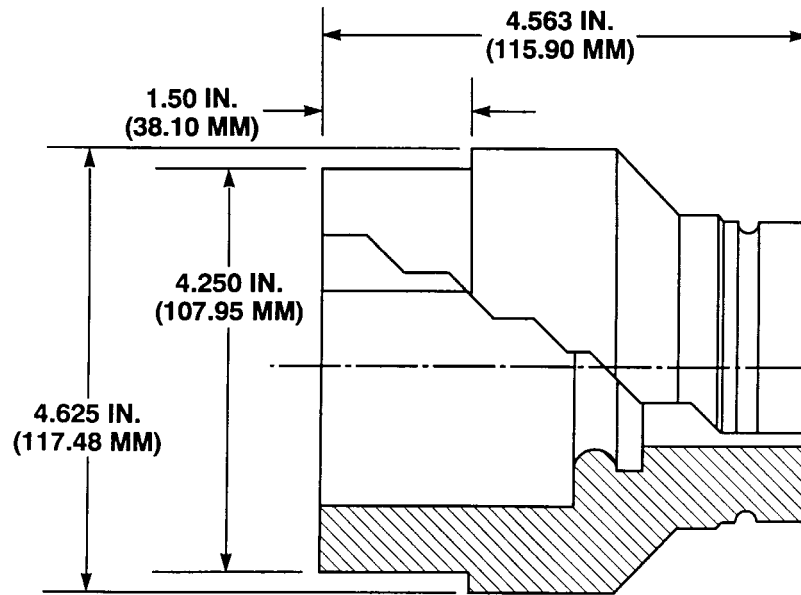
- a. Weld four 2 in. (50.80 mm) long strips of 3/16 in. (4.83 mm) keystock on socket, so that 1/2 in. (12.70 mm) extends beyond socket face.

C-29. STEEL DISC.



Fabricate steel disc from 2.5 in. (63.5 mm) round steel stock. Using a hacksaw, cut to dimension shown. File off rough edges.

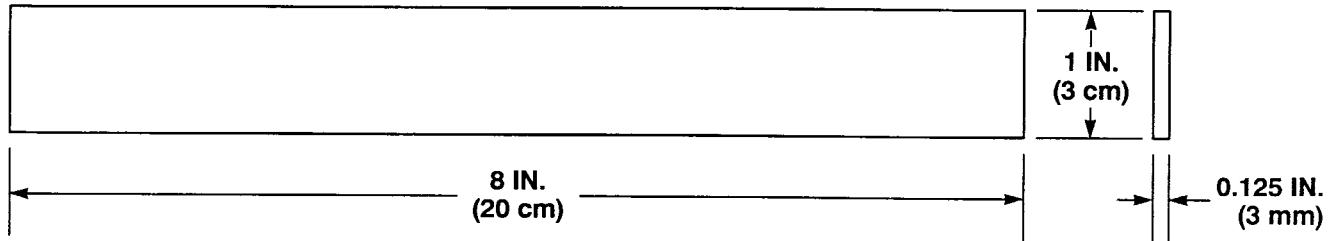
C-30. FLANGE NUT SOCKET.



Fabricate flange nut socket from socket P/N 1M1005 NSN 5130-00-234-1890.

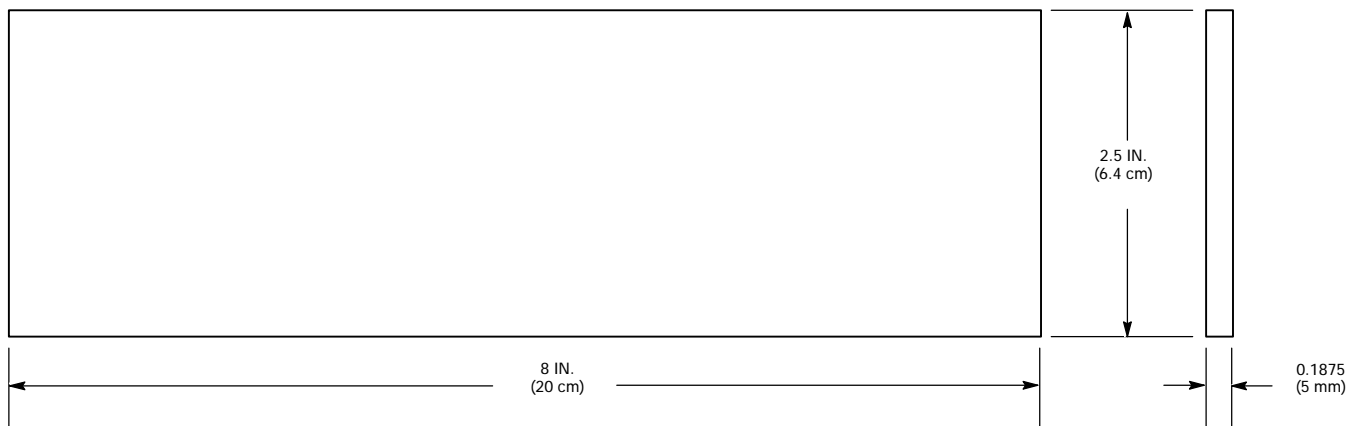
- a. Machine down outside diameter, face end of socket by 4.250 in. (107.95 mm) at a depth of 1.50 in. (38.10 mm).

C-31. STEERING STOP PLATE.



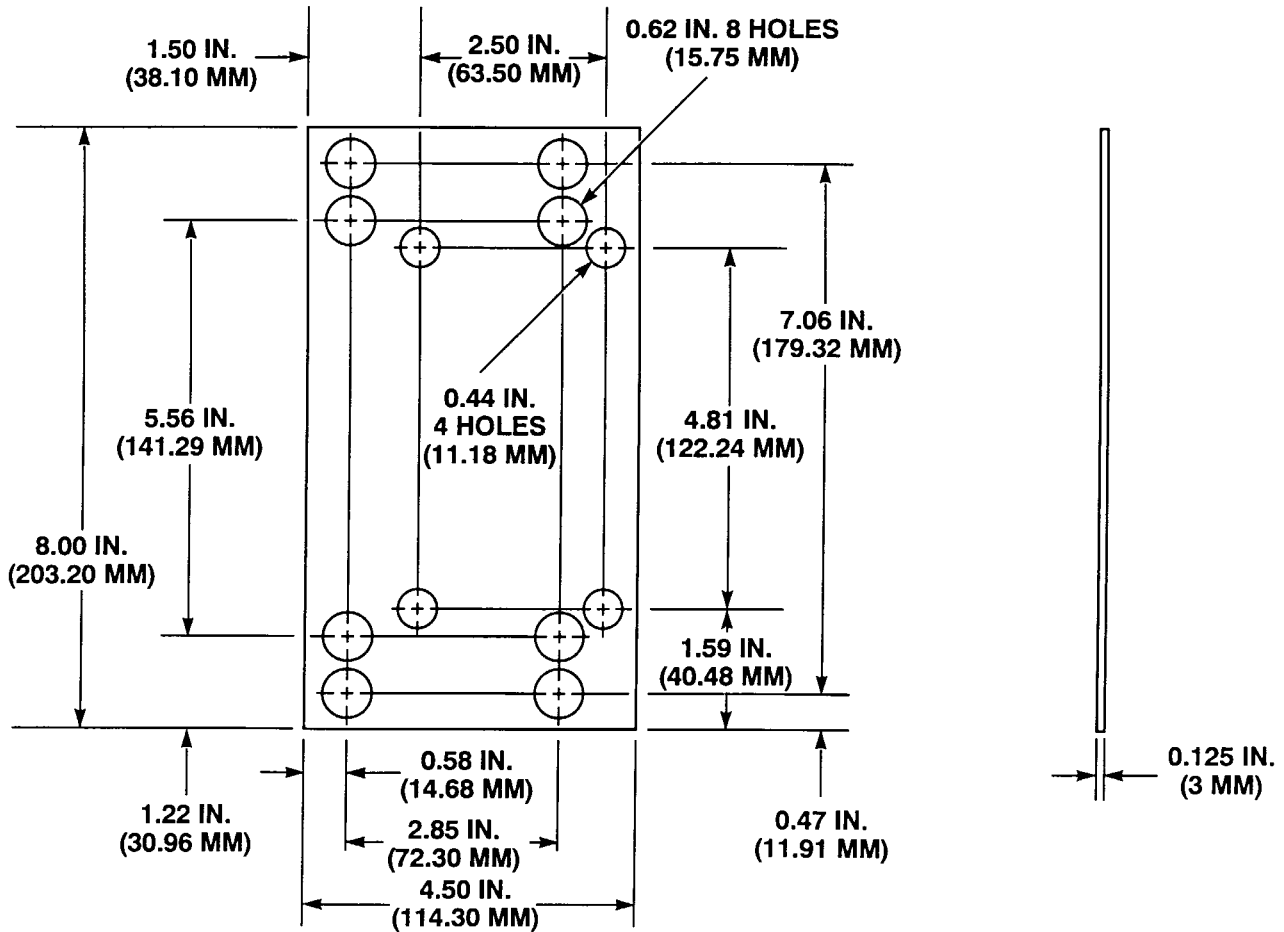
Fabricate steering stop plate from 1/8 in. (3 mm) thick mild steel stock. Using a hacksaw, cut to dimension shown. File off rough edges.

C-32. PITMAN ARM ANGLE PLATE.



Fabricate pitman arm angle plate from 3/16 in. (4.76 mm) thick mild steel stock. Using a hacksaw, cut to dimension shown. File off rough edges.

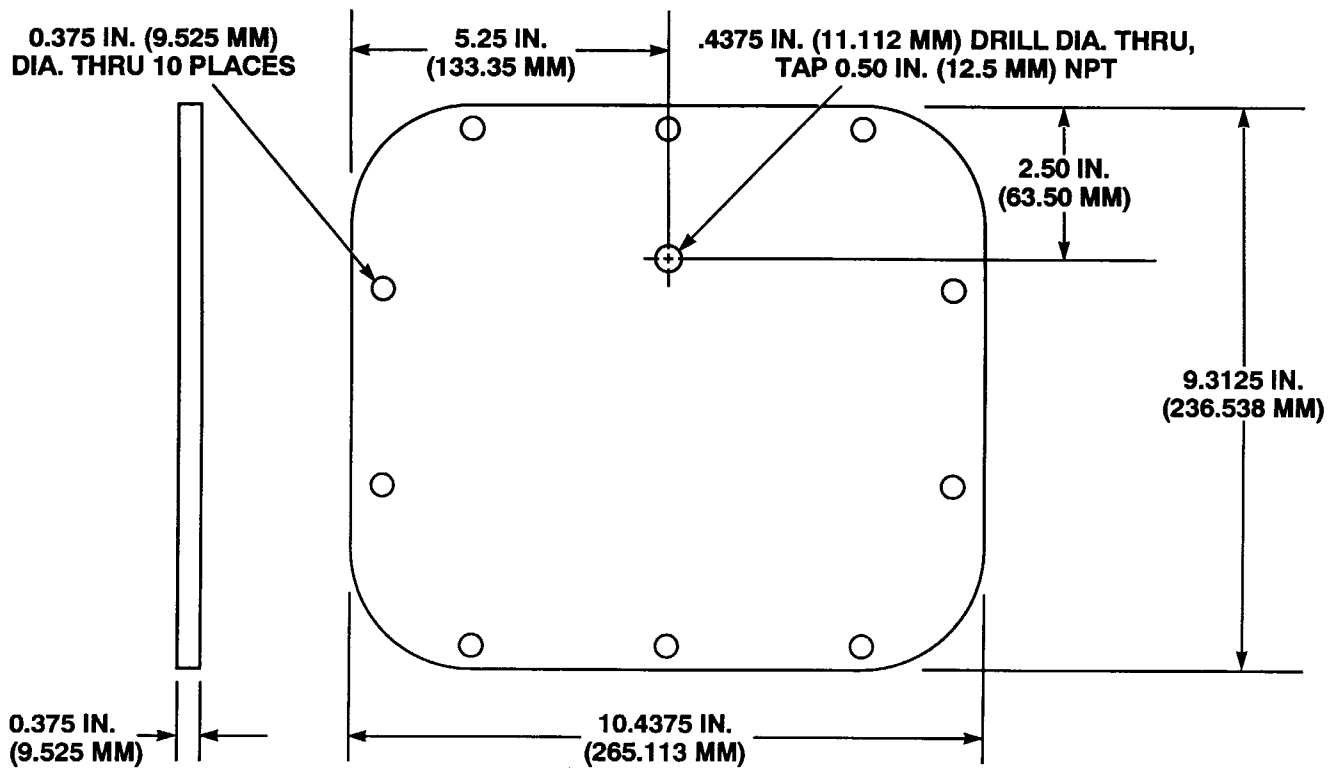
C-33. AXLE PLATE.



Fabricate axle plate from 1/8 in. (3 mm) thick mild steel stock.

- a. Cut a steel plate 4.50 in. (114.30 mm) by 8 in. (203.20 mm).
- b. Drill eight .62 in. (15.75 mm) diameter holes where shown.
- c. Drill four .44 in. (11.18 mm) diameter holes where shown.
- d. File off rough edges.
- e. Paint as required.

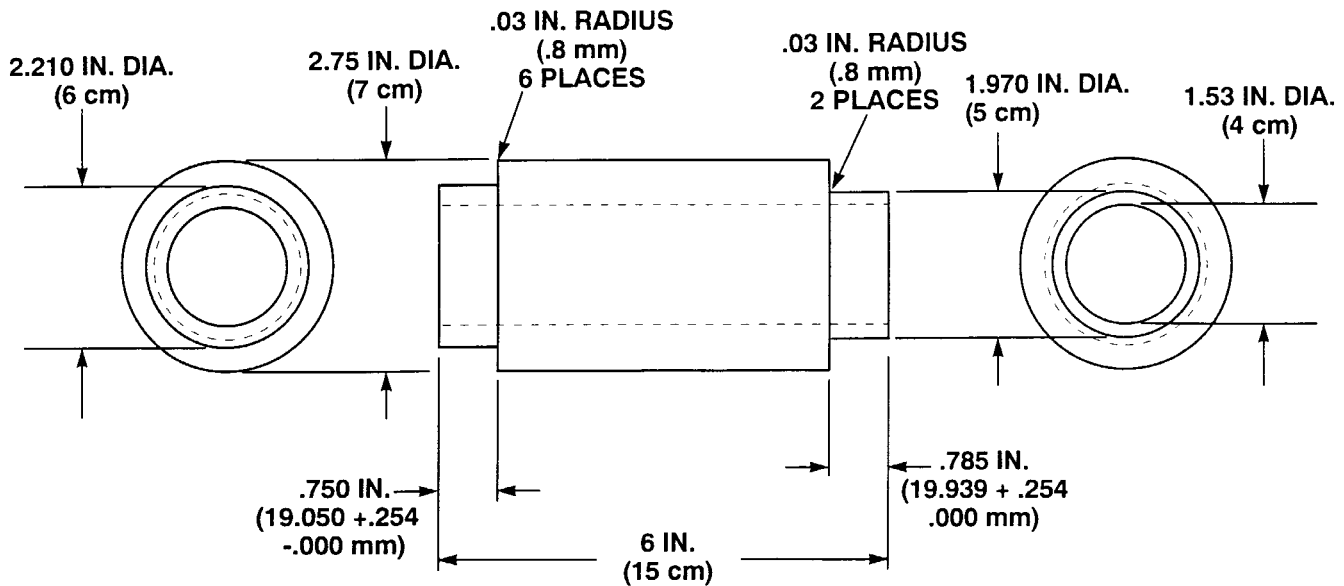
C-34. OIL COOLER TEST PLATE.



Fabricate oil cooler test plate from 3/8 in. (9.525 mm) thick mild steel stock.

- a. Using oil cooler gasket for template, cut a steel plate 9 5/16 in. (236 mm) by 10 7/16 in. (265 mm).
- b. Drill ten 3/8 in. (9.525 mm) diameter holes where shown.
- c. Drill 7/16 in. (11 mm) diameter hole where shown and tap to fit 1/2 in. NPT fitting.
- d. File off rough edges.
- e. Paint as required.

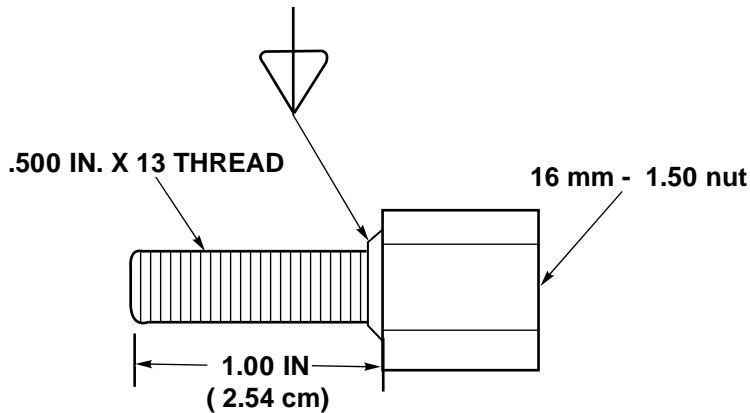
C-35. SEAL INSTALLER.



Machine seal installer from 2.75 in. (7 cm) diameter aluminum round stock.

- Cut a 6 in. (15 cm) piece of 2.75 in. (7 cm) diameter aluminum round stock.
- Drill 1.53 in. (4 cm) diameter hole through center of piece.
- Turn down to 1.970 in. (5 cm) diameter by .785 in. (20 cm) deep.
- Turn down to 2.210 in. (6 cm) diameter by .750 in. (19 cm) deep.

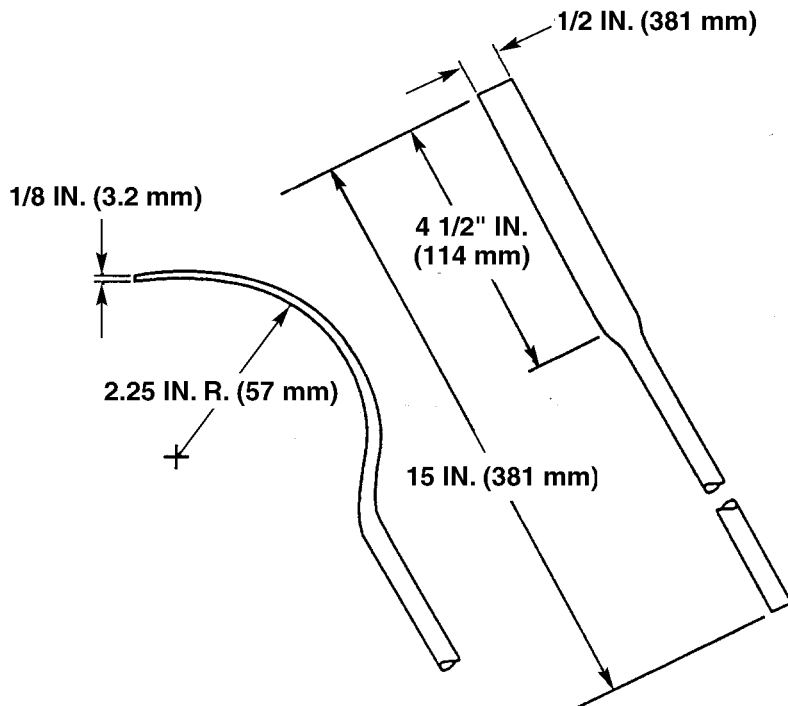
C-36. ADAPTER.



Fabricate from: screw (1) .500 in. x 13 x 1 in. grade 5, and nut 16mm x 1.50.

- a. Weld together screw and nut where indicated.
- b. Paint as required.

C-37. BEARING SHELL REMOVER.



- (1) Fabricate from 3/8 in. (9.5 mm) diameter cold rolled steel.
- (2) Heat and flatten 4-1/2 in. (114 mm) length of round stock until end is 1/8 X 1/2 X 4-1/2 in. (3.2 X 13 X 114 mm).
- (3) All dimensions are in inches (millimeters).

APPENDIX D

TORQUE LIMITS

D-1. SCOPE.

This section provides general torque limits for the screws, hoses and fittings used on the truck. Special torque limits are listed in the maintenance procedures for applicable components. The general torque limits given in this appendix shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot 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, tighten the screw or nut until it touches the metal bracket then tighten it one more turn.

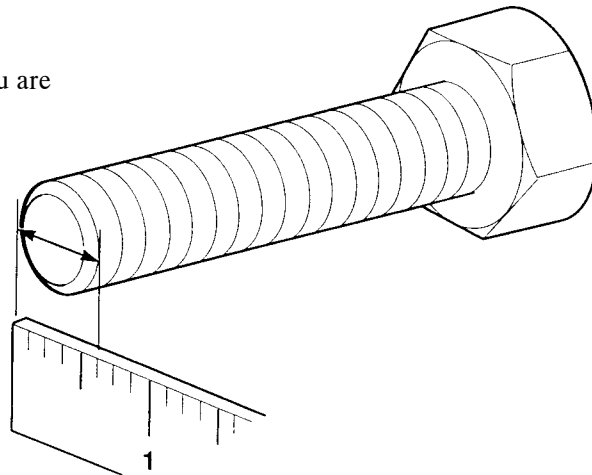
D-2. TORQUE LIMITS.

Table D-1 lists the torque limits for wet flange nuts. Table D-2 lists the torque limits for wet socket head capscrews. Table D-3 lists dry torque limits for capscrews. Dry torque limits are used on screws that do not have high pressure lubricants applied to the threads. Table D-4 lists wet torque limits for capscrews. Wet torque limits are used on screws that have high pressure lubricants applied to the threads. Table D-5 lists the torque limits for SAE 37 degree flare hose connections. Table D-6 lists the torque limits for SAE 45 degree flare hose connections. Table D-7 lists the torque limits for ORS preformed packing face seal hose connections. Table D-8 lists the torque limits for NPSM swivel connections.

D-3. HOW TO USE TORQUE TABLE.

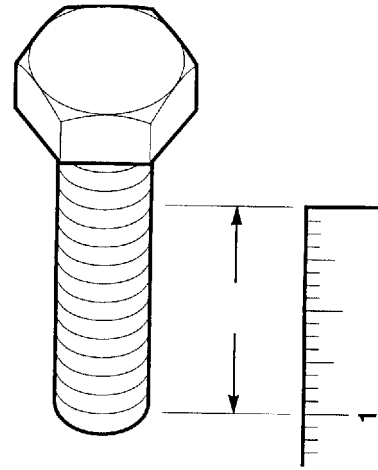
a. Screws and Nuts.

- (1) Measure the diameter of the screw you are installing with a ruler.



D-3. HOW TO USE TORQUE TABLE (CONT).

- (2) Measure out one inch with a ruler and count the number of threads per inch.
- (3) Under the heading **SIZE**, look down the left hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with the same size).
- (4) In the second column under **SIZE**, find the number of threads per inch that matches the number of threads per inch you counted in Step 2. (Not required for metric screws).
- (5) To find the grade screw you are installing, match the markings on the head to the correct picture of **CAPSCREW HEAD MARKINGS** on the torque table.
- (6) Look down the column under the picture you found in Step 5. until you find the torque limit (lb-ft or N-m) for the diameter and threads per inch of the screw you are installing.
- (7) Use wet torque values.



CAPSCREW HEAD MARKINGS



<p>Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).</p>  <p>STANDARD</p>	<p>Metric screws are of three grades: 8.8, 10.9, and 12.9. Grades & Manufacturer's marks appear on the screw head.</p>  <p>METRIC</p>
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Table D-1. Torque Limits For Wet Flange Nuts

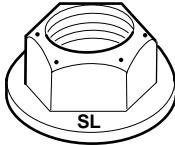
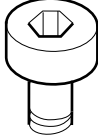
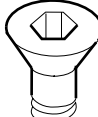
SPIRALLOCK FLANGE NUT MARKINGS GRADE 8	DIAMETER		THREADS PER INCH	TORQUE	
	IN.	MM		LB-FT	N-m
	1/4	6.35	20	15	20
	5/16	7.94	18	25	34
	3/8	9.65	16	45	61
	1/2	12.70	13	110	149
	5/8	15.87	11	210	285
	3/4	19.05	10	375	508

Table D-2. Torque Limits For Wet Socket Head Cap Screws

	TORQUE IN FT. LBS. (CAP SCREWS) LUBED		
	SIZE	SOC HD OR 12 PT	SOC FLAT HD
<p>SOC HEAD/12 PT.</p> 	.10-24	5	2.5
	.25-20	12	6
	.31-18	25	12
	.38-16	44	22
	.50-13	70	36
<p>SOC FLAT HEAD</p> 	.56-12	106	53
	.62-11	212	106
	.75-10	375	187
	1.00-8	781	

b. *Hoses and Fittings.*

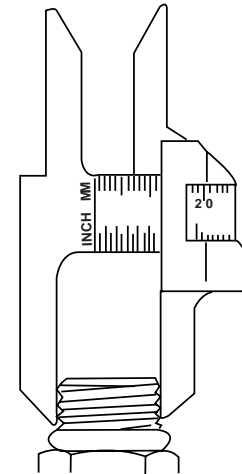
NOTE

Most fluid piping system sizes are measured by dash numbers. These are universally used abbreviations for the size of the component expressed as the numerator of the fraction with the denominator always being 16. For example, a -04 port is 4/16 or 1/4-inch. Dash numbers are usually nominal (in name only) and are abbreviations that make ordering of components easier.

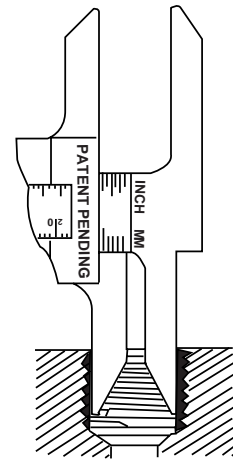
- (1) Measure the I.D./O.D. diameter with a caliper as shown.

- (2) Under the heading MALE THREAD O.D. and FEMALE THREAD I.D., match the measurements with the row in table to determine proper torque.

- (3) To find the sealing surface angle, use a protractor and measure the sealing surface parallel to the center line of the fitting.



**O.D.
(MALE THREADS)**



**I.D.
(FEMALE THREADS)**

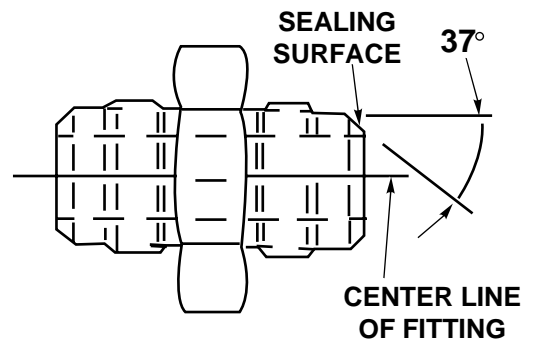
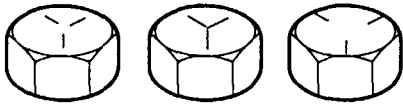


Table D-3. Torque Limits For Dry Fasteners

SIZE			TORQUE							
			SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	5	7	8	11	10	14	12	16
1/4	28	6.35	6	9	10	14	12	16	14	19
5/16	18	7.94	11	15	17	23	21	28	25	34
5/16	24	7.94	12	16	19	26	24	33	25	34
3/8	16	9.53	20	27	30	41	40	54	45	61
3/8	24	9.53	23	31	35	47	45	61	50	68
7/16	14	11.11	30	41	50	68	60	81	70	95
7/16	20		35	47	55	75	70	95	80	108
1/2	13	12.70	50	68	75	102	95	129	110	149
1/2	20		55	75	90	122	100	136	120	163
9/16	12	14.29	65	88	110	149	135	183	150	203
9/16	18		75	102	120	163	150	203	170	231
5/8	11	15.88	90	122	150	203	190	258	220	298
5/8	18		100	136	180	244	210	285	240	325
3/4	10	19.05	160	217	260	353	320	434	380	515
3/4	16		180	244	300	407	360	488	420	570
7/8	9	22.23	140	190	400	542	520	705	600	814
7/8	14		155	210	440	597	580	786	660	895
1	8	25.40	220	298	580	786	800	1085	900	1220
1	12		240	325	640	868	860	1166	1000	1356
1-1/8	7	25.58	300	407	800	1085	1120	1519	1280	1736
1-1/8	12		340	461	880	1193	1260	1709	1440	1953
1-1/4	7	31.75	420	570	1120	1519	1580	2142	1820	2468
1-1/4	12		460	624	1240	1681	1760	2387	2000	2712
1-3/8	6	34.93	560	759	1460	1980	2080	2820	2380	3227
1-3/8	12		640	868	1680	2278	2380	3227	2720	3688
1-1/2	6	38.10	740	1003	1940	2631	2780	3770	3160	4285
1-1/2	12		840	1139	2200	2983	3100	4204	3560	4827

CAPSCREW HEAD MARKINGS



Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).

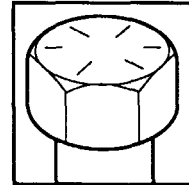
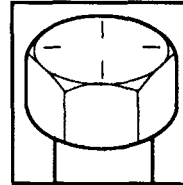
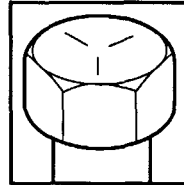
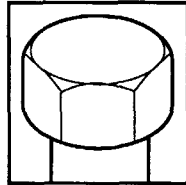


Table D-4. Torque Limits For Wet Fasteners

CAPSCREW HEAD MARKINGS			TORQUE							
SIZE			SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	4	6	6	8	8	11	9	12
1/4	28	6.35	5	7	7	9	9	12	10	14
5/16	18	7.94	8	11	13	18	16	22	18	24
5/16	24	7.94	9	12	14	19	18	24	20	27
3/8	16	9.53	15	20	23	31	30	41	35	47
3/8	24	9.53	17	23	25	34	30	41	35	47
7/16	14	11.11	24	33	35	47	45	61	55	75
7/16	20		25	34	40	54	50	68	60	81
1/2	13	12.70	35	47	55	75	70	95	80	108
1/2	20		40	54	65	88	80	108	90	122
9/16	12	14.29	50	68	80	108	100	136	110	149
9/16	18		55	75	90	122	110	149	130	176
5/8	11	15.88	70	95	110	149	140	190	170	231
5/8	18		80	108	130	176	160	217	180	244
3/4	10	19.05	120	163	200	271	240	325	280	380
3/4	16		140	190	220	298	280	380	320	434
7/8	9	22.23	110	149	300	407	400	542	460	624
7/8	14		120	163	320	434	440	597	500	678
1	8	25.40	160	217	440	597	600	814	680	922
1	12		170	231	480	651	660	895	740	1003
1-1/8	7	25.58	220	298	600	814	840	1139	960	1320
1-1/8	12		260	353	660	895	940	1275	1080	1464
1-1/4	7	31.75	320	434	840	1139	1100	1492	1360	1844
1-1/4	12		360	488	920	1248	1320	1790	1500	2034
1-3/8	6	34.93	420	570	1100	1492	1560	2115	1780	2414
1-3/8	12		460	624	1260	1709	1780	2414	2040	2776
1-1/2	6	38.10	560	760	1460	1980	2080	2820	2360	3200
1-1/2	12		620	841	1640	2224	2320	3146	2660	3607

Table D-5. Torque Limits For 37 Degree Flare Hose Connections

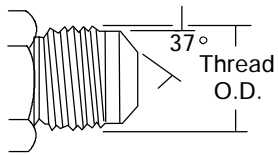
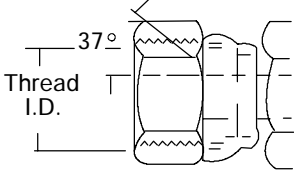
				
Male Half		Female Half		
INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/4	04	7/16-20	11-12	15-16
3/8	06	9/16-18	18-21	24-28
1/2	08	3/4-16	36-39	49-53
5/8	10	7/8-14	57-62	77-84
3/4	12	1 1/16-12	79-87	107-118
7/8	14	1 3/16-12	83-91	113-123
1	16	1 5/16-12	108-113	146-153
1 1/4	20	1 5/8-12	127-133	172-180
1 1/2	24	1 7/8-12	158-167	214-224
2	32	2 1/2-12	245-258	332-350

Table D-6. Torque Limits For 45 Degree Flare Hose Connections

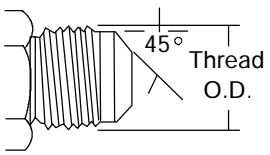
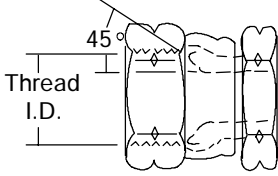
				
Male Half		Female Half		
INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/4	04	7/16-20	8-9	11-12
3/8	06	5/8-18	18-20	24-27
1/2	08	3/4-16	36-38	49-51
5/8	10	7/8-14	52-54	70-73
3/4	12	1 1/16-14	71-74	97-100

Table D-7. Torque Limits For ORS Preformed Packing Face Seal Hose Connections

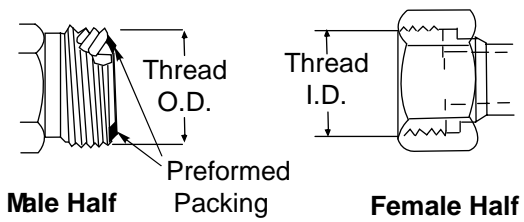
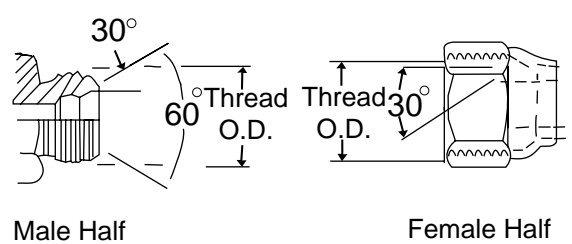
				
INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/4	04	9/16-18	10-12	14-16
3/8	06	11/16-16	18-20	24-27
1/2	08	13/16-16	32-35	43-47
5/8	10	1-14	46-50	62-68
3/4	12	1 3/16-12	65-70	88-95
1	16	1 7/16-12	108-113	146-153
1 1/4	20	1 11/16-12	127-133	172-180
1 1/2	24	2-12	158-167	214-226

Table D-8. Torque Limits For NPSM Swivel Connections

				
INCH SIZE	DASH NO.	THREAD SIZE	TORQUE LB.FT.	TORQUE N·m
1/8	02	1/8-27	3-4	4-5
1/4	04	1/4-18	10-11	14-15
3/8	06	3/8-18	16-18	22-24
1/2	08	1/2-14	25-27	34-37
3/4	12	3/4-14	46-48	62-65
1	16	1-1 1/2	80-83	108-113
1 1/4	20	1 1/4-11/2	130-134	176-182
1 1/2	24	1 1/2-11/2	160-164	217-222
2	32	2-11/2	170-174	231-240

APPENDIX E

MANDATORY REPLACEMENT PARTS

Section I. INTRODUCTION

E-1. SCOPE.

This appendix lists all mandatory replacement parts required for performance of Direct and General Support Maintenance of the PLS truck. It authorizes the requisitioning, issue, and disposition of consumable repair parts. All consumable repair parts listed in the maintenance tasks are listed here for ease of reference.

E-2. EXPLANATION OF COLUMNS (SECTION II).

- a. Column (1) - Replacement Part Reference Code.* This number is assigned to the entry in the listing and is referenced in the narrative task box to identify the part e.g., Clamp (Item 12, Appendix E).
- b. Column (2) - Nomenclature.* Indicates the federal item name and, if required, a description to identify the item.
- c. Column (3) - Part Number.* This is the vendor number assigned to the item.
- d. Column (4) - National Stock Number.* This is the National Stock Number assigned to the item; use it to request or requisition the item.

Section II. MANDATORY REPLACEMENT PARTS LIST

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
1	Adapter, Fuel	8928631	4730-01-336-6943
2	Ball	4B9880	3110-00-949-1438
3	Beam Center Bushing	29481-5	5365-01-161-4062
4	Beam Center Bushing	49400	3120-01-329-4297
5	Beam Center Bushing	C-2159	5365-01-344-2477
6	Beam End Bushing	45163	3120-01-345-0940
7	Beam End Bushing	45900	3120-01-155-4522
8	Bearing	23503649	3110-01-359-4525
9	Bearing	23503687	3110-01-359-4677
10	Bearing	441843-0001	3120-01-239-1369
11	Bearing Kit, Taper	V88130017	3120-01-346-7757
12	Bearing Set	2405CPA	3120-01-157-6832
13	Bearing, Intermediate	5196026	3120-00-843-6994
14	Bearing, Piston Pin	23501687	3120-00-094-3552
15	Bearing, Taper	V75650169	3110-01-273-0041
16	Bearing, Thrust	443688-1	3120-01-239-5139
17	Bearing, Thrust	TP612	3120-00-596-7688
18	Bolt Kit, Air Spring	A-10284	5305-01-345-3748
19	Bolt Set	A-5332	5306-01-344-7993
20	Bolt, Self-Locking	N9077	5306-01-223-4345
21	Bushing	209P-8-4	4730-01-348-6542
22	Bushing	5122445	3120-00-811-4699
23	Bushing	5123700	3120-00-662-1651
24	Bushing	GLY.PG 808560 A	5364-01-355-9529
25	Bushing, Plastic, Spacer	194	5365-01-154-8511
26	Clamp	24433	5340-01-131-8313
27	Clamp	5132650	5340-01-048-7743
28	Clamp	5143999	4730-00-080-5799
29	Clamp	700-88	5340-01-355-7648
30	Clamp	X300	5340-01-197-1196
31	Clip	COV0713	5340-01-029-9172
32	Collar, Adjustment	B-2848	3040-01-346-9820
33	Collar, Shaft	8925751	3040-01-234-8467
34	Copper Washer	265850FC88	5310-00-193-9753
35	Copper Washer	23513842	5310-01-395-1250
36	Copper Washer	5108436	5310-00-486-3129
37	Cover, Access	5117733	5340-00-833-0822
38	Cross	V75750400	2520-01-352-9164
39	Cross And Bearing	5-103X	2530-01-244-4949
40	Dust Cover	L-28-VC-121	5340-01-346-2252
41	Dust Shield	23016012	5340-01-318-9153

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
42	Element	5101760	2940-00-089-2520
43	Element	5106910	4730-01-160-5668
44	Filter Element	2020PMOR	2910-01-344-5791
45	Filter Element	23014205	2940-01-328-5584
46	Filter Element	25010643	4330-01-132-4842
47	Filter Element	25010778	2910-01-022-8183
48	Fitting, Grease	N1199N1860	4730-01-348-9511
49	Fitting, Grease	V75501903	4730-01-345-0734
50	Fitting, Grease	V75503714	4730-01-384-6286
51	Fitting, Lubrication	MS15002-3	4730-00-172-0015
52	Front/Rear Steer Gear Repair Kit	5518181	2530-01-335-7776
53	Fuel Pipe, Jumper	8928628	4710-01-337-4466
54	Gasket	02-23-00870-150	5330-01-281-1842
55	Gasket	03158320033	
56	Gasket	03158320035	
57	Gasket	0601-16501	5330-01-356-9971
58	Gasket	11007B	5330-01-344-0539
59	Gasket	11028B	5330-01-147-2520
60	Gasket	14079550	5330-00-107-3925
61	Gasket	23016017	5330-01-302-5092
62	Gasket	23017225	5330-01-328-7635
63	Gasket	23045365	5330-01-341-6493
64	Gasket	23046658	5330-01-088-5980
65	Gasket	23501587	5330-01-058-0587
66	Gasket	23506157	5330-01-348-3331
67	Gasket	23515145	5330-01-390-9045
68	Gasket	23520287	5330-01-447-1706
69	Gasket	2-510-011-860	5330-01-145-4573
70	Gasket	3921989	5330-00-107-3925
71	Gasket	5100638	5330-01-058-0586
72	Gasket	5100860	5330-01-058-8267
73	Gasket	5101408	5330-01-133-0119
74	Gasket	5104081	5330-01-078-7186
75	Gasket	5104105	5330-01-163-8178
76	Gasket	5104507	5330-01-088-5984
77	Gasket	5104978	5330-01-163-8179
78	Gasket	5117231	5330-00-972-8108
79	Gasket	5117243	5330-00-735-4289
80	Gasket	5117254	5330-00-745-7831
81	Gasket	5117269	5330-00-735-4291
82	Gasket	5117332	5330-00-725-2301
83	Gasket	5117535	5330-00-844-2907
84	Gasket	5117734	5330-00-745-7776

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
85	Gasket	5117786	5330-00-781-7117
86	Gasket	5117993	5330-00-973-1415
87	Gasket	5120224	5330-00-862-6929
88	Gasket	5121714	5330-00-745-7669
89	Gasket	5121835	5330-00-847-4967
90	Gasket	5123240	5330-00-054-8290
91	Gasket	5123570	5330-00-915-2835
92	Gasket	5123638	5330-00-862-6934
93	Gasket	5123812	5330-00-892-1764
94	Gasket	5126160	5330-00-458-2325
95	Gasket	5126161	5330-00-458-2324
96	Gasket	5126499	5330-00-736-0228
97	Gasket	5130995	5330-00-980-1546
98	Gasket	5136678	5330-00-198-7953
99	Gasket	5138659	5330-00-769-4882
100	Gasket	23520012	5330-00-915-4511
101	Gasket	5144901	5330-01-054-2399
102	Gasket	5145581	5330-00-222-0801
103	Gasket	5148810	5330-01-058-0585
104	Gasket	5150193	5330-00-212-6290
105	Gasket	6750186	5330-00-537-2388
106	Gasket	6-794-000557	3040-01-199-7951
107	Gasket	6833980	5330-01-236-1753
108	Gasket	6839213	5330-01-049-0552
109	Gasket	6880389	5330-01-141-9579
110	Gasket	731740-002	5330-01-355-4809
111	Gasket	79031	5330-01-078-2825
112	Gasket	8921312	5330-01-206-3263
113	Gasket	8923492	5330-01-037-4129
114	Gasket	8923512	5330-01-206-3264
115	Gasket	8923791	5330-01-088-5982
116	Gasket	8923792	5330-01-206-3265
117	Gasket	8924266	5330-01-270-1161
118	Gasket	8924413	
119	Gasket	8925778	5330-01-247-2474
120	Gasket	8926782	5330-00-758-2863
121	Gasket	97706	5330-01-078-2826
122	Gasket	D346-177	5330-00-364-3550
123	Gasket, Compression	5100404	5330-01-054-2398
124	Gasket, Cylinder Block	297428	5330-01-346-1605
125	Gasket, Cylinder Cover	297429	5330-01-348-8352
126	Gasket, Cylinder Head	297427	5330-01-346-1604
127	Gasket, Manifold	243430	5330-00-262-3272

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
128	Gasket, Oil Pan	23013339	5330-01-363-8833
129	Gasket, Seal Strip	5183476	5330-00-171-8763
130	Hardware Kit, Electronic	5234934	2920-01-408-8145
131	Impeller	23505995	2930-01-354-4353
132	Insert, Liner	5148501	2815-01-058-0254
133	Inserts, Screw	5121459	5340-00-921-6413
134	Intermediate Steer Gear Repair Kit	5541261	5330-01-344-0581
135	Isolator	23512307	5340-01-414-2177
136	Isolators	5104515	5340-01-057-4230
137	Key	49749AX	5315-00-837-2919
138	Key	5131724	5315-00-089-8807
139	Key	6772552	5315-00-402-0421
140	Key	7-569-000030	5315-01-203-6490
141	Key	8-47-17-06-002	5315-01-280-7372
142	Key	8926247	5315-01-214-1876
143	Key	8928537	5315-01-260-4595
144	Key	8928545	5315-01-304-9174
145	Kit, Overhaul	23012606	2520-01-176-6004
146	Kit, Plug	3331322K	5365-01-394-5979
147	Kit, Repair	5199617	5330-01-056-1111
148	Kit, Repair	711917	5330-01-362-0907
149	Kit, Repair	7350-5	5330-01-352-8831
150	Kit, Repair	75251-01SK	5330-01-372-4652
151	Kit, Repair	75251-13SK	5330-01-373-2973
152	Kit, Repair	75252-08SK	5330-01-392-8534
153	Kit, Repair	9-752-101064	5330-01-374-3260
152.1	Kit, Repair	9-752-101062	5330-01-398-8749
154	Kit, Repair	9-752-101065	5330-01-372-4651
155	Kit, Repair	MS28775-008	5330-00-579-3158
156	Kit, Repair	SK-16-2	4820-01-233-3441
157	Kit, Repair	SKMEH-3	5330-01-372-5297
158	Kit, Repair	SKMEH-4	5330-01-372-5296
159	Kit, Seal Replacement	RPGC-QAN	5330-01-K63-2529
160	Kit, Wire Gate	K240111	
161	Lip Seal	2-283-001-378	5330-01-233-8692
162	Lock, Valve	5111337	2815-00-529-8193
163	Locknut	0223-01030-011	5310-01-395-6272
164	Locknut	103026	5310-00-011-7049
165	Locknut	110310A	5310-01-159-8178
166	Locknut	110311-A	5310-01-111-0645
167	Locknut	110312A	5310-01-150-5918
168	Locknut	111316A	5306-01-106-7496
169	Locknut	115307A	5310-01-151-1036

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
170	Locknut	11841	5310-01-151-5546
171	Locknut	1244954-2	5310-00-074-1387
172	Locknut	1333510	5310-01-340-5671
173	Locknut	1408910	5310-01-111-0645
174	Locknut	1571850	5310-01-288-5096
175	Locknut	1598030	5310-01-342-8595
176	Locknut	1600460	5310-01-346-9445
177	Locknut	1764650	5301-01-346-3692
178	Locknut	192481	5310-01-058-3353
179	Locknut	22NM04	5310-00-207-9341
180	Locknut	2560HX	5310-01-081-5351
181	Locknut	29749	5310-01-019-3129
182	Locknut	30191	5310-01-178-5976
183	Locknut	41NE120	5310-00-530-0239
184	Locknut	44NTE-1210	5310-01-346-3789
185	Locknut	5117972	5310-00-043-0427
186	Locknut	5149163	2835-01-015-5419
187	Locknut	5151601	5310-00-270-7111
188	Locknut	60861A	5310-01-061-5678
189	Locknut	6772182	5310-01-228-6394
190	Locknut	8925752	5310-01-268-6783
191	Locknut	9174746	5310-00-844-0127
192	Locknut	93604342	5310-01-081-5351
193	Locknut	9413533	5310-01-018-5266
194	Locknut	L-10-MNS-500-X-1	5310-01-345-2350
195	Locknut	MA219-21065	5310-01-328-9940
196	Locknut	MS51849-74	5305-00-470-3321
197	Locknut	MS35690-525	5310-00-012-0368
197.1	Locknut	MS51922-17	5310-00-087-4652
198	Locknut	MS51922-21	5310-00-959-1488
199	Locknut	MS51922-37	5310-00-067-9507
200	Locknut	MS51922-53	5310-00-225-6408
201	Locknut	MS51922-9	5310-00-984-3806
202	Locknut	MS51943-31	5310-00-061-4650
203	Locknut	MS51967-14	5310-00-768-0318
204	Locknut	MS51967-23	5310-00-763-8921
205	Locknut	MS51967-27	5310-00-880-8187
206	Locknut	N12	5310-00-185-6345
207	Locknut	N9091	5310-01-050-5005
208	Locknut	N9406	5310-01-362-6171
209	Locknut	N9410	5310-01-348-8398
210	Locknut	T893R	5310-01-288-1116
211	Locknut	TLA-10008-GRC	5310-01-080-9201
212	Locknut	TLA-1213-GRC	5310-01-081-8244

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
213	Locknut	TLA-3816-GRC	5310-01-222-9097
214	Locknut	TLNF-0832-S	5310-01-165-1312
215	Locknut	V75502830	5310-01-344-6738
216	Locknut	V75503336	5310-01-344-6740
217	Locknut	V75503716	5310-01-357-3768
218	Lockplate	57022	5340-01-127-5636
219	Lockscrew	190770	5305-00-019-0770
220	Lockscrew	5101196	5306-01-120-3659
221	Lockscrew	5148324	5306-01-083-9374
222	Lockscrew	9409047	5306-01-210-3836
223	Lockscrew	9409620	5306-01-336-9667
224	Lockscrew	9412014	5305-01-165-3295
225	Lockstrip	6880899	5340-01-056-0037
225.1	Lockwasher	0400139971	
226	Lockwasher	103321	5310-00-261-7340
227	Lockwasher	112264	5310-01-081-0799
228	Lockwasher	114021	5310-01-081-0798
229	Lockwasher	11500879	5305-01-320-2395
230	Lockwasher	11501719	5306-01-407-7190
231	Lockwasher	122078A	5310-01-344-5946
232	Lockwasher	1388	5310-01-162-5737
233	Lockwasher	1459-254	5310-00-171-1734
234	Lockwasher	1495-Z	5310-01-161-2527
235	Lockwasher	1498	5310-01-161-7311
236	Lockwasher	1813	5310-01-132-0955
237	Lockwasher	187130	5310-00-584-5272
238	Lockwasher	1937550	5310-01-355-8798
239	Lockwasher	2150HX1	5310-01-141-5565
240	Lockwasher	2152HX	5310-00-939-1060
241	Lockwasher	2250HX	
242	Lockwasher	2261H	5310-00-080-9786
243	Lockwasher	23016303	5310-01-081-0799
244	Lockwasher	237648	5310-00-085-3891
245	Lockwasher	237686	5310-00-465-5643
246	Lockwasher	2434	5310-00-775-5139
247	Lockwasher	2435	5310-00-045-3299
248	Lockwasher	2523	5310-00-775-5182
249	Lockwasher	318B	5310-01-061-5302
250	Lockwasher	3231	5310-00-032-1814
251	Lockwasher	351AX	5310-01-129-0450
252	Lockwasher	352A	5310-01-081-1283
253	Lockwasher	352AX	5310-01-081-1283
254	Lockwasher	353AX	5310-00-582-5965

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
255	Lockwasher	355AX	5310-01-133-2130
256	Lockwasher	371AX	5310-00-775-5139
257	Lockwasher	50001716	5310-01-372-6391
258	Lockwasher	5177769	5310-00-209-1543
259	Lockwasher	7520854	5310-00-264-1888
260	Lockwasher	777-A	5310-01-061-4481
261	Lockwasher	7-949-000235	5310-01-173-3637
262	Lockwasher	7-949-000527	5310-01-205-3471
263	Lockwasher	7-949-000534	5310-01-259-6358
264	Lockwasher	7-950-160050	5310-01-292-4150
265	Lockwasher	8926285	5310-01-233-1338
266	Lockwasher	93613642	5310-01-068-8446
267	Lockwasher	AE30574	5310-00-092-6831
268	Lockwasher	MS15795-19	5310-00-209-0693
269	Lockwasher	MS27183-12	5310-00-081-4219
270	Lockwasher	MS35333-105	5310-00-019-0669
271	Lockwasher	MS35335-31	5310-00-596-7693
272	Lockwasher	MS35335-62	5310-00-184-9562
273	Lockwasher	MS35338-100	5310-00-261-8278
274	Lockwasher	MS35338-101	5310-00-184-8970
275	Lockwasher	MS35338-103	5310-00-184-8971
276	Lockwasher	MS35338-105	5310-00-577-5354
277	Lockwasher	MS35338-138	5310-00-933-8120
278	Lockwasher	MS35338-15	5310-00-012-1326
279	Lockwasher	MS35338-41	5310-00-045-4007
280	Lockwasher	MS35338-42	5310-00-045-3299
281	Lockwasher	MS35338-43	5310-00-045-3296
282	Lockwasher	MS35338-44	5310-00-582-5965
283	Lockwasher	MS35338-45	5310-00-407-9566
284	Lockwasher	MS35338-46	5310-00-637-9541
285	Lockwasher	MS35338-47	5310-00-209-0965
286	Lockwasher	MS35338-48	5310-00-584-5272
287	Lockwasher	MS35338-49	5310-00-167-0680
288	Lockwasher	MS35338-50	5310-00-820-6653
289	Lockwasher	MS35338-51	5310-00-584-7888
290	Lockwasher	MS35338-6	5310-00-010-3319
291	Lockwasher	MS35338-7	5310-00-010-3320
292	Lockwasher	MS35338-8	5310-00-261-7340
293	Lockwasher	MS35340-45	5310-00-959-4679
294	Lockwasher	MS45904-60	5310-00-080-9786
295	Lockwasher	MS51848-7	5310-01-040-7762
296	Lockwasher	N9015	4310-01-046-0186
297	Lockwasher	N9018	5310-01-032-4827

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
298	Lockwasher	N9265	5310-01-136-4888
299	Lockwasher	N9461	5310-01-348-8392
300	Lockwasher	N9574	5310-01-439-0818
301	Lockwasher	V88350241	5310-01-346-0138
302	Lockwasher	V88412056	2835-01-355-1918
303	Lockwasher	W08	5310-01-355-8794
304	Lockwasher	W 12	5310-00-010-6265
304.1	Lockwasher	Z093078423	
304.2	Lockwasher	Z095002434	
305	Machine Gun Kit	1878620U	1005-01-363-2502
306	Mount, Resilient	5104515	5340-01-057-4230
307	Nut, Adjusting	V75502102	5310-01-344-6280
308	Nut, Adjusting	V88140038	5310-01-344-6279
309	Nut, Flange	298125	5310-01-346-3787
310	Nut, Flanged Wiz Lock	31 WLF 51618	5310-00-166-8341
311	Nut, Plain, Hex	V75700689	5310-01-345-3757
312	Nut, Push-On	390963	5310-01-143-0542
313	Nut, Spanner	V75503561	5310-01-344-6313
314	Nut, Spanner	V88350222	5310-01-345-5495
315	Nut, Spanner	V88900207	5310-01-344-6312
316	Nut, Spring Clip	7-659-000256	5310-01-271-3286
317	Ring Set, Piston	23524350	2815-01-058-2204
318	Packing, Preformed	001081	5330-01-086-1013
319	Packing, Preformed	001082	5330-01-085-3105
320	Packing, Preformed	001083	5330-01-086-6196
321	Packing, Preformed	00908-77-00-00	5330-01-361-1181
322	Packing, Preformed	1081	5330-00-408-9895
323	Packing, Preformed	1082	5330-01-352-3354
324	Packing, Preformed	1083	5330-01-157-3798
325	Packing, Preformed	11007B	5330-01-344-0539
326	Packing, Preformed	11350	5330-01-147-6003
327	Packing, Preformed	11-910	5330-01-106-4336
328	Packing, Preformed	1332	
329	Packing, Preformed	177969	5330-01-353-9388
330	Packing, Preformed	19265FX	5330-01-054-7297
331	Packing, Preformed	200-116-4490	5330-01-361-1505
332	Packing, Preformed	200-214-4490	5330-01-116-8112
333	Packing, Preformed	200-912-4490	5330-00-395-5737
334	Packing, Preformed	2-011N103-70	5330-00-419-0749
335	Packing, Preformed	2-011N507-90	5330-01-265-8308
336	Packing, Preformed	2-012N507-90	5330-01-092-5502
337	Packing, Preformed	2-014N103-70	5330-00-213-8722
338	Packing, Preformed	2-016N552-90	5330-01-115-8225

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
338	Packing, Preformed	2-016N552-90	5330-01-115-8225
339	Packing, Preformed	2-018N507-90	5330-01-092-5503
340	Packing, Preformed	2-021N507-90	5330-01-109-1366
341	Packing, Preformed	2-029N507-90	5330-01-093-3503
342	Packing, Preformed	2-040N674-70	5330-00-137-3204
343	Packing, Preformed	2-112N507-90	5330-01-093-3504
344	Packing, Preformed	2-114N507-90	5330-01-288-4786
345	Packing, Preformed	22012-10	5330-00-966-8620
346	Packing, Preformed	22012-12	5330-00-966-8621
347	Packing, Preformed	22012-6	5330-00-200-8125
348	Packing, Preformed	22012-8	5330-00-996-8627
348.1	Packing, Preformed	22100070001	5331-01-475-3921
349	Packing, Preformed	2-219N674-70	5330-00-013-7784
350	Packing, Preformed	22617-10	5330-01-040-4772
351	Packing, Preformed	22617-12	5330-00-228-7196
352	Packing, Preformed	22617-16	5330-01-168-0885
353	Packing, Preformed	22617-20	5330-01-168-1802
354	Packing, Preformed	22617-6	5330-01-198-8439
355	Packing, Preformed	22617-8	5330-01-244-2273
356	Packing, Preformed	23017303	5330-01-334-9946
357	Packing, Preformed	23045075	5330-01-341-6763
358	Packing, Preformed	23503769	5365-01-286-3994
359	Packing, Preformed	23504352	5330-01-420-8670
360	Packing, Preformed	235063	5330-00-454-0370
360.1	Packing, Preformed	32075110	5331-01-475-3917
360.2	Packing, Preformed	32075111	5331-01-475-3907
361	Packing, Preformed	32185	5330-00-013-7784
362	Packing, Preformed	353264	5330-01-358-5432
363	Packing, Preformed	3-924N552-90	5330-01-038-3074
363.1	Packing, Preformed	405420	4730-01-351-7845
364	Packing, Preformed	405862	5330-00-490-1899
365	Packing, Preformed	5101138	5330-01-062-0942
366	Packing, Preformed	5101160	5330-01-058-0281
367	Packing, Preformed	5101198	5330-00-090-4638
368	Packing, Preformed	5101419	5330-01-164-0344
369	Packing, Preformed	6830007	5330-01-049-0547
370	Packing, Preformed	71040	5330-01-012-2722
371	Packing, Preformed	71041	5330-00-633-6827
372	Packing, Preformed	7-543-002870	4720-01-352-6004
373	Packing, Preformed	7-755-014003	5330-00-472-2783
374	Packing, Preformed	7-755-166003	5330-01-353-9544
375	Packing, Preformed	7-755-238003	5330-01-352-7742
376	Packing, Preformed	7-755-246003	5330-01-354-0235

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
377	Packing, Preformed	85318952	5330-01-155-4277
378	Packing, Preformed	8-74-80-09-059	5330-01-388-3727
379	Packing, Preformed	8923959	5330-00-166-1020
380	Packing, Preformed	8928676	5330-01-346-0846
381	Packing, Preformed	962	5330-00-056-4405
382	Packing, Preformed	9631	5330-00-232-0635
383	Packing, Preformed	A307777000-8	5330-00-920-4157
384	Packing, Preformed	FF446-25	5330-01-269-6152
385	Packing, Preformed	FF9446-12	5330-01-115-8226
386	Packing, Preformed	FF9446-14	5330-01-269-8580
387	Packing, Preformed	FF9446-18	5330-01-092-5503
388	Packing, Preformed	FF9446-21	5330-01-269-4323
389	Packing, Preformed	FF9855-12	5330-01-376-9629
390	Packing, Preformed	FF9855-16	5330-01-372-3867
391	Packing, Preformed	FF9855-18	5330-01-363-7073
392	Packing, Preformed	FF9855-21	5330-01-363-7074
393	Packing, Preformed	J200AS128	5330-00-111-3747
393.0.1	Packing, Preformed	M053225163	
393.1	Packing, Preformed	MS28775-013	5331-00-684-3420
394	Packing, Preformed	MS28775-026	5330-00-631-1342
395	Packing, Preformed	MS28775-121	5330-00-542-1398
396	Packing, Preformed	MS28778-16	5330-00-804-5694
397	Packing, Preformed	MS28778-20	5330-00-816-3546
398	Packing, Preformed	MS28778-4	5330-00-805-2966
399	Packing, Preformed	MS29512-16	5330-00-263-8054
400	Packing, Preformed	MS29561-14	5330-00-729-5254
401	Packing, Preformed	RK11341	5330-01-214-5090
402	Packing, Preformed	V75502787	5330-01-354-4160
402.1	Packing, Preformed	XA-2265	
403	Packing, Preformed	Z053071038	5330-00-633-6818
403.1	Packing, Preformed	Z053074979	
403.2	Packing, Preformed	Z053074980	
403.3	Packing, Preformed	Z053074981	
404	Packing, Preformed	Z053095777	5330-01-304-3453
405	Parts Kit, Air Flow	289352	2530-01-134-1834
406	Parts Kit, Gear Box	02-23-01251-022	5330-00-633-6188
407	Parts Kit, Hydraulic	23012606	2520-01-176-6004
408	Parts Kit, Seal	SK-10-2	5330-01-162-8277
409	Parts Kit, Seal	SK-10-3	2920-00-060-3411
410	Parts Kit, Seal	SK3-0002N-1	5330-01-357-7904
411	Parts Kit, Seal	SK3-10-3S	5330-01-358-3739
412	Parts Kit, Seal	SK3-16-3S	5330-01-358-3740
413	Pin	274889	5315-00-823-4333

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
414	Pin	5106909	5315-01-089-6864
415	Pin	5156295	5315-00-238-0843
416	Pin, Cotter	MS24665-134	5315-00-839-5820
417	Pin, Cotter	MS24665-283	5315-00-842-3044
418	Pin, Cotter	MS24665-287	5315-00-011-9120
419	Pin, Cotter	MS24665-291	5315-00-019-0777
420	Pin, Cotter	MS24665-353	5315-00-839-5822
421	Pin, Cotter	MS24665-360	5315-00-298-1499
422	Pin, Cotter	MS24665-624	5315-00-059-0217
423	Pin, Cotter	MS24665-625	5315-00-209-7273
424	Pin, Cotter	MS24665-627	5315-00-013-7308
425	Pin, Cotter	MS24665-752	5315-00-546-4297
426	Pin, Dowel	141346	5315-00-014-1346
427	Pin, Dowel	142522	5315-00-081-9924
428	Pin, Dowel	5103045	5315-01-137-3373
429	Pin, Dowel	5151576	5315-00-524-7660
430	Pin, Dowel	5175641	5315-00-829-0381
431	Pin, Lube Valve	6838442	5315-01-055-4411
432	Pin, Roll	WLM110004	5315-01-174-4642
433	Pin, Spring	6835729	5360-01-083-1433
434	Pin, Spring	7-690-081044	5315-01-382-8969
435	Plastic Bushing	45289-2	5365-01-163-8204
436	Plate	5103307	2815-01-058-3683
437	Plate, Separator	29501599	5365-01-342-8541
438	Plug	121-6T	5365-01-272-1481
439	Plug	8923313	4730-01-188-3492
440	Plug	8924749	4730-00-005-7376
441	Plug	8924750	4730-01-210-4251
442	Plug	8924751	4730-01-210-4253
443	Plug, Expansion	5139989	5340-00-255-4423
444	Plug, Lube Orifice	6883707	4730-01-127-6900
445	Plug, Nylon	715001A	5340-01-372-3982
446	Preformed Packing Kit	22617-12	5330-00-228-7196
447	Preformed Packing Kit	9S000104	5330-01-363-0667
448	Preformed Packing Kit	9S-000105	5330-01-393-5075
449	Preformed Packing Kit	9S000106	5330-01-372-8377
450	Preformed Packing Kit	FF9446-11	5330-01-214-4857
451	Preformed Packing Kit	SK2-10-2	5330-01-226-6810
452	Preformed Packing Kit	SK3-0017N-1	5330-01-357-7511
453	Preformed Packing Kit	SK3-0039N-1	5330-01-357-7510
454	Preformed Packing Kit	SK3-0024N-1	5330-01-357-7512
455	Preformed Packing Kit	SK3-0088N-1	5330-01-355-9248
456	Pump Assembly	V75503039	5365-01-345-1088

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
457	Push Clips	H360-4-2	5340-01-151-8391
458	Quickedge Molding	75000317	2510-01-176-1177
459	Repair Kit	60539	5330-01-302-2413
460	Repair Kit	711921	5330-01-393-4779
461	Repair Kit	711922	5330-01-354-4314
462	Repair Kit	9400	2530-01-344-5748
463	Repair Kit	9403	5330-01-344-2572
464	Repair Kit	9436	2520-01-344-9375
465	Repair Kit	9-752-100778	5330-01-353-9623
466	Repair Kit	9-752-100788	5330-01-352-6659
467	Repair Kit	9-752-100901	5330-01-353-9513
468	Repair Kit	9-752-100915	5330-01-354-3834
469	Repair Kit	9-752-101050	5330-01-353-9514
470	Retainer	1790632	2530-01-340-4080
471	Retainer	5149154	5365-01-015-5414
472	Retainer	MS28783-16	5330-00-171-5910
473	Retainer	MS28783-26	5330-00-944-9577
474	Retainer, Piston Pin	5180250	5340-00-792-9020
475	Retaining Ring	6758779	5365-00-852-2641
476	Ring Set	282525	2530-01-104-9031
477	Ring, Lock	14-00-139-040	5365-01-201-8981
478	Ring, Lock	5115572	5365-00-590-1739
479	Ring, Locking	2262131	5310-01-344-0559
480	Ring, Oil Collector	23011130	2520-01-145-0301
481	Ring, Piston	23524191	2815-01-337-3963
482	Ring, Piston	8923113	2815-01-321-2231
483	Ring, Piston	8923729	2815-01-247-7125
484	Ring, Piston	T-560-0330-001	3040-01-341-2340
485	Ring, Piston	T-561-0329-002	2815-01-345-1068
486	Ring, Retaining	001023	5365-01-087-8727
487	Ring, Retaining	1023	5365-01-157-3779
488	Ring, Retaining	14-00-139-033	5365-01-202-2587
489	Ring, Retaining	14-02-053-001	5365-01-205-9013
490	Ring, Retaining	23514733	
491	Ring, Retaining	329-1	5365-00-843-8601
492	Ring, Retaining	5198049	5365-00-930-3257
493	Ring, Retaining	MS16224-1087	5365-00-804-2025
494	Ring, Retaining	MS16624-1250	5365-00-806-2357
495	Ring, Retaining	MS16624-1315	5365-00-200-6684
496	Ring, Retaining	MS16625-1081	5365-00-804-9740
497	Ring, Retaining	MS16625-1200	5365-00-804-2784
498	Ring, Retaining	MS16625-1525	5365-00-504-3138
499	Ring, Retaining	V75501125	5365-01-344-8448

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
500	Ring, Retaining	V75503628	5365-01-345-2353
501	Ring, Retaining	V88150021	5360-01-345-2728
502	Ring, Retaining	V88510252	5330-01-354-4218
503	Ring, Retaining	V88510253	5330-01-345-0157
504	Ring, Retaining (Blue)	6882795	5365-01-083-1532
505	Ring, Retaining (Red)	6882797	5365-01-083-1533
506	Ring, Retaining (Yellow)	6882796	5365-01-083-1534
507	Ring, Seal	23019653	5330-01-338-6302
508	Ring, Seal	5103544	5330-01-088-6596
509	Ring, Seal	5197583	5330-00-930-3254
510	Ring, Seal	5198936	5365-01-016-0443
511	Ring, Seal, Cylinder Liner	8927189	5330-01-054-2267
512	Ring, Spindle	V88350243	5365-01-344-6016
513	Rod Bearing Set	23501025	3120-01-336-3064
514	Screw	115289A	5306-01-150-5884
515	Screw	1344950	5305-01-155-6107
516	Screw	1514640	5305-01-347-9802
517	Screw	1756870	5306-01-341-0712
518	Screw	186292	5306-00-849-8812
519	Screw	2009HX	5305-01-210-7413
520	Screw	2271280	
521	Screw	23045343	5306-01-245-9837
522	Screw	23512308	5306-01-411-6384
523	Screw	3829139	5306-00-024-6580
524	Screw	5103530	5306-01-084-4413
525	Screw	5103534	5306-01-078-4981
526	Screw	5103642	5305-01-078-1999
527	Screw	5121466	5306-00-894-2391
528	Screw	5148794	5305-01-058-5320
529	Screw	54067AX	5305-01-150-8714
530	Screw	7092	5305-00-335-4067
531	Screw	711053A	5305-01-355-2641
532	Screw	8-73-412	5306-01-336-8874
533	Screw	8920631	5306-01-169-5526
534	Screw	8923569	5305-01-192-2168
535	Screw	8923570	5306-01-208-7957
536	Screw	8923571	5306-01-128-3980
537	Screw	8925603	5306-01-297-6987
538	Screw	8927580	5306-01-193-9291
539	Screw	B1821BH038C400N	5305-00-781-3928
540	Screw	C95A37	5305-01-066-1825
541	Screw	CPR102737	5306-00-182-9230
542	Screw	MS35295-58	5305-01-056-5448

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
543	Screw	MS51095-416	5305-00-964-0589
544	Screw	MS90725-5	5305-00-068-0501
545	Screw	MS90725-60	5305-00-269-3211
546	Screw	MS90728-193	5305-00-947-4356
546.1	Screw	Z112007092	
547	Screw And Washer Assy	23018827	5305-01-341-8904
548	Screw, Cap W/Lockwasher	237757	5305-01-133-7193
549	Screw, Lock	5145092	5306-00-869-2868
550	Screw, Self-Locking	11504603	5305-01-336-6757
551	Screw, Self-Locking	23015458	5306-01-363-4057
552	Screw, Self-Locking	31 WLFS 51618-062	5306-01-350-8223
553	Screw, Self-Locking	378429-8	5306-01-145-6949
554	Screw, Self-Locking	9409010	5306-00-940-9010
555	Screw, Self-Locking	9409037	5305-00-292-4595
556	Screw, Self-Locking	MS35763-1033	5306-00-842-8223
557	Screw, Self-Tapping	1324510	5305-01-157-5624
558	Screw, Self-Tapping	1345280	5305-01-159-8544
559	Screw, Self-Tapping	1723180	5305-01-145-4003
560	Screw, Self-Tapping	58368AX	5305-01-167-0288
561	Screw, Self-Tapping	B71-10015-002	5305-01-352-2066
562	Screw, Tapping	234-94420-382	5305-01-351-8783
563	Seal	001332	5330-01-173-6825
564	Seal	23504641	5330-01-336-2997
565	Seal	23511486	5330-01-397-6491
565.1	Seal	251816010004	5340-01-474-7928
565.2	Seal	251816011300	5340-01-474-7934
565.3	Seal	251816991107	5340-01-474-8059
565.4	Seal	252044010012	5330-01-474-7061
566	Seal	3S9643-00	5330-00-246-6380
567	Seal	5102098	5330-01-058-5220
568	Seal	5103646	5330-01-088-2740
569	Seal	513439	5330-01-384-9330
570	Seal	5148502	5365-01-062-0943
571	Seal	589332	5330-01-372-5634
572	Seal	71246	5330-01-187-3640
573	Seal	80X100X10	5330-01-355-9269
574	Seal	8922140	5330-00-764-1659
575	Seal	NA1205A2315	5330-01-344-0635
576	Seal	NA1205W2259	5330-01-345-4712
577	Seal Kit	430457B	5330-01-394-3549
578	Seal Kit	9638	5330-01-344-2573
579	Seal Kit, Needle	23500533	5340-00-678-0944
580	Seal, Double Lipped, Teflon	3J3598	5330-01-162-8277

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
581	Seal, Oil	10124	5330-01-281-0907
582	Seal, Oil	13585	5330-00-202-1292
583	Seal, Oil	23016947	5330-01-245-0159
584	Seal, Oil	31333CRWH1	5330-01-204-5486
585	Seal, Oil	415023-SSR	5330-01-340-9882
586	Seal, Oil	415025-SSR	5330-01-340-9882
587	Seal, Oil	415304	5330-01-033-2697
588	Seal, Oil	5106223	5330-01-083-3980
589	Seal, Oil	5148502	5365-01-062-0943
590	Seal, Oil	5177786	5330-00-961-9801
591	Seal, Oil	6773311	5330-00-999-3752
592	Seal, Oil	8-74-21-25-017	5330-01-138-2629
593	Seal, Oil	8-74-21-25-021	5330-01-207-6676
594	Seal, Oil	8921150	5330-01-166-3618
595	Seal, Oil	8921209	5330-00-992-0695
596	Seal, Oil	9-734-100635	5330-01-208-7006
597	Seal, Oil	A11507	5330-00-846-8177
598	Seal, Oil	E75503729	5330-01-344-8263
598.1	Seal, Oil	M054097799	
599	Seal, Oil	V75503486	5330-01-344-8935
600	Seal, Oil	V75503596	5330-01-350-2906
601	Seal, Oil	V88350180	5330-01-344-0639
602	Seal, Oil, Rear	8929750	5330-01-324-0437
603	Seal, Plain	6836799	5330-01-145-0697
604	Seal, Plain, Encased	5177786	5330-00-961-9801
605	Seal, Ring	23011453	5330-01-088-5847
606	Seal, Ring	23011454	5365-01-084-5258
607	Seal, Ring	23011455	2520-01-149-3273
608	Seal, Ring	23014441	5330-01-087-6849
609	Seal, Ring	23014631	5935-01-342-3363
610	Seal, Ring	23019652	5330-01-054-2242
611	Seal, Ring	23045519	5330-01-280-7491
612	Seal, Ring	6758740	5330-00-582-0456
613	Seal, Ring	6770492	5330-00-999-3760
614	Seal, Ring	6833980	5330-01-236-1753
615	Seal, Ring	6836796	5330-01-336-6709
616	Seal, Ring	6836799	5330-01-145-0697
617	Seal, Ring	6836800	5330-01-336-2998
618	Seal, Ring	NA1205A2315	5330-01-344-0635
619	Seal, Ring	NA1205W2259	5330-01-345-4712
620	Seal, Valve	23045075	5330-01-341-6763
621	Seal, Water	23506248	5330-01-359-2143
622	Seal, Water	5148502	5365-01-062-0943

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
623	Sealing Kit (Inner)	V88510252	5330-01-354-4218
624	Sealing Kit (Outer)	V88510253	5330-01-345-0157
625	Setscrew	8927479	5305-01-297-7528
626	Setscrew	8927579	5305-01-336-5925
627	Setscrew Assy	35370-2	5305-01-167-0232
628	Shaft	23506053	3040-01-354-0406
629	Shim	4-195-9-00297	5365-01-354-0251
630	Shim	4-195-9-00298	5365-01-354-0252
631	Shim	4-195-9-00299	5365-01-354-0253
632	Shim	5183323	5365-00-377-2888
633	Shim	5185318	5365-00-377-2889
634	Shim	5185319	5365-00-377-2887
635	Shim Kit, Adjusting	V86010008	5365-01-344-6846
636	Shim Kit, Adjusting	V86010009	5365-01-344-6847
637	Shim Kit, Adjusting	V86010010	5365-01-344-4425
638	Shim Kit, Adjusting	V86010012	5365-01-344-6848
639	Shim Kit, Adjusting	V86010048	5310-01-345-2637
640	Shim Kit, Adjusting	V86010049	5365-01-350-3080
641	Shim Kit, Adjusting	V86010079	5365-01-345-2639
642	Shim Kit, Adjusting	V86010080	5365-01-345-3969
643	Shim Kit, Adjusting	V86010081	5365-01-345-3962
644	Shim Kit, Adjusting	V86020076	5365-01-345-0228
645	Shims	5100703	5365-01-082-1972
646	Skirt, Piston	23508986	2815-01-406-1952
647	Sleeve	V75503563	5365-01-344-4387
648	Snap Ring	8922605	5365-01-173-3437
649	Snap Ring	N1229N4408	5365-01-344-2598
650	Spacer	2262141	5310-01-344-0560
651	Spacer, Plate	59808BX	5365-01-156-0026
652	Spring	001288	5360-01-174-3821
653	Spring	007500	5360-01-145-7555
654	Spring	011434	5360-01-209-8802
655	Spring	12321866	5360-01-216-7059
656	Spring	3-4X1MD	5360-01-043-4761
657	Spring	5108918	5360-00-689-8264
658	Spring	5108919	2815-00-053-8992
659	Spring	5134477	5360-00-930-3264
660	Spring	5144857	
661	Spring	53733AX	5360-01-145-4724
662	Spring	54396AX	5360-01-086-1419
663	Spring	6768544	5360-00-679-7009
664	Spring	6831656	5360-00-211-9547
665	Spring	6880418	5360-01-035-9396

(1) Index No.	(2) Nomenclature	(3) Part Number	(4) National Stock Number
666	Spring	8923176	5360-01-206-3186
667	Spring	8927794	5360-01-336-9229
668	Spring Kit	23013754	5360-01-128-5646
669	Spring, Converter By-Pass	6834666	4820-01-082-9452
670	Spring, Lockup Shift Val	6839419	5360-01-144-6170
671	Spring, Lube Valve	6837882	5360-01-128-5645
672	Spring, Main Pressure Reg	6839209	5360-01-084-2394
673	Standard Piston Kit	282525	2530-01-104-9031
674	Standoff	23019304	3040-01-K62-9137
675	Strainer, Element	5126143	2940-00-745-7741
676	Stud	5130488	5307-01-044-7270
677	Stud	8925804	5307-00-550-1879
678	Thrust Washer, Oversize	5116485	5365-00-837-8352
679	Thrust Washer, Standard	5111424	3120-00-585-3282
680	Tube, Vent	6769580	4710-00-124-5737
681	U-Bolt	90359-A	4730-01-353-9723
682	U-Bolt	X125	5340-01-351-5690
683	Union, Bulkhead	1890800	4730-01-356-8646
684	Valve Guide	5149771	2815-01-062-0855
685	Valve Seat Insert	5148490	2815-01-055-7659
686	Valve, Lube	6837881	2520-01-051-6670
687	Valve, Seat	5148490	2815-01-055-7659
688	Washer	31425BX	2520-01-041-3542
689	Washer	40393AX	3120-01-146-9782
690	Washer	5104701	5330-00-599-0505
691	Washer	5125108	5310-00-785-3961
692	Washer	8925749	5365-01-239-9477
692.1	Washer, Fiber	Z082073500	3110-01-302-9300
693	Washer, Flat	5198988	5310-00-153-2717
694	Washer, Flat	60598	5310-00-663-7617
695	Washer, Seal	1760040	5310-01-353-2062
695.1	Washer, Seal	XA-1470	
696	Washer, Spring	M12133/1-12P	5310-01-038-2294
697	Washer, Thrust	5111424	3120-00-585-3282
698	Washer, Thrust	5117005	2815-00-735-4202
699	Washer, Thrust	6835321	3120-01-084-4607
700	Washer, Thrust	6881352	3120-01-056-2112
701	Washer, Thrust	6881638	3120-01-053-1819
702	Wear Pad	4-198-9-00020	2590-01-199-7975
703	Wear Pad	6-671-000306	2590-01-354-8240
704	Wear Pad	6-671-000308	2590-01-354-5443
705	Wear Pad	6-671-000362	2590-01-352-2339
706	Windshield Seal/Locking Strip	7500690	5330-01-178-7174

APPENDIX F

TOOL IDENTIFICATION LIST

Section I. INTRODUCTION

F-1. SCOPE.

This appendix lists all of the tools needed to repair the PLS.

F-2. GENERAL.

This appendix is a list of tools, both common and special, test equipment and tool kits used at Direct and General Support Maintenance level to repair the truck. This list is arranged alphabetically and shows the nomenclature, Part Number (P/N) and National Stock Number (NSN), when applicable. The index number corresponds to the index number found in the task box of maintenance procedures.

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS

Item No.	Description	Part No.	NSN	Reference
1	Adapter, Engine Stand	J33850	4910-00-146-9624	
2	Adapter Kit, Transfer Case	J-39911	4910-01-385-6779	
3	Adapter, Maintenance Stand, Differential	J-39929-A	4910-01-384-6264	
4	Adapter, Mechanical Puller	J7932	5120-00-733-8890	
5	Adapter, Press	206457	5120-01-357-0740	
6	Adapter, Radiator	J-29003-A	4910-01-170-4929	
7	Adapter, Slip Test	J33765	5935-01-297-2481	
8	Adapter, Socket (3/4 in. male to 1/2 in. female)	11655788-3	5120-00-144-5207	SC 4910-95-A31
9	Adapter, Socket (3/4 in. female to 1/2 in. male)	97-3725	5120-00-227-8088	
10	Adapter, Socket (3/4 in. female to 1 in. male)	A-A-2172	5120-00-227-8104	
11	Adapter, Socket (3/8 in. female to 1/4 in. male)	A-6	5120-00-227-8095	SC 4940-95-B20-HR
12	Alignment Tool, Blower	J33001	5120-01-158-3991	
13	Alignment Tool, Clutch	J-24221	5120-01-115-1156	
14	Alignment Tool, Pin	J24285	5120-01-232-0007	
15	Analyzer Set, STE/ICE-R	12259266	4910-01-222-6589	
16	Attachment, Ball, Micro	J4757	5210-00-221-1921	
17	Bit Set, Screwdriver	38699-1	5120-01-170-4454	SC 4910-95-A72-HR
18	Blade Kit, Hole Saw	GGG-S-66	3455-00-684-3918	

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
19	Box, Chalk, Reel and Line	GGG-C-291	5210-00-273-9793	
20	Bracket, Lifting	J-24196	5120-01-115-1157	
21	Bracket, Lifting	J24408-A	5306-01-338-6292	
22	Bracket, Mounting, Cylinder Liner	J24565-02	5340-01-158-3984	
23	Brush, Wire, Scratch	HB178	7920-00-291-5815	SC 4910-95-31
24	Brush, Wire, Valve Cylinder	J5437	5120-00-766-2141	
25	Caliper, Dial, 0-6 in. w/Dial	599-579-2	5210-01-010-4522	SC 3470-95-A02
26	Cap and Plug Set	10935405	5340-00-450-5718	
27	Caps, Vise Jaw	GGG-C-137	5120-00-246-4747	
28	Cartridge, ATEC	J38500-303	4940-01-367-6194	
29	Cartridge, DDEC	J38500-750	4940-01-367-4657	
29.1	Cartridge DDEC III/IV	J38500-1500	7025-01-482-8761	
30	Charging Kit, Pressure	12252157	4910-01-046-7109	
31	Clamp	42052	5340-01-084-4459	
32	Clamp, Machinist's	GGG-C-406	5120-00-222-1612	SC 4910-95-A72-HR
33	Clamp Plate	206459	5120-01-357-0741	
34	Collector Ring Installer and Staking Set	J24200	5120-01-048-3124	
35	Compressor Unit, Air	MIL-C-13874	4130-00-752-9633	
36	Compressor, Ring	J24204-1	5120-01-048-3130	
37	Compressor, Ring	J24227	4910-01-158-3974	
38	Compressor, Ring, Piston	RC40C	5120-00-250-6055	
39	Compressor, Spring	J24204-3	5120-01-048-2159	
40	Compressor, Spring	J24219	5120-01-048-2160	
41	Compressor, Spring, Valve	J7455-A	5120-01-297-2347	
42	Connector Remover	J38384	5120-01-355-3012	
43	Crowbar	1051985	5120-00-224-1390	SC 4910-95-A31
44	DDEC Repair Kit	J35888	2815-01-355-5993	
45	Detector, Leak, Vacuum Gage	J-23987-B	6685-01-061-4253	
46	Die Set, Metal Stamping	GGG-D-280	5110-00-289-0004	SC 4910-95-A31
47	Drill Machine, Upright	MIL-D-80038	3413-00-165-4117	
48	Drill Set, Twist	GGG-D-751	5133-00-449-6775	SC 3470-95-A02
49	Drill, Electric, Portable, 1/4 in.	1070	5130-00-889-8993	SC 4910-95-A31
50	Driver	2HS115	5120-01-374-6200	
51	Driver Bearing, Gear	J25257	5120-01-033-8902	

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
52	Driver, CTIS Seal	J41112	5120-01-355-0857	
53	Driver, CTIS Seal	J41113	5120-01-355-0858	
54	Expander, Seal, Oil	J4239	5120-00-336-0445	
55	Expander, Seal, Oil	J8682	5120-01-232-0005	
56	Extractor, Inertial	2HE226	5120-01-355-3010	
57	Extractor, Inertial	2HE227	5120-01-354-9543	
58	Eyes, Lifting	3016T39	5306-01-197-6569	
59	Eyes, Lifting	8891T82	5306-01-333-5486	
60	Eyes, Lifting	3016T65	5306-01-239-5053	
60.1	Fault Code Retrieval Device (FCRD)	CA1 05 020		
61	Fixture, Holding	J-24310	5120-01-115-1165	
62	Fixture, Lifting, Cylinder Head	J22062-01	4910-00-456-7620	
63	Fixture, PTO, Gear	J26899	4910-01-158-3969	
64	Fixture, Test, Head	J28454	4910-01-158-3985	
65	Gage Set, Cylinder Compression	J7334-E	4910-01-148-1236	
66	Gage Set, Feeler	FB310B	5210-01-119-7601	
67	Gage Set, Feeler	J 1698-02	5210-01-245-9564	
68	Gage Set, Feeler, Piston	J5438-01	5210-00-116-1631	
69	Gage Set, Telescoping	599-590	5210-00-473-9350	SC 4910-95-A63
70	Gage, Center And Front	J-29198-3	5210-01-133-6888	
71	Gage, Depth	J-22273-01	5210-00-023-4798	
72	Gage, Depth, Cylinder Liner	J24898	5210-01-174-4498	
73	Gage, Depth, Micrometer	GGG-C-105	5210-00-619-4045	SC 3470-95-A02
74	Gage, Dial	J-8165-2	4910-00-779-7103	
75	Gage, Dial, Bore, Cylinder	J5347-B	5210-01-070-4543	
76	Gage, Feeler	J3174-02	5210-00-671-2275	
77	Gage, Feeler	J9708-15	5210-01-156-7302	
78	Gage, Feeler, Jacobs Brake	007958	5210-01-214-2938	
79	Gage, Piston, Groove	J24599	5220-01-028-1109	
80	Gage, Timing, Injector	J25502	5220-01-348-1638	
81	Gloves, Chemical Oil Protective	ZZ-G-381	8415-00-641-4601	
82	Gloves, Heavy Duty	A-A-50022	8415-00-268-7859	SC 4910-95-A31
83	Goggles, Industrial	GGG-G-513	4240-00-269-7912	SC 4910-95-A31
84	Grinding Kit, Valve Seat	1750	4910-00-473-6437	SC 4910-95-A63

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
85	Grinding Machine, Valve Face	00G686	4910-00-540-4679	SC 4910-95-A63
86	Gun, Airblow	GGG-G-770	4940-00-333-5541	SC 4910-95-A31
87	Gun, Heat	500	4940-00-561-1002	SC 4910-95-A31
88	Hammer, Hand, Soft Plastic	3-HD	5120-01-065-9037	SC 4910-95-A72-HR
89	Hammer, Slide	J6125-1B	5120-01-112-2165	
90	Handle, Driver	J8092	5120-00-677-2259	
91	Handle, Driver	J-3154-1	5120-00-808-5082	
92	Handle, Driver	J24202-4	5120-01-054-4048	
93	Handle, Installer	J7079-2	5120-00-977-5578	
94	Harness, Breakout	J34517	6150-01-373-7771	
95	Holder, Stator Roller	J24218-2	5120-01-115-1158	
96	Honing Unit, Cylindrical Bore, Portable	J5902-01	5130-00-629-9782	
97	Indicator, Dial, Set	J5959-01	5120-00-794-9178	SC 4910-95-A31
98	Indicator, Dial, Set w/Magnetic Base	J7872	5120-00-402-9619	
99	Indicator, Dial, Timing Tool	J34930A	2815-01-355-6628	
100	Insertor and Remover, Charge Pump	J33080	5120-01-166-0572	
101	Insertor, Bearing And Bushing	J25562	5120-01-158-3946	
102	Insertor, Center Bushing, Front	302031	5120-01-186-3126	
103	Insertor, Plug, Cylinder Block	J-21850	5120-01-166-5419	
104	Insertor, Seal	J35373	5120-01-340-1820	
105	Installation Tool, Cup Plug	J33420	5120-01-297-2457	
106	Installer and Remover	J25275	5120-01-048-2180	
107	Installer, Bearing	J-24197	5120-01-115-1160	
108	Installer, Guide, Valve	J-21520	5120-00-999-8617	
109	Installer, Lock Ring	J24453	5120-01-054-4050	
110	Installer, Oil Seal, Sleeve	J21983	5120-01-227-8483	
111	Installer, Output Shaft Seal	J-24202-1A	5120-01-054-4042	
112	Installer, Plug	J-24411	5120-01-385-7288	
113	Installer, Plug	J24369	5120-01-054-4053	
114	Installer, Seal, Crankshaft, Front	J9783	5120-00-936-4377	
115	Installer, Seal	J9791	5120-01-013-1678	
116	Installer, Seal	J8550	5120-00-977-5579	
117	Installer, Seal	J24198	5120-01-054-4049	

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
118	Installer, Seal, Oil	J8501	5120-00-937-7267	
119	Installer, Seal, Transfer Case	6227 TRS	5120-01-383-7878	
120	Installer, Sleeve	J21983	5120-01-227-8483	
121	Installer, Valve Bridge	J7482	5120-00-999-8616	
122	Installer, Water Pump Seal	J-38858	5120-01-365-4079	
123	Installer Tool, Center Bushing, Rear	302026	4910-01-158-3941	
124	Installing Tool, Piston	J-23762-A	5120-00-127-7757	
125	Installing Tool, Valve	J24357	5120-01-048-3118	
126	Installing/Removing Tool	J-23019	5120-01-130-8864	
127	Jack, Dolly Type	93660	4910-00-289-7233	SC 4910-95-A31
128	Jack, Hydraulic, Hand	5029209-111-101	5120-00-188-1790	SC 4910-95-A31
129	Jack, Kit, Hydraulic, Hand	GGG-J-60	5120-00-595-8387	SC 4910-95-A31
130	Jack, Stabilizer	LO-J		
131	Jack, Transmission	49	4910-00-585-3622	SC 4910-95-A62
132	Jackstand	306	4910-00-251-8013	SC 4910-95-A74
133	Lathe, Brake Drum	4100	4910-01-028-9849	SC 4910-95-A31
134	Level	2579573-002	4920-00-064-8974	
135	Lifting, Bracket, Center	J-24195	5120-01-116-6048	
136	Lifting, Bracket, Flywheel	J-24365	5120-01-116-6049	
137	Lifting, Fixture, Clutch	J-24209	5120-01-115-1159	
138	Mag Ins Unit, Stat	MIL-M-6867C	6635-00-566-9772	
139	Micrometer, Outside, Caliper, Set	GGG-C-105	5210-00-554-7134	SC 3470-95-A02
140	Multimeter	ANURM105C	6625-00-999-6282	SC 4910-95-A31
141	Multiplier, Torque	292	5120-00-574-9318	SC 4910-95-A72-HR
142	OSS Tester	13189	4910-00-370-4908	
143	Oil, Seal, Expander	J8682	5120-01-232-0005	
144	Pan, Drain 4 gal	450	4910-00-387-9592	SC 4910-95-A31
145	Pan, Drain 6 gal	MIL-P-45819	4910-00-287-2944	
146	Pin, Guide	J1126	5315-01-165-1469	
147	Pin, Guide Set	J24315	5315-01-141-9458	
148	Plate Kit, Gear Bearing	2SK900	5180-01-167-4285	
149	Plate, Adapter, Transfer Case	TRS4114	5340-01-372-6413	
150	Pliers, Brake Repair	131A	5120-00-690-8044	SC 4910-95-A31
151	Pliers, Channel Lock	GGG-W-649	5120-00-287-2512	

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
152	Pliers, Retaining Ring	2BH945	5120-01-375-5699	
153	Pliers, Retaining Ring	0200	5120-00-288-9717	SC 4910-95-A31
154	Pliers, Retaining Ring	0500	5120-00-293-0046	SC 4910-95-A31
155	Pliers, Retaining Ring	0100	5120-00-293-0048	SC 4910-95-A31
156	Pliers, Retaining Ring	0400	5120-00-293-0049	SC 4910-95-A31
157	Pliers, Retaining Ring	0900	5120-00-293-0186	SC 4910-95-A31
158	Pliers, Retaining Ring	407	5120-00-595-9551	SC 4910-95-A31
159	Pliers, Retaining Ring	S6800	5120-00-595-9552	SC 4910-95-A31
160	Plug, Cylinder Block	J24597	5120-01-166-5421	
161	Plumb Bob	GGG-P-501	5210-00-007-8229	
162	Press, Arbor, Hand Operated	MIL-P-80261	3444-00-163-4338	SC 4910-95-A31
163	Press Plate	51100	5120-01-357-0743	
164	Press, 60 Ton	26A49	3444-00-449-7295	SC 4910-95-A31
165	Pressure Test Kit	3SK912	4910-01-378-8863	
166	Pressure Test Kit	3SK911	4910-01-378-9068	
167	Protector, Piston	J24210	5120-01-048-2156	
168	Protector, Seal	J24216-01	5120-01-048-2157	
169	Protector, Spindle	2HE234	3830-01-349-7390	
170	Protractor, Magnetic	2150A251	5210-01-415-0075	
171	Protractor, Square	05-12INCH	5210-00-273-1937	
172	Puller, Bolts	J26901-A	5210-01-185-6811	
173	Puller, Mechanical	J1902-B	5120-00-219-8397	
174	Puller Kit, Universal	1677	5180-00-423-1596	SC 4910-95-A31
175	Puller Kit, Universal, Slide Hammer	1178	5120-00-313-9496	SC 4910-95-A74
176	Pulley Kit, Pump, Roof Mount	2HP645	5120-01-375-5700	
177	Pulley Remover	J5356	5120-00-944-0363	
178	Pump, Force	466-46483	4130-01-192-0496	
179	Punch, Drift	PWA14920	5120-00-004-4921	
180	Reader, Diagnostic	J 38500-1	4910-01-343-3508	
181	Reamer Set, Hand	GGG-R-180	5110-00-357-6858	SC 3470-95-A02
182	Reconditioning Set, Injector Tube	J-22525-B	5180-00-019-4208	
183	Remover and Installer, Piston Ring	7950177	5120-00-494-1846	
184	Remover Assembly	J24563-A	4910-01-158-3982	
185	Remover Set, Valve Bridge	J7091-01	5120-00-999-8614	

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
186	Remover, Bearing, Front Support	J28557	5120-01-117-2523	
187	Remover, Bushing, Beam End	302030	5120-01-186-3125	
188	Remover, Center Bushing, Front	302032	5120-01-374-8970	
189	Remover, Center Bushing, Rear	302027	5120-01-357-0742	
190	Remover, Guide, Valve	J6569	5120-00-733-8880	
191	Remover, Snap Ring	J26598-A	4910-01-158-3996	
192	Remover, Valve Bridge	J7453	5120-00-999-8615	
193	Remover, Valve Pin	J-24412-2	5120-01-048-3128	
194	Remover, Valve Seat	J23479-E	5120-01-165-1935	
195	Respirator, Air Filter	GGG-M-125/6	4240-00-022-2524	SC 4910-95-A31
196	Rivet Gun	352	5130-00-982-8078	
197	Rule, Steel, Machinist	GGG-R-791	5210-00-204-1283	
198	Sander, Portable, Disk Electric	OOS90	5130-00-596-9728	SC4910-95-A31
199	Scale, Tension	J-8129	4910-00-779-6832	
200	Screw, Guide	J-1927-01	5120-01-144-4483	
201	Seal Installer, Flywheel	J21112-B	4910-01-176-4230	
202	Sleeve, Puller	J25007-4	4910-01-162-3633	
202.1	Smart Card	J38500-2300	7025-01-482-8800	
203	Snap Ring Assembly	J-24208-D	5120-01-116-5016	
204	Socket Set, 3/8 in.	221FSMY	5120-01-117-3876	SC 4910-94-A72-HR
205	Socket Set, Deep Well, 1/2 in.	GGG-W-641	5120-00-596-8622	SC 4910-95-A72-HR
206	Socket, Socket Head Screw, 12 mm	SAM12A	5120-01-104-5346	SC 4910-95-A31
207	Socket, Socket Head Screw, 14 mm	SAM14A	5120-01-079-8033	SC 4910-95-A31
208	Socket, Socket Head Screw, 3/4 in.	LAW124A	4470-01-350-0895	
209	Socket, Socket Head Screw, 1/8 in., 3/8 in. Drive	FA4A	5120-00-516-4979	
210	Socket, Socket Head Screw, 3/16 in., 3/8 in. Drive	4080-12	5120-00-683-8597	SC 4910-95-A31
211	Socket, Socket Head Screw, 5/16 in., 1/2 in. Drive	SA10A	5120-01-022-9505	
212	Socket, Socket Head Screw, 9/16 in., 1/2 in. Drive	SA18A	5120-01-367-3466	
213	Socket, Socket Head Screw, 5/8 in., 3/4 in. Drive	LAW120A	5120-00-601-6934	

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
214	Socket, Socket Head Screw, 3/8 in., 1/2 in. Drive	SA12A	5120-00-585-6237	
215	Socket, 12 mm Hex Head	849550-3-8AF	5120-00-240-6148	
216	Socket, 1-11/16 in.	GGG-W-641	5120-01-024-0168	
217	Socket, 55 mm	J39938	5120-01-386-5999	
218	Socket, 63 mm	J39939	5120-01-386-5988	
219	Socket, Spindle Nut	J41111	5120-01-354-9451	
220	Socket, Swivel 13/16 in.	A-A-1396	5120-00-236-7619	
221	Socket, Wrench Attachment, Screwdriver	J34650	5120-01-297-2374	
222	Spanner	2HE229	5120-01-354-9452	
223	Spanner	2HE230	5120-01-354-9450	
224	Spanner	2HE231	5120-01-354-9449	
225	Stand, Maintenance, Axle	150-AX	4910-00-241-3329	
226	Stand, Maintenance, Engine	J29109	4910-00-808-3372	
227	Steam Cleaner	PRO 12-5	7910-01-157-8272	
228	Stone, Abrasive, Cylinder	J5902-14	5130-00-937-7280	
229	Stone, Sharpening	A6F0	5345-00-584-4607	
230	Straight Edge	11-1480	4920-00-442-1030	SC 3470-95-A02
231	Stud Remover and Setter	GGG-S-775	5120-00-596-0980	SC 4910-95-A31
232	Stud Set	J25002	5120-01-048-2155	
233	Studs, Guide	J-24748	5315-01-162-3630	
234	Tap and Die Set	TDM99117	5136-01-119-0005	
235	Tape, Measuring	D-1420-A	5210-00-234-6745	SC 4910-95-A31
236	Tension Gage, Belt	J-23600-B	6635-01-093-3710	
237	Tester, Pressure, Radiator	J24460-01	4910-01-170-4928	
238	Testing Kit, Cylinder Block	2SK737	5180-01-252-9800	
238.1	Tool Kit, Blind Rivet	D-100-MIL-1	5180-01-201-4978	SC 4910-95-A74
239	Tool Kit, Electric	7550526	5180-00-876-9336	SC 4910-95-A01
240	Tool Kit, General Mechanic's	SC5180-90-CL-N05	5180-00-699-5273	
241	Tool Kit, General Mechanic's: Automotive	SC5180-90-N26	5180-00-177-7033	
242	Tool Set, Blower	J-6270-G	4940-00-611-7945	
243	Tool, Knuckle, Adjusting	J41115	5120-01-355-6571	
244	Tool, Lifting	J33079	5120-01-159-1736	
245	Tool, Staking	J24200-1	5120-01-359-2757	

Section II. TOOLS, TEST EQUIPMENT AND TOOL KITS (CONT)

Item No.	Description	Part No.	NSN	Reference
246	Tool, Timing, SRS/TRS	J39815	5120-01-343-1001	
247	Torch, Propane	737-1-0000	3433-01-161-4998	
248	Vise, Machinist's	504M2	5120-00-293-1439	SC 4910-95-A31
249	Vise, Pipe, Chain	CV12	5120-00-078-6662	
250	Weatherpac Crimper	J38852	5120-00-374-8936	
251	Welder, Arc	MIL-W-4125	3433-00-357-6311	SC 3433-90-N01-HR
252	Winch, Cable, Hand Operating	415526-1	3950-00-079-1202	
253	Wrench, Chain	CW24	5120-01-192-9403	
254	Wrench, Combination 1-1/16 in.	1234	5120-00-228-9515	SC 4910-95-A74
255	Wrench, Combination 1-1/8 in.	1172	5210-00-228-9516	SC 4910-95-A74
256	Wrench, Combination 1-1/4 in.	1173	5120-00-228-9517	SC 4910-95-A74
257	Wrench, Combination 1-5/16 in.	1174	5120-00-228-9518	SC 4910-95-A74
258	Wrench, Combination 1-3/8 in.	1175	5120-00-277-8833	SC 4910-95-A74
259	Wrench, Combination 1-7/16 in.	1176	5120-00-228-9519	SC 4910-95-A74
260	Wrench, Combination 1-1/2 in.	1178	5120-00-277-8834	SC 4910-95-A74
261	Wrench, Combination 1-5/8 in.	1180	5120-01-016-7144	
262	Wrench, Combination 1-11/16 in.	A-A-1351	5120-00-184-8566	
263	Wrench, Combination 1-3/4 in.	1256	5120-00-020-8658	
264	Wrench, Combination 1-13/16 in.	GGG-W-636TY4	5120-00-081-9099	
265	Wrench, Combination 1-7/8 in.	1260	5120-00-020-8632	
266	Wrench, Combination 2-1/8 in.	1268	5120-00-203-4795	
267	Wrench, Crowfoot, 7/8 in., 3/8 in. Drive	FC28A	5120-00-541-4071	
268	Wrench, Crowfoot, 3/4 in., 3/8 in. Drive	FC024	5120-00-187-7898	SC 4910-95-A31
269	Wrench, Crowfoot, 9/16 in., 3/8 in. Drive	GGG-W-646	5120-00-222-7975	SC 4910-95-A31
270	Wrench, Fuel Line	J-8932-B	5120-00-019-5232	
271	Wrench, Pipe 3-1/2 in. Opening	GGG-W-651	5120-00-277-1485	SC 4910-95-A31
272	Wrench Set, Pushrod	J21100-D	5120-00-132-2109	
273	Wrench Set, Socket 3/8 in. Drive	51200017510	5120-00-322-6231	SC 4910-95-A31
274	Wrench Set, Socket 3/4 in. Drive	FEDSTD353	5120-00-204-1999	SC 4910-95-A31
275	Wrench, Spanner	J41108	5120-01-375-4502	
276	Wrench, Torque (0-60 N·m)	TESI60	5120-01-112-9531	SC 4910-95-A31
277	Wrench, Torque (0-175 lb-ft [0-237 N·m])	A-A-2411	5120-00-640-6364	SC 4910-95-A31

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278	Wrench, Torque (0-600 lb-ft [0-814 N·m])	SW130-301	5120-00-221-7983	SC 4910-95-A31
279	Wrench, Torque Driver	TQSC6A	5120-01-112-9532	SC 4910-95-A72-HR
280	Zonal Separator, Oil and Water Spray Gun	MIL-S-12928CLASS1	4940-00-242-4100	SC 4910-95-A73

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SCHEMATICS

The following sections contain the schematics which are the same in all volumes of TM 9-2320-364-20 and TM 9-2320-364-34.

Section I contains the schematics for trucks equipped with the 145 amp alternator and the DDEC II engine.

Section II contains the schematics for trucks equipped with the 200 amp alternator and the DDEC III/IV engine.

SCHEMATICS

Section I. 145 AMP ALTERNATOR AND DDEC II ENGINE.

Section I contains the schematics for trucks equipped with the 145 amp alternator and the DDEC II engine.

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
439	MC116-MC106	4	EMERGENCY ENG STOP
439	MC116-S30	3	EMERGENCY ENG STOP
439	MC116-S30	3	EMERGENCY ENG STOP
439	MC116-CB13	4	DDEC
439	MC106-MC13	3	
439	SPLC-MC106	4	
439	MC11-MC18	5	ECM
439	MC8-L6	3	CHECK ENGINE LIGHT
439	MC8-L3	3	ENGINE STOP LIGHT
439	MC44-MC8	3	
439	MC11-SPLICE	4	
439	SPLICE-MC44	4	
439	SPLC-MC116	4	
451	MC11-MC18	5	ECM
451	MC106-MC13	3	
451	MC11-MC106	4	
505	MC106-MC13	3	
505	MC11-MC106	4	
505	MC11-MC18	5	ECM
508	MC11-R7	4	TRANSMISSION
508	MC11-MC18	5	ECM
509	MC11-MC18	5	ECM
509	MC8-L3	3	ENGINE STOP LIGHT
509	MC44-MC8	3	
509	MC11-MC44	4	
510	MC11-MC18	5	ECM
510	MC44-PS4	3	PARKING BRAKE
510	R22-MC44	4	
510	MC11-R22	4	
900	MC11-MC106	4	
900	MC11-MC18	5	ECM
900	MC106-MC13	3	
901	MC11-MC18	5	ECM
901	MC106-MC13	3	
901	MC11-MC106	4	
908	MC11-MC18	5	ECM
908	MC11-M4	4	THROTTLE POSN CONT
916	MC44-MC6	3	
916	MC11-MC44	4	
916	MC38-M16	3	
916	MC6-MC38	3	VERNIER CONTROL
916	MC6-M35	3	THROTTLE SENSOR
916	MC11-MC18	5	ECM
952	MC38-M16	3	
952	MC11-MC44	4	
952	MC44-MC6	3	THROTTLE SENSOR
952	MC11-MC18	5	ECM
952	MC6-MC38	3	VERNIER CONTROL
1001	MC8-L4	3	
1001	MC7-SPLICE	3	
1001	MC8-SPLICE	3	
1001	SPLICE-L13	3	
1001	SPLICE-L14	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1001	S1-MC7	3	RH HEADLIGHT
1002	S1-MC7	3	LH HEADLIGHT
1002	MC8-L11	3	
1002	MC7-SPLICE	3	
1002	SPLICE-MC8	3	
1002	SPLICE-L18	3	
1002	SPLICE-L16	3	
1003	MC7-MC3	3	
1003	S1-MC7	3	LH RR TURN SIGNAL
1003	MC3-MC80	6	
1003	MC3-MC16	6	TRAILER CONN 12VDC
1003	MC1-R15	4	LH TURN LIGHT
1003	MC80-L24	6	LH STOP LIGHT
1003	MC27-MC3	6	FRONT TOW
1003	MC7-MC1	3	
1003C	MC25-R17	4	LH TURN LIGHT
1003C	MC25-MC15	6	TRAILER CONN 12VDC
1004	MC7-MC1	3	
1004	MC7-MC3	3	
1004	S1-MC7	3	
1004	MC3-MC80	6	
1004	MC80-L22	6	RH STOP LIGHT
1004	MC27-MC3	6	
1004	MC3-MC78	6	
1004	MC3-MC16	6	
1004	MC1-R16	4	
1004C	MC25-R16	4	RH TURN LIGHT
1004C	MC25-MC15	6	TRAILER CONN 24VDC
1005	MC126-S9	3	
1005	PS3-MC3	3	
1005	MC3-MC16	6	TRAILER CONN 24VDC
1005	MC126-PS1	3	
1005	PS2-PS3	3	
1005	MC27-MC3	6	FRONT TOW
1005	PS1-PS2	3	
1005A	MC7-MC126	3	
1005A	MC126-S9	3	
1005A	S1-MC7	3	TURN SIGNAL/DIM SW
1006	MC2-SPLICE	3	
1006	SPLICE-L12	3	
1006	SPLICE-L17	3	
1006	MC2-R5	4	DIMMER
1007	MC2-R5	4	DIMMER
1007	MC2-SPLICE	3	
1007	SPLICE-L12	3	
1007	SPLICE-L17	3	
1008	MC3-MC78	6	
1008	MC4-S12	3	HEADLIGHTS

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1008	MC27-MC3	6	FRONT TOW
1008	MC3-SPLICE	3	
1008	MC3-MC4	3	
1008	MC3-MC16	6	TRAILER CONN 12VDC
1008	MC78-L22	6	RH TAIL LIGHT
1008	MC78-L24	6	LH TAIL LIGHT
1008C	MC25-MC15	6	TRAILER CONN 24VDC
1008C	MC25-R14	4	B.O. SERVICE
1009	PS2-PS3	3	
1009	PS1-PS2	3	
1009	MC2-PS1	3	
1009	MC2-CB6	4	STOP LIGHT
1012	MC3-SPLICE	3	
1012	SPLC-SPLC	3	
1012	MC2-SPLICE	3	
1012	SPLC-SPLC	3	
1012	SPLICE-L19	3	
1012	MC2-R2	4	CLEARANCE LIGHTS
1012	MC3-SPLICE	6	
1012	SPLICE-MC27	6	
1012	SPLICE-MC80	6	
1012	SPLICE-L32	6	RH SIDE MARKER
1012	SPLICE-L34	6	LH SIDE MARKER
1012	MC90-L31	6	RR SIDE MARKER
1012	MC90-L25	6	ID LIGHTS
1012	MC80-MC90	6	
1012	MC90-L33	6	RR SIDE MARKER
1016	MC92-MC2	3	
1016	S15-MC92	3	
1016	MC2-R3	4	HORN
1017	SPLICE-R5	4	
1017	MC52-R14	4	
1017	R2-MC52	4	
1017	MC2-SPLICE	4	
1017	SPLICE-R1	4	
1017	MC91-MC2	3	
1017	S1-MC91	3	
1017A	MC91-MC2	3	
1017A	S1-MC91	3	
1017A	MC2-R5	4	
1018	MC8-L10	3	HIGH BEAM
1018	MC8-1007	3	
1019	L15-1679	3	
1020	L14-L16	3	
1020	DUVAC IGN	5	FUEL PUMP
1020	S2-MC21	3	
1020	R27-MC48	5	
1020	MC60-IGN	5	DUVAC CONTROLLER
1020	MC21-MC60	5	
1020	MC108-M81	5	
1020	M81-MC60	5	
1021	MC2-S2	3	
1021	MC2-R11	4	
1021	R11-M76	4	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 3 OF 35
ENGINEERING DWG 1878290 SHEET 1
FP-5/FP-6 BLANK

REVISION V
CN 23138
11-24-92

CODE SORT			
CCCE	ROUTING	SH	DESCRIPTION
1021	MC52-R11	4	FRONT TOW
1021A	R11-MC1	4	
1021A	MC1-MC21	3	
1021A	MC21-MC60	5	
1021A	MC60-R27	5	
1026	MC52-CB16	4	
1029	MC2-R6	4	BEACON
1029	MC2-MC28	3	
1031	R3-SPLICE	4	
1032	MC8-MC21	3	
1032	M39-L9	3	LOW OIL PSI
1032	MC8-M39	3	
1032	PS9-MC21	5	ENGINE OIL PSI SW
1033	M39-M18	3	OIL PSI/H WTR ALM
1036	MC23-M8	5	
1036	MC23-M7	5	
1036	MC21-MC56	5	ETHER START
1036	MC21-S25	3	
1040	CB4-R4	4	WORKLIGHT
1040A	S6-MC4	3	
1040A	MC2-R4	4	WORKLIGHT
1040A	MC4-MC2	3	
1040B	MC3-MC79	6	RH WORKLIGHT
1040B	MC2-MC3	3	
1040B	MC2-R4	4	WORKLIGHT
1040B	MC3-MC54	6	LH WORKLIGHT
1045	R27-M7	5	
1049	MC2-R1	4	HEADLIGHTS
1049	MC4-MC2	3	
1049	S12-MC4	3	
1052	S20-S19	3	CHEM ALM-GPF
1052	S19-S18	3	GAS PART FLTR-SRW
1052	S18-S4	3	SRW-SRW/MHC
1052	S4-S30	3	SRW/MHC-EMER ENG S D
1052	S30-SPLICE	3	EMER ENG SHUT DOWN
1052	SPLICE-G11	3	AIR PRESSURE GAUGE
1052	MC4-SPLICE	3	
1052	SPLICE-L44	3	HEATER PANEL LIGHT
1052	S5-S6	3	BEACON LT-WORK LT
1052	S6-S7	3	WORK LT-WSHLD WSHR
1052	S7-S8	3	WSHLD WASHER-WIPERS
1052	S8-S21	3	WIPERS-DOME LIGHT
1052	S21-S9	3	DOME LT-B.O.SERV SEL
1052	S9-S10	3	BO SERV SEL-BO MKR
1052	S10-S11	3	B.O. MARKER-B.O. DR
1052	S11-S12	3	B.O. DRIVE-HEADLTS
1052	S12-S16	3	HEADLIGHTS-ENG BK
1052	S16-S14	3	ENG BRAKE-RHEO/DOME
1052	S14-SPLICE	3	RHEOSTAT/DOME
1052	SPLICE-G6	3	VOLTMETER 12V
1052	SPLC-SPLC	3	
1052	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1052	SPLICE-G1	3	WATER TEMP GAUGE
1052	SPLICE-G2	3	OIL PRESSURE GAUGE
1052	SPLICE-G4	3	TACHOMETER
1052	SPLICE-G5	3	SPEEDOMETER
1052	SPLICE-G3	3	FUEL GAUGE

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1052	MC1-SPLICE	3	
1052	SPLICE-L43	3	POST LIGHT
1052	SPLC-MC125	3	
1052	MC125-G12	3	AIR RESTRICTION GA
1052	MC1-SPLICE	3	
1052	MC1-CB1	4	15 AMP HEADLIGHT
1052	MC50-MC1	4	
1055	MC115-M7	5	
1055	M7-1277	5	
1055	M7-1281	5	
1056	MC111-MC32	3	
1056	MC32-MC109	6	CTI POWER MANIFOLD
1057	M20-M20	5	
1057	MC111-MC32	3	
1057	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC111-MC32	3	
1059	MC32-MC109	6	CTI POWER MANIFOLD
1059	MC111-MC32	3	
1061	MC22-MC109	6	CTI POWER MANIFOLD
1061	MC111-MC32	3	
1062	MC32-MC109	6	CTI POWER MANIFOLD
1062	MC111-MC32	3	
1063	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC111-MC32	3	
1065	MC32-MC109	6	CTI POWER MANIFOLD
1065	MC111-MC32	3	
1066	MC32-MC64	6	CTI AUX MANIFOLD
1066	MC110-MC32	3	
1067	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC110-MC32	3	
1070	MC32-MC64	6	CTI AUX MANIFOLD
1070	MC110-MC32	3	
1071	MC110-MC32	3	
1071	MC32-MC64	6	CTI AUX MANIFOLD
1072	R26-R25	3	
1072	MC110-MC32	3	
1072	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC110-MC32	3	
1074	MC110-MC32	3	
1074	R25-CB10	4	
1074	MC32-MC64	6	CTI AUX MANIFOLD
1075	M6-R25	4/3	
1075B	R25-R18	4	
1076	MC110-MC32	3	
1076	MC32-MC64	6	CTI AUX MANIFOLD
1079	CB5-M6	4	HAZARD LIGHTS
1080	MC7-MC2	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1080	MC2-M5	4	TURN SIGNAL/FLASHER
1082	MC2-MC52	4	
1082	MC2-M81	3	
1082	M81-S3	3	
1082	MC52-CB15	4	HEATER
1084	MC1-CB5	4	B.O. LIGHTS
1084	MC4-MC1	3	
1084	MC4-S9	3	
1091	L17-GROUND	3	
1092	L7-MC8	3	
1092	MC8-M51	3	
1093	MC31-MC57	6	
1093	MC1-MC31	3	
1093	MC1-CB16	4	
1093	MC57-S13	6	DRIVE LINE LOCK-UP
1094	S5-S14	3	
1095	R23-R24	4	
1095	MC44-R23	4	
1095	MC31-MC44	3	
1095	MC57-S13	6	DRIVE LINE LOCK-UP
1095	MC31-MC57	6	
1108	MC44-MC8	3	
1108	S05-MC44	4	
1108	MC8-G4	3	TACHOMETER
1113	MC8-MC21	3	
1113	G2-MC8	3	OIL PSI GAUGE
1113	SU3-MC21	5	ENG OIL PSI SNDG UN
1114	M66-MC8	3	
1114	MC96-MC8	3	LOW OIL LEVEL LIGHT
1114	MC8-L36	3	
1114	L36-M66	3	
1118	MC4-1919	3	
1118	S8-MC4	3	
1120	M66-MC8	3	
1120	M66-M3	3	
1120	PS6-PS7	3	
1120	PS6-MC8	3	
1120	L2-M66	3	
1137	M6(1)-M6(2)	5	
1137	M6(3)-M6(4)	5	
1138	M48-M7	5	SHUNT
1138	M7-M23	5	SLAVE
1138	M6-M48	5	SHUNT
1138	M77-M7	5	ARCTIC BATTERIES
1139	M7-M23	5	SLAVE
1139	M6-M7	5	
1139	M77-M7	5	ARCTIC BATTERIES
1147	TS2-MC21	5	ENG WTR TEMP SNDG UN
1147	M39-L8	3	HIGH WATER TEMP
1147	MC8-MC21	3	
1147	MC8-M39	3	
1149	MC1-R10	4	REVERSE
1149	MC3-MC78	6	
1149	MC1-MC124	3	
1149	MC78-MC77	6	REVERSE LIGHT
1149	MC124-MC77	6	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 4 OF 35
ENGINEERING DWG 1878290 SHEET 2
FP-7/FP-8 BLANK

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1153	S21-MC4	3	
1153	MC4-L20	3	DOME LIGHT
1168	MC2-R3	4	HORN
1168	MC2-M15	3	
1174	BUS BAR	4	
1175	R28-CB5	4	
1176	MC113-PS13	6	EMERGENCY STEER
1184	S5-MC4	3	
1184	MC2-R6	4	
1184	MC2-MC4	3	
1189	MC4-S9	3	
1189	MC44-R28	4	
1189	MC4-SPLICE	3	
1189	MC4-S21	3	
1189	MC2-SPLICE	3	
1189	MC2-M5	4	
1189	SPLICE-MC44	3	
1274	MC115-SPLC	5	
1274	M64-SPLICE	5	
1274	M8-SPLICE	5	
1275	M6-M20	5	
1275	M6-200 AMP	5	
1276	MC2-MC4	3	
1276	MC2-CB8	3	
1276	SPLICE-S14	3	
1276	SPLICE-MC53	3	
1276	MC4-SPLICE	3	
1276	MC2-SPLICE	4	
1276	MC53-SPLICE	3	
1276	SPLC-SPLC	3	
1276	SPLC-SPLC	3	
1276	SPLICE-M3	3	LOW AIR ALARM
1276	SPLICE-G5	3	SPEEDOMETER
1276	SPLICE-L1	3	PARKING BRAKE
1276	SPLICE-L2	3	LOW AIR
1276	SPLICE-L35	3	EMERGENCY STEERING
1276	SPLICE-L36	3	LOW HYDR OIL
1276	SPLC-SPLC	3	
1276	SPLICE-L5	3	XMSN CHECK
1276	SPLICE-L8	3	HIGH WATER TEMP
1276	SPLICE-L9	3	LOW OIL PSI
1276	SPLICE-G3	3	FUEL GAUGE
1276	SPLICE-G6	3	VOLTMETER 12V
1276	SPLICE-G1	3	WATER TEMP GAUGE
1276	SPLICE-G2	3	OIL PRESSURE GAUGE
1276	SPLICE-G4	3	TACHOMETER
1276	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1276	SPLICE-M18	3	ALARM
1277	MC115-SPLC	5	
1277	MC8-SPLICE	5	
1278	M20-M79	5	
1278	MC8-SPLICE	5	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1279	PS14-1277	5	
1279	MC115-PS14	5	
1279	M64-1280	5	
1280	CB21-R26	4	
1280	1281-R26	5	
1281	1280-MC47	5	
1281	R27-M81	5	
1281	1281-1281	5	
1292	MC4-S6	3	
1292	CB4-MC2	4	
1292	MC2-MC4	3	
1292	MC4-S12	3	
1314	1118-S7	3	
1318	MC3-MC8	3	
1318	MC3-G3	3	FUEL GAUGE
1318	MC3-SU5	6	FUEL LEVEL
1320	SU1-MC2	5	WATER TEMP SNDG UN
1320	G1-MC8	3	WATER TEMP
1320	MC8-MC21	3	
1340	CB15-MC14	4	SWING FIRE
1344	M20-MC22	5	
1362	R27-M64	5	
1371	MC8-PS5	3	
1371	L1-MC8	3	
1409	MC8-MC1	3	
1409	L5-MC8	3	
1409	MC1-R9	4	
1413	CB3-SPLICE	4	
1413	SPLICE-R6	4	
1430	R28-SH5	4/5	
1430	1832-R28	5	
1431	MC3-S2	3	
1431	MC3-M6	6	BATTERIES
1431	MC3-M6	6	BATTERIES
1431	MC1-MC119	4	
1431	MC119-R32	4	
1431	R32-S29	4	ARCTIC PUMP
1431	MC119-CB20	4	
1435	MC78-MC124	6	
1435	MC124-M78	6	
1435	MC77-MC124	6	
1435	MC85-MC86	7	
1435	MC86-MC87	7	
1435	MC33-MC84	7	
1435	GROUND	3	
1435	MC81-MC82	7	
1435	MC84-MC83	7	
1435	MC81-MC82	7	
1435	MC108-GND	5	
1435	GND	5	
1435	MC22-GND	5	
1435	M52-R26	4	
1435	M52-R28	4	
1435	R27-GND	5	
1435	MC125-GND	3	
1449	MC8-MC21	3	
1449	G10-MC8	3	TRANS OIL TEMP

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1449	SU2-MC21	5	TRANS TEMP SNDG UN
1454	MC81-MC82	7	
1460	MC81-MC82	7	
1461	MC86-MC87	7	
1461	MC85-MC86	7	
1462	MC81-MC82	7	
1463	MC81-MC82	7	
1464	MC81-MC82	7	
1465	MC81-MC82	7	
1466	MC85-MC86	7	
1466	MC86-MC87	7	
1467	MC81-MC82	7	
1468	MC81-MC82	7	
1469	MC81-MC82	7	
1469	MC86-MC87	7	
1469	MC85-MC86	7	
1470	MC86-MC87	7	
1470	MC85-MC86	7	
1471	MC85-MC86	7	
1471	MC86-MC87	7	
1471	MC81-MC82	7	
1472	MC85-MC86	7	
1472	MC81-MC82	7	
1472	MC86-MC88	7	
1475	MC85-MC86	7	
1475	MC86-MC87	7	
1480	MC84-MC93	7	
1480	MC84-MC83	7	
1481	MC84-MC83	7	
1481	MC84-MC93	7	
1482	MC84-MC93	7	
1482	MC84-MC83	7	
1483	MC83-MC84	7	
1483	MC84-MC93	7	
1484	MC83-MC84	7	
1484	MC84-MC93	7	
1485	MC84-MC94	7	
1485	MC83-MC84	7	
1486	MC84-MC94	7	
1486	MC83-MC84	7	
1487	MC1-S25	3	
1487	MC1-CB15	4	
1487	MC83-MC84	7	
1487	MC84-MC94	7	
1488	MC84-MC94	7	
1488	MC83-MC84	7	
1489	MC83-MC84	7	
1489	MC84-MC94	7	
1490	MC84-MC94	7	
1490	MC83-MC84	7	
1491	L16-1008	3	
1491	L14-1008	3	
1517	PS8-MC11	5	ATEC OIL PSI SWITCH
1517	MC11-R9	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1519	MC8-MC35	3	CTI OVERSPEED
1519	MC3-MC8	3	SPEEDOMETER
1519	MC8-MC35	3	CTI OVERSPEED
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1525	M16-PS4	3	
1534	MC107-M9	6	FUEL/WATER SEP
1534	MC2-SPLICE	4	
1534	SPLICE-CB8	4	
1534	MC3-MC107	6	
1534	MC2-MC3	3	
1534	MC3-S22	3	T-CASE LOCK-UP
1534	CB15-M76	4	
1538	MC97-M13	6	AIR DRYER
1538	MC25-MC97	6	
1538	MC25-CB15	4	
1538	MC25-MC98	6	
1538	MC99-M11	6	AFTER COOLER
1538	MC98-M14	6	AIR DRYER
1538	MC25-MC99	6	
1538	MC25-MC73	6	FAN CONTROL
1538	M76-MC25	4	
1640	MC119-SPLC	4	
1640	SPLICE-R26	4	
1640	SPLICE-MC44	4	
1640	MC44-S2	3	
1640	MC119-R32	4	
1644	MC119-R33	4	
1644	R33-R33	4	
1644	MC119-S29	4	ARCTIC PUMP
1644	R33-S29	4	ARCTIC PUMP
1644	MC119-MC25	4	
1644	MC25-MC120	6	
1644	MC120-M80	6	ARCTIC PUMP
1645	S29-R33	4	ARCTIC PUMP
1665C	MC25-MC15	6	TRAILER CONN 24VDC
1665C	MC25-CB20	4	
1674	S11-S10	3	
1674	S11-S9	3	
1676	R17-R16	4	
1676	R16-R15	4	
1676	R14-R3	4	
1676	R15-R14	4	
1676	CB20-R17	4	
1678	MC3-MC78	6	
1678	MC1-SPLICE	3	
1678	MC78-L24	6	LH B.O. STOP LIGHT

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 5 OF 35
ENGINEERING DWG 1878290 SHEET 2
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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1678	MC78-L22	6	RH B.O. STOP LIGHT
1678	SPLICE-MC3	3	
1678	MC1-R13	4	
1678	SPLICE-MC4	3	
1678	MC4-S9	3	
1678C	MC25-R13	4	B.O. STOP LIGHT
1678C	MC25-MC15	6	TRAILER CONN 24VDC
1679	L15-MC4	3	
1679	MC4-S11	3	
1680	MC3-SPLICE	3	
1680	SPLICE-MC1	3	
1680	SPLC-SPLC	3	
1680	SPLICE-MC4	3	
1680	SPLC-SPLC	3	
1680	SPLC-SPLC	3	
1680	SPLICE-L19	3	
1680	SPLICE-L19	3	
1680	MC3-MC78	6	
1680	MC4-S10	3	
1680	MC78-L24	6	LH B.O. TAIL LIGHT
1680	MC1-R17	4	B.O. LIGHTS
1680	MC78-L22	6	RH B.O. TAIL LIGHT
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-R17	4	B.O. TAIL LIGHTS
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1702	MC44-MC34	3	
1702	MC34-G7	3	
1702	MC44-R26	4	
1708	M32-1709	3	PASSENGER AIR HTR
1709	MC58-S19	3	GAS PART FILTER SW
1709	MC58-M30	3	
1710	M31-1709	3	DRIVER AIR HEATER
1711	CB11-R7	4	
1712	MC1-CB7	4	ENGINE BRAKE
1712	MC4-MC1	3	
1713	MC53-L37	3	
1713	MC4-MC1	3	
1713	S16-MC4	3	ENGINE BRAKE
1713	MC1-R7	4	TRANSMISSION
1713	S16-MC53	3	
1714	MC1-1716	4	
1714	MC4-MC1	3	ENGINE BRAKE
1714	S16-MC4	3	ENGINE BRAKE
1715	MC4-MC1	3	ENGINE BRAKE
1715	S16-MC4	3	ENGINE BK RH COILS
1715	MC11-MC1	4	
1715	MC11-M21	5	LH ENGINE BRAKE
1716	MC11-R5	4	RETARDER
1716	MC11-M22	5	RH ENGINE BRAKE
1717	MC44-S20	3	CHEMICAL ALARM SW
1717	MC44-CB19	4	
1718	M76-M77	6	BACK-UP ALARM
1722	MC34-1734	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1722	L26-MC34	3	
1722	MC33-MC84	7	
1722	MC84-MC83	7	
1723	MC44-S18	3	SELF RECOVERY WN SW
1723	MC44-CB18	4	
1724	MC112-SPLC	3	
1724	SPLICE-MC33	3	
1724	MC33-MC93	7	
1724	L27-MC112	3	
1724	M67-SPLICE	3	
1724	SPLC-MC112	3	
1724	M67-MC33	3	
1725	L28-MC112	3	
1725	MC84-MC83	7	
1725	MC33-MC84	7	
1725	MC112-MC33	3	
1726	MC33-MC84	7	
1726	MC84-MC83	7	
1726	MC112-MC33	3	
1726	L29-MC112	3	
1729	MC31-S18	3	SELF RECOVERY WINCH
1729	MC31-MC55	6	
1729	MC55-MC121	6	SELF RECOVERY WINCH
1730	MC31-S18	3	SELF RECOVERY WINCH
1730	MC55-MC122	6	SELF RECOVERY WINCH
1730	MC31-MC55	6	
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-MC29	6	CRANE
1732	MC55-MC123	6	SELF RECOVERY WINCH
1732	S4-MC31	3	SELF RECOVERY WINCH
1732	MC31-MC55	6	
1733	MC31-M67	3	
1733	MC31-M51	6	
1734	M67-SPLICE	3	
1734	SPLC-SPLC	3	
1734	SPLICE-MC31	3	
1734	MC31-M10	6	
1736	MC39-MC39	5	
1737	MC31-MC1	3	
1737	MC1-R22	4	CRANE HI IDLE
1737	MC31-MC29	6	CRANE
1738	MC44-1755	4	
1738	MC44-MC31	3	
1738	MC31-MC29	6	CRANE
1739	MC44-CB21	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1739	MC44-S19	3	GAS PARTICULATE SW
1744	S4-M67	3	
1745	MC103-S20	3	CHEMICAL ALARM
1746	MC103-M29	3	CHEMICAL ALARM
1747	MC103-M29	3	CHEMICAL ALARM
1755	MC84-MC83	7	
1755	MC44-CB18	4	
1755	MC33-MC84	7	
1755	MC33-MC44	3	
1765	MC3-MC113	6	
1765	L35-MC8	3	
1765	MC3-MC8	3	
1809	MC41-MC65	5	PULSE TACH DRIVE
1809	MC65-MC39	5	STE/ICE
1809	MC41-M40	5	PULSE TACH DRIVE
1810	MC65-MC39	5	STE/ICE
1810	MC41-M40	5	PULSE TACH DRIVE
1810	MC41-MC65	5	PULSE TACH DRIVE
1811	MC42-M41	5	DIFFERENTIAL PSI
1811	MC42-MC39	5	STE/ICE
1812	MC42-M41	5	DIFFERENTIAL PSI
1812	MC42-MC39	5	STE/ICE
1813	MC39-M6	5	
1814	MC39-M6	5	BATTERIES
1815	MC39-MC24	5	
1815	MC24-MC114	5	
1815	MC24-M20	5	
1816	MC39-MC65	5	STE/ICE
1816	MC39-M7	5	STARTER

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1818	MC39-M7	5	STARTER
1818	MC39-MC65	5	STE/ICE
1819	MC39-M7	5	
1820	MC24-M20	5	
1820	MC24-M20	5	
1820	MC39-MC24	5	
1821	MC39-M6	5	
1822	MC39-M6	5	BATTERIES
1824	SPLICE-MC67	5	
1824	MC66-M70	5	
1824	MC68-M72	5	
1824	SPLICE-MC70	5	
1824	SPLICE-MC71	5	
1824	MC65-MC39	5	STE/ICE
1824	SPLICE-MC68	5	
1824	MC67-M71	5	
1824	MC43-M42	5	FUEL PSI
1824	MC69-M73	5	
1824	MC70-M74	5	
1824	MC71-M75	5	
1824	SPLICE-MC69	5	
1824	MC66-SPLICE	5	
1824	SPLICE-MC65	5	
1824	SPLICE-MC43	5	
1825	MC68-MC69	5	
1825	MC70-MC71	5	
1825	MC65-MC43	5	
1825	MC43-MC67	5	
1825	MC67-MC68	5	
1825	MC70-M74	5	
1825	MC69-MC70	5	
1825	MC41-MC65	5	
1825	MC68-M72	5	
1825	MC66-M70	5	TURBO OUTLET PSI
1825	MC65-MC39	5	STE/ICE
1825	MC69-M73	5	
1825	MC67-M71	5	
1825	MC39-MC40	5	STE/ICE MODULE
1825	MC43-M42	5	FUEL PSI
1825	MC71-M75	5	
1825A	MC39-MC40	5	STE/ICE MODULE
1826	MC40-MC39	5	
1827	MC40-MC39	5	
1828	MC39-M48	5	SHUNT
1829	MC39-M48	5	SHUNT
1835	R2-CB2	4	
1839	R7-R8	4	
1860	MC39-MC24	5	
1860	MC24-MC114	5	
1861	MC24-MC114	5	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 6 OF 35
ENGINEERING DWG 1878290 SHEET 2
FP-11/FP-12 BLANK

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28 27 26 25 24 23 22 21 20

H
G
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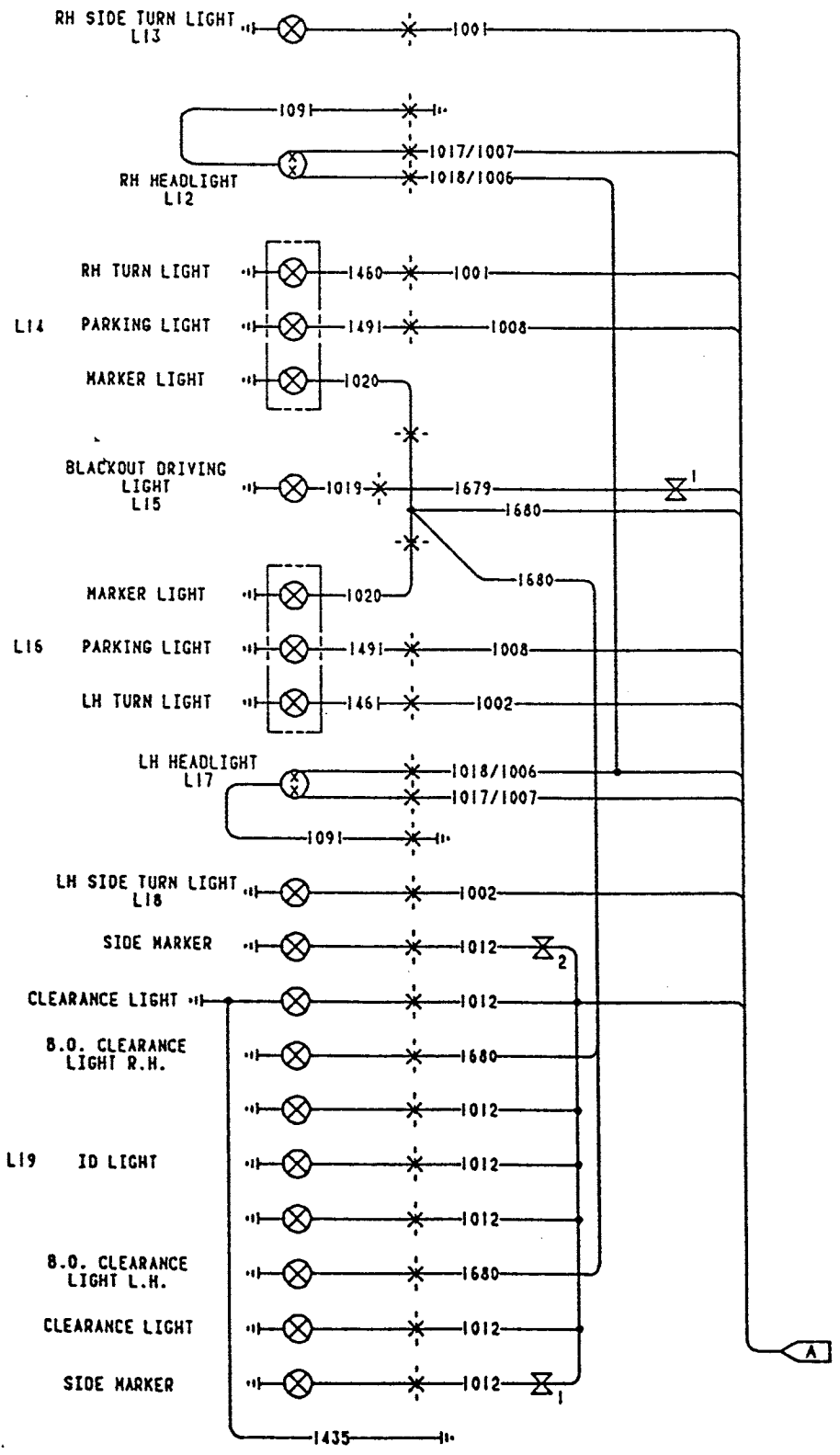
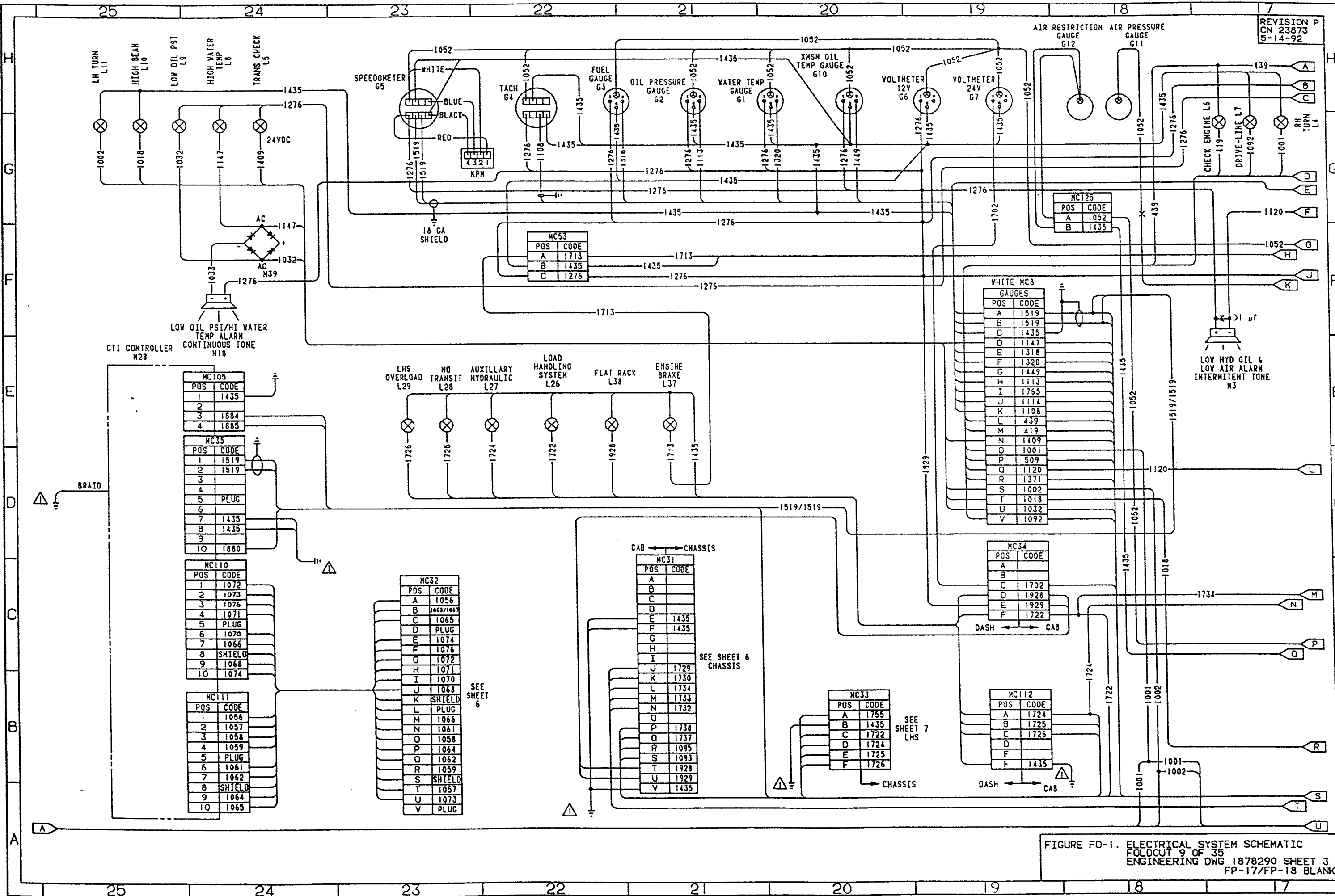


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 35
ENGINEERING DWG 1878290 SHEET 3
FP-15/FP-16 BLANK

28 27 26 25 24 23 22 21 20

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POS	CODE
1	1435
2	
3	1884
4	1885

POS	CODE
1	1519
2	1519
3	
4	
5	PLUG
6	
7	1435
8	1435
9	
10	1880

POS	CODE
1	1072
2	1073
3	1076
4	1071
5	PLUG
6	1070
7	1066
8	SHIELD
9	1068
10	1074

POS	CODE
1	1056
2	1057
3	1058
4	1059
5	PLUG
6	1061
7	1062
8	SHIELD
9	1064
10	1065

POS	CODE
A	1056
B	1063/1067
C	1065
D	PLUG
E	1074
F	1076
G	1072
H	1071
I	1070
J	1068
K	SHIELD
L	PLUG
M	1066
N	1061
O	1058
P	1064
Q	1062
R	1059
S	SHIELD
T	1057
U	1073
V	PLUG

POS	CODE
A	1713
B	1435
C	1276

POS	CODE
A	1519
B	1519
C	1435
D	1147
E	1318
F	1320
G	1449
H	1113
I	1765
J	1114
K	1108
L	439
M	419
N	1409
O	1001
P	509
R	1120
S	1371
T	1002
U	1018
V	1032

POS	CODE
A	
B	
C	
D	
E	1435
F	1435
G	
H	
I	
J	1729
K	1730
L	1734
M	1733
N	1732
O	
P	1738
Q	1737
R	1095
S	1093
T	1928
U	1929
V	1435

POS	CODE
A	1755
B	1435
C	1722
D	1724
E	1725
F	1726

POS	CODE
A	
B	
C	1702
D	1928
E	1929
F	1722

POS	CODE
A	1724
B	1725
C	1726
D	
E	
F	1435

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 9 OF 35
ENGINEERING DWG 1878290 SHEET 3
FP-17/FP-18 BLANK

REVISION P
CN 23873
5-14-92

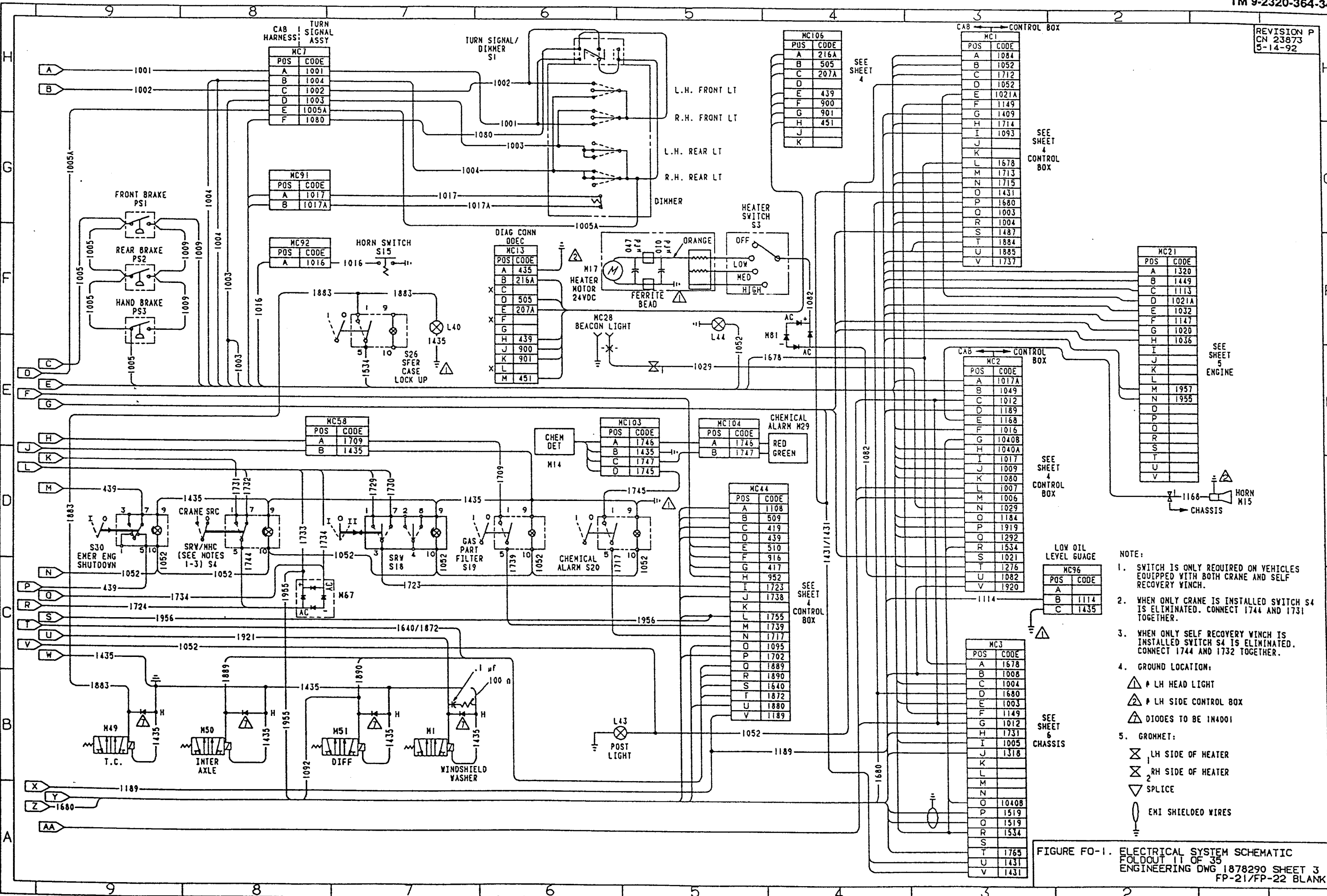


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 11 OF 35 ENGINEERING DWG 1878290 SHEET 3 FP-21/FP-22 BLANK

REVISION AA
CN 24575
9-9-94

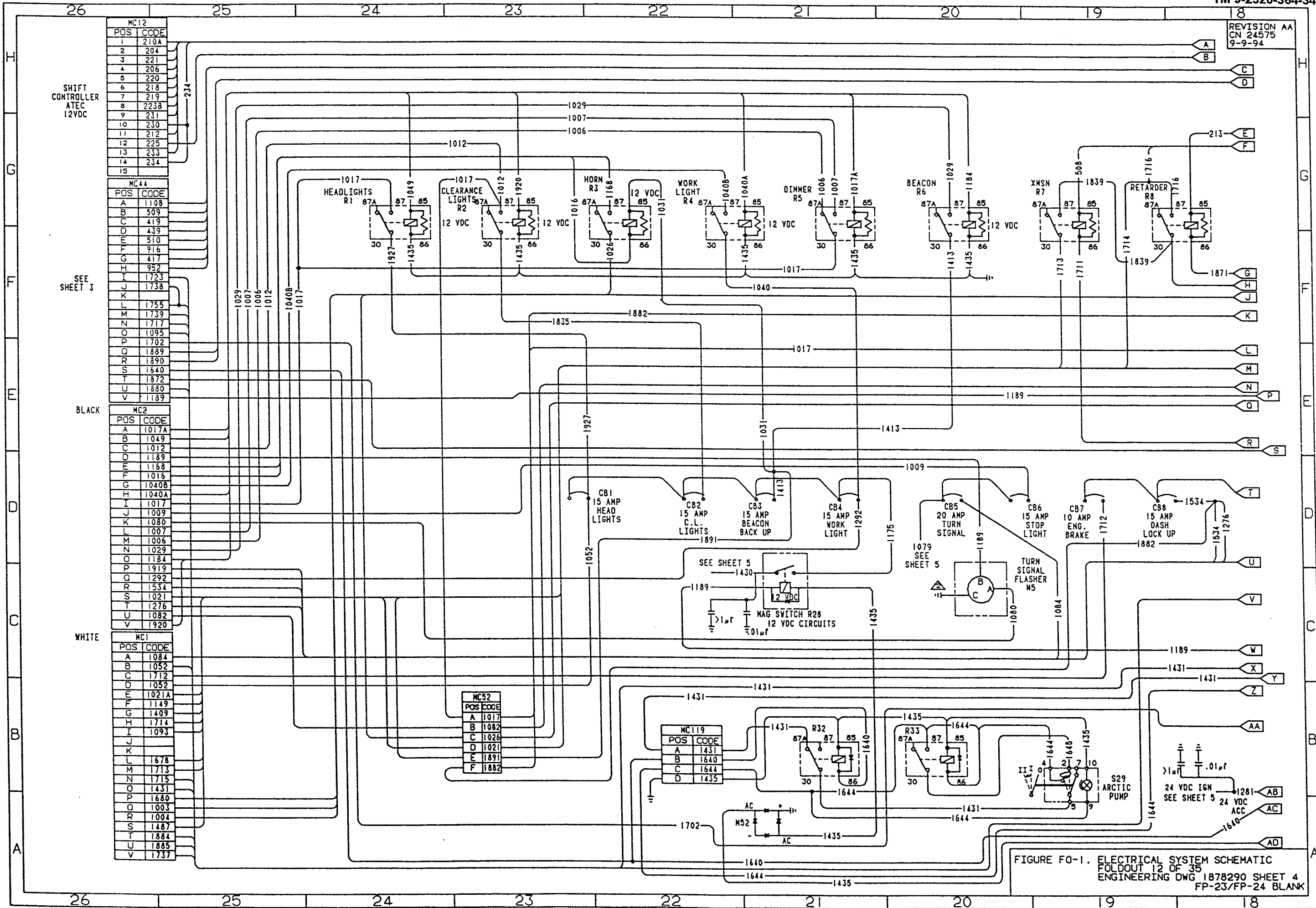


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 12 OF 35
ENGINEERING DWG 1878290 SHEET 4
FP-23/FP-24 BLANK

REVISION AA
CN 24575
9-9-94

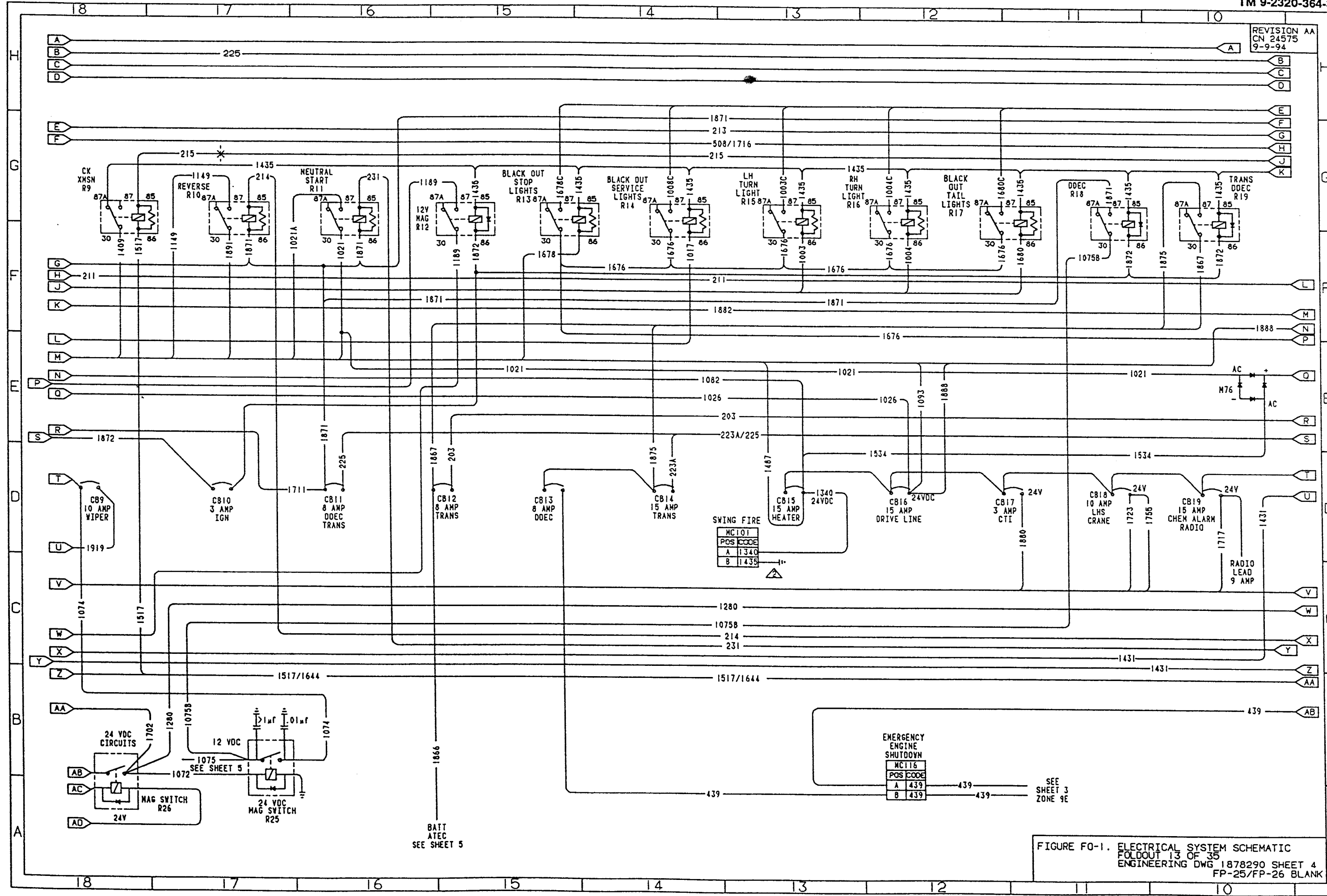


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 13 OF 35
ENGINEERING DWG 1878290 SHEET 4
FP-25/FP-26 BLANK

REVISION AA
CN 24575
9-9-94

POS	CODE
A	1320
B	1449
C	1113
D	1021A
E	1032
F	1147
G	1020
H	1036
J	X
K	X
L	X
M	1957
N	1955
O	X
P	X
Q	X
R	X
S	X
T	X
U	X
V	X

POS	CODE
A	1021A
B	1020

POS	CODE
1	GREEN
2	ORANGE
3	BROWN
4	RED
5	BLACK
6	PLUG
7	PLUG

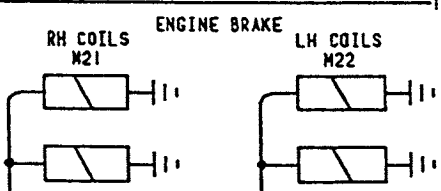
POS	CODE
1	1860
2	1820
3	1815
4	1861
5	1953

POS	CODE
A	1860
B	1820
C	1815
D	1861
E	1953

BOOST PRESSURE SWITCH
PS15
SPST-N.C.
P 7.5 PSI ± .5 PSI
ON RISING PRESSURE

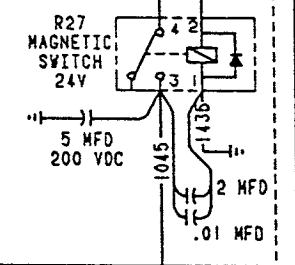
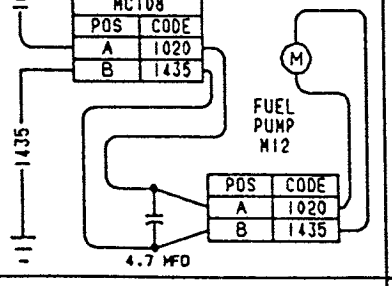
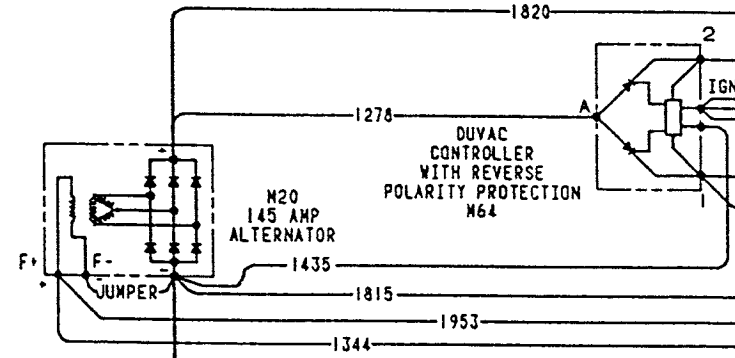
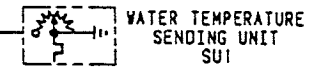
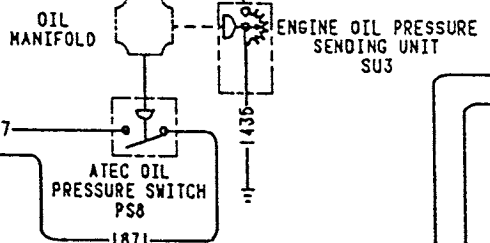
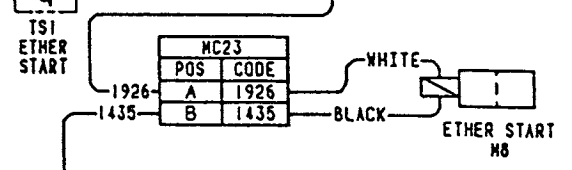
CONTROL BOX ← CHASSIS/ENGINE

POS	CODE
A	916
B	419
C	509
D	439
E	901
F	900
G	952
H	417
J	451
K	908
L	505
M	X
N	X
O	510
P	1517
Q	1871
R	1715
S	1716
T	508
U	208/209
V	115
W	X
X	X



POS	CODE
A	1036
B	1926

POS	CODE
A	1926
B	1435



SEE SHEET 4

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 15 OF 35
ENGINEERING DWG 1878290 SHEET 5
FP-29/FP-30 BLANK

REVISION V
CN 24138
11-24-92

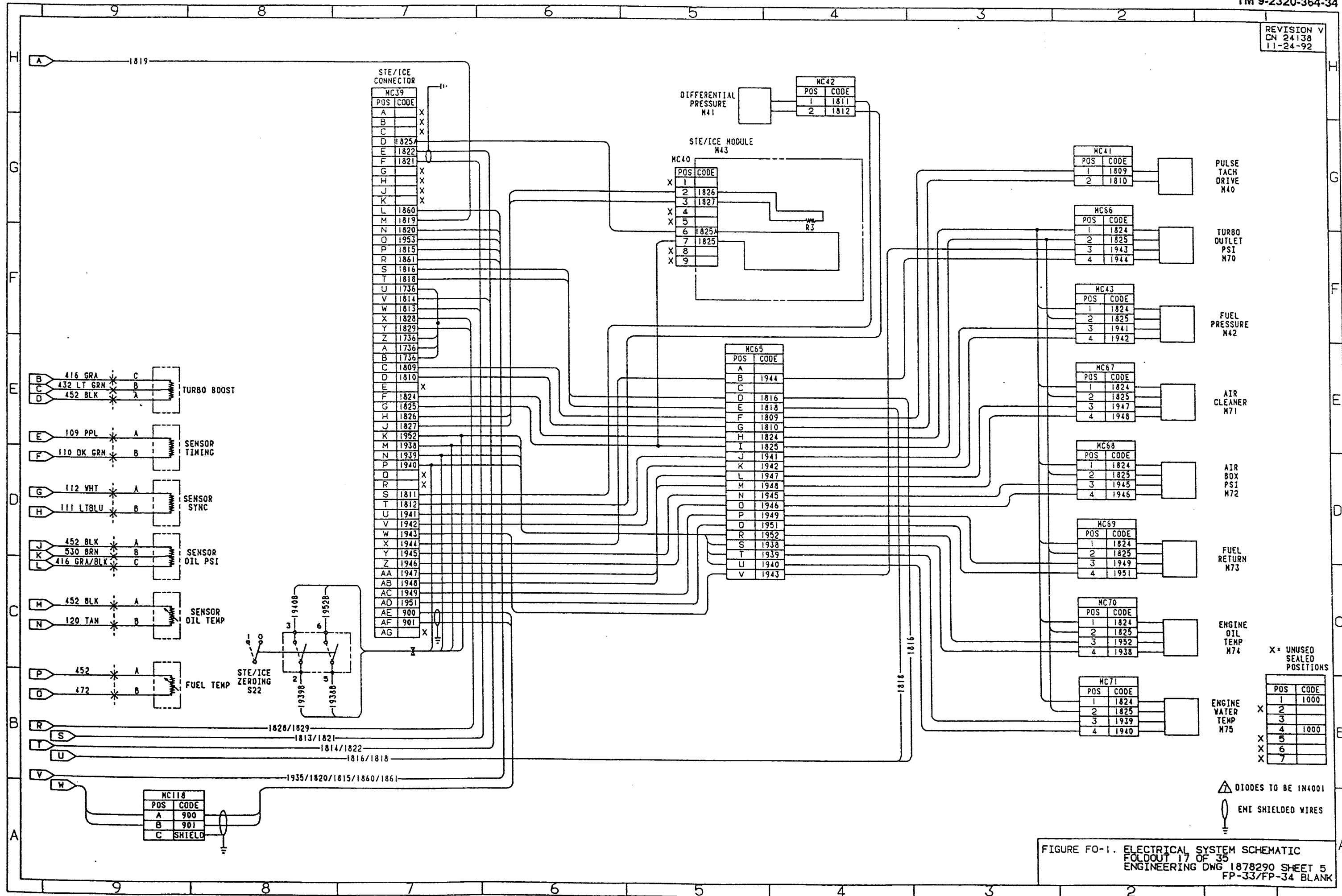


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 35
ENGINEERING DWG 1878290 SHEET 5
FP-33/FP-34 BLANK

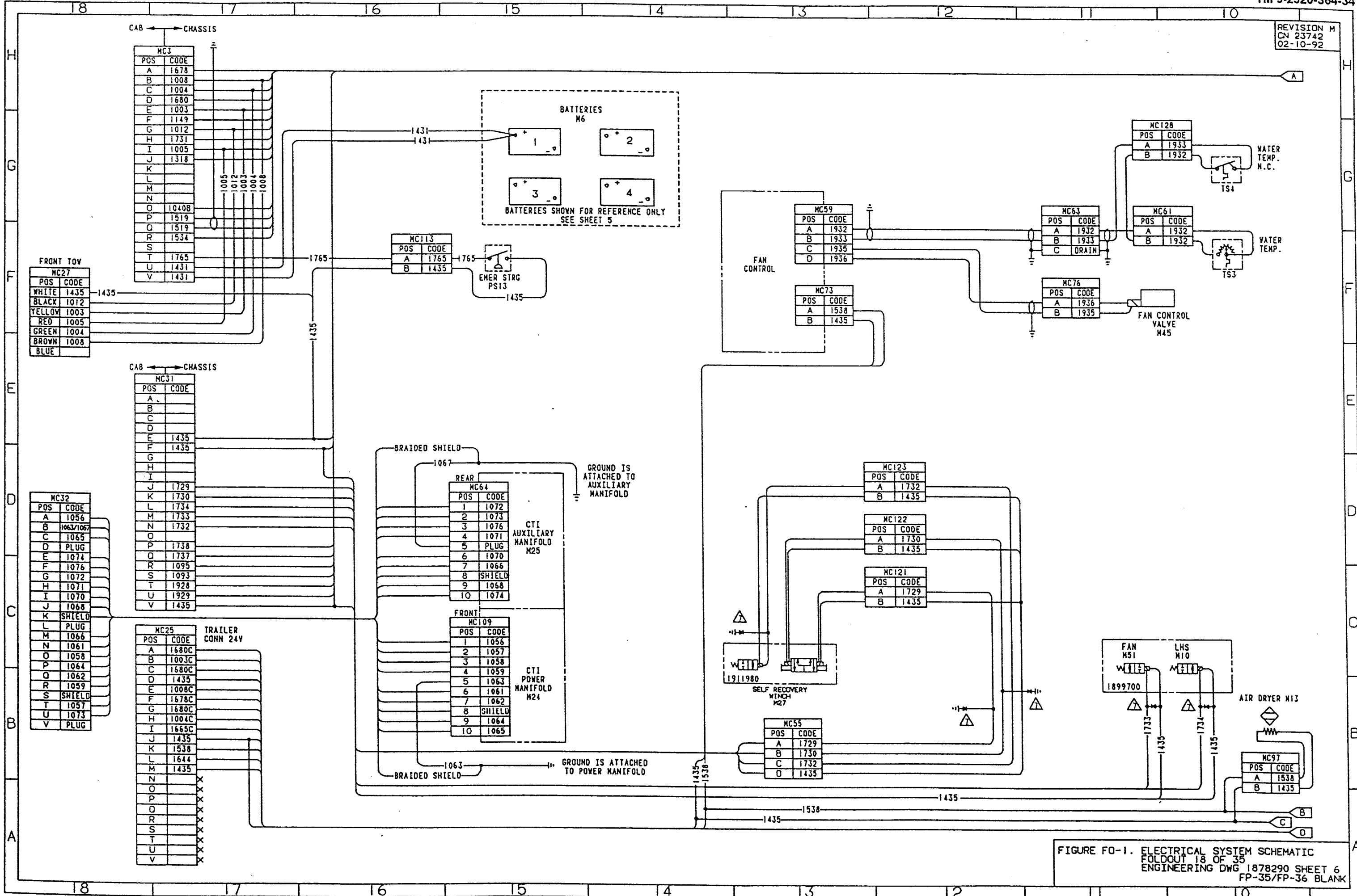


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 18 OF 35
ENGINEERING DWG 1878290 SHEET 6
FP-35/FP-36 BLANK

REVISION M
CN 23742
02-10-92

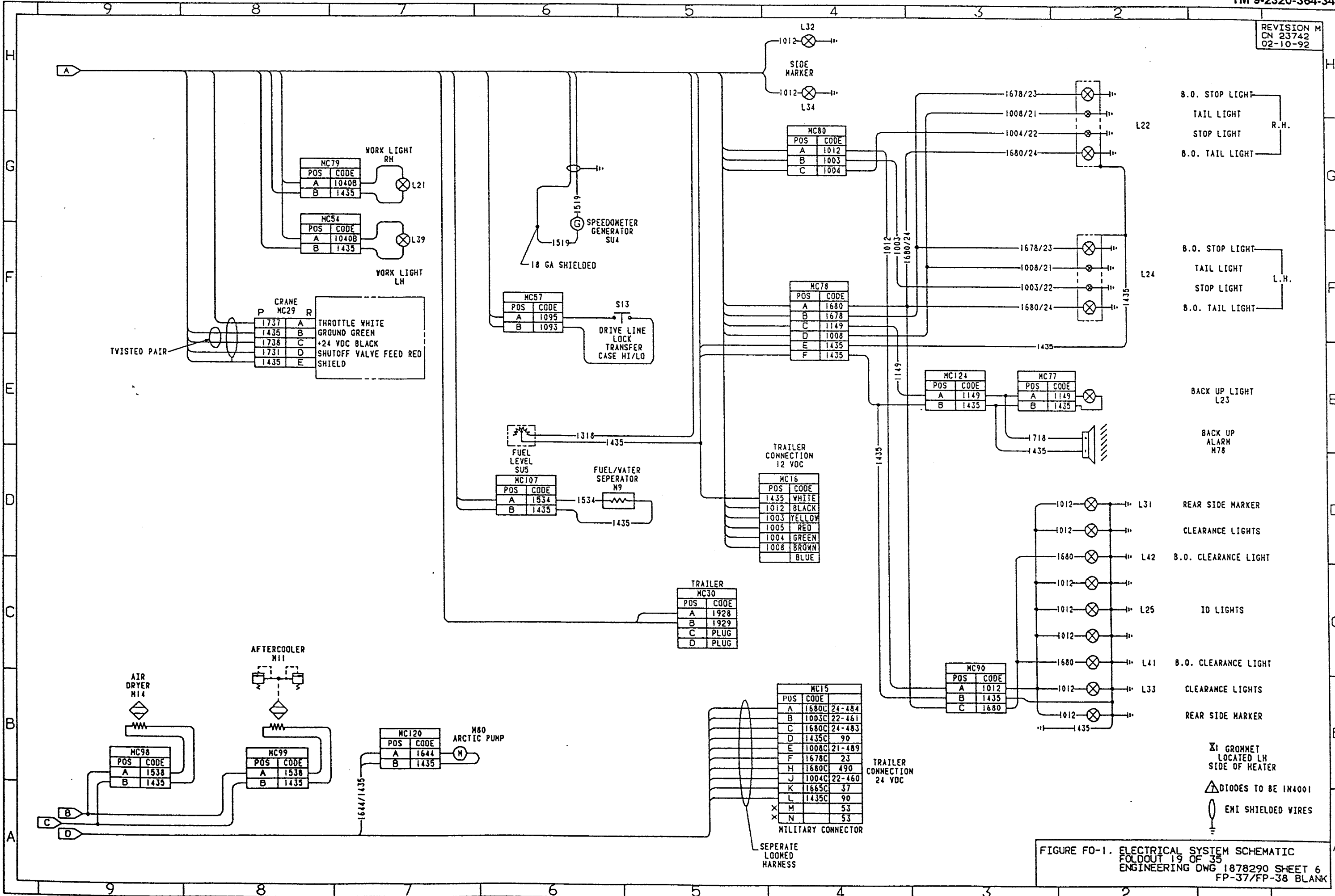


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 19 OF 35
ENGINEERING DWG 1878290 SHEET 6
FP-37/FP-38 BLANK

REVISION U
CN 23966
12-1-92

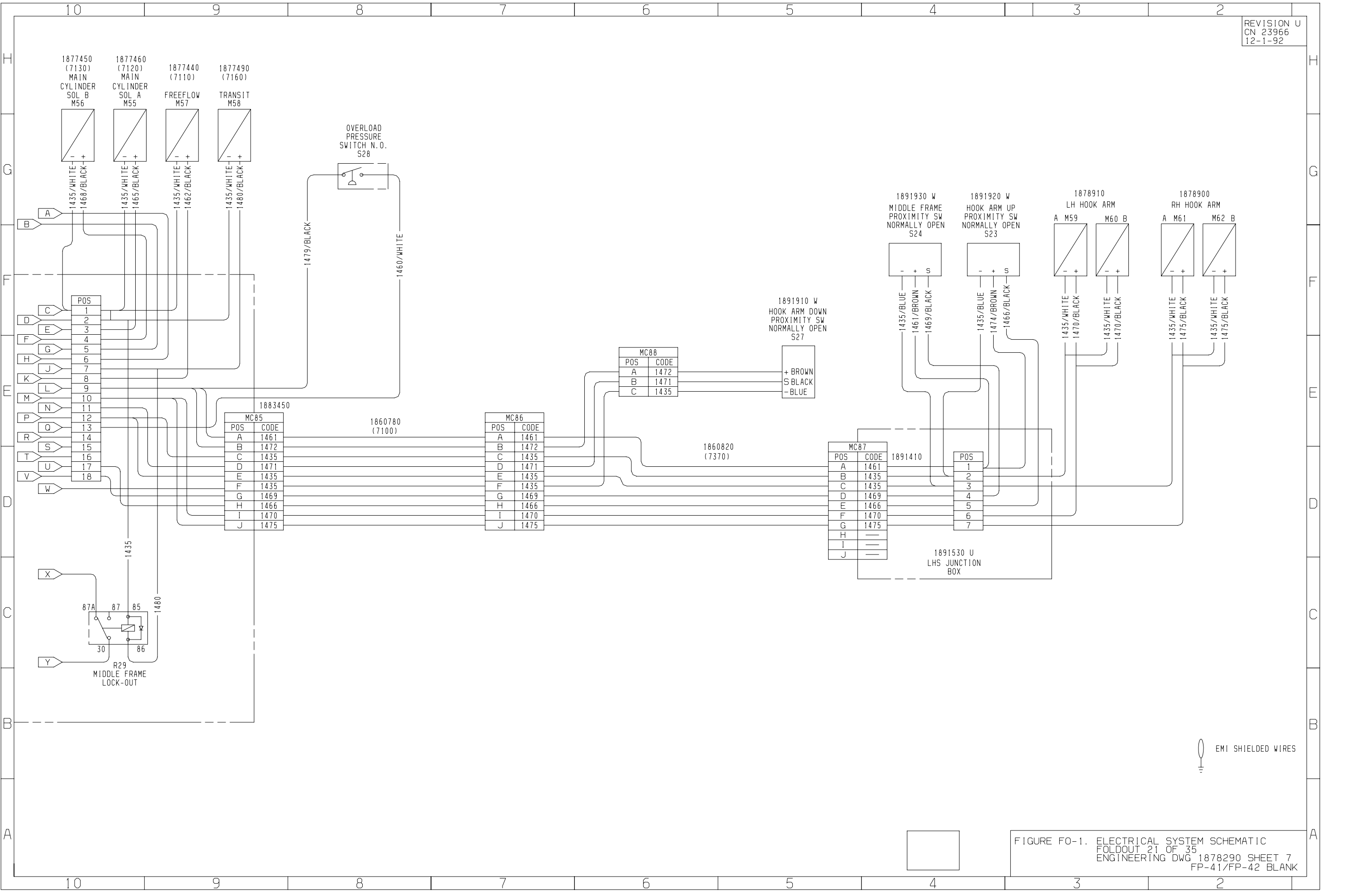
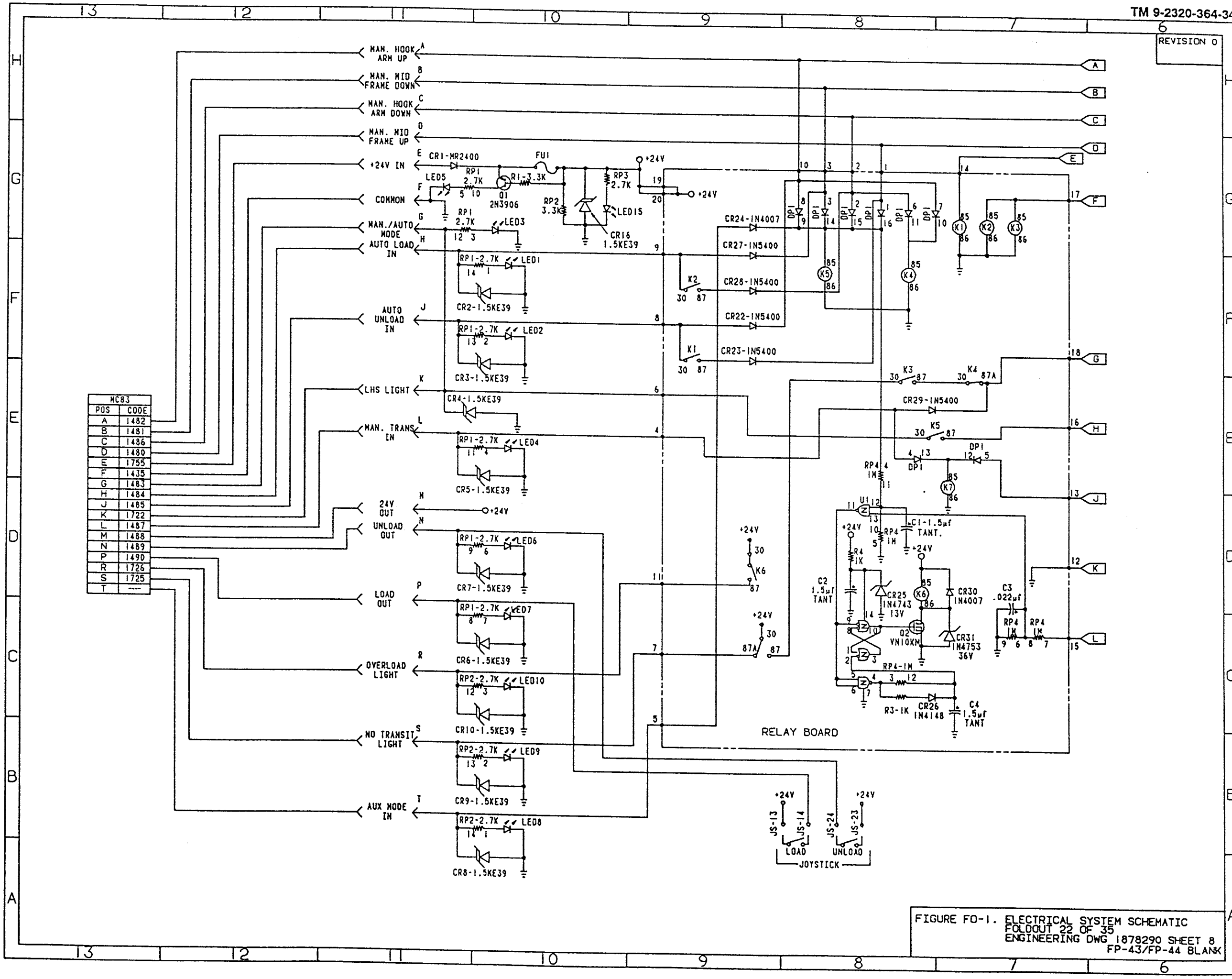
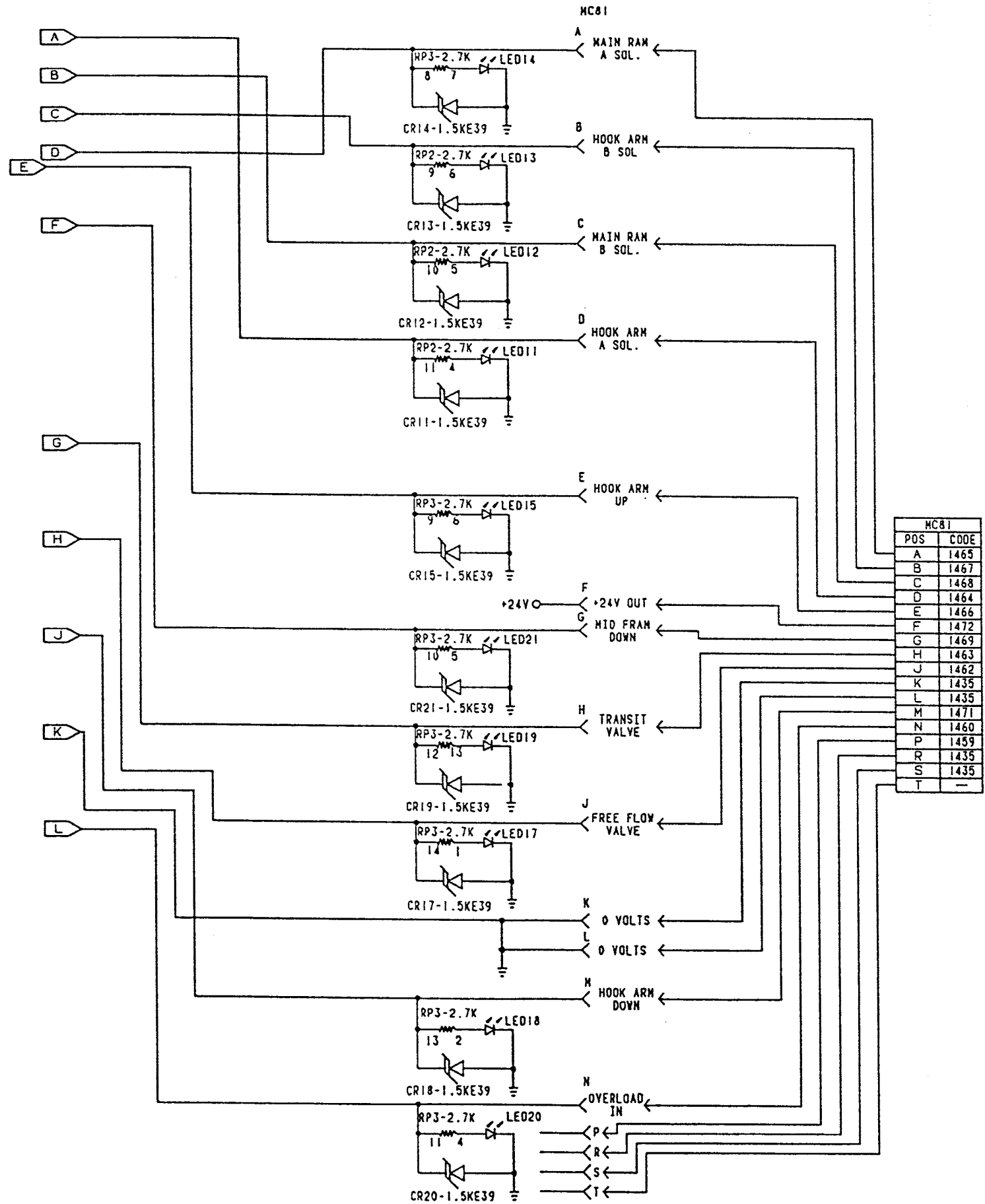


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 21 OF 35
ENGINEERING DWG. 1878290 SHEET 7
FP-41/FP-42 BLANK



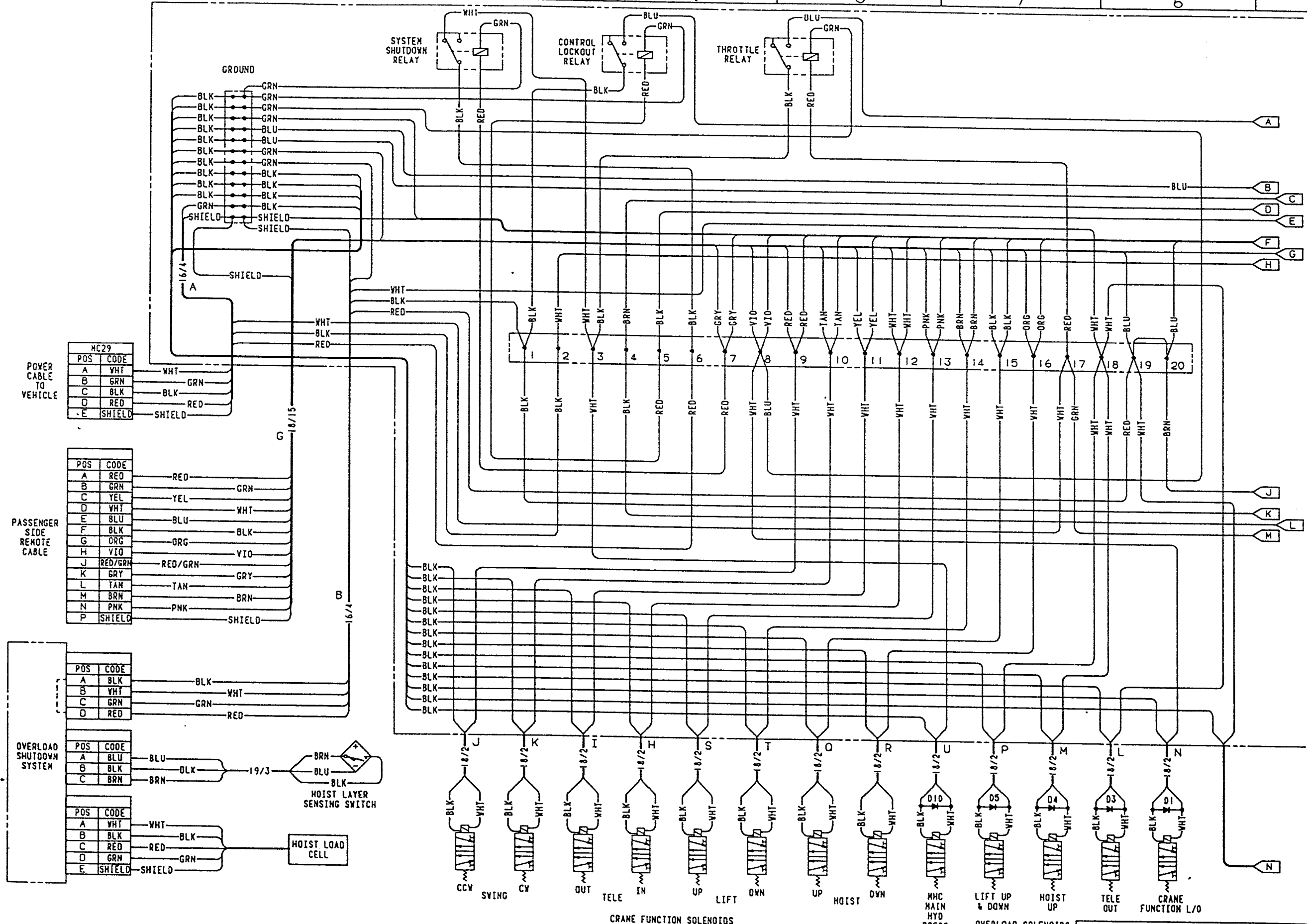
MC83	
POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1726
S	1725
T	---

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 22 OF 35
 ENGINEERING DWG 1878290 SHEET 8
 FP-43/FP-44 BLANK



MC81	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	-

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 23 OF 35
 ENGINEERING DWG 1878290 SHEET 8
 FP-45/FP-46 BLANK



POWER CABLE TO VEHICLE

POS	CODE	WHT	GRN	BLK	RED	SHIELD
A	WHT	WHT				
B	GRN		GRN			
C	BLK			BLK		
D	RED				RED	
E	SHIELD					SHIELD

PASSENGER SIDE REMOTE CABLE

POS	CODE	RED	GRN	YEL	WHT	BLU	BLK	ORG	VIO	RED/GRN	GRY	TAN	BRN	PNK	SHIELD
A	RED	RED													
B	GRN		GRN												
C	YEL			YEL											
D	WHT				WHT										
E	BLU					BLU									
F	BLK						BLK								
G	ORG							ORG							
H	VIO								VIO						
J	RED/GRN	RED/GRN													
K	GRY									GRY					
L	TAN										TAN				
M	BRN											BRN			
N	PNK												PNK		
P	SHIELD													SHIELD	

OVERLOAD SHUTDOWN SYSTEM

POS	CODE	BLK	WHT	GRN	RED
A	BLK	BLK			
B	WHT		WHT		
C	GRN			GRN	
D	RED				RED

OVERLOAD SHUTDOWN SYSTEM (continued)

POS	CODE	BLU	BLK	BRN
A	BLU	BLU		
B	BLK		BLK	
C	BRN			BRN

OVERLOAD SHUTDOWN SYSTEM (continued)

POS	CODE	WHT	BLK	RED	GRN	SHIELD
A	WHT	WHT				
B	BLK		BLK			
C	RED			RED		
D	GRN				GRN	
E	SHIELD					SHIELD

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 24 OF 35
 ENGINEERING DWG 1878290 SHEET 9
 FP-47/FP-48 BLANK

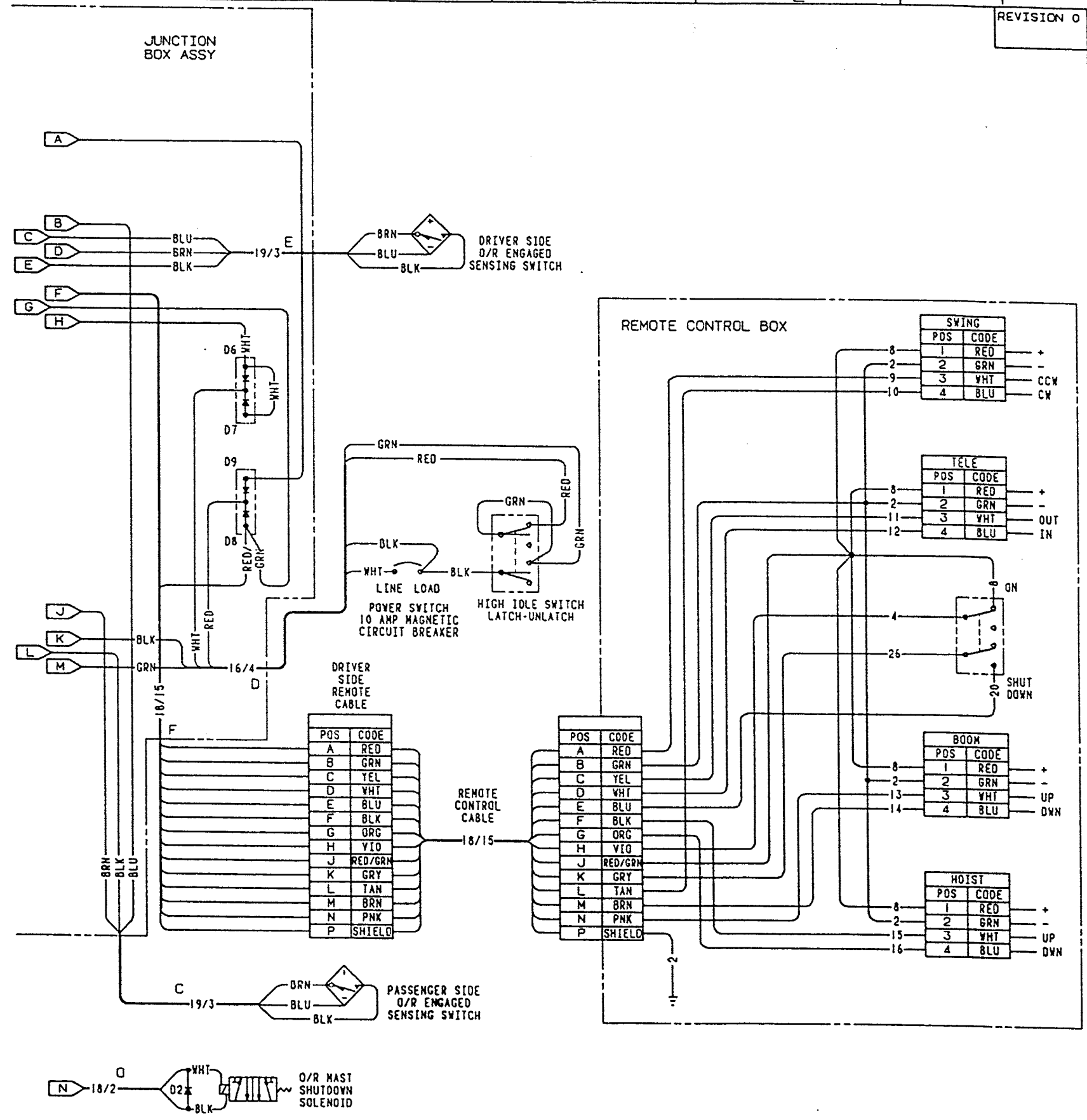
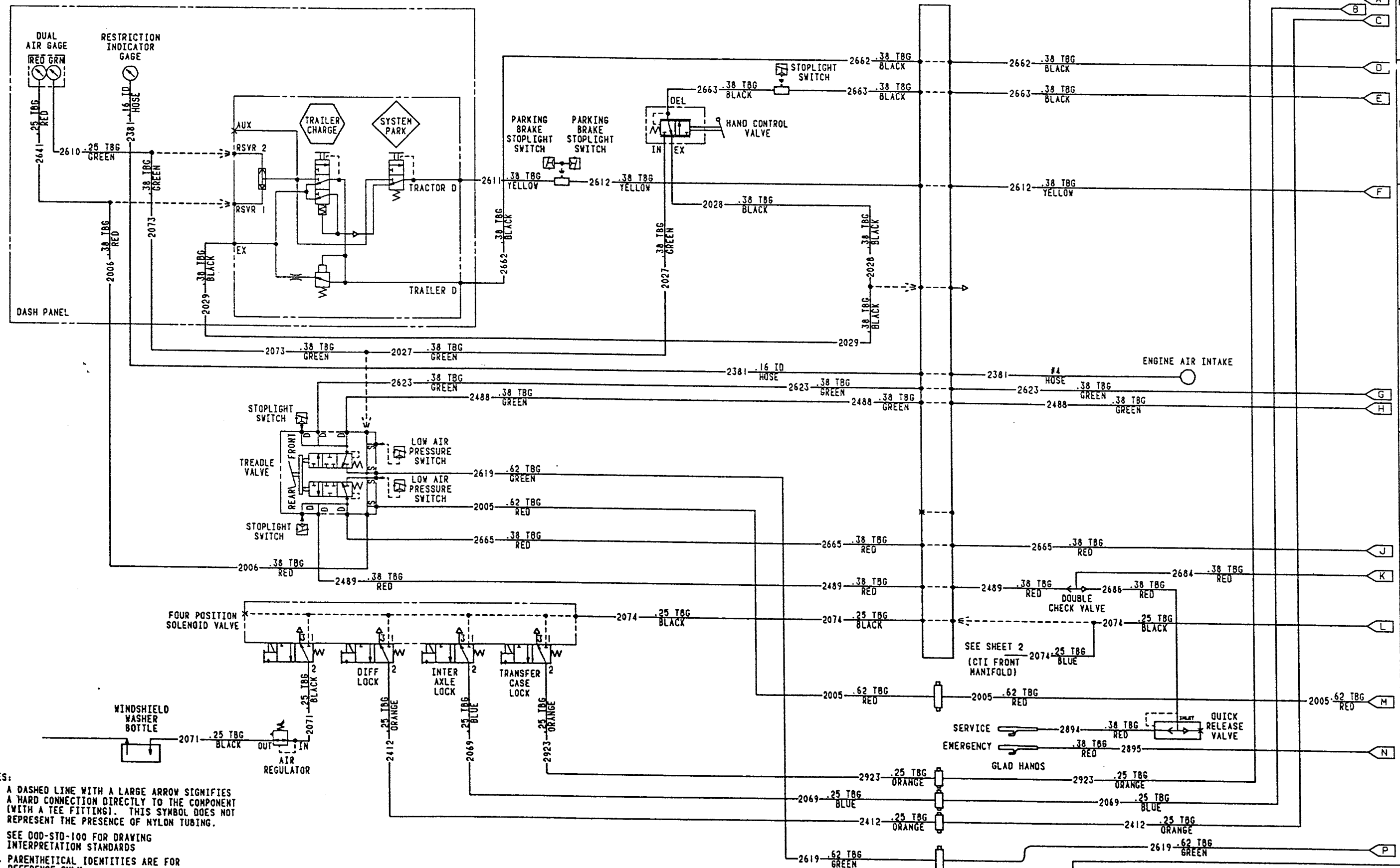


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLLOUT 25 OF 35
 ENGINEERING DWG 1878290 SHEET 9
 FP-49/FP-50 BLANK

REVISION F
CN 24526
3-28-94



- NOTES:
1. A DASHED LINE WITH A LARGE ARROW SIGNIFIES A HARD CONNECTION DIRECTLY TO THE COMPONENT (WITH A TEE FITTING). THIS SYMBOL DOES NOT REPRESENT THE PRESENCE OF NYLON TUBING.
 2. SEE ODD-STD-100 FOR DRAWING INTERPRETATION STANDARDS
 3. PARENTHEICAL IDENTITIES ARE FOR REFERENCE ONLY

FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 26 OF 35
ENGINEERING DWG 1878300 SHEET 1
FP-51/FP-52 BLANK

REVISION D
CN 24303
6-25-93

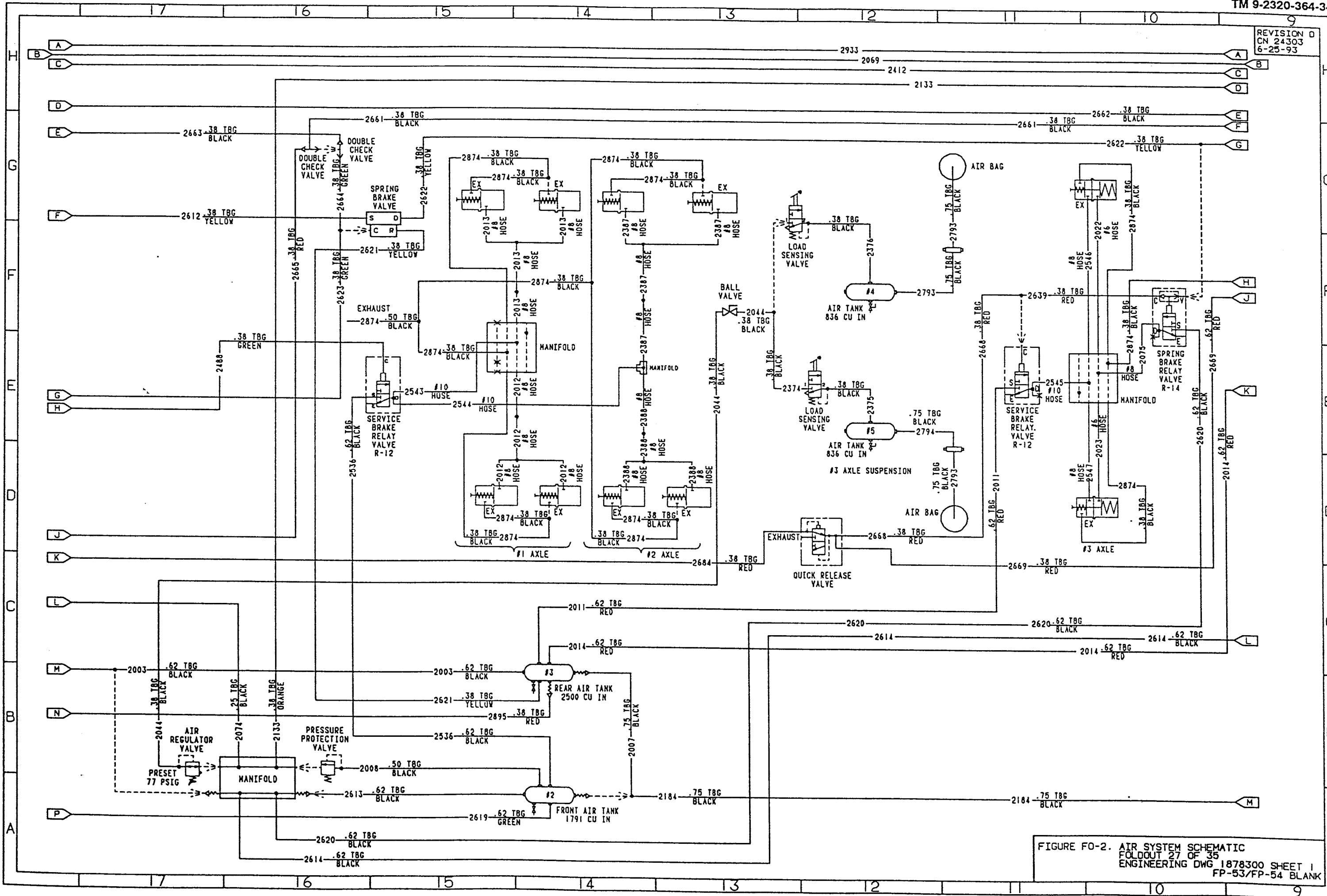
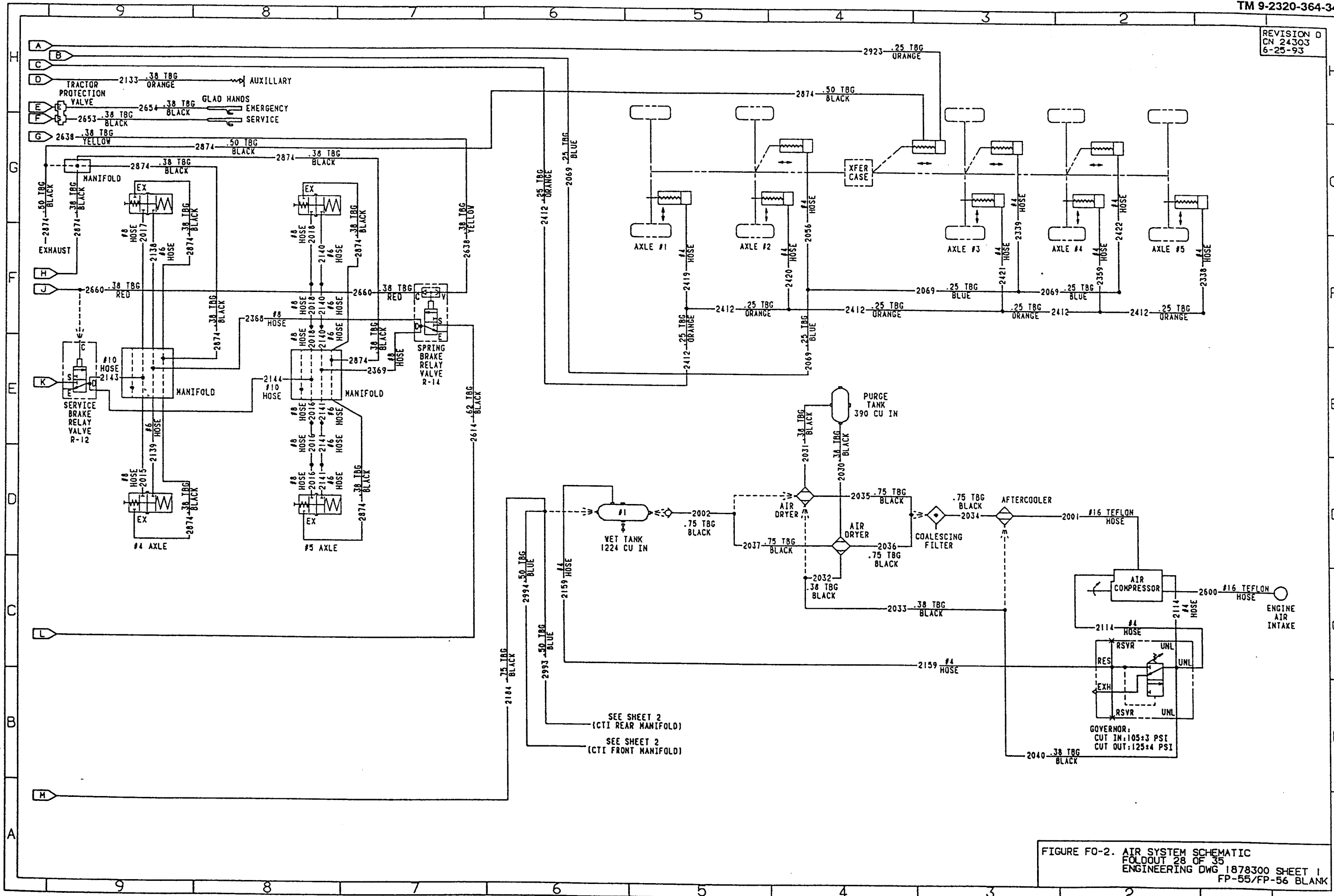


FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLIO 27 OF 35
ENGINEERING DWG 1878300 SHEET 1
FP-53/FP-54 BLANK

REVISION D
CN 24303
6-25-93



SEE SHEET 2
(CTI REAR MANIFOLD)
SEE SHEET 2
(CTI FRONT MANIFOLD)

FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 28 OF 35
ENGINEERING DWG 1878300 SHEET 1
FP-55/FP-56 BLANK

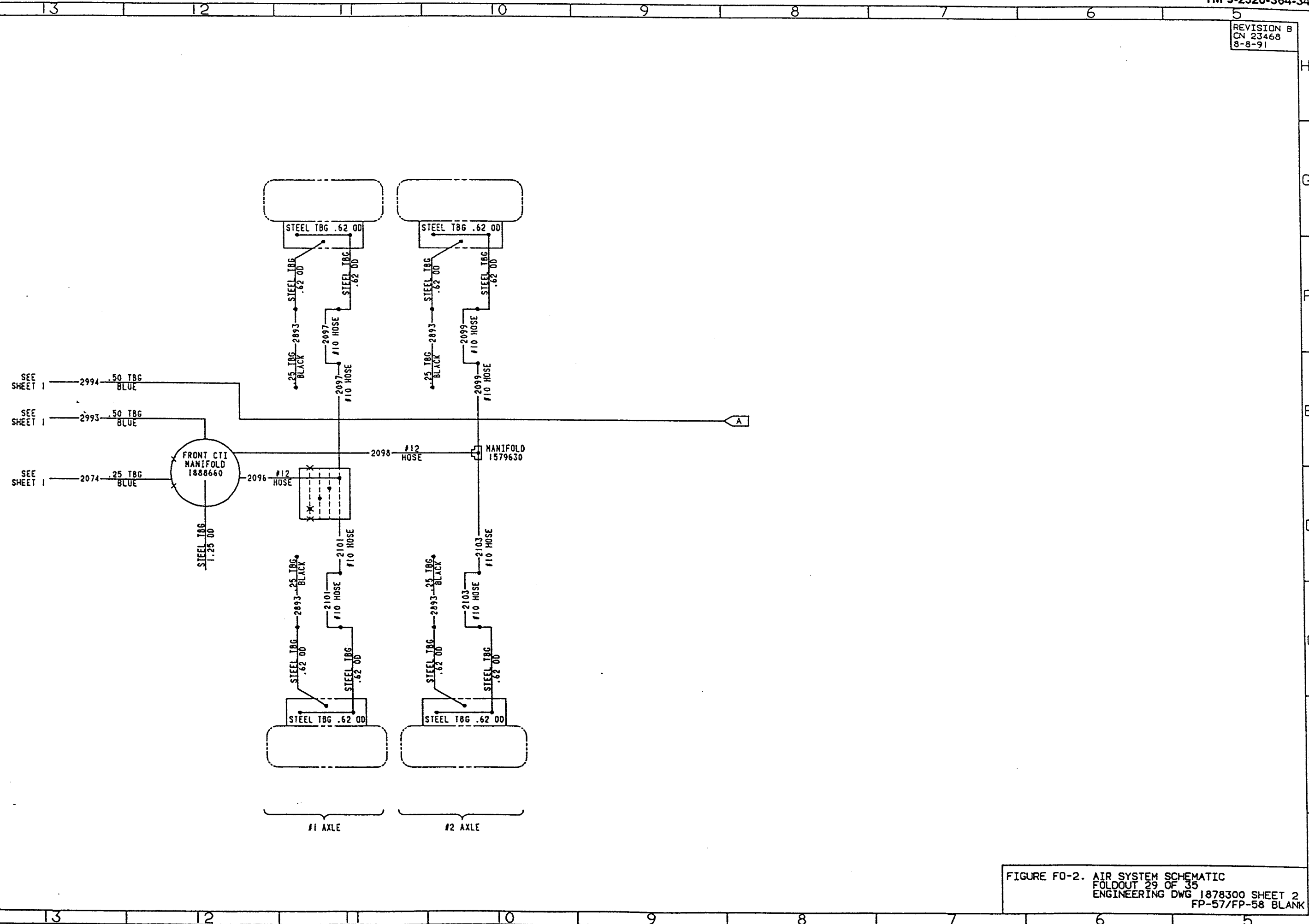


FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 29 OF 35
ENGINEERING DWG 1878300 SHEET 2
FP-57/FP-58 BLANK

REVISION B
CN 23468
8-8-91

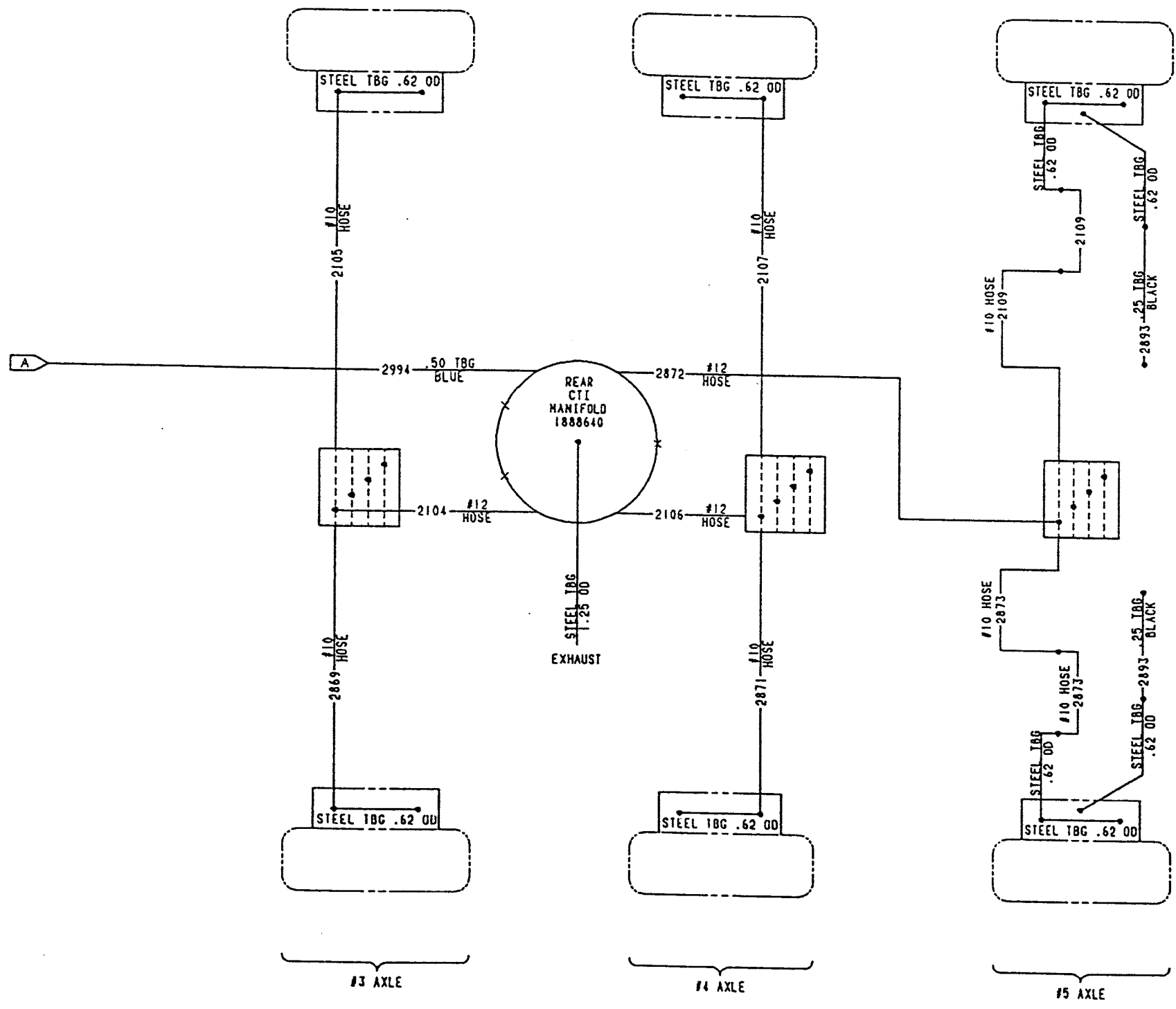


FIGURE FO-2. AIR SYSTEM SCHEMATIC
FOLDOUT 30 OF 35
ENGINEERING DWG 1878300 SHEET 2
FP-59/FP-60 BLANK

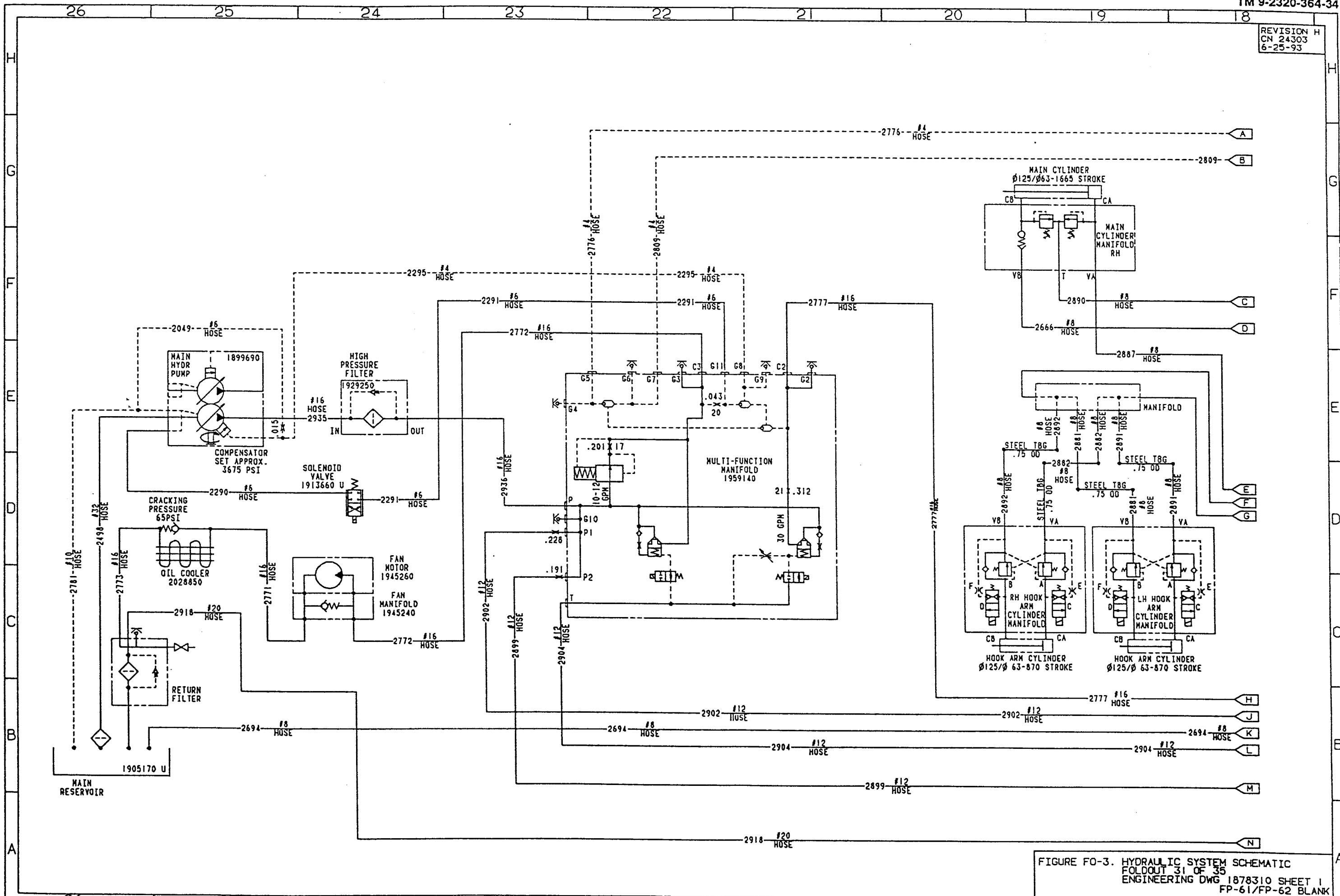


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
 FOLDOUT 31 OF 35
 ENGINEERING DWG 1878310 SHEET 1
 FP-61/FP-62 BLANK

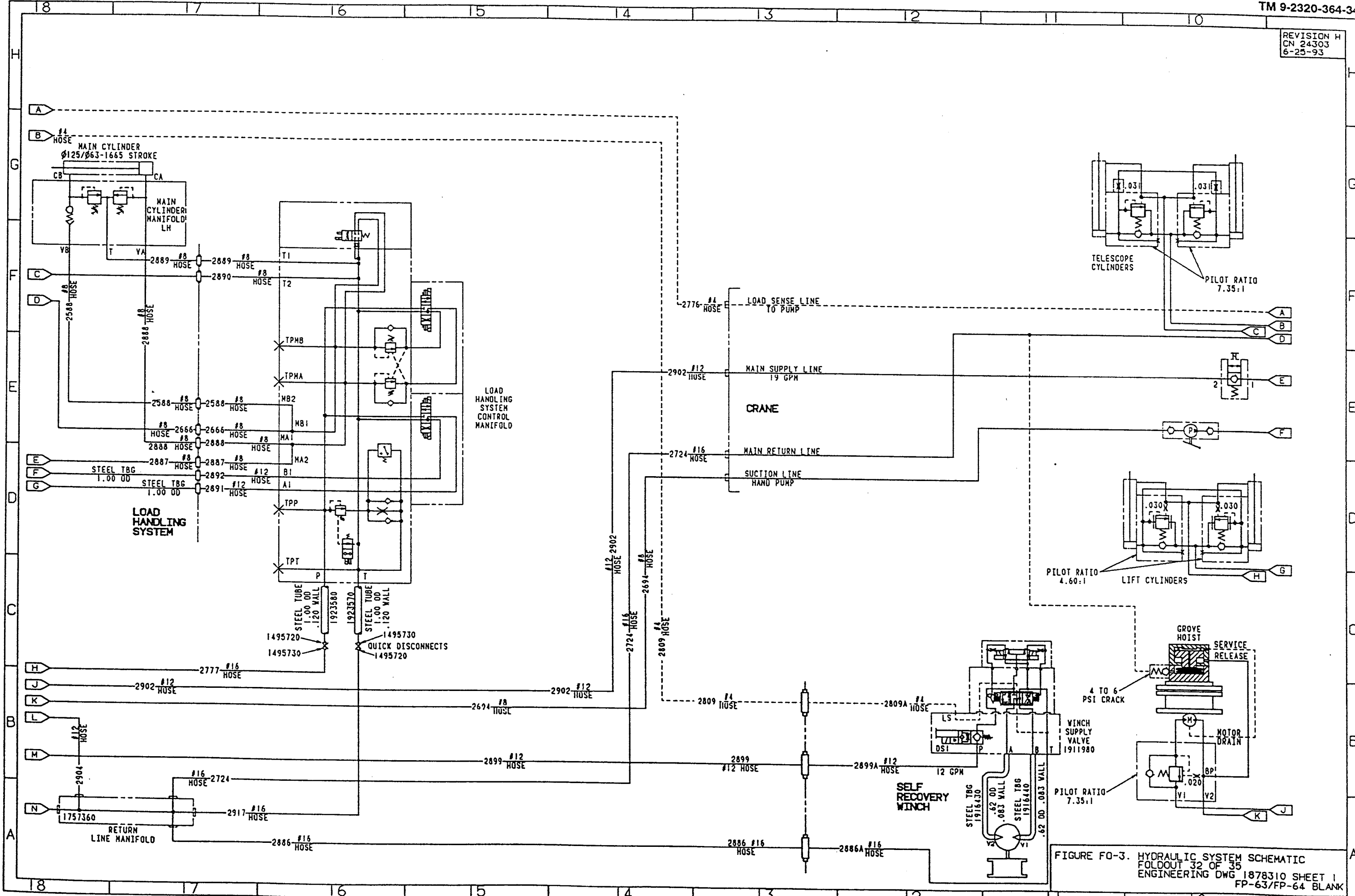


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 32 OF 35
ENGINEERING DWG 1878310 SHEET 1
FP-63/FP-64 BLANK

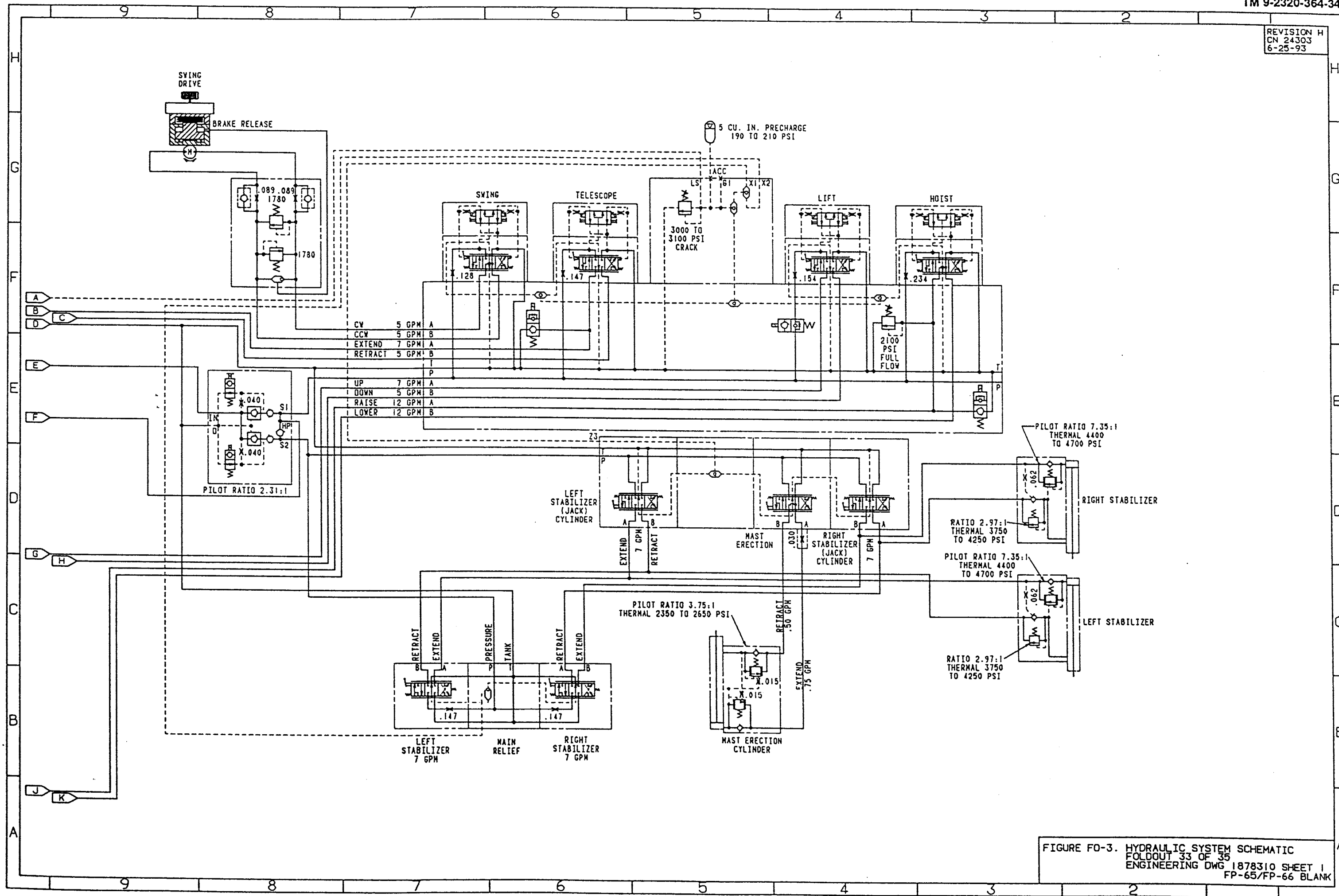


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 33 OF 35
ENGINEERING DWG 1878310 SHEET 1
FP-65/FP-66 BLANK

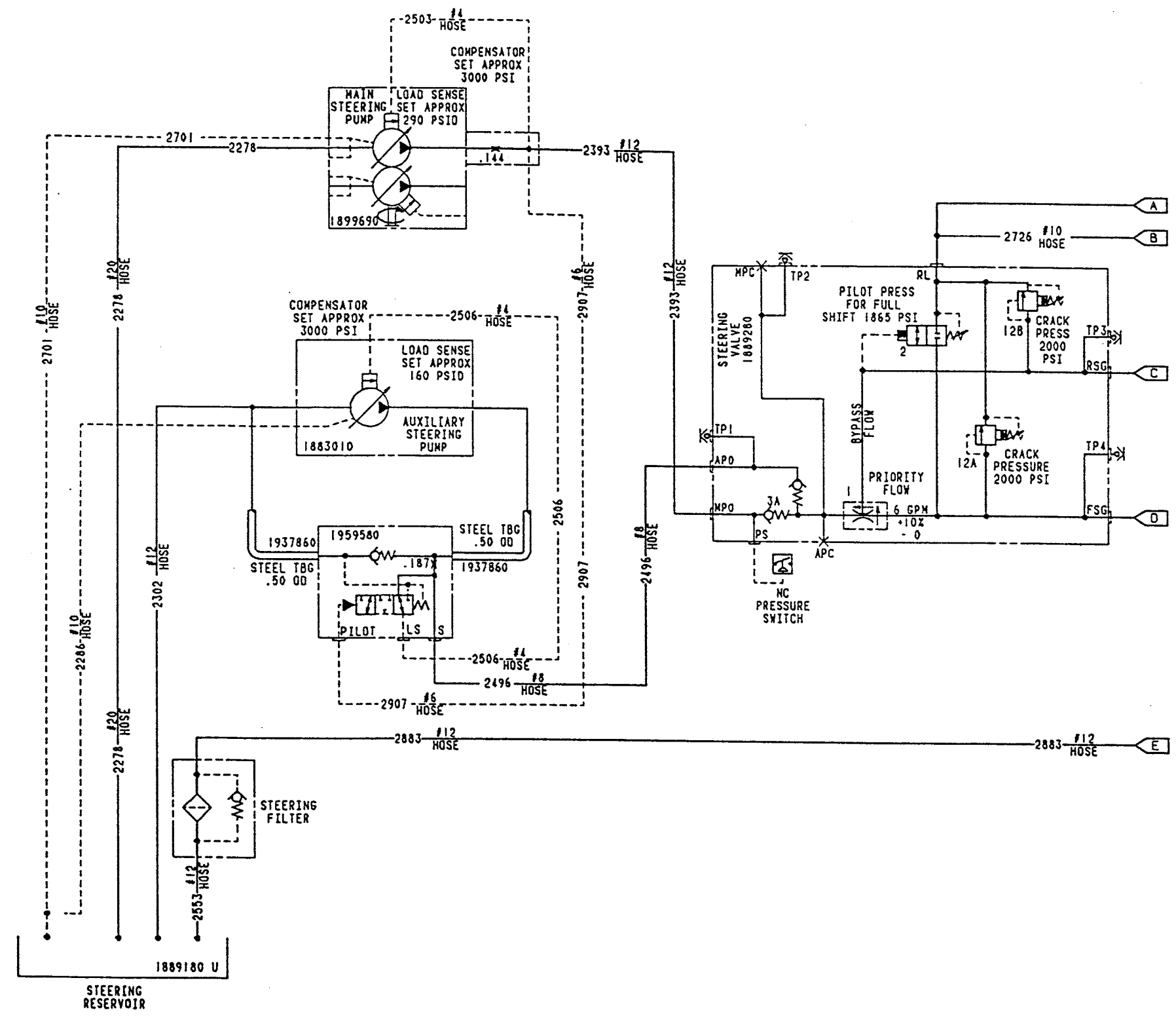


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 34 OF 35
ENGINEERING DWG 1878310 SHEET 2
FP-67/FP-68 BLANK

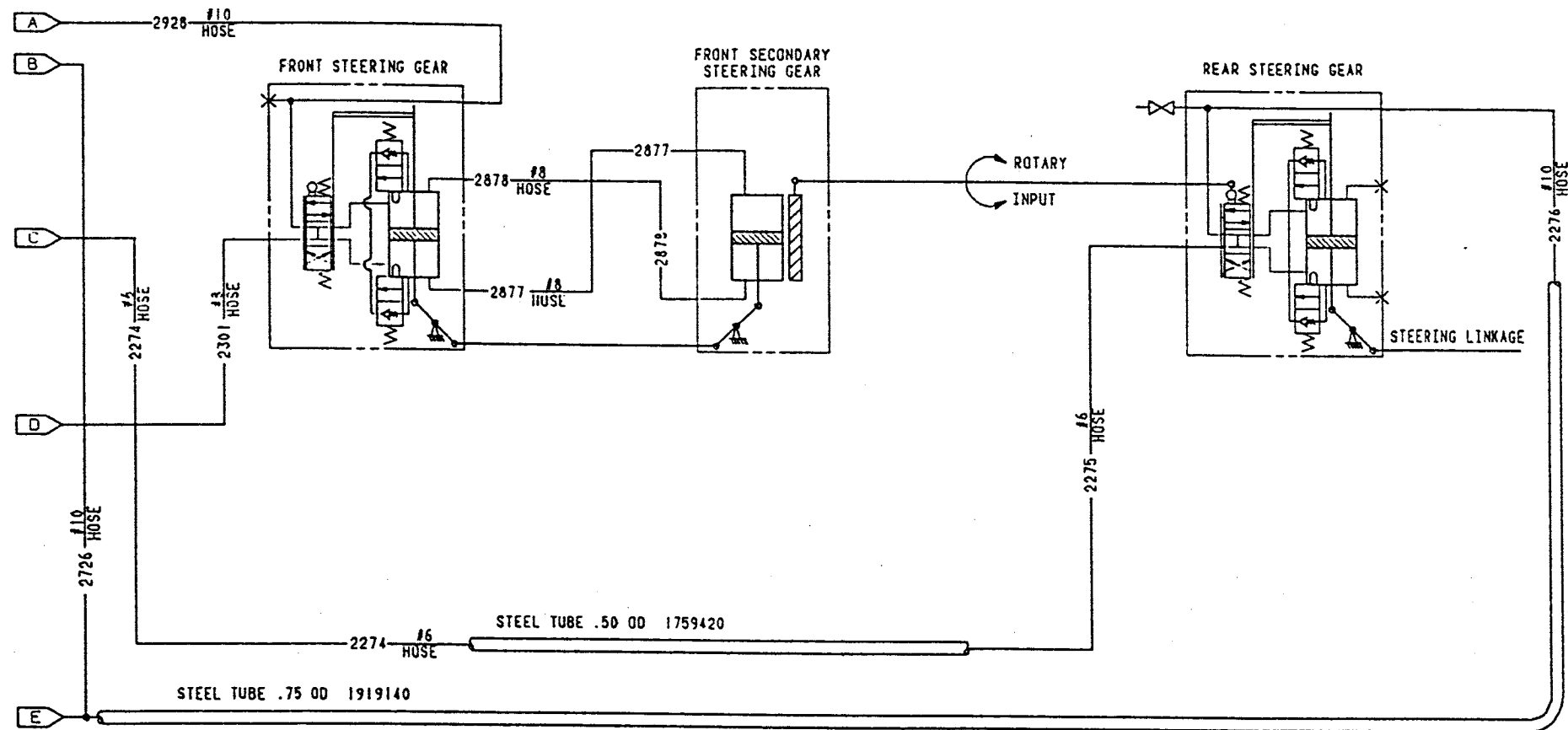


FIGURE FO-3. HYDRAULIC SYSTEM SCHEMATIC
FOLDOUT 35 OF 35
ENGINEERING DWG 1878310 SHEET 2
FP-69/FP-70 BLANK

SCHEMATICS

Section II. 200 AMP ALTERNATOR AND DDEC III/IV ENGINE.

Section II contains the schematics for trucks equipped with the 200 amp alternator and the DDEC III/IV engine.

26 25 24 23 22 21 20 19 18

REVISION H
CN 2225
4/14/00

MULTIPLE CONNECTORS			
NUMBER	ZONE	SH	DESCRIPTION
MC1	H3	3	CAB/ELECTRICAL BOX
MC1	C26	4	CAB/ELECTRICAL BOX
MC2	D3	3	CAB/ELECTRICAL BOX
MC2	D26	4	CAB/ELECTRICAL BOX
MC3	C3	3	CHASSIS
MC3	H17	6	CHASSIS
MC4	G10	3	SWITCHES
MC5	B12	3	WIPER MOTOR
MC6	D15	3	THROTTLE SENSOR
MC7	H8	3	TURN SIGNAL
MC8	F19	3	GAUGES
MC9	G4	4	ECU ATEC
MC10	G4	4	ECU ATEC
MC11	D3	4	DDEC
MC11	D26	5	DDEC
MC12	H26	4	SHIFT CONT ATEC
MC13	F6	3	DIGN CONN DDEC
MC14	B4	4	DDEC SIGNAL GROUND
MC15	B4	6	MILITARY CONNECTOR
MC16	D4	6	TRAILER
MC17	G11	5	DDEC
MC18	E11	5	DDEC
MC19	E13	5	TRANSMISSION
MC20	E12	5	TRANSMISSION
MC21	E2	3	ENGINE SENSOR
MC21	H26	5	ENGINE SENSOR
MC23	B23	5	ETHER START
MC24	G19	5	ALTERNATOR
MC25	C17	6	TRAILER 24VDC
MC27	F18	6	FRONT TOW
MC28	E6	3	BEACON LIGHT
MC29	F8	6	CRANE
MC30	C5	6	TRAILER
MC31	B21	3	CAB/CHASSIS
MC32	B23	3	CTI CHASSIS
MC33	F17	7	LHS CAB
MC34	C19	3	24V METERS
MC35	D24	3	CTI
MC36	A5	4	THROTTLE SENSOR
MC38	C15	3	VERNIER CONTROL
MC39	H7	5	STE/ICE
MC40	G5	5	STE/ICE MODULE
MC41	G2	5	PULSE TACH DRIVE
MC42	H4	5	DIFFERENTIAL PRESS
MC43	F2	5	FUEL PRESSURE
MC44	C5	3	CAB/TRANSMISSION
MC44	F26	4	CAB/TRANSMISSION
MC45	D5	4	ECU ATEC

MULTIPLE CONNECTORS			
NUMBER	ZONE	SH	DESCRIPTION
MC50	C7	4	RELAYS/ATEC
MC51	C6	4	ECU ATEC
MC52	B23	4	HEATER/DIMMER
MC53	F23	3	ENGINE BRAKE
MC54	F8	6	WORK LIGHT
MC55	B13	6	SELF RECOVERY WINCH
MC56	C23	5	ETHER THERMOSTAT
MC57	F6	6	DRIVE LINE LOCK
MC58	E7	3	GAS PART FILTER
MC59	G13	6	FAN CONTROL
MC60	G24	5	REVERSE PLRT PROTR
MC61	G10	6	FAN CONTL WTR TEMP
MC62	F13	5	DDEC ENGINE POWER
MC63	G11	6	FAN CONTROL
MC64	D15	6	AUXILIARY CTI MANF
MC65	E5	5	STE/ICE ENGINE
MC66	G2	5	TURBO OUTLET PSI
MC67	E2	5	AIR CLEANER
MC68	D2	5	AIR BOX PSI
MC69	D2	5	FUEL RETURN
MC70	C2	5	ENGINE OIL TEMP
MC71	B2	5	ENGINE WATER TEMP
MC73	F13	6	FAN CONTROL
MC76	F11	6	FAN CONTROL VALVE
MC77	E3	6	BACK UP LIGHT
MC78	F4	6	REAR LIGHT GROUP
MC79	G7	6	WORK LIGHT
MC80	G4	6	REAR LIGHT GROUP
MC81	E13	7	LHS
MC82	E12	7	LHS
MC83	E14	7	LHS
MC84	E15	7	LHS
MC85	E9	7	LHS
MC86	E7	7	LHS
MC87	D5	7	LHS
MC88	E6	7	LHS
MC90	C3	6	REAR LIGHT GP HARN
MC91	G8	3	STRN COL. -CAB HARN
MC92	F8	3	STRG COL. -CAB HARN
MC93	C17	7	LHS
MC94	B17	7	LHS
MC95	B15	5	DDEC BATTERY POWER
MC96	C2	3	LOW HYD OIL
MC97	B10	6	AIR DRYER
MC98	B9	6	AIR DRYER
MC99	B8	6	AFTER COOLER
MC102	A3	4	DDEC 6.8K RESISTOR
MC103	E5	3	CHEM DETECTOR
MC104	E5	3	CHEM ALARM

MULTIPLE CONNECTORS			
NUMBER	ZONE	SH	DESCRIPTION
MC105	E24	3	CTI ACCESS OUTPUT
MC106	H4	3	DDEC DIAGNOSTIC
MC107	D6	6	FUEL WATER SEP
MC108	C20	5	FUEL PUMP
MC109	C15	6	CTI POWER MANIFOLD
MC110	C24	3	CTI AUX MANF CAB
MC111	B24	3	CTI POWER MANF CAB
MC112	B19	3	LHS LIGHTS
MC113	F16	6	EMERGENCY STEER SW
MC116	B12	4	EMER ENG SHUT DOWN
MC118	A9	5	STE/ICE
MC119	B22	4	ARCTIC PUMP
MC120	B7	6	ARCTIC PUMP
MC121	C12	6	SELF RECOVERY WINCH
MC122	D12	6	SELF RECOVERY WINCH
MC123	D12	6	SELF RECOVERY WINCH
MC124	E3	6	BACK-UP LIGHT/ALARM
MC125	G18	3	AIR RESTRICTION LT
MC126	E11	3	STOP LIGHTS
MC127	B15	3	THROTTLE POSN SW
MC128	G10	6	AUX WATER TEMP SW

LIGHTS			
NUMBER	ZONE	SH	DESCRIPTION
L1	G16	3	PARKING BRAKE IND
L2	G17	3	LOW AIR INDICATOR
L3	G17	3	CHECK GAUGES IND
L4	G17	3	RH TURN INDICATOR
L5	G24	3	TRANS CHECK IND
L6	G18	3	CHECK ENGINE IND
L7	G17	3	DRIVE LINE LOCK IND
L8	G24	3	HI WATER TEMP IND
L9	G24	3	LOW OIL PSI IND
L10	G25	3	HI BEAM INDICATOR
L11	G28	3	LH TURN INDICATOR
L12	F27	3	RH HEADLIGHT
L13	G27	3	RH SIDE TURN SIGNAL
L14	F27	3	RH COMPOSITE
L15	E27	3	BLACKOUT DRIVE
L16	D27	3	LH COMPOSITE
L17	C27	3	LH HEADLIGHT
L18	C27	3	LH SIDE TURN SIGNAL
L19	B27	3	ID & CLEARANCE
L20	H10	3	DOME
L21	G7	6	RH WORK LIGHT
L22	G2	6	RH REAR COMPOSITE
L23	G2	6	BACK UP
L24	F2	6	LH REAR COMPOSITE
L25	C2	6	ID/CLEARANCE REAR
L26	E22	3	AUXILLARY HYDR IND
L27	E22	3	AUXILLARY HYDR IND
L28	E23	3	TRANSIT INDICATOR
L29	E23	3	LHS OVERLOAD IND
L31	D2	6	RH REAR S MKR (RED)
L32	H4	6	RH SIDE MKR (AMBER)
L33	B2	6	LH SIDE MKR (AMBER)
L34	H4	6	LH REAR S MKR (RED)
L35	G16	3	EMERGENCY STEERING
L36	G16	3	LOW HYD OIL
L37	D21	3	ENGINE BRAKE
L38	D21	3	FLAT RACK
L39	F7	6	LH WORK LIGHT
L40	F7	3	T.C. LOCKUP
L41	C2	6	L.H. B.O. CL LIGHT
L42	D2	6	R.H. B.O. CL LIGHT
L43	B5	3	POST LIGHT
L44	F5	3	HEATER PANEL LIGHT

SWITCHES			
NUMBER	ZONE	SH	DESCRIPTION
S1	H6	3	TURN SIGNAL/DIMMER
S2	E13	3	IGNITION
S3	F5	3	HEATER
S4	D8	3	SELF RECOVERY CRANE
S5	H12	3	BEACON LIGHT
S6	H13	3	WORK LIGHT
S7	H14	3	WINDSHIELD WASHER
S8	G15	3	WINDSHIELD WIPER
S9	F16	3	BLACK OUT SVCE SEL
S10	F54	3	BLACK OUT MARKER
S11	F14	3	BLACK OUT DRIVE
S12	F14	3	HEADLIGHTS
S13	F5	6	DRIVE LINE LOCK
S14	F12	3	RHEOSTAT
S15	F7	3	HORN
S16	F13	3	ENGINE BRAKE
S17	F7	3	DIAGNOSTIC REQUEST
S18	D7	3	SELF RECOVERY WINCH
S19	D6	3	GAS PARTIULATE FLTR
S20	D5	3	CHEMICAL ALARM
S21	H15	3	DOME LIGHT
S22	C8	5	STE/ICE ZEROING
S23	C22	7	PROX SW HOOK ARM UP
S24	C23	7	PROX SW MDL FR DOWN
S25	D13	3	ETHER START
S26	F7	3	TC LOCKUP
S27	E5	7	HOOK ARM DOWN
S28	G8	7	OVERLOAD PSI
S29	B19	4	ARCTIC PUMP
S30	E9	3	EMER ENG SHUT DOWN
S31	C16	3	THROTTLE POSITION
S32	C17	5	BATTERY DISCONNECT
PRESSURE SWITCHES			
PS1	G9	3	FRONT BRAKE
PS2	F9	3	REAR BRAKE
PS3	F9	3	HAND BRAKE
PS4	C14	3	PARKING BRAKE
PS5	B15	3	PARKING BRAKE SW
PS6	D17	3	LOW AIR PRESSURE
PS7	D17	3	LOW AIR PRESSURE
PS8	C22	5	ATEC OIL PRESSURE
PS9	D22	5	ENGINE OIL
PS10			GOVERNOR PRESSURE
PS11			GOVERNOR PRESSURE
PS13	F15	6	EMERGENCY STEER
PS12	D23	5	ALTER. OIL PRESSURE
PS15	F26	5	BOOST PRESSURE

TEMPERATURE SWITCHES			
NUMBER	ZONE	SH	DESCRIPTION
TS1	C23	5	ETHER START
TS2	D23	5	ENGINE WATER
TS3	F10	6	ENGINE WATER
TS4	G10	6	ENGINE WATER
RELAYS			
NUMBER ZONE SH DESCRIPTION			
R1	G24	4	HEADLIGHTS
R2	G23	4	ID/CLEARANCE LIGHTS
R3	G22	4	HORN
R4	G21	4	WORK LIGHTS
R5	G20	4	DIMMER
R6	G19	4	BEACON LIGHTS
R7	G18	4	TRANSMISSION
R8	G18	4	RATARDER
R9	G18	4	CK TRANSMISSION
R10	G17	4	REVERSE
R11	G16	4	NEUTRAL START
R12	G15	4	12 V MAG SWITCH
R13	G15	4	B.O. STOP
R14	G14	4	BO SERVICE TAIL LTS
R15	G13	4	LH TURN SIGNAL
R16	G12	4	RH TURN SIGNAL
R17	G12	4	BLACK OUT TAIL LTS
R18	G11	4	DDEC
R19	G10	4	TRANS DDEC
R20	G9	4	INTER AXLE
R21	G9	4	DIFFERENTIAL LOCK
R22	G8	4	CRANE HI IDLE
R23	G7	4	HIGH RANGE LOCKOUT
R24	G6	4	T.C. DUAL MODE
R25	B17	4	MAGNETIC SWITCH
R26	B18	4	MAGNETIC SWITCH
R27	D19	5	MAGNETIC SWITCH
R28	C21	4	MAGNETIC SWITCH
R29	C10	7	MIDDLE FR LOCKOUT
SENDING UNIT			
NUMBER ZONE SH DESCRIPTION			
SU1	E21	5	WATER TEMPERATURE
SU2	D21	5	TRANSMISSION TEMP
SU3	D21	5	ENGINE OIL PRESSURE
SU4	F6	6	SPEEDOMTER
SU5	D6	6	FUEL LEVEL

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 1 OF 26
ENGINEERING DWG 3053493 SHEET 1
FP-1/FP-2 BLANK

26 25 24 23 22 21 20 19 18

CIRCUIT BREAKERS			
NUMBER	ZONE	SH	DESCRIPTION
CB1	D22	4	15 AMP
CB2	D22	4	15 AMP
CB3	D21	4	15 AMP
CB4	D21	4	15 AMP
CB5	D20	4	20 AMP
CB6	D20	4	15 AMP
CB7	D19	4	10 AMP
CB8	D19	4	15 AMP
CB9	D18	4	10 AMP
CB10	D17	4	3 AMP
CB11	D16	4	8 AMP
CB12	D16	4	8 AMP
CB13	D15	4	8 AMP
CB14	D14	4	15 AMP
CB15	D13	4	15 AMP
CB16	D12	4	15 AMP
CB17	D12	4	3 AMP
CB18	D11	4	10 AMP
CB19	D10	4	15 AMP
CB20	D9	4	15 AMP
CB21	D9	4	30 AMP
CB22	D7	4	20 AMP
CB23	D7	4	20 AMP
CB24	C20	5	3 AMP
CB25	A14	4	15 AMP
CB26	A13	4	15 AMP
GAUGES			
NUMBER	ZONE	SH	DESCRIPTION
G1	G20	3	WATER TEMPERATURE
G2	G21	3	OIL PRESSURE
G3	G22	3	FUEL LEVEL
G4	G22	3	TACHOMETER
G5	G23	3	SPEEDOMETER
G6	G19	3	VOLTMETER 12V
G7	G19	3	VOLTMETER 24V
G10	G20	3	XMSN OIL TEMP
G11	G18	3	AIR PRESSURE
G12	H18	3	AIR RESTRICTION

MISCELLANEOUS			
NUMBER	ZONE	SH	DESCRIPTION
M1	B6	3	WINDSHIELD WSHR SOL
M2	B13	3	WIPER MOTOR
M3	E17	3	LOW OIL & AIR ALARM
M4	A5	4	THROTTLE POSN CONT
M5	C20	4	FLASHER
M6	C16	5	BATTERIES
M7	E17	5	STARTER
M8	B22	5	ETHER START
M9	D6	6	FUEL/WATER SEP
M10	C10	6	LHS SOLENOID VALVE
M11	C8	6	AFTERCOOLER
M12	C20	5	FUEL PUMP
M13	B10	6	AIR DRYER
M14	E6	3	CHEMICAL DETECTOR
M14	B9	6	AIR DRYER
M15	D1	3	HORN
M16	D16	3	VERNIER CONTROL
M17	F5	3	HEATER MOTOR
M18	F24	3	LOW OIL PRESS ALARM
M20	G22	5	ALTERNATOR, STD
M21	C25	5	RH SIDE ENG BK COIL
M22	C24	5	LH SIDE ENG BK COIL
M23	D18	5	SLAVE CONNECTER
M24	B15	6	CTI POWER MANIFOLD
M25	D15	6	CTI AUXILIARY MANF
M26	E13	7	LHS CAB CONTROLLER
M27	B13	6	SELF RECOVERY WINCH
M28	E25	3	CTI CONTROLLER
M29	G14	7	CHEMICAL ALARM
M30	D11	3	GAS PART FILTER
M31	D11	3	AIR HEATER DRIVER
M32	D12	3	AIR HEATER PASS
M33	D3	7	SRW SOLENOID VALVE
M35	E15	3	THROTTLE POSITIONER
M36	C9	4	DIODE
M39	F9	4	RECTIFIER
M40	G2	5	PULSE TACH DRIVE
M41	H5	5	DIFFERENTIAL PRESS
M42	F2	5	FUEL PRESSURE
M43	G5	5	STE/ICE MODULE
M45	F10	6	FAN CONTROL VALVE
M48	D16	5	SHUNT
M49	B9	3	XFR CASE LKUP SOL
M50	B8	3	INTER AXLE SOL V
M51	B8	3	DIFF SOLENOID VALVE
M51	C11	6	FAN
M52	A21	4	RECTIFIER
M53	G11	7	LHS HOOK ARM B
M54	G10	7	LHS HOOK ARM A
M55	G10	7	LHS MAIN CYLINDER B
M56	G10	7	LHS MAIN CYLINDER A

MISCELLANEOUS			
NUMBER	ZONE	SH	DESCRIPTION
M57	G9	7	LHS FREEFLOW
M58	G9	7	LHS TRANSIT
M59	F3	7	LHS LH HOOK ARM A
M60	F3	7	LHS LH HOOK ARM B
M61	F2	7	LHS RH HOOK ARM A
M62	F2	7	LHS RH HOOK ARM B
M64	C19	5	POLARITY PROTECTION
M66	G16	3	RECTIFIER
M67	C8	3	RECTIFIER
M68	G12	7	RECTIFIER
M70	F2	5	TURBO OUTLET PSI
M71	E2	5	AIR CLEANER
M72	D2	5	AIR BOX PSI
M73	C2	5	FUEL RETURN
M74	C2	5	ENGINE OIL TEMP
M75	B2	5	ENGINE WATER TEMP
M76	E10	4	RECTIFIER
M77	B17	5	ARCTIC BATTERIES
M78	E2	6	BACK-UP ALARM
M80	B7	6	ARCTIC PUMP
M81	F4	3	RECTIFIER
M83	F3	10	LHS FUSE - 5 AMP

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
104	MC36-M4	4	THROTTLE SENSOR
104	MC10-MC36	4	THROTTLE SENSOR
105	MC10-MC19	4/5	ATEC
106A	MC10-MC36	4	THROTTLE SENSOR
106A	MC36-M4	4	THROTTLE SENSOR
106A	MC10-106B	4/5	ATEC
106B	106A-MC19	4/5	ATEC
107	MC10-MC19	4/5	ATEC
108	MC10-MC19	4/5	ATEC
109	MC10-MC19	4/5	ATEC
110	MC10-MC19	4/5	ATEC
111	MC10-MC19	4/5	ATEC
112	MC10-MC20	4/5	ATEC
113	MC10-MC20	4/5	ATEC
114	MC10-MC19	4/5	ATEC
115	MC11-MC18	5	ECM
115	MC11-MC102	4	6.8K RESISTOR
115	MC10-MC19	4/5	ATEC
116	MC10-MC19	4/5	ATEC
117	MC10-MC19	4/5	ATEC
118	MC10-MC19	4/5	ATEC
119	MC10-MC19	4/5	ATEC
120	MC10-MC19	4/5	ATEC
121	MC10-MC19	4/5	ATEC
122	MC10-MC19	4/5	ATEC
123	MC10-MC19	4/5	ATEC
124	MC36-M4	4	THROTTLE SENSOR
124	MC10-MC36	4	THROTTLE SENSOR
150	MC62-MC62	5/4	
150	MC17-MC62	5	
195	MC5-M2	3	
201	MC51-GROUND	4	
201	MC9-MC51	4	
202A	MC9-SPLICE	4	
203	MC9-MC51	4	
203	MC51-CB12	4	
204	MC9-MC12	4	ATEC
206	MC9-MC12	4	ATEC
207A	MC51-MC106	4	ATEC
207A	MC9-MC51	4	ATEC
207A	MC106-MC13	4	
208/209	MC11-SPLICE	4	
208/209	SPLICE-MC51	4	
208/209	M6-MC95	5	
208/209	MC95-MC11	5	
208/209	MC51-MC9	4	
210A	MC9-MC12	4	
211	R8-MC50	4	
211	MC50-R8	4	RETARDER
211	MC9-MC50	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
212	MC9-MC12	4	
213	MC50-R8	4	RETARDER
213	MC9-MC50	4	
214	MC50-R10	4	REVERSE
214	MC9-MC50	4	
215	MC9-MC50	4	
215	MC50-R9	4	CHECK TRANSMISSION
216A	MC106-MC13	3	
216A	MC9-MC51	4	ATEC
216A	MC51-MC106	4	ATEC
218	MC9-MC12	4	ATEC
219	MC9-MC12	4	ATEC
220	MC9-MC12	4	ATEC
221	MC9-MC12	4	ATEC
222	MC9-GROUND	4	ATEC
223A	MC51-CB14	4	TRANSMISSION
223A	MC51-SPLICE	4	
223A	SPLC-SPLC	4	
223A	SPLC-SPLC	4	
223A	SPLICE-MC9	4	
223B	MC12-SPLICE	4	
225	CB11-MC12	4	
230	MC12-234	4	
231	MC50-MC12	4	
231	MC50-R22	4	CRANE HI IDLE
231	MC50-M36	4	
231	M36-R11	4	NEUTRAL START
233	MC50-MC12	4	
234	MC12-GROUND	4	
240	MC62-CB23	5/4	
240	CB23-M6	4/5	
240	MC17-MC62	5	
240	MC62-M6	5	
241	MC62-CB22	5/4	
241	MC62-M6	5	
241	MC17-MC62	5	
241	CB22-M6	4/5	
309	MC45-R24	4	TC DUAL MODE
313	MC45-R24	4	TC DUAL MODE
315	MC45-R24	4	TC DUAL MODE
417	MC6-M35	3	
417	MC11-MC44	4	
417	MC11-MC18	5	ECM
417	MC44-MC6	3	THROTTLE SENSOR
419	MC11-MC18	5	ECM
419	MC11-MC44	4	
419	MC44-MC8	3	
419	MC8-L6	3	CHECK ENGINE LIGHT

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FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 2 OF 26
ENGINEERING DWG 3053493 SHEET 1
FP-3/FP-4 BLANK

CODE SORT				CODE SORT				CODE SORT			
CODE	ROUTING	SH	DESCRIPTION	CODE	ROUTING	SH	DESCRIPTION	CODE	ROUTING	SH	DESCRIPTION
439	MC116-MC106	4	EMERGENCY ENG STOP	1001	MC7-SPLICE	3		1008	MC27-MC3	6	FRONT TOW
439	MC116-S30	3	EMERGENCY ENG STOP	1001	MC8-SPLICE	3		1008	MC3-SPLICE	3	
439	MC116-S30	3	EMERGENCY ENG STOP	1001	SPLICE-L13	3		1008	MC3-MC4	3	
439	MC116-CB13	4	DDEC	1001	SPLICE-L14	3		1008	MC3-MC16	6	TRAILER CONN 12VDC
439	MC106-MC13	3		1001	S1-MC7	3	RH HEADLIGHT	1008	MC78-L22	6	RH TAIL LIGHT
439	SPLC-MC106	4		1002	S1-MC7	3	LH HEADLIGHT	1008	MC78-L24	6	LH TAIL LIGHT
439	MC11-MC18	5	ECM	1002	MC8-L11	3		1008C	MC25-MC15	6	TRAILER CONN 24VDC
439	MC8-L6	3	CHECK ENGINE LIGHT	1002	MC7-SPLICE	3		1008C	MC25-R14	4	B.O. SERVICE
439	MC8-L3	3	ENGINE STOP LIGHT	1002	SPLICE-MC8	3		1009	PS2-PS3	3	
439	MC44-MC8	3		1002	SPLICE-L18	3		1009	PS1-PS2	3	
439	MC11-SPLICE	4		1002	SPLICE-L16	3		1009	MC2-PS1	3	
439	SPLICE-MC44	4		1003	MC7-MC3	3		1009	MC2-CB6	4	STOP LIGHT
439	SPLC-MC116	4		1003	S1-MC7	3	LH RR TURN SIGNAL	1012	MC3-SPLICE	3	
505	MC44-MC8	3	TACHOMETER	1003	MC3-MC80	6		1012	SPLC-SPLC	3	
505	MC11-MC44	4		1003	MC3-MC16	6	TRAILER CONN 12VDC	1012	MC2-SPLICE	3	
505	MC8-G4	3		1003	MC1-R15	4	LH TURN LIGHT	1012	SPLC-SPLC	3	
505	MC11-MC18	5		1003	MC80-L24	6	LH STOP LIGHT	1012	SPLICE-L19	3	
509	MC11-MC18	5	ECM	1003	MC27-MC3	6	FRONT TOW	1012	MC2-R2	4	CLEARANCE LIGHTS
509	MC8-L3	3	ENGINE STOP LIGHT	1003	MC7-MC1	3		1012	MC3-SPLICE	6	
509	MC44-MC8	3		1003C	MC25-R17	4	LH TURN LIGHT	1012	SPLICE-MC27	6	
509	MC11-MC44	4		1003C	MC25-MC15	6	TRAILER CONN 12VDC	1012	SPLICE-MC80	6	
510	MC11-MC18	5	ECM	1004	MC7-MC1	3		1012	SPLICE-L32	6	RH SIDE MARKER
510	MC44-PS4	3	PARKING BRAKE	1004	MC7-MC3	3		1012	SPLICE-L34	6	LH SIDE MARKER
510	R22-MC44	4		1004	S1-MC7	3		1012	MC90-L31	6	RR SIDE MARKER
510	MC11-R22	4		1004	MC3-MC80	6		1012	MC90-L25	6	ID LIGHTS
528	MC11-MC18	5	DIAG. REQ.	1004	MC80-L22	6	RH STOP LIGHT	1012	MC80-MC90	6	
528	MC106-S17	3		1004	MC27-MC3	6		1012	MC90-L33	6	RR SIDE MARKER
528	MC11-MC106	4		1004	MC3-MC78	6		1016	MC92-MC2	3	
900	MC11-MC106	4		1004	MC3-MC16	6		1016	S15-MC92	3	
900	MC11-MC18	5	ECM	1004	MC1-R16	4		1016	MC2-R3	4	HORN
900	MC106-MC13	3		1004C	MC25-R16	4	RH TURN LIGHT	1017	SPLICE-R5	4	
901	MC11-MC18	5	ECM	1004C	MC25-MC15	6	TRAILER CONN 24VDC	1017	MC52-R14	4	
901	MC106-MC13	3		1005	MC126-S9	3		1017	R2-MC52	4	
901	MC11-MC106	4		1005	PS3-MC3	3		1017	MC2-SPLICE	4	
908	MC11-MC18	5	ECM	1005	MC3-MC16	6	TRAILER CONN 24VDC	1017	SPLICE-R1	4	
908	MC11-M4	4	THROTTLE POSN CONT	1005	MC126-PS1	3		1017	MC91-MC2	3	
916	MC44-MC6	3		1005	PS2-PS3	3		1017	S1-MC91	3	
916	MC11-MC44	4		1005	MC27-MC3	6	FRONT TOW	1017A	MC91-MC2	3	
916	MC38-M16	3		1005	PS1-PS2	3		1017A	S1-MC91	3	
916	MC6-MC38	3	VERNIER CONTROL	1005A	MC7-MC126	3		1017A	MC2-R5	4	
916	MC6-M35	3	THROTTLE SENSOR	1005A	MC126-S9	3		1018	MC8-L10	3	HIGH BEAM
916	MC11-MC18	5	ECM	1005A	S1-MC7	3	TURN SIGNAL/DIM SW	1018	MC8-1007	3	
952	MC38-M16	3		1006	MC2-SPLICE	3		1019	L15-1679	3	
952	MC11-MC44	4		1006	SPLICE-L12	3		1020	L14-L16	3	
952	MC44-MC6	3	THROTTLE SENSOR	1006	SPLICE-L17	3		1020	S2-MC21	3	
952	MC11-MC18	5	ECM	1006	MC2-R5	4	DIMMER	1020	MC60-CB24	5	
952	MC6-MC38	3	VERNIER CONTROL	1007	MC2-R5	4	DIMMER	1020	MC21-MC60	5	
953	M6-MC14	5	DDEC SIGNAL GROUND	1007	MC2-SPLICE	3		1020	M12-MC60	5	
953	MC14-SPLICE	4		1007	SPLICE-L12	3		1020A	CB24-PS12	5	
953	SPLICE-MC102	4		1007	SPLICE-L17	3		1020B	PS12-ENG	5	ALTERNATOR
953	SPLICE-R22	4		1008	MC3-MC78	6		1021	MC2-S2	3	
953	SPLICE-MC106	4		1008	MC4-S12	3	HEADLIGHTS	1021	MC2-R11	4	
953	MC106-S17	3						1021	R11-M76	4	
953	S17-MC13	3						1021A	R11-MC1	4	
988	MC11-R7	4	TRANSMISSION					1021A	MC1-MC21	3	
988	MC11-MC18	5	ECM					1021B	MC21-MC60	5	
1001	MC8-L4	3						1021B	MC60-R27	5	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 3 OF 26
ENGINEERING DWG 3053493 SHEET 1
FP-5/FP-6 BLANK

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1021	MC52-R11	4	FRONT TOW
1021A	R11-MC1	4	
1021A	MC1-MC21	3	
1021A	MC21-MC60	5	
1021A	MC60-R27	5	
1026	MC52-CB16	4	
1029	MC2-R6	4	BEACON
1029	MC2-MC28	3	
1031	R3-SPLICE	4	
1032	MC8-MC21	3	
1032	M39-L9	3	LOW OIL PSI
1032	MC8-M39	3	
1032	PS9-MC21	5	ENGINE OIL PSI SW
1033	M39-M18	3	OIL PSI/H WTR ALM
1036	MC23-M8	5	
1036	MC23-M7	5	
1036	MC21-MC56	5	ETHER START
1036	MC21-S25	3	
1040	CB4-R4	4	WORKLIGHT
1040A	S6-MC4	3	
1040A	MC2-R4	4	WORKLIGHT
1040A	MC4-MC2	3	
1040B	MC3-MC79	6	RH WORKLIGHT
1040B	MC2-MC3	3	
1040B	MC2-R4	4	WORKLIGHT
1040B	MC3-MC54	6	LH WORKLIGHT
1045	R27-M7	5	
1049	MC2-R1	4	HEADLIGHTS
1049	MC4-MC2	3	
1049	S12-MC4	3	
1052	S20-S19	3	CHEM ALM-GPF
1052	S19-S18	3	GAS PART FLTR-SRW
1052	S18-S4	3	SRW-SRW/MHC
1052	S4-S30	3	SRW/MHC-EMER ENG S D
1052	S30-SPLICE	3	EMER ENG SHUT DOWN
1052	SPLICE-G11	3	AIR PRESSURE GAUGE
1052	MC4-SPLICE	3	
1052	SPLICE-L44	3	HEATER PANEL LIGHT
1052	S5-S6	3	BEACON LT-WORK LT
1052	S6-S7	3	WORK LT-WSHLD WSHR
1052	S7-S8	3	WSHLD WASHER-WIPERS
1052	S8-S21	3	WIPERS-DOME LIGHT
1052	S21-S9	3	DOME LT-B.O.SERV SEL
1052	S9-S10	3	BO SERV SEL-BO MKR
1052	S10-S11	3	B.O. MARKER-B.O. DR
1052	S11-S12	3	B.O. DRIVE-HEADLTS
1052	S12-S16	3	HEADLIGHTS-ENG BK
1052	S16-S14	3	ENG BRAKE-RHEO/DOME
1052	S14-SPLICE	3	RHEOSTAT/DOME
1052	SPLICE-G6	3	VOLTMETER 12V
1052	SPLC-SPLC	3	
1052	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1052	SPLICE-G1	3	WATER TEMP GAUGE
1052	SPLICE-G2	3	OIL PRESSURE GAUGE
1052	SPLICE-G4	3	TACHOMETER
1052	SPLICE-G5	3	SPEEDOMETER
1052	SPLICE-G3	3	FUEL GAUGE

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1052	MC1-SPLICE	3	
1052	SPLICE-L43	3	POST LIGHT
1052	SPLC-MC125	3	
1052	MC125-G12	3	AIR RESTRICTION GA
1052	MC1-SPLICE	3	
1052	MC1-CB1	4	15 AMP HEADLIGHT
1052	MC50-MC1	4	
1055	M7-R27	5	
1056	MC111-MC32	3	
1056	MC32-MC109	6	CTI POWER MANIFOLD
1057	MC111-MC32	3	
1057	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC32-MC109	6	CTI POWER MANIFOLD
1058	MC111-MC32	3	
1059	MC32-MC109	6	CTI POWER MANIFOLD
1059	MC111-MC32	3	
1061	MC22-MC109	6	CTI POWER MANIFOLD
1061	MC111-MC32	3	
1062	MC32-MC109	6	CTI POWER MANIFOLD
1062	MC111-MC32	3	
1063	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC32-MC109	6	CTI POWER MANIFOLD
1064	MC111-MC32	3	
1065	MC32-MC109	6	CTI POWER MANIFOLD
1065	MC111-MC32	3	
1066	MC32-MC64	6	CTI AUX MANIFOLD
1066	MC110-MC32	3	
1067	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC32-MC64	6	CTI AUX MANIFOLD
1068	MC110-MC32	3	
1070	MC32-MC64	6	CTI AUX MANIFOLD
1070	MC110-MC32	3	
1071	MC110-MC32	3	
1071	MC32-MC64	6	CTI AUX MANIFOLD
1072	R26-R25	3	
1072	MC110-MC32	3	
1072	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC32-MC64	6	CTI AUX MANIFOLD
1073	MC110-MC32	3	
1074	MC110-MC32	3	
1074	R25-CB10	4	
1074	MC32-MC64	6	CTI AUX MANIFOLD
1075	M6-R25	4/3	
1075B	R25-R18	4	
1076	MC110-MC32	3	
1076	MC32-MC64	6	CTI AUX MANIFOLD
1079	CB5-M6	4	HAZARD LIGHTS
1080	MC7-MC2	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1080	MC2-M5	4	TURN SIGNAL/FLASHER
1082	MC2-MC52	4	
1082	MC2-M81	3	
1082	M81-S3	3	
1082	MC52-CB15	4	HEATER
1084	MC1-CB5	4	B.O. LIGHTS
1084	MC4-MC1	3	
1084	MC4-S9	3	
1091	L17-GROUND	3	
1092	L7-MC8	3	
1092	MC8-M51	3	
1093	MC31-MC57	6	
1093	MC1-MC31	3	
1093	MC1-CB16	4	
1093	MC57-S13	6	DRIVE LINE LOCK-UP
1094	S5-S14	3	
1095	R23-R24	4	
1095	MC44-R23	4	
1095	MC31-MC44	3	
1095	MC57-S13	6	DRIVE LINE LOCK-UP
1095	MC31-MC57	6	
1113	MC8-MC21	3	
1113	G2-MC8	3	OIL PSI GAUGE
1113	SU3-MC21	5	ENG OIL PSI SNOG UN
1114	M66-MC8	3	
1114	MC96-MC8	3	LOW OIL LEVEL LIGHT
1114	MC8-L36	3	
1114	L36-M66	3	
1118	MC4-1919	3	
1118	S8-MC4	3	
1120	M66-MC8	3	
1120	M66-M3	3	
1120	PS6-PS7	3	
1120	PS6-MC8	3	
1120	L2-M66	3	
1137	M6(1)-M6(2)	5	
1137	M6(3)-M6(4)	5	
1138	M48-M7	5	SHUNT
1138	M7-M23	5	SLAVE
1138	M6-M48	5	SHUNT
1138	M77-M7	5	ARCTIC BATTERIES
1139	M7-M23	5	SLAVE
1139	M6-M7	5	
1139	M77-M7	5	ARCTIC BATTERIES
1147	TS2-MC21	5	ENG WTR TEMP SNOG UN
1147	M39-L8	3	HIGH WATER TEMP
1147	MC8-MC21	3	
1147	MC8-M39	3	
1149	MC1-R10	4	REVERSE
1149	MC3-MC78	6	
1149	MC1-MC124	3	
1149	MC78-MC77	6	REVERSE LIGHT
1149	MC124-MC77	6	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 4 OF 26
 ENGINEERING DWG 3053493 SHEET 2
 FP-7/FP-8 BLANK

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CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1153	S21-MC4	3	
1153	MC4-L20	3	DOME LIGHT
1168	MC2-R3	4	HORN
1168	MC2-M15	3	
1174	BUS BAR	4	
1175	R28-CB5	4	
1176	MC113-PS13	6	EMERGENCY STEER
1184	S5-MC4	3	
1184	MC2-R6	4	
1184	MC2-MC4	3	
1189	MC4-S9	3	
1189	MC44-R28	4	
1189	MC4-SPLICE	3	
1189	MC4-S21	3	
1189	MC2-SPLICE	3	
1189	MC2-M5	4	
1189	SPLICE-MC44	3	
1274	M20-M6	5	
1274	M8-SPLICE	5	
1275	M6-M20	5	
1276	MC2-MC4	3	
1276	MC2-CB8	3	
1276	SPLICE-S14	3	
1276	SPLICE-MC53	3	
1276	MC4-SPLICE	3	
1276	MC2-SPLICE	4	
1276	MC53-SPLICE	3	
1276	SPLC-SPLC	3	
1276	SPLC-SPLC	3	
1276	SPLICE-M3	3	LOW AIR ALARM
1276	SPLICE-G5	3	SPEEDOMETER
1276	SPLICE-L1	3	PARKING BRAKE
1276	SPLICE-L2	3	LOW AIR
1276	SPLICE-L35	3	EMERGENCY STEERING
1276	SPLICE-L36	3	LOW HYDR OIL
1276	SPLC-SPLC	3	
1276	SPLICE-L5	3	XMSN CHECK
1276	SPLICE-L8	3	HIGH WATER TEMP
1276	SPLICE-L9	3	LOW OIL PSI
1276	SPLICE-G3	3	FUEL GAUGE
1276	SPLICE-G6	3	VOLTMETER 12V
1276	SPLICE-G1	3	WATER TEMP GAUGE
1276	SPLICE-G2	3	OIL PRESSURE GAUGE
1276	SPLICE-G4	3	TACHOMETER
1276	SPLICE-G10	3	XMSN OIL TEMP GAUGE
1276	SPLICE-M18	3	ALARM
1279	PS14-1277	5	
1279	MC115-PS14	5	
1279	M64-1280	5	
1280	CB21-R26	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1280	1281-R26	5	
1281	1280-MC47	5	
1281	R27-M81	5	
1281A	M6-S32	5	BATTERIES
1281A	S32-SPLICE	5	
1281A	SPLICE-M64	5	
1281A	SPLICE-M20	5	
1292	MC4-S6	3	
1292	CB4-MC2	4	
1292	MC2-MC4	3	
1292	MC4-S12	3	
1314	1118-S7	3	
1318	MC3-MC8	3	
1318	MC3-G3	3	FUEL GAUGE
1318	MC3-SU5	6	FUEL LEVEL
1320	SU1-MC2	5	WATER TEMP SNDG UN
1320	G1-MC8	3	WATER TEMP
1320	MC8-MC21	3	
1340	CB15-MC14	4	SWING FIRE
1344	M20-MC22	5	
1362	R27-M64	5	
1371	MC8-PS5	3	
1371	L1-MC8	3	
1409	MC8-MC1	3	
1409	L5-MC8	3	
1409	MC1-R9	4	
1413	CB3-SPLICE	4	
1413	SPLICE-R6	4	
1430	R28-SH5	4/5	
1430	1832-R28	5	
1431	MC3-S2	3	
1431	MC3-M64	5/6	POLARITY PROTECTION
1431	MC3-M64	5/6	POLARITY PROTECTION
1431	MC1-MC119	4	
1431	MC119-R32	4	
1431	R32-S29	4	ARCTIC PUMP
1431	MC119-CB20	4	
1435	MC78-MC124	6	
1435	MC124-M78	6	
1435	MC77-MC124	6	
1435	MC85-MC86	7	
1435	MC86-MC87	7	
1435	MC33-MC84	7	
1435	GROUND	3	
1435	MC81-MC82	7	
1435	MC84-MC83	7	
1435	MC81-MC82	7	
1435	MC108-GND	5	
1435	GND	5	
1435	MC22-GND	5	
1435	M52-R26	4	
1435	M52-R28	4	
1435	R27-GND	5	
1435	MC125-GND	3	
1435	MC23-M7	5	
1435	MC23-M8	5	EITHER START

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1449	MC8-MC21	3	
1449	G10-MC8	3	TRANS OIL TEMP
1449	SU2-MC21	5	TRANS TEMP SNDG UN
1454	MC81-MC82	7	
1461	MC81-MC82	7	
1461	MC86-MC87	7	
1461	MC85-MC86	7	
1462	MC81-MC82	7	
1463	MC81-MC82	7	
1464	MC81-MC82	7	
1465	MC81-MC82	7	
1466	MC85-MC86	7	
1466	MC86-MC87	7	
1467	MC81-MC82	7	
1468	MC81-MC82	7	
1469	MC81-MC82	7	
1469	MC86-MC87	7	
1469	MC85-MC86	7	
1470	MC86-MC87	7	
1470	MC85-MC86	7	
1471	MC85-MC86	7	
1471	MC86-MC87	7	
1471	MC81-MC82	7	
1472	MC85-MC86	7	
1472	MC81-MC82	7	
1472	MC86-MC88	7	
1475	MC85-MC86	7	
1475	MC86-MC87	7	
1480	MC84-MC93	7	
1480	MC84-MC83	7	
1481	MC84-MC83	7	
1481	MC84-MC93	7	
1482	MC84-MC93	7	
1482	MC84-MC83	7	
1483	MC83-MC84	7	
1483	MC84-MC93	7	
1484	MC83-MC84	7	
1484	MC84-MC93	7	
1485	MC84-MC94	7	
1485	MC83-MC84	7	
1486	MC84-MC94	7	
1486	MC83-MC84	7	
1487	MC1-S25	3	
1487	MC1-CB15	4	
1487	MC83-MC84	7	
1487	MC84-MC94	7	
1488	MC84-MC94	7	
1488	MC83-MC84	7	
1489	MC83-MC84	7	
1489	MC84-MC94	7	
1490	MC84-MC94	7	
1490	MC83-MC84	7	
1491	L16-1008	3	
1491	L14-1008	3	
1517	PS8-MC11	5	ATEC OIL PSI SWITCH
1517	MC11-R9	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1519	MC8-MC35	3	CT1 OVERSPEED
1519	MC3-MC8	3	SPEEDOMETER
1519	MC8-MC35	3	CT1 OVERSPEED
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1519	G5-MC8	3	SPEEDOMETER
1519	MC3-MC8	3	SPEEDOMETER
1519	MC3-SU4	6	SPEEDOMETER
1525	M16-PS4	3	
1534	MC107-M9	6	FUEL/WATER SEP
1534	MC2-SPLICE	4	
1534	SPLICE-CB8	4	
1534	MC3-MC107	6	
1534	MC2-MC3	3	
1534	MC3-S22	3	T-CASE LOCK-UP
1534	CB15-M76	4	
1538	MC97-M13	6	AIR DRYER
1538	MC25-MC97	6	
1538	MC25-CB15	4	
1538	MC25-MC98	6	
1538	MC99-M11	6	AFTER COOLER
1538	MC98-M14	6	AIR DRYER
1538	MC25-MC99	6	
1538	MC25-MC73	6	FAN CONTROL
1538	M76-MC25	4	
1640	MC119-SPLC	4	
1640	SPLICE-R26	4	
1640	SPLICE-MC44	4	
1640	MC44-S2	3	
1640	MC119-R32	4	
1644	MC119-R33	4	
1644	R33-R33	4	
1644	MC119-S29	4	ARCTIC PUMP
1644	R33-S29	4	ARCTIC PUMP
1644	MC119-MC25	4	
1644	MC25-MC120	6	
1644	MC120-M80	6	ARCTIC PUMP
1645	S29-R33	4	ARCTIC PUMP
1665C	MC25-MC15	6	TRAILER CONN 24VDC
1665C	MC25-CB20	4	
1674	S11-S10	3	
1674	S11-S9	3	
1676	R17-R16	4	
1676	R16-R15	4	
1676	R14-R3	4	
1676	R15-R14	4	
1676	CB20-R17	4	
1678	MC3-MC78	6	
1678	MC1-SPLICE	3	
1678	MC78-L24	6	LH B.O. STOP LIGHT

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 5 OF 26
ENGINEERING DWG 3053493 SHEET 2
FP-9/FP-10 BLANK

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1678	MC78-L22	6	RH B.O. STOP LIGHT
1678	SPLICE-MC3	3	
1678	MC1-R13	4	
1678	SPLICE-MC4	3	
1678	MC4-S9	3	
1678C	MC25-R13	4	B.O. STOP LIGHT
1678C	MC25-MC15	6	TRAILER CONN 24VDC
1679	L15-MC4	3	
1679	MC4-S11	3	
1680	MC3-SPLICE	3	
1680	SPLICE-MC1	3	
1680	SPLC-SPLC	3	
1680	SPLICE-MC4	3	
1680	SPLC-SPLC	3	
1680	SPLICE-L19	3	
1680	SPLICE-L19	3	
1680	MC3-MC78	6	
1680	MC4-S10	3	
1680	MC78-L24	6	LH B.O. TAIL LIGHT
1680	MC1-R17	4	B.O. LIGHTS
1680	MC78-L22	6	RH B.O. TAIL LIGHT
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1680C	MC25-R17	4	B.O. TAIL LIGHTS
1680C	MC25-MC15	6	TRAILER CONN 24VDC
1702	MC44-MC34	3	
1702	MC34-G7	3	
1702	MC44-R26	4	
1708	M32-1709	3	PASSENGER AIR HTR
1709	MC58-S19	3	GAS PART FILTER SW
1709	MC58-M30	3	
1710	M31-1709	3	DRIVER AIR HEATER
1711	CB11-R7	4	
1712	MC1-CB7	4	ENGINE BRAKE
1712	MC4-MC1	3	
1713	MC53-L37	3	
1713	MC4-MC1	3	
1713	S16-MC4	3	ENGINE BRAKE
1713	MC1-R7	4	TRANSMISSION
1713	S16-MC53	3	
1714	MC1-1716	4	
1714	MC4-MC1	3	ENGINE BRAKE
1714	S16-MC4	3	ENGINE BRAKE
1715	MC4-MC1	3	ENGINE BRAKE
1715	S16-MC4	3	ENGINE BK RH COILS
1715	MC11-MC1	4	
1715	MC11-M21	5	LH ENGINE BRAKE
1716	MC11-R5	4	RETARDER
1716	MC11-M22	5	RH ENGINE BRAKE
1717	MC44-S20	3	CHEMICAL ALARM SW
1717	MC44-CB19	4	
1718	M78-M77	6	BACK-UP ALARM
1722	MC34-1734	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1722	L26-MC34	3	
1722	MC33-MC84	7	
1722	MC84-MC83	7	
1723	MC44-S18	3	SELF RECOVERY WN SW
1723	MC44-CB18	4	
1724	MC112-SPLC	3	
1724	SPLICE-MC33	3	
1724	MC33-MC93	7	
1724	L27-MC112	3	
1724	M67-SPLICE	3	
1724	SPLC-MC112	3	
1724	M67-MC33	3	
1725	L28-MC112	3	
1725	MC84-MC83	7	
1725	MC33-MC84	7	
1725	MC112-MC33	3	
1726	MC33-MC84	7	
1726	MC84-MC83	7	
1726	MC112-MC33	3	
1726	L29-MC112	3	
1729	MC31-S18	3	SELF RECOVERY WINCH
1729	MC31-MC55	6	
1729	MC55-MC121	6	SELF RECOVERY WINCH
1730	MC31-S18	3	SELF RECOVERY WINCH
1730	MC55-MC122	6	SELF RECOVERY WINCH
1730	MC31-MC55	6	
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-S4	3	SELF RECOVERY WINCH
1731	MC3-MC29	6	CRANE
1732	MC55-MC123	6	SELF RECOVERY WINCH
1732	S4-MC31	3	SELF RECOVERY WINCH
1732	MC31-MC55	6	
1733	MC31-M67	3	
1733	MC31-M51	6	
1734	M67-SPLICE	3	
1734	SPLC-SPLC	3	
1734	SPLICE-MC31	3	
1734	MC31-M10	6	
1736	MC39-MC39	5	
1737	MC31-MC1	3	
1737	MC1-R22	4	CRANE HI IDLE
1737	MC31-MC29	6	CRANE
1738	MC44-1755	4	
1738	MC44-MC31	3	
1738	MC31-MC29	6	CRANE
1739	MC44-CB21	4	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1739	MC44-S19	3	GAS PARTICULATE SW
1744	S4-M67	3	
1745	MC103-S20	3	CHEMICAL ALARM
1746	MC103-M29	3	CHEMICAL ALARM
1747	MC103-M29	3	CHEMICAL ALARM
1755	MC84-MC83	7	
1755	MC44-CB18	4	
1755	MC33-MC84	7	
1755	MC33-MC44	3	
1765	MC3-MC113	6	
1765	L35-MC8	3	
1765	MC3-MC8	3	
1809	MC41-MC65	5	PULSE TACH DRIVE
1809	MC65-MC39	5	STE/ICE
1810	MC41-M40	5	PULSE TACH DRIVE
1810	MC65-MC39	5	STE/ICE
1810	MC41-M40	5	PULSE TACH DRIVE
1810	MC41-MC65	5	PULSE TACH DRIVE
1811	MC42-M41	5	DIFFERENTIAL PSI
1811	MC42-MC39	5	STE/ICE
1812	MC42-M41	5	DIFFERENTIAL PSI
1812	MC42-MC39	5	STE/ICE
1813	MC39-M6	5	
1814	MC39-M6	5	BATTERIES
1815	MC39-MC24	5	
1815	MC24-MC114	5	
1815	MC24-M20	5	
1816	MC39-MC65	5	STE/ICE
1816	MC39-M7	5	STARTER

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1818	MC39-M7	5	STARTER
1818	MC39-MC65	5	STE/ICE
1819	MC39-M7	5	
1820	MC24-M20	5	
1820	MC24-M20	5	
1820	MC39-MC24	5	
1821	MC39-M6	5	
1822	MC39-M6	5	BATTERIES
1824	SPLICE-MC67	5	
1824	MC66-M70	5	
1824	MC68-M72	5	
1824	SPLICE-MC70	5	
1824	SPLICE-MC71	5	
1824	MC65-MC39	5	STE/ICE
1824	SPLICE-MC68	5	
1824	MC67-M71	5	
1824	MC43-M42	5	FUEL PSI
1824	MC69-M73	5	
1824	MC70-M74	5	
1824	MC71-M75	5	
1824	SPLICE-MC69	5	
1824	MC66-SPLICE	5	
1824	SPLICE-MC65	5	
1824	SPLICE-MC43	5	
1825	MC68-MC69	5	
1825	MC70-MC71	5	
1825	MC65-MC43	5	
1825	MC43-MC67	5	
1825	MC67-MC68	5	
1825	MC70-M74	5	
1825	MC69-MC70	5	
1825	MC41-MC65	5	
1825	MC68-M72	5	
1825	MC66-M70	5	TURBO OUTLET PSI
1825	MC65-MC39	5	STE/ICE
1825	MC69-M73	5	
1825	MC67-M71	5	
1825	MC39-MC40	5	STE/ICE MODULE
1825	MC43-M42	5	FUEL PSI
1825	MC71-M75	5	
1825A	MC39-MC40	5	STE/ICE MODULE
1826	MC40-MC39	5	
1827	MC40-MC39	5	
1828	MC39-M48	5	SHUNT
1829	MC39-M48	5	SHUNT
1835	R2-CB2	4	
1839	R7-R8	4	
1860	MC39-MC24	5	
1860	MC24-MC114	5	
1861	MC24-MC114	5	

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 6 OF 26 ENGINEERING DWG 3053493 SHEET 2 FP-11/FP-12 BLANK

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1861	MC39-MC24	5	
1866	CB12-M6	4	
1866	M6-CB12	4/3	
1867	R19-CB12	4	
1871	MC11-CB11	4	DDEC TRANS
1871	PS8-MC11	5	ATEC OIL PSI SWITCH
1871	MC11-R8	4	
1871	MC11-R11	4	
1871	MC11-R10	4	
1871	MC11-R18	4	
1872	R19-MC44	4	
1872	MC44-R18	4	DDEC
1872	MC44-1020	3	
1875	CB14-R19	4	
1880	MC4-MC35	3	
1880	MC44-CB17	4	CTI
1882	MC52-R21	4	
1882	MC52-SPLICE	4	
1882	MC52-R20	4	
1883	S26-L40	3	TC LOCK-UP LIGHT
1883	S26-M49	3	TC LOCK-UP
1884	MC1-R20	4	INTER AXLE
1884	MC1-M39	4	
1884	MC1-MC105	3	
1885	MC1-M39	4	
1885	MC1-MC105	3	
1885	R23-R21	4	
1885	MC1-R23	4	
1888	CB16-R21	4	DIFFERENTIAL LOCK
1888	CB16-R20	4	INTER AXLE
1889	MC44-R20	4	INTER AXLE
1889	MC44-M50	3	INTER AXLE LOCK
1890	MC44-M51	3	DIFFERENTIAL LOCK
1890	MC44-R21	4	DIFFERENTIAL LOCK
1891	MC52-SPLICE	4	
1891	MC52-R10	4	REVERSE
1916	S8-MC4	3	
1916	MC5-M2	3	WIPER MOTOR
1916	MC5-MC4	3	WIPER MOTOR
1917	MC5-M2	3	
1917	MC5-MC4	3	
1917	S8-MC4	3	
1919	MC2-MC5	3	
1919	MC5-M2	3	
1919	MC5-1118	3	
1919	MC2-CB10	4	
1920	MC2-1008	3	
1920	MC2-R2	4	CLEARANCE LIGHTS
1921	S7-MC4	3	
1921	M1-MC4	3	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1926	MC56-MC23	5	ETHER START
1927	R1-CB1	4	HEADLIGHTS
1928	MC34-MC31	3	
1928	L38-MC34	3	
1928	MC31-MC30	6	TRAILER
1929	MC31-MC30	6	TRAILER
1929	MC34-MC31	3	
1932	MC128-MC61	6	WATER TEMP
1932	MC61-TS3	6	WATER TEMP
1932	MC59-MC63	6	
1932	MC63-MC128	6	
1933	MC61-TS3	6	WATER TEMP
1933	MC63-MC61	6	
1933	MC59-MC63	6	
1935	MC76-M45	6	FAN CONTROL VALVE
1935	MC59-MC76	6	
1935	MC76-M45	6	FAN CONTROL VALVE
1935	MC59-MC76	6	
1938	MC70-M74	5	
1938	MC70-MC65	5	
1938	MC65-MC39	5	
1938B	MC39-S22	5	STE/ICE ZEROING
1939	MC71-M75	5	ENGINE WATER TEMP
1939	MC65-MC39	5	STE/ICE
1939	MC71-MC65	5	
1939B	MC39-S22	5	STE/ICE ZEROING
1940	MC71-MC65	5	
1940	MC71-M75	5	ENGINE WATER TEMP
1940	MC65-MC39	5	STE/ICE
1940B	MC39-S22	5	STE/ICE ZEROING
1941	MC43-M42	5	FUEL PSI
1941	MC43-MC65	5	
1941	MC65-MC39	5	STE/ICE
1942	MC43-MC65	5	
1942	MC65-MC39	5	
1942	MC43-M42	5	FUEL PSI
1943	MC65-MC39	5	STE/ICE
1943	MC66-M70	5	TURBO OUTLET PSI
1943	MC66-MC65	5	TURBO OUTLET PSI
1944	MC66-M70	5	
1944	MC65-MC39	5	STE/ICE
1944	MC66-MC65	5	TURBO OUTLET PSI
1945	MC68-MC65	5	
1945	MC68-M72	5	AIR BOX PSI
1945	MC65-MC39	5	STE/ICE
1946	MC67-M71	5	

CODE SORT			
CODE	ROUTING	SH	DESCRIPTION
1946	MC65-MC39	5	STE/ICE
1946	MC68-M72	5	AIR BOX PSI
1946	MC68-MC65	5	
1947	MC67-MC65	5	
1947	MC65-MC39	5	STE/ICE
1947	MC67-M71	5	AIR CLEANER
1948	MC67-MC65	5	
1948	MC65-MC39	5	STE/ICE
1949	MC69-MC65	5	FUEL RETURN
1949	MC69-MC65	5	
1949	MC65-MC39	5	STE/ICE
1950	MC5-MC4	3	
1950	S8-MC4	3	
1951	MC65-MC39	5	STE/ICE
1951	MC69-M73	5	FUEL RETURN
1951	MC69-MC65	5	
1952	MC65-MC39	5	
1952	MC70-M74	5	ENGINE OIL TEMP
1952	MC70-MC65	5	
1952B	MC39-S22	5	STE/ICE ZEROING
1953	MC39-MC24	5	
1953	MC24-MC114	5	
1953	MC24-M20	5	
1955	M67-MC21	3	FAN SPEED CONTROL
1956	MC127-MC44	3	FAN SPEED CONTROL
1957	MC127-MC21	3	FAN SPEED CONTROL
SHIELD	MC32-MC64	6	CTI AUX MANIFOLD
SHIELD	MC32-MC109	6	CTI POWER MANIFOLD

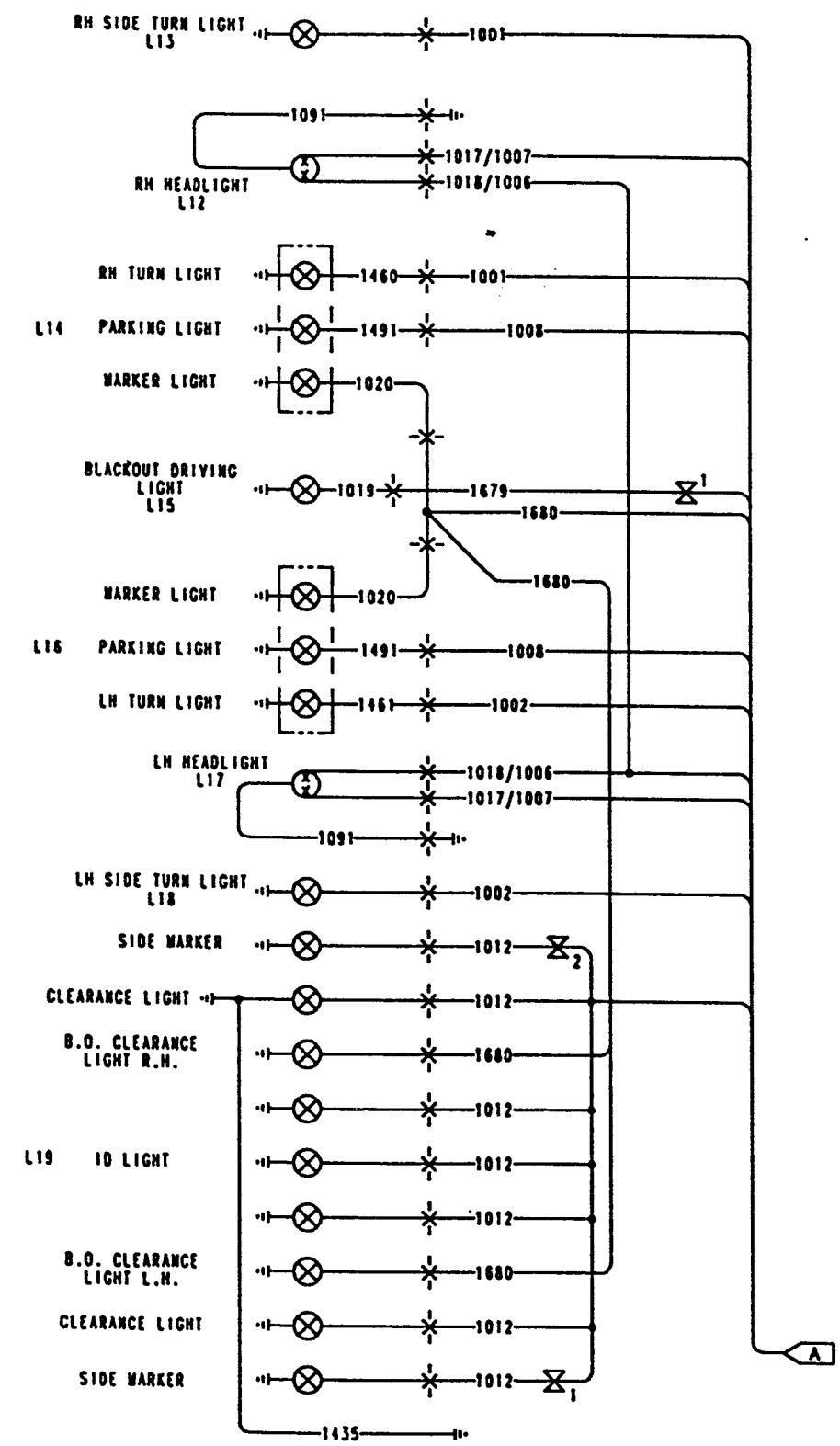
FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 7 OF 26
 ENGINEERING DWG 3053493 SHEET 2
 FP-13/FP-14 BLANK

REVISION 0

28 27 26 25 24 23 22 21 20

H
G
F
E
D
C
B
A

H
G
F
E
D
C
B
A



28 27 26 25 24 23 22 21 20

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 8 OF 26
ENGINEERING DWG 3053493 SHEET 3
FP-15/FP-16 BLANK

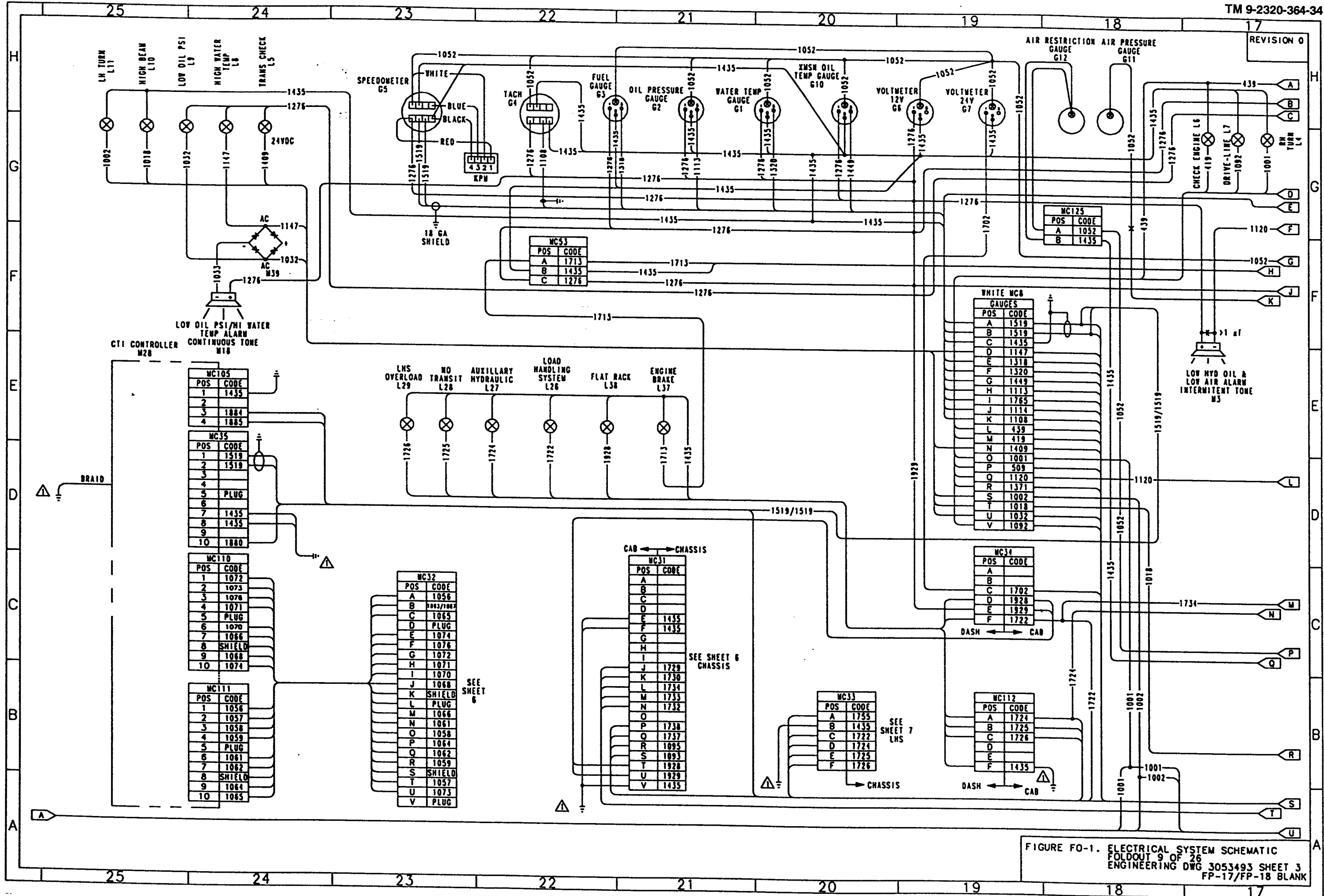


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 9 OF 26
 ENGINEERING DWG 3053493 SHEET 3
 FP-17/FP-18 BLANK

REVISION D

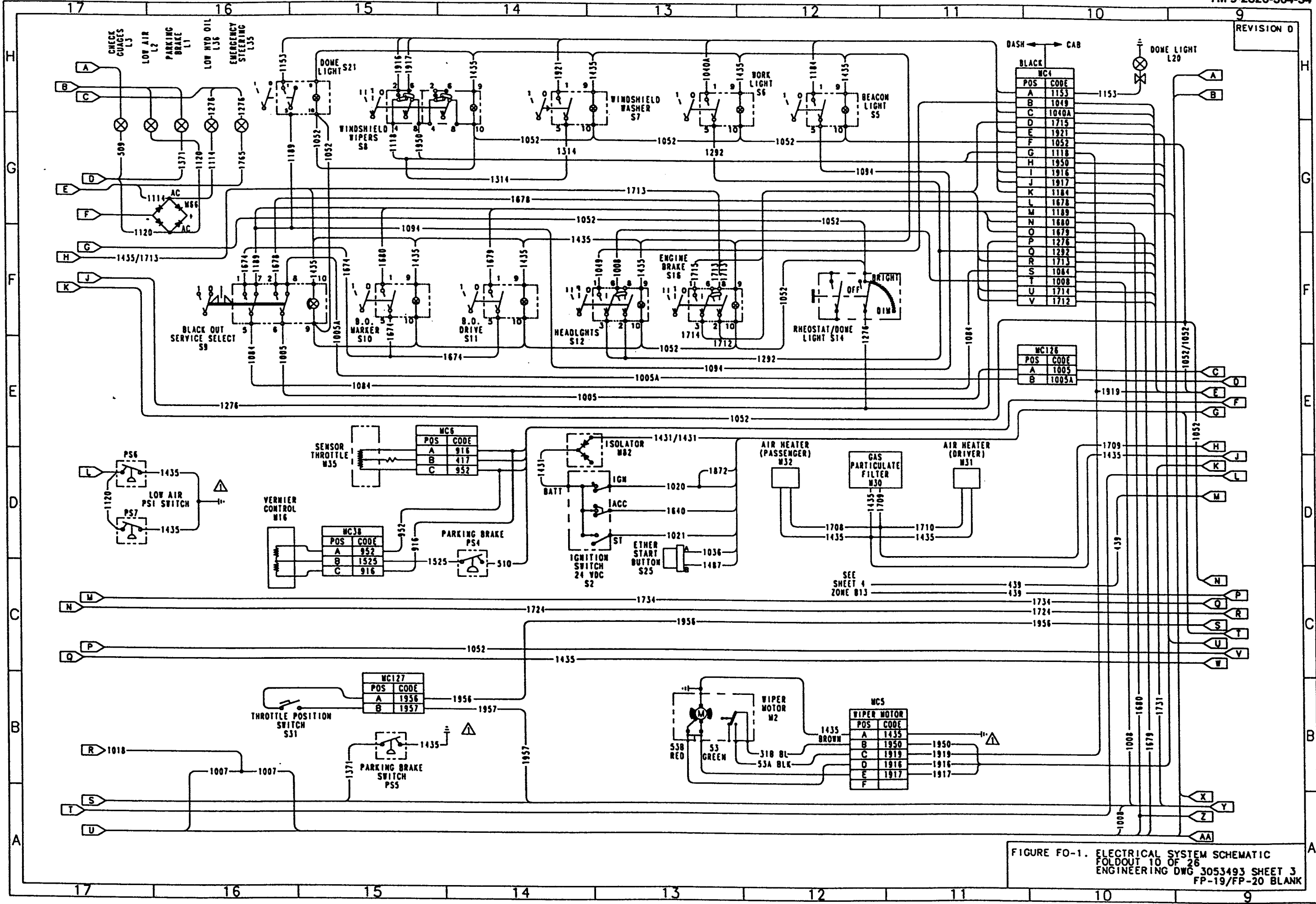
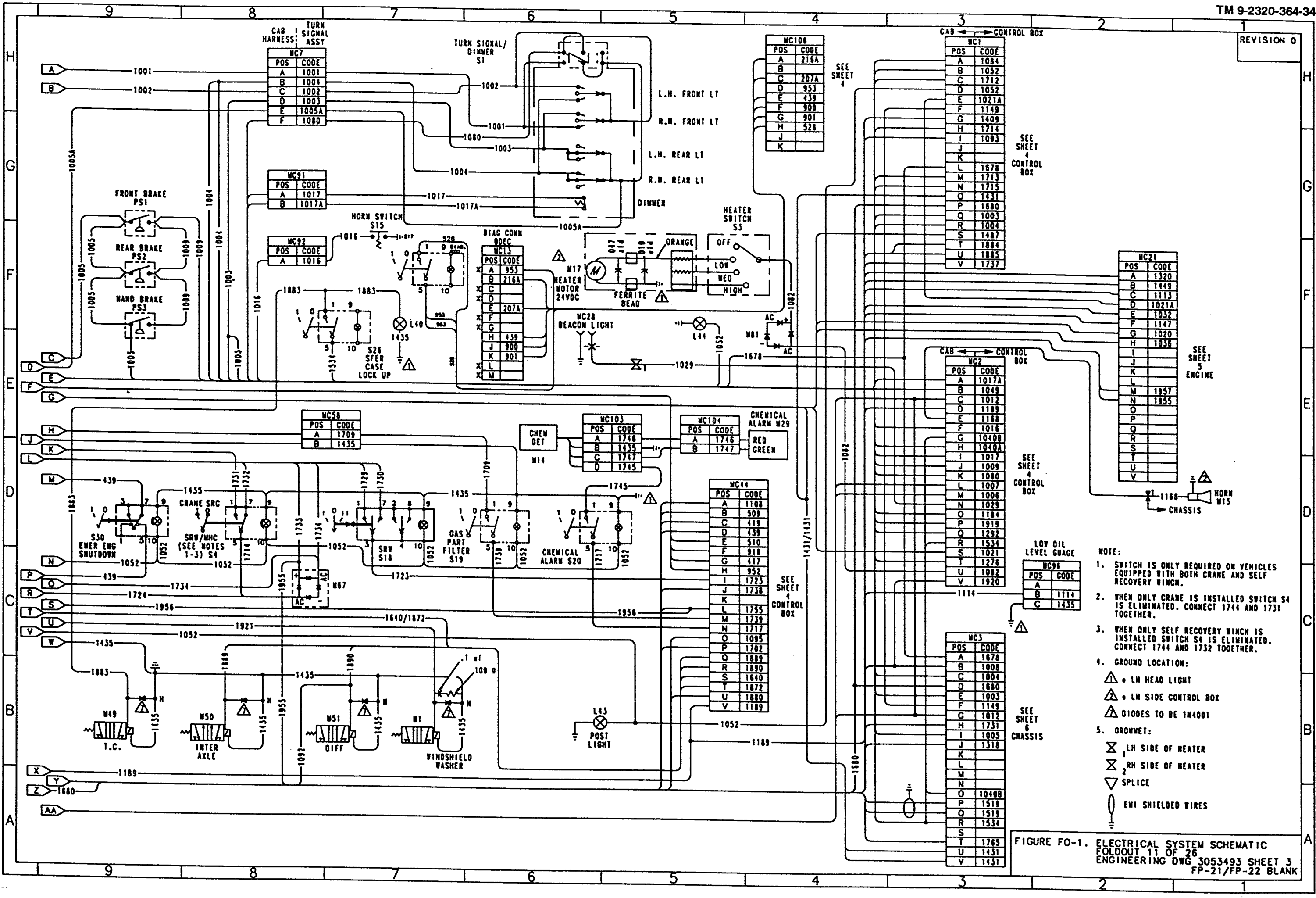


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 10 OF 26
 ENGINEERING DWG 3053493 SHEET 3
 FP-19/FP-20 BLANK

REVISION 0



- NOTE:
- SWITCH IS ONLY REQUIRED ON VEHICLES EQUIPPED WITH BOTH CRANE AND SELF RECOVERY WINCH.
 - WHEN ONLY CRANE IS INSTALLED SWITCH S4 IS ELIMINATED. CONNECT 1744 AND 1731 TOGETHER.
 - WHEN ONLY SELF RECOVERY WINCH IS INSTALLED SWITCH S4 IS ELIMINATED. CONNECT 1744 AND 1732 TOGETHER.

4. GROUND LOCATION:
- △ • LH HEAD LIGHT
 - △ • LH SIDE CONTROL BOX
 - △ DIODES TO BE 1N4001
5. GROMMET:
- ⊗ LH SIDE OF HEATER
 - ⊗ RH SIDE OF HEATER
 - ▽ SPLICE
 - EMI SHIELDED WIRES

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 11 OF 26 ENGINEERING DWG 3053493 SHEET 3 FP-21/FP-22 BLANK

REVISION C
CN 14815
12-15-97

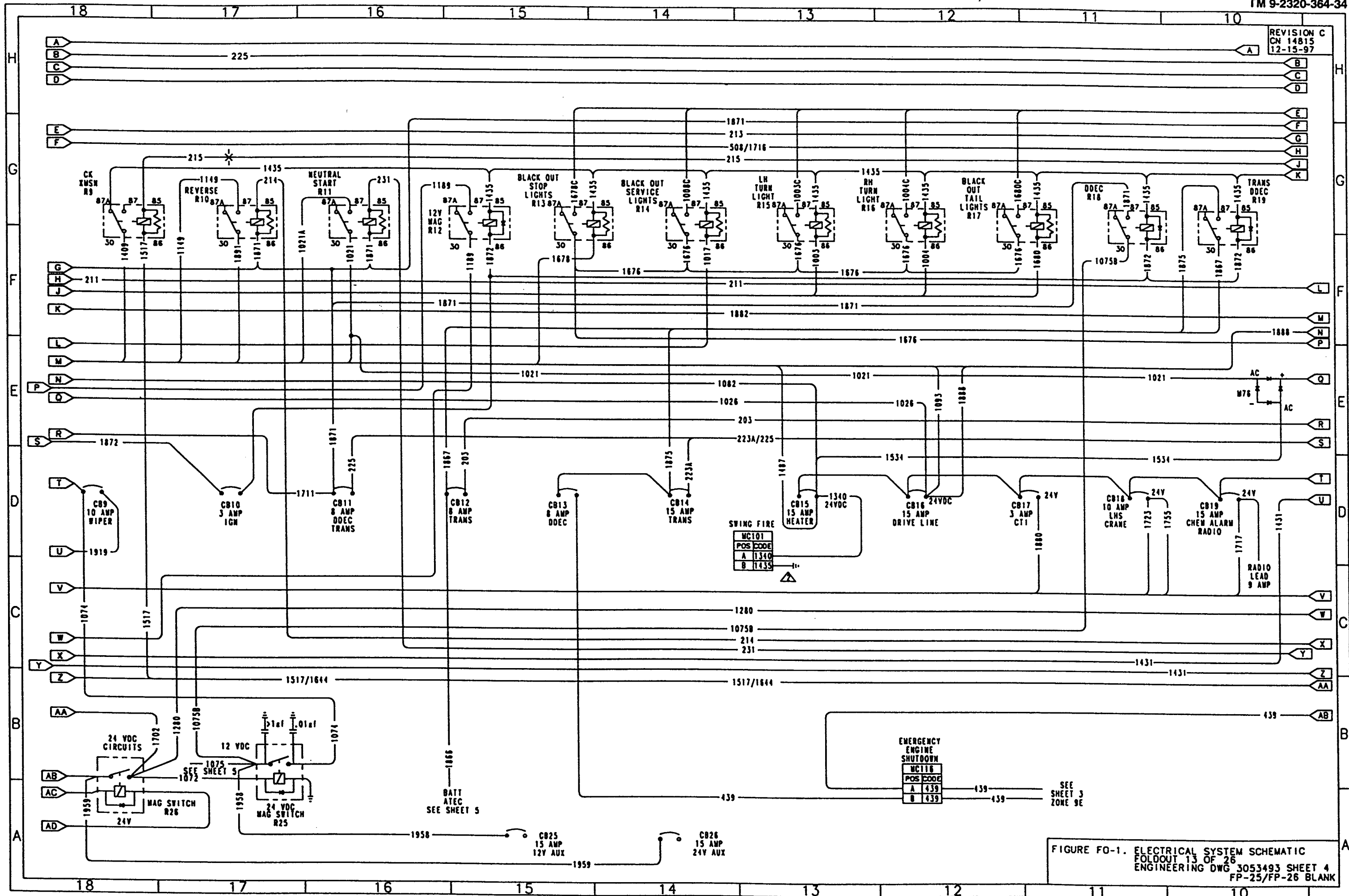
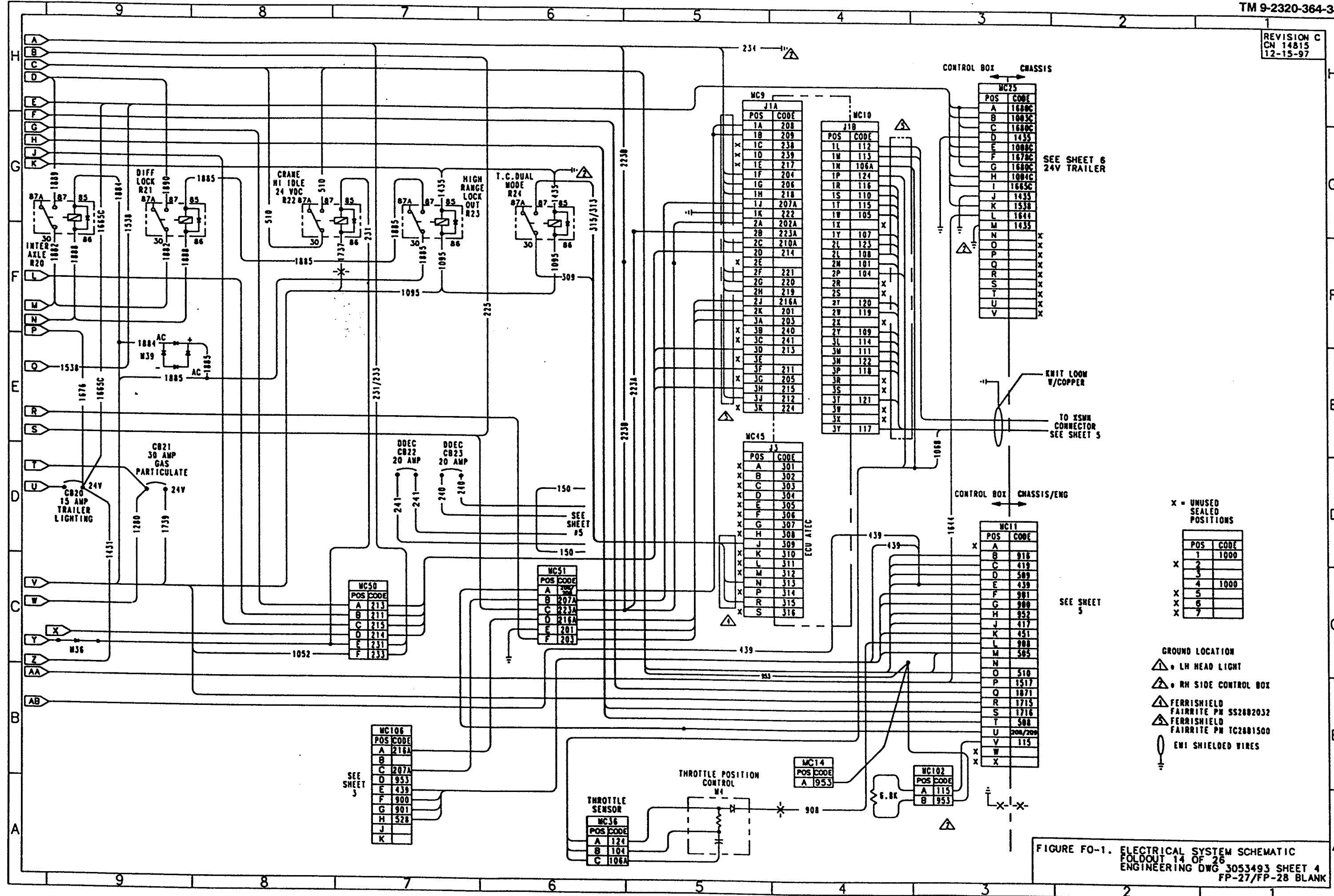


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 13 OF 26
 ENGINEERING DWG 3053493 SHEET 4
 FP-25/FP-26 BLANK



REVISION C
CN 14815
12/15/97

POS	CODE
A	1320
B	1449
C	1113
D	1021A
E	1032
F	1147
G	1020
H	1036
J	X
K	X
L	X
M	1957
N	1955
O	X
P	X
R	X
S	X
T	X
U	X
V	X

POS	CODE
A	1021A
B	1020

POS	CODE
1	1860
2	1820
3	1815
4	1861
5	1953

BOOST PRESSURE SWITCH
PS15
SPST-N.C.
7.5 PSI ± .5 PSI
ON RISING PRESSURE

CONTROL BOX ↔ CHASSIS/ENGINE

POS	CODE
A	X
B	916
C	419
D	509
E	439
F	901
G	900
H	952
J	417
K	528
L	908
M	505
N	X
O	510
P	1517
R	1871
S	1715
T	1716
U	208/209
V	115
W	X
X	X

POS	CODE
A	1036
B	1926

POS	CODE
A	1928
B	1435

POS	CODE
A	1020
B	1435

POS	CODE
A	1020
B	1435

SEE SHEET 4

1430
150
240/240
241/241
150

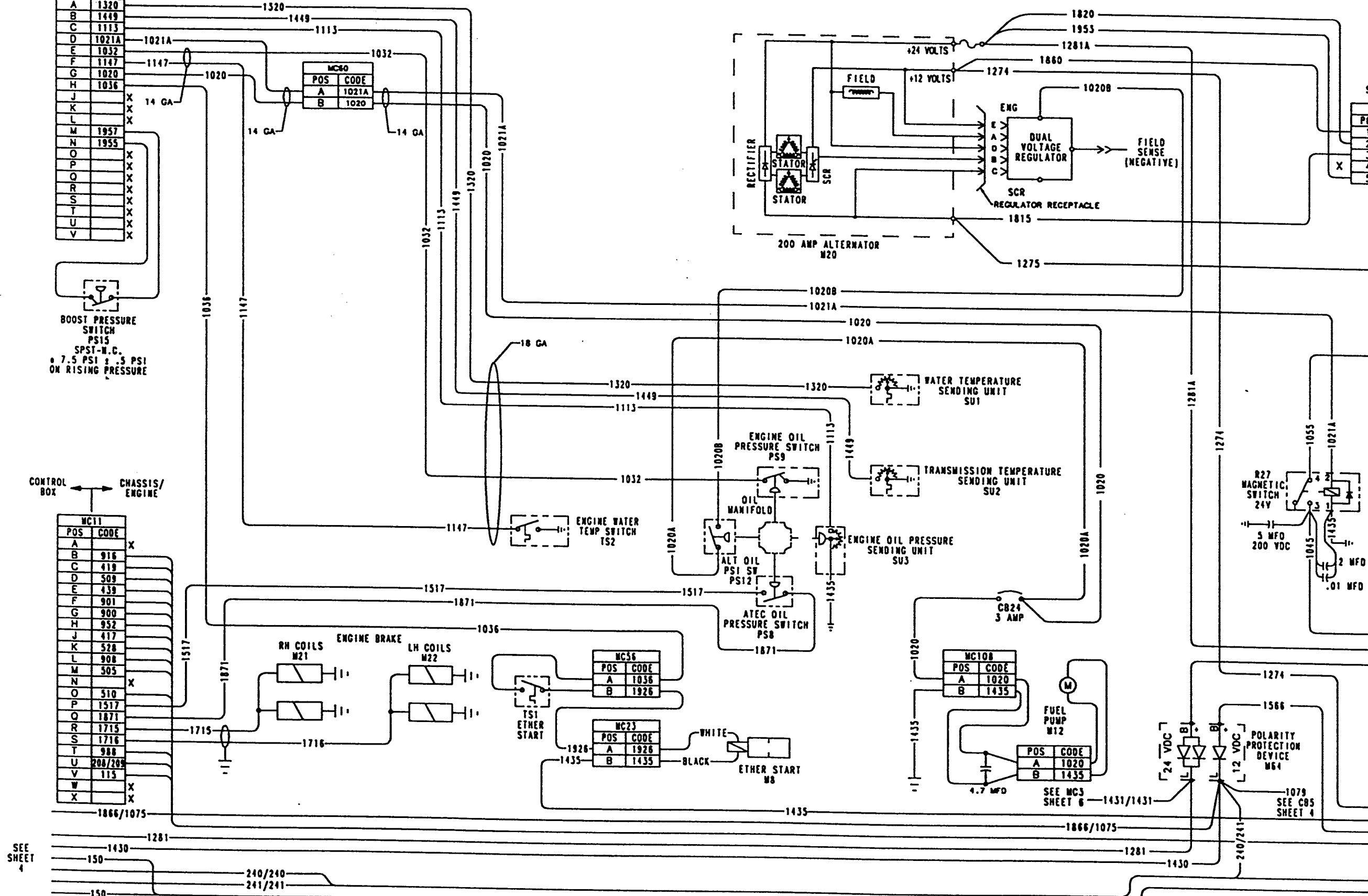


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 15 OF 26
ENGINEERING DWG 3053493 SHEET 5
FP-29/FP-30 BLANK

REVISION C
CN14815
12/15/97

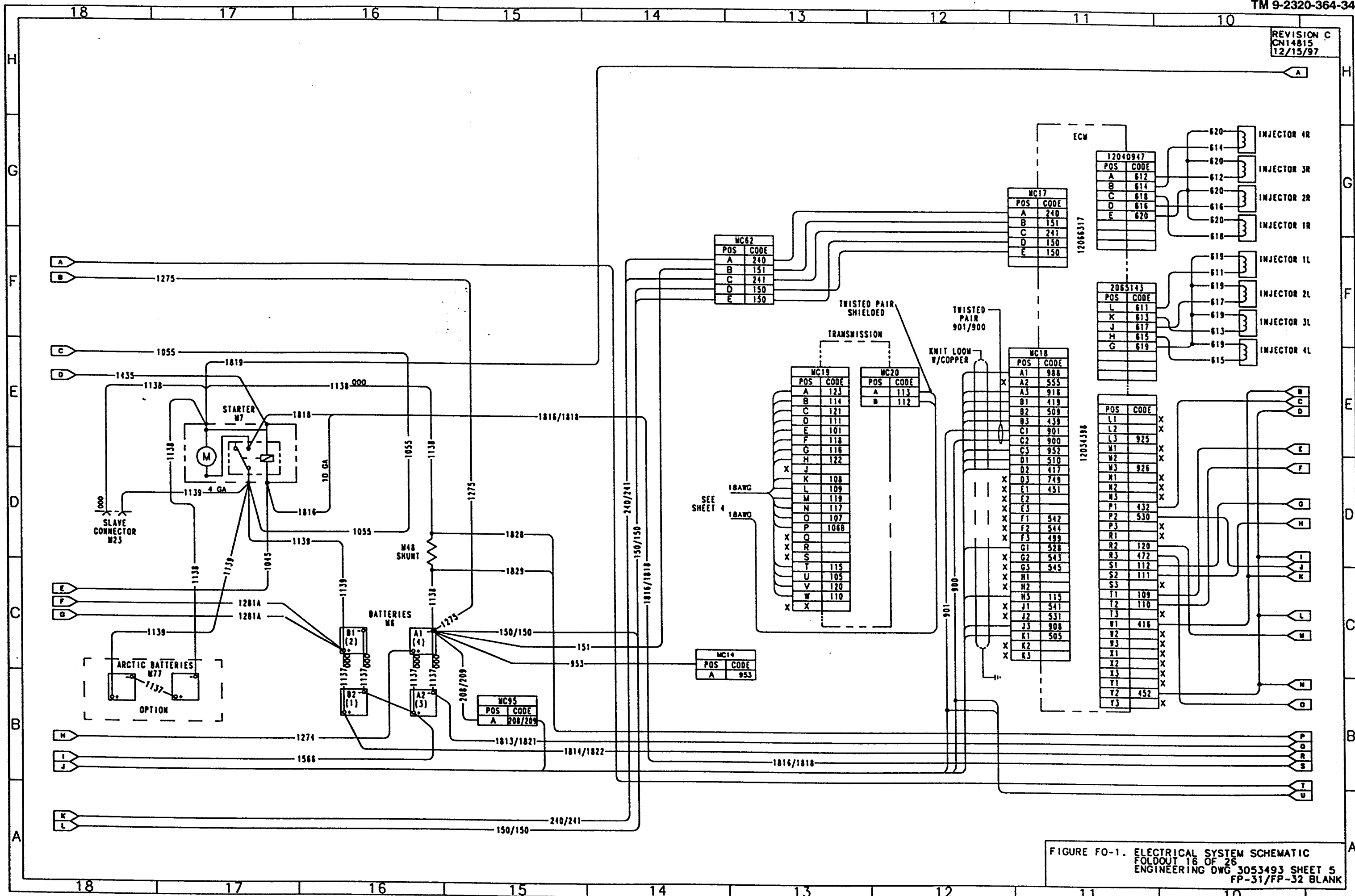


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 16 OF 26
ENGINEERING DWG 3053493 SHEET 5
FP-31/FP-32 BLANK

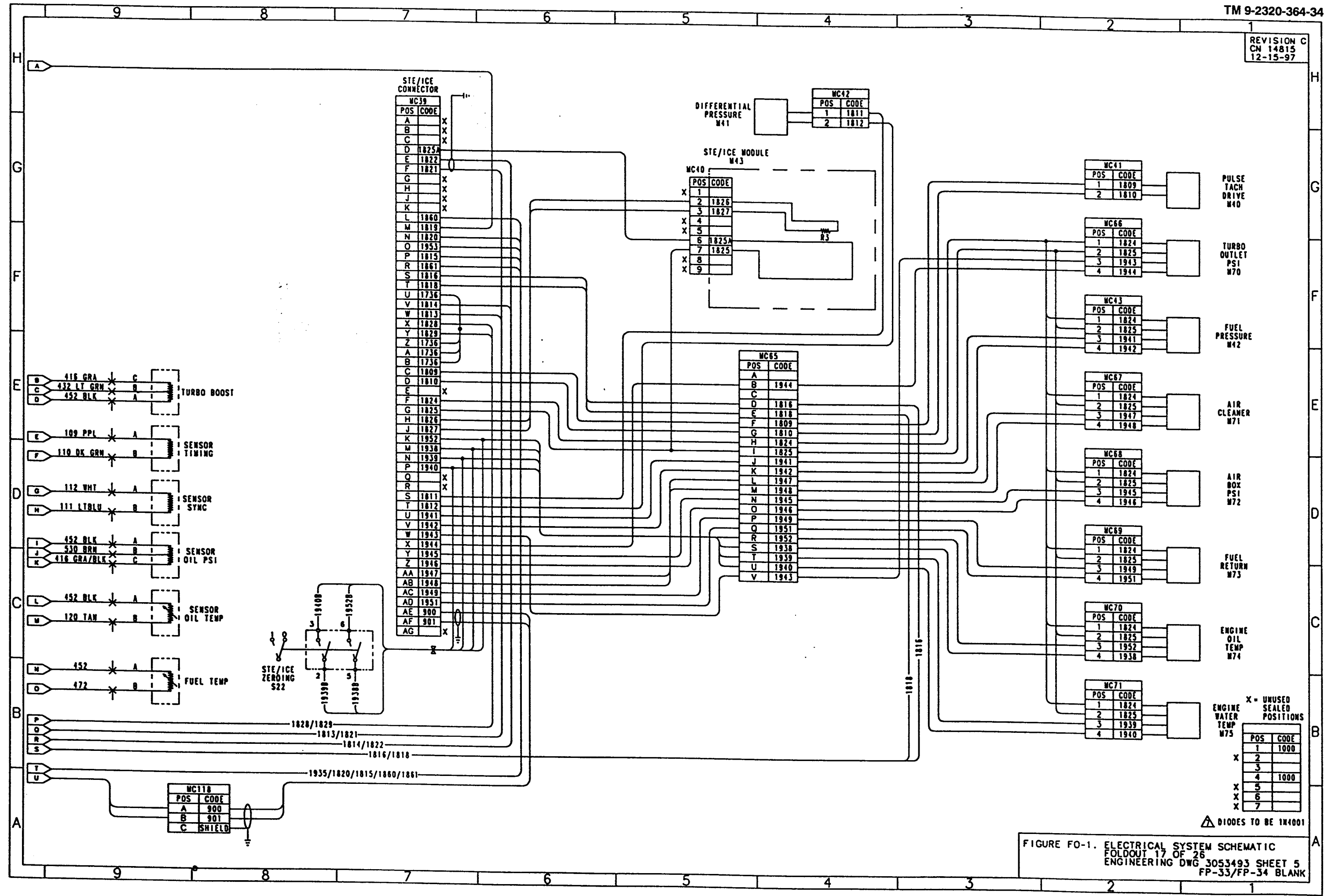


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 17 OF 26
ENGINEERING DWG 3053493 SHEET 5
FP-33/FP-34 BLANK

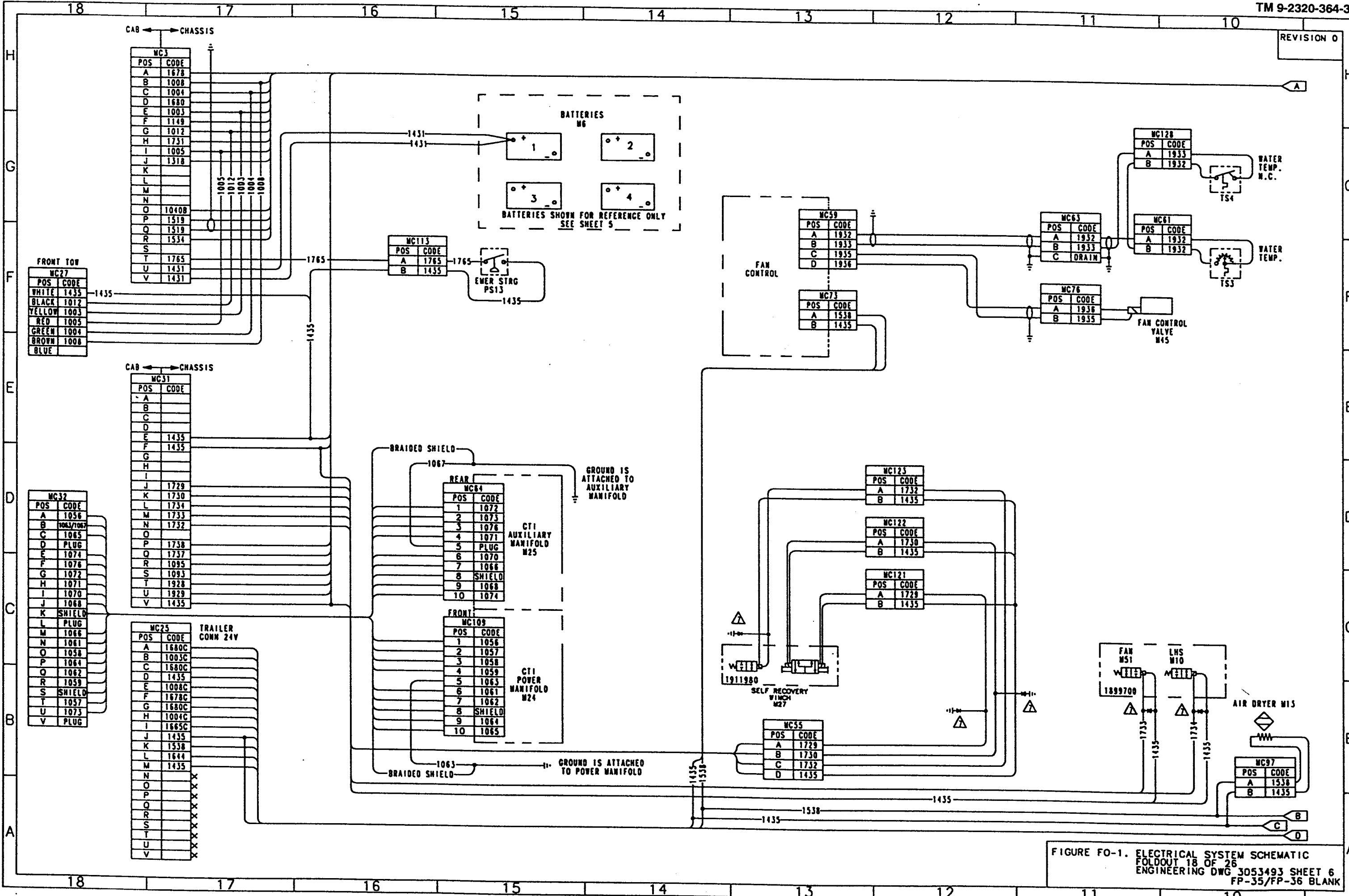


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 18 OF 26 ENGINEERING DWG 3053493 SHEET 6 FP-35/FP-36 BLANK

REVISION 0

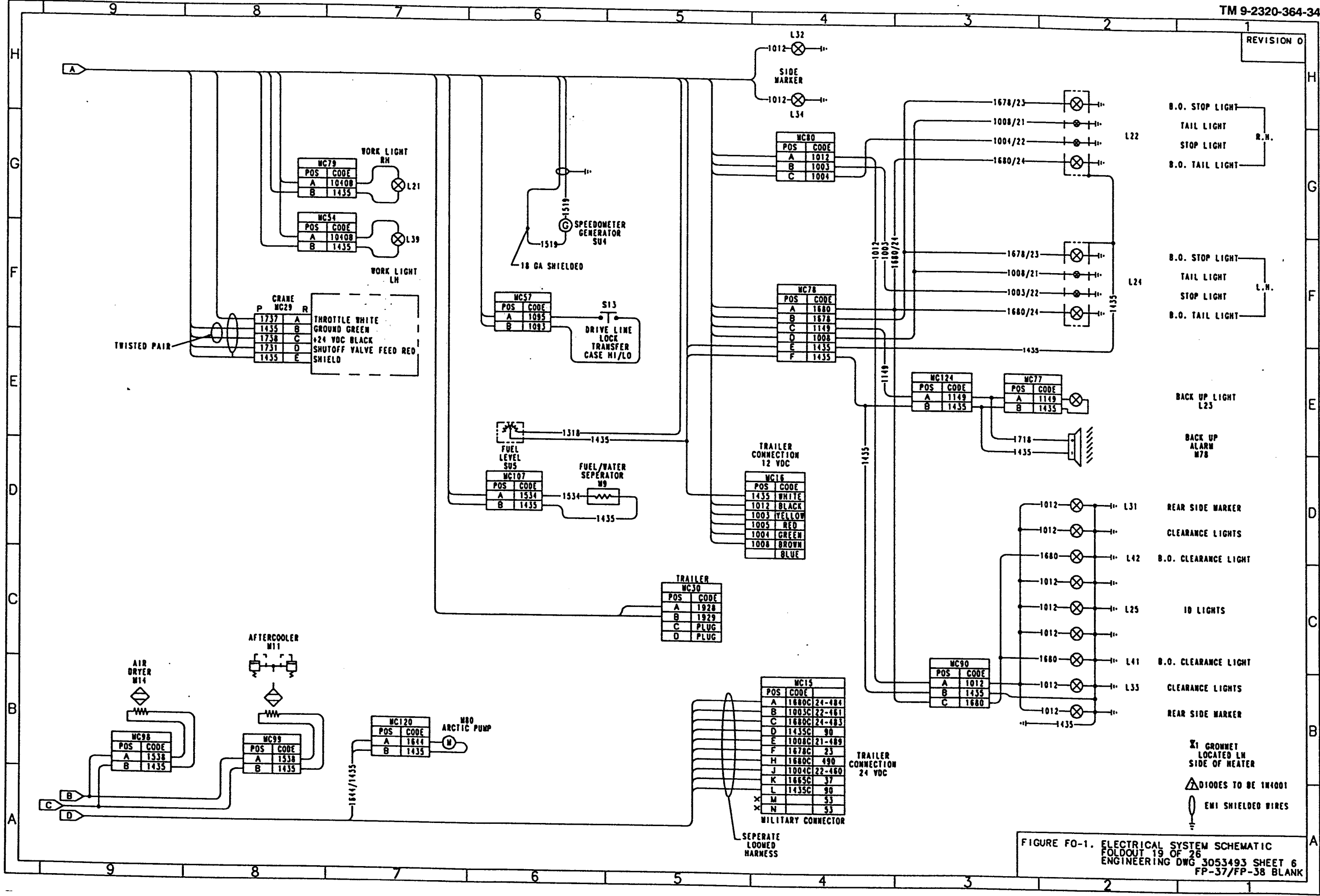
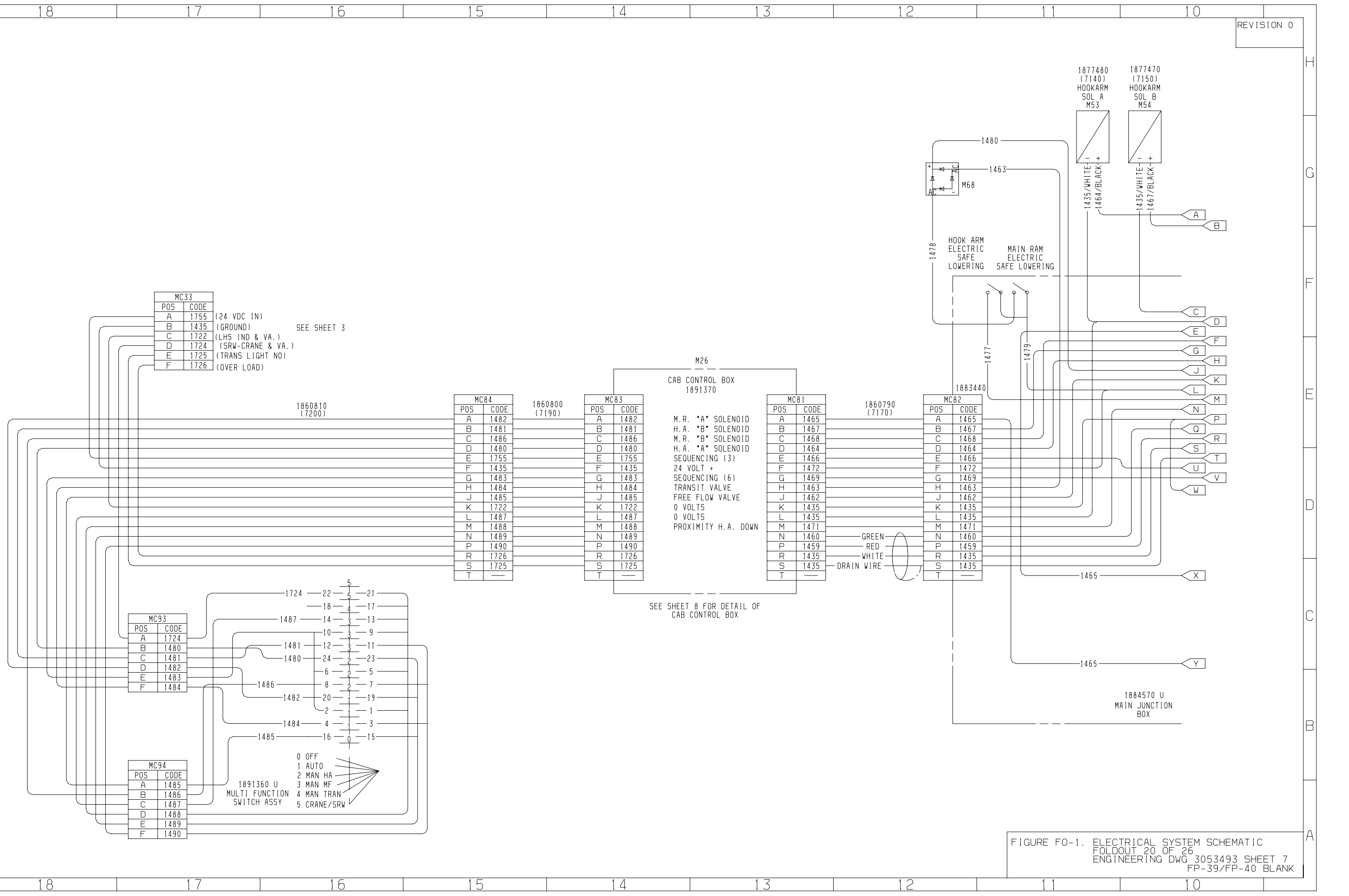


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 19 OF 26
 ENGINEERING DWG 3053493 SHEET 6
 FP-37/FP-38 BLANK



MC33		
POS	CODE	
A	1755	(24 VDC IN)
B	1435	(GROUND)
C	1722	(LHS IND & VA.)
D	1724	(SRW-CRANE & VA.)
E	1725	(TRANS LIGHT NO)
F	1726	(OVER LOAD)

SEE SHEET 3

1860810
(7200)

MC84		
POS	CODE	
A	1482	
B	1481	
C	1486	
D	1480	
E	1755	
F	1435	
G	1483	
H	1484	
J	1485	
K	1722	
L	1487	
M	1488	
N	1489	
P	1490	
R	1726	
S	1725	
T	---	

1860800
(7190)

MC83		
POS	CODE	
A	1482	
B	1481	
C	1486	
D	1480	
E	1755	
F	1435	
G	1483	
H	1484	
J	1485	
K	1722	
L	1487	
M	1488	
N	1489	
P	1490	
R	1726	
S	1725	
T	---	

M26
CAB CONTROL BOX
1891370

M.R. "A" SOLENOID
H.A. "B" SOLENOID
M.R. "B" SOLENOID
H.A. "A" SOLENOID
SEQUENCING (3)
24 VOLT +
SEQUENCING (6)
TRANSIT VALVE
FREE FLOW VALVE
0 VOLTS
0 VOLTS
PROXIMITY H.A. DOWN

SEE SHEET 8 FOR DETAIL OF
CAB CONTROL BOX

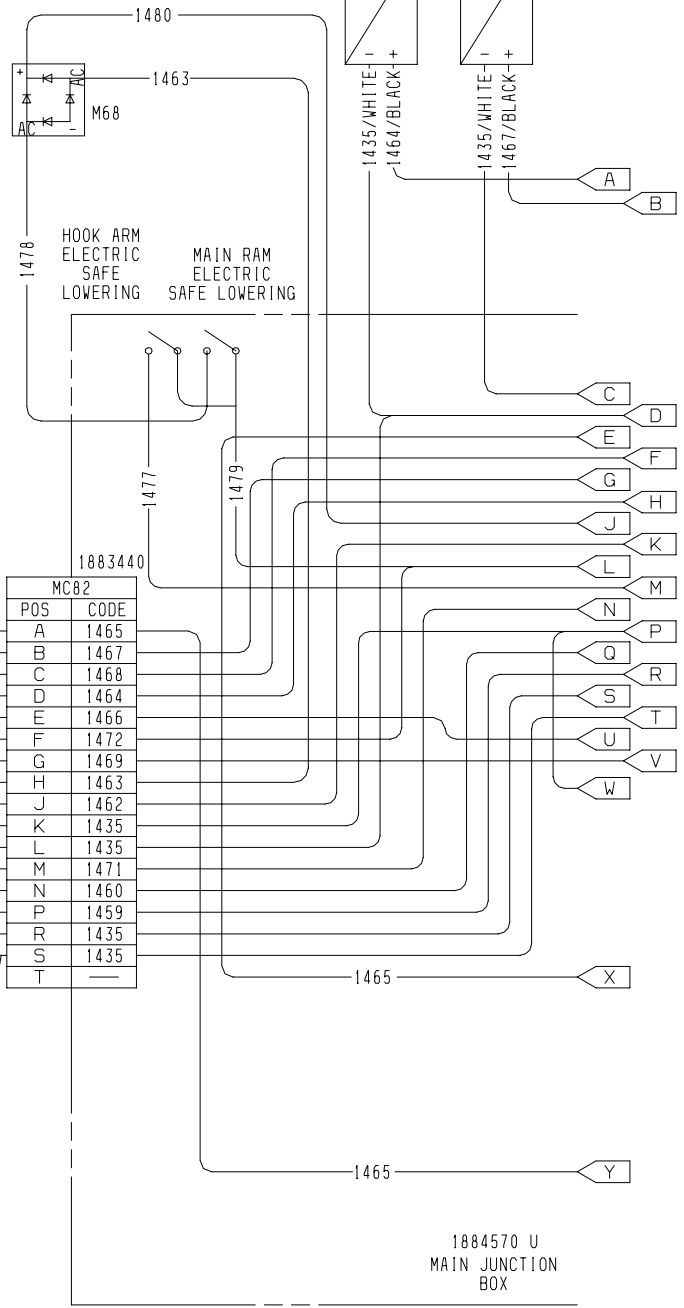
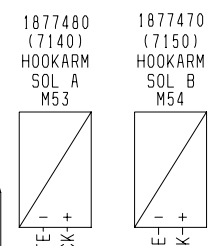
MC81		
POS	CODE	
A	1465	
B	1467	
C	1468	
D	1464	
E	1466	
F	1472	
G	1469	
H	1463	
J	1462	
K	1435	
L	1435	
M	1471	
N	1460	
P	1459	
R	1435	
S	1435	
T	---	

GREEN
RED
WHITE
DRAIN WIRE

1860790
(7170)

MC82		
POS	CODE	
A	1465	
B	1467	
C	1468	
D	1464	
E	1466	
F	1472	
G	1469	
H	1463	
J	1462	
K	1435	
L	1435	
M	1471	
N	1460	
P	1459	
R	1435	
S	1435	
T	---	

1883440



MC93		
POS	CODE	
A	1724	
B	1480	
C	1481	
D	1482	
E	1483	
F	1484	

MC94		
POS	CODE	
A	1485	
B	1486	
C	1487	
D	1488	
E	1489	
F	1490	

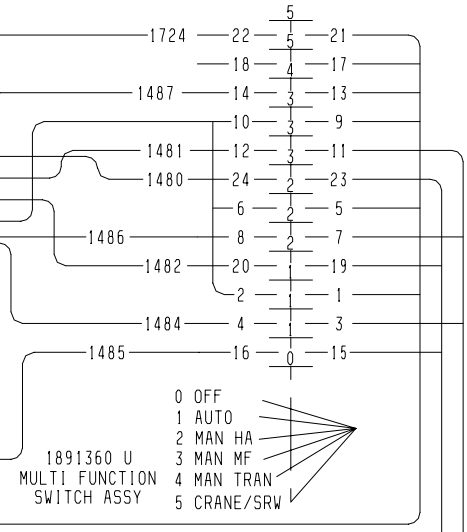


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
FOLDOUT 20 OF 26
ENGINEERING DWG 3053493 SHEET 7
FP-39/FP-40 BLANK

REVISION 0

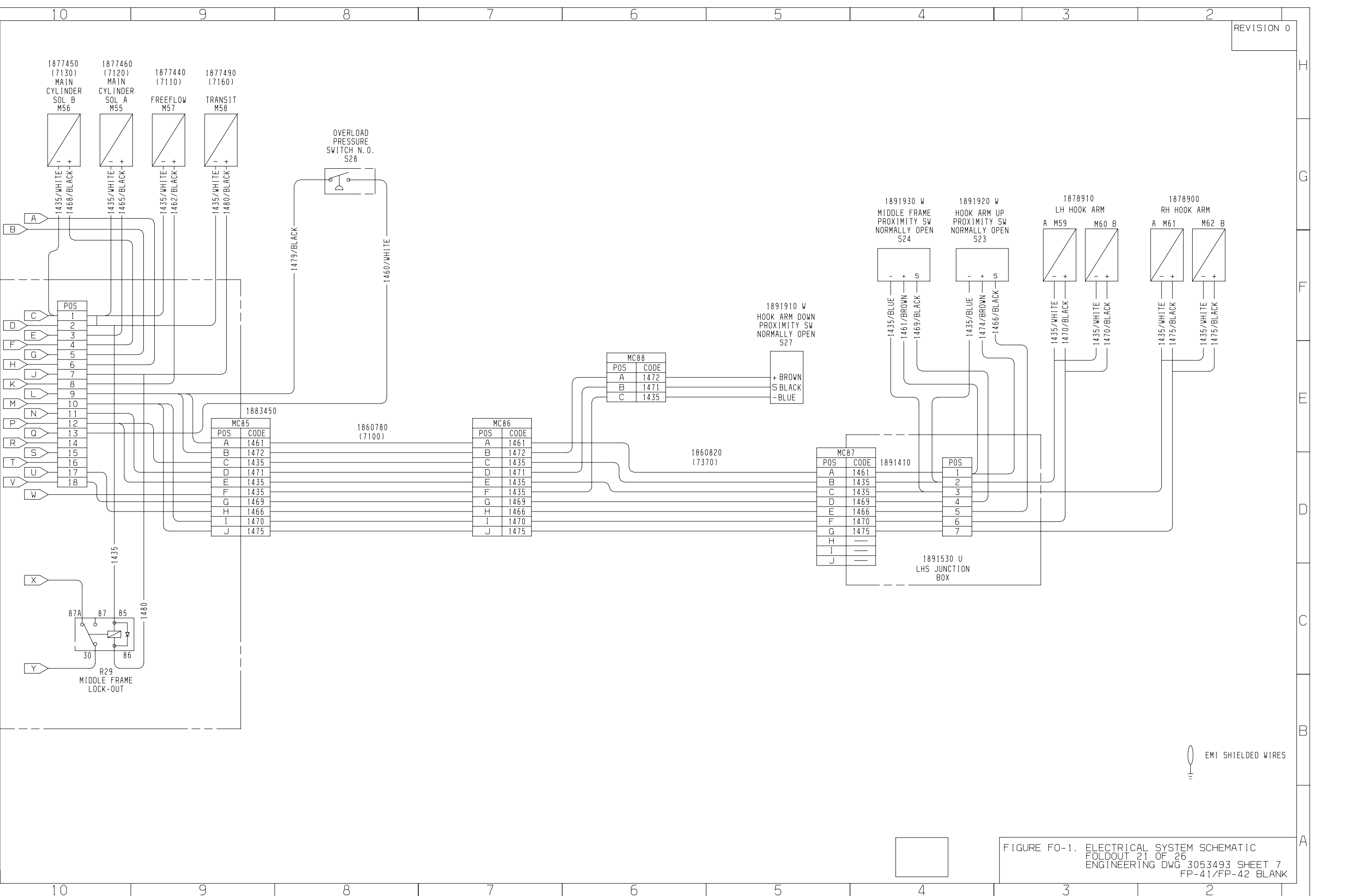
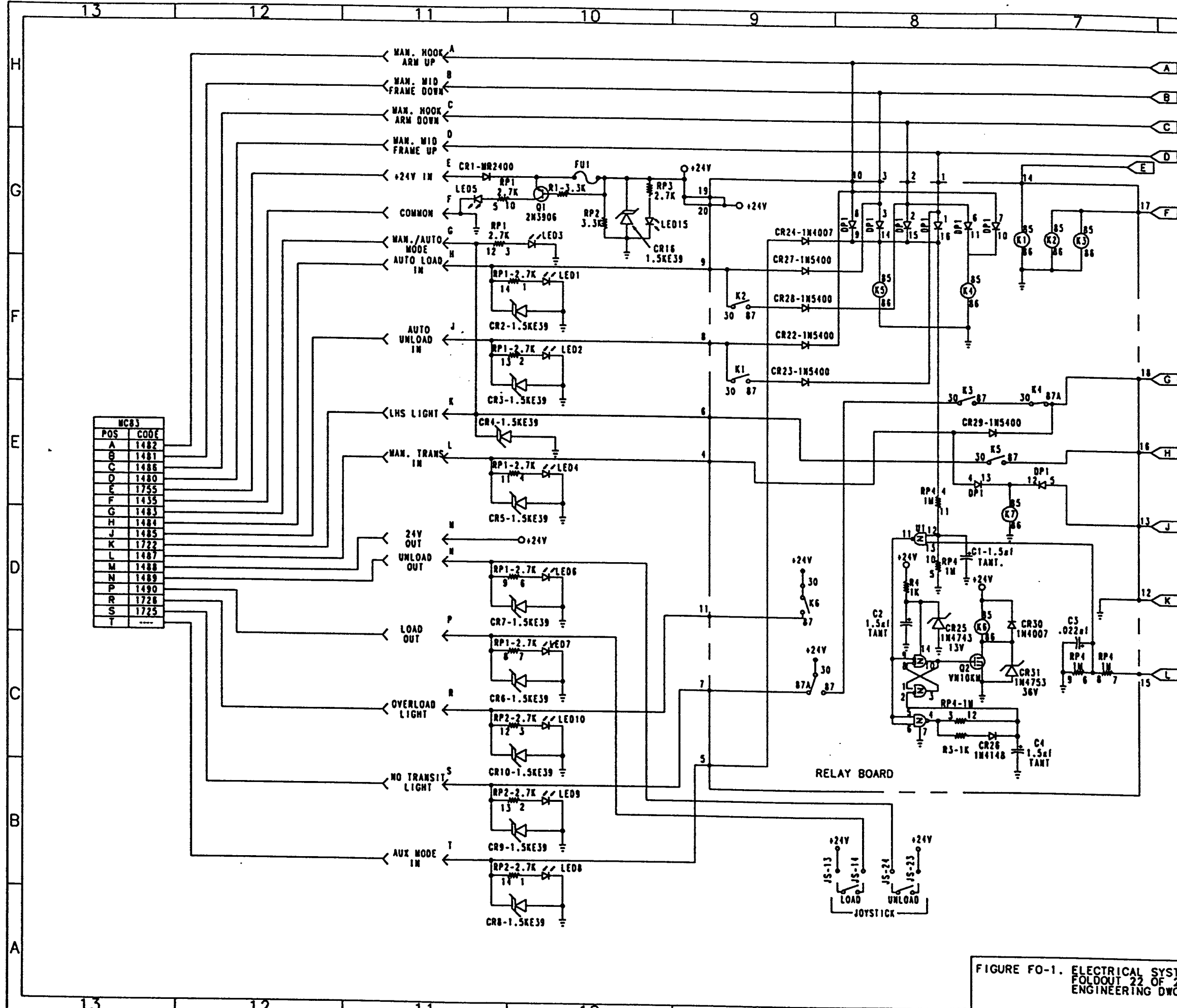
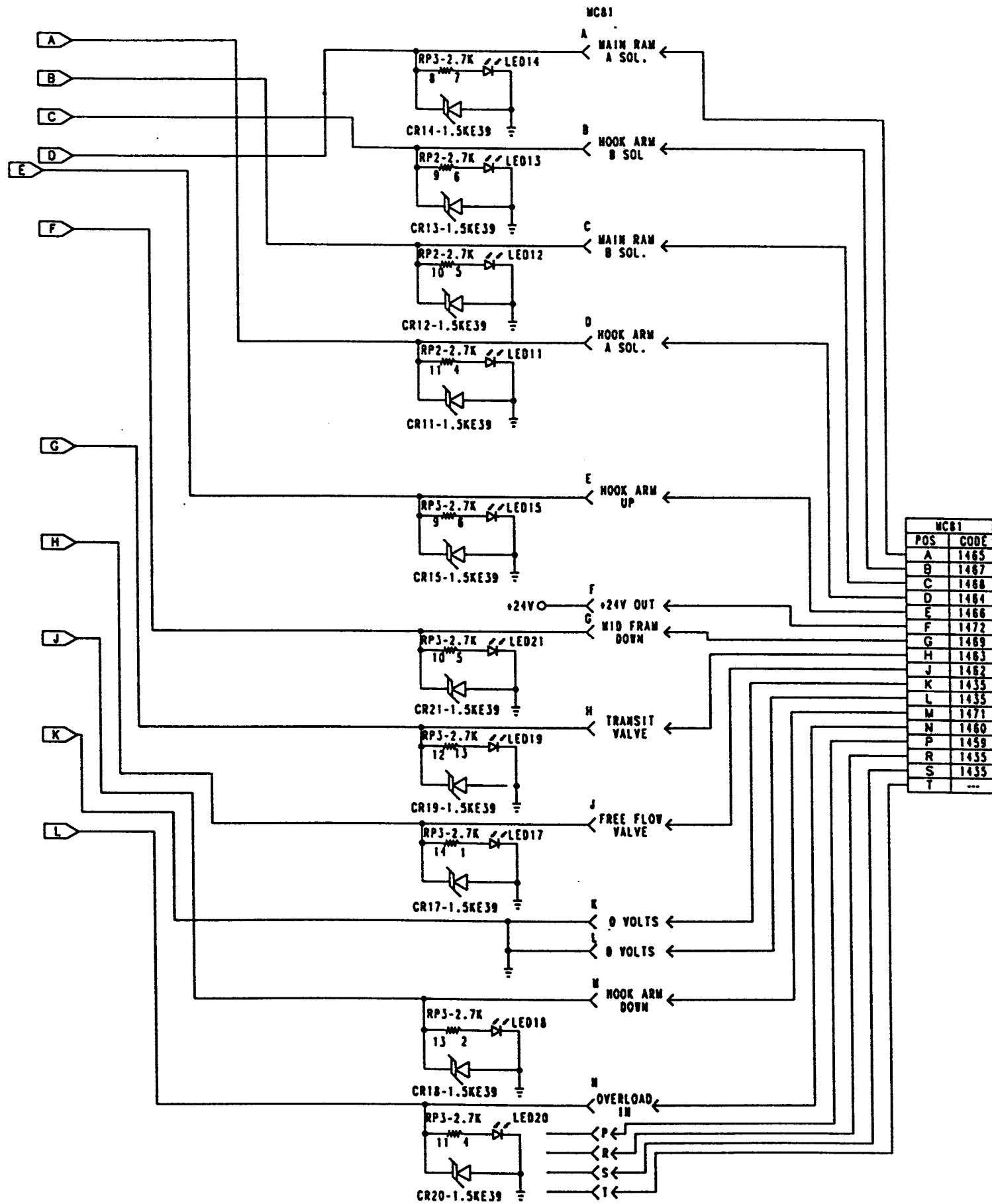


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 21 OF 26
 ENGINEERING DWG 3053493 SHEET 7
 FP-41/FP-42 BLANK



NC83	
POS	CODE
A	1482
B	1481
C	1486
D	1480
E	1755
F	1435
G	1483
H	1484
J	1485
K	1722
L	1487
M	1488
N	1489
P	1490
R	1728
S	1725
T	----

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 22 OF 26
 ENGINEERING DWG 3053493 SHEET 8
 FP-43/FP-44 BLANK



MCB1	
POS	CODE
A	1465
B	1467
C	1468
D	1464
E	1466
F	1472
G	1469
H	1463
J	1462
K	1435
L	1435
M	1471
N	1460
P	1459
R	1435
S	1435
T	---

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 23 OF 26
 ENGINEERING DWG 3053493 SHEET 8
 FP-45/FP-46 BLANK

13

12

11

10

9

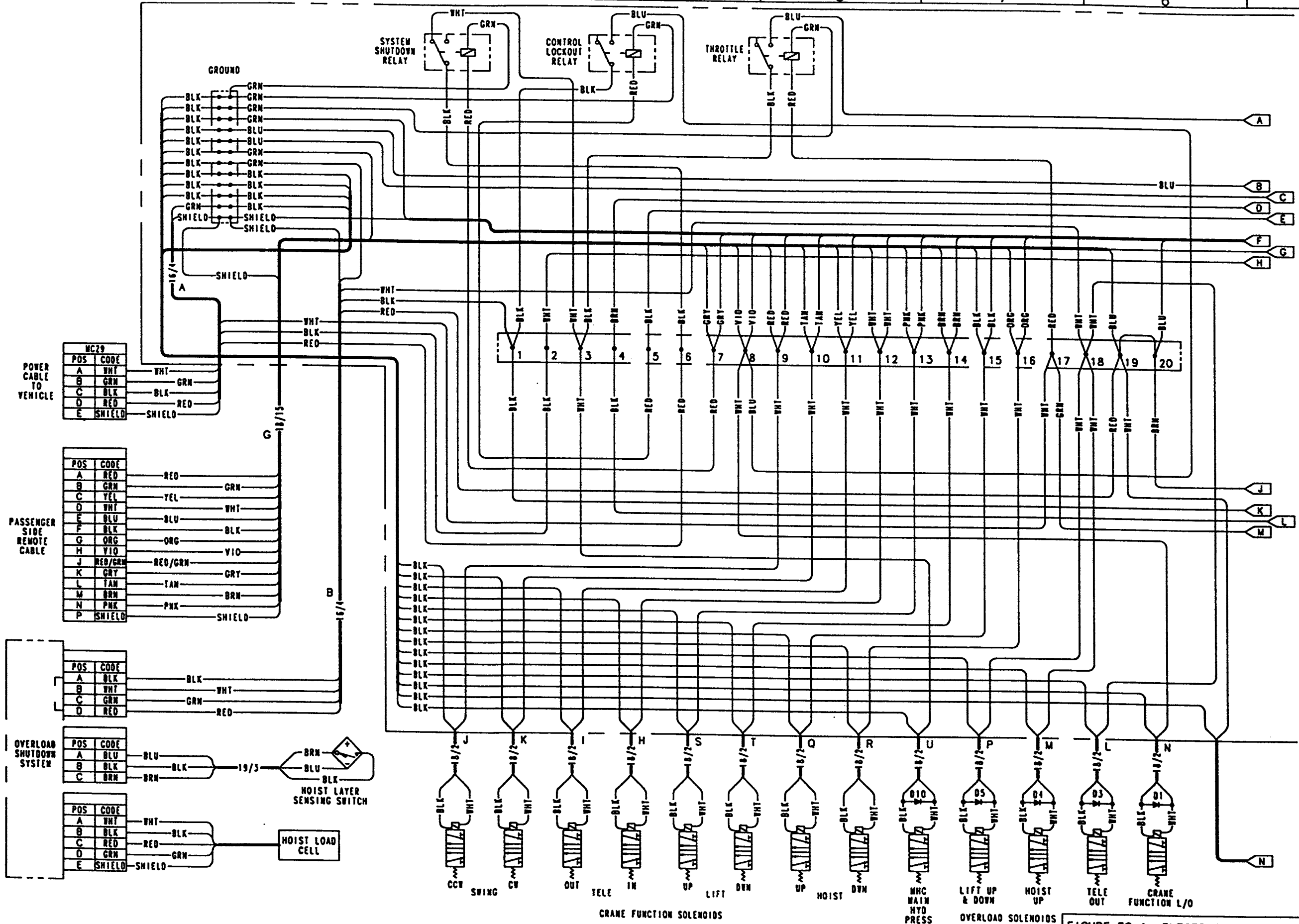
8

7

6

5

H
G
F
E
D
C
B
A



POWER CABLE TO VEHICLE

POS	CODE
A	WHT
B	GRN
C	BLK
D	RED
E	SHIELD

PASSENGER SIDE REMOTE CABLE

POS	CODE
A	RED
B	GRN
C	YEL
D	WHT
E	BLU
F	BLK
G	ORG
H	VIO
J	RED/GRN
K	GRY
L	TAN
M	BRN
N	PNK
P	SHIELD

OVERLOAD SHUTDOWN SYSTEM

POS	CODE
A	BLK
B	WHT
C	GRN
D	RED

HOIST LOAD CELL

POS	CODE
A	WHT
B	BLK
C	RED
D	GRN
E	SHIELD

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 24 OF 26
 ENGINEERING DWG 3053493 SHEET 9
 FP-47/FP-48 BLANK

13

12

11

10

9

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5

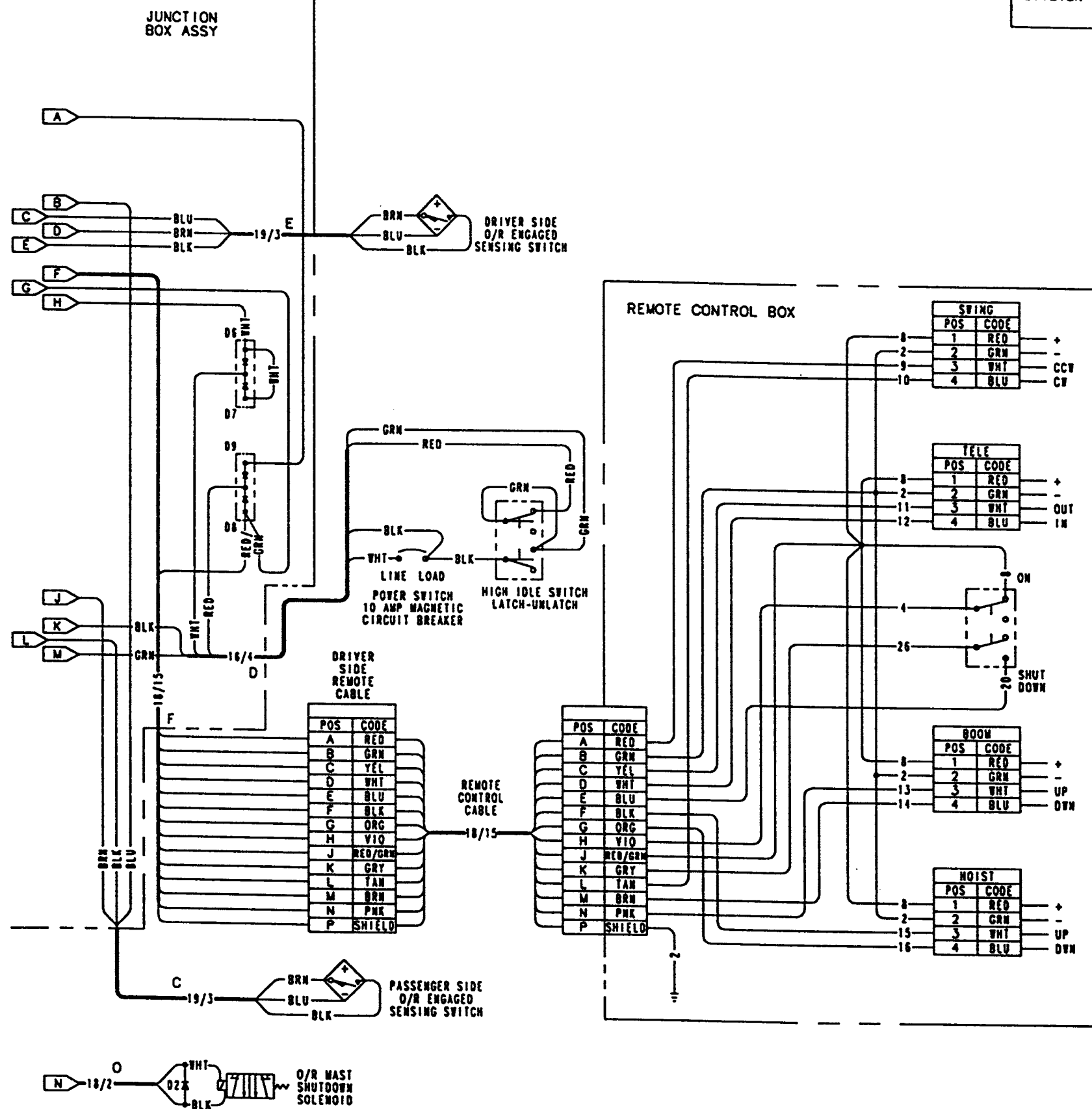
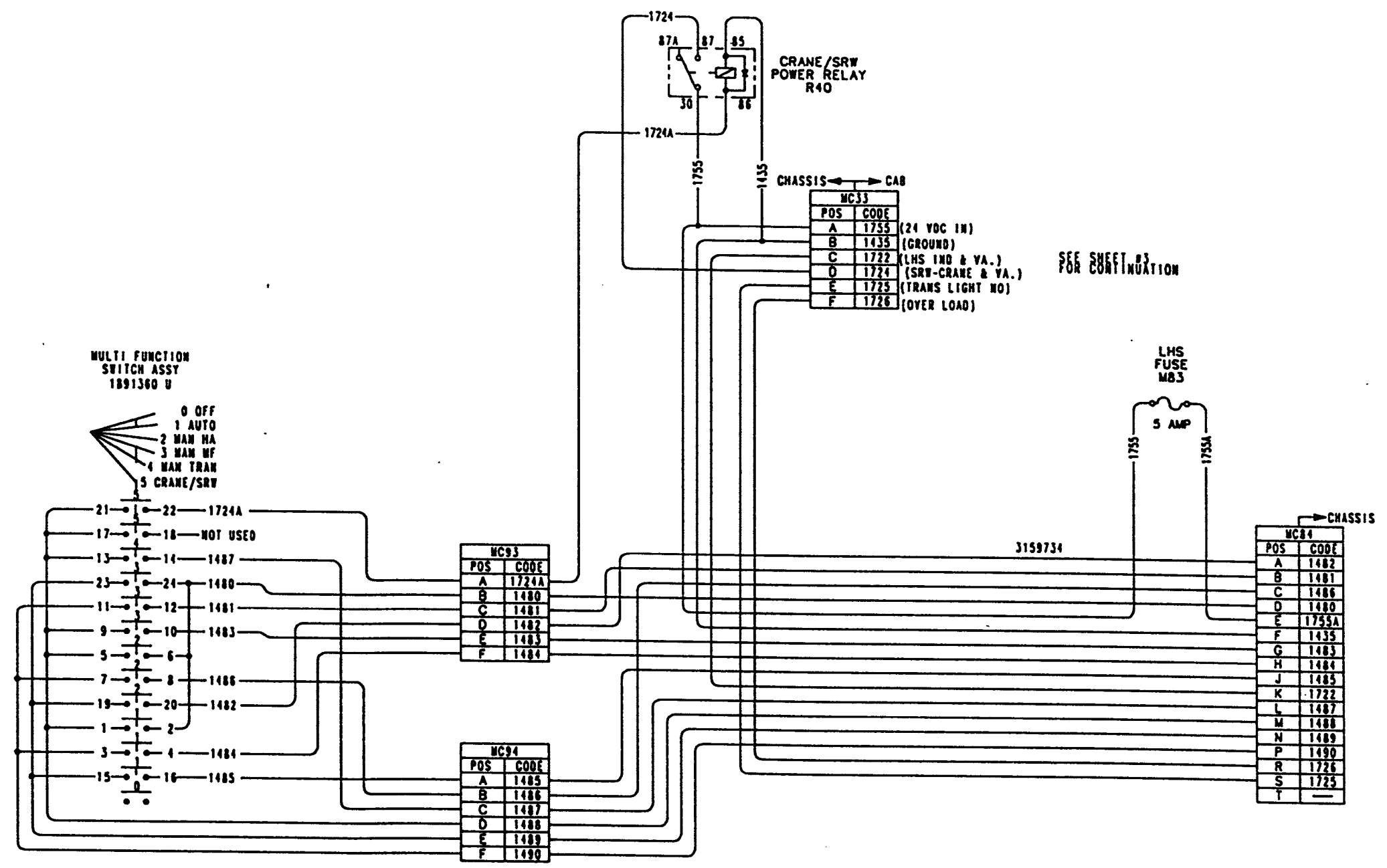


FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC
 FOLDOUT 25 OF 26
 ENGINEERING DWG 3053493 SHEET 9
 FP-49/FP-50 BLANK



FOR LHS CIRCUIT PROTECTION CONFIGURATION

FIGURE FO-1. ELECTRICAL SYSTEM SCHEMATIC FOLDOUT 26 OF 26 ENGINEERING DWG 3053493 SHEET 10 FP-51/FP-52 BLANK

By Order of the Secretary of the Army:

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

Official:



SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0525711

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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).	
	0004 00-2	4-7				Wrong POC is listed. <div style="border: 1px solid black; padding: 20px; text-align: center; font-size: 48px; font-weight: bold; transform: rotate(-10deg);">SAMPLE</div>	
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
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PUBLICATION NUMBER TM 9-2320-364-34-2	DATE 30 November 2005	TITLE Palletized Load System, Models M1074/M1075
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).	
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).	
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PUBLICATION NUMBER TM 9-2320-364-34-2	DATE 30 November 2005	TITLE Palletized Load System, Models M1074/M1075
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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
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RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
For use of this form, see AR 25-30; the proponent agency is ODISC4.							
TO: (Forward to proponent of publication or form) (Include ZIP Code) AMSTALC-LPIT / 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 TM 9-2320-364-34-2						DATE 30 November 2005	TITLE Palletized Load System, Models M1074/M1075
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).	
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	

TO: <i>(Forward direct to addressee listed in publication)</i> AMSTALC-LPIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
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PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 9-2320-364-34-2	DATE 30 November 2005	TITLE Palletized Load System, Models M1074/M1075
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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.)*

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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

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches.....	Centimeters.....	2.540
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.....	29.573
Pints.....	Liters.....	0.473
Quarts.....	Liters.....	0.946
Gallons.....	Liters.....	3.785
Ounces.....	Grams.....	28.349
Pounds.....	Kilograms.....	0.454
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

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters.....	Inches.....	0.394
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
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

